Panasonic
ideas for life

# OVERVIEW

## ECO-POWER METERS


14/05/2012

# Visualizing energy consumption to save energy

Install Eco-POWER METERs in lighting equipment, air conditioners, and production equipment to measure power consumption and check the current status. Afterwards, with specific targets in place, the implementation and management of an energy savings plan is quick and simple. Visualizing target achievements improves the energy usage cycle and allows for changes to be made to maximize efficiency.


Measurement

Analysis

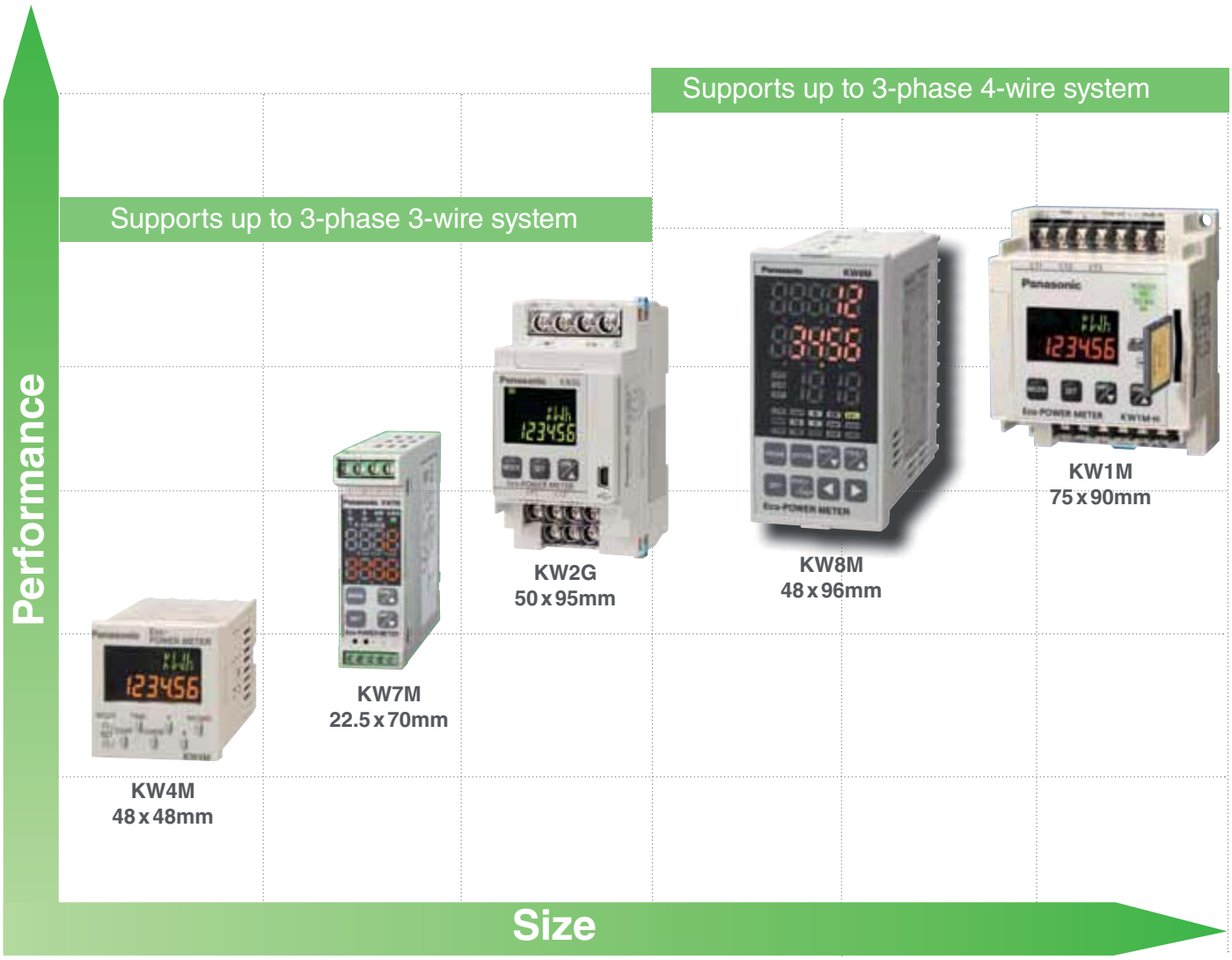
Energy saving target setting

Implementation and management of an energy saving plan

# Contents



# Product overview



# Performance of Eco-POWER METERs

: Available
–: Not available

| Product name | | KW2G Expandable | | KW1M Standard | | KW1M-H SD card | KW7M DIN rail | KW4M DIN48x48 MEWTOCOL | KW4M DIN48x48 Modbus | KW8M DIN48x96 Basic | KW8M DIN48x96 Built-in memory | KW8M DIN48x96 1/5A CT input |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appearance | |  Main unit |  Expansion unit |  |  |  |  |  | |  |  |  |
| Part no. | | AKW2010G | AKW2110G AKW2152G[1] AKW2182G[1] | AKW1110 | AKW1111 | AKW1121 | AKW7111 | AKW5111, AKW5211 | AKW5112, AKW5212 | AKW8111 | AKW8111H | AKW8115 |
| Dimensions mm (WxHxD) | | 50x95x65 | 25x 95x65 | 75x90x50 | | | 22.5x75x100 | AKW51: 48x48x81.9 AKW52: 48x48x87.5 | | 48x96x98.5 | | |
| Mounting method | DIN rail[3] | • | • | • | • | • | • | • | | – | – | – |
| | Screw installation | – | – | • | • | • | – | – | | – | – | – |
| | Mounting frame[3] | – | – | • | • | • | – | • | | • | • | • |
| | Control panel | • | • | • | • | • | • | •[2] | | – | – | – |
| | Control board | – | – | • (Mounting frame[3] required) | | | – | • | | • | • | • |
| Rated operating voltage | | 100V-240V AC | | | | | | | | | | |
| Measurement voltage | | 240V AC system[4] | | 220/440V AC system | | | 240V AC system[4] | | | 220/440V AC system | | |
| Phase and wire system | | 1-phase, 2-wire; 1-phase, 3-wire; 3-phase, 3-wire | | | | | | | | | | |
| | | – | | 3-phase, 4-wire | | | – | | | 3-phase, 4-wire | | |
| Current transformer See page 13 | | Panasonic (5A, 50A, 100A, 250A, 400A, 600A) | | Panasonic (5A, 50A, 100A, 250A, 400A) | | | | | | | | Any[5] |
| Communication | Interface | RS485, USB | | RS485 | | | | | | | | |
| | Protocol | MEWTOCOL, Modbus (RS485 only) | | MEWTOCOL, Modbus | | | | MEWTOCOL | Modbus | MEWTOCOL, Modbus | | |
| | Max. no. of stations | 99 | | | | | | | | | | |
| Pulse output | | • | – | • | • | • | • | • | • | • | • | • |
| Alarm signal output | Instantaneous active electric power | • | – | • | • | • | • | • | • | • | • | • |
| | Current value | • | – | • | • | • | – | – | – | – | – | • |
| | Stand-by current | • | – | – | • | • | – | – | – | – | – | • |
| | Pulse count value | • | – | – | • | • | – | • | • | • | • | • |
| Main unit memory | | – | – | – | – | • | – | – | – | – | • | – |
| SD card | | – | – | – | – | • | – | – | – | – | – | – |
| Clock/calendar function | | – | – | – | – | • | – | – | – | – | • | – |
| Measurement items | Electric energy | Active | | | | | | | | Active, reactive, apparent | | |
| | Instantaneous electric power | Active, reactive, apparent | | Active | | | | | | Active, reactive, apparent | | |
| | Current | L1, N/L2, L3 | | L1, L3 | L1, L2, L3 | L1, L2, L3 | L1 and L2 | | | L1, L2, L3 | | |
