
**User's
Manual**

**Voltage Fluctuation/Flicker
Measurement Software
for WT5000
(IEC 61000-3-3 Compliant)**

Harmonic/Flicker Measurement Software for WT5000 consists of the following software applications.

- IEC 61000-3-2 Harmonic Measurement Software
- IEC 61000-3-3 Voltage Fluctuation and Flicker Measurement Software
- IEC 61000-3-11 Voltage Fluctuation and Flicker Measurement Software
- IEC 61000-3-12 Harmonic Measurement Software

Of these applications, this user's manual explains the handling precautions, features, and operating procedures of the **IEC 61000-3-3 Voltage Fluctuation and Flicker Measurement Software**. To ensure correct use, please read this manual thoroughly before beginning operation.

After reading this manual, keep it in a safe place for quick reference in the event that a question arises.

The manuals for the Harmonic and Flicker Measurement Software for WT5000 are listed on the next page. Please read all manuals.

For information about the handling precautions, functions, and operating procedures of WT5000 Precision Power Analyzer and the Harmonic Measurement Software as well as the handling and operating procedures for Windows, see the manuals for those products.

Notes

- The contents of this manual are subject to change without prior notice as a result of continuing improvements to the instrument's performance and functions. The figures given in this manual may differ from those that actually appear on your screen.
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Revisions

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Manuals

The following manuals, including this one, are provided as manuals for the **Harmonic/Flicker Measurement Software for WT5000**. The manuals explain the handling precautions, features, and how to operate each software.

PDF Data of Manuals

The downloaded zip file contains the following PDF data files. The zip file also contains Japanese manuals.

File Name	Manual Title	Manual No.
IEC61000-3-2 Users Manual.pdf	Harmonic Measurement Software for WT5000 (IEC 61000-3-2 Compliant) User's Manual	IM D024-01EN
IEC 61000-3-3 Users Manual.pdf	This manual. Voltage Fluctuation/Flicker Measurement Software for WT5000 (IEC 61000-3-3 Compliant) User's Manual	IM D024-02EN
IEC 61000-3-11 Users Manual.pdf	Voltage Fluctuation/Flicker Measurement Software for WT5000 (IEC 61000-3-11 Compliant) User's Manual	IM D024-03EN
IEC 61000-3-12 Users Manual.pdf	Harmonic Measurement Software for WT5000 (IEC 61000-3-12 Compliant) User's Manual	IM D024-04EN

Online Help

The above user's manuals are incorporated in the software as help files. For instructions on how to use the help feature, see section 12.3.

* You can also view the WT5000 User's Manual from the online help.

Manual Title	Manual No.
WT5000 Precision Power Analyzer Features Guide	IM WT5000-01EN
WT5000 Precision Power Analyzer User's Manual	IM WT5000-02EN
WT5000 Precision Power Analyzer Getting Started Guide	IM WT5000-03EN
WT5000 Precision Power Analyzer Communication Interface User's Manual	IM WT5000-17EN

Notes about Using This Software

Notes on Using the Software

- To allow a WT5000 to communicate with a PC through the WT5000's USB interface, a USB driver must be installed in the PC. When you install the software in the PC, the USB driver can also be installed.
- Do not operate the WT5000 while using this software. Doing so may cause errors.
- The software may not be able to continue if the PC enters standby or hibernation mode. Disable standby and hibernation modes when you use the software.
- This software can only control one WT5000 at a time. Also, it cannot connect multiple PCs to the same WT5000.
- If a connection error disrupts the connection between the WT5000 and the PC, turn the WT5000 OFF and then ON again.

How to Use This Manual

Structure of the Manual

This user's manual consists of the following sections.

Chapter	Title	Description
1	Product Overview	Explains the software's features and the details of its applicable standards.
2	Preparation before Use	Explains how to connect the WT5000 to a PC and how to install this software.
3	Starting and Using the Software	Explains how to start the software and describes the main window.
4	Using the Start and Exit Pages	Explains how to select a test schedule menu and how to close the software.
5	Using the Open Page to Load Measured Data and Setting Information	Explains how to load setting information and measured data.
6	Using the Connection Page to Establish a Connection between the PC and a WT5000	Explains how to establish a connection between the WT5000 and a PC.
7	Using the Setting Page to Configure Measurement and Judgment Conditions	Explains how to set general test conditions.
8	Using the Measure Page to Make Measurements	Explains how to execute a compliance test.
9	Using the Analysis Page to Display Judgment Results and Measured Data	Explains how to display judgment results and measured data.
10	Using the Print Page to Print Reports	Explains how to print a report.
11	Using the Save Page to Save Setting Information and Measured Data	Explains how to save setting information and measured data.
12	Other Features	Explains how to arrange windows, use the help function, and display the software's version information.
13	Troubleshooting	Lists various error messages.
14	Specifications	Lists the specifications of the software.
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Software Versions That This Manual Applies To

This manual applies to **IEC 61000-3-3 Voltage Fluctuation and Flicker Measurement Software** versions 6.61 or later. If you are using an older version, you will not be able to use all of the features described in this manual.

The software version is displayed in the upper right of this software's window. For details, see sections 3.2 and 12.4.

Software License Agreement

Yokogawa Test & Measurement Corporation

Harmonic/Flicker Measurement Software for WT5000 Software License Agreement

Important: Read the following terms and conditions carefully.

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Article 4: Limitation of Liability

YOKOGAWA will not be held liable for any damages incurred in relation to This Software.

Article 5: Court with Jurisdiction

Should a dispute arise as a result of using This Software or in regards to this license agreement, both parties agree to discuss the issue in good faith. If an agreement cannot be reached, the Tokyo District Court shall be the exclusive agreement jurisdictional court of the first hearing.

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1.1 Explanation of Functions

The Voltage Fluctuation and Flicker Measurement Software can measure the voltage fluctuations and flickers produced by electrical equipment according to IEC standards (for an overview, see section 1.3) and display and save the judgment results.

Applicable Measurement Instruments

This software is dedicated to YOKOGAWA's WT5000 Precision Power Analyzers.

For the handling precautions, features, and operating procedures of the WT5000, see the WT5000 User's Manual.

This user's manual (IMD024-02EN) describes the case when this software is used in combination with the WT5000 (hereinafter referred to as the WT).

Applicable Standard

For the applicable standards, see section 1.3.

Setting Up Test Schedule Menus

You can arrange the following steps as you like to create custom test schedule menus.



Start: Select and edit test schedule menus.



Open: Load measured data and WT setting information files.



Connection: Configure the connection between the PC and a WT.



Setting: Set compatibility and measurement conditions.



Measure: Measure voltage fluctuation and flicker.



Analysis: Display measured results as bar and trend graphs.



Print: Print screen images and reports.



Save: Save measured data and setting information files.



Exit: Close the software.

1.1 Explanation of Functions

You can start this software and then operate it according to the order of one of the test schedule menus. By designing appropriate menus, you can make the testing process smoother. You can also avoid forgetting and skipping steps when you have to repeat the same process over and over again.

Here are more details about each step:

Start



Use to select and edit test schedule menus. There are four preset standard test schedule menus available, in addition to custom test schedule menus that you can make yourself (located under the "User Setting" option button).

Open



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 the software. The software application shows the numeric data and judgment, trend graph view, and CPF graph view.* The software application can judge whether the measured data loaded offline conforms to the standard.

* Valid only for normal voltage fluctuation and flicker measurement.

Loading Setting Information

You can load setting information files that contain information such as measurement conditions, judgment conditions, and report titles and comments (reports contain information such as judgment results and lists of measured data values).

Connection



Use to connect the PC on which this software is installed to a WT through a USB, GP-IB, or Ethernet interface.

Setting



WT Measurement Conditions

Use to set WT measurement conditions such as the range to be measured and the line filter.

WT Judgment Conditions

Use to set the IEC 61000-3-3 voltage fluctuation and flicker measurement standards to be used for judgment.

Edition Settings for IEC 61000-3-3

IEC 61000-3-3 specifies voltage fluctuation and flicker. You can set the IEC 61000-3-3 edition from 2.0 or 3.0.

Note

This manual explains the case when the IEC61000-3-3 edition number is set to Ed3.0. If you set the edition number to Ed2.0, read "Tmax" as "d(t)" in the following explanations.

Edition Settings for IEC 61000-4-15

IEC 61000-4-15 specifies requirements for measurement instruments. You can set the IEC edition from the following. This setting affects the flicker measurement parameters of the WT.

Edition No. of the IEC 61000-4-15	Flicker Measurement Parameters of the WT			
	50 Hz		60 Hz	
	230 V	120 V	120 V	230 V
Edition 1.1	Yes	No	Yes	No
Edition 2.0	Yes	Yes	Yes	Yes

For more details, see chapter 14.

Measure



Measurement Modes

There are two voltage and flicker measurement modes.

- **Normal Voltage Fluctuation and Flicker Measurement**

In this mode, the software calculates all voltage and flicker values: dc, dmax, Tmax, Pst, and Plt. It makes an overall judgment by comparing the calculated values with the set limits.

- **Measurement of dmax Caused By Manual Switching**

The software measures the maximum relative voltage change, dmax, when the EUT (equipment under test) is turned ON and OFF manually. After the EUT has been turned ON and OFF 24 times, the software makes a judgment by comparing the average dmax with the set limit.

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 Tmax
 - Short-term flicker value Pst
 - Long-term flicker value Plt
 - Instantaneous flicker sensation IFS*
 - Cumulative probability function CPF
- * Displayed as PF on the trend graph

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 judgment 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 overall judgment result from the data measured during all observation periods and judgment results. You can also abort the measurement from the PC before the specified measurement count is reached.

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 judgment. When 24 measurements are completed and you execute the judgment, the judgment 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 judgment results up to that point are discarded.

Analysis



Numeric Data and Judgment

The application can display the judgment result indicating whether the measured data of normal voltage fluctuation and flicker measurement or measurement of d_{max} caused by manual switching is within the specified limits as well as the measured data. The judgment 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: d_c , d_{max} , T_{max} , i_{dc} , i_{dmax} , iT_{max} , and PF.

CPF Graph View

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

Print



You can attach comments and titles to a list of measured voltage fluctuation and flicker values and print and then save the list to .pdf or .bmp files or print the list as a report.

Save



Saving Setting Information

You can save setting information, such as measurement conditions, judgment conditions, and report titles and comments, to an .ini file (reports contain information such as judgment results and lists of measured data values.).

Saving Measured Data

You can use this software to save the measured data that the PC has acquired from the WT to an .fdt file. When you save a measured data file, an .ini setting information file is also saved.

Saving a Report in CSV Format

You can save report files in CSV format. This software cannot load CSV files, but you can use another program that can load CSV files to view the report data.

Exit



Use to close the software.

Online Mode and Offline Mode

Online Mode

The software is in online mode when the PC is connected to the WT through a USB, GP-IB, or Ethernet interface. The software must be in online mode to acquire voltage fluctuation and flicker data from the WT as it is measuring. You can switch to Online mode from the Connection page. In online mode, you can change the WT settings from the PC.

Offline Mode

You can load previously saved measured voltage fluctuation and flicker data into the software. You can use the loaded data to display numerical judgments, trend graphs,* and CPF graphs.*

* Valid with general voltage fluctuation and flicker measurement.

1.2 PC System Requirements

PC

CPU: Dual core or more processor
 Memory: 2 GB or more recommended
 Storage: 10 GB free space or more

Operating System

English version of Windows 8.1 or Windows 10

Communication Card

USB

A USB port that supports USB Revision 1.1 or higher

GP-IB

NI (National Instruments)

	OS	
	Windows 8.1	Windows 10
	Version of the driver NI-488.2	
PCI-GPIB	3.1.0 or later	15.5.0 or later
PCI-GPIB+		
PCIe-GPIB		
PCIe-GPIB+		
GPIB-USB-HS		
GPIB-USB-HS+	14.0 or later	

Ethernet

An Ethernet port that supports 10BASE-T, 100BASE-TX, or 1000BASE-T

Display and Mouse

Display Resolution: 1366 × 768 dots or higher
 Operating System: Operating system mentioned above

WT5000

WT firmware version 2.01 or later with the following functions.

- IEC Harmonic/Flicker measurement feature (/G7 option)
- USB, GP-IB, or Ethernet interface (standard)

WT Firmware Versions and Selectable IEC 61000 Edition Numbers

The following edition numbers can be selected in firmware version 2.01 and later.

Edition No. of the IEC 61000-3-3

- Edition 2.0 (Ed2.0)
- Edition 3.0 (Ed3.0)

Edition No. of the IEC 61000-4-15

- Edition 1.1 (Ed1.1)
- Edition 2.0 (Ed2.0)

IEC 61000-4-15 specifies requirements for measurement instruments.

For details, see chapter 14.

1.3 Applicable Standards

The software application supports the following standards.

Voltage Fluctuation and Flicker Suppression Standards

- IEC 61000-3-3 Edition 2.0:2008, IEC 61000-3-3 Edition 3.0:2013
- EN 61000-3-3:2008, EN 61000-3-3:2013

Flicker Meter Function and Design Specifications

- IEC 61000-4-15 Edition 1.1:2003, IEC 61000-4-15 Edition 2.0:2010
- EN 61000-4-15:1998/A1:2003, EN 61000-4-15:2011

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

Scope

The limits of the IEC 61000-3-3 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 2.0 or Edition 3.0 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. For edition 2.0, 230 V/60 Hz and 120 V/50 Hz are additionally supported. However, IEC 61000-3-11 edition 2.0 or edition 3.0 does not define limits for 120 V/60 Hz, 230 V/60 Hz, or 120 V/50 Hz.

Measurement Items and Limits in IEC 61000-3-3 Edition 2.0 or Edition 3.0

Measurement Item	Limit
Relative steady-state voltage change dc	3.3% or less
Maximum relative voltage change dmax	4% or less (no conditions)* 6% or less (condition 1)* 7% or less (condition 2)*
Period during which relative voltage change exceeds 3.3% Tmax (IEC 61000-3-3 Edition 3.0) d(t) (IEC 61000-3-3 Edition 2.0)	500 ms or less
Short-term flicker value Pst	1.0 or less
Long-term flicker value Plt	0.65 or less

* For the conditions, see the figure below.

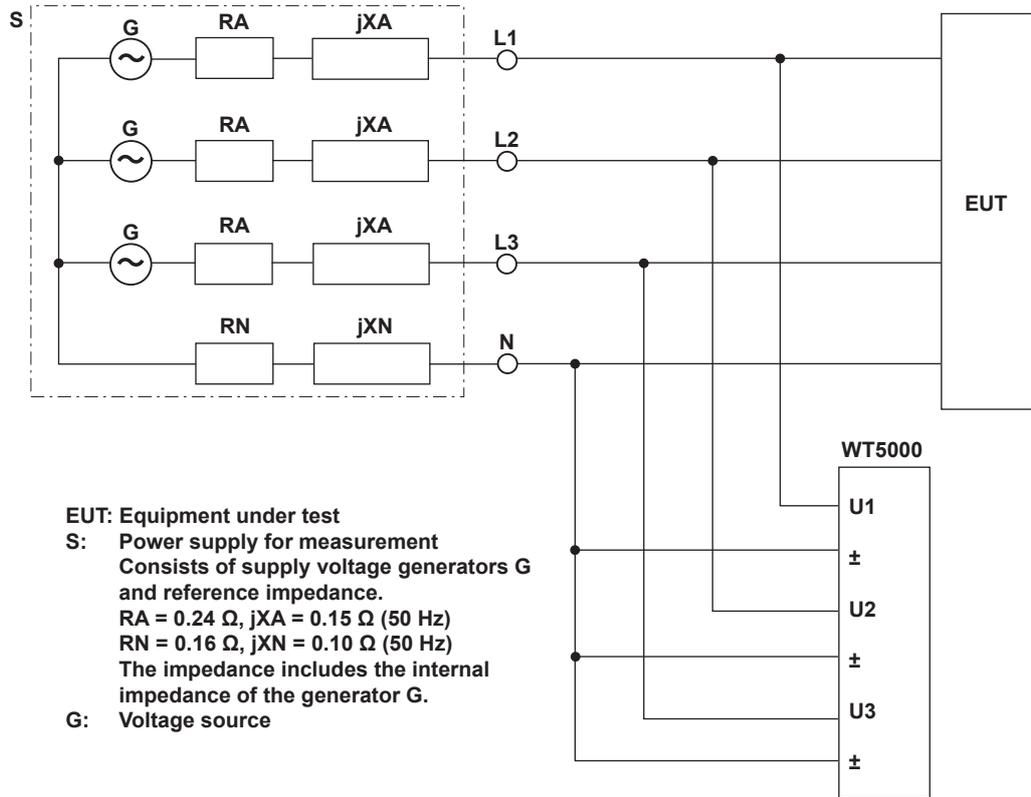
Conditions for the Limit on Maximum Relative Voltage Change dmax

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



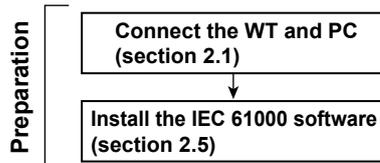
L2 and L3 are not connected if the wiring system is single-phase, two-wire.

1.4 Flow of Operation

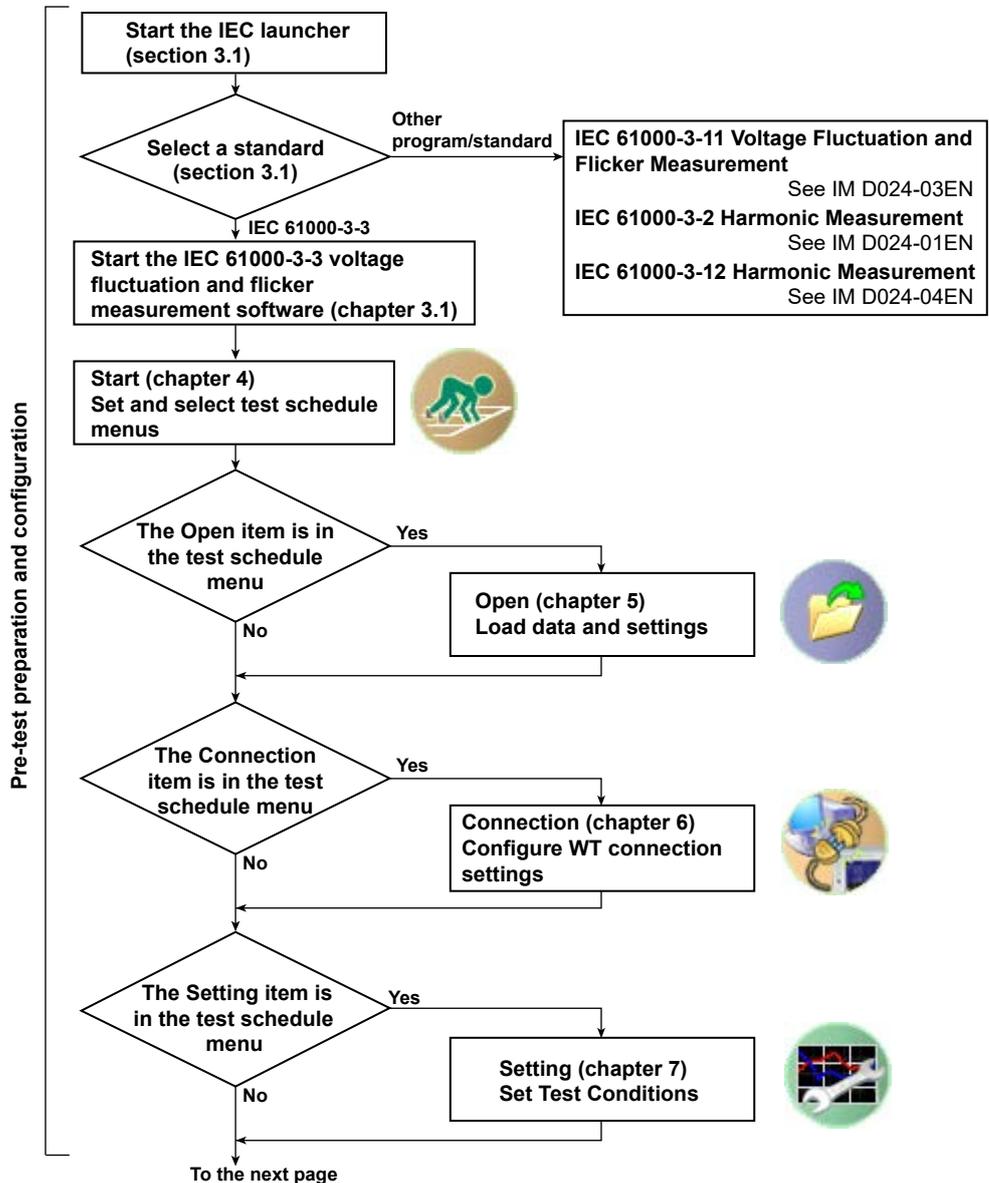
To display and judge the voltage fluctuation and flicker measurement data using this software, the WT and PC must be connected, the harmonic/flicker measurement software for WT5000 (IEC 61000 software) must be installed, WT measurement conditions must be set, and judgment conditions of the applicable standard must be set. Follow the steps below.

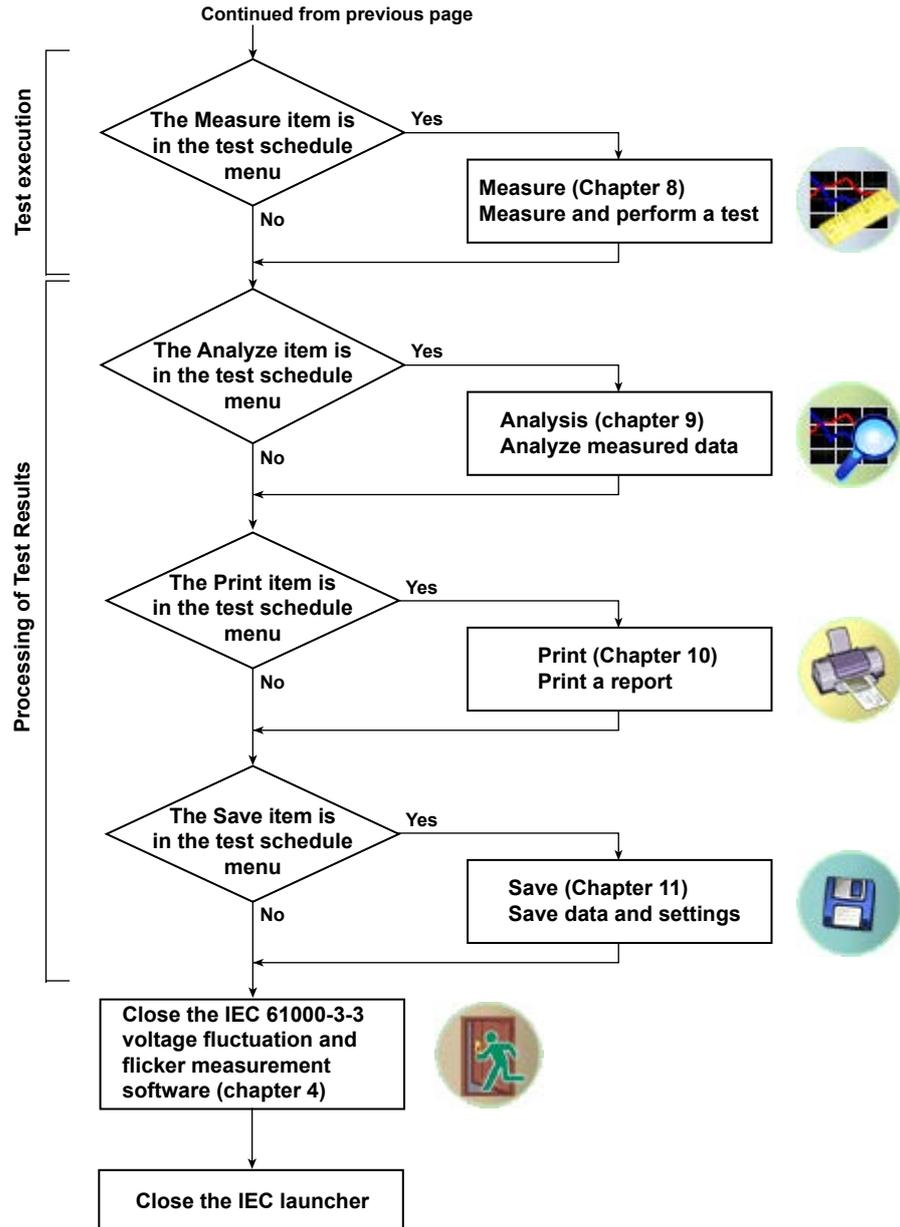
The available communication interfaces for connecting the WT to the PC are USB, GP-IB, and Ethernet.

Preparation Flow Chart



Test Flowchart





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.

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

Note

- If no voltage fluctuation occurs on the WT in the measurement period, dc is zero.
- If a steady-state condition does not occur during the measurement period on the WT, it is considered to be a fluctuating condition. The measured value of dc is displayed as follows.
 - Undef (undefined, IEC 61000-4-15 Ed1.1)
 - 0 (IEC 61000-4-15 Ed2.0)
 And the judgment is displayed as follows.
 - Error (IEC 61000-4-15 Ed1.1)
 - Pass (IEC 61000-4-15 Ed2.0)

Maximum Relative Voltage Change dmax

• For IEC 61000-4-15 Ed1.1

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

• For IEC 61000-4-15 Ed2.0

The absolute value of the difference between the maximum value and the value in the previous steady-state condition is compared with the absolute value of the difference between the minimum value and the value in the previous steady-state condition in a single voltage fluctuation.* dmax is the value obtained by dividing the larger of the two values by the rated voltage expressed as a percentage.

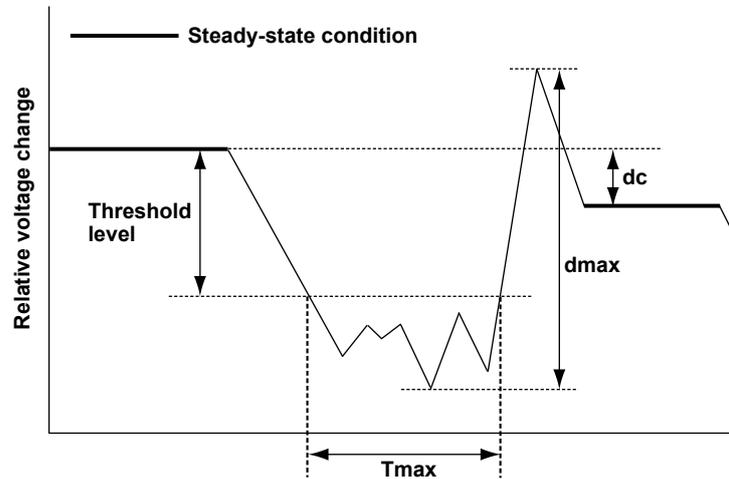
* Condition between two steady-state conditions.

Period during Which Relative Voltage Change Exceeds the Threshold Level Tmax

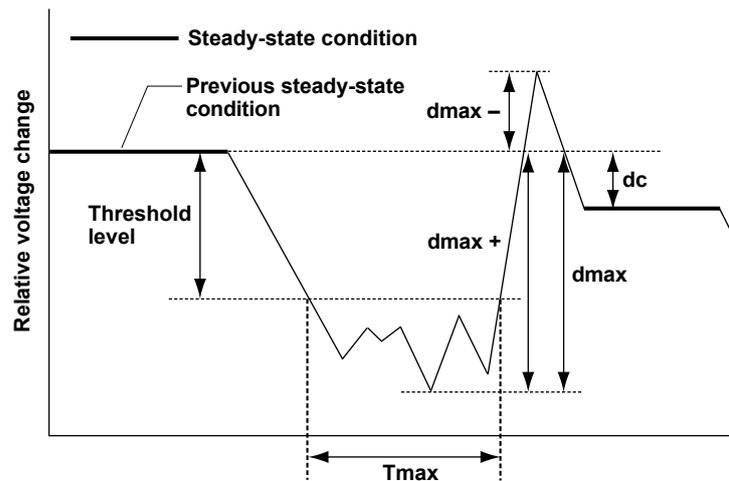
The time during which the relative voltage change during a voltage fluctuation period exceeds the threshold level.

