EQUO Series

Power Sensor Station

ZN-KMX21-□

Start-Up Guide

1897609-3B

⚠ Read PRECAUTIONS FOR SAFE USE and PRECAUTIONS FOR CORRECT USE described in the Instruction Sheet before using the product.

OMRON

Thank you for selecting OMRON product.
This guide describes the quick procedures and operational method to start up this product.
For further information, refer to the Instruction Sheet and the User's Manual in the Utility CD, both contained in the package.

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STEP 1 Checking the contents

☐ Main Unit	1
☐ AC Adapter or DC Cable	1
☐ Power Sensor Station Cable	1
☐ Alarm Output Connector	1
☐ Instruction Sheet	1
☐ Utility disk (CD-ROM)	1
☐ Start-Up Guide (This document)	1

STEP 2 Preparing necessary items

☐ Power Sensor/Monitor
Power Monitor KM100
Compact Power Sensor KM20-B40
Smart Power Monitor KM50-C/E

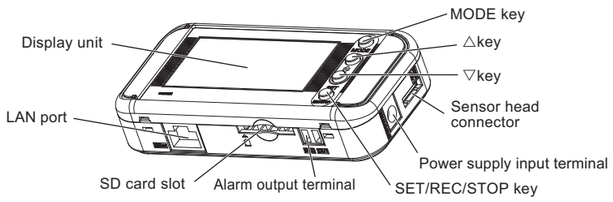
In the case of network connections

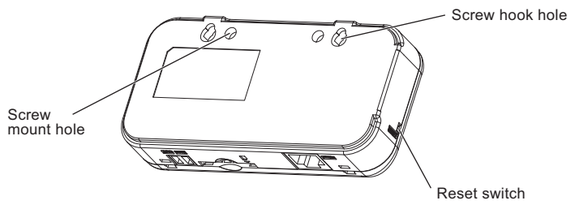
☐ LAN Cable, HUB for LAN Supporting 10BASE-T and 100BASE-TX
☐ SD memory card (SDHC compatible) HMC-SD291 (2 GB) (Operation checked.)

When recording the measured data into the device

☐ SD memory card (SDHC compatible) HMC-SD291(2 GB) (Operation checked.)

Exterior features

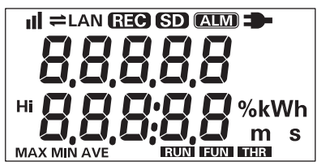




■Control unit

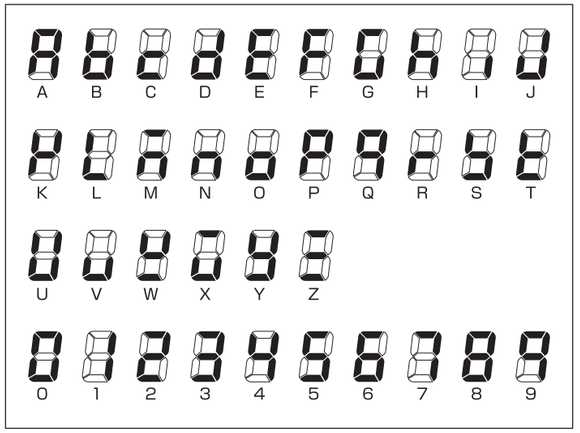
Name	Main functions
MODE key	Switch operating modes. Release an alarm or an error (press and hold). Cancel settings before fixing.
Item selection key △ key	Move up the setting items. Change display screens. Change setting values (increasing).
Item selection key ▽ key	Move down the setting items. Change display screens. Change setting values (decreasing).
SET/REC/STOP key	Fix setting values etc. Start/stop record (press and hold). Send the recorded data into the SD card.

■Display unit



Display	Meaning and operation when turned ON
	An integrated 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.
SD	An SD memory card is inserted. Blinking: The SD card is being accessed.
ALM	The total sum of integral power consumptions have exceeded the upper threshold value.
	Power is supplied.
Hi	Indicates the upper limit threshold value.
MAX	Indicates the maximum momentary power total sum.
MIN	Indicates the minimum momentary power total sum.
AVE	Indicates the average momentary power total sum.
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 THR mode.

