Please ensure this instruction manual is delivered to the end user.

For your records

Created: September 27, 2024

High-Temperature Hot Air Burner

HT4 (TCU4HB) / HT7.5 (TCU7.5HB)

Instruction Manual

Thank you very much for purchasing our high-temperature hot air burner.

● Be sure to read before use.

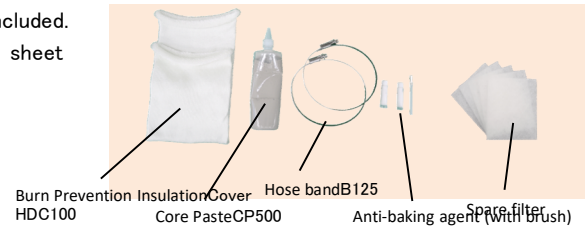
Kansai Electoric Heat Co., Ltd.

High-Temperature Hot Air Burner

1. Verify Accessories

① Please confirm that the following accessories are included.

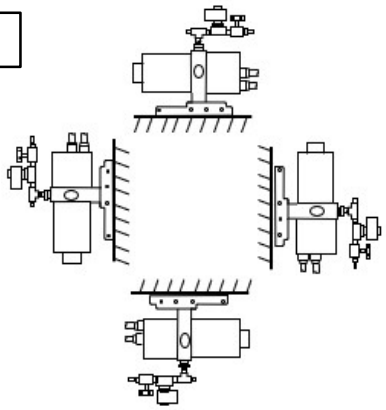
- Burn Prevention Insulation Cover HDC100 × 1 sheet
- Core Paste CP500 × 1 piece
- Mounting band B125 × 2 pieces
- Anti-baking agent × 2 (with brush)
- Spare filter for terminal box cooling fan ×5



2. Installation

① During both normal operation and preheating operation, the installation orientation can be adjusted to any angle.
Additionally, regardless of the mounting orientation, if the heat from the high-temperature hot air burner flows backward, causing the heat from the furnace body or heated object to rise and the terminal box interior to become hot, the terminal box cooling fan will activate.
Do not disconnect the primary power supply while the terminal box cooling fan is operating, even after the high-temperature hot air burner has stopped running.

Installation



② Never install the unit in locations subject to vibration. This may damage the internal heater, insulators, or sensors. Exercise particular caution with the outlet sensor, as it is exposed wire.

③ Places where installation is not possible

- Outdoor locations exposed to wind and rain
- Near flammable materials
- Areas where acidic gases, corrosive gases, etc., are present
- Inside a sealed box
- Areas with high levels of dust or particulate matter
- Areas with electrically conductive suspended particles (e.g., carbon fibers)
- Ambient temperature: Locations outside the range of 0° C to +50° C (must not freeze)
- Ambient humidity: Locations with humidity exceeding 85% at 50° C, or locations with condensation

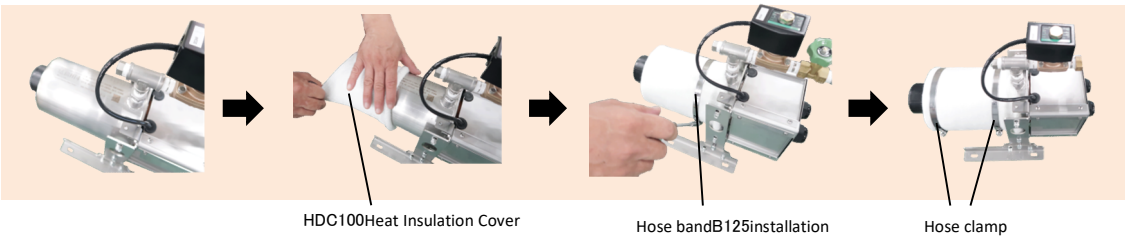
※ Do not use in environments where the installation location or intake air contains gases such as oil smoke or Class III petroleum products (mineral oil, alosin, etc.), oil components, aromatic hydrocarbon solvents, oil mist, etc.

Other Applications	
•	Characteristic change testing of metal and ceramic materials due to high-temperature exposure
•	High-temperature annealing of metals
•	Instant sterilization (sterilization)
•	Instantaneous melting of resins, softening/melting of light metals
•	Vehicle disc brake performance testing at high temperatures
•	Material strength testing via exposure to high-temperature, high-pressure argon gas (hydrogen)

Main gases not suitable for use	
•	Corrosive, flammable gases, etc.
•	Gases containing chlorine, chloride, etc.
•	Gases containing sulfur, etc.
•	Gases containing water vapor, etc.
•	Gases containing enamel, etc.
•	Gases containing metals, etc.
•	Gases containing carbon fibers, etc.
•	Gases containing ammonia, etc., up to 949° C

④ During hot air operation, the exterior of the heater case becomes extremely hot. Install the included burn prevention insulation cover HDC100 as needed.

HDC100 Burn Prevention Insulation Cover Installation Method

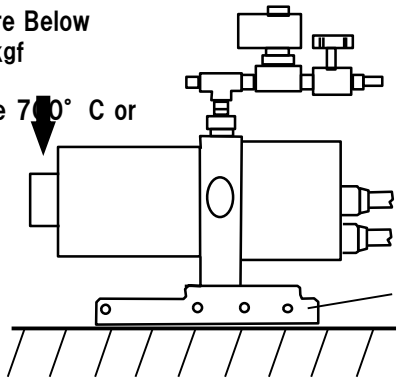


⑤ Secure the unit firmly using the mounting hardware at the specified mounting pitch (strictly adhere to the mounting pitch).

〈Hot Air Outlet

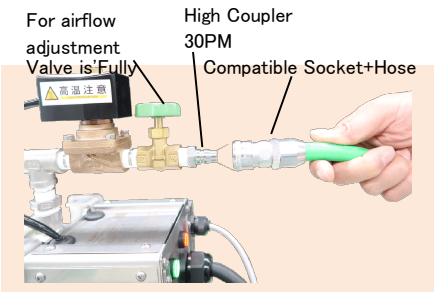
Discharge Temperature Below 700° C : ←Up to 3 kgf

DischargeTemperature 700° C or



3. Piping

① The air supply port uses a Hi-Coupler 30PM. Select an appropriate hose, connect it to the matching socket, and attach it to the Hi-Coupler. Use compressed air (dry gas) as the supply air.
At this time, ensure the air volume adjustment valve is in the 'fully closed' position.



② For the outlet piping, use gas pipes, metal flexible tubes, or other piping that can withstand the supply air pressure and has sufficient heat resistance for the hot air outlet.
Furthermore,since the heater caseof the high-temperaturehot airburnerexpands and contracts during hot air operation due to thermal expansion and during cooling when operation stops, install piping that accommodates thermal expansion.If the connecting piping cannot accommodate expansion and contraction, the high-temperature hot air burner may be damaged.

③ The hot air outlet becomes extremely hot. Apply the included pipe anti-seize compound to the threads of the hot air outlet before connecting the discharge pipe.

④ If the piping is long, pressure loss occurs due to the friction coefficient inside the pipe, pipe diameter, pipe bends, etc. This reduces the airflow volume, causing the heater to overheat abnormally. Therefore, select an air supply source that sufficiently accounts for the piping pressure loss.

⑤ The high-temperature hot air burner is designed for high temperatures. If the hot air outlet piping is long, the temperature will drop rapidly due to heat dissipation. Therefore, position the high-temperature hot air burner unit as close as possible to the heating target or ensure the outlet piping is adequately insulated.

⑥ Ensure all piping connections are airtight. Apply the supplied Core Paste CP500 to all pipe connection points.

⑦ Residual cutting chips or debris from piping installation entering the hot air outlet or air supply port can cause internal short circuits in the heater, posing a significant hazard. Exercise extreme caution during piping installation to ensure no chips or debris remain inside the pipes.

4. Operation

① Supply air within the maximum usable air volume, minimum usable air volume, and pressure resistance range of each high-temperature hot air burner.
Additionally, the following air sources cannot be used.

- Air containing dust, oil mist, moisture, or conductive substances

  If dust, oil mist, moisture, or conductive substances enter the heater, insulation will deteriorate, shortening the heater's lifespan. Furthermore, dust heated inside the heater may eject from the hot air outlet as sparks, posing a significant hazard.
- Air containing combustible gases or flammable liquid vapors
- Air with supply temperatures outside the range of 0° C to +40° C, or air with temperatures of 40° C and humidity levels of 85% or higher (must not condense under normal to high pressure conditions)

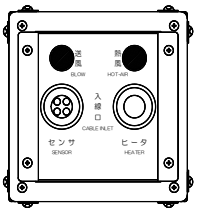
Confirm that power is supplied to the heater and control begins at the temperature detected by the A sensor set for hot air temperature detection.

The exterior of the heater case may become hot during hot air operation. Install the included burn prevention insulation cover HDC100 as needed.

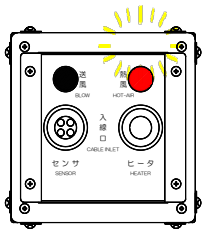
② When hot air operation is stopped, if moisture is present in the air remaining inside the heater, condensation may occur as the air temperature drops within the heater. If condensation inside the heater causes insulation degradation, insulation may recover after several minutes to tens of minutes of fresh air ventilation operation.

③ The lamp status on the terminal cover varies depending on the operating condition.

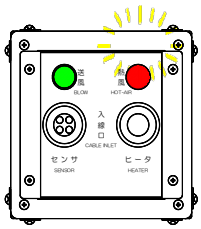
When the primary power supply is ON and the NFB of the temperature control unit is OFF, both the blower lamp and heater lamp will be off.



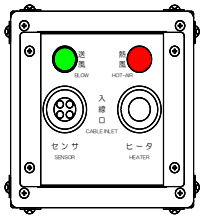
When the temperature control unit's NFB is ON and stopped, the hot air lamp (red) flashes.



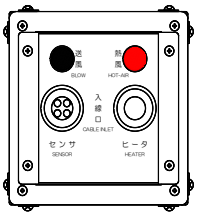
During fan operation, the fan lamp (green) is lit, and the hot air lamp (red) flashes



During hot air operation, the fan lamp (green) illuminates and the hot air lamp (red) illuminates.



During preheat operation, the hot air lamp (red) will be lit.



5. Self-Inspection

To ensure safer operation of this unit, we recommend performing a self-inspection when the usage period exceeds 10 years.

[Self-Inspection Items]

- Measurement of insulation resistance
- Measurement of heater current value
- Inspection of Terminal Block Tightening
- Inspect and clean the interior of the main unit and the air intake for foreign objects.
- Measure the heater resistance value
- Other visual inspections

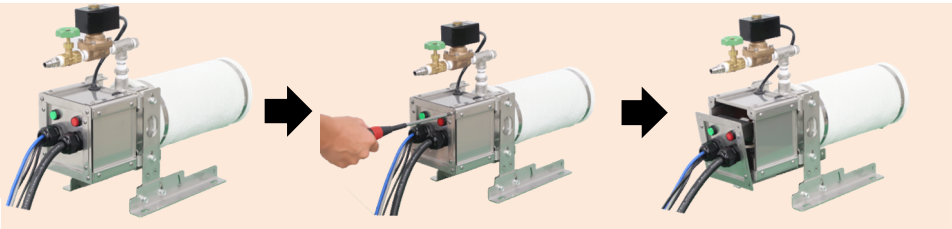
※ For self-inspections, please request assistance from your nearest licensed electrician.

