



Pen HeaterPH Series

Please keep this manual in a safe place.



The cup is a sample for comparing sizes with the product.
And no relation whatsoever to our products.

Introduction

- Thank you for purchasing the PH Series Electric Pen Heater for high-temperature hot air generator
- This manual explains the necessary items for the correct and safe handling of the pen heater.
- This ensures the pen heater performs at its best, prevents accidents, and maintains reliable operation over the long term.
- To achieve optimal performance, proper handling is essential not only for maintenance inspections after operation but also at every stage from acquisition to actual operation.
- Before transporting, installing, piping, wiring, operating, maintaining, inspecting, repairing, or disassembling the pen heater,
- Please be sure to thoroughly familiarize yourself with this manual and handle the pen heater correctly and safely.
- For safety, never modify the pen heater. Accidents caused by modifications
- Any issues arising from such changes are beyond our responsibility.
- Ensure this manual is delivered to the personnel responsible for handling the unit.
- Keep this manual in a safe place so you can refer to it whenever needed.
- This manual and the pen heater may be revised or improved without prior notice.
- If you have any questions, please contact our company.

Kansai Electric Heat Corp.

● This manual uses the following symbols to ensure safe handling of the pen heater.



Danger

: If handled incorrectly, dangerous situations may occur death or may occur.



Caution

: Incorrect handling may create hazardous situations, potentially causing moderate, When minor injury is possible, or when only property damage



Caution

Please note that even items listed under “Minor Injury” may lead to serious consequences depending on the situation.

All items listed are important: be sure to follow them.

 Danger	
General	● Transportation, installation, piping, wiring, operation, maintenance, inspection, repair, and disassembly must be performed by specialists thoroughly familiar with the handling of pen heaters. Failure to do so may result in injury, electric shock, or fire. ● Do not use the pen heater in explosive atmospheres. Risk of injury or fire. ● Always turn off the power before performing any of the following tasks: transportation, installation, piping, wiring, operation, maintenance, inspection, repair, or disassembly. Failure to do so may result in injury, electric shock, or fire. ● Do not touch the heating element when powering on this unit, as there is a risk of electric shock.
Installation	● Do not install the pen heater in an unstable location, as this may cause injury.
Piping	● Always connect the ground wire. Failure to do so may result in electric shock.
Wiring	● Do not forcefully bend, pull, or pinch the wiring, as this may cause electric shock or fire.
Operation	● Ensure the hot air does not come into contact with the human body. There is a risk of burns.
Control	● In the event of a power outage, stop operation immediately to prevent injury. ● Do not touch the unit or piping while in operation, as they become extremely hot and may cause burns. ● If an abnormality occurs, stop operation immediately. Risk of burns.
Maintenance Inspection	● Perform maintenance and inspection work only after the main unit and piping have cooled sufficiently to avoid the risk of burns.



Caution

General	● Verify that the item matches your order. Do not use it if it is incorrect, as it may cause injury or damage. ● Do not use the pen heater for any purpose other than the specifications listed in the instruction manual. ● Do not use a damaged pen heater. There is a risk of injury, electric shock, or damage. ● Do not insert foreign objects or fingers into the openings or gaps of the pen heater. There is a risk of injury, electric shock, or damage. ● Do not apply excessive force to the pen heater. There is a risk of injury or damage.
Transportation	● Exercise extreme caution during transport to prevent dropping.
Installation	● Do not place combustible materials near the pen heater. ● Keep the nameplate legible at all times. Do not remove it.
Piping	● Ensure that the pen heater piping connections are installed securely to prevent loosening or leaks, as this could cause damage or fire.
Wiring	● Ensure the rated voltage of the pen heater matches the nominal voltage of the input voltage. Failure to do so may result in damage or fire. ● Wiring work must be performed by qualified personnel in accordance with the Electrical Equipment Technical Standards and internal wiring regulations. There is a risk of electric shock or fire.
Operation control	● Before operating the equipment, ensure safety and take precautions to prevent exposure to danger for anyone other than the designated operator. Risk of injury, burns, or damage exists.
Maintenance Inspection	● Do not touch the terminals when measuring the insulation resistance of the pen heater, as there is a risk of electric shock. ● Always reinstall any parts removed for maintenance or inspection work in their original positions. There is a risk of electric shock or fire.
Disposal	● When disposing of the pen heater, treat it as general industrial waste.
Other	● Depending on the equipment into which the pen heater is incorporated, compliance with the provisions of the Industrial Safety and Health Act and the fire prevention ordinances of each municipality may be required.

