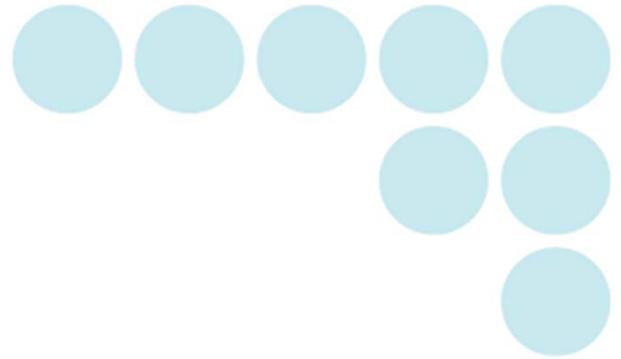


EQUO Series

**Portable Power Monitor
ZN-CTX21**

**Power Sensor Station
ZN-KMX21**



User's Manual

Introduction

Thank you for purchasing an EQUO Series CTX21 Portable Power Monitor or ZN-KMX21 Power Sensor Station.

This manual describes the information on the functions, performance and usage required to use the unit.

Please observe the following when using the unit:

- 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.

Trademarks

- Microsoft and Windows are registered trademarks or trademarks of Microsoft Corporation in the United States and other countries.
- Other company names and product names are registered trademarks or trademarks of the respective company.

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.

Describes in detail product specifications and other necessary information required to use the product.

Multi Data Viewer Light Software Manual

Describes the information of the functions and usage of the PC software, Multi Data Viewer Light.

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Errors and Omissions.

Information presented by Omron Companies has been checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical or proofreading errors or omissions.

Precautions on Safety

● Meanings of Signal Words

For the safe operation of ZN-CTX21 main unit, 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:

 <b style="font-size: 1.2em;">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.
--	--

 <b style="font-size: 1.2em;">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

	<ul style="list-style-type: none"> ● Mandatory Requirement Indicates a general mandatory requirement.
	<ul style="list-style-type: none"> ● Prohibition Indicates general prohibition.
	<ul style="list-style-type: none"> ● Electric Shock Warning Warns against an electric shock under specific conditions.
	<ul style="list-style-type: none"> ● Explosion Warning Warns against an explosion under specific conditions.
	<ul style="list-style-type: none"> ● Disassembly Prohibition Indicates the possibility of accidents such as an electric shock caused by unit disassembly.

● Warning Indications

 <b style="font-size: 1.5em;">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.	

<p>Anti-virus protection</p> <p>Install the latest commercial-quality antivirus software on the computer connected to the control system and maintain to keep the software up-to-date.</p>	
<p>Security measures to prevent unauthorized access</p> <p>Take the following measures to prevent unauthorized access to our products.</p> <ul style="list-style-type: none"> · Install physical controls so that only authorized personnel can access control systems and equipment. · Reduce connections to control systems and equipment via networks to prevent access from untrusted devices. · Install firewalls to shut down unused communications ports and limit communications hosts and isolate control systems and equipment from the IT network. · Use a virtual private network (VPN) for remote access to control systems and equipment. · Adopt multifactor authentication to devices with remote access to control systems and equipment. · Set strong passwords and change them frequently. · Scan virus to ensure safety of USB drives or other external storages before connecting them to control systems and equipment. 	
<p>Data input and output protection</p> <p>Validate backups and ranges to cope with unintentional modification of input/output data to control systems and equipment.</p> <ul style="list-style-type: none"> · Checking the scope of data. · Checking validity of backups and preparing data for restore in case of falsification and abnormalities. · Safety design, such as emergency shutdown and fail-soft operation in case of data tampering and abnormalities. 	
<p>Data recovery</p> <p>Backup data and keep the data up-to-date periodically to prepare for data loss.</p>	

⚠ CAUTION

<p>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.</p>	
<p>An electric shock may occur. Do not replace the batteries when the unit is clamped to a conductor for measurement.</p>	
<p>Tighten the terminal screws at a recommended torque: 0.69 to 0.88N·m. Make sure that the screws are not slanted away from the center after tightened.</p>	
<p>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.</p>	
<p>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.</p>	
<p>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.</p>	
<p>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.</p>	
<p>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.</p>	

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.
- Do not use the product in a safety circuit for nuclear or life-support systems. *1
- Dispose of the product as industrial waste.
- When using batteries on ZN-CTX, use them 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 memory 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. personal 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 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 ZN-CTX21 unit is clamped to a conductor for measurement.
- ZN-CTX21 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.
- The dedicated CT connected with ZN-CTX21 must be the model specified by Omron.

Dedicated CT: ZN-CT□□□-□A

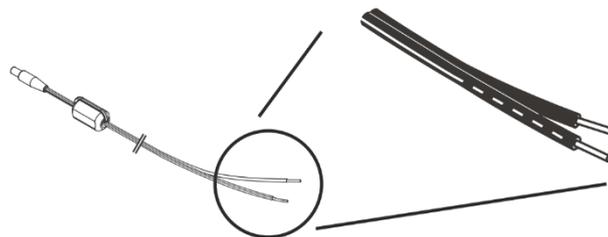
Precautions for Correct Use

1. Avoid installing the product in the following places:

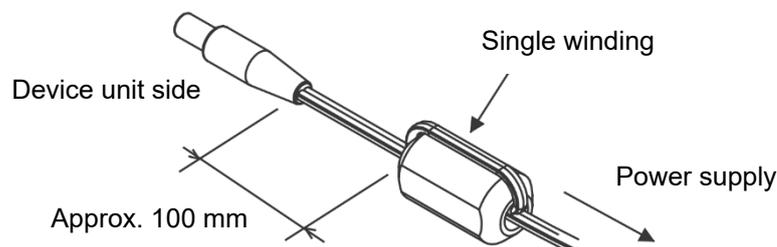
- Places exceeding the rated ambient temperature
- Places exposed to extreme temperature changes (where condensation occurs)
- Places subject to relative humidity exceeding the rated humidity range
- Places subject to corrosive or flammable gases
- Places subject to mist, droplets, coarse particles, 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 of ZN-CTX21

- 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.
- Battery disposal must follow the guidelines provided by local governments. Dispose of batteries in compliance with the relevant local regulations.
- Batteries are not usable on ZN-KMX21. Do not open the rear cover of the main unit and set batteries.



4. 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.

5. Measurement by ZN-CTX21

- 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.

6. Use of Power Sensor/Monitor

- When using the product, also read KM Series Power Sensor/Monitor instruction sheets for necessary information relevant to the product.
- The Power Sensors/Monitors that can be connected to the product are KM20-B40-FLK, KM50-C, KM50-E, KM100, KM-N1-FLK, KM-N2-FLK and KM-N3-FLK.
- To directly connect KM-N1-FLK, KM-N2-FLK and KM-N3-FLK to the product, please purchase a separately sold dedicated connection cable ZN9-KMC30-N.

7. Long-term storage

- If the product will not be used for a long period of time, store the product in the location where the temperature is not too high. Otherwise the built-in battery may drain faster.

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

CTX21: Only ZN-CTX21 is applicable.

KMX21: Only ZN-KMX21 is applicable.

Common: Both ZN-CTX21 and ZN-KMX21 are applicable.

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

Note: Shows operational tips or related useful information.

■ About Power Sensor/Monitor

The orders for Small Power Sensor KM20-B40-FLK ended in March 2019.

The orders for Power Monitor KM100 ended in March 2020.

Table of Contents

Introduction	i
Table of Contents	xi
1. Product Overview	1-1
1.1 Features and Functions	1-1
1.1.1 ZN-CTX21.....	1-1
1.1.2 ZN-KMX21	1-3
1.2 Configuration.....	1-4
1.2.1 Standalone.....	1-4
1.2.2 Network Connection	1-4
1.3 Easy Power Measurement.....	1-5
1.4 Multi-point Power Measurement	1-6
1.5 Setup and Operation Procedure	1-7
1.5.1 ZN-CTX21.....	1-7
1.5.2 ZN-KMX21	1-9
2. Part Name and Function	2-1
2.1 Unit.....	2-1
2.2 Display Unit.....	2-2
2.3 Control Unit	2-3
2.3.1 Control Key	2-3
2.3.2 Reset Switch.....	2-3
2.3.3 Inserting/Removing SD memory card.....	2-3
2.4 Input/Output Specifications	2-5
2.4.1 Alarm Output Terminals	2-5
2.4.2 Output Specifications.....	2-5
3. Check and Preparation	3-1
3.1 Checking the Package Contents.....	3-1
3.2 Preparing the Required Items	3-2
3.3 Assembly.....	3-3
3.3.1 Connecting Power Sensor/Monitor	3-3
3.3.2 Connecting Dedicated CT.....	3-5

3.3.3	Using Alarm Function.....	3-5
3.3.4	Preparing Power Supply	3-6
3.3.5	Checking Operation	3-8
3.4	PC Software	3-9
3.5	Setting the Measurement Conditions.....	3-10
3.5.1	Switching to "FUN" Mode	3-10
3.6	Connecting to Network.....	3-13
3.6.1	Preparation	3-13
3.6.2	Setting IP Address of the Unit.....	3-14
3.6.3	Setting the PC IP Address	3-17
3.6.4	Connecting LAN Cable	3-23
3.7	Mounting the Unit.....	3-24
3.7.1	Free-stand Installation	3-24
3.7.2	Securing with Mounting Magnets.....	3-24
3.7.3	Securing with Mounting Screws.....	3-25
3.7.4	Screw Hook Mounting.....	3-25
3.8	Attaching Dedicated CT to Measurement Target.....	3-27
4.	Setting the Unit (Unit Operation)	4-1
4.1	Setting Procedure and Operation Mode	4-1
4.2	Settings (FUN Mode Operation)	4-2
4.2.1	Setting Item List	4-2
4.2.2	Selecting "FUN" Operation Mode	4-4
4.2.3	Selecting Items	4-5
4.2.4	Definition of Items	4-7
4.2.5	Changing the Set Value	4-22
4.3	Settings (THR Mode Operation)	4-24
4.3.1	Setting Item List	4-24
4.3.2	Selecting "THR" Operation Mode	4-25
4.3.3	Selecting Items	4-25
4.3.4	Definition of Items	4-25
4.3.5	Changing the Set Value	4-26
4.4	Copying Setting Data for Multiple Monitor Units	4-27
5.	Measurement and Recording (Unit Operation)	5-1
5.1	Overview	5-1
5.2	Selecting Operation Mode	5-2
5.3	Screen Transition in RUN Mode	5-3

5.3.1	ZN-CTX21	5-3
5.3.2	ZN-KMX21	5-6
5.4	Starting/Stopping Recording	5-8
5.4.1	Starting Recording	5-8
5.4.2	Stopping Recording	5-8
5.5	Display Ranges	5-9
5.6	SD Outputting File to SD Memory Card.....	5-10
5.7	Cancelling Retained Alarm.....	5-11
5.8	Display Turning OFF	5-12
6.	Appendix	6-1
6.1	6. Ratings and Performance	6-1
6.1.1	ZN-CTX21	6-1
6.1.2	ZN-KMX21	6-3
6.2	Error Display List.....	6-5
6.3	Character Display List.....	6-6
6.4	SD Memory Card Folder Structure	6-7
6.5	Calibration	6-8

Revision History

1. Product Overview

1.1 Features and Functions

1.1.1 ZN-CTX21

(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 "Multi Data Viewer Light Software 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 memory 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 "Multi Data Viewer Light Software 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 HISP 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.

1.1.2 ZN-KMX21

(1) Easy Multi-point Data Acquisition

The ZN-KMX21 Power Sensor Station provides the measurement and recording of power consumption at multiple points. Individual measured values are added to total sums, which can be checked at operation sites. The station can be connected to up to 31 Power Sensor/Monitor units, whose momentary power, integrated power, power factor, and pulse count values can be independently recorded. Power data acquisition at operation sites now becomes easy, contributing to enhanced energy-saving efficiency.

(2) Recording in SD Memory Card

The measured data can be recorded in the Power Sensor Station. Up to approx. 200 data items* can be accumulated in the internal memory at the maximum load, and approx. 6800 items at the minimum load, which enables the station to continue data recording even at an emergency network failure. The station allows its data accumulated in the internal memory to be output to an SD memory card in CSV format without stopping measurement, thus making continuous recording for long hours possible.

* The recordable shortest time in the internal memory is approximately 1 hour and 20 minutes. Use an SD memory card for longer time of recording.

(3) Network Connections

The measured values obtained from multiple Power Sensor Station units can be recorded to a PC connected to the stations via LAN cable by using the PC software. Individual Power Sensor Stations can be controlled from the PC to check or change their settings as well as start/stop the recording. (Refer to "Multi Data Viewer Light Software 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.

(4) Graph Display and Data Processing Software

The data output to an SD memory card or recorded 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 multiple station data can be displayed simultaneously side by side on the screen. (Refer to "Multi Data Viewer Light Software Manual" for details.)

(5) Alarm Output

Alarm output terminals are provided on the Power Sensor Station. The alarm is output when the measured power value exceeds the upper limit. This feature provides 'visualization' of the power limit, allowing the operator to quickly handle problems.

1.2 Configuration

1.2.1 Standalone

Portable Power Monitor/Power Sensor Station 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 memory card. The recorded data in an SD memory card can be displayed in graphs using the PC software.



1.2.2 Network Connection

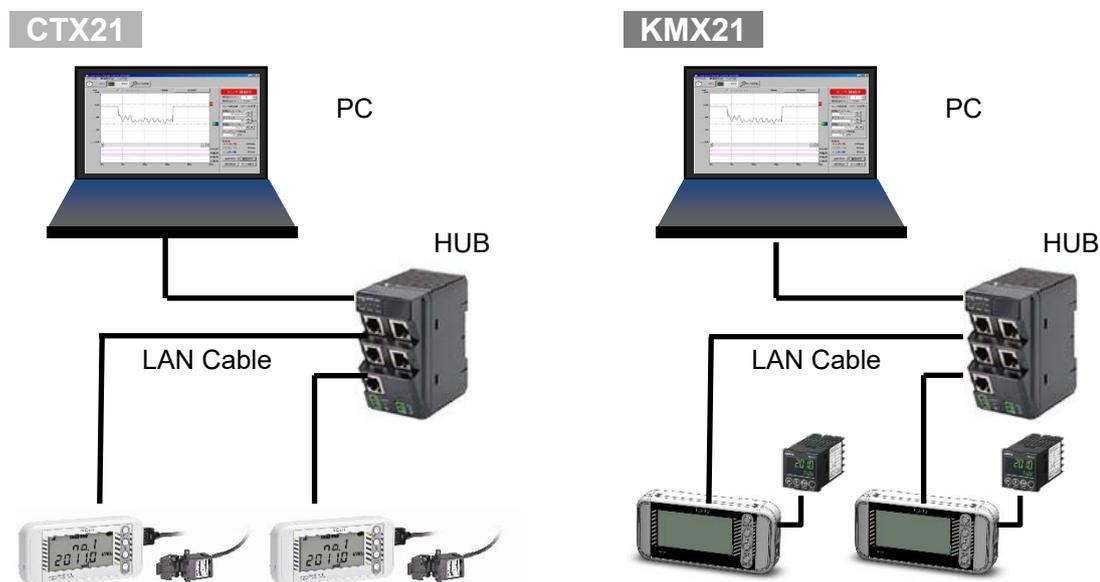
Portable Power Monitor/Power Sensor Station can be connected to a PC via LAN. The following operations are available by using the PC software.

(1) Remote Setting and Operation from PC

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

(2) Measured Data Acquisition to PC

The measured data on Portable Power Monitor/Power Sensor Station can be acquired to a PC using the PC software, Multi Data Viewer. The acquired data can be displayed in graphs offline using the PC tool.



1.3 Easy Power Measurement **CTX21**

- 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 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 Multi-point Power Measurement **KMX21**

- By connecting multiple KM series Power Sensors/Monitors (sold separately) to a Power Sensor Station as its lower units, the momentary power and integral power consumption obtained via the individual units can be displayed both as the individual values and the total sum of individual values.
- Momentary power values are displayed all the time while the power is ON.
- Integral power consumption values are constantly calculated only during the recording, which has been started by (holding) the SET/REC/STOP key. The display is constantly updated. When the recording is stopped, the values at the time of the stop are displayed.
- Values measured at multiple points can be logged to a single CSV file record.

Note

- Up to 100 units of Power Sensor Station can be connected with a PC. (However up to 1024 channels are usable.)
- Up to 31 units of Power Sensor/Monitor of the KM series can be connected with one Power Sensor Station unit.

If there are multiple circuits in one unit, as in the KM-N series, count the number of enabled circuits as the same number of units.

