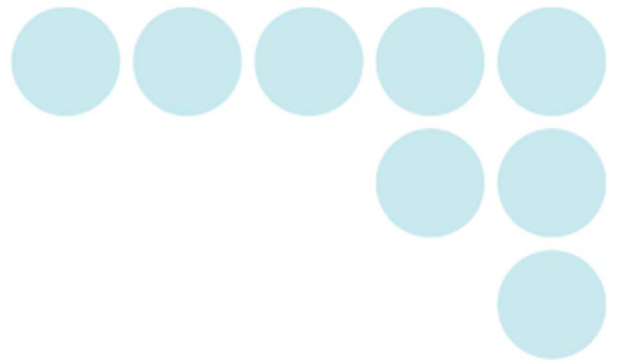




EQUO Series
Portable Power Monitor
ZN-CTX21



User's Manual

Introduction

Thank you for purchasing an EQUO Series CTX21 Portable Power Monitor.

This manual describes the information on the functions, performance and usage required to use the Portable Power Monitor.

Please observe the following when using the Portable Power Monitor:

- This product must be handled by specialists with electrical knowledge.
- Read this User's Manual thoroughly to be familiar with the product beforehand for correct operation.
- Keep this manual properly for future reference.

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Manual Type and Usage

The major contents of the manuals are shown below. Select and read the manual according to your need.

Included Manuals (Print)

Instruction Sheet

Describes the information to ensure the safe and proper use of the product, and information regarding ratings, performance and installation.

Startup Guide

Describes the basic procedures including the package content check, assembly, setting operation, recording operation and data display.

Manuals available from Website (PDF data)

User's Manual (This document)

Describes information to ensure the safe and proper use of the product

Describes package content items and detailed procedures for assembly, setting operation, recording operation and data display

Product specifications

Other necessary information required to use the Portable Power Monitor ZN-CTX21

Station Utility User's Manual

Describes the information of accessory, functions and operation of the PC software Station Utility.

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Precautions on Safety

●Meanings of Signal Words






For the safe operation of ZN-CTX21, this operation manual indicates the precautions by using the following marks and symbols. The precautions given here contain important information related to safety, and therefore must be observed.

The marks and symbols for the safety precautions are as follows:





 WARNING	Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or may result in serious injury or death. Additionally there may be significant property damage.
--	--

 CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage.
--	--




●Meaning of Precaution Symbols

	●Mandatory Requirement Indicates a general mandatory requirement.
	●Prohibition Indicates general prohibition.
	●Electric Shock Warning Warns against an electric shock under specific conditions.
	●Explosion Warning Warns against an explosion under specific conditions.
	●Disassembly Prohibition Indicates the possibility of accidents such as an electric shock caused by unit disassembly.

●Warning Indications

 WARNING	
The mounting magnets provided with the product have strong magnetism. If the product is mounted using these magnets, anyone wearing a heart pacemaker must not operate the product; or the product must not be in proximity of such a person.	
This product contains lithium batteries. Serious injury may occur due to fire or explosion. Do not attempt to disassemble the product, deform it by applying pressure, heat it in a high temperature (100°C or more), or burn it for disposal.	
The sensor head connector and the CT input circuit are not insulated. Do not connect the dedicated CT terminal and connection cable directly to AC or DC power supply. Extensive property damage, minor or moderate injury may be caused by the electrical flow through the product, if they are connected directly to AC or DC power supply.	

⚠ CAUTION

A minor or moderate injury or property damage may occur due to explosion. Do not use the product in an environment containing an inflammable or explosive gas.	
An electric shock may occur. Do not replace the batteries when the unit is clamped to a conductor for measurement.	
An electric shock may occur. Do not remove or insert a sensor head from/to the connector with the unit clamped to a conductor for measurement.	
An electric shock may occur. Make sure that the power of a conductor to be measured is turned OFF before clamping or detaching the unit to/from the conductor. Or wear insulating gloves if the power is not turned OFF.	
An electric shock may occur. Do not touch the terminal sections of the unit and the conductor to be measured when the unit is clamped to the conductor.	
An electric shock or minor injury as well as fire or unit malfunction may occur. Do not attempt to disassemble, repair or modify the product.	

Precautions for Safe Use

Observe the following precautions to ensure safe operation:

- Do not install the product in the places subject to exposure to water, oil, or chemical splashes.
- Only the provided AC adapter (not other) must be used when using AC power supply.
- If a voltage that exceeds the rated voltage is applied to the AC adapter, smoke may occur. Do not connect a power supply that exceeds the rated voltage. In a situation where a voltage higher than the rating is applied, use protective equipment so that the power supply voltage does not exceed the rated voltage.
- Dispose of the product as industrial waste.
- Use batteries correctly, only after reading and being familiarized with the precautions provided by the manufacturer.
- Do not apply strong shock to the product, or it may cause damage or malfunction. It is recommended to screw the product to mount it on the wall. Stop using the product when strong shock is applied.
- When inserting or removing an SD card, the AC adapter, alarm output cable, or sensor connector, securely hold the product to prevent it from dropping and being damaged.
- Do not bring the product close to magnetic products (e.g. magnetic cards), sensitive electronics equipment (e.g. computers or clocks), when the product is attached with the mounting magnets.
- Small pieces may be chipped off the mounting magnets when they are attracted to the surface. Make sure the pieces do not enter the eyes. Consult a medical doctor if this happens.
- When using the mounting magnets to install the product, take caution not to allow a finger to be caught between the product(s) and the magnetic surface.
- Do not install the product at a high place when using the mounting magnets.
- Apply an appropriate load to the alarm output terminals to prevent possible smoking.
- If liquid crystal leaks due to a damage to the LCD panel, take caution not to allow it to contact your skin, to be inhaled or swallowed. If it has contacted your skin or entered your mouth, seek medical attention.
- Do not touch the Portable Power Monitor terminals as well as the sensor head connector and the dedicated CT terminal when the unit is clamped to a conductor for measurement.
- The product cannot be used for measurement of the secondary circuit of an inverter.
- Take anti-static electricity measures (e.g. touching grounded metal object) when handling the product.
- Only the dedicated CT specified by OMRON must be used.

Dedicated CT: ZN-CT□□□-□A

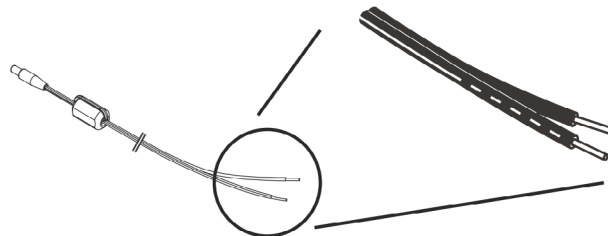
Precautions for Correct Use

1. Avoid installing the product in the following places:

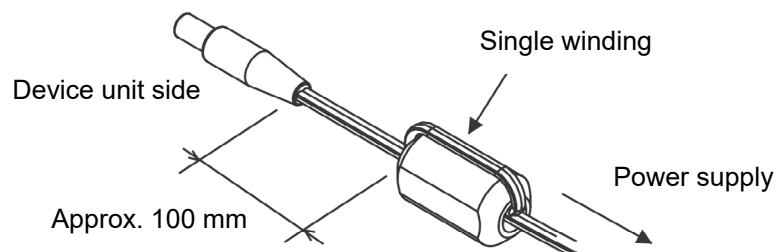
- Places exceeding the rated ambient temperature
- Places exposed to extreme temperature changes (where condensation occurs)
- Places subject to relative humidity exceeding the rated humidity range
- Places subject to corrosive or flammable gases
- Places subject to mist, droplets, coarse particles, fiber, salt, metal dust, or large amount of particles
- Places subject to direct shock or vibration
- Places subject to direct sunlight
- Places subject to exposure to water, oil, or chemical splashes
- Places subject to strong magnetic field or electric field
- Outdoors

2. Wiring

- Wire the product cable separately from high-voltage or power lines. Placing them in the same wiring or the same duct may cause induction, resulting in the product malfunction or damage.
- Make sure that the I/O terminals are inserted or removed with the power turned OFF. Doing this with the power ON may result in a malfunction.
- When using the provided DC cable, connect a wire with white line to the power supply (24 VDC \pm 3%), and connect a wire without the line to 0 V.



- Mounting a ferrite core can reduce noise affecting to or affected by other devices when supplying power with the DC cable. When using the provided DC cable, wind the provided ferrite core as shown below.



3. Battery use

- Do not mix new and old batteries, or ones of different types or manufacturers. Doing so may result in the product malfunction.
- Do not install batteries in wrong polarities.
- Always attach the battery cover during use. OMRON cannot be responsible for the product performance, if the batteries accidentally drop off the product due to the unattached battery cover.

- Remove the batteries when they are not used for a long time.
- Used batteries remaining installed for a long time may leak and corrode in the product.
- Do not disassemble or throw the battery into the fire.
- When the battery level is low, the product may repeatedly restart. If this happens, replace the batteries with new ones.
- Use the AC adapter when operating the product through a network, since network connection rapidly consumes batteries.

4. Battery disposal

- Battery disposal must follow the guidelines provided by local governments. Dispose of batteries in compliance with the relevant local regulations.

5. Mounting screw holes

- The screw holes provided on the product are M3 and 4 mm deep. Do not screw deeper than 4 mm, which may damage the product.

6. Measurement

- Provide a distance of 20mm or more between the dedicated CT and the product when the mounting magnets are used. Otherwise, measurement may be affected by the magnetism and therefore, may not be correct.
- Correct settings must be made specifically according to the object to be measured.
- This product is not categorized as "a specified measuring instrument" officially approved by an organization specified in relevant measurement acts. Therefore, the measured data provided by this product cannot be used for official energy certificates.

How to Read This Manual

■ Symbols Used in this Manual

Menu items that are displayed on the screen, windows, dialog boxes and other GUI elements displayed on the PC are indicated by brackets "[]".

■ Marks Used in this Manual

Important: Indicates essential information on the product operation and functions which requires special attention or caution.

Note: Shows operational tips or related useful information.

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Revision History

1. Product Overview

1.1 Features and Functions

(1) Portable Power Monitor for Easy Operation at Manufacturing Sites

The ZN-CTX21 Portable Power Monitor provides simplified wiring operation and measurement of power consumption (converted values) without stopping lines. Power data acquisition at operation sites now becomes easy, contributing to enhanced energy-saving efficiency.

(2) Network Connection

The measured values obtained from multiple Portable Power Monitor units can be acquired to a PC connected to the units via LAN cable by using the PC software. The individual Portable Power Monitors can be controlled from the PC to check or change their settings as well as start/stop the recording. (Refer to "Station Utility User's Manual" for details.)

Online real-time control of the entire network is also possible from the PC by using Wave Inspire ES, separately sold software.

(3) Recording to an SD Memory Card

The measured data can be recorded in the Portable Power Monitor. Up to approx. 6500 data items* can be accumulated in the internal memory, which enables the monitor to continue data recording even at an emergency network failure. The monitor allows its data accumulated in the internal memory to be output to an SD memory card in CSV format without stopping measurement. The data can be loaded and controlled on the PC.

* The internal memory can store the data continuously for approx. 105 minutes at the standard recording interval (1 second). Use an SD memory card for longer time of recording.

(4) Graph Display and Data Processing Software

The data output to an SD card or acquired to a PC through LAN connection can be displayed in graphs or processed online by using the PC software. The data items in different periods can be combined or data from multiple monitor units can be displayed simultaneously top to bottom on the screen. (Refer to "Station Utility User's Manual" for details.)

(5) Alarm Output

Alarm output terminals are provided on the Portable Power Monitor. The alarm is output when the integrated power value exceeds the upper limit. This feature provides 'visualization' of the power limit, allowing the operator to quickly handle problems. (Available in the NORM and HISPD measurement operation modes)

(6) Backup Batteries

This product provides an uninterruptible power supply consisting of two AAA batteries, which prevents recording operation from being stopped even at an accidental power outage or failure. Rechargeable nickel-metal hydride cells or alkaline dry cells can be used.

*1: Battery life depends on the measurement environment and conditions as well as the battery type and performance.

(7) Auto-range Switch

The Portable Power Monitor provides two measurement ranges: Normal and Small for each dedicated CT type. The monitor can automatically switch the measurement range to a small-scale range when the measured power level becomes approx. 5% or below the rated current. Highly precise low power level measurement is possible.

(8) High-speed Logging

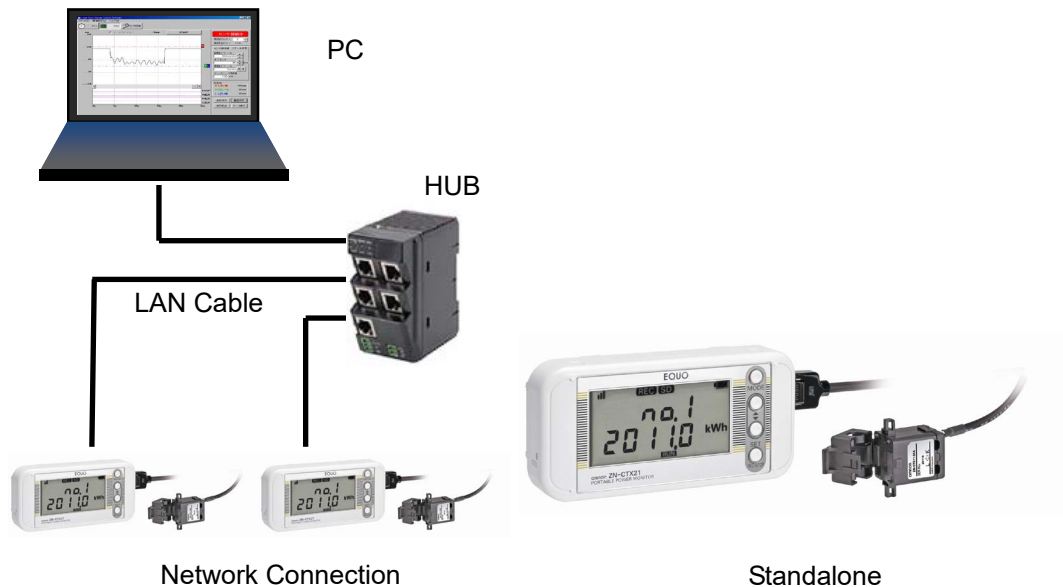
The Portable Power Monitor can provide the dedicated mode for more detailed measurement recording.

The measurement recording speed can be selected between 100ms at 50Hz or 83ms at 60Hz, which facilitates detailed analysis of power consumption changes (When the measurement mode is set to HISPD).

*2: Network functions cannot be used during high-speed logging.

1.2 Configuration

This product can be used in the following two types of configuration.



1.2.1 Standalone

Portable Power Monitors can be operated standalone without connecting them to a network. The measured data is recorded in the internal memory and can be loaded to a PC via an SD card. The recorded data in an SD card can be displayed in graphs using SD Viewer ES or Energy Viewer, software included in Station Utility. (Refer to "Station Utility User's Manual" for the PC software details.)

1.2.2 Network Connection

Portable Power Monitors can be connected to a PC via LAN. The following operations are available by using the PC software. (Refer to "Station Utility User's Manual" for the PC software details.)

(1) Remote Setting and Operation from PC

Settings on Portable Power Monitors (except for IP address settings) and recording start/stop operation can be controlled remotely from the PC by using the Station Utility (PC software) setting tool.

(2) Measured Data Acquisition to PC

The measured data on Portable Power Monitors can be acquired to the PC using the Station Utility (PC software) logging tool. The acquired data can be displayed in graphs offline on SD Viewer ES or Energy Viewer included in Station Utility.

1.3 Easy Power Measurement

- The Portable Power Monitor displays the measured momentary power during the power is ON.
- The monitor measures electric current values, which are then multiplied by a specified voltage and power factor (the ratio of effective power) to convert them into power values.
- A long press of the SET/REC/STOP key measures and displays an integrated power consumption.
- Another long press of the SET/REC/STOP key stops recording and the integrated power value up to that moment is displayed as a record in the ranking from the highest to lowest integrated power values. (Ranking Function)
- Up to 9 value records can be logged in the ranking. When the 10th record is added, the lowest integrated power value is deleted.
- The ranking can be cleared using the CLEAR menu item.
- The integral power consumption reset function is also available, which enables the operator to analyze the peak power by only using the monitor unit.

1.4 Setup and Operation Procedure

1.4.1 Standalone Operation

Check the package contents
⇒3.1 Checking the Package Contents

Check the required items
⇒3.2 Preparing the Required Items

Connect the sensor head, alarm output terminals and prepare the power supply
⇒3.3 Configuring the Unit

Install the Station Utility PC software
⇒"Station Utility User's Manual": 1. Overview and Preparation

Set the measurement conditions
⇒3.5 Setting the Measurement Conditions

Mount the product
⇒3.7 Mounting the Unit

Attach the dedicated CT
⇒3.8 Attaching Dedicated CT to Measurement Target

Make settings directly on the unit
⇒4 Setting the Unit (Unit Operation)

Record data by direct unit operation
⇒5 Measurement and Recording (Unit Operation)

Analyze short-period recording data
⇒"Station Utility User's Manual": 4. Momentary Value Display

Analyze long-period recording data
⇒"Station Utility User's Manual": 5. Integration and Summation

1.4.2 Operation via Network

Check the package contents
⇒3.1 Checking the Package Contents

Check the required items
⇒3.2 Preparing the Required Items

Connect the sensor head, alarm output terminals and prepare the power supply
⇒3.3 Configuring the Unit

Install the Station Utility PC software
⇒"Station Utility User's Manual": 1. Overview and Preparation

Set the measurement conditions
⇒3.5 Setting the Measurement Conditions

Connect the product to a network
⇒3.6 Connecting to Network

Mount the product
⇒3.7 Mounting the Unit

Attach the dedicated CT
⇒3.8 Attaching Dedicated CT to Measurement Target

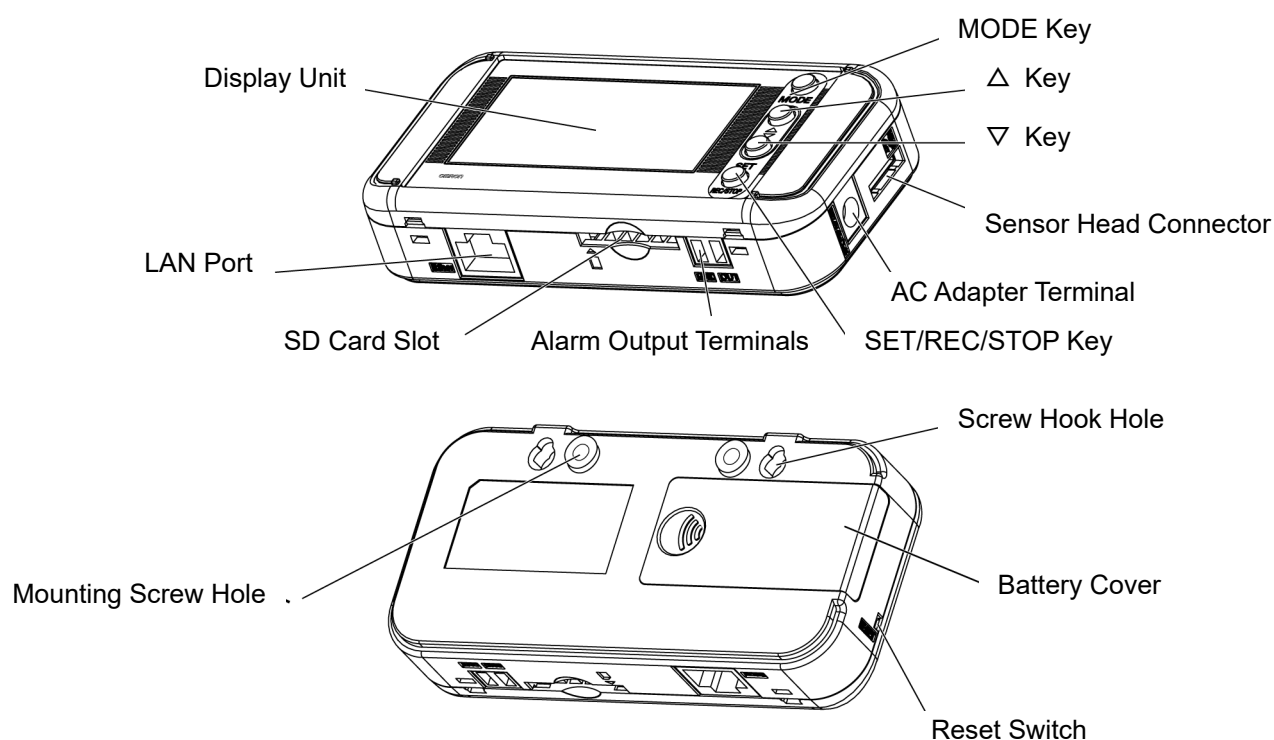
Record data to PC
⇒"Station Utility User's Manual":
3. Recording to PC

Remotely record data to the unit
⇒"Station Utility User's Manual": 2.
Remote Setting and Operation
Control from PC

Analyze short-period recording data
⇒"Station Utility User's Manual": 4. Momentary Value Display

Analyze long-period recording data
⇒"Station Utility User's Manual": 5. Integration and Summation





2. Part Name and Function



2.1 Display Unit



Display Unit

Indicator Definition	
Display	Definition/Function (When Displayed)
	An Integral power consumption reset interval is set. The setting is OFF when this is not displayed.
	Communication via LAN cable is in process.
LAN	A LAN cable is connected and network communication is ready.
REC	Data is being recorded in the internal memory. Blinking: The timer is set for the unit to wait for recording start.
SD	An SD memory card is inserted. Blinking: The SD card is being accessed.
ALM	An integral power consumption has exceeded the specified upper threshold value.
	Power is being supplied to the unit.
	The battery level is shown in 4 levels. Replace the batteries when this is blinking. This indication is not available when the measurement mode (MODE) is in NORM or HISPD.
Hi	Indicates the upper limit threshold value.
MAX	Indicates the maximum momentary power value.
MIN	Indicates the minimum momentary power value.
AVE	Indicates the average momentary power value.
RUN	The unit is currently operating in RUN mode.
FUN	The unit is currently operating in FUN mode.
THR	The unit is currently operating in FUN mode.

