

# OMRON KM1/KE1

【Function Slave】  
Smart Power Monitor/Smart Monitoring Device

KM1-EMU8A-FLK Pulse/Temperature Input Unit  
KE1-VSU1B-FLK Voltage-Sag Monitoring Unit  
KE1-VAU1B-FLK Voltage/Current Monitoring Unit

## EN INSTRUCTION SHEET

Thank you for purchasing this product. This manual describes the functions, performance, and application methods needed for optimum use of the product. Please observe the following items when using the product.

- This product is designed for use by qualified personnel with a knowledge of electrical systems.
- Before using the product, thoroughly read and understand this manual to ensure correct use.
- Keep this manual in a safe location so that it is available for reference whenever required.

OMRON Corporation

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## PRECAUTIONS ON SAFETY

### ● Meanings of Signal Words



Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or there may be property damage.

### ● Signal Words



Property damage may occur due to fire. Tighten the terminal screws to the specified torques. Recommended terminal screw tightening torque: 0.69 to 0.88 N·m After tightening the screw, check that the screw is not tilted.	
Minor or moderate injury or property damage may occur due to explosion. Do not use the product in locations where explosive or flammable gasses may be present.	
Breakdown or explosion may occasionally occur. Use the power-supply voltage and loads of the specified range.	
Breakdown or explosion may occasionally occur. Isolation isn't obtained between the voltage input circuit and the CT secondary circuit. When grounding the dedicated CT, Zero-phase CT(ZCT) wrong wiring may cause short circuit between the voltage input circuit and the CT secondary circuit. Since this product uses the dedicated CT, even if CT isn't grounded, the normal measurement is available.	
Electric shock may occasionally occur. Always make sure that the power is turned OFF before connecting the Current Transformer (CT).	
Electric shock may occasionally occur. Do not touch the terminals while energized.	
Electric shock may occasionally occur. Use the covered electric wire with basic insulation or more when clamping the special CT. When the special CT is clamped the bus-bar, use insulation tape to cover the bus-bar or to keep the distance (basic insulation or more) between bus-bar and special CT.	
Doing so may occasionally result in electric shock, minor injury, fire, or malfunction of products. Do not try to disassemble, repair, or modify the product.	

## ■ Ratings

Item	Model	KM1-EMU8A-FLK (Pulse/Temperature Input Unit)	KE1-VSU1B-FLK (Voltage-Sag Monitoring Unit)	KE1-VAU1B-FLK (Voltage/Current Monitoring Unit)
Applicable circuit			1-phase 2-wire, 1-phase 3-wire, 3-phase 3-wire, 3-phase 4-wire	
Power supply	Rated power supply voltage	100 to 240 VAC, 50/60 Hz		
	Allowable power supply voltage range	85% to 110% of rated supply voltage		
	Power supply frequency variation range	45 to 65 Hz		
	Power consumption	10 VA max		
Input	Voltage sag monitoring prevention	Only the electrical voltage measurement function backed up at least 1.2 second by the electrical double layer capacitor		
	Rated input voltage	100 to 480 VAC [1-phase 2-wire]: Line voltage 100/200 VAC [1-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		
	Rated input frequency	50/60 Hz		
	Input frequency variation 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)
Date/Time	Clock setting	2012 to 2099 with leap year adjustment		
	Clock accuracy	±1.5 minutes/month (at 23°C)		
	Backup retention period	7 days by the electrical double layer capacitor (during power OFF) at 23°C		
Ambient operating temperature	-10 to 55°C (with no icing or condensation)			
Conservation temperature	-25 to 65°C (with no icing or condensation)			
Ambient operating humidity	Relative humidity 25% to 85%			
Conservation humidity	Relative humidity 25% to 85%			
Altitude	2,000 m max.			
Installation environment	Overvoltage category: II, Degree of contamination: 2, Measurement category: II			
Applicable standards	EC61010-2-030, EN61326-1			

## ■ Features

### 【Function Slave】

- Capable of operating independently.
  - However, only the KM1-EMU8A-FLK cannot be operated independently.
- A maximum of four units can be connected to the Measurement Master in conjunction with the CT expansion slave.

