# Heater Condition Monitoring Device
# K7TM

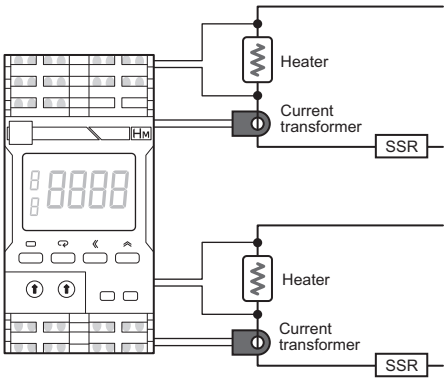
## Predictive maintenance by monitoring heater condition

- Able to do trend analysis of condition deterioration of resistance heaters
- Measures and monitors voltage, current and resistance values of heater, regardless of heater temperature control method
- Analyzes the change rate in resistance value of the heater, taking into account the temperature of the heater
- Can be easily retrofitted onto existing equipment without impacting existing control
- Can support up to 2 heaters per monitoring unit
- Can perform measurement up to a heater current of 600 A AC
- Monitor unit alarms and notifies of deterioration when the rate of change in heater resistance value exceeds the threshold

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

## Overview

The K7TM is a device for supporting condition monitoring of heaters by measuring the resistance values of the heaters.
The Unit calculates a resistance value by measuring the voltage at both ends of the heater and its current, so it can measure the resistance value of even the live heater. In addition, by collecting the resistance value data of heaters measured, the Unit can catch signs of heater deterioration or identify trouble-prone heaters to analyze the cause from the data.



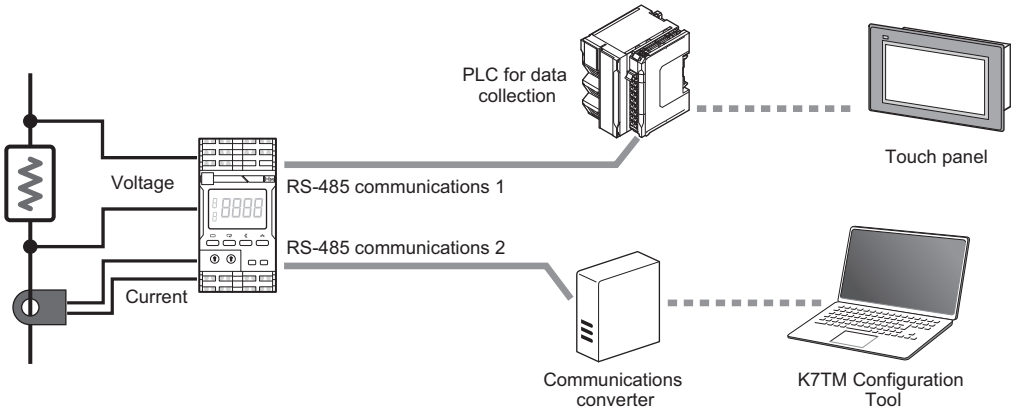

The K7TM targets the resistance heating heater.
The representative examples are shown below.

- Sheathed heater
- Cartridge heater
- Band heater
- Cast heater
- SiC (silicon carbide) heater
- Ceramic heater

**Note:** Be aware that the K7TM cannot measure the resistance values of the following heaters:

- Induction heater
- Steam heater
- Oil fan heater or gas fan heater

## System Configuration



# Model Number Structure

## Model Number Legend

**K7TM - A 2 M □**
(1) (2)(3)(4) (5)

| (1) | (2) | (3) | (4) | (5) | Meaning |
|---|---|---|---|---|---|
| **Base model** | **Input type** | **Number of channels** | **Unit type** | **Power supply voltage** | |
| K7TM | | | | | Heater Condition Monitoring Device |
| | A | | | | Voltage and Current |
| | | 2 | | | 2 channels |
| | | | M | | K7TM |
| | | | | A | 100 to 240 V AC power supply |
| | | | | D | 24 V AC/DC power supply |

# Ordering Information

## K7TM

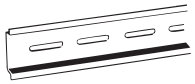
| Power supply voltage | Model |
|---|---|
| 100 to 240 V AC | **K7TM-A2MA** |
| 24 V AC/DC | **K7TM-A2MD** |

## CT (Order Separately)

| Rated primary-side current | Model | Model compliant with UL certification |
|---|---|---|
| 5 A | **K6CM-CICB005** | **K6CM-CICB005-C** |
| 25 A | **K6CM-CICB025** | **K6CM-CICB025-C** |
| 100 A | **K6CM-CICB100** | **K6CM-CICB100-C** |
| 200 A | **K6CM-CICB200** | **K6CM-CICB200-C** |
| 400 A | **K6CM-CICB400** | **K6CM-CICB400-C** |
| 600 A | **K6CM-CICB600** | --- |

**Note: 1.** A cable for connection is provided with the CT.
**2.** K7TM devices are UL-certified when used as a set with a CT model with "-C" at the end. Select a CT with "-C" at the end of the model name if UL certification is required for equipment.
**3.** The CT input terminals of the K7TM can be connected in either direction of the special CT regardless of polarity.

