

KW1M Eco-POWER METER (Standard type)

Related Information

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■ Options P.1225~


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Simple and compact power meter perfect for control panels

Features

- In addition to simple measurement of voltage, current, power and integrated electrical power, etc., output of alarm signal is possible using the “alarm setting”.
 - **50 mm 1.969 in** thickness
 - Both screw and DIN rail installation (easy installation)
 - Switchable between electrical power and electricity charge usage
 - Display of calculated CO₂ value possible
-
- Direct input with 400 V AC system
Transformer not required. Support for 400 V AC power measurement
 - Three-phase four-wire system
 - Power factor and frequency measurement
 - Simultaneous power/pulse measurement

Only
AKW1111

PRODUCT TYPES

Main unit

Product name	Phase and wire system	Operating power supply	Measured voltage input	Terminal type	Part No.
KW1M Eco-POWER METER Standard type	Single-phase two-wire system	100 to 240 V AC 50 / 60 Hz	100 / 200 V AC system	Screw terminal (M3.5 “+ / -” screw) (Note 2) , (M3 “+ / -” screw)	AKW1110
	Single-phase three-wire system Three-phase three-wire system Three-phase four-wire system (Note 1)		100 / 200 / 400 V AC system (Select with setting mode)		AKW1111

Notes: 1) Three-phase four-wire system: for AKW1111 only

2) The M3.5 “+ / -” screws are only for the operation voltage and voltage input terminals (P0, P1, P2, and P3) of AKW1111.

Dedicated current transformer (CT)

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

Note: Please order in accordance with the type of power distribution system you will be measuring. (Even if you will be using a secondary 5 A CT, you will need an AKW4801C.)

Options

Product name	Descriptions	Part No.
Mounting rail	Rail for holding DIN rail terminal socket	AT8-DLA1
Fastening plate	Plate for holding DIN rail	ATA4806
Mounting frame	Used for mounting in a panel	AKW1822

Tool and Software

Product name	Descriptions	Remark
KW Monitor (Note 1) (Data collection software for Eco-POWER METER)	For parameter settings, editing of measurement values, and monitoring, etc.	You can download from our website (free of charge) (Note 2)
KW Watcher (Electric power monitoring software)	Please use in situations where Web Datalogger Unit (DLU) / Data Logger Light (DLL) and Eco-POWER METER are used together. For easy “visualization” of data collected in DLU or DLL	

Notes: 1) KW Monitor only uses MEWTOCOL. You cannot use MODBUS (RTU) type.

2) Customer registration is required to download data.

Other tool

Product name	Descriptions	Remark
KW1M Eco-POWER METER User's manual (pdf)	Detailed explanation of Eco-POWER METER usage	You can download from our website (free of charge) (Note 2)

KW1M-H Eco-POWER METER (SD card type)

Related Information

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 KW1M-H
(SD card type)

panasonic-electric-works.net/sunx

Simple and compact power meter perfect for control panels

Features

- In addition to simple measurement of voltage, current, power and integrated electrical power, etc., output of alarm signal is possible using the “alarm setting”.
- 50 mm **1.969 in** thickness
- Both screw and DIN rail installation (easy installation)
- Switchable between electrical power and electricity charge usage
- Display of calculated CO₂ value possible
- Internal memory (Read by SD/SDHC memory card)
 - * SD/SDHC memory card: sold separately
- 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

PRODUCT TYPES

Main unit

Product name	Phase and wire system	Operating power supply	Measured voltage input	Terminal type	Part No.
KW1M-H Eco-POWER METER SD card type	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	100 / 200 / 400 V AC system (Select with setting mode)	Screw terminal (M3 “+ / -” screw)	AKW1121

Dedicated current transformer (CT)

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

Note: Please order in accordance with the type of power distribution system you will be measuring. (Even if you will be using a secondary 5 A CT, you will need an AKW4801C.)

Options

Product name	Descriptions	Part No.
Mounting rail	Rail for holding DIN rail terminal socket	AT8-DLA1
Fastening plate	Plate for holding DIN rail	ATA4806
Backup battery	Used for memory backup function or clock function	AFPG804
Mounting frame	Used for mounting in a panel	AKW1822

Tool and Software

Product name	Descriptions	Remark
KW Monitor (Note 1) (Data collection software for Eco-POWER METER)	For parameter settings, editing of measurement values, and monitoring, etc.	You can download from our website (free of charge) (Note 2)
KW View (Power display tool)	For KW1M-H You can then display the data as a graph by Eco-POWER METER data (electric power only). (1 hour units fixed)	
KW Watcher (Electric power monitoring software)	Please use in situations where Web Datalogger Unit (DLU) / Data Logger Light (DLL) and Eco-POWER METER are used together. For easy “visualization” of data collected in DLU or DLL	

Notes: 1) KW Monitor only uses MEWTOCOL. You cannot use MODBUS (RTU) type.
2) Customer registration is required to download data.

Other tool

Product name	Descriptions	Remark
KW1M-H Eco-POWER METER User's manual (pdf)	Detailed explanation of Eco-POWER METER usage	You can download from our website (free of charge) (Note 2)

FIBER SENSORS

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KW1M-R Eco-POWER METER (Wireless type)

Related Information

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The ideal Eco-POWER METER for reduced wiring

PRODUCT TYPES

Main unit

Product name	Phase and wire system	Operating power supply	Measured voltage input	Terminal type	Part No.
KW1M-R Eco-POWER METER Wireless type Master (Note 2, Note 3)	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	100 / 200 / 400 V AC system (Select with setting mode)	Screw terminal (M3.5 "+ / -" screw) (Note 1) dand (M3 "+ / -" screw)	AKW1000 (Note 4)
KW1M-R Eco-POWER METER Wireless type Slave					AKW1131 (Note 4)

Notes: 1) For AKW1000: M3.5 "+ / -" screw [Operating power supply, RS232C (SD, RD and SG) terminal only], For AKW1131: M3.5 "+ / -" screw [Operating power supply, Voltage input (P0, P1, P2, and P3) terminal only]

2) Using MODE1 master/slave setting mode on the AKW1000, you can select between "Master" and "Slave".

3) AKW1000 does not have a power measurement function.

4) For Japan and China, please use the AKW1000 and AKW1131. For Korea, please use the AKW1000K and AKW1131K. Note that the rated voltage of the AKW1000K and AKW1131K is limited to 220 V AC.

Dedicated current transformer (CT) (Only AKW1131)

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

Note: Please order in accordance with the type of power distribution system you will be measuring. (Even if you will be using a secondary 5 A CT, you will need an AKW4801C.)

Other tool

Product name	Descriptions	Remark
KW1M-R Eco-POWER METER User's manual (pdf)	Detailed explanation of Eco-POWER METER usage	You can download from our website (free of charge) (Note 2)

Features

• Automatic routing system

Station number is determined from the received data and the terminal device for connection is automatically found.

Complex terminal registration and routing settings are not required.

• Quick implementation with easy settings

Easy installation by simply pressing the setting buttons while viewing the LCD.

* Not compatible with KR20 wireless unit.

Powered by AC power, direct connection and installation to distribution panels, etc., is also easy.

• With RS485 connection, other Eco-POWER METER series can be made wireless.

Other MEWTOCOL and MODBUS (RTU) devices in the Eco-POWER METER series, etc., can be made wireless by connecting to the slave units using the RS485 interface. For MEWTOCOL devices, up to 99 units^{*1} can be connected to a single master unit. For MODBUS (RTU) devices, up to 247 units^{*2} can be connected (including slave units).

*1. This is the maximum number of slave units that can be connected to one master unit due to the limitation of the RS485 interface.

*2. With wireless connectivity, the KW1M-R is capable of connecting a maximum total of 250 master and slave units. However, due to the limitation of the MODBUS (RTU) protocol, the number of stations that can be used as measuring devices is limited to 247 units.

• Support for 400 V AC system load

• Three-phase four-wire system

• Simultaneous power/pulse measurement

• Usable countries Japan, China, Korea

Tool and Software

Product name	Descriptions	Remark
KW Monitor (Note 1) (Data collection software for Eco-POWER METER)	For parameter settings, editing of measurement values, and monitoring, etc.	You can download from our website (free of charge) (Note 2)
KW Watcher (Electric power monitoring software)	Please use in situations where Web Datalogger Unit (DLU) / Data Logger Light (DLL) and Eco-POWER METER are used together. For easy "visualization" of data collected in DLU or DLL	
KW Network Monitor (Wireless networks verifying software)	For use with KW1M-R. By simply connecting it to the master and PC, you can verify the connection status of a wireless network or terminal device.	

Notes: 1) KW Monitor only uses MEWTOCOL. You cannot use MODBUS (RTU) type.

