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

USER'S MANUAL



IM WT1801E-02EN 1st Edition 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 r	numbers are the land	quage 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.
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Revisions

• 1st Edition: September 2016

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 cause damage to the instrument or user's data, and precautions that can be taken to prevent such occurrences.
French	
AVERTISSEI	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
Κ	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.

- 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



Setting Items in a Table

	Function	Element/2	Order	Scaling	Upper Scale	Lower Scale
⊠ T1	Urms —	Ciomont 1		hoto		
⊠ T2	Irms	Element 1	-	Auto	-	-
⊘ T3	Р	Element 1	-	Auto	-	-
⊠ T4	s	Element 1	-	Auto	-	-
⊘ T5	Q	Element 1	-	Auto	-	-
atta	λ	Flomont 1	_	Auto	-	-

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.

		1	rend Iter	ns
Display	Function	Element/Z	Order	Scaling
⊘ T1	Urms	Element 1	-	Auto
⊘ T2	Irms	Element 1	-	Auto

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 no 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.

 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.



Note.

Numeric01 WT1801E

- @ 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.

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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 Settings
Element	3 <mark>♦ ⊕</mark> 5 [6]
	[3P3W:Σ A] [1P2W] [1P2W] [1P2W]
	3P4W
	3P3W(3V3A)

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 (\blacktriangle and \triangledown) 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,	0.75 V, 1.5 V, 3 V, 5 V, 7.5 V, 15 V, 30 V, 50 V, 75 V,
300 V, 600 V, 1000 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)

- **1.** 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.
- **2.** 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 (\blacktriangle and \triangledown) 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,	5 mA, 10 mA, 25 mA, 50 mA, 100 mA, 250 mA,		
1 A, 2 A, 5 A	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.

- 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 (\blacktriangle and \checkmark) 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		

External current sensor range display



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.

Setting the External Current Sensor 1.4 **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.



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 mV/A × 100 A = 1 V.

- Therefore, configure the settings as indicated below. 1 V
- External current sensor range:
- 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.
- 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.



Display format indicators (DIRECT, MEASURE)

External current sensor range display (Display example of when the display format

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.

Scaling		
Scaling	Turns the scaling featu	re on and off
OFF ON	*	When you want to multiply the external current sensor output by the
⊲ VT Scaling —	-Set the VT ratio.	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.
⊲ CT Scaling —	-Set the CT ratio.	
⊲ SF Scaling —	-Set the power coefficie	nt.
■ All Elements _ Setup	-Display the menu for co	onfiguring all elements (see section 1.17).

Setting the VT Ratio (VT Scaling)

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

(VT Scaling	
¢	Element 1	
	3.0000	
¢	Element 2	Cursor (use the ◀▶ cursor keys to move it)
	1.0000	
ф	Element 3	
	1.0000	Set the VT ratio (0.0001 to 00000.0000)
Φ	Element 4	Set the VI fatto (0.000 f to 35353.5353).
	1.0000	
Φ	Element 5	
	1.0000	
¢	Element 6	
	1.0000	
	Exec Conv S	- Copies the VT ratio
	LACC DUPY Z	The VT ratio of the input element that is indicated by the cursor is conied 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.



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.



Setting the Valid Measurement Range 1.7

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

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

3¥

1.5V



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.

Available current range options

Setting the Valid Current Measurement Range (Current Range Configuration)

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

(Range Settings)		
50A Input Element	-Set the valid measurement ranges of the 50 A input element.`	
<u> </u>		Direct input range
5A Input Element	-Set the valid measurement ranges of the 5 A input element.	J
Ext Sensor Input Element	-Set the valid measurement ranges of the external current sen	sor.

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.

1A



- 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.

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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

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



- 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.

100mA

50mA

20mA

10mA

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

Available external current sensor range options

assigned to the same wiring unit are set to the same status. 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 range, you can 1+99 Current Range Configuration For each input element or wiring unit, set whether the range is a Element1 Element2 Element3 nt5 Element6 lement4 Eleme you can set all ranges as valid valid measurement range ALL ON 10 1 J □ √ measurement ranges (All ON). for all input elements (All 5¥ ON) or not (All OFF). 21 C 19 Slot in which an input element is not installed 500mV ☑ All ON 200mV All OFF 100mV Available options for the measurement 50mV ranges that this instrument can switch Peak Over Jump 0FF 10 10V 0FF 0Ff to when a peak over-range occurs 19 OFF 50A ExtSenso 5A 10V Measurement range to switch to when a peak over-range occurs 5V When Element Independent is set to OFF, the input elements that are 2V 1V 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 500mV 200mV operates as follows: 100mV When a peak over-range occurs, the measurement range increases to the 50mV range specified here, skipping the ranges in between. When the measurement range to switch to when a peak over-range occurs

 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 (nFormula)

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



To add active powers and motor output and use them in $\eta 1$ to $\eta 4$, 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.



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

3P3W 3P4W

3P3W(3V3A)

Star > Delta

Delta > Star

Delta Computation Settings (Δ Measure)

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

⊿ Measure]			
Element [1] [2] [3] [4] [5] [6]	Installed input	elements		
[1P2W] [3P3W:Σ A] [3P3W(3V3A):Σ B] ——	The set wiring	systems		
⊿Measure Type [] 3P3₩▷3V3A [Delta▷Star] Set the delta computation type.				
All All The available options vary depending on the set wiring systems.				
Set the delta computation mode (rms, mean, do, r, mean, as)	Wiring System	Delta Computation Type		
Set the delta computation mode (rms, mean, dc, r-mean, ac).	1P3W	Difference, 3P3W > 3V3A		
	3P3W	Difference, 3P3W > 3V3A		

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.

	System Config	
	Date/Time	
	Language	
	LCD	
	USB Keyboard	
Ja	apanese English	
	Preference	
	Crest Factor	Set the creat factor (CE3 CE6 CE6A)
	CF6 CF6A	- Set the crest lactor (CF3, CF0, CF0A).

1.12 Setting Measurement Periods

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 Sou	rce Settings			
All	Element 1	Element 2	Element 3	Element 4	Element 5	Element 6
- Voltage Rectifier	OFF	0FF	OFF	0FF	0FF	OFF
Voltage Level	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Current Rectifier	0FF	0FF	OFF	0FF	0FF	0FF
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.



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.

Freq Filter (A)		Freq Filter
Element 1		Element 1
Cutoff		0FF 100Hz 1kHz
Element 2 OFF ON	Cursor (use the ◀► cursor keys to move it)	Element 2
Cutoff		OFF 100Hz 1kHz
Element 3		Element 3
Cutoff	Set the frequency filter when the data undate interval is Auto	OFF 100Hz 1kHz
Element 4	• Turn the frequency filter on or off.	Element 4
Cutoff Cutoff Cutoff Element 5	 Set the cutoff frequency (100 Hz, 200 Hz, 400 Hz, 800 Hz, 1.6 kHzv, 3.2 kHz, C 4 kHz, 200 Hz, 400 Hz, 200 Hz, 200	Element 5
OFF ON	6.4 KHZ, 12.8 KHZ, and 25.6 KHZ).	Element 5
		OFF 100Hz 1kHz
Element 6		Element 6
Cutoff	Displays the frequency filter setup manu* for when the data	OFF 100Hz 1kHz
4	update interval is not Auto	
Freq Filter -	>	

* 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.

Update Rate Auto OFF	-Set whether to set the data update ─────→ interval to Auto (ON/OFF).	Auto OFF
		ON
Fast (200ms) — ↑	Increases the data update interval ¹	
✓ Current Rate	-Set the data update interval (50ms, 100ms, 200ms, 500ms, 1s,	2s, 5s, 10s, 20s).
↓ (1s) — Slow	-Decreases the data update interval ¹	
Time Out at Update Rate Auto— 15	-Set the timeout² value for when the data update interval is Aut (1s, 5s, 10s, 20s)	0.

- 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.

Averaging						
Averaging	Turns averaging on and off					
OFF ON						
Туре	-Set the averaging type (Exp, Lin).					
Exp Lin						
💠 Count _	-Set the attenuation constant or average count.					
8	• When Type is set to Exp: Set the attenuation constant (2 to 64).					
	• When Type is set to Lin: Set the average count (8 to 64).					

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

 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 E	lements Set	up		
Element	[1]	[2]	[3]	[4]	[5]	[6]
	E	3P4₩:Σ A]	[3P4₩:Σ B]
U Auto Range	0FF	0FF	0FF	0FF	0FF	0FF
U Range	1000V	1000V	1000V	1000V	1000V	1000V
Ext Sensor	0FF	0FF	0FF	0FF	0FF	0FF
I Auto Range	0FF	0FF	0FF	0FF	0FF	0FF
I Range	5A	5A	5A	50A	50A	50A
Sensor Preset	Others	Stiers	Others	Others	Others	Others
Sensor Ratio [mV/A (mQ)]	10.0000	1).0000	10.0000	10.0000	10.0000	10.0000
CT Preset	Others	Ot iers	Others	Others	Others	0thers
Scaling	0FF	CFF	0FF	0FF	0FF	0FF
VT Scaling	1.0000	.0000	1.0000	1.0000	1.0000	1.0000
CT Scaling	1.0000	.0000	1.0000	1.0000	1.0000	1.0000
SF Scaling	1.0000	.0000	1.0000	1.0000	1.0000	1.0000
Line Filter	0FF	CFF	0FF	0FF	0FF	0FF
- Cutoff	0.5kHz	0.5kHz	0.5kHz	0.5kHz	0.5kHz	0.5kHz
Freq Filter	0FF	CFF	0FF	0FF	0FF	0FF
Freq Filter (A)	OFF	(FF	OFF	OFF	OFF	OFF
- Cutoff	100Hz	00Hz	100Hz	100Hz	100Hz	100Hz
Sync Source	11	1	11	14	14	14

