Energy saving support equipment
KM-PM Power Monitor Series

OMRON

Easy-to-Retrofit Ethernet Power Monitor for Global Production Equipment

EtherNet/IP Modbus

Compact 38 mm Ethernet Power Monitors Make energy management easier

Multi-Circuit Power Monitor KM-PM

The KM-PM can be installed inside control panels and distribution boards, making system construction easy. It also supports power sources worldwide and allows for easy Power measurement, contributing to energy management.

Multi-circuit measurements

3-phase 4-wire	1 circuit
3-phase 3-wire 1-phase 3-wire	2 circuit
1-phase 2-wire	4 circuit

Single-phase 100 V to Three-phase 480 V

Dedicated CT

Minimum 5 A,
Supports up to 600 A

Packed Full of Functions

Ethernet communication

EtherNet/IP
Modbus

Industry's*1 thinnest

Width 38 mm

* For EtherNet/IP™ compatible type, in the case of 400 V measurement

Accuracy

IEC Class 0.5S

* Except when using 5A CT

Safety Standards Acquired

CE cULus CSA

*1. As of July 2025, according to our company survey. For EtherNet/IP™ compatible models and systems measuring 400 V.

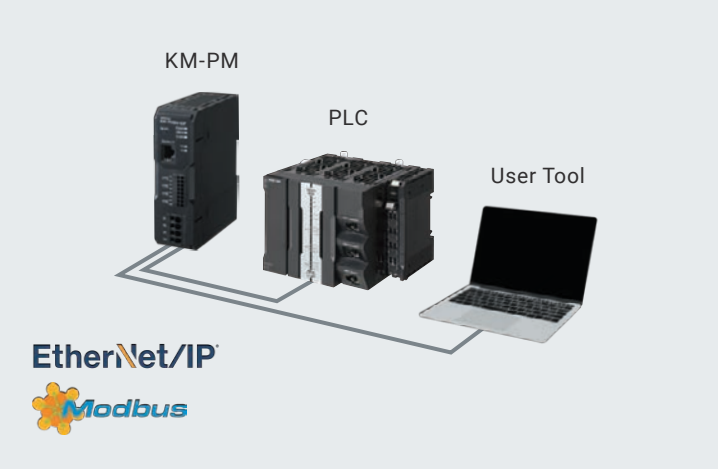
Note1. KM-PCBE600 is only available in certain regions.
Note2. The CT with a 600A rating (KM-PCBE600) does not support safety standard certification, including UL/CSA certification.

Real-Time Power Monitoring for Production Equipment — With Significantly Reduced Implementation Effort

1. Easy to Install

Reduces Installation work inside panels

Compact ethernet-compatible Power Monitor easily integrates into existing systems and control panels.



2. Easy to Choose

Simplify Device Selection

Certified to major international safety standards and compatible with 400V systems, this power monitor simplifies device selection and supports global deployment.

3. Easy to Setup

Minimize System Setup and Configuration Time

The support tool helps reduce common wiring and setup errors, cutting installation effort for power monitoring systems.

1. Easy to Install

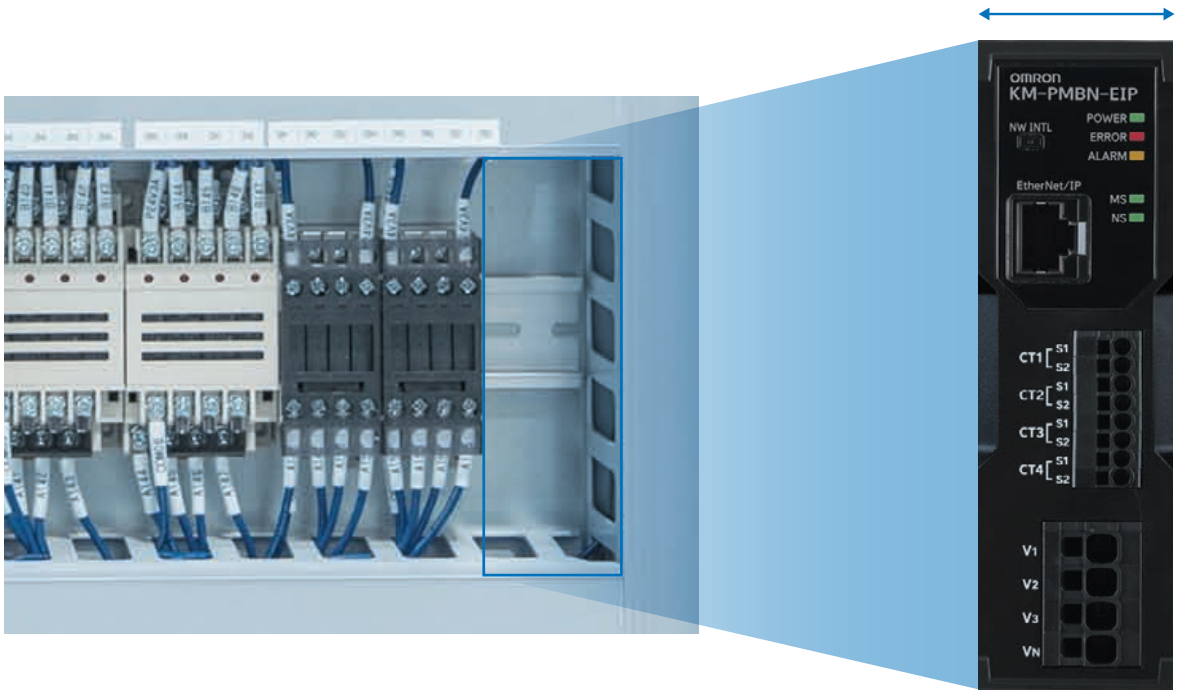
Reduces Installation work inside panels

Can be installed even in the small open spaces of existing panels.

Industry's Thinnest *1 Width 38 mm

Achieves EtherNet/IP™ support in a slim body.Significant space savings allow Installation even in small gaps, whether for single or multiple circuits.

*1. As of July 2025, according to our research. For EtherNet/IP™ compatible models and systems measuring 400 V.



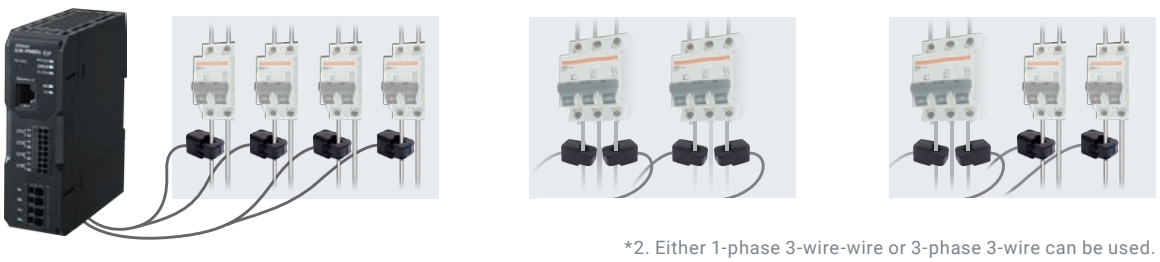
Height 124 mm
(Depth 104 mm)

Compatible with multiple circuits, allowing minimization of wiring and equipment

Multi-circuit measurements

Multi-circuit measurements reduces the measurement cost per circuit.

1-phase 2-wire	1-phase 3-wire/ 3-phase 3-wire *2	Combination of 1-phase 3-wire and 1-phase 2-wire
4 circuits	**2 circuits**	**3 circuits** *3



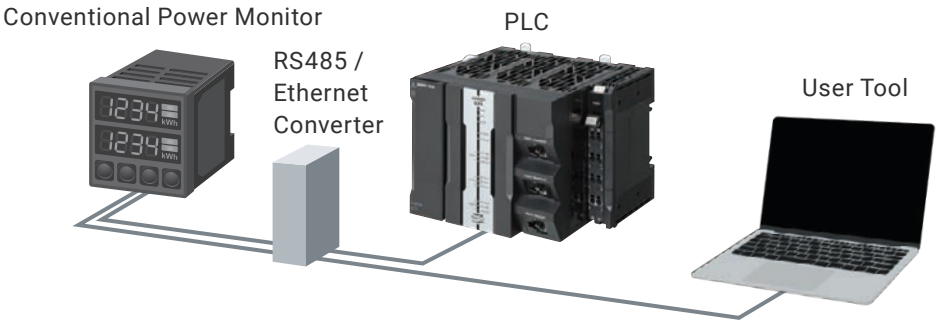
*2. Either 1-phase 3-wire-wire or 3-phase 3-wire can be used.
*3. Measurement of single-phase two-wire branched from 1-phase 3-wire.
Note: CT capacity (5 A, 50 A, 100 A, 200 A, 400 A, 600 A) can be selected for each circuit.

Equipped with Ethernet as a Standard Communication Interface — No Converter Required, Reducing Wiring Effort

Ethernet Communication

Compatible with Ethernet communication (EtherNet/IP™, ModbusTCP), improving connectivity to production equipment and user tools.

