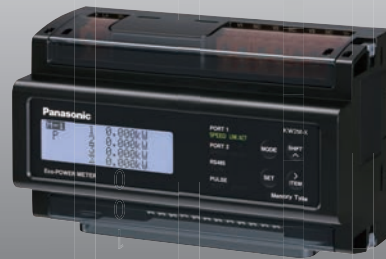


Overview

Eco-POWER METER



Visualizing energy consumption to maximize energy efficiency

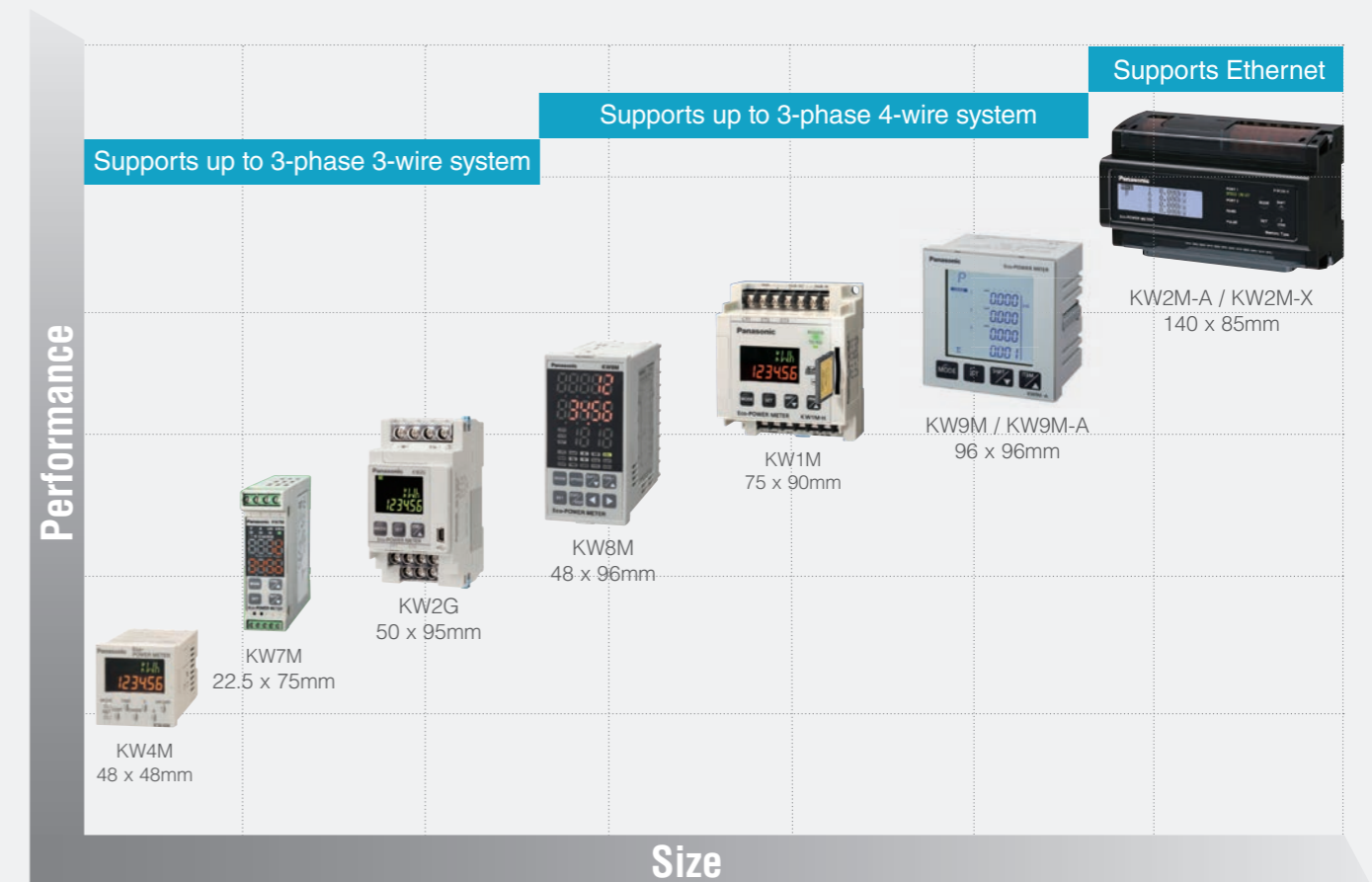
A systematic energy management system (EMS) as specified by ISO 50001 / EN 16001 with the goal to improve the energy efficiency leads to a reduction in use and cost of energy, and greenhouse gas emissions.

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.







Product overview







- Performance 04
- 3-Phase 4-Wire Systems:**
 - KW2M-A / KW2M-X 06
 - KW9M / KW9M-A 08
 - KW1M / KW1M-H 10
 - KW8M 12
- 1-Phase 3-Wire Systems:**
 - KW2G / KW4M / KW7M 14
- Current transformers** 16
- Applications** 18
- Software / CE** 19