Relationship between dc, dmax, and Tmax

- For IEC 61000-4-15 Ed1.1



- For IEC 61000-4-15 Ed2.0



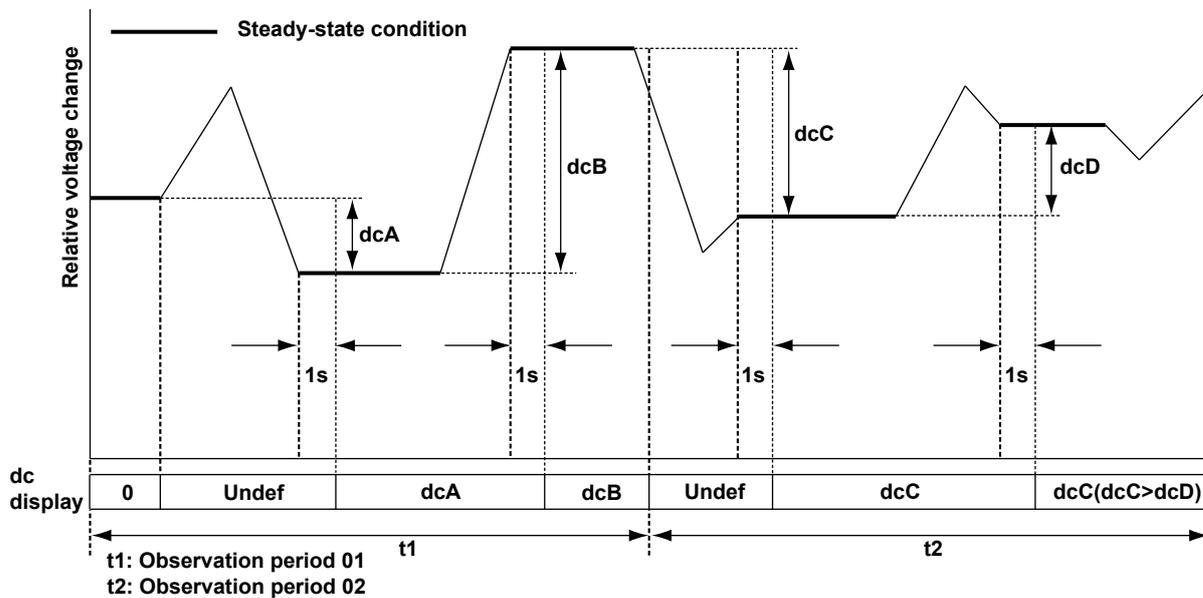
dmax +: The difference between the minimum value and the value in the previous steady-state condition

dmax -: The difference between the maximum value and the value in the previous steady-state condition

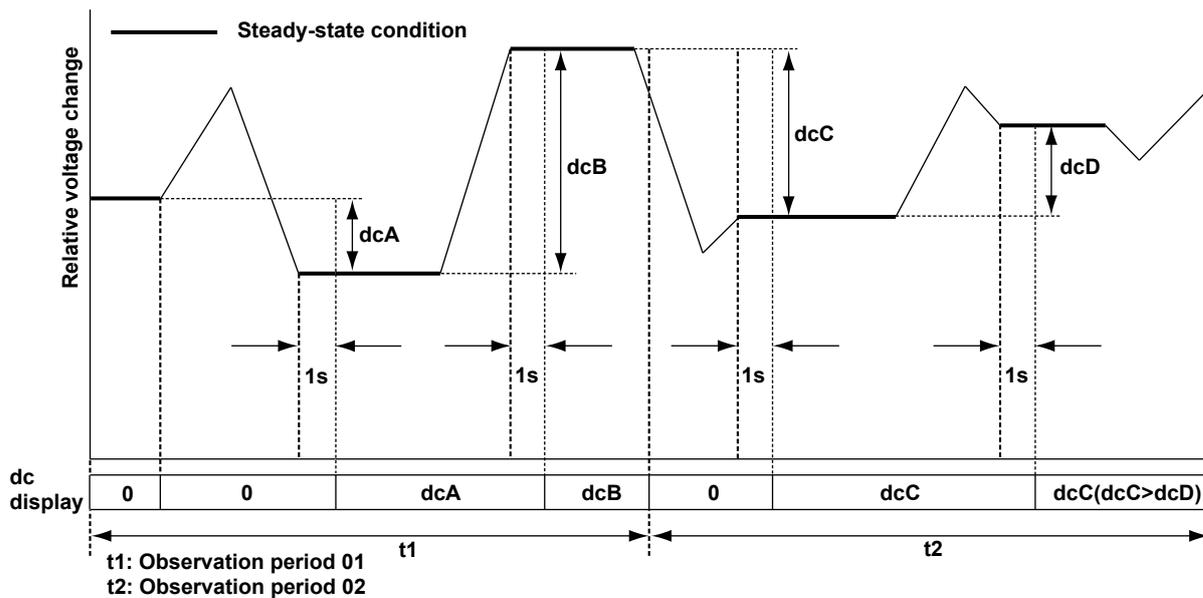
dmax: The larger of the absolute values of dmax + and dmax -

Display Example of dc

• For IEC 61000-4-15 Ed1.1



• For IEC 61000-4-15 Ed2.0



1.5 Terminology Related to Flicker

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 1st 10 minutes

Pst₂: Pst of the 2nd 10 minutes

:

Pst₁₂: Pst of the 12th 10 minutes

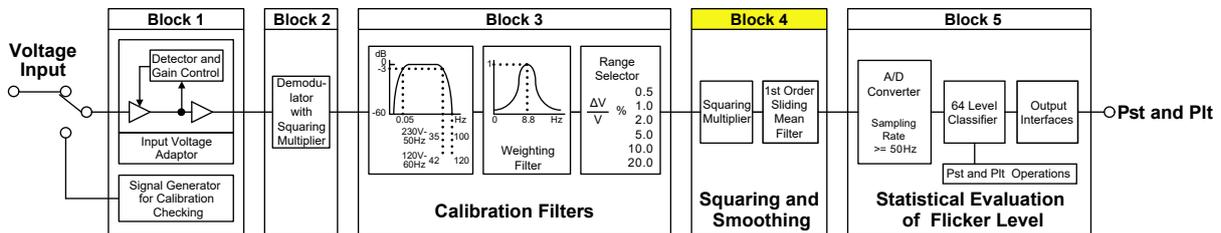
Note

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.

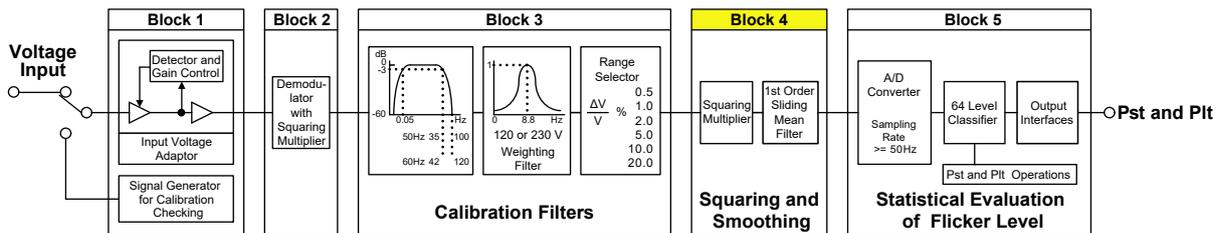
Instantaneous Flicker Sensation IFS

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



Block Diagram of the Flicker Meter in IEC 61000-4-15 Edition 2.0



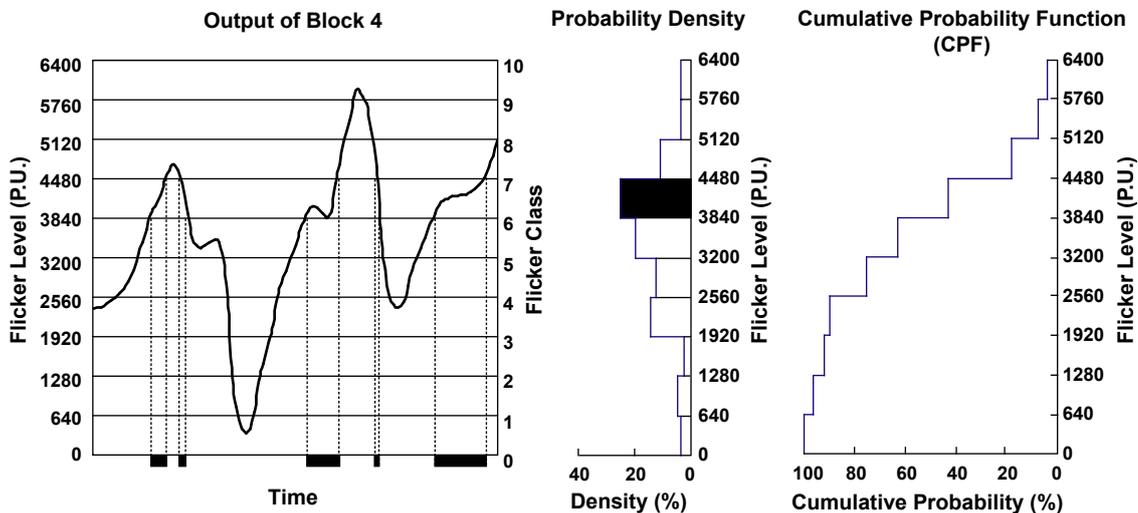
Note

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

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

2.1 Connecting the WT5000 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.

French

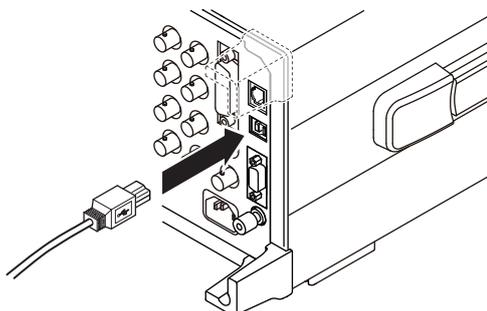
ATTENTION

Toujours mettre le PC et le WT hors tension avant de brancher ou de débrancher des câbles de communication, pour éviter tout dysfonctionnement ou panne du circuit interne.

When Controlling the WT through the USB

Connect the USB port for PCs (type B connector) on the rear panel of the WT to the PC. For details on the connection procedure and the specifications of the USB interface, see the WT main unit user's manual.

- Sections 2.2 and 2.3 in the Communication Interface User's Manual (IM WT5000-17EN)



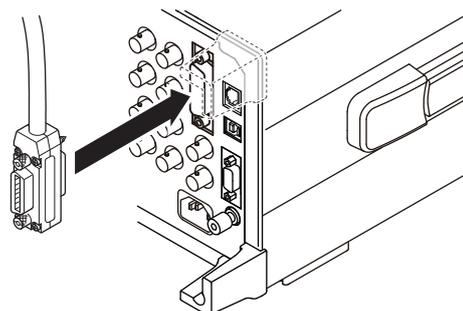
When Controlling the WT through the GP-IB

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 WT main unit user's manual.

- Sections 3.2 and 3.3 in the Communication Interface User's Manual (IM WT5000-17EN)

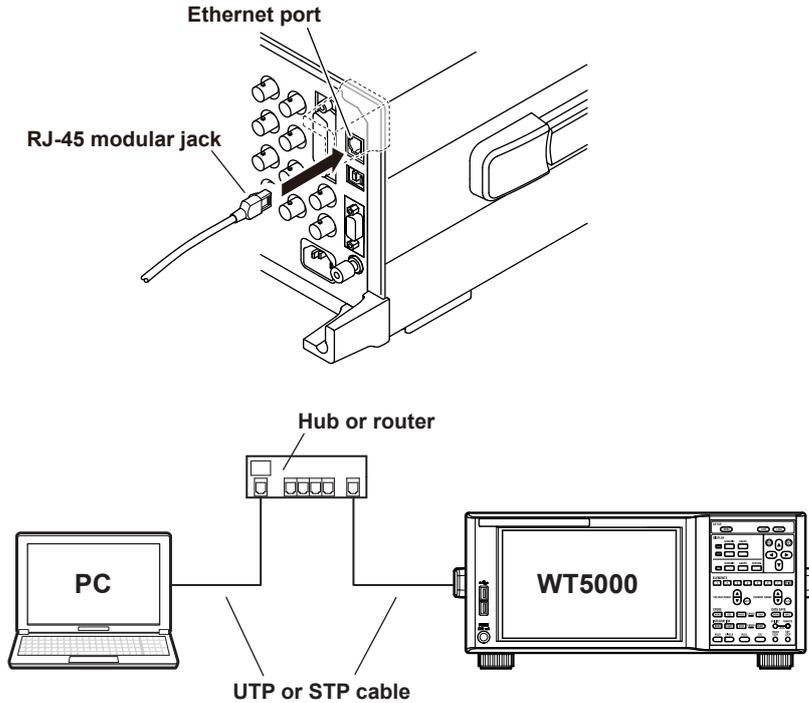
Use an appropriate connector for your PC to connect the other end of the GP-IB cable.



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 WT main unit user's manual.

- Sections 1.2 and 1.3 in the Communication Interface User's Manual (IM WT5000-17EN)



Note

- Use a cable, hub, or router that supports the data rate of your 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 USB Control

Procedure

Starting the WT5000

1. Turn on the WT5000 power switch to start the WT5000.
For details on how to turn on the power switch, see in the WT5000 Getting Started Guide (IM WT5000-03EN).

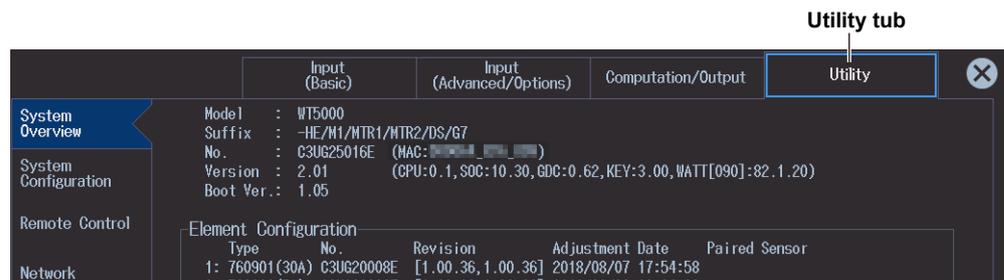
Utility Settings Overview (Utility)

You can display the remote control setting screen from the utility settings overview screen. The utility settings overview screen can be opened mainly using the following two methods.

- * For information about the utility settings overview screen, see section 1.4 in the User's Manual, IM WT5000-02EN.

Procedure Using the Setup Menu

1. Tap the **Setup** icon (), or press **MENU** under SETUP.
2. Tap the **Utility** tab. The utility settings overview screen appears.

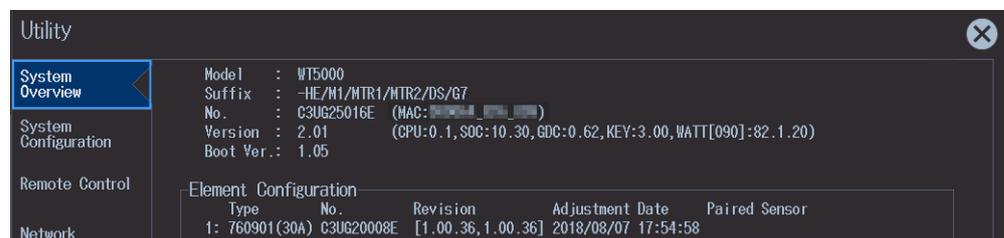


Note

You can also display the utility settings overview screen by moving the cursor on the Utility tab using the arrow keys and then pressing SET.

Procedure Using the UTILITY Key

1. Press **UTILITY** on the front panel. The utility settings overview screen appears.

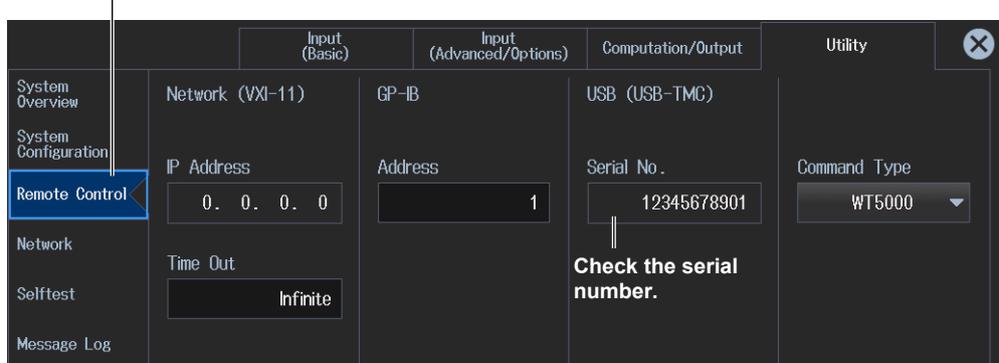


2.2 Setting the USB Control

Checking the Serial Number

Check that the serial number used for USB TMC communication is displayed under Serial No.

Configure remote control.



Explanation

Each device that is connected through USB has its own unique ID in the USB system. This ID is used to distinguish between different devices. When you connect the WT to the PC, make sure that the WT ID does not overlap with those of other devices.

Note

- Refer to section 2.5, and install YOKOGAWA's USB driver in the PC.
- When you connect a WT to the PC and use the software to control the WT, you cannot use multiple types of communication interface at the same time.
- You can connect one WT or multiple WTs to a PC and use the software to control the them.
- 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).

2.3 Setting the GP-IB Control

Procedure

Starting the WT5000

1. Turn on the WT5000 power switch to start the WT5000.

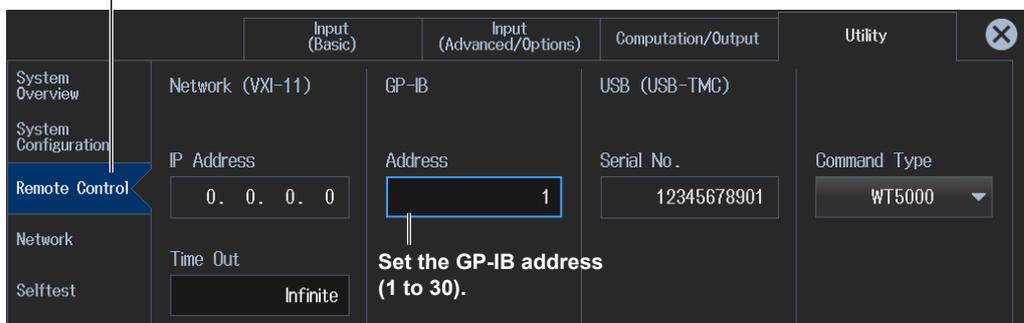
Remote Control Settings (Remote Control)

1. Refer to section 2.2, and open the utility settings overview screen.
2. Tap the **Remote Control** button.
The remote control setting screen (Network (VXI-11), GP-IB, USB (USB-TMC)) appears.

Setting the GP-IB Address

3. Tap **Address**. Use the displayed input box to set the GP-IB address.

Configure remote control.



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).

2.4 Setting the Ethernet Control

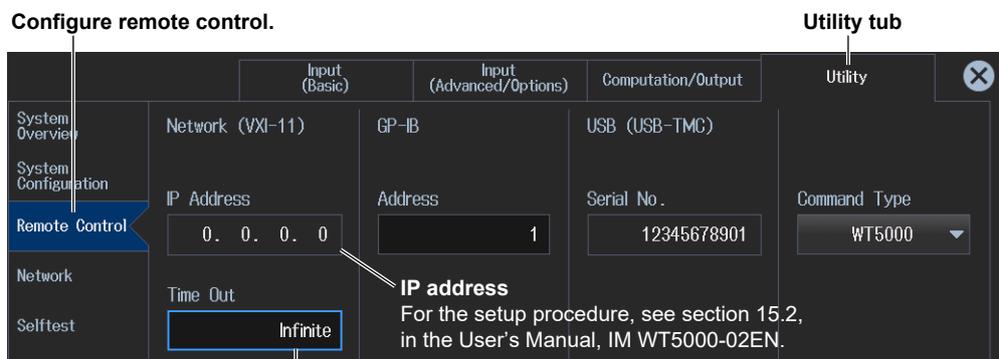
Procedure

Starting the WT5000

1. Turn on the WT5000 power switch to start the WT5000.

Remote Control Settings (Remote Control)

1. Refer to section 2.2, and open the utility settings overview screen.
2. Tap **Remote Control**.
A remote control setup screen (Network (VXI-11/GP-IB/USB (USB-TMC)) appears.
3. Tap **Time OUT**. Use the displayed input box to set the timeout value.

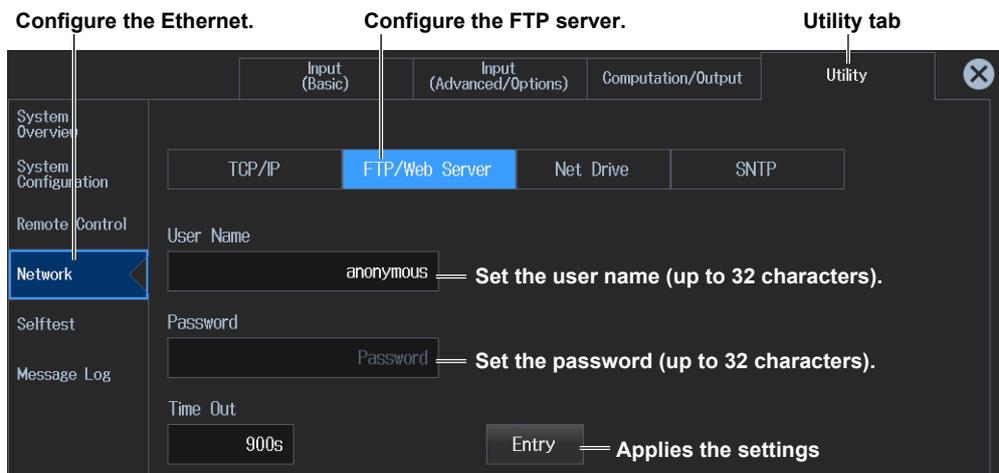


Set the timeout period (Infinite, 1 to 3600 s)

Configure the Ethernet

Setting the User Name and Password

4. Tap **Network**.
An Ethernet setup screen (TCP/IP, FTP Server, Net Drive, SNTP) appears.
5. Tap **FTP/Web Server**. An FTP/Web Server screen appears.
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 TCP/IP

You must enter TCP/IP settings to control the WT from a PC through the network. For the setup procedure, see the following WT user's manual.

- Features Guide (IM WT5000-01EN)
- User's Manual (IM WT5000-02EN)

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 32 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 32 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).

2.5 Installation and Uninstallation

Procedure

Installation

Before installing the software, close all programs that are currently running. If an older version of the Harmonic/Flicker Measurement Software for WT5000 is installed, uninstall it first (see page 2-12).

The following procedure explains how to install the software on Windows 10. The windows that appear will vary depending on the operating system.

Note

A dialog box regarding administrator privileges may appear during the installation. If this happens, follow the message in the dialog box.

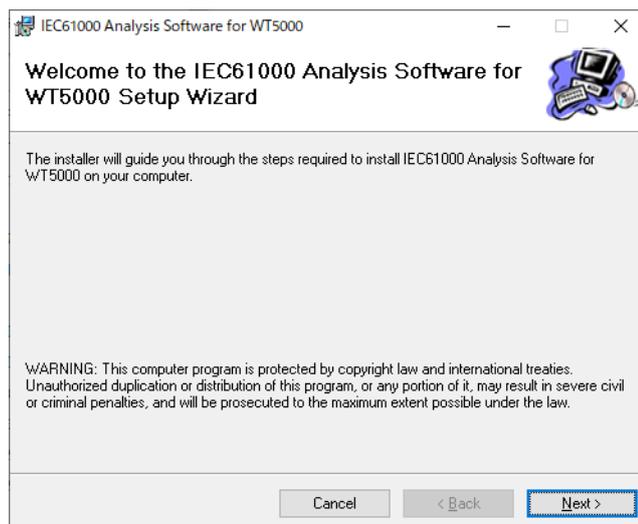
1. Turn on the PC and start Windows.
2. Download the software from the following YOKOGAWA Web page.
<https://tmi.yokogawa.com/support/download-software-drivers-firmware/>
3. Unzip the downloaded file.

Installing Harmonic/Flicker Measurement Software for WT5000

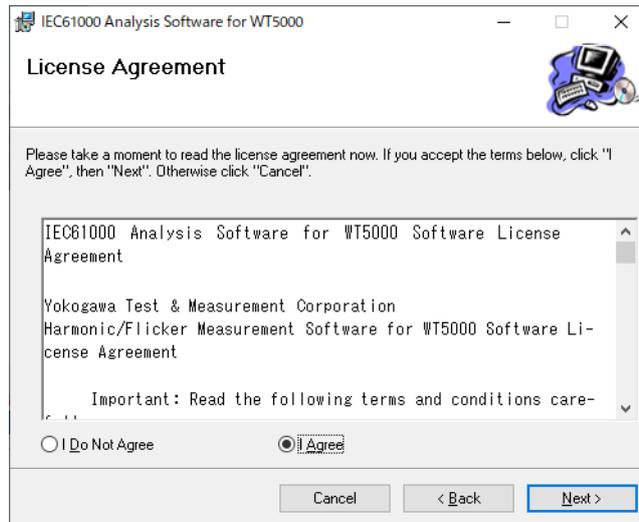
4. Double-click **Installer.exe**.



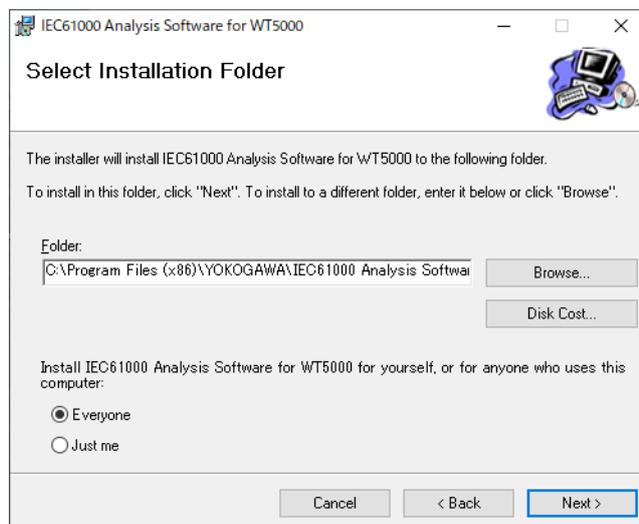
5. The "User Account Control" window will appear. Click **Allow** or **Yes** to continue the installation. The installer starts. Follow the instructions on the screen, and then click **Next**.



6. If you agree with the license agreement, select **I Agree**, and click **Next**. Otherwise, select **I Do Not Agree**. The installation will be canceled.

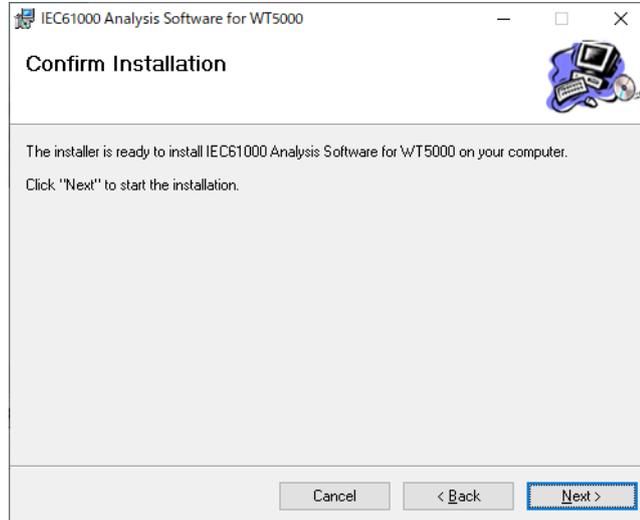


7. Select the installation destination, and click **Next**.
Click **Browse** to specify the destination. The default installation destination is as follows:
- Windows 32-bit version
C:\Program Files\YOKOGAWA\IEC61000 Analysis Software for WT5000
 - Windows 64-bit version
C:\Program Files (x86)\YOKOGAWA\IEC61000 Analysis Software for WT5000

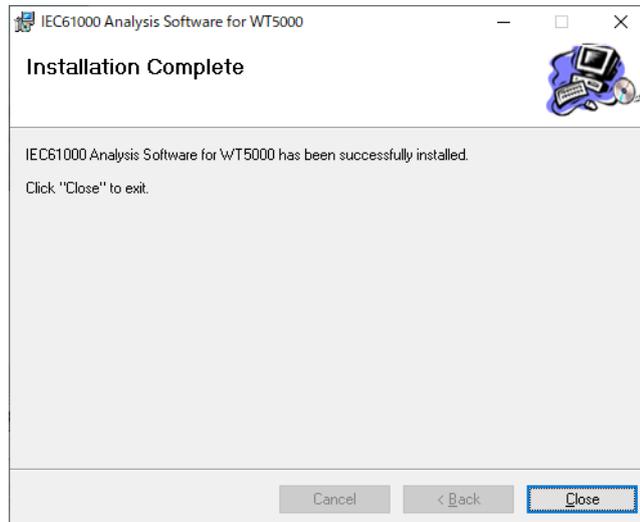


2.5 Installation and Uninstallation

8. A window prompting you to start the installation appears. If the installation settings are okay, click **Next**. The software installation starts.
- Click **Back** if you want to change the installation settings.
- Click **Cancel** to cancel the installation.



9. When the software installation finishes normally, the following window appears. Click **Close** to complete the installation. YOKOGAWA > IEC61000 for WT5000 will be added to the Windows Start menu.



Next, the USB driver (YTUSB) installation wizard starts automatically.

Note

After the installation finishes, a Program Compatibility Assistant window may appear. The installation has been completed successfully, so select **"This program installed correctly"** or **Cancel** to close the window.

Installing USB driver (YTUSB)

1. Click **YTUSB Install**.

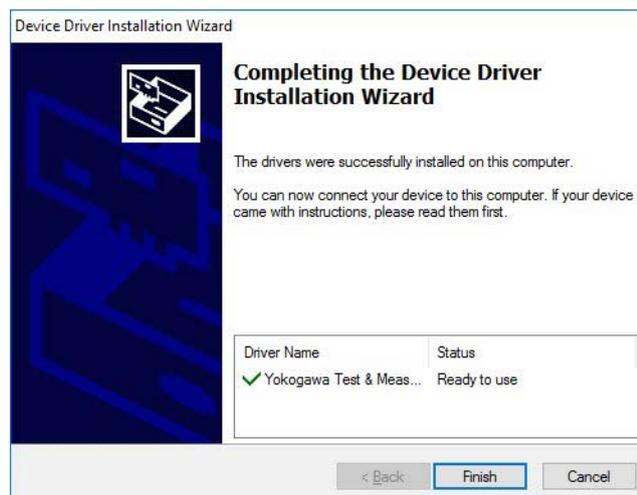


If the “User Account Control” window appears during the installation, click **Allow** or **Yes** to continue the installation.

2. Follow the instructions on the screen, and then click **Next**.

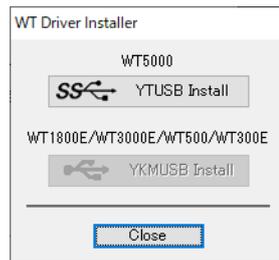


3. When the software installation finishes normally, the following screen appears. Click **Finish** to complete the installation.



2.5 Installation and Uninstallation

4. Click **Close** to complete the installation.



Uninstallation

This section explains how to uninstall the software on Windows 10.

1. On the  (**Start**) menu, click  (**Settings**). The Windows setup window appears.
2. In the Windows setup window, select **Apps**. The Apps window appears.
3. From the items on the left side of the window, select **Apps & features**.