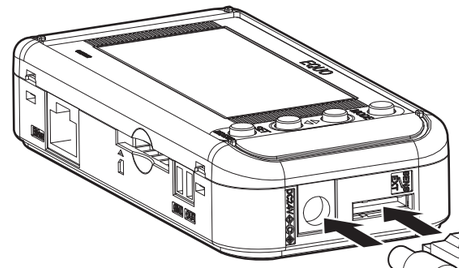
■Character display list



■Major messages displayed

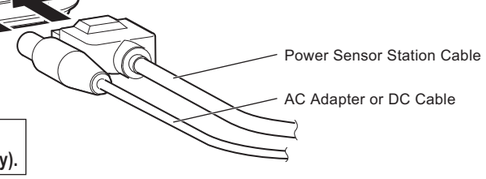
Display	Character strings	Display	Character strings	Display	Character strings
cycLE	CYCLE	t inE	TIME	r inG	RING
Unit	UNIT	oFF	OFF	int h	INT H
rEc	REC	on	ON	rESEt	RESET
inteG	INTEG	diSP	DISP	donE	DONE
init	INIT	norn	NORM	dAtA	DATA
Etc	ETC	iP	IP	SEn	SEN
rESEr	RESTR	SUb	SUB	no Sd	NO SD
bcYUP	BCKUP	rAtE	RATE	SdLcY	SDLCK
cLocY	CLOCK	conv	CONV	HArd	HARD
YEAr	YEAR	UtoFS	UTOFS	totAL	TOTAL
nonth	MONTH	rErEc	REREC		
dAY	DAY	cont	CONT		

STEP 3 Connecting the Power Sensor Station cable and turning the power ON



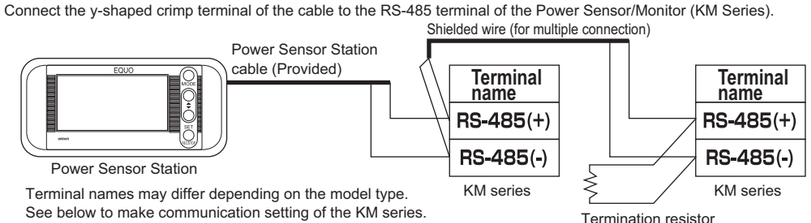
1 Connect the Power Sensor Station cable.

Insert it until it clicks.



2 Connect the Power Sensor Station cable to the Power Sensor/Monitor (KM Series) (sold separately).

Connect the y-shaped crimp terminal of the cable to the RS-485 terminal of the Power Sensor/Monitor (KM Series).



Terminal names may differ depending on the model type.
See below to make communication setting of the KM series.
Unit No.: A consecutive number starting from 1.
To change the starting number (other than 1), other setting is required.
Baud rate: 38400 bps
Data bit length: 7-bit
Stop bit length: 2-bit
Vertical parity: even

Note
- When connecting multiple sensors, up to 31 Power Sensors/Monitors (KM series) can be connected.
- Insert a termination resistor of 120Ω (1/2 W) between the RS-485 terminals of the end of the Power Sensor/Monitor (KM series).
- Shielded wire for termination resistor and multiple connection must be provided by the user.
- Connect the Sensor such that the polarities of the crimp terminal label and connecting terminal are matched.
- For details on usage of the Power Sensor/Monitor (KM series), refer to the corresponding manual.

•Communication settings for KM series
(Sensors with default settings require unit number setting from the second one or later.)

KM50-C/E (Baud rate example: 38400 bps)
After power-ON, hold the MODE key to enter "Setting Mode". In "Setting Mode", press the Enter key to enter "Communication Setting Mode", and then change the baud rate from 9.6 Kbps (default) to 38.4 Kbps.

KM20-B40 (Baud rate example: 38400 bps)
Turn ON the number 2 and 3 pins of the DIP switch (COMMUNICATION SETTING SW).

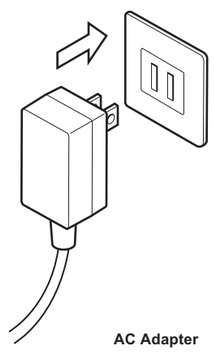
KM100 (Baud rate example: 38400 bps)
After power-ON, hold the level key to enter "Setting Level". Press the level key in "Setting Level" and then change the baud rate from 9.6 Kbps (default) to 38.4 Kbps.

For details on usage of the Power Sensor/Monitor (KM series), refer to the corresponding manual.

3 Connect the AC adapter or DC cable plug to the power supply input terminal.

Note: Only the provided AC adapter must be used when using AC power supply.
Only the provided DC cable must be used when using DC power supply.