• : Available
 - : Not available

Product name	KW2M-A	KW2M-X	KW9M	KW9M-A
Type	Standard	Memory	Standard	Advanced
Image				
Product no.	AKW263100A	AKW264100A	AKW91110	AKW92112
Dimensions mm (WxHxD)	85 x 140 x 65		96 x 96 x 56 ¹⁾ 96 x 96 x 68 ²⁾	
Mounting method	DIN rail ³⁾	•	-	-
	Screw installation	•	-	-
	Mounting frame ³⁾	•	-	-
	Control panel	•	-	-
	Control board	•	-	•
Channel	2		1	
Web server	•		-	
Rated operating voltage	100-240V AC		85 to 264V AC / 100 to 300VDC	
Measurement voltage	690V AC ³⁾		500VAC	
Phase and wire system	1-phase, 2-wire; 1-phase, 3-wire; 3-phase, 3-wire; 3-phase, 4-wire			
Current transformer (CT) See page 17	CT with secondary side output 1A or 5A ⁴⁾			
Communication	Interface	RS485, Ethernet		RS485, USB
	Protocol	MEWTOCOL, Modbus RTU, Modbus TCP		MEWTOCOL, Modbus RTU, DL/T645-2007
	Max. no. of stations	RS485: 99		99
Pulse output	2		-	2
Alarm signal output	Instantaneous active electric power	•	-	•
	Current value	•	-	•
	Stand-by current	•	-	•
	Pulse count value	•	-	•
Present value	•	-	-	• ⁷⁾
Present demand	•	-	•	•
Main unit memory	•	-	-	•
SD memory card	-	4 GB	-	-
Clock/calendar function	-	•	-	•
Measurement items	Electric energy (export)	Active, reactive		
	Electric energy (import)	Active, reactive, apparent		
	Instantaneous electric power	Active, reactive, apparent		
	Current	L1, L2, L3, N		
	Voltage	L1, L2, L3, L1-L2, L1-L3, L2-L3		
	Electricity costs ⁵⁾	-		
	CO ₂ equivalent	-		
	Conversion value	•		
	Power factor	•		
	Frequency	•		
	Pulse counter	•	-	•
	Hour meter	•	-	-
	Simultaneous power/pulse measurement	•	-	-
Temperature °C Sensor	-	-	-100.0 to 0.0 to 100.0	
Software ⁶⁾	KW Watcher	-	•	-
	KW View	-	-	-
	KW Monitor	-	-	-

1) Without terminal block
 2) With terminal block
 3) When UL standard is supported 0 to 300VAC
 4) Use commercially available current transformers (CT) or JS series with secondary currents of 1A or 5A and primary currents of max. 4000A (see page 17).
 5) The Eco-POWER METER is designed chiefly to manage saving energy. It is neither intended nor can it be legally used for billing.
 6) Free of charge. For KW Watcher, a Web Datalogger Unit (DLU) is required.
 7) See page 8

• : Available
 - : Not available

Product name	KW1M	KW1M-H	KW8M DIN48x96	
Type	Standard	SD card	Basic / Built-in memory	1A/5A CT input
Image				
Product no.	AKW1111B	AKW1121B	AKW8111 / AKW8111H	AKW8115
Dimensions mm (WxHxD)	75 x 90 x 50		48 x 96 x 98.5	
Mounting method	DIN rail ³⁾	•	•	-
	Screw installation	•	•	-
	Mounting frame ³⁾	•	•	•
	Control panel	•	•	-
	Control board	• (Mounting frame ³⁾ required)		•
Channel	1			
Web server	-			
Rated operating voltage	100-240V AC			
Measurement voltage	440VAC			
Phase and wire system	1-phase, 2-wire; 1-phase, 3-wire; 3-phase, 3-wire; 3-phase, 4-wire			
Current transformer (CT) See page 17	Panasonic (5A, 50A, 100A, 250A, 400A, 600A)			Any ⁴⁾
Communication	Interface	RS485		
	Protocol	MEWTOCOL, Modbus RTU		
	Max. no. of stations	99		
Pulse output	•	•	•	•
Alarm signal output	Instantaneous active electric power	•	•	•
	Current value	•	•	-
	Stand-by current	•	•	-
	Pulse count value	•	•	•
Present value	•	•	•	•
Present demand	-			
Main unit memory	-	•	-	-
SD memory card	-	•	-	-
Clock/calendar function	-	•	-	-
Measurement items	Electric energy (export)	-	-	-
	Electric energy (import)	Active		Active, reactive, apparent
	Instantaneous electric power	Active		Active, reactive, apparent
	Current	L1, L2, L3		
	Voltage	L1-L2, L1-L3, L2-L3		L1, L2, L3
	Electricity costs ⁵⁾	•	•	•
	CO ₂ equivalent	•	•	-
	Conversion value	-	-	-
	Power factor	•	•	•
	Frequency	•	•	•
	Pulse counter	•	•	•
	Hour meter	•	•	•
	Simultaneous power/pulse measurement	•	•	•
Temperature °C	-			
Software ⁶⁾	KW Watcher	•	•	•
	KW View	-	•	-
	KW Monitor	•	•	•

4) Use commercially available current transformers (CT) or JS series with secondary currents of 1A or 5A and primary currents of max. 4000A (see page 17).
 5) The Eco-POWER METER is designed chiefly to manage saving energy. It is neither intended nor can it be legally used for billing.
 6) Free of charge. For KW Watcher, a Web Datalogger Unit (DLU) is required.

KW2M

The KW2M Eco-POWER METER series allows energy saving and electric power monitoring with multiple circuits.



Features

- › One unit can measure two circuits
- › Up to three expansion units may be connected for the required number of circuits
- › Wire-saving and space-saving
- › Internal memory (KW2M-X): measured data can be saved in CSV files and visualized by KW Watcher
- › Equipped with two Ethernet communication ports
- › Web server functionality allows operational settings of the device and upgrading the version of the main unit's firmware without conventional dedicated software tools.
- › Web server functionality with real-time monitoring (KW2M-X)
- › Web creator tool (KW2M-X) for creating user defined pages
- › Power quality measurements
- › Hour meter function
- › IEC61010-1 CAT III

Order guide

Product name	Phase and wire system	Rated operating voltage	Measurement voltage	Applicable current transformer ¹⁾	Part no.
KW2M-A Eco-POWER METER Standard type	1-phase, 2-wire system 1-phase, 3-wire system 3-phase, 3-wire system 3-phase, 4-wire system	100 to 240VAC 50/60Hz	0 to 690VAC (when UL standard is supported 0 to 300VAC)	CT with secondary side output 1A or 5A	AKW263100A
KW2M-X Eco-POWER METER Memory type					AKW264100A
KW2M-A/KW2M-X Expansion unit					AKW272100A

¹⁾ CT with a secondary current of 1A or 5A see page 17. The Panasonic CTs AKW4** series cannot be used.