Caution : Never perform an insulation withstand voltage test on this unit (already performed at the factory). Doing so may cause malfunction.

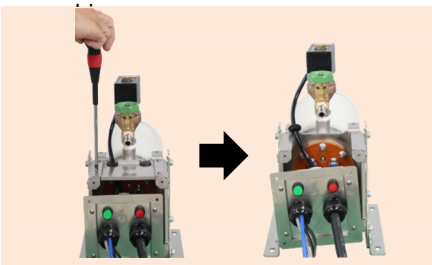
6. Heater Replacement Procedure

● In the unlikely event of a heater element breakage in the high-temperature hot air burner, only the heater element can be replaced.
After verifying the model and part number of your current high-temperature hot air burner against the spare heater model, perform the replacement following the procedure below.
(Spare Heater Model: HT4 Spare Heater: HT4S, HT7.5 Spare Heater: HT7.5S)

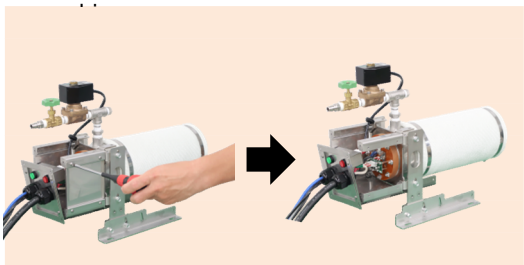
① Remove the four M4 screws on the front outer side of the terminal cover using a No. 2 Phillips screwdriver.



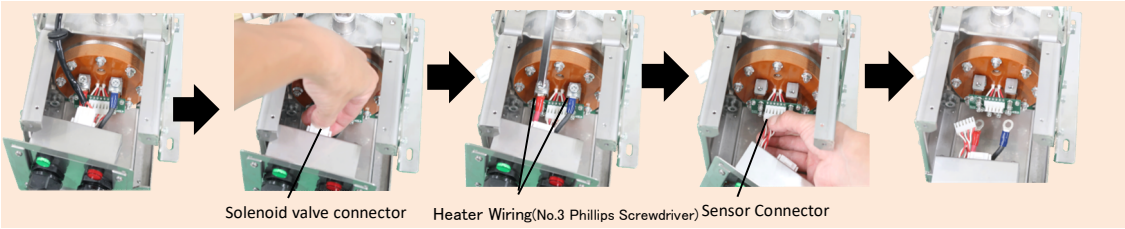
② Remove the four M4 screws on the top surface of the terminal cover using a No. 2 Phillips



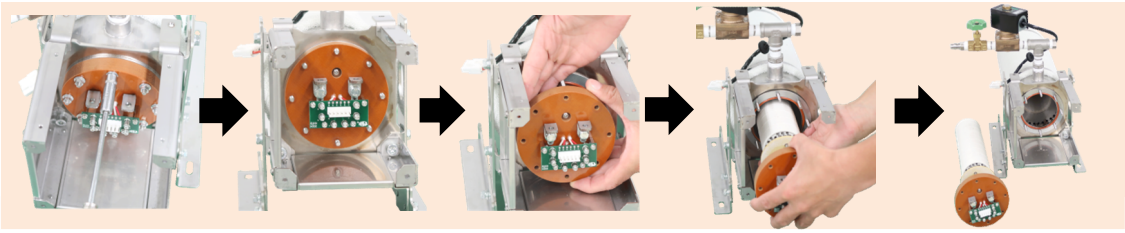
③ Remove the four M4 screws on the side of the terminal cover using a No. 2 Phillips



④ Manually remove the solenoid valve connector from the terminal plate, remove the wiring at the heater terminal section using a No. 3 Phillips screwdriver, and manually remove the sensor connector, totaling 3 locations.

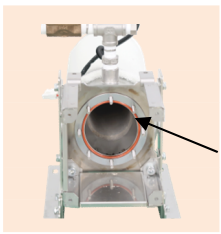


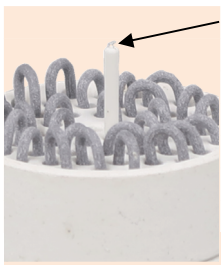
⑤ Remove the 8 mounting bolts on the terminal plate using an M5 box wrench. Then, remove the heater element.



※When installing the spare heater, perform the work in the reverse order of the above removal steps.

《Precautions When Replacing the Heater Element》





Temperature Control Unit Offset

1. Installation

①

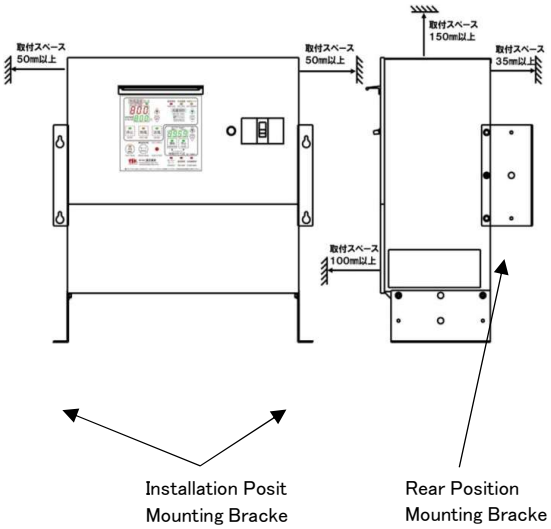
This unit is designed for floor mounting or rear panel mounting only. Always install it with the control panel vertical and the unit level. The mounting brackets (2 pieces) are included in the instruction manual bag at shipment. Attach them to the floor mounting position and rear panel mounting position as needed (the mounting screws ×4 are attached to the floor mounting position).

Also, attach the breaker cover (red: included with the instruction manual) to the vertical slots above and below the main breaker (be sure to attach the breaker cover to prevent the main breaker from being used as an ON/OFF switch).

②

Refer to the diagram on the right for installation and ensure sufficient mounting space.

The space behind the unit (35 mm or more) is critical for internal cooling, regardless of whether the unit is mounted or installed against a wall.
Also, do not install this unit in locations that may cause temperature rise, such as above heat-generating components.



③ Places where installation is not possible

- Locations subject to vibration
- Near combustible materials
- Locations outside ambient temperatures of −5° C to +40° C
- Outdoors where exposed to wind and rain
- Sealed rooms and enclosures
- Locations with electrically conductive floating particles (e.g., carbon fibers)
- Locations with floating acidic gases, corrosive gases, etc.
- Locations with ambient humidity of 85% R.H. or higher
- Locations where the back side is in close contact with walls, etc.
- Locations at altitudes of 1000 meters or higher
- Locations with low atmospheric pressure
- Above heat-generating components
- Locations with high levels of dust or particulate matter

2. Power Supply

① Have a licensed electrician perform power connection and grounding work.

② Always use commercial power with a pure sine wave (50/60 Hz) for this unit. Never use power with distorted waves containing harmonics. Also, take sufficient measures to prevent surge voltages and noise from entering the power supply.

③ Install a dedicated circuit. When installing a ground fault circuit interrupter (GFCI), determine the sensitivity current rating according to the table below (the sensitivity current of a GFCI is typically about 10 times the initial leakage current).

Model	Earth Leakage Circuit Breaker (ELB) Sensitivity Current Guidelines
TCU4HB・TCU7.5HB	100mA

④ To prevent electric shock accidents, perform grounding work (Type D grounding for 300V or less; Type C grounding for 600V or less).

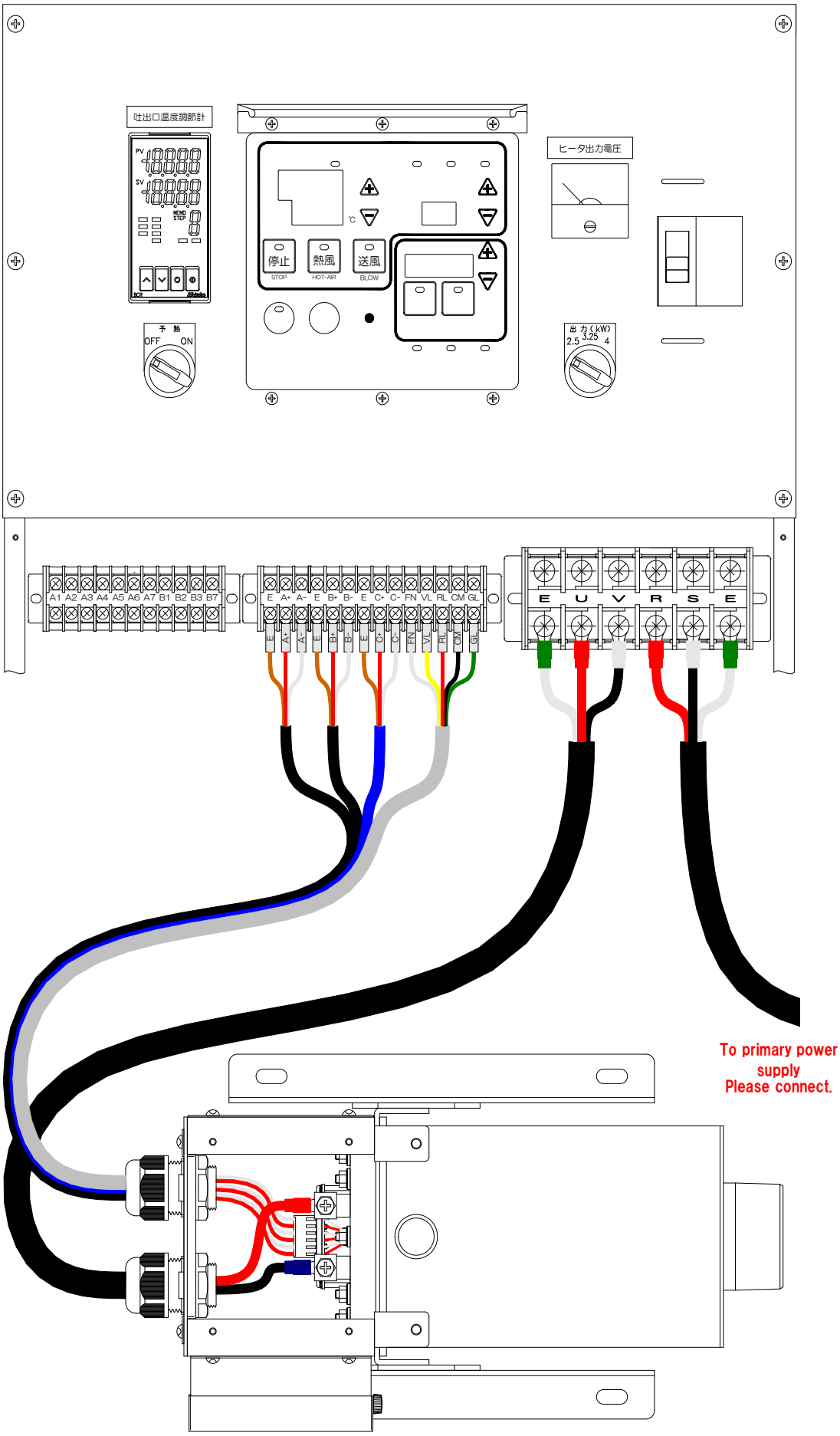
Caution Be aware that excessively long wiring can cause voltage drop.

