

WT5000

Precision Power Analyzer

U S E R ' S M A N U A L

YOKOGAWA ♦

Yokogawa Test & Measurement Corporation

IM WT5000-02EN
1st Edition

List of Manuals

Thank you for purchasing the WT5000 Precision Power Analyzer. This User's Manual explains how to use the WT5000. To ensure correct use, please read this manual thoroughly before operation.

After reading this manual, keep it in a safe place. The following manuals, including this one, are provided as manuals for the WT5000. Please read all manuals.

Manual Title	Manual No.	Description
WT5000 Precision Power Analyzer Features Guide	IM WT5000-01EN	The supplied CD contains the PDF file of this manual. This manual explains all the instrument's features other than the communication interface features.
WT5000 Precision Power Analyzer User's Manual	IM WT5000-02EN	This document. The supplied CD contains the PDF file of this manual. The manual explains how to operate this instrument.
WT5000 Precision Power Analyzer Getting Started Guide	IM WT5000-03EN	This guide explains the handling precautions and basic operations of this instrument.
WT5000 Precision Power Analyzer Communication Interface User's Manual	IM WT5000-17EN	The supplied CD contains the PDF file of this manual. The manual explains the instrument's communication interface features and instructions on how to use them.
Model WT5000 Precision Power Analyzer	IM WT5000-92Z1	Document for China

The "EN", "E", and "Z1" in the manual numbers are the language codes.

Contact information of Yokogawa offices worldwide is provided on the following sheet.

Document No.	Description
PIM 113-01Z2	List of worldwide contacts

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.
- Every effort has been made in the preparation of this manual to ensure the accuracy of its contents. However, should you have any questions or find any errors, please contact your nearest YOKOGAWA dealer.
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Revisions

- 1st Edition: September 2018

Conventions Used in This Manual

Notes

The notes and cautions in this manual are categorized using the following symbols.



Improper handling or use can lead to injury to the user or damage to the instrument. This symbol appears on the instrument to indicate that the user must refer to the user's manual for special instructions. The same symbol appears in the corresponding place in the user's manual to identify those instructions. In the manual, the symbol is used in conjunction with the word "WARNING" or "CAUTION."

WARNING

Calls attention to actions or conditions that could cause serious or fatal injury to the user, and precautions that can be taken to prevent such occurrences.

CAUTION

Calls attention to actions or conditions that could cause light injury to the user or damage to the instrument or user's data, and precautions that can be taken to prevent such occurrences.

French

AVERTISSEMENT

Attire l'attention sur des gestes ou des conditions susceptibles de provoquer des blessures graves (voire mortelles), et sur les précautions de sécurité pouvant prévenir de tels accidents.

ATTENTION

Attire l'attention sur des gestes ou des conditions susceptibles de provoquer des blessures légères ou d'endommager l'instrument ou les données de l'utilisateur, et sur les précautions de sécurité susceptibles de prévenir de tels accidents.

Note

Calls attention to information that is important for the proper operation of the instrument.

Character Notations

Menu Names and Panel Keys in Bold Characters

Indicate controls such as menu commands, tabs, and buttons that appear on the screen and front panel keys

Unit

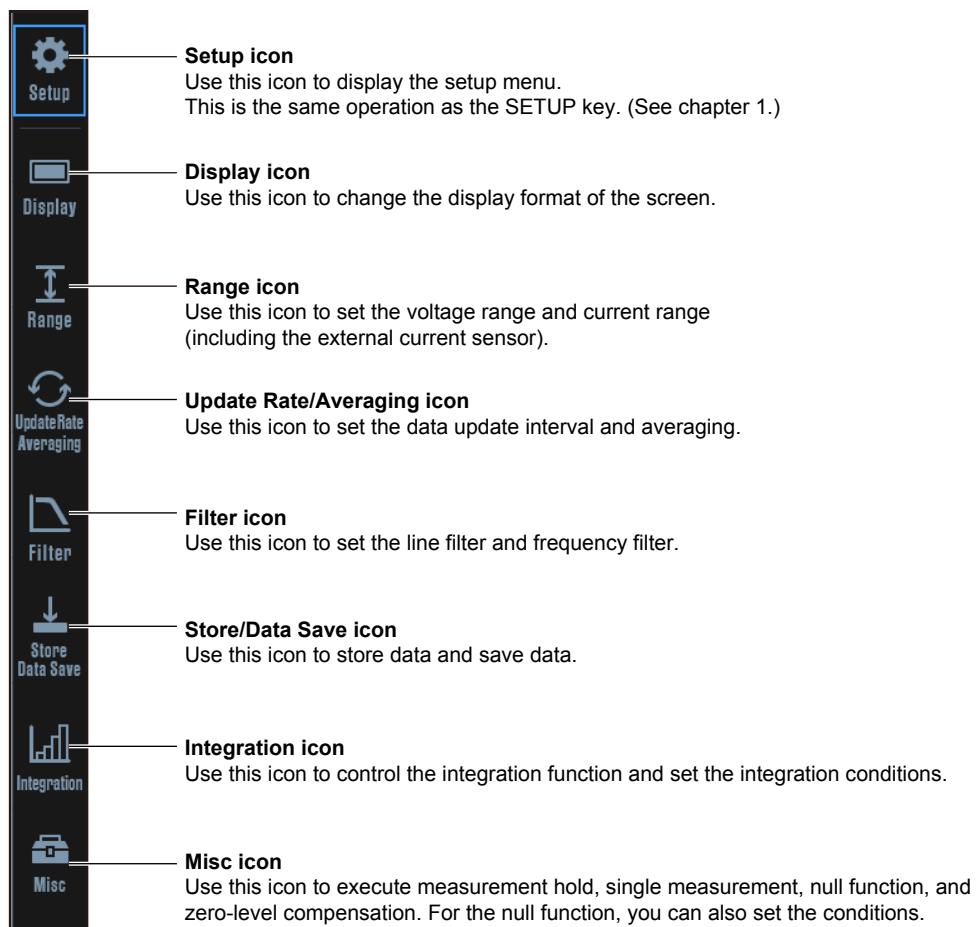
k	Denotes 1000. Example: 100 kHz
K	Denotes 1024. Example: 720 KB (file size)

Menu Icons

Menu Icon Types

You can control all the settings of this instrument using the *setup menu*, which is explained in chapter 1. Separate from the setup menu, dedicated icons are displayed for settings that are particularly used often. These icons are referred to as *menu icons* in this manual.

When you tap a menu icon, related settings are displayed in the sub menu area (S menu). Therefore, when you use a menu icon, you can change the settings while viewing the measurement.

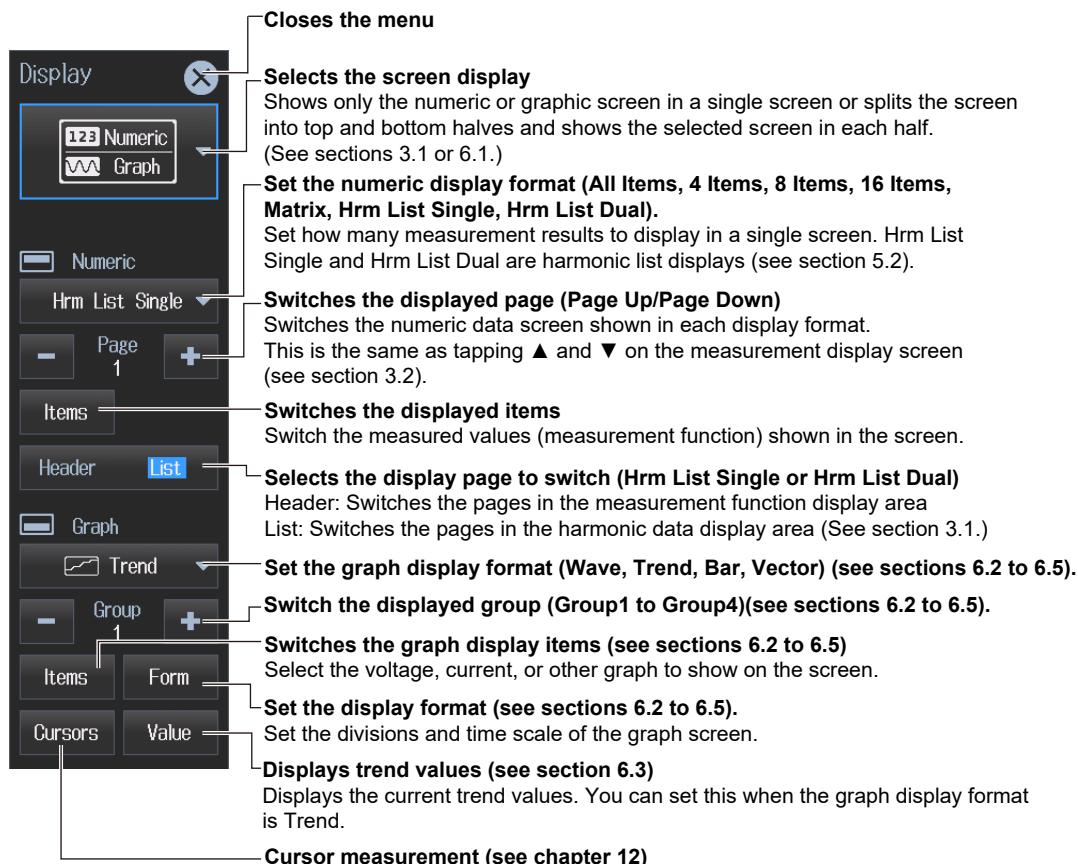


Display Icon

Use this icon to change the display format of the screen.

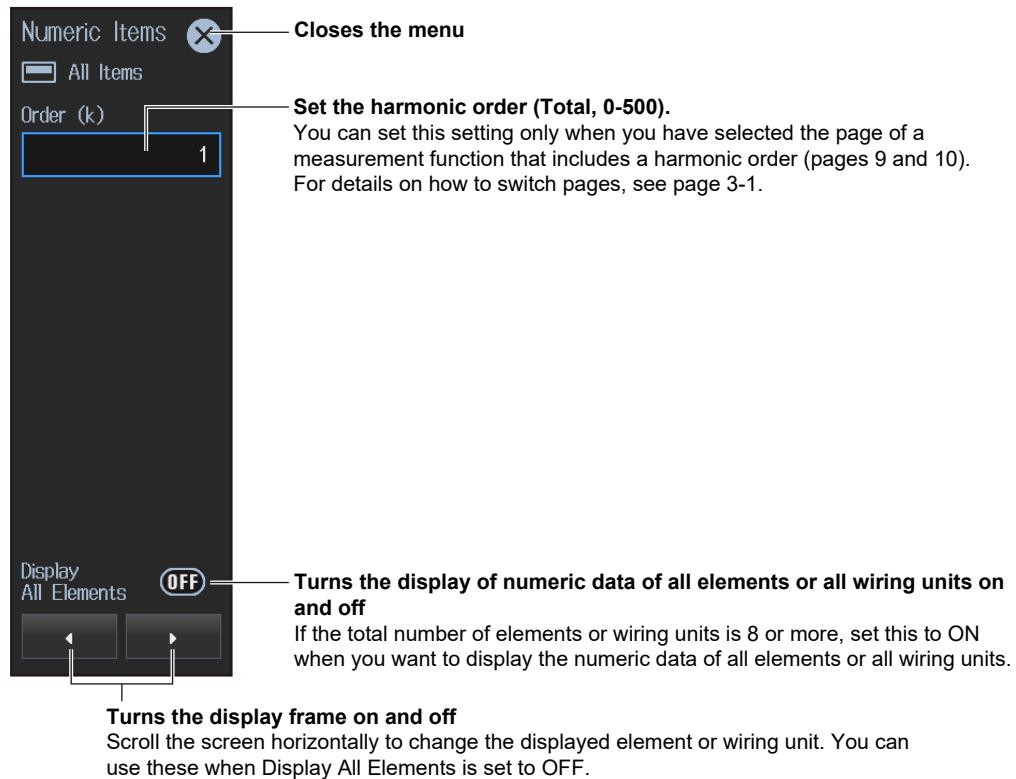


Display Menu



Switching the Displayed Items (Item)

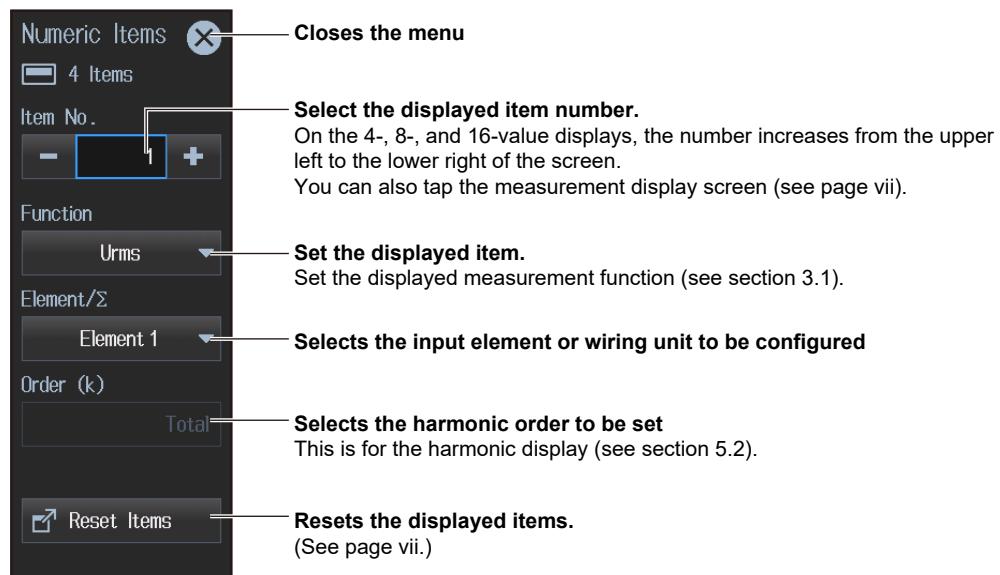
On the All Items Display



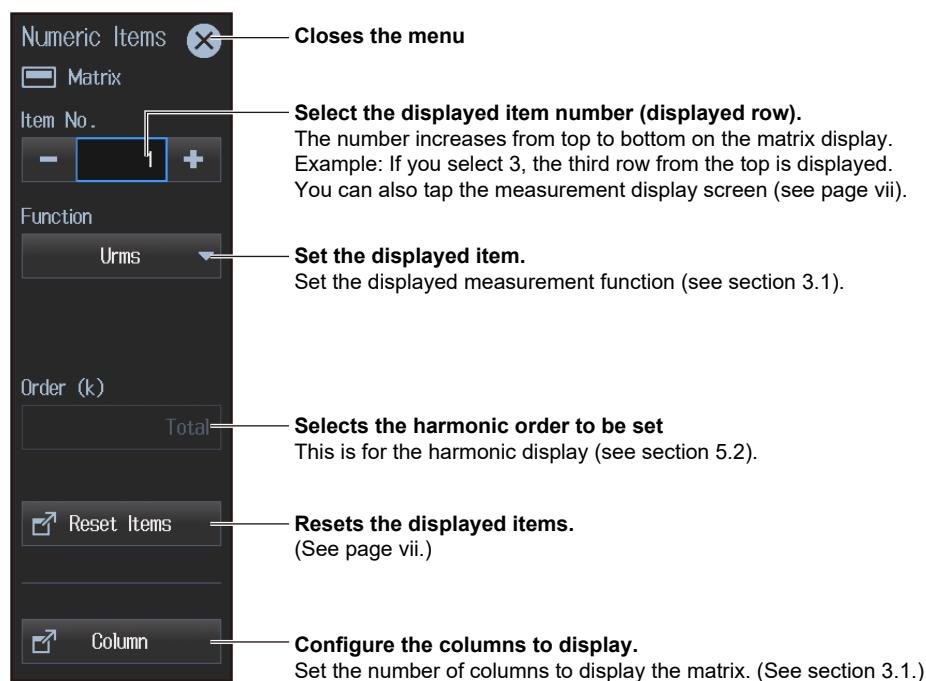
Note

On the All Items display, you cannot select individual displayed items and change their measurement function, element, or wiring unit. If you switch to the Matrix display, you can change the measurement functions, elements, and wiring units using the displayed table (see the previous page).

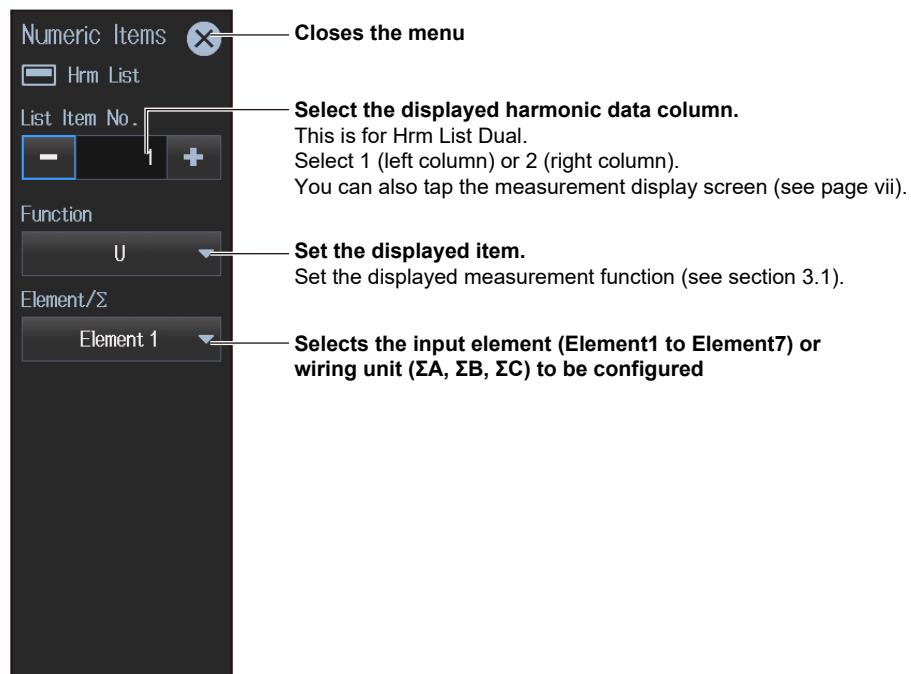
On the 4-, 8-, and 16-Value Displays



On the Matrix Display



On the Hrm List Single or Hrm List Dual Display



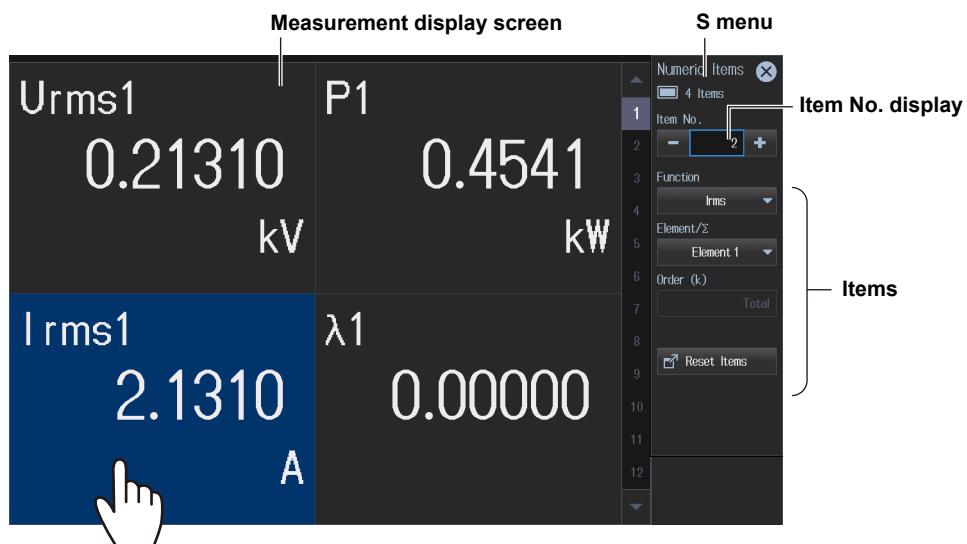
Note

On the harmonics list displays, you can change the measurement function, element, and wiring unit for the selected list, but you cannot change these settings for each individual displayed item.

Selecting the Displayed Item Number or Displayed Harmonic Data Column

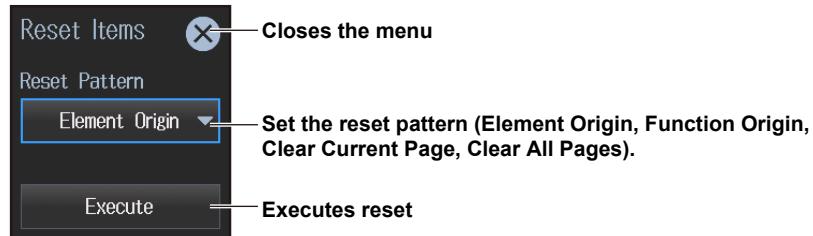
While you are changing the displayed items, you can select the displayed item or displayed harmonic data column you want shown by tapping the measurement display screen directly with an S menu shown.

This is the same operation as selecting the displayed item number (on the 4-, 8-, and 16-value displays and matrix display) and selecting the displayed harmonic data column (on the Hrm List Single or Hrm List Dual display).



1. Tap the Item No.2 area. The Item No. display changes to 2.
2. Set the items (e.g., function).

Resetting the Displayed Items

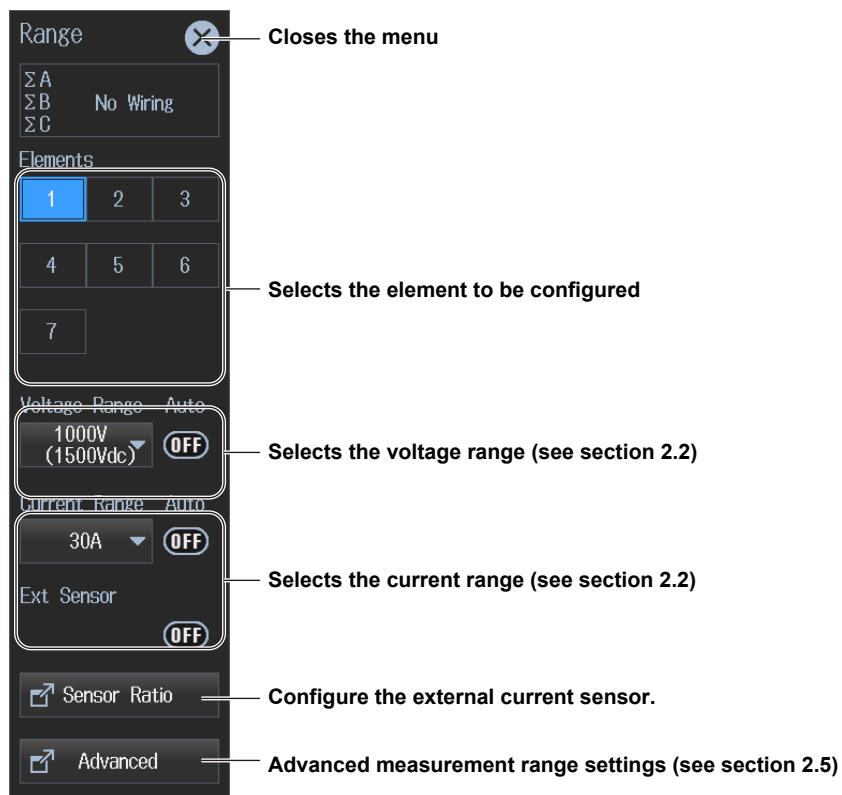


Range Icon

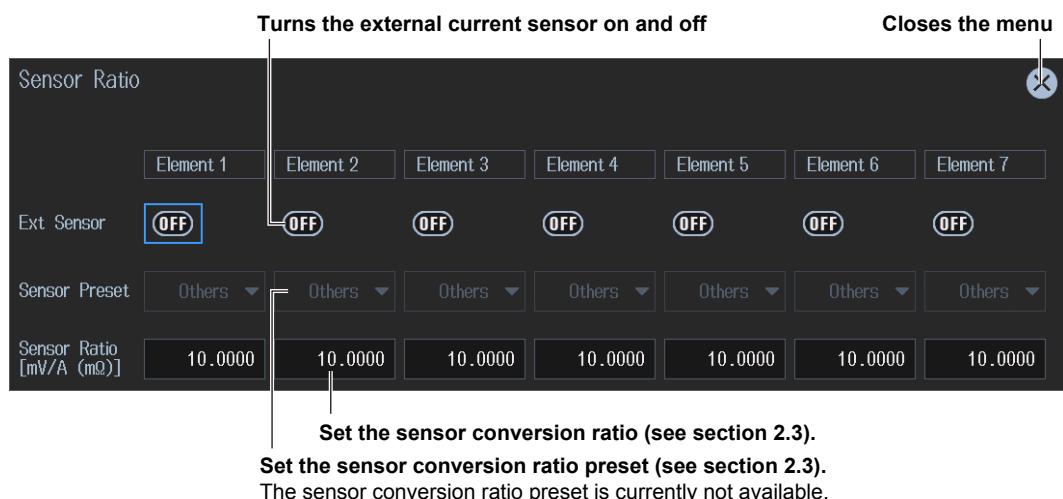
Use this icon to set the voltage range and current range (including the external current sensor).



Range Menu



Configuring the External Current Sensor



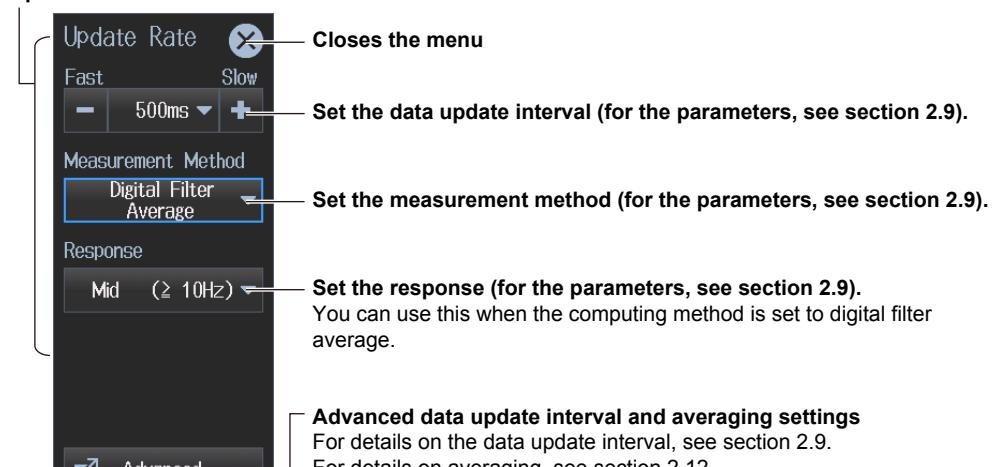
Update Rate/Averaging Icon

Use this icon to set the data update interval and averaging.

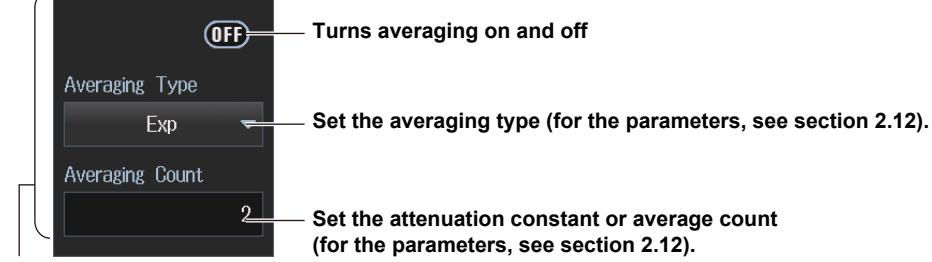


Update Rate/Averaging Menu

Update Rate menu



Averaging menu

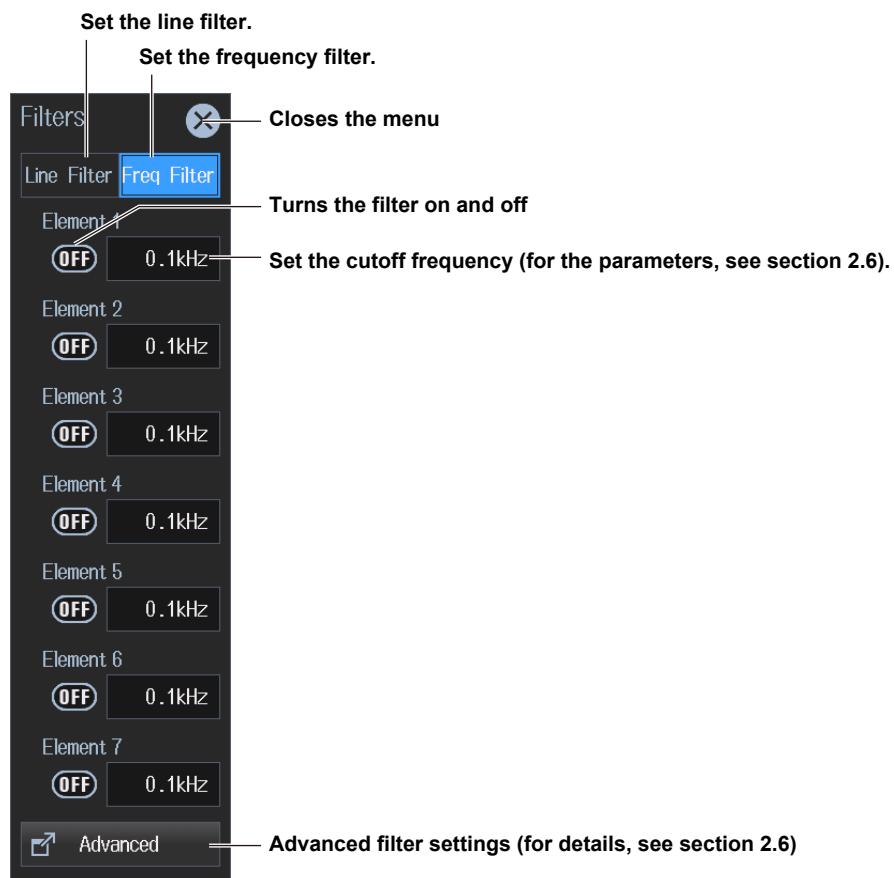


Filter Icon

Use this icon to set the line filter and frequency filter.



Filter Menu

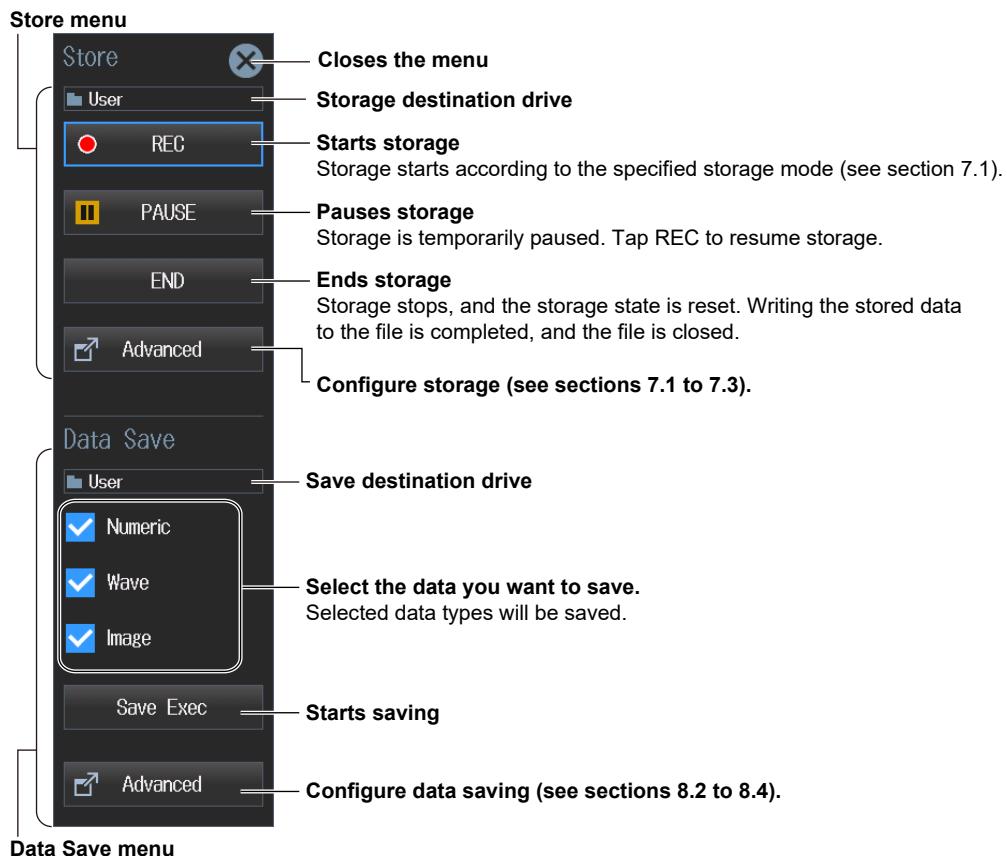


Store/Data Save Icon

Use this icon to store data and save and load data.



Store/Data Save Menu

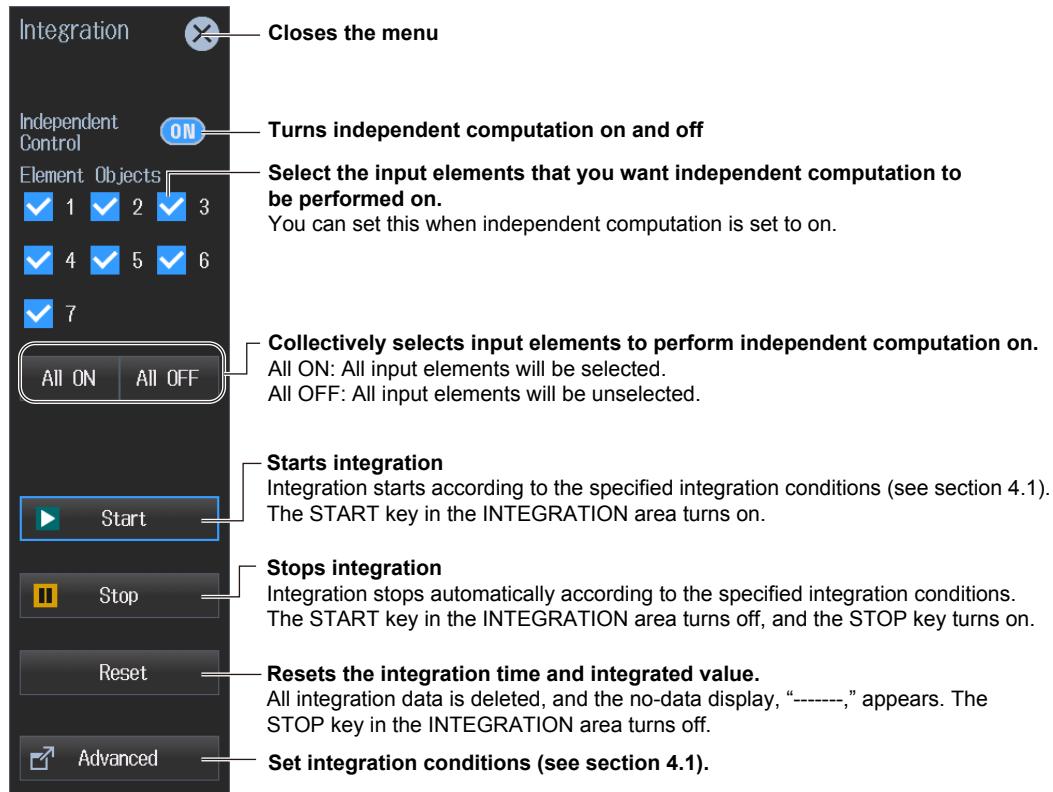


Integration Icon

Use this icon to set integration conditions.



Integration Menu

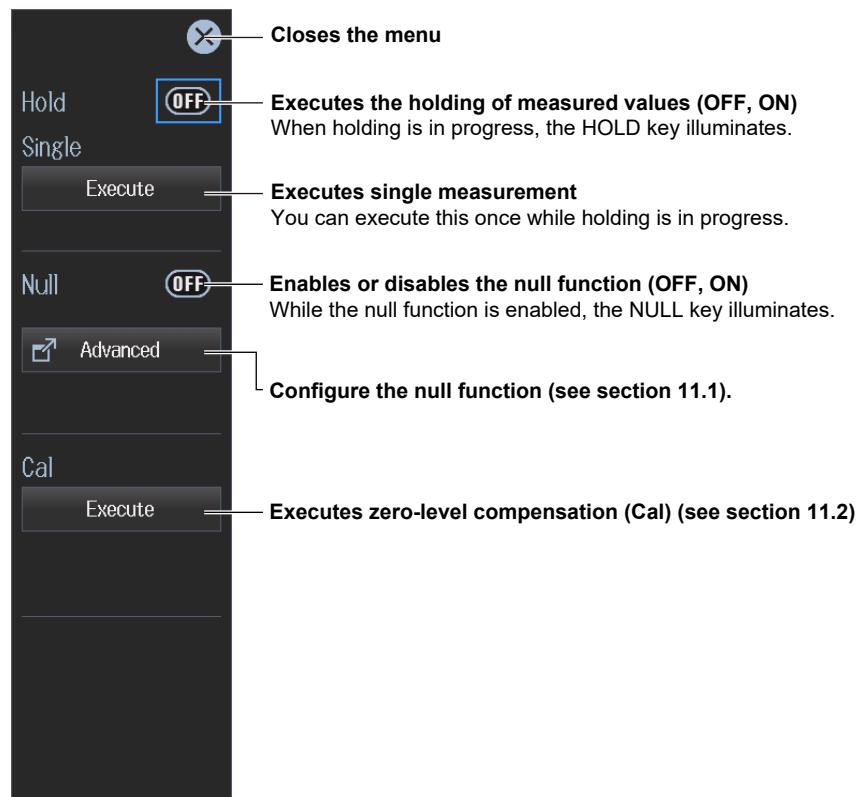


Misc Icon

Use this icon to execute measurement hold, single measurement, null function, and zero-level compensation. For the null function, you can also set the conditions.



Hold/Single/Null/Cal Menu



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1.1 Setting the Measurement Mode

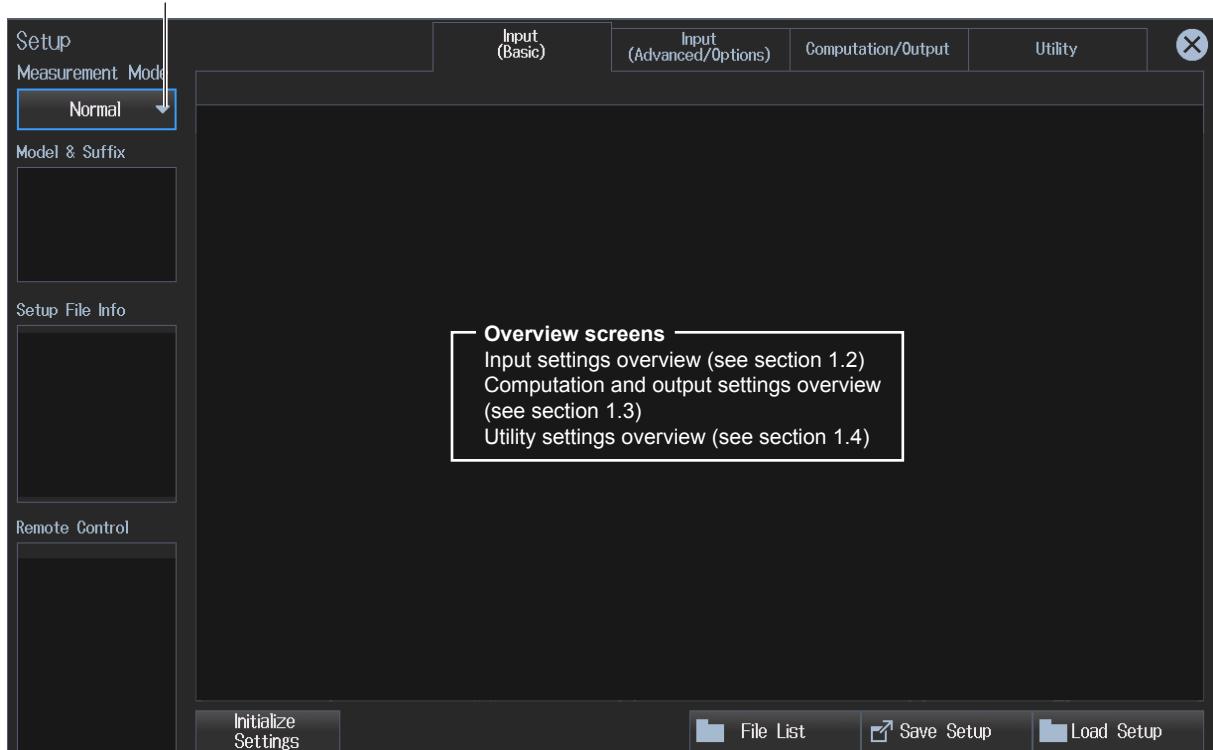
On this instrument, you can change the measurement interval and the screen display mode according to what is being measured (application). The following measurement modes are available on this instrument.



Measurement Mode (Measurement Mode)

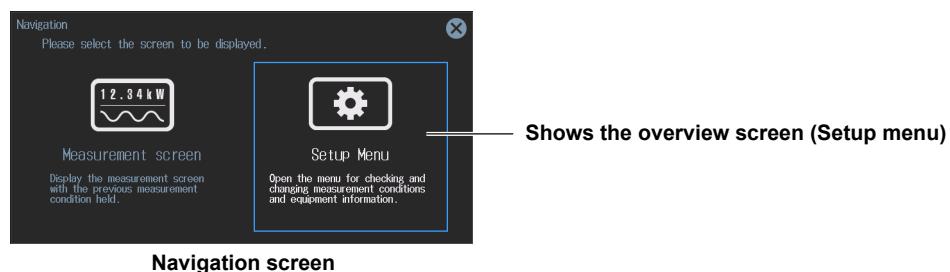
1. Tap the **Setup** icon , or press **MENU** under **SETUP**. The setup screen appears.

Selects the measurement mode (Normal)



Note

You can also display the overview screen from the navigation screen that appears immediately after power-on.



1.2 Input Settings Overview

The settings applied to the input elements and wiring units that are installed in this instrument are shown in table format. You can control all the settings from this overview screen.



Input Settings (Basic) Overview (Input (Basic))

1. Tap the **Setup** icon , or press **MENU** under **SETUP**.
2. Tap the **Input (Basic)** tab. An input settings (basic measurement conditions) overview screen appears.

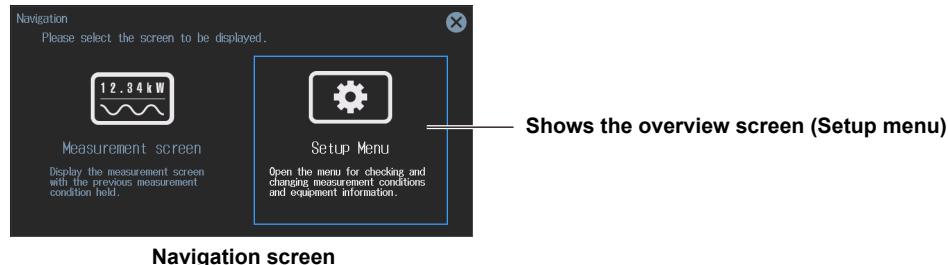
Pressing **ESC** closes the overview screen.

Input (Basic) tab						
		Input (Basic)	Input (Advanced/Options)	Computation/Output	Utility	X
Σ A (3V3A)						
Element 1 30A	Element 2 30A	Element 3 30A	Element 4 30A	Element 5 30A	Element 6 30A	Element 7 30A
Wiring 1P2W	Wiring 1P2W	Wiring 1P2W	Wiring 3V3A	Wiring 3V3A	Wiring 3V3A	Wiring 1P2W
Voltage Range 1000V	Voltage Range 1000V	Voltage Range 1000V	Voltage Range 1000V	Voltage Range 1000V	Voltage Range 1000V	Voltage Range 1000V
Current Range 30A	Current Range 30A	Current Range 30A	Current Range 30A	Current Range 30A	Current Range 30A	Current Range 30A
Sensor Ratio 10000.0000	Sensor Ratio 10.0000	Sensor Ratio 10.0000	Sensor Ratio 10.0000	Sensor Ratio 10.0000	Sensor Ratio 10.0000	Sensor Ratio 10.0000
Scaling ON	Scaling ON	Scaling ON	Scaling ON	Scaling ON	Scaling ON	Scaling ON
VT Ratio 1.0000	VT Ratio 1.0000	VT Ratio 1.0000	VT Ratio 1.0000	VT Ratio 1.0000	VT Ratio 1.0000	VT Ratio 1.0000
CT Ratio 1.0000	CT Ratio 1.0000	CT Ratio 1.0000	CT Ratio 1.0000	CT Ratio 1.0000	CT Ratio 1.0000	CT Ratio 1.0000
SF Ratio 1.0000	SF Ratio 1.0000	SF Ratio 1.0000	SF Ratio 1.0000	SF Ratio 1.0000	SF Ratio 1.0000	SF Ratio 1.0000
Line Filter ON Cutoff 0.5kHz	Line Filter ON Cutoff 0.5kHz	Line Filter OFF Cutoff 0.5kHz	Line Filter ON Cutoff 0.5kHz			
Freq Filter ON Cutoff 0.1kHz	Freq Filter ON Cutoff 0.1kHz	Freq Filter ON Cutoff 0.1kHz	Freq Filter ON Cutoff 0.1kHz	Freq Filter ON Cutoff 0.1kHz	Freq Filter ON Cutoff 0.1kHz	Freq Filter ON Cutoff 0.1kHz
Sync Source I1	Sync Source I2	Sync Source I3	Sync Source I4	Sync Source I5	Sync Source I6	Sync Source I7

Shows the settings of Element1 to Element7
You can also set the input element items.

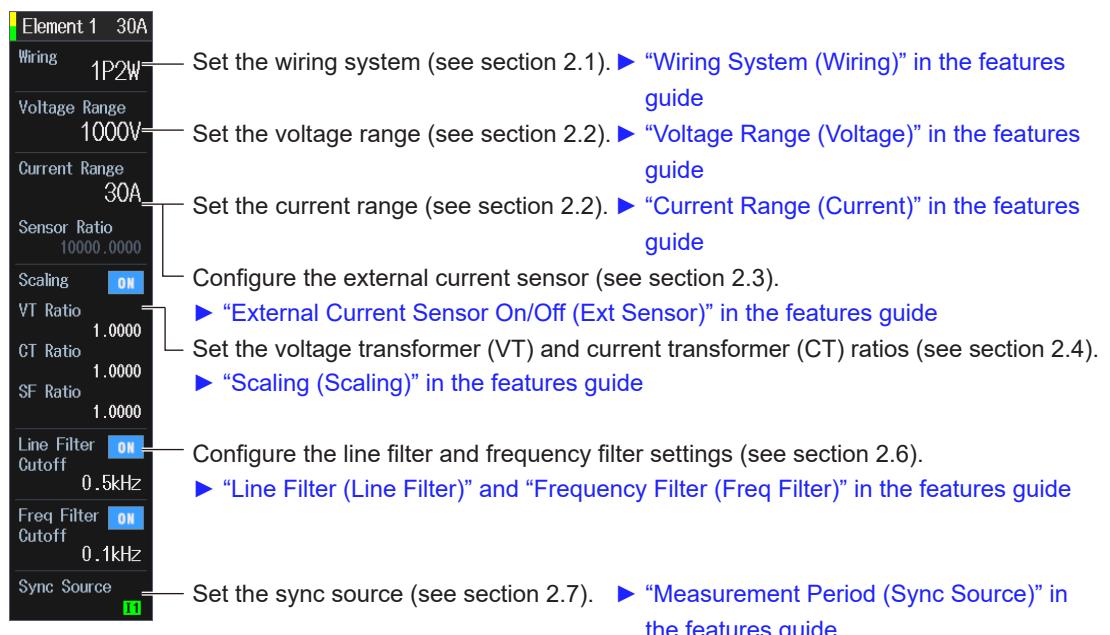
Note

- You can also display the input settings overview screen by moving the cursor on the Input (Basic) tab using the arrow keys and then pressing SET.
- You can also display the overview screen from the navigation screen that appears immediately after power-on.



Configuring Input Elements

You can edit settings by tapping the setting buttons in each input element area of the overview screen.

**Note**

You can also edit the settings by moving the cursor on each setting button using the arrow keys and then pressing SET.

Input Settings (Advanced) Overview (Input (Advanced/Options))

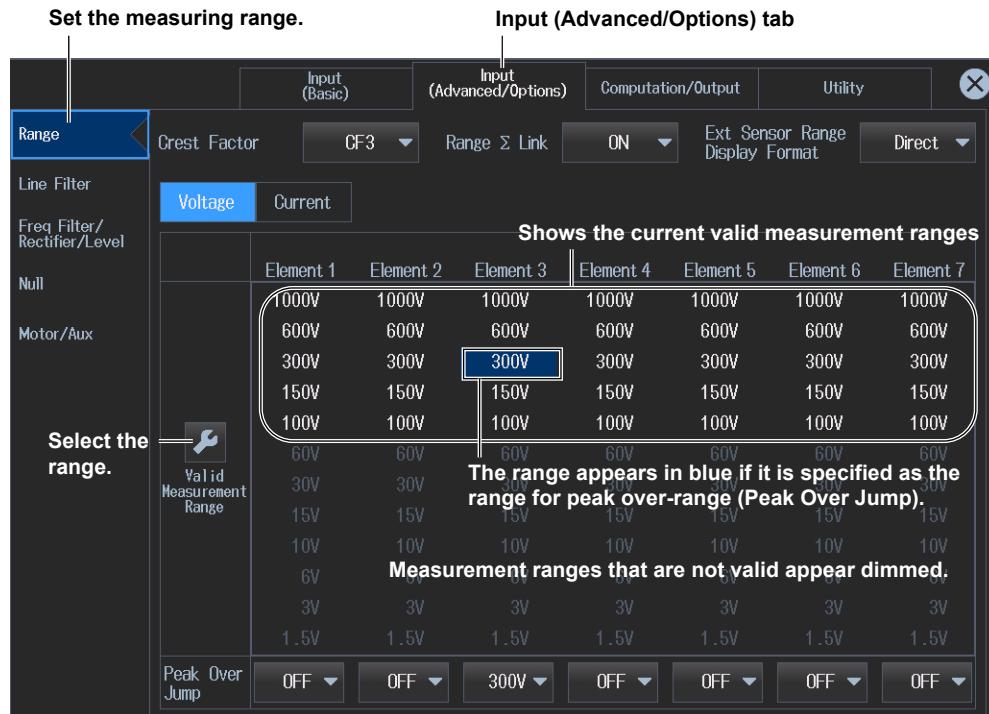
- Tap the **Setup** icon , or press **MENU** under **SETUP**.
- Tap the **Input (Advanced/Options)** tab. An input settings (advanced/options) overview screen appears.

Pressing **ESC** closes the overview screen.

1.2 Input Settings Overview

Advanced Measurement Range Settings (Range) ► section 2.5

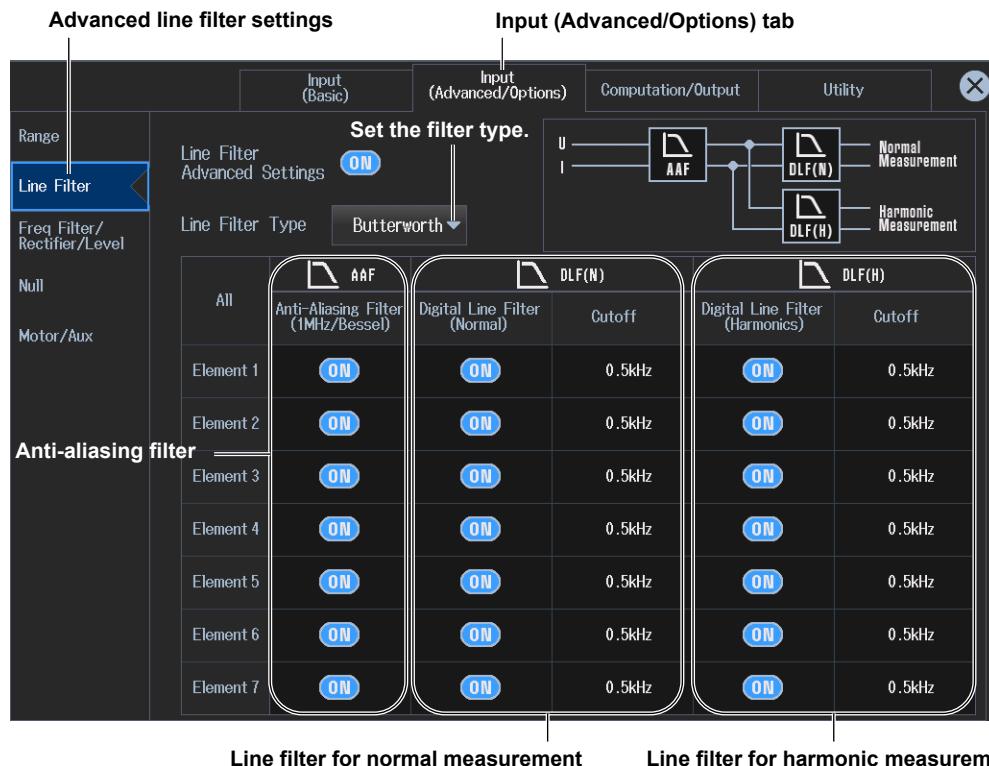
3. Tap Range. An advanced measurement range setup screen appears.



Advanced Line Filter Settings (Line Filter) ► section 2.6

3. Tap Line Filter. A line filter setup screen appears.

The following screen is an example when Advanced Settings are on. You can set the AAF, DLF (N) and DLF (H) filters separately.



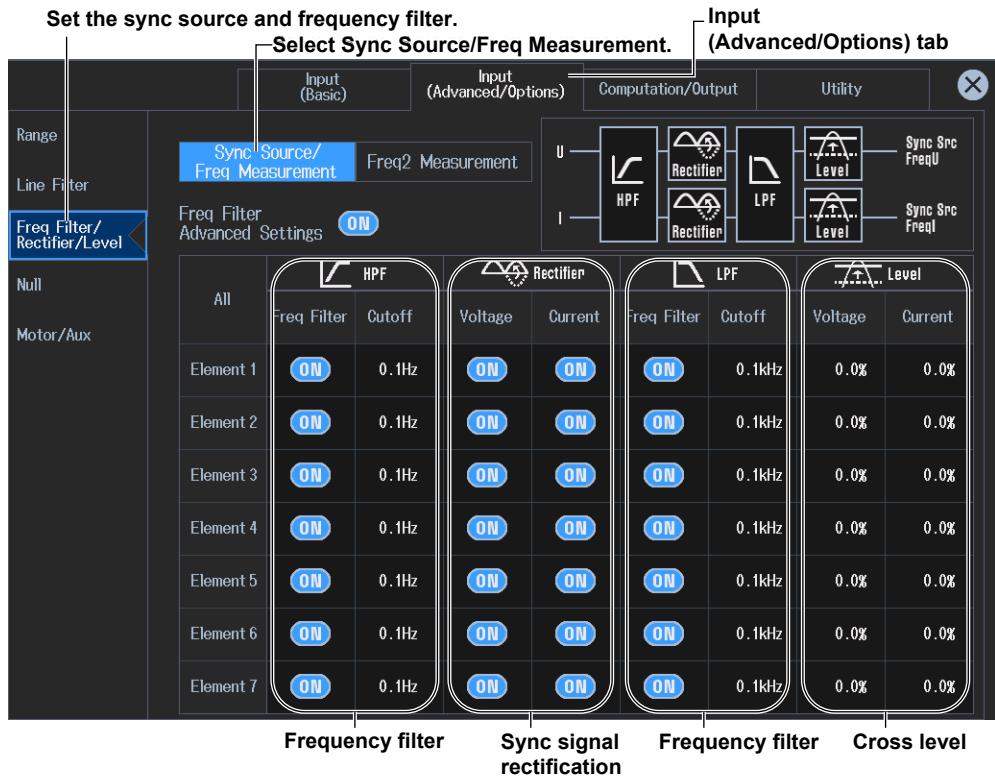
Sync Source and Frequency Filter Settings (Freq Filter/Rectifier/Level)

► sections 2.6, 2.7

3. Tap Freq Filter/Rectifier/Level. A frequency filter setup screen appears.

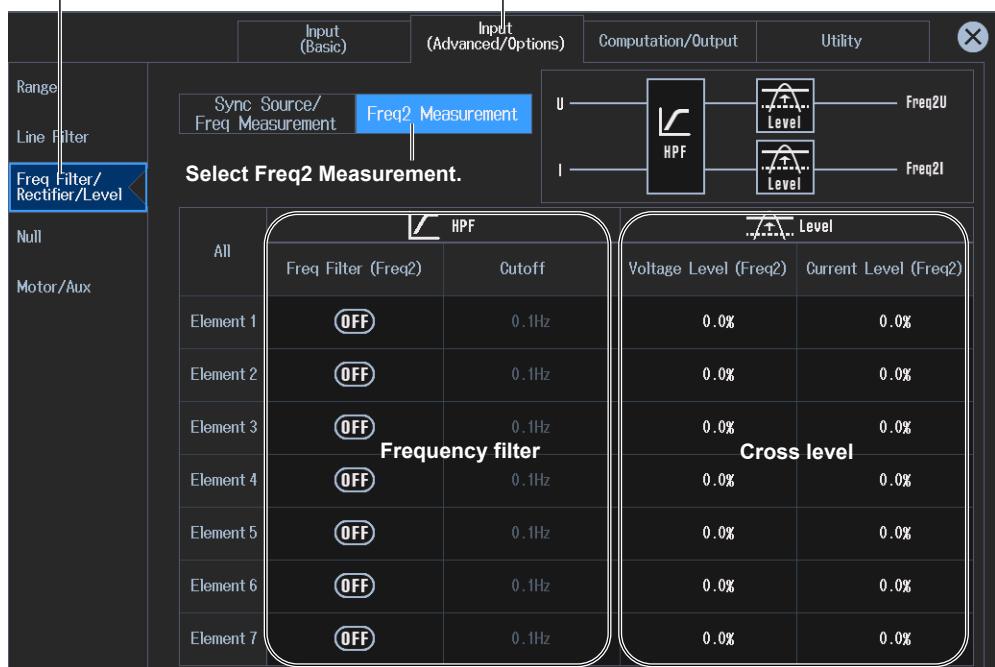
Sync Source and Frequency Measurement Settings (Sync Source/Freq Measurement)

The following screen is an example when Advanced Settings are on. You can set the HPF, Rectifier, LPF, and Level separately.



Frequency 2 Measurement Settings (Freq2 Measurement)

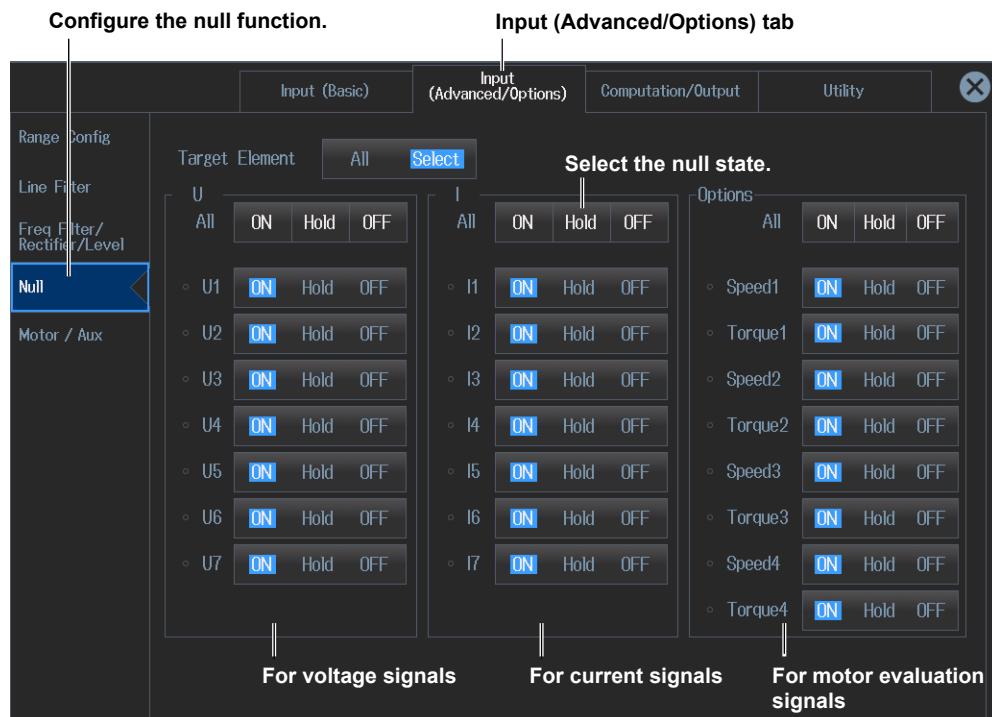
Set the sync source and frequency filter. Input Setting (Advanced/Options) tab



1.2 Input Settings Overview

Null Settings (Null) ► section 11.1

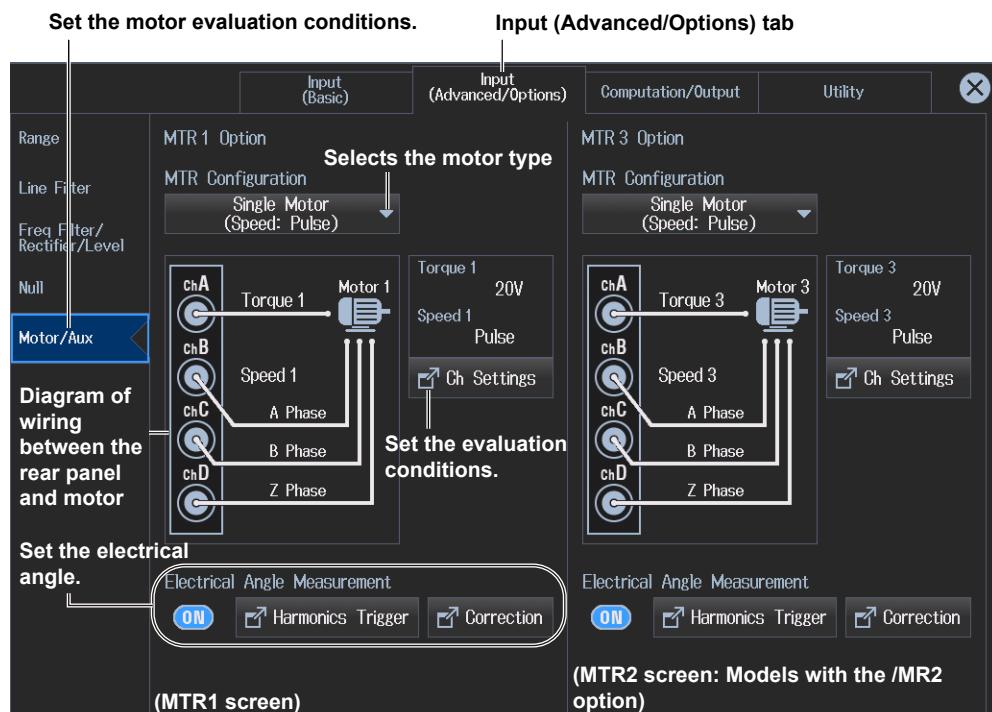
- Tap Null. A null function setup screen appears.



Motor Evaluation Condition Settings (Motor/Aux) ► section 9.1

- Tap Motor/Aux.

A Motor/Aux screen (MTR1/MTR2) appears. The following screen is an example for a model with the /MTR2 option.



1.3 Computation and Output Settings Overview

The overview screen shows in a table the various settings related to the input signal computing method, harmonic measurement, integration conditions, numeric and graphic screen displays, data saving, DA output, and so on. You can control all the settings from this overview screen.



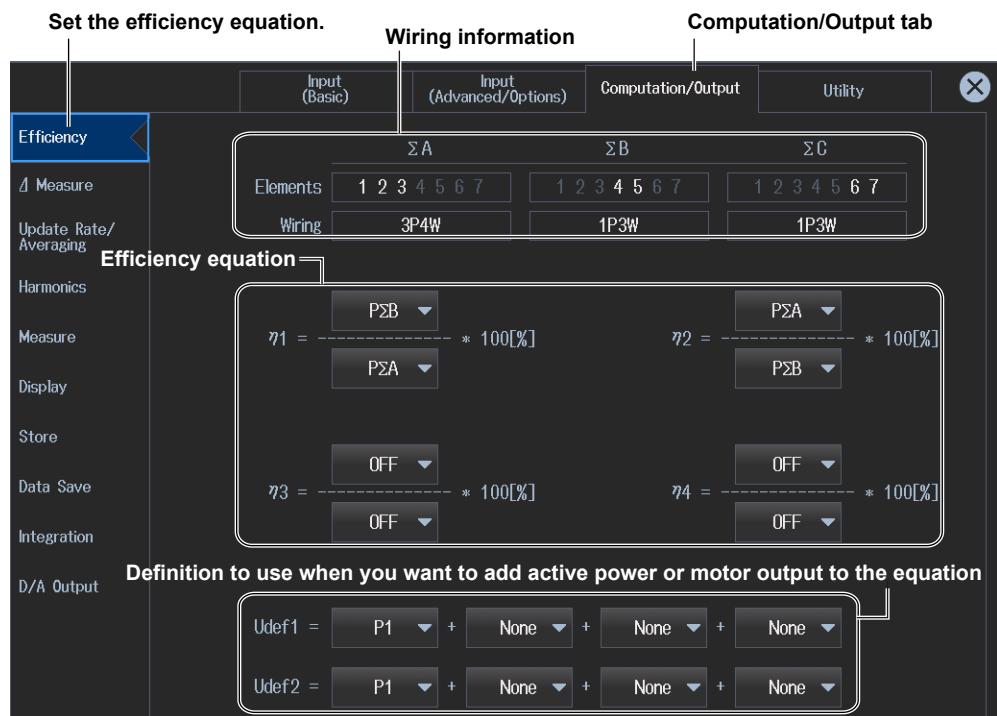
Computation and Output Settings Overview (Computation/Output)

1. Tap the **Setup** icon , or press **MENU** under **SETUP**.
2. Tap **Computation/Output** tab.

A computation and output settings overview screen appears. Pressing **ESC** closes the overview screen.

Setting the Efficiency Equation (Efficiency) ► section 2.10

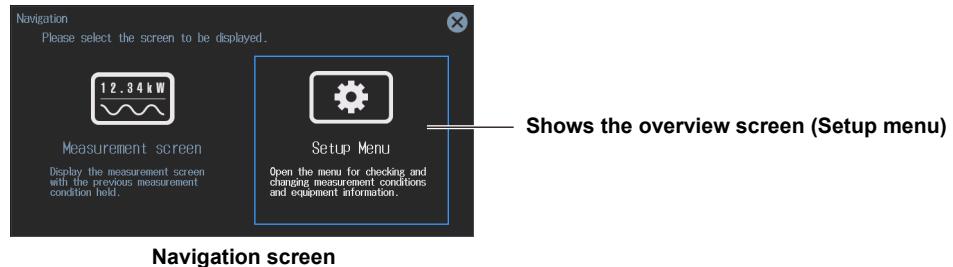
3. Tap **Efficiency**. An efficiency equation setup screen appears.



1.3 Computation and Output Settings Overview

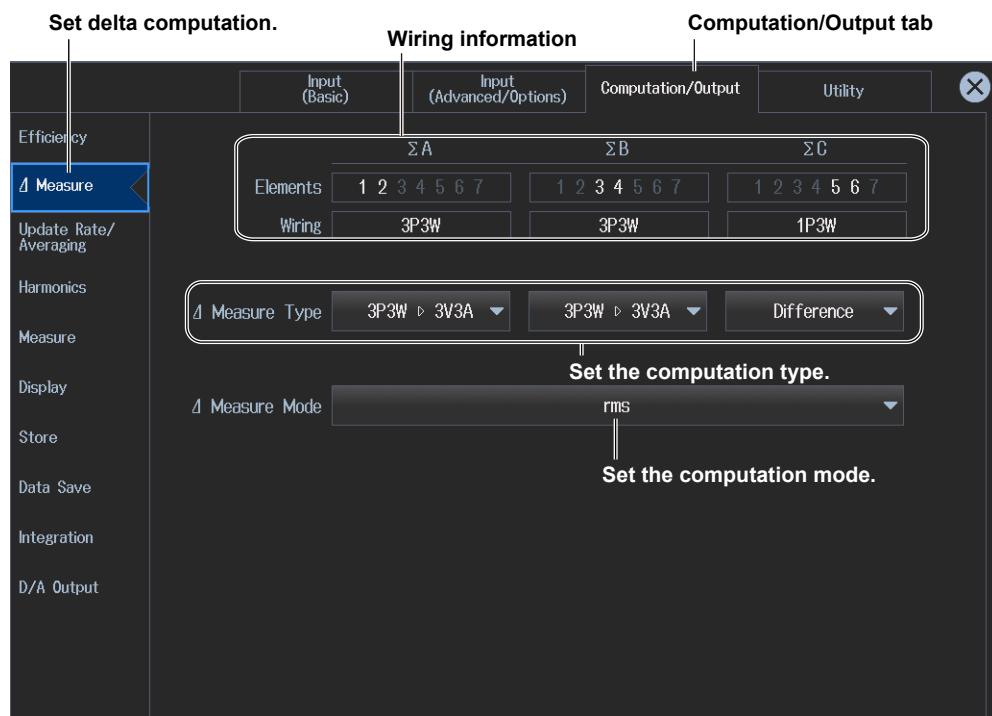
Note

- You can also display the input settings overview screen by moving the cursor on the Computation/Output tab using the arrow keys and then pressing SET.
- You can also display the overview screen from the navigation screen that appears immediately after power-on.



Setting the Delta Computation (Δ Measure) ► section 2.11

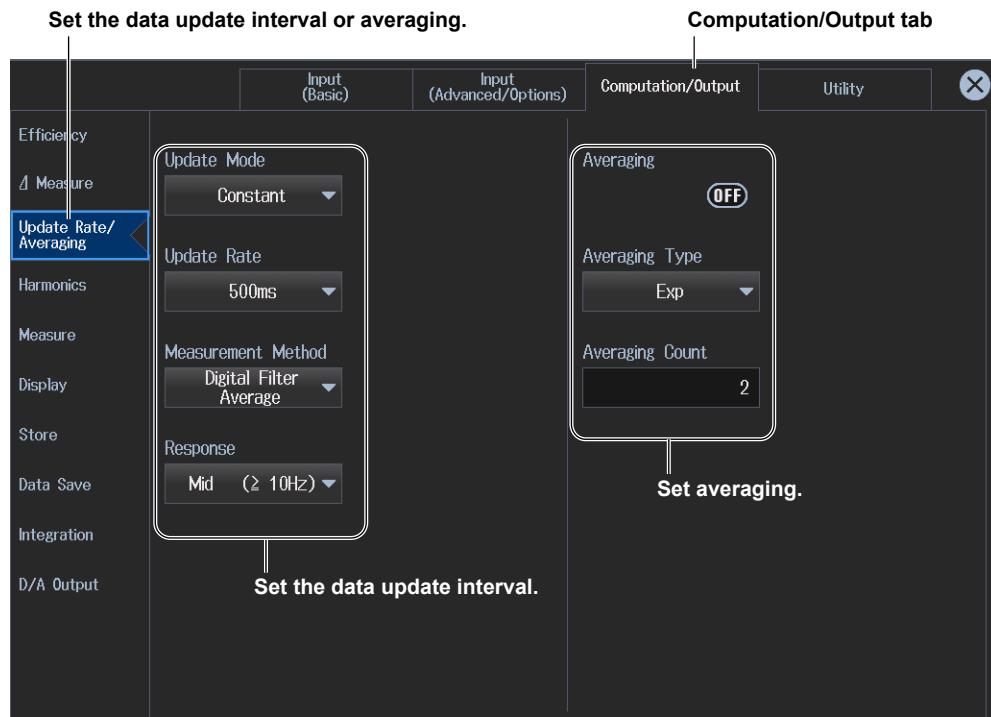
3. Tap Δ Measure. A delta computation setup screen appears.



Setting the Data Update Interval and Averaging (Update Rate/Averaging) ▶ sections 2.9 to 2.12

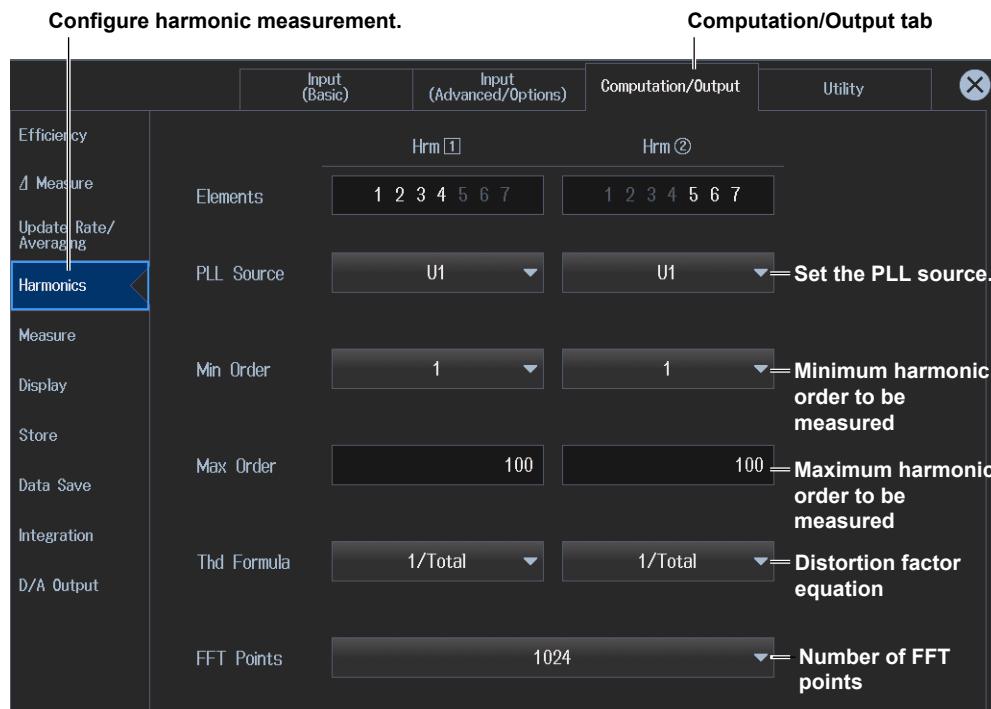
3. Tap **Update Rate/Averaging**.

A data update interval/averaging setup screen appears.



Setting the Harmonic Measurement (Harmonics) ▶ section 5.1

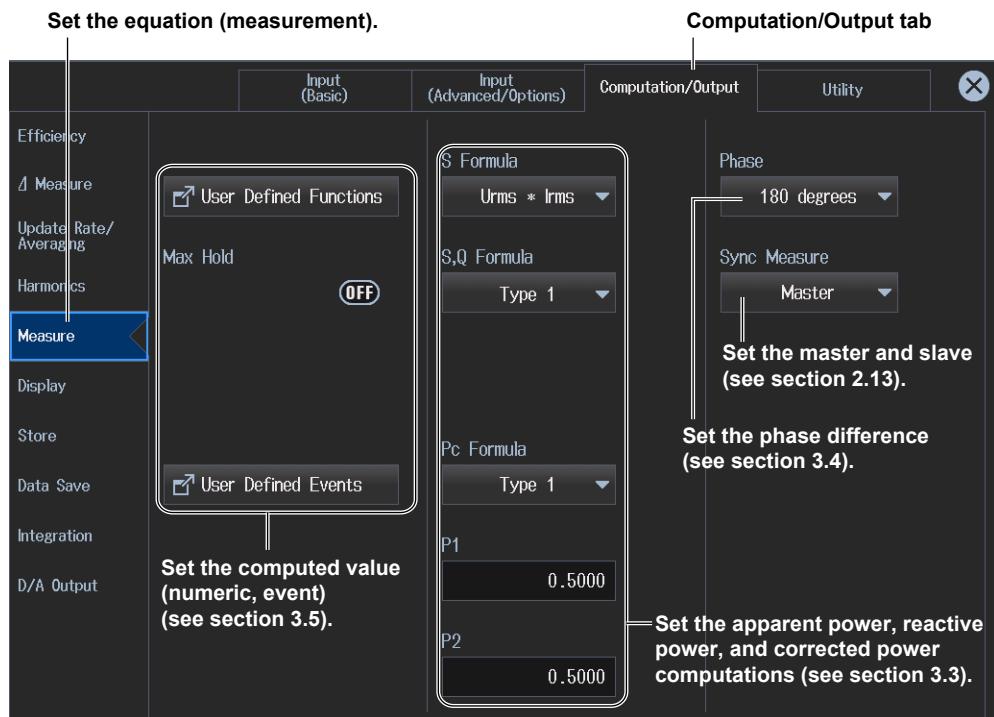
3. Tap **Harmonics**. A harmonic measurement setup screen appears.