Measurement items

Item	Unit	Data display range
Electric energy import	Active	kWh
	Reactive	kvarh
	Apparent	kVAh
Electric energy export	Active	kWh
	Reactive	kvarh
	Apparent	kVAh
Instantaneous electric power	Active	kW
	Reactive	kvar
	Apparent	kVA
Current	A	0.000 to 999.999
Voltage	V	0.00 to 999.9999
Power factor		-1.000 to 1.000
Frequency	Hz	0.00 to 99.99
Pulse counter		0.000 to 999.999
Conversion value	kWh	0.000 to 9.999.999.999.999.999
Hour meter	ON-time	h
	OFF-time	

General specifications

Item	Description
Rated operating voltage	85 to 264VAC
Rated frequency	50/60Hz
Rated power consumption	15VA (240VAC)
Momentary power-off time	10ms
Ambient temperature	Guaranteed accuracy: -10 to +55°C -10 to +50°C (-25 to +70°C at storage)
Ambient humidity	30 to 85% RH (at 20°C, non-condensing)
Display method	Black-and-white LCD with backlight
Display updating time cycle	500, 1000, 2000, 3000ms (set with setting mode)
Measurement speed	Sampling rate
	Data update time
Power failure memory	Internal memory
Size	85 x 140 x 65mm (main unit) 85 x 70 x 65mm (expansion unit)
Weight	Approx. 450g Approx. 200g (expansion unit)

Demand monitoring specifications

Demand type	IEC61557-12 compliant demand Sliding block internal demand Fixed block internal demand Current demand
Demand monitor input type	Current transformer input Pulse input ¹⁾ (set with setting mode)
Demand time span	1 to 60min. (set with setting mode)
Demand measurement item	Present demand
Demand data update cycle	1min.
Display	Present demand (active / reactive / apparent) active (export) / reactive (export) / current
Saved data	Max. demand, monthly max. demand (latest 13 months) ²⁾

- ¹⁾ Only CH1 of main unit is available. Only current transformer input is available for CH2 of main unit and expansion unit.
²⁾ Only AKW264100A

Web server specifications

Simultaneous access number	6 sessions
Web browser ¹⁾	Windows: Google Chrome, Mozilla Firefox iOS ²⁾ : Safari, Google Chrome Android ²⁾ : Google Chrome

- ¹⁾ Use OS and browser with the latest version.
²⁾ System Web is not supported.

Measurement output specifications

Item	Description
Output points	Two channels
Insulation method	PhotoMOS relay
Output type	1a
Output capacity	100mA, 30VAC/DC
Output mode	Pulse by integral power / Output by alarm or events (set with setting mode)
Pulse output	Pulse width
	Pulse output unit
Alarm output	Type
	Alarm reset
Event output	Display
	Output signal
	Output capacity
Protection element	Varistor ²⁾

- ¹⁾ Only AKW264100A
²⁾ Varistor is mounted internal as a protection element.
Install a protective device in case of using at the place where it effects by surge.

Accuracy

Item	Description
Electrical power	0.5% Active electric power compliant class 0.5S (IEC 62053-22) ¹⁾ Reactive electric power compliant class 2 (IEC 62053-23)
	0.2% ²⁾ 1-phase 3-wire system 2 (N) phase current, 3-phase 3-wire system 2 (S) phase current, 0.5%
Current *	0.2% 1-phase 3-wire system 2 (N) phase voltage, 3-phase 3-wire system between 3-1 voltage 3-phase 4-wire system line voltage is 0.5%
	0.2% 1-phase 3-wire system 2 (N) phase voltage, 3-phase 3-wire system between 3-1 voltage 3-phase 4-wire system line voltage is 0.5%

- * When the current respectively voltage is less than 5% of the rated value, the accuracy may deviate by max. 0.5%.
¹⁾ IEC62053 is the international standard for electrical power measuring devices.
²⁾ Errors resulting from current transformers (CT) and voltage transformers (VT) are not considered.

Measurement input specifications

Item	Description	
Input points	One channel	
Insulation method	Input dedicated insulation (insulated with other function terminals)	
Input method	Connection point / non-voltage a contact or open collector (operated by internal power source)	
Input signal ²⁾	Impedance during short-circuit: max. 1kΩ Residual voltage during short-circuit: max. 3V Impedance while open: min. 100kΩ	
Input mode	Pulse input; synchronized with input from outer device ¹⁾ Measure maintenance time ¹⁾	
Max. counting speed	2000Hz / 30Hz	
Min. input signal width	0.25ms (2000Hz selected) 16.7ms (30Hz selected) ON: OFF ratio = 1:1	
Pre-scale setting	Decimal point	
	Range	
Output mode	HOLD	
Protection element	Zener diode	
Pulse input	Pulse input	
	Pulse rate	
	Pulse input condition	2000Hz:
		30Hz:
Operation voltage	5VDC 10mA	

- ¹⁾ Only AKW264100A
²⁾ Non-voltage input

KW9M

The KW9M Eco-POWER METER series combines energy saving by visualizing energy consumption and monitoring electric power quality with high accuracy.