Caution Always disconnect the power supply before wiring or inspection. For TCU4HB and TCU7.5HB, even if the main breaker (NFB) is OFF, power remains supplied to the control circuit. Therefore, always disconnect the factory main power supply (primary side power supply). Working with the power connected will result in electric shock.

Caution If using an outlet for connection, ensure sufficient capacity. Avoid using outlets whenever possible, as they may overheat or malfunction due to aging-related contact issues or phase loss.

Caution The temperature control unit is primarily designed for industrial environments. Using it in residential settings may cause radio interference. In such cases, the user may need to take appropriate measures to reduce interference.

3. Terminal Structure, Terminal Arrangement, Wiring Flow

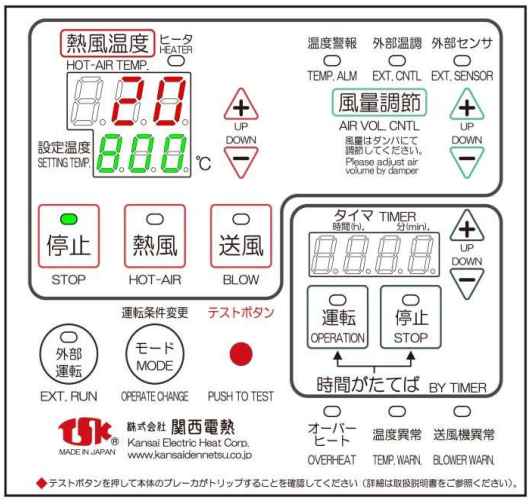


4. Maintenance and Inspection

Test Button

This test button verifies that the main breaker (NFB) trips correctly during overheating.
Once a month, with the unit stopped (but powered on), press the test button for several seconds to confirm the overheat lamp illuminates, the overheat operation indicator displays (see P.20), and the main unit breaker (NFB) trips.

After confirmation, turn off the main power supply (factory power) and the main unit breaker (NFB), then turn them back on again.



Inspection and Cleaning

Clean the exhaust fan regularly. Accumulation of dust on the exhaust fan reduces the cooling effect inside the temperature control unit and may cause malfunction.

Storage

When storing the temperature control unit for extended periods, take sufficient precautions against condensation and freezing. Condensation occurs especially during winter when the storage environment temperature drops. If stored at low temperatures while condensation is present, it will freeze, potentially causing electrical component failure.

Self-Inspection

To ensure safer operation of this unit, we recommend performing a self-inspection when the usage period exceeds 10 years.

[Self-Inspection Items]

- Measurement of insulation resistance
- Inspection and cleaning for foreign objects inside the control panel
- Inspection of Terminal Block Tightening
- Check operation and heat generation of electrical components
- Other visual inspections

※ For self-inspections, please request assistance from your nearest licensed electrician.

Cautio : Never perform an insulation withstand voltage test on this unit (already performed at the factory). Doing so may cause malfunction.

◆ Regarding energization fires

The temperature control unit automatically resumes operation from before the power interruption if the main power is restored within 1 second after a momentary power loss (e.g., power outage). Therefore, to prevent electrical fires, we recommend installing a device that disconnects the primary power supply during disasters like earthquakes. However, the temperature control unit itself can also be configured to prevent restarting after power restoration.

For setup instructions, access our website: http://www.kansaidennetsu.co.jp

↓

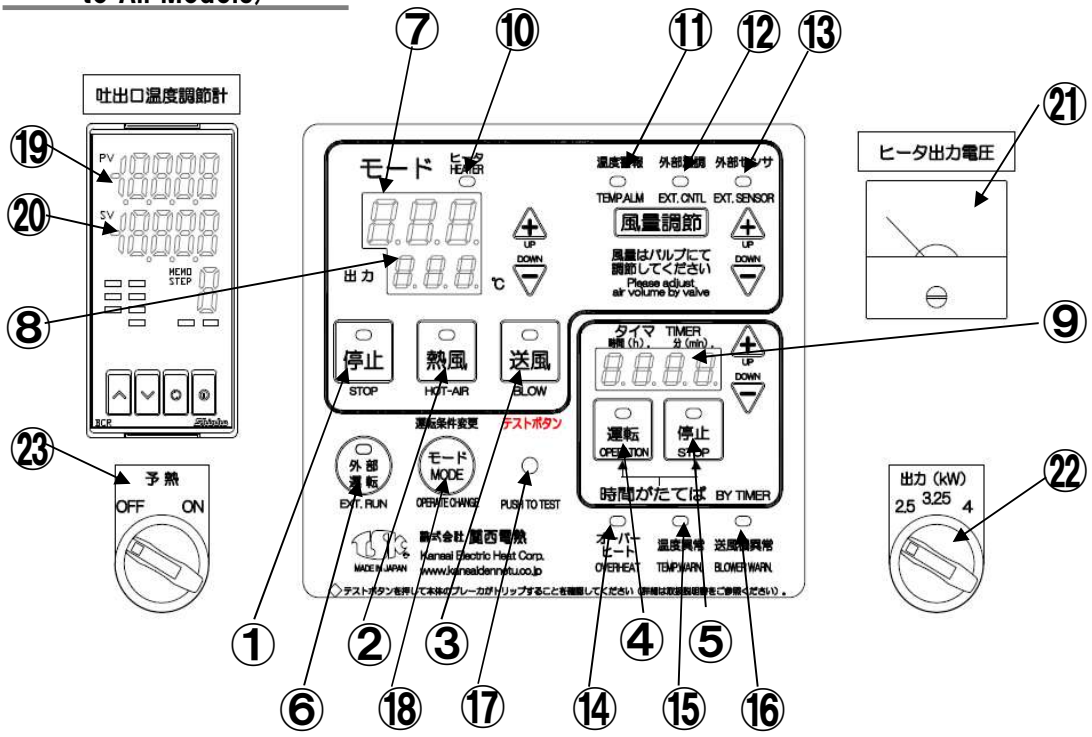
Technical Data

↓

and refer to the 'Electrical Fire Countermeasures' section within the Technical Data.

5. Names and Functions of Components

Control Panel (Common to All Models)



① Stop Switch

This switch stops fan operation, hot air operation, and preheating operation, and cancels timer operation.

② Hot Air Switch

Pressing this switch starts hot air operation. Switching the operating condition to preheat operation will start preheat operation.

③ Fan Switch

Press the switch to start fan operation.

④ Timer Operation Switch

Pressing this switch allows you to set the time at which operation will start after a delay. After setting, press the hot air switch.

⑤ Timer Stop Switch

Press the switch to set the time after which operation will stop. After setting, press the Hot Air Switch.

⑥ External Operation Switch

By pressing and holding the switch (2 seconds), operation can be performed via external operation ON/OFF signals and external heater ON/OFF signals.

⑦ Mode Display

Displays the current mode.
When changing modes, displays each item.
During hot air operation, displays 'OUT'.

⑧ Heater Output Display

During hot air operation, displays heater output (%).
When changing modes, the parameter contents are displayed.

⑨ Timer Setting Display

Displays the set timer duration. Counts down as time elapses.

⑩ Heater Lamp

The heater control status is indicated by illumination or

⑪ Temperature Alarm Lamp

If a temperature alarm setting is entered, it illuminates when the temperature reaches the alarm setting value.

⑫ External Temperature Control Lamp

This indicator lights up when the operating condition is

⑬ External Sensor Lamp

This function is disabled on this unit (not used).

⑭ Overheat Lamp

Lights up when the heater case reaches an abnormally high temperature, causing the breaker (NFB) to trip.

⑮ Temperature Abnormal Indicator

Illuminates when the discharge temperature is high or the suction temperature is high, causing the breaker (NFB) to trip or switching to ventilation operation.

⑯ Fan Malfunction Indicator

This switch is not functional on this unit (it will not

⑰ Test Button

Pressing the button trips the breaker (NFB).

⑱ Mode Switch

Use this to change operating conditions.

⑲ Hot Air Temperature Display (Temperature

Displays the outlet temperature.)

⑳ Set Temperature Display (Temperature Controller)

Displays the outlet temperature setpoint. When switching the operating condition to an external sensor, displays the external sensor's setpoint temperature.

㉑ Voltage Meter

Displays the voltage of the heater output.

㉒ Output Switch

Heater capacity can be selected in three stages via a

HT4: 2.5kW ⇔ 3.25kW ⇔ 4kW

HT7.5: 5kW ⇔ 6.25kW ⇔ 7.5kW

㉓ Preheat Switch

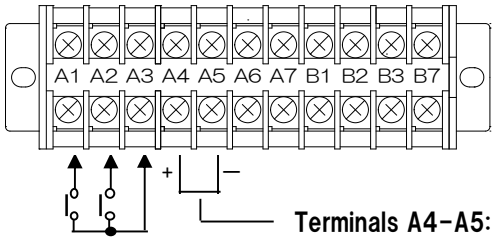
Switches between hot air operation and preheat operation. Turning the switch ON activates preheat operation.

6. Service Terminal

● The TCU Series temperature control unit is equipped with service terminals for external input and external output.

(M3.5, 10P terminal block upper row, tightening torque: 1.4 N·m)

《Input Terminals》



Terminals A4-A5: External temperature control (4-20 mA)

Used when controlling temperature with another temperature controller.
Input DC 4 to 20 mA (**A4 →+, A5→−**) .
*4 mA: Heater output 0%, 20 mA: Heater output 100%, use the unit's hot air temperature controller as an outlet temperature upper.

Terminal A3: Input common terminal

This is the input common terminal for the **external** operation ON/**OFF** **terminal A1 and the external heater** ON/**OFF** terminal A2.

Terminal A2: External Heater On/Off Terminal

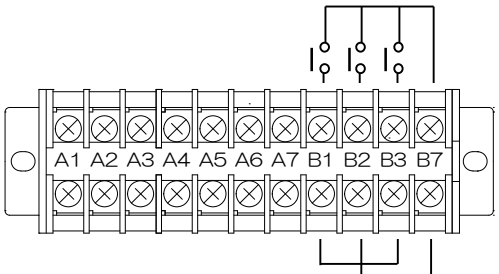
Used to turn the heater (normal operation, preheat operation) on/off via an external signal. Input is compatible with contact outputs (terminal voltage DC24V, 7mA or less).

Terminal A1: External operation ON/OFF terminal

Used for starting/stopping operation via an external signal. The input is compatible with contact outputs (terminal voltage DC24V, 7mA or less).

《Output Terminals》

Contact Rating DC 5V: 10mA or more, DC 30V: 1A or less
(Voltage-free contact signal output)



Terminals B1-B2-B3: Output terminals (selectable)

Contact Output (Internal Relay)
Terminals that turn ON when the output function set by the output terminal function is activated.
Initial settings are: B1: Fan, B2: Heater, B3: Fault.
(Select any three output functions from: Fan, Heater, Fault, Temperature Alarm, Operation)

※ Refer to P.18 for output terminal function settings.

Terminal B7: Output Common Terminal

Output common for **B1**, **B2**, and B3 (total output common current: 3A or less).

Caution : When using service terminals, always disconnect the main power supply before wiring. Wiring while energized may cause electric shock. Also, always reinstall the terminal cover after wiring.