4 Connect the AC plug of the AC adapter to an outlet 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) and the non-lined wire to 0V.



AC Adapter

* A single wiring around the provided ferrite core can reduce noise.

DC Cable

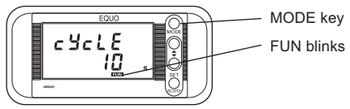
5 When the power is turned ON, the product is set in the free-run status (data acquisition enabled) and displays the measured value.

STEP 4 Setting measurement conditions

Set the number of Power Sensors/Monitors (KM series) connected to the Power Sensor Station.
Measurement condition can be set in FUN mode.

1 Press the MODE key to blink "FUN"

If FUN is already blinking, this operation is not necessary.

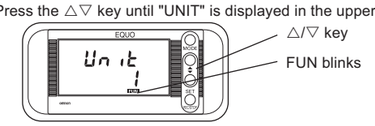


2 Set UNIT (number of Sensors connected) of the Power Sensor/Monitor (KM series).

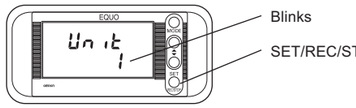
Example: Setting five Sensors.

If the lower line shows "5", the number of the Sensors has been set to 5 so that procedures (2) to (4) are not required.

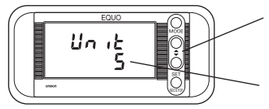
(1) Press the △▽ key until "UNIT" is displayed in the upper line.



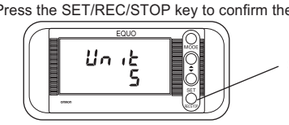
(2) Press the SET/REC/STOP key to blink the lower line.



(3) Press the △▽ key until "5" is displayed in the lower line.



(4) Press the SET/REC/STOP key to confirm the number of connecting Sensors to 5.



A reset interval of the integral power consumption can be set by displaying "INTEG" in the upper line of the display. For example, if you set the interval to 30 min, the integral power consumption will be reset at 30-minute intervals such as 0:00 to 0:30, 0:30 to 1:00, 1:00 to 1:30. The initial value is set to OFF (no reset).

STEP 5 Installing Station Utility

Install Station Utility (the supplied software) in advance.
Station Utility consists of a setting tool, logging tool and data display tool.

■Product requirements

OS: Windows XP (32-bit)/Windows Vista (32-bit)/Windows 7 (32-bit/64-bit)
CPU: Intel (x86) compatible processor, 1.5 GHz or higher
Memory: 1 GB or more (2 GB or more recommended)
Display: Resolution 1024x768 or more, 65,535 colors (16-bit color) or more
HDD: A minimum of 30 MB free space is required to install Station Utility.
CD-ROM drive: For installation
LAN port (supporting 10BASE-T and 100BASE-TX) : For network connections
SD card reader and writer/SD card slot : For unit recorded data reading

■Installation

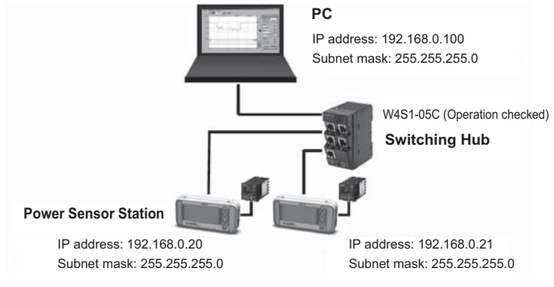
Upon inserting the supplied Utility Disk into the computer's CD-ROM drive, the screen shown on the right appears.
If the screen does not appear, execute Setup.exe in the CD-ROM drive.
Press the "Station Utility" button to start installation.
Follow the instructions displayed on the screen.
Installation should be implemented by an authorized user such as a system administrator.

Refer to the Station Utility User's Manual (provided in the CD) for Station Utility operation.

STEP 6 Network connections

When connecting Power Sensor Station and PC via network, network connection setting is required.
Be sure to perform network connection setting of the Power Sensor Station unit before connecting the LAN cable.

