Panasonic

Installation Instructions KT4H/B Temperature Controller

No. KT4HE7 2013.05

To ensure safe and correct use, thoroughly read and understand these instructions before using this instrument. For detailed usage and options, please refer to User's Manual for the KT4H/B. Please download User's Manual from our website.

SAFETY PRECAUTIONS

(Be sure to follow the precautions described below to prevent injury or accidents.)

The safety precautions are classified into categories: "Warning" and "Caution".

⚠ **Warning**: Procedures which may lead to dangerous conditions and cause death or serious injury, if not carried out properly.

⚠ **Caution**: Procedures which may lead to dangerous conditions and cause superficial to medium injury or physical damage or may degrade or damage the product, if not carried out properly.

⚠ Warning

- When using this controller on occasions which serious injury would be expected to occur or when damage is likely to expand or proliferate, make sure to take safety measures such as installing double safety structures.
- Do not use this controller in an environment with flammable gases, or it may cause explosion.

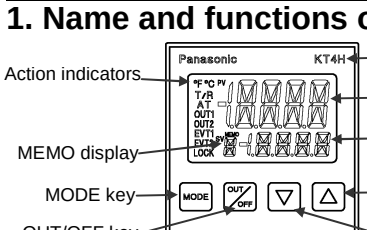
⚠ Caution

- Fasten the electric wire with the terminal screws securely. Imperfect connection may cause abnormal heating or fumes.
- Use this controller according to the rating and environmental conditions. Otherwise abnormal heating or fumes may occur.
- Do not touch the terminals while the power is supplied to the controller, as this may cause electric shock.
- Do not disassemble or modify the controller, as this may cause electric shock or fumes.

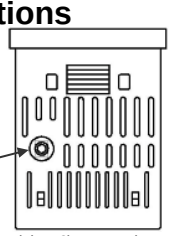
⚠ Caution

- This instrument should be used in accordance with the specifications described in these instructions. If it is not used according to the specifications, it may malfunction or cause fire.
- Be sure to follow the warnings, cautions and notices. Not doing so could cause serious injury or accidents.
- The contents of this booklet are subject to change without notice.
- This instrument is designed to be installed in a control panel. If not, measures must be taken to ensure that the operator cannot touch power terminals or other high voltage sections.
- Be sure to turn the power supply to the instrument OFF before cleaning this instrument.
- Use a soft, dry cloth when cleaning the instrument. (Alcohol based substances may tarnish or deface the unit.)
- As the display section is vulnerable, do not strike or scratch it with a hard object.
- Any unauthorized transfer or copying of this document, in part or in whole, is prohibited.
- Matsushita Electric Works, Ltd. is not liable for any damages or secondary damages incurred as a result of using this product, including any indirect damages.

1. Name and functions of the sections



(Fig.1-1)



(Fig.1-2) Bottom view

MODE key : Selects the setting mode, or registers the set value.
OUT/OFF key : Switches control output ON/OFF or Auto/Manual control.
Increase key : Increases the numeric value.
Decrease key : Decreases the numeric value.
PV display : Indicates the PV (process variable).
SV display : Indicates the SV (main set value).
MEMO display : Indicates the set value memory number.
Action indicators
℉/℃ : Temperature unit ℉ or ℃ lights when selected.
T/R : Lights when Serial communication (option) is performing (TX output).
AT : Flashes while AT(auto-tuning) or auto-reset is performing.
OUT1 : Lights when control output is ON or when Heating output (option) is ON. Flashes corresponding to the MV in 0.25 second cycles for DC current output type.
OUT2 : Lights when cooling output (option) is ON.
EVT1 : Lights when Alarm 1 output is ON.
EVT2 : Lights when Alarm 2 output (option) is ON or Heater burnout alarm (option) is ON.
LOCK: Lights when Lock 1, Lock 2 or Lock 3 is selected.
Tool connector: The following operations can be conducted from external computer by connecting the tool cable (sold separately). (1) Reading and setting of SV, PID and various set values, (2) Reading of PV and action status, (3) Function change

