

**WT1801E, WT1802E, WT1803E,
WT1804E, WT1805E, WT1806E
Precision Power Analyzer**

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

Thank you for purchasing the WT1801E, WT1802E, WT1803E, WT1804E, WT1805E, or WT1806E Precision Power Analyzer. This User's Manual explains how to use this instrument. To ensure correct use, please read this manual thoroughly before beginning operation.
Keep this manual in a safe place for quick reference in the event a question arises.

List of Manuals

The following manuals, including this one, are provided as manuals for this instrument. Please read all the manuals.

Manual Title	Manual No.	Description
WT1801E, WT1802E, WT1803E, WT1804E, WT1805E, WT1806E Precision Power Analyzer Features Guide	IM WT1801E-01EN	The supplied CD contains the PDF file of this manual. This manual explains all the features of this instrument other than the communication interface features.
WT1801E, WT1802E, WT1803E, WT1804E, WT1805E, WT1806E Precision Power Analyzer User's Manual	IM WT1801E-02EN	This manual. The supplied CD contains the PDF file of this manual. The manual explains how to operate this instrument.
WT1801E, WT1802E, WT1803E, WT1804E, WT1805E, WT1806E Precision Power Analyzer Getting Started Guide	IM WT1801E-03EN	This guide explains the handling precautions and basic operations of this instrument.
WT1801E, WT1802E, WT1803E, WT1804E, WT1805E, WT1806E Precision Power Analyzer Communication Interface User's Manual	IM WT1801E-17EN	The supplied CD contains the PDF file of this manual. This manual explains the communication interface features of this instrument and how to use them.
WT1801E, WT1802E, WT1803E, WT1804E, WT1805E, WT1806E Precision Power Analyzer	IM WT1801E-92Z1	Document for China

The "EN" 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 functionality. 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.
- Copying or reproducing all or any part of the contents of this manual without the permission of YOKOGAWA is strictly prohibited.
- The TCP/IP software of this product and the documents concerning it have been developed/created by YOKOGAWA based on the BSD Networking Software, Release 1 that has been licensed from the Regents of the University of California.

Trademarks

- Microsoft, Internet Explorer, MS-DOS, Windows, Windows Vista, Windows 7, Windows 8, Windows 8.1, and Windows 10 are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
- Adobe and Acrobat are either registered trademarks or trademarks of Adobe Systems Incorporated.
- Modbus is a registered trademark of AEG Schneider.
- In this manual, the ® and TM symbols do not accompany their respective registered trademark or trademark names.
- Other company and product names are registered trademarks or trademarks of their respective holders.

Revisions

- 1st Edition: September 2016
- 2nd Edition: June 2017
- 3rd Edition: October 2017

Symbols and Notation Used in This Manual

Notes and Cautions

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 proper operation of the instrument.

Units

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

Key Operation and Functions

Key Operation

How to Use Setup Menus That Appear When Keys Are Pressed

The operation after you press a key varies depending on the key that you press.



- A: Press the soft key to use the cursor keys to configure this setting. Use the cursor keys to set the value or select an item.
- B: A related setup menu appears when you press the soft key.
- C: The selected setting switches each time you press the soft key.
- D: A dialog box or the keyboard appears when you press the soft key. Use the cursor keys and the SET key to configure the settings.
- E: Press the soft key to display a selection menu. Press the soft key that corresponds to the appropriate setting.
- F: Press the soft key to use the cursor keys to configure this setting. After you configure the setting, the status of the selected setting switches each time you press the soft key.
- G: Press the soft key to execute the specified feature.
- H: Press the soft key to apply the value assigned to the key.

How to Display the Setup Menus That Are Written in Purple below the Keys

In the explanations in this manual, “SHIFT+key name (written in purple)” is used to indicate the following operation.

1. Press **SHIFT**. The SHIFT key lights to indicate that the keys are shifted. Now you can select the setup menus written in purple below the keys.
2. Press the key that you want to display the setup menu of.

ESC Key Operation

If you press **ESC** when a setup menu or available options are displayed, the screen returns to the menu level above the current one. If you press **ESC** when the highest level menu is displayed, the setup menu disappears.

RESET Key Operation

If you press **RESET** when you are using the cursor keys to set a value or select an item, the setting is reset to its default value (depending on the operating state of this instrument, the setting may not be reset).

SET Key Operations

The operation varies as indicated below depending on what you are setting.

- For a setup menu that has two values that you use the cursor keys to adjust Press **SET** to switch the value that the cursor keys adjust.
- For a menu that has the cursor keys + SET mark (◀+Ⓢ) displayed on it Press **SET** to confirm the selected item.

Cursor Keys Operations

The operation varies as indicated below depending on what you are setting.

- When setting a value
 - Up and down **cursor** keys: Increases and decreases the value
 - Left and right **cursor** keys: Changes which digit to set
- When selecting the item to set
 - Up and down **cursor** keys: Moves the cursor between settings

How to Enter Values in Setup Dialog Boxes

1. Use the keys to display the appropriate setup dialog box.
2. Use the **cursor** keys to move the cursor to the item that you want to set.
3. Press **SET**. The operation varies as indicated below depending on what you are setting.
 - A selection menu appears.
 - A check box is selected or cleared.
 - An item is selected.
 - A table of settings is selected.

Displaying a Selection Menu and Selecting an Item

Select OFF or ON.

Displays the selection menu

After selecting an item with the cursor keys, press SET to confirm it.

Setting Items in a Table

After moving the cursor to the table, press SET to select the setting that you want to change.

Use the cursor keys and the SET key to select a table entry.

How to Clear Setup Dialog Boxes

Press **ESC** to clear the setup dialog box from the screen.

Entering Values and Strings

Entering Values

Using the Cursor Keys to Enter Values

Select the appropriate item using the soft keys, and change the value using the cursor keys and the SET key. This manual sometimes describes this operation simply as “using the cursor keys.”



Note

Some items that you can set using the cursor keys are reset to their default values when you press the RESET key.

Entering Character Strings

Use the keyboard that appears on the screen to enter character strings such as file names and comments. Use the cursor keys and the SET key to operate the keyboard and enter a character string.

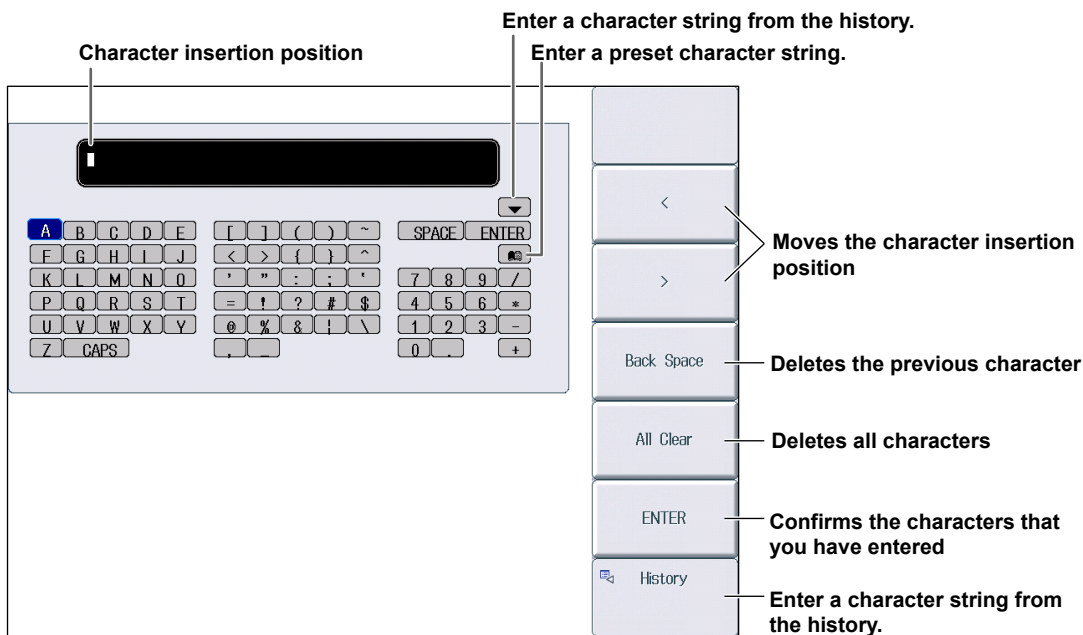
How to Operate the Keyboard

1. After bringing up the keyboard, use the **cursor** keys to move the cursor to the character that you want to enter.
2. Press **SET** to enter the character.
 - If a character string has already been entered, use the arrow soft keys (< and >) to move the cursor to the position you want to insert characters into.
 - To switch between uppercase and lowercase letters, move the cursor to **CAPS** on the keyboard, and then press **SET**.
 - To delete the previous character, press the **Back Space** soft key.
 - To delete all the characters, press the **All Clear** soft key.
3. Repeat steps 1 and 2 to enter all the characters in the string.
 - Select  on the keyboard or press the **History** soft key to display a list of character strings that you have entered previously. Use the cursor keys to select a character string, and press **SET** to enter the selected character string.
 - Select  on the keyboard to display a list of preset character strings. The following operands and equations, which are used with user-defined functions, are included as preset character strings.

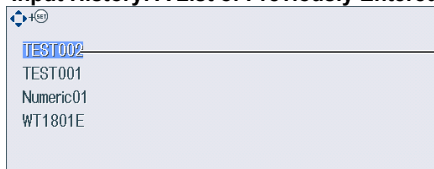
ABS(	PPK(	HVF(	RMS(
SQR(	MPK(	HCF(	MN(
SQRT(	CF	KFACT(	RMN(
LOG(	TI(	EAU(	DC(
LOG10(	THD(	EAI(	AC(
EXP(	THF(	PLLFRQ(	PC(
NEG(	TIF(

Use the **cursor** keys to select a character string, and press **SET** to enter the selected character string.

4. Press the **ENTER** soft key, or move the cursor to ENTER on the keyboard, and press **SET** to confirm the character string and clear the keyboard.



Input History: A List of Previously Entered Character Strings



After selecting an item with the cursor keys, press SET to confirm it.

Note

- @ cannot be entered consecutively.
- File names are not case-sensitive. Comments are case-sensitive. The following file names cannot be used due to MS-DOS limitations:
AUX, CON, PRN, NUL, CLOCK, COM1 to COM9, and LPT1 to LPT9
- For details on file name limitations, see the features guide, IM WT1801E-01EN.

Contents

List of Manuals.....	i
Symbols and Notation Used in This Manual.....	iii
Key Operation and Functions.....	iv
Entering Values and Strings.....	vi

Chapter 1 Basic Measurement Conditions

1.1	Configuring the Wiring System Settings.....	1-1
1.2	Setting the Voltage and Current Ranges.....	1-2
1.3	Setting the External Current Sensor Range (Option).....	1-4
1.4	Setting the External Current Sensor Conversion Ratio (Option).....	1-5
1.5	Setting the Display Format of the External Current Sensor Range (Option).....	1-6
1.6	Setting the Scaling Feature When Using a VT or CT.....	1-7
1.7	Setting the Valid Measurement Range.....	1-9
1.8	Setting the Efficiency Equation.....	1-12
1.9	Turning the Independent Input Element Configuration On and Off.....	1-13
1.10	Setting Delta Computation.....	1-14
1.11	Setting the Crest Factor.....	1-15
1.12	Setting Measurement Periods.....	1-16
1.13	Setting Line Filters.....	1-17
1.14	Setting Frequency Filters.....	1-18
1.15	Setting the Data Update Interval.....	1-19
1.16	Setting Averaging.....	1-20
1.17	Displaying the Menu for Configuring All Elements.....	1-21
1.18	Displaying the Setup Parameter List.....	1-22

Chapter 2 Harmonic Measurement Conditions (Option)

2.1	Setting Harmonic Measurement Conditions.....	2-1
-----	--	-----

Chapter 3 Motor Evaluation Conditions (Option)

3.1	Setting Motor Evaluation Conditions.....	3-1
-----	--	-----

Chapter 4 Auxiliary Input Conditions (Option)

4.1	Setting Auxiliary Input Conditions.....	4-1
-----	---	-----

Chapter 5 Holding Measured Values and Performing Single Measurements

5.1	Holding Measured Values.....	5-1
5.2	Performing Single Measurements.....	5-2

Chapter 6 Power Measurement (Numeric Data Display)

6.1	Setting the Display Format.....	6-1
6.2	Switching the Displayed Page.....	6-2
6.3	Changing the Displayed Items on the 4 Items, 8 Items, and 16 Items Displays.....	6-4
6.4	Changing the Displayed Items on the Matrix Display.....	6-6
6.5	Changing the All Items Display.....	6-9
6.6	Changing the Harmonics List Display (Option).....	6-10
6.7	Setting the Custom Display.....	6-12

Chapter 7	Computations	
7.1	Setting User-Defined Functions	7-1
7.2	Setting User-Defined Events	7-2
7.3	Setting Apparent Power, Reactive Power, and Corrected Power Equations.....	7-3
7.4	Setting the Sampling Frequency	7-4
7.5	Setting the Phase Difference Display Format.....	7-5
7.6	Setting Master and Slave Synchronized Measurement	7-6
7.7	Setting the Voltages or Currents Whose Frequencies Will Be Measured	7-7
Chapter 8	Integrated Power (Watt hour)	
8.1	Setting Independent Integration	8-1
8.2	Setting Integration Conditions	8-2
8.3	Starting, Stopping, and Resetting Integration.....	8-5
8.4	Integration Resume Action at Power Failure Recovery.....	8-6
Chapter 9	Waveform Display	
9.1	Setting the Display Format	9-1
9.2	Turning the Display of Waveforms On and Off and Setting the Vertical Zoom Factors and Vertical Positions	9-3
Chapter 10	Trend Display	
10.1	Setting the Display Format	10-1
10.2	Turning the Trend Display On and Off and Setting the Measurement Functions to Display and the Vertical Scales.....	10-3
Chapter 11	Bar Graph Display (Option)	
11.1	Setting the Display Format	11-1
11.2	Setting the Measurement Function to Display and the Vertical Scale.....	11-2
Chapter 12	Vector Display (Option)	
12.1	Setting the Display Format	12-1
12.2	Setting the Element and Wiring Unit to Display and the Zoom Factor	12-2
Chapter 13	Split Display	
13.1	Configuring the Split Display	13-1
Chapter 14	Cursor Measurements	
14.1	Performing Cursor Measurements on Waveforms	14-1
14.2	Performing Cursor Measurements on Trends	14-2
14.3	Performing Cursor Measurements on Bar Graphs.....	14-3
Chapter 15	High Speed Data Capturing	
15.1	Setting the Number of Data Captures and Configuring the Capture Control Settings ...	15-1
15.2	Configuring the Save Conditions of Captured Numeric Data	15-4
15.3	Changing the Displayed Items for High Speed Data Capturing	15-6
15.4	Starting and Stopping High Speed Data Capturing.....	15-9
Chapter 16	Storing Data	
16.1	Configuring Storage Control.....	16-1
16.2	Setting the Numeric Data Items to Store	16-4
16.3	Configuring the Save Conditions of Stored Numeric Data	16-5
16.4	Starting, Stopping, and Resetting Storage	16-6

Chapter 17 Saving and Loading Data

17.1	Connecting USB Memory Devices	17-1
17.2	Saving Setup Parameters	17-3
17.3	Saving Waveform Display Data	17-5
17.4	Saving Numeric Data	17-6
17.5	Loading Setup Parameters.....	17-8
17.6	File Operations	17-9

Chapter 18 Saving Screen Images

18.1	Saving Screen Images	18-1
------	----------------------------	------

Chapter 19 Printing Screen Images and Numeric Data (Option)

 19.1	Loading Roll Paper into the Built-In Printer (Option)	19-1
19.2	Printing Using the Built-in Printer (Option)	19-5

Chapter 20 Ethernet Communication

20.1	Connecting this instrument to a Network.....	20-1
20.2	Configuring TCP/IP Settings.....	20-3
20.3	Accessing this instrument from a PC (FTP Server).....	20-4
20.4	Monitoring the display of this instrument from a PC (Web Server).....	20-5
20.5	Connecting to a Network Drive.....	20-8
20.6	Using SNTP to Set the Date and Time	20-9

Chapter 21 Other Features

21.1	Viewing System Information (Overview).....	21-1
21.2	Initializing Settings.....	21-2
21.3	Setting the Message, Menu, and USB Keyboard Languages	21-3
21.4	Setting the Screen Brightness and Configuring the Display Color Settings	21-4
21.5	Configuring the Environment Settings	21-5
21.6	Configuring D/A Output Items (Option).....	21-6
21.7	Carrying Out Self-Tests (Selftest).....	21-7
21.8	Performing Zero-Level Compensation	21-9
21.9	Using the NULL Feature.....	21-10
21.10	Locking the Keys	21-11

Appendix

Appendix 1	Messages and Corrective Actions	App-1
------------	---------------------------------------	-------

Index

1.1 Configuring the Wiring System Settings

This section explains the following settings for wiring systems:

- Wiring system
- Wiring unit
- Wiring pattern

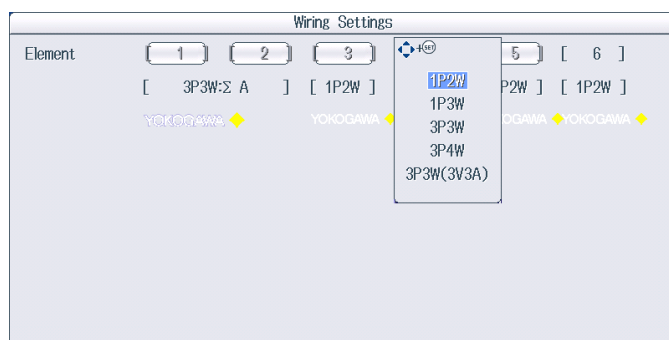
▶ [“Wiring System \(Wiring\)” in the features guide](#)

Wiring Settings (Wiring Settings)

Press **WIRING** and then the **Wiring** soft key to display the following screen.

Set 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.



Wiring System Pattern

- 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 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

- Because the wiring system with the largest element number is automatically determined according to the settings of the wiring systems with smaller element numbers, the element with the largest element number cannot be selected.
- You cannot set the wiring units for larger element numbers before the wiring units for smaller element numbers.
- To measure voltage, current, and active power Σ functions using high speed data capturing, set the wiring system to 3P4W or 3P3W (3V3A). When the wiring system is set to 1P3W or 3P3W, voltage, current, and active power Σ functions are not measured.

1.2 Setting the Voltage and Current Ranges

This section explains the following settings for the voltage and current ranges:

- Input element
- Auto range
- Fixed range
 - ▶ “Voltage Range (RANGE UP/DOWN (V))” and “Current Range (RANGE UP/DOWN (A))” in the features guide

Voltage Range (VOLTAGE RANGE)

1. Press the **ELEMENT** key for setting ranges to select the input element or wiring unit that you want to set the voltage range of.
 - While the setup menu is displayed, press **ESC**. Information corresponding to the input elements or wiring units will be displayed highlighted on the menu. You can also use the soft keys corresponding to the highlighting to select the input element or wiring unit.
 - Press **SHIFT+the ELEMENT (ALL)** key for setting ranges to collectively configure all the input elements for which the following conditions are met.
 - The input element type (for 5 A or for 50 A) is the same.
 - The valid measurement range setting (see section 1.7) is the same.
2. Follow the instructions below to set the voltage range.

Auto Range Setting

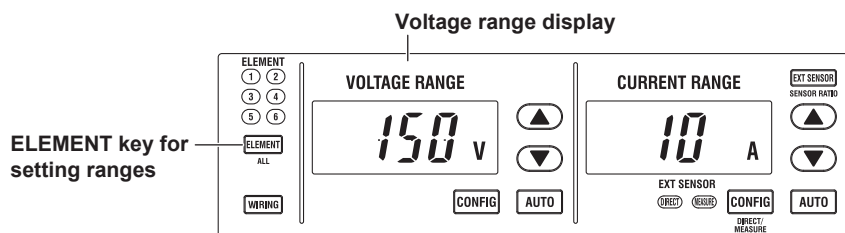
Press the voltage range’s **AUTO** key.

Setting the Fixed Range

Press the voltage range’s **fixed range** keys (**▲** and **▼**) 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 Element Independent (see section 1.9) is set to OFF, the voltage ranges of input elements that are assigned to the same wiring unit are set to the same range. When Element Independent is set to ON, you can set the voltage range of input elements that are assigned to the same wiring unit separately.

Current Range (CURRENT RANGE)

- Press the **ELEMENT** key for setting ranges to select the input element or wiring unit that you want to set the current range of.
 - While the setup menu is displayed, press **ESC**. Information corresponding to the input elements or wiring units will be displayed highlighted on the menu. You can also use the soft keys corresponding to the highlighting to select the input element or wiring unit.
 - Press **SHIFT+the ELEMENT (ALL)** key for setting ranges to collectively configure all the input elements for which the following conditions are met.
 - The input element type (for 5 A or for 50 A) is the same.
 - The valid measurement range setting (see section 1.7) is the same.
- Follow the instructions below to set the current range.

Auto Range Setting

Press the current range's **AUTO** key.

Setting the Fixed Range

Press the current range's **fixed range** keys (**▲** and **▼**) to set the current range.

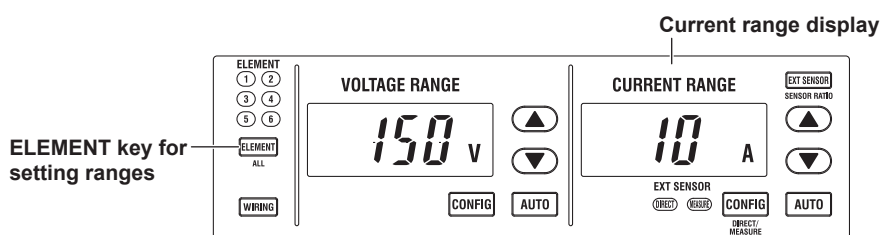
Available Current Range Options

• 5 A Input Element

When the crest factor is set to 3	When the crest factor is set to 6 or 6A
10 mA, 20 mA, 50 mA, 100 mA, 200 mA, 500 mA, 1 A, 2 A, 5 A	5 mA, 10 mA, 25 mA, 50 mA, 100 mA, 250 mA, 500 mA, 1 A, 2.5 A

• 50 A Input Element

When the crest factor is set to 3	When the crest factor is set to 6 or 6A
1 A, 2 A, 5 A, 10 A, 20 A, 50 A	500 mA, 1 A, 2.5 A, 5 A, 10 A, 25 A



Note

When Element Independent (see section 1.9) is set to OFF, the current ranges of input elements that are assigned to the same wiring unit are set to the same range. When Element Independent is set to ON, you can set the current range of input elements that are assigned to the same wiring unit separately.

1.3 Setting the External Current Sensor Range (Option)

This section explains the following settings for external current sensor ranges (current ranges that are used when external current sensors are being used). This feature is available on models with the /EX1 to /EX6 option.

- Input element
- External current sensor
- Auto range
- Fixed range

► [“External Current Sensor Range \(EXT SENSOR; option\)” in the features guide](#)

1. Press the **ELEMENT** key for setting ranges to select the input element or wiring unit that you want to set the external current sensor range of.
 - While the setup menu is displayed, press **ESC**. Information corresponding to the input elements or wiring units will be displayed highlighted on the menu. You can also use the soft keys corresponding to the highlighting to select the input element or wiring unit.
 - Press **SHIFT+the ELEMENT (ALL)** key for setting ranges to collectively configure all the input elements for which the following conditions are met.
 - The input element type (for 5 A or for 50 A) is the same.
 - The valid measurement range setting (see section 1.7) is the same.
2. Press **EXT SENSOR** to illuminate the EXT SENSOR key.

Press **EXT SENSOR** again to turn the EXT SENSOR key off. In this state, you can set the current range that is used when current is applied directly to this instrument (see section 1.2).
3. Follow the instructions below to set the external current sensor range.

Auto Range Setting

Press the current range's **AUTO** key.

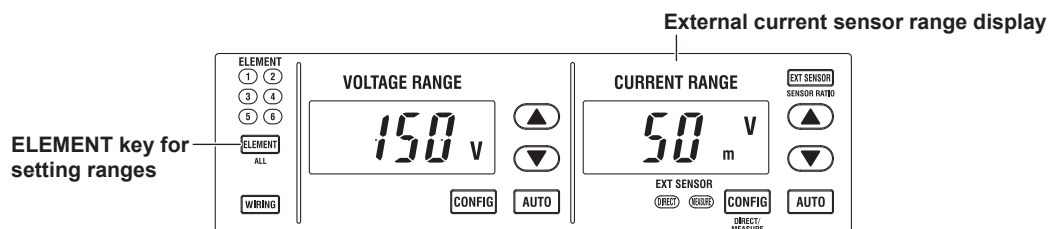
Setting the Fixed Range

Press the current range's **fixed range** keys (**▲** and **▼**) to set the external current sensor range.

Available External Current Sensor Range Options

When the display format of the external current sensor range is set to DIRECT, 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 MEAS, the setup range is set to the value from the following table divided by the external current sensor conversion ratio (the unit is A). For instructions on how to set the display format of the external current sensor range, see section 1.5.

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 Element Independent (see section 1.9) is set to OFF, the external current sensor ranges of input elements that are assigned to the same wiring unit are set to the same range. When Element Independent is set to ON, you can set the external current sensor range of input elements that are assigned to the same wiring unit separately.

1.4 Setting the External Current Sensor Conversion Ratio (Option)

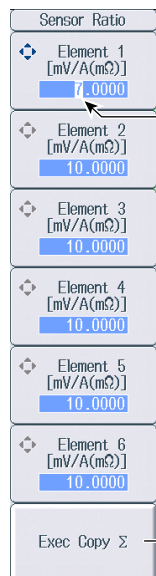
This section explains the following settings for the external current sensor conversion ratio. This feature is available on models with the /EX1 to /EX6 option.

- Conversion ratio
- Copying the conversion ratio

► [“External Current Sensor Conversion Ratio \(SENSOR RATIO; option\)” in the features guide](#)

Sensor Ratio Menu

Press **SHIFT+EXT SENSOR** (SENSOR RATIO) to display the following menu.



The screenshot shows a menu titled "Sensor Ratio" with six elements and an "Exec Copy" option. Each element is labeled "Element 1" through "Element 6" and has a unit "[mV/A(mΩ)]" and a numerical value. The values are: Element 1: 7.0000, Element 2: 10.0000, Element 3: 10.0000, Element 4: 10.0000, Element 5: 10.0000, Element 6: 10.0000. The "Exec Copy" option is labeled with a sigma symbol (Σ). A cursor is positioned over the value "7.0000" in Element 1. A bracket on the right side of the menu indicates that the conversion ratio for all elements is set to 0.0001 to 99999.9999. A note below the menu states that the conversion ratio of the input element indicated by the cursor is copied to all the input elements in that element's wiring unit.

Cursor (use the ◀▶ cursor keys to move it)

Set the conversion ratio (0.0001 to 99999.9999).

Copies the conversion ratio
The conversion ratio of the input element that is indicated by the cursor is copied to all the input elements in that element's wiring unit.

Note

When using the dedicated shunt box, you can select an external current sensor conversion ratio preset in the menu for configuring all elements (see section 1.17).

External Current Sensor Range and Conversion Ratio Configuration Example

When measuring 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

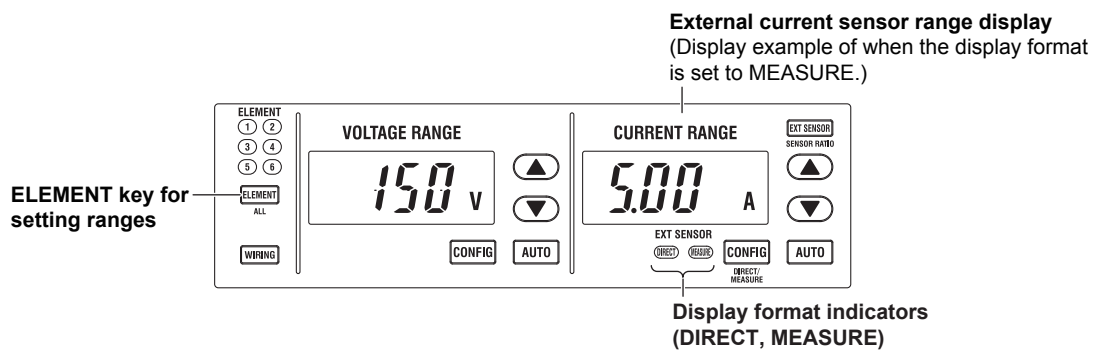
1.5 Setting the Display Format of the External Current Sensor Range (Option)

This section explains the following setting for the external current sensor range. This feature is available on models with the /EX1 to /EX6 option.

- Display format

▶ “External Current Sensor Range Display Format (DIRECT/MEASURE; option)”
in the features guide

1. Press the **ELEMENT** key for setting ranges to select the input element or wiring unit that you want to set the external current sensor range of.
 - If you press **ESC** to clear the setup menu from the screen, soft keys corresponding to the input elements or wiring units will be displayed on the menu. You can use these soft keys to select the input element or wiring unit.
 - Press **SHIFT+**the **ELEMENT** (ALL) key for setting ranges to collectively configure all the input elements for which the following conditions are met.
The input element type (for 5 A or for 50 A) is the same.
The valid measurement range setting (see section 1.7) is the same.
2. Press **EXT SENSOR** to illuminate the EXT SENSOR key.
Press **EXT SENSOR** again to turn the EXT SENSOR key off.
3. Press **SHIFT+**the current range's **CONFIG** (DIRECT/MEASURE) key. The DIRECT indicator or MEAS indicator, which indicates the display format, illuminates. The external current sensor range is displayed in the indicated display format.
Press **SHIFT+**the current range's **CONFIG** (DIRECT/MEASURE) key again to switch the display format. The indicators illuminate and turn off appropriately.



1.6 Setting the Scaling Feature When Using a VT or CT

This section explains the following settings for measuring voltage through an external VT (voltage transformer) and current that through an external CT (current transformer):

- Turning the scaling feature on and off
- VT ratio
- CT ratio
- Power coefficient

► “Scaling (SCALING)” in the features guide

Scaling Menu

Press **SCALING** to display the following menu.

The screenshot shows a vertical menu with the following items and annotations:

- Scaling** (header)
- Scaling** (sub-header)
- OFF ON** (toggle) — Turns the scaling feature on and off
- VT Scaling** — Set the VT ratio.
- CT Scaling** — Set the CT ratio.
- SF Scaling** — Set the power coefficient.
- All Elements Setup** — Display the menu for configuring all elements (see section 1.17).

* When you want to multiply the external current sensor output by the conversion ratio and read the current of the circuit under measurement directly, turn the VT/CT scaling feature off. If it is turned on, the value will be further multiplied by the CT ratio.

Setting the VT Ratio (VT Scaling)

Press the **VT Scaling** soft key to display the following menu.

The screenshot shows a vertical menu with the following items and annotations:

- VT Scaling** (header)
- Element 1** (value: 8.0000)
- Element 2** (value: 1.0000)
- Element 3** (value: 1.0000)
- Element 4** (value: 1.0000)
- Element 5** (value: 1.0000)
- Element 6** (value: 1.0000)
- Exec Copy Σ** — Copies the VT ratio

Annotations:

- Cursor (use the ◀▶ cursor keys to move it)** — points to the value field of Element 1.
- Set the VT ratio (0.0001 to 99999.9999).** — brackets Elements 1 through 6.
- Copies the VT ratio** — points to the Exec Copy Σ option.

The VT ratio of the input element that is indicated by the cursor is copied to all the input elements in that element's wiring unit.

Setting the CT Ratio (CT Scaling)

Press the **CT Scaling** soft key to display the following menu.

The screenshot shows a menu titled "CT Scaling" with six elements. Each element has a diamond icon and a numerical value in a blue box. Element 1 has a value of 3.0000, while Elements 2 through 6 have values of 1.0000. A cursor is positioned over the value for Element 1. Below the elements is an "Exec Copy Σ" option. Brackets and arrows point from text labels to the cursor and the "Exec Copy Σ" option.

Cursor (use the ◀▶ cursor keys to move it)

Set the CT ratio.

Copies the CT ratio
The CT ratio of the input element that is indicated by the cursor is copied to all the input elements in that element's wiring unit.

Note

When using the dedicated CT, you can select a CT ratio preset in the menu for configuring all elements (see section 1.17).

Setting the Power Coefficient (SF Scaling)

Press the **SF Scaling** soft key to display the following menu.

The screenshot shows a menu titled "SF Scaling" with six elements. Each element has a diamond icon and a numerical value in a blue box. Element 1 has a value of 3.0000, while Elements 2 through 6 have values of 1.0000. A cursor is positioned over the value for Element 1. Below the elements is an "Exec Copy Σ" option. Brackets and arrows point from text labels to the cursor and the "Exec Copy Σ" option.

Cursor (use the ◀▶ cursor keys to move it)

Set the power coefficient.

Copies the power coefficient
The power coefficient of the input element that is indicated by the cursor is copied to all the input elements in that element's wiring unit.

1.7 Setting the Valid Measurement Range

This section explains the following settings for the valid measurement range:

- Valid measurement range
- Measurement ranges that this instrument can switch to when a peak over-range occurs
 - ▶ “Valid Measurement Range (CONFIG (V)/CONFIG (A))” in the features guide

Setting the Valid Voltage Measurement Range (Voltage Range Configuration)

Press the voltage range’s CONFIG key to display the following screen.

Valid measurement range

- The measurement range switches (in order) between the ranges whose check boxes are selected.
- Ranges whose check boxes are not selected are skipped.
- When Element Independent (see section 1.9) is set to OFF, the input elements that are assigned to the same wiring unit are set to the same status.

Available voltage range options

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

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

For each input element or wiring unit, you can set all ranges as valid measurement ranges (All ON).

Slot in which an input element is not installed

Available options for the measurement ranges that this instrument can switch to when a peak over-range occurs

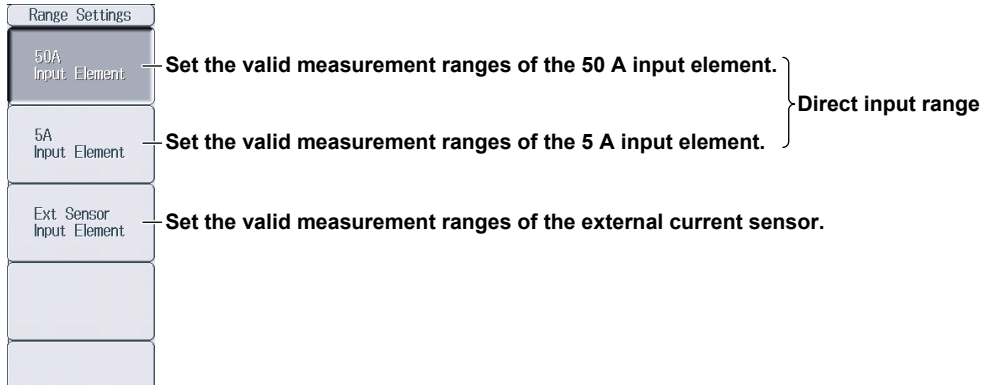
Measurement range to switch to when a peak over-range occurs

- When Element Independent is set to OFF, 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**), this 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 is set to OFF, the measurement range increases in the order specified by the measurement ranges whose check boxes have been selected.

Voltage Range Configuration						
	Element1	Element2	Element3	Element4	Element5	Element6
1000V	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-
600V	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-
300V	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-
150V	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-
100V	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-
60V	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-
30V	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-
15V	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-
10V	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-
6V	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-
3V	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-
1.5V	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-
Peak Over Jump	OFF	1000V	1000V	OFF	OFF	-

Setting the Valid Current Measurement Range (Current Range Configuration)

Press the current range's CONFIG key to display the following menu.



Setting the Valid Measurement Range of 50 A Input Elements (50A Input Element)—Direct Input Range

Valid measurement range

- The measurement range switches (in order) between the ranges whose check boxes are selected.
- Ranges whose check boxes are not selected are skipped.
- When Element Independent (see section 1.9) is set to OFF, the input elements that are assigned to the same wiring unit are set to the same status.

Available current range options

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



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

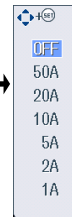
	Element1	Element2	Element3	Element4	Element5	Element6
50A	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-
20A	-	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-
10A	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-
5A	-	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-
2A	-	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-
1A	-	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-
Peak Over Jump	-	50A	50A	OFF	OFF	-



For each input element or wiring unit, you can set all ranges as valid measurement ranges (All ON).