Connection Example



Setting Example

PC IP address	192.168.0.100
IP address of the Power Sensor Station	(Unit 1) 192.168.0.20 (Factory default) (Unit 2) 192.168.0.21 (Change from the factory default)
Subnet mask	255.255.255.0 (Factory default)

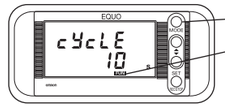
Note
- Before establishing network connection, be sure to understand LAN networking concepts.
- When connecting Power Sensor Stations via network, establish the dedicated LAN network.
- When using in-house network or LAN network that has already been established, contact your network administrator as there may be limitation or rules on available IP addresses. In such case, operation of Power Sensor Station or supplied PC software cannot be guaranteed.
- Be sure that IP addresses of the PC and Power Sensor Station do not overlap. The IP addresses of the 4th segment (IP4) must be different on all devices even when operating with subnet mask other than 255.255.255.0.

Making unit settings

Make settings on the Power Sensor Station in FUN mode.

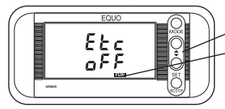
1 Press the MODE key to blink "FUN".

If FUN is already blinking, this operation is not necessary.

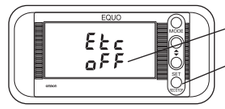


2 Display "ETC" in the upper line and set the lower line to "DISP".

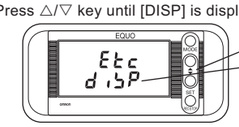
(1) Press the △ or ▽ key until "ETC" is shown in the upper line.



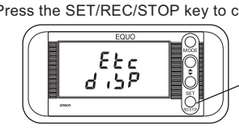
(2) Press the SET/REC/STOP key to make the display in the lower line blink.



(3) Press △/▽ key until [DISP] is displayed at the lower row.



(4) Press the SET/REC/STOP key to confirm [DISP].



3 Display "IP" in the upper line in the same way as step 2, and set the lower line to "DISP".

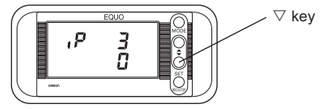
4 Set the IP address.

The factory default is set to "192.168.0.20".
Change it to "192.168.0.21".

(1) Apply "IP" to "DISP". Then, press the ▽ key to display "IP1".
If "192" is not displayed, change the value referring to the changing "IP 4" example shown later.

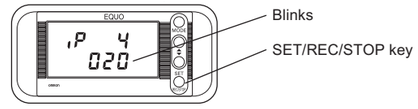
(2) Press the ▽ key to display "IP2".
If "168" is not displayed, change the value referring to the changing "IP 4" example shown later.

(3) Press the ▽ key to display "IP3".
If "0" is not displayed, change the value referring to the changing "IP 4" example shown later.

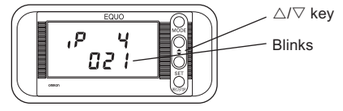


(4) Press the ▽ key to display "IP4".
Change "20" to "21".

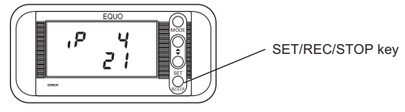
(5) Press the SET/REC/STOP key. "20" in the lower line blinks.



(6) Press the ▽ or △ key to change the value to "21".



(7) Press the SET/REC/STOP key. The value is applied.



5 Set SUB 1 to 4 (subnet mask) in the same way as step 4.

Use "255.255.255.0" (Factory default) for subnet mask.
To change the subnet mask, contact your network administrator.

6 Press the MODE key. The unit is reset.

The unit is connected through the new IP address after restart.

Making PC settings

Refer to the Power Sensor Station User's Manual (provided in the CD) for the PC IP address setting.

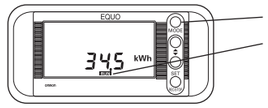
STEP 7 Data Record

Measured values can be recorded into the Power Sensor Station unit and a PC.

When recording measured data in the Power Sensor Station

1 Press the MODE key to turn "RUN" ON.

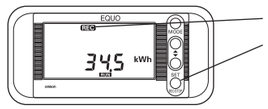
If RUN is already on, this operation is not necessary.