Refer to the Appendix for the definitions of alphabetical, numeric and principal message displays.

Refer to: Appendix, "Character Display List"

2.2 Control Unit

2.2.1 Control Key

Name	Function
MODE Key	Switches the operation mode. Resets an alarm or error (Long press). Cancels the setting before applying it.
Item Selection Key (△ Key)	Moves the setting items (Upward). Switches the display. Changes the setting value (Incremental).
Item Selection Key (▽ Key)	Moves the setting items (Downward). Switches the display. Changes the setting value (Decremental).
SET/REC/STOP Key	Applies the setting value or changes. Starts/stops recording (Long press). Saves the recorded data to the SD memory card.

2.2.2 Reset Switch

The reset switch is provided inside the aperture on the unit left side. Use a thin wire or similar object to press the switch. The unit resets itself.

Do not touch the front keys when the unit is in reset process, until the power indication is displayed.

Reset operation does not initialize the settings made on the unit.

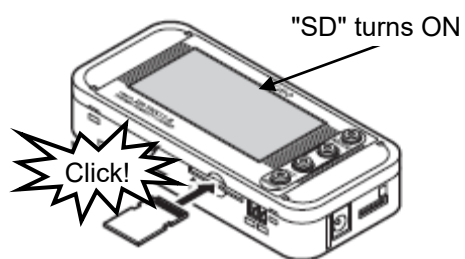
2.2.3 Inserting/Removing SD Card

This product provides an SD card slot for SD memory card operation such as writing the measured data recorded in the internal memory to the card, and writing/reading the setting data to/from the card.

Important

- Secure the unit firmly when inserting/removing an SD card. It is essential especially when the unit is mounted using the screw hook holes. If the card is inserted/removed without securing the unit, the unit may be detached from the hooks and drop on the floor, damaging itself.
- Do not remove the SD card when the "SD" display is blinking. Doing so may destroy the data in the SD card.
- Do not touch the metal terminal of the SD card.
- Make sure that the SD card does not bend.
- Avoid static electricity when inserting/removing an SD card.
- Do not enable the write-protection of the SD card.

(1) Inserting SD Card



- (1) Insert an SD card into the SD card slot with the metal terminal facing up.
- (2) Push the card inward until it clicks.
- (3) "SD" appears on the display.

(2) Removing SD Card

- (1) Push the inserted SD card inward until it clicks.
- (2) Stop pushing and let the card pops out. Take caution not to drop the card.
- (3) "SD" on the display disappears.

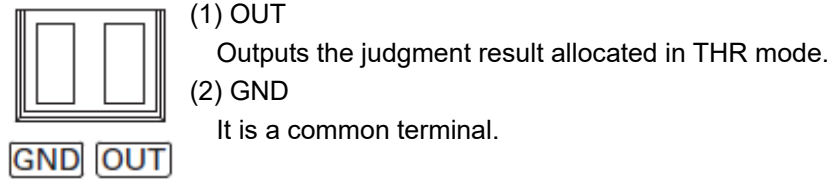
Important

- If an SD card is unformatted, format it before inserting it into the SD card slot.
- For SD card format software distribution page, refer to the following URL.
https://www.sdcard.org/downloads/formatter_4/

2.3 Input/Output Specifications

2.3.1 Alarm Output

(1) Alarm Output Terminals



The terminal names are inscribed on the unit.
Use the provided alarm output connector for wiring.

(2) Output Specifications

External power supply voltage	12 to 24 VDC $\pm 10\%$
Load current	45 mA max.
ON residual voltage	1.2 V max.
OFF leakage current	0.1 mA max.
Internal circuit diagram	

Important

- Do not connect the external power supply directly between OUT and GND.
Note that it must be connected through a load.
- An alarm cannot be output when the measurement mode (MODE) is set to "SLEEP".

3. Check and Preparation

3.1 Checking the Package Contents

This product package includes the following items:

<input type="checkbox"/> Main Unit ZN-CTX21	1
<input type="checkbox"/> AC Adapter or DC cable	1
<input type="checkbox"/> Alarm Output Connector	1
<input type="checkbox"/> Instruction Sheet	1
<input type="checkbox"/> Startup Guide	1
<input type="checkbox"/> Mounting Magnet (Pre-installed)	2

3.2 Preparing the Required Items

The following items are required to use this product.

(1) Common

- ☐ Dedicated CT: ZN-CT□□□1-□A 1 (Sold separately)
Up to three units can be connected when using a branch cable (ZN-CTM11-C)
- ☐ PC (personal computer) for the PC software 1
Refer to: 3.4.2 Operating Environment
- ☐ SD Memory Card (SDHC compatible) 1
Used to save measured data or to relocate the data (When recording in a Portable Power Monitor unit)
Recommended: HMC-SD291 (2 GB)
- ☐ AAA batteries (when using battery power supply) 2
Alkaline dry cells or nickel-metal hydride cells (Ni-MH)

Important

- Manganese battery cells cannot be used.
- Use two batteries of the same type. Do not mix new and used batteries.

(2) Network Connection

- ☐ LAN Cable (10BASE-T or 100BASE-TX; Safety Category 5e or higher; Straight Type)
- ☐ LAN Connection HUB (for 10BASE-T or 100BASE-TX)

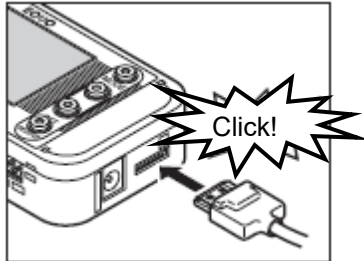
Note

- Generally, Portable Power Monitors should be connected to a PC via a HUB.

3.3 Configuring the Unit

3.3.1 Connecting Dedicated CT

The separately sold dedicated CT of ZN-CT□□1-□A or ZN-CTM□□-□A CT is required to use this product.



Insert the dedicated CT in the sensor head connector until it clicks.

Important

- A branch cable (ZN-CTM11-C) is required when using ZN-CTM□□-□A. For connecting method, refer to the instruction sheet of ZN-CTM□□-□A.
- Do not insert or remove the CT unit to/from the sensor head connector when a conductor for measurement is clamped.
- Do not insert or remove the sensor head to/from the connector when the unit power is ON.
- The dedicated CT may be damaged if either of the above happens.

3.3.2 Using Alarm Function

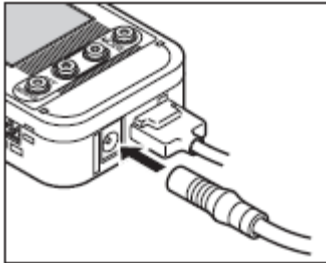
Use the provided alarm output connector to connect the OUT and GND alarm output terminals to the load according to the output specifications.

Refer to: 2.3.1 Alarm Output

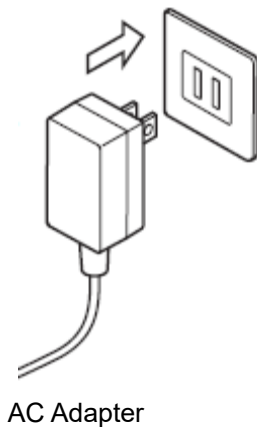
3.3.3 Preparing Power Supply

An external power supply or batteries can supply power to this product.

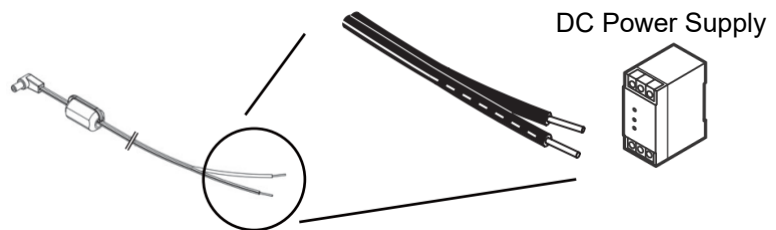
(1) Connecting to External Power Supply



(1) Insert the AC adapter or DC cable plug into the power supply terminal on the unit.



(2) Connect the AC plug of the AC adapter to an outlet (100 VAC to 240 VAC) when using AC power supply. To use DC power supply, connect the white-lined wire of the DC cable to the power input (24 VDC \pm 10%) and the non-lined wire to 0V.



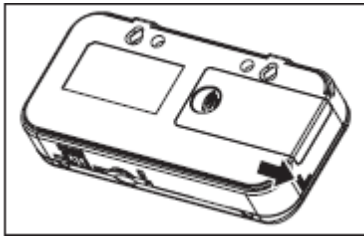
Important

- Use the provided AC adapter when using AC power supply.
- Use the provided DC cable when using DC power supply.
- Do not use batteries when connecting the unit to a network. (Batteries are rapidly consumed.)

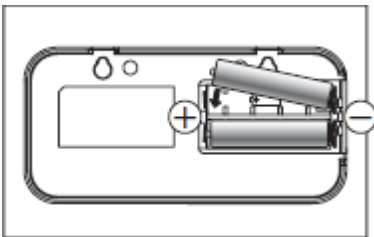
Note

- A power switch is not provided on the unit. The unit starts operation immediately when the power is supplied.
- The external power supply is normally used as the primary power source when both external power supply and batteries are provided in the configuration. Batteries are used when the external power supply fails due to power outage or other reason. The unit automatically switches to the battery supply in such an event provided the batteries are mounted in the unit.

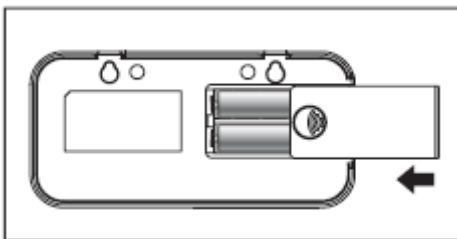
(2) Using Batteries



(1) Slide the battery cover off the rear side of the unit.



(2) Mount two batteries to the correct polarities in the battery compartment.



(3) Slide the battery cover on to close the battery compartment.

Important

- Take caution not to insert the batteries in the wrong polarities. The unit may be damaged if this happens.
- Use two batteries of the same type and model. Do not mix new and used batteries.

Note

- It is recommended that the SLEEP measurement mode is entered when using battery power supply.
- The AC adapter is used as the primary power source when both AC adapter and batteries are connected to the unit. The unit automatically switches to the battery source when the AC power supply is discontinued due to power failure or other reason.
- A power switch is not provided on the unit. The unit starts operation immediately after the batteries are installed.
- Rechargeable batteries (if they are used) must be charged prior to use. The unit does not provide a battery charging feature.

3.3.4 Checking Operation

After the power is turned ON, the type name and version are displayed for a while. Then, the power information appears on the display.

Press ▽ or △ keys to change the display while the "RUN" indicator at the bottom of the display is ON.

Refer to: 5.3 Screen Transition in RUN Mode

Important

- Do not touch the front keys until the power information appears on the display after the power is ON.

3.4 Station Utility PC Software Overview and Preparation

3.4.1 Overview

Station Utility PC software consists of four principal functions. Refer to "Station Utility User's Manual" for details.

(1) Setting Tool

This function provides remote operations including measurement condition settings (except for some settings), recording start and stop on the PC for remotely located Portable Power Monitors.

(2) Logging Tool

The function acquires the measured data from Portable Power Monitors to the PC via network.

The measured data in the monitors also can be displayed on the PC.

(3) Momentary Value Display (SD Viewer ES)

The tool provides the graph displays offline of the data acquired to the PC using the logging tool or the Portable Power Monitor data recorded to the SD memory card. It can also combine multiple data items recorded in different periods or provide a concurrent display of multiple data items recorded in different periods or with different Portable Power Monitors. Detailed power value changes in interaction with other devices at the operation site can be observed.

(4) Integration and Summation Tool (Energy Viewer)

The tool provides summations of data acquired to the PC using the logging tool or Portable Power Monitor data recorded to the SD memory card. The unit of summation periods can be changed and pre-selected summation items on multiple Portable Power Monitor units can be displayed in graphs with this tool. It also provides the comparison of the current data with past summation data. Longer-term (e.g. daily or monthly) power value changes at the operation site can be observed.

3.4.2 Installation

Install Station Utility on the PC.

Refer to "Station Utility User's Manual": 1.3 Operating Environment and 1.4 Installation, for the installation procedure.

3.5 Setting the Measurement Conditions

Set the measurement conditions for the object to measure. The measurement conditions include six items: the number of channels to use (USECH), the measurement target circuit (TYPE), the dedicated CT type (CT), the voltage of the measurement target (VOLT), power factor (PF) and frequency (FREQ).

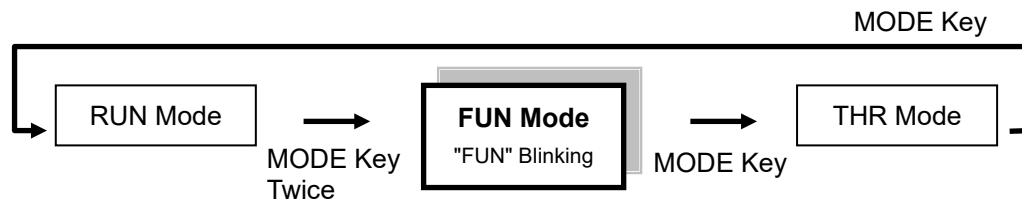
Note

Refer to the sections below for details on messages displayed on the display unit and operational key functions.

Refer to: 2.1 Display Unit, 2.2 Control Unit, and 4.2 Setting (FUN Mode Operation)

(1) Switching to "FUN" Mode

"FUN" mode should be entered for setting measurement conditions. Press the MODE key until the "FUN" indicator at the right of the display starts blinking.



(2) Setting the Number of Channels to Use (USECH) (Example: 2 Channels)

CLEAR ("FUN" Blinking)	Press the ∇ or Δ key until "USECH" appears at the upper row on the display.
↓ ∇ or Δ Key	
USECH 2CH	Check if "2CH" is displayed at the lower row. If it is displayed, the number of channels has been already set to "2", and no other setting is required. If the above is not displayed, press the SET/REC/STOP key. The lower row indication starts blinking.
↓ SET/REC/STOP Key	
USECH 1CH ↑ Blinking	Press the ∇ or Δ key to display "2CH" at the lower row.
↓ ∇ or Δ Key	
USECH 2CH ↑ Blinking	Press the SET/REC/STOP key to apply "2CH" for the number of channels to use. The blinking at the lower row stops.
↓ SET/REC/STOP Key	
USECH 2CH	Next, proceed to the measurement target circuit type (TYPE) and dedicated CT type (CT) settings.

(3) Setting Measurement Target Circuit (TYPE) and Dedicated CT Type (CT)

Set the measurement target circuit (TYPE) and dedicated CT type (CT) in the same way as the previous setting.

Refer to the FUN mode description for the measurement target circuit and dedicated CT type details.

Reference: 4.2.4 (13) Measurement Target Circuit (TYPE), 4.2.4 (14) Dedicated CT Type (CT)

(4) Setting Voltage of Measurement Target (VOLT) (Example: 100.0V)

Display (Upper/Lower)	Operation
CT 200A ("FUN" Blinking)	Press the ∇ or Δ key until "VOLT" appears at the upper row on the display.
↓ ∇ or Δ Key	
VOLT 220.0	Press the SET/REC/STOP key. The lower row indication starts blinking.
↓ SET/REC/STOP Key	
VOLT 220.0 ↑ Blinking	Press the ∇ or Δ key to display "100.0" at the lower row. Note A long press of the ∇ or Δ key can rapidly change the values in Decremental or incremental steps.
↓ ∇ or Δ Key	
VOLT 100.0 ↑ Blinking	Press the SET/REC/STOP key to apply "100.0" for the measurement target voltage. The blinking at the lower row stops.
↓ SET/REC/STOP Key	
VOLT 100.0	Next, proceed to the power factor (PF) and frequency (FREQ) settings.

(5) Setting Power Factor (PF) and Frequency (FREQ)

Set the power factor (PF) and frequency (FREQ) in the same way as the previous setting. Refer to the FUN mode description for the power factor and frequency details.

Reference: 4.2.4 (16) Power Factor (PF), 4.2.4 (17) Frequency

3.6 Connecting to Network

Network settings are required on the Portable Power Monitors to be connected to a network. Connect the LAN cables after completing the network settings on the Portable Power Monitor units.

Important

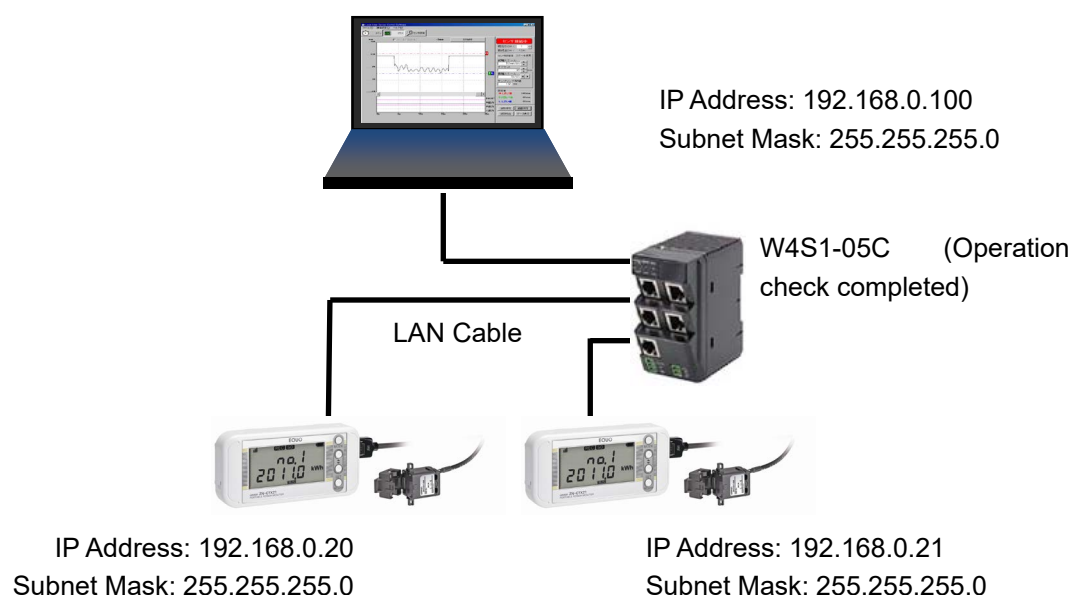
- A full understanding of LAN is required to connect Portable Power Monitors to a network.
- Establish a dedicated LAN for connecting Portable Power Monitors to a network.
- Connection to an in-house network or an existing LAN requires caution, since specific restrictions or rules may have been applied to the IP address management. Consult your network administrator. In case that such a network is used, however, OMRON cannot guarantee the performance of the Portable Power Monitors and the PC software.
- The measurement operation mode (MODE) still must be set to "NORM" if the IP address and subnet masks settings use its default values. Also set the network function availability (NET) to "ON". Network connection is not possible when "SLEEP" or "HISPD" measurement mode (MODE) is entered.

3.6.1 Preparation

Define the IP addresses and subnet masks to use before establishing network connection.

Setting Example

Portable Power Monitor IP Address	(Unit 1): 192.168.0.20 (Factory default) (Unit 2): 192.168.0.21
PC IP Address	192.168.0.100
Subnet Mask	255.255.255.0 (Factory default)



Note

- Portable Power Monitors are assigned by the IP address: 192.168.0.20, and subnet mask: 255.255.255.0 as the factory defaults.
- The IP addresses of Portable Power Monitors and the PC must be individually unique

and must not overlap one another in the network. In the example above, Portable Power Monitor Unit 2 is assigned with "192.168.0.21", the PC, "192.168.0.100", changing the fourth value (segment) of the IP address of the monitor Unit 1, in order to distinguish among the units connected.

- Set the same subnet mask value to the Portable Power Monitors and PC to be connected in the network.
- To change the subnet mask, contact your network administrator. If the subnet mask is changed from 255.255.255.0, the fourth segment of the IP addresses of the Portable Power Monitors and PC in the network still must be distinguished from one another.
- The setting range of the individual segments of IP address and subnet mask is 0 to 255.