2) Customer registration is required to download data.

Options

Product name	Descriptions	Part No.
Mounting rail	Rail for holding DIN rail terminal socket	AT8-DLA1
Fastening plate	Plate for holding DIN rail	ATA4806
Backup battery (included) (Note 1)	Used for memory backup function or clock function	AFPG804
RS232C cable (Note 2)	Dsub 9-pin ⇄ Wire (3-contact) 3 m 9.843 ft	AKR1801
*Pencil type antenna	Antenna for installation outside of control panel (1 pc.) (1 required per unit.)	AKW1802
*Antenna with cable (included) (Note 3, 4)	Antenna for installation inside of control panel (2 m 6.562 ft) (1 pc.) (Includes magnet and two-sided tape for installation.)	AKW1803
*Antenna extension cable (Note 4)	Extension cable for antenna with cable (2 m 6.562 ft) (1 pc.) (Communication distance is shortened when using an antenna extension cable.)	AKW1804

Notes: 1) One backup battery is included with AKW1000 and AKW1000K.

2) Applies to AKW1000 and AKW1000K.

3) AKW1000 and AKW1131 each include one antenna with cable (AKW1803). AKW1000K and AKW1131K each include one pencil type antenna (AKW1802).

4) In Korea you cannot use the antenna with cable (AKW1803) or the antenna extension cable (AKW1804).

*Cannot be used with the KR20 wireless unit.

KW4M Eco-POWER METER (DIN□48)

Related Information

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Eco-POWER METER makes energy management easy for all your facilities and machines!

Features

- Electrical power measurement function**
 Instantaneous electrical power, integrated electrical energy, each phase voltage and each phase current
- Hour meter function installed**
 Measuring the power distribution time of loads possible
- Counter function installed**
 Supports pulse output devices including flow meters
- Supports for 400 V AC power measurement (use with external voltage transformer)**
- Supports 4 types of dedicated current transformer (CT) to cover wide**
- Supports Networking**
 - An RS485 communications port comes standard
 - Comes with MODBUS (RTU) and easily connects to PLC

DIN□48

IP66

PRODUCT TYPES

Main unit

Phase and wire system	Operating power supply	Measured voltage input	Terminal type	Communication protocol	Part No.
Single-phase two-wire system Single-phase three-wire system Three-phase three-wire system	100 to 240 V AC	100 / 200 V AC system	Screw terminal, M3.5 "+ / -" screw (crimp terminal)	MEWTOCOL	AKW5111
				MODBUS(RTU)	AKW5112
			11-pins	MEWTOCOL	AKW5211
				MODBUS(RTU)	AKW5212

Dedicated current transformer (CT)

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

Notes 1) When connectors are not necessary for trunk cables, cutting processing by users is necessary.

2) Please order in accordance with the type of power distribution system you will be measuring. (Even if you will be using a secondary 5 A CT, you will need an AKW4801C.)

Tool and Software

Product name	Descriptions	Remark
KW Monitor (Note 1) (Data collection software for Eco-POWER METER)	For parameter settings, editing of measurement values, and monitoring, etc.	You can download from our website (free of charge) (Note 2)
KW Watcher (Electric power monitoring software)	Please use in situations where Web Datalogger Unit (DLU) / Data Logger Light (DLL) and Eco-POWER METER are used together. For easy "visualization" of data collected in DLU or DLL	

Notes 1) KW Monitor only uses MEWTOCOL. You cannot use MODBUS (RTU) type (AKW5112, AKW5212) for communication.

2) Customer registration is required to download data.

Other tool

Product name	Descriptions	Remark
KW4M Eco-POWER METER User's manual (pdf)	Detailed explanation of Eco-POWER METER usage	You can download from our website (free of charge) (Note 2)

Options

Product name	Descriptions	Part No.
Mounting frame	Used for DIN48 size Main unit installation panel (For use when installation on the board is not possible)	AKW4822
Terminal protective cover	Used for screw terminal type Cover for shielding terminals of the main unit	AKW4823
Mounting frame	Supplied with a unit Used for mounting in a panel	AT8-DA4
Rubber gasket	Supplied with a unit Used for mounting in a panel	ATC18002
Protective cover	Used for protecting a front display (common to Timer/Counter)	AQM4803
DIN rail terminal socket	For 11-pin type (surface mounting)	ATC180041
Rear terminal socket	For 11-pin type (embedded mounting)	AT78051
11P cap	For 11-pin type (connectable directly with soldering)	AT8-DP11
Mounting rail	DIN rail terminal socket fixing rail	AT8-DLA1

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KW7M Eco-POWER METER

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Features

- Can be installed in control panels Supports DIN specification (22.5 mm 0.866 in) and is thinnest
- Power Measurement Function
Instantaneous electrical power display, integrated electrical energy display, each phase voltage display and current display
- Supports 5 A CT of secondary current input and for 400 V AC power measurement
- Supports Networking (RS485 communications port comes standard)

All functions needed power measurement now in a DIN type!

PRODUCT TYPES

Main unit

Phase and wire system	Operating power supply	Measured voltage input	Terminal type	Part No.
Single-phase two-wire system Single-phase three-wire system Three-phase three-wire system	100 to 240 V AC	100 / 200 V AC	Phoenix terminal M3 “-” screw / M2 “-” screw	AKW7111

Dedicated current transformer (CT)

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

Options

Product name	Descriptions	Part No.
Mounting rails	Rail for holding DIN rail terminal socket	AT8-DLA1
Fastening plate	Plate for holding DIN rail	ATA4806
Terminal screw driver	Using when wiring Phoenix terminal socket	AFP0806

Note: Please order in accordance with the type of power distribution system you will be measuring. (Even if you will be using a secondary 5 A CT, you will need an AKW4801C.)

Tool and Software

Product name	Descriptions	Remark
KW Monitor (Note 1) (Data collection software for Eco-POWER METER)	For parameter settings, editing of measurement values, and monitoring, etc.	You can download from our website (free of charge) (Note 2)
KW Watcher (Electric power monitoring software)	Please use in situations where Web Datalogger Unit (DLU) / Data Logger Light (DLL) and Eco-POWER METER are used together. For easy “visualization” of data collected in DLU or DLL.	

Other tool

Product name	Descriptions	Remark
KW7M Eco-POWER METER User's manual (pdf)	Detailed explanation of Eco-POWER METER usage	You can download from our website (free of charge) (Note 2)

Notes: 1) KW Monitor only uses MEWTOCOL. You cannot use Modbus (RTU) type.
2) Customer registration is required to download data.

KW8M Eco-POWER METER (DIN48 × 96)

Related Information

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AKW8111 / AKW8111H
(High performance type)AKW8115
(1 A / 5 A CT input type)
panasonic-electric-works.net/sunx

Lineup with new energy saving and environmentally friendly features!

Features

- Direct measurement of 400 V AC power loads (without transformer)
 - Three-phase four-wire system available
 - Simultaneous power and pulse measurement
 - Supports Networking (RS485 communications port comes standard)
-
- Log data can be saved to memory of main unit.
 - Built-in battery (for memory backup)
- } Only AKW8111H
-
- CT with secondary side output 1 A / 5 A can be connected directly.
 - High current circuit measurement
- } Only AKW8115

PRODUCT TYPES

Main unit

Phase and wire system	Operating power supply	Measured voltage input	Measured current input	Log function	Part No.	Terminal type
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	100 / 200 / 400 V AC system (Select with setting mode)	Dedicated CT type 5 A / 50 A, 100 A, 250 A, 400 A	—	AKW8111	Screw terminal (M3 "+ / -" screw)
			Secondary current of CT Max. 4000 A (Secondary current: 1 A or 5 A)	○	AKW8111H	
				—	AKW8115	

Dedicated current transformer (CT) (Dedicated CT cannot be used with the AKW8115)

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

Note: For AKW8111 and AKW8111H, please order in accordance with the type of power distribution system you will be measuring. (Even if you will be using a secondary 5 A CT, you will need an AKW4801C.)

Options

Product name	Available model			Part No.
	AKW8111	AKW8111H	AKW8115	
Terminal cover	○	○	○	AKT8801
Spare battery (Note 1)	—	○	—	AFC8801
Mounting frame (Note 2)	○	○	○	AKW8822

Notes: 1) The spare battery is attached to AKW8111H when shipped.
2) The mounting bracket is attached to the main unit in KW8M. Use when installation on the board is not possible.

Tool and Software

Product name	Descriptions	Remark
KW Monitor (Note 1) (Data collection software for Eco-POWER METER)	For parameter settings, editing of measurement values, and monitoring, etc.	You can download from our website (free of charge) (Note 2)
KW Watcher (Electric power monitoring software)	Please use in situations where Web Datalogger Unit (DLU) / Data Logger Light (DLL) and Eco-POWER METER are used together. For easy "visualization" of data collected in DLU or DLL.	

