Panasonic
ideas for life

SIMPLE WATT-HOUR METER

KW4S Eco-POWER METER

Eco-POWER METER simplifies the management of the energy use for your facilities and machinery. New MEWTOCOL communications protocol function added for easy PLC connection.

RoHS Directive compatibility information
http://www.nais-e.com/

FEATURES

1. Electricity meter that acts like an industrial component (DIN size: 48×48)
Eco-POWER METER is both compact and inexpensively priced. It is easy to install on your existing equipment and machinery.

2. Digitally display integrated electrical energy and electricity charges
You can digitally display integrated electrical energy, voltage, current, and electricity charges. This is handy for managing energy-saving.

3. Log and track data of integrated electrical energy usage
It is easy to load the power usage pulse output into a PLC or counter.

4. Centrally manage integrated electrical energy, voltage, and current
Equipped standard with RS485 communication port. Up to 99 units can be connected (when using our recommended devices).

PRODUCT TYPES

Product name	Phase and wire system	Rated input	Current transformer	Terminal type	Part No.
KW4S Eco-POWER METER Main unit	Single-phase two-wire system Single-phase three-wire system Three-phase three-wire system	100 to 120/ 200 to 240V AC	Dedicated CT type*1	Screw terminal	AKW4111
				11-pins	AKW4211
			Commercial CT type*1*2	Screw terminal	AKW4121
				11-pins	AKW4221
Dedicated current transformer (CT)	Can be used with AKW4111 and AKW4211 (For KW4M Eco-POWER METER, AKW5111 and AKW5211.)				AKW4801
Data collection software for Eco-POWER METER	Setting of any parameter, and editing and monitoring of all measurement values. Downloadable from http://www.mew.co.jp/ac/e/download/index.html				KW Monitor

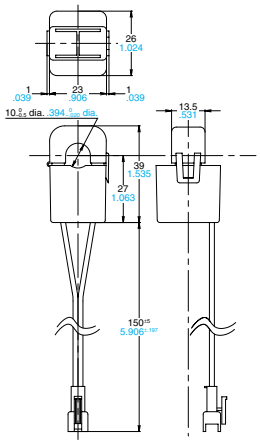
Notes:
*1. You can use the dedicated CT to measure primary current rated up to 50A. If the primary current is rated above 50A, please use a commercial CT in combination with the commercial CT type Eco-POWER METER.
*2. The commercial CT should have a secondary current rating of 1A.

DEDICATED CT AND COMMERCIAL CT

Dedicated Current Transformer (CT) (AKW4801) (option) Specifications

Item	Specifications
Rated primary current	50A
Ratio error	±1.0% F.S.
Diameter of conductor to be measured	10 dia. (max.)
Breakdown voltage (Initial value)	1,000 Vrms AC for 1min: Between core and output connector terminal
Insulation resistance (Initial value)	Min. 100MΩ: Between core and output terminal (at 500V DC)
Allowable number of detachments/attachments	Approx. 100 times
Vibration resistance (Functional)	10 to 55 Hz: 1 cycle/ min single amplitude of 0.15 mm .006 inch (10 min on 3 axes)
Vibration resistance (Destructive)	10 to 55 Hz: 1 cycle/ min single amplitude of 0.375 mm .015 inch (1 h on 3 axes)
Shock resistance (Functional)	Min. 98 m 321.522 ft./s² (4 times on 3 axes)
Shock resistance (Destructive)	Min. 294 m 964.567 ft./s² (5 times on 3 axes)
Operating temperature range	–10°C to +50°C +14°F to 122°F (Without frost and non-condensing)
Storage temperature	–30°C to +60°C –22°F to 140°F (Without frost and non-condensing)
Mass (Weight)	Approx. 50g 1.76oz (Trunk cable included)
Ambient humidity	35 to 80% R.H. (non-condensing at 20°C)

Dimensions

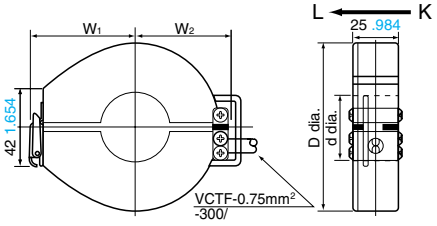


Recommended Commercial CT

Clamp-on type CT (U.R.D. co., ltd.)

Rated current	Part number	d dia.	D dia.	W1	W2
100A	CTL-24CL-100A/1A-C2	24	70	43	41
200A	CTL-24CL-200A/1A-C2	24	70	43	41
300A	CTL-36CL-300A/1A-C2	36	90	53	51
400A	CTL-36CL-400A/1A-C2	36	90	53	51
500A	CTL-60CL-500A/1A-C2	60	115	65	62

For details, please see the U.R.D. co., ltd. web site at http://www.u-rd.com/.



SPECIFICATIONS

1. Main unit

Item	Specifications	
Rated operating voltage	100 to 120/200 to 240V AC	
Rated frequency	50/60 Hz common	
Rated power consumption	Max. 10 VA	
Allowable operating voltage range	85 to 132/170 to 264V AC (85% to 110% of rated operating voltage)	
Allowable power off time	10ms	
Ambient temperature	–10°C to +50°C +14°F to 122°F (Storage temperature: –25°C to +70°C –13°F to 158°F)	
Ambient humidity	30 to 85%RH (at 20°C non-condensing)	
Breakdown voltage (initial value)	Between insulated circuits: 2,000V/1 min. Note: Cut-off current: 10 mA However, protection varistors excluded	Insulation circuit (1) Power supply terminal (1(R), 2(N. S), 3(T)) CT input terminal (CT1(+, -), CT2(+, -)) (2) RS485 terminal (+, -) (3) Pulse output terminal (+, -)
Insulation resistance (initial value)	Between insulated circuits: At least 100MΩ (With 500 V DC)	
Vibration resistance (Functional)	10 to 55 Hz: 1 cycle/ min single amplitude of 0.35 mm .014 inch (10 min on 3 axes)	
Vibration resistance (Destructive)	10 to 55 Hz: 1 cycle/ min single amplitude of 0.75 mm .030 inch (1 h on 3 axes)	
Shock resistance (Functional)	Min. 98 m 321.522 ft./s² (4 times on 3 axes)	
Shock resistance (Destructive)	Min. 294 m 964.567 ft./s² (5 times on 3 axes)	
Power failure memory method	EEP-ROM (Over 100,000 overwrites)	
Protective construction	IP66 (front panel with rubber gasket) Note: Water resistance (IP66) will be degraded by repeated installation (with contact).	

2. Input

Item			Specifications
Measuring item	Power		Integrated electrical energy (kWh)
	Voltage		Effective value (V)
	Current		Effective value (A)
	Electricity charge		Integrated electricity charge (¥, $, €)
Phase and wire system			Single-phase two-wire system Single-phase three-wire system Three-phase three-wire system
Input voltage	Rating		Single-phase two-wire system: 100 to 120/200 to 240V AC (common use) Single-phase three-wire system: 100 to 120V AC Three-phase three-wire system: 200 to 240V AC
	Allowable measuring voltage		85% to 110% of rated operating voltage Single-phase two-wire system: 85 to 132/170 to 264V AC (common use) Single-phase three-wire system: 85 to 132V AC Three-phase three-wire system: 170 to 264V AC
Input current	Rating of primary side	Dedicated CT	50 A (applied to dedicated CT only) (Gurantee accuracy range: 10% to 100% of a rated current)*
		Commercial CT	100 to 950 A (can be set via CT ratio) (Gurantee accuracy range: 10% to 100% of a rated current of each CT)*
	Rating of secondary side	Dedicated CT	16.7mA
		Commercial CT	1A
		Allowable current	120% of rated current of each CT (at 20°C)
	Max. measuring current		999.9A
Allowable measuring integrated electrical energy			0 to 99999.9kWh
Allowable measuring electricity charge			Yen: 0 to 999999¥ Dollars: 0 to 9999.99$ Euros: 0 to 9999.99€
Accuracy (Not including CT error)	Basic accuracy		Gurantee accuracy range: 10% to 100% of a rated current of each CT Integrated electrical energy: ±2.5%F.S. ±1 degit. (at 20°C rated input, rated frequency, power factor: 1) Voltage: ±2.5%F.S. ±1 degit (at 20°C rated input, rated frequency, power factor: 1) Current: ±2.5%F.S. ±1 degit (at 20°C rated input, rated frequency, power factor: 1) Electricity charge: ±2.5%F.S. ±1 degit (at 20°C rated input, rated frequency, power factor: 1)
	Tempearture characteristics		±1.5% F.S./10°C ±1 degit (for –10 to 50°C range and rated input; based on 20°C, power factor: 1)
	Frequency characteristics		±1.5% F.S. ±1 degit (for ±5% frequency change and rated input; based on rated frequency, power factor: 1)

Note: * Please use within the range of accuracy guarantee of current of CT.
When you use with the primary side current out of accuracy guarantee range, an actual primary side current value may differ from the value of the display.
ex) The display may not be 0.0A at the time of primary side current 0A.

