This instruction manual must be delivered to the end user. **For safe keeping**

3-003 Date Created: May 2024

TSK Hot Air Generator

General (For Mold Dryers X-3MS and X-4MS)

● Be sure to read before use.

- Thank you for purchasing the TSK Hot Air Generator.
- Please verify that the model, part number, and voltage on the nameplate match your ordered product.

For operation of the hot air generator, please read the 'Instruction Manual: Basic Operation'.

1. Precautions for Use
2. Installation
3. Piping
4. Power Supply
5. Maintenance and Inspection
6. Names and Functions of Components
7. Service Terminal
8. Fault Detection
9. Other Functions
10. Remote Controller
11. Warranty

TSK Hot Air Gener
Electric Hot Air Mold Dryer
- X-3MS
- X-4MS

Kansai Electric Heat Corp.

. Precautions for Use※ Be sure to check before use.

To ensure trouble-free operation of the hot air generator

◆This section lists important precautions that have caused malfunctions in the past. Please compare these with your company's usage methods and inquire accordingly.

- Always clean the intake filter (standard equipment) of the mold dryer. Clogging of the filter may cause abnormal overheating inside the heater, potentially preventing operation.

- If the atmosphere at the mold dryer installation site contains conductive airborne particles such as dust, powder, carbon fibers, oil, oil fumes, oil mist, moisture, or water vapor. If these substances adhere to or enter the hot air generator's or hot air generator, leading to malfunction of the mold dryer.

- Cannot be used in environments with combustible gases, flammable gases, plating, or corrosive atmospheres. Please consult us beforehand.

- Keep the mold dryer's circuit breaker (NFB) ON at all times. Do not use the ON/OFF switch as an operation switch. Do not use it as an ON/OFF switch. Surge voltage may damage internal electronic components.

- Flexible hose piping to the discharge port or suction port of the mold dryer will inevitably leak hot air due to the characteristics of flexible hoses. will inevitably cause hot air leakage. Leaked high-temperature hot air may flow back into the mold dryer, damage the electronic components in the control panel. Therefore, use the enclosed air leak prevention to install the flexible hose piping to the outlet or inlet..

- Applying voltage to input terminals A1 to A10 and output terminals B8 to B10 will cause failure. Additionally, applying voltage exceeding the rated value to output terminals B1 to B7 will cause failure.(When using a remote controller... optional), output voltage,, output voltage, input voltage,

- Do not bundle or route the service terminal wiring adjacent to AC power lines, power lines, or harmonic lines. Internal electronic componentsbe damaged by noise.(When using a remote controller... optional)

- Do not stop the mold dryer operation using the electromagnetic contactor or similar device installed on the primary side of the mold dryer. Do not stop the mold dryer using an electromagnetic contactor or similar device installed on the primary side. Surge voltages will damage the internal electronic components.

- Induced lightning surges caused by lightning strikes can lead to damage, malfunction, or fire in mold dryers. If you use a mold dryer in an area susceptible to lightning strikes, be sure to implement lightning protection measures such as installing arresters (lightning arresters).

- Always use commercial power with a sine wave (50/60 Hz) for the mold dryer's power supply. Never use power from frequency converters or other sources that produce distorted waveforms containing harmonics.
  Harmonics and noise may damage internal electronic components.

2. Installation

①Install in a level position.
Refer to the photo on the right for the front-to-back tilt angle.
Also, ensure the left-right position is level.

②Please use the lifting eyes when moving.

③where installation is not possible

- ・Vibrating locations
- ・Outdoors exposed to wind and rain
- ・Near combustible materials
- ・Above heat-generating objects
- ・Sealed rooms and enclosures
- ・Locations at altitudes of 1000m or higher
- ・Locations with low atmospheric pressure
- ・Locations with ambient humidity of 85% R.H. or higher
- ・Locations where the back side is in direct contact with walls, etc.
- ・Locations where acidic gases, corrosive gases, etc., are present
- ・Locations with electrically conductive suspended particles (e.g., carbon fibers)
- ・Locations with ambient temperatures outside the range of 0° C to +40° C

Caution **When moving the mold dryer using the lifting brackets, check for any abnormalities such as damage, deformation, scratches, wear, rust, or corrosion on the lifting brackets. Be sure to check that all bolts and nuts are tight.**

3. Piping

①Securely fasten the piping to the outlet.

②Install piping as thick as possible, as short as possible, and with gentle bends.

③It ended up tearing, and during the mould drying process, the hot air.

④Do not apply a tensile load to the outlet flange whilst the mould dryer is secured in place.