| | Voltage | L1-L2, L1-L3, L2-L3 | | L1-L2, L2-L3 | L1-L2, L1-L3, L2-L3 | | L1-L2, L2-L3 | | | L1, L2, L3 | | |
| | Electricity costs[6] | • | Displayed on main unit | • | • | • | • | • | • | • | • | • |
| | $CO_2$ equivalent | • | | • | • | • | – | • | • | – | – | – |
| | Power factor | • | | – | • | • | – | – | – | • | • | • |
| | Frequency | • | | – | • | • | – | – | – | • | • | • |
| | Pulse counter | • | | – | • | • | – | • | • | • | • | • |
| | Hour meter | – | – | • | • | • | – | • | • | • | • | • |
| | Simultaneous power/ pulse measurement | • | – | – | • | • | – | – | – | • | • | • |
| Software[7] | KW Monitor | • | • | • | • | • | • | • | – | • | • | • |
| | KW Watcher | • | • | • | • | • | • | • | – | • | • | • |
| | KW View | – | – | – | – | • | – | – | – | – | – | – |
| Mark | | CE | | CE, S-Mark | | | | CE, UL, S-Mark | | CE, S-Mark | | |
| Page reference | | Pages 5 to 7 | | Pages 8 and 9 | | | Pages 10 to 12 | | | | | |

[1] AKW2152G is a pulse input unit and AKW2182G is an analog input unit. They do not have a power measurement function.
[2] Optional terminal socket is required.
[3] Sold separately.
[4] For 440V systems, a commercial voltage transformer (secondary voltage rating: 110V) is required.
[5] Use commercially available current transformers (CT) with secondary currents of 1A or 5A and primary currents of 4000A or less.
[6] The Eco-POWER METER is designed chiefly to manage saving energy. It is neither intended nor can it be legally used for billing.
[7] Free of charge. For KW Watcher, a Web Datalogger Unit (DLU) is required.

Panasonic's new KW2G Eco-POWER METER allows you to manage energy more efficiently than ever. You can easily add up to 7 expansion units to the KW2G Eco-POWER METER, allowing you to gather data for several circuits at once.


# Features

- Measure power produced and consumed
- USB port for easy PC connection
- Simultaneous measurement of power and pulse input
- Up to 8 circuits for 1-phase, 3-wire and 3-phase, 3-wire systems, or 16 circuits for 1-phase, 2-wire systems
- Main unit can display measured values for both itself and expansion units
- Easy expansion: Eliminate excess wiring by using up to seven expansion units to add the required number of CT inputs for your application
- Quick installation
- Additional expansion units with analog and pulse input

## Order guide

<table>
<tr><th colspan="3">Product name</th><th>Phase and wire system</th><th>Rated operating voltage</th><th>Measurement voltage</th><th>Current transformer [1]</th><th>Part no.</th></tr>
<tr><td rowspan="5">KW2G Eco-POWER METER</td><td colspan="2">Main unit</td><td rowspan="2">1-phase, 2-wire system<br>1-phase, 3-wire system<br>3-phase, 3-wire system</td><td rowspan="2">100 to 240V AC<br>50/60Hz</td><td rowspan="2">240V AC system</td><td rowspan="2">Panasonic (5/50A, 100A, 250A, 400A, 600A type)</td><td>AKW2010G</td></tr>
<tr><td rowspan="4">Expansion unit</td><td>Power measurement</td><td>AKW2110G</td></tr>
<tr><td>Pulse input</td><td>Number of input points</td><td colspan="3">Input method</td><td rowspan="2">AKW2152G</td></tr>
<tr><td rowspan="2">Analog input</td><td rowspan="2">2 channels</td><td colspan="3">Switch, relay, transistor (open collector)</td></tr>
<tr><td colspan="3">Input range</td><td rowspan="2">AKW2182G</td></tr>
<tr><td colspan="3">Voltage: 0 to 5V/1 to 5V, current: 0 to 20mA/4 to 20mA</td></tr>
</table>

[1] Sold separately.