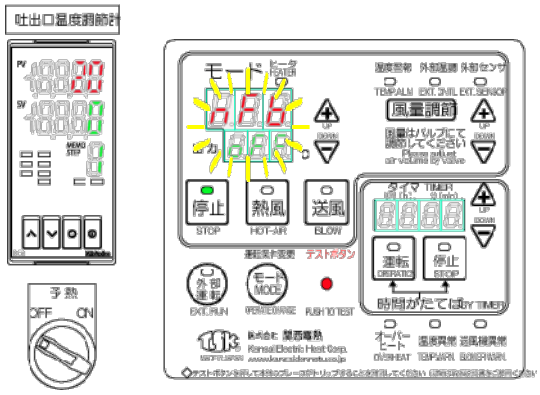
Caution : Avoid adjacent wiring or bundling of service terminals with AC power lines, power lines, or harmonic lines.

Operation (Hot Air Operation)

※ Connect the compressed air piping to the air supply port (30PM) of the high-temperature hot air burner and ensure compressed air is being supplied. If compressed air is not supplied, the high-temperature hot air burner will operate with no airflow.

① Turn ON the factory power supply (primary power supply).

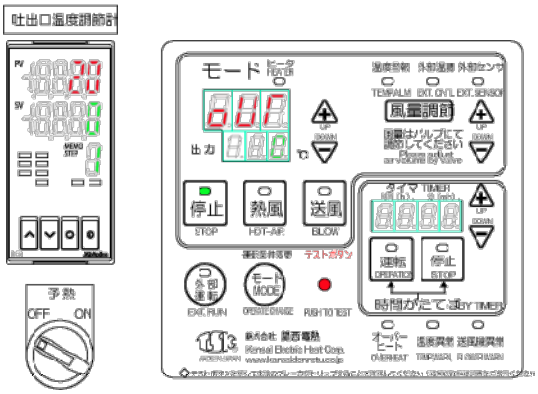
The stop lamp (green) illuminates, 'nFb' flashes on the mode display, and 'oFF' flashes on the heater output display.



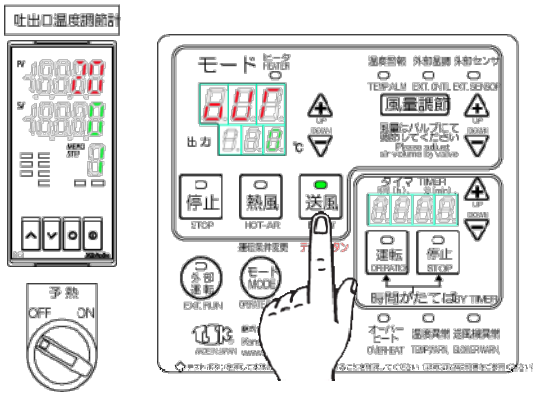
※ Operation is not possible in this state.

② Turn the main breaker (NFB) ON.

The mode display shows 'oUT' and the heater output display shows '0'.

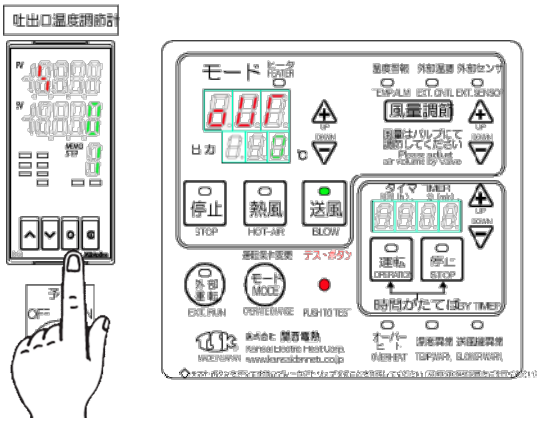


③ Pressing the fan switch will illuminate the fan lamp (green) and start fan operation.

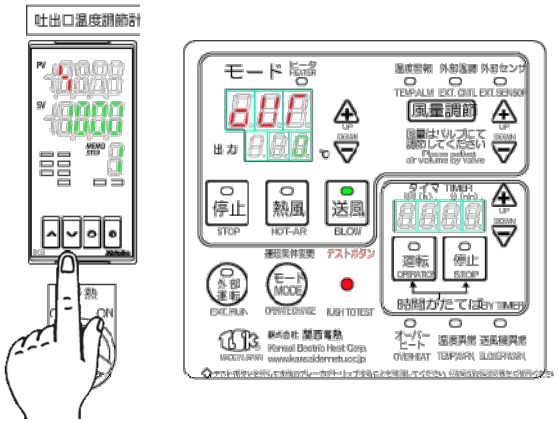


④ Press the setting registration key on the temperature controller.

The hot air temperature display shows 'S' and the set temperature display shows '0' (during initial operation).

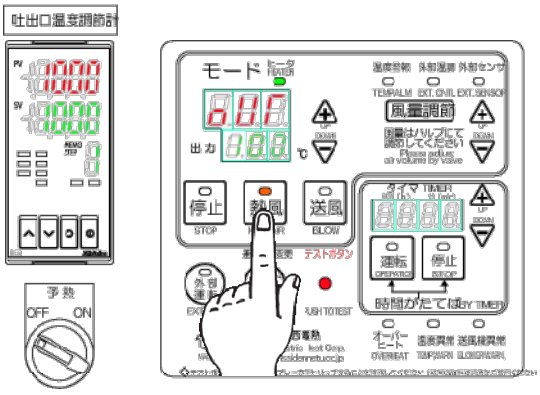


⑤ Use the up/down keys to set the desired hot air temperature. Then press the set/register key again to return to the normal display.



You can set the temperature in 1° C increments using the up/down keys.

⑥ Pressing the hot air switch illuminates the hot air lamp (orange) and starts hot air operation.



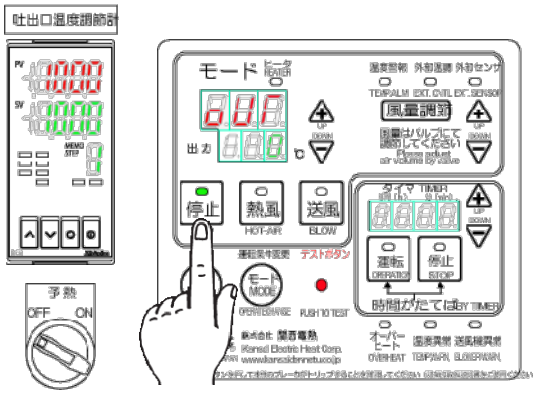
The heater lamp (green) indicates the heater control status by lighting or flashing.

※ If the hot air temperature does not rise to the set temperature, adjust by reducing the supply

8. Operation Stop

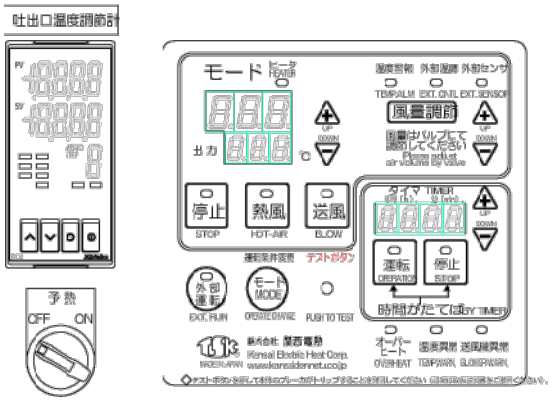
① Press the stop switch.

The stop lamp (green) will illuminate, and all operations will stop.



② If the high-temperature hot air burner will not be used for an extended period, turn OFF the factory power supply as well.

All displays will turn off.



※ The main unit's breaker (NFB) does not need to be turned OFF

The high-temperature hot air burner incorporates a terminal box cooling fan. The cooling fan will activate if the interior of the terminal box becomes hot, regardless of whether the burner is operating or stopped. Do not disconnect the primary power supply while the fan is operating.

※ Always stop the unit using the stop switch before turning off the factory power supply or the unit's circuit breaker. Turning off the factory power supply or the unit's circuit breaker without first stopping the unit using the stop switch while the high-temperature hot air burner is operating may cause malfunction.

※ If the unit breaker is turned OFF and then ON again while the high-temperature hot air burner is being operated or stopped via external control, the external control mode will be canceled. If power must be interrupted while operating in external control mode, always interrupt the power at the factory-side power supply (primary power supply). (Re-energizing the factory-side power supply will maintain the external control mode.)

Do not stop the high-temperature hot air burner using electromagnetic contactors or similar devices installed on the primary side of the temperature control unit. Surge voltages may damage internal electronic components.

Keep the temperature control unit's breaker (NFB) ON at all times. Do not use the ON/OFF switch as an operation switch. Surge voltage may damage internal electronic components.

● Operation during power outages and momentary power interruptions

- In the event of a momentary power interruption at the factory due to a power outage, etc., regardless of the time taken to restore power, the unit will automatically resume operation at the state it was in before the interruption after power is restored (recovery).

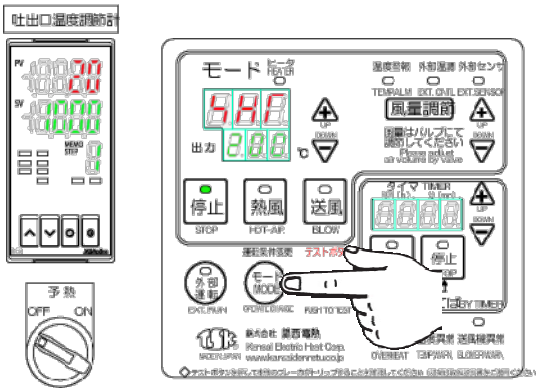
9. Preheating Operation

Preheat operation is a method where power is supplied to the high-temperature hot air burner during no-airflow conditions to perform preheating, enabling the required hot air discharge temperature to be achieved in the shortest time possible upon starting airflow.

- During preheating operation, control is managed based on either the set temperature of the A sensor for detecting hot air temperature of the high-temperature hot air burner or the B sensor for detecting preheating temperature. If the set temperature of the A sensor for detecting hot air temperature is extremely low, control may start before reaching the set temperature of the B sensor for detecting preheating temperature due to radiant heat or rising air currents.

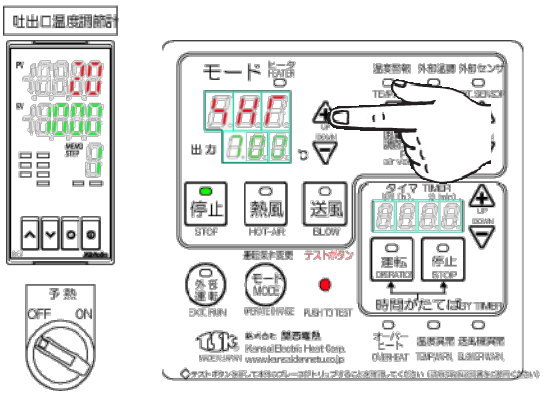
① Press and hold the mode switch for approximately 2 seconds while the unit is stopped

The mode display will show 'SHT', and the heater output display will show '200' (during initial operation).



