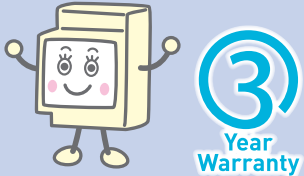


Optimize your energy use



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"

"Digital Signage"

Air Conditioning Control

Data Collection and Accumulation

Power Monitoring

Signal Conversion

Environment Management

Related Products

"Visualization"

For easy visualization to find waste or loss without expertise.

▶ P.8

Most recommended for power use analysis.



"Visualization" of accumulated data in DLL / ELC
KW Watcher ▶ P.8

Free download



Visualization of measured and collected data on the SD memory card
KW View ▶ P.9

Free download

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



ELC500 ▶ P.12

ELC1 ▶ P.14



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

Max. 24 circuits



Energy saving and electric power quality monitoring with multiple circuits.
KW2M ▶ P.22

KW2M ▶ P.22

For preventative maintenance!



For both energy-saving and power monitoring
KW9M ▶ P.28

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

KS1 ▶ P.40

Environment Management

Management of temperature and air for further energy-saving.

▶ P.41

Temperature Controller



Thermocouple, RTD, DC current / voltage input possible!
KT4R / KT4H / KT4B ▶ P.41

KT4R / KT4H / KT4B ▶ P.41

Air Flow Monitor



Pipe size: 25 to 200A
EWA2 ▶ P.42

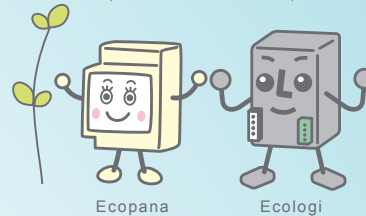
EWA2 ▶ P.42

Read a success report

Reductions of CO₂ by 67 % and basic unit by 72 % have been achieved with the help of "Visualization".
Learn more

See  P.43

A plentiful lineup!



Ecopana

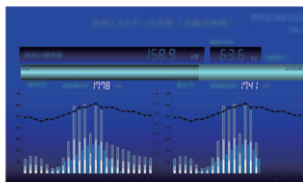
Ecologi

"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.

"Visualization"

"Digital Signage"

Air Conditioning Control

Data Collection and Accumulation

Power Monitoring

Signal Conversion

Environment Management

Related Products

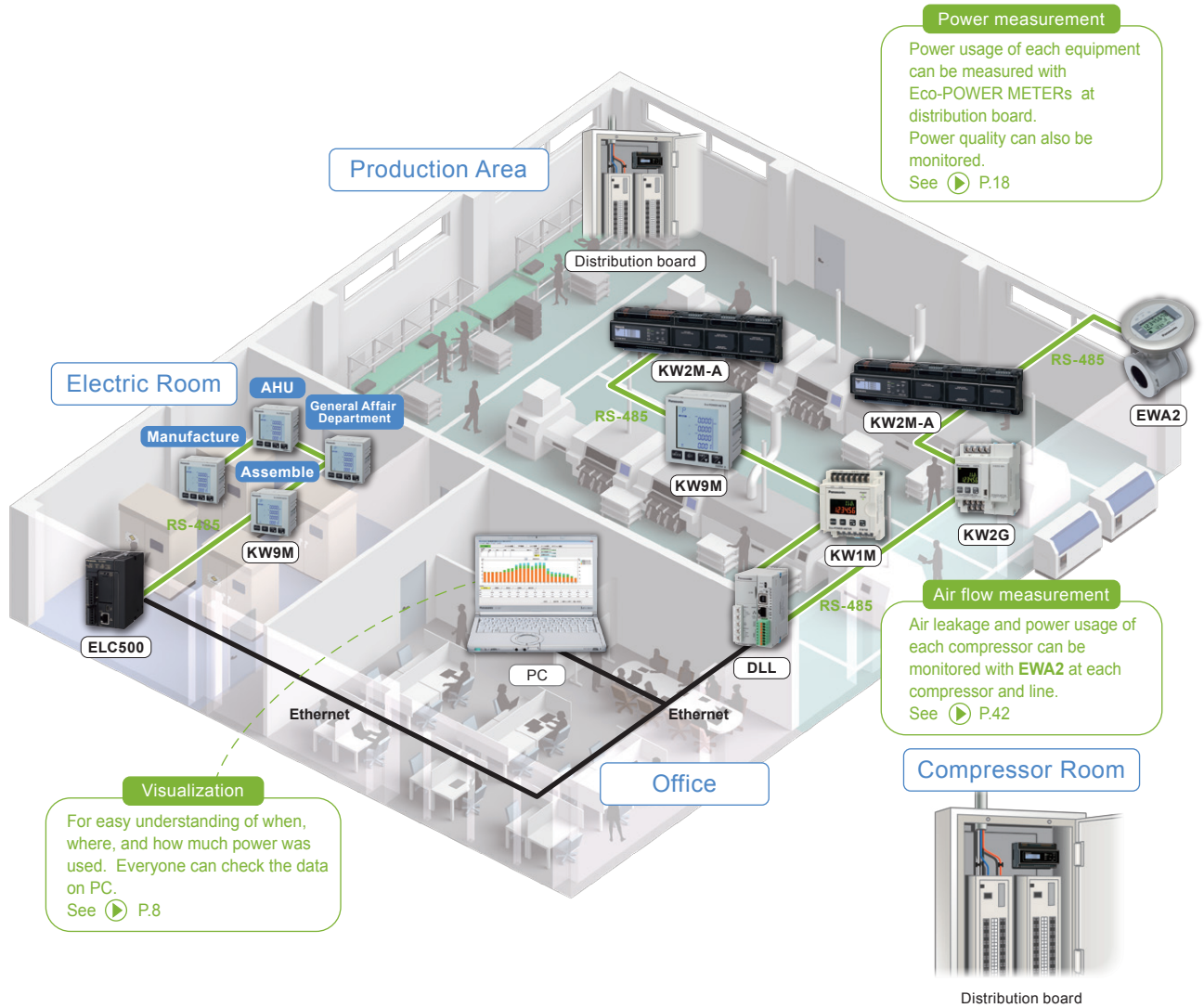
Example Application

→ 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.

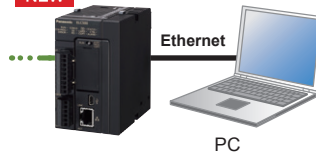
In this way, you can take the appropriate measures to minimize your energy consumption while satisfying your need.



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.

NEW



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.

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

Example Application

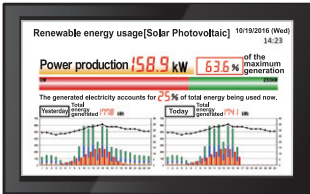
→ Factory "Digital Signage"

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

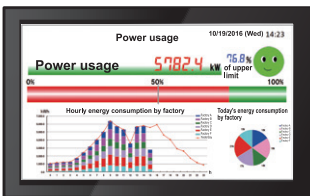


Real-time display of actual measurements helps provide an easy-to-understand explanation of energy-saving activities.

Main Entrance

Factory

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.

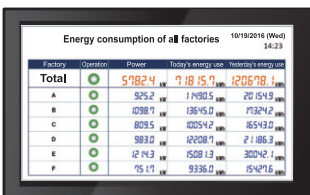
Office

Production progress

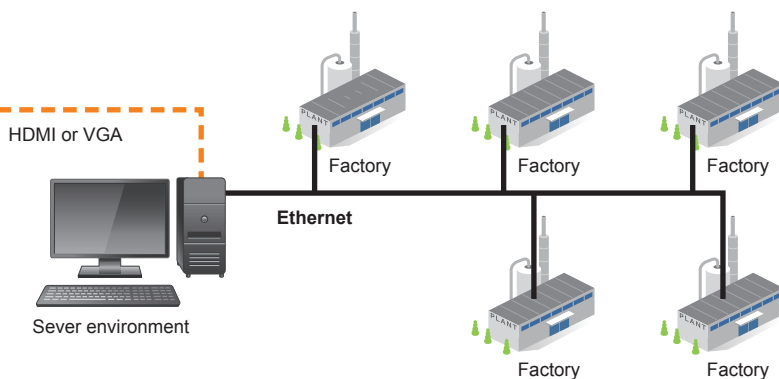


Shows power consumption, production progress, and resource intensity in tables or graphs. Perfect to see the progression and find any problem to deal with.

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!

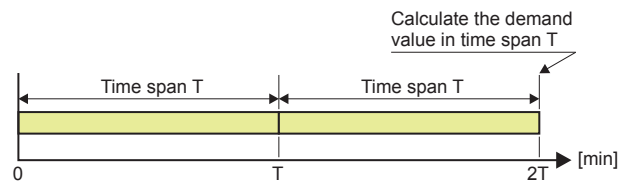
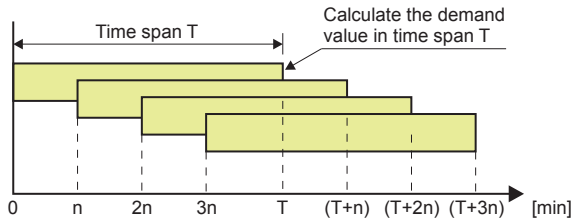


Super Ecologi kun

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.]



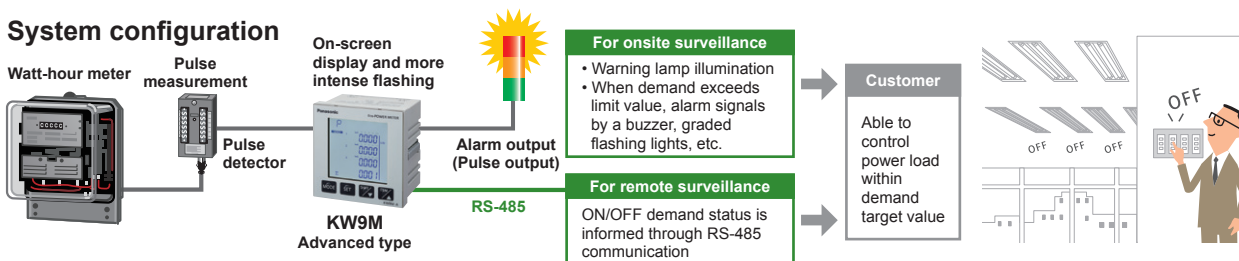
• Sliding block interval method

The next time span starts “n” minutes later. (Value “n” is arbitrarily set by users.)

• Fixed block interval method

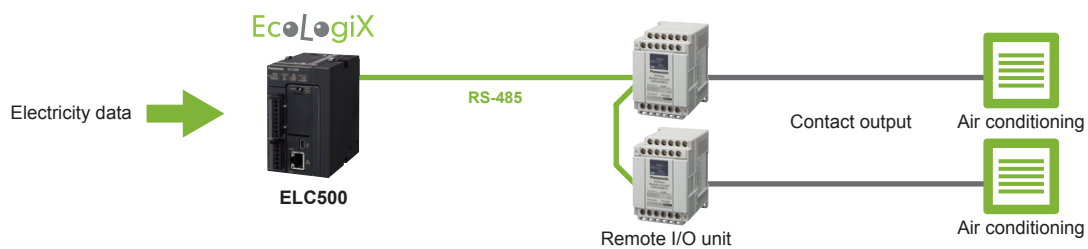
The next time span starts after completion of the current span.

System configuration



* Also ready for CT inputs (electric power measurement)

Control

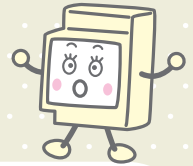


Air conditioners are automatically turned OFF based on the set control pattern.

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 | UEL500 |
| Remote I/O unit | 2 Input points / 4 Relay output points RS-485 [Modbus RTU / MEWTOCOL] | UENU2D4R12 |

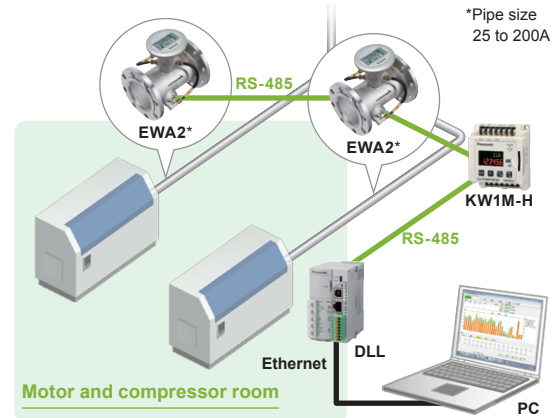
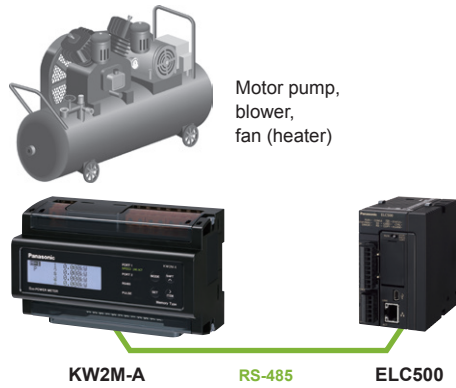
Power quality and air consumption are monitored too!



Example Application

→ Preventive Maintenance & Energy-saving

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

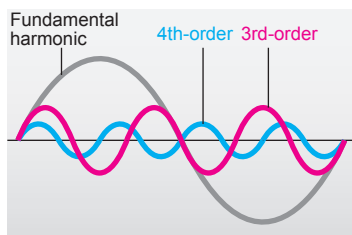


Preventive maintenance of motor or inverter equipment is possible.