Uninstalling Harmonic/Flicker Measurement Software for WT5000

4. From the list displayed on the right side of the window, select **IEC61000 Analysis Software for WT5000**, and click **Uninstall**.
A window appears for confirming the uninstallation of the selected app and related information.
5. Click **Uninstall**.
6. If the "User Account Control" window appears during the uninstallation, click **Allow** or **Yes** to continue the uninstallation.
7. A uninstallation confirmation window appears.
Click **Yes** to uninstall IEC61000 Analysis Software for WT5000.
Click **No** to cancel.

Uninstalling YTUSB (USB Driver)

4. From the list of apps and features displayed on the right side of the screen, select **Windows driver package and then Yokogawa Test & Measurement Corporation (WinUSB) YTUSB (mm/dd/yyyyx.x.x.x)**, and click **Uninstall**.
The uninstallation will proceed in a similar manner as described above.

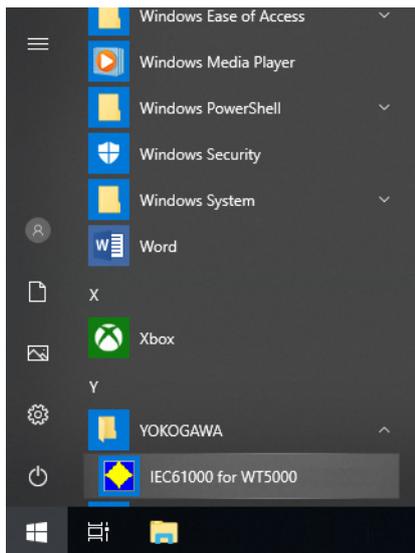
3.1 Starting the Software

Procedure

Starting the Software

1. Choose  (Start) > YOKOGAWA > IEC61000 Analysis for WT5000.

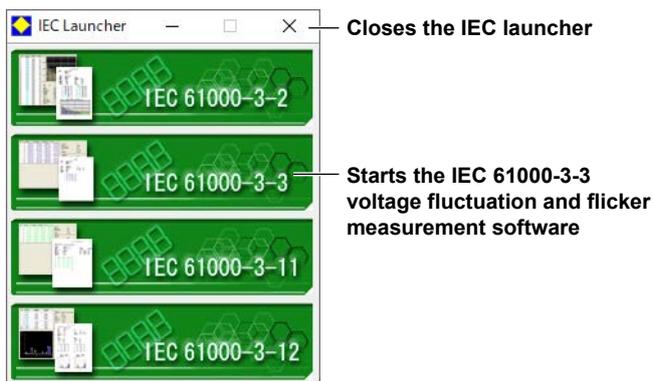
The procedure above applies when the default software installation destination and program folder are used. If you changed the installation destination or program folder at installation, select the corresponding location.



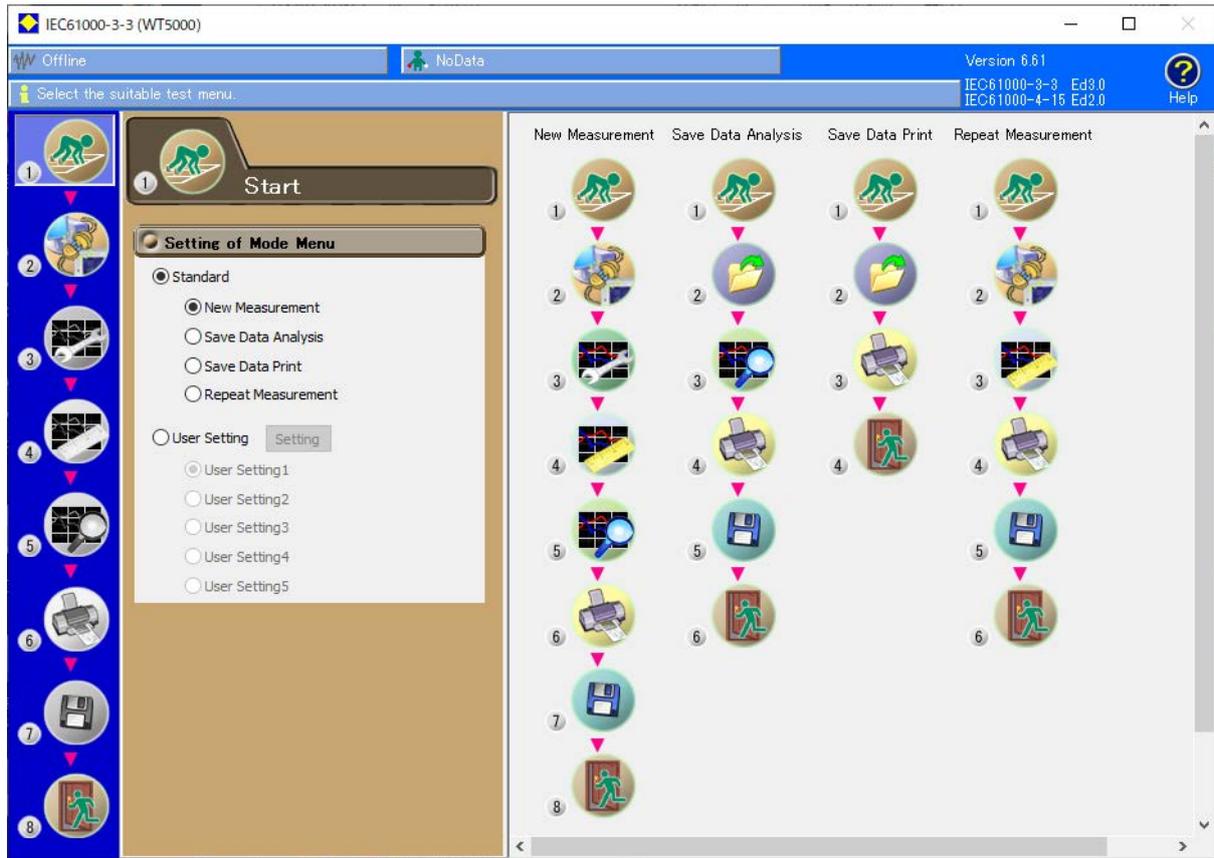
2. The “User Account Control” window will appear. Click **Allow** or **Yes**. The IEC Launcher appears. Use it to select the appropriate standard.

Selecting a Standard

3. Select **IEC 61000-3-3** to open the IEC 61000-3-3 voltage fluctuation and flicker measurement software.



3.1 Starting the Software



Explanation

You can start this software by accessing its shortcut from the start menu's program folder. This software is installed in the location that you specified in the previous chapter.

Selecting a Standard

To measure the voltage fluctuation and flicker of a device with an electric current not greater than 16 A, select **IEC 61000-3-3**. The voltage fluctuation and flicker measurement software will start. If you select a different standard, the program that corresponds to that standard will start. For information about the programs that correspond to other standards, see their user's manuals (the help function, see section 12.3).

3.2 Basic Operations

Information area
Connection status: Online/offline (see chapter 6)

Information bar
Notices appear here.

Judgment results (chapter 8)

Compliance judgment standard number and edition

Software version

Help button (chapter 12)

Menu area
The test schedule menu items, such as Connection, Measure, and Print, appear here. When you click an icon, its submenu appears. Icons that cannot be selected are dimmed.
The currently selected icon is highlighted.

Submenu area
In the Start window, you select the test schedule menu here. In other windows, boxes for configuring the settings of the selected menu item appear here.

Setting and display area
The following types of information are displayed.

- Configuration dialog boxes
- Measurement and judgment results
- Print previews
- Information about loaded or saved files

Menu Area Icons



Start

Use to select and edit test schedule menus. There are four preset standard test schedule menus available, in addition to custom test schedule menus that you can make yourself (located under the "User Setting" option button).



Open

Use to open the following kinds of files:

- Setting information files that contain information such as measurement conditions and judgment conditions.
- Measured data files that contain measured data acquired by the PC from a WT.



Connection

Use to connect the PC to the WT through a USB, GP-IB, or Ethernet interface.



Setting

Use to set measurement and judgment conditions.



Measure

Use to measure voltage fluctuation and flicker. There are two measurement modes.

- Normal voltage fluctuation and flicker measurement (General mode)
- Measurement of dmax caused by manual switching (Manual dmax mode)



Analysis

Use to display measured results in one of the following formats.

- Numerical judgment
- Trend graph
- CPF graph



Print

You can attach comments and titles to a list of measured values and print the list as a report.



Save

Use to save the following kinds of files.

- Setting information files that contain information such as measurement conditions and judgment conditions.
- Measured data files that contain measured data acquired by the PC from a WT.
- CSV files that contain measured data and waveform data.



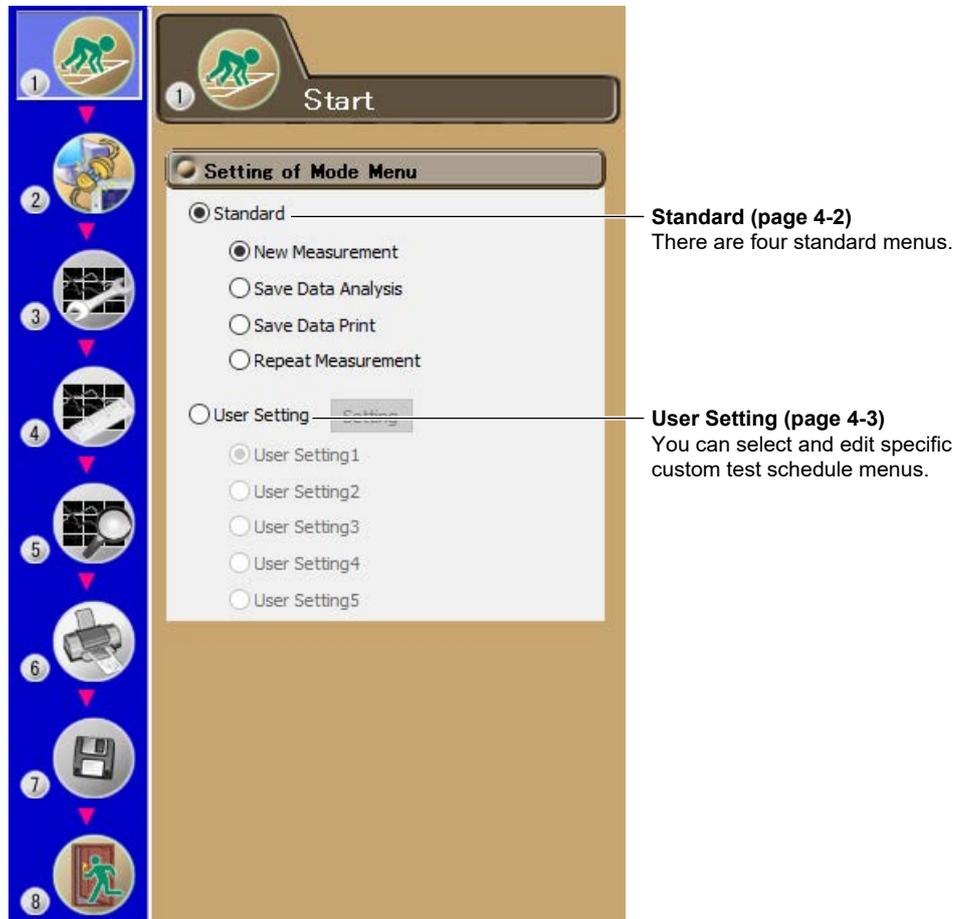
Exit

Use to close the software.

4.1 Selecting a Test Schedule Menu

Procedure

1. Select the  icon in the menu area. The Start submenu appears.



4.1 Selecting a Test Schedule Menu

Selecting One of the Standard Test Schedule Menus

2. Click **Standard**.
3. Select one of the following test schedule menus. The icons representing the steps that are included in the menu that you select will appear in the menu area on the left.
 - New Measurement
 - Save Data Analysis
 - Save Data Print
 - Repeat Measurement

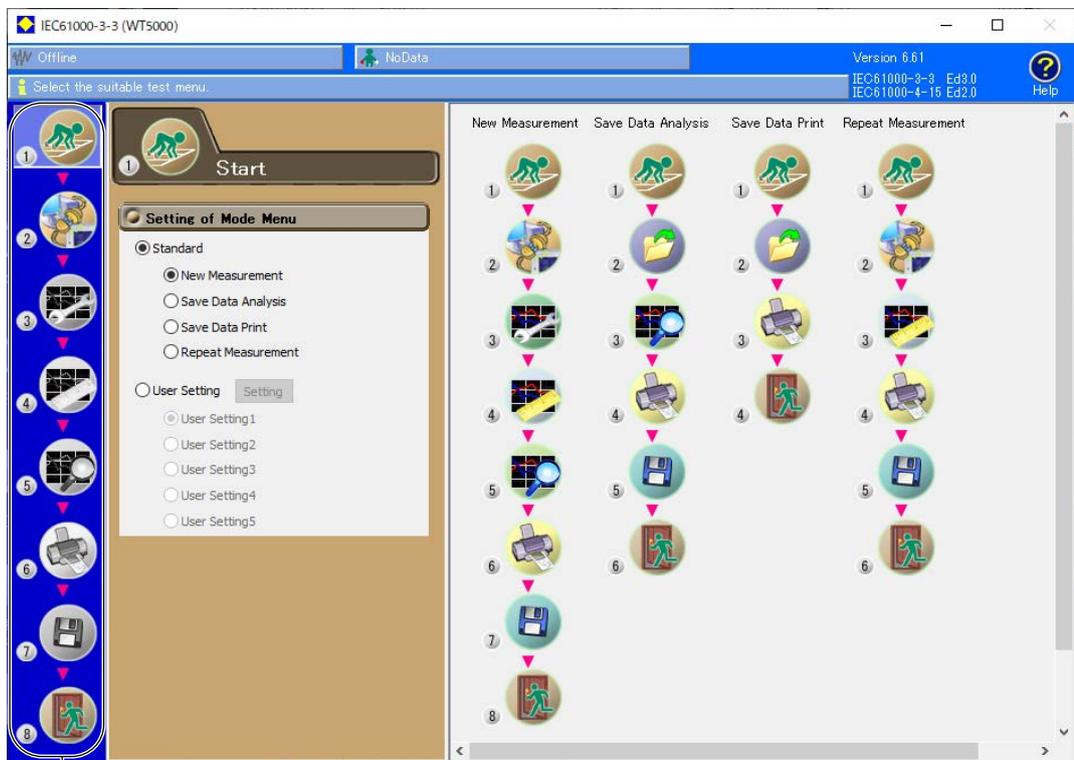
Standard

New Measurement

Save Data Analysis

Save Data Print

Repeat Measurement

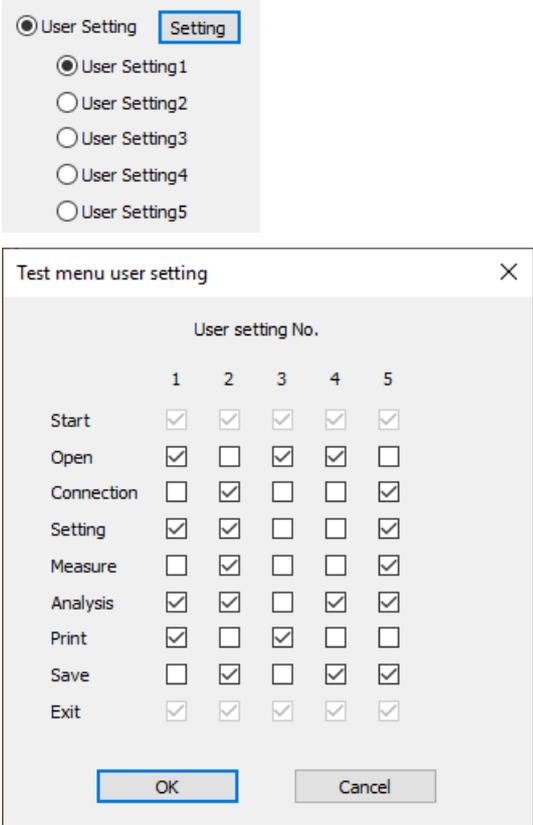


Menu area

The icons of the test schedule menu that you select appear.

Creating Your Own Custom Test Schedule Menu (User Setting)

- 2. Click **User Setting**.
- 3. Click **Setting**. The menu customization dialog box appears (the dialog box is labeled "Test menu user setting").
- 4. Use the check boxes to select the steps that you want to include in each of the five custom test schedule menus (labeled as "User Setting" 1 to 5 in the start window).
- 5. Click **OK**.
- 6. Select the custom test schedule menu that you want to use from "User Setting" 1 to 5. The icons representing the steps that are included in the custom test schedule menu that you select will appear in the menu area on the left.



Explanation

Selecting a Test Schedule Menu

A test schedule menu lays out the overall test structure. You can choose from test schedule menus that contain different combinations of the following 9 steps. For more information on each step, see section 1.1.



Start: Select and edit test schedule menus.



Open: Load measured data and WT setting information files.



Connection: Configure the connection between the PC and a WT.



Setting: Set compatibility and measurement conditions.



Measure: Measure voltage fluctuation and flicker.



Analysis: Display measured results as bar and trend graphs.



Print: Print screen images and reports.



Save: Save measured data and setting information files.



Exit: Close the software.

Icon Display



Icon Number

This number indicates an icon's order in a menu.

Standard Menus

The following four standard menus are available.

- **New Measurement:** Set measurement and judgment conditions, make measurements, and then print and save the data.
- **Save Data Analysis:** Analyze, print, and save data that was measured and saved in the past.
- **Save Data Print:** Print data that was measured and saved in the past.
- **Repeat Measurement:** Make measurements with the same measurement and judgment conditions that you used for the previous measurement, and print and save data without analyzing it.

Setting Up Custom Test Schedule Menus

You can create custom test schedule menus by selecting what steps to include in them. You can create up to five different custom test schedule menus.

- Start and Exit steps are always selected. You cannot deselect them.
- The steps are arranged in the order that they appear in the menu customization dialog box. You cannot change this order.

Icon Activation/Deactivation

Some icons are not available depending on the connection status with the WT or the availability of measured data. These types of icons appear dimmed.

Selectable (activated)



Not selectable (deactivated)



For example, the Measure icon cannot be selected when the Connection menu has been set such that the software is in offline mode. Icons such as Open, Connection, and Setting cannot be selected during measurement.

The following is a list of each icon and when it cannot be selected.

Start	During measurement
Open	During measurement
Connection	During measurement
Setting	During measurement
Measurement	When the software is in offline mode
Analysis	During measurement, or when there is no measured data to analyze
Print	During measurement, or when there is no measured data to print
Save	During measurement, or when there is no measured data to save
Exit	During measurement

4.2 Closing the Software

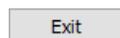
Procedure

1. Select the  icon in the menu area. The Exit submenu appears.



Closing the IEC 61000-3-3 Voltage Fluctuation and Flicker Measurement Software

2. Click **Exit**. The software closes.



Closing the IEC61000 Launcher

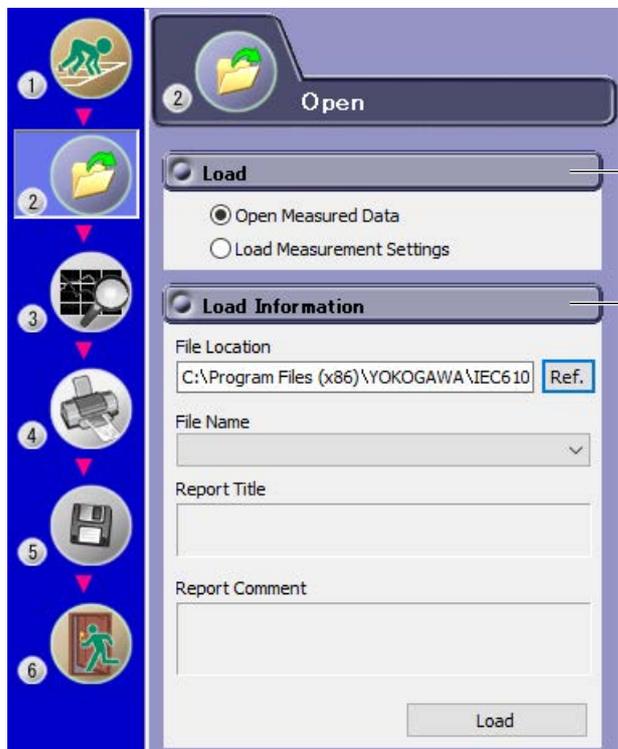
Click the icon below.



5.1 Loading Setting Information and Measured Data

Procedure

1. Select the  icon in the menu area. The Open submenu appears.

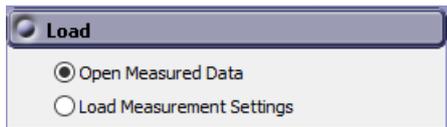


Load (page 5-2)
Select the type of data to load.

Load Information (page 5-2)
Select a file to open. When you select a file, its information appears.

Selecting the Type of Data to Load

2. Select one of the two data types listed under Load.



Selecting a File to Open

3. Specify the file location. There are two places where you can specify the file location.
 - Under Load Information in the submenu
 - At the top of the setting and display area

When you specify the file location, information about the files that can be loaded appears in the setting and display area.
4. Select a file to open. When there is more than one available file, you can select which file to open using one of the following two methods.
 - Click  next to the File Name box under Load Information. A list of available files appears. Select a file from the list.
 - Select a file to open from one of the files listed in the setting and display area.

5.1 Loading Setting Information and Measured Data

- Click **Load**, or double-click the file you want to open. The software will open the measured data or setting information file.

Note

- When the software is in online mode, it will switch to offline mode if you load setting information or measured data.
- If an error occurs while loading the setting information, the settings are reset to their default values.
- If an error occurs while loading measured data or setting information, the data may not be loaded properly. Confirm the filename and extension and then reopen the file.
- You cannot load setting information or measured data while making measurements.

Configuring File Information Display Settings

- Right-click on the file information heading area at the top of the setting and display area. A list of the different types of information that can be displayed appears.
- Select the type of information that you want to be displayed.

Date	Report Title	Report Comment	General Data	Manual Data	File Name	Element
2019/12/03 17:57:10	✓ Date	.. *	-	M303_201...	5% 5% 5% 30A 30A 30A	
2019/12/03 18:11:49	✓ Report Title	.. *	-	M303_201...	5% 5% 30A 30A 30A 30A	
2019/12/03 18:11:56	✓ Report Comment	.. *	-	M303_201...	5% 5% 30A 30A 30A 30A	
2019/12/03 18:12:02	✓ General Data	.. *	-	M303_201...	5% 5% 30A 30A 30A 30A	
	✓ Manual Data					
	✓ File Name					
	✓ Element					

Explanation

Loading Setting Information

You can load the setting information that has been saved using the procedure described in section 11.1.

- A dash appears in the General Data and Manual Data columns for setting information files.
- Setting information file names have the following extension.
Extension: .ini
- Setting information files contain the following:
 - Measurement and judgment conditions (see chapter 7)
Data that has been acquired from the WT or loaded from a file can be judged using loaded judgment conditions.
 - Graph display settings (see sections 9.2 and 9.3)

- Report titles and comments (see section 10.1)
You can put comments and titles on reports of data acquired from the WT or loaded from files, and then print and save the reports. For more information about printing and saving, see chapters 10 and 11.

Loading Measured Data and Setting Information

- You can load the measured data and setting information that has been saved using the procedure described in section 11.1.
- An asterisk appears in the General Data and Manual Data columns for files that contain measured data.
- Files that contain measured data are composed of two types of files with the following extensions.

Extension: .fdt Measured data
.ini Setting information

When measured data of the WT3000E/WT3000 series is loaded

- “*(Old)” appears in the General Data and Manual Data columns of the file information display area.
- You cannot perform rejudgment by changing the conditions of the standard because this is an offline analysis.

Note

You cannot load setting information unless the flicker measurement status is Reset. For more information about the flicker measurement status, see sections 8.1 and 8.2.

Kinds of File Information

- Date: When the file was saved.
Displayed in this format: year/month/day hour:minute:second
- Report Title (See section 10.1)
- Report Comment (See section 10.1)
- General Data: If data acquired in General mode (normal voltage fluctuation and flicker measurement) is contained in the file, an asterisk appears here.
- Manual Data: If data acquired in Manual mode (measurement of dmax caused by manual switching) is contained in the file, an asterisk appears here.
- File Name (See section 11.1)
- Element: The WT5000 element configuration is displayed with icons in order from elements 1 to 7 from the left and.
When measured data of the WT3000E/WT3000 is loaded, elements are displayed with numbers.

General Data	Manual Data	File Name ^	Element
*	-	20191121_001_WT5	5%, 5%, 30%, 30%, 30%, 30%
-	*(Old)	SampleData_3-2	30,30,30,30

Moving the mouse pointer over a line in the element configuration shows the detailed element information (model, instrument number).

WT5000 Element1 : 760902,"
WT5000 Element2 : 760902,"
WT5000 Element3 : 760901,"
WT5000 Element4 : 760901,"
WT5000 Element5 : 760901,"
WT5000 Element6 : 760901,"

Sorting the file list

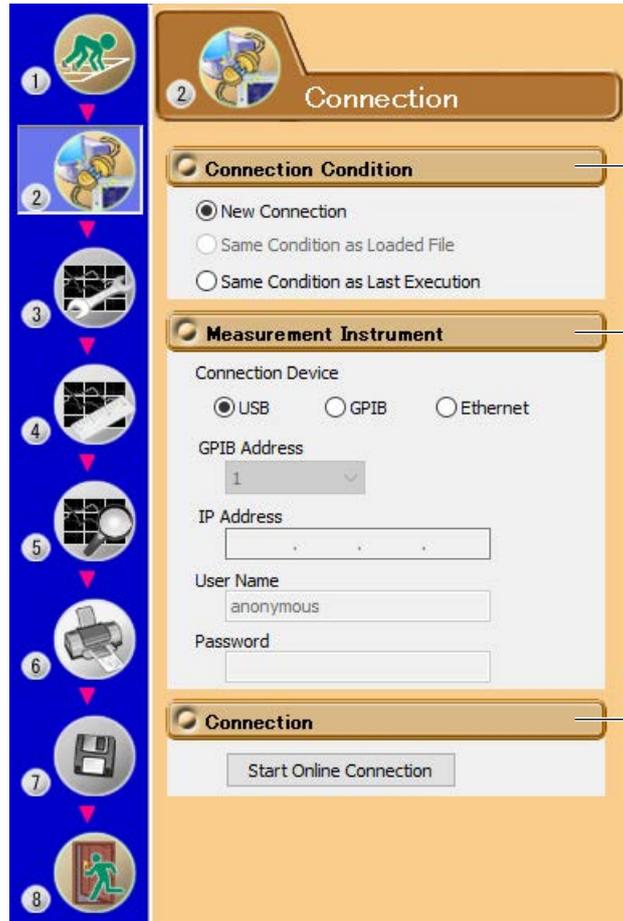
You can sort the list of loaded files in ascending or descending order by clicking an item heading area. The sorted item heading area shows ^ (ascending) or v (descending).

6.1 Establishing a New Connection Between the PC and a WT5000

Procedure

1. Select the  icon in the menu area. The Connection submenu appears.

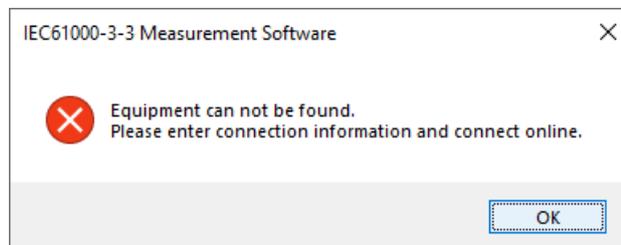
The connectable WTs are automatically detected when you start the software, and the information of the first connectable device found is displayed.



The screenshot shows the 'Connection' dialog box with the following sections and callouts:

- 1**: Points to the 'Connection' icon in the left-hand menu.
- 2**: Points to the 'Connection' title bar of the dialog box.
- Connection Condition (page 6-2)**: Points to the 'Connection Condition' section, which includes radio buttons for 'New Connection', 'Same Condition as Loaded File', and 'Same Condition as Last Execution'.
- Measurement Instrument (page 6-2)**: Points to the 'Measurement Instrument' section, which includes radio buttons for 'USB', 'GPIB', and 'Ethernet', along with input fields for 'GPIB Address', 'IP Address', 'User Name', and 'Password'.
- Connection (page 6-3)**: Points to the 'Connection' section at the bottom, which contains a 'Start Online Connection' button.

If no connectable WT is found, the following message appears.

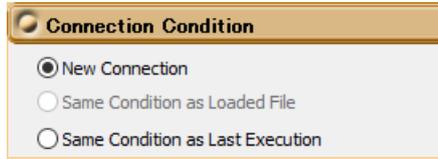


If the above message appears even after the manual search, check the following items.

- Is the WT turned on?
- Is the communication interface cable connected?
- Are the communication settings (GP-IB address, IP address, etc.) of each WT unique?

Connection Condition

- 2. Select **New Connection**.



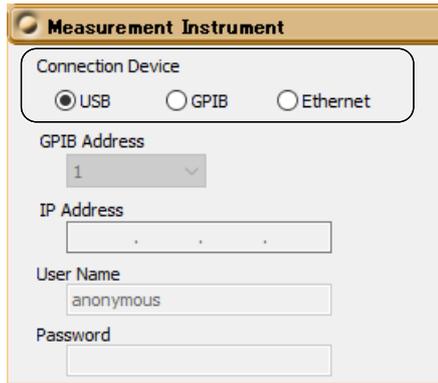
Note

- You can only select Same Condition as Loaded File if you load setting information or measured data using the procedure described in section 5.1.
- You cannot select Same Condition as Last Execution when you first start up the software.

Connection Device

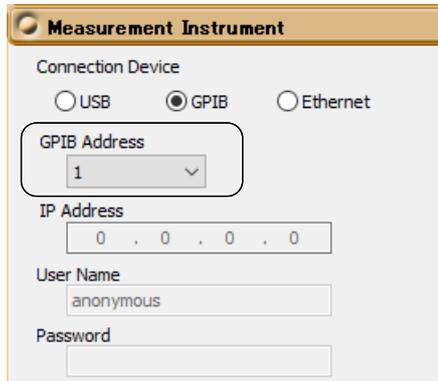
The configuration of the connection device that is automatically detected and displayed can be changed.