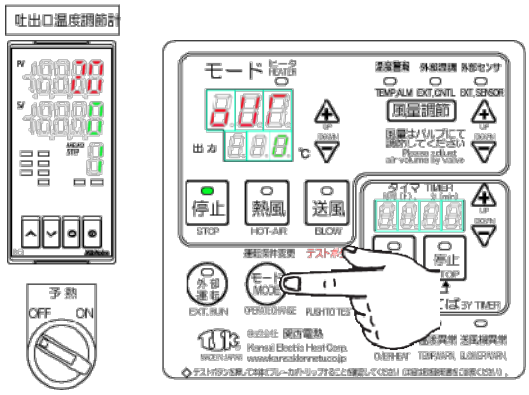
② Set the desired temperature using the up/down keys.

Temperature settings can be made in 1° C increments from 200° C to 700° C.

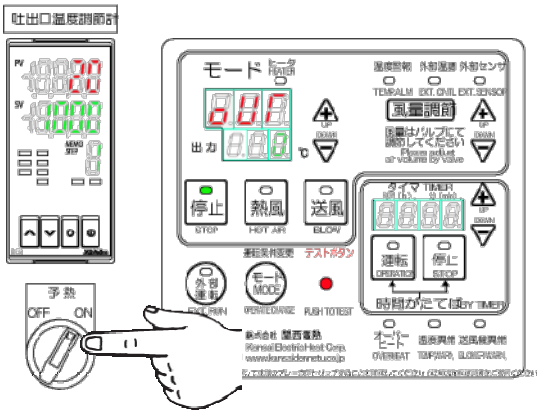


③ Press the mode switch four times.

The normal mode display 'OUT' and heater output display '0' will appear.

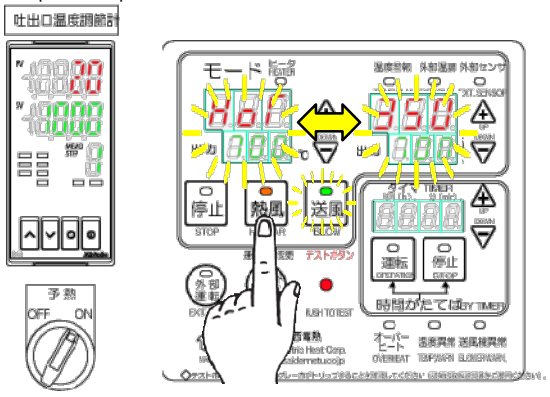


④ Turn the preheat switch ON.



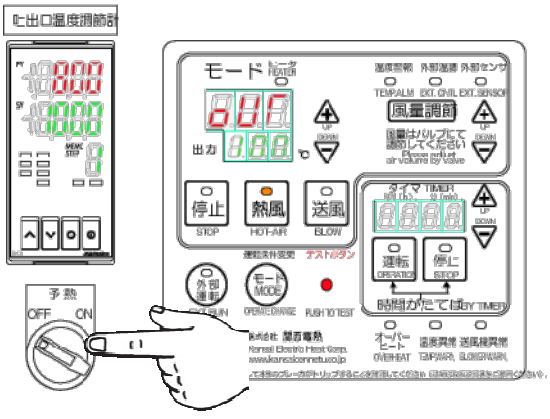
⑤ Press the hot air switch.

The hot air lamp (orange) illuminates, the fan lamp (green) flashes, and the mode display alternates between 'Hot' and 'Displayed Temperature', indicating preheat operation has started.



⑥ Turn the preheat switch OFF.

Normal operation (hot air operation) will commence, switching to discharge temperature control.



※ A sleep function is provided for preheat operation. If 30 minutes elapse after starting preheat operation, the heater will automatically turn OFF.

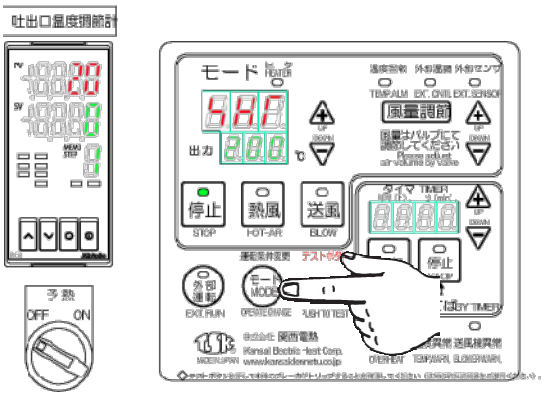
10. When Using External Temperature Control

- Hot air can be controlled using signals from an externally installed temperature sensor and temperature controller. In this case, use the unit's temperature controller as an outlet temperature upper limit limiter.
- When using the external temperature control function, the set hot air temperature value and the hot air temperature display value will correspond to the temperature measured by the outlet sensor.

① Prepare a temperature sensor to measure the external temperature and a temperature controller to manage the external temperature. Connect the output from the external temperature controller to the external temperature control input terminals A4 and A5, ensuring the positive (A4) and negative (A5) connections are correct (note the polarity).

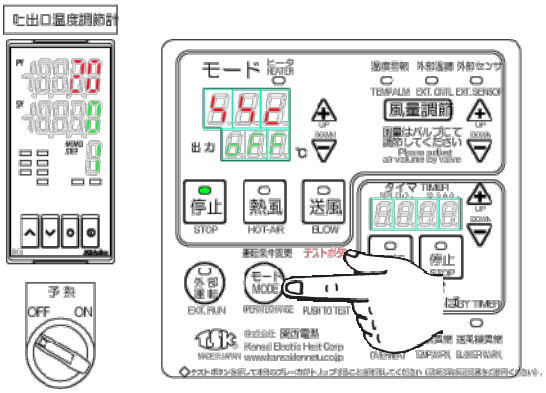
② Press and hold the mode switch (for approximately 2 seconds).

The mode display shows 'SHT', and the heater output display shows the 'set temperature' for preheating operation.



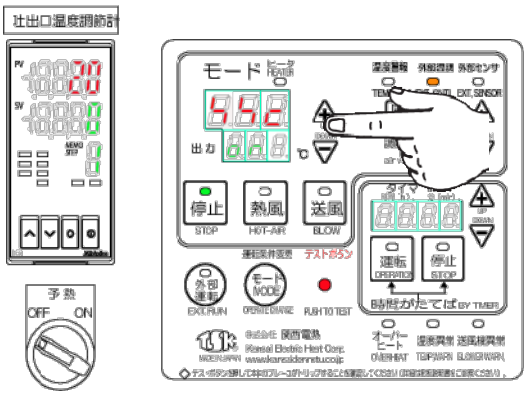
③ Press the mode switch once again.

The mode display will show 'SSc', and the heater output display will show 'oFF'.



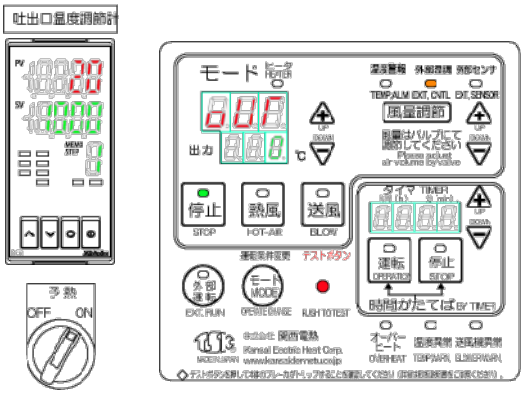
④ Use the up key to set the output display to 'on'.

After setting, press the mode switch three times to return to the normal operation display. The external temperature control lamp (orange) will illuminate.



⑤ After setting the desired temperature and airflow, start hot air operation and simultaneously begin temperature management using the external thermostat.

When external temperature control is turned ON, the external temperature control lamp (orange) will light up regardless of the external temperature control input.



※ When using the external temperature control function, control is based on whichever temperature is reached first: the temperature set on the external temperature controller or the outlet set temperature on the high-temperature hot air burner unit itself. Therefore, set each temperature considering heat dissipation from piping, etc.

※ If you no longer use the external temperature control function, set the lower section of the output display to 'OFF' as described in item ④ above.

11. Timer Operation/Timer Stop

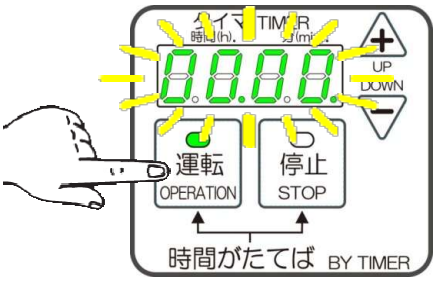
Before performing timer operation or timer stop, set the hot air temperature and airflow volume as desired.

Perform timer settings while the unit is stopped(timer settings cannot be made during hot air operation).

● Timer Operation (Starts after time elapses)

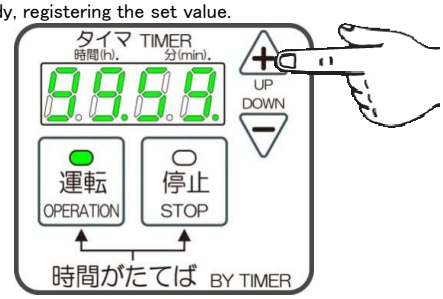
① Press the timer operation switch.

The timer operation lamp (green) will light up, and the timer display will show '00.00.' flashing, or the previously set time will be lit.

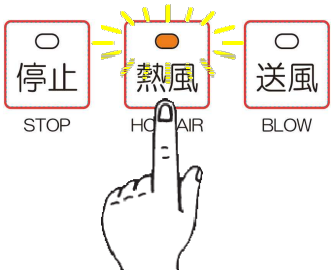


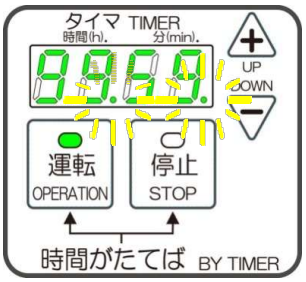
② Use the up/down keys to set the desired time.

You can set up to a maximum of 99 hours and 59 minutes in 1-minute increments. After setting, release the Up/Down keys. After 2 seconds, the display will change from flashing to steady, registering the set value.



③ Press the hot air operation switch.





The time countdown (timer countdown) will start (dot display flashes). When the time countdown reaches '00.00', hot air operation will begin. During the time countdown, the hot air lamp (orange) will flash. After hot air operation starts, it will switch to a steady light.

※ After the countdown ends, the timer display shows '00.00.'.

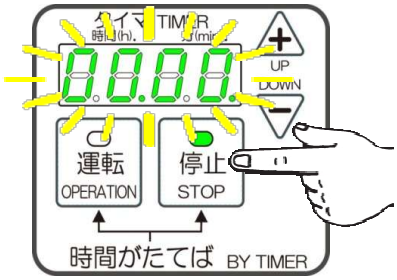
※ Pressing the stop switch halts both timer operation and the time countdown.

※ When the preheat operation mode is 'on', the unit will enter preheat operation during the time count. However, after the time count ends, it will ignore reaching the preheat set temperature and start hot air operation. Please be aware of this.

● Timer Stop (Stops after time elapses)

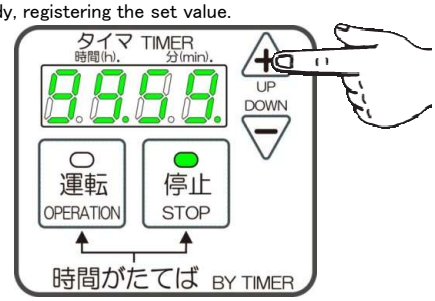
① Press the timer stop switch.