Features

- › Large-screen LCD with backlight clearly displays values in four lines
- › High accuracy: instantaneous active power: 1%, class 1 (IEC 62053-21)
- › Display updating time: 0.1s
- › Panel-mount type capable of multi-circuit measurement
- › Simultaneous measurement of up to three circuits in a 1-phase, 2-wire system
- › Capable of displaying small currents of 1mA
- › Bidirectional measurement of electric energy of each circuit
- › Compatible with AC/DC power supply
- › Power measurement with a direct connection to an already-installed large-capacity commercial CT (secondary side 1A/5A type)
- › Suited for 3-phase, 4-wire systems of up to 500VAC

Order guide

Product name	Phase and wire system	Measurement voltage	Measurement current ¹⁾	Part no.
KW9M Eco-POWER METER Standard type	1-phase, 2-wire system 1-phase, 3-wire system 3-phase, 3-wire system 3-phase, 4-wire system	0 to 500VAC	1 to 65535A	AKW91110
KW9M Eco-POWER METER Advanced type				AKW92112

¹⁾ CT with a secondary current of 1A or 5A see page 17. The Panasonic CTs AKW4** series cannot be used.

Measurement items

Item	Unit	Data display range
Electric energy import	Active	kWh
	Reactive	kvarh
	Apparent	kVAh
Electric energy export	Active	kWh
	Reactive	kvarh
Instantaneous electric power	Active	kW
	Reactive	kvar
	Apparent	kVA
Current	A	0.000 to 9.999.999
Voltage	V	0.00 to 9.999.999
Power factor		-1.000 to 1.000
Frequency	Hz	0.00 to 99.99
Converted digital value		0.000 to 9999999.9
Temperature	°C	-100.0 to 100.0

General specifications

Item	Description
Rated operating voltage	AC 85 to 264V
	DC 100 to 300V
Rated frequency	50/60Hz
Rated power consumption	Approx. 5VA (240V AC at 25°C)
	Approx. 3W (240V DC at 25°C)
Momentary power-off time	10ms
Ambient temperature	Guaranteed accuracy: -10 to +55°C -25 to +55°C (-25 to +70°C at storage)
Ambient humidity	30 to 85% RH (at 20°C, non-condensing)
Display method	LCD with backlight
Measurement speed	Sampling rate 1.024 MHz (Approx. 1.0μs)
	Data update time 100ms
Power failure memory	Internal memory (min. an overwrites 10 ¹⁰) Saved items: settings and measurement values
Size	96×96×56mm (without terminal block)
	96×96×68mm (with terminal block)
Weight	Approx. 450g KW9M-A: approx. 480g (with secondary battery)

Measurement input specifications

Item	Description	
Voltage	Input voltage	1P2W L-L 0 to 500VAC 1P3W L-L 0 to 500VAC L-N 0 to 250VAC 3P3W L-L 0 to 500VAC 3P4W L-L 0 to 500VAC L-N 0 to 289VAC
	Impedance	Min. 2MΩ (L-N; V1/V2/V3-Vn)
	Resolution	0.01V
	Accuracy ¹⁾	Standard: 0.5% Advanced: 0.2%
	VT ratio	1.00 to 600.00 Voltage transformer (VT) is required when you measure a load with voltage over rated voltage.
	Current	Input current (with CT)
Max. current		10A (200% of input current)
Overload capacity		1000% of the input current for 3s
Resolution		0.001A
Accuracy ¹⁾		Standard: 0.5% Advanced: 0.2% ²⁾
Power	Accuracy ¹⁾	Standard: 1.0% Advanced: 0.5% Active power: class 1 (IEC 62053-21) Reactive power: class 2 (IEC 62053-23)
	Accuracy	±5.0°C

¹⁾ Errors resulting from current transformers (CT) and voltage transformers (VT) are not considered.

²⁾ When the current is less than 5% of the rated value, the accuracy may deviate by max. 0.5%.

Measurement output specifications

Item	Description	
Number of output point	2 points *Insulate between output terminals	
Insulation method	PhotoMOS relay	
Output type	1a	
Output capacity	100mA, 30V 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	100ms approx.
	Pulse output unit	0.0001kWh / 0.001kWh / 0.01kWh / 0.1kWh / 1kWh / 10kWh / 100kWh
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

Communication

Item	RS485	USB (Full Speed)
Protocol	MEWTOCOL/Modbus (RTU) (selectable), DL/T645-2007	MEWTOCOL
Max. number of stations	99	1

KW1M/-H

The Panasonic KW1M Eco-POWER METER can be hooked up directly to industrial 400V AC networks.



KW1M-H

AKW1121

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⁾	Product no.
KW1M Eco-POWER METER Standard type	1-phase, 2-wire system 1-phase, 3-wire system 3-phase, 3-wire system	100 to 240V AC 50/60Hz	240V AC system	Panasonic CT type 5A/50A, 100A, 250A, 400A, 600A	AKW1110B
			220/440V AC system		AKW1111B
KW1M-H Eco-POWER METER SD card type ¹⁾	3-phase, 4-wire system	220/440V AC system	AKW1121B		

¹⁾ Sold separately

Measurement items

Item	Unit	Data display range
Active electric energy	kWh/MWh	0.00 to 9999.99MWh 0.00 to 999999.99kWh (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
	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

Main unit

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
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)
	› Short-circuit impedance: max. 1kΩ
	› Short-circuit residual voltage: max. 2V
Prescale	› Impedance when open: min. 100kΩ
	Decimal places
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 30VDC
Pulse width	Approx. 100ms
ON-state voltage drop	Max. 1.5V
OFF-state leakage current	Max. 100μA
Output mode (selectable)	› Pulse output at fixed intervals (per 0.001, 0.01, 0.1, 1, 10, or 100kWh of active electric energy)
	› Alarm output: power, current, stand-by current ¹⁾ , pulse count