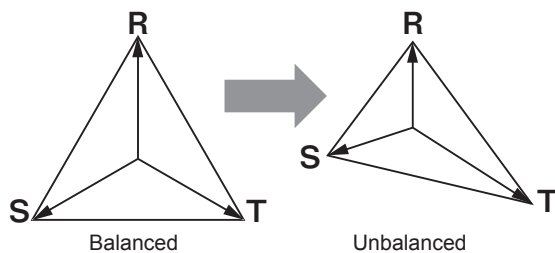
When equipment malfunctions or deteriorates, harmonics or unbalanced voltage / current are generated. They may cause a variety of problems such as breaker malfunction or malfunction / halting of equipment with built-in microcomputer, heat generation of motor, insufficient torque etc., leading to a shorter 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



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

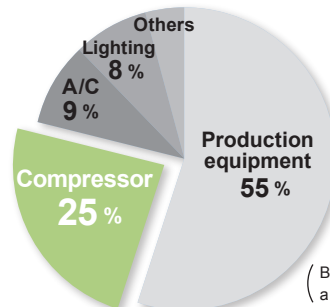
Ultrasonic detection is used for the detection principle, so elements such as filters are not required and measurement is possible even in the presence of oil mist. In addition, the flow of high-cost nitrogen gas can also be measured, and consumption can be monitored.

*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

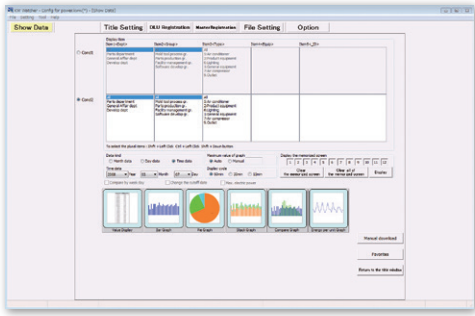
"Visualization"

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

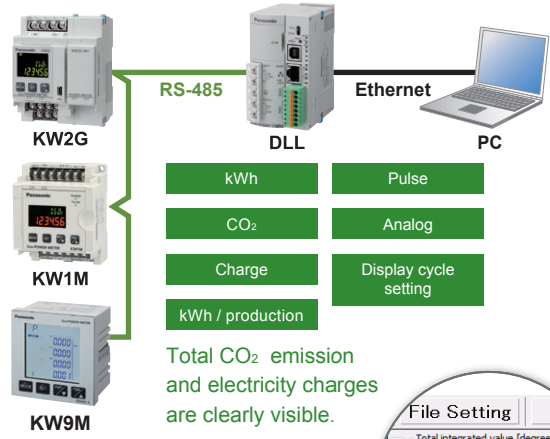
Eco-POWER METER
+
PLC (FP7, FP0H) / DLL / ELC □

LANGUAGE EN CH ID VN DE ES PT KR JP

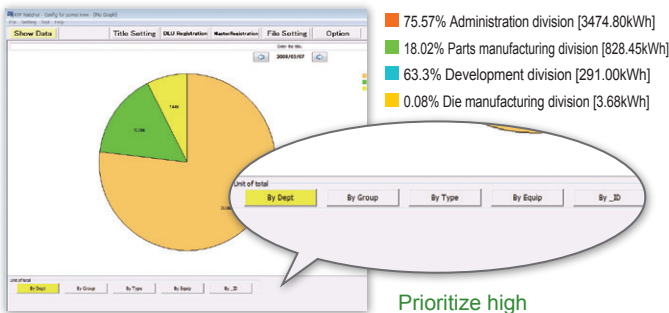
Simply select the data, dates, and types of graphs you want to display



* Fix the equipment and details in the initial configuration.



Pie Chart: for quick identification



Prioritize high consuming areas.

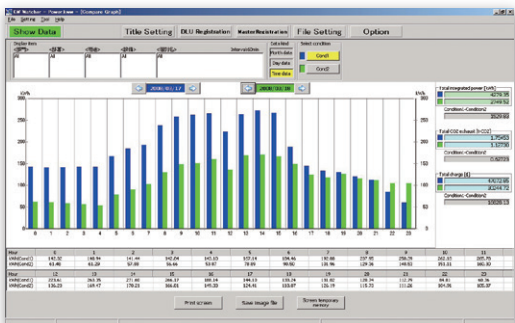
- Shows the energy consumption breakdown in the areas of your choice such as division, department, and the purpose of use.
- A good indicator of the biggest energy consumer you should take care of.

Stack Graph: for quick resolution



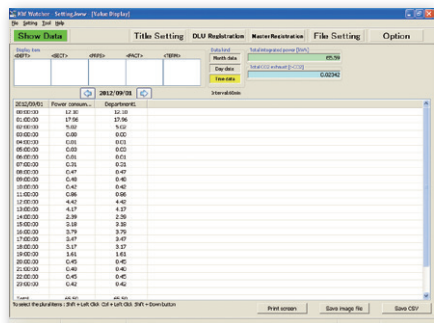
- Identifies the very equipment that contributed to the increase in overall energy consumption, which helps you deal with the issue quickly.

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 frames or different machines in the same time period.

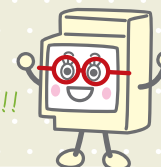
Value Display: to do more things!



- 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.

Simple
"Visualization"!!



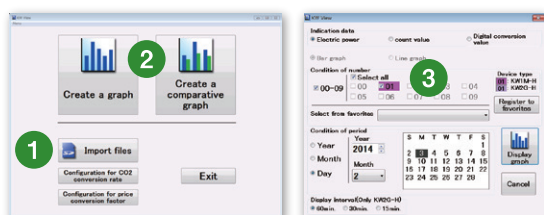
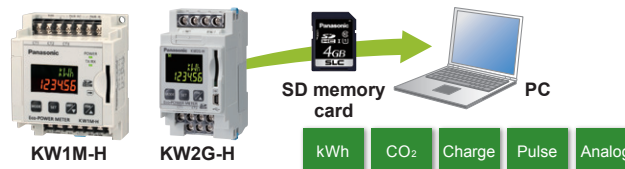
KW View ▶ For "Visualization" of measured data saved to the SD memory card

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



Comparison graph of before and after of accumulated power consumption



Comparison graph calculated power and temperature (analog)

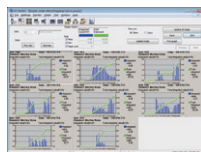
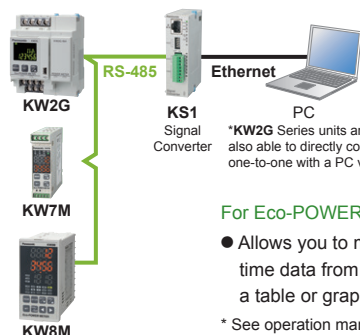


KW Monitor

Operation checking / real-time monitoring software

Eco-POWER METER + KS1

LANGUAGE EN CH KR JP

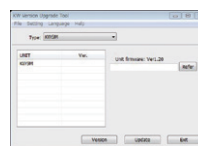


For Eco-POWER METER

- 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

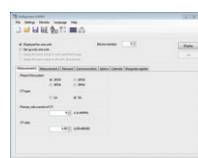


For Eco-POWER METER

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

Configurator KW9M

KW9M series setting software

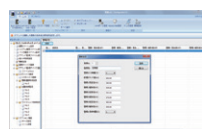


For Eco-POWER METER KW9M series

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

Configurator EL

Operation setting software

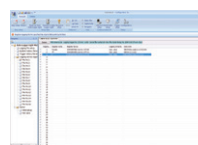


For EcoLogiX

- 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

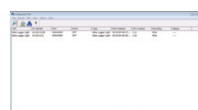


For ELC500 Control unit

- 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

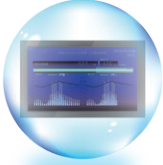
EN JP

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.

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.

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.

Organize

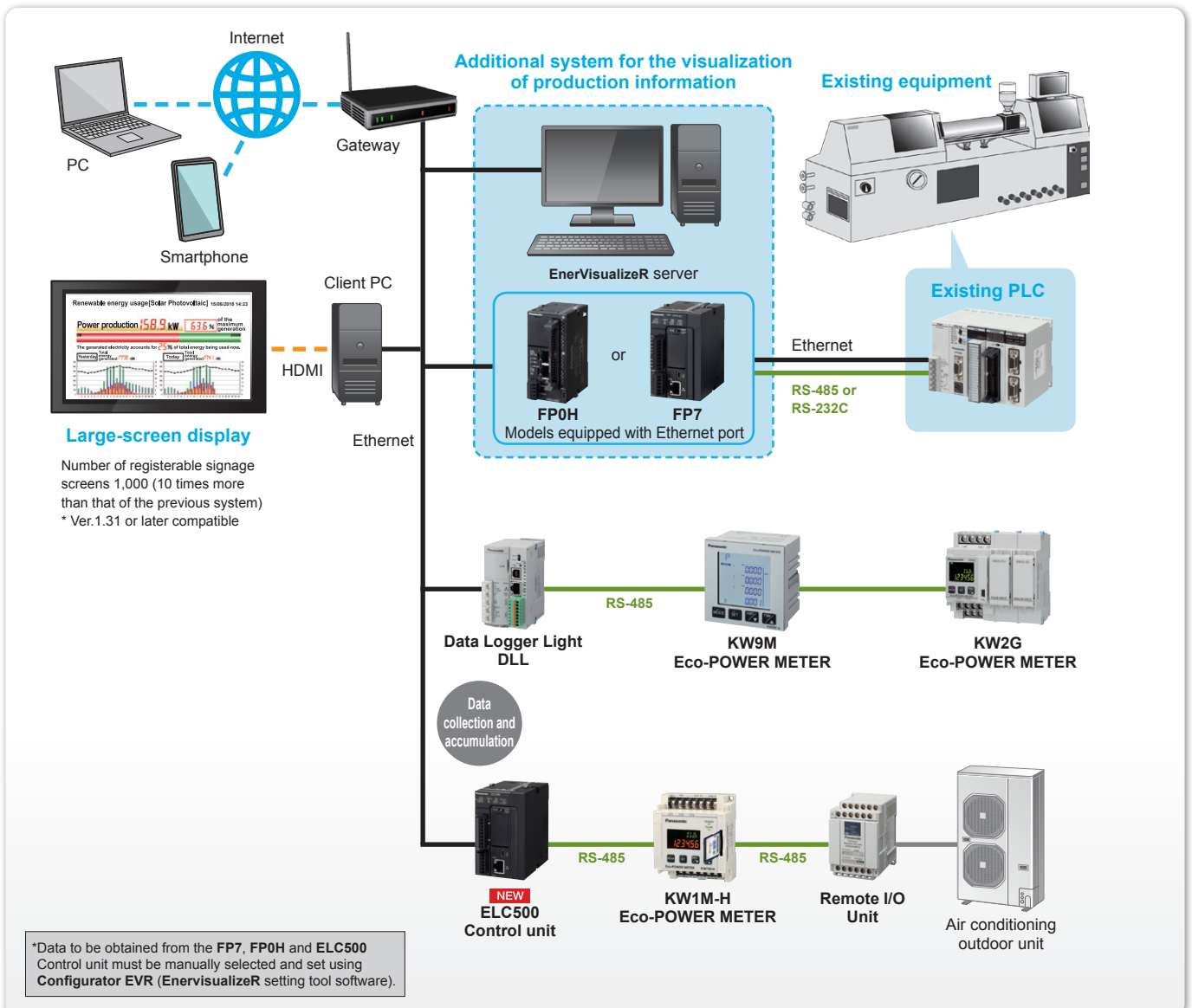
Document Form



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.

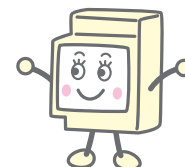
* Documents are prepared based on the data collected by **EnerVisualizeR**. Regarding the data collection period and frequency, refer to the **EnerVisualizeR** User's Manual.

"Digital Signage"



*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).

New Product!!



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 **EnerVisualizeR** 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.

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.

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.

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.

Air Conditioning Control

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 CO₂ concentration, and supports protocols used in third-party watt meters.