Setting the measurement (Measure)

► sections 2.13, 3.3, 3.4, 3.5

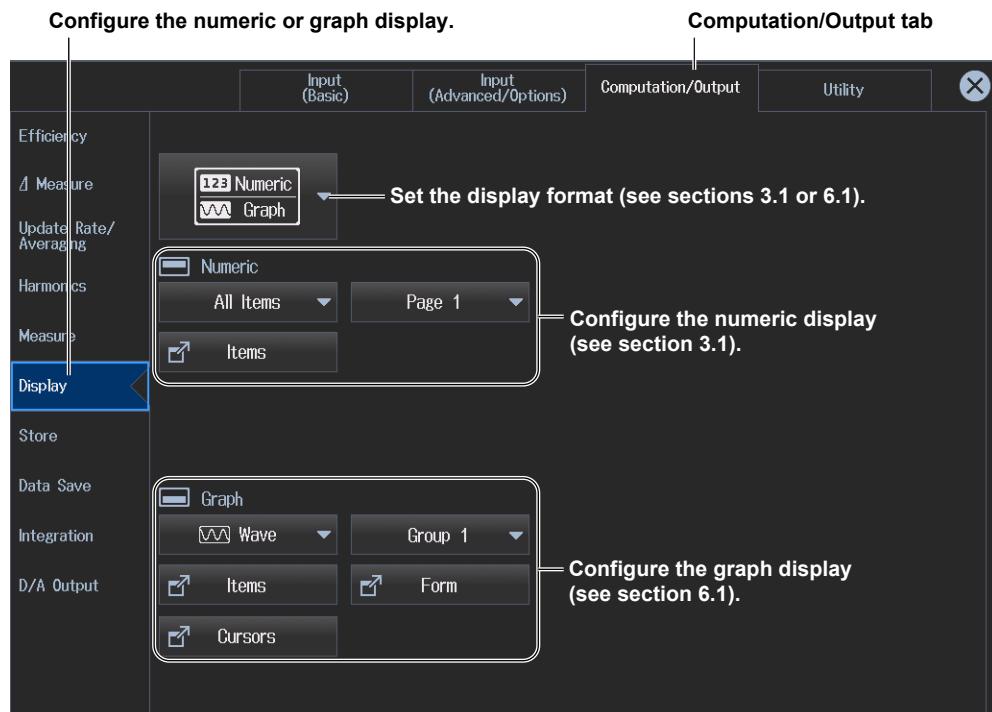
3. Tap **Measure**. A setup screen for the user-defined functions, apparent power formula, master/slave, and phase difference appears.



Configuring the Numeric and Graphic Displays (Display)

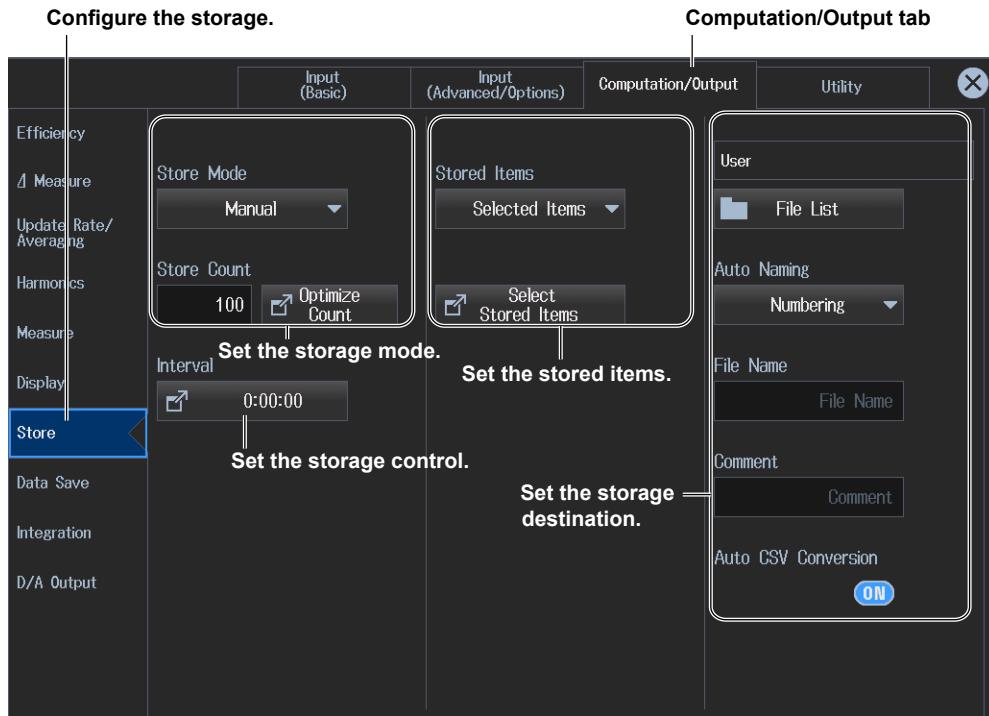
► sections 3.1, 6.1

3. Tap **Display**. The Display screen (Display/Numeric/Graph) appears.



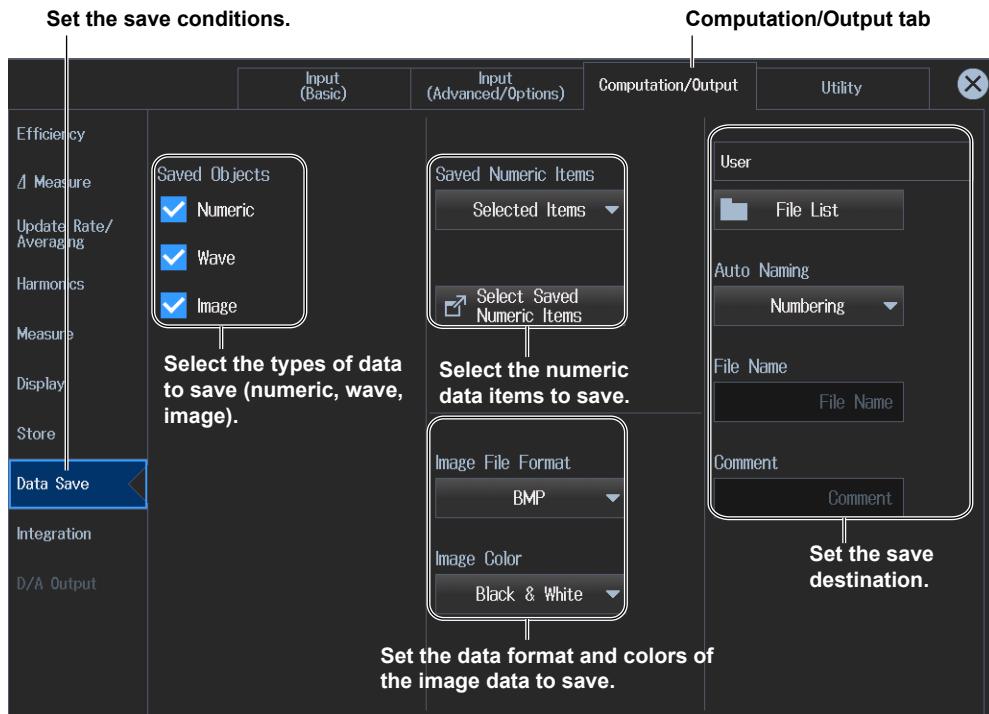
Configuring the Storage (Store) ► section 7.1

3. Tap **Store**. A storage setup screen appears.



Configuring the Data Save Function (Data Save) ► section 8.2, 8.3, 8.4, 8.5

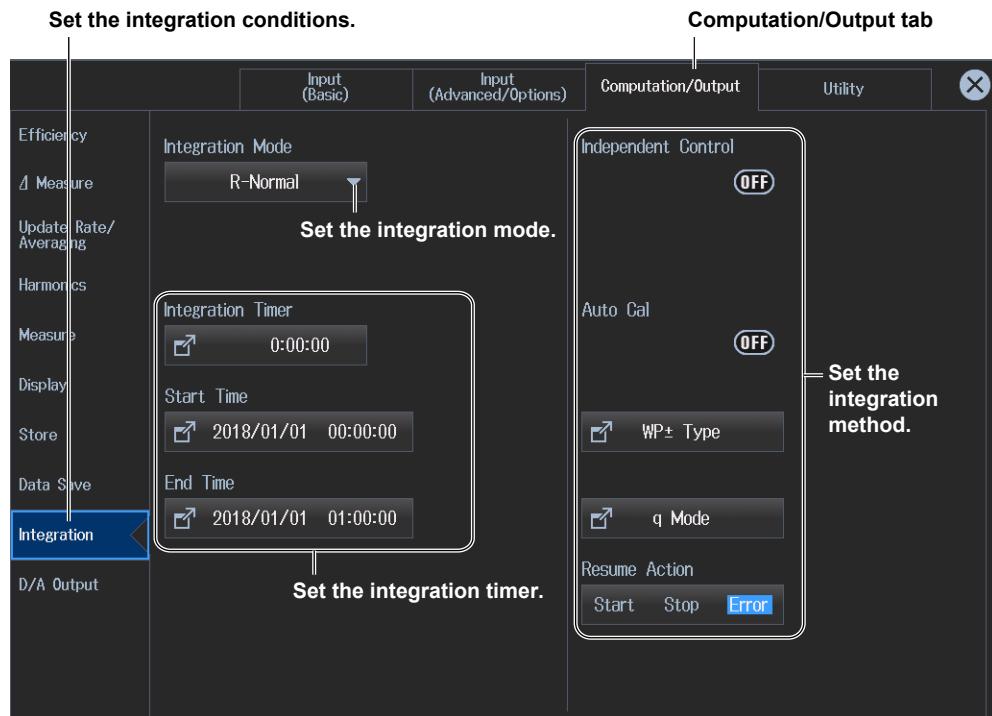
3. Tap **Data Save**. A data save setup screen appears.



1.3 Computation and Output Settings Overview

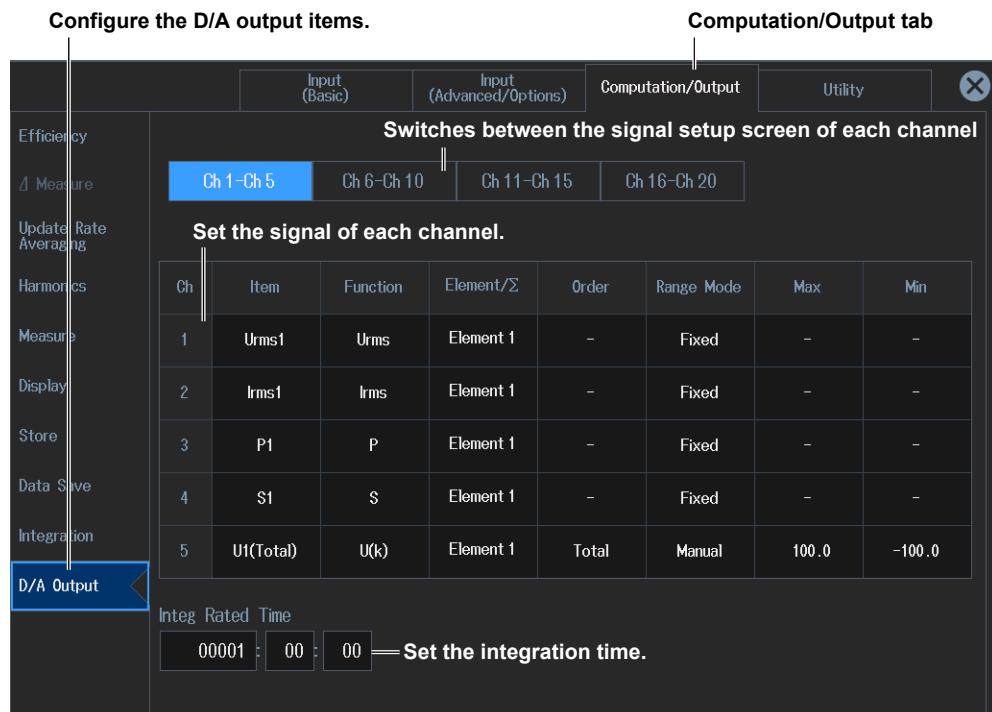
Setting the Integration Conditions (Integration) ► section 4.1

- Tap **Integration**. An integration condition setup screen appears.



Configuring the DA Output (D/A Output) ► section 14.2

- Tap **D/A Output**. A D/A output setup screen appears.



1.4 Utility Settings Overview

The system settings of this instrument are displayed in table format. You can control all the settings from this overview screen.



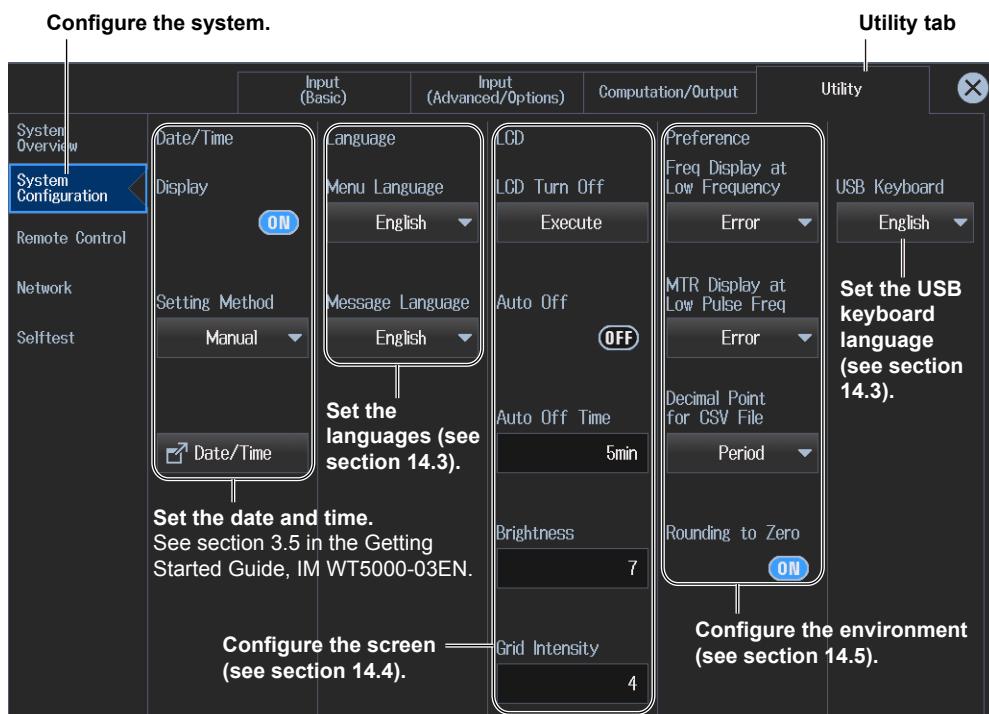
Utility Settings Overview (Utility)

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

System Configuration (System Configuration)

► [section 14.3, 14.4, 14.5](#)

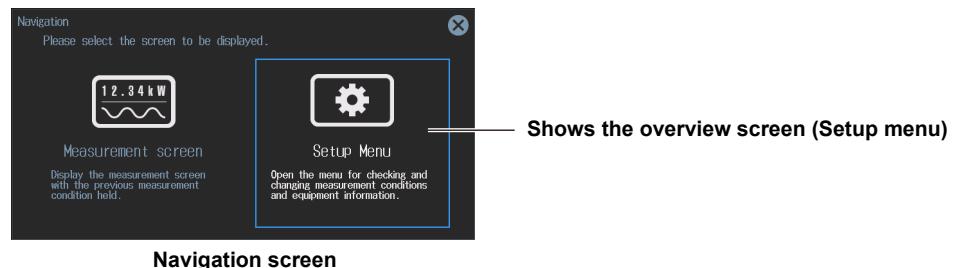
3. Tap **System Configuration**. A system settings overview appears.



1.4 Utility Settings Overview

Note

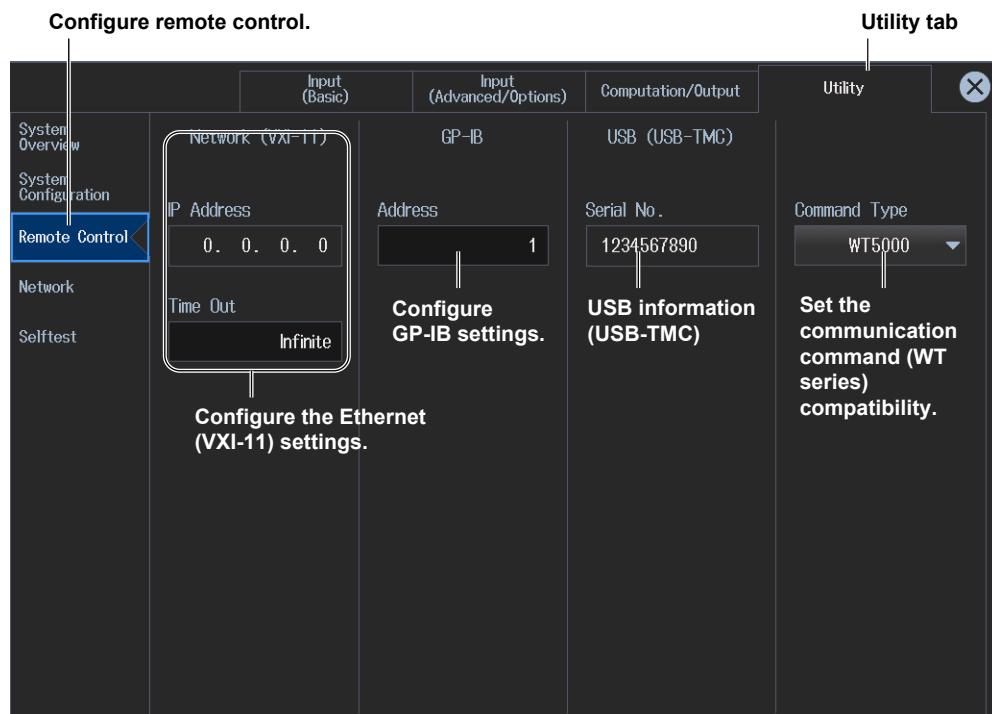
- You can also display the input settings overview screen by moving the cursor on the Utility tab using the arrow keys and then pressing SET.
- You can also display the overview screen from the navigation screen that appears immediately after power-on.



Remote Control Settings (Remote Control) ►section 14.1

3. Tap Remote Control.

A remote control setup screen (Network(VXI-11/GP-IB/USB(USB-TMC)) appears.

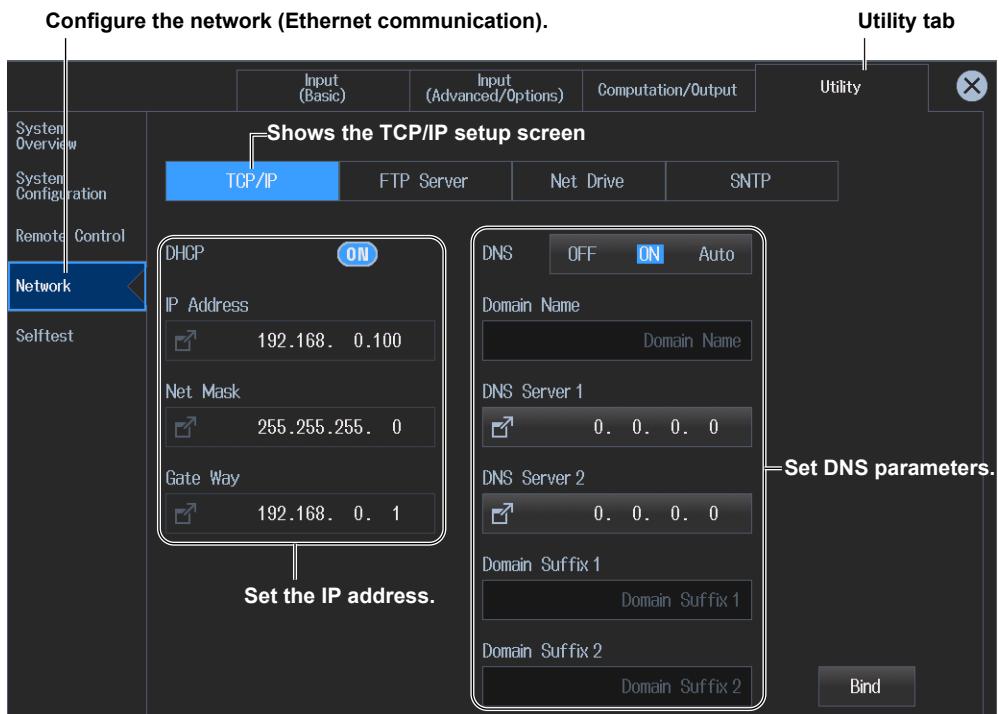


Ethernet Communication Settings (Network)

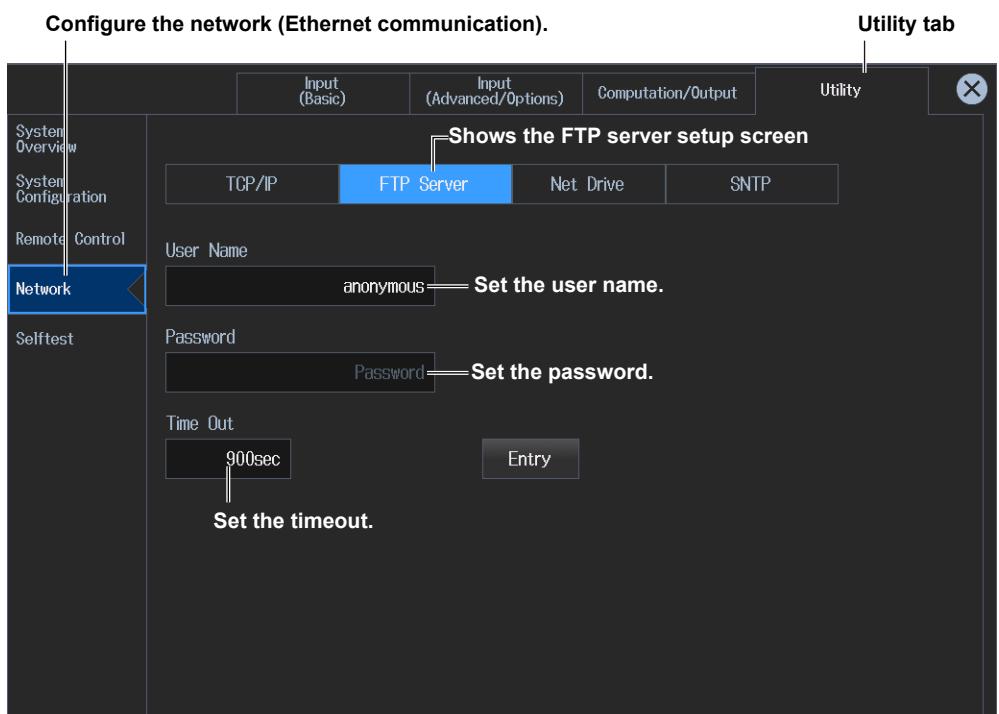
► section 13.2, 13.3, 13.4, 13.5

3. Tap **Network**. A network setup screen appears.

- **TCP/IP Settings (see section 13.2)**

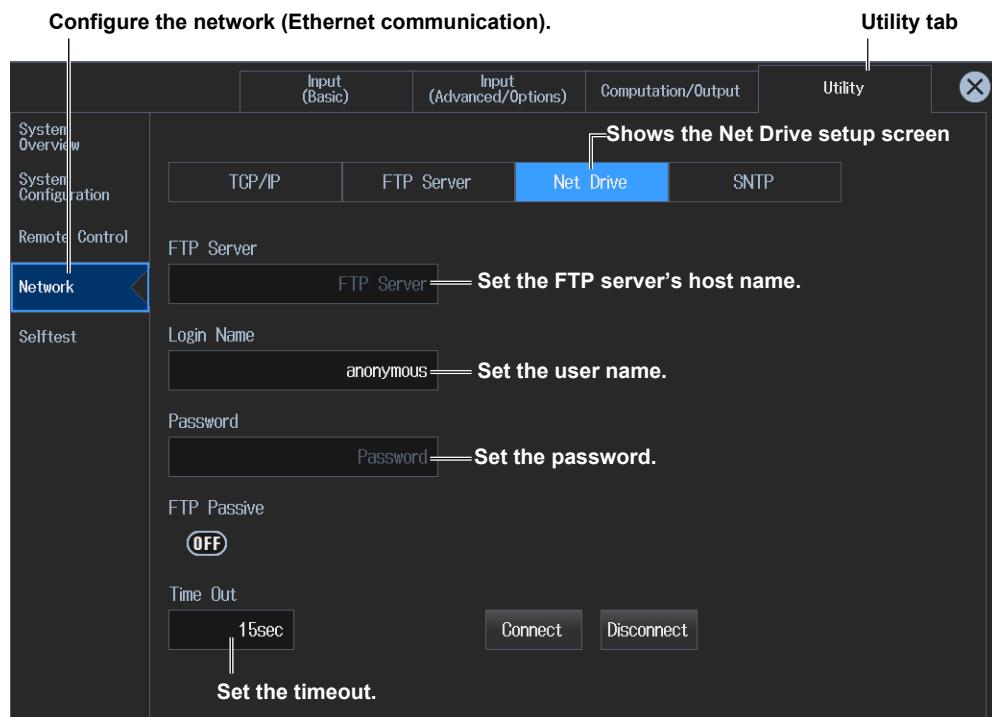


- **FTP Server Settings (see section 13.3)**

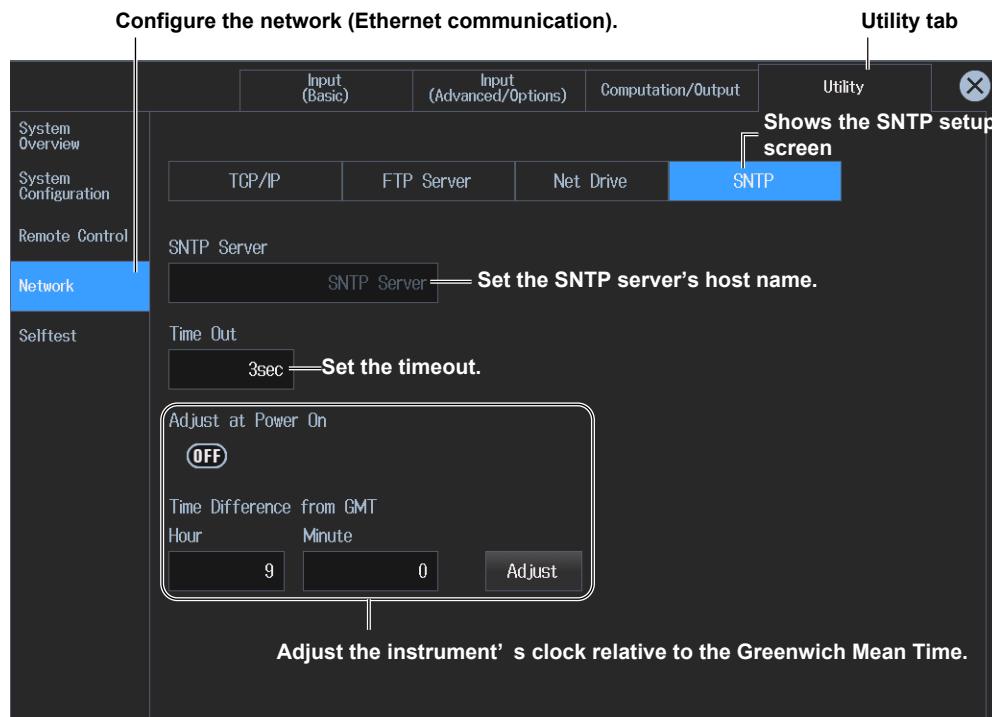


1.4 Utility Settings Overview

- Network Drive Settings (see section 13.4)

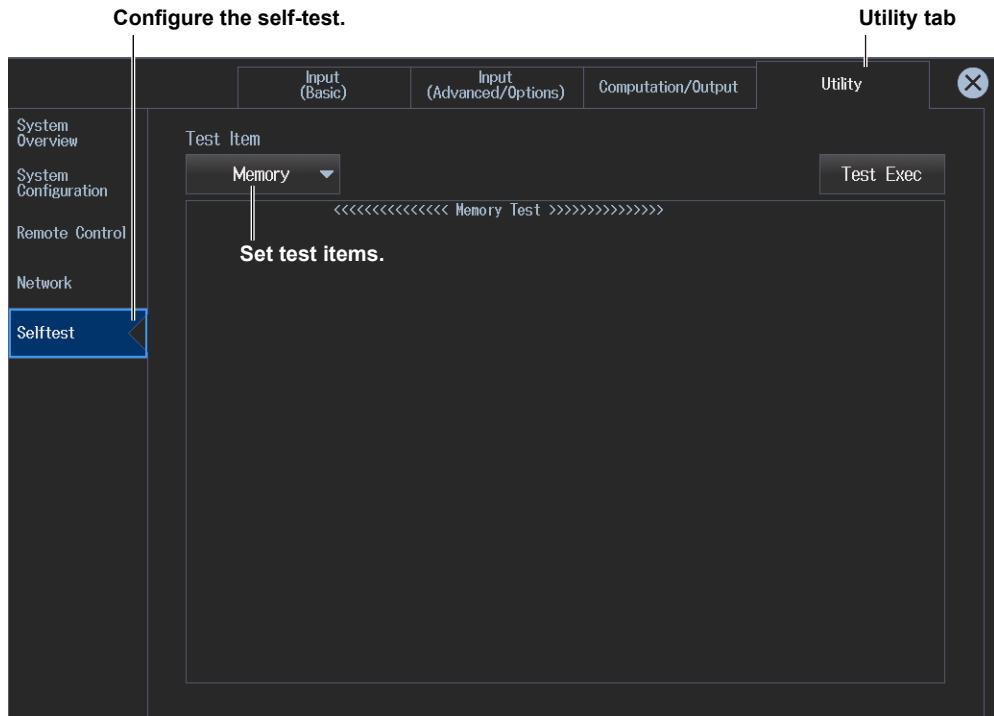


- SNTP (date and time) settings (see section 13.5)



Self-test (Selftest) ▶ section 14.6

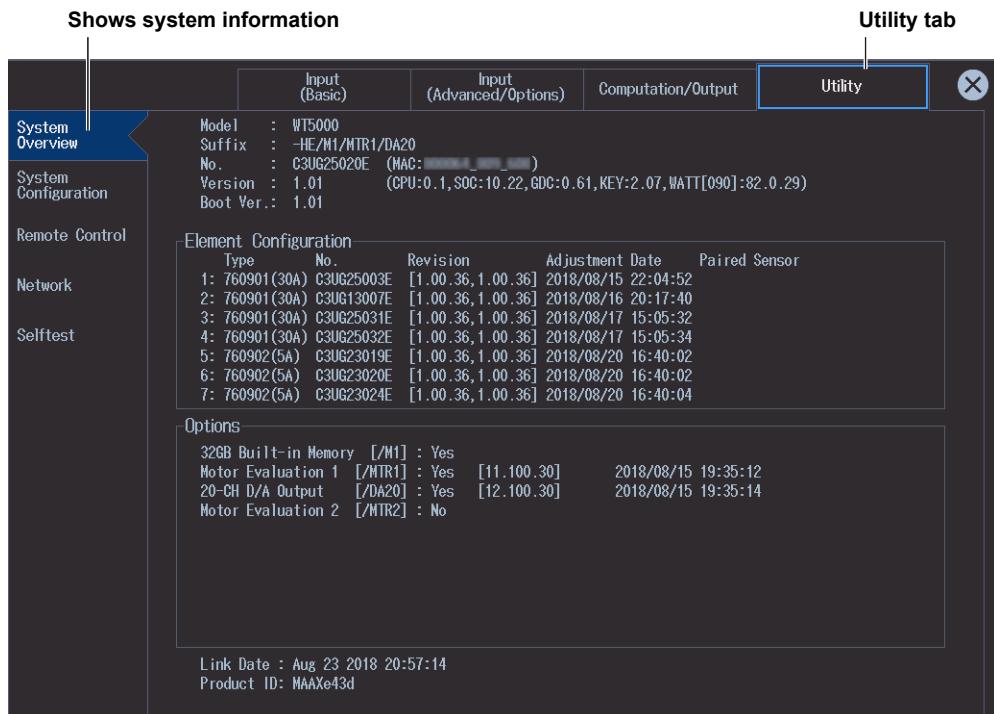
3. Tap **Selftest**. A self-test setup screen appears.



System Information Overview Screen (System Overview)

▶ section 14.7

3. Tap **System Overview**. A system information overview appears.



1.5 Loading, Saving, Initializing Setup Data

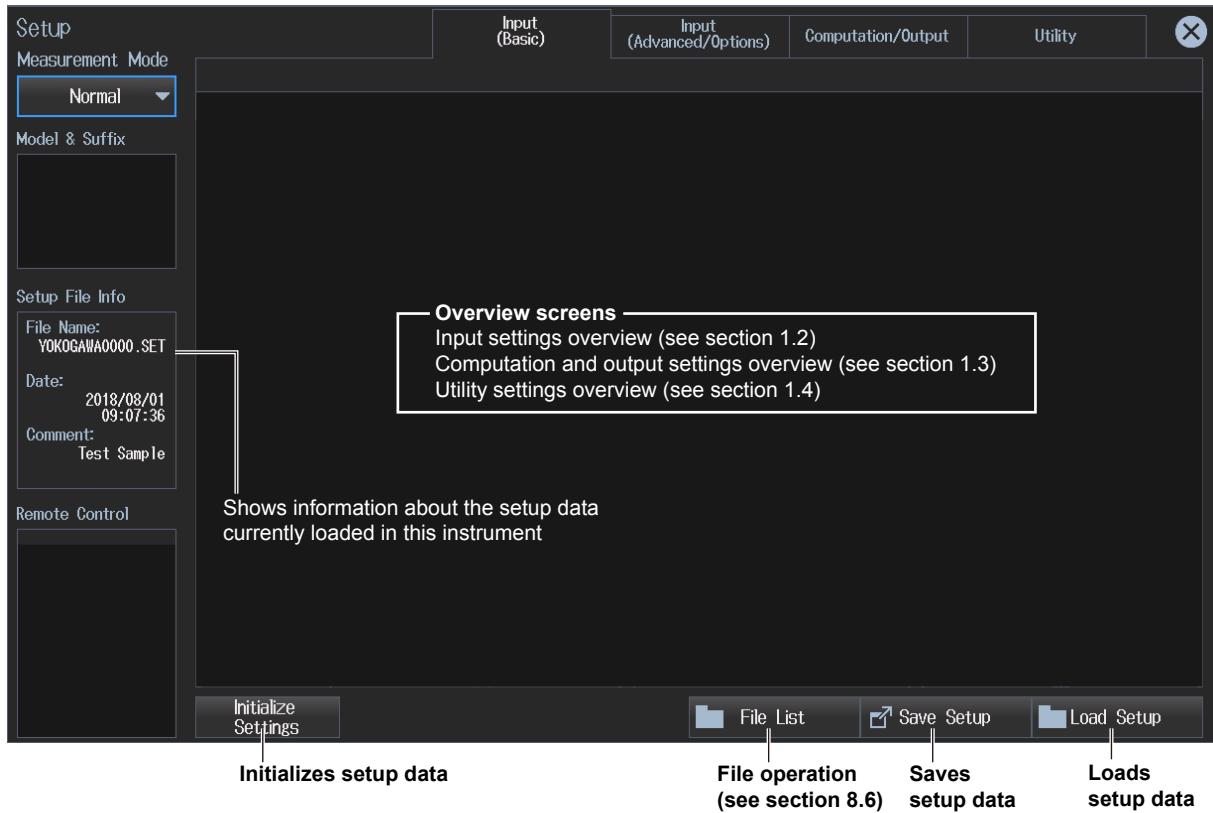
- ▶ “Loading Setup Data (Load Setup)” in the features guide
- ▶ “Saving Setup Data (Save Setup)” in the features guide
- ▶ “Initializing Settings (Initialize Settings)” in the features guide

You can load, save, and initialize the system settings of this instrument.



Loading, Saving, Initializing Setup Data (Load Setup/Save Setup/Initialize Settings)

1. Tap the **Setup** icon , or press **MENU** under **SETUP**. The setup screen appears.

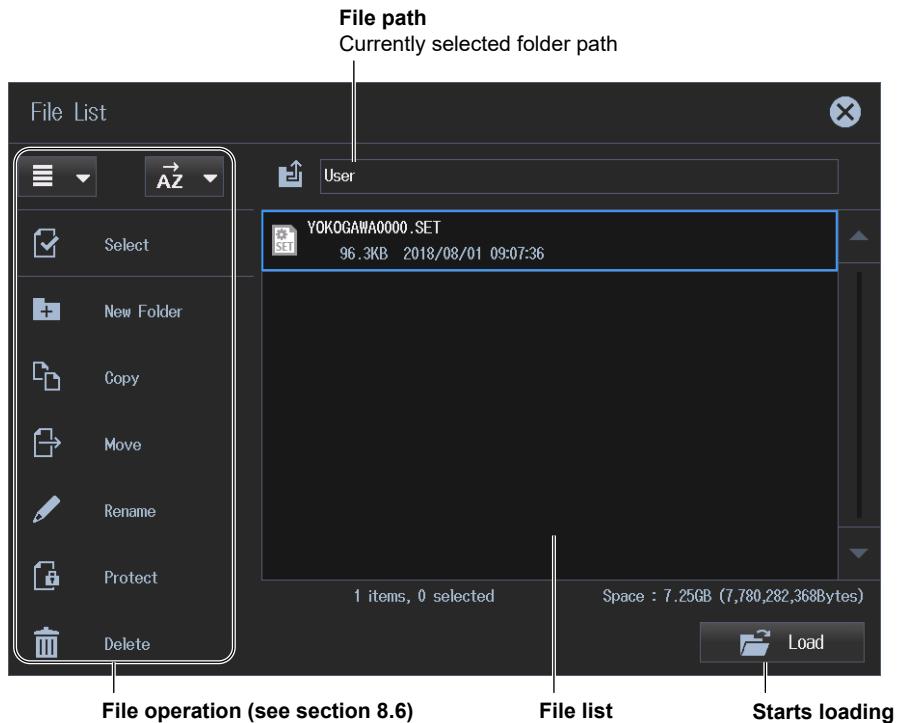


Loading Setup Data

2. Tap **Load Setup**. A file list appears.

Pressing ESC closes the file list.

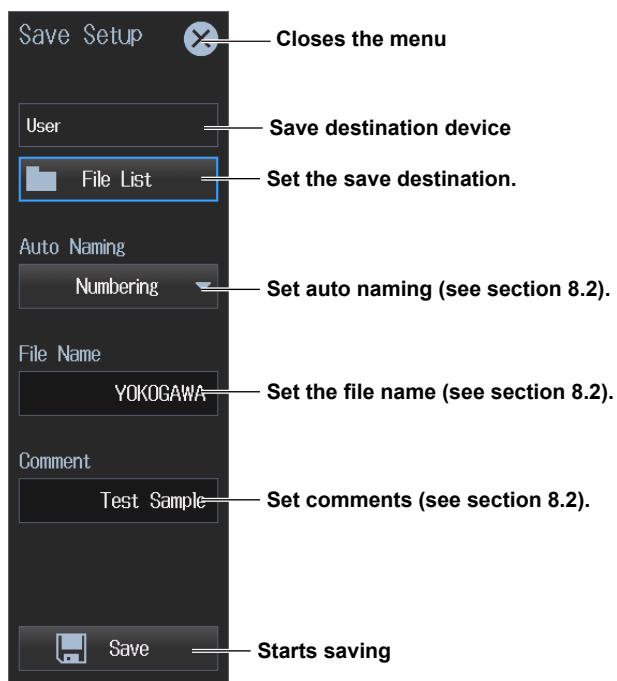
3. Select the setup data you want to load from the file list. The extension for setup data is .set.
4. Tap **Load**. The setup data is loaded into the instrument.



Saving Setup Data

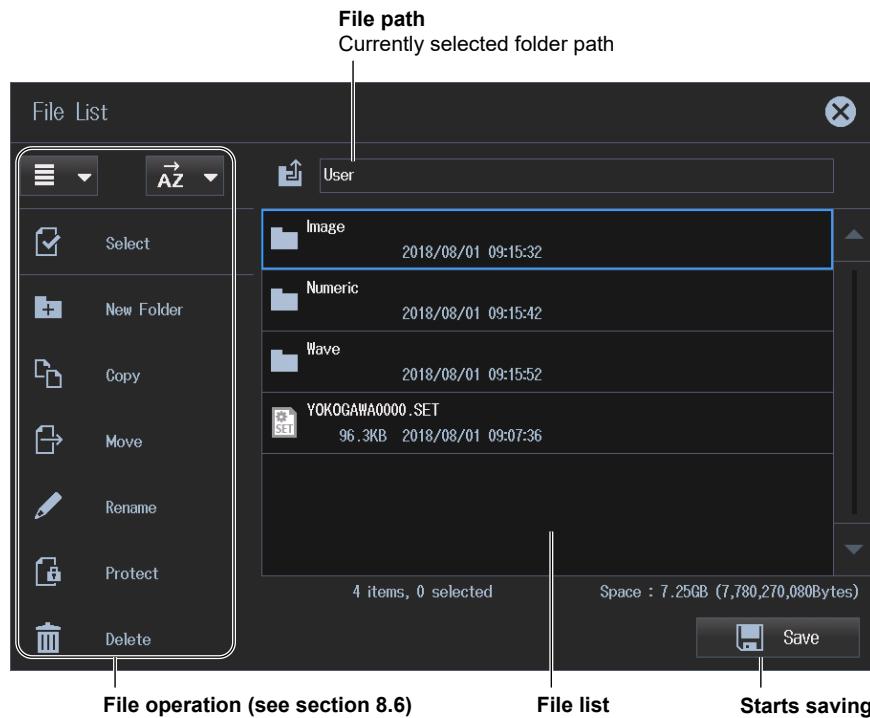
2. Tap **Save Setup**. A Save Setup screen appears.

Pressing ESC closes the Save Setup screen.



Setting the Save Destination

3. Tap **File List**. A file list appears.
Pressing ESC closes the file list.
4. Select the save destination from the file list.
5. Tap **Save**. The setup data is saved in the save destination folder.



Initializing the Setup Data

2. Tap **Initialize Settings**. A confirmation screen appears for executing the initialization.
3. Tap **OK**. The setup data of this instrument will be initialized.

2.1 Setting the Wiring System

This section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)

▶ “Wiring System (Wiring)” in the features guide
▶ “Range Σ link (Range Σ Link)” in the features guide

Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under SETUP.
2. Tap the **Input (Basic)** tab. An input settings (basic measurement conditions) overview screen appears. Pressing **ESC** closes the overview screen.

Set the wiring system.		Input (Basic) tab						
		Element 1	Element 2	Element 3	Element 4	Element 5	Element 6	Element 7
Wiring	1P2W	Wiring 1P2W	Wiring 1P2W	Wiring 1P2W	Wiring 1P2W	Wiring 1P2W	Wiring 1P2W	Wiring 1P2W
Voltage Range	1000V	Voltage Range 1000V	Voltage Range 1000V	Voltage Range 1000V	Voltage Range 1000V	Voltage Range 1000V	Voltage Range 1000V	Voltage Range 1000V
Current Range	30A	Current Range 30A	Current Range 30A	Current Range 30A	Current Range 30A	Current Range 30A	Current Range 30A	Current Range 30A
Sensor Ratio	10.0000	Sensor Ratio 10.0000						
Scaling	ON	Scaling ON	Scaling ON	Scaling ON	Scaling ON	Scaling ON	Scaling ON	Scaling ON
VT Ratio	1.0000	VT Ratio 1.0000	VT Ratio 1.0000	VT Ratio 1.0000	VT Ratio 1.0000	VT Ratio 1.0000	VT Ratio 1.0000	VT Ratio 1.0000
CT Ratio	1.0000	CT Ratio 1.0000	CT Ratio 1.0000	CT Ratio 1.0000	CT Ratio 1.0000	CT Ratio 1.0000	CT Ratio 1.0000	CT Ratio 1.0000
SF Ratio	1.0000	SF Ratio 1.0000	SF Ratio 1.0000	SF Ratio 1.0000	SF Ratio 1.0000	SF Ratio 1.0000	SF Ratio 1.0000	SF Ratio 1.0000
Line Filter	ON	Line Filter ON	Line Filter ON	Line Filter ON	Line Filter ON	Line Filter ON	Line Filter ON	Line Filter ON
Cutoff	0.5kHz	Cutoff 0.5kHz	Cutoff 0.5kHz	Cutoff 0.5kHz	Cutoff 0.5kHz	Cutoff 0.5kHz	Cutoff 0.5kHz	Cutoff 0.5kHz
Freq Filter	ON	Freq Filter ON	Freq Filter ON	Freq Filter ON	Freq Filter ON	Freq Filter ON	Freq Filter ON	Freq Filter ON
Cutoff	0.1kHz	Cutoff 0.1kHz	Cutoff 0.1kHz	Cutoff 0.1kHz	Cutoff 0.1kHz	Cutoff 0.1kHz	Cutoff 0.1kHz	Cutoff 0.1kHz
Sync Source	11	Sync Source 11	Sync Source 12	Sync Source 13	Sync Source 14	Sync Source 15	Sync Source 16	Sync Source 17

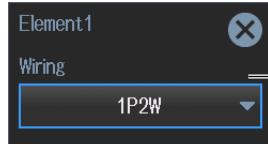
Note

You can also display the input settings (basic measurement conditions) overview screen by moving the cursor on the Input (Basic) tab using the arrow keys and then pressing SET.

Setting the Wiring System

3. Tap **Wiring** of the input element number you want to configure. A wiring system setup menu appears.

Wiring system (example of element 1)



Select the wiring system (1P2W, 1P3W, 3P3W, 3P4W, 3P3W(3V3A)).
When you select an input element, the wiring systems that you can select are displayed. Select the wiring system from those displayed.

2.1 Setting the Wiring System

Wiring System Combination

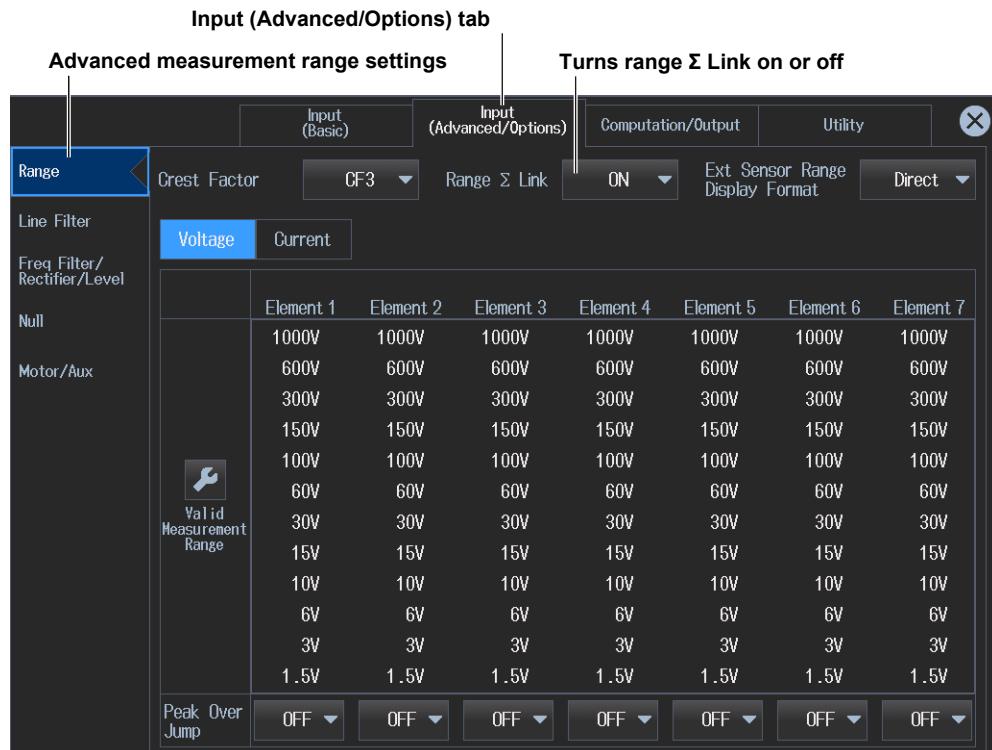
- If you select 1P3W, 3P3W, 3P4W, or 3P3W(3V3A) for the wiring system, the wiring unit is set with the two or three input elements adjacent to the selected element whose element numbers are larger than the selected element.
- On models that have six or more input elements installed, up to three wiring units (ΣA , ΣB , and ΣC) are automatically set. The wiring unit symbols ΣA , ΣB , and ΣC are attached to the element numbers in order, starting with the smallest number.

Note

- You cannot set the wiring units for larger element numbers before the wiring units for smaller element numbers.
- You cannot assign different types of input element to a wiring unit.

Range Σ Link Settings (Range Σ Link)

2. Tap the Input (Advanced/Options) tab. An input settings (advanced/options) overview screen appears. Pressing **ESC** closes the overview screen.
3. Tap Range. An advanced measurement range setup screen appears.



Note

When range Σ link is set to on, the measurement ranges of the input elements assigned to the same wiring unit are set to the same range. When range Σ link is set to off, the measurement ranges of the input elements can be set independently even when they are assigned to the same wiring unit.

2.2 Setting the Voltage Range and Current Range

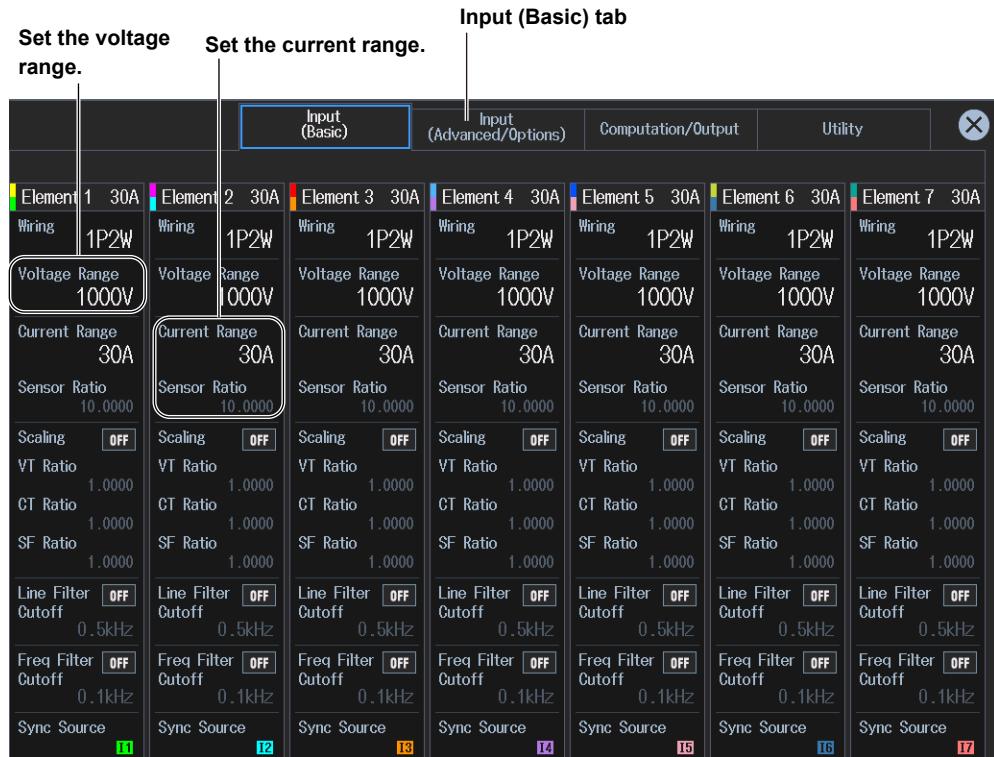
- ▶ “Voltage Range (Voltage, VOLTAGE RANGE)” in the features guide
- ▶ “Auto Voltage Range (Auto (Voltage), AUTO)” in the features guide
- ▶ “Current Range (Current, CURRENT RANGE)” in the features guide
- ▶ “Auto Current Range (Auto (Current), AUTO)” in the features guide

This section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Menu Icons (see page iii)
- Procedure Using the Keys (other than SETUP) (see section 1.2 in IM WT5000-03EN)

Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under SETUP.
2. Tap the **Input (Basic)** tab. An input settings (basic measurement conditions) overview screen appears. Pressing **ESC** closes the overview screen.



Note

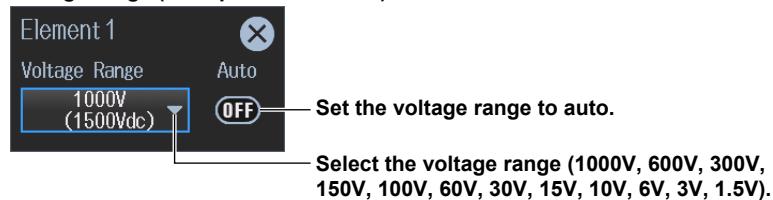
You can also display the input settings (basic measurement conditions) overview screen by moving the cursor on the Input (Basic) tab using the arrow keys and then pressing SET.

2.2 Setting the Voltage Range and Current Range

Setting the Voltage Range (Voltage Range)

3. Tap **Voltage Range** of the input element number you want to configure. A voltage range setup menu appears.

Voltage range (example of element 1)



4. Follow the instructions below to set the voltage range.

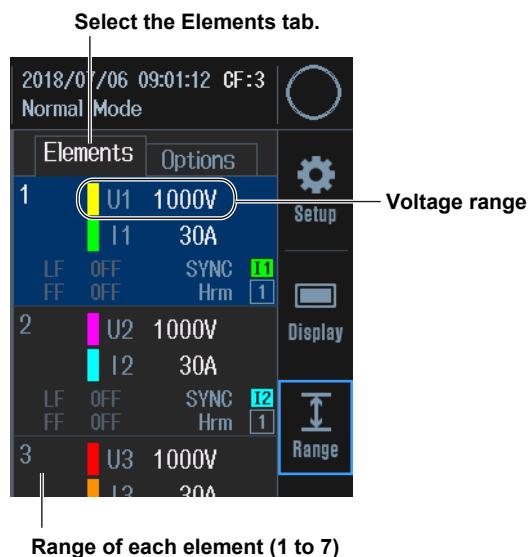
- **Sets auto range mode**

3. Tap **Auto**. The AUTO key illuminates.

- **Setting the Fixed Range**

Tap **Voltage Range**. A voltage menu appears.

Tap a voltage range on the menu to set the voltage range.



Available voltage range options

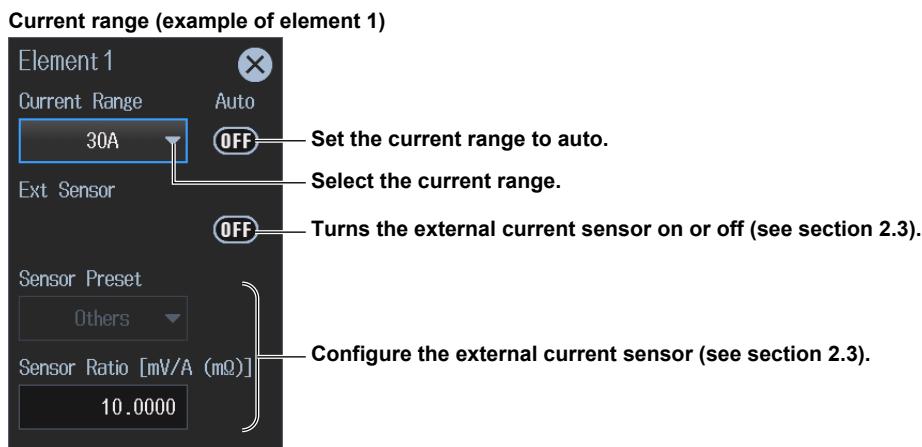
When the Crest Factor Is Set to 3	When the Crest Factor Is Set to 6 or 6A
1.5 V, 3 V, 6 V, 10 V, 15 V, 30 V, 60 V, 100 V, 150 V, 300 V, 600 V, 1000 V	0.75 V, 1.5 V, 3 V, 5 V, 7.5 V, 15 V, 30 V, 50 V, 75 V, 150 V, 300 V, 500 V

Note

- When range Σ link (see section 2.1) is set to on, the voltage ranges of the input elements assigned to the same wiring unit are set to the same range. When range Σ link is set to off, the voltage ranges of the input elements can be set independently even when they are assigned to the same wiring unit.
- When the setup menu screen is overlapped on the range display of each element, press ESC. The setup menu screen will close.

Setting the Current Range (Current Range)

3. Tap **Current Range** of the input element number you want to configure. A current range setup menu appears.



4. Follow the instructions below to set the current range.

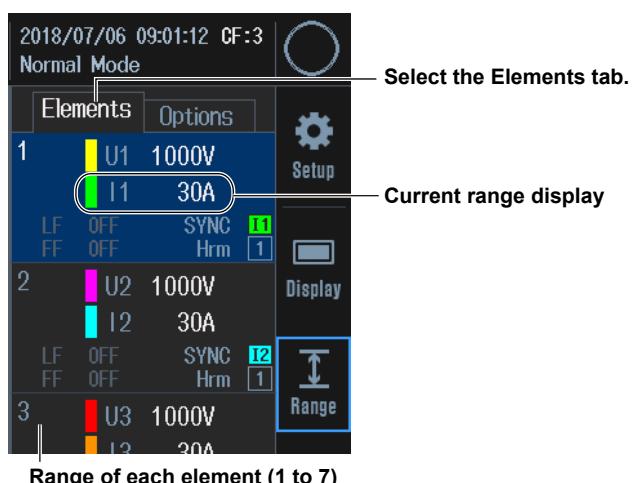
- **Sets auto range mode**

Tap **Auto**. The AUTO key illuminates.

- **Setting the Fixed Range**

Tap **Current Range**. A current range menu appears.

Tap a current range on the menu to set the current range.



Available current range options

- **5 A Input Element**

When the Crest Factor Is Set to 3	When the Crest Factor Is Set to 6 or 6A
5 mA, 10 mA, 20 mA, 50 mA, 100 mA, 200 mA, 500 mA, 1 A, 2 A, 5 A	2.5 mA, 5 mA, 10 mA, 25 mA, 50 mA, 100 mA, 250 mA, 500 mA, 1 A, 2.5 A

- **30 A Input Element**

When the Crest Factor Is Set to 3	When the Crest Factor Is Set to 6 or 6A
500 mA, 1 A, 2 A, 5 A, 10 A, 20 A, 30 A	250 mA, 1 A, 2.5 A, 5 A, 10 A, 15 A

Note

When range Σ link (see section 2.1) is set to on, the voltage ranges of the input elements assigned to the same wiring unit are set to the same range. When range Σ link is set to off, the voltage ranges of the input elements can be set independently even when they are assigned to the same wiring unit.

2.2 Setting the Voltage Range and Current Range

Procedure Using the Menu Icons

You can also use the menu icons shown on the right side of the screen to set the voltage range and current range.

1. Tap the **Range** menu icon  A Range menu appears in the sub menu area on the right side of the screen.

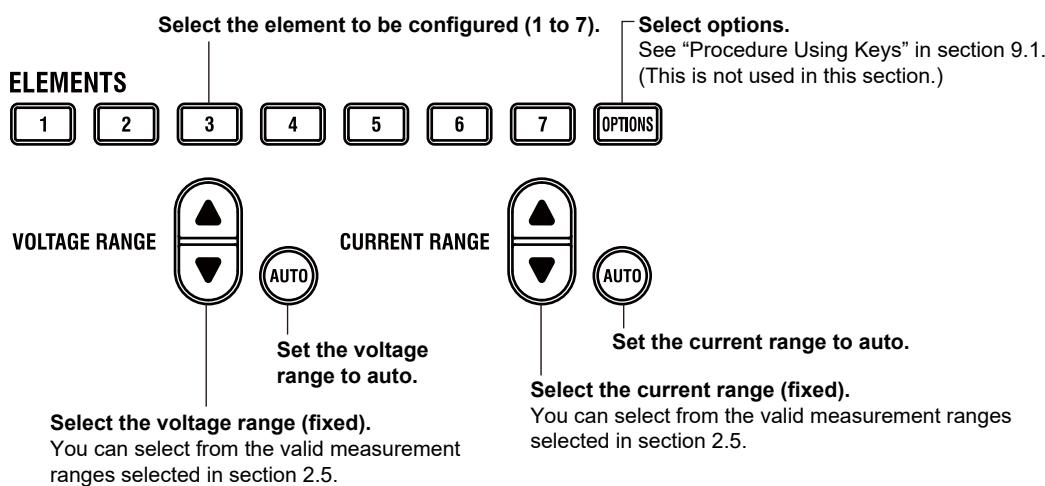
By tapping the displayed items, you can specify the same settings as when using the screen explained earlier.

Note

For a description of the Range menu screen, see "Menu Icons" on page v.

Procedure Using Keys

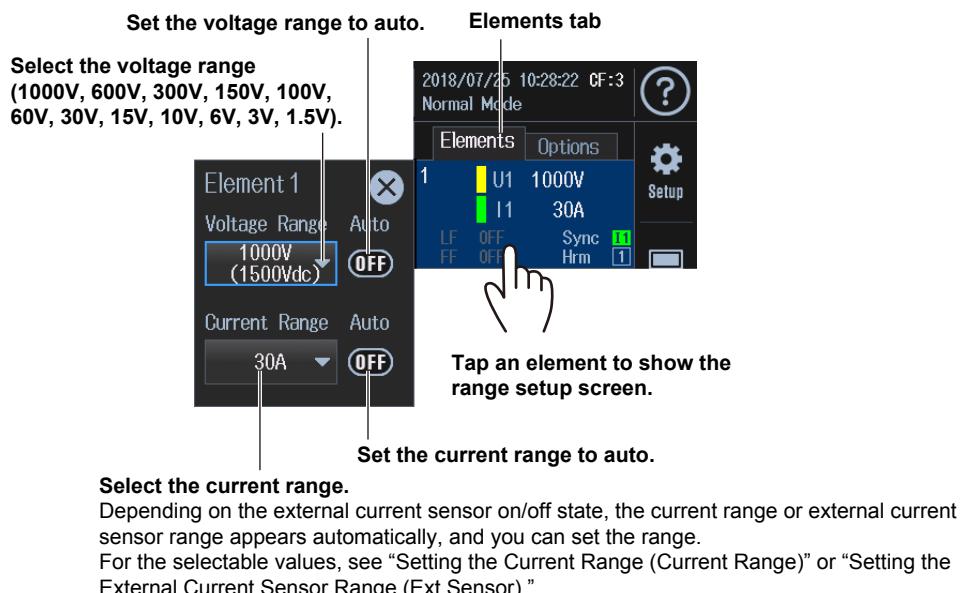
You can also use the front panel keys to set the voltage range and current range.



Procedure Using the Input Information Area (Elements tab)

If you use the input information area shown on the right side of the screen, you can set the voltage range and current range while viewing the measurements.

1. Tap the **Elements** tab. An Elements menu appears in the input information area.
2. Tap the element (1 to 7) you want to configure. A range setup screen for the element appears.



2.3 Configuring the External Current Sensor

- ▶ “External Current Sensor On/Off (Ext Sensor)” in the features guide
- ▶ “External current sensor conversion ratio (Sensor Ratio)” in the features guide
- ▶ “Display format of external current sensor range (Ext Sensor Range Display Format)” in the features guide

This section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Menu Icons (see page iii)

Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under SETUP.
2. Tap the **Input (Basic)** tab. An input settings (basic measurement conditions) overview screen appears. Pressing **ESC** closes the overview screen.

Input (Basic) tab						
Set the current range.						
Element 1 30A	Element 2 30A	Element 3 30A	Element 4 30A	Element 5 30A	Element 6 30A	Element 7 30A
Wiring 1P2W	Wiring 1P2W	Wiring 1P2W	Wiring 1P2W	Wiring 1P2W	Wiring 1P2W	Wiring 1P2W
Voltage Range 1000V	Voltage Range 1000V	Voltage Range 1000V	Voltage Range 1000V	Voltage Range 1000V	Voltage Range 1000V	Voltage Range 1000V
Current Range 30A	Current Range 30A	Current Range 30A	Current Range 30A	Current Range 30A	Current Range 30A	Current Range 30A
Sensor Ratio 10.0000	Sensor Ratio 10.0000	Sensor Ratio 10.0000	Sensor Ratio 10.0000	Sensor Ratio 10.0000	Sensor Ratio 10.0000	Sensor Ratio 10.0000
Scaling OFF	Scaling OFF	Scaling OFF	Scaling OFF	Scaling OFF	Scaling OFF	Scaling OFF
VT Ratio 1.0000	VT Ratio 1.0000	VT Ratio 1.0000	VT Ratio 1.0000	VT Ratio 1.0000	VT Ratio 1.0000	VT Ratio 1.0000
CT Ratio 1.0000	CT Ratio 1.0000	CT Ratio 1.0000	CT Ratio 1.0000	CT Ratio 1.0000	CT Ratio 1.0000	CT Ratio 1.0000
SF Ratio 1.0000	SF Ratio 1.0000	SF Ratio 1.0000	SF Ratio 1.0000	SF Ratio 1.0000	SF Ratio 1.0000	SF Ratio 1.0000
Line Filter OFF	Line Filter OFF	Line Filter OFF	Line Filter OFF	Line Filter OFF	Line Filter OFF	Line Filter OFF
Cutoff 0.5kHz	Cutoff 0.5kHz	Cutoff 0.5kHz	Cutoff 0.5kHz	Cutoff 0.5kHz	Cutoff 0.5kHz	Cutoff 0.5kHz
Freq Filter OFF	Freq Filter OFF	Freq Filter OFF	Freq Filter OFF	Freq Filter OFF	Freq Filter OFF	Freq Filter OFF
Cutoff 0.1kHz	Cutoff 0.1kHz	Cutoff 0.1kHz	Cutoff 0.1kHz	Cutoff 0.1kHz	Cutoff 0.1kHz	Cutoff 0.1kHz
Sync Source 11	Sync Source 12	Sync Source 13	Sync Source 14	Sync Source 15	Sync Source 16	Sync Source 17

Note

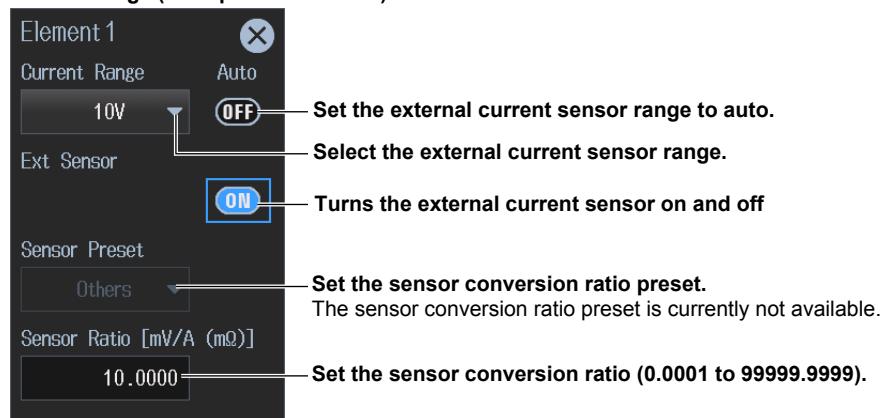
You can also display the input settings (basic measurement conditions) overview screen by moving the cursor on the Input (Basic) tab using the arrow keys and then pressing SET.

2.3 Configuring the External Current Sensor

Setting the External Current Sensor Range (Ext Sensor)

3. Tap **Current Range** of the input element number you want to configure. An external current sensor range setup menu appears.

Current range (example of element 1)



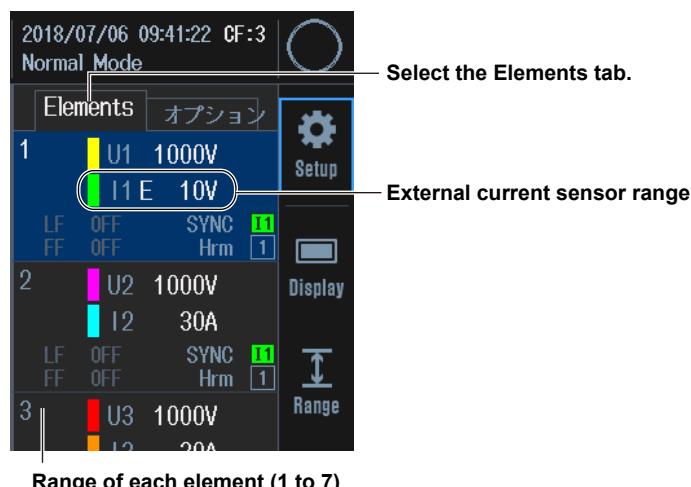
4. Follow the instructions below to set the external current sensor range.

- **Sets auto range mode**

Tap **Auto**. The AUTO key illuminates.

- **Setting the Fixed Range**

Tap **Current Range**. An external current sensor range menu appears. Tap the external current sensor range on the menu, and set the range.



Available External Current Sensor Range Options

When the display format of the external current sensor range is set to Direct (see the next page), you can select the range from the available options shown in the following table (the unit is mV or V). When the display format is set to Measure, the setup range is set to the value from the following table divided by the external current sensor conversion ratio (the unit is A).

When the Crest Factor Is Set to 3	When the Crest Factor Is Set to 6 or 6A
50 mV, 100 mV, 200 mV, 500 mV, 1 V, 2 V, 5 V, 10 V	25 mV, 50 mV, 100 mV, 250 mV, 500 mV, 1 V, 2.5 V, 5 V

Note

When range Σ link (see section 2.1) is set to on, the external current sensor ranges of the input elements assigned to the same wiring unit are set to the same range. When range Σ link is set to off, the external current sensor ranges of the input elements can be set independently even when they are assigned to the same wiring unit.

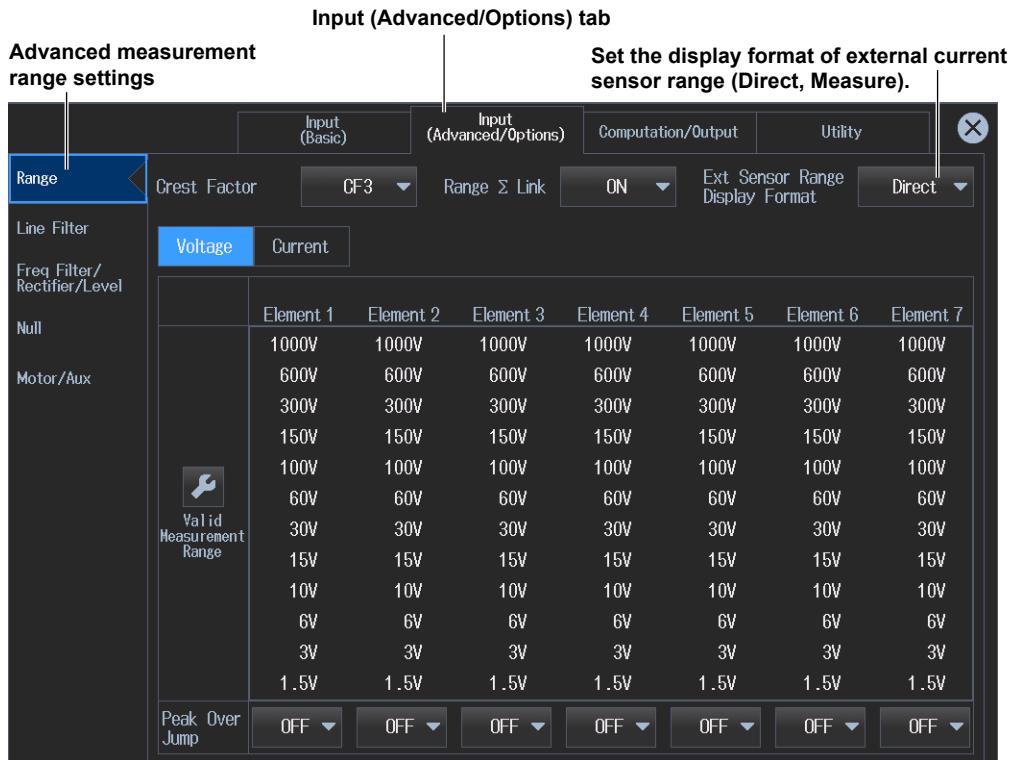
External Current Sensor Range and Conversion Ratio Configuration Example

When you measure a current with a maximum value of 100 A using a current sensor that produces 10 mV when 1 A of current is flowing, the maximum voltage that the current sensor produces is $10 \text{ mV/A} \times 100 \text{ A} = 1 \text{ V}$. Therefore, configure the settings as indicated below.

- External current sensor range: 1 V
- External current sensor conversion ratio: 10 mV/A

Setting the Display Format of External Current Sensor Range (Ext Sensor Range Display Format)

3. Tap the Input (Advanced/Options) tab. An input settings (advanced/options) overview screen appears. Pressing **ESC** closes the overview screen.
4. Tap Range. An advanced measurement range setup screen appears.



2.3 Configuring the External Current Sensor

Procedure Using the Menu Icons

You can also use the menu icons shown on the right side of the screen to set the external current sensor range.

1. Tap the **Range** menu icon  A Range menu appears in the sub menu area on the right side of the screen.

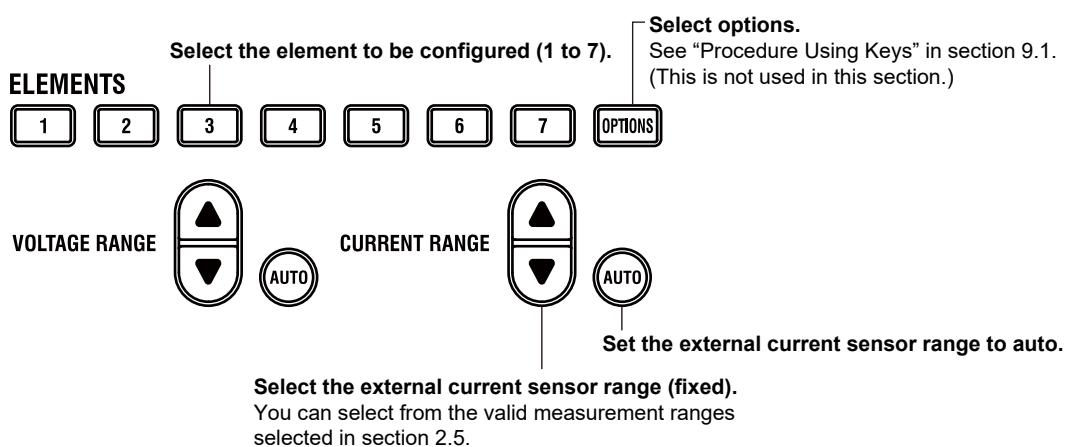
By tapping the displayed items, you can specify the same settings as when using the keys explained earlier.

Note

For a description of the Range menu screen, see "Menu Icons" on page v.

Procedure Using Keys

You can also use the front panel keys to set the external current sensor range.



Note

To turn the external current sensor on and off or set the sensor conversion ratio and other details, use the Setup menu.

2.4 Setting the Voltage Transformer (VT) and Current Transformer (CT) Ratios

► “Scaling (Scaling)” in the features guide

This section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)

Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under **SETUP**.
2. Tap the **Input (Basic)** tab. An input settings (basic measurement conditions) overview screen appears. Pressing **ESC** closes the overview screen.

Input (Basic) tab						
Input (Basic)		Input (Advanced/Options)		Computation/Output		Utility
Element 1 30A	Wiring 1P2W	Element 2 30A	Wiring 1P2W	Element 3 30A	Wiring 1P2W	Element 4 30A
Voltage Range 1000V		Voltage Range 1000V		Voltage Range 1000V		Voltage Range 1000V
Current Range 30A		Current Range 30A		Current Range 30A		Current Range 30A
Sensor Ratio 10.0000		Sensor Ratio 10.0000		Sensor Ratio 10.0000		Sensor Ratio 10.0000
Scaling ON	Scaling OFF	Scaling ON				
VT Ratio 1.0000						
CT Ratio 1.0000						
SF Ratio 1.0000						
Line Filter Cutoff 0.5kHz						
Freq Filter Cutoff 0.1kHz						
Sync Source I1	Sync Source I2	Sync Source I3	Sync Source I4	Sync Source I5	Sync Source I6	Sync Source I7

Set the VT ratio, CT ratio, and power coefficient.