1. Pre-Use Checks

1-1 Inspection of Actual

Please confirm that the following items are present. Also, please verify that there are no abnormalities.

- Main unit (1 unit) ● Instruction manual (this document) ● Pen heater assembly procedure manual
- Anti-seize compound ● Anti-seize compound instructions
- Wiring cord (300mm length, 1 piece) ● Strainer (MS-6)

2. Installation

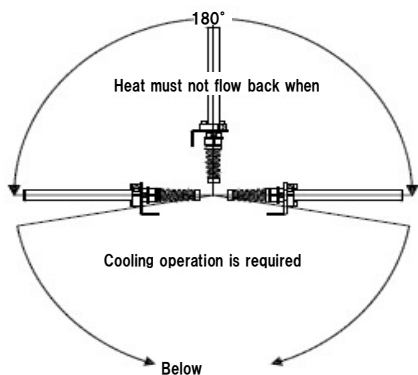
- Use at ambient temperatures between -10°C and $+60^{\circ}\text{C}$ (do not allow freezing).
- The heater case (exterior) becomes hot during operation; keep combustible materials away.
- Do not install in the following locations:
 - ◇ Outdoors where it will be exposed to wind and rain
 - ◇ Near flammable materials
 - ◇ Locations with high levels of dust or particulate matter
 - ◇ Areas with airborne conductive substances (e.g., carbon fibers)
 - ◇ Areas where acidic gases, corrosive gases, etc., are present
- Installation is acceptable if the unit is mounted horizontally. However, in other cases, ensure the hot air temperature and airflow, operating methods. Regardless of the mounting

Ensure no heat backflow occurs during fan stop or hot start operation. If heat flows back, internal heater wiring, terminals, air supply tubes, etc., may be damaged.

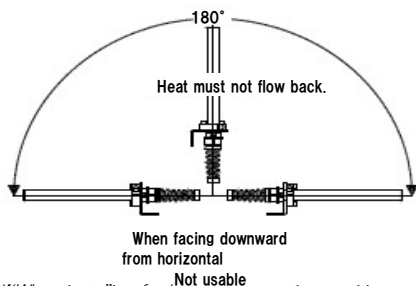
There is a risk of damage. Be sure to cool until the hot air temperature at Sensor A position drops below 70°C .

Installation Position

[Installation Position for Normal Operation]



[Installation Position for Hot Start Operation]

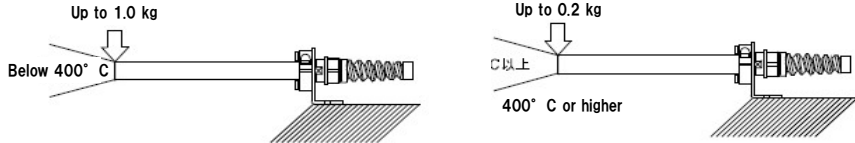


※When installing for hot start operation, position the unit so that the hot air outlet is horizontal or angled upward to prevent heat from flowing back.

This product must be used in combination with the Pen Heater Dedicated Multi-Controller TRC202-P.

Heat outlet load capacity

Do not secure this unit solely by the screw portion of the pen heater's outlet.



● During hot air operation, applying load to the outlet may cause deformation due to high temperatures, potentially leading to malfunctions. Refer to the diagram above for installation and piping.