1.5 Setup and Operation Procedure

1.5.1 ZN-CTX21

(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 Assembly

Install the Multi Data Viewer Light PC software
→ "Multi Data Viewer Light Software Manual": 1.5 Installation

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
→ "Multi Data Viewer Light Software Manual" 4.5 Graph Display

Analyze long-period recording data
→ "Multi Data Viewer Light Software Manual" 3.7 Displaying Graphs

(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 Assembly

Install the Station Utility PC software
→ "Multi Data Viewer Light Software Manual": 1.5 Installation

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
→ "Multi Data Viewer Light Software Manual" 2.6 Creating/Saving Projects

Remotely record data to the unit
→ "Multi Data Viewer Light Software Manual" 2.8 Logging (Logging Menu)

Analyze short-period recording data
→ "Multi Data Viewer Light Software Manual": 4.5 Graph Display

Analyze long-period recording data
→ "Multi Data Viewer Light Software Manual": 3.7 Displaying Graphs

1.5.2 ZN-KMX21

(1) Standalone Operation

Check the package contents
→ 3.1 Checking the Package Contents

Check the required items
→ 3.2 Preparing the Required Items

Connect KM series power sensors/monitors; alarm output terminals and prepare the power supply
→ 3.3 Assembly

Install the Multi Data Viewer Light PC software
→ "Multi Data Viewer Light Software Manual": 1.5 Installation

Set the measurement conditions
→ 3.5 Setting the Measurement Conditions

Mount the product
→ 3.7 Mounting the Unit

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
→ "Multi Data Viewer Light Software Manual": 4.5 Graph Display

Analyze long-period recording data
→ "Multi Data Viewer Light Software Manual": 3.7 Displaying Graphs

(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 KM series power sensors/monitors; alarm output terminals and prepare the power supply

→ 3.3 Assembly

Install the Multi Data Viewer Light PC software

→ "Multi Data Viewer Light Software Manual": 1.5 Installation

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

Record data in PC

→ "Multi Data Viewer Light Software Manual" 2.6 Creating/Saving Projects

Remotely record data in the unit

→ "Multi Data Viewer Light Software Manual" 2.8 Logging (Logger Menu)

Remotely set Power Sensor/Monitor

→ "Multi Data Viewer Light Software Manual" 2.7.3 Setting Devices

Analyze short-period recording data

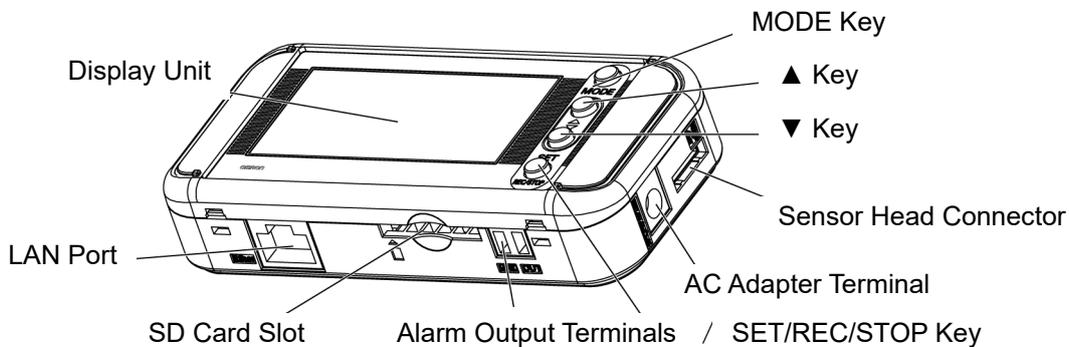
→ "Multi Data Viewer Light Software Manual": 4.5 Graph Display

Analyze long-period recording data

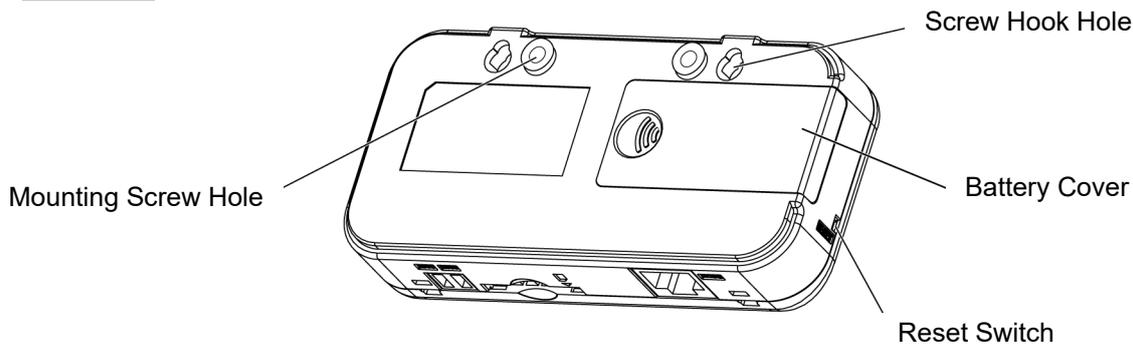
→ "Multi Data Viewer Light Software Manual": 3.7 Displaying Graphs

2. Part Name and Function

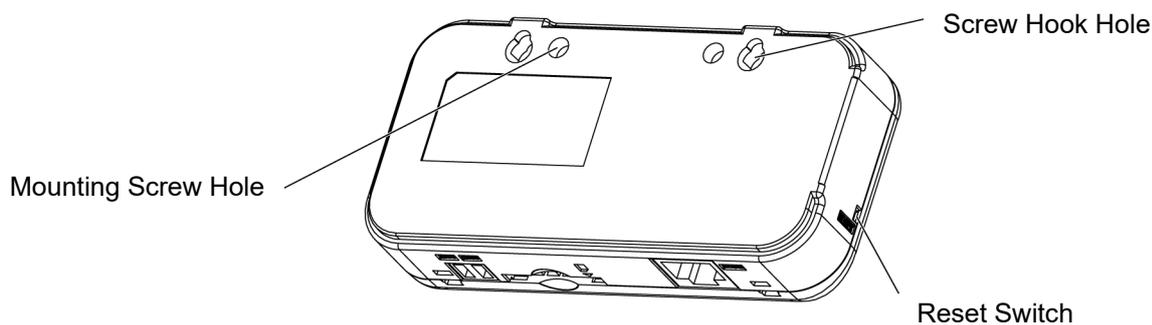
2.1 Unit



CTX21



KMX21



2.2 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 memory card is being accessed.
ALM	Integral power consumption has exceeded the specified upper threshold value.
	Power is being supplied to the unit.
 *1	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.

*1 Not displayed on ZN-KMX21.

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

Refer to: Appendix, "Character Display List"

2.3 Control Unit

2.3.1 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.

2.3.2 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.

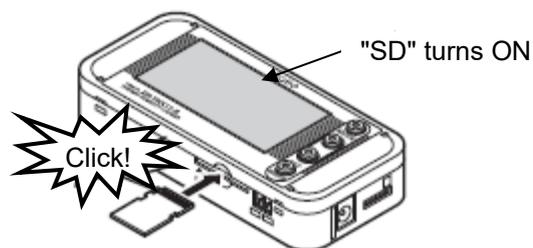
2.3.3 Inserting/Removing SD memory card

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 memory 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 memory card when the "SD" display is blinking. Doing so may destroy the data in the SD memory card.
- Do not touch the metal terminal of the SD memory card.
- Make sure that the SD memory card does not bend.
- Avoid static electricity when inserting/removing an SD memory card.
- Do not enable the write-protection of the SD memory card.

(1) Inserting SD memory card



- [1] Insert an SD memory 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 memory card

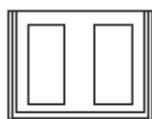
- [1] Push the inserted SD memory card inward until it clicks.
- [2] Stop pushing and let the card pops out. Take caution not to drop the card.
- [3] "SD" on the display disappears.

Important

- If the SD memory card has not been formatted yet, format it before inserting into the card slot.
- For the page to download the formatting software for SD memory cards, refer to the following URL.
<https://www.sdcard.org/downloads/formatter/>

2.4 Input/Output Specifications

2.4.1 Alarm Output Terminals



GND OUT

(1) OUT

Outputs the judgment result allocated in THR mode.

(2) GND

It is a common terminal.

The terminal names are inscribed on the unit.

Use the provided alarm output connector for wiring.

2.4.2 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". (Only for ZN-CTX21)

3. Check and Preparation

3.1 Checking the Package Contents

This product package includes the following items:

<input type="checkbox"/> Main Unit ZN-CTX21 or ZN-KMX21	1
<input type="checkbox"/> AC Adapter or DC cable	1
<input type="checkbox"/> Instruction Sheet	1
<input type="checkbox"/> Startup Guide	1
<input type="checkbox"/> Alarm Output Connector	1
<input type="checkbox"/> Power Sensor Station Cable (ZN-KMX21 only)	1
<input type="checkbox"/> Mounting Magnet (Pre-installed, ZN-CTX21 only)	1

3.2 Preparing the Required Items

The following items are required to use this product.

CTX21

- Dedicated CT: ZN-CT□□□1-□A 1 (Separately sold)
Up to three units can be connected when using a branch cable (ZN-CTM11-C)
- 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.

KMX21

- KM Series Power Sensors/Monitors
 - KM100 Power Monitor
 - KM20-B40-FLK Small Power Sensor
 - KM50-□ Smart Power Monitor
 - KM-N1-FLK Small Power Monitor
 - KM-N2-FLK Power Monitor
 - KM-N3-FLK Power Monitor
- } Any of them in 1 to 31 units
(Sold separately)

Common

- SD Memory Card (SDHC compatible) 1
Used to save measured data or to relocate the data
(when recording in a Portable Power Monitor/Power Sensor Station unit)
Recommended: HMC-SD292 (2 GB), HMC-SD492 (4 GB)
- PC (personal computer) for the PC software 1

To connect the product with the network and use it, the following is necessary.

- 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, the unit should be connected to a PC via a HUB.

3.3 Assembly

3.3.1 Connecting Power Sensor/Monitor **KMX21**

(1) Power Sensor/Monitor Settings (KM Series)

Communication protocol *1	Compoway/F *2
Unit No.	Assign unique consecutive numbers.
Communication Speed	38.4 kbps
Data Bit Length	7 bits (Factory default) *3
Stop Bit Length	2 bits (Factory default) *4
Vertical Parity	EVEN (Factory default)
Transmission Waiting Time	20 ms (Factory default)

*1 KM20-B40-FLK and KM100 are not included.

*2 The initial values of KM-N2-FLK and KM-N3-FLK are set to Modbus.

*3 The initial values of KM-N2-FLK and KM-N3-FLK are set to 8 bits.

*4 The initial values of KM-N2-FLK and KM-N3-FLK are set to 1 bit.

■ Individual Power Sensor/Monitor Type Setting

[1] The first unit only requires the following setting if its factory settings have not been changed.

<KM50-□>

Power ON → (Meas. Mode) → (Setting Mode) → (Comm. Setting Mode)

→ (Comm. Speed Setting)  Hold the key → Set to "38.4" 

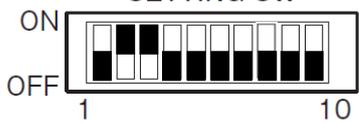
Twic 

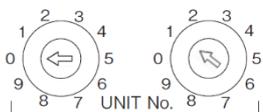
 To Change UP
 To Apply ENTER

<KM20-B40-FLK>

Turn ON the DIP switches 2 and 3 (COMMUNICATION SETTING SW). (See below)

COMMUNICATION SETTING SW





Unit No.: 01

<KM100>

Power ON → (Operation Level) → (Setting Level) → (Comm. Setting Level)

→ (Comm. Speed Setting)  Hold the key → Set to "38.4" 

   Twice

 To Change UP
 To Apply MODE

<KM-N1-FLK>

- KM-N1-FLK can have up to four circuits in one unit. The circuit operates like an independent power monitor, and performs setting and measurement individually.
- For the setting method, refer to the KM-N1-FLK instruction manual and user's manual.
- When multiple circuits are enabled in one KM-N1-FLK, always observe the following conditions.
 - Circuit A unit number is minimum
 - The circuits B to D do not overlap sequentially from the unit number of the circuit A

<KM-N2-FLK and KM-N3-FLK>

- KM-N2-FLK and KM-N3-FLK can have up to four circuits in one unit.
- For the setting method, refer to the instruction manual and user's manual of KM-N2-FLK and KM-N3-FLK.

[2] Make the same setting on the other units (Unit No. 2, 3, 4...).

The Unit No. setting is also required for the other units in addition to the setting above.

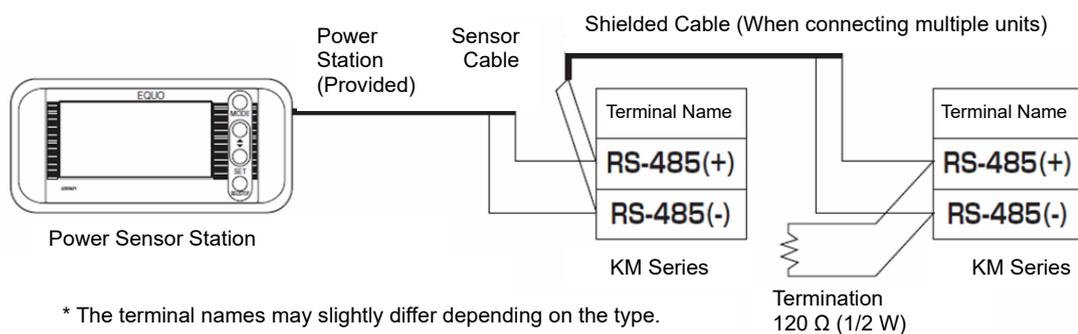
If measurement is performed for other circuit than three-phase, three-wire system, specific circuit type settings are required.

Refer to the relevant Power Sensor/Monitor instruction sheet for details.

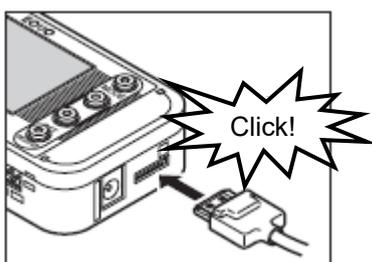
(2) Power Sensor/Monitor Connection (KM Series)

Up to 31 units of Power Sensors/Monitors can be connected to a single Power Sensor Station. If there are multiple circuits in one unit, as in the KM-N series, count the number of enabled circuits as the same number of units.

Connect Power Sensors/Monitors to a Power Sensor Station as shown below, in a daisy chain.



[1] Connect the provided Power Sensor Station cable to the station unit.



Insert the cable into the sensor head connector until it clicks.

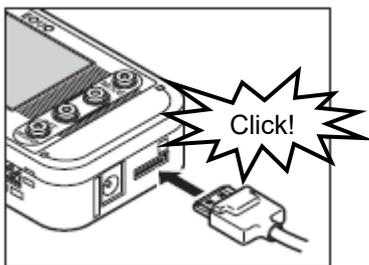
- [2] Connect the first Power Sensor/Monitor unit to the Power Sensor Station.
Connect the Power Sensor/Monitor to the provided Power Sensor Station cable.
- [3] When connecting multiple Power Sensor/Monitor units, connect a shielded cable between Power Sensor/Monitor units. The shielded cable must be provided by the user.
- [4] Provide a 120 Ω (1/2 W) termination between the RS-485 terminals on the last Power Sensor/Monitor unit.
The shielded cable for the termination must be provided by the user.

Important

- Match the polarities between the crimp terminals and terminal holes when connecting the units.
- Refer to the relevant Power Sensor/Monitor operation manual for their detailed operation.

3.3.2 Connecting Dedicated CT **KMX21**

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.

3.3.3 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.

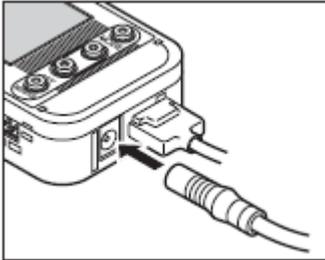
Refer to: 2.4.1 Alarm Output Terminals

3.3.4 Preparing Power Supply

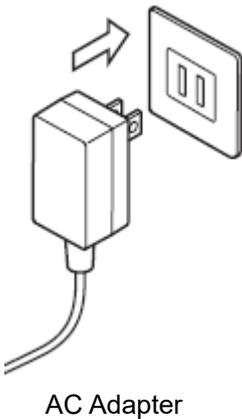
ZN-CTX21 can be operated by external power supply or using batteries.

ZN-KMX21 is operated by external power supply only.

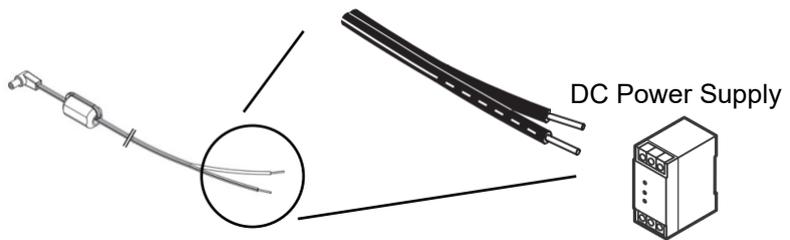
(1) Connecting to External Power Supply



[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±10%) and the non-lined wire to 0V.

