User's Manual

IM CW240P-E

CW240
Clamp-on Power Meter

Quick Setup Manual

YOKOGAWA
Yokogawa M&C Corporation

IM CW240P-E
1st Edition: Jul 2004 (KP)

Introduction

Thank you for purchasing our CW240 Clamp-on Power Meter.
This Quick Setup Manual briefly describes the key operations as well as setting examples of the CW240 upon actual measurement, so that you can operate the CW240 for the first time.

In addition to this manual, the User's Manual is available separately.
The User's Manual describes in detail the features and functions of the CW240 as well as safety measurements using the CW240.
Use the in-depth User's Manual together with this Quick Setup Manual.

After reading this manual, always keep it in an easily accessible convenient place for later reference. This manual will come in handy when you are unsure of how to operate the CW240.

Disk No. CW240P-E
1st Edition: Jul. 2004 (KP)

Precautions for Safe Use of the CW240

The following safety symbols are used on the CW240 and in this manual.

⚠ WARNING

Indicates a hazard that may result in the loss of life or serious injury of the user unless the described instructions is abided by.

⚠ CAUTION

Indicates a hazard that may result in an injury to the user and/or physical damage to the product or other equipment unless the described instructions is abided by.

NOTE

Indicates information that is essential for handling the instrument or should be noted in order to familiarize yourself with the instrument's operating procedure and/or functions.

TIP

Indicates information that complements the present topic.

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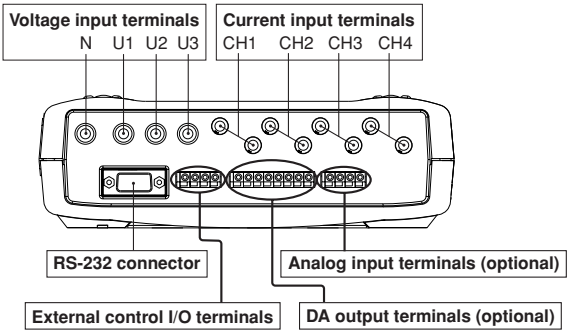
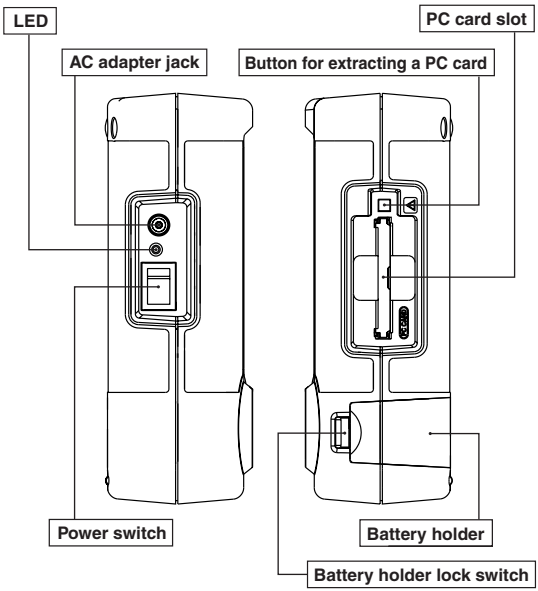
1. Part Names and How to Use Parts

1.1 Part Names and How to Use Parts



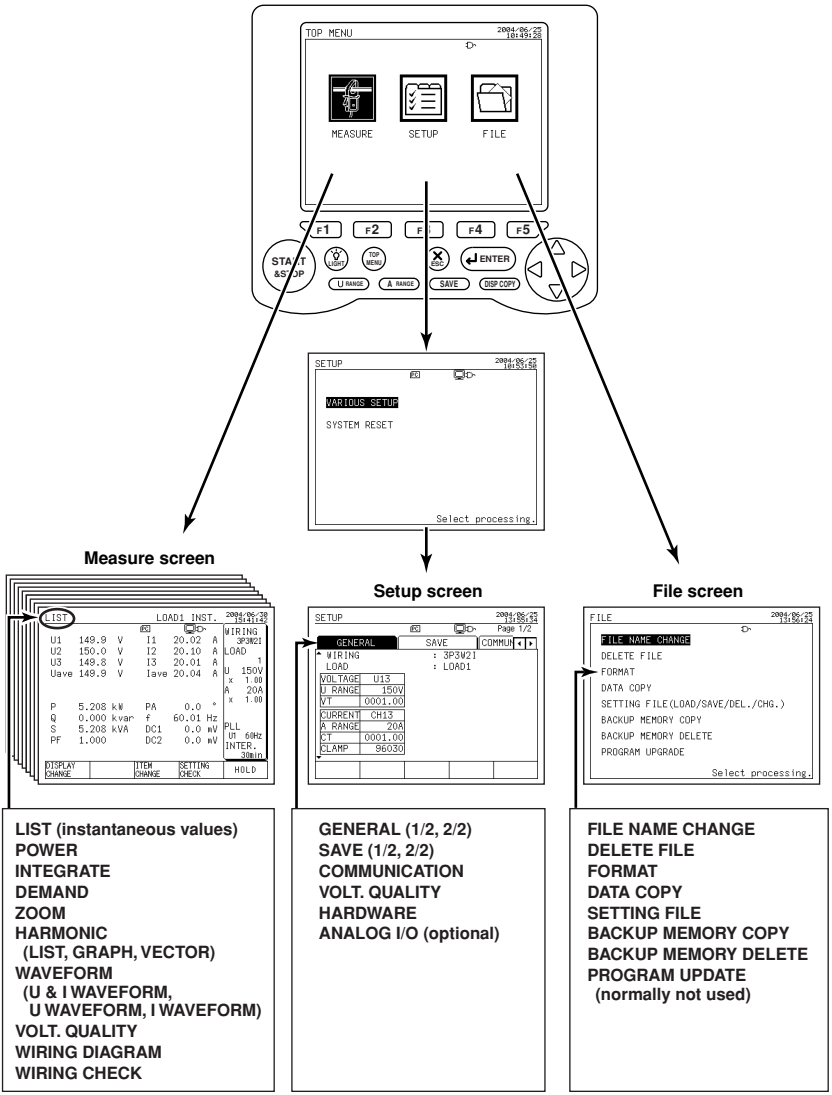


► For more details, refer to the CW240 User's Manual ◄

Chapter 2, "Part Names and How to Use Parts"

1.2 Screen Configuration

Basic Screen Configuration



LIST (instantaneous values)
POWER
INTEGRATE
DEMAND
ZOOM
HARMONIC
(LIST, GRAPH, VECTOR)
WAVEFORM
(U & I WAVEFORM, U WAVEFORM, I WAVEFORM)
VOLT. QUALITY
WIRING DIAGRAM
WIRING CHECK

GENERAL (1/2, 2/2)
SAVE (1/2, 2/2)
COMMUNICATION
VOLT. QUALITY
HARDWARE
ANALOG I/O (optional)

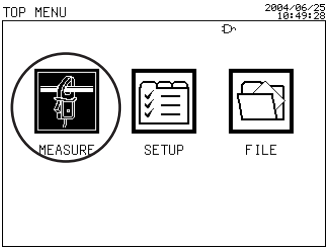
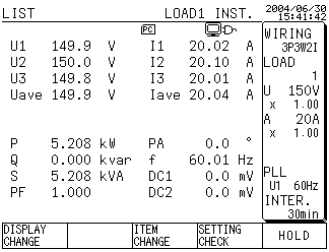
FILE NAME CHANGE
DELETE FILE
FORMAT
DATA COPY
SETTING FILE
BACKUP MEMORY COPY
BACKUP MEMORY DELETE
PROGRAM UPDATE
(normally not used)

► For more details, refer to the CW240 User's Manual ◄

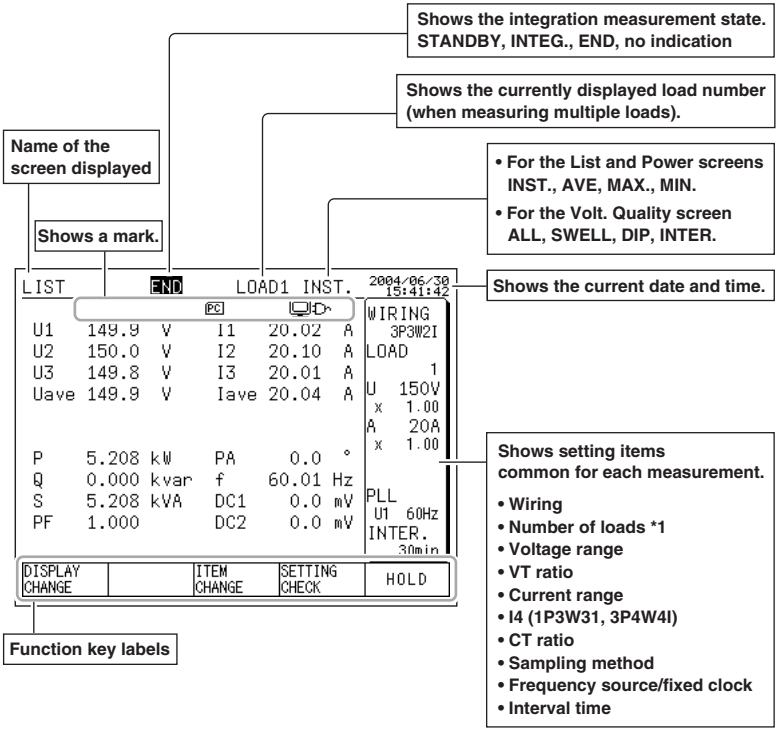
Section, "2.4 Screen Configuration"

Displaying Measure Screen

● How to Display Measure Screen

TOP MENU	**Press the TOP MENU key.** 
	Using the cursor key, select the MEASURE icon (highlighted).
ENTER	**Press the ENTER key to display the Measure screen.**  (The List screen is used as an example.)