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

- 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

Element 1 (1000V-sol) Element 2 (1000V-sol) Element 3 (1000V-sol) Element 4 (1000V-sol) Element 6 (1000V-sol) Powe ring 1P2W 2 A(3P3W) PA(2P3W) PA(2P3W) PB(2P3W)			Power	Element Set	tings		
Iming 11/2W 2 A(3730) 2 A(3730) 12 A(3730) 2 A(3730) 12 A(3730) 2 B(1730) 2 B(Element 1 [1000V-5A]	Element 2 [1000V-50A]	Element 3 [1000V-50A]	Element 4 [1000V-50A]	Element 5 [1000V-50A]	Element 6 [1000V-50A]
Offage OUOUP IOUUP IOUUP <t< th=""><th>Wiring</th><th>1P2W</th><th>∑ A(3P3₩)</th><th>Σ A(3P3₩)</th><th>1P2W</th><th>$\Sigma B(1P3P)$</th><th>Σ B(1P3W)</th></t<>	Wiring	1P2W	∑ A(3P3₩)	Σ A(3P3₩)	1P2W	$\Sigma B(1P3P)$	Σ B(1P3W)
Caling Off Off<	Voltage kange Current Range Sensor Ratio [mV/A (mΩ)]	5A 10.0000	504 10.0000	50Å 10.0000	50A 10.0000	50Å 10.0000	504 10.0000
Latio caling Factor 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 1.0000 ync Source 11 12 12 14 15 15 ne Filter 0ff 0ff 0ff 0ff 0ff 0ff 0ff nee Filter 0ff 0ff 0ff 0ff 0ff 0ff 0ff	Scaling	0ff	Off	Off	Off	Off	
ync Source 11 12 12 14 15 15 ine Filter Off Off Off Off Off Off Off req Filter Off Off Off Off Off Off Off	CT Ratio Scaling Factor	1.0000	1.0000 1.0000	1.0000	1.0000 1.0000	1.0000 1.0000	1.0000 1.0000 1.0000
ine Filter Off Off Off Off Off Off Off	Sync Source	11	12	12	14	15	15
	Line Filter Freg Filter	Óff Off	Off Off	Óff Off	Off Off	Off Off	Off Off
ress NPLL INFO to exit this display	Press INPLIT INF	0 to exit this	display				

Measurement Range Settings List

Voltage Range Settings	Current Range Settings	Info Form
U1 U2 U3 U4 U5 U6 1000	11 12 13 14 15 16 5 50 50 50 50 50 50 50 50 50 50 50 50 50 50 50 20 <th>Power Element Settings</th>	Power Element Settings
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	1 10 10 10 10 10 500m 5 5 5 5 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 1	Range Settings — Select Range Settings.
Press INPUT INFO to exit this display.		

Info Items Menu

3. Press ITEM to display the Info Items menu.

Info Items	
(
<u> </u>	
<u> </u>	
Display Frame	-Turns the display frame on and off
OFF ON	

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.



- 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.

Element Settings	
Element 1	
Hrm1 Hrm2	
Element 2 (ΣΑ)	
Hrm1 Hrm2	
Element 3 (ΣΑ)	
Hrm1 Hrm2	Cat the surgery of the inner classes (Unred Unred)
Element 4	Input elements that are assigned to the same wiring unit are set to the
Hrm1 Hrm2	same group.
Element 5 (ΣB)	
Hrm1 Hrm2	
Element 6 (ΣB)	
Hrm1 Hrm2	
Setting Motor Evaluation Conditions 3.1

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. MOTOR Settings When Sense Type is set to Analog: Speed Torque Ρm Turns the auto range on and off 1.0000 1.0000 1.0000 Scaling Set the fixed range (20V, 10V, 5V, 2V, 1V). Unit Nm W rpm Set the linear scale (A: 1.000 m to 1.000 M; B: -1.000 M to Analog Analog Sense Type 1.000M). Analog Auto Range **NFF OFF** Set A (the slope) and B (the offset). 20V Computes A and B 201 Analog Range Set the line filter (OFF, 100Hz, 1kHz). Linear Scale 1.000 1.000 Α Set the synchronization source (U1, I1, U2, I2, U3, I3, U4, I4, В 0.000 0.000 U5, I5, U6, I6, Ext Clk, None). Calculation Calculation Even if Sense Type is set to Pulse, correctly setting the Line Filter OFF synchronization source improves measurement accuracy. Sync Source None When Sense Type is set to Pulse: 10000.0000 50.0000 Pulse Range Upper Set the upper and lower limits. 50.0000 Pulse Range Lower 0.0000 Rated Freq Revolution signal: 0.0000 to 99999.9999 [rpm] 50.0000 15000Hz Rated Upper Torque signal: -10000.0000 to 10000.0000 [N•m] Rated Lower -50 0000 5000Hz Set the positive and negative rated torque signal pulse Pulse N 60 frequencies (1 to 10000000 [Hz]). Pole Source Set the positive and negative rated torque signal values Sync Speed 11 (-10000.0000 to 10000.0000 [N•m]). Electrical Angle Measurement Electrical Angle Correction **ON** Set the number of pulses per revolution of the revolution signal (1 to 9999). **Turns electrical angle**

> Set the voltage or current whose frequency will be measured to compute the synchronous speed (U1, I1, U2, I2, U3, I3, U4, 14, U5, 15, U6, 16).

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

measurement on and off

Configure the electrical angle correction. You can configure the electrical angle correction

when Electrical Angle Measurement is set to ON.

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.

Cot the first Y suis value D/I and Y suis value [mm]
Set the first X-axis value $[V]$ and Y-axis value $[PPH]$
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[Nm/V]	
Point1X[V] 0.000	Set the first X axis value [V] and X axis value [Nm]
Point1Y[Nm] 0.000	-3 and -3 and $-$
Point2X[V] 0.000	- Set the second X-axis value [V] and X-axis value [Nm]
Point2Y[Nm] 0.000	(-1.000 T to 1.000 T).
Cancel Execute -	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	-Set the correction value (−180.00 to 180.00).
Clear Correction	Clears the correction value
Auto Enter Correction Execute	Automatically computes the correction value
Auto Enter Target U1	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 ca	n configure up to two input signals.
	Aux Settings	
Aux Name Scaling Unit Analog Auto Range Analog Range Linear Scale A B	AUX1 AUX2 1.0000 1.0000 kW/m2 kW/m2 0N 0FF 20V 20V 1.000 1.000 0.00 0.000 Calculation Calculation	Set the input signal name (up to 8 characters). Set the scaling factor (0.0001 to 99999.9999). Set the unit (up to 8 characters). Turns the auto range on and off Set the fixed range (20V, 10V, 5V, 2V, 1V, 500mV, 200mV, 100mV, 50mV). 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).
Line Filter	OFF	Computes A and B 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.

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

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.

Update 1560	(500msec)	
Data	Data update interval a update count	

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 ltems —	-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	-Select the harmonics list display (/G5 or /G6 option).
Single Dual	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** ($\overline{\mathbf{A}}$) to jump to the first page.

Press **SHIFT+PAGE** \checkmark ($\underline{\bullet}$) 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

When these characters are displayed in black, you can switch the page.



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** ($\overline{\bullet}$) to jump to the first page.

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

	Measurement functio	n side Har	monic order data s	side	
	hvf3	35	36		
	Kfact3	39	40		
	■PAGE 3/11		F	PAGE 1/13	
To the previous p To the next p	bage $\left(\begin{array}{c} PAGE \\ \bullet \end{array} \right)$ The bage $\left(\begin{array}{c} PAGE \\ \bullet \end{array} \right)$	he arrows that can b the page are di — Currently displ	be used to switch splayed in black. aved page —		To the previous page
Noto					

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

Numeric (4)	/ 4 Items display: 1 to 48 ∖
	Select the item number that you want to set. 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
	guide).
Element/Σ	–Set the element and wiring unit (Element 1 to Element 6, ΣA to ΣC).
Element 1	
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.

Numeric (4)	
🗘 ltem No.	
1	
Function	
Urms	
Element/2	
Reset Items	
Reset Pattern	Set the reset pattern (Element Origin, Euroction Origin, Clear Current Page, Clear All
Element Origin	Pages).
Reset Items Exec -	Resets the items using the specified reset pattern
Display Frame	
OFF ON	

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 ▲ ▼ keys, or the SHIFT+PAGE ▲ ▼ (▲ and ▼) 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/λ/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**.

M	latrix Items	
Φ	ltem No.	-Select the item number that you want to set (1 to 81).
	1	
	Function	-Set the measurement function (None, other functions—for details on the various
	Urms	measurement functions, see "Items That This Instrument Can Measure" in the features
		guide).
φ	Order _	- Set the harmonic order (Total, 0 to 500; /G5 or /G6 option).
	Total	You can set this setting only when you have selected a measurement function that includes a harmonic order.
⊲		
F	leset Items —	-Set the resetting of displayed items.
	umn Settings	Configure the columns to display
001		- configure the columns to display.
Die	snlav Frame	
LA		- Turns the display frame on and off
OF	F ON	

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.

Matrix Items	
🗘 litem No.	
Function	
Urms	
Densil Hame	
Reset Items	<
Reset Pattern	Out the second sectors (Element Origin Execution Origin Olege Origin Origin Origin
Element Origin	- Set the reset pattern (Element Origin, Function Origin, Clear Current Page, Clear All Pages)
	, 1 4900).
Reset Items	Resats the items using the specified reset pattern
Exec	Resets the tems using the specified reset pattern
Column Cottings	
ODIGHIHI OCCUIES	
Display Frame	
OFF ON	

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

Column Settings	
Column Num	Set the number of columns $(4, 6)$
4 6	
💠 Column No.	Set the column number (1 to 6)
2	
Element/S	Set the element and wiring unit (None Element 1 to Element 6
Element 2	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

🕸 & change i	tems	
	Element 1	Element 2
Urms [V	0.0000k	0.0000k

Changing the Measurement Function (Vertical direction)

- 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/\/\$\Phi key, WP/q/TIME key, FU/FI/\$\phi 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

 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**.

Numeric (All)	-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.
Display All Elements OFF ON	- 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.
Display Frame	-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.

List Items	
💠 List Item No.	
	- 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
Function	the right column of the harmonic order data of the dual harmonics list.
	– Set the measurement function (U, I, P, S, Q, λ, Φ, ΦU, ΦΙ, Ζ, Rs, Xs, Rp, Xp).
Element/ Σ	
Element 1	-Set the element and wiring unit (Element 1 to Element 6, ΣA to ΣC).
Display Frame	-Turns the display frame on and off
OFF ON	· · · · · · · · · · · · · · · · · · ·

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.