Other tool

Product name	Descriptions	Remark
KW8M Eco-POWER METER User's manual (pdf)	Detailed explanation of Eco-POWER METER usage	You can download from our website (free of charge) (Note 2)

Notes: 1) KW Monitor only uses MEWTOCOL. You cannot use Modbus (RTU) type.
2) Customer registration is required to download data.

FIBER SENSORS

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1215 PRECAUTIONS IN USING Eco-POWER METER (Common)

- Avoid locations subject to flammable or corrosive gases, excessive dust, oil, vibrations, or excessive shocks.
- 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.
- Since the cover for main unit 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.
- This product is designed to be used only with our options. Options from other companies are not compatible.

Measurement

- Accurate measurement may not be possible if harmonics or waveforms are distorted. Therefore, please test on actual equipment before using.
- Do not use the secondary circuit of the inverter. It causes heat and malfunctions in the main unit.

Surge

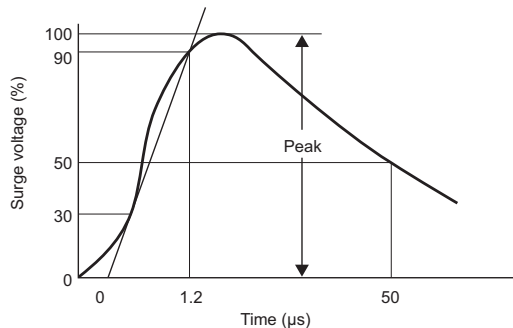
- If the operating power supply surge exceeds the following value, the internal circuit could be destroyed, so be sure to use a surge absorption element.

Surge voltage	KW1M series	Other series
	4,000 V	6,000 V

Standard surge waveform

The values in the graph are the surge-voltage resistance at $\pm(1.2 \times 50)$ μ s of single-polarity full-wave voltage.

Surge wave form [$\pm(1.2 \times 50)$ μ s single-polarity full-wave voltage]



- External noise 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	1,500 V

Noise wave form (noise simulator)

Rise time: 1 ns Pulse width: 1 μ s, 50 ns

Polarity: \pm Cycle: 10 ms

(Note 1): Accurate measurement may not be possible if excessive noise gets added to the input line.

Self-diagnostic function

If an error occurs, the following displays will be given.

Display	Meaning	Output status	Restoration procedure	Status after restoration
ERR00	CPU error	OFF	Turn the power off and then on again.	The display at start-up before the CPU malfunction occurred.
ERR01	Memory error (Note 2)		EEPROM life ended. Replace the main unit.	

(Note 2): Includes the possibility that the EEPROM's life has expired.

Power failure memory

- Eco-POWER METER memories integrated electric power and working status to internal EEPROM until when power supply is off. (Power failure guarantee) And every time to change each setting, each setting value is memorized to internal EEPROM at the same time. Therefore, change setting frequently makes EEPROM's life short. Avoid to usage like this.

Others

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

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Pulse measurement

Input connection (except AKW7111 and AKW1110)

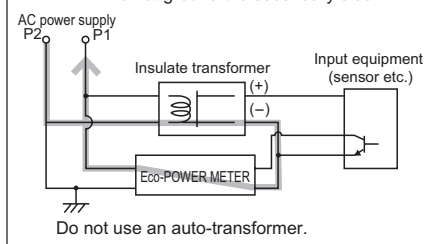
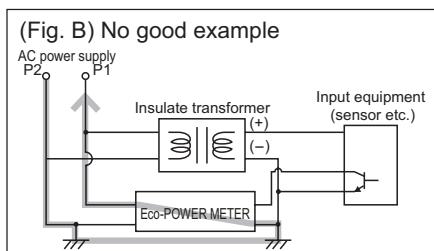
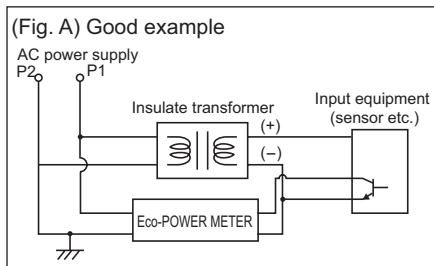
- **Contact input**
Use highly reliable metal plated contacts. Since the contact's bounce time leads directly to error in the count value, use contacts with as short a bounce time as possible. In general, select 30 Hz for max. counting speed.
- **Non-contact input (Transistor input)**
Connect with an open collector. Use the transistor with the following specifications.
 $V_{CEO} = \text{min. } 20 \text{ V}$, $I_C = \text{min. } 20 \text{ mA}$, $I_{CBO} = \text{max. } 6 \mu\text{A}$
Use transistors with a residual voltage of less than 1.5 V when the transistor is ON.

Note: Short-circuit impedance should be less than 1 kΩ. (When the impedance is 0 Ω, drain current is approx, 7 mA. The open-circuit impedance should be more than 100 kΩ.)

- **Input wiring**
Please use shielded wire or metal wire-ways exclusively and a wire length of 10 m **32.808 ft** or less. If the wiring length is longer, the impact due to floating capacitance may result in abnormal operation.

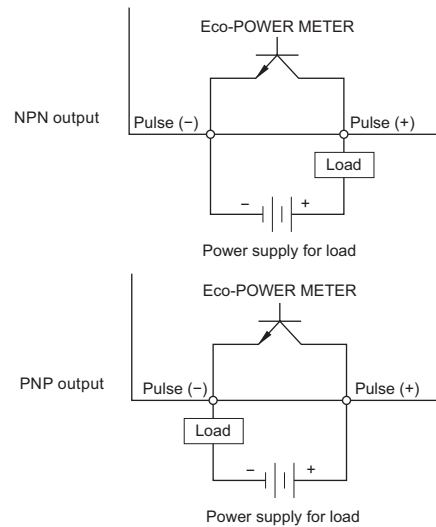
Note: The operating power supply input part (KW1M and KW8M: included measured voltage input part) is not insulated to pulse input parts. So the input equipment must have the power supply transformer in which the secondary side is not grounded with the primary and secondary sides insulated as in Fig. A, in order to prevent interference of the power supply circuit when connecting the external input circuit. Please be aware that when the secondary side is grounded or an auto-transformer is used, there will be a short circuit as in Fig. B below and the internal circuit of the product will be destroyed.

*Fig. A and B: For single-phase two-wire system example



Output connection

Since the transistor output is insulated from the internal circuit by a photo-coupler, it can be used both as a NPN output and PNP (equal value) output.



Regarding dedicated current transformers (In AKW8115, dedicated current transformers are not used, therefore, please confirm the respective user's manual.)

HOW to attach the Current Transformer (CT)

- One current transformer (CT) is required to measure a single-phase two-wire system. Two CTs are required to measure a single-phase three-wire system or three-phase three-wire system. Three CTs are required to measure three-phase four-wire system. Using all CTs should be the same.
- Check beforehand that the thickness of the electric wire is smaller than the through hole of the CT.
- When connecting CT, connect the secondary side to the terminal of the main unit first, and after that wire the primary side to a load electric wire. The incorrect installation order may lead to an electrical shock and malfunction of the CT.
- CT has polarity. Align according to the direction (K → L) written on the CT and install from the power source side (K) facing the load side (L). If the direction is incorrect, accurate measurement is impossible.
- When installing and closing CTs, please confirm there is no dust or foreign matter on the separating surfaces. In addition, 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.
- If there is some distortion by harmonic or waveform, it may not measure correctly. Please check with the actual system before adopting it.

When CT's cable is extended

- Dedicated CT cable length is approximately 1m **3.281 ft** for AKW4801C and AKW4802C while the dedicated CT cable length is approximately 200 mm **7.874 in** for AKW4803C and AKW4804C.
- Extension of the cable is possible up to approximately 10 m **32.808 ft** 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 mm². When extending the cable, use as thick a cable as possible.

* When extending the cable, please perform testing under actual conditions before using.