MODE key
"RUN" turns on

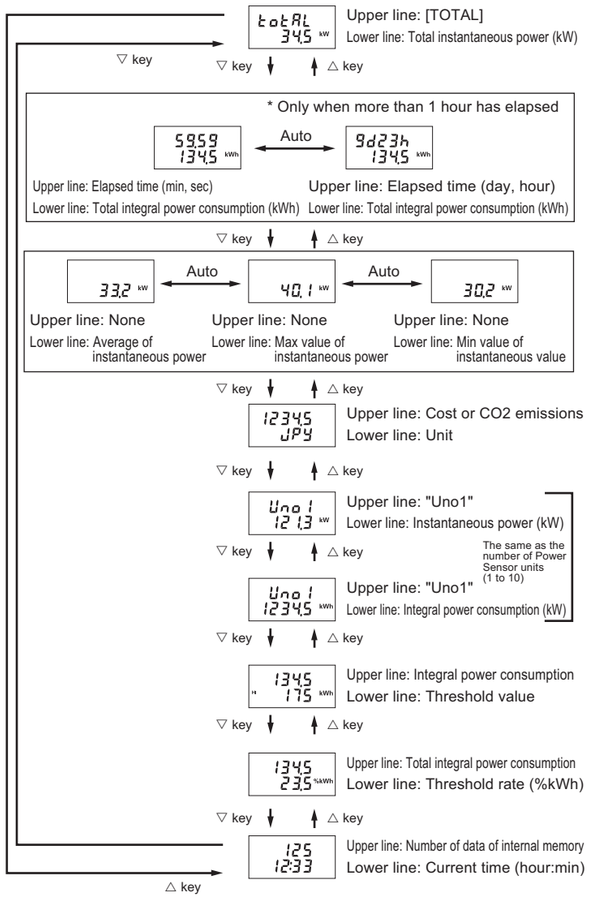
2 Press and hold the SET/REC/STOP key (for 3 seconds or longer) to start recording.

During recording, "REC" is turned ON.
Data is recorded in the internal memory.



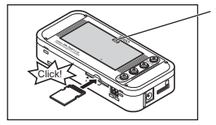
"REC" turns on
Press and hold
the SET/REC/STOP key.

3 You can change the display contents with the △ and ▽ keys.



4 Insert an SD memory card to obtain the data recorded in the internal memory.

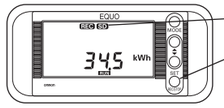
Insert the SD card with metal terminals facing upward until it clicks.
When it inserted correctly, "SD" turns on.



"SD" turning on

When ejecting the card, push the card until it clicks and then pull it out.

5 Press the SET/REC/STOP key to output the data to the SD memory card as a CSV file.



"SD" blinks during file output.
SET/REC/STOP key

Caution
Do not eject the SD memory card while "SD" is blinking.
When "SD" changes from the blinking to turned-on status, writing is complete and you can eject the SD memory card.

- If you press and hold the SET/REC/STOP key less than 3 seconds, file output is carried out while recording in the internal memory continues.
- If you press and hold the SET/REC/STOP key more than 3 seconds, file output is carried out though recording into the internal memory is stopped. "REC" turns OFF.
- After "SD" stops blinking, you can eject the SD memory card.

If the internal memory is used up, recording stops. However, when SD card has been inserted, data will be automatically output to the card as a file to continue recording (in the case when factory default is set to the CONTINUE Mode).

Main error messages displayed

Display (Upper line/ Lower line)	Meaning	Description
DATA E1100	Measured data writing failure	Failure in writing the measured data on the SD memory card due to no free memory or pulling out the card while writing. Insert a writable SD memory card. Press and hold the MODE key (for 3 seconds or longer) to release an error display. If an error occurs, insert a proper SD card and stop recording. After the data is properly written to the SD memory card, restart recording.
SEN E2001	Sensor error	A Sensor that is different from the one that has been automatically registered at startup is mounted. Restart the Sensor.
NO SD E3000	No SD memory card inserted.	No SD memory card is inserted. Insert an SD memory card. Press and hold the MODE key (for 3 seconds or longer) to release an error display.
SDLCK E3002	SD memory card writing is prohibited.	SD memory card writing is prohibited. Insert a writable SD memory card. Press and hold the MODE key (for 3 seconds or longer) to release an error display.

When acquiring data to a PC

Use Station Utility to acquire the measured data to the PC from a Power Sensor Station connected via network.
Refer to the Station Utility User's Manual (provided in the CD) for the procedure of data acquisition.

List of Power Sensor Station setting items

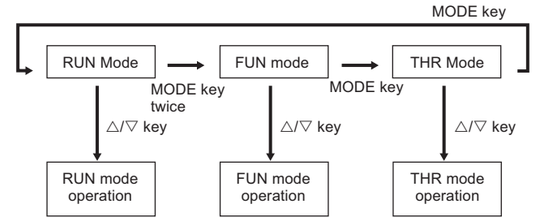
For details, refer to the User's Manual.

Operating Modes

The Power Sensor Station has three Operating Modes.
Measurement and recording are performed in RUN Mode.