Slot in which a 50 A input element is not installed

Available options for the measurement ranges that this instrument can switch to when a peak over-range occurs



Measurement range to switch to when a peak over-range occurs

- When Element Independent is set to OFF, 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), this 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 is set to OFF, the measurement range increases in the order specified by the measurement ranges whose check boxes have been selected.

Setting the Valid Measurement Range of 5 A Input Elements (5A Input Element)—Direct Input Range

Valid measurement range

- The measurement range switches (in order) between the ranges whose check boxes are selected.
- Ranges whose check boxes are not selected are skipped.
- When Element Independent (see section 1.9) is set to OFF, the input elements that are assigned to the same wiring unit are set to the same status.

Available current range options

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



Current Range Configuration

	Element1	Element2	Element3	Element4	Element5	Element6
5A	<input checked="" type="checkbox"/>	-	-	-	-	-
2A	<input type="checkbox"/>	-	-	-	-	-
1A	<input checked="" type="checkbox"/>	-	-	-	-	-
500mA	<input checked="" type="checkbox"/>	-	-	-	-	-
200mA	<input type="checkbox"/>	-	-	-	-	-
100mA	<input checked="" type="checkbox"/>	-	-	-	-	-
50mA	<input type="checkbox"/>	-	-	-	-	-
20mA	<input type="checkbox"/>	-	-	-	-	-
10mA	<input type="checkbox"/>	-	-	-	-	-
Peak Over Jump	5A	-	-	-	-	-

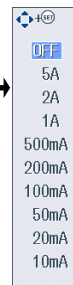
If the measurement range to switch to when a peak over-range occurs has been selected, the range background is displayed in yellow.



For each input element or wiring unit, you can set all ranges as valid measurement ranges (All ON).

Slot in which a 5 A input element is not installed

Available options for the measurement ranges that this instrument can switch to when a peak over-range occurs



Measurement range to switch to when a peak over-range occurs

- When Element Independent is set to OFF, 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**), this 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 is set to OFF, the measurement range increases in the order specified by the measurement ranges whose check boxes have been selected.

Setting the Valid Measurement Range of External Current Sensors (Ext Sensor Input Element)

Valid measurement range

- The measurement range switches (in order) between the ranges whose check boxes are selected.
- Ranges whose check boxes are not selected are skipped.
- When Element Independent (see section 1.9) is set to OFF, the input elements that are assigned to the same wiring unit are set to the same status.

Available external current sensor range options

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



Current Range Configuration

	Element1	Element2	Element3	Element4	Element5	Element6
10V	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-
5V	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-
2V	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-
1V	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-
500mV	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-
200mV	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-
100mV	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-
50mV	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	-
Peak Over Jump	OFF	10V	10V	OFF	OFF	-

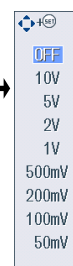
If the measurement range to switch to when a peak over-range occurs has been selected, the range background is displayed in yellow.



For each input element or wiring unit, you can set all ranges as valid measurement ranges (All ON).

Slot in which an input element is not installed

Available options for the measurement ranges that this instrument can switch to when a peak over-range occurs



Measurement range to switch to when a peak over-range occurs

- When Element Independent is set to OFF, 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**), this 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 is set to OFF, the measurement range increases in the order specified by the measurement ranges whose check boxes have been selected.

1.8 Setting the Efficiency Equation

This section explains the following settings for the efficiency equation:

- Efficiency equation
- Summation of the active power and motor output³

► [“Efficiency Equation \(η Formula\)” in the features guide](#)

Setting the Efficiency Equation (ηFormula)

Press **WIRING** and then the **η Formula** soft key to display the following screen.

The screenshot shows the **η Formula** configuration screen. At the top, there are six element selection buttons labeled [1], [2], [3], [4], [5], and [6]. Below these are two wiring system selection buttons: [1P2W] and [3P3W:Σ A], followed by another set of [1P2W] and [1P3W:Σ B] buttons. The main area contains four efficiency equation settings: η1, η2, η3, and η4. Each equation is represented as a fraction with a numerator and denominator, followed by a multiplication sign and 100[%]. There are 'OFF' buttons for each equation. Below the equations are two Udef settings: Udef1 and Udef2. Each Udef is defined as a sum of four terms: Udef1 = P1 + None + None + None, and Udef2 = P1 + None + None + None. On the right side of the screen, there are three text annotations with arrows pointing to specific parts of the interface: 'Installed input elements' points to the top element buttons; 'The set wiring systems' points to the wiring system buttons; and 'Set the denominator and numerator of the efficiency equation to the active power and motor power measurement functions. (P1 to P6,¹ PΣA to PΣC,² Pm,³ Udef1, Udef2). You can set up to four equations: η1 to η4. Define Udef1 and Udef2 (P1 to P6,¹ PΣA to PΣC,² Pm³).' points to the Udef settings.

To add active powers and motor output and use them in η1 to η4, use Udef1 and Udef2.

- 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 Can be set on models with the /MTR option.

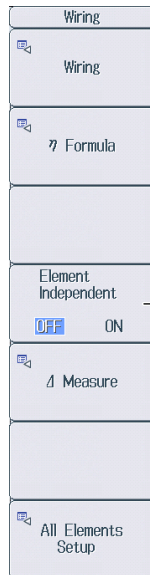
1.9 Turning the Independent Input Element Configuration On and Off

This section explains how to turn the independent input element configuration on and off.

▶ [“Independent Input Element Configuration \(Element Independent\)” in the features guide](#)

Wiring Menu

Press **WIRING** to display the following menu.



Turns independent input element configuration on and off

1.10 Setting Delta Computation


This section explains the following settings for the delta computation.

- Delta computation type
- Delta computation mode

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

Delta Computation Settings (Δ Measure)

Press **WIRING** and then the Δ **Measure** soft key to display the following screen.



Installed input elements

The set wiring systems

Set the delta computation type.
The available options vary depending on the set wiring systems.

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

Set the delta computation mode (rms, mean, dc, r-mean, ac).

1.11 Setting the Crest Factor

This section explains how to set the crest factor.

▶ [“Crest Factor \(Crest Factor\)” in the features guide](#)

System Config Menu

Press **UTILITY** and then the **System Config** soft key to display the following menu.



Set the crest factor (CF3, CF6, CF6A).

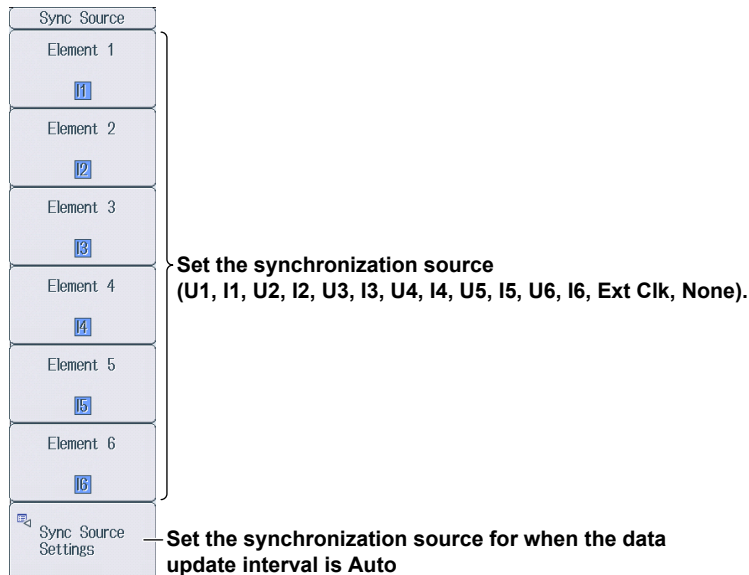
1.12 Setting Measurement Periods

This section explains how to set the synchronization sources that determine the measurement period.

► [“Measurement Period \(SYNC SOURCE\)” in the features guide](#)

Sync Src Menu

Press **SYNC SOURCE** to display the following menu.



Setting the Synchronization Source for When the Data Update Interval is Auto (Sync Source Setting)

Press **SYNC SOURCE** and then the **Sync Src Setting** soft key to display the following screen.

To set all elements to the same setting at once, change the settings in the **All** column.

Turn on or off the synchronization source rectifier for voltage, current, and external current sensor signals.

Sync Source Settings						
All	Element 1	Element 2	Element 3	Element 4	Element 5	Element 6
Voltage Rectifier	OFF	OFF	OFF	OFF	OFF	OFF
Voltage Level	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Current Rectifier	OFF	OFF	OFF	OFF	OFF	OFF
Current Level	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Ext. Sensor Rectifier	OFF	OFF	OFF	OFF	OFF	OFF
Ext. Sensor Level	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Set the synchronization source level for voltage, current, and external current sensor signals.

- When the rectifier function is off: -100.0% to 100.0%
- When the rectifier function is on: 0.0% to 100.0% (absolute value)

1.13 Setting Line Filters

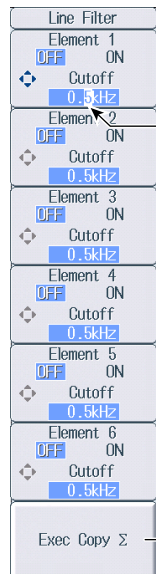
This section explains the following settings for line filters:

- Turning line filters on and off
- Cutoff frequency

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

Line Filter Menu

Press **LINE FILTER** to display the following menu.



The screenshot shows a menu titled "Line Filter" with six elements. Each element has a status indicator (OFF/ON), a "Cutoff" label, and a frequency value (0.5kHz). A cursor is positioned over the "Cutoff" field of Element 2. Below the menu is an "Exec Copy Σ" option.

Cursor (use the ◀▶ cursor keys to move it)

Configure the line filter settings:

- Turn the line filter on or off.
- Set the cutoff frequency (0.1kHz to 100.0kHz in steps of 0.1 kHz, 300kHz, 1MHz).

Copies the line filter setting
The line filter setting of the input element that is indicated by the cursor is copied to all the input elements in that element's wiring unit.

1.14 Setting Frequency Filters

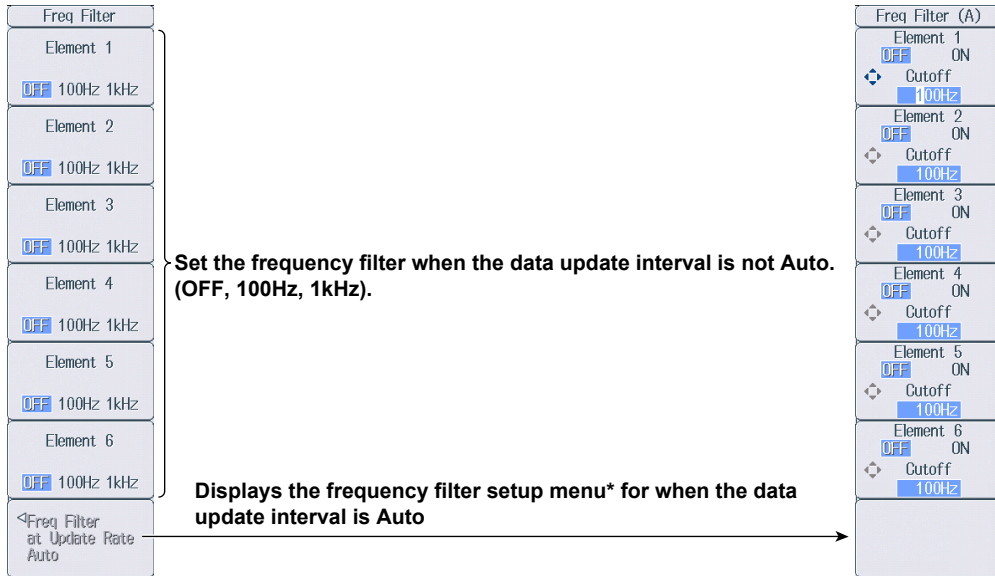
This section explains how to set the frequency filter.

► “Frequency Filter (FREQ FILTER)” in the features guide

Freq Filter Menu

When the data update interval is not Auto

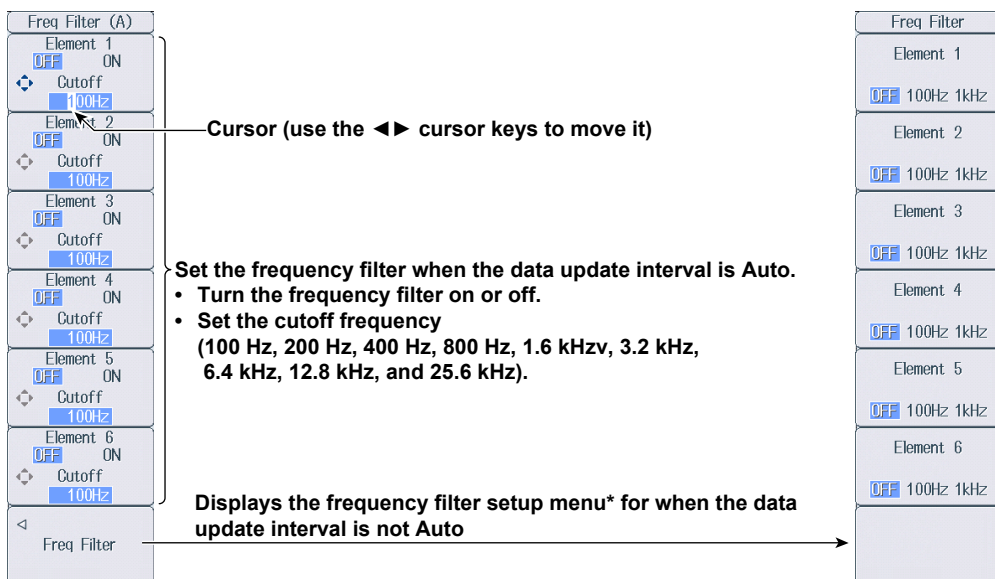
Press **SHIFT+LINE FILTER** (FREQ FILTER) to display the following menu.



Freq Filter (A) Menu

When the data update interval is Auto

Press **SHIFT+LINE FILTER** (FREQ FILTER) and then the **Freq Filter at Update Rate Auto** soft key to display the following menu.



* The menu item is displayed, but the function is invalid.

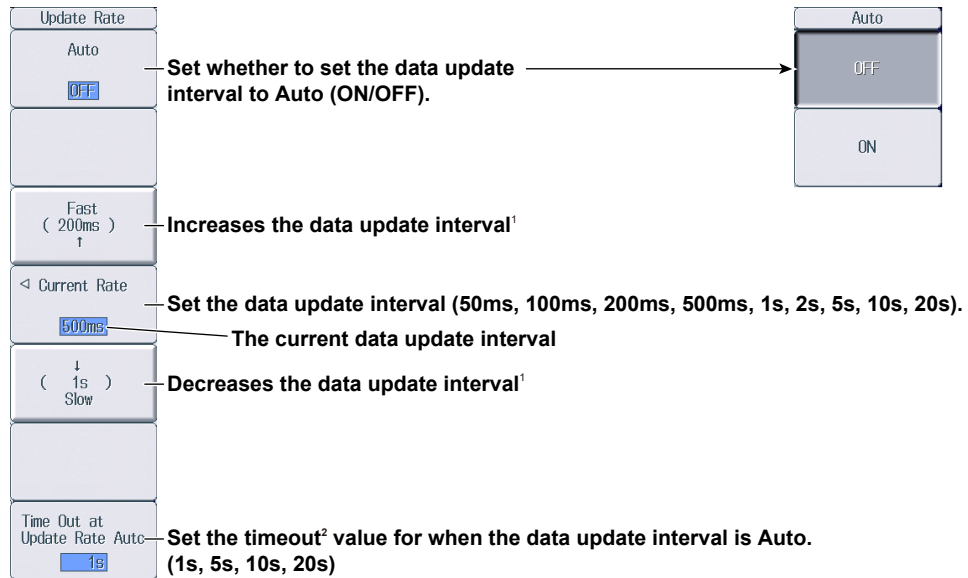
1.15 Setting the Data Update Interval

This section explains how to set the data update interval.

► [“Data Update Interval \(UPDATE RATE\)” in the features guide](#)

Update Rate Menu

Press **UPDATE RATE** to display the following menu.



- 1 You can set this when the data update interval is not Auto.
- 2 You can set this when the data update interval is Auto.

1.16 Setting Averaging

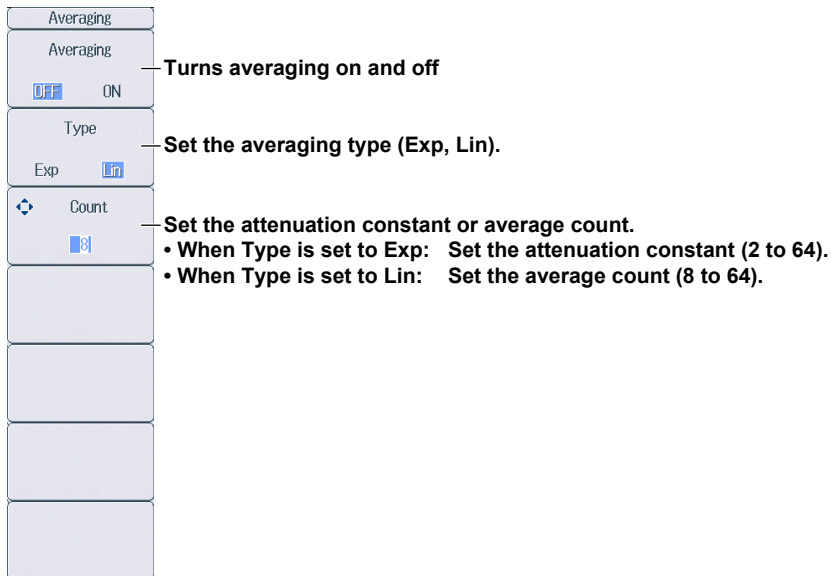
This section explains the following settings for averaging:

- Turning averaging on and off
- Averaging type
- Attenuation constant
- Average count

► [“Averaging \(AVG\)” in the features guide](#)

Averaging Menu

Press **AVG** to display the following menu.



1.17 Displaying the Menu for Configuring All Elements

This section explains how to set the settings for all elements.

► [“Settings of All Elements \(All Elements Setup\)” in the features guide](#)

All Elements Setup Menu

1. Press **WIRING** and then the **All Elements Setup** soft key to display the following menu. Use the **cursor** keys to select the setting that you want to change, and then press **SET** to display the available options or an input box.

All Elements Setup						
Element	[1]	[2]	[3]	[4]	[5]	[6]
	3P4W:Σ A			3P4W:Σ B		
U Auto Range	OFF	OFF	OFF	OFF	OFF	OFF
U Range	1000V	1000V	1000V	1000V	1000V	1000V
Ext Sensor	OFF	OFF	OFF	OFF	OFF	OFF
I Auto Range	OFF	OFF	OFF	OFF	OFF	OFF
I Range	5A	5A	5A	50A	50A	50A
Sensor Preset	Others	Others	Others	Others	Others	Others
Sensor Ratio [mV/A (mΩ)]	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000
CT Preset	Others	Others	Others	Others	Others	Others
Scaling	OFF	OFF	OFF	OFF	OFF	OFF
VT Scaling	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
CT Scaling	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
SF Scaling	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Line Filter	OFF	OFF	OFF	OFF	OFF	OFF
- Cutoff	0.5kHz	0.5kHz	0.5kHz	0.5kHz	0.5kHz	0.5kHz
Freq Filter	OFF	OFF	OFF	OFF	OFF	OFF
Freq Filter (A)	OFF	OFF	OFF	OFF	OFF	OFF
- Cutoff	100Hz	100Hz	100Hz	100Hz	100Hz	100Hz
Sync Source	I1	I1	I1	I4	I4	I4

Use the cursor keys to select the item that you want to set.

1.18 Displaying the Setup Parameter List

This section explains how to display a list of setup parameters.

► “Displaying the Setup Parameter List (INPUT INFO)” in the features guide

Info Form Menu

1. Press **INPUT INFO**. The INPUT INFO key illuminates and the split display appears. The top half of the screen displays the setup parameter list. Press INPUT INFO again to clear the setup parameter list and display the previous screen.
2. Hold down **FORM** until the Info Form menu appears. Input element or measurement range settings are displayed.

Input Element Settings List

Power Element Settings						
	Element 1 [1000V-50A]	Element 2 [1000V-50A]	Element 3 [1000V-50A]	Element 4 [1000V-50A]	Element 5 [1000V-50A]	Element 6 [1000V-50A]
Wiring	1P2W	≥ A(3P3W)	≥ A(3P3W)	1P2W	≥ B(1P3W)	≥ B(1P3W)
Voltage Range	1000V	1000V	1000V	1000V	1000V	1000V
Current Range	5A	50A	50A	50A	50A	50A
Sensor Ratio [mV/A (mΩ)]	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000
Scaling	Off	Off	Off	Off	Off	Off
VT Ratio	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
CT Ratio	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Scaling Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Sync Source	I1	I2	I2	I4	I5	I5
Line Filter	Off	Off	Off	Off	Off	Off
Freq Filter	Off	Off	Off	Off	Off	Off

Press INPUT INFO to exit this display.

Info Form

Power Element Settings

Select Power Element Settings.

Range Settings

Measurement Range Settings List

Voltage Range Settings						Current Range Settings					
U1	U2	U3	U4	U5	U6	I1	I2	I3	I4	I5	I6
1000	1000	1000	1000	1000	1000	5	50	50	50	50	50
600	600	600	600	600	600	2	20	20	20	20	20
300	300	300	300	300	300	1	10	10	10	10	10
150	150	150	150	150	150	500m	5	5	5	5	5
100	100	100	100	100	100	200m	2	2	2	2	2
60	60	60	60	60	60	100m	1	1	1	1	1
30	30	30	30	30	30	50m					
15	15	15	15	15	15	20m					
10	10	10	10	10	10	10m					
6	6	6	6	6	6						
3	3	3	3	3	3						
1.5	1.5	1.5	1.5	1.5	1.5						

Press INPUT INFO to exit this display.

Info Form

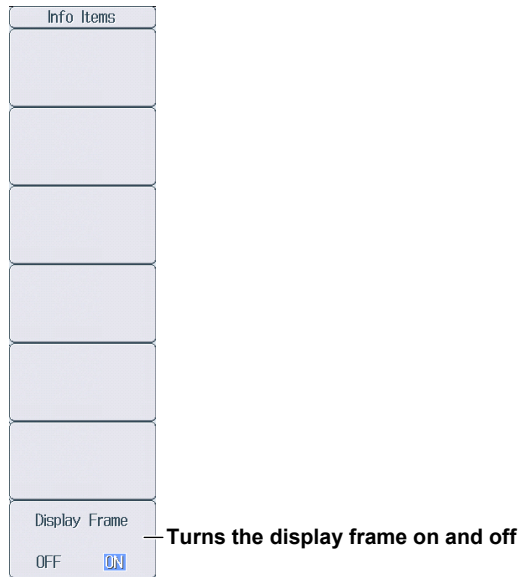
Power Element Settings

Select Range Settings.

Range Settings

Info Items Menu

3. Press **ITEM** to display the Info Items menu.



2.1 Setting Harmonic Measurement Conditions

This section explains the following settings for harmonic measurement conditions. This feature is available on models with the /G5 or /G6 option.

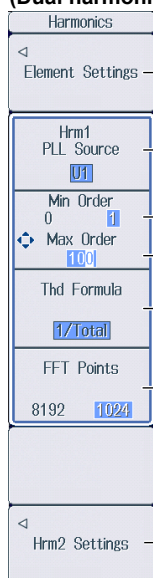
- Input element group
- PLL source
- Measured harmonic order
- Distortion factor equation

▶ “Harmonic Measurement Conditions (Option)” in the features guide

Harmonics Menu

Press **HRM SET** to display the following menu.

**Menu on a Model with the /G6 Option
(Dual harmonic measurement)**



Configure the input element groups.¹

Group Hrm1

Set the PLL source (U1, I1, U2, I2, U3, I3, U4, I4, U5, I5, U6, I6, Ext Clk).

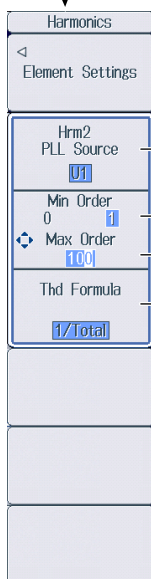
Set the minimum value of the measured harmonic order (0, 1).

Set the maximum value of the measured harmonic order (1 to 500).

Set the distortion factor equation (1/Total, 1/Fundamental).

Set the number of FFT points when the data update interval is Auto. (1024, 8192).²

Configure the Group Hrm2.¹



Group Hrm2

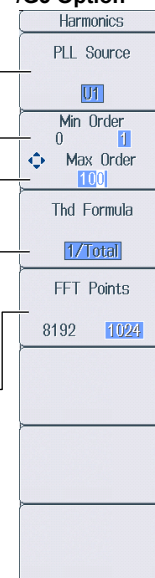
Set the PLL source (U1, I1, U2, I2, U3, I3, U4, I4, U5, I5, U6, I6, Ext Clk).

Set the minimum value of the measured harmonic order (0, 1).

Set the maximum value of the measured harmonic order (1 to 500).

Set the distortion factor equation (1/Total, 1/Fundamental).

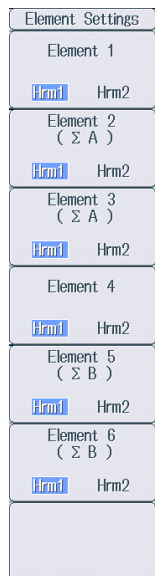
Menu on a Model with the /G5 Option



1 You can set this when the data update interval is not Auto.
2 You can set this when the data update interval is Auto.

Setting the Input Element Group (Element Settings)

Press the **Element Settings** soft key to display the following menu.



Set the group of the input element (Hrm1, Hrm2).
Input elements that are assigned to the same wiring unit are set to the same group.

3.1 Setting Motor Evaluation Conditions

This section explains the following settings for motor evaluation conditions. This feature is available on models with the /MTR option.

- Scaling factor
- Unit
- Input signal type
- Analog input range
- Analog input linear scale
- Line filter
- Synchronization source
- Pulse input range
- Torque signal pulse rating
- Number of pulses per revolution of the revolution signal
- Motor's number of poles for computing the synchronous speed
- Voltage or current whose frequency is measured to compute the synchronous speed
- Electrical angle measurement
- Motor efficiency and total efficiency computations

► “Motor Evaluation Conditions (Option)” in the features guide

Setting Motor Evaluation Conditions (MOTOR Settings)

Press **SHIFT+SCALING** (MOTOR/AUX SET) to display the following screen.

On models with the /AUX option, the auxiliary input conditions setup screen is displayed. See section 4.1.

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).

Set the unit (up to 8 characters).

Set the speed, torque, and Pm units.

Set the input signal type (Analog, Pulse).

Set the type of revolution sensor for Speed and the type of the torque meter for Torque.

The screenshot shows the 'MOTOR Settings' screen with the following fields and values:

Field	Speed	Torque	Pm
Scaling	1.0000	1.0000	1.0000
Unit	rpm	Nm	W
Sense Type	Analog	Analog	
Analog Auto Range	OFF	OFF	
Analog Range	20V	20V	
Linear Scale A	1.000	1.000	
Linear Scale B	0.000	0.000	
	Calculation	Calculation	
Line Filter	OFF		
Sync Source	None		
Pulse Range Upper	10000.0000	50.0000	
Pulse Range Lower	0.0000	-50.0000	
Rated Upper		50.0000	15000Hz
Rated Lower		-50.0000	5000Hz
Pulse N	60		
Sync Speed	Pole: 2	Source: I1	
Electrical Angle Measurement	ON	Electrical Angle Correction	

When Sense Type is set to Analog:

- Turns the auto range on and off
- Set the fixed range (20V, 10V, 5V, 2V, 1V).
- Set the linear scale (A: 1.000 m to 1.000 M; B: -1.000 M to 1.000M).
Set A (the slope) and B (the offset).
- Computes A and B
- Set the line filter (OFF, 100Hz, 1kHz).
- Set the synchronization source (U1, I1, U2, I2, U3, I3, U4, I4, U5, I5, U6, I6, Ext Clk, None).
Even if Sense Type is set to Pulse, correctly setting the synchronization source improves measurement accuracy.

When Sense Type is set to Pulse:

- Set the upper and lower limits.
Revolution signal: 0.0000 to 99999.9999 [rpm]
Torque signal: -10000.0000 to 10000.0000 [N·m]
- Set the positive and negative rated torque signal pulse frequencies (1 to 10000000 [Hz]).
- Set the positive and negative rated torque signal values (-10000.0000 to 10000.0000 [N·m]).

Turns electrical angle measurement on and off

Configure the electrical angle correction. You can configure the electrical angle correction when Electrical Angle Measurement is set to ON.

Set the number of pulses per revolution of the revolution signal (1 to 9999).

Set the voltage or current whose frequency will be measured to compute the synchronous speed (U1, I1, U2, I2, U3, I3, U4, I4, U5, I5, U6, I6).

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

3.1 Setting Motor Evaluation Conditions

Computing A and B (Calculation)

Compute A (the slope) and B (the offset) from two points on the characteristics graph of a revolution sensor or torque meter.

Rotating Speed's A and B

On the motor evaluation conditions setup screen, select **Calculation** under Speed to display the following screen.

Calculation

$Y=AX+B[\text{rpm}/V]$

Point1X[V] 0.000

Point1Y[rpm] 0.000

Point2X[V] 0.000

Point2Y[rpm] 0.000

Cancel Execute

Set the first X-axis value [V] and Y-axis value [rpm] (-1.000 T to 1.000 T).

Set the second X-axis value [V] and Y-axis value [rpm] (-1.000 T to 1.000 T).

Computes A and B

Cancels the computation

Torque's A and B

On the motor evaluation conditions setup screen, select **Calculation** under Torque to display the following screen.

Calculation

$Y=AX+B[\text{Nm}/V]$

Point1X[V] 0.000

Point1Y[Nm] 0.000

Point2X[V] 0.000

Point2Y[Nm] 0.000

Cancel Execute

Set the first X-axis value [V] and Y-axis value [Nm] (-1.000 T to 1.000 T).

Set the second X-axis value [V] and Y-axis value [Nm] (-1.000 T to 1.000 T).

Computes A and B

Cancels the computation

Setting the Electrical Angle Correction Value (Electrical Angle Correction)

On the motor evaluation conditions setup screen, select **Electrical Angle Correction** to display the following screen.

Electrical Angle Correction

Correction Value 0.00

Clear Correction

Auto Enter Correction Execute

Auto Enter Target U1

Set the correction value (-180.00 to 180.00).

Clears the correction value

Automatically computes the correction value
Correction Value is set to the computed value.

Set the voltage or current to automatically compute the
correction value of (U1, I1, U2, I2, U3, I3, U4, I4, U5, I5, U6, I6).

Computing the Motor Efficiency and Total Efficiency

This instrument can compute the motor efficiency (the ratio of motor output to the power consumed by the motor) and total efficiency from the measured active power and motor output. For information on how to set expressions, see section 1.8.

4.1 Setting Auxiliary Input Conditions

This section explains the following settings for auxiliary input conditions. This feature is available on models with the /AUX option.

- Input signal name
- Scaling factor
- Unit
- Input signal range
- Input signal linear scale
- Line filter

► “Auxiliary Input Conditions (Option)” in the features guide

Setting Auxiliary Input Conditions (Aux Settings)

Press **SHIFT+SCALING** (MOTOR/AUX SET) to display the following screen.

On models with the /MTR option, the motor evaluation conditions setup screen is displayed. See section 3.1.

You can configure up to two input signals.

The screenshot shows the 'Aux Settings' screen with the following parameters and callouts:

- Aux Name:** AUX1 and AUX2. Callout: Set the input signal name (up to 8 characters).
- Scaling:** 1.0000 for both. Callout: Set the scaling factor (0.0001 to 99999.9999).
- Unit:** kW/m2 for both. Callout: Set the unit (up to 8 characters).
- Analog Auto Range:** ON and OFF. Callout: Turns the auto range on and off.
- Analog Range:** 20V for both. Callout: Set the fixed range (20V, 10V, 5V, 2V, 1V, 500mV, 200mV, 100mV, 50mV).
- Linear Scale A:** 1.000 for both. Callout: Set the linear scale (A: 1.000 m to 1.000 M; B: -1.000 M to 1.000M).
- Linear Scale B:** 0.00 for both. Callout: Set A (the slope) and B (the offset).
- Calculation:** Both set to 'Calculation'. Callout: Computes A and B.
- Line Filter:** OFF. Callout: Set the line filter (OFF, 100Hz, 1kHz).

Computing A and B (Calculation)

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

On the auxiliary input conditions setup screen, select **Calculation** to display the following screen.

The screenshot shows the 'Calculation' screen with the following parameters and callouts:

- Equation:** $Y = AX + B[\text{Unit}/V]$
- Point1X[V]:** 0.000. Callout: Set the first X-axis value [V] and Y-axis value [Unit] (-1.000 T to 1.000 T).
- Point1Y[Unit]:** 0.000. Callout: Set the first X-axis value [V] and Y-axis value [Unit] (-1.000 T to 1.000 T).
- Point2X[V]:** 0.000. Callout: Set the second X-axis value [V] and Y-axis value [Unit] (-1.000 T to 1.000 T).
- Point2Y[Unit]:** 0.000. Callout: Set the second X-axis value [V] and Y-axis value [Unit] (-1.000 T to 1.000 T).
- Buttons:** Cancel and Execute. Callout: Computes A and B.
- Cancel:** Callout: Cancels the computation.

5.1 Holding Measured Values

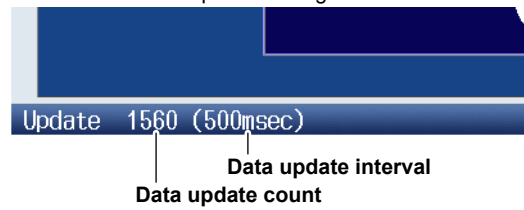
This section explains how to hold measured values.

▶ [“Holding Measured Values \(HOLD\)” in the features guide](#)

Press **HOLD**. The HOLD key illuminates, and the displayed measured value is held.

- Values such as D/A output, the list of numeric data that is being printed on the built-in printer, and communication output are also held.
- Press **HOLD** again to turn the HOLD key off. This releases the hold feature. The measured data is then updated at the specified data update rate (see section 1.15).

If you hold the measured value, the data update count in the lower left of the screen stops increasing.



5.2 Performing Single Measurements

This section explains how to perform single measurements.

▶ [“Single Measurement \(SINGLE\)” in the features guide](#)

1. Press **HOLD**. The HOLD key illuminates, and the displayed measured value is held.
2. Press **SINGLE**. A single measurement is performed at the specified data update rate, and this instrument then holds the measured value.

Note

- If, while the HOLD key is illuminated, you press **HOLD** again, the HOLD key will turn off, and the hold feature will be released. If you press **SINGLE** 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 press the key.
 - When the data update interval is set to Auto, single measurement is not possible.
-

6.1 Setting the Display Format

This section explains how to set the numeric data display format. To set the display format, you can:

- Select it from the Numeric Form menu.
- Set it directly by pressing NUMERIC.

► [“Numeric Data Display Format” in the features guide](#)

Numeric Form Menu

Press **NUMERIC** and then **FORM** to display the following menu.

If the setup parameter list is being displayed (the INPUT INFO key is illuminated), the Info Form menu may be displayed. If this happens, press **FORM** again.

Numeric Form	
4 Items	Select the 4 Items display.
8 Items	Select the 8 Items display.
16 Items	Select the 16 Items display.
Matrix	Select the matrix display. You can select four or six columns (see section 6.4).
All Items	Select the All Items display.
Hrm List Single Dual	Select the harmonics list display (/G5 or /G6 option). This instrument switches between the single and dual list displays each time you press this soft key.
Custom	Select the custom display. You can load the background and customize the numeric data display (see section 6.7).

NUMERIC Key

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

6.2 Switching the Displayed Page

This section explains how to switch the displayed numeric data page.