The timer stop lamp (green) will light up, and the timer display will show '00.00.' flashing or the previously set time lit.

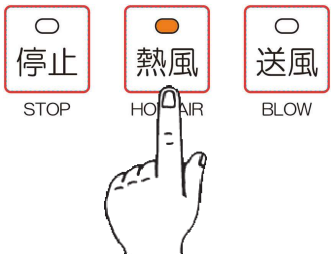


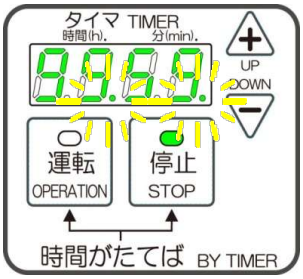
② Use the up/down keys to set the desired time.

You can set up to a maximum of 99 hours and 59 minutes in 1-minute increments. After setting, release the Up/Down keys. After 2 seconds, the display will change from flashing to steady, registering the set value.



③ Press the hot air operation switch.





Time counting (timer countdown) begins (dot display flashes), and hot air operation starts. When the time count reaches '00.00', hot air operation stops. During hot air operation, the hot air lamp (orange) is lit. After hot air operation ends, it switches to flashing.

※ After the countdown ends, the timer display shows '00.00.'.

※ Pressing the stop switch halts both timer operation and the time countdown.

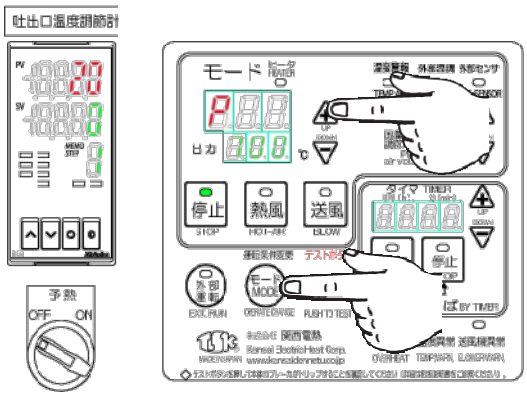
※ If the preheat operation mode is set to 'on', the unit will enter preheat operation after the time count ends and continue control at the preheat temperature.

12. Unlock

● To use the temperature alarm or output terminal function settings, you must change each parameter. Before changing any parameter, first unlock the parameter.

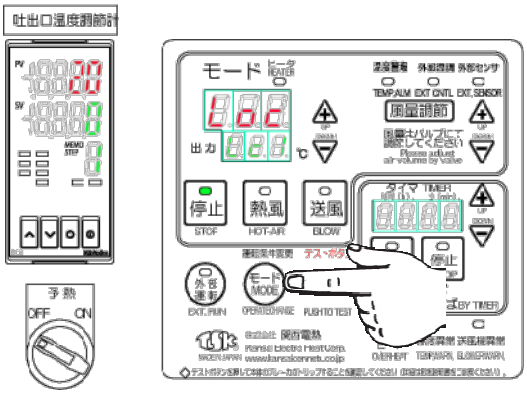
① Press and hold the Mode key while continuously pressing the Hot Air Temperature Up key.

The mode display will show 'P', and the heater output display will show '70.0'.

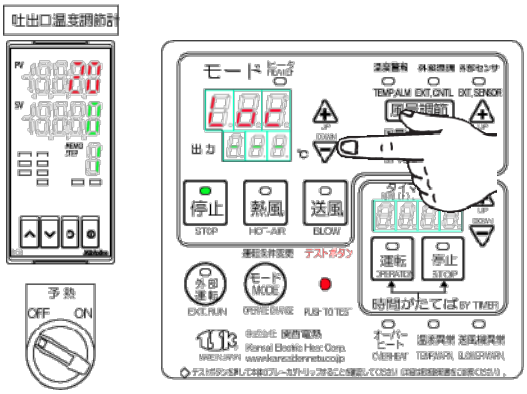


② Press the Mode key six times.

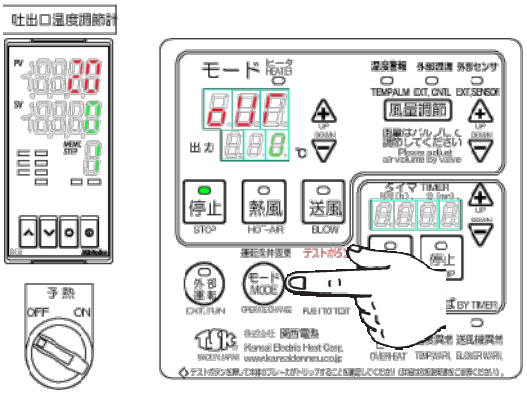
The mode display will show 'Loc' and the heater output display will show 'Lc1'.



③ Use the down key to change the heater output display to '---'.



④ After modification, press the Mode key once to return to the normal operation display. This completes the unlocking process.



※ The factory default lock mode is 'Lc1'. '---' indicates unlocked; 'Lc2' locks only the temperature setting, fan speed setting, timer setting, and other settings. If you wish to lock the temperature setting, fan speed setting, and timer setting to prevent incorrect settings, you can change it to 'Lc2' for use.

To relock after unlocking, perform the same operation as above to change the heater output display from '-----' to 'Lc1'.

Unlocking allows modification of all parameters. However, never change any parameters not listed in this manual.
Modifying these may cause dangerous operating conditions or malfunctions. Furthermore, no warranty coverage applies for any changes made, so exercise extreme caution.

13. When Setting Temperature Alarms

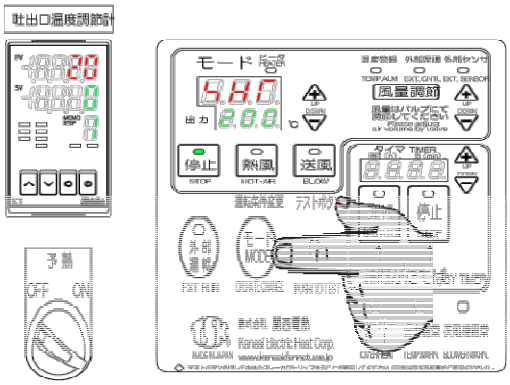
● If the discharge hot air temperature exceeds a specified range relative to the set temperature, an alarm signal can be output. Use this as needed (disabled at factory default).

① Select the temperature alarm output signal 'A1' for one of the output terminal functions.

※ Refer to P.18 for the output terminal function selection method.

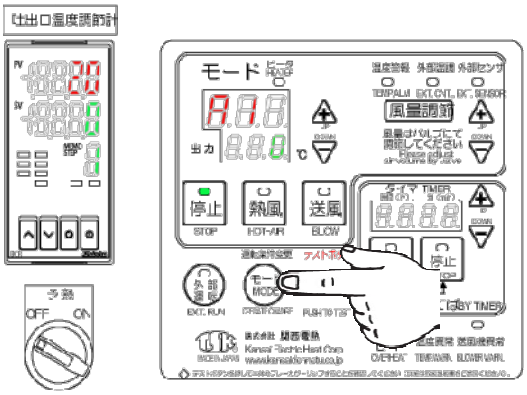
② After unlocking in the stopped state, press and hold the mode switch for approximately 2 seconds.

The mode display shows 'SHT', and the heater output display shows the 'set temperature' for preheating operation.



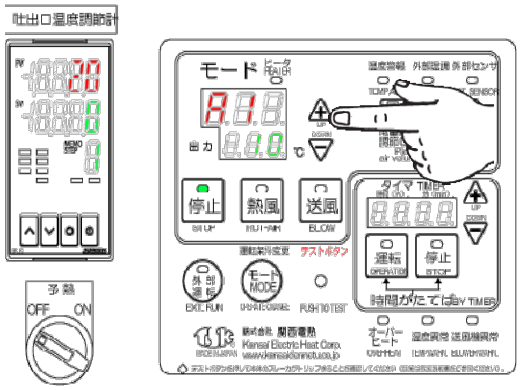
③ Press the mode switch once.

The mode display will show 'A1' and the output display will show '0'.



④ Use the up/down keys to set the desired temperature range.

After setting, press the mode switch four times to return to normal operation.



※ The temperature alarm does not stop the unit's operation.

※ Setting the temperature alarm to 0 disables the temperature alarm output.

※ The temperature alarm is output as a voltage-free contact signal (contact capacity: AC 250V 1A, DC 30V 1A) from the output terminal (B1 or B2 or B3).

Temperature Alarm Mode Change

※Changes must be made in the stopped state with external operation disabled.

● The temperature alarm mode is set to the upper/lower deviation alarm mode with standby at the factory. You can change this alarm mode according to your usage.

Changeable Alarm Modes

Alarm Operation : When outlet temperature setpoint is 150 and temperature alarm setpoint is 50

※ Only lower limit deviation alarm and lower limit deviation alarm with standby −50 setting

Alarm output turns ON within the shaded area.

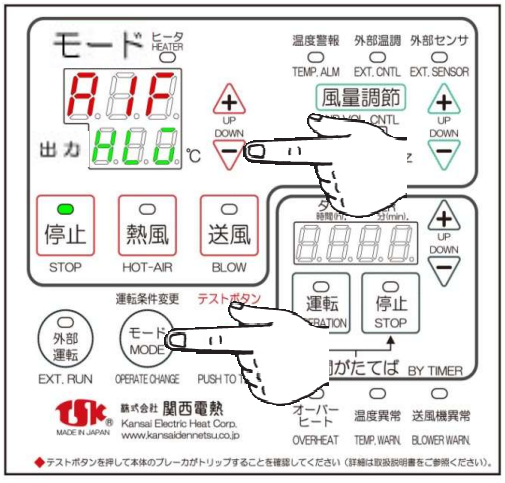
Setting Value	Alarm Mode	Alarm Operation (50 100 150 200 250 300)
n.n.n.	No alarm operation 『－－－』	No alarm operation
H.n.n.	Upper Deviation Alarm 『H』	
L.n.n.	Lower Limit Deviation Alarm 『L』	
HLn.	Upper/Lower Limit Deviation Alarm 『HL』	
WId	Upper/Lower Deviation Range Alarm 『WId』	
AS.	Upper Absolute Value Alarm 『AS』	
rAS.	Lower Limit Absolute Value Alarm 『rAS』	
HW.	Upper Limit Deviation Alarm with Standby 『HW』	
LW.	Lower Limit Deviation Alarm with Standby 『LW』	
HLW.	Upper/Lower Limit Deviation Alarm with 『HLW』	

※ "With delay" means that when hot air operation starts, even if the hot air temperature (measured value) is within the alarm range, the alarm does not turn ON immediately. Instead, the alarm occurs only when the temperature first goes outside the alarm range and then re-enters it.

※ Only the lower deviation alarm and the lower deviation alarm with delay should have negative setpoints.

