

Power Monitoring

KW1M SERIES Eco-POWER METER



*1 Low Voltage Directive, EMC Directive

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



KW1M Standard type:
AKW1110B

KW1M Common features

- Output of alarm signal is possible using the "alarm setting"
- 50 mm 1.97 in thickness makes it perfect for control panel installations
- Selectable screw, DIN rail and panel installation
- Display switchable between electrical power and electricity charge usage
- Display of calculated CO₂ value possible
- Measurement of inverter power supplies (primary side) is available



KW1M-H
SD card type:
AKW1121B

Features of KW1M-H

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

Order guide

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

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

Specifications

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

Measurement items

Item	Unit	Data display range
Instantaneous electric power (Active)	kW	0.00 to 9999.99
Integrated electric power (Active)	kWh/MWh	0.00 to 9999999.99 kWh (when 9-digit display)
Current	R-current	A 0.0 to 6000.0
	S-current ^{*1}	A 0.0 to 6000.0
	T-current	A 0.0 to 6000.0
Voltage	R (RS)-voltage	V 0.0 to 9999.9
	S (RT)-voltage ^{*1}	V 0.0 to 9999.9
	T (TS)-voltage	V 0.0 to 9999.9
Electricity charge ^{*2}	-	0. to 999999
Conversion carbon dioxide value	kg-CO ₂	0.00 to 999999
Power factor ^{*1}	-	0.00 to 1.00 [Identify leading phase (-) or lagging phase] (Only in range of phase angle $\theta = -90^\circ$ to $+90^\circ$)
Frequency ^{*1}	-	47 to 63.0 Hz
Hour meter	ON-time	h (Hour) 0.0 to 99999.9
	OFF-time	h (Hour) 0.0 to 99999.9
Pulse count value ^{*1}	-	0 to 999999
Integrated electric power converted by pulse	kWh/MWh	0.000 kWh to 9999.99 MWh
Demand ^{*3}	Present demand	kW 0.00 to 9999.99
	Estimated demand	kW 0.00 to 9999.99
	Ratio of estimated demand	% 0.0 to 9999.9

*1 Excluding AKW1110B.

*2 For self-managed energy savings and cannot be used for billing purposes.

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

General specifications

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

Demand monitoring pulse input specifications (for AKW1121B)

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

Accuracy

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

Pulse input specifications (for AKW1111B and AKW1121B)

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

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

Pulse output (Transistor output) specifications

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

*1 The recommended setting for the minimum pulse output unit that can be measured is less than four pulses per second. More than four pulses may cause miss-counts.

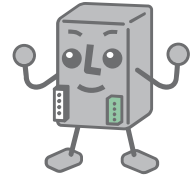
Calculation method
(Pulse output unit: Value of PL-P) > (maximum electric power measurement [kW]) / (3,600 [s] x 4 [pulse / s])

*2 Only AKW1111B and AKW1121B are supported.

*3 Only AKW1121B is supported.

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

Demand control
with Kw1M-H
and EcoLogix



Specifications

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

Communication specification

Item	Specifications	
	RS-485 communication	
Protocol	MEWTOCOL and Modbus RTU (selectable with setting mode)	
Isolation status	Isolated with the internal circuit	
Number of connected units	Max. 99 units ^{1 2}	
Transmission distance	1,200 m 3,937 ft ³	
Transmission speed	2,400 / 4,800 / 9,600 / 19,200 / 38,400 bps (selectable with setting mode) For AKW1121B , 57,600 and 115,200 bps are also selectable	
Transmission format	Data length: 8-bit / 7-bit (selectable with setting mode) ⁴ , Parity: Not available / Odd number / Even number (selectable with setting mode), Stop bit: 1 bit (fixed)	
Communication method / Synchronous system	Half-duplex / Synchronous communication method	
Flow control	—	
Ending resistance	120 Ω approx. (built-in)	

¹ For RS-485 converter on the computer side, we recommend SI-35 and SI-35USB (from LINE EYE Co., Ltd.).

² When using SI-35, SI-35USB or our PLC (which can be connected up to 99 units), up to 99 Eco-POWER METERs can be connected.

In case using this system with the other devices, up to 31 Eco-POWER METER units can be connected.

³ Please check with the actual devices when some commercial devices with RS-485 interface are connected.

The number of connected devices, transmission distance, transmission speed may be different according to using devices or transmission line.

⁴ With Modbus RTU protocol for RS-485 communication, it works only with data length 8-bit.

* Modbus Protocol is a communications protocol developed for PLCs by Modicon Inc.

Memory specifications of main unit (for AKW1121B)

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

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

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

¹ Panasonic business-use SD memory card is recommended.