► [“Switching the Displayed Page \(PAGE UP/PAGE DOWN\)” in the features guide](#)

1. Follow the procedure in section 6.1 to select the numeric data display format.

4 Items, 8 Items, 16 Items, Matrix, All Items, and Custom Displays

2. Press **PAGE▲** to display the previous page.

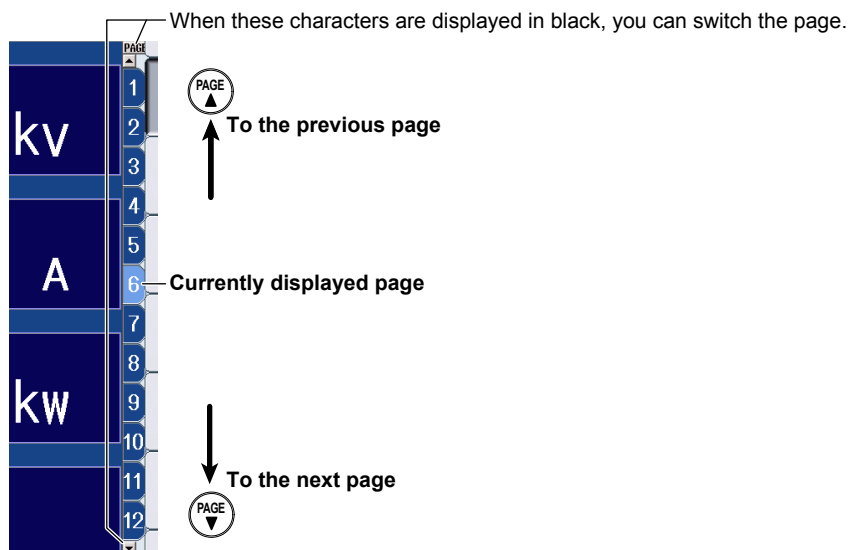
Press **PAGE▼** to display the next page.

Press **SHIFT+PAGE▲** (**▲**) to jump to the first page.

Press **SHIFT+PAGE▼** (**▼**) to jump to the last page.

- You can switch the displayed page separately for the 4 Items, 8 Items, 16 Items, Matrix, All Items, and Custom displays.
- For the All Items display, the first page is always displayed in the top half of the screen, and the currently selected page from pages 2 to 12 is displayed in the bottom half of the screen. On the split display, you can switch between pages 1 to 12.
- For the Custom display, you can switch between pages when the display is set so that the total number of displayed items is more than the number of items that can be displayed on one page (see section 6.7).

Example of the 4 Items Display

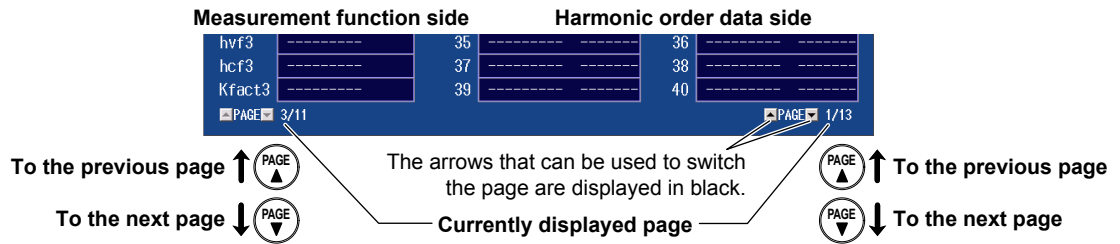


Hrm List Single and Hrm List Dual Displays (/G5 or /G6 options)

2. Press **ESC** to clear the menu.
3. Press the **cursor** keys (**◀▶**) to select either the measurement function side (the left side of the screen) or the harmonic order data side (the right side of the screen).
4. Press **PAGE▲** to display the previous page.
Press **PAGE▼** to display the next page.

Press **SHIFT+PAGE▲** (**▲**) to jump to the first page.

Press **SHIFT+PAGE▼** (**▼**) to jump to the last page.



Note

If you do not perform step 2 to clear the menu, you cannot switch between the measurement function and the harmonic order data sides.

6.3 Changing the Displayed Items on the 4 Items, 8 Items, and 16 Items Displays

This section explains the following settings for the displayed items on the 4 Items, 8 Items, and 16 Items displays:

- Item number
- Measurement function
- Element and wiring unit
- Harmonic order
- Resetting the displayed items
- Turning the display frame on and off

To change the displayed items, you can:

- Set the items on the Numeric (4), Numeric (8), or Numeric (16) menu.
- Set items directly by pressing the function select keys and ELEMENT.
▶ [“4-, 8-, and 16-Value Displays \(4 Items/8 Items/16 Items\)” in the features guide](#)

1. Follow the procedure in section 6.1 to set the numeric data display format to the 4 Items, 8 Items, or 16 Items display.

Numeric (4), Numeric (8), and Numeric (16) Menus

2. Press **ITEM** to display the following menu.

If the setup parameter list is being displayed (the INPUT INFO key is illuminated), the Info Items menu may be displayed. If this happens, press **ITEM** again.

In step 1, you can also display the Numeric (4), Numeric (8), or Numeric (16) menu by pressing **NUMERIC**, **ITEM**, and then repeatedly pressing **NUMERIC**.

Example of the Numeric (4) Menu

The screenshot shows the Numeric (4) menu with the following options and annotations:

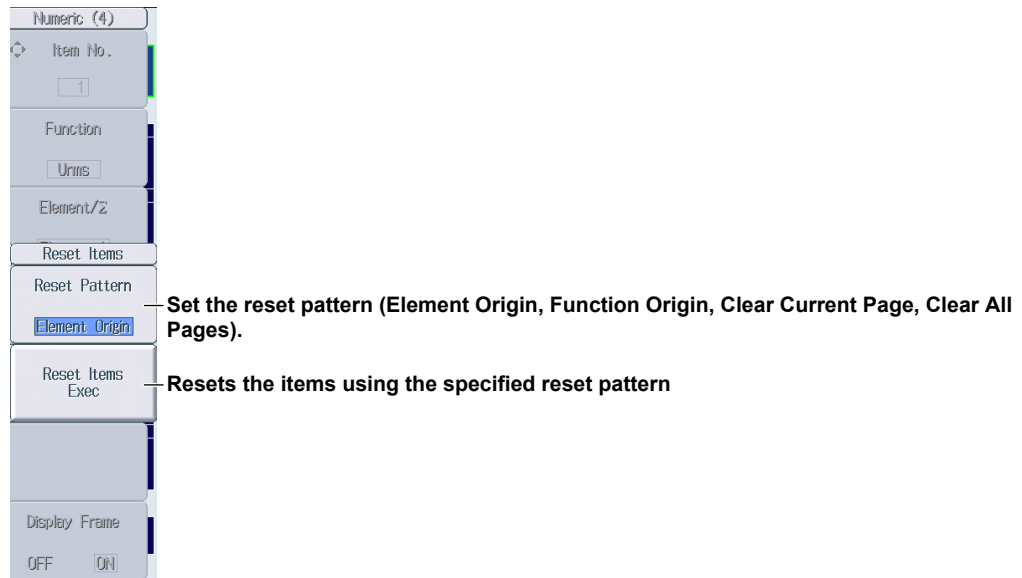
- Item No.**: Select the item number that you want to set. (4 Items display: 1 to 48; 8 Items display: 1 to 96; 16 Items display: 1 to 192)
- Function**: Set the measurement function (None, other functions—for details on the various measurement functions, see “Items That This Instrument Can Measure” in the features guide).
- Element/Σ**: Set the element and wiring unit (Element 1 to Element 6, ΣA to ΣC).
- Order**: Set the harmonic order (Total, 0 to 500; /G5 or /G6 option). You can set this setting only when you have selected a measurement function that includes a harmonic order.
- Reset Items**: Set the resetting of displayed items.
- Display Frame**: Turns the display frame on and off.

Switching the Page

To set items on pages that aren't currently displayed, switch to these pages. For details on how to switch pages, see section 6.2.

Reset Items Menu

Press the **Reset Items** soft key to display the following menu.



Function Select Keys and the ELEMENT Key

Follow steps 1 and 2 on the previous page to display the Numeric (4), Numeric (8), or Numeric (16) menu.

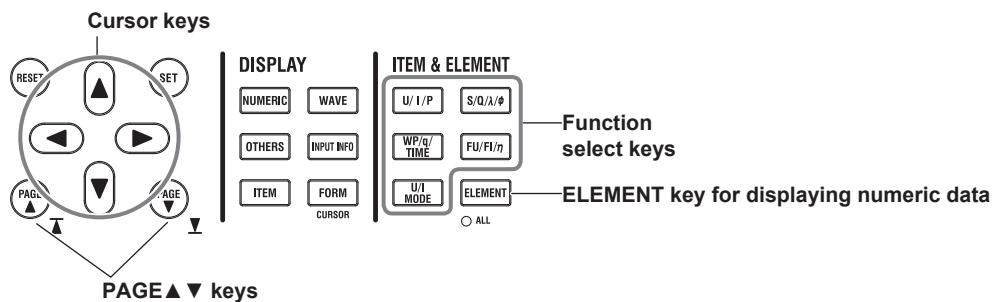
3. Press **ESC** to clear the menu.

Example of the 8 Items Display

Displayed in the upper left of the numeric data display screen



4. Press the **cursor** keys, the **PAGE** \blacktriangle \blacktriangledown keys, or the **SHIFT+PAGE** \blacktriangle \blacktriangledown (\blacktriangle and \blacktriangledown) keys to select the item that you want to change.
5. Press the function select key that corresponds to the measurement function that you want to display.
Function select keys: **U/I/P** key, **S/Q/A/ Φ** key, **WP/q/TIME** key, **FU/FI/ η** key, and **U/I MODE** key
6. Press the **ELEMENT** key for displaying numeric data to select the element and wiring unit that you want to display.
 - Press **SHIFT+the ELEMENT (ALL)** key for displaying numeric data to illuminate the indicator below the ELEMENT key and change all elements of the measurement functions on the displayed page to the same element and wiring unit at once.
 - Press **SHIFT+the ELEMENT (ALL)** key for displaying numeric data again to turn the indicator off and stop setting all elements at once.



6.4 Changing the Displayed Items on the Matrix Display

This section explains the following settings for the displayed items on the Matrix display:

- Item number
- Measurement function
- Element and wiring unit
- Harmonic order
- Resetting the displayed items
- Display column
- Turning the display frame on and off

To change the displayed items, you can:

- Set the items on the Matrix Items menu.
- Set items directly by pressing the function select keys and ELEMENT.

► [“Matrix Display \(Matrix\)” in the features guide](#)

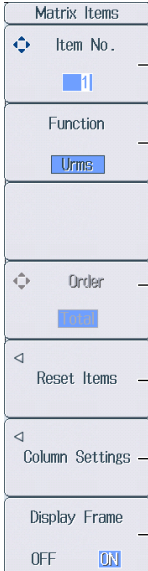
1. Follow the procedure in section 6.1 to set the numeric data display format to the Matrix display.

Matrix Items Menu

2. Press **ITEM** to display the following menu.

If the setup parameter list is being displayed (the INPUT INFO key is illuminated), the Info Items menu may be displayed. If this happens, press **ITEM** again.

In step 1, you can also display the Matrix Items menu by pressing **NUMERIC**, **ITEM**, and then repeatedly pressing **NUMERIC**.



The screenshot shows the Matrix Items menu with the following items and annotations:


- Item No.**: Select the item number that you want to set (1 to 81). The value 11 is displayed.
- Function**: 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). The value Urms is displayed.
- Order**: Set the harmonic order (Total, 0 to 500; /G5 or /G6 option). You can set this setting only when you have selected a measurement function that includes a harmonic order.
- Reset Items**: Set the resetting of displayed items.
- Column Settings**: Configure the columns to display.
- Display Frame**: Turns the display frame on and off. The value OFF is displayed.

Switching the Page

To set items on pages that aren't currently displayed, switch to these pages. For details on how to switch pages, see section 6.2.

Reset Items Menu

Press the **Reset Items** soft key to display the following menu.




The screenshot shows a vertical menu titled 'Matrix Items'. The menu items are: 'Item No.' (with a value of 1), 'Function' (with a value of 'Urms'), 'Reset Items', 'Reset Pattern' (with 'Element Origin' selected), 'Reset Items Exec', 'Column Settings', and 'Display Frame' (with 'OFF' and 'ON' options). Annotations on the right side of the menu provide descriptions for the 'Reset Pattern' and 'Reset Items Exec' options.

- Reset Pattern** (Element Origin): Set the reset pattern (Element Origin, Function Origin, Clear Current Page, Clear All Pages).
- Reset Items Exec**: Resets the items using the specified reset pattern

Column Settings Menu

Press the **Column Settings** soft key to display the following menu.



The screenshot shows a vertical menu titled 'Column Settings'. The menu items are: 'Column Num' (with a value of 4 and a range of 6), 'Column No.' (with a value of 2), 'Element/Σ' (with 'Element 2' selected), 'Reset Items Exec', and three empty menu items at the bottom. Annotations on the right side of the menu provide descriptions for the 'Column Num', 'Column No.', and 'Element/Σ' options.

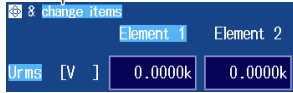
- Column Num**: Set the number of columns (4, 6).
- Column No.**: Set the column number (1 to 6).
- Element/Σ**: Set the element and wiring unit (None, Element 1 to Element 6, ΣA to ΣC).
- Reset Items Exec**: Resets items to the default values

Function Select Keys and the ELEMENT Key

Follow steps 1 and 2 on page 6-6 to display the Matrix Items menu.

3. Press **ESC** to clear the menu.

Displayed in the upper left of the numeric data display screen



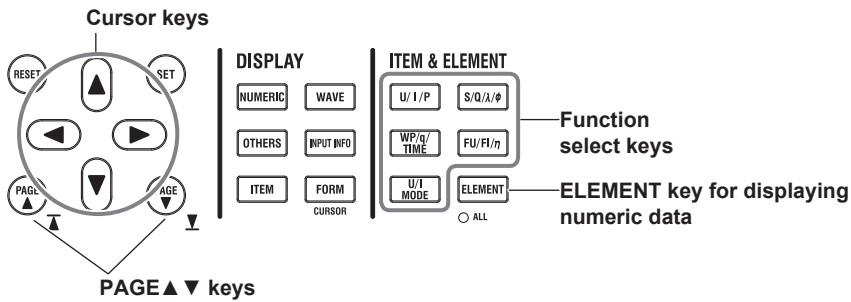
Changing the Measurement Function (Vertical direction)

4. Press the **cursor keys** (**▲▼**), the **PAGE▲▼** keys, or the **SHIFT+PAGE▲▼** (**⏴** and **⏵**) keys to select the row that you want to change.
5. Press the function select key that corresponds to the measurement function that you want to display.

Function select keys: **U/I/P** key, **S/Q/A/Φ** key, **WP/q/TIME** key, **FU/Fl/η** key, and **U/I MODE** key

Changing the Element and Wiring Unit (Horizontal direction)

4. Use the **cursor keys** (**◀▶**) to select the column that you want to change.
5. Press the **ELEMENT** key for displaying numeric data to select the element and wiring unit that you want to display.



6.5 Changing the All Items Display

This section explains the following All Items display settings:

- Harmonic order
- Turning the display of all element and all wiring unit data on and off
- Turning the display frame on and off

► “All Display (All Items)” in the features guide

1. Follow the procedure in section 6.1 to set the numeric data display format to the All Items display.

Numeric (All) Menu

2. Press **ITEM** to display the following menu.

If the setup parameter list is being displayed (the INPUT INFO key is illuminated), the Info Items menu may be displayed. If this happens, press **ITEM** again.

In step 1, you can also display the Numeric (All) menu by pressing **NUMERIC**, **ITEM**, and then repeatedly pressing **NUMERIC**.

The screenshot shows a vertical menu titled "Numeric (All)". It contains three main sections, each with a title and a status indicator:

- Order(*)**: A blue bar is shown below the title, indicating it is selected.
- Display All Elements**: The status is "ON", with a blue bar to the left of the text.
- Display Frame**: The status is "ON", with a blue bar to the right of the text.

— **Set the harmonic order (Total, 0 to 500; /G5 or /G6 option).**

You can set this setting only when you have selected the page of a measurement function includes a harmonic order. For details on how to switch pages, see section 6.2.

— **Turns the display of numeric data of all elements or all wiring units on and off**

If the total number of elements or wiring units is 7 or more, set this to ON when you want to display the numeric data of all elements or all wiring units.

— **Turns the display frame on and off**

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 section 6.4).

6.6 Changing the Harmonics List Display (Option)

This section explains the following settings for the harmonics list display (Hrm List). This feature is available on models with the /G5 or /G6 option.

- List number
- Measurement function
- Element and wiring unit
- Turning the display frame on and off

To change the displayed items, you can:

- Set the items on the List Items menu.
- Set items directly by pressing the function select keys and ELEMENT.

▶ [“Single Harmonics and Dual Harmonics Lists \(Hrm List Single/Dual; option\)” in the features guide](#)


1. Follow the procedure in section 6.1 to set the numeric data display format to the harmonics list display (Hrm List).

List Items Menu

2. Press **ITEM** to display the following menu.

If the setup parameter list is being displayed (the INPUT INFO key is illuminated), the Info Items menu may be displayed. If this happens, press **ITEM** again.

In step 1, you can also display the List Items menu by pressing **NUMERIC**, **ITEM**, and then repeatedly pressing **NUMERIC**. There is a List Items menu for the single harmonics list and the dual harmonics list. When you repeatedly press **NUMERIC**, the menu for the single harmonics list is displayed after the All Items display, and the menu for the dual harmonics list is displayed after the menu for the single harmonics list.



The screenshot shows a vertical menu titled "List Items" with the following options and annotations:

- List Item No.**: Shows "11". Annotation: "Select the list number that you want to set (1, 2). Function, element, and wiring unit settings that you make for list number 2 are also reflected in the right column of the harmonic order data of the dual harmonics list."
- Function**: Shows "U". Annotation: "Set the measurement function (U, I, P, S, Q, λ, Φ, ΦU, ΦI, Z, Rs, Xs, Rp, Xp)."
- Element/Σ**: Shows "Element 1". Annotation: "Set the element and wiring unit (Element 1 to Element 6, ΣA to ΣC)."
- Display Frame**: Shows "OFF" and "ON". Annotation: "Turns the display frame on and off"

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.

Function Select Keys and the ELEMENT Key

Follow steps 1 and 2 on page 6-10 to display the List Items menu.

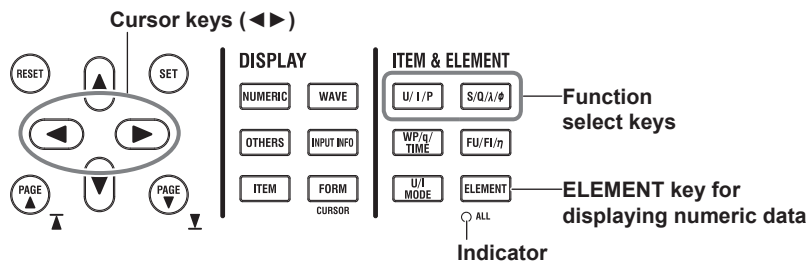
- Press **ESC** to clear the menu.
- Use the **cursor** keys (**◀▶**) to select the harmonic order data side (the right side of the screen).
If you are displaying the dual harmonics list, you can set the left or right column of the harmonic order data, whichever you have selected.

Example of the Single Harmonics List

Displayed in the upper left of the numeric data display screen



- Press the function select key that corresponds to the measurement function that you want to display.
Function select keys: **U/I/P** key and **S/Q/A/Φ** key
(The **WP/q/TIME** key, **FU/FI/η** key, and **U/I MODE** key are disabled.)
- Press the **ELEMENT** key for displaying numeric data to select the element and wiring unit that you want to display.
 - If you are displaying the dual harmonics list, press **SHIFT+the ELEMENT (ALL)** key for displaying numeric data to illuminate the indicator below the ELEMENT key and change all elements of the left and right columns of the harmonic order data to the same element and wiring unit at once.
 - Press **SHIFT+the ELEMENT (ALL)** key for displaying numeric data again to turn the indicator off and stop setting all elements at once.



6.7 Setting the Custom Display

This section explains the following Custom display settings:

- Loading of display configuration files
- Loading of background files
- Display configuration
 - Total items, items per page, custom items (item number, measurement function, element and wiring unit, harmonic order, display position, font size, font color), saving custom display configuration files
- Turning the display frame on and off

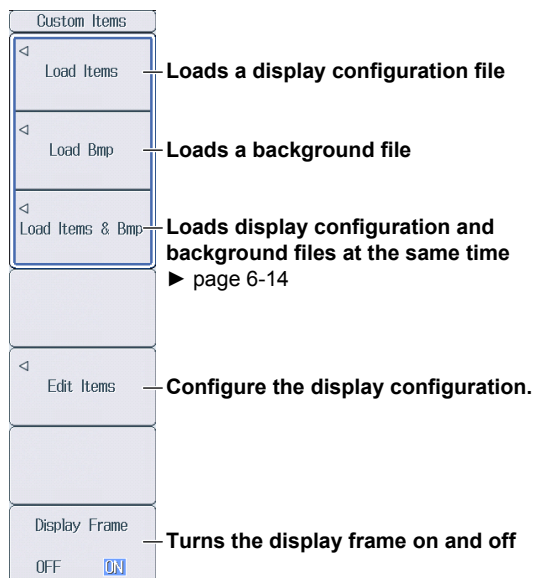
► [“Custom Display \(Custom\)” in the features guide](#)

1. Follow the procedure in section 6.1 to set the numeric data display format to Custom.

Custom Items Menu

2. Press **ITEM** to display the following menu.

If the setup parameter list is being displayed (the INPUT INFO key is illuminated), the Info Items menu may be displayed. If this happens, press **ITEM** again.



You can load files for the custom display.
Display configuration files: .txt files
Background files: .bmp files

- You can use the “Edit Items” menu described below to change the display configuration that you have loaded.
- To load both a display configuration file and background file at the same time, load the display configuration file.

Setting the Display Configuration (Edit Items)

Press the **Edit Items** soft key to display the following menu.

<div style="border: 1px solid gray; padding: 2px;"> Edit Items Total Items <input type="text" value="4"/> </div>	Set the total number of items (1 to 192).
<div style="border: 1px solid gray; padding: 2px;"> Items Per Page <input type="text" value="4"/> </div>	Set the number of items per page (1 to 192). • Any changes made to Total Items will change the Items Per Page setting, and vice-versa. • For details on how to switch pages, see section 6.2.
<div style="border: 1px solid gray; padding: 2px;"> Custom Items </div>	Customize display items.
<div style="border: 1px solid gray; padding: 2px;"> Save Custom Items </div>	Saves the display configuration file

Customizing Display Items (Custom Items)

Press the **Custom Items** soft key to display the following screen.

(X, Y)

Select the item number that you want to set (1 to the Total Items setting).

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).

Set the element and wiring unit (Element 1 to Element 6, ΣA to ΣC).

When Function is set to None:
Set the character string (up to 15 characters).

When the measurement function includes a harmonic order:
Set the harmonic order (Total, 0 to 500; /G5 or /G6 option).

Set the display position.
 • X Pos: 0 (left edge of the screen) to 800 (right edge of the screen)
 • Y Pos: 0 (top of the screen) to 671 (bottom of the screen)

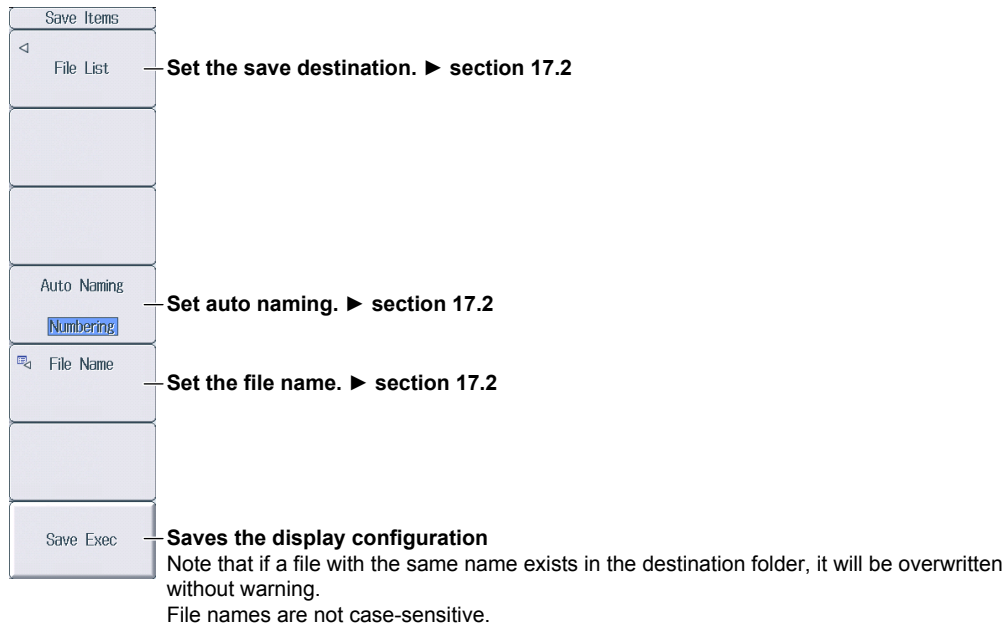
Set the font size (14, 16, 20, 24, 32, 48, 64, 96, 128).

Set the font color (Yellow, Green, Magenta, Cyan, Red, Orange, Light Blue, Purple, Blue, Pink, Light Green, Dark Blue, Blue Green, Salmon Pink, Mid Green, Gray, White, Dark Gray, Blue Gray, Black).

6.7 Setting the Custom Display

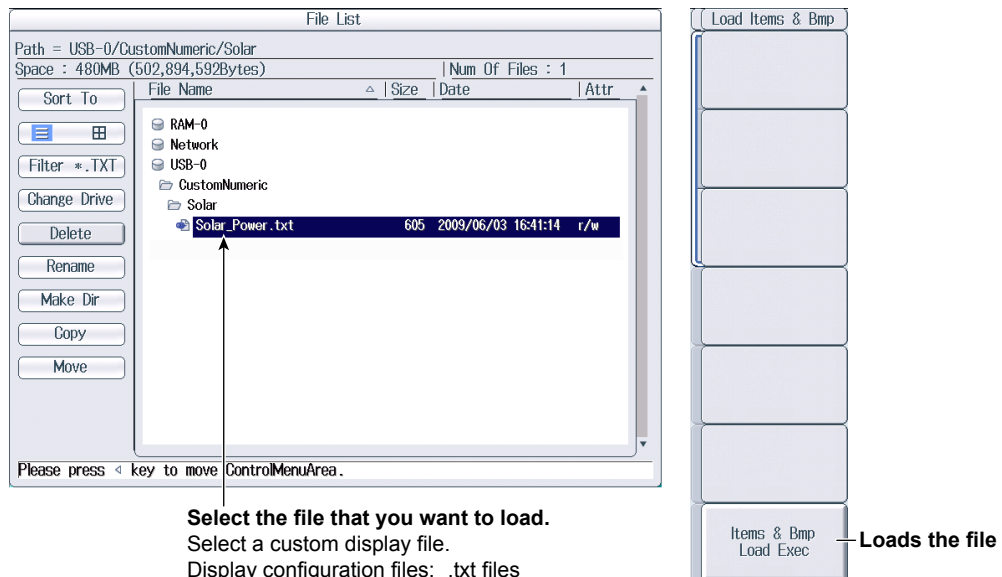
Saving Display Configuration Files (Save Custom Items)

Press the **Save Custom Items** soft key to display the following menu.



Loading Display Configuration and Background Files at the Same Time (Load Items & Bmp)

Follow the procedure on page 6-12 to display the Custom Items menu, and then press the **Load Items & Bmp** soft key to display the following screen.



Select the file that you want to load.

Select a custom display file.

Display configuration files: .txt files

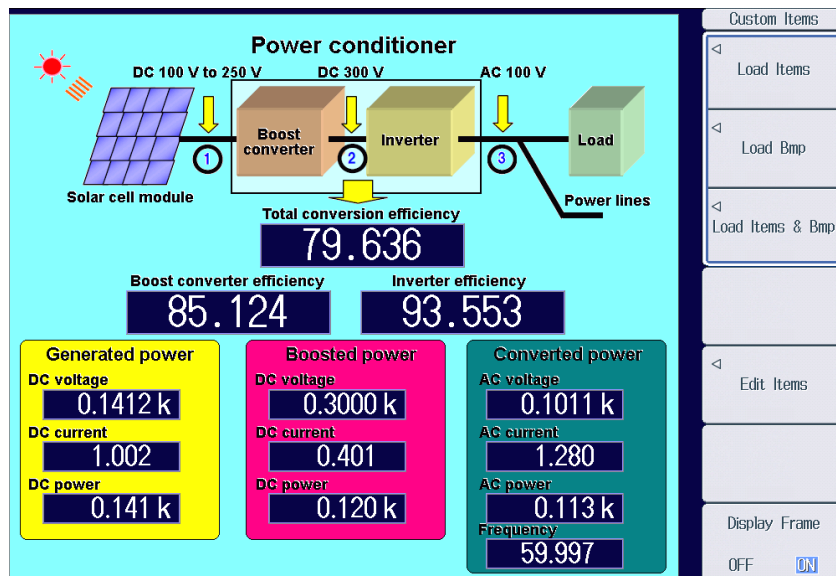
Background files: .bmp files

To load both a display configuration file and background file at the same time, load the display configuration file.

However, an error will occur if a background file that has the same name as the display configuration file is not present in the save destination folder of the display configuration file.

For the operating procedure, see section 17.6.

Example of Loading a File for the Custom Display

**Note**

After you properly load a display configuration file and a background file, if you restart this instrument and the same background file is not in the same location, the background will return to its default.

7.1 Setting User-Defined Functions

This section explains the following settings for user-defined functions:

- Turning computations on and off
- Computation name
- Unit
- Expressions
- Turning max hold on and off

► [“User-Defined Functions \(User Defined Function\)” in the features guide](#)

Setting User-Defined Functions (User Defined Function)

Press **MEASURE** and then the **User Defined Function** soft key to display the following screen.

Set the expression.

Function	On/Off	Name	Unit
Function 1	OFF ON	Avg-W	W
Expression	WH(E1)/(T1(E1)/3600)		
Function 2	OFF ON	P-loss	W
Expression	P(E1)-P(E2)		
Function 3	OFF ON	U-ripple	%
Expression	(UPPK(E1)-UMPK(E1))/2/IDC(E1)*100		
Function 4	OFF ON	I-ripple	%
Expression	(IPPK(E1)-IMPK(E1))/2/IDC(E1)*100		
Function 5	OFF ON	D-UrmsR	V
Expression	DELTAU1RMS(E7)		

Annotations:

- Turns the computation on and off (points to On/Off column)
- Set the computation name (up to 8 characters). (points to Name column)
- Set the unit (up to 8 characters). (points to Unit column)
- User Defined F01-F05: Displays the setup screen for user-defined functions F1 to F5
- User Defined F06-F10: Displays the setup screen for user-defined functions F6 to F10
- User Defined F11-F15: Displays the setup screen for user-defined functions F11 to F15
- User Defined F16-F20: Displays the setup screen for user-defined functions F16 to F20
- Max Hold: Turns max hold on and off

7.2 Setting User-Defined Events

This section explains the following settings for user-defined events:

- Event number
- Turning events on and off
- Event name
- Character string displayed when events occur or do not occur
- Judgment condition setup method
 - Using numeric data to perform judgment
 - Measurement function, element and wiring unit, harmonic order, comparison condition, comparison reference
 - Using logical AND and OR of events to perform judgment
 - Inversion of judgment conditions

► “User-Defined Events (User Defined Event)” in the features guide

Setting User-Defined Events (User Defined Event)

Press **MEASURE** and then the **User Defined Event** soft key to display the following screen.

Set the event number (1 to 8).

Turns the event on and off

Set the event name (up to 8 characters).

Set the character string that is displayed when events occur or do not occur (up to 6 characters).

Select the judgment condition setup method (Range, Condition).

Using numeric data to perform judgment (Range)

- Set the measurement function (for details on the various measurement functions, see “Items That This Instrument Can Measure” in the features guide).
- Set the element and wiring unit (Element 1 to Element 6, ΣA to ΣC).
- Set the harmonic order (Total, 0 to 500; /G5 or /G6 option). You can set this setting when the measurement function includes a harmonic order.
- Set the comparison condition (OFF, <, <=, =, >, >=, !=).
- Set the comparison reference (-9.999T to 9.999T).

Using logical AND and OR of events to perform judgment (Condition)

- Set the judgment condition inversion.
- Set AND, OR, or END.
- Set the events.

You can select events whose event numbers are smaller than the number specified by Event No. for the current event.

The settings are displayed.

When you turn an event on, the corresponding check box is selected.

7.3 Setting Apparent Power, Reactive Power, and Corrected Power Equations

This section explains the following settings for the apparent power, reactive power, and corrected power equations:

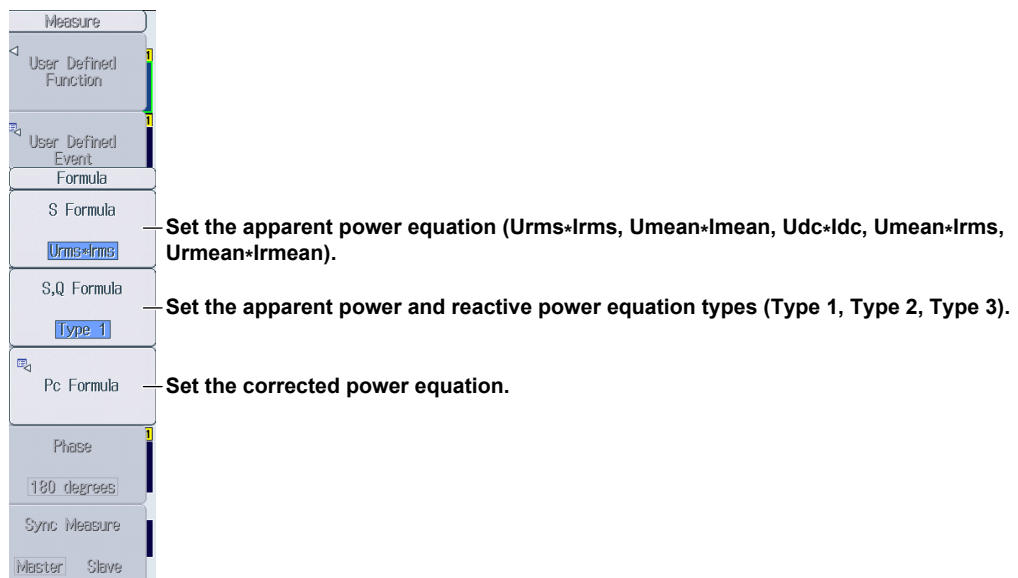
- Apparent power equation
- Apparent power and reactive power equation types
- Corrected power equation

Applicable standard and coefficients

► [“Apparent Power, Reactive Power, and Corrected Power Equations \(Formula\)” in the features guide](#)

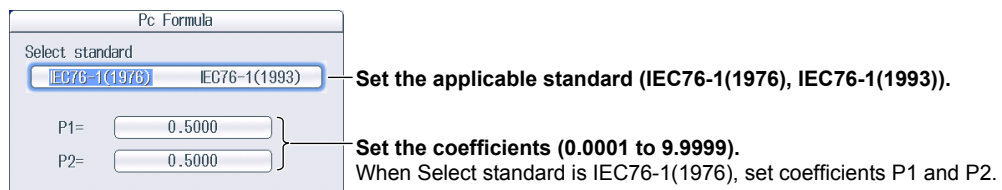
Formula Menu

Press **MEASURE** and then the **Formula** soft key to display the following menu.



Setting the Corrected Power Equation (Pc Formula)

Press the **Pc Formula** soft key to display the following screen.



7.4 Setting the Sampling Frequency

This section explains how to set the sampling frequency.

► [“Sampling Frequency \(Sampling Frequency\)” in the features guide](#)

Measure Menu

Press **MEASURE** to display the following menu.

Measure
< User Defined Function
Ⓜ User Defined Event
< Formula
Sampling Frequency <u>Auto</u>
Phase <u>180 degrees</u>
Sync Measure <u>Master</u> Slave

— Set the sampling frequency (Auto, Clock A, Clock B, Clock C).

7.5 Setting the Phase Difference Display Format

This section explains how to set the phase difference display format.

► [“Phase Difference Display Format \(Phase\)” in the features guide](#)

Measure Menu

Press **MEASURE** to display the following menu.

Measure
< User Defined Function
☐ User Defined Event
< Formula
Sampling Frequency Auto
Phase 180 degrees
Sync Measure Master Slave

— Set the phase difference display format (180 degrees, 360 degrees).

7.6 Setting Master and Slave Synchronized Measurement

This section explains the following setting for master and slave synchronized measurement.

- Master and slave
 - ▶ [“Master/Slave Synchronized Measurement \(Sync Measure\)”](#) in the features guide

Measure Menu

Press **MEASURE** to display the following menu.

Measure
< User Defined Function
Ⓜ User Defined Event
< Formula
Sampling Frequency Auto
Phase 180 degrees
Sync Measure Master Slave

— Select whether this is the master unit or a slave unit (Master, Slave).