3. Pulse output for integrated electrical energy (transistor output)

Item	Specifications
Number of output points	1point
Insulation method	Optical coupler
Output type	Open collector
Output capacity	100mA 30V DC
Pulse width	Approx. 100ms*1
ON state voltage drop	1.5V or less
OFF state leakage current	100μA or less
Pulse output unit	0.001kWh, 0.01kWh, 0.1kWh, 1kWh, 10kWh, 100kWh (Setting modes can be set using the keys on the front panel.)

*1. Erroneous count can happen depending on the connected counter and PLC when the off time is short in the pulse output. Therefore, please change to a suitable pulse output unit.

4. Communication

1) Communication specifications

Item		Specifications
Interface		Conforming to RS485
Protocol		Our method/MEWTOCOL (Setting modes can be set using the keys on the front panel.)
Isolation status		Isolated with internal circuit
No. of connected units (Max.)		99 units*2*3/31 units*3
Transmission distance		1,200m
Transmission speed (Baud rate)		2,400, 4,800, 9,600, 19,200 bps (Setting modes can be set using the keys on the front panel.)
Transmission data format	Data length	7-bit/8-bit (Setting modes can be set using the keys on the front panel.)
	Parity	Not available/Odd/Even (Setting modes can be set using the keys on the front panel.)
	Stop bit	1 bit (Fix)
Communication method		Half duplex
Synchronous method		Start-stop synchronous method
Terminating resistor		Approx. 120Ω (internal)*1

2) Factory settings

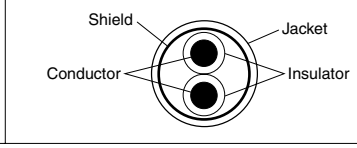
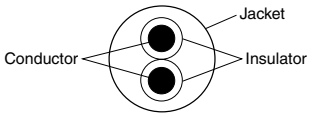
Transmission speed	Data length	Parity	Stop bit	Station No.
19,200 bps	8-bit	Not available	1 bit (Fix)	1

Notes:
*1. Use only for a terminal station. Please refer to "4) RS485 wiring and terminal station setting" before setting it to the terminal station side. It is on the general station side when shipped.
*2. We recommend Lineeye Co., Ltd. SI-35 as the PC side RS485 device.
*3. Up to 99 units can be connected when an SI-35 or our recommended PLC are used. When devices other than these are mixed, the maximum number of connectable units is restricted to 31.

3) Recommended cable for RS485 communication

Please use the transmission cables in the table below for Eco-POWER METER's RS485 communication system.

Cable	Conductor		Insulator		Cable diameter	Example of equivalent cable
	Size	Resistance (at 20°C)	Material	Thickness		
Twisted-pair cable with shield	1.25mm² (AWG 16) or more	Max. 16.8Ω/km	Polyethylene	Max. 0.5mm .020 inch	Approx. 8.5mm .335 inch	9860 made by Belden Inc.
	0.5mm² (AWG 20) or more	Max. 33.4Ω/km	Polyethylene	Max. 0.5mm .020 inch	Approx. 7.8mm .307 inch	9207 made by Belden Inc.
VCTF	0.75mm² (AWG 18) or more	Max. 25.1Ω/km	Polyvinylchloride	Max. 0.6mm .024 inch	Approx. 6.6mm .260 inch	VCTF0.75mm² × 2C

Cable	Twisted-pair cable with shield	VCTF
Sectional view		

Notes:
1. The twisted-pair cables must be shielded type.
2. Use transmission cables of the same type. Do not use different types together.
3. The twisted-pair cables with shield are recommended where electrical noises might occur.

4) RS485 wiring and terminal station setting

(1) Always be sure to set up a terminal station on Eco-POWER METER's RS485 system (Fig. 1).

(2) If using a shielded cable for the RS485 transmission line, ground one end.
Use a class D (class 3) dedicated earth for grounding. Do not use the earth together with other earth wires (Fig. 1).

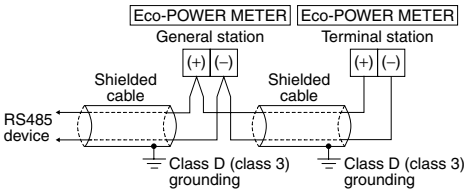


Fig.1

(3) Change the slide switch on the side of Eco-POWER METER as a terminal station (Fig. 2).

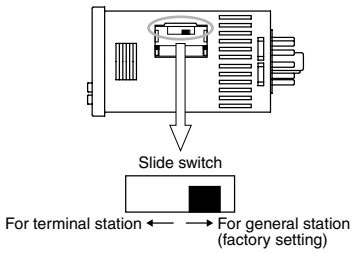


Fig.2

(4) Be sure to daisy chain the RS485 transmission line between each station. Do not use a splitter (Fig. 3).

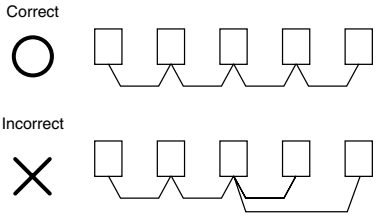
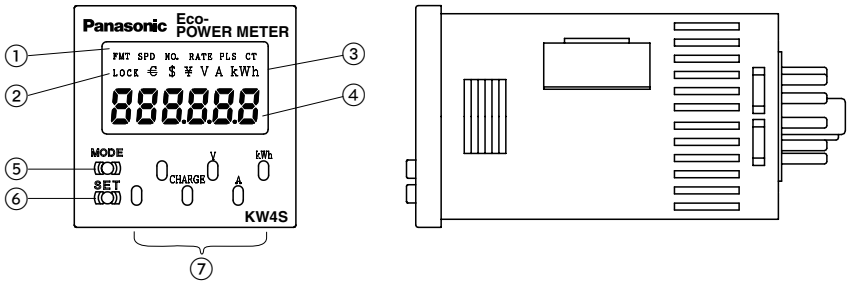


Fig.3

APPLICABLE STANDARDS

Safety standards	EN61010-1	Degree of pollution 2/Overvoltage category II
EMC	(EMI) EN61326	
	Radiated emission electric field strength	EN55011 Group 1 Class A
	Noise terminal voltage	EN55011 Group 1 Class A
	(EMS) EN61326	
	Static discharge immunity	EN61000-4-2 4 kV contact 8 kV air
	RF electromagnetic field immunity	EN61000-4-3 10 V/m (80 MHz to 1 GHz) 3 V/m (1.44 GHz to 2 GHz) 1 V/m (2.0 GHz to 2.7 GHz)
	EFT/B immunity	EN61000-4-4 2 kV (Power line) 1 kV (Signal line)
	Surge immunity	EN61000-4-5 1 kV (Power line)
	Conductivity noise immunity	EN61000-4-6 3 V/m (0.15 MHz to 80 MHz)
	Power frequency electric field immunity	EN61000-4-8 30 A/m (50 Hz)
	Immunity to voltage dips, momentary power stoppage and voltage fluctuations	EN61000-4-11 10 ms, 30% (Rated voltage) 500 ms, Min. 90% (Rated voltage)

PART NAME



① Mode indicator
② Lock indicator
③ Unit indicator

④ Display of integrated electrical energy, current, voltage, electricity charge and each setting value.

⑤ MODE key
Use to shift between setting modes

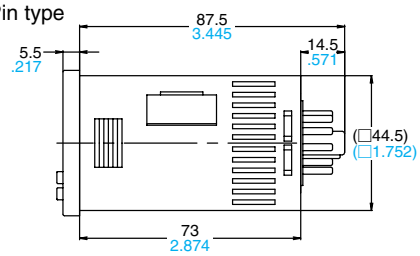
⑥ SET key
Perform each setting

⑦ Select key (No. 1 to No. 6)
Change each display item.
Use to shift between setting modes.

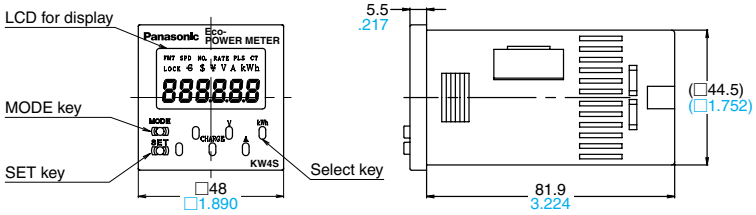
DIMENSIONS

mm inch General tolerance: ±1.0 ±.039

Pin type

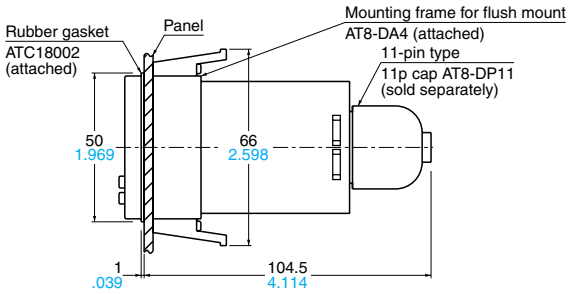


Screw terminal type

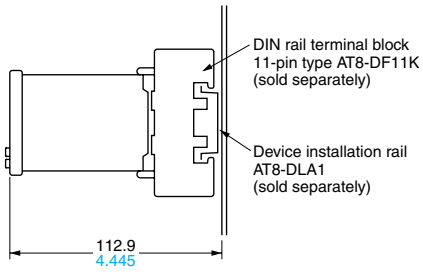


Dimensions for flush mount (with adapter installed)

