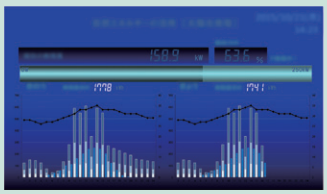
Panasonic

Energy Management Solutions

Optimize your energy use

"Visualization"

"Digital Signage"



Data Collection and Accumulation

Power Monitoring

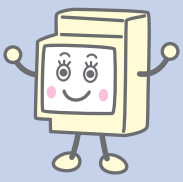
Energy-saving Control

NEW EcoLogiX ECOnect

IoT

Environment Management

Related Products



3 Year Warranty

Start "Visualization" and Realize "Optimization"

Trying energy-saving activities at random does not give you meaningful results for the time and efforts you put into. On the other hand, “Visualization” of energy use enables you to efficiently discover the hidden waste and take the right steps for it, which contributes to “Optimization” of energy use. You can minimize your energy consumption, while satisfying your need.With our variety of “Visualization” products, you can build a “Visualization” system as you like. You are welcome to try some first, and later add more to your system as you need. Now, it is time to find your favorites from our “Visualization” products listed below.

"Visualization"

For easy visualization to find waste or loss without expertise.

P.8

Visualization Software

Most recommended for power use analysis.

Free down-load

"Visualization" of accumulated data in **DLL / ELC□**

KW Watcher P.8

Free down-load

Visualization of measured and collected data on the SD memory card

KW View P.9

Air Conditioning Control

For air conditioning control as necessary based on power monitoring. Every type of measurement data can be collected and accumulated.

P.12

Control Unit

EcoLogiX

NEW

ELC500 P.12

ELC1 P.14

ECOnect

Remote I/O unit P.14

Power Monitoring

Beginning with 1 device, easy to expand the system later. Selectable from a wide variations depending on the application.

P.18

Eco-POWER METER

Max. 24 circuits

Energy saving and electric power quality monitoring with multiple circuits.

KW2M P.22

For preventative maintenance!

For both energy-saving and power monitoring

KW9M P.28

Signal Conversion

RS-232C / RS-485 data can be easily monitored by Ethernet.

P.40

Signal Converter

Ethernet connection for RS-232C / RS-485 communication

KS1 P.40

Environment Management

Management of temperature and air for further energy-saving.

P.41

Temperature Controller

Temper-ature

Thermocouple, RTD, DC current / voltage input possible!

KT4R / KT4H / KT4B P.41

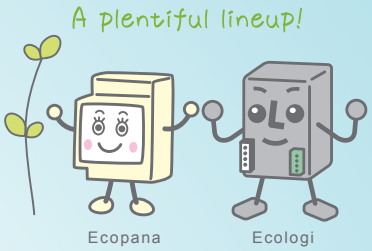
Air Flow Monitor

Pipe size: 25 to 200A

EWA2 P.42

Read a success report

Reductions of CO_2 by 67 % and basic unit by 72 % have been achieved with the help of "Visualization".
Learn more
See ▶ P.43

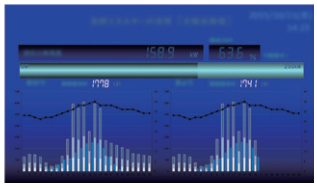


"Digital Signage"

For real-time monitoring of energy consumption and equipment operation. A perfect indicator of your improvement in energy efficiency and productivity.

▶ P.10

Digital Signage Software



"Digital Signage" to share any information
EnerVisualizeR ▶P.10

Data Collection and Accumulation

Every type of measurement data can be collected and accumulated.

▶ P.16

Data Logger

Data Logger Light（DLL） ▶P.16

Web Server

FP Web-Server 2 ▶P.17

Eco-POWER METER

Max. 16 circuits can be measured

Economical expandable type
KW2G ▶P.30

SD card type
KW2G-H ▶P.30

Standard type
KW1M ▶P.34

SD card type
KW1M-H ▶P.34

Mini DIN□48
KW4M ▶P.36

22.5 mm ultrathin type
KW7M ▶P.36

Compatible with general-purpose CT
KW8M ▶P.36

Related Products

Other products that help you improve production efficiency.

▶ See our Website

Digital Flow Sensor

FM-200

Programmable Controller

FP7

FP0H

Pressure Sensor

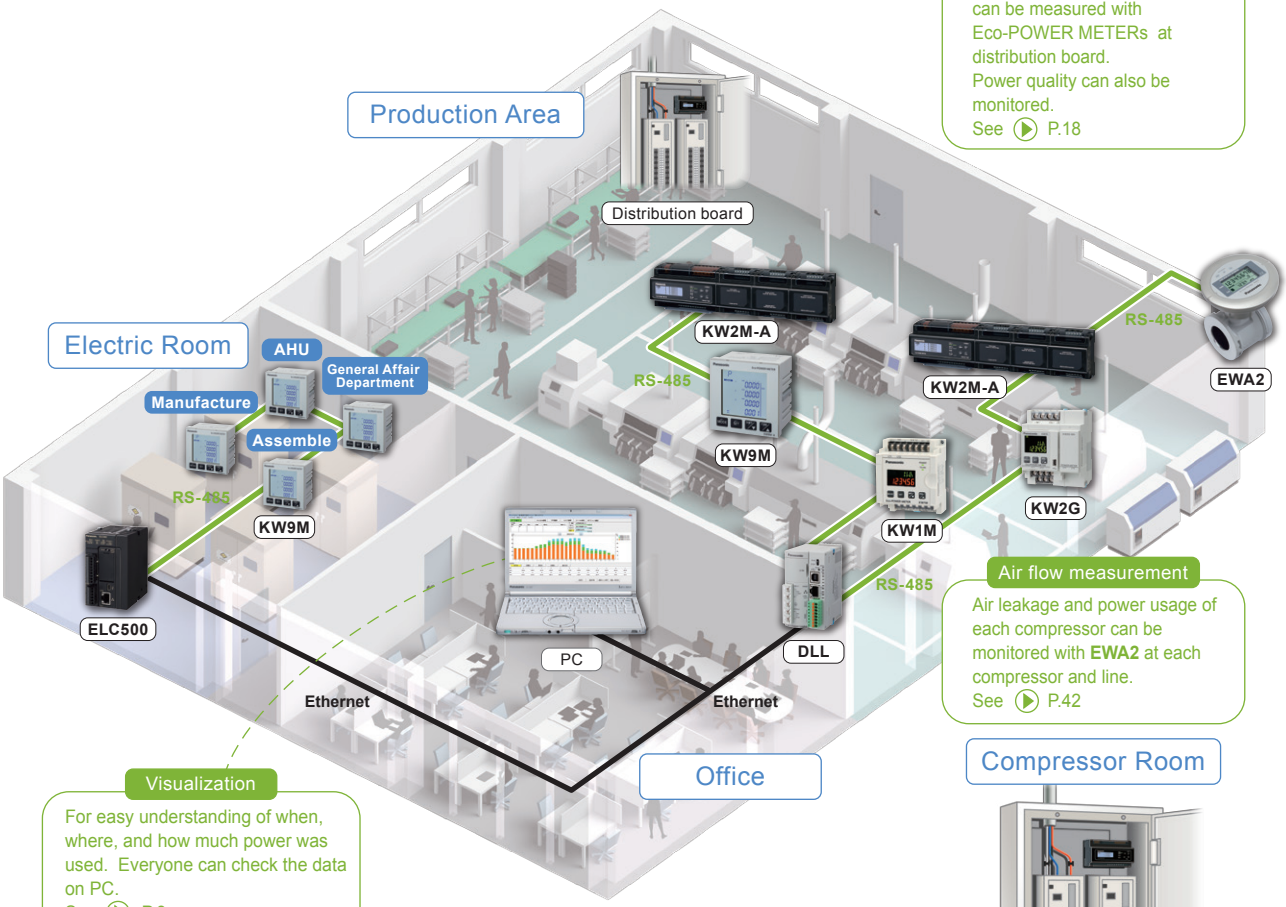
DP-100 Ver.2

* Some products are not available in certain countries. Contact your nearest sales office for product details.
* Ethernet is a registered trademark of Fuji Xerox Co., Ltd. and Xerox Corporation.
* Digital Flow Sensor **FM-200**, Pressure Sensor **DP-100 Ver.2**, Current Transformer (CT), Options, and Accessory are not covered by 3 year warranty.

Example Application

→ Factory "Visualization"

The key to succeed in energy-saving is to consume energy as much energy as you really need.
"Visualization" of energy consumption allows you to discover unnecessary energy use
as well as errors in equipment operation, which further increase energy waste.
In this way, you can take the appropriate measures to minimize your energy consumption while satisfying your need.



Power measurement

Power usage of each equipment can be measured with Eco-POWER METERs at distribution board.
Power quality can also be monitored.
See P.18

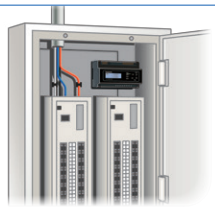
Air flow measurement

Air leakage and power usage of each compressor can be monitored with **EWA2** at each compressor and line.
See P.42

Visualization

For easy understanding of when, where, and how much power was used. Everyone can check the data on PC.
See P.8

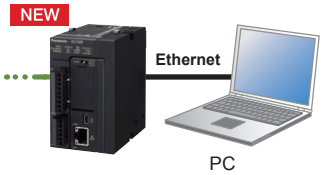
Compressor Room



Distribution board

KW2M-A Eco-POWER METER

Equipped with two Ethernet communication ports and RS-485 communication. Measurement of various parameters and power quality surveillance are possible.



ELC500 Control unit

Demand control enables limiting peak power consumption. For example, setting a delay time for starting each air conditioner unit or controlling startups of air conditioner units in rotation lowers peak power consumption.

KW9M Eco-POWER METER Advanced type

Preventative maintenance is achieved by monitoring electric power quality using higher harmonics wave and unbalance measurement. Batch display of phases and total power on a large screen.

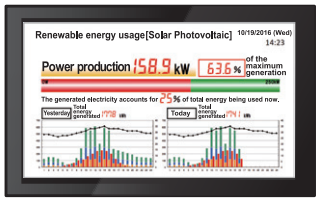
Example Application

→ Factory "Digital Signage"

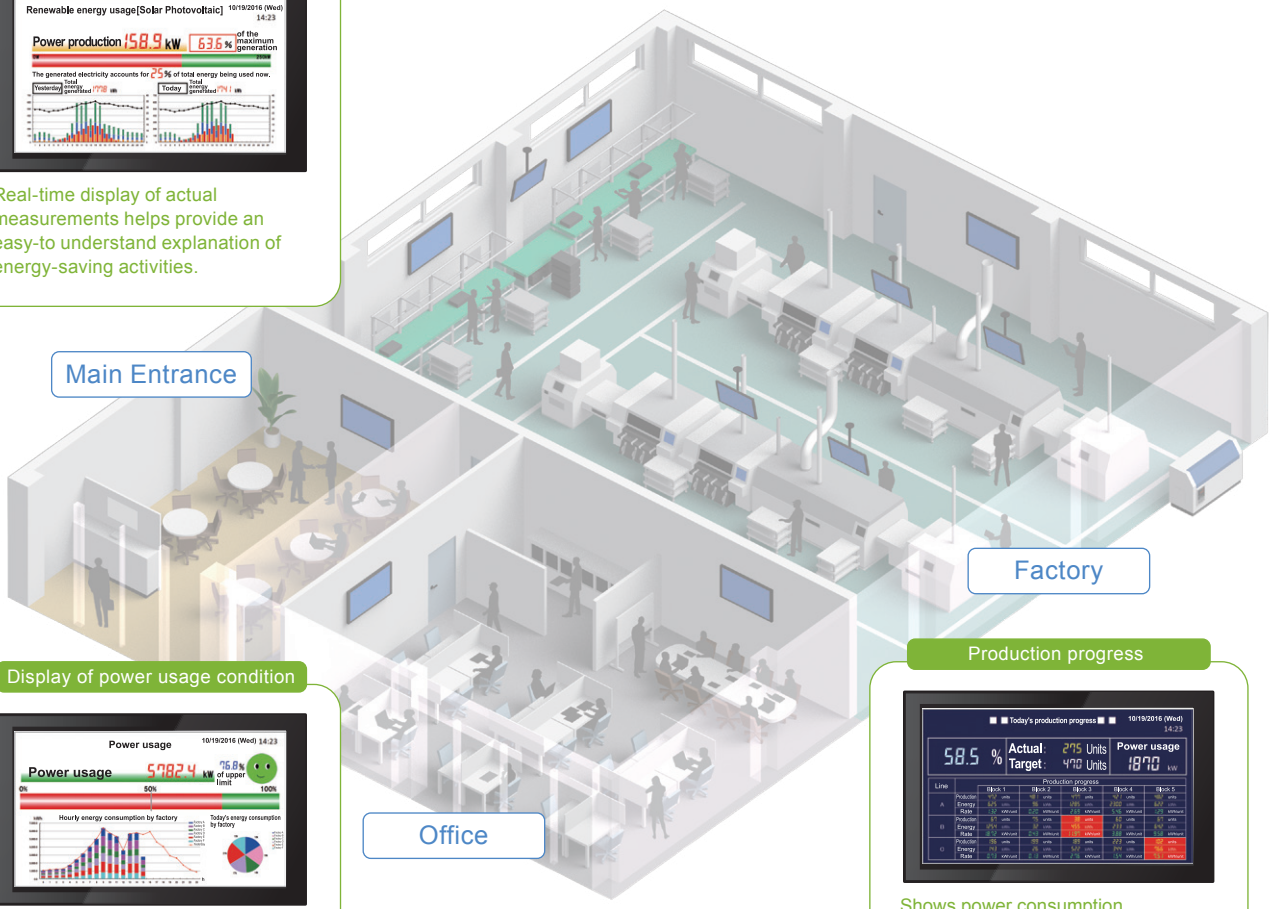
Once you have achieved "Visualization" and find the right step to reduce your energy consumption, it is time to utilize "Digital Signage" and get everyone involved in energy-saving activities. "Digital Signage" shows the progress in energy consumption levels and productivity, which motivates people to play a part in the activities.

See P.10

Display of energy usage condition



Real-time display of actual measurements helps provide an easy-to understand explanation of energy-saving activities.



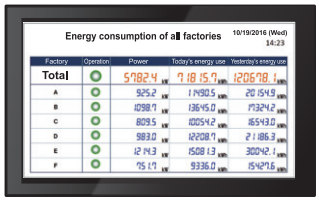
Display of power usage condition

Presentation of the data of power usage condition to all employees raises their awareness of energy-saving in the workplace.

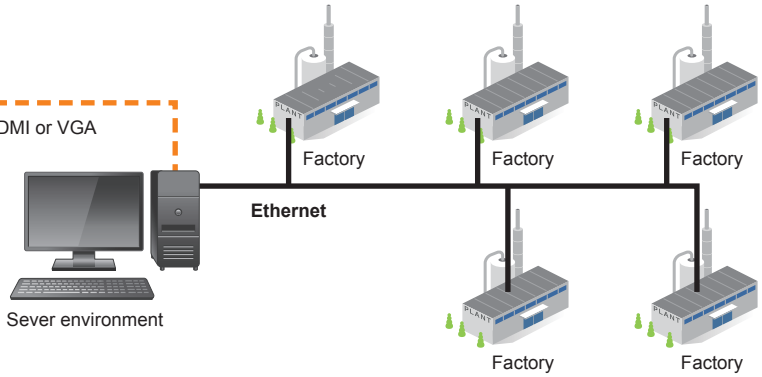
Production progress

Shows power consumption, production progress, and resource intensity in tables or graphs. Perfect to see the progression and find any problem to deal with.

One-view factory energy consumption



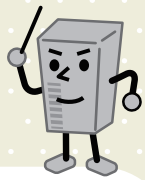
Shows the real-time data of energy consumption in each factory and the total of them just in one screen.



Example Application

→ Demand Management & Air Conditioning Control

Reduce your electricity expenses!

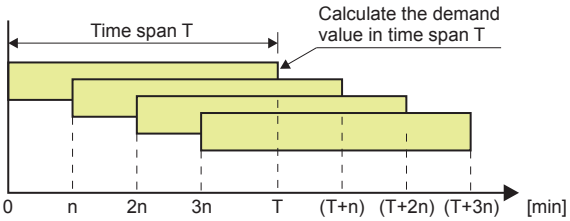


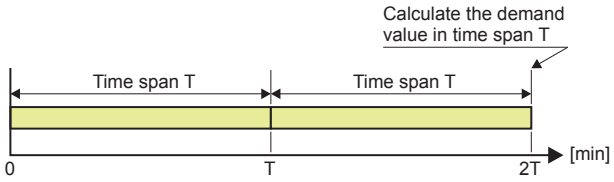
Super Ecologi kun

Demand management

IEC demand (Sliding block interval and Fixed block interval)

Users set the time span for demand calculation to an arbitrary value between 1 to 60 minutes (in increments of one minute). The average power demand within the set span is calculated at the end of the span. [The demand values of active, reactive, apparent, active (export), and reactive (export) power are calculated.]

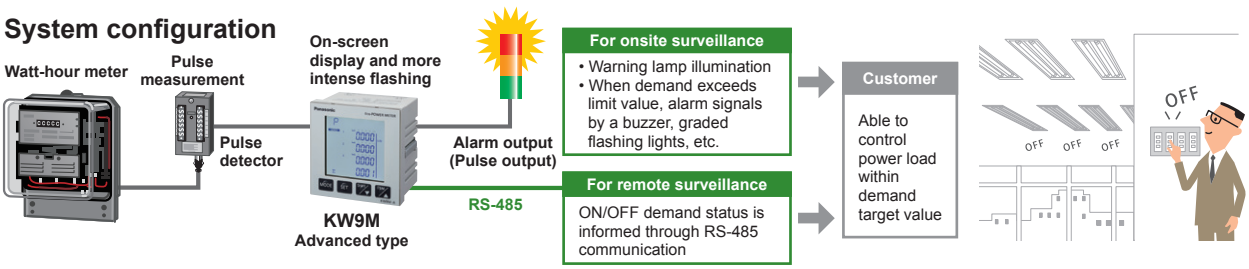




• Sliding block interval method
The next time span starts “n” minutes later.
(Value “n” is arbitrarily set by users.)

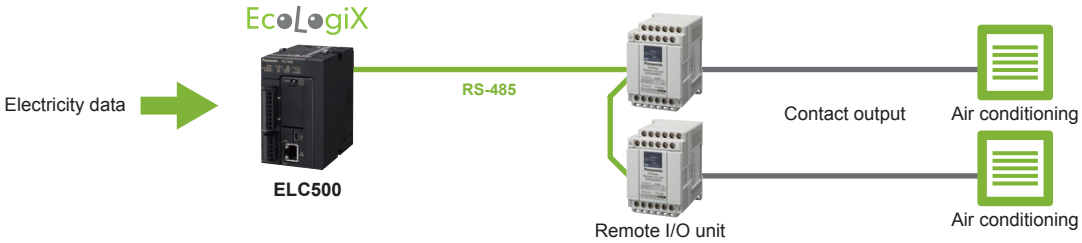
• Fixed block interval method
The next time span starts after completion of the current span.

System configuration



* Also ready for CT inputs (electric power measurement)

Control



Air conditioners are automatically turned OFF based on the set control pattern.

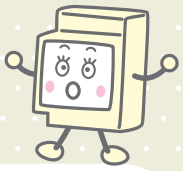
Energy-saving control system

Product name	Details	Model No.
ELC500 Control unit	Collection of measured data Peak power monitoring / control (Alarm-linked control, cyclic control, startup control), PLC function	**UELC500**
Remote I/O unit	2 Input points / 4 Relay output points RS-485 [Modbus RTU / MEWTOCOL]	**UENU2D4R12**

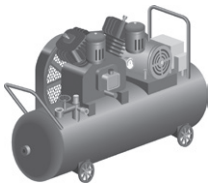
Example Application

→ Preventive Maintenance & Energy-saving

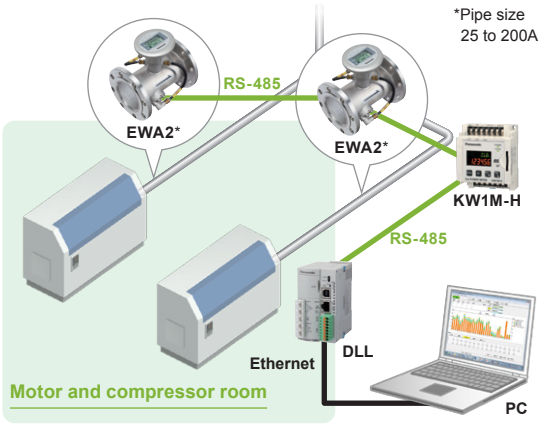
Power quality and air consumption are monitored too!



Power quality monitoring and air "Visualization" of factory production equipment



Motor pump, blower, fan (heater)

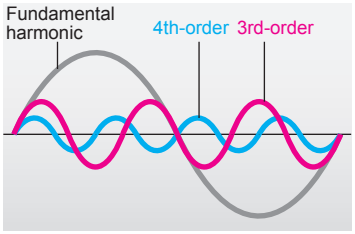


Preventive maintenance of motor or inverter equipment is possible.

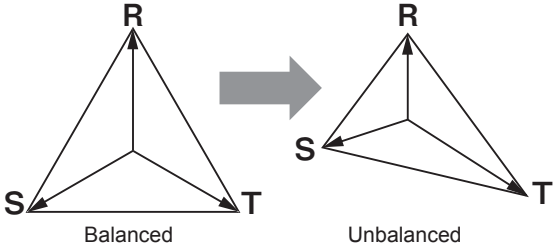
When equipment malfunctions or deteriorates, harmonics or unbalanced voltage / current are generated. They may cause a variety of problems such as breaker malfunction or malfunction / halting of equipment with built-in microcomputer, heat generation of motor, insufficient torque etc., leading to a shorter life cycle or increased power consumption. Monitoring harmonics and fluctuations lead to preventive maintenance of such troubles.

KW2M and KW9M Eco-POWER METER for measuring power quality and assisting preventive maintenance for equipment troubles

- **Harmonics up to 31st-order: THD (harmonic distortion) measurement, current / voltage balance measurement.**
- **High accuracy:**
  Active power 0.5 % , current / voltage 0.2 % contributes to a few percent of accumulated power reductions.



Harmonic generation



Balanced Unbalanced

Compressor efficiency can be measured.

Air flow monitor helps to judge whether air supply capability of the compressor is suitable for required air volume .
Even when a compressor is idling, it requires 30 - 40 % of its full operation power. Is such a large capacity compressor necessary ? By fully operating a suitable compressor, the power consumption of the entire factory can be reduced.

Eco-POWER METER and Air flow monitor for "Visualization" of unnecessary idling of compressors

Ultrasonic detection is used for the detection principle, so elements such as filters are not required and measurement is possible even in the presence of oil mist. In addition, the flow of high-cost nitrogen gas can also be measured, and consumption can be monitored.

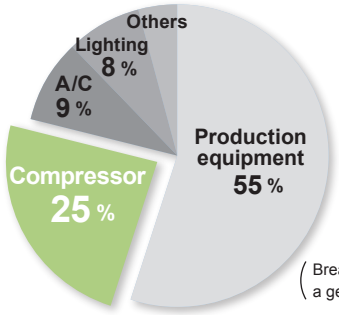
*Nitrogen gas can be measured with small or medium pipe size only.

Do you know what this number is?

Power consumption rate of compressor in a factory Approx. 25 %

In fact, a compressor requires large amounts of power compared to other equipments.
In other words, when thinking about energy-saving in a factory, reducing energy used for the compressor is a big contributing factor.

Now, let's measure the waste air flow by "Visualization".
"Visualize" air flow by installing an ultrasonic air flow monitor.
This leads to air leakage detection and higher efficiency of the compressor.



Breakdown of power consumption in a general factory

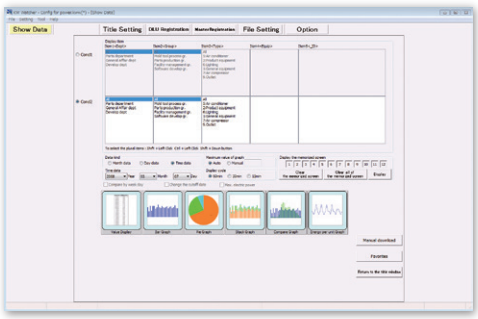
Software Introduction Free

KW Watcher ▶ For "Visualization" of data accumulated in PLC (FP7, FP0H) / DLL / ELC□

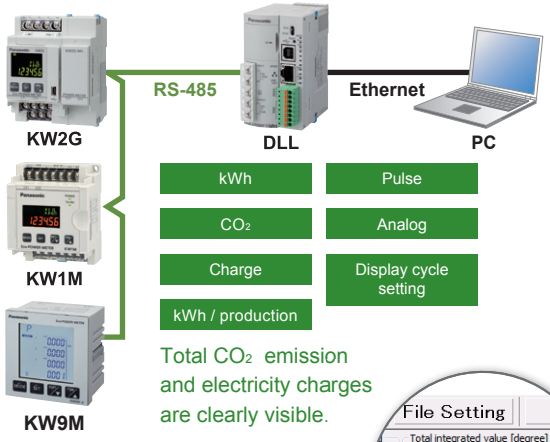
Eco-POWER METER
+
PLC (FP7, FP0H) / DLL / ELC□

LANGUAGE EN CH ID VN DE ES PT KR JP

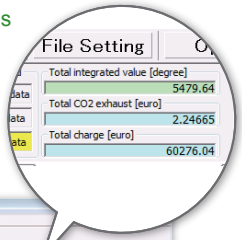
Simply select the data, dates, and types of graphs you want to display



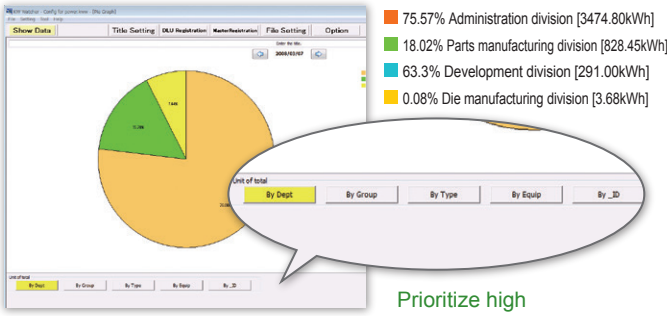
* Fix the equipment and details in the initial configuration.



Total CO_2 emission and electricity charges are clearly visible.



Pie Chart: for quick identification



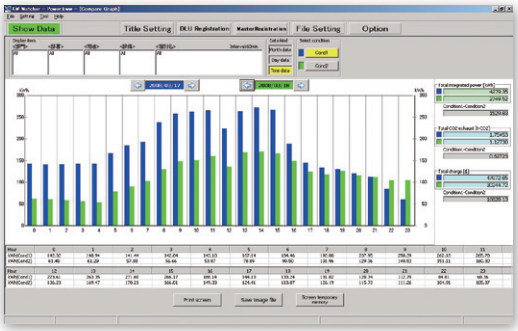
Prioritize high consuming areas.

- Shows the energy consumption breakdown in the areas of your choice such as division, department, and the purpose of use.
- A good indicator of the biggest energy consumer you should take care of.

Stack Graph: for quick resolution

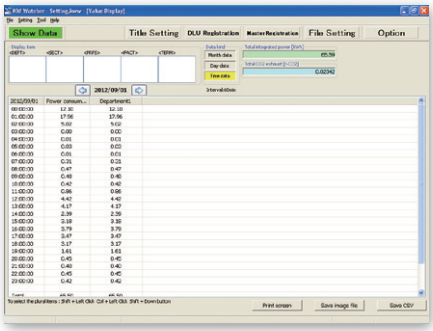
- Identifies the very equipment that contributed to the increase in overall energy consumption, which helps you deal with the issue quickly.