7.7 Setting the Voltages or Currents Whose Frequencies Will Be Measured

This instrument can measure the frequencies of the voltages or currents of all elements, so the setup menu is not displayed even if you press **SHIFT+MEASURE** (FREQ MEASURE).

8.1 Setting Independent Integration

This section explains the following settings for independent integration. If you turn independent integration on, you can start, stop, and reset integration for each input element separately.

- Turning independent integration on and off
 - Element that independent integration will be performed on
- ▶ [“Enabling or Disabling Independent Integration \(Independent Control\)” in the features guide](#)

Integ Menu

Press **INTEG** to display the following menu.

Integ
Independent Control
OFF **ON** — Turns independent integration on and off

Element Object — Select the elements that independent integration will be performed on.*
This soft key is displayed when Independent Control is set to ON.
①②③④⑤⑥ — The input elements that independent integration will be performed on are displayed.

Start

Stop * 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).

Reset

Integ Set

Selecting the Element That Independent Integration Will Be Performed On (Element Object)

Press the **Element Object** soft key to display the following screen.

Element Object

<input checked="" type="checkbox"/> Element 1	<input checked="" type="checkbox"/> Element 4
<input checked="" type="checkbox"/> Element 2	<input checked="" type="checkbox"/> Element 5
<input checked="" type="checkbox"/> Element 3	<input checked="" type="checkbox"/> Element 6

All ON **All OFF**

Select the check boxes for the input elements that you want independent integration to be performed on.

All ON — Selects all input elements

All OFF — Clears all selected input elements

8.2 Setting Integration Conditions

This section explains the following settings for integration conditions:

- Integration mode
- Integration timer
- Scheduled times for real-time integration
- Turning integration auto calibration on and off
- Watt-hour integration method for each polarity
- Current mode for current integration
- Rated time of integrated D/A output (/DA option)

► [“Integration Conditions \(Integ Set\)” in the features guide](#)

Integ Menu

Press **INTEG** and then the **Integ Set** soft key to display the following menu.

The screenshot shows the 'Integ Set' menu with the following options and callouts:

- Mode**: Set the integration mode (Normal, Continuous, R-Normal, R-Continuous).¹
- Integ Timer**: Set the integration timer.
- Real-time Control**: Set the scheduled times for real-time integration. This soft key is displayed when Mode is set to R-Normal or R-Continuous.
- Auto Cal**: Turns integration auto calibration on and off¹
- WP± Type**: Set the watt-hour integration methods for each polarity.¹
- q Mode**: Set the current modes for current integration.
- D/A Output Rated Time**: Set the rated time of integrated D/A output (/DA option).

¹ You can set this when the data update interval is not Auto.

Setting the Integration Timer (Integ Timer)

Press the **Integ Timer** soft key to display the following screen.

When Independent Integration Is Off

The screenshot shows the 'Integ Timer' screen with the 'Integ Timer' field set to 00000 : 00 : 00. Callout: Set the integration timer (00000 hours : 00 minutes : 00 seconds to 10000 hours : 00 minutes : 00 seconds).*

When Independent Integration Is On

The screenshot shows the 'Integ Timer' screen with the 'Setting' dropdown set to 'Each'. Callout: Select the integration timer's setup method (Each, All). When you select Each, you can set the integration timer for each input element.

Element	Hours	Minutes	Seconds
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

* When Mode is set to Normal and the integration timer is 00000 : 00 : 00, this instrument is in manual integration mode.

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

Press the **Real-time Control** soft key to display the following screen.

The Real-time Control soft key is displayed when Mode is set to R-Normal or R-Continuous.

When Independent Integration Is Off

Real-time Control

Start: 2011 / 01 / 01 00 : 00 : 00 Now

End: 2011 / 01 / 01 01 : 00 : 00 Copy

Scheduled integration stop time
Scheduled integration start time

Sets the scheduled integration start time to the current time

Copies the scheduled integration start time to the scheduled integration stop time

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 On

Real-time Control

Setting: Each All

Element 1	Start	2011 / 01 / 01	00 : 00 : 00	Now
	End	2011 / 01 / 01	01 : 00 : 00	Copy
Element 2	Start	2011 / 01 / 01	00 : 00 : 00	Now
	End	2011 / 01 / 01	01 : 00 : 00	Copy
Element 3	Start	2011 / 01 / 01	00 : 00 : 00	Now
	End	2011 / 01 / 01	01 : 00 : 00	Copy
Element 4	Start	2011 / 01 / 01	00 : 00 : 00	Now
	End	2011 / 01 / 01	01 : 00 : 00	Copy
Element 5	Start	2011 / 01 / 01	00 : 00 : 00	Now
	End	2011 / 01 / 01	01 : 00 : 00	Copy
Element 6	Start	2011 / 01 / 01	00 : 00 : 00	Now
	End	2011 / 01 / 01	01 : 00 : 00	Copy

Select the schedule setup method (Each, All). When you select Each, you can set the schedule for each input element.

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

Press the **WP± Type** soft key to display the following screen.

WP± Type

Setting: Each All

Element 1	Charge/Discharge	Sold/Bought
Element 2	Charge/Discharge	Sold/Bought
Element 3	Charge/Discharge	Sold/Bought
Element 4	Charge/Discharge	Sold/Bought
Element 5	Charge/Discharge	Sold/Bought
Element 6	Charge/Discharge	Sold/Bought

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

Set the integration method (Charge/Discharge, Sold/Bought).

Setting the Current Mode for Current Integration (q Mode)

Press the **q Mode** soft key to display the following screen.



Select the current mode setup method (Each, All).
When you select Each, you can set the current mode for each input element.

Set the current mode (rms, mean, dc, r-mean, ac).

Setting the Rated Time of Integrated D/A Output (D/A Output Rated Time, /DA option)

Press the **D/A Output Rated Time** soft key to display the following screen.



Set the rated time of integrated D/A output
(00000 hours : 00 minutes : 00 seconds to 10000 hours :
00 minutes : 00 seconds).

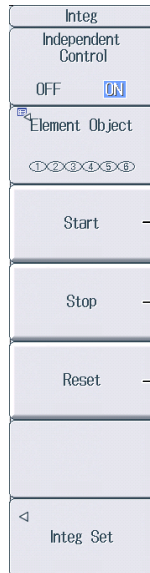
8.3 Starting, Stopping, and Resetting Integration

This section explains how to start, stop, and reset integration.

► [“Starting, Stopping, and Resetting Integration \(Start/Stop/Reset\)” in the features guide](#)

Integ Menu

Press **INTEG** to display the following menu.



Starts integration

This instrument starts integration using the integration mode that you have specified (see section 8.2).

- The START indicator to the right of the INTEG key illuminates. Integration has started; “Integ: Start” is displayed.*
- The START indicator to the right of the INTEG key blinks. The integration operation is ready; “Integ: Ready” is displayed.*

Stops integration

This instrument automatically stops integration according to the integration mode that you have specified. To force integration to stop, press this soft key. The integration time and integrated value are held.

- The STOP indicator to the right of the INTEG key blinks. Integration has stopped; “Integ: Stop” is displayed.* If you press the Start soft key when “Stop” is displayed in yellow, you can resume integration from the point where you stopped integration.
- The STOP indicator to the right of the INTEG key illuminates. Integration has stopped automatically because the integration timer has expired; “Integ: TimeUp” is displayed.* Integration has stopped automatically because of real-time control; “Integ: Stop” is displayed.* “Stop” is displayed in orange.

Resets the integration time and integrated value.

All integration data is deleted, and the no-data display, “-----,” appears. The STOP indicator to the right of the INTEG key turns off.

* Character strings are displayed in the upper-right section of the screen.

Note

If you do not reset integration, you will not be able to start it again.

8.4 Integration Resume Action at Power Failure Recovery

This section explains how to set the Integration Resume Action at Power Failure Recovery.

- ▶ [“Integration Resume Action at Power Failure Recovery \(Integration Resume Action\)” in the features guide](#)

Integration Resume Action Menu

Press **UTILITY**, the **System Config** soft key, and then the **Preference** soft key to display the following menu.

Preference
Resolution <input type="button" value="5digits"/>
Freq Display at Frequency Low 0 <input type="button" value="Error"/>
Motor Display at Pulse Freq Low 0 <input type="button" value="Error"/>
Decimal Point for CSV File <input type="button" value="Period"/> <input type="button" value="Comma"/>
Integration Resume Action Start <input type="button" value="Stop"/> <input type="button" value="Error"/>
Menu Font Size Small <input type="button" value="Large"/>
Rounding to Zero OFF <input type="button" value="ON"/>

— Set the Integration Resume Action at Power Failure Recovery (Start, Stop, Error).

9.1 Setting the Display Format

This section explains the following settings for the waveform display format:

- Number of divisions of the waveform screen
- Time axis
- Trigger
- Advanced waveform display settings
- Waveform mapping

► “Display Format (FORM)—Waveform” in the features guide

Wave Form Menu

Press **WAVE** and then **FORM** to display the following menu.

If the setup parameter list is being displayed (the INPUT INFO key is illuminated), the Info Form menu may be displayed. If this happens, press **FORM** again.

The screenshot shows the Wave Form menu with the following items and annotations:

- Format**: Set the number of divisions of the waveform screen (Single, Dual, Triad, Quad, Hexa).¹
- Time/div**: Set the time axis (0.05 ms to $\frac{\text{the specified data update interval}}{10}$).²
- Trigger Settings**: Configure trigger settings.³
- Display Settings**: Configure the advanced waveform display settings.
- Wave Mapping**: Set waveform mapping.

Footnotes:

- ¹ In addition to using this Format soft key, you can repeatedly press WAVE to change the order and the number of divisions.
- ² For information on how to set the data update interval, see section 1.15.
- ³ You can set this when the data update interval is not Auto.

Configuring Trigger Settings (Trigger Settings)

Press the **Trigger Settings** soft key to display the following menu.

The screenshot shows the Trigger Settings menu with the following items and annotations:

- Mode**: Set the trigger mode (Auto, Normal, OFF).
- Source**: Set the trigger source (U1, I1, U2, I2, U3, I3, U4, I4, U5, I5, U6, I6, Ext Clk).
- Slope**: Set the trigger slope (f, r, fl).
- Level**: Set the trigger level (0.0% to ±100.0%).

Configuring Advanced Waveform Display Settings (Display Settings)

Press the **Display Settings** soft key to display the following menu.

The screenshot shows the 'Disp Settings' menu with the following options and annotations:

- Interpolate**: Set the display interpolation (· · ·, ^, v).
- Graticule**: Set the grid (grid icon, square icon, crosshair icon).
- Scale Value**: Turns the display of scale values on and off (OFF, ON).
- Wave Label**: Turns the display of waveform labels on and off (OFF, ON).

Note

Changes that you make to the waveform display settings on the Display Settings menu are also reflected in the advanced trend display settings (see section 10.1).

Setting Waveform Mapping (Wave Mapping)

Press the **Wave Mapping** soft key to display the following screen.

The screenshot shows the 'Wave Mapping' screen with the following options and annotations:

- Mode**: Select the waveform mapping mode (Auto, Fixed, User).
- Mapping Destination**: Set the mapping destination (the divided screen number: 0 to 5). Map each waveform (U1, I1, etc.) to the part of the divided screen that you want it to appear on.
 - These settings are displayed when Mode is set to User.
 - Spd/Aux1 and Trq/Aux2 can be set on models with the /MTR or /AUX options.

Waveform	Mapping Number	Waveform	Mapping Number
U1	0	I1	0
U2	1	I2	1
U3	2	I3	2
U4	3	I4	3
U5	4	I5	4
U6	5	I6	5
Spd/Aux1	0	Trq/Aux2	0

9.2 Turning the Display of Waveforms On and Off and Setting the Vertical Zoom Factors and Vertical Positions

This section explains the following waveform display settings:

- Turning the display of waveforms on and off
- Vertical zoom factor
- Vertical position

► “Display Items (ITEM)—Waveform” in the features guide

Configuring the Waveform Display

Press **WAVE** and then **ITEM** to display the following menu.

If the setup parameter list is being displayed (the INPUT INFO key is illuminated), the Info Form menu may be displayed. If this happens, press **ITEM** again.

Select the waveforms that you want to display.

Set the vertical zoom factor

(× 0.1, × 0.2, × 0.25, × 0.4, × 0.5, × 0.75, × 0.8, × 1, × 1.14, × 1.25, × 1.33, × 1.41, × 1.5, × 1.6, × 1.77, × 2, × 2.28, × 2.66, × 2.83, × 3.2, × 3.54, × 4, × 5, × 8, × 10, × 12.5, × 16, × 20, × 25, × 40, × 50, × 100).

Set the vertical position (0.000% to ±130.000%).

	Wave	Items	Wave	Items
Display ON/OFF	Vertical Zoom	Vertical Position	All ON	Turns the display of all waveforms on
<input checked="" type="checkbox"/> U1	<input type="text" value="x 1"/>	<input type="text" value="0.000%"/>	All OFF	Turns the display of all waveforms off
<input checked="" type="checkbox"/> I1	<input type="text" value="x 1"/>	<input type="text" value="0.000%"/>		
<input checked="" type="checkbox"/> U2	<input type="text" value="x 1"/>	<input type="text" value="0.000%"/>		
<input checked="" type="checkbox"/> I2	<input type="text" value="x 1"/>	<input type="text" value="0.000%"/>		
<input checked="" type="checkbox"/> U3	<input type="text" value="x 1"/>	<input type="text" value="0.000%"/>		
<input checked="" type="checkbox"/> I3	<input type="text" value="x 1"/>	<input type="text" value="0.000%"/>		
<input checked="" type="checkbox"/> U4	<input type="text" value="x 1"/>	<input type="text" value="0.000%"/>		
<input checked="" type="checkbox"/> I4	<input type="text" value="x 1"/>	<input type="text" value="0.000%"/>		
<input checked="" type="checkbox"/> U5	<input type="text" value="x 1"/>	<input type="text" value="0.000%"/>		
<input checked="" type="checkbox"/> I5	<input type="text" value="x 1"/>	<input type="text" value="0.000%"/>		
<input checked="" type="checkbox"/> U6	<input type="text" value="x 1"/>	<input type="text" value="0.000%"/>		
<input checked="" type="checkbox"/> I6	<input type="text" value="x 1"/>	<input type="text" value="0.000%"/>		
<input checked="" type="checkbox"/> Speed <input checked="" type="checkbox"/> Torque	Speed and Torque are displayed on models with the /MTR option.			
<input checked="" type="checkbox"/> Aux1 <input checked="" type="checkbox"/> Aux2	Aux1 and Aux2 are displayed on models with the /AUX option.			

10.1 Setting the Display Format

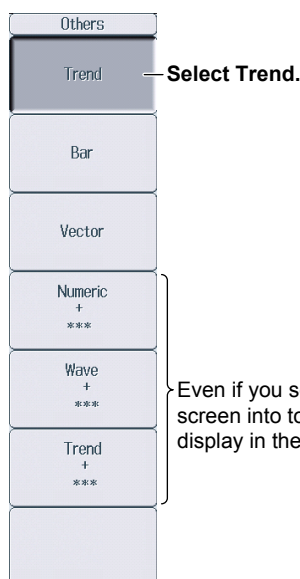
This section explains the following settings for the trend display format:

- Number of divisions of the trend screen
- Time axis
- Restarting trends
- Advanced trend display settings

► “Display Format (FORM)—Trend” in the features guide

Others Menu

Press **OTHERS** to display the following menu.

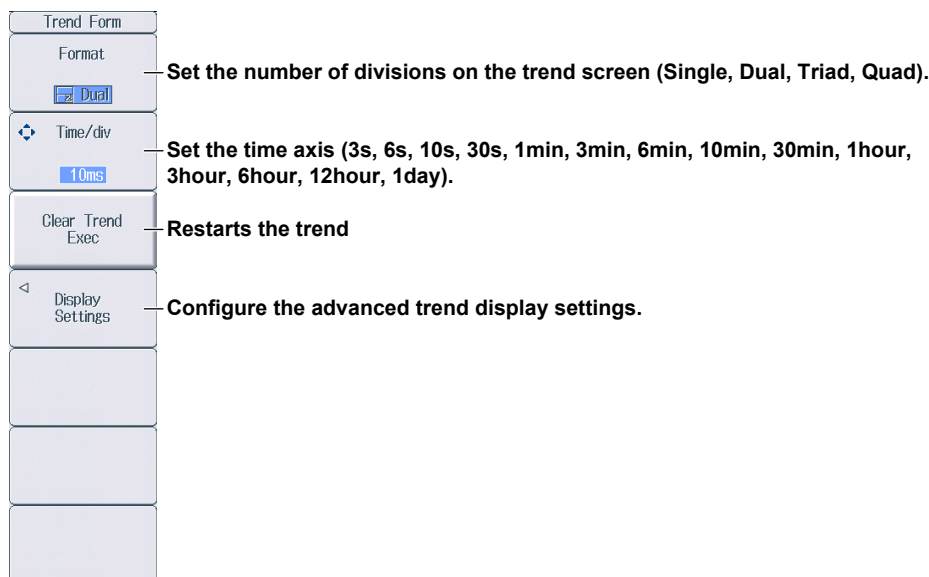


Even if you select one of these settings, you can still show the trend display. You can split the screen into top and bottom halves, and show the trend display in one half and another display in the other half. ► chapter 13

Trend Form Menu

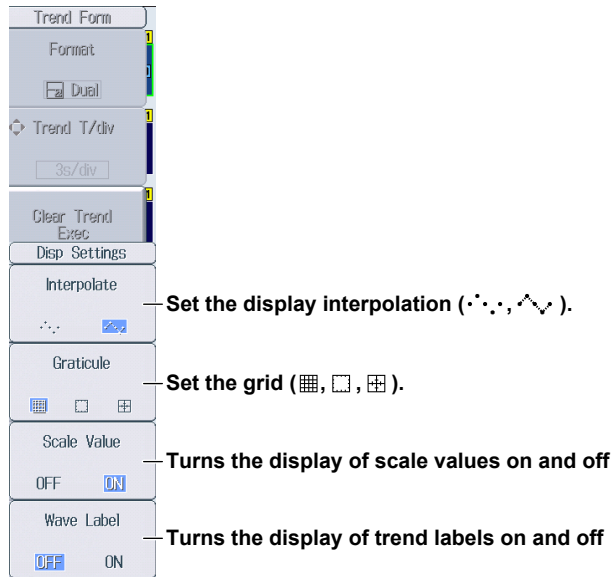
Press **FORM** to display the following menu.

If the setup parameter list is being displayed (the INPUT INFO key is illuminated), the Info Form menu may be displayed. If this happens, press **FORM** again.



Configuring Advanced Trend Display Settings (Display Settings)

Press the **Display Settings** soft key to display the following menu.



Note

Changes that you make to the trend display settings on the Display Settings menu are also reflected in the advanced waveform display settings (see section 9.1).

10.2 Turning the Trend Display On and Off and Setting the Measurement Functions to Display and the Vertical Scales

This section explains the following trend display settings:

- Turning the trend display on and off
- Measurement function
- Element and wiring unit
- Harmonic order
- Vertical scale

Vertical scale mode and upper and lower limits of vertical scales

► [“Display Items \(ITEM\)—Trend” in the features guide](#)

1. Follow the procedure in section 10.1 to select Trend on the Others menu.

Configuring the Trend Display

2. Press **ITEM** to display the following screen.

If the setup parameter list is being displayed (the INPUT INFO key is illuminated), the Info Form menu may be displayed. If this happens, press **ITEM** again.

Select the trends that you want to display.

If you move the cursor to Display, and then press SET, you can select all the trends (All ON) and clear all the selections (All OFF).

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

Set the element and wiring unit (Element 1 to Element 6, ΣA to ΣC).

Set the harmonic order (Total, 0 to 500; /G5 or /G6 option).

You can set this setting when the measurement function includes a harmonic order.

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

Display	Function	Element/Z	Order	Scaling	Upper Scale	Lower Scale
<input checked="" type="checkbox"/> T1	Urms	Element 1	–	Manual	100.0	–100.0
<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	FreqU	Element 1	–	Auto	–	–
<input type="checkbox"/> T9	Urms	Element 1	–	Auto	–	–
<input type="checkbox"/> T10	Urms	Element 1	–	Auto	–	–
<input type="checkbox"/> T11	Urms	Element 1	–	Auto	–	–
<input type="checkbox"/> T12	Urms	Element 1	–	Auto	–	–
<input type="checkbox"/> T13	Urms	Element 1	–	Auto	–	–
<input type="checkbox"/> T14	Urms	Element 1	–	Auto	–	–
<input type="checkbox"/> T15	Urms	Element 1	–	Auto	–	–
<input type="checkbox"/> T16	Urms	Element 1	–	Auto	–	–

Set the upper and lower limits (–9.999 T to 9.999 T). These settings can be set when Scaling is set to Manual.

11.1 Setting the Display Format

This section explains the following settings for the bar graph display format. This feature is available on models with the /G5 or /G6 option.

- Number of divisions of the bar graph screen
- Bar graph display range (displayed harmonic orders)

▶ “Display Format (FORM)—Bar Graph” in the features guide

Others Menu

Press **OTHERS** to display the following menu.



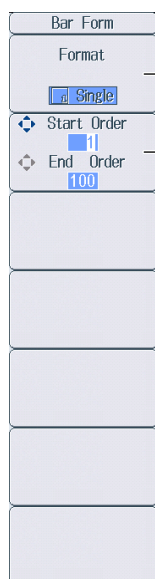
Select Bar.

Even if you select one of these settings, you can still show the bar graph display. You can split the screen into top and bottom halves, and show the bar graph display in one half and another display in the other half. ▶ chapter 13

Bar Form Menu

Press **FORM** to display the following menu.

If the setup parameter list is being displayed (the INPUT INFO key is illuminated), the Info Form menu may be displayed. If this happens, press **FORM** again.



Set the number of divisions on the bar graph screen (Single, Dual, Triad).

Set the bar graph display range.

- The display' s start harmonic order (0 to 490)
- The display' s end harmonic order (10 to 500)

You can set the range to any value provided that the end harmonic order is larger than the start harmonic order by 10 or more.

11.2 Setting the Measurement Function to Display and the Vertical Scale

This section explains the following bar graph display settings. This feature is available on models with the /G5 or /G6 option.

- Bar graph number
- Measurement function
- Element
- Vertical scale

Vertical scale mode, vertical scale type, vertical scale upper limit, and X-axis position

▶ [“Display Items \(ITEM\)—Bar Graph” in the features guide](#)

1. Follow the procedure in section 11.1 to select Bar on the Others menu.

Bar Items Menu

2. Press **ITEM** to display the following menu.

If the setup parameter list is being displayed (the INPUT INFO key is illuminated), the Info Form menu may be displayed. If this happens, press **ITEM** again.

Bar Items	
Item No. 11	— Select the bar graph number that you want to set (1, 2, 3).
Function U	— Set the measurement function (U, I, P, S, Q, λ, Φ, ΦU, ΦI, Z, Rs, Xs, Rp, Xp).
Element Element 1	— Set the element (Element 1 to Element6).
Scale Mode Fixed Manual	— Select the vertical scale’s setup method (Fixed, Manual).
Vertical Scale Linear Log	— Set the vertical scale type (Linear, Log). This soft key is displayed when you set Scale Mode to Manual.
Upper Scale 100.0	— Set the upper limit (0 to 9.999 T). This soft key is displayed when you set Scale Mode to Manual.
X Axis Position Bottom Center	— Set the X-axis position (Bottom, Center). This soft key is displayed when you set Scale Mode to Manual and Vertical Scale to Linear.

12.1 Setting the Display Format

This section explains the following settings for the vector display format. This feature is available on models with the /G5 or /G6 option.

- Number of divisions of the vector screen
- Turning the numeric data display on and off

► “Display Format (FORM)—Vector” in the features guide

Others Menu

Press **OTHERS** to display the following menu.



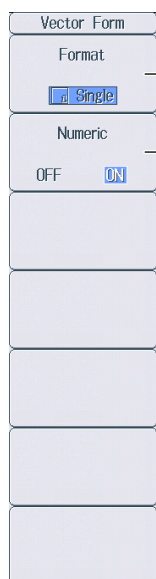
Select Vector.

Even if you select one of these settings, you can still show the vector display. You can split the screen into top and bottom halves, and show the vector display in one half and another display in the other half. ► chapter 13

Vector Form Menu

Press **FORM** to display the following menu.

If the setup parameter list is being displayed (the INPUT INFO key is illuminated), the Info Form menu may be displayed. If this happens, press **FORM** again.



Set the number of divisions on the vector screen (Single, Dual).

Turns the numeric data display on and off

12.2 Setting the Element and Wiring Unit to Display and the Zoom Factor

This section explains the following vector display settings. This feature is available on models with the /G5 or /G6 option.


- Vector number
- Element and wiring unit
- Zoom factor

► [“Display Items \(ITEM\)—Vector” in the features guide](#)

1. Follow the procedure in section 12.1 to select Vector on the Others menu.

Vector Items Menu

2. Press **ITEM** to display the following menu.
 - If the setup parameter list is being displayed (the INPUT INFO key is illuminated), the Info Form menu may be displayed. If this happens, press **ITEM** again.
 - If setup parameter list is being displayed, the vector that you have set to vector number 1 is displayed in the bottom half of the screen.



The screenshot shows a vertical menu titled "Vector Items" with the following sections:

- Item No.:** A field containing the number "1". An annotation points to this field with the text: "Select the vector number that you want to set (1, 2)."
- Object:** A field containing the symbol ΣA . An annotation points to this field with the text: "Set the element and wiring unit (Element 1 to Element 6, ΣA to ΣC)."
- U Mag:** A field containing the value "1.000".
- I Mag:** A field containing the value "1.000".

Annotations for the zoom factor fields:

- **Set the zoom factor (0.100 to 100,000).**
- Set the zoom factor of fundamental wave U (1) or I (1). The value that indicates the size of the vector display's peripheral circle changes according to the zoom factor, and the size of the vectors that indicate U (1) and I (1) change accordingly as well.
- If you press this soft key to select both U Mag and I Mag, you can link the zoom factors of both settings and change them at the same time.

13.1 Configuring the Split Display

This section explains the following split display settings:

- The two screens to display
- Switching between Form menus
- Switching between Items menus

► [“Split Display” in the features guide](#)

Others Menu

Press **OTHERS** to display the following menu.

The split screen that you configure last is displayed.

- Others**
- Trend**
- Bar**
- Vector**
- Numeric + Wave** — Set the top half of the screen to the Numeric display, and set the display that you want to show in the bottom half of the screen (Wave, Trend, Bar,* Vector*).
- Wave + ***** — Set the top half of the screen to the Wave display, and set the display that you want to show in the bottom half of the screen (Numeric, Trend, Bar,* Vector*).
- Trend + ***** — Set the top half of the screen to the Trend display, and set the display that you want to show in the bottom half of the screen (Numeric, Wave, Bar,* Vector*).

* This feature is available on models with the /G5 or /G6 option.

Form Menu

Press **FORM** to switch between the Form menus of the two screens that you set on the Others menu. Configure the settings on each menu.

Display	For Instructions on How to Use the Form Menu, See:
Numeric	Sections 6.1 and 6.2
Wave	Section 9.1
Trend	Section 10.1
Bar	Section 11.1
Vector	Section 12.1

If the setup parameter list is being displayed (the INPUT INFO key is illuminated), the setup parameter list is displayed in the top half of the screen and the screen that you set to display in the top half of the screen on the Others menu is displayed in the bottom half of the screen. Additionally, if you repeatedly press **FORM**, you can switch between the Info Form menu and the menu of the screen that is displayed in the bottom half of the screen.

Items Menu

Press **ITEM** to switch between the Items menus of the two screens that you set on the Others menu. Configure the settings on each menu.

Display	For Instructions on How to Use the Items Menu, See:
Numeric	Sections 6.3 to 6.7
Wave	Section 9.2
Trend	Section 10.2
Bar	Section 11.2
Vector	Section 12.2

If the setup parameter list is being displayed (the INPUT INFO key is illuminated), the setup parameter list is displayed in the top half of the screen and the screen that you set to display in the top half of the split screen on the Others menu is displayed in the bottom half of the screen. Additionally, if you repeatedly press **ITEM**, you can switch between the Info Form menu and the menu of the screen that is displayed in the bottom half of the screen.

14.1 Performing Cursor Measurements on Waveforms

This section explains the following settings for performing cursor measurements on waveforms:

- Turning the cursor display on and off
- The waveforms to perform cursor measurements on
- Cursor movement path
- Cursor position
- Turning linked cursor movement on and off

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

1. Follow the procedures in chapter 9 to display waveforms.

Wave Cursor Menu

2. Press **SHIFT+FORM** (CURSOR) to display the following menu.

Wave Cursor	
Cursor OFF ON	Turns the cursor display on and off
C1+ Trace U1	Set the waveform to measure with cursor 1 (+) (U1, I1, U2, I2, U3, I3, U4, I4, U5, I5, U6, I6, Speed, ¹ Torque, ¹ Aux1, ² Aux2 ²).
C2× Trace I1	Set the waveform to measure with cursor 2 (×) (U1, I1, U2, I2, U3, I3, U4, I4, U5, I5, U6, I6, Speed, ¹ Torque, ¹ Aux1, ² Aux2 ²).
Cursor Path Max	Set the cursor movement path (Max, Min, Mid).
C1+ Position 160	Set the positions of cursor 1 (+) and cursor 2 (×) (0, which is the left edge of the screen to 800, which is the right edge of the screen)
C2× Position 640	
Linkage OFF ON	Turns linked cursor movement on and off

1 This feature is available on models with the /MTR option.
2 This feature is available on models with the /AUX option.

14.2 Performing Cursor Measurements on Trends

This section explains the following settings for performing cursor measurements on trends:

- Turning the cursor display on and off
- The trends to perform cursor measurements on
- Cursor position
- Turning linked cursor movement on and off

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

1. Follow the procedures in chapter 10 to display trends.

Trend Cursor Menu

2. Press **SHIFT+FORM** (CURSOR) to display the following menu.

Trend Cursor	
Cursor OFF ON	Turns the cursor display on and off
C1+ Trace T1	Set the trend to measure with cursor 1 (+) (T1 to T16).
C2× Trace T2	Set the trend to measure with cursor 2 (×) (T1 to T16).
C1+ Position 100	Set the positions of cursor 1 (+) and cursor 2 (×) (0, which is the left edge of the screen to 1601, which is the right edge of the screen)
C2× Position 900	
Linkage OFF ON	Turns linked cursor movement on and off

14.3 Performing Cursor Measurements on Bar Graphs

This section explains the following settings for performing cursor measurements on bar graphs:

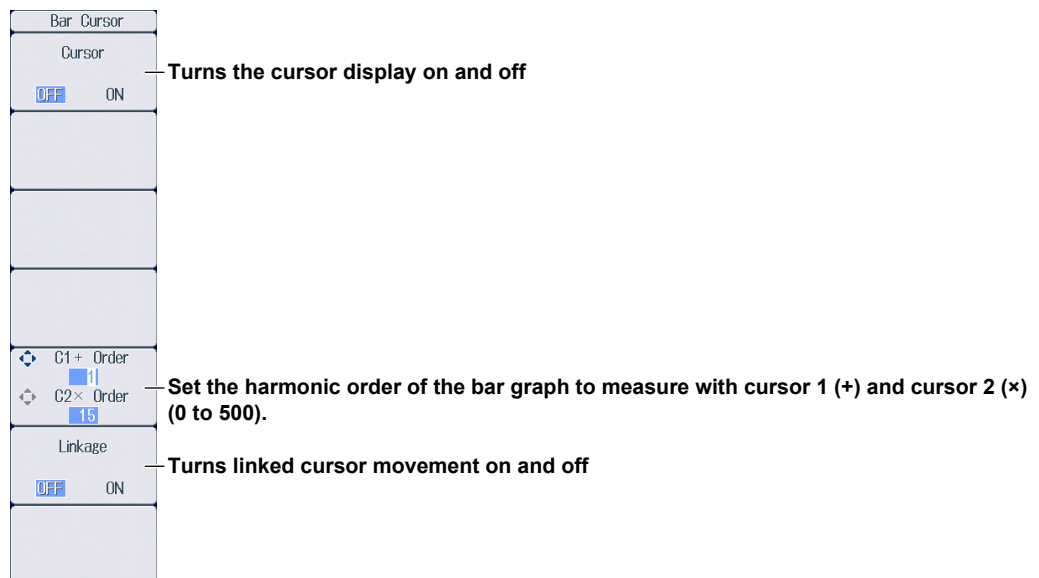
- Turning the cursor display on and off
- Cursor position
- Turning linked cursor movement on and off

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

1. Follow the procedures in chapter 11 to display bar graphs.

Bar Cursor Menu

2. Press **SHIFT+FORM** (CURSOR) to display the following menu.



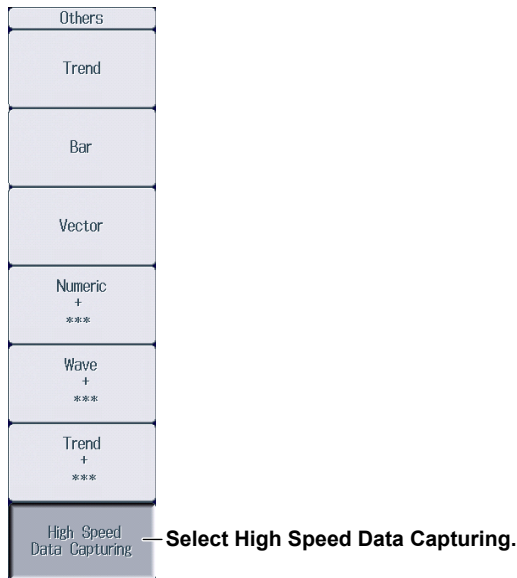
15.1 Setting the Number of Data Captures and Configuring the Capture Control Settings

This section explains the following settings concerning the number of data captures for high speed data capturing and the capture control settings.

- Number of data captures
- Confirming and optimizing the maximum capturing count
- Capture control settings
 - Voltage and current measurement modes, turning the HS filter on and off, setting the HS filter cutoff frequency, triggering, performing synchronized measurement using an external signal
- Selecting whether to save to a file
 - ▶ **“Capture Count (Capture Count)” and “Capture Control Settings (Control Settings)” in the features guide**

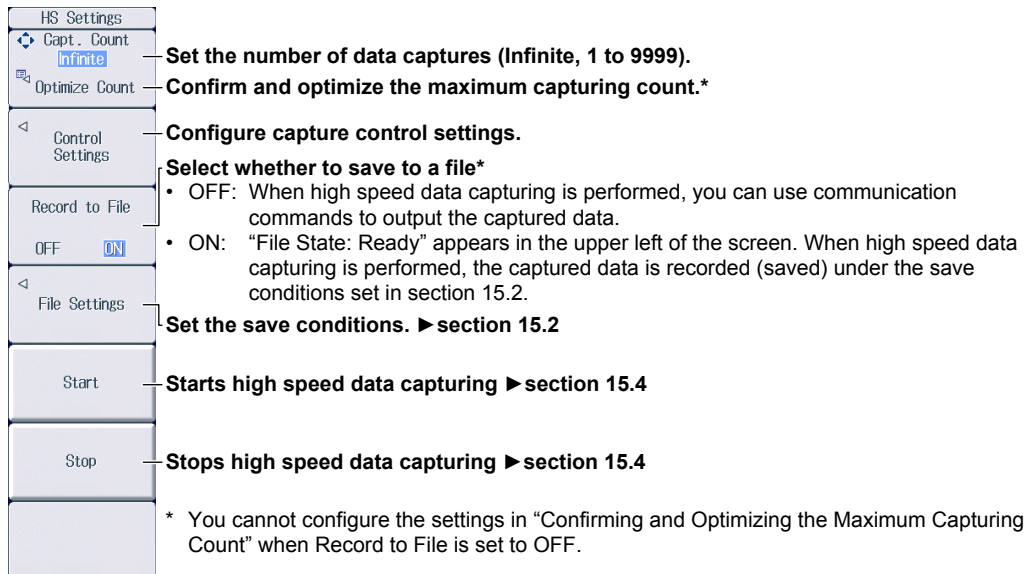
Others Menu

Press **OTHERS** to display the following menu.



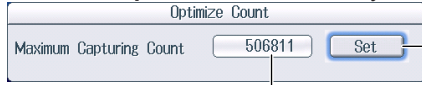
HS Settings Menu

Press **FORM** to display the following menu.



Confirming and Optimizing the Maximum Capturing Count (Optimize Count)

Press the **Optimize Count** soft key to display the following screen.