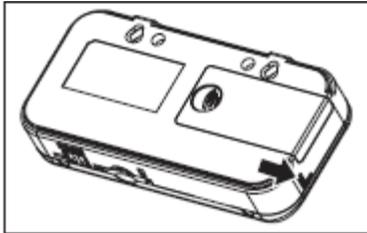


Important

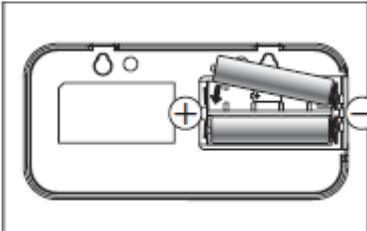
- Use the provided AC adapter when using AC power supply.
- Use the provided DC cable when using DC power supply.
- Do not use batteries when connecting the unit to a network. Batteries are rapidly consumed. (ZN-CTX21 only)
- Batteries cannot be used. Do not open the unit cover to attempt to install the batteries. (ZN-KMX21 only)

Note

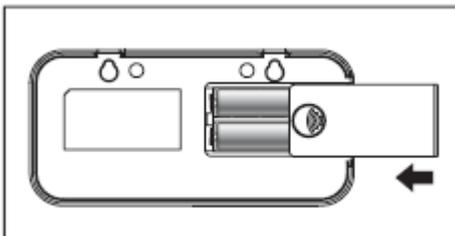
- A power switch is not provided on the unit. The unit starts operation immediately when the power is supplied.
- The external power supply is normally used as the primary power source when both external power supply and batteries are provided in the configuration. Batteries are used when the external 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. (ZN-CTX21 only)

(2) Using Batteries CTX21

[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.

3.3.5 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.
- 20 seconds or more waiting time is required until the power information appears, because the unit needs to wait for Power Sensor/Monitors to start up. (ZN-KMX21 only)
- The connected Power Sensor/Monitor units must be turned ON before the Power Sensor Station. If the order is reversed, the station may not correctly recognize the type names of the Power Sensor/Monitor units, which may result in power data acquisition failures. (ZN-KMX21 only)
- The "ALLOK" indication appears when the unit normally recognizes all the connected Power Sensor/Monitor units.
- If the connection is not normally recognized, investigate the cause by checking wirings, communication conditions, unit No. settings or other related issues. (ZN-KMX21 only)

3.4 PC Software

For ZN-CTX21 and ZN-KMX11-S□, the PC software Multi Data Viewer Light can be used. The PC Software Multi Data Viewer Light is a useful tool package for ZN-CTX21 and ZN-KMX21 settings, logging, as well as data summation and display. The Utility comprises the following three tools:

(1) **Summary/Display Tool: Multi Data Viewer**

The Multi Data Viewer is the tool used to aggregate, display and analyze measurement data by the Setting Manager and measurement data of the SD memory card recorded by the devices.

(2) **Setting/Logging Tool: Setting Manager**

The Setting Manager is the tool to make settings on devices and their measurement channels. It can also communicate with the devices to directly collect the measured data for logging.

(3) **Instant Value Displaying Tool: SD Viewer ES**

The SD Viewer ES provides the graph displays of the data acquired to the PC using the Setting Manager or data recorded to the SD memory card.

For installation and usage, refer to “Multi Data Viewer Light Software Manual.”

3.5 Setting the Measurement Conditions

For ZN-CTX21, set up the measurement condition of the object measured. The measurement condition is the following six items: The number of operating channels (USECH), application circuit (TYPE), dedicated CT type (CT), measurement target voltage (VOLT), power factor (PF), and frequency (FREQ).

For ZN-KMX21, set up the number of the Power Sensor/Monitor units connected with this Power Sensor Station.

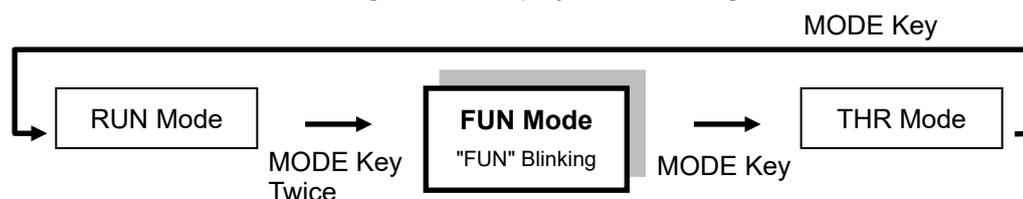
Note

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

Refer to: 2.2 Display Unit, 2.3 Control Unit

3.5.1 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.



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

CTX21

Display (Upper/Lower)	Operation
CLEAR ("FUN" Blinking)	Press the ▼ or ▲ key until "USECH" appears at the upper row on the display.
↓ ▼ or ▲ 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 ▲ key to display "2CH" at the lower row.
↓ ▼ or ▲ 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.

(2) Setting Measurement Target Circuit (TYPE) and Dedicated CT Type (CT)**CTX21**

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(14) Measurement Target Circuit (TYPE), 4.2.4(15) Dedicated CT Type (CT)

(3) Setting Voltage of Measurement Target (VOLT) (Example: 100.0V)**CTX21**

Display (Upper/Lower)	Operation
CT 200A ("FUN" Blinking)	Press the ▼ or ▲ key until "VOLT" appears at the upper row on the display.
↓ ▼ or ▲ 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 ▲ key to display "100.0" at the lower row. Note • A long press of the ▼ or ▲ key can rapidly change the values in Decremental or incremental steps.
↓ ▼ or ▲ 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.

(4) Setting Power Factor (PF) and Frequency (FREQ)**CTX21**

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(17) Power Factor (PF), 4.2.4(18) Frequency (FREQ)

(5) Setting the Number of Power Sensor/Monitor Units to be Connected (Example: 5 Units)

KMX21

Display (Upper/Lower)	Operation
CYCLE 10 s ("FUN" Blinking)	Press the ▼ or ▲ key until "NODE" appears at the upper row on the display.
↓ ▼ or ▲ Key	
UNIT 1	The default number of Power Sensor/Monitor units appears at the lower row. Press the SET/REC/STOP key.
↓ SET/REC/STOP Key	
UNIT 1 ↑ Blinking	The numeral at the lower row starts blinking. Press the ▼ or ▲ key to set "5".
↓ ▼ or ▲ Key	
UNIT 5 ↑ Blinking	"5" is applied to NODE by pressing the SET/REC/STOP key. Once applied, the blinking at the lower row stops.
↓ SET/REC/STOP Key	
UNIT 5	

After the value is applied, the unit restarts when FUN mode is switched to THR mode.

3.6 Connecting to Network

Network settings are required on the unit to be connected to a network.
Connect the LAN cables after completing the network settings on the unit.

Important

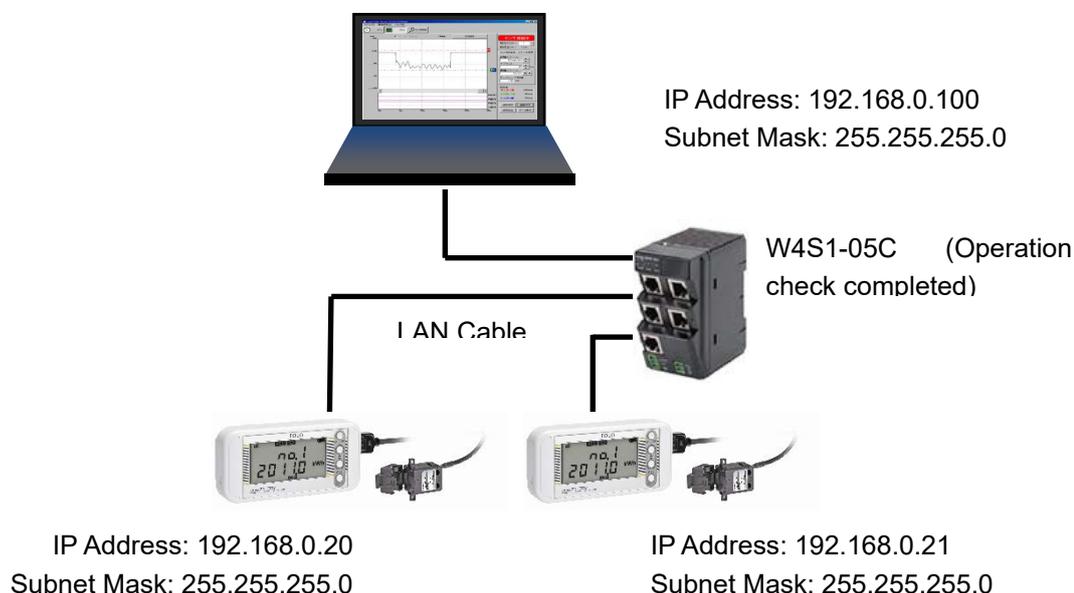
- A full understanding of LAN is required to connect the unit to a network.
- Establish a dedicated LAN for connecting the unit to a network.
- Connection to an in-house network or an existing LAN requires caution, since specific restrictions or rules may have been applied to the IP address management. Consult your network administrator. In case that such a network is used, however, OMRON cannot guarantee the performance of the unit 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. (ZN-CTX21 only)

3.6.1 Preparation

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

Setting Example

IP Address of the unit	(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

- The unit is assigned by the IP address: 192.168.0.20, and subnet mask: 255.255.255.0 as the factory defaults.
- The IP addresses of the unit and the PC must be individually unique and must not overlap one another in the network. In the example above, the 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 unit 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 unit 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 IP Address of the Unit

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

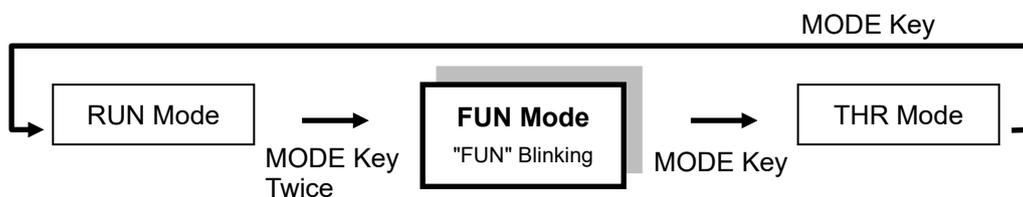
Note

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

Refer to: 2.2 Display Unit, 2.3 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
CYCLE 10 s ("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".
↓ ▼ 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.

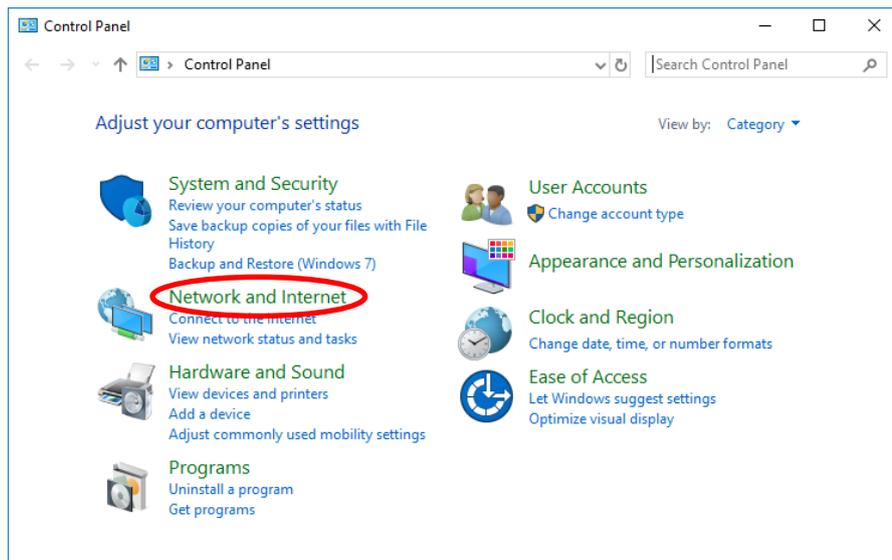
3.6.3 Setting the PC IP Address

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.

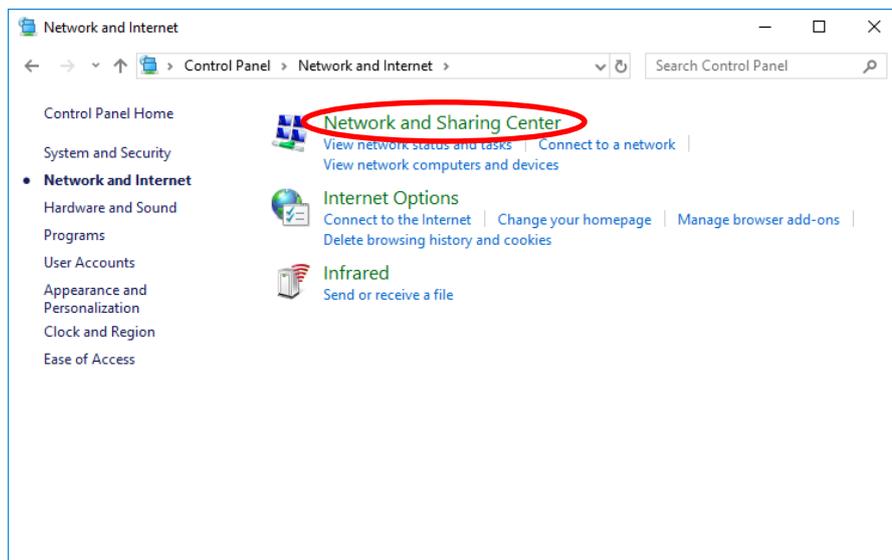
(1) Windows 10

Follow the procedure below to set the IP address.

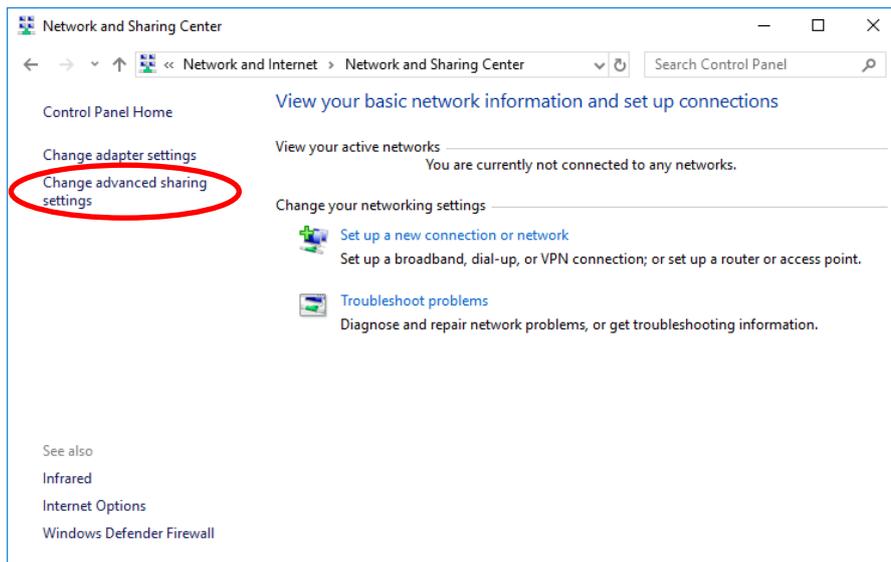
[1] Select "Start menu" – "Control Panel" and then click "Network and Internet".



[2] Click "Network and Sharing Center".

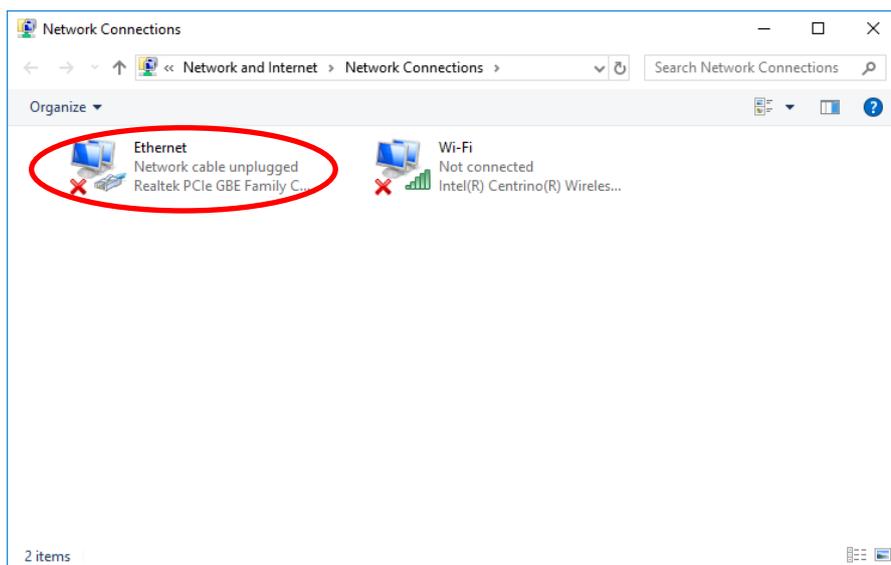


[3] Click “Change adapter settings”.