4. Power Supply

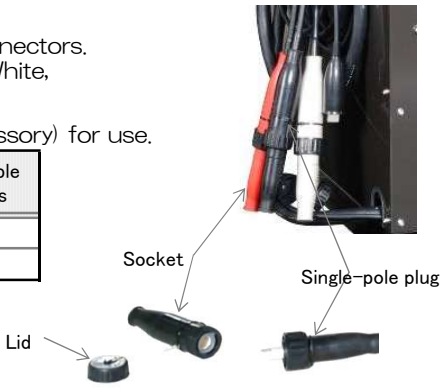
①Have a licensed electrician performconnection and grounding work.

② Connect the power cord according to: R (Red), S (White), T (Black), and Ground (Green).

◆The terminals of the one-touch connector cable are single-pole connectors.
The connector colors for each phase are [R phase = Red, S phase = White,
T phase = Black], and each has a matching color socket.

Please prepare a power cable and wire it to the socket (included accessory) for use.

	Heater Current Value200V/220V220V power source	Blower Rated Current Value 200V	Socket-Compatible Crimp Terminals
X-3MS	86.6A/94.5A	6.2A	R38-12
X-4MS	130A/142A	9.2A	R60-12



◇Regarding One-Touch Connector Cable Wiring

- When wiring to the included socket, use proper crimp terminals and ensure secure connection with the correct tightening torque.
- Ensure the plug and socket are securely inserted and fixed without any looseness.
- Do not subject the plug's power receiving section to impact. This can cause deformation and result in poor contact.
- Prevent foreign objects such as dirt, dust, or sand from entering the plug and socket. This can cause poor contact.
- Never insert or remove the plug and socket while power is applied.
- When the plug and socket are disconnected, cover the socket with the cap (socket accessory) to protect it.

③ Always use commercial power with a pure sine wave (50/60 Hz) for the mold dryer's power supply.
or distorted waveform. Also, take sufficient measures to prevent surge voltages and noise from entering the power supply.Take sufficient countermeasures.

④Install a dedicated circuit. If installing an earth leakage circuit breaker, determine the sensitivity current rating according to the table on the next page.

4. Power SupplyContinued on Page 2

⑤ Toelectric shock accidents, perform grounding work. (300V or less: Type D grounding; 600V or less: Type C grounding)

Caution **Avoid excessively long wiring to prevent voltage drop.**

Caution **Always disconnect the power supply when wiring or inspecting. Even when the main breaker (NFB) of the hot air generator is turned OFF, power is supplied to the control circuit. Therefore, always disconnect the factory main power supply (primary side power supply). Working with the power on may cause electric shock.**

Caution **When installing outlets for connections, ensure sufficient capacity. Outlets may overheat or malfunction due to aging-related contact issues or phase loss, Avoid using outlets whenever possible.**

Caution **Hot air generators are primarily industrial equipment. Using them in residential environments may cause radio interference. In such cases, the user of this product may be required to take appropriate measures to reduce interference.**

Model	Earth Leakage Circuit Breaker (ELB) Sensitivity Current Guidelines
X-3MS	100 mA
X-4MS	200mA

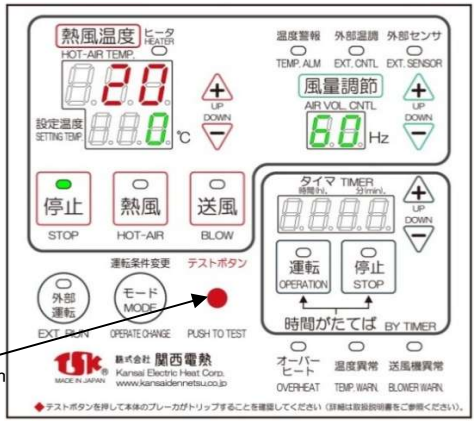
* The sensitivity current of a GFCI is generally about 10 times the initial leakage current.

5. Maintenance and Inspection

Test Button

This is a test button to confirm that the main unit breaker (NFB) This is a test button to verify that the main unit breaker (NFB) trips correctly during overheating. Once a month, with the unit powered off (but still energized), press the test button for several seconds to verify the overheat lamp illuminates and the main breaker trips for several seconds to verify the overheat lamp illuminates and overheat operation indicator (see P9), and the main unit's confirm the breaker (NFB) trip operation.

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



Test button

After inspecting the inlet filter,

◆A demi-filter is installed at the inlet of the mold dryer. Always inspect the inlet demi-filter and clean it regularly. If the filter becomes clogged, the heater case may reach abnormally high temperatures, causing overheating or temperature abnormalities.

◇Removing the filter maintenance panel exposes the demi-filter.

It is installed. Perform maintenance (cleaning)

When replacing, remove the band and take out the demi-filter.

Clean with water.

When installing, ensure it is completely dry before attaching the Demi filter.

*The demi filter can be washed and reused.

*Airflow can be confirmed using the [Differential Pressure Gauge] and [Airflow Conversion Chart] on the control panel, allowing you to check for reduced airflow due to filter clogging can be confirmed.

Self-Inspection

◆To ensure safer operation of this unit, we recommend conducting a voluntary inspection if the usage period exceeds 10 years.