Compare Graph: to reveal deviation



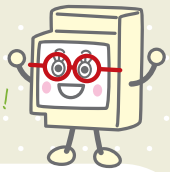
- Proves your progress in energy saving.
- Perfect to find and improve any deviation within system operation by comparing the same machine in different time flames or different machines in the same time period.

Value Display: to do more things!



- Gives total, average, maximum, and minimum values of measured data.
- Convenient to make reports, being saved as CSV file.

* Ethernet is a registered trademark of Fuji Xerox Co., Ltd. and Xerox Corporation.



KW View

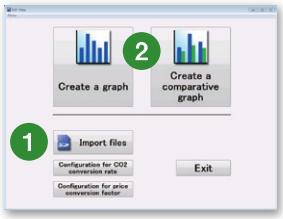
For "Visualization" of measured data saved to the SD memory card

SD card compatible Eco-POWER METER

LANGUAGE EN CH JP

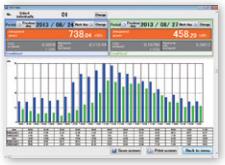
"Visualization" in 3 easy steps.

Step 1 **Click "Import files"**
Step 2 **Select graph**
Step 3 **Select date and data to visualize**



kWh | CO_2 | Charge | Pulse | Analog

Comparison graph of before and after of accumulated power consumption



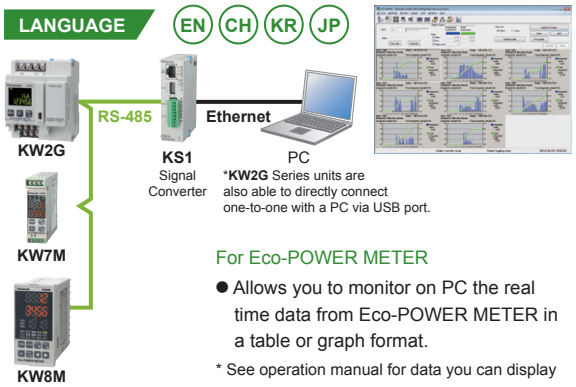
Comparison graph calculated power and temperature (analog)

KW Monitor

Operation checking / real-time monitoring software

Eco-POWER METER + KS1

LANGUAGE EN CH KR JP



*KW2G Series units are also able to directly connect one-to-one with a PC via USB port.

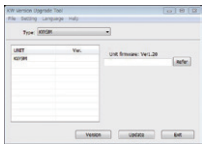
For Eco-POWER METER

- Allows you to monitor on PC the real time data from Eco-POWER METER in a table or graph format.

* See operation manual for data you can display

KW Version Upgrade Tool

Eco-POWER METER Version Upgrade Tool

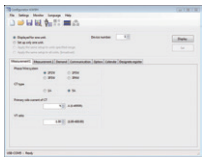


For Eco-POWER METER

- Upgrades the firmware of **KW2G**, and **KW9M** via USB cable or RS-485 communication.

Configurator KW9M

KW9M series setting software

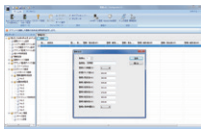


For Eco-POWER METER **KW9M** series

- Setup several units at one time and copy the setting conditions.
- Monitoring and logging measured value are possible.

Configurator EL

Operation setting software

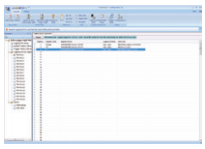


For EcoLogiX

- Each control pattern setting and accumulation file can be displayed. The target value is input for warning level setting.

Configurator DL

Data Logger Light setting software



For **Data Logger Light**

- Setting is possible without the target **DLL** main unit connected.
- Set data can be transferred to a **DLL** main unit via USB 2.0 or Ethernet.

Configurator EL500

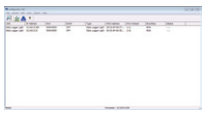
Main unit setting software

For **ELC500** Control unit

- Software for entering settings for data collection / storage, demand monitoring / control, email, etc. in **ELC500** Control unit

Configurator WD

IP address search software



- Tool to display IP addresses and versions, and change IP addresses

All software (On P.8 to P.9) can be downloaded for free from our website. System requirements can be also confirmed.

* Registry of customer information is required.

"Digital Signage"

EnerVisualizeR (EVR)

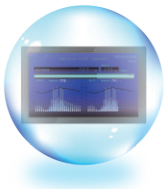
* There might be areas or countries this product cannot be supported. Please ask our local sales office for the availability.

LANGUAGE EN JP

Data collected by Programmable controller **FP7***, **FP0H*** and **ELC500 Control unit** can be transferred to **EnerVisualizeR** server!

* Model equipped with Ethernet port

Visualize



Digital Signage

The digital signage function of **EnerVisualizeR** promotes active participation of employees in energy-saving activities. It can also be used to show energy-saving activities conducted at the facility to visiting customers.

Share & Analyze

Compilation, Analysis and Sharing of Data

Data accumulated and compiled by **EnerVisualizeR** can be shared by multiple clients using Web service. Each user can conduct detailed analysis using the 1-sec. cycle view function. Users can also plot graphs and output data in a report form.

Monitor

Demand Monitoring

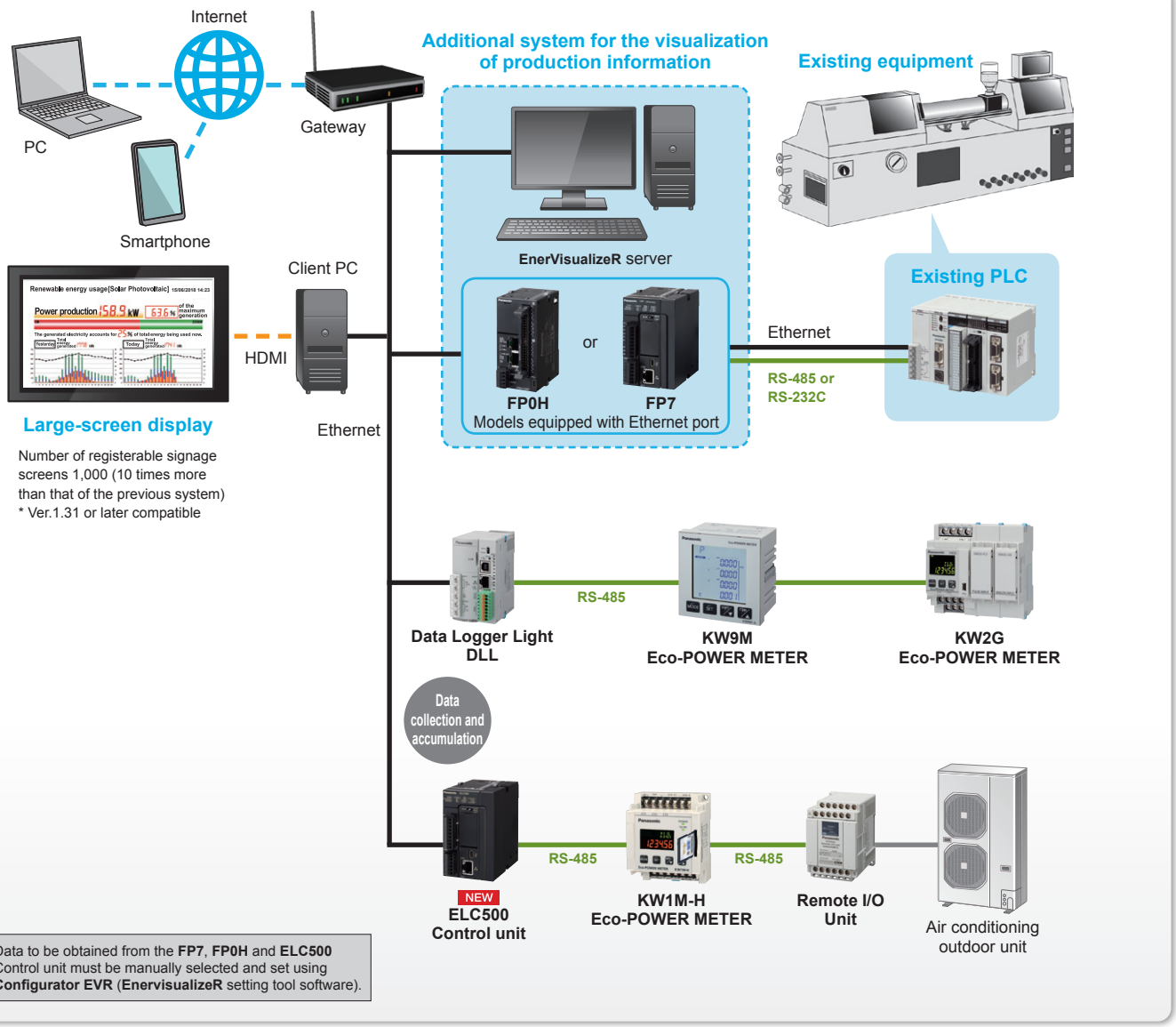
Predictive monitoring is conducted every minute to check the possibility of the demand exceeding the set value. If the demand is about to exceed the set level, a 3-stage alarm is generated. Information of the demand can be displayed on the digital signage. Past records, graphs and numerical data can be output as a hard copy for easy confirmation.

Organize

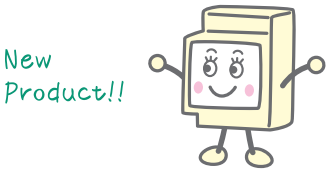
Document Form

Daily / weekly / monthly report can be automatically produced based on the data accumulated and Compiled By **EnerVisualizeR**. Since the document is output as a Microsoft® Excel® file, the user can change the layout easily.

* Documents are prepared based on the data collected by **EnerVisualizeR**. Regarding the data collection period and frequency, refer to the **EnerVisualizeR** User's Manual.



*Data to be obtained from the **FP7**, **FP0H** and **ELC500** Control unit must be manually selected and set using **Configurator EVR** (**EnerVisualizeR** setting tool software).



Order guide

Product name	Descriptions	Product type	Model No.
EnerVisualizeR	Software and 5-unit connection license*.	DVD and USB	**UEVRS101**
Real-time driver	Necessary for real-time monitoring, alarm monitoring, etc.	USB	**UEVRN001**
Additional license for 5 units	Necessary to add license of **FP7 / FP0H / DLL / ELC□** to connect to **EnerVisualizeR***		**UEVRL005**
Additional license for 20 units			**UEVRL020**
Additional license for 50 units			**UEVRL050**

* Units that can be connected to **EnerVisualizerR** are **FP7**, **FP0H**, **DLL** and **ELC□**.
Note:
1.This software is designed for the purpose of energy conservation and easy status checks, such as power in use.
The displayed data are not guaranteed as they may differ from the actual values due to malfunctions of the system including software, deviation of measurement start time, timing, etc.
2.This software is intended for independent energy saving management and cannot be used for billing purposes.

Required operating environment

We call PC to install this software as server environment, and PC to access web server as client environment.
Please use server environment for this software only and don't use with other software to avoid abnormal operation.

Server environment

Item	Operating environment
OS (required environment)	Windows® 7 Professional (64-bit) Windows® 8.1 Pro (64-bit) Windows® 10 Pro 1709 (64-bit)*1
CPU	Intel® Core™ i5 2-GHz or higher*2 Intel® Core™ i7 3-GHz or higher*3
Memory	8 GB or more*4, 16 GB or more*5
Hard disk	300 GB or more*2, 700 GB or more*3
USB port	2 or more ports available*6
Screen size	SXGA + (1,400 × 1,050) or higher
Java™	Java™ 1.7*7, Java™ 1.8*8
Browser	Google Chrome® Version: 62.0.3202.62 or higher Mozilla Firefox® Version: 56.0.1 or higher
Others	Microsoft® Excel® 2010, 2013 (used for report layout creation)

*1 The working is checked with Windows 10 Version 1709 by us. In versions other than Version 1709, it may not work properly, or the operation may become unstable.
*2 Logging device or Inst. device registrations are less than 4,000 points.
*3 Logging device or Inst. device registrations are 4,000 points or more.
*4 Logging device or Inst. device registrations are less than 2,000 points.
*5 Logging device or Inst. device registrations are 2,000 points or more.
*6 For installing USB license key and additional licenses.
*7 Java™ 1.7 is installed automatically installation when **EnerVisualizeR** Ver.1.20 or lower. **EnerVisualizeR** dose not operate normally under the condition other than Java™ 1.7.
*8 Java™ 1.8 is installed automatically installation when **EnerVisualizeR** Ver.1.30 or higher. **EnerVisualizeR** dose not operate normally under the condition other than Java™ 1.8.

Client environment

Item	Operating environment
OS (required environment)	Windows® 7 (32-bit / 64-bit) Windows® 8.1 (64-bit) Windows® 10 Pro 1709 (64-bit)*1
CPU	Intel® Core™ i5 2GHz or higher
Memory	2 GB
Screen size	SXGA + (1,400 × 1,050) or higher
Java™	Java™ 1.7*7, Java™ 1.8*8
Browser	Google Chrome® Version: 62.0.3202.62 or higher Mozilla Firefox® Version: 56.0.1 or higher
Others	Microsoft® Excel® 2010, 2013 (used for report layout creation)

Note:
• System
EnerVisualizeR is compatible with systems using **FP7** / **FP0H** / **DLL** / **ELC□** and "Eco-POWER METER".
• Number of registered devices
The operation (display) speed may change depending on the operating environment and registration contents.
• Download environment
As **EnerVisualizeR** uses FTP (File Transfer Protocol) commands to download files, be sure to use it on a network where FTP commands are enabled. Check with your system administrator to make sure that the network is FTP-enabled.

Note: Windows, Windows7, Windows8.1, Windows7 Professional, Windows8.1 Pro, Windows10 Pro, Windows10 and Excel are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries. Intel and Intel Core are trademarks of Intel Corporation or its subsidiaries in the U.S. and/or other countries. Java is a registered trademark of Oracle Corporation and its subsidiaries and affiliates in the United States and other countries. Google Chrome is a registered trademark of Google Inc. Mozilla Firefox is a registered trademark of the Mozilla Foundation in the United States and other countries.

Max. number of registrations

Item		Max.number of registrations
FP7 / FP0H / DLL / ELC□		100*1
Logging device		2,000*2, 10,000*3
Inst. device		2,000*4, 10,000*3
Device alarm		100*4
Cycle execution script		10*4
Digital signage screen		100, 1,000*3
Analysis view	Personal view	each user:100
	Published view	all users total:100
Report	Report	30
	Device	200
User		100
Alarm-mail recipient		100*4

*1 Additional license (option) is required.
*2 One second cycle view can be registered up to 100 points out of 2,000 points.
*3 Ver.1.30 or later.
*4 Real-time driver (option) is required.

Software comparison

	EnerVisualizeR	KW Watcher	KW View	KW Monitor
Digital signage	○	–	–	–
Data sharing through web service	○	–	–	–
Reports output	○	CSV only	–	–
Real-time display	○*1	–	–	○
Short-cycle graph	○ *One second cycle	–	–	–
FTP data collection	○	○	–	–
Alarm output	○	Electric power only	–	–
FP7 / FP0H / DLL / ELC□	○	○	–	–
Graph by department	○	○	–	–
Standalone	–	–	○ (SD memory card)	–

*1 Real-time driver (option) is required.

EcoLogiX ELC500 Control Unit

*Low Voltage Directive, EMC Directive

IoT-compatible energy controller for optimization of energy usage based on monitoring / control of power demand and visualization of production information

- High-speed demand forecast at 5-second intervals and advance demand forecast before the start of demand time span help reduce energy consumption and improve productivity.
- Ethernet port supports Modbus/TCP and allows simultaneous connection of up to 16 units. This allows for flexible connection to another system.
- Capable of collecting data from a maximum of 395 slave terminals (Ethernet port: 197, RS-485 port: 99 × 2).*1
- Using a Web server, the **ELC500** can remotely monitor electricity usage and production output and display data graphically.
- Supports demand time spans of 15-minute demand and 60-minute gas demand used in Japan for use in a diversity of energy-saving applications.*2
- Demand control function can also control air conditioners and lighting systems, thus contributing to the reduction of contract demand and power consumption.
- Programming function can be used to control air conditioner outdoor units based on CO_2 concentration, and supports protocols used in third-party watt meters.

NEW

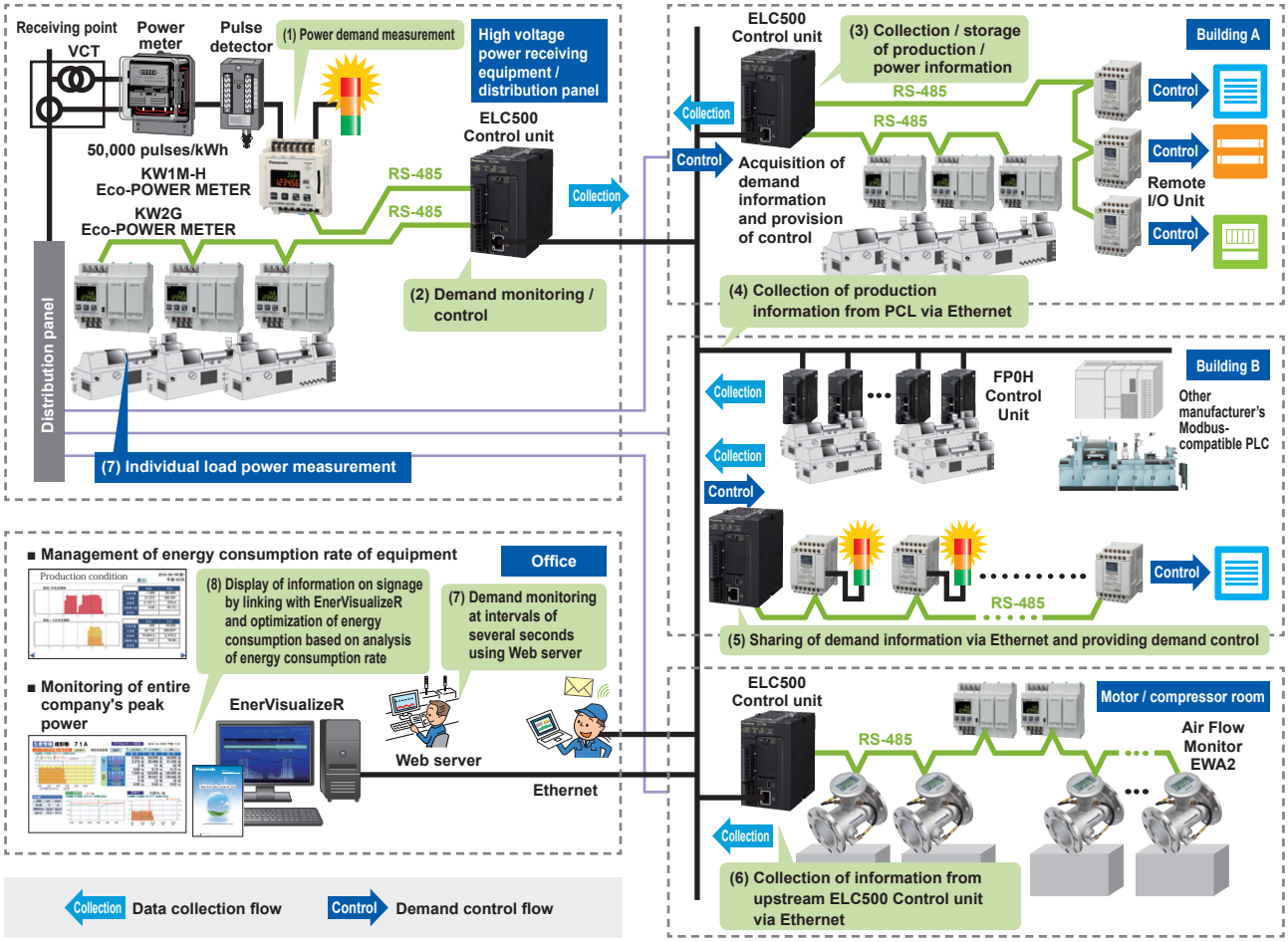
ELC500 Control unit: UELC500

*1 The number of slave terminals varies depending on usage conditions. For details, see the instruction manual for the **ELC500** Control unit.
*2 Demand time span varies from country to country.

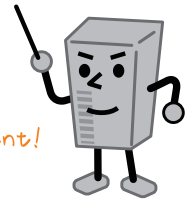
Example of system configuration – For power peak-cut and operation monitoring

(1) Measurement of power demand
(2) Demand monitoring at intervals of several seconds
(3) Collection and storage of production / power information
(4) Acquisition of production information from PLC and energy information collected by ELC500 Control unit through Ethernet
(5) Sharing of demand information via Ethernet and providing demand control
(6) Collection of information from ELC500 Control unit via Ethernet
(7) Demand monitoring* at intervals of several seconds using Web server
(8) Compilation, analysis and sharing of information by linking with EnerVisualizeR

* Screen must be created using **Control Web Creator**.



Single unit for both energy saving and productivity improvement!



Order guide

Product name	Descriptions	Model No.
ELC500 Control unit	Collection of measured data Peak power monitoring / control (Alarm-linked control, cyclic control, startup control), PLC function	**UELC500**
Configurator EL500[*1]	Main unit setting software	—
Control FPWIN Pro7[*2]	Programming tool	**AFPSPR7A**
Configurator WD[*1]	IP address search tool	—
Control Web Creator[*1]	Custom website creation software (Please purchase key unit separately.)	**AFPSWC**
Key unit	License key for **Control Web Creator**, 1 license, USB port connection	**AFPSWCKEY**
Backup battery (attached)	Required for holding the calendar timer function	**AFPX-BATT**
Power supply cable (attached)	Cable length 1 m 3.281 ft	**AFPG805**
FP7 end unit (attached)	For connecting the end	**AFP7END**

*1 Can be downloaded free from the Panasonic website (member registration is required).
*2 Before programming, download the project file from our website and use the project to program.

Main unit specifications

Item	Specification
Rated operating voltage	24 V DC
Current consumption	300 mA or less[*1]
Ambient temperature	0 to +55 °C +32 to +131 °F
Ambient humidity	10 to 95 % RH (at +25 °C +77 °F, no dew condensation allowed)
Serial communication	Ethernet: 1 port, RS-232C: 1 port, RS-485 and RS-422: 2 ports
Compatible regulations	Low Voltage Directive, EMC Directive, RoHS Directive

*1 Regarding system consumption current, see the User's Manual for **ELC500** Control unit.

External memory specifications

Item	Specification
Supported media	SD memory card
Compatible format	Compatible with SD / SDHC standards (FAT16 and FAT32 only)
Capacity	2 to 32 GB
Speed class	Class 2 to Class 10

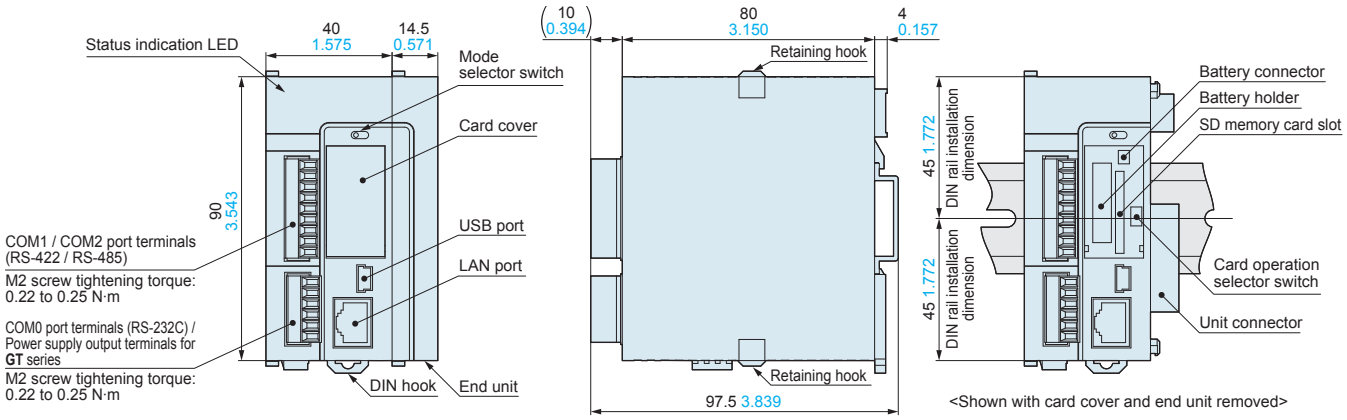
*1 If a (momentary) power outage occurs during writing, data can become corrupted. Use of UPS (Uninterruptible Power Supply) is recommended.
*2 Use of Panasonic's industrial SD memory card (SLC memory card) is recommended. For the handling of SD memory card, see the User's Manual for **ELC500** Control unit.

Main specifications

Item	Specification
Communication (Downstream communication)	• Ethernet: 1 port [supported protocols: MEWTOCOL-COM, Modbus TCP; number of nodes: 197 units; number of simultaneous connections: 20] • RS-232C: 1 port [supported protocols: MEWTOCOL-COM, Modbus RTU, general-purpose communication] • RS-485 and RS-422: 2 ports [supported protocols: MEWTOCOL-COM, Modbus RTU, PLC link[*1], general-purpose communication]
Data collection (logging) function	• Stored data: Instantaneous values, differential values • Data storage location, storage format: SD / SDHC memory card, CSV file format • Maximum number of registerable points: 512 points/16 files (Up to 16 files can be registered. Up to 128 points can be registered in 1 file.) • Number of storable files: 100 files
Demand monitoring function	• Demand type: Constant-cycle (15 / 30 / 60 min) demand; demand cycle: 5 sec (high speed)/min, IEC demand[*2] (demand / interval time span: 1 to 60 min) • Total number of demand monitoring target units: 50 units • Number of registerable I/O control devices / control patterns: 16 points / alarm-linked control, startup control, cyclic control (ON/OFF control for all)[*3]
Network function	• Communication protocols: TCP/IP, UDP/IP • Application protocols: SMTP (SMTP AUTH supported), FTP (client / server), SNTP, DHCP, DNS, HTTP (server)
Email transmission function	• Number of registerable points: 16 points • Subject title: 64 half-width characters (32 full-width characters), Message: 256 half-width characters (128 full-width characters)
Others	• Web server function: Custom Web region, 8 MB (**Control Web Creator** is required), number of simultaneous sessions: 16 • Extension function: Addition of **FP7** (PLC) units enables acquisition of information such as I/O signals, analog data and temperature data. Maximum of 8 units[*4] • Program function: 32-k steps Programming is possible when **Control FPWIN Pro7** is used.

*1 PLC link supported COM1 port only
*2 Demand in compliance with IEC 61557-12, "Performance measuring and monitoring devices (PMD)"
*3 Use **ECOnect** series remote I/O units (**UENU2D4R12**).
*4 The number of connectable units is limited. For details, refer to the **ELC500** Control unit specifications or manual.
Note: Modbus protocol is a communication protocol developed by Modicon Inc. for use with programmable logic controllers (PLCs).
* Ethernet is a registered trademark of Fuji Xerox Co., Ltd. and Xerox Corporation.

Dimensions (Unit : mm in)



Air Conditioning Control

EcoLogiX ELC1 Control Unit

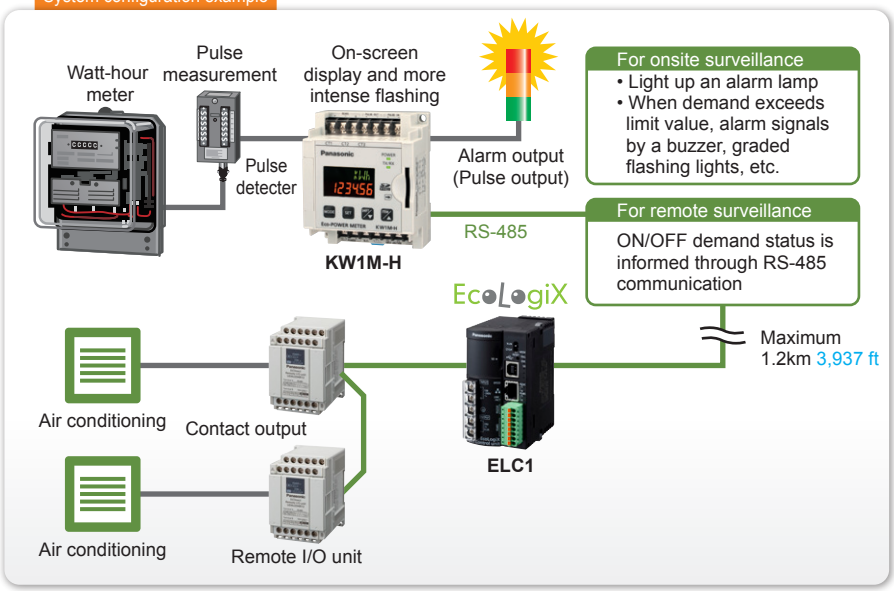
*Contact your nearest sales office regarding availability.