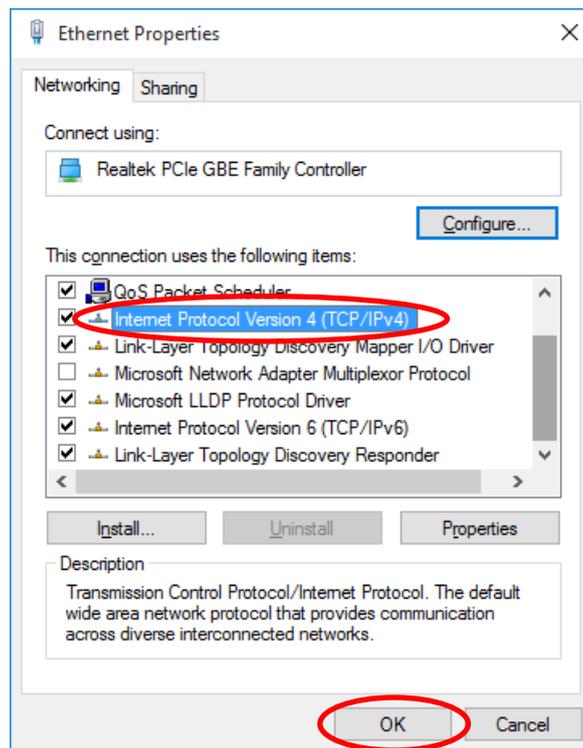


[4] Right-click the network adapter for Internet connection, and select “Properties” on the displayed menu.

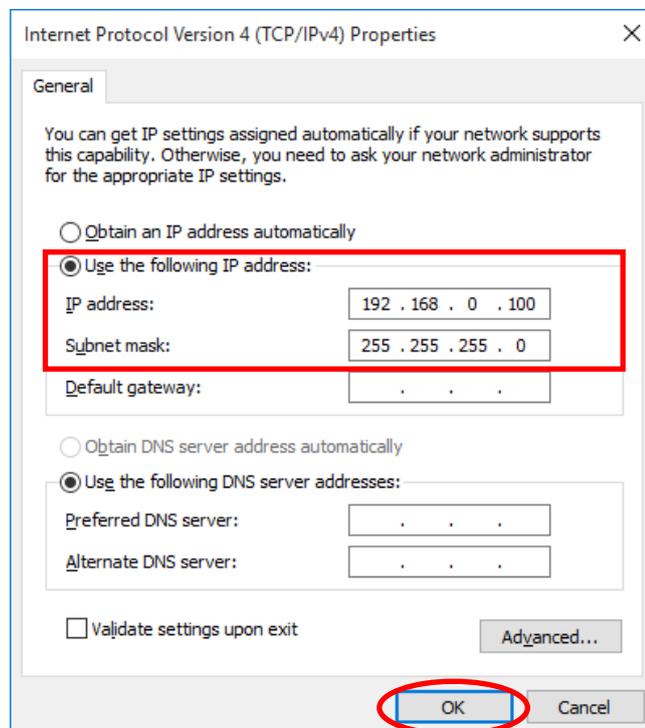
As an example, right-click the “Ethernet” icon here.



[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.

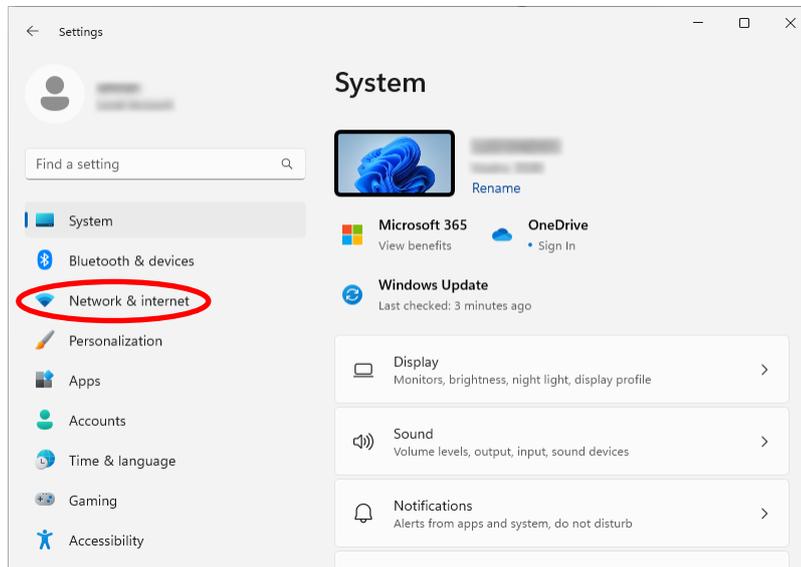


[7] On "Local Area Connections Properties", click "Close" to close the window.

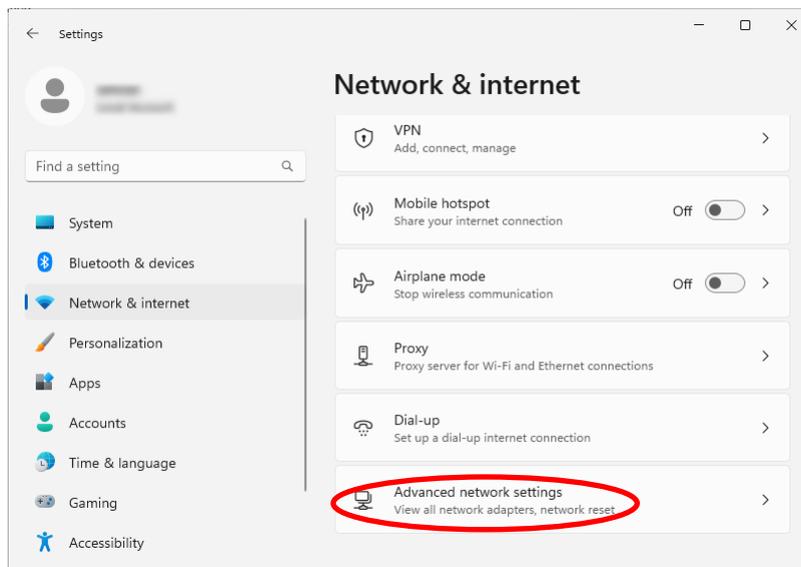
(2) Windows 11

Follow the procedure below to set the IP address.

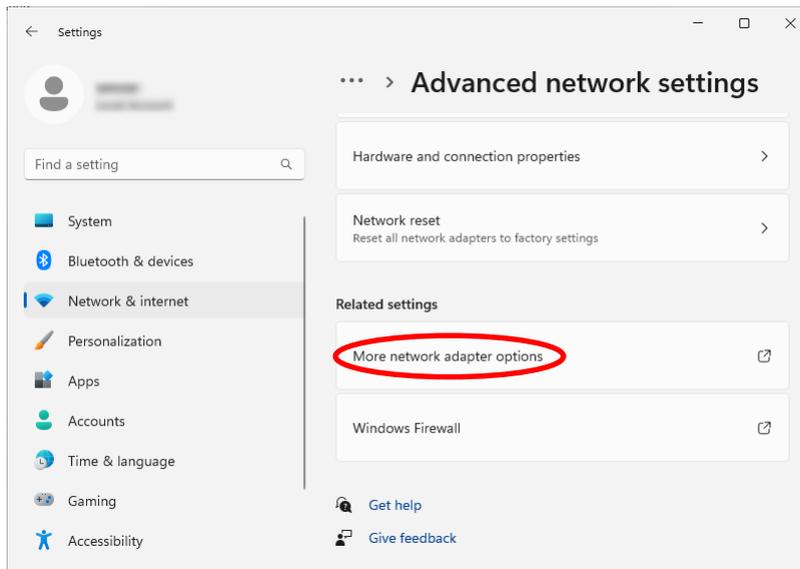
[1] Select “Start menu” – “Settings” and then click “Network and Internet”.



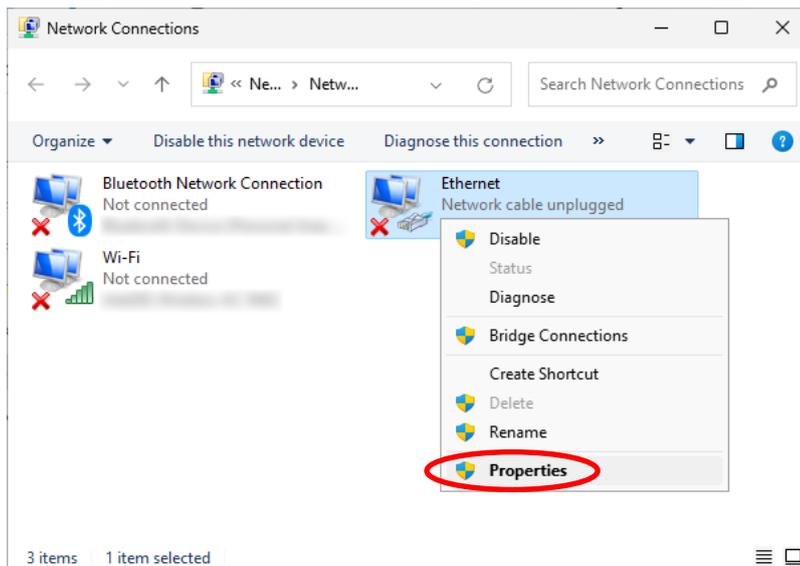
[2] Click “Advanced network settings”.



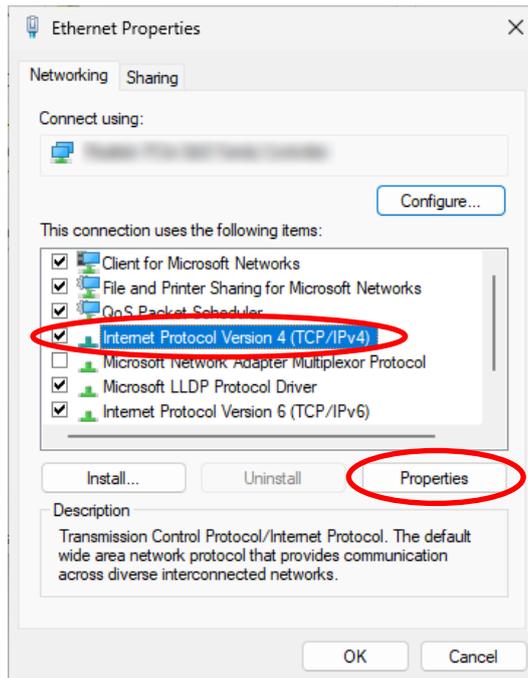
[3] Click “More network adapter options”.



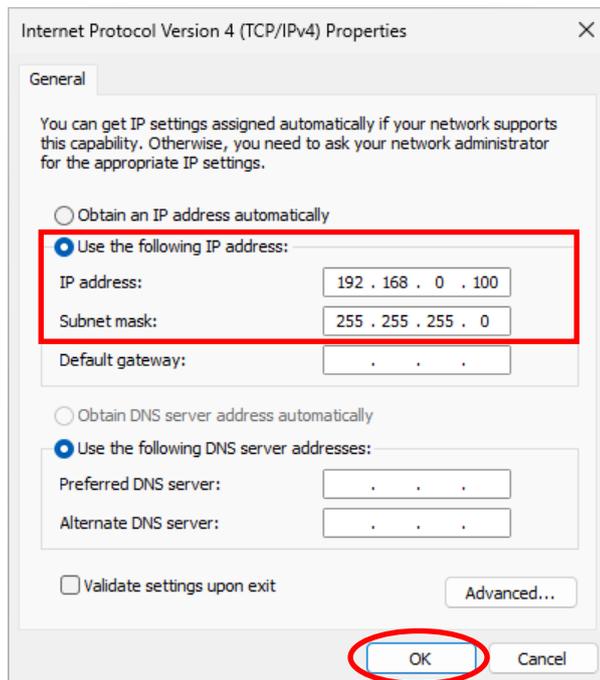
[4] Right-click the “Ethernet” icon, and select “Properties” on the displayed menu.



[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.

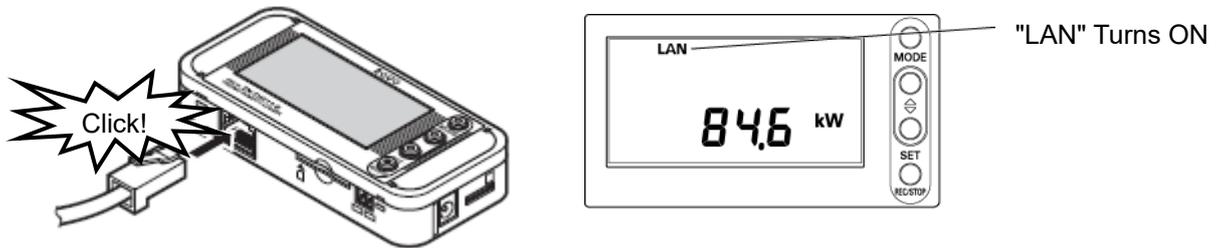


[7] On "Ethernet Properties", click "Close" to close the window.

3.6.4 Connecting LAN Cable

Use LAN cables to connect the unit and the PC to the network.

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



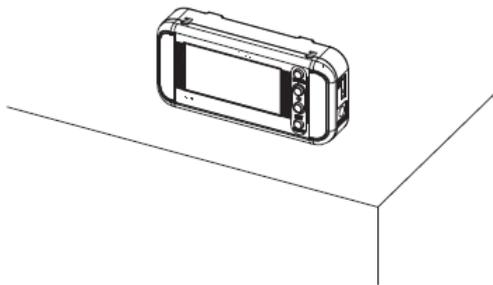
3.7 Mounting the Unit

This section describes the procedure to install the product.

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

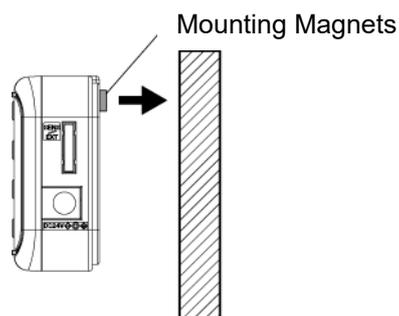


Important

- 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.
- Be careful with handling of the power cable, dedicated CT, power sensor station cable, and LAN cable to prevent them from being hooked.

3.7.2 Securing with Mounting Magnets

Two mounting magnets are provided on the rear side of ZN-CTX21. Use them to securely mount the unit on the wall or other vertical surface.

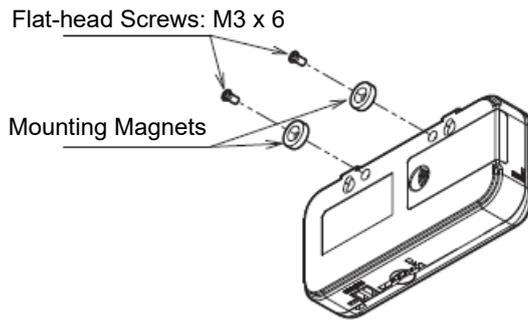


Important

- 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.

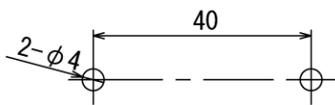
Note

- ZN-KMX21 can be fixed using magnets by attaching attachment magnets ZN9-EM01-S (separately sold) to the screw holes (fastening torque 0.4 to 0.6 N/cm).



3.7.3 Securing with Mounting Screws

Mounting screw holes are provided on the rear side of the unit. The dimensions to process the screw holes are as follows.



Important

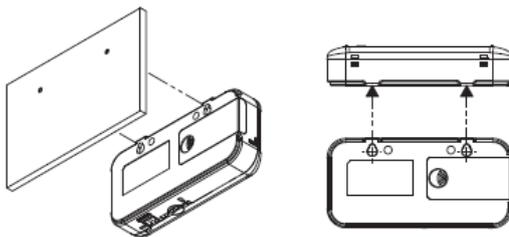
- The screw holes are 4 mm deep. Do not screw deeper than 4 mm, which may damage the product.

Note

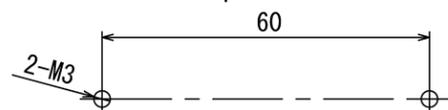
- ZN-CTX21 is equipped with mounting magnets on these screw holes by default. By removing these magnets, this product can be fixed using the mounting screws.