Recommended.

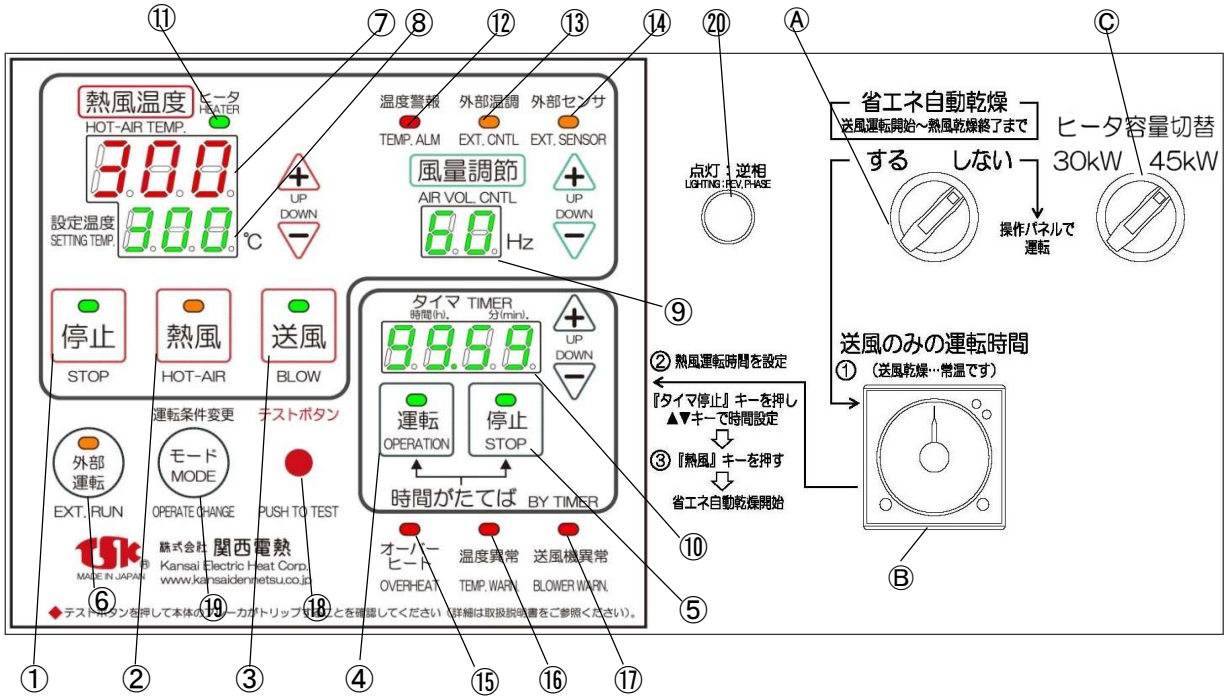
[Self-Inspection Items]

- Insulation Resistance Measurement
- Heater Current Value Measurement
- Inspection of electrical component operation and heat generation
- Other visual inspections
- Inspection and cleaning for foreign object ingress inside the control panel.
- Inspection and cleaning for foreign object ingress inside the main unit and suction inlet.

Caution **Do not perform insulation withstand voltage tests on this unit (already performed at the factory). Doing so may cause malfunctions.**

6. Names and Functions of Parts

Control Panel (X-3MS/X-4MS)



① Stop switch

Used to stop fan operation and hot air operation, and to cancel timer operation.

② Hot Air Switch

Pressing the switch starts hot air operation.

③ Fan Switch

Pressing the switch starts fan operation.

④ Timer Operation Switch

Pressing the 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 for operation to stop after a certain period. After setting, press the hot air switch.

⑥ External Operation Switch

※Not used with mold dryers.

⑦ Indicator PV

Displays the outlet temperature.

⑧Setpoint SV

Displays the set temperature for the outlet temperature.

⑨ Airflow Adjustment Display

To display the airflow adjustment (inverter frequency setting) value.

⑩ Timer Setting Display

Displays the timer setting time. Counts down by time increment.

⑪Heater Lamp

Indicates the heater control operation status via illumination and flashing.

⑫ Temperature alarm lamp

※Not used with mold dryers.

⑬External Temperature Control Lamp

※Not used with mold dryers.

⑭ External Sensor Lamp

※Not used with mold dryers.

⑮ Overheat Indicator

This indicator lights up when the heater case interior reaches an abnormally high temperature, causing the breaker (NFB) to trip.

⑯Temperature Abnormal Indicator

Illuminates when discharge temperature is high or intake temperature exceeds the blower's allowable temperature, causing the breaker (NFB) to trip. and the unit switches to fan operation.

⑰ Blower Abnormal Lamp

Lights up when the blower is overloaded, stopping opera

⑱ Test Button

Pressing the button will trip the breaker (NFB).