### 【KM1-EMU8A-FLK】

- Capable of connecting with the KM1/KE1 Measurement Master.
- When being connected with the KM1 Measurement Master, it is possible to use 3-STATE function in a state of event input.
- Having 7 event inputs.
- Having 1 thermistor input, capable of measuring temperature.

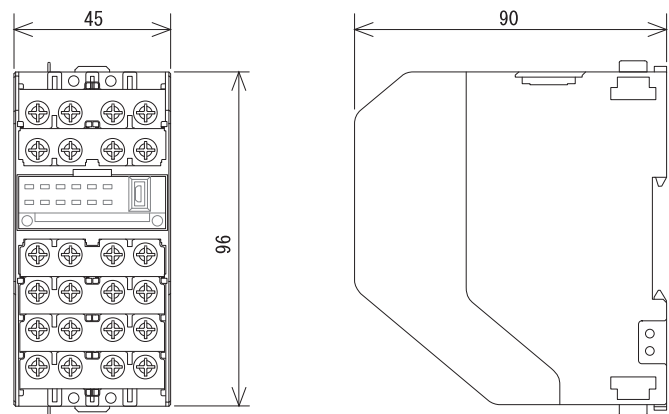
### 【KE1-VSU1B-FLK】

- Capable of connecting with the KE1 Measurement Master.
- Having a relay output and a semiconductor relay output.
- Capable of monitoring for instantaneous voltage drop, it is possible to give alerts from a semiconductor relay and a relay.

### 【KE1-VAU1B-FLK】

- Capable of connecting with the KE1 Measurement Master.
- Having two relay outputs.
- Capable of monitoring voltage/current, it is possible to give alerts such as overvoltage and overcurrent.

## ■ Dimensions (unit: mm)



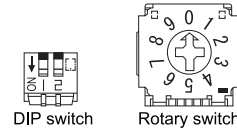
## ■ Setting Switch

There are two setting switches: a rotary switch and a DIP switch.

Slave ID can be set by a rotary switch. The slave ID is used to identify each unit when multiple units are connected. The slave ID should be set without overlapping among 1 to 4. The communication protocol can be set by the DIP switch. Instead of Switch 1, use Switch 2 to change the communication protocol.

Switch 2: OFF CompoWay/F  
ON Modbus

- Make sure to set the switch only when the power is OFF. The settings will be enabled only when the power is turned on and any change made during current application will not be reflected. To change the settings, turn off the power and make necessary changes. Then, turn on the power again.
- To use KM1-EMU8A-FLK with 3-STATE function, the Slave ID of the Function Slave should be set to 5.



## ■ USB port

The setting and measurement values can be read by connecting KM1/KE1 with a USB cable. Although the Power is off, the settings can be changed via USB connection. Be sure to turn on the power when using multiple units. To make measurement values read, make sure to turn on KM1/KE1 first and connect the USB cable. When the power is ON with multiple units connected, the settings of the combined units can be read and written by connecting the USB cable with the Measurement Master.