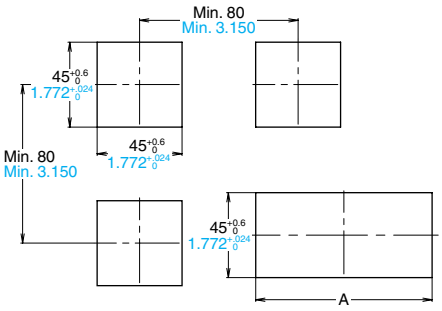
Pin type



Dimensions for front panel installations



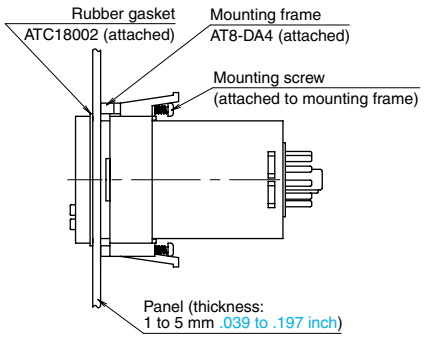
Panel cut-out dimensions



When n units are continuously installed, the dimension (A) is calculated according to the following formula (n: the number of units to be installed):

$A = (48 \times n - 2.5)^{+0.6}_{0}$ $A = (1.890 \times n - .098)^{+.024}_{0}$

Front panel installations

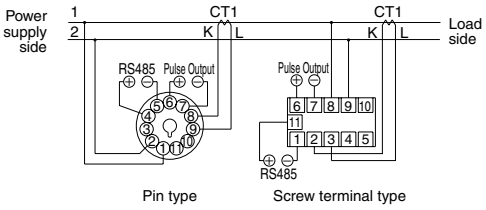


Note: Installed continuously, waterproofing property on the unit will be lost.

TERMINAL LAYOUTS & WIRING DIAGRAMS

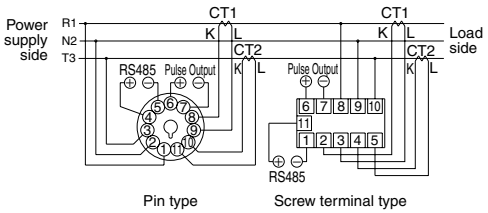
Single-phase two-wire system

When measuring with a single-phase two-wire system, one current transformer (CT) is required.



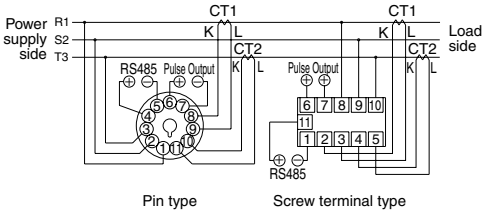
Single-phase three-wire system

When measuring with a single-phase three-wire system, two current transformers (CT) are required.



Three-phase three-wire system

When measuring with a three-phase three-wire system, two current transformers (CT) are required.



Terminal layouts

No.	Type	
	Pin type	Screw terminal type
1	1, R, R	RS485 –
2	2, N, S	CT1 K
3	3, T, T	CT1 L
4	RS485 +	CT2 K
5	RS485 –	CT2 L
6	Pulse output +	Pulse output +
7	Pulse output –	Pulse output –
8	CT1 K	1, R, R
9	CT1 L	2, N, S
10	CT2 K	3, T, T
11	CT2 L	RS485 +

You must connect in accordance with the wiring diagram. The voltages for input between each pin (terminal) are given in the table below.

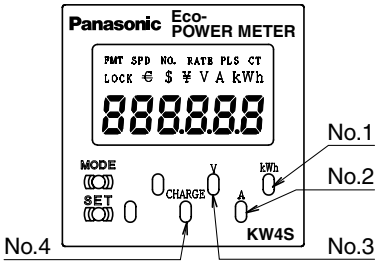
System	Type	Pin number	Input voltage
Single-phase three-wire system	Pin type	① - ②	100 to 120/200 to 240 V AC (100 to 120/200 to 240 V ~)
	Screw terminal type	⑧ - ⑨	
Single-phase three-wire system	Pin type	① - ② - ③	100 to 120 V AC (100 to 120 V ~: 3 W)
	Screw terminal type	⑧ - ⑨ - ⑩	
Three-phase three-wire system	Pin type	① - ② - ③	200 to 240 V AC (200 to 240 V 3 ~)
	Screw terminal type	⑧ - ⑨ - ⑩	

Notes: 1. For safety and to protect the device, connect a breaker at the voltage input part.
2. After wiring, turn the power off and on again (ON → OFF → ON).

CURRENT TRANSFORMER (CT) INSTALLATION

1) When installing a current transformer (CT), you must first connect the CT secondary side to the Eco-POWER METER and then wire the CT primary side to the load line.
2) The current transformer has polarity. Align with the direction (K → L) written on the current transformer (CT) and install from the power supply side facing the load side. Measurement is not possible if the direction is wrong.
3) On the dedicated current transformer (CT) (AKW4801), “K” is white and “L” is black.
4) Check beforehand that the power line thickness is smaller than the diameter of the through-hole of the current transformer (CT). When installing a clamp-on type CT, verify that the separating surfaces are making perfect contact when the CT is closed. Measurement errors will occur if there is a gap in the separating surfaces.
5) The length of the cable for the dedicated current transformer (CT) (AKW4801) is approximately 1 m. Extension of the cable is possible up to approximately 10 m if the environment is completely free from noise such as external and line induction noise, and the cable has a thickness of at least 0.75 mm^2. When extending the cable, use as thick a cable as possible.
*When extending the cable, please perform testing under actual conditions before using.

EACH MEASURED VALUE DISPLAY

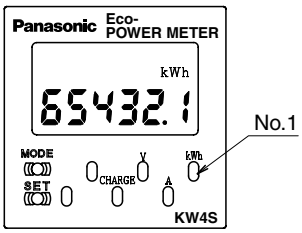


Select key 1 → Integrated electrical energy display
Select key 2 → Current display
Select key 3 → Voltage display
Select key 4 → Electricity charge display

1. Integrated electrical energy display

It is the mode which displays integrated electrical energy by present.
Press Select key 1 to display the integrated electrical energy.

Sample display for integrated electrical energy: 65,432.1 kWh

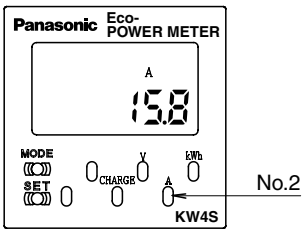


While displaying the integrated electrical energy, press MODE key while holding down SET key to clear this value.
* After reaching the full scale (99999.9 kWh), the value reverts to 0.0 kWh, and continues to measure.

2. Current display

It is the mode which displays the current value of the load.
Press Select key 2 to display the current.

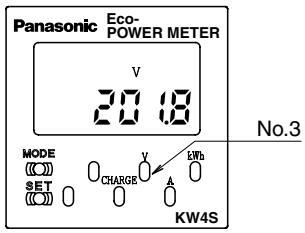
Sample display for current: 15.8 A



3. Voltage display

It is the mode which displays the voltage value of the load.
Press Select key 3 to display the voltage.

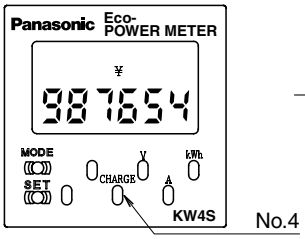
Sample display for voltage: 201.8 V



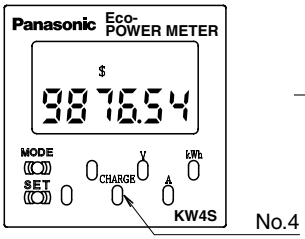
4. Electricity charge display

It is the mode which displays the value of a standard of the electricity charge to the integrated electrical energy.
Press Select key 4 to display the electricity charge.
By pressing Select key 4 at the electricity charge display, you can switch among ¥ (yen) $ (dollar) and € (Euro). (¥ → $ → €)

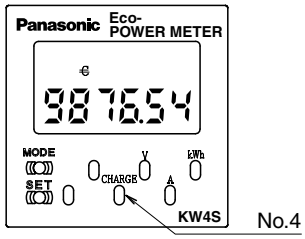
¥
Sample display: 987,654 yen



$
Sample display: 9,876.54 dollars



€
Sample display: 9,876.54 euros

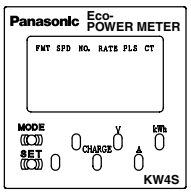


OPERATION MODE *Set each operation mode before using.

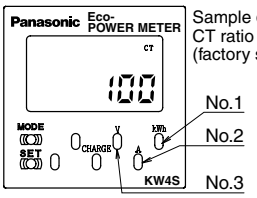
1. Commercial CT ratio setting mode (AKW4121, AKW4221 only)

This mode is used to set the CT ratio of a commercial CT (commercially available current transformer (CT) with secondary side rating current of 1 A).
If your commercial CT is 100 A/1A, the CT ratio is 100.

1) Press MODE key. The mode indicator lights up fully.



2) Press Select key 1. The [CT] indicator flashes, and the unit shifts to commercial CT ratio setting mode.



