Panasonic

OVERVIEW

ECO-POWER METERS

29/10/2013

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		KW9M Standard	KW1M Standard	KW1M-H SD card	KW8M DIN48x96 Basic	KW8M DIN48x96 Built-in memory	KW8M DIN48x96 1A/5A CT input
Appearance							
Product no.		**AKW91110**	**AKW1111**	**AKW1121**	**AKW8111**	**AKW8111H**	**AKW8115**
Dimensions mm (W x H x D)		96 x 96 x 56 [1] 96 x 96 x 68 [2]	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)		•	•	•
Rated operating voltage		85 to 264V AC 100 to 300V DC	100-240V AC				
Measurement voltage		500V AC	440V AC				
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		Any [4]	Panasonic (5A, 50A, 100A, 250A, 400A, 600A)				Any [4]
Communication	Interface	RS485, USB	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	–	•	•	•	•	•
Main unit memory		–	–	•	–	•	–
SD card		–	–	•	–	–	–
Clock/calendar function		–	–	•	–	•	–
Measurement items	Electric energy (export)	Active, reactive	–	–	–	–	–
	Electric energy (import)	Active, reactive, apparent	Active		Active, reactive, apparent		
	Instantaneous electric power	Active, reactive, apparent	Active		Active, reactive, apparent		
	Current	L1, L2, L3					
	Voltage	L1, L2, L3, L1-L2, L1-L3, L2-L3	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		-100.0 to 0.0 to 100.0					
Software [6]	KW Monitor	•	•	•	•	•	•
	KW Watcher	•	•	•	•	•	•
	KW View	–	–	•	–	–	–
Mark		CE	CE , S-Mark		CE, S-Mark		
Page reference		Pages 8/9	Pages 10/11		Pages 12/13		

1) Without terminal block
2) With terminal block
3) Sold separately
4) Use commercially available current transformers (CT) with secondary currents of 1A or 5A and primary currents of 4000A or less.
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.

• : Available
– : Not available

Product name		KW2G Expandable		KW1110 Standard	KW7M DIN rail	KW4M DIN48x48 MEWTOCOL	KW4M DIN48x48 Modbus
Appearance		 Main unit	 Expansion unit				
Product no.		**AKW2010G**	**AKW2110G** **AKW2152G** [1] **AKW2182G** [1]	**AKW1110**	**AKW7111**	**AKW5111,** **AKW5211** [2]	**AKW5112,** **AKW5212** [2]
Dimensions mm (W x H x D)		50 x 95 x 65	25 x 95 x 65	75 x 90 x 50	22.5 x 75 x 100	AKW51: 48 x 48 x 81.9 AKW52: 48 x 48 x 87.5	
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	•	–	–	–	•	•
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 Monitor	•	•	•	•	•	–
	KW Watcher	•	•	•	•	•	–
	KW View	–	–	–	–	–	–
Mark		CE		CE , S-Mark		CE, UL, S-Mark	
Page reference		Pages 14/15		Pages 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.

Needs	Recommended model

- Need to measure multiple points
- Need to measure micro-power such as standby power
- Need for electric power surveillance
- Need to measure import and export energy

KW9M

- Capable of simultaneously measuring up to three circuits in a 1-phase, 2-wire system
- Capable of displaying small currents of 1mA and above
- Bidirectional measurement of electric energy

- Need to measure power of commercial current transformer installed at facility
- Need to measure high current circuits

KW8M 1A/5A CT input type
KW9M

- Capable of direct input from a commercial 1A/5A current transformer on the secondary side and up to 4000A current transformer on the primary side.