Set the number of data captures.

The capturing count is set to the maximum capturing count displayed to the left.

Maximum capturing count (0 to the maximum number of captures)

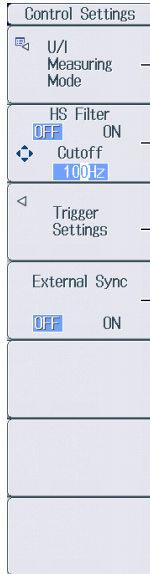
* The maximum number of times that data can be captured depends on the number of numeric data items that you have set to be saved and the free space at the save destination.

For instructions on how to set the save destination and the numeric data items to be saved, see section 15.2.

Even if you have specified a USB memory device as the save destination, if you remove the USB memory device, the save destination switches automatically to the internal RAM disk. If you close this screen and then open it again by pressing the Optimize Count soft key, the maximum capturing count changes to the value determined by the internal RAM disk's free space.

Configuring Capture Control Settings (Control Settings)

Press the **Control Settings** soft key to display the following menu.



Configure the voltage and current measurement modes.

Set the HS Filter.

- Turn the HS filter on or off.
- Set the cutoff frequency (1 Hz to 1000 Hz in steps of 1 Hz)

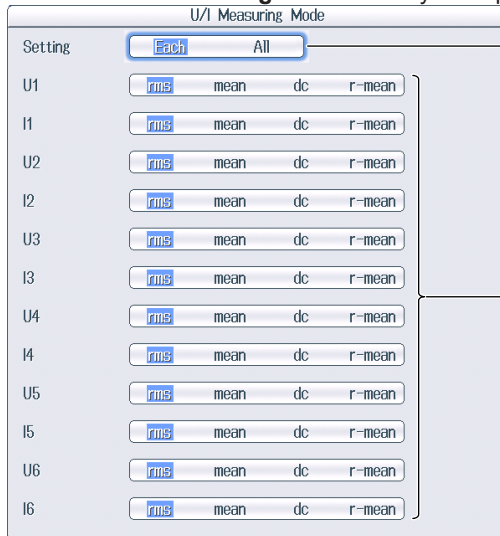
Configure trigger settings.

Turn external signal synchronization on or off.

- OFF: This instrument captures data every 5 ms.
- ON: This instrument captures data in sync with an external signal.

Configuring the Voltage and Current Measurement Modes

Press the **U/I Measuring Mode** soft key to display the following menu.



Select the measurement mode setup method (Each, All).


When you select Each, you can set the measurement mode separately for the current and voltage of each input element.

Set the measurement mode (rms, mean, dc, r-mean).

Note

If the voltage and current measurement mode settings differ for elements assigned to the same wiring unit, the measurement data (Σ function) for the wiring unit is displayed as "-----" (no data).

Configuring Trigger Settings



Control Settings

U1 measuring mode

HS Filter OFF ON

Cutoff

Trigger Settings

Mode
Auto

Source
U1

Slope
f f_r f_t

Level
0.0%

Set the trigger mode (Auto, Normal, OFF).

Set the trigger source (U1, I1, U2, I2, U3, I3, U4, I4, U5, I5, U6, I6, Ext Clk).

Set the trigger slope (f, f_r, f_t).

Set the trigger level (0.0% to ±100.0%).

15.2 Configuring the Save Conditions of Captured Numeric Data

This section explains the following settings for the save conditions of captured numeric data.

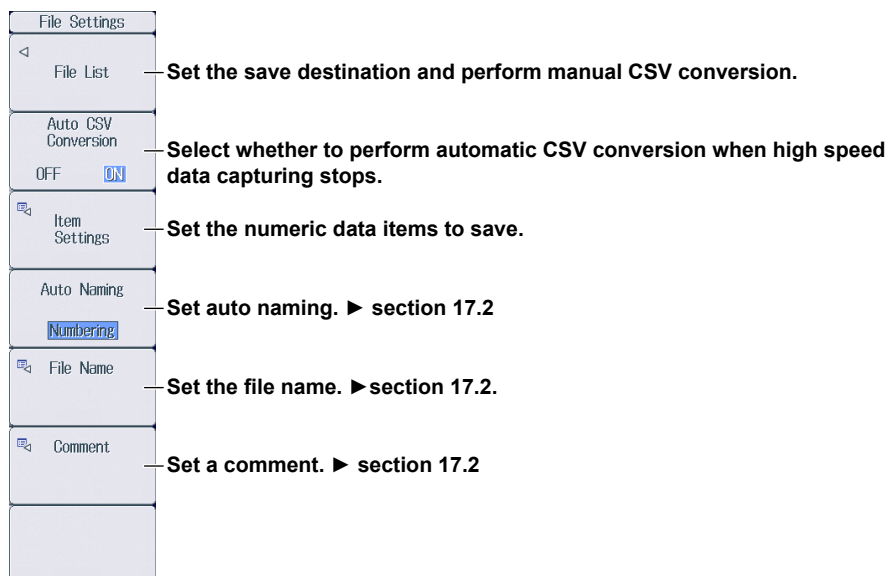
- Save destination
- Selecting whether to perform automatic CSV conversion when capturing stops
- Numeric data items to save
- Auto naming
- File name
- Comment

► [“Save Conditions \(File Settings\)” in the features guide](#)

1. Follow the procedure in section 15.1 to select High Speed Data Capturing on the Others menu.

File Settings Menu

2. Press **FORM** and then the **File Settings** soft key to display the following menu.



Setting the Save Destination and Performing Manual CSV Conversion

Press the **File List** soft key to display the following screen.

Set the save destination.*
When high speed data capturing starts (see section 15.4), captured data is saved to the specified file name at the specified save destination.
* You cannot specify a network drive as the save destination.

Executes the manual CSV conversion
Select the data file (.WTS file) that was saved, and then press the **CSV Convert** soft key to create a data file in ASCII format.

File Name	Size	Date	Time	Permissions
RAM-0				
Network				
USB-0				
Data				
0000.WTS	27.3K	2011/06/09	16:53:42	r/w
0001.WTS	54.7K	2011/06/09	16:54:02	r/w
0002.WTS	38.3K	2011/06/09	16:54:16	r/w

Setting the Numeric Data Items to Save

Press the **Item Settings** soft key to display the following screen.

The numeric data items in this screen whose check boxes are selected are saved.

For the individual numeric data items U, I, and P, you can set whether to save the numeric data for all installed input elements and wiring units (All ON) or not (All OFF).

You can set whether to save all the numeric data (All ON) or not (All OFF).

For each input element or wiring unit, you can set whether to save the numeric data for U, I, and P (All ON) or not (All OFF). You cannot configure this setting for slots that do not have input elements installed in them.

On models with the /MTR option, you can set whether to save the numeric data for Speed, Torque, and Pm (All ON) or not (All OFF).

On models with the /AUX option, you can set whether to save the numeric data for Aux1 and Aux2 (All ON) or not (All OFF).

Item Settings									
All	Element1	Element2	Element3	Element4	Element5	Element6	Σ A	Σ B	Σ C
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Motor								
	Speed								
	Torque								
	Pm								
	Aux								
	Aux1								
	Aux2								

Slot in which an input element is not installed

Note

Even if you select the check box for wiring unit ΣA, ΣB, or ΣC, the wiring unit's numeric data will not be saved under the following circumstances.

- When the wiring system has not been set
- When the wiring system is set to 1P3W or 3P3W
- When input elements assigned to the same wiring unit have different voltage or current measurement mode settings

For information on how to set the wiring system, see section 1.1.

15.3 Changing the Displayed Items for High Speed Data Capturing

This section explains the following settings concerning the displayed items for high speed data capturing.

- Number of columns
- Column number
- Element and wiring unit
- Resetting the displayed items
- Peak over-range information
- Turning the display frame on and off

► [“Display Items \(ITEM\)—High Speed Data Capturing” in the features guide](#)

1. Follow the procedure in section 15.1 to select High Speed Data Capturing on the Others menu.

HS Items Menu

2. Press **ITEM** to display the following menu.

HS Items	
Column Num 4 6	Set the number of columns (4, 6).
Column No. 11	Set the column number (1 to 6).
Element/Σ Element 1	Set the element or wiring unit (None, Element 1 to Element 6, ΣA to ΣC).
Reset Items Exec	Resets items to the default values
Display Peak Over Status OFF ON	Peak over-range information
Display Frame OFF ON	Turns the display frame on and off

Switching the Page

You can switch between page 1 and 2 (pages 1 to 4 on models with the /MTR or /AUX option). The items are arranged for high speed data capturing, and the displayed measurement functions are fixed for every page. For details on how to switch pages, see section 6.2.

Page 1 Example

	Element 1	Element 2	Element 3	Element 4	PAGE
Voltage	100Vrms	1000Vrms	1000Vrms	1000Vrms	1
Current	1Arms	5Arms	5Arms	50Arms	2
U [V]	98.93	0.0000 k	0.0000 k	0.0000 k	3
I [A]	0.6907	0.0000	0.0000	0.000	4
P [W]	68.23	-0.0000 k	0.0000 k	-0.000 k	

Page 2 Example

		Element 1	Element 2	Element 3	Element 4
Voltage		100Vrms	1000Vrms	1000Vrms	1000Vrms
Current		1Arms	5Arms	5Arms	50Arms
U	[V]	98.93	0.0000 k	0.0000 k	0.0000 k
MaxU		98.93	0.0000 k	0.0000 k	0.0000 k
MinU		91.97	0.0000 k	0.0000 k	0.0000 k
I	[A]	0.6907	0.0000	0.0000	0.000
MaxI		0.7913	0.0000	0.0000	0.000
MinI		0.6591	0.0000	0.0000	0.000
P	[W]	68.23	-0.0000 k	0.0000 k	-0.000 k
MaxP		75.82	0.0000 k	0.0000 k	0.000 k
MinP		62.35	-0.0000 k	-0.0000 k	-0.000 k

Page 3 Example

(Page 3 can only be selected on models with the /MTR or /AUX option.)

		Element 1	Element 2	Element 3	Element 4
Voltage		100Vrms	1000Vrms	1000Vrms	1000Vrms
Current		1Arms	5Arms	5Arms	50Arms
U	[V]	98.93	0.0000 k	0.0000 k	0.0000 k
I	[A]	0.6907	0.0000	0.0000	0.000
P	[W]	68.23	-0.0000 k	0.0000 k	-0.000 k
Speed	[rpm]	--OF--			
Torque	[Nm]	--OF--			
Pm	[W]	--OF--			

Speed, Torque, and Pm are displayed on models with the /MTR option.

Aux1	[kW/m2]	-0.000
Aux2	[kW/m2]	0.000

Aux1 and Aux2 are displayed on models with the /AUX option.

Page 4 Example

(Page 4 can only be selected on models with the /MTR or /AUX option.)

		Element 1	Element 2	Element 3	Element 4
Voltage		100Vrms	1000Vrms	1000Vrms	1000Vrms
Current		1Arms	5Arms	5Arms	50Arms
U	[V]	98.93	0.0000 k	0.0000 k	0.0000 k
MaxU		98.93	0.0000 k	0.0000 k	0.0000 k
MinU		91.97	0.0000 k	0.0000 k	0.0000 k
I	[A]	0.6907	0.0000	0.0000	0.000
MaxI		0.7913	0.0000	0.0000	0.000
MinI		0.6591	0.0000	0.0000	0.000
P	[W]	68.23	-0.0000 k	0.0000 k	-0.000 k
MaxP		75.82	0.0000 k	0.0000 k	0.000 k
MinP		62.35	-0.0000 k	-0.0000 k	-0.000 k
Speed	[rpm]	--OF--			
MaxSpd		--OF--			
MinSpd		--OF--			
Torque	[Nm]	--OF--			
MaxTrq		--OF--			
MinTrq		--OF--			
Pm	[W]	--OF--			
MaxPm		--OF--			
MinPm		--OF--			

Speed, Torque, and Pm are displayed on models with the /MTR option.

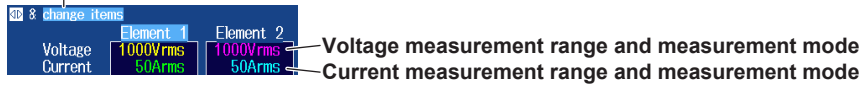
Aux1	[kW/m2]	-0.000
MaxAux1		0.000
MinAux1		-0.000
Aux2	[kW/m2]	0.000
MaxAux2		0.001
MinAux2		-0.000

Aux1 and Aux2 are displayed on models with the /AUX option.

ELEMENT Key

3. Press **ESC** to clear the menu.

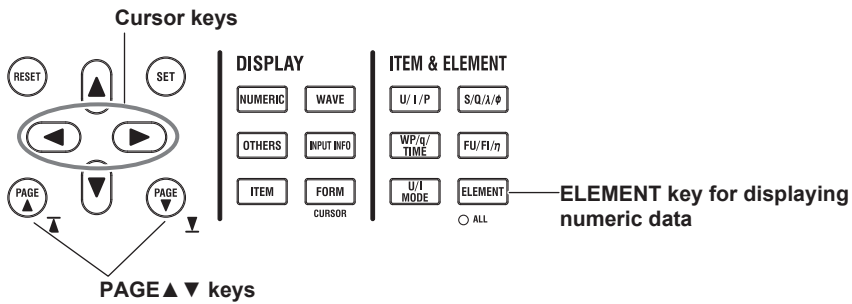
Displayed in the upper left of the numeric data display screen



Changing the Element and Wiring Unit (Horizontal direction)

4. Use the **cursor keys** (◀▶) to select the column that you want to change.
5. Press the **ELEMENT** key for displaying numeric data to select the element and wiring unit that you want to display.

In high speed data capturing, the elements and wiring unit configurations are the same on all four pages. If you change the element and wiring unit configuration on one page, the configuration changes on the other pages as well.




15.4 Starting and Stopping High Speed Data Capturing

This section explains how to start and stop high speed data capturing.

► [“Starting and Stopping High Speed Data Capturing \(Start/Stop\)” in the features guide](#)


CAUTION

During high speed data capturing and when captured data is being saved, the storage medium 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 medium and corrupt its data.

During high speed data capturing, “HS State: Start” appears in the upper right of the screen. While the captured data is being saved, “File State: Rec” appears in the upper left of the screen.

French

ATTENTION

Pendant la collecte de données haute vitesse et lorsque les données collectées sont enregistrées, 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 et les données qu'il contient.

Lors de la collecte des données haute vitesse, « HS State: Start » s'affiche dans l'angle supérieur droit de l'écran.

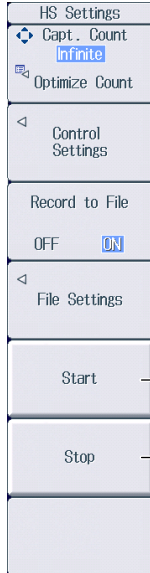
Lorsque les données collectées sont enregistrées, « File State: Rec » s'affiche dans l'angle supérieur gauche de l'écran.

15.4 Starting and Stopping High Speed Data Capturing

1. Follow the procedure in section 15.1 to select High Speed Data Capturing on the Others menu.

HS Settings Menu

2. Press **FORM** to display the following menu.



Starts high speed data capturing

High speed data capturing starts according to the specified number of data captures (see section 15.1), the capture control settings (see section 15.1), and the save conditions (see section 15.2).

- When high speed data capturing is started, "HS State: Start" appears in the upper right of the screen.
- When the captured data is being saved, "File State: Rec" appears in the upper left of the screen.

Stops high speed data capturing

After the specified number of data captures have been made, high speed data capturing automatically stops. To force high speed data capturing to stop, press this soft key. When high speed data is stopped, "HS State: Ready" appears in the upper right of the screen.

Note

- You cannot restart high speed data capturing without first stopping high speed data capturing.
 - After you stop high speed data capturing and then change the settings or restart high speed data capturing, the data captured up to that point is deleted.
-

16.1 Configuring Storage Control

This section explains the following settings for storage control:

- Storage mode
- Storage count
- Confirming and optimizing the maximum storage count
- Storage interval
- Scheduled times for real-time storage
- Trigger event (synchronization to a user-defined event)
- Storage of numeric data when storage starts

▶ “Storage Control (Control Settings)” in the features guide

Control Settings Menu

Press **SHIFT+STORE START** (STORE SET) and then the **Control Settings** soft key to display one of the menus shown below. The menu that appears varies depending on the storage mode setting that you have specified.

Manual Storage Mode

The screenshot shows a vertical menu titled "Control Settings" with the following items and annotations:

- Store Mode**: Set Store Mode to Manual. (The value "Manual" is highlighted in blue.)
- Store Count**: Set the storage count (Infinite, 1 to 9999999). (The value "100" is highlighted in blue.)
- Optimize Count**: Confirms and optimizes the maximum storage count.
- Interval**: Set the storage interval.
- Store at Start**: Select whether to store numeric data when storage starts. (The value "OFF" is highlighted in blue.) This soft key is displayed when Interval is set to a value other than 00 : 00 : 00.

Confirming and Optimizing the Maximum Storage Count

Press the **Optimize Count** soft key to display the following screen.

The screenshot shows a screen titled "Optimize Count" with the following items and annotations:

- Maximum Store Count**: Sets the storage count. The value "683963" is displayed in a text field, and a "Set" button is to its right. The storage count is set to the maximum storage count displayed to the left.

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

* 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 16.2. For details on how to set the save destination, see section 16.3.

Even if you have specified a USB memory device as the save destination, if you remove the USB memory device, the save destination switches automatically to the internal RAM disk. If you close this screen and then open it again by pressing the Optimize Count soft key, the maximum storage count changes to the value determined by the internal RAM disk's free space.

Setting the Storage Interval

Press the **Interval** soft key to display the following screen.

The screenshot shows a screen titled "Interval" with the following items and annotations:

- Interval**: Set the storage interval (00 hours : 00 minutes : 00 seconds to 99 hours : 59 minutes : 59 seconds). (The value "01" is highlighted in blue in the minutes field.)

Scheduled Times for Real-Time Storage Mode

The screenshot shows the 'Control Settings' screen with the following options and annotations:

- Store Mode:** Set to 'Real Time'. Annotation: **Set Store Mode to Real Time.**
- Store Count:** Set to '100'. Annotation: **Set the storage count (Infinite, 1 to 9999999).**
- Optimize Count:** Annotation: **Confirms and optimizes the maximum storage count ▶ previous page**
- Interval:** Annotation: **Set the storage interval. ▶ previous page**
- Real-time Control:** Annotation: **Set the scheduled times for real-time storage.**
- Store at Start:** Set to 'OFF'. Annotation: **Select whether to store numeric data when storage starts.**
This soft key is displayed when Interval is set to a value other than 00 : 00 : 00.

Setting Scheduled Times for Real-Time Storage

Press the **Real-time Control** soft key to display the following screen.

The screenshot shows the 'Real-time Control' screen with the following fields and annotations:

- Start:** 2011 / 01 / 01 00 : 00 : 00. Annotation: **Scheduled storage start time**
- End:** 2011 / 01 / 01 01 : 00 : 00. Annotation: **Scheduled storage stop time**
- Now:** Annotation: **Set the scheduled start and stop times (Year/month/day, 00 hours : 00 minutes : 00 seconds to 23 hours : 59 minutes : 59 seconds).**
- Copy:** Annotation: **Copies the scheduled storage start time to the scheduled storage stop time**

Additional text below the screen:

- Sets the scheduled storage start time to the current time
- Copies the scheduled storage start time to the scheduled storage stop time

Integration-Synchronized Storage Mode

The screenshot shows the 'Control Settings' screen with the following options and annotations:

- Store Mode:** Set to 'Integ Sync'. Annotation: **Set Store Mode to Integ Sync.**
- Store Count:** Set to '100'. Annotation: **Set the storage count (Infinite, 1 to 9999999).**
- Optimize Count:** Annotation: **Confirms and optimizes the maximum storage count ▶ previous page**
- Interval:** Annotation: **Set the storage interval. ▶ previous page**
- Store at Start:** Set to 'OFF'. Annotation: **Select whether to store numeric data when storage starts.**

Event-Synchronized Storage Mode

Control Settings	
Store Mode Event	Set Store Mode to Event.
Store Count 100	Set the storage count (Infinite, 1 to 9999999).
Optimize Count	Confirms and optimizes the maximum storage count ► page 16-1
Trigger Event Event1	Select the trigger event (Event 1 to Event 8). When measured data is updated, storage is started if the conditions of the specified user-defined event are met.

Single-Shot Storage Mode

Control Settings	
Store Mode Single Shot	Set Store Mode to Single Shot.
Store Count 100	Set the storage count (Infinite, 1 to 9999999).
Optimize Count	Confirms and optimizes the maximum storage count ► page16-1

16.2 Setting the Numeric Data Items to Store

This section explains how to set the numeric data items to store.

- Numeric data items to store
 - Numeric data items that are displayed on the screen
 - Numeric data items specified on the stored item setup screen
 - ▶ “Stored Items (Item Settings)” in the features guide

Item Settings Menu

Press **SHIFT+STORE START** (STORE SET) and then the **Item Settings** soft key to display the following menu.

The diagram shows a vertical menu with the following options and callouts:

- Item Settings** (Title)
- Displayed Numeric Items**: Stores the numeric data that is displayed on the screen. Press this soft key to store the numeric data items that are displayed on the screen.
- Selected Items**: Stores the numeric data that you have specified on the Store Items setup screen. Press this soft key to store the numeric data items that you have specified on the Store Items setup screen that is displayed when you press the Items soft key.
- Items**: Set the stored items. This soft key is displayed when you select Selected Items.
- (Empty menu items)

Setting Stored Items (Items)

Press the **Items** soft key to display the following screen.

When you press the Selected Items soft key on the Item Settings menu, the numeric data items that you have specified on the following screen are stored.

- Selects all the numeric data items
- Clears the selection of all the numeric data items
- Selects the preset numeric data items

The screenshot shows the 'Item Settings' screen with a grid of items. The 'All ON' option is selected. A callout points to the grid with the instruction: "Select the check boxes for the numeric items that you want to store."

Item	Selected	Item	Selected	Item	Selected	Item	Selected
Preset	<input checked="" type="checkbox"/> All ON	<input type="checkbox"/> All OFF	<input type="checkbox"/> Preset1	<input type="checkbox"/> Preset2			
Element	<input checked="" type="checkbox"/> Element1	<input type="checkbox"/> Element2	<input type="checkbox"/> Element3	<input type="checkbox"/> Element4	<input type="checkbox"/> Element5	<input type="checkbox"/> Element6	
	<input type="checkbox"/> Σ A	<input type="checkbox"/> Σ B	<input type="checkbox"/> Σ C				
Function	<input checked="" type="checkbox"/> Urms	<input type="checkbox"/> Umn	<input type="checkbox"/> Udc	<input type="checkbox"/> Urnn	<input type="checkbox"/> Uac	<input checked="" type="checkbox"/> FreqU	<input type="checkbox"/> GfU
	<input checked="" type="checkbox"/> Irms	<input type="checkbox"/> Imn	<input type="checkbox"/> Idc	<input type="checkbox"/> Irnn	<input type="checkbox"/> Iac	<input checked="" type="checkbox"/> FreqI	<input type="checkbox"/> GfI
	<input checked="" type="checkbox"/> P	<input checked="" type="checkbox"/> S	<input checked="" type="checkbox"/> Q	<input checked="" type="checkbox"/> λ	<input checked="" type="checkbox"/> φ	<input type="checkbox"/> Pc	
	<input type="checkbox"/> U+peak	<input type="checkbox"/> U-peak	<input type="checkbox"/> h+peak	<input type="checkbox"/> h-peak	<input type="checkbox"/> P+peak	<input type="checkbox"/> P-peak	
	<input type="checkbox"/> WP	<input type="checkbox"/> WP+	<input type="checkbox"/> WP-	<input type="checkbox"/> q	<input type="checkbox"/> q+	<input type="checkbox"/> q-	
	<input type="checkbox"/> Time	<input type="checkbox"/> WS	<input type="checkbox"/> WQ				
	<input type="checkbox"/> ?1	<input type="checkbox"/> ?2	<input type="checkbox"/> ?3	<input type="checkbox"/> ?4			
	<input type="checkbox"/> F1	<input type="checkbox"/> F2	<input type="checkbox"/> F3	<input type="checkbox"/> F4	<input type="checkbox"/> F5	<input type="checkbox"/> F6	<input type="checkbox"/> F7
	<input type="checkbox"/> F8	<input type="checkbox"/> F9	<input type="checkbox"/> F10	<input type="checkbox"/> F11	<input type="checkbox"/> F12	<input type="checkbox"/> F13	<input type="checkbox"/> F14
	<input type="checkbox"/> F15	<input type="checkbox"/> F16	<input type="checkbox"/> F17	<input type="checkbox"/> F18	<input type="checkbox"/> F19	<input type="checkbox"/> F20	
	<input type="checkbox"/> Event1	<input type="checkbox"/> Event2	<input type="checkbox"/> Event3	<input type="checkbox"/> Event4			
	<input type="checkbox"/> Event5	<input type="checkbox"/> Event6	<input type="checkbox"/> Event7	<input type="checkbox"/> Event8			
	<input type="checkbox"/> FreqPLL1	<input type="checkbox"/> FreqPLL2					
	<input type="checkbox"/> U(k)	<input type="checkbox"/> I(k)	<input type="checkbox"/> P(k)	<input type="checkbox"/> S(k)	<input type="checkbox"/> Q(k)	<input type="checkbox"/> λ(k)	<input type="checkbox"/> φ(k)
	<input type="checkbox"/> φU(k)	<input type="checkbox"/> φI(k)	<input type="checkbox"/> Z(k)	<input type="checkbox"/> Rs(k)	<input type="checkbox"/> Xs(k)	<input type="checkbox"/> Rp(k)	<input type="checkbox"/> Xp(k)
	<input type="checkbox"/> Uthd	<input type="checkbox"/> Ithd	<input type="checkbox"/> Pthd	<input type="checkbox"/> UhdI(k)	<input type="checkbox"/> IhdI(k)	<input type="checkbox"/> PhdI(k)	
	<input type="checkbox"/> Uthf	<input type="checkbox"/> Ithf	<input type="checkbox"/> Pthf	<input type="checkbox"/> hvf	<input type="checkbox"/> hvf	<input type="checkbox"/> hcf	<input type="checkbox"/> K-factor
	<input type="checkbox"/> φU-Uj	<input type="checkbox"/> φI-Ik	<input type="checkbox"/> φU-Ii	<input type="checkbox"/> φU-Uj	<input type="checkbox"/> φU-Ik		
	<input type="checkbox"/> ΔU1	<input type="checkbox"/> ΔU2	<input type="checkbox"/> ΔU3	<input type="checkbox"/> ΔUΣ	<input type="checkbox"/> ΔI		
	<input type="checkbox"/> ΔP1	<input type="checkbox"/> ΔP2	<input type="checkbox"/> ΔP3	<input type="checkbox"/> ΔPΣ			
	<input type="checkbox"/> Speed	<input type="checkbox"/> Torque	<input type="checkbox"/> SyncSp	<input type="checkbox"/> Slip	<input type="checkbox"/> Pm	<input type="checkbox"/> EaU	<input type="checkbox"/> EaI

16.3 Configuring the Save Conditions of Stored Numeric Data

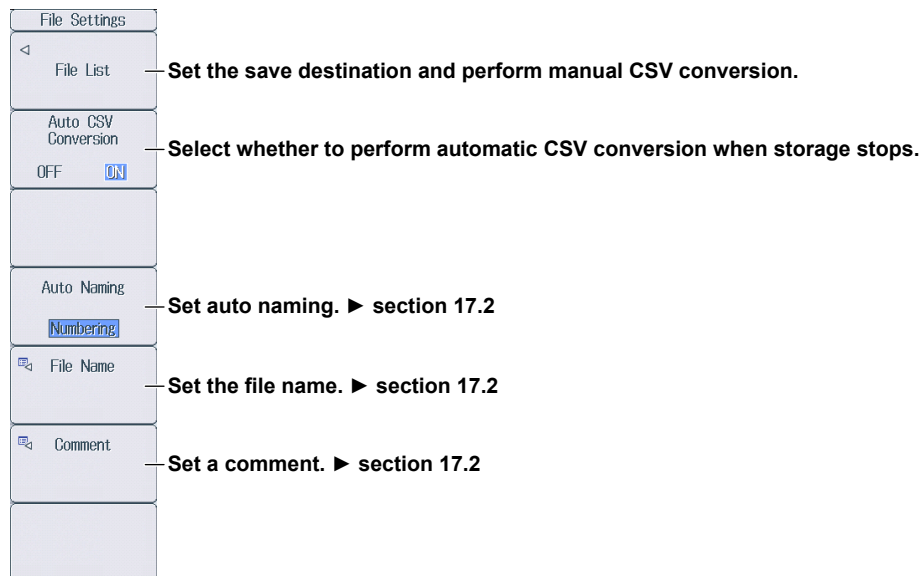
This section explains the following settings for the save conditions of stored numeric data:

- Save destination
- Selecting whether to perform automatic CSV conversion when storage stops
- Auto naming
- File name
- Comment

▶ “Save Conditions (File Settings)” in the features guide

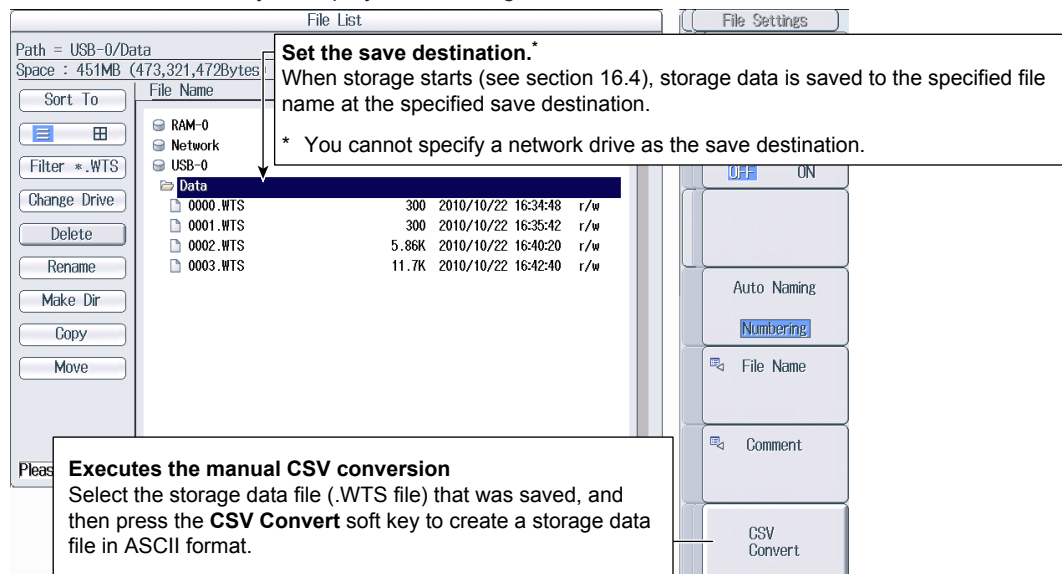
File Settings Menu

Press **SHIFT+STORE START** (STORE SET) and then the **File Settings** soft key to display the following menu.



Setting the Save Destination and Performing Manual CSV Conversion

Press the **File List** soft key to display the following screen.



16.4 Starting, Stopping, and Resetting Storage

This section explains how to start, stop, and reset storage.

- ▶ [“Starting, Stopping, and Resetting Storage \(STORE START, STORE STOP, and STORE RESET\)”](#) in the features guide

CAUTION

During storage, the storage medium 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 medium or corrupt its data.

Storage is in progress when the STORE START key is illuminated or blinking or when the STORE STOP key is blinking.

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.

Starting the Storage Operation

Press **STORE START**. This instrument starts storage using the storage mode that you have specified (see section 16.1).

- The STORE START key is illuminated.
Storage has started; “Store: Start” is displayed.*
- The STORE START key is blinking.
The storage operation is ready; “Store: Ready” is displayed.*

* Character strings are displayed in the upper left of the screen.

Stopping the Storage Operation

This instrument automatically stops storage according to the storage mode that you have specified. To pause storage, press **STORE STOP**.

- The STORE STOP key is blinking.
Storage has been paused; “Store: Stop” is displayed.*
If you press STORE START when “Stop” is displayed in yellow, you can resume the storage operation from the point where you stopped the storage operation.
- The STORE STOP key is illuminated.
Storage has been automatically stopped; “Store: Close” is displayed, and then “Store:Cmpl” is displayed.*

* Character strings are displayed in the upper left of the screen.

Resetting the Storage Operation

Press **SHIFT+STORE STOP** (STORE RESET). The STORE STOP key turns off.

- If the storage operation has been paused
This instrument finishes writing stored data to a file and closes the file.
- If the storage operation has automatically stopped
When the storage operation stops automatically, this instrument finishes writing stored data to a file and closes the file. Therefore, the reset operation performs no file operations.

Note

If you do not reset storage, you will not be able to start it again.


17.1 Connecting USB Memory Devices

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 this instrument to the network. For details, see section 20.4.


► [“Storage Media” in the features guide](#)

CAUTION

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

French

ATTENTION

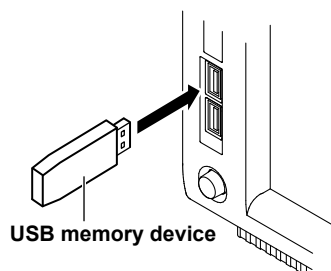
- Lorsque le dispositif accède au support de stockage USB, ne retirez pas ce dernier et ne mettez pas l'alimentation hors tension. Vous risqueriez d'endommager le support de stockage ou les données qu'il contient.
- Quand le système accède au support de stockage USB,  s'affiche au centre, dans la partie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

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 front panel.

Hot-plugging is supported: you can connect or disconnect the USB device at any time, regardless of whether this instrument is on or off. When the power is on, this 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.



17.1 Connecting USB Memory Devices

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 an incompatible USB memory device.
 - 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 Handling Precautions

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

17.2 Saving Setup Parameters

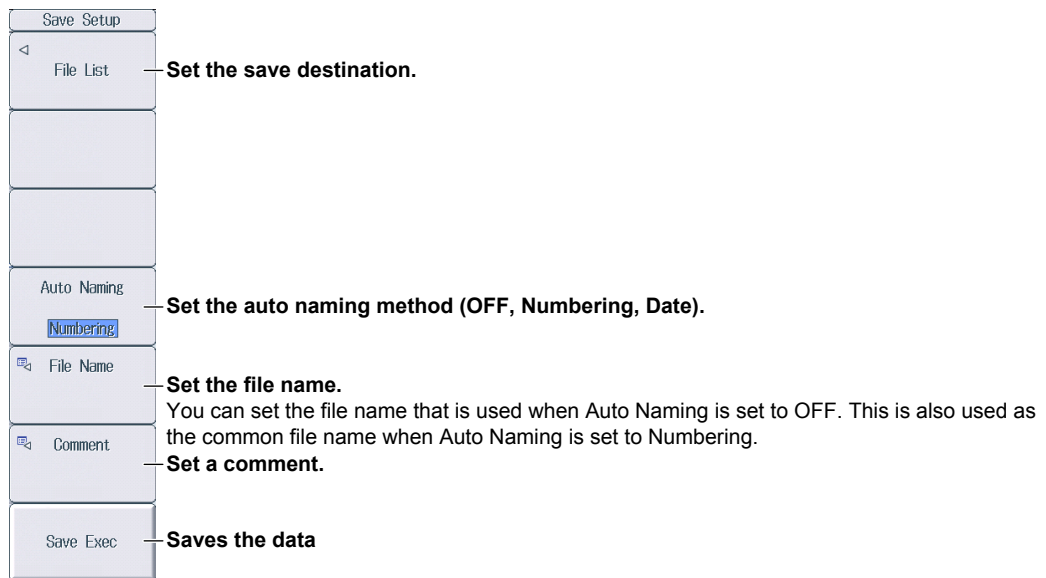
This section explains the following settings for saving setup parameters:

- Save destination
- Auto naming
- File name
- Comment

► “Saving Setup Data (Save Setup)” in the features guide

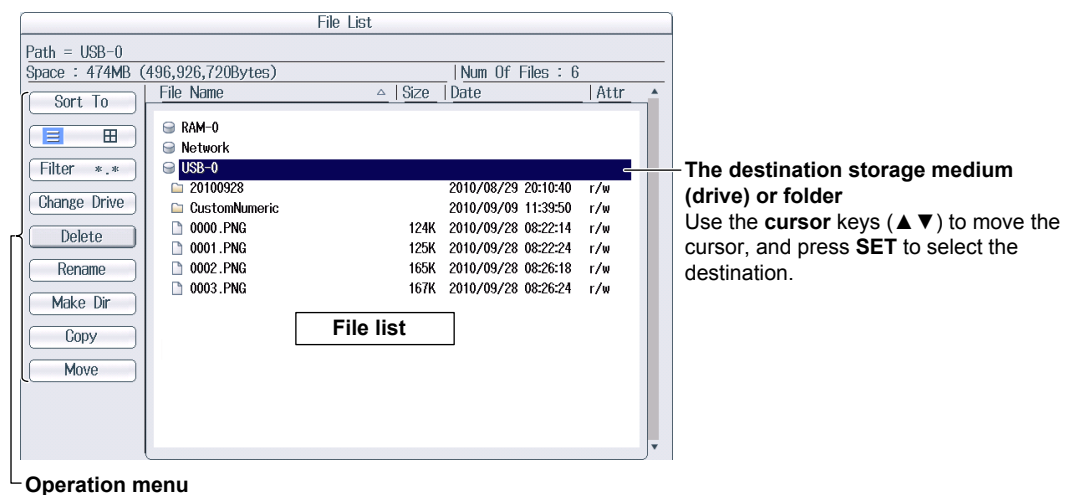
Save Setup Menu

Press **FILE** and then the **Save Setup** soft key to display the following menu.