Sample display for commercial CT ratio setting mode (factory setting: 100)

3) Enter the CT ratio using Select keys 1, 2, and 3.

* The CT ratio changes in increments of 50 and range from 100 and 950.

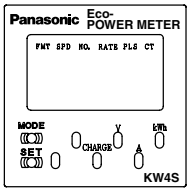
4) Press SET key to finalize the CT ratio setting, and return to the display previous to the mode setting display. The mode indicator light goes off.

* The dedicated CT type (AKW4111 and AKW4211) does not have a CT ratio setting mode.

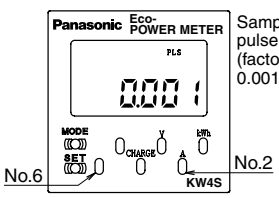
2. Unit for pulse output setting mode

It is the mode which sets up the unit of a pulse output. A pulse is outputted whenever the amount of integrated electricity charge reaches per setup.

1) Press MODE key. The mode indicator lights up fully.



2) Press Select key 2. The [PLS] indicator flashes, and the unit shifts to unit for pulse output setting mode.



Sample display for unit for pulse output setting mode (factory setting: 0.001 kWh/pulse)

3) Press Select key 6 to change the unit for pulse output.

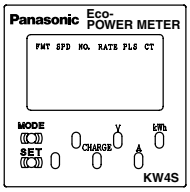
→ 0.001kWh → 0.01kWh → 0.1kWh → 1kWh → 10kWh → 100kWh →

4) Press SET key to finalize the unit for pulse output, and return to the display previous to the mode setting display. The mode indicator light goes off.

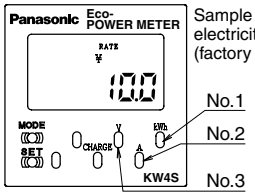
3. Electricity rate setting mode

It is the mode which sets up the electricity rate used as a standard per 1 kWh.

1) Press MODE key. The mode indicator lights up fully.



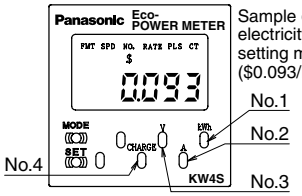
2) Press Select key 3. The [RATE] indicator flashes, and the unit shifts to electricity rate setting mode.



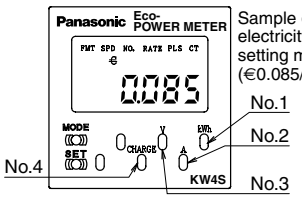
Sample display for electricity rate setting mode (factory setting: ¥10/kWh)

3) Press Select key 6 to change between ¥ (yen), $ (dollars), and € (euros).

→ ¥ → $ → € →



Sample display for electricity rate setting mode ($0.093/kWh)



Sample display for electricity rate setting mode (€0.085/kWh)

4) Set rate per 1 kWh by pressing Select keys 1, 2, 3, and 4.
For electricity rate per 1 kWh;

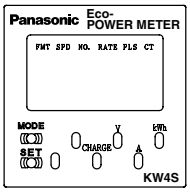
- ¥ (Yen) can be set in the range of 0.0 to 99.9.
- $ (Dollar) can be set in the range of 0.000 to 9.999.
- € (Euro) can be set in the range of 0.000 to 9.999.

5) Press SET key to finalize the electricity rate per 1 kWh, and return to the display previous to the mode setting display. The mode indicator light goes off.

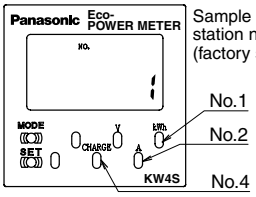
4. Station number setting mode (RS485)

It is the mode which sets an individual station number for each main unit when communicating by connecting two or more main units in serial communication (RS485). When setting make sure that the station numbers do not overlap.

1) Press MODE key. The mode indicator lights up fully.



2) Press Select key 4. The [NO.] indicator flashes, and the unit shifts to station number setting mode.



Sample display for station number setting mode (factory setting: 1)

3) Enter the station number using Select keys 1 and 2.

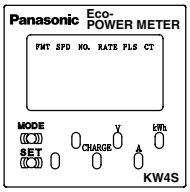
* The station number can be set between 1 and 31.

4) Press SET key to finalize the station number setting, and return to the display previous to the mode setting display. The mode indicator light goes off.

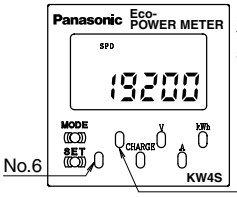
5. Transmission speed setting mode (RS485)

It is the mode which sets up transmission speed in serial communication (RS485). Please set up transmission speed according to the masters (PC etc.).

1) Press MODE key. The mode indicator lights up fully.



2) Press Select key 5. The [SPD] indicator flashes, and the unit shifts to transmission speed setting mode.



Sample display for transmission speed setting mode (factory setting: 19200 bps)

3) Press Select key 6 to change the transmission speed.

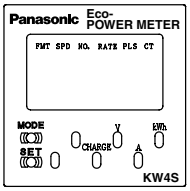
→ 19200 → 9600 → 4800 → 2400 →

4) Press SET key to finalize the transmission speed setting, and return to the display previous to the mode setting display. The mode indicator light goes off.

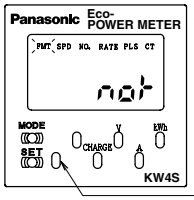
6. Transmission format setting mode (RS485)

It is the mode which sets up a transmission format in serial communication (RS485). Please set up transmission format according to the masters (PC etc.).

1) Press MODE key. The mode indicator lights up fully.



2) Press Select key 6. The [FMT] indicator flashes, and the unit shifts to protocol setting mode.



Sample display for protocol setting mode (MEW system example)

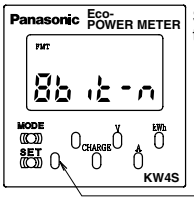
No.6

3) Press Select key 6 to change the protocol system.

NOR (): MEW system
MEW (): MEWTOCOL

NOR↔MEW

4) When the SET key is pressed, the currently displayed communication protocol is set and the screen moves to the mode for setting the data length and parity.



Sample display for transmission format setting mode
(factory setting:
8 bits/Not available
n: Not available
E: Even (parity)
o: Odd (parity))

No.6

5) Press Select key 6 to change the data length/parity.

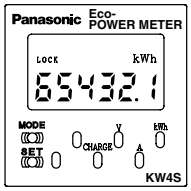
→8bit-n→8bit-E→8bit-o→7bit-n→7bit-E→7bit-o

6) Press SET key to finalize the data length/parity setting, and return to the display previous to the mode setting display. The mode indicator light goes off.

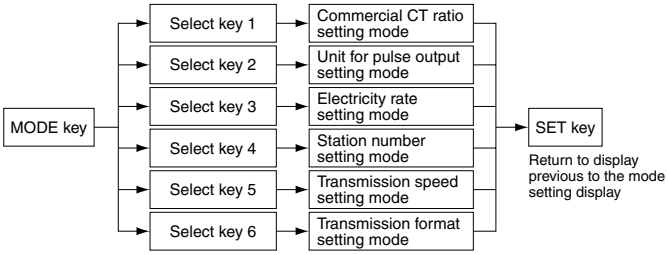
7. Lock mode setting

When you press SET key continuously for about three seconds, the [LOCK] indicator lights, and MODE key and Select keys become locked (pressing them will have no effect).

Press SET key continuously for about three seconds again to release Lock mode. The [LOCK] indicator goes off, and the Lock mode is released (unlocked).



TO SHIFT MODE SETTINGS



SELF-DIAGNOSIS FUNCTION

If an error occurs, one of the following indications will appear.

Display	Meaning	Output status	Recovery	The value after recovery
Err-00	CPU error	OFF	Power turned on again	The value when power on before the error occurs
Err-01	Memory error. See note		EEP-ROM lifetime ended. Replace unit.	—

Note: * Includes the possibility that the EEP-ROM's life has expired.

POWER-FAILURE MEMORY

Eco-POWER METER stores integrated electrical energy, electricity charge, and each of its settings in EEP-ROM until the power is shut off (power-failure guarantee). For this reason, you should avoid using the unit in an environment where the power is turned on and off very frequently, if possible. Utilization in such an environment will shorten the lifetime of the EEP-ROM.

OPTIONS

Product Name	Part No.
DIN rail terminal socket	AT8-DF11K
Rear terminal socket	AT78051
DIN protective cover (flexible)	AQM4803

OTHERS

Eco-POWER METER is designed chiefly for managing energy saving. It is not intended to be used for billing. Also note that this is not a specific meter that pass the official approval by the designated organization, which sets to Measurement Law, so it cannot be used for proof of electrical energy.

SURGES

1. If the power supply surge exceeds the following value, the internal circuit could be destroyed, so be sure to use a surge absorption element.

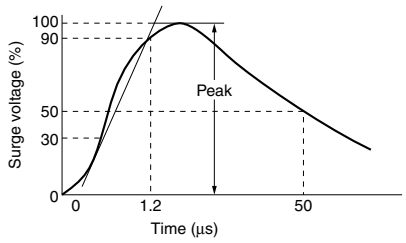
Surge voltage: 6,000V

Standard surge waveform

The values in the graph right are the surge-voltage resistance at ±(1.2 × 50) µs of single-polarity full-wave voltage.