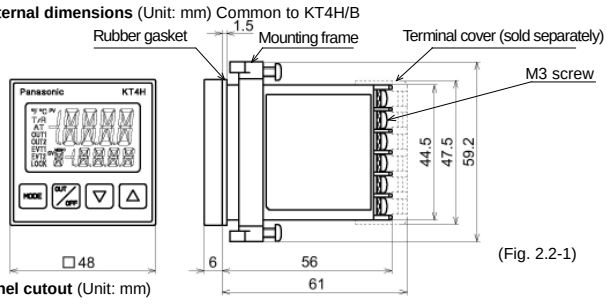
2. Mounting to the control panel

2.1 Site selection

This instrument is intended to be used under the following environmental conditions (IEC61010-1): Overvoltage category Ⅱ, Pollution degree 2

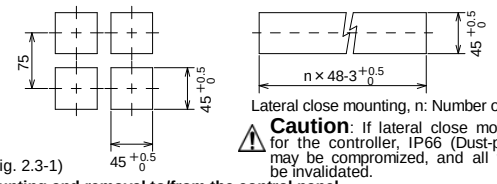
Ensure the mounting location corresponds to the following conditions:
- A minimum of dust, and an absence of corrosive gases
- No flammable, explosive gases
- Few mechanical vibrations or shocks
- No exposure to direct sunlight, an ambient temperature of 0 to 50℃ (32 to 122℉) that does not change rapidly
- An ambient non-condensing humidity of 35 to 85%RH
- No large capacity electromagnetic switches or cables through which large current is flowing
- No water, oil or chemicals or where the vapors of these substances can come into direct contact with the controller

2.2 External dimensions (Unit: mm) Common to KT4H/B



(Fig. 2.2-1)

2.3 Panel cutout (Unit: mm)



(Fig. 2.3-1)

Lateral close mounting, n: Number of units mounted

⚠ **Caution**: If lateral close mounting is used for the controller, IP66 (Dust-proof/Drip-proof) may be compromized, and all warranties will be invalidated.

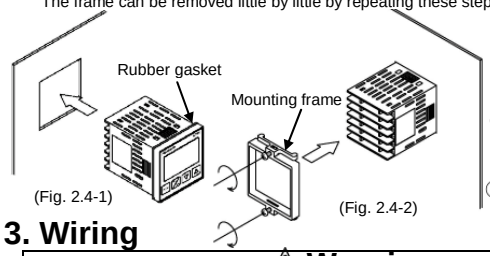
2.4 Mounting and removal to/from the control panel

How to mount the KT4H/B (Fig.2.4-1, Fig.2.4-2)

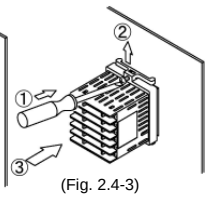
Mount the controller vertically to ensure it adheres to the Dust-proof/Drip-proof specification (IP66).
Mountable panel thickness: Within 1 to 5mm
(1) Insert the controller from the front side of the panel.
(2) Insert the mounting frame until the frame tips come into contact with the panel, and fasten with screws. Tighten screws with one rotation upon the screw tips touching the panel. Torque: 0.05 to 0.06N•m.

How to remove the mounting frame (Fig.2.4-3)

(1) Turn the power to the unit OFF, and disconnect all wires before removing the mounting frame.
(2) Insert a flat blade screwdriver between the screw frame and unit①.
(3) Slowly push the frame upward using the screwdriver② while pushing the unit toward the panel③.
(4) Repeat step (2) and slowly push the frame downward using the screwdriver for the other side. The frame can be removed little by little by repeating these steps.



(Fig. 2.4-1) (Fig. 2.4-2)



(Fig. 2.4-3)

3. Wiring

⚠ Warning

Turn the power supply to the instrument off before wiring or checking it. Working on or touching the terminal with the power switched on may result in severe injury or death due to Electric Shock.