NEW



ELC500 Control unit: UELC500

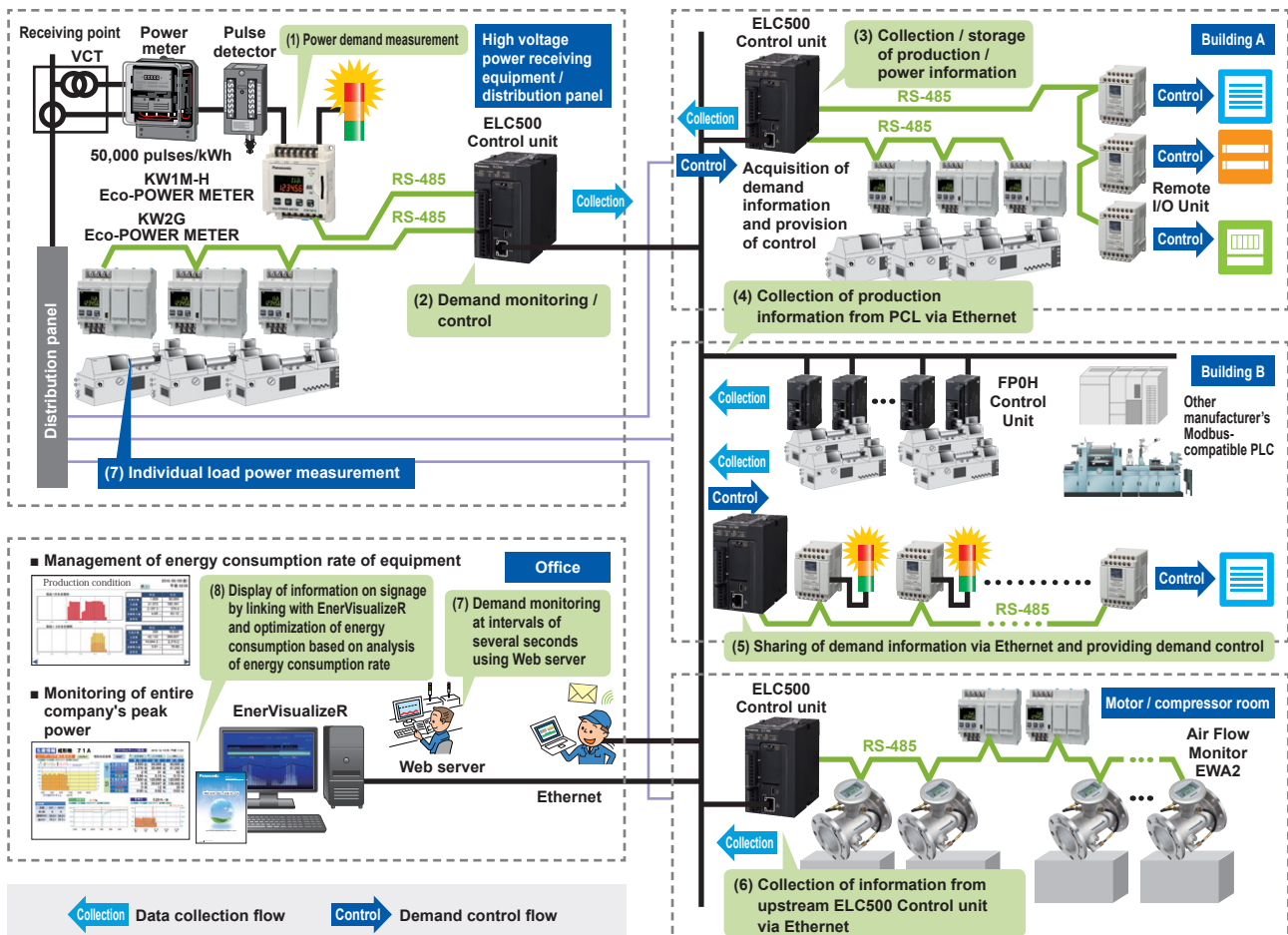
*1 The number of slave terminals varies depending on usage conditions. For details, see the instruction manual for the ELC500 Control unit.

*2 Demand time span varies from country to country.

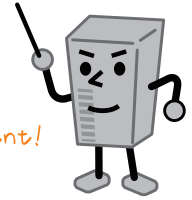
Example of system configuration – For power peak-cut and operation monitoring

- (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 | UEL500 |
| 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.) | AFP5WC |
| Key unit | License key for Control Web Creator , 1 license, USB port connection | AFP5WCKEY |
| Backup battery (attached) | Required for holding the calendar timer function | AFPX-BATT |
| Power supply cable (attached) | Cable length 1 m 3.281 ft | AFP805 |
| 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) | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> Communication protocols: TCP/IP, UDP/IP Application protocols: SMTP (SMTP AUTH supported), FTP (client / server), SNMP, DHCP, DNS, HTTP (server) |
| Email transmission function | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> 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)"

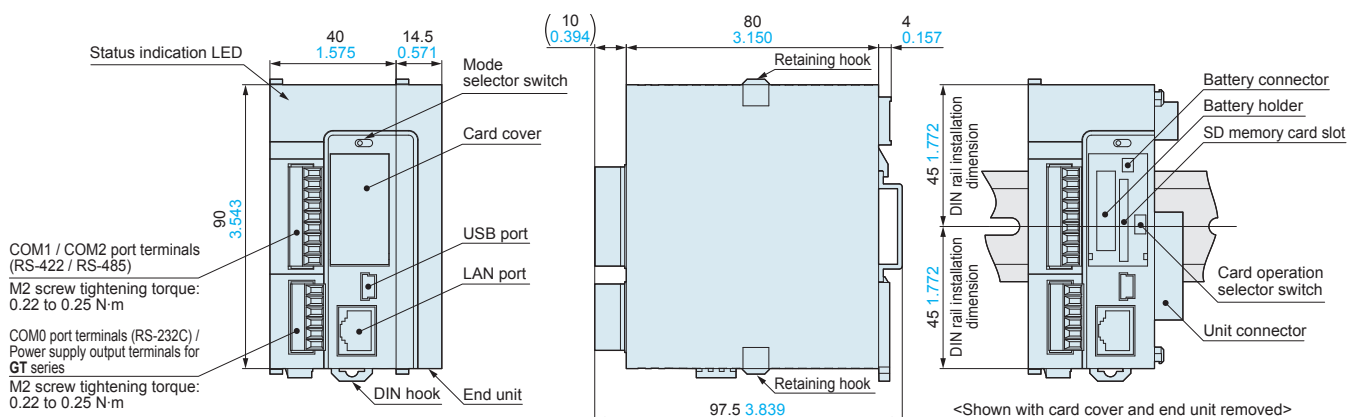
*3 Use **EConect** series remote I/O units (**UENU2D4R12**).

*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

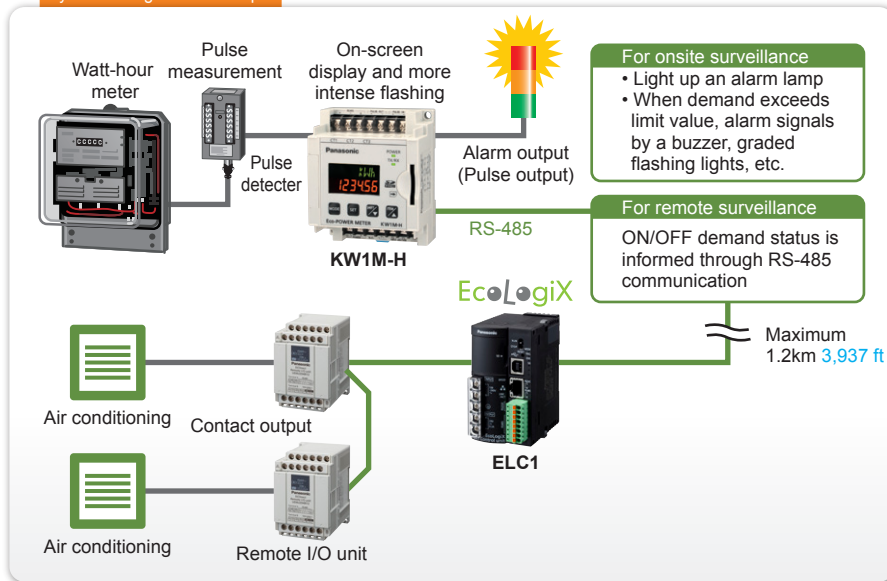


ELC1 Control unit: UELC1000



UENU2D4R12

System configuration example



Air Conditioning Control

Control Scheme EcoLogiX

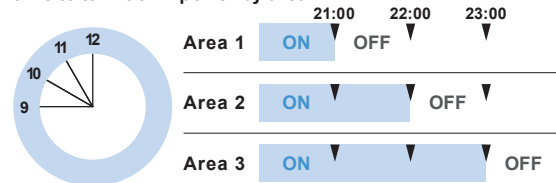
Cyclic Control

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



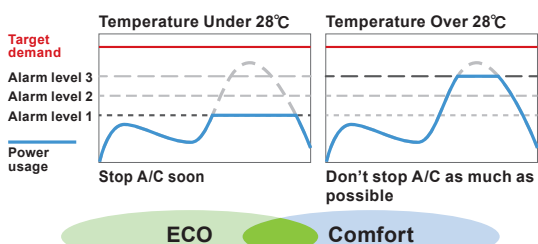
Scheduled Control

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



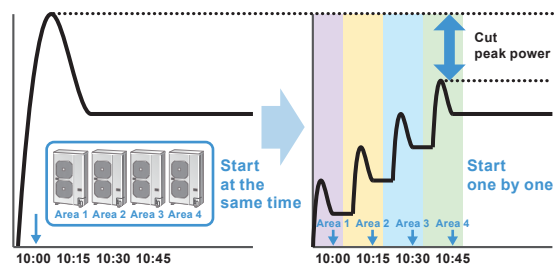
Demand Alarm Control

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



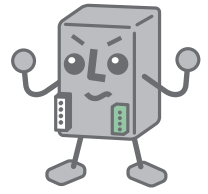
Start Control

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 required.)

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 °C +14 to +131 °F |
| Storage temperature | -25 to +70 °C -13 to +158 °F |
| Ambient humidity | 30 to 85 % RH (at +25 °C +77 °F) non-condensing |
| Storage humidity | 30 to 85 % RH (at +25 °C +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 |

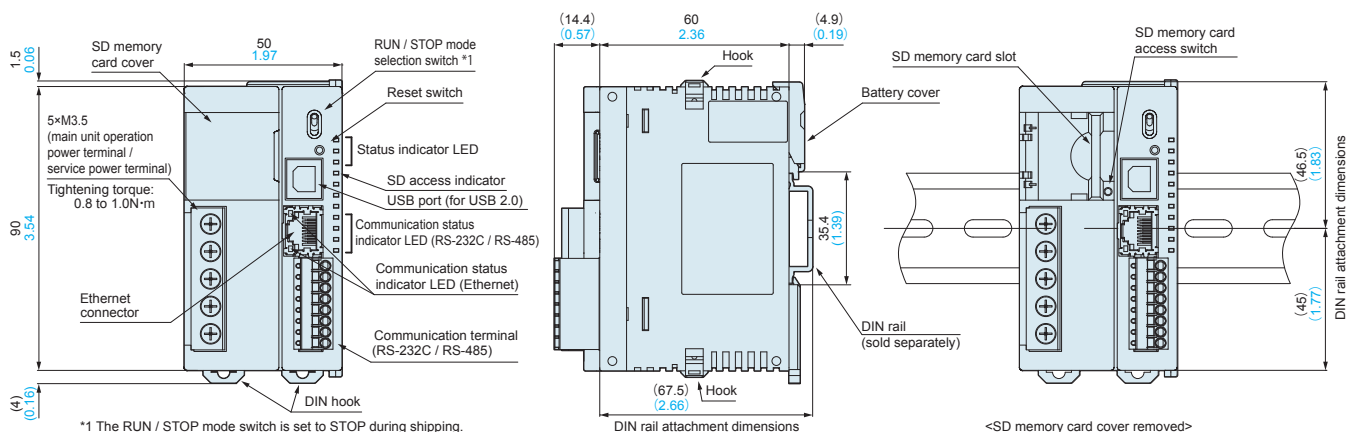
*1 Panasonic business-use SD memory card is recommended. UHS standard SDHC memory cards are not supported.

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)



Data Collection and Accumulation

Data Logger Light (DLL)



*Low Voltage Directive, EMC Directive

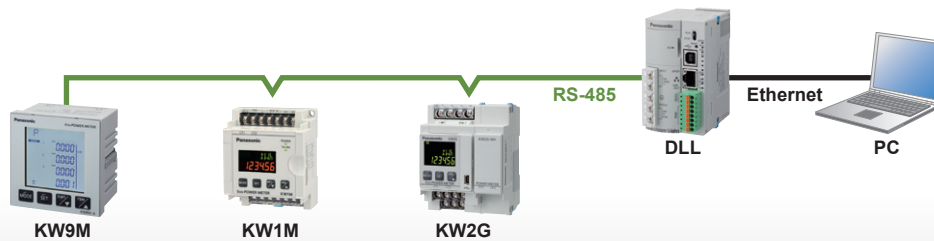
Easier for everyone to make the electric power visualization

- 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



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 °C +14 to +131 °F |
| Storage temperature | -25 to +70 °C -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>

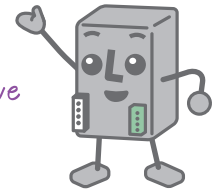
| | |
|--|--------------------------------|
| Support media ^{*1} | SD / SDHC memory card |
| Supported format standards ^{*2} | SD / SDHC standard conformance |
| Capacity | 2 to 32 GB |
| Speed class | Class 2 to Class 10 |

*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.

Collect data
and to improve
"visibility"!



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 |
| | | Stored to ² | • Internal memory (SRAM): 1 MB • SD / SDHC memory cards: 2 to 32 GB |
| | Data stored | File system | VFAT / FAT12 / FAT16 / FAT32 |
| | | Stored format | CSV file type |
| | | Number of storable files | 100 |
| | Trigger | Trigger type | <ul style="list-style-type: none"> • 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 |
| 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), SNMP, 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 method | 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 | |

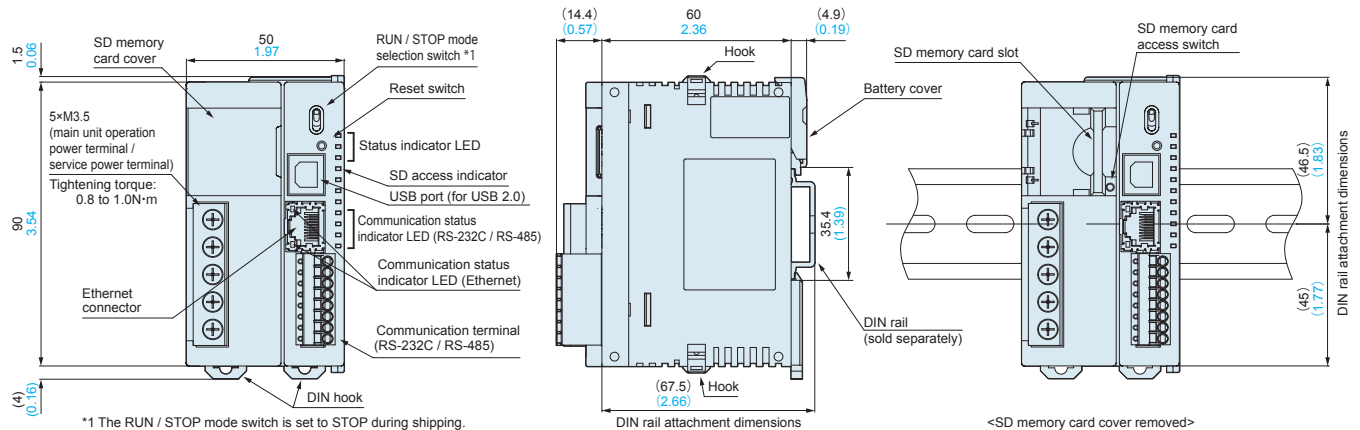
*1 When using a PC as a slave station, you are recommended to use SI-35 or SI-35USB of LINEEYE Co., Ltd. as an RS-485 interface.