* UHS standard SDHC memory cards are not supported.

Log data may not be written to the SD memory card if SD memory card without operational confirmation is used.

* The use of UPS (Uninterruptible Power Supply) is recommended due to the possibility of data damage in case of a power failure during writing.

* Refer to the user manual regarding SD memory card handling.

<Precautions when handling the SD memory card>

Data saved to the SD memory card may be lost in the following cases. Be aware that Panasonic Industrial Devices SUNX Co., Ltd. assumes no responsibility for any loss or direct / indirect damage of registered data.

1) If the SD memory card is misused by the customer or a third party

2) If the SD memory card is effected by electrostatic / electronic noise

3) If the card is removed or the main unit is turned OFF while the main unit SD memory card access LED is flashing (reading data).

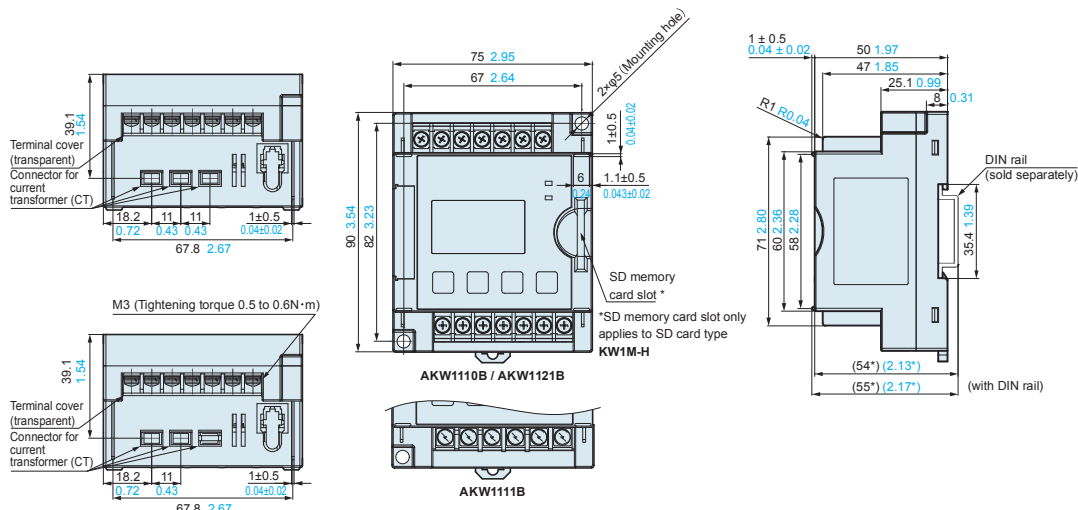
* It is recommended to save important data to other media and always perform backup.

Calendar timer specifications (for AKW1121B)

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

Dimensions (Unit: mm in)

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



Dedicated Current Transformer (CT)



*1 Clamp-on type only

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

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

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



General specifications

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

Notes: 1) Dedicated CT are dedicated for low voltage under 440 V AC system. They can not be used for high voltage circuit.

2) In each type of Eco-POWER METER excluding **AKW8115, KW9M and KW2M**, a combination of commercially secondary side 5 A CTs and dedicated CTs for 5 A is used for measuring high voltage circuits; For details, confirm with each respective user's manual.

3) Since dedicated CTs cannot be used when measuring with **AKW8115, KW9M and KW2M**, please be careful and do not purchase a dedicated CT by mistake.

4) For the **AKW8115, KW9M and KW2M**, CT with a secondary side current 1 A or 5 A is recommended. Please confirm the specification beforehand.

5) Dedicated CT are not included with Eco-POWER METERS.

6) Each dedicated CT includes a 1 m 3.281 ft relay cable, respectively.

Options

Extension cable

CT (current transformer)	Extension cable	CT attachment relay cable (1 m 3.281 ft)
Product name		Model No.
CT extension cable As an Eco-POWER METER dedicated CT option	3 m 9.843 ft	AKW4703
	5 m 16.404 ft	AKW4705
	10 m 32.808 ft (made-to-order)	AKW4710

*1 Specify no more than one level for various extension cable connections.

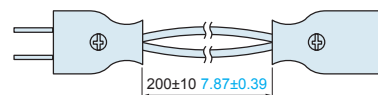
*2 15 m 49.213 ft and 20 m 65.617 ft extension cables are available on a made-to-order basis. For details, please contact our company.