Reduction of waste electricity through control of air conditioning

- Simple setting is possible by just inputting the control pattern into the setting tool software
- Peak power monitoring and control based on electricity usage sum is possible
- Simple expansion of the system is possible through RS-485 communication

ELC1 Control unit: UELC1000

System configuration example



ECOnect

UENU2D4R12

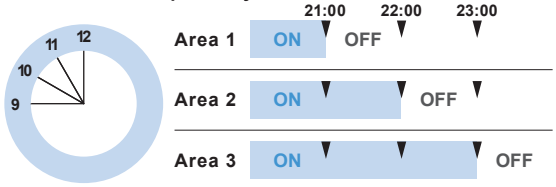
Control Scheme EcoLogiX

Cyclic Control

Cut total power usage while keeping comfort by controlling grouped load in rotation.

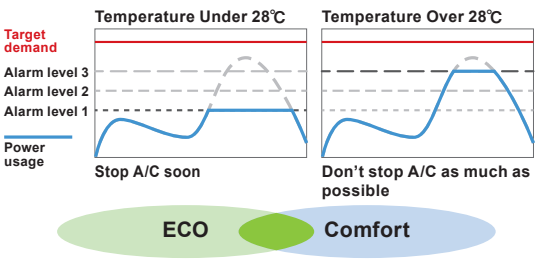
Scheduled Control

Cut total power usage by setting time to turn down power by area.



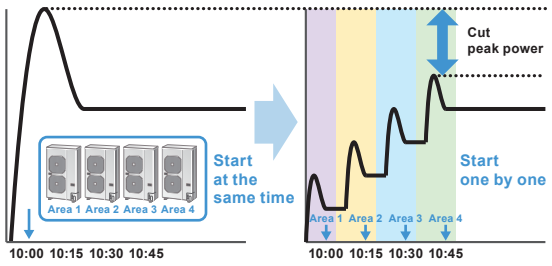
Demand Alarm Control

Environmental parameter allows to take balance of energy saving and comfort.



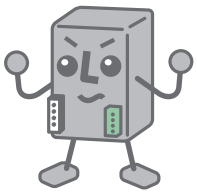
Start Control

Cut peak power by shifting start time for each group.



* Please use demand value and alarm status calculated by **ELC1** for your reference. Please refer to operation manual for detail.

Power reduction with energy-saving control!



Order guide

Product name	Descriptions	Model No.
ELC1 Control unit	Measurement data collection, peak power monitoring / control (warning interlocking control, cyclic control, start control)	**UELC1000**
Remote I/O unit	Operation power source voltage: 100-240 V AC, Input output points: 2 Input points / 4 Relay output points, Communication specifications: RS-485〔MEWTOCOL / Modbus RTU〕	**UENU2D4R12**
Battery for **FPΣ** (included in **ELC1**)	For internal memory backup and clock functionality	**AFPG804**
Configurator EL*1	Control unit **ELC1** Setting tool software (version 2.0 or later)	-
Configurator WD*1	IP address search tool (version 1.62 or higher)	-

*1 Softwares can be downloaded for free from our website. (Registry of customer information is reguired.)

Specifications

Use safely and correctly after carefully reading the product specification manual, user manual, and operational instruction manual.

General specifications

Item	Specification
Rated operation voltage	100-240 V AC
Allowable operation voltage range	85-264 V AC (85 to 110 % of rated operation voltage)
Rated frequency	50/60 Hz
Allowable momentary power-off time	10 ms or less
Rated output voltage (service power source)	24 V DC
Output voltage range	21.6-26.4 V DC
Rated output current	0.2 A *1
Inrush current	30 A or less
Ambient temperature	-10 to + 55 ℃ +14 to +131 °F
Storage temperature	-25 to + 70 ℃ -13 to +158 °F
Ambient humidity	30 to 85 % RH (at +25 ℃ +77 °F) non-condensing
Storage humidity	30 to 85 % RH (at +25 ℃ +77 °F) non-condensing
Operating condition	No corrosive gas or excessive dust
Current consumption	230 mA or less (100 V AC)
Main unit weight	200 g approx. (Excluding battery)

*1 If a current load over the specified level is continuously applied, the unit may break down. When a short circuit is detected, the whole power supply of control unit **ELC1** will be shut down.

Communication specifications <Ethernet communication>

Interface		IEEE802.3u, 100BASE-TX / 10BASE-T
Connector type		RJ45
Transmission specifications	Transmission speed	100Mbps / 10Mbps
	Transmission method	Base band
	Maximum segment length	100 m 328 ft
Communication cable		UTP (category 5)
Protocol		TCP/IP, UDP/IP
Functions		Auto-negotiation function MDI/MDI-X Auto-crossover function

Communication specifications <RS-232C and RS-485>

Interface		RS-232C	RS-485
Communication style		1:1 Communication	1:N Communication
Number of connected units		1 Unit	99 Units*1*2
Communication method		Half-duplex operation	
Synchronous system		Synchronous communication method	
Transmission distance		15 m 49 ft	Max. 1,200 m 3,937 ft*3
Transmission speed		4,800 / 9,600 / 19,200 / 38,400 / 57,600 / 115,200 bps	
Transmission format	Data length	7 bit / 8 bit*4	
	Parity	Odd / even / none	
	Stop bit	1 bit / 2 bit	
Protocol		MEWTOCOL / Modbus RTU	

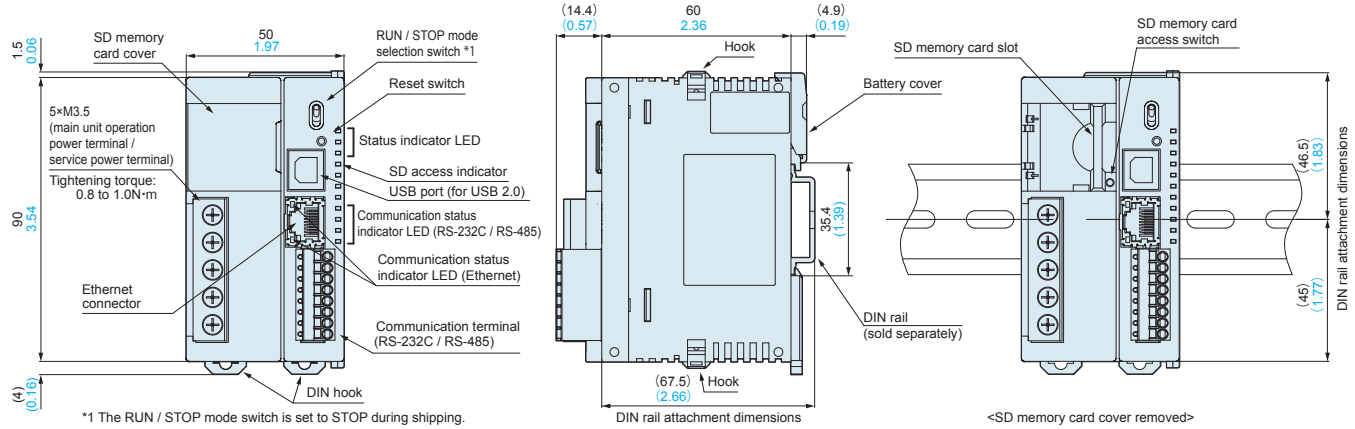
*1 When using a PC as a slave station, you are recommended to use SI-35 or SI-35USB of LINEEYE Co., Ltd. as an RS-485 interface.
*2 When using SI-35, SI-35USB, our Eco-POWER METER or our PLC(which can be connected up to 99 units), up to 99 units can be connected. In case using this system with other devices, up to 31 units can be connected.
*3 The transmission distance is limited by the transmission speed and the number of units connected. When the speed is 38,400 bps or lower, the maximum transmission distance is 1,200 m 3,937 ft, and the number of units is 99.
*4 With Modbus RTU protocol, it works only with 8-bit.

External memory specifications <SD memory card slot>

Support media*1	SD memory card
Supported format standard*2	SD / SDHC standard conformance
Capacity	2 GB to 32 GB
Speed class	Class 2 to Class 10

*1 Panasonic business-use SD memory card is recommended. UHS standard SDHC memory cards are not supported. Log data may not be written to the SD memory card if an SD memory card without operational confirmation is used.
*2 The use of UPS (Uninterruptible Power Supply) is recommended because data damage may occur in case of instant power failure during writing.
*3 Refer to the user manual regarding SD memory card handling.

Dimensions (Unit: mm in)



*1 The RUN / STOP mode switch is set to STOP during shipping.

DIN rail attachment dimensions

<SD memory card cover removed>

Data Logger Light (DLL)

CE*

*Low Voltage Directive, EMC Directive

Easier for everyone to make the electric power visualization

- Easy to install and set up all-in-one unit
  Featuring the USB port, SD / SDHC memory card slot, and universal AC power supply, **DLL** can be easily installed with a reduction in required wiring, enhancing the convenience and cost effectiveness.
- Dedicated software for setup of the **DLL** on a PC alone
- Equipped with both USB and Ethernet ports, to change settings
- Compatible with SD / SDHC memory cards (Class 10, up to 32 GB)
- Universal AC power supply and equipped with a 24 V DC, 0.2 A external service power supply
- Equipped with a built-in RS-232C / RS-485 interface

ALL IN ONE

Data Logger Light: AKL1000

System configuration example

Order guide

Product name	Descriptions	Model No.
Data Logger Light (DLL)	Number of registrable devices: 300 points Max. (Total of 300 points Max. for 16 files), Internal memory: 1 MB, SD / SDHC memory card: Max. 32 GB	**AKL1000**
Slim 30 type Mounting plate	Plate for perpendicularly installing the **Data Logger Light** (set for 10)	**AFP0811**
Flat type Mounting plate	Plate for installing **Data Logger Light** flush with the panel (set for 10)	**AFP0804**
Battery for FPΣ (included)	For internal memory backup function and clock function	**AFPG804**
Terminal screw driver	Using when wiring Phoenix terminal	**AFP0806**
Configurator DL[*1]	**Data Logger Light** setting software	–
Configurator WD[*1]	IP addresses search tool (Ver.1.50 or more)	–

*1 It can be downloaded from our website. (membership registration is required)

Specifications

Use safely and correctly after carefully reading the product specification manual, user manual, and operational instruction manual.

General specifications

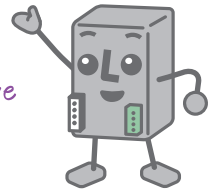
Item	Specifications
Rated operating voltage	100-240 V AC
Allowable operating voltage range	85-264 V AC (85 to 110 % of rated operating voltage)
Rated frequency	50/60 Hz
Allowable momentary power-off time	Max. 10 ms
Rated output voltage	24 V DC
Output voltage range	21.6-26.4 V DC
Rated output current	0.2 A[*1]
Ambient temperature	-10 to +55 ℃ +14 to +131 °F
Storage temperature	-25 to +70 ℃ -13 to +158 °F
Current consumption	Max. 230 mA (at 100 V AC)
Weight	200 g approx. (Excluding battery)

*1 If a current load over the specified level is continuously applied, the unit may break down. When a short circuit is detected, the whole power supply of **Data Logger Light** will be shut down.

External memory specifications <SD memory card slot>

Support media[*1]	SD / SDHC memory card
Supported format standards[*2]	SD / SDHC standard conformance
Capacity	2 to 32 GB
Speed class	Class 2 to Class 10

*1 Panasonic business-use SD memory card is recommended.
*2 The use of UPS (Uninterruptible Power Supply) is recommended because data damage may occur in case of instant power failure during writing.
*3 Refer to the user manual regarding SD memory card handling.



Specifications

Use safely and correctly after carefully reading the product specification manual, user manual, and operational instruction manual.

Function specifications

		Items	Specifications
Data accumulation	Accumulation data	Descriptions	Instantaneous, difference, average, minimum, and maximum values
		Data format (Valid for the register system)	16 bit integers (signed / unsigned), 32 bit integers (signed / unsigned), 64 bit integers (signed / unsigned), HEX (4 digits / 8 digits), Real number
		Number of registrable files	16
		Number of registrable devices*1	300 points / 1 file
	Data stored	Stored to*2	• Internal memory (SRAM): 1 MB • SD / SDHC memory cards: 2 to 32 GB
		File system	VFAT / FAT12 / FAT16 / FAT32
		Stored format	CSV file type
		Number of storable files	100
	Trigger	Trigger type	• Constant cycle (user-selectable from 1 second to 24 hours) • Contact status (leading edge, trailing edge, both edge differential, accumulated ON time, total switching times, ON status, OFF status) • Specified time (every minute, every hour, every day, every week, every month, every year, and specified time) • Register (=, >, <, ≠) • Trigger combinations (AND, OR)
		Number of registrable	128
E-mail sending function		Transmission network	Ethernet
		E-mail content	Title: Max.16 letters Body text: Max. 254 letters
		Number of registrable	64 (No attachment)
Network function		Communication protocol	TCP / IP, UDP / IP
		Application protocol	SMTP (Capable of POP / APOP authentication), FTP (client / server), SNTP, DHCP, DNS

* 1 The maximum total number of points for registrable devices is always 300, for 16 files.
* 2 The internal memory can store data using the backup battery.
Please note that data stored in the internal memory may be lost when the battery has been depleted.

Communication specifications

<Ethernet>

Interface		IEEE802.3U, 10BASE-T / 100BASE-TX
Connector type		RJ45
Transmission specifications	Transmission speed	10Mbps / 100Mbps
	Transmission method	Base band
	Max. segment length	100 m 328 ft
Communication cable		UTP (category 5)
Functions		Auto-negotiation function, MDI / MDI-X auto-crossover function

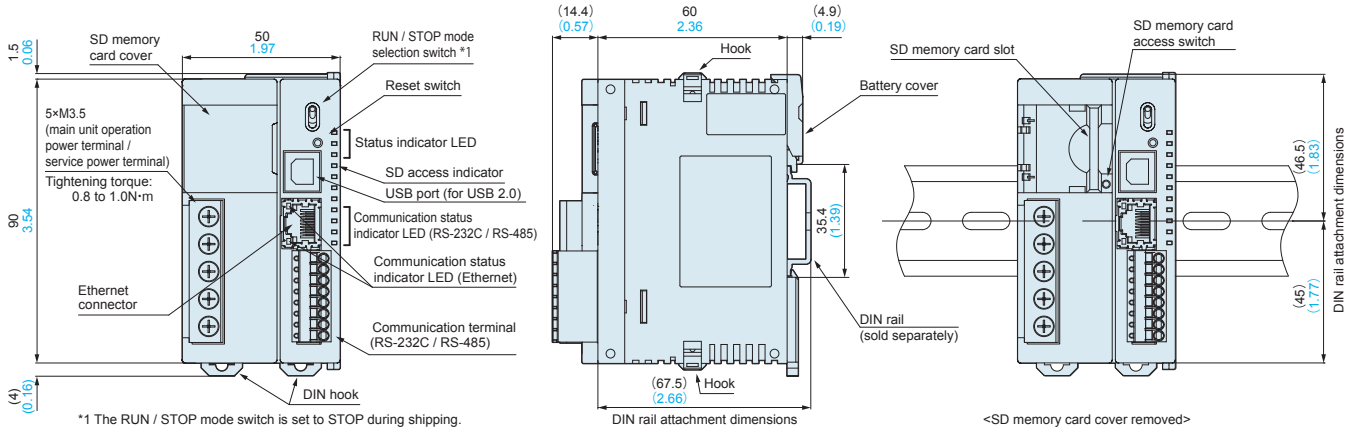
* Ethernet is a registered trademark of Fuji Xerox Co., Ltd. and Xerox Corporation.

<RS-232C and RS-485>

Interface		RS-232C (Not isolated from the internal circuit)	RS-485 (Isolated from the internal circuit)
Communication style		1:1 communication	1:N communication
Number of connected units		1 unit	99 units*1 *2
Communication method		Half-duplex	
Synchronous system		Synchronous communication method	
Transmission distance		15 m 49 ft	Max. 1,200 m 3,937 ft*3
Transmission speed		4,800 / 9,600 / 19,200 / 38,400 / 57,600 / 115,200 bps	
Transmission format	Stop bit	1-bits / 2-bits	
	Parity	Odd / Even / None	
	Data length	7-bits / 8-bits*4	
Protocol		MEWTOCOL / Modbus RTU	

*1 When using a PC as a slave station, you are recommended to use SI-35 or SI-35USB of LINEEYE Co., Ltd. as an RS-485 interface.
*2 When using SI-35, SI-35USB, our Eco-POWER METER or our PLC (which can be connected up to 99 units), up to 99 units can be connected. In case using this system with other devices, up to 31 units can be connected.
*3 The transmission distance is limited by the transmission speed and the number of units connected. When the speed is 38,400 bps or lower, the maximum transmission distance is 1,200 m 3,937 ft, and the number of units is 99.
*4 With Modbus RTU protocol, it works only with 8-bit.

Dimensions (Unit: mm in)



*1 The RUN / STOP mode switch is set to STOP during shipping.

DIN rail attachment dimensions

<SD memory card cover removed>

FP Web-Server & FP Web Expansion Unit

Worldwide communication

The **FP Web-Server** module connects all FP Series controllers to the Ethernet.
No changes to the PLC programs are necessary. Simply assign an IP address to the **FP Web-Server** and connect the PLC to the **FP Web-Server** via the serial RS-232 interface.

- Uses existing Intranet, saves wiring
- Uses standard browser, saves Scada software
- Remote control, Remote monitoring,Remote programming
- Alarm information via e-mail
- Data logging (with **FPWEBEXP**)

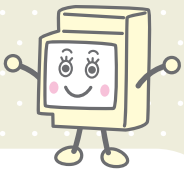
FPWEB2: FPWEBEXP

Order guide

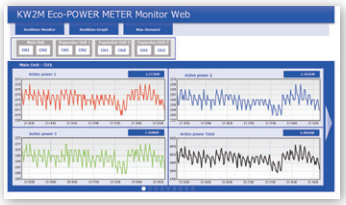
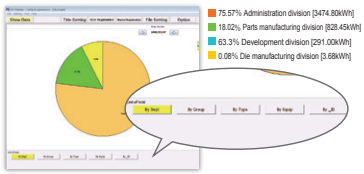
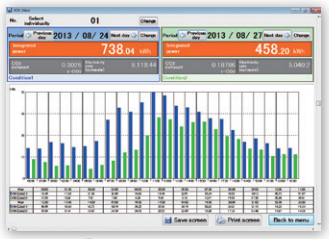
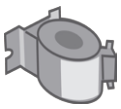
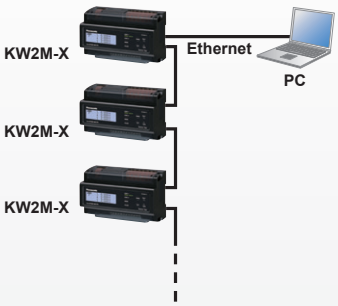
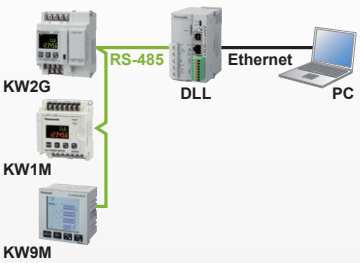
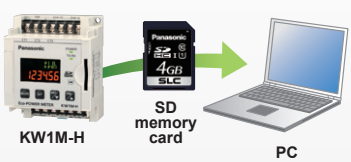
Product name	Descriptions	Model No.
FP Web-Server 2	**FB Web-Server 2** Ethernet unit with 10 / 100 MBit / s and modern interface.	**FPWEB2**
FP Web Expansion Unit	Can only be used with **FPWEB2** Version 1.1 or later.	**FPWEBEXP**

Eco-POWER METER enables “visualization”

of power consumption and helps to detect waste.
Visualization software for measured data analysis can be downloaded **for free** from our website.



Three ways to visualize power consumption

	Visualize data of Eco-POWER METER	Visualize data of data logger	Visualize data of SD memory card
Purposes	• For real time monitoring • For a few points measurement • Want to check data anytime on PC without going to the site.	• From some points to many points measurement • Want to check data anytime on PC without going to the site.	• For a few-point measurement • Want to collect data periodically by hand and no need of every 15 min data.
Visualization method	 *KW2M-X (AKW264100A) only For real time monitoring by **Web server functionality**	 For energy usage analysis by software **“KW Watcher”** *Also, Digital signage software, **EnerVisualizeR** is available for a charge.	 For easy and simple visualization by software **“KW View”**
Required devices	 • KW2M-X Eco-POWER METER +  ・General-purpose Current transformer (CT)	 • Eco-POWER METER +  • ELC□ / Data Logger Lite (DLL) +  ・Dedicated Current transformer (CT)	 • SD card type Eco-POWER METER +  • Current transformer (CT) +  • SD memory card
Wiring works			

Note: Panasonic business-use SD memory card is recommended.

STEP 1 Choose Eco-POWER METER

Visualize data of Eco-POWER METER

KW2M-X

Visualize data of SD memory card

KW2G-H

KW1M-H

Visualize data of data logger

KW1M

KW2G

KW4M

KW7M

KW8M

KW9M

KW2M-A

Please refer to the next page for performance comparison.

STEP 2 Check required CT quantity

		Main purpose	Required CT
1P2W	L1, L2	For light / outlet	
1P3W	R, N, T	For light / home	
3P3W	R, S, T	For production	
3P4W	R, S, T, N	For production / light	

Note 1: Dedicated current transformer (CT) cannot be used with **AKW8115** , **KW9M** and **KW2M**
Note 2: For the **AKW8115**, **KW9M** and **KW2M**,CT with a secondary side current 1 A or 5 A is recommended.
Please confirm the specification beforehand.

STEP 3 Choose CT from 5A to 600A type

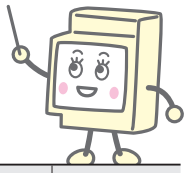
Please check beforehand that the thickness of the electric wire is smaller than the through hole of the CT.
(ø10 to 36 mm ø0.39 to 1.42 in) (Please refer to P.38.)

Eco-POWER METER performance comparis

		Main unit		Expansion unit			KW9M		Main unit	
		KW2M-A	KW2M-X	KW2M			Standard type	Advanced type	KW2G	KW2G-H
		Standard type	Memory type	Power measurement	Multi analog input	Digital I/O			Standard type	SD card type
Appearance		 DIN	 DIN	 DIN	 DIN	 DIN	 PANEL mounting	 PANEL mounting	 DIN	 DIN
Model No.		AKW263100A	AKW264100A	AKW272100A	AKW273230A	AKW274240A	AKW91110	AKW92112	AKW2010GB	AKW2020GB
Dimensions (mm in) (W × H × D)		140 × 85 × 65 5.51 × 3.35 × 2.56		70 × 85 × 65 2.76 × 3.35 × 2.56			96 × 96 × 68 3.78 × 3.78 × 2.68 (including terminal base)		50 × 95 × 65 1.97 × 3.74 × 2.56	
Mounting method*1		DIN rail					Panel mounting		DIN rail	
Operating power supply		100-240 V AC					100-240 V AC 100-300 V DC		100-240 V AC	
Input measured voltage (Select with setting mode)		0-690 V AC *When UL standard is supported, 0-300 V AC					0-500 V AC *When UL standard is supported, 0-300 V AC		100 / 200 V AC system	
Phase and wire system	Single-phase two-wire system	○		○	–	–	○	○	○	○
	Single-phase three-wire system	○		○	–	–	○	○	○	○
	Three-phase three-wire system	○		○	–	–	○	○	○	○
	Three-phase four-wire system	○		○	–	–	○	○	–	–
Load measurement for 400 V AC system*2		Transformer not required. Direct input possible			–	–	Transformer not required. Direct input possible		External voltage transformer (VT) required.	
Current transformer (CT)		General-purpose current transformer*3 (1 A or 5 A CT)			–	–	General-purpose current transformer*3 (1 A or 5 A CT)		Dedicated type: 5 A, 50 A, 100 A, 250 A, 400 A and 600 A	
Measurement items	Integrated electric power	○	○	○	–	–	○	○	○ (Active)	
	Integrated electric energy	○	○	○	–	–	○	○	○ (Active, Reactive, Apparent, Regenerative)	
	Current	○	○	○	–	–	○	○	○ (R, N/S, and T)	
	Voltage	○	○	○	–	–	○	○	○ (RS, RT, and TS)	
	Electricity charge*4	○	○	○	–		○	○	○	○
	Conversion carbon dioxide value	○	○	○			–	–	○	○
	Power factor	○	○	○			○	○	○	○
	Frequency	○	○	○			○	○	○	○
	Hour meter	○	○	○	–	–	–	–	○	○
	Pulse count value	○	○	–	–	○*6	–	○	○	○
	Simultaneous power and pulse measurement	○	○	–	–	–	–	○	○	○
	Demand*7	○	○	○	–	–	○	○	–	–
	Electric power quality	○*9	○*9	○*9	–	–	○ THD only	○*9	–	–
Communication	RS-485 Communication protocol*10	MEWTOCOL, Modbus RTU switchover		–			MEWTOCOL, Modbus RTU, DL / T645-2007 switchover		MEWTOCOL, Modbus RTU switchover	
	RS-485 Number of connected units	Up to 99 units		–			Up to 99 units		Up to 99 units	
	Ethernet Port number	2 ports					–	–	–	–
	Ethernet Protocol(DNS. DHCP)	TCP / IP , UDP / IP					–	–	–	–
Temperature measurement		–		–	RTD input : 2 points	–	○	○	–	–
Number of pulse input point*11		1 point		–	–	2 points	–	2 points	1 point	1 point
Number of pulse output point		2 points		–	–	4 points	–	2 points	1 point	1 point
Number of analog input point		–	–	–	3 points*12		–	–	–	–
Excess alarm output	Instantaneous active electric power	○	○	–	–	○	–	○	○	○
	Current value	○	○	–	–	○	–	○	○	○
	Stand-by electric power	○	○	–	–	○	–	○	○	○
	Preset value	○	○	–	–	○	–	○	○	○
	Demand	○	○	–	–	○	–	○	–	–
Memory		–	Internal memory	–	–	–	–	Internal memory	–	Internal / External memory
Calendar timer		–	○	–	–	–	–	○	–	○
Web server		○*13	○	–	–	–	–	–	–	–
Tool and software	**KW Monitor**	–	–	–	–	–	–	–	○	○
	KW Watcher	○	○	○	○	○	○	○	○	○
	KW View	–	–	–	–	–	–	–	–	○
Standard		CE,cTUVus*14 ,KC			CE,cTUVus*14		CE,cTUVus,KC		CE,S-MARK,KC	CE,KC

*1 DIN rail, mounting frame, and terminal socket are sold separately.
*2 VT (secondary side rated value 110 V) is necessary for load measurement which exceeds the rated input voltage.
*3 **KW2M**, **KW9M**: Primary side 65,535 A or less. **AKW8115**: Primary side 4,000 A or less.
*4 The Eco-POWER METERs are for self-managed energy-savings and cannot be used for billing purposes.
*5 Hour meter function can be used only with main unit and one expansion unit. **AKW2152G** can measure maintenance time only.
*6 Displayed at the main unit

Select as required!