- 3. Select **USB, GPIB, or Ethernet**.
 - If you select USB, proceed to step 6.
 - If you select GP-IB, proceed to step 4.
 - If you select Ethernet, proceed to step 5.



Selecting a Communication Address (GP-IB)

- 4. Select the GP-IB address of the WT that you intend to connect to.



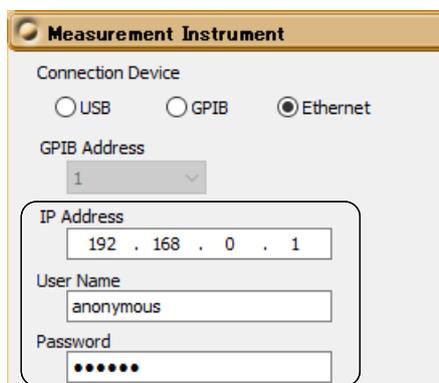
Proceed to step 6.

Note

- GP-IB address number 0 is reserved for the PC and cannot be selected.

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

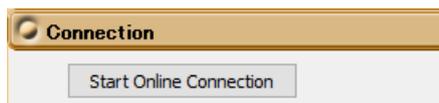
5. Set the IP address, user name, and password of the WT that you intend to connect to.



The screenshot shows a dialog box titled "Measurement Instrument". It has three radio buttons under "Connection Device": "USB", "GPIB", and "Ethernet", with "Ethernet" selected. Below is a "GPIB Address" dropdown menu showing "1". A rounded rectangle highlights the "IP Address" field (containing "192 . 168 . 0 . 1"), "User Name" field (containing "anonymous"), and "Password" field (containing six dots).

Making the Connection

6. Click **Start Online Connection**. The software will establish a connection between the PC and the WT. The configuration and measurement operations listed onwards can be performed once the software has automatically determined that communication is possible.



The screenshot shows a dialog box titled "Connection" with a single button labeled "Start Online Connection".

Note

- You cannot proceed to measurement, analysis, printing, or saving until an online connection has been established.
- If you click Start Online Connection and establish a connection, but the connected WT is not in a measurement-ready state, a communication error will occur. If the GP-IB address, IP address, user name, or password is wrong, or if the PC is simply unable to connect to the WT, a communication error will occur.

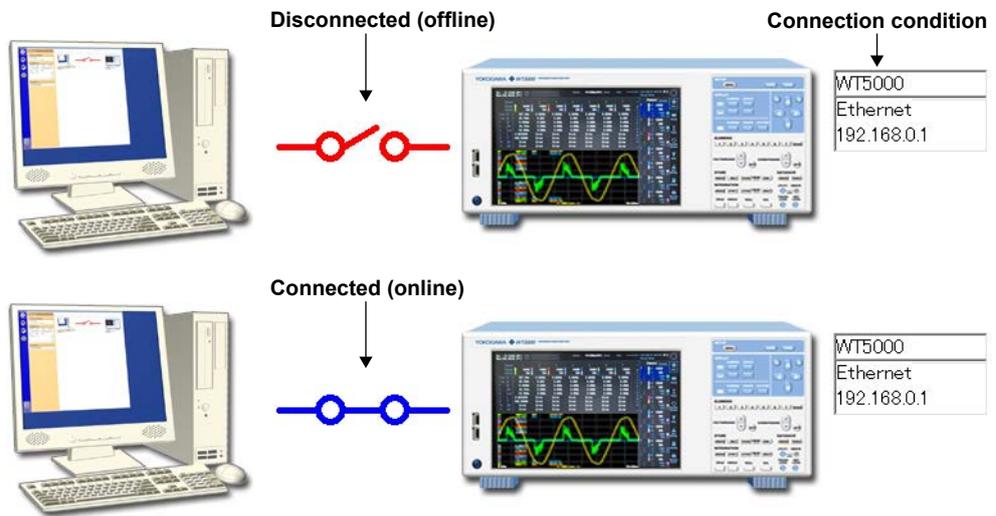
Explanation

Selecting a Communication Address

- **GP-IB**
Select the GP-IB address of the WT that you intend to connect to.
Selectable range: 1 to 30
- **Ethernet**
 - Set the IP address of the WT that you intend to connect to.
Selectable range: 0.0.0.0 to 255.255.255.255
 - You can set the user name and password of the WT that you intend to connect to.
Usable characters: Those characters that the WT supports.

Displaying Connection Conditions and Status

The connection conditions that you set in the Connection submenu appear in the setting and display area along with the current connection status.



The connection status also appears in the information area.



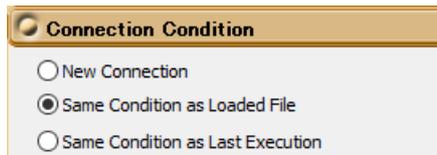
Note

- It can take more than 10 seconds to switch from offline to online mode.
- We recommend that you use a National Instruments GP-IB card. GP-IB cards made by other companies may not function properly.

6.2 Using the Connection Settings from a Loaded File

Procedure

1. Select the  icon in the menu area. The Connection submenu appears. For general information about the Connection submenu, see section 6.1.
2. Select **Same Condition as Loaded File** under Connection Condition.

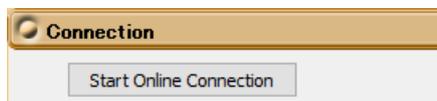


Note

You can only select Same Condition as Loaded File if you load setting information using the process described in section 5.1.

Making the Connection

3. Click **Start Online Connection**. The software will establish a connection between the PC and the WT. The configuration and measurement operations listed onwards can be performed once the software has automatically determined that communication is possible.



Note

- You cannot proceed to measurement, analysis, printing, or saving until an online connection has been established.
- If you click Start Online Connection and establish a connection, but the connected WT is not in a measurement-ready state, a communication error will occur. If the GP-IB address, IP address, user name, or password is wrong, or if the PC is simply unable to connect to the WT, a communication error will occur.

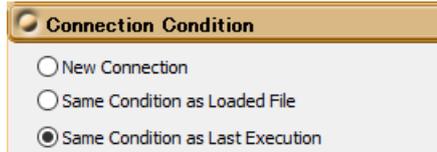
Explanation

Follow this procedure to use the settings from a file that has been loaded according to the procedure described in “Loading Setting Information” in section 5.1.

6.3 Using the Same Connection Settings as Before

Procedure

1. Select the  icon in the menu area. The Connection submenu appears. For general information about the Connection submenu, see section 6.1.
2. Select **Same Condition as Last Execution** under Connection Condition.

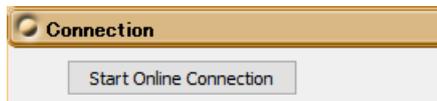


Note

You cannot select Same Condition as Last Execution when you first start up the software.

Making the Connection

3. Click **Start Online Connection**. The software will establish a connection between the PC and the WT. The configuration and measurement operations listed onwards can be performed once the software has automatically determined that communication is possible.



Note

- You cannot proceed to measurement, analysis, printing, or saving until an online connection has been established.
- If you click Start Online Connection and establish a connection, but the connected WT is not in a measurement-ready state, a communication error will occur. If the GP-IB address, IP address, user name, or password is wrong, or if the PC is simply unable to connect to the WT, a communication error will occur.

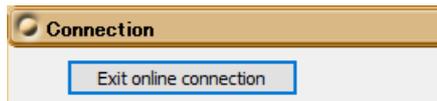
Explanation

Follow this procedure to set the connection settings to the same as when you last closed this software.

6.4 Ending a Connection by Switching to Offline Mode

Procedure

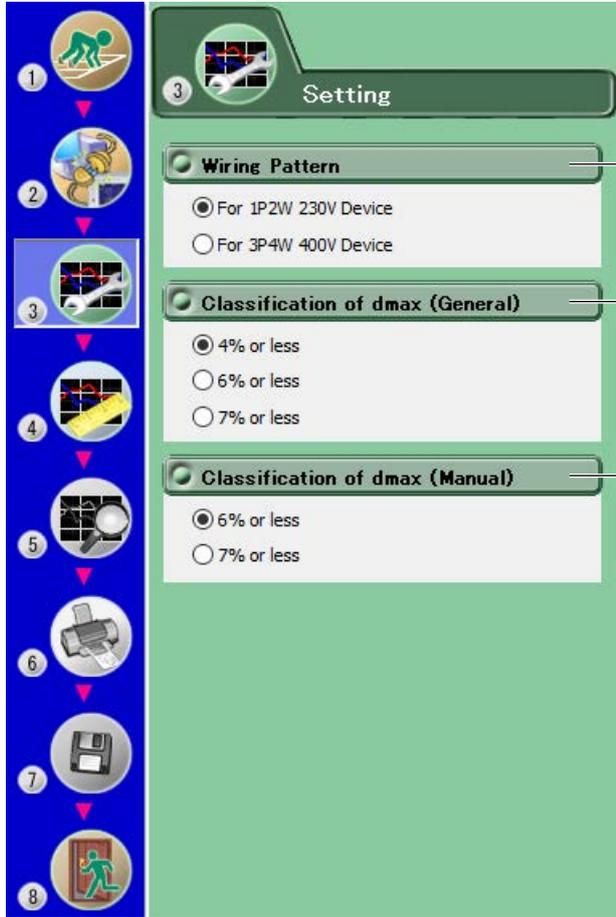
1. Select the  icon in the menu area. The Connection submenu appears. For general information about the Connection submenu, see section 6.1.
2. When you are in online mode, click **Exit online connection**. The software will disconnect from the WT.



7.1 Setting General Test Conditions

Procedure

1. Select the  icon in the menu area. The Setting submenu appears.



The screenshot shows a vertical menu on the left with eight numbered icons. The 'Setting' icon (3) is highlighted. The main area shows the 'Setting' submenu with three sections:

- Wiring Pattern** (page 7-2): Select the wiring pattern of the circuit you will measure.
 - For 1P2W 230V Device
 - For 3P4W 400V Device
- Classification of dmax (General)** (page 7-2): When making normal voltage fluctuation and flicker measurements (General mode), select the dmax classification here.
 - 4% or less
 - 6% or less
 - 7% or less
- Classification of dmax (Manual)** (page 7-2): When measuring the dmax caused by manual switching (Manual dmax mode), select the dmax classification here.
 - 6% or less
 - 7% or less

In the setting and display area, you can switch between basic settings and advanced settings by clicking these buttons:  . For details, see sections 7.2 and 7.3.

-  Basic settings
-  Advanced settings

Wiring Pattern

2. Select the wiring pattern of the circuit you will measure.



The screenshot shows a dialog box titled "Wiring Pattern". It contains two radio button options: "For 1P2W 230V Device" (which is selected) and "For 3P4W 400V Device".

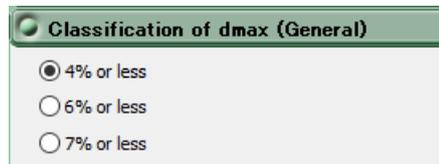
Note

When you switch wiring patterns, the following settings, which are displayed in the setting and display area, will change to default values that are appropriate to the wiring pattern that you select. For details, see sections 7.2 and 7.3.

- The WT settings (the settings on the WT Measurement Instrument tab)
 - The testing judgment conditions (the settings under the Standard tab)
-

Classification of dmax (General)

3. When making normal voltage fluctuation and flicker measurements (General mode), select the dmax classification here.



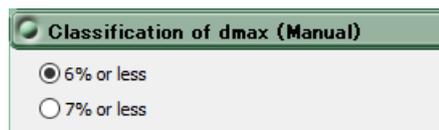
The screenshot shows a dialog box titled "Classification of dmax (General)". It contains three radio button options: "4% or less" (selected), "6% or less", and "7% or less".

Note

When you change this setting, the dmax setting that is displayed under Judge (General) on the WT Measurement Instrument tab in the setting and display area will also change. For details, see section 7.3.

Classification of dmax (Manual)

4. When measuring dmax caused by manual switching (Manual dmax mode), select the dmax classification here.



The screenshot shows a dialog box titled "Classification of dmax (Manual)". It contains two radio button options: "6% or less" (selected) and "7% or less".

Note

When you change this setting, the dmax setting that is displayed under Judge (Manual) on the WT Measurement Instrument tab in the setting and display area will also change. For details, see section 7.3.

Explanation

Classification of dmax

The limit dmax is 4, 6, or 7% depending on the conditions. For information about the conditions that affect dmax, see section 1.3.

7.2 Setting the WT5000 Measurement Conditions

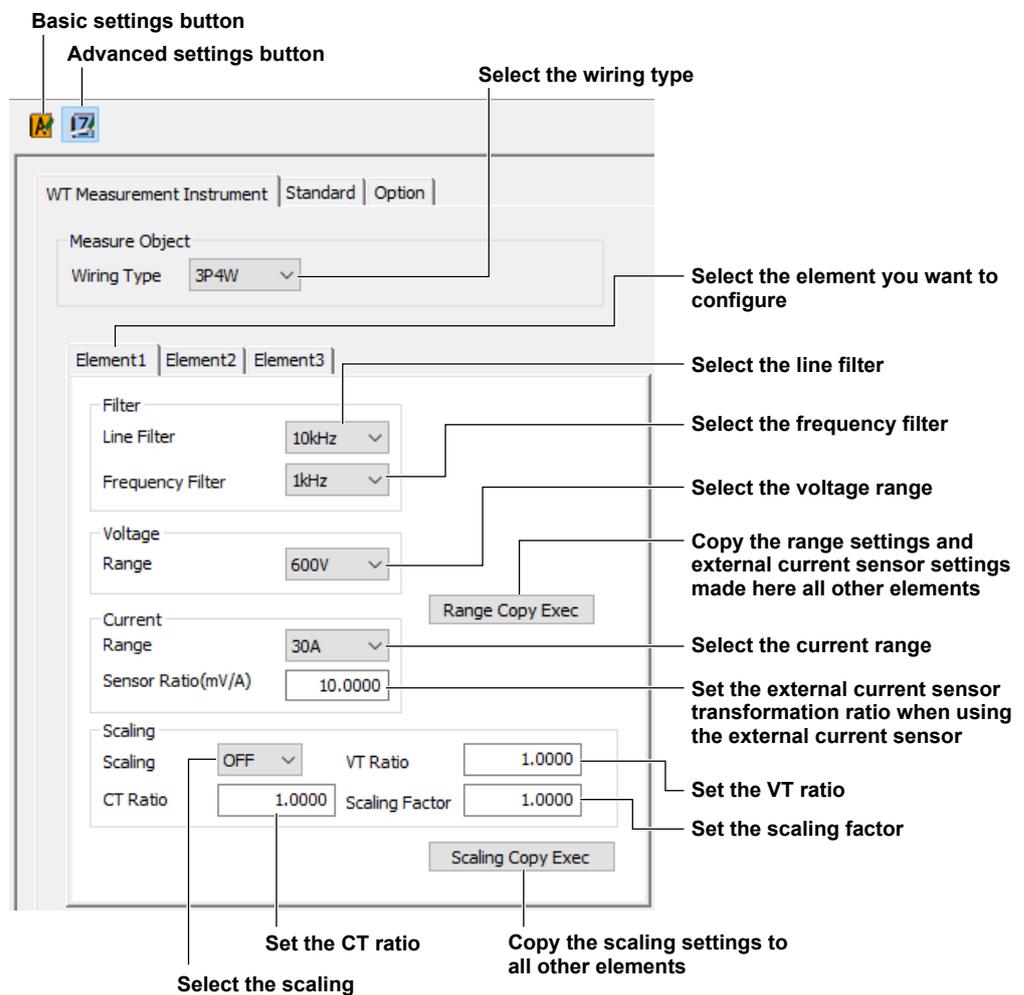
Procedure

1. Select the **WT Measurement Instrument** tab in the setting and display area. The WT measurement condition configuration dialog box appears.
2. Click the basic settings button  or the advanced settings button .
3. Configure the various settings.

Note

When you select the basic settings button, the following setting is unavailable. To adjust this setting, click the advanced settings button.

- Scaling ON/OFF



Explanation

Wiring Type

Select the object whose voltage fluctuation and flicker will be measured. The installed elements are displayed as configurable devices depending on the selected wiring system.

Copying the Range

You can copy the range settings configured for one element to all other elements with the same wiring. The voltage range, the current range, and the external current sensor range are copied.

Copying the Scaling Settings

You can copy the scaling settings configured for one element to all other elements with the same wiring. The settings that are copied are:

- VT ratio
- CT ratio
- Scaling factor

For information about the following settings and how to make settings from the WT, see the following manuals.

Setting	Manuals	Refer To
Line filter	Features Guide, IM WT5000-01EN	4 Input Settings (Advanced/Options)
	User's Manual, IM WT5000-02EN	Section 2.7
Frequency filter	Features Guide, IM WT5000-01EN	4 Input Settings (Advanced/Options)
	User's Manual, IM WT5000-02EN	Section 2.7
Voltage/current range	Features Guide, IM WT5000-01EN	4 Input Settings (Advanced/Options)
	User's Manual, IM WT5000-02EN	Sections 2.2 and 2.3
Scaling	Features Guide, IM WT5000-01EN	4 Input Settings (Advanced/Options)
	User's Manual, IM WT5000-02EN	Sections 2.4 and 9.1

Note

You can only change measurement conditions in online mode with the flicker measurement status set to Reset. For more information about the flicker measurement status, see sections 8.1 and 8.2.

Setting Changes Based on Wiring Pattern Selection

When you select a wiring pattern in the Setting submenu, the settings marked off in the following figures change to their default values. The values in the figures are the default values.

- Changes when you select “For 1P2W 230V Device.”

The screenshot displays the configuration interface for the WT5000 instrument. At the top, the 'Wiring Pattern' section is active, with the radio button for 'For 1P2W 230V Device' selected. Below this, the 'Measure Object' section shows 'Wiring Type' set to '1P2W'. The 'Element1' section contains several sub-sections: 'Filter' with 'Line Filter' at 10kHz and 'Frequency Filter' at 1kHz; 'Voltage' with 'Range' at 300V; 'Current' with 'Range' at 30A and 'Sensor Ratio(mV/A)' at 10.0000; and 'Scaling' with 'Scaling' set to 'OFF', 'VT Ratio' at 1.0000, 'CT Ratio' at 1.0000, and 'Scaling Factor' at 1.0000. 'Range Copy Exec' and 'Scaling Copy Exec' buttons are located to the right of their respective sections.

7.2 Setting the WT5000 Measurement Conditions

- Changes when you select “For 3P4W 400V Device.”

Wiring Pattern

For 1P2W 230V Device

For 3P4W 400V Device

WT Measurement Instrument | Standard | Option

Measure Object

Wiring Type **3P4W** ▼

Element1 | Element2 | Element3

Filter

Line Filter **10kHz** ▼

Frequency Filter **1kHz** ▼

Voltage

Range **600V** ▼

Current

Range **30A** ▼

Sensor Ratio(mV/A) **10.0000**

Scaling

Scaling **OFF** ▼ VT Ratio **1.0000**

CT Ratio **1.0000** Scaling Factor **1.0000**

Range Copy Exec

Scaling Copy Exec

7.3 Setting the WT5000 Judgment Conditions

Procedure

1. Select the **Standard** tab in the setting and display area. The judgment condition configuration dialog box appears.
2. Click the basic settings button  or the advanced settings button .
3. Configure the various settings.

Note

When you select the basic settings button, the following settings are unavailable. To adjust these settings, click the advanced settings button.

- Measure Mode
- Un
- Frequency
- 1 Observation Period
- Count
- dmin
- dc, Tmax, Pst, Plt of the Judge (General)

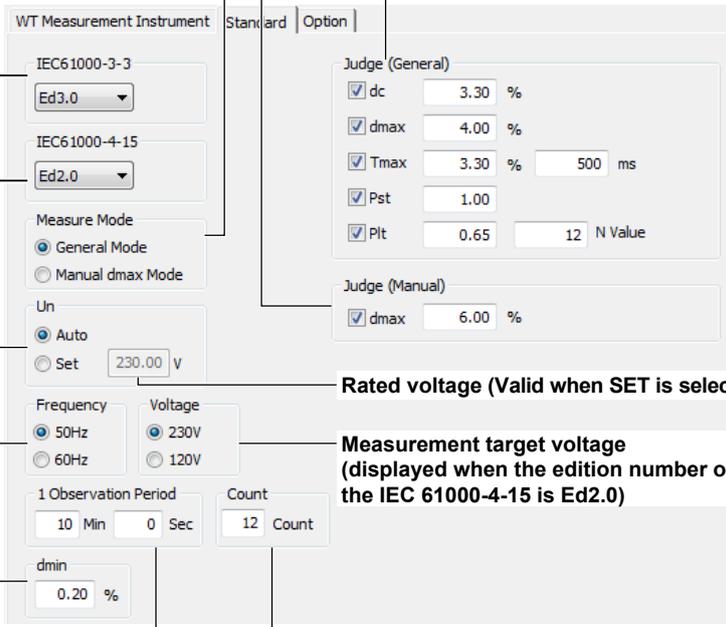
When measured data has been loaded, the normal voltage fluctuation and flicker measurement judgment condition Tmax, located under Judge (General), is unavailable.

Measure Mode

- General Mode: Normal voltage fluctuation and flicker measurement
- Manual dmax Mode: Manual switching dmax measurement

Turn measurement of dmax caused by manual switching (Manual dmax Mode) ON or OFF and set the dmax limit.

Turn ON or OFF all of the judgment conditions for normal voltage fluctuation and flicker measurement (General Mode) and set each condition's limits.



Edition No. of the IEC 61000-3-3 (Ed2.0, Ed3.0)

Edition No. of the IEC 61000-4-15 (Ed1.1, Ed2.0)

Rated voltage assignment method (AUTO, SET)

Measurement target frequency

Steady-state range

Rated voltage (Valid when SET is selected)

Measurement target voltage (displayed when the edition number of the IEC 61000-4-15 is Ed2.0)

Measurement count (Valid with normal voltage fluctuation and flicker measurement.)

Length of one observation period (Valid with normal voltage fluctuation and flicker measurement.)

Explanation

For an explanation of the terminology, see section 1.5.

WT Firmware Versions and Selectable IEC 61000 Edition Numbers

The following edition numbers can be selected in firmware version 2.01 and later.

Edition No. of the IEC 61000-3-3	Edition No. of the IEC 61000-4-15
• Edition 2.0 (Ed2.0)	• Edition 1.1 (Ed1.1)
• Edition 3.0 (Ed3.0)	• Edition 2.0 (Ed2.0)

IEC 61000-4-15 specifies requirements for measurement instruments. For details, see chapter 14.

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, Tmax, 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 WT 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.

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.

Measurement Target Voltage (Displayed when IEC 61000-4-15 Ed2.0 is selected)

You can set the measurement target voltage to 230 V or 120 V.

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

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%.

Normal Voltage Fluctuation and Flicker Measurement (General Mode)

Judgment Conditions for Relative Steady-State Voltage Change dc

- **Turning ON/OFF the Judgment of Relative Steady-State Voltage Change dc**
You can select whether to include relative steady-state voltage change dc in the flicker measurement judgment.

- **Limit on Relative Steady-State Voltage Change dc**

You can set the limit in the range of 1.00 to 99.99%.

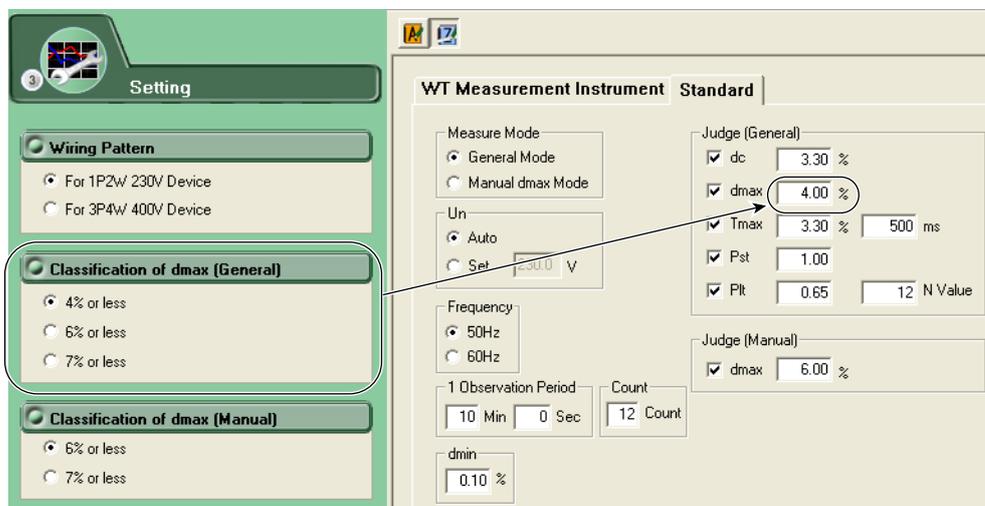
Judgment Conditions for Maximum Relative Voltage Change dmax

- **Turning ON/OFF the Judgment of Maximum Relative Voltage Change dmax**
You can select whether to include maximum relative voltage change dmax in the flicker measurement judgment.

- **Limit on Maximum Relative Voltage Change dmax**

You can set the limit in the range of 1.00 to 99.99%.

However, after you set a value, if you perform step 3 on page 7-2, the limit will be changed to the value you set there.



Judgment Conditions for Period during Which Relative Voltage Change Exceeds the Threshold Level Tmax

- **Turning ON/OFF the Judgment of Period during Which Relative Voltage Change Exceeds the Threshold Level Tmax**

You can select whether to include the period during which the relative voltage change exceeds the threshold level Tmax in the flicker measurement judgment.

- **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 Tmax**

You can set the limit in the range of 1 to 99999 ms.

Judgment Conditions for Short-Term Flicker Value Pst

- **Turning ON/OFF the Judgment of Short-Term Flicker Value Pst**

You can select whether to include short-term flicker value Pst in the flicker measurement judgment.

- **Limit on Short-Term Flicker Value Pst**

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

Judgment Conditions for Long-Term Flicker Value Plt

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

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

- **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). 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 judgment conditions only in On-Line Mode when the flicker measurement status is Reset or Complete. For details on the flicker measurement status, see section 8.1 or 8.2.
 - You can set judgment conditions on items other than dmax during the measurement of dmax caused by manual switching, but judgment is not performed on them.
-

Judgment Conditions for Measurement of dmax Caused by Manual Switching (Manual dmax mode)

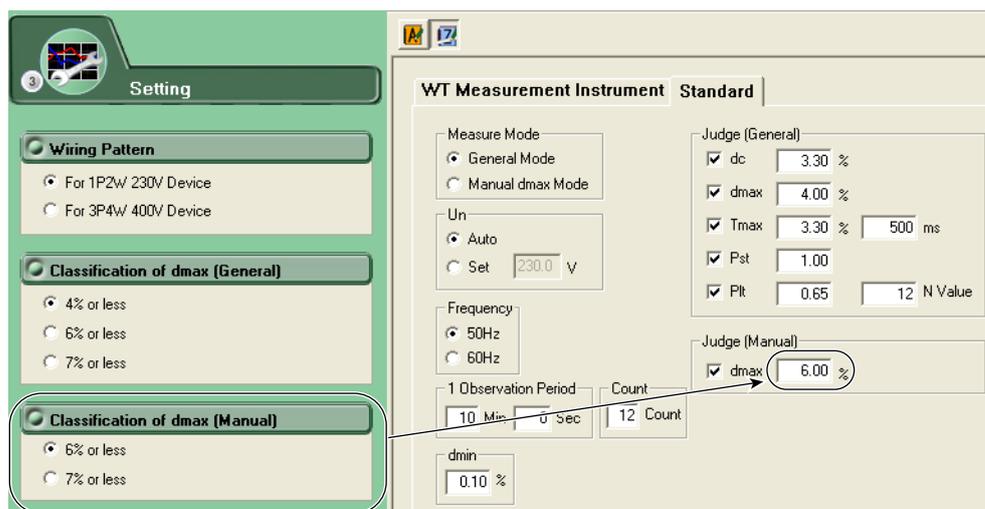
Judgment Conditions for Maximum Relative Voltage Change dmax

- **Turning ON/OFF the Judgment of Maximum Relative Voltage Change dmax**
You can select whether to include maximum relative voltage change dmax in the flicker measurement judgment.

- **Limit on Maximum Relative Voltage Change dmax**

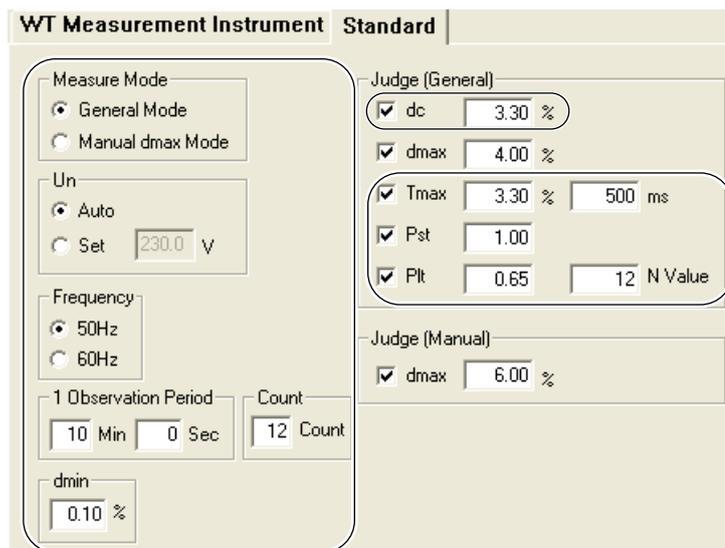
You can set the limit in the range of 1.00 to 99.99%.

However, after you set a value, if you perform step 4 on page 7-2, the limit will be changed to the value you set there.



