

# Power Monitors

KM-N2 / KM-N3

**Multi-circuit Power Monitors for Energy Management  
Easily Implement All Types of Power Monitoring  
with On-panel and In-panel Installation**



- Power Monitors applicable around the globe
- Solve design, installation, and operation topics with one model for each installation type

# New Value For Control Panels

Control Panels: The Heart of Manufacturing Sites.

Evolution in control panels results in large evolution in production facilities.

And if control panel design, control panel manufacturing processes, and human interaction with them are innovated, control panel manufacturing becomes simpler and takes a leap forward.

OMRON will continue to achieve a control panel evolution and process innovation through many undertakings starting with the shared Value Design for Panel \*1 concept for the specifications of products used in control panels.

## \*1 Value Design for Panel



Our shared Value Design for Panel (herein after referred to as "Value Design") concept for the specifications of products used in control panels will create new value to our customer's control panels.

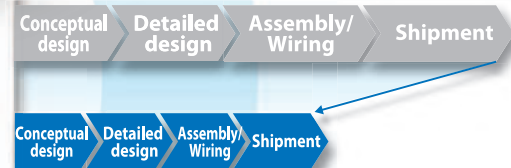
Combining multiple products that share the Value Design concept will further increase the value provided to control panels.



Further Evolution  
for  
**Panels**

**New Value  
For  
Control Panels**

Innovation for  
panel building  
**Process**



Simple & Easy  
for panel business  
**People**



# Multi-circuit Power Monitors for Energy Management

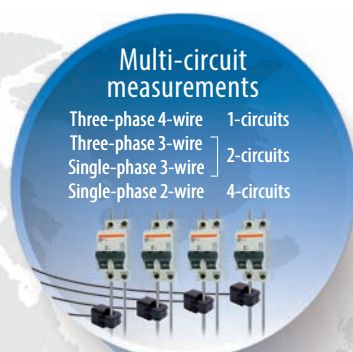
## Easily Implement All Types of Power Monitoring with On-panel and In-panel Installation

### The New KM-N2 and KM-N3 Power Monitors

Energy management starts by continuously monitoring power.

The KN-N2 and KN-N3 enable all types of power measurement with easy installation and easy system construction.

You can mount them on or in control panels and distribution boards and take advantage of their compatibility with power supplies around the world.



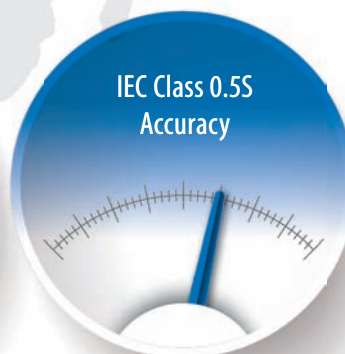
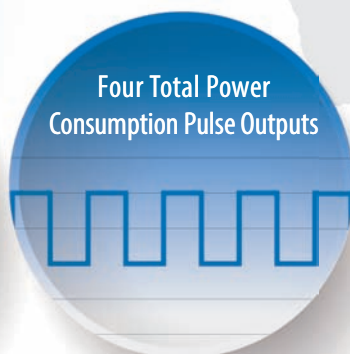
KM-N2



KM-N3



## Packed Full of Functions!



Features Common to  
Both the KM-N2 and KM-N3

# Power Monitors for Energy Management That

Easier Application and Greater Work Efficiency for Everyone

System Design Manager

Handle All EMS\* Specifications



Energy Manager

No Numeric Value

\*EMS: Energy Management System

## General-purpose CTs



## Corresponding to the Main International Standards



## Many Host Communications Methods

PLC

Proprietary systems

Central monitoring system



RS-485 communications  
Modbus(RTU)  
CompoWay/F

Total power  
consumption  
pulse outputs

## Large Easy-to-read Displays

Actual Size



## Multi-address System



Address

Setting

02

Automatic assignment

03

Three-phase, 3-wire

Three-phase, 3-wire

Setting

04

Automatic assignment

05

Single-phase, 3-wire

Single-phase, 2-wire

06

Single-phase, 2-wire

Setting

09

Three-phase, 4-wire

## DIN Rail Installation Type KM-N2



# Solve Design, Installation, and Operation Issues



On-panel Installation Type KM-N3



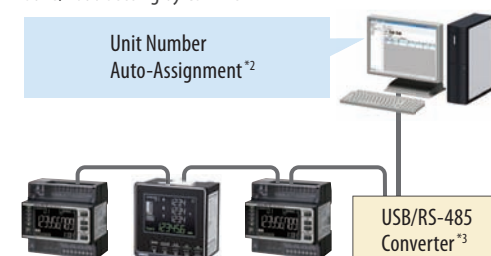
## Push-In Plus Terminal Block

The structure of Push-In Plus terminal blocks helps reduce wiring mistakes with easy-to-insert terminals that hold wires firmly (RS-485 communications and pulse output terminals).



## Efficient Initial Setting Tool<sup>\*1</sup>

- Easy-to-use setting functions of the communications and measurement conditions
- Save/Load setting by CSV file



<sup>\*1</sup>. Supported Version of main unit: V2.0.0 or higher for all models.

<sup>\*2</sup>. Except for KM-N2-FLK.

<sup>\*3</sup>. For this software, compatibility of the USB/RS-485 converter has been verified for SI-35USB (LINEEYE Co.,Ltd.). K3SC-10 is not compatible.

## Wiring Error Detection

ALARM lamp blinks



! lamp lights up



# Power Monitor

# KM-N2-FLK

## Global Power Monitor for Mounting Inside Control Panels



- Solve design, installation, and operation topics.
- You can measure up to four circuits with one Power Monitor.
- Use general-purpose CTs and handle a variety of worksites.
- Large, easy-to-read white LCD for improved visibility.
- IEC Class 0.5S high-precision measurements (Power Monitor only).



**⚠ Refer to Safety Precautions on page 19.**

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

## Ordering Information

### Power Monitor

| Model     | Rated input voltage<br>(Common terminals of a power supply and a measurement voltage input.)                                                                                                                                                                                                           | Dimensions              | Communications                      |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------------------|
| KM-N2-FLK | 1-phase 2-wire: 100 to 277 VAC<br>1-phase 3-wire: 100 to 220 VAC (L-N), 200 to 440 VAC (L-L)<br>3-phase 3-wire: 173 to 277 VAC (L-L)<br>3-phase 4-wire (earthed neutral): 100 to 254 VAC (L-N), 173 to 440 VAC (L-L)<br>3-phase 4-wire (unearthed neutral): 100 to 120 VAC (L-N), 173 to 208 VAC (L-L) | 90 × 90 × 65 mm (H×W×D) | RS-485 communications, pulse output |

To use a commercially available current transformer, use a CT with a secondary current rating of 1 A or 5 A, and a rated load of at least 1.0 VA.

### Split Type Current Transformer (CT) (CE marking compliant KM-N2/N3 dedicated products \*)

| Model        | Rated primary current | Rated secondary current |
|--------------|-----------------------|-------------------------|
| KM-NCT-E100A | 100 A                 | 1 A                     |
| KM-NCT-E250A | 250 A                 |                         |
| KM-NCT-E500A | 500 A                 |                         |

\* The KM-NCT-E conforms to the standards shown above ONLY when it is used with a power monitor KM-N2-FLK or KM-N3-FLK to which it is attached. Use of the KM-NCT-E without a power monitor does not conform to these standards.

**Note:** Select a CT cable that does not exceed the rated load of 1 VA.

## Specifications

### Ratings (Power Monitor)

| Item                            | Model                                                                                        | KM-N2-FLK                                                                                                                                                                                                                                                                                              |
|---------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Applicable phase wiring methods |                                                                                              | Single-phase two-wire, single-phase three-wire, three-phase three-wire, and three-phase four-wire                                                                                                                                                                                                      |
| Number of measured circuits     |                                                                                              | Single-phase two-wire: 4 circuits max., Single-phase three-wire or three-phase three-wire: 2 circuits max., Three-phase four-wire: 1 circuit                                                                                                                                                           |
| Power consumption               |                                                                                              | 7 VA max.                                                                                                                                                                                                                                                                                              |
| Input                           | Rated input voltage<br>(Common terminals of a power supply and a measurement voltage input.) | 1-phase 2-wire: 100 to 277 VAC<br>1-phase 3-wire: 100 to 220 VAC (L-N), 200 to 440 VAC (L-L)<br>3-phase 3-wire: 173 to 277 VAC (L-L)<br>3-phase 4-wire (earthed neutral): 100 to 254 VAC (L-N), 173 to 440 VAC (L-L)<br>3-phase 4-wire (unearthed neutral): 100 to 120 VAC (L-N), 173 to 208 VAC (L-L) |
|                                 | Allowable supply voltage range                                                               | 85% to 115% of rated power supply voltage                                                                                                                                                                                                                                                              |
|                                 | Connectable CTs                                                                              | General-purpose CT with a rated secondary current of 1 A or 5 A *                                                                                                                                                                                                                                      |
|                                 | Maximum CT secondary current                                                                 | 6 A                                                                                                                                                                                                                                                                                                    |
|                                 | Rated input frequency                                                                        | 50/60 Hz                                                                                                                                                                                                                                                                                               |
| Ambient operating temperature   |                                                                                              | –25 to 55°C (with no condensation or icing)                                                                                                                                                                                                                                                            |
| Ambient operating humidity      |                                                                                              | 25% to 85%                                                                                                                                                                                                                                                                                             |
| Storage temperature             |                                                                                              | –25 to 85°C (with no condensation or icing)                                                                                                                                                                                                                                                            |
| Storage humidity                |                                                                                              | 25% to 85%                                                                                                                                                                                                                                                                                             |
| Operating altitude              |                                                                                              | 2,000 m max.                                                                                                                                                                                                                                                                                           |
| Installation environment        |                                                                                              | Overvoltage category II, measurement category II, pollution degree 2                                                                                                                                                                                                                                   |
| Electromagnetic environment     |                                                                                              | Industrial electromagnetic environment (EN/IEC 61326-1 Table 2)                                                                                                                                                                                                                                        |
| Compliant standards             |                                                                                              | EN 61010-2-030, EN 61326-1, and UL 61010-1                                                                                                                                                                                                                                                             |