Surge wave form

[±(1.2 × 50) µs uni-polar full wave voltage]



2. External noise of up to the level shown below is treated as noise voltage, but levels higher than this could lead to malfunctioning or damage to the internal circuit.

	Power supply terminals	Input terminals
Noise voltage	1,500V	500V

Noise wave form (noise simulator)

Rise time: 1ns

Pulse width: 1 µs, 50 ns

Polarity: ±

Cycle: 10ms

NOTES

1. Avoid locations subject to flammable or corrosive gases, excessive dust, oil, vibrations, or excessive shocks.

2. Since the cover is made of polycarbonate resin, avoid contact with or use in environments containing methyl alcohol, benzene, thinners, and other organic solvents; and ammonia, caustic sodas, and other alkaline substances.

Panasonic
ideas for life

KW7M Eco-POWER METER
DIN Type

All functions needed for power measurement now in a DIN type!

1 Save Space and Install More Easily

① Can be installed in control panels
Supports DIN specification (22.5 mm) and is thinnest in industry with a display (Based on our investigation).
Installable on DIN rail

② Can be used with compact dedicated Current Transformer (CT).

2 Power Measurement Function

① Instantaneous electrical power display
② Integrated electrical energy display
③ Each phase voltage and current display

3 Multiple Inputs

① Also supports 5 A CT of secondary current input.
*When inputting a 5 A secondary current, use 2-stage configuration by combining with a dedicated CT.

② Support for 400 V AC
*Use with external voltage transformer (VT)

4 Supports Networking

① An RS485 communications port comes standard
② Comes with MEWTOCOL/Modbus (RTU).
*Modbus Protocol is a communications protocol developed for PLCs by Modicon Inc.

③ Pulse output is standard function.

KW7M Eco-POWER METER DIN Type
ARCT1B281E '07.6

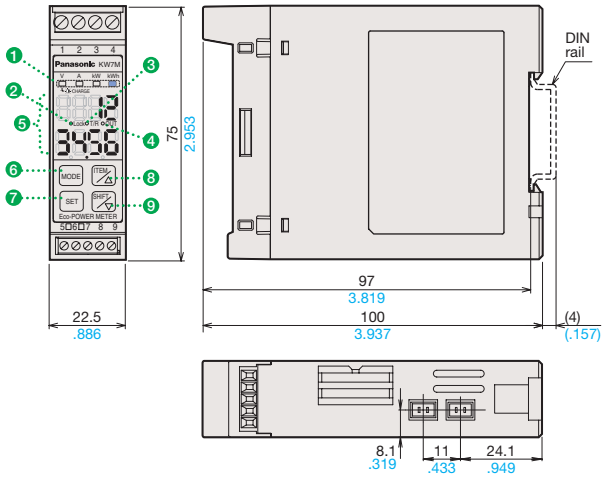
New

http://www.mew.co.jp/ac/e/

Matsushita Electric Works, Ltd.

KW7M Eco-POWER METER DIN Type

PART NAME AND DIMENSIONS



1. **Display indicator** ····· Lighting or Blinking according to the display
2. **Lock indicator** ····· Lighting while in lock mode.
3. **T/R indicator** ····· Blinking while communication
4. **OUT indicator** ····· Lighting when pulse output
5. **Value display** ····· • Displays the instantaneous electrical power, integrated electrical energy, current, voltage and electricity charge.
   • Displays the all settings.
6. **MODE key**
7. **SET key**
8. **ITEM/△ key**
9. **SHIFT/▽ key**

Terminal layouts

No.	Type
1	R
2	S
3	T
4	No connection
5	Pulse output "+"
6	Pulse output "–"
7	RS485 "+"
8	RS485 "–"
9	RS485 "E"

PRODUCT TYPES AND SPECIFICATIONS

Main unit

Phase and wire system	Rated input	Current transformer	Part No.
Single-phase two-wire system Single-phase three-wire system Three-phase three-wire system	100 to 120/200 to 240 V AC	Dedicated CT type (5 A, 50 A (common)/ 100 A/250 A/400 A)	AKW7111

Dedicated current transformer (CT)

Rated primary current	Part No.
5 A/50 A	AKW4801C
100 A	AKW4802C
250 A	AKW4803C
400 A	AKW4804C

Measurement items

Item		Unit	Data range
Instantaneous electrical power		kW	0.00 to 999999.99
Integrated electrical energy		kWh	0.00 to 999999.99 to 1000000.0 to 9999999.9
Current	L1 (CT1) phase current	A	0.0 to 999.9 to 1000 to 6000
	L2 (CT2) phase current	A	0.0 to 999.9 to 1000 to 6000
Voltage	Voltage between 1-2	V	0.0 to 999.9 to 1000 to 9999
	Voltage between 2-3	V	0.0 to 999.9 to 1000 to 9999
Electricity charge*			0.00 to 999999.99 to 1000000.0 to 9999999.9 to 10000000 to 99999999

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

Main unit

Rated operating voltage	100 to 120/200 to 240V AC
Rated frequency	50/60 Hz common
Rated power consumption	6 VA
Allowable operating voltage range	85 to 132/170 to 264V AC (85% to 110% of rated operating voltage)
Allowable power off time	10 ms
Ambient temperature	–10°C to +50°C +14°F to +122°F (Storage temperature: –25°C to +70°C –13°F to +158°F)
Ambient humidity	30 to 85%RH (at 20°C non-condensing)
Display method	7-segment LED
Power failure memory method	EEP-ROM (Over 100,000 overwrites)

Communication

Interface	Conforming to RS485
Protocol	MEWTOCOL/Modbus (RTU)
Number of connected units	Max. 99 units

Input

Input voltage	Rating	Single-phase two-wire system: 100 to 120/200 to 240 V AC (common use) Single-phase three-wire system: 100 to 120 V AC Three-phase three-wire system: 200 to 240 V AC
	Allowable measuring voltage	85% to 110% of rated operating voltage
	VT ratio	1.00 to 99.99 [External voltage transformer (VT) is required.]
	Max. displayed voltage	9999 V
Input current	Rating of primary side	• 5 A/50 A/100 A/250 A/400 A (when using dedicated CT) • 1 to 4000 A (when using secondary 5A CT)
	CT ratio	1 to 4000/5 A (Can be set in setting mode.) (Supported when dedicated CT used in 2-step configuration.)
	Max. displayed current	6000 A (When 400 A or higher, use commercial CT with 5 A rated secondary current.)
Accuracy (Not including CT error) (Not including VT error)	Basic accuracy	Instantaneous electrical power, Integrated electrical energy, Voltage, Current and Electricity charge ±2.5% F.S. ±1 digit (at 20°C rated input, rated frequency, power factor: 1), Guarantee accuracy range: 10 to 100% of a rated current of each CT
	Temperature characteristics	±1.5% F.S./10°C ±1 digit (for –10 to 50°C range, rated input and power factor: 1)
	Frequency characteristics	±1.5% F.S. ±1 digit (for ±5% frequency change, rated input and power factor: 1)

- Please read "Installation instruction" before using to ensure correct usage.
- For details, specifications and handling, please read the KW7M Eco-POWER METER user's manual.
- You can download the user's manual from http://www.mew.co.jp/ac/e.

These materials are printed on ECF pulp.
These materials are printed with earth-friendly vegetable-based (soybean oil) ink.
PRINTED WITH SOY INK

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■ Telephone: +81-6-6908-1050 ■ Facsimile: +81-6-6908-5781
http://www.mew.co.jp/ac/e/

ARCT1B281E 200706-0YT

Panasonic
ideas for life

Lineup with new energy saving and environmentally friendly features!

KW8M Eco-POWER METER

(DIN48 × 96 size)

FEATURES of AKW8111

1. Direct measurement of 400 V power loads

2. Three-phase, four-wire system available

3. Improved measurement function

- Instantaneous electric power
- Integrated electric power
- Each phase voltage and current
- Frequency • Power factor

4. Simultaneous power and pulse measurement

5. Supports Networking (Up to 99 units can be connected.)

- RS485 • MEWTOCOL/Modbus (RTU)*

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

6. KW8M series complies with CE marking.

FEATURES of AKW8111H

New

1. Includes all the features of AKW8111.

2. Built-in memory

Log data can be saved to memory of main unit.

3. Built-in battery (for memory backup)

Protects log data and time measurements against power failures.