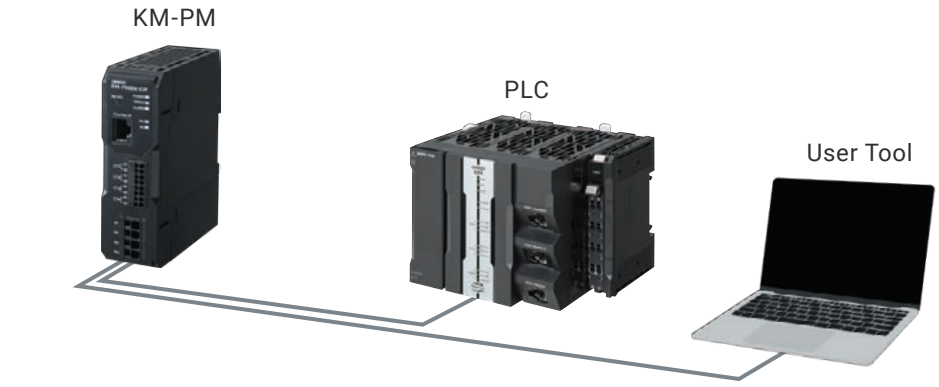
Before



After

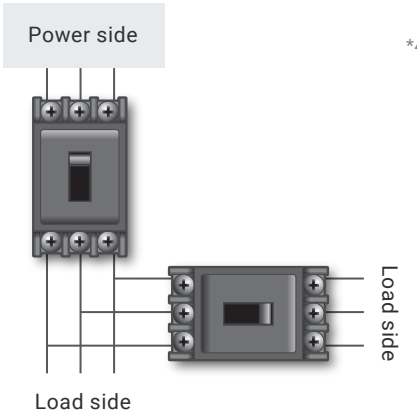
EtherNet/IP

Modbus



Its space-saving design enables measurement at the individual small breaker level.

Its space-saving, multi-circuit monitoring*4 allows measurement down to individual small breakers, providing detailed insight into power consumption in production equipment.



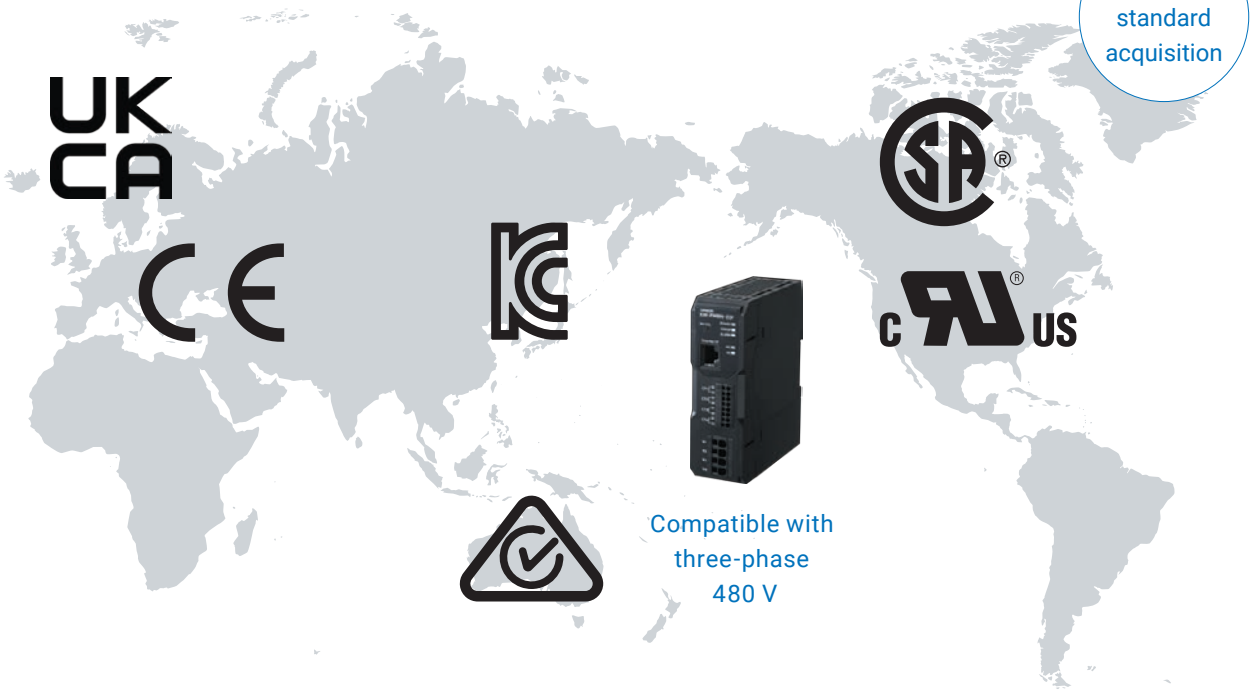
*4. Monitoring is only possible when both targets have the same voltage. An additional unit is needed when using a different voltage.

Reducing the effort of model selection

Acquired major safety standards, enabling global export

KM-PM supports single-phase 100 V to three-phase 480 V, enabling Power measurement for a wide range of equipment. Additionally, it has obtained major safety certifications, allowing for global deployment.

Safety standard acquisition



Compatible with a wide range of voltage environments to prevent model selection errors

Previously, selecting and managing devices for each machine and region was time-consuming. With just one KM-PM model, you can support diverse equipment worldwide—simplifying selection, reducing management workload, and promoting global standardization.

Single-phase 100 V to three-phase 480 V

Before **Selection and management of devices according to the usages are necessary.**

Device A (Domestic)	Measured voltage 200 V
DeviceB (Ethernet communication)	Ethernet communication compatible
Device C (Overseas)	Safety standards
Device D (400 V)	Measured voltage 400 V

After **Reduce management work with one model that can handle various use cases.**

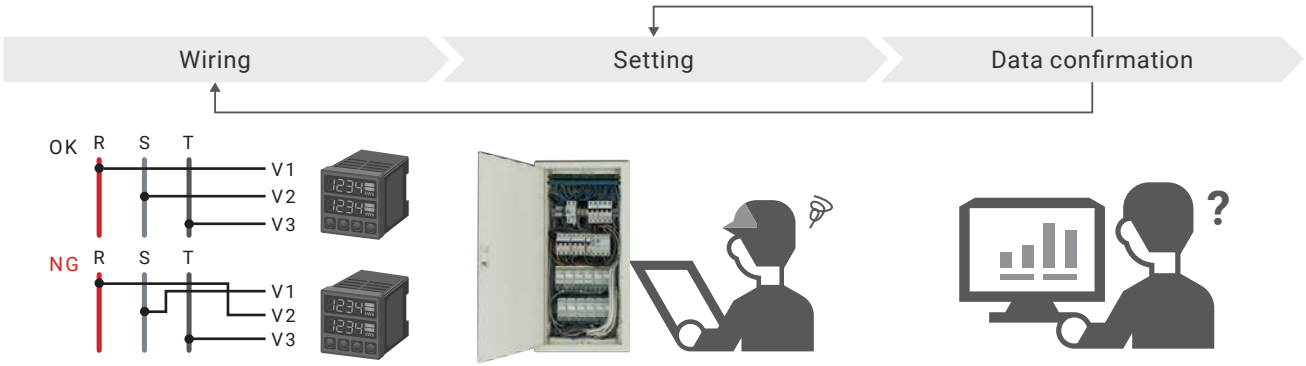
Device A (Domestic)	
DeviceB (Ethernet communication)	
Device C (Overseas)	
Device D (400 V)	

3. Easy to Setup

Minimize System Setup and Configuration Time

Miswiring and incorrect settings occurred cause a significant amount of rework in system construction.With KM-PM, even users without expertise in power measurement can easily operate the system thanks to its intuitive UI design, significantly reducing rework.

Before Rework time occurred due to miswiring and incorrect settings of devices.



Phase wiring mistakes can occur during voltage connection.

The manual is difficult to understand, leading to forgotten or incorrect settings.

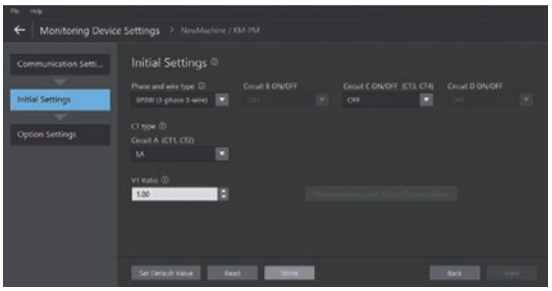
It takes time to investigate the cause because data is not coming in properly.

After Helps minimize rework

Easy operation with step-by-step workflow. Miswiring can also be detected, preventing the need to backtrack during the setup work.

Just choose from the options.

Simple setup by the following configuration.

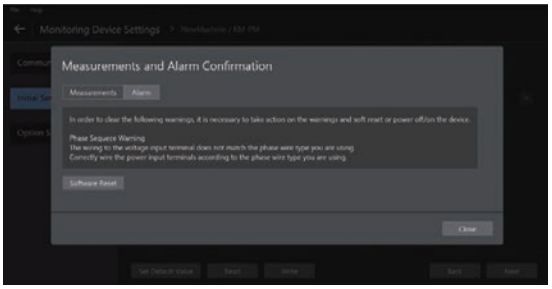


Grasp the current measurement value.

It is possible to understand the current measurement Value at the Settings stage.

Notifies when a mistake occurs.

In case of miswiring or wrong settings, an alarm suggests corrective functions.



Log viewing is available

Visualize power consumption with a simple Logging Functions.

For building green control panels

Natural disasters caused by global warming and climate change have become global social issue, that drives over 150 countries and regions worldwide to take action toward decarbonization.Our goal is to reduce greenhouse gas (GHG) emissions toward by half through new ways of building control panels, that key figure of the manufacturing site.

Green

Creating green control panels

Reducing GHG emission of control panels to achieve carbon neutrality

This Value Design also integrate environment consideration concept that enable earth and user-friendly control panel building.

Panel

Further Evolution for Panels

Realize compact & highly reliable control panels

Unified size and side-by-side mounting help delivering more compact control panels with additional functionality.OMRON Push-In Plus technology for easy wire insertion and firm wire holding ability.

Process

Innovation for design, building Process

Realize greatly reduces design/manufacturing work

eCAD library provided for all models greatly reduces design work. Push-In Plus technology requires only a single step, greatly reducing wiring work.

People

Simple & Easy People

Provide reliable and comfortable manufacturing for all people who deal with control panels

OMRON's Push-In Plus technology is as easy as inserting to an earphone jack. This reduces the load on worker fingers.