How Settings Change Based on the Selected Wiring Pattern

When you select a wiring pattern in the Setting submenu, the settings marked off in the figure below change to their default values. The values in the figure below are the default values.



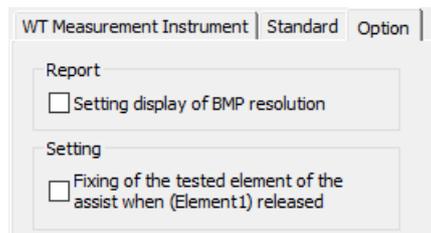
7.4 Setting the Optional Conditions

Procedure

1. Select the **Option** tab in the setting and display area. The optional condition configuration dialog box appears.
2. Configure the various settings.

Note

The items that you can set are the same whether you press the basic settings button  or the advanced settings button .



Explanation

Report

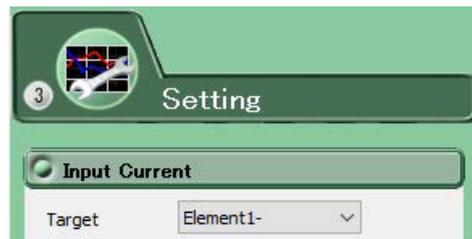
- **Setting display of BMP resolution**

In the BMP item under Output Form of the Print menu, the selectable output resolutions appear. (See section 10.2.)

Setting

- **Fixing of the tested element of the assist when (Element1) released**

Select the check box to select the target element. A target element setting box appears in the Setting submenu area.



If the check box is not selected, the target element is fixed to element 1.

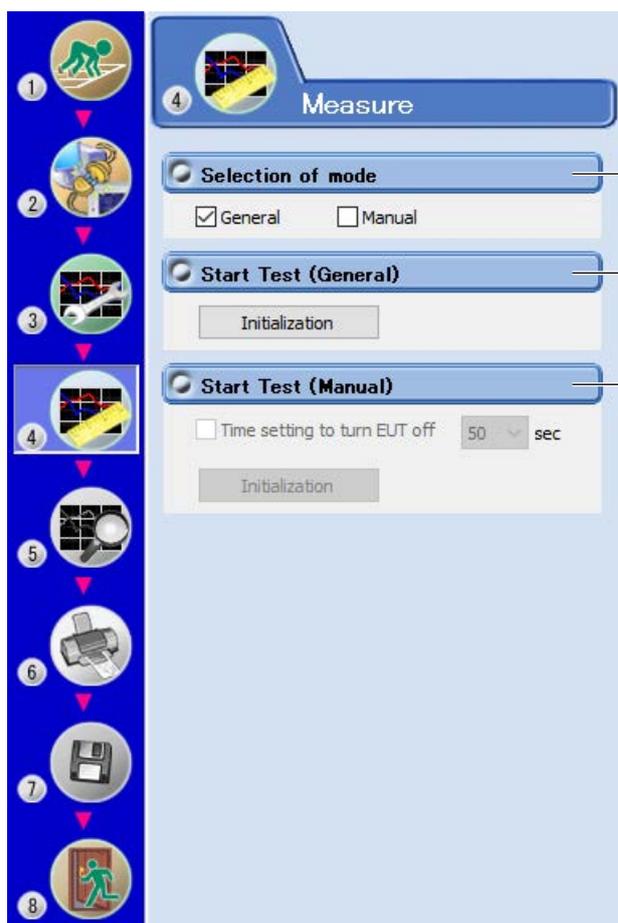
8.1 Executing the Normal Voltage Fluctuation and Flicker Measurement

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

Calculates all the voltage fluctuation and flicker values of d_c , d_{max} , T_{max} , P_{st} , and Plt , compares them to the preset limits, and indicates the overall judgment.

Procedure

1. Select the  icon in the menu area. The Setting submenu appears.



Selection of mode (page 8-3)
Select which kind of measurement to perform.

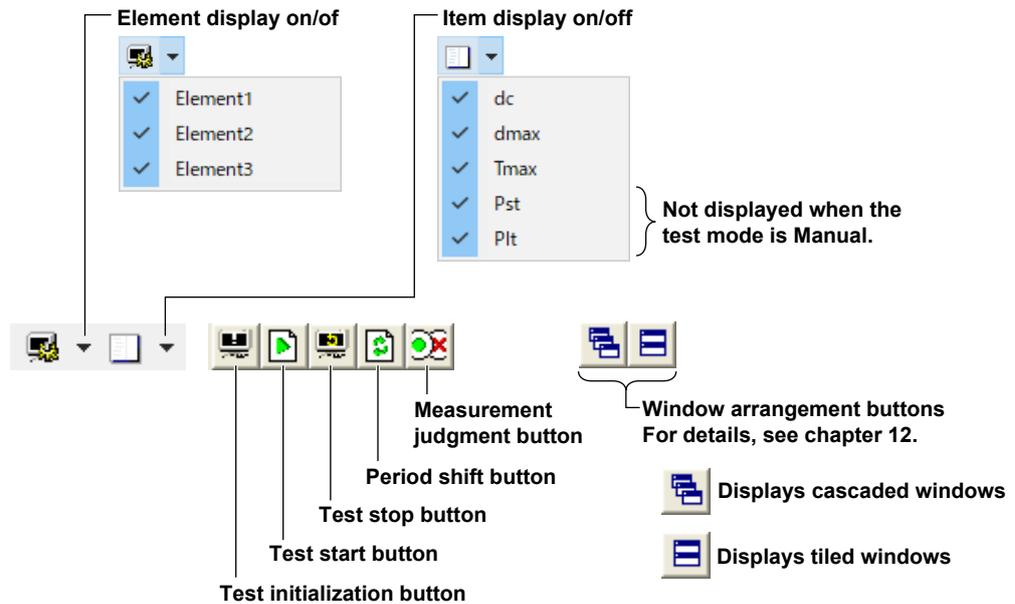
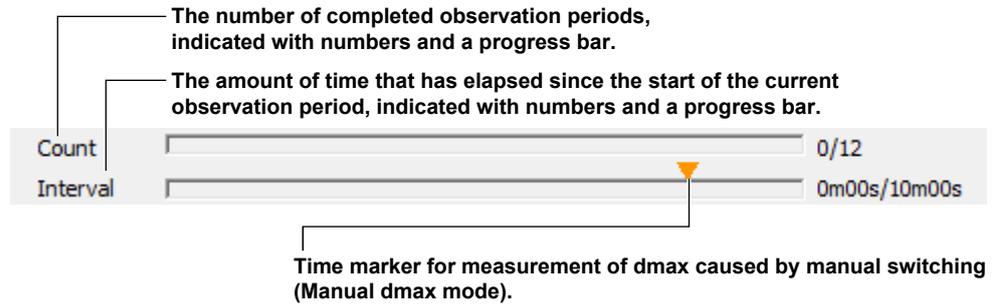
Start Test (General) (page 8-3)
Perform normal voltage fluctuation and flicker measurement (General mode).

Start Test (Manual) (section 8.2)
Perform measurement of d_{max} caused by manual switching (Manual mode).

8.1 Executing the Normal Voltage Fluctuation and Flicker Measurement

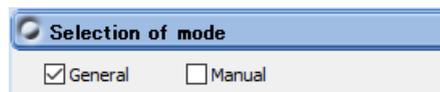
Upper portion of the setting and display area

* Icons that cannot be selected are dimmed.



Selecting a Test Mode

2. Select **General**. You can also select both General and Manual.

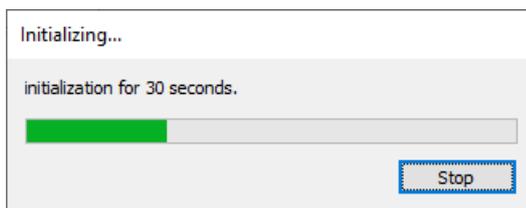
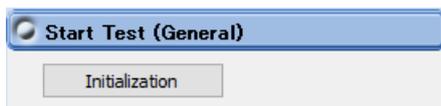


Starting a Compliancy Test

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 a Test” on page 8-5.

Initializing a Test

3. Click **Initialization** under Start Test (General) or click the  button. The initialization dialog box appears, and initialization begins.



Once initialization is complete, the initialization dialog box will automatically close, initialization button turns start test button. And the Numeric View window will display:

- The current measured values for Un[V] and Freq[Hz].
- “----” for dc[%], dmax [%], Tmax[ms], and Pst.

	Element 1				
Voltage	3.00V				
Setting Voltage	230V				
Setting Freq	50Hz				
Un	0.00V				
Freq	-----Hz				
Element Judgement	-----				

Limit No.	Element 1		500/3.30 Tmax[ms]	1.00 Pst	0.65 12N PIt
	3.30 dc[%]	4.00 dmax[%]			
1	-----	-----	-----	-----	-----
2	-----	-----	-----	-----	-----
3	-----	-----	-----	-----	-----
4	-----	-----	-----	-----	-----
5	-----	-----	-----	-----	-----
6	-----	-----	-----	-----	-----
7	-----	-----	-----	-----	-----
8	-----	-----	-----	-----	-----
9	-----	-----	-----	-----	-----
10	-----	-----	-----	-----	-----
11	-----	-----	-----	-----	-----
12	-----	-----	-----	-----	-----

8.1 Executing the Normal Voltage Fluctuation and Flicker Measurement

Starting a Test

- Click **Start Test** under Start Test (General) or click the  button. The Numeric View window will display:
 - Fixed values for Un[V] and Freq[Hz]
 - The maximum measured values within the observation period for dc[%], dmax [%], Tmax[ms], and Pst.

The bar and numbers next to Interval indicate how much time has passed. The bar and numbers next to Count indicate how many observation periods have finished. The measurement results appear in the Trend Graph View window.

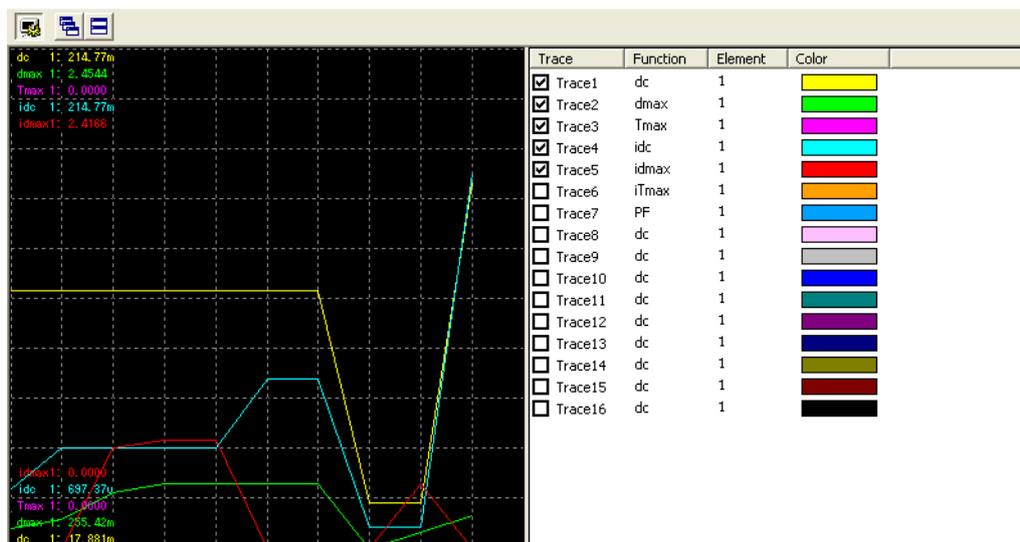
Start Test (General)

Start Test

Count /12

Interval 0m06s/0m30s

Limit	Element1		3.30	4.00	500/3.30	1.00	0.65 12N
No.	dc[%]	dmax[%]	Tmax[ms]	Pst	Plt		
1	0.00 Pass	0.00 Pass	0.00 Pass				
2	-----	-----	-----	-----	-----		
3	-----	-----	-----	-----	-----		



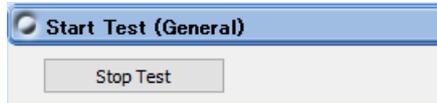
When the measurement of all observation periods is complete, the normal voltage fluctuation and flicker measurement automatically stops. The result and judgment are displayed.

	Element1
Voltage	300.00V
Setting Voltage	230V
Setting Freq	50Hz
Un	0.00V
Freq	-----Hz
Element Judgement	Fail

Limit	Element1		3.30	4.00	500/3.30	1.00	0.65 12N
No.	dc[%]	dmax[%]	Tmax[ms]	Pst	Plt		
1	0.00 Pass	0.00 Pass	0.00 Pass	1.08 Fail			
2	0.00 Pass	0.00 Pass	0.00 Pass	1.41 Fail			
3	0.00 Pass	0.00 Pass	0.00 Pass	1.58 Fail			
4	0.00 Pass	0.00 Pass	0.00 Pass	1.57 Fail			
5	0.00 Pass	0.00 Pass	0.00 Pass	1.50 Fail			
6	0.00 Pass	0.00 Pass	0.00 Pass	1.50 Fail			
7	0.00 Pass	0.00 Pass	0.00 Pass	1.54 Fail			
8	0.00 Pass	0.00 Pass	0.00 Pass	1.44 Fail			
9	0.00 Pass	0.00 Pass	0.00 Pass	1.36 Fail			
10	0.00 Pass	0.00 Pass	0.00 Pass	1.37 Fail			
11	0.00 Pass	0.00 Pass	0.00 Pass	1.46 Fail			
12	0.00 Pass	0.00 Pass	0.00 Pass	1.53 Fail			
							1.46 Fail

Stopping a Test

1. Click **Stop Test** in the Start Test (General) box or click  on the toolbar to stop the measurement. The measured data and test results are discarded, and Interval and Count in the Numeric View window are cleared.



	Element1				
Voltage	300.00V				
Setting Voltage	230V				
Setting Freq	50Hz				
Un	0.00V				
Freq	-----Hz				
Element Judgement	----				

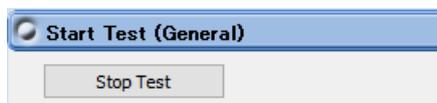
Limit	Element1				
No.	dc[%]	dmax[%]	Tmax[ms]	Pst	Pit
1	0.00 Pass	0.00 Pass	0.00 Pass	99.99 Fail	
2	0.00 Pass	0.00 Pass	0.00 Pass	-----	
3	-----	-----	-----	-----	
4	-----	-----	-----	-----	
5	-----	-----	-----	-----	
6	-----	-----	-----	-----	
7	-----	-----	-----	-----	
8	-----	-----	-----	-----	
9	-----	-----	-----	-----	
10	-----	-----	-----	-----	
11	-----	-----	-----	-----	
12	-----	-----	-----	-----	

Changing the Judgment Conditions and Re-judging the Measured Data

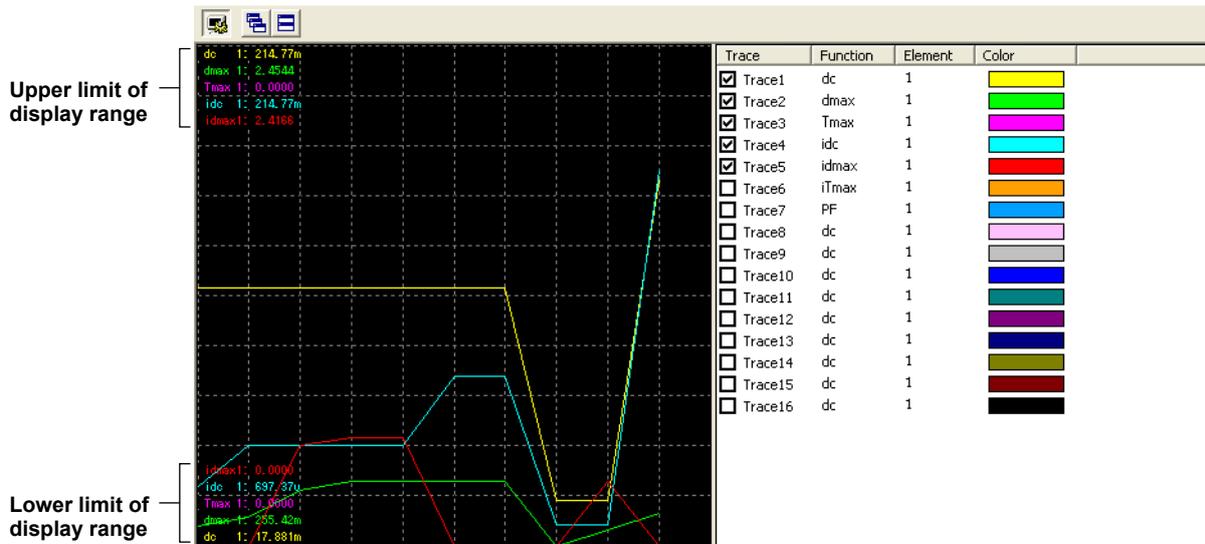
When the normal voltage fluctuation and flicker measurement is complete, change the judgment conditions according to the procedure given in “Setting the Judgment Conditions” in chapter 7. If you change the judgment conditions, the measured voltage fluctuation and flicker data is re-judged, and the judgment is updated.

Resetting a Test

1. Click **Stop Test** in the Start Test (General) box or click  on the toolbar to reset the measurement. The measured data and test results are discarded, and Interval and Count in the Numeric View window are cleared.



Setting the Trend Graph Traces



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
- Tmax Period during which relative voltage change exceeds the threshold level
- idc Instantaneous relative steady-state voltage change
- idmax Instantaneous maximum relative voltage change
- iTmax 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.

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.

Explanation

Display during Measurement

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

The number of completed observation periods, indicated with numbers and a progress bar.

The amount of time that has elapsed since the start of the current observation period, indicated with numbers and a progress bar.

The measured value for the current observation period. The dc, dmax, and Tmax values being observed are displayed. 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.

Element 1	
Voltage	300.00V
Setting Voltage	230V
Setting Freq	50Hz
Un	0.00V
Freq	----Hz
Element Judgement	----

Limit	Element 1					
	3.30	4.00	5.00/3.30	1.00	0.65	12N
No.	dc [%]	dmax [%]	Tmax [ms]	Pst	Plt	
1	0.00 Pass	0.00 Pass	0.00 Pass	1.08 Fail		
2	0.00 Pass	0.00 Pass	0.00 Pass	1.41 Fail		
3	0.00 Pass	0.00 Pass	0.00 Pass	1.58 Fail		
4	0.00 Pass	0.00 Pass	0.00 Pass	1.57 Fail		
5	0.00 Pass	0.00 Pass	0.00 Pass	1.50 Fail		
6	0.00 Pass	0.00 Pass	0.00 Pass	1.50 Fail		
7	0.00 Pass	0.00 Pass	0.00 Pass	1.54 Fail		
8	0.00 Pass	0.00 Pass	0.00 Pass	1.44 Fail		
9	0.00 Pass	0.00 Pass	0.00 Pass	1.36 Fail		
10	0.00 Pass	0.00 Pass	0.00 Pass	1.37 Fail		
11	0.00 Pass	0.00 Pass	0.00 Pass	-----		
12	-----	-----	-----	-----		

Judgments displayed for completed observation periods

- The final values of dc, dmax, and Tmax are compared with the respective limits, and the judgment (pass or fail) is displayed.
- If a steady-state condition does not occur during the measurement period, it is considered to be a fluctuating condition. The measured value of dc is displayed as Undef (undefined, IEC 61000-4-15 Ed1.1) or 0 (IEC 61000-4-15 Ed2.0), and the judgment is displayed as Error (IEC 61000-4-15 Ed1.1) or Pass (IEC 61000-4-15 Ed2.0).
- The short-term flicker value, Pst, is calculated, compared to the limit, and the judgment (pass or fail) is displayed.
- The judgment of items whose judgment is turned OFF is displayed as Undef.

8.1 Executing the Normal Voltage Fluctuation and Flicker Measurement

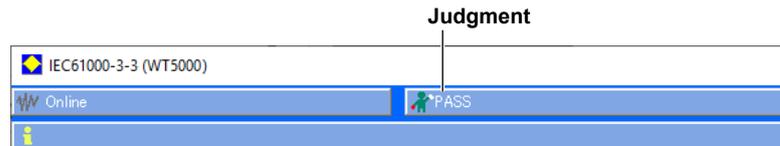
Judgment Display after Measurement

Once the test is finished, the overall judgment appears.

Display example: PASS



The overall judgment appears in the information area.



If all of the elements that are tested pass, PASS appears. Otherwise, FAIL appears.



PASS



Measurement ended without the relative voltage change ever having exceeded steady-state range d_{min} . (The measured values for dc, d_{max} , and T_{max} were all 0.)



A steady-state condition did not occur in one or more observation periods (equivalent to $dc = \text{Undef}$ in IEC 61000-4-15 Ed1.1).

* Does not appear when Ed1.1 is selected.



FAIL



NoData

Selecting a Test Mode

- To perform a normal voltage fluctuation and flicker measurement (General mode), select General.
- To measure d_{max} caused by manual switching (Manual d_{max} mode), select Manual.
- You can also select both General and Manual.

Initializing the Measurement

- The initialization takes approximately 30 s.
- Rms voltage U_n and voltage frequency F_{req} 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 U_n and Voltage Frequency F_{req}

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

Resetting a Test

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 7.2).

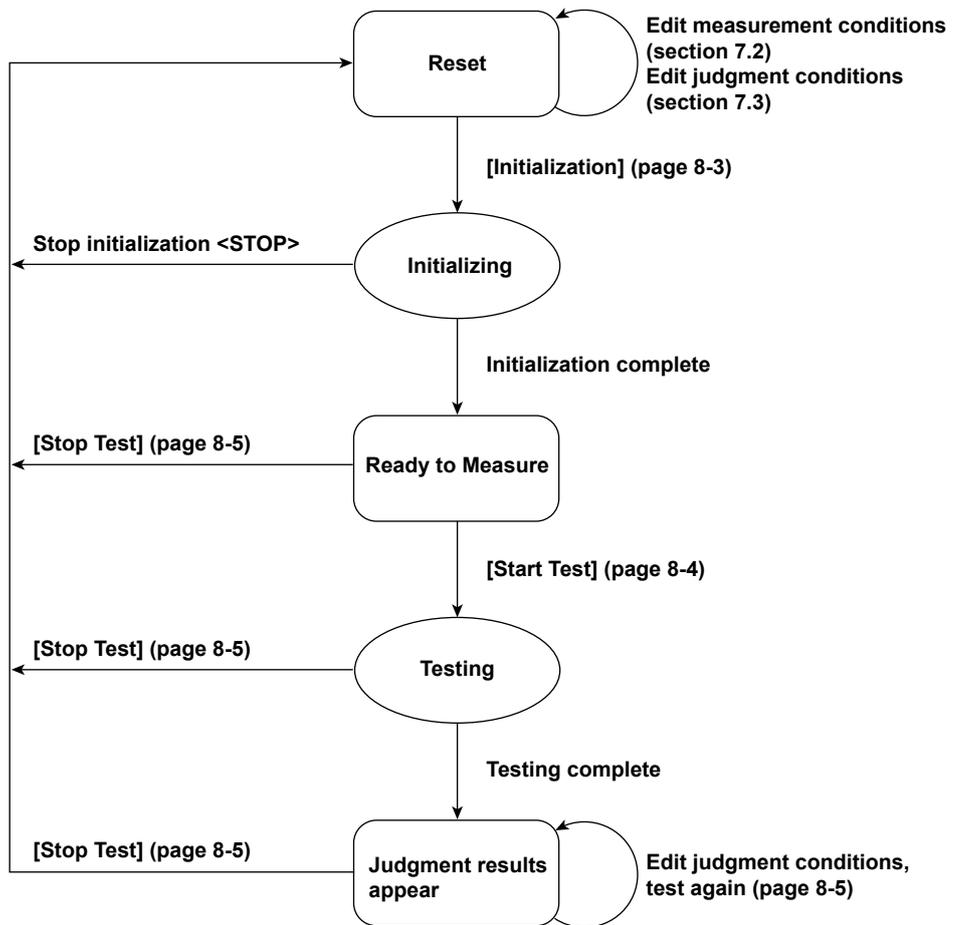
Flicker Measurement Status

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 (judgment by measurement item) and judgment (element judgment and overall judgment).

Normal Voltage Fluctuation and Flicker Measurement Flowchart

(Flicker Measurement Status Transitions)



Numbers in parenthesis indicate relevant sections or pages in the manual.
 Brackets are used to indicate buttons or icons.
 Greater than and less than signs are used to indicate buttons (i.e. <Stop Test>).

8.2 Executing the Measurement of dmax Caused by Manual Switching

Measurement of dmax caused by manual switching is executed.

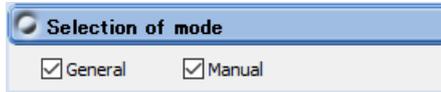
Measures the maximum relative voltage change, dmax, when the EUT switch is manually turned ON and OFF, determines the average over 24 measurements, and compares and judges against the limit.

Procedure

1. Select the  icon in the menu area. The Measure submenu appears. For general information about the Measure submenu, see section 8.1.

Selecting a Test Mode

2. Select **Manual**. You can also select both General and Manual.

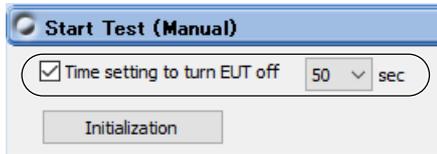


Selection of mode

General Manual

Setting the Time Marker

3. Select the **Time setting** check box under Start Test (Manual).  appears above the Interval bar in the upper portion of the setting and display area.
4. Set **Time setting** to 1 to 60 seconds.



Start Test (Manual)

Time setting to turn EUT off 50 sec

Initialization



Count 0/12

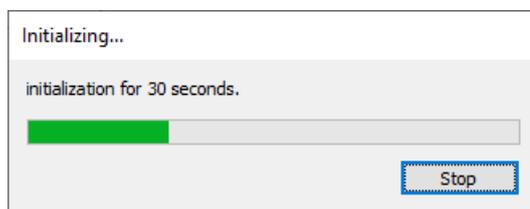
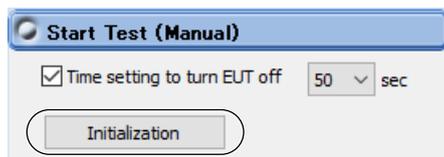
Interval 0m00s/10m00s

Starting a Compliancy Test

Check that the software is in On-Line mode and that the flicker measurement status is Reset (when the status is Reset, the measured values are reset and initialization can be performed). If the status is not Reset, follow the procedure described on page 8-16, "Resetting a Test" to set the flicker measurement status to Reset.

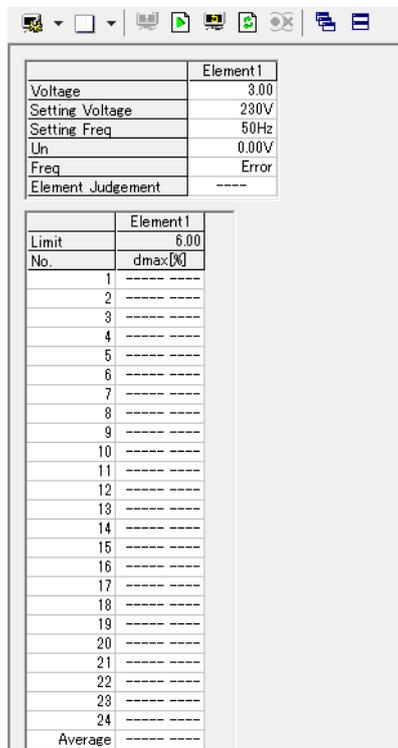
Initializing a Test

Click **Initialization** under Start Test (Manual) or click the  button. The initialization dialog box appears, and initialization begins.



Once initialization is complete, the initialization dialog box will automatically close, and the Numeric View window will display:

- The current measured values for Un[V] and Freq[Hz].
- "----" for dmax[%].

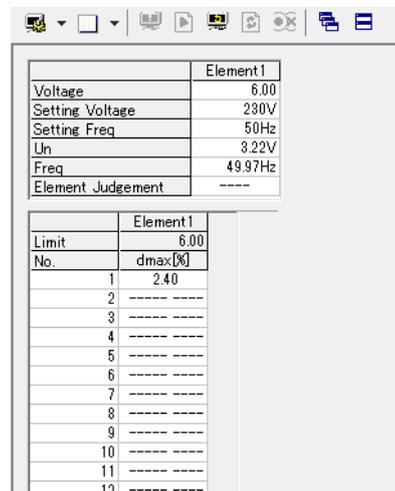
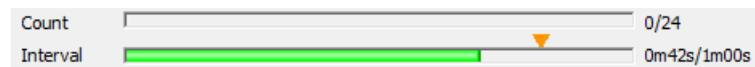
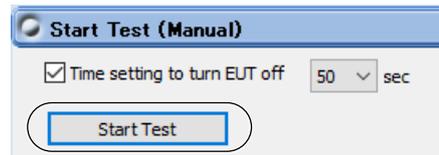


8.2 Executing the Measurement of dmax Caused by Manual Switching

Starting a Test

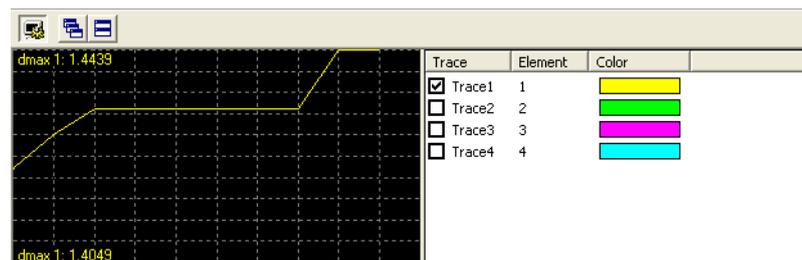
1. Click **Start Test** under Start Test (Manual) or click the  button. The Numeric View window will display:
 - Fixed values for Un[V] and Freq[Hz]
 - The maximum value for dmax during the current observation period in light blue.

The bar and numbers next to Interval indicate how much time has passed. The bar and numbers next to Count indicate how many observation periods have finished. The measurement results appear in the Trend Graph View window.