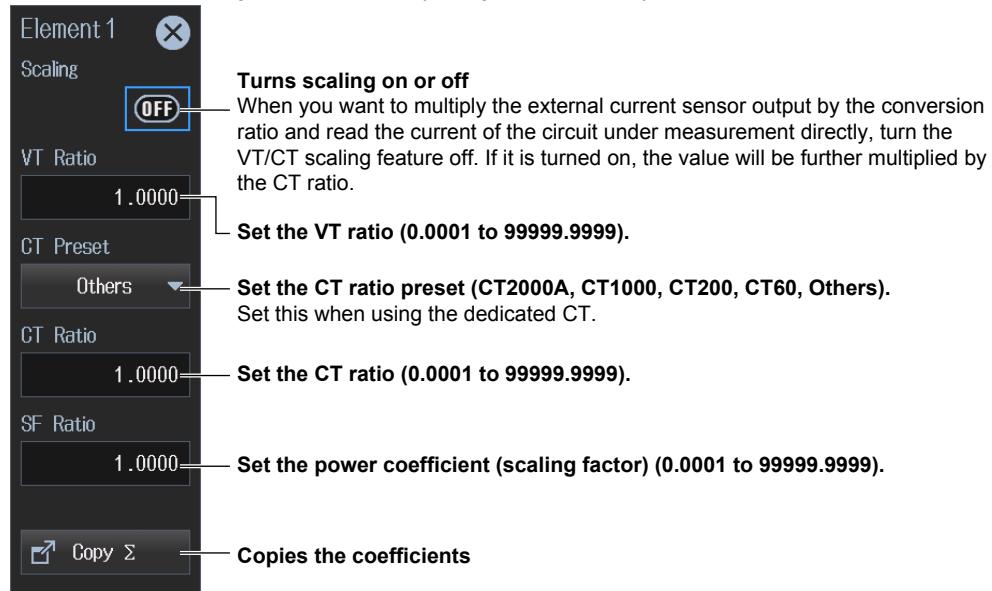
Note

You can also display the input settings (basic measurement conditions) overview screen by moving the cursor on the Input (Basic) tab using the arrow keys and then pressing **SET**.

Setting the VT Ratio, CT Ratio, and Power Coefficient (Scaling)

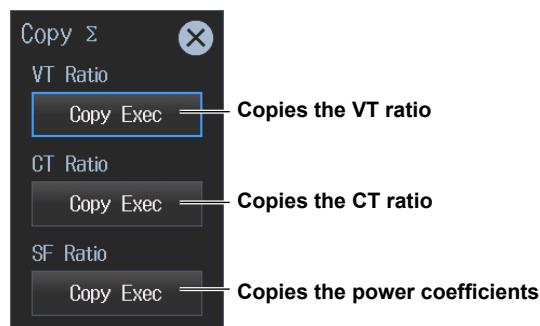
- Tap **Scaling** of the input element number you want to configure. A scaling setup menu appears.

VT ratio, CT ratio, and power coefficient (example of element 1)



Copying VT Ratio, CT Ratio, and Power Coefficient (Exec Copy Σ)

You can copy the ratio or coefficient of the input element that is indicated by the cursor to all the input elements in that element's wiring unit.



2.5 Setting the Valid Measurement Range

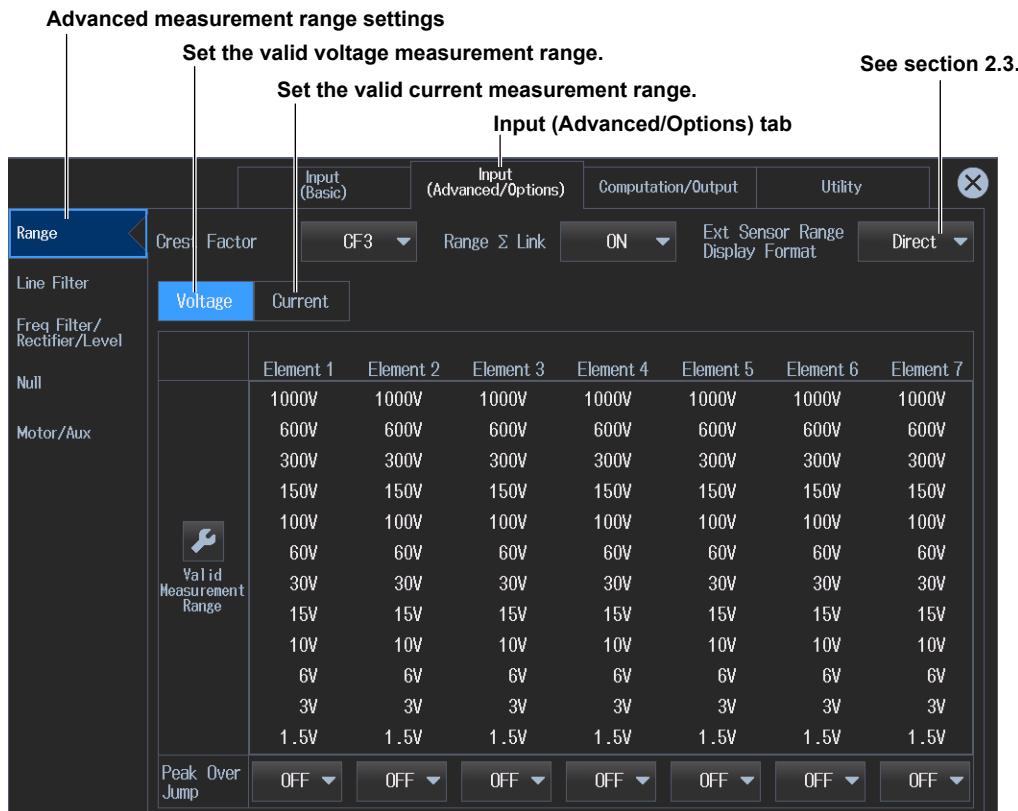
► “Valid Measurement Range (Valid Measurement Range)” in the features guide

This section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)

Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under SETUP.
2. Tap the **Input (Advanced/Options)** tab. An input settings (advanced/options) overview screen appears. Pressing **ESC** closes the overview screen.
3. Tap **Range**. An advanced measurement range setup screen appears.



Note

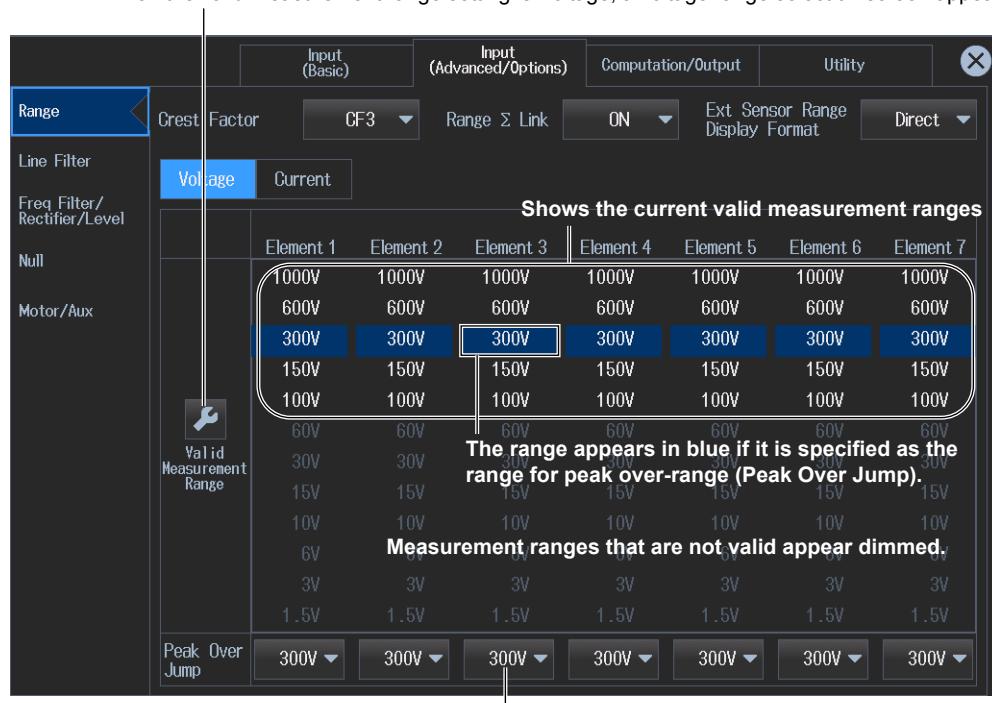
You can also display the input settings (advanced/options) overview screen by moving the cursor on the Input (Advanced/Options) tab using the arrow keys and then pressing SET.

Setting the Valid Voltage Measurement Range (Voltage)

- Tap **Voltage**. A valid voltage measurement range setup screen appears.

Select the valid measurement range.

When the valid measurement range setting is Voltage, a voltage range selection screen appears.



Set the measurement range to switch to when a peak over-range occurs.

(OFF, 1000V, 600V, 300V, 150V, 100V, 60V, 30V, 15V, 10V, 6V, 3V, 1.5V)

- When Range Σ Link is set to on, the input elements that are assigned to the same wiring unit are set to the same range.
- If auto range is on (you can turn it on by pressing AUTO), the instrument operates as follows:
- When a peak over-range occurs, the measurement range increases to the range specified here, skipping the ranges in between.
- When the measurement range to switch to when a peak over-range occurs has not been selected, the measurement range increases in the order specified by the measurement ranges that have been selected.

Selecting the Valid Measurement Range (Voltage)

5. Tap **Valid Measurement Range**. A voltage range selection screen appears.

By tapping an input element or wiring unit, you can set all ranges as valid measurement ranges (All ON).

If the measurement range to switch to when a peak over-range occurs has been selected, the range background is displayed in gray.

All	Element 1	Element 2	Element 3	Element 4	Element 5	Element 6	Element 7
1000V	<input checked="" type="checkbox"/>						
600V	<input checked="" type="checkbox"/>						
300V	<input checked="" type="checkbox"/>						
150V	<input checked="" type="checkbox"/>						
100V	<input checked="" type="checkbox"/>						
60V	<input type="checkbox"/>						
30V	<input type="checkbox"/>						
15V	<input type="checkbox"/>						
10V	<input type="checkbox"/>						
All ON							
All OFF							
1.5V	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Valid measurement range

- The measurement range switches (in order) between the selected ranges.
- Ranges that are not selected are skipped.
- When Element Independent (see section 2.1) is set to ON, the input elements that are assigned to the same wiring unit are set to the same status.

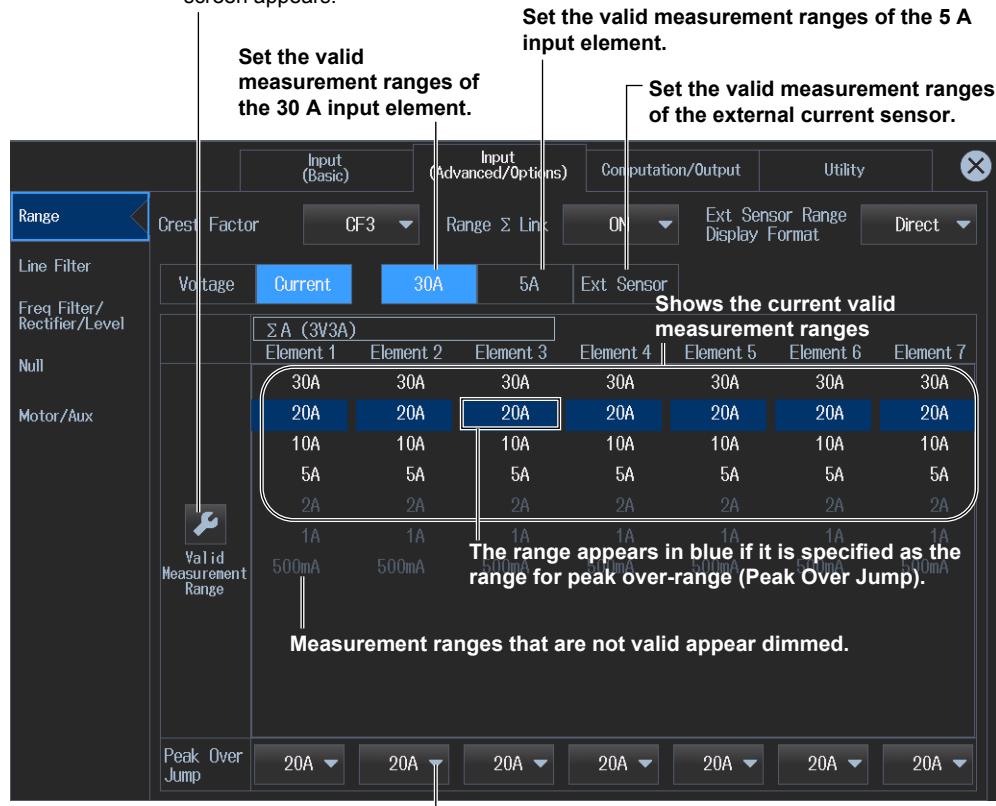
By tapping each range display, you can set whether the range is a valid measurement range for all input elements or all wiring units (All ON) or not (All OFF).

Setting the Valid Current Measurement Range (Current)

- Tap **Current**. A valid current measurement range setup screen appears.

Select the valid measurement range.

When the valid measurement range setting is Current, a current range selection screen appears.



Set the measurement range to switch to when a peak over-range occurs.

30 A input element

(OFF, 30A, 20A, 10A, 5A, 2A, 1A, 500mA)

5 A input element

(OFF, 5A, 2A, 1A, 500mA, 200mA, 100mA, 50mA, 20mA, 10mA, 5mA)

External current sensor

(OFF, 10V, 5V, 2V, 1V, 500mV, 200mV, 100mV, 50mV)

- When Range Σ Link is set to on, the input elements that are assigned to the same wiring unit are set to the same range.
- If auto range is on (you can turn it on by pressing AUTO), the instrument operates as follows:
- When a peak over-range occurs, the measurement range increases to the range specified here, skipping the ranges in between.
- When the measurement range to switch to when a peak over-range occurs has not been selected, the measurement range increases in the order specified by the measurement ranges that have been selected.

Selecting the Valid Measurement Range (30 A input element example)

5. Tap **Valid Measurement Range**. A current range selection screen appears.

If the measurement range to switch to when a peak over-range occurs has been selected, the range background is displayed in gray.

By tapping an input element or wiring unit, you can set all ranges as valid measurement ranges (All ON).

Range Σ link off indication

Valid Current Measurement Range

Σ A (3V3A)								
All	Element 1	Element 2	Element 3	Element 4	Element 5	Element 6	Element 7	
30A	<input checked="" type="checkbox"/>							
20A	<input checked="" type="checkbox"/>							
10A	<input checked="" type="checkbox"/>							
5A	<input checked="" type="checkbox"/>							
2A	<input type="checkbox"/>							
1A	<input type="checkbox"/>							
500mA	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Valid measurement range

- The measurement range switches (in order) between the selected ranges.
- Ranges that are not selected are skipped.
- When range Σ link (see section 2.1) is set to ON, the input elements that are assigned to the same wiring unit are set to the same status.

By tapping each range display, you can set whether the range is a valid measurement range for all input elements or all wiring units (All ON) or not (All OFF).

2.6 Setting the Line Filter and Frequency Filter

► “Line Filter (Line Filter)” in the features guide

► “Frequency Filter, Rectifier, Level (Freq Filter/Rectifier/Level)” in the features guide

This section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Menu Icons (see page iii)

Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under SETUP.

Setting the Line Filter and Frequency Filter (Cutoff)

2. Tap the **Input (Basic)** tab. An input settings (basic measurement conditions) overview screen appears. Pressing **ESC** closes the overview screen.

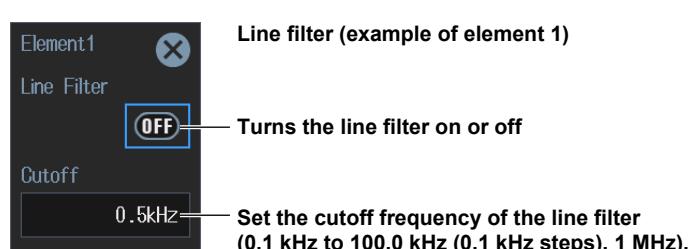


Note

You can also display the input settings (basic measurement conditions) overview screen by moving the cursor on the Input (Basic) tab using the arrow keys and then pressing SET.

Setting the Line Filter (Line Filter)

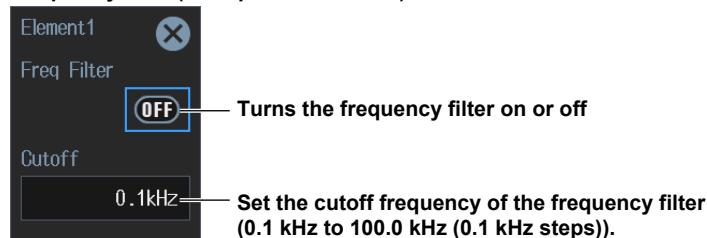
3. Tap **Line Filter**. A line filter setup screen appears.



Setting the Frequency Filter (Freq Filter)

3. Tap **Freq Filter**. A frequency filter setup screen appears.

Frequency filter (example of element 1)



Setting the Line Filter and Frequency Filter (Advanced Settings)

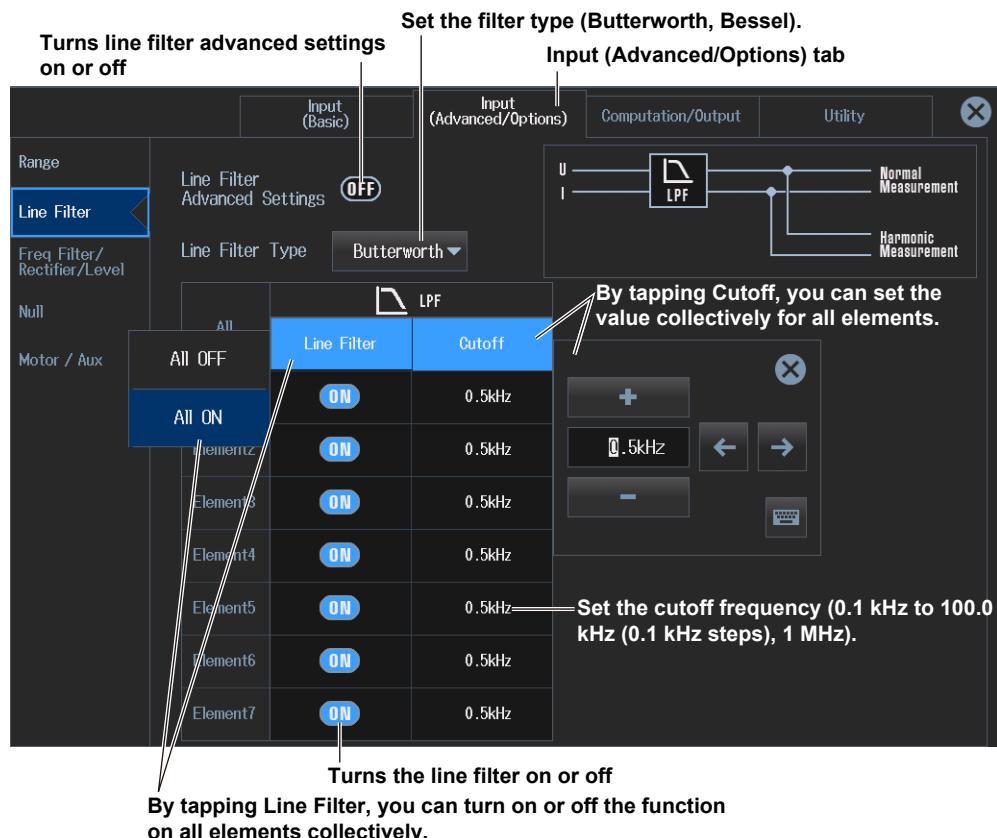
2. Tap the **Input (Advanced/Options)** tab. An input settings (advanced/options) overview screen appears. Pressing **ESC** closes the overview screen.

Setting the Line Filter (Line Filter)

3. Tap **Line Filter**. A line filter setup screen appears.

- When Line Filter Advanced Settings Is Set to OFF

You can set the cutoff frequency and filter type.

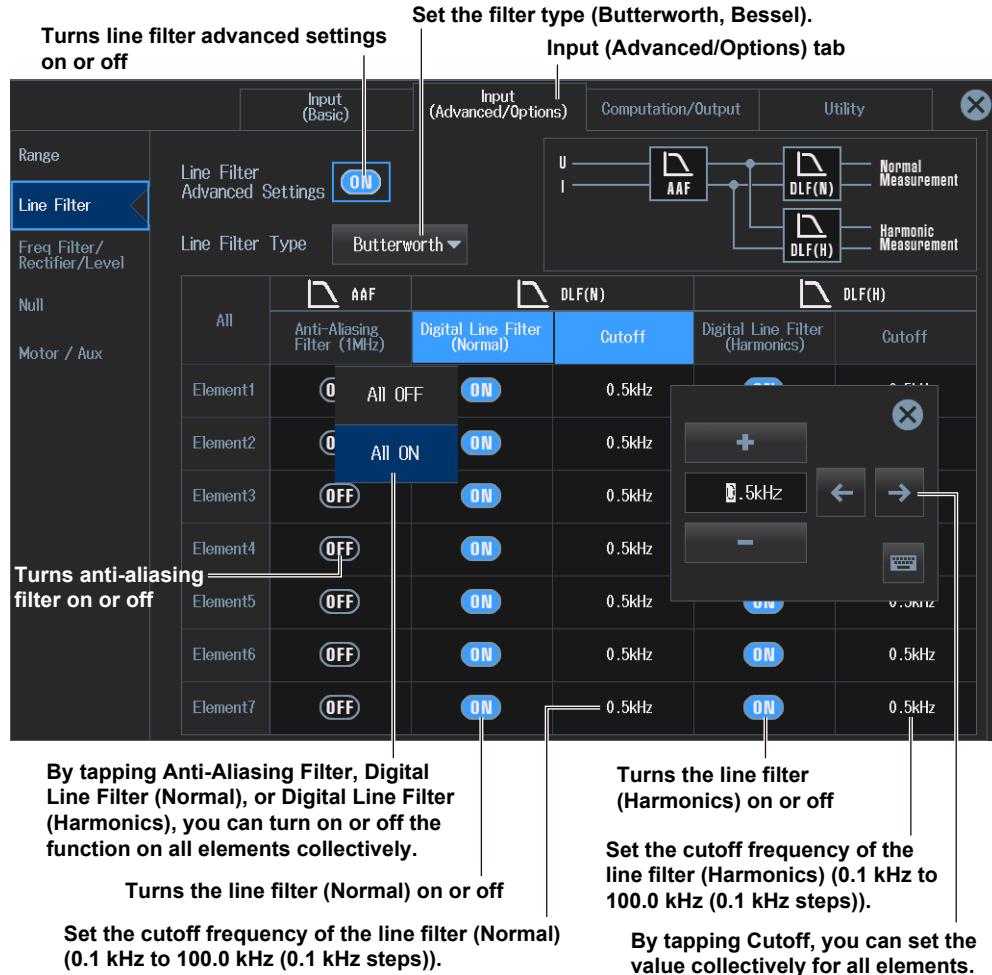


2.6 Setting the Line Filter and Frequency Filter

- When Line Filter Advanced Settings Is Set to ON

You can set the following filters separately.

- AAF (anti-aliasing filter)
- DLF (N) (normal measurement line filter)
- DLF(H) (harmonics line filter)

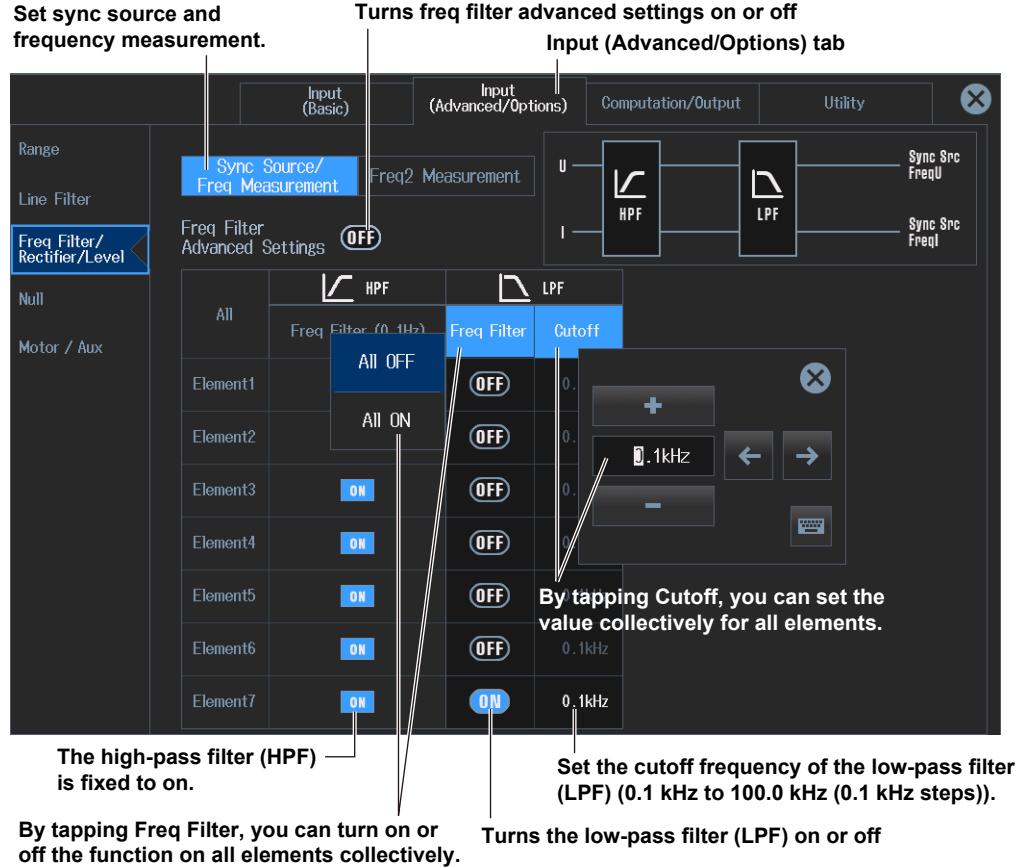


Setting the Frequency Filter (Sync Source/Freq Measurement)

3. Tap **Freq Filter/Rectifier/Level**. A frequency filter setup screen appears.
4. Tap **Sync Source/Freq Measurement**. A Sync Source/Freq Measurement (sync source/frequency measurement) screen appears.

- When Freq Filter Advanced Settings Is Set to OFF

You can set the cutoff frequency of the low-pass filter (LPF).

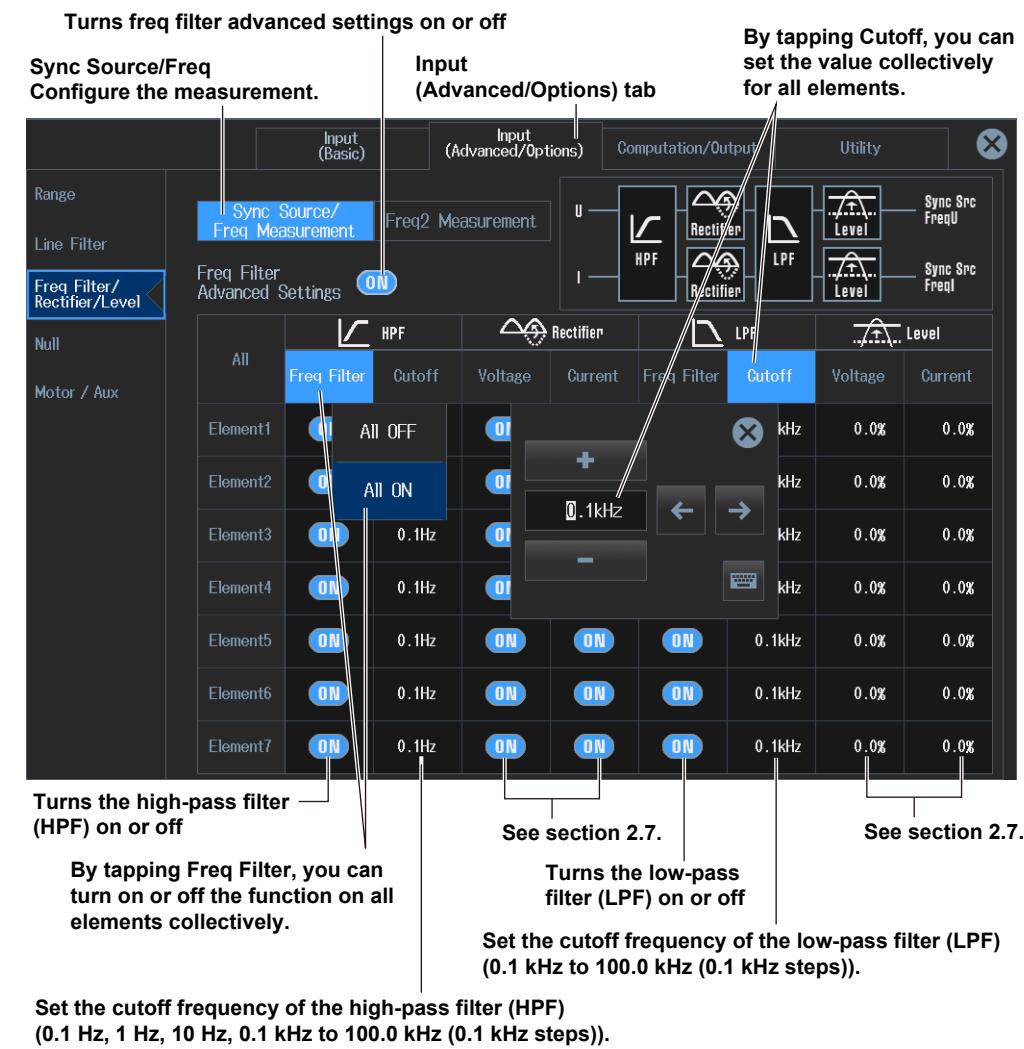


2.6 Setting the Line Filter and Frequency Filter

- When Freq Filter Advanced Settings Is Set to ON

You can set the following filters and items separately.

- High-pass filter (HPF)
- Rectifier (Rectifier)
- Low-pass filter (LPF)
- Cross level (Level)



Second Frequency Measurement Settings (Freq2 Measurement)

3. Tap **Freq Filter/Rectifier/Level**. A frequency filter setup screen appears.
4. Tap **Freq2 Measurement**. A Freq2 Measurement (second frequency measurement) screen appears.

By tapping Cutoff, Voltage Level (Freq2), or Current Level (Freq2), you can set the value collectively for all elements.

Set the second frequency measurement.

Input (Advanced/Options) tab

Element	Freq Filter (Freq2)	Cutoff	Voltage Level (Freq2)	Current Level (Freq2)
Element1	OFF	All OFF	0.0%	
Element2	OFF	All ON	0.0%	
Element3	OFF	0.1Hz	0.0%	
Element4	OFF	0.1Hz	0.0%	
Element5	OFF	0.1Hz	0.0%	0.0%
Element6	ON	0.1Hz	0.0%	0.0%
Element7	OFF	0.1Hz	0.0%	0.0%

Turns the high-pass filter (HPF) on or off

By tapping Freq Filter (Freq2), you can turn on or off the function on all elements collectively.

Set the cutoff frequency of the high-pass filter (HPF) (0.1 Hz, 1 Hz, 10 Hz, 0.1 kHz to 100.0 kHz (0.1 kHz steps)).

Set the voltage cross level (0.0% to 100.0% (0.1% steps)).

Set the current cross level (0.0% to 100.0% (0.1% steps)).

You can use the voltage and current cross level settings when the high-pass filter (HPF) is set to OFF.

Procedure Using the Menu Icons

You can also use the menu icons shown on the right side of the screen to set the line filter and frequency filter.

1. Tap the **Filter** menu icon . A Filter menu appears in the sub menu area on the right side of the screen.
- By tapping the displayed items, you can specify the same settings as when using the keys explained earlier.

Note

For a description of the Filter menu screen, see "Menu Icons" on page v.

2.7 Set the measurement interval.

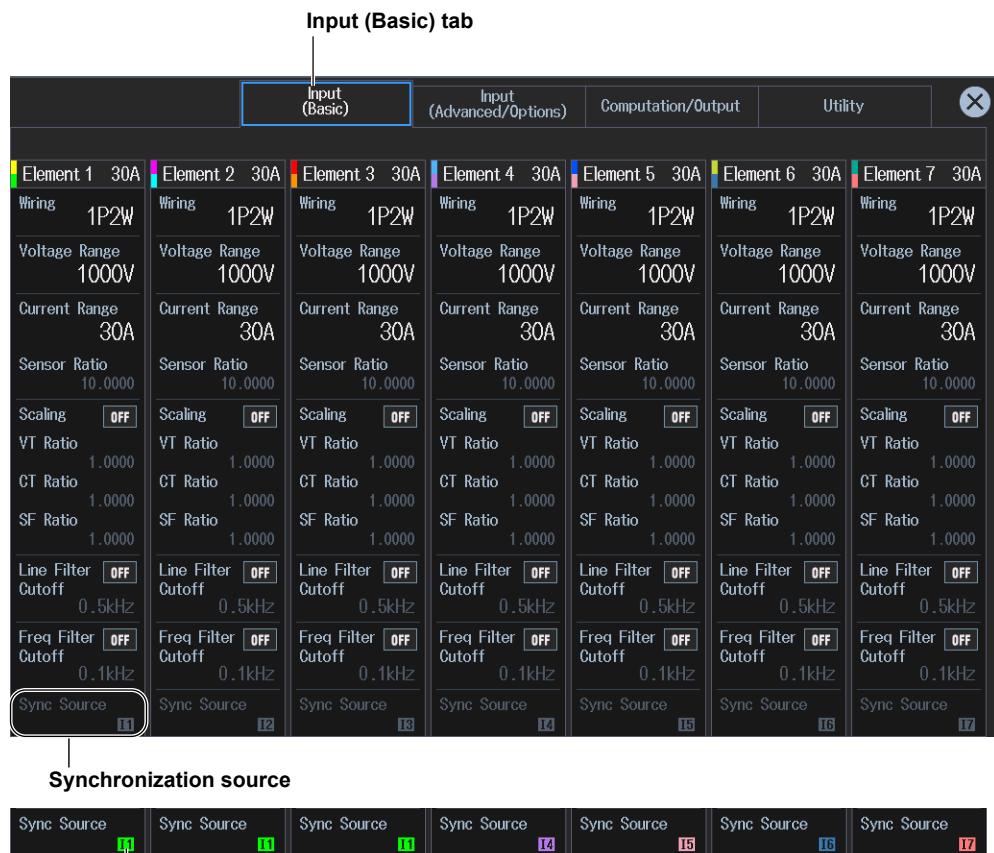
► “Measurement Period (Sync Source)” in the features guide

This section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)

Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under SETUP.
2. Tap the **Input (Basic)** tab. An input settings (basic measurement conditions) overview screen appears. Pressing **ESC** closes the overview screen.



When the sync source needs to be set, the sync source setting information changes into color. When Measure Method is set to Sync Source Period Average on the update interval setup screen in section 2.9, set the sync source.

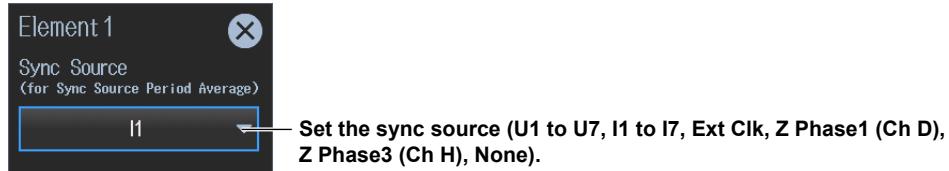
Note

You can also display the input settings (basic measurement conditions) overview screen by moving the cursor on the Input (Basic) tab using the arrow keys and then pressing SET.

Setting the Sync Source (Sync Source)

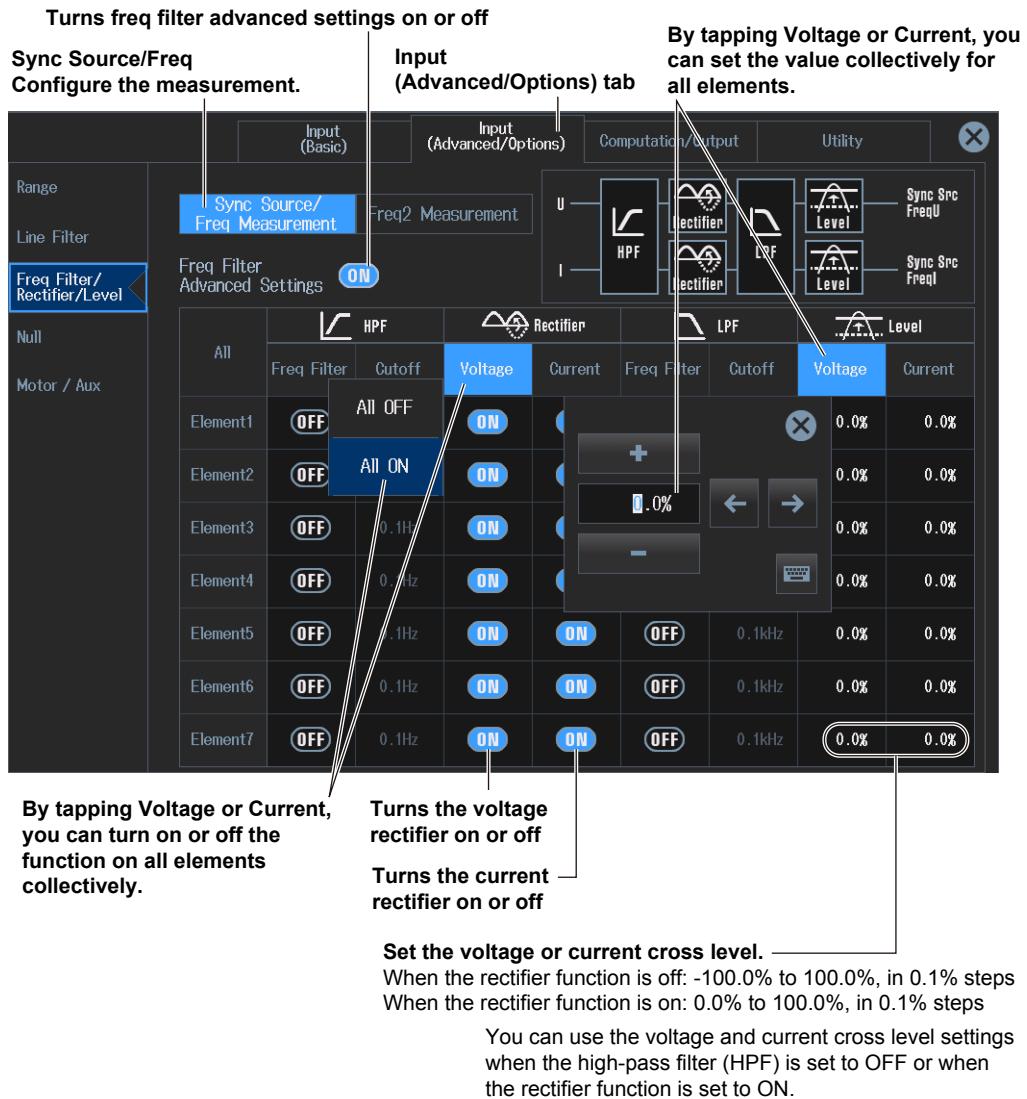
3. Tap **Sync Source**. A sync source setup screen appears.

Sync source (example of element 1)



Setting the Cross Level (Level)

4. Tap the **Input (Advanced/Options)** tab. An input settings (advanced/options) overview screen appears. Pressing **ESC** closes the overview screen.
5. Tap **Freq Filter/Rectifier/Level**. A frequency filter setup screen appears.
6. Tap **Sync Source/Freq Measurement**. A Sync Source/Freq Measurement (sync source/frequency measurement) screen appears.



2.8 Setting the Crest Factor

► “Crest Factor (Crest Factor)” in the features guide

This section explains operating procedures using the following setup methods.

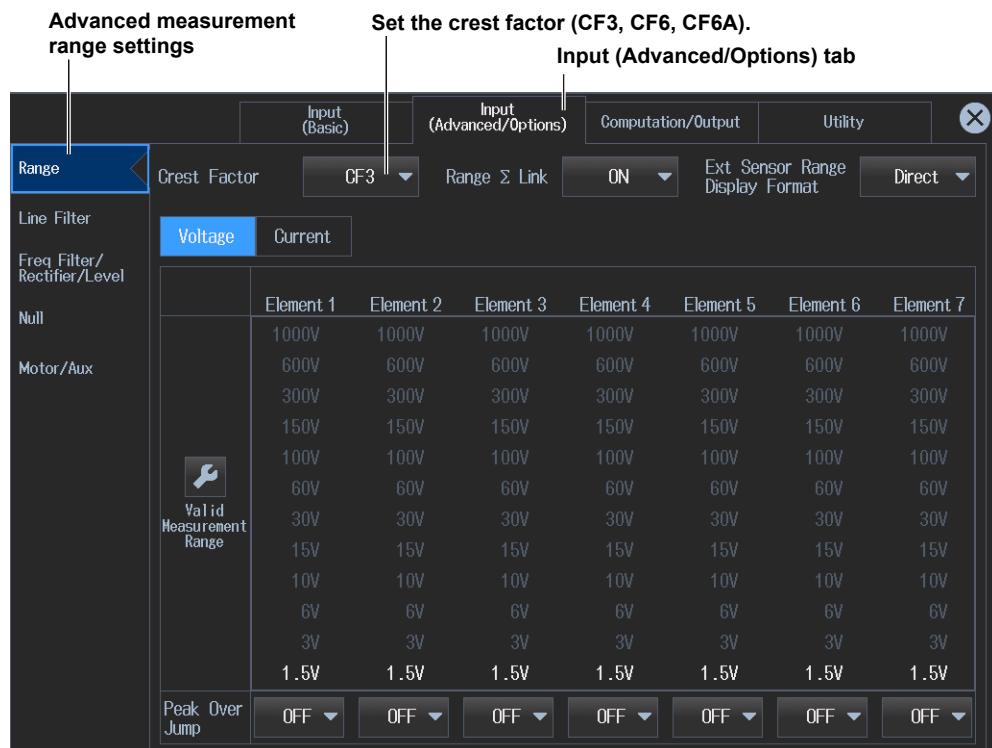
- Procedure Using the Setup Menu (see chapter 1)

Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under SETUP.
2. Tap the **Input (Advanced/Options)** tab. An input settings (advanced/options) overview screen appears. Pressing **ESC** closes the overview screen.

Crest factor (Crest Factor)

3. Tap **Range**. An advanced measurement range setup screen appears.



Note

You can also display the input settings (advanced/options) overview screen by moving the cursor on the Input (Advanced/Options) tab using the arrow keys and then pressing SET.

2.9 Setting the Data Update Interval

► “Data Update Interval (Update Rate)” in the features guide

This section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Menu Icons (see page iii)

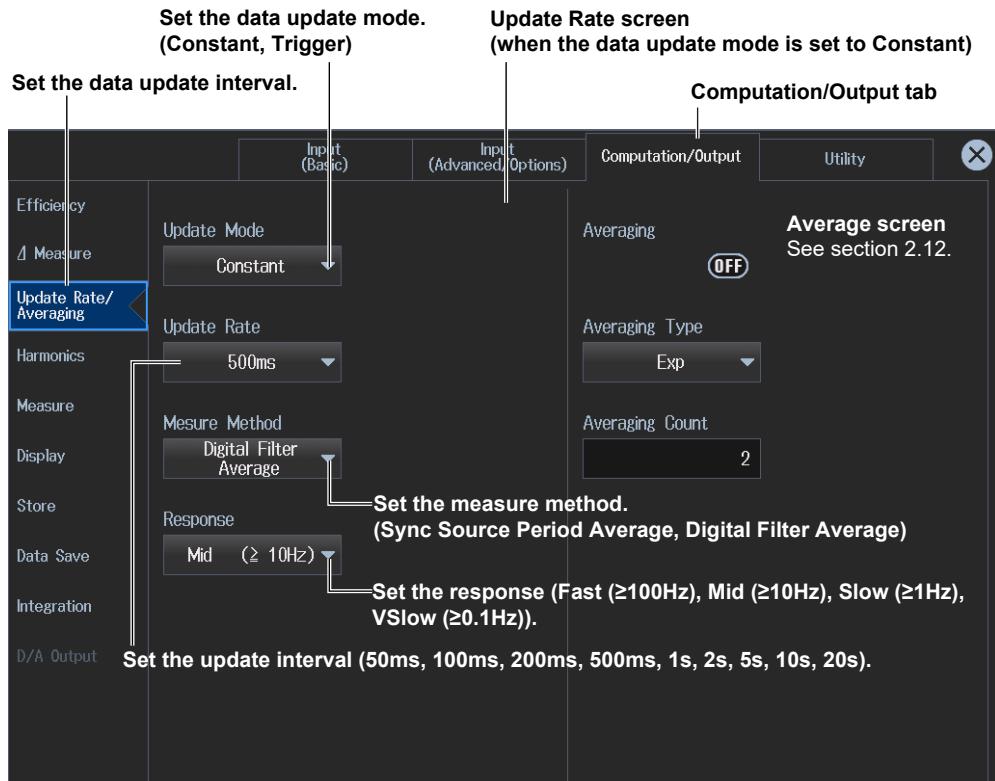
Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under **SETUP**.
2. Tap **Computation/Output** tab. A computation and output settings overview screen appears. Pressing **ESC** closes the overview screen.

Setting the Data Update Interval (Update Rate)

3. Tap **Update Rate/Averaging**. A drop-down list for setting the interval appears.

- When the Data Update Mode Is Set to Constant

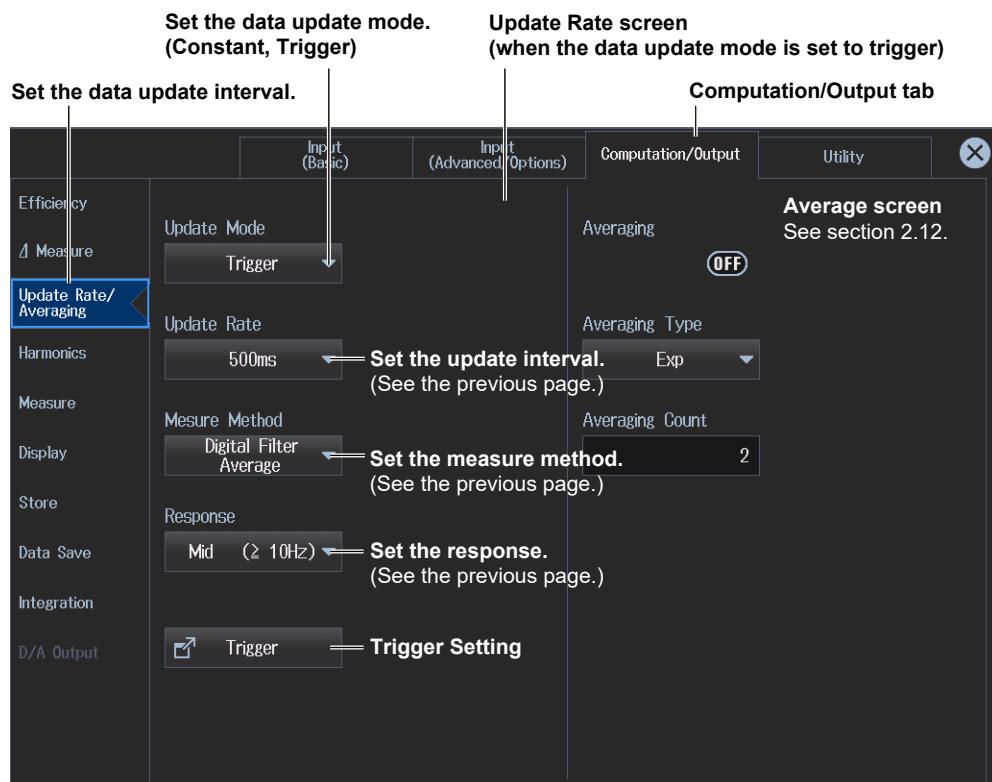


Note

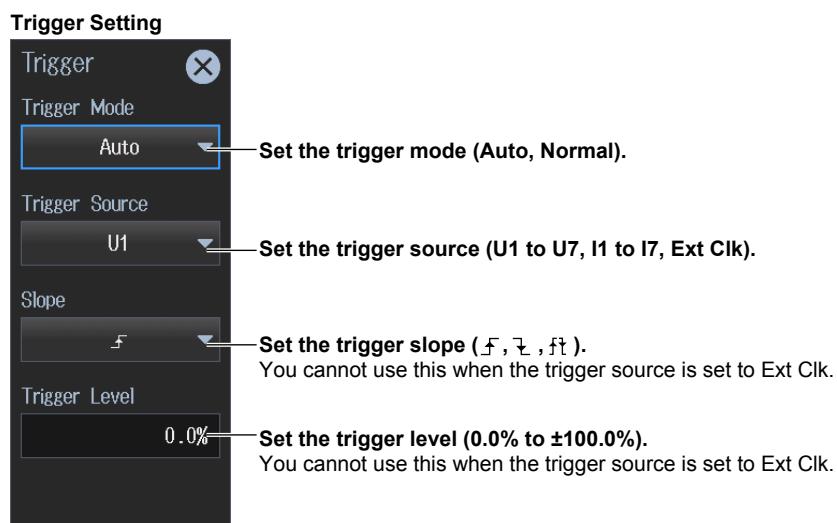
You can also display the computation/output settings overview screen by moving the cursor on the Computation/Output tab using the arrow keys and then pressing SET.

2.9 Setting the Data Update Interval

- When the Data Update Mode Is Set to Trigger



Trigger Setting



Procedure Using the Menu Icons

You can also use the menu icons shown on the right side of the screen to set the data update interval.

- Tap the **Update Rate/Averaging** menu icon . An Update Rate./Averaging menu appears in the sub menu area on the right side of the screen.

By tapping the displayed items, you can specify the same settings as when using the keys explained earlier.

Note

- For a description of the Update Rate/Averaging menu screen, see "Menu Icons" on page v.
- When the trigger source is set to Ext Clk, you cannot set the trigger slope (L fixed to falling).

2.10 Setting the Efficiency Equation

► “Efficiency Equation (Efficiency)” in the features guide

This section explains operating procedures using the following setup methods.

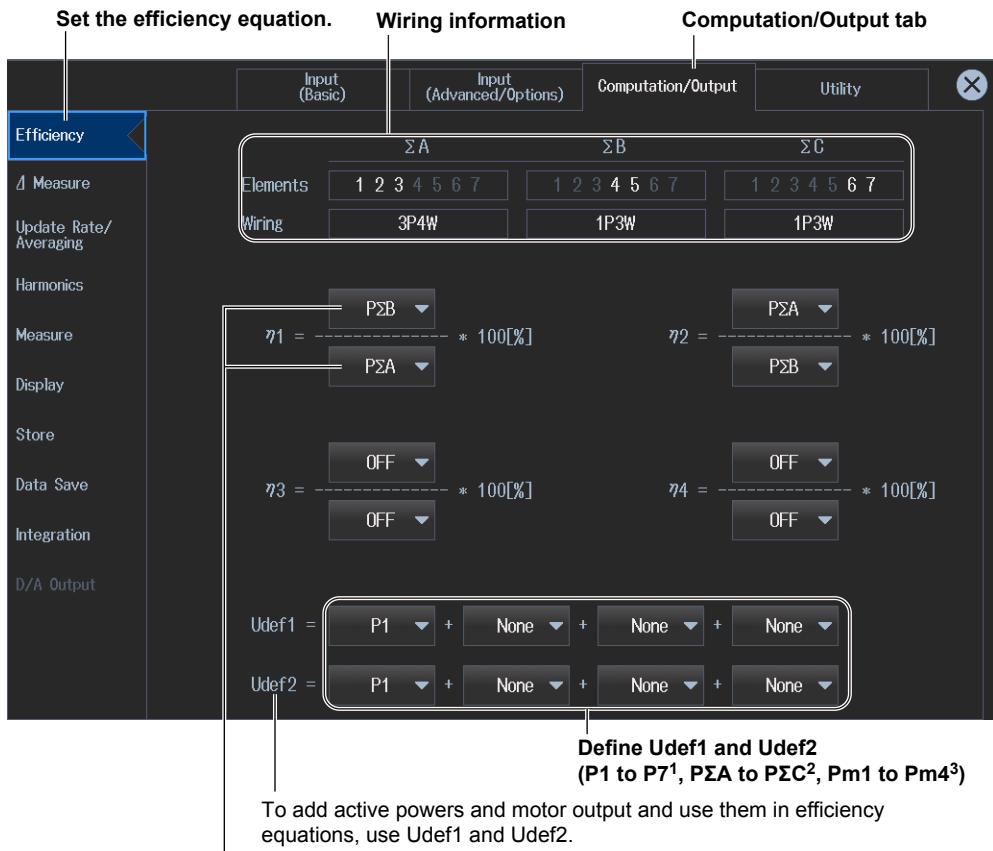
- Procedure Using the Setup Menu (see chapter 1)

Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under SETUP.
2. Tap **Computation/Output** tab. A computation and output settings overview screen appears. Pressing **ESC** closes the overview screen.

Setting the Efficiency Equation (Efficiency)

3. Tap **Efficiency**. An efficiency equation setup screen appears.



- 1 Can be set within the range of the installed input elements.
- 2 Can be set within the range of the wiring unit that is automatically determined by the installed input elements.
- 3 You can set this on models with the /MTR1 or /MTR2 option.

Note

You can also display the computation/output settings overview screen by moving the cursor on the Computation/Output tab using the arrow keys and then pressing SET.

2.11 Setting the Delta Computation

► “Delta Computation (Δ Measure)” in the features guide

This section explains operating procedures using the following setup methods.

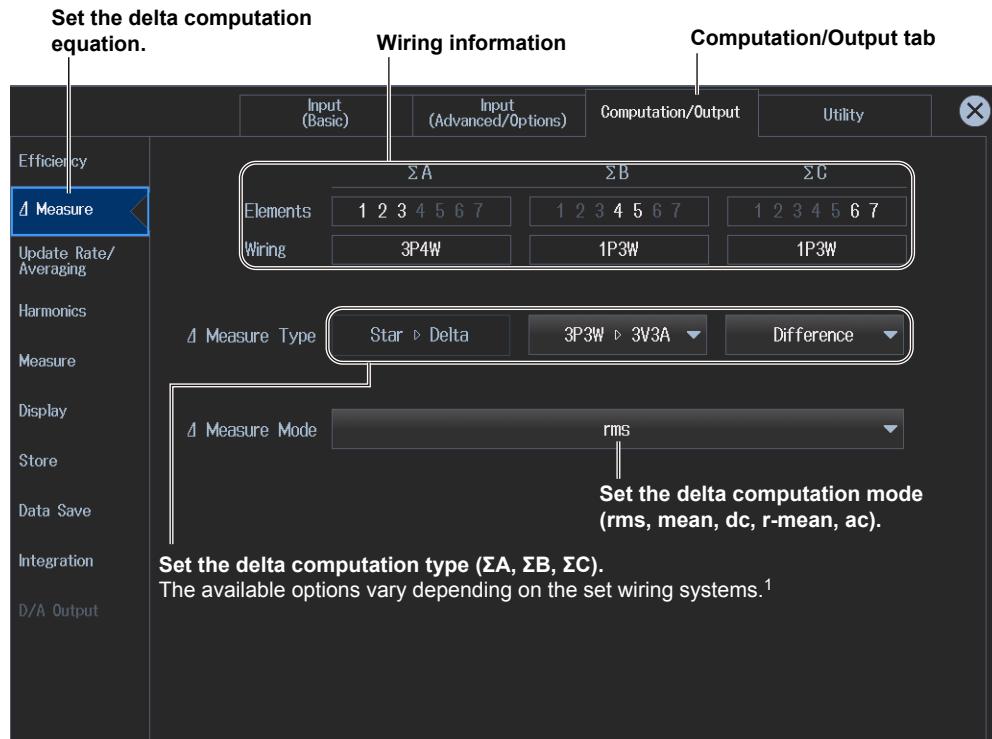
- Procedure Using the Setup Menu (see chapter 1)

Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under SETUP.
2. Tap **Computation/Output** tab. A computation and output settings overview screen appears. Pressing **ESC** closes the overview screen.

Setting Delta Computation (Δ Measure)

3. Tap **Δ Measure**. A delta computation setup screen appears.



1 Delta computation type

Wiring System	Delta Computation Type
1P3W	Difference, 3P3W>3V3A
3P3W	Difference, 3P3W>3V3A
3P4W	Star>Delta
3P3W(3V3A)	Delta>Star

Note

You can also display the computation/output settings overview screen by moving the cursor on the Computation/Output tab using the arrow keys and then pressing SET.

2.12 Setting Averaging

► “Averaging (Averaging) in the features guide

This section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)

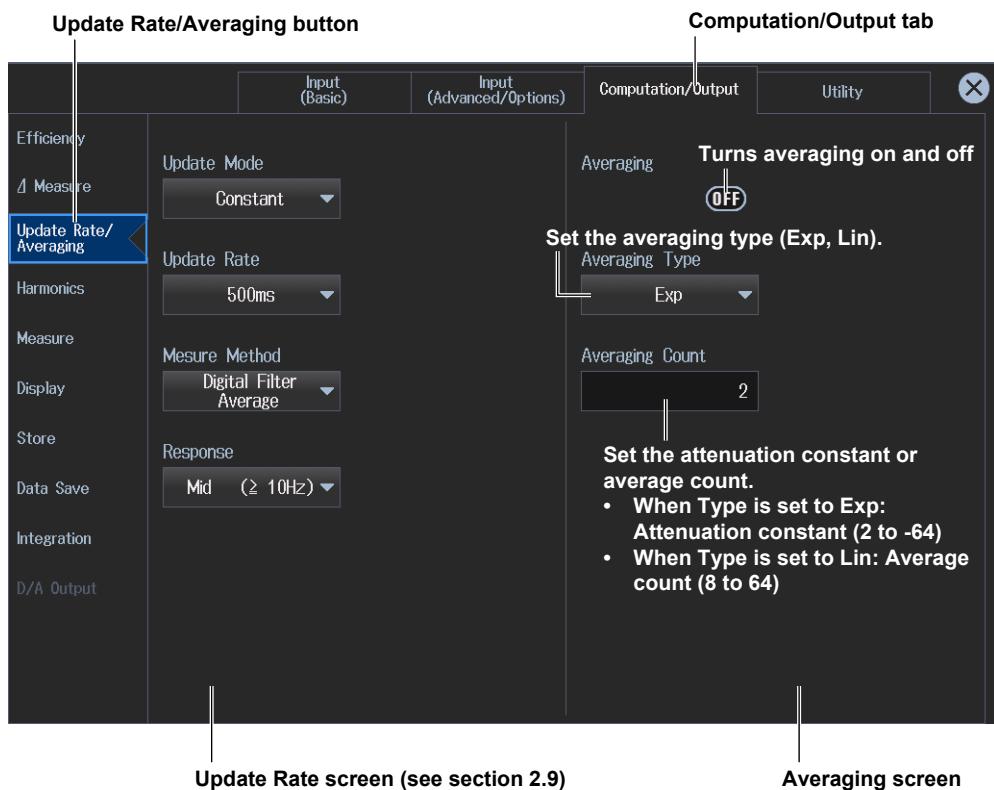
Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under **SETUP**.
2. Tap **Computation/Output** tab. A computation and output settings overview screen appears. Pressing **ESC** closes the overview screen.

Setting Averaging (Averaging)

3. Tap **Update Rate/Averaging**.

A data update interval/averaging setup screen appears.



Note

You can also display the computation/output settings overview screen by moving the cursor on the Computation/Output tab using the arrow keys and then pressing SET.

2.13 Master/slave Synchronous Measurement

► “Master/Slave Synchronous Measurement (Sync Measure)” in the features guide

This section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)

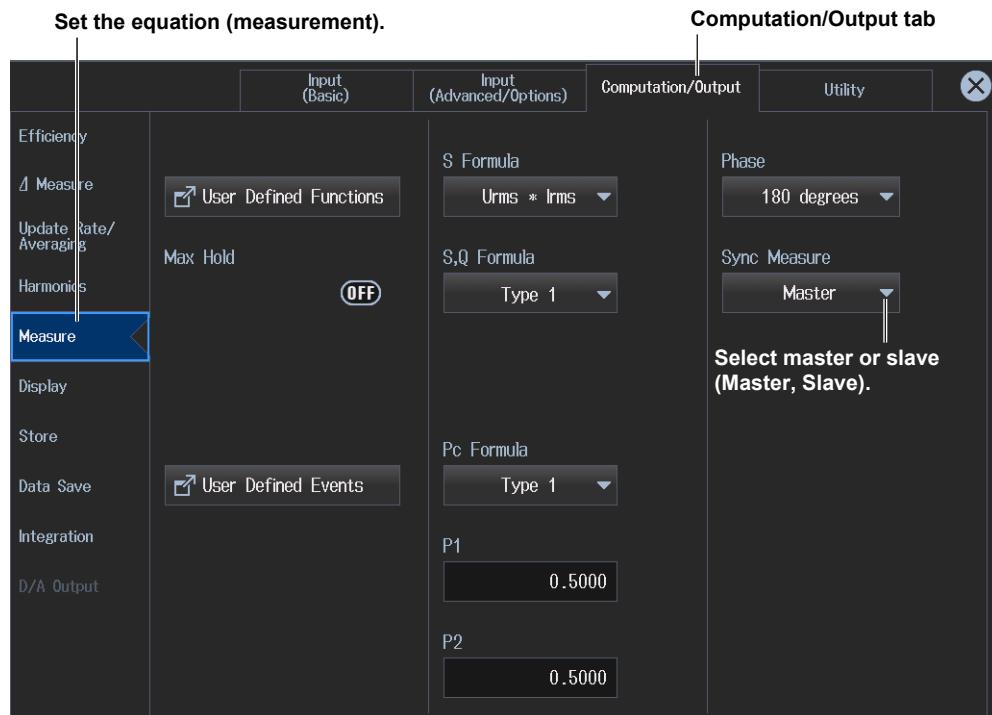
Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under SETUP.
2. Tap **Computation/Output** tab. A computation and output settings overview screen appears. Pressing **ESC** closes the overview screen.

Setting the Master and Slave (Sync Measure)

3. Tap **Measure**.

An equation (computation) setup screen appears.



Note

You can also display the computation/output settings overview screen by moving the cursor on the Computation/Output tab using the arrow keys and then pressing SET.

3.1 Setting the Display Format

- ▶ “Numeric Data Display (NUMERIC)” in the features guide
- ▶ “Switching the Displayed Page (Page Scroll)” in the features guide
- ▶ “All display (All Items)” in the features guide
- ▶ “4-, 8-, and 16-Value Displays (4 Items/8 Items/16 Items)” in the features guide
- ▶ “Matrix display (Matrix)” in the features guide
- ▶ “Display Items (Items, Numeric)” in the features guide

This section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Menu Icons (see page iii)
- Procedure Using the Keys (other than SETUP) (see section 1.2 in IM WT5000-03EN)

Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under SETUP.
2. Tap **Computation/Output** tab. A computation and output settings overview screen appears. Pressing **ESC** closes the overview screen.

Setting the Display Format (Display)

3. Tap **Display**.

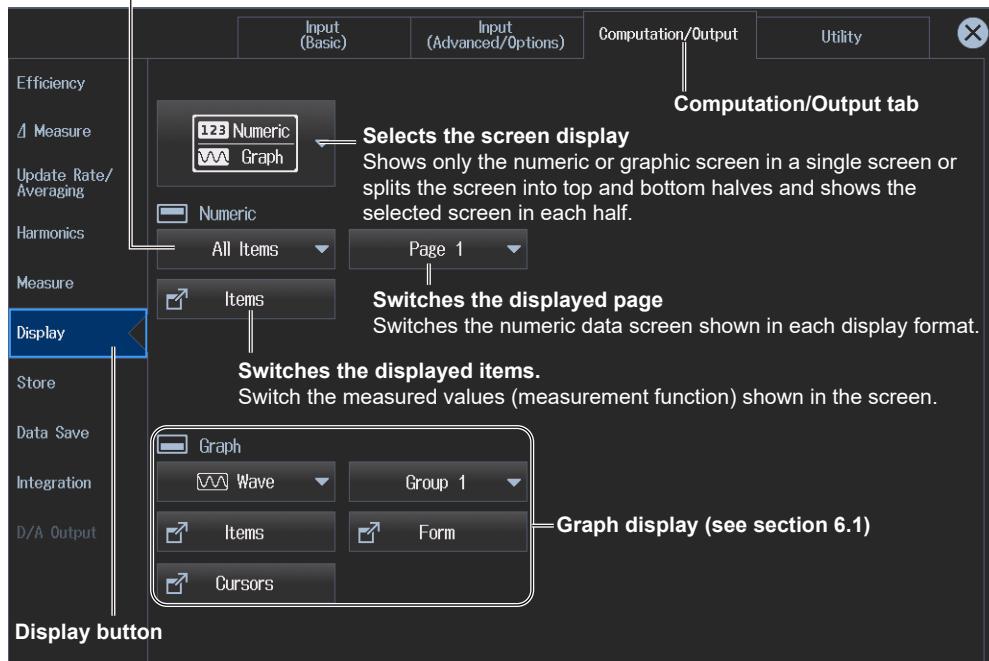
A display format setup screen appears.

Set the numeric display format

(All Items, 4 Items, 8 Items, 16 Items, Matrix, Hrm List Single, Hrm List Dual).

Set how many measurement results to display in a single screen.

Hrm List Single and Hrm List Dual are harmonic list displays (see section 5.2).



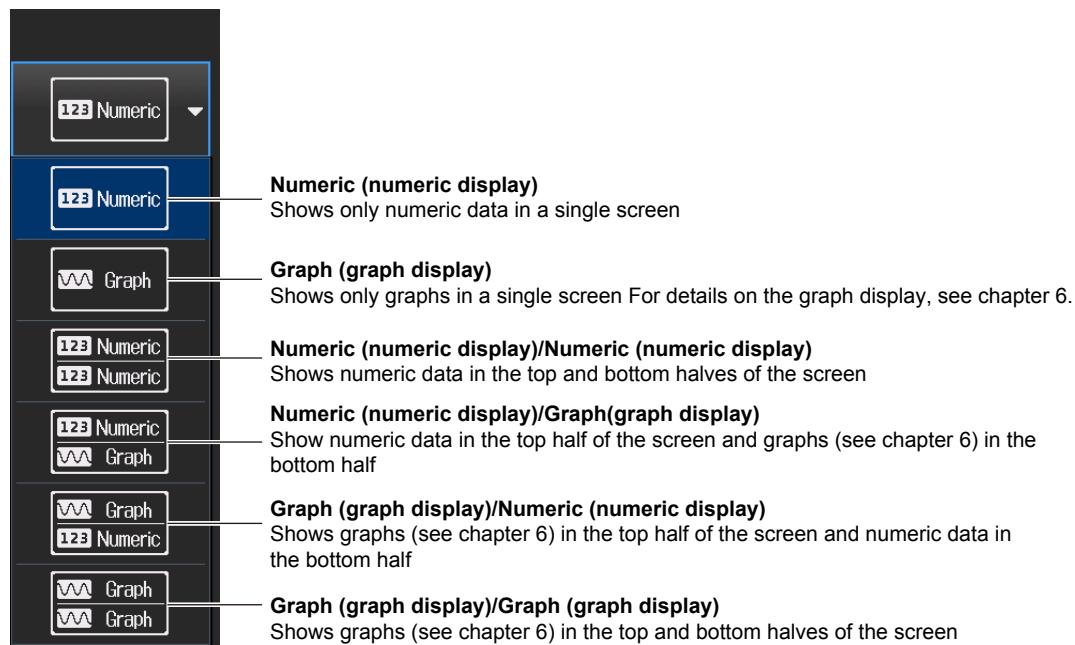
Note

You can also display the computation/output settings overview screen by moving the cursor on the Computation/Output tab using the arrow keys and then pressing SET.

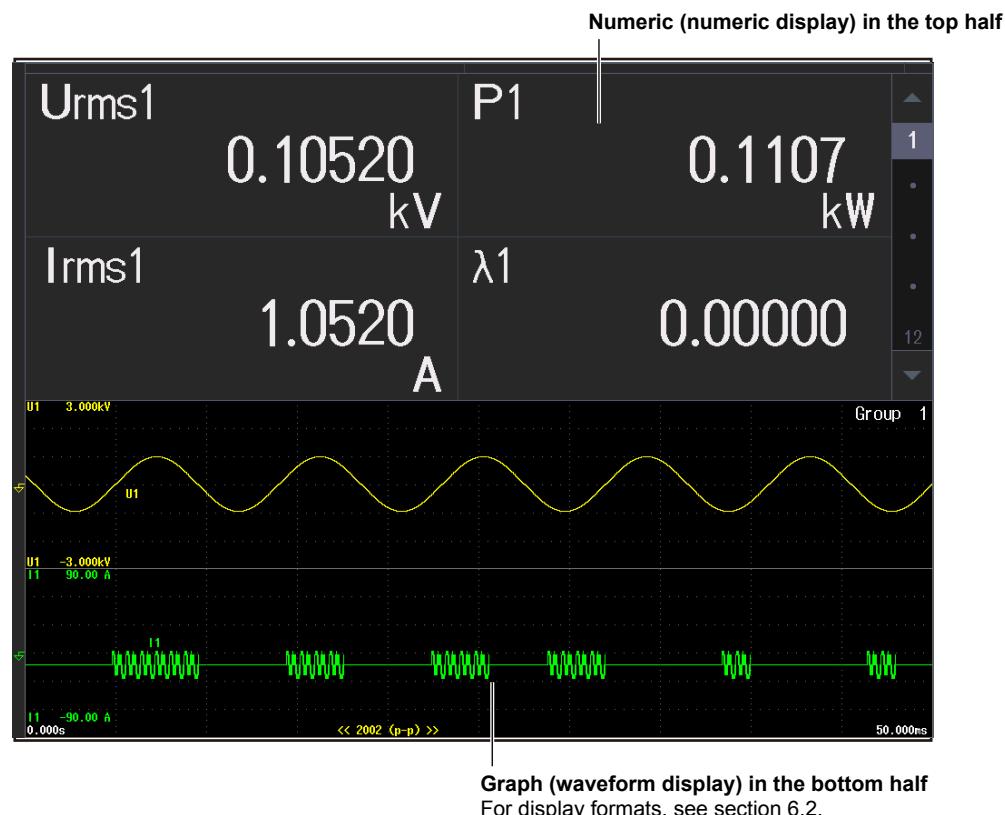
3.1 Setting the Display Format

Setting the Screen Display

You can switch the display format of the Numeric (numeric display) and Graph (graph display) screens.



Example of Numeric (numeric display)/Graph(graph display)



Setting the Numeric Display Format

Set how to display the measurement items on a single screen.

All Items (shows all values)

Element	1	2	3	4	5	6	7
Voltage	1000V						
Current	30A						
Urms [V]	0.10860k	0.10960k	0.11060k	0.11160k	0.11260k	0.11360k	0.11460k
Irms [A]	1.0860	2.0860	3.0860	4.0860	5.0860	6.0860	7.0860
P [W]	0.1179k	0.2286k	0.3413k	0.4560k	0.5727k	0.6914k	0.8121k
S [VA]	0.1179k	0.2286k	0.3413k	0.4560k	0.5727k	0.6914k	0.8121k
Q [var]	0.1179k	0.2286k	0.3413k	0.4560k	0.5727k	0.6914k	0.8121k
λ [-]	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
ϕ [$^{\circ}$]	G0.000						
fU [Hz]	13.277k	13.279k	13.281k	13.283k	13.285k	13.287k	13.289k
fI [Hz]	13.278k	13.280k	13.282k	13.284k	13.286k	13.288k	13.290k
Urms [V]	0.10860k	0.10960k	0.11060k	0.11160k	0.11260k	0.11360k	0.11460k
Umn [V]	0.10960k	0.11060k	0.11160k	0.11260k	0.11360k	0.11460k	0.11560k
Udc [V]	0.11060k	0.11160k	0.11260k	0.11360k	0.11460k	0.11560k	0.11660k
Urnn [V]	0.11160k	0.11260k	0.11360k	0.11460k	0.11560k	0.11660k	0.11760k
Uac [V]	0.11260k	0.11360k	0.11460k	0.11560k	0.11660k	0.11760k	0.11860k
Ufnd [V]	-----	-----	-----	-----	-----	-----	-----
U+pk [V]	0.00000k						
U-pk [V]	0.00000k						
CfU [-]	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Pc [W]	0.0000k						
P+pk [W]	0.0000k						
P-pk [W]	0.0000k						

Switching the displayed page shows other items in this display area.

4 Items (4-value display)

Urms1	P1
0.10280	0.1057
kV	kW
Irms1	λ_1
1.0280	0.00000
A	

8 Items (8-value display)

Urms1	Q1
0.10280	0.1057
kV	kvar
Irms1	λ_1
1.0280	0.00000
A	
P1	ϕ_1
0.1057	G0.000
kW	$^{\circ}$
S1	fU1
0.1057	22.352
kVA	kHz

16 Items (16-value display)

Urms1	Q1	fU1	I+pk1
0.10200	0.1040	26.762	0.0000
kV	kvar	kHz	A
Irms1	λ_1	fI1	I-pk1
1.0200	0.00000	26.763	0.0000
A		kHz	A
P1	ϕ_1	U+pk1	CfU1
0.1040	G0.000	0.00000	0.000
kW	$^{\circ}$	kV	
S1	Pc1	U-pk1	CfI1
0.1040	0.0000	0.00000	0.000
kVA	kW	kV	

Matrix (matrix display)

	Element 1	Element 2	Element 3	Element 4
Urms [V]	0.10410 k	0.10510 k	0.10610 k	0.10710 k
Irms [A]	1.0410	2.0410	3.0410	4.0410
P [W]	0.1084 k	0.2145 k	0.3227 k	0.4328 k
S [VA]	0.1084 k	0.2145 k	0.3227 k	0.4328 k
Q [var]	0.1084 k	0.2145 k	0.3227 k	0.4328 k
λ [-]	0.00000	0.00000	0.00000	0.00000
ϕ [$^{\circ}$]	G0.000	G0.000	G0.000	G0.000
fU [Hz]	30.557 k	30.559 k	30.561 k	30.563 k
fI [Hz]	30.558 k	30.560 k	30.562 k	30.564 k

Measurement function

Shows the measured values of each element

3.1 Setting the Display Format

Hrm List Single (single screen display of harmonics)

Hrm List Dual (split screen display of harmonics)

Function display of each element and Σ

Shows harmonic data
Shows the harmonics (Total, DC, 1 to 500) of an item. Shows 40 harmonics per page.

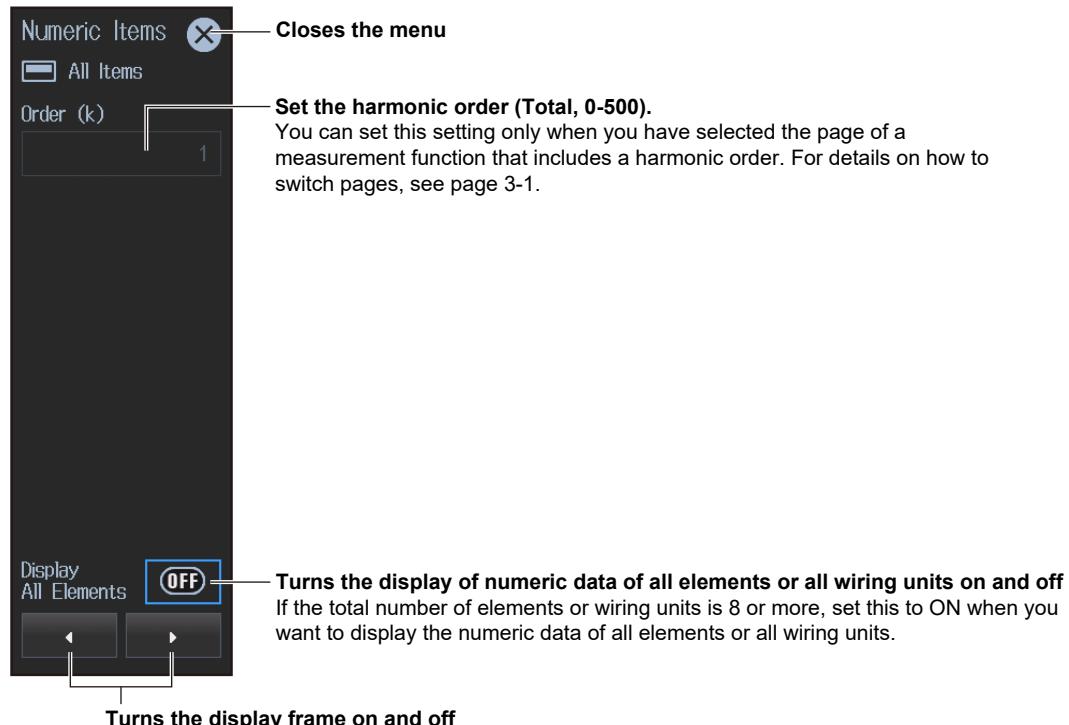
Function display of each element and Σ

Shows harmonic data
Shows the harmonics (Total, DC, 1 to 500) of two items. Shows 20 harmonics per page.