Value Design for Panel

Integrating green perspectives into Value Design

Value Design for Panel (Value Design) is the common concept shared across OMRON's in-panel product specifications to deliver new value to your control panels.This Value Design also integrate environment consideration concept that enable earth and user-friendly control panel building.

OMRON

Power Monitor
KM-PM

38 mm-wide Ethernet Power Monitor for Global Control Panel Integration

- Industry's thinnest width:
  38 mm ✻1 (for Ethernet communication + 480 V measurement)
- Supports EtherNet/IP™ and ModbusTCP
- A 3-phase 3-wire for up to 2 circuits.
- High-precision measurement: IEC class 0.5S (main unit) ✻2
- A rated input voltage of 480 V.

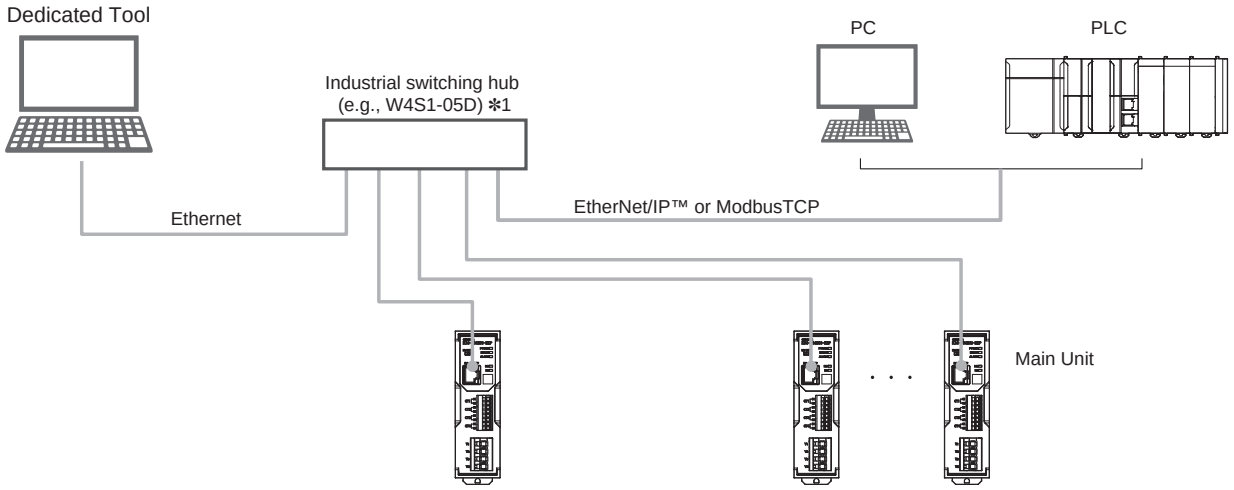
✻1. According to our research as of July 2025.
✻2. Excluding for 5A CT

⚠ **Refer to *Safety Precautions* on page 22.**

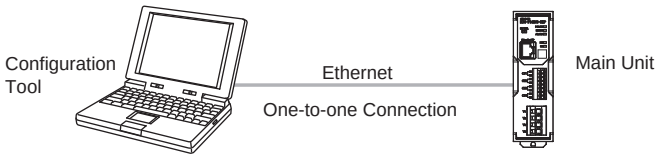
For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

System Configurations

Basic Configurations



✻1. When configuring the IP address setting for main unit.
Only when configuring the IP address settings, connect the computer and control unit one-to-one with Ethernet cable communication.



Ordering Information

Main Unit

Rated input voltage (Shared power supply)	Model
3-phase 4-wire: 100 to 277 VAC (L-N), 173 to 480 VAC (L-L) 1-phase 2-wire: 100 to 277 VAC 1-phase 3-wire: 100 to 240 VAC (L-N), 200 to 480 VAC (L-L) 3-phase 3-wire: 1 phase grounded: 100 to 480 VAC (L-L) 3-phase 3-wire: ungrounded: 173 to 480 VAC (L-L)	**KM-PMBN-EIP**

CT (order separately)

Rated primary current	Model
5 A	**KM-PCBE005**
50 A	**KM-PCBE050**
100 A	**KM-PCBE100**
200 A	**KM-PCBE200**
400 A	**KM-PCBE400**
600 A ✻1 ✻2	**KM-PCBE600**

✻1. KM-PCBE600 is only available in certain regions.
✻2. The CT with a 600 A rating (KM-PCBE600) does not support safety standard certification, including UL/CSA certification.

EtherNet/IP communications cable recommended parts

Use a Category 5 or higher STP cable (shielded twisted pair cable).

Cable with Connectors

Item		Recommended manufacturer	Cable length (m)	Model
Wire Gauge and Number of Pairs: AWG26, 4-pair Cable Cable Sheath material: LSZH ✻2	Cable with Connectors on Both Ends (RJ45/RJ45) Standard RJ45 plug type ✻1 Cable color: Yellow ✻3 	OMRON	0.3	**XS6W-6LSZH8SS30CM-Y**
			0.5	**XS6W-6LSZH8SS50CM-Y**
			1	**XS6W-6LSZH8SS100CM-Y**
			2	**XS6W-6LSZH8SS200CM-Y**
			3	**XS6W-6LSZH8SS300CM-Y**
			5	**XS6W-6LSZH8SS500CM-Y**
Wire Gauge and Number of Pairs: AWG22, 2-pair Cable	Cable with Connectors on Both Ends (RJ45/RJ45) Rugged RJ45 plug type ✻1 Cable color: Light blue 	OMRON	0.3	**XS5W-T421-AMD-K**
			0.5	**XS5W-T421-BMD-K**
			1	**XS5W-T421-CMD-K**
			2	**XS5W-T421-DMD-K**
			5	**XS5W-T421-GMD-K**
			10	**XS5W-T421-JMD-K**

✻1. Cables with standard RJ45 plugs are available in the following lengths: 0.2 m, 0.3 m, 0.5 m, 1 m, 1.5 m, 2 m, 3 m, 5 m, 7.5 m, 10 m, 15 m, 20 m.
Cables with rugged RJ45 plugs are available in the following lengths: 0.3 m, 0.5 m, 1 m, 2 m, 3 m, 5 m, 10 m, 15 m.
For details, refer to the *Industrial Ethernet Connectors Catalog* (Cat. No. G019).
✻2. The lineup features Low Smoke Zero Halogen cables for in-cabinet use and PUR cables for out-of-cabinet use.
✻3. Cable colors are available in yellow, green, and blue. The last character of the model changes to "-G" or "-B".

Connect to Condition Monitoring Configuration Too (Settling Tool), PLC, and PC using Ethernet cable.
Category 5 or higher STP (shielded twisted pair) cable is used.Either straight or cross cable can be used.

Cable/Connector

Part name	Manufacturer	Model
Cable	Kuramo Electric Co.	**KETH-SB ✻**
RJ45 connector	Panduit Corporation	**MPS588-C ✻**

✻ It is recommended to use the cable and connector in combination described above.

Industrial switching hub (recommended parts)

Recommended manufacturer	Appearance	Functions	Number of ports	Model
OMRON		Quality of Service (QoS): EtherNet/IP control data priority 10/100BASE-TX, Auto-Negotiation	5	**W4S1-05D**
Cisco Systems, Inc	Consult the manufacturer. https://www.cisco.com/			
Contec USA, Inc.	Consult the manufacturer. https://www.contec.com/us/			
Phoenix Contact USA	Consult the manufacturer. https://www.phoenixcontact.com/online/portal/pc			

Ratings and Specifications

Main unit

Item		Function
Input specifications	Rated input voltage (Shared power supply)	3-phase 4-wire: 100 to 277 VAC (L-N), 173 to 480 VAC (L-L) 1-phase 2-wire: 100 to 277 VAC 1-phase 3-wire: 100 to 240 VAC (L-N), 200 to 480 VAC (L-L) 3-phase 3-wire: 1 phase grounded: 100 to 480 VAC (L-L) 3-phase 3-wire: ungrounded: 173 to 480 VAC (L-L)
	Input voltage fluctuation range	85 to 115% of the rated input
	Connectable CT	Dedicated CT
	Rated input frequency	50/60 Hz
	Applicable circuit type	3-phase 4-wire, 1-phase 2-wire, 1-phase 3-wire, 3-phase 3-wire
	Number of measuring circuits	3-phase 4-wire: 1 circuit at max. 1-phase 2-wire: 4 circuits at max. 1-phase 3-wire, 3-phase 3-wire: 2 circuits at max.
	CT secondary side rated current	According to the rating of dedicated CTs
	Maximum current for CT secondary side	According to the rating of dedicated CTs
Power consumption		15 VA or less
Ambient operating temperature		-25 to 55°C (with no condensation or icing)
Ambient operating humidity		25% to 85% RH
Storage temperature		-25 to 85°C (with no condensation or icing)
Storage humidity		25% to 85% RH
Dielectric strength voltage		2,000 VAC for 1 minute Between (Voltage input terminals + Current input terminals) and LAN port Between electronic circuitry and case
Insulation resistance		20 MΩ min (500 VDC mega) Between (Voltage input terminals + Current input terminals) and LAN port Between electronic circuitry and case
Vibration resistance		Single amplitude: 0.35 mm, Acceleration: 5m/s^2, Frequency: 10 to 55 Hz 10 sweeps each in X, Y, and Z directions for 5 min
Shock resistance		150m/s^2, 3 times each in X, Y, and Z axes, 6 directions
Display		LED
Weight		250 g
Mounting method		DIN rail
Altitude		2,000 m or less
Degree of protection		IP20 (excluding LAN port section)
Electromagnetic environment		Industrial electromagnetic environment (EN/IEC 61326-1 Table 2)
Applicable standards		CE, UKCA Installation environment: EN61010-1/EN61010-2-030, Pollution Degree 2, Overvoltage/measurement Category II (L-N: 480 V), III (L-N: 300 V) EMC: EN61326-1, ClassA (EMI), Industrial Location (EMS) UL • UL61010-1 Pollution degree 2, overvoltage Category II (L-N: 480 V), III (L-N: 300 V) • UL61010-2-030 Measurement Category II (L-N: 480 V) and III (L-N: 300 V) CSA • CAN/CSA C22.2 No.61010-1 Pollution degree 2, overvoltage Category II (L-N: 480 V), III (L-N: 300 V) • CAN/CSA C22.2 No.61010-2-030 Measurement Category II (L-N: 480 V) and III (L-N: 300 V) Korean Radio Law KSC9610-6-2, KSC9811 RCM EN61326-1

Measurements Specifications (50A CT, 100A CT, 200A CT, 400A CT, 600A CT ✻1 ✻2)

Item	Description
Measurement item	Total power consumption (active, regenerative, and reactive), power (active and reactive), current, voltage, power factor, and frequency
Active power	0.5% ✻3 (IEC62053-22 class 0.5S) ✻4
Reactive power	2% ✻3 (IEC62053-23 class2) ✻4
Measurement frequency	80 ms (50 Hz), 66.7 ms (60 Hz)
Functions	Conversion

✻1. KM-PCBE600 is only available in certain regions.
✻2. The CT with a 600 A rating (KM-PCBE600) does not support safety standard certification, including UL/CSA certification.
✻3. Errors from dedicated CT are not included.
✻4. IEC62053 is an international standard on Power meters.