## Accessories (Order Separately)

| DIN Tracks | Model |
|---|---|
|  | **PFP-100N** |
| | **PFP-50N** |

| End Plate | Model |
|---|---|
| | **PFP-M** |

# Ratings and Specifications

| Item | | Specifications |
|---|---|---|
| Operation power supply | Power supply voltage and frequency | K7TM-A2MA: 100 to 240 V AC, 50/60 Hz<br>K7TM-A2MD: 24 V AC, 50/60 Hz, 24 V DC |
| | Operating power supply voltage range | 85% to 110% of the rated voltage |
| | Operating frequency range | 45 to 65 Hz |
| | Power consumption | K7TM-A2MA: 8.5 VA max. (100 to 240 V AC) |
| | | K7TM-A2MD: 5.2 VA max. (24 V AC)/ 2.9 W max. (24 V DC) |
| | Recommend external fuse | T2A, time delay, high-breaking capacity |
| Ambient operating temperature | | -10 to 55°C |
| Ambient operating humidity | | 25% to 85% |
| Storage temperature | | -20 to 65°C (with no condensation or icing) |
| Altitude | | 2,000 m max. |
| Insulation resistance | | 20 mΩ min.<br>Between all external terminals and case;<br>Between all power supply terminals and all other terminals;<br>Between (all voltage input terminals + all CT input terminals) and (all communications terminals + all transistor terminals);<br>Between all voltage input terminals and all CT input terminals;<br>Between the channels of voltage inputs;<br>Between the channels of CT inputs |
| Dielectric strength | | 2,000 V AC for 1 minute<br>Between all external terminals and case;<br>Between all power supply terminals and all other terminals;<br>Between (all voltage input terminals + all CT input terminals) and (all communications terminals + all transistor terminals);<br>Between all voltage input terminals and all CT input terminals;<br>Between the channels of voltage inputs;<br>Between the channels of CT inputs |
| Vibration resistance | | Frequency 10 to 55 Hz, 0.35-mm single amplitude, acceleration 50 $m/s^2$,<br>10 sweeps of 5 min each in X, Y, and Z directions |
| Shock resistance | | 100 $m/s^2$, 3 times each in X, Y, and Z axes, 6 directions |
| Degree of protection | | IP20 |
| Terminal block type | | Push-In Plus |
| Exterior color | | Black (Munsell N 1.5) |
| Mounting | | DIN Track |
| Weight | | Approx. 200 g |
| Wiring material | Wire type | Solid or Stranded wire |
| | Wiring material | Copper |
| | Recommended wires | 0.25 to 1.5 $mm^2$<br>AWG 24 to AWG 16 |
| | Stripping length (without ferrules) | 8 mm |
| Installation environment | | Operation voltage: EN/IEC 61010-1 Pollution Degree 2, Overvoltage category II |
| | | Measurement circuit: EN/IEC 61010-2-030 Pollution Degree 2, CAT II 600 V or CAT III 300 V |
| Industrial electromagnetic environment | | EN/IEC 61326-1 Industrial electromagnetic environment |

# Measurement Specifications

| Item | | Specifications |
|---|---|---|
| **Input range** | | Current<br>Rated 5 A AC: 0.00 to 5.00 A AC<br>Rated 25 A AC: 0.0 to 25.0 A AC<br>Rated 100 A AC: 0.0 to 100.0 A AC<br>Rated 200 A AC: 0.0 to 200.0 A AC<br>Rated 400 A AC: 0.0 to 400.0 A AC<br>Rated 600 A AC: 0.0 to 600.0 A AC<br>Rated frequency: 50/60 Hz<br><br>Voltage<br>Rated 120 V AC: 0.0 to 120.0 V AC<br>Rated 240 V AC: 0.0 to 240.0 V AC<br>Rated 480 V AC: 0.0 to 480.0 V AC<br>Rated 600 V AC: 0.0 to 600.0 V AC<br>Rated frequency: 50/60 Hz |
| **Measurable range** | | Current<br>Rated 5 A AC: 0.00 to 5.50 A AC<br>Rated 25 A AC: 0.0 to 27.5 A AC<br>Rated 100 A AC: 0.0 to 110.0 A AC<br>Rated 200 A AC: 0.0 to 220.0 A AC<br>Rated 400 A AC: 0.0 to 440.0 A AC<br>Rated 600 A AC: 0.0 to 650.0 A AC<br><br>Voltage<br>Rated 120 V AC: 0.0 to 132.0 V AC<br>Rated 240 V AC: 0.0 to 264.0 V AC<br>Rated 480 V AC: 0.0 to 528.0 V AC<br>Rated 600 V AC: 0.0 to 660.0 V AC |
| **Measurement accuracy** | | Absolute accuracy of voltage/current: ±0.5% FS ±1 digit to the input range Conditions:<br>• When sine waves are input continuously<br>• Variations in CTs are not included.<br><br>Repeat accuracy of resistance value (reference value): ±1% rdg ±1 digit Conditions:<br>• When sine waves are input continuously<br>• Variations in CTs are not included. |
| **Measurement target** | | Resistance heating heater |
| **CH1 voltage input**<br>**CH2 voltage input** | **Measurement accuracy** | ±0.5% FS ±1 digit |
| | **Input range** | 0 to 600 V AC, 50/60 Hz |
| | **Recommend external fuse** | Class CC, Class J, or Class T with a rated current of 7 A or less |
| **CH1 CT input**<br>**CH2 CT input** | **Measurement accuracy** | ±0.5% FS ±1 digit |
| | **Input range** | 0 to 600 A AC, 50/60 Hz |

## Output Specifications of Transistor Output Terminals

| Item | | Specifications |
|---|---|---|
| Transistor output (Alarm output, Output at error) | Contact form | NPN open collector (normally close) |
| | Rated voltage | 24 V DC (maximum voltage: 26.4 V DC) |
| | Maximum current | 50 mA |
| | Leakage current when power turning OFF | 0.1 mA max. |
| | Residual voltage | 1.5 V max. |

## Communications Specifications

| Item | | Specifications |
|---|---|---|
| RS-485 communications 1 RS-485 communications 2 | Transmission path connection method | RS-485: Multidrop |
| | Communications method | RS-485 (2-wire, half duplex) |
| | Cable length | When the baud rate is 115.2 kbps or less, the maximum length is 500 m with a twisted-pair cable.<br>When the baud rate is 230.4 kbps, the maximum length is 200 m with a twisted-pair cable. |
| | Protocol | Modbus RTU |
| | Baud rate | 9.6 kbps/ 19.2 kbps/ 38.4 kbps/ 57.6 kbps/ 115.2 kbps/ 230.4 kbps |
| | Data length | Always 8 bits |
| | Stop bits | Always 1 bit (with parity being even/odd)<br>Always 2 bits (with parity being none) |
| | Connection configurations | 1:1 or 1:N |
| | Maximum number of Units | 32 Units (including the host system) |
| | Parity | None/Even/Odd |
| | Send wait time | 0 to 99 ms |

