

NEW

Multi-circuit Smart  
Power Monitor

# KM1

New Ways to Uncover Power Savings  
Measure Multiple Distribution  
Panels at the Same Time



Visualize, Monitor, and Analyze  
Your Energy Usage

# Greater Visualization Enables More Energy Savings

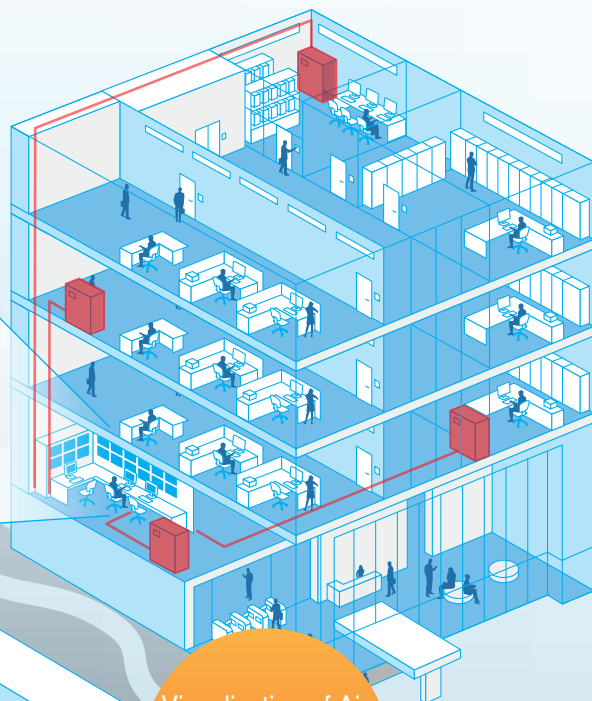
The key to saving energy lies in knowing the breakdown of electric power.

As we enter times of even greater power shortages, overall monitoring of electric power alone starts to lose its effectiveness. The key to finding hidden wastes of electric power is to enhance the visibility of power consumption at the distribution panel breaker level. The KM1 can help you determine when, where, and how much electric power is being used to help reduce unnecessary power consumption.

Visualization of Power Consumption at the Floor and Distribution Panel Levels



Office buildings, large commercial facilities (building and energy management systems), etc.



Visualization of Air Conditioning, Lighting, and Other Equipment



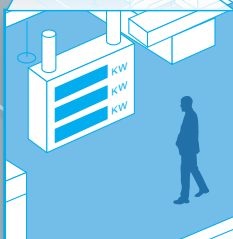
Office floors (factory energy management system), etc.

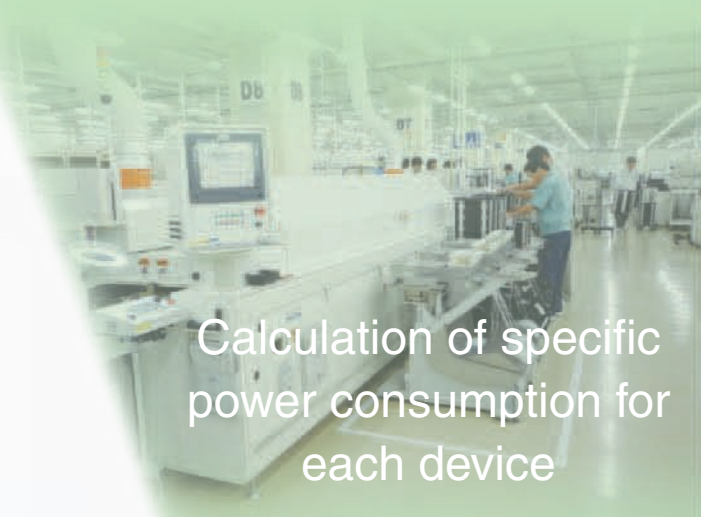


Visualization by Device




Factory production lines (factory energy management systems), etc.





Calculation of specific  
power consumption for  
each device



Measurement of  
electric power at  
the breaker level

OMRON's KM1 platform enables the visualization of power consumption for all distribution panels as a cohesive group.

Measure two  
systems with a  
single Power  
Monitor

Measurements that  
give you a little more.

Save space and reduce wiring work

Measure up to 36 circuits.

Simple installation



Add Units as Needed for Any Application

Multi-circuit Smart  
Power Monitor

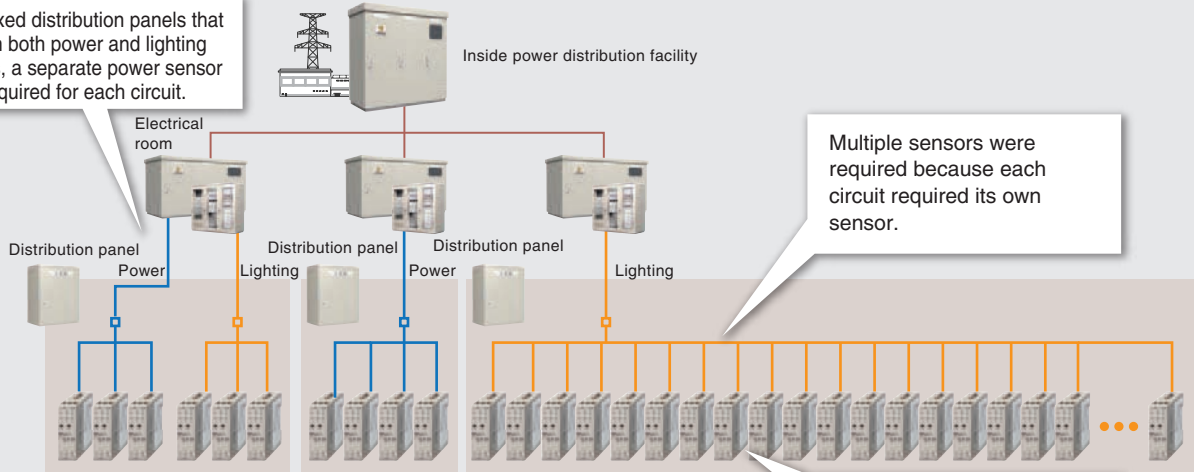
**KM1**

# The KM1 platform solves the work and cost issues to visualize

## Previous Problems

Previously, measuring electric power for multiple circuits or systems required costly and difficult-to-install power sensors.

For mixed distribution panels that contain both power and lighting circuits, a separate power sensor was required for each circuit.



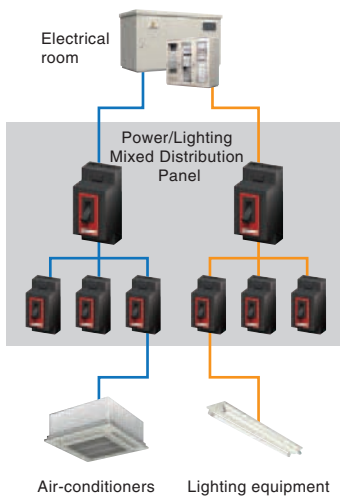
Measuring multiple circuits requires difficult installation and results in high costs.

## Simple and Smart: The KM1 Platform

### Dual System Monitoring

#### Industry-first Dual System Monitoring

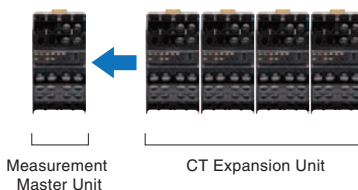
A single KM1 can perform measurements for mixed distribution panels with circuits for both air-conditioners and lighting equipment.