Measurement Specifications (5A CT)

Item		Description
Measurement item		Total power consumption (active, regenerative, and reactive), power (active and reactive), current, voltage, power factor, and frequency
Accuracy ✻1 ✻2 ✻3	**Voltage ✻4**	±0.5% of F.S. ±1 digit
	Current ✻5	±0.5% of F.S. ±1 digit
	Power	±1.0% of F.S. ±1 digit (Power factor = 1)
	Frequency	±0.2% of F.S. ±1 digit
Effect of temperature ✻6		±1.0% of F.S.
Influence of frequency ✻7		±1.0% of F.S.
Influence of harmonics ✻8		±0.5% of F.S.
Measurement frequency		80 ms (50 Hz), 66.7 ms (60 Hz)
Functions		Conversion

✻1. Errors from dedicated CT are not included.
✻2. Value when ambient temperature of 23°C, rated input, and rated frequency.
✻3. 10% or more of the rated input current.
✻4. For the voltage between R and T phases, the accuracy is ±1.0% of F.S ±1 digit under the same conditions.
✻5. For the S phase current of 3-phase 3-wire and N phase current of 1-wire 3-phase, the accuracy is ±1.0% of F.S ±1 digit under the same conditions.
✻6. Percentage with respect to measurement value when within operating temperature range, ambient temperature of 23°C, rated input, rated frequency, and power factor of 1.
✻7. Percentage with respect to measurement value when within range of rated frequency ±5 Hz, ambient temperature of 23°C, rated input, rated frequency, and power factor of 1.
✻8. Error margin when ambient temperature of 23°C and superimposed the 2nd, 3rd, 5th, 7th, 9th, 11th, and 13th harmonics with content percentages of 30% current and 5% voltage relative to the fundamental wave.

Communications specifications

Item		Description
Communications protocols		TCP/IP, UDP/IP
Supported services		MODBUS and TCP EtherNet/IP (Tag-Data-Link (Class1)), CIP message communications (Class3/UCMM) BOOTP (Client), DHCP (Client) ACD LLDP (Agent: Send Functions only)
Number of ports		1
Physical layer		100BASE-TX
Ethernet interface		AutoNegotiation, AutoMDI/MDI-X
Transmission specifications	**Media access method**	CSMA/CD
	Modulation	Baseband
	Topology	Star
	Baud rate	100 Mbps (100BASE-TX)
	Transmission media	Twisted-pair cable (Shielded: STP) Category 5, 5e or more
	Transmission distance	Up to 100 m (Distance between hub and node)
	Number of cascade connections	No restrictions in the use of Switching hub.

Dedicated CT specifications

Item \ Model		KM-PCBE005	KM- PCBE050	KM- PCBE100	KM- PCBE200	KM- PCBE400	KM- PCBE600 ✻1 ✻2
Primary side rated current		5 A	50 A	100 A	200 A	400 A	600 A
Rated voltage		480 VAC					
Secondary winding		3,000 turns				6,000 turns	9,000 turns
Insulation resistance		Between output terminals and case: 50 mΩ min.					
Dielectric strength voltage		Between Output terminals and case: 2,000 VAC for 1 minutes					
Protective element		7.5 V clamp element					
Allowable number of attachments and detachments		100 times					
Diameter of wire attachable		7.9 mm dia. max.	9.5 mm dia. max.	14.5 mm dia. max.	24.0 mm dia. max.	35.5 mm dia. max.	
Operating temperature and humidity ranges		-25 to 55°C, 25% to 85% RH (with no icing or condensation)					
Storage temperature and humidity ranges		-30 to 65°C, 25% to 85% RH (with no icing or condensation)					
Supplied cable length		2.9 m					
Supplied cable terminals	**Output**	Ferrule terminal					
	CT	Round terminal					

Note: 1. When using the CT as a set with the KM-PMBN-EIP Power Monitor, also consider the operating environment conditions of the power monitor. Consider the operating environment conditions of the device that is used as a set with this CT.

✻1. KM-PCBE600 is only available in certain regions.

✻2. The CT with a 600 A rating (KM-PCBE600) does not support safety standard certification, including UL/CSA certification.

Installing Condition Monitoring Configuration Tool

Condition Monitoring Configuration Tool is a tool to configure the following condition monitoring devices by communications. The unified configuration and verification environment of the tool makes it easy to verify the deployment of condition monitoring devices.
This product (KM-PM) also allows you to perform the initial setup and logging with this tool.

Product name	Model	Introduction
Motor Condition Monitoring Device	K6CM	Quantify the status of three-phase induction motors.
Thermal Condition Monitoring Device	K6PM-TH	Constantly and remotely monitor and diagnose the temperature status of panel devices to achieve both labor-saving and risk mitigation of abnormal stops.
Insulation resistance Monitor Equipment	K7GE-MG	Understand degradation trends through automatic measurement of insulation resistance. Prevent unexpected equipment stoppages.
Heater Condition Monitoring Device	K7TM	Transform reactive maintenance and scheduled maintenance of heater equipment into predictive maintenance through heater condition monitoring.
Advanced Motor Condition Monitoring Device	K7DD	Implement predictive maintenance with real-time condition monitoring of variable speed motors.
Power Monitor	KM-PMBN-EIP	Ethernet-compatible Power Monitor that can be retrofited to global production facilities Use Condition Monitoring Configuration Tool Ver.1.3.0 or later.

Operating Environment

Supported OS	Windows 10 (Version1607 or later) and 11 (Japanese or English) 64 bit
PC specifications	CPU: 1 GHz or more, 64-bit processor Memory: 2 GB or more Disk reserved area capacity: 20 GB or more Monitor resolution: 1920 × 1080 Others: LAN port (for network connection)

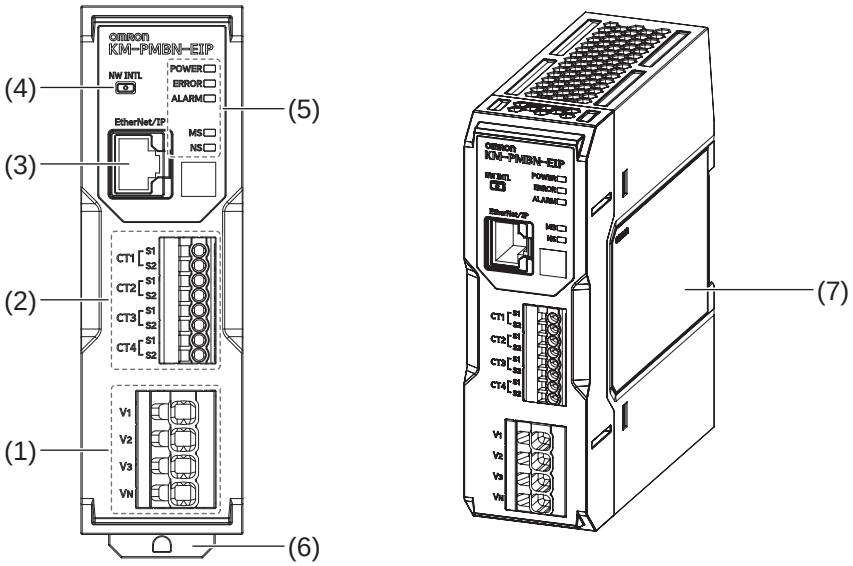
How to obtain the Condition Monitoring Configuration Tool

The Tool is provided by download only.
https://www.ia.omron.com/cmc_tool

Part names and functions

Main unit

Front



No.	Name	Description
(1)	Voltage input terminals	Terminals for inputting the power and voltage (combined with the input for measured voltage)
(2)	CT input terminals	Terminal for connecting the CT cables for CT1 to CT4
(3)	Communication connector	Terminals for connecting communication cables of the EtherNet/IP network
(4)	Network setting initialization button	Button to return the IP address, password, and other settings to the factory default state. Press and hold it for 3 seconds. Please refer to the *KM-PMBN-EIP User's Manual* (Man. No. N241-E1)
(5)	Status display LED	[POWER]: Lights in green when power is supplied. [ERROR]: Flashes in red when there is an error such as a malfunction. [ALARM]: Flashes in orange when there is a warning. [MS]: Module Status. Displays the status of the Main Unit. It is green when it is normal. ✻ [NS]: Network Status. Displays the state of the communications. It lights or flashes green when it is normal. ✻ ✻ For details, refer to *MS/NS Indicators* on the page 17.
(6)	DIN hook	Hook for attaching to the DIN rail
(7)	Product labels	Label with information such as the model, power voltage, connector layout, and serial number