3.6.2 Setting Portable Power Monitor IP Address

This section explains the procedure to set the IP address for Portable Power Monitor Unit 2 (Example: Change the factory default "192.168.0.20" to "192.168.0.21").

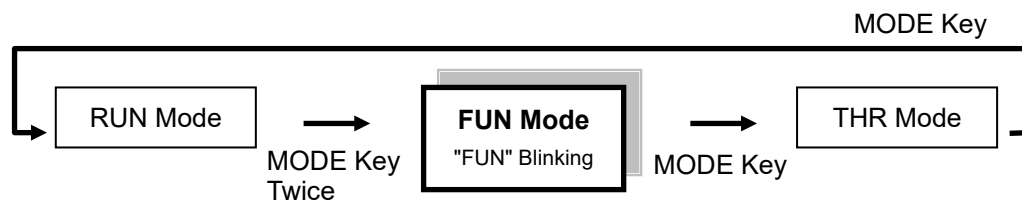
Note

- Refer to the sections below for details on messages displayed on the display unit and operational key functions.

Refer to: 2.1 Display Unit and 2.2 Control Unit

(1) Switching to "FUN" Mode

"FUN" mode should be entered for changing the IP address. Press the MODE key until the "FUN" indicator at the right of the display starts blinking.



(2) Setting ETC and IP to “DISP”

Display (Upper/Lower)	Operation
CLEAR 10s ("FUN" Blinking)	Press the ▽ or △ key until "ETC" appears at the upper row on the display.
↓ ▽ or △ Key	
ETC OFF	Press the SET/REC/STOP key. "OFF" at the lower row starts blinking.
↓ SET/REC/STOP Key	
ETC OFF ↑ Blinking	Press the ▽ or △ key to display "DISP".
↓ ▽ or △ Key	
ETC DISP ↑ Blinking	Press the SET/REC/STOP key to apply "DISP". Blinking stops.
↓ SET/REC/STOP Key	
ETC DISP	Press the ▽ or △ key to display "IP" at the upper row.
↓ ▽ or △ Key	
IP OFF	Press the SET/REC/STOP key. "OFF" at the lower row starts blinking.
↓ SET/REC/STOP Key	
IP OFF ↑ Blinking	Press the ▽ or △ key to display "DISP".
↓ ▽ or △ Key	
IP DISP ↑ Blinking	Press the SET/REC/STOP key to apply "DISP". Blinking stops.
↓ SET/REC/STOP Key	
IP DISP	Proceed to the IP address setting procedure.

(3) Changing IP Address (from factory default: 192.168.0.20 to 192.168.0.21)

Display (Upper/Lower)	Operation
IP DISP	Display the first segment of the IP address. Press the ▽ or △ key until "P 1" appears at the upper row.

↓ ▽ or △ Key

IP 1 192	Check that "192" is displayed at the lower row, and press the ▽ key. If "192" is not displayed, change the value referring to the changing "IP 4" example shown later.
-------------	---

↓ ▽ Key

IP 2 168	Check that "168" is displayed at the lower row, and press the ▽ key. If "168" is not displayed, change the value referring to the changing "IP 4" example shown later.
-------------	---

↓ ▽ Key

IP 3 0	Check that "0" is displayed at the lower row, and press the ▽ key. If "0" is not displayed, change the value referring to the changing "IP 4" example shown later.
-----------	---

↓ ▽ Key

IP 4 20	Press the SET/REC/STOP key to change the value displayed at the lower row to "21".
------------	--

↓ SET/REC/STOP Key

IP 4 020 ↑ Blinking	The value starts blinking. Press the ▽ or △ key to change the value to "21".
---------------------------	--

↓ ▽ or △ Key

IP 4 021 ↑ Blinking	Press the SET/REC/STOP key to apply the value. Blinking stops.
---------------------------	--

↓ SET/REC/STOP Key

IP 4 21	To check or change the subnet mask, press the ▽ key to display "SUB1" at the upper row.
------------	---

↓ ▽ Key

Check that SUB1 to SUB4 are set to 255, 255, 255 and 0 respectively and apply them in the same way as the procedure above.

After the settings for IP 1 to IP 4 and SUB1 to SUB4 are completed, press the MODE key.

"RESET" is displayed and the unit resets itself.

3.6.3 Setting the PC IP Address

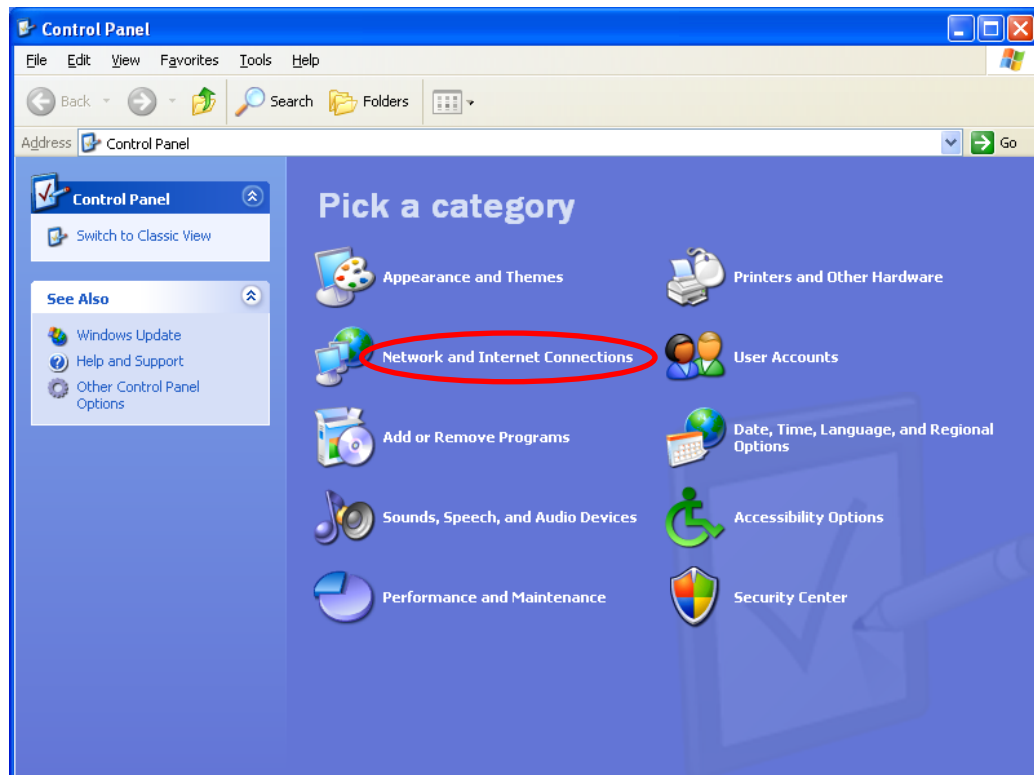
This section describes the procedure to change the IP address of the PC to "192.168.0.100".

Login with a user account with administrator/manager authority, which is required to change the IP address of the PC.

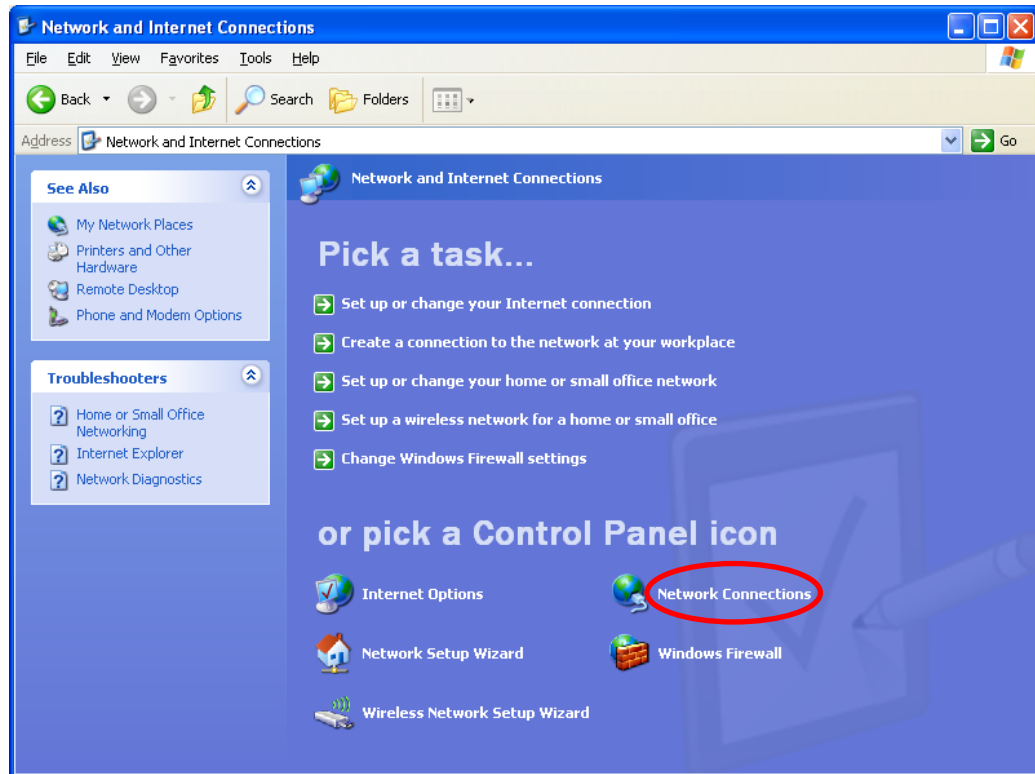
(1) Windows XP

Follow the procedure below to set the IP address.

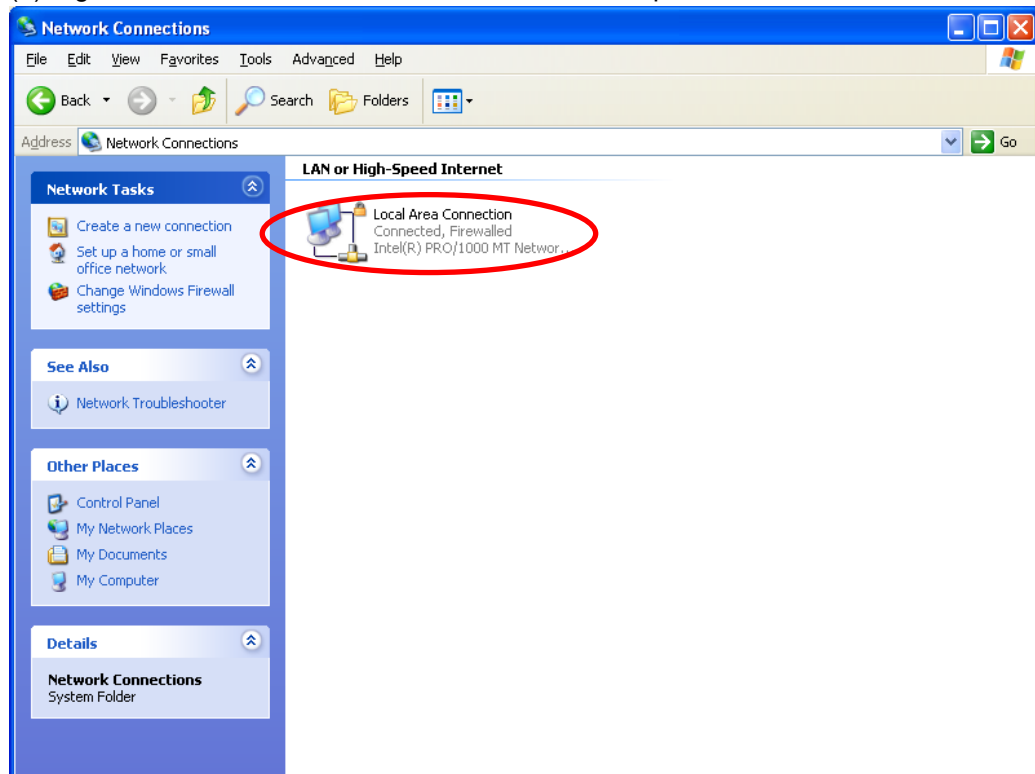
(1) Select "Start menu" – "Control Panel" to display the Control Panel and click "Network and Internet Connections".



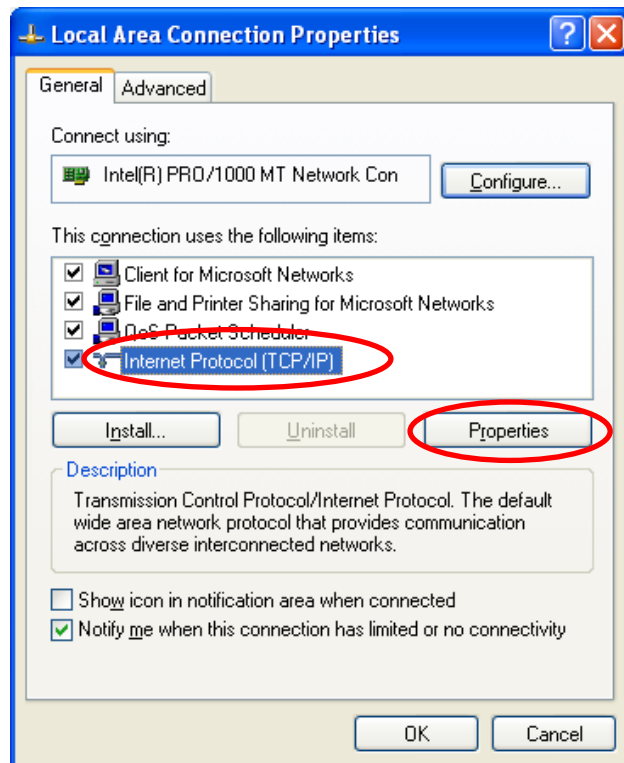
(2) Click “Network Connections”.



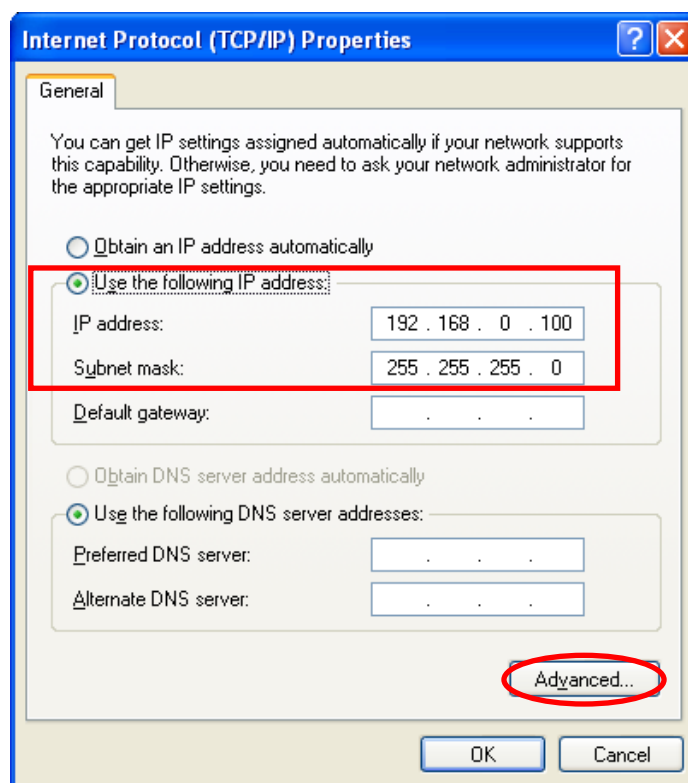
(3) Right-click “Local Area Connection” and select “Properties”.



(4) Highlight "Internet Protocol (TCP/IP)" and click "Properties".



(5) Select "Use the following IP address" and set "IP address" to "192.168.0.100" and "Subnet mask" to "255.255.255.0". Press "OK" to close the window.

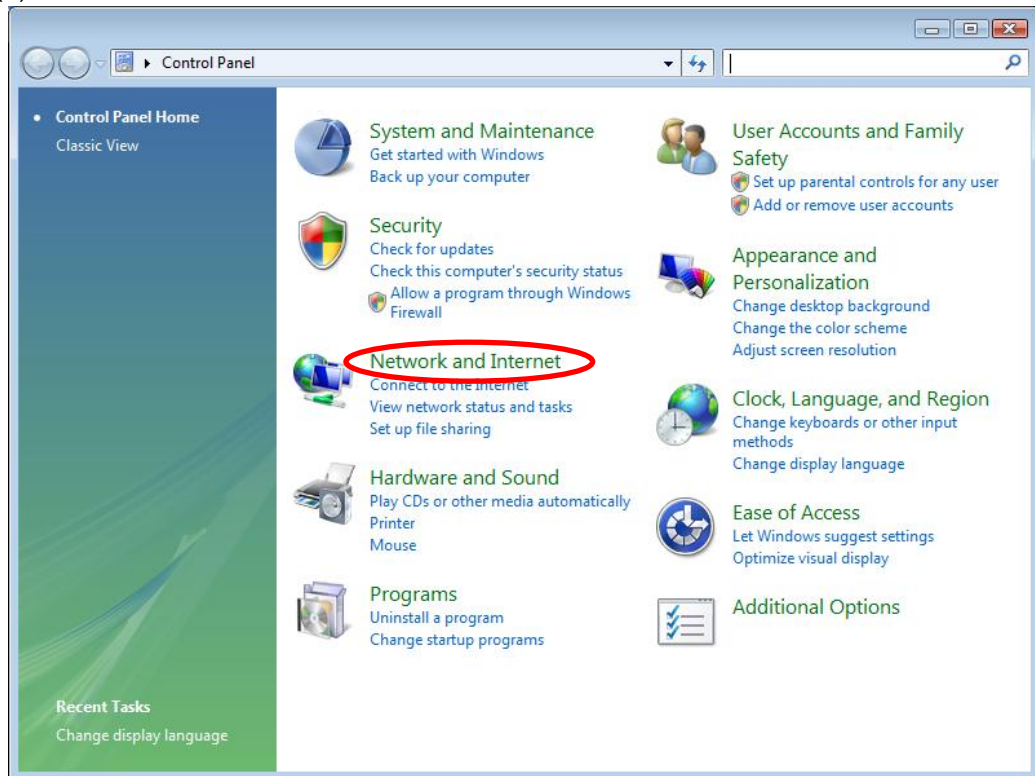


(6) Click "OK" in the "Local Area Connection Properties" window. The window closes.

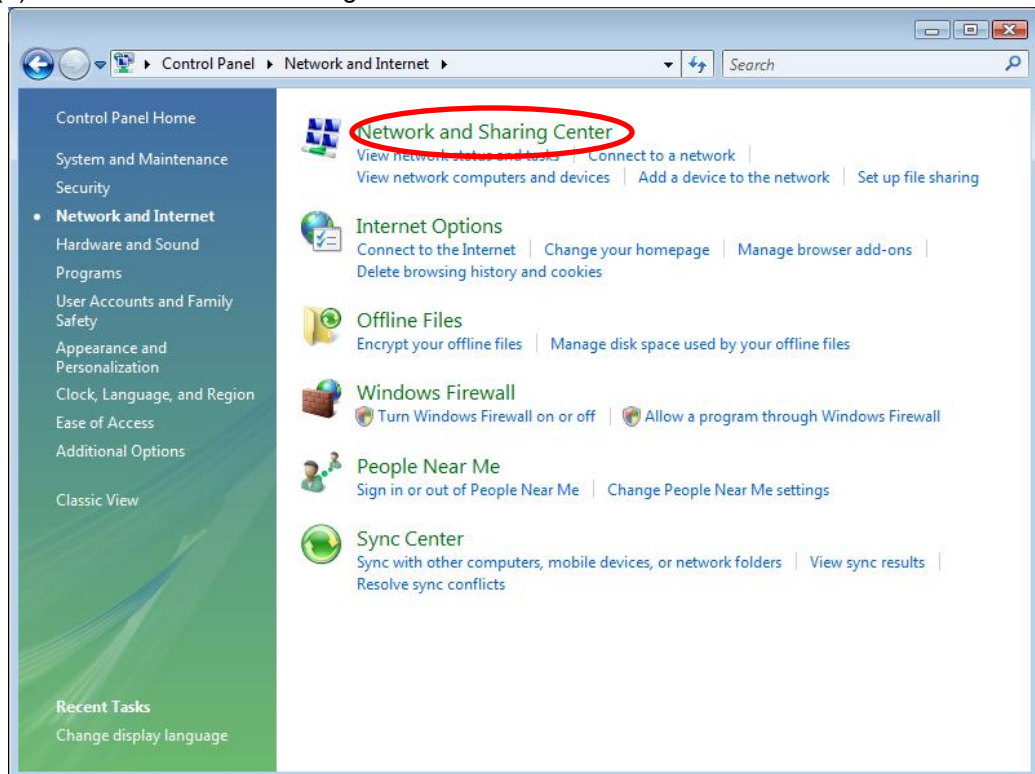
(2) Windows Vista

Follow the procedure below to set the IP address.