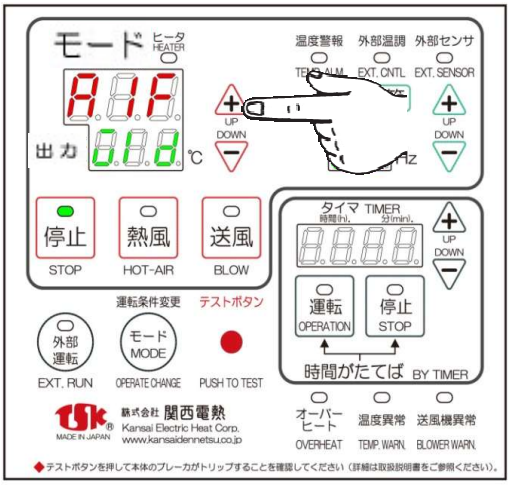
① After unlocking, press and hold the Mode key while continuously pressing the Hot Air Temperature Down key.

The mode display will show 'AIF', and the heater output display will show 'HLW'.



② Use the up/down keys to change to the desired alarm mode.

After setting, press the Mode key nine times to return to the normal operation display.

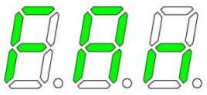
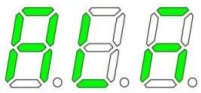


※ After changing the temperature alarm settings, lock the settings again before operating.

14. Output Terminal Function Settings

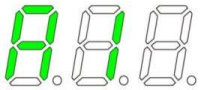
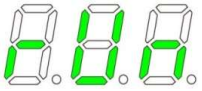
At shipment, the output terminals (service terminals: B1–B2–B3–B7) are set for fan output, heater output, and fault output. These output settings can be changed as desired.

《Factory Default Settings》

- Output Terminal **B1** 
  Fan Output Signal 'Fan'
  : Output during fan operation.
- Output Terminal **B2** 
  Heater output signal: 'HET':Out put duringnormal operation (hot air operation)and preheating operation(Not output during fan operation, stop, or abnormal conditions).
- Output Terminal **B3** 
  Abnormal Output Signal『ALM』
  : Outputs during an abnormality.

※ Output terminal B7 is the common ground.

《Configurable Output Settings》

- 
  Temperature alarm output signal 'A1'
  : Output when the temperature alarm is activated.
- 
  Operation Output Signal 'rUn'
  : Output during normal operation (hot air operation) and fan operation (not output during preheating operation, stop, or abnormal conditions).

※ Abnormal output signals are generated upon detection of all abnormalities except reverse connection of each temperature sensor, negative temperature detection, or reverse phase abnormality.

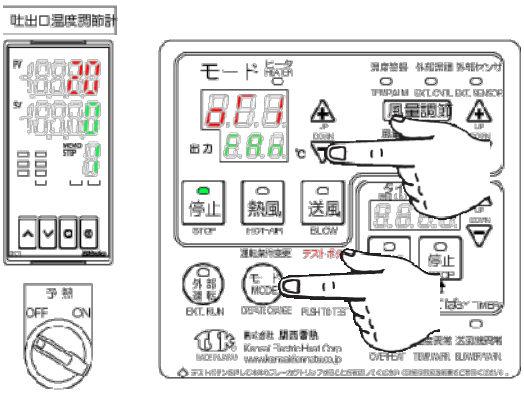
※ Each output signal activates the internal relay contact terminals B1–B7, B2–B7, and B3–B7 when the selected function
(Voltage-free contact signal; contact capacity DC 30V, 1A)

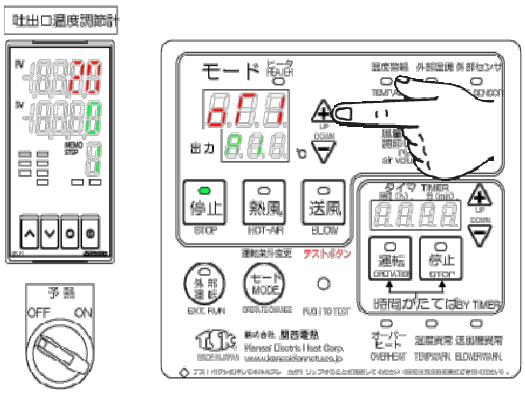
Output terminal function settings must be performed after unlocking in the stopped state.

【To changeoutput terminal B1】

① Press and hold the mode switch while simultaneously pressing the hot air temperature down key for 10 seconds.
The mode display shows 'oT1', and the heater output display shows 'Fan'. Ignore the 'A1F' display on the mode display during operation.

② Use the up/down keys to change the heater output display to the desired output function.





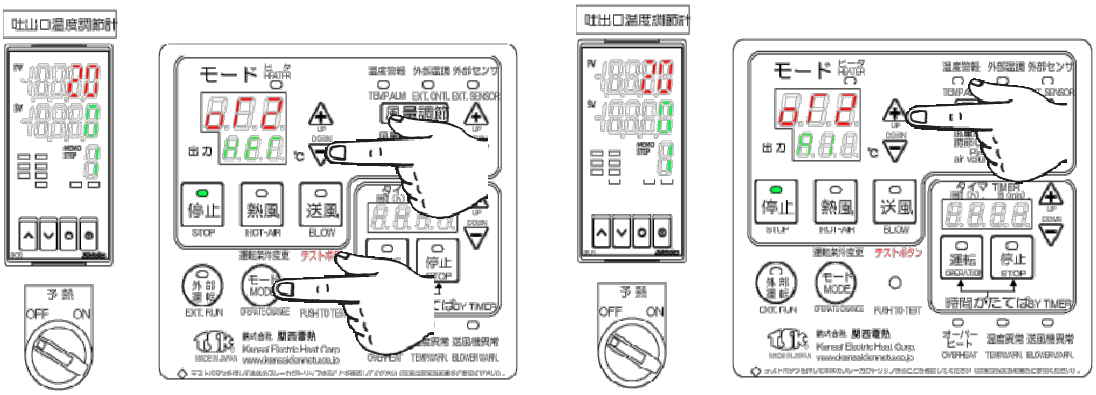
③ After setting, press the mode switch three times to return to the normal stop state.

【To output terminal B2】Output Terminal B2

① While holding down the Mode Switch, simultaneously press and hold the Down Key for 10 seconds. After the mode display shows 'oT1', press the Mode Switch once.

The mode display will show 'oT2', and the heater output display will show 'HET'. Ignore the 'A1F' display that may appear on the mode display during this process.

② Use the up/down keys to change the heater output display to the desired output function.



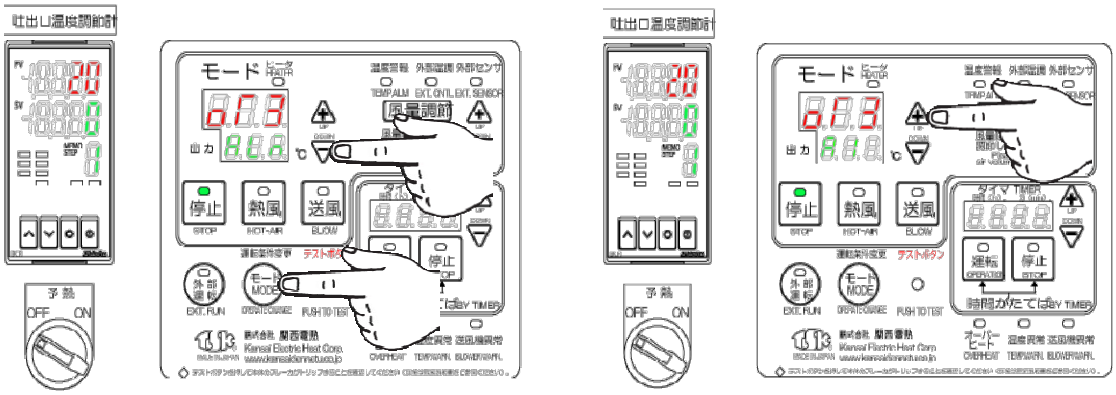
③ After setting, press the mode switch twice to return to the normal stop state.

【To change output terminal B3】Output

① While holding down the mode switch, simultaneously press and hold the down key for 10 seconds. After 'oT1' appears in the hot air temperature display, press the mode switch twice.

The mode display will show 'oT3' and the heater output display will show 'ALM'. Ignore the 'A1F' display on the mode display during this process.

② Use the up/down keys to change the heater output display to the desired output function.



③ After setting, press the mode switch once to return to the normal stop state.

After setting, be sure to lock the device before starting operation.

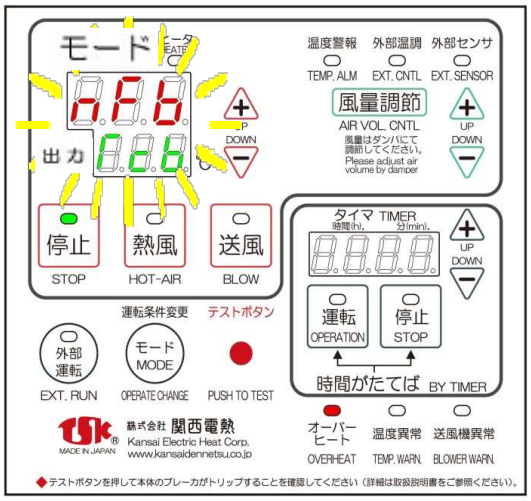
15. Abnormal Condition Detection

◆ When an abnormality is detected, the abnormality indicator will light up and the buzzer will sound simultaneously. The buzzer will stop sounding once the abnormality is cleared according to the reset method for each abnormality.

15-1 Overheat

If the heater case reaches an abnormally high temperature, it is detected as overheating, causing the main unit's breaker (NFB) to trip and all operations to stop.

● Overheating



The overheat lamp (red) illuminates, 'nFb' flashes on the mode display, and 'Tcb' flashes on the heater output display.

《Main Causes》

- Air is not being supplied
- Insufficient exhaust openings in the furnace body, etc.
- High resistance (pressure loss) at the outlet due to proximity of the target workpiece, etc.

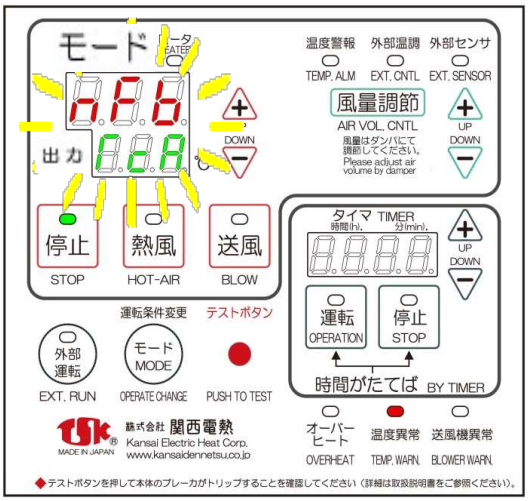
《Resolution Method》

Eliminate the cause of overheating and allow sufficient cooling. Then, turn off both the main power supply (factory power) and the unit's circuit breaker (NFB), and turn them back on again.

15-2 Temperature Abnormality

If the outlet temperature exceeds the upper limit, it detects a temperature abnormality, causing the main breaker (NFB) to trip and all operations to stop.

● When the outlet temperature exceeds the upper limit at the outlet sensor section



The temperature abnormality lamp (red) illuminates, 'nFb' flashes on the mode display, 'TcA' flashes on the heater output display, the main breaker (NFB) trips, and all operation stops.