MS/NS Indicators

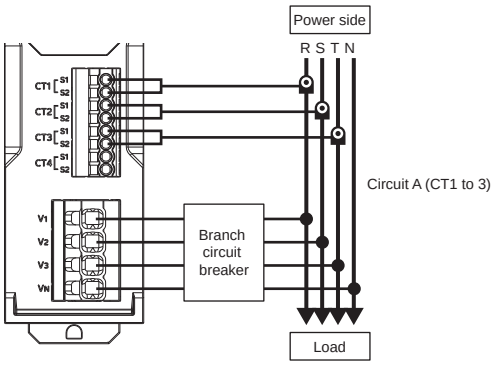
Symbol	Name	Color	Status	Operating condition
MS	Product status indication (Module Status}	Green	Lit.	Normal status
			Flashes at 1-s intervals.	Obtaining the IP address from the BOOTP/DHCP server
		Red	Lit.	Critical product failure (communication is not possible)
			Flashes at 1-s intervals.	One of the following conditions • IP address is duplicated (communication is not possible) • Product internal communication error (communication is possible) The product has failed if it does not return to normal as a result of cycling the power supply or performing a software reset.
		---	Not lit.	No power supply
NS	Network status indication (Network Status)	Green	Lit.	Tag data link or message connection established
			Flashes at 1-s intervals.	No tag data link or message connection established
		Red	Lit.	IP address duplication status
			Flashes at 1-s intervals.	The connection has timed out
		---	Not lit.	No power is being supplied, offline, obtaining the IP address from the BOOTP/DHCP server, or critical failure

Circuit diagram of CT wiring

The below table shows the wiring for voltage, current, and CT by each phase and wire type.

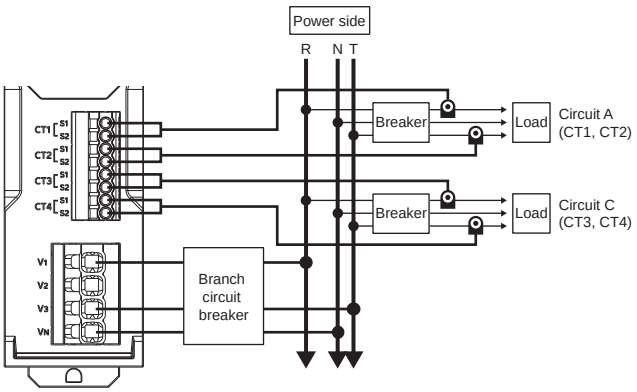
For 3-phase 4-wire (3P4W)

3-phase 4-wire measures one circuit, as shown in the following diagram.



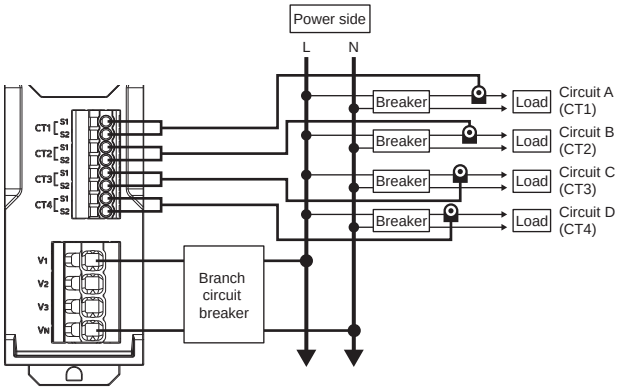
For 1-phase 3-wire (1P3W)

With 1-phase 3-wire, multi-point measurement of up to 2 circuit is possible. CT1 and 2 are used to measure only 1 circuit. Be sure to attach the CT to the R and T phases.



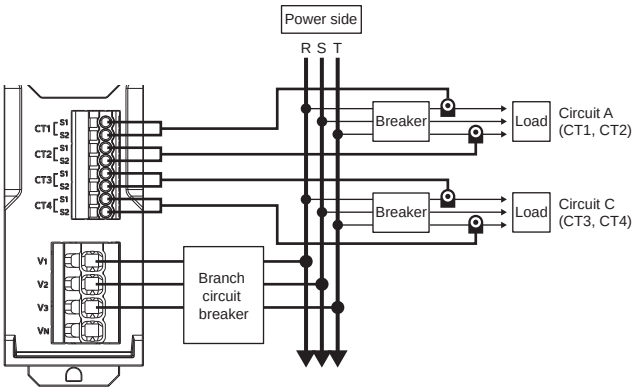
For 1-phase 2-wire (1P2W)

As shown below, 1-phase 2-wire can measure a maximum of 4 circuits. The CT must be attached to the L-phase.



For 3-phase 3-wire (3P3W)

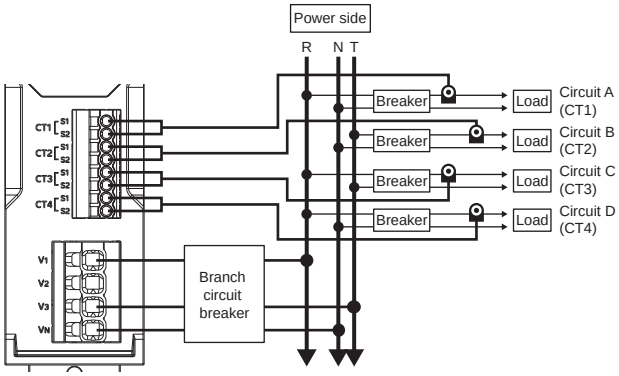
As shown below, 3-phase 3-wire can measure a maximum of 2 circuits. Use CT1, CT2 when measuring only 1 circuit. The CT must be attached to the R-phase and the T-phase.



The following wiring is also possible as a further method of measuring.

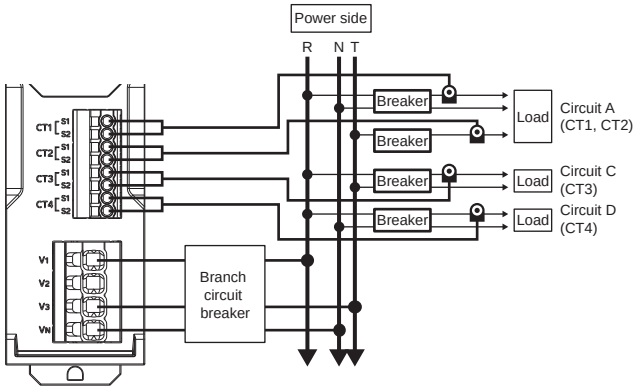
For 1-phase 2-wire voltage selected (1P2W2)

The 1-phase 3-wire circuit and the 1-phase 2-wire branching off from it are measured at the same time. With this connection, a setting is required according to which of R-N phase, T-N phase, or R-T phase is connected to the 1-phase 2-wire circuit. The 1-phase 2-wire circuit CT must be attached to the R-phase or the T-phase.



For 1-phase 3-wire composite (1P3W2)

The 1-phase 3-wire circuit and the 1-phase 2-wire branching off from it are measured at the same time. With this connection, a setting is required according to which of R-N phase, T-N phase, or R-T phase is connected to the 1-phase 2-wire circuit. The 1-phase 2-wire circuit CT must be attached to the R-phase or the T-phase.



Wiring diagram

Depending on the phase and wire type, the phase relationship of Wire connected to the Voltage input terminals and to the CT input terminals is as follows.

	Phase and wires connected to the Voltage input terminals				Phase and wires connected to the CT input terminals				Number of measuring circuits
	V1	V2	V3	VN	CT1	CT2	CT3	CT4	
1-phase 2-wire	L-phase (VL)	---	---	N-phase (VN)	L-phase 1	L-phase 2	L-phase 3	L-phase 4	4 circuit
1-phase 3-wire	R-phase (VR)	---	T-phase (VT)	N-phase (VN)	R-phase 1	T-phase 1	R-phase 2	T-phase 2	2 circuit
3-phase 3-wire	R-phase (VR)	S-phase (VS)	T-phase (VT)	---	R-phase 1	T-phase 1	R-phase 2	T-phase 2	2 circuit
3-phase 4-wire	R-phase (VR)	S-phase (VS)	T-phase (VT)	N-phase (VN)	R-phase	S-phase	T-phase	---	1 circuit

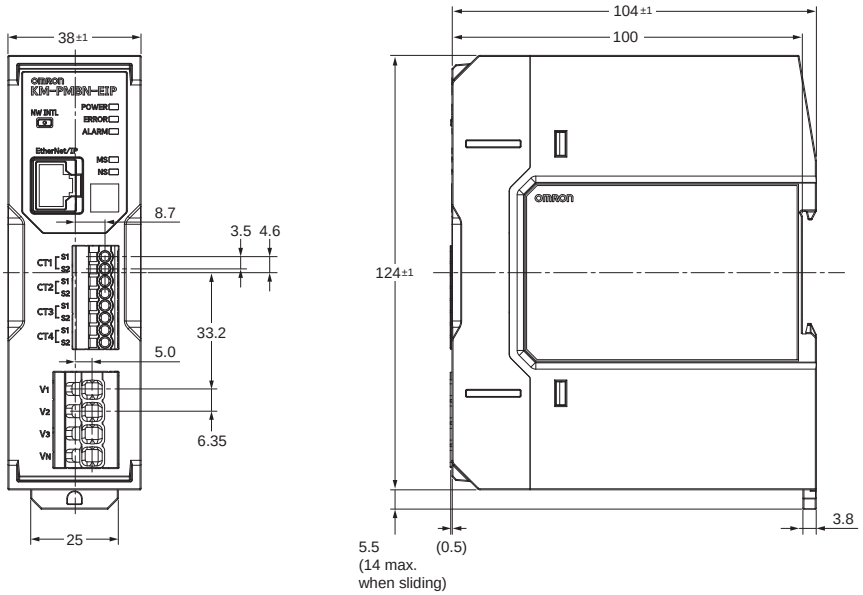
KM-PM

Dimensions

(Unit: mm)