- 3. Press ESC to clear the menu.
- 4. 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



5. Press the function select key that corresponds to the measurement function that you want to display.

Function select keys: U/I/P key and $S/Q/\lambda/\Phi$ key (The WP/q/TIME key, FU/FI/ŋ key, and U/I MODE key are disabled.)

- 6. 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

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.

Custom Items		
⊲ Load Items	-Loads a display configuration file	You can load files for the custom display. Display configuration files: .txt files Background files: .bmp files
⊲ Load Bmp —	-Loads a background file	You can use the "Edit Items" menu described below to change the display configuration that you have loaded.
⊲ Load Items & Bmp	- Loads display configuration and background files at the same time ▶ page 6-14	 To load both a display configuration file and background file at the same time, load the display configuration file.
⊲ Edit Items —	-Configure the display configuration.	
Display Frame	-Turns the display frame on and off	

Setting the Display Configuration (Edit Items)

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

Edit Items	
Total Items	-Set the total number of items (1 to 192)
4	
Items Per Page — 4	 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.
⊲ Custom Items —	 For details on how to switch pages, see section 6.2. Customize display items.
⊲ Save Custom Items	-Saves the display configuration file

Customizing Display Items (Custom Items)

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



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).

Saving Display Configuration Files (Save Custom Items)

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

Save Items	
⊲ File List –	-Set the save destination. ► section 17.2
Auto Naming 	-Set auto naming. ► section 17.2
¤ File Name –	-Set the file name. ► section 17.2
Save Exec –	- Saves the display configuration Note that if a file with the same name exists in the destination folder, it will be overwritten without warning.
	File names are not case-sensitive.

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.





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.

Setting User-Defined Functions 7.1

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 exp	ressi	on.					
Turns the computation on and off		Set the computation name Set the unit (up to 8 characters), (up to 8 chara		unit characters).			
					Ì.	User Defined	
		User Defined I	Function Settings			Liser Defined	
Function 1	OFF	ON Name	Avg-W	Unit (W	F01-F05	Displays the setup screen for
Expression		WH	(E1)/(T1(E1)/3600))			user-defined functions F1 to F5
Function 2	OFF	ON Name	P-loss	Unit (W	User Defined	Displays the setup screen for
Expression			P(E1)-P(E2)			100110	user-defined functions F6 to F10
Function 3	OFF	0N Name	U-ripple	Unit (%	User Defined	Displays the actus corean for
Expression		(UPPK(E1)	-UMPK(E1))/2/UDC(I	E1)*100		F11-F15	user-defined functions F11 to F15
Function 4	OFF	ON Name	I-ripple	Unit (%		
Expression		(IPPK(E1)	-IMPK(E1))/2/IDC(E	1)*100		F16-F20	 Displays the setup screen for
Function 5	OFF	ON Name	D-UrmsR	Unit	V		user-defined functions F16 to F20
Expression			DELTAU1RMS(E7)			Max Hold	-Turns may hold on and off
F01-F05		F06-F10	F11-F15		16-F20		
					1		

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 Set the event name occur or out of (up to 8 characters). (up to 6	character string that is displayed when events r do not occur characters).
Edit Items User Defined Event Event No. 5 OFF DN Event Name Ev5 TRUE True FALSE Fa Expression Range Condition Element/2 Order Range Urms Element 1 Total OFF 0.00 OFF 0.000 0FF 0.000	Select the judgment condition setup method (Range, Condition). Using numeric data to perform judgment (Range) • Set the measurement function (for
Event Name Expression ✓ Ev1 URMS(E1)<100.00E+00 AND URMS(E1)>80.000E+00 ○ Ev2 No Expression ○ Ev3 No Expression ○ Ev4 No Expression ✓ Ev5 NOT(EV1() AND EV2() OR EV3()) ○ Ev6 No Expression ○ Ev7 No Expression ○ Ev7 No Expression ○ Ev8 No Expression	 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, <, <=, =, >, >=, !=).
When you turn an event on, the corresponding check box is selected.	 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.

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.

Measure	
✓ User Defined Function	
User Defined	
Formula	
S Formula	
Urms×irms	Set the apparent power equation (Urms∗Irms, Umean∗Imean, Udc∗Idc, Umean∗Irms, Urmean∗Irmean).
S,Q Formula	
Type 1	Set the apparent power and reactive power equation types (Type 1, Type 2, Type 3).
Pc Formula -	Set the corrected power equation.
Phase 1	
180 degrees	
Sync Measure	
Master Slave	

Setting the Corrected Power Equation (Pc Formula)

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

Pc Formula	
Select standard	−Set the applicable standard (IEC76-1(1976), IEC76-1(1993)).
P1= 0.5000 P2= 0.5000	-Set the coefficients (0.0001 to 9.9999). When Select standard is IEC76-1(1976), set coefficients P1 and P2

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.



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.



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	Select whether this is the master unit or a slave unit (Master, Slave)
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 IN	-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.
Start	- The input elements that independent integration will be performed on are displayed.
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]
S	Element 1 Element 2 Element 3	V V	Element 4 Element 5 Element 6	}	Select the check boxes for the input elements that you want independent
	All ON		All OFF	ns all s	selected input elements

Selects all 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.

(Integ Set	
Mode	Sat the integration mode (Normal Continuous P Normal P Continuous)
R-Normal	- Set the integration mode (Normal, Continuous, K-Normal, K-Continuous).
lnteg 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 OFF ON	-Turns integration auto calibration on and off
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

	Integ Timer	
Integ Timer		Set the integration timer (00000 hours : 00 minutes : 00 seconds to 10000 hours : 00 minutes : 00 seconds).*
When Ind	ependent	
Integratio	n Is On	
	Integ Timer	
Setting	Fach All	Select the integration timer's setup method (Each, All).
Element 1	00000: 00: 00	When you select Each, you can set the integration timer for each input element.
Element 2	00000 : 00 : 00	
Element 3	00000 : 00 : 00	
Element 4	00000 : 00 : 00	
Element 5	00000 : 00 : 00	* When Mode is set to Normal and the integration timer is 00000 : 00 : 00 this instrument is in manual integration mode.
Element 6		

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 Inde	pendent Integration Is Off Real-time Control	
Start 2 End 2 Start 2	011 / 01 / 01 00: 00: 00 Now 011 / 01 / 01 01: 00: 00 Copy }	Set the scheduled start and stop times (Year/month/day, 00 hours : 00 minutes : 00 seconds to 23 hours : 59 minutes : 59 seconds).
Scheo Sets th the cur	luled integration start time e scheduled integration start time to rent time	
Copies schedu	the scheduled integration start time to the led integration stop time	
When Inde	pendent Integration Is On Real-time Control	
Setting	Each All	Select the schedule setup method
Element 1	Start 2011 / 01 / 01 00 : 00 : 00 Now)	(Each, All).
	End 2011 / 01 / 01 01 : 00 Copy	When you select Each, you can set the schedule for each input element
Element 2	Start 2011 / 01 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 : 00 : 00 Copy	
Element 6	Start 2011 / 01 / 01 00 : 00 : 00 Now	
	End 2011 / 01 / 01 : 00 : 00 Copy	

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.

	q Mo	de		
Setting	Each	All		
Element 1	rms mean	dc	r-mean	ac
Element 2	rms mean	dc	r-mean	ac
Element 3	rms mean	dc	r-mean	ac
Element 4	rms mean	dc	r-mean	ac
Element 5	rms mean	dc	r-mean	ac
Element 6	rms mean	dc	r-mean	ac

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.

D/A Output Rated Time	
Rated Time 00001 : 00 : 00 -	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.

Integ	J	
Independent Control		
OFF ON		
Element Object	Starts integration	
D23D96	This instrument starts integration using the integration mode that you have specified (see	
Start –	 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 INTEC key blicks. 	
Stop –	The integration operation is ready; "Integ: Ready" is displayed.*	
	Stops integration	
Reset –	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	
⊲	Trom the point where you stopped integration.	
integ Set	Integration has stopped automatically because the integration timer has expired; "Integ:	
	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	
5digits	
Freq Display at Frequency Low	
0 Error Motor Display at	
Pulse Freq Low	
Decimal Point	
for CSV File	
Integration Resume Action	
Start Stop Error	 Set the Integration Resume Action at Power Failure Recovery (Start, Stop, Error).
Menu Font Size	
Small Large	
Rounding to Zero	
OFF ON	

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.

	Wave Form	
	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 <u>the specified data update interval</u>). ²
√	Trigger Settings	-Configure trigger settings. ³
	Display Settings	-Configure the advanced waveform display settings.
	Wave Mapping —	-Set waveform mapping.
		 In addition to using this Format soft key, you can repeatedly press WAVE to change the order and the number of divisions. For information on how to set the data update interval, see section 1.15. 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.



Configuring Advanced Waveform Display Settings (Display Settings)

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



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.

Wave Mapping				
Mode	Auto	Fixed	User)—	Select the waveform mapping mode (Auto, Fixed, User).
U1	0	11	٦	
U2	1	12	1	
U3	2	13	2	
U4	3	14	3	Set the mapping destination (the divided screen number: 0 to 5).
U5	4	15	4	Map each waveform (U1, I1, etc.) to the part of the divided screen that you want it
U6	5	16	5	 These settings are displayed when Mode is set to User.
Spd/Aux	x1 0	Trq/Aux2	0]	• Spd/Aux1 and Trq/Aux2 can be set on models with the /MTR or /AUX options.

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 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
⊠ U1	x 1	0.000%		
⊠ 1	x 1	0.000%	All OFF	Turns the display of all waveforms off
₫ U2	x 1	0.000%		
₫ 12	x 1	0.000%		
⊘ U3	x 1	0.000%		
⊠ 3	x 1	0.000%		
⊘ U4	x 1	0.000%		
I 4	x 1	0.000%		
I U5	x 1	0.000%		
I 5	x 1	0.000%		
🗹 U6	x 1	0.000%		
I 6	x 1	0.000%		
Speed 2 Speed and Torque are displayed on				
				1

Aux1 and Aux2 are displayed on $Aux2 \int Mux1$ and Aux2 are displayed on $Aux2 \int Mux2$
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.

Others	Select Trend.
Bar	
Vector	
Numeric + *** Wave + *** Trend + ***	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.

