

## KW1M Series Eco-POWER METER

Simple and compact power meter  
perfect for control panels



KW1M-H Eco-POWER METER  
SD memory card type



KW1M Eco-POWER METER  
Standard type



# KW1M/-H

## Eco-POWER METER

CE

### Features

- Use “visualization” to grasp current status (measurement)  
In addition to simple measurement of voltage, current, power and integrated electrical power, etc., output of warning signals is possible using the “warning setting”.
- 50 mm thickness makes it perfect for control panel installations.
- Both screw and DIN rail installation (easy installation).
- Switchable between electrical power and electricity charge usage.
- Display of calculated CO<sub>2</sub> value possible.

### Features of KW1M-H

- Inherits features of KW1M.
- Internal memory (SD memory card reading)
- Built-in battery (for clock and log data backup)
- Addition of measurement items.
  - Power factor, frequency, and pulse counter
  - Integrated electrical power by month/day/hour
  - Calendar timer function

### Specifications

## Product type, Measurement items and Specifications

### Product type

Product name	Measured voltage input	Model No.
KW1M Eco-POWER METER Standard type	100/200 VAC	<b>AKW1110</b>
	100/200/400 VAC (Select with setting mode)	<b>AKW1111</b>
KW1M-H Eco-POWER METER SD memory card type	100/200/400 VAC (Select with setting mode)	<b>AKW1121</b>

Phase and wire system	Operating power supply	Measured current input	Current transformer (sold separately)	Terminal type
Single-phase two-wire system Single-phase three-wire system Three-phase three-wire system	100 to 240 VAC, 50/60 Hz	50A	Dedicated CT type [5 A, 50 A (common)/ 100 A/250 A/400 A]	Screw terminal (M3 “+/-” screw) or (M3.5 “+/-” screw)*1
Three-phase four-wire system (For AKW1111, AKW1121 only)		100A		
		250A		
		400A		

\*1 The M3.5 “+/-” screws are only for the operation voltage and voltage input terminals (P0, P1, P2, and P3).

### Measurement items

Item	Unit	Data display range
Instantaneous electrical power (Active)	kW	0.00 to 9999.99
Integrated electrical power (Active)	kWh/MWh	0.00 to 9999.99MWh 0.00 to 9999999.99kWh (When 9-digit display)
Current	R current	A
	S current*2	A
	T current	A
Voltage	R (RS) voltage	V
	S (RT) voltage*2	V
	T (TS) voltage	V
Electricity charge*1	–	0.00 to 999999
Converted CO <sub>2</sub> value	kg-CO <sub>2</sub>	0.00 to 999999
Power factor*2	–	0.00 to 1.00 [Identify leading phase (–) or lagging phase] (Only in range of phase angle $\theta = -90^\circ$ to $+90^\circ$ )
Frequency*2	Hz	47.5 to 63.0
Hour meter	ON time	h (Hour)
	OFF time	h (Hour)
Pulse counter*2	–	0 to 999999

\*1 Eco-POWER METER is designed chiefly for managing energy saving. It is not intended to be used for billing.

\*2 For AKW1111, AKW1121 only

# KW1M-H Eco-POWER METER SD memory card type

## Automatic locking of electricity usage amount

- Measurement data locked at intervals of 1, 10, 15, 30, and 60 minutes (selectable)
- Screen display of past logs for each month, day or hour (max. 1.5 years)
- Data reading using SD memory cards

## Direct input with 400 VAC system

- Direct input with 400 VAC system or 3-phase, 4-wire system voltage
- Support for overseas markets and large-scale factories that use high voltage.

## Simultaneous power/pulse measurement

- Simultaneous power and pulse measurement

## KW1M Eco-POWER METER Standard type

Direct input with 100/200 VAC system (AKW1110)  
Direct input with 400 VAC system (AKW1111)

Single-phase two-wire/Single-phase three-wire/Three-phase three-wire system  
Single-phase two-wire/Single-phase three-wire/Three-phase three-wire/  
Three-phase four-wire system(\*) (\*only AKW1111)

**Common** Includes MEWTOCOL/MODBUS protocol

- Easy network construction

## Notification function (external output)

- Standby power warning: Warning lets you find standby power of devices and equipment (For AKW1111, AKW1121).
- Excess power and current warning: Warning lets you find overuse of power or current.