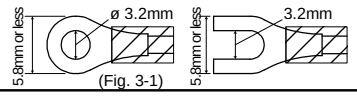
⚠ Caution

- The terminal block of this instrument is designed to be wired from the left side. The lead wire must be inserted from the left side of the terminal, and fastened by the terminal screw. The torque is approximately 0.63N•m.
- When using a terminal cover (AKT4H801), pass terminal wires numbered 7 to 12 into the holes of the terminal cover. See (Fig. 3-2).
- To extend a thermocouple's lead wire, be sure to use a compensating lead wire in accordance with the sensor input specification. (If any other compensating lead wire is used, a temperature indication error may be caused.)
- Use the 3-wire RTD which corresponds to the input specification of this controller.
- This controller does not have a built-in power switch, circuit breaker or fuse. Therefore, it is necessary to install them in the circuit externally, near the controller. (Recommended fuse: Time-lag fuse, rated voltage 250V AC, rated current 2A)
- For a 24V AC/DC power source, do not confuse polarity when using direct current (DC).
- When using a relay contact output type, externally use a relay according to the capacity of the load to protect the built-in relay contact.
- When wiring, keep input wires (thermocouple, RTD, etc.) away from AC sources or load wires to avoid external interference.
- If Alarm 2 and Heater burnout alarm are added together, they (EVT2) utilize common output terminals.

●**Lead wire solderless terminal**

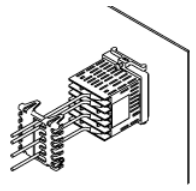
Use a solderless terminal with an insulation sleeve in which an M3 screw fits as shown below. The torque is approximately 0.63N•m.

Solderless terminal	Manufacturer	Model name	Tightening torque
Y type	Nichifu Terminal Industries Co.,Ltd.	TMEV1.25Y-3	0.63N•m
	Japan solderless Terminal MFG Co.,Ltd.	VD1.25-B3A	
Round type	Nichifu Terminal Industries Co.,Ltd.	TMEV1.25-3	
	Japan Solderless Terminal MFG Co.,Ltd.	V1.25-3	

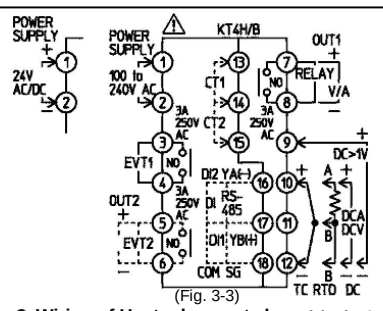


(Fig. 3-1)

●**When using a Terminal cover**



(Fig. 3-2)

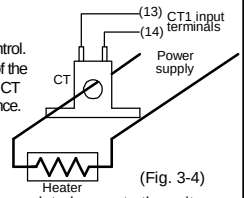


(Fig. 3-3)

EVT1 : Alarm 1 output
EVT2 : Alarm 2 output (option) or Heater burnout alarm output (option)
OUT1 : Control output or Heating output (option)
OUT2 : Cooling output (option)
TC : Thermocouple input
RTD : RTD input
DC : DC current, voltage input
CT1 : Current transformer input (option: Single, 3-phase)
CT2 : Current transformer input (option: 3-phase)
RS-485 : Serial communication (option)
DI : Contact input (option)

● **Wiring of Heater burnout alarm (single, 3-phase)**

This alarm is not usable for detecting heater current under phase control. Use the current transformer (CT) provided, and pass one lead wire of the heater circuit into the hole of the CT. (Fig.3-4) When wiring, keep the CT wire away from AC sources or load wires to avoid the external interference. In the case of 3-phase, pass any 2 lead wires of R, S, T into the CT, and connect them with CT1 (13, 14) and CT2 (14, 15) terminals.



(Fig. 3-4)

4. Operation

After the unit is mounted to the control panel and wiring is completed, operate the unit following the procedures below.

(1) Turn the power supply to the KT4H/B ON.