\* The KM-series CTs (the KM20-CTF or KM-NCT Series) cannot be used. Use general-purpose CTs with a secondary-side output of 1 A or 5 A.

## Split Type Current Transformer (CT) (CE marking compliant KM-N2/N3 dedicated products \*)

| Item                                     | KM-NCT-E100A                                                          | KM-NCT-E250A  | KM-NCT-E500A  |
|------------------------------------------|-----------------------------------------------------------------------|---------------|---------------|
| Rated primary current: In                | 100 A                                                                 | 250 A         | 500 A         |
| Rated secondary current: Is              | 1 A                                                                   |               |               |
| Rated frequency                          | 50/60 Hz                                                              |               |               |
| Cable Length                             | Please refer to <i>Writing to KM-NCT-E□□□A</i>                        |               |               |
| Rated load                               | 1 VA                                                                  |               |               |
| Insulation resistance                    | 100 MΩ min. (at 500 VDC mega) between core and all output terminals   |               |               |
| Dielectric strength voltage              | 2300 VAC, 1 minute between core and all output terminals.             |               |               |
| Weight                                   | Approx. 170 g                                                         | Approx. 175 g | Approx. 290 g |
| Maximum wire diameter                    | 24 dia.                                                               | 24 dia.       | 36 dia.       |
| Operating temperature and humidity range | -20 to 55 °C, relative humidity: 85% max. with no condensation        |               |               |
| Storage temperature and humidity range   | -30 to 90 °C, relative humidity: 85% max. with no condensation        |               |               |
| Applicable standards *                   | EN61010-1, EN61010-2-030, EN61326-1                                   |               |               |
| Installation environment                 | Overvoltage category and measurement category: II, Pollution level: 2 |               |               |

\* The KM-NCT-E conforms to the standards shown above ONLY when it is used with a power monitor KM-N2-FLK or KM-N3-FLK to which it is attached. Use of the KM-NCT-E without a power monitor does not conform to these standards.

### Wiring to KM-NCT-E□□□A

- For wiring of the output terminal of CT, use AWG18-14 electric wire (with a cross-section of 0.75-2.0 mm<sup>2</sup>) and Y-shape terminal compatible with the M3 screw.
- The recommended torque for screwing the M3 screws onto the output terminal is 0.3 N·m. Make sure the Y terminal is pushed all the way in and tightened firmly. After fixing the wiring, confirm that the wire is fixed securely.
- The guideline of the maximum wiring length between KM-N2-FLK or KM-N3-FLK and KM-NCT-E is as follows.  
The longer the wire length, the larger the measurement error using the KM-NCT-E becomes.
- The limit of the wiring length can also be calculated by the following formula. Calculate the wiring length limit according to the conductor resistivity of the wiring and keep the wiring length below the limit.
- The limits of the wiring length shown below are for reference only. They do not guarantee proper use.

| Wiring diameter                         | Guideline for wiring length limit |
|-----------------------------------------|-----------------------------------|
| 0.75 mm <sup>2</sup> (AWG18 equivalent) | 15 m                              |
| 2.0 mm <sup>2</sup> (AWG14 equivalent)  | 43 m                              |

Wiring extension limit value (one-way) (m)=  
0.475/conductor resistivity (Ω/m)

**Note:** Select a CT cable that does not exceed the rated load of 1 VA.

## Performance (Power Monitor)

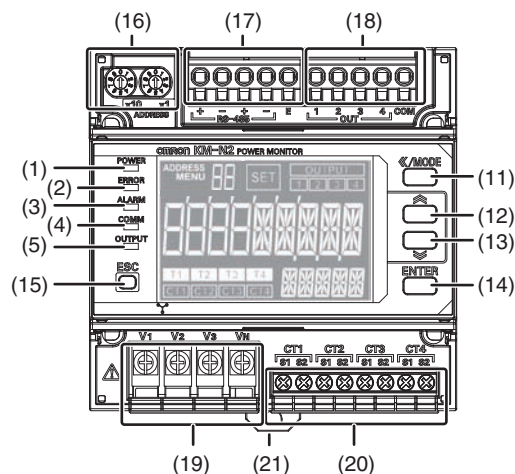
| Item                             | Model                                      | KM-N2-FLK                                                                                                                                                                                               |
|----------------------------------|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Measured items                   |                                            | Total power consumption (active, regenerative, and reactive), power (active and reactive), current, voltage, power factor, and frequency                                                                |
| Measurement specifications       | Active power                               | 0.5% (IEC 62053-22 class 0.5S) *                                                                                                                                                                        |
|                                  | Reactive power                             | 2% (IEC 62053-23 class 2) *                                                                                                                                                                             |
|                                  | Sampling cycle                             | 80 ms for 50 Hz and 66.7 ms for 60 Hz                                                                                                                                                                   |
| Insulation resistance            |                                            | (1) Between all electrical circuits and the case: 20 MΩ min. (at 500 VDC)<br>(2) Between all power supply and voltage inputs and all communications and pulse output terminals: 20 MΩ max. (at 500 VDC) |
| Dielectric strength              |                                            | (1) Between all electrical circuits and the case: 2,200 VAC for 1 min<br>(2) Between all voltage and current inputs and all communications and pulse output terminals: 2,200 VAC for 1 min              |
| Vibration resistance             |                                            | Single amplitude: 0.1 mm, Acceleration: 15 m/s <sup>2</sup> , Frequency: 10 to 150 Hz, 10 sweeps for 8 min each along three axes                                                                        |
| Shock resistance                 |                                            | 150 m/s <sup>2</sup> , 3 times each in 6 directions (up/down, left/right, forward/backward)                                                                                                             |
| Indications and operation method |                                            | LED/LCD indications and operation buttons                                                                                                                                                               |
| Weight                           |                                            | Approx. 350 g (Power Monitor only)                                                                                                                                                                      |
| Degree of protection             |                                            | IP20                                                                                                                                                                                                    |
| Pulse output                     | Number of outputs                          | Number of outputs: 4 (photoMOS relay outputs)<br>Used for the total power consumption pulse output.                                                                                                     |
|                                  | Output capacity                            | 50 mA at 40 VDC<br>ON residual voltage: 1.5 V max. (for output current of 50 mA)<br>OFF leakage current: 0.1 mA max.                                                                                    |
|                                  | Output unit                                | Output unit: 1, 10, 100, 1k, 5k, 10k, 50k, or 100k (wh)<br>Pulse ON time: 500 ms (Cannot be changed.)                                                                                                   |
| Communications interface         | Communications method                      | RS-485 (2-wire half-duplex with start-stop synchronization)                                                                                                                                             |
|                                  | Communications protocol                    | Modbus (RTU): Binary. CompoWay/F: ASCII                                                                                                                                                                 |
|                                  | Baud rate                                  | 1.2, 2.4, 4.8, 9.6, 19.2, or 38.4 kbps                                                                                                                                                                  |
|                                  | Data length                                | Data length: 7 or 8 bits<br>Stop bits: 1 or 2 bits<br>Vertical parity: Even, odd, or none                                                                                                               |
|                                  | Maximum transmission distance              | 1,200 m                                                                                                                                                                                                 |
| Dimensions (H×W×D)               | Maximum number of connected Power Monitors | Modbus: 99, CompoWay/F: 31<br>If you measure more than one circuit with one Power Monitor, the number of circuits is treated as the number of connected Power Monitors.                                 |
|                                  |                                            | 90 × 90 × 65 mm (excluding protrusions)                                                                                                                                                                 |
| Installation method              |                                            | DIN Rail mounting                                                                                                                                                                                       |
| Accessories                      |                                            | Instruction Manual and Compliance Sheet                                                                                                                                                                 |

\* The error of the CT or VT is not included. IEC 62053 is an international standard for power metering.