⑲ Mode Switch

⑧ When changing the setting SV display to the heater output display, use this to return to return to the hot air temperature setting display.

⑳ Reverse Phase Lamp

Lights up during power supply reverse phase or phase loss.

Ⓐ Energy-saving auto-dry switch

Select between Normal Operation or Energy-Saving Auto Drying. Press and hold the hot air switch during hot air operation.

Ⓑ Fan-only operation timer

You can set the fan-only operation time during energy-saving auto drying.

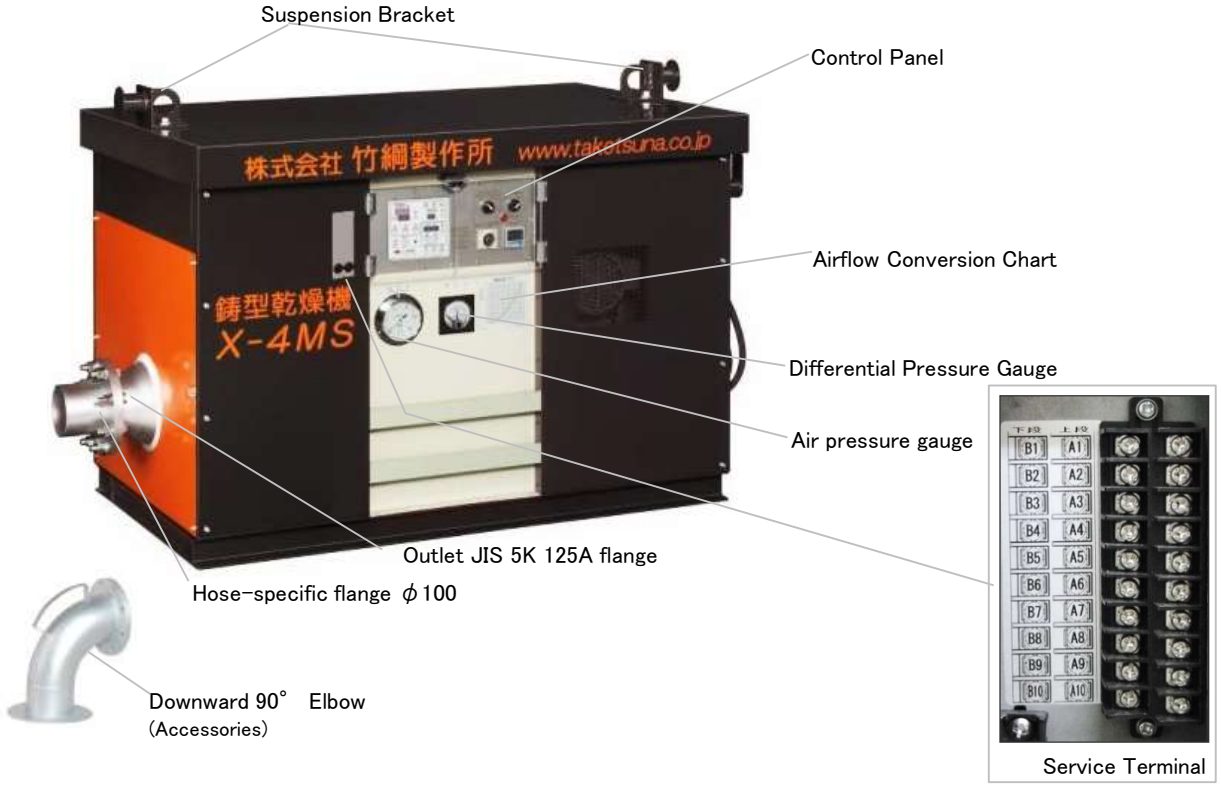
ⒸHeater Capacity Switch

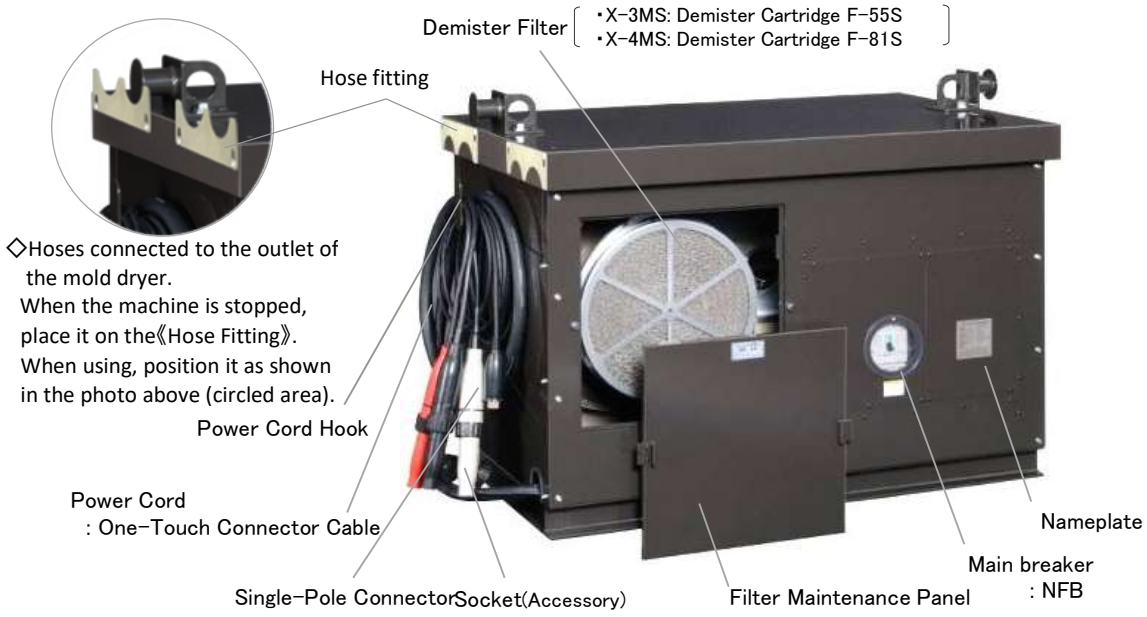
Allows switching the heater capacity during hot air operation.

6. Names and Functions of Parts ...Continued on Page 4

MODEL: X-4MS

※The same applies to the X-3MS.





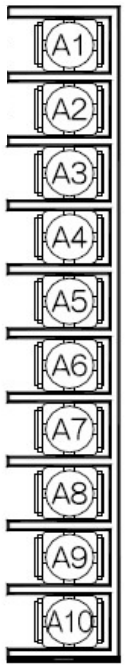
◇When placing this unit on top of a mold and drying by injecting hot air directly from the mold's main sprue, use a downward-facing 90° elbow. Directly attach the downward 90° elbow to the JIS 5K125A flange section of the outlet.

◇When drying multiple molds with a single unit, install the optional [2-way], [3-way], or [4-way] splitters directly on to the outlet JIS 5K125A. Attach directly to the flange section.

◇When moving the mold dryer using lifting brackets, ensure the brackets show no abnormalities such as damage, deformation, scratches, wear, rust, or corrosion. And always check that bolts and nuts are not loose.

7. Service Terminal

《Input Terminals》 M3 20P Terminal Block Upper Row Tightening Torque: 0.5 N·m

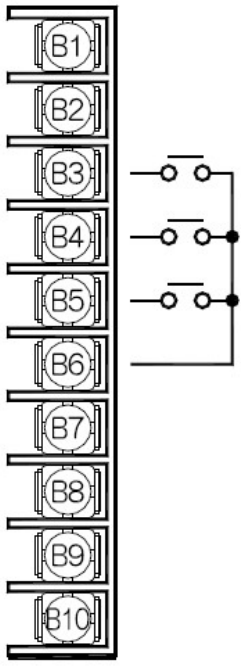


A1 to A7 : Unused terminals.

A8・A9・A10 : Terminal for remote controller connection
For remote code connection when using the optional remote controller