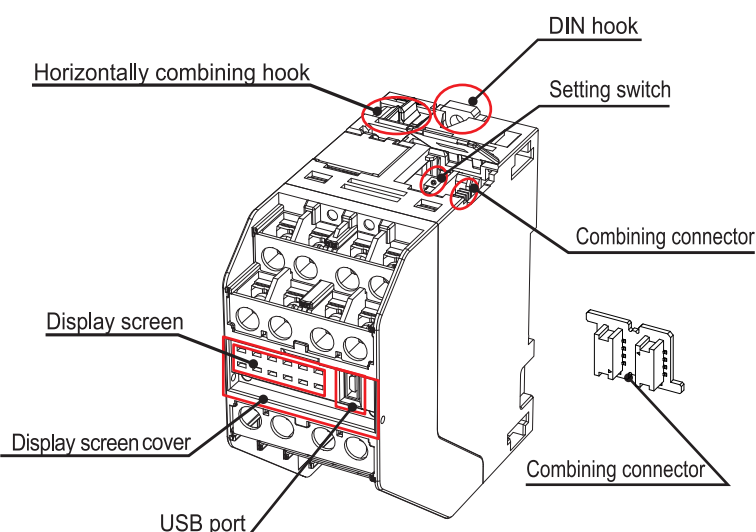
- Use a mini-USB B cable
- Download the setting tools and ".inf" files necessary for communication from the website: <http://www.ia.omron.com/>

## ■ Display screen

Model	Green	Red	Yellow	Yellow	Yellow	Yellow
KM1-EMU8A-FLK	PWR	ALM	EV1	EV2	EV3	EV4
	CONN	COMM	EV5	EV6	EV7	TH
KE1-VSU1B-FLK	PWR	ALM				
	CONN	COMM	OUT1	OUT2		
KE1-VAU1B-FLK	PWR	ALM	CT1	CT2	CT3	
	CONN	COMM	OUT1	OUT2		

PWR : Lighting when the power is ON. Blinking at the time of errors.  
ALM : Lighting when the alarm is going off.  
EV : Corresponding LED lighting when the Event is ON.  
CT : Corresponding LED lighting when the CT is ON.  
CONN : Lighting when the multiple units are connected.  
COMM : Lighting when the RS-485, USB is in communication mode.  
TH : ON when a thermistor is turned on.  
OUT : Corresponding LED lighting when the Output is ON.

## ■ Nomenclature



## PRECAUTIONS FOR SAFE USE

In order to prevent malfunction, false operation or adverse effect on performance/functions, observe the following matters.

- Do not store, install or use the product in the following environment.
    - Locations subject to vibration or strong shocks.
    - Locations where the Unit is unstable.
    - Locations subject to temperature or humidity beyond the specifications.
    - Locations subject to extreme change in temperature and humidity, resulting in icing or condensation. Locations subject to vibration or strong shocks.
    - Locations subject to direct sunlight.
    - Outdoors or locations exposed to the elements.
    - Locations subject to static electricity or noise.
    - Locations splashed with water and oil, and locations subject to exposure to salt water
    - Locations subject to corrosive gases (in particular, sulfide gas and ammonia gas).
    - Locations subject to dust (including iron dust).
    - Locations subject to a electric field or a magnetic field.
  - Install DIN rails using screws without looseness. Furthermore, install the DIN rails and body assuredly. Looseness may cause the DIN rails, product body and wiring to unfasten due to vibration, impact and so on.
  - Use 35mm width DIN rails (Omron, Form PFP-50N/-100N).
  - Wire the product using crimp terminals for M3.5 screws.
  - Make sure of proper specification and wiring prior to conduction.
  - Before operating or performing maintenance of the product, read this Instruction Manual thoroughly to acquire sufficient knowledge of the product. Otherwise electric shock, injury, accident, or malfunction may occur.
  - Install and clearly mark a switch or circuit breaker conforming to requirement in IEC60947-1 and IEC60947-3, to enable immediate power OFF by the operator.
  - Understand instructions of a manual before setting up equipment.
  - When installing the product, allow as much space as possible from the equipments that generate powerful high frequency noises, such as high-frequency welders, high-frequency sewing machines or motors, or devices that generate surges.
  - Be sure to touch grounded metal as a measure against electrostatic prior to touching of the product.
  - Separate the product wiring from high-voltage or high-current power lines to prevent inductive noise, and do not place the product wiring parallel to or in the same ducts or conduits as power lines. Use separate ducts, separate conduits, or shielded cables.
  - Do not install the product close to heat-producing devices, a coil for instance.
  - Do not make metals, conductors or chips during installation and machining penetrate into products.
  - Do not use thinner or similar merical alcohol.
  - Use the specified power supply and wires for the supply of control power or inputs. Product failure, burns, or electric shock may occur.
  - Install wall surface using screws without looseness. Looseness may cause the product body and wiring to unfasten due to vibration, impact, and so on.
  - When using multiple units, slide the horizontally combining hook unit a clicking sound is heard.
  - When mounting the unit on the DIN rail, slide the DIN hook unit a clicking sound is heard.
  - Use our dedicated CTs and dedicated CT cable.
 