*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)



Data Collection and Accumulation

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**)



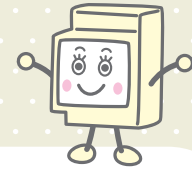
FPWEB2: FPWEBEXP

Order guide

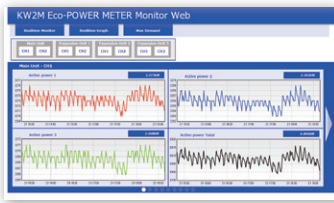
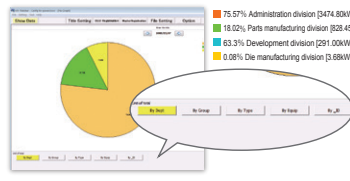

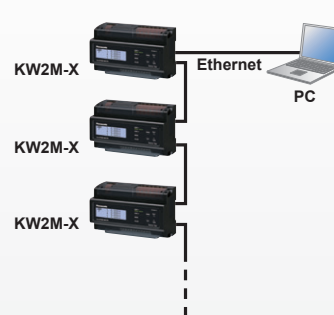
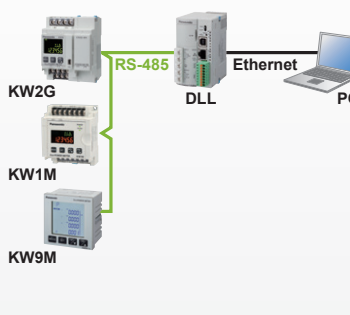
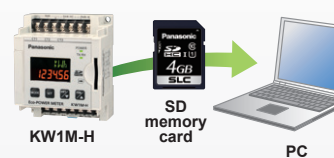
| Product name | Descriptions | Model No. |
|------------------------------|---|-----------------|
| FP Web-Server 2 | FB Web-Server 2 Ethernet unit with 10 / 100 MBit / s and modern interface. | FPWEB2 |
| FP Web Expansion Unit | Can only be used with FPWEB2 Version 1.1 or later. | FPWEBEXP |

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 | <ul style="list-style-type: none"> • For real time monitoring • For a few points measurement • Want to check data anytime on PC without going to the site. | <ul style="list-style-type: none"> • From some points to many points measurement • Want to check data anytime on PC without going to the site. | <ul style="list-style-type: none"> • For a few-point measurement • Want to collect data periodically by hand and no need of every 15 min data. |
| Visualization method |  <p>*KW2M-X (AKW264100A) only</p> <p>For real time monitoring by Web server functionality</p> |  <p>For energy usage analysis by software “KW Watcher”</p> <p>*Also, Digital signage software, EnerVisualizeR is available for a charge.</p> |  <p>For easy and simple visualization by software “KW View”</p> |
| Required devices | <ul style="list-style-type: none"> • KW2M-X Eco-POWER METER + <ul style="list-style-type: none"> • General-purpose Current transformer (CT) | <ul style="list-style-type: none"> • Eco-POWER METER + <ul style="list-style-type: none"> • ELC□ / Data Logger Lite (DLL) + <ul style="list-style-type: none"> • Dedicated Current transformer (CT) | <ul style="list-style-type: none"> • SD card type Eco-POWER METER + <ul style="list-style-type: none"> • Current transformer (CT) + <ul style="list-style-type: none"> • 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 | | For light / outlet | |
| 1P3W | | For light / home | |
| 3P3W | | For production | |
| 3P4W | | 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 comparison

| | | 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 | Advanced type | Standard type | SD card type |
| Appearance | |  |  |  |  |  |  |  |  |  |
| 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 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| | Single-phase three-wire system | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| | Three-phase three-wire system | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| | Three-phase four-wire system | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Load measurement for 400 V AC system ² | | Transformer not required. Direct input possible | | | <input type="radio"/> | <input type="radio"/> | 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) | | | <input type="radio"/> | <input type="radio"/> | 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 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> (Active) | |
| | Integrated electric energy | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> (Active, Reactive, Apparent, Regenerative) | |
| | Current | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> (R, N/S, and T) | |
| | Voltage | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> (RS, RT, and TS) | |
| | Electricity charge ⁴ | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| | Conversion carbon dioxide value | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| | Power factor | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| | Frequency | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| | Hour meter | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| | Pulse count value | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| | Simultaneous power and pulse measurement | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| | Demand ⁷ | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Electric power quality | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | |
| Communication | 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 | | | - | | - | |
| | | Protocol(DNS, DHCP) | | TCP / IP, UDP / IP | | | - | | - | |
| Temperature measurement | | <input type="radio"/> | | <input type="radio"/> | RTD input : 2 points | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | | |
| Number of pulse input point ¹¹ | | 1 point | | <input type="radio"/> | <input type="radio"/> | 2 points | <input type="radio"/> | 2 points | 1 point | 1 point |
| Number of pulse output point | | 2 points | | <input type="radio"/> | <input type="radio"/> | 4 points | <input type="radio"/> | 2 points | 1 point | 1 point |
| Number of analog input point | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | 3 points ¹² | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Excess alarm output | Instantaneous active electric power | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| | Current value | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| | Stand-by electric power | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| | Preset value | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| | Demand | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Memory | | <input type="radio"/> | Internal memory | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | Internal memory | <input type="radio"/> | Internal / External memory |
| Calendar timer | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Web server | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Tool and software | KW Monitor | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| | KW Watcher | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| | KW View | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 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.

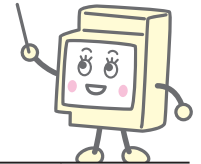
³ KW2M, KW9M: Primary side 65,535 A or less. AKW8115: Primary side 4,000 A or less.

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 | | | | | | MEWTOCOL type | Modbus type | | | 1 A / 5 A CT input type |
| Power measurement | Power measurement and Pulse output | Pulse input | Analog input | | | | | | | |
| | | | | | | | | | | |
| 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 | |
| <input type="radio"/> | <input type="radio"/> | — | — | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | |
| <input type="radio"/> | <input type="radio"/> | — | — | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | |
| <input type="radio"/> | <input type="radio"/> | — | — | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | |
| — | — | — | — | — | <input type="radio"/> | <input type="radio"/> | — | — | <input type="radio"/> | |
| 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) | |
| <input type="radio"/> (Active) | | — | — | <input type="radio"/> (Active) | <input type="radio"/> (Active) | <input type="radio"/> (Active) | <input type="radio"/> (Active) | <input type="radio"/> (Active) | <input type="radio"/> (Active, Reactive, Apparent) | |
| <input type="radio"/> (Active, Reactive, Apparent, Regenerative) | | — | — | <input type="radio"/> (Active) | <input type="radio"/> (Active) | <input type="radio"/> (Active) | <input type="radio"/> (Active) | <input type="radio"/> (Active) | <input type="radio"/> (Active, Reactive, Apparent) | |
| <input type="radio"/> (R, N/S, and T) | | — | — | <input type="radio"/> (R and T) | <input type="radio"/> (R, S, and T) | <input type="radio"/> (R, S, and T) | <input type="radio"/> (CT1 and CT2) | <input type="radio"/> (CT1 and CT2) | <input type="radio"/> (CT1, CT2 and CT3) | |
| <input type="radio"/> (RS, RT, and TS) | | — | — | <input type="radio"/> (R and T) | <input type="radio"/> (R, S, and T) | <input type="radio"/> (RS, RT, and TS) | <input type="radio"/> (between 1 and 2, between 2 and 3) | <input type="radio"/> (between 1 and 2, between 2 and 3) | <input type="radio"/> (between P1 and P2, between P2 and P3) | |
| Displayed on the main unit | | — | — | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | |
| <input type="radio"/> ⁵ | <input type="radio"/> ⁵ | <input type="radio"/> ⁵ | — | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | |
| — | — | <input type="radio"/> ⁸ | — | — | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | |
| — | — | — | — | — | <input type="radio"/> | <input type="radio"/> | — | — | <input type="radio"/> | |
| — | — | — | — | — | — | <input type="radio"/> 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 | |
| — | — | — | 2 points ¹⁵ | — | — | — | — | — | — | |
| — | <input type="radio"/> | — | — | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | |
| — | <input type="radio"/> | — | — | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | |
| — | <input type="radio"/> | — | — | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | |
| — | — | — | — | — | — | Internal / External memory | — | — | — | |
| — | — | — | — | — | — | <input type="radio"/> | — | — | — | |
| — | — | — | — | — | — | — | — | — | — | |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | |
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | |
| <input type="radio"/> When connected to AKW2020GB | | | | — | — | <input type="radio"/> | — | — | — | |
| 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.

*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

Power Monitoring

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

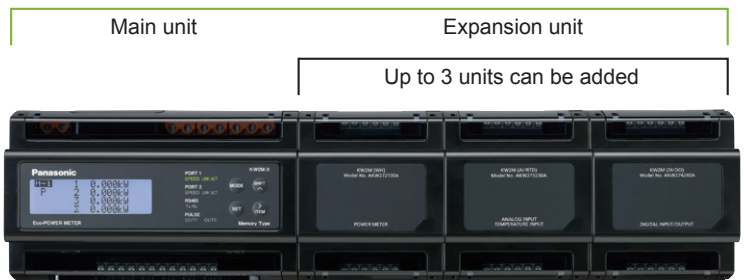


Digital I/O:
AKW274240A

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)

4 units in total



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

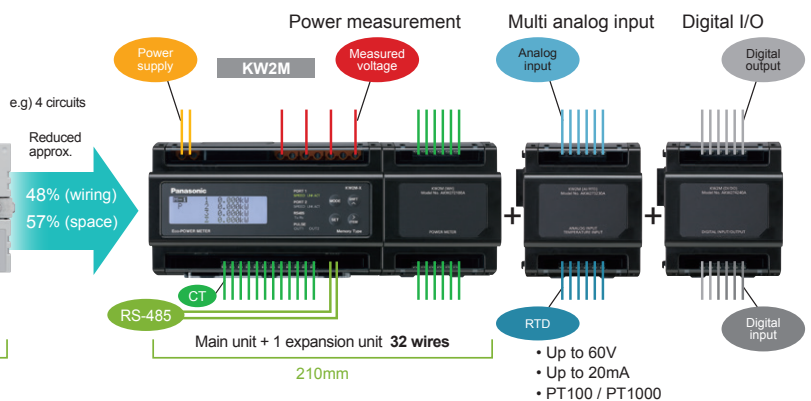
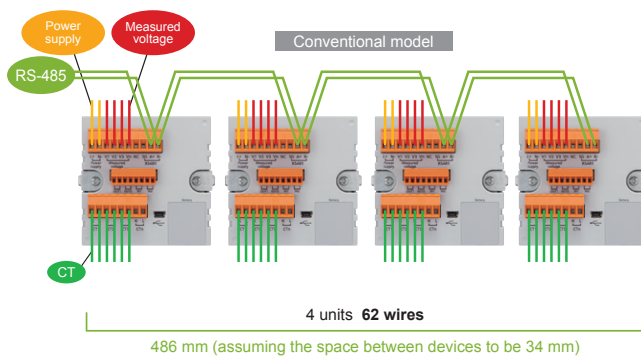
Push-in connectors (Ø2.6mm single-core cables)

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**.



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**".

Ethernet communication

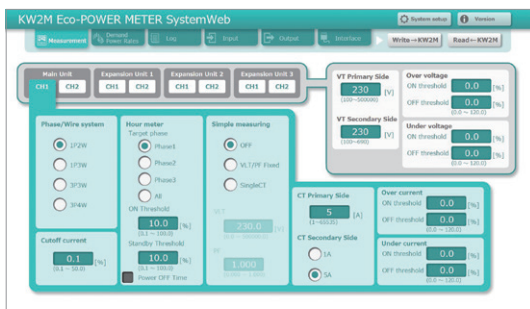
- Equipped with two Ethernet communication ports, so devices can be daisy chained without adding a HUB.
- Connectable to both **KW Watcher** and Central monitoring system / SCADA at the same time.