¹⁾ For AKW1111, AKW1121

Main unit memory (AKW1121)

Item	Description	
File type 1 (hourly instantaneous values)	Log cycle	60min (fixed)
	Log data	Electric energy, instantaneous electric power, current, voltage, power factor, frequency, and count value
	Log data amount	24 records per file (max. 1.5 years)
File type 2 (hourly difference values)	Log cycle	60 min. (fixed)
	Log data	Electric energy and count value
	Log data amount	24 records per file (max. 1.5 years)
File type 3 (frequent instantaneous values)	Log cycle	1, 5, 10, 15, 30 or 60min (selectable)
	Log data	Electric energy, instantaneous electric power, current, voltage, power factor, frequency, and count value
	Log 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>

KW8M

KW8M is a high voltage input type for direct measurement of 400V loads and 1A/5A CT type.



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 all types of energy by month, day and hour
- › Manual electric energy measurement
- › Clock/calendar function

AKW8115

- › Direct input of 1A/5A current transformers¹⁾

¹⁾ CT with a secondary current of 1A or 5A see page 17. The Panasonic CTs AKW4** series cannot be used.

Order guide

Product name	Phase and wire system	Rated operating voltage	Measurement voltage	Current transformer	Log function	Product no.
KW8M Eco-POWER METER	1-phase, 2-wire system	100 to 240V AC 50/60Hz	220/440V AC	Panasonic CT type 5A/50A, 100A, 250A, 400A, 600A	Not available	AKW8111
	1-phase, 3-wire system				Available	AKW8111H
	3-phase, 3-wire system 3-phase, 4-wire system			Commercial CT type 1A/5A (secondary current)	Not available	AKW8115

¹⁾ Sold separately

Measurement items

Item	Unit	Data range
Electric energy	Active electric energy	0.00 to 9999999.9 kWh
	Reactive electric energy	0.00 to 9999999.9 kvarh
	Apparent electric energy	0.00 to 9999999.9 kVAh
Instantaneous electric power	Active power	0.00 to 9999999.99 kW
	Reactive power	-99999.99 to 999999.99 kvar
	Apparent power	0.00 to 9999999.99 kVA
Current	L1, L2, L3	0.0 to 6000 A
Voltage	L1, L2, L3	0.0 to 9999 V
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	0.0 to 99999.9 h
	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.

Main unit

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°C to +50°C (-25°C to +70°C at storage)
Ambient humidity	30 to 85% RH (at 20°C non-condensing)
Breakdown voltage	Between the isolated circuits: 2000V for 1min (measured with 500V DC)
Insulation resistance	Between the isolated circuits: min. 100MΩ (measured with 500V DC)
Vibration resistance	10 to 55Hz (1 cycle/min), single amplitude: 0.375mm (1h on 3 axes)
Shock resistance	Min. 294m/s ² (5 times on 3 axes)
Display method	8-digit, 7-segment LED
Power failure memory	EEPROM (min. 100000 overwrites)
Size	48x96x98.5mm
Weight (without mounting bracket)	Approx. 235g (AKW8111), approx. 250g (AKW8111H), approx. 265g (AKW8115)

Pulse input

Item	Description
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)
	› Short-circuit impedance: max. 1kΩ › Short-circuit residual voltage: max. 2V › Impedance when open: min. 100kΩ
Prescale	Decimal places
	Range

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	Max. 1.5V
OFF-state leakage current	Max. 100μA
Output mode (selectable)	› Pulse output at fixed intervals (per 0.001, 0.01, 0.1, 1, 10, or 100kWh of active electric energy)
	Alarm output: power, current ¹⁾ , stand-by current ¹⁾ , pulse count)

¹⁾ For AKW8115

Additional features (AKW8111H)

Item	Description	
Log function of main unit memory	Log cycle	60min
	Log data	Active, reactive, and apparent electric power
	Log data amount	Max. 2232 records (for 3 months)
	Display	Electric energy by month, day, and hour
Selected logging	Log cycle	1, 5, 10, 15, 30, 60 min
	Log data	Active, reactive, and apparent electric power, instantaneous voltage, instantaneous current, pulse count value
	Log data amount	Max. 2160 records (for 1.5 days when log cycle is 1min)
Clock/calendar function	Accuracy: 240s (at -10°C), 70s (at 25°C), 240s (at 50°C) per month	
Manual measurement of 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

KW2G / KW4M / KW7M

Panasonic's Eco-POWER METERS allow you to manage energy efficiently than ever. You can easily add up to 7 expansion units to the KW2G Eco-POWER METER, e.g.



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; saves space and wiring
- › Additional expansion units with analog and pulse input
- › 8-unit connection
- › Compatible with systems of up to 3-phase, 3-wire
- › Support for 400V AC power measurement (use with external voltage transformer)
- › KW4M: Also easy to mount on a panel surface with a mounting frame (sold separately)
- › Supports networking (RS485 port)
- › KW4M: 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⁾	Product no.
KW2G Eco-POWER METER	Main unit	1-phase, 2-wire system 1-phase, 3-wire system 3-phase, 3-wire system	100 to 240V AC 50/60Hz	240V AC system	Panasonic CT type 5A/50A, 100A, 250A, 400A, 600A	AKW2010GB
	Expansion unit	Power measurement				AKW2110GB
		Pulse input				AKW2152G
		Analog input				AKW2182G
KW4M Eco-POWER METER DIN 48x48 type		1-phase, 2-wire system 1-phase, 3-wire system 3-phase, 3-wire system	100 to 240V AC 50/60Hz	240V AC system	Panasonic CT type 5A/50A, 100A, 250A and 400A	AKW5111 AKW5112 AKW5211 AKW5212 AKW7111B
KW7M Eco-POWER METER DIN-rail type						