Split type	KM20-CTF-5A	KM20-CTF-50A
	KM20-CTF-100A	KM20-CTF-200A
	KM20-CTF-400A	KM20-CTF-600A
Through type	KM20-CTB-5A/50A	
- Dedicated CT cable : KM20-CTF-CB3 (3m)
- This Product cannot be used to measure the inverter's secondary side.
  - Allow for proper ventilation. Do not block the area around the product, or the ventilation holes on the product.
  - Make sure to wire properly after confirming the terminal number. Do not connect anything with terminals that are not used.
  - This is a class A product. In residential areas it may cause radio interference, in which case the user may be required to take adequate measures to reduce interference.
  - Use dedicated CT under 600 V voltage circuit.

## Precautions for Correct Use

- Set the parameters of the product so that they are suitable for the system being measured.
- Do not pull the unit with a cable.
- Dispose of this product in accordance with local and national disposal regulations.
- Always use varistors to between the line of power supply and the line of voltage input when this product installed under overvoltage category III.

## Suitability for Use

The warranty period for an OMRON Product is one year from either the date of purchase or the date on which the OMRON Product is delivered to the specified location. OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of the products in the customer's application or use of the product. Take all necessary steps to determine the suitability of the product for the systems, machines, and equipment with which it will be used. Know and observe all prohibitions of use applicable to this product. NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM. See also product catalog for Warranty and Limitation of Liability.