Switching the Displayed Items (Items)

You can switch the measured value (measurement function) shown in the screen.

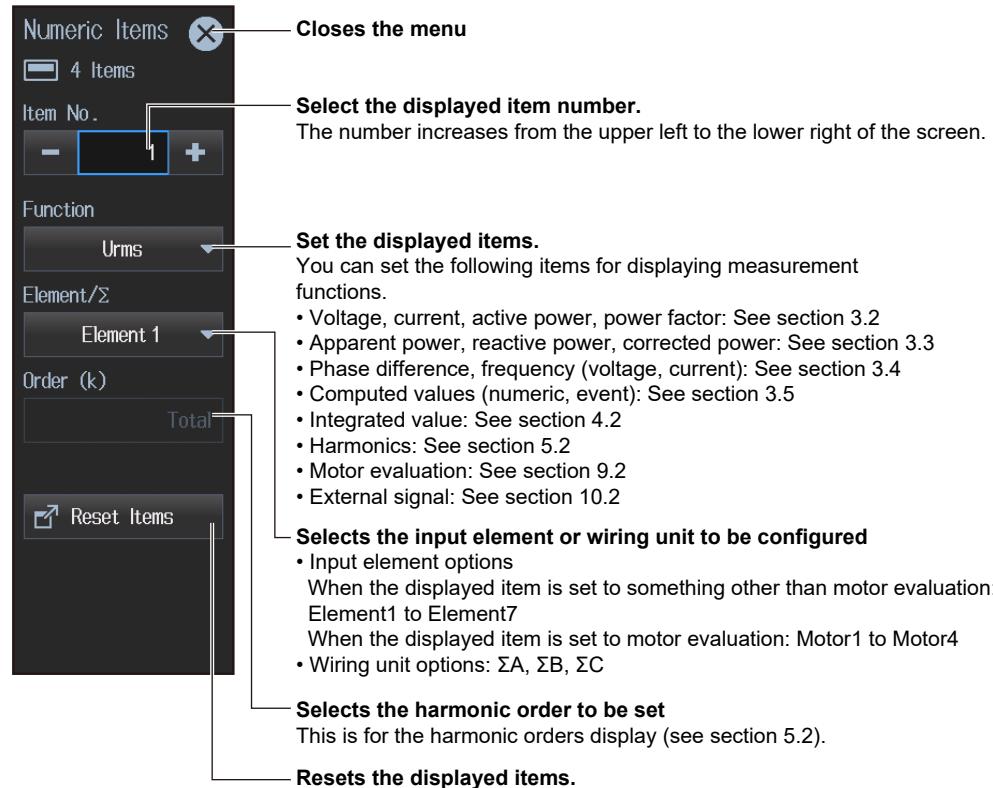
On the All Items Display



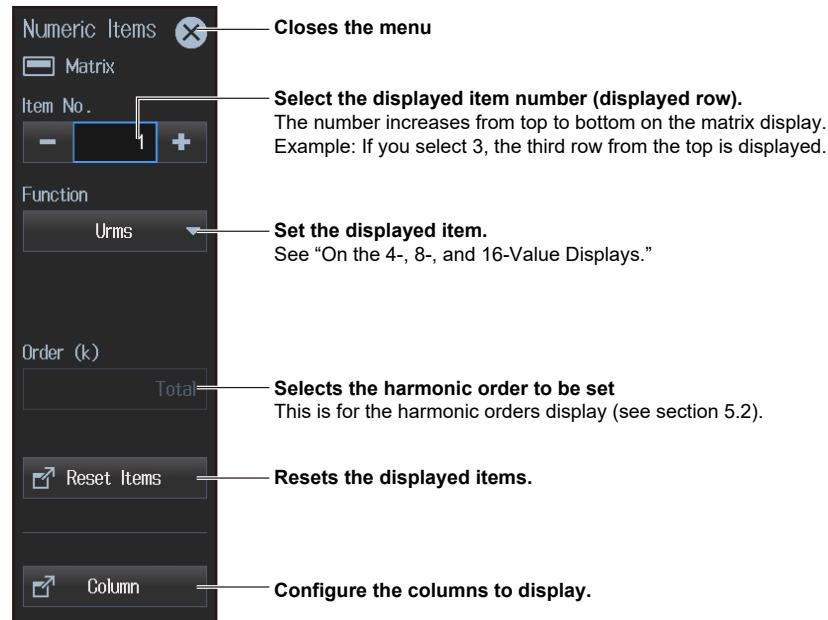
Note

On the All Items display, you cannot select individual display items and change their measurement function, element, or wiring unit. If you switch to the Matrix display, you can change the measurement functions, elements, and wiring units using the displayed table (see the previous page).

On the 4-, 8-, and 16-Value Displays

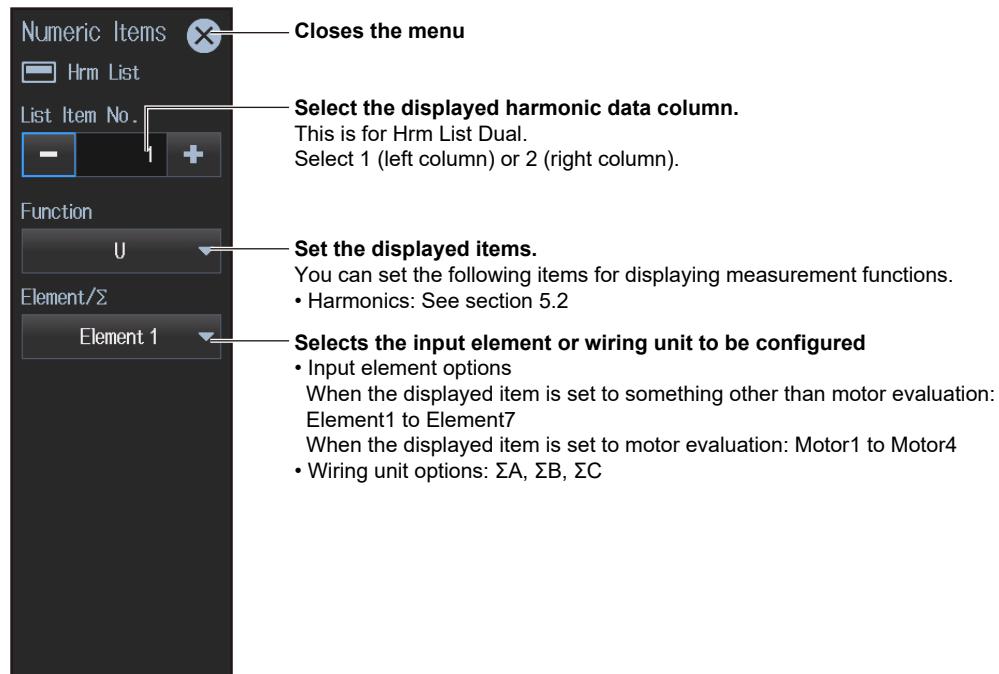


On the Matrix Display



3.1 Setting the Display Format

On the Hrm List Single or Hrm List Dual Display

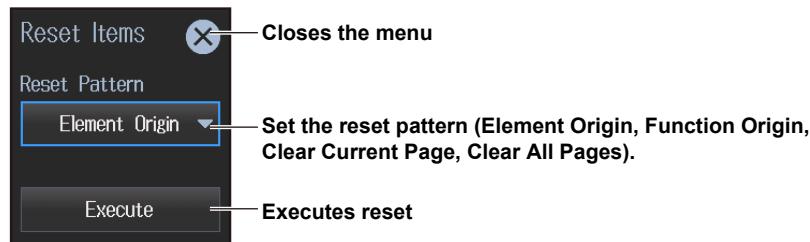


Note

On the harmonics list displays, you can change the measurement function, element, and wiring unit for the selected list, but you cannot change these settings for each individual display item.

Resetting the Displayed Items

You can clear the displayed items (no data “----”) or return them to the preset displayed items.



Reset Patterns

Element Origin pattern (1 element on 1 page)

The screen is a display example of element 1.

Urms1	P1	1
0.17390	0.3024	
kV	kW	
Irms1	λ1	7
1.7390	0.00000	8
A		9
		10
		11
		12

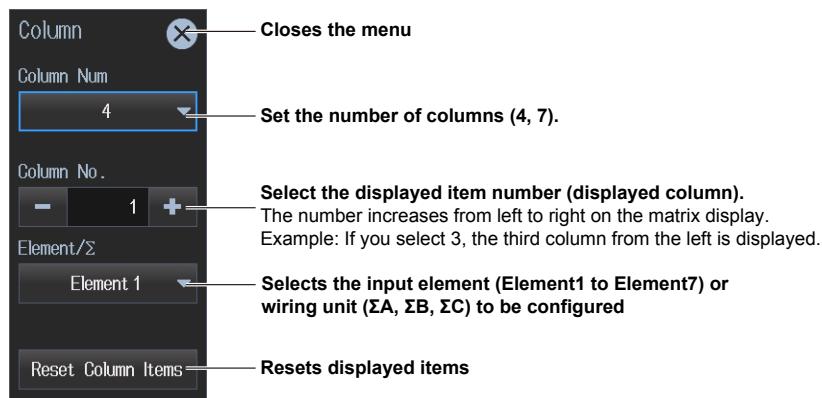
Function Origin pattern (1 function on 1 page)

The screen is a display example of voltage.

Urms1	Urms3	1
0.19740	0.19940	
kV	kV	
Urms2	Urms4	7
0.19840	0.20040	8
kV	kV	9
		10
		11
		12

Configuring the Columns to Display

You can configure this on the Matrix display.



Procedure Using the Menu Icons

You can also use the menu icons shown on the right side of the screen to set the display format.

1. Tap the **Display** menu icon  A Display menu appears in the sub menu area on the right side of the screen.

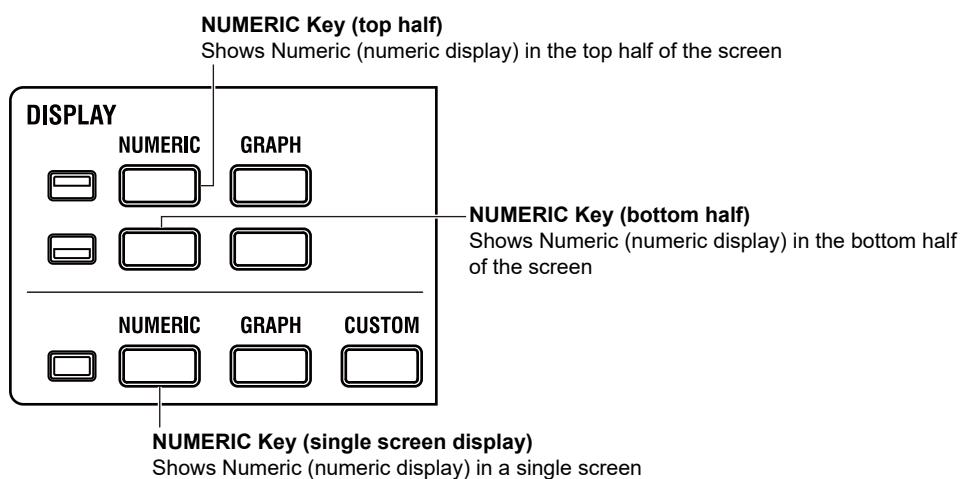
By tapping the displayed items, you can specify the same settings as when using the screen explained earlier.

Note

For a description of the Display menu screen, see "Menu Icons" on page v.

Switching the Display Format (NUMERIC key)

You can also use keys to perform "Setting the Screen Display" and "Setting the Numeric Display Format" described earlier.



Each time you press **NUMERIC**, the display format switches, in order, between All Items, 4 Items, 8 Items, 16 Items, Matrix, Hrm List Single, and Hrm List Dual.

3.2

Displaying the Voltage, Current, Active Power, and Power Factor

This instrument shows on the screen the measurements (measurement functions) of the voltage and current applied to the input elements or wiring units.

► “[Measurement Functions Used in Normal Measurement](#)” in the features guide

The measurements of voltage, current, active power, and power factor do not require you to set equations. The measurements are simply shown on the screen. Using an example, this section explains how to display measurement results numerically.

In addition, this section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Menu Icons (see page iii)

Measurement Display Screen (Example of a 4 items display)

Measurement display of input element 1



If you hold your finger down on the 4-, 8-, 16-value, matrix or harmonics display for at least 1 second, you can perform the operations described in “Switching the Displayed Items (Items),” provided later.

Switches the displayed page (Page Up/Page Down)
Switches to the measurement display of another input element
Tap ▲ or ▼ to change the displayed page in order from the current number. Tap the number directly to change to the number display page.

Note

Voltage, current, active power, and power factor values can be shown graphically.

- The waveform display function (see section 6.2) shows voltage and current values graphically.
- The trend display (see section 6.3) shows voltage, current, active power, and power factor values graphically.

Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under SETUP.
2. Tap **Computation/Output** tab. A computation and output settings overview screen appears. Pressing **ESC** closes the overview screen.

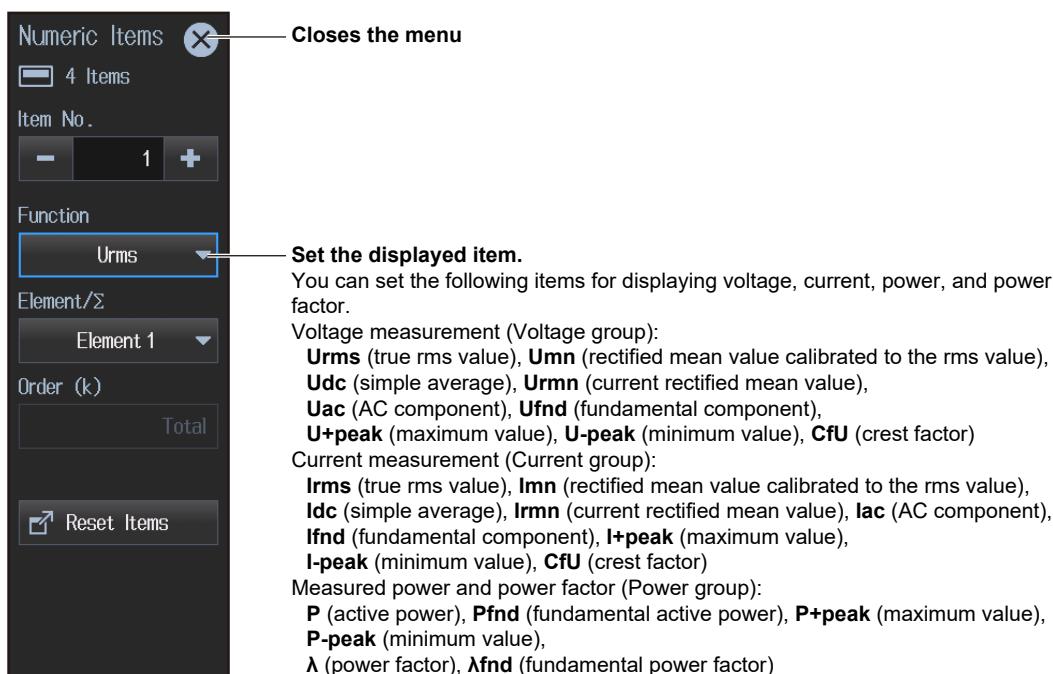
Switching the Displayed Items (Items)

You can switch the measured value (measurement function) shown in the screen.

3. Tap **Display**.

A display format setup screen (Numeric/Graph) appears. For details, see section 3.1.

4. Tap **Items**. The following screen appears.



Procedure Using the Menu Icons

You can also use the menu icons shown on the right side of the screen to switch the displayed items.

1. Tap the **Display** menu icon  . A Display menu appears in the sub menu area on the right side of the screen.

By tapping the displayed items, you can specify the same settings as when using the screen explained earlier.

Note

For a description of the Display menu screen, see "Menu Icons" on page v.

3.3

Displaying Apparent Power, Reactive Power, and Corrected Power

This instrument calculates, based on equations that are defined, apparent power (S), reactive power (Q), and corrected power (Pc) from the measurements of the voltage and current applied to the input elements or wiring units and shows calculated results on the screen.

- ▶ [“Equation for Apparent Power \(S Formula\)” in the features guide](#)
- ▶ [“Apparent Power and Reactive Power Computation Types \(S,Q Formula\)” in the features guide](#)
- ▶ [“Equation for Corrected Power \(Pc Formula\)” in the features guide](#)

To determine apparent power (S), reactive power (Q), and corrected power (Pc) values, you need to set equations.

Using an example, this section explains how to display computation results numerically.

In addition, this section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Menu Icons (see page iii)

Measurement Display Screen (Example of a 4 items display)

Measurement display of input element 1

Computed apparent power value	Computed corrected power value
S1 0.1381 kVA	Pc1 0.0000 kW
Q1 0.1381 kvar	-----



Computed reactive power value

If you hold your finger down on the 4-, 8-, 16-value, matrix or harmonics display for at least 1 second, you can perform the operations described in “Switching the Displayed Items (Items),” provided later.

Switches the displayed page (Page Up/Page Down)

Switches to the measurement display of another input element. Tap ▲ or ▼ to change the displayed page in order from the current number. Tap the number directly to change to the number display page.

Note

Apparent power, reactive power, and corrected power values can be shown graphically.

- The trend display(see section 6.3) shows apparent power, reactive power, and corrected power values graphically.

Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under SETUP.
2. Tap **Computation/Output** tab. A computation and output settings overview screen appears. Pressing **ESC** closes the overview screen.

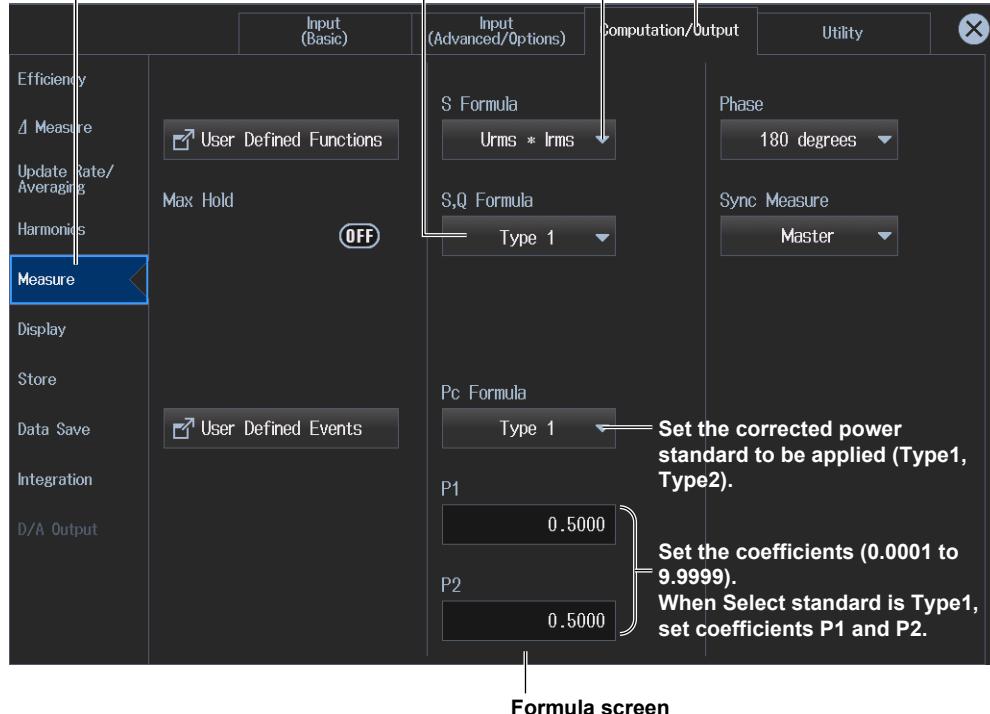
Setting Measurement Equations (Measure)

3. Tap **Measure**.

An equation setup screen appears.

Set the apparent power and corrected power computation type (Type 1, Type 2, Type 3).

Set equations.



Note

You can also display the computation/output settings overview screen by moving the cursor on the Computation/Output tab using the arrow keys and then pressing SET.

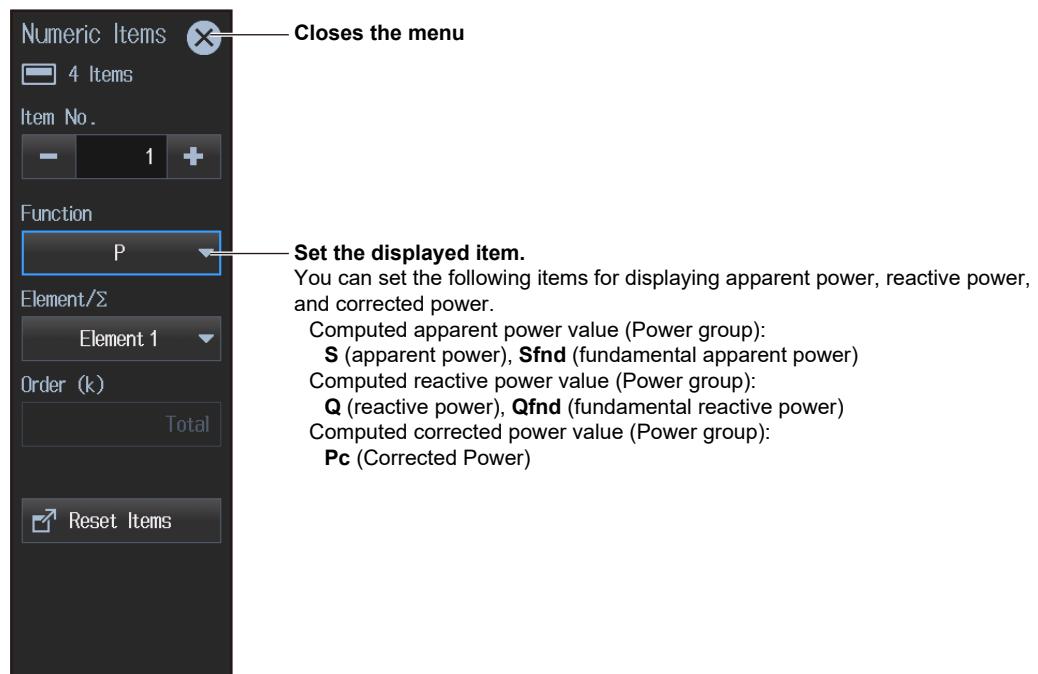
Switching the Displayed Items (Items)

You can switch the measured value (measurement function) shown in the screen.

3. Tap **Display**.

A display format setup screen (Numeric/Graph) appears. For details, see section 3.1.

4. Tap **Items**. The following screen appears.



Procedure Using the Menu Icons

You can also use the menu icons shown on the right side of the screen to switch the displayed items.

1. Tap the **Display** menu icon . A Display menu appears in the sub menu area on the right side of the screen.

By tapping the displayed items, you can specify the same operation as explained in “Switching the Displayed Items” described earlier.

Note

For a description of the Display menu screen, see “Menu Icons” on page v.

3.4 Displaying the Phase Difference And Frequency (Voltage and Current)

This instrument shows on the screen the measurements of the phase differences and frequencies of the voltage and current applied to the input elements or wiring units.

► “Phase Difference Display Format (Phase)” in the features guide

The measurements of phase difference and frequency do not require you to set equations. The measurements are simply shown on the screen. Using an example, this section explains how to display measurement results numerically.

In addition, this section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Menu Icons (see page iii)

Measurement Display Screen (Example of a 4 items display)

Measurement display of input element 1



If you hold your finger down on the 4-, 8-, 16-value, matrix or harmonics display for at least 1 second, you can perform the operations described in “Switching the Displayed Items (Items),” provided later.

Switches the displayed page (Page Up/Page Down)
Switches to the measurement display of another input element
Tap ▲ or ▼ to change the displayed page in order from the current number. Tap the number directly to change to the number display page.

Note

Phase difference and frequency (voltage and current) values can be shown graphically.

- The trend display (see section 6.3) shows phase difference and frequency (voltage and current) values graphically.

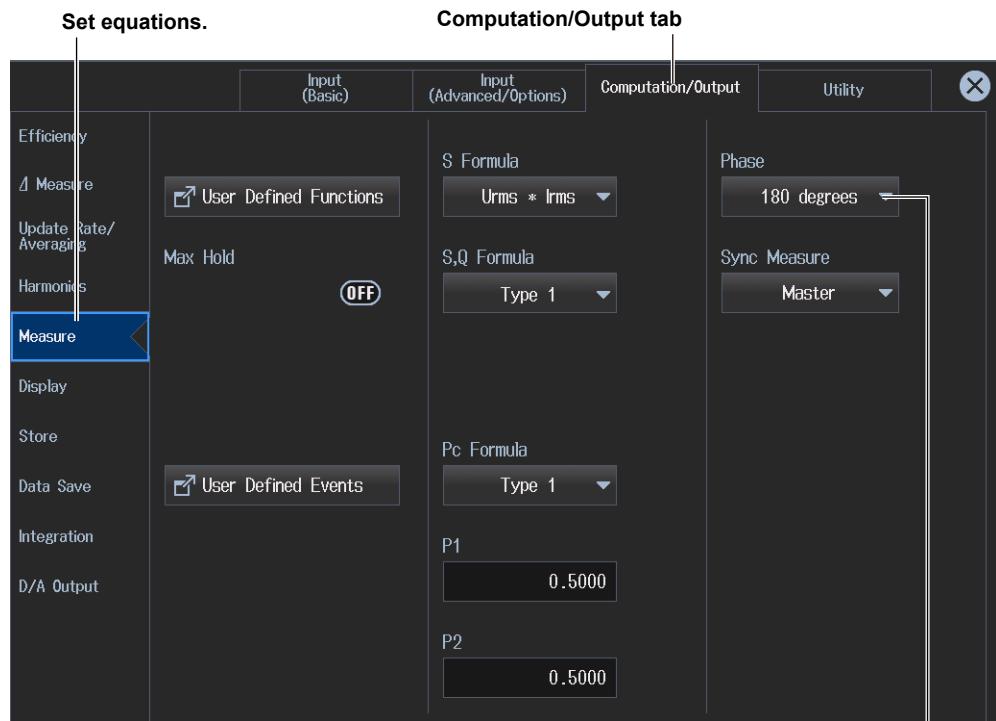
Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under SETUP.
2. Tap **Computation/Output** tab. A computation and output settings overview screen appears. Pressing **ESC** closes the overview screen.

Phase Difference Display Mode (Phase)

3. Tap **Measure**.

An equation setup screen appears.



Note

You can also display the computation/output settings overview screen by moving the cursor on the Computation/Output tab using the arrow keys and then pressing SET.

3.4 Displaying the Phase Difference And Frequency (Voltage and Current)

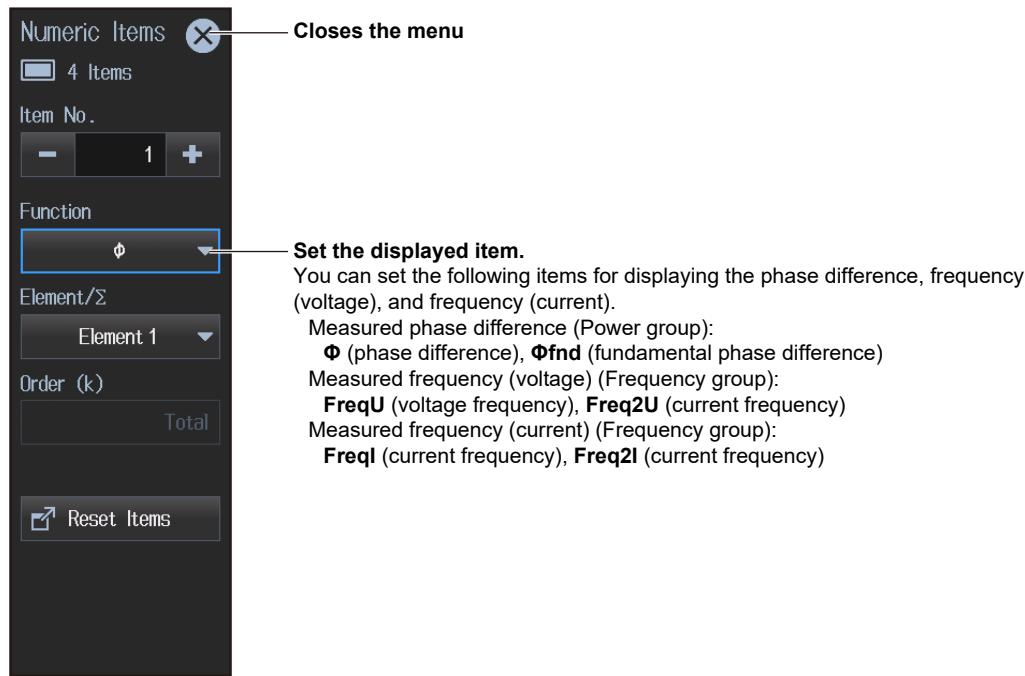
Switching the Displayed Items (Items)

You can switch the measured value (measurement function) shown in the screen.

3. Tap **Display**.

A display format setup screen (Numeric/Graph) appears. For details, see section 3.1.

4. Tap **Items**. The following screen appears.



Procedure Using the Menu Icons

You can also use the menu icons shown on the right side of the screen to switch the displayed items.

1. Tap the **Display** menu icon

A Display menu appears in the sub menu area on the right side of the screen.

By tapping the displayed items, you can specify the same operation as explained in "Switching the Displayed Items" described earlier.

Note

For a description of the Display menu screen, see "Menu Icons" on page v.

3.5 Displaying Computed Values (Values and Events)

You can combine function symbols to create equations and use the numeric data of the combined functions to determine the numeric data (value) of the equation. You can also define events that are used to make judgments when measurement values are compared to the range or reference value. These numeric data and the judgment results of events (true or false) are shown on the screen.

- ▶ “User-Defined Functions (User Defined Functions)” in the features guide
 - ▶ “Measuring the Average Active Power” in the features guide
 - ▶ “User-Defined Events (User Defined Event)” in the features guide

Using an example, this section explains how to display computation results.

The following computed values are displayed as an example.

- Average active power measurement (Avg-W) and power loss (P-loss): Value example (user-defined function)
- Power measurement range (Ev1) and voltage measurement range (Ev2): Event example (user-defined event)

In addition, this section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Menu Icons (see page iii)

Measurement Display Screen (Example of a 4 items display)

Measurement display of input element

Measured average active power (numeric example) Measured power loss (numeric example)

Avg-W	P-loss	1
3.188	-533.188	2
W	W	3
True	True	4
Judgment result of power measurement range (event example)	Judgment result of voltage measurement range (event example)	5
		6
If you hold your finger down on the 4-, 8-, 16-value, matrix or harmonics display for at least 1 second, you can perform the operations described in “Switching the Displayed Items (Items),” provided later.	Switches the displayed page (Page Up/Page Down) Switches to the measurement display of another input element. Tap ▲ or ▼ to change the displayed page in order from the current number. Tap the number directly to change to the number display page.	7 8 9 10 11 12

Note

Computed values (values and events) can be shown graphically.

- The trend display (see section 6.3) shows computed values (values and events) graphically.

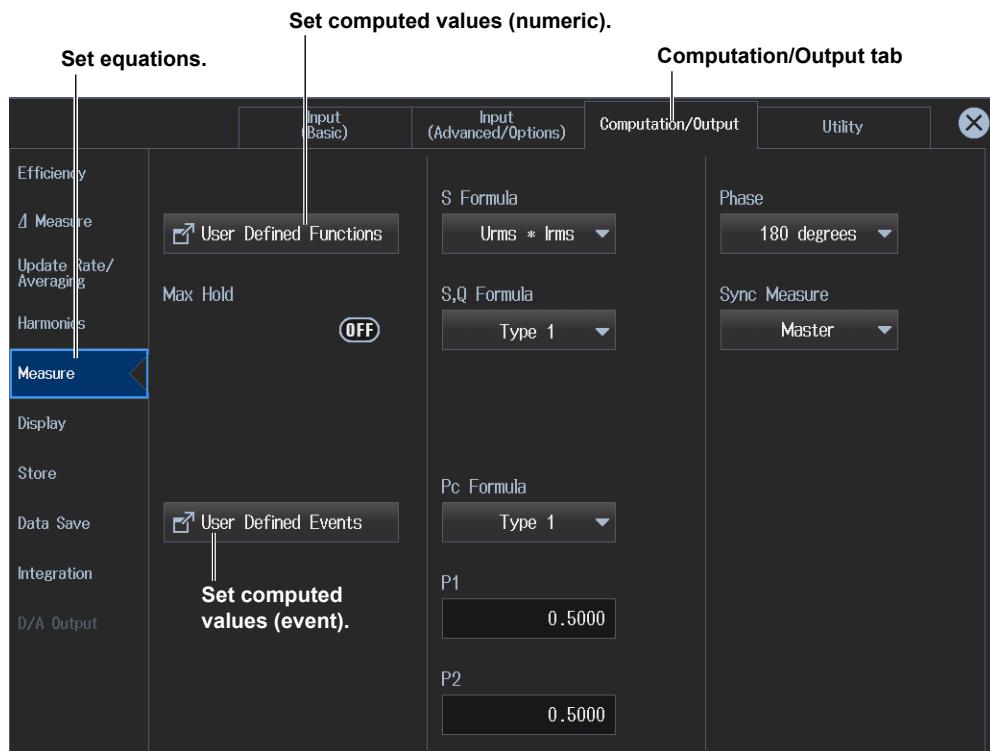
Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under SETUP.
2. Tap **Computation/Output** tab. A computation and output settings overview screen appears. Pressing **ESC** closes the overview screen.

Computed Value (Value) Display Mode (User Defined Function Settings)

3. Tap **Measure**.

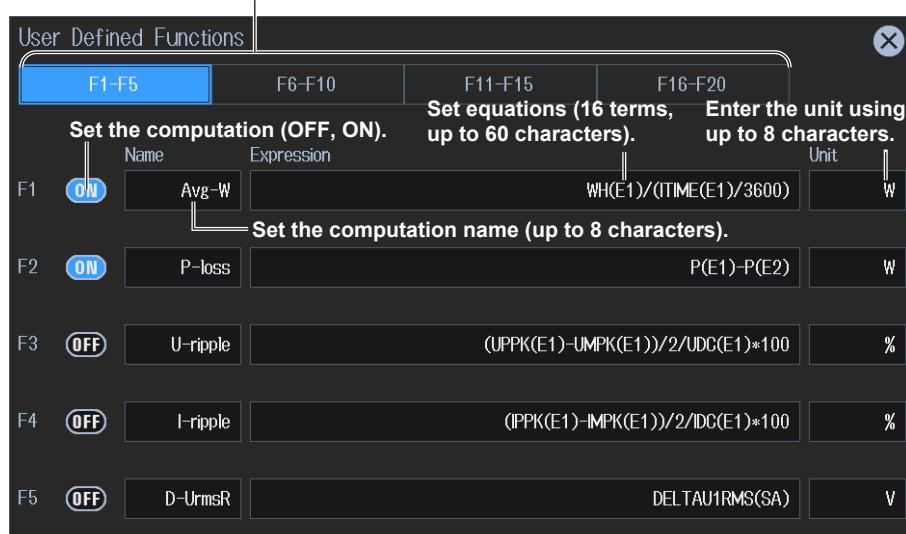
An equation setup screen appears.



4. Tap **User Defined Functions**.

The following screen appears.

Displays the setup screen for user-defined functions (F1 to F5, F6 to F10, F11 to F15, F16 to F20)



3.5 Displaying Computed Values (Values and Events)

The user-defined function setup screen shows five functions per screen. Up to 20 functions can be defined. In the setup example, the computed value of average active power is set in F1 and the computed value of power loss is set in F2.

F1: Average active power Avg-W =

Integrated power of element 1 WH(E1)/Elapsed integration time of element 1 ITIME(E1)/3600

F2: Power loss P-loss = Active power of element 1 P(E1) – Active power of element 2 P(E2)

If you set the computation setting to on, computed values are shown on the measurement display screen.

Note

- By default, the computed values of user definitions contain samples. Change them as necessary.
- You can also display the computation/output settings overview screen by moving the cursor on the Computation/Output tab using the arrow keys and then pressing SET.

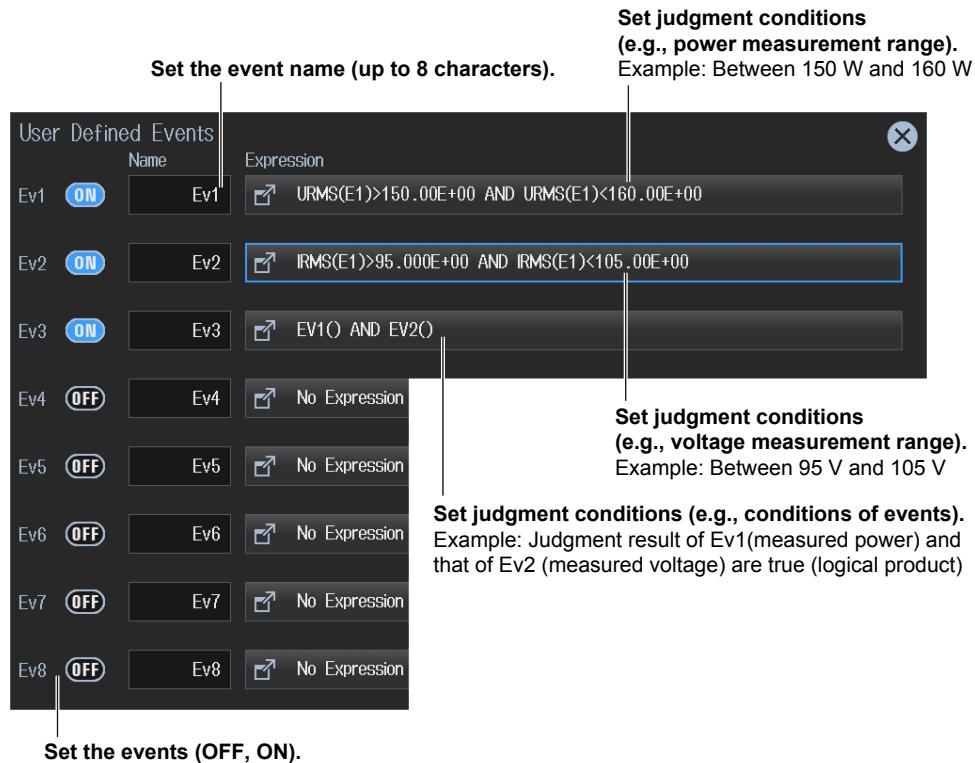
Computed Value (Event) Display Mode (User Defined Event)

3. Tap Measure.

An equation setup screen appears.

4. Tap User Defined Events.

The following screen appears.



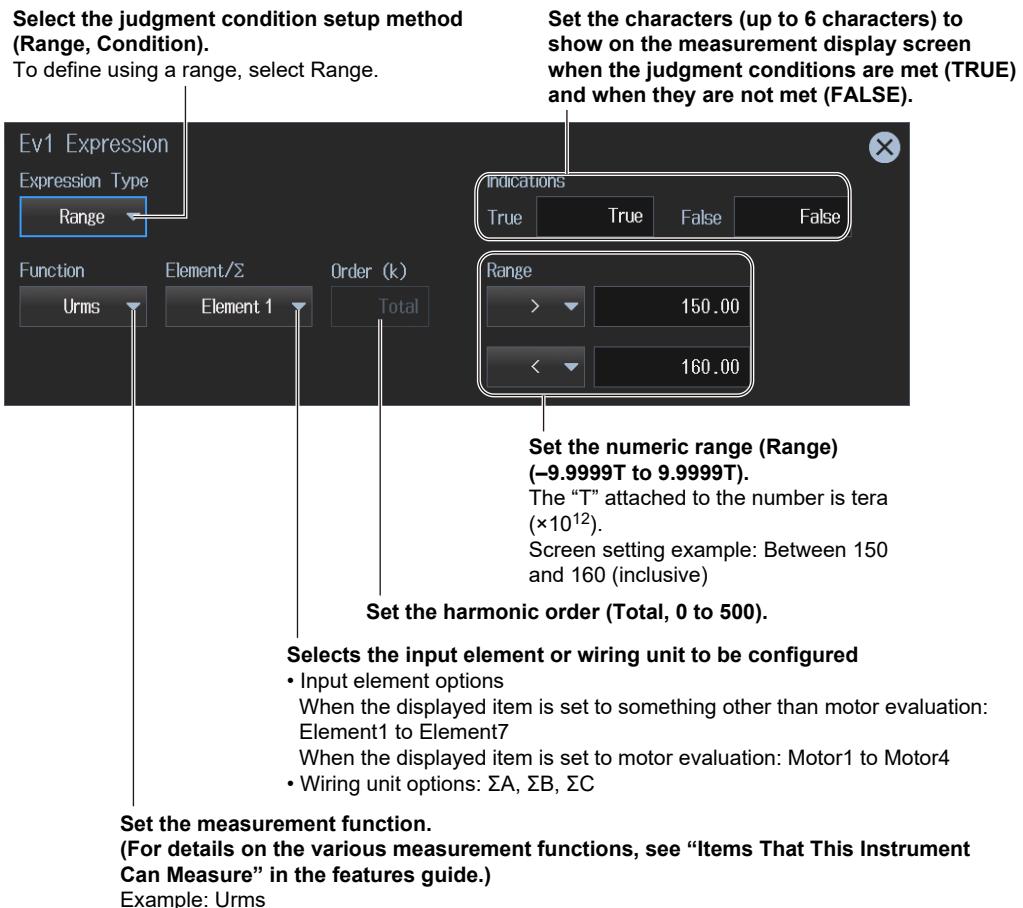
Set the judgment conditions.

5. Tap Expression (judgment condition setting). The following screen appears.

3.5 Displaying Computed Values (Values and Events)

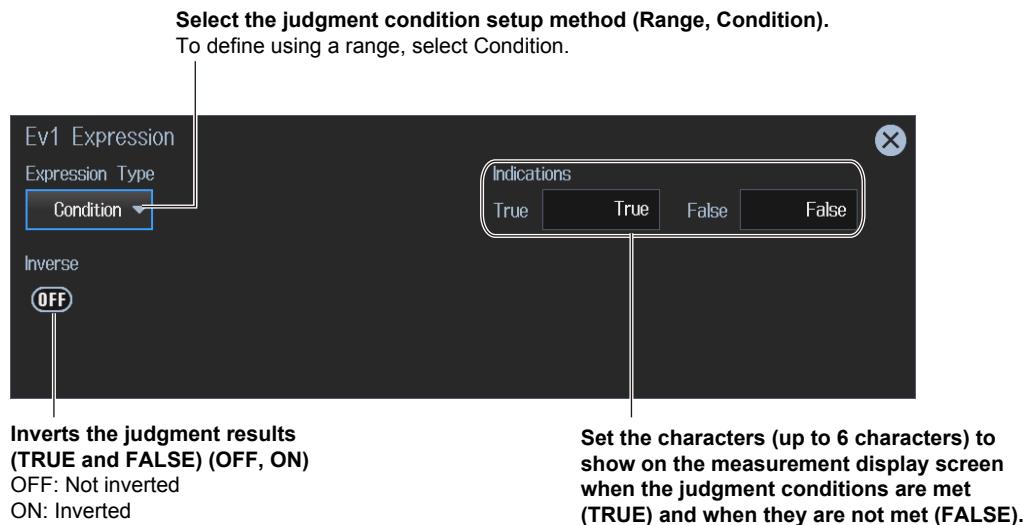
- **Setting Judgment Conditions (example: power measurement range)**

This is an explanation for defining an equation using range.



- **Setting Judgment Conditions (example: conditions of events)**

This is an explanation for defining an equation using conditions.



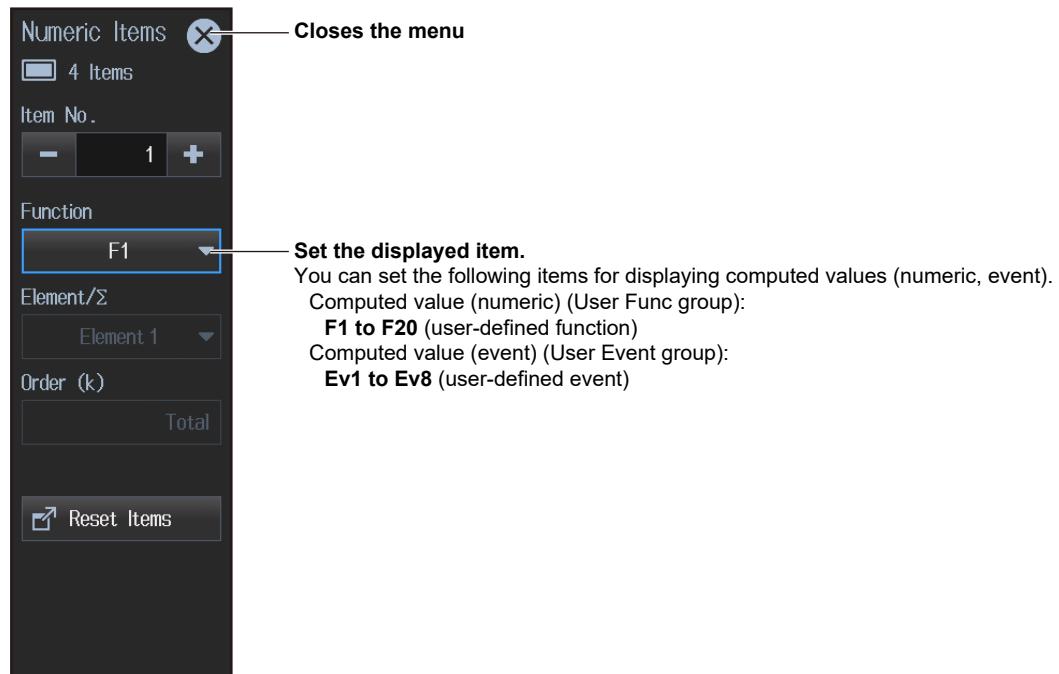
Switching the Displayed Items (Items)

You can switch the measured value (measurement function) shown in the screen.

3. Tap **Display**.

A display format setup screen (Numeric/Graph) appears. For details, see section 3.1.

4. Tap **Items**. The following screen appears.



Procedure Using the Menu Icons

You can also use the menu icons shown on the right side of the screen to switch the displayed items.

1. Tap the **Display** menu icon . A Display menu appears in the sub menu area on the right side of the screen.

By tapping the displayed items, you can specify the same operation as explained in “Switching the Displayed Items” described earlier.

Note

For a description of the Display menu screen, see “Menu Icons” on page v.

3.6 Holding the Maximum Values

This instrument shows on the screen the maximum values of measurements (measurement functions) of the voltage, current, power, and the like applied to the input elements or wiring units.

► “MAX Hold (Max Hold)” in the features guide

Using an example, this section explains how to display the maximum values of measurements.

The following maximum values are displayed as an example.

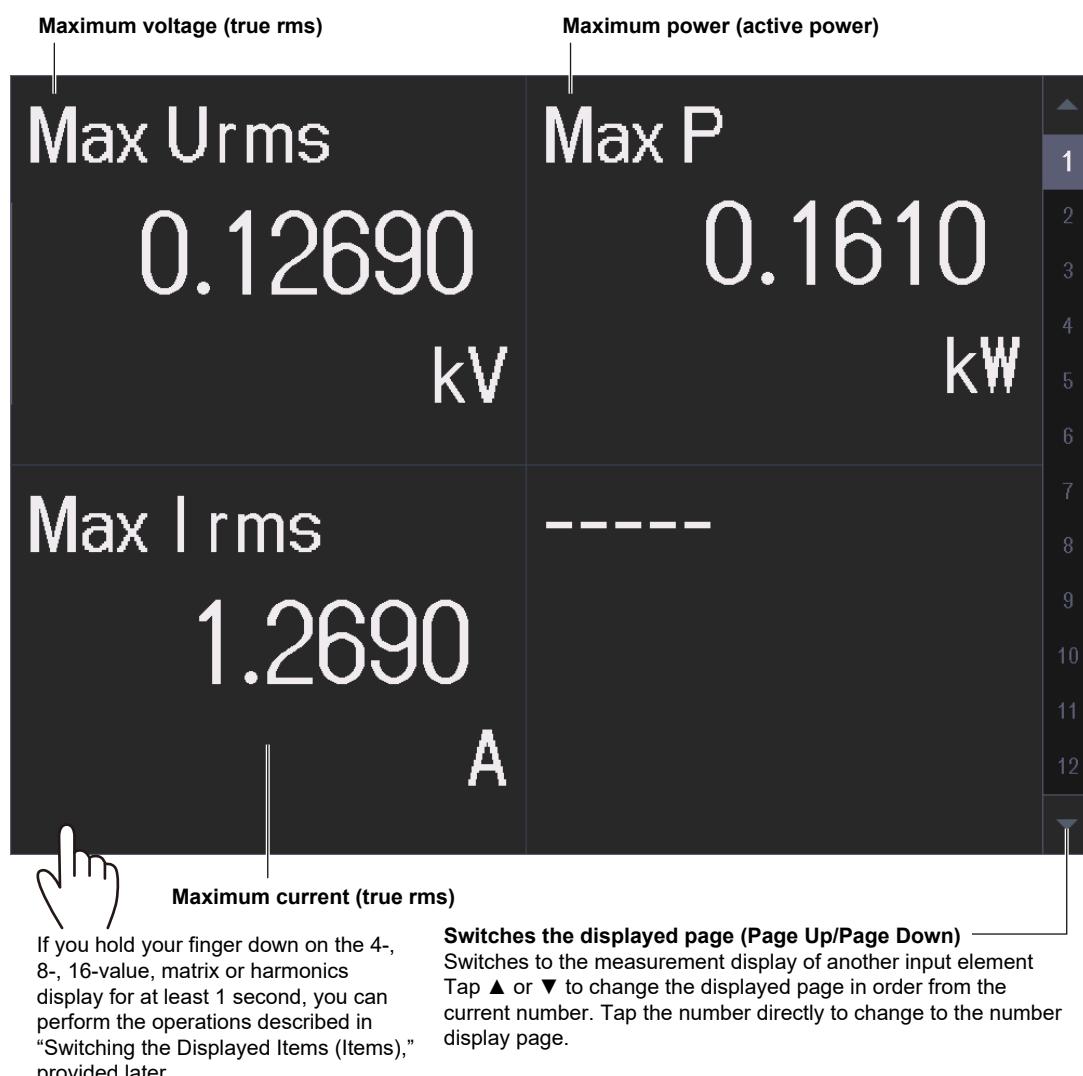
- Maximum value of the true rms voltage (Max Urms)
- Maximum value of the true rms current (Max Irms)
- Maximum value of the active power (Max P)

In addition, this section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Menu Icons (see page iii)

Measurement Display Screen (Example of a 4 items display)

Measurement display of input element 1

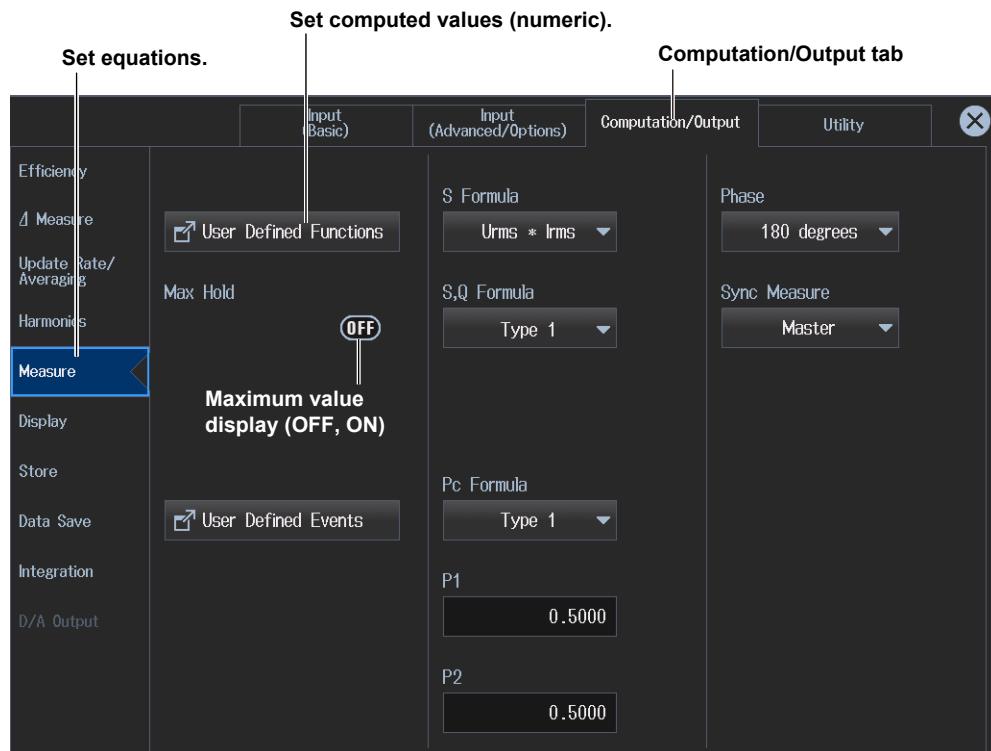


Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under **SETUP**.
2. Tap **Computation/Output** tab. A computation and output settings overview screen appears. Pressing **ESC** closes the overview screen.

Maximum Value Display Mode (Max Hold)

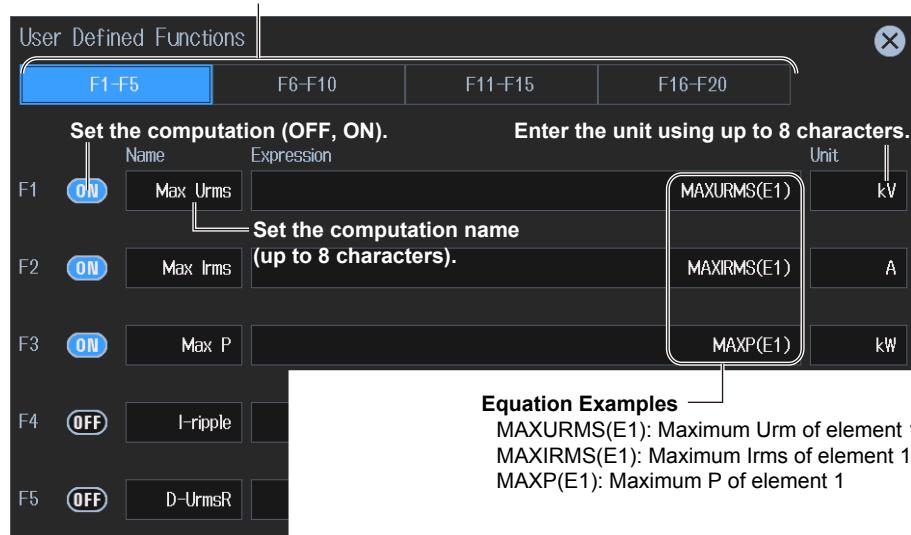
3. Tap **Measure**.
- An equation setup screen appears.
4. Tap **Max Hold** to select ON.



5. Tap **User Defined Functions**.

The following screen appears.

Displays the setup screen for user-defined functions (F1 to F5, F6 to F10, F11 to F15, F16 to F20)



3.6 Holding the Maximum Values

The user-defined function setup screen shows five functions per screen. Up to 20 functions can be defined. In the setup example, the maximum value of the true rms voltage is set in F1, the maximum value of the true rms current is set in F2, and the maximum value of the active power is set in F3.

- F1: Maximum value of the true rms voltage (element 1) Max Urms1 = MAXURMS(E1)
- F2: Maximum value of the true rms current (element 1) Max Irms1 = MAXIRMS(E1)
- F3: Maximum value of the active power (element 1) Max P1 = MAXP(E1)

If you set the computation setting to on, maximum values are shown on the measurement display screen.

Note

- By default, the computed values of user definitions contain samples. Change them as necessary.
- You can also display the computation/output settings overview screen by moving the cursor on the Computation/Output tab using the arrow keys and then pressing SET.

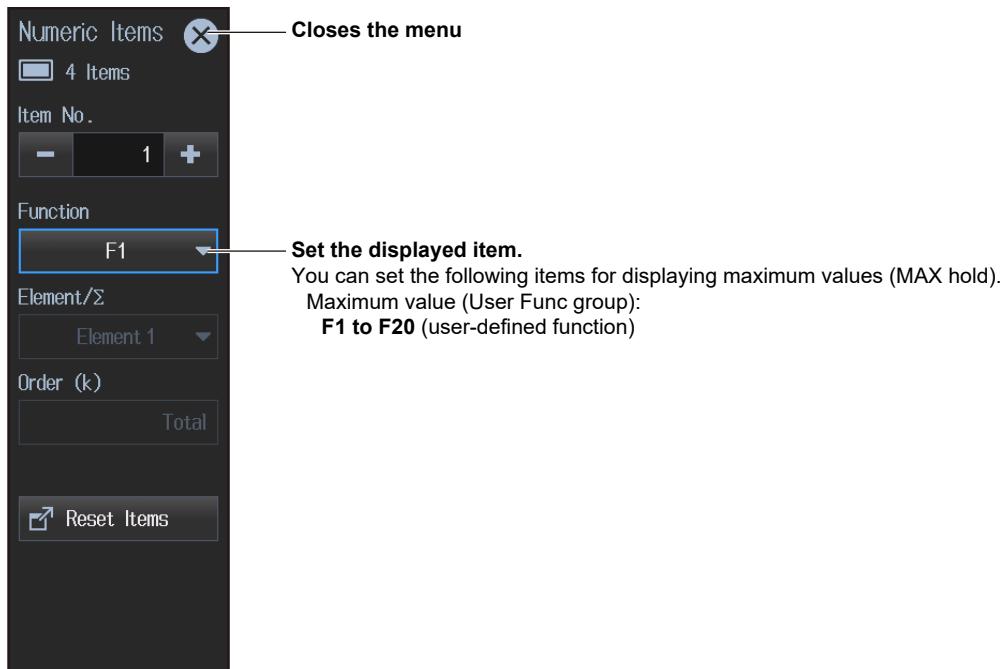
Switching the Displayed Items (Items)

You can switch the measured value (measurement function) shown in the screen.

3. Tap Display.

A display format setup screen (Display/Numeric/Graph) appears. For details, see section 3.1.

4. Tap Items. The following screen appears.



Procedure Using the Menu Icons

You can also use the menu icons shown on the right side of the screen to switch the displayed items.

1. Tap the **Display** menu icon . A Display menu appears in the sub menu area on the right side of the screen.

By tapping the displayed items, you can specify the same operation as explained in "Switching the Displayed Items" described earlier.

Note

For a description of the Display menu screen, see "Menu Icons" on page v.

4.1 Setting Integration Conditions

- ▶ “Enabling or Disabling Independent Integration (Independent Control)” in the features guide
 - ▶ “Integration Auto Calibration On/Off (Auto Cal)” in the features guide
 - ▶ “Integration Mode (Integration Mode)” in the Features Guide
 - ▶ “Integration Timer (Integration Timer)” in the features guide
 - ▶ “Scheduled Times for Real-Time Integration (Start Time/End Time)” in the features guide
 - ▶ “Watt Hour Integration Method for Each Polarity (WP ± Type)” in the features guide
 - ▶ “Current Mode for Current Integration (q Mode)” in the features guide
 - ▶ “Rated Time for Integrated D/A Output (Integration Rated Time)” in the features guide
- ▶ “Integration resume action at power failure recovery (Resume Action)” in the features guide

This section explains operating procedures using the following setup methods.

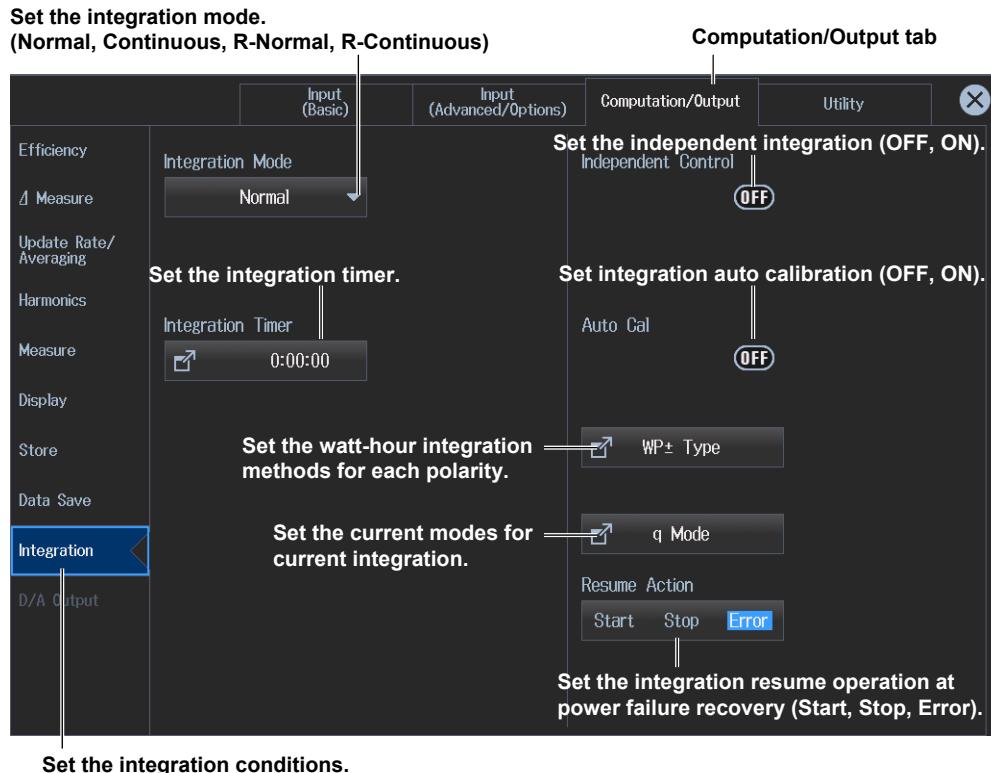
- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Menu Icons (see page iii)
- Procedure Using the Keys (other than SETUP) (see section 1.2 in IM WT5000-03EN)

Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under SETUP.
2. Tap **Computation/Output** tab. A computation and output settings overview screen appears. Pressing **ESC** closes the overview screen.

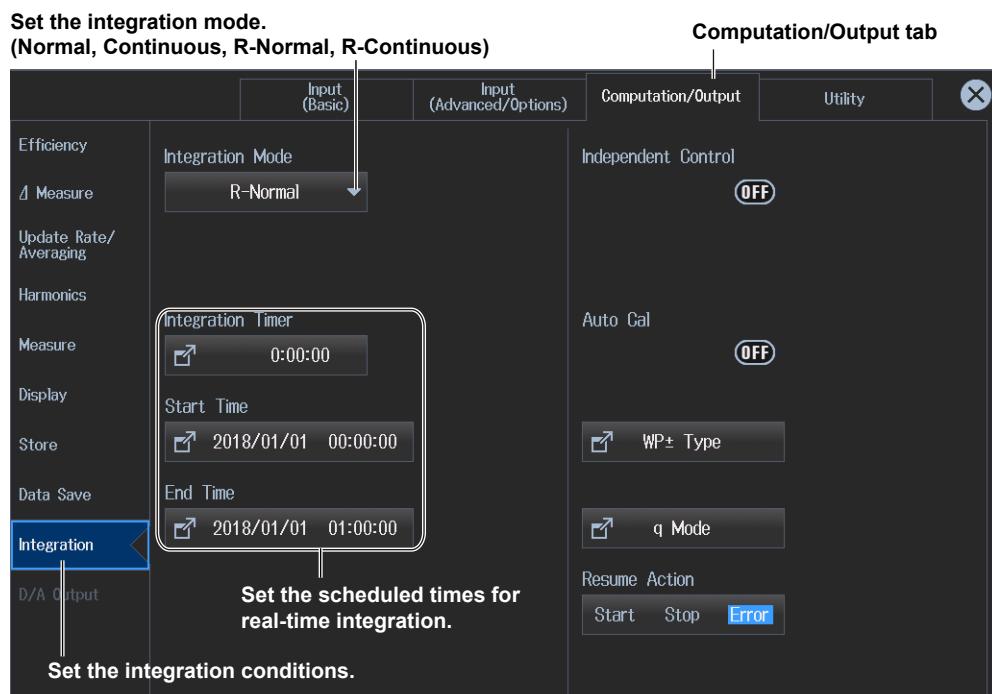
Setting Integration Conditions (Integration)

3. Tap **Integration**. An integration condition setup screen appears.
- When the Integration Mode Is Set to Normal or Continuous



4.1 Setting Integration Conditions

- When the Integration Mode Is Set to R-Normal or R-Continuous



Note

You can also display the computation/output settings overview screen by moving the cursor on the Computation/Output tab using the arrow keys and then pressing SET.

Setting the Integration Timer (Timer)

- Tap Integration Timer. The following screen appears.

When independent computation is on

Integration Timer

Setting **Each** All

Element 1	00000	:	00	:	00
Element 2	00000	:	00	:	00
Element 3	00000	:	00	:	00
Element 4	00000	:	00	:	00
Element 5	00000	:	00	:	00
Element 6	00000	:	00	:	00
Element 7	00000	:	00	:	00

Select the integration timer's setup method (Each, All). When you select Each, you can set the integration timer for each input element.

Set the integration timer.
(00000 hours : 00 minutes : 00 seconds to 10000 hours : 00 minutes : 00 seconds).
When Mode is set to Normal and the integration timer is 00000 : 00 : 00, the instrument is in manual integration mode.

When independent computation is off

Integration Timer

00000 : 00 : 00

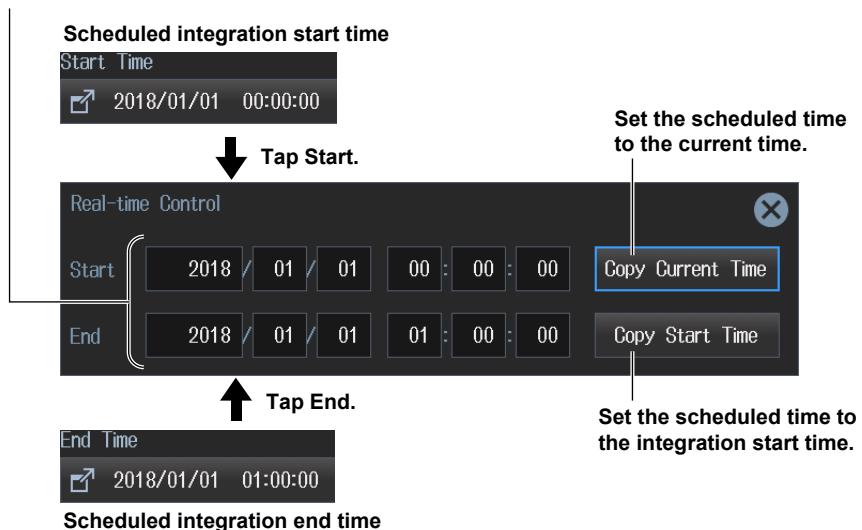
Setting Scheduled Times for Real-Time Integration (Real-time Control)

4. Tap Real-time Control. The following screen appears.

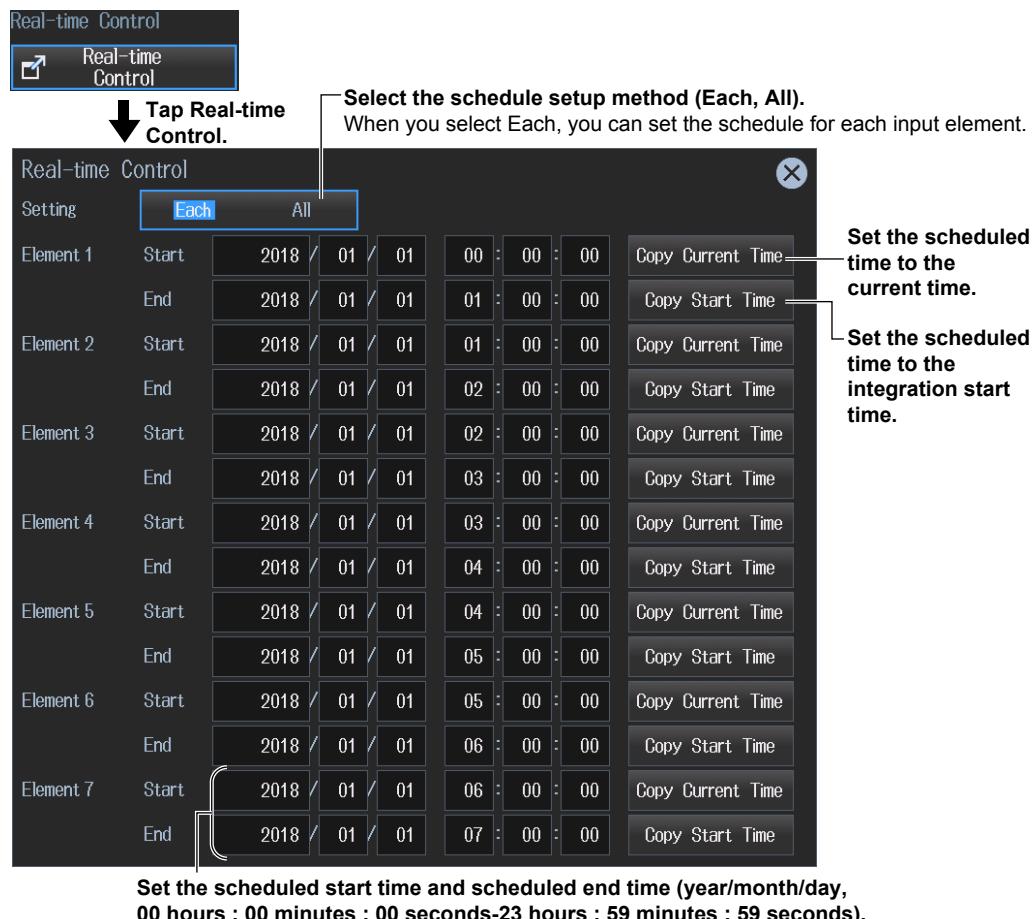
The Real-time Control button appears when the integration mode is set to R-Normal or R-Continuous.

- When Independent Integration Is Disabled

Set the scheduled start and stop times
(Year/month/day, 00 hours : 00 minutes : 00 seconds to 23 hours : 59 minutes : 59 seconds).



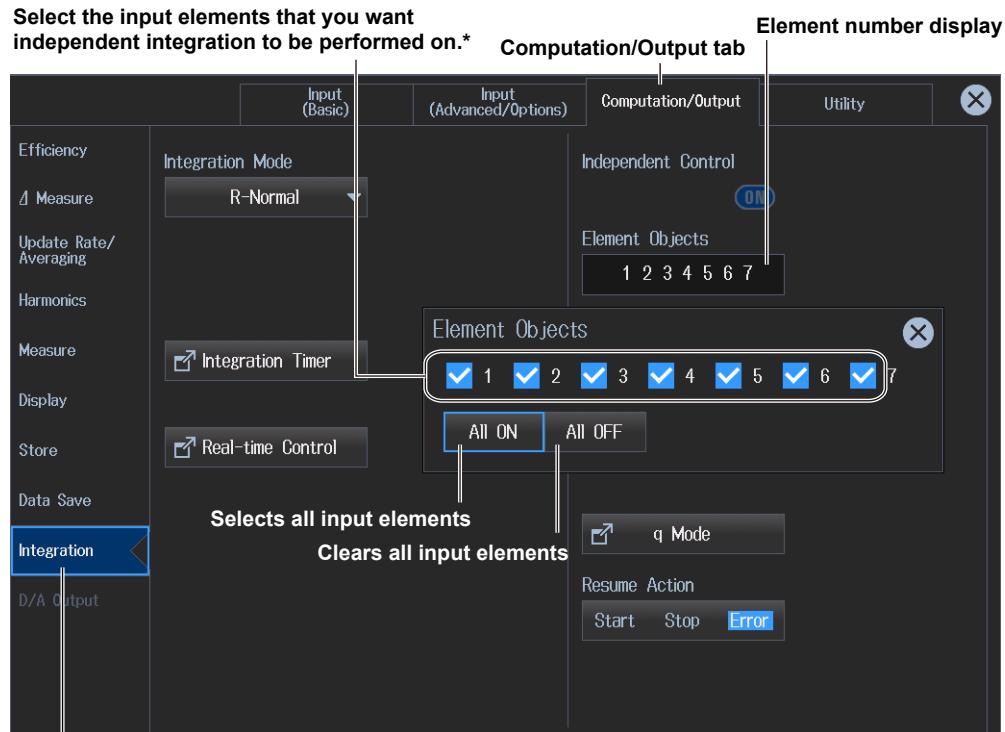
- When Independent Integration Is Enabled



4.1 Setting Integration Conditions

Setting Independent Integration (Independent Control)

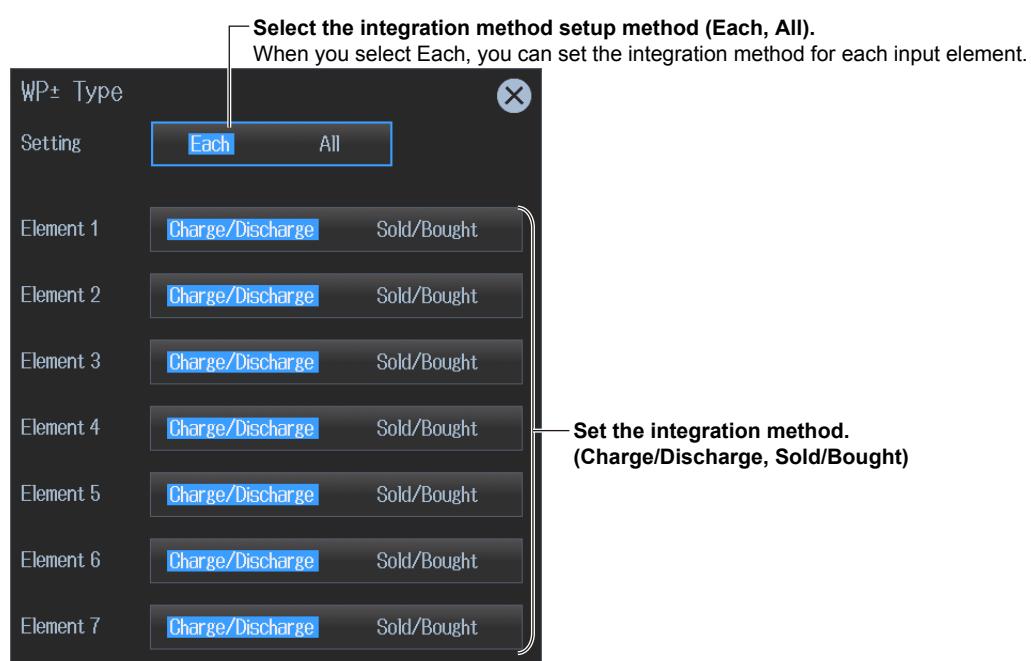
4. Tap **Independent Control**. Element numbers appear.
5. Tap within the element number display frame. The following screen appears.



* Even if you select input elements that independent integration will be performed on, independent integration may not be performed due to the wiring system setting or the independent input element configuration (see the features guide).

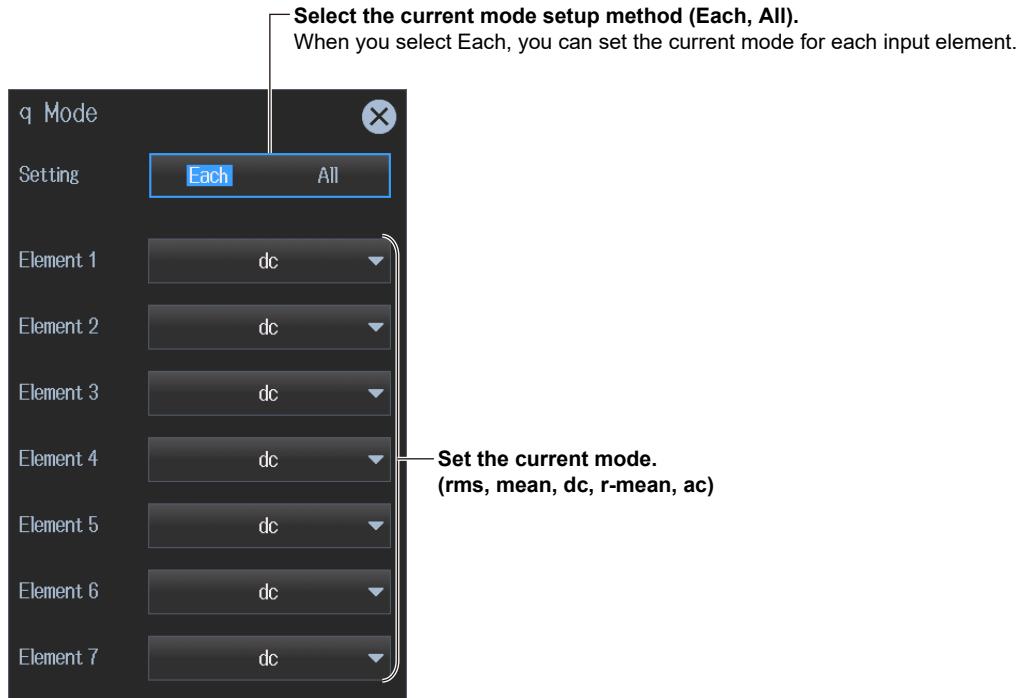
Setting the Watt-Hour Integration Method for Each Polarity (WP± Type)

4. Tap **WP± Type**. The following screen appears.



Setting the Current Mode for Current Integration (q Mode)

4. Tap q Mode. The following screen appears.



Procedure Using the Menu Icons

You can also use the menu icons shown on the right side of the screen to set the integration conditions.