FIBER SENSORS
LASER SENSORS
PHOTO-ELECTRIC SENSORS
MICRO PHOTO-ELECTRIC SENSORS
AREA SENSORS
LIGHT CURTAINS
PRESSURE / FLOW SENSORS
INDUCTIVE PROXIMITY SENSORS
PARTICULAR USE SENSORS
SENSOR OPTIONS
SIMPLE WIRE-SAVING UNITS
WIRE-SAVING SYSTEMS
MEASUREMENT SENSORS
STATIC CONTROL DEVICES
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HUMAN MACHINE INTERFACES
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Applications
Eco-Power Meters
Communication Devices
Measurement Systems
Options
Performance Comparison
Selection Guide
KW1M
KW1M-H
KW1M-R
KW4M
KW7M
KW8M

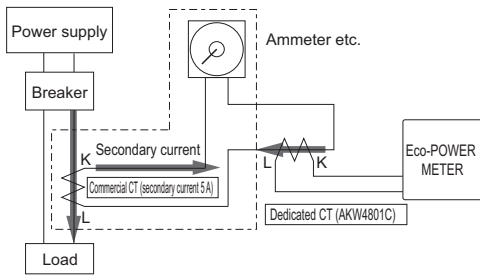
To connect CT with secondary side current 5 A

How to connect for measuring by combination with CT (secondary side current 5 A)

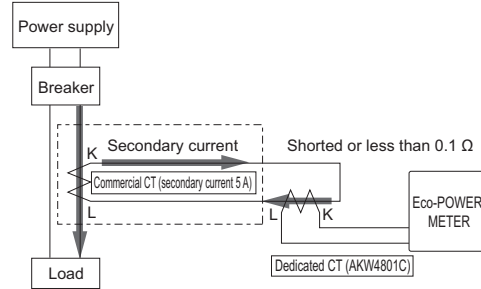
- Select 5 A at CT type setting mode (CT-T).
- Set the primary current of measured CT (secondary side current 5 A) at primary side current of CT setting mode (CT-1). <Example> If the measured CT is 400 A / 5 A, set to "400".
- Clamp the dedicated CT for 5 A (AKW4801C), which is connected to the main unit first, to secondary side of the CT. CT direction (K → L) should be set for the CT direction.
- Please set the CT (secondary side current 5 A CT) and, AKW4801C, approximately 1 m 3.281 ft apart. If the two CTs are set too close each other, it may not measure accurately due to magnetic field interference.

(Connection example)

With ammeter etc.



Without ammeter



RS485 Communication

- When using shielded cable for the RS485 transmission line, ground one end. Use a class D dedicated earth for grounding. Do not share a ground with other earth lines. (Fig. 1)

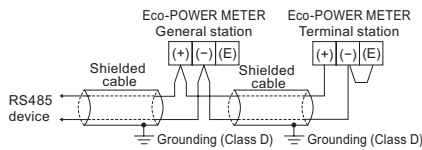


Fig. 1

- With a terminal station, RS485 "E" and RS485 "-" should be shorted. [For KW4M Eco-POWER METER, change the slide switch on the side of main unit as a terminal station. (Fig. 3)]

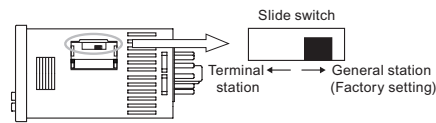


Fig. 3

- Be sure to connect with daisy chain the RS485 transmission line between each unit. Do not use a splitter. (Fig.2)

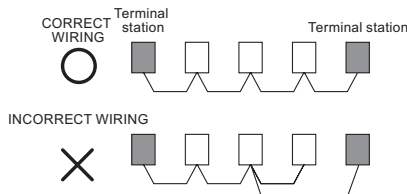
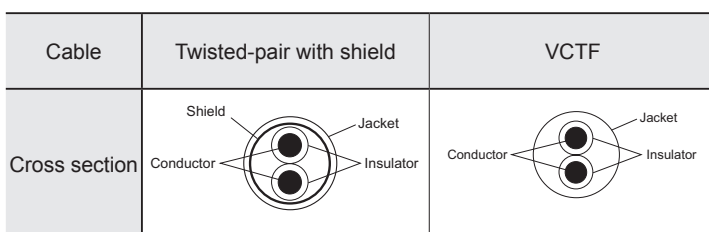


Fig.2

Recommended cable

Use the transmission cables shown below for Eco-POWER METER RS485 communication system.

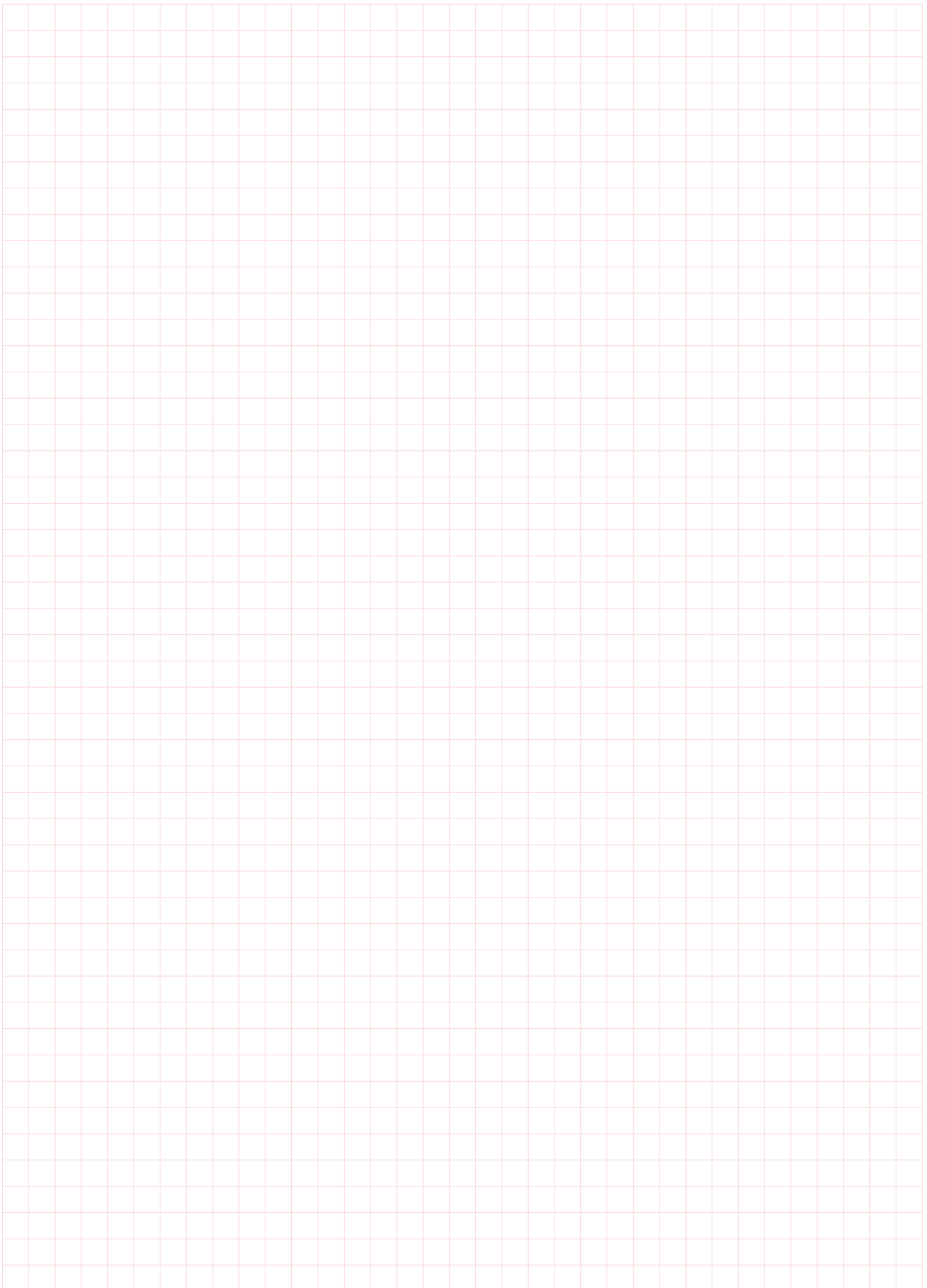
Cable	Conductor		Insulator		Cable diameter	Applicable cable
	Size (Note 4)	Resistance (at 20 °C)	Material	Thickness		
Twisted-pair with shield	1.25 mm ² 0.0019 in ² (AWG16) or more	Max. 16.8 Ω / km	Polyethylene	Max. 0.5 mm 0.020 in	Approx. 8.5 mm 0.335 in	HITACHI KPEV-S1.25 mm ² 0.0019 in ² × 1P Belden Inc.9860
	0.5 mm ² 0.0008 in ² (AWG20) or more	Max. 33.4 Ω / km	Polyethylene	Max. 0.5 mm 0.020 in	Approx. 7.8 mm 0.307 in	HITACHI KPEV-S0.5 mm ² 0.0008 in ² × 1P Belden Inc.9207
VCTF	0.75 mm ² 0.0012 in ² (AWG18) or more	Max. 25.1 Ω / km	PVC	Max. 0.6 mm 0.024 in	Approx. 6.6 mm 0.260 in	VCTF0.75 mm ² 0.0012 in ² × 2C(JIS)



- Notes: 1) Use shielded type twisted-pair cables.
 2) Use only one type of the transmission cables. Do not mix different types of the cables.
 3) Use twisted-pair with shield cables under a bad noise environment.
 4) For KW7M, use electrical wire with 0.3 to 1.0 mm² 0.0005 to 0.0016 in² cross sectional area (AWG#22 to 16) (stripped wire length 5 mm 0.197 in). When connecting two lines to the communication terminal, please use two of the same size electrical wire (stripped wire length 5 mm 0.197 in) with 0.3 to 0.34 mm² 0.00047 to 0.00053 in² cross sectional areas.