(for remote controller communication).

《Output Terminal》 M3 20P Terminal block lower row. Tightening torque: 0.5 N·m

Contact capacity: DC 5V, 10mA or more; DC 30V, 1A or less; total output common 3A or less. (voltage-free contact signal output)



B1・B2 : Unused terminals.

B3 : Blower signal output terminal
This terminal turns ON during blower operation.

B4 : Hot Air Signal Output Terminal
This terminal turns ON during hot air operation.

B5 : General Fault Output Terminal
Terminal that turns ON when overheating, various temperature abnormalities, blower fan abnormalities, or frequency abnormalities occur.
(**Does not output when reverse connection of temperature sensors occurs, negative temperatures are detected,,phase reversal abnormality, or during burnout of the K-type thermocouple for the mold thermometer.**)

B6 : Output common terminal
Common terminal for B3, B4, B5.

B7 : Unused terminals.

B8・B9・B10 : Terminal for remote controller connection
When using the optional remote controller,
This is the terminal for connecting the remote control cable (for remote controller power supply).

Caution **The B9 Remote Controller Power + terminal and B10 Remote Controller Power - terminal carry a DC 24V voltage. Do not short-circuit these terminals under any circumstances. Short-circuiting will cause failure.**

Caution
...When using the service terminals, always disconnect the main power supply (factory power) before proceeding. Wiring while energized will cause electric shock. Always reinstall the terminal cover after wiring is complete.
...Avoid adjacent wiring or bundling of the service terminals with AC power lines, power lines, or harmonic lines.