3.7.4 Screw Hook Mounting

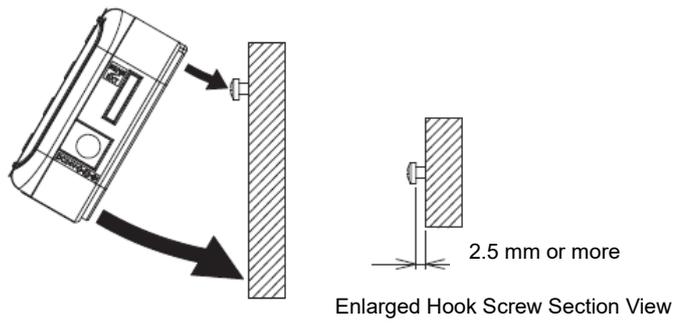
Two screw hook holes are provided on the rear top of the unit (immediately below the protrusions on the top), which allow easy mounting of the unit on the wall or other vertical surface.



The dimensions to process the screw hook holes are as follows.



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 memory card when the unit is mounted by hooking.
- If removing/inserting the SD memory card without fixing the main unit securely, the unit might fall and be damaged.

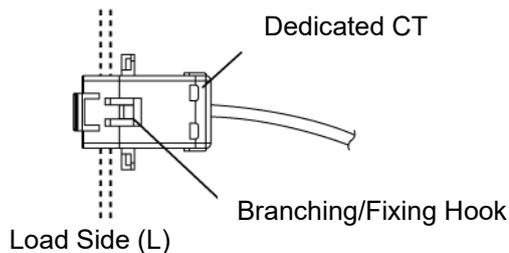
3.8 Attaching Dedicated CT to Measurement Target CTX21

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.

Power Supply Side (K)

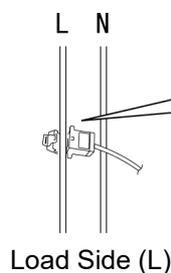


- (2) Spread the CT branching/fixing hook and insert the measurement target wire into the hook cavity. Let the hook clamp the wire by pressing it until it clicks.

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.

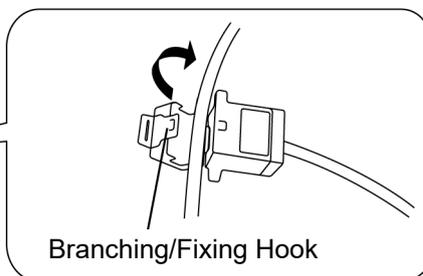
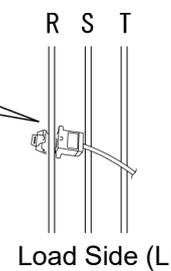
<Single-phase Two-wire>

Power Supply Side (K)



<Three-phase Three-wire>

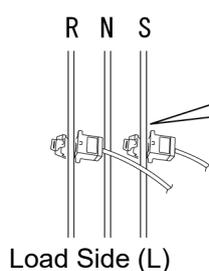
Power Supply Side (K)



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.

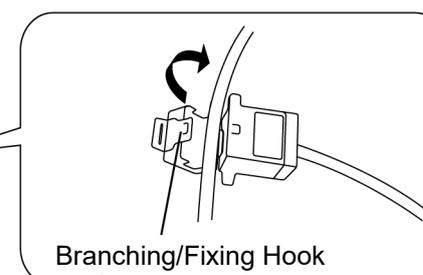
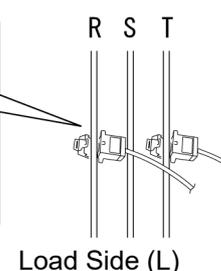
<Single-phase Three-wire>

Power Supply Side (K)



<Three-phase Three-wire>

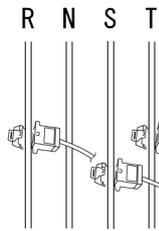
Power Supply Side (K)



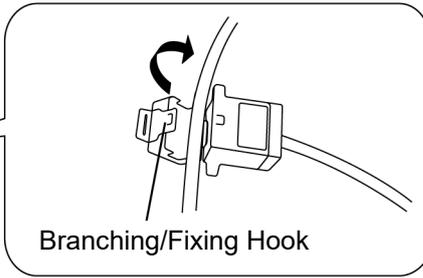
If the number of channels is "3CH", clamp CH1 at phase R, CH2 at phase S and CH3 at phase T.

<Three-phase Four-wire>

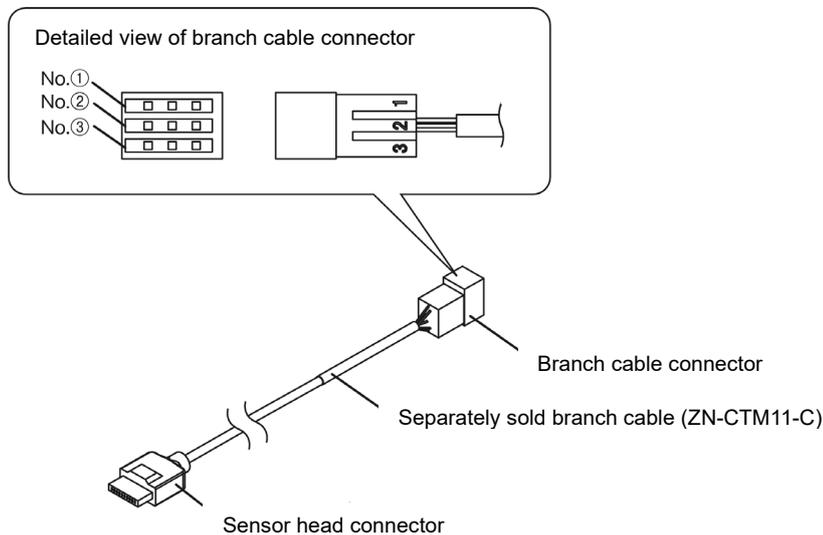
Power Supply Side (K)



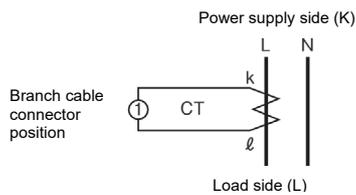
Load Side (L)



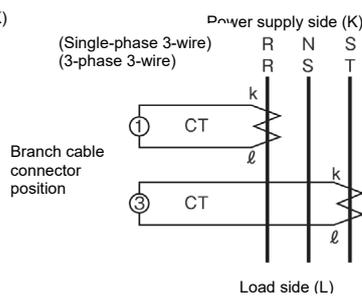
- (3) When using ZN-CTX□□-□A, connect it with the separately sold branch cable, ZN-CTM11-C. Now, the connector position of the branch cable used must match the phase & wire type of the circuit measured.



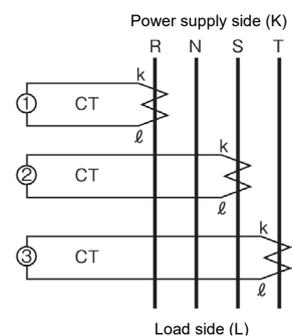
• Single phase 2-wire



• Single phase 3-wire/3-phase 3-wire



• 3-phase 4-wire



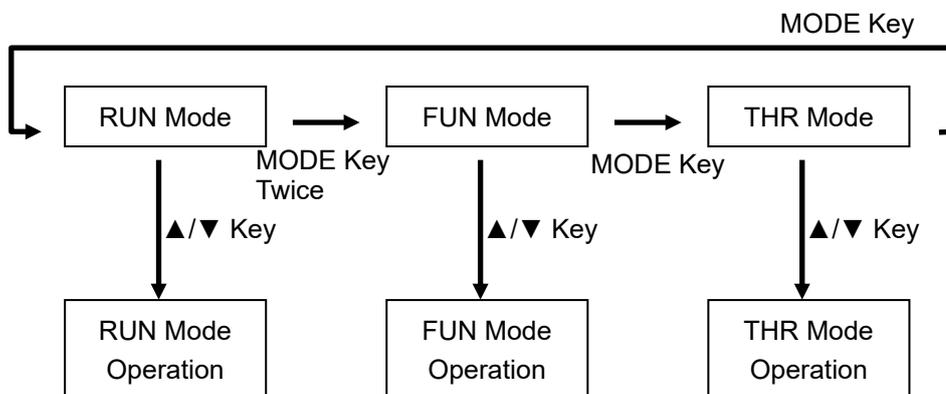
Important

- 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 unit power must be ON when clamping a measurement target.

4. Setting the Unit (Unit Operation)

4.1 Setting Procedure and Operation Mode

The following diagram shows the unit setting procedure flow:



The unit 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 ▲ 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 unit

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	CTX	KMX	
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 on ZN-CTX21.	1s *1 10s *2	●	●	
UNIT	<i>UnIt</i>	Number of Power Sensors/ Monitors connected	1 to 31	1		●	
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. Only ZN-CTX21 records integrated power in the ranking log up to the moment of zero reset. 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	●		

Display Item		Display	Setting Item	Setting Value	Factory Default	CTX	KMX	
TYPE		TYPE	Measured circuit	The displayed items vary depending on the number of the channels to use. 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)	3P3	●		
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		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		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	Year setting	Not initialized by INIT.	●	●
		MONTH	month	Month	Month setting		●	●
		DAY	DAY	Day	Day setting		●	●
		TIME	clock	Hour/Minute	Hour/minute setting		●	●
	NET		net	Network function availability	OFF/ON	OFF	●	
IP(DISP)	IP1 to IP4	IP	IP address	0 to 255	192.168.0.20	●	●	
	SUB1 to SUB4	sub	Subnet mask	0 to 255	255.255.255.0	●	●	
DETAIL(DISP)	SCT5A	sct5A	Rated primary side current value	5 to 9999 Only effective when CT is set to 5A.	5A	●		
	LOCUT	locut	Zero-out low current value	0.1 to 19.9%	0.6%	●		
	RANGE	range	Measurement range	NORM/AUTO	AUTO	●		

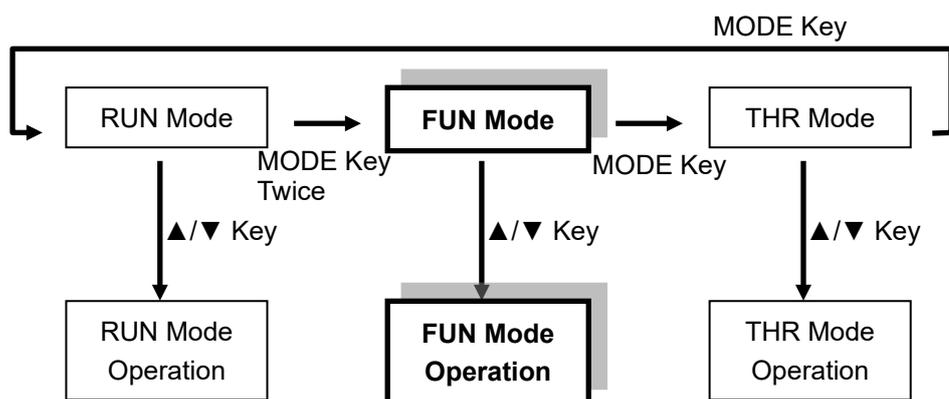
Display Item		Display	Setting Item	Setting Value	Factory Default	CTX	KMX
INIT ETC (DISP)	RATE	<i>r R t E</i>	Rate/CO ₂ conversion value setting	00.000 to 99.999	0	●	●
	CONV	<i>c o n v</i>	Conversion unit	JPY/USD/EUR/CNY/ KRW/CO ₂	JPY	●	●
	UTOFS	<i>U t o F s</i>	Offset Unit No.	1 to 99	1		●
	REREC	<i>r E r E c</i>	REC restoration availability at startup	OFF/ON	OFF	●	●

*1 ZN-CTX21

*2 ZN-KMX21

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.

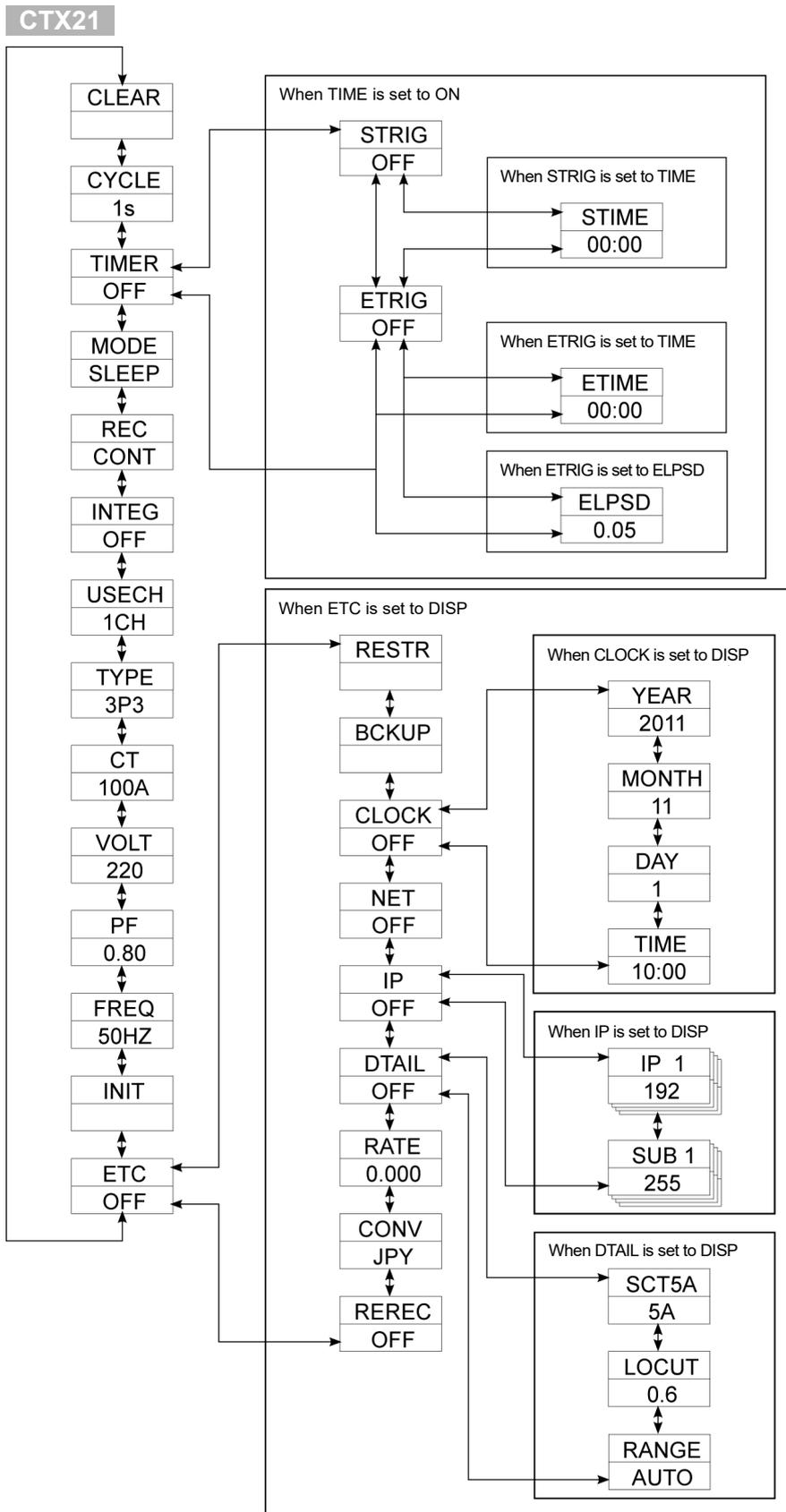


Note

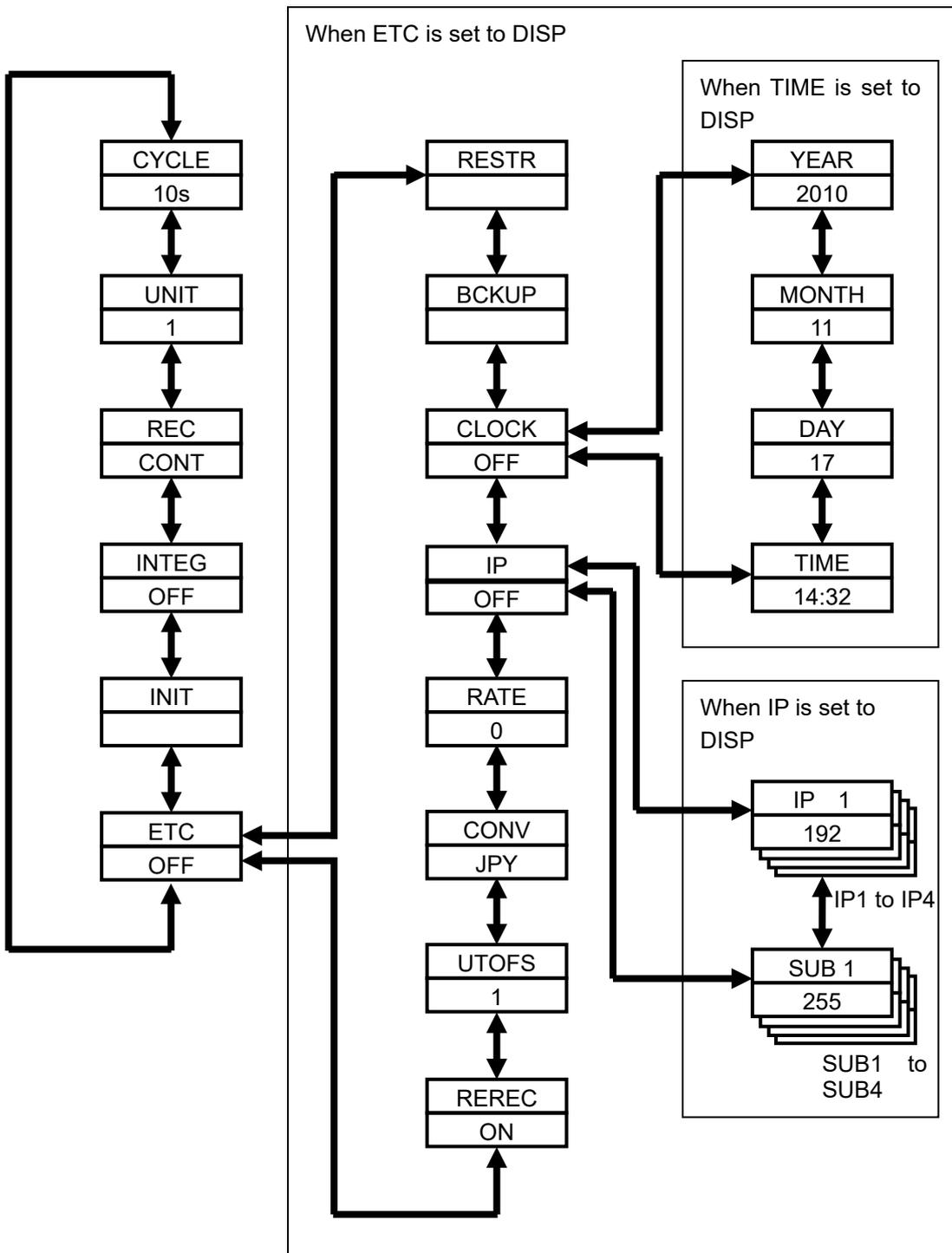
- FUN mode cannot be entered when recording in the internal memory is in progress in RUN mode ("REC" is on the display).