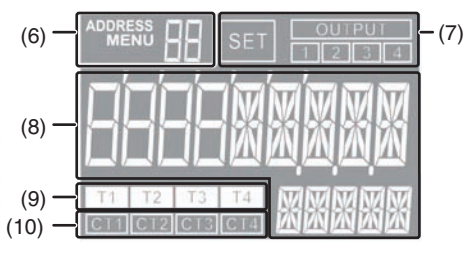
## Part Names and Functions

### Power Monitor

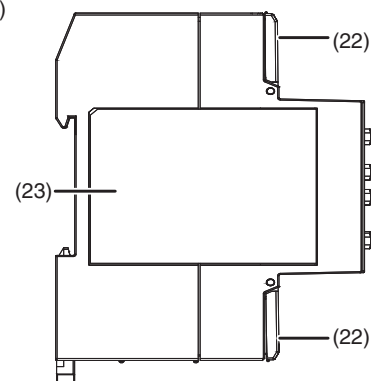
Front Panel with Terminal Block Covers Removed



Detailed View of LCD



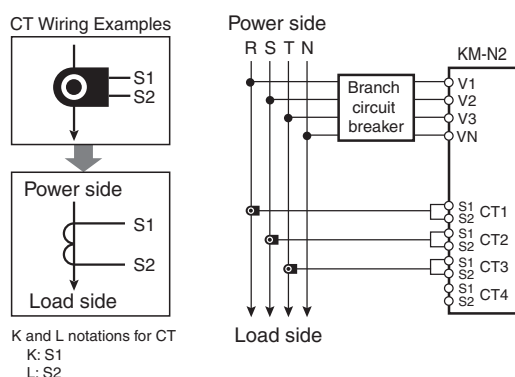
Side View



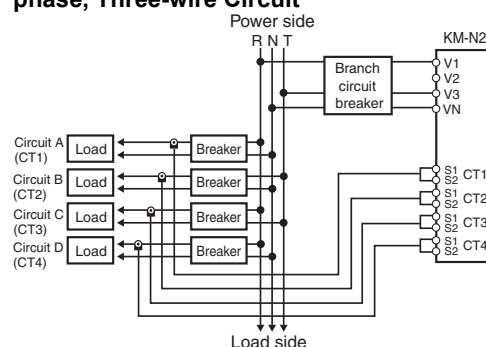
| No.  | Item                                    |              | Description                                                                                                                            |
|------|-----------------------------------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------|
| (1)  | Power indicator (green)                 |              | Lights when the power supply is turned ON.                                                                                             |
| (2)  | Error indicator (red)                   |              | Flashes when there is an abnormality, such as a failure.                                                                               |
| (3)  | Alarm indicator (orange)                |              | Flashes when there is an alarm.                                                                                                        |
| (4)  | Communications indicator (yellow)       |              | Lit during communications.                                                                                                             |
| (5)  | Pulse indicator (yellow)                |              | Lit while pulses are being output from OUT1 (circuit A).                                                                               |
| (6)  | Communications address and menu display | SET          | Lit in Setting Mode.                                                                                                                   |
|      |                                         | OUTPUT       | Lit while a pulse output is being set up.                                                                                              |
| (7)  | Status Indicators                       | 1            | Lit while pulses are being output from OUT1.                                                                                           |
|      |                                         | 2            | Lit while pulses are being output from OUT2.                                                                                           |
|      |                                         | 3            | Lit while pulses are being output from OUT3.                                                                                           |
|      |                                         | 4            | Lit while pulses are being output from OUT4.                                                                                           |
|      |                                         |              |                                                                                                                                        |
| (8)  | Measured value/set value display        | Main display | Displays the measured value or set value.                                                                                              |
|      |                                         | Sub display  | Displays the measurement unit or setting name.                                                                                         |
| (9)  | Tariff display                          |              | Displays the tariff number (T1 to T4) a total active power consumption is being saved.                                                 |
| (10) | CT usage display                        |              | Displays the numbers of the CTs (CT1 to CT4) for which measurement or setting operations are in progress.                              |
| (11) | <</MODE Key                             |              | Short press: Changes the circuit or moves the digit.<br>Long press: Changes the mode.                                                  |
| (12) | ⏏ Key                                   |              | Increments the item or value.                                                                                                          |
| (13) | ⏏ Key                                   |              | Decrements the item or value.                                                                                                          |
| (14) | ENTER Key                               |              | Enters the item or value.                                                                                                              |
| (15) | ESC Key                                 |              | Cancel                                                                                                                                 |
| (16) | Rotary switches                         |              | Set the communications address for circuit A. The left switch (x10) sets the tens place and the right switch (x1) sets the ones place. |
| (17) | RS-485 communications terminals         | RS-485 + (1) | RS-485 + terminal                                                                                                                      |
|      |                                         | RS-485 – (1) | RS-485 – terminal                                                                                                                      |
|      |                                         | RS-485 + (2) | RS-485 + terminal for crossover wiring                                                                                                 |
|      |                                         | RS-485 – (2) | RS-485 – terminal for crossover wiring                                                                                                 |
|      |                                         | RS-485 E     | RS-485 terminating resistance terminal                                                                                                 |
| (18) | Pulse output terminals                  | OUT1         | Pulse output terminal for circuit A                                                                                                    |
|      |                                         | OUT2         | Pulse output terminal for circuit B                                                                                                    |
|      |                                         | OUT3         | Pulse output terminal for circuit C                                                                                                    |
|      |                                         | OUT4         | Pulse output terminal for circuit D                                                                                                    |
|      |                                         | COM          | Pulse output common terminal                                                                                                           |
| (19) | Voltage input terminals                 |              | Terminal used to input the power supply voltage. These terminals are also used for the measured voltage inputs.                        |
| (20) | CT input terminals                      |              | Terminals used to connect the CT cables for CT1 to CT4                                                                                 |
| (21) | DIN hook                                |              | Hook used to mount the Power Monitor to a DIN Track                                                                                    |
| (22) | Terminal block covers                   |              | Sealed terminal block covers                                                                                                           |
| (23) | Terminal arrangement label              |              | Label that provides information, such as the model number, power supply voltage, terminal arrangement, and serial number               |

## Connection Wiring Diagrams

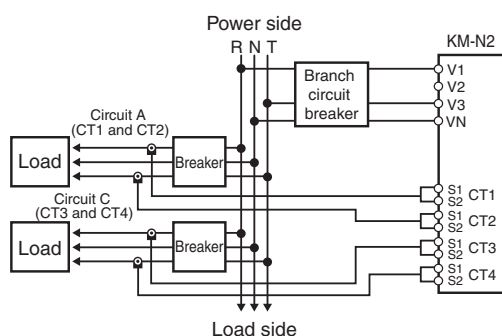
### Three-phase, Four-wire Circuit



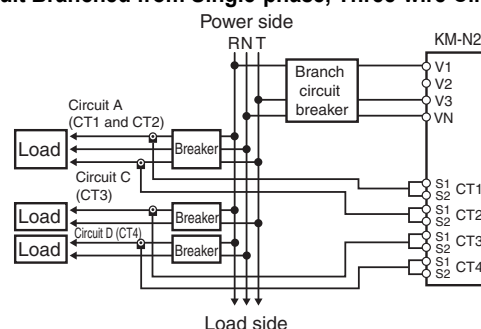
### Single-phase, Two-wire Circuit Branched from Single-phase, Three-wire Circuit



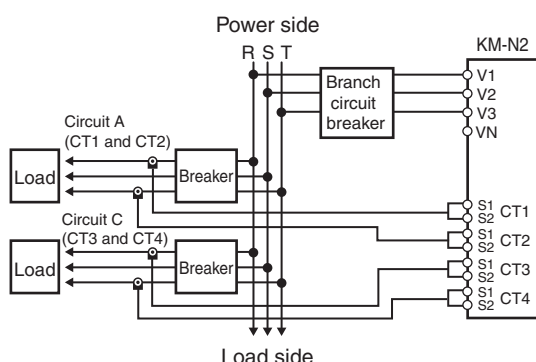
### Single-phase, Three-wire Circuit



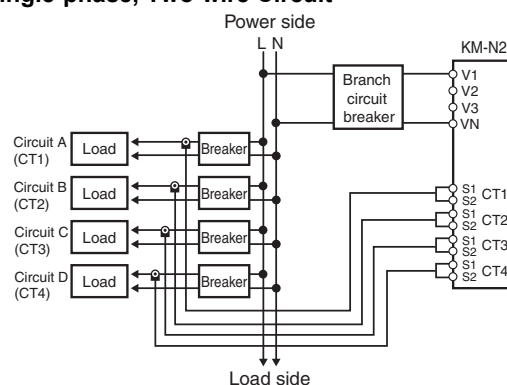
### Single-phase, Three-wire Circuit and Single-phase, Two-wire Circuit Branched from Single-phase, Three-wire Circuit



### Three-phase, Three-wire Circuit



### Single-phase, Two-wire Circuit



## CT Wiring

- For each circuit, one CT is required to measure single-phase two-wire power, two CTs are required to measure single-phase three-wire power or three-phase three-wire power, and three CTs are required to measure three-phase four-wire power.
- Use AWG18 to AWG14 (cross-sectional area: 0.75 to 2.0 mm<sup>2</sup>) wires with a heat resistance of 85°C min. to connect to the CT input terminals.
- Use ferrules suitable for the wire diameter to connect to the CT input terminals.
- The recommended tightening torque for M3 terminal screws is 0.5 to 0.6 N·m. Push ferrules all the way in and tighten the screws securely.