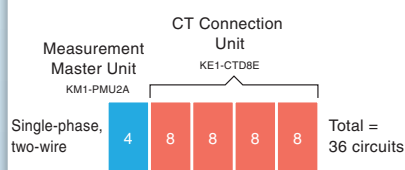
### Measure up to 36 circuits.

#### Add CT Expansion Units for More Measurements

One Measurement Master Unit accepts up to 4 CT inputs, and a CT Expansion Unit accepts up to 8 CT inputs. (Up to four CT Expansion Units can be added.) This enables the measurement of up to 36 single-phase two-wire circuits.



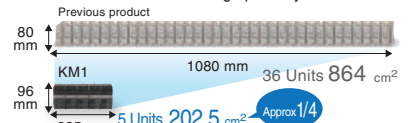
#### Single-phase, two-wire



### Space-efficient Design and Reduced Wiring

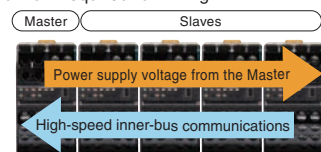
#### Mounting Space Reduced to 1/4 That of Previous Models

With the KM1, all you need is five Power Monitors. You can reduce the mounting space by 76%.



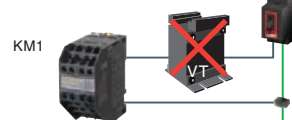
#### Linked design eliminates the need for voltage and communications wiring.

The elimination of communications and power line crossovers results in less time and work required for wiring.



#### Direct Measurement of 480 V without a VT

No VT equipment is required, even for 480 V measurements.



# power consumption across all distribution panels.

## With the KM1...

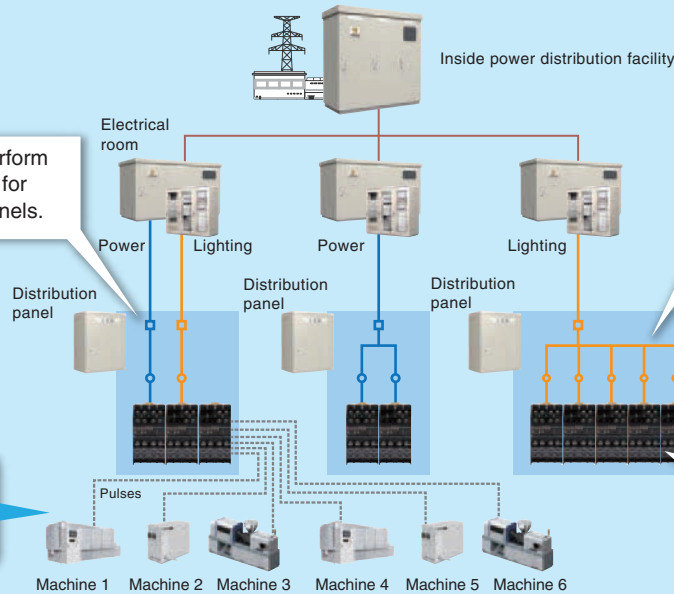
The KM1 solves both the time and cost issues even for multiple circuits and systems.

A single KM1 can perform measurements even for mixed distribution panels.

A single KM1 can perform measurements for up to 36 circuits in a distribution panel.

The KM1 accepts up to 7 pulse inputs. The KM1 can also collect production information.

The KM1 Power Monitors are linked so voltage and communication wiring is not required.

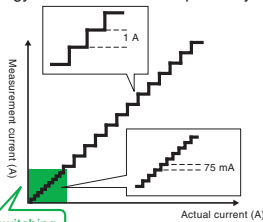


The KM1 provides a simple and smart solution to the issues encountered with traditional power sensors.

## High-precision Measurements

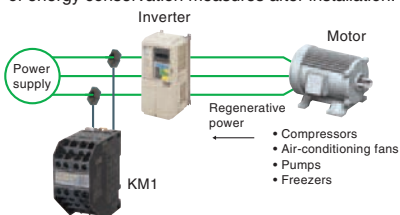
### High-precision Micropower Measurements

The KM1 performs high-precision measurement even below 5% of the rated current. Even standby energy can be measured dependably.



### Primary-side Inverter Support

The KM1 can provide accurate measurements without any current waveform distortion even after an inverter is installed. Measurement accuracy:  $\pm 2\%$  FS This enables measuring the effectiveness of energy conservation measures after installation.

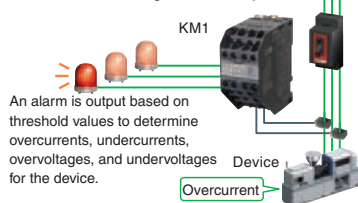


## Additional Measurements to Aid in Energy Conservation

### Visualization to Help Maintenance

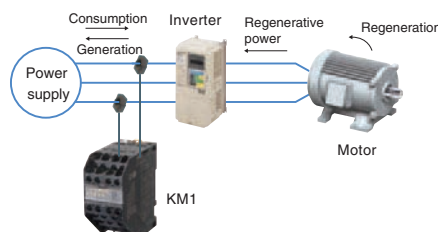
With the wide range of output capabilities on the KM1, you can see exactly when you should perform maintenance.

- Overcurrent, Undercurrent, Overvoltage, and Undervoltage Alarm Output



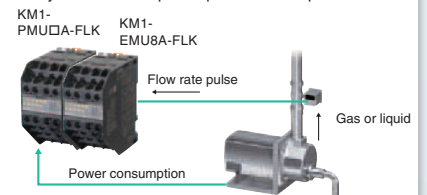
### Visualization of Power Generation Effectiveness

The effectiveness of power generation can be visualized by measuring the power consumption and regenerative power together at the same time.



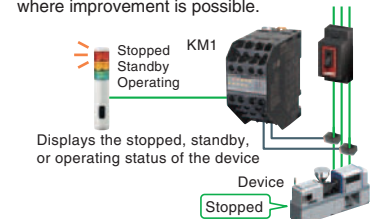
### Visualization of Specific Power Consumption through Pulse/Temperature Input Units

Use pulse inputs to measure production information at the same time, including flow rates, throughput, temperature inputs, and more. When this information is combined with other electric power data, you can easily visualize the specific power consumption.



### Energy Classification

The total power consumption and total time can be divided up between the three states of stopped, standby, and operating based on the power consumption value and pulse input. Classifying energy helps to clearly identify areas where improvement is possible.



\* This function is supported only by the KM1-PMU8A-FLK.

# Connect up to 4 Slave Units to a Master Unit for a maximum of 36 measurement points per set.

- A single Measurement Master Unit can measure two systems.
- Measure up to 36 circuits with CT Expansion Units.
- Simultaneous measurement of production information with extra measurements via a Pulse/Temperature Input Unit.



Measurement Master Unit (One)

Slave Units (4 Max.)