	Trend Form	
	Format	Set the number of divisions on the trend screen (Single, Dual, Triad, Quad).
	z Dual	······································
φ	Time/div	- Set the time axis (3s, 6s, 10s, 30s, 1min, 3min, 6min, 10min, 30min, 1hour,
	10ms	3hour, 6hour, 12hour, 1day).
(Clear Trend Exec	-Restarts the trend
4	Display Settings	-Configure the advanced trend display settings.

Configuring Advanced Trend Display Settings (Display Settings) Press the Display Settings soft key to display the following menu.

Trend Form	
Formart	
Fz Dual	
🗘 Trend TZdiv 🏻 🗎	
3s/div	
Clear Trend Exec	
Disp Settings	
Interpolate	-Set the display interpolation (…, ^,).
·••• 🔼	
Graticule	
	– Set the grid (##, ,).
Scale Value	Turne the diapley of eacle values on and off
OFF ON	- Turns the display of scale values on and on
Wave Label	Turns the display of trans labels on and off
OFF ON	- runns the display of trend labers on and on
Note	
Changes that	at you make to the trend display settings on the Display

advanced waveform display settings (see section 9.1).

Settings menu are also reflected in the

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).

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

Trend Items						
Display	Function	Element/Z	Order	Scaling	Upper Scale	Lower Scale
⊘ T1	Urms	Element 1	-	Manual	100.0	-100.0
⊘ T2	Irms	Element 1	-	Auto	-	-
⊘ T3	Р	Element 1	-	Auto	-	-
⊘ T4	S	Element 1	-	Auto	-	-
⊘ T5	Q	Element 1	-	Auto	-	-
⊘ T6	λ	Element 1	-	Auto	-	-
⊘ T7	φ	Element 1	-	Auto	-	-
⊘ T8	FreqU	Element 1	-	Auto	-	-
⊖T9	Urms	Element 1	-	Auto	-	-
□T10	Urms	Element 1	-	Auto	-	-
OT11	Urms	Element 1	-	Auto	-	-
□T12	Urms	Element 1	-	Auto	-	-
□T13	Urms	Element 1	-	Auto	-	-
OT14	Urms	Element 1	-	Auto	-	-
□T15	Urms	Element 1	-	Auto	-	-
□T16	Urms	Element 1	-	Auto	-	-

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.

(Others)	
Trend	
Bar —	-Select Bar.
Vector	
Numeric + ***	
Wave + ****	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
Trend + ***	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.

Bar Form Format	-Set the number of divisions on the bar graph screen (Single, Dual, Triad).
Start Order Il End Order I00	 Set the bar graph display range. The display's start harmonic order (0 to 490) The display's end harmonic order (10 to 500)
·	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

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.	Select the har graph number that you want to set $(1, 2, 3)$
11	
Function	Set the measurement function (II I P S $\Omega \lambda \Phi \Phi$ DI Φ I 7 Rs Xs Rn Xn)
Element	-Set the element (Element 1 to Element6)
Element 1	
Scale Mode	Soloct the vertical scale's setup method (Fixed Manual)
Fixed Manual	-Select the ventical scale's setup method (rixed, Manual).
Vertical Scale	Sot the vertical scale type (Linear Log)
Linear Log	This soft key is displayed when you set Scale Mode to Manual.
🔶 Upper Scale	Set the upper limit (0 to 0 000 T)
100.0	This soft key is displayed when you set Scale Mode to Manual.
X Axis Position	Sat the X axis position (Pottom Contor)
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.

Others	
Trend	
Bar	
Vector —	-Select Vector.
Numeric + ***	
Wave + ***	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
Trend + ***	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.

Vector Form Format	-Set the number of divisions on the vector screen (Single, Dual).
Numeric	-Turns the numeric data display on and off
OFF ON	

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.

۷	ector Items	
¢	ltem No.	Select the vector number that you want to set (1, 2).
	11	
	Object _	–Set the element and wiring unit (Element 1 to Element 6, ΣΑ to ΣC).
<u>^</u>		
♥	1.000 I Mag 1.000	 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.

Others	
Trend	
Bar	The split screen that you configure last is
	displayed.
Vector	
	Set the top half of the screen to the Numeric display,
Numeric + _	and set the display that you want to show in the bottom half of the screen (Wave, Trend, Bar,* Vector*).
Wave	
Wave +	Set the top half of the screen to the Wave display,
***	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 split 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.

-
- Turns the cursor display on and off
Set the waveform to measure with auroar $4 (\pm) (114 + 14 + 12 + 12 + 14 + 14 + 15 + 16 + 16)$
Speed, ¹ Torque, ¹ Aux1, ² Aux2 ²).
Set the waveform to measure with cursor 2 (\times) (01, 11, 02, 12, 03, 13, 04, 14, 05, 15, 06, 16, Speed, ¹ Torque, ¹ Aux1, ² Aux2 ²).
- Set the cursor movement path (Max, Min, Mid).
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)
-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	-Turns the cursor display on and off
OFF ON	
C1 + Trace	-Set the trend to measure with cursor 1 (+) (T1 to T16)
T1	
C2× Trace	-Set the trend to measure with cursor $2(x)$ (T1 to T16)
T2	
▲ C1 + Pocition	
$\begin{array}{c} 100\\ \hline 00\\ \hline 02\times Position\\ \hline 900 \end{array}$	-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)
Linkage	-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.

Bar Cursor	
Cursor	-Turns the cursor display on and off
OFF ON	· · · · · · · · · · · · · · · · · · ·
C1 + Order	
💠 C2× Order –	- Set the harmonic order of the bar graph to measure with cursor 1 (+) and cursor 2 (×)
15	(0 to 500).
Linkage	-Turns linked cursor movement on and off
OFF ON	

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.

Others	
Trend	
Bar	
Vector	
Numeric + ***	
Wave + ***	
Trend + ***	
High Speed Data Capturing	-Se

" – Select High Speed Data Capturing.

HS Settings Menu

Press FORM to display the following menu.

HS Settings	
Capt. Count	Set the number of data captures (Infinite, 1 to 9999).
🛡 Optimize Count —	Confirm and optimize the maximum capturing count.*
	Configure capture control settings.
Settings	Select whether to save to a file*
Record to File	OFF: When high speed data capturing is performed, you can use communication commands to output the captured data.
OFF ON	• ON: "File State: Ready" appears in the upper left of the screen. When high speed data
⊲ File Settings —	capturing is performed, the captured data is recorded (saved) under the save conditions set in section 15.2.
110 00001100	Set the save conditions. ► section 15.2
Start —	-Starts high speed data capturing ► section 15.4
Stop —	-Stops high speed data capturing ▶section 15.4
	* You cannot configure the settings in "Confirming and Optimizing the Maximum Capturing Count" when Record to File is set to OFF.

Confirming and Optimizing the Maximum Capturing Count (Optimize Count)

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

 Optimize Count
 Set the number of data captures.

 Maximum Capturing Count
 506811
 Set

- 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)



Configuring the Voltage and Current Measurement Modes

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

	OVE Mediadring Mode	
Setting	Fach All	Select the measurement mode setup method (Each,
U1	mean dc r-mean	All). When you select Each, you can set the measurement
11	mean dc r-mean	mode separately for the current and voltage of each input
U2	mean dc r-mean	element.
12	mean dc r-mean	
U3	mean dc r-mean	
13	mean dc r-mean	Set the manufacturement mode (rms, mean, do, r, mean)
U4	mean dc r-mean	– Set the measurement mode (rms, mean, uc, r-mean).
14	mean dc r-mean	
U5	mean dc r-mean	
15	mean dc r-mean	
U6	mean dc r-mean	
16	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	
∿ U/I	
Measuring Mode	
LID Eller	
OFF ON	
O Cutoff	
Ingger Settings	
Mode	Set the trigger mode (Auto Normal OFF)
Auto	
Source	
	Set the trigger source (U1, I1, U2, I2, U3, I3, U4, I4, U5, I5, U6, I6, Ext Clk).
<u>U1</u>	
Slope	
	– Set the trigger slope (_, , , , ,}).
F1 F F1	
Level	$\mathbf{O}_{\mathbf{r}}(\mathbf{r}) = \mathbf{I}_{\mathbf{r}}(\mathbf{r}) + \mathbf{I}$
0.0%	-Set the trigger level (0.0% to $\pm 100.0\%$).
• Level	–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.

File Settings ⊲ File List —	–Set the save destination and perform manual CSV conversion.
Auto CSV Conversion OFF ON	Select whether to perform automatic CSV conversion when high speed data capturing stops.
ltem Settings	-Set the numeric data items to save.
Auto Naming	-Set auto naming. ► section 17.2
File Name –	-Set the file name. ► section 17.2.
Comment –	Set a comment. ► section 17.2

Setting the Save Destination and Performing Manual CSV Conversion

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



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.



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 	-Set the number of columns (4, 6).
◆ Column No. [1]	-Set the column number (1 to 6).
Element/S 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	-Turns the display frame on and off
OFF ON	

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

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

Page 2 Example

	Voltage Current	Element 1 100Vrms 1Arms	Element 2 1000Vrms 5Arms	Element 3 1000Vrms 5Arms	Element 4 1000Vrms 50Arms	
U MaxU MinU	[V]	98.93 98.93 91.97	0.0000 k 0.0000 k 0.0000 k	0.0000 k 0.0000 k 0.0000 k	0.0000 k 0.0000 k 0.0000 k	23
l Maxl Minl	[A]	0.6907 0.7913 0.6591	0.0000 0.0000 0.0000	0.0000 0.0000 0.0000	0.000 0.000 0.000	4
P MaxP MinP	[₩]	68.23 75.82 62.35	-0.0000 k 0.0000 k -0.0000 k	0.0000 k 0.0000 k -0.0000 k	-0.000 k 0.000 k -0.000 k	

Page 3 Example

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

	Voltage Current	Element 1 100Vrms 1Arms	Element 2 Element 3 1000Vrms 1000Vrms 5Arms 5Arms	E lement 4 1000Vrms 50Arms 1	
U	[V]]	98.93	0.0000 k 0.0000 k	k 0.0000 k 2	
1	[A]	0.6907	0.0000 0.0000	0.000 4	
Р	[W]	68.23	-0.0000 k 0.0000 k	k -0.000 k	
Speed	[rpm]	0F	Speed Torque and		
Torque	? [Nm]	0F	Pm are displayed on models with the /MTR	AUX1 (kw/m2) -0.000 Aux1 and Aux2 are > displayed on mode with the /AUX optic	ls on.
Pm	[₩]	0F			

Page 4 Example

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

	Voltage Current	Element 1 100Vrms 1Arms	Element 2 1000Vrms 5Arms	Element 3 1000Vrms 5Arms	Elemen 1000Vri 50Ari	t 4 A	
U MaxU MinU	[V]	98.93 98.93 91.97	0.0000 k 0.0000 k 0.0000 k	0.0000 k 0.0000 k 0.0000 k	0.00)00 k 2)00 k 3)00 k	
l Maxl Minl	[A]	0.6907 0.7913 0.6591	0.0000 0.0000 0.0000	0.0000 0.0000 0.0000	0.0 0.0 0.0)00)00)00	
P MaxP MinP	[₩]	68.23 75.82 62.35	-0.0000 k 0.0000 k -0.0000 k	0.0000 k 0.0000 k -0.0000 k	-0.0 0.0 -0.0)00 k)00 k)00 k	
Speed MaxSpd MinSpd	[rpm]	0 F 0 F 0 F		ue and	Aux1 MaxAux1	[k\/m2]	-0.
Torque MaxTrq MinTrq	[Nm]	0 F 0 F 0 F	Pm are displ models with option.	ayed on the /MTR	MinAux1 Aux2 MaxAux2	[k\/m2]	-0. 0.
Pm MaxPm MinPm	[₩]	0 F 0 F 0 F			MinAux2		-0.