1) Sold separately

General specifications

• : Available
- : Not available

Product name	KW2G		KW1M	KW7M	KW4M DIN48x48		
	Expandable		Standard	DIN rail	MEWTOCOL	Modbus	
Image							
Product no.	AKW2010GB	AKW2110GB AKW2152G¹⁾ AKW2182G¹⁾	AKW1110B	AKW7111B	AKW5111, AKW5211²⁾	AKW5112, AKW5212²⁾	
Dimensions mm (WxHxD)	50x95x65	25x 95x65	75x90x50	22.5x75x100	AKW51: 48x48x81.9 AKW52: 48x48x87.5		
Mounting method	DIN rail ³⁾	•	•	•	•		
	Screw installation	-	-	•	-		
	Mounting frame ³⁾	-	-	•	•		
	Control panel	•	•	•	• ²⁾		
	Control board	-	-	• (Mounting frame ³⁾ required)	-	•	
Rated operating voltage	100-240V AC						
Measurement voltage	240V AC ⁴⁾						
Phase and wire system	1-phase, 2-wire; 1-phase, 3-wire; 3-phase, 3-wire						
Current transformer (CT) See page 17	Panasonic (5A, 50A, 100A, 250A, 400A, 600A)			Panasonic (5A, 50A, 100A, 250A, 400A)			
Communication	Interface	RS485, USB		RS485			
	Protocol	MEWTOCOL, Modbus RTU (RS485 only)		MEWTOCOL, Modbus RTU	MEWTOCOL	Modbus RTU	
	Max. no. of stations	99					
Pulse output	•	-	•	•	•	•	
Alarm signal output	Instantaneous active electric power	•	-	•	•	•	
	Current value	•	-	•	-	-	
	Stand-by current	•	-	-	-	-	
	Pulse count value	•	-	-	•	•	
Preset value	-	-	-	-	•	•	
Demand	-	-	-	-	-	-	
Main unit memory	-	-	-	-	-	-	
SD card	-	-	-	-	-	-	
Clock/calendar function	-	-	-	-	-	-	
Measurement items	Electric energy	Active					
	Instantaneous electric power	Active, reactive, apparent			Active		
	Current	L1, N/L2, L3		L1, L3	L1 and L2		
	Voltage	L1-L2, L1-L3, L2-L3		L1-L2, L2-L3	L1-L2, L2-L3		
	Electricity costs ⁵⁾	•	Displayed on main unit	•	•	•	•
	CO ₂ equivalent	•		•	-	•	•
	Power factor	•		-	-	-	-
	Frequency	•		-	-	-	-
	Pulse counter	•	-	-	-	•	•
	Hour meter	-	-	•	-	•	•
Simultaneous power/ pulse measurement	•	-	-	-	-	-	
Software ⁶⁾	KW Watcher	•	•	•	•	-	
	KW View	-	-	-	-	-	
	KW Monitor	•	•	•	•	-	
Mark	CE		CE, S-Mark		CE, UL, S-Mark		
Page reference	Pages 14/15		Page 10	Page 16			

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 current rating: 110V) is required.

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

6) Free of charge. For KW Watcher, a Web Datalogger Unit (DLU) is required.



Specifications

	JS17S-Ipn/1A						JS24S-Ipn/1A						JS36S-Ipn/1A			
Prim. nominal current (I _{pn}) in A	60	75	100	125	150	200	100	125	150	200	250	300	300	400	500	600
Class 0.5: Burden in VA	-	-	-	-	-	-	-	-	-	-	-	-	0.5	0.5	0.5	-
Class 1.0: Burden in VA	-	-	-	-	-	-	-	-	-	-	0.5	1	1.5	1.5	-	-
Class 3.0: Burden in VA	0.2	0.5	0.5	1	1	1	1	1	1	1	-	-	-	-	-	-

	JS17S-Ipn/5A			JS24S-Ipn/5A				JS36S-Ipn/5A							
Prim. nominal current (I _{pn}) in A	-	150	-	100	150	200	250	300	400	200	250	300	400	500	600
Class 0.5: Burden in VA	-	-	-	-	-	-	-	-	-	-	-	-	0.5	0.5	0.5
Class 1.0: Burden in VA	-	-	-	-	-	0.5	0.5	0.5	0.5	-	0.5	0.5	2.5	2.5	5.0
Class 3.0: Burden in VA	-	1.5	-	1.5	1.5	-	-	-	-	2.5	-	-	-	-	-

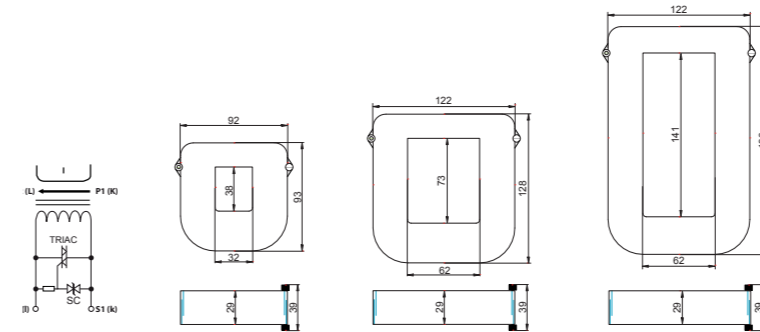
	JSC-01-Ipn/1A and 5A				JSC-02-Ipn/1A and 5A				JSC-03-Ipn/1A and 5A											
Prim. nominal current (I _{pn}) in A	100	150	200	250	300	400	400	500	600	750	800	1000	800	1000	1200	1250	1500	1600	2000	2400
Class 0.5: Burden in VA	-	-	-	-	-	0.5	-	-	-	1.0	1.0	1.0	2.5	1.0	1.0	5.0	5.0	10.0	10.0	10.0
Class 1.0: Burden in VA	-	-	-	-	-	-	-	-	-	0.5	1	1.5	1.5	-	-	-	-	-	-	-
Class 3.0: Burden in VA	0.2	0.5	0.5	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-