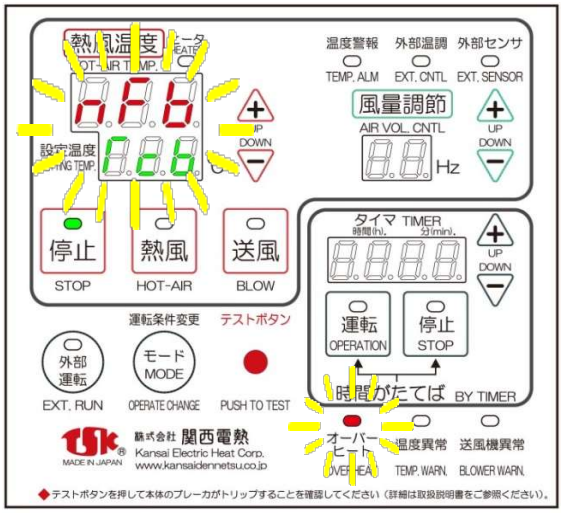
8. Abnormal Condition Detection

◆When an abnormality is detected, an error indicator will light up and a buzzer will sound simultaneously. the buzzer will also stop.

8-1 Overheat

If the temperature inside the heater casing reaches an abnormally high level, this is detected as overheating; alternatively, if the overheating sensor used to monitor the temperature inside the heater casing becomes disconnected, this is detected as a burnout. In either case, the main circuit breaker (NFB) will trip and all operations will cease.

● During Overheating



The overheat indicator (red) lights up, and 'NFB' flashes in the indicated PV section, whilst 'TCB' flashes in the set temperature display.

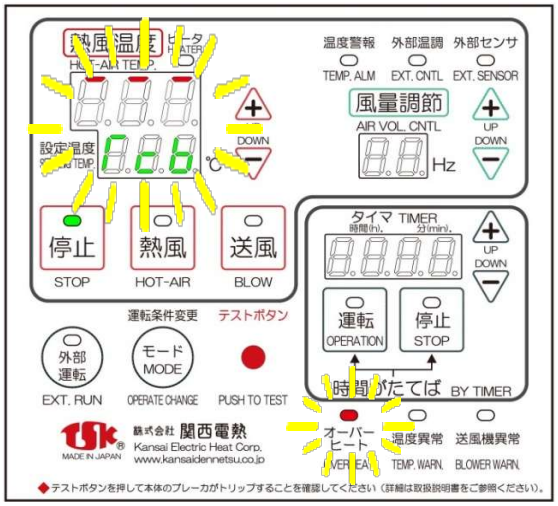
《Primary Causes》

- Clogging of the intake demi-filter.
- Fan motor lockup due to foreign object intrusion.
- The mold sprue for exhausting hot air from the mold is not secured.
- The mold sprue for introducing hot air is too small. (Significant pressure loss)

《Reset Method》

After removing the cause of overheating and allowing sufficient cooling, turn off the main power supply (factory power) and the unit breaker (NFB) OFF, then turn them ON again.

●When the overheat sensor burns out



The overheat indicator (red) will flash, and '---' will appear in the indicated PV display, whilst 'TCB' will flash in the set SV display.

《Primary Causes》

- Overheat sensor wire break.
- Overheat sensor wiring break.
- Overheat sensor wiring connector disconnection.

《Reset Method》

Turn off the primary power supply and request repairs.

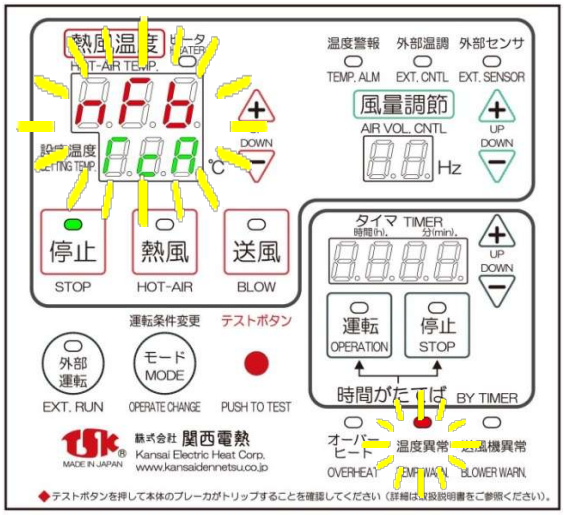
Caution: Always disconnect the main power supply (factory power) before checking wiring or making adjustments during an abnormality.

8. Abnormal Condition Detection

8-2 Temperature Abnormality

◆If the outlet temperature exceeds the upper limit or the intake temperature exceeds the upper limit, the hot air generator will stop or enter fan-only operation mode. Operation will also stop in case of sensor burnout (e.g., wire breakage) or abnormal temperatures inside the mold dryer.

●When the outlet temperature exceeds the upper limit.



The temperature abnormality lamp (red) will illuminate, and the PV display will show NFB, with the setpoint TCA will flash in the SV section, and the main unit breaker (NFB) will trip and all operations will stop.