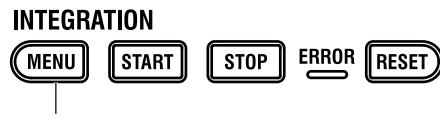
1. Tap the **Integration** menu icon . An Integration menu appears in the sub menu area on the right side of the screen.
By tapping the displayed items, you can specify the same settings as when using the screen explained earlier.

Note

For a description of the Integration menu screen, see "Menu Icons" on page v.

Procedure Using Keys

You can also use the front panel keys to set integration.



Set the integration conditions.
The Setup menu appears.

4.2 Displaying Integrated Values (numeric display)

This instrument calculates the integrated value of power (watt hours) and the integrated value of current (ampere hours) from the voltage and current applied to the input elements or wiring units and shows the measurements (measurement functions) on the screen.

► [“Starting, Stopping, and Resetting Integration” in the features guide](#)

Watt hours (WP, WP+, WP-) and ampere hours (q, q+, q-) do not require you to set equations. The values are simply shown on the screen when integration is started.

To determine the volt-ampere hours (WS) and var hours (WQ), you need to set the equations for apparent power (S) and reactive power (Q). For the setup procedure, see section 3.3.

Using an example, this section explains how to display integrated values numerically.

In addition, this section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Menu Icons (see page iii)
- Procedure Using the Keys (other than SETUP) (see section 1.2 in IM WT5000-03EN)

Measurement Display Screen (Example of a 4 items display)

Measurement display of input element 1

Measured sum of positive and negative watt hours

Measured volt-ampere hours

WP1

5.00000

Wh

WS1

69.8619

mVAh

q1

5.00000

Ah

WQ1

69.8619

mvarh



Measured sum of positive and negative ampere hours

If you hold your finger down on the 4-, 8-, 16-value, matrix or harmonics display for at least 1 second, you can perform the operations described in “Switching the Displayed Items (Items),” provided later.

Measured var hours

Switches the displayed page (Page Up/Page Down)

Switches to the measurement display of another input element. Tap ▲ or ▼ to change the displayed page in order from the current number. Tap the number directly to change to the number display page.

Note

Integrated values can be shown graphically.

- The trend display (see section 6.3) shows integrated values graphically.

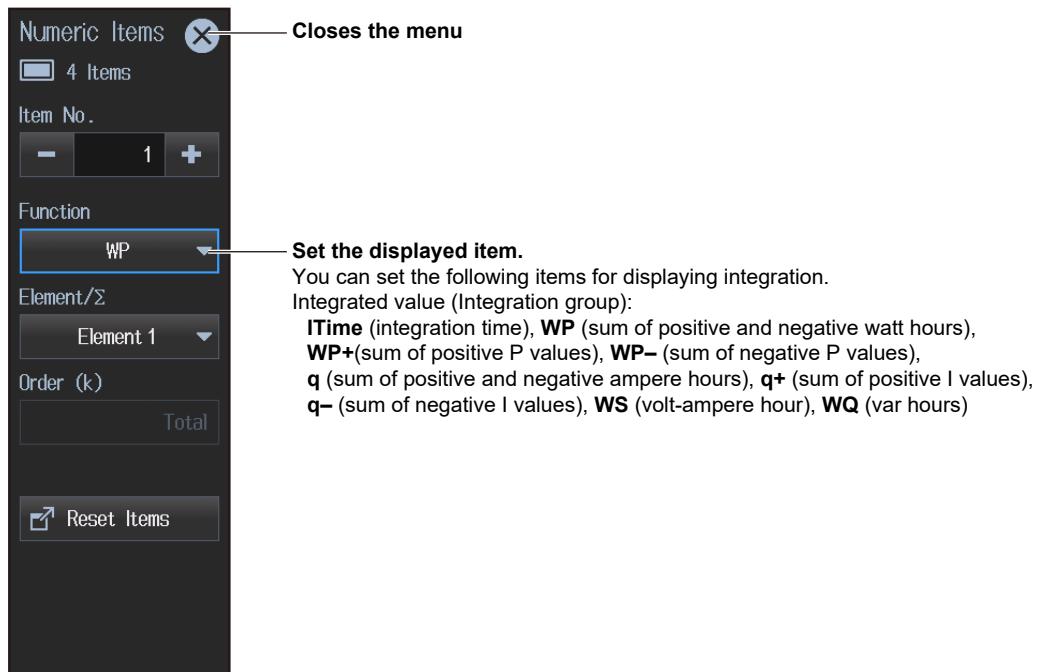
Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under SETUP.
2. Tap **Computation/Output** tab. A computation and output settings overview screen appears. Pressing **ESC** closes the overview screen.

Switching the Displayed Items (Item)

You can switch the measured value (measurement function) shown in the screen.

3. Tap **Display**.
- A display format setup screen (Numeric/Graph) appears. For details, see section 3.1.
4. Tap **Items**. The following screen appears.



Procedure Using the Menu Icons

You can also use the menu icons shown on the right side of the screen to switch the displayed items.

1. Tap the **Display** menu icon . A Display menu appears in the sub menu area on the right side of the screen.
- By tapping the displayed items, you can specify the same settings as when using the screen explained earlier.

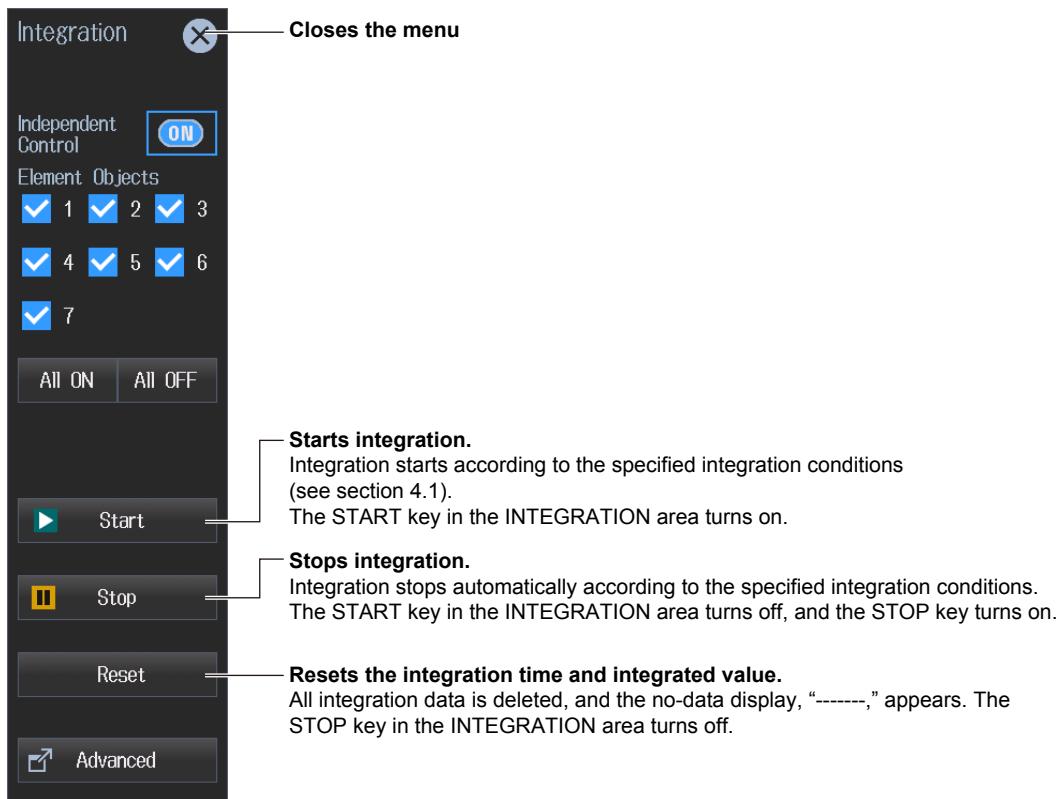
Note

For a description of the Display menu screen, see "Menu Icons" on page v.

4.2 Displaying Integrated Values (numeric display)

Starting, Stopping, and Resetting Integration (Start/Stop/Reset)

1. Tap the **Integration** menu icon  An Integration menu appears in the sub menu area on the right side of the screen.



Note

For a description of the Integration menu screen, see "Menu Icons" on page v.

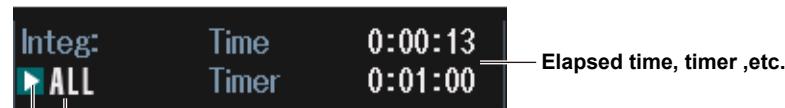
Integration Status Display

The integration status (running, paused, end), independent integration on/off state, integration time, and so on are shown at the top of the screen.

Peak 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 Over 1 1 2 2 3 3 4 4 5 5 6 6 7 7 8 8 9 9 10 10 11 11 12 12		Update 1s (500ms) DF/	Integ ALL	Time 0:00:09	Timer 0:01:00
WP1	WS1				
5.00000	69.8619				
Wh	mVAh				
q1	WQ1				
5.00000	69.8619				
Ah	mvarh				

Integration Information

When Independent Integration Is Disabled



Elapsed time, timer ,etc.

Integration status display (running, paused, ended)

This is the same display as when independent integration is off (see below).

When independent integration is enabled



Example: Integration running on elements 1 to 3



When integration starts, the elements selected for integration execution show START icons.



Example: Integration paused on elements 1 to 3



When integration stops, the elements selected for integration execution show STOP icons. If you start it again, the icons change to START, and integration resumes.



Example: Integration ended on elements 1 to 3



When integration ends after the specified timer value elapses or when the scheduled real-time integration time is reached, the elements selected for integration execution show STOP icons. Unlike pausing, you need to reset the integration after it ends to start the integration again.



When you execute reset, the integration information is cleared, and the STOP icons return to displaying numbers.

Procedure Using Keys

You can also use the front panel keys to start, end, and reset integration.

INTEGRATION



Resets the integration status

ERROR indicator

Lights when an integration error occurs. In this situation, an error message appears at the top of the screen. For more information about how to handle error messages, see appendix 1.

Stops integration.

Starts integration.

5.1 Setting Harmonic Measurement Conditions

- ▶ “Input Element Group (Elements)” in the features guide
- ▶ “PLL Source (PLL Source)” in the features guide
- ▶ “Measured Harmonic Orders (Min Order/Max Order)” in the features guide
- ▶ “Distortion Factor Equation (Thd Formula)” in the features guide
- ▶ “Number of FFT Points (FFT Points)” in the features guide
- ▶ “Anti-Aliasing Filter” in the features guide

This section explains operating procedures using the following setup methods.

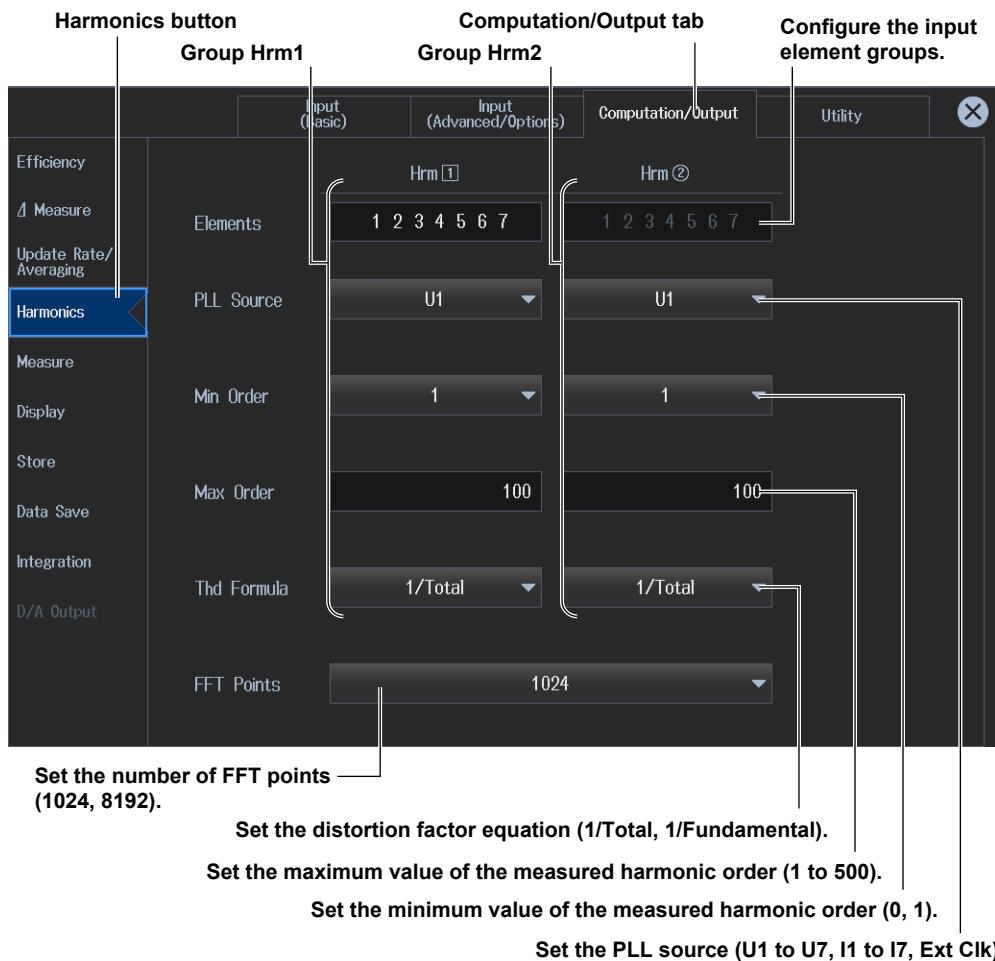
- Procedure Using the Setup Menu (see chapter 1)

Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under SETUP.
2. Tap **Computation/Output** tab. A computation and output settings overview screen appears. Pressing **ESC** closes the overview screen.

Setting the Harmonic Measurement (Harmonics)

3. Tap **Harmonics**. A harmonic measurement setup screen appears.



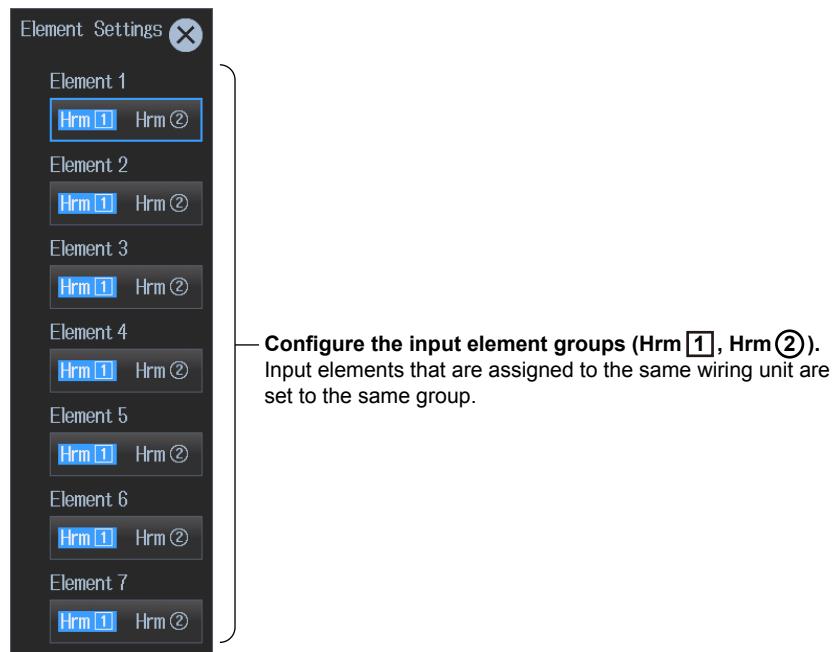
5.1 Setting Harmonic Measurement Conditions

Note

You can also display the computation/output settings overview screen by moving the cursor on the Computation/Output tab using the arrow keys and then pressing SET.

Setting the Input Element Group (Element Set)

4. Tap **Elements**. The Element Settings screen appears.



5.2

Displaying Harmonic Measurements (numeric display)

This instrument shows on the screen the harmonic measurements (measurement functions) of the voltage and current applied to the input elements or wiring units.

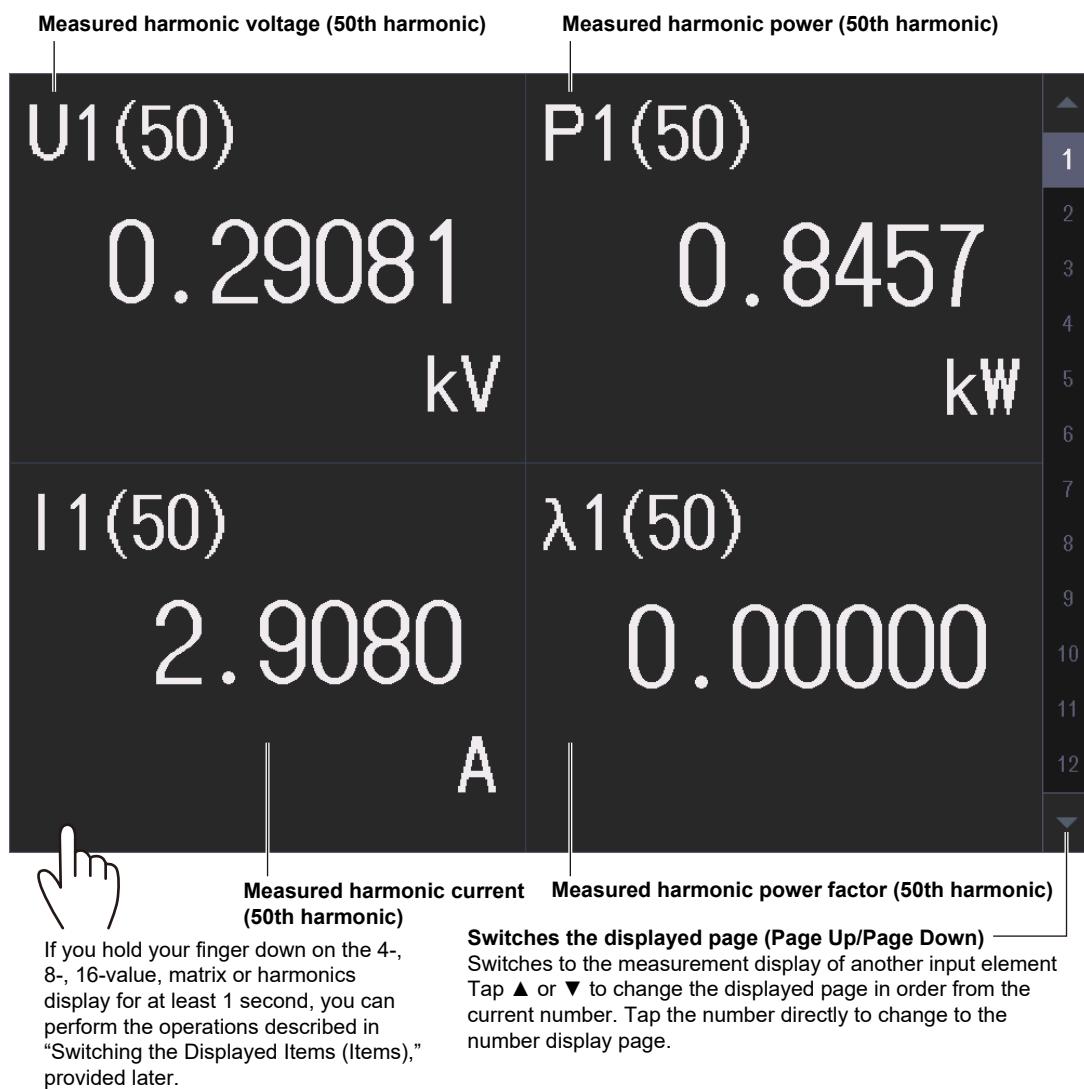
Using an example, this section explains how to display harmonic measurements numerically.

In addition, this section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Menu Icons (see page iii)

Measurement Display Screen (Example of a 4 items display)

Measurement display of input element 1



Note

Harmonic measurements can be shown graphically.

- The trend display (see section 6.3) shows harmonic measurements graphically.
- The bar graph display (see section 6.4) shows the magnitude of each harmonic graphically.
- The vector display (see section 6.5) shows the phase difference and the magnitude relationship between fundamental waves U(1) and I(1) of each element in the wiring unit.

Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under SETUP.
2. Tap **Computation/Output** tab. A computation and output settings overview screen appears. Pressing **ESC** closes the overview screen.

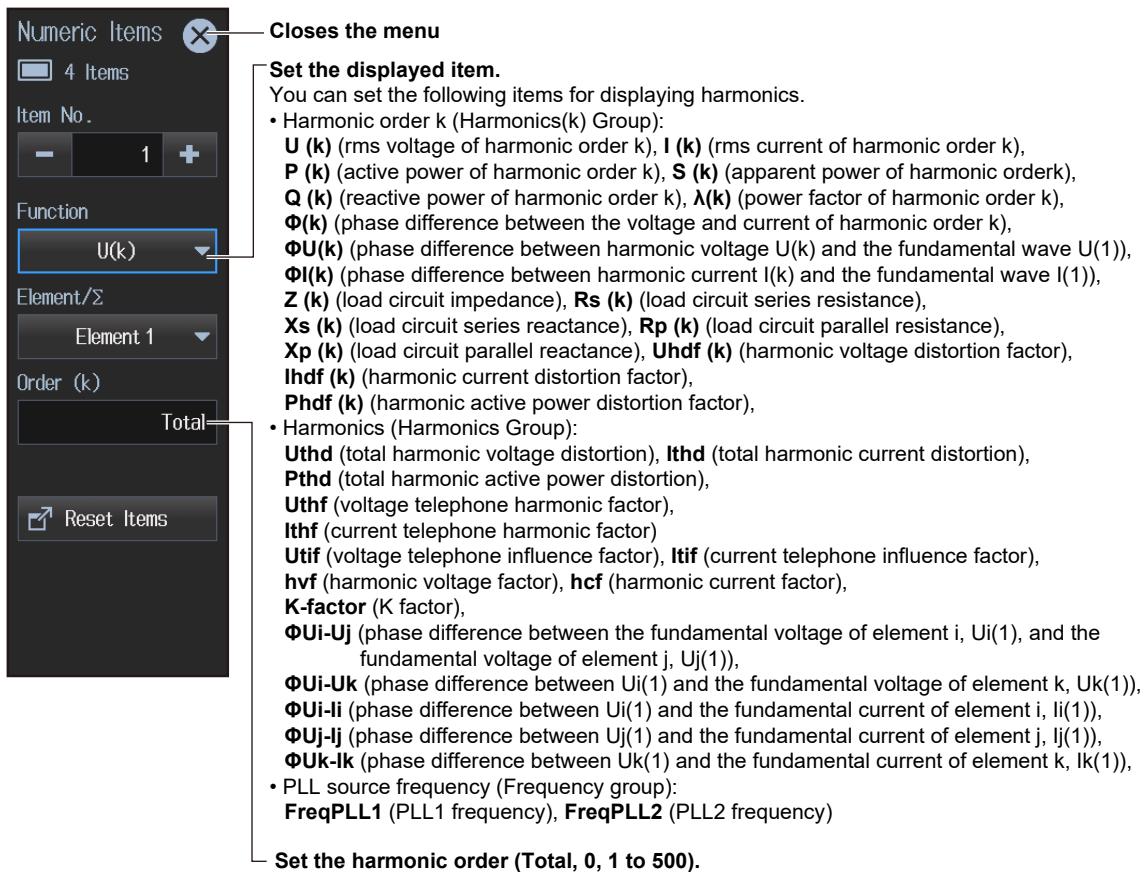
Switching the Displayed Items (Items)

You can switch the measured value (measurement function) shown in the screen.

3. Tap **Display**.

A display format setup screen (Numeric/Graph) appears. For details, see section 3.1.

4. Tap **Items**. The following screen appears.



Procedure Using the Menu Icons

You can also use the menu icons shown on the right side of the screen to switch the displayed items.

1. Tap the **Display** menu icon  . A Display menu appears in the sub menu area on the right side of the screen.

By tapping the displayed items, you can specify the same settings as when using the screen explained earlier.

Note

For a description of the Display menu screen, see "Menu Icons" on page v.

6.1 Setting the Display Format

▶ “Switching the Displayed Page (Page Scroll)” in the features guide

This section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Menu Icons (see page iii)
- Procedure Using the Keys (other than SETUP) (see section 1.2 in IM WT5000-03EN)

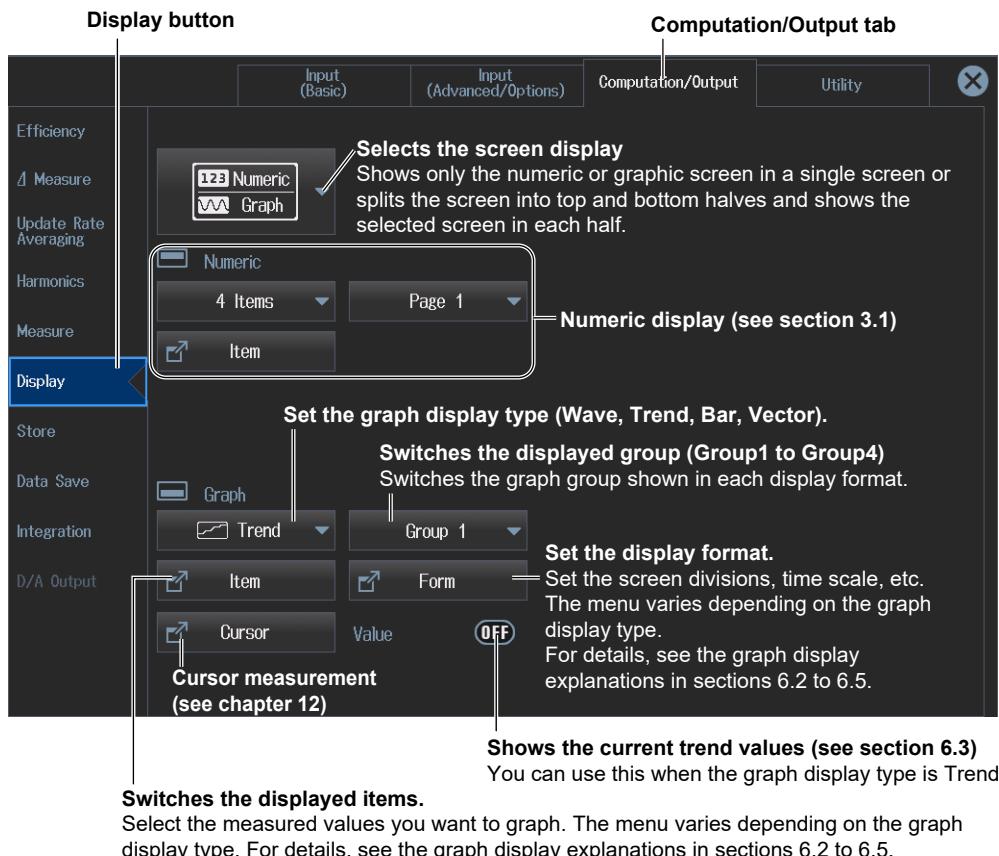
Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under SETUP.
2. Tap **Computation/Output tab**. A computation and output settings overview screen appears. Pressing **ESC** closes the overview screen.

Setting the Display Format (Display)

3. Tap **Display**.

A display format setup screen (Numeric/Graph) appears.



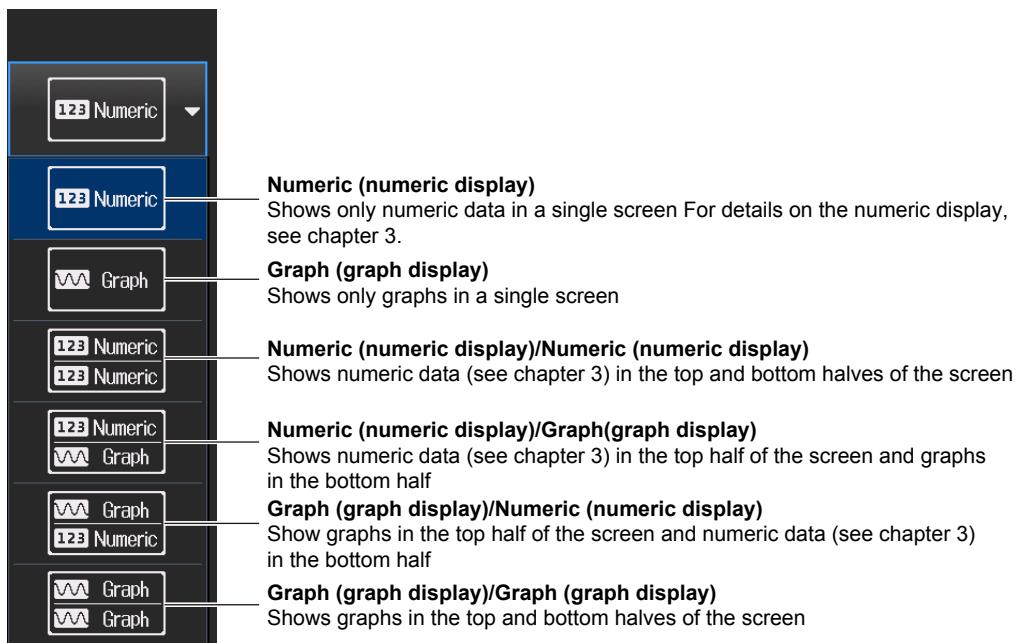
Note

You can also display the computation/output settings overview screen by moving the cursor on the Computation/Output tab using the arrow keys and then pressing SET.

6.1 Setting the Display Format

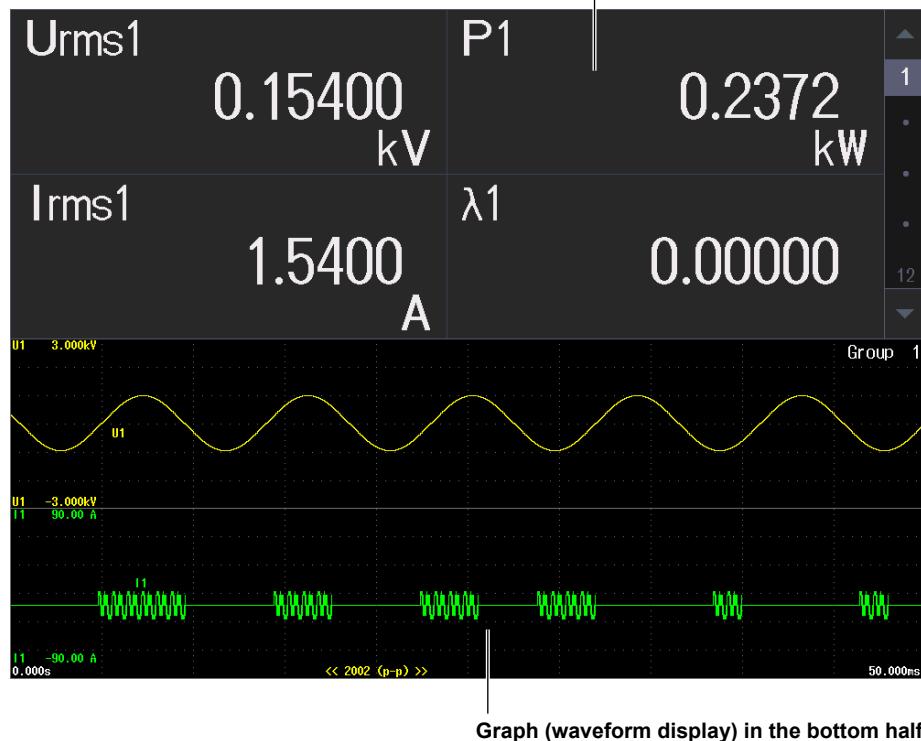
Display settings

You can switch the display format of the Numeric (numeric display) and Graph (graph display) screens.



Example of Numeric (numeric display)/Graph(graph display)

Numeric (numeric display) in the top half
For details on the numeric display, see chapter 3.



Procedure Using the Menu Icons

You can also use the menu icons shown on the right side of the screen to set the voltage range and current range.

1. Tap the **Display** menu icon  A Display menu appears in the sub menu area on the right side of the screen.

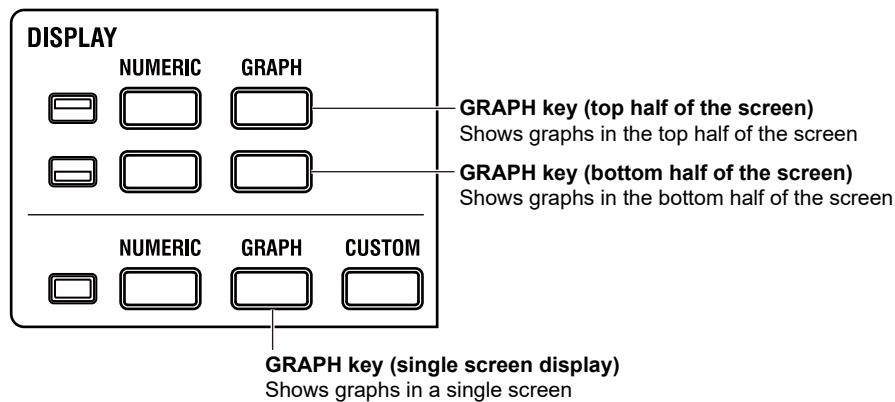
By tapping the displayed items, you can specify the same settings as when using the screen explained earlier.

Note

For a description of the Display menu screen, see "Menu Icons" on page v.

Switching the Display Format (GRAPH key)

You can also use keys to perform "Setting the Screen Display" described earlier and "Setting the Graph Display Type."



Each time you press GRAPH, the graph type switches, in order, between waveform, trend, bar graph, and vector.

6.2 Waveform Display

This instrument shows on the screen the waveforms of the voltage and current applied to the input elements or wiring units.

- ▶ “Waveform Display (Wave)” in the features guide
- ▶ “Display Format (Form, Wave)” in the features guide
- ▶ “Number of Windows (Format)” in the features guide
 - ▶ “Time Axis (Time/div)” in the features guide
 - ▶ “Vertical Axis (Amplitude)” in the features guide
- ▶ “Advanced Waveform Display Settings (Advanced)” in the features guide
- ▶ “Display Items (Items, Wave)” in the features guide

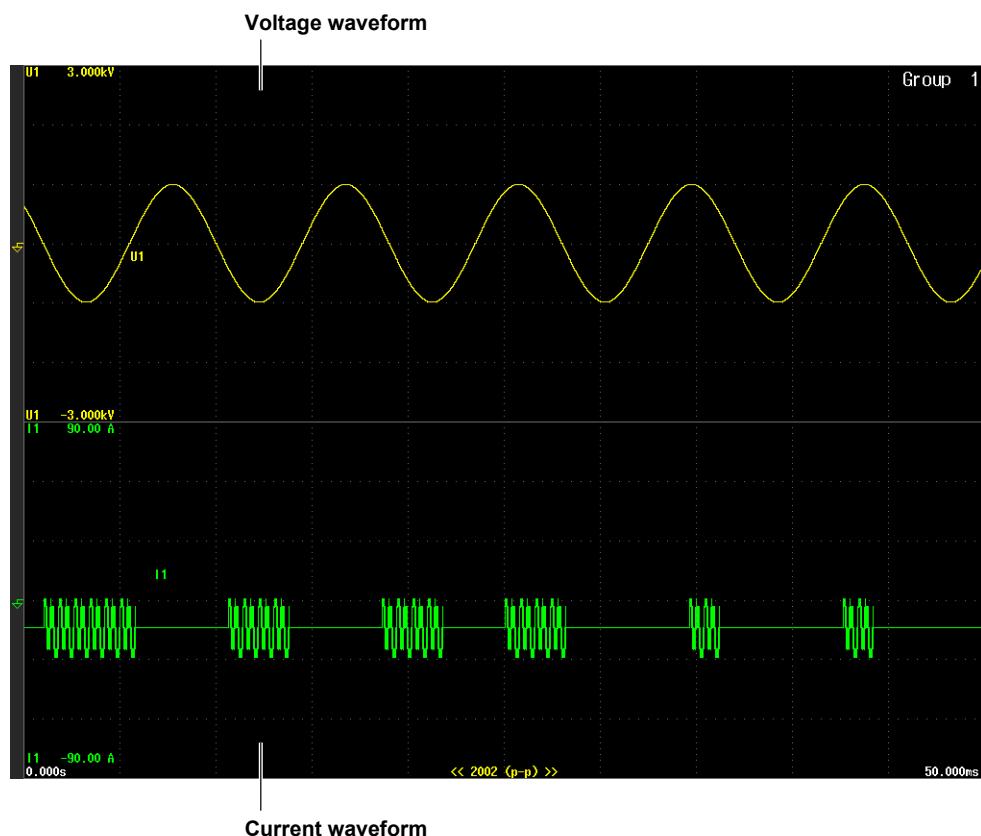
Using an example, this section explains how to display measurement results with waveforms.

In addition, this section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Menu Icons (see page iii)

Waveform Display Screen (Example of group1 dual display)

Waveform display of input element 1



Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under SETUP.
2. Tap **Computation/Output** tab. A computation and output settings overview screen appears. Pressing **ESC** closes the overview screen.
3. Tap **Display**.

A display format setup screen (Numeric/Graph) appears. For details, see section 6.1.

Setting the Graph Display Type (Graph)

- Tap **Graph** to select Wave.

Switching the Displayed Group (Group)

- Tap **Group** to select a group from Group1 to Group4.

You can select up to four groups. The Item and Form settings, explained later, are applied to the group numbers you select in this step.

For example, you can set a group for each signal for motor evaluation and display the waveforms by switching the group display. In the following example, Group1 to Group3 display the voltages and currents of the input elements, and Group4 displays the rotating speed and torque.

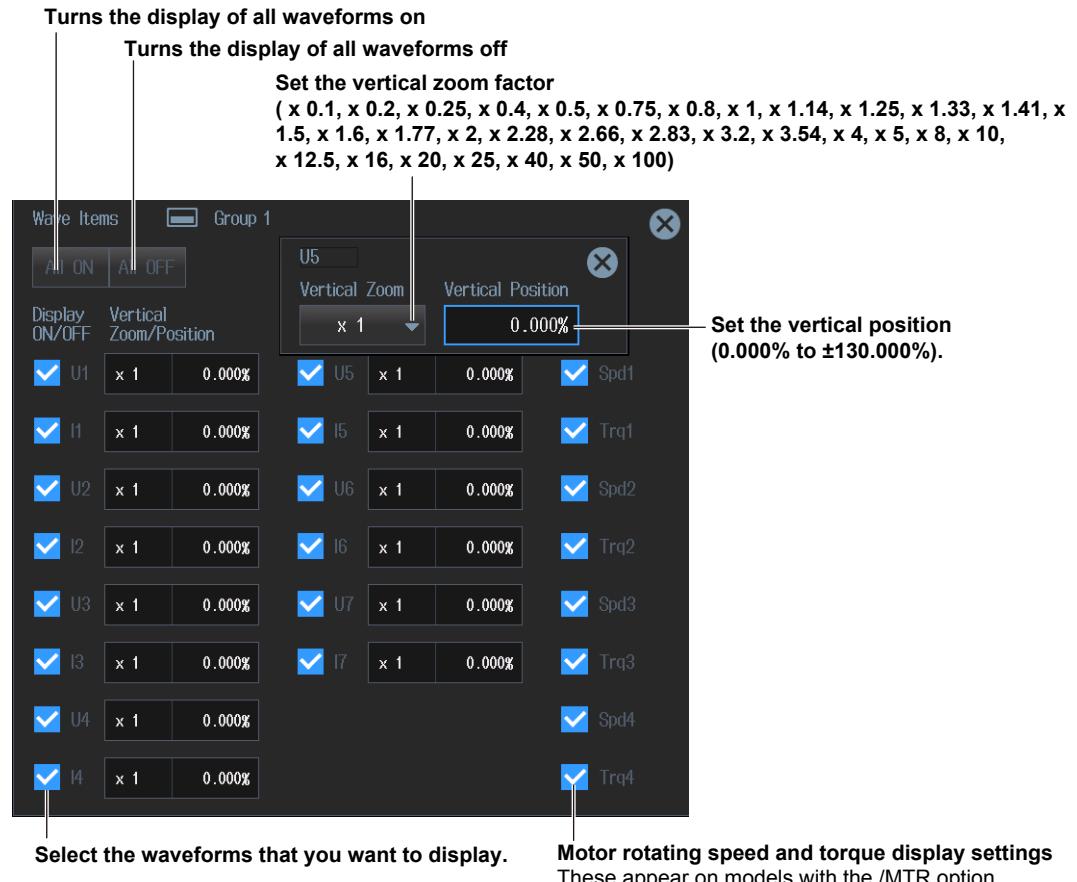
- In Group1, display U1 and I1 (Item operation), and set the screen to Dual display (Form operation).
- In Group2, display U2 and I2 (Item operation), and set the screen to Dual display (Form operation).
- In Group3, display U3 and I3 (Item operation), and set the screen to Dual display (Form operation).
- In Group4, display Speed1 and Torque1 (Item operation), and set the screen to Dual display (Form operation).

Switching the Displayed Items (Items)

Select the voltages and currents of the input elements to be displayed with waveforms.

- Tap **Items**. A Wave Items screen appears.

- Tap within the Vertical Zoom/Position display frame. A Zoom/Position setup screen appears.

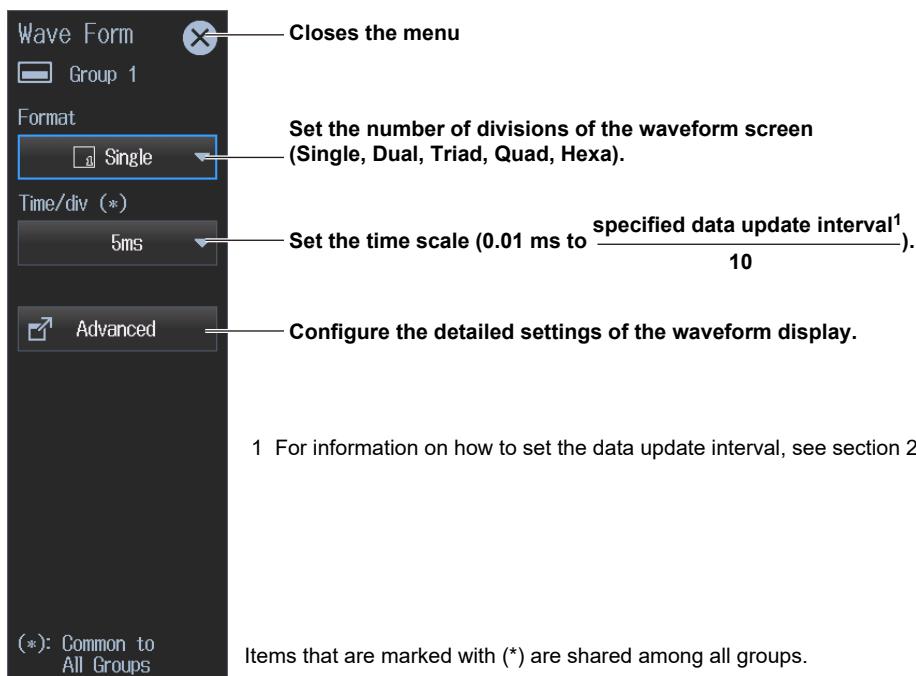


6.2 Waveform Display

Setting the Display Format (Form)

Set the division of the waveform display screen and time scale (Time/div).

7. Tap **Form**. A Wave Form screen appears.

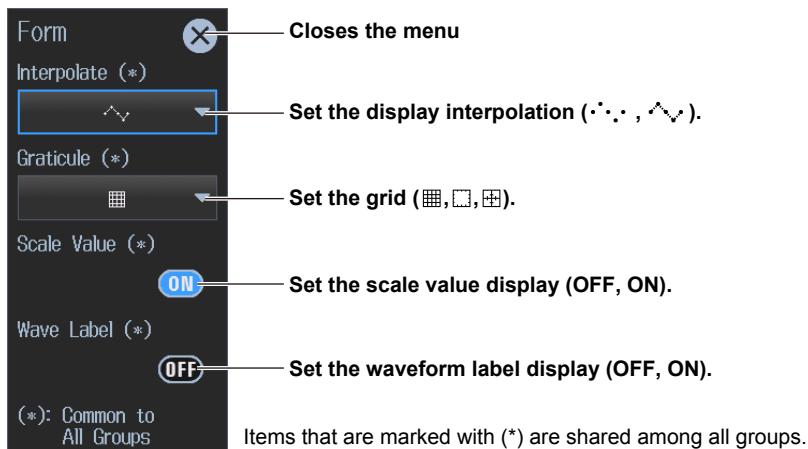


1 For information on how to set the data update interval, see section 2.9.

Items that are marked with (*) are shared among all groups.

Advanced Waveform Display (Advanced)

8. Tap **Advanced**. A Form screen appears.



Procedure Using the Menu Icons

You can also use the menu icons shown on the right side of the screen to switch the displayed items.

1. Tap the **Display** menu icon . A Display menu appears in the sub menu area on the right side of the screen.

By tapping the displayed items, you can specify the same operation as explained in "Switching the Displayed Items" described earlier.

Note

For a description of the Display menu screen, see "Menu Icons" on page v.

6.3 Trend display

This instrument shows on the screen the trend graphs of the voltage, current, and the like applied to the input elements or wiring units.

- ▶ “Trend Display (Trend)” in the features guide
- ▶ “Display Format (Form, Trend)” in the features guide
- ▶ “Display Items (Items, Trend)” in the features guide

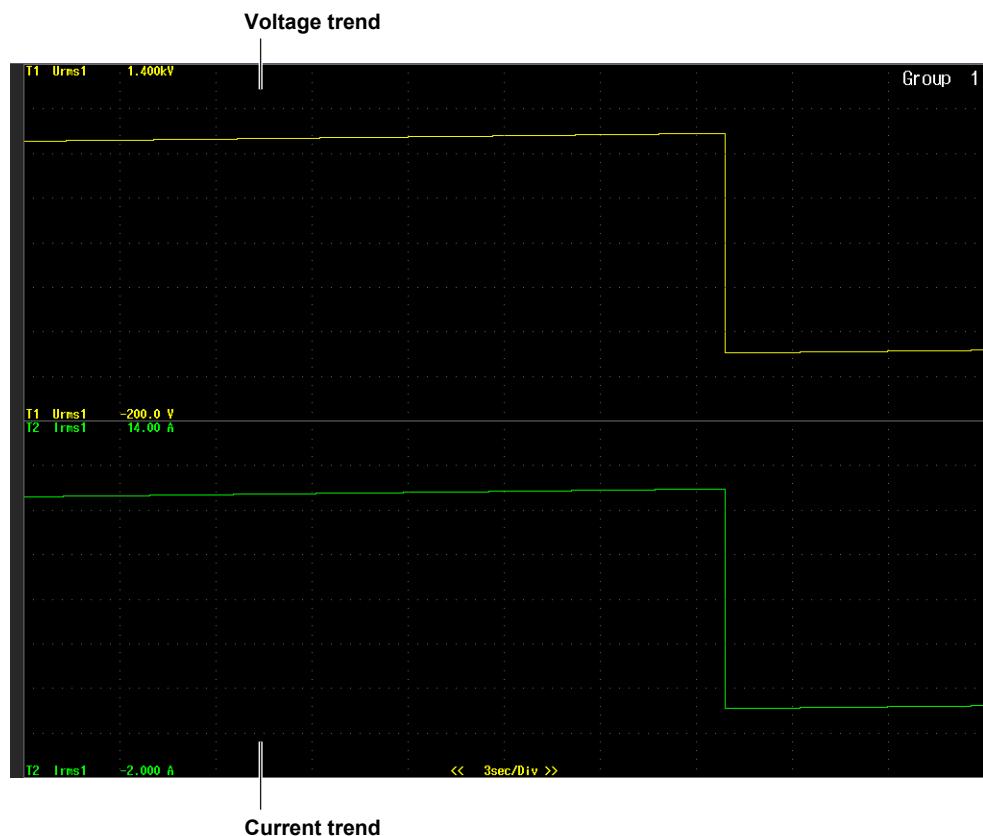
Using an example, this section explains how to display measurement results with trend graphs.

In addition, this section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Menu Icons (see page iii)

Trend Display Screen (Example of group1 dual display)

Trend display of input element 1



Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under **SETUP**.
2. Tap **Computation/Output** tab. A computation and output settings overview screen appears. Pressing **ESC** closes the overview screen.
3. Tap **Display**.

A display format setup screen (Numeric/Graph) appears. For details, see section 6.1.

6.3 Trend Display

Setting the Graph Display Type (Graph)

4. Tap **Graph** to select Trend.

Switching the Displayed Group (Group)

5. Tap **Group** to select a group from Group1 to Group4.

You can select up to four groups. The Item and Form settings, explained later, are applied to the group numbers you select in this step.

For example, you can set a group for each signal for motor evaluation and display the trends by switching the group display. In the following example, Group1 to Group3 display the voltages and currents of the input elements, and Group4 displays the rotating speed and torque.

- In Group1, display Urms1(T1) and Irms1(T2) (Item operation), and set the screen to Dual display (Form operation).
- In Group2, display Urms2(T3) and Irms2(T4) (Item operation), and set the screen to Dual display (Form operation).
- In Group3, display Urms3(T5) and Irms3(T6) (Item operation), and set the screen to Dual display (Form operation).
- In Group4, display Speed1(T7) and Torque1(T8) (Item operation), and set the screen to Dual display (Form operation).

Switching the Displayed Items (Items)

Select the voltages and currents of the input elements to be displayed with trends.

6. Tap **Items**. A Trend Items screen appears.

Set the graphs of trend 1 to trend 8.

Set the graphs of trend 1 to trend 8.

Turns the display of all waveforms on

Turns the display of all waveforms off

(*) Common to All Groups

Display	Function (*)	Element/ Σ /Motor (*)	Order (*)	Scaling	Upper Scale	Lower Scale
<input checked="" type="checkbox"/> T1	Urms	Element 1	-	Auto	-	-
<input checked="" type="checkbox"/> T2	Irms	Element 1	-	Auto	-	-
<input checked="" type="checkbox"/> T3	P	Element 1	-	Auto	-	-
<input checked="" type="checkbox"/> T4	S	Element 1	-	Auto	-	-
<input checked="" type="checkbox"/> T5	Q	Element 1	-	Auto	-	-
<input checked="" type="checkbox"/> T6	λ	Element 1	-	Auto	-	-
<input checked="" type="checkbox"/> T7	ϕ	Element 1	-	Auto	-	-
<input checked="" type="checkbox"/> T8	U(k)	Element 1	Total	Manual	100.0	-100.0

Items that are marked with (*) are shared among all groups.

Set the upper and lower limits (-9.999 T to 9.999 T).
These settings can be set when vertical scale mode is set to Manual.

Select the vertical scale's setup method (Auto, Manual).

Set the harmonic order (Total, 0 to 500).
You can set this setting when the measurement function includes a harmonic order.

Selects the input element or wiring unit to be configured

- Input element options
When the displayed item is set to something other than motor evaluation: Element1 to Element7
When the displayed item is set to motor evaluation: Motor1 to Motor4
- Wiring unit options: ΣA , ΣB , ΣC

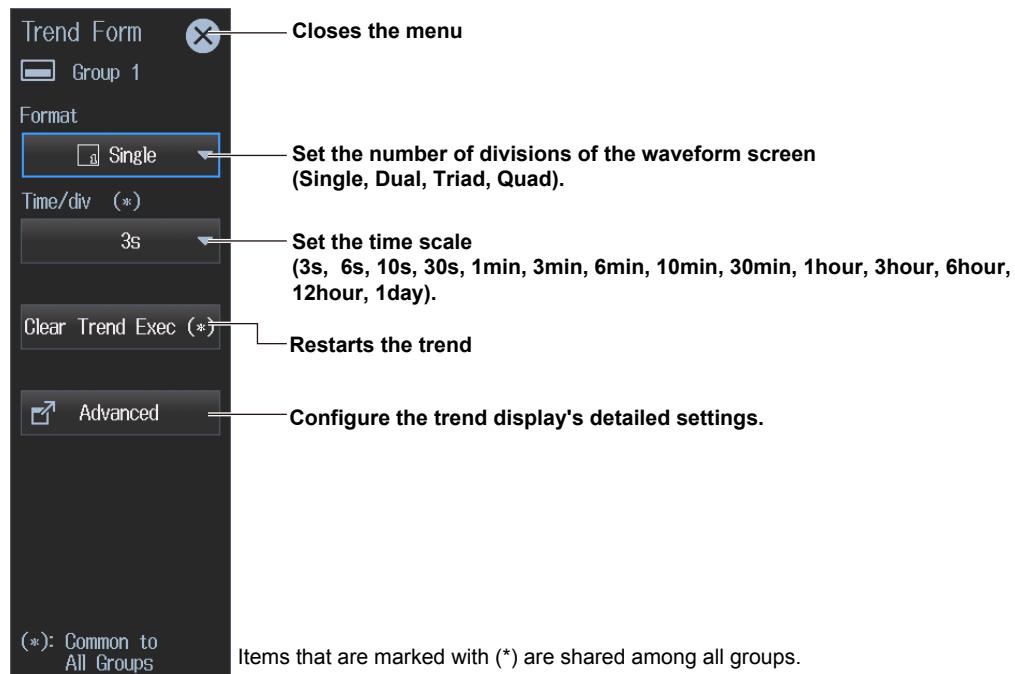
Set the measurement function (for details on the various measurement functions, see "Items That This Instrument Can Measure" in the features guide).

Select the trends that you want to display.

Setting the Display Format (Form)

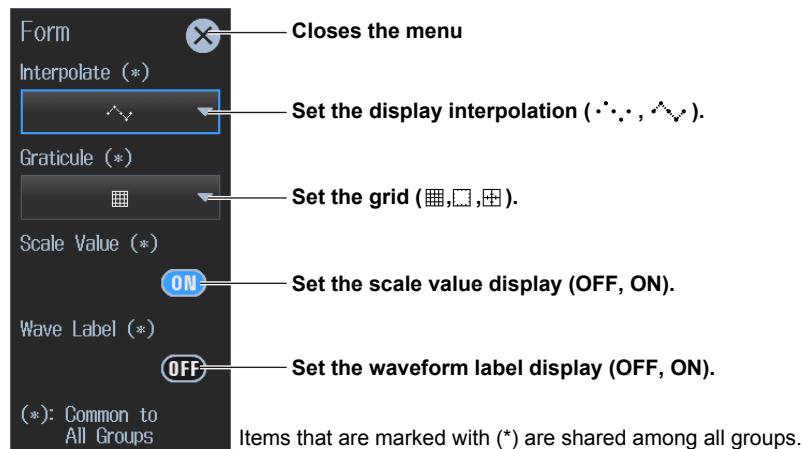
Set the division of the trend display screen and time scale (Time/div).

- Tap **Form**. A Trend Form screen appears.



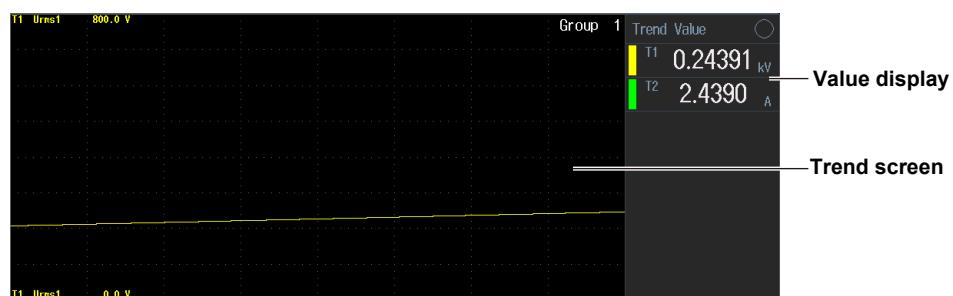
Advanced Waveform Display (Advanced)

- Tap **Advanced**. A Form screen appears.



Displaying the Current Trend Values (Value)

- Tap **Value**. The current value is displayed on the trend display.
Tapping Value again clears the Value display.



Procedure Using the Menu Icons

You can also use the menu icons shown on the right side of the screen to switch the displayed items.

1. Tap the **Display** menu icon  . A Display menu appears in the sub menu area on the right side of the screen.

By tapping the displayed items, you can specify the same operation as explained in "Switching the Displayed Items" described earlier.

Note

For a description of the Display menu screen, see "Menu Icons" on page v.

6.4 Bar Graph Display

This instrument shows on the screen the harmonic orders and magnitudes of the voltage, current, and the like applied to the input elements with bar graphs.

- ▶ “Bar Graph Display (Bar)” in the features guide
- ▶ “Display Format (Form, Bar)” in the features guide
- ▶ “Display Items (Items, Bar)” in the features guide

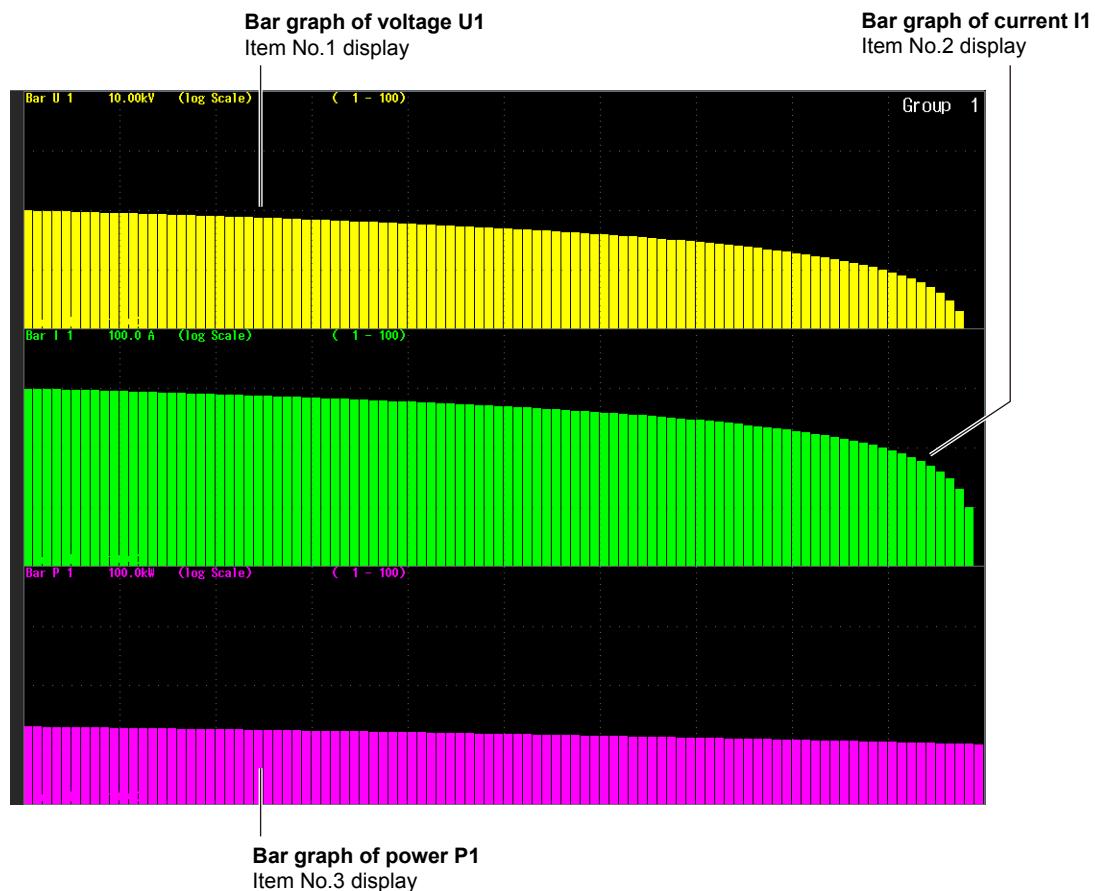
Using an example, this section explains how to display measurement results with bar graphs.

In addition, this section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Menu Icons (see page iii)

Bar Graph Display Screen (example of Group1 Triad display)

Bar graph display of input element 1



Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under **SETUP**.
2. Tap **Computation/Output** tab. A computation and output settings overview screen appears. Pressing **ESC** closes the overview screen.
3. Tap **Display**.
A display format setup screen (Numeric/Graph) appears. For details, see section 6.1.

Setting the Graph Display Type (Graph)

- Tap **Graph** to select Bar.

Switching the Displayed Group (Group)

- Tap **Group** to select a group from Group1 to Group4.

You can select up to four groups. The Item and Form settings, explained later, are applied to the group numbers you select in this step.

For example, you can set a group for element and display the bar graphs by switching the group display. In the above example, Group1 to Group4 display the voltages, currents, and powers of input elements 1 to 4.

- In Group1, display U1, I1, and P1 (Item operation), and set the screen to Dual display (Form operation).
- In Group2, display U2, I2, and P2 (Item operation), and set the screen to Dual display (Form operation).
- In Group3, display U3, I3, and P3 (Item operation), and set the screen to Dual display (Form operation).
- In Group4, display U4, I4, and P4 (Item operation), and set the screen to Dual display (Form operation).

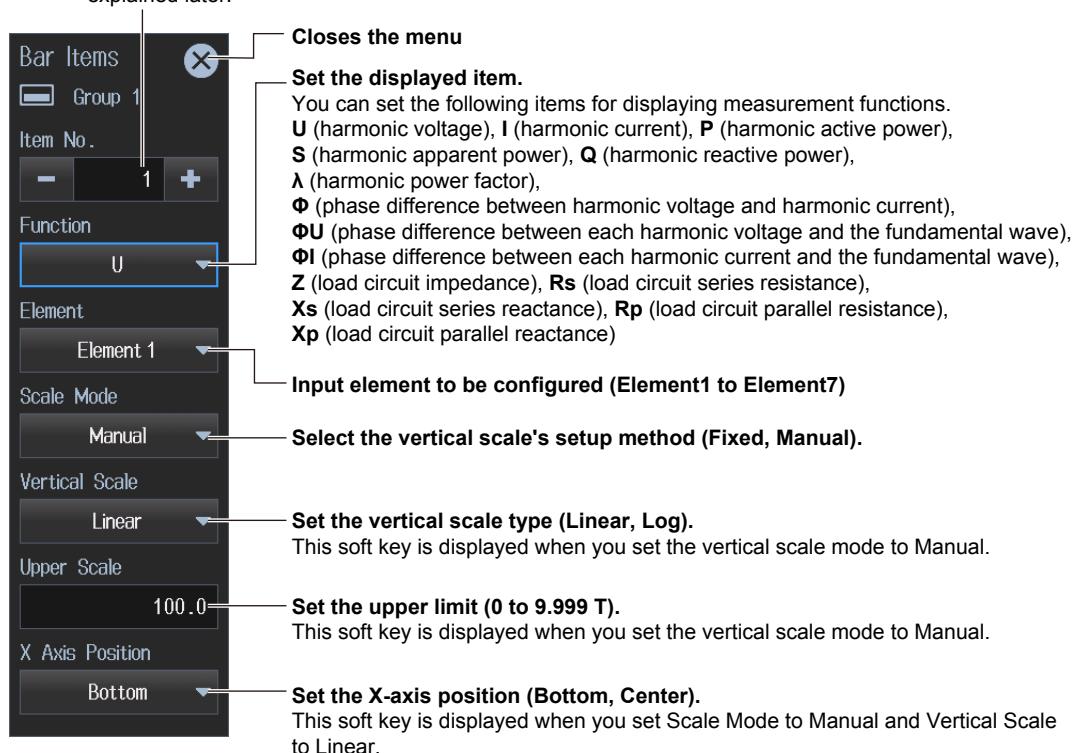
Switching the Displayed Items (Items)

Select the voltages and currents of the input elements to be displayed with bar graphs.

- Tap **Items**. The following screen appears.

Select the displayed item number.

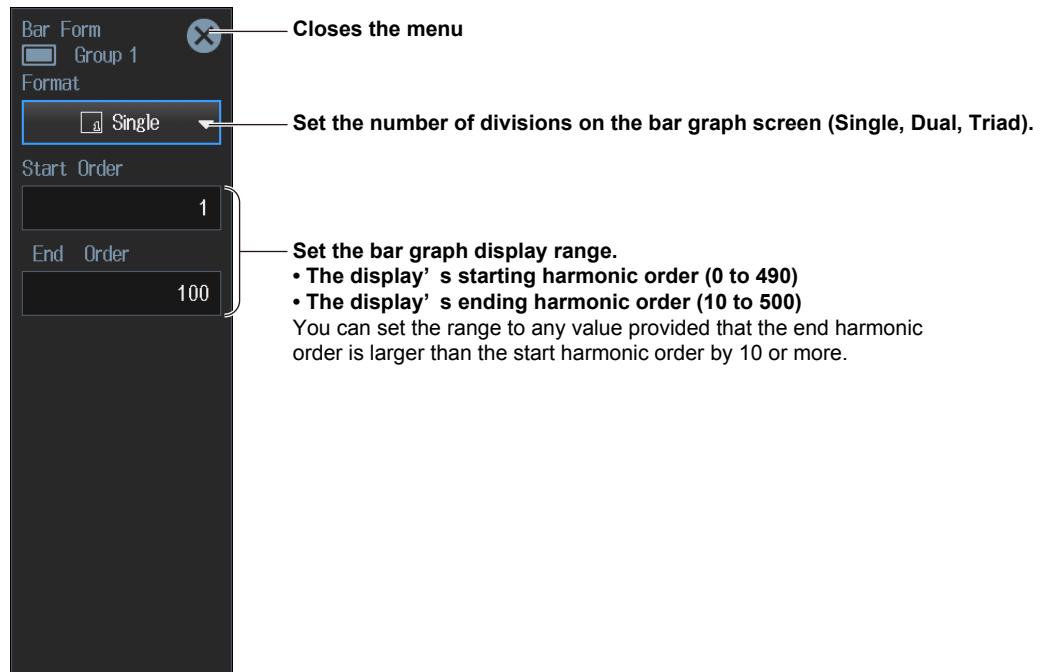
The number increases from top to bottom on the bar graph screen. To show the No.2 and No.3 item numbers on the bar graph display, set the screen division to Dual or triad in the display format settings explained later.



Setting the Display Format (Form)

Set the divisions of the bar graph screen and the range of harmonic orders to display (Start Order, End Order).

7. Tap **Form**. A Bar Form screen appears.



Procedure Using the Menu Icons

You can also use the menu icons shown on the right side of the screen to switch the displayed items.

1. Tap the **Display** menu icon . A Display menu appears in the sub menu area on the right side of the screen.
- By tapping the displayed items, you can specify the same operation as explained in "Switching the Displayed Items" described earlier.

Note

For a description of the Display menu screen, see "Menu Icons" on page v.

6.5 Vector Display

This instrument shows on the vector screen the phase difference and the magnitude relationship between fundamental waves and harmonic waves of the voltage, current, and the like applied to wiring units.

- ▶ “Vector Display (Vector)” in the features guide
- ▶ “Display Format (Form, Vector)” in the features guide
- ▶ “Display Items (Items, Vector)” in the features guide

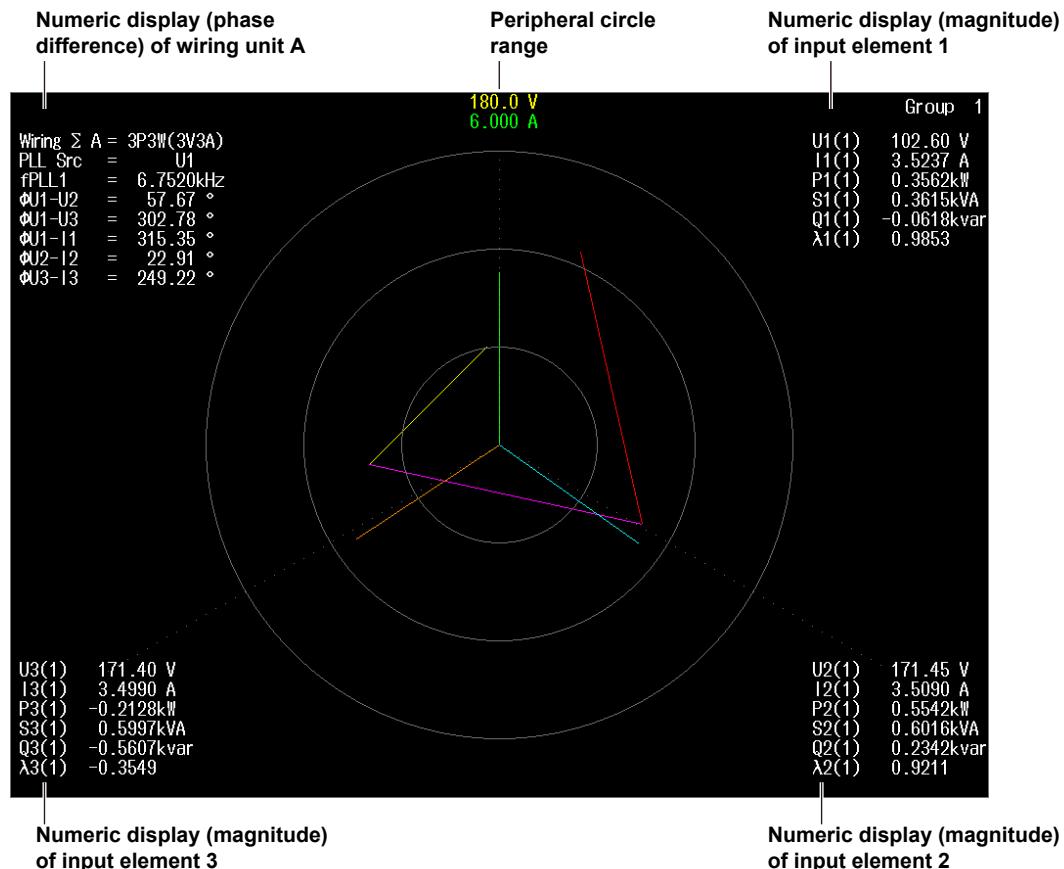
Using an example, this section explains how to display measurement results with vectors.

In addition, this section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Menu Icons (see page iii)

Vector Display Screen (example of Group1 ΣA display)

Vector display of wiring unit A



Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under SETUP.
2. Tap **Computation/Output** tab. A computation and output settings overview screen appears. Pressing **ESC** closes the overview screen.
3. Tap **Display**.

A display format setup screen (Numeric/Graph) appears. For details, see section 6.1.

Setting the Graph Display Type (Graph)

4. Tap **Graph** to select Vector.

Switching the Displayed Page (Group)

5. Tap **Group** to select a group from Group1 to Group4.

You can select up to four groups. The Item and Form settings, explained later, are applied to the group numbers you select in this step.

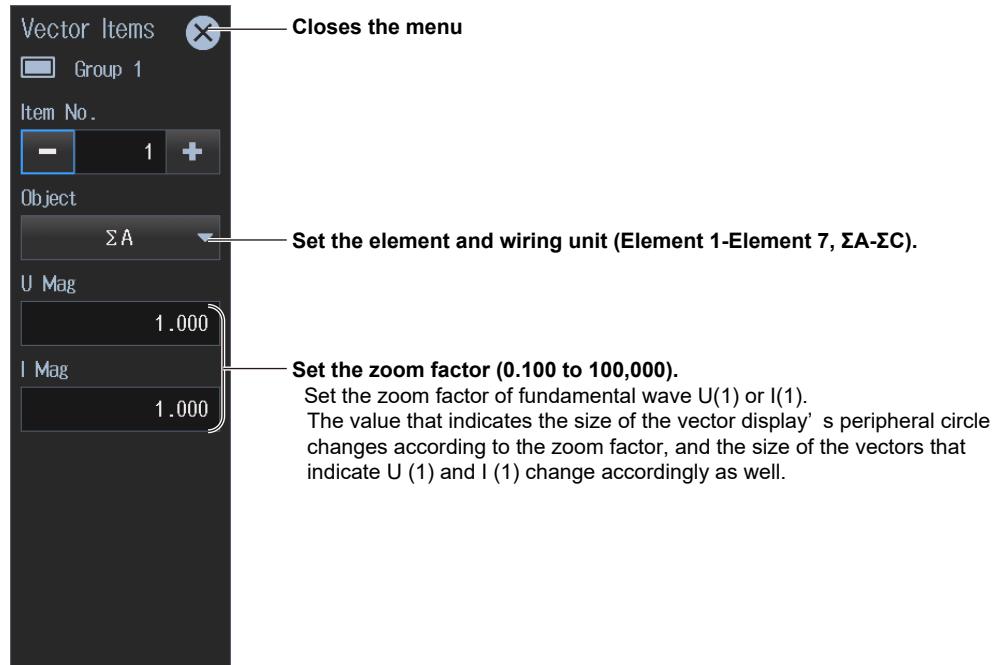
For example, you can set a group for element and display the vectors by switching the group display. In the example below, Group1 shows wiring unit A and Group2 wiring unit B.

- Display ΣA in Group1 (Item operation).
- Display ΣB in Group2 (Item operation).

Switching the Displayed Items (Items)

Select the input element or wiring unit to display the vectors of.

6. Tap **Items**. A Vector Items screen appears.



Example of a Vector Split Display

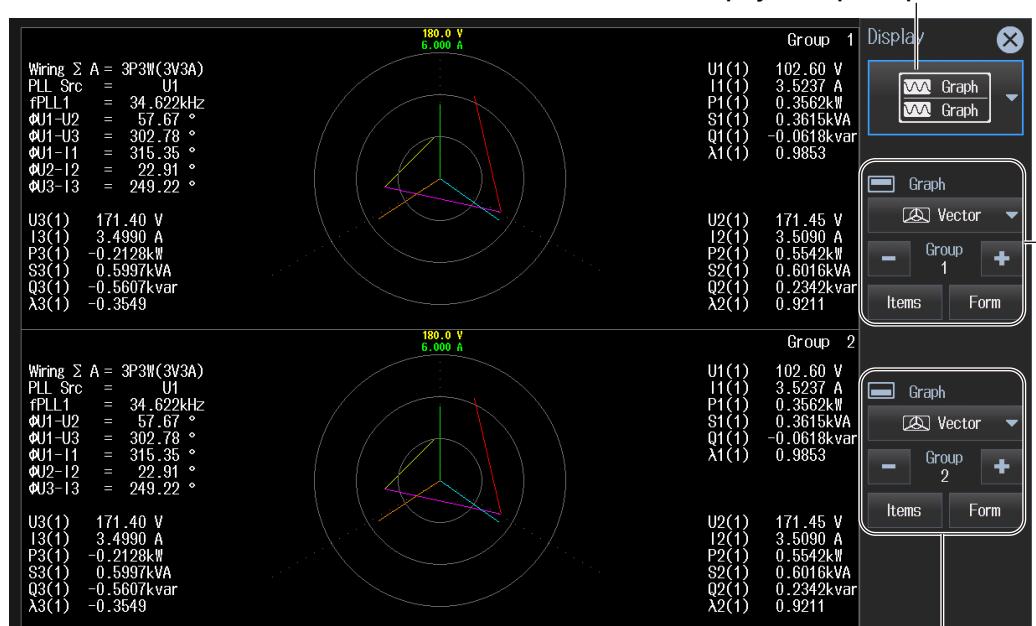
Select Graph/Graph according to "Setting the Screen Display" in section 6.1. On the split display, only the vectors of Item No.1 are displayed, so select the vectors to show in the second screen according to the group settings described earlier. If you select single screen display for Graph in "Setting the Screen Display" in section 6.1, you can also show the same split display by performing the procedure in "Setting the Display Format (Form)" described below.

Set Graph of Group1 to Vector.

Example of Item No. set to 1 and Object set to ΣA

(see "Switching the Displayed Items (Items)" on the previous page)

Set the display to Graph/Graph.



Set Graph of Group2 to Vector.