## Contact Information

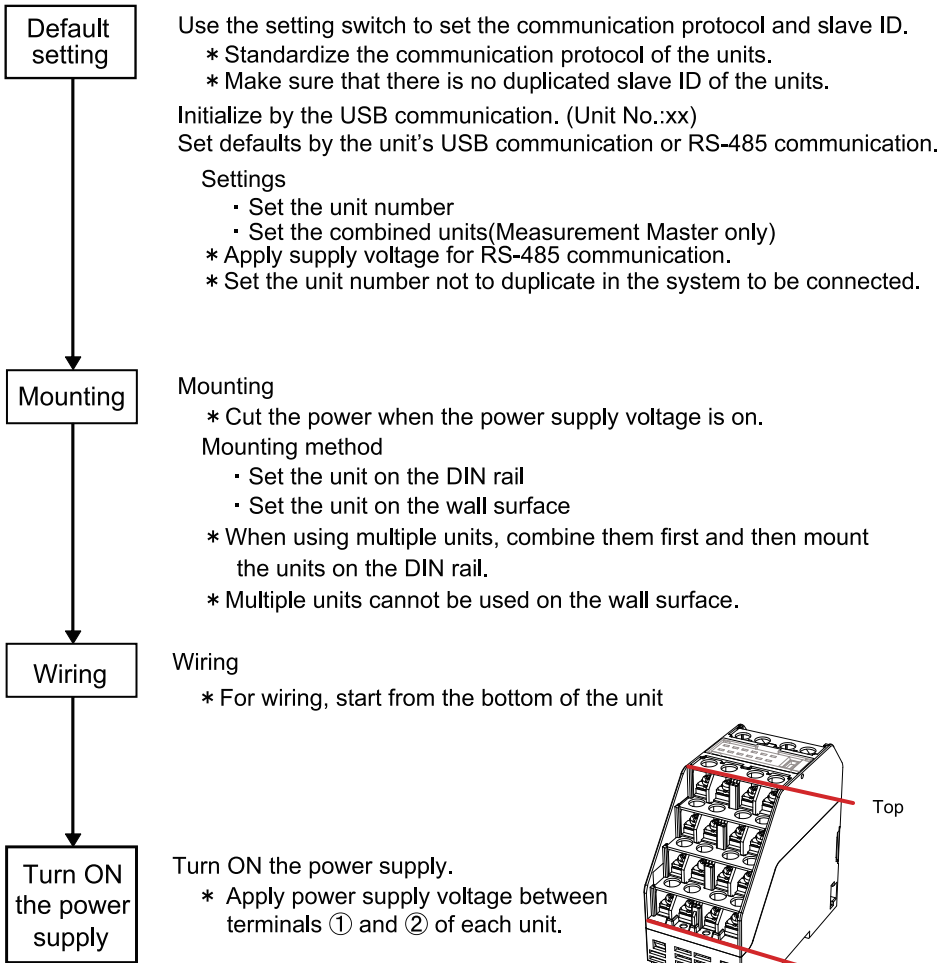
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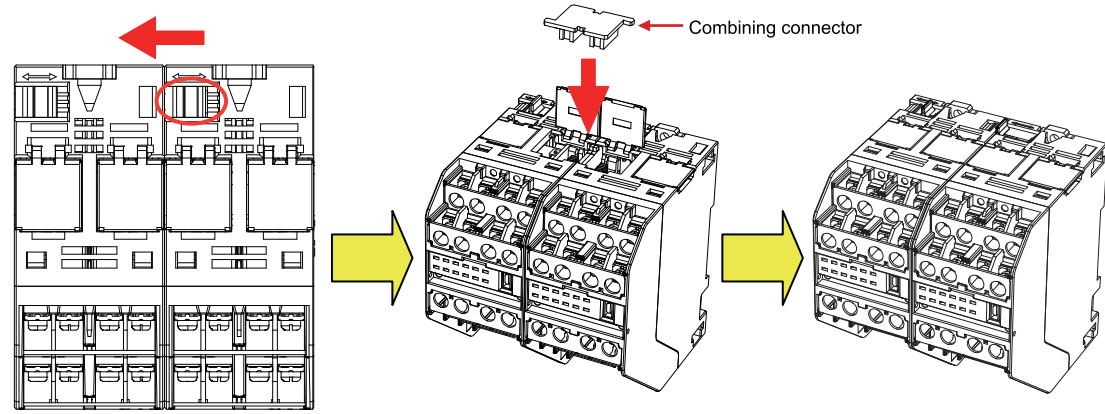
**OMRON CORPORATION**  
3-4-10 Toranomon Minato-ku, Tokyo, 105-0001 Japan  
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## Basic operating procedure



## Connect

When using multiple units, fix the adjacent units using a horizontally combining hook and connect them using the attached Combining connector. Slide the horizontally combining hook until a clicking sound is heard.



To separate the units, follow the combining procedure backwards.

- \* To remove the Combining connector, use a flathead screwdriver.
- \* The Function slave can be only connected to the Measurement Master.

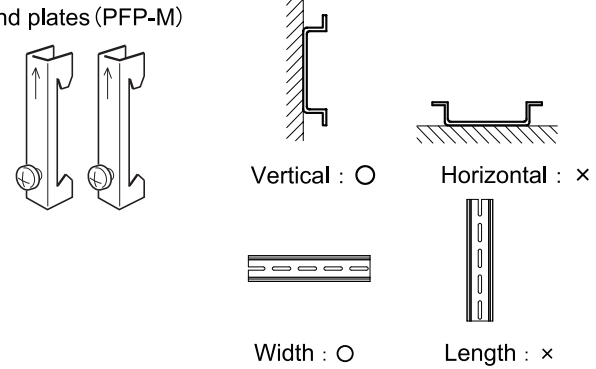
## Mounting of the unit on the DIN rail

To install the DIN rail, place at least three screws vertically against the ground (within the control panel) After the installation, set the end plates on both sides of the product so that the DIN rail is firmly fixed.