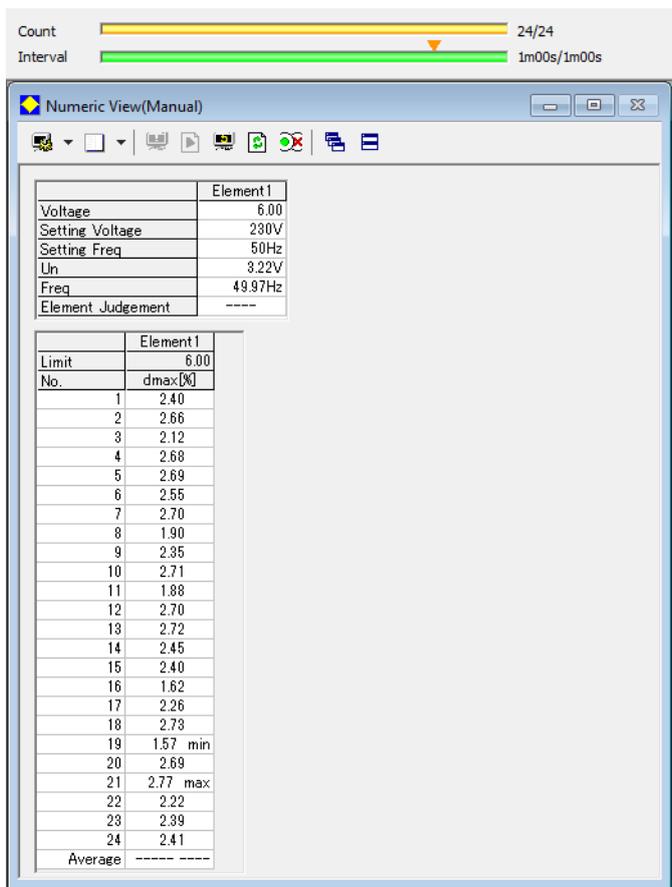
Element 1	
Voltage	6.00
Setting Voltage	230V
Setting Freq	50Hz
Un	3.22V
Freq	49.97Hz
Element Judgement	-----

Element 1	
Limit	6.00
No.	dmax [%]
1	2.40
2	-----
3	-----
4	-----
5	-----
6	-----
7	-----
8	-----
9	-----
10	-----
11	-----
12	-----



2. 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).
3. 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.

- Repeat steps 1 and 3 to measure dmax 24 times.



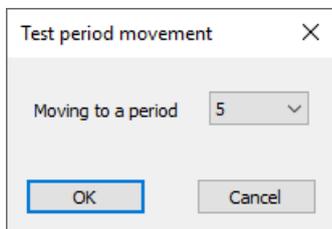
Remeasuring by Shifting the Observation Period

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

- Click on the toolbar. The Move dialog box opens.
- Select the number of the observation period you want to re-measure.

Note

You can only shift to and remeasure observation periods that have already been measured.

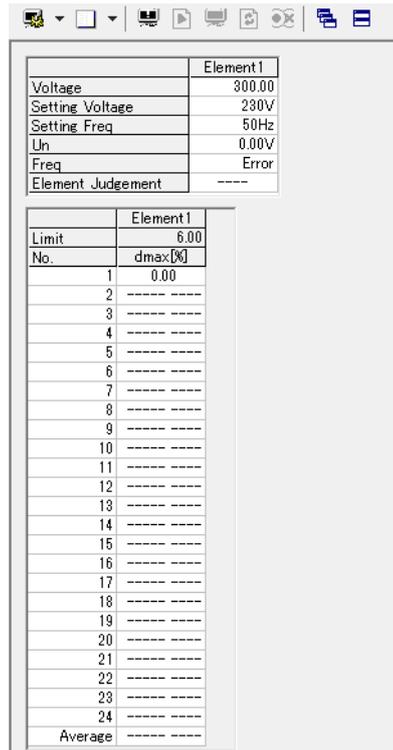
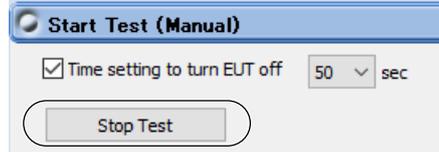


- Carry out steps 2 to 4 to measure dmax.
If you start the re-measurement, the measurement count and graph display shown in Count decrease by one. In addition, the total elapsed time of measurement decreases by one observation period.
- If you want to continue with the measurement, repeat steps 2 to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

8.2 Executing the Measurement of dmax Caused by Manual Switching

Stopping a Test

1. Click **Stop Test** in the Start Test (Manual) box or click  on the toolbar to stop the measurement. The measured data and test results are discarded, and Interval and Count in the Numeric View window are cleared.



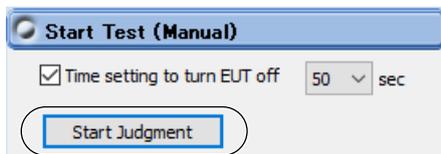
The image shows the Numeric View window with a toolbar at the top. It contains two tables. The first table shows test parameters for Element 1. The second table shows a limit table for Element 1.

	Element 1
Voltage	300.00
Setting Voltage	230V
Setting Freq	50Hz
Un	0.00V
Freq	Error
Element Judgement	----

Limit	Element 1
No.	dmax[%]
1	0.00
2	-----
3	-----
4	-----
5	-----
6	-----
7	-----
8	-----
9	-----
10	-----
11	-----
12	-----
13	-----
14	-----
15	-----
16	-----
17	-----
18	-----
19	-----
20	-----
21	-----
22	-----
23	-----
24	-----
Average	-----

Completing the Measurement and Displaying the Judgment

1. Check that the measurement of all observation periods (24) is complete, and that the dmax data of each observation period is displayed.
2. Click **Start Judgment** under Start Test (Manual) or click the  button. 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 judgment of the average of the measured dmax are displayed.



Element 1	
Voltage	6.00
Setting Voltage	230V
Setting Freq	50Hz
Un	3.22V
Freq	49.95Hz
Element Judgement	Pass

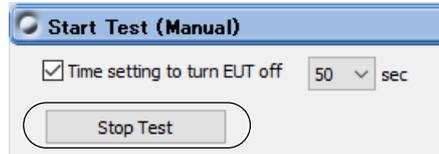
Element 1	
Limit	6.00
No.	dmax [%]
1	2.40
2	2.66
3	2.12
4	2.68
5	2.69
6	2.55
7	2.70
8	1.90
9	2.35
10	2.71
11	1.88
12	2.70
13	2.72
14	2.45
15	2.40
16	1.62
17	2.26
18	2.73
19	1.57 min
20	2.69
21	2.77 max
22	2.22
23	2.39
24	2.41
Average	2.42 Pass

Changing the Judgment Conditions and Re-judging the Measured Data

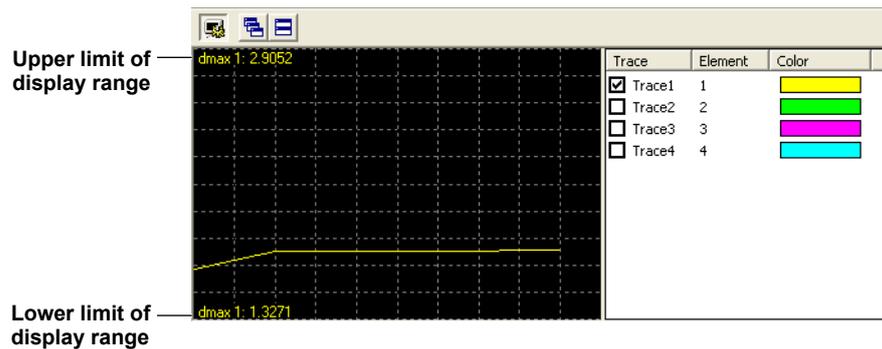
When the measurement of dmax caused by manual switching is complete, change the judgment conditions according to the procedure given in section 7.3, "Setting the WT5000 Judgment Conditions." If you change the judgment conditions, the average data of the measured dmax is re-judged, and the judgment is updated.

Resetting a Test

1. Click **Stop Test** in the Start Test (Manual) box or click  on the toolbar to reset the measurement. The measured data and test results are discarded, and Interval and Count in the Numeric View window are cleared.



Setting the Trend Graph Traces



Trace

Select the trends you want to display (select or clear the check boxes). Up to 4 trends can be displayed.

Element

Select the element to be displayed.

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

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.

Explanation

Time Marker

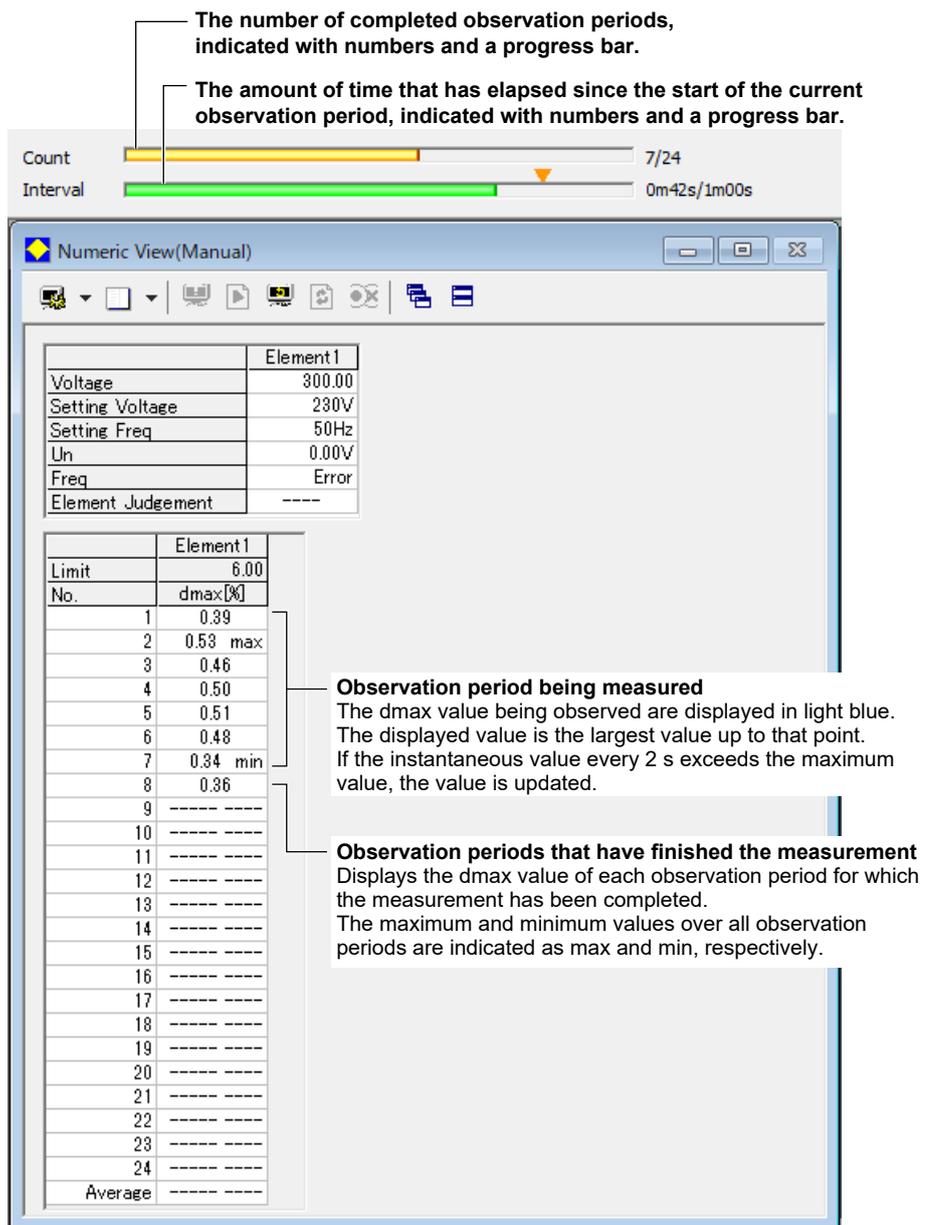
One way you can use the time marker is as a reminder of when to turn OFF the power supply of an EUT that does not turn OFF immediately after it is switched OFF.

 appears above the Interval bar at the top of the setting and display area when you select the Time setting check box.

You can set the time marker to a value from 1 to 60 seconds.

Display during Measurement

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



The screenshot shows a control panel at the top with two progress bars. The first bar is labeled 'Count' and shows '7/24'. The second bar is labeled 'Interval' and shows '0m42s/1m00s'. Below this is a window titled 'Numeric View(Manual)' containing two tables.

Table 1: Measurement Settings

	Element 1
Voltage	300.00
Setting Voltage	230V
Setting Freq	50Hz
Un	0.00V
Freq	Error
Element Judgement	----

Table 2: Measurement Results

Limit	Element 1
No.	dmax [%]
1	0.39
2	0.53 max
3	0.46
4	0.50
5	0.51
6	0.48
7	0.34 min
8	0.36
9	----
10	----
11	----
12	----
13	----
14	----
15	----
16	----
17	----
18	----
19	----
20	----
21	----
22	----
23	----
24	----
Average	----

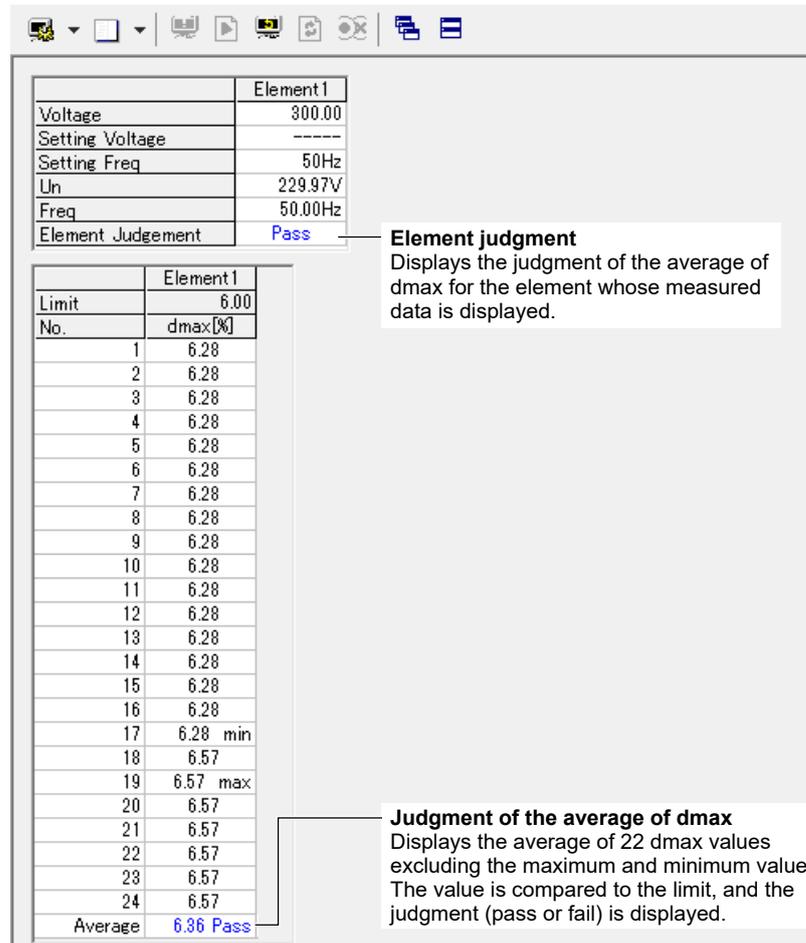
Annotations:

- The number of completed observation periods, indicated with numbers and a progress bar.** (Points to the 'Count' bar)
- The amount of time that has elapsed since the start of the current observation period, indicated with numbers and a progress bar.** (Points to the 'Interval' bar)
- 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.

8.2 Executing the Measurement of dmax Caused by Manual Switching

Judgment 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 Test

- 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 Test

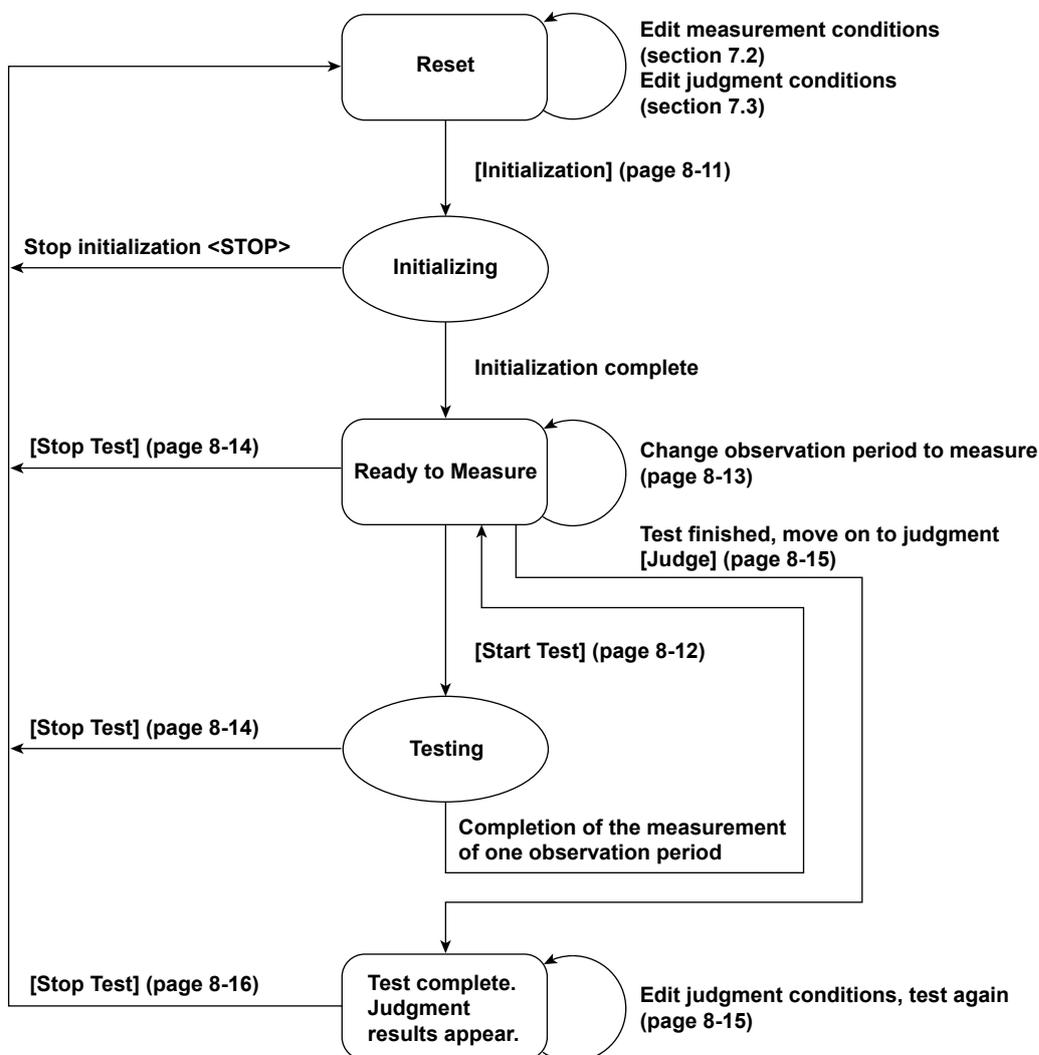
To initialize and restart the measurement, reset the measurement after the measurement of dmax caused by manual switching is complete and the flicker measurement status is indicating Complete. You cannot initialize or start the measurement in the Complete status. In addition, reset the measurement to change the measurement conditions of the the measurement of dmax caused by manual switching (section 7.2).

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 (judgment by measurement item) and judgment (element judgment and overall judgment).

Flow Chart of the Measurement of dmax Caused by Manual Switching
(Transition Diagram of the Flicker Measurement Status)

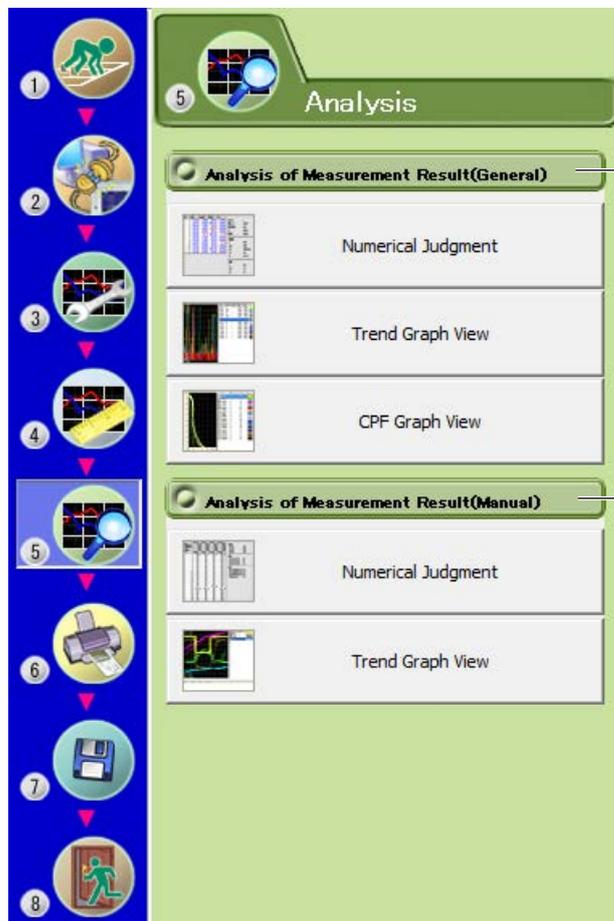


Numbers in parenthesis indicate relevant sections or pages in the manual.
 Brackets are used to indicate buttons or icons.
 Greater than and less than signs are used to indicate buttons (i.e. <Stop Test>).

9.1 Displaying Numerical Judgments

Procedure

1. Select the  icon in the menu area. The Analysis submenu appears.



Analysis of Measurement Result (General)
 You can view normal voltage fluctuation and flicker measurement (General mode) results using the following displays:

- Numerical judgment (page 9-2)
- Trend graph (section 9.2)
- CPF graph (section 9.3)

Analysis of Measurement Result (Manual)
 You can view measurement of dmax caused by manual switching (Manual dmax mode) results using the following displays:

- Numerical judgment (page 9-3)
- Trend graph (section 9.2)



Window arrangement buttons
 For details, see chapter 12.



Displays cascaded windows



Displays tiled windows

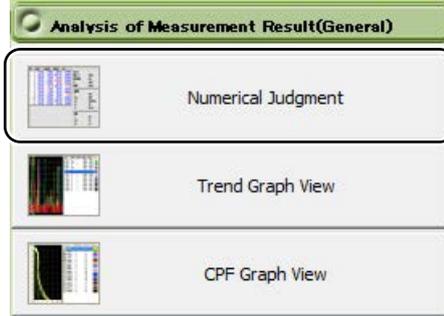
Note

Notes when switching to the Measure window

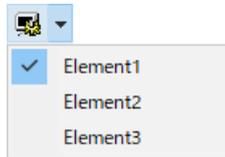
While in the Analysis window, if you click the Measure icon and switch to the Measure window, the measured data will be discarded. Save the data if you do not want it to be discarded (see chapter 11 for information on how to save data).

Displaying Numerical Judgments for Normal Voltage Fluctuation and Flicker Measurements (General Mode)

- Click **Numerical Judgment** under Analysis of Measurement Result (General).
The numerical judgment display window will appear and show numerical values and judgments for the selected element.



- Click and select which element's numerical judgment you want to display.



Note

- You can only select Numeric Data and Judgment in Off-Line mode with the measured data loaded.
- In On-Line mode, the numeric data and judgment view is displayed for the element that is selected in the measurement conditions of the WT.

Normal Voltage Fluctuation and Flicker Measurement

Measurement conditions

Element 1	
Voltage	15.00V
Setting Voltage	230V
Setting Freq	50Hz
Un	5.07V
Freq	49.94Hz
Element Judgement	Fail

Element judgment

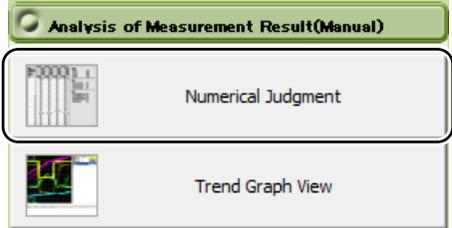
Limit	Element 1	3.30	4.00	500/3.30	1.00	0.65 12N
No.	dc[%]	dmax[%]	Tmax[ms]	Pst	Plt	
1	0.21 Pass	0.53 Pass	0.00 Pass	0.13 Pass		
2	19.77 Fail	20.08 Fail	995.80 Fail	12.14 Fail		
3	0.22 Pass	0.56 Pass	0.00 Pass	0.13 Pass		
4	2.35 Pass	2.36 Pass	0.00 Pass	0.92 Pass		
5	2.01 Pass	4.31 Fail	1500.00 Fail	2.29 Fail		
6	0.00 Pass	0.00 Pass	0.00 Pass	0.02 Pass		
7	0.00 Pass	0.00 Pass	0.00 Pass	0.02 Pass		
8	0.00 Pass	0.00 Pass	0.00 Pass	0.02 Pass		
9	0.00 Pass	0.00 Pass	0.00 Pass	0.02 Pass		
10	0.00 Pass	0.00 Pass	0.00 Pass	0.02 Pass		
11	0.00 Pass	0.00 Pass	0.00 Pass	0.02 Pass		
12	0.00 Pass	0.00 Pass	0.00 Pass	0.02 Pass		5.31 Fail

Limit

Measured value and judgment for each observation period

Displaying Numerical Judgments for Measurements of dmax Caused by Manual Switching (Manual dmax mode)

- 2. Click **Numerical Judgment** under Analysis of Measurement Result (Manual). The numerical judgment display window will appear and show numerical values and judgments for each element that was measured.



Measurement of dmax Caused by Manual Switching

Element 1	
Voltage	300.00
Setting Voltage	230V
Setting Freq	50Hz
Un	0.00V
Freq	Error
Element Judgment	----

Measurement conditions

Element judgment

Element 1	
Limit	6.00
No.	dmax[%]
1	0.00
2	0.53
3	0.00
4	0.00
5	0.00
6	0.00
7	0.00
8	0.00
9	0.58 max
10	0.00
11	0.00
12	0.00
13	0.00
14	0.00
15	0.00
16	0.00
17	0.00
18	0.00
19	0.00
20	0.00
21	0.32 min
22	0.00
23	0.00
24	0.00
Average	----

Limit

Measured value and judgment for each observation period

Judgment of the average of dmax

Explanation

Measurement Conditions

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

Limit

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

Measured Value and Judgment for Each Observation Period

Normal Voltage Fluctuation and Flicker Measurement

- The final values of dc, dmax, and Tmax are compared with the respective limits, and the judgment (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 measured value of dc is displayed as Undef (undefined, IEC 61000-4-15 Ed1.1) or 0 (IEC 61000-4-15 Ed2.0), and the judgment is displayed as Error (IEC 61000-4-15 Ed1.1) or Pass (IEC 61000-4-15 Ed2.0).
- The short-term flicker value, Pst, is calculated, compared to the limit, and the judgment (pass or fail) is displayed.
- The judgment of items whose judgment 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.

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

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

Judgment 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 judgment (pass or fail) is displayed.

Element Judgment

Normal Voltage Fluctuation and Flicker Measurement

For elements whose measured data is displayed, if the judgment of all items whose judgment 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 judgment of the average of dmax for the element whose measured data is displayed.

Overall Judgment

If the judgment 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.

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.

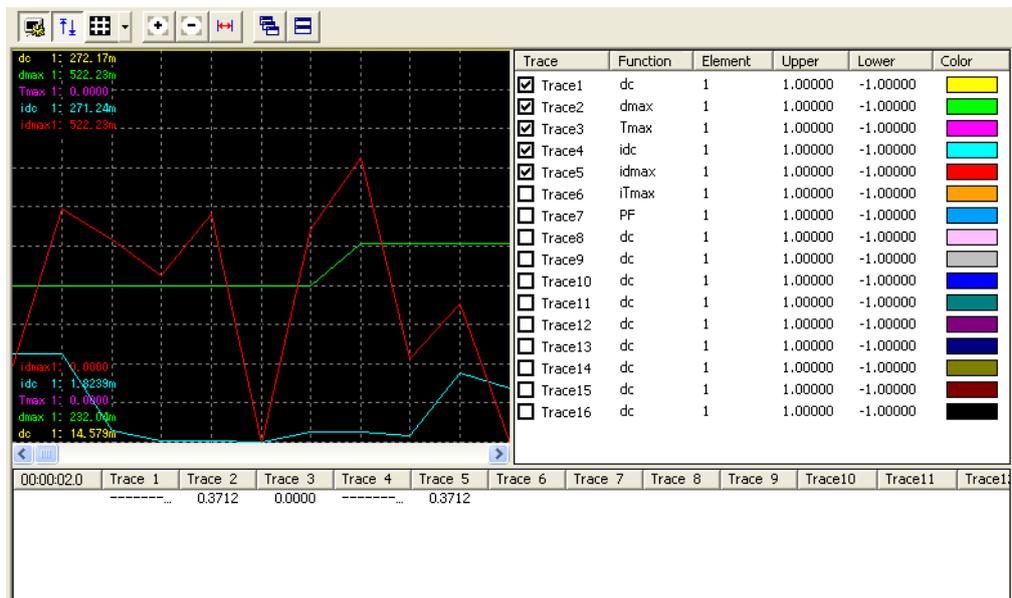
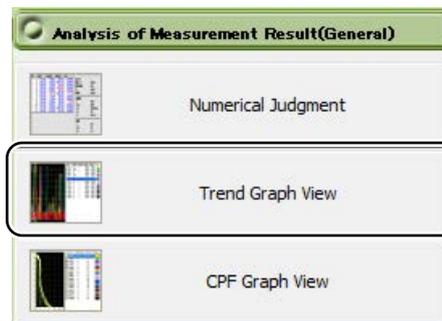
9.2 Displaying Trend Graphs

Procedure

1. Select the  icon in the menu area. The Analysis submenu appears. For general information about the Analysis submenu, see section 9.1.