4.2.3 Selecting Items

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



KMX21



4.2.4 Definition of Items

(1) Ranking Clear (CLEAR) CTX21

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.

CTX21

The range of selection (Options):

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

Initial value:

1s

This setting item is only displayed when the measurement mode (MODE) is set to "NORM" or "SLEEP".

■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-SD292) 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.

KMX21

□ The range of selection (Options):

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

□ Initial value:

10s

■ Recording Interval and the Number of Connectable Units

The number of connectable Power Sensors/Monitors is restricted depending on the recording interval setting. Refer to the following table and specify the interval time.

Possible Interval Options for the Number of Units

Number of Units	Possible Interval Options
1 unit	1s / 2s / 5s / 10s / 20s / 30s / 1m
2 units	2s / 5s / 10s / 20s / 30s / 1m
3 to 6 units	5s / 10s / 20s / 30s / 1m
7 to 12 units	10s / 20s / 30s / 1m
13 to 24 units	20s / 30s / 1m
25 to 31 units	30s / 1m

Possible Number of Units for Interval Options (UNIT)

Recording Interval	Possible Number of Units (UNIT)
1 second	1 unit
2 seconds	Up to 2 units
5 seconds	Up to 6 units
10 seconds	Up to 12 units
20 seconds	Up to 24 units
30 seconds	Up to 31 units
1 minute	Up to 31 units

Important

- Only selectable items are displayed as the menu depending on the number of units connected and recorded intervals.

■ Recording Interval and Internal Memory

The possible recording time in the internal memory varies depending on the recording interval setting. The details are shown in the table below.

The recording time also differs depending on the types of Power Sensors/Monitors to be connected.

(1) When KM20-B40-FLK/KM100 are connected:

Recording Interval	Possible Internal Memory Recording Time			
	1 Unit Connected	5 Units Connected	10 Units Connected	31 Units Connected
1 second	Approx. 1 hr. 50 min.	-	-	-
2 seconds	Approx. 3 hr. 40 min.	-	-	-
5 seconds	Approx. 9 hr. 30 min.	Approx. 2 hr. 40 min.	-	-
10 seconds	Approx. 19 hr.	Approx. 5 hr. 20 min.	Approx. 2 hr. 50 min.	-
20 seconds	Approx. 1 day 14 hr.	Approx. 10 hr. 50 min.	Approx. 5 hr. 40 min.	-
30 seconds	Approx. 2 days	Approx. 8 hr. 30 min.	Approx. 8 hr. 30 min.	Approx. 2 hr. 50 min.
1 minute	Approx. 4 days	Approx. 17 hr. 10 min.	Approx. 17 hr. 10 min.	Approx. 5 hr. 40 min.

(2) When KM50-C/KM50-E are connected:

Recording Interval	Possible Internal Memory Recording Time			
	1 Unit Connected	5 Units Connected	10 Units Connected	31 Units Connected
1 second	Approx. 1 hr. 20 min.	-	-	-
2 seconds	Approx. 2 hr. 40 min.	-	-	-
5 seconds	Approx. 6 hr. 40 min.	Approx. 1 hr. 40 min.	-	-
10 seconds	Approx. 13 hr. 20 min.	Approx. 3 hr. 20 min.	Approx. 1 hr. 40 min.	-
20 seconds	Approx. 1 day 2 hr.	Approx. 6 hr. 40 min.	Approx. 3 hr. 30 min.	-
30 seconds	Approx. 1 day 16 hr.	Approx. 10 hr. 10 min.	Approx. 5 hr. 10 min.	Approx. 1 hr. 40 min.
1 minute	Approx. 3 days 8 hr.	Approx. 20 hr. 20 min.	Approx. 10 hr. 30 min.	Approx. 3 hr. 20 min.

(3) When KM-N1-FLK/KM-N2-FLK/KM-N3-FLK are connected:

Recording Interval	Possible Internal Memory Recording Time			
	1 Circuit Connected	5 Circuits Connected	10 Circuits Connected	31 Circuits Connected
1 second	Approx. 1 hr. 50 min.	-	-	-
2 seconds	Approx. 3 hr. 40 min.	-	-	-
5 seconds	Approx. 9 hr. 30 min.	Approx. 2 hr. 40 min.	-	-
10 seconds	Approx. 19 hr.	Approx. 5 hr. 20 min.	Approx. 2 hr. 50 min.	-
20 seconds	Approx. 1 day 14 hr.	Approx. 10 hr. 50 min.	Approx. 5 hr. 40 min.	-
30 seconds	Approx. 2 days	Approx. 8 hr. 30 min.	Approx. 8 hr. 30 min.	Approx. 2 hr. 50 min.
1 minute	Approx. 4 days	Approx. 17 hr. 10 min.	Approx. 17 hr. 10 min.	Approx. 5 hr. 40 min.

Note

- Please note that the table above does not include the recording times when KM50-□ is combined with other types.

(3) **Number of Power Sensor/Monitor Units Connected (UNIT)** **KMX21**

Specifies the number of Power Sensor/Monitor units to be connected.

The range of selection (Numeric input):

1 to 31

Initial value:

1

Important

- Recording Interval and the Number of Connectable Units

The recording interval setting (CYCLE) is restricted depending on the connectable number of Power Sensor/Monitor units. The CYCLE value automatically changes to the smallest possible interval, in case that the number of Power Sensor/Monitor units is increased and the previous interval value becomes irrelevant.

(4) Timer Setting (TIMER) CTX21

Specifies if the timer function is required.

The range of selection (Options):

OFF / ON

Setting Value	Operation
OFF	The timer function is not used. Start trigger and End trigger are also set to OFF.
ON	The timer function is used. Start trigger and End trigger can be specified.

The following item appears when the ▼ key is pressed after the setting is applied with the SET/REC/STOP key.

Setting Value	Item
OFF	MODE
ON	STRIG

Initial value:

OFF

Note

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

(5) Start Trigger (STRIG) CTX21

Sets the recording start trigger.

The range of selection (Options):

OFF / TIME

Setting Value	Operation
OFF	A long press (for 3 seconds or longer) of the SET/REC/STOP key starts recording.
TIME	Recording starts when the specified start time is reached.

The following item appears when the ▼ key is pressed after the setting is applied with the SET/REC/STOP key.

Setting Value	Item
OFF	ETRIG
TIME	STIME

Initial value:

OFF

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.

(6) Start Time (STIME) CTX21

Specifies the recording start time.

Recording starts at a specified time every day.

The range of selection (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.

(7) End Trigger (ETRIG) **CTX21**

Sets the recording end trigger.

The range of selection (Options):

OFF / TIME / ELPSD

Setting Value	Operation
OFF	A long press (for 3 seconds or longer) of the SET/REC/STOP key stops recording.
TIME	Recording stops when the specified end time is reached.
ELPSD	Recording stops when the specified time has elapsed after the start of recording.

The following item appears when the ▼ key is pressed after the setting is applied with the SET/REC/STOP key.

Setting Value	Item
OFF	ETRIG
TIME	STIME
ELPSD	STIME

Initial value:

OFF

Note

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

(8) End Time (ETIME) **CTX21**

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.

(9) Elapsed Time (ELPSD) CTX21

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 stops command via key operation or communication.

Important

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

(10) Measurement Mode (MODE) CTX21

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

- The range of selection (Options):
NORM / SLEEP / HISPD

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)

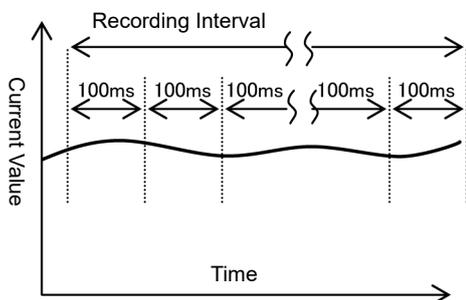
- Initial value:
SLEEP

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.

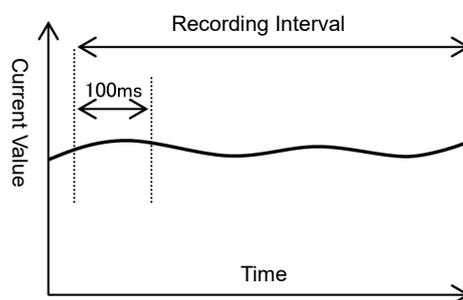
<NORM Mode>

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



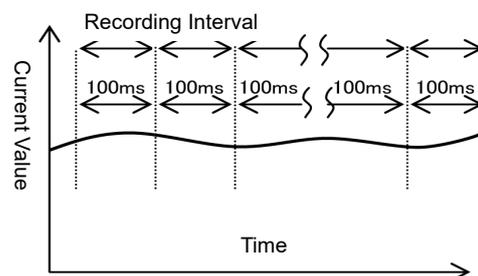
<SLEEP Mode>

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.

(11) Recording Mode (REC)

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

□The range of selection (Options):

CONT / RING

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.

□Initial value:

CONT

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.

Important

- When directly collecting measured data using Setting Manager, be sure to set the recording mode to RING mode if you are not using an SD memory card.

(12) Integrated Power Reset Interval (INTEG)

Specifies the interval for measuring integrated power.

The range of selection (Options):

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

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.

Initial value:

OFF

Note

- When you press the MODE key and change the operation mode after changing the set value on ZN-CTX21, the unit resets the setting and restarts, clearing the ranking.

Important

- With ZN-CTX21 and ZN-KMX21, only the integrated power is reset on the display, not the integrated power that is output to a file.

(13) The Number of Channels to Use (USECH) CTX21

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

(14) Measurement Target Circuit (TYPE) CTX21

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):

1P2 / 1P3 / 3P3 / 3P4

Number of Channels (USECH)	Displayed Item
1CH	1P2 (Single-phase, two-wire) / 3P3 (Three-phase, three-wire)
2CH	1P3 (Single-phase, three-wire) / 3P3 (Three-phase, three-wire)
3CH	3P4 (Three-phase, four-wire)

Initial value:

3P3

(15) Dedicated CT Type (CT) CTX21

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

(16) Voltage of Measurement Target (VOLT) CTX21

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

(17) Power Factor (PF) CTX21

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

(18) Frequency (FREQ) CTX21

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

(19) 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.

(20) Others (ETC)

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

Setting range:

OFF / DISP

The items displayed by the setting value are as follows.

Item	Setting Value		
	OFF	DISP	
		CTX21	KMX21
Setting data reading	No	Yes	Yes
Setting data writing	No	Yes	Yes
Time setting	No	Yes	Yes
Network setting	No	Yes	No
IP address setting	No	Yes	Yes
DTAIL	No	Yes	No
Charge/CO2 converted value setting	No	Yes	Yes
Setting of converted value unit	No	Yes	Yes
Unit number offset	No	No	Yes

The following item appears when the ▼ key is pressed after the setting is applied with the SET/REC/STOP key.

Setting Value	Item	
	CTX21	KMX21
OFF	CLEAR	CYCLE
DISP	RESTR	CYCLE

Initial value:

OFF

Note

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

(21) 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 memory 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 memory card as a backup.
- The setting data backed up in a unit can be restored on another unit.
- Setting data reading is not possible when ETC is set to "OFF".

(22) 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 memory card as a backup.
- If an SD memory 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 unit: the data is overwritten.

Note

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

(23) Time Setting (CLOCK)

Specifies if the time setting is required.

The range of selection (Options):

OFF / DISP

Setting Value	Operation
OFF	Time setting is not available.
DISP	Time setting is available.

The following item appears when the ▼ key is pressed after the setting is applied with the SET/REC/STOP key.

Setting Value	Item	
	CTX21	KMX21
OFF	NET	IP
DISP	YEAR	YEAR

Initial value:

OFF

Note

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

(24) 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".

(25) Network Setting (NET) CTX21

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

(26) Setting IP Address (IP)

Specifies if the IP address setting is required.

The range of selection (Options):

OFF / DISP

Setting Value	Operation
OFF	IP address settings are not available.
DISP	IP address settings are available.

The following item appears when the ▼ key is pressed after the setting is applied with the SET/REC/STOP key.

Setting Value	Item	
	CTX21	KMX21
OFF	DTAIL	RATE
DISP	IP 1	IP 1

Initial value:

OFF

Note

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

(27) 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".

(28) DTAIL CTX21

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

Setting Value	Operation
OFF	A rated primary side current value, zero-out low current value and measurement range cannot be specified.
DISP	A rated primary side current value, zero-out low current value and measurement range can be specified.

The following item appears when the ▼ key is pressed after the setting is applied with the SET/REC/STOP key.

Setting Value	Item
OFF	RATE
TIME	SCT5A

Initial value:

OFF

Note

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

(29) Rated Primary Side Current Value (SCT5A) CTX21

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".

(30) Zero-out Low Current Value (LOCUT) CTX21

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".

(31) Measurement Range (RANGE) **CTX21**

Specifies the measurement range.

The range of selection (Options):

NORM / 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.

Initial value:

AUTO

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	0.250A
400A	8.0A	0.500A

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

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

Specifies the electricity rate or CO₂ emission level per kWh.

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".

(33) 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 kWh)

Initial value:

JPY

Note

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

(34) Offset Unit No. (UTOFS) KMX21

Specifies the starting (offset) unit number set for the Power Sensor/Monitor units to be connected.

To use the unit numbers from No.10 to No.15, for example, "10" is set for the offset number (this setting item), while "6" is set for the number of Power Sensor/Monitor units to be connected (UNIT).

The range of selection (Numeric input):

1 to 99

Initial value:

1

Important

- The unit numbers for UTOFS and UNIT settings must not exceed "99".
- However, depending on the offset number setting and the number of connected Power Sensor/Monitor units, 100 or larger numbers may exist. In this case, the set value of the unit is automatically changed so that the maximum value of the unit number is 99.

(35) 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

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.

Initial value:

OFF

Note

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

Important

- ZN-CTX21: 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.
- ZN-KMX21: The data remaining in the internal memory is output to the SD memory card at startup regardless of the setting.
- Be careful that the remaining data in the internal memory is discarded and recording is resumed without an error indication.

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 ▲ key to display CYCLE.

Display (Upper/Lower)	Operation
CYCLE 10 s	Press the MODE key repeatedly until "FUN" starts blinking. Press the ▼ or ▲ 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	
CYCLE 10 s ↑ Blinking	The value options are displayed in sequence by pressing the ▲ or ▼ key. To cancel the setting attempt, press the MODE key.
↓ ▼ or ▲ Key	
CYCLE 30 s ↑ Blinking	Press the ▲ 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	
CYCLE 30 s	

Use the ▲ 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 ▲ key to display YEAR.