4. Optional functions (3 items) added

- Each integrated electric power by month, day and hour
- Arbitrary integrated active electrical power
- Calendar timer function

RoHS Directive compatibility information
http://www.mew.co.jp/ac/e/environment/

PRODUCT TYPES

1. Main unit

Phase and wire system	Operating power supply	Measured voltage input	Measured current input	Current transformer	Terminal type	Log function	Model No.
Single-phase two-wire system Single-phase three-wire system Three-phase three-wire system Three-phase four-wire system	100 to 240 V AC, 50/60 Hz	• 400 V AC • 100/200 V AC	5 A, 100 A, 250 A, 400 A	Dedicated CT type [5 A, 50 A (common)/ 100 A/250 A/400 A]	Screw terminal (M3 “+” screw)	Not available	AKW8111
						Available	AKW8111H

2. Dedicated current transformer (CT)

Rated primary current	Model No.
5 A	AKW4801
50 A	
100 A	AKW4802
250 A	AKW4803
400 A	AKW4804

3. Tools

Product name	Descriptions
KW Monitor*	Data collection software (free of charge) for parameter settings, editing of measurement values, and monitoring, etc.
KW8M Eco-POWER METER User’s manual	Detailed explanation of Eco-POWER METER usage (PDF)

* Customer registration is required to download data.
Download from http://www.mew.co.jp/ac/e

4. Options

Product name	Model No.
Terminal cover	AKT8801
Battery	AFC8801

MEASUREMENT ITEMS

Item		Unit	Data range (Display range)
Integrated electric power	Active power	kWh	0.00 to 9999999.9
	Reactive power	kvarh	0.00 to 9999999.9
	Apparent power	kVAh	0.00 to 9999999.9
Instantaneous electric power	Active power	kW	0.00 to 999999.99
	Reactive power	kvar	–99999.99 to 0.00 to 999999.99
	Apparent power	kVA	0.00 to 999999.99
Current	CT1 current	A	0.0 to 6000
	CT2 current	A	0.0 to 6000
	CT3 current	A	0.0 to 6000
Voltage	Voltage between P1 and P0	V	0.0 to 9999
	Voltage between P2 and P0	V	0.0 to 9999
	Voltage between P3 and P0	V	0.0 to 9999
Electricity charge*			0.00 to 99999999
Power factor		Display	0.00 to 1.00 (Distiguishes if ahead (LEAD) or behind (LAG).)
		Communication	–1.00 to 0.00 to 1.00 (Within range of phase angle θ = –90 to 0 to +90°)
Frequency		Hz	47.5 to 63.0
Hour meter	ON time	Time	0.0 to 99999.9
	OFF time		
Pulse counter			0 to 99999999

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

KW8M Eco-POWER METER
ARCT1B306E ’08.5

New

SPECIFICATIONS

1. Main unit

Item	Specifications	
Rated operating voltage	100 to 240V AC	
Rated frequency	50/60Hz common	
Rated power consumption	8VA	
Inrush current	30 A or less (200 VAC 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)	
Breakdown voltage (initial)	Between the isolated circuits: 2000V for 1min Note: Cut-off current: 10mA However protective varistor excluded.	● Outer edge (case) ⇔ All terminals ● Insulated circuit • GND ⇔ All other terminals • Operating power supply terminals ⇔ Analog input terminals*1 • Operating power supply terminals ⇔ Pulse input terminal • RS485 ⇔ All other terminals • Pulse output terminals ⇔ All other terminals
Insulation resistance (initial)	Between the isolated circuits:100MΩ or more (measured at 500V DC)	
Vibration resistance	10 to 55Hz (1cycle/min) single amplitude: 0.375mm (1h on 3 axes)	
Shock resistance	Min. 294m/s² (5 times on 3 axes)	
Display method	8-digit, 7-segment LED	
Power failure memory method	EEP-ROM (more than 100,000 overwrite)	
Size	48 × 96 × 98.5 mm	
Weight*2	AKW8111: approx.235g	AKW8111H: approx.250g

*1 Analog input terminals: No.11 to 20 / Pulse input terminal: No.4 and 5
*2 Without mounting bracket

2. Input specifications

Item		Specifications
Measured input voltage	Rating	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	85% to 120% of rated input voltage
	Allowable measurement 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) *Voltage transformer (VT) is required when you measure a load with voltage over 440V system. (Secondary side: 110V)
Measured input current	Primary side rating	• 5A/50A/100A/250A/400A (In case using dedicated CT.) (Select with setting mode) • 1 to 4000A (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)
	Current threshold for hour meter	1.0 to 100.0%F.S. (Select with setting mode)
Accuracy (without error in CT and VT)	Instantaneous electric power (active/reactive/apparent) Integrated electric power (active/reactive/apparent) Voltage Current Electricity charge	±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)
	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)

3. Pulse input specifications

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: 1kΩ Residual voltage when shorted: Max. 2V Impedance when open: 100kΩ
Output mode	HOLD (Over count)
Number of digit	8-digit (0 to 99999999)

4. Output specifications

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/ Alarm(AL-P)/Counter(Cnt) (Selectable with setting mode)

* We recommend the setting of minimum unit for pulse output for measurement shown as below.
Output pulse: 4 pulse or less per 1sec.

5. Communication Specifications

Item		Specifications
Interface		Conforming to RS485
Protocol		MEWTOCOL/MODBUS(RTU)
Isolation status		Isolated with the internal circuit
Number of connected units		99 (max.)*2 *3
Transmission distance		1200m (max.)*1
Transmission speed		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)

Factory settings

Protocol	Station no.	Transmission speed (Baud rate)	Data length	Parity	Stop bit
MEWTOCOL	1	19200 bps	8-bit	Odd number	1 bit (fixed)

*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 PLC from Matsushita Electric Works, Ltd. (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 8bit.

6. Optional specifications (AKW8111H only)

Item			Specifications
Log function Memory of main unit	Automatic logging	Save cycle	60 min.
		Save data	Integrated active power, Integrated reactive power, Integrated apparent power
		Save data amount	Max. 2232 records *3 months
		Display	Integrated electric power by month, Integrated electric power by day, Integrated electric power by hour
	Selected logging*1	Save cycle	1, 5, 10, 15, 30, 60 min.
		Save data	Integrated active power, Integrated reactive power, Integrated apparent power, Instantaneous voltage, Instantaneous current, Pulse count value
		Save data amount	Max. 2160 records *1.5 days (when save frequency is 1 min.)
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)
Arbitrary integrated active power			Integrated active power in arbitrary time Display range: 0.00 to 9999999.9 kWh
Content of battery backup			Time measurement and log data retained
Battery life*2 *3			About 5 years (at ambient temperature 25°C)

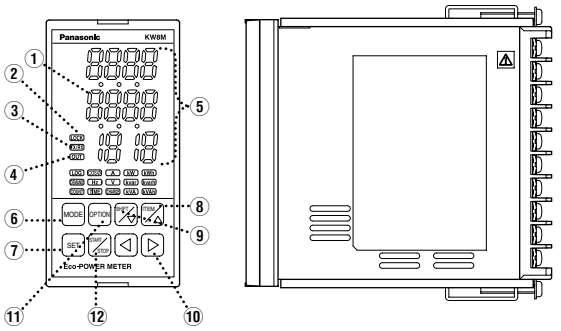
*1 Another software is required to check selectable log data saved in the built-in memory. The recommended software, KW Monitor, is available for download from our web http://www.mew.co.jp/ac/e
*2 When battery power is reduced, "E" is blinking. Please change the battery according to the battery replacement procedure.
*3 Battery life will shorten if this product is used in high temperature environments.

7. Dedicated Current Transformer (CT) Specifications

Model number	AKW4801	AKW4802	AKW4803	AKW4804
Primary side rated current	5A/50A	100A	250A	400A
Rated secondary side current	1.67mA/16.7mA	33.3mA	125mA	200mA
Winding (Turn)	3000	3000	2000	2000
Ratio error	±1.0%F.S.			
Hole Dia (mm)	10 dia.	16 dia.	24 dia.	36 dia.
Breakdown voltage (initial)	1000V AC/1min (Between through hole and output lead wire)	2000V AC/1min (Between through hole and output lead wire)		
Insulation resistance (initial)	Min. 100MΩ (at DC500V) (Between through hole and output lead wire)			
Functional vibration resistance	10 to 55Hz (1cycle/minute) single amplitude of 0.15mm (10 min. on X, Y and Z axes)			
Destructive vibration resistance	10 to 55Hz (1cycle/ minute) single amplitude of 0.375mm (1 hrs. on X, Y and Z axes)			
Functional shock resistance	Min. 98m/s² (4 times on X, Y and Z axes)			
Destructive shock resistance	Min. 294m/s² (5 times on X, Y and Z axes)			
Output protection level	±7.5V with clamp element		±3.0V with clamp element	
Permissible clamping frequency	Approx. 100 times			
Ambient temperature	–10 to +50°C (without frost and non-condensing)			
Storage temperature	–20 to +60°C (without frost and non-condensing)			
Ambient humidity	35 to 85%RH (at 20°C non-condensing)			
Weight	Approx. 50g (Trunk cable included)	Approx. 80g (Trunk cable included)	Approx. 200g (Trunk cable included)	Approx. 300g (Trunk cable included)

Note: Dedicated current transformers (CT), AKW4801, AKW4802, AKW4803, AKW4804, 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 (AKW4801).