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

<u>)00</u>)00

000

00

)01)00

ELEMENT Key

3. Press ESC to clear the menu.

Displayed in the upper left of the numeric data display screen

Element 1 Voltage 1000Vrms Current 50Arms

Voltage measurement range and measurement mode Current measurement range and measurement mode

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.

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.

HS Settings Capt. Count Infinite Optimize Count Control Settings	
Record to File	
OFF IN ☐ File Settings Start —	 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.
Stop –	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

Control Settings	
Store Mode	- Set Store Mode to Manual.
◆ Store Count 100 – © Optimize Count –	- Set the storage count (Infinite, 1 to 9999999). - Confirms and optimizes the maximum storage count
■Interval	-Set the storage interval.
Store at Start	-Select whether to store numeric data when storage starts.
OFF ON	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.

Optimize Count

Sets the storage count 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.



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

Scheduled Times for Real-Time Storage Mode

Control Settings	
Store Mode	- Set Store Mode to Real Time
Real Time	
Store Count	-Set the storage count (Infinite, 1 to 9999999).
🔍 Optimize Count —	-Confirms and optimizes the maximum storage count previous page
lnterval	-Set the storage interval IN previous page
Real-time	Cat the ackedulad times for real time stars
Control	- Set the scheduled times for real-time storage.
Store at Start	
	-Select whether to store numeric data when storage starts.

Setting Scheduled Times for Real-Time Storage

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

et the scheduled start and stop times (ear/month/day, 00 hours : 00 minutes : 00 econds to 23 hours : 59 minutes : 59 seconds).
et ti (ear eco

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



Event-Synchronized Storage Mode

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

Single-Shot Storage Mode

Store Mode Set Store Mode to Single Shot. Image Shot Set Store Count Image Shot Set the storage count (Infinite, 1 to 99999999). Image Count Confirms and optimizes the maximum storage count ▶ page16-1	Control Settings	
Set Store Mode to Single Shot. Store Count Coptimize Count Confirms and optimizes the maximum storage count ▶ page16-1	Store Mode	Pat Stava Mada ta Singla Shat
Store Count ■ 100 ■ 0ptimize Count – Set the storage count (Infinite, 1 to 99999999). ■ 0ptimize Count – Confirms and optimizes the maximum storage count ► page16-1	Single Shot	- Set Store mode to Single Shot.
Confirms and optimizes the maximum storage count ► page16-1	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



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.

			ems	c data it	e numeri	ts all the	Selec	
າຣ	data iten	numeric	f all the i	lection o	s the sel	Clear		
m	c data ite	numeri	e preset	elects tr	5			
_				ettings	Item S			
۱				Preset2	Preset1	All OFF	All ON	Preset
Ш		Element6	Element5	Element4	Element3	Element2	✓ Element1	Element
Ш			Í		Σ C	🗆 Σ Β	Π Σ Α	
	🗆 CfU	✓ FreqU	🗆 Uac 👘	🗆 Urmn	🗆 Udc	🗆 Umn	🗹 Urms	Function
Ш	🗆 Cfi	✓ Freql	🗆 lac	🗆 Irmn	🗆 kic	🗆 lmn	🗹 Irms	
		🗆 Pc	v 🖗	🗹 λ	√ Q	√ \$	√ P	
		🗆 P-peak	P+peak	🔲 I-peak	🗆 H+peak	🗆 U-peak	🗆 U+peak	
		🗌 q-	- q+	🗆 q	🗏 WP-	🗆 WP+	U WP	
					🗆 WQ	🗆 WS	🗆 Time	
				74	73	12	71	
	🗆 F7	🗆 F6	🗆 F5	🗆 F4	🗆 F3	🗆 F2	🗆 F1	
U	🗆 F14	🗆 F13	🗆 F12	🗆 F11	🗆 F10	🗆 F9	🗆 F8	
ſĪ		🗆 F20	🗆 F19	🗆 F18	🗆 F17	🗆 F16	🗆 F15	
				Event4	Event3	Event2	Event1	
Ш				Event8	Event7	Event6	Event5	
						FreqPLL2	FreqPLL1	
	🗆 Ø(k)	🗆 λ(k)	🗆 Q(k)	🗆 S(k)	🗆 P(k)	🗆 l(k)	🗆 U(k)	
	🗆 Xp(k)	🗆 Rp(k) 👘	🗆 Xs(k)	🗆 Rs(k)	🗆 Z(k)	🗆 🕬(k)	🗆 🕸 U(k)	
		🗆 Phdf(k) 🗌	🗆 Ihdf(k) 👘	🗆 Uhdf(k)	📄 Pthd	🗆 ithd	🗆 Uthd	
	C K-factor	🗆 hcf	🗆 hvf	🗆 ltif	🔲 Utif	🗆 lthf	🗆 Uthf	
			🗆 ØUk-lk	🗆 🕸 j-lj	🗆 ¢Ui-li	🗆 Øli-Uk	🗆 ¢Ui-Uj	
			<u> </u>	ΔυΣ	☐ <u>1</u> U3	☐ <u>1</u> U2	<u>□ <u>4</u>01</u>	
				ο ΔρΣ	□ <u>/</u> P3	☐ 4P2	□ <u>4</u> P1	
	🗆 Eal	🗆 EaU	🗆 Pm	🗆 Slip	SyncSp	Torque	Speed	

Select the check boxes for the numeric items that you want to store.

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.

File Settings	
⊲ File List —	-Set the save destination and perform manual CSV conversion.
Auto CSV Conversion OFF ON	-Select whether to perform automatic CSV conversion when storage stops.
Auto Naming	-Set auto naming. ► section 17.2
➡ File Name	-Set the file name. ► section 17.2
Comment	-Set a comment. ► section 17.2

Setting the Save Destination and Performing Manual CSV Conversion

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

		File List	File Settings	
Path = USB- Space : 451N Sort To Filter *.WT Change Driv Delete Rename Make Dir Copy Move	//Data B (473,321,472Bytes) File Name RAM-0 Network USB-0 Data 0000.WTS 0000.WTS 0003.WTS	Set the save destination.* When storage starts (see section 16.4), name at the specified save destination. * You cannot specify a network drive a 300 2010/10/22 16:34:48 r/w 300 2010/10/22 16:34:48 r/w 5.86K 2010/10/22 16:40:20 r/w 11.7K 2010/10/22 16:42:40 r/w	storage data is save s the save destination OFF ON Auto Naming Numbering File Name	ed to the specified file
Pleas Exe Sele then file i	cutes the manua ct the storage da press the CSV (n ASCII format.	al CSV conversion ata file (.WTS file) that was saved, and Convert soft key to create a storage data	CSV Convert	

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.



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 Parameters (Save Setup)" in the features guide

Save Setup Menu

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

Save Setup	
⊲ File List —	-Set the save destination.
Auto Naming	-Set the auto naming method (OFF, Numbering, Date).
■ File Name _	- Set the file name. You can set the file name that is used when Auto Naming is set to OFF. This is also used as
Comment _	the common file name when Auto Naming is set to Numbering. - Set a comment.
Save Exec -	-Saves the data

Setting the Save Destination (File List)

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

		File List]
Path = USB-0 Space : 474MB Sort To Filter *.* Change Drive Delete Rename Make Dir Copy Move	(496,926,720Bytes) File Name RAM-0 Network USB-0 Z0100928 CustomNumeric 0000.PNG 0001.PNG 0001.PNG 0002.PNG		Num Of Files : 6 Date 2010/08/29 20:10:40 2010/09/09 11:39:50 2010/09/28 08:22:14 2010/09/28 08:22:14 2010/09/28 08:22:14 2010/09/28 08:22:14 2010/09/28 08:22:14 2010/09/28 08:26:18 2010/09/28 08:26:41	Attr	The destination storage medium (drive) or folder Use the cursor keys (▲ ▼) to move t cursor, and press SET to select the destination.

└ Operation menu

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_1215	30_0 (2010/09/30 12:15:30)
Y M D H Mi	n 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.