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

Display (Upper/Lower)	Operation
CYCLE 10 s ("FUN" Blinking)	Press the MODE key repeatedly until "FUN" starts blinking. "CYCLE" is displayed at the upper row. Press the ▼ or ▲ key to display YEAR. To display YEAR, ETC and TIME must be set to DISP.
↓ ▼ or ▲ Key	
YEAR 2010	Press the SET/REC/STOP key, then, the last digit number at the lower row starts blinking.
↓ SET/REC/STOP Key	
YEAR 2010 ↑ Blinking	The value increases or decreases at a press of the ▲ or ▼ key. The amount of increase/decrease becomes larger by holding ▲ or ▼ key. To cancel the setting attempt, press the MODE key.
↓ ▼ or ▲ Key	
YEAR 2011 ↑ Blinking	Press the ▲ 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	
YEAR 2011	

Use the ▲ 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 main unit 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". *1
- 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.

*1:Only for ZN-CTX21

4.3.1 Setting Item List

The table below shows the THR mode setting item list.

CTX21

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

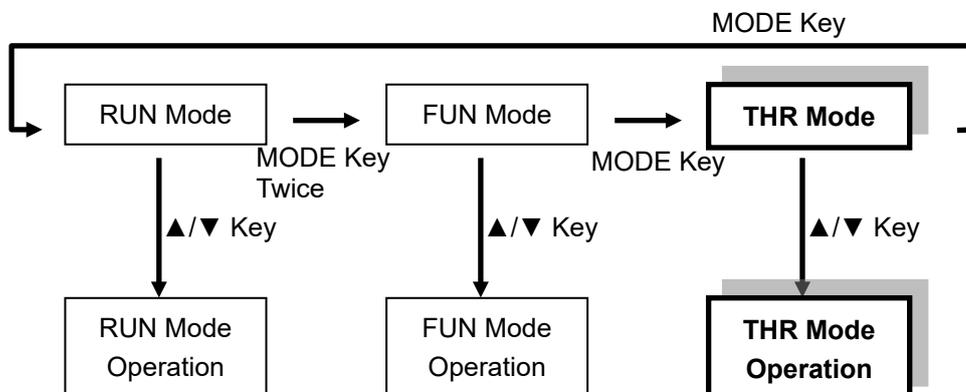
KMX21

Display Item	Display	Setting Item	Function/Operation	Factory Default
INT H	INT H	Integrated power upper limit threshold	Used to specify the integrated power consumption upper limit threshold for an alarm output.	0 kWh

The integrated power threshold is evaluated against a total sum of the power values acquired from the connected Power Sensor/Monitor units.

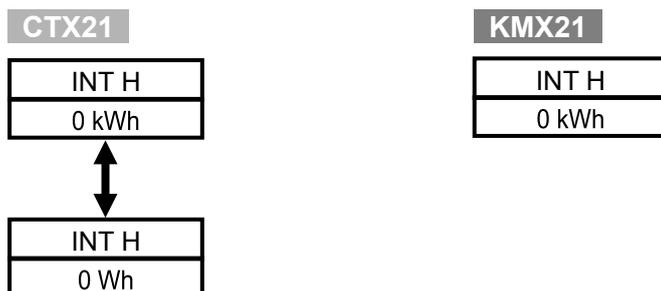
4.3.2 Selecting "THR" Operation Mode

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 \triangle and ∇ keys. To change the set value, select the item with \blacktriangle or \blacktriangledown 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 kWh 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)**

CTX21

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 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(22) Writing the Setting Data (BCKUP), 4.2.4(21) Reading Setting Data (RESTR)

5. Measurement and Recording (Unit Operation)

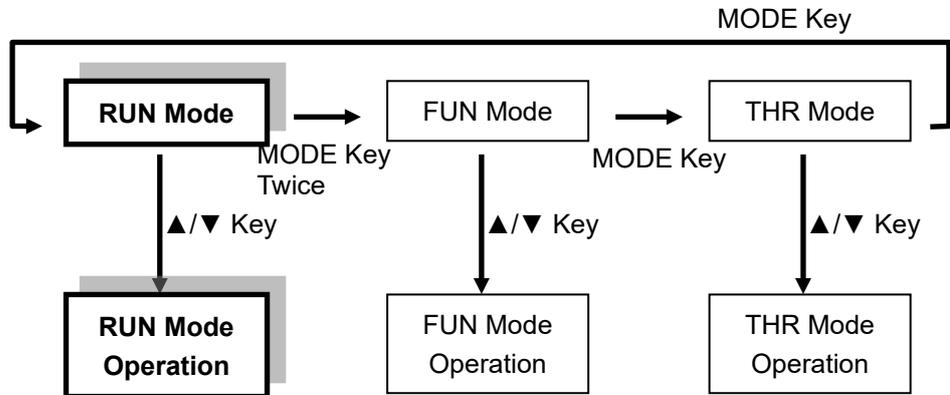
5.1 Overview

Measured values can be recorded in two ways: recording in a unit or in a PC via network. This chapter explains recording in a unit.

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.

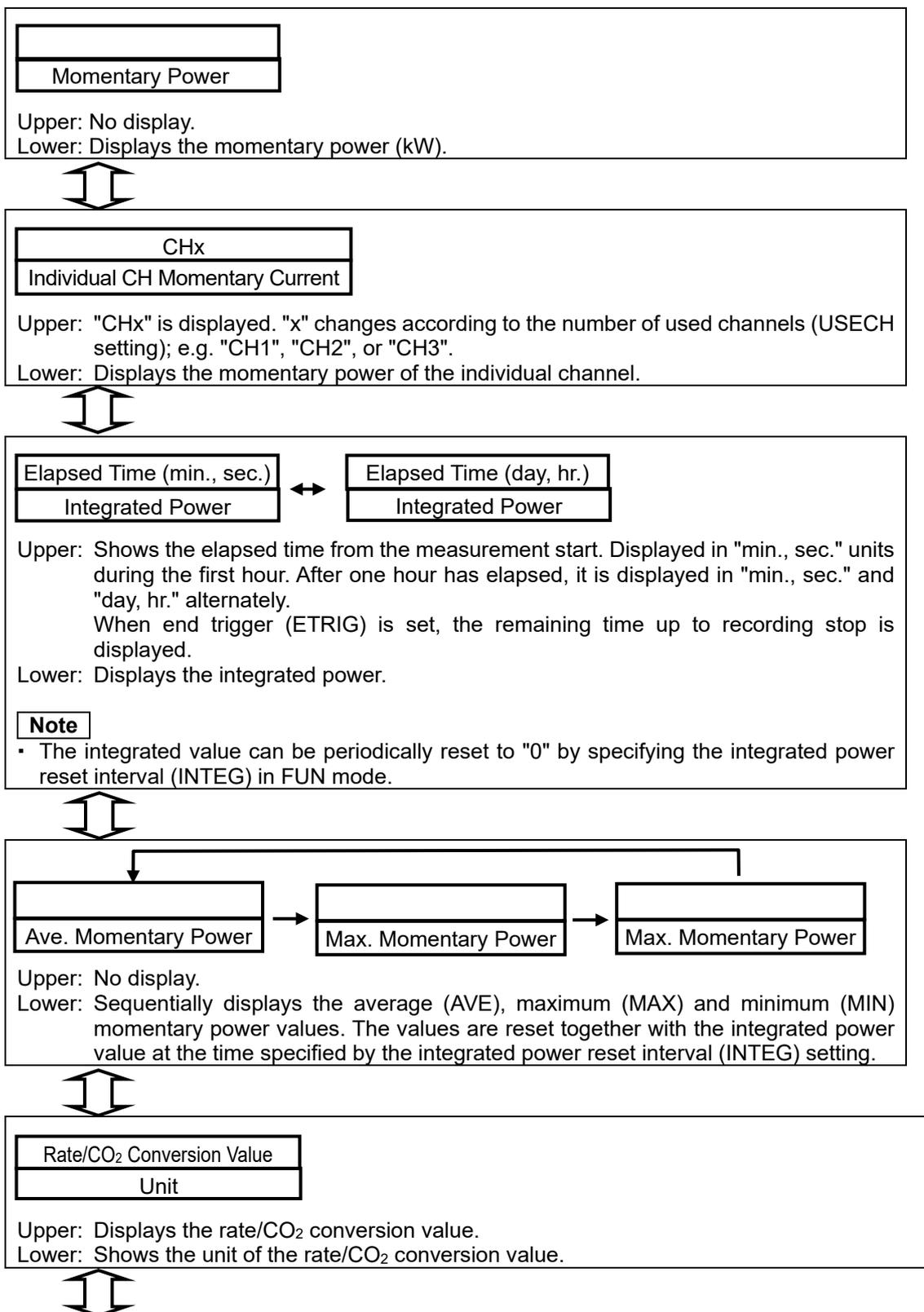
**Note**

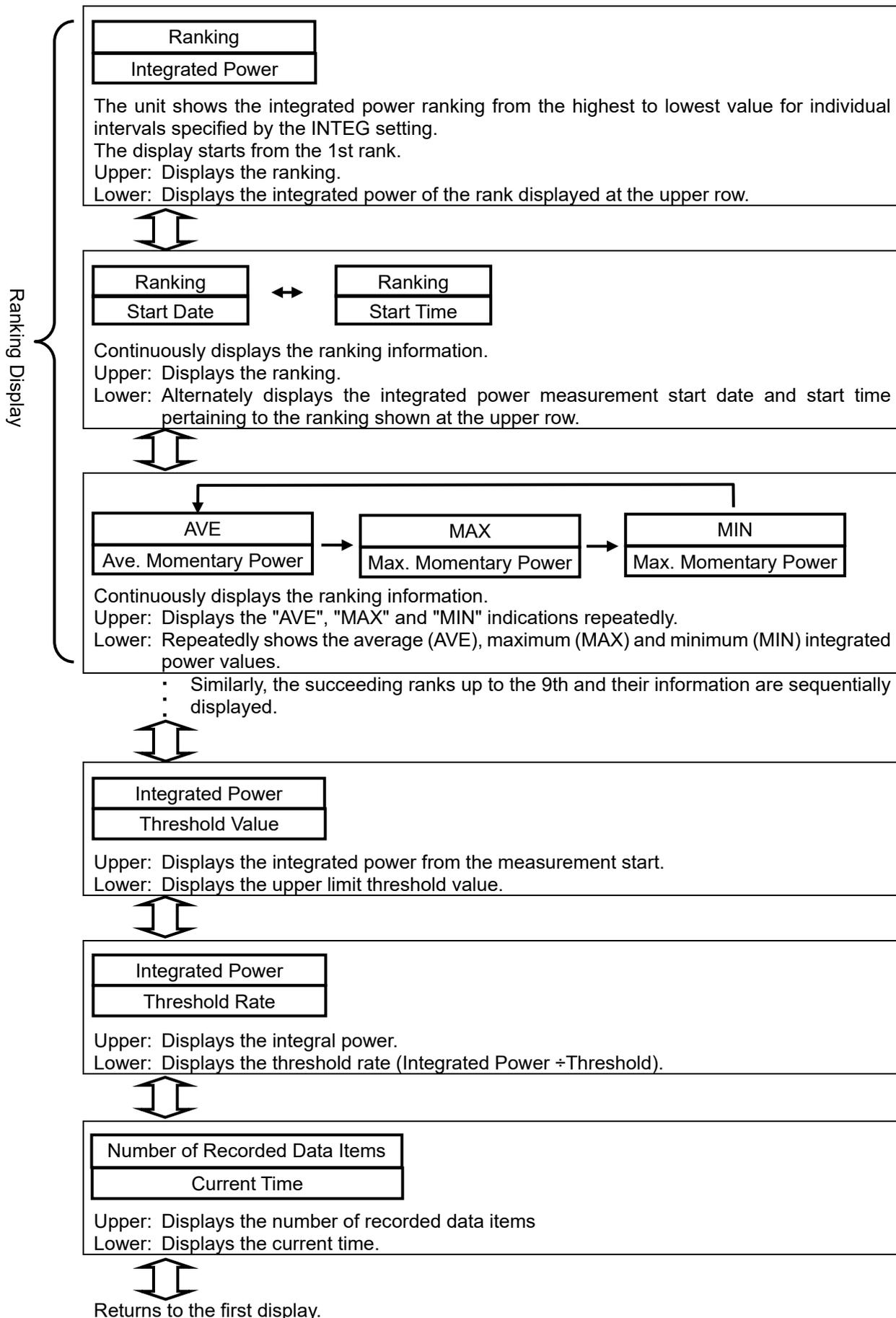
- A shift to other mode is prohibited during recording.

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.

5.3.1 ZN-CTX21





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.

5.3.2 ZN-KMX21

TOTAL
Momentary Power

Upper: Displays "TOTAL".
 Lower: Displays the total sum (kW) of the momentary power values of all the connected Power Sensor units.



<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; padding: 5px;">Elapsed Time (min., sec.)</td> </tr> <tr> <td style="text-align: center; padding: 5px;">Integrated Power Total Sum</td> </tr> </table>	Elapsed Time (min., sec.)	Integrated Power Total Sum	↔	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; padding: 5px;">Elapsed Time (day, hr.)</td> </tr> <tr> <td style="text-align: center; padding: 5px;">Integrated Power Total Sum</td> </tr> </table>	Elapsed Time (day, hr.)	Integrated Power Total Sum
Elapsed Time (min., sec.)						
Integrated Power Total Sum						
Elapsed Time (day, hr.)						
Integrated Power Total Sum						

Upper: Shows the elapsed time from the measurement start. Displayed in "min., sec." units during the first hour. After one hour has elapsed, it is displayed in "min., sec." and "day, hr." alternately.
 Lower: Displays the total sum (kWh) of the integrated power values of all the connected Power Sensor units.

Note

- The integrated value can be periodically reset to "0" by specifying the integrated power reset interval (INTEG) in FUN mode.



<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; padding: 5px;">Average</td> </tr> </table>	Average	→	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; padding: 5px;">Maximum</td> </tr> </table>	Maximum	→	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; padding: 5px;">Minimum</td> </tr> </table>	Minimum
Average							
Maximum							
Minimum							

Upper: No display.
 Lower: Sequentially displays the average (AVE), maximum (MAX) and minimum (MIN) values of momentary power total sums.



Rate/CO ₂ Conversion Value
Unit

Upper: Displays the rate/CO₂ conversion value.
 Lower: Shows the unit of the rate/CO₂ conversion value.



Uno 1
Momentary Power

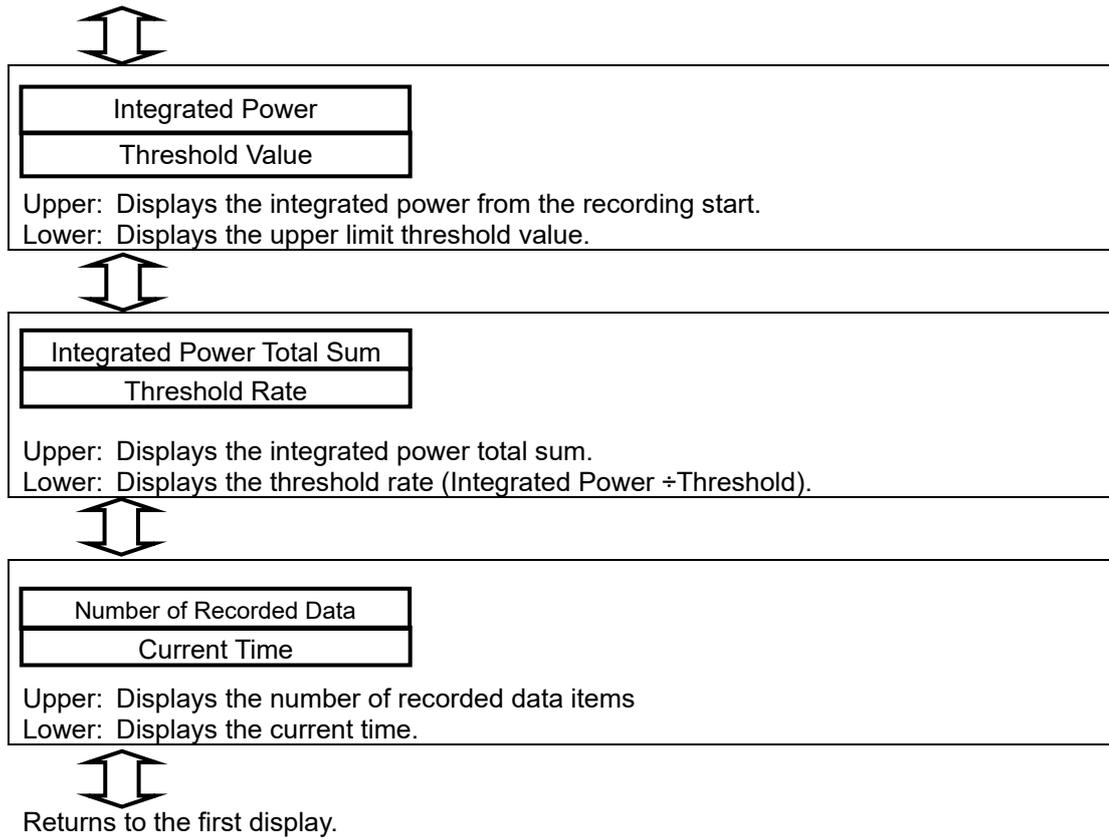
Upper: Displays "Uno 1", which refers to the Power Sensor/Monitor Unit No.1.
 Lower: Displays the Uno 1 momentary power (kW).