## Measurement items

| Item | | Unit | Data display range |
|---|---|---|---|
| Active electric energy [1] | | kWh/MWh | 0.00 to 9999.99MWh, 0.00 to 9999999.99kWh (when 9-digit display) |
| Instantaneous electric power | Active [2] | kW | –9999.99 to 9999.99 |
| | Reactive [2] | kvar | –9999.99 to 9999.99 |
| | Apparent | kVA | 0.00 to 9999.99 |
| Current | L1 | A | 0.000 to 6000.00 |
| | N/L2 | A | 0.000 to 6000.00 (calculated value) |
| | L3 | A | 0.000 to 6000.00 |
| Voltage | L1-L3 | V | 0.0 to 9999.9 |
| | L1-L3 | V | 0.0 to 9999.9 (calculated value) |
| | L2-L3 | V | 0.0 to 9999.9 |
| Electricity costs [3] | | | 0.00 to 999999 |
| $CO_2$ equivalent | | kg $CO_2$ | 0.00 to 999999 |
| Power factor [2] | | | –1.00 to 1.00 (without identification of leading and lagging phases) |
| Frequency | | Hz | 47.5 to 63.0 |
| Pulse counter (AKW2010G, AKW2152G) | | | 0 to 999999 |
| Converted digital value (AKW2182G) | | | -999999 to 999999 |

## General specifications

| Item | Description |
|---|---|
| Rated operating voltage (main unit) | 100 to 240V AC |
| Rated frequency (main unit) | 50/60Hz common |
| Rated power consumption | Main unit: 6VA<br>Expansion unit: 0.5VA, 1.0VA (AKW2152G)<br>(240V AC at 25°C) |
| Allowable operating voltage (main unit) | 85 to 264V AC<br>(85 to 110% of rated operating voltage) |
| Momentary power-off time (main unit) | 10ms |
| Ambient temperature | –10 to +50°C (–25 to +70°C at storage) |
| Ambient humidity | 30 to 85% RH (at 20°C, non-condensing) |
| Display method (main unit) | LCD with backlight, green;<br>top: 5-digit (1 x 7-segment + 4 x 16-segment),<br>bottom: 6-digit (7-segment) |
| Number of expansion units | Max. 7 |
| Power failure memory | EEPROM (min. 1000000 overwrites)<br>Saved items: setting and measurement values |
| Weight | Main unit: 180g, expansion unit: 80g<br>(AKW2110G), 85g (AKW2152G, AKW2182G) |

[1] The electric power produced can be measured but will not be subtracted from the active electric energy value.
[2] While detecting generated electric power, negative values are displayed for instantaneous electric power and power factor.
[3] The Eco-POWER METER is designed chiefly to manage saving energy. It is neither intended nor can it be legally used for billing.

## Up to 16 circuits
Single-phase, two-wire system

## Expandable and efficient


### Pulse input (AKW2010G, AKW2152G)

| Item | | Description |
|---|---|---|
| Count input mode | | Incremental (fixed) |
| Max. counting speed | | 50kHz/30Hz (selectable) |
| Min. input pulse width | | 0.01ms (for 50kHz)/16.7ms (for 30 Hz), duty ratio = 1:1 |
| Input signal | | Switch, relay, transistor (open collector)<br>• Short-circuit impedance: max. 1kΩ<br>• Short-circuit residual voltage: max. 2V<br>• Impedance when open: min. 100kΩ |
| Prescale | Decimal places | Max. 3 |
| | Range | 0.001 to 100.000 (selectable) |

### Pulse output (AKW2010G)

| Item | Description |
|---|---|
| Number of output points | 1 |
| Insulation method | Optical coupler |
| Output type | Open collector |
| Output capacity | 100mA 30V DC |
| Pulse width | Approx. 100ms |
| ON-state voltage drop | 1.5V or less |
| OFF-state leakage current | 100μA or less |
| Output mode (selectable) | • Pulse output at fixed intervals (per 0.001/0.01/0.1/1/10/100kWh of active electric energy)<br>• Alarm output for power, current, stand-by current, pulse count value |

### Analog input (AKW2182G)

| Item | | Description |
|---|---|---|
| Number of input points | | 2 channels |
| Rated input range | Voltage | 0 to 5V/1 to 5V |
| | Current | 0 to 20mA/4 to 20mA |
| Converted digital value | | 0 to 4000 (decimal number) |
| Resolution | | 1/4000 (12 bit) |
| Overall precision | | ±1% F.S. (-10 to 55°C) |
| Input impedance | Voltage | 440kΩ |
| | Current | 125Ω |
| Maximum input range | Voltage | -0.3 to +10V |
| | Current | -2 to +30mA |
| Input protection | | Diode |