## Voltage Wiring (Power supply voltage and measurement voltage are shared.)

- The Power Monitor has voltage input terminals V1, V2, V3, and VN, which function as both the operating power supply terminals and voltage measurement terminals.
- Connect a branch circuit breaker between the voltage input terminals and the wiring so that the power supply can be turned OFF immediately.
- For safety, always work with the power supply turned OFF both at the main power supply and at the branch circuit breaker.
- Connect the wires in the correct phase sequence. Otherwise, the power and power consumption cannot be measured correctly.
- When wiring the power supply and measured voltage terminals, use round or forked crimp terminals (6.7 mm wide or less) suitable for M3.5 screws and AWG24 to AWG14 (cross-sectional area: 0.2 to 2.0 mm<sup>2</sup>) wires.
- Recommended tightening torque for M3.5 terminal screws: 0.8 N·m. Push crimp terminals all the way in and tighten the screws securely. After securing the wiring, gently pull on the cables to check that they are held securely.
- Always use the Power Monitor with the terminal covers closed.

## Wiring Diagram

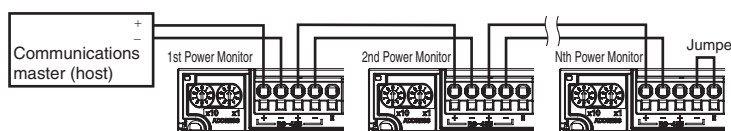
The following table shows the relationship between the wire phases connected to the voltage input terminals and CT input terminals for each phase wiring method.

|                      | Phase wires connected to voltage input terminals |              |              |              | Phase wires connected to CT input terminals |           |           |           | Number of measured circuits |
|----------------------|--------------------------------------------------|--------------|--------------|--------------|---------------------------------------------|-----------|-----------|-----------|-----------------------------|
|                      | V1                                               | V2           | V3           | VN           | CT1                                         | CT2       | CT3       | CT4       |                             |
| Single-phase, 2-wire | Phase L (VR)                                     | ---          | ---          | Phase N (VN) | Phase L 1                                   | Phase L 2 | Phase L 3 | Phase L 4 | 4                           |
| Single-phase, 3-wire | Phase R (VR)                                     | ---          | Phase T (VT) | Phase N (VN) | Phase R 1                                   | Phase T 1 | Phase R 2 | Phase T 2 | 2                           |
| Three-phase, 3-wire  | Phase R (VR)                                     | Phase S (VS) | Phase T (VT) | ---          | Phase R 1                                   | Phase T 1 | Phase R 2 | Phase T 2 | 2                           |
| Three-phase, 4-wire  | Phase R (VR)                                     | Phase S (VS) | Phase T (VT) | Phase N (VN) | Phase R                                     | Phase S   | Phase T   | ---       | 1                           |

**Note:** The numbers in "phase L 1" and "phase L 2" indicate the number of the circuit.

## RS-485 Communications Wiring Diagram

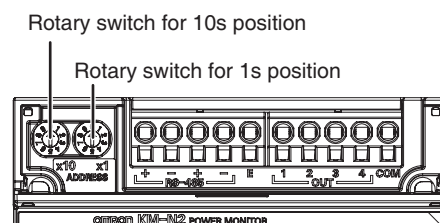
- The connection configuration is 1:1 or 1:N. For a 1:N configuration, up to 99 nodes can be connected for Modbus and up to 31 nodes can be connected for CompoWay. If you measure more than one circuit with one Power Monitor, the number of circuits is treated as the number of connected Power Monitors.
- The terminal block has push-in terminals. When wiring, observe the Precautions for Correct Use in *Wires and Precautions for Using Push-in Plus Terminal Blocks (RS-485 Communications Terminals and Pulse Output Terminals)*.
- The KM-N2 does not have a FG terminal. Connect only the positive and negative lines for RS-485.
- Use twisted-pair cables.
- Wire the RS-485 communications lines and power lines separately to prevent the influences of noise.
- The maximum transmission distance is 1,200 m.
- Always test communications on the actual system regardless of the transmission distances and number of connected Power Monitors.
- Always close the terminal block covers before you use the Power Monitor.



## Communications Address Setting

Turn the rotary switches for the 1s and 10s positions and set the communications address for circuit A.

- The value on the rotary switches is assigned as the communications address for circuit A (1st circuit). When multiple addresses are used, the values given in the following table are allocated automatically.
- The communications addresses for circuit B through circuit D cannot be set individually.



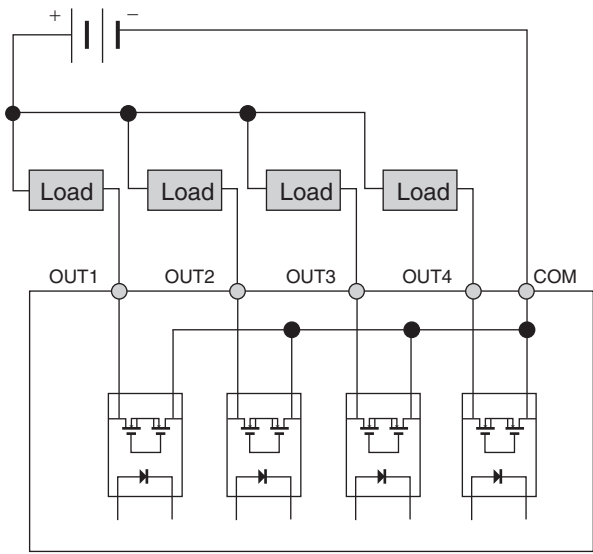
|                                                                                                                    | Circuit A | Circuit B    | Circuit C    | Circuit D    |
|--------------------------------------------------------------------------------------------------------------------|-----------|--------------|--------------|--------------|
| Three-phase, four-wire                                                                                             | Set value | ---          | ---          | ---          |
| Single-phase, two-wire circuit branched from single-phase, two-wire circuit or single-phase, three-wire circuit    | Set value | Set value +1 | Set value +2 | Set value +3 |
| Single-phase, three-wire circuit or three-phase, three-wire circuit                                                | Set value | ---          | Set value +1 | ---          |
| Single-phase, three-wire circuit and single-phase, two-wire circuit branched from single-phase, three-wire circuit | Set value | ---          | Set value +1 | Set value +2 |

## Terminating Resistance Setting

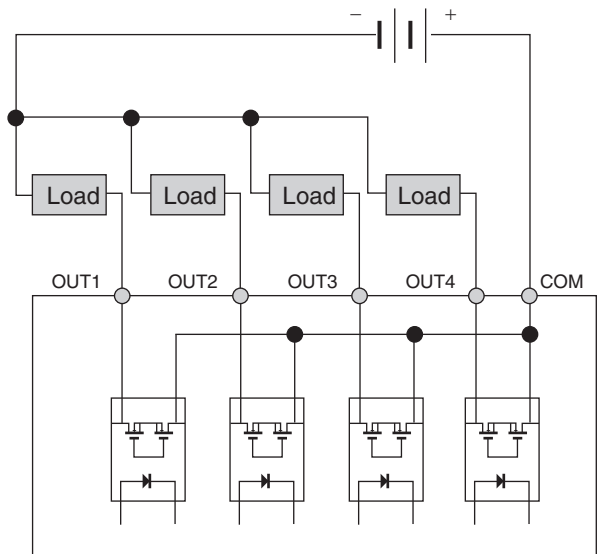
- The Power Monitor has terminating resistance built in. On the last node on the communications line, connect a jumper between the RS-485 negative terminal and the RS-485 E terminal. The internal terminating resistance will be connected.
- When using a host that does not have built-in terminating resistance, connect terminating resistance to the host as well. The terminating resistance is 120  $\Omega$  (1/2 W).
- Do not wire terminating resistance to the KM-N2 partway along the transmission path. Communications failures may occur.