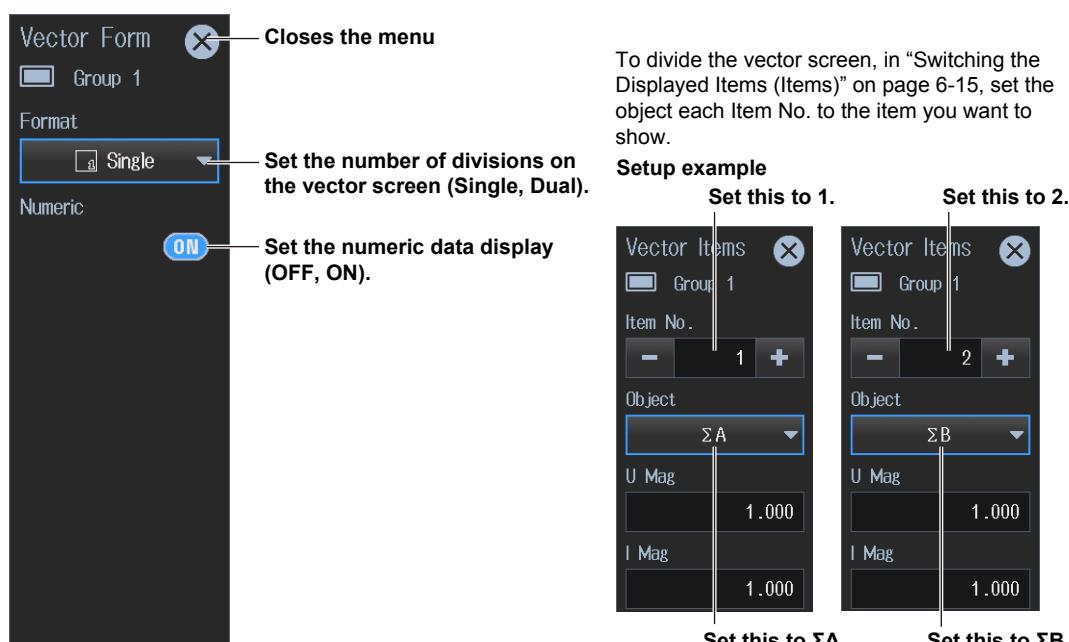
Example of Item No. set to 1 and Object set to ΣB

(see "Switching the Displayed Items (Items)" on the previous page)

Setting the Display Format (Form)

Set whether to show numeric data on the Graph screen.

- Tap Form. A Vector Form screen appears.



Procedure Using the Menu Icons

You can also use the menu icons shown on the right side of the screen to switch the displayed items.

1. Tap the **Display** menu icon  A Display menu appears in the sub menu area on the right side of the screen.

By tapping the displayed items, you can specify the same operation as explained in "Switching the Displayed Items" described earlier.

Note

For a description of the Display menu screen, see "Menu Icons" on page v.

7.1 Setting the Storage Operation

- ▶ “Data Storage (Store, MENU (STORE))” in the features guide
- ▶ “Storage Control” in the features guide

This section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Menu Icons (see page iii)
- Procedure Using the Keys (other than SETUP) (see section 1.2 in IM WT5000-03EN)

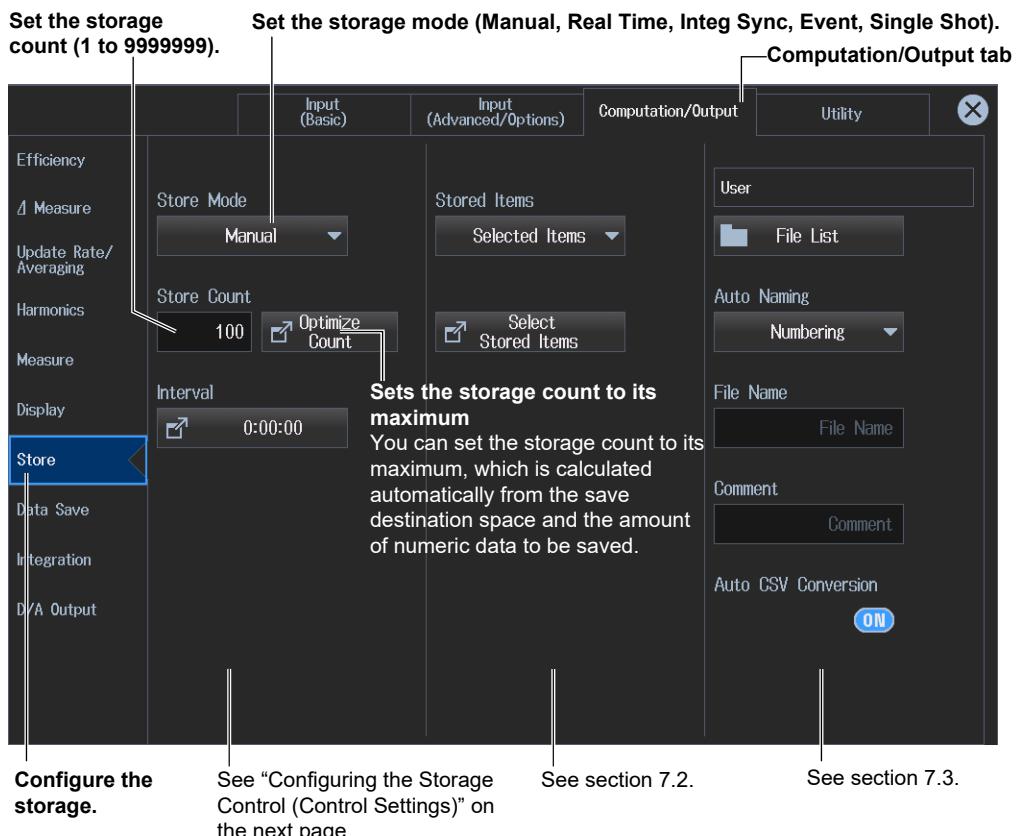
Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under SETUP.
2. Tap **Computation/Output** tab. A computation and output settings overview screen appears. Pressing **ESC** closes the overview screen.

Configuring the Storage (Store)

3. Tap **Store**.

A Store screen appears.



Note

You can also display the computation/output settings overview screen by moving the cursor on the Computation/Output tab using the arrow keys and then pressing SET.

7.1 Setting the Storage Operation

Setting the Maximum Storage Count

Tap **Optimize Count**, which is used to set the maximum storage count. An Optimize Count screen appears.

Confirms and optimizes the maximum storage count



Maximum storage count (0-the maximum number of times that data can be stored to the save destination)

If the save destination is set to a USB memory device (drive) and you remove it, the save destination automatically changes to internal memory. If you close this screen, tap Optimize Count, and reopen this screen, the maximum storage count is changed to a value determined from the free space of the internal memory.

Note

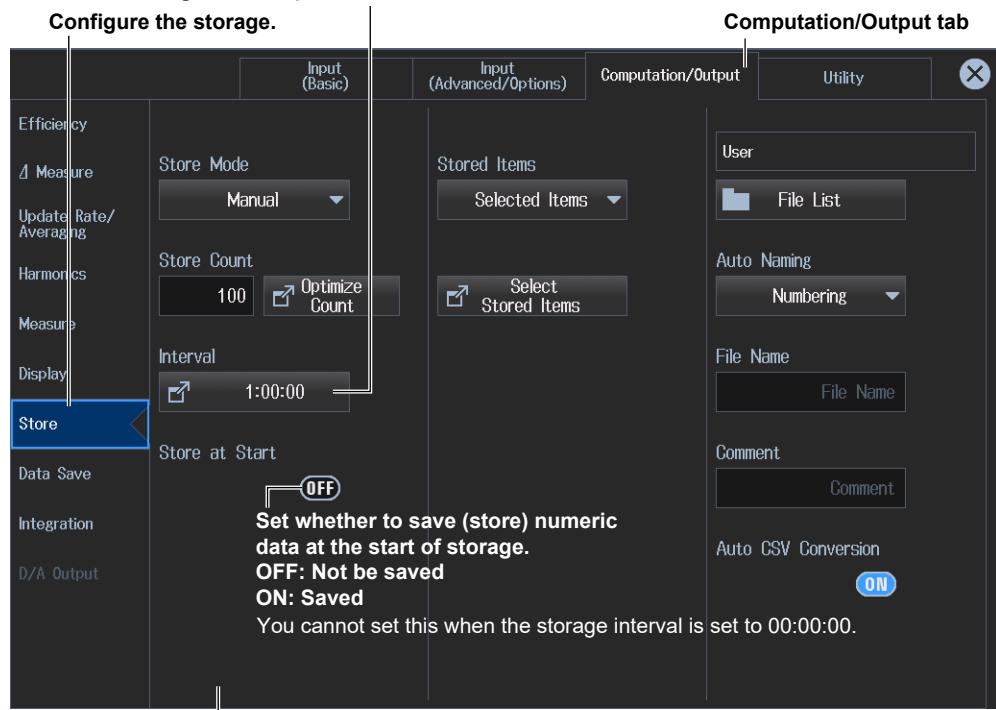
The maximum number of times that storage can be performed depends on the number of stored items that you have set and the free space at the save destination.

For details on how to set the stored items, see section 7.2. For details on how to set the save destination, see section 7.3.

Setting the Storage Control

- When the Storage Mode Is Manual

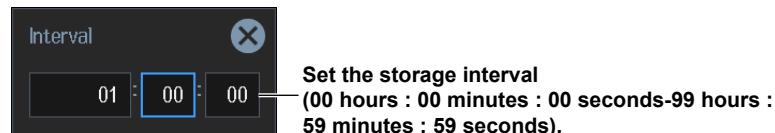
Set the storage interval (00 hours : 00 minutes : 00 seconds-99 hours : 59 minutes : 59 seconds).



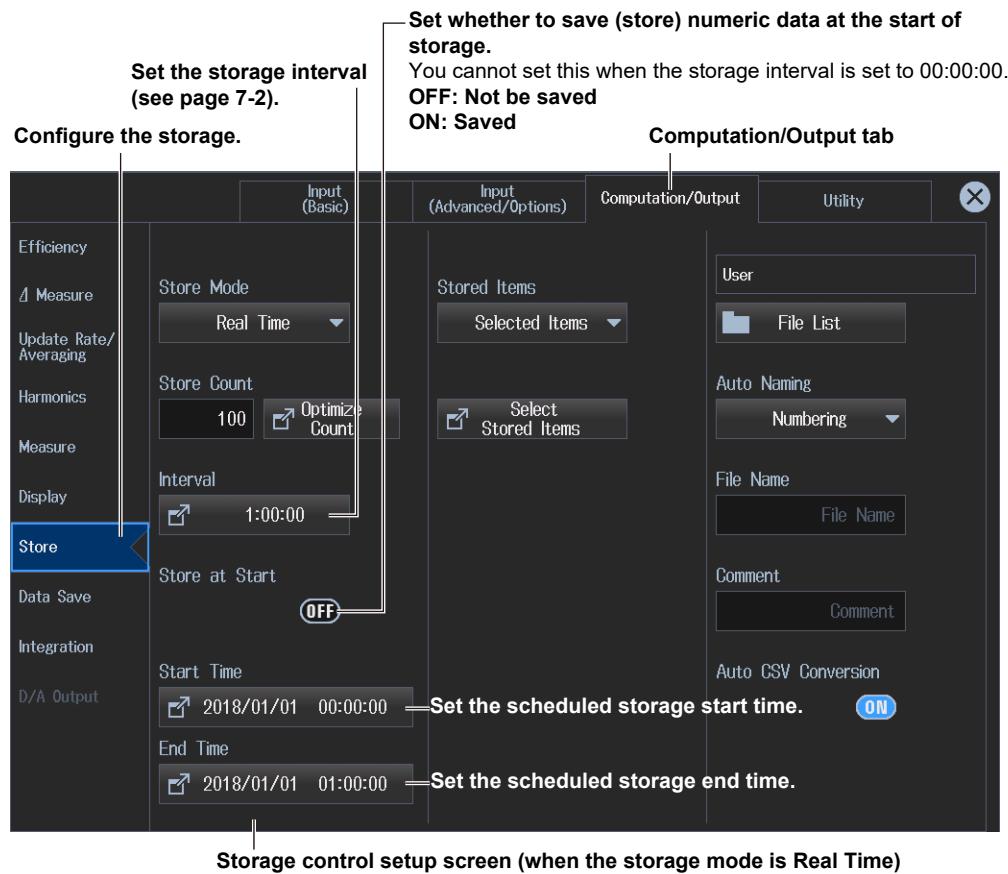
Storage control setup screen (when the storage mode is Manual)

Setting the Storage Interval

Tap **Interval**. An Interval screen appears.



- When the Storage Mode Is Real Time

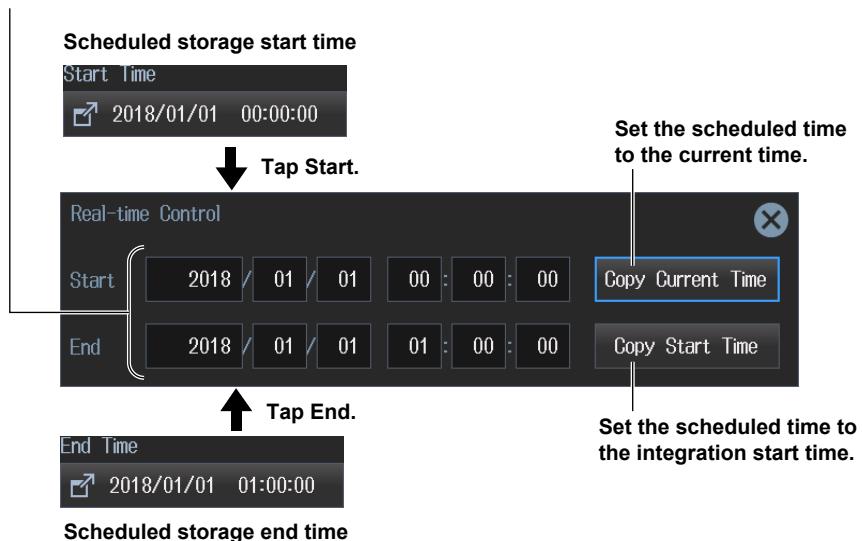


Storage control setup screen (when the storage mode is Real Time)

Setting the Scheduled Start Time

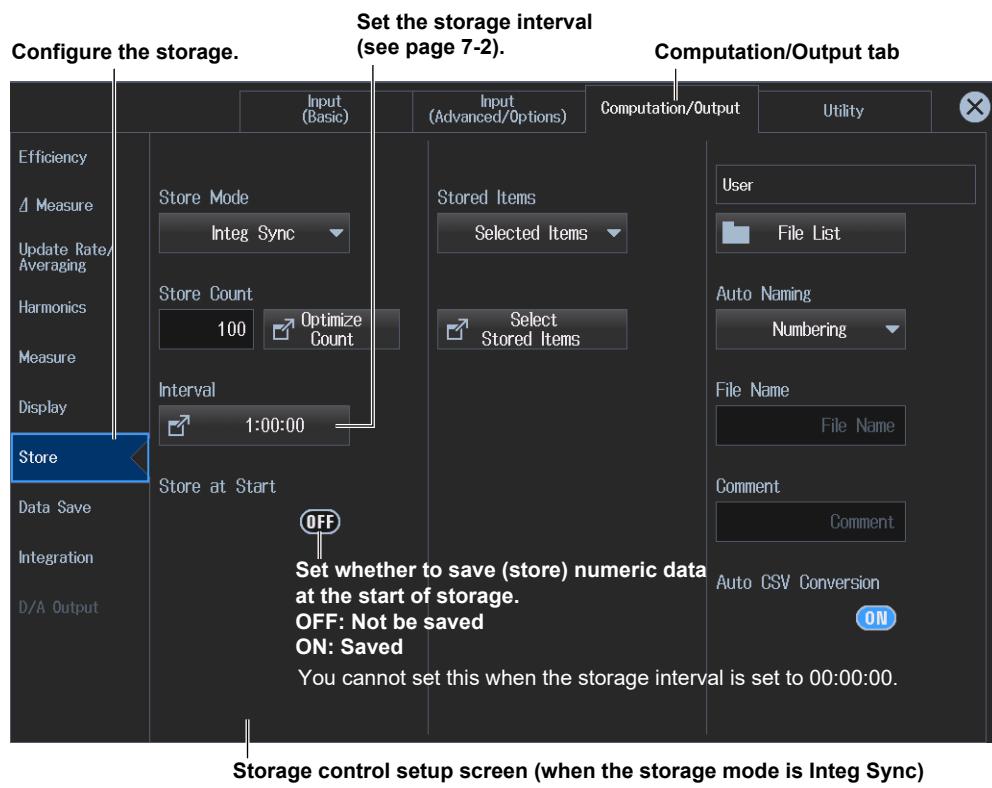
Tap **Start Time** or **End Time**. A Real-time Control screen appears.

Set the scheduled start and stop times
(Year/month/day, 00 hours : 00 minutes : 00 seconds to 23 hours : 59 minutes : 59 seconds).

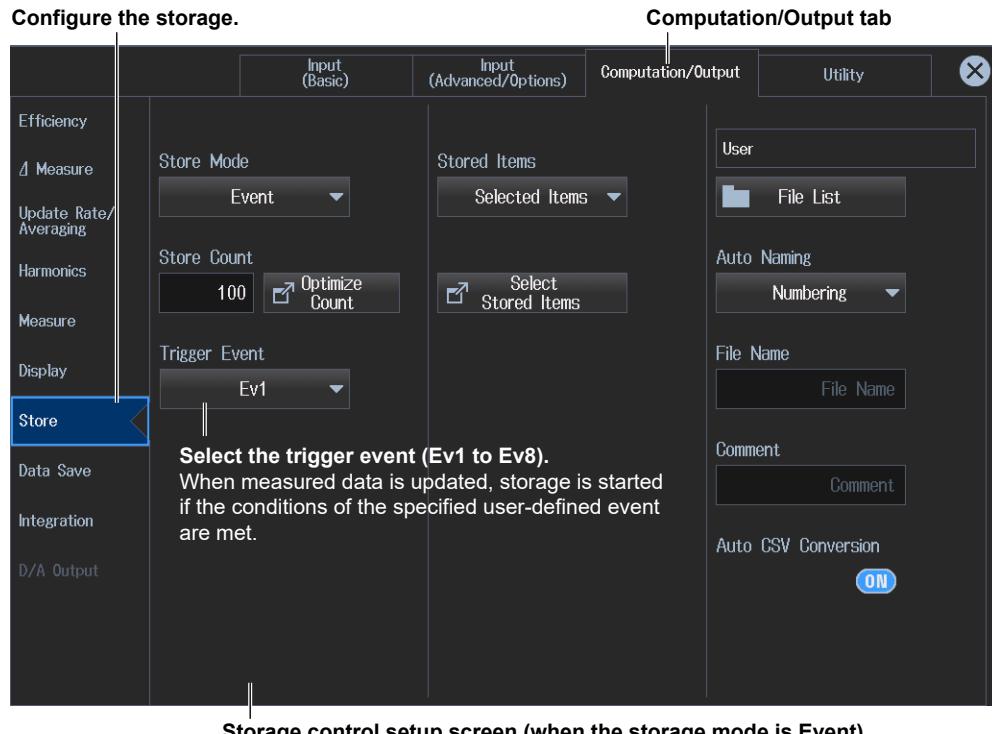


7.1 Setting the Storage Operation

- When the Storage Mode Is Integ Sync (integration synchronization)



- When the Storage Mode Is Event



Note

When the storage mode is set to Single Shot, there are no storage control settings.

Procedure Using the Menu Icons

You can also use the menu icons shown on the right side of the screen to set the storage.

1. Tap the **Store Data Save** menu icon  A Store-Save menu appears in the sub menu area on the right side of the screen.

By tapping the displayed items, you can specify the same settings as when using the screen explained earlier.

Note

For a description of the Store Data Save menu screen, see "Menu Icons" on page v.

Procedure Using Keys

You can also use the front panel keys to set storage.

STORE



Configure the storage.

The Setup menu appears.

7.2 Set the stored items.

► “Stored Items” in the features guide

This section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Menu Icons (see page iii)
- Procedure Using the Keys (other than SETUP) (see section 1.2 in IM WT5000-03EN)

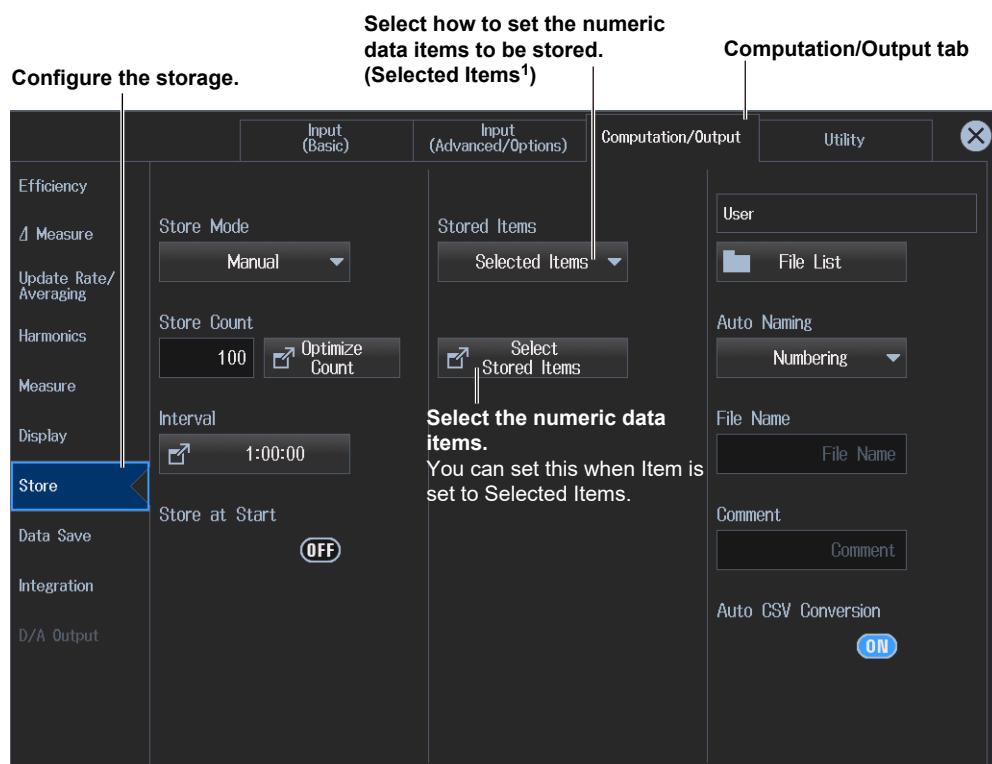
Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under SETUP.
2. Tap **Computation/Output** tab. A computation and output settings overview screen appears. Pressing **ESC** closes the overview screen.

Configuring the Storage (Store)

3. Tap **Store**.

A storage setup screen appears.



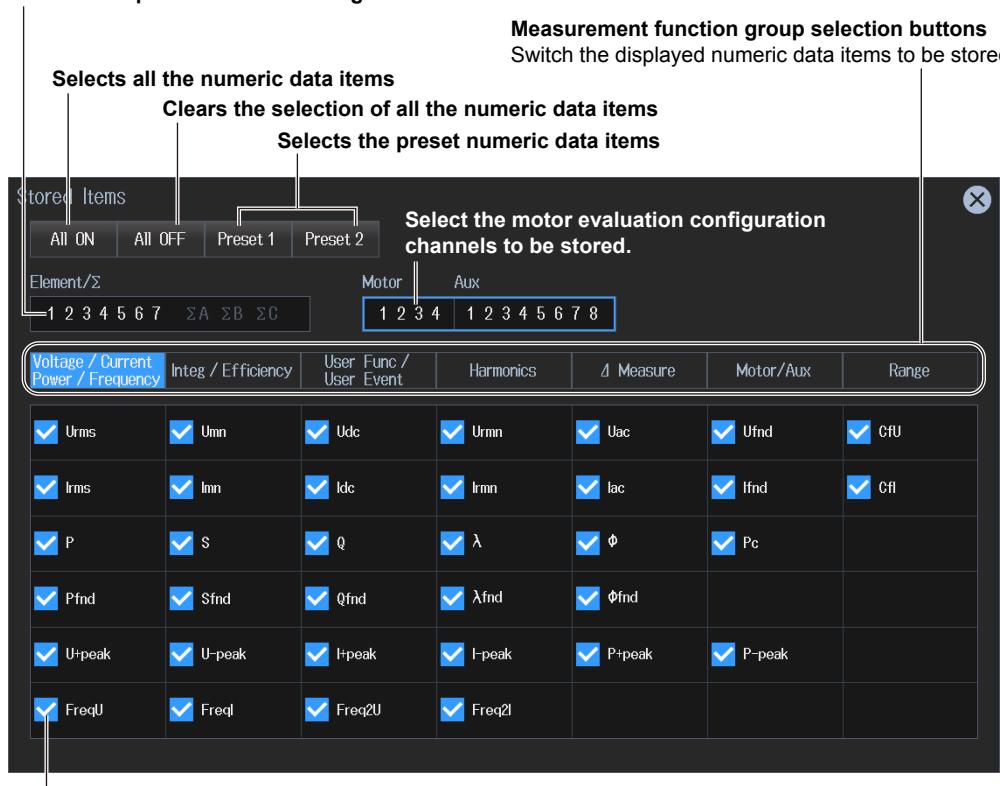
Note

You can also display the computation/output settings overview screen by moving the cursor on the Computation/Output tab using the arrow keys and then pressing SET.

Selecting the Numeric Data Items (Selected Stored Items)

Tap **Selected Stored Items** for selecting the numeric data items. A Stored Items screen appears.

Select the input elements or wiring units to be stored.



Select the numeric items that you want to store.

Procedure Using the Menu Icons

You can also use the menu icons shown on the right side of the screen to set the storage.

1. Tap the **Store Data Save** menu icon . A Store-Save menu appears in the sub menu area on the right side of the screen.

By tapping the displayed items, you can specify the same settings as when using the screen explained earlier.

Note

For a description of the Store Data Save menu screen, see "Menu Icons" on page v.

Procedure Using Keys

You can also use the front panel keys to set storage.

STORE



Configure the storage.
The Setup menu appears.

7.3 Setting the Data Storage Destination

► “File Save Conditions” in the features guide

This section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Menu Icons (see page iii)
- Procedure Using the Keys (other than SETUP) (see section 1.2 in IM WT5000-03EN)

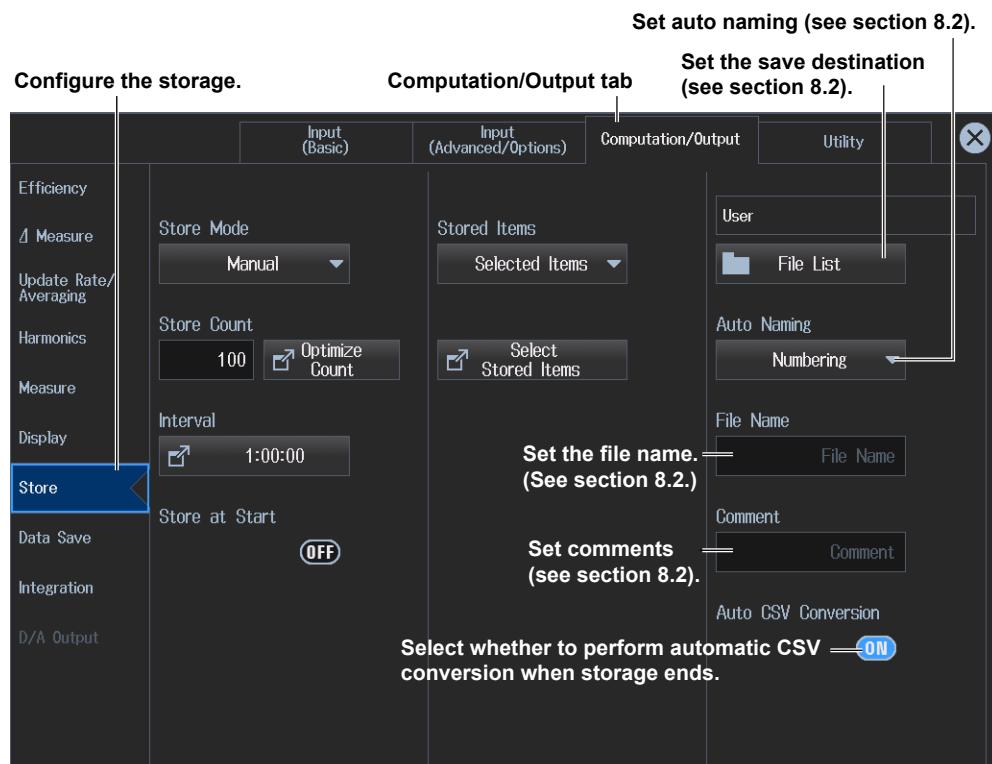
Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under SETUP.
2. Tap **Computation/Output** tab. A computation and output settings overview screen appears. Pressing **ESC** closes the overview screen.

Configuring the Storage (Store)

3. Tap **Store**.

A storage setup screen appears.



Note

You can also display the computation/output settings overview screen by moving the cursor on the Computation/Output tab using the arrow keys and then pressing SET.

Procedure Using the Menu Icons

You can also use the menu icons shown on the right side of the screen to set the storage.

1. Tap the **Store/Data Save** menu icon  A Store/Data Save menu appears in the sub menu area on the right side of the screen.

By tapping the displayed items, you can specify the same settings as when using the screen explained earlier.

Note

For a description of the Store/Data Save menu screen, see "Menu Icons" on page v.

Procedure Using Keys

You can also use the front panel keys to set storage.

STORE



Configure the storage.

The Setup menu appears.

7.4 Starting (REC), Pausing (PAUSE), and Ending (END) Storage

► “Starting, Pausing, and Ending Storage Recording” in the features guide

This section explains operating procedures using the following setup methods.

- Procedure Using the Menu Icons (see page iii)
- Procedure Using the Keys (other than SETUP) (see section 1.2 in IM WT5000-03EN)

CAUTION

During storage, the storage device is constantly being accessed, even though the icon that indicates this is not displayed. Do not remove the USB memory device or turn the power off. Doing so may damage the storage device or corrupt its data.

Storage in progress: While the REC key or PAUSE key is illuminated

French

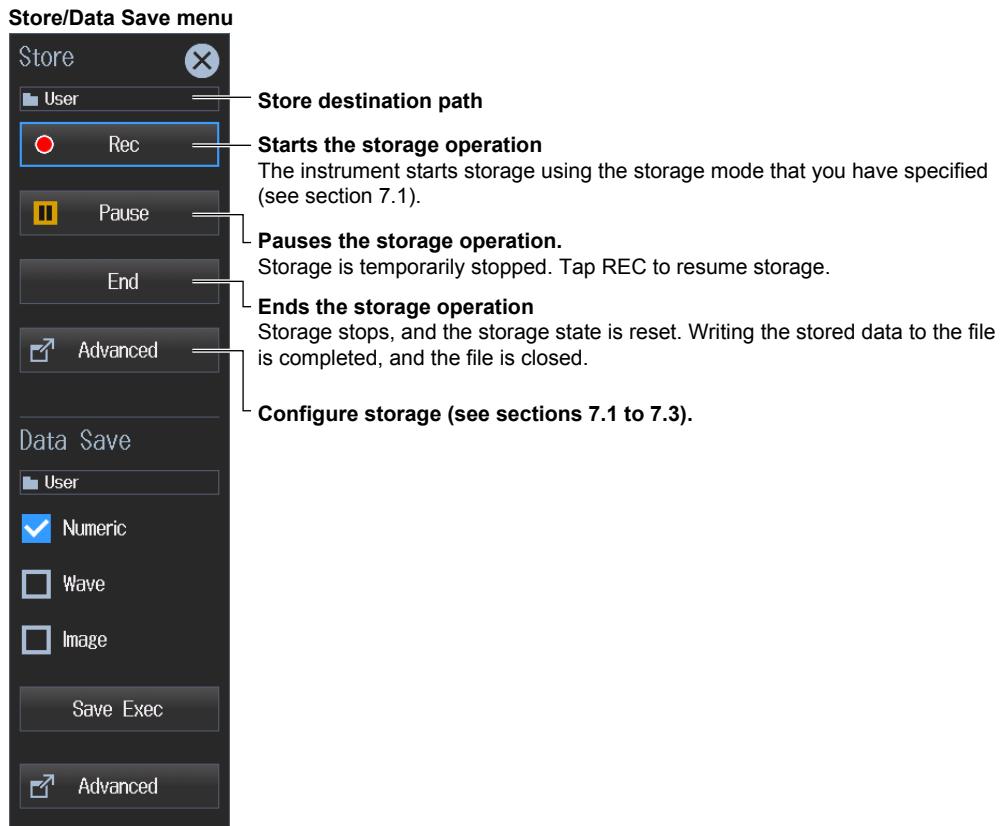
ATTENTION

Pendant la collecte, le système a constamment accès au support de stockage, même si l’icône qui l’indique n’est pas affichée. Ne retirez pas le support de stockage USB et ne coupez pas l’alimentation. Vous risqueriez d’endommager le support de stockage ou les données qu’il contient.

Le stockage est en cours quand la touche STORE START est éclairée ou quand elle clignote, ou bien quand la touche STORE STOP clignote.

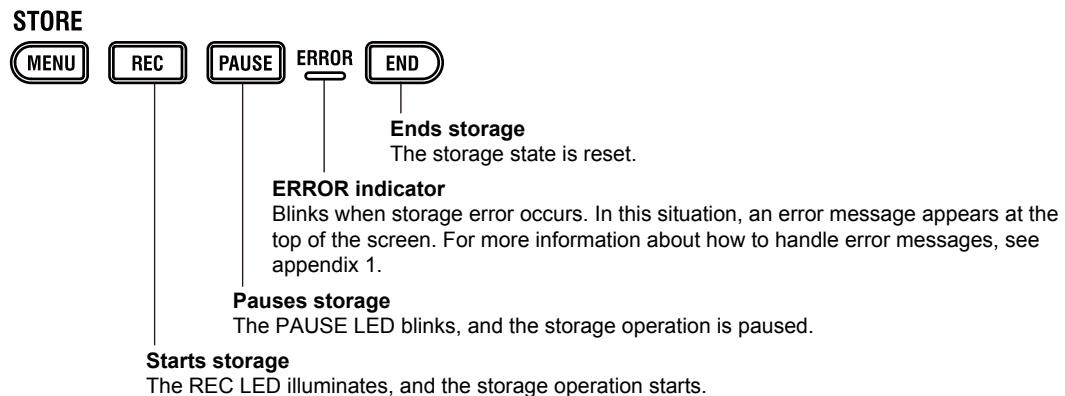
Procedure Using the Menu Icons

1. Tap the **Store/Data Save** menu icon  . A Store/Data Save menu appears in the sub menu area on the right side of the screen.



Procedure Using Keys

You can also use the front panel keys to start, pause, and end storage.



8.1 Connecting a USB Memory Device

This section explains how to connect USB memory devices to save and load data.

If you want to use a storage device on your network (a network drive), you have to use an Ethernet cable to connect the instrument to the network. For details, see section 13.5.

► “Storage Device” in the features guide

CAUTION

- Do not remove the USB storage device or turn off the power when the device is being accessed. Doing so may damage the storage device or corrupt its data.
 - When the USB memory device is being accessed, an access indicator is displayed in the top center the screen and the USB memory device indicator blinks.
-

French

ATTENTION

- Lorsque le dispositif accède au support de stockage USB, ne retirez pas ce dernier et ne mettez pas l'alimentation hors tension. Vous risqueriez d'endommager le support de stockage ou les données qu'il contient.
 - Quand le système accède au support de stockage USB, s'affiche au centre, dans la partie supérieure de l'écran, et le voyant du support de stockage USB clignote.
-

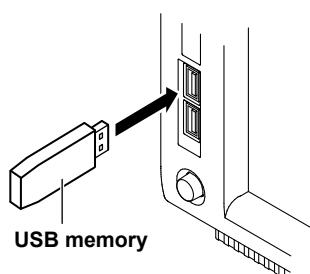
8.1 Connecting a USB Memory Device

USB Memory Devices That Can Be Used and How to Connect USB Memory Devices

Use portable USB memory devices that are compatible with USB Mass Storage Class version 1.1. Connect USB memory devices directly to the USB ports (type A) for connecting peripheral devices on the instrument's front panel.

Hot-plugging is supported: you can connect or disconnect the USB device at any time, regardless of whether the instrument is on or off. When the power is on, the instrument automatically detects the USB memory device after it is connected.

This instrument has two USB ports: USB-0 and USB-1. The port numbers are not fixed. The port at which the first USB memory device is detected becomes USB-0. The port at which the second USB memory device is detected becomes USB-1.



Note

- Connect USB memory devices directly to the USB ports (type A) for connecting peripheral devices. Do not connect them through a hub.
 - Use portable USB memory devices that are compatible with USB Mass Storage Class version 1.1. Do not connect incompatible USB memory devices.
 - You cannot use protected USB memory devices (such as those that contain encrypted content).
 - Do not connect and disconnect the two USB devices repetitively. Provide at least a 10-second interval between removal and connection.
-

General USB Memory Handling Precautions

Follow the general handling precautions that are included with your USB memory.

8.2

Setting the Save Destination for Numeric Data, Waveform Data, and Screen Images

- ▶ “File Save Conditions” in the features guide
- ▶ “Conditions for Saving Numeric Data” in the features guide
- ▶ “Conditions for Saving Screen Images” in the features guide

This section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Menu Icons (see page iii)
- Procedure Using the Keys (other than SETUP) (see section 1.2 in IM WT5000-03EN)

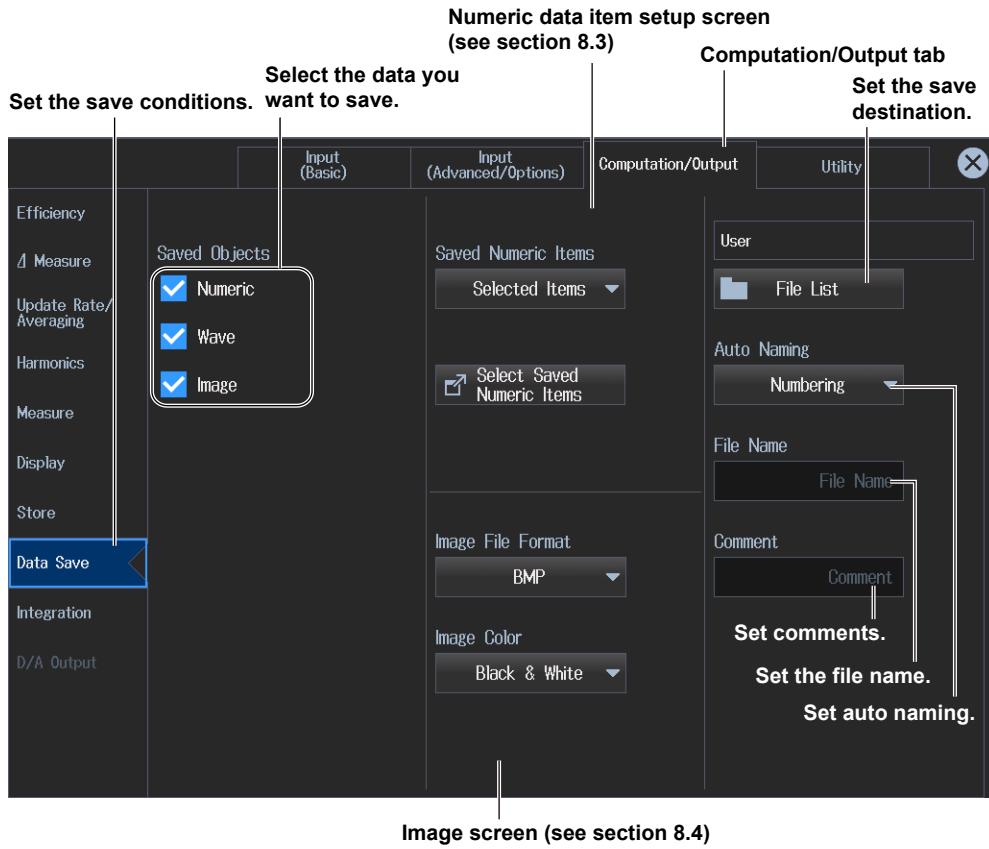
Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under SETUP.
2. Tap **Computation/Output** tab. A computation and output settings overview screen appears. Pressing **ESC** closes the overview screen.

Setting the Save Conditions (Data Save)

3. Tap **Data Save**.

An save condition setup screen appears.

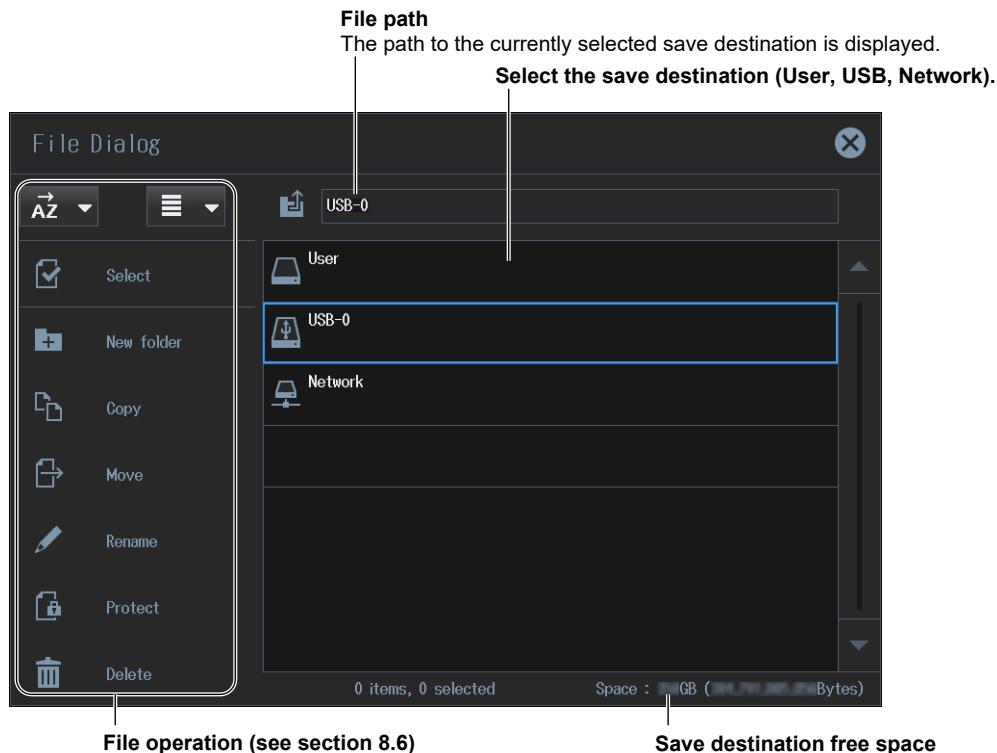


Note

You can also display the computation/output settings overview screen by moving the cursor on the Computation/Output tab using the arrow keys and then pressing SET.

Setting the Save Destination

4. Tap File List. A file list appears.



Setting Auto Naming (Auto Naming)

OFF: The auto naming feature is disabled. The name that you specified for the File Name setting is used. If there is a file with the same name in the save destination folder, you cannot save the data.

Numbering: The instrument automatically adds a four-digit number from 0000 to 0999 after the common name that you specified for the File Name setting and saves the file.

Date: The file name is the date and time (down to seconds) when the file is saved. The file name that you specified for the File Name setting is ignored.

20170930_121530_0 (2017/09/30 12:15:30)
Y M D H Min S The sequence number (0-9, A-Z) that is appended if a file name with the exact same date and time (down to seconds) exists.

The sequence number that comes after the date and time is appended if a file name with the exact same date and time (down to seconds) exists.

The sequence number is incremented by one (0 to 9 and then A to Z) each time a file is added.

Assigning File Names (File Name)

You can set the file name that is used when Auto Naming is set to OFF. This is also used as the common file name when Auto Naming is set to Numbering. The maximum number of characters that you can use for file names and folder names is 32 characters. However, there are limitations on the type of characters and the character strings that you can use.

For instructions on how to enter text, see section 3.4 in the *Getting Started Guide*, IM WT5000-03JA.

Setting a Comment (Comment)

You can add a comment that consists of up to 30 characters when you save a file. You do not have to enter a comment.

All characters, including spaces, can be used in comments.

For instructions on how to enter text, see section 3.4 in the *Getting Started Guide*, IM WT5000-03JA.

Procedure Using the Menu Icons

You can also use the menu icons shown on the right side of the screen to set data saving.

1. Tap the **Store/Data Save** menu icon  A Store/Data Save menu appears in the sub menu area on the right side of the screen.

By tapping the displayed items, you can specify the same settings as when using the screen explained earlier.

Note

For a description of the Store/Data Save menu screen, see "Menu Icons" on page v.

Procedure Using Keys

You can also use the front panel keys to set data saving.

DATA SAVE



Set the save destination.
The Setup menu appears.

8.3 Setting the Numeric Data Items to Save

► “Saved Numeric Items (Saved Numeric Items)” in the features guide

This section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Menu Icons (see page iii)
- Procedure Using the Keys (other than SETUP) (see section 1.2 in IM WT5000-03EN)

Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under SETUP.
2. Tap **Computation/Output** tab. A computation and output settings overview screen appears. Pressing **ESC** closes the overview screen.

Setting the Save Conditions (Data Save)

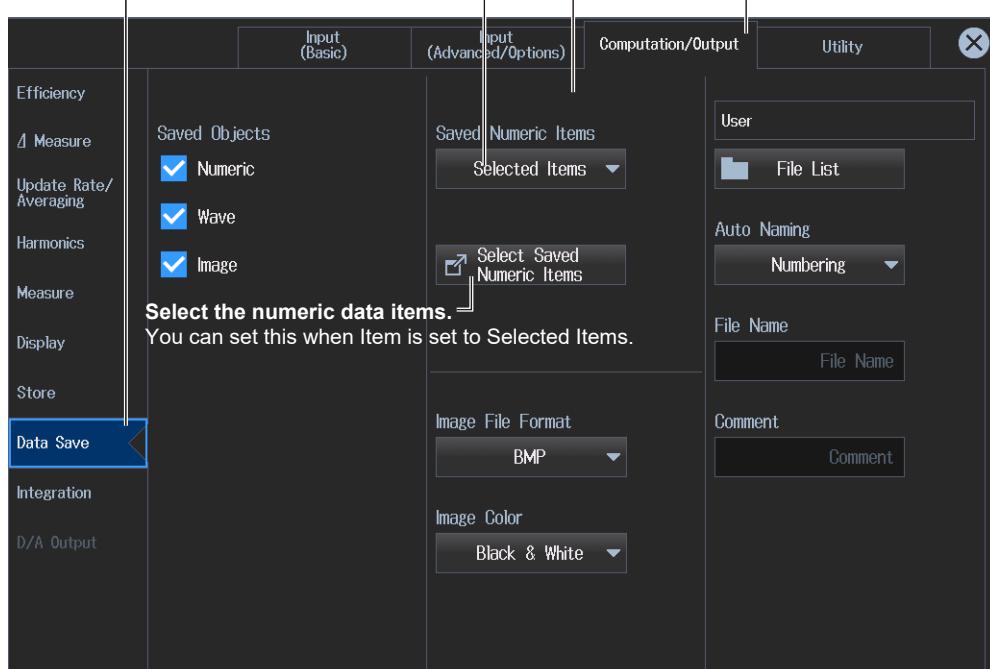
3. Tap **Data Save**.

An save condition setup screen appears.

Select how to set the numeric data items to be saved.

(Displayed Numeric Items¹, Selected Items²)

Set the save conditions.



1 The numeric data items shown on the screen are stored.

2 The selected numeric data items are stored.

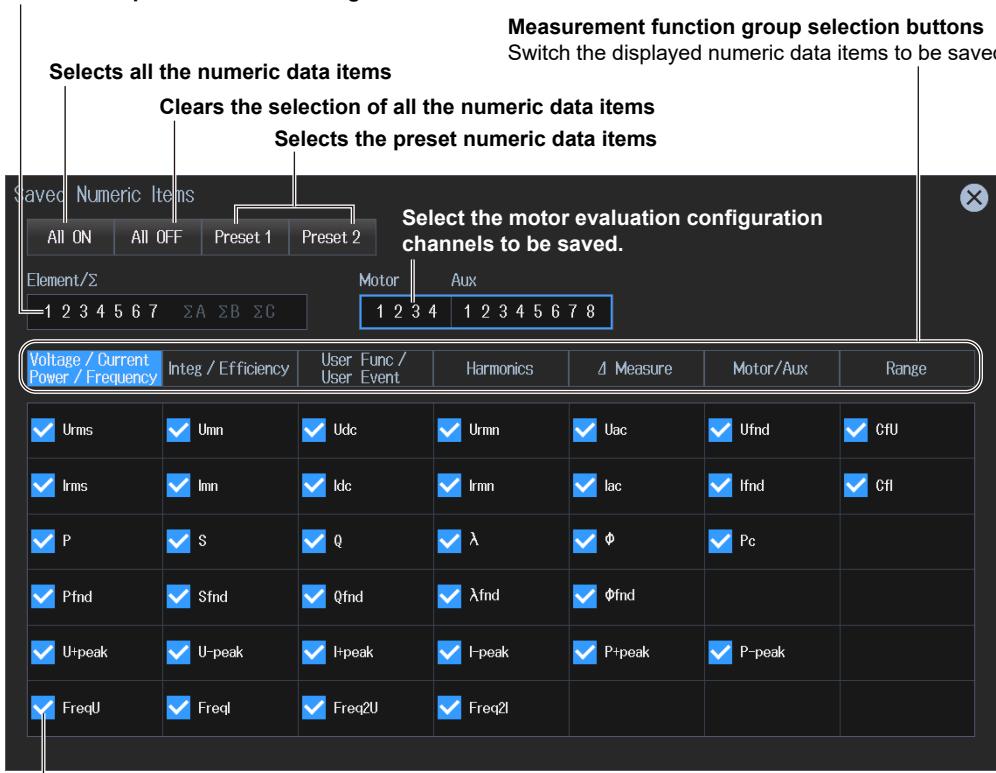
Note

You can also display the computation/output settings overview screen by moving the cursor on the Computation/Output tab using the arrow keys and then pressing SET.

Selecting Numeric Data Items (Select Saved Numeric Items)

Tap **Select Saved Numeric Items** for selecting the numeric data items. A Saved Numeric Items screen appears.

Select the input elements or wiring units to be saved.



Select the numeric items that you want to save.

Procedure Using the Menu Icons

You can also use the menu icons shown on the right side of the screen to set numeric data saving.

1. Tap the **Store/Data Save** menu icon . A Store/Data Save menu appears in the sub menu area on the right side of the screen.

By tapping the displayed items, you can specify the same settings as when using the screen explained earlier.

Note

For a description of the Store Data Save menu screen, see "Menu Icons" on page v.

Procedure Using Keys

You can also use the front panel keys to set numeric data saving.

DATA SAVE



Set the save destination.

The Setup menu appears.

8.4 Setting the Format of Saved Screen Images

► “Format of Screen Image Data (Image File Format)” in the features guide

This section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Menu Icons (see page iii)
- Procedure Using the Keys (other than SETUP) (see section 1.2 in IM WT5000-03EN)

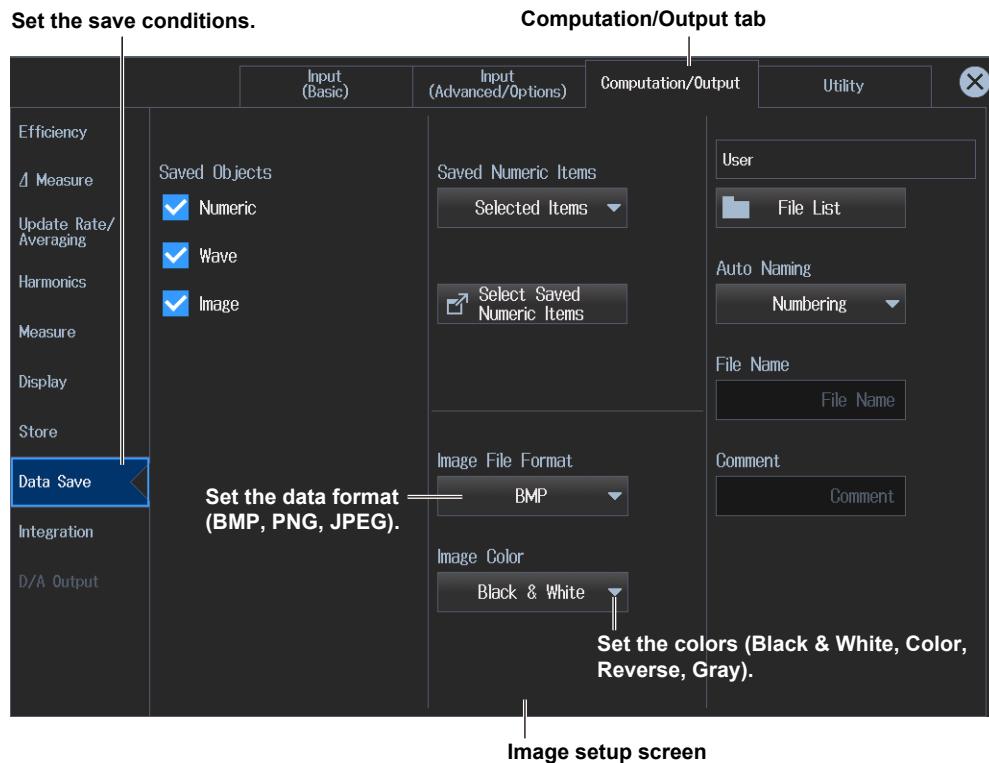
Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under SETUP.
2. Tap **Computation/Output** tab. A computation and output settings overview screen appears. Pressing **ESC** closes the overview screen.

Setting the Save Conditions (Data Save)

3. Tap **Data Save**.

An save condition setup screen appears.



Note

You can also display the computation/output settings overview screen by moving the cursor on the Computation/Output tab using the arrow keys and then pressing SET.

Procedure Using the Menu Icons

You can also use the menu icons shown on the right side of the screen to set screen image saving.

1. Tap the **Store/Data Save** menu icon  . A Store/Data Save menu appears in the sub menu area on the right side of the screen.

By tapping the displayed items, you can specify the same settings as when using the screen explained earlier.

Note

For a description of the Store Data Save menu screen, see "Menu Icons" on page v.

Procedure Using Keys

You can also use the front panel keys to set screen image saving.

DATA SAVE



Set the save destination.
The Setup menu appears.

8.5 Saving Numeric Data, Waveform Data, and Screen Images

- ▶ “Conditions for Saving Numeric Data” in the features guide
- ▶ “Conditions for Saving Screen Images” in the features guide
- ▶ “Saving (Save Exec, EXEC)” in the features guide

This section explains operating procedures using the following setup methods.

- Procedure Using the Menu Icons (see page iii)
- Procedure Using the Keys (other than SETUP) (see section 1.2 in IM WT5000-03EN)

CAUTION

While data is being save, the storage device is constantly being accessed, even though the icon that indicates this is not displayed. Do not remove the USB memory device or turn the power off. Doing so may damage the storage device or corrupt its data.

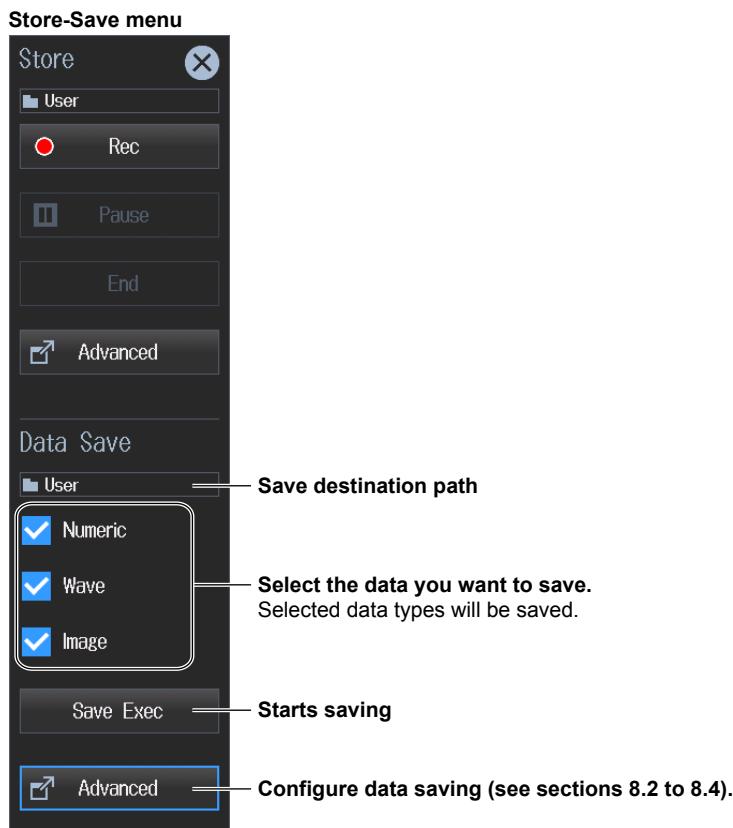
French

ATTENTION

Pendant la collecte, le système a constamment accès au support de stockage, même si l'icône qui l'indique n'est pas affichée. Ne retirez pas le support de stockage USB et ne coupez pas l'alimentation. Vous risqueriez d'endommager le support de stockage ou les données qu'il contient.

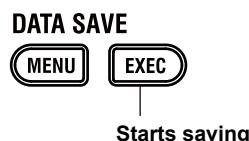
Procedure Using the Menu Icons

1. Tap the **Store/Data Save** menu icon  . A Store/Data Save menu appears in the sub menu area on the right side of the screen.



Procedure Using Keys

You can also use the front panel keys to save data.



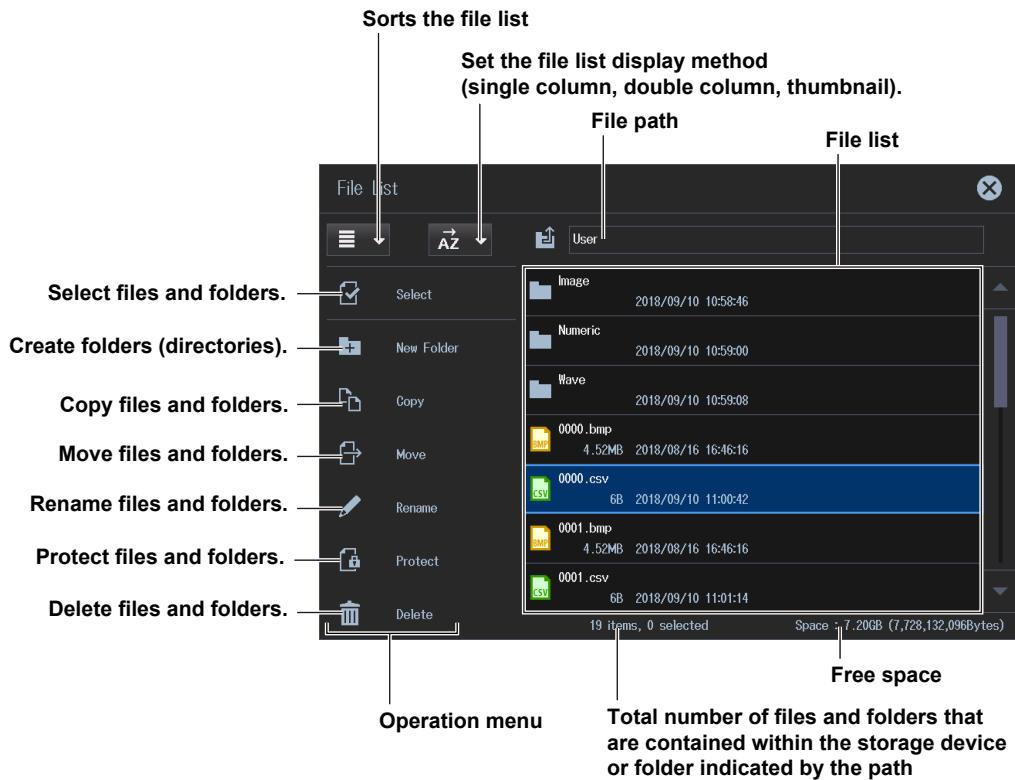
8.6 File Operations

► “File List (File List)” in the features guide

This section will explain how to operate the file list.

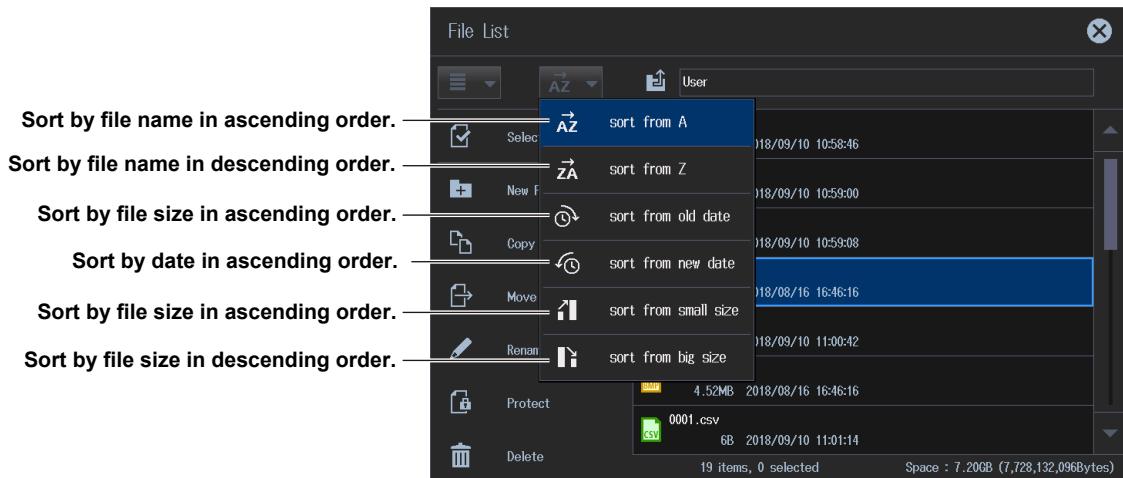
The file list is a function used to manage files as explained in chapter 7, “Storing Numeric Data,” and section 8.2.

File List (File List)



Sorting the File List ($\vec{A}Z$)

Tap $\vec{A}Z$ on the operation menu. The following screen appears.



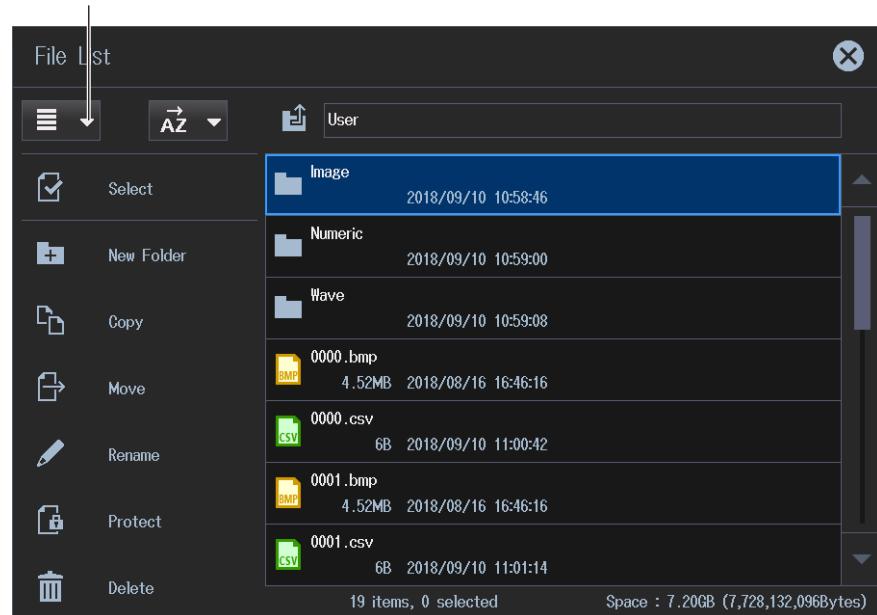
Setting the Display Format (≡, ≡≡, ≡≡≡)

Tap ≡, ≡≡, or ≡≡≡ on the operation menu. The following screen appears.

Single Column Display (≡)

The file list is shown in a single column.

Set the file list display method
(≡, ≡≡, ≡≡≡).

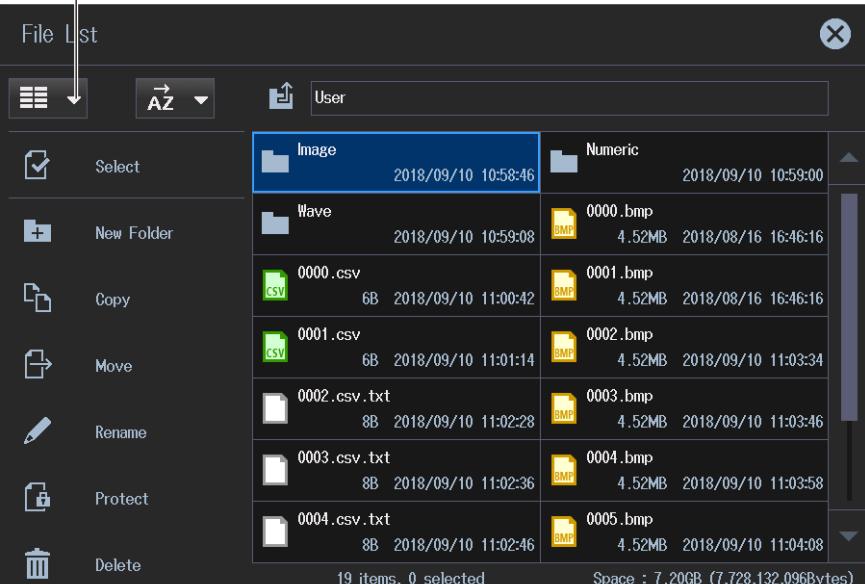


8.6 File Operations

Double Column Display ()

The file list is shown in two columns.

Set the file list display method
( ,  , ).



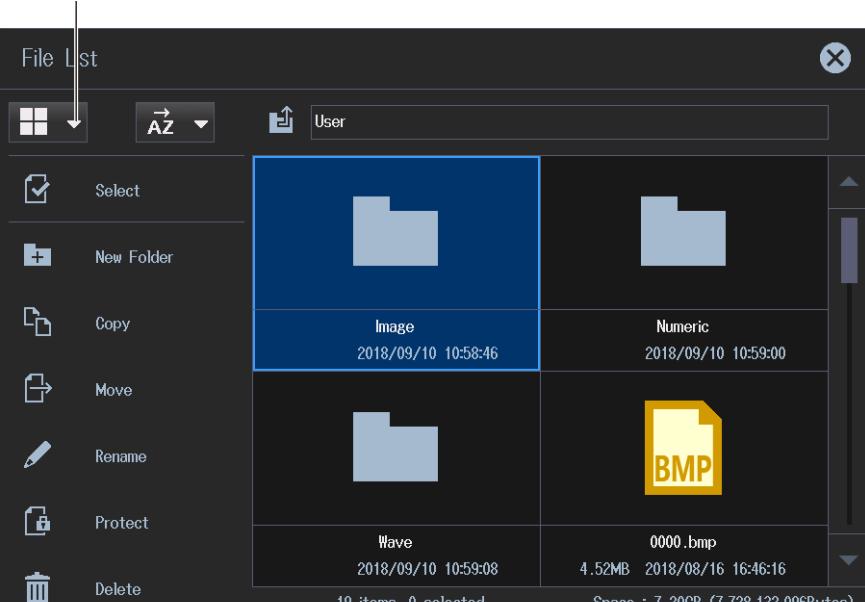
The screenshot shows the 'File List' window with the 'Double Column Display' method selected. The interface includes a toolbar with icons for Select, New Folder, Copy, Move, Rename, Protect, and Delete. A search bar labeled 'User' is present. The main area displays a list of files and folders in two columns. The first column contains icons for 'Image' (blue folder), 'Wave' (blue folder), '0000.csv' (green CSV file), '0001.csv' (green CSV file), '0002.csv.txt' (white file), '0003.csv.txt' (white file), and '0004.csv.txt' (white file). The second column contains icons for 'Numeric' (blue folder), '0000.bmp' (yellow BMP file), '0001.bmp' (yellow BMP file), '0002.bmp' (yellow BMP file), '0003.bmp' (yellow BMP file), '0004.bmp' (yellow BMP file), and '0005.bmp' (yellow BMP file). Below the list, status information indicates '19 items, 0 selected' and 'Space : 7.20GB (7,728,132,096Bytes)'.

Select	Image	Numeric
<input checked="" type="checkbox"/>	2018/09/10 10:58:46	2018/09/10 10:59:00
 New Folder	Wave	0000.bmp
 Copy	0000.csv	BMP 4.52MB 2018/08/16 16:46:16
 Move	0001.csv	0001.bmp
 Rename	0002.csv	0002.bmp
 Protect	0002.csv.txt	4.52MB 2018/09/10 11:03:34
 Delete	0003.csv	0003.bmp
	0003.csv.txt	4.52MB 2018/09/10 11:03:46
	0004.csv	0004.bmp
	0004.csv.txt	0005.bmp

Thumbnail Display ()

The file list is shown as thumbnails.

Set the file list display method
( ,  , ).



The screenshot shows the 'File List' window with the 'Thumbnail Display' method selected. The interface is identical to the Double Column Display window, featuring a toolbar with Select, New Folder, Copy, Move, Rename, Protect, and Delete icons, and a User search bar. The main area displays the same list of files and folders as the previous screenshot, but now each item is represented by a small thumbnail icon. The first column shows icons for 'Image' (blue folder), 'Wave' (blue folder), '0000.csv' (green CSV file), and '0001.csv' (green CSV file). The second column shows icons for 'Numeric' (blue folder), '0000.bmp' (yellow BMP file), '0001.bmp' (yellow BMP file), and '0002.bmp' (yellow BMP file). Below the list, the status information remains the same: '19 items, 0 selected' and 'Space : 7.20GB (7,728,132,096Bytes)'.

Select	Image	Numeric
<input checked="" type="checkbox"/>	2018/09/10 10:58:46	2018/09/10 10:59:00
 New Folder	Wave	0000.bmp
 Copy	0000.csv	BMP 4.52MB 2018/08/16 16:46:16
 Move	0001.csv	0001.bmp
 Rename	0002.csv	0002.bmp
 Protect	0002.csv.txt	4.52MB 2018/09/10 11:03:34
 Delete	0003.csv	0003.bmp
	0003.csv.txt	4.52MB 2018/09/10 11:03:46
	0004.csv	0004.bmp
	0004.csv.txt	0005.bmp

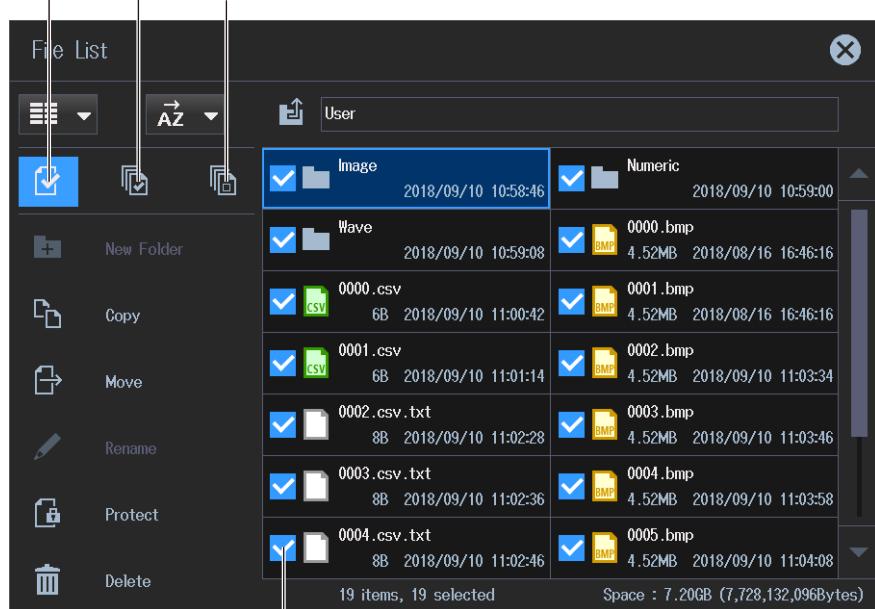
Selecting Files and Folders (Select)

To select multiple files or folders, tap **Select** on the operation menu. The following screen appears. You can return to the original screen by tapping Select again.

Select files and folders.

Selects all check boxes (selects all).

Clears all check boxes (unselects all).



A check mark appears when you tap the check box.
Tap it again to clear it.

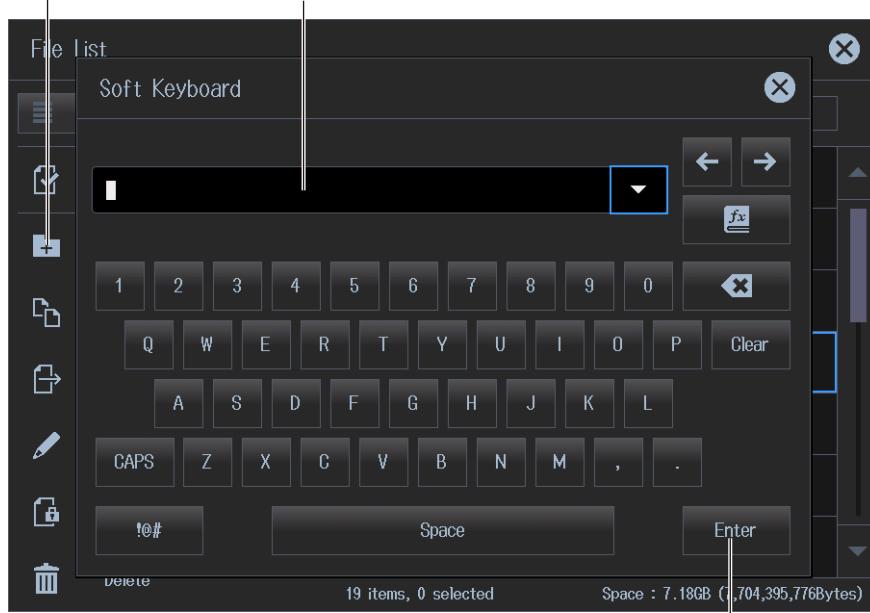
Making Folders (New folder)

Tap **New folder** on the operation menu. The following screen appears.

To make a new folder within a folder, tap the appropriate folder on the file list, and then tap New folder.

Create folders (directories).

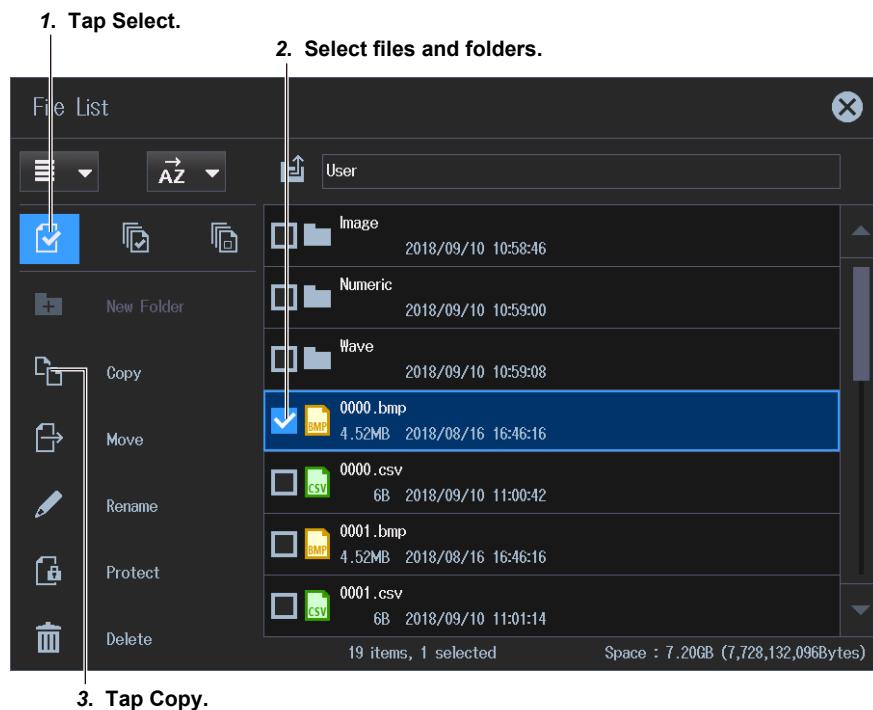
Use the keyboard to enter the new folder name
(up to 32 characters).