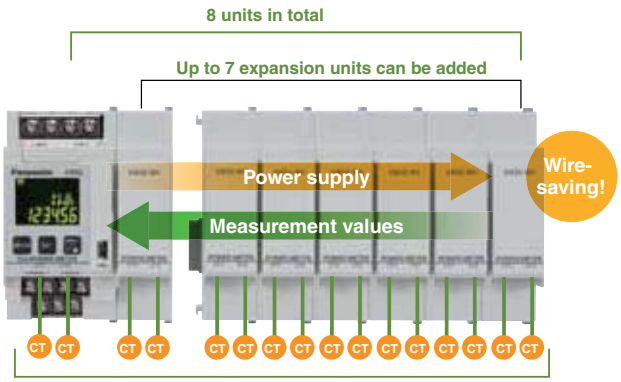
### Communication

| Item | RS485 | USB (Full Speed) |
|---|---|---|
| Protocol | MEWTOCOL/Modbus (RTU) (selectable) | MEWTOCOL |
| Max. number of stations | 99 | 1 |

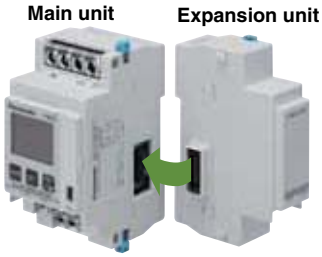
Features 1

# Easy, wire-saving expansion

**Eliminate excess wiring by using up to seven expansion units to add the required number of CT inputs for your application.**




**Connector for easy expansion**




16 circuits (1-phase, 2-wire system)
8 circuits (1-phase, 3-wire system and 3-phase, 3-wire system)

## Data display for each unit

**Displaying main unit data H**


Main unit Expansion units

**Displaying expansion unit data 2**

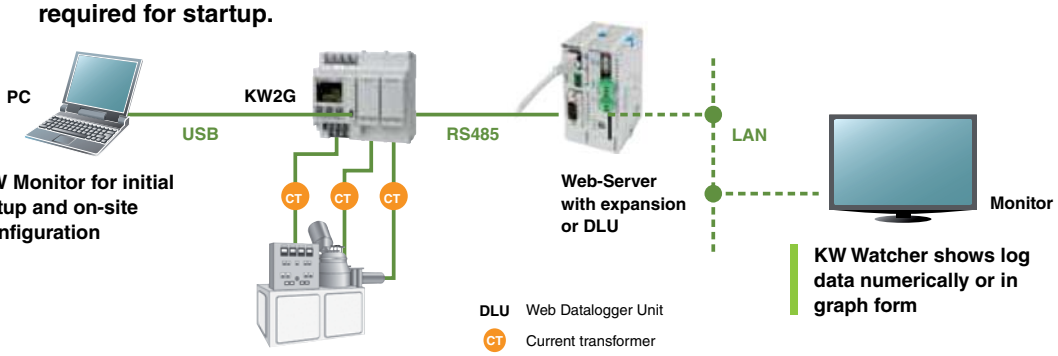

Main unit Expansion units

**The main unit can display data of expansion units by a simple switching operation.**

Features 2

# Quick initial setting via USB

**The unit can be connected to a PC via USB. KW Monitor, an operation setting and check tool, allows you to configure and check the operation of KW2G on site, reducing the time required for startup.**




Features 3

## Quick installation

**The units can be mounted on DIN rails.**


Features 4

## Variety of measurements

- **Simultaneous measurement of electric power and pulse input (e.g. flow amount)**
- **Measurement of inverter power supplies (primary side) available**


**KW1M**
AKW1111

**KW1M-H**
AKW1121

The Panasonic KW1M Eco-POWER METER, which consumes less power itself than its predecessor, can be hooked up directly to industrial 400V AC networks.

## Features

- Screw and DIN-rail installation possible
- Integrated RS485 interface (Modbus RTU/MEWTOCOL)
- Automatic logging of measurement data at numerous selectable intervals (can be saved on SD card)
- Diverse alarm functions, e.g. when current consumption levels are exceeded
- Clock/calendar function
- Suited for measuring 3-phase currents of up to 400V AC
- Monitors and displays the most important electrical parameters

## Order guide

| Product name | Phase and wire system | Rated operating voltage | Measurement voltage | Current transformer [1] | Part no. |
|---|---|---|---|---|---|
| KW1M Eco-POWER METER Standard type | 1-phase, 2-wire system<br>1-phase, 3-wire system<br>3-phase, 3-wire system<br>3-phase, 4-wire system | 100 to 240V AC 50/60Hz | 240V AC system | Panasonic (5/50A, 100A, 250A, 400A type) | **AKW1110** |
| | | | 220/440V AC system | | **AKW1111** |
| KW1M-H Eco-POWER METER SD card type | | | | | **AKW1121** |

[1] Sold separately.

## Measurement items

| Item | | Unit | Data display range |
|---|---|---|---|
| Active electric energy | | kWh/MWh | 0.00 to 9999.99MWh<br>0.00 to 9999999.99kWh (when 9-digit display) |
| Active instantaneous electric power | | kW | 0.00 to 9999.99 |
| Current | L1, L2, L3 | A | 0.0 to 6000.0 |
| Voltage | L1-L2, L1-L3, L2-L3 | V | 0.0 to 99999.9 |
| Electricity costs [1] | | - | 0.00 to 999999 |
| $CO_2$ equivalent | | kg $CO_2$ | 0.00 to 999999 |
| Power factor | | - | 0.00 to 1.00 (with identification of leading and lagging phases in the phase angle range of –90° to +90°) |
| Frequency | | - | 47.5 to 63.0Hz |
| Hour meter | ON-time | h | 0.0 to 99999.9 |
| | OFF-time | h | |
| Pulse counter | | - | 0 to 999999 |

[1] The Eco-POWER METER is designed chiefly to manage saving energy. It is neither intended nor can it be legally used for billing.