- Need to measure multiple points
- Need to measure micro-power such as standby power
- Need to measure existing equipment without line stoppage
- Need to load analog data or pulse data

KW2G Series

- The environmental conditions and power can be monitored by using up to 7 expansion units (analog input and pulse input types).
- Able to measure micro-power
- Simple measurement function enables power measurement using CT current only

Needs	Recommended model
▸ Need to simply visualize data on Eco-POWER METER ▸ Need to use the Eco-POWER METER for trials ▸ Need to collect data on SD card	**KW1M-H**  • Main unit has built-in memory • Transfer of data to SD memory card allows visualization on PC screens.
▸ Need to measure 3-phase 4-wire systems	**KW1M Series** (except AKW1110) **KW8M/KW9M Series**  • Direct measurement even of 3-phase, 4-wire 400V AC or 500V AC systems can be done without voltage transformer.
▸ Need for waterproof device or use in narrow-space power meter	**KW4M / KW7M**  • IEC IP66 certified protective structure • DIN type (22.5mm) ideal for installation in a panel
▸ Need to monitor demand	**KW1M-H / KW8M** (AKW8111H)  • Built-in demand function • Alarm outputs when demand target value is exceeded

KW9M

KW9M is a type of power meter, which can promote energy saving by visualizing power consumption. It can also be used to monitor electric power 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 or above
- 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 500V AC

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 500V AC	1 to 4000A	**AKW91110**

1) Please contact our sales offices for current transformers (CT) with a secondary current of 1A or 5A. Panasonic CTs (see p. 17) cannot be used.

Measurement items

Item		Unit	Data display range
Electric energy import	Active	kWh	0.000 to 9999999.9
	Reactive	kvarh	
	Apparent	kVAh	
Electric energy export	Active	kWh	0.000 to 9999999.9
	Reactive	kvarh	
Instantaneous electric power	Active	kW	–99999 to 0.000 to 99999
	Reactive	kvar	
	Apparent	kVA	
Current		A	0.000 to 8000.0
Voltage		V	0.00 to 99999
Power factor			–1.000 to 0.000 to 1.000
Frequency		Hz	0.00 to 99.99
Converted digital value			0.000 to 9999999.9
Temperature		°C	–100.0 to 0.0 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	