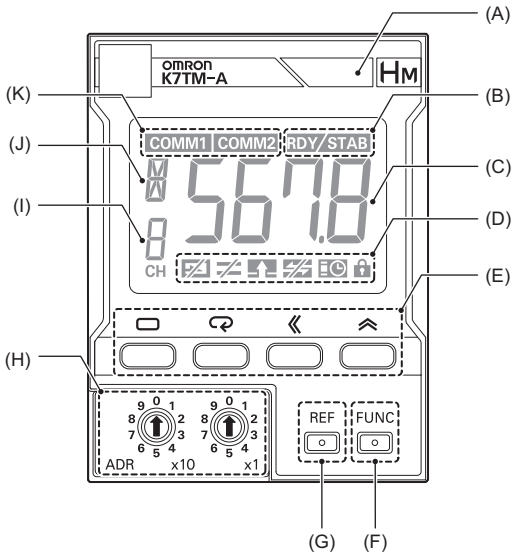
## Ratings and Specifications of CT*1

| Item \ Model | K6CM-CICB005(-C) | K6CM-CICB025(-C) | K6CM-CICB100(-C) | K6CM-CICB200(-C) | K6CM-CICB400(-C) | K6CM-CICB600 |
|---|---|---|---|---|---|---|
| Construction | Internal split type | | | | | |
| Primary-side rated current | 5 A | 25 A | 100 A | 200 A | 400 A | 600 A |
| Rated voltage | 600 V AC | | | | | |
| Secondary winding | 3,000 turns | | | | 6,000 turns | 9,000 turns |
| Insulation resistance | Between output terminal and case: 50 mΩ min | | | | | |
| Dielectric strength | Between output terminal and case: 2,000 V AC for 1 minute | | | | | |
| Protective element | 7.5 V clamp element | | | | | |
| Allowable number of attachments and detachments | 100 times | | | | | |
| Diameter of wire attachable *2 | 7.9 mm dia. max. | 9.5 mm dia. max. | 14.5 mm dia. max. | 24.0 mm dia. max. | 35.5 mm dia. max. | |
| Operating temperature and humidity range | -20 to 60°C, 25% to 85% (with no condensation or icing) | | | | | |
| Storage temperature and humidity range | -30 to 65°C, 25% to 85% (with no condensation or icing) | | | | | |
| Supplied cable length | 2.9 m | | | | | |
| Supplied cable terminal | K7TM side: Ferrule, CT side: Round crimp terminal | | | | | |
| Degree of protection | IP20 | | | | | |

*1. To comply with UL certification, refer to *Conformance to Safety Standards* (page 16).
*2. When you use a flat wire, refer to the outline dimensional drawing of the relevant CT and use a CT with a larger diameter. However, use the CT within the range of its rated current.

# Nomenclature

## Front Section

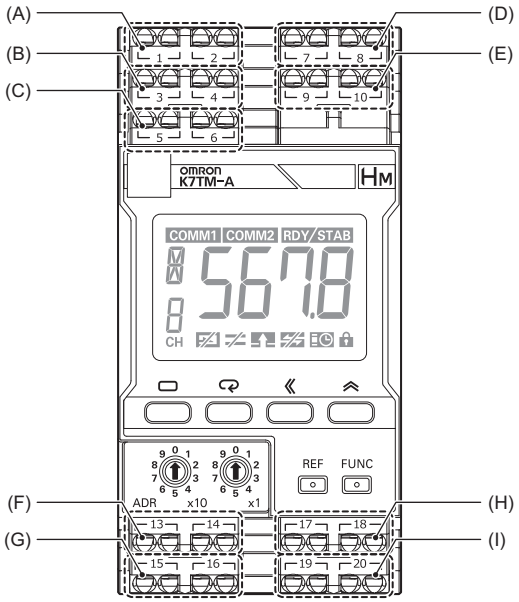



| Symbol | Name | Function | |
|---|---|---|---|
| (A) | Alarm output indicator | Indicates the alarm judgment results in three colors.<br>Green: Normal<br>Yellow: Warning (At least one of the heater deterioration alarm (warning) and the last resistance value change rate alarm has occurred.)<br>Red: Critical (At least one of the heater deterioration alarm (critical) and the heater burnout alarm has occurred.)<br>It will turn red also if any other fatal failure occurs.<br>The red light overrides the yellow light.<br>Not lit: It is not lit when the measurement operation has stopped. | |
| (B) | Monitoring step indicator display | **RDY** | Indicates the registration status of a reference resistance value of the current channel.<br>Not lit: Reference resistance value not registered<br>Flashing: Reference resistance value under evaluation<br>Lit: Reference resistance value registered |
| | | **STAB** | Indicates the monitoring status of the current channel.<br>Not lit: Waiting for stabilization ✻1<br>Lit: Stabilized<br>Flashing: Unstabilization error |
| (C) | Main display | Indicates a measurement value or a set value. | |
| (D) | Status display | **IN** | Indicates whether there are voltage and current inputs.<br>Not lit: Voltage and current input on all channels ✻1<br>Flashing: Voltage and current not input except on the current channel<br>Lit: Voltage and current not input on the current channel |
| | | **FAIL** | Indicates the occurrence status of a measurement error.<br>Not lit: A measurement error not generated on all channels ✻1<br>Flashing: A measurement error generated except on the current channel<br>Lit: A measurement error generated on the current channel |
| | | **ALM** | Indicates that an alarm has occurred.<br>Not lit: An alarm not generated on all channels ✻1<br>Flashing: An alarm generated except on the current channel<br>Lit: An alarm generated on the current channel |
| | | **LOCK** | Lit when setting change protection is enabled. |
| (E) | Operation Keys | Level Key (▭) | Selects the setting level. |
| | | Mode Key (↻) | Switches setting parameter displays, on the setting level that allows you to change the parameter.<br>Switches measurement value displays (reference resistance value change rate, resistance value, voltage value, current value, power, temperature, and alarm status), on the Operation Level. |
| | | Shift Key ( ≪ ) | Moves from the parameter name display state to the monitoring state.<br>Puts the parameter value into the changeable state.<br>Used for digit shift, in the setting change state. |
| | | Up Key (≫) | Increments the value when the parameter is in the setting change state.<br>Switches channels of the measurement value or parameter to display, in the measurement value display state or the parameter display state. |