## RS485 communication

| Item | Description |
|---|---|
| Protocol | MEWTOCOL and Modbus (RTU) (selectable) |
| Max. number of stations | 99 |

## General specifications

| Item | Description |
|---|---|
| Rated operating voltage | 100 to 240V AC |
| Rated frequency | 50/60Hz common |
| Rated power consumption | 6VA (AKW1110), 8VA (AKW1111, AKW1121) (240V AC at 25°C) |
| Allowable operating voltage | 85 to 264V AC (85 to 110% of rated operating voltage) |
| Momentary power-off time | 10ms |
| Ambient temperature | –10 to +50°C (–25 to +70°C at storage) |
| Ambient humidity | 30 to 85% RH (at 20°C, non-condensing) |
| Display method | LCD with backlight; top: green, 4-digit, 16-segment; bottom: amber, 6-digit, 7-segment |
| Power failure memory | EEPROM (min. 100000 overwrites) |
| Weight | Approx. 170g (AKW1110, AKW1111), approx. 180g (AKW1121) |

## Pulse input (AKW1111/AKW1121)

| Item | | Description |
|---|---|---|
| Count input mode | | Incremental (fixed) |
| Max. counting speed | | 2kHz/30Hz (selectable) |
| Min. input pulse width | | 0.25ms (for 2kHz)/16.7ms (for 30Hz), duty ratio = 1:1 |
| Input signal (at 20°C) | | • Switch, relay, transistor (open collector)<br>• Short-circuit impedance: max. 1kΩ<br>• Short-circuit residual voltage: max. 2V<br>• Impedance when open: min. 100kΩ |
| Prescale | Decimal places | Max. 3 |
| | Range | 0.001 to 100.000 (selectable) |

## Pulse output

| Item | Description |
|---|---|
| Number of output points | 1 |
| Insulation method | Optical coupler |
| Output type | Open collector |
| Output capacity | 100mA 30V DC |
| Pulse width | Approx. 100ms |
| ON-state voltage drop | 1.5V or less |
| OFF-state leakage current | 100µA or less |
| Output mode (selectable) | • Pulse output at fixed intervals (per 0.001/0.01/0.1/1/10/100kWh of active electric energy)<br>• Alarm output: power, current, stand-by current [1], pulse count value |

[1] For AKW1111, AKW1121

## Main unit memory (AKW1121)

| Item | | Description |
|---|---|---|
| Log type 1 (hourly instantaneous values) | Log cycle | 60min (fixed) |
| | Log data | Electric energy, instantaneous electric power, current, voltage, power factor, frequency, and pulse count value |
| | Data amount | 24 records per file (max. 1.5 years) |
| Log type 2 (hourly difference values) | Log cycle | 60min. (fixed) |
| | Log data | Electric energy and pulse count value |
| | Data amount | 24 records per file (max. 1.5 years) |
| Log type 3 (frequent instantaneous values) | Log cycle | 1min, 5min, 10min, 15min, 30min, or 60min (selectable) |
| | Log data | Electric energy, instantaneous electric power, current, voltage, power factor, frequency, and pulse count value |
| | Data amount | Max. 7200 records, approx. 5 days (for a log cycle of 1min) |
| Main unit display | | Electric energy by month (max. 1.5 years), by day (max. 1 month), by hour (max. 24 hours) |

## External memory (AKW1121)

| Item | Description |
|---|---|
| Supported media | SD memory card [1] |
| Supported formats | Compliant with SD and SDHC standards [2] |

[1] SD/SDHC 2GB or 4GB memory card by Panasonic Corporation recommended.

[2] To format SD memory cards, please download and use the formatting software available on the Panasonic website: http://panasonic.jp/support/global/cs/sd/download


# Features

## AKW8111

- Direct measurement of 400V power loads
- 3-phase, 4-wire system compatibility
- Improved measurement function
- Instantaneous electric power
- Electric energy
- Voltage and current measurement for each phase
- Frequency
- Power factor
- Simultaneous power and pulse measurement
- Supports networking (up to 99 stations can be connected)
- RS485, MEWTOCOL/Modbus (RTU)

## AKW8111H

- Includes all the features of AKW8111
- Built-in memory
- Log data can be saved to memory of main unit
- Built-in battery (for memory backup)
- Protects log data and time measurements from power failures
- Logging of electric energy by month, day and hour
- Manual electric energy measurement
- Clock/calendar function

## AKW8115

- Direct input of 1A or 5A secondary current transformers (CT)
- Panasonic CT no longer required

## Order guide

| Product name | Phase and wire system | Rated operating voltage | Measurement voltage | Current transformer [1] | Log function | Part no. |
|---|---|---|---|---|---|---|
| KW8M Eco-POWER METER | 1-phase, 2-wire system<br>1-phase, 3-wire system<br>3-phase, 4-wire system | 100 to 240V AC<br>50/60Hz | 220/440V AC | Panasonic (5/50A, 100A, 250A, 400A type) | – | **AKW8111** |
| | | | | | • | **AKW8111H** |
| | | | | Commercial CT (secondary current 1A or 5A) | – | **AKW8115** |

[1] Sold separately.

## Measurement items

| Item | | Unit | Data range |
|---|---|---|---|
| Electric energy | Active electric energy | kWh | 0.00 to 9999999.9 |
| | Reactive electric energy | kvarh | 0.00 to 9999999.9 |
| | Apparent electric energy | kVAh | 0.00 to 9999999.9 |
| Instantaneous electric power | Active power | kW | 0.00 to 9999999.99 |
| | Reactive power | kvar | -99999.99 to 999999.99 |
| | Apparent power | kVA | 0.00 to 9999999.99 |
| Current | L1, L2, L3 | A | 0.0 to 6000 |
| Voltage | L1, L2, L3 | V | 0.0 to 9999 |
| Electricity costs [1] | | – | 0.00 to 99999999 |
| Power factor | Display | – | 0.00 to 1.00 |
| | Communication | – | –1.00 to 1.00 |
| Frequency | | Hz | 47.5 to 63.0 |
| Hour meter | ON-time | h | 0.0 to 99999.9 |
| | OFF-time | | |
| Pulse counter | | – | 0 to 99999999 |

[1] The Eco-POWER METER is designed chiefly to manage saving energy. It is neither intended nor can it be legally used for billing.