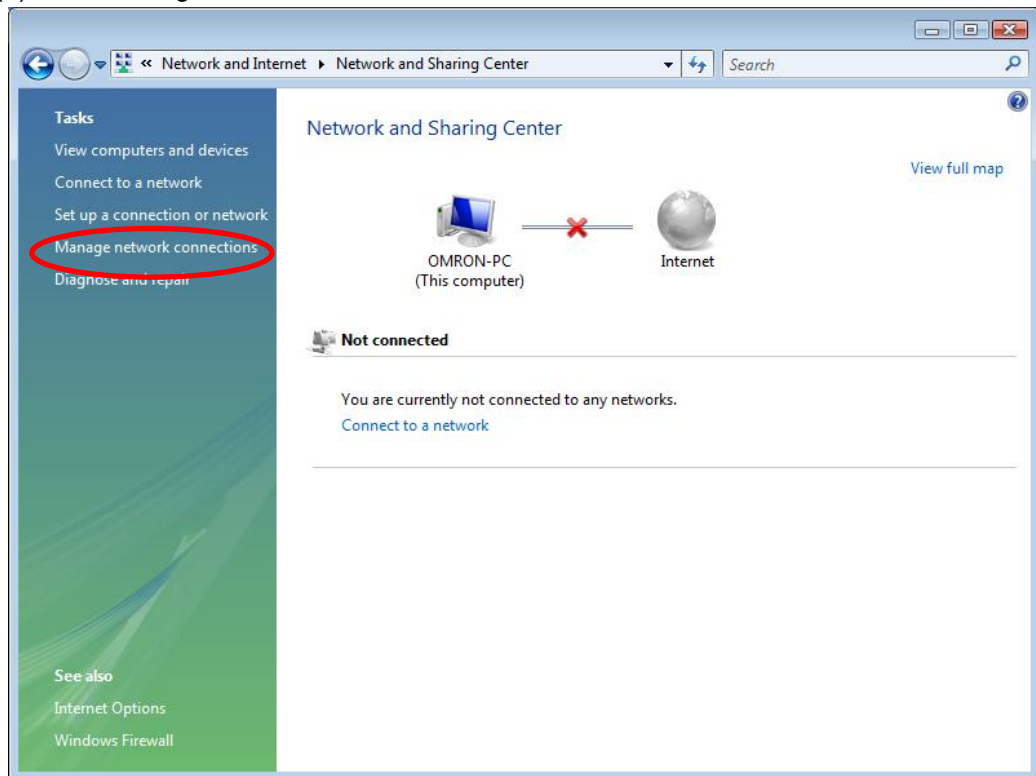
(1) Select “Start menu” – “Control Panel” and click “Network and Internet”.



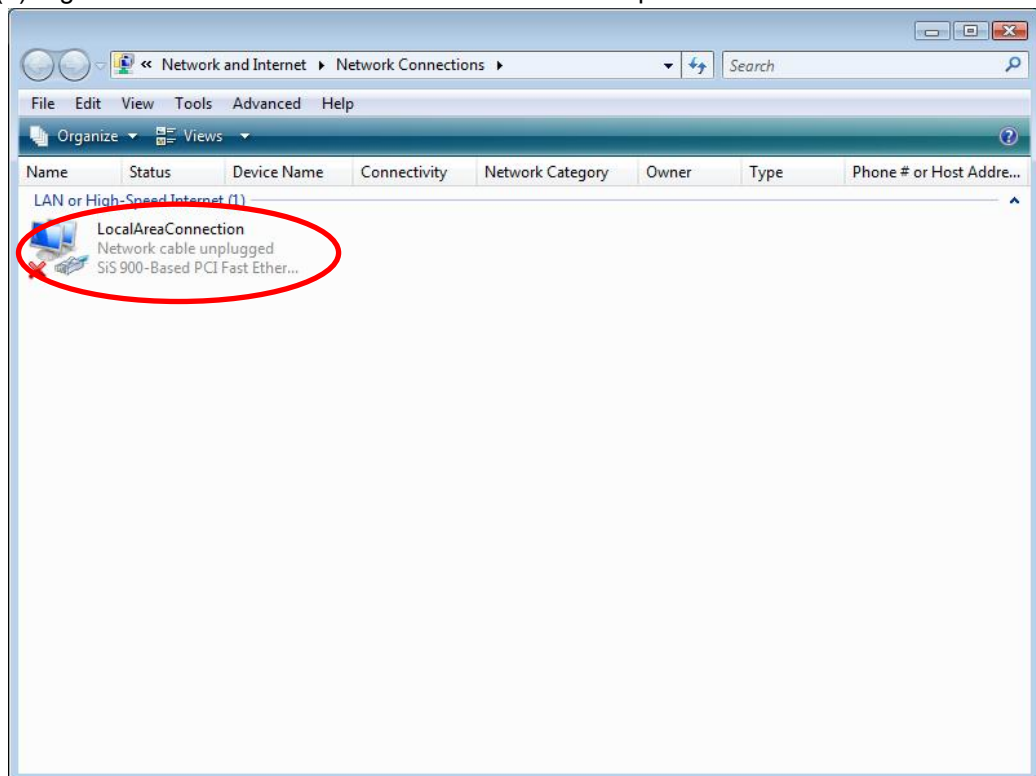
(2) Click “Network and Sharing Center”.



(3) Click “Manage network connections”.

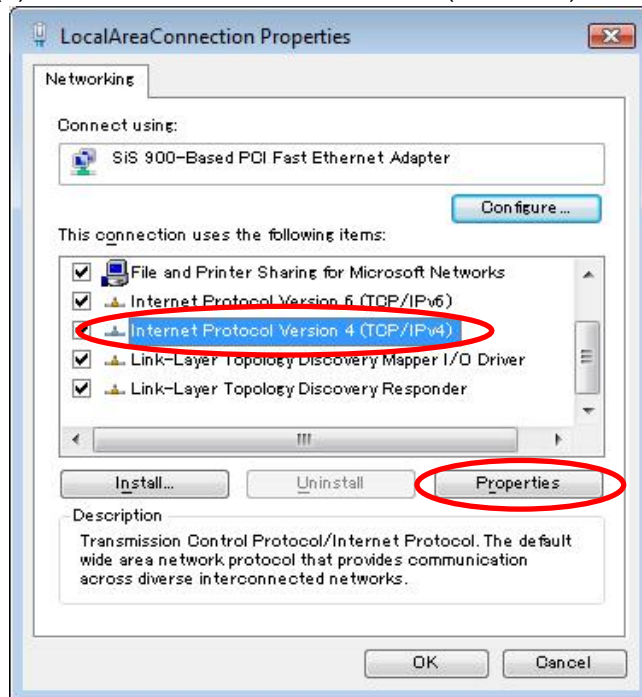


(4) Right-click “Local Area Connection” and select “Properties”.

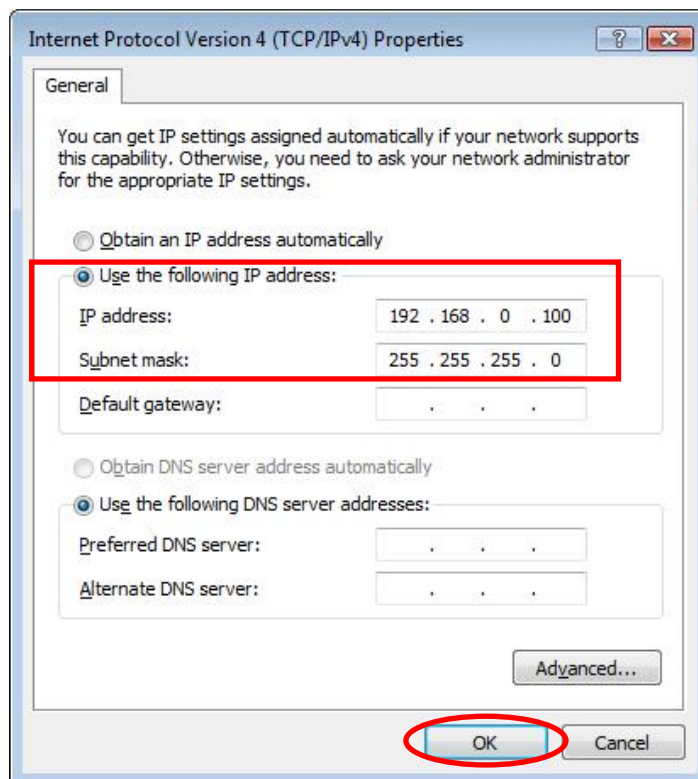


(5) When the “User Account Control” window appears, click “Continue”.

(6) Select “Internet Protocol Version 4 (TCP/IPv4)” and click “Properties”.



(7) Select “Use the following IP address” and set “IP address” and “Subnet mask”. Click “OK” to close the window.

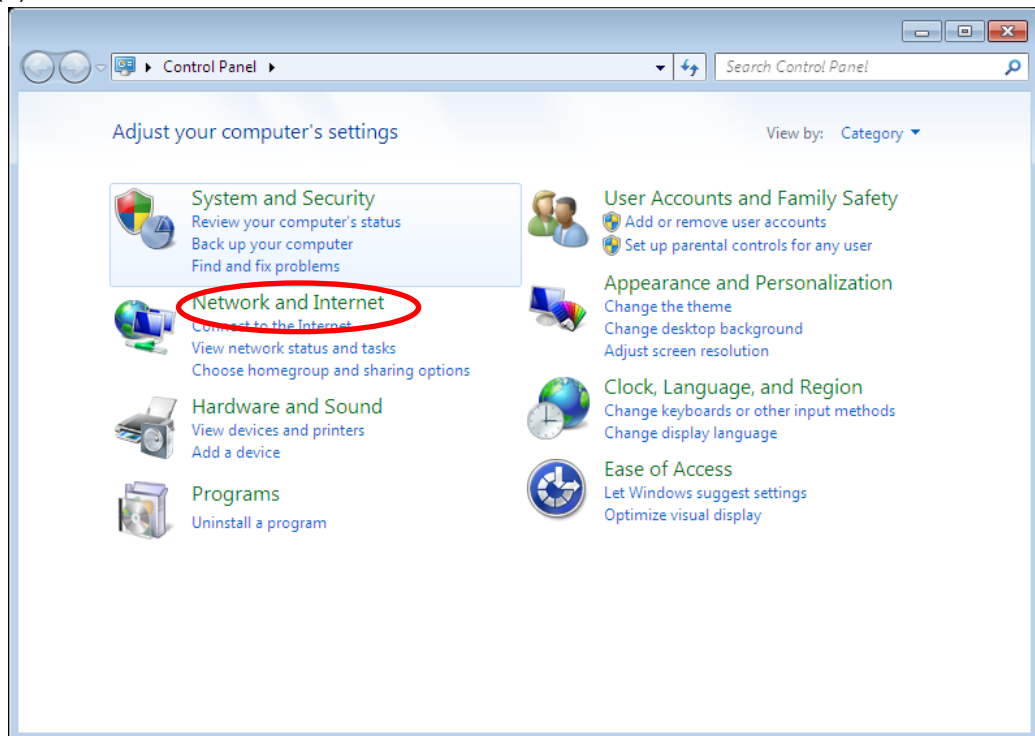


(8) Click "Close" in the “Local Area Connections Properties” window. The window closes.

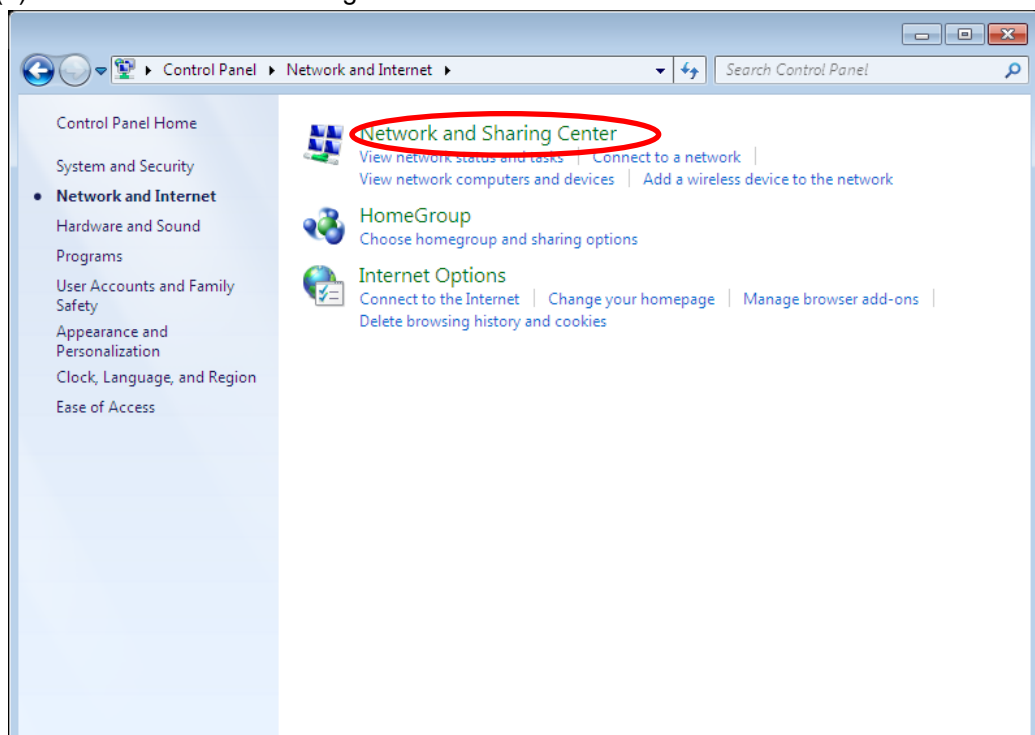
(3) Windows 7

Follow the procedure below to set the IP address.

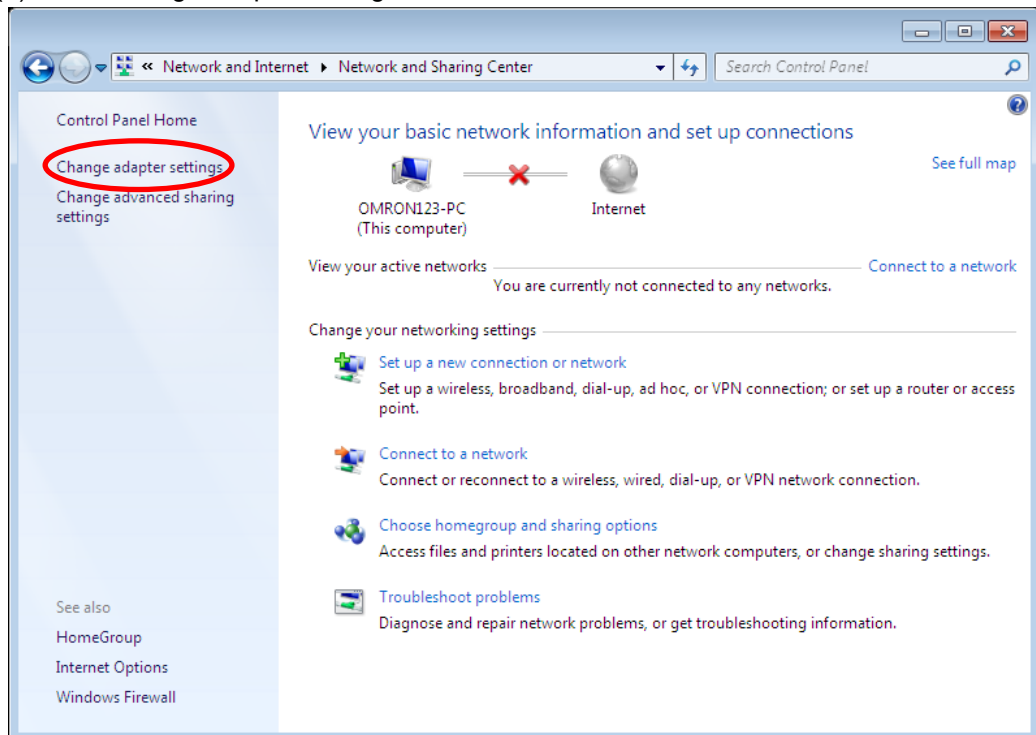
(1) Select “Start menu” – “Control Panel” and click “Network and Internet”.



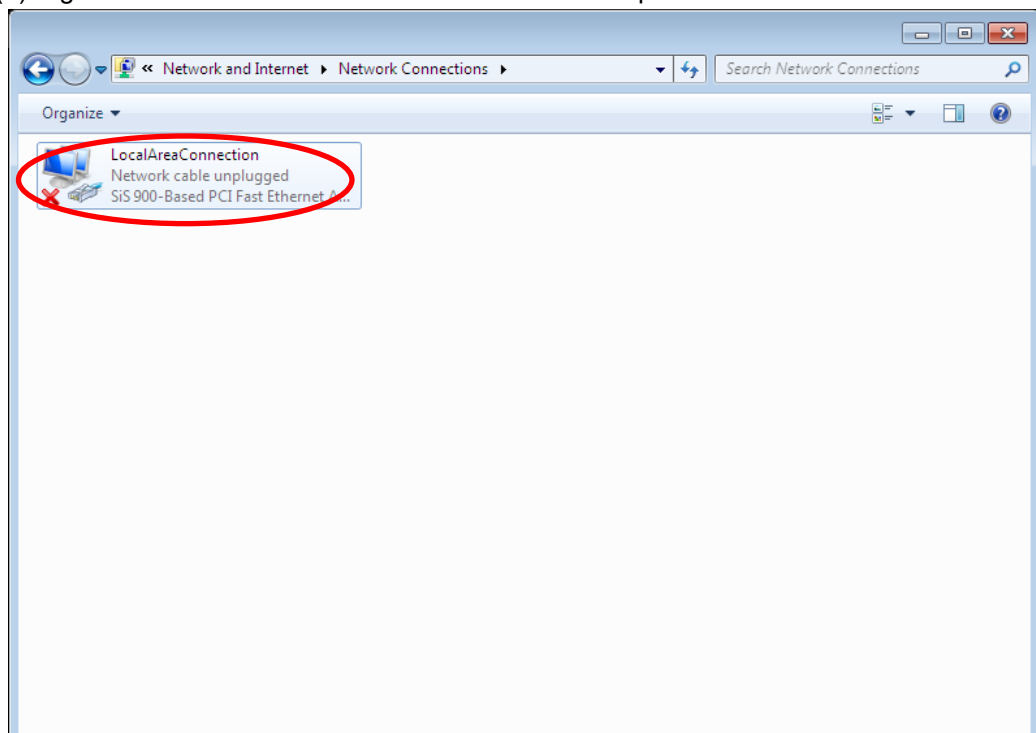
(2) Click “Network and Sharing Center”.



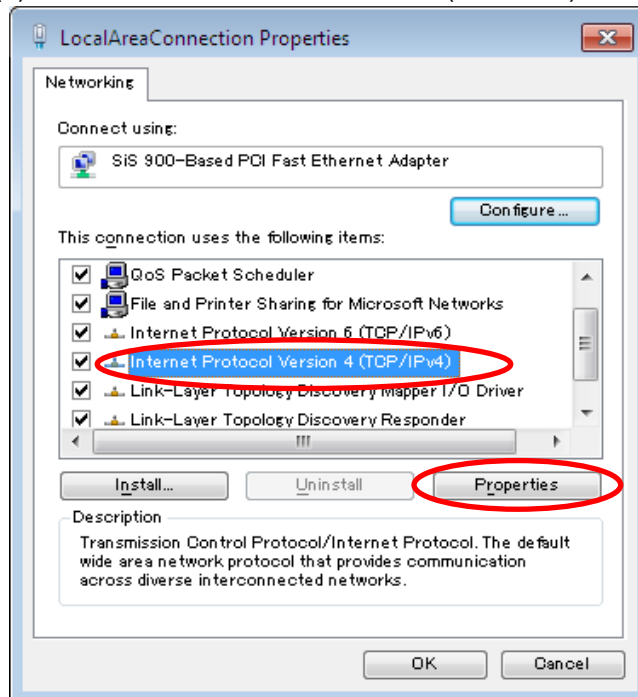
(3) Click “Change adapter settings”.



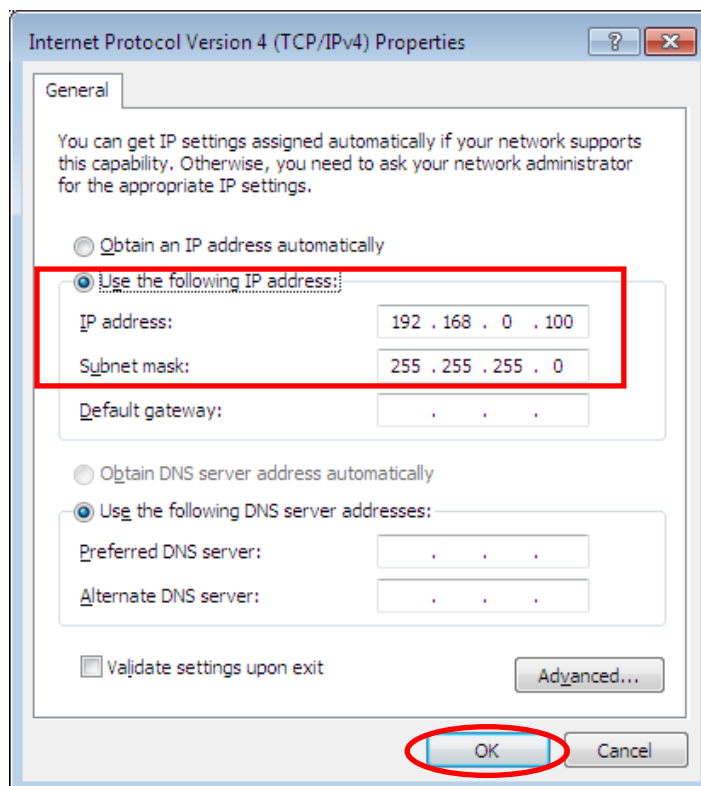
(4) Right-click “Local Area Connection” and select “Properties”.