Item	JSxxS-Ipn/1A*			JSxxS-Ipn/5A*		
Accuracy	Class 0.5 / 1.0 / 3.0; depending on models; look at the table					
Output terminals	2 x M3 screw with terminal cover					
System voltage	AC 720V					
Overload withstand	1.2 times rated current continuously					
Compliant width	IEC/EN60044-1, IEC61010-1 ø16 / ø24 / ø36 / ø17 / ø36					
Operating temperature range	-20°C to +55°C					
Relative humidity	≤ 85%, non-condensing					
Test voltage	3kV for 1 minute					
Frequency range	50/60Hz					
Protection level	bipolar 6.5Vs					
Installation category	CAT II or CAT III 600VAC					

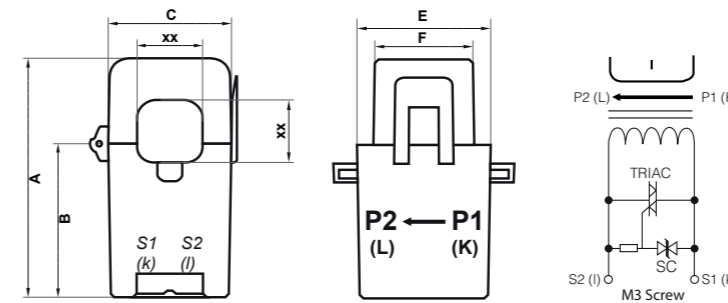
Item	JSC-XX-Ipn/1A*			JSCxx-Ipn/5A*		
	JSC-01	JSC-02	JSC-03	JSC-01	JSC-02	JSC-03
Primary nominal current (I _{pn})	100 to 400A	400 to 1000A	800 to 2400A	100 to 400A	400 to 1000A	800 to 2400A
Secondary nominal current	1A			5A		
Accuracy	Class 0.5 / 1.0 / 3.0; depending on models; look at the table					
AC conductor voltage	≤ 720 Vms					
AC withstand voltage	3000Vms					
Installation category	Cat II or Cat III (600VAC)					
Overload withstand	1.2 times rated current continuously					
Operating temperature range	-20°C to +60°C					
Compliant width	EN 60044-1, IEC61010-1, RoHS					
Protection level	bipolar 6.5Vs					
Lead cable	18A WG twisted stranded wires (600V); 2m long					
Bus-bar pass through window	32 x 38mm	62 x 73mm	62 x 141mm	32 x 38mm	62 x 73mm	62 x 141mm
Weight	300g	700g	1150g	300g	700g	1150g

* Suitable for KW2M, KW9M

Dimensions



Dimension in mm



Model	A	B	C	xx	E	F
JS 17 S	64.1	41.1	33.1	17	35.8	26.2
JS 24 S	74.5	47.0	45.0	24	33.7	21.1
JS 36 S	91.4	57.0	57.1	36	40.2	21.1