3. Wiring

● The pen heater uses Sensor A (for detecting outlet hot air temperature) and Sensor B (for hot start temperature and overheating prevention).

This heater incorporates two built-in thermocouples [K] (for temperature detection): Sensor A and Sensor B. These

Furthermore, by controlling the temperature with the dedicated pen heater multi-controller TRC202-P, can be used without fusing the heater.

The pen heater and the dedicated pen heater multi-controller TRC202-P as a set.

● Use one dedicated pen heater multi-controller TRC202-P per pen heater.

Using the TRC202-P allows you to fully utilize the pen heater's performance.

Control is possible. Without the TRC202-P, the pen heater cannot be operated safely.

Temperature control, heater protection, hot start operation, etc., cannot be performed at all.

Note: Be sure to wire according to the wiring example with TRC202-P.

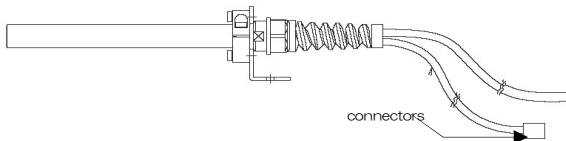
In such cases, not only can heater breakage not be prevented, but it may also lead to serious accidents.

Note) Regarding the detected temperatures of each temperature sensor

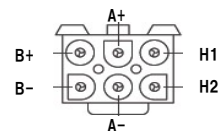
...There is a measurement (spatial) distance between the heating element (heater) and each temp.

Due to factors such as pressure, temperature differences may occur in the detected temperat.

3-1 Terminal



Pen Heater Connector



Terminal No	Terminal Name	Purpose
H1 • H2	Heater Terminal	Heater power supply
A+ • A-	A Sensor Terminal [K]	For detecting outlet hot air temperature
B+ • B-	B Sensor Terminal [K]	Hot Start Temperature Detection Heater Overheat Prevention

● Do not directly touch the power connection or grounding work.

● To prevent electric shock accidents, request a Class D (third-class) grounding. Please perform the work.

● The terminals of the included pen heater wiring cord (300mm length, with connector) are covered with marked tubes.

The terminal numbers for the pen heater are only marked on the mark tube; they are not indicated elsewhere.

The included wiring cord is absolutely required for wiring.

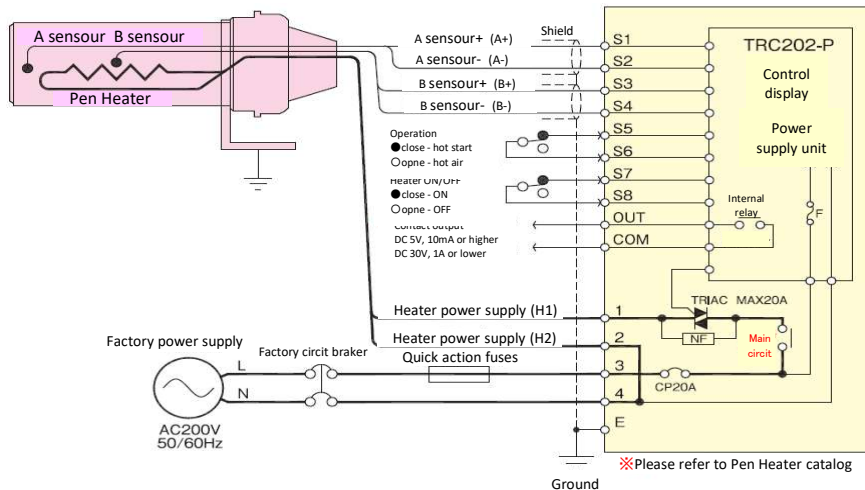
※ Each sensor of the pen heater may carry energy equivalent to static electricity due to static induction and electromagnetic induction when the heater is energized.

Therefore, do not connect any cables to the terminals of each sensor while the heater is energized.