	Expansion unit				KW1M Standard type		KW1M-H SD card type	KW4M DIN□48		KW7M DIN rail	KW8M DIN48×96
	KW2G / KW2G-H										1 A / 5 A CT input type
	Power measurement	Power measurement and Pulse output	Pulse input	Analog input				MEWTOCOL type	Modbus type		
	 DIN	 DIN	 DIN	 DIN	 DIN Screw PANEL mounting		 DIN Screw PANEL mounting	 DIN Screw PANEL mounting		 DIN	 PANEL mounting
	AKW2110GB	AKW2160GB	AKW2152G	AKW2182G	AKW1110B	AKW1111B	AKW1121B	AKW5111 AKW5211	AKW5112 AKW5212	AKW7111B	AKW8115
	25 × 95 × 65 0.98 × 3.74 × 2.56				75 × 90 × 50 2.95 × 3.54 × 1.97			Screw terminal type: 48 × 48 × 81.9 1.89 × 1.89 × 3.22 11-pin type: 48 × 48 × 87.5 1.89 × 1.89 × 3.44		22.5 × 75 × 100 0.89 × 2.95 × 3.94	48 × 96 × 98.5 1.89 × 3.78 × 3.88
	DIN rail				DIN rail, Screw, Panel mounting(mounting frame is required)			DIN rail, Panel mounting (option parts are required for each method)		DIN rail	Panel mounting
	100-240 V AC				100-240 V AC						
	100 / 200 V AC system		–	–	100 / 200 V AC system	100 / 200 / 400 V AC system		100 / 200 V AC system			100 / 200 / 400 V AC system
	○	○	–	–	○	○	○	○		○	○
	○	○	–	–	○	○	○	○		○	○
	○	○	–	–	○	○	○	○		○	○
	–	–	–	–	–	○	○	–		–	○
	External voltage transformer (VT) required.		–	–	External voltage transformer (VT) required.	Transformer not required Direct input possible		External voltage transformer (VT) required.			Transformer not required Direct input possible
	Dedicated type: 5 A, 50 A, 100 A, 250 A, 400 A and 600 A		–	–	Dedicated type: 5 A, 50 A, 100 A, 250 A, 400 A and 600 A			Dedicated type: 5 A, 50 A, 100 A, 250 A and 400 A			General-purpose current transformer*3 (1 A or 5 A CT)
			–	–							
	○ (Active)		–	–	○ (Active)	○ (Active)	○ (Active)	○ (Active)	○ (Active)	○ (Active)	○ (Active, Reactive, Apparent)
	○ (Active, Reactive, Apparent, Regenerative)		–	–	○ (Active)	○ (Active)	○ (Active)	○ (Active)	○ (Active)	○ (Active)	○ (Active, Reactive, Apparent)
	○ (R, N/S, and T)		–	–	○ (R and T)	○ (R, S, and T)	○ (R, S, and T)	○ (CT1 and CT2)	○ (CT1 and CT2)	○ (CT1 and CT2)	○ (CT1, CT2 and CT3)
	○ (RS, RT, and TS)		–	–	○ (R and T)	○ (R, S, and T)	○ (RS, RT, and TS)	○ (between 1 and 2, between 2 and 3)	○ (between 1 and 2, between 2 and 3)	○ (between 1 and 2, between 2 and 3)	○ (between P1 and P0, between P2 and P0, between P3 and P0)
	Displayed on the main unit		–	–	○	○	○	○	○	○	○
			–	–	○	○	○	○	○	–	–
			–	–	–	○	○	–	–	–	○
			–	–	–	○	○	–	–	–	○
	○*5	○*5	○*5	–	○	○	○	○	○	–	○
	–	–	○*6	–	–	○	○	○	○	–	○
	–	–	–	–	–	○	○	–	–	–	○
	–	–	–	–	–	–	○*8	–	–	–	–
	–	–	–	–	–	–	–	–	–	–	–
	–				MEWTOCOL, Modbus RTU switchover			MEWTOCOL	Modbus RTU	MEWTOCOL, Modbus RTU switchover	
	–				Up to 99 units						
	–	–	–	–	–	–	–	–	–	–	–
	–	–	–	–	–	–	–	–	–	–	–
	–	–	–	–	–	–	–	–	–	–	–
	–	–	2 points	–	–	1 point	1 point	1 point	1 point	–	1 point
	–	1 point	–	–	1 point	1 point	1 point	1 point	1 point	1 point	1 point
	–	–	–	2 points*15	–	–	–	–	–	–	–
	–	○	–	–	○	○	○	○	○	○	○
	–	○	–	–	○	○	○	–	–	–	○
	–	○	–	–	–	○	○	–	–	–	○
	–	–	–	–	–	○	○	○	○	–	○
	–	–	–	–	–	–	○	–	–	–	–
	–	–	–	–	–	–	Internal / External memory	–	–	–	–
	–	–	–	–	–	–	○	–	–	–	–
	–	–	–	–	–	–	–	–	–	–	–
	○	○	○	○	○	○	○	○	–	○	○
	○	○	○	○	○	○	○	○	–	○	○
	○ When connected to **AKW2020GB**				–	–	○	–	–	–	–
	CE,S-MARK,KC	CE,KC	CE,S-MARK,KC		CE,KC			CE,UL,S-MARK,KC		CE,KC	CE,S-MARK,KC

*7 Simplified demand management in the case of power measurement using CT.
AKW91110 supports IEC demand only.
*8 IEC demand cannot be used. 30 minutes fixed demand only.
*9 Higher harmonic wave, unbalance degree measurement, etc. Please refer to the product manual for details.
*10 Switchover possible using setting mode. Refer to the communication specifications regarding restrictions.
*11 Input method is contact / non-voltage contact (Open collector)
*12 Input range of the analog input unit is selected using setting mode Voltage: 0 to 60 V
Current: 0 to 20 mA / 4 to 20 mA
*13 Only for operational setting
*14 UL61010-1:2012, CAN/CSA-C22.2 2 No.61010-1-12
*15 Select with setting mode. Voltage: 0-5V / 1-5V. Current: 0-20 mA / 4-20 mA

KW2M SERIES Eco-POWER METER

*1 Low Voltage Directive, EMC Directive
*2 Excluding **AKW273230A** and **AKW274240A**

Expansion units and two Ethernet ports allow you to optimize your energy consumption

e.xtreme

Main unit — Standard type: **AKW263100A**

Memory type: **AKW264100A**

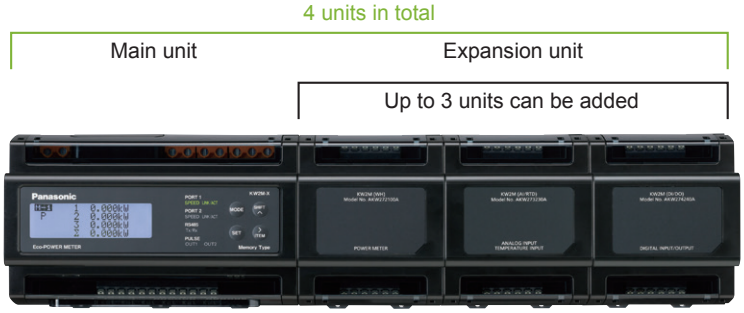
Expansion unit — Power measurement: **AKW272100A**

Multi analog input: **AKW273230A**

Digital I/O: **AKW274240A**

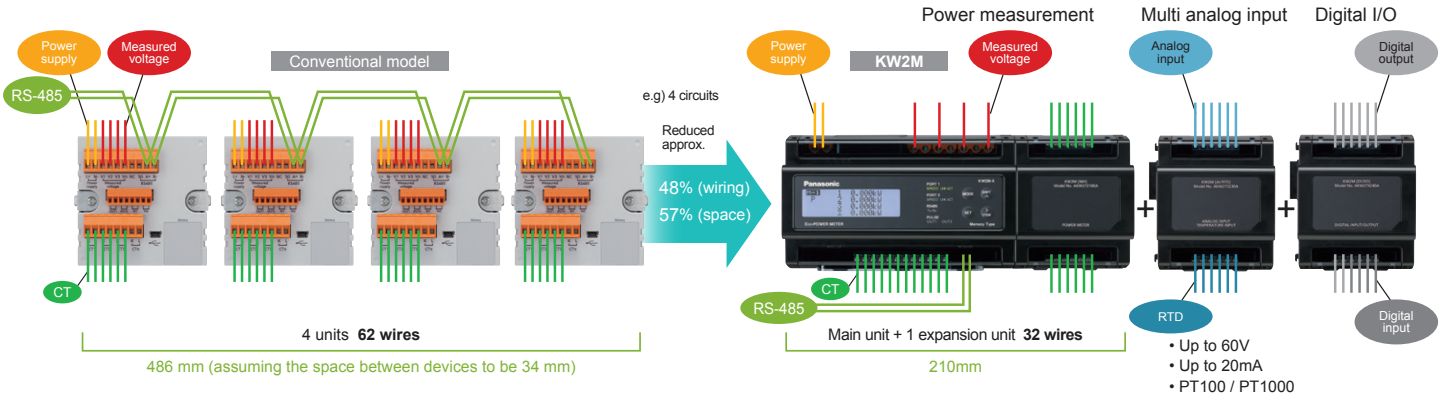
One unit can measure two circuits. Up to three expansion units may be connected for the required number of circuits.

Up to 8 circuits (three-phase four-wire), or up to 24 circuits (single-phase two-wire)



Wire-saving and space-saving

- **Two-circuit measurement**
  One unit can measure two circuits
- **Expandable**
  Up to three expansion units can be connected
- **Fast and easy wiring**
  Push-in connectors (Ø2.6mm single-core cables)
- **Connectable to various sensors as well as electric power**
  Not only power, but monitoring of various parameters is possible.
  Analog input (3CH), RTD (2CH), digital input (2CH), digital output (4CH)
- **Electric Power quality monitoring**
  Harmonics and unbalance measurement

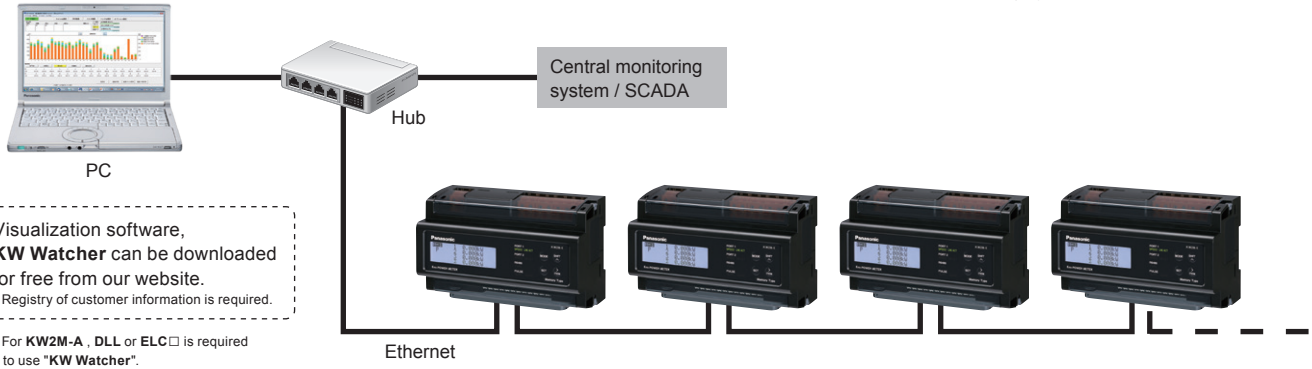


Internal memory(**KW2M-X**) e.xtreme

- Measured data can be saved in CSV files and visualized by **KW Watcher.**

Ethernet communication

- Equipped with two Ethernet communication ports, so devices can be daisy chained without adding a HUB.
- Connectable to both **KW Watcher** and Central monitoring system / SCADA at the same time.



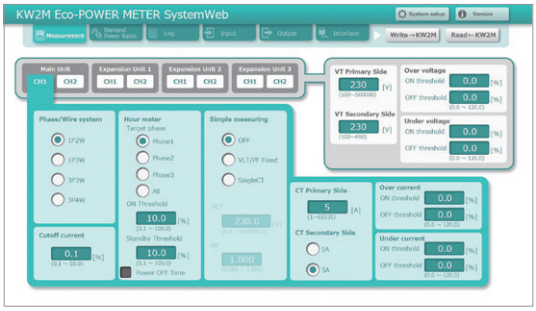
Visualization software, **KW Watcher** can be downloaded for free from our website.
* Registry of customer information is required.

* For **KW2M-A** , **DLL** or **ELC**☐ is required to use "**KW Watcher**".

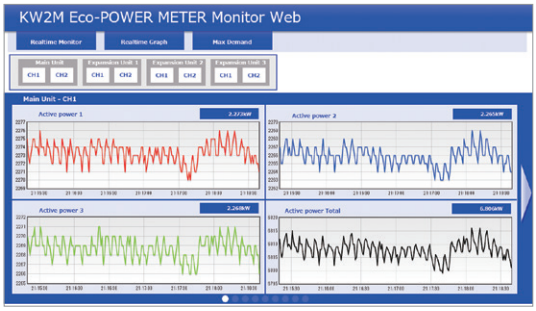
Web server functionality

Operational settings on the PC via Ethernet cable. Also real time monitoring is possible with **KW2M-X**.

Operational setting



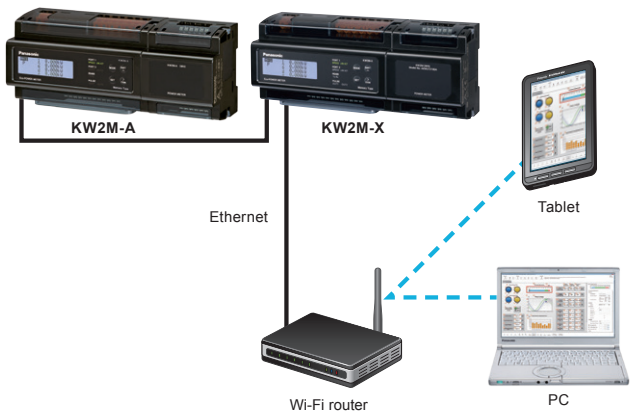
Real-time monitoring (**KW2M-X** only) e.xtreme



Web Creator (**KW2M-X**) e.xtreme

By uploading user-defined screens (content) with **Control Web Creator** to the web server integrated in the **KW2M-X**, users can monitor the information in a browser.

* The data of **KW2M-A** can be also displayed when connected to **KW2M-X** via Ethernet.

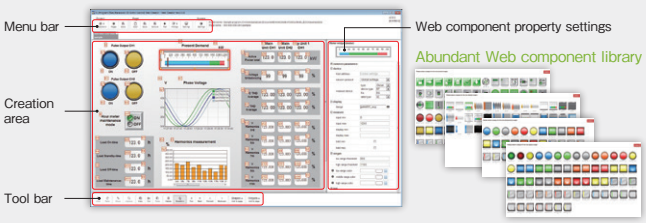


* Wi-Fi is a registered trademark of Wi-Fi Alliance.
* Please provide commercially available products.

[Control Web Creator]

You, too, are a Web content creator

This is a graphics creation tool that allows you to easily design Web content that is published by the **KW2M-X**. You can creatively design content by arranging Web components such as switches, lamps and meters on the screen and then setting the properties. You can link your content to information in the **KW2M-X** without any knowledge of HTML.



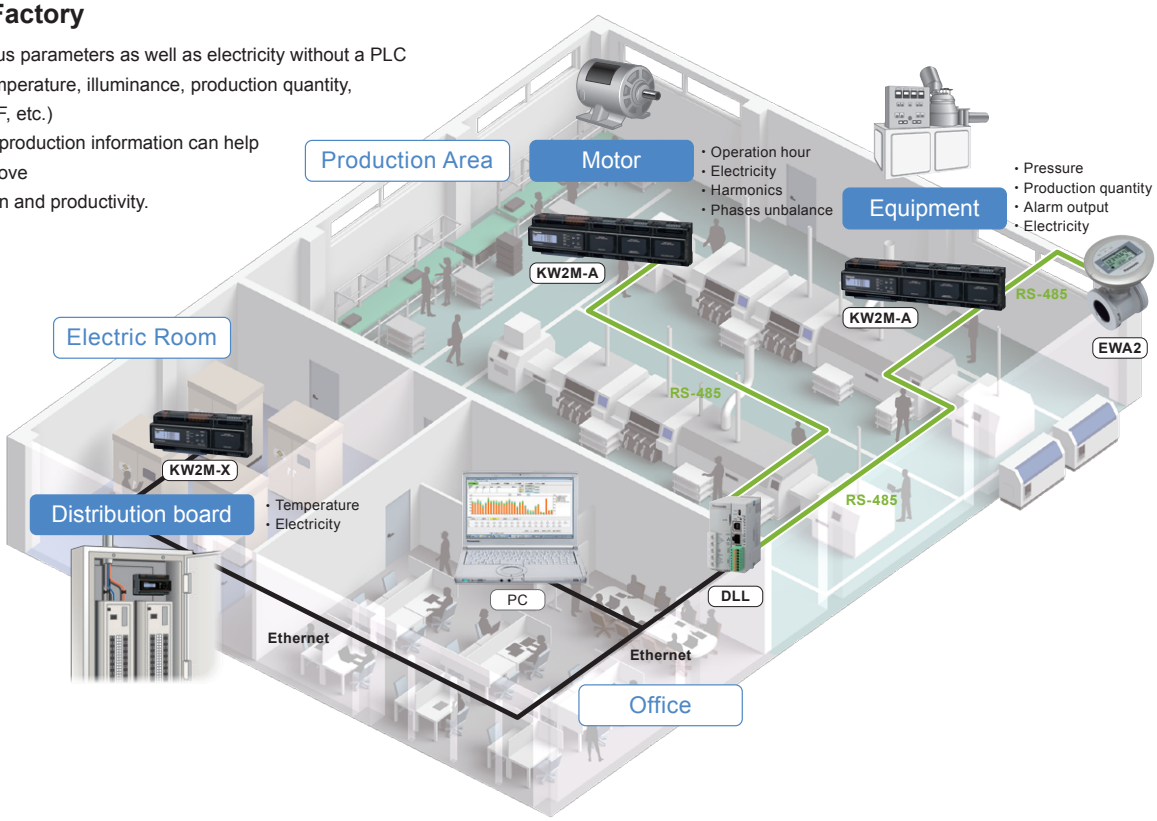
- Same style of operation as the program display image creation tool
- Components can be arranged by dragging and dropping.
- Detailed component settings are easy using properties.
- Components can be resized without reduction in quality.
- Images can be pasted in.

Note: A key unit (sold separately) is required to use **Control Web Creator**.

Power Monitoring

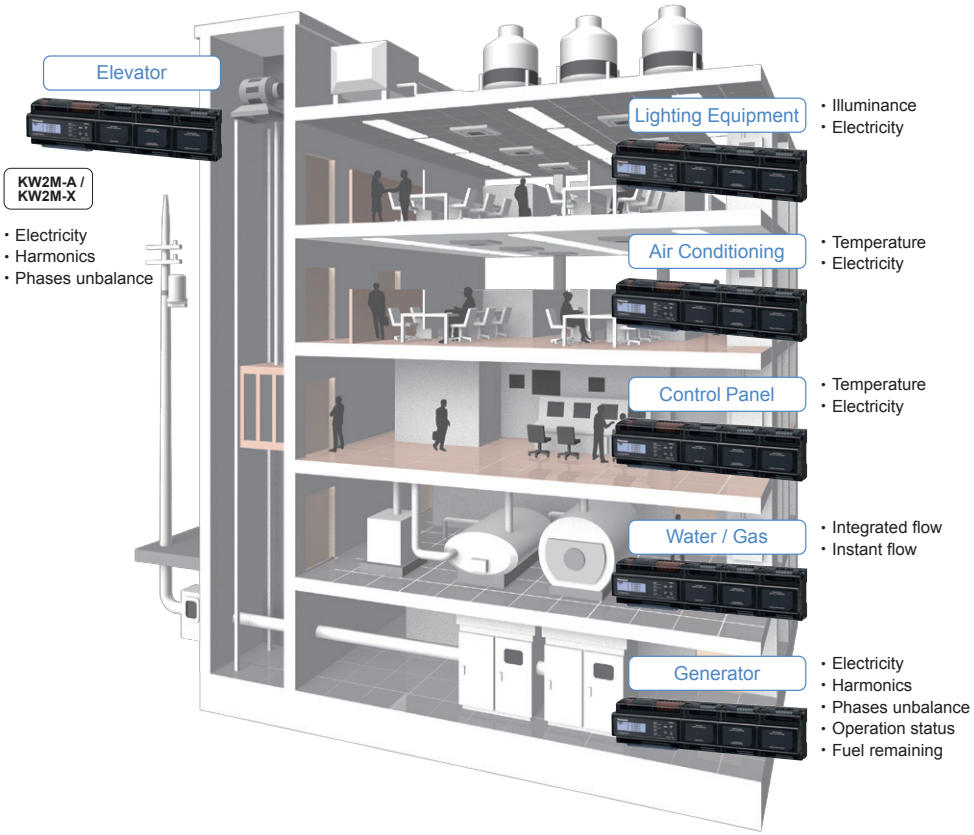
Application Factory

KW2M can collect various parameters as well as electricity without a PLC (Air, water, pressure, temperature, illuminance, production quantity, operation status ON/OFF, etc.)
This environmental and production information can help you to analyze and improve your energy consumption and productivity.



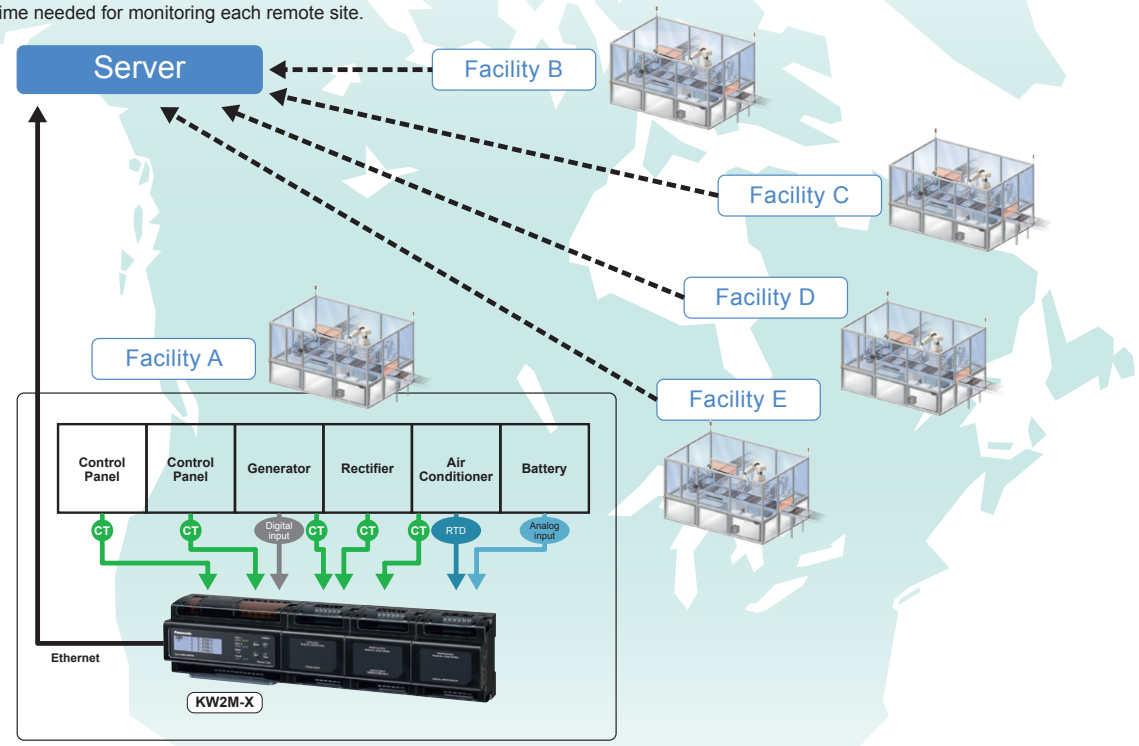
Application Building / Commercial complex

In building / commercial complexes, **KW2M** helps to maintain the comfort and early detection of abnormalities by monitoring variations of energy consumption and temperature on each floor or for equipment.



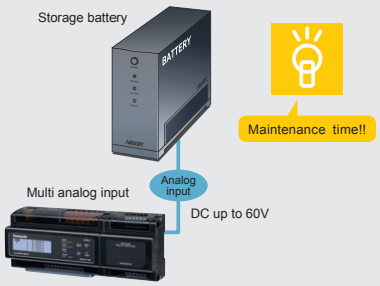
Application Remote network monitoring

Thanks to Ethernet communication functionality, the server can collect remote data through the **KW2M**.
This reduces the cost and time needed for monitoring each remote site.



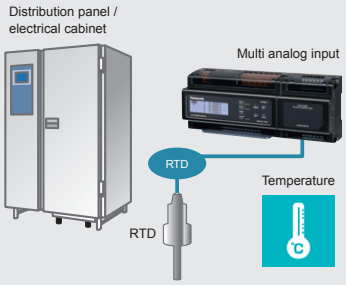
Predictive maintenance of storage battery
(Multi analog input unit)

Measure the DC voltage to get information about when the battery is deteriorated and needs to be replaced. This helps with maintenance planning.



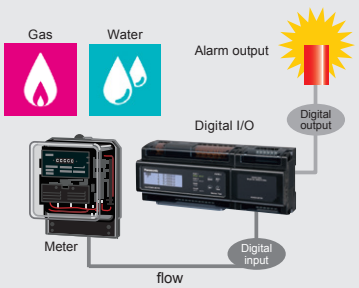
Predictive maintenance of panel
(Multi analog input unit)

By measuring the temperature inside electrical cabinet at the transformer, you can easily determine when it is time for maintenance.



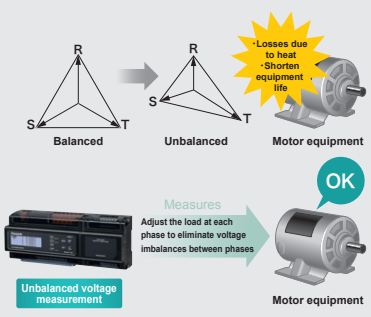
Alarm output
(Digital I/O unit)

Integrated flow data monitoring is possible using the digital I/O unit. You can also output the alarm when an error occurs.



Measurement of interphase unbalance
(Power measurement unit)

If there is an unbalanced load due to a V-connected transformer or a heater, a voltage imbalance occurs between phases, and the motor torque becomes insufficient, causing a rise in heat or a reduction in product life.



Power Monitoring

Order guide

Product name			Phase and wire system	Operating power supply	Input measured voltage	Applicable current transformer *1	Model No.
KW2M-A / KW2M-X Eco-POWER METER	Main unit	**KW2M-A** (Standard type)	Single-phase two-wire system Single-phase three-wire system Three-phase three-wire system Three-phase four-wire system	100-240 V AC 50/60 Hz	0-690 V AC When UL standard is supported, 0-300 V AC	CT with secondary side output 1 A or 5 A	**AKW263100A**
		KW2M-X (Memory type)					**AKW264100A**
	Expansion unit	Power measurement					**AKW272100A**
		Multi analog input	Number of input points		Input range		**AKW273230A**
			Analog input (Voltage / Curret) 3 channels		0-60 V, 0-20 mA, 4-20 mA		
			Resistance temperature detector input (RTD) 2 channels		PT100 / PT1000		
		Digital I/O	Number of I/O points		Input method		**AKW274240A**
			Pulse input 2 channels, Pulse output 4 channels		Contact / non-voltage a contact or open-collector		

*1 Dedicated current transformer (CT) cannot be used. Please use a general-purpose CT with a secondary side current 1A or 5A.