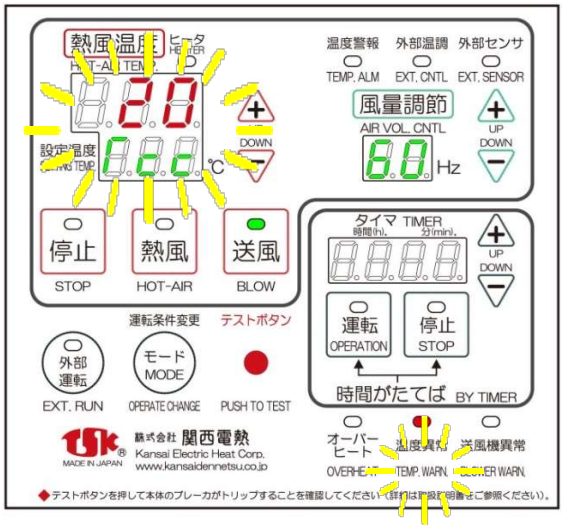
《Primary Causes》

- Discharge outlet temperature exceeds upper limit.
- Reduced airflow due to excessive pressure loss.
- Reduced airflow due to clogged inlet demi-filter.

《Reset Method》

Remove the cause of the outlet temperature limit being exceeded, allow sufficient cooling, then turn off the main power supply (factory power) and the unit breaker (NFB) and then turn them back ON.

●When the suction temperature exceeds the upper



The temperature fault indicator (red) lights up, the current discharge temperature is displayed in the PV section, the TCC flashes in the SV section, and the unit enters fan-only operation.

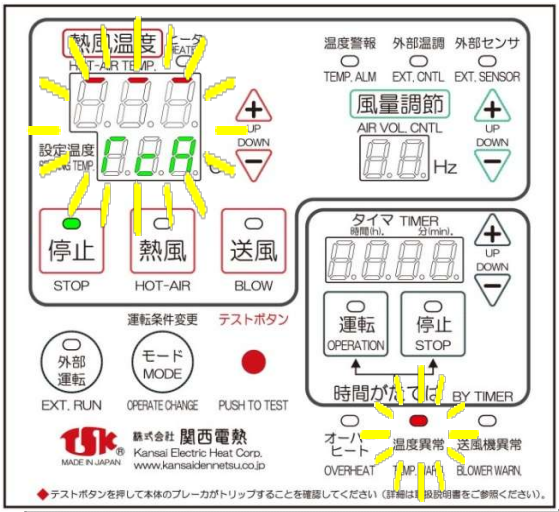
《Primary Causes》

- If the intake temperature exceeds the upper limit.
- If the temperature exceeds the upper limit of the intake gas temperature for the mold.
- If heat flows back from the mould or similar sources whilst the machine is at a standstill, such as after the operation has finished.

《Reset Method》

After the inlet temperature drops, pressing the stop switch.

●When the outlet sensor burns out



The temperature fault indicator (red) will flash, '---' will appear in the display (PV), 'TCA' will flash in the setpoint (SV) display, and the main circuit breaker (NFB) will trip, bringing all operations to a halt.

《Primary Causes》

- Outlet sensor wire breakage
- Outlet sensor wiring break
- Disconnection of outlet sensor wiring

《Reset Method》

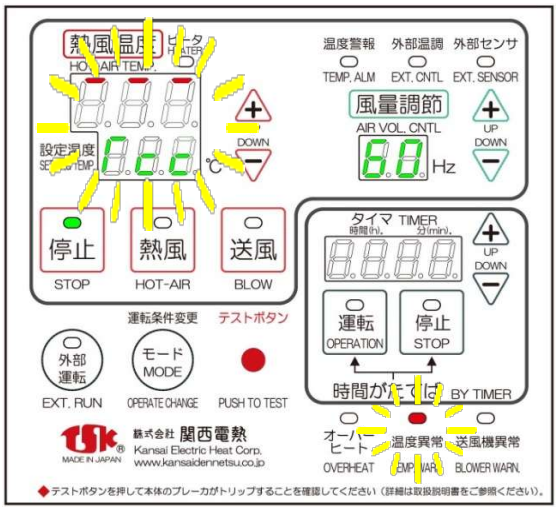
Turn off the primary power supply and request repairs.

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

8. Abnormal Detection

8-2 Temperature abnormality...

● When the intake sensor burns out



The temperature fault indicator (red) illuminates; 'NFB' flashes in the PV display and 'TCA' flashes in the SV display; the main circuit breaker (NFB) trips, and all operations are halted.