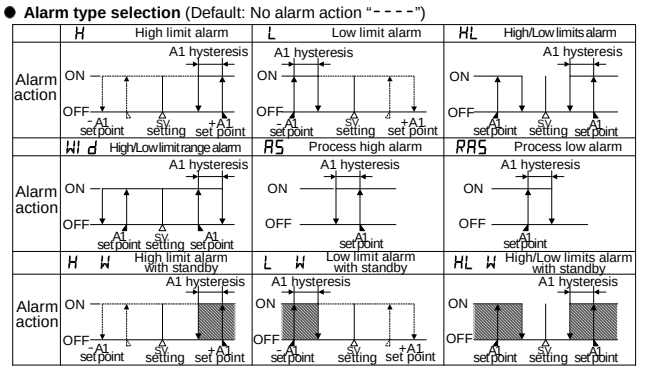
(2) Initial settings

Refer to "5. Operation flowchart", "6. Basic operation" and "7. AT Perform/Cancel". Select an input type, alarm type, Direct/Reverse action, etc. during Setup mode. If initial settings are not required, skip this step, and proceed to step (3).

● **Input type selection** (Default: K, -200 to 1370℃ K C)

K C	K	-200 to 1370 ℃	K F	K	-320 to 2500 ℉
K C	K	-200.0 to 400.0 ℃	K F	K	-320.0 to 750.0 ℉
J C	J	-200 to 1000 ℃	J F	J	-320 to 1800 ℉
R C	R	0 to 1760 ℃	R F	R	0 to 3200 ℉
S C	S	0 to 1760 ℃	S F	S	0 to 3200 ℉
b C	B	0 to 1820 ℃	b F	B	0 to 3300 ℉
E C	E	-200 to 800 ℃	E F	E	-320 to 1500 ℉
T C	T	-200.0 to 400.0 ℃	T F	T	-320.0 to 750.0 ℉
N C	N	-200 to 1300 ℃	N F	N	-320 to 2300 ℉
PL2C	PL-Ⅱ	0 to 1390 ℃	PL2F	PL-Ⅱ	0 to 2500 ℉
C C	C(W/Re5-26)	0 to 2315 ℃	C F	C(W/Re5-26)	0 to 4200 ℉
Pt C	Pt100	-200.0 to 850.0 ℃	Pt F	Pt100	-320.0 to 1500.0 ℉
JPtC	JPt100	-200.0 to 500.0 ℃	JPtF	JPt100	-320.0 to 900.0 ℉
PtC	Pt100	-200 to 850 ℃	PtF	Pt100	-320 to 1500 ℉
JPtC	JPt100	-200 to 500 ℃	JPtF	JPt100	-320 to 900 ℉
420A	4 to 20mA	-2000 to 10000 [Connect 50Ω shunt resistor (AKT4810, sold separately).]			
020A	0 to 20mA				
0 1V	0 to 1V	-2000 to 10000			
0 5V	0 to 5V				
1 5V	1 to 5V				
0 10V	0 to 10V				

● **Alarm type selection** (Default: No alarm action "----")



● **Alarm Energized/Deenergized selection**
[Default: EVT1 contact output ON (Energized) NoML]
NoML : EVT1 contact output ON (Energized) REVS : EVT1 contact output OFF (Deenergized)

● **Direct/Reverse action selection** [Default: Reverse (Heating) HEAT]
HEAT : Reverse action (Heating), CooL : Direct action (Cooling)

● **OUT/OFF key function selection** (Default: OUT/OFF function oFF)
oFF : OUT/OFF function, MANU : Auto/Manual control function