● **Description of Display**

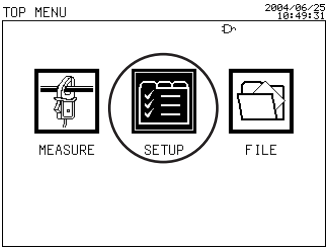
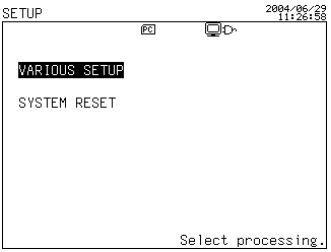
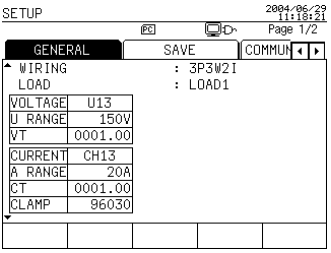


► For more details, refer to the CW240 User's Manual ◄

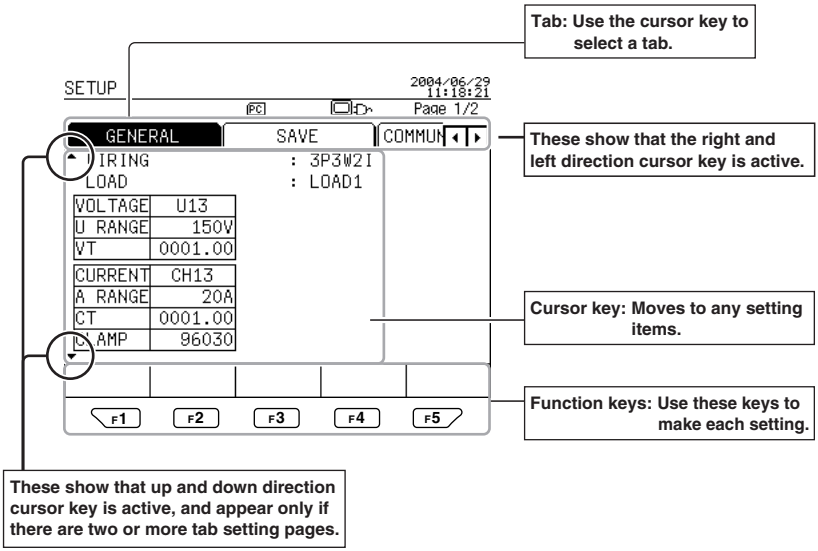
Section 7.2.2, "Description of Display"

Displaying Setup Screen

● How to Display Setup Screen

TOP MENU	**Press the TOP MENU key. The Top Menu screen appears.** 
	Using the cursor key, select the SETUP icon (highlighted).
ENTER	**Press the ENTER key to display the top Setup screen.** 
	Using the cursor key, select VARIOUS SETUP (highlighted).
ENTER	**Press the ENTER key to display the Setup screen.**  (The List screen is used as an example.)

● **Description of Display**



<Items consisting of Setup screen>

General 1/2,
General 2/2,
Save 1/2,
Save 2/2,
Communication,
Volt. Quality,
Hardware,
Analog I/O
(optional)

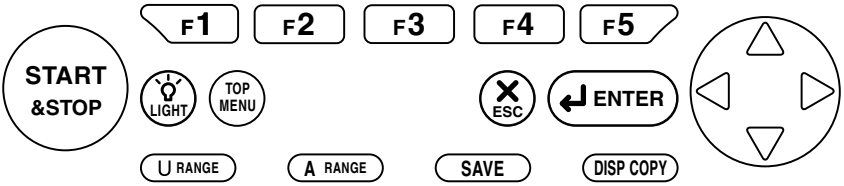
Description of Mark Indication

	Appears if a voltage overrange occurs.
	Appears if a current overrange occurs.
	Appears when integration measurement is made by external input control.
	Appears in the event of loss of PLL synchronization. This automatically selects the fixed clock.
	Appears when a reactive power meter method is used.
	Appears when display hold is enabled.
	Appears if the amount of data exceeds the capacity of a PC card or the internal memory.
	Appears when the CW240 is configured so that data is saved in a PC card. Also, this mark blinks during an access to the PC card.
	Appears when data has been saved in the backup memory.
	Appears when the CW240 is configured so that data is saved in the internal memory. Also, this mark blinks during an access to the internal memory.
	Appears if the CW240 is in a key lock state.
	Appears when the CW240 is configured so that the RS-232 connection destination is a PC. Also, this mark blinks during communication with the PC.
	Appears if the CW240 is configured so that the RS-232 connection destination is a printer. Also, this mark blinks during communication with the printer.
	Appears if the CW240 is powered through the AC adapter.
	Appears when the CW240 is powered through alkaline batteries or a NiMH battery pack. This mark indicates a battery voltage reduction (remaining capacity) in four steps.

► For more details, refer to the CW240 User's Manual ◄

Section 2.6, "Description of Mark Indication"

1.3 Operation Keys



Key Name	Functional Description
Function keys F1 to F5	These are setting keys corresponding to the information displayed in the bottom of the screen.
START & STOP key	Starts/stops integration measurements.
LIGHT key	Turns the backlight ON/OFF. When held down for more than 3 seconds, it locks or unlocks the operation keys.
TOP MENU key	Switches the display screen to the Top Menu
ESC key ENTER key	Cancels setup conditions or other data. Confirms setup conditions or other data.
Cursor key	Moves the cursor to the item you wish to select.
U RANGE key	Changes the voltage range.
A RANGE key	Changes the current range.
SAVE key	Manually save or print measured data.
DISP COPY key	Hard-copies information displayed on the screen. Copy destination setting: PC card, internal memory, or printer

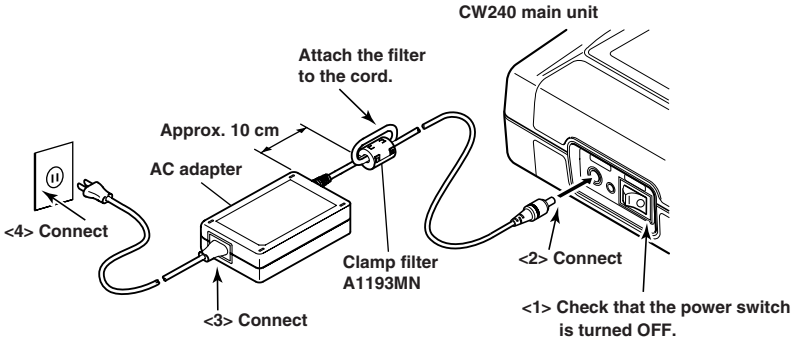
► For more details, refer to the CW240 User's Manual ◄

Section 2.2, "Operation Keys"

2. Preparation for Measurements

2.1 Connecting a Power Supply

Connect the AC adapter.



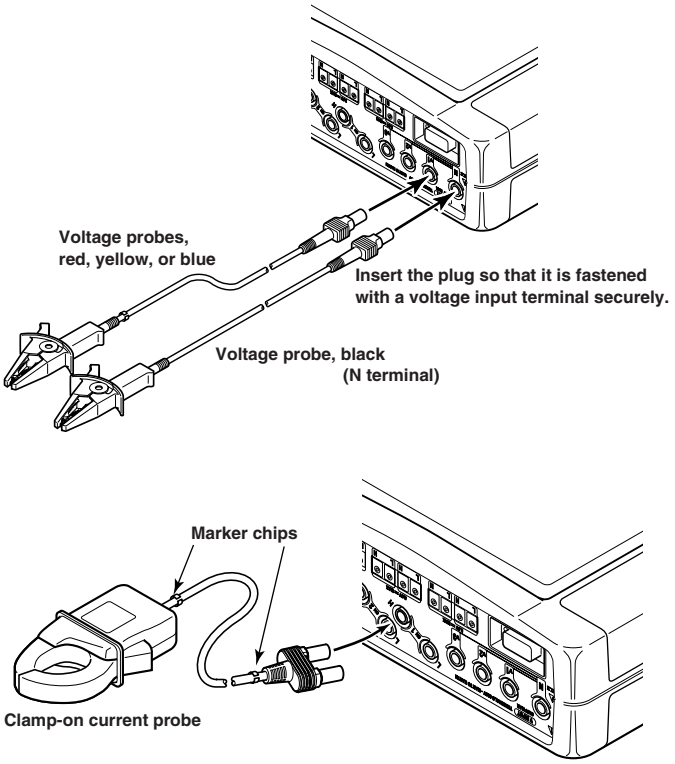
As backup power supply during a power failure, one of the following batteries can be used. Use it together with the AC adapter.

- Alkaline batteries (supplied)
- NiMH battery pack (optional)

► For more details, refer to the CW240 User's Manual ◄

Section 3.2, "Connecting a Power Supply"

2.2 Connecting Voltage Probes and Current Probes

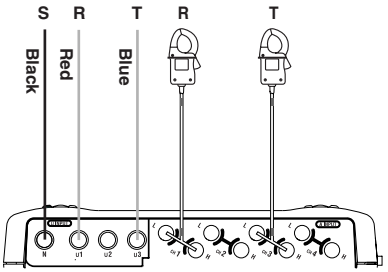


► For more details, refer to the CW240 User's Manual ◄

Section 3.3, "Connecting Voltage Probes"
Section 3.4, "Connecting Clamp-on Probes"

<Example of three-phase three-wire two-current>

Single load of three-phase three-wire two-current (3P3W2I) <Two-power-meter method>

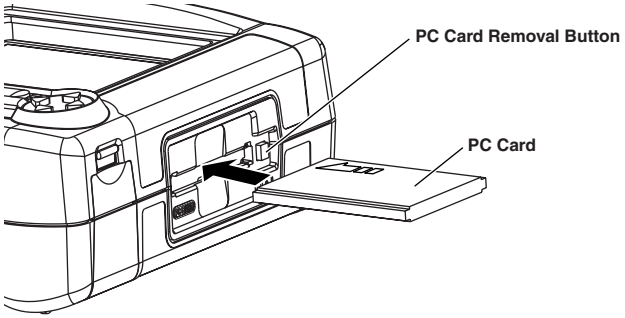


► For more details, refer to the CW240 User's Manual ◄

Section 3.5, "Connection Diagrams of Voltage Probes and Clamp-on Probes"

2.3 Inserting a PC Card into the CW240

<Insertion method>



● Insertion Method

With the front surface of the card facing up (the direction the arrow is pointing), insert the PC card securely into the PC card slot on the side of the CW240.

► For more details, refer to the CW240 User's Manual ◄

Chapter 11, "PC Card"

● Saving Data to PC Card

- Data can be saved to the PC card, as well as the CW240's internal memory.
- Setup conditions (set values) can be loaded/saved.

► For more details, refer to the CW240 User's Manual ◄

Section 6.4, "Save Data Settings 1/2"

Section 6.5, "Save Data Settings 2/2"

Chapter 8, "Saving Measured Data"

Section 9.6, "Setting Files (Load/Save/Delete/Name Change)"

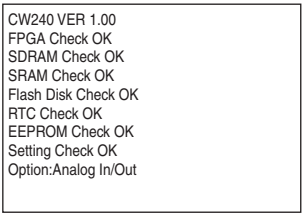
2.4 Turning ON the Power Switch

1 **Model Name Screen**

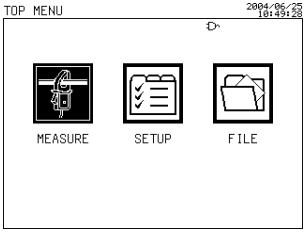
When the power switch is turned ON, the CW240 displays the following startup screen for approx. 2 seconds.

2 **Message Screen**

This screen displays the model, version number, the presence of options, and self-check results.



3 When the self-check has been completed normally, the screen displayed when you previously turned OFF the CW240 appears.



To switch to the Top Menu screen shown on the left, press the TOP MENU key.

► For more details, refer to the CW240 User's Manual ◄

Section 3.6, "Turning ON the Power Switch"

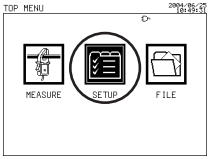
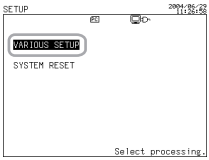
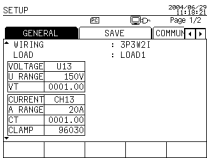
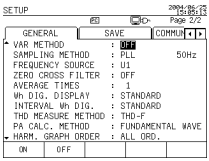
3. General Settings

Setting Up the Wiring, Number of Loads, Voltage Range, Current Range, and Clamp-on Current Probe

Example of Setting:

Setting three-phase three-wire two-current (3P3W2I) 200-V line (50 Hz, 120-A load) using the clamp-on probe 96030 (rating: 200 A)

● Displaying General Tab

<table>
<tr><td> 
</td><td>Displays SETUP.
 