Pulse Output Wiring Diagrams

NPN Output Connection Diagram



PNP Output Connection Diagram



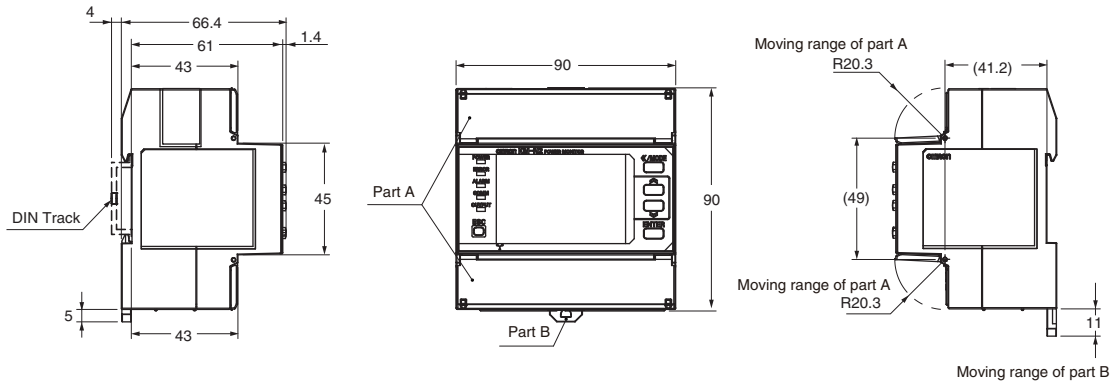
- The Power Monitor provides four pulse output terminals. One common is used.
- The terminal block has push-in terminals. When wiring, observe the Precautions for Correct Use in *Wires and Precautions for Using Push-in Plus Terminal Blocks (RS-485 Communications Terminals and Pulse Output Terminals)*.
  - Never connect an external power supply directly between an output terminal and the common. Always connect a load.
  - Wire signal lines and power lines separately to prevent the influences of noise.
  - The outputs are assigned as follows and cannot be changed: OUT1 is for circuit A, OUT2 is for circuit B, OUT3 is for circuit C, and OUT4 is for circuit D.

Dimensions

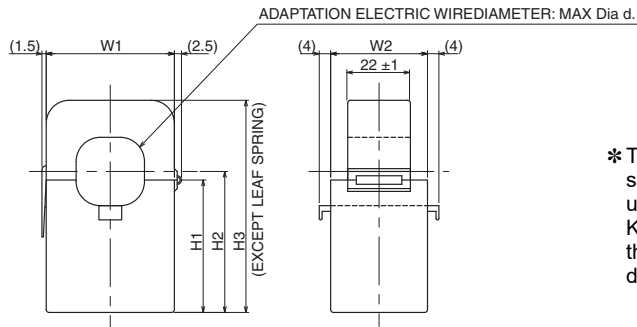
(Unit: mm)

Power Monitor

KM-N2-FLK



**KM-NCT-E100A**  
**KM-NCT-E250A**  
**KM-NCT-E500A**  
**(CE marking compliant**  
**KM-N2/N3 dedicated**  
**products \*)**



\* The KM-NCT-E conforms to the standards shown above ONLY when it is used with a power monitor KM-N2-FLK or KM-N3-FLK to which it is attached. Use of the KM-NCT-E without a power monitor does not conform to these standards.

| Dimension (mm) | Dia. d | W1   | W2     | H1     | H2     | H3     |
|----------------|--------|------|--------|--------|--------|--------|
| KM-NCT-E100A   | 24     | 45±2 | 34±2   | 46.5±1 | 49.5±1 | 74.5±1 |
| KM-NCT-E250A   | 24     | 45±2 | 34±2   | 46.5±1 | 49.5±1 | 74.5±1 |
| KM-NCT-E500A   | 36     | 57±2 | 40.5±2 | 56.5±1 | 61±1.5 | 91±2   |

# Power Monitor

# KM-N3-FLK

## Global Power Monitor for On-panel Installation

- Solve design, installation, and operation topics.
- You can measure up to four circuits with one Power Monitor.
- Use general-purpose CTs and handle a variety of worksites.
- Large, easy-to-read white and green LCD for improved visibility.
- IEC Class 0.5S high-precision measurements (Power Monitor only).



**NEW**

Refer to Safety Precautions on page 19.

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

## Ordering Information

### Power Monitor

| Model     | Applicable phase wiring methods                                                                                                                                                                                                                                                                                                            | Power supply voltage                                 | Dimensions                                            | Communications                         |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|-------------------------------------------------------|----------------------------------------|
| KM-N3-FLK | Single-phase, 2-wire: 100 to 277 VAC<br>Single-phase, 3-wire:<br>100 to 240 VAC (L-N), 200 to 480 VAC (L-L)<br>Three-phase, 3-wire: 173 to 277 VAC (L-L)<br>Three-phase, 4-wire (earthed neutral):<br>100 to 277 VAC (L-N), 173 to 480 VAC (L-L)<br>Three-phase, 4-wire (unearthed neutral):<br>100 to 120 VAC (L-N), 173 to 208 VAC (L-L) | 100 to 240 VAC<br>Separate from measurement voltage. | 96 × 96 × 64 mm<br>(H×W×D)<br>(excluding protrusions) | RS-485 communications,<br>pulse output |

To use a commercially available current transformer, use a CT with a secondary current rating of 1 A or 5 A, and a rated load of at least 1.0 VA.

### Optional Products (Order Separately)

#### Terminal Covers

| Model            |
|------------------|
| E53-COV24 (3pcs) |

#### Waterproof Packing

| Model    |
|----------|
| Y92S-P10 |

**Note:** This Waterproof Packing is provided with the KM-N3.

#### Mounting Adapter

| Model          |
|----------------|
| Y92F-51 (2pcs) |

**Note:** This Mounting Adapter is provided with the KM-N3.

### Split Type Current Transformer (CT) (CE marking compliant KM-N2/N3 dedicated products \*)

| Model        | Rated primary current | Rated secondary current |
|--------------|-----------------------|-------------------------|
| KM-NCT-E100A | 100 A                 | 1 A                     |
| KM-NCT-E250A | 250 A                 |                         |
| KM-NCT-E500A | 500 A                 |                         |

\* The KM-NCT-E conforms to the standards shown above ONLY when it is used with a power monitor KM-N2-FLK or KM-N3-FLK to which it is attached. Use of the KM-NCT-E without a power monitor does not conform to these standards.

**Note:** Select a CT cable that does not exceed the rated load of 1 VA.

## Specifications

### Ratings (Power Monitor)

| Item                                       | Model                          | KM-N3-FLK                                                                                                                                                                                                                                                                                                                         |
|--------------------------------------------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Applicable phase wiring methods            |                                | Single-phase two-wire, single-phase three-wire, three-phase three-wire, and three-phase four-wire                                                                                                                                                                                                                                 |
| Number of measured circuits                |                                | Single-phase two-wire: 4 circuits max., Single-phase three-wire or three-phase three-wire: 2 circuits max., Three-phase four-wire: 1 circuit                                                                                                                                                                                      |
| Power supply voltage (operating frequency) |                                | 100 to 240 VAC (50/60 Hz)                                                                                                                                                                                                                                                                                                         |
| Power supply allowable voltage range       |                                | 85% to 110% of rated power supply voltage                                                                                                                                                                                                                                                                                         |
| Power consumption                          |                                | 7 VA max.                                                                                                                                                                                                                                                                                                                         |
| Input                                      | Rated input voltages           | Single-phase, 2-wire: 100 to 277 VAC<br>Single-phase, 3-wire: 100 to 240 VAC (L-N), 200 to 480 VAC (L-L)<br>Three-phase, 3-wire: 173 to 277 VAC (L-L)<br>Three-phase, 4-wire (earthed neutral): 100 to 277 VAC (L-N), 173 to 480 VAC (L-L)<br>Three-phase, 4-wire (unearthed neutral): 100 to 120 VAC (L-N), 173 to 208 VAC (L-L) |
|                                            | Allowable supply voltage range | 85% to 115% of rated power supply voltage                                                                                                                                                                                                                                                                                         |
|                                            | Connectable CTs                | General-purpose CT with a rated secondary current of 1 A or 5 A *                                                                                                                                                                                                                                                                 |
|                                            | Maximum CT secondary current   | 6 A                                                                                                                                                                                                                                                                                                                               |
|                                            | Rated input frequency          | 50/60 Hz                                                                                                                                                                                                                                                                                                                          |
| Ambient operating temperature              |                                | –25 to 55°C (with no condensation or icing)                                                                                                                                                                                                                                                                                       |
| Ambient operating humidity                 |                                | 25% to 85%                                                                                                                                                                                                                                                                                                                        |
| Storage temperature                        |                                | –25 to 85°C (with no condensation or icing)                                                                                                                                                                                                                                                                                       |
| Storage humidity                           |                                | 25% to 85%                                                                                                                                                                                                                                                                                                                        |
| Operating altitude                         |                                | 2,000 m max.                                                                                                                                                                                                                                                                                                                      |
| Installation environment                   |                                | Overvoltage category II, measurement category II, pollution degree 2                                                                                                                                                                                                                                                              |
| Electromagnetic environment                |                                | Industrial electromagnetic environment (EN/IEC 61326-1 Table 2)                                                                                                                                                                                                                                                                   |
| Compliant standards                        |                                | EN 61010-2-030, EN 61326-1, and UL 61010-1                                                                                                                                                                                                                                                                                        |

\* The KM-series CTs (the KM20-CTF or KM-NCT Series) cannot be used. Use general-purpose CTs with a secondary-side output of 1 A or 5 A.