Function comparison (for KW2M-A and KW2M-X)

Function	Product name	
	KW2M-A	**KW2M-X**
Logging	Not available	Available (CSV format)
Web Creator	Not available	Available
Integral power for each time zone	Not available	Available (4-zone)
Demand saved data	Available (Only Max. demand)	Available [Monthly max.demand 12 records(12-month)]

Specifications

General specifications

Item		Specification	
Supply voltage range		100-240 V AC	
Rated frequency		50/60 Hz	
Nominal power consumption		15 VA approx. (240 V AC at +25 °C +77 °F)	
Inrush current		30 A or less (240 V AC/DC at +25 °C +77 °F)	
Allowable momentary power-off time		10 ms	
Ambient temperature		Operation	at -10 to +50 °C +14 to +122 °F
		Storage	at -25 to +70 °C -13 to +158 °F
Ambient humidity		30 to 85 % RH (at +20 °C +68 °F) non-condensing	
Breakdown voltage (initial)		Between the isolated circuits: 2,000 V / 1 min	
		a) enclosure ↔ all terminals b) primary insulated circuits ↔ secondary insulated circuits (Double insulation) • power supply terminals ↔ other terminals • voltage input terminals ↔ other terminals	
Insulation resistance (initial)		Between the isolated circuits: 100 MΩ or more	
Vibration resistance		10 to 150 Hz (7.5 minutes/cycle) single amplitude: 0.075 mm (1 h on 3 axes)	
		10 to 55 Hz (1 minute/cycle) single amplitude: 0.375 mm (1 h on 3 axes)	
Shock resistance		Min. 294 m/s² (5 times on 3 axes)	
Display method		LCD with backlight	
Display updated cycle		500, 1,000, 2,000, 3,000 ms (set with setting mode)	
Power failure memory method (when power is off)		Internal memory	
Sea level altitude		Under 2,000 m	
Overvoltage category		III	
Pollution degree		2	
Dimensions W/H/D		Main unit	85 × 140 × 65 mm 3.346 × 5.512 × 2.559 in
		Expansion unit	85 × 70 × 65 mm 3.346 × 2.756 × 2.559 in
Weight		Main unit	450 g approx.
		Expansion unit (Power measurement)	200 g approx.
		Expansion unit (Digital I/O, Multi analog input)	140 g approx.
Calender timer*1	Range	January 1, 2015 00:00:00 to December 31, 2099 23:59:59 (leap year supported)	
	Time accuracy	Monthly accuracy Max. 15 sec. (at +25 °C +77 °F)	
	Back up period	About 1 month (by secondary battery when power off after 48-hours or more of power on time, at +23 °C +73.4 °F)	

*1 Only **KW2M-X**

Measurement items (for AKW263100A, AKW264100A and AKW272100A)

Item			Display data range
Instantaneous power (Active, Reactive, Apparent)			-999.99P to 999.99P (W, var, VA)
Total integral power (import) (Active, Reactive, Apparent)			0.000k to 9999.9P (Wh, varh, VAh)
Total integral power (export) (Active, Reactive)			0.000k to 9999.9P (Wh, varh)
Current			0.000 to 999.99k (A)
Voltage			0.00 to 9999.9k (V)
Power factor			-1.000 to 0.000 to 1.000
Frequency			0.00 to 99.99 (Hz)
Pulse count value			0.000 to 999999
Power conversion value			0.000k to 9999.9P
Leakage current			0.0000 to 99999.9999 (A)
Power quality	Unbalanced current (Each phase)		0.00 to 300.00 %
	Unbalanced voltage (Each phase)		0.00 to 300.00 %
	Current / Voltage THD (total harmonic distortion) (Each phase)		0.00 to 400.00 %
	Current harmonics (2nd to 31st) (Each phase)		0.00 to 400.00 %
	Voltage harmonics (2nd to 31st) (Phase, Line)		0.00 to 400.00 %
	Hour Meter (ON-time, OFF-time, Stand-by time, Maintenance time)		0.0 to 99999.9 h
Present demand*1		Active, Reactive, Apparent,Active (export), Reactive (export)	0.000k to 999.99M (W, var, VA)
		Current	0.000k to 999.99k (A)

* 'Display data range' is the range to be able to indicate with the main unit display, it is not a range that can be measured.
* If the voltage to be measured is not the rated frequency (commercial frequency), it may take time to stabilize THD (total harmonic distortion).

*1 Please use this demand function as your standard.
The demand value calculated with this function is not guaranteed.

Accuracy (for AKW263100A, AKW264100A and AKW272100A)

Item	Specifications	
Electrical power	±0.5 %	Active power Compliant Class 0.5S (IEC 62053-22) Reactive power Compliant Class 2 (IEC 62053-23)
Current	±0.2 %*1 ±0.5 % for 2(N)-phase of 1P3W and 2(S)-phase of 3P3W.	
Voltage	±0.2 %	±0.5 % for 2-phase of 1P3W, 3-1 voltage of 3P3W and line voltage of 3P4W.

*1 When it measures current under 5 % of rating, it may not satisfy the accuracy according to setting of CT. (Max.error 0.5 %)
The tolerance of CT sensor and VT(instrument voltage transformer) are not included.

Specifications

Output specifications (for AKW263100A, AKW264100A and AKW274240A)

Item		Specifications
Number of output point	Main unit	2 points (insulate between output terminals)
	Expansion unit (Digital I/O)	4 points (insulate between output terminals)
Insulation method		MOSFET relay
Output type		1a
Output capacity		100 mA, 30 V AC/DC
Output mode (OUT1 / OUT2)		• Pulse by integral power • Output by alarm or events (set with setting mode)

Analog input specifications (for AKW273230A)

Item		Specifications
Input channel		3 channels
Input range (select with setting mode)	Voltage	0 to 60 V
	Current	0 to 20 mA / 4 to 20 mA (set with setting mode)
Resolution		24bit
Total accuracy		Within ±0.1 % F.S. (at +25 °C +77 °F), Within ±0.3 % F.S. (at -10 to +50 °C +14 to +122 °F)

Digital input specifications (for AKW263100A, AKW264100A and AKW274240A)

Item		Specifications
Number of input point	Main unit	1 point
	Expansion unit (Digital I/O)	2 points
Insulation method		Designated insulation for input (insulate to the other functions)
Input method		Contact / non-voltage a contact or open-collector
Input signal	Non-voltage	• Impedance; Max. 1 kΩ (when short-circuit current: Max. 10 mA) • Residual voltage when shorted; Max. 3 V • Impedance when open: Min. 100 kΩ
Input mode		Pulse input Synchronized with input from outer device*1 Measure maintenance time*1
Max. counting speed		2000 Hz / 30 Hz
Min. input signal width		0.25 ms (when 2000 Hz is set) / 16.7 ms (when 30 Hz is set) ON:OFF ratio=1:1

*1 Only **KW2M-X**

RTD input specifications (for AKW273230A)

Item		Specifications	Item		Specifications
Input channel		2 channels	Total accuracy	CH1	Within ±0.3 % F.S. (at +25 °C +77 °F), Within ±0.5 % F.S. (at -10 to +50 °C +14 to +122 °F)
Input range	PT100	-200.0 to +200.0 °C -128.9 to +93.3 °F		CH2	Within ±0.5 % F.S. (at +25 °C +77 °F), Within ±1.0 % F.S. (at +10 to +40 °C +50 to +104 °F), Within ±1.5 % F.S. (at 0 to +50 °C +14 to +122 °F)
	PT1000	-200.0 to +200.0 °C -128.9 to +93.3 °F			
Resolution (24bit)		0.1 °C			

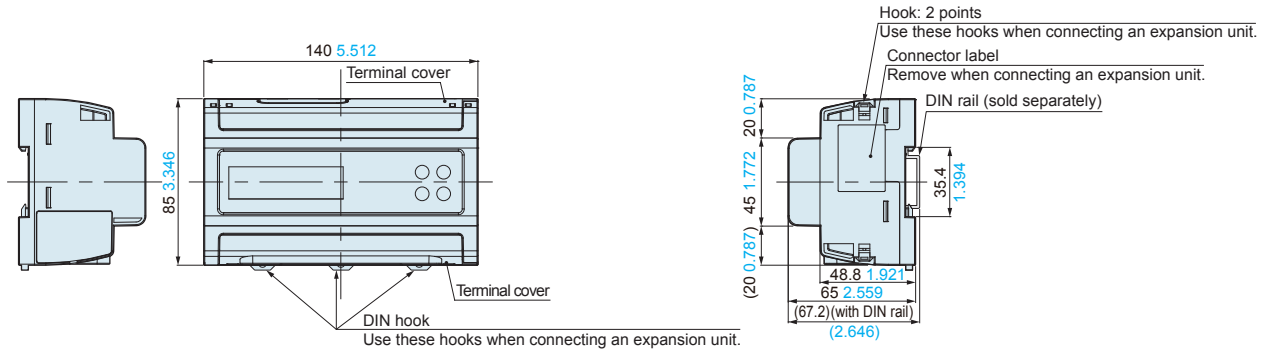
Web screen creation tools

Product name	Descriptions	Part No.
Control Web Creator	Windows version. Downloadable free of change from our website. Please purchase Key unit separately.	**AFPSWC**
Key unit	License key for **Controle Web Creator**. 1license. For USB port.	**AFPSWCKEY**

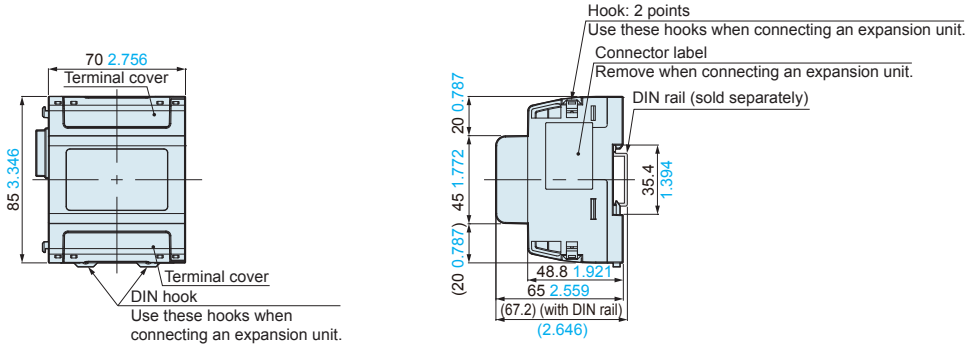
Control Web Creator are available for download.
* Membership registration is required to access / download this data.

Dimensions (Unit: mm in)

AKW263100A / AKW264100A — Main unit



AKW272100A / AKW274240A / AKW273230A — Expansion unit



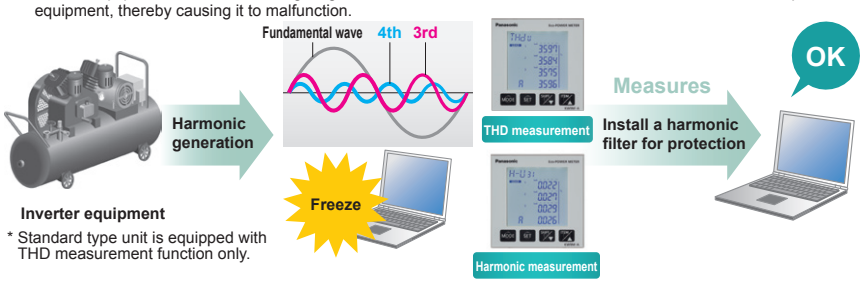
KW9M SERIES Eco-POWER METER

*Low Voltage Directive, EMC Directive

Energy saving and electric power quality monitoring are combined

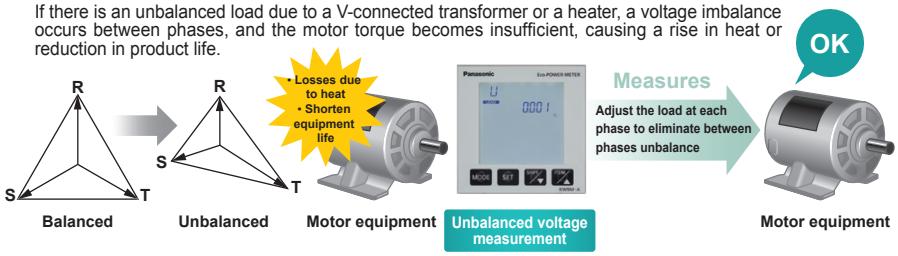
- Large-screen LCD with backlight clearly displays the electric power of each phases and their total on one screen.
- High accuracy 0.2% (Current / voltage measurement accuracy)
- Integral active power measurement resolution 0.01Wh
- Harmonic measurement (Advanced type)

Inverter equipment and fluorescent lighting fixtures are harmonic sources and can have adverse effects on precision equipment, thereby causing it to malfunction.



- Measurement of interphase unbalance (Advanced type)

If there is an unbalanced load due to a V-connected transformer or a heater, a voltage imbalance occurs between phases, and the motor torque becomes insufficient, causing a rise in heat or reduction in product life.



KW9M
Advanced type: **AKW92112**

Order guide

Product name	Phase and wire system	Input measurement voltage	Input measurement current	Applicable current transformer*1	Model No.
KW9M Eco-POWER METER standard type	Single-phase two-wire system Single-phase three-wire system Three-phase three-wire system Three-phase four-wire system (shared)	0-500 V AC (for UL 0-300 V AC)	1 to 65,535 A	CT for 1 A or 5 A	**AKW91110**
KW9M Eco-POWER METER advanced type					**AKW92112**

*1 Dedicated current transformer (CT) cannot be used. Please use a general-purpose CT with a secondary side current 1 A or 5 A.

Specifications

Use safely and correctly after carefully reading the product specification manual, user manual, and operational instruction manual.

Measurement items

Item		Unit	Display data range*1	Standard Present value*2	Advanced Present value*2	Advanced Maximum	Advanced Minimum
Instantaneous power	Active	kW	-99999 to 0.000 to 99999	●	●	●	●
	Reactive	kvar					
	Apparent	kVA					
Integral power (import)	Active	kWh	0.01 to 9999999.99 Wh*3 0.000 to 9999999.9	●	●	–	–
	Reactive	kvarh					
	Apparent	kVAh					
Integral power for each time zone (4-zone) (import)	Active	kWh	0.000 to 9999999.9	–	●	–	–
	Reactive	kvarh					
	Apparent	kVAh					
Integral power (export)	Active	kWh	0.000 to 9999999.9	●	●	–	–
	Reactive	kvarh					
Integral power for each time zone (4-zone) (export)	Active	kWh	0.000 to 9999999.9	–	●	–	–
	Reactive	kvarh					
Current		A	0.000 to 99999	●	●	●	●
N-phase when 3P4W		A		–	●	●	●
Voltage (Phase and Line voltage)		V	0.00 to 99999	●	●	●	●
Power factor			-1.000 to 0.000 to 1.000	●	●	●	●
Frequency		Hz	0.00 to 99.99	●	●	●	●
Pulse count value			0.000 to 99999999	–	●	–	–
Power conversion value	Total		0.000 to 99999999	●	●	–	–
	For each time zone			–	●	–	–
Temperature		degree C	-100.0 to 100.0	●	●	–	–
Calendar			January 1, 2000 00:00:00 to Dec. 31, 2099 23:59:59	–	●	–	–

*1 The data display range is the numerical value range which can be displayed by the main unit display section and not the allowable measurement range. *2 Instantaneous value
*3 The value measured in 0.01Wh corresponds to reading via RS-485 communication only.

Power quality

Item		Unit	Display data range	Present value (Instantaneous value)	Maximum	Minimum
Unbalanced current*1	Each phase	%	0.000 to 999.99	●	●	●
Unbalanced voltage*1	Each phase	%	0.000 to 999.99	●	●	●
Current THD*2*4	Each phase	%	0.000 to 400.00	●	–	–
Voltage THD*2*4	Each phase	%	0.000 to 400.00	●	–	–
Current harmonics*1*3	Each phase	%	0.000 to 400.00	●	–	–
Voltage harmonics*1*3	Phase	%	0.000 to 400.00	●	–	–
	Line	%	0.000 to 400.00	●	–	–

*1 Only advanced type *2 Total harmonic distortion *3 2nd to 31st
*4 If the voltage to be measured is not the rated (commercial) frequency, it may take time for THD (total harmonic distortion) to stabilize.

Demand measurement

Item		Unit	Display data range	Present value (Instantaneous value)	Maximum	Minimum
Present demand	Active	kW	0.000 to 99999	●	●	—
	Reactive	kvar				
	Apparent	kVA				
	Active (export)	kW				
	Reactive (export)	kvar				
	Current	A				
Estimated demand*1,2		kW	0.000 to 99999	●	–	—
Ratio of estimated demand*1,2		%	0.000 to 99999	●	–	—
Integral power converted by pulse*1,2		kWh	0.000 to 999999.99	●	–	—

* Please use this demand function as your standard.
The demand value calculated with this function is not guaranteed.
*1 Only advanced type
*2 Only when 30-min demand is set.

Accuracy

Item		Standard / Advanced
Accuracy (Without error of CT / VT)	Electrical power	0.5 %
		Active electric power Class 0.5S (IEC 62053-22)*1
		Reactive electric power Class 2 (IEC 62053-23)*1
	Current	0.2 %*2 (Single-phase three-wire system 2 (N) phase current, three-phase three-wire system 2 (S) phase current, 0.5 %)
	Voltage	0.2 % (Single-phase three-wire system 2 (N) phase voltage, three-phase three-wire system between 3-1 voltage, three-phase four-wire system line voltage is 0.5 %)
	Temperature	±5.0 °C (after cycle temperature correction (selectable in setting mode)) two hours after communication

*1 IEC 62053 is the international standard for electrical power measuring devices. *2 Current less than 5 % of rated value may be outside of accuracy assurance range according to CT setting (maximum tolerance: 0.5 %).

Specifications

Use safety and correctly after carefully reading the product specification, user manual, and operational instruction manual.

General specifications

Type		Standard	Advanced
Supply voltage range		100-240 V AC 100-300 V DC	
Rated frequency		50/60 Hz	
Nominal power consumption		5 VA approx. (240 V AC at +25 °C +77 °F)	6 VA approx. (240 V AC at +25 °C +77 °F)
		3 W approx. (240 V DC at +25 °C +77 °F)	3 W approx. (240 V DC at +25 °C +77 °F)
Inrush current		30 A or less (240 V AC/DC at +25 °C +77 °F)	
Allowable momentary power-off time		10 ms or less	
Ambient temperature		Accuracy guarantee: -10 to +55 °C +14 to +131 °F Operation: -25 to +55 °C -13 to +131 °F Storage: -25 to +70 °C -13 to +158 °F	
Ambient humidity		30 to 85 % RH (at +20 °C +68 °F) non-condensing	
Breakdown voltage (initial)		Between the isolated circuits: 2,000 V / 1 min	Between the isolated circuits: 1,500 V / 1 min
		a) enclosure - all terminals b) between insulated circuits • power supply terminals – other terminals • RS-485 terminals – other terminals • measured current input terminals – other terminals	a) enclosure - all terminals b) between insulated circuits • power supply terminals - other terminals • RS-485 terminals - other terminals • measured current input terminals - other terminals • pulse input terminals - other terminals • pulse output terminals - other terminals
Insulation resistance (initial)		Between the isolated circuits: 100 MΩ or more	
Vibration resistance		10 to 150 Hz (7.5 minutes/cycle) single amplitude: 0.075 mm 0.0030 in (1 h on 3 axes) 10 to 55 Hz (1 minute/cycle) single amplitude: 0.375 mm 0.015 in (1 h on 3 axes)	
Shock resistance		Min. 294 m/s² (5 times on 3 axes)	
Display method		LCD with backlight	
Display updating time		100 to 1,000 ms (set with setting mode)	
Power failure memory method (when power OFF)		Internal memory (overwrite 10^{10} or more)	
Calendar	Range		From January 1, 2000 00:00:00 to December 31, 2099 23:59:59
	Accuracy		±15 seconds/month (at +25 °C +77 °F)
	Backup		About 1-month (backup with secondary battery) (after passing 48-hour, at +23 °C +73.4 °F)
Degree of protection		Front: IP51, Back: IP20	
Sea level altitude		Under 2,000 m 6,562 ft	
Overvoltage category		2	
Pollution degree		II	
Dimensions W/H/D		96 × 96 × 56 mm 3.78 × 3.78 × 2.20 in (without terminal block) 96 × 96 × 68 mm 3.78 × 3.78 × 2.68 in (with terminal block)	
Weight		450 g approx.	480 g approx. (with secondary battery)

Input specifications (for AKW92112)

Input points		Two points (Non-insulated between channels (COM is shared))
Insulation method		Input dedicated insulation (insulated with other function terminals)
Input method		Connection point / non-voltage a contact or open collector (operated with internal power source)
Input signal	Non-voltage input	- Impedance during short-circuit: 1kΩ or less (short-circuit current, approximately 10 mA or less) - Residual voltage during short-circuit: 3 V or less - Impedance while open: 100 kΩ or more
Input mode	IN1	Pulse input or external device output signal clock synchronization
	IN2	Pulse input
Maximum counting speed	IN1	30 Hz (during pulse input selection)
	IN2	2,000 Hz / 30 Hz
Minimum input signal width	IN1	16.7 ms ON : OFF ratio = 1:1
	IN2	0.25 ms (2,000 Hz selection) / 16.7 ms (30 Hz selection) ON : OFF ratio = 1:1
Pre-scale setting	Decimal point	Up to three decimal points can be selected
	Range	0.001 - 100.000 (setting possible in setting mode)
Output mode (during pulse output selection)		HOLD
Protection element		Zener diode

Output specifications (for AKW92112)

Number of output point		2 points *Insulate between output terminals
Insulation method		PhotoMOS relay
Output type		1a
Output capacity		100 mA, 30 V AC/DC
Output mode (OUT1 / OUT2)		• Pulse by integral power • Output by alarm or events (set with setting mode)
Pulse output by integral power	Pulse width	100 ms approx.
	Pulse output unit	0.0001 kWh / 0.001 kWh / 0.01 kWh / 0.1 kWh /1 kWh / 10 kWh / 100 kWh
Alarm output Event output	Type	Stand-by power alarm / Under voltage alarm / Over voltage alarm / Power interruption alarm / Under current alarm / Over current alarm / Active power alarm / Reactive power alarm / Apparent power alarm / Power factor alarm / Over frequency alarm / Under frequency alarm / Voltage harmonics alarm / Current harmonics alarm / Voltage THD alarm / Current THD alarm / Unbalanced voltage alarm / Unbalanced current alarm / Power demand alarm / Current demand alarm / Counter output / Level output (external control)
	Alarm reset	Self-reset (according to the setting) / Manual-reset
Protection element		Varistor*

* Varistor is mounted internal as a protection element.
Install a protective device in case of using at the place where it effects by surge.

Communication specifications <RS-485>

Interface		Conforming to RS-485
Communication method		Half-duplex
Synchronous system		Synchronous communication method
Isolation status		Isolated with the internal circuits
Protocol		MEWTOCOL, Modbus RTU, DL/T645-2007 *1 (select with setting mode)
Number of connected unit		99 (Max.) *2
Transmission distance		1,200 m 3,937 ft *3
Transmission speed		1,200 / 2,400 / 4,800 / 9,600 / 19,200 / 38,400 / 57,600 / 115,200 bps (select with setting mode)
Transmission format	Data length	8 bit (fixed)
	Parity	Not available / odd number / even number (select with setting mode)
	Stop bit	1 bit, 2 bit (select with setting mode)

*1 MEWTOCOL is the protocol for PLC from Panasonic. DL/T645 is the China power-meter standard. Only DL/T645-2007 is supported.
*2 For RS-485 converter on the computer side, we recommend SI-35 and SI-35USB (from LINE EYE Co., Ltd.). When using SI-35, SI-35USB or PLC from our company (which can be connected up to 99 units), up to 99 can be connected.
In case using this system with the other devices, up to 31 can be connected.
*3 Please check with the actual devices when some commercial devices with RS-485 interface are connected. The number of connected devices, transmission distance, and transmission speed may be different according to using transmission line.

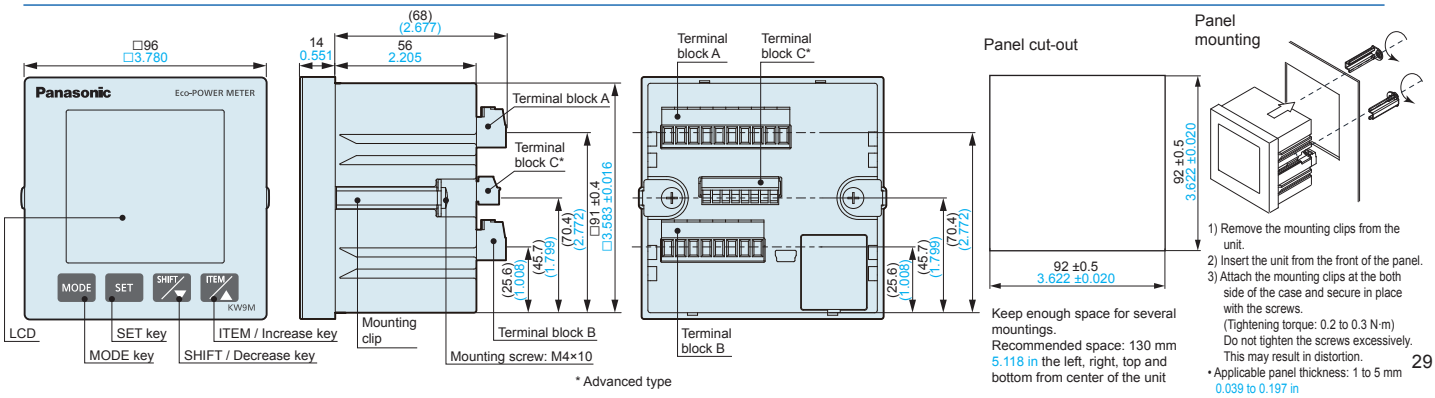
Demand monitor and control specifications

AKW91110 supports only marked items (●)

Demand type		• Peak demand • IEC 61557-12 demand (●) 1. Sliding block interval demand 2. Fixed block interval demand 3. Current demand • 30-min demand (set with setting mode)
Demand monitor input type		Current transformer (CT) input (IEC demand / 30-min demand) (●) Integral pulse input (only 30-min demand) (set with setting mode)
Demand time span*1	IEC 61557-12 demand (●)	1 to 60 min. (set with setting mode)
	30-min demand	30 min. (fixed)
Demand measurement item		Present demand, Estimated demand (only 30-min demand)
Demand calculate method*2		Additional method / Average method (set with setting mode)
Demand data update cycle (●)		1 min
Demand stand-by time (mask time)*2		1 to 30 min. (set with setting mode)
Display	IEC 61557-12 demand (●)	Present demand (Active / Reactive / Apparent / Active (export) / Reactive(export) / Current)
	30-min demand	Power demand (active power), Estimated demand, Demand target value, Ratio of estimated demand, Current present demand, Monthly max. demand, Max. demand
Saved data		Monthly max. demand 12 records (12-month), Max.demand (●)
Time span synchronized method		Clock synchronized (Pulse input to IN1) (set with setting mode)

*1 The time span can be arbitrarily set only for sliding block interval demand and fixed block interval demand.
*2 Available when 30-min demand is selected.

Dimensions (Unit: mm in)

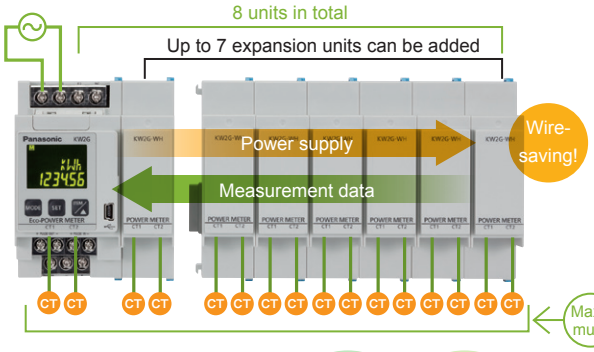


KW2G SERIES Eco-POWER METER

*1 Low Voltage Directive, EMC Directive
*2 Refer to p.20

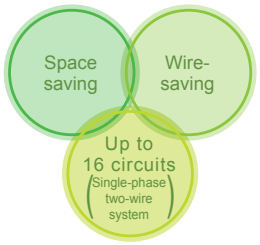
Up to 8 units! Expandable to suit conditions of use without waste!