Displaying Trend Graphs for Normal Voltage Fluctuation and Flicker Measurements (General Mode)

2. Click **Trend Graph View** under Analysis of Measurement Result (General). The trend graph display window appears.

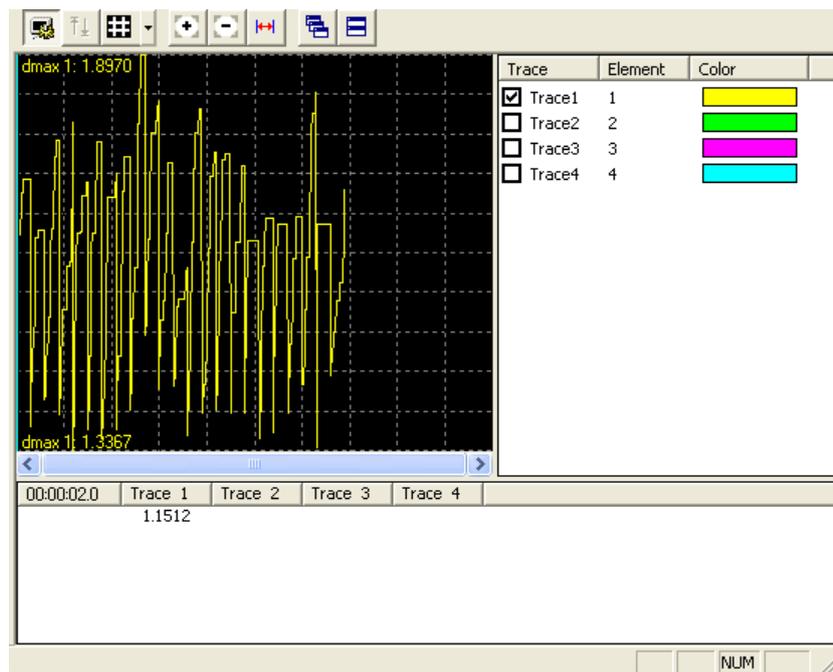
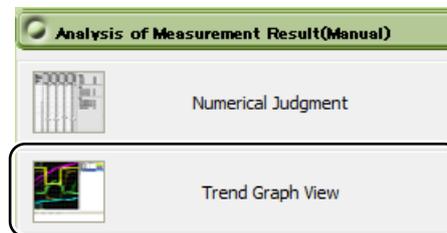


Note

- 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.

Displaying Trend Graphs for Measurements of dmax Caused by Manual Switching (Manual dmax mode)

- Click **Trend Graph View** under Analysis of Measurement Result (Manual). The trend graph display window appears.



Note

- 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.

9.2 Displaying Trend Graphs

Setting the Trend Graph

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

Auto Ranging

- **If the Auto Ranging Button Is Selected**

The range automatically switches according to the retrieved value.

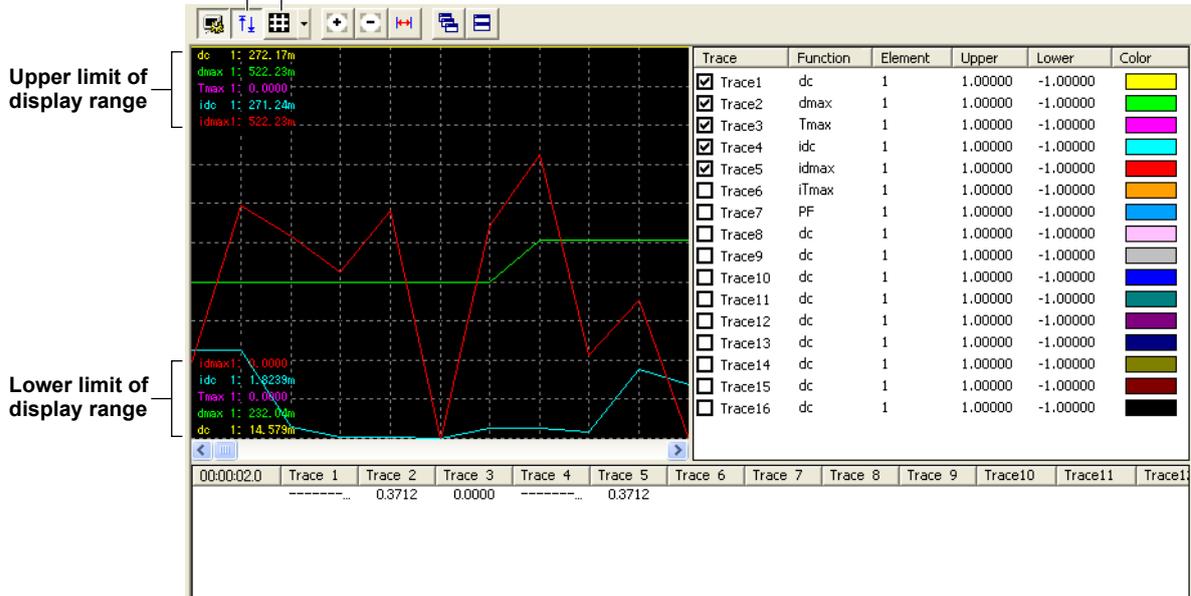
- **If the Auto Ranging Button Is Not Selected**

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).

Graticule

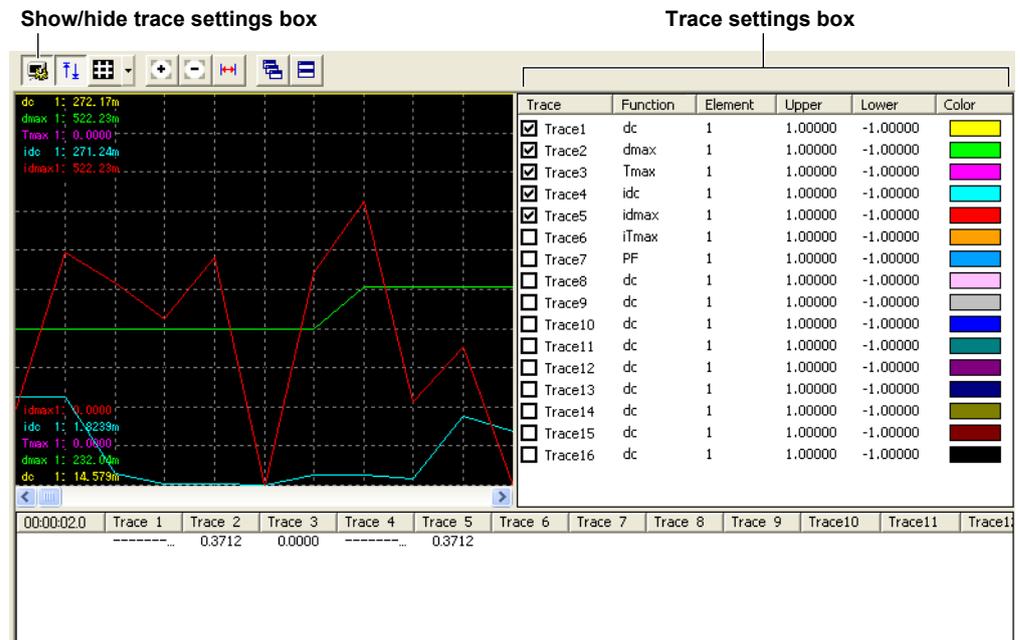
Select the grid type to be displayed in the trend display area (Dotted, Line, or None).

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



Setting the Trace

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



Trace

Select the trends you want to display (select or clear the check boxes).

Function

Select the measurement function to be displayed. You can only select what measurement functions to display for normal voltage fluctuation and flicker measurement (General mode). In Manual dmax mode (measurement of dmax caused by manual switching), the only function that is displayed is dmax.

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
 - Tmax Period during which relative voltage change exceeds the threshold level
 - idc Instantaneous relative steady-state voltage change
 - idmax Instantaneous maximum relative voltage change
 - iTmax Period during which instantaneous relative voltage change exceeds the threshold level
 - PF Instantaneous flicker sensation (IFS)
- The measured value for PF is displayed at every 1-ms interval.
- The measured values for all measurement functions other than PF are displayed at every 2-s interval.

9.2 Displaying Trend Graphs

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 for normal voltage fluctuation and flicker measurement (General mode). In Manual dmax mode (measurement of dmax caused by manual switching), the display range of the trend display is fixed to auto 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.

Zooming In/Out

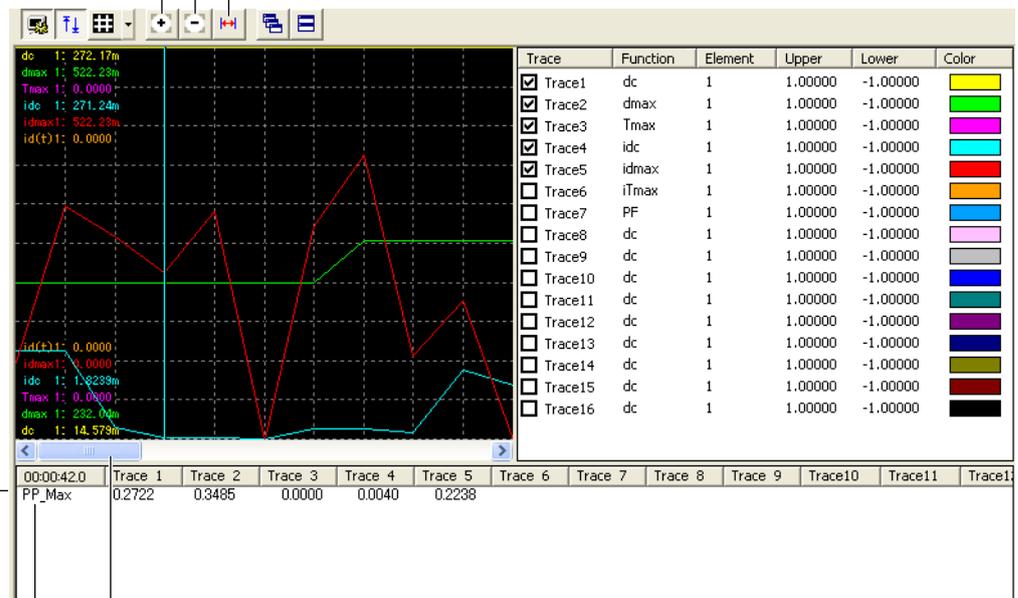
Zoom in

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

Zoom out

Each time you click Zoom-, the display is reduced. You can zoom out to the elapsed time in the trend display area.

Display all: Displays the whole measurement time

**Slider**

Drag the slider to the desired time position on the waveform.

PP_Max

In the trend display, if not all the measured values can be displayed because the specified time axis value is set too high, measured values are P-P compressed and displayed.*

When this occurs, PP_Max is displayed here. For example, if the measured values for PF are being displayed but the measured values for every 1-ms interval will not fit on the trend graph, the P-P compressed measured values are displayed.

To display values without P-P compression, zoom in on the time axis.

* P-P Compression (Peak-to-Peak Compression)

In P-P compression, a maximum and minimum value are extracted from the values measured over a given period of time and are used to produce a compressed measured value. For details, see the WT5000 Features Guide (IM WT5000-01EN).

Cursor

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

Note

When you zoom in on the time axis display, you can move the cursor in 1-ms intervals. The measured data at the cursor location will be displayed in the following ways:

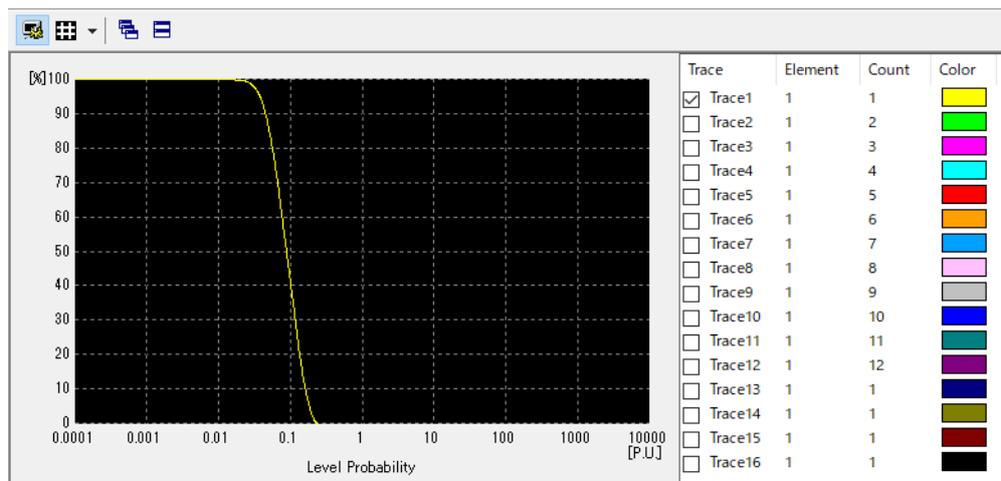
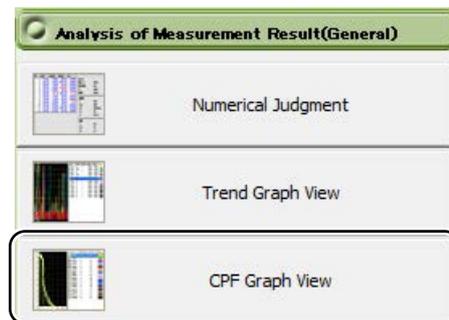
- The measured value for PF is displayed at every 1-ms interval.
- The measured values for all measurement functions other than PF are displayed using values interpolated from the data measured at every 2-s interval.

9.3 Displaying a CPF Graph

1. Select the  icon in the menu area. The Analysis submenu appears. For general information about the Analysis submenu, see section 9.1.

Displaying a CPF Graph for Normal Voltage Fluctuation and Flicker Measurements (General Mode)

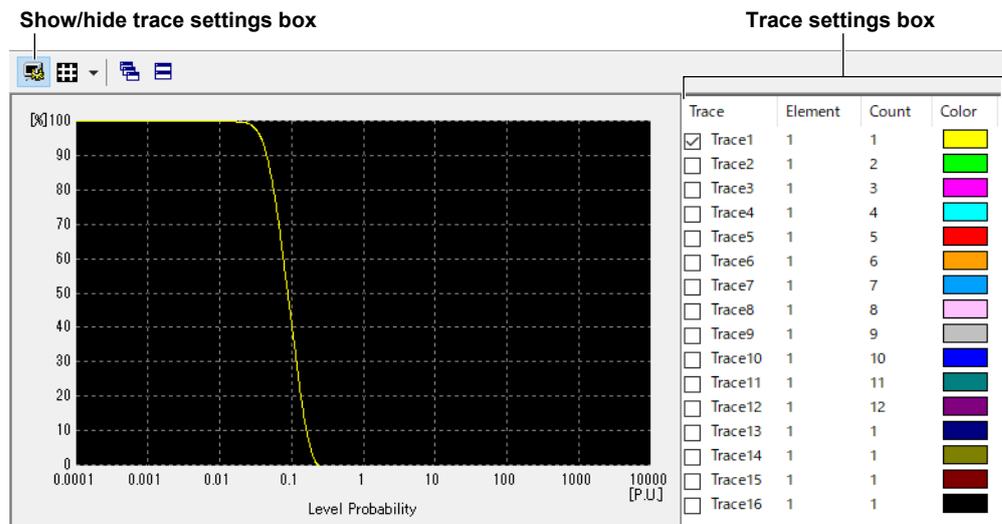
2. Click **CPF Graph View** under Analysis of Measurement Result (General). The CPF graph display window appears.



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 cannot display the CPF graph during measurement.

Setting the Trace



Trace

Select the trends you want to display (select or clear the check boxes).

Element

Select the element to be displayed.

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

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.

Count

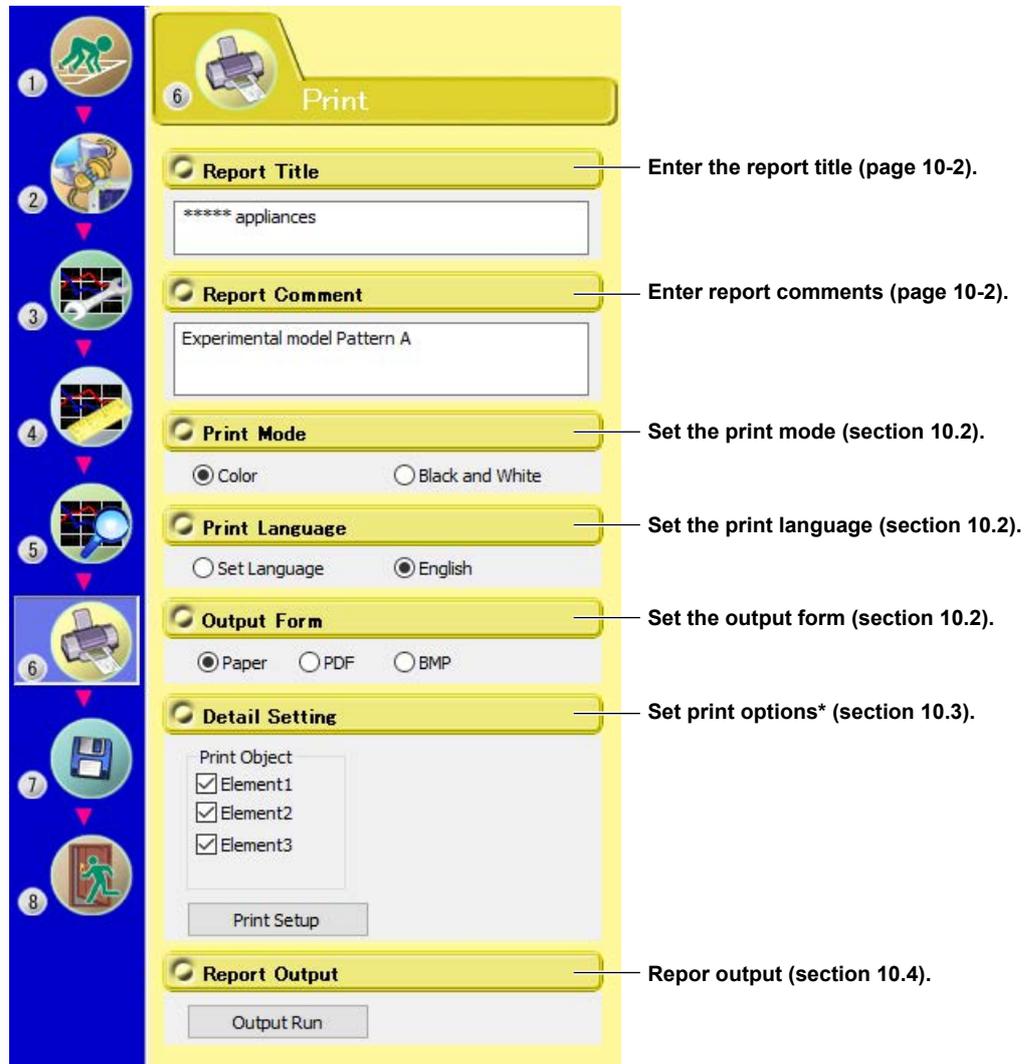
Selects the observation period to be displayed on the CPF graph.

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

10.1 Setting a Report's Title and Comments

Procedure

1. Select the  icon in the menu area. The Print submenu appears.



The screenshot shows a software interface with a vertical menu on the left and a 'Print' submenu on the right. The menu items are numbered 1 through 8. The 'Print' submenu is highlighted in yellow and contains several sections:

- Report Title:** A text input field containing '***** appliances'. An annotation points to this field: 'Enter the report title (page 10-2)'. This section is associated with step 1.
- Report Comment:** A text input field containing 'Experimental model Pattern A'. An annotation points to this field: 'Enter report comments (page 10-2)'. This section is associated with step 2.
- Print Mode:** Radio buttons for 'Color' (selected) and 'Black and White'. An annotation points to this section: 'Set the print mode (section 10.2)'. This section is associated with step 3.
- Print Language:** Radio buttons for 'Set Language' and 'English' (selected). An annotation points to this section: 'Set the print language (section 10.2)'. This section is associated with step 4.
- Output Form:** Radio buttons for 'Paper' (selected), 'PDF', and 'BMP'. An annotation points to this section: 'Set the output form (section 10.2)'. This section is associated with step 5.
- Detail Setting:** A section titled 'Print Object' with three checked checkboxes: 'Element1', 'Element2', and 'Element3'. Below them is a 'Print Setup' button. An annotation points to this section: 'Set print options* (section 10.3)'. This section is associated with step 6.
- Report Output:** A section with an 'Output Run' button. An annotation points to this section: 'Repor output (section 10.4)'. This section is associated with step 7.

Step 8 points to the printer icon in the menu area.

10.1 Setting a Report's Title and Comments

Switches pages (elements)

Print

Zooms the print preview in or out

Print preview

***** appliances

Print Date : Thu Dec 19 11:07:23 2019
 MeasureDate : Thu Dec 19 11:02:25 2019
 Comment : Experimental model Pattern A

Regulation : IEC61000-3-3 E61.0
 IEC61000-4-15 E62.0
 Interval : 0Min32Sec
 Model : YOKOGAWA WT5000
 Wiring : three-phase 4wire
 Voltage Range : 0.00V
 Set Voltage : 230V
 Set Frequency : 50Hz
 Voltage UI : 3.22V
 Frequency UI : 49.953Hz
 Element : 1
 dmin : 1.00%

FAIL

Element1 : Fail
 dc (3.30%) : Pass
 dmax (4.00%) : Pass
 Tmax (500ms) : Fail
 Pst (1.00) : Fail
 Pst (0.85) : Fail

No.	dc(%)	dmax(%)	Tmax(ms)	Pst
1	3.30	4.00	0.00	0.85
2	2.33	2.32	0.00	1.38
3	0.00	0.00	0.00	0.02
4	0.00	0.00	0.00	0.02
5	0.00	0.00	0.00	0.02
6	2.33	2.82	0.00	1.38
7	0.00	0.00	0.00	0.02
8	0.00	0.00	0.00	0.02
9	2.33	2.78	0.00	1.40
10	0.00	0.00	0.00	0.02
11	0.00	0.00	0.00	0.02
12	2.40	2.82	0.00	1.38

Legend: █ Ok, █ Over

dc 3.30%

dmax 4.00%

Tmax 500ms

Pst 1.00

Pst 0.85

2. Enter the report title and the report comments in their respective boxes.

Report Title

***** appliances

Report Comment

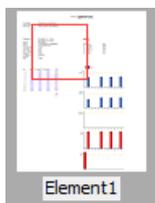
Experimental model Pattern A

Explanation

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

Print Preview Display Range

If the print preview is being zoomed in on, the displayed area is indicated with a red frame.

**Moving the Print Preview Display Range**

Drag the red frame (which indicates the display range) to move the display range.

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 can be entered.
Comment	Up to 1000 characters can be entered. Up to 90 characters can be displayed on one line. Up to 6 lines can be displayed.

10.2 Setting the Print Mode, Print Language and Output Form

Procedure

Selecting the Print Mode

1. Select Color or Black and White under Print Mode. When you change the print mode, the print preview in the setting and display area will change accordingly.



Print Mode

Color Black and White

Selecting a Print Language

2. Select English or Set Language under Print Language. When you change the print language, the print preview in the setting and display area will change accordingly.



Print Language

Set Language English

Selecting a Output Form

3. Select Paper, PDF or BMP under Output Form.



Output Form

Paper PDF BMP

Selecting the BMP Resolution

4. On the Option tab in the setting and display area of section 7.4, if you selected the “Setting display of BMP resolution” check box, select the BMP resolution.



Output Form

Paper PDF BMP

Explanation

Selecting the BMP Resolution

You can select the resolution from the following:

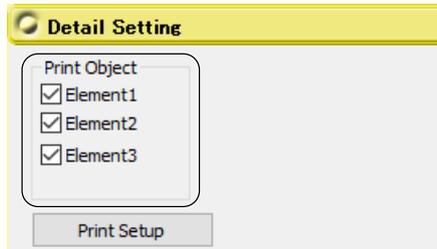
- Lowest: Approx. 2MB, 768 × 1024
- Low: Approx. 9MB, 1536 × 2048
- High: Approx. 36MB, 3072 × 4096
- Highest: Approx. 147MB, 6144 × 8192

10.3 Setting Print Details (Detail Setting)

Procedure

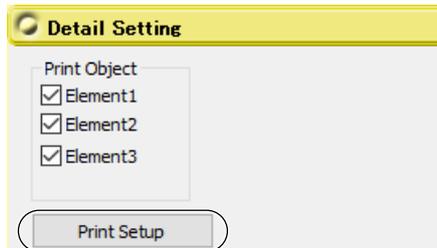
Selecting the Elements Whose Data You Want to Print

1. In the Print Object box, select the elements whose data you want to print.

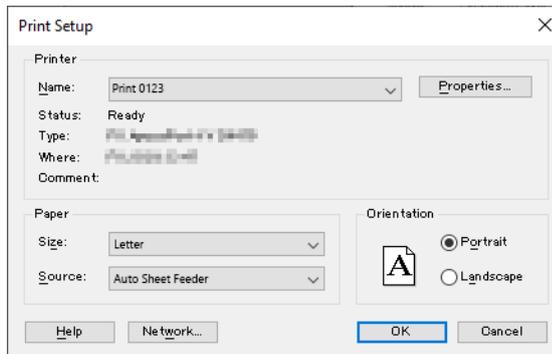


Setting Up the Printer

1. Choose **Print Setup**. The Print Setup dialog box opens.



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



Explanation

Selecting the Elements Whose Data You Want to Print

You can select the elements that were selected under Measure Object. The Measure Object setting is explained in section 7.2.

Print Setup

Make printer settings according to your system environment.

10.4 Printing

Procedure

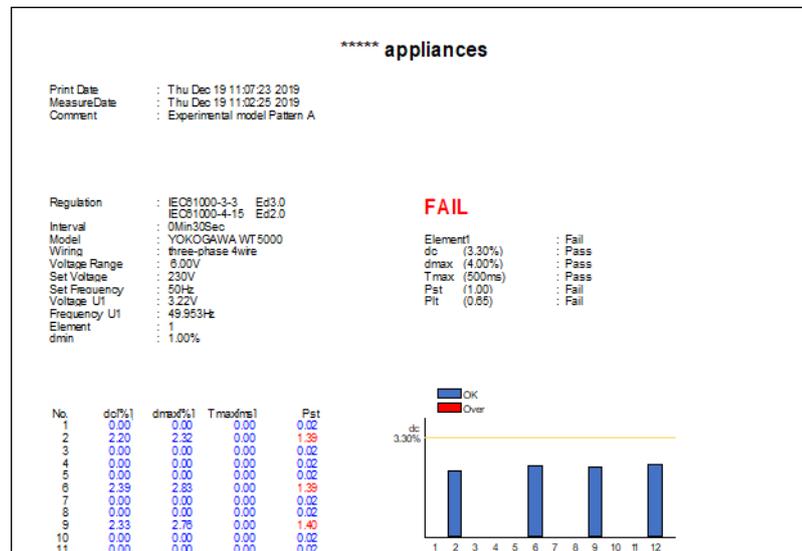
Printing a Report

You can print a report when measured data has been acquired or has been loaded from memory.

1. Click **Output Run**.
 - If Paper has been selected, proceed to step 2.
 - If PDF or BMP has been selected, proceed to step 3.



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



3. Set the **location** and **file name** to save to. Click **Save**. The report is saved in the specified output format (PDF or BMP).

Printing a Report Using the Print Button

1. Click the  button. A Print dialog box appears.
2. Enter appropriate settings for **Printer, Range, Copies**, etc. Click **OK**. The report is printed

Explanation

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

Printing Reports

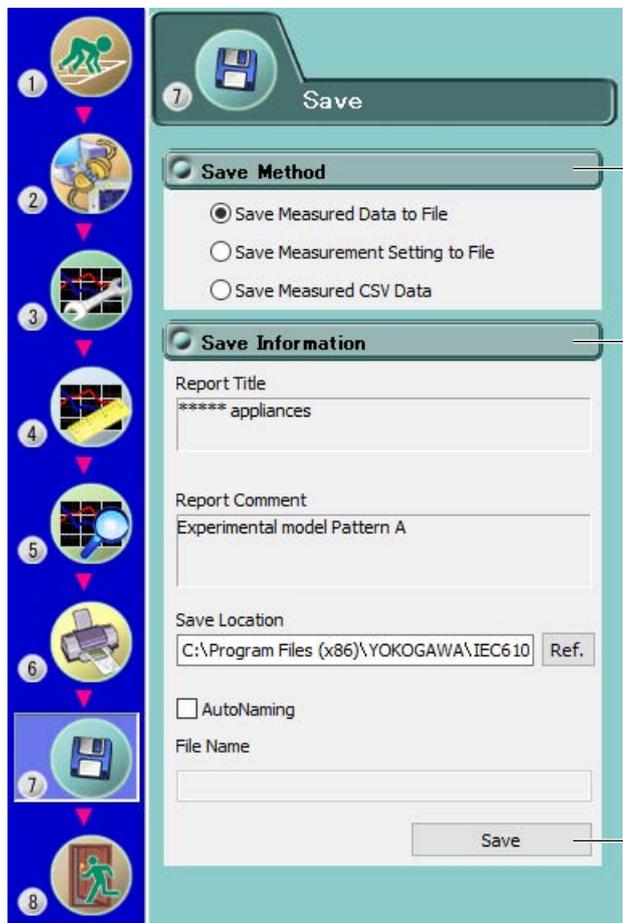
You can print a report when the measured data has been retrieved (or loaded).

You can print a report for each input element (see section 10.3).

11.1 Saving Setting Information and Measured Data

Procedure

1. Select the  icon in the menu area. The Save submenu appears.



The screenshot shows a software interface with a vertical menu on the left and a 'Save' submenu on the right. The menu items are numbered 1 through 8. The 'Save' submenu is open, showing options for 'Save Method' and 'Save Information'. Callouts point to specific fields and buttons in the submenu.