Communications Unit (One)

Dual System Measurement Unit\*  
KM1-PMU2A-FLK

CT Expansion Unit  
KE1-CTD8E

Pulse/Temperature Input Unit  
KM1-EMU8A-FLK

DeviceNet Communications Unit  
KE1-DRT-FLK

**Power Measurement Master Unit**  
Measurement of Multiple Circuits Across Two Different Systems

**Features:** Dual system measurement of rated input voltage (a combination of two of the following types: single-phase, two-wire; single-phase, three-wire; or three-phase, three-wire)

**Maximum number of CT connections:** 4 (two different types of selectable CTs)

**Output:** Three transistor outputs (measurement value alarm output, three-state output, or total power consumption pulse output)

**Measurement/logging functions:** Voltage, current, active power, reactive power, total power consumption, power factor, and frequency

**Other functions:** Three-state energy classification, total power consumption conversion (CO2/currency), simple measurement, 480 V input without a VT

\* Use the KM1-PMU1A-FLK Single-system Measurement Unit for three-phase, four-wire configurations.

**8 CT Connections per Unit**  
Maximum of 32 CT Connections with 4 Units

**Features:** Connect up to 4 Units to the Master Unit (Cannot be used as a standalone device.)  
No rated input voltage; phase wiring method is the same as the Master Unit.

**Maximum number of CT connections:** 8 (two different types of selectable CTs)

**Output:** One relay contact output (for alarm output)

**Measurement functions:** Current, active power, reactive power, total power consumption, and power factor

**Power Measurements and More**  
Measure Throughput and Temperatures

**Features:** Connect up to 4 Units to the Master Unit (Cannot be used as a standalone devices.)

**Event inputs:** Seven pulse inputs (You can use event inputs to switch between pulse input counts (e.g., throughput), pulse conversion (e.g., flow rates), calculation of power consumption per pulse, pulse input ON time (e.g., operating time), and three-state energy function.)

**Temperature input:** One (thermistor input, abnormal temperature detection)

**Measurement/logging functions:** Pulse count, pulse input ON time, and temperature

**Efficiently Transfer Large Amounts of Data**  
DeviceNet Communications Unit

**Features:** Manage multiple KM1 Power Monitors from a single host (PLC or PC).  
Connect up to five KM1 Power Monitors to a single DeviceNet Communications Unit.

**Communications functions:** Remote I/O communications, explicit message communications, configuration and monitoring of KM1 Power Monitors, and automatic detection of baud rates

## Unit Configurations and the Number of Measurable Circuits

The maximum numbers of circuits that can be measured with the KM1-PMU2A-FLK Measurement Master Unit are as follows:

### Single System Voltage Input from One System to a Measurement Master Unit

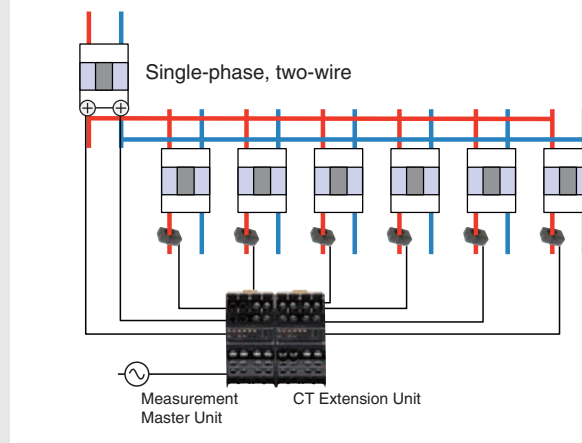
#### ● Maximum Circuit Configuration

Unit Configuration  
 KM1-PMU2A-FLK  
 Measurement Master Unit (Four CTs)  
 + KE1-CTD8E  
 CT Expansion Unit (8 CTs)

	PMU2A	CTD8E				Total
Single-phase, two-wire	4	8	8	8	8	= 36 circuits
Single-phase, three-wire	2	4	4	4	4	= 18 circuits
Three-phase, three-wire	2	4	4	4	4	= 18 circuits
Not: Use the KM1-PMU1A-FLK (three CTs) Single-system Master Unit for three-phase, four-wire configurations.						
Three-phase, four-wire	1	2	2	2	2	= 9 circuits

#### ● Connection Example

Distribution Panel for Lighting (Single-phase, Two-wire)  
 Measurement of Six Lights



### Dual System Voltage Inputs from Two Systems to a Measurement Master Unit

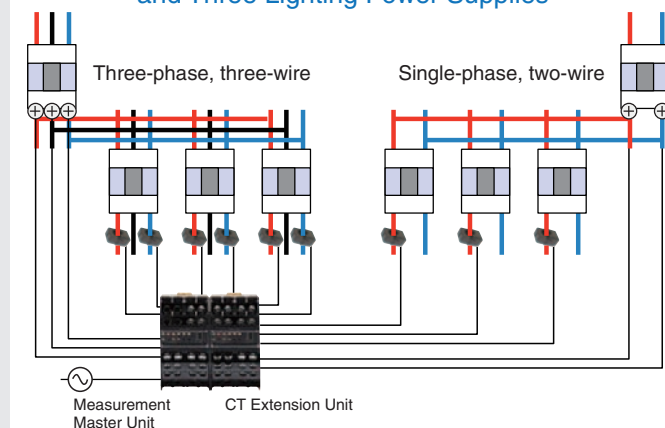
#### ● Maximum Circuit Configuration

Unit Configuration  
 KM1-PMU2A-FLK  
 Measurement Master Unit (Four CTs)  
 + KE1-CTD8E  
 CT Expansion Unit (8 CTs)

	PMU2A	CTD8E				Total
Single-phase, two-wire	2	4	4	4	4	= 18 circuits
Three-phase, three-wire	1	2	2	2	2	= 9 circuits
Single-phase, three-wire	1	2	2	2	2	= 9 circuits
Three-phase, three-wire	1	2	2	2	2	= 9 circuits

#### ● Connection Example

Mixed Distribution Panel for Lighting and Operation (Three-phase, Three-wire or Single-phase, Two-wire)  
 Measurement of Three Operational Power Supplies and Three Lighting Power Supplies



# Free Software Provides Support for Everything from Setup to the Collection and Analysis of Measurement Data

## Setup

Connect the KM1 to a PC with a USB cable to easily set up the KM1.

### Free Configuration Tool (KM1/KE1-Setting)

- USB-powered, so there is no need to supply additional power to the KM1.
- Simple setting of the parameters that are required for setup.



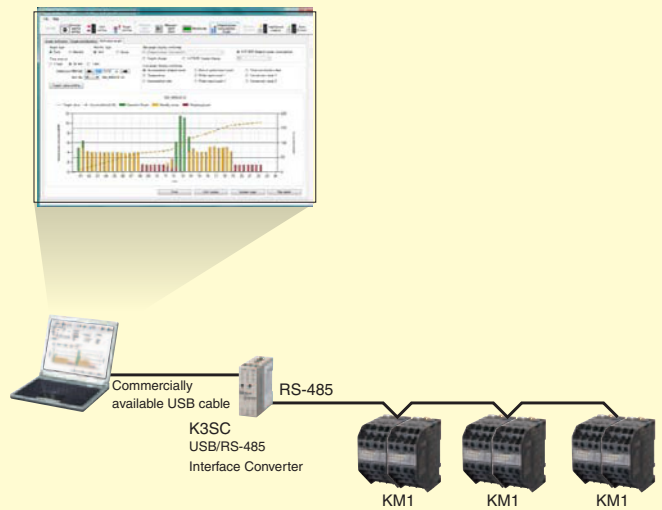
## Perform Evaluation and Verification

Data can be collected directly on a computer for evaluation and verification.