AKW1121

Output terminal (selection)  
(1) Integrated power pulse  
(2) Excess current and power notification  
(3) Standby power notification

CT connects easily.

Highly visible LCD

**KW1M-H only**  
Built-in backup battery (replaceable)

Screw mounting  
Safe and easy installation M3 screws and terminal protective cover

DIN rail installation  
Keys on front for easy setting  
Switch display items

**KW1M-H only**  
Write measurement data to SD/SDHC card. (SD and SDHC cards sold separately)



AKW1110

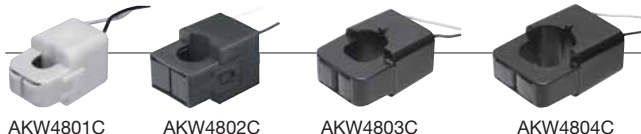


AKW1111

## Options

### ● Dedicated current transformer\*

A CT is not included with the product. Please order in accordance with the type of power distribution system you will be measuring. (Even if you will be using a secondary 5A CT, you will need an AKW4801C.)



AKW4801C

AKW4802C

AKW4803C

AKW4804C

Product name	Rated primary current	Model No.
Dedicated current transformer for 5 A/50 A	5A/50A	AKW4801C
Dedicated current transformer for 100 A	100A	AKW4802C
Dedicated current transformer for 250 A	250A	AKW4803C
Dedicated current transformer for 400 A	400A	AKW4804C

### ● Mounting rail (applicable for DIN and IEC standards)



AT8-DLA1

Length: 1 m aluminum

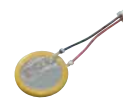
### ● Fastening plate



ATA806

\*For holding DIN rail

### ● Backup battery



\*Included with main unit (For AKW1121)  
AFP804

Product name	Description	Model No.
Mounting rail	Rail for holding DIN rail terminal socket	AT8-DLA1
Fastening plate	Plate for holding DIN rail	ATA806
Backup battery (included)	For clock function (AKW1121: For memory backup function)	AFP804

\*Dedicated current transformers (CT), AKW4801C, AKW4802C, AKW4803C, AKW4804C, are dedicated for low voltage under 440V system. They can not be used for high voltage circuit. In case measuring high voltage circuit, make a 2-step construction by combination of a commercial CT of secondary side current 5A for high voltage and the dedicated CT for 5A (AKW4801C).

All software tool can be downloaded\*, free of charge, from the website.

Panasonic Electric Works website <http://panasonic-electric-works.net/ac> \*Customer registration is required before you download.

For easy power "visualization"

- Electrical power
- CO<sub>2</sub>
- Charge
- 1h Fixed

**KW View** (Power display tool) Verification For KW1M-H

- (1) Simply load the CSV file on your SD or SDHC card into your PC. You can then display the data as a graph by month, day and hour, and print it out.
- (2) Using easy operation, you can manage Eco-POWER METER data for up to 99 units.
- (3) Graph display is in 1 hour units (fixed).



KW View

For easy "visualization" of data collected in the DLU\*

- Electrical power
- CO<sub>2</sub>
- Charge
- Flow
- Temperature
- Primary units
- 1h Fixed

**KW Watcher** (tool for checking power measurement operation)

Management

- (1) Please use in situations where the DLU\* and Eco-POWER METER are used together.
- (2) Gather power, water amount, temperature, primary unit and air flow amount measurement data collected in the DLU\* to easily create graphs and numerical displays, etc. (Measuring instruments such as other sensors will be required for flow amount, temperature and primary units.)
- (3) Measurement is in 1 hour units (fixed).