Save Method (page 11-2)
Select the type of data to save and the file format to save it to.

Save Information (page 11-2)
Set the location and file name to save to.

Execute save operation (page 11-2)

11.1 Saving Setting Information and Measured Data

Configuring File Information Display Settings

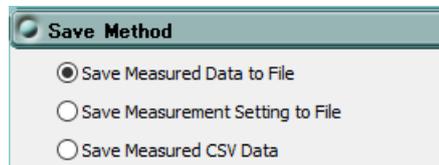
1. Right-click on the file information heading area at the top of the setting and display area. A list of the different types of information that can be displayed appears.
2. Select the type of information that you want to be displayed.

Date	Report Title	Report Comment	General Data	Manual Data	File Name	Element
2019/12/03 17:57:10	✓ Date	.. *	.. *	-	M303_201...	5% 5% 5% 30% 30% 30%
2019/12/03 18:11:49	✓ Report Title	.. *	.. *	-	M303_201...	5% 5% 30% 30% 30% 30%
2019/12/03 18:11:56	✓ Report Comment	.. *	.. *	-	M303_201...	5% 5% 30% 30% 30% 30%
2019/12/03 18:12:02	✓ General Data	.. *	.. *	-	M303_201...	5% 5% 30% 30% 30% 30%
	✓ Manual Data					
	✓ File Name					
	✓ Element					

Saving the Measured Data

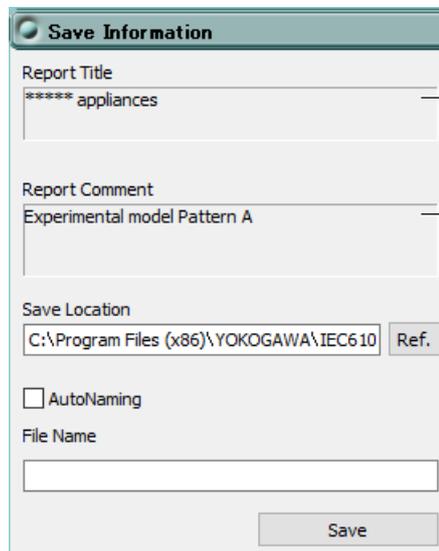
You can save the measured data when the measured data has been retrieved (or loaded).

1. Select **Save Measured Data to File**.



The 'Save Method' dialog box contains three radio button options: 'Save Measured Data to File' (selected), 'Save Measurement Setting to File', and 'Save Measured CSV Data'.

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



The 'Save Information' dialog box has the following fields and controls:

- Report Title: ***** appliances
- Report Comment: Experimental model Pattern A
- Save Location: C:\Program Files (x86)\YOKOGAWA\IEC610 Ref.
- AutoNaming:
- File Name: (empty text box)
- Save: (button)

Section 10.1 explains how to set report titles and comments.

Note

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

Saving the Setting Information

1. Select **Save Measurement Setting to File**.

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

Section 10.1 explains how to set report titles and comments.

Note

You cannot save the setting information while the measurement is in progress.

Explanation

Kinds of File Information

- Date: When the file was saved.
Displayed in this format: year/month/day hour:minute:second
- Report Title (See section 10.1)
- Report Comment (See section 10.1)
- General Data: If data acquired in General mode (normal voltage fluctuation and flicker measurement) is contained in the file, an asterisk appears here.
- Manual Data: If data acquired in Manual mode (measurement of dmax caused by manual switching) is contained in the file, an asterisk appears here.
- Element (See section 5.1)

When measured data of the WT3000E/WT3000 series is loaded

- “*(Old)” appears in the General Data and Manual Data columns of the file information display area.
- You cannot perform rejudgment by changing the conditions of the standard because this is an offline analysis.

Sorting the file list

You can sort the list of loaded files in ascending or descending order by clicking an item heading area. The sorted item heading area shows ^ (ascending) or v (descending).

Saving Measured Data

You can use this software to save the measured voltage fluctuation and flicker data that the PC has acquired from the WT to a file. When the software saves this data, it will also save the WT voltage fluctuation and flicker measurement conditions along with the setting information described below.

File Name/Extension

- You can select any file name that the PC will recognize.
- When you choose to save a file, two files will be saved with the same file names but with these different extensions:

Extension: .fdt Measured data
.ini Setting information

Saving Setting Information

When in online mode, the software can save the following setting information to a file.

- Measurement and judgment conditions (see chapter 7)
- Graph display settings (see sections 9.2 and 9.3)
- Report titles and comments (see section 10.1)

File Name/Extension

You can select any file name that the PC will recognize.

Extension: .ini

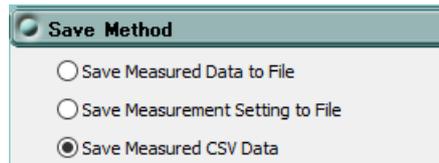
11.2 Saving Measured Data as a Report in CSV Format

You can save measured data as a report in CSV format.

Note

You cannot save measured data in CSV format while measurement is taking place.

1. Select **Save Measured CSV Data**.



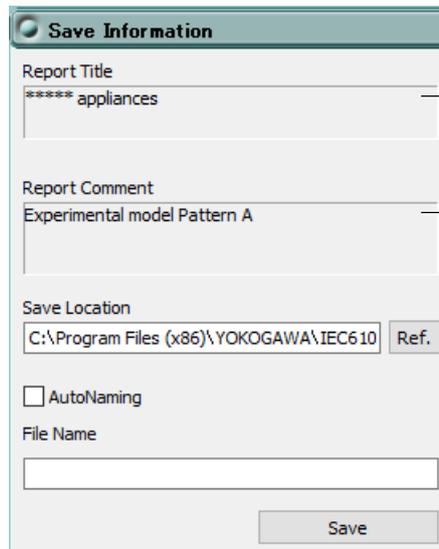
Save Method

Save Measured Data to File

Save Measurement Setting to File

Save Measured CSV Data

2. Specify the **Save Location**, and enter the file name in the **File Name** box.
3. Click **Save**. The measured data is saved to CSV format.



Save Information

Report Title
***** appliances

Report Comment
Experimental model Pattern A

Save Location
C:\Program Files (x86)\YOKOGAWA\IEC610 Ref.

AutoNaming

File Name

Save

Section 10.1 explains how to set report titles and comments.

11.2 Saving Measured Data as a Report in CSV Format

Explanation

This section explains how to save measured data as a report in CSV file format. When you save the data in CSV format, you can view it using a PC spreadsheet program (such as Microsoft Excel).

File Name/Extension

You can select any file name that the PC will recognize.

Extension: .csv

If AutoNaming is not used when saving to a CSV file, the file is saved with the following name.

"Text written in the file name box" + "_CSV".csv

Example of Measured Data Saved to CSV Format and Then Opened Using Microsoft Excel

	A	B	C	D	E	F	G	H	I
1	<< General >>								
2	Title :***** appliances								
3	PrintDate(MeasureDate) : Mon Feb 25 09:01:23 2019(Thu Mar 26 13:56:32 2009)								
4	Comment : Experimental model Pattern A								
5	Regulation : IEC61000-3-3 Ed3.0 IEC61000-4-15 Ed2.0								
6	Interval : 10Min00Sec								
7	Model : YOKOGAWA WT5000								
8	Wiring : 1 P2W								
9	Voltage Range : 300.00V								
10	Set Voltage : ---								
11	Voltage U1 : 229.97V								
12	Set Frequency : 50Hz								
13	Frequency U1 : 49.999Hz								
14	Element : 1								
15	dmin : 0.10%								
16	Element : Fail								
17	Total Element : Fail								
18									
19	dc (3.30%) : Pass								
20	dmax (4.00%) : Fail								
21	d(t) (500ms) : Fail								
22	Pst (1.00%) : Fail								
23	Plt (0.65) : Fail								
24									
25	No.		dc[%]		dmax[%]		Tmax[ms]		pst
26		1	1.74		1.75		0		0.47
27	Observation periods	2	3.04		3.49		360.01		0.48
28		3	0.88		1.75		0		0.51
29		4	3.04		3.48		600		0.52
30		5					0		0.47
31		6				120.01			2.15
32		7				0			0.51
33		8	1.74		1.74		0		0.5
34		9	0.44		3.28		0		1.27
35		10	0.87		0.87		0		0.46
36		11	2.61		3.49		220.01		0.51
37		12	0.44		0.87		0		0.48
38									
39							Plt		1.03
40									

Measurement conditions

Element judgment/total judgment

Limits

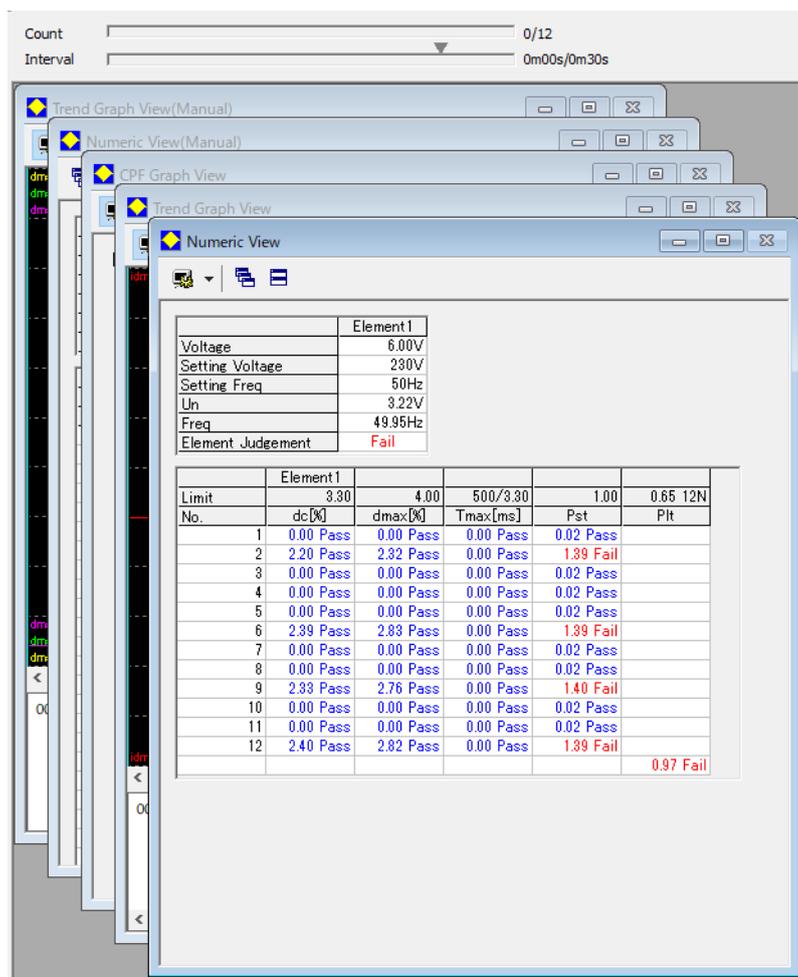
Measured values for each observation period

12.1 Cascading Windows

Procedure

Click . The windows are cascaded so that you can see the title of each window.

An Example of Cascaded Windows within the Analysis Window



Explanation

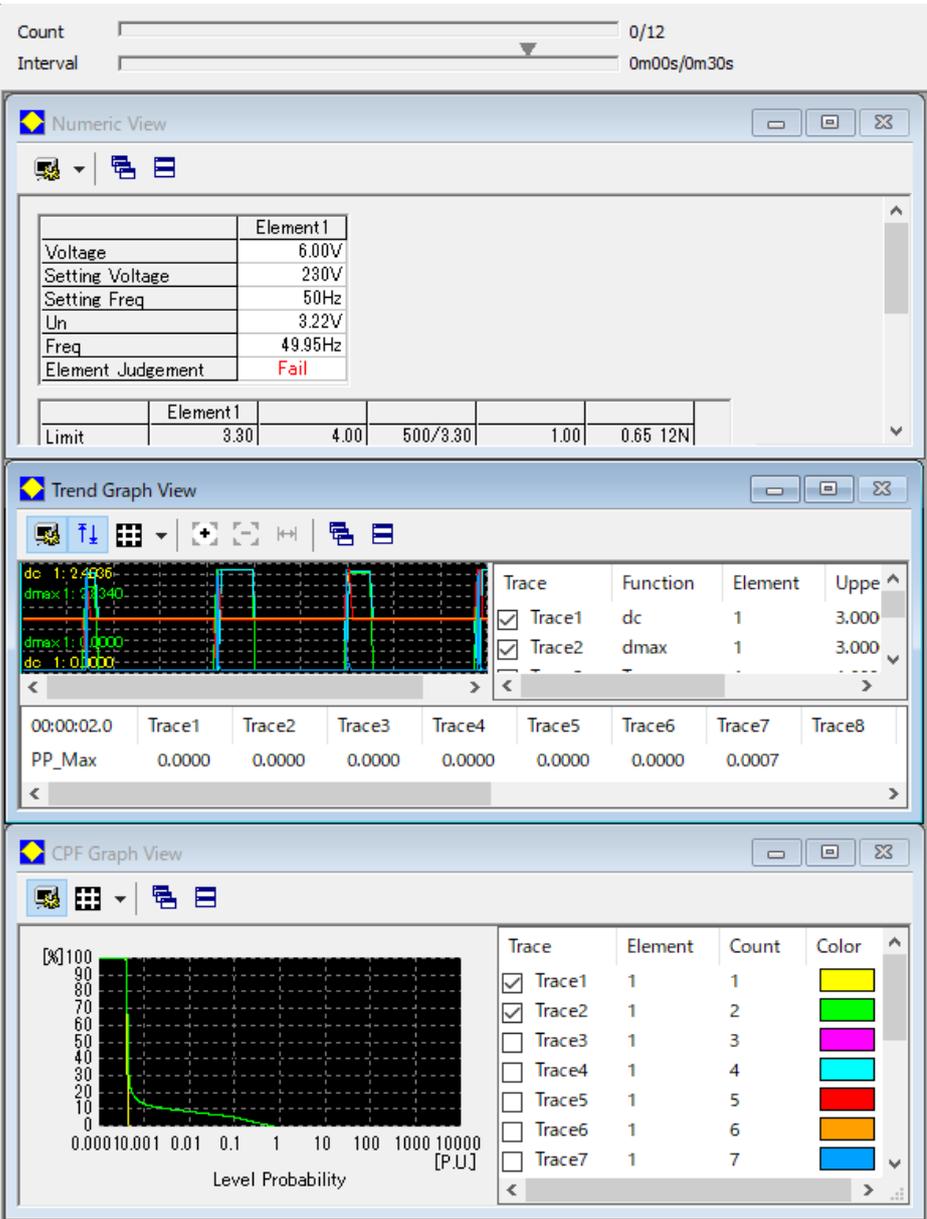
- Windows are cascaded so that the title of all displayed windows can be seen.
- The active graph or list window becomes the front window after the cascade operation.
- The cascade order varies depending on the type of displayed window.

12.2 Tiling Windows

Procedure

Click . The windows are tiled so that they do not overlap with each other.

An Example of Tiled Windows within the Analysis Window



The screenshot shows three windows tiled vertically within an analysis window. At the top, there are controls for 'Count' (0/12) and 'Interval' (0m00s/0m30s).

Numeric View displays a table of parameters for 'Element 1':

	Element 1
Voltage	6.00V
Setting Voltage	230V
Setting Freq	50Hz
Un	3.22V
Freq	49.95Hz
Element Judgement	Fail

Below the table is a summary table:

Limit	Element 1					
	3.30	4.00	500/3.30	1.00	0.65	12N

Trend Graph View shows a waveform plot with two traces. The plot area includes labels: 'dc 1: 2.4936', 'dmax 1: 3.340', 'dmax 1: 0.0000', and 'dc 1: 0.0000'. A table to the right of the plot lists traces:

Trace	Function	Element	Upper
<input checked="" type="checkbox"/> Trace1	dc	1	3.000
<input checked="" type="checkbox"/> Trace2	dmax	1	3.000

Below the plot is a summary table for 'PP_Max':

	Trace1	Trace2	Trace3	Trace4	Trace5	Trace6	Trace7	Trace8
PP_Max	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0007	

CPF Graph View shows a graph of Level Probability [%] vs Level Probability [P.U.] on a log scale. The y-axis ranges from 0 to 100, and the x-axis ranges from 0.000 to 10000. A table to the right lists traces with their colors:

Trace	Element	Count	Color
<input checked="" type="checkbox"/> Trace1	1	1	Yellow
<input checked="" type="checkbox"/> Trace2	1	2	Green
<input type="checkbox"/> Trace3	1	3	Magenta
<input type="checkbox"/> Trace4	1	4	Cyan
<input type="checkbox"/> Trace5	1	5	Red
<input type="checkbox"/> Trace6	1	6	Orange
<input type="checkbox"/> Trace7	1	7	Blue

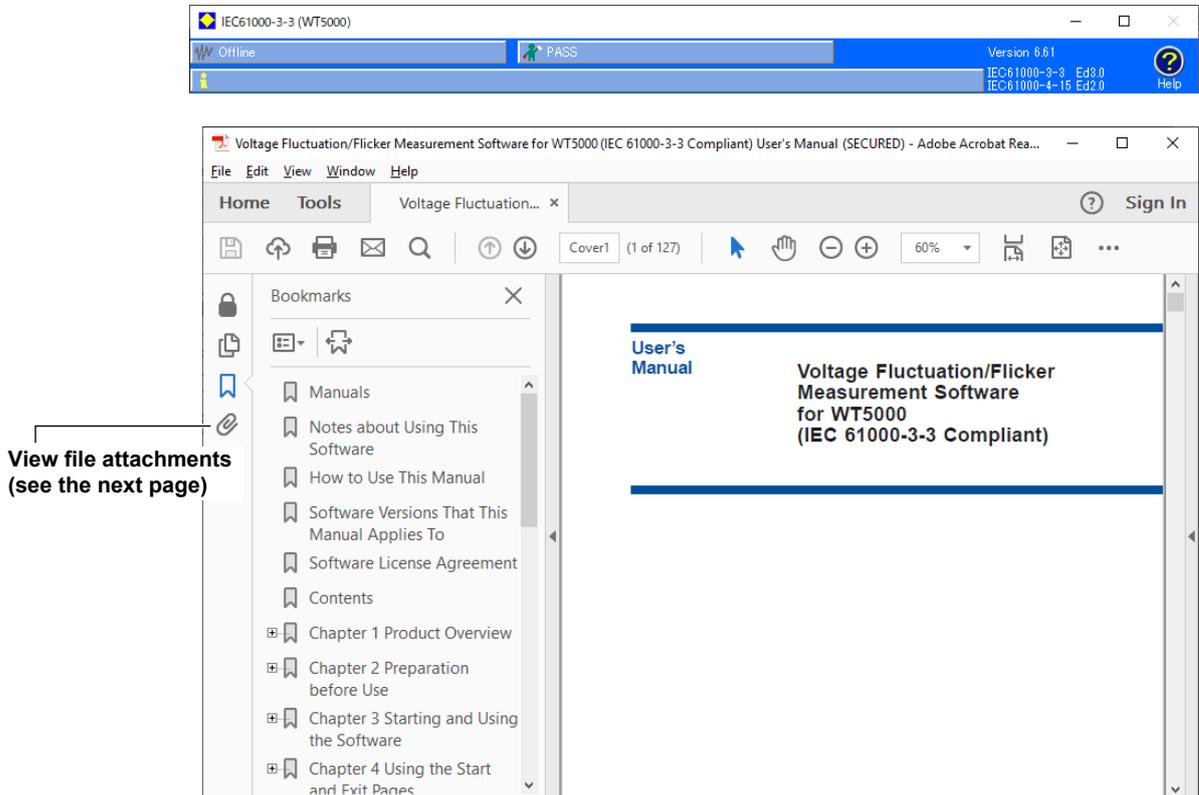
Explanation

- 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.

12.3 Using the Help Function

Procedure

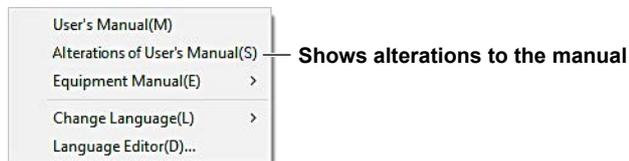
Click , the help button. If Adobe Acrobat Reader is installed on the PC, it will start up and open the PDF User's Manual for this software.



Displaying Alteration Notices

If alteration notices are available, you can view them by following the procedure below.

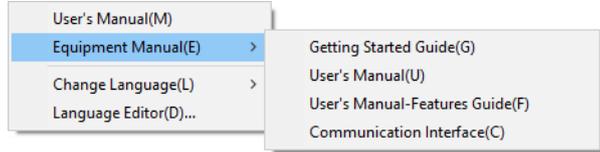
1. Right-click the help  button.
2. Click **Alterations of User's Manual**.



* The Alterations of User's Manual menu item is displayed only when there are alteration notices for the user's manual.

View the WT User's Manual

1. Right-click the help  button.
2. Click **Equipment Manual**.
3. Click the manual you want to view.



Explanation

Online Help

The user's manual is displayed as a help document in PDF. You can find information about operating procedures of this software and terminology.

* To view the PDF data, you need Adobe Acrobat Reader or a software application that can open PDF data.

If there is an alteration notice, you can display it by clicking Help and then clicking **Alterations of User's Manual**. This will open a 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, go to the following Web page, and then browse to the download page.

<https://tmi.yokogawa.com/support/download-software-drivers-firmware/>

If there are alteration notices, they are downloaded as file attachments to the user's manual. You can view and save file attachments by following the procedure below.

1. Open the user's manual PDF file with Adobe Acrobat Reader, and select file attachment  in the navigation panel. A file attachment panel appears.
2. In the file attachment panel, select a file attachment. You can click the appropriate icons in the top area of the file attachment panel to display, save, and perform other operations on the file attachment.

Rename the downloaded user's manual and alteration notice as indicated below, 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 **Alterations of User's Manual** from the **Help** menu.

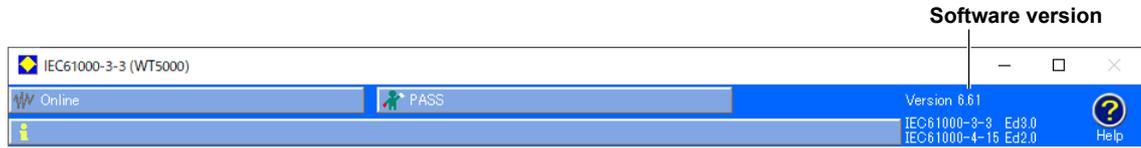
- User's Manual File Name IMD024-02EN.pdf
- Alteration Notice File Name Alterations-02E.pdf

Note

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

12.4 Viewing Version Information

The IEC 61000-3-3 Voltage Fluctuation and Flicker Measurement Software version number appears in the information area.



Note

The software version is different for each operation mode indicated below.

- IEC 61000-3-2 Harmonic Measurement
- IEC 61000-3-3 Voltage Fluctuation and Flicker Measurement
- IEC 61000-3-11 Voltage Fluctuation and Flicker Measurement
- IEC 61000-3-12 Harmonic Measurement

If any function is updated, the version of the other function may not change.

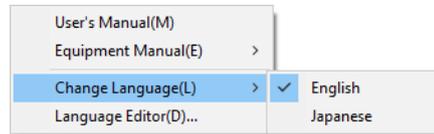
For the most recent version of the software, check the YOKOGAWA's Web page below.

<https://tmi.yokogawa.com/support/download-software-drivers-firmware/>

The program for updating the software as well as the most recent user's manual and alteration notice (see section 12.3) can be downloaded from YOKOGAWA's Web page above.

12.5 Setting the Displayed Language

1. Right-click the help  button.
2. Click **Change Language**.
3. Select the language you want to use.



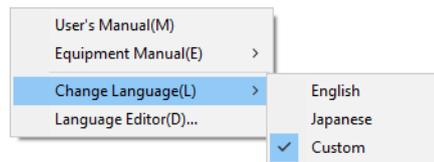
Note

Depending on the operating system, some language fonts may not be installed. In such cases, if you change the language, text will not be displayed properly. To display the text properly, you need to install appropriate fonts in the operating system.

Customizing the Displayed Language

To customize the displayed language, edit the language file by following the procedure in section 12.6.

If there is a language file that you create (custom file), the submenu will appear as follows:



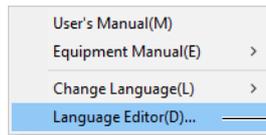
Select **Custom** to load the custom file.

12.6 Editing the Displayed Language

You can edit the text that is displayed in the dialog boxes and windows of the software.

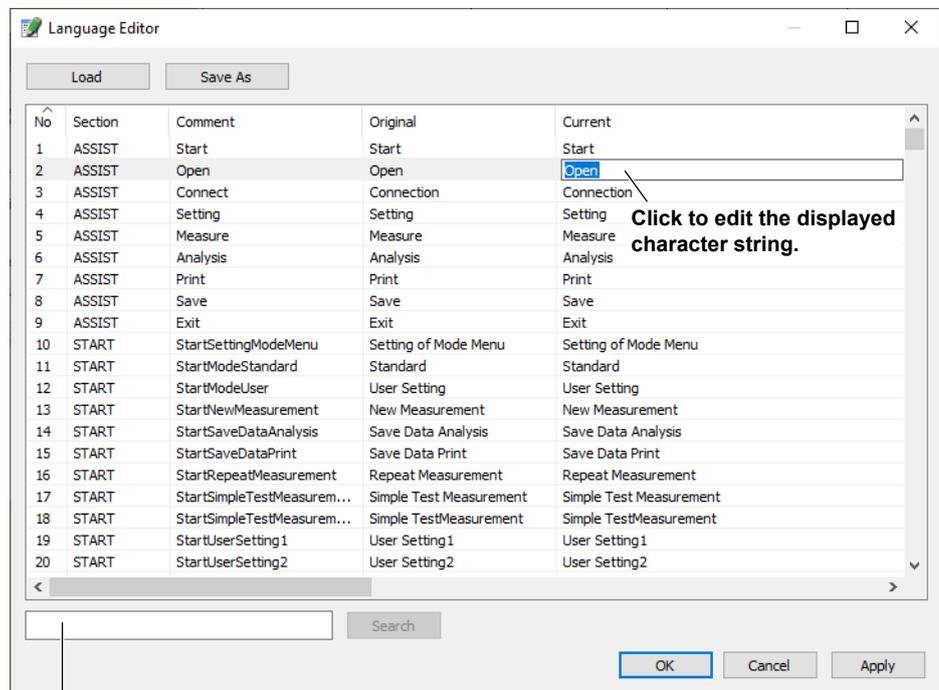
Editing the Displayed Language

1. Right-click the help  button.
2. Click **Language Editor**.



Edit the displayed language

3. In the Language Editor dialog box, click the cells in the Current column to edit the text to display.



You can search for a character string by entering the string here and clicking **Search**.

Saving the Edited Language Information

Click **Save As** to save the edited language information to a file. The file name extension is .lang.

Note

The English and Japanese language information files are in the following folder.

C:\Users\<User>\Documents\YOKOGAWA\IEC61000 Analysis Software for WT5000\Language

Loading Saved Language Information

Click **Load** to load a language information file into the Language Editor dialog box.

13.1 Troubleshooting

If a message is displayed on the PC display, see section 13.2, "Error Messages."

Problems and Solutions

Unable to communicate with the WT using USB.

Using Device Manager, check whether the USB driver is appropriate for the WT series. If the driver is not appropriate, switch to the appropriate USB driver (see page 2-11).

Unable to communicate with the WT using GP-IB.

Communication may not work properly on GP-IB cards other than those of NI (National Instruments). Use a GP-IB card by NI (see section 1.2).

Measurement stops suddenly.

Close the memory-resident software running on the PC. For example, if virus checking software frequently checks the communications between this software and the PC, the performance of the PC may decline drastically. If you choose to stop the virus check and use the PC, please do so in a network environment that is well protected against viruses.

13.2 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 USB, GP-IB, or Ethernet cable is connected properly.• For USB, check that a USB hub is not being used.• 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.
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.	The value you tried to specify is out of range.
Please input a value from 0.01 to 999.99.	Set the value within the allowed range.
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.	

14.1 Specifications

Item	Specification
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 judgments made according to the standard. The executable file name is IEC61000.exe.
Applicable instruments	WT5000 (Model: WT5000)
Applicable standards	<p>Voltage fluctuation and flicker suppression standards</p> <ul style="list-style-type: none"> IEC 61000-3-3 Edition 2.0:2008, IEC 61000-3-3 Edition 3.0:2013 EN 61000-3-3:2008, EN 61000-3-3:2013 <p>Flicker meter function and design specifications</p> <ul style="list-style-type: none"> IEC 61000-4-15 Edition 1.1:2003, IEC 6100-4-15 Edition 2.0:2010 EN 61000-4-15:1998/A1:2003, EN 61000-4-15:2011
Features	<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>Measurement 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), Tmax, Pst, and Plt, compares them to the preset limits, and indicates the overall judgment. 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 3.0 or 2.0.</p> <p>Set the WT judgment conditions Set the judgment conditions of the voltage fluctuation and flicker measurement that is defined in IEC 61000-3-3 Edition 3.0 or 2.0.</p> <p>Set the title and comment of reports Set the title/comment of reports. Reports are printed and saved to .bmp or .pdf files along with measured data.</p> <p>Start/stop the measurement Measurement can be started in On-Line mode.</p> <p>Numeric data and judgment Display the judgment 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</p> <ul style="list-style-type: none"> Display the trend graph of the normal voltage fluctuation and flicker measurement (dc, dmax, d(t), Tmax, idc, idmax, id(t), iTmax, and IFS). Display the trend graph of measurement of dmax caused by manual switching (dmax). <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, judgment 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 measured data in CSV format Save measured voltage fluctuation and flicker data reports in CSV format. The saved data can be loaded in a software application on the PC.</p> <p>Printing and saving of reports Reports can be saved to .pdf or .bmp files. Report files can also be printed.</p>
PC system requirements	See section 1.2.

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