### Free Data Collection Software: Easy KM-Manager V3

Release date: October 2012

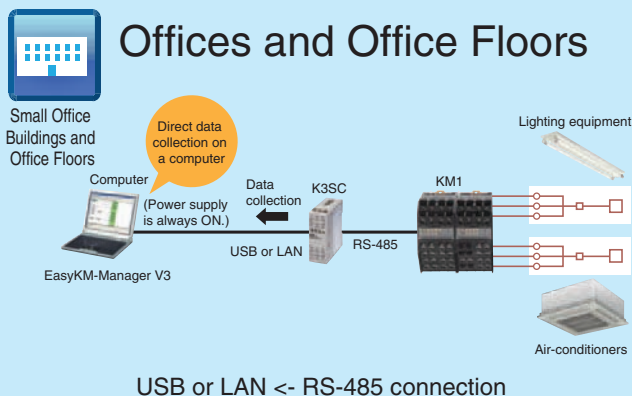
- Displays and trend analysis of instantaneous values
- Graphs of Integral power consumption and other data



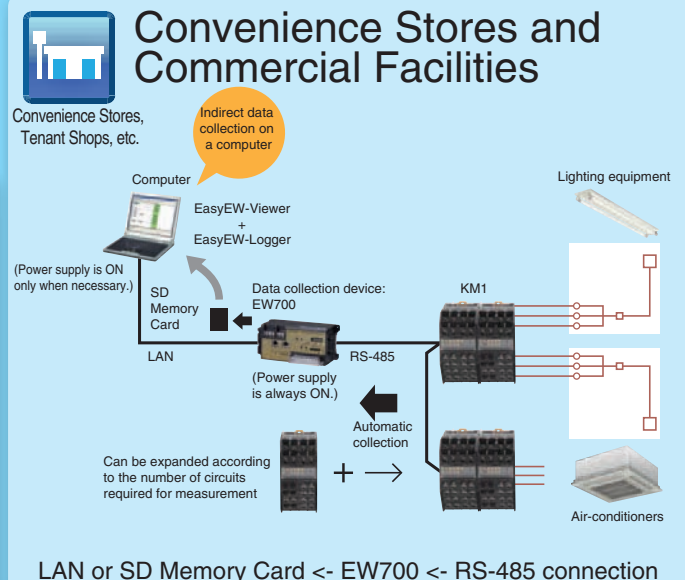
## Application Examples

Highly configurable for any scale, from data collection directly from a computer to batch data collection with the EW700.

### Offices and Office Floors



### Convenience Stores and Commercial Facilities





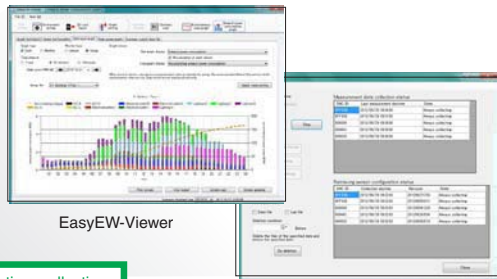
# Data Collection and Display Analysis

Perform advanced automatic data collection through a data collection device.

Free Automatic Data Collection Software (Easy EW-Logger)  
Free Graph Display Software (Easy EW-Viewer)

- Displays and trend analysis of instantaneous values
- Graphs of total power consumption and other data

Release date: July 2012

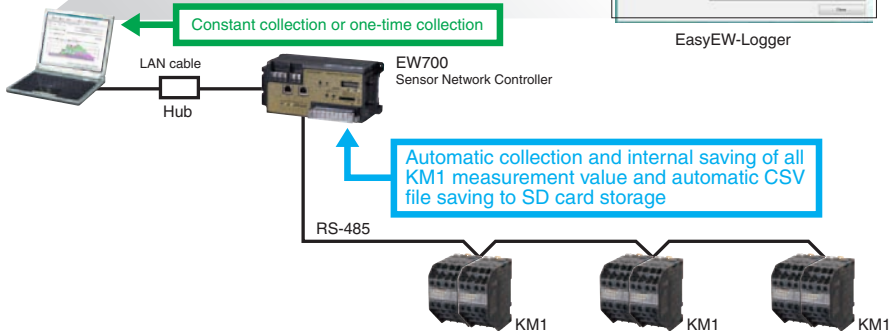


EasyEW-Viewer

EasyEW-Logger

Constant collection or one-time collection

Automatic collection and internal saving of all KM1 measurement value and automatic CSV file saving to SD card storage



**Energy-saving Analysis Support Software**  
**Dr. ECO**

Release date: October 2012

Freely manipulate and analyze collected data to help you find out exactly where energy is being wasted.

Simple operation using only a mouse

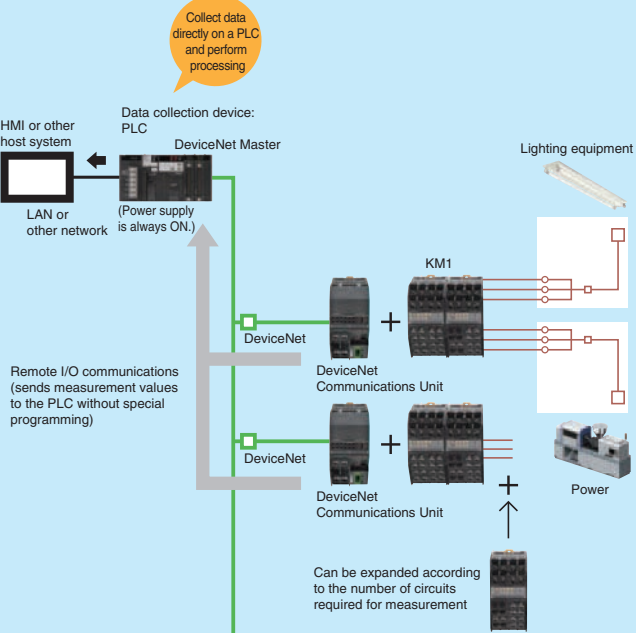
This software must be purchased separately. Refer to the product catalog for details. (Cat. No.: N169)

## Large-scale Systems

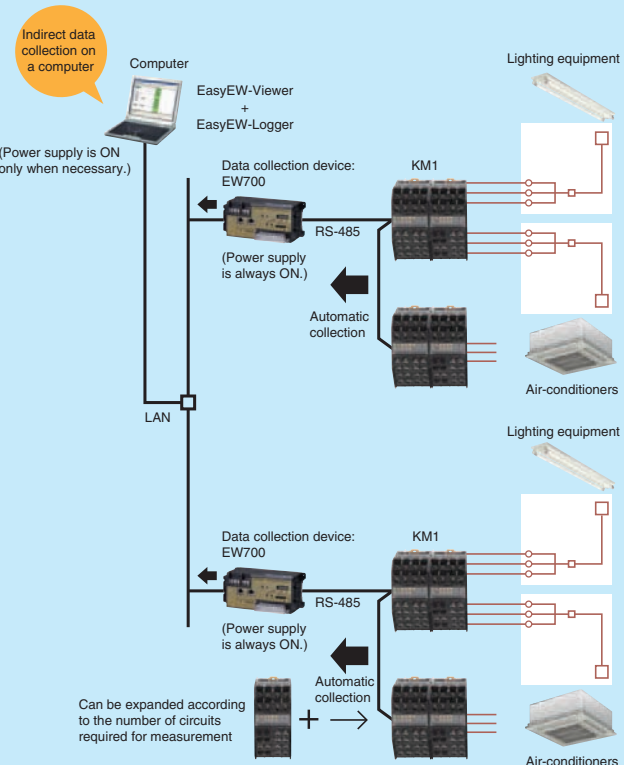
Manufacturing Facilities  
Buildings, Offices, etc.