A maximum of seven units can be added as necessary. Power source wiring is not required.



Connector for easy expansion!

Main unit Expansion unit



16 circuits
(single-phase two-wire system)
8 circuits
single-phase three-wire system and three-phase three-wire system

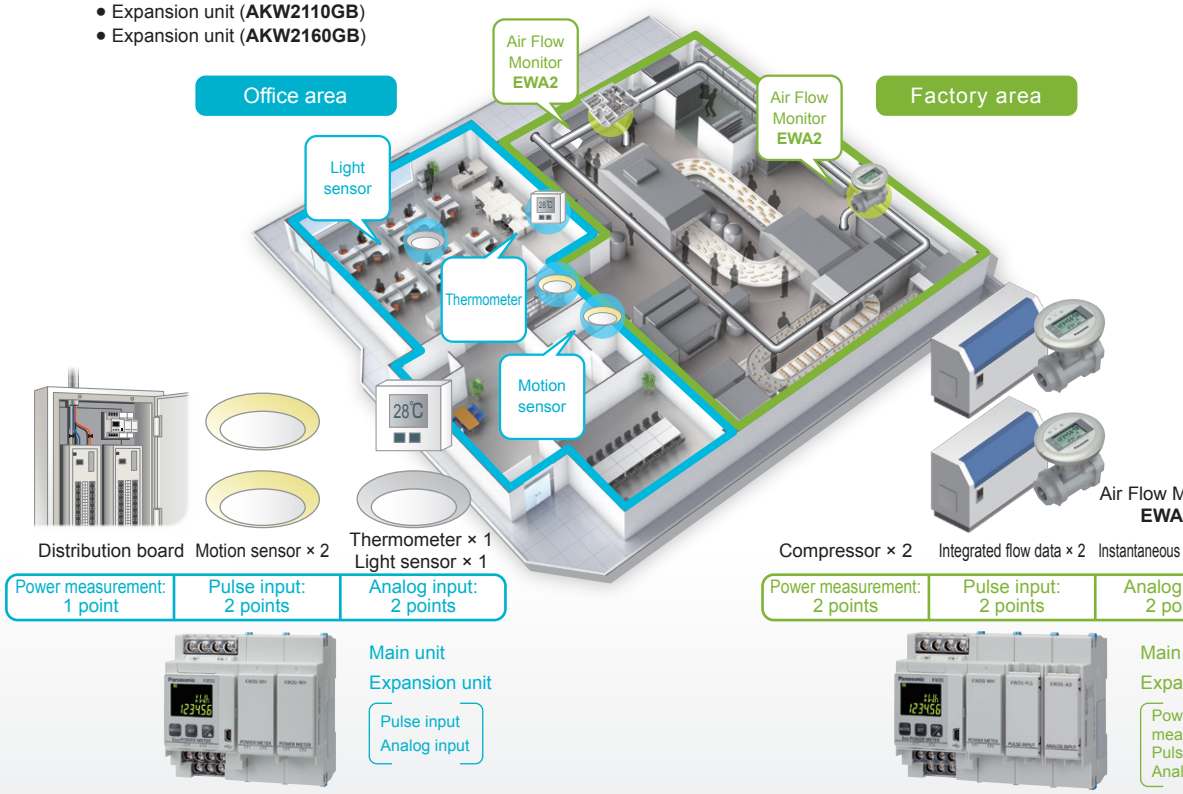
Main unit	 **KW2G** Standard type: **AKW2010GB**		 **KW2G-H** SD card type: **AKW2020GB**	
Expansion unit	 Power measurement: **AKW2110GB**	 Power measurement and Pulse output: **AKW2160GB**	 Pulse input: **AKW2152G**	 Analog input: **AKW2182G**

Connectable to various sensors as well as electrical power!

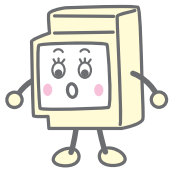
Air and water usage as well as temperature, humidity, lighting environments can be known along with electrical power through the use of the pulse input / analog input expansion unit.

Application example

- Power measurement
  - Main unit (**AKW2010GB**)
  - Main unit (**AKW2020GB**)
  - Expansion unit (**AKW2110GB**)
  - Expansion unit (**AKW2160GB**)
- Pulse input
  - Main unit (**AKW2010GB**) = one input
  - Expansion unit (**AKW2152G**) = two inputs
- Analog input
  - Expansion unit (**AKW2182G**) = two inputs



The expansion type is space-saving.



KW2G / KW2G-H Common features

- Up to 7 expansion units can be added as required without need for power or other wiring.
  Up to 16 circuits (single-phase two-wire) or 8 circuits (single-phase three-wire; three-phase three-wire)
- If an expansion unit (pulse input and analog input type) is used, flow, temperature, humidity and other environmental conditions can be monitored.
- By using an expansion unit (power measurement and pulse output), pulse output is possible for each measuring circuit.
- Capable of various types of measurement.
  Simultaneous measurement of regenerative power (instantaneous), micro-power, inverter power (primary side), electrical power and pulse (flow, etc.)
- Simple measurement function enables measurement of electric power of only the CT.
- Via USB connection with a PC, using KW Monitor, you can easily check initial settings and operating status.
- Quick installation: The units fit DIN rails.
- Pulse output width can be freely set in the range of 1 to 100 ms; finer power values can be output to an external counter.
- Because pulse input status is displayed, the operational status of external connected devices can be monitored.
- Hour meter function allows OFF time and ON time measurement

Features of KW2G-H

- Internal memory
  Automatic logging function (read by SD memory card).
  Automatic logging of measurement data on expansion units.
- Built-in battery (clock and log data backup).

Order guide

Product name			Phase and wire system	Operating power supply	Input measured voltage	Current transformer (sold separately)	Model No.
KW2G / KW2G-H Eco-POWER METER	Main unit (Standard type)		Single-phase two-wire system Single-phase three-wire system Three-phase three-wire system	100-240 V AC 50/60 Hz	100 / 200 V AC system	Dedicated type (5 A, 50 A, 100 A, 250 A, 400 A, 600 A)	**AKW2010GB**
	Main unit (SD card type)						**AKW2020GB**
	Expansion unit	Power measurement					**AKW2110GB**
		Power measurement and Pulse output*1					**AKW2160GB**
		Pulse input*2	Number of input points	Input method			**AKW2152G**
			2 channels	Contact / No contact (open collector)			
		Analog input*2	Number of input points	Input range			**AKW2182G**
			2 channels	Voltage: 0 to 5 V / 1 to 5 V*3 Current: 0 to 20 mA / 4 to 20 mA*3			

*1 Use a main unit (standard type) of Ver. 1.04 or later and a main unit (SD card type) of Ver.1.01 or later.
*2 Use a main unit (standard type) of Ver. 1.02 or later. *3 Select with setting mode

Specifications

Use safely and correctly after carefully reading the product specification manual, user manual, and operational instruction manual.

Measurement items

Power measurement (for AKW2010GB, AKW2020GB, AKW2110GB and AKW2160GB)

Item		Unit	Data display range
Integrated electric power (Active) *1		kWh/MWh	0.00 to 9999.99 kWh to 9999.99 MWh, 0.00 to 9999999.99 kWh (when 9-digit display)
Instantaneous electric power	Active*2	kW	-9999.99 to 0.000 to 9999.99
	Reactive*2	kvar	-9999.99 to 0.00 to 9999.99
	Apparent	kVA	0.00 to 9999.99
Current	R-current	A	0.000 to 6000.00
	N/S-current	A	0.000 to 6000.00 (calculated value)
	T-current	A	0.000 to 6000.00
Voltage	R (RS)-voltage	V	0.0 to 9999.9
	S (RT)-voltage	V	0.0 to 9999.9 (calculated value)
	T (TS)-voltage	V	0.0 to 9999.9
Electricity charge*3			0.00 to 999999
Conversion carbon dioxide value		kg-CO_2	0.00 to 999999
Power factor*2		Displayed on the main unit	-1.00 to 1.00 (without identify leading phase and lagging phase)
Frequency		Hz	47.5 to 63.0
Pulse count value*4			0 to 999999

*1 **KW2G / KW2G-H** can measure regeneration electric power. Integrated electrical power is not integrated (not subtracted) when detecting regeneration electric power.
*2 While detecting regeneration electric power, minus is displayed on instantaneous active electric power and power factor.
*3 Eco-POWER METER is designed chiefly to manage saving energy. It is neither intended nor can it be legally used for billing.
*4 Displayed digit of pulse counter differs according to the pre-scale set by pre-scale setting mode.

Pulse input (for AKW2152G)

Item	Data display range
Pulse count value *	0 to 999999

* The number of displayed digit of pulse count value differs according to the pre-scale set by pre-scale setting mode.

Analog input (for AKW2182G)

Item	Data display range
Converted digital value *	-999999 to 999999

* The number of displayed digits of the converted digital values differs according to the preset decimal point position.

Hour Meter (excluding AKW2182G)

Item	Unit	Data display range
OFF-time*1	Hour	0 to 99999.9
ON-time 1*1		
ON-time 2*1		
Maintenance time*2		
Actual work time		
Ratio of ON-time 1*1	%	0.0 to 100.0
Ratio of ON-time 2*1		

*1 Excluding **AKW2152G**
*2 Maintenance time by using pulse input cannot be measured with **AKW2110GB** or **AKW2160GB**
*3 Hour meter function can be used only with main unit and one expansion unit.

Accuracy (for AKW2010GB, AKW2020GB, AKW2110GB and AKW2160GB)

Item		Specifications
Accuracy without error in CT and VT	Integrated electric power and Instantaneous electric power	Within ± (2.0 % F.S. + 1 digit) (at +20 °C +68 °F, rated input, rated frequency, power factor 1) *Accuracy coverage: 10 to 100 % of rated current
	Current	Within ± (1.0 % F.S. + 1 digit) (at +20 °C +68 °F, rated input, rated frequency, power factor 1) *Accuracy coverage: 10 to 100 % of rated current
	Voltage	Within ± (1.0 % F.S. + 1 digit) (at +20 °C +68 °F, rated input, rated frequency, power factor 1)
	Temperature characteristics	Within ± (1.0 % F.S. + 1 digit) (Range of -10 to +50 °C +14 to +122 °F, rated input, power factor 1)
	Hour meter	± (0.01 %.+1 digit) Monthly accuracy: ±240 sec. (at +20 °C +68 °F)
	Frequency characteristics	Within ± (1.0 % F.S. + 1 digit) (Frequency change ±5 % based on rated frequency, rated input, power factor 1)

General specifications

Item	Specifications
Rated operating voltage	100-240 V AC (Add to main unit)
Rated frequency	50/60 Hz common
Rated power consumption	Main unit: 6 VA, Expansion unit (Power measurement, Power measurement and Pulse output, and Analog input): 0.5 VA/unit, Expansion unit (Pulse input): 1.0 VA/unit (240 V AC at +25 °C +77 °F)
Allowable operating voltage range	85-264V AC (85 % to 110 % of rated operating voltage)
Allowable momentary power-off time	10 ms
Ambient temperature	-10 to +50 °C +14 to +122 °F (-25 to +70 °C -13 to +158 °F at storage)
Ambient humidity	30 to 85 % RH (at +20 °C +68 °F), non-condensing
Display method	LCD with backlight (green), Upper: 5-digit (7-segment 1-digit + 16-segment 4-digit), Lower: 6-digit (7-segment)
Number of connectable expansion units	Max. 7 units
Power failure memory method	EEPROM (more than 1,000,000 overwrite), Memory items: setting value and integral measuring value
Weight	Main unit (Standard type): 180 g approx. Main unit (SD card type): 185 g approx. Expansion unit (Power measurement): 80 g approx. Expansion unit (Power measurement and Pulse output, Pulse input and Analog input): 85 g approx.

KW2G SERIES Eco-POWER METER

Specifications

Use safely and correctly after carefully reading the product specification manual, user manual, and operational instruction manual.

Memory specifications of main unit (for AKW2020GB)

Item			Specifications
Logging functions	File type 1*1 (instantaneous value)	Save cycle	15 min (00 hr. 00 min 00 sec after the day) (fixed)
		Save data	(Instantaneous value) Integrated electric power (1) (2), Instantaneous active electric power (1) (2), Instantaneous reactive electric power (1) (2), Instantaneous apparent electric power (1) (2), R-current (1), R (T)-current (2), S (N)-current, R/RS-voltage (1), R (T/TS)-voltage (2), RT-voltage, Power factor (1) (2), Frequency, Count value, Converted digital value for CH0, Converted digital value for CH1, Pulse count value for CH0 and Pulse count value for CH1
		Save data amount	96 records per file (Max. approx. 8 days worth of data)
	File type 2*1 (difference value)	Save cycle	15 min (00 hr. 00 min 00 sec after the day) (fixed)
		Save data	(Difference value) Integrated electric power (1) (2), Count value, Pulse count value for CH0 and Pulse count value for CH1
		Save data amount	96 records per file (Max. approx. 8 days worth of data)
	File type 3*1 (instantaneous value detail)	Save cycle	Select among 1 min, 5 min, 10 min, 15 min, 30 min, or 60 min (Saved timing) When 1 min is selected: 00 sec after the minute When 5 min is selected: 00, 05, 10, 15, 20, 25, 30... min after the hour When 10 min is selected: 00, 10, 20, 30, 40, 50 min after the hour When 15 min is selected: 00, 15, 30, 45 min after the hour When 60 min is selected: 00 min after the hour
		Save data	Integrated electric power (1) (2), Instantaneous active electric power (1) (2), Instantaneous reactive electric power (1) (2), Instantaneous apparent electric power (1) (2), R-current (1), R (T)-current (2), S (N)-current, R/RS-voltage (1), R (T/TS)-voltage (2), RT-voltage, Power factor (1) (2), Frequency, Count value, Converted digital value for CH0, Converted digital value for CH1, Pulse count value for CH0 and Pulse count value for CH1
		Save data amount	Max. 720 records, 12 hours approx. worth of data (when the save cycle is set to one minute)
	Main unit display		Integrated electric power by day (latest data covering 8 days period) / Integrated electric power by hour (latest data covering 12 hours period)
Calendar timer function			Time accuracy Monthly accuracy: ±30 sec (at +25 °C +77 °F)
Content of battery backup			Time measurement and Log data
Battery life*2			2 years approx. (at +25 °C +77 °F, in power-off state)

*1 Using the setting mode, you can select whether or not to write to the SD memory card for each of file types 1, 2, and 3. Files can be created for each unit.
*2 When the battery gets low, the BATT display will start flashing. Please replace the battery in accordance with the battery replacing procedure. Also, battery life will be shortened if the main unit is used in a high temperature environment.
* While measuring, data is collected in the memory of main unit. If, while measuring, the memory capacity of main unit is reached, data will be overwritten in succession starting from the oldest data. Initialization of the main unit memory is possible.

External memory specifications (for AKW2020GB)
<SD memory card slot>

Item	Specifications
Support media	SD memory card*1
Supported format standards	SD / SDHC standard conformance

*1 Panasonic business-use SD memory card is recommended.
* UHS standard SDHC memory cards are not supported.
Log data may not be written to the SD memory card if an SD memory card without operational confirmation is used.
* The use of UPS (Uninterruptible Power Supply) is recommended because data damage may occur in case of instant power failure during writing.
* Refer to the user manual regarding SD memory card handling.

<Precautions when handling the SD memory card>
Data saved to the SD memory card may be lost in the following cases. Be aware that Panasonic Industrial Devices SUNX Co., Ltd. assumes no responsibility for any loss or direct / indirect damage of registered data.
1) If the SD memory card is misused by the customer or a third party
2) If the SD memory card is effected by electrostatic / electronic noise
3) If the card is removed or the main unit is turned OFF while the main unit SD memory card access LED is flashing (reading data).
* It is recommended to save important data to other media and always perform backup.

Communication specifications

Item	Specifications	
	RS-485 communication	USB communication*5
Protocol	MEWTOCOL / Modbus RTU (selectable with setting mode)	——
Transmission function	——	Computer link (MEWTOCOL)
Isolation status	Isolated with the internal circuit	Isolated with the internal circuit
Number of connected units	99 units Max.*1*2	——
Transmission distance	1,200 m 3,937 ft Max.*3	——
Transmission speed	2,400 / 4,800 / 9,600 / 19,200 / 38,400 / 57,600 / 115,200 bps (selectable with setting mode)	12 Mbps (Full-speed)
Transmission format	Data length: 8-bit / 7-bit (selectable with setting mode)*4 Parity: Not available / Odd number / Even number (selectable with setting mode) Stop bit: 1-bit / 2-bit (selectable with setting mode)	——
Communication method	Half-duplex	——
Synchronous system	Synchronous communication method	——
Ending resistance	120 Ω approx. (built-in)	——

*1 For RS-485 converter on the computer side, we recommend SI-35 and SI-35USB (from LINE EYE Co.,Ltd.).
*2 When using SI-35, SI-35USB or PLC from our company (which can be connected up to 99 units), up to 99 Eco-POWER METER can be connected.
In case using this system with the other devices, up to 31 Eco-POWER METER can be connected.
*3 Please check with the actual devices when some commercial devices with RS-485 interface are connected. The number of connected devices, transmission distance, and transmission speed may be different according to using transmission line.
*4 With Modbus RTU protocol, it works only with 8-bit.
*5 When using the USB port, install the dedicated USB driver.

Specifications

Use safely and correctly after carefully reading the product specification manual, user manual, and operational instruction manual.

Pulse input specifications (for AKW2010GB, AKW2020GB and AKW2152G)

Item		Specifications
Input mode		Addition (Fixed)
Max. counting speed		50 kHz / 30 Hz (Select with setting mode)
Pulse input (Min. input signal width)		0.01 ms (When 50 kHz selected) / 16.7 ms (When 30 Hz selected), ON : OFF ratio = 1 : 1
Input signal		Contact / No contact (open collector) • Impedance when shorted: Max. 1 kΩ • Residual voltage when shorted: Max. 2 V • Impedance when open: Min. 100 kΩ
Output mode		HOLD (Over count)
Prescale	Decimal point	Setting possible up to under 3-digit
	Range	0.001 to 100.000 (Set with setting mode)

Analog input specifications (for AKW2182G)

Item		Specifications
Number of input points		2 channels
Input range (Select with setting mode)	Voltage	0 to 5 V / 1 to 5 V (selectable with setting mode)
	Current	0 to 20 mA / 4 to 20 mA (selectable with setting mode)
Converted digital value		0 to 4,000 (decimal number) *
Resolution		1/4,000 (12 bits)
Overall precision		±1 % F.S. or less (-10 to +55 °C +14 to +131 °F)
Input impedance	Voltage	440 kΩ
	Current	125 Ω
Absolute maximum input	Voltage	-0.3 to +10 V
	Current	-2 to +30 mA
Input protection		Diode

* Digital conversion value differs according to the scaling conversion value set by setting mode.
If the analog input value exceeds the upper or lower limit, the digital value will preserve the upper or lower limit.

Pulse output (Transistor output) specifications (for AKW2010GB, AKW2020GB and AKW2160GB)

Item	Specifications
Number of output point	1 point
Insulation method	Photo coupler
Output type / Output capacity	Open collector / 100 mA 30 V DC
Pulse width (when pulse output with integrated active electric power selected)	1 to 100 ms (selectable with setting mode)
ON state voltage drop	1.5 V or less
OFF state leakage current	100 μA or less
Pulse output unit*1 (selectable with setting mode)	0.001 kWh, 0.01 kWh, 0.1 kWh, 1 kWh, 10 kWh, 100 kWh / Power alarm (AL-P) / Current alarm (AL-C) / Stand-by power alarm (AL-S) / Counter (Cnt) General-purpose output (OUT) / Error alarm (Error)
General-purpose output	Level output / Repeat cycle output / One-shot output (selectable with setting mode)
Output ON-time, Output OFF-time	0.1 to 10.0 sec. (selectable with setting mode)

*1 General-purpose output (OUT) and Error alarm (Error) are possible using main unit software **AKW2010GB** Ver. 1.05 or later and **AKW2020GB** Ver. 1.02 or later and expansion unit software **AKW2160GB** Ver.1.01 or later.
*2 For normal operation of other functions, to switch on minimal pulse width of 1 to 10 ms, the maximum pulse output interval is 25 ms.
Consequently, a minimum measurable pulse unit output setting of 40 pulses or less per 1 second is recommended.

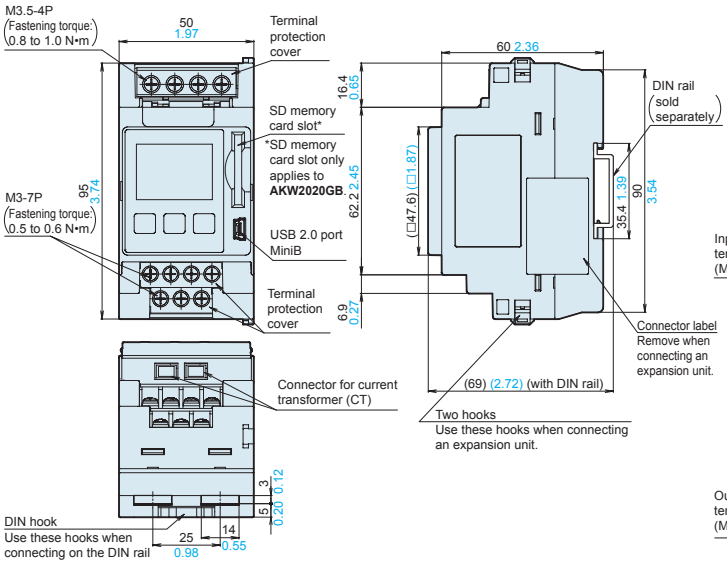
How to calculate

Unit for pulse output: PL-P > Max. measurement power (kW) / 3,600 sec × 40 pulse/sec

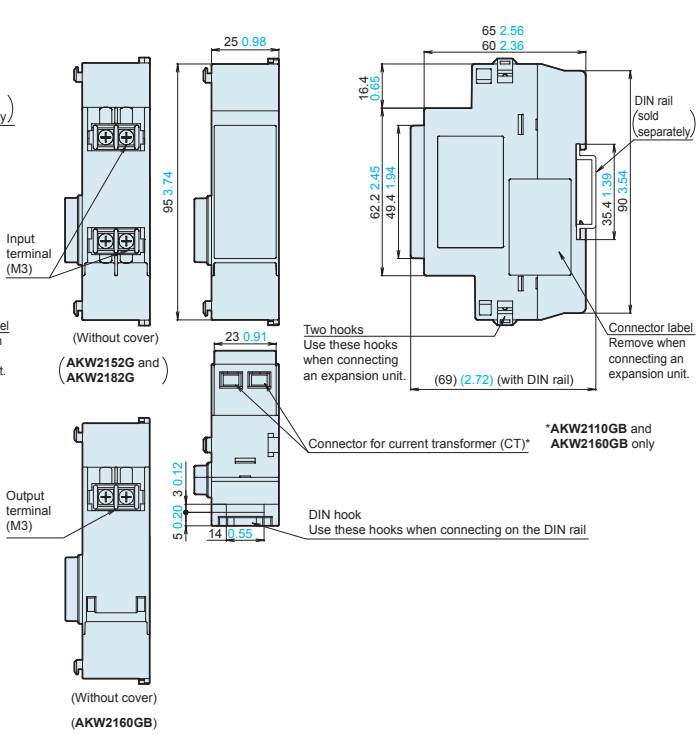
When the pulse output unit is 0.001, the maximum power that can be properly measured by pulse output is 144 kW (3,600 sec × 40 pulse/sec × 0.001).
Note:
(1) Count errors may occur if the pulse output is set to 40 pulses or more per 1 second.
(2) If the pulse output OFF time is set too short, count errors by connected counters, PLCs (Programmable Logic Controllers) may occur.
*3 These count output specifications are only for the main unit.

Dimensions (Unit: mm in)

AKW2010GB / AKW2020GB Main unit



AKW2110GB / AKW2160GB / AKW2152G / AKW2182G Expansion unit



KW1M SERIES Eco-POWER METER

*1 Low Voltage Directive, EMC Directive

An abundant line-up including standard type (200 V / 400 V type) and SD card type.

KW1M Standard type:
AKW1110B

KW1M Common features

- Output of alarm signal is possible using the “alarm setting”
- 50 mm 1.97 in thickness makes it perfect for control panel installations
- Selectable screw, DIN rail and panel installation
- Display switchable between electrical power and electricity charge usage
- Display of calculated CO_2 value possible
- Measurement of inverter power supplies (primary side) is available

KW1M-H
SD card type:
AKW1121B

Features of KW1M-H

- Internal memory (Read by SD memory card)
- Built-in battery (for clock and log data backup)
- Calendar timer function
- Simple demand function
- Allows demand management by receiving electricity pulse from electric charge meter.

Order guide

Product name	Phase and wire system	Operating power supply	Input measured voltage	Current transformer (sold separately)	Model No.
KW1M Eco-POWER METER (Standard type)	Single-phase two-wire system Single-phase three-wire system Three-phase three-wire system Three-phase four-wire system *1	100-240 V AC 50/60 Hz	100 / 200 V AC system	Dedicated type 5 A, 50 A, 100 A, 250 A, 400 A and 600 A	**AKW1110B**
			100 / 200 / 400 V AC system (Select with setting mode)		**AKW1111B**
KW1M-H Eco-POWER METER (SD card type)					**AKW1121B**

*1 For a three-phase four-wire system, excluding **AKW1110B**.

Specifications

Use safely and correctly after carefully reading the product specification manual, user manual, and operational instruction manual.

Measurement items

Item		Unit	Data display range
Instantaneous electric power (Active)		kW	0.00 to 9999.99
Integrated electric power (Active)		kWh/MWh	0.00 to 9999.99 MWh
			0.00 to 9999999.99 kWh (when 9-digit display)
Current	R-current	A	0.0 to 6000.0
	S-current*1	A	0.0 to 6000.0
	T-current	A	0.0 to 6000.0
Voltage	R (RS)-voltage	V	0.0 to 9999.9
	S (RT)-voltage*1	V	0.0 to 9999.9
	T (TS)-voltage	V	0.0 to 9999.9
Electricity charge*2		-	0.00 to 999999
Conversion carbon dioxide value		kg-CO_2	0.00 to 999999
Power factor*1		-	0.00 to 1.00 [Identify leading phase (–) or lagging phase] (Only in range of phase angle θ = –90° to +90°)
Frequency*1		-	47.5 to 63.0 Hz
Hour meter	ON-time	h (Hour)	0.0 to 99999.9
	OFF-time	h (Hour)	0.0 to 99999.9
Pulse count value*1		-	0 to 999999
Integrated electric power converted by pulse		kWh/MWh	0.000 kWh to 9999.99 MWh
Demand*3	Present demand	kW	0.00 to 9999.99
	Estimated demand	kW	0.00 to 9999.99
	Ratio of estimated demand	%	0.0 to 9999.9

*1 Excluding **AKW1110B**.
*2 For self-managed energy-savings and cannot be used for billing purposes.
*3 Please use this demand function as your standard. The demand value calculated with this function is hot guaranteed.