</td></tr>
<tr><td> 
</td><td>Selecting VARIOUS SETUP.
 
</td></tr>
<tr><td></td><td>The General 1/2 screen is displayed.
 
</td></tr>
<tr><td>  </td><td>Use up and down direction cursor key.
The General 2/2 screen is displayed.
 
</td></tr>
</table>

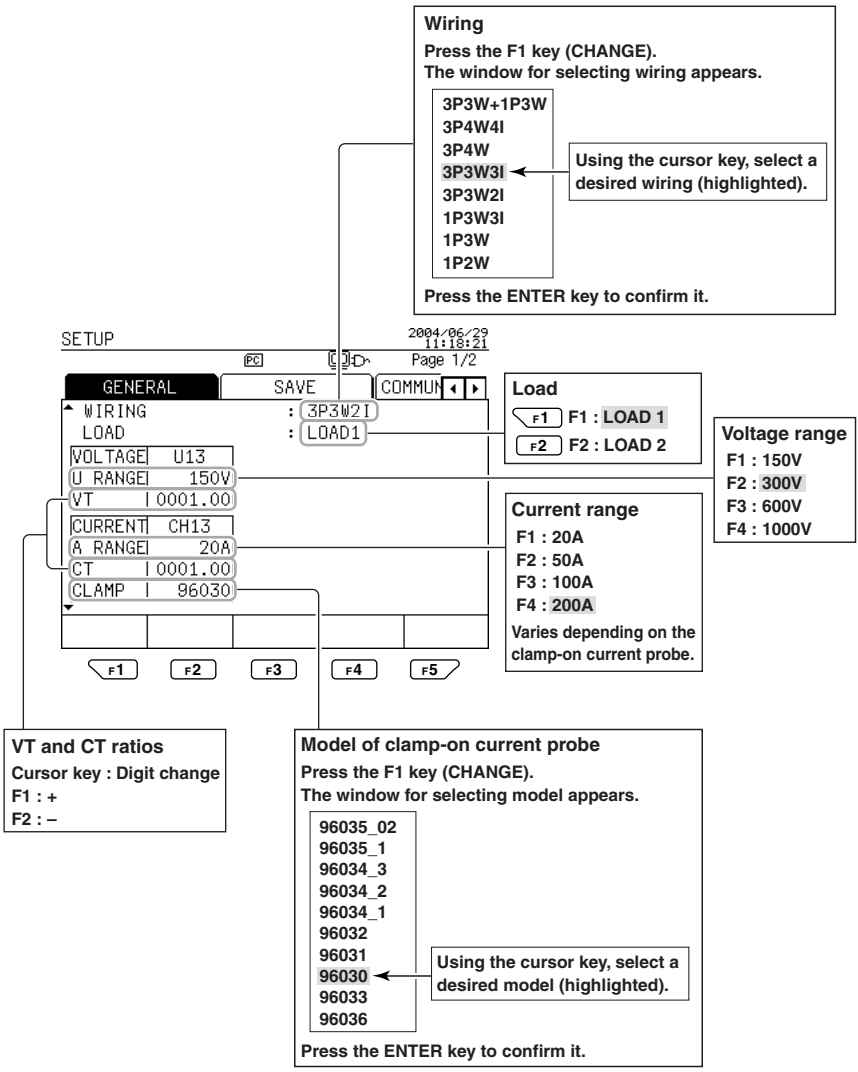
► For more details, refer to the CW240 User's Manual ◄

Section 6.2, "General Settings 1/2"

Section 6.3, "General Settings 2/2"

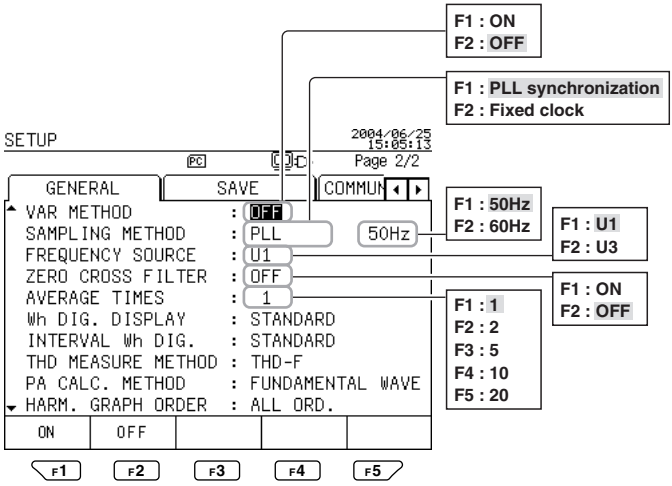
Displaying General 1/2 Screen

Using the right and left direction cursor key, select the General tab (highlighted).



Displaying General 2/2 Screen

After settings of General 1/2 has been completed, display the General 2/2 screen using the up and down direction cursor key.

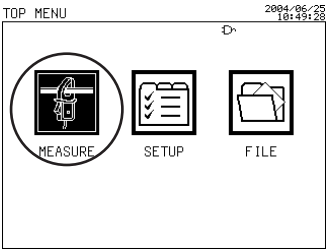


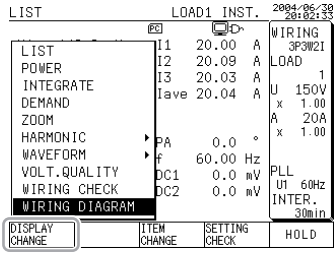
4. Wiring

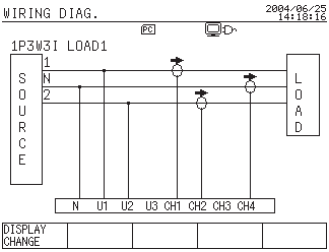
4.1 Displaying Wiring Diag. screen

You can carry out wiring by viewing the Wiring Diag. screen.

<table>
<tr>
<td>TOP MENU

ENTER</td>
<td>Displays the Measure screen.
 
</td>
</tr>
<tr>
<td>F1

</td>
<td>Press the F1 key (DISPLAY CHANGE) for window callup.
 

Using the cursor key, select WIRING DIAG. (highlighted).</td>
</tr>
<tr>
<td>ENTER</td>
<td>Press the ENTER key to display the Wiring Diag. screen.
 
</td>
</tr>
</table>

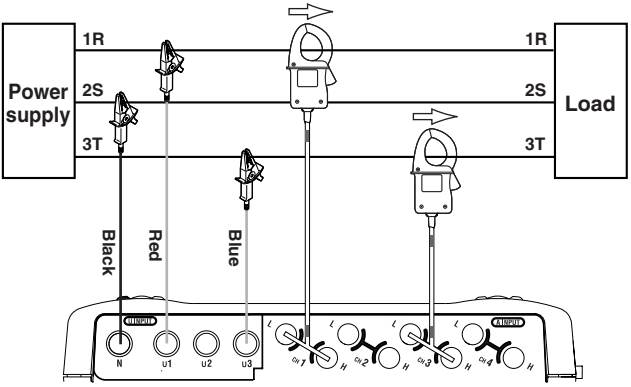
4.2 Wiring

⚠ WARNING

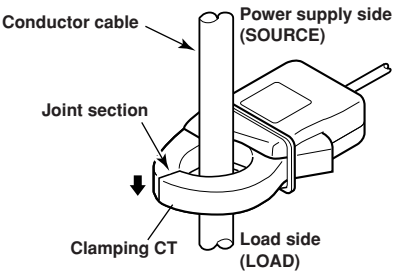
- **When attaching voltage probes to or clamping a clamp-on current probe on the circuit under test, turn off power to the circuit under test.**
  It is extremely dangerous to connect or disconnect a voltage probe or clamp or unclamp a clamp-on current probe without turning off the circuit under test.
- **Be sure to connect voltage probes to or clamp a clamp-on current probe on the secondary side of the circuit under test, such as current limiters (circuit breakers). Should an accident such as a short occur, other circuits will be protected by these circuit breakers.**

Viewing the Wiring Diag. screen, attach voltage probes to or clamp clamp-on current probes on the circuit under test.

● Actual Wiring



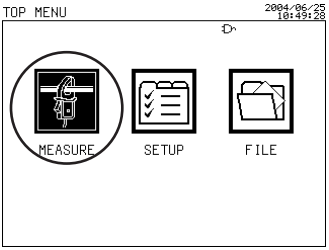
<Clamp-on current probe>

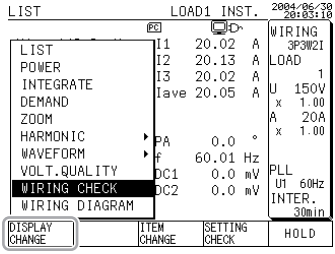


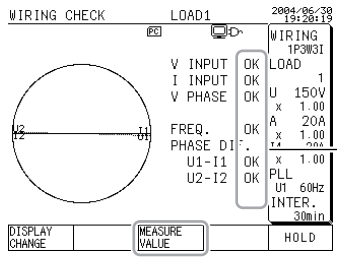
4.3 Checking Wiring

You can confirm whether wiring is properly carried out or not by viewing the Wiring Check screen.

<table>
<tr>
<td>TOP MENU

ENTER</td>
<td>Displays the Measure screen.
 
</td>
</tr>
<tr>
<td>F1

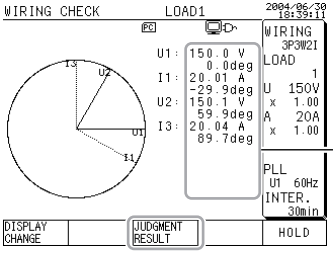
</td>
<td>Press the F1 key (DISPLAY CHANGE) for window callup.
 

Using the cursor key, select the WIRING CHECK (highlighted).</td>
</tr>
<tr>
<td>ENTER</td>
<td>Press the ENTER key to display the Wiring Check screen.
 

Judgment Result screen
Judgment result
Wiring conditions are checked by the vector diagram and judgment results (OK/NG).
If NG is shown, check its wiring.</td>
</tr>
<tr>
<td>F3</td>
<td>Press the F3 key to switch between MEASURE VALUE and JUDGMENT RESULT.</td>
</tr>
</table>

F3

Press the F3 key to switch between MEASURE VALUE and JUDGMENT RESULT.



● If the results of one or more wiring check are NG, check the following:

Results	Measures
Voltage input judgment is NG.	• Check if the voltage probes are connected properly to the circuit under test. • Check if the voltage probes are connected properly to the voltage input terminals of the meter. • Check if the voltage range is appropriate to the input level.
Current input judgment is NG.	• Check if the clamp-on current probe(s) is clamped onto the circuit under test properly. • Check if clamp-on current probe(s) is connected to the current input terminal of the meter properly. • Check if the current range is appropriate to the input level.
Phase difference judgment (voltage - current) is NG.	• Check if the voltage phase sequence is correct. • Check if the direction of the arrows and the phase of the clamp-on current probe(s) are correct.
Voltage phase judgment is NG.	• Check if the voltage phase sequence is correct. • Check if the circuit under test and the setting of the wiring system agree with each other.
Current phase judgment is NG.	• Check if the direction of the arrows and the phase of the clamp-on current probe(s) are correct. • Check if the circuit under test and the setting of the wiring system agree with each other.
Frequency source check is NG.	• Check if the voltage input selected for the frequency source is stable. • Check if the voltage probes selected for the frequency source are connected properly.