### Split Type Current Transformer (CT) (CE marking compliant KM-N2/N3 dedicated products \*)

| Item                                     | KM-NCT-E100A                                                          | KM-NCT-E250A  | KM-NCT-E500A  |
|------------------------------------------|-----------------------------------------------------------------------|---------------|---------------|
| Rated primary current: $I_n$             | 100 A                                                                 | 250 A         | 500 A         |
| Rated secondary current: $I_s$           | 1 A                                                                   |               |               |
| Rated frequency                          | 50/60 Hz                                                              |               |               |
| Cable Length                             | Please refer to <i>Writing to KM-NCT-E□□□A</i>                        |               |               |
| Rated load                               | 1 VA                                                                  |               |               |
| Insulation resistance                    | 100 MΩ min. (at 500 VDC mega) between core and all output terminals   |               |               |
| Dielectric strength voltage              | 2300 VAC, 1 minute between core and all output terminals.             |               |               |
| Weight                                   | Approx. 170 g                                                         | Approx. 175 g | Approx. 290 g |
| Maximum wire diameter                    | 24 dia.                                                               | 24 dia.       | 36 dia.       |
| Operating temperature and humidity range | –20 to 55 °C, relative humidity: 85% max. with no condensation        |               |               |
| Storage temperature and humidity range   | –30 to 90 °C, relative humidity: 85% max. with no condensation        |               |               |
| Applicable standards *                   | EN61010-1, EN61010-2-030, EN61326-1                                   |               |               |
| Installation environment                 | Overvoltage category and measurement category: II, Pollution level: 2 |               |               |

\* The KM-NCT-E conforms to the standards shown above ONLY when it is used with a power monitor KM-N2-FLK or KM-N3-FLK to which it is attached. Use of the KM-NCT-E without a power monitor does not conform to these standards.

#### Wiring to KM-NCT-E□□□A

- For wiring of the output terminal of CT, use AWG18-14 electric wire (with a cross-section of 0.75-2.0mm<sup>2</sup>) and Y-shape terminal compatible with the M3 screw.
- The recommended torque for screwing the M3 screws onto the output terminal is 0.3 N·m. Make sure the Y terminal is pushed all the way in and tightened firmly. After fixing the wiring, confirm that the wire is fixed securely.
- The guideline of the maximum wiring length between KM-N2-FLK or KM-N3-FLK and KM-NCT-E is as follows.  
The longer the wire length, the larger the measurement error using the KM-NCT-E becomes.
- The limit of the wiring length can also be calculated by the following formula. Calculate the wiring length limit according to the conductor resistivity of the wiring and keep the wiring length below the limit.
- The limits of the wiring length shown below are for reference only. They do not guarantee proper use.

| Wiring diameter                         | Guideline for wiring length limit |
|-----------------------------------------|-----------------------------------|
| 0.75 mm <sup>2</sup> (AWG18 equivalent) | 15 m                              |
| 2.0 mm <sup>2</sup> (AWG14 equivalent)  | 43 m                              |

Wiring extension limit value (one-way) (m)=  
0.475/conductor resistivity (Ω/m)

**Note:** Select a CT cable that does not exceed the rated load of 1 VA.

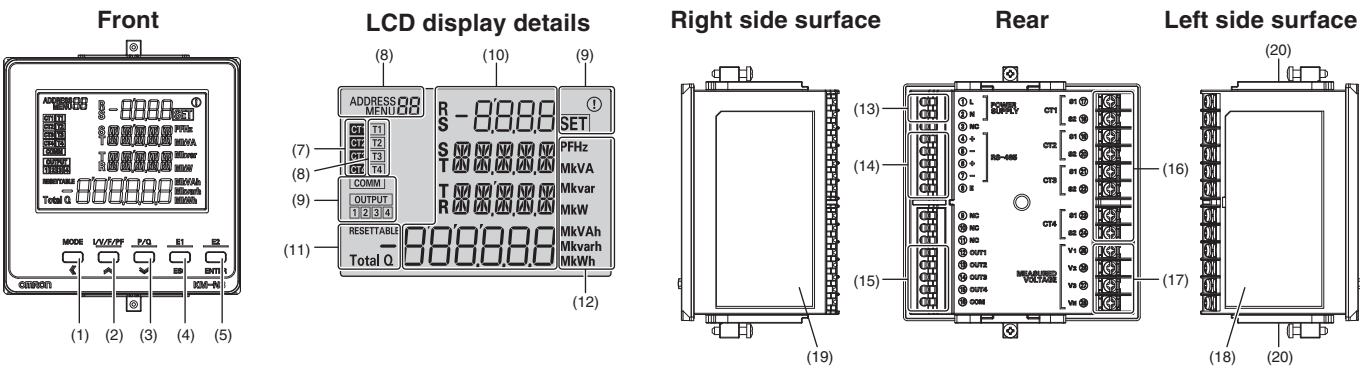
Performance (Power Monitor)

| Item                             |                                            | Model | KM-N3-FLK                                                                                                                                                                                               |
|----------------------------------|--------------------------------------------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Measured items                   |                                            |       | Total power consumption (active, regenerative, and reactive), power (active and reactive), current, voltage, power factor, and frequency                                                                |
| Measurement specifications       | Active power                               |       | 0.5% (IEC 62053-22 class 0.5S *)                                                                                                                                                                        |
|                                  | Reactive power                             |       | 2% (IEC 62053-23 class 2) *                                                                                                                                                                             |
|                                  | Sampling cycle                             |       | 80 ms for 50 Hz and 66.7 ms for 60 Hz                                                                                                                                                                   |
| Insulation resistance            |                                            |       | (1) Between all electrical circuits and the case: 20 MΩ min. (at 500 VDC)<br>(2) Between all power supply and voltage inputs and all communications and pulse output terminals: 20 MΩ max. (at 500 VDC) |
| Dielectric strength              |                                            |       | (1) Between all electrical circuits and the case: 1,400 VAC for 1 min<br>(2) Between all voltage and current inputs and all communications and pulse output terminals: 1,400 VAC for 1 min              |
| Vibration resistance             |                                            |       | Single amplitude: 0.1 mm, Acceleration: 15 m/s <sup>2</sup> , Frequency: 10 to 150 Hz, 10 sweeps for 8 min each along three axes                                                                        |
| Shock resistance                 |                                            |       | 150 m/s <sup>2</sup> , 3 times each in 6 directions (up/down, left/right, forward/backward)                                                                                                             |
| Indications and operation method |                                            |       | LCD indications and operation buttons                                                                                                                                                                   |
| Weight                           |                                            |       | Approx. 350 g (Power Monitor only)                                                                                                                                                                      |
| Degree of protection             |                                            |       | Front: IP65, Rear case: IP20, Terminal: IP00                                                                                                                                                            |
| Pulse output                     | Number of outputs                          |       | Number of outputs: 4 (photoMOS relay outputs)<br>Used for the total power consumption pulse output.                                                                                                     |
|                                  | Output capacity                            |       | 50 mA at 40 VDC<br>ON residual voltage: 1.5 V max. (for output current of 50 mA)<br>OFF leakage current: 0.1 mA max.                                                                                    |
|                                  | Output unit                                |       | Output unit: 1, 10, 100, 1k, 5k, 10k, 50k, or 100k (wh)<br>Pulse ON time: 500 ms (Cannot be changed.)                                                                                                   |
| Communica-<br>tions interface    | Communications method                      |       | RS-485 (2-wire half-duplex with start-stop synchronization)                                                                                                                                             |
|                                  | Communications protocol                    |       | Modbus (RTU): Binary. CompoWay/F: ASCII                                                                                                                                                                 |
|                                  | Baud rate                                  |       | 1.2, 2.4, 4.8, 9.6, 19.2, or 38.4 kbps                                                                                                                                                                  |
|                                  | Data length                                |       | Data length: 7 or 8 bits<br>Stop bits: 1 or 2 bits<br>Vertical parity: Even, odd, or none                                                                                                               |
|                                  | Maximum transmission distance              |       | 1,200 m                                                                                                                                                                                                 |
|                                  | Maximum number of connected Power Monitors |       | Modbus: 99, CompoWay/F: 31<br>If you measure more than one circuit with one Power Monitor, the number of circuits is treated as the number of connected Power Monitors.                                 |
| Dimensions (H×W×D)               |                                            |       | 96 × 96 × 64 mm (excluding protrusions)                                                                                                                                                                 |
| Installation method              |                                            |       | On-panel installation                                                                                                                                                                                   |
| Accessories                      |                                            |       | Instruction Manual and Compliance Sheet, Mounting adapter and waterproof packing                                                                                                                        |

\* The error of the CT or VT is not included. IEC 62053 is an international standard for power metering.