## General specifications

| Item | Description |
|---|---|
| Rated operating voltage | 100 to 240V AC |
| Rated frequency | 50/60Hz common |
| Rated power consumption | 8VA (240V AC at 25°C) |
| Allowable operating voltage | 85 to 264V AC (85% to 110% of rated operating voltage) |
| Momentary power-off time | 10ms |
| Ambient temperature | –10 to +50°C (–25 to +70°C at storage) |
| Ambient humidity | 30 to 85% RH (at 20°C, non-condensing) |
| Display method | 8-digit, 7-segment LED |
| Power failure memory | EEPROM (min. 100000 overwrites) |
| Size | 48 x 96 x 98.5mm |
| Weight (without mounting bracket) | Approx. 235g (AKW8111), approx. 250g (AKW8111H), approx. 265g (AKW8115) |

## Pulse input

| Item | | Description |
|---|---|---|
| Count input mode | | Incremental (fixed) |
| Max. counting speed | | 2kHz/30Hz (selectable) |
| Min. input pulse width | | 0.25ms (for 2kHz)/16.7ms (for 30Hz), duty ratio = 1:1 |
| Input signal (at 20°C) | | Switch, relay, transistor (open collector)<br>• Short-circuit impedance: max. 1kΩ<br>• Short-circuit residual voltage: max. 2V<br>• Impedance when open: min. 100kΩ |
| Prescale | Decimal places | Max. 3 |
| | Range | 0.001 to 100.000 (selectable) |

## Pulse output

| Item | Description |
|---|---|
| Number of output points | 1 |
| Insulation method | Optical coupler |
| Output type | Open collector |
| Output capacity | 100mA 30V DC |
| Pulse width | Approx. 100ms |
| ON-state voltage drop | 1.5V or less |
| OFF-state leakage current | 100μA or less |
| Output mode (selectable) | • Pulse output at fixed intervals (per 0.001/0.01/0.1/1/10/100kWh of active electric energy)<br>• Alarm output: power, current [1], stand-by current [1], pulse count value |

[1] For AKW8115

## Additional features (AKW8111H)

| Item | | | Description |
|---|---|---|---|
| Log function of main unit memory | Automatic | Log cycle | 60min |
| | | Log data | Active, reactive, and apparent electric energy |
| | | Data amount | Max. 2232 records (for 3 months) |
| | | Display | Electric energy by month, day, and hour |
| | Selectable | Log cycle | 1min, 5min, 10min, 15min, 30min, 60min |
| | | Log data | Active, reactive, and apparent electric energy, current, voltage, pulse count value |
| | | Data amount | Max. 2160 records, approx. 1.5 days (for a log cycle of 1min) |
| Clock/calendar function | | | Accuracy: 240s (at –10°C), 70s (at 25°C), 240s (at 50°C) per month |
| Manual measurement of active electric energy | | | Arbitrary time period, display range: 0.00 to 9999999.9kWh |
| Backup battery | | Saved data | Clock and log data |
| | | Battery life | Approx. 5 years (at ambient temperature of 25°C) |

## RS485 communication

| Item | Description |
|---|---|
| Protocol | MEWTOCOL and Modbus (RTU) (selectable) |
| Max. number of stations | 99 |


# Features

- Compatible with systems of up to 3-phase, 3-wire
- Support for 400V AC power measurement (use with external voltage transformer)
- Also easy to mount on a panel surface with a mounting frame (sold separately)
- Supports networking (RS485 port)
- Protective structure: IEC IP66 (only front panel with rubber gasket)
- UL-compliant
- DIN rail type (KW7M) ideal for installation in a panel

## Order guide

| Product name | Phase and wire system | Rated operating voltage | Measurement voltage | Current transformer [1] | Part no. |
|---|---|---|---|---|---|
| KW4M Eco-POWER METER DIN 48x48 type | 1-phase, 2-wire system<br>1-phase, 3-wire system<br>3-phase, 3-wire system | 100 to 240V AC 50/60Hz | 240V AC system | Panasonic (5/50A, 100A, 250A, 400A type) | **AKW5111**<br>**AKW5112**<br>**AKW5211**<br>**AKW5212**<br>**AKW7111** |
| KW7M Eco-POWER METER DIN-rail type | | | | | |

[1] Sold separately.

## Measurement items

| Item | | Unit | KW4M | KW7M |
|---|---|---|---|---|
| | | | Data display range | |
| Instantaneous electric power | | kW | 0.00 to 9999.99 | 0.00 to 999999.99 |
| Electric energy | | kWh/MWh | 0.00 to 9999.99MWh, 0.00 to 9999999.99kWh (when 9-digit display) | 0.00 to 9999999.9kWh |
| Current | L1 | A | 0.0 to 999.9 | 0.0 to 6000.0 |
| | L2 | A | 0.0 to 999.9 | 0.0 to 6000.0 |
| Voltage | L1-L2, L2-L3 | V | 0.0 to 9999.9 | |
| Electricity costs [1] | | Yen/Yuan | 0 to 999999 | – |
| | | Dollars/Euros | 0.0 to 99999.9 | – |
| | | No currency | 0 to 999999 | 0.00 to 99999999 |
| $CO_2$ equivalent | | kg $CO_2$ | 0.0 to 999999 | – |
| Hour meter | ON-time | h | 0.0 to 99999.9 | – |
| | OFF-time | | | |
| Pulse counter | | – | 0 to 999999 | – |

[1] The Eco-POWER METER is designed chiefly to manage saving energy. It is neither intended nor can it be legally used for billing.