<table>
<tr><th>Symbol</th><th>Name</th><th colspan="3">Function</th></tr>
<tr><td>(F)</td><td>FUNC Key<br>(Function Key)</td><td colspan="3">Releases the alarm latch.</td></tr>
<tr><td>(G)</td><td>REF Key<br>(Reference Key)</td><td colspan="3">Starts resistance reference value registration for the current channel.<br>When the reference resistance value is under evaluation, cancels reference resistance value registration.</td></tr>
<tr><td>(H)</td><td>Unit number setting switch</td><td colspan="3">Sets the Unit number.</td></tr>
<tr><td>(I)</td><td>CH display</td><td colspan="3">Indicates the channel of the currently displayed parameter.</td></tr>
<tr><td rowspan="18">(J)</td><td rowspan="18">LVL/Measurement value mark display</td><td colspan="3">Operation Level: Indicates the currently displayed measurement value mark.<br>Other levels: Indicates the mark showing the setting level.</td></tr>
<tr><td>Level</td><td>Measurement value mark</td><td>Meaning</td></tr>
<tr><td rowspan="8">Operation Level</td><td>d</td><td>Reference Resistance Value Change Rate</td></tr>
<tr><td>R</td><td>Resistance Value</td></tr>
<tr><td>V</td><td>Voltage Value</td></tr>
<tr><td>C</td><td>Current Value</td></tr>
<tr><td>S</td><td>Power</td></tr>
<tr><td>t</td><td>Temperature</td></tr>
<tr><td>A</td><td>Alarm Status</td></tr>
<tr><td>Setting level</td><td>Level mark</td><td>Meaning</td></tr>
<tr><td>Adjustment Level (Common)</td><td>A</td><td>Shows that you are on the Adjustment Level (Common).</td></tr>
<tr><td>Adjustment Level (Power)</td><td>b</td><td>Shows that you are on the Adjustment Level (Power).</td></tr>
<tr><td>Adjustment Level (Temperature)</td><td>C</td><td>Shows that you are on the Adjustment Level (Temperature).</td></tr>
<tr><td>Initial Setting Level</td><td>0</td><td>Shows that you are on the Initial Setting Level.</td></tr>
<tr><td>Communications Setting 1 Level</td><td>1</td><td>Shows that you are on the Communications Setting 1 Level.</td></tr>
<tr><td>Communications Setting 2 Level</td><td>2</td><td>Shows that you are on the Communications Setting 2 Level.</td></tr>
<tr><td rowspan="2">(K)</td><td rowspan="2">Communications display</td><td>COMM1</td><td colspan="2">Lit when the communications 1 terminals (for host system) received a command to the local address.</td></tr>
<tr><td>COMM2</td><td colspan="2">Lit when the communications 2 terminals (for K7TM Configuration Tool or IoT gateway) performed normal communications.</td></tr>
</table>

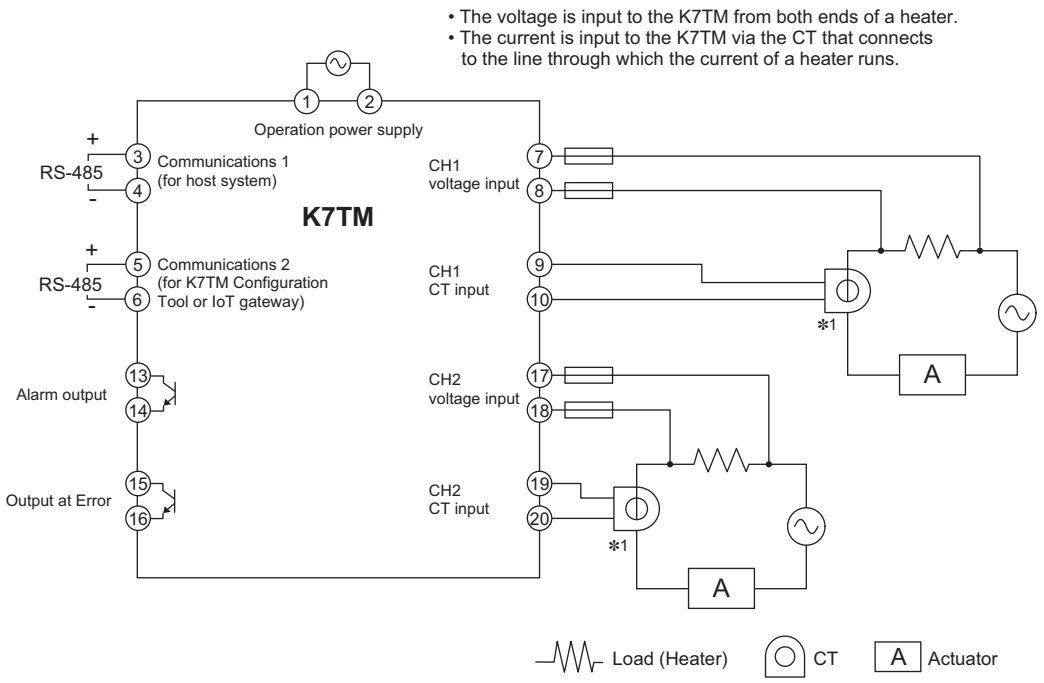
***1.** Not lit also when the measurement operation has stopped.

## Terminal Section




| Symbol | Terminal Numbers | Name | Function |
|---|---|---|---|
| (A) | 1 and 2 | Operation power supply | To be connected with the operation power supply to the K7TM. |
| (B) | 3 and 4 | RS-485 communications 1 | To be connected with the RS-485 communications line.<br>This is a communications terminal for communicating with the host system.<br>Number 3: +, Number 4: - |
| (C) | 5 and 6 | RS-485 communications 2 | To be connected with the RS-485 communications line.<br>This is a communications terminal for communicating with the K7TM Configuration Tool or the IoT gateway.<br>Number 5: +, Number 6: - |
| (D) | 7 and 8 | CH1 voltage input | To be connected with both ends of a heater to measure the voltage applied to the heater. This is an input for the 1st channel of the two channels measurable. |
| (E) | 9 and 10 | CH1 CT input | To be connected with the CT, connected to a heater current measuring point, to measure the current running down the heater. This is an input for the 1st channel of the two channels measurable. |
| (F) | 13 and 14 | Alarm output | Compares the resistance value change rate and the alarm threshold to produce an alarm output.<br>Number 13: Collector of the NPN transistor, Number 14: Emitter of the NPN transistor. |
| (G) | 15 and 16 | Output at error | Produces a Output at error, in case of a measurement error or a self-diagnosis error.<br>Number 15: Collector of the NPN transistor, Number 16: Emitter of the NPN transistor. |
| (H) | 17 and 18 | CH2 voltage input | To be connected with both ends of a heater to measure the voltage applied to the heater. This is an input for the 2nd channel of the two channels measurable. |
| (I) | 19 and 20 | CH2 CT input | The CT connected to the heater current measurement point is wired to this terminal, and the K7TM measures the heater current. This is the second input of the two measurable channels. |

## Connection Diagram

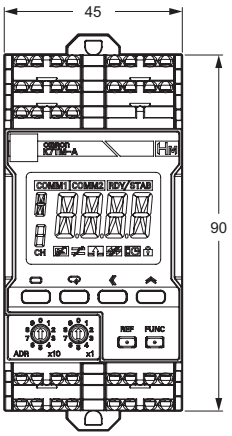


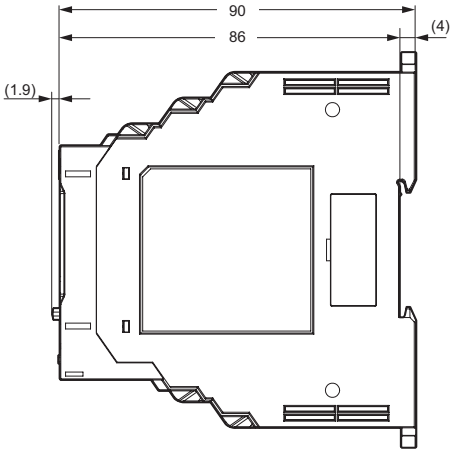

**∗1.** The CT input terminals of the K7TM can be connected in either direction of the special CT regardless of polarity.