Save Wave	
⊲ File List —	-Set the save destination. ► section 17.2
Auto Naming — Numbering	-Set auto naming. ► section 17.2
🔍 File Name 🗕	-Set the file name. ► section 17.2
©⊲ Comment –	-Set a comment. ► section 17.2
Save Exec -	-Saves the data

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

 $\label{eq:FILE} \mbox{Press FILE} \mbox{ and then the } \mbox{Save Numeric soft key to display the following menu.}$

Save Numeric	
⊲ File List —	-Set the save destination. ► section 17.2
⊲ ltem Settings	-Set the numeric data items to save.
Auto Naming	Cotouts noming b costion 47.0
Numbering	-Set auto naming. F section 17.2
🗟 File Name _	-Set the file name. ► section 17.2
Comment –	-Set a comment. ► section 17.2
Save Exec -	-Saves the data

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							
			Clea	ars the se	lection o	of all the	numeric	data items
				S	elects th	ne prese	t numeri	c data item
_				ltem S	ettings			
_						•		
	Preset	All ON	All OFF	Preset1	Preset2			
	Element	✓ Element1	Element	2 🗆 Element3	Element4	Element5	Element6	
		DΣA	ΞΣΒ	ΩΣC				
L	Function	🗹 Urms	🗆 Umn	🗆 Udc	🗆 Urmn	🗆 Uac	✓ FreqU	🗆 CfU
		🗹 Irms	🗆 lmn	🗆 ldc	🗆 Irmn	🗆 lac	✓ Freql	🗆 Cfi
L		√ P	v s	√ Q		V 🖗	🗆 Pc	
		🗆 U+peak	🗆 U-peak	🗆 l+peak	🗆 I-peak	P+peak	P-peak	
L		O WP	🗆 ₩P+	WP-	q	🗌 q+		
		🗆 Time		🗆 WQ				
L		<u> </u>	<u> </u>	73	<u> </u>			
L		🗆 F1	🗆 F2	🗆 F3	🗆 F4	🗆 F5	🗆 F6	🗆 F7
		🗆 F8	🗆 F9	🗆 F10	🗆 F11	🗆 F12	🗆 F13	🗆 F14
		🗆 F15	🗆 F16	🗆 F17	🗆 F18	🗆 F19	🗆 F20	
		Event1	Event2	Event3	Event4			
		Event5	Event6	Event7	Event8			
		FreqPLL1	🗆 FreqPLI	2				
		🗆 U(k)	🗆 (k)	🗆 P(k)	🗆 S(k)	🗆 Q(k)	λ(k)	□ Φ(k)
		🗆 🗘 U(k)	🗆 🕬(k)	🗆 Z(k)	🗆 Rs(k)	🗆 Xs(k)	🗆 Rp(k)	🗆 Xp(k)
		Uthd	🗆 ithd	Pthd	Uhdf(k)	🗆 Ihdf(k)	Phdf(k)	
		🗆 Uthf	🗆 lthf	🗆 Utif	🗆 ltif	🗆 hvf	🗆 hcf	K-factor
		📄 ¢Ui-Uj	🗆 Øli-lk	🗆 ¢Ui-li	🗆 🔱 j-lj	🗆 \$Uk-lk		
F		<u> </u>	0 /02	<u> </u>	ΔυΣ	<u> </u>		
		☐ <u>/P1</u>	<u> </u>	☐ <u>/</u> P3	Ο ΔΡΣ			
		Speed	🗆 Torque	😑 SyncSp	🗆 Slip	🗆 Pm	🗆 EaU	🗆 Eal
				, , , , , , , , , , , , , , , , , , , ,	,	,	,	

-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 Parameters (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)



Sorting the File List (Sort To)

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

	File List				
	Path = USB-0/Data Space : 469MB (490,332,160Bytes) Num Of Files : 12				
	()+⊞	File Name	△ Size	Date	Attr
Sorts by file name in ascending order Sorts by file name in descending order Sorts by file size in ascending order Sorts by file size in descending order Sorts by date and time in ascending order Sorts by date and time in descending order	By Name[v] By Name[v] By Size[v] By Size[v] By Date[v] By Date[v] Make Dir Copy Move	RAM-0 Network USB-0 Data 0000.CSV 0000.PNG 0001.SET 0001.SET 0002.CSV 0002.SET 0002.SET 0002.SET 0002.SET 0002.SET 0002.SET 0002.SET 0003.SET 0003.SET	3.06K 160K 59.2K 59.2K 59.2K 59.2K 59.2K 200K 163K 2.98K 163K 59.2K	2010/09/30 11:09:42 2010/09/30 11:09:42 2010/09/30 11:09:42 2010/09/30 11:09:42 2010/09/30 11:09:44 2010/09/30 11:09:46 2010/09/30 11:09:46 2010/09/30 11:09:50 2010/09/30 11:09:52 2010/09/30 11:09:54	Г/W Г/W Г/W Г/W Г/W Г/W Г/W Г/W Г/W
		(

Setting the Display Format (\equiv , \boxplus) Select \equiv or \boxplus on the operation menu to display the following screen.

List Display (≡)

	File List					
	Path = USB-0/Data					
	Space : 468MB (490,332,160Bytes) Num Of Files					
	Sort To	File Name	△ Size	Date	Attr	
Set the display format.—		⊜ RAM-0 ⊜ Network				
	Filter *.*	😁 USB-0				
		🗁 Data				
	Unange Drive	0000.CSV	3.06K	2010/09/30 11:09:42	r/w	
	Delete	% 0000.PNG	160K	2010/09/30 11:09:42	r/w	
		10000.SET	59.2K	2010/09/30 11:09:42	r/w	
	(Rename)	D001.CSV	3.06K	2010/09/30 11:09:44	r/w	
	Malia Dia	D 0001.PNG	162K	2010/09/30 11:09:44	r/w	
		D 0001.SET	59.2K	2010/09/30 11:09:46	r/w	
	Copy	0002.CSV	200K	2010/09/30 11:09:46	r/w	
		D 0002.PNG	163K	2010/09/30 11:09:48	r/w	
	Move)	0002.SET	59.2K	2010/09/30 11:09:50	r/w	
		0003.CSV	2.98K	2010/09/30 11:09:50	r/w	
		D 0003.PNG	163K	2010/09/30 11:09:52	r/w	
		D0003.SET	59.2K	2010/09/30 11:09:54	r/w	

Thumbnail Display (III)



Setting the Type of Files to List (Filter)

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

Path = USB-0/Data Space : 468MB (490,332,160Bytes) Num Of Files : 12 Sort To File Name Size Date Wetwork USB-0 USB-0 USB-0 Data 0000. CSV 3.06K 2010/09/30 11:09:42 r/w r/w 0000. SET 59.2K 2010/09/30 11:09:44 r/w 0000. SET 59.2K 2010/09/30 11:09:44 r/w 0000. SET 59.2K 2010/09/30 11:09:44 r/w 0001. SET 59.2K 2010/09/30 11:09:44 r/w 0000. SET 59.2K 2010/09/30 11:09:44 r/w 0001. SET 59.2K 2010/09/30 11:09:44 r/w 0001. SET 59.2K 2010/09/30 11:09:44 r/w 0002. CSV 200K 2010/09/30 11:09:44 r/w 0002. SV 2000K 2010/09/30 11:09:44 r/w 0002. CSV 200K 2010/09/30 11:09:44 r/w 0002. SV 200K 2010/09/30 11:09:44 r/w 0002. CSV 200K 2010/09/30 11:09:44 r/w 0002. SV 200K 2010/09/30 11:09:44 r/w 0002. CSV 200K 2010/09/30 11:09:44 r/w 0002. SV 200K 2010/09/30 11:09:44 r/w 0002. CSV 200K 2010/09/30 11:09:46 r/w 0002. SV 200K 2010/09/30 11:09:50 r/w 0002. SV 200K 2010/09/30 11:09:50 r/w 0002. SV 200K 2010/09/30 11:09:50 r/w 0003. SV 200/09/30 11:09				File List			
Space : 468MB (490,332,160Bytes) Num Of Files : 12 Sort To File Name Size Date Image: Space : 468MB (490,332,160Bytes) Num Of Files : 12 Sort To File Name Size Date Image: Space : 468MB (490,332,160Bytes) Num Of Files : 12 Sort To File Name Size Date Image: Space : 468MB (490,332,160Bytes) Num Of Files : 12 Image: Space : 468MB (490,332,160Bytes) Num Of Files : 12 Image: Space : 468MB (490,332,160Bytes) Num Of Files : 12 Image: Space : 468MB (490,332,160Bytes) Num Of Files : 12 Image: Space : 468MB (490,332,160Bytes) Num Of Files : 12 Image: Space : 468MB (490,332,160Bytes) Num Of Files : 12 Image: Space : 468MB (490,332,160Bytes) Num Of Files : 12 Image: Space : 468MB (490,332,160Bytes) Num Of Files : 12 Image: Space : 468MB (490,332,160Bytes) Num Of Files : 12 Image: Space : 468MB (490,332,160Bytes) Num Of Files : 12 Image: Space : 468MB (490,332,160Bytes) Num Of Files : 12 Image: Space : 468MB (490,332,160Bytes) Num Of Files : 12 Image: Space : 468MB (490,332,160Bytes) Num Of Files : 12 Image: Space : 468MB (490,332,160B		Path = USR-0/Data					
Sort To File Name △ Size Date Attr		Space : 468MB (Space : 468MB (490,332,160Bytes) Num Of Files : 12				
Set the type of file to list. RAM-0 Network USB-0 Data 0000. CSV 3.06K 2010/09/30 11:03:42 r/w 0000. SSV 3.06K 2010/09/30 11:03:42 r/w 0000. SSV 3.06K 2010/09/30 11:03:42 r/w 0001. CSV 3.06K 2010/09/30 11:03:44 r/w 0001. SET 59.2K 2010/09/30 11:03:46 r/w 0001. SET 59.2K 2010/09/30 11:03:46 r/w 0002. CSV 200K 2010/09/30 11:03:46 r/w 0002. SET 59.2K 2010/09/30 11:03:46 r/w 0002. SV 200K 2010/09/30 11:03:48 r/w 0002. SET 59.2K 2010/09/30 11:03:48 r/w 0002. SET 9.26K 2010/09/30 11:03:45 r/w 0003. SEV 2.98K 2010/09/30 11:03:50 r/w 0003. SEV 2.98K 2010/09/30 11:0		Sort To	File Name	△ Size	Date	Attr	
	Set the type of file to list.—	Sort To	File Name RAM-0 Network USB-0 Data 0000.CSV 0000.PNG 0001.GSV 0001.SET 0001.SET 0002.CSV 0002.CSV 0002.SET 0002.SET 0003.SET 0002.SET 0002.SET 0002.SET 0002.SET 0002.SET 0002.SET	 ▲ Size 3.06K 160K 59.2K 3.06K 162K 59.2K 200K 163K 59.2K 2.98K 163K 	2010/09/30 11:09:42 2010/09/30 11:09:42 2010/09/30 11:09:42 2010/09/30 11:09:44 2010/09/30 11:09:44 2010/09/30 11:09:46 2010/09/30 11:09:46 2010/09/30 11:09:48 2010/09/30 11:09:50 2010/09/30 11:09:50	r/w r/w r/w r/w r/w r/w r/w r/w r/w r/w	

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.