Setting the Save Destination (File List)

Press the **File List** soft key to display the following screen.



Note

For details on how to move between the operation menu and the file list and how to operate the operation menu, see section 17.6.

Setting Auto Naming (Auto Naming)

- OFF: The auto naming feature is not used. 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: This 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.

20100930_121530_0 (2010/09/30 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.

Setting the File Name (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.

Setting the Comment (Comment)

You can add a comment that consists of up to 30 characters when saving files. You do not have to enter a comment. All characters, including spaces, can be used in comments.

17.3 Saving Waveform Display Data

This section explains the following settings for saving waveform display data:

- Save destination
- Auto naming
- File name
- Comment

▶ “Saving Waveform Display Data (Save Wave)” in the features guide

Save Wave Menu

Press **FILE** and then the **Save Wave** soft key to display the following menu.



17.4 Saving Numeric Data

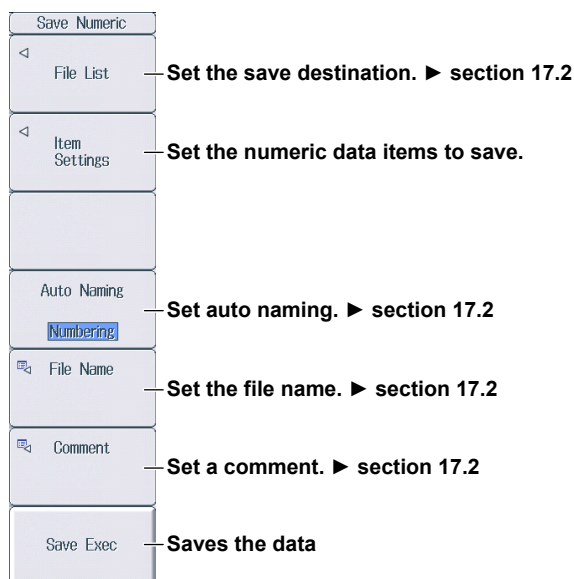
This section explains the following settings for saving numeric data:

- Save destination
- Numeric data items to save
- Auto naming
- File name
- Comment

► [“Saving Numeric Data \(Save Numeric\)” in the features guide](#)

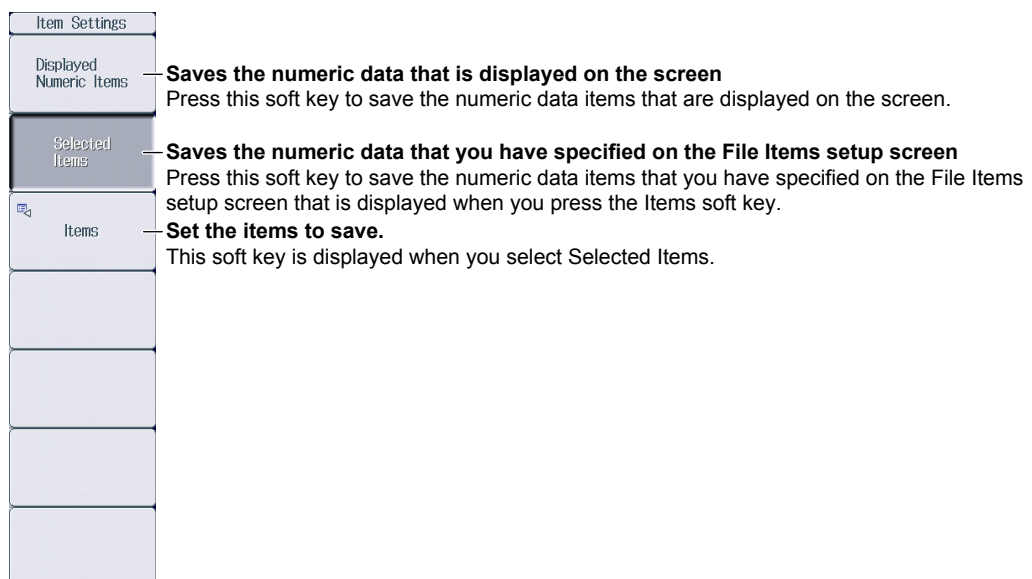
Save Numeric Menu

Press **FILE** and then the **Save Numeric** soft key to display the following menu.



Setting the Numeric Data Items to Save (Item Settings)

Press the **Item Settings** soft key to display the following menu.



Setting Items to Save (Items)

Press the **Items** soft key to display the following screen.

When you press the Selected Items soft key on the menu on the previous page, the numeric data items that you have specified on the following screen are saved.

Selects all the numeric data items
Clears the selection of all the numeric data items
Selects the preset numeric data items

Preset		All ON		All OFF		Preset1		Preset2					
Element	<input checked="" type="checkbox"/> Element1	<input type="checkbox"/> Element2	<input type="checkbox"/> Element3	<input type="checkbox"/> Element4	<input type="checkbox"/> Element5	<input type="checkbox"/> Element6							
	<input type="checkbox"/> ΣA	<input type="checkbox"/> ΣB	<input type="checkbox"/> ΣC										
Function	<input checked="" type="checkbox"/> Urms	<input type="checkbox"/> Umn	<input type="checkbox"/> Udc	<input type="checkbox"/> Urnn	<input type="checkbox"/> Uac	<input checked="" type="checkbox"/> FreqJ	<input type="checkbox"/> GRJ						
	<input checked="" type="checkbox"/> Irms	<input type="checkbox"/> Imn	<input type="checkbox"/> Idc	<input type="checkbox"/> Irnn	<input type="checkbox"/> Iac	<input checked="" type="checkbox"/> FreqI	<input type="checkbox"/> GR						
	<input checked="" type="checkbox"/> P	<input checked="" type="checkbox"/> S	<input checked="" type="checkbox"/> Q	<input checked="" type="checkbox"/> λ	<input checked="" type="checkbox"/> ϕ	<input type="checkbox"/> Pc							
	<input type="checkbox"/> U+peak	<input type="checkbox"/> U-peak	<input type="checkbox"/> I+peak	<input type="checkbox"/> I-peak	<input type="checkbox"/> P+peak	<input type="checkbox"/> P-peak							
	<input type="checkbox"/> WP	<input type="checkbox"/> WP+	<input type="checkbox"/> WP-	<input type="checkbox"/> q	<input type="checkbox"/> q+	<input type="checkbox"/> q-							
	<input type="checkbox"/> Time	<input type="checkbox"/> WS	<input type="checkbox"/> WQ										
	<input type="checkbox"/> ?1	<input type="checkbox"/> ?2	<input type="checkbox"/> ?3	<input type="checkbox"/> ?4									
	<input type="checkbox"/> F1	<input type="checkbox"/> F2	<input type="checkbox"/> F3	<input type="checkbox"/> F4	<input type="checkbox"/> F5	<input type="checkbox"/> F6	<input type="checkbox"/> F7						
	<input type="checkbox"/> F8	<input type="checkbox"/> F9	<input type="checkbox"/> F10	<input type="checkbox"/> F11	<input type="checkbox"/> F12	<input type="checkbox"/> F13	<input type="checkbox"/> F14						
	<input type="checkbox"/> F15	<input type="checkbox"/> F16	<input type="checkbox"/> F17	<input type="checkbox"/> F18	<input type="checkbox"/> F19	<input type="checkbox"/> F20							
	<input type="checkbox"/> Event1	<input type="checkbox"/> Event2	<input type="checkbox"/> Event3	<input type="checkbox"/> Event4									
	<input type="checkbox"/> Event5	<input type="checkbox"/> Event6	<input type="checkbox"/> Event7	<input type="checkbox"/> Event8									
	<input type="checkbox"/> FreqPLL1	<input type="checkbox"/> FreqPLL2											
	<input type="checkbox"/> U(k)	<input type="checkbox"/> I(k)	<input type="checkbox"/> P(k)	<input type="checkbox"/> S(k)	<input type="checkbox"/> Q(k)	<input type="checkbox"/> $\lambda(k)$	<input type="checkbox"/> $\phi(k)$						
	<input type="checkbox"/> $\Phi U(k)$	<input type="checkbox"/> $\Phi I(k)$	<input type="checkbox"/> Z(k)	<input type="checkbox"/> R _s (k)	<input type="checkbox"/> X _s (k)	<input type="checkbox"/> R _p (k)	<input type="checkbox"/> X _p (k)						
	<input type="checkbox"/> Uthd	<input type="checkbox"/> Ithd	<input type="checkbox"/> Pthd	<input type="checkbox"/> Uhd _f (k)	<input type="checkbox"/> Ihd _f (k)	<input type="checkbox"/> Phd _f (k)							
	<input type="checkbox"/> Uthf	<input type="checkbox"/> Ithf	<input type="checkbox"/> Pthf	<input type="checkbox"/> Ithf	<input type="checkbox"/> hvf	<input type="checkbox"/> hcf	<input type="checkbox"/> K-factor						
	<input type="checkbox"/> $\Phi U-UJ$	<input type="checkbox"/> $\Phi U-Uk$	<input type="checkbox"/> $\Phi U-I$	<input type="checkbox"/> $\Phi UJ-UJ$	<input type="checkbox"/> $\Phi UJ-Ik$								
	<input type="checkbox"/> $\Delta U1$	<input type="checkbox"/> $\Delta U2$	<input type="checkbox"/> $\Delta U3$	<input type="checkbox"/> $\Delta U\Sigma$	<input type="checkbox"/> ΔI								
	<input type="checkbox"/> $\Delta P1$	<input type="checkbox"/> $\Delta P2$	<input type="checkbox"/> $\Delta P3$	<input type="checkbox"/> $\Delta P\Sigma$									
	<input type="checkbox"/> Speed	<input type="checkbox"/> Torque	<input type="checkbox"/> SyncSp	<input type="checkbox"/> Slip	<input type="checkbox"/> Pm	<input type="checkbox"/> EaU	<input type="checkbox"/> EaI						

Select the check boxes for the numeric items to save.

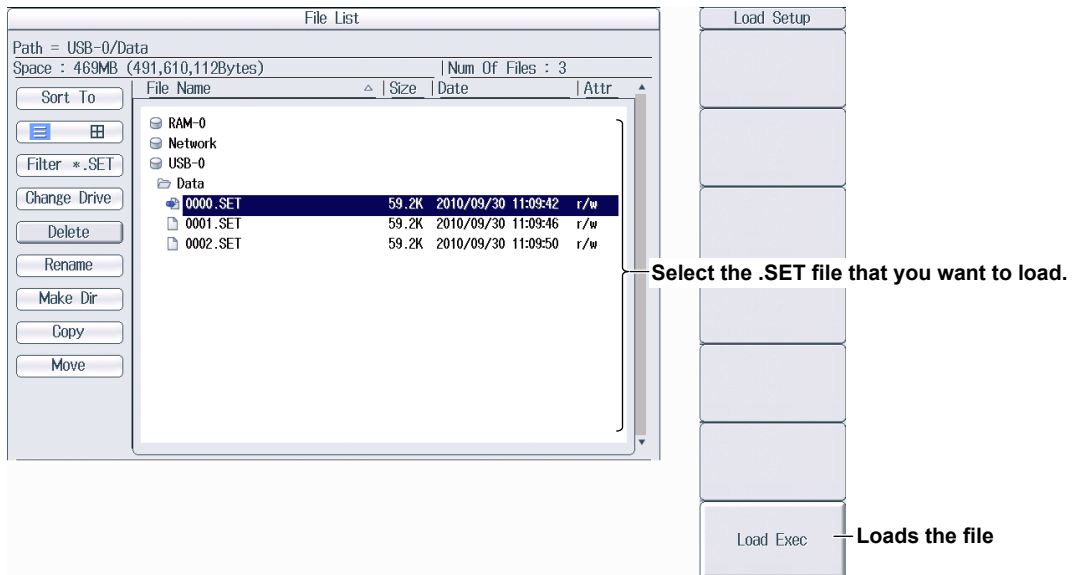
17.5 Loading Setup Parameters

This section explains how to load setup parameters.

► [“Loading Setup Data \(Load Setup\)” in the features guide](#)

Load Setup Menu

Press **FILE** and then the **Load Setup** soft key to display the following screen.



Note

- This instrument cannot load setup parameters that have been saved by a product with an incompatible firmware version.
- This instrument cannot load setup parameters that were saved by an instrument with a different element configuration or with different options.

17.6 File Operations

This section explains the file list's operation menu and the FILE_Utility menu.

- Sorting the file list
- Display format
- Type of file to list
- Changing storage media (drives)
- Deleting files and folders
- Renaming files and folders
- Making folders (directories)
- Copying files and folders
- Moving files and folders
- Selecting files and folders (All Set, All Reset, and Set/Reset)

► [“File Operations \(Utility\)” in the features guide](#)

The File List (File List)

Selection mark

If you want to perform an operation on a group of files at the same time, move the cursor to a file that you want to select, and then press **SET** to display this mark next to the file. To select multiple folders, press the **Set/Reset** soft key on the FILE_Utility menu to display this mark next to the selected folder.

If you want to perform an operation on a single file, move the cursor to the file you want to select to display this mark next to the file.

Operation menu cursor
Use the **cursor keys (▲▼)** to move the cursor.

Sorts the file list
Set the display format.
Set the type of file to list.

Changes the storage medium (drive)
Deletes the selected files and folders
Renames files and folders
Makes folders (directories)
Copies the selected files and folders
Moves the selected files and folders

Total number of files and folders that are contained within the storage medium or folder indicated by the path

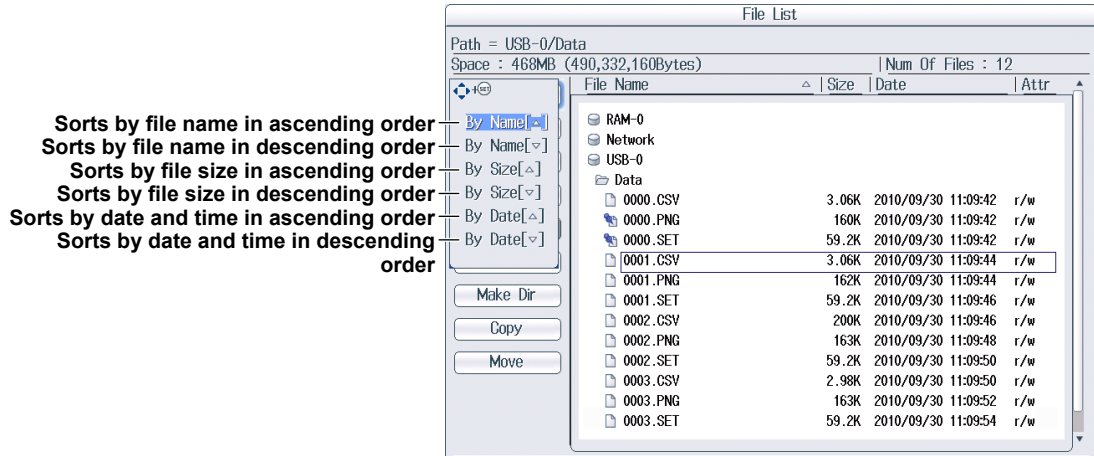
File list cursor
Use the **cursor keys (▲▼)** to move the cursor.

Operation menu ← **File list**
Use the **cursor keys (◀▶)** to switch between operation areas.

File Name	Size	Date	Attr
0000.CSV	3.06K	2010/09/30 11:09:42	r/w
0000.PNG	160K	2010/09/30 11:09:42	r/w
0000.SET	59.2K	2010/09/30 11:09:42	r/w
0001.CSV	3.06K	2010/09/30 11:09:44	r/w
0001.PNG	162K	2010/09/30 11:09:44	r/w
0001.SET	59.2K	2010/09/30 11:09:44	r/w
0002.CSV	2.39K	2010/09/30 11:09:50	r/w
0002.PNG	163K	2010/09/30 11:09:52	r/w
0002.SET	59.2K	2010/09/30 11:09:54	r/w

Sorting the File List (Sort To)

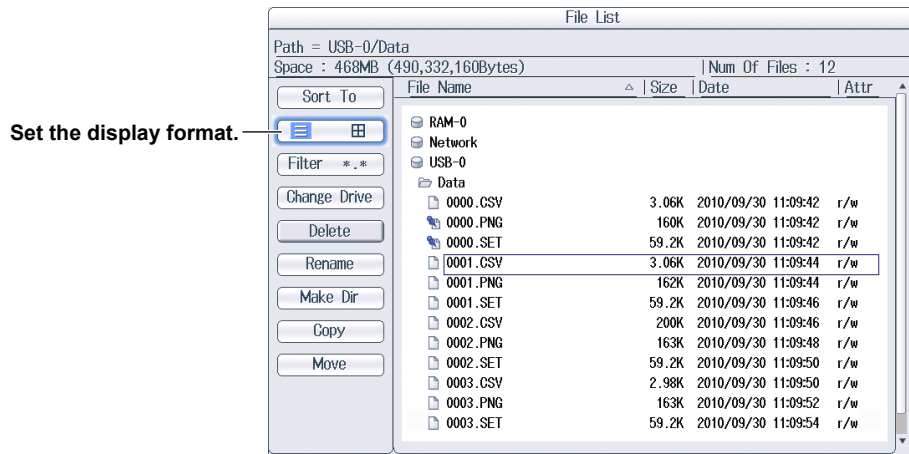
Select **Sort To** on the operation menu to display the following screen.



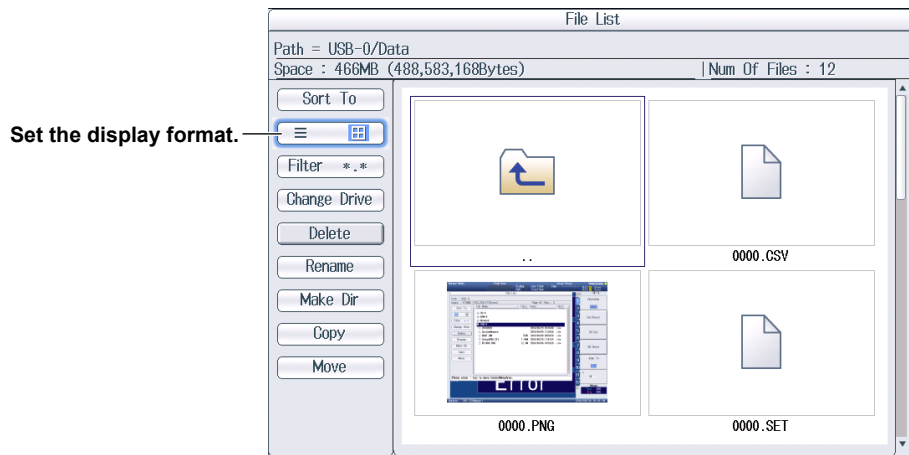
Setting the Display Format (≡, 田)

Select ≡ or 田 on the operation menu to display the following screen.

List Display (≡)

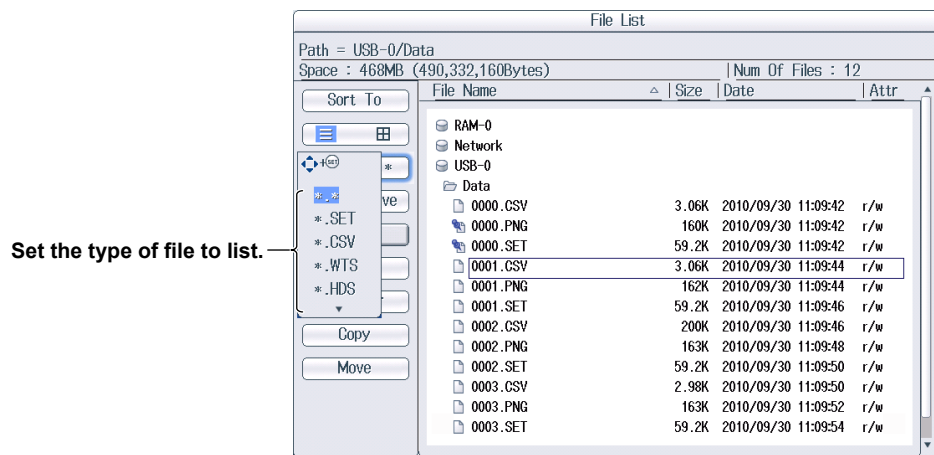


Thumbnail Display (田)



Setting the Type of Files to List (Filter)

Select **Filter** on the operation menu to display the following screen.



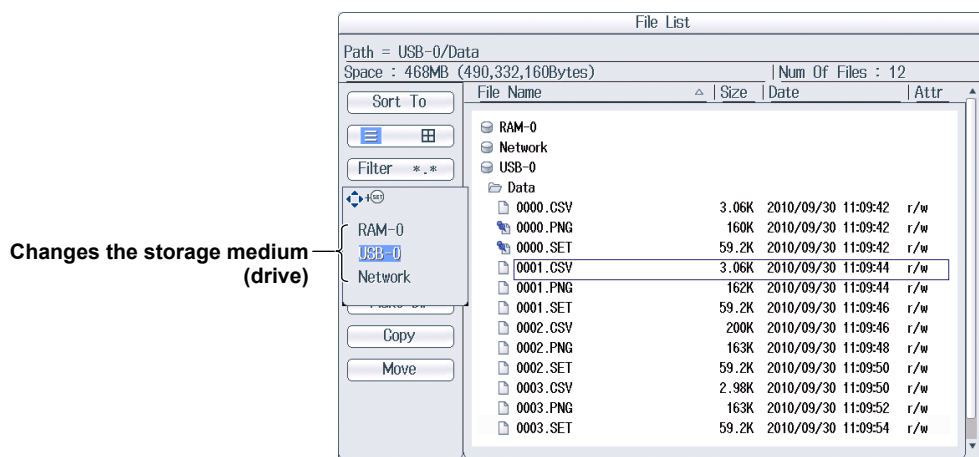
Set the type of file to list.

File Type

.	All files
*.SET	Setup parameter files
*.CSV	Numeric data files (ASCII format), storage data files (ASCII format), and waveform display data files (ASCII format)
*.WTS	Storage data files (binary format)
*.HDS	Storage header files (binary format)
*.BMP	Screen image data files (BMP format) and custom display background files
*.PNG	Screen image data files (PNG format)
*.JPG	Screen image data files (JPEG format)
*.TXT	Custom display configuration files

Changing the Storage Medium or Drive (Change Drive)

Select **Change Drive** on the operation menu to display the following screen.



Changes the storage medium (drive)

Storage Medium (Drive) Type

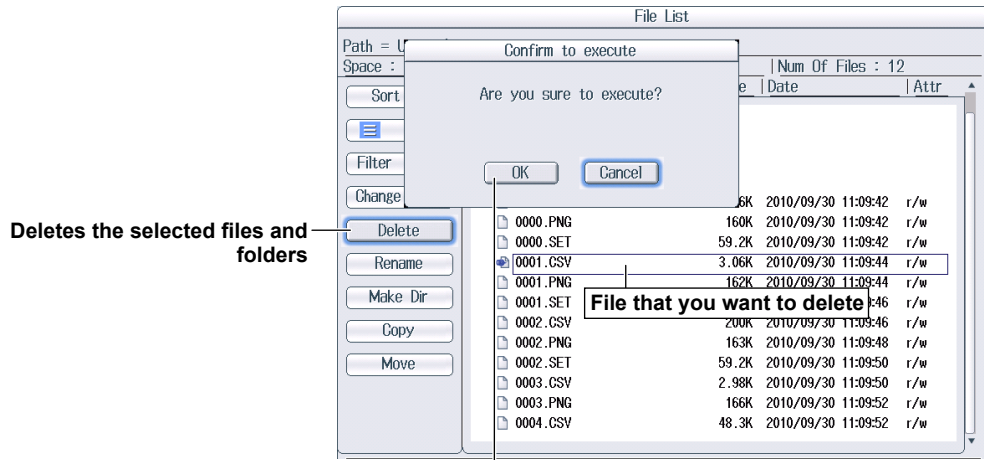
RAM-0	Internal RAM disk of this instrument
USB-0	USB memory device that was detected first
USB-1	USB memory device that was detected second
Network	Network drive

Note

You can also change the storage medium by highlighting the storage medium (drive) you want to change to in the file list and pressing SET.

Deleting Files and Folders (Delete)

1. Select the file or folder in the file list that you want to delete.
2. Select **Delete** on the operation menu to display the following screen.



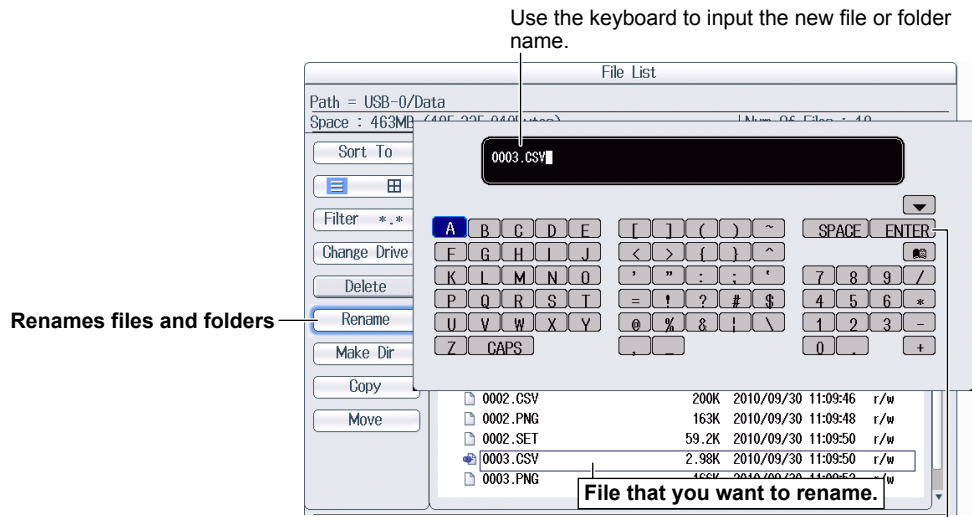
Confirms the deletion of files and folders

Note

- To delete multiple files or folders that are in the file list at the same time, move the cursor to the file or folder that you want to delete, and then carry out the following operations.
Files: Press SET or the Set/Reset soft key on the Utility menu.
Folders: Press the Set/Reset soft key on the Utility menu. If you press SET, all the files and folders that you have selected up to that point will be cleared.
- You cannot delete folders on network drives.

Renaming Files and Folders (Rename)

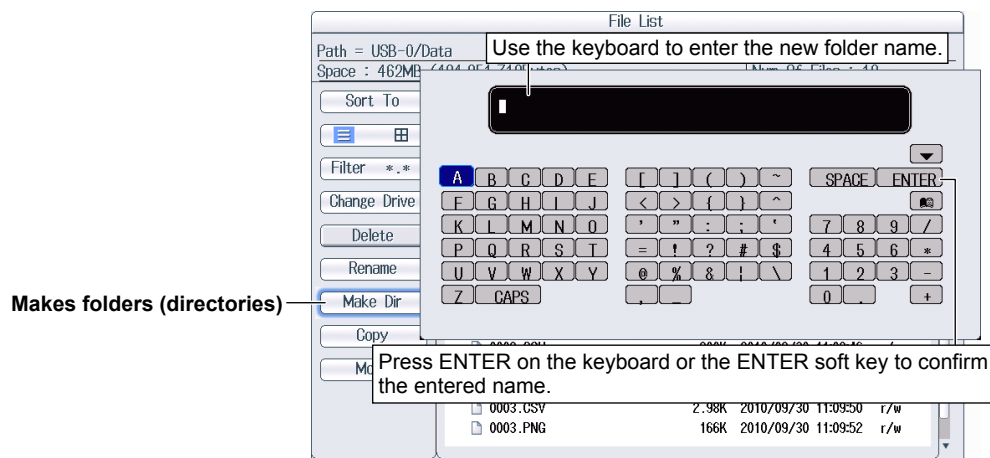
1. Select the file or folder in the file list that you want to rename.
2. Select **Rename** on the operation menu to display the following screen.



Press **ENTER** on the keyboard or the **ENTER** soft key to confirm the entered name.

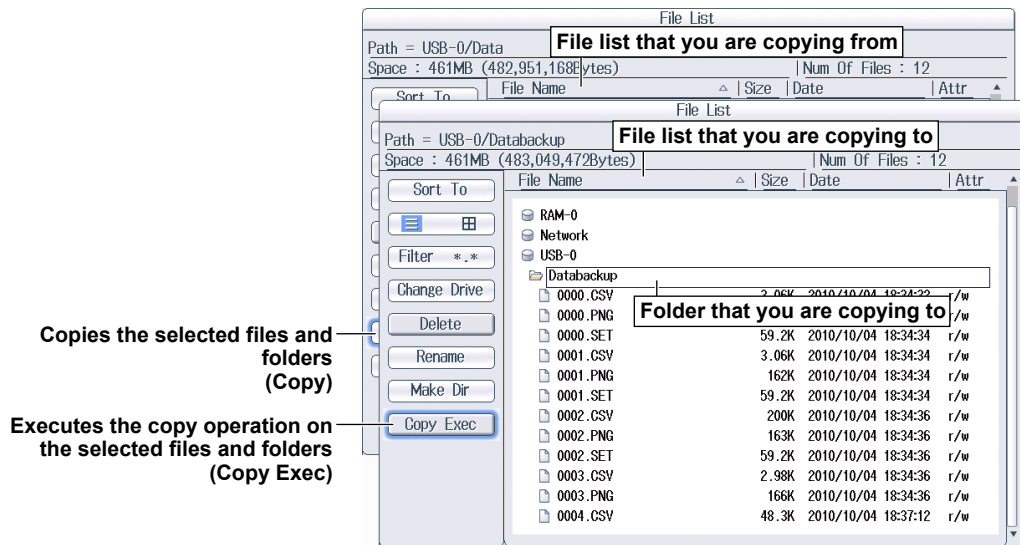
Making Folders (Directories; Make Dir)

1. Select the drive or folder in the file list that you want to make the new folder in.
2. Select **Make Dir** on the operation menu to display the following screen.

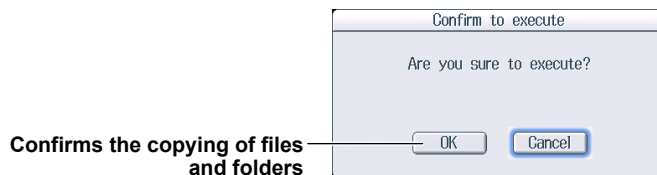


Copying Files and Folders (Copy)

1. Select the file or folder in the file list that you want to copy.
2. Select **Copy** on the operation menu to display the following screen.



3. Select the drive or folder in the file list that you are copying to.
4. Select **Copy Exec** on the operation menu to display the following screen.

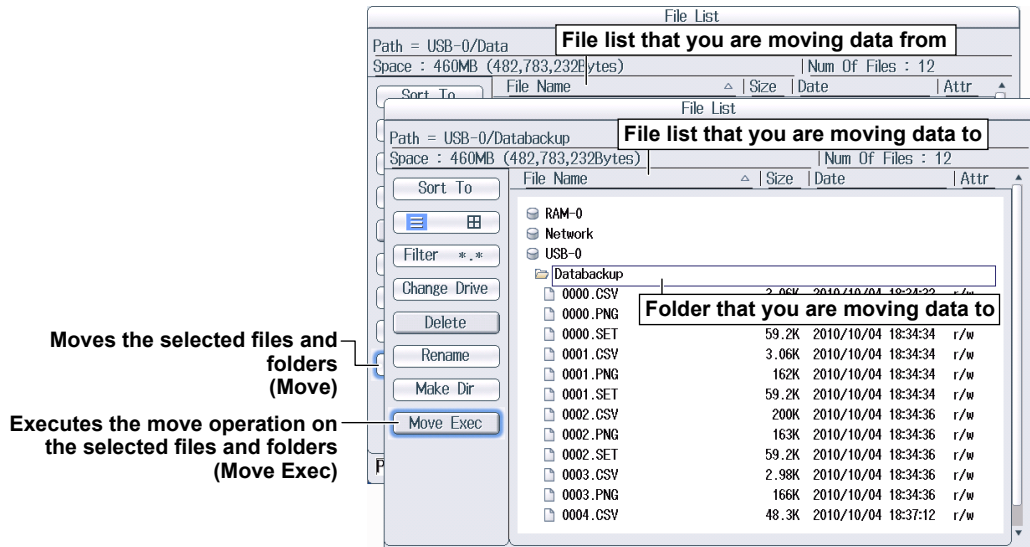


Note

- The procedure for selecting multiple files or folders at the same time to copy them is the same as the procedure for selecting multiple files or folders at the same time to delete them. For more details, see the note on page 17-11.
- You cannot copy folders on a network drive.
- You can perform file operations on the file list that you are copying to as well.

Moving Files and Folders (Move)

1. Select the file or folder in the file list that you want to move.
2. Select **Move** on the operation menu to display the following screen.



3. Select the drive or folder in the file list that you are moving to.
4. Select **Move Exec** on the operation menu to display the following screen.

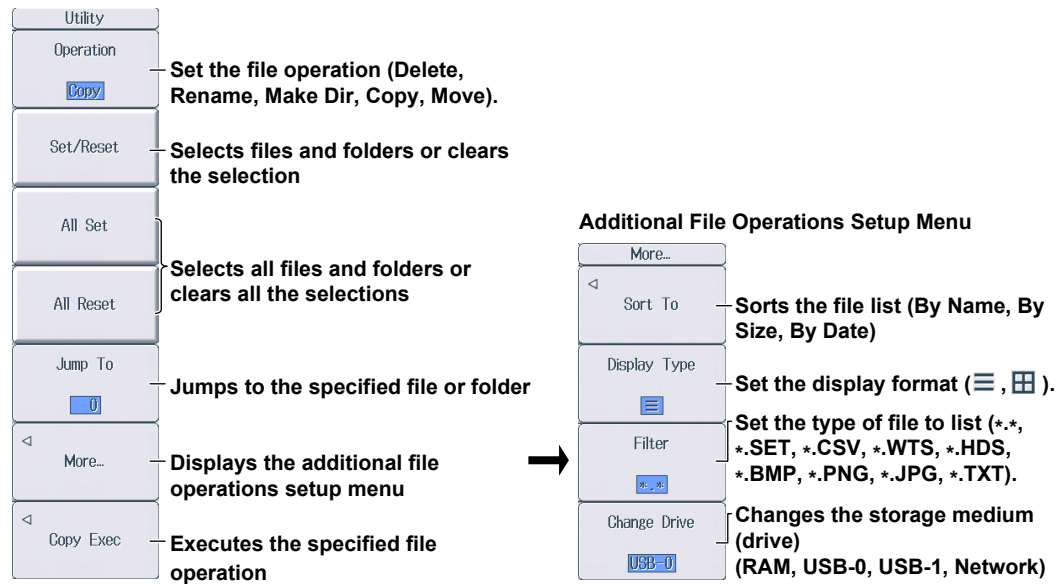


Note

- The procedure for selecting multiple files or folders at the same time to move them is the same as the procedure for selecting multiple files or folders at the same time to delete them. For more details, see the note on page 17-11.
- You cannot move folders on a network drive.
- You can perform file operations on the file list that you are moving data to as well.

FILE Utility Menu

Press **FILE** and then the **Utility** soft key to display the following menu.



Setting the File Operation (Operation, More)

You can perform the same file operations as those that you can perform from the operation menu described on pages 17-8 to 17-13.