NOTE

There may be cases where the result of the check may show what is actually correct wiring as NG and vice versa. For this reason, also check for an error in the vector diagram or measured values.

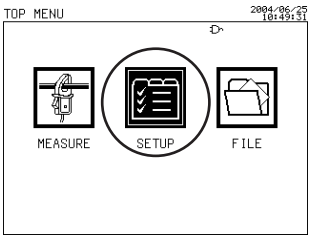
5. Measurements

5.1 Measuring an instantaneous value

1 **Settings**

Example:

Measuring an instantaneous value of three-phase three-wire two-current (3P3W2I) 200-V line (50 Hz, 120-A load) using the clamp-on probe 96030 (rating: 200 A)

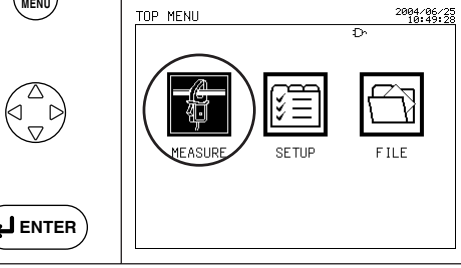
TOP MENU  ENTER	**Displays SETUP.**  Top Menu screen
General 1/2	**Using the right and left direction cursor key, display the General 1/2 screen.** **Set up necessary items on the screen.** For details, refer to Chapter 3 in this manual.
General 2/2	**Next, using the up and down direction cursor key, display the General 2/2 screen.** **Also set up necessary items on the screen.** For details, refer to Chapter 3 in this manual.
Save 1/2	**Using the right and left direction cursor key, select Save 1/2 screen.**
Save 2/2	**Next, using the up and down direction cursor key, select Save 2/2 screen.**
ENTER	This completes the settings, returning you to the Top Menu screen.

2 **Wiring**

After the above settings have been completed, carry out wiring, referring to Chapter 4 in this manual.

3 Measurements

TOP MENU



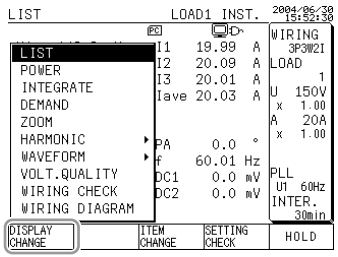
ENTER

Display a Measure screen.

● List Screen

F1

Press the F1 (DISPLAY CHANGE) key to display the List screen.

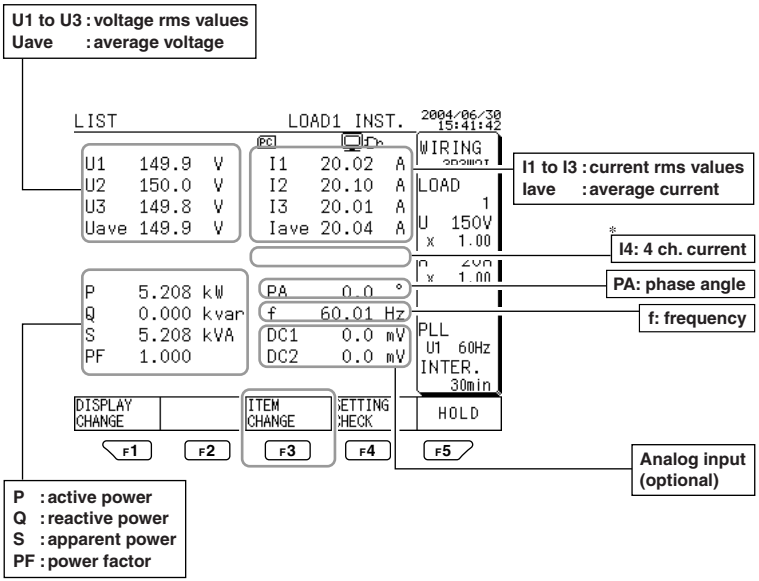


Using the cursor key, select LIST (highlighted).

ENTER

Press the ENTER key to confirm it. The List screen appears.

<Description of the List screen>



F2 **LOAD CHANGE**

The load changes the F2 key is pressed.

(For measurement of multiple loads)

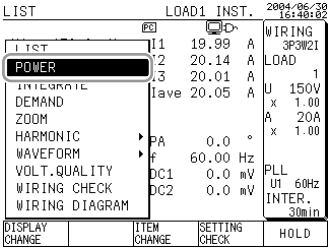
F3 **The item changes each time the F3 key is pressed:**

For instantaneous value measurements, the AVE, MAX., and MIN. values indicate the measured values of integration measurement conducted immediately before that.

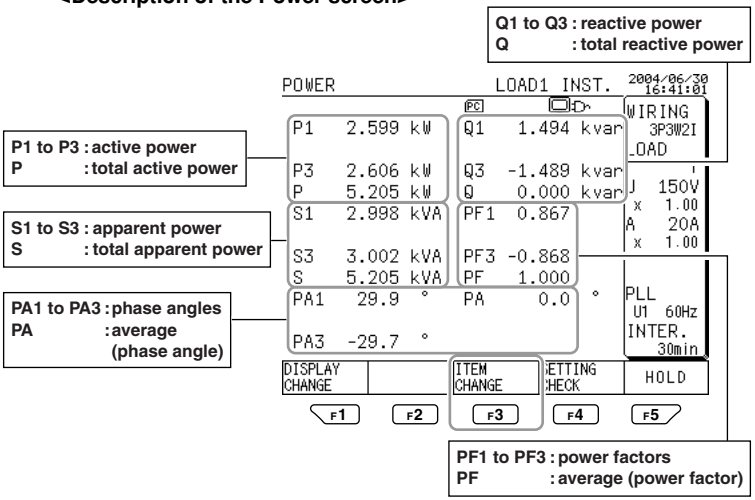
(If no integration measurement is made immediately before that, symbol ----- appears.)

*I4: 4 ch. current is displayed only when wiring are set to 1P3W3I and 3P4W4I.

● Power Screen

F1	**Press the F1 (DISPLAY CHANGE) key to display the Power screen.** 
	Using the cursor key, select POWER (highlighted).
ENTER	**Press the ENTER key to confirm it. The Power screen appears.**

<Description of the Power screen>



F2 **LOAD CHANGE**

The load changes the F2 key is pressed.

(For measurement of multiple loads)

F3 **The item changes each time the F3 key is pressed:**

For instantaneous value measurements, the AVE, MAX., and MIN. values indicate the measured values of integration measurement conducted immediately before that.

(If no integration measurement is made immediately before that, symbol ----- appears.)

5.2 Measuring Electric Energy (Integration Measurement)

1 Making Settings

Example:
Measuring electric energy of three-phase three-wire two-current (3P3W2I) 200-V line (50 Hz, 120-A load) using the clamp-on probe 96030 (rating: 200 A)

General 2/2

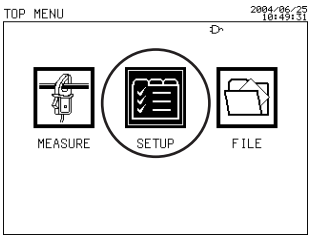
Setting Item	Description (Setting value)
Wh DISPLAY	STANDARD

Save 1/2

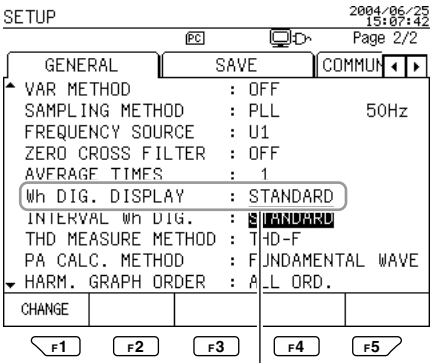
Setting Item	Description (Setting value)
MEASURE START	TIME
	2004/07/01 07:00
MEASURE STOP	TIME
	2004/07/03 07:00
INTERVAL TIME	5 min
DATA SAVE	PC card
FILE NAME	PLANT5

Save 2/2

Setting Item	Description (Setting value)
INTEGRATE/DEMAND	ON

TOP MENU  ENTER	**Displays SETUP.** 
General 1/2 General 2/2	**Using the right and left direction cursor key, display the General screen.** **Set up necessary items on the screen.** For details, refer to Chapter 3 in this manual.
Save 1/2 Save 2/2	**Using the right and left direction cursor key, select Data Save screen.** **Set up necessary items on the screen.**

<General 1/2>



Decimal point position

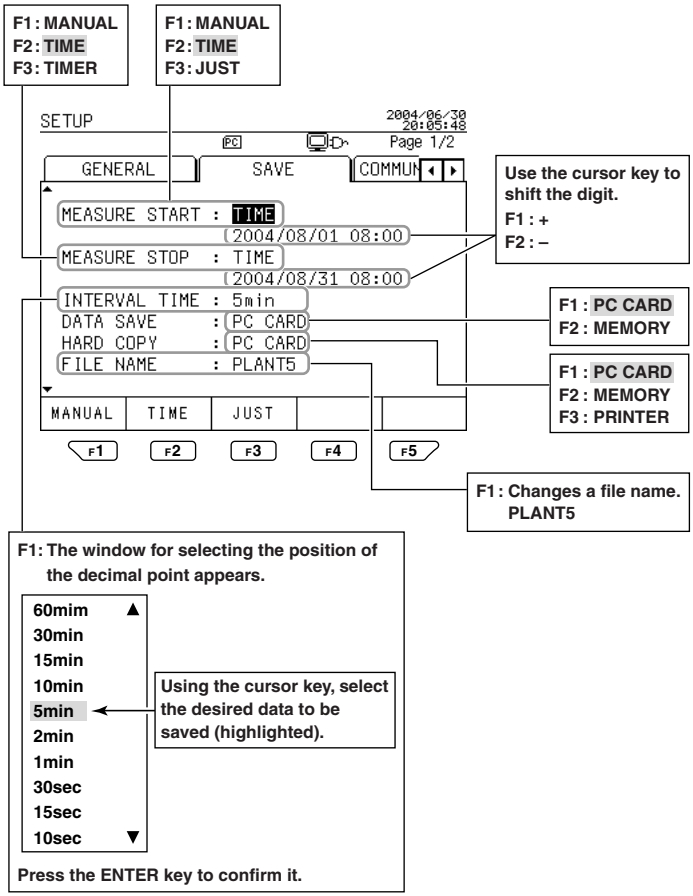
F1: The window for selecting the position of the decimal point appears.