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 KW1M-H
 KW1M-R
 KW4M
 KW7M
 KW8M

MEMO



KR20 WIRELESS UNIT

Related Information ■ Options P.1228



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**High-speed, wireless communication
with easy installation and simple wiring!!**

PRODUCT TYPES

Main unit

Product name	Descriptions	Part No.
RS485 type	RS232C, RS485	AKR2002
I/O type (NPN)	I/O: 8/8 (NPN), RS232C	AKR2015
I/O type (PNP)	I/O: 6/6 (PNP), RS232C	AKR2045

Notes: 1) A power supply cable (1 m **3.281 ft**) for the main unit is supplied with this product.
2) Antenna is not attached. Select from optional supplies.

Options

Product name	Descriptions	Part No.
Standard antenna (Note 4)	2 pieces	AKR2802
Antenna with cable (Note 4)	2 pieces, 2 m length 6.562 ft	AKR2803
Antenna extension cable (Note 4)	Special order 2 pieces, 2 m length 6.562 ft	AKR2804
Power supply cable for FPΣ (Note 5)	1 piece, 1 m length 3.281 ft	AFPG805
Power supply unit for FP0	Input: 100 to 240 V AC Output: 24 V DC, 0.7 A	AFP0634

Notes: 1) Two antennas and two antenna extension cables are required per main unit.
2) A magnet and double-sided tape are supplied with antennas with cable for fitting.
3) When an antenna extension cable is used, the communication distance becomes short.
4) KR20 Wireless unit cannot be used with the KW1M-R Eco-POWER METER (Wireless type).
5) Included with product

Setting software

Product name	Descriptions	Remark
Control Configurator KR	Setting tool for KR20 Wireless unit	You can download from our website (free of charge) (Note) Use the tool Ver. 1.20 or later for KR20.

Features

- High-speed data communications (134 kbps wireless)**
 Approximately 15 to 20 times faster compared to low power wireless communication devices (comparison by our company) achieved and use for purposes requiring high speed response possible.
 Examples: All measuring devices (control panel, security alarm, temperature monitor, electricity monitor, production quantity monitor, etc.), 0.1 seconds or less for sending and receiving data with several dozens of bytes (approximately 1.5 seconds for the previous product)
- Reducing the wiring and installation work**
 Wiring is unnecessary when the layouts for machines and equipment frequently change and in installation in locations where wiring is difficult. Installation of the main unit on the board and DIN rail attachment possible
- Common units for master and slave**
- Easy-to-operate main unit and setting tool software**
- Wireless repeater function**
 The communication distance of wireless devices (between the master and a slave) is approximately 250 m **820.25 ft** outdoors in an open location (approximately 50 m **164.05 ft** indoors). Since the repeater function is also incorporated in this unit, the communication distance can be extended by adding products for use as repeaters between the master and slave. (Up to 8 units can be installed between the master and slave.)
- Up to 99 wireless slave units can be connected for one master wireless device**
 Co-existence of RS485 and I/O type is also possible. However, only when using 1:N communication and MEWTOCOL (communication protocol for our company's PLC).

CAUTION CONCERNING RADIO LAW

Do not dismantle or remodel the product.

COUNTRIES WHERE THE USE OF KR20 HAS BEEN AUTHORIZED

The use of KR20 has been authorized in the following countries.

Japan, China, Thailand, Singapore, 25 European countries (Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France*, Germany, Greece, Hungary, Iceland, Ireland, Italy, Lithuania, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, UK)

* In France, this product must not be used outdoors. Please use it indoors only.
* Products with the indication label affixed to their rear side

Manual

Product name	Descriptions	Remark
KR20 Wireless unit User's manual	Detailed explanation of KR20 Wireless unit usage (pdf)	You can download from our website (free of charge) (Note)

Note: Customer registration is required to download data.

FIBER SENSORS

LASER SENSORS

PHOTOELECTRIC SENSORS

MICRO PHOTOELECTRIC SENSORS

AREA SENSORS

LIGHT CURTAINS

PRESSURE / FLOW SENSORS

INDUCTIVE PROXIMITY SENSORS

PARTICULAR USE SENSORS

SENSOR OPTIONS

SIMPLE WIRE-SAVING UNITS

WIRE-SAVING SYSTEMS

MEASUREMENT SENSORS

STATIC CONTROL DEVICES

ENDOSCOPE

LASER MARKERS

PLC / TERMINALS

HUMAN MACHINE INTERFACES

ENERGY CONSUMPTION VISUALIZATION COMPONENTS

FA COMPONENTS

MACHINE VISION SYSTEMS

UV CURING SYSTEMS

Applications

Eco-Power Meters

Communication Devices

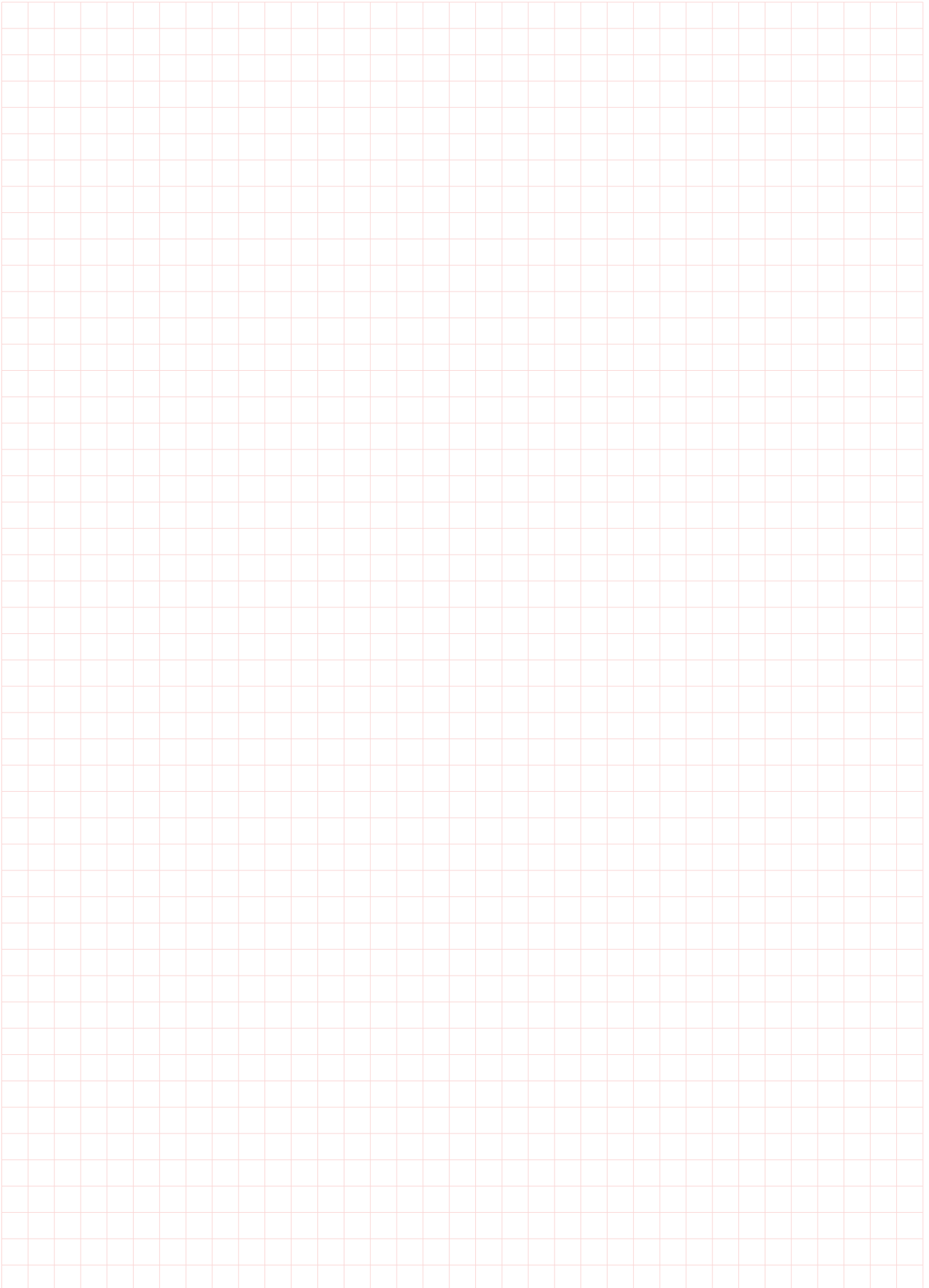
Measurement Systems

Options

KR20

KS1

MEMO



KS1 SIGNAL CONVERTER

Related Information ■ Options P.1228

- FIBER SENSORS
- LASER SENSORS
- PHOTOELECTRIC SENSORS
- MICRO PHOTOELECTRIC SENSORS
- AREA SENSORS
- LIGHT CURTAINS
- PRESSURE / FLOW SENSORS
- INDUCTIVE PROXIMITY SENSORS
- PARTICULAR USE SENSORS
- SENSOR OPTIONS
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- WIRE- SAVING SYSTEMS
- MEASUREMENT SENSORS
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- FA COMPONENTS
- MACHINE VISION SYSTEMS
- UV CURING SYSTEMS
- Applications
- Eco-Power Meters
- Communication Devices
- Measurement Systems
- Options