Select/Clear (Set/Reset)

This soft key selects the file or folder in the file list that is highlighted or clears the selection. The selection marks (see page 17-8) are displayed to the left of the selected files.

Select All and Clear All (All Set and All Reset)

All Set: In the file list, when a drive is highlighted or a file or folder in a drive or folder is highlighted, pressing this soft key selects all the files and folders in the corresponding drive or folder. The selection marks (see page 17-8) are displayed to the left of the selected files and folders.

All Reset: Pressing this soft key clears all the selected files and folders.

Jump to the Specified File or Folder (Jump To)

Press this soft key to move the cursor to the file or folder in the file list that you specify by its position number. The top-most position in the file list is number 0.

Range: 0-999. However, if you specify a position whose number is larger than the total number of files and folders in the file list, the cursor will move to the bottom-most file or folder in the file list.

18.1 Saving Screen Images

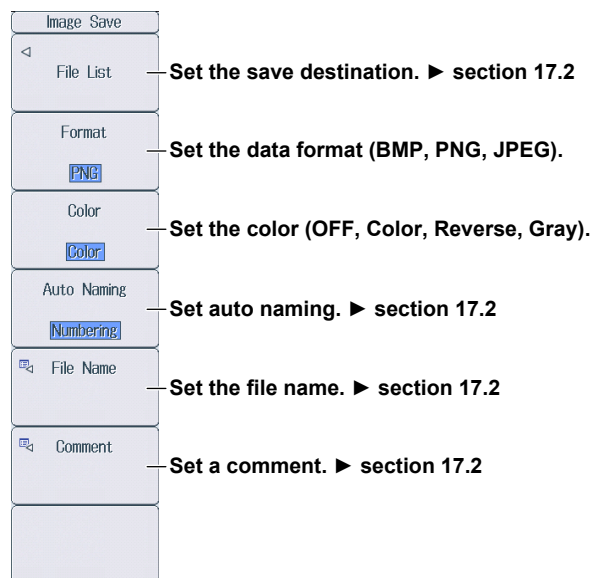
This section explains the following settings for saving screen images:

- Save destination
- File format
- Color
- Auto naming
- File name
- Comment

▶ [“Saving Screen Images” in the features guide](#)

Image Save Menu

Press **SHIFT+IMAGE SAVE (MENU)** to display the following menu.



Saving Screen Captures

Press **IMAGE SAVE** to save the screen image with the save conditions that you specified on the Image Save menu.

19.1 Loading Roll Paper into the Built-In Printer (Option)

This section explains how to load roll paper into the optional built-in printer.

Printer Roll Paper

Only use roll paper specifically made for use with this instrument. When you first use the printer, use the included roll paper. When you need a new supply of roll paper, contact your nearest YOKOGAWA dealer.

Part Number: B9316FX
Specifications: Heat sensitive paper, 10 m
Minimum Quantity: 10 rolls

Handling Roll Paper

The roll paper is made of heat sensitive paper that changes color thermochemically. Please read the following information carefully.

Storage Precautions

When in use, the heat-sensitive paper changes color gradually at temperatures of approximately 70° C or higher. The paper can be affected by heat, humidity, light, and chemicals, whether something has been recorded on it or not. As such, please follow the guidelines listed below.

- Store the paper in a cool, dry, and dark place.
- Use the paper as quickly as possible after you break its protective seal.
- If you attach a plastic film that contains plasticizing material, such as vinyl chloride film or cellophane tape, to the paper for a long time, the recorded sections will fade due to the effect of the plasticizing material. Use a holder made of polypropylene to store the roll paper.
- When pasting the record paper to another material, do not use paste that contains organic solvents such as alcohol or ether. Doing so will change the paper's color.
- We recommend that you make copies of the recordings if you intend to store them for a long period of time. Because of the nature of heat-sensitive paper, the recorded sections may fade.

Handling Precautions

- Use genuine, YOKOGAWA-supplied roll paper.
- If you touch the roll paper with sweaty hands, there is a chance that you will leave fingerprints on the paper, thereby blurring the recorded sections.
- If you rub something against the surface of the roll paper, the paper may change color due to frictional heat.
- If the roll paper comes into contact with products such as chemicals or oil, there is a chance that the paper will change color or that the recorded sections will disappear.

Loading the Roll Paper



WARNING

A roll paper cutter is present inside the printer unit cover. Be careful of the cutter so as to avoid injuring your fingers or hands.

- Do not insert your fingers into the opening on the printer unit (the roll paper ejection hole).
- When you have opened the printer unit cover to place roll paper in the holder, avoid touching the cutter with your fingers and hands.

Do not touch the print head and print motor. If you do, you may burn yourself.

French



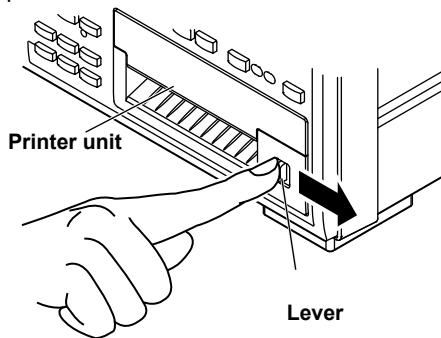
AVERTISSEMENT

Un dispositif de coupe de papier en rouleau est fixé sur le couvercle de l'imprimante. Prendre garde de se blesser les mains ou les doigts avec le dispositif de coupe.

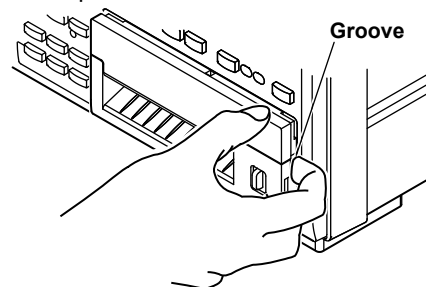
- Ne pas insérer de doigt dans l'ouverture de sortie du papier en rouleau de l'imprimante.
- Ne pas laisser une main ou des doigts entrer en contact avec le dispositif de coupe lors de l'ouverture du couvercle de l'imprimante et de la charge du papier en rouleau dans son logement.

Ne touchez pas la tête d'impression ni le moteur d'impression. Vous pourriez vous brûler.

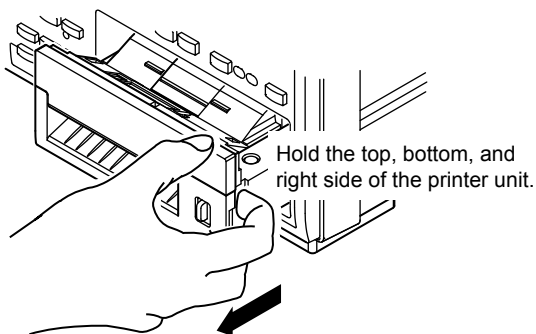
1. Slide the lever to the right to make the printer unit protrude from this instrument.



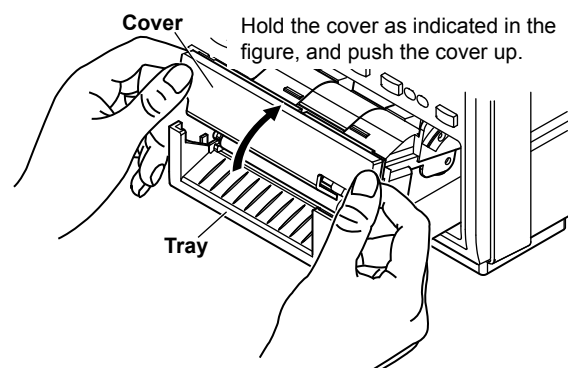
2. Insert your finger into the groove on the right side of the printer unit.



3. Hold the top, bottom, and right side of the printer unit, and then pull it toward you until it stops (pull the unit approximately 5 cm).

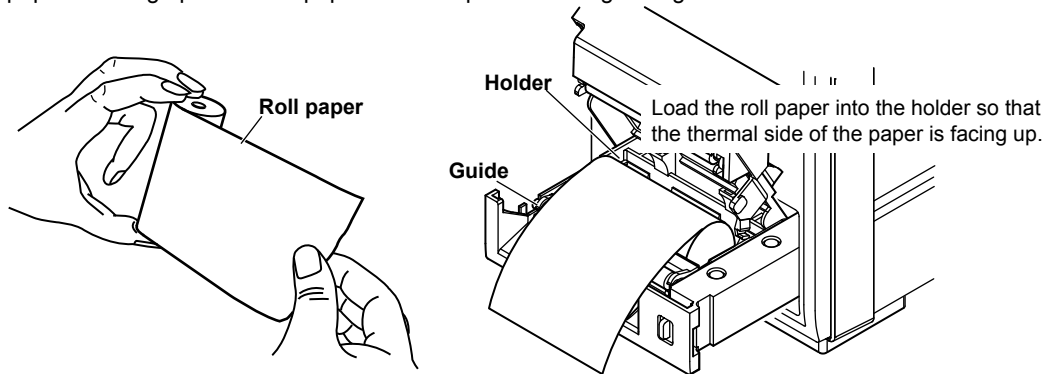


4. Hold the left and right sides of the printer unit's tray with your hands, and push the right and left sides of the front of the cover with your thumbs to raise it.

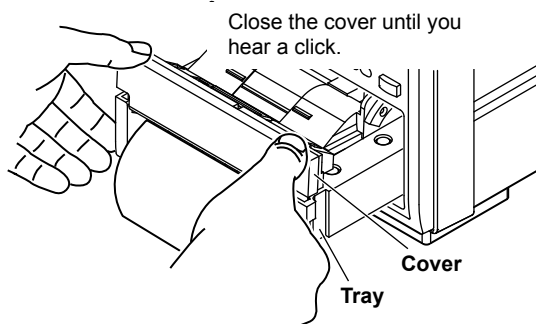
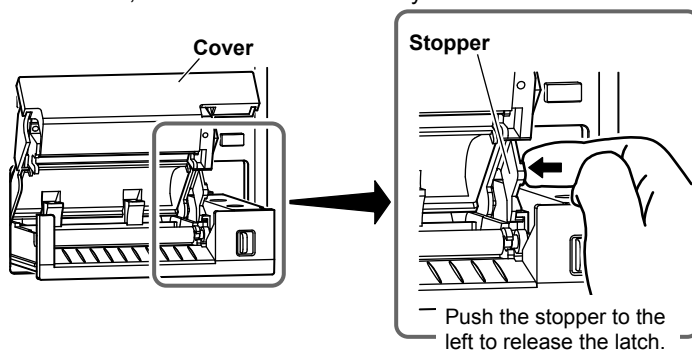


19.1 Loading Roll Paper into the Built-In Printer (Option)

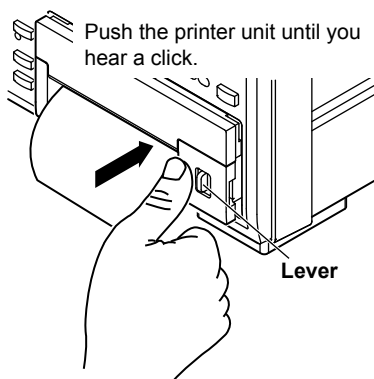
5. Pull approximately 10 cm of the roll paper out, and load the roll paper in the holder so that the thermal side of the paper is facing up. Load the paper so that it passes through the guides.



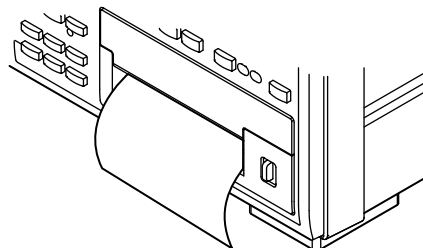
6. Lower the cover while you push the stopper to the left to release the latch. Hold the tray from underneath with both hands, and close the cover until you hear a click.



7. Push the printer unit (push the area to the left of the lever on the front panel) back into this instrument until you hear a click.



This completes the procedure for loading the roll paper.



Feeding Paper

Press **SHIFT+PRINT** (MENU) to display the following menu.



Feeds paper

Each time that you press this soft key, this instrument feeds approximately 3 cm of the roll paper.

Cutting Roll Paper

After you load roll paper and close the cover or after you print measured data, to cut the roll paper, pull the paper up against the top of the cover.

Note

- If you open the printer cover immediately after you cut the roll paper, repeat steps 5 to 7 on pages 19-2 and 19-3.
 - After you load roll paper and close the cover, check whether the paper feeds correctly. If the roll paper does not feed straight, repeat steps 1 to 7 on pages 19-2 and 19-3.
 - If you load the roll paper backwards, the paper may not feed properly or data may not be printed. This is because the print head doesn't come into contact with the thermal side of the paper. Load the roll paper into the holder in the proper orientation.
-

19.2 Printing Using the Built-in Printer (Option)

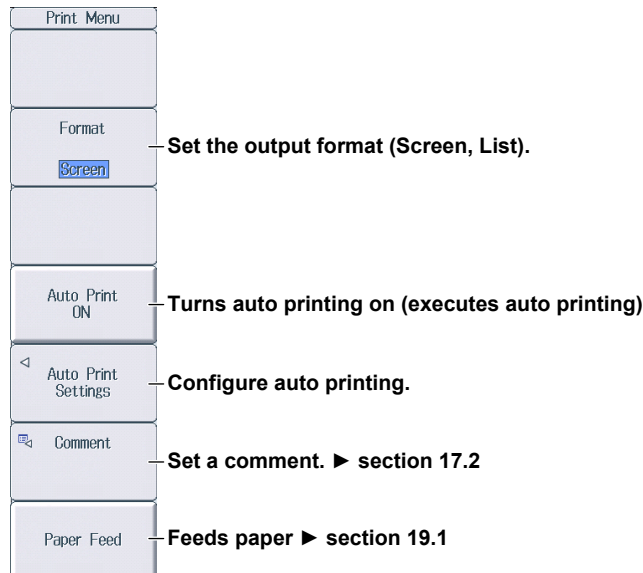
This section explains the following settings for printing on the optional built-in printer:

- Output format
- Executing auto printing
- Auto printing
 - Print mode, print count, print interval, scheduled times for real-time printing, trigger event (synchronized to a user-defined event), and printing data when printing starts
- Comment
- Feeding paper

► [“Printing Screen Images and Numeric Data \(Option\)” in the features guide](#)

Print Menu Menu

Press **SHIFT+PRINT** (MENU) to display the following menu.



Configuring Auto Printing

Press the **Auto Print Settings** soft key to display one of the menus shown below. The menu that appears varies depending on the Print Mode setting that you have specified.

Interval Print Mode

Auto Print Settings

Print Mode — Set Print Mode to Interval.

Print Count — Set the print count (Infinite, 1 to 9999).

Print Interval — Set the print interval.

Print at Start — Select whether to print the data at print start

Setting the Print Interval

Press the **Print Interval** soft key to display the following screen.

Interval

Interval 00 : 01 : 00 — Set the print interval (00 hours : 00 minutes : 10 seconds to 99 hours : 59 minutes : 59 seconds).

Scheduled Times for Real-Time Print Mode

Auto Print Settings

Print Mode — Set Print Mode to Real Time.

Print Count — Set the print count (Infinite, 1 to 9999).

Print Interval — Set the print interval ► “Interval Print Mode” above

Real-time Control — Set the scheduled times for real-time printing.

Print at Start — Select whether to print the data at print start

Setting Scheduled Times for Real-Time Printing

Press the **Real-time Control** soft key to display the following screen.

The screenshot shows the 'Real-time Control' screen with the following fields and buttons:

- Start:** 2011 / 01 / 01 00 : 00 : 00
- End:** 2011 / 01 / 01 01 : 00 : 00
- Buttons:** Now, Copy

Annotations and instructions:

- Scheduled print stop time:** Points to the End field.
- Scheduled print start time:** Points to the Start field.
- Now:** Set the scheduled start and stop times (Year/month/day, 00 hours : 00 minutes : 00 seconds to 23 hours : 59 minutes : 59 seconds).
- Copy:** Copies the scheduled print start time to the scheduled print stop time.

Integration-Synchronized Print Mode

The screenshot shows the 'Auto Print Settings' screen with the following settings:

- Print Mode:** Integ. Sync. (Set Print Mode to Integ. Sync.)
- Print Interval:** (Set the print interval ► "Interval Print Mode" on the previous page)
- Print at Start:** ON (Select whether to print the data at print start)

Event-Synchronized Print Mode

The screenshot shows the 'Auto Print Settings' screen with the following settings:

- Print Mode:** Event. (Set Print Mode to Event.)
- Print Count:** Infinite (Set the print count (Infinite, 1 to 9999).)
- Trigger Event:** Event1 (Set the trigger event (Event 1 to Event 8). When measured data is updated, data is printed each time the conditions of the specified user-defined event are met.)

Printing

Press **Print** to print data according to the conditions specified in the Print Menu menu.

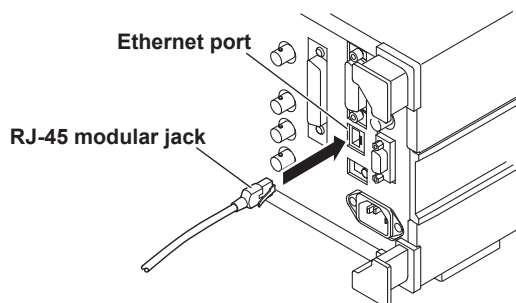
20.1 Connecting this instrument to a Network

This section explains how to connect this instrument to a network.

Ethernet Interface Specifications

There is a 1000BASE-T port located on the rear panel of the instrument.

Item	Specifications
Ports	1
Electrical and mechanical specifications	IEEE802.3
Transmission system	Ethernet (1000BASE-T, 100BASE-TX, 10BASE-T)
Communication protocol	TCP/IP
Supported services	FTP server, DHCP, DNS, remote control (VXI-11), SNMP, FTP client, Modbus/TCP server, and Web server
Connector type	RJ-45 connector



Items Required to Connect this instrument to a Network

Cable

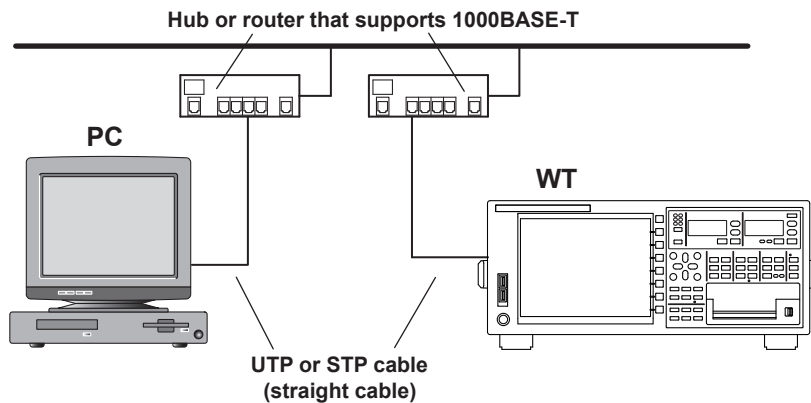
Use one of the following types of network cables that supports the data rate of your network.

- A UTP (Unshielded Twisted-Pair) cable
- An STP (Shielded Twisted-Pair) cable

Connection Procedure

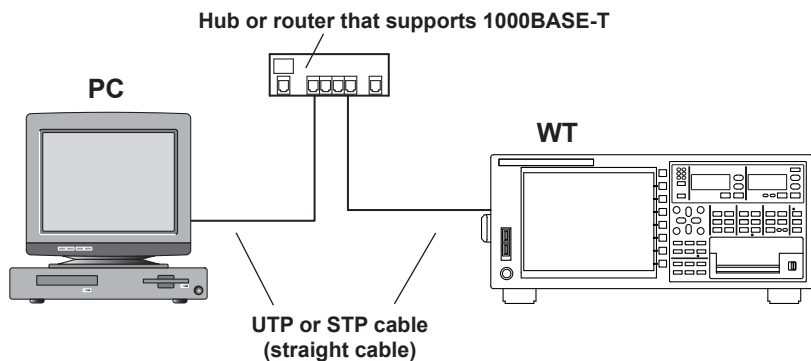
To Connect to a PC over a Network

1. Turn off this 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 this instrument.



To Connect to a PC through a Hub or Router

1. Turn off this 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 this instrument.



Note

- Use a hub or router that supports the data rate of your network.
 - When you connect a PC to this 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 this instrument to a PC directly. Direct communication without a hub or router is not guaranteed to work.
-

20.2 Configuring TCP/IP Settings

This section explains the following TCP/IP settings for connecting this instrument to a network:

- DHCP
 - IP address, subnet mask, and default gateway
- DNS
 - Domain name, DNS server IP address, and domain suffix

► [“TCP/IP \(TCP/IP\)” in the features guide](#)

Configuring TCP/IP Settings (TCP/IP)

Press **UTILITY**, the **Network** soft key, and then the **TCP/IP** soft key to display the following screen.

Set the DHCP (OFF, ON).

The screenshot shows a 'Network' configuration screen with the following fields and options:

- DHCP:** A toggle switch set to **ON**.
- IP Address:** Four input boxes, each containing '0'.
- Net Mask:** Four input boxes, each containing '255'.
- Gate Way:** Four input boxes, each containing '0'.
- DNS:** A toggle switch set to **OFF**, with **ON** and **Auto** options also visible.
- Domain Name:** A text input field.
- DNS Server1:** Four input boxes, each containing '0'.
- DNS Server2:** Four input boxes, each containing '0'.
- Domain Suffix1:** A text input field.
- Domain Suffix2:** A text input field.
- Bind:** A button at the bottom right.

Set these when DHCP is set to OFF.

- IP address
- Subnet mask
- Default gateway

These are displayed when DNS is set to ON or Auto.

- Domain name
- DNS server IP address (1: primary, 2: secondary)
- Domain suffix (1: primary, 2: secondary)

Applies the settings

Navigation buttons at the bottom: TCP/IP, ET/ Web Server, Net Drive, SNTP.

Set the DNS (OFF, ON, Auto).

- **OFF:** The DNS is disabled.
- **ON:** The DNS is enabled. Set the domain name, and the DNS server's primary and secondary IP addresses and domain suffixes.
- **Auto:** The DNS is enabled. Set the domain suffixes. The domain name and the DNS server IP addresses are set automatically. The Auto option is only displayed when DHCP is set to ON.

20.3 Accessing this instrument from a PC (FTP Server)

This section explains the following settings for accessing this instrument from a PC on a network:

- User name
- Password
- Timeout
- FTP client software

► [“FTP Server \(FTP Server\)” in the features guide](#)

Configuring FTP Server Settings (FTP/Web Server)

Press **UTILITY**, the **Network** soft key, and then the **FT/WebP Server** soft key to display the following menu.

The screenshot shows a menu titled "Network" with the following fields and controls:

- User Name:** A text input field containing "anonymous". A callout points to it: "Set the user name (up to 32 characters)."
- Password:** A text input field. A callout points to it: "Set the password (up to 32 characters)."
- Time Out(sec):** A numeric input field containing "900". A callout points to it: "Set the timeout value (30 to 3600 s)."
- Entry:** A button. A callout points to it: "Applies the settings"

At the bottom of the screen, there are four soft keys: TCP/IP, FTP/Web Server, Net Drive, and SNTP.

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 this instrument.

Note

If you set the user name to "anonymous," you can access this instrument without entering a password.

20.4 Monitoring the display of this instrument from a PC (Web Server)

This section explains the following settings for accessing this instrument from a PC over a network to show the instrument's display on the PC and remotely controlling the instrument from the PC.

- User name
- Password
- Connecting to the DLM4000 from a PC

► [“Web Server \(Web Server\)” in the features guide](#)

Configuring Web Server Settings (FTP/Web Server)

Press **UTILITY**, the **Network** soft key, and then the **FTP/Web Server** soft key to display the following menu.

The screenshot shows a menu titled "Network" with the following fields and controls:

- User Name:** A text input field containing "anonymous". A callout points to this field with the text: "Set the user name (up to 32 characters)."
- Password:** A text input field. A callout points to this field with the text: "Set the password (up to 32 characters)."
- Time Out(sec):** A text input field containing "900".
- Entry:** A button located at the bottom right of the menu. A callout points to this button with the text: "Applies the settings".

At the bottom of the menu, there are four soft keys: "TCP/IP", "FTP/Web Server", "Net Drive", and "SNTP". The "FTP/Web Server" key is currently selected.

Note

Time Out is a setting used by the FTP server feature. It is not necessary for the Web server feature.

Connecting to this instrument from a PC


1. Open a Web browser* on a PC that is connected to the network.
* Recommended browser: Internet Explorer 9.0 or later
2. Enter the following address.
http://xxx.xxx.xxx.xxx/
(Type the IP address of this instrument for xxx.xxx.xxx.xxx.)
3. Enter the user name and password that you set on the network setup screen of this instrument, which is shown on the previous page, and connect to this instrument.
The following screen appears.

Note

If you set the user name to "anonymous," you can access this instrument without entering a password.

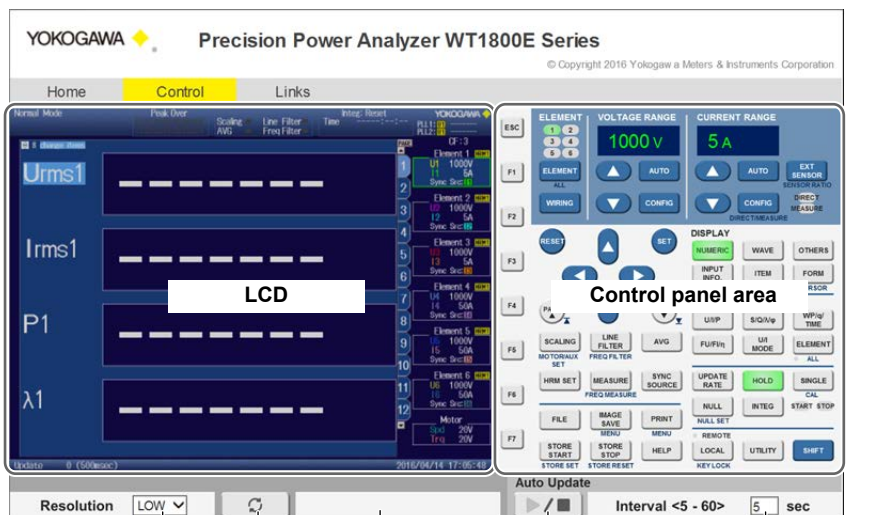
Home Screen

Information about the instrument is displayed.

YOKOGAWA  Precision Power Analyzer WT1800E Series		© Copyright 2016 Yokogawa Meters & Instruments Corporation
Home	Control	Links
Instrument Model	WT1806E	Precision Making
Manufacturer	Yokogawa Meters & Instruments Corporation	
Serial Number	XXXXXXXXXX	
Description	Precision Power Analyzer WT1800E Series	
Host Name	XXX.XXX.XXX.XXX	
MAC Address	00:00:64:XX:XX:XX	
TCP/IP Address	XXX.XXX.XXX.XXX	
Firmware Revision	3.01	
VISA resource string	TCPIP::XXX.XXX.XXX.XXX::inst0::INSTRs	

Control Screen

4. Click the Control tab.
The following screen appears.



The screenshot shows the Control Screen of the Yokogawa Precision Power Analyzer WT1800E Series. The screen is divided into several sections:

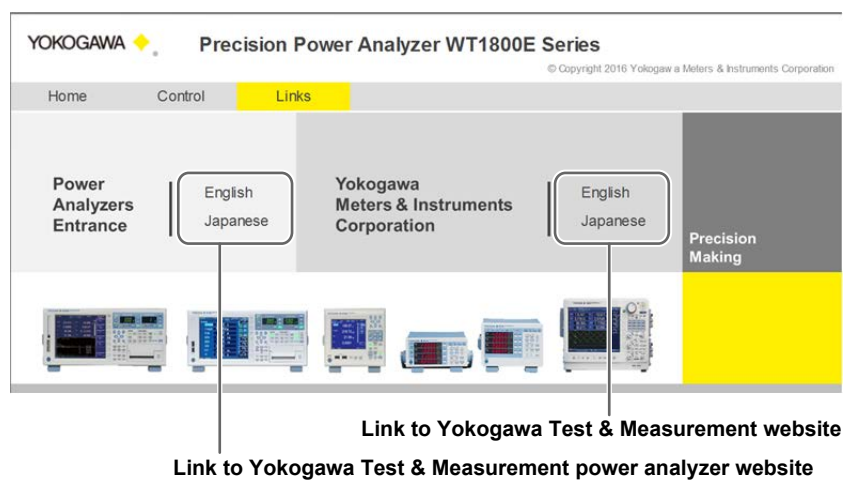
- Resolution:** A dropdown menu set to 'LOW'.
- Refresh screen button:** A circular arrow icon.
- Auto Update:** A play button icon.
- Interval:** A field set to '<5 - 60>' with a unit of 'sec'.

Labels and instructions for these elements are as follows:

- Resolution:** Set the resolution. Select LOW (512×384) or HIGH (1024×768).
- Refresh screen button:** Refresh screen button
- Auto Update:** Auto refresh start/stop button
- Interval:** Set the screen refresh interval. Set in the range of 5 to 60 s.

Links Screen

5. Click the Link tab.
The following screen appears.



20.5 Connecting to a Network Drive

This section explains the following settings for saving and loading various data of this instrument from a network drive (FTP server):

- FTP server (file server)
- Login name
- Password
- Turning FTP passive mode on and off
- Timeout
- Connecting to and disconnecting from a network drive

► [“Network Drive \(Net Drive\)” in the features guide](#)

Configuring Network Drive (Net Drive) Settings and Connecting to It

Press **UTILITY**, the **Network** soft key, and then the **Net Drive** soft key to display the following menu.

The screenshot shows a 'Network' configuration menu with the following fields and buttons:

- FTP Server:** An empty text input field. Description: Set the FTP server's host name.
- Login Name:** A text input field containing 'anonymous'. Description: Set the login name (up to 32 characters).
- Password:** An empty text input field. Description: Set the password (up to 32 characters).
- FTP Passive:** A toggle switch currently set to 'ON'. Description: Turns FTP passive mode on and off.
- Time Out(sec):** A text input field containing '15'. Description: Set the timeout value (1 to 3600 s).
- Connect:** A button. Description: Connects this instrument to the network drive (FTP server).
- Disconnect:** A button. Description: Disconnects this instrument from the network drive (FTP server).

At the bottom of the screen, there is a soft key menu with four options: TCP/IP, FTP/Web Server, Net Drive (highlighted), and SNTP.

20.6 Using SNTP to Set the Date and Time

This section explains how to use SNTP to set the date and time of this instrument.

- SNTP server
- Timeout
- Turning automatic adjustment on and off
- Time difference from Greenwich Mean Time (setting shared with the date and time on the System Config menu)
- Time adjustment

► [“SNTP \(SNTP\)” in the features guide](#)

Configuring SNTP Settings (SNTP)

Press **UTILITY**, the **Network** soft key, and then the **SNTP** soft key to display the following menu.

Configure the SNTP server settings
(IP address; host name and domain name can be set when DNS is enabled).

Set the timeout value (1 to 60 s).

Turns automatic adjustment on and off

Set the time difference from Greenwich Mean Time
(-12 hours and 0 minutes to 13 hours and 0 minutes).

Executes time adjustment

21.1 Viewing System Information (Overview)

This section explains how to view system information of this instrument.

▶ [“Overview \(System Overview\)” in the features guide](#)

System Information List (System Overview)

Press **UTILITY** and then the **System Overview** soft key to display the following screen.

System Overview			
Model	: WT1806E		
Suffix	: -5A3-50A3-HE-D/EX6/B5/G6/Y1/DA/AUX/PD		
No.	: 123456789 (MAC:XXXXXXXXXXXX)		
Version	: 3.01 (PMB:0.05,C10:0.09,GDC:0.51,WATT:1.01,HRM:0.30)		
-Element Configuration-			
	Type	Calibration Date	Status
Element 1:	1000V-5A	2015/10/23 02:52:40	OK OK
Element 2:	1000V-5A	2015/10/23 02:52:40	OK OK
Element 3:	1000V-5A	2015/10/23 02:52:40	OK OK
Element 4:	1000V-50A	2015/10/23 02:53:50	OK OK
Element 5:	1000V-50A	2015/10/23 02:53:50	OK OK
Element 6:	1000V-50A	2015/10/23 02:53:50	OK OK
-Options-			
Ext Sensor Input	[/EX6]:Yes		
Built-in Printer	[/B5] :Yes		
2ch Harmonic Measure	[/G6] :Yes		
Delta Computation	:Yes		
Add-on Freq Measure	:Yes		
RGB Output	[/Y1] :Yes		
20Ch DA Outputs	[/DA] :Yes	2015/10/23 02:58:44	OK OK
Auxiliary Input	[/AUX]:Yes	2015/10/23 02:55:50	OK OK
High Speed Capturing	:Yes		
6ch Sensor Power	[/PD] :Yes		
Link Date	: Jun 22 2016 14:22:49		
Product ID	: ESPXXXXXXXXXX		

Displayed Contents

Model	Model
Suffix	Suffix code
No.	Instrument number
Version	Firmware version
Element Configuration	Input element types
Options	Options
Link Date	Date and time that the firmware was created
Product ID	Unique number assigned to each instrument (necessary for the purchase of additional options)

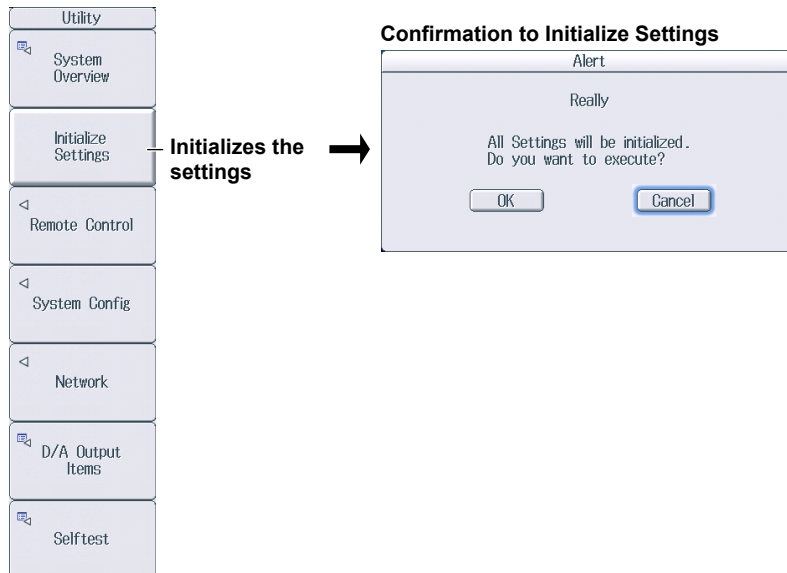
21.2 Initializing Settings

This section explains how to initialize this instrument settings to their factory default values.

► [“Initializing Settings \(Initialize Settings\)” in the features guide](#)

Utility Menu

Press **UTILITY** to display the following menu.



Note

Only initialize this instrument if you are sure that it is okay for all of the settings to be returned to their initial values. You cannot undo an initialization. We recommend that you save the setup parameters before you initialize this instrument.

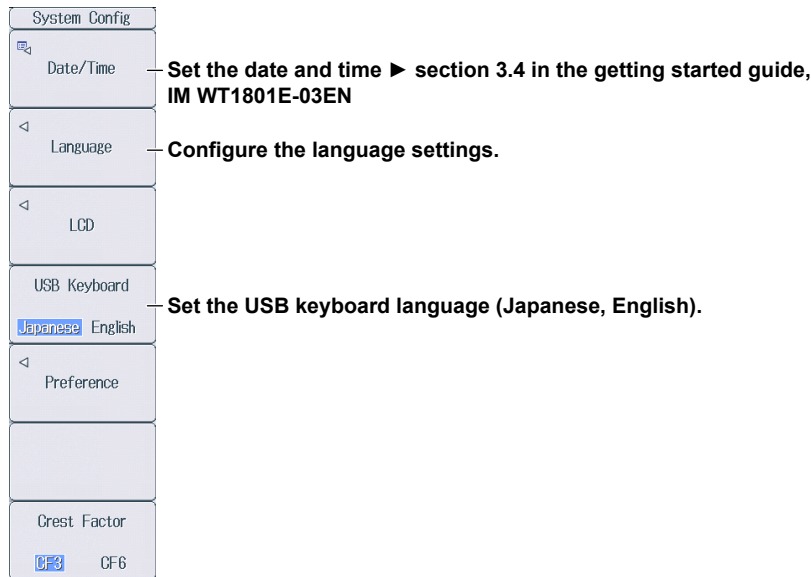
21.3 Setting the Message, Menu, and USB Keyboard Languages

This section explains the settings that you can use to change the message, menu, and USB keyboard languages.