Confirms the folder name you entered

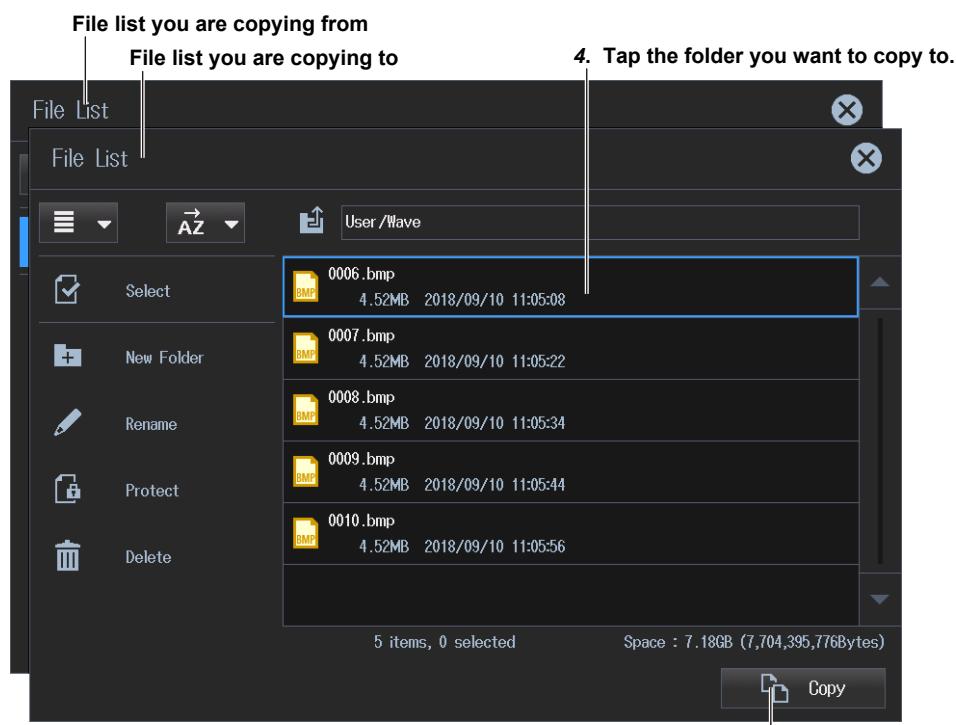
Copying Files and Folders (Copy)

1. Tap **Select** on the operation menu.
This menu is used when copying multiple files or folders.
2. Tap the files and folders in the file list that you want to copy.
For the selection procedure, see "Selecting Files and Folders (Select)" on the previous page.
3. Tap **Copy** on the operation menu. A copy destination file list appears.

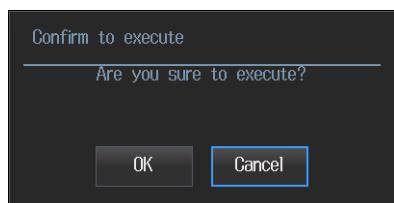


4. On this list, tap the copy destination folder.

The contents of the folder appear.

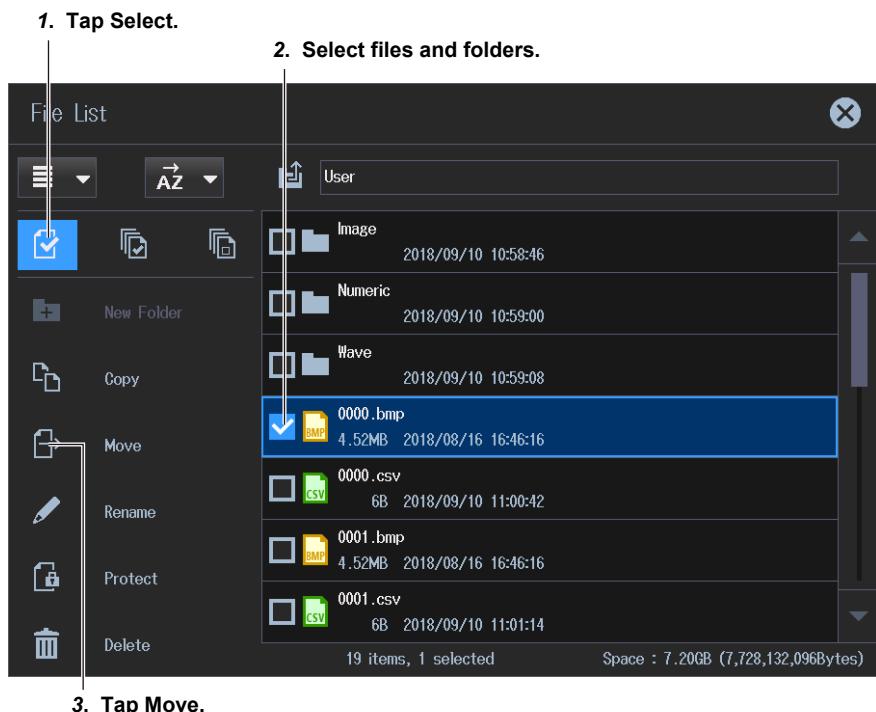


5. Tap **Copy** in the lower right of the screen. The following screen appears.
Tap OK to copy the files and folders.



Moving Files and Folders (Move)

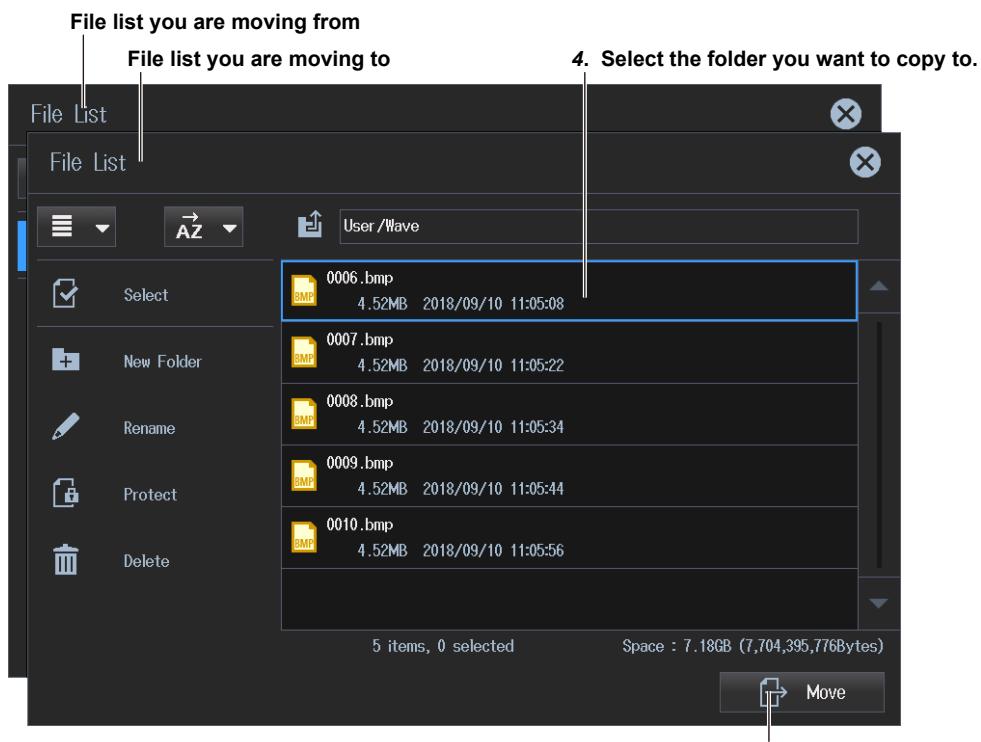
1. Tap **Select** on the operation menu.
This menu is used when moving multiple files or folders.
2. Tap the files and folders in the file list that you want to move.
For the selection procedure, see "Selecting Files and Folders (Select)" on the previous page.
3. Tap **Move** on the operation menu. A move destination file list appears.



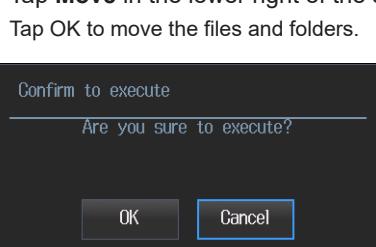
8.6 File Operations

4. On this list, tap the move destination folder.

The contents of the folder appear.

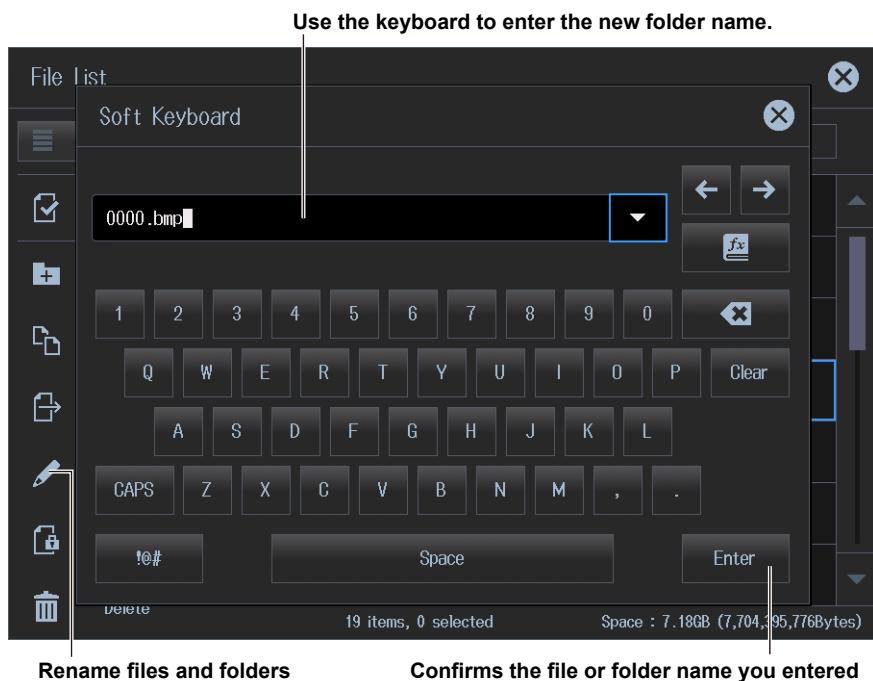


5. Tap **Move** in the lower right of the screen. The following screen appears.



Renaming Files and Folders (Rename)

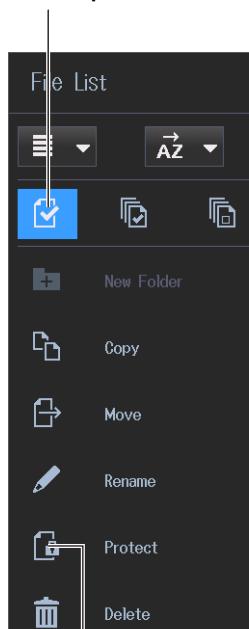
1. Tap the file or folder in the file list that you want to rename.
2. Tap **Rename** on the operation menu. The following screen appears.



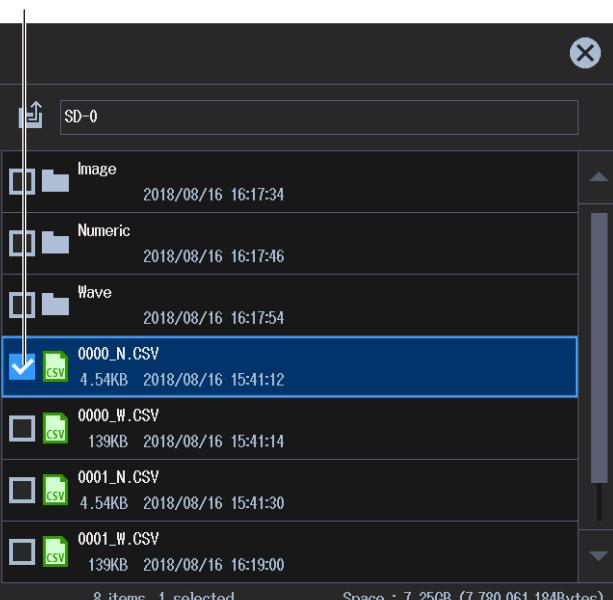
Protecting Files and Folders (Protect)

1. Tap **Select** on the operation menu.
This menu is used when moving multiple files or folders.
2. Tap the files and folders that you want to protect on the file list.
- For the selection procedure, see "Selecting Files and Folders (Select)" on page 8-14.
3. Tap **Protect** on the operation menu. Protection appears on the file or folder icons.

1. Tap Select.



2. Select files and folders.



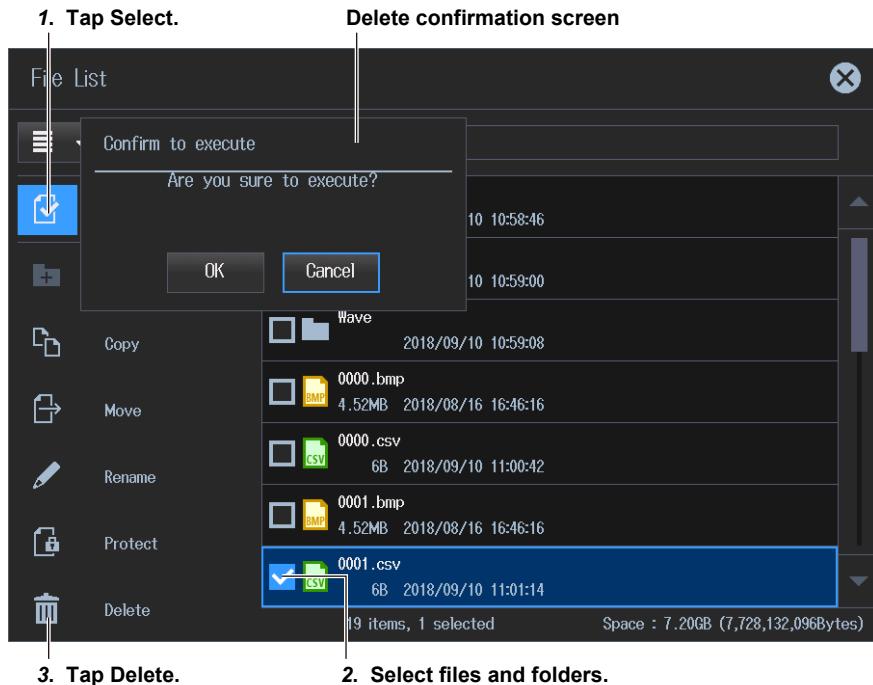
Protection mark



3. Tap Protect.

Deleting Files and Folders (Delete)

1. Tap Select on the operation menu.
This menu is used when deleting multiple files or folders.
2. Tap the files and folders that you want to delete on the file list.
For the selection procedure, see "Selecting Files and Folders (Select)" on the previous page.
3. Tap Delete on the operation menu. A delete confirmation screen appears.
Tap OK to delete the files and folders.



9.1 Setting Motor Evaluation Conditions

► “[Motor Evaluation/Auxiliary Inputs \(Motor/Aux\)](#)” in the features guide

This section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)

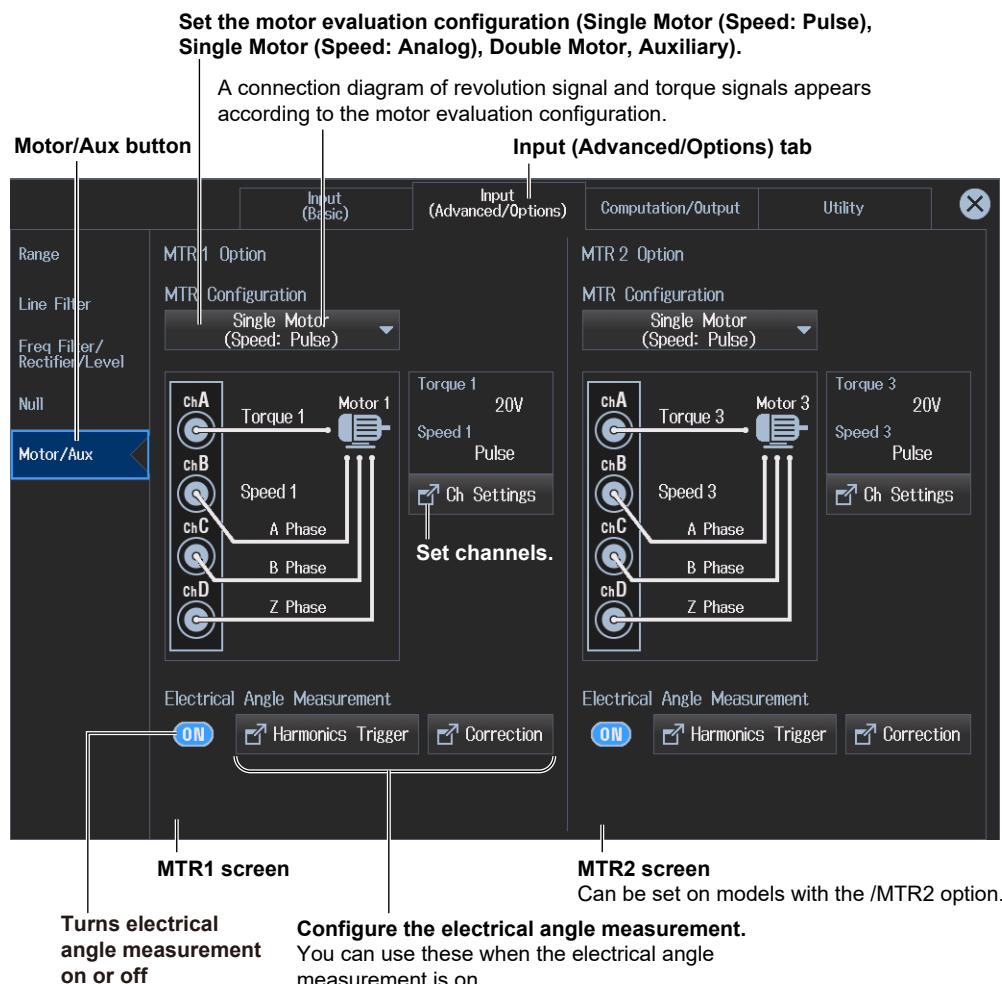
Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under **SETUP**.
2. Tap the **Input (Advanced/Options)** tab. An input settings (advanced/options) overview screen appears. Pressing **ESC** closes the overview screen.

Setting Motor Evaluation Conditions (Motor/Aux)

3. Tap **Motor/Aux**. A motor evaluation condition setup screen (MTR1 Option/MTR2 Option) appears.

The following screen is an example for a model with the /MTR2 option.



Note

- You can configure the Motor1 and Motor2 settings on models with the /MTR1 option and the Motor1 to Motor4 settings on models with the /MTR2 option.
- You can also display the input settings overview screen by moving the cursor on the Input (Advanced/Options) tab using the arrow keys and then pressing **SET**.

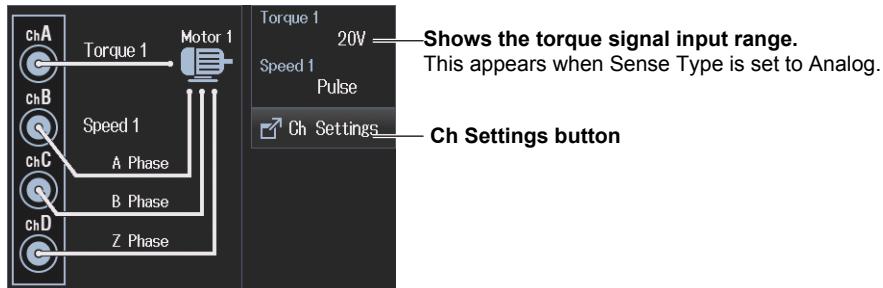
9.1 Setting Motor Evaluation Conditions

Configuring the Channels (Ch Settings)

The following four types of setup screens are available depending on the motor evaluation configuration setting.

Single Motor (Speed:Pulse)

4. Tap Ch Settings. A channel setup screen for pulse single motor appears.



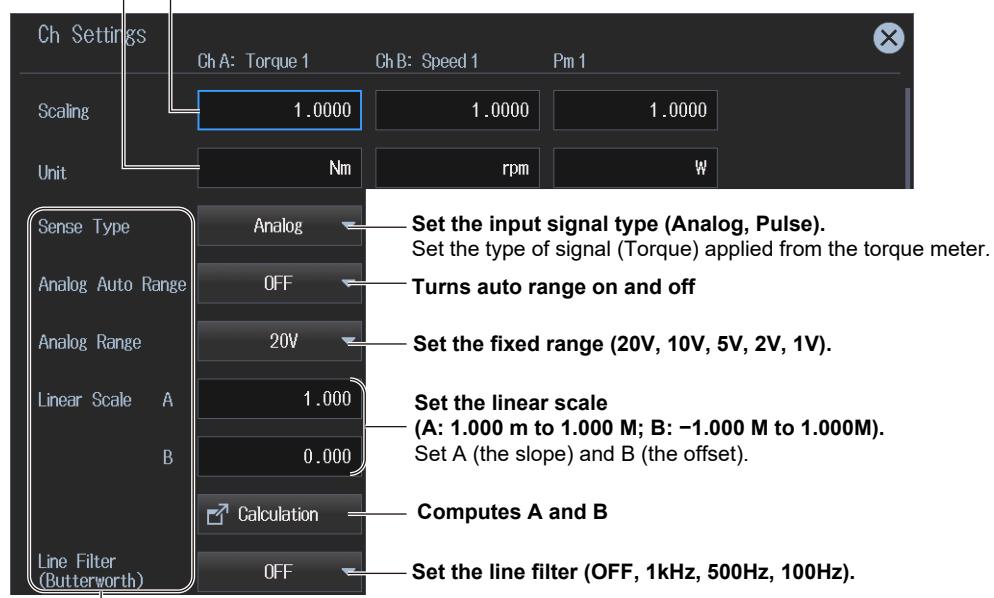
Motor evaluation setup screen (Single Motor-Speed signal set to Pulse type)

Set the unit (up to 8 characters).

Set the speed, torque, and Pm units.

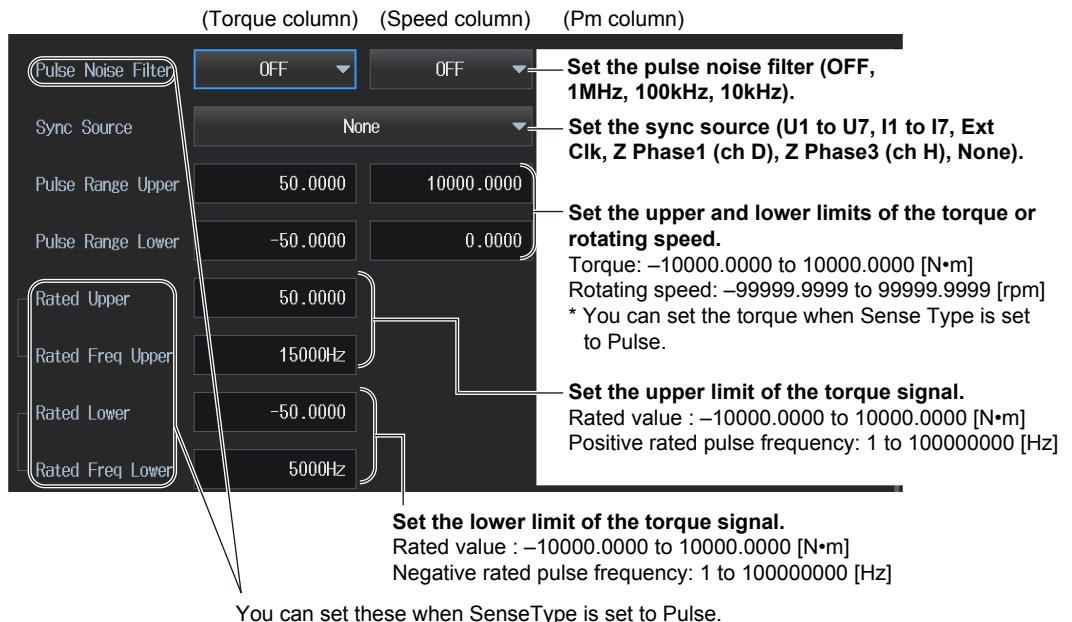
Set the scaling factor (0.0001 to 99999.9999).

Set the scaling factor that is used to convert the signal from the revolution sensor or torque meter to speed (rotating speed), torque, and Pm (motor output).

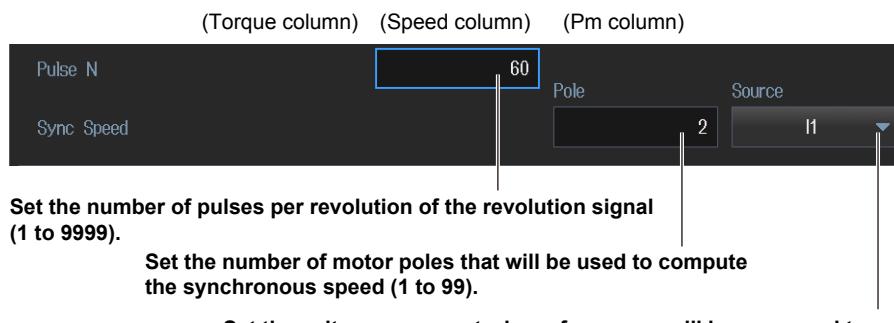


You can set these when Sense Type is set to Analog.

Drag the screen to display the bottom area of the motor evaluation setup screen.

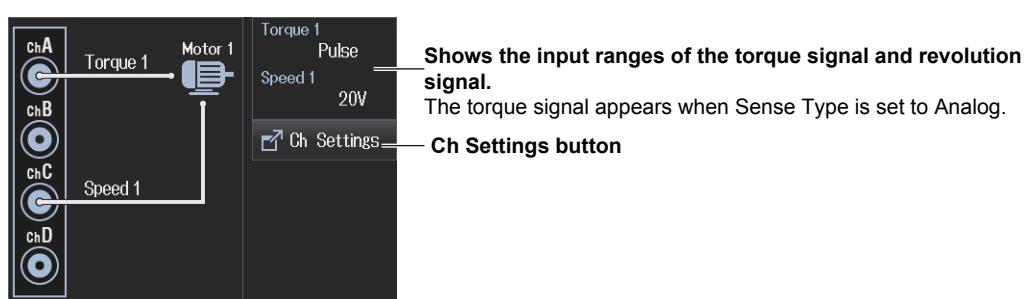


Drag the screen to display the bottom area of the motor evaluation setup screen.



Single Motor (Speed:Analog)

4. Tap **Ch Settings**. A channel setup screen for analog single motor appears.



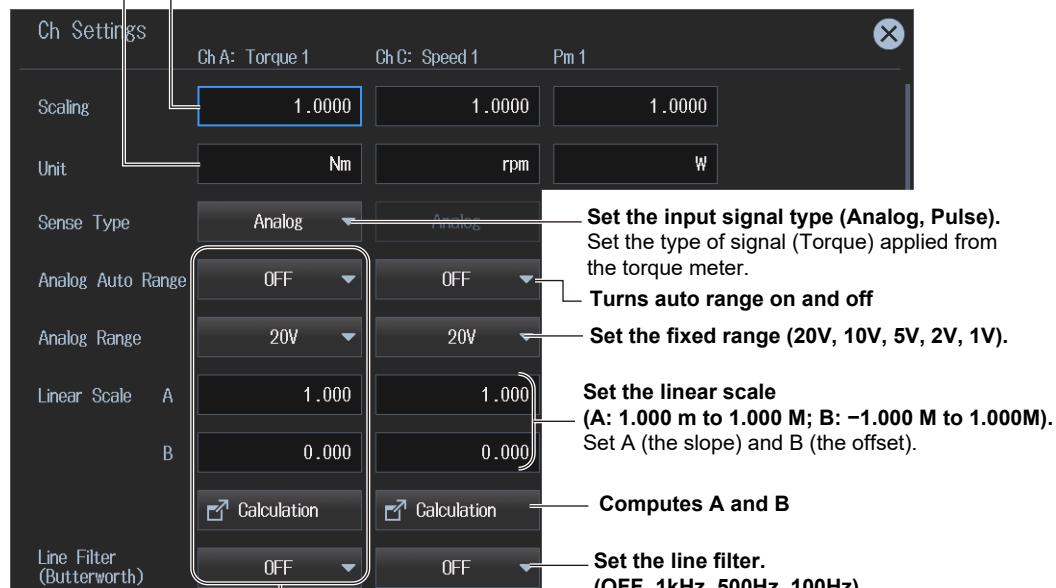
9.1 Setting Motor Evaluation Conditions

Motor evaluation setup screen (Single Motor-Speed signal set to Analog type)

Set the unit (up to 8 characters).
Set the speed, torque, and Pm units.

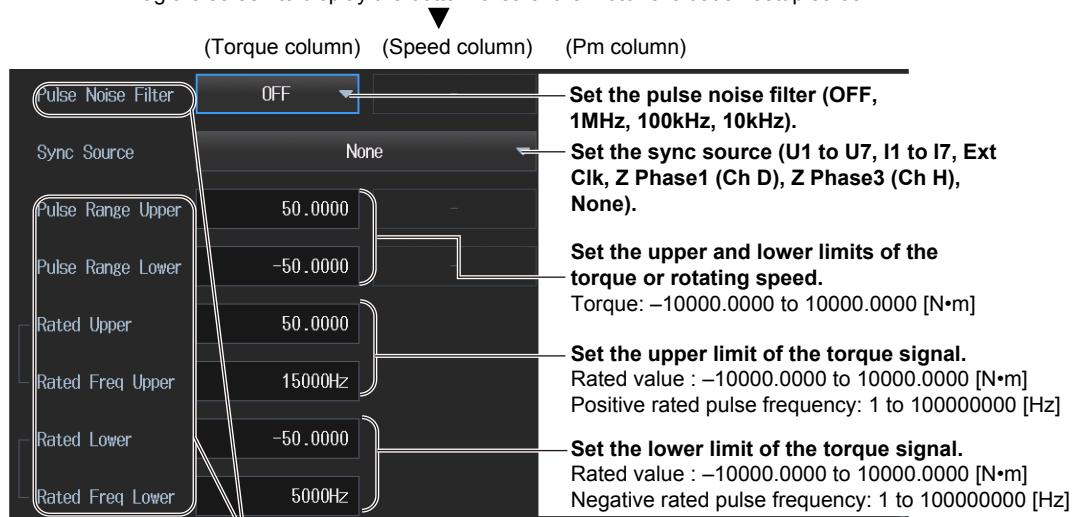
Set the scaling factor (0.0001 to 99999.9999).

Set the scaling factor that is used to convert the signal from the revolution sensor or torque meter to speed (rotating speed), torque, and Pm (motor output).



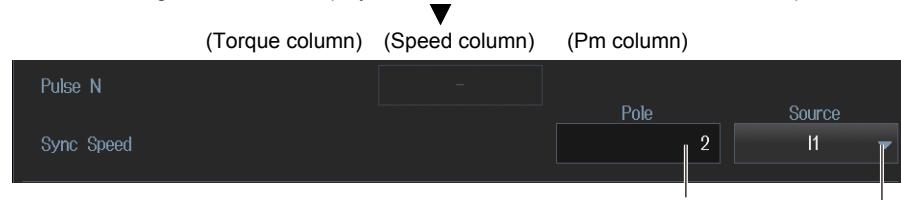
You can set the range, scale, filter, and the like of the torque signal when Sense Type is set to Analog.

Drag the screen to display the bottom area of the motor evaluation setup screen.



You can set these when SenseType is set to Pulse.

Drag the screen to display the bottom area of the motor evaluation setup screen.

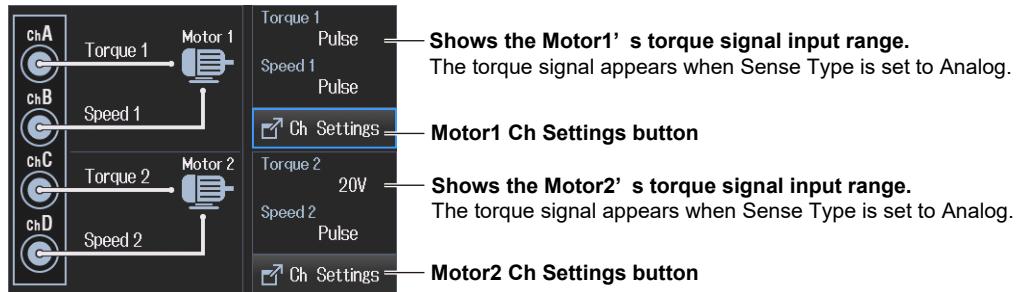


Set the number of motor poles that will be used to compute the synchronous speed (1 to 99).

Set the voltage or current whose frequency will be measured to compute the synchronous speed (U1 to U7, I1 to I7).

Double Motor

4. Tap Ch Settings. A channel setup screen for double motor appears.



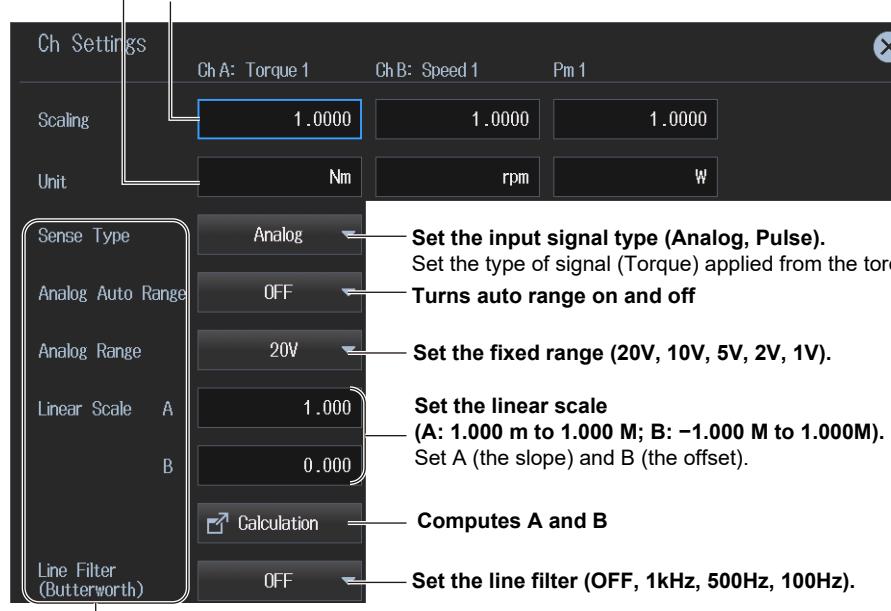
Motor evaluation setup screen (Double Motor)

Set the unit (up to 8 characters).

Set the speed, torque, and Pm units.

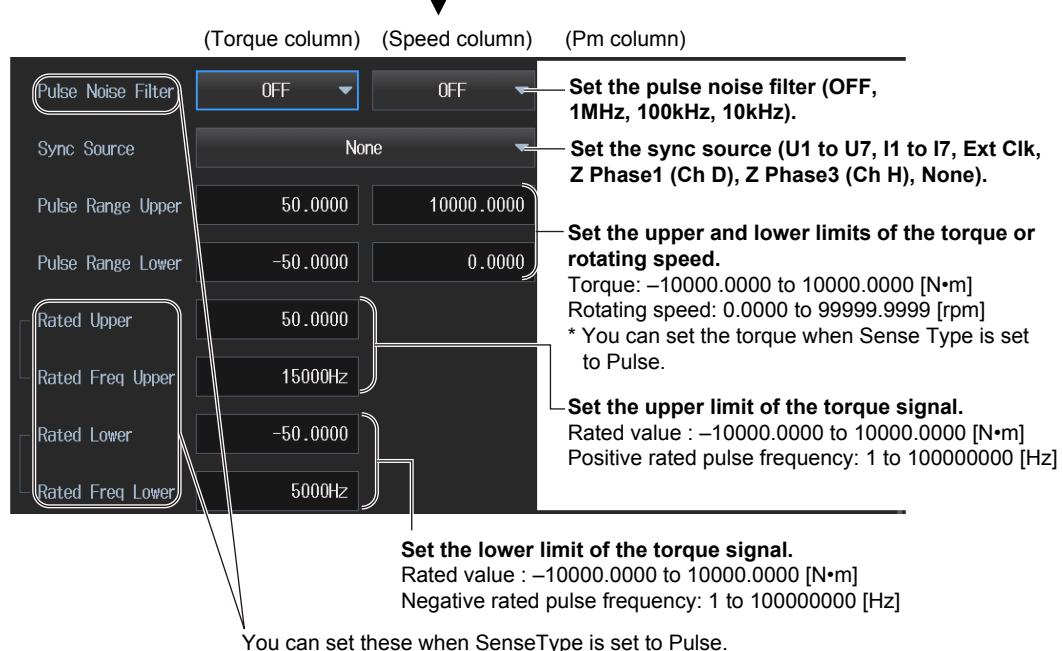
Set the scaling factor (0.0001 to 99999.999).

Set the scaling factor that is used to convert the signal from the revolution sensor or torque meter to speed (rotating speed), torque, and Pm (motor output).

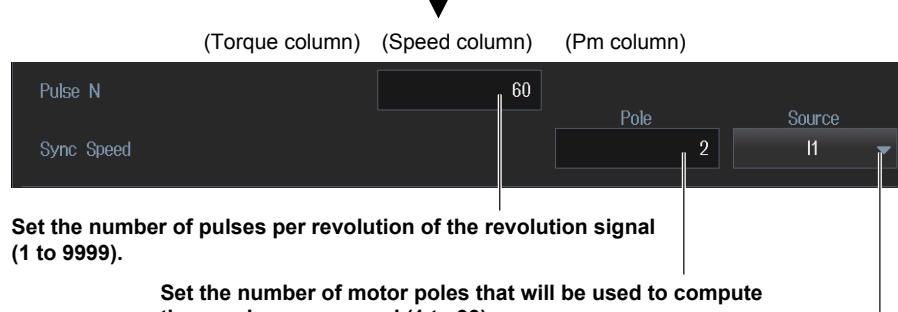


9.1 Setting Motor Evaluation Conditions

Drag the screen to display the bottom area of the motor evaluation setup screen.

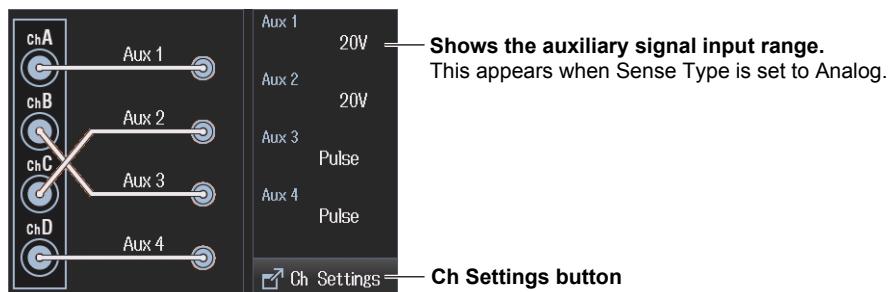


Drag the screen to display the bottom area of the motor evaluation setup screen.



Auxiliary

- Tap Ch Settings. A channel setup screen for auxiliary input appears.

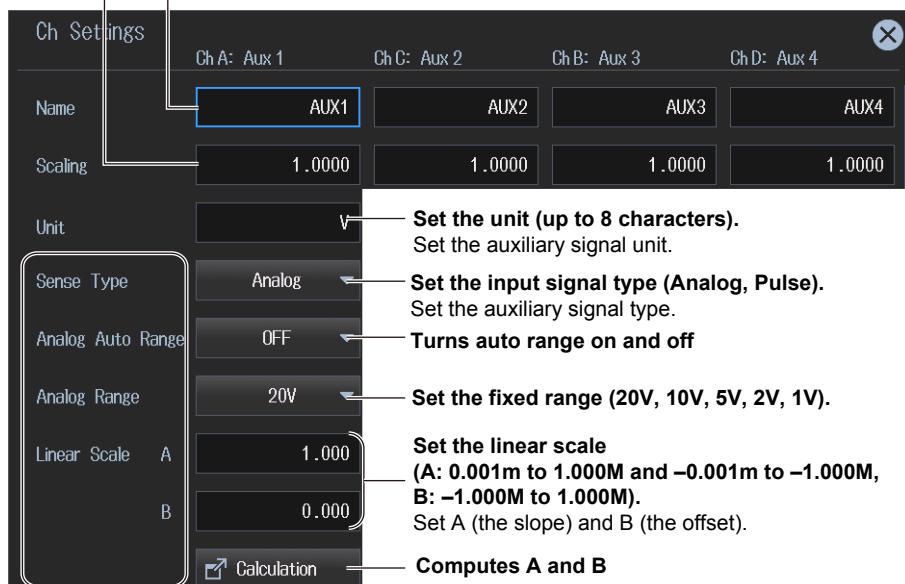


Motor evaluation setup screen (Auxiliary)**Set the scaling factor (0.0001 to 99999.9999).**

Set the scaling factor for scaling or computing auxiliary signals.

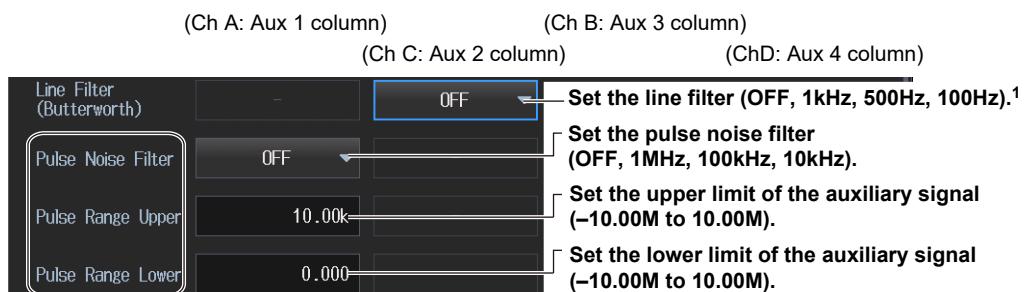
Set the signal name (up to 8 characters).

Set the signal names for Aux1 to Aux4.



You can set these when Sense Type is set to Analog.

Drag the screen to display the bottom area of the motor evaluation setup screen.



You can set these when SenseType is set to Pulse.

1 You can set this when SenseType is set to Analog.

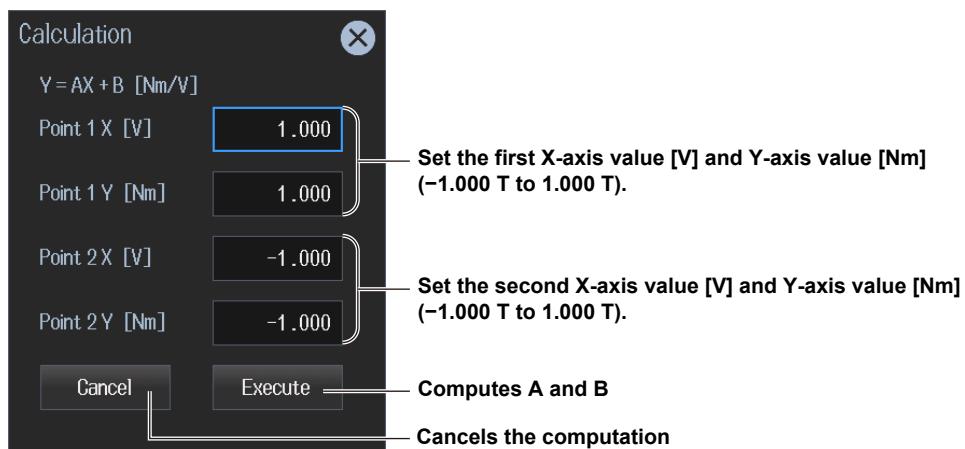
9.1 Setting Motor Evaluation Conditions

Computing A and B (Calculation)

Compute A (slope) and B (offset) from two points on the characteristics graph of the input signal.

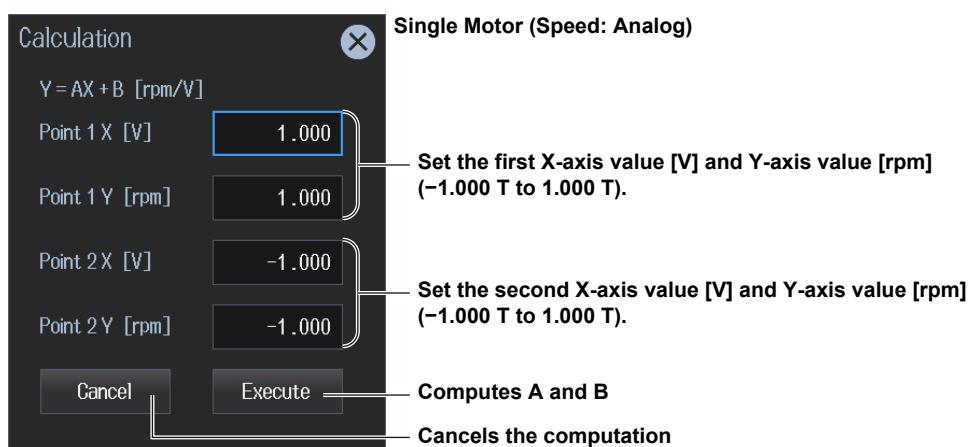
Torque A and B

On the motor evaluation condition setup screen, select Calculation under Torque. The following screen appears.



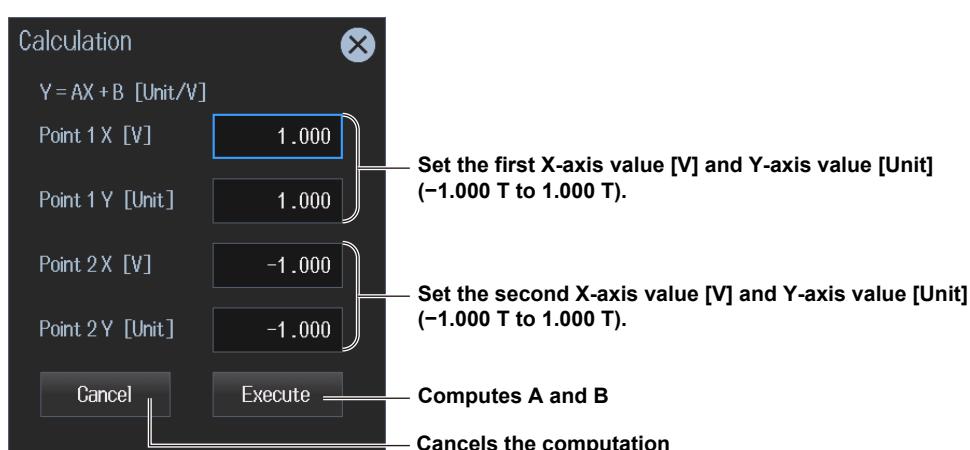
Rotating Speed A and B

On the motor evaluation condition setup screen, select Calculation under Speed. The following screen appears.



External Signal Input A and B

On the motor evaluation condition setup screen, select Calculation under Aux1 to Aux4. The following screen appears.



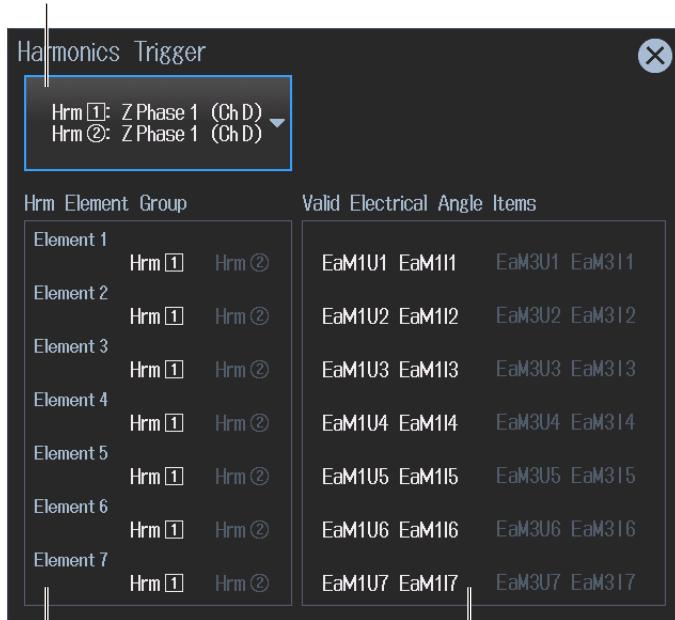
Setting the Electrical Angle Measurement (Electrical Angle Measurement)

Selecting the Harmonic Group (Harmonics Trigger)

5. Tap ON/OFF under Electrical Angle Measurement. The button changes to ON. The Harmonics and Correction buttons next to the ON/OFF button become available (step 7).
6. Tap **Harmonics Trigger**. A Harmonics Trigger screen appears.

Set the harmonic analysis trigger.

(Hrm①: Z Phase 1 (Ch D) Hrm①: Z Phase 1 (Ch D) Hrm①: None
 (Hrm②: Z Phase 1 (Ch D), Hrm②: None , Hrm②: Z Phase 1 (Ch D))



Shows harmonic element grouping

Electrical angle measurement items

These are determined and shown automatically depending on the configuration.

Hrm①: Z Phase 1 (Ch D) : Set the Hrm1 and Hrm2 triggers to the Z phase of motor 1.
Hrm②: Z Phase 1 (Ch D)

Hrm①: Z Phase 1 (Ch D) : Set the Hrm1 trigger to the Z phase of motor 1.
Hrm②: None

Hrm①: None
Hrm②: Z Phase 1 (Ch D) : Set the Hrm2 trigger to the Z phase of motor 1.

Note

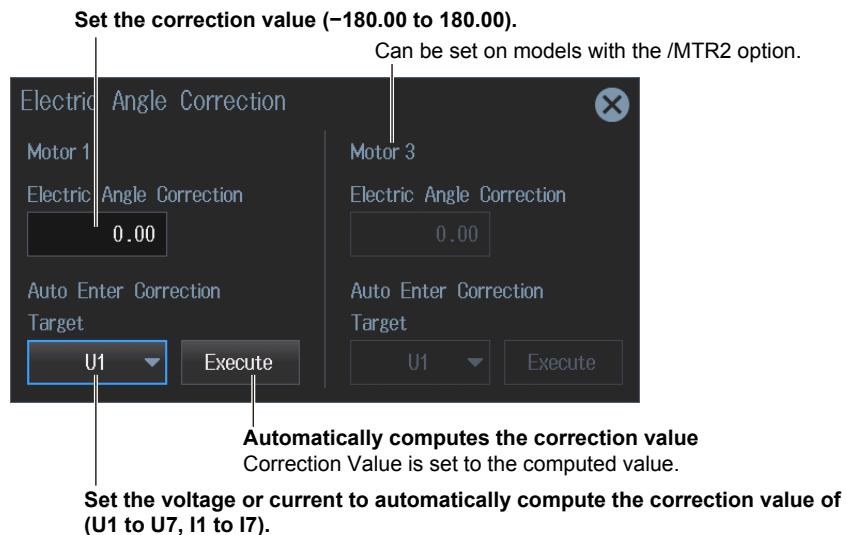
The harmonic analysis trigger parameters vary depending on the /MTR1 option and /MTR2 option.

- **Electrical angle measurement of motor 1 set to on and Electrical angle measurement of motor 2 set to off**
 Hrm1: Z Phase1 and Hrm2: Z Phase1
 Hrm1: Z Phase1 and Hrm2: None
 Hrm1: None and Hrm2: Z Phase1
- **Electrical angle measurement of both motor 1 and motor 2 set to on**
 Hrm1: Z Phase1 and Hrm2: Z Phase3
 Hrm1: Z Phase3 and Hrm2: Z Phase1
- **Electrical angle measurement of motor 1 set to off and electrical angle measurement of motor 2 set to on**
 Hrm1: Z Phase3 and Hrm2: Z Phase3
 Hrm1: Z Phase3 and Hrm2: None
 Hrm1: None and Hrm2: Z Phase3

9.1 Setting Motor Evaluation Conditions

Setting the Electrical Angle Correction Value (Electric Angle Correction)

7. Tap **Correction**. An Electric Angle Correction screen appears.



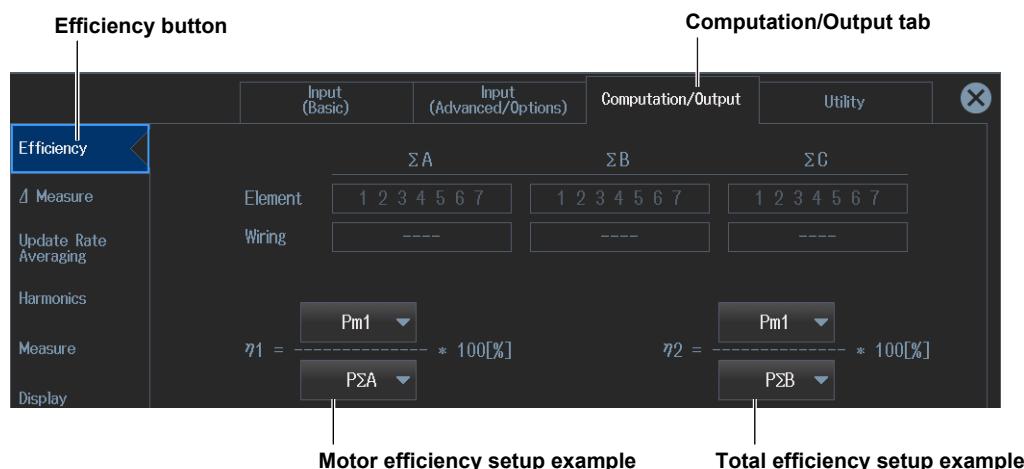
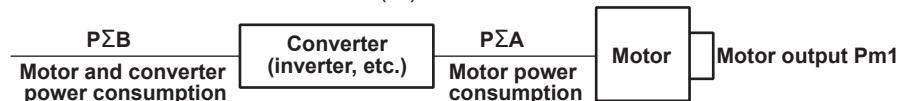
Setting the Motor Efficiency Computation

This instrument can compute the motor efficiency (the ratio of power consumption to motor output) and total efficiency from the active power and motor output that it measures.* For information on how to set expressions, see section 2.10.

- Example in which motor efficiency is set to η_1 and total efficiency to η_2

$$\text{Motor efficiency } \eta_1(\%) = \frac{\text{Motor output } P_m (\text{W})}{P_{\Sigma A}(\text{W})} \times 100$$

$$\text{Total efficiency } \eta_2(\%) = \frac{\text{Motor output } P_m (\text{W})}{P_{\Sigma B}(\text{W})} \times 100$$



Procedure Using the Input Information Area (Options tab)

If you use the input information area shown on the right side of the screen, you can set the analog range, line filter, and pulse noise filter while viewing the measurements. These settings are the same as those in “Configuring the Channels (Ch Settings)” described earlier.

1. Tap the **Options** tab. An Options menu appears in the input information area.
2. Tap the channel (Ch A to Ch H) you want to control. A channel setup screen appears. The channel display and channel setup screen vary depending on the motor evaluation configuration setting.

Line filter (OFF, 1kHz, 500Hz, 100Hz)

You can use this when the input signal type is analog.

Analog range (20V, 10V, 5V, 2V, 1V)

You can use this when the input signal type is analog.

Turns analog auto range on and off

You can use this when the input signal type is analog.



**pulse noise filter
(OFF, 1MHz, 100kHz, 10kHz)**
You can use this when the input signal type is pulse.



Tap a channel to display the channel setup screen.

You can use Ch C and Ch D when the motor evaluation configuration is set to Double Motor or Auxiliary.

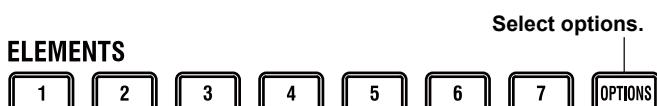
Can be set on models with the /MTR2 option.

You can use Ch G and Ch H when the motor evaluation configuration is set to Double Motor or Auxiliary.

Procedure Using Keys

You can use the front panel keys to display the input information area and the motor evaluation condition setup screen.

1. Press **OPTIONS**. The input information area display changes to Options tab.
2. Press **OPTIONS** again. A motor evaluation condition setup screen appears.
Press **OPTIONS** yet again to return to the input information area (Options tab) display.



9.2

Displaying the Motor Evaluation (numeric display)

This instrument shows on the screen the measurements (measurement functions) of motor evaluation based on the revolution sensor or torque meter signals applied to Ch A to Ch H on the rear panel. In addition, this instrument shows on the screen the measurements (measurement functions) of the motor power consumption based on the voltage or current applied to the wiring units. Using an example, this section explains how to display motor evaluation measurements numerically. Note that to determine the motor efficiency or total efficiency values (η), you need to set equations (see sections 2.10 and 9.1).

In addition, this section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Menu Icons (see page iii)

Measurement Display Screen (Example of a 4 items display)

Motor evaluation measurement display

Measured motor rotating speed	Measured motor mechanical output
Speed1	Pm1
60.0000	0.0031
rpm	kW
Torque1	η 1
0.5000	90.000
Nm	
	Measured motor torque Measured motor efficiency

If you hold your finger down on the 4-, 8-, 16-value, matrix or harmonics display for at least 1 second, you can perform the operations described in "Switching the Displayed Items (Items)," provided later.

Switches the displayed page (Page Up/Page Down)
Switches to the measurement display of another input element
Tap \blacktriangle or \blacktriangledown to change the displayed page in order from the current number. Tap the number directly to change to the number display page.

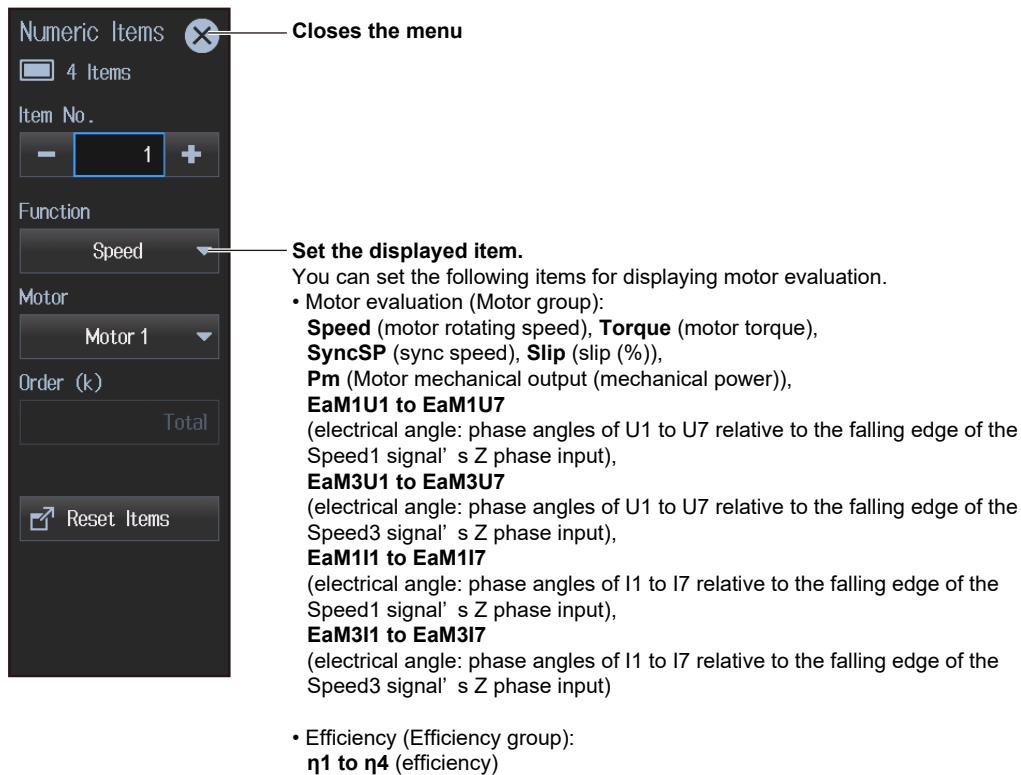
Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under SETUP.
2. Tap **Computation/Output** tab. A computation and output settings overview screen appears. Pressing **ESC** closes the overview screen.

Switching the Displayed Items (Items)

You can switch the measured value (measurement function) shown in the screen.

3. Tap **Display**.
- A display format setup screen (Numeric/Graph) appears. For details, see section 3.1.
4. Tap **Items**. The following screen appears.



Procedure Using the Menu Icons

You can also use the menu icons shown on the right side of the screen to switch the displayed items.

1. Tap the **Display** menu icon  A Display menu appears in the sub menu area on the right side of the screen.
- By tapping the displayed items, you can specify the same settings as when using the screen explained earlier.

Note

For a description of the Display menu screen, see "Menu Icons" on page v.

10.1 Holding Measured Values

► “Holding Measured Values (Hold, HOLD)” in the features guide

This section explains operating procedures using the following setup methods.

- Procedure Using the Menu Icons (see page iii)
- Procedure Using the Keys (other than SETUP) (see section 1.2 in IM WT5000-03EN)

Procedure Using the Menu Icons

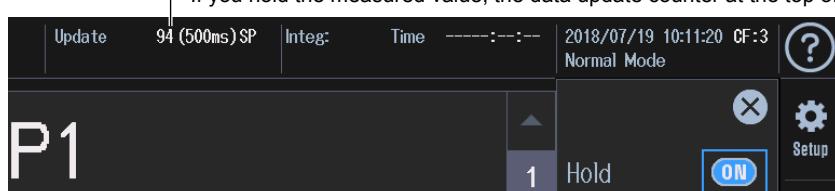
1. Tap the **Misc** menu icon  . A Hold/Single/Null/Cal menu appears in the sub menu area on the right side of the screen.
2. Tap **Hold**. The HOLD key illuminates, and the displayed measured value is held. Tapping **Hold** again turns off the HOLD key. This releases the held measured values. The measured data is then updated at the specified data update interval (see section 2.9).

Hold/Single Null/Cal Menu



Executes the holding of measured values (OFF, ON)
When holding is in progress, the HOLD key illuminates.

If you hold the measured value, the data update counter at the top of the screen stops.

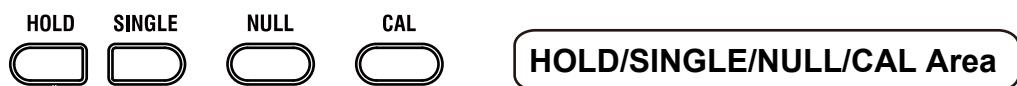


Note

Values in the numeric data list of D/A output, communication output, and the like as well as the graph display are put on hold.

Procedure Using Keys

You can also use the front panel keys to hold the measured values.



Holding Measured Values

The HOLD key LED illuminates, and the measure values are put on hold.

10.2 Single Measurement

► “Single Measurement (Single Execute, SINGLE)” in the features guide

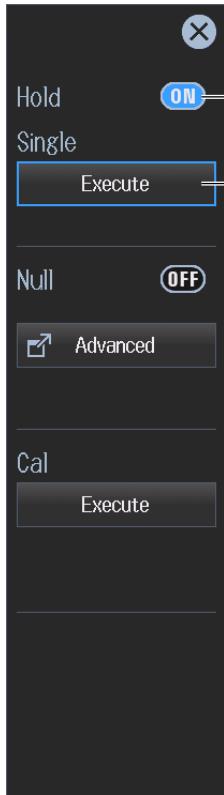
This section explains operating procedures using the following setup methods.

- Procedure Using the Menu Icons (see page iii)
- Procedure Using the Keys (other than SETUP) (see section 1.2 in IM WT5000-03EN)

Procedure Using the Menu Icons

1. Tap the **Misc** menu icon  . A Hold/Single/Null/Cal menu appears in the sub menu area on the right side of the screen.
2. Tap **Hold**. The HOLD key illuminates, and the displayed measured value is held.
3. Tap **Single Execute**. A single measurement is performed at the specified data update rate, and the instrument then holds the measured value.

Hold/Single Null/Cal Menu



1. **Execute the holding of measured values (OFF, ON)**
When holding is in progress, the HOLD key illuminates.

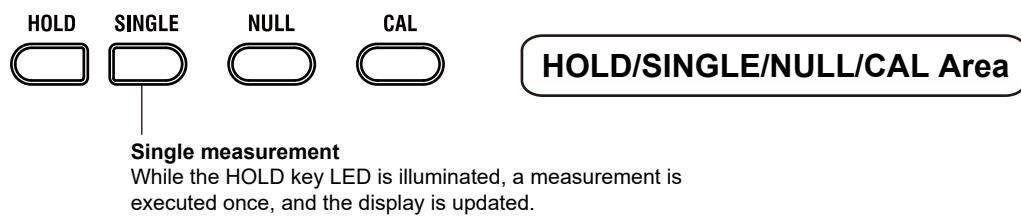
2. **Execute a single measurement.**
You can execute this once while holding is in progress.

Note

If, while the HOLD key is illuminated, you tap Hold again, the HOLD key will turn off, and the held measured values will be released. If you tap Single Execute while the hold feature is released, the measured value is updated (re-measured) when the time specified by the data update rate elapses after you tap the key.

Procedure Using Keys

You can also use the front panel keys to perform single measurements.



Single measurement

While the HOLD key LED is illuminated, a measurement is executed once, and the display is updated.

11.1 Configuring, Enabling, and Disabling the Null Function

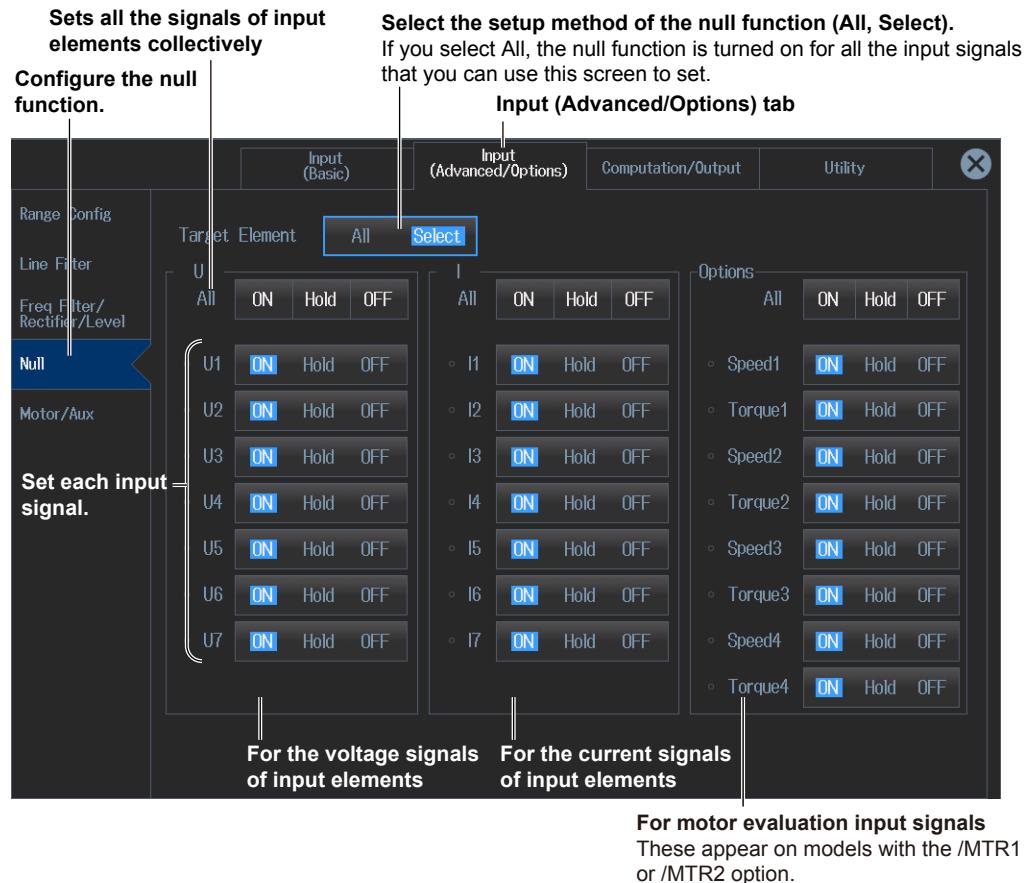
► “Enabling and Disabling the Null Feature (Null, NULL)” in the features guide

This section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Menu Icons (see page iii)
- Procedure Using the Keys (other than SETUP) (see section 1.2 in IM WT5000-03EN)

Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under SETUP.
2. Tap the **Input (Advanced/Options)** tab. An input settings (advanced/options) overview screen appears. Pressing **ESC** closes the overview screen.
3. Tap **Null**. The null function setup screen appears.



Note

You can also display the input settings (advanced/options) overview screen by moving the cursor on the Input (Advanced/Options) tab using the arrow keys and then pressing SET.

Procedure Using the Menu Icons

You can also use the menu icons shown on the right side of the screen to set the null function.

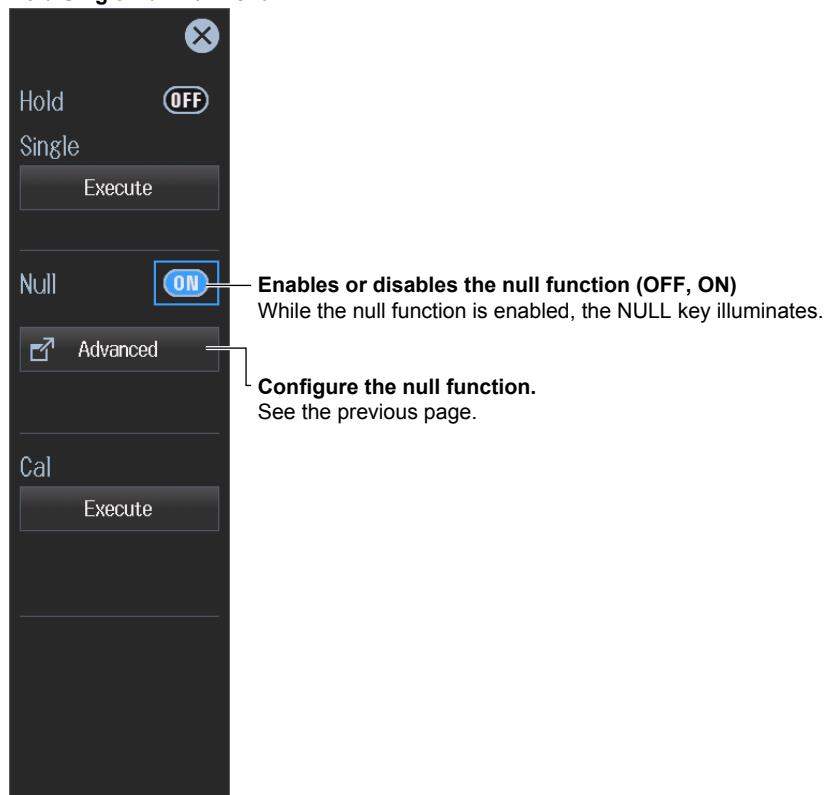
1. Tap the **Misc** menu icon  . A Hold/Single/Null/Cal menu appears in the sub menu area on the right side of the screen.

By tapping the displayed items, you can specify the same settings as when using the tap operation explained earlier.

Enabling and Disabling the Null Function

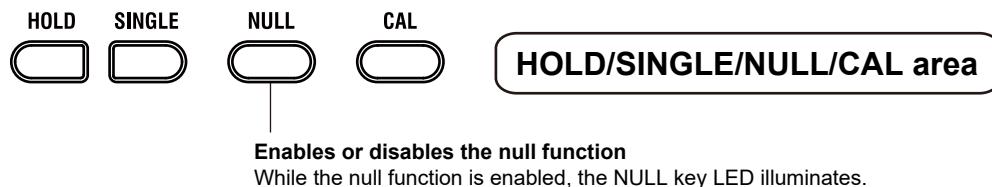
2. Tap **Null Advanced**. The NULL key illuminates, and the function is enabled.
 - The null value for each signal is used for those signals that have been configured to use the null function.
 - Tapping Null Settings again turns off the NULL key and disables the function.

Hold/Single Null/Cal Menu



Procedure Using Keys

You can also use the front panel keys to enable and disable the null function.



11.2 Zero-Level Compensation (Cal)

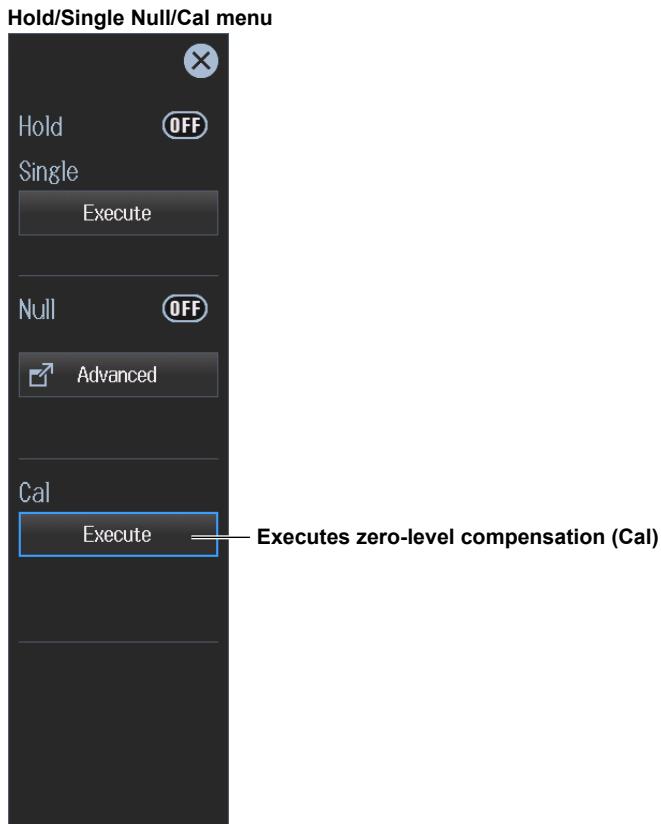
► “Zero-Level Compensation (Cal Execute, CAL)” in the features guide

This section explains operating procedures using the following setup methods.

- Procedure Using the Menu Icons (see page iii)
- Procedure Using the Keys (other than SETUP) (see section 1.2 in IM WT5000-03EN)

Procedure Using the Menu Icons

1. Tap the **Misc** menu icon . A Hold/Single/Null/Cal menu appears in the sub menu area on the right side of the screen.
2. Tap **Cal Execute**. Zero-level compensation is executed.

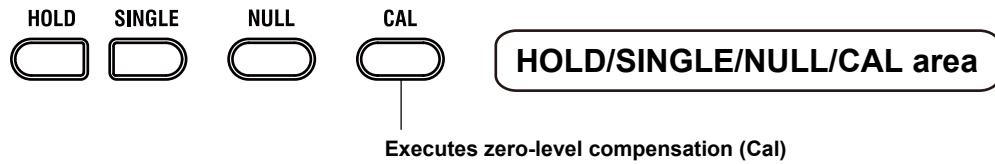


Note

- The instrument automatically performs zero-level compensation after you change the measurement range or input filter.
- To make accurate measurements, we recommend that you execute zero-level compensation after warming up the instrument for at least 30 minutes.
- If the measurement range and input filter remain the same for a long period of time, the zero level may change due to the changes in the instrument's environment. If this happens, we recommend that you execute zero-level compensation.
- The integration feature includes an auto calibration feature that automatically performs zero-level compensation.

Procedure Using Keys

You can also use the front panel keys to execute zero-level compensation (Cal).



12.1 Cursor Measurement on Waveforms

This instrument shows on the screen the waveforms of the voltage and current applied to the input elements or wiring units. When you place cursors on the waveforms, the instrument shows the measured values at the cursor positions.

► “[Cursor Measurement \(Cursors\)](#)” in the features guide

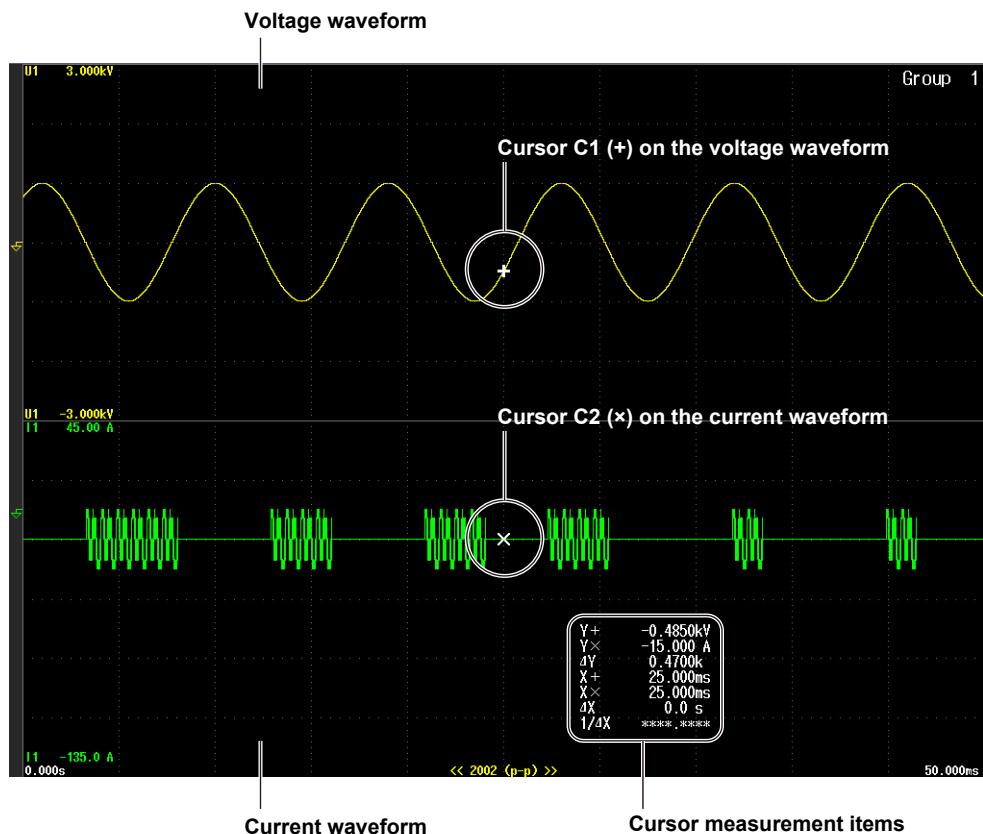
Using an example, this section explains how to display waveform cursor measurement results.