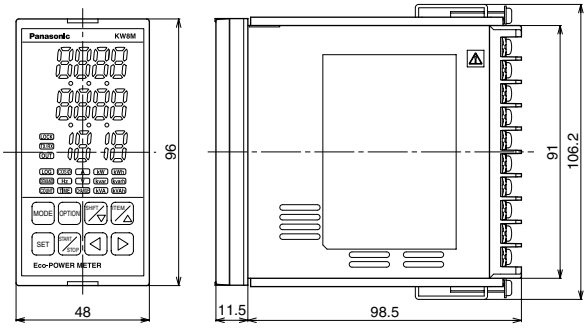
PARTS NAMES



① Display indicator ·····Lighting or blinking according to the display
② LOCK indicator ·····Lighting while in lock mode
③ TX/RX indicator·····Blinking while communication
④ OUT indicator·····Lighting when pulse output
⑤ Display each value ·····Display each measured value, Display each setting value
⑥ MODE key
⑦ SET key
⑧ ITEM / △ key
⑨ SHIFT / ▽ key
⑩ Left / Right (◁/▷) keys
⑪ OPTION key
⑫ START/STOP key

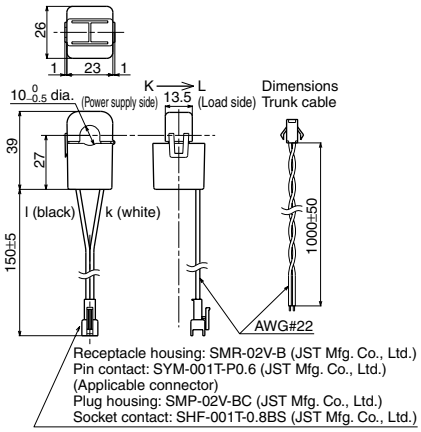
DIMENSIONS (unit: mm)

1. Main unit

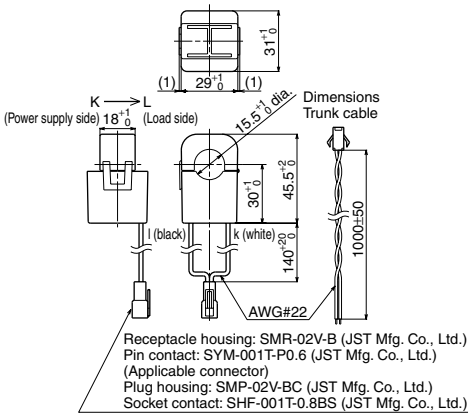


2. Dedicated CT

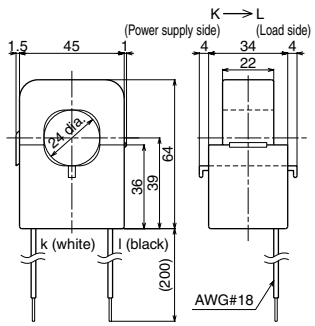
1) For 5A/50A (AKW4801)



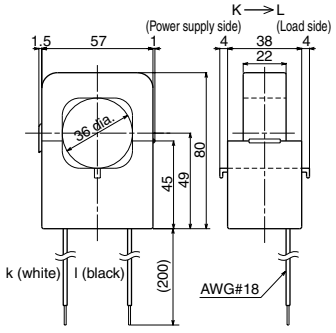
2) For 100A (AKW4802)



3) For 250A (AKW4803)



4) For 400A (AKW4804)



TERMINAL ARRANGEMENT AND WIRING DIAGRAMS

1. Main unit terminal arrangement

Be sure to wire according to the terminal arrangement or wiring diagrams.

• Terminal arrangement

Function		Terminal No.		Function	
GND		①	⑪	P1	Measured voltage input
Operating power supply	L	②	⑫	P0	
	N	③	⑬	P2	
Pulse input	+	④	⑭	P3	
	–	⑤	⑮	CT1(+)	Measured CT input
Pulse output	+	⑥	⑯	CT1(–)	
	–	⑦	⑰	CT2(+)	
RS485	+	⑧	⑱	CT2(–)	
	–	⑨	⑲	CT3(+)	
	E	⑩	⑳	CT3(–)	

Back view

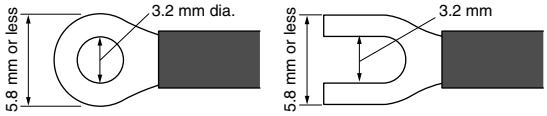
①		⑪
②		⑫
③		⑬
④		⑭
⑤		⑮
⑥		⑯
⑦		⑰
⑧		⑱
⑨		⑲
⑩		⑳

⚠ The input voltage to each terminal is as follows.

Terminal	Phase and wire system	Terminal	Input voltage
Operating power supply	Single-phase two-wire	②–③	100 to 240VAC (100 to 240V~) (Line voltage)
Measured voltage input	Single-phase two-wire	⑪–⑫	0 to 440VAC (0 to 440V~) (Line voltage)
	Single-phase three-wire	⑪–⑫–⑬	0 to 220VAC (0 to 220V~: 3W) (Phase voltage)
	Three-phase three-wire	⑪–⑫–⑬	0 to 440VAC (0 to 440V 3~) (Line voltage)
	Three-phase four-wire	⑪–⑫–⑬–⑭	0 to 254VAC (0 to 254V 3N~) (Phase voltage)

• Caution for Wiring

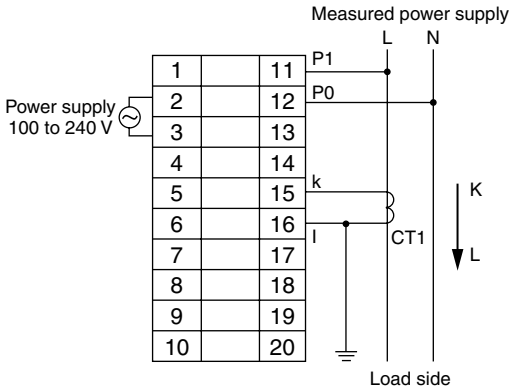
1) Terminal fastening torque should be 0.6 to 1.0N·m.
2) This has no built-in power switch, circuit breaker for power supply part. To protect the device, it is necessary to install power switch and circuit breaker in the power supply circuit.
And this has no built-in power switch, circuit breaker or fuse for measured voltage input parts. Therefore it is necessary to install them in the circuit near this unit.
3) The terminal block of KW8M is designed to be wired from left. Insert wires to the terminal from the left and fasten with terminal screws.
4) In case using insulation sleeve, use an insulation sleeve applicable to M3 screw. Fastening torque should be 0.6 to 1.0N·m. (Refer to the below.)



2. Wiring diagrams (wiring for electrical power measurement)

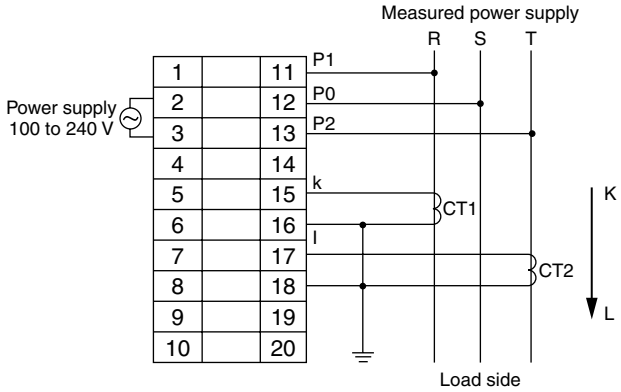
• Single-phase two-wire system

One current transformer (CT) is required to measure single-phase two-wire system.



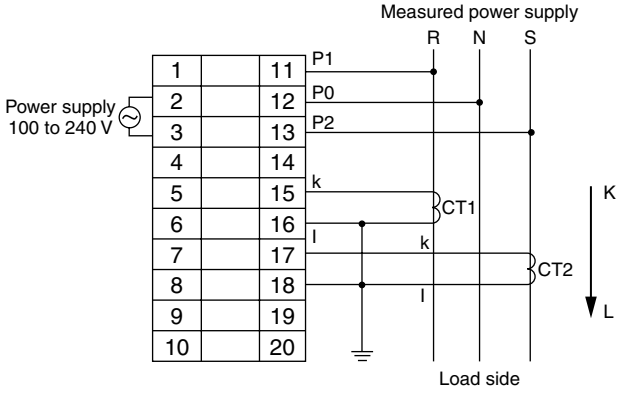
• Three-phase three-wire system

Two CTs are required to measure three-phase three-wire system.



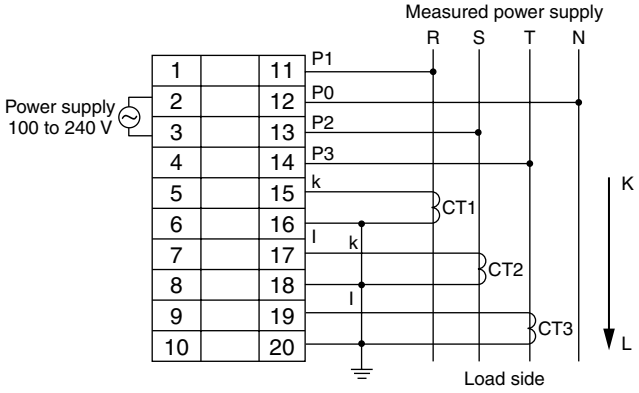
• Single-phase three-wire system

Two CTs are required to measure single-phase three-wire system. Wire by diagram of single-phase two-wire system when measure load using R-S with single-phase three-wire system.



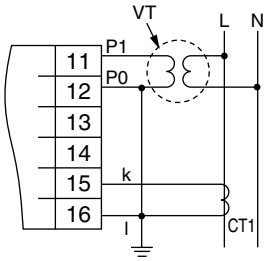
• Three-phase four-wire system

Three CTs are required to measure three-phase four-wire system.