### Factories and Production Lines

Manufacturing Facilities






LAN -> PLC -> DeviceNet connection



LAN -> EW700 -> RS-485

# KM-series Power Monitor Models

Item	Series name	KM1 Series			KM50 Series		KM20 Series	
	Types	Low-cost, reduced wiring, space-saving, versatile multi-circuit measurement			Intelligent on-panel type		Stationary or embedded type	
	Model	KM1-PMU□A-FLK	KE1-CTD8E	KM1-EMU8A-FLK	KM50-C1-FLK	KM50-E1-FLK	KM20-B40-FLK	KM20-B40
	Product name	Multi-circuit Smart Power Monitor			48 x 48 Smart Power Monitor	48 x 96 Smart Power Monitor	Compact power sensor with RS-485 communications	Compact power sensor with pulse output
External appearance								
Features	<ul style="list-style-type: none"> <li>Inherits the features of the KM50-E.</li> <li>Input of two systems with different voltages (PMU2A)</li> <li>Maximum number of measured circuits</li> <li>Single-phase, two-wire: 4 circuits (PMU2A)</li> <li>Single-phase, three-wire/ Three-phase, three-wire: 2 circuits (PMU2A)</li> <li>Three-phase, four-wire: 1 circuit (PMU1A)</li> <li>Up to four Slave Units can be added</li> </ul>	<ul style="list-style-type: none"> <li>Maximum number of measured circuits per Unit</li> <li>Single-phase, two-wire: 8 circuits</li> <li>Single-phase, three-wire: 4 circuits</li> <li>Three-phase, three-wire: 4 circuits</li> <li>Three-phase, four-wire: 2 circuits</li> </ul>	<ul style="list-style-type: none"> <li>Seven event inputs</li> <li>One temperature input</li> </ul>	<ul style="list-style-type: none"> <li>Primary-side Inverter measurement supported.</li> <li>Pulse input ON time measurement</li> <li>Specific power consumption management</li> </ul>	<ul style="list-style-type: none"> <li>Primary-side inverter measurement supported.</li> <li>Three-state energy classification</li> <li>Pulse input ON time measurement</li> <li>Specific power consumption management</li> <li>400-V direct measurement</li> </ul>	<ul style="list-style-type: none"> <li>Simple and easy to use</li> <li>Affordable</li> <li>Easy initial setup with switches only</li> </ul>		
Installation	DIN Track			Front panel or DIN Track mounting bracket (sold separately)		DIN Track		
Numeric display	None			Eleven-segment LEDs	Eleven-segment LEDs	None	None	
Dimensions (mm)	45 x 96 x 90 (WxHxD) (maximum width of 45 x 5 when five Units are linked together)			DIN 48 x 48 Depth: 91 (Including terminal cover)	DIN 48 x 96 Depth: 88 (Including terminal cover)	W30xH80xD78	W30xH80xD78	
Applicable phase wiring method	Single-phase, two-wire	OK	OK	-	OK	OK	OK	OK
	Single-phase, three-wire	OK	OK	-	OK	OK	OK	OK
	Three-phase, three-wire	OK	OK	-	OK	OK	OK	OK
	Three-phase, four-wire	PMU1A only	OK	-	-	OK	-	-
	400-V direct measurement	OK	-	-	(A VT is required.)	OK	(A VT is required.)	(A VT is required.)
Power Monitor power supply	100 to 240 VAC	Provided from the Master Unit	100 to 240 VAC	Same as measured circuits 100 to 240 VAC (common)	100 to 240 VAC	Same as measured circuits 100 to 240 VAC (common)		
Measured items	Total power consumption	OK	OK	-	OK	OK	OK	OK
	Active power	OK	OK	-	OK	OK	OK	-
	Reactive power	OK	OK	-	OK	OK	-	-
	Current	OK	OK	-	OK	OK	OK (R and T phases)	-
	Voltage	OK	-	-	OK	OK	OK (R and T phases)	-
	Power factor	OK	OK	-	OK	OK	OK	-
	Frequency	OK	-	-	OK	OK	OK	-
	Pulse count	-	-	OK (Can be changed with event input.)	OK (Can be changed with event input.)	OK (Can be changed with event input.)	-	-
	Pulse Input ON Time	-	-	OK (Can be changed with event input.)	OK (Can be changed with event input.)	OK (Can be changed with event input.)	-	-
	Specific power consumption	OK (Can be changed with event input.)	-	-	OK (Can be changed with event input.)	OK (Can be changed with event input.)	-	-
Temperature	-	-	OK	OK	OK	-	-	
Functions	Three-state energy classification	OK	-	-	-	OK	-	-
	Simple power measurement (measures only the value of the input current)	OK	OK	-	OK	OK	-	-
	Micropower Measurements Mode (automatic range switching)	OK	OK	-	OK	OK	-	-
	Display of CO <sub>2</sub> emission	-	-	-	OK	OK	-	-
	Display of regenerative power	-	-	-	OK	OK	-	-
Outputs	Total power consumption pulse output	OK	-	-	OK	OK	-	OK
	Alarm output for measured items	OK	OK	Temperature alarms only	OK	OK	-	-
	Three-state (operating power, standby power, stopped power) status output	OK	-	-	-	OK	-	-
External interface	LAN port	-	-	-	-	-	-	-
	ComWay/RS-485 Communications (connections for up to 31 nodes)	OK	-	OK	OK	OK	OK	-
	Modbus RS-485 Communications (connections for up to 99 nodes)	OK	-	OK	OK	OK	-	-
Data logging	Logging to Power Monitor internal memory	OK	-	OK	OK	OK	-	-
	Logging to external memory	-	-	-	-	-	-	-
Applicable standards	CE, S, KC, and TÜV mark			UL, CE, S, and KC mark		-	-	

## Ordering Information

### Smart Power Monitors

Model	Unit type	Unit category	Power supply voltage	Communications
KM1-PMU2A-FLK	Dual Power System Measurement Unit	Measurement master	100 to 240 VAC	RS-485
KM1-PMU1A-FLK	Power Measurement Unit			
KM1-EMU8A-FLK	Pulse/Temperature Input Unit	Function slave		
KE1-CTD8E	CT Extension Unit	CT extension slave	Power supplied from the Measurement Master Unit	–
KE1-DRT-FLK	DeviceNet Communications Unit	Communications slave	100 to 240 VAC	RS-485 or DeviceNet

### Options (Order Separately)

#### Separate or In-panel Current Transformer (CT)

Model	Rated primary current	Rated secondary current	Installation
KM20-CTF-5A	5 A	Special output	Installed separately
KM20-CTF-50A	50 A		
KM20-CTF-100A	100 A		
KM20-CTF-200A	200 A		
KM20-CTF-400A	400 A		
KM20-CTF-600A	600 A		
KM20-CTB-5A/50A	5 A/50 A		In-panel (penetration type)

Note: CT Cables are not included with the CTs.