## RS485 communication

| Item | Description |
|---|---|
| Protocol | MEWTOCOL/Modbus (RTU) |
| Max. number of stations | 99 |

For detailed information please refer to our website
**www.panasonic-electric-works.com**

## General specifications

| Item | KW4M | KW7M |
|---|---|---|
| Rated operating voltage | 100 to 240V AC | |
| Rated frequency | 50/60Hz common | |
| Rated power consumption | 8VA (240V AC at 25°C) | 6VA (240V AC at 25°C) |
| Allowable operating voltage | 85 to 132V AC/170 to 264V AC (85% to 110% of rated operating voltage) | |
| Momentary power-off time | 10ms | |
| Ambient temperature | –10 to +50°C (–25 to +70°C at storage) | |
| Ambient humidity | 30 to 85% RH (at 20°C, non-condensing) | |
| Display method | KW4M: LCD, 6-digit, 7-segment with backlight (setting value) and 4-digit, 16-segment (mode); top: green, bottom: amber, KW7M: LED, 8-digit, 7-segment | |
| Power failure memory | EEPROM (min. 100000 overwrites) | |

# Current transformers

AKW4801C | AKW4802C | AKW4803C | AKW4804C | AKW4506C | AKW4507C/ AKW4508C

## Specifications

| Item | Clamp-on type | | | | Through type | | |
|---|---|---|---|---|---|---|---|
| | AKW4801C | AKW4802C | AKW4803C | AKW4804C | AKW4506C | AKW4507C | AKW4508C |
| Rated primary current | 5/50A | 100A | 250A | 400A | 50/100A | 250/400A | 600A |
| Rated secondary current | 1.67/16.7mA | 33.3mA | 125mA | 200mA | 16.7/33.3mA | 125m/200mA | 200mA |
| Winding (turns) | 3000 | 3000 | 2000 | 2000 | 3000 | 2000 | 3000 |
| Ratio error | ±2.0% F.S. | | | | ±1.0% F.S. | | |
| Through hole | ø10 | ø16 | ø24 | ø36 | ø17 | ø36 | |
| Breakdown voltage [1] | 1000V AC/min | | 2000V AC/min | | 1000V AC/min | 2000V AC/min | |
| Insulation resistance [1] | Min. 100MΩ (at 500V DC) | | | | | | |
| Output protection level | ± 7.5V with clamp element | | ± 3.0V with clamp element | | ± 7.5V with clamp element | ± 3.0V with clamp element | |
| Permissible clamping frequency | Approx. 100 times | | | | - | | |
| Ambient temperature range | –10 to +50°C (without frost and non-condensing) | | | | | | |
| Storage temperature | –20 to +60°C (without frost and non-condensing) | | | | | | |
| Ambient humidity | 35 to 85% RH (at 20°C, non-condensing) | | | | 35 to 80% RH (at 20°C, non-condensing) | | |
| Weight (trunk cable included) | Approx. 60g | Approx. 90g | Approx. 200g | Approx. 295g | Approx. 70g | Approx. 200g | Approx. 215g |

[1] Between through hole and output lead wire.

**Notes**

- The Panasonic current transformers (CT) listed above are intended for low-voltage systems under 440V AC. They cannot be used for high-voltage systems. When used in high-voltage systems, all Eco-POWER METERs except for AKW8115 require a combination of a commercial secondary side 5A CT and a Panasonic primary side 5A CT (AKW4801C). Do not purchase a Panasonic CT for AKW8115. AKW8115 can only be used with a commercial CT.
- Panasonic CTs are not included with Eco-POWER METERs.
- Each Panasonic CT comes with a 1m trunk cable.

## Optional trunk cable

| Product name | | Part no. |
|---|---|---|
| Trunk cable for Panasonic current transformers | 3m | **AKW4703** |
| | 5m | **AKW4705** |
| | 10m (special order) | **AKW4710** |

# Mounting parts

**KW8M: Backup battery**

For AKW811H (enclosed with main unit)

**AFC8801**

**KW4M: Mounting frame**

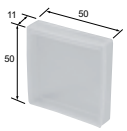
**AKW4822**

**KW4M: Terminal cover**

For screw-terminal type (AKW51xx)