AUTO
000000
00000.0
0000.00
000.000
STANDARD

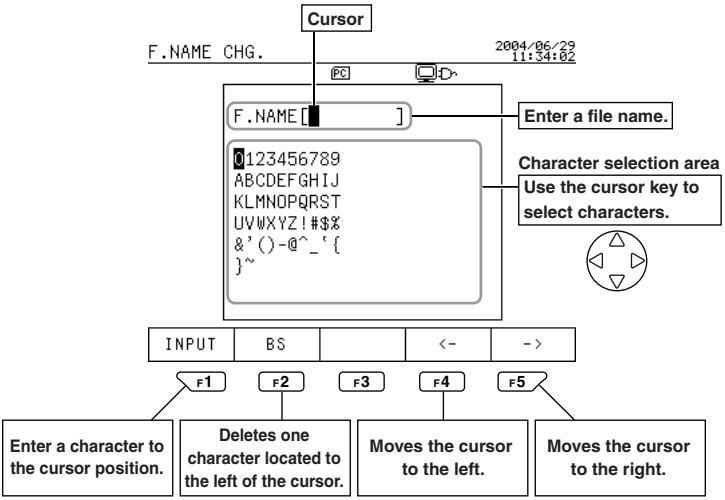
Using the cursor key, select the desired position of the decimal point (highlighted).

Press the ENTER key to confirm it.

<Save 1/2>


F1 : MANUAL
F2 : TIME
F3 : TIMER
F1 : MANUAL
F2 : TIME
F3 : JUST
SETUP
2004/06/30
20:05:48
Page 1/2
GENERAL
SAVE
COMMUN
MEASURE START : TIME
2004/08/01 08:00
MEASURE STOP : TIME
2004/08/31 08:00
INTERVAL TIME : 5min
DATA SAVE : PC CARD
HARD COPY : PC CARD
FILE NAME : PLANT5
MANUAL
TIME
JUST
F1
F2
F3
F4
F5
Use the cursor key to shift the digit.
F1 : +
F2 : –
F1 : PC CARD
F2 : MEMORY
F1 : PC CARD
F2 : MEMORY
F3 : PRINTER
F1 : Changes a file name. PLANT5
F1 : The window for selecting the position of the decimal point appears.
60mim
30min
15min
10min
5min
2min
1min
30sec
15sec
10sec
Using the cursor key, select the desired data to be saved (highlighted).
Press the ENTER key to confirm it.

<File name change>



<File name determination>

ENTER

Press the ENTER key.

This changes the file name, proceeding to the Data Save screen.

NOTE

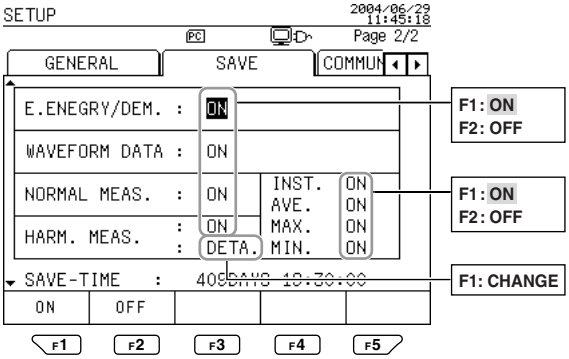
A file name will be automatically assigned if it has not been specified:
File name: 240AMXXX (XXX: 000 to 029)

< Save 2/2>

After settings of Save 1/2 has been completed, display the Save 2/2 screen using up and down direction cursor key.

Set the items to be saved to ON. (OFF if not)

Use the cursor key to select items to be saved, and press the F1 key if the items are set to ON, and the F2 key if set to OFF.



<Exiting the Save 2/2 screen>

Press the ENTER key.

The screen returns to the Top Menu screen.

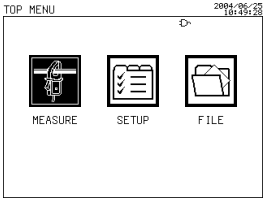
NOTE

- **Check SAVE-TIME. This can confirm how long the data can be saved in the PC card currently installed in the PC. If the SAVE-TIME is shorter than the measurement period, delete unnecessary files in the PC card or replace the PC card with a new one having a larger capacity.**
- **The measured data thus set to ON are saved to the PC card for each interval time. If you still have other data to be saved, set the items to ON.**

2 Confirming Settings

TOP MENU

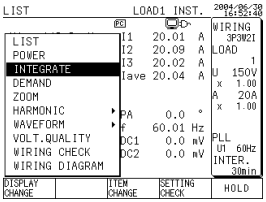
Displays the Measure screen.



ENTER

F1

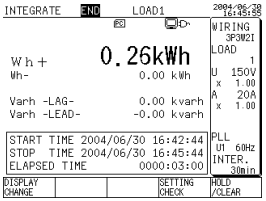
Press the F1 key (DISPLAY CHANGE) for window callup.



Using the cursor key, select INTEGRATE (highlighted).

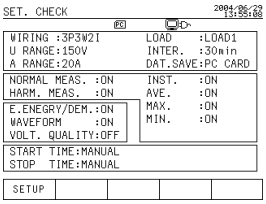
ENTER

Press the ENTER key to display the Integrate screen.



F4

Press the F4 key to display the Setting Check screen.



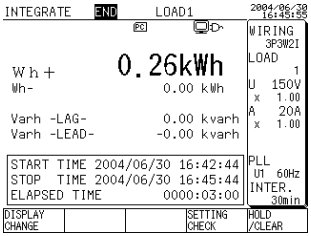
Check each item is set properly before pressing the ENTER key.
This returns to the Measure (Integrate) screen.

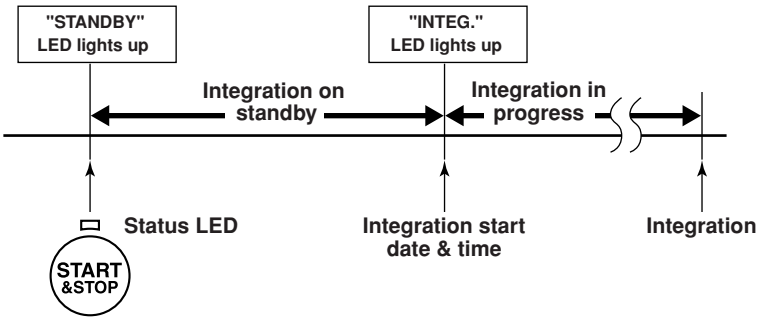
If a set value needs to be changed, press the F1 key (SETUP).
The Setup screen appears.
Change the set value. After the setup, press the ENTER key for returning to the Measure (Integrate) screen.

3 **Wiring**

After the above settings have been completed, carry out wiring, referring to Chapter 4 in this manual.

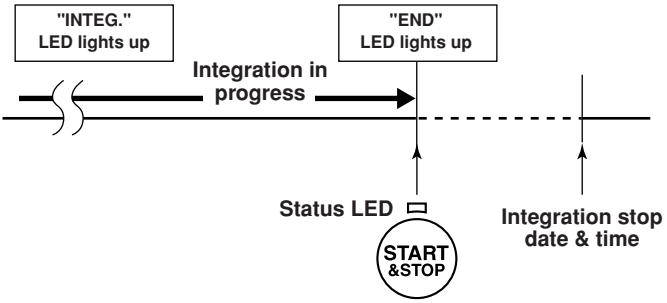
4 **Integration Start**

	Check that the Integrate screen is displayed. 
START &STOP	**Press START&STOP key. Integration starts according to the setting of the integration starting method.** • **STANDBY** This appears until it becomes integration start time. • **INTEG.** This appears when it becomes integration start time, starting integration measurement. • **END** Integration stops according to the setting of the integration starting method.



<Forced end>

START &STOP	**Press START&STOP key displays the integration stop confirmation message.**
ENTER	**Press the ENTER key to forcibly stop integration.** "END" appears on the screen.



NOTE

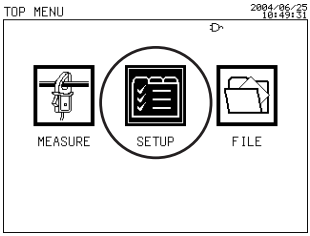
Even if you forcibly stop integration, data before forcible stop are stored into the PC card.

5.3 Measuring Harmonics

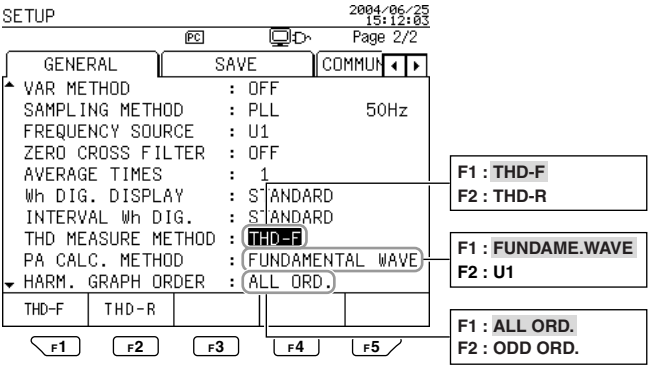
1 Settings

General 2/2

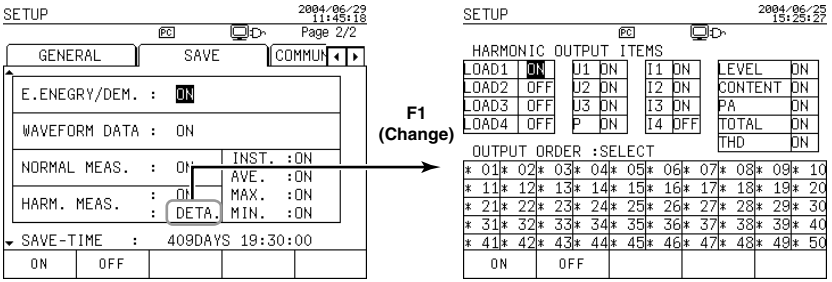
Setting Item	Description (setting value)
THP measure method	THD-F (fundamental wave)
Phase angle calculation method	Fundamental wave method
Harm. Graph Order	ALL ORD.

TOP MENU  ENTER	**Displays SETUP.** 
General 1/2 General 2/2	**Using right and left direction cursor key, display the General screen.** **Set up necessary items on the screen.** For details, refer to Chapter 3 in this manual.
Save 1/2 Save 2/2	**Using right and left direction cursor key, select Data Save screen.** **Set up necessary items on the screen.**

<General 2/2>



< Save 2/2>



<Exiting the Save 2/2 screen>

Press the ENTER key.

The screen returns to the Top Menu screen.

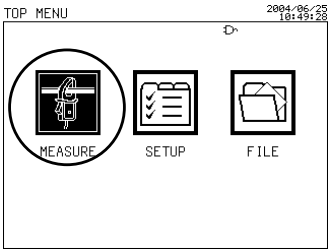
2 Wiring

After the above settings have been completed, carry out wiring, referring to Chapter 4 in this manual.

3 Measuring Harmonics

TOP MENU

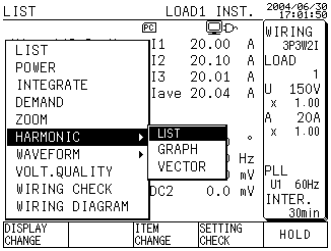
Display a Measure screen.



ENTER

F1

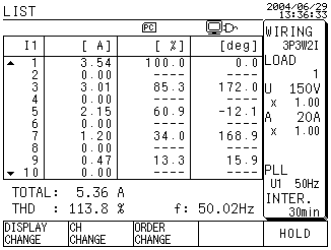
Press the F1 (DISPLAY CHANGE) key to display the List screen.



Using the cursor key, select HARMONIC (highlighted).
Press the right direction cursor key to move to the Harmonic window.
Select one of LIST, GRAPH and VECTOR using the up and down direction cursor key.