Measurement input specifications

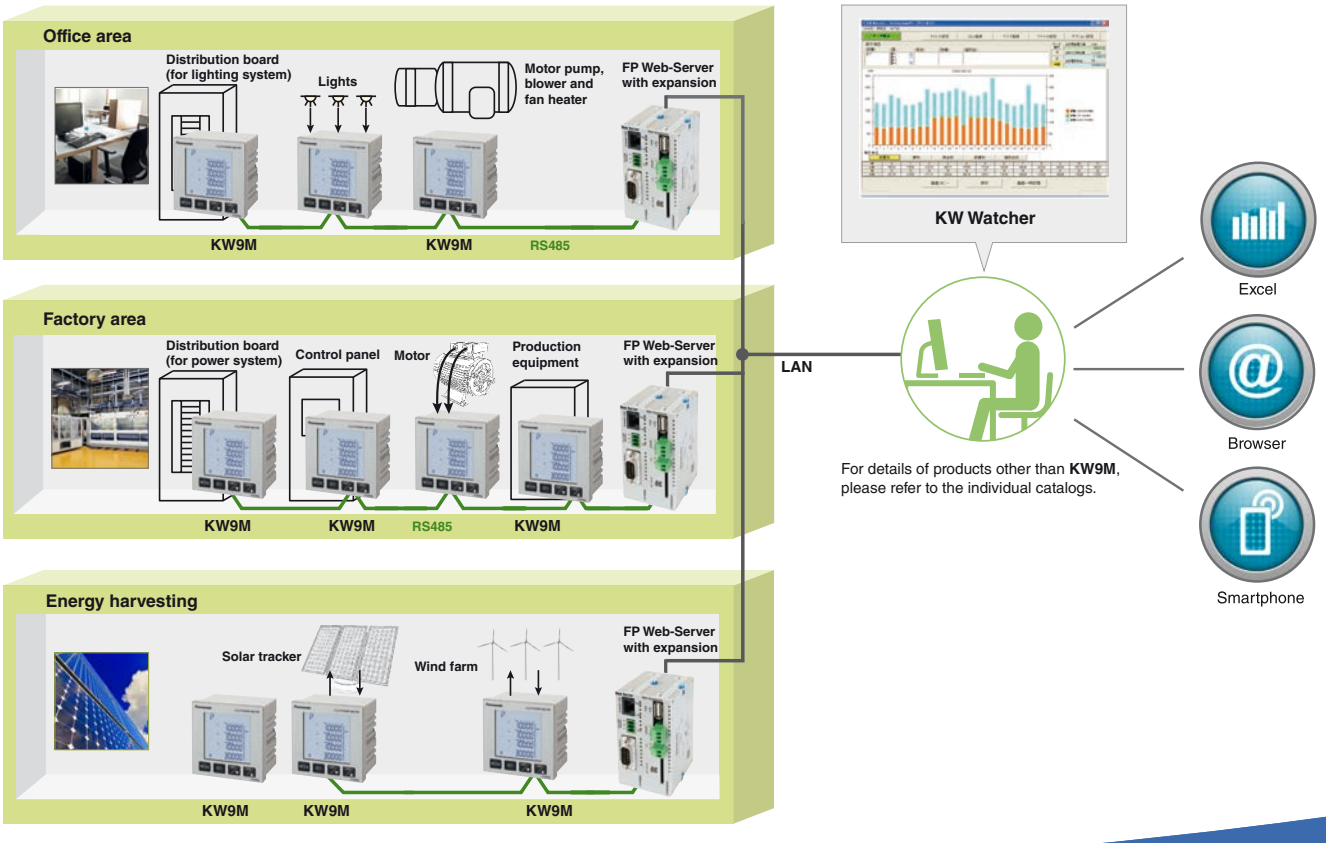
Item		Description		
Voltage	Input voltage	1P2W	L-L	0 to 500VAC
		1P3W	L-L	0 to 500VAC
			L-N	0 to 250VAC
		3P3W	L-L	0 to 500VAC
		3P4W	L-L	0 to 500VAC
			L-N	0 to 289VAC
	Impedance	2MΩ or more (L-N; V1/V2/V3-Vn)		
	Resolution	0.01V		
	Accuracy [1)]	0.5%		
	VT ratio	1.00 to 600.00 Voltage transformer (VT) is required when you measure a load with voltage over rated voltage.		
Current	Input current (with CT)	Primary current		4000A or less
		Secondary current		1A or 5A
	Max. current	10A (200% of input current)		
	Overload capacity	1000% of the input current for 3s		
	Resolution	0.001A		
	Accuracy [1)]	0.5%		
Power	Accuracy [1)]	1.0%		
		Active power: class 1 (IEC 62053-21)		
		Reactive power: class 2 (IEC 62053-23)		
Tempera-ture	Accuracy	±5.0°C		

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

Communication

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

Application examples



KW1M
AKW1111

KW1M-H
AKW1121

The Panasonic KW1M Eco-POWER METER 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
- Demand function (KW1M-H)

Order guide

Product name	Phase and wire system	Rated operating voltage	Measurement voltage	Current transformer [1]	Product no.
KW1110 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 240V AC 50/60Hz	240V AC system	Panasonic CT type 5A/50A, 100A, 250A, 400A, 600A	**AKW1110**
KW1M Eco-POWER METER Standard type			220/440V AC system		**AKW1111**
KW1M-H Eco-POWER METER SD card type [1]					**AKW1121**

[1] Sold separately

Measurement items

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

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 • 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, 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

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 transformers [1)]

1) Please contact our sales offices for current transformers (CT) with a secondary current of 1A or 5A. Panasonic CTs (see p. 17) cannot be used.