KW Watcher

For easy "visualization" of data collected from Eco-POWER METER

- Integrated/Instantaneous power
- CO<sub>2</sub>
- Charge
- Current
- Voltage
- ON time
- Power factor
- Frequency
- Counter
- Demand
- Time set OK

**KW Monitor** (Data collection software for Eco-POWER METER)

Analysis Uses only MEWTOCOL

- (1) Measuring can be selected among 1 s, 5 s, 10 s, 15 s, 30 s, 60 s, 1 m, 5 m, 10 m, 15 m, 30 m, and 60 m units.\*1
- (2) Electrical power can be measured either integrated or instantaneous.



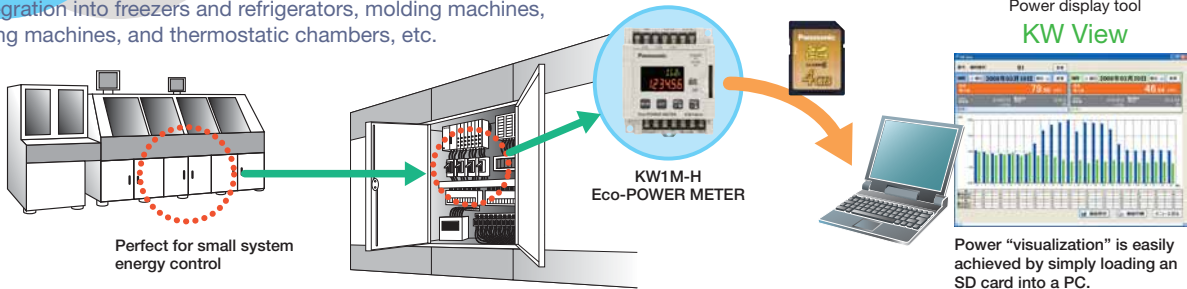
KW Monitor

\*DLU is the abbreviation for Web Datalogger Unit.

System configuration

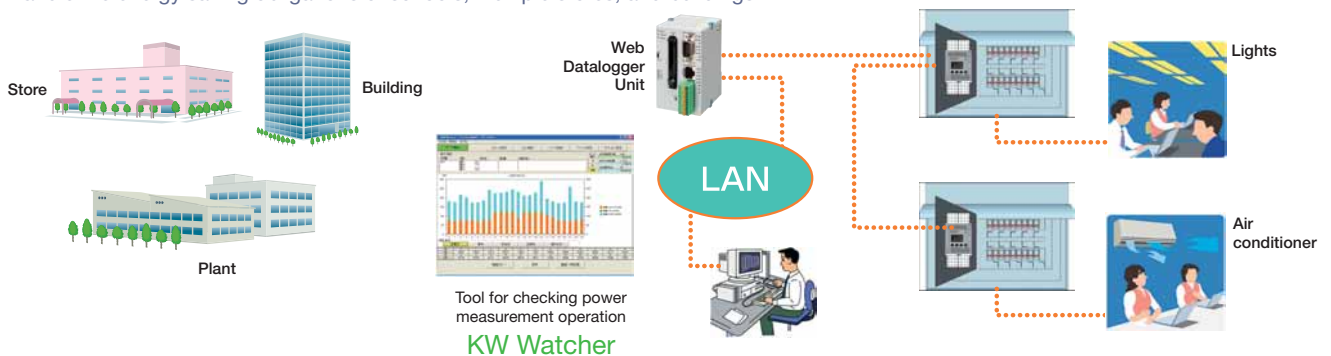
Equipment embedded power surveillance

For integration into freezers and refrigerators, molding machines, mounting machines, and thermostatic chambers, etc.



Power surveillance of lighting and air conditioning of buildings, plants, and stores, etc.

Handle the energy saving obligations of schools, multiple stores, and buildings.



# Specifications

For details, please refer to the KW1M/KW1M-H Eco-POWER METER user's manual.