ENTER

Press the ENTER key to display the Harmonic window.

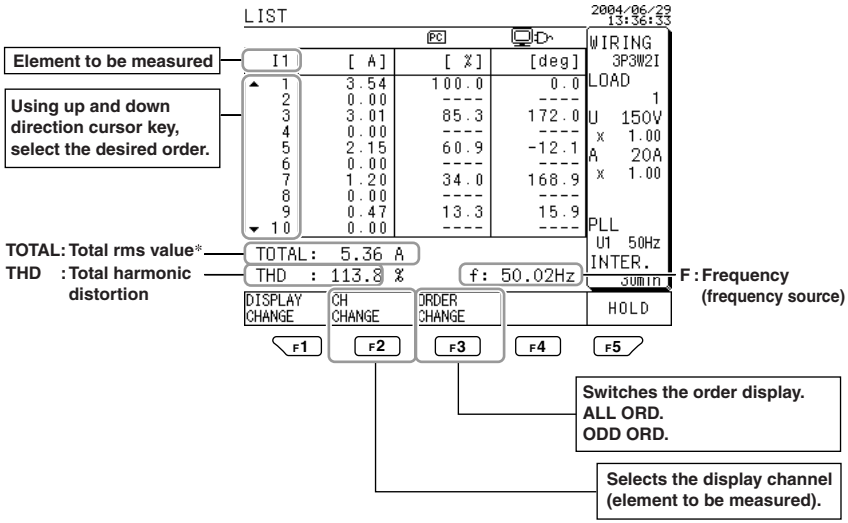


(The List screen is used as an example.)

► For more details, refer to the CW240 User's Manual ◄

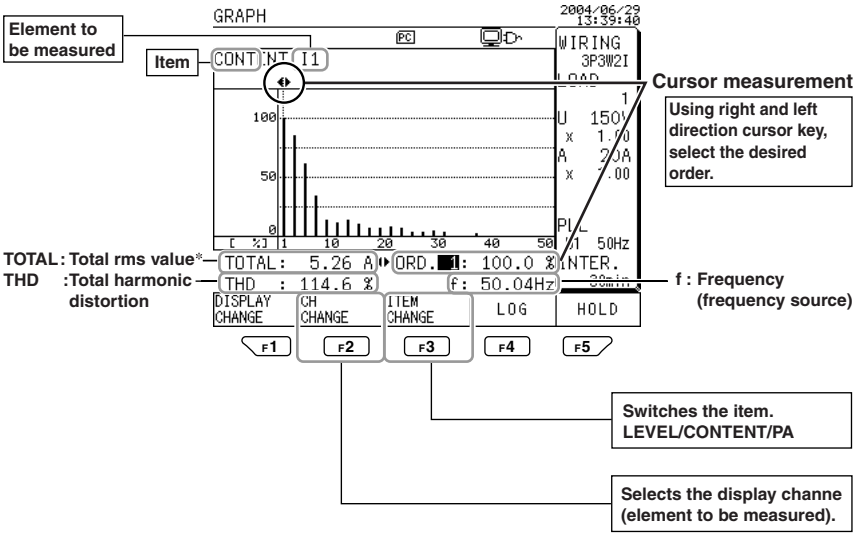
Chapter 6, "Configuring Settings"
Section 6.5, "Save Data Settings 2/2"
Chapter 7, "Making Measurements"
Section 7.6, "Measuring Harmonics"

<List>

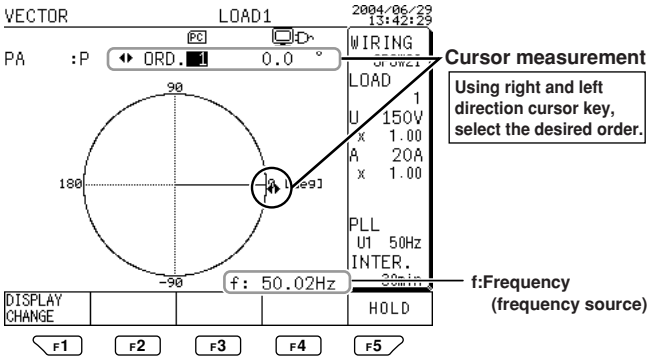


TOTAL: Total rms value*: Total rms values are displayed if the elements to be measured are voltage (U) and current (I); total power values are displayed if the element to be measured is power (P).

<Graph>



<Vector>



F2 **LOAD CHANGE**

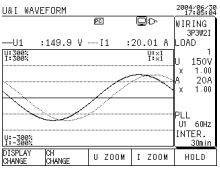
The load changes the F2 key is pressed.

(For measurement of multiple loads)

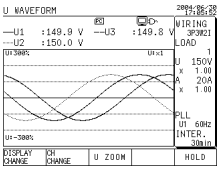
5.4 Displaying Waveform

One of the following three screens can be displayed:

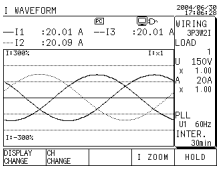
U&I WAVEFORM



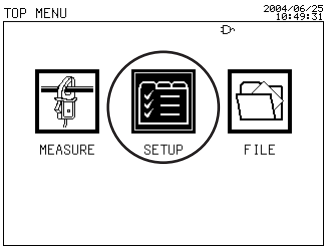
U WAVEFORM



I WAVEFORM



1 Making Settings

TOP MENU  ENTER	**Displays SETUP.**  Top Menu screen
General 1/2	**Using right and left direction cursor key, display the General 1/2 screen.** **Set up necessary items on the screen.** For details, refer to Chapter 3 in this manual.
General 2/2	**Next, using up and down direction cursor key, display the General 2/2 screen.** **Also set up necessary items on the screen.** For details, refer to Chapter 3 in this manual.
Save 1/2	**Using right and left direction cursor key, select Save 1/2 screen.**
Save 2/2	**Next, using up and down direction cursor key, select Save 2/2 screen.**
Volt. Quality	**Using the cursor key, select VOLT. QUALITY.**
ENTER	This completes the settings, and return to the Top Menu screen.

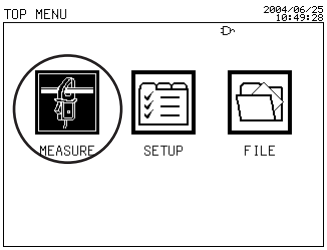
2 Wiring

After the above settings have been completed, carry out wiring, referring to Chapter 4 in this manual.

3 Displaying Waveforms

TOP MENU

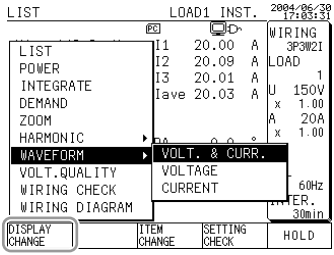
Displays the Measure screen.



ENTER

F1

Press the F1 key (DISPLAY CHANGE) for window callup.



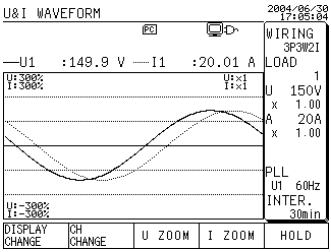
Using the cursor key, select WAVEFORM (highlighted).

Press the right direction cursor key to move to the Waveform window.

Using up and down direction cursor key to select one of VOLT. & CURR., VOLTAGE and CURRENT .

ENTER

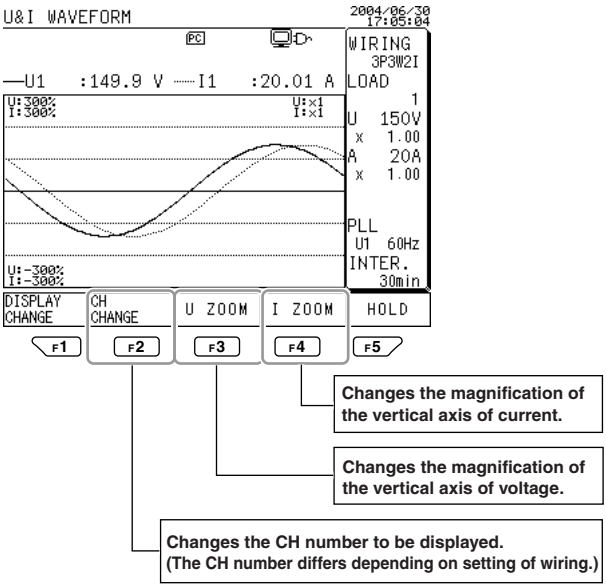
Press the ENTER key to display the Waveform window.



The VOLT. & CURR. (U&I) screen is used as an example.

► For more details, refer to the CW240 User's Manual ◄

Chapter 6, "Configuring Settings"
Subsection 6.5.4, "Waveform Data"
Chapter 7, "Making Measurements"
Section 7.7, "Displaying Waveform"



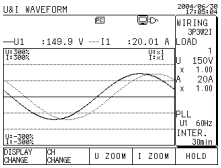
<Vertical axis>

- The display range of the vertical axis is determined on the basis of the measurement range set.
- U ZOOM and I ZOOM allow you to change the magnification (scaling) of the vertical axis.
  1 → 2 → 5 → 10 → 20 → 1/3 → 1/2

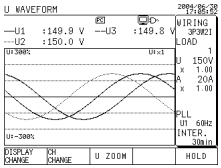
<To switch a waveform screen>

Using up and down direction cursor key, switch the waveform screen.

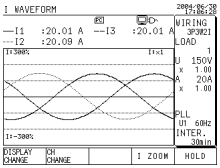
U&I WAVEFORM



U WAVEFORM



I WAVEFORM



5.5 Measuring Voltage Quality (Voltage Fluctuation)

1 **Settings**

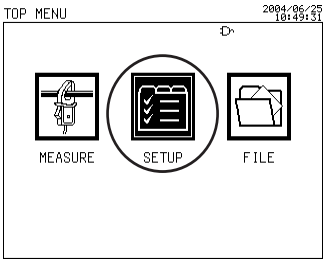
Example:
Standard voltage: 100 V; Voltage swell: 120%; Voltage dip: 90%; Interruption: 10%; Hysteresis: 1%

Save 1/2

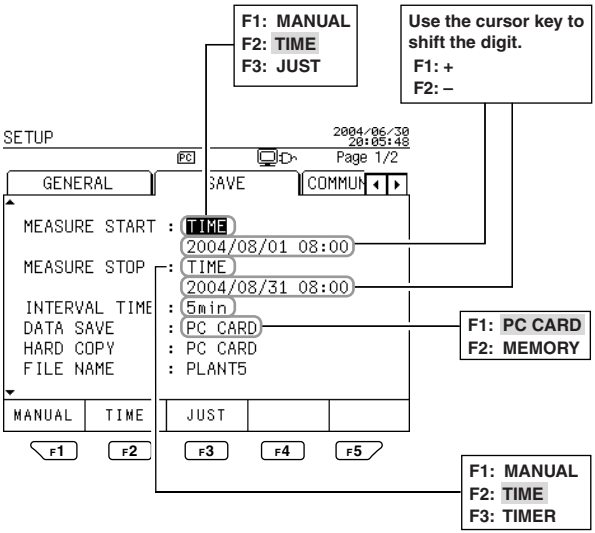
Setting Item	Description (Setting value)
Measure Start	TIME
	2004/07/01 07:00
Measure Stop	TIME
	2004/07/03 07:00
Interval Time	5 min
Data Save	PC card