#### Current Transformer (CT) Cable

Model	Specification
KM20-CTF-CB3	3-m cable

Note: Use the CT Cable specified by OMRON or one manufactured by JST Mfg. Co.  
You can also use a 1.25-B3A crimping terminal or AWG22 power cable.

### Related Devices (Sold Separately)

#### When Connected to a Computer

#### Communications Interface Converter

Model	Dimensions (mm)	Communications conversion	Power supply voltage
K3SC-10 AC100-240	30 × 80 × 78 (W×H×D)	RS-232C, USB <-> Half-duplex RS-485	100 to 240 VAC
K3SC-10 AC/DC24			24 VAC/DC

# Ratings

Item	Model	Master Unit		Slave Unit		
		KM1-PMU2A-FLK (Dual Power Systems)	KM1-PMU1A-FLK (Single Power System)	KM1-EMU8A-FLK (Pulses/Temperatures)	KE1-CTD8E (CT Extension Unit)	
Applicable phase wiring method		Single-phase two-wire, single-phase three-wire, and three-phase three-wire	Single-phase two-wire, single-phase three-wire, three-phase three-wire, and three-phase four-wire	–	Single-phase two-wire, single-phase three-wire, three-phase three-wire, and three-phase four-wire	
Maximum number of CT connections		4	3	–	8	
Selectable types of CT capacities		2 types	1 type	–	Two types per Slave Unit	
Power supply	Rated power supply voltage	100 to 240 VAC, 50/60 Hz			–	
	Allowable supply voltage range	85% to 110% of rated power supply voltage			–	
	Power supply allowable frequency range	45 to 65 Hz			–	
	Power consumption	Standalone: 10 VA max., Maximum expansion: 14 VA max.		10 VA max.	–	
Input	Rated input voltage	100 to 480 VAC (single-phase, 2-wire): Line voltage 100/200 VAC (single-phase, 3-wire): Phase voltage/line voltage 100 to 480 VAC (3-phase, 3-wire): Line voltage	100 to 480 VAC (single-phase, 2-wire): Line voltage 100/200 VAC (single-phase, 3-wire): Phase voltage/line voltage 100 to 480 VAC (3-phase, 3-wire): Line voltage 58 to 277 VAC (3-phase, 4-wire): Phase voltage	–	–	
	Rated input current (CT)	(5, 50, 100, 200, 400, or 600 A)		–	(5, 50, 100, 200, 400, or 600 A)	
	Rated input power	With 5-A CT: 4 kW With 50-A CT: 40 kW With 100-A CT: 80 kW With 200-A CT: 160 kW With 400-A CT: 320 kW With 600-A CT: 480 kW		–	–	
	Rated input frequency	50/60 Hz			–	
	Allowable input frequency range	45 to 65 Hz			–	
	Allowable input voltage	110% of rated input voltage (continuous)			–	
	Allowable input current	120% of rated input current (continuous)		–	120% of rated input current (continuous)	
	Rated input load	Voltage input: 0.5 VA max. (excluding power supply) Current input: 0.5 VA max. (for each input)		–	Current input: 0.5 VA max. (for each input)	
	Clock	Clock setting	2012 to 2099 (Adjusted for leap years during this period.)			–
		Clock accuracy	±1.5 min./month (at 23° C)			–
Clock backup period		Seven-day backup with an electric double-layer capacitor (after being powered for at least 24 hours and when at 23° C when the power is turned OFF)			–	
Ambient operating temperature	–10 to 55°C (with no condensation or icing)					
Storage humidity	–25 to 65°C (with no condensation or icing)					
Ambient operating humidity	25% to 85%					
Storage humidity	25% to 85%					
Altitude	2,000 m max.					
Installation environment	Overvoltage category II, pollution degree 2, measurement category II					
Compliant standards	EN/IEC 61010-2-030 and EN/IEC 31626-1 Industrial electromagnetic environment					

# Performance

Item	Model	Master Unit		Slave Unit	
		KM1-PMU2A-FLK (Dual Power Systems)	KM1-PMU1A-FLK (Single Power System)	KM1-EMU8A-FLK (Pulses/Temperatures)	KE1-CTD8E (CT Extension Unit)
Accuracy <sup>1</sup>	Voltage	±1.0% FS, ±1 digit; or, ±2.0% FS, ±1 digit for voltage across Vtr under the same conditions		–	–
	Current	±1.0% FS, ±1 digit However, the accuracy is ±2.0% FS, ±1 digit for the phase-S current for a three-phase, three-wire circuit and the phase-N current for a single-phase, three-wire circuit under the same conditions.		–	±1.0% FS, ±1 digit However, the accuracy is ±2.0% FS, ±1 digit for the phase-S current for a three-phase, three-wire circuit and the phase-N current for a single-phase, three-wire circuit under the same conditions.
	Power (active power and reactive power)	Active power and reactive power ±2.0% FS, ±1 digit (Power factor = 1)		–	Active power and reactive power ±2.0% FS, ±1 digit (Power factor = 1)
	Frequency	±0.3 Hz ±1 digit			–
	Power factor <sup>2</sup>	±5.0% FS at an ambient temperature of 23° C, rated input, rated frequency, and a power factor of 0.5 to 1 to 0.5		–	±5.0% FS at an ambient temperature of 23° C, rated input, rated frequency, and a power factor of 0.5 to 1 to 0.5
	Temperature	–		±5°C two hours after the power supply is turned ON (after performing any adjustments for the ambient temperature)	–
Temperature influence	±1.0% FS (percentage of the measurement value at an ambient temperature of 23° C, rated input, rated frequency, and a power factor of 1 in the operating temperature range)		±1.0% FS (percentage of the measurement value at an ambient temperature of 23° C in the operating temperature range)	±1.0% FS (percentage of the measurement value at an ambient temperature of 23° C, rated input, rated frequency, and a power factor of 1 in the operating temperature range)	
Influence of frequency	±1.0% FS (percentage of the measurement value at an ambient temperature of 23° C, rated input, rated frequency, and a power factor of 1 in the rated frequency ±5 Hz range)		–	±1.0% FS (percentage of the measurement value at an ambient temperature of 23° C, rated input, rated frequency, and a power factor of 1 in the rated frequency ±5 Hz range)	
Influence of harmonics	±0.5% FS (at ambient temperature of 23°C, error for superimposed 2nd, 3rd, 5th, 7th, 9th, 11th, and 13th harmonics for a content percentage of 30% for current and 5% for voltage of the basic wave)		–	±0.5% FS (at ambient temperature of 23°C, error for superimposed 2nd, 3rd, 5th, 7th, 9th, 11th, and 13th harmonics for a content percentage of 30% for current and 5% for voltage of the basic wave)	