Mode	Name	Display	Description
RUN	Measurement execution mode	"RUN"turns ON	Performs measurement
FUN	Function setting mode	"FUN" blinks	Sets various parameters.
THR	Threshold setting mode	"THR" blinks	Sets conditions for alarm output.

Change of operating modes is executed by the MODE key.
Press the MODE key twice to change the mode from RUN to FUN.
For other cases, press the MODE key once.
Press the △ key/▽ key to display the detailed screen.
During recording into the device, transition from RUN mode to other modes is disable.

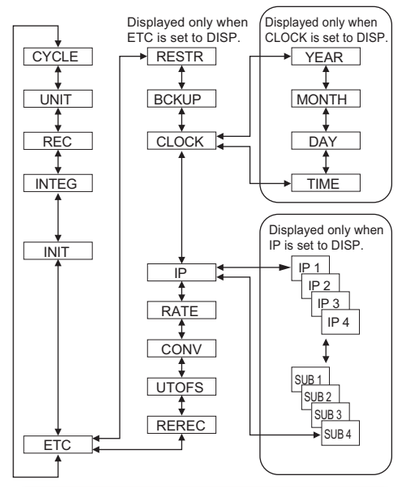


FUN mode

Settings regarding measurement and recording functions can be made in FUN mode.

Display items			Setting items	Contents	Factory default
CYCLE			Record interval	Sets the update intervals of measured values. 1s (second)/2s/5s/10s/20s/30s/1 min (minute)	10s
UNIT			The number of Power Sensor/Monitor units to connect	Specifies the number of Power Sensor/Monitor units to be connected. 1 to 31	1
REC			Recording mode	Specifies the operation when the internal memory becomes full. CONT/RING	CONT
INTEG			Integrated power reset interval	Specifies the time interval for integrated power measurement. OFF/30min (minute)/1h (hour)/24h	OFF
INIT			Return to the factory default.	Press and hold the SET/REC/STOP key to start initializing. If the operating mode is changed with the MODE key after displaying DONE, the device is reset and starts again.	-
ETC (At DISP)	RESTR		Reading the setting data from the SD memory card	Press and hold the SET/REC/STOP key to read the setting data from the SD memory card and set them on the main unit. If the operating mode is changed with the MODE key after displaying DONE, the device will be reset and reboot.	-
	BCKUP		Writing the setting data on the SD memory card	Press and hold the SET/REC/STOP key to save the setting data on the SD memory card.	-
	CLOCK (At DISP)	YEAR	Year	Sets the year.	Cannot be initialized with INIT.
		MONTH	Month	Sets the month.	
		DAY	Day	Sets the day.	
		TIME	Hour: Minute	Sets Hour and Minute.	
	IP (At DISP)	IP	IP1 to IP4	IP address 0 to 255	192.168.0.20
		SUB	SUB1 to SUB4	Subnet mask 0 to 255	255.255.255.0
	RATE		Rate/CO2 conversion rate setting	Specifies the rate/CO2 conversion value. 00.000 to 99.999	0
	CONV		Conversion unit setting	Specifies the unit of the rate/CO2 conversion value setting (RATE). JPY (yen)/USD (U.S. dollar)/EUR (Euro)/CNY (Chinese yuan)/ KRW (Korean won)/CO2 (CO2 emissions per kWh)	JPY
	UTOFS		Unit No. offset	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).	1
	REREC		Power failure REC restoration	Specify if the Power Sensor Station writes data and resumes recording after restart in the event of a power failure during recording.	OFF

Use the △ key/▽ key to move among the setting items, and fix it with the SET/REC/STOP key.



If "ETC", "CLOCK or "IP" is set to "DISP," the setting will return to "OFF" upon restart.

THR Mode

In THR mode, a threshold value for alarm output is set. When measurement is performed in RUN mode, if a measured value exceeds the threshold value, "ALM" is turned ON and alarm output becomes ON condition.
(Alarm output will be unavailable if both items are set to 0.)

Display items	Setting items	Description	Factory default
INT H	Upper limit of integral power consumption threshold value more than kWh	"ALM" and alarm output will turn ON when the measured integral power consumption is higher than the set value. 0 kWh to 99999 kWh	0kWh

Use the △ key/▽ key to move among the items, and fix them with the SET/REC/STOP key.

Suitability for Use: Refer to Suitability for Use in the Instruction Sheet

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