Uno 1
Integrated Power

Upper: Displays "Uno 1", which refers to the Power Sensor/Monitor Unit No.1.
 Lower: Displays the Uno 1 integrated power (kWh).

- Shows the momentary and integrated power of the other connected units (Uno 2, Uno 3, Uno 4 ...) in the same way.

**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 ZN-CTX21 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 memory 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 \triangle 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. (ZN-CTX21 only)

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

If pressing and holding the SET/REC/STOP key (for 3s or more) during recording, in short while "REC" is blinking, recording is stopped, data are saved in a file on the SD memory card, and "REC" is turned OFF.

ZN-CTX21 stops recording at the preset end time, saves data in a file on the SD memory card, and turns OFF "REC."

Important

- If stopping recording, insert a writable SD memory card in advance.
- 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 Display Ranges

The display ranges of the main unit, internal data, and CSV file are as follows.

CTX21

	Instantaneous current (A)	Instantaneous power (kW)	Integrated power (kWh)	Elapse time
Screen display	0.000 - 99999	0.000 - 99999	0.000 - 99999 ▪ Display 99999 after exceeding the limit.	0 0 0 0 - 9 23 59 59 (days, hours, minutes, and seconds from the left) ▪ "--:--" after exceeding the limit
Internal data (CSV file)	0.000 - 99999.999	0.000 - 99999.999	0.000 - 99999.999 ▪ Returns to 0.000 after exceeding the limit.	N/A

The position of the decimal point on the screen varies according to the size of the value.

That of internal data (CSV file) is fixed to the third decimal place.

KMX21

	Power factor	Instantaneous power (kW)	Integrated power (kWh)
Screen display	N/A	-99.99 - 999.99	0.0 - 9999.9 ▪ Displays 9999.9 after exceeding the limit until reaching the upper limit of internal data. ▪ Returns to 0.0 after that.
Internal data (CSV file)	-1.00 - 1.00	-99999.99 - 99999.99	0.0 - 999999.9 ▪ Returns to 0.0 after exceeding the limit.
Internal data (CSV file)*1	-1.00 - 1.00	-214748.36 - 214748.36	0.0 - 9999999.9 ▪ Returns to 0.0 after exceeding the limit.

*1 When KM-N1-FLK/KM-N2-FLK/KM-N3-FLK are connected

5.6 SD Outputting File to SD Memory Card

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

- (1) The SET/REC/STOP is pressed (for less than 3 seconds) during recording. Recording in the internal memory continues.
- (2) 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

- (3) 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(11) Recording Mode (REC)

- (4) 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.
- (5) 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(35) Power Startup REC Restoration (REREC)

5.7 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). (ZN-CTX21 only)

5.8 Display Turning OFF **CTX21**

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(10) Measurement Mode (MODE)

6. Appendix

6.1 Ratings and Performance

6.1.1 ZN-CTX21

Item	ZN-CTX21	ZN-CTX21-A
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	Momentary power, Integrated power consumption* ²	
Measurement Operation Mode	Normal mode, Sleep mode* ³ , High-speed logging mode* ⁴	
Recording Mode	Continue mode* ⁵ , Ring mode* ⁶	
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 memory card (SDHC support, measured value saving/set value saving and reading), Recommended SD memory card: HMC-SD292 (2GB) / HMC-SD492 (4GB) (manufactured by OMRON)* ⁸	
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* ¹⁰	Approx. 1 week* ¹¹	
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 DC500VDC)	
Withstand Voltage	1000 VAC, 50/60 Hz, 1 min.: Between the case and current input circuit	
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* ¹²	
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	
Accessories1	Instruction Sheet, Startup Guide, Mounting Magnets* ¹³ , Alarm Output Connector* ¹⁴	
Accessories1	AC Adapter* ¹⁵	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 LAN cannot be used when high-speed mode is specified.

-
- *5: Automatically writes the data to the SD memory card when the internal memory reaches its capacity and continues recording until the SD memory card 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.)
 - *6: 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.)
 - *7: Output when the integrated power upper limit specified in THR mode is exceeded. An alarm output is not available in SLEEP mode.
 - *8: When using a third party SD card, it is recommended to use a reliable and durable industrial SD card (SD standard or SDHC standard (not compliant with SDXC standard), Class 4 or higher, flash memory type SLC or MLC type). You must confirm the operation of the SD card yourself.
 - *9: Nickel-metal hydride cells or alkaline dry cells can be used. Manganese battery cells cannot be used.
 - *10: Battery life varies depending on the measurement environment, recording interval, operation mode as well as the battery type and performance.
 - *11: Conditions: Two AAA nickel-metal hydride cells; Sleep mode; Continue mode; Recording interval: 1 s; SD memory card: HMC-SD292; and Operation temperature: 23°C; and Automatic range selection off.
 - *12: The installation place must be free from physical shock when using mounting magnets.
 - *13: Already installed on the product by factory default.
 - *14: OMRON's XW4B-02B1-H1 connector.
 - *15: This provided AC adapter must be used.

6.1.2 ZN-KMX21

Item	ZN-KMX21	ZN-KMX21-A
Connectable Power Sensor/Monitor	KM20-B40-FLK, KM50-C, KM50-E, KM100, KM-N1-FLK, KM-N2-FLK, KM-N3-FLK	
Max. Number of Connectable Power Sensor/Monitor Units	31 units	
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.	
Recorded data	Momentary power, Integrated power, Power factor, Sum of pulse input counts 1 and 2*1	
Operation Function	Integrated power total sum, integrated momentary power, electricity rate total sum	
Recording Mode	Continue mode*2, Ring mode*3	
External Output	Alarm output (Photocoupler output)*4	
Communication Interface	Ethernet (10BASE-T, 100BASE-TX)	
Memory Capacity (Internal)	Internal memory: approx. 200 data items (at maximum load); approx. 6800 data items*5 (at minimum load)	
Memory Capacity (External)	SD memory card (SDHC support, measured value saving / set value saving and reading), Recommended SD memory card: HMC-SD292 (2GB) / HMC-SD492 (4GB) (manufactured by OMRON)*6	
Power Supply	DC input: 24 VDC±10%, AC adapter: 100 to 240 VAC/50 to 60 Hz	
Current Consumption	Max. 80 mA	
Operating Temperature	Without Ethernet: -10°C to 40°C (no condensation or icing) With Ethernet: 0°C to 40°C (no condensation or icing)	
Operating Humidity	20 to 85%RH (no condensation or icing)	
Storage Temperature	-15°C to +60°C	
Storage Humidity	20 to 85%RH (no condensation or icing)	
Insulation Resistance	20 MΩ (with DC500V Megger)	
Withstand Voltage	1000 VAC, 50/60 Hz, 1 min	
Vibration Resistance	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*7	
Shock Resistance	150 m/s ² in 6 directions (+/-X, +/-Y, and +/-Z directions), 3 times each*7	
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	
Accessories1	Instruction Sheet, Startup Guide, Alarm Output Connector*8, Connection Cable*9	
Accessories2	AC Adapter*10	DC cable, Ferrite core

*1: Only supported for KM50-C and KM50-E.

*2: Automatically writes the data to the SD memory card when the internal memory reaches its capacity and continues recording until the SD memory card 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.)

*3: 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.)

*4: Output when the integrated power upper limit specified in THR mode is exceeded.

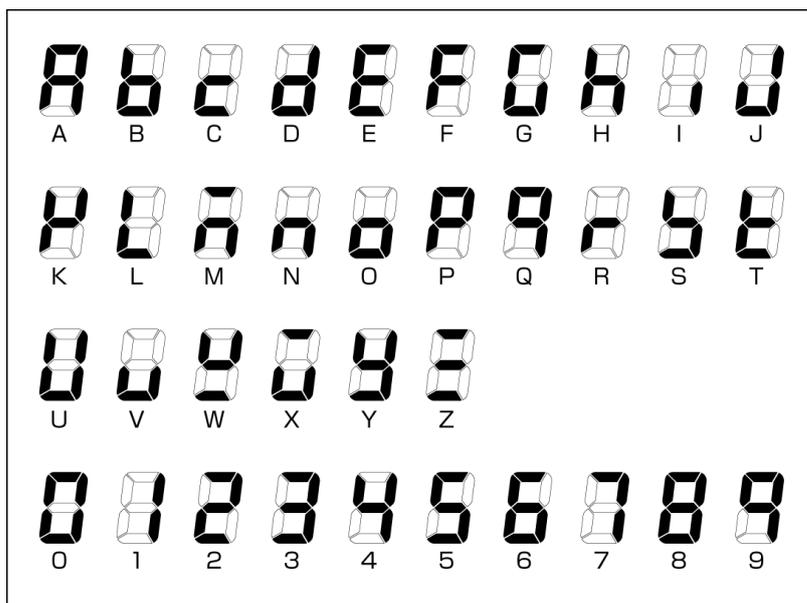
*5: The maximum load is applied when 31 KM50-□ units are connected; and the minimum load, when a single KM20-B40-FLK is connected.

- *6: When using a third party SD card, it is recommended to use a reliable and durable industrial SD card (SD standard or SDHC standard (not compliant with SDXC standard), Class 4 or higher, flash memory type SLC or MLC type). You must confirm the operation of the SD card yourself.
- *7: The vibration resistance when mounted using the ZN9-EM01-S magnets (separately sold): 10 to 55 Hz, 0.3mm double amplitude, acceleration: 20m/s^2 for each in X, Y and Z directions for 50 min. The installation place must be free from physical shock.
- *8: OMRON's XW4B-02B1-H1 connector.
- *9: When connecting KM-N1-FLK, KM-N2-FLK or KM-N3-FLK directly, purchase the dedicated connection cable ZN9-KMC30-N separately.
- *10: The provided AC adapter must be used.

6.2 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 memory card. Hold the MODE key for 3 seconds or more to cancel the error display. If this error occurs, insert a normal SD memory card and stop recording. Resume recording after checking that the data has been normally written to the SD memory card.
SEN E2001	Sensor error	Other sensors than those registered in the initialization process at the last startup are connected. Restart the station unit.
SEN E2002	Sensor communication error	Communications with the sensor failed. Confirm the settings and wiring of the sensor and main unit. By pressing and holding the MODE key (for 3s or more), the error display is cancelled.
SEN E2003	Sensor registration failure	Sensor registration failed in the initialization process during start up. Confirm the settings and wiring of the sensor and main unit before starting the main unit again. If turning ON the power of the main unit before the sensor starts up, the sensor cannot be registered correctly.
NO SD E3000	No SD memory card inserted	An SD memory card is not inserted. Insert a write-enabled SD memory 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. * This will not be displayed on ZN-KMX21.
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 memory card. Hold the MODE key for 3 seconds or more to cancel the error display.
RESTR E5002	Setting file reading failure	There are 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.

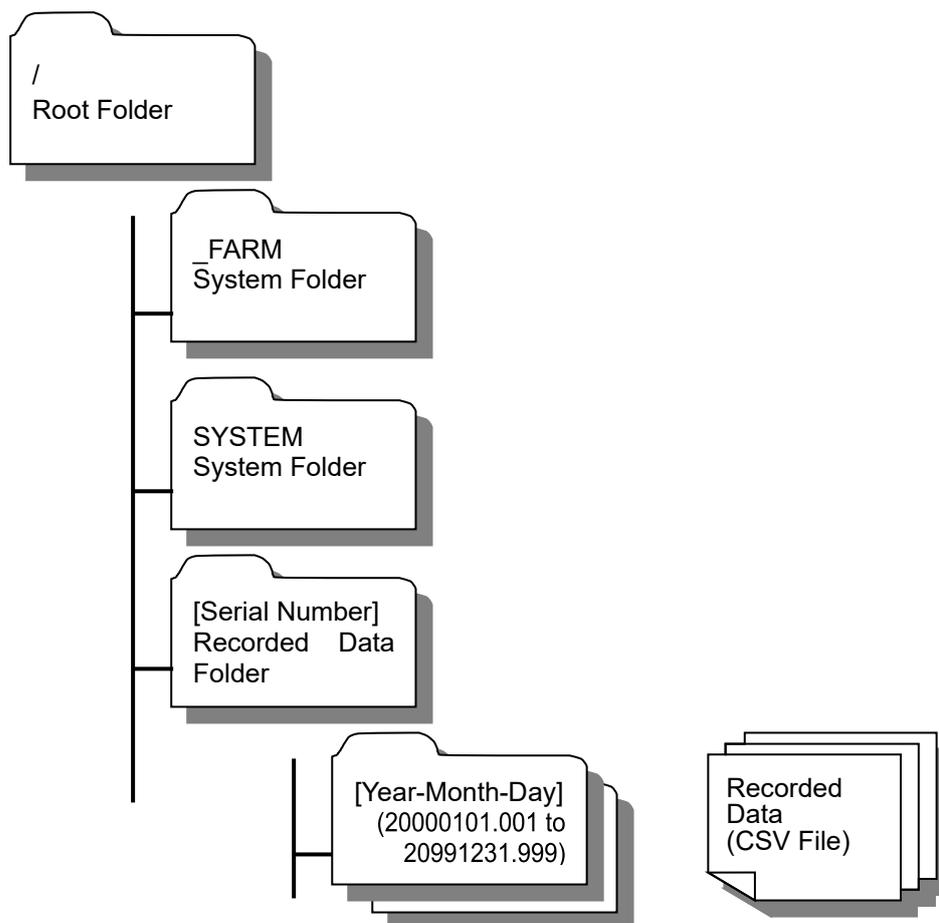
6.3 Character Display List



Main Messages

Display	String	Display	String	Display	String
cLEAR	CLEAR	rESTr	RESTR	bctSA	SCT5A
cYcLE	CYCLE	bckUP	BCKUP	LocUt	LOCUT
t inEr	TIMER	cLocK	CLOCK	rAnGE	RANGE
StrIG	STRIG	YEAr	YEAR	AUtO	AUTO
St inE	STIME	nonth	MONTH	rAtE	RATE
EtRIG	ETRIG	dAY	DAY	conV	CONV
Et inE	ETIME	t inE	TIME	rErEc	REREC
ELPsd	ELPSD	oFF	OFF	int h	INT H
nodE	MODE	on	ON	rESEt	RESET
rEc	REC	dISP	DISP	donE	DONE
intEG	INTEG	norñ	NORM	dAtA	DATA
USEch	USECH	SLEEP	SLEEP	no sd	NO SD
tYPE	TYPE	hISPd	HISPD	sdLcK	SDLCK
ct	CT	nEt	NET	hARd	HARD
volt	VOLT	,P	IP	sd Er	SD ER
PF	PF	SUb	SUB	bAtLo	BATLO
FrEQ	FREQ	cont	CONT		
in it	INIT	r inG	RING		
EtC	ETC	dTA IL	DTAIL		

6.4 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 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.

6.5 Calibration

The units do not required calibration.

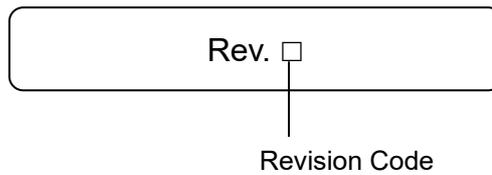
Revision History

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
01	July 2019	First edition
02	March 2023	Revisions for adding safety precautions regarding security.
03	July 2023	Correction of descriptions.
04	February 2024	Correction of descriptions.

OMRON Corporation Industrial Automation Company

Kyoto, JAPAN

Contact : www.ia.omron.com

Regional Headquarters

OMRON EUROPE B.V.

Wegalaan 67-69, 2132 JD Hoofddorp
The Netherlands

Tel: (31) 2356-81-300 Fax: (31) 2356-81-388

OMRON ASIA PACIFIC PTE. LTD.

438B Alexandra Road, #08-01/02 Alexandra
Technopark, Singapore 119968

Tel: (65) 6835-3011 Fax: (65) 6835-2711

OMRON ELECTRONICS LLC

2895 Greenspoint Parkway, Suite 200
Hoffman Estates, IL 60169 U.S.A.

Tel: (1) 847-843-7900 Fax: (1) 847-843-7787

OMRON (CHINA) CO., LTD.

Room 2211, Bank of China Tower,
200 Yin Cheng Zhong Road,
PuDong New Area, Shanghai, 200120, China

Tel: (86) 21-5037-2222 Fax: (86) 21-5037-2200

Authorized Distributor:

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