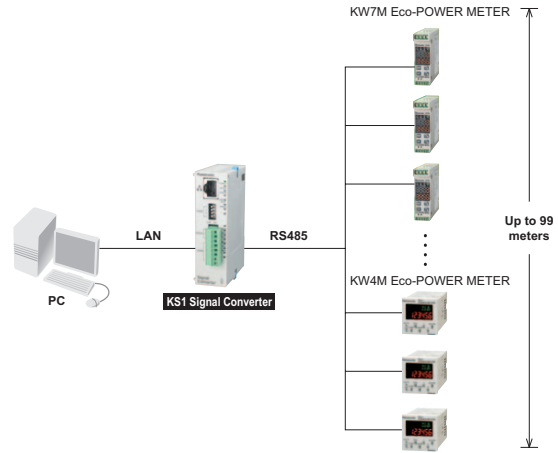


panasonic-electric-works.net/sunx

RS232C / RS485 Data can be easily monitored by LAN (functions as a server)

Features

- The connectors are located on the front panel. Easy to connect
- Easy to operate
- Can be connected to the LAN without the need of switching between RS232C and RS485 signals
- Easy-to-install DIN-rail-mountable type



PRODUCT TYPES

Main unit

Product name	Rated voltage	Signal conversion specifications	Part No.
KS1 signal converter	24 V DC	Ethernet ↔ RS232C / RS485	AKS1202

Options

Product name	Descriptions	Part No.
Power supply unit for FP0	Input: 100 to 240 V AC, Output: 24 V DC, 0.7 A	AFP0634
Power supply cable for FPΣ (Note 1)	1 piece, 1 m 3.281 ft length	AFP0805
Screwdriver for terminal block	Using when wiring Phoenix terminal socket	AFP0806

(Note 1): Included with product

Setting software

Product name	Descriptions	Remark
Configurator WD	IP address searching tool software for KS1	You can download from our website (free of charge) (Note 2)

Manual

Product name	Descriptions	Remark
KS1 Signal Converter User's manual	Detailed explanation of KS1 Signal Converter usage (pdf)	You can download from our website (free of charge) (Note 2)

(Note 2): Customer registration is required to download data.

KR20

KS1

CAUTIONS BEFORE USING

Do not use the Unit in the following environments.

- Where the unit will be exposed to direct sunlight and where the ambient temperature is outside the range of 0 to 55 °C.
- Where the ambient humidity is outside the range of 30 to 85 % RH (at 20 °C non-condensing) and where condensation might occur by sudden temperature changes.
- Where inflammable or corrosive gas might be produced.
- Where the unit will be exposed to excessive airborne dust or metal particles.
- Where the unit will be exposed to water, oil or chemicals.
- Where organic solvents such as benzene, paint thinner, alcohol, or strong alkaline solutions such as ammonia or caustic soda might adhere to the product.
- Where direct vibration or shock might be transmitted to the product, and where water might wet the product.
- Places unaffected by power transmission lines, high voltage equipment, power cables, power equipment, radio transmitters and any other equipment that would generate high switching surge.

Please use the Unit according to the specifications described in this manual. Otherwise, it may malfunction or cause fire and an electric shock.

- Connect to the power supply in compliance with the rating.
- Refer to the wiring diagram to ensure proper wiring for the power supply, input and output.
- Do not perform wiring or installation with a live line. It may also lead to circuit burnout or fire.
- Do not add voltage and current to an output terminal from outside.

Static electricity

- Discharge static electricity touching the grounded metal etc. when you touch the unit.
- Excessive static electricity might be generated especially in a dry place.

Cleaning

- Wipe dirt of the main unit with soft cloth etc. (When thinner is used, the unit might deform or be discolored.)

Power supply

- Connect a breaker to the voltage input part for safety reasons and to protect the device.
- Do not turn on the power supply or input until all wiring is completed.
- Do not add abnormal voltage directly, otherwise it might damage internal circuit.

Before power on

Please note the following points when turning on power at the first time.

- Confirm there are neither wiring rubbish nor especially an electrical conduction when installed.
- Confirm neither the power supply wiring, the I/O wiring nor the power supply voltage are wrong.
- Tighten the installation screw and the terminal screw surely.
- Use an electric wire applicable to the rated current.

Others

- Please note that it might take time to approve the communication again after power on and breaking the communication.
- This product is designed to be used only with our options. Options from other companies are not compatible.

FIBER
SENSORSLASER
SENSORSPHOTO-
ELECTRIC
SENSORSMICRO
PHOTO-
ELECTRIC
SENSORSAREA
SENSORSLIGHT
CURTAINSPRESSURE /
FLOW
SENSORSINDUCTIVE
PROXIMITY
SENSORSPARTICULAR
USE
SENSORSSENSOR
OPTIONSSIMPLE
WIRE-SAVING
UNITSWIRE-SAVING
SYSTEMSMEASURE-
MENT
SENSORSSTATIC
CONTROL
DEVICES

ENDOSCOPE

LASER
MARKERSPLC /
TERMINALSHUMAN
MACHINE
INTERFACESENERGY
CONSUMPTION
VISUALIZATION
COMPONENTSFA
COMPONENTSMACHINE
VISION
SYSTEMSUV
CURING
SYSTEMS

Applications

Eco-Power
MetersCommunication
DevicesMeasurement
Systems

Options

KR20**KS1**

Web Datalogger Unit

Related Information ■ Options P.1228

- FIBER SENSORS
- LASER SENSORS
- PHOTOELECTRIC SENSORS
- MICRO PHOTOELECTRIC SENSORS
- AREA SENSORS
- LIGHT CURTAINS
- PRESSURE / FLOW SENSORS
- INDUCTIVE PROXIMITY SENSORS
- PARTICULAR USE SENSORS
- SENSOR OPTIONS
- SIMPLE WIRE-SAVING UNITS
- WIRE-SAVING SYSTEMS
- MEASUREMENT SENSORS
- STATIC CONTROL DEVICES
- ENDOSCOPE
- LASER MARKERS
- PLC / TERMINALS
- HUMAN MACHINE INTERFACES
- ENERGY CONSUMPTION VISUALIZATION COMPONENTS
- FA COMPONENTS
- MACHINE VISION SYSTEMS
- UV CURING SYSTEMS
- Applications
- Eco-Power Meters
- Communication Devices
- Measurement Systems
- Options
- DLU**
- DLL



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Powerful data logger
Use for power surveillance
and temperature management.

Features

- **Collect all sorts of device data**
 FP series Programmable Controller
 KW series Eco-POWER METER
 KT4H / KT4B Temperature Controller
- **Store collected data in CF cards in CSV format**
 Supports up to 1 GB of CF cards
- **Special tool software not required, easy settings**

SPECIFICATIONS

Three data collection methods: Serial communications, direct bus connection, and pulse input

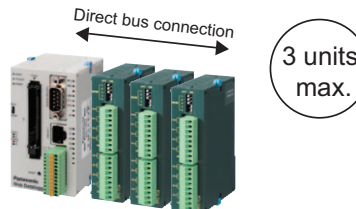
- The RS485 serial communications allow data collection from up to 99 units. No programming for communications is required. Simply designate data (DT) to be collected on the Web Datalogger Unit setting screen if the connected equipment is KW series Eco-POWER METER or KT4H / KT4B Temperature Controller compatible with MEWTOCOL.
- Notes: 1) An optional communication cassette is required for serial communications.
 2) The maximum connectable number of KT4H / KT4B Temperature Controller units is 31.