Do not touch directly (you may feel a current equivalent to static electricity).

If direct contact is unavoidable during temperature measurement, we recommend connecting the sensor terminals.

3-2 Wiring Example



Hot Start Operation

During no-wind operation, energize the heater for preheating, and simultaneously start the blower. Operation to discharge the required hot air discharge temperature.

- continuous hot start is set to a maximum of 10 minutes.

- When switching from hot start operation to normal operation (hot air operation), ensure perform normal operation (hot air operation). At least half the duration of the immediately preceding hot start operation

Hot Start Operation

Normal Operation (Hot Air Operation)

Hot Start Operation

Ensure it is 10 minutes or less.

The duration of the hot start operation immediately preceding
Please ensure it is at least half the duration.

Example) Hot start operation = 5 minutes continuous → Subsequent hot air operation requires at least 2 minutes 30 seconds.

◆ Do not operate hot start continuously for more than 10 minutes. ◆

- For pen heater and TRC202 wiring, refer to the Multi-Controller TRC202 instruction manual.

- For pen heater and TRC202 wiring, refer to the Multi-Controller

- During normal operation (when detecting outlet hot air temperature and performing hot air operation), keep the S5-S6 terminals of the TRC202-P open.

- During hot start operation, keep the S5-S6 terminals of the TRC202-P closed. To switch to normal operation (hot air discharge) simultaneously with airflow, open the S5-S6 terminals of the TRC202-P.

- Use shielded compensation wires [K] for A and B sensor wiring, and ensure the shield is properly grounded. Additionally, keep the wiring for the A and B sensors, S5 to S8, and COM-OUT as short as possible to minimize susceptibility to noise and surge voltages.

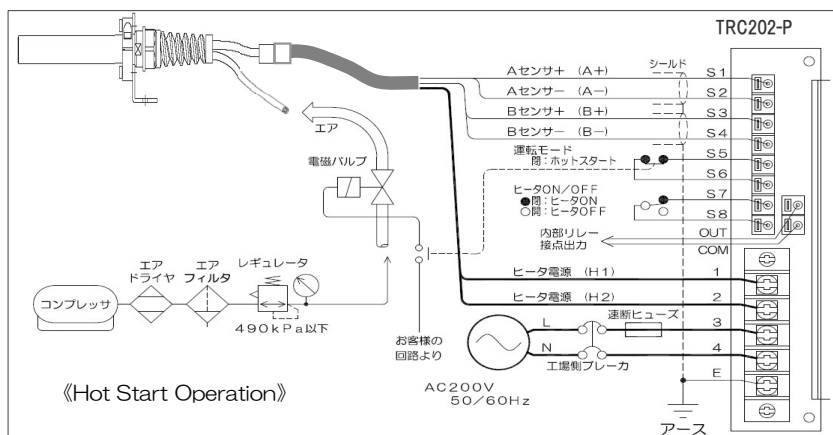
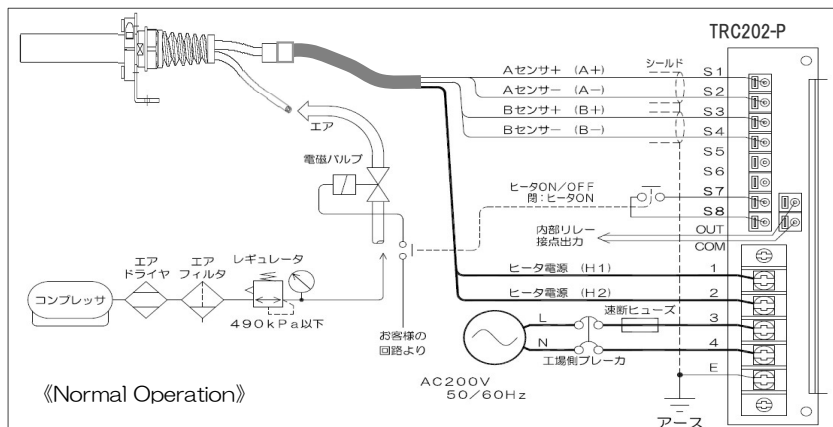
- Reversing the A/B sensor connections will cause the heater to overheat and break. (This is not covered under warranty.)