## ● Main unit

Item	Specifications
Rated operating voltage	100 to 240V AC
Rated frequency	50/60Hz common
Rated power consumption	AKW1110: 6 VA (240V AC at 25°C) / AKW1111, AKW1121: 8 VA (240V AC at 25°C)
Allowable operating voltage range	85 to 264V AC (85% to 110% of rated operating voltage)
Allowable momentary power-off time	10ms
Ambient temperature	-10 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 Upper section: Green, 4-digit, 16-segment, Letter height 6.5 mm Lower section: Amber, 6-digit, 7-segment, Letter height 7.5 mm
Power failure memory method	EEP-ROM (more than 100,000 overwrite)
Size	75 × 90 × 50 mm
Weight	KW1M: approx. 170g / KW1M-H: approx. 180g

## ● Power input specifications

Item		Specifications	
		AKW1110	AKW1111, AKW1121
Phase and wire system		Single-phase two-wire, Single-phase three-wire, Three-phase three-wire (common)	Single-phase two-wire, Single-phase three-wire, Three-phase three-wire, Three-phase four-wire (common)
Input voltage	Rating	Single-phase two-wire: 0 to 220V AC (Line voltage) Single-phase three-wire: 0 to 110V AC (Phase voltage) Three-phase three-wire: 0 to 220V AC (Line voltage)	Single-phase two-wire: 0 to 440V AC (Line voltage) Single-phase three-wire: 0 to 220V AC (Phase voltage) Three-phase three-wire: 0 to 440V AC (Line voltage) Three-phase four-wire: 0 to 254V AC (Phase voltage)
	Allowance	Up to 120% of rated input voltage	
	Allowable measurement voltage	Single-phase two-wire: 0 to 264V AC (Line voltage) Single-phase three-wire: 0 to 132V AC (Phase voltage) Three-phase three-wire: 0 to 264V AC (Line voltage)	Single-phase two-wire: 0 to 528V AC (Line voltage) Single-phase three-wire: 0 to 264V AC (Phase voltage) Three-phase three-wire: 0 to 528V AC (Line voltage) Three-phase four-wire: 0 to 300V AC (Phase voltage)
	VT ratio	1.00 to 99.99 (Set with setting mode) * A transformer for measuring (VT) is required when measuring loads that exceed the nominal input voltage (AKW1111 and AKW1121 are 440 VAC, and AKW1110 is 220 VAC). Please use a commercially available VT with nominal secondary measurement voltage of 110 V. For low voltage circuits, secondary grounding is not required for the VT (transformer for measuring instruments) or the CT (current sensor).	
Input current	Primary side rating	<In case using dedicated CT> 5A/50A/100A/250A/400A (Select with setting mode) <In case using commercial CT with secondary side 5A> 1 to 4000 A (Set with setting mode) * Use a commercial CT with secondary side current of 5A when measure 400A or more. * Accuracy coverage: 10 to 100% of rated current of CT	
Special functions	Cut-off current	1.0 to 50.0%F.S. (Select with setting mode)	
	Cut-off voltage	Within 5% of rated voltage (within voltage value sought by rated voltage × 0.05 × VT ratio) (fixed)	
	Current threshold for hour meter	1.0 to 100.0%F.S.	
Accuracy (without error in CT and VT)	Indication accuracy	Instantaneous electric power Integrated electric power Voltage Current Electricity charge Calculated CO <sub>2</sub> value	±2.5% F.S. +1digit (at 20°C, rated input, rated frequency, power factor 1) * Accuracy coverage: 10 to 100% of rated current of CT
		Hour meter	±0.01%+1digit (at 20°C) (In case power on start or current energizing: ±0.01%+1s+1 digit, at 20°C)
		Temperature characteristics	±1.5% F.S. /10°C ±1digit (Range of -10 to 50°C for rated input, power factor 1)
	Frequency characteristics	±1.5% F.S. ±1 digit (Frequency change±5% based on rated frequency, for rated input, power factor 1)	