# Dimensions

(Unit: mm)

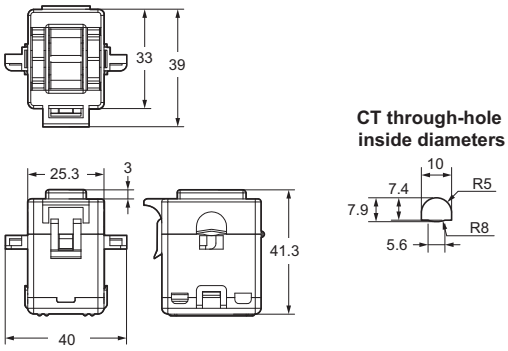
## K7TM




## Special CT (Current Transformer)

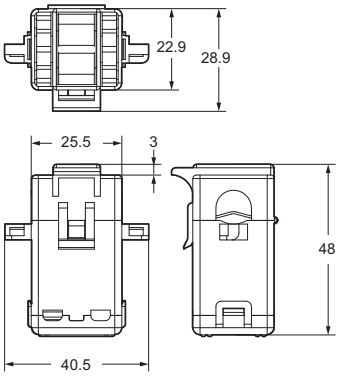
### K6CM-CICB005-C
### K6CM-CICB005



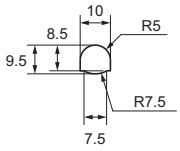

**CT through-hole inside diameters**



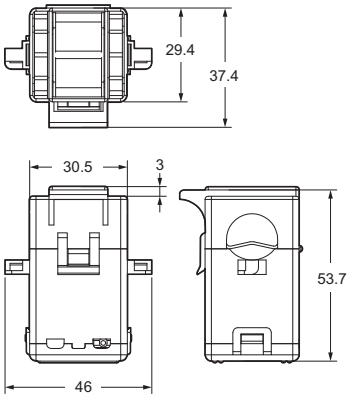

### K6CM-CICB025-C
### K6CM-CICB025



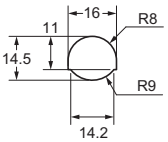

**CT through-hole inside diameters**



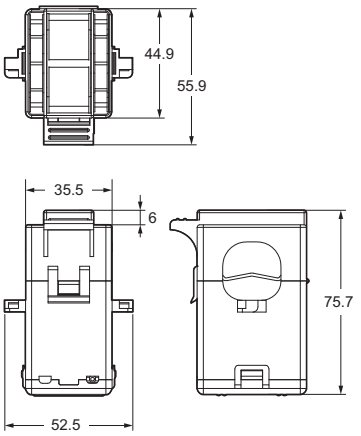

### K6CM-CICB100-C
### K6CM-CICB100



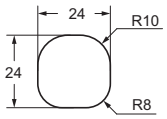

**CT through-hole inside diameters**



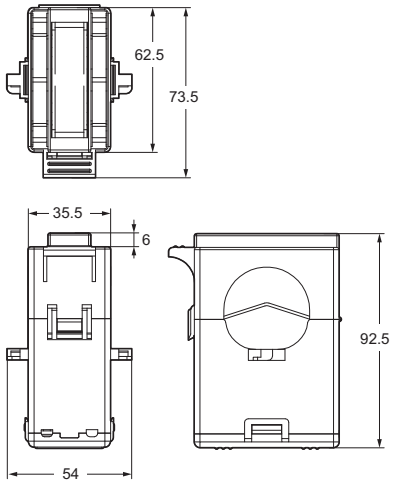

### K6CM-CICB200-C
### K6CM-CICB200



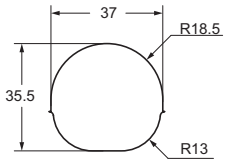

**CT through-hole inside diameters**



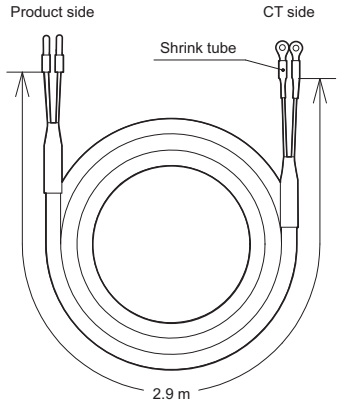
**K6CM-CICB400-C**
**K6CM-CICB400**
**K6CM-CICB600**




**CT through-hole inside diameters**




**CT-supplied cable ✻**



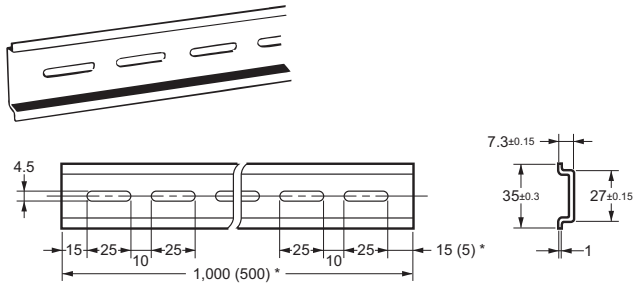

✻ The CT-supplied cable is attached to the CT.

**Note: 1.** The "-C" at the end of the special CTs refer to the models compliant with UL certification. Models without "-C" can also be used if UL certification is not required. The ratings and specifications are common to all of them.
**2.** To comply with UL certification for the special CT, refer to *Conformance to Safety Standards* (page 16).
**3.** The CT input terminals of the K7TM can be connected in either direction of the special CT regardless of polarity.

## Optional Products for DIN Track Mounting

### DIN Tracks

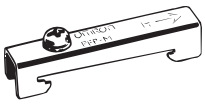
**PFP-100N**
**PFP-50N**

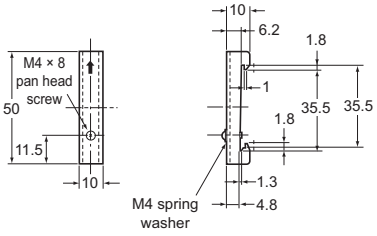



* Dimensions in parentheses are for the PFP-50N.