Relay cable

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

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

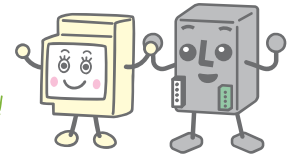
Intermediate power cable



Product name	Model No.
Intermediate power cable	AKE2811

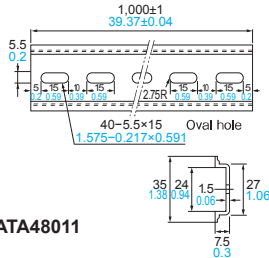
*1 Use of an intermediate power cable is recommended when the dedicated CT attachment power cable is not divided into two.

we welcome
energy-saving
consultations!



Required for DIN rail mounting

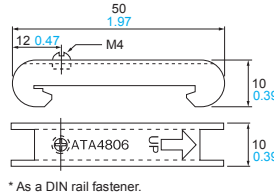
Mounting rails (applicable for DIN and IEC standards):
For **KW4M** pin type (**AKW5211** and **AKW5212**),
KW7M, **KW2G** / **KW2G-H**, **KW1M** / **KW1M-H**, **KW2M**



Model No.: **ATA48011**

Fastening plate:

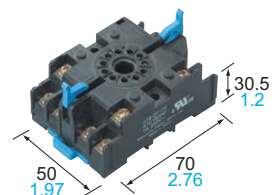
For **KW4M** pin type (**AKW5211** and **AKW5212**),
KW7M, **KW2G** / **KW2G-H**, **KW1M** / **KW1M-H**, **KW2M**



Model No.: **ATA4806**

DIN rail terminal socket:

For **KW4M** 11-pin type
(**AKW5211** and **AKW5212**)

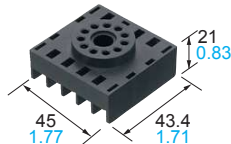


Model No.: **ATC180041**

Required for panel mounting

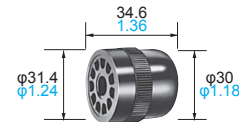
Rear terminal socket: For **KW4M** 11-pin type (**AKW5211** and **AKW5212**)

Model No.: **AT78051**



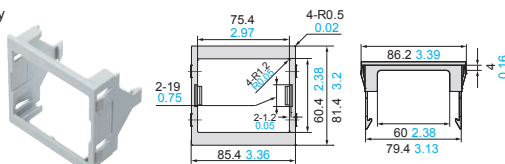
11P cap: Applicable to **KW4M** 11 pin type (**AKW5211**, **AKW5212**)

Model No.: **ATA4861**



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

* Sold separately

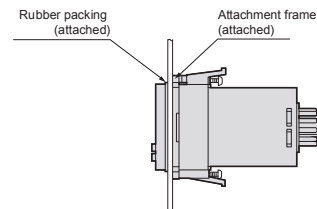


Model No.: **AKW1822**

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

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

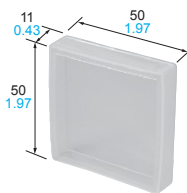
[Rubber packing]
Model No.: **ATC18002**



Convenient for panel mounting

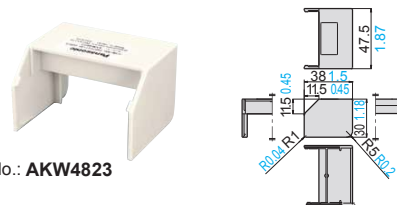
Protective cover for DIN 48 size (flexible type) : For **KW4M**

Model No.: **AQM4803**

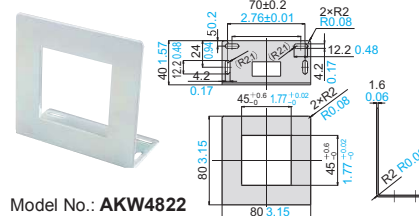


Terminal protective cover: For **KW4M** screw terminal type (**AKW5111** and **AKW5112**)

Model No.: **AKW4823**

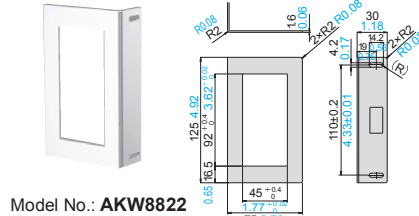


Mounting frame: For **KW4M** * For fixing



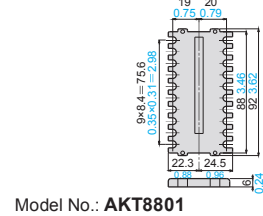
Model No.: **AKW4822**

Mounting frame: For **KW8M**



Model No.: **AKW8822**

Terminal cover: For **KW8M**



Model No.: **AKT8801**

Others

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

Model No.: **AFP0806**



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

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

Model No.: **AFP804**



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

* Packaged with the main unit

Model No.: **AFC8801**