	File List				
Changes the storage medium— (drive)	Path = USB-0/Da Space : 468MB (Sort To Filter *.*	File 490,332,160Bytes) File Name RAM-0 Network USB-0 Data 0000.CSV 0000.SET 0000.SET 0001.CSV 0001.CSV 0001.CSV 0002.EXET 0002.SET 0002.SET 0002.SET 0002.SET 0002.SET 0002.SET 0002.SET 0002.SET	 △ Size 3.06K 160K 59.2K 3.06K 162K 59.2K 200K 163K 59.2K 2.98K 163K 163K 163K 163K 	Num Of Files : 1 Date 2010/09/30 11:09:42 2010/09/30 11:09:42 2010/09/30 11:09:42 2010/09/30 11:09:42 2010/09/30 11:09:44 2010/09/30 11:09:34 2010/09/30 11:09:44 2010/09/30 11:09:44 2010/09/30 11:09:43 2010/09/30 11:09:44 2010/09/30 11:09:44 2010/09/30 11:09:34 2010/09/30 11:09:44 2010/09/30 11:09:44 2010/09/30 11:09:41 2010/09/30 11:09:41 2010/09/30 11:09:41 2010/09/30 11:09:41 2010/09/30 11:09:50 2010/09/30 11:09:50 2010/09/30 11:09:50 2010/09/30 11:09:50 2010/09/30 11:09:50	2 Attr • r/w r/w r/w r/w r/w r/w r/w r/w
	Move	0002.SET 0003.CSV 0003.PNG 0003.SET	59.2K 2.98K 163K 59.2K	2010/09/30 11:09:50 2010/09/30 11:09:50 2010/09/30 11:09:52 2010/09/30 11:09:54	r/w r/w r/w r/w

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 I	nultiple 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 canno	t 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.

	File List				
	Path = USB-0/Data	Use the keyboard to enter the new folder name.			
	Space : 462MB (404 or	4 7400 utoo) [Nime Of Files + 40			
	Sort To				
	Filter *.*				
	Change Drive				
	Delete	LMN0 '":; '789/			
		Q[R]S[T] = !!?!#!\$ 4[5]6[*]			
	Rename				
Makes folders (directories) —	Make Dir				
	Сору				
	M Press ENTI	ER on the keyboard or the ENTER soft key to confirm			
	the entered	d name.			
		0003.CSV 2.98K 2010/09/30 11:09:50 r/w			
		0003.PNG 166K 2010/09/30 11:09:52 r/w			

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.

	File List				
	Path = USB-0/Data	File list	that you are copy	ying from	
	Space : 461MB (48)	2,951,168Eytes)		Num Of Files : 12	
	Sort To	ile Name	_ Size Di	ate	Attr 🔺
			File List		
	Path = USB-0/Dat	tabackup F i	ile list that you a	re copying to	
	Space : 461MB (4	183,049,472Bytes)		Num Of Files : 1	2
	Sort To	File Name	_ Size	Date	Attr
Copies the selected files and — folders (Copy) Executes the copy operation on — the selected files and folders (Copy Exec)	Change Drive Change Drive Change Drive Change Drive Change Drive Cange Drive Change Drive Change Drive Copy Exec	 RAM-0 Network USB-0 Databackup 0000.CSV 0000.PNG 0001.SET 0001.SET 0001.SET 0002.CSV 0002.CSV 0002.SET 0002.SET 0002.SET 0002.SET 0003.CSV 0003.PNG 0004.CSV 	Folder that you a 59.2K 3.06K 162K 59.2K 200K 163K 59.2 2.98K 166K 48.3K	2010/10/04 18:34:34 2010/10/04 18:34:34 2010/10/04 18:34:34 2010/10/04 18:34:34 2010/10/04 18:34:34 2010/10/04 18:34:36 2010/10/04 18:34:36 2010/10/04 18:34:36 2010/10/04 18:34:36 2010/10/04 18:34:36	r/w r/w r/w r/w r/w r/w r/w r/w r/w r/w
		0004.CSV	48.3K	2010/10/04 18:37:12	r/w

- 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.

	Confirm to execute
	Are you sure to execute?
Confirms the copying of files — and folders	OK Cancel

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.

	Confirm to execute
	Are you sure to execute?
Confirms the moving of files and — folders	OK Cancel

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.

Utility			
Operation	Cat the file exercises (Delete		
Copy	Rename, Make Dir, Copy, Move).		
Set/Reset _	- Selects files and folders or clears the selection		
All Set		Additional File	Operations Setup Menu
All Reset	Selects all files and folders or clears all the selections	More ⊲ Sort To –	– Sorts the file list (By Name, By Size, By Date)
Jump To _	Jumps to the specified file or folder	Display Type =	Set the display format (\equiv , \boxplus).
⊲ More –	Displays the additional file	Filter -	*.SET, *.CSV, *.WTS, *.HDS, *.BMP, *.PNG, *.JPG, *.TXT).
⊲ Copy Exec –	Executes the specified file operation	Change Drive 	Changes the storage medium (drive) (RAM, USB-0, USB-1, Network)

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.

lmage Save	
⊲ File List —	-Set the save destination. ► section 17.2
Format -	-Set the data format (BMP, PNG, JPEG).
Color –	-Set the color (OFF, Color, Reverse, Gray).
Auto Naming	-Set auto naming. ► section 17.2
■ File Name _	-Set the file name. ► section 17.2
Comment _	-Set a comment. ► section 17.2

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.



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).



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



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.



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.



IM WT1801E-02EN

Feeding Paper

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

Print Menu]
	\prec
Format	
Screen	
)	
,	
Auto Print	
ON	
-	
Auto Print	
octunga	
Comment	
þ	-
Paper Feed	Feeds paper
	Each time that you press this soft key, this instrumentfeeds approximately 3 cm of the roll
v	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.

	Print Menu	
	Format Screen	- Set the output format (Screen, List).
	Auto Print ON	-Turns auto printing on (executes auto printing)
4	Auto Print Settings	-Configure auto printing.
N.	Comment -	-Set a comment. ► section 17.2
	Paper Feed -	-Feeds paper ► section 19.1

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	Sat Drint Mada ta Internal
Interval	- Set Print mode to interval.
💠 Print Count	-Set the print count (Infinite, 1 to 9999).
Infinite	
<u> </u>	
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.



Scheduled Times for Real-Time Print Mode



Setting Scheduled Times for Real-Time Printing

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



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

Copies the scheduled print start time to the scheduled print stop time

Integration-Synchronized Print Mode

current time



Event-Synchronized Print Mode



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), SNTP, FTP client, Modbus/		
	TCP server, and Web server		
Connector type	RJ-45 connector		
Ethernet port RJ-45 modular jack			

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.
- 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).	
	Network	
DHCP (OFF DN	Set these when DHCP is set to OFF. -• IP address
Net Mask	255 . 255 . 255 . 255	-• Subnet mask
Gate Way	0.0.0.0	-• Default gateway
DNS Domain Name		These are displayed when DNS is set to ON or Auto. -∙ Domain name
DNS Server1 DNS Server2		 DNS server IP address (1: primary, 2: secondary)
Domain Suffix1 Domain Suffix2	}}	 Domain suffix (1: primary, 2: secondary)
TCP/IP	Bind ; ² /Web Server/Net Drive/SNTP	Applies the settings
	Set the DNS (OFF, ON, Auto). OFF: The DNS is disabled.	
	• ON The DNS is enabled. Set the	e domain name, and the DNS server's primary and

- 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.

	Network		
User Name	anonymous)	-Set the user name (up to 32 characters).
Password		}	- Set the password (up to 32 characters).
Time Out(sec)	900		- Set the timeout value (30 to 3600 s).
		Entry	Applies the settings
	/Web Server Not Drive	J. SNTP J	

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.

	Network	``````````````````````````````````````	
User Name	anonymous	}	-Set the user name (up to 32 characters).
Password		}	-Set the password (up to 32 characters).
Time Out(sec)	900		
		Entry	Applies the settings
TCP/IP	/Web_Server_/Net_Drive	八 SNTP /	

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

- 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/
 - (Type the IP address of this instrument for xxx.xxx.xxx.)
- 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_

Г

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 Mod	lel	WT1806E	
Manufacturer		Yokogawa Meters & Instruments Corporation	
Serial Number		XXXXXXXX	
Description		Precision Power Analyzer WT1800E Series	
Host Name		XXX.XXX.XXX.XXX	
MAC Address		00:00:64:XX:XX:XX	
TCP/IP Address	3	XXX.XXX.XXX.XXX	
Firmware Revis	sion	3.01	Precision
VISA resource	string	TCPIP::XXX.XXX.XXX.XXX::inst0::INSTRs	Making

Control Screen

 Click the Control tab. The following screen appears.



Links Screen

5. Click the Link tab.

The followi	The following screen appears.				
YOKOGAWA 🔶	Precision	n Power Analyzer V	VT1800E Ser	'ies	Matars & Instruments (
Home	Control L	inks -	- Cu,	pyrigin 2010 Tonogun a l	
Power Analyzers Entrance	English Japanese	Yokogawa Meters & Instru Corporation	uments	English Japanese	Precision Making

Link to Yokogawa Meters & Instruments homepage

Link to Yokogawa Meters & Instruments power analyzer homepage

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.



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.

Network	
SNTP Server	Configure the SNTP server settings
Time Out(sec) 3	when DNS is enabled). Set the timeout value (1 to 60 s)
Adjust at Power On DEE ON	Turns automatic adjustment on and off
Time Difference From GMT	······
Hour 9	Cat the time difference from Creanwich Man Time
Minute 0	(-12 hours and 0 minutes to 13 hours and 0 minutes).
Adjust	Executes time adjustment
、 TCP/IP 八FTP/Web Server八 Net Drive 八 SNTP ノ	

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.