### End Plate

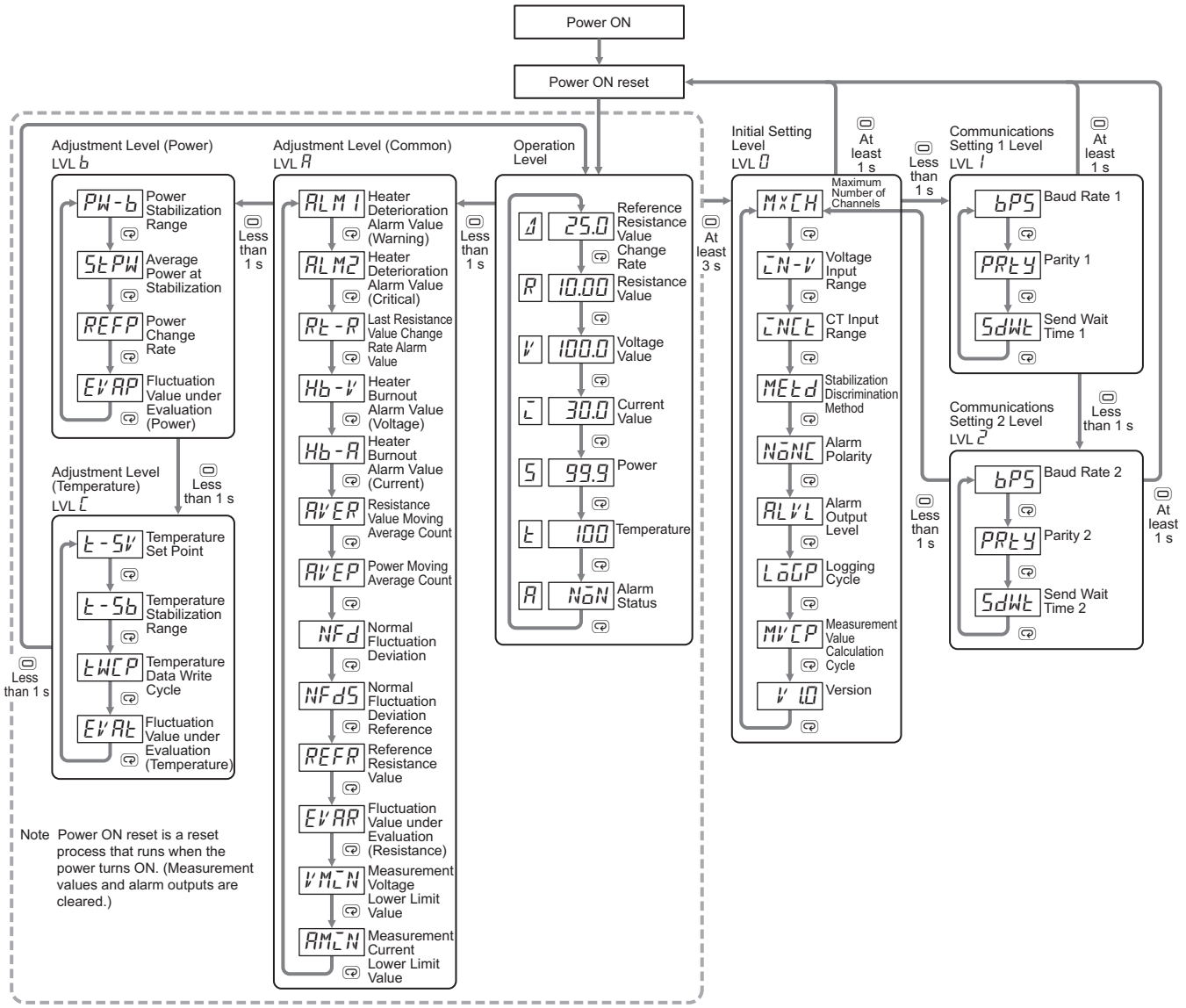
**PFP-M**





# Parameters

## Parameter Flow



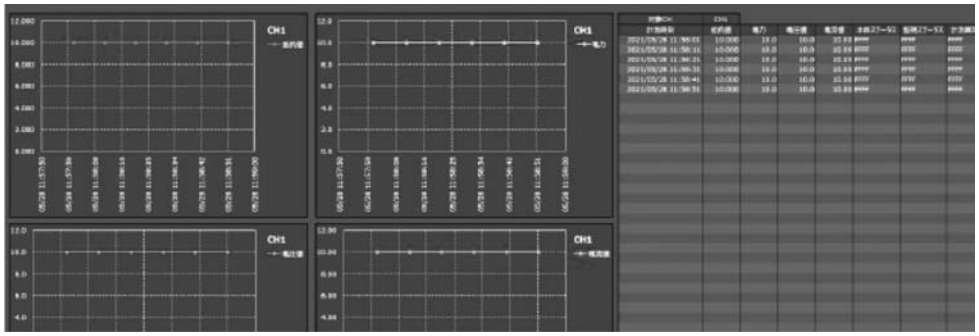
## Parameters List

| Level | Parameter name | Characters | Setting (monitoring) range | Default value | Description |
|---|---|---|---|---|---|
| Operation | Reference Resistance Value Change Rate | Δ | -100.0 to 999.9 (%) | Monitored value just displayed | The resistance value change rate is calculated on the basis of the *Reference Resistance Value*. |
| | Resistance Value | R | 0.000 to 9.999 (Ω)<br>10.00 to 99.99 (Ω)<br>100.0 to 999.9 (Ω) | Monitored value just displayed | This is a resistance value of the heater. |
| | Voltage Value | V | 120 V range: 0.0 to 132.0 (V)<br>240 V range: 0.0 to 264.0 (V)<br>480 V range: 0.0 to 528.0 (V)<br>600 V range: 0.0 to 660.0 (V) | Monitored value just displayed | This is a voltage value applied to the heater. |
| | Current Value | C | 5 A range: 0.00 to 5.50 (A)<br>25 A range: 0.0 to 27.5 (A)<br>100 A range: 0.0 to 110.0 (A)<br>200 A range: 0.0 to 220.0 (A)<br>400 A range: 0.0 to 440.0 (A)<br>600 A range: 0.0 to 650.0 (A) | Monitored value just displayed | This is a current value applied to the heater. |
| | Power | S | 0.0 to 429.0 (kVA) | Monitored value just displayed | This is an apparent power of the heater. |
| | Temperature | t | -1,999 to 9,999 (°C/°F) | Monitored value just displayed | This is a temperature used as a reference for checking the heater for stability. |
| | Alarm Status | A | NON: Normal<br>ALM1: Heater Deterioration Alarm (Warning)<br>ALM2: Heater Deterioration Alarm (Critical)<br>Rt-R: Last Resistance Value Change Rate Alarm Value<br>Hb: Heater Burnout Alarm | Monitored value just displayed | This parameter displays the present alarm status. |
| Adjustment (Common) | Heater Deterioration Alarm Value (Warning) | ALM1 | 0.1 to 999.9 (%) | 3.0 (%) | Set the alarm value (caution) for heater deterioration. |
| | Heater Deterioration Alarm Value (Critical) | ALM2 | 0.1 to 999.9 (%) | 5.0 (%) | Set the alarm value (warning) for heater deterioration. |
| | Last Resistance Value Change Rate Alarm Value | Rt-R | 0.1 to 999.9 (%) | 25.0 (%) | Set the alarm value for last resistance value change rate alarm value. |
| | Heater Burnout Alarm Value (Voltage) | Hb-V | 0.0 to 99.9 (% FS) | 40.0 (% FS) | Set the voltage conditions for heater burnout alarm. |
| | Heater Burnout Alarm Value (Current) | Hb-A | 0.0 to 99.9 (% FS) | 1.0 (% FS) | Set the current conditions for heater burnout alarm. |
| | Resistance Value Moving Average Count | AVER | LOW: Moving Average Count of 10<br>MID: Moving Average Count of 20<br>HIGH: Moving Average Count of 40 | LOW | Set the moving average for resistance value. |
| | Power Moving Average Count | AVEP | LOW: Moving Average Count of 10<br>MID: Moving Average Count of 20<br>HIGH: Moving Average Count of 40 | LOW | Set the moving average for power. |
| | Normal Fluctuation Deviation | NFd | 0.1 to 999.9 (%) | 1.0 (%) | Set the range of resistance values required for the K7TM determining that the heater temperature is stabilized. |
| | Normal Fluctuation Deviation Reference | NFdS | Same range as Resistance Value | Monitored value just displayed | This is a moving average value of the past 10 resistance values calculated in the stabilized state. |
| | Reference Resistance Value | REFR | Same range as Resistance Value | Monitored value just displayed | This is a reference resistance value registered by the operation command *Reference Resistance Value Registration Start*. |
| | Fluctuation Value under Evaluation (Resistance) | EVAR | Same range as Reference Resistance Value Change Rate | Monitored value just displayed | In the *Reference Resistance Value Evaluation State*, the value for which the reference resistance value change rate has fluctuated most sharply will be retained. |
| | Measurement Voltage Lower Limit Value | VMIN | 3.0 to 99.9 (% FS) | 3.0 (% FS) | Set the lowest voltage conditions for calculating resistance values. |