Part Names and Functions

Power Monitor

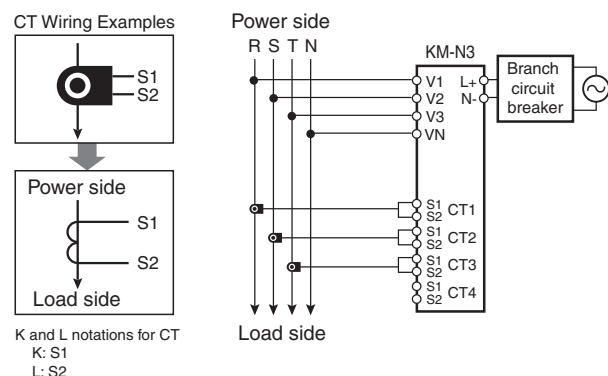


| No. | Item            | Description                                                                                                                                                                                                                                         |
|-----|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (1) | MODE• ◀ key     | Long press: The measurement mode is switched with the setup mode.<br>[MODE] key (measurement mode): The measurement circuit is changed.<br>[◀] key (setup mode): Change of the measurement circuit / Digit shifting when a numerical value is input |
| (2) | I/V/F/PF• ▶ key | [I/V/F/PF] key (measurement mode): The display of current, voltage, frequency, or power factor is switched.<br>[▶] key (setup mode): Items or values are changed (up)                                                                               |
| (3) | P/Q • key       | [P/Q] key (measurement mode): The display of effective power or reactive power is switched.<br>[•] key (setup mode): Items or values are changed (down)                                                                                             |
| (4) | E1•ESC key      | [ESC] key (measurement mode): Cancel<br>[E1] key (setup mode): The display of each integrated electric energy is switched.                                                                                                                          |

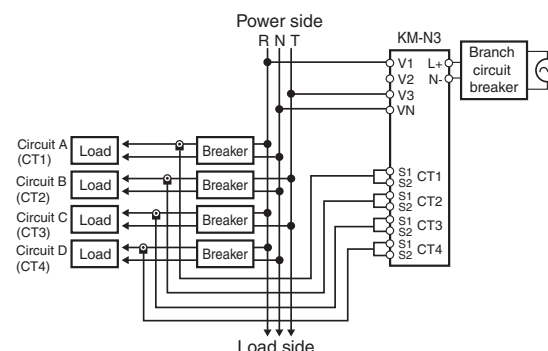
| No.  | Item                                         | Description                                                                                                                                                   |
|------|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (5)  | E2•ENTER key                                 | [ENTER] key (measurement mode): Select/Determine<br>[E2] key (setup mode): The display of each resettable integrated electric energy is switched.             |
| (6)  | Communication address / Menu display         | When ADDRESS is lit (in the measurement mode): The communication address is displayed.<br>When MENU is lit (in the setup mode): The menu number is displayed. |
| (7)  | In-operation CT display                      | The CT number in the condition of measurement or setup (CT1 to CT4) is displayed.                                                                             |
| (8)  | Tariff display                               | The tariff number which is saving the integrated effective energy (T1 to T4) is displayed.                                                                    |
| (9)  | State display                                | COMM                                                                                                                                                          |
|      |                                              | OUTPUT                                                                                                                                                        |
|      |                                              | 1                                                                                                                                                             |
|      |                                              | 2                                                                                                                                                             |
|      |                                              | 3                                                                                                                                                             |
|      |                                              | 4                                                                                                                                                             |
|      |                                              | SET                                                                                                                                                           |
| (10) | Measured value display / Setup value display | ①                                                                                                                                                             |
|      |                                              | First display / instantaneous value display                                                                                                                   |
|      |                                              | Second display / Integrated value display                                                                                                                     |
| (11) | Measurement auxiliary display                | RESETTABLE                                                                                                                                                    |
|      |                                              | ---                                                                                                                                                           |
|      |                                              | Total Q                                                                                                                                                       |
| (12) | Unit display                                 | The unit of each measured value is lit.                                                                                                                       |
| (13) | Power supply terminal                        | Power supply voltage is input to this terminal                                                                                                                |
| (14) | RS-485 communication terminal                | RS-485 + (1)                                                                                                                                                  |
|      |                                              | RS-485 - (1)                                                                                                                                                  |
|      |                                              | RS-485 + (2)                                                                                                                                                  |
|      |                                              | RS-485 - (2)                                                                                                                                                  |
|      |                                              | RS-485E                                                                                                                                                       |
| (15) | Pulse output terminal                        | OUT1                                                                                                                                                          |
|      |                                              | OUT2                                                                                                                                                          |
|      |                                              | OUT3                                                                                                                                                          |
|      |                                              | OUT4                                                                                                                                                          |
|      |                                              | COM                                                                                                                                                           |
| (16) | CT input terminal                            | Terminal to connect the CT cable for CT1 to CT4                                                                                                               |
| (17) | Measured voltage input terminal              | Measured voltage is input to this terminal.                                                                                                                   |
| (18) | Terminal array label                         | Model, power supply voltage, terminal array, serial number, and so on are written on this label.                                                              |
| (19) | Wiring label                                 | A wiring diagram of voltage and current is written on this label.                                                                                             |
| (20) | Mounting adapter                             | Adapter to fix the main unit to the panel                                                                                                                     |

## Connection Wiring Diagrams

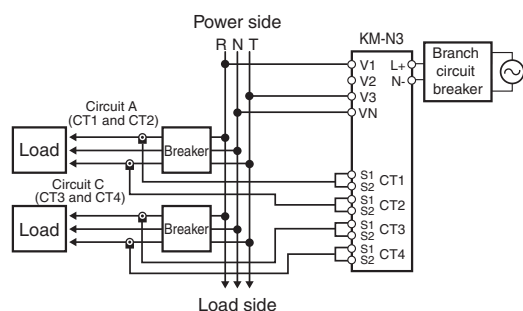
### Three-phase, Four-wire Circuit



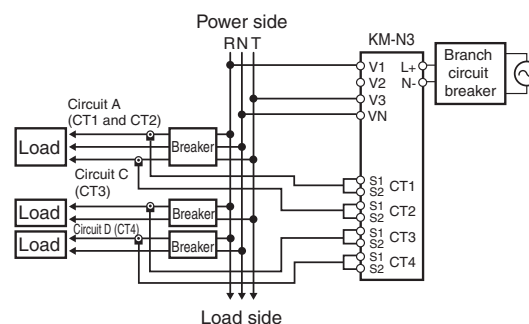
### Single-phase, Two-wire Circuit Branched from Single-phase, Three-wire Circuit



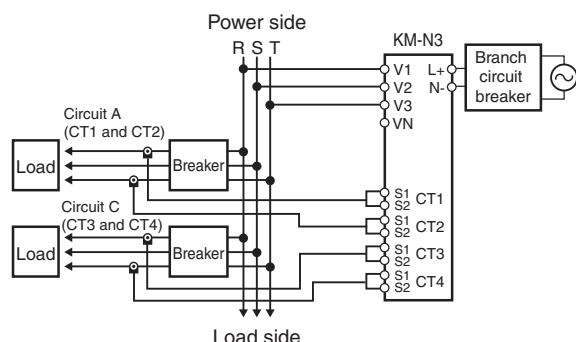
## Single-phase, Three-wire Circuit



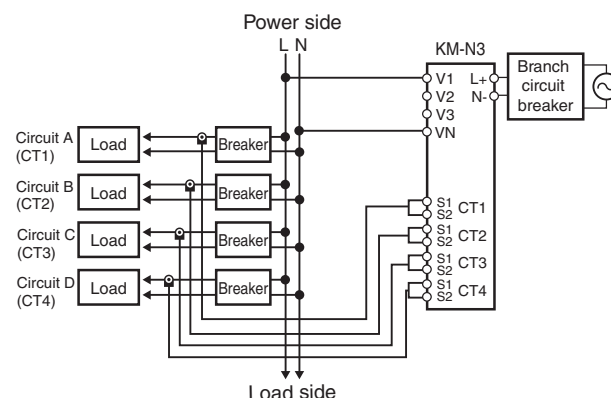
## Single-phase, Three-wire Circuit and Single-phase, Two-wire Circuit Branched from Single-phase, Three-wire Circuit



## Three-phase, Three-wire Circuit



## Single-phase, Two-wire Circuit



## CT Wiring

- For each circuit, one CT is required to measure single-phase two-wire power, two CTs are required to measure single-phase three-wire power or three-phase three-wire power, and three CTs are required to measure three-phase four-wire power.
- Use AWG18 to AWG14 (cross-sectional area: 0.75 to 2.0 mm<sup>2</sup>) wires and round or forked crimp terminals (5.8 mm wide or less) suitable for M3 screws to connect to the CT input terminals.
- The recommended tightening torque for M3 terminal screws is 0.5 to 0.58 N·m. Push crimp terminals all the way in and tighten the screws securely. After you secure the wires, confirm that they are securely held in place.