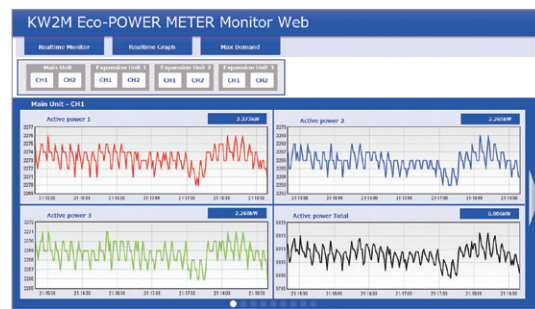
Web server functionality

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

Operational setting



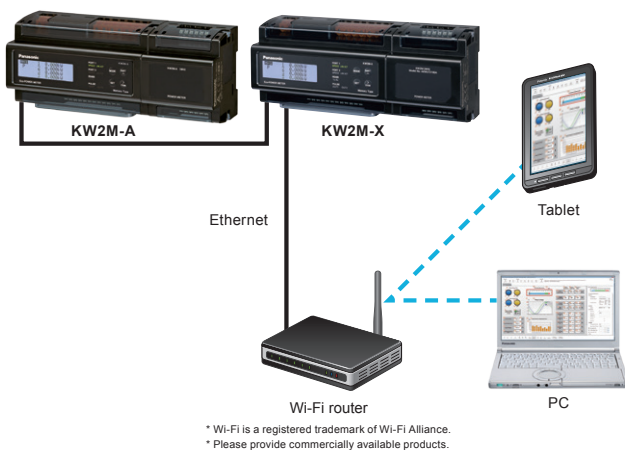
Real-time monitoring (KW2M-X only)



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.

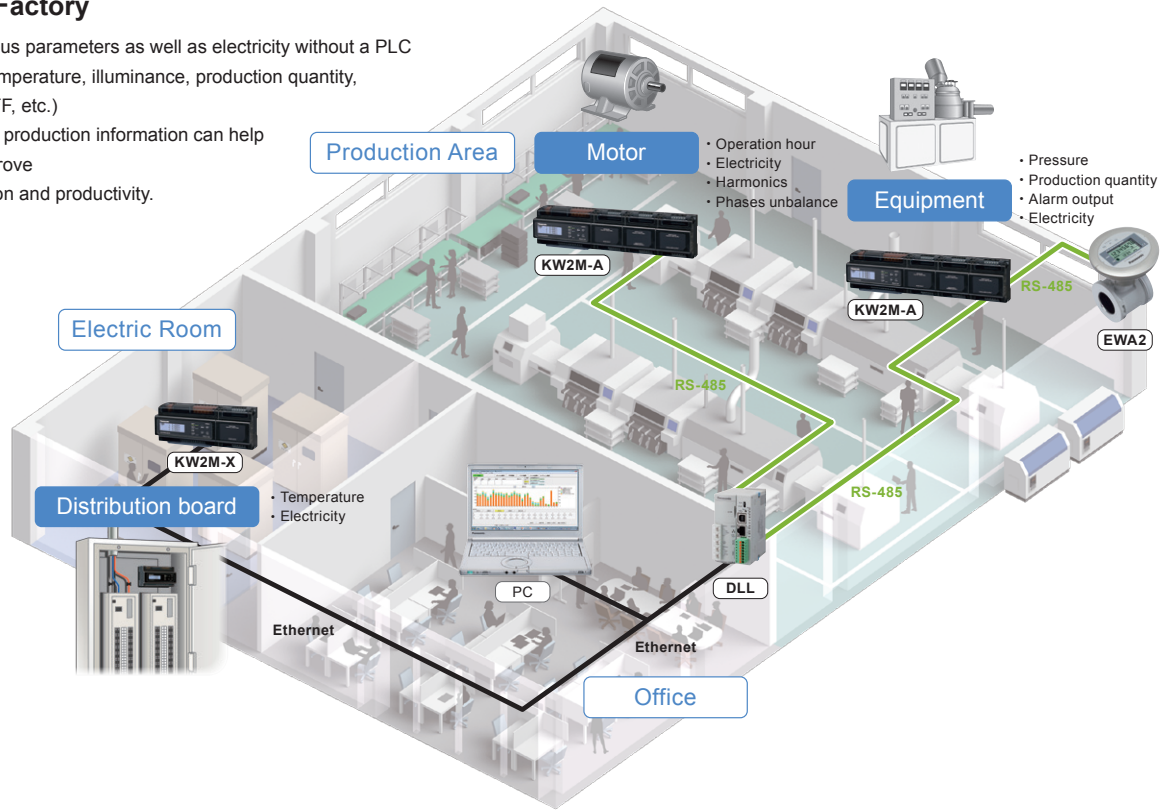
Note: A key unit (sold separately) is required to use **Control Web Creator**.

Power Monitoring

Application Factory

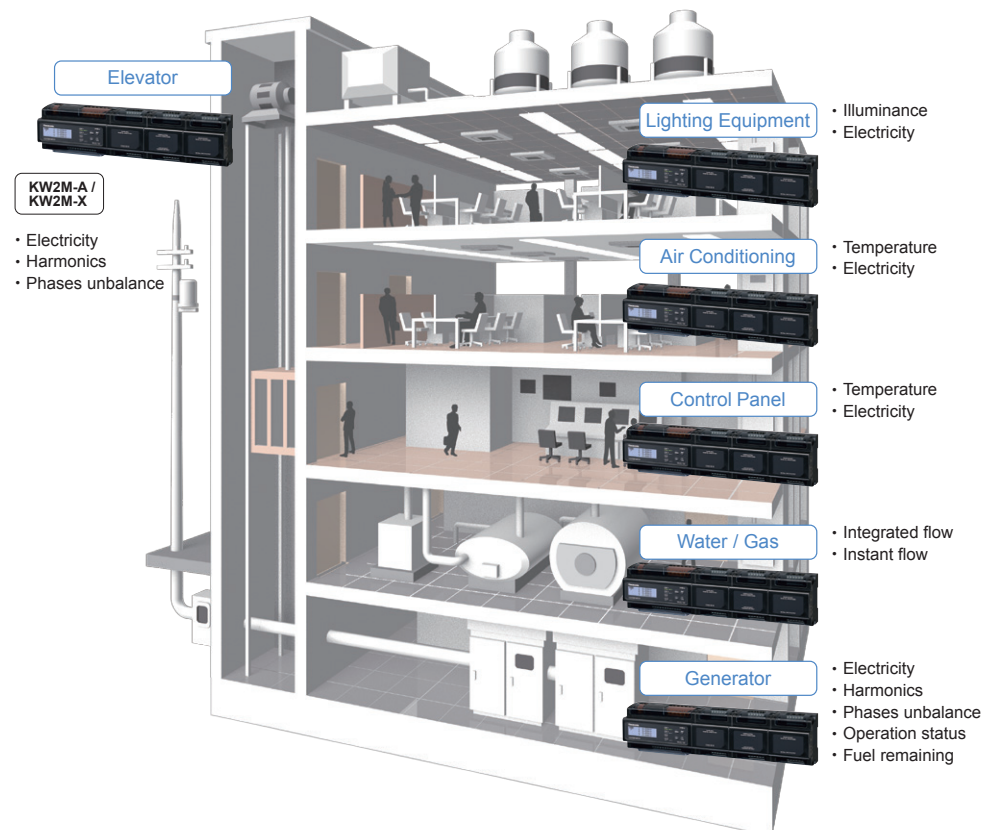
KW2M can collect various parameters as well as electricity without a PLC (Air, water, pressure, temperature, illuminance, production quantity, operation status ON/OFF, etc.)

This environmental and production information can help you to analyze and improve your energy consumption and productivity.



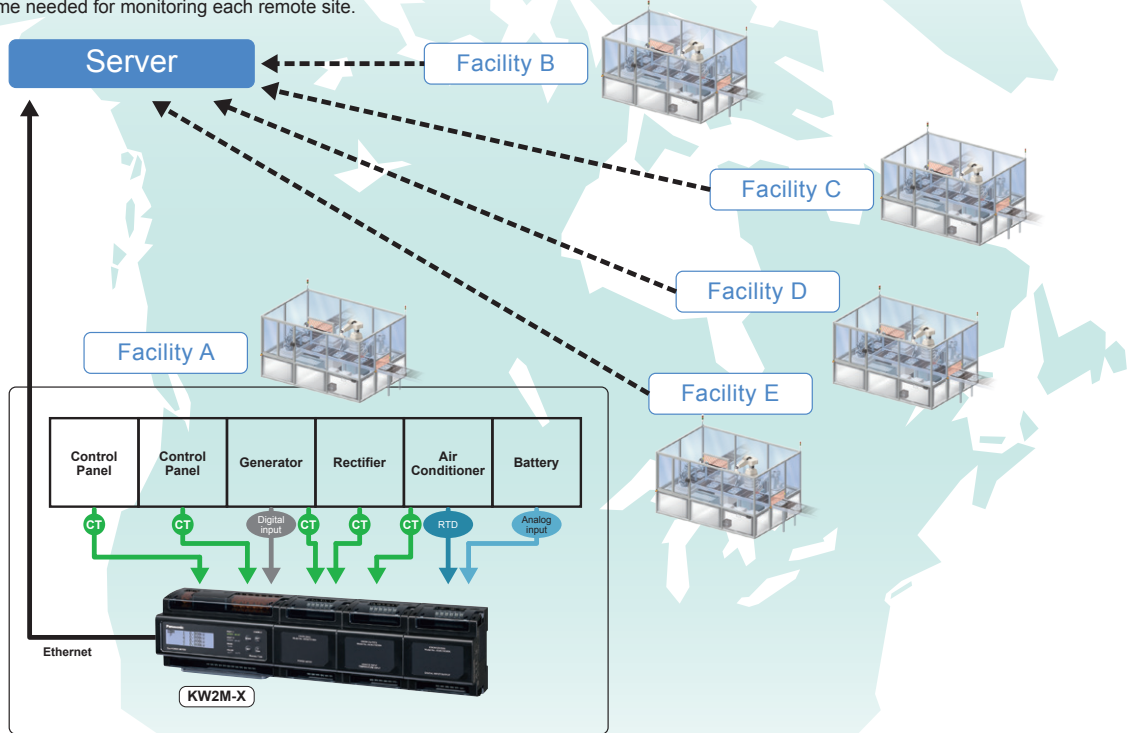
Application Building / Commercial complex

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.



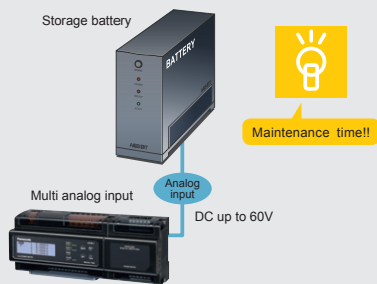
Application Remote network monitoring

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.



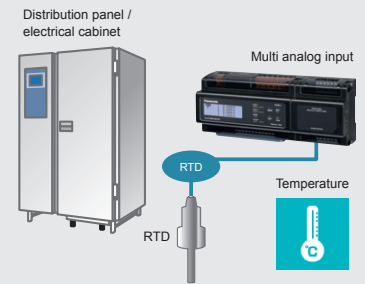
Predictive maintenance of storage battery (Multi analog input unit)

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



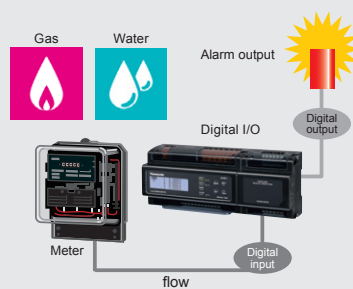
Predictive maintenance of panel (Multi analog input unit)

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



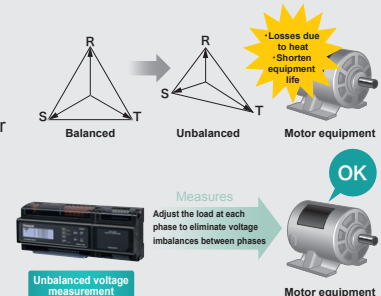
Alarm output (Digital I/O unit)

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) | 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 | Single-phase two-wire system Single-phase three-wire system Three-phase three-wire system Three-phase four-wire system | | | | AKW272100A |
| | | Multi analog input | Number of input points | | Input range | | AKW273230A |
| | | | Analog input (Voltage / Current) 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/s ² (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. |
| Calendar 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) |

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) | <ul style="list-style-type: none"> 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 $\pm 0.1\%$ F.S. (at +25 °C +77 °F), Within $\pm 0.3\%$ F.S. (at -10 to +50 °C +14 to +122 °F) | |

RTD input specifications (for AKW273230A)

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

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 | <ul style="list-style-type: none"> 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

Web screen creation tools

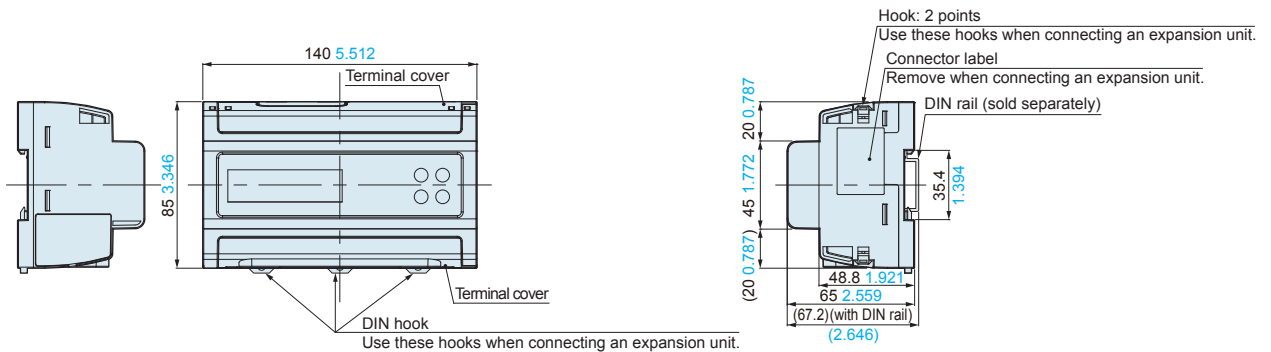
| Product name | Descriptions | Part No. |
|---------------------|---|-----------|
| Control Web Creator | Windows version. Downloadable free of charge from our website. Please purchase Key unit separately. | AFPSWC |
| Key unit | License key for Control Web Creator . 1license. For USB port. | AFPSWCKEY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