| | Measurement Current Lower Limit Value | AMIN | 3.5 to 99.9 (% FS) | 3.5 (% FS) | Set the lowest voltage conditions for calculating resistance values. |

| Level | Parameter name | Characters | Setting (monitoring) range | Default value | Description |
|---|---|---|---|---|---|
| Adjustment (Power) | Power Stabilization Range | PW-b | 0.1 to 999.9 (%) | 20.0 (%) | Set the range of powers that the K7TM judges to be stabilized. |
| | Average Power at Stabilization | StPW | Same range as Power | Monitored value just displayed | This is an average power at stabilization registered by the operation command, *Reference Resistance Value Registration Start*. |
| | Power Change Rate | REFP | -100.0 to 999.9 (%) | Monitored value just displayed | This is a power change rate based on the *Average Power at Stabilization*. |
| | Fluctuation Value under Evaluation (Power) | EvAP | -100.0 to 999.9 (%) | Monitored value just displayed | In the *Reference Resistance Value Evaluation State*, the value for which the power change rate has fluctuated most sharply will be retained. |
| Adjustment (Temperature) | Temperature Set Point | t-Sv | 0 to 9,999 (°C/°F) | 0 (°C/°F) | Set the reference for temperature stabilization range that the K7TM judged to be stabilized. |
| | Temperature Stabilization Range | t-Sb | 1 to 9,999 (°C/°F) | 10 (°C/°F) | Set the temperature stabilization range that the K7TM judged to be stabilized. |
| | Temperature Data Write Cycle | tWCP | 1 to 999 (s) | 10 (s) | Set the time during which the K7TM waits for temperature to be written from the host system. |
| | Fluctuation Value under Evaluation (Temperature) | EvAt | Same range as Temperature | Monitored value just displayed | In the *Reference Resistance Value Evaluation State*, the value for which temperature is most different from the temperature set point will be retained. |
| Initial Setting | Maximum Number of Channels | MxCH | 1 to 2 | 1 | Set the number of input channels to use. |
| | Voltage Input Range | CN-V | 120V<br>240V<br>480V<br>600V | 120V | Set the voltage input range, according to the voltage applied to the heater. |
| | CT Input Range | CNCt | 5A<br>25A<br>100A<br>200A<br>400A<br>600A | 25A | Set the CT input range, according to the CT to use. |
| | Stabilization Discrimination Method | MEtd | Md-1: Power<br>Md-2: Temperature | Md-1 | Set the method by which to monitor the heater. |
| | Alarm Polarity | NoNC | N-o: Normally open<br>N-C: Normally close | N-C | Set whether to turn the alarm output contacts ON or OFF during normal operation. |
| | Alarm Output Level | ALvL | LoW: Warning or Critical<br>HIGH: Critical | HIGH | Set the level where the alarm output is produced when an alarm occurs. |
| | Logging Cycle | LogP | 10 to 9,999 (in 10 times) | 100 (in 10 times) (approx. 1 day) | Set the cycle in which to keep a log of the last resistance value change rate, voltage, and current. |
| | Measurement Value Calculation Cycle | MvCP | 1 to 999 (s) | 100 (s) | Set the cycle in which to calculate the measurement values. |
| | Version | V 1.0 | --- | --- | Displays the current software version. |
| Communications Setting 1, 2 | Baud Rate 1 and 2 | bPS | 9.6 (kbps)<br>19.2 (kbps)<br>38.4 (kbps)<br>57.6 (kbps)<br>115.2 (kbps)<br>230.4 (kbps) | 115.2 (kbps) | Set the baud rate of the communications terminals 1 or 2. |
| | Parity 1 and 2 | PrtY | NoNE: None<br>EVEN: Even<br>odd: Odd | EVEN | Set the parity of the communications terminals 1 or 2. |
| | Send Wait Time 1 and 2 | SdWt | 0 to 99 (ms) | 20 (ms) | Set the send wait time of the communications terminals 1 or 2. |

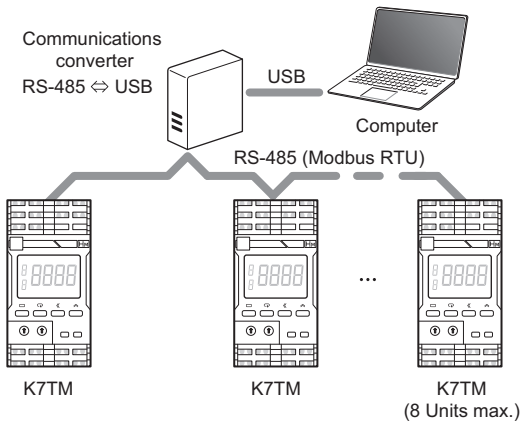
# Tool

The K7TM Configuration Tool is a tool for “configuration,” “adjustment,” and “logging” of the K7TM.
A macro book of Microsoft® Excel is used.
Using the K7TM Configuration Tool allows you to perform configuration and adjustment more easily than K7TM key operations.