## Power Supply Wiring

- Connect a branch circuit breaker between the power supply terminal and the wiring so that the power supply can be turned OFF immediately.
- For safety, always work with the power supply turned OFF both at the main power supply and at the branch circuit breaker.
- The terminal block has push-in terminals. When wiring, observe the Precautions for Correct Use in *Wires and Precautions for Using Push-in Plus Terminal Blocks (RS-485 Communications Terminals and Pulse Output Terminals)*.

## Wiring Measurement Voltages

- For safety, always work with the power supply turned OFF both at the main power supply.
- Connect the wires in the correct phase sequence. Otherwise, the power and power consumption cannot be measured correctly.
- When wiring the measured voltage terminals, use round or forked crimp terminals (5.8 mm wide or less) suitable for M3 screws and AWG14 (cross-sectional area: 0.75 to 2.0 mm<sup>2</sup>) wires.
- Recommended tightening torque for M3 terminal screws: 0.5 to 0.58 N·m. Push crimp terminals all the way in and tighten the screws securely. After securing the wiring, gently pull on the cables to check that they are held securely.

## Wiring Diagram

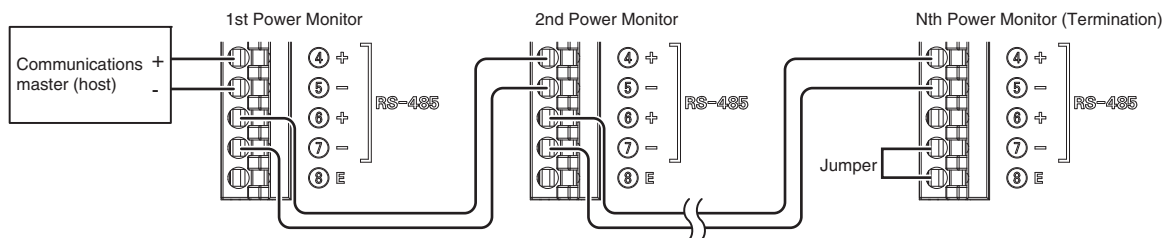
The following table shows the relationship between the wire phases connected to the voltage input terminals and CT input terminals for each phase wiring method.

|                      | Phase wires connected to voltage input terminals |              |              |              | Phase wires connected to CT input terminals |           |           |           | Number of measured circuits |
|----------------------|--------------------------------------------------|--------------|--------------|--------------|---------------------------------------------|-----------|-----------|-----------|-----------------------------|
|                      | V1                                               | V2           | V3           | VN           | CT1                                         | CT2       | CT3       | CT4       |                             |
| Single-phase, 2-wire | Phase L (VR)                                     | ---          | ---          | Phase N (VN) | Phase L 1                                   | Phase L 2 | Phase L 3 | Phase L 4 | 4                           |
| Single-phase, 3-wire | Phase R (VR)                                     | ---          | Phase T (VT) | Phase N (VN) | Phase R 1                                   | Phase T 1 | Phase R 2 | Phase T 2 | 2                           |
| Three-phase, 3-wire  | Phase R (VR)                                     | Phase S (VS) | Phase T (VT) | ---          | Phase R 1                                   | Phase T 1 | Phase R 2 | Phase T 2 | 2                           |
| Three-phase, 4-wire  | Phase R (VR)                                     | Phase S (VS) | Phase T (VT) | Phase N (VN) | Phase R                                     | Phase S   | Phase T   | ---       | 1                           |

**Note:** The numbers in "phase L 1" and "phase L 2" indicate the number of the circuit.

RS-485 Communications Wiring Diagram

- The connection configuration is 1:1 or 1:N. For a 1:N configuration, up to 99 nodes can be connected for Modbus and up to 31 nodes can be connected for CompoWay. If you measure more than one circuit with one Power Monitor, the number of circuits is treated as the number of connected Power Monitors.
- The terminal block has push-in terminals. When wiring, observe the Precautions for Correct Use in *Wires and Precautions for Using Push-in Plus Terminal Blocks (RS-485 Communications Terminals and Pulse Output Terminals)*.



- The KM-N3 does not have a FG terminal. Connect only the positive and negative lines for RS-485.
- Use twisted-pair cables.
- Wire the RS-485 communications lines and power lines separately to prevent the influences of noise.
- The maximum transmission distance is 1,200 m.
- Always test communications on the actual system regardless of the transmission distances and number of connected Power Monitors.

Communications Address Setting

- Change to Setting Mode and set the communications address for circuit A. Refer to the Instruction Manual for the communications address setting method. If the multi-address function is used, the addresses in the following table are automatically allocated based on the communications address set for circuit A (the first circuit).
- The communications addresses for circuit B through circuit D cannot be set individually.

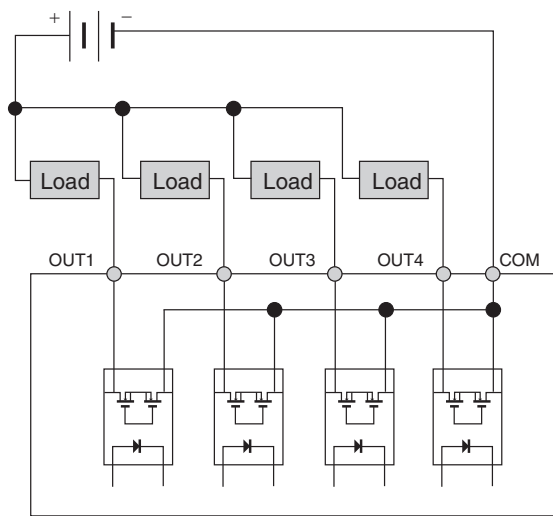
|                                                                                                                    | Circuit A | Circuit B    | Circuit C    | Circuit D    |
|--------------------------------------------------------------------------------------------------------------------|-----------|--------------|--------------|--------------|
| Three-phase, four-wire                                                                                             | Set value | ---          | ---          | ---          |
| Single-phase, two-wire circuit branched from single-phase, two-wire circuit or single-phase, three-wire circuit    | Set value | Set value +1 | Set value +2 | Set value +3 |
| Single-phase, three-wire circuit or three-phase, three-wire circuit                                                | Set value | ---          | Set value +1 | ---          |
| Single-phase, three-wire circuit and single-phase, two-wire circuit branched from single-phase, three-wire circuit | Set value | ---          | Set value +1 | Set value +2 |

Terminating Resistance Setting

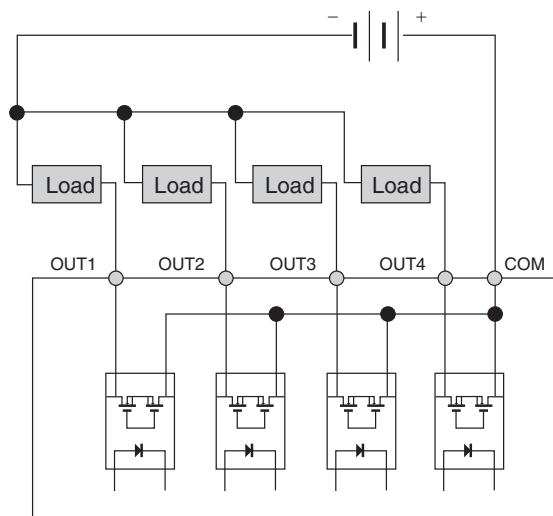
- The Power Monitor has terminating resistance built in. On the last node on the communications line, connect a jumper between the RS-485 negative terminal and the RS-485 E terminal. The internal terminating resistance will be connected.
- When using a host that does not have built-in terminating resistance, connect terminating resistance to the host as well. The terminating resistance is 120 Ω (1/2 W).
- Do not wire terminating resistance to the KM-N3 partway along the transmission path. Communications failures may occur.

Pulse Output Wiring Diagrams

NPN Output Connection Diagram



PNP Output Connection Diagram



- The Power Monitor provides four pulse output terminals. One common is used.
- The terminal block has push-in terminals. When wiring, observe the Precautions for Correct Use in *Wires and Precautions for Using Push-in Plus Terminal Blocks (RS-485 Communications Terminals and Pulse Output Terminals)*.
  - Never connect an external power supply directly between an output terminal and the common. Always connect a load.
  - Wire signal lines and power lines separately to prevent the influences of noise.
  - The outputs are assigned as follows and cannot be changed: OUT1 is for circuit A, OUT2 is for circuit B, OUT3 is for circuit C, and OUT4 is for circuit D.