### Recommended DIN rail

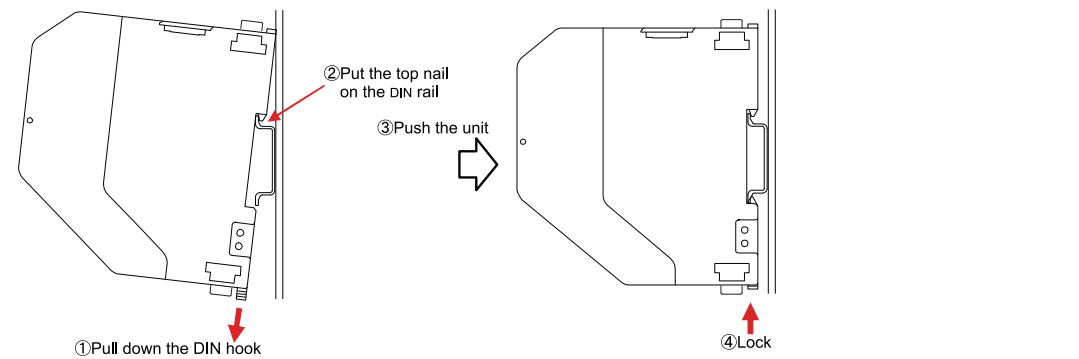
Model	Dimension
PFP-100N	1,000mm
PFP-50N	500mm

### End plates (PFP-M)



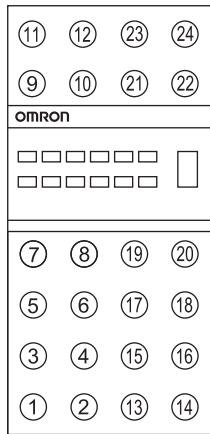
### Mounting of the product

Pull down the DIN hook of bottom side and put the top nail on the DIN rail. Push the unit until the DIN hook can be locked and then lock the DIN hook.



To remove the product, use a flathead screwdriver by pulling down the DIN hook.

## Terminal diagram



Terminal number	KM1-EMU8A-FLK Pulse/Temperature Input Unit	KE1-VSU1B-FLK Voltage Sag Monitoring Unit	KE1-VAU1B-FLK Voltage/Current Monitoring Unit
①	Power supply voltage	Power supply voltage	Power supply voltage
②	Power supply voltage	Power supply voltage	Power supply voltage
③	Transistor output COM	Relay output	Relay output 1
④	Transistor output 1	Relay output	Relay output 1
⑤	Transistor output 2	Semiconductor relay output	Relay output 2
⑥	Transistor output 3	Semiconductor relay output	Relay output 2
⑦	RS-485 A(-)	RS-485 A(-)	RS-485 A(-)
⑧	RS-485 B(+)	RS-485 B(+)	RS-485 B(+)
⑨	Event input1 (+)	NC	NC
⑩	Event input1 (-)	NC	NC
⑪	Event input2 (+)	NC	NC
⑫	Event input2 (-)	NC	NC
⑬	Event input3 (+)	NC	CT-1S
⑭	Event input3 (-)	NC	CT-1L
⑮	Event input4 (+)	NC	CT-2S
⑯	Event input4 (-)	NC	CT-2L
⑰	Event input5 (+)	NC	CT-3S
⑱	Event input5 (-)	NC	CT-3L
⑲	Event input6 (+)	NC	NC
⑳	Event input6 (-)	NC	NC
㉑	Event input7 (+)	P1	P1
㉒	Event input7 (-)	P2	P2
㉓	Thermistor input	P3	P3
㉔	Thermistor input	P0	P0

## Wiring diagram