## ● Pulse input specifications (For AKW1111, AKW1121 only)

Item	Specifications	
Input mode	Addition (Fixed)	
Max. counting speed	2kHz/30Hz (Select with setting mode)	
Pulse input	Min. input signal width: 0.25ms (When 2kHz selected)/16.7ms (When 30Hz selected) ON : OFF ratio = 1 : 1	
Input signal	Contact/No contact (open collector) • Impedance when shorted: Max. 1kΩ • Residual voltage when shorted: Max. 2V • Impedance when open: Min. 100kΩ	
Output mode	HOLD (Over count)	
Prescale setting	Decimal point	Setting possible up to 3 digits after decimal point
	Range	0.001 to 100.000 (Set with setting mode)

## ● Pulse output (transistor output) specifications (For AKW1111, AKW1121 only)

Item	Specifications
Number of output point	1 point
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
Pulse output unit	0.001/0.01/0.1/1/10/100kWh/Power alarm (AL-P)/Current alarm (AL-C)/Standby power alarm (AL-S)*1/Counter (Cnt)*1 (Selectable with setting mode)

\*1 For AKW1111, AKW1121 only

\*We recommend the setting of minimum unit for pulse output for measurement shown as below.

Output pulse: 4 pulse or less per 1sec.

Calculation method

(Pulse output unit: value of PL-P) > (Max. measured power [kW]) / (3600 [s] x 4 [pulse/s])

Note 1: Count errors may occur if pulse output unit is set so that 4 or more pulses are output per 1 second.

Note 2: The connected counter or PLC may cause count errors if the OFF time of the pulse output unit is short.

## ● Communication specifications

Item	Specifications	
Interface	Conforming to RS485	
Protocol	MEWTOCOL/MODBUS (RTU) (selectable with setting mode)	
Isolation status	Isolated with the internal circuit	
Number of connected units	99 (max.)*2 *3	
Transmission distance	1200m*1	
Transmission speed	38400/19200/9600/4800/2400bps (selectable with setting mode)	
Transmission format	Data length	8bit/7bit (selectable with setting mode)*4
	Parity	Not available / Odd number / Even number (selectable with setting mode)
	Stop bit	1bit (fixed)
Communication method	Half-duplex	
Synchronous system	Synchronous communication method	
Ending resistance	Approx. 120Ω (built-in)	

\*1 Please check with the actual devices when some commercial devices with RS485 interface are connected.

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

\*2 For RS485 converter on the computer side, we recommend SI-35 and SI-35USB (from LINE EYE Co., Ltd.).

\*3 When using SI-35, SI-35USB or our PLC (which can be connected up to 99 units), up to 99 Eco-POWER METER can be connected.

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

\*4 With MODBUS (RTU) protocol, it works only with data length (8bit/7bit).

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

## ● Memory specifications of main unit (KW1M-H only)

Item	Specifications	
File type 1 (momentary value)*5	Save cycle	60 min. (on the hour) (fixed)
	Save data	(Momentary value) Integrated electric power, Instantaneous electric power, Current, Voltage, Power factor, Frequency, Pulse count value
	Save data amount	24 records per file (max. approx. 1.5 years worth of data)
File type 2 (difference value)*5	Save cycle	60 min. (on the hour) (fixed)
	Save data	(Difference value) Integrated electric power, Pulse count value
	Save data amount	24 records per file (max. approx. 1.5 years worth of data)
File type 3 (momentary value detail)*5	Save cycle	Select among 1 min, 5 min, 10 min, 15 min, 30 min, or 60 min. (Saved timing) When 1 min is selected: starts immediately after power is turned on 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, Pulse count value
	Save data amount	7,200 records
Main unit display	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)	
Calendar timer function	Time accuracy; monthly accuracy: ±240 sec. (at -10°C)/monthly accuracy: ±70 sec. (at 25°C)/ monthly accuracy: ±240 sec. (at 50°C)	
Content of battery backup	Time measurement and log data retained	

\*5 With the setting mode you can select whether or not to save file types 1, 2 and 3, respectively.

All file types will be saved to memory if measuring is started without making this setting.

You can write to a SD memory card the log data that was saved to the internal memory.