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

Dimensions (Unit: mm in)

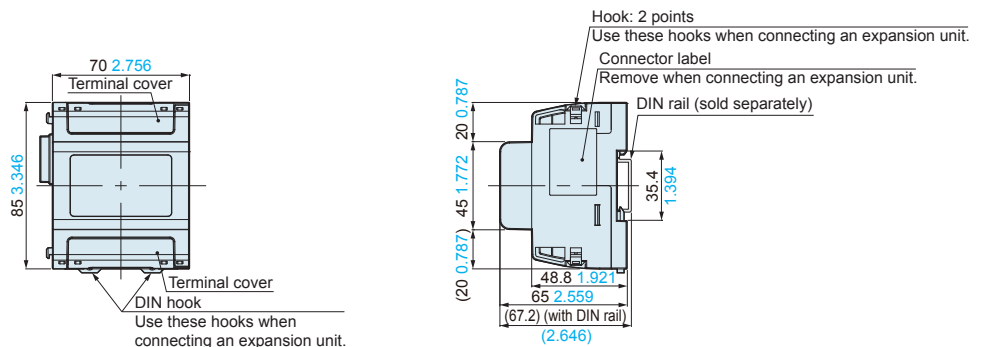
AKW263100A / AKW264100A

Main unit



AKW272100A / AKW274240A / AKW273230A

Expansion unit



Power Monitoring

KW9M SERIES Eco-POWER METER

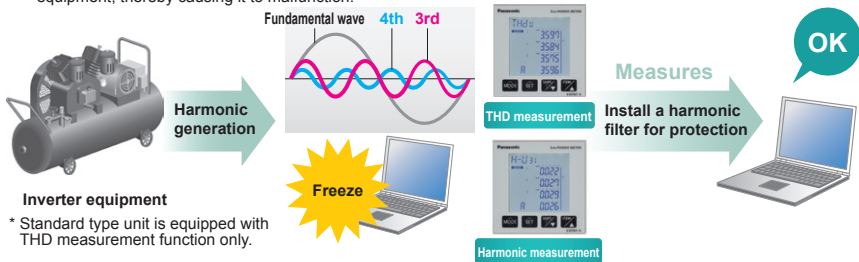


*Low Voltage Directive, EMC Directive

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 | 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 | Three-phase three-wire system Three-phase four-wire system (shared) | | | | 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 | Type | | Standard | Advanced | | |
|---|--------------------|--|----------|----------------------------|----------------------------|---------|
| | Unit | Display data range ¹ | | Present value ² | Present value ² | Maximum |
| Instantaneous power | Active | kW | ● | ● | ● | ● |
| | Reactive | kvar | | | | |
| | Apparent | kVA | | | | |
| Integral power (import) | Active | kWh | ● | ● | - | - |
| | Reactive | kvarh | | | | |
| | Apparent | kVAh | | | | |
| Integral power for each time zone (4-zone) (import) | Active | kWh | - | ● | - | - |
| | Reactive | kvarh | | | | |
| | Apparent | kVAh | | | | |
| Integral power (export) | Active | kWh | ● | ● | - | - |
| | Reactive | kvarh | | | | |
| | Apparent | kVAh | | | | |
| Integral power for each time zone (4-zone) (export) | Active | kWh | - | ● | - | - |
| | Reactive | kvarh | | | | |
| | Apparent | kVAh | | | | |
| 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 999999999 | - | ● | - | - |
| Power conversion value | Total | 0.000 to 999999999 | ● | ● | - | - |
| | 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.

Accuracy

| Item | Standard | | Advanced | |
|------------------|---|--------------------------|---|--------------------------|
| | Accuracy | Without error of CT / VT | Accuracy | Without error of CT / VT |
| Electrical power | 0.5 % | | 0.5 % | |
| | Active electric power Class 0.5S (IEC 62053-22) ¹ | | Active electric power Class 2 (IEC 62053-23) 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 %) | | 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 %) | |
| 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 %).

Power quality

| Item | Unit | Display data range | Present value (Instantaneous value) | Maximum | Minimum |
|----------------------------------|------------|--------------------|-------------------------------------|---------|---------|
| Unbalanced current ¹ | Each phase | % | 0.000 to 999.99 | ● | ● |
| | 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 | ● | - |
| | 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 | ● | - | - |

¹ 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.

Specifications

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

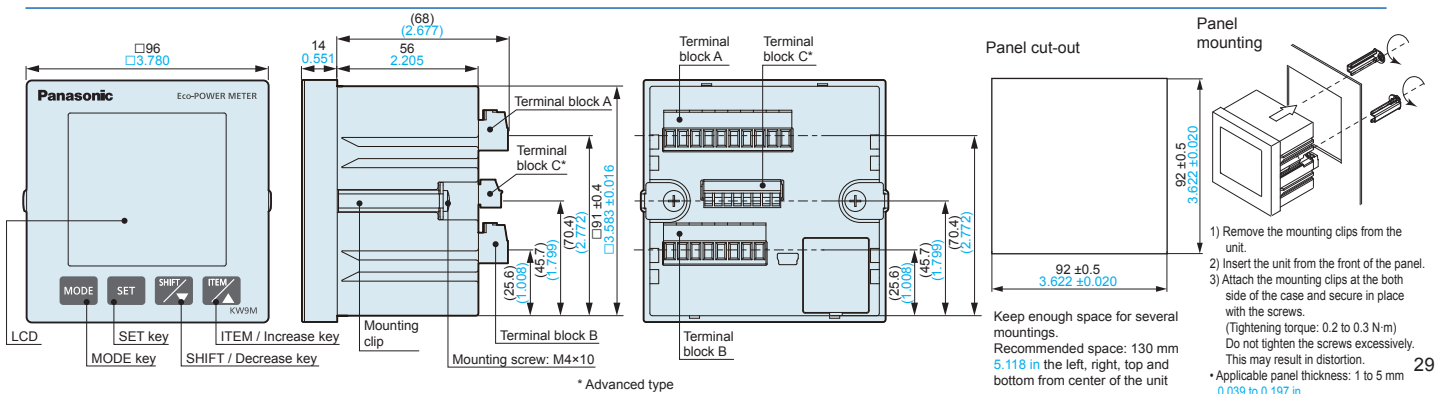
General specifications

| 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) 3 W approx. (240 V DC 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) |
| 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/s ² (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 ¹⁹ 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-setting 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 |

Dimensions (Unit: mm in)



* Advanced type

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.
³⁾ 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.

Power Monitoring

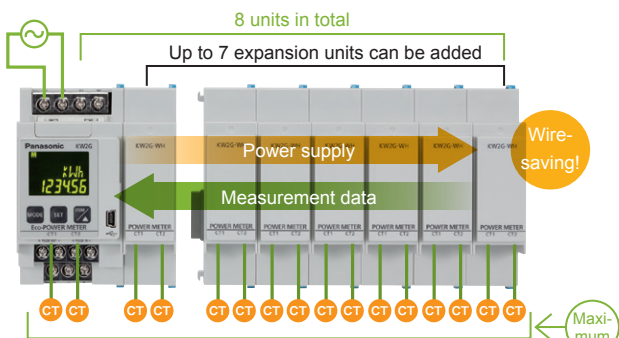
KW2G SERIES Eco-POWER METER



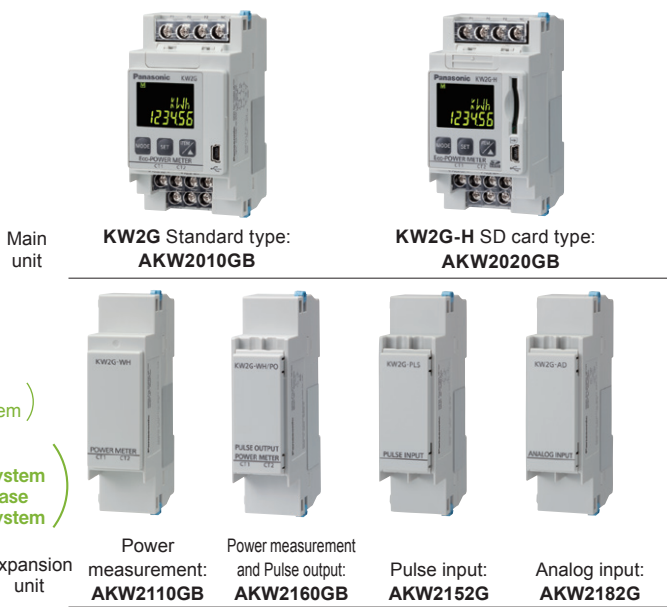
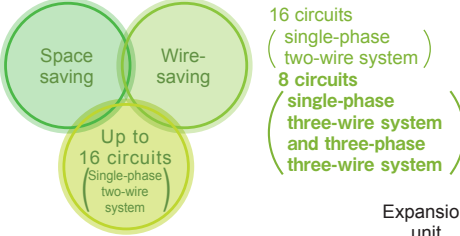
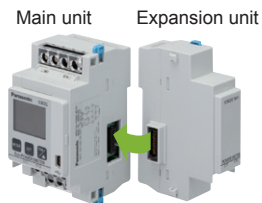
*1 Low Voltage Directive, EMC Directive
*2 Refer to p.20

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!

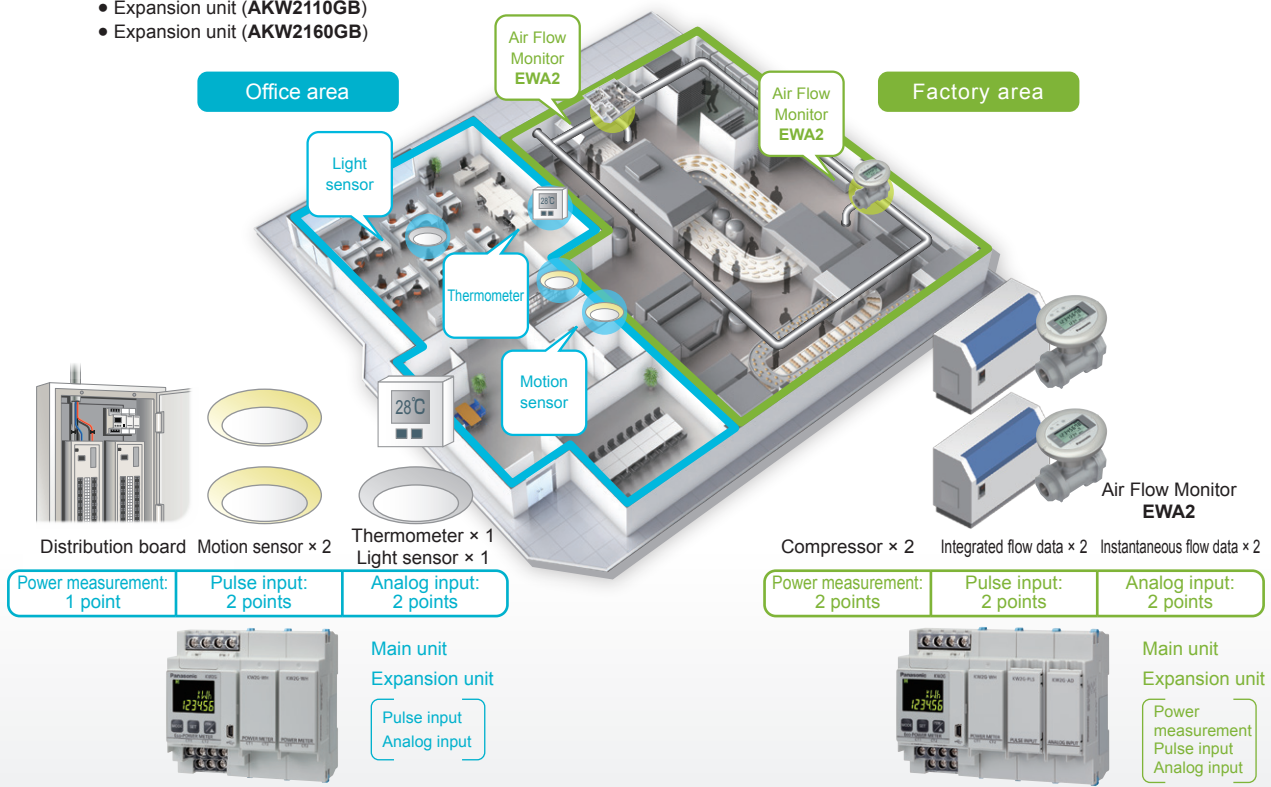


■ Connectable to various sensors as well as electrical power!

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.

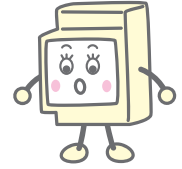
Application example

- 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



Power Monitoring

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 |
| | Power measurement | | | | | AKW2110GB |
| | Expansion unit | Power measurement and Pulse output ¹ | Number of input points 2 channels | Input method Contact / No contact (open collector) | AKW2152G | |
| | | Pulse input ² | | | | |
| | | Analog input ² | Number of input points 2 channels | Input range Voltage: 0 to 5 V / 1 to 5 V ³ Current: 0 to 20 mA / 4 to 20 mA ³ | AKW2182G | |

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 |
| | Reactive ² | kvar |
| | Apparent | kVA |
| Current | R-current | A |
| | N/S-current | A |
| | T-current | A |
| Voltage | R (RS)-voltage | V |
| | S (RT)-voltage | V |
| | T (TS)-voltage | V |
| 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 ³ | | 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. |

Power Monitoring

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 (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).