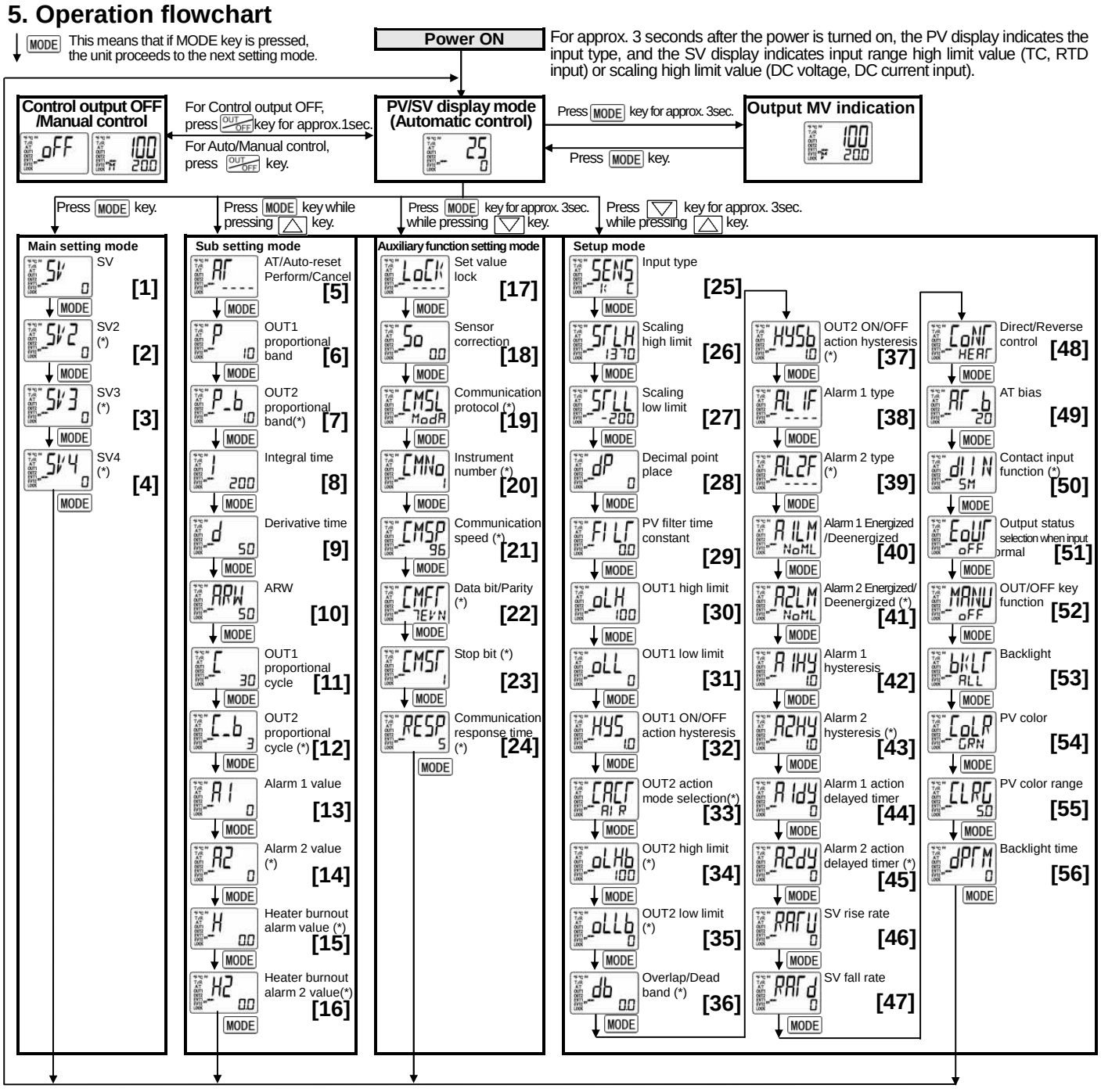
(3) Input each set value. Refer to chapters "5. Operation flowchart" and "6. Basic operation".

● **Set value lock selection** (Default: Unlock ----)
LoC1 : Lock 1 (All set values are locked)
LoC2 : Lock 2 (All set values except SV are locked)
LoC3 : Lock 3 (Set values can be changed temporarily, however, after the power is turned off and on, they return to their previous values.)

(4) Turn the load circuit power ON.