● External memory specifications <SD memory card slot> (KW1M-H only)

Item	Specifications
Support media	SD memory card (256MB to 4GB)*6
Supported format standards	Compliant with SD and SDHC standards*7

\*6 Operation verified maker: Panasonic Corporation

\*7 To format SD memory cards, please download and use the formatting software available on the Panasonic website.

The file system on a SD memory card that was formatted using standard PC software does not comply with the SD memory card standard.

[Panasonic website → Customer support → SD/SDHC memory card page → Software download list] [http://panasonic.jp/support/sd\\_w/download](http://panasonic.jp/support/sd_w/download)

<SD memory card handling cautions>

In the following cases, you may lose data saved on SD memory cards.

Panasonic Electric Works will bear absolutely no responsibility for loss of stored data or any resulting direct or indirect damages.

- 1) Erroneous use of SD memory cards by the user or a third part.
- 2) The SD memory card was affected by static electricity or electrical noise.
- 3) The card was removed or the main power was turned off while the SD memory card access lamp on the main unit was flashing (data writing).

\*We recommend that important data always be backed up to a separate medium.

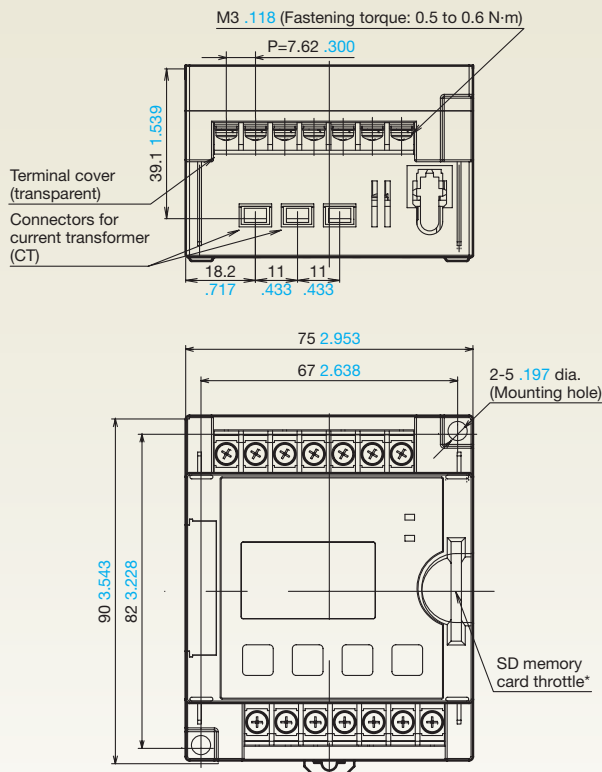
Dimensions

KW1M-H SD memory card type AKW1121  
KW1M Standard type AKW1110, AKW1111

- Be sure to wire according to the terminal arrangement or wiring diagrams.
- For details, please refer to the KW1M/KW1M-H Eco-POWER METER user's manual.

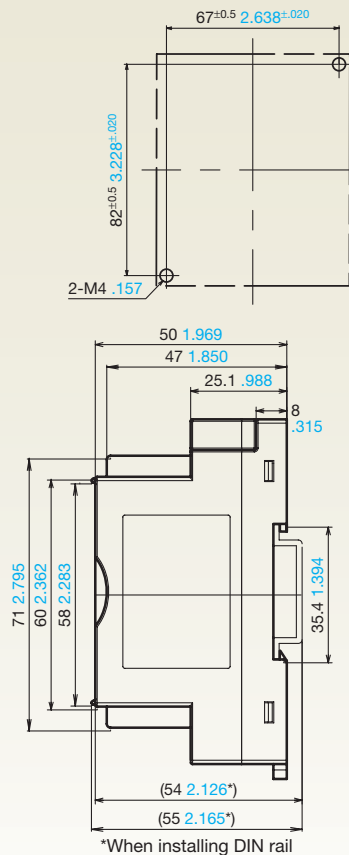
(unit: mm inch)  
General tolerance: ±1.0 ±.039

● KW1M, KW1M-H



\*SD memory card throttle only applies to SD card compatible type KW1M-H.