**AKW4823**

**KW4M: Protective cover**




**AQM4803**

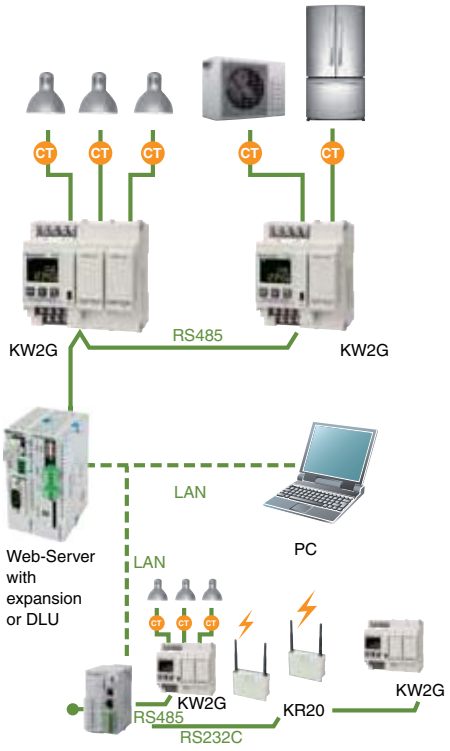
**KW1M(-H): Mounting frame**

**AKW1822**

# Applications

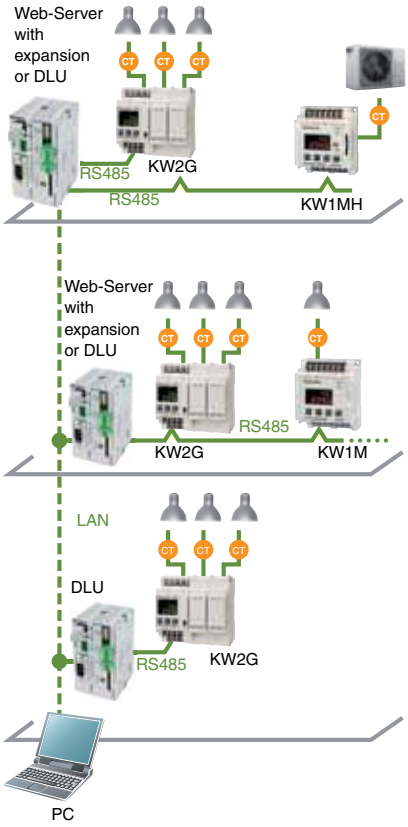
**Small retailers**

## Convenience stores



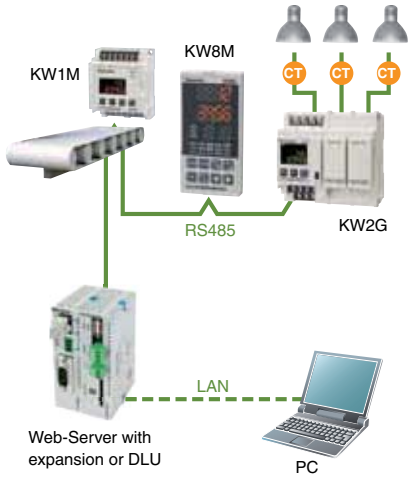

**Airports, universities, hospitals**

## Public facilities




**Plants with large equipment**

## Plants




**DLU** Web Datalogger Unit

CT Current transformer

Add only the required number of units in a small switchboard. Ideal for small stores.

### Expandable type

**KW2G Eco-POWER METER**

Mountable on a control board.

### Waterproof type (IP66)

**KW4M Eco-POWER METER**

Designed for DIN-rail mounting, ideal for installation on a panel.

### DIN rail type

**KW7M Eco-POWER METER**

Add only the required number of units, keeping costs down and preventing waste.

### Expandable type

**KW2G Eco-POWER METER**

Convenient. Check data on a PC immediately.

### SD memory card type

**KW1M-H Eco-POWER METER**

Mountable on a panel board. For 400V equipment.

### Panel surface mount type

**KW8M Eco-POWER METER**

Convenient. Check data on a PC immediately.

### SD memory card type

**KW1M-H Eco-POWER METER**

### Standard type

**KW1M Eco-POWER METER**

# CE marking

When using in the application conforming to EN61010-1/IEC61010-1, make sure to satisfy the following (environmental) conditions:

- Overvoltage category II, Pollution degree 2
- Indoor use
- Ambient temperature of –10 to 50°C
- Ambient non-condensing humidity of 35 to 85%RH (at 20°C)
- Altitude of 2000m or less
- A minimum of dust, and an absence of corrosive gas
- No flammable, explosive gas
- Few mechanical vibrations or shocks
- No exposure to direct sunlight
- No large capacity electromagnetic switches or cables through which large current is flowing

**Applicable standard: Safety Standard: EN61010-1/EMC: EN61326-1**

# Software

## KW Monitor

Software
**Eco-POWER METER** | Centralized control by PC | Analysis |

For easy configuration and visualization of data collected from the Eco-POWER METER

- You can directly access the Eco-POWER METER via your PC. Data can be constantly collected and easily displayed numerically or in graph form.
- Measurements can be taken at intervals of 1s, 5s, 10s, 15s, 30s, 60s, 1min, 5min, 15min, 30min or 60min.
- You can measure electric energy or instantaneous electric power.

**Note: All software can be downloaded free of charge from our website. You can also check the required operating environments.**

## KW View

SD card type
**For KW1M-H** | Power display tool | Verification |

For easy visualization of power data stored on an SD memory card

- Simply load the power data (CSV file) collected on an SD/SDHC memory card into your PC. You can then display the data as a graph by month, day or hour, and print it out.
- Manage Eco-POWER METER data for up to 99 units.

## KW Watcher

Data logger
**For DLU*** | Electric power monitoring software | Management |

For easy visualization of data collected in the DLU

- Data is stored in the data logger per time unit. You can access and collect data via your PC when necessary.
- Easily create graphs and numerical displays for measurement data collected in the DLU*, e.g. power consumption, water use, temperature, air flow amount, etc.
- Measurements can be taken in intervals of 15, 30 or 60 minutes.

***DLU is the abbreviation for Web Datalogger Unit.**

# Other key products for efficient energy management

### Wireless convenience

**KR20 wireless unit**

2.4GHz wireless communication of RS232C/RS485 data

### Monitoring by LAN (Ethernet)

**KS1 signal converter**

Converts RS232C/RS485 data for communication via LAN

### Data collection and storage

**FP Web-Server with FP Web Expansion Unit**

Connects all FP series units and Eco-POWER METERs to the Ethernet and stores data on SD cards

**DLU (Web Datalogger Unit)**

Collects data from Eco-POWER METERs and stores it on CF cards; provided with RS232C modem and four digital input points

# Global Network

North America | Europe | Asia Pacific | China | Japan

## Panasonic Electric Works

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