Volt. Quality

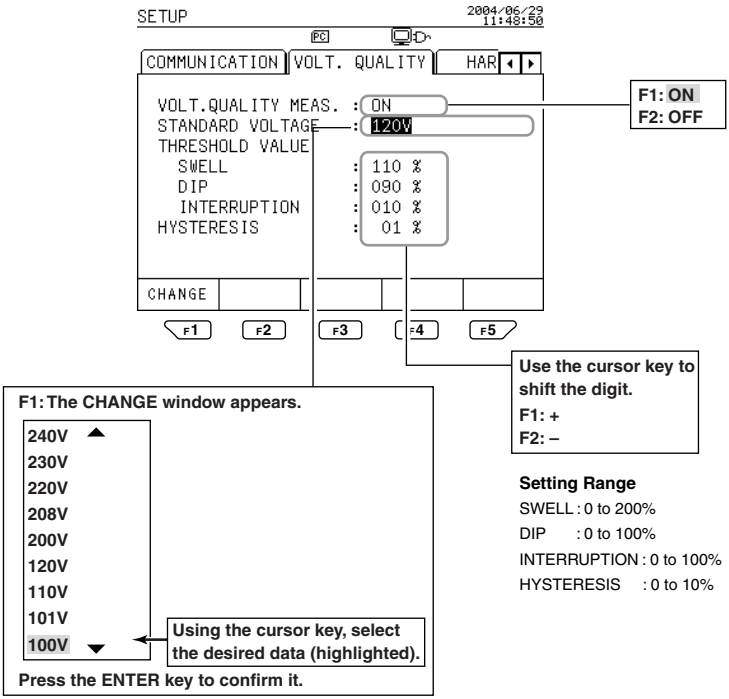
Setting Item		Description (Setting value)
Volt. Quality measurement		ON (performs voltage quality measurement)
Standard Voltage		100V
Threshold Value	Voltage dip	110%
	Voltage swell	90%
	Instantaneous voltage interruption	10%
Hysteresis		1%

TOP MENU ENTER	**Displays the Measure screen.**  Top Menu screen
General 1/2	**Using right and left direction cursor key, display the General 1/2 screen.** **Set up necessary items on the screen.** For details, refer to Chapter 3 in this manual.
General 2/2	**Next, using up and down direction cursor key, display the General 2/2 screen.** **Also set up necessary items on the screen.** For details, refer to Chapter 3 in this manual.
Save 1/2	**Using right and left direction cursor key, select Save 1/2 screen.**
Save 2/2	**Next, using up and down direction cursor key, select Save 2/2 screen.**
Volt. Quality	**Using the cursor key, select VOLT. QUALITY.**
ENTER	This completes the settings, and return to the Top Menu screen.

<Save 1/2>



<Volt. Quality>



Setting Range

SWELL : 0 to 200%
DIP : 0 to 100%
INTERRUPTION : 0 to 100%
HYSTERESIS : 0 to 10%

2 Wiring

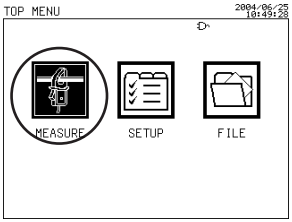
After the above settings have been completed, carry out wiring, referring to Chapter 4 in this manual.

3 Voltage Quality Measurement

TOP MENU

ENTER

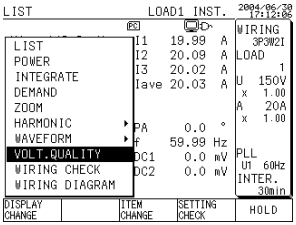
Displays the Measure screen.



F1

ENTER

Press the F1 key (DISPLAY CHANGE) for window callup.

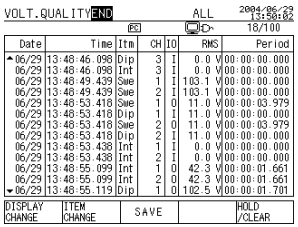


ENTER

Using the cursor key, select VOLT. QUALITY (highlighted).

ENTER

The Volt. Quality screen appears.



START &STOP

Press the START&STOP key. Start integration according to the setting of the integration starting method.

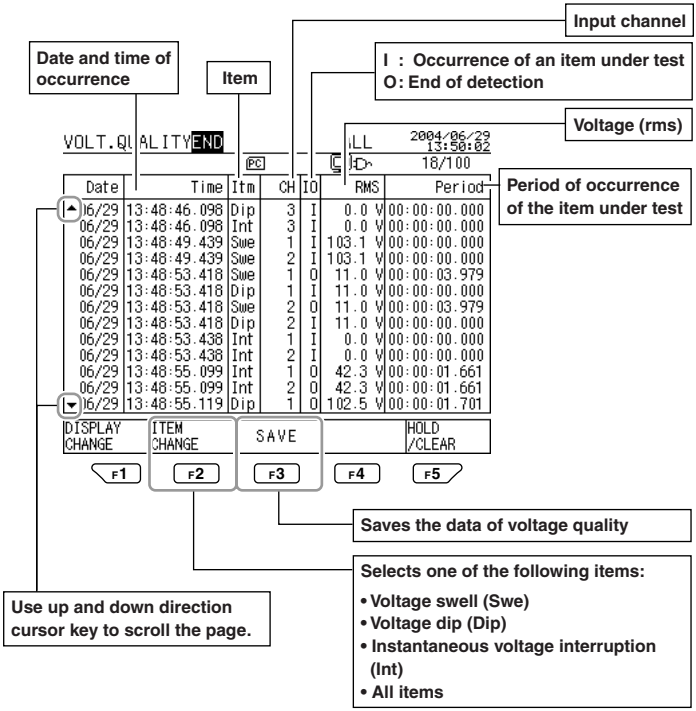
"STANDBY" appears until it becomes integration start time.

► For more details, refer to the CW240 User's Manual ◄

Chapter 6, "Configuring Settings"
Subsection 6.7, "Voltage Quality Settings"
Chapter 7, "Making Measurements"
Section 7.8, "Measuring Voltage Quality (Voltage Dip, Voltage Swell, or Instantaneous Interruption)"

● **Voltage Quality Measurement**

In this section, voltage dip, voltage swell or instantaneous interruption are measured and displayed.



● **Stopping Integration Measurement**

Integration stops according to the setting of the integration starting method. ("END" appears when it becomes integration stop time.)

As soon as integration stops, voltage quality data is written to the PC card.

● **Forcibly Stopping Integration Measurement**

If you want to stop integration measurement before it becomes integration stop time thus set, press the START&STOP key while integration is in progress.

NOTE

Even if you forcibly stop integration, data before forcible stop are stored into the PC card.

6. Troubleshooting

This chapter describes how to handle problems that may arise with the CW240. If an error message has been displayed on the display screen, refer to Section 16.2, "Error Message Content and Actions" of the CW240 User's Manual.

Symptom	Things to Check	Reference Section
1) Nothing is displayed when the power switch is turned ON.	When using AC power • Confirm that the power cord is connected to the outlet correctly.	3.2.1
	• Confirm that the power supply is within the allowable power supply voltage range.	3.2.1
	When using battery power • Confirm that the battery case is correctly installed.	3.2.2 3.2.3
	• If a NiMH battery pack is being used, confirm that the battery has been sufficiently charged.	3.2.3
	• If an alkaline dry cell is being used, confirm that the battery has not dissipated. (Confirm that the battery is installed with correct polarity.)	3.2.2
2) Setting data is initialized when power is turned OFF.	• If the opening messages "RTC Initialized" and "Settings Initialized" are displayed when power is turned ON, the backup battery has become dissipated. Backup batteries cannot be replaced by the customer. Contact a service representative. The lifetime of the backup battery is approximately 10 years.	3.6
3) The measurement display value is incorrect.	• Check for the possibility of noise on the input signal.	
	• Confirm that the measurement probe and clamp are connected correctly.	3.3 3.4
	• Confirm that the frequency measurement element has been set correctly.	6.3.2 6.3.3
	• Confirm that the ambient temperature/humidity are within the specification's allowable range.	4.2

► For more details, refer to the CW240 User's Manual ◄

Section 6.2, "General Settings 1/2"

Section 6.3, "General Settings 2/2"

Symptom	Things to Check	Reference Section
4) Key operation cannot be done.	• Confirm that key lock is not displayed at the upper right of the display area.	15.3
5) Saving and writing to internal memory cannot be done.	• Turn the power OFF then ON again. The problem may be resolved in the opening self-test.	3.6
	• It is possible that a power supply error, etc., occurred while the internal memory was being accessed. Format the internal memory in the file processing mode. Data saved in the internal memory will be lost.	9.4
6) Saving and writing to the PC card cannot be done.	• Confirm that the PC card has been inserted correctly.	11.2
	• Confirm that the PC card has been formatted.	9.4
	• Confirm that the capacity of the PC card has not been exceeded.	11
7) Communication cannot be done through the RS-232 interface.	• Confirm that the communication parameters of the CW240 and the controller, etc., match.	6.6
	• Confirm that the specifications of the cables connecting the CW240 and the controller, etc., are suitable for the purpose.	10.2
8)Printing cannot be done.	• Confirm that printer power is ON. (Refer to the printer's instruction manual.)	10.3
	• Confirm that connection cable specifications match.	10.3
	• Confirm that connection cables are connected correctly.	10.3
	• Confirm that the communication parameters of this device and the printer match.	10.3
	• Confirm that the print media has been set correctly.	–
9) An error occurs in the opening message.	• This is a hardware error. Contact to your local service representative.	3.6

7. Memory Capacity (for Reference)

For saving all items of normal measurement data, electric energy/demand measured data, all items of harmonic measured data, waveform data and voltage quality measured data

Wiring		1P2W 4 loads	1P3W 2 loads	1P3W3I	3P3W2I 2 loads	3P3W3I, 3P4W	3P4W4I	3P3W+ 1P3W
No. of Data Items		5624	5052	3758	6888	4390	5002	7504
PC card (64MB)	1min	17hours	19hours	26hours	14hours	22hours	19hours	13hours
	60min	44days	49days	65days	35ays	56days	49days	32days
Internal Memory	1min	12min	13min	19min	8min	16min	13min	7min
	60min	12hours	13hours	19hours	8hours	16hours	13hours	7hours

1min, 60min : Interval time

► For more details, refer to the CW240 User's Manual ◄

Section 8.3, "Memory (Reference)"

8. Check Sheets

How to use these check sheets

This Quick Setup Manual comes with check sheets so that you can accurately and effectively carry out on-site measurements and settings. Please make use of these sheets, describing necessary setting items in advance.
Description on check sheets

- Setting of the current range (A range) varies depending on the clamp-on current probe to be used.
- Voltage/current input indication varies depending on the setting of the wiring and load.
- The shaded mark such as 150V indicates the default setting value upon system reset or when shipped from the factory.