General specifications

Item	Specifications
Rated operating voltage	100-240 V AC
Rated frequency	50/60 Hz common
Rated power consumption	6 VA (**AKW1110B**), 8 VA (**AKW1111B** and **AKW1121B**) (240 V AC at +25 °C +77 °F)
Allowable operating voltage range	85-264 V AC (85 % to 110 % of rated operating voltage)
Allowable momentary power-off time	10 ms
Ambient temperature	-10 to +50 °C +14 to +122 °F (-25 to +70 °C -13 to +158 °F at storage)
Ambient humidity	30 to 85 % RH (at +20 °C +68 °F), non-condensing
Display method	LCD with backlight Upper: green, 4-digit, 16-segment Lower: amber, 6-digit, 7-segment
Power failure memory method	EEPROM (more than 100,000 overwrite)
Weight	170 g approx. (**AKW1110B** and **AKW1111B**), 180 g approx. (**AKW1121B**) * Excluding battery

Demand monitoring pulse input specifications (for AKW1121B)

Item	Specifications
Input method	Non-voltage pulse input or open collector input
Pulse fixed quantity	50,000 (pulse/kWh) / 2,000 (pulse/kWh)
Minimum pulse width	0.25 ms (2 kHz selection) / 16.7 ms (30 Hz selection)
Pulse rate	0.001 to 100.000 kWh / 1 pulse

Accuracy

Item		Specifications
Accuracy without error in CT and VT	Integrated electric power and Instantaneous electric power	Within ± (2.0 % F.S. + 1 digit) (at +20 °C +68 °F, rated input, rated frequency, power factor 1) Accuracy coverage: 5 to 100 % of rated current
	Current	Within ± (1.0 % F.S. + 1 digit) (at +20 °C +68 °F rated input, rated frequency, power factor 1) Accuracy coverage: 5 to 100 % of rated current
	Voltage	Within ± (1.0 % F.S. + 1 digit) (at +20 °C +68 °F rated input, rated frequency, power factor 1)
	Hour meter	Within ± (0.01 % +1 digit) (at +20 °C +68 °F) [In case power on start or current energizing: within ± (0.01 % + 1 sec + 1 digit) (at +20 °C +68 °F)]
	Temperature characteristics	Within ± (1.0 % F.S. + 1 digit) (Range of -10 to +50 °C +14 to +122 °F, rated input, power factor 1)
	Frequency characteristics	Within ± (1.0 % F.S. + 1 digit) (Frequency change ± 5 % based on rated frequency, rated input, power factor 1)

Pulse input specifications (for AKW1111B and AKW1121B)

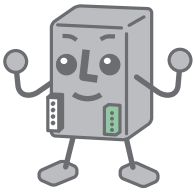
Item		Specifications
Input mode		Addition (Fixed)
Max. counting speed		2 kHz / 30 Hz (Select with setting mode)*1
Pulse input (Min. input signal width)		0.25 ms (When 2 kHz selected) / 16.7 ms (When 30 Hz selected), ON : OFF ratio = 1 : 1
Input signal (at +20 °C +68 °F)		Contact / No voltage contact (open collector)
		• Impedance when shorted: Max. 1 kΩ
		• Residual voltage when shorted: Max. 2 V
		• Impedance when open: Min. 100 kΩ
Mode		HOLD (Over count)
Prescale	Decimal point	Setting possible up to under 3-digit
	Range	0.001 to 100.000 (Set with setting mode)

*1 Counting speed will be fixed at 50 Hz when you select Counting speed “pulse through” in the pulse output unit.

Pulse output (Transistor output) specifications

Item	Specifications
Output points	1 point
Insulation method	Photo coupler
Output form	Open collector
Output capacity	100 mA 30 V DC
Pulse width	100 ms approx.
Maximum voltage drop when ON	1.5 V or less
Leakage current when OFF	100 μA or less
Pulse output units (selectable in setting mode)*1	0.001 / 0.01 / 0.1 / 1 / 10 / 100 kWh / Power alarm (AL-P) / Current alarm (AL-C) / Stand-by power alarm (AL-S)*2 / Counter(Cnt)*2 / Demand alarm (DEM)*3 / Pulse-through (P-THR)*3

*1 The recommended setting for the minimum pulse output unit that can be measured is less than four pulses per second. More than four pulses may cause miss-counts.
Calculation method
(Pulse output unit: Value of PL-P) > (maximum electric power measurement [kW]) / (3,600 [s] x 4 [pulse / s]
*2 Only **AKW1111B** and **AKW1121B** are supported.
*3 Only **AKW1121B** is supported.
Pulse output status (output contact status) is confirmed by communication.



Specifications

Use safely and correctly after carefully reading the product specification manual, user manual, and operational instruction manual.

Communication specification

Item	Specifications
	RS-485 communication
Protocol	MEWTOCOL and Modbus RTU (selectable with setting mode)
Isolation status	Isolated with the internal circuit
Number of connected units	Max. 99 units*1 *2
Transmission distance	1,200 m 3,937 ft*3
Transmission speed	2,400 / 4,800 / 9,600 / 19,200 / 38,400 bps (selectable with setting mode) For **AKW1121B**, 57.600 and 115.200 bps are also selectable
Transmission format	Data length: 8-bit / 7-bit (selectable with setting mode)*4, Parity: Not available / Odd number / Even number (selectable with setting mode), Stop bit: 1 bit (fixed)
Communication method / Synchronous system	Half-duplex / Synchronous communication method
Flow control	———
Ending resistance	120 Ω approx. (built-in)

*1 For RS-485 converter on the computer side, we recommend SI-35 and SI-35USB (from LINE EYE Co., Ltd.).
*2 When using SI-35,SI-35USB or our PLC (which can be connected up to 99 units), up to 99 Eco-POWER METERs can be connected.
In case using this system with the other devices, up to 31 Eco-POWER METER units can be connected.
*3 Please check with the actual devices when some commercial devices with RS-485 interface are connected.
The number of connected devices, transmission distance, transmission speed may be different according to using devices or transmission line.
*4 With Modbus RTU protocol for RS-485 communication, it works only with data length 8-bit.
* Modbus Protocol is a communications protocol developed for PLCs by Modicon Inc.

Memory specifications of main unit (for AKW1121B)

Item		Specifications
File type 1 (instantaneous value)	Save cycle	60 min (on the hour) (fixed)
	Save data	(Instantaneous value) Integrated electric power, Instantaneous electric power, Current, Voltage, Power factor, Frequency, and Count value
	Save data amount	24 records per file (Max. approx. 1.5 years worth of data)
File type 2 (difference value)	Save cycle	60 min (on the hour) (fixed)
	Save data	(Difference value) Integrated electric power and Count value
	Save data amount	24 records per file (Max. approx. 1.5 years worth of data)
File type 3 (instantaneous value detail	Save cycle	Select among 1 min / 5 min / 10 min / 15 min / 30 min / 60 min (Saved timing) When 1 min is selected: 00 sec after the minute When 5 min is selected: 00, 05, 10, 15, 20, 25, 30... min after the hour When 10 min is selected: 00, 10, 20, 30, 40, 50 min after the hour When 15 min is selected: 00, 15, 30, 45 min after the hour When 60 min is selected: 00 min after the hour
	Save data	Integrated electric power, Instantaneous electric power, Current, Voltage, Power factor, Frequency, and Count value
	Save data amount	Max. 5,760 records, 4 days approx. period (when the save cycle is set to one minute)
Main unit display		Integrated electric power by month (latest data covering 1.5 year period) / Integrated electric power by day (latest data covering 1 month period) / Integrated electric power by hour (latest data covering 24 hours period)

External memory specifications <SD memory card slot> (for AKW1121B)

Item	Specifications
Support media	SD memory card*1
Supported format standards	SD / SDHC standard conformance

*1 Panasonic business-use SD memory card is recommended.
* UHS standard SDHC memory cards are not supported.
Log data may not be written to the SD memory card if SD memory card without operational confirmation is used.
* The use of UPS (Uninterruptible Power Supply) is recommended due to the possibility of data damage in case of a power failure during writing.
* Refer to the user manual regarding SD memory card handling.

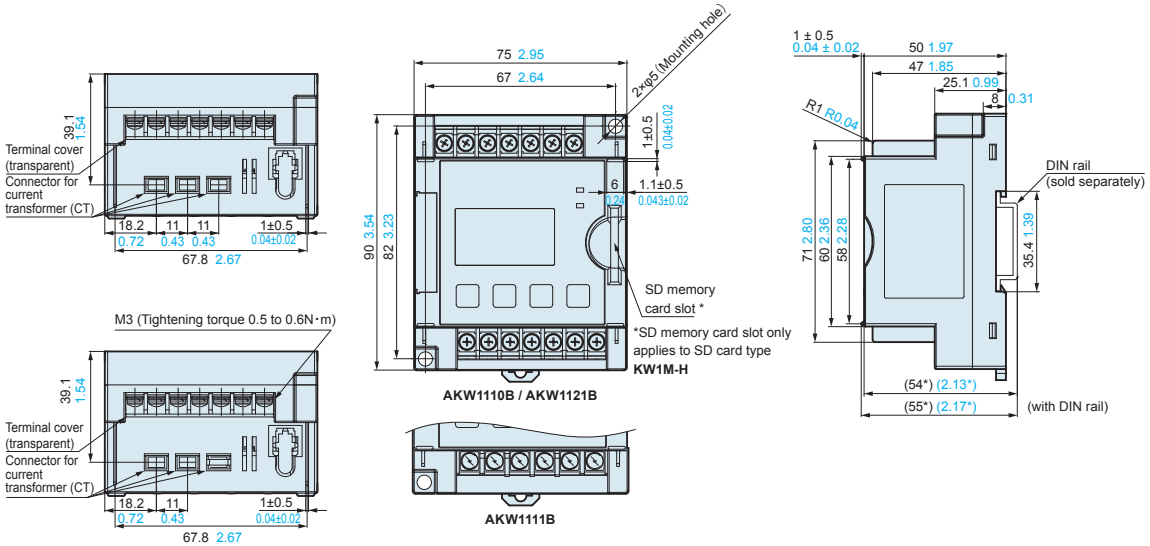
<Precautions when handling the SD memory card>
Data saved to the SD memory card may be lost in the following cases. Be aware that Panasonic Industrial Devices SUNX Co., Ltd. assumes no responsibility for any loss or direct / indirect damage of registered data.
1) If the SD memory card is misused by the customer or a third party
2) If the SD memory card is effected by electrostatic / electronic noise
3) If the card is removed or the main unit is turned OFF while the main unit SD memory card access LED is flashing (reading data).
* It is recommended to save important data to other media and always perform backup.

Calendar timer specifications (for AKW1121B)

Item	Specifications
Time accuracy	Monthly accuracy: ± 240 sec (at -10 °C +14 °F) Monthly accuracy: ± 70 sec (at +25 °C +77 °F) Monthly accuracy: ± 240 sec (at +50 °C +122 °F)
Content of battery backup	Time measurement and log data
Battery life	2 years approx. (at ambient temperature +25 °C +77 °F) (in power-off state)

Dimensions (Unit: mm in)

● Be sure to confirm the product specifications, user manual, and operational instruction manual.



KW4M / KW7M / KW8M SERIES Eco-POWER METER

*1 **KW4M** only
*2 Low Voltage Directive, EMC Directive
*3 Excluding **KW7M**

Features of KW4M

- Easy on-panel mounting with included mounting frame
- Protective structure: IEC IP66 (Only the panel front with rubber gasket)
- UL-compliant
- Measurement of inverter power supplies (primary side) is available

Features of KW7M

- DIN rail type ideal for installation in a panel
- Slim, 22.5 mm 0.89 in wide: easily mounts anywhere
- Measurement of inverter power supplies (primary side) is available

Common Features of KW8M

- Compatible with systems of up to three-phase four-wire
- Easy on-panel mounting with included mounting frame
- Measurement of inverter power supplies (primary side) is available

KW8M with logging function type

- Log data is stored to memory of main unit
- Built-in battery (for clock and log data backup)
- Simple demand function

KW8M 1A / 5A CT input type

- Capable of direct input from 1 A / 5 A CT in the secondary side without using dedicated CT
- High current circuit measurement

KW4M: AKW5111

KW7M: AKW7111B

KW8M: AKW8111

Order guide

Product name	Protocol	Phase and wire system	Input measured voltage	Current transformer (sold separately)	Terminal type	Model No.
KW4M Eco-POWER METER DIN □48 type	MEWTOCOL	Single-phase two-wire system Single-phase three-wire system Three-phase three-wire system	100 / 200 V AC system	Dedicated type (5 A, 50 A, 100 A, 250 A and 400 A)	Screw terminal	**AKW5111**
	Modbus RTU					**AKW5112**
	MEWTOCOL				11-pin	**AKW5211**
	Modbus RTU					**AKW5212**
KW7M Eco-POWER METER DIN rail type		Single-phase two-wire system Single-phase three-wire system Three-phase three-wire system	100 / 200 V AC system		Screw terminal (M3 / M2 screw)	**AKW7111B**
KW8M Eco-POWER METER DIN 48 × 96 type	High performance type	Single-phase two-wire system Single-phase three-wire system Three-phase three-wire system Three-phase four-wire system	100 / 200 / 400 V AC system (Select with setting mode)	Dedicated type (5 A, 50 A, 100 A, 250 A, 400 A and 600 A)	Screw terminal (M3 "+ / –" screw)	**AKW8111**
						AKW8111H
	1 A / 5 A CT input type			CT for 1A or 5A *		**AKW8115** *

* Since a dedicated CT is not used, please use a 4,000 A or less type (secondary current: 1 A or 5 A).

Specifications

Use safely and correctly after carefully reading the product specification manual, user manual, and operational instruction manual.

Measurement items

KW4M

Item		Unit	Data display range
Instantaneous electric power		kW	0.00 to 9999.99
Integrated electric power		kWh MWh	0.00 to 9999.99 kWh and after 10.00 MWh to 9999.99 MWh When 9-digit display: 0.00 to 9999999.99 kWh
Current	L1 (CT1) - phase current	A	0.0 to 6000.0
	L2 (CT2) - phase current	A	0.0 to 6000.0
Voltage	Voltage between 1-2	V	0.0 to 9999.9
	Voltage between 2-3	V	0.0 to 9999.9
Electricity charge*	Yen	JPY	0 to 999999
	Dollars	$	0.0 to 99999.9
	Euros	EUR	0.0 to 99999.9
	Yuan	CNY	0 to 999999
	No currency	CHG	0 to 999999
Conversion carbon dioxide value		kg-CO_2	0.0 to 999999
Hour meter	ON-time	h (Hour)	0.0 to 99999.9
	OFF-time	h (Hour)	0.0 to 99999.9
Pulse count value		Count	0 to 999999

KW7M

Item		Unit	Data display range
Instantaneous electric power		kW	0.00 to 999999.99
Integrated electric power		kWh	0.00 to 9999999.9
Current	L1 (CT1) - phase current	A	0.0 to 6000
	L2 (CT2) - phase current	A	0.0 to 6000
Voltage	Voltage between 1-2	V	0.0 to 9999
	Voltage between 2-3	V	0.0 to 9999
Electricity charge *			0.00 to 99999999

KW8M

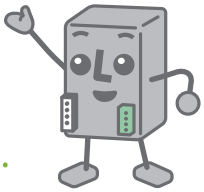
Item		Unit	Data display range
Integrated electric power	Active	kWh	0.00 to 9999999.9
	Reactive	kvarh	0.00 to 9999999.9
	Apparent	kVAh	0.00 to 9999999.9
Instantaneous electric power	Active	kW	0.00 to 9999999.99
	Reactive	kvar	-99999.99 to 0.00 to 999999.99
	Apparent	kVA	0.00 to 9999999.99
Current	CT1 - phase current	A	0.0 to 6000
	CT2 - phase current	A	0.0 to 6000
	CT3 - phase current	A	0.0 to 6000
Voltage	Voltage between P1 and P0	V	0.0 to 9999
	Voltage between P2 and P0	V	0.0 to 9999
	Voltage between P3 and P0	V	0.0 to 9999
Electricity charge*		–	0.0 to 99999999
Power factor	Displayed on the main unit	–	0.00 to 1.00 [with identify leading phase (LEAD) or lagging phase (LAG)]
	Communication	–	-1.00 to 0.00 to 1.00 Only in range of phase angle θ= –90° to 0 to +90°
Frequency		Hz	47.5 to 63.0
Hour meter	ON-time	Time	0.0 to 99999.9
	OFF-time		
Pulse count value		–	0.0 to 99999999

* Eco-POWER METER is primarily designed to manage saving energy. It is neither intended nor can it be legally used for billing.

Accuracy

Item		Specifications
Accuracy without error in CT and VT	Integrated electric power and Instantaneous electric power	Within ± (2.0 % F.S. + 1 digit) In case of 5 A CT mode. Within ± (2.5 % F.S. + 1 digit) (at +20 °C +68 °F, rated input, rated frequency, power factor 1) *1 Accuracy coverage: 5 to 100 % of rated current
	Current	Within ± (1.0 % F.S. + 1 digit) (at +20 °C +68 °F rated input, rated frequency, power factor 1) Accuracy coverage: 5 to 100 % of rated current
	Voltage	Within ± (1.0 % F.S. + 1 digit) (at +20 °C +68 °F rated input, rated frequency, power factor 1)
	Hour meter *2	Within ± (0.01 % +1 digit) (at +20 °C +68 °F) [In case power on start or current energizing: Within ± (0.01 % + 1 sec + 1 digit) (at +20 °C +68 °F)]
	Temperature characteristics	Within ± (1.0 % F.S. + 1 digit) In case of 5 A CT mode. Within ± (1.5 % F.S. + 1 digit) (Range of -10 to +50 °C +14 to +122 °F, rated input, power factor 1)
	Frequency characteristics	Within ± (1.0 % F.S. + 1 digit) In case of 5 A CT mode. Within ± (1.5 % F.S. + 1 digit) (Frequency change ± 5 % based on rated frequency, rated input, power factor 1)

*1 Integrated electric power (active / apparent) and instantaneous electric power (active / apparent) of **AKW8115**: within ± (1.0 % F.S. + 1 digit) (at +20 °C +68 °F, rated input, rated frequency, power factor 1)
Accuracy coverage: 5 to 100 % of rated current
*2 Excluding **AKW7111B**



Specifications

Use safely and correctly after carefully reading the product specification manual, user manual, and operational instruction manual.

General specifications

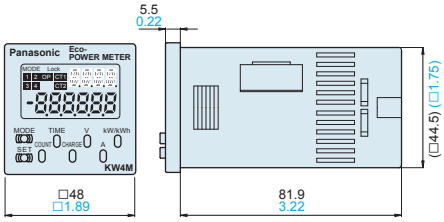
Item	Specifications		
	KW4M	KW7M	KW8M
Rated operating voltage	100-120 V AC / 200-240 V AC		100-240 V AC
Rated frequency	50/60 Hz common		
Rated power consumption	8 VA (240 V AC at +25 °C +77 °F)	6 VA (240 V AC at +25 °C +77 °F)	8 VA (240 V AC at +25 °C +77 °F)
Allowable operating voltage range	85-132 V AC / 170-264 V AC (85 % to 110 % of rated operating voltage)		85-264V AC (85 % to 110 % of rated operating voltage)
Allowable momentary power-off time	10 ms		
Ambient temperature	-10 to +50 °C +14 to +122 °F (-25 to +70 °C -13 to +158 °F) at storage		
Ambient humidity	30 to 85 % RH (at +20 °C +68 °F non-condensing)		
Vibration resistance	10 to 55 Hz (1cycle/min), single amplitude: 0.75 mm 0.03 in (1 hour on 3 axes)	10 to 55 Hz (1cycle/min), single amplitude: 0.375 mm 0.01 in (1 hour on 3 axes)	
Shock resistance	Min. 294 m/s^2 (5 times on 3 axes)		
Display method	6-digit, 7-segment (set value) with backlight and 4-digit, 16-segment (mode), LCD upper section: green, lower section: amber	8-digit, 7-segment LED	
Power failure memory method	EEPROM (more than 100,000 overwrite)		
Protection	IEC standard IP66 (only front panel with rubber gasket) * Mounted in a row, waterproofing property will be lost.	—	
Weight	140 g approx. (screw terminal type), 130 g approx. (11-pin type)	100 g approx.	235 g approx. (**AKW8111**), 250 g approx. (**AKW8111H** high performance type), 265 g approx. (**AKW8115** 1 A / 5 A CT input type)

*1 Water resistant properties (IP66) are lost when attached consecutively (closely adhered).

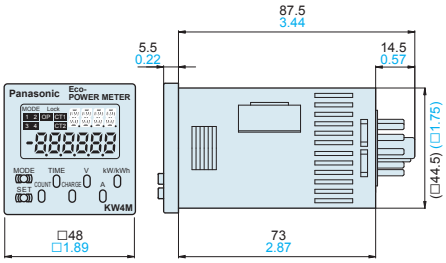
Dimensions (Unit: mm in)

KW4M

Screw terminal type (AKW5111 / AKW5112)



11-pin type (AKW5211 / AKW5212)

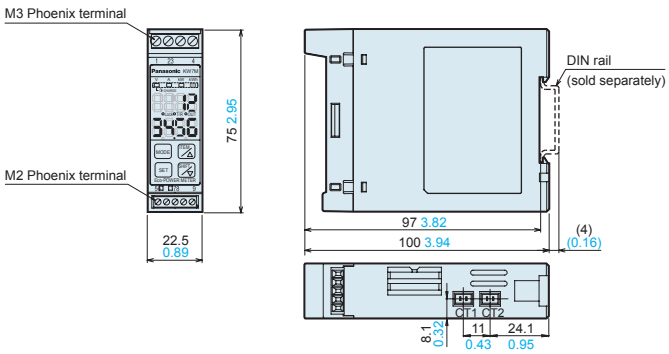


Terminal layout

No.	Terminal type		
	Pin type	Screw terminal type	
1	1, R, R	RS-485 (−)	M3.5 screw with cross-recessed /slotted head
2	2, N, S	CT1(k)/IN	
3	3, T, T	CT1(ℓ), CT2(ℓ)	
4	RS-485 (+)	CT2(k)	
5	RS-485 (−)	0V	
6	Pulse output (+)	Pulse output (+)	
7	Pulse output (−)	Pulse output (−)	
8	CT1(k)/IN	1, R, R	
9	CT1(ℓ), CT2(ℓ)	2, N, S	
10	CT2(k)	3, T, T	
11	0V	RS-485 (+)	

Note: For 11-pin type, use DIN rail terminal block (**ATC180041**).

KW7M



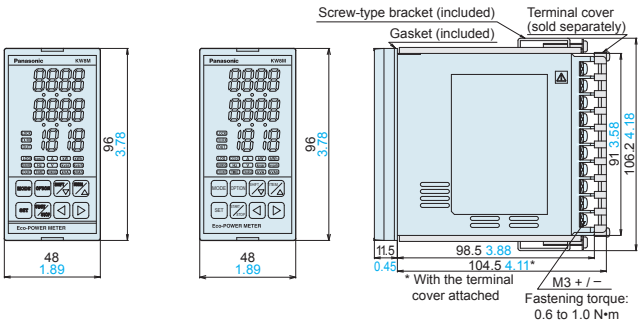
Terminal layout

No.	Function	Terminal type
1	1, R, R	Phoenix terminal M3 screw with slotted head
2	2, N, S	
3	3, T, T	
4	Unused terminal (N.C.)	
5	Pulse output (+)	Phoenix terminal M2 screw with slotted head
6	Pulse output (−)	
7	RS-485 (+)	
8	RS-485 (−)	
9	RS-485 (E)	

Note: RS-485 (E) terminal is not an SG (signal ground) terminal. Do not connect it to the grounding wire of a shielded cable.

KW8M

AKW8115 / AKW8111 / AKW8111H



Terminal layout

No.	Function		No.	Function	Terminal type
1	N.C.		11	P1	Measurement voltage input	M3 screw with cross-recessed / slotted head
2	Operating power supply	L	12	P0	
3		N	13	P2	
4	Pulse input	+	14	P3	
5		−	15	CT1 (+)	Measurement CT input (**AKW8111 / AKW8111H**) Measurement current input (**AKW8115**)
6	Pulse output	+	16	CT1 (−)	
7		−	17	CT2 (+)	
8	RS-485	+	18	CT2 (−)	
9		−	19	CT3 (+)	
10		E	20	CT3 (−)	

Note: RS-485 (E) terminal is not an SG (signal ground) terminal. Do not connect it to the grounding wire of a shielded cable.

Dedicated Current Transformer (CT)

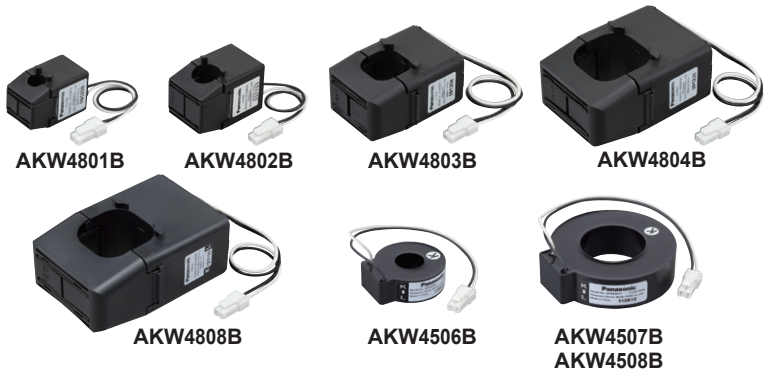
CE*1

*1 Clamp-on type only

Order guide (Dedicated Current Transformer (CT) cannot be used with AKW8115, KW9M and KW2M)

	Primary side rated current	Model No.
Clamp-on type	5A / 50 A	**AKW4801B**
	100 A	**AKW4802B**
	250 A	**AKW4803B**
	400 A	**AKW4804B**
	600 A	**AKW4808B**
Through type	50 A / 100 A	**AKW4506B**
	250 A / 400 A	**AKW4507B**
	600 A	**AKW4508B**

Note: Be sure to place an order according to distribution systems excluding **AKW8115, KW9M** and **KW2M**.



AKW4801B AKW4802B AKW4803B AKW4804B AKW4808B AKW4506B AKW4507B AKW4508B

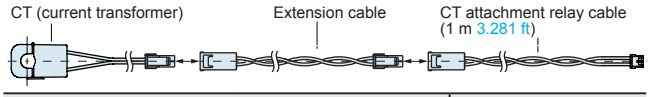
General specifications

Item \ Type / Model No.	Clamp-on type					Through type		
	AKW4801B	**AKW4802B**	**AKW4803B**	**AKW4804B**	**AKW4808B**	**AKW4506B**	**AKW4507B**	**AKW4508B**
Primary side rated current	5 A / 50 A	100 A	250 A	400 A	600 A	50 A / 100 A	250 A / 400 A	600 A
Secondary side rated current	1.67 mA / 16.7 mA	33.3 mA	125 mA	200 mA	200 mA	16.7 mA / 33.3 mA	125 mA / 200 mA	200 mA
Winding (Turn)	3,000	3,000	2,000	2,000	3,000	3,000	2,000	3,000
Ratio error	± 2.0% F.S.					± 1.0% F.S.		
Through hole	ø10 mm ø0.39 in	ø16 mm ø0.63 in	ø24 mm ø0.94 in	ø36 mm ø1.42 in		ø17 mm ø0.67 in	ø36 mm ø1.42 in	
Breakdown voltage (initial)	1,000 V AC / 1 min (Between through hole and output lead wire)		2,000 V AC / 1 min (Between through hole and output lead wire)			1,000 V AC / 1 min (Between through hole and output lead wire)	2,000 V AC / 1 min (Between through hole and output lead wire)	
Insulation resistance (initial)	Min. 100 MΩ (at 500 V DC megger) (Between through hole and output lead wire)							
Functional vibration resistance	10 to 55 Hz (1 cycle/min), single amplitude: 0.15 mm 0.01 in (10 min on 3 axes)							
Vibration resistance	10 to 55 Hz (1 cycle/min), single amplitude: 0.375 mm 0.01 in (1 hour on 3 axes)							
Functional shock resistance	Min. 98 m/s^2 (4 times on 3 axes)							
Shock resistance	Min. 294 m/s^2 (5 times on 3 axes)							
Output protection level	±7.5 V with clamp element		±3.0 V with clamp element			±7.5 V with clamp element	±3.0 V with clamp element	
Permissible clamping frequency	100 times approx.					—		
Ambient temperature	-10 to +50 °C +14 to +122 °F (without frost and non-condensing)							
Storage temperature	-20 to +60 °C -4 to +140 °F (without frost and non-condensing)							
Ambient humidity	35 to 85 % RH (at +20 °C +68 °F non-condensing)							
Dimensions (mm in) (W × H × D)	23 × 40 × 26.5 0.08 × 0.13 × 0.09	30 ×46.5 × 32 0.10 × 0.15 × 0.11	45 ×65 × 34 0.15 × 0.21 × 0.11	57 ×81 × 38 0.19 × 0.27 × 0.12	62.6 ×93.3 × 40 0.21 × 0.31 × 0.13	ø42 × 15 1.65 × 0.05	ø70 ×19 2.76 × 0.06	ø70 ×19 2.76 × 0.06
Weight (Relay cable included)	60 g approx.	90 g approx.	200 g approx.	295 g approx.	450 g approx.	70 g approx.	200 g approx.	215 g approx.