## Performance

Item	Model	Master Unit		Slave Unit	
		KM1-PMU2A-FLK (Dual Power Systems)	KM1-PMU1A-FLK (Single Power System)	KM1-EMU8A-FLK (Pulses/Temperatures)	KE1-CTD8E (CT Extension Unit)
Low-cut current set value		0.1% to 19.9% of rated input in 0.1% increments		–	0.1% to 19.9% of rated input in 0.1% increments
Sampling cycle		100 ms for measurement voltage at 50 Hz and 83.3 ms for measurement voltage at 60 Hz		100 ms	100 ms for measurement voltage at 50 Hz and 83.3 ms for measurement voltage at 60 Hz
Insulation resistance		Insulation resistance: 20 M (at 500 VDC)			
Dielectric strength		All models: Locations to which 2,000 V was applied for one minute: Between all terminals and case KM1-PMU1A-FLK: Between the power supply terminals and RS-485/USB/transistor output Between the power supply terminals and current/voltage input Between current/voltage input and RS-485/USB/transistor outputs KM1-PMU2A-FLK: Between the power supply terminals and RS-485/USB/transistor outputs Between the power supply terminals and current/voltage input Between current/voltage inputs and RS-485/USB/transistor outputs Between current/voltage input 1 and voltage input 2 KM1-EMU8A-FLK: Between power supply terminals, temperature input, and RS-485/USB/transistor outputs KE1-CTD8E: Between current inputs and USB/relay outputs			
Vibration resistance		Single-amplitude: 0.35 mm, Acceleration: 50 m/s <sup>2</sup> Vibration: 10 to 55 Hz, 10 sweeps of 5 minutes each along 3 axes			
Shock resistance		150 m/s <sup>2</sup> , 3 times each in 6 directions (up/down, left/right, forward/backward)			
Weight		230 g			
Memory backup		No. of writes to non-volatile memory: 1,000,000 times			
Event inputs	Number of inputs	–		7	–
	No-voltage inputs	–		ON current: 15 mA max., ON residual voltage: 8 V max., OFF leakage current: 1.5 mA max.	–
	Voltage input	–		High level: 4.75 to 30 VDC Low level: 0 to 2 VDC Input impedance: Approx. 2 kΩ	–
	Minimum input time	–		5ms	–
Temperature inputs	Thermistor inputs	–		1	–
	Applicable thermistor	–		E52-THE5A Color code (blue): –50 to 50° C Color code (black): 0 to 100° C	–
Combinations		Capable of supporting 7 event inputs and 1 temperature input when linked with the KM1-EMU8A-FLK.		–	
Transistor outputs	Number of outputs	Three open collectors (OUT1, OUT2, OUT3) and common			–
	Output capacity	30 VDC, 30 mA			–
	ON residual voltage	1.2 V max.			–
	OFF leakage current	100 μA max.			–
	Total power consumption pulse output	Outputs one pulse when the power consumption reaches the set pulse output unit (1, 10, 100, 1k, 2k, 5k, 10k, 20k, 50k, 100k W/h).			–
	Alarm output	Outputs an alarm based on the set alarm output threshold.			–
	Recovery method	Automatic recovery only			–
Relay output	Number of outputs	–			One NO contact (OUT1)
	Rated load	–			Resistance load, 125 VAC, 3 A; 30 VDC, 3 A
	Mechanical life expectancy	–			5,000,000 times min.
	Electrical life expectancy	–			200,000 times min. (rated load switching frequency: 1,800 times/h)
	Failure rate P level	–			5 VDC, 10 mA (at a switching frequency of 120 times/min)
	Alarm output	–			Turns output ON or OFF based on the alarm set value.
	Recovery method	–			Automatic recovery only
RS-485	Protocols	Communications protocol setting: CompoWay/F or Modbus			
	Sync method	Start-stop			
	Node number setting	CompoWay/F: 0 to 99, Modbus: 1 to 99 When a switch operation is performed to set the protocol to Modbus when the node number is set to 0, the node number is automatically changed to 1.			
	Baud rate	9,600 bps, 19,200 bps, or 38,400 bps			
	Transmission code	CompoWay/F: ASCII, Modbus: Binary			
	Data length <sup>3</sup>	CompoWay/F: 7 bits, 8 bits; Modbus: 8 bits			
	Stop bits <sup>3</sup>	CompoWay/F: 1 bit or 2 bits; Modbus: 1 bit with priority, 2 bits without priority			
	Parity	Even, odd, or none			
	Maximum transmission distance	500 m			
	Maximum number of nodes	CompoWay/F: 31, Modbus: 99			
Communication items	Refer to the relevant communications specifications manuals.				
USB		USB 1.1 compatible			
Memory retention for power interruptions		Parameter data Total power consumption (Saved to internal memory every 5 minutes.)			
Number of link connector insertions/removals		25 times			

\*1. Based on JISC1111, without special CT error, at ambient temperature of 23° C, rated input, and rated frequency. Applicable to 2nd, 3rd, 5th, 7th, 9th, 11th, and 13th harmonics.

\*2. Power factor formula: Power factor = Active power/Apparent power

$$\text{Apparent power} = \sqrt{(\text{Active power})^2 + (\text{Reactive power})^2}$$

\*3. The set value may change when the protocol is changed to Modbus. Check the set values if you change the DIP switch settings.

# Performance

## Special CTs Current Transformer (CT) Cable

Configuration	Installed separately						In-panel (penetration type)	
Item	Model	KM20-CTF-5A	KM20-CTF-50A	KM20-CTF-100A	KM20-CTF-200A	KM20-CTF-400A	KM20-CTF-600A	KM20-CTB-5A/50A
Rated primary current		5 A	50 A	100 A	200 A	400 A	600 A	5 A/50 A
Rated secondary current		1.67 mA	1.67 mA	33.3 mA	66.7 mA	66.7 mA	66.7 mA	1.67 mA/16.7 mA
Secondary winding		3,000 turns				6,000 turns	9,000 turns	3,000 turns
Applicable frequency	10 Hz to 5 kHz							
Insulation resistance	Between output terminals and case: 50 M $\Omega$ min. (at 500 VDC)							
Dielectric strength	Between output terminals and case: 2,000 VAC for 1 minute							
Protective element	7.5-V clamp element							
Allowable number of connections/disconnections	100 times							
Applicable wire diameter *		7.9 mm max.	9.5 mm max.	14.5 mm max.	24.0 mm max.	35.5 mm max.		8.4 mm max.
Operating temperature and humidity ranges	-20 to 60° C, 85% max. (with no condensation)							
Storage temperature and humidity ranges	-30 to 65° C, 85% max. (with no condensation)							

Note: Operate the Special CTs at a low voltage of 600 V or less.  
\* If you use a flat cable, select the cable based on the dimensions of the CT.

## Current Transformer (CT) Cable

Model	KM20-CTF-CB3
Cable length	3 m

Note: Either use the CT Cable specified by OMRON or use 1.25-B3A crimp terminals and AWG22 wire from J.S.T. Mfg. Co., Ltd.

# Specifications

## DeviceNet Communications Unit (KE1-DRT-FLK)

### • DeviceNet Communications Specifications

Item	Specification																
Communications	<ul style="list-style-type: none"> <li>Remote I/O communications (I/O assignment settings with simple assignment settings or the Configurator)</li> <li>Message communications</li> </ul>																
Connection configuration	Can be a combination of multidrops and T-branching (for both main and branch lines).																
Baud rate	500, 250, or 125 kbps (automatically detected)																
Rated primary current	5 dedicated lines (2 signal lines, 2 power lines, and 1 shield)																
Communications distance	<table border="1"> <thead> <tr> <th>Baud rate</th> <th>Maximum network length</th> <th>Branch line length</th> <th>Total for all branch lines</th> </tr> </thead> <tbody> <tr> <td>500 kbps</td> <td>100 m max. (100 m max.)</td> <td>6 m max.</td> <td>39 m max.</td> </tr> <tr> <td>250 kbps</td> <td>250 m max. (100 m max.)</td> <td>6 m max.</td> <td>78 m max.</td> </tr> <tr> <td>125 kbps</td> <td>500 m max. (100 m max.)</td> <td>6 m max.</td> <td>156 m max.</td> </tr> </tbody> </table>	Baud rate	Maximum network length	Branch line length	Total for all branch lines	500 kbps	100 m max. (100 m max.)	6 m max.	39 m max.	250 kbps	250 m max. (100 m max.)	6 m max.	78 m max.	125 kbps	500 m max. (100 m max.)	6 m max.	156 m max.
	Baud rate	Maximum network length	Branch line length	Total for all branch lines													
	500 kbps	100 m max. (100 m max.)	6 m max.	39 m max.													
	250 kbps	250 m max. (100 m max.)	6 m max.	78 m max.													
125 kbps	500 m max. (100 m max.)	6 m max.	156 m max.														
Numbers in parentheses are the lengths for thin cable.																	