《Main Causes》

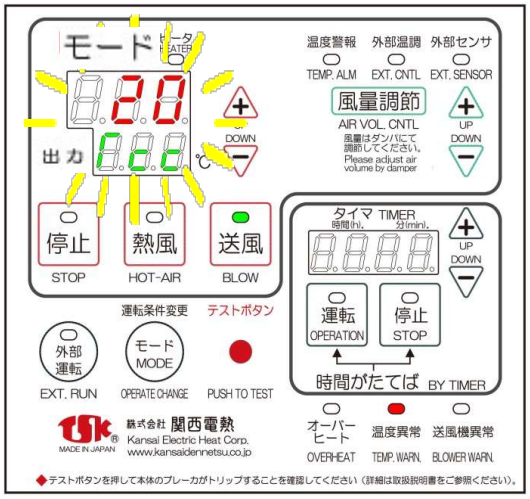
- Reduced air volume from the air source
- Reduced airflow due to excessive pressure loss

《Resolution Method》

After eliminating the cause of the outlet temperature limit being exceeded and allowing sufficient cooling, turn OFF the main power supply (factory power) and the unit breaker (NFB), then turn them back ON.

Caution: Always disconnect the main power supply (factory power supply) before checking or adjusting wiring during an abnormality.

● When the inlet temperature exceeds the upper limit



※ In this case, the upper limit of the inlet temperature is an abnormality detected by the inlet temperature detection sensor installed inside the heater.

The temperature abnormality lamp (red) illuminates, the current outlet temperature appears on the mode display, 'Tcc' flashes on the heater output display, and the unit enters forced-air operation mode.
*During preheating operation, the unit will be in a sto

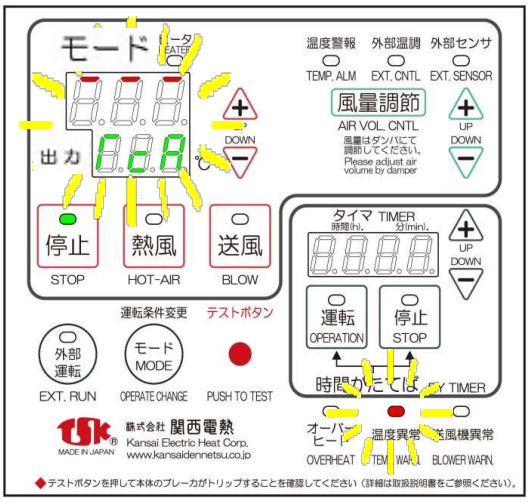
《Main Causes》

- When the intake gas temperature of the high-temperature hot air burner exceeds the upper limit (150° C)

《Resolution Method》

After the inlet temperature has dropped, pressing the stop switch will clear the alarm.

● Discharge port sensor burnout



The temperature abnormality lamp (red) flashes,'-----' appearson the mode display, 'TcA' flashes on the heater output display, the main unit breaker (NFB) trips, and all operations stop.Mode Display'-----', Heater Output Display 'TcA' Flashing, Main Unit Breaker (NFB) Tripped, All Operations Stopped

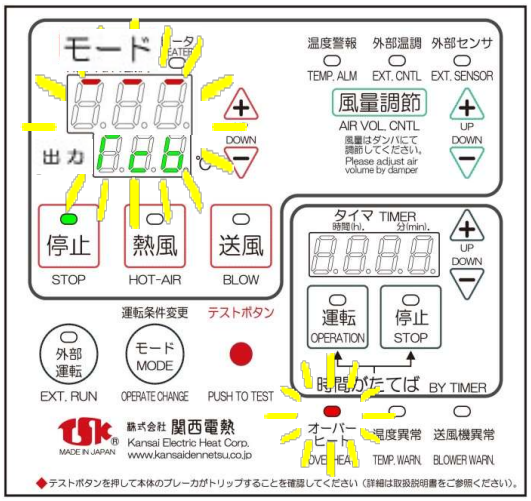
《Main Causes》

- Outlet Sensor Disconnection
- Outlet sensor wiring break
- Discharge port sensor wiring disconnection

《Resolution Method》

Turn off the primary power supply and request repair.

● Overheat Sensor Burnout



The Overheat Lamp (red) flashes, the mode displayshows '---', the heater output display shows 'Tcb' flashing, the main breaker (NFB) trips,all operations stop.

《Main Causes》

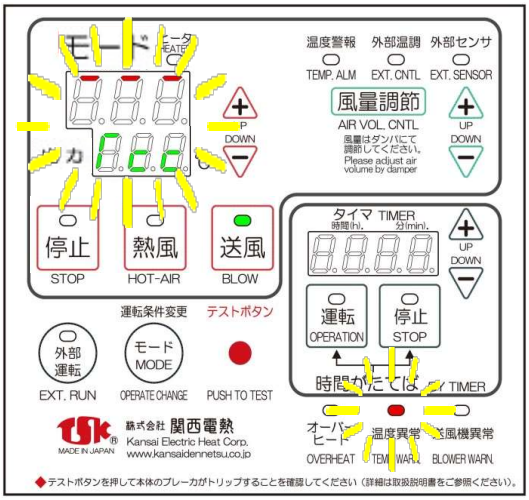
- Overheat Sensor Disconnection
- Overheat sensor wiring break
- Overheat Sensor Wiring Disconnection

《Resolution Method》

Turn off the primary power supply and request repair.

Caution: Always disconnect the main power supply (factory power supply) before checking or adjusting wiring during an abnormality.

● Inlet Sensor Burnout



The temperature abnormality lamp (red) will flash, the mode displaywill show '---', the heater output display will flash 'Tcc', and the unit will enter fan operation mode.operation and preheat operation will stop.

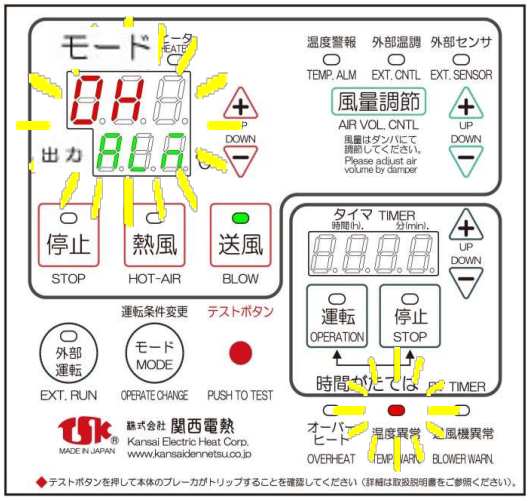
《Main Causes》

- Inlet Sensor Disconnection
- Inlet sensor wiring break
- Entry sensor wiring disconnection

《Resolution Method》

Turn off the primary power supply and request repair.

● When the internal temperature of the temperature control unit is abnormal



The temperature abnormality lamp (red) flashes, 'OH' flashes on the mode display, 'ALM' flashes on the heater output display, and the unit enters fan operation mode.
Operation will stop during fan operation or preheating operation.

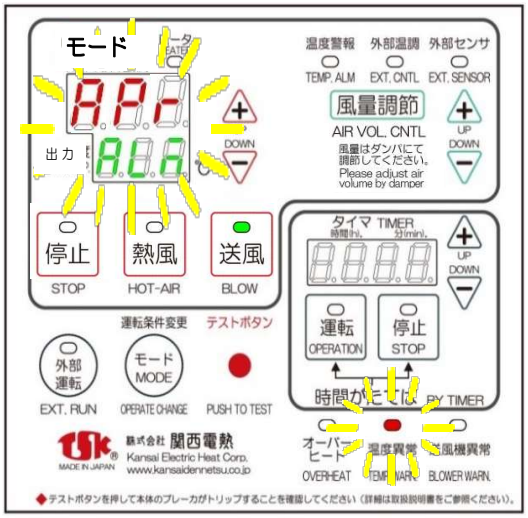
《Main Causes》

- Ambient temperature at temperature control unit installation location is high
- Impact of furnace body heat dissipation temperature when installed at the top of the furnace body

《Resolution Method》

Stop operation using the stop switch. After the internal temperature of the temperature control unit has dropped, the alarm can be cleared using the stop switch.

● APR Abnormal



The temperature abnormality lamp (red) flashes, 'APr' flashes on the mode display, 'ALM' flashes on the heater output display, and the unit enters fan operation mode.

《Main Causes》

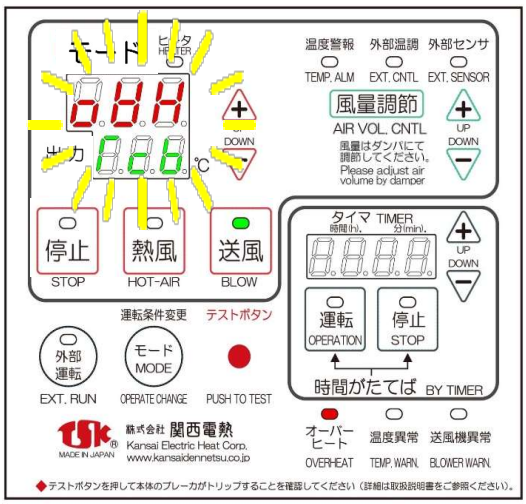
- APR malfunction
  High temperature inside the control panel

《Resolution Method》

After the control panel internal temperature drops, press the stop switch to clear the alarm.

Caution: Always disconnect the main power supply (factory power supply) before checking or adjusting wiring during an abnormality.

- Insufficient Airflow Overheat Prevention



The overheat lamp (red) illuminates, 'oVH' flashes on the mode display, 'Tcb' flashes on the heater output display, and the unit enters fan operation mode.

This activates when airflow decreases for any reason and the internal heater temperature exceeds the set discharge temperature by a certain amount. This is compatible with the above overheat condition, but depending on usage conditions, either one will activate.

《Main Causes》

- Same cause as the above overheat

《Resolution Method》

After eliminating the cause of overheating and allowing sufficient cooling, turn the main breaker (NFB) OFF and then ON again.

Warranty

- The warranty period for this unit is one year from the date of purchase.
- If a malfunction occurs during the warranty period under normal use in accordance with the instruction manual, we will repair it free of charge based on the following terms. However, for service calls more than 50 km from our Osaka headquarters or Tokyo branch office, or 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 incurred as a
- The warranty for repaired parts and workmanship shall be valid for three months after repair.
- The following cases are not covered by the warranty:
  - Failure or damage due to incorrect use, careless handling, or abnormal voltage.
  - Disassembled or modified items.
  - Damage caused by overheating not attributable to our product.
  - Damage, malfunction, or loss caused by lightning strikes, earthquakes, typhoons, floods, fires, or sa
  - Rust formation or electrical leakage due to condensation.
  - Damage caused by dust, debris, lint, oil mist, etc.
  - Electrical leakage or malfunction caused by the adhesion of conductive carbon fibers or exposure
  - Failure or damage caused by use in an installation environment affected by oil.
  - 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, painting.
  - Inconvenience, loss, or secondary loss (e.g., telephone charges, compensation for lost business, commercial losses, etc.).
  - Transportation and lodging expenses incurred during on-site repairs.
- We cannot provide on-site repairs if the equipment is installed in locations that are difficult to access, dar
- This warranty is valid only within Japan.

  If our products purchased within Japan are exported overseas, the warranty will no longer apply.
  In such cases, warranty coverage will only apply to products returned to our factory for in-house repair.
  Furthermore, the customer shall bear all costs associated with import/export and transportation required for bringing the product in for repair and returning it after repair.

《熱風温度、設定温度、タイマ表示部の表示文字一覧》

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