Order guide

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

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: 100MΩ or more (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	48 x 96 x 98.5mm
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	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, 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	Automatic logging	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, instanteous voltage, instanteous 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

Panasonic's 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
- Saves space and wiring
- 8-unit connection

Order guide

Product name			Phase and wire system	Rated operating voltage	Measurement voltage	Current transformer [1]	Part 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	**AKW2010G**
	Expansion unit	Power measurement					**AKW2110G**
		Pulse input	Number of input points	Input method			**AKW2152G**
			2 channels	Switch, relay, transistor (open collector)			
		Analog input		Input range			**AKW2182G**
				Voltage: 0 to 5V/1 to 5V, current: 0 to 20mA/4 to 20mA			

1) Sold separately

Measurement items

Item		Unit	Data display range
Active electric energy [1]		kWh/MWh	0.00 to 9999999.99kWh [2] 0.000 to 999999.99kWh
Instantaneous electric power	Active [3]	kW	–9999.99 to 9999.99
	Reactive [3]	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 [4]			0.00 to 999999
CO_2 equivalent		kg-CO_2	0.00 to 999999
Power factor [3]		Displayed on main unit	–1.00 to 1.00 (without identification of leading and lagging phases)
Frequency		Hz	47.5 to 63.0
Pulse counter (AKW2110G, 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, expansion unit: 0.5VA/unit (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)
Display method	LCD with backlight, green; top: 5-digit (1 x 7-segment + 4 x 16-segment), bottom: 6-digit (7-segment)
Number of expansion units	Max. 7
Power failure memory	EEPROM (min. 1000000 overwrites) Saved items: setting and measurement values
Weight	Main unit: 180g, expansion unit: 80g (AKW2110G), 85g (AKW2152G, AKW2182G)

1) The electric power produced can be measured but will not be subtracted from the electric energy value.
2) When 9-digit display
3) While detecting generated electric power, negative values are displayed for instantaneous electric power and power factor.
4) The Eco-POWER METER is designed chiefly to manage saving energy. It is neither intended nor can it be legally used for billing.

Pulse input (AKW2010G, AKW2152G)

Item		Description
Input mode		Incremental (fixed)
Max. counting speed		50kHz/30Hz (selectable)
Min. input pulse width		0.01ms (for 50kHz)/16.7ms (for 30Hz), duty ratio = 1:1
Input signal		Switch, relay, transistor (open collector) • Short-circuit impedance: max. 1kΩ • Short-circuit residual voltage: max. 2V • 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, or 100kWh of active electric energy) Alarm output for power, current, stand-by current, or pulse count

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

Connector for easy expansion

Main unit

Expansion unit

Features

- 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.
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** **AKW7111**
KW7M Eco-POWER METER DIN-rail type					

1) Sold separately

Main unit

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°C to +50°C (–25°C 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)	

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

Current transformers

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

Specifications

Item	Clamp-on type [1]				Through type		
	AKW4801C	AKW4802C	AKW4803C	AKW4804C	AKW4506C	AKW4507C	AKW4508C
Primary side rated current	5A/50A	100A	250A	400A	50A/100A	250A/400A	600A
Secondary side rated current	1.67mA/16.7mA	33.3mA	125mA	200mA	16.7mA/33.3mA	125mA/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)						
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/s^2 (4 times on 3 axes)						
Shock resistance	Min. 294m/s^2 (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. 70g	Approx. 200g	Approx. 215g

1) 600A clamp-on type CT available (AKW4808C)

Note: Please contact our sales offices for current transformers (CT) with a secondary current of 1A or 5A. Panasonic CTs (see p. 17) cannot be used.