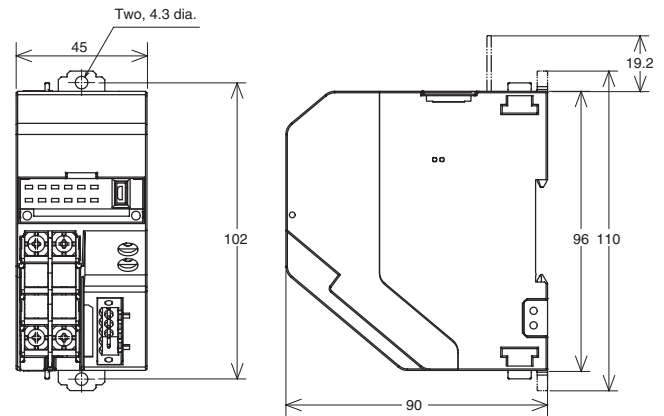
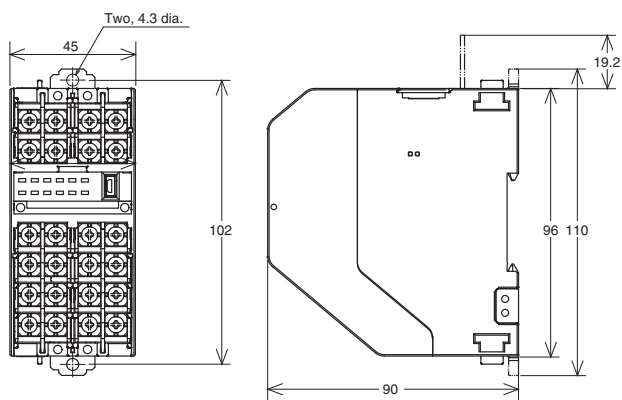
## Dimensions

(Unit: mm)

## Smart Power Monitors

KM1-PMU1A-FLK/PMU2A-FLK/EMU8A-FLK/KE1-CTD8E

KE1-DRT-FLK

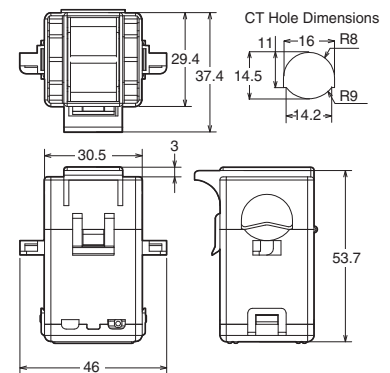
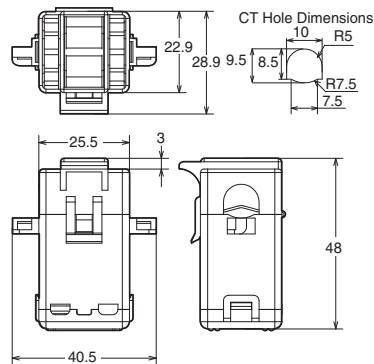
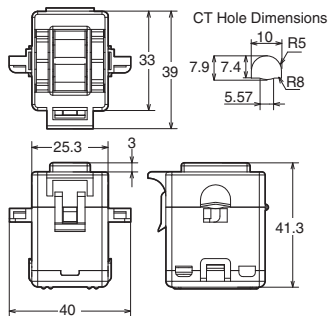


## Separate Current Transformers (CTs)

KM20-CTF-5A

KM20-CTF-50A

KM20-CTF-100A

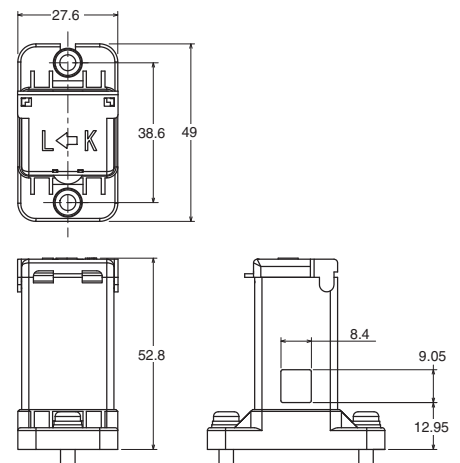
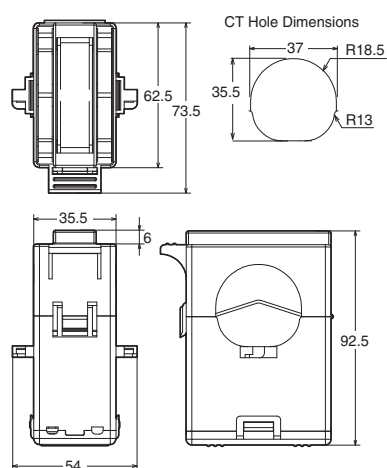
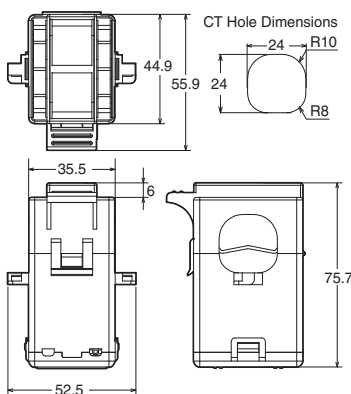


## In-panel CT, penetration type

KM20-CTF-200A

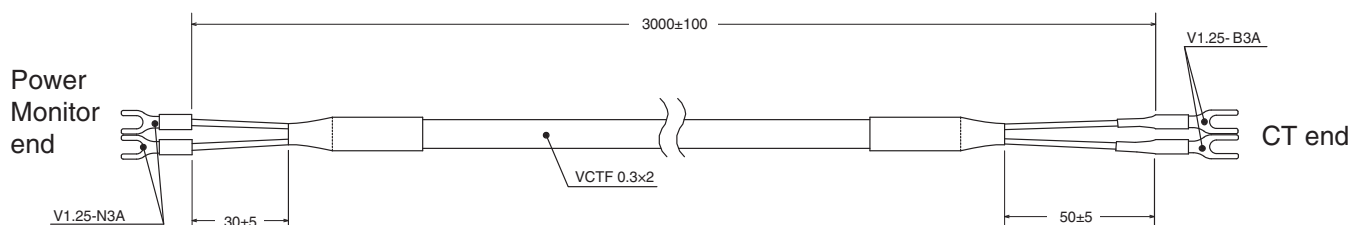
KM20-CTF-400A/600A

KM20-CTB-5A/50A



## CT Cable

KM20-CTF-CB3 (Special CT cable)



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