Check Sheet No. _____

File name:	
Site name:	
Prepared by:	
Date issued:	

Table 1: General 1/2

Item	User setting	CW240 setting
Wiring		<1> Change If you would like to change wiring, select one of the following items: 3P3W+1P3W / 3P3W21 3P4W4I / 1P3W3I 3P4W / 1P3W 3P3W3I / 1P2W
Number of Load	Load	For 1P3W or 3P3W2I: <1> Load 1 <2> Load 2
		For 1P2W: <1> Load 1 <2> Load 2 <3> Load 3 <4> Load 4
Wiring: 3P3W + 1P3W Load at 1P3W		For 3P3W + 1P3W: <1> R-S <2> S-T <3> T-R
U range (voltage range) Example Voltage: U1 U range: 300 VT ratio: 0001.00	Voltage inputs (U1-U3) differ depending on the setting of the wiring and load. U1 / U2 / U3 — V	<1> 150V <2> 300V 4 <3> 600V <4> 1000V
VT ratio		1.00 0.01 to 9999.99

Check Sheet No. _____

File name:	
Site name:	
Prepared by:	
Date issued:	

Table 2: General 1/2

<table>
<tr><th>Item</th><th colspan="2">User setting</th><th>CW240 setting</th></tr>
<tr><td>A range (current range)

Example
<table><tr><td>Current</td><td>CH1</td></tr><tr><td>A range</td><td>500A</td></tr><tr><td>CT ratio</td><td>0001.00</td></tr><tr><td>Clamp-on current probe</td><td>96032</td></tr></table></td><td colspan="2">Current input channels (CH) differ depending on the setting of the wiring and load.

CH1 A
CH2 A
CH3 A
CH4 A</td><td>Setting of the current range (A range) varies depending on the clamp-on current probe to be used.

Refer to Table 3. *1</td></tr>
<tr><td>CT ratio</td><td colspan="2"></td><td>1.00 0.01 to 9999.99</td></tr>
<tr><td>Clamp-on probe *1</td><td colspan="2"></td><td><1> Change
If you would like to change the probe, select one of the following probes:
<table><tr><td>96035-2 (300A)</td><td>96032</td></tr><tr><td>96035-1 (3000A)</td><td>96031</td></tr><tr><td>96034-3 (1000A)</td><td>96030</td></tr><tr><td>96034-2 (2000A)</td><td>96033</td></tr><tr><td>96034-1 (3000A)</td><td>96036</td></tr></table></td></tr>
</table>

Check Sheet No. _____

File name:	
Site name:	
Prepared by:	
Date issued:	

Table 3: Types of Clamp-on Current Probes *1

Model	–	User setting	Current range (A range)
96036(2 A)	–		<1> 200 mA <2> 500 mA <3> 1 A <4> 2 A
96033(50 A)	–		<1> 5 A <2> 10 A <3> 20A <4> 50 A
96030(200 A)	–		<1> 20 A <2> 50 A <3> 100 A <4> 200 A
96031(500 A)	–		<1> 50 A <2> 100 A <3> 200 A <4> 500 A
96032(1000 A)	–		<1> 200 A <2> 500 A <3> 1000 A
96034(3000 A)	Using the switch on a clamp-on probe to select current range		
	96034_1 (3000A)		<1> 300 A <2> 750 A <3> 1500 A <4> 3000 A
	96034_2 (2000A)		<1> 200 A <2> 500 A <3> 1000 A <4> 2000 A
	96034_3 (1000A)		<1> 100 A <2> 200 A <3> 500 A <4> 1000 A
96035(3000 A)	Using the switch on a clamp-on probe to select current range		
	96035_1 (3000A)		<1> 300 A <2> 750 A <3> 1500 A <4> 3000 A
	96035_2 (300A)		<1> 30 A <2> 75 A <3> 150 A <4> 300 A

Check Sheet No. _____

File name:	
Site name:	
Prepared by:	
Date issued:	

Table 4: General 2/2

Item	User setting	CW240 setting
VAR METHOD		<1> ON <2> OFF
SAMPLING METHOD		<1> PLL synchronization <2> Fixed clock For fixed clock: <1> 50 Hz <2> 60 Hz
FREQUENCY SOURCE		For 1P3W or 1P3W3I: <1> U1 <2> U2
		For 3P3W2I: <1> U1 <2> U3
		For 3P3W3I, 3P4W, 3P4W4I, or 3P3W + 1P3W: <1> U1 <2> U2 <3> U3
ZERO CROSS FILTER		<1> ON <2> OFF
AVERAGE TIMES		<1> 1 <2> 2 <3> 5 <4> 10 <5>20
Wh DISPLAY/ INTEGRATE		<1> Change If selected: Decimal point position and unit can be changed.
(Decimal point position)		<1> AUTO <2> 000000 <3> 00000.0 <4> 0000.00 <5> 000.000 <6> STANDARD
(Unit)		<1> mWh <2> Wh <3> kWh <4> MWh <5> GWh
E.ENEGRY/DEM. within Interval time		<1> Change If selected: Unit can be changed.
(Unit)		<1> mWh <2> Wh <3> kWh <4> MWh <5> GWh
THD MEASURE METHOD		<1> THD-F With reference to fundamental wave <2> THD-R With reference to all rms values
PA CALC. METHOD		<1> Fundamental wave <2> U1
HARM. GRAPH ORDER		<1> ALL ORD. (1st-50th) <2> ODD ORD.

Check Sheet No. _____

File name:	
Site name:	
Prepared by:	
Date issued:	

Table 5: Save 1/2

Item		User setting	CW240 setting
MEASURE	START		<1> MANUAL <2> TIME <3> JUST
	STOP		<1> MANUAL <2> TIME <3> TIMER
	TIME	Start date	Stop date
		Start time	Stop time
	TIMER	_____ (hh:mm:ss) to _____ (hh:mm:ss)	
SAVE	INTERVAL TIME		<1> Change If selected: Select one of the following items:
	DATA SAVE		<1> PC card <2> Internal memory
	HARD COPY		<1> PC card <2> Internal memory <3>Printer
	FILE NAME		<1> Change If selected: Enter a file name.

Min	Sec	
60 min		
30 min	30 sec	
15 min	15 sec	
10 min	10 sec	
5 min	5 sec	500 msec
2 min	2 sec	200 msec
1 min	1 sec	100 msec
		1 wave

Check Sheet No. _____

File name:	
Site name:	
Prepared by:	
Date issued:	

Table 6: Save 2/2

Item		User setting	CW240 setting
Electric Energy data Demand data			<1> ON Saves data. <2> OFF Does not save data.
WAVEFORM data			<1> ON Saves data. <2> OFF Does not save data.
Normal measurement data			<1> ON Saves data. <2> OFF Does not save data.
Harmonic data MEAS.			<1> ON Saves data. <2> OFF Does not save data.
Detailed items of Harmonic data MEAS. DETA.			<1> Change If selected: The Detail screen appears. Refer to Table 7 for details.
Common to normal measurement and harmonic measurement	INST.		<1> ON <2> OFF
	AVE		<1> ON <2> OFF
	MAX.		<1> ON <2> OFF
	MIN.		<1> ON <2> OFF

Check Sheet No. _____

File name:	
Site name:	
Prepared by:	
Date issued:	

Table 7: Save 2/2

Item		User setting	CW240 setting
LOAD	Displays the number of loads.		
	LOAD 1		<1> ON <2> OFF
	LOAD 2		<1> ON <2> OFF
	LOAD 3		<1> ON <2> OFF
	LOAD 4		<1> ON <2> OFF
ELEMENT	Element display varies depending on the setting of the wiring.		
	U1		<1> ON <2> OFF
	U2		<1> ON <2> OFF
	U3		<1> ON <2> OFF
	P		<1> ON <2> OFF
	I1		<1> ON <2> OFF
	I2		<1> ON <2> OFF
	I3		<1> ON <2> OFF
	I4		<1> ON <2> OFF
LEVEL			<1> ON <2> OFF
CONTENT			<1> ON <2> OFF
HARM. PA			<1> ON <2> OFF
TOTAL VAL			<1> ON <2> OFF
THD			<1> ON <2> OFF

Check Sheet No. _____

File name:	
Site name:	
Prepared by:	
Date issued:	

Table 8: Harmonic Output Order Setup

Item	User setting	CW240 setting
OUTPUT ORDER		<1> Saves ALL ORD. (1st to 50th) <2> Saves ODD ORD. <3> Saves EVEN ORD. <4> Allows you to select harmonic orders individually.

<1> ON <2> OFF

An asterisk (*) is displayed for a selected order number.

01	02	03	04	05	06	07	08	09	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

Table 9: Communication

Item	User setting	CW240 setting
RS-232 CONNECT		<1> Printer <2> PC
BAUD RATE		<1> Change If selected: Select one of the following items: 38400 bps / 19200 bps / 9600 bps / 4800 bps / 2400 bps / 1200 bps
DATA LENGTH		<1> 7 <2> 8
PARITY		<1> EVEN <2> ODD <3> NONE
STOP BIT		<1> 1 <2> 2
FLOW CONTROL		<1> OFF/OFF <2> XON/XON <1> XON/RS <2> CS/RS

Check Sheet No. _____

File name:	
Site name:	
Prepared by:	
Date issued:	

Table 10: Voltage Quality

Item		User setting	CW240 setting
VOLT. QUALITY MEAS.			<1> ON Measures voltage quality. <2> OFF Does not measure voltage quality.
STANDARD VOLTAGE			<1> Change If selected: Select one of the following items: 1000 V, 600 V, 480 V, 380 V, 346 V, 277 V, 240 V, 230 V, 220 V, 208 V, 202 V, 200 V, 120 V, 110 V, 101 V, 100 V
THRESHOLD VALUE	SWELL		110% 0 to 200%
	DIP		90% 0 to 100%
	INTERRUPTION		10% 0 to 100%
HYSTERESIS			Percent indication with respect to standard voltage (common to voltage swell, voltage dip, voltage interruption) 1% 0 to 10%

Check Sheet No. _____

File name:	
Site name:	
Prepared by:	
Date issued:	

Table 11: Hardware

Item	User setting	CW240 setting
LANGUAGE		<1> Change If selected: ENGLISH
BEEP		<1> ON Generates a beep each time an operation key is pressed. <2> OFF Turns off the beep.
BACKLIGHT AUTO OFF		<1> ON Automatically turns off backlight. <2> OFF Does not automatically turn off backlight.
LCD CONTRAST		Sets LCD contrast (1 to 8).
ID NUMBER		001 001 — 999
DATE AND TIME	Year/Month/ Hour/Min/Sec	Sets date and time (accurate time entry).

YOKOGAWA

Yokogawa M&C Corporation

YOKOGAWA M&C CORPORATION

International Sales Dept.
2-9-32 Nakacho, Musashino-shi, Tokyo, 180-8750 Japan
Phone: 81-422-52-5716 Facsimile: 81-422-55-8954

YOKOGAWA CORPORATION OF AMERICA (U.S.A.)
Phone: 1-770-253-7000 Facsimile: 1-770-251-2088

YOKOGAWA EUROPE B. V. (THE NETHERLANDS)
Phone: 31-334-64-1611 Facsimile: 31-334-64-1610

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Phone: 973-358100 Facsimile: 973-336100

LTD. YOKOGAWA ELECTRIC (RUSSIAN FEDERATION)
Phone: 7-095-737-7868 Facsimile: 7-095-737-7869

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