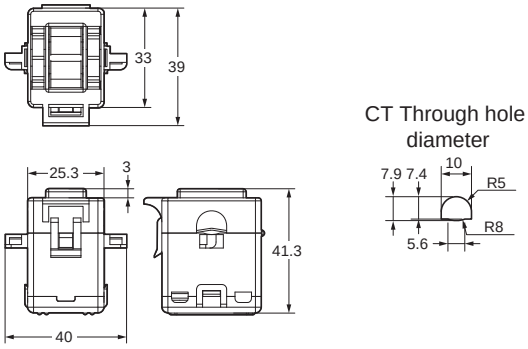
Main unit

KM-PMBN-EIP

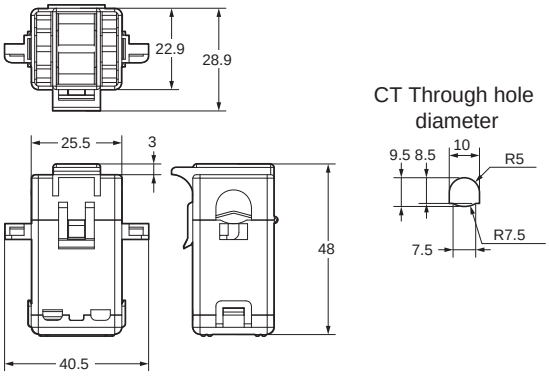


Dedicated CT

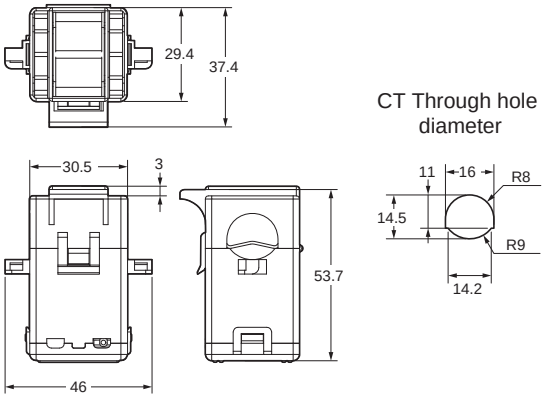
KM-PCBE005



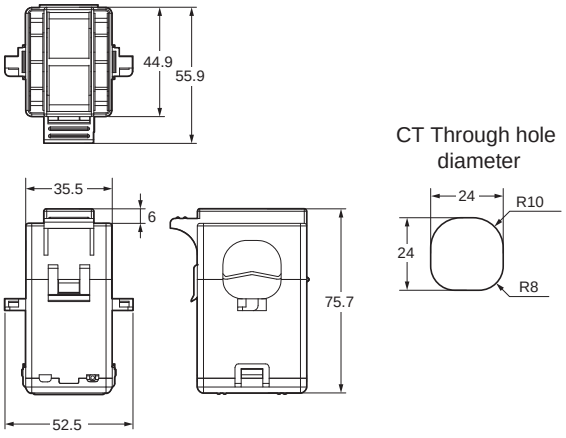
KM-PCBE050



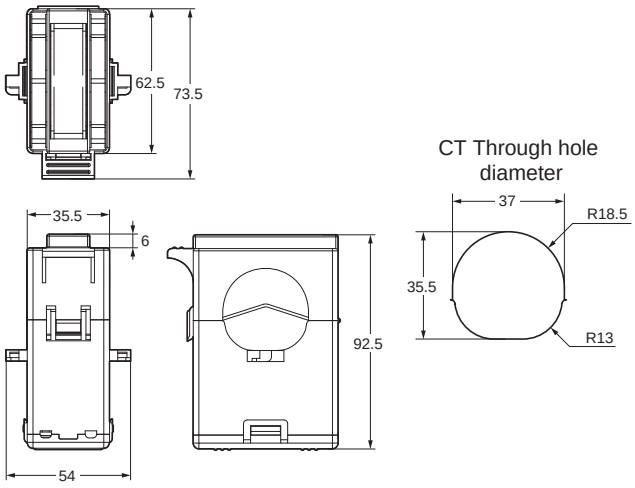
KM-PCBE100



KM-PCBE200

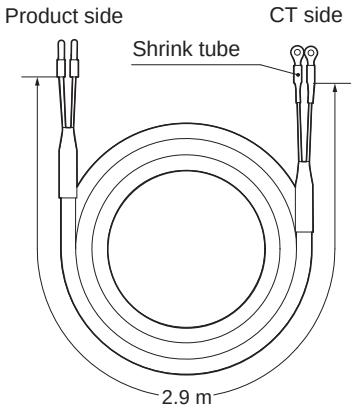


KM-PCBE400
KM-PCBE600



Note: 1. KM-PCBE600 is only available in certain regions.
Note: 2. The CT with a 600 A rating (KM-PCBE600) does not support safety standard certification, including UL/CSA certification.

CT-supplied cable

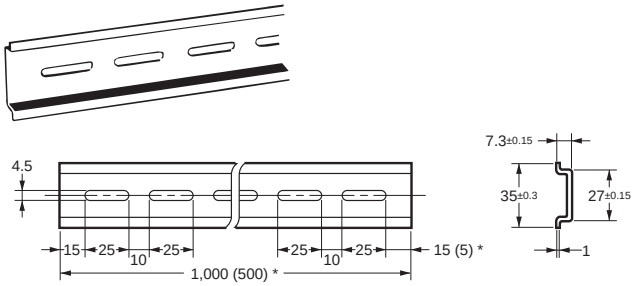


Note: The CT-supplied cable is attached to the CT.

Optional Products for DIN Track Mounting

DIN Tracks

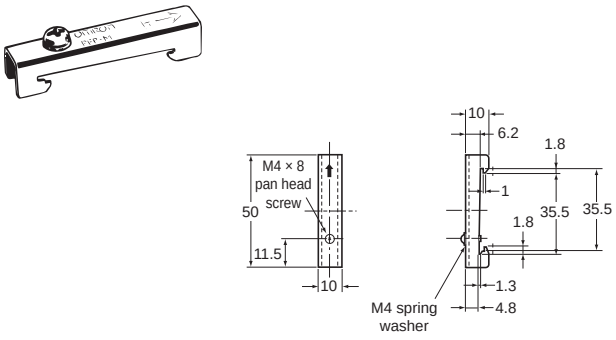
PFP-100N
PFP-50N



* Dimensions in parentheses are for the PFP-50N.

End Plate

PFP-M



Safety Precautions

Warning Indications

⚠ CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or in property damage.
Precautions for Safe Use	Supplementary comments on what to do or avoid doing, to use the product safely.
Precautions for Correct Use	Supplementary comments on what to do or avoid doing, to prevent failure to operate, malfunction or undesirable effect on product performance.

Symbols

	General Caution Indicates unspecified general cautions, warnings, and dangers.
	Electrical Shock Caution Indicates possibility of electric shock under specific conditions.
	Indicates the possibility of explosion or rupture under specific conditions.
	General Prohibition Indicates unspecified general prohibitions.
	Disassembly Prohibition Indicates prohibitions the disassembly of a device because of the possibility of injuries due to electric shock.
	General instructions Indicates instructions on unspecified general action.

⚠ CAUTION

Breakdown or explosion may occasionally occur.
Use the power voltage and load within the specified and rate ranges.

Minor or moderate injury or property damage may occur due to explosion.
Do not use in locations exposed to flammable or explosive gases.

Electric shock may occasionally occur.
Do not touch any of the terminals while the power is being supplied.

Minor electric shock, fire, or malfunction may occasionally occur.
Never disassemble, modify, or repair the product.

Electric shock may occasionally occur.
Always make sure that the power to the circuit the CT is being attached to is turned OFF before connecting the CT ✻.

Property damage may occur due to fire.
Always make sure that the wires are connected properly before turning ON the power supply.

Minor injury due to electric shock may occasionally occur.
Do not touch the product except for any buttons (keys) while power is being supplied.

Property damage may occasionally occur due to ignition.
When wiring, make sure that the wiring material is properly inserted all the way into each terminal hole of the product.

Minor electric shock, fire, or malfunction may occasionally occur. Do not allow metal objects, conductors, or cuttings from installation work to enter the product.

✻ CT: Current Transformer

⚠ CAUTION

Take adequate security measures against DDoS attacks (Distributed Denial of Service attacks), computer viruses and other technologically harmful programs, unauthorized access and other possible attacks before using this product.

Security Measures

Anti-virus protection
Install the latest commercial-quality antivirus software on the computer connected to a control/monitor system and maintain to keep the software up-to-date.

Security measures to prevent unauthorized access
Take the following measures to prevent unauthorized access to our products.

- Install physical controls so that only authorized personnel can access control/monitor systems and equipment.
- Reduce connections to a control/monitor system and equipment via networks to prevent access from untrusted devices.
- Install firewalls to shut down unused communications ports and limit communications hosts and isolate a control/monitor system and equipment from the IT network.
- Use a virtual private network (VPN) for remote access to a control/monitor system and equipment.
- Scan virus to ensure safety of SD cards or other external storages before connecting them to a control/monitor system and equipment.

Data input and output protection
Validate backups and ranges to cope with unintentional modification of input/output data to a control/monitor system and equipment.

- Checking the scope of data
- Checking validity of backups and preparing data for restore in case of data tampering and abnormalities
- Safety design, such as emergency shutdown, in case of data tampering and abnormalities

Data recovery
Perform regular backups and keep the data up-to-date for data loss prevention.

When an intranet environment is used via a global address, connecting to an unauthorized terminal or server, such as SCADA or HMI, may result in network security issues such as spoofing or tampering. Take adequate measures on your own, such as restricting access to terminals, using terminals with secure functions, and locking the installation area.