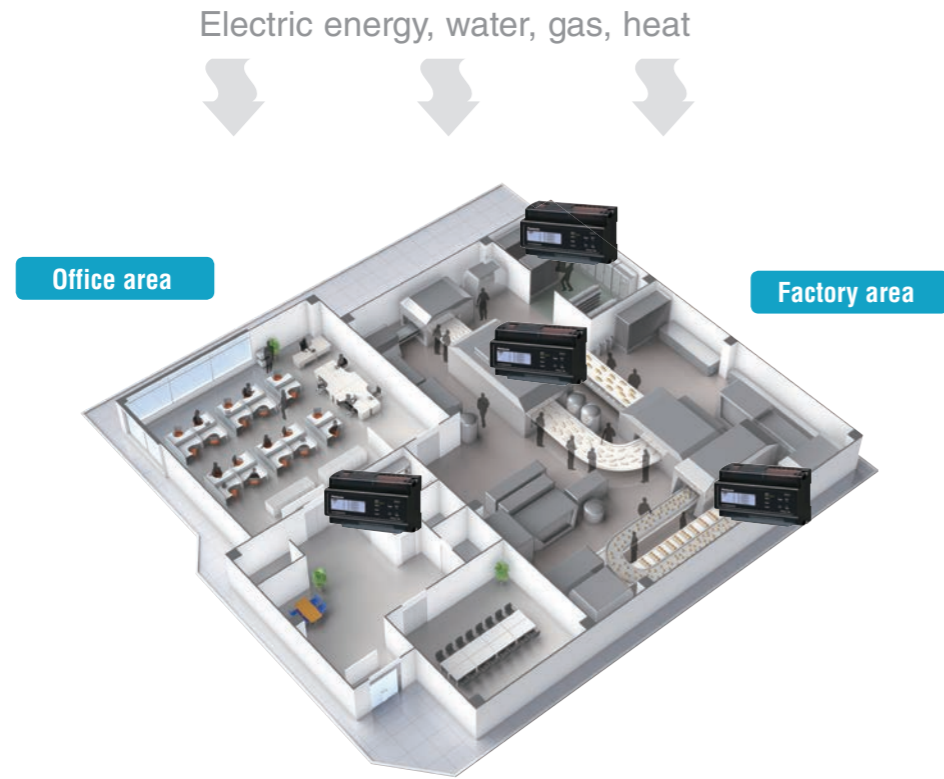
Specifications

Item	Clamp-on type*					Through type*		
	AKW4801B	AKW4802B	AKW4803B	AKW4804B	AKW4808B	AKW4506B	AKW4507B	AKW4508B
Primary side rated current	5A/50A	100A	250A	400A	600A	50A/100A	250A/400A	600A
Secondary side rated current	1.67mA/16.7mA	33.3mA	125mA	200mA	200mA	16.7mA/33.3mA	125mA/200mA	200mA
Winding (turns)	3000	3000	2000	2000	3000	3000	2000	3000
Ratio error	±2.0% F.S.					±1.0% F.S.		
Through hole	ø10	ø16	ø24	ø36	ø36	ø17	ø36	
Breakdown voltage	1000V AC/min		2000VAC/min			1000VAC/min		2000VAC/min
Insulation resistance	Min. 100MΩ (at 500V DC)							
Functional vibration resistance	10 to 55Hz (1 cycle/min), single amplitude: 0.15mm (10min on 3 axes)							
Vibration resistance	10 to 55Hz (1 cycle/min), single amplitude: 0.375mm (1h on 3 axes)							
Functional shock resistance	Min. 98m/s² (4 times on 3 axes)							
Shock resistance	Min. 294m/s² (5 times on 3 axes)							
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°C to +50°C (without frost and non-condensing)							
Storage temperature	-20°C 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. 450g	Approx. 70g	Approx. 200g	Approx. 215g

* Suitable for KW1M, KW2G, KW4M, KW7M, KW8M

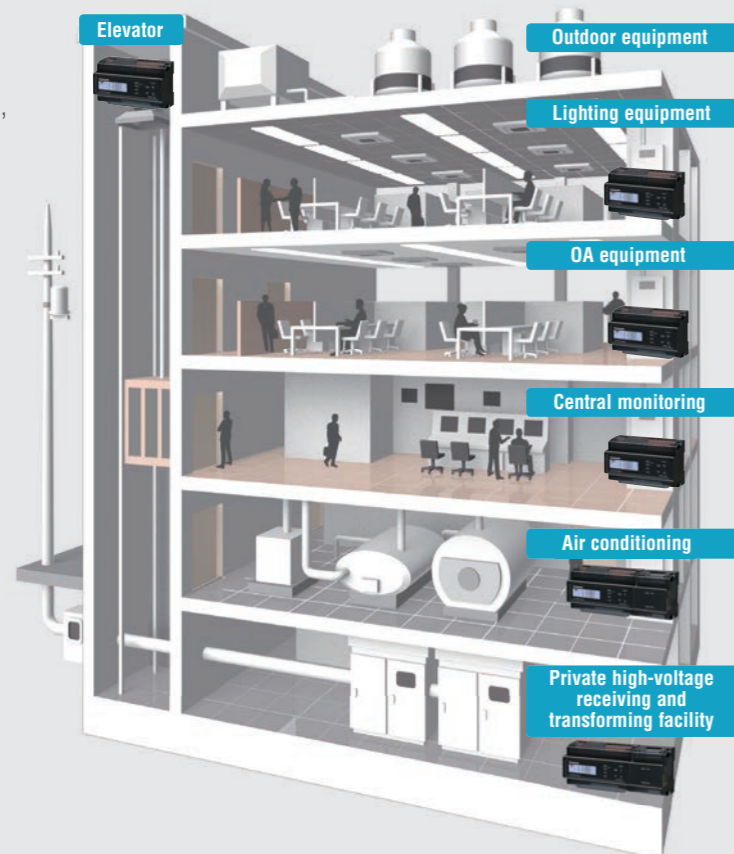
Industry

Plants with industrial-size equipment



Building

Public facilities
(e. g. airports, universities,
hospitals, retailers)

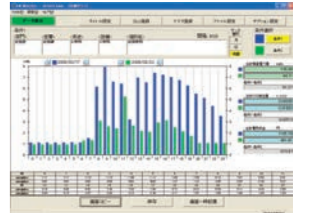


Software

KW Watcher Data logger
For FP Web-Server | Electric power monitoring software | Management |

For easy visualization of data collected in the FP Web-Server

- › Data is stored in the FP Web-Server 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 FP Web-Server, e.g. power consumption, water use, temperature, air flow amount, etc.
- › Measurements can be taken in intervals of 15, 30 or 60 minutes.



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

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

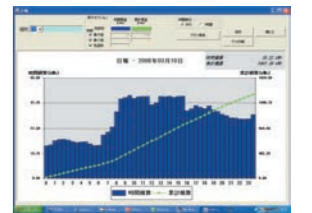
- › Simply load the power data (CSV file) collected on an SD/SDHC memory card into your PC. You can then display the data as a graph by month, day or hour, and print it out.
- › Manage Eco-POWER METER data for up to 99 units.



KW Monitor Software
Eco-POWER METER | Centralized control by PC | Analysis |

For easy visualization of data collected directly 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 taken at intervals of 1s, 5s, 10s, 15s, 30s, 60s, 1min, 5min, 15min, 30min or 60min.
- › You can measure electric energy or instantaneous electrical power.



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

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°C to 50°C
- › Ambient non-condensing humidity of 35 to 85%RH (at 20°C)
- › Altitude of max. 2000m

- › 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: EN 61010-1 / EMC: EN 61326-1

Other key products for efficient energy management

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



North America

Europe

Asia Pacific

China

Japan

Panasonic Electric Works

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Asia Pacific/China/Japan		
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