In addition, this section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Menu Icons (see page iii)

Cursor Measurement on Waveforms (Example of voltage and current)

Waveform display of input element 1



Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under **SETUP**.
2. Tap **Computation/Output** tab. A computation and output settings overview screen appears. Pressing **ESC** closes the overview screen.
3. Tap **Display**.

A display format setup screen (Numeric/Graph) appears. For details, see section 6.1.

Setting the Graph Display Type (Graph)

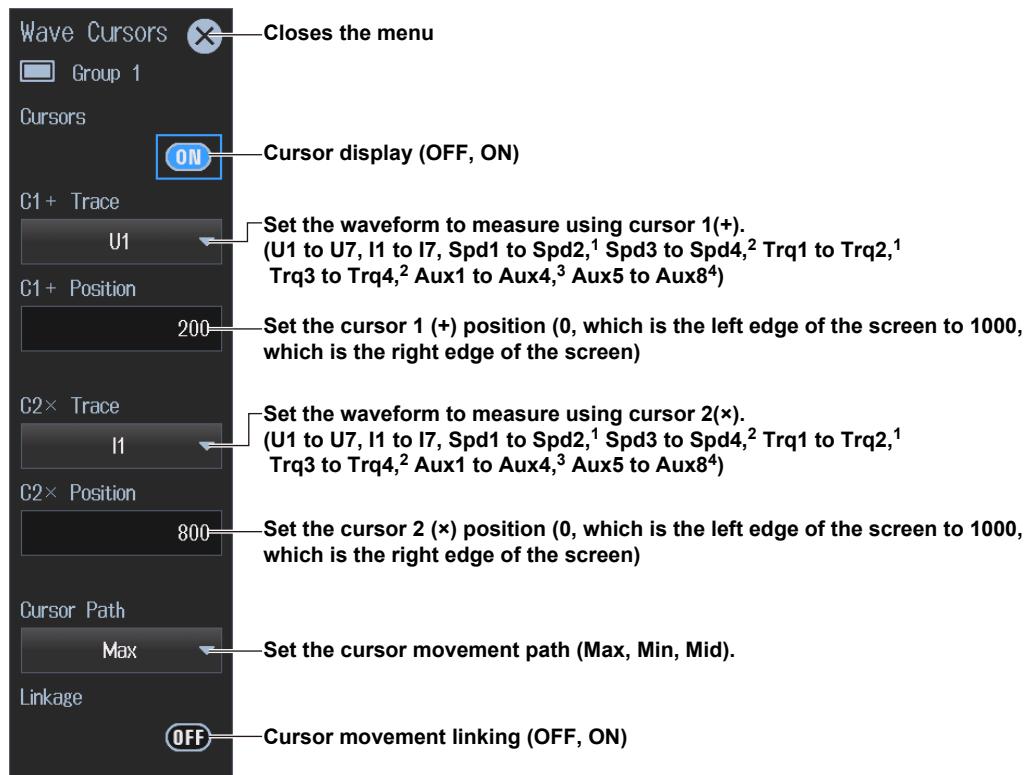
4. Tap **Graph** to select Wave.

Note

For instructions on how to display the waveforms, see sections 6.1 and 6.2.

Displaying the Cursors (Cursors)

5. Tap **Cursors**. A Wave Cursors screen appears.



- 1 You can set this on models with the /MTR1 option when MTR Configuration is set to Single Motor or Double Motor (see section 9.1).
- 2 You can set this on models with the /MTR2 option when MTR Configuration is set to Single Motor or Double Motor (see section 9.1).
- 3 You can set this on models with the /MTR1 option when MTR Configuration is set to Auxiliary (see section 9.1).
- 4 You can set this on models with the /MTR2 option when MTR Configuration is set to Auxiliary (see section 9.1).

Procedure Using the Menu Icons

You can also use the menu icons shown on the right side of the screen to switch the displayed items.

1. Tap the **Display** menu icon . A Display menu appears in the sub menu area on the right side of the screen.

By tapping the displayed items, you can specify the same operation as explained in "Switching the Displayed Items" described earlier.

Note

For a description of the Display menu screen, see "Menu Icons" on page v.

12.2 Cursor Measurement on Trends

This instrument shows on the screen the trends of the voltage and current applied to the input elements or wiring units. When you place cursors on the trends, the instrument shows the measured values at the cursor positions.

► [“Cursor Measurement \(Cursors\)” in the features guide](#)

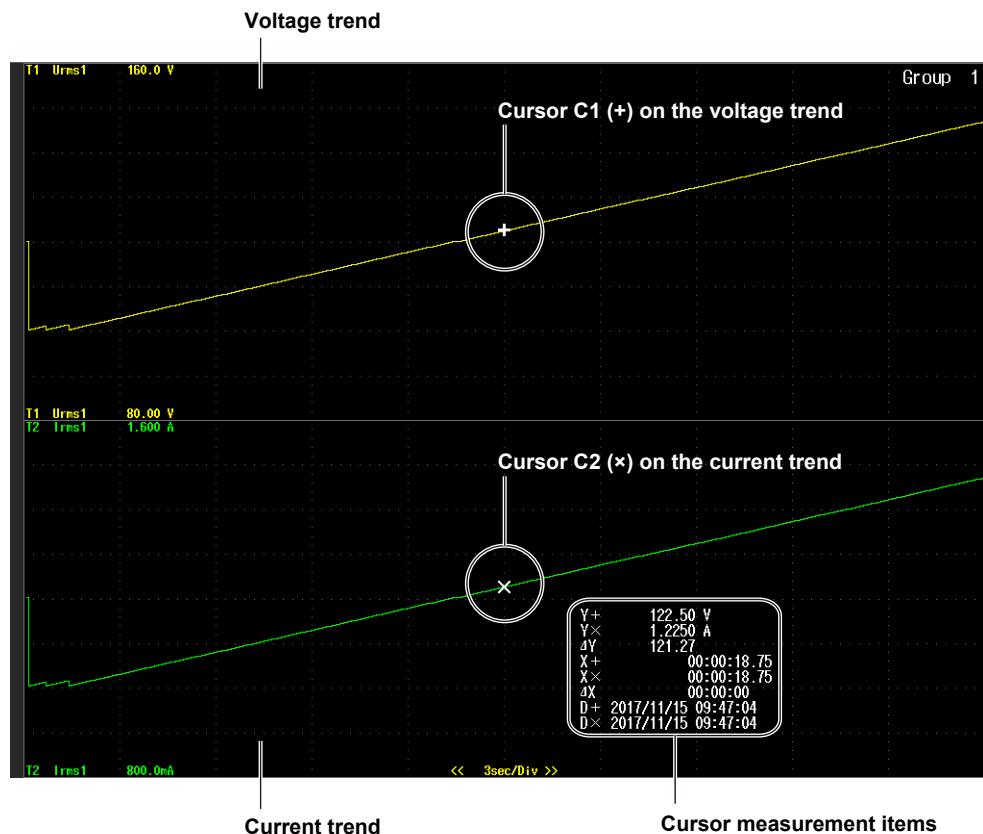
Using an example, this section explains how to display trend cursor measurement results.

In addition, this section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Menu Icons (see page iii)

Cursor Measurement on Trends (Example of voltage and current)

Trend display of input element 1



Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under **SETUP**.
2. Tap **Computation/Output** tab. A computation and output settings overview screen appears. Pressing **ESC** closes the overview screen.
3. Tap **Display**.

A display format setup screen (Numeric/Graph) appears. For details, see section 6.1.

Setting the Graph Display Type (Graph)

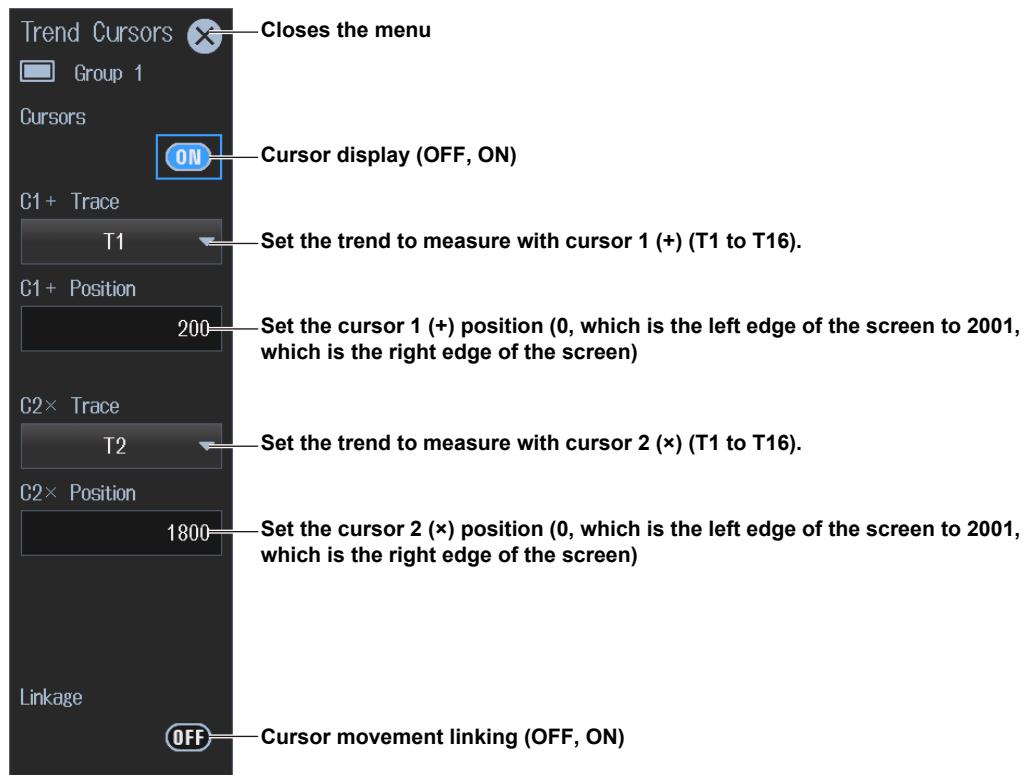
4. Tap **Graph** to select Trend.

Note

For instructions on how to display the waveforms, see sections 6.1 and 6.3.

Displaying the Cursors (Cursors)

5. Tap **Cursors**. A Trend Cursors screen appears.



Procedure Using the Menu Icons

You can also use the menu icons shown on the right side of the screen to switch the displayed items.

1. Tap the **Display** menu icon . A Display menu appears in the sub menu area on the right side of the screen.

By tapping the displayed items, you can specify the same operation as explained in "Switching the Displayed Items" described earlier.

Note

For a description of the Display menu screen, see "Menu Icons" on page v.

12.3 Cursor Measurement on Bar Graphs

This instrument shows on the screen the harmonic orders and magnitudes of the voltage, current, and the like applied to the input elements with bar graphs. When you place cursors on the bar graphs, the instrument shows the measured values at the cursor positions.

► “[Cursor Measurement \(Cursors\)](#)” in the features guide

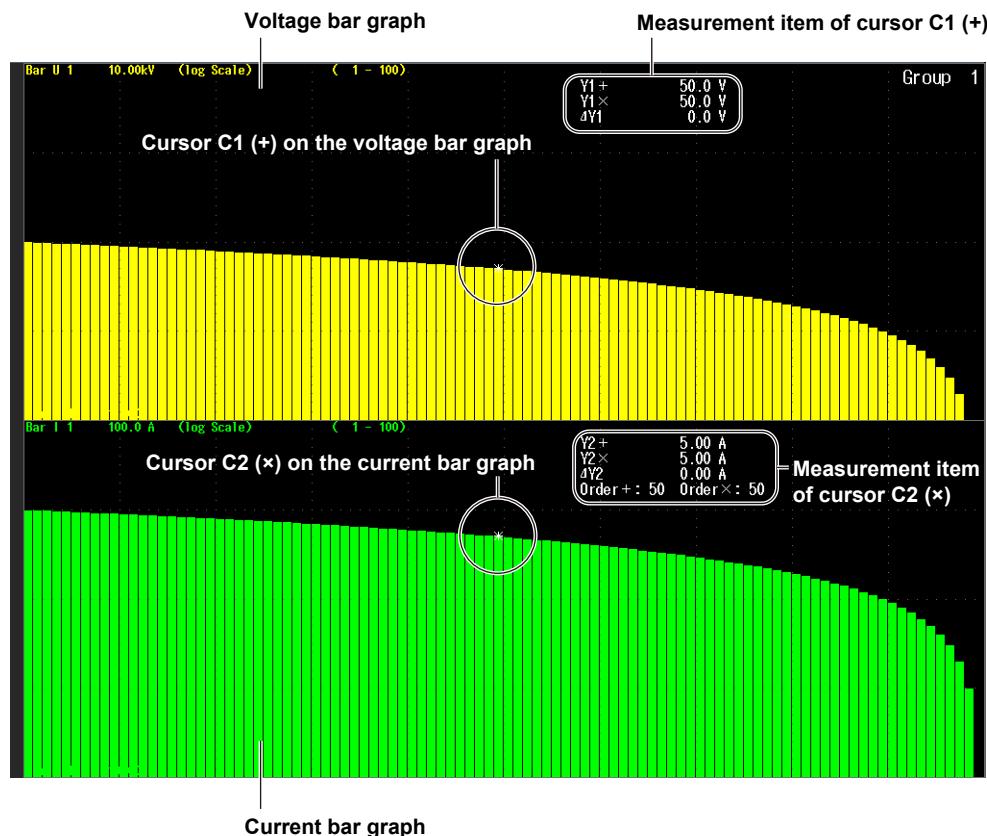
Using an example, this section explains how to display bar graph cursor measurement results.

In addition, this section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Menu Icons (see page iii)

Cursor Measurement on Bar Graphs (Example of voltage and current)

Bar graph display of input element 1



Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under **SETUP**.
2. Tap **Computation/Output** tab. A computation and output settings overview screen appears. Pressing **ESC** closes the overview screen.
3. Tap **Display**.

A display format setup screen (Numeric/Graph) appears. For details, see section 6.1.

Setting the Graph Display Type (Graph)

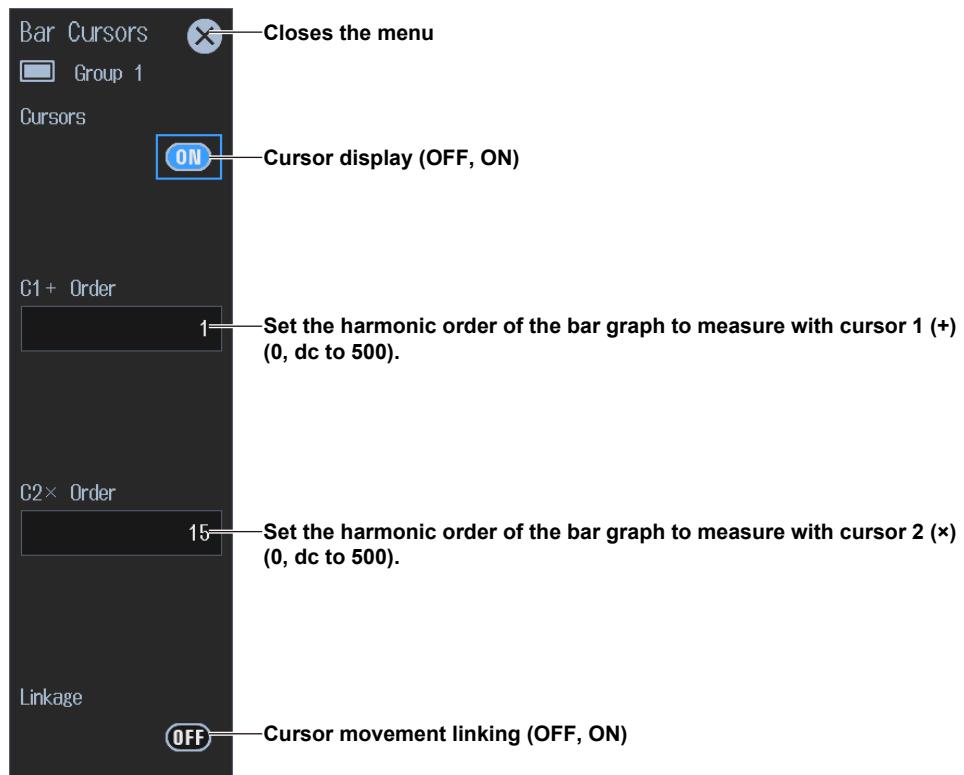
4. Tap **Graph** to select Bar.

Note

For instructions on how to display the waveforms, see sections 6.1 and 6.3.

Displaying the Cursors (Cursors)

5. Tap **Cursors**. The following screen appears.



Procedure Using the Menu Icons

You can also use the menu icons shown on the right side of the screen to switch the displayed items.

1. Tap the **Display** menu icon . A Display menu appears in the sub menu area on the right side of the screen.

By tapping the displayed items, you can specify the same operation as explained in "Switching the Displayed Items" described earlier.

Note

For a description of the Display menu screen, see "Menu Icons" on page v.

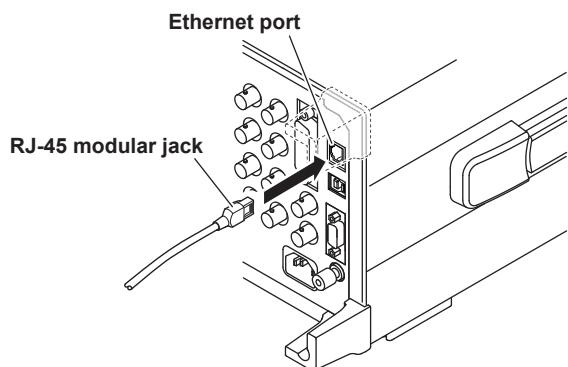
13.1 Connecting the Instrument to a Network

This section explains how to connect the instrument to a network.

Ethernet Interface Specifications

There is a 1000BASE-T port located on the rear panel of this instrument.

Item	Specifications
Ports	1
Electrical and mechanical specifications	IEEE802.3 compliant, Auto-MDIX
Transmission system	Ethernet(1000BASE-T/100BASE-TX/10BASE-T)
Communication protocol	TCP/IP
Supported services	Server: FTP and VXI-11 Client: FTP (Net Drive), SNTP, DHCP, and DNS
Connector type	RJ-45 connector



Items Required to Connect the Instrument to a Network

Cable

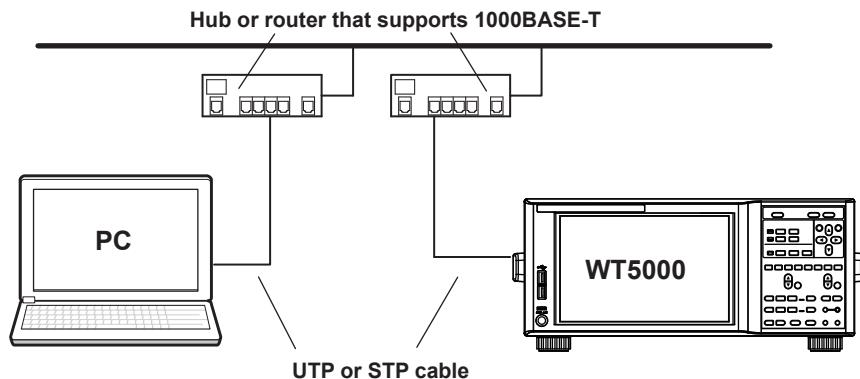
Use one of the following types of network cable that conforms to the transfer speed of your network.

- A UTP (Unshielded Twisted-Pair) cable
- An STP (Shielded Twisted-Pair) cable

Connection Procedure

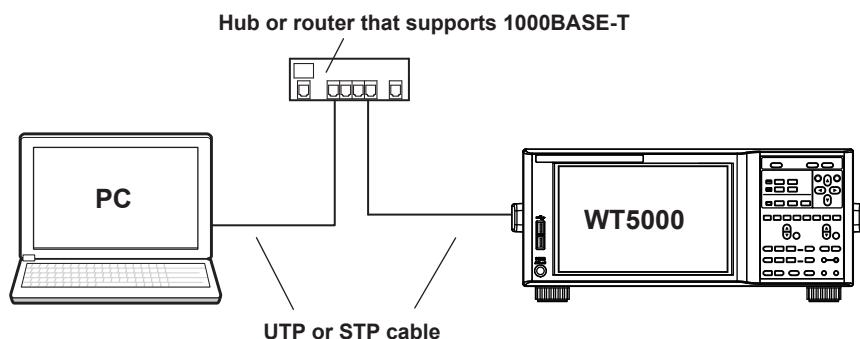
To Connect to a PC over a Network

1. Turn off the instrument.
2. Connect one end of a UTP (or STP) cable to the ETHERNET 1000BASE-T port on the rear panel.
3. Connect the other end of the UTP (or STP) cable to a hub or router.
4. Turn on the instrument.



To Connect to a PC through a Hub or Router

1. Turn off the instrument and the PC.
2. Connect one end of a UTP (or STP) cable to the ETHERNET 1000BASE-T port on the rear panel.
3. Connect the other end of the UTP (or STP) cable to a hub or router.
4. Connect the PC to the hub or router in the same way.
5. Turn on the instrument.



Note

- Use a hub or router that conforms to the transfer speed of your network.
 - When you connect a PC to the instrument through a hub or router, the PC must be equipped with an auto switching 1000BASE-T/100BASE-TX/10BASE-T network card.
 - Do not connect the instrument to a PC directly. Direct communication without a hub or router is not guaranteed to work.
-

13.2 Configuring the TCP/IP Settings

▶ “TCP/IP (TCP/IP)” in the features guide

This section explains operating procedures using the following setup methods.

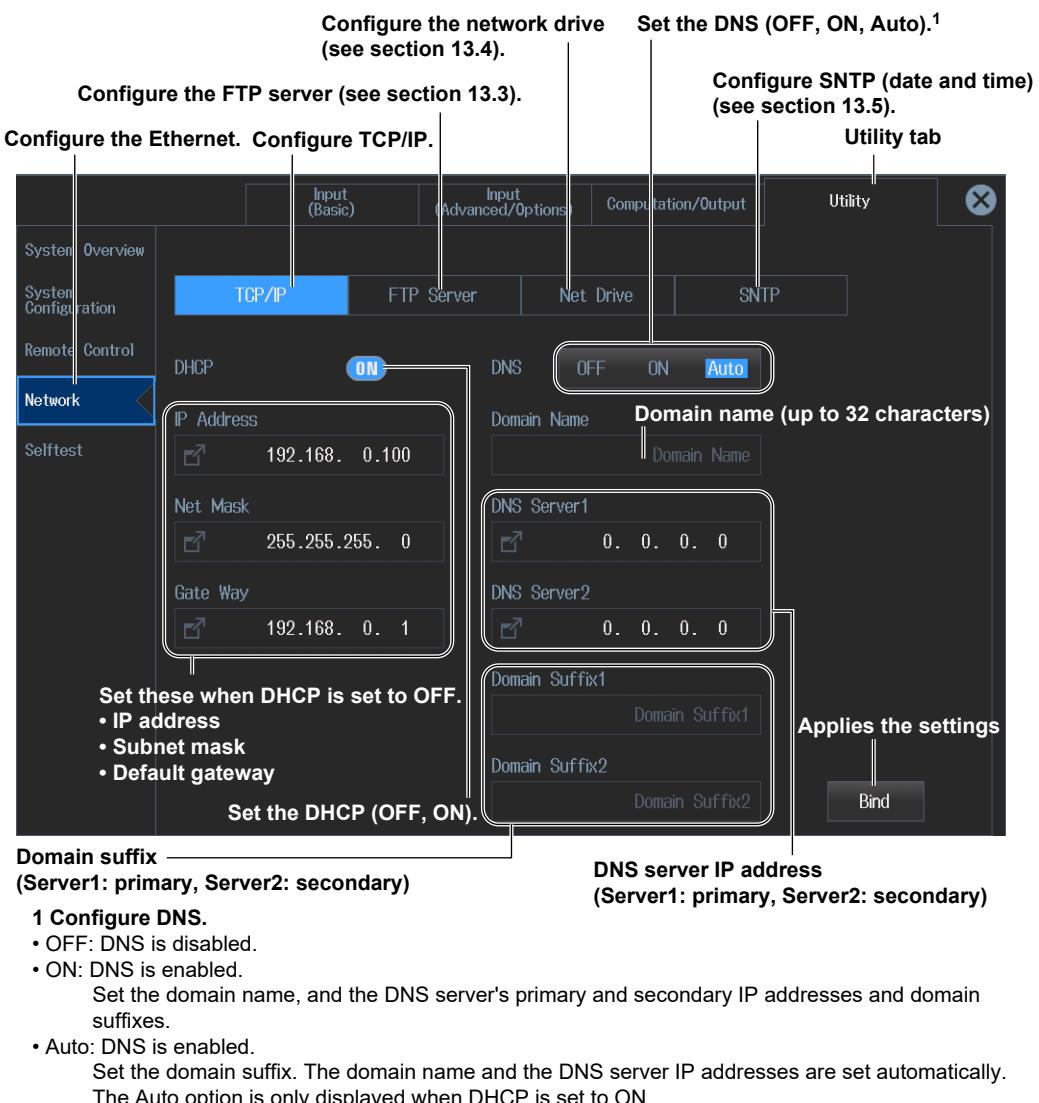
- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Keys (other than SETUP) (see section 1.2 in IM WT5000-03EN)

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.
Pressing **ESC** closes the overview screen.
3. Tap **Network**.
An Ethernet setup screen (TCP/IP, FTP Server, Net Drive, SNTP) appears.

Configuring the TCP/IP Settings (TCP/IP)

4. Tap **TCP/IP**. A TCP/IP screen appears.



13.2 Configuring the TCP/IP Settings

Note

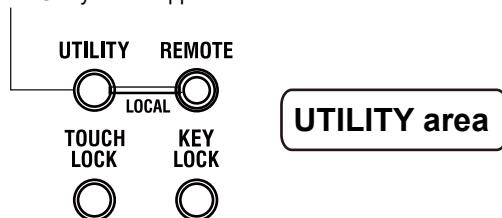
You can also display the utility settings overview screen by moving the cursor on the Utility tab using the arrow keys and then pressing SET.

Procedure Using Keys

You can also use the front panel keys to configure Ethernet communication.

Configure Ethernet communication.

The Utility menu appears.



13.3 Accessing the Instrument from a PC (FTP Server)

▶ “FTP Server (FTP Server)” in the features guide

This section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Keys (other than SETUP) (see section 1.2 in IM WT5000-03EN)

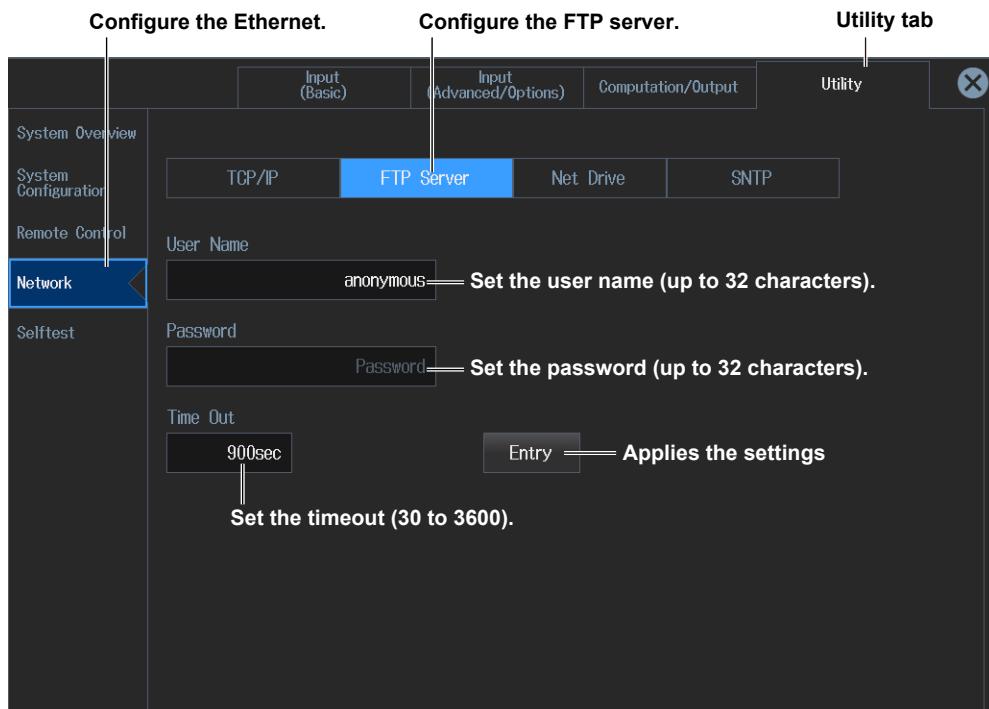
Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under SETUP.
2. Tap the **Utility** tab. The utility settings overview screen appears.
Pressing **ESC** closes the overview screen.
3. Tap **Network**.

An Ethernet setup screen (TCP/IP, FTP Server, Net Drive, SNTP) appears.

Configuring the FTP Server (FTP Server)

4. Tap **FTP Server**. An FTP Server screen appears.



Note

- If you set the user name to “anonymous,” you can connect to the instrument without entering a password.
- 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.

FTP Client Software

Start an FTP client on a PC.

Enter the user name and password that you entered on the screen shown above to connect to the instrument.

Procedure Using Keys

See section 13.2.

13.4 Connecting to a Network Drive

► “Network Drive (Net Drive)” in the features guide

This section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Keys (other than SETUP) (see section 1.2 in IM WT5000-03EN)

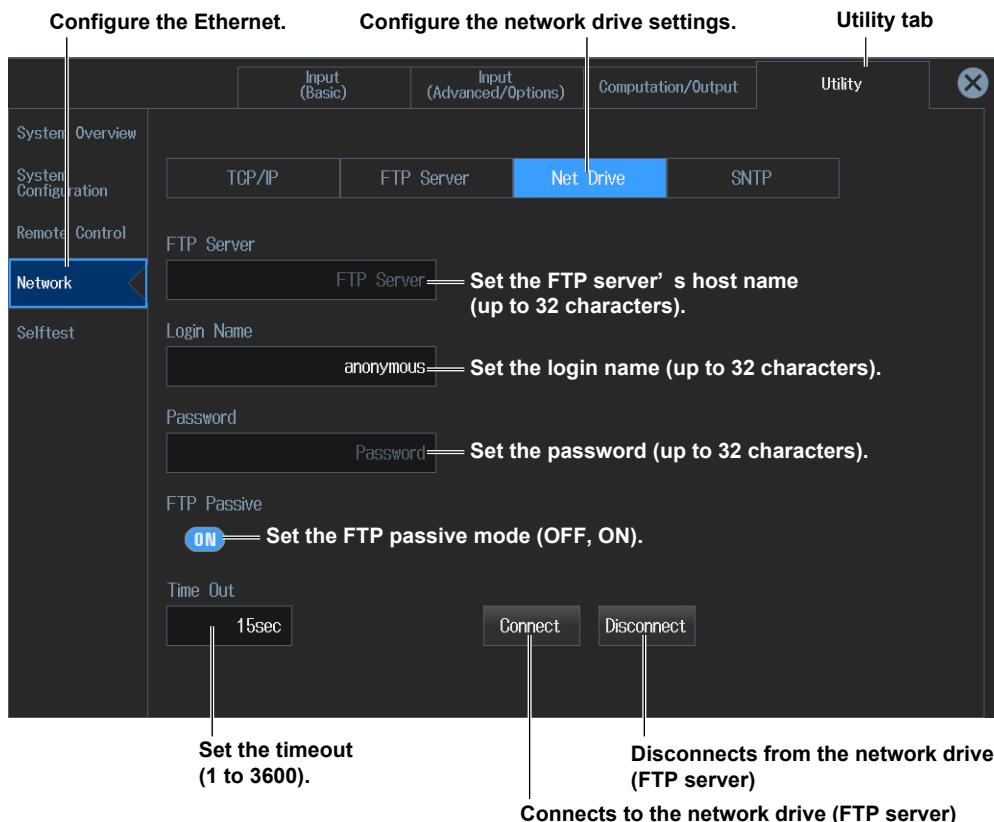
Procedure Using the Setup Menu

1. Tap the **Setup** icon , or press **MENU** under **SETUP**.
2. Tap the **Utility** tab. The utility settings overview screen appears.
Pressing **ESC** closes the overview screen.
3. Tap **Network**.

An Ethernet setup screen (TCP/IP, FTP Server, Net Drive, SNTP) appears.

Configuring the Network Drive (Net Drive)

4. Tap **Net Drive**. A Net Drive 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 Keys

See section 13.2.

13.5 Setting the Date and Time via SNTP

► “[SNTP \(SNTP\)](#)” in the features guide

This section explains operating procedures using the following setup methods.

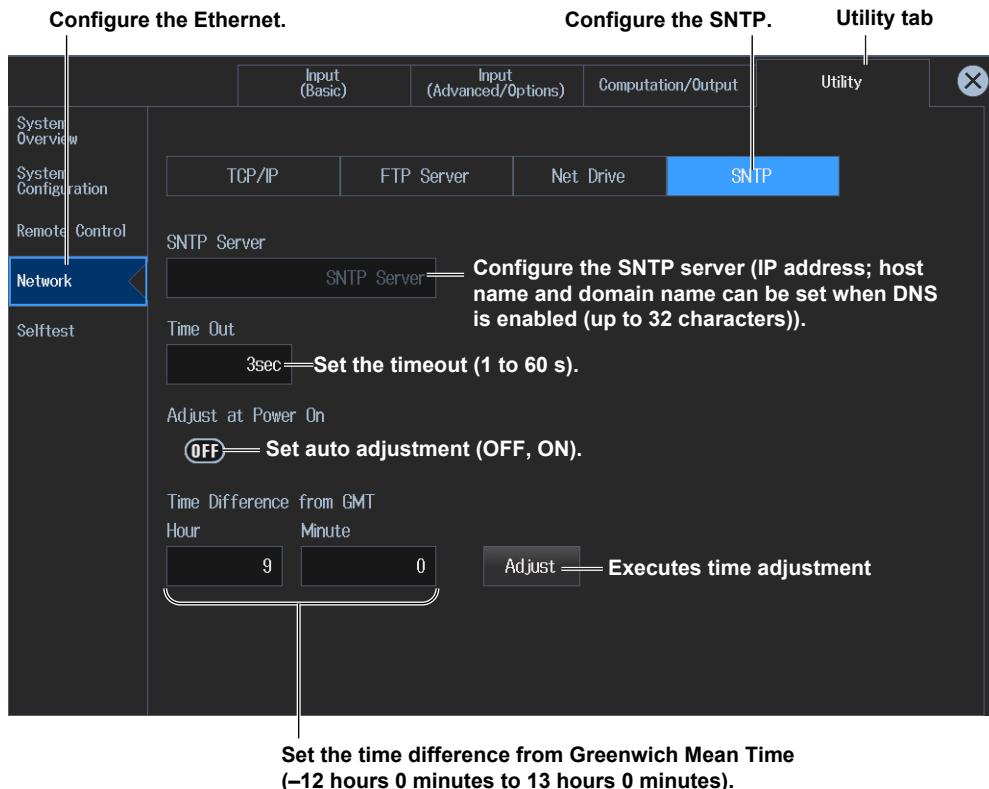
- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Keys (other than SETUP) (see section 1.2 in IM WT5000-03EN)

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.
Pressing **ESC** closes the overview screen.
3. Tap **Network**.
An Ethernet setup screen (TCP/IP, FTP Server, Net Drive, SNTP) appears.

Configuring the SNTP Settings (SNTP)

4. Tap **SNTP**. An SNTP 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 Keys

See section 13.2.

14.1 Remote Control

► “Remote Control (Remote Control)” in the features guide

This section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Keys (other than SETUP) (see section 1.2 in IM WT5000-03EN)

Procedure Using the Setup Menu

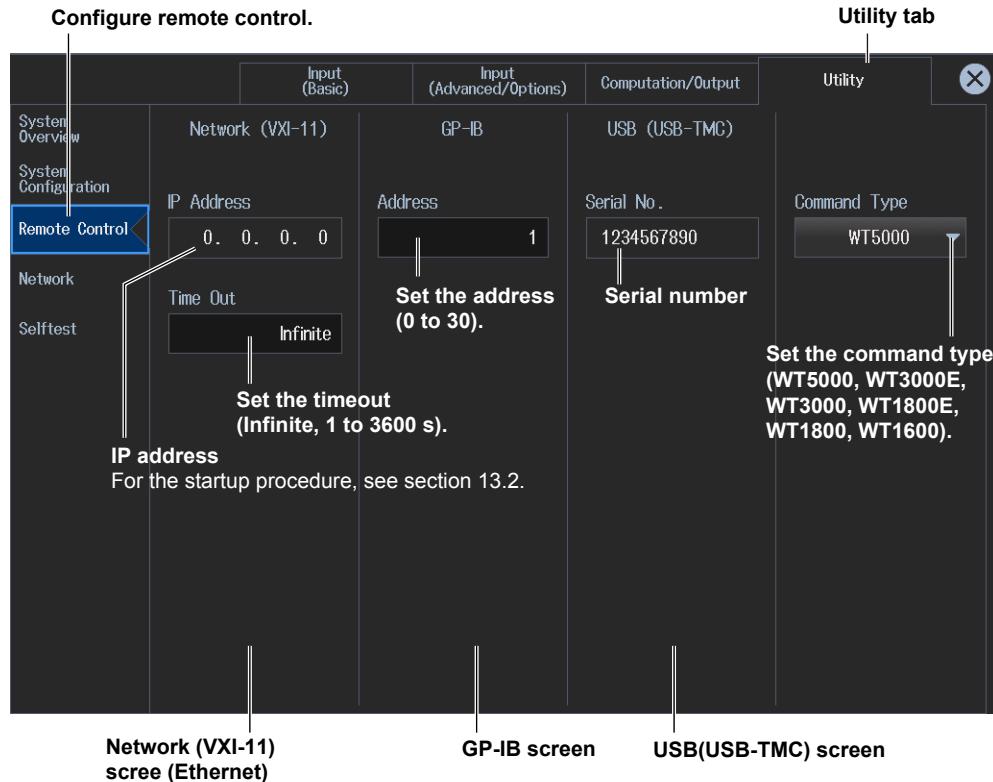
1. Tap the **Setup** icon , or press **MENU** under **SETUP**.
2. Tap the **Utility** tab. The utility settings overview screen appears.

Pressing **ESC** closes the overview screen.

Remote Control Settings (Remote Control)

3. Tap **Remote Control**.

A remote control setup screen (Network(VXI-11/GP-IB/USB(USB-TMC)) appears.



Note

- Only use one communication interface: GP-IB, USB, or Network. If you send commands simultaneously from more than one communication interface, the instrument will not execute the commands properly.
- 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.

Network (VXI-11)

To use the Ethernet interface, you must specify the following TCP/IP settings.

- IP address
- Subnet mask
- Default gateway

For details on setting these parameters, see section 13.2.

USB Settings

- Install the YOKOGAWA USB driver on your PC. For information about how to obtain the YOKOGAWA USB driver, contact your nearest YOKOGAWA dealer. You can also access the YOKOGAWA USB driver download web page and download the driver.
<http://www.yokogawa.com/jp-ymi/tm/F-SOFT/>
- Do not use USB drivers (or software) supplied by other companies.

GP-IB Settings

- When the controller is communicating with the instrument or with other devices through GP-IB, do not change the address.
- Each device that is connected in a GP-IB system has its own unique address. This address is used to distinguish between different devices. Therefore, you must assign a unique address to the instrument when connecting it to a PC or other device.

Command Type

Specify the command type compatible with this instrument or legacy models (WT3000E, WT3000, WT1800E, WT1800, WT1600).

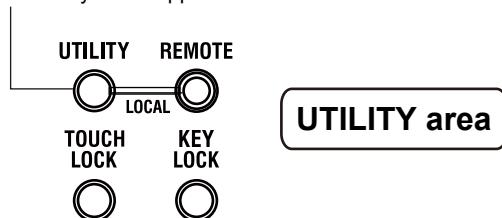
The response to the *IDN? and *OPT? commands will be according to the model of the specified command type.

Procedure Using Keys

You can also use the front panel keys to configure remote control.

Configure remote control.

The Utility menu appears.



14.2 Configuring the DA Output (option)

► “D/A Output (D/A Output, option)” in the features guide

This section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Keys (other than SETUP) (see section 1.2 in IM WT5000-03EN)

Procedure Using the Setup Menu

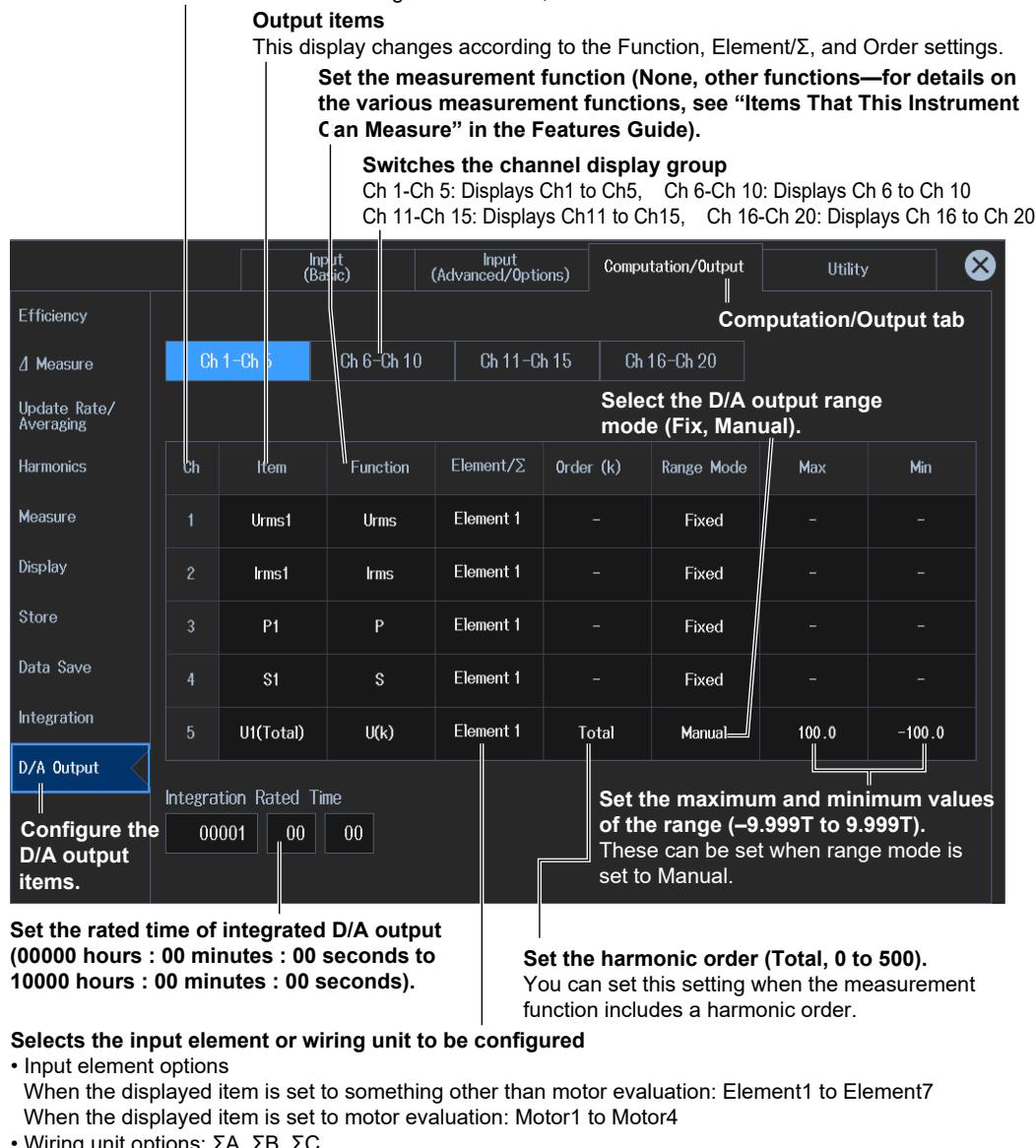
1. Tap the **Setup** icon , or press **MENU** under SETUP.
2. Tap **Computation/Output** tab. A computation and output settings overview screen appears. Pressing **ESC** closes the overview screen.

Configuring the DA Output (D/A Output)

3. Tap **D/A Output**. A DA output setup screen appears.

D/A output signal name

For details on the connector pinout and the D/A output signal assignment, see section 4.6 in the Getting Started Guide, IM WT5000-03EN.



The screenshot shows the DA Output configuration screen with several callouts explaining different parameters:

- Output items**: This display changes according to the Function, Element/ Σ , and Order settings.
- Set the measurement function (None, other functions—for details on the various measurement functions, see “Items That This Instrument Can Measure” in the Features Guide).**
- Switches the channel display group**: Ch 1-Ch 5: Displays Ch1 to Ch5, Ch 6-Ch 10: Displays Ch 6 to Ch 10, Ch 11-Ch 15: Displays Ch11 to Ch15, Ch 16-Ch 20: Displays Ch 16 to Ch 20
- Select the D/A output range mode (Fix, Manual).**
- Set the maximum and minimum values of the range (-9.999T to 9.999T).** These can be set when range mode is set to Manual.
- Set the rated time of integrated D/A output (00000 hours : 00 minutes : 00 seconds to 10000 hours : 00 minutes : 00 seconds).**
- Selects the input element or wiring unit to be configured**
 - Input element options
When the displayed item is set to something other than motor evaluation: Element1 to Element7
When the displayed item is set to motor evaluation: Motor1 to Motor4
 - Wiring unit options: ΣA , ΣB , ΣC

14.2 Configuring the DA Output (option)

Note

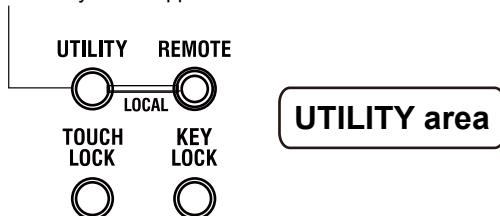
You can also display the computation/output settings overview screen by moving the cursor on the Computation/Output tab using the arrow keys and then pressing SET.

Procedure Using Keys

You can also use the front panel keys to configure the D/A output.

Configure the D/A output items.

The Utility menu appears.



14.3 Setting the Message, Menu, and USB Keyboard Languages

► “System Configuration (System Configuration)” in the features guide

This section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Keys (other than SETUP) (see section 1.2 in IM WT5000-03EN)

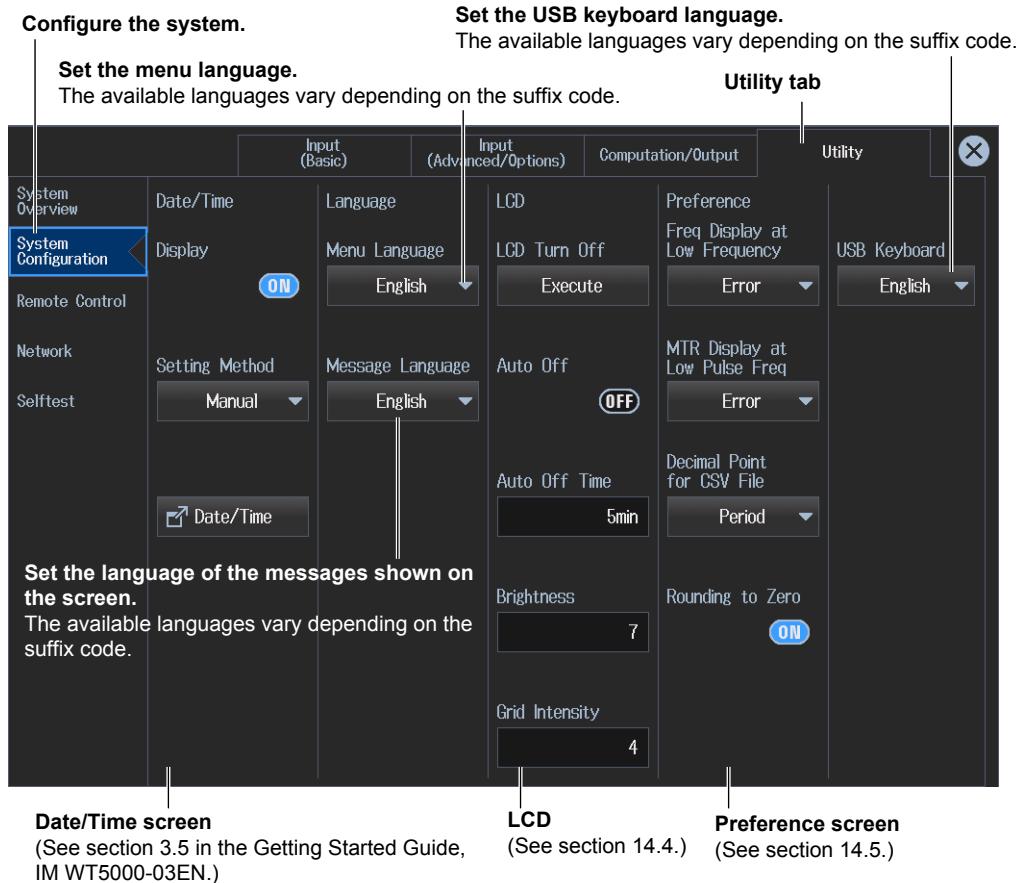
Procedure Using the Setup Menu

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

Setting the Language and USB Keyboard (Language, USB Keyboard)

3. Tap **System Configuration**.

A system setup (Date/Time, Language, LCD, Preference) appears.



Note

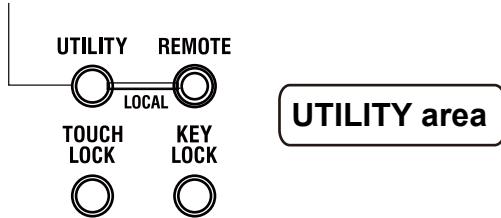
You can also display the utility settings overview screen by moving the cursor on the Utility tab using the arrow keys and then pressing SET.

Procedure Using Keys

You can also use the front panel keys to configure the system.

Configure the system.

The Utility menu appears.



14.4 Setting the Screen Brightness and Turning the Screen Off

► “System Configuration (System Configuration)” in the features guide

This section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Keys (other than SETUP) (see section 1.2 in IM WT5000-03EN)

Procedure Using the Setup Menu

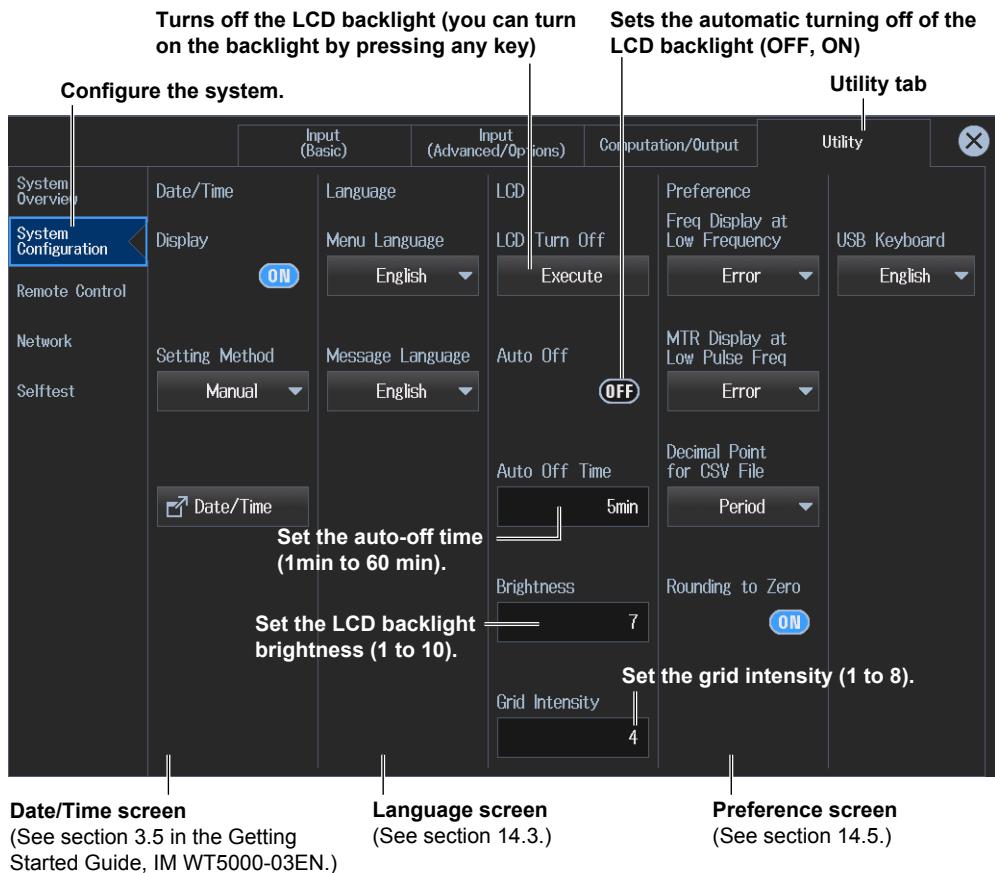
1. Tap the **Setup** icon , or press **MENU** under SETUP.
2. Tap the **Utility** tab. The utility settings overview screen appears.

Pressing **ESC** closes the overview screen.

Setting the Screen Brightness and Turning the Screen Off (LCD)

3. Tap **System Configuration**.

A system setup (Date/Time, Language, LCD, Preference) 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 Keys

See section 14.3.

14.5 Environment Settings (Preference)

► “System Configuration (System Configuration)” in the features guide

This section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Keys (other than SETUP) (see section 1.2 in IM WT5000-03EN)

Procedure Using the Setup Menu

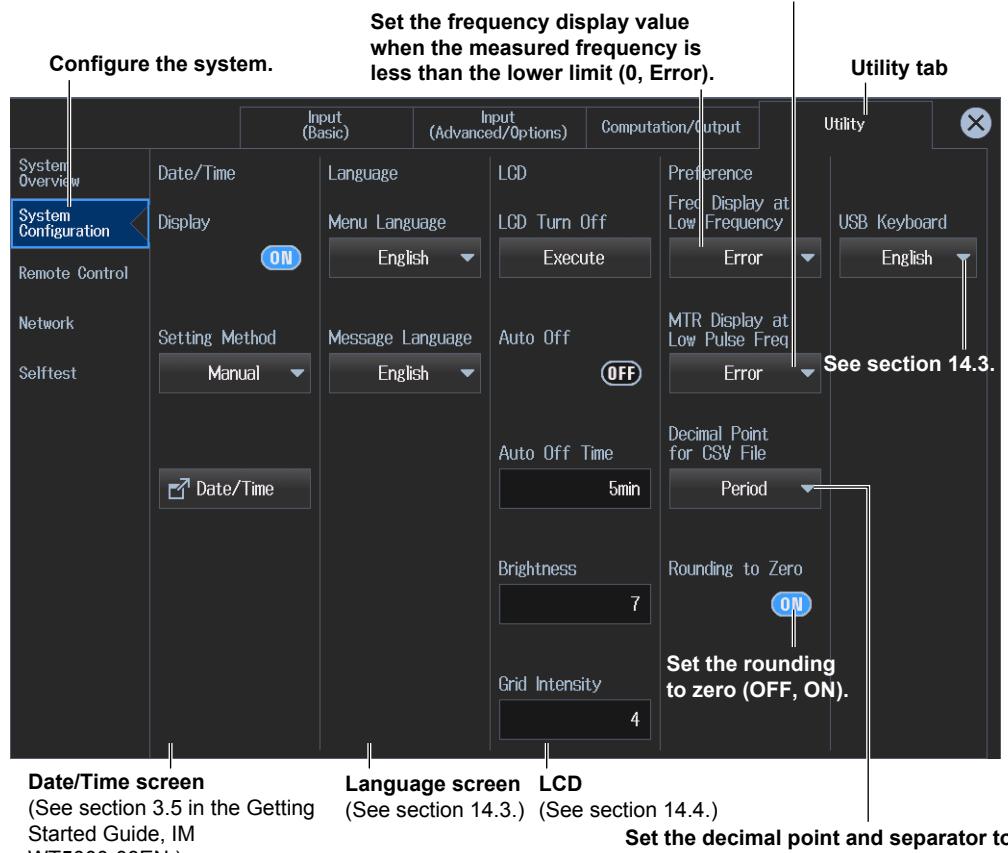
1. Tap the **Setup** icon , or press **MENU** under SETUP.
2. Tap the **Utility** tab. The utility settings overview screen appears.
Pressing **ESC** closes the overview screen.

Environment Settings (Preference)

3. Tap **System Configuration**.

A system setup (Date/Time, Language, LCD, Preference) appears.

On models with the /MTR option, set the motor display value when the measured pulse frequency is less than the lower limit (0, Error).



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 Keys

See section 14.3.

14.6 Self-Test

► “**Self-Test (Selftest)**” in the Features Guide

This section explains operating procedures using the following setup methods.

- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Keys (other than SETUP) (see section 1.2 in IM WT5000-03EN)

Procedure Using the Setup Menu

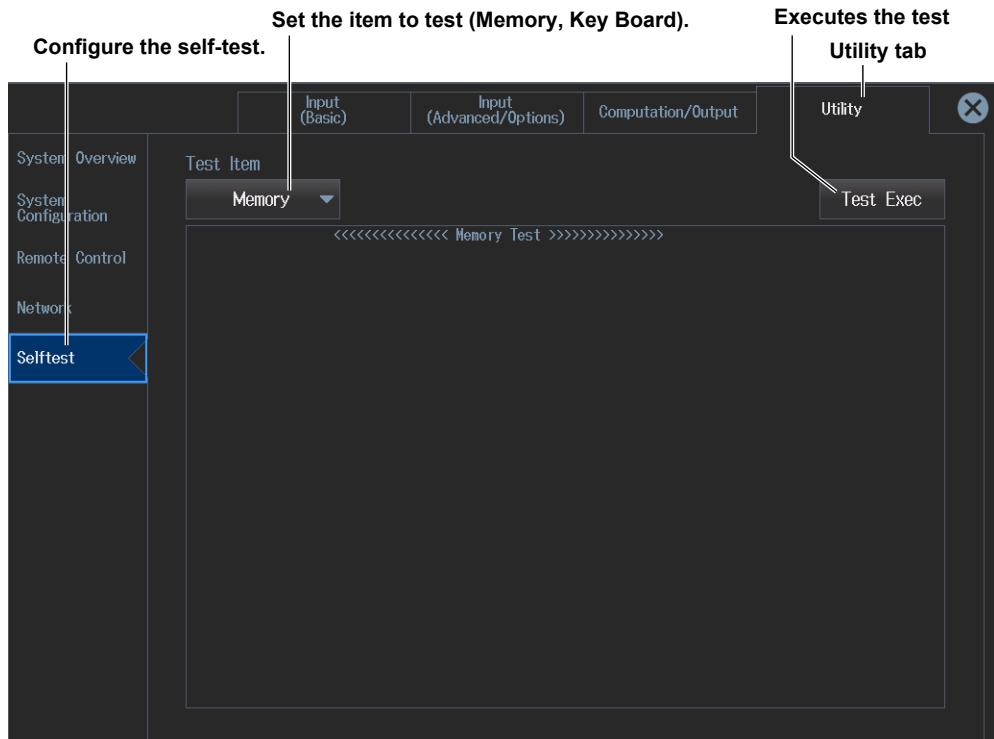
1. Tap the **Setup** icon , or press **MENU** under SETUP.
2. Tap the **Utility** tab. The utility settings overview screen appears.
Pressing **ESC** closes the overview screen.

Self-test (Selftest)

3. Tap **Selftest**.
A self-test screen appears.

Memory Test

4. Tap **Test Item** to select Memory.

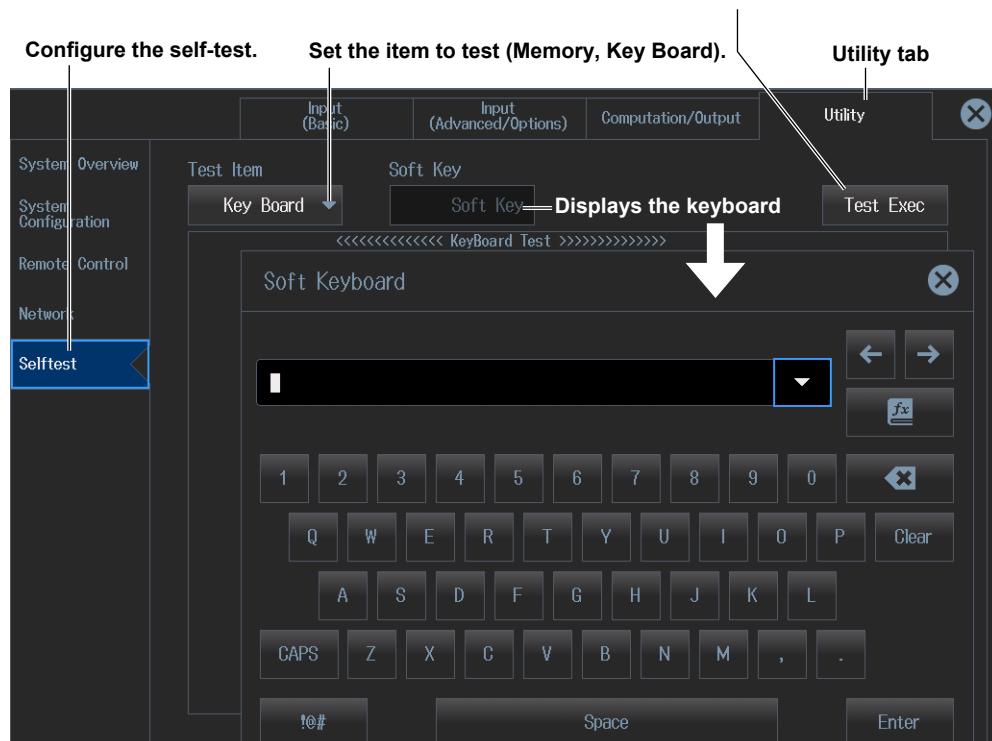


Executing the Soft Keyboard Test

4. Tap **Test Item** to select Key Board.
- **Front Panel Key Test**
5. Tap **Test Exec**. A front panel key test and indicator test will be executed.

Executes the test

This self-test tests the panel keys and indicators.



• **Onscreen Soft Keyboard Test**

5. Tap **Soft Key**. A soft keyboard appears.
6. Tap **Test Exec**. A soft keyboard test will be executed.

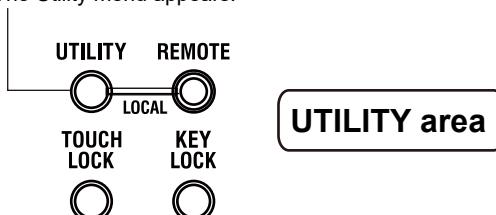
Note

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 Keys

You can also use the front panel keys to set the self-test.

Configure the self-test.
The Utility menu appears.



14.7 Viewing System Information (Overview)

► “Instrument Information (System Overview)” in the features guide

This section explains operating procedures using the following setup methods.

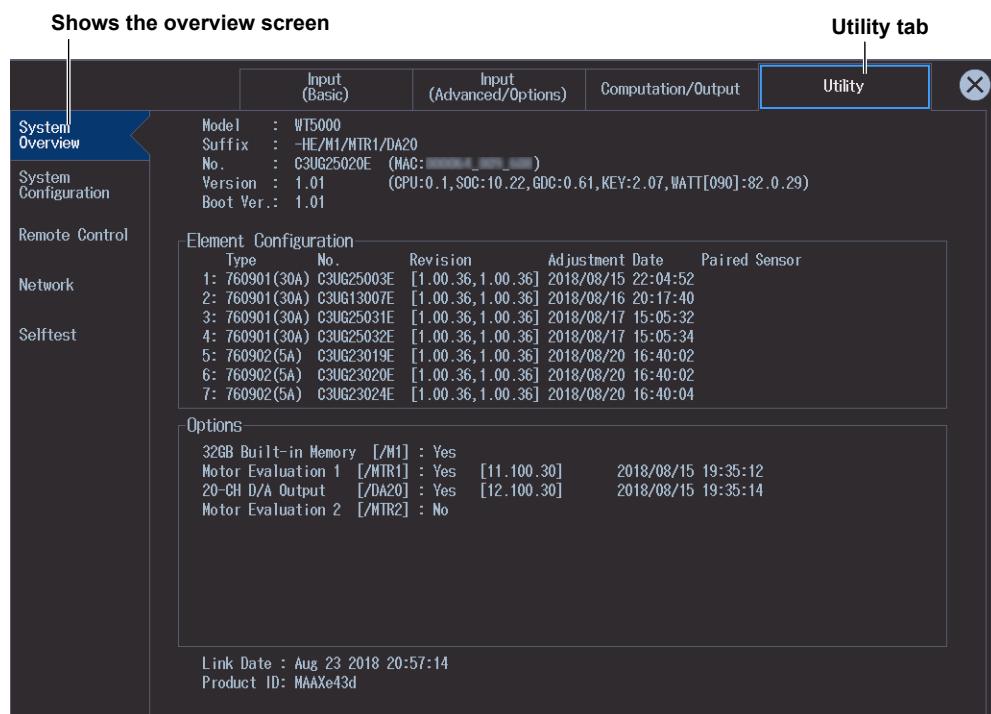
- Procedure Using the Setup Menu (see chapter 1)
- Procedure Using the Keys (other than SETUP) (see section 1.2 in IM WT5000-03EN)

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.
Pressing **ESC** closes the overview screen.

System Information List (System Overview)

3. Tap **System Overview**.
A system information overview appears.



Displayed Information

Model	The model number
Suffix	The suffix code
No.	The instrument number
Version	The firmware version
Boot Ver.	The boot program version
Element Configuration	The input element types
Options	The options
Link Date	The date and time that the firmware was created
Product ID	A unique number assigned to each instrument (necessary for the purchase of additional options)

14.7 Viewing System Information (Overview)

Note

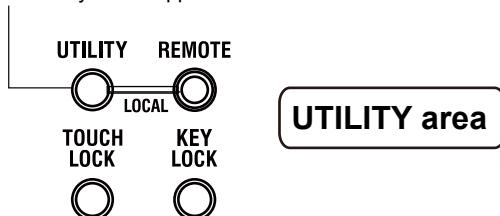
You can also display the utility settings overview screen by moving the cursor on the Utility tab using the arrow keys and then pressing SET.

Procedure Using Keys

You can also use the front panel keys to display the system overview.

Shows the setup information (overview).

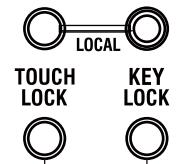
The Utility menu appears.



14.8 Locking the Touch Panel and Front Panel Operations

You can lock the operation of the instrument to prevent affecting the measurement operation as a result of accidentally tapping the touch panel or pressing the front panel keys.

UTILITY REMOTE



UTILITY area

Locks the front panel key operation

Press this key to lock the keys on the front panel. The key illuminates.
Press the key again to clear that state.

Locks the touch panel operation

Press this key to lock touch panel. The key illuminates.
Press the key again to clear that state.

Note

In remote mode (REMOTE LED lit), the front panel nor the touch panel can be used. To release remote mode, press UTILITY. For details on remote mode, see the communication interface user's manual, IM WT5000-17EN.

Appendix 1 Messages and Corrective Actions

Messages

Messages may appear on the screen while you are using this instrument. This section describes the error messages and how to respond to them. You can display the messages in the language that you specify through the operations explained in section 14.3. If servicing is necessary to solve the problem indicated by a message, contact your nearest YOKOGAWA dealer.

In addition to the following error messages, there are also communications error messages. These messages are explained in the communication interface user's manual, IM WT5000-17EN.

Warning Messages (1 to 99)

Code	Message	Chapter or Section
3	Turned on pressing the ESC key. The system has been initialized.	3.6 ¹
11	Cannot measure PLL frequency. Check input level.	5.1
12	File access slow. Too many files in directory or medium read/write speed slow.	8.6
64	File access is aborted.	—
80	System Configuration was changed. The system has been initialized.	—
81	Input element configuration was changed. The system has been initialized.	—
84	Key lock is enabled. To release the lock, press the KEY LOCK key.	1.2 ¹
85	In remote control mode, all keys are locked except LOCAL (UTILITY) key. Please hit LOCAL (UTILITY) key to exit the remote control mode.	Chapters 1 to 3 ²
86	In Local Lockout mode, all keys are locked. Please cancel the local lockout.	Chapters 1 to 3 ²
87	Firmware was changed. The system has been initialized.	—
89	Processing system settings change. Please wait for a moment.	—
90	This model has no external current sensor. Check the specifications to see whether or not the optional external current sensor is provided.	14.7
92	This model has no harmonics measurement. Check the specifications to see whether or not the optional harmonics measurement is provided.	14.7
93	This model has neither motor evaluation function or auxiliary input. Check the specifications to see whether or not the optional motor evaluation function and the optional auxiliary input are provided.	14.7
97	There are measure conditions which make sigma functions unmeasurable. All or part of sigma functions will not be measured.	2.1
98	External Sync interval has gone out of range. Check External Sync (MEAS START) input.	4.2 ¹

1 Getting Started Guide, IM WT5000-03EN

2 Communication Interface User's Manual, IM WT5000-17EN

Appendix 1 Messages and Corrective Actions

Setup Error Messages (500 to 899)

Code	Message	Chapter or Section
600	File access failure.	—
601	Invalid file name. Check the file name.	8.2
602, 603	No USB device or no storage media inserted. Check the USB device connection, and the existence of a storage medium in the drive.	8.1
604	Media failure. Check the storage medium.	8.1
605	File not found. Check the filename and the storage medium.	—
606	Media is protected. Set the disk's(medium's) write protect switch to OFF.	—
607	Media was removed while accessing. Check the storage medium.	8.1
608, 609	File already exists.	—
610	Contains invalid characters.	8.2
611, 612	Media full. Delete unnecessary file(s) or use another disk.	8.6
613	Cannot delete a directory if there are files in the directory.	8.6
614	File is protected.	—
615	Physical format error. Reformat the medium. If the same error occurs, the instrument is probably unable to execute a format on this medium.	—
616 to 620,	File system failure.	—
622 to 641	Check using another disk. If the same message still appears, maintenance service is required.	—
621	File is damaged. Check the file.	—
643 to 653,	Media failure.	—
659, 660	Check the medium.	—
656	Cannot save more than 256 item to the root directory. Change save destination or delete files/directories from the root directory.	8.2
662	File operation is interrupted.	—
663	File unknown format. Check the file format.	1.5
665	Cannot load this file format. File was stored on other models or other versions.	—
666	File is now being accessed. Execute after access is made.	—
675	Cannot load this file. Model/options do not conform.	—
676	Writing prohibited in this file.	—
677	An error occurred while network access. Confirm network conditions.	Chapter 13
690	Cannot execute for the directory depth is 10 or more.	—
691	Cannot execute because of source and destination are over lapped.	—
692	Cannot execute for the media itself.	—
693	Cannot store at Network Drive.	7.3
694	Trigger Event is Off.	3.5

Appendix 1 Messages and Corrective Actions

Code	Message	Chapter or Section
695	File version is new. Update firmware.	—
696	The file may be damaged or an unsuccessful file close could have occurred.	—
697	Abnormal data file. Unsuccessful finish of file save is detected.	—
705	Can not operate while accessing medium. Wait until access has completed.	—
706	Can not operate during hard copy. Wait until output has completed.	—
714	Cannot execute for All display mode.	—
720	Over Run had occurred.	—
721	Can not set or execute because store is processing. Try Again.	—
722	No target Element for integration execution.	4.1
723	Can not set or execute when Integ Independent Control is on.	4.1
724	Can not set or execute because recording is processing. Try again.	—
725	File creation stopped. File size exceeded 2G bytes.	—
726	Cannot start integration. In order to start, set Time/div for wave bigger than 0.01 ms.	6.2
750, 751	Unable to connect to the server. Check the network settings and configuration.	Chapter 13
752	This ftp function is not supported.	—
753	FTP Error: Client Handle Confirm the network settings and connection.	Chapter 13
758	Failed to acquire time from SNTP server. Confirm the network settings and connection.	13.5
759	Failed to initialize network. Confirm the network settings.	Chapter 13
800	Illegal date-time. Set the correct date and time.	3.5*
801	Illegal file name. The file name contains characters which are not allowed or the file name is not a valid MS-DOS file name. Enter another file name.	8.2
802	Cannot be set or executed in the Normal measurement mode. Usable measurement mode are as follows.	—

Appendix 1 Messages and Corrective Actions

Code	Message	Chapter or Section
812	Cannot be set or executed while storing data.	—
* Getting Started Guide, IM WT5000-03EN		
813	Cannot be set while integration is running. Reset Integration.	4.2
814	Cannot be set or executed when NULL is on. Please turn NULL off.	11.1
823	Cannot change during CAL. Wait until CAL is completed.	11.2
827	Illegal math expression. Input a correct computing equation.	4.1
831	Processing now. Retry setting or execution again.	—
841	Attempted to start integration after integration time has reached its preset value.	4.2
842	Attempted to start integration while integration is in progress.	4.2
843	Measurement stopped due to overflow during integration or due to a power failure.	4.2
844	Attempted to stop integration even though integration was not in progress.	4.2
845	Attempted to reset integration even though integration was in progress or integration mode was not selected.	4.2
846	Attempted to start integration while measurement of peak overflow was in progress.	—
847	Attempted to start integration in continuous integration mode when integration preset time was set to "0".	4.1
848	Attempted made to start integration in real time counting integration mode when the end time had already passed.	4.1
849	Attempted made to start storing in real time counting storing mode when the end time had already passed.	7.1
850	Cannot be set or executed at current store state. To set or execute, reset store.	7.4
852	Stored file is illegal. Initialize memory before storing.	7.4
854	Waveform display data not found.	—
855	Data destination memory is full. Saving has been stopped.	—
856	An error has occurred while storing. Storing has been stopped.	—
857	Cannot be set while Master/Slave Synchronized Measurement is set to Slave.	2.13
858	Store process is in progress now. Execute or set setting again.	—
859	Cannot convert selected file. Select a file with an extension of WTS or HDS.	7.3
862	Numeric data not found.	—
863	Cannot be set or executed when different types of elements are installed.	—
864	This wiring cannot be set as the first selected element.	2.1
865	Cannot be set while integration is running. Stop or reset Integration.	4.2
874	Sync source, PLL source or trigger source cannot be set to Ext Clk, while Master/Slave Synchronization Measurement is set to Slave.	2.13
875	Master/Slave Synchronization Measurement cannot be set to Slave, while sync source, PLL source or trigger source is set to Ext Clk.	2.13
876	Can not calculate from present point value.	9.1
877	Can not set 0 to count.	7.1
878	Can not set 0. Set to a value other than 0.	—
880	Cannot be set or executed while initialization. Wait until status changes to "Ready".	—
881	Cannot be set or executed while measurement is in progress. To set or execute, "Stop" measurement.	—
882	Stopped measurement. Detection error of measuring interval signal. Check External Sync (MEAS START) input.	4.2*
893	Invalid cutoff frequency setup. Set the cutoff frequencies so that the low pass filter's (LPF) cutoff frequency is higher than the high pass filter (HPF).	2.6

* Getting Started Guide, IM WT5000-03EN

System Error Messages (900 to 999)

Code	Message	Chapter or Section
901	Failed to backup setup data. The system has been initialized. Maintenance service is required.	—
902	System RAM failure. Maintenance service is required.	—
903	System ROM failure. Maintenance service is required.	—
904	Internal temperature is too high. Maintenance service is required. It will shutdown automatically.	—
905	Detected Sensed disconnection of input element. Turn Off the instrument and reinsert the input element. If this error continues or frequently occurs, maintenance service is required.	—
906	Fan stopped. Power off immediately. Maintenance service is required.	—
907	Backup battery is flat. Maintenance service is required to replace the back-up battery.	—
909	Illegal SUM value. Maintenance service is required.	—
911	Software exception has occurred. A firmware update may be required. Notify maintenance service the Service No. below.	—
915	EEPROM SUM error. EEPROM may be damaged. Maintenance service is required.	—
918	Input element1 is not installed. Turn Off the instrument and insert an input element to element1.	—
919	Option board cannot be detected. Maintenance service is required.	—
921	Failed in communication with devices. Maintenance service is required.	—
922	Failed in communication with devices. Maintenance service is required.	—
923	Transmit data abnormality from devices. Maintenance service is required.	—
926	The USB device's power consumption exceeded the capacity of the USB hub.	—
927	Disconnected USB device port 1, because overcurrent was detected.	—
928	Disconnected USB device port 2, because overcurrent was detected.	—
929	A USB mass storage device that is greater than 137 GB in capacity has been connected. Be careful in using this device. If an area exceeding 137 GB is accessed, the storage device may break.	—
931	Hardware configuration error occurred. Restart this machine. If it occurred again, maintenance service is required.	—
932	Error occurred while ImageFile process.	—
940	An element with an old version has been installed. The firmware may require an element version upgrade for correct measurement. Contact maintenance service for element update instructions.	—
941	A new element version or type has been installed. In order to make correct measurements or to measure with the new element types, upgrade the instrument's firmware.	—

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