Notes: 1) Dedicated CT are dedicated for low voltage under 440 V AC system. They can not be used for high voltage circuit.
2) In each type of Eco-POWER METER excluding **AKW8115, KW9M** and **KW2M**, a combination of commercially secondary side 5 A CTs and dedicated CTs for 5 A is used for measuring high voltage circuits; For details, confirm with each respective user's manual.
3) Since dedicated CTs cannot be used when measuring with **AKW8115, KW9M** and **KW2M**, please be careful and do not purchase a dedicated CT by mistake.
4) For the **AKW8115**, **KW9M** and **KW2M**, CT with a secondary side current 1 A or 5 A is recommended. Please confirm the specification beforehand.
5) Dedicated CT are not included with Eco-POWER METERs.
6) Each dedicated CT includes a 1 m 3.281 ft relay cable, respectively.

Options

Extension cable



Product name		Model No.
CT extension cable As an Eco-POWER METER dedicated CT option	3 m 9.843 ft	**AKW4703**
	5 m 16.404 ft	**AKW4705**
	10 m 32.808 ft (made-to-order)	**AKW4710**

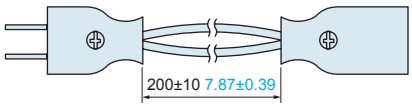
*1 Specify no more than one level for various extension cable connections.
*2 15 m 49.213 ft and 20 m 65.617 ft extension cables are available on a made-to-order basis. For details, please contact our company.

Relay cable

Product name	Model No.
Relay cable (1m 3.281 ft) (made-to-order)	**AKW4811B**

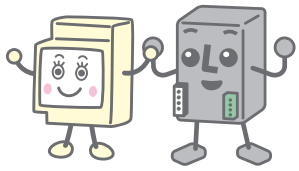
* A relay cable comes with each dedicated current transformer (CT) for free.

Intermediate power cable



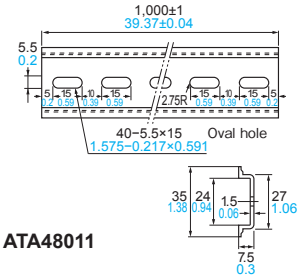
Product name	Model No.
Intermediate power cable	**AKE2811**

*1 Use of an intermediate power cable is recommended when the dedicated CT attachment power cable is not divided into two.



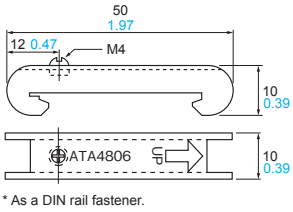
Required for DIN rail mounting

Mounting rails (applicable for DIN and IEC standards): For **KW4M** pin type (**AKW5211** and **AKW5212**), **KW7M, KW2G / KW2G-H, KW1M / KW1M-H, KW2M**



Model No.: **ATA48011**

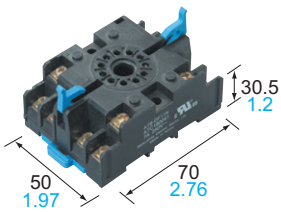
Fastening plate: For **KW4M** pin type (**AKW5211** and **AKW5212**), **KW7M, KW2G / KW2G-H, KW1M / KW1M-H, KW2M**



* As a DIN rail fastener.

Model No.: **ATA4806**

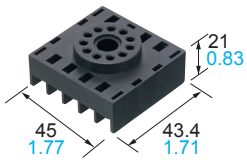
DIN rail terminal socket: For **KW4M** 11-pin type (**AKW5211** and **AKW5212**)



Model No.: **ATC180041**

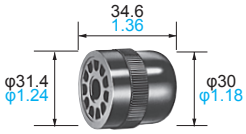
Required for panel mounting

Rear terminal socket: For **KW4M** 11-pin type (**AKW5211** and **AKW5212**)



Model No.: **AT78051**

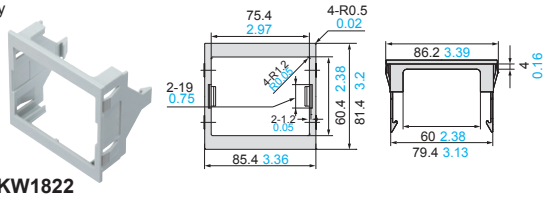
11P cap: Applicable to **KW4M** 11 pin type (**AKW5211**, **AKW5212**)



Model No.: **ATA4861**

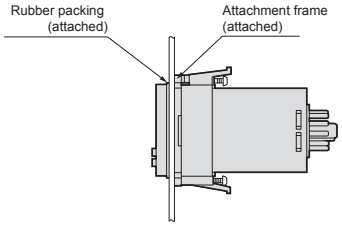
Mounting frame: For **KW1M** and **KW1M-H**

* Sold separately



Model No.: **AKW1822**

Rubber packing, attachment frame: For **KW4M**

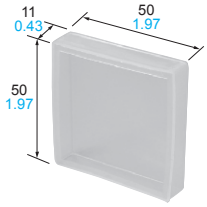


[Attachment frame]
Model No.: **ATA4811**

[Rubber packing]
Model No.: **ATC18002**

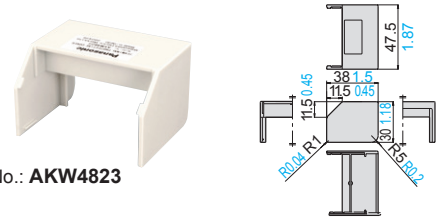
Convenient for panel mounting

Protective cover for DIN 48 size (flexible type) : For **KW4M**



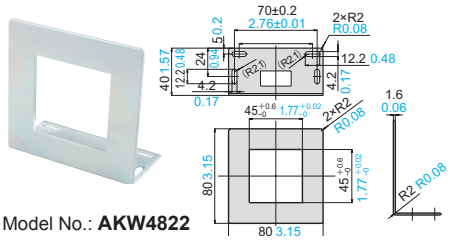
Model No.: **AQM4803**

Terminal protective cover: For **KW4M** screw terminal type (**AKW5111** and **AKW5112**)



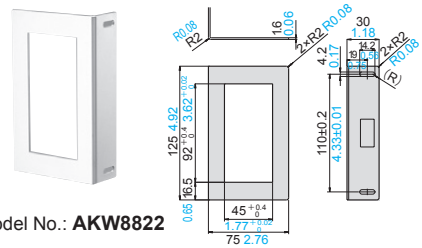
Model No.: **AKW4823**

Mounting frame: For **KW4M** * For fixing



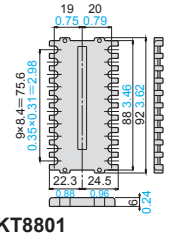
Model No.: **AKW4822**

Mounting frame: For **KW8M**



Model No.: **AKW8822**

Terminal cover: For **KW8M**



Model No.: **AKT8801**

Others

Screwdriver for terminal socket: For **KW7M, DLL**

Model No.: **AFP0806**

Backup battery: For **KW1M-H**, **KW2G-H** main unit, **ELC□**, **DLL**

* Packaged with **AKW1121B AKW2020GB, UELC1000, AKL1000**

Model No.: **AFPG804**

Backup battery: For with logging function type **KW8M** (**AKW8111H**) only

* Packaged with the main unit

Model No.: **AFC8801**

Can be monitored using a Ethernet

Signal converter KS1

*EMC Directive

RS-232C / RS-485 data can be easily monitored by Ethernet!!

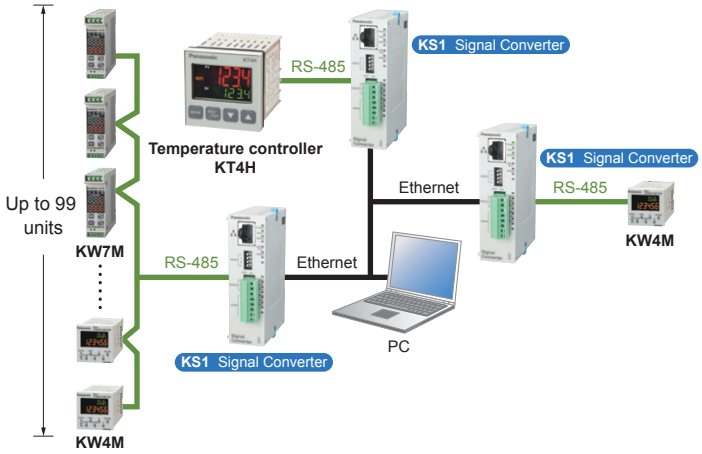
Easy to connect
The connectors are located on the front panel.

Easy to operate
The IP address can be easily set by using the "**Configurator WD**" setup software, which can be downloaded from our website.
Can be connected to the Ethernet without the need of switching between RS-232C and RS-485 signals.

Easy-to-install DIN-rail-mountable type

Economical
Affordable price

KS1: AKS1202



Order guide

Product name	Rated operation voltage	Description	Model No.
KS1 Signal converter	24 V DC	RS-232C / RS-485⇔Ethernet	**AKS1202**
Configurator WD[*1]	—	IP address search tool	—

*1 Can be downloaded free from our website (membership registration is required).

Specifications

Use safely and correctly after carefully reading the product specification manual, user manual, and operational instruction manual.

Communication specifications <Ethernet communication>

Interface		IEEE802.3u, 10BASE-T / 100BASE-TX
Connector configuration		RJ45
Transmission specifications	Transmission speed	10 Mbps / 100 Mbps
	Transmission method	Base band
	Maximum segment length	100 m 328.084 ft
Communication cable		UTP (category 5)
Protocol		Modbus TCP(RTU,ASCII), TCP/IP
Function		Auto negotiation function, MDI / MDI-X auto crossover function

* Ethernet is a registered trademark of Fuji Xerox Co., Ltd. and Xerox Corporation.

<RS-232C, RS-485 communication>

Interface		RS-232C (non-insulated)	RS-485 (insulated)
Conversion COM port[*1]		COM1	COM2
Communication style		1:1 communication	1:N communication
Number of connection units		1 unit	Max. 99 units
Communication method		Full duplex system	Half-duplex operation
Synchronous system		Synchronous communication method	
Transmission distance		15 m 49 ft	Max. 1,200 m 3,937 ft[*2]
Transmission speed		2,400 / 4,800 / 9,600 / 19,200 / 38,400 / 57,600 / 115,200 bps	
Connection connector quantity		Max. 3	
COM reception time-out		Setting range 10 ms to 300 s	
Non-transmission connection cut-off time		Setting range 0 - 1800 s (Setting value of 0 is not cut off)	
Transmission format	Data length	8 bit fixed	
	Parity	Odd / even / none	
	Stop bit	1 bit / 2 bit	
	Terminator code	CR / CR+LF / None	
Serial ⇔ Ethernet conversion format		Command response format	

*1 COM1, COM2 can be combined.
*2 Confirm using the actual device if connecting to a commercially available device. The number of stations, transmission distance, and communication speed may differ depending on the device and transmission path. Refer to the user manual for details.

Temperature controller KT4R / KT4H / KT4B SERIES

*1 Low Voltage Directive, EMC Directive
*2 **KT4R** only

- **Multi-input**
  Versatile thermocouple, RTD, DC voltage and DC current input for temperature detecting sensors
- **Smooth initial setting and setting adjustment (KT4R only)**
  Smooth operation is enabled at initial startup and after changing settings.
- **Fine control of heat capacity (KT4R only)**
  Sampling period rate half (1/2 times) from previous model: high speed 125 ms processing implemented.
- **Maximum number of connections with DLL: 31**

Order guide

KT4R series (Black)

Base model	Power Supply	Sensor input	Control output	Alarm output	Heating / cooling	Heater burnout	Communication function	Model No.
AKT4R	1 (100–240 V AC)	1 (Multi-input)	1 (Relay contact)	1 (1 point)	0 (Not available)	0 (Not available)	Blank (Not available)	AKT4R111100
							1 (serial communication RS-485)	AKT4R1111001
				2 (2 points)			Blank (Not available)	AKT4R111200
							1 (serial communication RS-485)	AKT4R1112001
			2 (Non-contact voltage)	1 (1 point)			Blank (Not available)	AKT4R112100
							1 (serial communication RS-485)	AKT4R1121001
				2 (2 points)			Blank (Not available)	AKT4R112200
							1 (serial communication RS-485)	AKT4R1122001

*1 Using EV2 assigned setting, use for heating and cooling control is possible.
*2 Since a shunt resistor is built in, a separately sold shunt resistor is not required when DC current input is specified.

KT4H series (Ash gray)

Base model	Power supply	Sensor input	Control output	Alarm output	Heating / Cooling	Heater burnout	Communication function	Description	
AKT4H									
	1							100-240 V AC	
	2							24 V AC/DC	
		1						Multi-input (Thermocouple, RTD, DC current, DC voltage)	
			1					Relay contact	
			2					Non-contact voltage (voltage output for SSR drive)	
			3			0		DC current	Heater burnout alarm : not possible
				1				1 point (1a)	
				2	0			2 points (1a+1a)	Heating / Cooling control output : not possible
					0			Not available	
					1	0		Relay contact	Heater burnout alarm : not possible
					2	0		Non-contact voltage (voltage output for SSR drive)	Heater burnout alarm : not possible
						0		Not available	
			1 or 2		0	3		Single phase 20A *4	
			1 or 2		0	4		Single phase 50A *4	
			1 or 2		0	5		Three phase 20A *4	
			1 or 2		0	6		Three phase 50A *4	
							Blank	Not available	
							1	Serial communication RS-485	
							2	Contact input	

*1 CT1 or CT2 for current transformer is provided as an accessory when heater burnout alarm is added.
*2 Under some conditions, option functions (shaded items) may not be available; please check the “Description” of the above table for non-functioning circumstances.
*3 When current input is specified, a shunt resistor (sold separately) is required.
*4 Heater burnout alarm not supported when control output is DC output type / Not supported when heating / cooling control is selected.

Part No. search method
Example: When the optional functions (heating / cooling: relay contact, communication function: serial communication) are added on to the basic function
• Part No.: **AKT4H1111101**

KT4B series (Black)

Base model	Power Supply	Sensor input	Control output	Alarm output	Heating / Cooling	Heater burnout	Communication function	Model No.
AKT4B	1 100-240 V AC	1 (Multi-input)	1 (Relay contact)	1 (1 point)	0 (Not available)	0 (Not available)	Blank (Not available)	AKT4B111100
							1 (serial communication)	AKT4B1111001
				2 (2 points)			Blank (Not available)	AKT4B111200
							1 (serial communication)	AKT4B1112001
			2 (Non-contact voltage)	1 (1 point)			Blank (Not available)	AKT4B112100
							1 (serial communication)	AKT4B1121001
				2 (2 points)			Blank (Not available)	AKT4B112200
							1 (serial communication)	AKT4B1122001
			3 (DC current)	1 (1 point)			Blank (Not available)	AKT4B113100
							1 (serial communication)	AKT4B1131001
				2 (2 points)			Blank (Not available)	AKT4B113200
							1 (serial communication)	AKT4B1132001

*1 Please inquire if you need specifications not included in the model numbers above. On our website, it is easy to find products by model number selection or by searching for specifications.
*2 Use RS-485 for serial communication.
*3 When current input is specified, a shunt resistor (sold separately) is required.

Air flow monitor EWA2 SERIES

CE*

*EMC Directive (all models), Pressure Equipment Directive (**AEWA2150** / **AEWA2200** only)

Visualize compressed air and nitrogen gas (N_2)* consumption in order to Identify and eliminate waste!

* Nitrogen gas can be measured with small or medium pipe size only.

- Ultrasonic detection is used for the detection principle
- Selectable flow conversion function
  [Normal flow / Standard flow]
- Equipped with RS-485 Modbus RTU communication

Small pipe size:
AEWA2025

Medium pipe size:
AEWA2040

Large pipe size:
AEWA2100

Order guide

Type	Pipe size	Model No.
Small pipe size	25A (1B)	**AEWA2025**
	32A (1 1/4B)	**AEWA2032**
Medium pipe size	40A (1 1/2B)	**AEWA2040**
	50A (2B)	**AEWA2050**
	65A (2 1/2B)	**AEWA2065**
	80A (3B)	**AEWA2080**
Large pipe size	100A (4B)	**AEWA2100**
	150A (6B)	**AEWA2150**
	200A (8B)	**AEWA2200**

Option

Type	Details		Model No.
Connection cable	5 m 16.40 ft length	0.2mm² 6-core cabtyre cable with connector on one side	**AEWA1C05**
	20 m 65.62 ft length		**AEWA1C20**

* The connecting cable is not included. Please be sure to purchase it.

Specifications

Communication specifications

Item		Specifications
Interface		Conforming to EIA-485
Protocol		Modbus RTU
Communication method		Half-duplex
Synchronous system		Synchronous communication method
Number of connected units		115,200 bps: Max. 8 units 9,600 / 19,200 / 38,400 / 57,600 bps: Max. 31 units
Transmission speed		9,600 / 19,200 / 38,400 / 57,600 / 115,200 bps (select in setting mode)
Transmission format	Data length	8 bit
	Stop bit	1 bit / 2 bit
	Parity	None / Odd number / Even number
Data buffer		100 byte
Response time		9,600 bps : 100 to 130 ms 38,400 bps : 50 to 80 ms 115,200 bps : 40 to 70 ms 19,200 bps : 70 to 100 ms 57,600 bps : 40 to 70 ms
Ending resistance		100 Ω approx. (built-in) (select in setting mode)

* The number of connectable units, transmission distance, and transmission speed may differ depending on the device to be connected and transmission path. Please confirm using the actual device.

Specifications

Use safely and correctly after carefully reading the product specification manual, user manual, and operational instruction manual.

Common specifications

Item			Specifications
Rated pressure range			0 to 1 MPa (Gauge pressure)
Rated operating voltage			24 V DC ±10 %
Power consumption			1.5 W or less
Pulse output			Open drain output • Max. inflow current: 50 mA • Applied voltage: 24 V DC or less • Residual voltage: 1.5 V or less (at inflow current 50 mA)
	Output mode		Direct flow pulse
	Over current protection		Equipped
	Pulse output time		Duty (1:1) 50 / 100 / 125 / 250 / 500 ms (select in setting mode)
Analog current output			Output current: 4 to 20 mA Output accuracy: ±0.1 mA Max. external load: 400 Ω or less
	Output mode		Instant flow, air pressure and temperature (select in setting mode)
		Instant flow	Zero point: 4 mA (Direct flow display mode, reverse flow ~ within low flow cut off) 12 mA (Direct / Reverse flow display mode, within low flow cut off)
		Air pressure	0 kPa: 4 mA, 1 MPa: 20 mA
		Temperature	-10 °C +14 °F: 4 mA, +60 °C +140 °F: 20 mA
Pressure loss			Extremely small (same as straight pipe)
Response time			500 ms
Using environment	Enclosure protection		IP64 (IEC)
	Ambient temperature		-10 to +60 °C +14 to +140 °F (Storage: -20 to +70 °C -4 to +158 °F)
	Ambient humidity		90 % RH or less (No dew condensation or icing allowed)

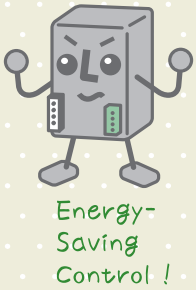
* When installing the monitor in a horizontal pipe, install it with its display facing up. It can also be installed to vertical pipings.

Individual specifications

Model No.		AEWA2025	AEWA2032	AEWA2040	AEWA2050	AEWA2065	AEWA2080	AEWA2100	AEWA2150	AEWA2200
Pipe size		25A (1B)	32A (1 1/4B)	40A (1 1/2B)	50A (2B)	65A (2 1/2B)	80A (3B)	100A (4B)	150A (6B)	200A (8B)
Measurable fluids		Air (compressed air), Nitrogen gas						Air (compressed air)		
Flow range	Actual flow [m³/h]	−0.6 to −35 or +0.6 to +35	−1.1 to −65 or +1.1 to +65	−1.3 to −80 or +1.3 to +80	−2.5 to −150 or +2.5 to +150	−4 to −240 or +4 to +240	−5 to −300 or +5 to +300	−10 to −500 or +10 to +500	−24 to −1,200 or +24 to +1,200	−40 to −2,000 or +40 to +2,000
	Normal flow* [Nm³/h]	−4.3 to −250 or +4.3 to +250	−8 to −470 or +8 to +470	−9.4 to −580 or +9.4 to +580	−18 to −1,090 or +18 to +1,090	−29 to −1,740 or +29 to +1,740	−36 to −2,170 or +36 to +2,170	−72 to −3,620 or +72 to +3,620	−170 to −8,690 or +170 to +8,690	−290 to −14,490 or +290 to +14,490
Flow measuring accuracy	±5 % R.S. [m³/h]	−0.6 to −3.5 or +0.6 to +3.5	−1.1 to −6.5 or +1.1 to +6.5	−1.3 to −8 or +1.3 to +8	−2.5 to −15 or +2.5 to +15	−4 to −24 or +4 to +24	−5 to −30 or +5 to +30	−10 to −50 or +10 to +50	−24 to −120 or +24 to +120	−40 to −200 or +40 to +200
	±2 % R.S. [m³/h]	−3.5 to −35 or +3.5 to +35	−6.5 to −65 or +6.5 to +65	−8 to −80 or +8 to +80	−15 to −150 or +15 to +150	−24 to −240 or +24 to +240	−30 to −300 or +30 to +300	−50 to −500 or +50 to +500	−120 to −1,200 or +120 to +1,200	−200 to −2,000 or +200 to +2,000
Conversion accuracy		±2.5 % R.S. [at dry air or nitrogen gas (at 90 % RH or below), ordinary temperatures and 0.5 MPa]						±2.0 % R.S. [at dry air (at 90 % RH or below), ordinary temperatures and 0.3 MPa]		
Unit for pulse output		10 / 100 / 1,000 [L/pulse]						100 / 1,000 / 10,000 [L/pulse]		
Low flow cut off		Within ±0.1 m³/h	Within ±0.2 m³/h	Within ±0.2 m³/h	Within ±0.4 m³/h	Within ±0.6 m³/h	Within ±0.8 m³/h	Within ±2.6 m³/h	Within ±5.0 m³/h	Within ±9.0 m³/h
Material		Measuring pipe: Aluminum alloy, PPS, FVMQ						Measuring pipe: Stainless alloy, PPS and FVMQ		
Net weight		1.5 kg approx.	1.4 kg approx.	1.0 kg approx.	1.2 kg approx.	1.4 kg approx.	1.7 kg approx.	10.3 kg approx.	18.3 kg approx.	24.4 kg approx.

* With supply pressure 0.7 MPa and temperature in pipe at +25 °C +77 °F

A Success Report from Panasonic Industrial Devices SUNX Tatsuno Co., Ltd.



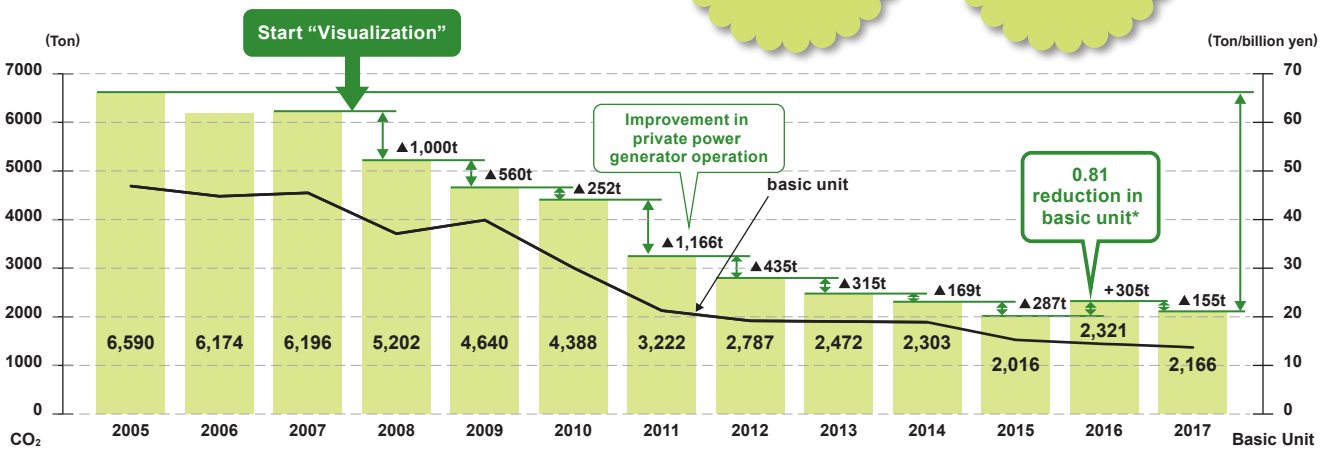
Panasonic Industrial Devices SUNX Tatsuno has shown a great reduction in energy consumption.
However, they previously had trouble achieving the reduction target, having little idea about further steps .
How did they accomplish the excellent results in such a hard situation? The key is "Visualization".
Through "Visualization", they were able to discover hidden energy waste and come up with effective measures, which led to success.

Tatsuno Factory CO_2 reduction performance

* As compared with 2005

67%* reduction in CO_2

72%* reduction in basic unit

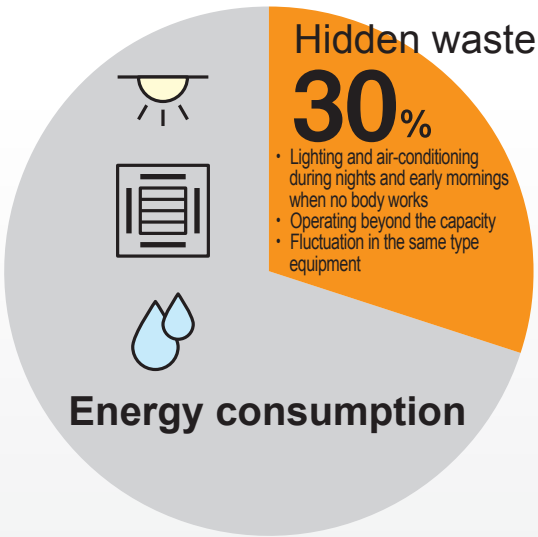


* CO_2 emissions increased due to production increase in 2016.

Examples of energy-saving measures

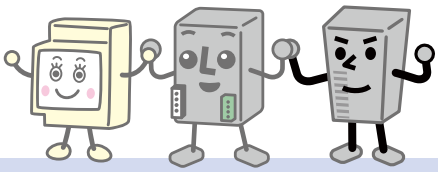
Item	Annual effect in cost (1kWh = 13JPY)	Applied equipment
Mold making machine : turn off the breaker when no electricity is required	28,579 JPY	22.9kWh/day
Heating cylinder for injection molding machine : equip with thermal insulators to avoid heat loss.	78,468 JPY	56kWh×50 Units
Resin dryers for molding : circulate hot air exhaust into intake.	1,004,640 JPY	32.2kWh×10 Units
Line facilities : Back up data and turn off power supply when not in operation	197,340 JPY	63.25kWh/line
Avoid unnecessary lighting thoroughly by adding a canopy switch (string switch)	79,872 JPY	32W×20 lights

Think about how much money you have wasted for useless energy consumption.



By "Visualization", the Panasonic group discovered about 30% of waste in energy consumption.
Trying energy-saving activities at random does not give you meaningful results for the time and efforts you put into.

The quickest way to save energy is to find the hidden waste and take appropriate measures.



・This product includes software developed by the IEEE Industry Connections Security Group (ICSG)

Please contact .....

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