- Wiring for A/B sensors, S5-S8, and COM-OUT must be routed within the same duct as the main circuit (AC).

- Do not route the wiring for the A/B sensors, S5 to S8, and COM-OUT within the same duct as the main circuit (AC). Doing so may cause malfunctions.

3-2 Wiring...Continued

- When wiring the pen heater, connect the included wiring cable (300mm long with connector) to the pen heater's connector. If the length is insufficient, use the optional extension cable.
- Due to the inherent characteristics of semiconductors, leakage current occurs. Therefore, when performing maintenance on the pen heater and TRC202-P, turn OFF the breaker installed at the factory.
- TRC202-P will activate the safety circuit (main circuit relay) during an abnormality, disconnecting the heater circuit. Check the displayed abnormality details and perform maintenance.
- Ensure the power supply uses a dedicated circuit with sufficient capacity.



3-3 Wiring

- The pen heater's wiring section uses a **connector** (connector type), so included with the (300mm length, with connector).

Additionally, an optional extension cord (with connector) is sold separately.

Note: Do not connect the pen heater connector using the included wiring cord or optional extension cord.

Using wiring of an incompatible size may cause poor contact.



《Accessory Wiring Cord (300mm Length, Connector Included)》

- Heater wire
...AWG18 (equivalent to 0.75mm²) No terminal processing
- Compensation leads K for A sensor and B sensor
...0.3mm² No terminal processing
- *Accessories: The wiring cord terminals are marked with a tube
The terminal numbers are marked.

Caution

When connecting or disconnecting the connector on the pen heater body and the connector on the wiring cord, do so slowly and without excessive force. Insert and remove connectors without applying load. Applying excessive force vertically or horizontally may damage the pin connector. There is a risk of damage.

Note: After wiring is complete, check that no leftover material or shavings remain in the terminal area.

Note: When mounting the pen heater to a robot or similar device for movement, ensure the main unit's wiring cord is securely fixed.

Ensure the unit is in a fixed state. If using an optional extension cord, ensure the extension cord section is not movable.

Set it so that the air supply tube is connected to the pen heater.

4. Piping

Piping Precautions

- When supplying air from a compressor, connect the air supply tube to the pen heater's air supply line.
- When extending the air supply tube, carefully consider the pressure loss incurred by the air supply tube.
- When extending the air supply tube, carefully consider the pressure loss incurred
- Use piping materials such as gas pipes or tubes that can withstand the airflow pressure, and ensure the hot air outlet has sufficient heat resistance.
- If piping is long, pressure loss occurs due to internal friction coefficient, diameter, pipe bends, etc., reducing airflow volume.
- If the piping is long, pressure loss occurs due to the pipe's friction coefficient, diameter, and bends, reducing airflow and causing the heater to overheat. Exercise
- The longer the piping from the hot air outlet, the more rapidly the temperature drops due to heat dissipation. Therefore,
 - Bring the pipe close to the object being heated or apply sufficient insulation.
- Ensure all pipe connections are secure to prevent air leaks.
- If metal shavings or similar particles enter the pen heater through the air supply port during piping installation, they can cause a short circuit inside the heater, which is extremely dangerous.

This can cause a short circuit, which is extremely dangerous. Exercise extreme caution during piping installation.
- To prevent foreign objects from entering the pen heater, install the included strainer (MS-6) in the suction-side piping.

Please use it as installed.

5. Operation

● If power is applied to the heater without ventilation and without control, the heater will overheat and burn out within minutes.