Optional trunk cable

Product name		Product 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

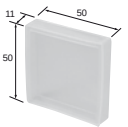
AKW4822

KW4M: Terminal cover

For screw-terminal type (AKW51xx)

AKW4823

KW4M: Protective cover



AQM4803

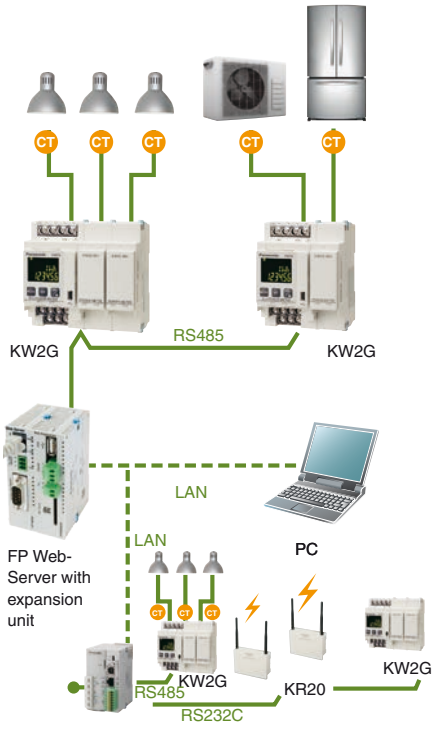
KW1M/KW1M-H: Mounting frame

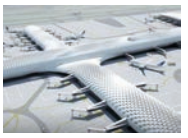
AKW1822

Application examples

Small retailers

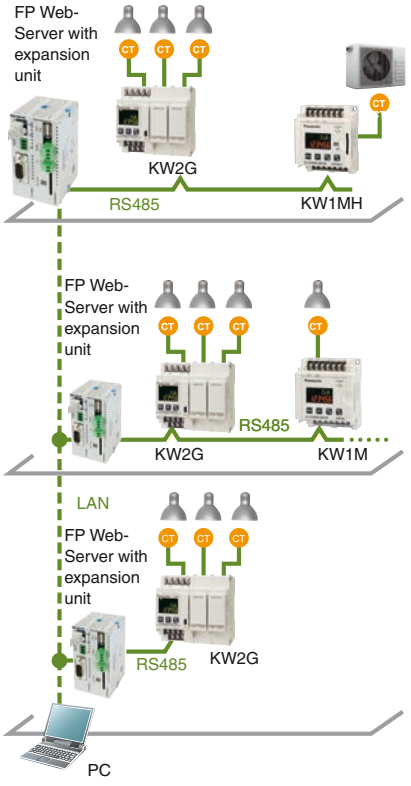
Convenience stores





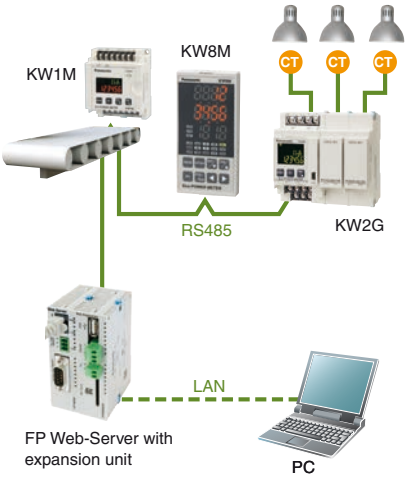
Airports, universities, hospitals

Public facilities



Plants with industrial-size equipment

Plants



Displays power values of each phase on one screen.

Multifunction type

KW9M Eco-POWER METER

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

Expandable type

KW2G Eco-POWER METER

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

DIN rail type

KW7M Eco-POWER METER

Displays power values of each phase on one screen.

Multifunction type

KW9M 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

Displays power values of each phase on one screen.

Multifunction type

KW9M 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°C 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

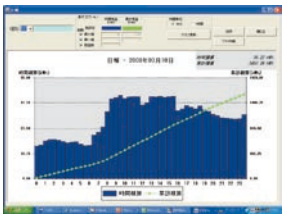
Applicable standard: Safety Standard: EN 61010-1 / EMC: EN 61326-1

Software

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.

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 / FP Web-Server

- 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.

DLU (Web Datalogger Unit)

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

Global Network

North America | Europe | Asia Pacific | China | Japan

Panasonic Electric Works

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