When building an intranet, communications problems may occur due to cable disconnection or unauthorized network equipment.
Take adequate measures to restrict physical access to network equipment, for example, by locking the installation area.

Equipment with SD Memory Card functionality poses a security risk that a third party may remove or illegally unmount removable media to illegally acquire, tamper with, or replace files and data contained in them.
Take adequate measures on your own to restrict physical access to the Controller, for example, by locking the installation area, controlling entry to the room, or taking appropriate control measures for the removable media.

Security Measures of Condition Monitoring Configuration Tool

To prevent computer viruses, install antivirus software on a computer where you use this software. Make sure to keep the antivirus software updated.

Keep your computer's OS updated to avoid security risks caused by a vulnerability in the OS. Manage usernames and passwords in the OS or this software carefully to protect them from unauthorized uses.

Always use the highest version of this software to add new features, increase operability, and enhance security.

Set up a firewall (E.g., disabling unused communication ports, limiting communication hosts, etc.) on a network of a control/monitor system and devices, and ensure isolation from other IT networks.
Make sure to connect to a control/monitor system within the firewall.

Use a virtual private network (VPN) for remote access to a control/monitor system and devices from this software.

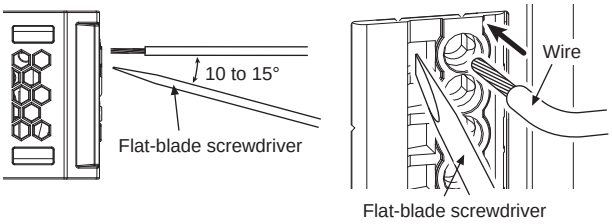
PRECAUTIONS FOR SAFE USE

Observe the following to ensure safe use of model KM-PMBN-EIP.

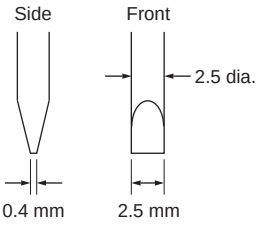
- If the product is used in a manner not specified by the INSTRUCTION MANUAL, the protection provided by the product may be impaired.
- Do not use or store the product in any of the following locations.
  - Locations subject to shock or vibration
  - Unstable locations
  - Locations subject to temperatures or humidity outside rated ranges
  - Locations subject to condensation as the result of severe changes in temperature
  - Outside or otherwise exposed to direct sunlight and weather
  - Locations subject to static electricity or other forms of noise
  - Locations exposed to electromagnetic fields
  - Locations subject to exposure to water or oil
  - Locations exposed to water
  - Locations subject to exposure to salt water spray
  - Locations subject to corrosive gases (in particular, sulfide gas and ammonia gas)
  - Locations subject to dust (including iron dust)
  - Locations subject to exposure to solvents
  - Locations subject to bugs and small animals
  - Locations subject to a load
- Ensure the screws fixing the DIN rails are tight. Also ensure that the DIN rails and the body are attached properly. Looseness may cause the DIN rails, body, and wires to separate if vibrations or impacts occur.
- Use 35mm width DIN rails (OMRON, model PFP-50N/-100N).
- Use AWG24 to 12 to wire the input voltage terminals. The heat resistant temperature of the wire is 70 degrees or more.
- Be sure to check that the wiring is correct before turning on the power.
- Before using or maintaining the product, thoroughly read and understand this manual.
- Understand the user manual before setting the device.
- Do not pull cables.
- For compliance with standards and safety, in order to protect against overcurrent, install a branch circuit protector with a rated current of 1A conforming to the voltage at which the device is used and the appropriate standards of the country where the device is used (US: UL Listed, Canada: cUL Listed,and other countries: for example, IEC60947-1 and IEC60947-2). Failure to do so may lead to an electric shock or fire. Check the wiring diagram in this manual to connect the voltage input terminal of this product to the branch circuit protector. If multi-electrode breakers are being used to prevent fire, the neutral conductor and the contactless ground of the main power supply must all be shut down simultaneously. (For example, a 4-pole circuit breaker that can simultaneously disconnect 4 poles.) If other branch circuit protector (for example, fuse) is to be used as an overcurrent protector, select ones with the same characteristics for all poles.
- Before using the device, be sure to check the wiring before turning on the power. Electric shock, injury, accident, or malfunction may occasionally occur because defective wiring.
- This is a “class A” product. In residential areas it may cause radio interference. The user may be required to take adequate measures to reduce interference if this occurs.
- Separate the product wiring from high-voltage or high-current power lines to prevent inductive noise. Do not place the product wiring parallel to or in the same ducts or conduits as power lines.
- Do not install the product close to heat-producing devices (those using coil elements, for instance).
- When mounting the product on the DIN rail, slide the DIN hook unit until a clicking sound is heard.
- Be sure to wire properly with the correct terminal name. Do not wire unused terminals.
- If EtherNet/IP tag data links (cyclic communications) are used with a repeating hub, the communications load on the network will increase. This will increase collisions and may prevent stable communications.
- Follow the directions indicated in the manual for connecting EtherNet/IP or the cable. It may result in communication failure.
- If you accidentally drop the product, the inside of the product may be damaged, so do not use it.
- Periodically check that the LED indicators operate correctly. Depending on the operating environment, the display or indicators may fail due to deterioration.
- Use and store the product in a location where the ambient temperature and humidity are within the specified ranges. If applicable, provide forced cooling.
- Do not continue to use the product if the front surface peels.
- Mount the product in the correct direction for installation.
- When wiring, use a wire of sufficient length.
- Make sure that the Voltage input and the CT input are within the specifications of the product.
- Make sure the crimp terminals for wiring are of the specified size.
- The product may be subject to radio disturbances. Do not install the product near equipment that generates high frequencies or surges.
- Do not exceed the communications distance that is given in the specifications and use the specified communications cable. As for the requirements on the communication distance and the cable, refer to KM-PMBN-EIP User’s Manual (Man. No: N241-E1).
- Dispose of this product appropriately as industrial refuse in accordance with local and national regulations.
- Clamp the wire of the CT correctly. After clamping, make sure until it clicks into place.
- Use this product inside the control panel to prevent external noise.
- The terminal block may be damaged if you insert a flat-blade screwdriver in the release hole with excessive force. When inserting a flat-blade screwdriver into the release holes, operate with a force of 15 N or less.
- The voltage input and connect the CT input correctly to the same application.
- Do not bend a wire more than its natural bending radius or pull on it with excessive force. Doing so may cause wire disconnection or damage to the terminal block.
- Do not wire anything to the release holes.

PRECAUTIONS FOR CORRECT USE

- When cleaning the unit, make sure the power is off and wipe the surface of the unit with a soft dry cloth. Do not use chemicals including solvents such as thinners, benzine, or alcohol.
- This product is not categorized as "a specified measuring instrument" officially approved by an organization specified in relevant measurement acts. It cannot be used to certify power usage.
- Mount this product on DIN rails for use.
- This product cannot be used to measure the inverter's secondary side.
- Ensure that the rated voltage is reached within 2 seconds of turning the power on.
- Set the parameters of the product so that they are suitable for the system being measured.
- Refer to the status information of the product on the tag data link communications and refer to the received data only in case of no errors occurring with the product.
- Confirm that the wire does not stick up after wiring of the stranded cable.
- The factory default IP address is '192.168.250.50'. Please ensure that it does not conflict with any other devices when setting it up on your PC. (Pressing and holding the NW INTL switch on the front of the product will reset it to the factory default IP address.)
- When wiring a ferrule terminal or single wire, push it directly into the terminal hole.
  When wiring a stranded wire, insert the wire into the terminal hole while pushing straight along the taper of the release hole with the recommended flat-blade screwdriver.



- The terminal block may be damaged if a specialized tool is not used. Use a recommended flat-blade screwdriver to insert into a release hole on the terminal block.



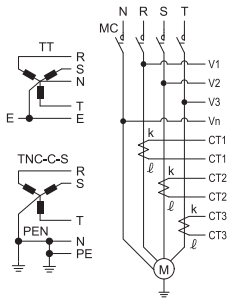
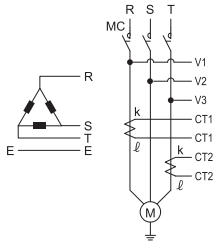
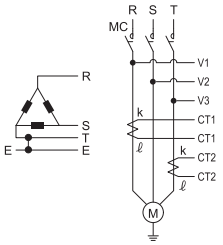
- Use the power supply and transformers with suitable capacities and rated outputs.
- Do not install the product in close contact with the heating element.
- Do not install the product near equipment that generates high frequencies or surges.
- Make sure that the setting values in the product match the specifications of the load and CT that are actually used.
- Do not ground the terminal on the output side of the CT. Failure to do so may result in unstable measurements.
- Do not directly clamp the CT to the lines exceeding 600 VAC.
- Mount the product in the correct direction for installation.
- For the wire to be measured passing through the primary side of the special CT, use an insulated wire with basic insulation or a higher degree of insulation.

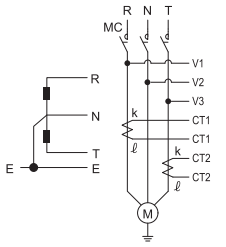
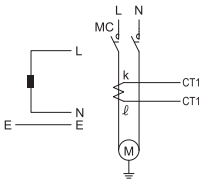
Regulations and Standards

Conformance to Safety Standards

- The protection provided by the device may be impaired if the device is used in a manner that is not specified by the manufacturer.
- To use the product, install it as an embedded device within a control panel.
- To use the CT, install it in the same control panel as the product with a sufficient clearance from other devices.
- Use the CT listed as “Special CT (CT to connect to this product)”.
- Use the voltage and CT inputs under conditions specified for the measurement category.
- The maximum temperature of the terminal block is 70°C. Therefore, use wires with a rated temperature of 70°C or higher.
- Table 1 below summarizes the nominal voltage and measurement circuit connections available for each overvoltage category (OVC II, OVC III) and each measurement category (CAT II, CAT III) in the Main Power Supply System Configurations. Do not use the device under conditions that exceed this category and conditions.