● Use clean air free of dust, oil mist, moisture, etc., as the air supply source. If dust, oil mist, moisture, etc., enters the heater interior,
If dust, oil mist, moisture, etc., enter the heater, insulation will deteriorate, shortening the heater's lifespan.

Furthermore, if dust enters the heater, it will be heated by the heater's heat and may become hot sparks at the hot air outlet and may fly out dangerously.

● To prevent electric shock accidents if moisture enters the heater, using an isolation transformer is safer

● Use compressed air as the air supply source. Reduce the supply pressure to 0.5 MPa or less.

Supply air at or below the maximum allowable air volume. Also, install an air filter, micro-elessa, etc.

Please use air with dust removed.

● If dust or other particles enter the heater, the heater or sensor may break or become damaged.

● We recommend installing a dust removal filter to prevent dust from entering the heater.

※For dust removal, we recommend installing a dust removal filter equivalent to the CKD AF1003P series as an example.

● Use with supply air temperatures between 0° C and +60° C and humidity below 90% R.H. (non-condensing).

● Use in environments where combustible gases or flammable liquid vapors are present is dangerous.

● The heater case becomes hot during operation. Install insulation or similar measures as necessary to prevent burns.

● After stopping operation, condensation may occur if humidity inside the piping is high. In the unlikely event of condensation causing

If insulation degradation occurs, running the fan for several minutes will eliminate condensation and restore insulation.

● Due to the characteristics of the insulator, the pen heater's insulation may deteriorate during prolonged shutdowns after extended operation.

If the pen heater's insulation deteriorates, insulation can be restored by operating it with a small amount of airflow.

● While the pen heater ensures self-dust generation equivalent to cleanliness class 10,000, the following usage conditions apply:

These conditions are required.

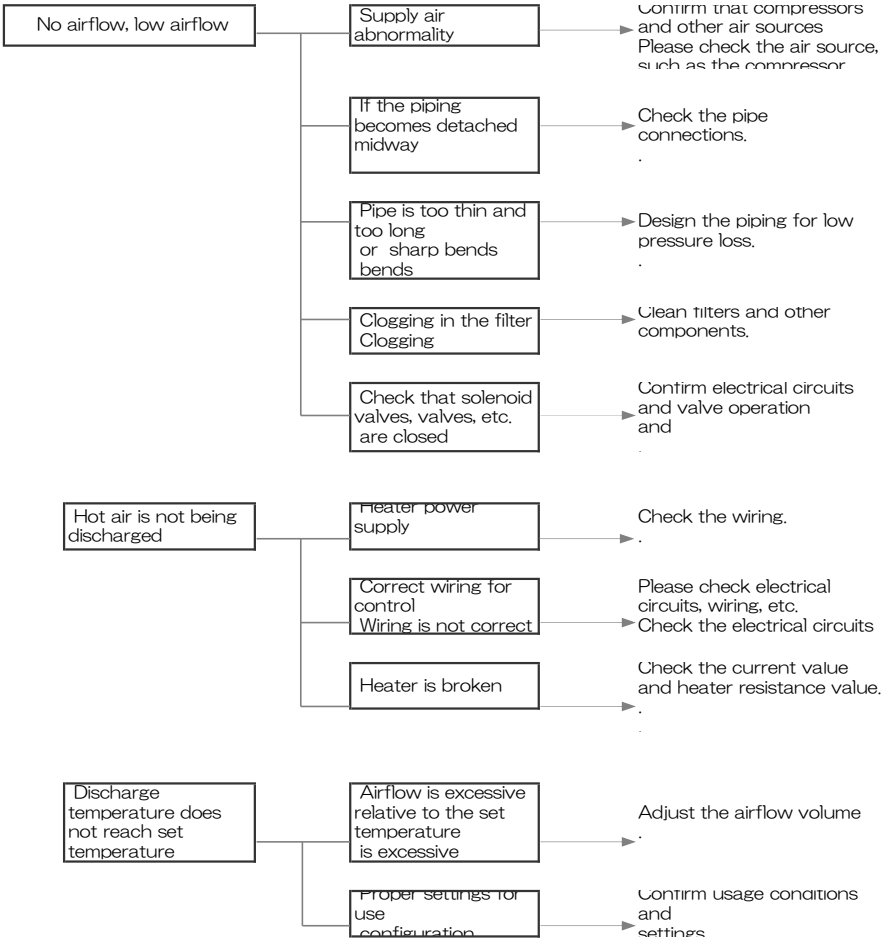
- The supplied gas must be clean air or an inert gas.
- Install and use in a vibration-free location.
- Avoid sudden changes or pulsations in the supplied air pressure and air volume.
- Maintain a clean operating environment.