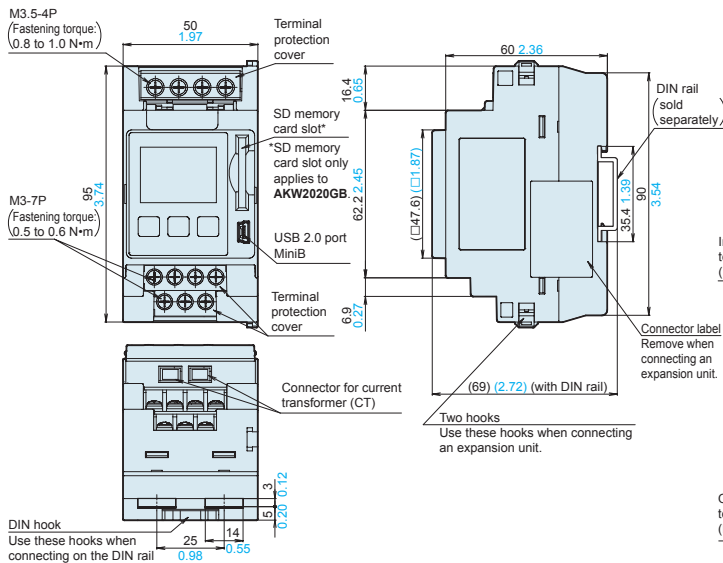
Note:

(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.

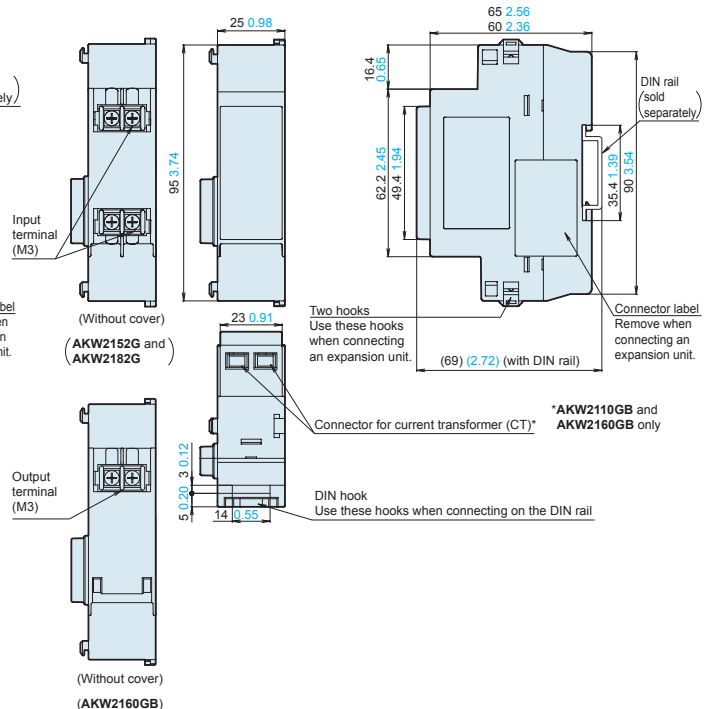
*3 These count output specifications are only for the main unit.

Dimensions (Unit: mm in)

AKW2010GB / AKW2020GB Main unit



AKW2110GB / AKW2160GB / AKW2152G / AKW2182G Expansion unit



Power Monitoring

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 CO₂ 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 | 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 |
| KW1M-H Eco-POWER METER (SD card type) | Three-phase three-wire system Three-phase four-wire system ^{*1} | | 100 / 200 / 400 V AC system (Select with setting mode) | | 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 |
| | S-current ¹ | A |
| | T-current | A |
| Voltage | R (RS)-voltage | V |
| | S (RT)-voltage ¹ | V |
| | T (TS)-voltage | V |
| 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 $\theta = -90^\circ$ to $+90^\circ$) |
| Frequency ¹ | - | 47.5 to 63.0 Hz |
| Hour meter | ON-time | h (Hour) |
| | OFF-time | h (Hour) |
| 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 |
| | Estimated demand | kW |
| | Ratio of estimated demand | % |

*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 not 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 \pm (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 \pm (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 \pm (1.0 % F.S. + 1 digit) (at +20 °C +68 °F, rated input, rated frequency, power factor 1) |
| | Hour meter | Within \pm (0.01 % + 1 digit) (at +20 °C +68 °F) [In case power on start or current energizing: within \pm (0.01 % + 1 sec + 1 digit) (at +20 °C +68 °F)] |
| | Temperature characteristics | Within \pm (1.0 % F.S. + 1 digit) (Range of -10 to +50 °C +14 to +122 °F, rated input, power factor 1) |
| | Frequency characteristics | Within \pm (1.0 % F.S. + 1 digit) (Frequency change \pm 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 k Ω |
| | • Residual voltage when shorted: Max. 2 V |
| Mode | • Impedance when open: Min. 100 k Ω |
| | HOLD (Over count) |
| Prescale | Decimal point |
| | Range |

*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 μ A 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.

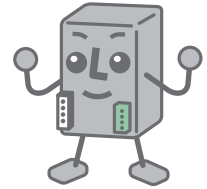
Calculation method
(Pulse output unit: Value of PL-P) > (maximum electric power measurement [kW]) / (3,600 [s] x 4 [pulse / s])

*2 Only AKW1111B and AKW1121B are supported.

*3 Only AKW1121B is supported.

Pulse output status (output contact status) is confirmed by communication.

Demand control
with kWIM-H
and EcoLogix



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 |
| Main unit display | 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) |
| | | 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).

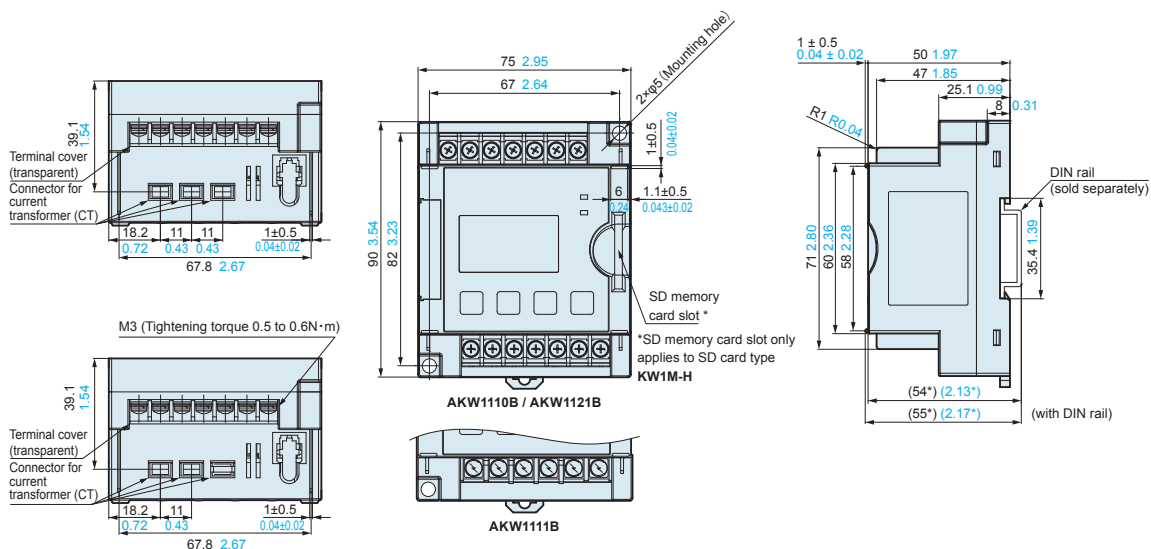
* It is recommended to save important data to other media and always perform backup.

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.



Power Monitoring



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 | 100 / 200 V AC system | Dedicated type (5 A, 50 A, 100 A, 250 A and 400 A) | Screw terminal | AKW5111 |
| | Modbus RTU | Single-phase three-wire system | | | | AKW5112 |
| | MEWTOCOL | Three-phase three-wire system | | | 11-pin | AKW5211 |
| | Modbus RTU | Three-phase three-wire system | | | | 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 | Dedicated type (5 A, 50 A, 100 A, 250 A, 400 A and 600 A) | Screw terminal (M3 / M2 screw) | AKW7111B |
| KW8M Eco-POWER METER DIN 48 × 96 type | High performance type | Single-phase two-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 |
| | | Single-phase three-wire system | | | | AKW8111H |
| | Three-phase three-wire system | AKW8115 * | | | | |
| | 1 A / 5 A CT input type | Single-phase two-wire system Single-phase three-wire system Three-phase three-wire system Three-phase four-wire system | (Select with setting mode) | CT for 1A or 5A * | | |

* 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)] -1.00 to 0.00 to 1.00 Only in range of phase angle $\theta = -90^\circ$ to 0 to $+90^\circ$ |
| | Communication | - |
| Frequency | Hz | 47.5 to 63.0 |
| Hour meter | ON-time | Time 0.0 to 99999.9 |
| | OFF-time | Time 0.0 to 99999.9 |
| 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.

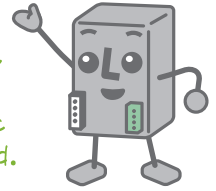
Accuracy

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

²⁾ Excluding AKW7111B

Let's start measuring at where the most electric power is used.



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) | | 85-264 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) | | |
| Vibration resistance | 10 to 55 Hz (1 cycle/min), single amplitude: 0.75 mm 0.03 in (1 hour on 3 axes) | 10 to 55 Hz (1 cycle/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) |

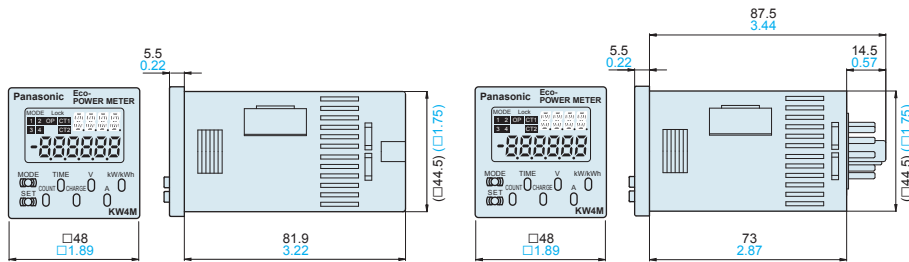
*1 Water resistant properties (IP66) are lost when attached consecutively (closely adhered).

Dimensions (Unit: mm in)

KW4M

Screw terminal type (AKW5111 / AKW5112)

11-pin type (AKW5211 / AKW5212)

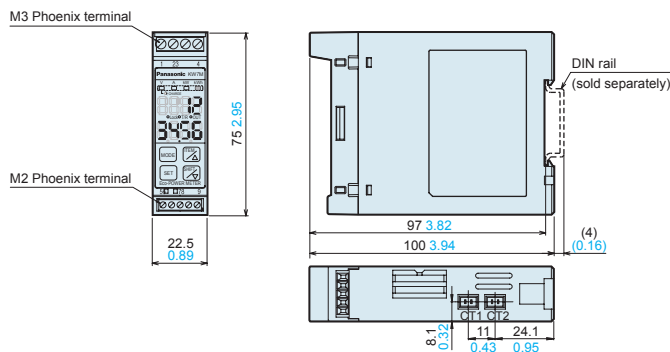


Terminal layout

| 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(t), CT2(t) | |
| 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(t), CT2(t) | 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



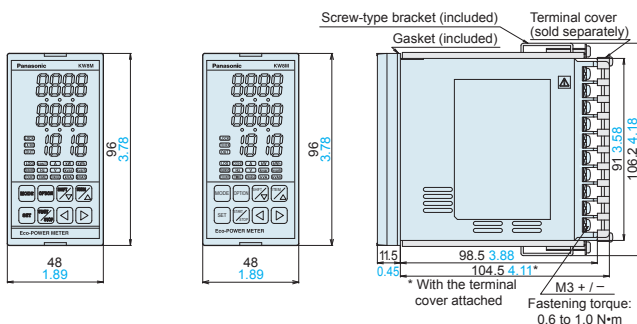
Terminal layout

| 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.) | Phoenix terminal M2 screw with slotted head |
| 5 | Pulse output (+) | |
| 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 | 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 (+) | |
| 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.

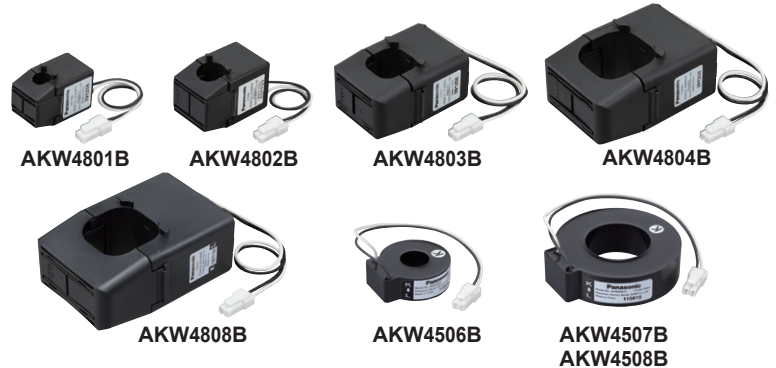
Dedicated Current Transformer (CT)



*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.