- (5) Select “Internet Protocol Version 4 (TCP/IPv4)” and click “Properties”.



- (6) Select “Use the following IP address” and set “IP address” and “Subnet mask”. Click “OK” to close the window.

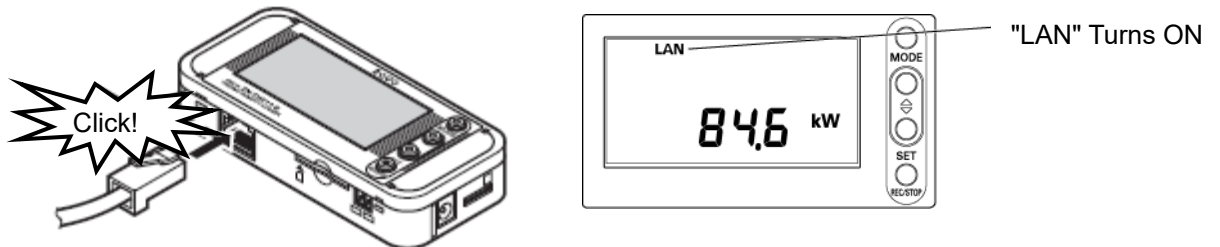


- (7) Click "Close" in the “Local Area Connections Properties” window. The window closes.

3.6.4 Connecting LAN Cable

Use LAN cables to connect the Portable Power Monitor units and the PC to the network.

When the LAN cables have been properly connected, the "LAN" indicator turns ON on the unit display.



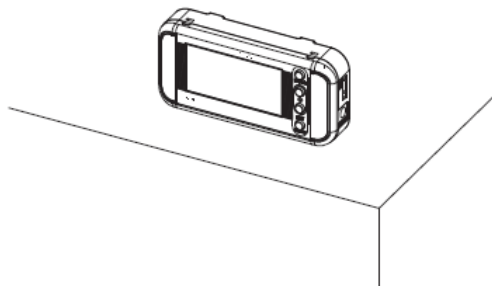
3.7 Mounting the Unit

This section describes the procedure to install a Portable Power Monitor unit.

Important

This product is a sensitive device. Take caution not to let it drop when installing.
Use screws to fix the product through the provided mounting screw holes for installation on the wall or other equipment where vibration or shock may directly affect the unit.

3.7.1 Free-stand Installation

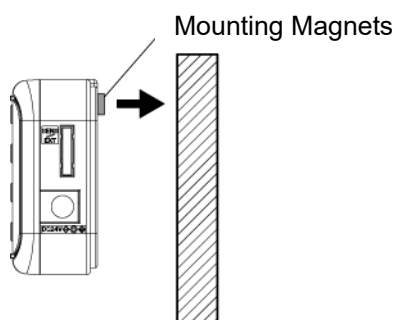


Important

When placing the product on a desk or other elevated object, place it at a sufficient distance from the edges or corners of the object to prevent the unit from dropping to be damaged. Caution must also be taken in laying the power supply cable and the dedicated CT to avoid their contacting or hitting the unit.

3.7.2 Securing with Mounting Magnets

Two mounting magnets are provided on the rear side of the unit. Use them to securely mount the unit on the wall or other vertical surface.



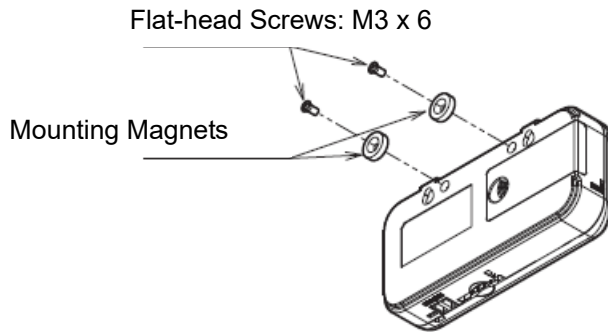
Important

Mount the unit on a location where mechanical shock is not applied when mounting it with magnets.

The cable layout also requires caution not to allow the sensor head and cable apply pressure to the magnet-mounted unit.

3.7.3 Securing with Mounting Screws

Mounting screw holes are provided on the rear side of the unit, which are attached with mounting magnets by default. The unit can be screw-mounted through the holes by removing the magnets. (Refer to the Appendix: Installation Diagram for the screw hole dimensions.)

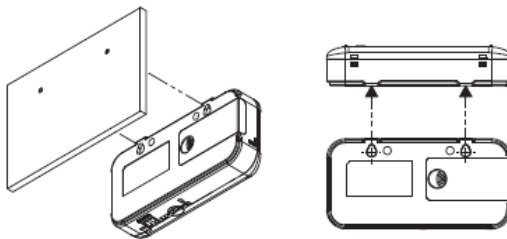


Important

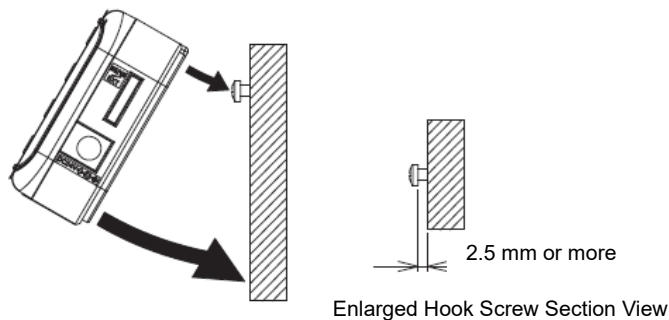
The screw holes are 4 mm deep. Do not screw deeper than 4 mm, which may damage the product.

3.7.4 Screw Hook Mounting

Two screw hook holes are provided on the rear top of the unit (immediately below the protrusions on the top), which allow easy mounting of the unit on the wall or other vertical surface. (Refer to the Appendix: Installation Diagram for the screw hooking hole dimensions. Please remove the mounting magnet before mounting it in the hook hole.)



Pre-mount the M3 screws on the wall surface and hook the unit on the screws through the holes. Mount the screws allowing a distance of 2.5 mm or more between the screw head and the surface.



Important

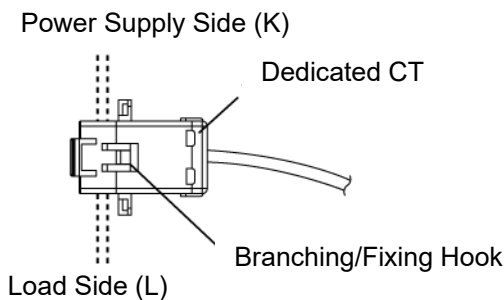
Firmly hold the unit with your hand to insert or remove the SD card when the unit is mounted by hooking. Otherwise the unit may drop on the floor and be damaged.

3.8 Attaching Dedicated CT to Measurement Target

Attach the dedicated CT on the wire to the measurement target.

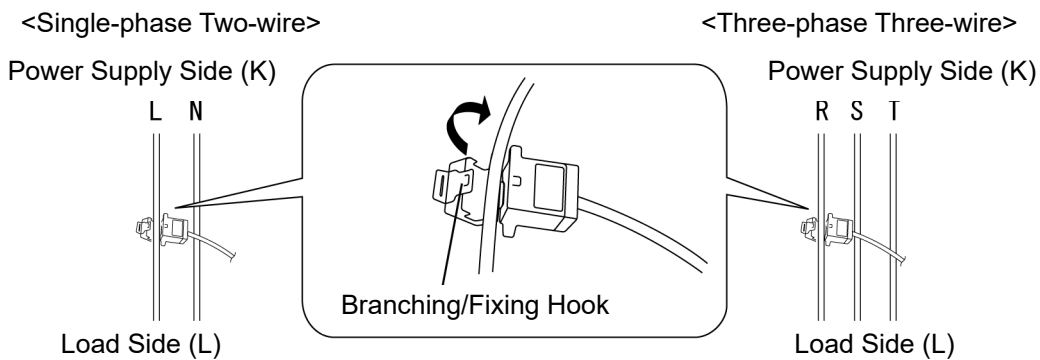
When using a Clamp-on CT (ZN-CT□51□A), refer to the instruction sheet of the Clamp-on CT.

- (1) Align the sides of the dedicated CT to the power supply side (K) and load side (L) correctly. In the figure below, the CT top corresponds to the power supply side and the bottom to the load side, with the branching/fixing hook facing up.

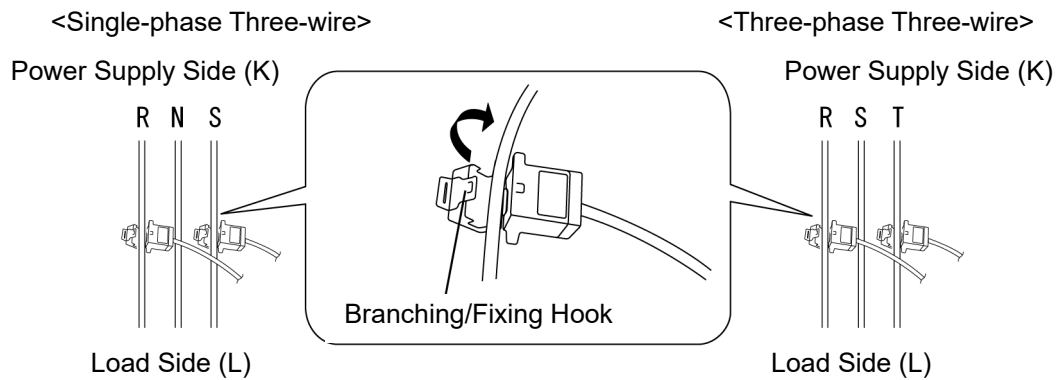


- (2) Spread the CT branching/fixing hook and clamp the measuring target wire. Align the recess of the CT with the wire and fix it until it clicks.

If the number of channels is "1CH", clamp the CT at phase L for a single-phase two-wire circuit; and clamp at phase R for a three-phase three-wire circuit.

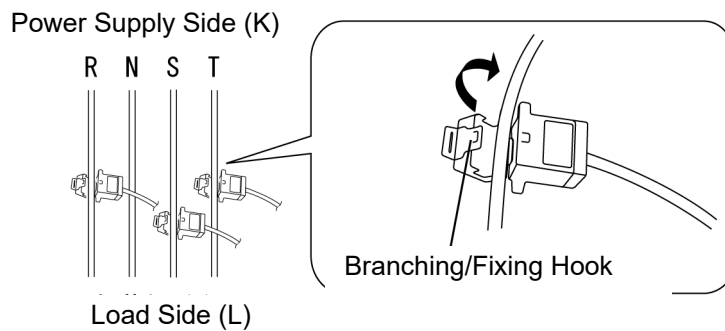


If the number of channels is "2CH", clamp CH1 at phase R and CH3 at phase S for a single-phase three-wire circuit; and clamp CH1 at phase R and CH3 at phase T for a three-phase three-wire circuit.

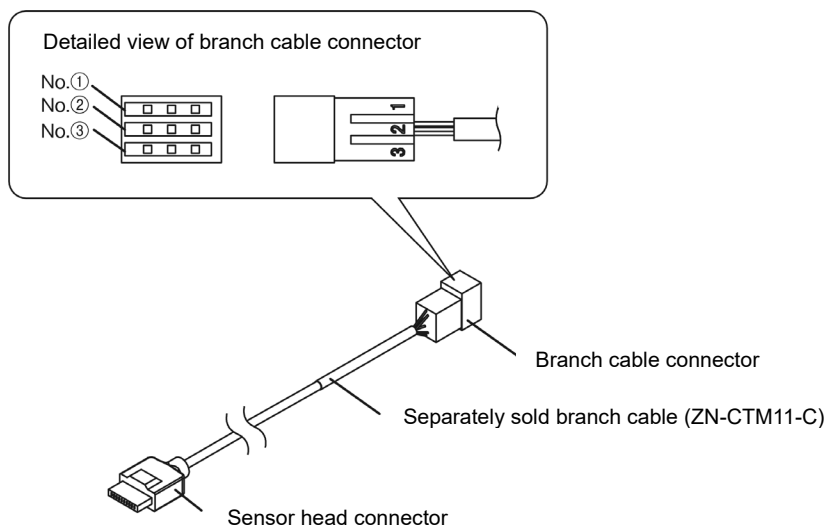


If the number of channels is "3CH", clamp CH1 at phase R, CH2 at phase S and CH3 at phase T.

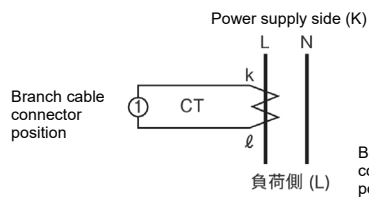
<Three-phase Four-wire>



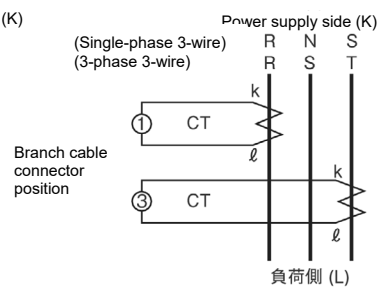
- (3) When using ZN-CTX□□-□A, connect it with the separately sold branch cable, ZN-CTM11-C. Now, the connector position of the branch cable used must match the phase & wire type of the circuit measured.



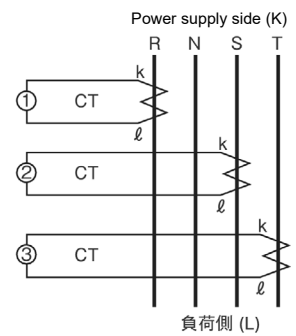
• Single phase 2-wire



• Single phase 3-wire/3-phase 3-wire



• 3-phase 4-wire



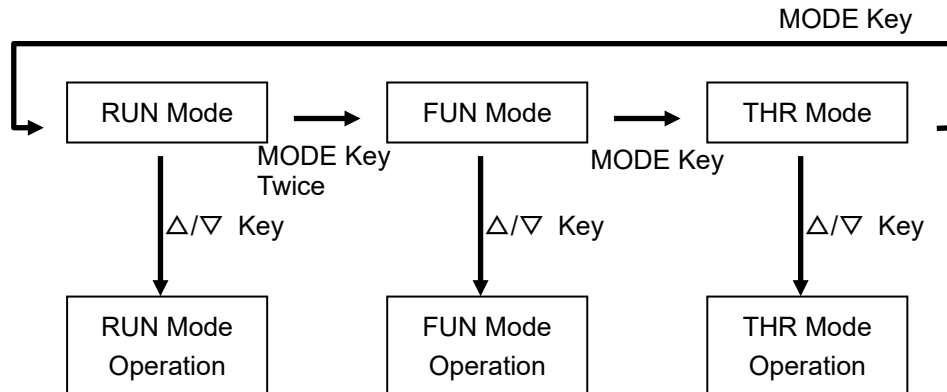
Important

- Take extra caution against electric shock.
- Do not insert or remove the sensor head to/from the connector when the measurement target is clamped.
- The Portable Power Monitor unit power must be ON when clamping a measurement target.

4. Setting the Unit (Unit Operation)

4.1 Setting Procedure and Operation Modes

The following diagram shows the Portable Power Monitor setting procedure flow:



The Portable Power Monitor provides the three operation modes, which can be switched with the MODE key.

To change the mode from RUN to FUN, press the MODE key twice. At the first press of the MODE key, "RUN" blinks and at the second, "FUN" blinks and the mode is entered.

Use the Δ and ∇ keys to switch among setting and display items in each operation mode.

Table: Operation Mode

Display	Name	Description
"RUN" ON	Measurement Execution Mode (RUN Mode)	Used for power measurement and recording.
"FUN" Blinking	Function Setting Mode (FUN Mode)	Entered to make measurement and recording settings.
"THR" Blinking	Threshold Setting Mode (THR Mode)	Entered to make setting on the upper threshold value for power alarm output.

Note

The mode cannot be changed during data recording in the internal memory in RUN mode ("REC" indicator is ON).

4.2 Settings (FUN Mode Operation)

Enter FUN mode to make measurement and recording settings on the Portable Power Monitor.

4.2.1 Setting Item List

The following list shows the setting items available in FUN mode.

Display Item		Display	Setting Item	Setting Value	Factory Default
CLEAR		<i>cLEAR</i>	Ranking clear	A press of the REC key displays "CLEAR". Another press of the REC key clears the ranking.	-
CYCLE		<i>cYcLE</i>	Recording interval	1s (sec.)/2s/5s/10s/20s/30s/1min. This setting item is not displayed when the measurement mode is HISPd.	1s
TIMER (ON)	STRIG	<i>strIG</i>	Start trigger	OFF/TIME	OFF
	STIME	<i>stIME</i>	Start time	00:00 to 23:59	00:00
	ETRIG	<i>etrIG</i>	End trigger	OFF/TIME/ELPSD	OFF
	ETIME	<i>etIME</i>	End time	00:00 to 23:59	00:00
	ELPSD	<i>ELPSd</i>	Elapsed time	0.05 (0 min. 5 sec.) to 999.59 (999 min. 59 sec.)	0.05
MODE		<i>mOdE</i>	Measurement mode	NORM/SLEEP/HISPd The unit reset itself and restarts when the MODE key is pressed to change the operation mode after a set value is applied.	SLEEP
REC		<i>rEc</i>	Recording mode	CONT/RING	CONT
INTEG		<i>intEG</i>	Integrated power reset interval	OFF/30min./1h (hrs.)/24h "30min.": Integrated power is reset to zero at 0 and 30 min. of every hour; "1h": reset at 0 min. of every hour; "24h": reset at 0:00 every day. The integrated power up until the moment of reset is recorded in the ranking log before it is cleared to zero. After the INTEG setting is changed, the unit resets itself and restarts, clearing the ranking, when the operation mode is changed by pressing the MODE key.	OFF
USECH		<i>USEch</i>	The number of channels to use	1CH/2CH/3CH	1CH
TYPE		<i>tYPE</i>	Measured circuit	The displayed items vary depending on the number of the channels to use.	3P3

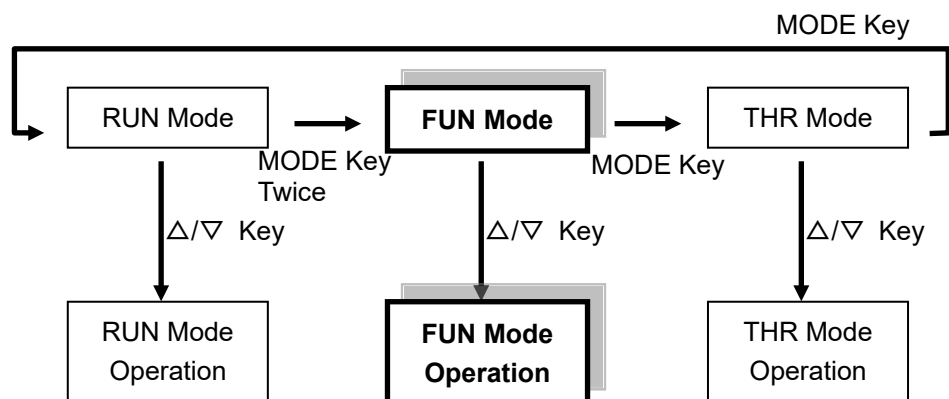
4. Setting the Unit (Unit Operation)

				When set to 1CH: 1P2 (Single-phase, two-wire) / 3P3 (Three-phase, three-wire) When set to 2CH: 1P3 (Single-phase, three-wire) / 3P3 (Three-phase, three-wire) When set to 3CH: 3P4 (Three-phase, four-wire)	
CT		ct	Dedicated CT type	5A/50A/100A/200A/400A	100A
VOLT		volt	Voltage of measurement target	1.0 to 9999.9	220
PF		PF	Power factor	0.01 to 1.00	0.80
FREQ		FREQ	Frequency	50Hz/60Hz	50
INIT		init	Restore the factory default	Initialization starts at a long press of the SET/REC/STOP key. The unit restarts when the operation mode is changed after the "DONE" indication appears.	-
ETC (DISP)	RESTR	restr	Read setting data from the SD memory card.	The unit reads the setting data from a pre-inserted SD memory card to set itself, at a long press of the SET/REC/STOP key. The unit restarts when the operation mode is changed after the "DONE" indication appears.	-
	BCKUP	bckup	Write setting data to the SD memory card.	The unit saves the setting data in a pre-inserted SD memory card, at a long press of the SET/REC/STOP key.	-
	CLOCK (DISP)	YEAR	Year	Year setting	Not initialized by INIT.
		MONTH	Month	Month setting	
		DAY	Day	Day setting	
		TIME	Hour/Minute	Hour/minute setting	
	NET	net	Network function availability	OFF/ON	OFF
	IP (DISP)	IP1 to IP4	IP address	0 to 255	192. 168. 0. 20
		SUB1 to SUB4	Subnet mask	0 to 255	255. 255. 255. 0
	DTAIL (DISP)	SCT5A	Rated primary side current value	5 to 9999 Only effective when CT is set to 5A.	5A
		LOCUT	Zero-out low current value	0.1 to 19.9%	0.6%