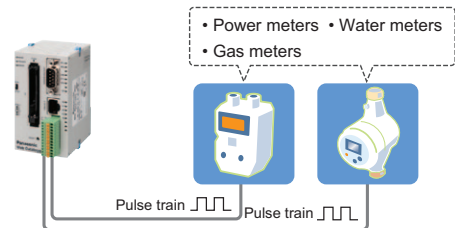
RS485 1,200 m 3,937.2 ft 99 units max. (KT4H / KT4B Temperature Controller: 31 units max.)

FP0 expansion (thermocouple, A/D converter) units can be directly connected to the bus by the built-in connectors.

Up to three units can be connected to the right side of the Web Datalogger Unit.



The four parallel input points allow pulse meters, such as power, gas, and water meters, to be connected.



PRODUCT TYPES

Product name	Part No.	Specifications
Main unit	AFL1200	Logging of data of up to 99 devices
Communication cassette	AFPG801	RS232C × 1 ch
	AFPG802	RS232C × 2 ch
	AFPG803	RS485 × 1 ch
	AFPG806	(RS232C × 1 ch) + (RS485 × 1 ch)
Backup battery for FPΣ	AFPG804	Battery for full-time back up of operation memory and clock/calendar function
Power supply unit for FP0	AFP0634	Input: 100 to 240 V AC, Output: 24 V DC, 0.7 A
IP search tool	————	Software for searching IP addresses of Web Datalogger Units connected to the LAN. You can download from our website (free of charge) (Note)
Java applet	————	Useful for creating HTML monitoring files. You can download from our website (free of charge) (Note)

Note: Customer registration is required to download data.

Data Logger Light

Related Information ■ Options P.1228

NEW



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User-friendly data logger ideal for Eco-POWER METER
Make the power “visualization” promote eco-conscious operations

Features

- **Easy-to-install all-in-one unit**
 - Provided with a USB port and an SD / SDHC memory card slot as standard equipment
 - * SD / SDHC memory card not included
 - It is possible to set conditions and registered devices through the USB interface.
 - * A separately available USB2.0 cable is required.
- **Dedicated software downloadable free of charge facilitates operations in areas outside the LAN.**
- **Universal AC power supply**
 - Compatible with universal AC power supply, eliminating the need for preparing a separate DC power supply. A 24 V DC, 0.2 A external power supply is also provided as standard equipment.
- **Provided with a RS232C / RS485 communication port as standard equipment**
 - There is no need to prepare a separate communication cassette.

PRODUCT TYPES

Main unit

Product name	Descriptions	Part No.
Data Logger Light	Number of registerable devices: 300 points max. (Total of 300 points max. for either 1 or 16 files) Internal memory: 1 MB * SD / SDHC memory card: Max. 32 GB	AKL1000

Options

Product name	Descriptions	Part No.
Slim 30 type Mounting plate for FP0	Plate for perpendicularly installing the Data Logger Light (set for 10)	AFP0811
Flat type Mounting plate for FP0	Plate for installing Data Logger Light flush with the panel (set for 10)	AFP0804
Battery for FPΣ (included)	For internal memory backup function and clock function	AFP0804
Terminal screw driver	Using when wiring Phoenix terminal socket	AFP0806

Note: The use of a Panasonic SD memory card is recommended. (2 to 32 GB, Class 2 to 10)

Tool and Software

Product name	Descriptions	Remark
Configurator DL	Data Logger Light setting software	You can download from our website (free of charge) (Note)
Configurator WD	IP addresses search tool (Ver.1.50 or more)	

Other tool

Product name	Descriptions	Remark
Data Logger Light User's manual (pdf)	Explain how to use and setting procedures	You can download from our website (free of charge) (Note)

Note: Customer registration is required to download data.

FIBER SENSORS

LASER SENSORS

PHOTOELECTRIC SENSORS

MICRO PHOTOELECTRIC SENSORS

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LIGHT CURTAINS

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SENSOR OPTIONS

SIMPLE WIRE-SAVING UNITS

WIRE-SAVING SYSTEMS

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STATIC CONTROL DEVICES

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Measurement Systems

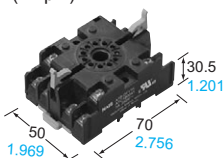
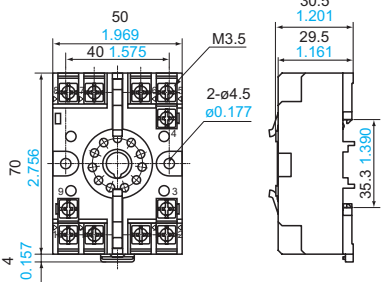
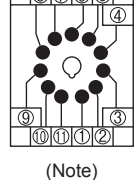
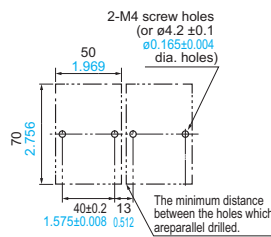
Options

DLL

DLL

TERMINAL SOCKETS

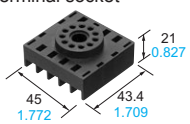
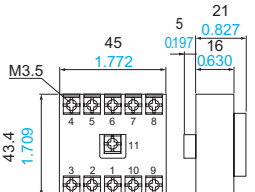
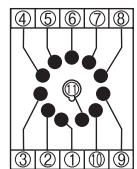
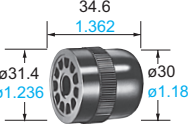
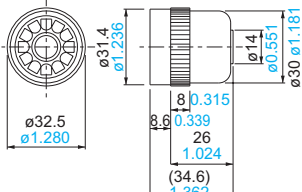
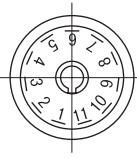
Unit: mm in Tolerance: ±1.0 0.039

Type	Appearance	Dimensions	Terminal wiring (Top view)	Mounting hole dimensions
KW4M Eco-POWER METER 11-pin type AKW5211 AKW5212 Part No.: ATC180041	●DIN rail terminal socket (11-pin) 		 (Note)	

Note: Terminal number on the main unit are identical to those on the terminal socket.

SOCKETS

Unit: mm in Tolerance: ±1.0 0.039

Type	Appearance	Dimensions	Terminal wiring (Top view)	Mounting hole dimensions
KW4M Eco-POWER METER 11-pin type AKW5211 AKW5212 Part No.: AT78051	●Rear terminal socket 			—
	●11P cap 			—

INSTALLATION PARTS

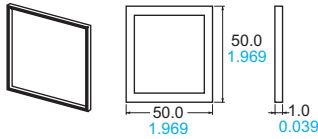
Unit: mm in Tolerance: ±1.0 0.039

●Antenna with cable: Applicable for KW1M-R  Cable length: 2 m 6.562 ft 1 piece *Cannot be used in Korea. *Included with AKW1000 and AKW1131. Part No.: AKW1803	●Pencil type antenna: Applicable for KW1M-R  1 piece *Included with AKW1000K and AKW1131K. Part No.: AKW1802
●Antenna extension cable: Applicable for KW1M-R  Cable length: 2 m 6.562 ft 1 piece *Cannot be used in Korea. Part No.: AKW1804	●RS232C cable: Applicable for KW1M-R (Master)  Part No.: AKR1801

FIBER SENSORS
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INDUCTIVE PROXIMITY SENSORS
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WIRE-SAVING SYSTEMS
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ENDOSCOPE
LASER MARKERS
PLC / TERMINALS
HUMAN MACHINE INTERFACES
ENERGY CONSUMPTION VISUALIZATION COMPONENTS
FA COMPONENTS
MACHINE VISION SYSTEMS
UV CURING SYSTEMS

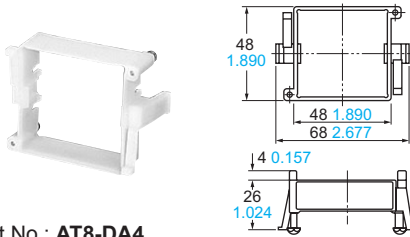
Applications
Eco-Power Meters
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Options

- Rubber gasket: Applicable for KW4M
*The rubber gasket is enclosed in the KW4M.



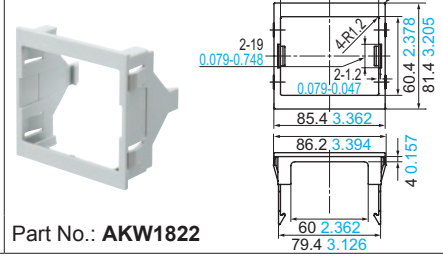
Part No.: **ATC18002**

- Mounting frame: Applicable for KW4M
*The rubber gasket is enclosed in the KW4M.