※Recommended operating environment: ISO Class 7 (ISO) or Class 10,000 (FED-STD-209D) or higher Cleanroom

• Avoid using highly static-prone synthetic resins for piping materials. Also, to prevent dust generation from the piping,

Use clean piping materials.

6. Troubleshooting



if the above measures do not resolve the malfunction, or if any other malfunction occurs, please contact us.

7. Self-Inspection

To ensure safer use of this unit, if the usage period exceeds 10 years,
We recommend performing a self-inspection.

[Self-Inspection

...For self-inspection tasks, please request assistance from your nearest electrical contractor.

- Insulation resistance measurement ● Heater current measurement and resistance measurement
- Inspection and cleaning for foreign object ingress inside and at the intake port ● Inspection of terminal block tightness
- Other visual inspections

● Hot Air Operation

Since all Pen Heater PH Series products undergo thorough hot air operation testing, We ship only fully functional products.

(Note: The heater case may show slight discoloration due to hot air operation testing, but this does not affect performance.)

8. Warranty

- The warranty period for this unit is one year from the date of purchase.
- If the product malfunctions during the warranty period under normal use as specified in the instruction manual, the following applies:
 - However, if the location is more than 50 km from our Osaka headquarters or Tokyo branch, and
 - For service calls to remote islands, actual expenses for transportation and lodging will be charged.
- We assume no responsibility whatsoever for any expenses, profits/losses, or other damages arising from this device.
 - The warranty period for this unit is one year from the date of purchase.
- The warranty for repaired parts and procedures is valid for 3 months after repair.
- The following cases are not covered by the warranty:
 - Failure due to incorrect use or careless handling, or failure/damage due to abnormal voltage.
 - Damage or malfunction caused by improper use or careless handling.
 - Items that have been disassembled or modified.
 - Damage caused by overheating not attributable to our product.
 - Damage, malfunction, or loss caused by lightning strikes, earthquakes, typhoons, flooding, fire, or salt damage.
 - Rust formation or electrical leakage due to condensation.
 - Damage caused by dust, debris, lint, oil mist, etc.
 - Electrical leakage and malfunctions caused by the adhesion of conductive carbon fibers or exposure to acidic gases and corrosive gases, or malfunctions caused by acid gases or corrosive gases.
 - Failure or damage caused by transportation, moving, dropping, etc., after purchase.
 - Failure to settle payment.
 - Use not in accordance with the instruction manual.
- We will not bear the costs for the following:
 - Consumable parts and painting.
 - We will provide free repairs based on the inconvenience, loss, or secondary loss caused by the inability to use the device.
 - (e.g., telephone charges, compensation for lost business hours, commercial losses, etc.).
 - Transportation and lodging expenses incurred during on-site repairs.
- We cannot provide on-site repairs for installations in locations that are difficult to access, dangerous, or at high elevations.
- The warranty is valid only within Japan.
- The warranty is valid only within Japan.
 - The warranty does not apply if our products purchased in Japan are exported overseas.
 - In this case, warranty coverage applies only to products returned to our factory for in-house repairs.
 - Additionally, for carry-in repairs and the export/import required for returning the repaired unit,
 - Transportation costs will be borne by the customer.

Manufacturer
Distributor



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