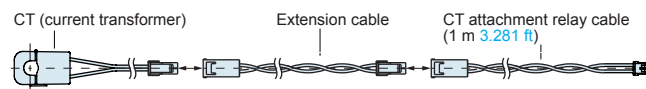
General specifications

| Item | Type | Clamp-on type | | | | | Through type | | |
|---------------------------------|-----------|--|--------------------------------------|---|------------------------------------|--|---|---------------------------|---|
| | Model No. | 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.

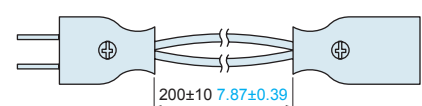
*2 15 m 49.213 ft and 20 m 65.617 ft extension cables are available on a made-to-order basis. For details, please contact our company.

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.

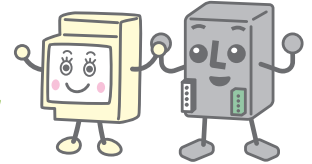
Intermediate power cable



| Product name | Model No. |
|--------------------------|-----------|
| Intermediate power cable | AKE2811 |

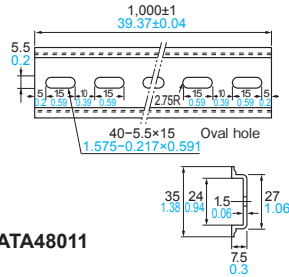
*1 Use of an intermediate power cable is recommended when the dedicated CT attachment power cable is not divided into two.

We welcome energy-saving consultations!



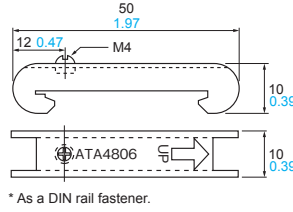
Required for DIN rail mounting

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**

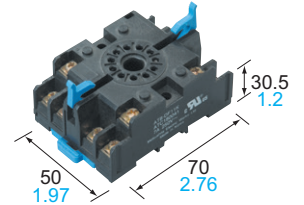
Fastening plate: For **KW4M** pin type (**AKW5211** and **AKW5212**), **KW7M**, **KW2G** / **KW2G-H**, **KW1M** / **KW1M-H**, **KW2M**



* As a DIN rail fastener.

Model No.: **ATA4806**

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

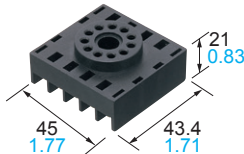


Model No.: **ATC180041**

Required for panel mounting

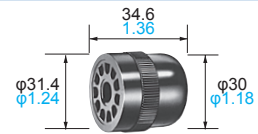
Rear terminal socket: For **KW4M** 11-pin type (**AKW5211** and **AKW5212**)

Model No.: **AT78051**



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

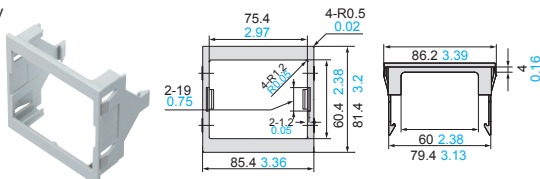
Model No.: **ATA4861**



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

* Sold separately

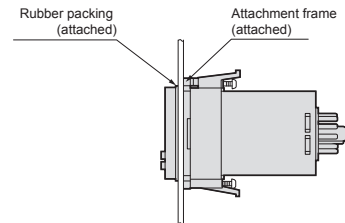
Model No.: **AKW1822**



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

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

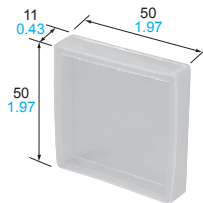
[Rubber packing]
Model No.: **ATC18002**



Convenient for panel mounting

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

Model No.: **AQM4803**



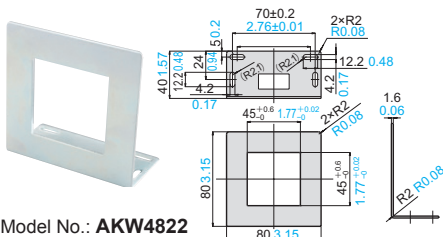
Terminal protective cover: For **KW4M** screw terminal type (**AKW5111** and **AKW5112**)

Model No.: **AKW4823**



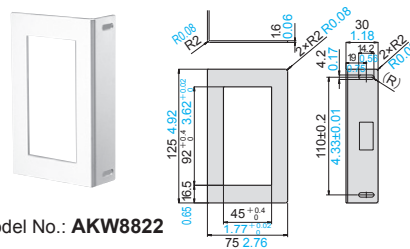
Mounting frame: For **KW4M** * For fixing

Model No.: **AKW4822**



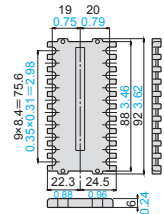
Mounting frame: For **KW8M**

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**

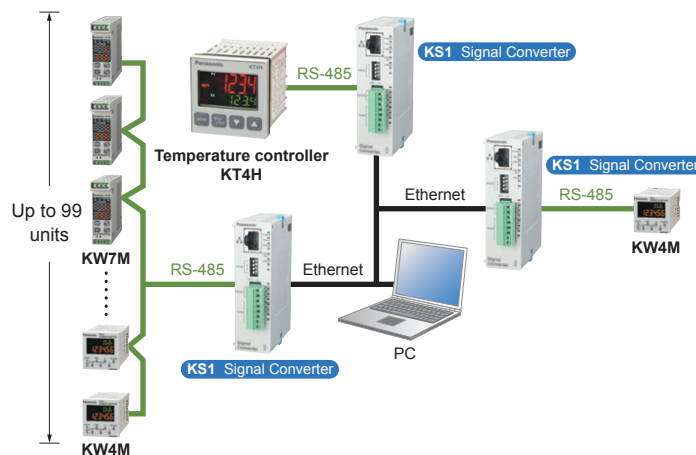
UL US CE *EMC Directive

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

- 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 |
| | | | | 2 (2 points) | | | 1 (serial communication RS-485) | AKT4R1111001 |
| | | | | 1 (1 point) | | | Blank (Not available) | AKT4R111200 |
| | | | | 2 (2 points) | | | 1 (serial communication RS-485) | AKT4R112001 |
| | | | 2 (Non-contact voltage) | 1 (1 point) | Blank (Not available) | AKT4R112100 | | |
| | | | | 2 (2 points) | 1 (serial communication RS-485) | AKT4R1121001 | | |
| | | | | 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 2 | 1 | 1 | 1 | 0 | 0 | 1 | 100-240 V AC | | | |
| | | | | | | | | 24 V AC/DC | | | |
| | Multi-input (Thermocouple, RTD, DC current, DC voltage) | | | | | | | | | | |
| | Relay contact | | | | | | | | | | |
| | Non-contact voltage (voltage output for SSR drive) | | | | | | | | | | |
| | DC current | | | | | | | Heater burnout alarm : not possible | | | |
| | 1 point (1a) | | | | | | | | | | |
| | 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 | | | | | | | 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.: **AKT4H111101**

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 |
| | | | | 2 (2 points) | | | 1 (serial communication) | AKT4B1111001 |
| | | | | 1 (1 point) | | | Blank (Not available) | AKT4B111200 |
| | | | | 2 (2 points) | | | 1 (serial communication) | AKT4B112001 |
| | | | | Blank (Not available) | | | AKT4B112100 | |
| | | | | 1 (serial communication) | | | AKT4B1121001 | |
| | | | 2 (Non-contact voltage) | 1 (1 point) | Blank (Not available) | AKT4B112200 | | |
| | | | | 2 (2 points) | 1 (serial communication) | AKT4B1122001 | | |
| | | | | Blank (Not available) | AKT4B113100 | | | |
| | | | | 1 (serial communication) | AKT4B1131001 | | | |
| | | | | 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.

Environment Management

Air flow monitor **EWA2** SERIES

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



Visualize compressed air and nitrogen gas (N₂)* 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



Order guide

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

Option

| Type | Details | | Model No. |
|------------------|-----------------------------|--|-----------------|
| Connection cable | 5 m 16.40 ft length | 0.2mm ² 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 19,200 bps : 70 to 100 ms 38,400 bps : 50 to 80 ms 57,600 bps : 40 to 70 ms 115,200 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.

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 [m ³ /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* [Nm ³ /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. [m ³ /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. [m ³ /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 m ³ /h | Within ±0.2 m ³ /h | Within ±0.2 m ³ /h | Within ±0.4 m ³ /h | Within ±0.6 m ³ /h | Within ±0.8 m ³ /h | Within ±2.6 m ³ /h | Within ±5.0 m ³ /h | Within ±9.0 m ³ /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

Specifications

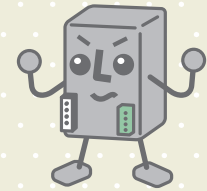
Use safely and correctly after carefully reading the product specification manual, user manual, and operational instruction manual.

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 |
| | <ul style="list-style-type: none"> • 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 |
| | Air pressure |
| | Temperature |
| Pressure loss | Extremely small (same as straight pipe) |
| Response time | 500 ms |
| Using environment | Enclosure protection |
| | Ambient temperature |
| | Ambient humidity |

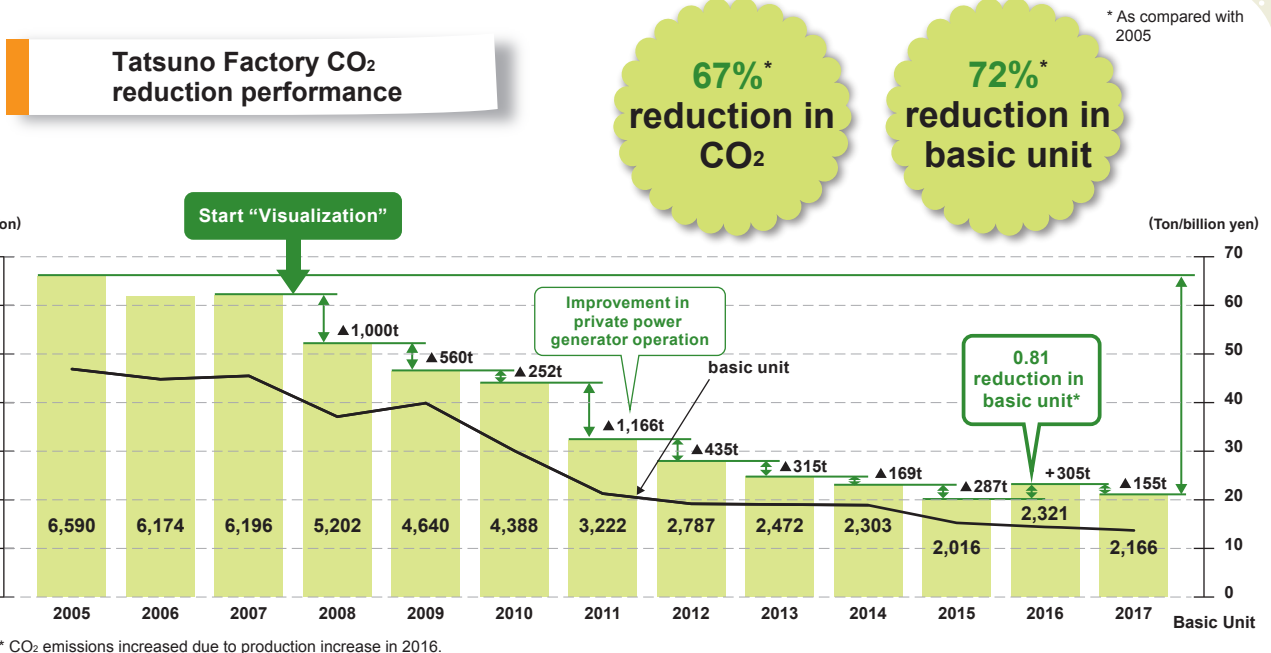
* When installing the monitor in a horizontal pipe, install it with its display facing up. It can also be installed to vertical pipings.

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



Energy-Saving Control!

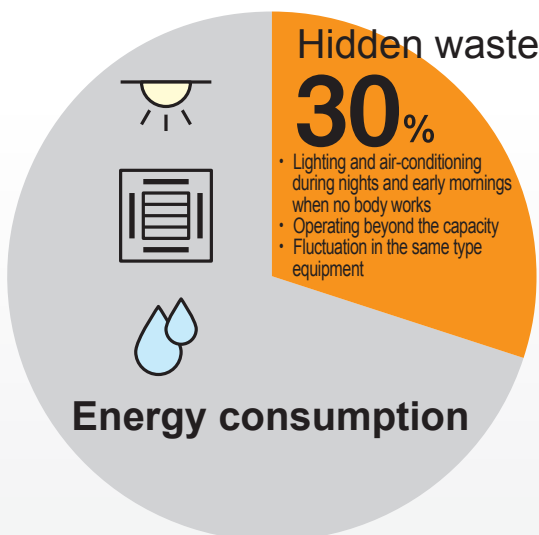
Panasonic Industrial Devices SUNX Tatsuno has shown a great reduction in energy consumption. However, they previously had trouble achieving the reduction target, having little idea about further steps. How did they accomplish the excellent results in such a hard situation? The key is "Visualization".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



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 |

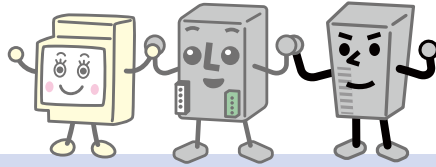
Think about how much money you have wasted for useless energy consumption.



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

Panasonic Corporation

Industrial Device Business Division

■ 1006, Oaza Kadoma, Kadoma-shi, Osaka 571-8506, Japan
industrial.panasonic.com/ac/e/

Panasonic[®]

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