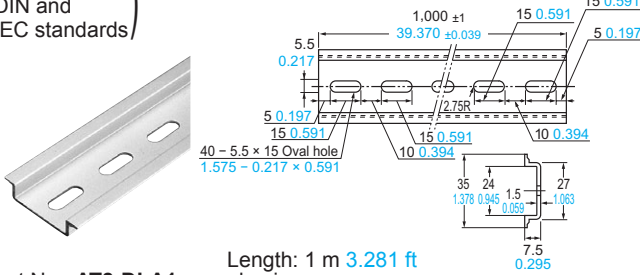
Part No.: **AT8-DA4**

- Mounting frame: Applicable for KW1M and KW1M-H
*Sold separately



Part No.: **AKW1822**

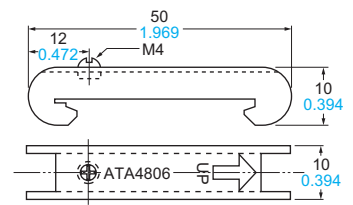
- Mounting rails: Applicable for KW4M Pin type (AKW5211, AKW5212), (Applicable for KW7M and KW1M / -H / -R (IEC standards))



Part No.: **AT8-DLA1**

Length: 1 m **3.281 ft** aluminum

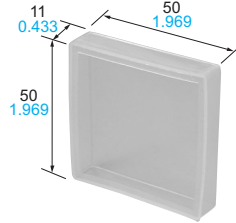
- Fastening plate



Part No.: **ATA4806**

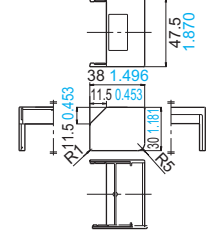
*For holding DIN rails

- Protective cover for DIN 48 size (Flexible type): Applicable for KW4M



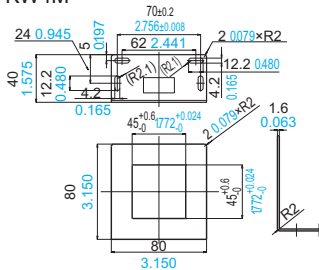
Part No.: **AQM4803**

- Terminal protective cover: Applicable for screw terminal type KW4M(AKW5111 and AKW5112)



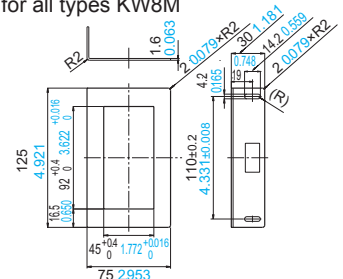
Part No.: **AKW4823**

- Mounting frame: Applicable for KW4M



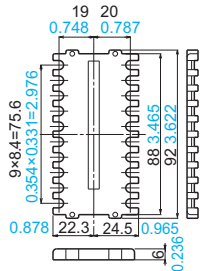
Part No.: **AKW4822**

- Mounting frame: Applicable for all types KW8M



Part No.: **AKW8822**

- Terminal cover: Applicable for all types KW8M



Part No.: **AKT8801**

- Backup battery: Applicable for high performance type KW8M (AKW8111H) only



Part No.: **AFC8801**

*Packaged with the main unit

- Screwdriver for terminal socket: Applicable for KW7M



Part No.: **AFP0806**

- Backup battery: Applicable for KW1M-H and KW1M-R (Master)



Part No.: **AFPG804**

*Packaged with the main unit (AKW1000, AKW1000K, AKW1121)

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Eco-Power Meters

Communication Devices

Measurement Systems

Options

DEDICATED CURRENT TRANSFORMER (CT)



Part No.: **AKW4801C**



Part No.: **AKW4802C**



Part No.: **AKW4803C**



Part No.: **AKW4804C**

Product type (Dedicated CT cannot be used with AKW8115.)

Primary side rated current	Part No.
5 A / 50 A (common)	AKW4801C
100 A	AKW4802C
250 A	AKW4803C
400 A	AKW4804C

Note: For except AKW8115, please order in accordance with the type of power distribution system you will be measuring. (Even if you will be using a secondary 5 A CT, you will need an AKW4801C.)

Specifications

Item	Part No.	AKW4801C	AKW4802C	AKW4803C	AKW4804C
Primary side rated current		5 A / 50 A	100 A	250 A	400 A
Secondary side rated current		1.67 mA / 16.7 mA	33.3 mA	125 mA	200 mA
Winding (Turn)		3,000	3,000	2,000	2,000
Ratio error		±2.0 % F.S.			
Hole Dia (mm)		ø10	ø16	ø24	ø36
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)		
Insulation resistance (initial)		Min. 100 MΩ (at 500 V DC) (Between through hole and output lead wire)			
Functional vibration resistance		10 to 55 Hz (1 cycle / minute) single amplitude of 0.15 mm 0.0059 in (10 min. on X, Y and Z axes)			
Destructive vibration resistance		10 to 55 Hz (1 cycle / minute) single amplitude of 0.375 mm 0.0148 in (1 hrs. on X, Y and Z axes)			
Functional shock resistance		Min. 98 m 322 ft /s ² (4 times on X, Y and Z axes)			
Destructive shock resistance		Min. 294 m 965 ft /s ² (5 times on X, Y and Z axes)			
Output protection level		±7.5 V with clamp element		±3.0 V with clamp element	
Permissible clamping frequency		Approx. 100 times			
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 non-condensing)			
Weight		60g approx. (Trunk cable included)	90g approx. (Trunk cable included)	215g approx. (Trunk cable included)	315g approx. (Trunk cable included)

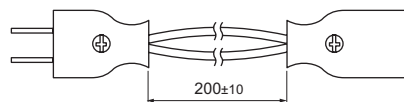
- Notes: 1) Dedicated current transformers (CT), AKW4801C, AKW4802C, AKW4803C, AKW4804C, are dedicated for low voltage under 440 V system. They can not be used for high voltage circuit.
- 2) In each type of Eco-POWER METER excluding AKW8115, a combination of commercially secondary side 5 A CTs and dedicated CTs for 5 A (AKW4801C) is used for measuring high-voltage circuits; therefore, AKW4801C is definitely necessary. For details, confirm with each respective user's manual.
- 3) Since dedicated CTs (AKW48***) cannot be used when measuring with AKW8115, please be careful and do not purchase a dedicated CT by mistake.
- 4) For AKW8115 current transformer (CT), current transformers manufactured by U.R.D. Co., Ltd. (clamp-on type CT CTL-CL series) are recommended. Please confirm the specification beforehand.
- 5) Dedicated current transformers (CT) are not included with Eco-POWER METERS.
- 6) Each dedicated current transformer (CT) includes a 1 m **3.281 ft** trunk cable, respectively.

• Trunk cable



Product name		Part No.
Trunk cable for CT [Option of Eco-POWER METER dedicated current transformer (CT)]	3 m 9.843 ft	AKW4703
	5 m 16.405 ft	AKW4705
	10 m 32.81 ft (special order)	AKW4710

• Intermediate power cable



Product name	Part No.
Intermediate power cable	AKE2811

Note: We recommend using an intermediate power cable when attaching the dedicated CT to a non-"Y" split power cable.

OPTIONS

<p>●RS232C cable: for KR20 and KW1M-R Eco-POWER METER (Master)</p>  <p>Part No.: AKR1801</p>	<p>●Power supply cable for FPΣ: for KR20 and KS1</p>  <p>Part No.: AFPG805 *Included with product</p>
<p>●Screwdriver for terminal block: for KS1 and Data Logger Light</p>  <p>Part No.: AFP0806</p>	<p>●Standard antenna: for KR20 * You cannot use KW1M-R.</p>  <p>Part No.: AKR2802</p>
<p>●Antenna with cable: for KR20 * You cannot use KW1M-R.</p>  <p>Part No.: AKR2803</p>	<p>●Antenna extension cable: for KR20 * You cannot use KW1M-R.</p>  <p>Part No.: AKR2804</p>
<p>●Battery for FPΣ: for Web Datalogger Unit and Data Logger Light</p>  <p>Part No.: AFPG804</p>	<p>●Power supply unit for FP0: for KR20, KS1 and Web Datalogger Unit</p>  <p>Part No.: AFPG634 * Input voltage: 100 to 240 V AC Output capacity: 24 V DC, 0.7 A</p>
<p>●Communication cassettes: for Web Datalogger Unit</p>  <p>RS232C × 1 ch Part No.: AFPG801 RS232C × 2 ch Part No.: AFPG802 RS485 (isolated) × 1 ch Part No.: AFPG803 RS232C × 1 ch RS485 (isolated) × 1 ch Part No.: AFPG806</p>	
<p>●Slim 30 type Mounting plate for FP0: for Data Logger Light</p>  <p>Part No.: AFP0811</p>	<p>●Flat type Mounting plate for FP0: for Data Logger Light</p>  <p>Part No.: AFP0804</p>

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