Table 1

	3-phase 4-wire (earthed neutral)		3-phase 3-wire type (contactless ground)		3-phase 3-wire type (1-phase ground)	
						
	Nominal Voltage	Rated voltage and size of AWM wires	Nominal Voltage	Rated voltage and size of AWM wires	Nominal Voltage	Rated voltage and size of AWM wires
OVC III CAT II	100 V ≤ phase voltage ≤ 150 V	150 V min. No size limit	---	---	100 V ≤ line voltage ≤ 150 V	150 V min. No size limit
	150 V < phase voltage ≤ 277 V	600 V min. 1 AWG min.	173 V ≤ line voltage ≤ 300 V	600 V min. 1 AWG min.	150 V < line voltage ≤ 300 V	600 V min. 1 AWG min.
OVC III CAT II	---	---	---	---	100 V ≤ line voltage ≤ 150 V	150 V min. No size limit
	---	---	173 V ≤ line voltage ≤ 300 V	300 V min. No size limit	150 V < line voltage ≤ 300 V	300 V min. No size limit
	---	---	300 V < line voltage ≤ 480 V	600 V min. 1 AWG min.	300 V < line voltage ≤ 480 V	600 V min. 1 AWG min.

	1-phase 3-wire		1-phase 2-wire	
				
	Nominal Voltage	Rated voltage and size of AWM wires	Nominal Voltage	Rated voltage and size of AWM wires
OVC III CAT II	100 V ≤ phase voltage ≤ 150 V	150 V min. No size limit	100 V ≤ line voltage ≤ 150 V	150 V min. No size limit
	150 V < phase voltage ≤ 240 V	600 V min. 1 AWG min.	150 V < line voltage ≤ 277 V	600 V min. 1 AWG min.
OVC III CAT II	---	---	---	---
	---	---	---	---
	---	---	---	---

For the wire passing through the primary side of this CT, select an AWM (Appliance Wiring Material) wire that meets the conditions in the table 1 and table 2:

- A wire that satisfies the conditions in the table 2 below to ensure that the case temperature of this CT is 65°C or less.
- An insulated wire with basic insulation or a higher degree of insulation that meets the requirements of the product used in combination with this CT. The product used in combination with this CT specifies the rated voltage and size of the AWM wire that can be used, depending on the configuration of the main power supply system and the measurement category.

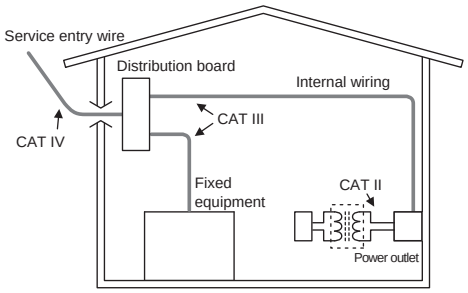
Table 2

Model	Wire size	Operating Ambient Temperature for This CT and the Equipment Used in Combination with It
KM-PCBE005	24 AWG min. (0.25 mm^2 min.)	55°C max.
KM-PCBE050	6 AWG min. (16 mm^2 min.)	55°C max.
KM-PCBE100	4 AWG min. (22 mm^2 min.)	45°C max.
	2 AWG min. (35 mm^2 min.)	50°C max.
	1 AWG min. (50 mm^2 min.)	55°C max. (up to primary current of 90 A)
KM-PCBE200	2/0 AWG min. (70 mm^2 min.)	45°C max.
	3/0 AWG min. (95 mm^2 min.)	50°C max.
	4/0 AWG min. (120 mm^2 min.)	55°C max. (up to primary current of 160 A)
KM-PCBE400	450 kcmil min. (250 mm^2 min.)	40°C max.
		50°C max. (up to primary current of 300 A)
		55°C max. (up to primary current of 240 A)

Measurement category

The measurement category classifies the places and equipment which you can connect to the measurement terminals, as prescribed in EN/IEC 61010-2-030.
Each category is as follows.

CAT II: Energy-consuming equipment with an energy supply from fixed wiring equipment (such as a power outlet)
CAT III: Equipment in fixed wiring equipment that particularly demands equipment reliability and effectiveness
CAT IV: Equipment to use at the electrical service entry

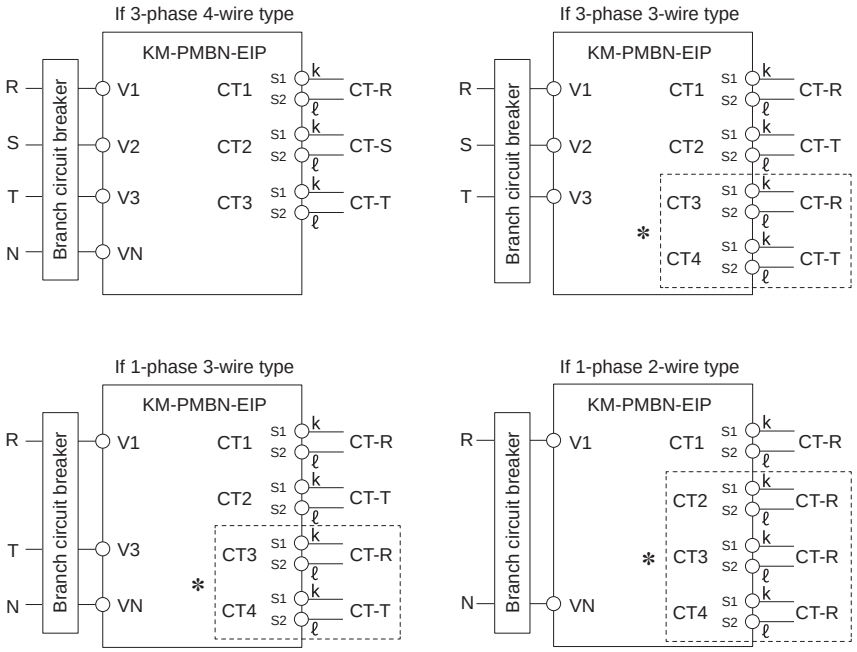


Special CT (CT to connect to this product)

Primary-side rated current	Model	Supplied cable
5 A	KM-PCBE005	Included
50 A	KM-PCBE050	
100 A	KM-PCBE100	
200 A	KM-PCBE200	
400 A	KM-PCBE400	
600 A ✻	KM-PCBE600	

✻ 600 A-rated current transformers (model KM-PCBE600) do not comply with safety standard certifications, including UL/CSA certification.

Connection diagrams



✻ Wire only during multiple circuit measurements.

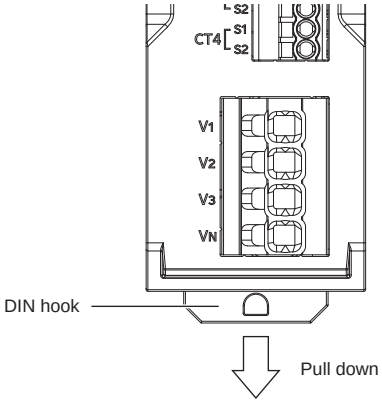
Conformance to EN/IEC Standards

This is a “class A” product. In residential areas it may cause radio interference. The user may be required to take adequate measures to reduce interference if this occurs. The product must be installed within a control panel.

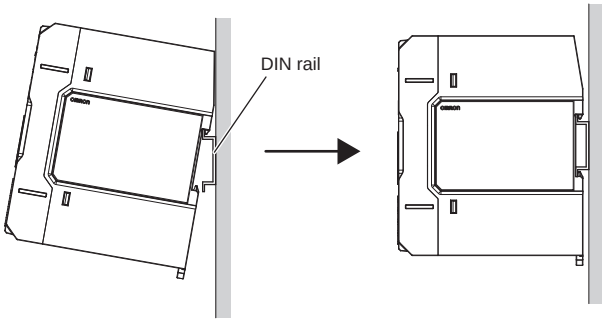
Installation and Wiring

For safety purposes, install the unit in a location where you won't touch the terminals when operating the main unit. For example, install so that the terminals are hidden within the control board so that a person working on the unit will not be able to touch live wires.

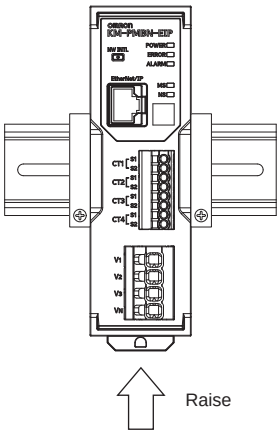
1. Fix the DIN rail to the installation location
   DIN rail (recommended product):
   Model PFP-50N/-100N (from Omron)
2. Pull down the DIN hook on the bottom of the body of the unit



3. Fit the flanges of the body onto the DIN rail as shown in the below diagram, and click into place



4. Raise the DIN hook and fix the body to the DIN rail



Detaching the body of the unit

When removing the body from the DIN rail, use a flathead screwdriver to flick open the DIN hook and open downwards.

Important

- Ensure that the DIN rails and the body are attached properly. Looseness may cause the DIN rails, body, and wires to separate if vibrations or impacts occur.
- Fix end plates to the body units at each end of the DIN rail. These stop the units from jumping off the DIN rail due to vibration or impacts.
  End plate (recommended part): model PFP-M (from Omron)
- Make sure you install so there is space for wiring above and below the body of the unit. (about 50 mm above the unit and 30 mm below the unit)

Information

- You can attach multiple model KM-PM to the DIN rail and fit the bodies next to each other.

MEMO

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Note: Do not use this document to operate the Unit.

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