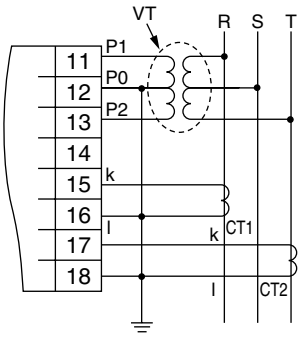
3. VT (Voltage transformer) is needed when you measure a load with voltage over 440V system.
(Use commercial VT, those secondary rating is 110V.)

• Single-phase two-wire system



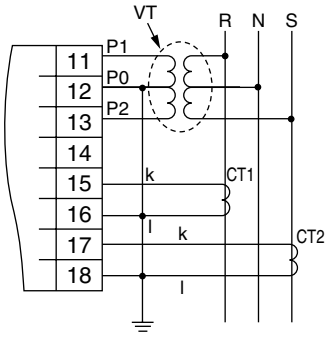
No.13, 14, 17 to 20 are not wired.

• Three-phase, three-wire system



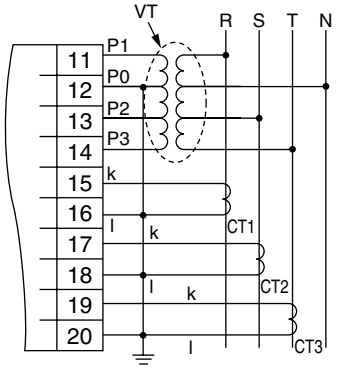
No.14, 19, 20 are not wired.

• Single-phase, three-wire system



No.14, 19, 20 are not wired.

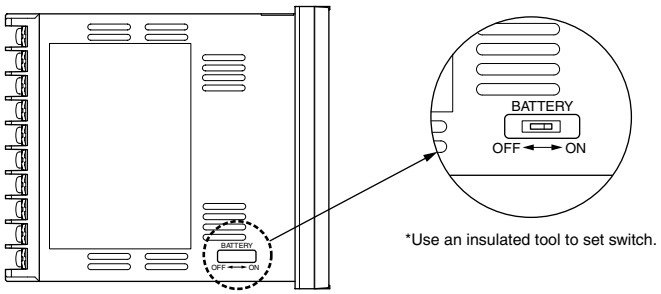
• Three-phase, four-wire system



*Grounding CT's secondary side (ℓ line) and VT's secondary neutral line (P0) is recommended for the unit protection when CT or VT breaks down.

Battery for Backup Memory (Only AKW8111H)

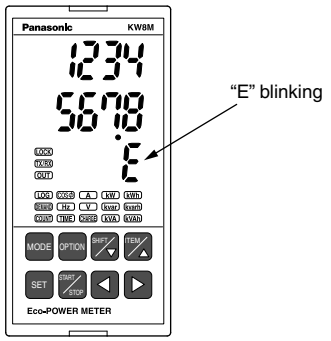
Battery is set to the main unit, when shipping. Be sure to set the battery switch ON before starting the unit.
Also, use an insulated tool to set switch.
It can backup the logging data and calender time.
*When passing long time with battery OFF, initialize the memory by memory initialize mode (MODE 4).



*Use an insulated tool to set switch.

1. Battery life

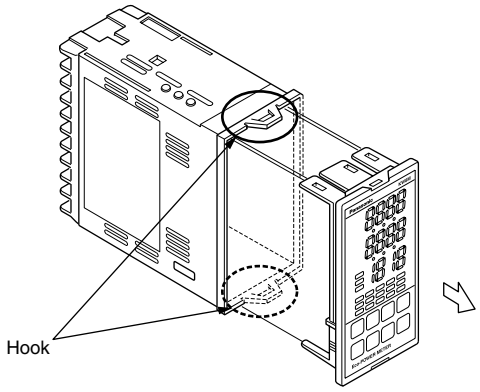
Battery life is about 5 years (at 25°C).
Battery life will shorten if this product is used in high temperature environments.
When battery power is reduced, "E" is blinking in the bottom line.
Please replace the battery in accordance with the remove and mounting procedure.



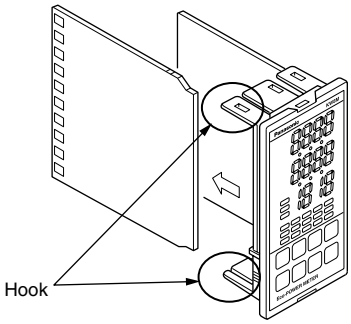
2. How to remove the battery

When disposing the unit or replacing battery, refer to below.

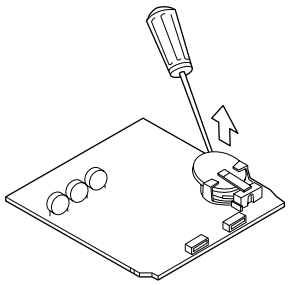
Please undo wiring when disposing the unit or replacing the battery. Electrical shock may occur if you touch places where high voltage is present. Also, release any static electricity in your body before proceeding.



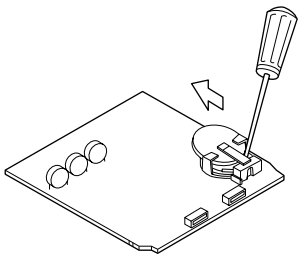
1) Remove 2 hooks at the top and bottom of the case and draw PC board block from the case.



2) Remove 2 hooks at the top and bottom from the block and remove the PC board with battery.



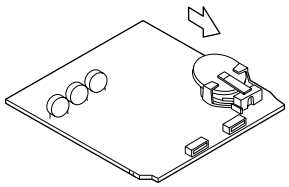
3) Insert an insulated tool between holder and battery and take battery and put it on the stopper.



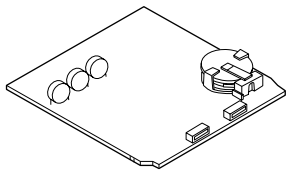
4) Push battery to the marked direction from back and take it.

3. How to mount the battery

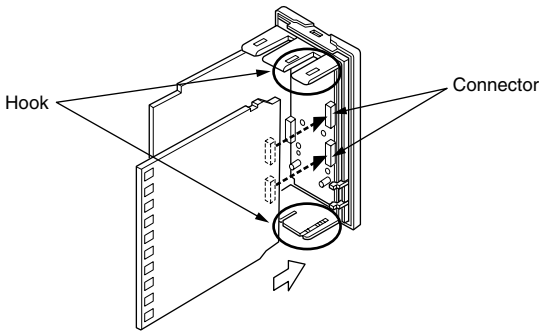
*Mount the new battery **within three minutes** of removing the old battery.



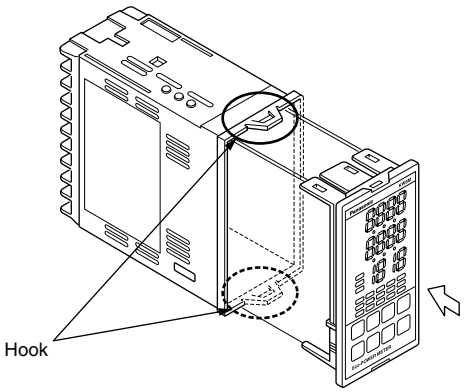
1) In the direction of the arrow, insert the battery horizontally into the backup battery holder with the “+” side facing up.



2) Make sure the battery is securely placed in the battery holder.



3) Insert the PC board with the battery into the two connectors so that the PC board is locked in place by the two hooks at the top and bottom.



4) Being careful of the direction, insert the PC board block into the case to the end making sure that it is secured in place by the two hooks at the top and bottom.

NOTES

1. Avoid locations subject to flammable or corrosive gases, excessive dust, oil, vibrations, or excessive shocks.

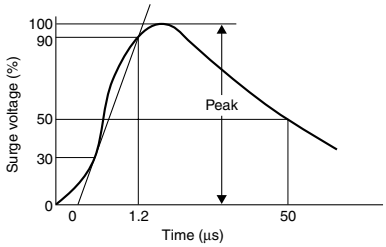
2. Although the case is made from fireproof resin, do not mount it next to flammable materials. Also, avoid placing it directly on top of materials that catch fire easily.

3. If the operating power supply surge exceeds the following value, the internal circuit could be destroyed, so be sure to use a surge absorption element.

Surge voltage	6,000V

Standard surge waveform
The values in the graph right are the surge-voltage resistance at ±(1.2 × 50)μs of single-polarity full-wave voltage.

Surge wave form
[±(1.2 × 50) μs uni-polar full wave voltage]



4. External noise of up to the level shown below is treated as noise voltage, but levels higher than this could lead to malfunctioning or damage to the internal circuit.

	Operating power supply terminals
Noise voltage	1,500V

Noise wave form (noise simulator)
Rise time: 1ns Pulse width: 1μs, 50ns
Polarity: ± Cycle: 10ms
Note: Accurate measurement may not be possible if excessive noise gets added to the input line.

5. Accurate measurement may not be possible if harmonics or waveforms are distorted. Therefore, please test on actual equipment before using.

6. This product is designed to be used only with our options. Options from other companies are not compatible.

Please contact .....

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http://www.mew.co.jp/ac/e/

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