		RANGE	<i>rRnGE</i>	Measurement range	NORM/AUTO	AUTO
		RATE	<i>rRtE</i>	Rate/CO ₂ conversion value setting	00.000 to 99.999	0
		CONV	<i>cOnu</i>	Conversion unit	JPY/USD/EUR/CNY/KRW/CO ₂	JPY
		REREC	<i>rErEc</i>	REC restoration availability at startup	OFF/ON	OFF

4.2.2 Selecting "FUN" Operation Mode

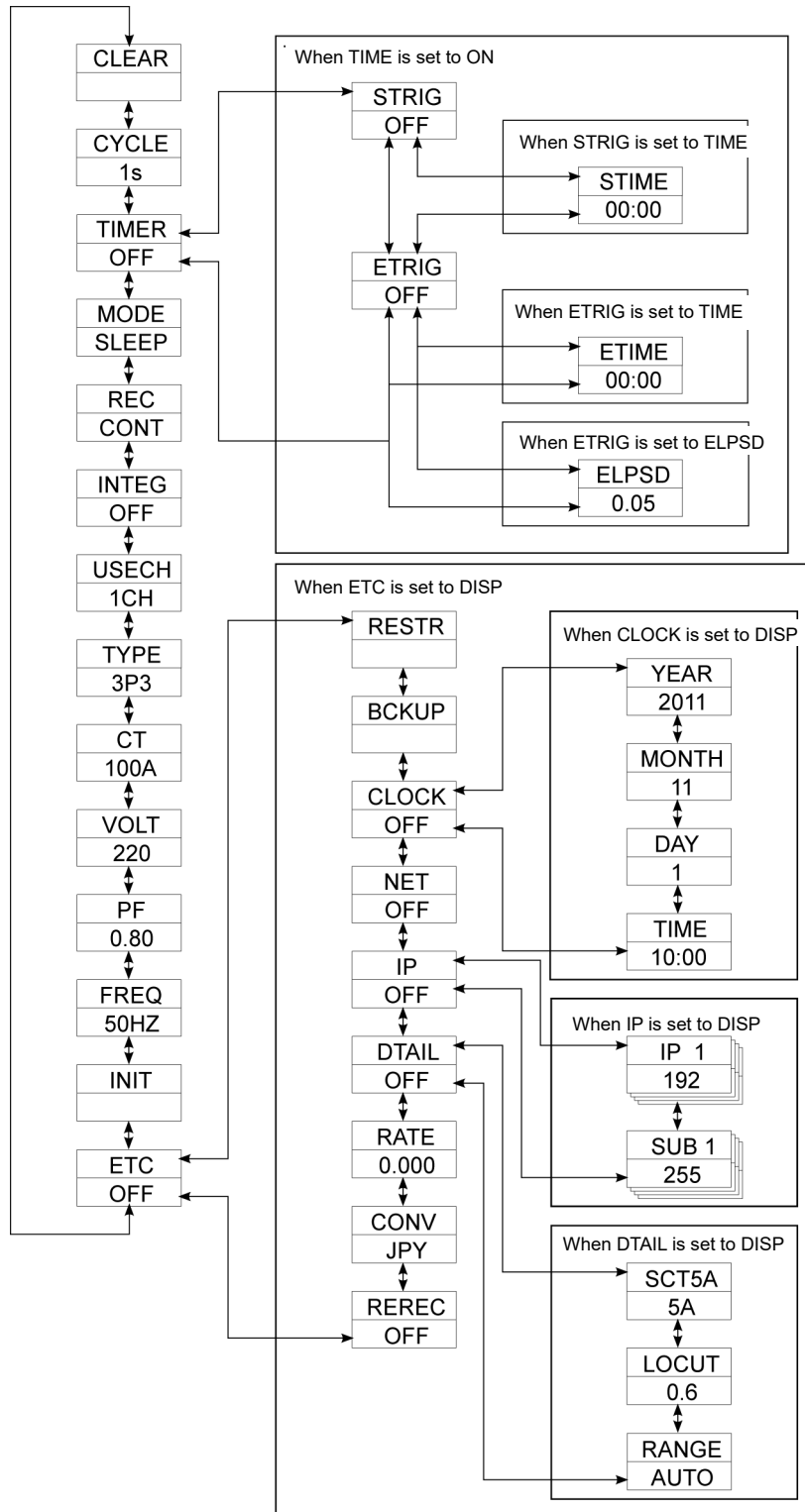
Press the MODE key to change the operation mode to "FUN". The "FUN" indication on the right of the display starts blinking.

**Note**

FUN mode cannot be entered when recording in the internal memory is in progress in RUN mode ("REC" is ON on the display).

4.2.3 Selecting Items

Move the selection items using the Δ and ∇ keys. To change the set value, select the item with Δ or ∇ key and apply the selection with the SET/REC/STOP key. Press the MODE key to change the operation mode.



4.2.4 Definition of Items

(1) Ranking Clear (CLEAR)

Clears the ranking. (The ranking is also cleared when the power is turned OFF.)

Operation:

A press of the REC key displays "CLEAR" at the lower row on the display. If the REC key is pressed again (when the "CLEAR" indication is displayed), the ranking is cleared. To cancel the clearing, press the MODE key.

(2) Recording Interval (CYCLE)

Specifies the interval of measured value recording. This setting item is only displayed when the measurement mode (MODE) is set to "NORM" or "SLEEP".

The range of selection (Options):

1s (second)/ 2s / 5s / 10s / 20s / 30s / 1minute

Initial value: 1s

■Recording Interval and Internal Memory

Possible recording time in the internal memory depends on the recording interval setting as shown in the table below:

(SD memory cards can be used for continuous recording for a longer time.)

Measurement Mode (NORM or SLEEP)		
Recording Interval	Possible Internal Memory Recording Time (1CH)	Possible Internal Memory Recording Time (3CH)
1 second	Approx. 1 hr. 45 min.	Approx. 1 hr. 15 min.
2 seconds	Approx. 3 hr. 30 min.	Approx. 2 hr. 30 min.
5 seconds	Approx. 8 hr. 45 min.	Approx. 6 hr. 15 min.
10 seconds	Approx. 17 hr. 30 min.	Approx. 12 hr. 30 min.
20 seconds	Approx. 1 day 11 hr.	Approx. 1 day 1 hr.
30 seconds	Approx. 2 days 4 hr. 30 min.	Approx. 1 day 13 hr. 30 min.
1 minute	Approx. 4 days 9 hr.	Approx. 3 days 3 hr.

Measurement Mode (HISPD)		
Frequency	Possible Internal Memory Recording Time (1CH)	Possible Internal Memory Recording Time (3CH)
50 Hz	Approx. 11 min. 30 sec.	Approx. 8 min. 5 sec.
60 Hz	Approx. 9 min. 35 sec.	Approx. 6 min. 40 sec.

■Battery Life

Battery life varies depending on the recording interval setting. Refer to the following battery life table and the battery operation period when setting the recording interval.

Conditions: Two AAA nickel-metal hydride batteries; SLEEP mode; Continue mode; recording interval: 1s; network function OFF; SD memory card (HMC-SD291) is used; ambient temperature: 23°C

Recording Interval	Battery Life
1 second	Approx. 7 days
2 seconds	Approx. 12 days
5 seconds	Approx. 20 days

10 seconds	Approx. 25 days
20 seconds	Approx. 29 days
30 seconds	Approx. 30 days
1 minute	Approx. 32 days

* The table above only shows representative values. The actual battery life depends on the measurement environment, recording interval, measurement mode as well as the type and performance of the SD memory card and batteries to use.

(3) Timer Setting (TIMER)

Specifies if the timer function is required.

The range of selection (Options):

OFF / ON

Initial value: OFF

Setting Value	Operation
OFF	The timer function is not used. Start trigger and End trigger are also set to OFF. The MDOE item appears when the ∇ key is pressed after the setting is applied with the SET/REC/STOP key.
ON	The timer function is used. Start trigger and End trigger can be specified. The STRIG item appears when the ∇ key is pressed after the setting is applied with the SET/REC/STOP key.

Note

- The setting returns to "OFF" when FUN mode is exited, if both Start trigger (STRIG) and End trigger (ETRIG) are set to "OFF".

(4) Start Trigger (STRIG)

Sets the recording start trigger.

The range of selection (Options):

OFF / TIME

Initial value: OFF

Setting Value	Operation
OFF	A long press (for 3 seconds or longer) of the SET/REC/STOP key starts recording. The ETRIG item appears when the ∇ key is pressed after the setting is applied with the SET/REC/STOP key.
TIME	Recording starts when the specified start time is reached. The STIME item appears when the ∇ key is pressed after the setting is applied with the SET/REC/STOP key.

Note

- A long press (for 3 seconds or longer) of the SET/REC/STOP key starts recording overriding the TIME setting.
- If a TIME setting is made, the "REC" indication keeps blinking (indicating that TIME has been set) until recording starts.

(5) Start Time (STIME)

Specifies the recording start time.

Recording starts at a specified time every day.

Setting range (Numeric input):

00:00 to 23:59

Initial value: 00:00

Note

- STIME cannot be specified when STRIG is set to "OFF".

Important

- Recording continues if recording has been already in progress when the specified start time is reached.
- Recording does not start if the unit is in error status when the specified start time is reached.

(6) End Trigger (ETRIG)

Sets the recording end trigger.

The range of selection (Options):

OFF / TIME / ELPSD

Initial value: OFF

Setting Value	Operation
OFF	A long press (for 3 seconds or longer) of the SET/REC/STOP key stops recording. The ETRIG item appears when the ▽ key is pressed after the setting is applied with the SET/REC/STOP key.
TIME	Recording stops when the specified end time is reached. The STIME item appears when the ▽ key is pressed after the setting is applied with the SET/REC/STOP key.
ELPSD	Recording stops when the specified time has elapsed after the start of recording. The STIME item appears when the ▽ key is pressed after the setting is applied with the SET/REC/STOP key.

Note

- A long press (for 3 seconds or longer) of the SET/REC/STOP key stops recording overriding the TIME or ELPSD setting.

(7) End Time (ETIME)

Specifies the recording end time.

Recording stops at a specified time every day.

The range of selection (Numeric input):

00:00 to 23:59

Initial value: 00:00

Note

- ETIME cannot be specified when ETRIG is set to "OFF" or "ELPSD".
- Recording stops when the specified end time is reached overriding a record start command via key operation or communication.

Important

- Nothing happens if recording has already stopped when the specified end time is reached.

(8) Elapsed Time (ELPSD)

Specifies the elapsed time after recording starts until recording stops.

The range of selection (Numeric input):

0.05 (0 min. 5 sec.) to 999.59 (999 min. 59 sec.)

Initial value: 0.05

Note

- ELPSD cannot be specified when ETRIG is set to "OFF" or "TIME".
- Recording stops when the specified time is elapsed overriding a record stop command via key operation or communication.

Important

- Nothing happens if recording has already stopped when the specified end time is reached.

(9) Measurement Mode (MODE)

Used to select the measurement mode (e.g. SLEEP mode).

The range of selection (Options):

NORM / SLEEP / HISPD

Initial value: SLEEP

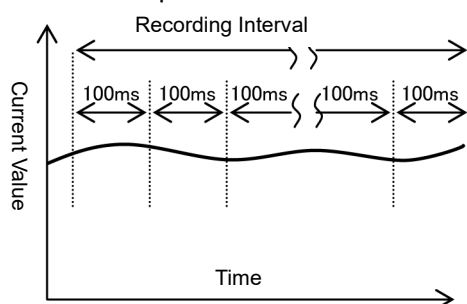
Measurement Mode	Operation
NORM	The unit provides normal operation.
SLEEP	Sleep mode The unit provides energy saving operation. The CPU is in standby mode except when recording at a specified interval. Operation in this mode is recommended when using battery power supply.
HISPD	High-speed logging mode The unit provides recording at the shortest possible interval for relevant measurement results. (100ms/50Hz; 83.3ms/60Hz)

Note

- The unit resets itself and restarts when the MODE key is pressed to change the operation mode, after the measurement mode has been changed and applied with the SET/REC/STOP key.
- An alarm output is not available in SLEEP mode.
- Network operation is not available in SLEEP or HISPD mode.
- Measurement operation details vary, as shown below, depending on the measurement mode setting.

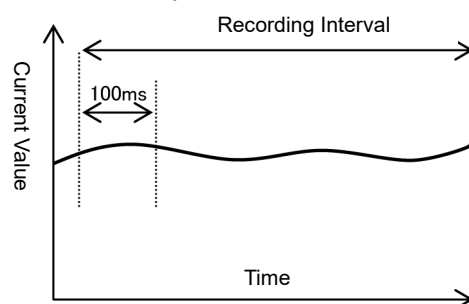
<NORM Mode>

Calculate an effective current value every 100ms during the specified recording interval and use the values (as measured values) to obtain the power level.



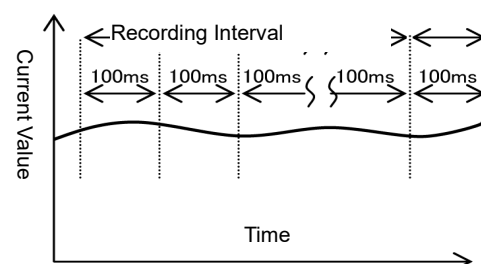
<SLEEP Mode>

Use the effective current value in the first 100ms of the recording interval as the measured value of the interval and obtain the power level.



<HISPD Mode>

Calculate and record an effective current value and the power level at every 100ms.



The effective value is calculated every 83.3ms for measurement at 60 Hz.

(10) Recording Mode (REC)

Specifies the write operation to the SD memory card during recording.

The range of selection (Options):

CONT / RING

Initial value: CONT

Recording Mode	Operation
CONT	Continue mode The unit outputs the files in the internal memory to the SD memory card when the internal memory becomes full during recording, and continues recording. If an error occurs due to no insertion of an SD memory card, the unit stops recording and holds the data in the internal memory.
RING	Ring mode The unit overwrites the oldest data in the internal memory when the internal memory becomes full, and continues recording.

Note

- A press of the SET/REC/STOP key (for 3 seconds or less) during recording enables the unit to output the data accumulated so far in the internal memory to the SD memory card without stopping recording.

(11) Integrated Power Reset Interval (INTEG)

Specifies the interval for measuring integrated power.

The range of selection (Options):

OFF / 30min. / 1h (hr.) / 24h

Initial value: OFF

Setting Value	Operation
OFF	The unit continuously measures the integrated power without resetting the value to zero.
30min.	The unit measures the integrated value at the interval of 30 minutes; at 0 and 30 minutes of every hour (0:00 to 0:30; 0:30 to 1:00; 1:00 to 1:30...).
1h	The unit measures the integrated value at the interval of one hour; at 0 minutes of every hour (0:00, 1:00, 2:00...).
24h	The unit measures the integrated value at the interval of 24 hours; at 0:00 of every day.

Note

When you press the MODE key and change the operation mode after changing the set value, the unit resets the setting and restarts, clearing the ranking.

Important

Only the integrated power is reset on the display, not the integrated power that is output to a file. Use the integration/summation function of the Station Utility to perform summation on a PC

(12) The Number of Channels to Use (USECH)

Specifies the number of channels to use. The same number of dedicated CTs must be set.

The range of selection (Options):

1CH / 2CH / 3CH

Initial value: 1CH

(13) Measurement Target Circuit (TYPE)

Select the phase and wire configuration of the circuit to be measured. The items displayed for selection varies depending on the number of channels to use (USECH).

The range of selection (Options):

- When the number of channels (USECH) is 1CH:

1P2 (Single-phase, two-wire) / 3P3 (Three-phase, three-wire)

- When the number of channels (USECH) is 2CH:

1P3 (Single-phase, three-wire) / 3P3 (Three-phase, three-wire)

- When the number of channels (USECH) is 3CH:

3P4 (Three-phase, four-wire)

Initial value: 3P3

(14) Dedicated CT Type (CT)

Used to select the type of the dedicated CT to use. Make sure that the type of the CT to use is specified.

The range of selection (Options):

5A / 50A / 100A / 200A / 400A

Initial value: 100A

(15) Voltage of Measurement Target (VOLT)

Specifies the effective voltage in the circuit to be measured. Make sure that a correct value is specified since it is used to obtain the current value in the circuit.

The range of selection (Numeric input):

1.0 to 9999.9

Initial value: 220

(16) Power Factor (PF)

Specifies the power factor of the circuit to be measured. The power factor refers to the ratio of the real power to the apparent power in the circuit. The power factor varies depending on the measurement target; however, it generally ranges from approx. 0.6 to 1.0. Since it is used by the unit to convert a current value into a power value, it must be adjusted specifically on individual measurement targets.

The range of selection (Numeric input):

0.01 to 1.00

Initial value: 0.8

(17) Frequency (FREQ)

Used to select the power frequency at which the measurement target operates, according to the power frequency used in your region or country. The unit uses the frequency to measure current values. The correct frequency must be specified for measurement accuracy.

The range of selection (Options):

50Hz / 60Hz

Initial value: 50Hz

(18) Initialization (INIT)

The unit initializes the setting values and restores the factory defaults (except for year, month, day, hour and minute settings).

Operation:

Initialization starts at a long press of the SET/REC/STOP key and is completed when "DONE" is displayed.

The unit resets itself and restarts when the MODE key is pressed to change the operation mode.

(19) Others (ETC)

Specifies if the unit displays the items for setting file read/write, time setting, and network setting.

Setting range:

OFF / DISP

Initial value: OFF

Setting Value	Operation
OFF	The unit does not display the items for setting data read/write, time setting, network setting, DTAIL, rate/CO2 conversion value setting and conversion unit setting. The RNKCL item returns when the ∇ key is pressed after the setting is applied with the SET/REC/STOP key.
DISP	The unit displays the items for setting data read/write, time setting, network setting, DTAIL, rate/CO2 conversion value setting and conversion unit setting. The RESTR item is displayed when the ∇ key is pressed after the setting is applied with the SET/REC/STOP key.

Note

The ETC setting returns to "OFF" when the unit is reset.

(20) Reading Setting Data (RESTR)

Restores the unit settings by using the SD memory card with the setting data saved as a backup using the BCKUP setting (described later).

Operation:

Insert the SD card containing the setting data, and hold the SET/REC/STOP key.

Reading is completed when "DONE" is displayed.

The unit resets itself and restarts when the MODE key is pressed to change the operation mode.

Note

- Only one setting data item (the setting data for only one unit) can be stored in a single SD card as a backup. The setting data backed up in one Portable Power Monitor can be restored on other Portable Power Monitor unit.
- Setting data reading is not possible when ETC is set to "OFF".

(21) Writing the Setting Data (BCKUP)

Saves the unit setting data in an SD memory card as a backup.

Operation:

Insert an SD memory card and hold the SET/REC/STOP key.

Saving is complete when "DONE" is displayed.

Important

Only one setting data item (the setting data for only one unit) can be stored in a single SD card as a backup. If an SD card containing an already-saved setting data backup is used, the setting data in the card is overwritten. The same applies to a backup performed on other Portable Power Monitor: the data is overwritten.

Note

- The setting data is written into the SYSTEM folder in the SD card.
- Setting data writing is not possible when ETC is set to "OFF".

(22) Time Setting (CLOCK)

Specifies if the time setting is required.

The range of selection (Options):

OFF / DISP

Initial value: OFF

Setting Value	Operation
OFF	Time setting is not available. The DTAIL item is displayed when the ▽ key is pressed after the setting is applied with the SET/REC/STOP key.
DISP	Time setting is available. The YEAR item is displayed when the ▽ key is pressed after the setting is applied with the SET/REC/STOP key.

Note

- The CLOCK setting is not possible when ETC is set to "OFF".
- The CLOCK setting returns to "OFF" when the unit is reset.

(23) YEAR/MONTH/DAY/TIME Setting

Specifies the year/month/day/time values.

Setting range (Numeric input):

YEAR: 2000 to 2099

MONTH: 1 to 12

DAY: 1 to 31

TIME: 00:00 to 23:59

Note

The year/month/day/time settings are not possible when ETC is set to "OFF" and CLOCK is also set to "OFF".

(24) Network Setting (NET)

Specifies if the network functions are required. However, this setting is only effective when the measurement mode (MODE) is set to "NORM".