		Sy	stem Uverv	iew			
Model :	WT1806E						
Suffix :	-5A3-50A3-H	E-D/EX6/	'B5/G6/V1/DA	/AUX/PD			
No. :	123456789	123456789 (MAC: D00054_943_005)					
Version :	3.01	(P#B:0.	05,010:0.09	,GDC:0.51,	WATT	:1.01,HRM:0.30)	
FI	<i>a</i>						
rElement Cor	ifiguration—			D .			
	Type		Calibratio	n Date	Sta	itus	
Element 1:	1000V-5A		2015/10/23	02:52:40	UK	UK	
Element 2:	1000V-5A		2015/10/23	02:52:40	OK	OK	
Element 3:	1000¥-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	
Ext Sensor Built-in P 2ch Harmon Delta Comp Add-on Fre RGB Output 20Ch DA Ou Auxiliary High Speed 6ch Sensor	Input [/E: rinter [/B ic Measure[/G utation q Measure [/V tputs [/A Capturing Power [/P]	(6]:Yes 5]:Yes 3]:Yes :Yes :Yes 1]:Yes 4]:Yes JX]:Yes :Yes)]:Yes	2015/10/23 2015/10/23	02:58:44 02:55:50	ok ok	OK OK	
Link Date : Jun 22 2016 14:22:49 Product ID: Karting							

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.

System Config	
Date/Time _	- Set the date and time ► section 3.4 in the getting started guide, IM WT1801E-03EN
⊲ Language _	- Configure the language settings.
LCD	
USB Keyboard	- Set the USB keyboard language (Japanese, English).
Japanese English	
Crest Factor	
CF3 CF6	

Configuring the Language Settings

Press the Language soft key to display the following menu.



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.

LCD	
LCD Turn OFF	-Turns off the LCD backlight (you can turn on the backlight by pressing any key)
Auto OFF	- Select whether to automatically turn off the LCD backlight.
◆ Auto OFF Time 5min	 Set the amount of time before the backlight is automatically turned off (1min to 60min).
Brightness	- Set the LCD backlight brightness (1 to 10).
Color Settings -	- Configure the display color settings.

Configuring the Display Color Settings

Press the Color Settings soft key to display the following menu.

	Color Sett	ings		
⊢Graph Color				 Sets the graph colors to the default values
De	efault	Cla	ssic	Sets the graph colors to the classic values
CH1(U1)		CH9(U5)		
CH2(I1)		CH10(I5)		
CH3(U2)		CH11(U6)		
CH4(12)		CH12(16)		Set the graph colore for CH1 to CH16
CH5(U3)		CH13(Spd)		-Set the graph colors for CHT to CHT6.
CH6(13)		CH14(Trq)		
CH7(U4)		CH15		
CH8(14)		CH16		
Grid Intensity	4			Set the grid intensity (1 to 8).
Base Color	Blue	Gray		Set the menu and setup screen background color (Blue, Gray).

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	- Set the number of digits of numeric data to display (Adigits, 5digits)
5digits	ber the number of digits of numeric data to display (+digits, odigits).
Freq Display at Frequency Low	- Sat the fraguency display value when the measured fraguency is less than the lower
0 Error	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	Set the desired point and concreter to use when data is solved in ASCII formation of CSV
Period Comma	file (Period, Comma).
Integration Regume Action	
Resulte Action _	Set the integration resume action at power failure recovery (Start, Stop, Error).
Start Stop Error	
Menu Font Size	Set the many fast size (Small Large)
Small Large	- Set the menu ront size (Sman, 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, $Element/\Sigma$, 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 $\Sigma C).$

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/2	0rder	Range Mode	Mapy	Min
1	Urms1	Urms	Element 1	-	Manual	100.0	-100.0
2	Irms1	Irms	Element 1	-	Fixed	- L	
- 3	P1	Р	Element 1	-	Fixed	-	-
4]	\$1	S	Element 1	-	Fixed	-	-
5	Q1	Q	Element 1	-	Fixed	-	-
6	λ1	λ	Element 1	-	Fixed	-	-
7	¢1	Φ	Element 1	-	Fixed	-	-
8	fU1	FreqU	Element 1	-	Fixed	-	-
9	fi1	Freql	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.

Selftest	
Test Item	
Memory	Set the item to test (Memory, Key Board).
L	
Test Exec	
Test Exec	

Executing the Memory Test

Selftest	
Test Item	Sat the item to test to Memory
Memory	- Set the item to test to memory
<u> </u>	
Test Exec -	- Executes the 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.



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)

▶ "Key Lock (KEY LOCK)" in the features guide

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.	3.61
	The system has been initialized.	
11	Cannot measure PLL frequency.	2.1
	Check input level.	
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.	21.10
	To release the lock, press the KEY LOCK (SHIFT+LOCAL) key.	
85	In remote control mode, all keys are locked except LOCAL key.	Chapters 1 to 3 ²
	Please hit LOCAL key to exit the remote control mode.	
86	In Local Lockout mode, all keys are locked.	Chapters 1 to 3 ²
	Please cancel the local lockout.	
87	Firmware was changed.	_
	The system has been initialized.	
88	Integration has started and measurement ranges of the MOTOR/AUX are switched to fixed	1.2 and 1.15
	ranges. Even if the Data Update Interval setting is Auto, Voltage/Current measurement range	
	are also switched to fixed ranges.	
89	Processing system settings change.	—
	Please wait for a moment.	
90	This model has no external current sensor.	21.1
	Check the specifications to see whether or not the optional external current sensor is	
	provided.	
91	This model has no built-in printer.	21.1
	Check the specifications to see whether or not the optional built-in printer is provided.	
92	This model has no harmonics measurement.	21.1
	Check the specifications to see whether or not the optional harmonics measurement is	
	provided.	
93	This model has neither motor evaluation function or auxiliary input.	21.1
	Check the specifications to see whether or not the optional motor evaluation function	
	and the optional auxiliary input are provided.	
97	There are measure conditions which make sigma functions unmeasurable.	1.1 and 15.1
	All or part or sigma functions will not be measured.	*1
98	External Sync interval has gone out of range.	4.4 '
	Check External Sync (MEAS START) input.	

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	17.2
001	Check the file name	11.2
602 603	No LISB device or no storage media inserted	17 1
002, 003	Check the LISB device connection, and the existance of a storage medium in the drive	17.1
604	Modia failura	17 1
004	Check the storage medium	17.1
<u>605</u>	File net found	
609	File fiol found.	—
606	Modia is protected	
000	Set the diak's (medium's) write protect switch to OFF	—
607	Set the disk s(medium's) while protect switch to OFF.	17.1
607	Check the storage medium	17.1
<u> </u>	Check the storage medium.	
608, 609	File already exists.	
610	Contains invalid characters.	17.2
611, 612	Media full.	17.6
	Delete unnecessary file(s) or use another disk.	
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,	File system failure.	_
622 to 641	Check using another disk. If the same message still appears, maintenance service is	
	required.	
621	File is damaged.	_
	Check the file.	
643 to 653	Media failure.	_
	Check the medium.	
657	File operation is interrupted.	_
658	File unknown format.	17.5 and 17.6
	Check the file format.	
662	Cannot load this bitmap file.	6.7
	Use file of 16bit Color or 24bit Color Mode with less or equal size 800x672.	
663	Cannot load this text file.	6.7
	Confirm the contents of file.	
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.	Chapter 20
	Confirm network conditions.	•
679	Printer error.	_
	Maintenance service is required.	
680	Close the printer cover.	19.1
681	Paper empty	19.1
001	l oad a roll chart	1011
682	The printer head temperature is abnormality	_
002	Printing will be aborted	
	Printing will not be possible until the printe head temperature comes normal	
683	Printer over heat	_
000	Power off immediately	
685	Printer time out	
000	Maintenance service is required	
686	Printer error	_
600	Cannot evenute for the directory donth is 10 or more	
601		
091	Carnot 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 occured.	_
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 occured.	
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.	Chapter 20
	Check the network settings and configuration.	
752	This ftp function in not supported.	
753	FTP Error: Client Handle	Chapter 20
	Confirm the network settings and connection.	
758	Failed to acquire time from SNTP server.	20.5
750	Confirm the network settings and connection.	Chapter 20
759	Falled to Initialize network.	Chapter 20
800		3.5*
800	Set the correct date and time	5.5
801		17.2
001	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.	
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.	8.3
	Reset Integration.	
814	Cannot be set or executed when NULL is on.	21.9
	Please turn NULL off.	
815	Cannot be set or executed when the Data Update Interval is Auto.	1.15
823	Cannot change during CAL.	21.8
0.07	Wall until CAL IS completed.	0.1
027	Inegal main expression.	0.1
831	Processing now	
001	Retry setting or execution again	—
841	Attempted to start integration after integration time has reached its preset value	83
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	8.3
	mode was not selected.	
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	8.2
	time was set to "0".	
848	Attempted made to start integration in real time counting integration mode when the	8.2
	end time had already passed.	
849	Attempted made to start storing in real time counting storing mode when the end time	16.1
	had already passed.	
* Getting star	ted 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 occured 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.	—
859	Cannot convert selected file	16.3
000	Select a file with an extension of WTS or HDS	10.0
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	11
865	Cannot be set while integration is running	8.3
	Stop or reset Integration.	
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.	19.2
000	Start Auto Print from the [PRINT MENU] (SHIFT+PRINT).	10.0
808	Print out destination must be set to Bulit-in Printer in order to start Auto Print.	19.2
860	Auto Print function is not supported in the surront measurement mode or settings	10.2
870	Auto Print function is not supported in the current measurement mode of settings.	10.2
070	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.	97.6
875	Master/Slave Synchronization Measurement cannot be set to Slave, while sync	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.	15.4
880	Cannot be set or executed while initialization	15.4
000	Wait until status changes to "Ready".	10.4
881	Cannot be set or executed while measurement is in progress.	15.4
882	Stopped measurement. Detection error of measuring interval signal.	4.4*
003	Cappet to set or executed in High Speed Data Capturing Mode	
884	Can not set wiring to 1P3W/3P3W/ in High Speed Data Capturing Mode	1 1
004	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 Inerval 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

Appendix 1 Messages and Corrective Actions

Code	Message	Chapter or Section
890	Cannot start the store.	16.1 or 1.15
	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.	
891	Cannot start the auto print.	19.2 or 1.15
	Change print mode from sychronize with integration by the [STORE SET] menu.	
	Otherwise, turn off Auto of the Data Update Interval by the [UPDATE RATE] menu.	
892	Cannot start the integration.	7.3, 1.2, or 1.3
	Set S and Q Formula to another expecting for Type 3 by the [MEASURE] menu, or fix measurement ranges.	

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.	

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