1. Connect the K7TM and the computer (K7TM Configuration Tool) in consultation with the figure.
   The K7TM Configuration Tool can configure up to eight K7TM Units.
2. Download the K7TM Configuration Tool from the website.
   https://www.ia.omron.com/k7tm_tool
   The K7TM Configuration Tool can be used just by decompressing the file, because it uses a macro book of Microsoft® Excel.

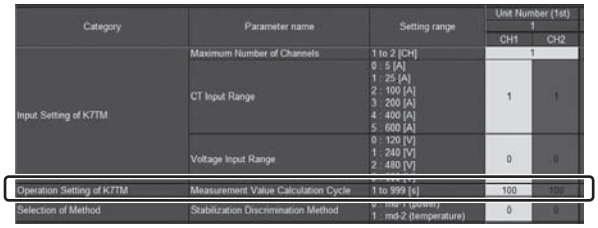
- It may take time for the K7TM Configuration Tool to be started or saved.
- When you perform the functions of the K7TM Configuration Tool, the drawing, calculation, and edit processing of Excel are stopped depending on the timing. While using the K7TM Configuration Tool, you are recommended not to operate other Excel files. Operating other Excel files will cause the K7TM Configuration Tool to operate unstably.
- The mouse cursor is in the following state during the processing of the K7TM Configuration Tool.




The system requirements are as follows.

| | |
|---|---|
| **Supported OS** | Windows 10 (64-bit edition), English or Japanese ✻1 |
| **PC specifications** | 1 GHz or faster CPU, 1 GB or more of RAM, and 16 GB or more of required disk space |
| **Excel** | Excel 2019 32-bit or 64-bit edition, English or Japanese ✻2 |
| **RS-485–USB Communications converter** | Use a commercially available product. ✻3 |
| **Maximum number of connected K7TM Units** | 8 Units |

**✻1.** Japanese characters may be garbled if the system locale of the computer that uses the K7TM Configuration Tool is not ja-JP.
**✻2.** When you use the K7TM Configuration Tool with Excel 2013 or Excel 2016, set Measurement Value Calculation Cycle on the Initial Setting of K7TM Sheet of the K7TM Configuration Tool to 100 seconds or less. (Default setting: 100 s)
It may become unstable if you set a value that exceeds 100 seconds.




**✻3.** OMRON performed an evaluation test on the SI-35USB-2 manufactured by LINE EYE (with a driver version of V2.12.18).

For details on how to use the K7TM Configuration Tool, refer to the K7TM User’s Manual (Cat. No. N227).

You can download the latest version of this tool from the following OMRON website.
http://www.ia.omron.com/k7tm_tool

In the interest of product improvement, the tool specifications are subject to change without notice.

# Conformance to Safety Standards

- The protection provided by the device may be impaired if the device is used in a manner that is not specified by the manufacturer.
- To use the Product, install it as an embedded device within a control panel.
- To use the special CT, install it in the same control panel as the Product with a sufficient clearance from other devices.
- For the special CT, use one with -C suffixed to the model.
- For the operation power supply and voltage inputs, use recommended fuses that are externally installed.
- Use the voltage and CT inputs under conditions specified for the measurement category.
- The maximum temperature of the terminal block is 65°C. Therefore, use wires with a rated temperature of 65°C or higher.
- For the wire passing through the primary side of the special CT, use an insulated wire with basic insulation or higher degree of insulation that complies with Table 1.
- Using Table 2 as a guideline, select such a wire as the case temperature of the special CT will be 65°C or less.

**Table 1**

| Load (heater) circuit voltage | AWM (Appliance Wiring Material) Wires Rated voltage and size | |
|---|---|---|
| | Overvoltage category II Measurement category II | Overvoltage category III Measurement category III |
| > 300 ≤ 600 V | 600 V min. 1 AWG min. | |
| > 150 ≤ 300 V | 300 V min. No restriction on size | 600 V min. 1 AWG min. |
| ≤ 150 V | 150 V min. No restriction on size | 150 V min. No restriction on size |

**Table 2**

| Special CT model | Wire size | Ambient operating temperature of K7TM and special CT |
|---|---|---|
| K6CM-CICB005-C | 24 AWG min. (0.25 mm² min.) | 55°C max. |
| K6CM-CICB025-C | 12 AWG min. (3.5 mm² min.) | 55°C max. |
| K6CM-CICB100-C | 4 AWG (22 mm²) | 45°C max. |
| | 2 AWG (35 mm²) | 50°C max. |
| | 1 AWG min. (50 mm² min.) | 55°C max. |
| K6CM-CICB200-C | 2/0 AWG (70 mm²) | 45°C max. |
| | 3/0 AWG min. (95 mm² min.) | 50°C max. |
| K6CM-CICB400-C | 3/0 AWG min. x 2 wires (95 mm² min. x 2 wires) | 40°C max. |

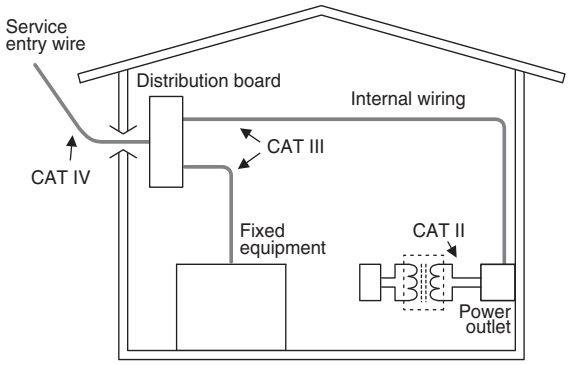
## ●Measurement category

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

CAT II: Energy-consuming equipment with an energy supply from fixed wiring equipment (such as a power outlet)

CAT III: Equipment in fixed wiring equipment that particularly demands equipment reliability and effectiveness

CAT IV: Equipment to use at the electrical service entry

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