The range of selection (Options):

OFF/ON

Initial value: OFF

(25) Setting IP Address (IP)

Specifies if the IP address setting is required.

The range of selection (Options):

OFF / DISP

Initial value: OFF

Setting Value	Operation
OFF	IP address settings are not available. The DTAIL item is displayed when the ∇ key is pressed after the setting is applied with the SET/REC/STOP key.
DISP	IP address settings are available. The IP 1 item is displayed when the ∇ key is pressed after the setting is applied with the SET/REC/STOP key.

Note

- The IP setting is not possible when ETC is set to "OFF".
- The IP setting returns to "OFF" when the unit is reset.

(26) IP Address and Subnet Mask (IP 1 to IP 4, SUB 1 to SUB 4)

Specifies the 4 segments of the IP address (IP 1 to IP 4) and the 4 segments of the subnet mask (SUB 1 to SUB 4).

Setting range (Numeric input):

IP 1, IP 2, IP 3, IP 4: 0 to 255

SUB 1, SUB 2, SUB 3, SUB 4: 0 to 255

Initial value: IP 1.IP 2.IP 3.IP 4 = 192.168.0.20

SUB 1.SUB 2.SUB 3.SUB 4 = 255.255.255.0

Note

- The unit resets itself and restarts when the MODE key is pressed to change the operation mode, after the IP address and subnet mask values have been changed and applied with the SET/REC/STOP key.
- The IP address and subnet mask settings are not possible when ETC is set to "OFF" and IP is also set to "OFF".

(27) DTAIL

Sets if a rated primary side current value, zero-out low current value and measurement range are specified.

The range of selection (Options):

OFF / DISP

Initial value: OFF

Setting Value	Operation
OFF	A rated primary side current value, zero-out low current value and measurement range cannot be specified. The RATE item is displayed when the ▽ key is pressed after the setting is applied with the SET/REC/STOP key.
DISP	A rated primary side current value, zero-out low current value and measurement range can be specified. The SCT5A item is displayed when the ▽ key is pressed after the setting is applied with the SET/REC/STOP key.

Note

- The DTAIL setting is not possible when ETC is set to "OFF".
- The DTAIL setting returns to "OFF" when the unit is reset.

(28) Rated Primary Side Current Value (SCT5A)

Specifies the rated primary side current value. However, this setting is only effective when the dedicated CT type (CT) is set to "5A".

The range of selection (Numeric input):

5 to 9999

Initial value: 5

Note

The rated primary side current value cannot be specified when ETC is set to "OFF" and DTAIL is also set to "OFF".

(29) Zero-out Low Current Value (LOCUT)

Determines low current values to be zeroed out by specifying the threshold value in a percentage to the dedicated CT type (CT) current value. The current values equal to or lower than the specified value are deemed noise and therefore ignored. For example, if 0.6% (initial value) is specified and the CT value is 100A, the values equal to or lower than 0.6A (i.e. 0.6% of 100A) are all eliminated as noise.

The range of selection (Numeric input):

0.1 to 19.9%

Initial value: 0.6%

Note

The LOCUT setting is not possible when ETC is set to "OFF" and DTAIL is also set to "OFF".

(30) Measurement Range (RANGE)

Specifies the measurement range.

The range of selection (Options):

NORM / AUTO

Initial value: AUTO

Setting Value	Operation
NORM	The measurement range is fixed.
AUTO	The measurement range is automatically switched with approximately 5% or less of the CT rated current.

Note

The table below shows the resolutions (reference values) under AUTO setting.

* The reference value indicates a typical value, not a guaranteed value.

CT rating	Approx. more than 5%	Approx. 5% or less
5A	0.1A	0.007A
50A	1.0A	0.063A
100A	2.0A	0.125A
200A	4.0A	0.25A
400A	8.0A	0.5A

The measurement range cannot be specified when ETC is OFF and DTAIL is OFF.

(31) Rate/CO₂ Conversion Value Setting (RATE)

Specifies the electricity rate or CO₂ emission level per 1kWh.

The range of selection (Numeric input):

00.000 to 99.999

Initial value: 0.000

Note

The rate/CO₂ conversion value setting is not possible when ETC is set to "OFF".

(32) Conversion Unit Setting (CONV)

Specifies the unit for the rate/CO₂ conversion setting (RATE).

The range of selection (Options):

JPY (Japanese yen) / USD (US dollar) / EUR (Euro) / CNY (Chinese yuan) / KRW
(Korean won) /

CO₂ (CO₂ emission level per 1kWh)

Initial value: JPY

Note

The conversion unit cannot be specified when ETC is set to "OFF".

(33) Power Startup REC Restoration (REREC)

Specifies if the REC restoration function is used in the event of power startup.

The range of selection (Options):

OFF / ON

Initial value: OFF

Setting Value	Operation
OFF	The unit does not automatically start recording at the next startup after a power failure during recording.
ON	The unit automatically writes data to a memory card and starts recording at the next startup after a power failure during recording.

Note

The power startup REC restoration setting is not possible when ETC is set to "OFF".

Important

An error occurs if an SD memory card is not inserted at the startup immediately after a power failure when the REC restoration is set to "ON". The unit fails in writing data to the memory card and does not start recording. To solve this situation, cancel the error state and start recording via key operation.

4.2.5 Changing the Set Value

The value setting depends on the type of items, which are classified into option selection type and numeric input type.

(1) Changing Option Type Item Values (Example: CYCLE)

Press the MODE key several times to enter FUN mode, and press the ∇ or Δ key to display CYCLE.

Display (Upper/Lower)	Operation
CYCLE 10 s	Press the MODE key repeatedly until "FUN" starts blinking. Press the ∇ or Δ key to display CYCLE at the upper row of the display. Press the SET/REC/STOP key, then, the value at the lower row starts blinking.

SET/REC/STOP Key \downarrow

Display (Upper/Lower)	Operation
CYCLE 10 s ↑ Blinking	The value options are displayed in sequence by pressing the Δ or ∇ key. To cancel the setting attempt, press the MODE key.

∇ or Δ Key \downarrow

Display (Upper/Lower)	Operation
CYCLE 30 s ↑ Blinking	Press the Δ or ∇ key to display the desired value, and press the SET/REC/STOP key. The value is applied and the blinking stops.

SET/REC/STOP Key \downarrow

Display (Upper/Lower)	Operation
CYCLE 30 s	

Use the Δ or ∇ key again to display other setting item and MODE key to change the operation mode.

(2) Changing Numeric Input Type Item Value (Example: YEAR)

Press the MODE key several times to enter FUN mode, and press the ∇ or Δ key to display YEAR.

To display YEAR, ETC and TIME must have been set to DISP beforehand.

Display (Upper/Lower)	Operation
CYCLE 10s ("FUN" Blinking)	Press the MODE key repeatedly until "FUN" starts blinking. "CYCLE" is displayed at the upper row. Press the ∇ or Δ key to display YEAR. To display YEAR, ETC and TIME must be set to DISP.

∇ or Δ Key \downarrow

Display (Upper/Lower)	Operation
YEAR 2010	Press the SET/REC/STOP key, then, the last digit number at the lower row starts blinking.

SET/REC/STOP Key \downarrow

Display (Upper/Lower)	Operation
YEAR 2010 ↑ Blinking	The value increases or decreases at a press of the Δ or ∇ key. The amount of increase/decrease becomes larger by holding Δ or ∇ key. To cancel the setting attempt, press the MODE key.

∇ or Δ Key \downarrow

Display (Upper/Lower)	Operation
YEAR 2011 ↑ Blinking	Press the Δ or ∇ key to display the desired value, and press the SET/REC/STOP key. The value is applied and the blinking stops.

SET/REC/STOP Key \downarrow

Display (Upper/Lower)	Operation
YEAR 2011	

Use the Δ or ∇ key again to display other setting item and MODE key to change the operation mode.

4.3 Settings (THR Mode Operation)

THR mode must be entered for setting the threshold for Portable Power Monitor alarm output.

Set the upper limit of the integrated power consumption for the threshold value.

If the measured value exceeds the set upper limit value during RUN operation, the station's alarm output terminal turns ON and the "ALM" indication on the display turns ON.

Note

- An alarm is not output when the measurement mode (MODE) is set to "SLEEP".
- Alarm monitoring cannot be stopped.

However, it can be avoided by setting the threshold value to "0". The factory default is set to the value (0) in which alarm monitoring is not performed.

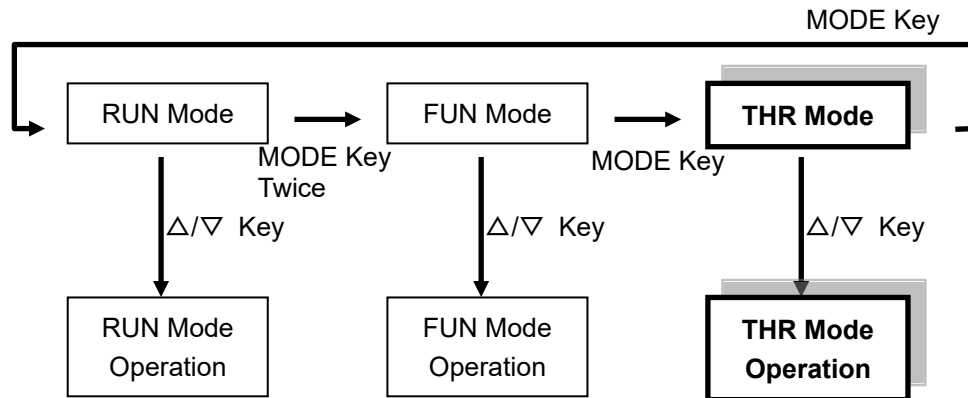
4.3.1 Setting Item List

The table below shows the THR mode setting item list.

Display Item	Display	Setting Item	Function/Operation	Factory Default
INT H	int h	Upper limit threshold of kWh or higher integrated power	Specifies the integrated power upper limit threshold value for alarm output (kWh or higher).	0 kWh
INT H	int h	Upper limit threshold of less than kWh integrated power	Specifies the integrated power upper limit threshold value for alarm output (less than kWh).	0 Wh

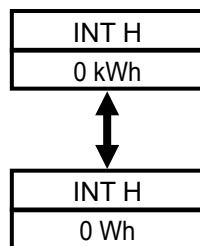
4.3.2 Selecting "THR" Operation Mode

Press the MODE key to change the operation mode to "THR". "THR" at the lower right of the display starts blinking.



4.3.3 Selecting Items

Move the selection items using the Δ and ∇ keys. To change the set value, select the item with Δ or ∇ key and apply the selection with the SET/REC/STOP key. Press the MODE key to change the operation mode.



4.3.4 Definition of Items

(1) Upper Limit Threshold of kWh or Higher Integrated Power (INT H)

Specifies the integrated power consumption upper limit threshold for an alarm output.

The "ALM" indication and alarm output turn ON, when the measured integrated power exceeds the set value.

Setting range (Numeric input):

0 Wh to 99999 kWh (Threshold setting becomes "OFF" if "0" is specified)

Initial value:

0 kWh

(2) Upper Limit Threshold of Less than kWh Integrated Power (INT H)

Specifies the integrated power consumption upper limit threshold for an alarm output.

The "ALM" indication and alarm output turn ON, when the measured integrated power exceeds the set value.

Setting range (Numeric input):

0 Wh to 999 Wh (Threshold setting becomes "OFF" if "0" is specified)

Initial value:

0 Wh

4.3.5 Changing the Set Value

Follow the same procedure as in FUN mode.

Refer to: 4.2.5 Changing the Set Value

4.4 Copying Setting Data for Multiple Monitor Units

The settings on multiple Portable Power Monitor units can be unified by using the same setting data saved in an SD memory card. This is convenient especially when controlling multiple monitor units using the same settings. Make necessary settings only on one unit (through unit operation), save it in an SD memory card and then, restore it in other units. This can greatly save the entire setting procedures, thus, minimizing setting errors.

Refer to: 4.2.4 (14) Writing the Setting Data (BCKUP), 4.2.4 (13) Reading Setting Data (RESTR)

5. Measurement and Recording (Unit Operation)

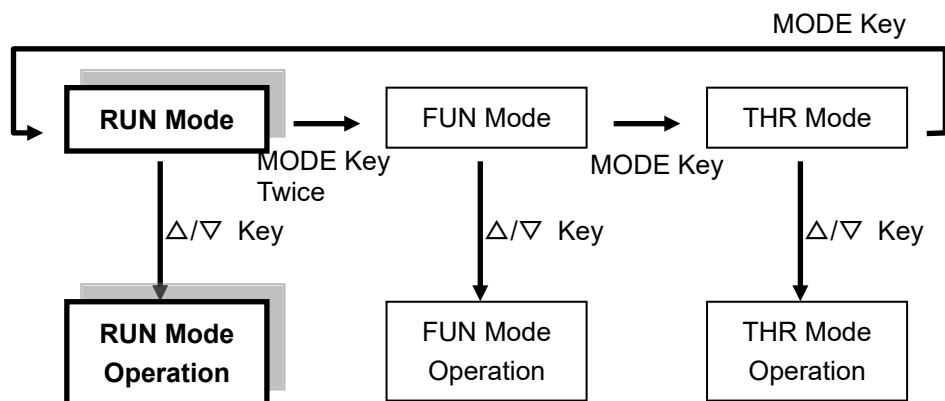
5.1 Overview

Measured values can be recorded in two ways: recording in Portable Power Monitor units or in the PC via network. This chapter explains recording in Portable Power Monitor units.

5.2 Selecting Operation Mode

RUN mode must be entered for power measurement.

Press the MODE key to change the operation mode to "RUN". "RUN" at the bottom right of the display turns ON.

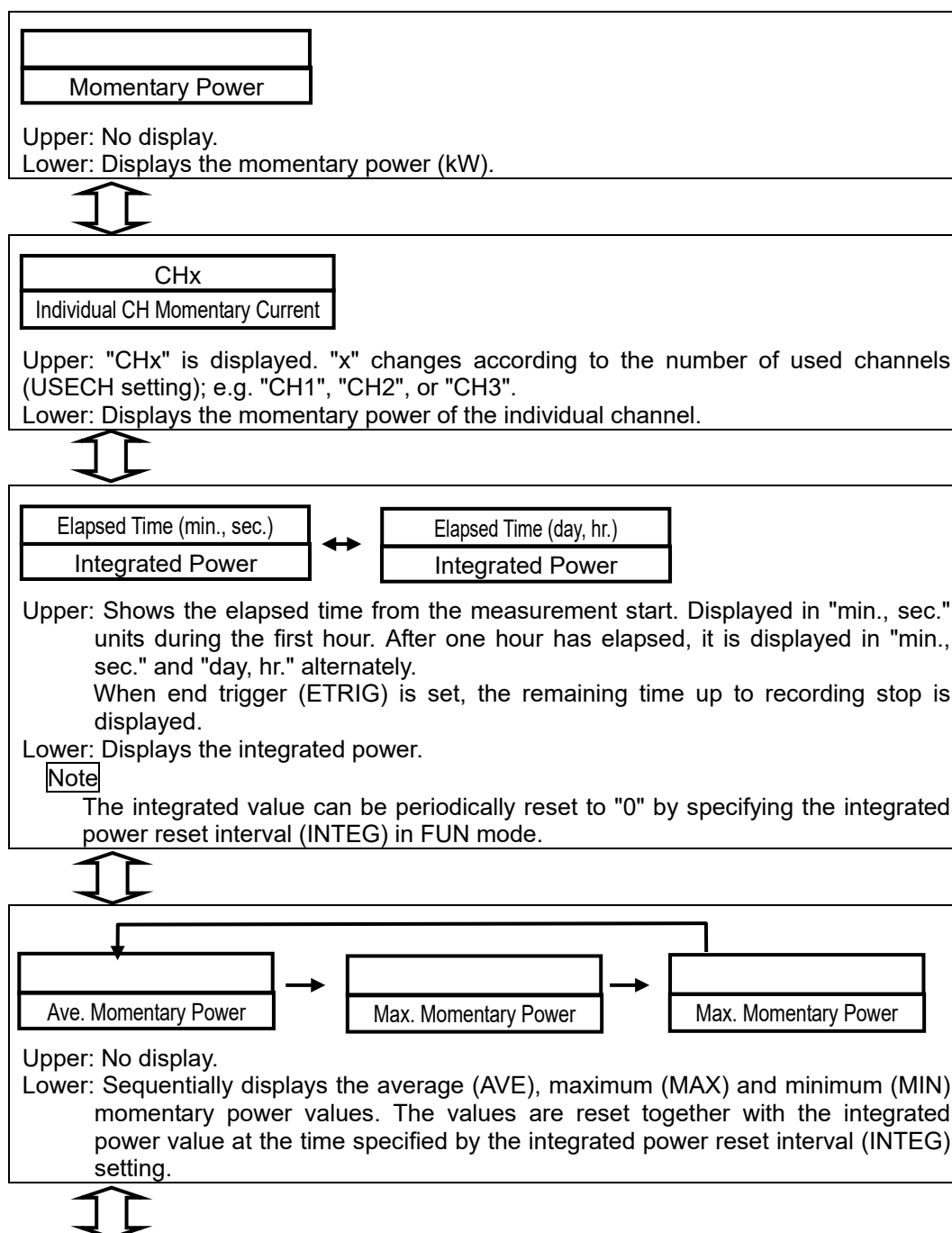


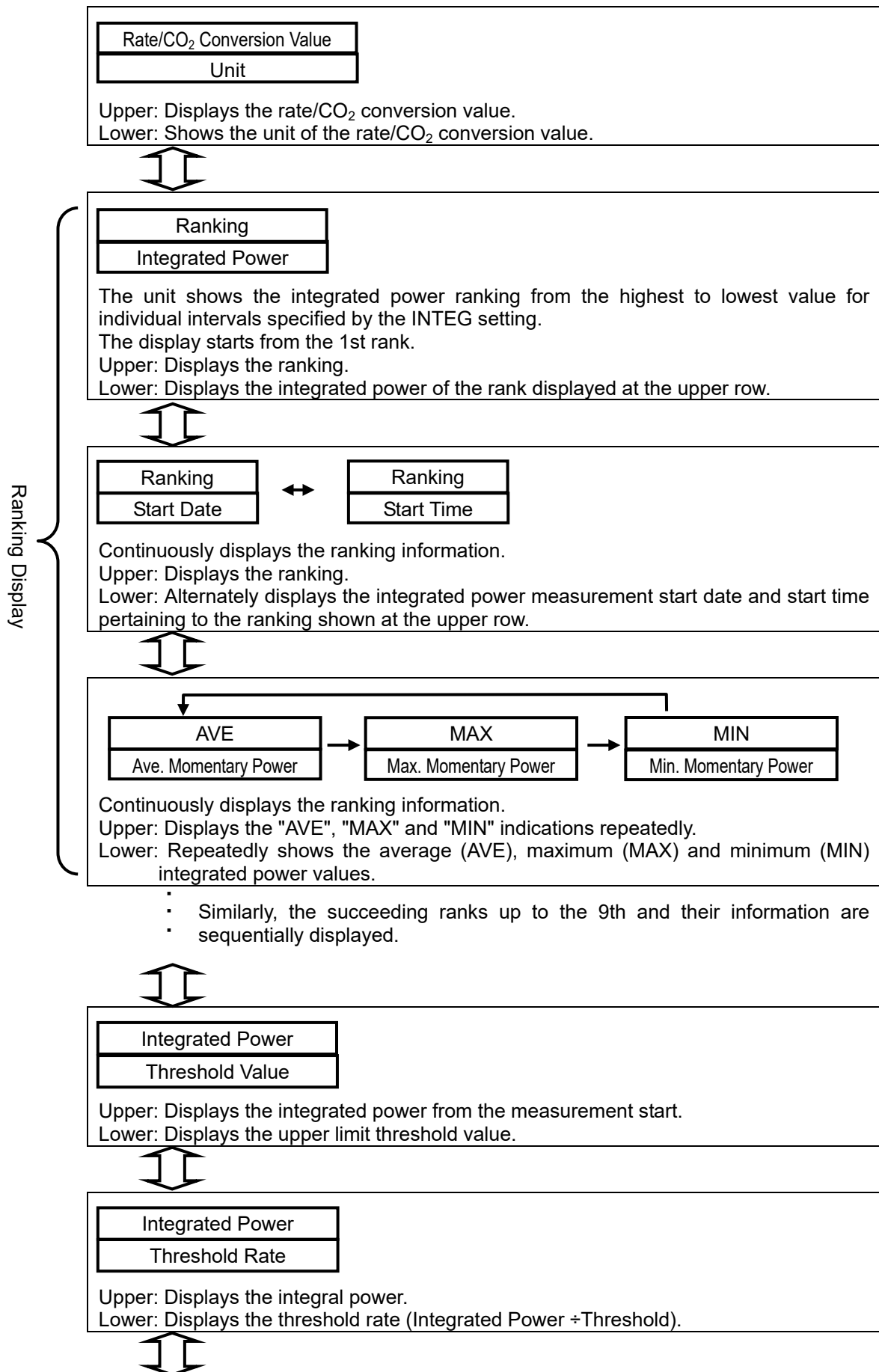
Note

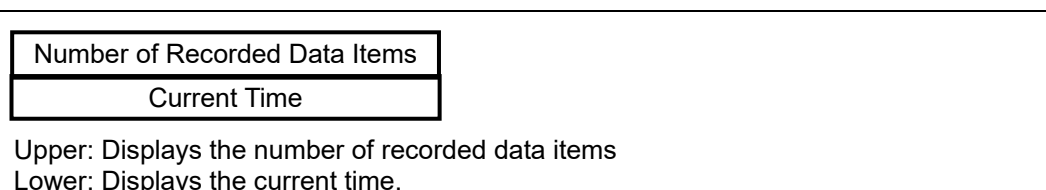
A shift to other mode is prohibited during recording.