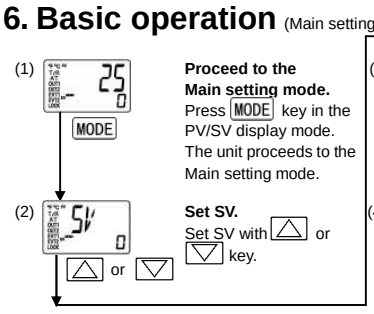
Control action starts so as to keep the control target at the SV (desired value).

5. Operation flowchart



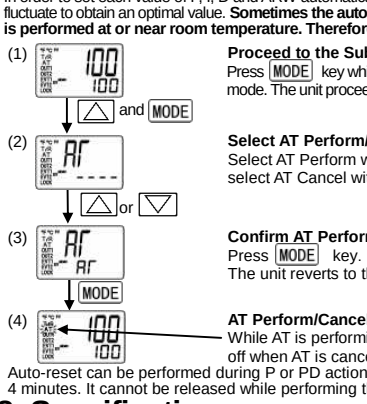
(*): Setting items with (*) are optional, and they appear only when the options are added. Numbers such as [1], [2], etc. are setting item numbers in the User's Manual.

6. Basic operation (Main setting mode, When setting SV to 100℃)



7. AT Perform/Cancel (PID action)

In order to set each value of P, I, D and ARW automatically, the auto-tuning process should be made to fluctuate to obtain an optimal value. **Sometimes the auto-tuning process will not fluctuate if auto-tuning is performed at or near room temperature. Therefore auto-tuning might not finish normally.**



Auto-reset can be performed during P or PD action. Auto-reset is cancelled in approximately 4 minutes. It cannot be released while performing this function.

8. Specifications

Power supply: 100 to 240V AC 50/60Hz, or 24V AC/DC 50/60Hz
Allowable fluctuation range: 100 to 240V AC: 85 to 264V AC,
24V AC/DC : 20 to 28V AC/DC

Indication accuracy
Thermocouple: Within ±0.2% of each input span±1digit, or within ±2℃(4℉), whichever is greater
However, for R, S inputs, 0 to 200℃ (0 to 400℉): Within ±6℃ (12℉)
B input, 0 to 300℃ (0 to 600℉): Accuracy is not guaranteed.
K, J, E, T, N inputs, less than 0℃ (32℉): Within ±0.4% of input span±1digit
RTD: Within ±0.1% of each input span ±1digit, or within ±1℃ (2℉), whichever is greater
DC current, voltage input: Within ±0.2% of each input span ±1digit

Control output 1
Relay contact: 1a, Control capacity, 3A 250V AC (resistive load) 1A 250V AC (inductive load cosø=0.4)
Electric life: 100,000 cycles
Non-contact voltage (for SSR drive): 12V DC±15% Max. 40mA (short circuit protected)
DC current: 4 to 20mA DC, Load resistance, Max. 550Ω

Alarm 1 output, Alarm 2 output, Heater burnout alarm output
Relay contact 1a, Control capacity, 3A 250V AC (resistive load), Electric life, 100,000 cycles

Control output 2
Relay contact 1a, Control capacity, 3A 250V AC (resistive load), Electric life, 100,000 cycles
Non-contact voltage (For SSR drive): 12V DC±15%, Max. 40mA DC (short circuit protected)

Contact input : Circuit current when closed: Approx. 6mA
Power consumption : Approx. 8VA
Ambient temperature, humidity: 0 to 50℃ (32 to 122℉), 35 to 85%RH (no condensation)
Weight : Approx. 120g
Accessories included: Mounting frame 1 piece, Rubber gasket (Mounted to the unit) 1 piece, Installation instructions 1 copy
Heater burnout alarm Single phase 20A: CT1 (AKT4815), 50A: CT2 (AKT4816): 1 piece each
Heater burnout alarm 3-phase 20A: CT1 (AKT4815), 50A: CT2 (AKT4816): 2 pieces each
Accessories sold separately: Terminal cover (AKT4H801), Shunt resistor [AKT4810 (50Ω)] Tool cable (AKT4H820)

● For the detailed usage and User's Manual, please contact us at the address below.

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