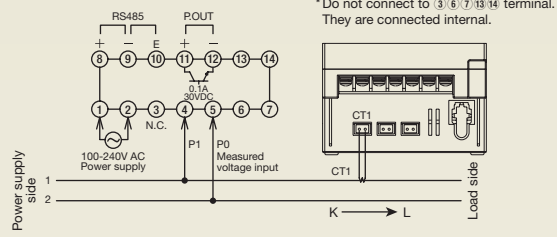
● Mounting hole dimensions



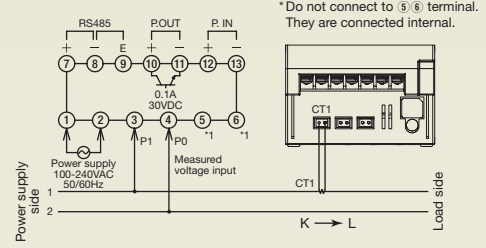
# KW1M, KW1M-H Terminal arrangement and Wiring diagrams

## ● Single-phase two-wire system

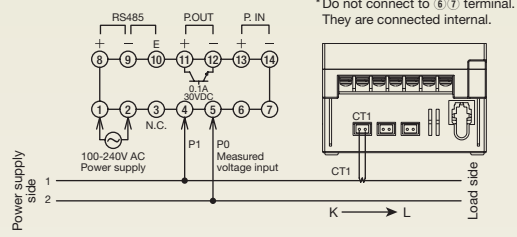
AKW1110



AKW1111

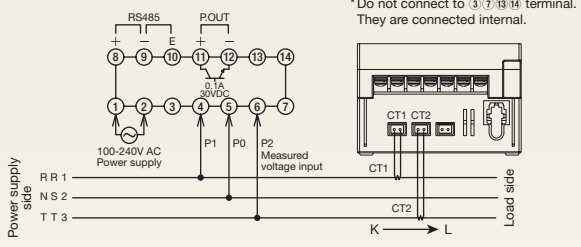


AKW1121

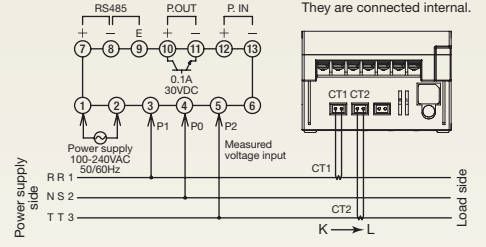


## ● Single-phase three-wire/Three-phase three-wire system (CT is secondarily necessary)

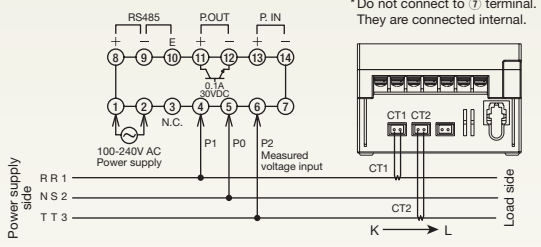
AKW1110



AKW1111

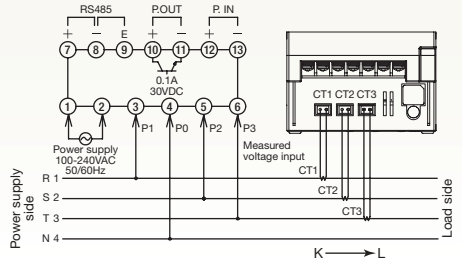


AKW1121

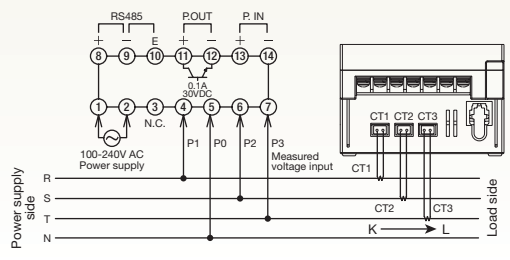


## ● Three-phase four-wire system (CT is thirdly necessary)

AKW1111



AKW1121



Please contact .....

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