5.3 Screen Transition in RUN Mode

Pressing the Δ or ∇ key in RUN mode switches the display as shown below. Pressing the MODE key changes the operation mode.







Returns to the first display.

Note

- The "REC" indication turns ON during data recording.
- "ALM" turns ON when the measured value exceeds the upper limit threshold value or the alarm output is ON. To cancel the retained alarm, hold the MODE key.

5.4 Starting/Stopping Recording

5.4.1 Starting Recording

The unit starts recording power level when the SET/REC/STOP key is held (long press for at least 3 seconds) in RUN mode or when the specified start time is reached. The "REC" indication turns ON when recording starts.

The measured data is recorded and accumulated in the internal memory, and is output in a CSV file to the SD memory card when the SET/REC/STOP key is pressed.

Important

- If recording starts with recorded data remaining in the internal memory, the remaining recorded data is lost. To save the data, press the SET/REC/STOP key for less than 3 seconds to output the data to the SD card before recording. Recorded data remaining in the internal memory is the result of the unit restarting after a power failure or a press of the reset switch in midst of recording. This situation does not happen if recording is correctly stopped.

To check for remaining data, press the ∇ or Δ key in RUN mode to locate the display in which the current time is shown at the lower row. Check its upper row, and if its value is "0", then there is no data remaining in the internal memory.

- The unit cannot start recording while an error message is shown in the display. Remove the error cause, and cancel the error status by holding the MODE key (3 seconds or longer). Then, start recording.

Note

- The Power Startup REC Restoration (REREC) function automatically resumes recording (if it is set to "ON") when the unit restarts after it was accidentally turned OFF during recording.
- An SD memory card must be placed in the unit when the SET/REC/STOP key is pressed for data output during recording or when recording is stopped. It is not necessarily the case at the point when the unit starts recording.
- Disable the write protection of an SD memory card. If it is enabled, an error occurs when the unit attempts to write data to the card (when the internal memory becomes full) and recording stops.
- A shift to other mode is prohibited during recording.

5.4.2 Stopping Recording

The unit stops recording and outputs files to the SD memory card when the SET/REC/STOP key is held (long press for at least 3 seconds) during recording ("REC" is ON) or when the specified end time is reached. The "REC" indication turns OFF when recording stops.

Important

A write-enabled SD memory card must be inserted in the slot when stopping recording. If a data output attempt fails, recording stops with the recorded data in the internal memory retained and the error message is displayed. Hold the MODE key (3 seconds or longer) to cancel the error status. Insert an SD memory card and output the recorded data file to the card by pressing SET/REC/STOP key. Do not start recording before the data in the

internal memory is written to the SD memory card. The data is discarded once the unit starts recording.

5.5 SD Outputting File to SD Memory Card

Recorded data can be output to SD memory card files when any of the following cases happen.

- (a) The SET/REC/STOP is pressed (for less than 3 seconds) during recording. Recording in the internal memory continues.
- (b) The SET/REC/STOP key is held (for 3 seconds or longer) during recording. Recording in the internal memory stops.

Refer to: 5.4.2 Stopping Recording

- (c) The internal memory becomes full during recording. Recording in the internal memory continues. (The recording mode must have been set to "Continue mode".)

Refer to :4.2.4 (4) Recording Mode (REC)

- (d) The SET/REC/STOP key is pressed (for less than 3 seconds in RUN mode) during non-recording process, when recorded data remains in the internal memory. This refers to the case that the unit restarts after it is reset during recording due to a power failure or other reason.
- (e) The Power Startup REC Restoration function (REREC) is set to ON, and the unit restarted after a power failure during recording. Recording will start automatically after completion of file output. If a file output failed, an error occurs and recording will not start.

Reference: 4.2.4 (33) Power Startup REC Restoration Function

5.6 Cancelling Retained Alarm

"ALM" turns ON when the integrated power value exceeds the upper limit threshold or the alarm output is ON.

To cancel the retained alarm, hold the MODE key (for 3 seconds or longer).

A generated alarm will not be automatically cancelled even if the integrated power is reset and the value falls short of the threshold by the integrated power reset setting (INTEG).

5.7 Display Turning OFF

The display may turn OFF during recording in RUN mode if the unit has not been operated for 10 seconds. This suggests that the unit has entered SLEEP mode. Despite the screen being turned OFF, recording still continues as long as the unit is in recording process.

To activate the display again, press any key. A key pressed when the display is turned OFF only triggers the display to turn ON, regardless of its specific function assigned. To execute

the function assigned to that key, press it again when the display has recovered from SLEEP mode.

Refer to: 4.2.4 (3) Measurement Mode (MODE)

6. Ratings and Performance

Item	Description
Connectable Sensor	ZN-CTS□1-□A, ZN-CTM□1-□A
Display	7-seg. 5-digit 2-step LCD display, auxiliary information indicator displays
Recording Interval	1 s, 2 s, 5 s, 10 s, 20 s, 30 s, 1 min. * ¹
Operation Function* ²	Momentary power, Integrated power consumption
Measurement Operation Mode	Normal mode, Sleep mode* ³ , High-speed logging mode
Recording Mode	Continue mode* ⁴ , Ring mode* ⁵
External Output	Alarm output (Photocoupler output) * ⁶
Memory Capacity (Internal)	Internal memory: approx. 6500 data items (The number of CHs is 1)
Memory Capacity (External)	SD card with SDHC compatibility* ⁷ (Save measured values and converted values; save and read setting values)
Power Supply	DC input: 24 VDC±10% AC adapter: 100 to 240 VAC/50 to 60 Hz Batteries: Two AAA batteries* ⁸
Current Consumption	Max. 80 mA (AC adapter used)
Battery Life* ⁹	Approx. 1 week* ¹⁰
Operating Temperature	Battery Supply: -10°C to 60°C (no condensation or icing) AC Adapter: 0°C to 40°C (no condensation or icing)
Operating Humidity	20 to 85%RH (no condensation or icing)
Storage Humidity/Temperature	-15°C to +60°C, 20 to 85%RH (no condensation or icing)
Insulation Resistance	20 MΩ (with DC500V Megger)
Withstand Voltage	1000 VAC, 50/60 Hz, 1 min.: Between the case and I/O terminal
Vibration Resistance	With mounting screws: 10 to 150 Hz, 0.7 mm double amplitude, acceleration: 50 m/s ² for each in X, Y and Z directions for 80 min. With mounting magnets: 10 to 55 Hz, 0.3 mm double amplitude, acceleration: 20 m/s ² for each in X, Y and Z directions for 50 min.
Shock Resistance	150 m/s ² in 6 directions (+/-X, +/-Y, and +/-Z directions), 3 times each* ¹¹
Material	ABS
Degree of Protection	IP30
Mounting	Magnet mounting, screw mounting, hook, free standing
Dimensions (WDH)	117.2 × 24.6 × 56.8 mm (Excluding protrusions)
Weight (in Package)	Approx. 500 g
Accessories	Instruction Sheet, Startup Guide, Mounting Magnets* ¹² , Alarm Output Connector* ¹³ , AC Adapter, DC cable, Ferrite core

*1: In high-speed logging mode, data is recorded in 83 ms at 60 Hz and in 100 ms at 50 Hz.

*2: Momentary power and integrated power values are converted from the measured current. Correctly specify the number of used channels, applicable measurement target circuit, CT type, frequency, voltage and power factor.

*3: The display turns OFF after 10 seconds of no user operation and recovers by a key operation when SLEEP mode is specified. LAN cannot be used when sleep mode is specified.

*4: Automatically writes the data to the SD memory card when the internal memory reaches its capacity and continues recording until the SD card memory capacity reaches its limit. The unit stops operation if there is no SD memory card inserted when the internal memory reaches its capacity. (Recording can be resumed after inserting an SD memory card and

outputting the data to it at a press of button.)

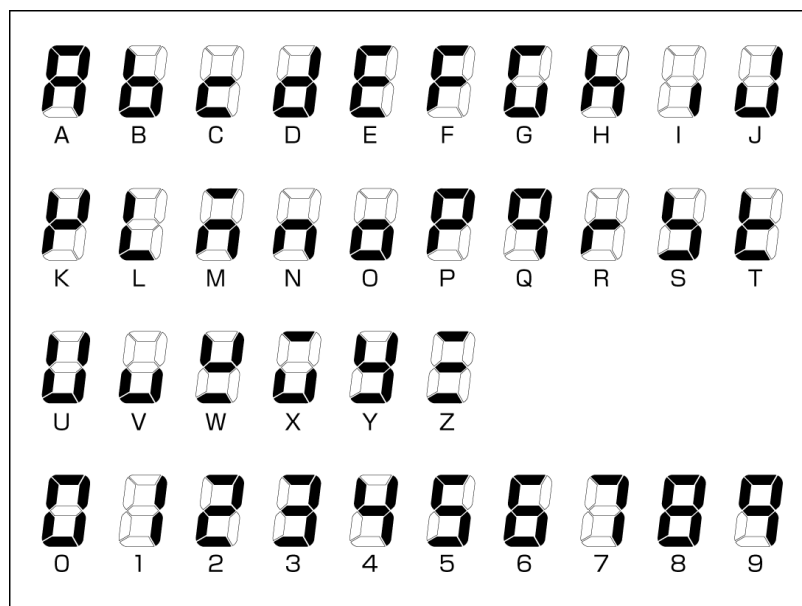
- *5: Continues the recording of the latest measured values until the internal memory reaches its capacity. (If the internal memory capacity exceeds the capacity, data is overwritten from the oldest one in the memory.)
- *6: Output when the integrated power upper limit specified in THR mode is exceeded. An alarm output is not available in SLEEP mode.
- *7: An OMRON HMC-SD291 SD Memory Card or an SDHC Class 4 or higher memory card is recommended.
- *8: Nickel-metal hydride cells or alkaline dry cells can be used. Manganese battery cells cannot be used.
- *9: Battery life varies depending on the measurement environment, recording interval, operation mode as well as the battery type and performance.
- *10: Conditions: Two AAA nickel-metal hydride cells; Sleep mode; Continue mode; Recording interval: 1 s; SD memory card: HMC-SD291; and Operation temperature: 23°C; and Automatic range selection off.
- *11: The installation place must be free from physical shock when using mounting magnets.
- *12: Already installed on the product by factory default.
- *13: OMRON's XW4B-02B1-H1 connector.

Appendix

Error Display List

Display Upper/Lower	Description	Troubleshooting
DATA E1100	Measured data writing failure	Failed to write recorded data to the SD memory card due to no free space or the card being removed during writing. Insert a write-enabled SD card. Hold the MODE key for 3 seconds or more to cancel the error display.
NO SD E3000	No SD memory card inserted	An SD memory card is not inserted. Insert a write-enabled SD card. Hold the MODE key for 3 seconds or more to cancel the error display.
BATLO E3001	Unable to access the SD memory card	The SD memory card cannot be accessed due to the battery voltage drop. Replace the batteries or connect to the AC adapter. Hold the MODE key for 3 seconds or more to cancel the error display.
SDLCK E3002	Write-protected SD memory card	The SD memory card is write-protected. Replace it with a write-enabled one. Hold the MODE key for 3 seconds or more to cancel the error display.
SD ER E3003	SD memory card recognition error	Failed to recognize the SD memory card. Insert a normal SD memory card. Hold the MODE key for 3 seconds or more to cancel the error display.
RESTR E5000	Invalid setting file data	The setting data in the SD memory card is invalid e.g. an invalid model type or setting values. Hold the MODE key for 3 seconds or more to cancel the error display.
BCKUP E5001	Setting file writing failure	Failed to write setting files to the SD memory card due to no free space or the card being write-protected. Insert a write-enabled SD card. Hold the MODE key for 3 seconds or more to cancel the error display.
RESTR E5002	Setting file reading failure	There is no setting files contained in the SD memory card. Replace it with an SD memory card with setting files. Hold the MODE key for 3 seconds or more to cancel the error display.
HARD E****	Hardware error	There may be a failure on the hardware. Please contact the distributor or OMRON representative office. The displayed error code is required for identifying the problem.

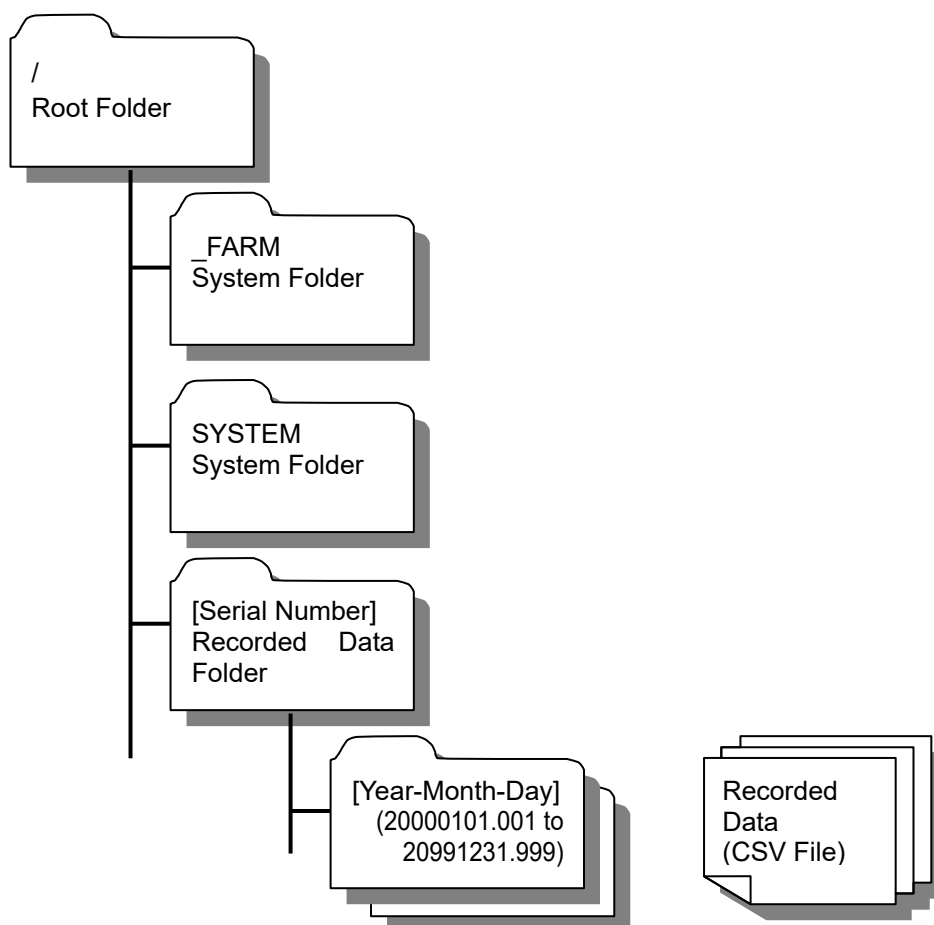
Character Display List



Display	String	Display	String	Display	String
	CLEAR		RESTR		SCT5A
	CYCLE		BCKUP		LOCUT
	TIMER		CLOCK		RANGE
	STRIG		YEAR		AUTO
	STIME		MONTH		RATE
	ETRIG		DAY		CONV
	ETIME		TIME		REREC
	ELPSD		OFF		INT H
	MODE		ON		RESET
	REC		DISP		DONE
	INTEG		NORM		DATA
	USECH		SLEEP		NO SD
	TYPE		HISPD		SDLCK
	CT		NET		HARD
	VOLT		IP		SD ER
	PF		SUB		BATLO
	FREQ		CONT		
	INIT		RING		
	ETC		DTAIL		

Main Messages

SD Memory Card Folder Structure

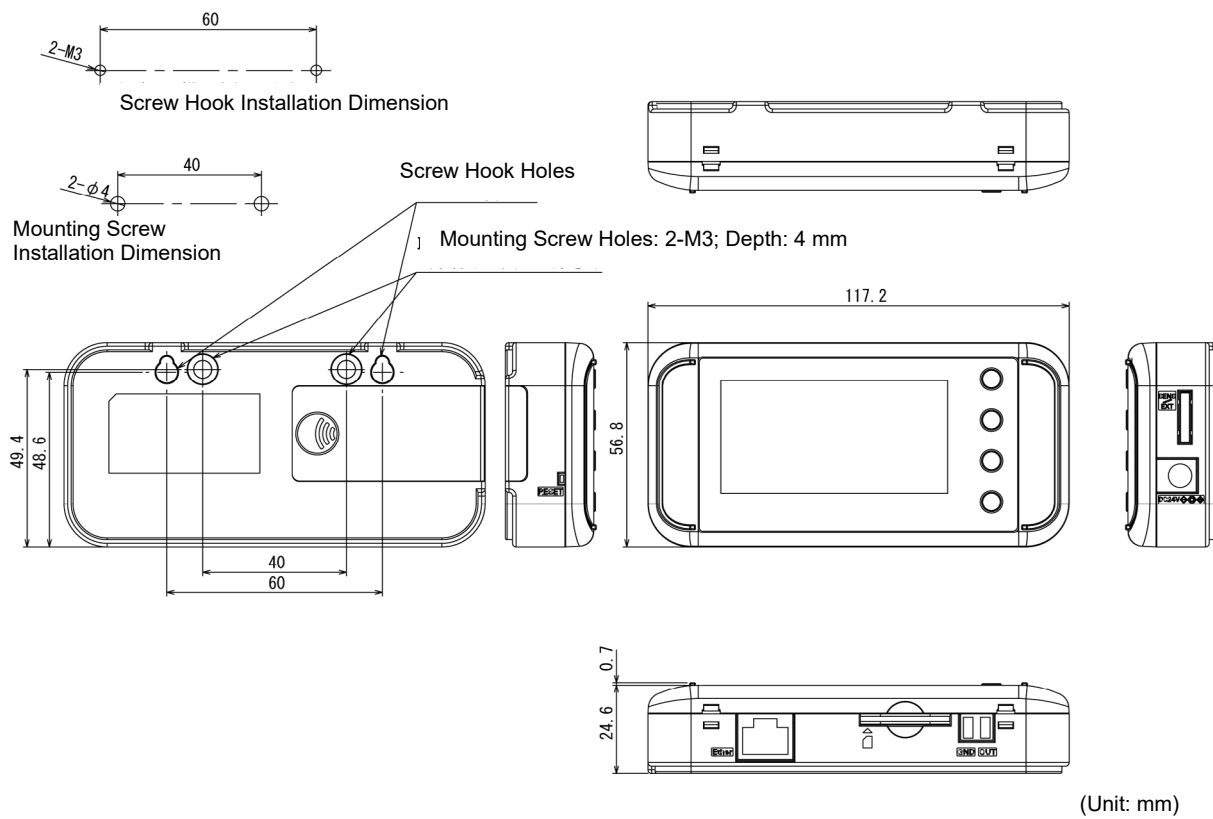


File/Folder Name	Description
_FARM	For system use. Do not modify the file names or the internal files.
SYSTEM	For system use. Do not modify the file names or the internal files.
[Serial Number]	Folder for storing recorded data. The folders are named with the serial numbers corresponding to the Portable Power Monitor unit numbers.
[Year-Month-Day]	Sub folders for storing recorded data. Folder Name Structure: "Recorded time and date (YYYYMMDD format) + . + Serial No." Example: 20111001.001 The folder is written on October 1, 2011. Recorded data file is created in the CSV format. File Name Structure: "Hour-Minute-Second + Serial No.".CSV Example: 12345601.CSV The recorded data file is written at 12:24:56.

Calibration

Portable Power Monitor units do not required calibration.

Installation Diagram



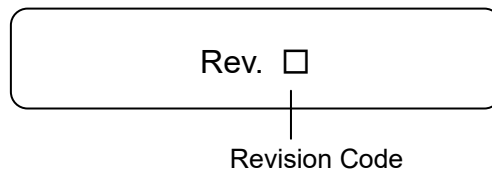
Revision History

The specifications of this product are subject to changes without prior notice due to the addition of new functions or modification for improvement. These changes will be reflected in relevant manuals whenever such changes are made.

The revised manual contains the revision history with the manual revision codes and the revision descriptions.

Manual Revision Code

The manual revision code is provided at the lower right corner of the manual.



Revision History

Revision Code	Date	Description
A	October 2011	First edition
B	November 2012	Correspondence of display unit change
C	December 2016	Revised due to change of PC software distribution method.
D	March 2019	Revised due to change of Terms and Conditions Agreement.
E	July 2019	Correction of contact information.

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