► [“Language \(Language\)” and “USB Keyboard Language \(USB Keyboard\)” in the features guide](#)

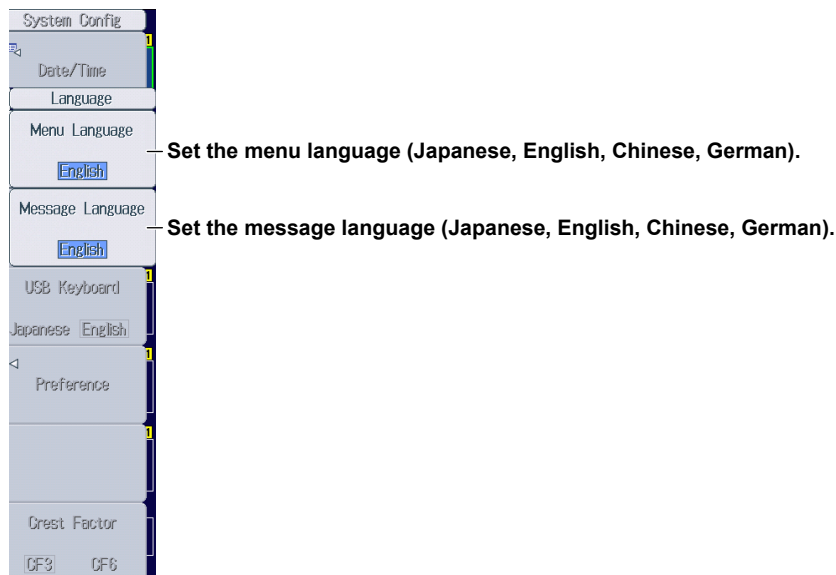
System Config Menu

Press **UTILITY** and then the **System Config** soft key to display the following menu.



Configuring the Language Settings

Press the **Language** soft key to display the following menu.



Note

Even if you set the menu or message language to a language other than English, some terms will be displayed in English.

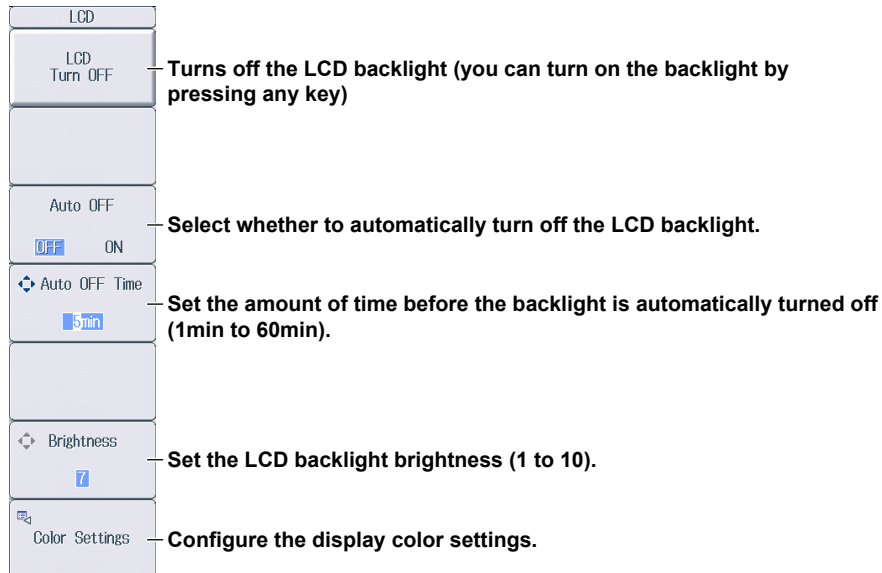
21.4 Setting the Screen Brightness and Configuring the Display Color Settings

This section explains how to set the screen brightness and configure the display color settings.

► [“Adjusting the LCD \(LCD\)” in the features guide](#)

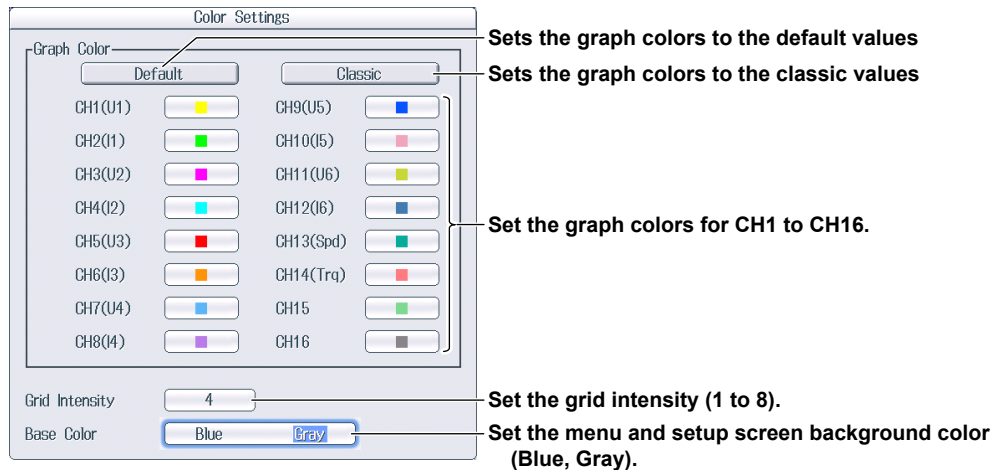
LCD Menu

Press **UTILITY**, the **System Config** soft key, and then the **LCD** soft key to display the following menu.



Configuring the Display Color Settings

Press the **Color Settings** soft key to display the following menu.



21.5 Configuring the Environment Settings

This section explains the following environment settings:

- Number of digits of numeric data to display
- Frequency display value when the measured frequency is less than the lower limit
- Motor display value (/MTR option) when the measured pulse frequency is less than the lower limit
- Decimal point and separator to use when data is saved in ASCII format (.CSV)
- Integration resume action at power failure recovery
- Menu font size
- Rounding to zero

► [“Environment Settings \(Preference\)” in the features guide](#)

Preference Menu

Press **UTILITY**, the **System Config** soft key, and then the **Preference** soft key to display the following menu.

Preference	
Resolution 5digits	Set the number of digits of numeric data to display (4digits, 5digits).
Freq Display at Frequency Low 0 Error	Set the frequency display value when the measured frequency is less than the lower limit (0, Error).
Motor Display at Pulse Freq Low 0 Error	On models with the /MTR option, set the motor display value when the measured pulse frequency is less than the lower limit (0, Error).
Decimal Point for CSV File Period Comma	Set the decimal point and separator to use when data is saved in ASCII format as a .CSV file (Period, Comma).
Integration Resume Action Start Stop Error	Set the integration resume action at power failure recovery (Start, Stop, Error).
Menu Font Size Small Large	Set the menu font size (Small, Large).
Rounding to Zero OFF ON	Turns rounding to zero on and off

21.6 Configuring D/A Output Items (Option)

This section explains the following settings for D/A output. This feature is available on models with the /DA option.

- Measurement function
- Element and wiring unit
- Harmonic order
- D/A output range
 - Range mode, range maximum, and range minimum

► [“D/A Output \(D/A Output Items; option\)” in the features guide](#)

Configuring D/A Output Items

Press **UTILITY** and then the **D/A Output Items** soft key to display the following screen.

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 WT1801E-03EN.

Output item

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).

Set the element and wiring unit (Element 1 to Element 6, ΣA to ΣC).

Set the harmonic order (Total, 0 to 500; /G5 or /G6 option).

You can set this setting when the measurement function includes a harmonic order.

D/A Output Items							
Ch	Item	Function	Element/ Σ	Order	Range Mode	Max	Min
1	Urms1	Urms	Element 1	-	Manual	100.0	-100.0
2	Irms1	Irms	Element 1	-	Fixed	-	-
3	P1	P	Element 1	-	Fixed	-	-
4	S1	S	Element 1	-	Fixed	-	-
5	Q1	Q	Element 1	-	Fixed	-	-
6	$\lambda 1$	λ	Element 1	-	Fixed	-	-
7	$\phi 1$	ϕ	Element 1	-	Fixed	-	-
8	fU1	FreqU	Element 1	-	Fixed	-	-
9	fI1	FreqI	Element 1	-	Fixed	-	-
10	Urms1	Urms	Element 1	-	Fixed	-	-
11	Urms1	Urms	Element 1	-	Fixed	-	-
12	Urms1	Urms	Element 1	-	Fixed	-	-
13	Urms1	Urms	Element 1	-	Fixed	-	-
14	Urms1	Urms	Element 1	-	Fixed	-	-
15	Urms1	Urms	Element 1	-	Fixed	-	-
16	Urms1	Urms	Element 1	-	Fixed	-	-
17	Urms1	Urms	Element 1	-	Fixed	-	-
18	Urms1	Urms	Element 1	-	Fixed	-	-
19	Urms1	Urms	Element 1	-	Fixed	-	-
20	Urms1	Urms	Element 1	-	Fixed	-	-

Select the mode of the D/A output range (Fix, Manual).

Set the maximum and minimum values of the range (-9.999 T to 9.999 T).

These settings can be set when Range Mode is set to Manual.

21.7 Carrying Out Self-Tests (Selftest)

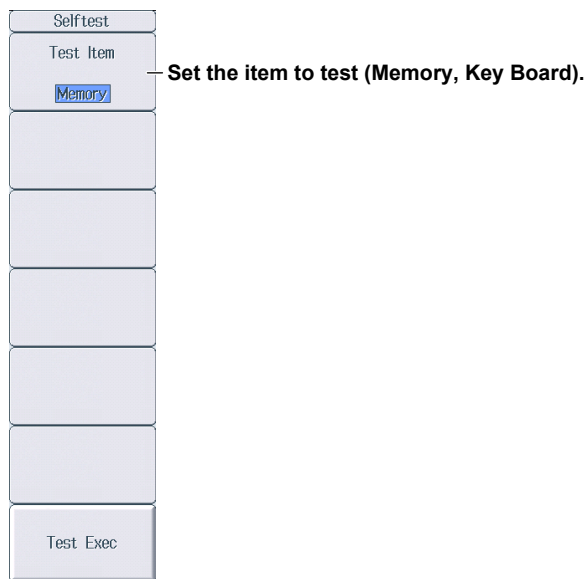
This section explains the following settings for testing whether the memory and keys of this instrument are functioning properly:

- Test item
 - Memory test
 - Key test
- Operation keys, indicators, and keyboard

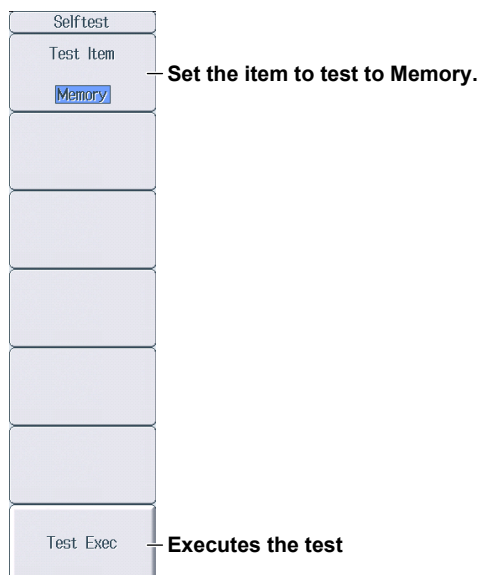
► [“Self-Test \(Selftest\)” in the features guide](#)

Selftest Menu

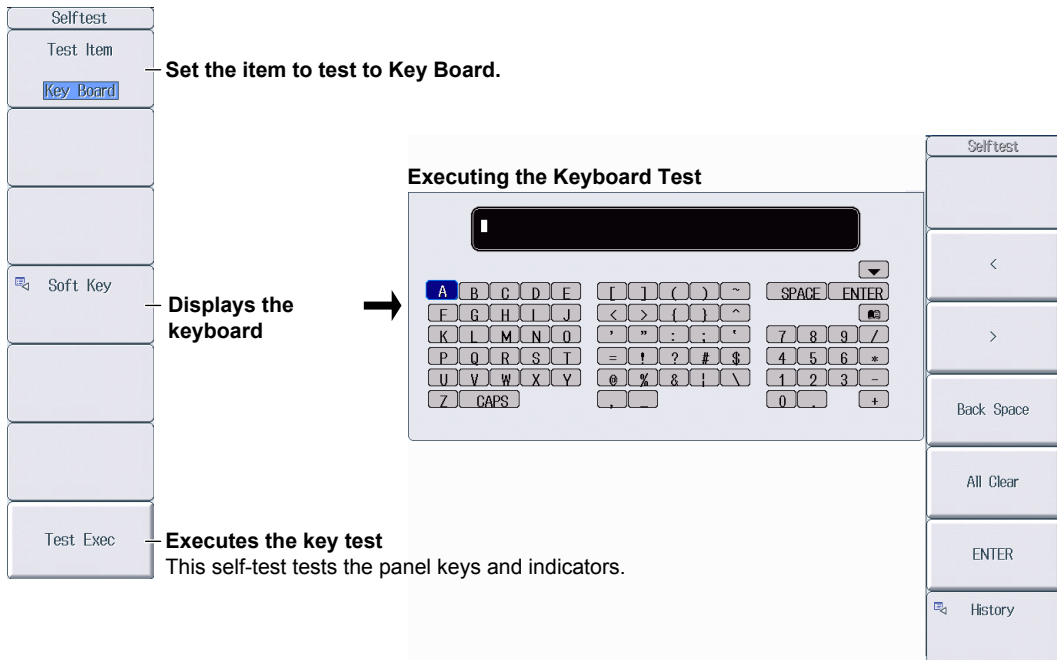
Press **UTILITY** and then the **Selftest** soft key to display the following menu.



Executing the Memory Test



Executing the Key Test



21.8 Performing Zero-Level Compensation

This section explains how to perform zero-level compensation.

▶ [“Zero-Level Compensation \(CAL\)” in the features guide](#)

Press **SHIFT+SINGLE** (CAL) to execute zero-level compensation.

Note

- This 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 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.
-

21.9 Using the NULL Feature

This section explains the following settings for the NULL feature:

- NULL feature setup method
 - All the signals of a given signal type or the selected signals
- Enabling and disabling the NULL feature

► [“NULL Feature \(NULL SET\)” in the features guide](#)

Configuring NULL Feature Settings

Press **SHIFT+NULL** (NULL SET) to display the following screen.

Select the setup method of the NULL feature (All, Select).
If you select All, the NULL feature is turned on for all the input signals that you can use this screen to set.

Set the state of the NULL feature for all the signals of a given signal type (ON, Hold, OFF).

- For the voltage signals of the installed input elements
- For the current signals of the installed input elements
- For motor evaluation input signals
- For external signals

Set the state of the NULL feature for each signal (ON, Hold, OFF).

The motor evaluation input signal setup screen is displayed on models with the /MTR option.

The external signal setup screen is displayed on models with the /AUX option.

Enabling and Disabling the NULL Feature

Press **NULL** to illuminate the NULL key and enable the NULL feature.

- The NULL value for each signal is used for those signals that have been configured to use the NULL feature.
- Press **NULL** again to turn the NULL key off and disable the NULL feature.

21.10 Locking the Keys

This section explains how to lock the panel keys, which prevents you from unintentionally changing the current state of this instrument.

▶ [“Key Lock \(KEY LOCK\)” in the features guide](#)

Key Lock (KEY LOCK)

Press **SHIFT+LOCAL** (KEY LOCK). “LOCK” is displayed in the upper right of the screen, and the operation keys are locked.

- The key lock disables all keys of this instrument except for the power switch, SHIFT key, and LOCAL key.
- Press **SHIFT+LOCAL** (KEY LOCK) again to release the key lock.

Note

When the keys are locked, you cannot use a USB mouse or keyboard to operate this instrument either.

Appendix 1 Messages and Corrective Actions

Messages

Error 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 21.3. 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 communication error messages. These messages are explained in the communication interface user's manual, IM WT1801E-17EN.

Warning Messages (1 to 99)

Code	Message	Chapter or Section
3	Turned on pressing the RESET key. The system has been initialized.	3.6 ¹
11	Cannot measure PLL frequency. Check input level.	2.1
12	File access slow. Too many files in directory or medium read/write speed slow.	17.6
64	File access is aborted.	—
80	System Configuration was changed. The system has been initialized.	—
84	Key lock is enabled. To release the lock, press the KEY LOCK (SHIFT+LOCAL) key.	21.10
85	In remote control mode, all keys are locked except LOCAL key. Please hit LOCAL 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.	—
88	Integration has started and measurement ranges of the MOTOR/AUX are switched to fixed ranges. Even if the Data Update Interval setting is Auto, Voltage/Current measurement range are also switched to fixed ranges.	1.2 and 1.15
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.	21.1
91	This model has no built-in printer. Check the specifications to see whether or not the optional built-in printer is provided.	21.1
92	This model has no harmonics measurement. Check the specifications to see whether or not the optional harmonics measurement is provided.	21.1
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.	21.1
95	Be careful not to exceed a current supply limit value to use the power supply for a current sensor.	2.11 ¹
96	If the S or Q computation is set to type 1 or 2, the following is applied to elements with the rectifier set to on. <ul style="list-style-type: none"> • Φ is fixed to lag (G). Displayed in the range of 0 to 180°(360 degrees format). • The sign of Q is fixed to positive. For QΣ that includes elements with the rectifier set to on, type 2 is used. 	Chapter 7
97	There are measure conditions which make sigma functions unmeasurable. All or part of sigma functions will not be measured.	1.1 and 15.1
98	External Sync interval has gone out of range. Check External Sync (MEAS START) input.	4.4 ¹

1 Getting started guide, IM WT1801E-03EN

2 Communication interface user's manual, IM WT1801E-17EN

Setup Error Messages (500 to 899)

Code	Message	Chapter or Section
600	File access failure.	—
601	Invalid file name. Check the file name.	17.2
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.	17.1
604	Media failure. Check the storage medium.	17.1
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.	17.1
608, 609	File already exists.	—
610	Contains invalid characters.	17.2
611, 612	Media full. Delete unnecessary file(s) or use another disk.	17.6
613	Cannot delete a directory if there are files in the directory.	17.6
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, 622 to 641	File system failure. 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. Check the medium.	—
657	File operation is interrupted.	—
658	File unknown format. Check the file format.	17.5 and 17.6
662	Cannot load this bitmap file. Use file of 16bit Color or 24bit Color Mode with less or equal size 800x672.	6.7
663	Cannot load this text file. Confirm the contents of file.	6.7
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 20
679	Printer error. Maintenance service is required.	—
680	Close the printer cover.	19.1
681	Paper empty. Load a roll chart.	19.1
682	The printer head temperature is abnormality. Printing will be aborted. Printing will not be possible until the printe head temperature comes normal.	—
683	Printer over heat. Power off immediately.	—
685	Printer time out. Maintenance service is required.	—
686	Printer error.	—
690	Cannot execute for the directory depth is 10 or more.	—
691	Cannot execute because of source and destination are overrapped.	—

Code	Message	Chapter or Section
692	Cannot execute for the media itself.	—
693	Cannot store at Network Drive.	16.3
694	Trigger Event is Off.	7.2
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.	—
711	File operation not allowed during hard copy. Wait until the hard copy completes.	—
713	Cannot execute for All or Custom 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.	8.1
723	Can not set or execute when Integ Independent Control is on.	8.1
724	Can not set or execute because recording is processing. Try again.	—
725	File creation stopped. File size exceeded 2G bytes.	—
750, 751	Unable to connect to the server. Check the network settings and configuration.	Chapter 20
752	This ftp function is not supported.	—
753	FTP Error: Client Handle Confirm the network settings and connection.	Chapter 20
758	Failed to acquire time from SNTP server. Confirm the network settings and connection.	20.5
759	Failed to initialize network. Confirm the network settings.	Chapter 20
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.	17.2
802	Cannot be set or executed in the Normal measurement mode. Usable measurement mode are as follows.	—
811	Cannot be set to this display mode. Harmonics option is necessary.	—
812	Cannot be set or executed while storing data.	—
813	Cannot be set while integration is running. Reset Integration.	8.3
814	Cannot be set or executed when NULL is on. Please turn NULL off.	21.9
815	Cannot be set or executed when the Data Update Interval is Auto.	1.15
823	Cannot change during CAL. Wait until CAL is completed.	21.8
827	Illegal math expression. Input a correct computing equation.	8.1
831	Processing now. Retry setting or execution again.	—
841	Attempted to start integration after integration time has reached its preset value.	8.3
842	Attempted to start integration while integration is in progress.	8.3
843	Measurement stopped due to overflow during integration or due to a power failure.	8.3
844	Attempted to stop integration even though integration was not in progress.	8.3
845	Attempted to reset integration even though integration was in progress or integration mode was not selected.	8.3
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".	8.2
848	Attempted made to start integration in real time counting integration mode when the end time had already passed.	8.2
849	Attempted made to start storing in real time counting storing mode when the end time had already passed.	16.1

* Getting started guide, IM WT1801E-03EN

Appendix 1 Messages and Corrective Actions

Code	Message	Chapter or Section
850	Cannot be set or executed at current store state. To set or execute, reset store.	16.4
852	Stored file is illegal. Initialize memory before storing.	16.4
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.	7.6
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.	16.3
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.	1.1
865	Cannot be set while integration is running. Stop or reset Integration.	8.3
866	Cannot be set or executed while Auto Print is operating. Turn off Auto Print from the [PRINT MENU] (SHIFT+PRINT) menu.	19.2
867	Auto Print is not in operation. Start Auto Print from the [PRINT MENU] (SHIFT+PRINT).	19.2
868	Print out destination must be set to Built-in Printer in order to start Auto Print. Set [Print to] to Built-in from the [PRINT MENU] (SHIFT+PRINT) menu.	19.2
869	Auto Print function is not supported in the current measurement mode or settings.	19.2
870	Auto Print [Interval] setting is invalid. Set [Interval] time to an appropriate amount from the [PRINT MENU](SHIFT+PRINT) ->[Auto Print Settings] menu.	19.2
871	Attempted made to start Auto Print when the end time had already passed. Set [End Time] to a future date & time from the [PRINT MENU](SHIFT+PRINT) ->[Auto Print Settings] menu.	19.2
872	Auto print's print-out has been canceled. The printer or file system is in action.	19.2
874	Sync source, PLL source or trigger source cannot be set to Ext Clk, while Master/Slave Synchronization Measurement is set to Slave.	7.6
875	Master/Slave Synchronization Measurement cannot be set to Slave, while sync source, PLL source or trigger source is set to Ext Clk.	7.6
876	Can not calculate from present point value.	3.1 or 4.1
877	Can not set 0 to count.	15.1 or 16.1
879	Can not set or execute while recording high speed data. Stop measurement and wait for file status "Ready".	15.4
880	Cannot be set or executed while initialization. Wait until status changes to "Ready".	15.4
881	Cannot be set or executed while measurement is in progress. To set or execute, "Stop" measurement.	15.4
882	Stopped measurement. Detection error of measuring interval signal. Check External Sync (MEAS START) input.	4.4*
883	Cannot be set or executed in High Speed Data Capturing Mode.	—
884	Can not set wiring to 1P3W/3P3W in High Speed Data Capturing Mode. Select a different wiring.	1.1
885	Cannot be set or executed in High Speed Data Capturing Mode. Set or execute in Normal Measurement Mode.	Appendix 10*
886	Cannot be set or executed to same current ranges, due to different types of elements are installed or external current sensor settings are not same.	1.3
887	Cannot start integration. Turn off Independent Element setting by the [WIRING] menu, or switch the measurement ranges to fixed ranges.	1.1
888	Cannot start the integration. Turn off Independent control by the [INTEG] menu or turn off Auto of the Data Update Interval by the [UPDATE RATE] menu.	8.1 or 1.15
889	Setting and execution is not available when auto-ranging is set to ON.	1.2

* Getting started guide, IM WT1801E-03EN

Code	Message	Chapter or Section
890	Cannot start the store. Change store mode from synchronize with integration or set store interval to zero by the [STORE SET] menu. Otherwise, turn off Auto of the Data Update Interval by the [UPDATE RATE] menu.	16.1 or 1.15
891	Cannot start the auto print. Change print mode from synchronize with integration by the [STORE SET] menu. Otherwise, turn off Auto of the Data Update Interval by the [UPDATE RATE] menu.	19.2 or 1.15
892	Cannot start the integration. Set S and Q Formula to another expecting for Type 3 by the [MEASURE] menu, or fix measurement ranges.	7.3, 1.2, or 1.3

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.	—
905	System failure. Install the input modules and the options correctly.	—
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.	—
910	This operation is prohibited for EEPROM protection.	—
915	EEPROM SUM error. EEPROM may be damaged. Maintenance service is required.	—
919	Module installation condition and setup parameters do not match. The system has been initialized. Maintenance service is required.	—
920	SUM error of NULL value. The Null value is reset to 0.	—
921	System Failed to Draw Display. 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.	—

Index

Symbols

4, 8, and 16 Items displays.....	6-4
1000BASE-T port	20-1

A

A and B computation, auxiliary input	4-1
A and B computation, motor evaluation	3-2
All Items display.....	6-9
analog input, motor evaluation	3-1
AND	7-2
apparent power equation.....	7-3
applicable standards, corrected power.....	7-3
auto calibration	8-2
AUTO key, current range.....	1-3
AUTO key, voltage range	1-2
automatic CSV conversion, high speed data capturing	15-4
automatic CSV conversion, storage	16-5
auto naming.....	17-4
auto off.....	21-4
auto print.....	19-6
auxiliary input.....	4-1
averaging.....	1-20
AVG key.....	1-20

B

background.....	6-12
background color, screen	21-4
backlight	21-4
bar graph display	11-1
built-in printer.....	19-1

C

cable, network	20-1
capture control.....	15-1
capturing count.....	15-1
character strings, entering.....	vi
color, screen	21-4
color, screen image	18-1
column, high speed data capturing.....	15-6
column, matrix display	6-6
comment.....	17-4
common name, files	17-4
compensation, zero-level.....	21-9
CONFIG (DIRECT/MEASURE) key	1-6
CONFIG key, current range.....	1-10
CONFIG key, voltage range	1-9
connection procedure, network	20-2
conventions used in this manual	iii
corrected power.....	7-3
crest factor.....	1-15
CT ratio.....	1-8
current integration.....	8-4
current, measurement mode of high speed data capturing ..	15-1
current mode, current integration	8-4
current range	1-3
cursor keys, operating	v
cursor measurement, bar graph	14-3
cursor measurement, trend	14-2
cursor measurement, waveform.....	14-1
custom display.....	6-12
customizing.....	6-12

cutoff frequency, high speed data capturing.....	15-1
cutoff frequency, normal measurement	1-17

D

D/A output.....	21-6
D/A output, rated time.....	8-4
data, storing.....	16-1
data update count.....	5-1
data update interval.....	1-19
decimal point	21-5
delete, files	17-12
delta computation	1-14
DHCP	20-3
display brightness.....	21-4
display, changing high speed data capturing.....	15-6
display, changing the 4, 8, and 16 Items displays	6-4
display, changing the All Items display	6-9
display, changing the matrix display	6-6
display color, screen.....	21-4
display configuration.....	6-12
displayed harmonic orders	11-1
displayed page, switching.....	6-2
display format, bar graph.....	11-1
display format, external current sensor range	1-6
display format, files.....	17-10
display format, numeric data	6-1
display format, phase difference.....	7-5
display format, trend.....	10-1
display format, vector	12-1
display format, waveform.....	9-1
display frame	6-4, 6-6, 6-9, 6-10, 15-6
display, harmonics list.....	6-10
display interpolation.....	9-2, 10-2
display position.....	6-12
distortion factor equation	2-1
divisions, bar graph screen.....	11-1
divisions, trend screen.....	10-1
divisions, vector screen	12-1
divisions, waveform screen	9-1
DNS.....	20-3

E

efficiency equation.....	1-12
electrical angle.....	3-1
electrical angle correction.....	3-2
ELEMENT (ALL) key, numeric data.....	6-5, 6-11
ELEMENT (ALL) key, range	1-2, 1-3, 1-4, 1-6
ELEMENT key, numeric data	6-5, 6-8, 6-11, 15-8
ELEMENT key, range	1-2, 1-3, 1-4, 1-6
environment settings	21-5
error message	App-2
ESC key, operating.....	iv
ethernet communication	20-1
event.....	7-2
event-synchronized printing.....	19-7
event-synchronized storage	16-3
expression	7-1, 7-3
extension	17-11
external current sensor conversion ratio	1-5
external current sensor range.....	1-4
external VT/CT	1-7
EXT SENSOR key.....	1-4, 1-6
EXT SENSOR (SENSOR RATIO) key	1-5

Index

F	Page	K	Page
feeding paper.....	19-4	k and K	iii
file format, screen image	18-1	keyboard, operating.....	vi
FILE key	17-3, 17-5, 17-6, 17-8, 17-15	key lock	21-11
file list.....	17-9	keys, operating	iv
file name	17-4	key test	21-8
file operation.....	17-9, 17-15		
files, copying.....	17-13	L	Page
files, deleting.....	17-12	language.....	21-3
files, moving.....	17-14	linear scale, auxiliary input	4-1
files, renaming	17-12	linear scale, motor evaluation.....	3-1
file type	17-11	line filter	1-17
folders, making	17-13	line filter, auxiliary input	4-1
font color.....	6-12	LINE FILTER (FREQ FILTER) key	1-18
font size	6-12	LINE FILTER key.....	1-17
font size, menu	21-5	line filter, motor evaluation.....	3-1
FORM (CURSOR) key	14-1, 14-2, 14-3	list number.....	6-10
FORM key	1-22, 6-1, 9-1, 10-1, 11-1, 12-1, 13-1, 15-1, 15-4, 15-10	LOCAL (KEY LOCK) key.....	21-11
frequency display value when measured frequency is less than lower limit.....	21-5	lock	21-11
frequency filter.....	1-18		
FTP server, feature this instrument	20-4	M	Page
FTP server, network	20-8	manual.....	i
FU/FI/!et! key.....	6-5, 6-8	master and slave synchronization	7-6
function select keys	6-5, 6-8, 6-11	matrix display.....	6-6
		max hold.....	7-1
		measured harmonic order	2-1
		MEASURE key	7-1, 7-2, 7-3, 7-4, 7-5, 7-6
		measurement mode, high speed data capturing	15-1
		measurement period.....	1-16
		memory access icon.....	17-1
		memory test.....	21-7
		menu language.....	21-3
		message.....	App-1
		message language	21-3
		motor display value when measured pulse frequency is less than lower limit	21-5
		motor efficiency	3-2
		motor evaluation	3-1
		movement path.....	14-1
		N	Page
		network connection.....	20-1
		network drive	20-8
		notes and cautions	iii
		NULL feature	21-10
		NULL key.....	21-10
		NULL (NULL SET) key	21-10
		number of digits to display.....	21-5
		numeric data, display of high speed data capturing	15-6
		numeric data, display of normal measurement.....	6-1
		numeric data, saving	17-6
		numeric data, saving of high speed data capturing	15-4
		numeric data, storage.....	16-4
		NUMERIC key	6-1
		O	Page
		optimization, high speed data capturing.....	15-1
		optimization, storage	16-1
		OR	7-2
		OTHERS key	10-1, 11-1, 12-1, 13-1, 15-1
		output items, D/A output	21-6
		overview	21-1
G	Page		
graph color.....	21-4		
Greenwich Mean Time, time difference	20-9		
grid.....	9-2, 10-2		
grid brightness	21-4		
H	Page		
harmonic measurement.....	2-1		
harmonics list.....	6-10		
HOLD key	5-1, 5-2		
hold, measured value	5-1		
HRM SET key.....	2-1		
HS filter	15-1		
I	Page		
IMAGE SAVE key	18-1		
IMAGE SAVE (MENU) key	18-1		
independent input element configuration.....	1-13		
independent integration	8-1		
initialization to factory default settings.....	21-2		
INPUT INFO key.....	1-22		
INTEG key	8-1, 8-2, 8-5		
integrated D/A output, rated time.....	8-4		
integration, auto calibration of	8-2		
integration condition	8-2		
integration mode.....	8-2		
integration, scheduled times for.....	8-3		
integration; starting, stopping, resetting.....	8-5		
integration-synchronized printing.....	19-7		
integration-synchronized storage	16-2		
integration timer.....	8-2		
interval printing	19-6		
ITEM key ...	1-23, 6-4, 6-6, 6-9, 6-10, 6-12, 9-3, 10-3, 11-2, 12-2, 13-2, 15-6		
J	Page		
judgment condition	7-2		

P		Page		
PAGE ▲ key	6-2, 6-3		single-shot storage	16-3
PAGE ▼ key	6-2, 6-3		SNTP	20-9
page, switching	6-2		sort, files	17-10
phase difference	7-5		split display	13-1
PLL source	2-1		S/Q/I/Φ key	6-5, 6-8, 6-11
poles, number of	3-1		standard, corrected power	7-3
position	9-3		storage count	16-1
power coefficient	1-8		storage interval	16-1
power measurement	6-1		storage media (drive), files	17-11
print count	19-6		storage mode	16-1
printer roll paper	19-1		storage, numeric data	16-4
printing	19-5		storage, scheduled times for	16-2
printing, scheduled times for	19-6		storage; starting, stopping, resetting	16-6
print interval	19-6		STORE START key	16-6
Print key	19-8		STORE START (STORE SET) key	16-1, 16-4, 16-5
PRINT (MENU) key	19-4, 19-5		STORE STOP key	16-6
pulse input, motor evaluation	3-1		STORE STOP (STORE RESET) key	16-7
R			Page	
range, auxiliary input	4-1		synchronization source, motor evaluation	3-1
range, D/A output	21-6		synchronized measurement, high speed data capturing	15-1
rated time	8-4		synchronized measurement, master and slave	7-6
reactive power equation type	7-3		synchronous speed	3-1
renaming, files	17-12		SYNC SOURCE key	1-16
reset; 4, 8, and 16 Items displays	6-4		system information	21-1
reset; high speed data capturing display	15-6		T	
RESET key, operating	v		TCP/IP	20-3
reset, matrix display	6-6		test	21-7
restart, storage	16-6		time axis, trend	10-1
revisions	ii		time axis, waveform	9-1
revolution signal	3-1		time difference	20-9
roll paper	19-1		torque signal	3-1
roll paper, cutting	19-4		total efficiency	3-2
roll paper, loading	19-2		trademarks	ii
Rounding to zero	21-5		trend display	10-1
S			Page	
sampling frequency	7-4		trend label	10-2
save conditions, high speed data capturing	15-4		trigger	9-1, 15-1
save conditions of captured data, high speed data capturing	15-4		type A	17-1
save conditions of storage data	16-5		U	
save conditions, storage	16-5		U/I MODE key	6-5, 6-8
save destination	17-3		U/I/P key	6-5, 6-8, 6-11
scale value	9-2, 10-2		UPDATE RATE key	1-19
scaling factor, auxiliary input	4-1		USB keyboard language	21-3
scaling factor, motor evaluation	3-1		USB memory device, connecting	17-1
scaling feature	1-7		USB port	17-1
SCALING key	1-7		user-defined event	7-2
SCALING (MOTOR/AUX SET) key	3-1, 4-1		user-defined function	7-1
schedule, integration	8-3		UTILITY key	1-15, 20-3, 20-6, 20-8, 20-9, 21-1, 21-2, 21-3, 21-4, 20-5, 21-5, 8-6
schedule, printing	19-7		V	
schedule, storage	16-2		valid measurement range	1-9
screen image, saving	18-1		values, entering	vi
self-tests	21-7		vector display	12-1
separator	21-5		vertical position	9-3
sequence number, files	17-4		vertical scale, bar graph	11-2
SET key, operating	v		vertical scale, trend	10-3
setup dialog box values, entering	v		vertical zoom factor	9-3
setup menus, operating	iv		voltage, measurement mode of high speed data capturing	15-1
setup parameter list, displaying	1-22		voltage range	1-2
setup parameters, loading	17-8		VT ratio	1-7
setup parameters, saving	17-3		W	
SINGLE (CAL) key	21-9		watt hours	8-1
SINGLE key	5-2		watt hours for each polarity	8-3
single measurement	5-2		waveform display	9-1
			waveform display data, saving	17-5

Index

waveform label	9-2
waveform mapping	9-2
WAVE key	9-1, 9-3
Web Server	20-5
WIRING key	1-1, 1-12, 1-13, 1-14
wiring pattern	1-1
wiring system	1-1
wiring unit	1-1
WP/q/TIME key	6-5, 6-8

Z

Page

zero-level compensation	21-9
zoom factor, vector	12-2
zoom factor, waveform	9-3