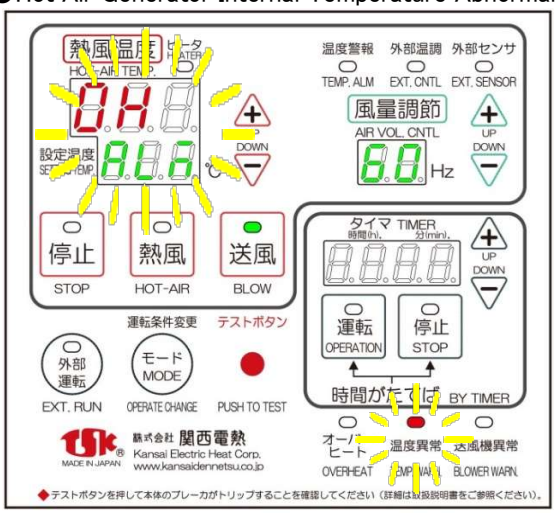
《Primary Causes》

- Intake sensor wire breakage
- Intake sensor wiring break
- Disconnection of the inlet sensor wiring connector

《Reset Method》

Eliminate the cause of the exhaust temperature exceeding the upper limit and allow the unit to cool sufficiently. Then, switch off both the main power supply (factory power supply) and the unit's circuit breaker (NFB), before switching them back on.

●Hot Air Generator Internal Temperature Abnormal



The temperature abnormality lamp (red) flashes, OH appears on the display PV section, and the ALM indicator flashes on the SV section.
ALM flashes on the SV display, and the unit enters fan operation mode.

《Primary Causes》

- High ambient temperature at mold dryer installation site
- Hot air leaking from the outlet flows back into the control panel
- Impact of furnace body heat dissipation temperature when installed above the furnace body

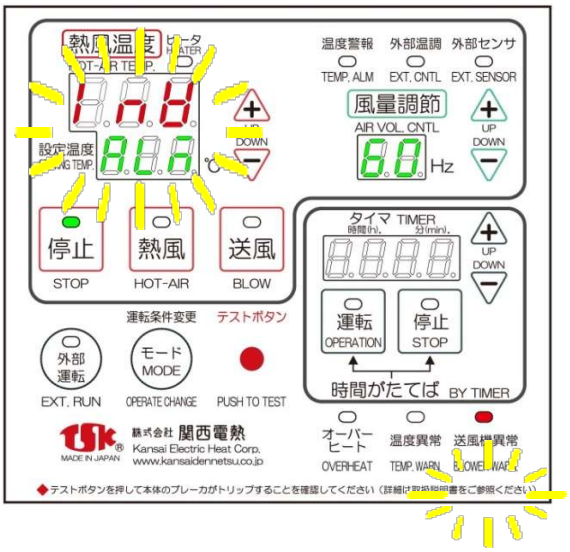
《Reset Method》

Stop operation using the stop switch. After the internal temperature of the mold dryer has dropped, and then turn OFF the main unit breaker (NFB). to reset it.

8-3 Blower Abnormal

◆When the blower experiences overload, overcurrent, or lockup, all operations of the mold dryer will stop.

●When the blower malfunctions



The blower abnormality lamp (red) illuminates, and "INV" flashes on the instruction PV section.
and ALM flashes on the setpoint SV display.

《Primary Causes》

- Bearing wear
- Abnormal voltage (voltage outside rated range)
- Piping with high pressure loss
- Avoid using in locations with extremely narrow pipe openings
- The mold sprue for hot air injection or exhaust is too small.
- Clogging of the intake demi-filter

《Reset Method》

An abnormality will be displayed on the internal inverter panel.
After confirming the displayed content, turn off the main unit's breaker
OFF, and report the displayed information.

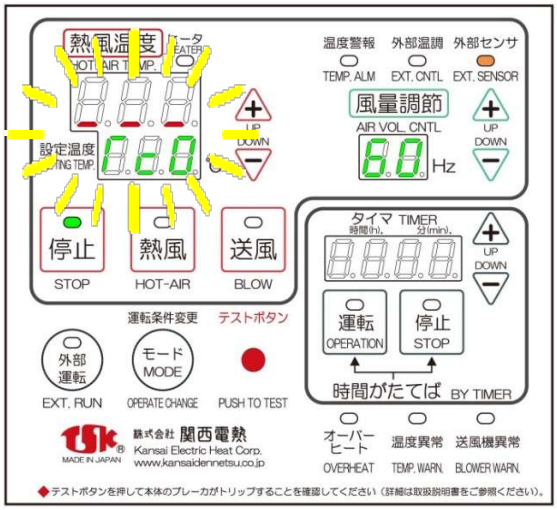
Caution: Always disconnect the main power supply (factory power) before checking wiring or making adjustments during an abnormality.

8. Abnormal Detection

8-4 Other Abnormalities

● Reverse connection of any temperature sensor, or detection of negative temperatures

◆If any temperature sensor is reverse-connected or detects temperatures below -15° C (-9° F) (internal sensor only: -5° C/-40° F),the mold dryer will stop.



The display for each sensor will flash in the setpoint PV section and the setpoint SV section.

Discharge port sensor	TCA
Intake Sensor	TCC
Overheat Sensor	TCB
Internal Temperature S	TCM

《Primary Causes》

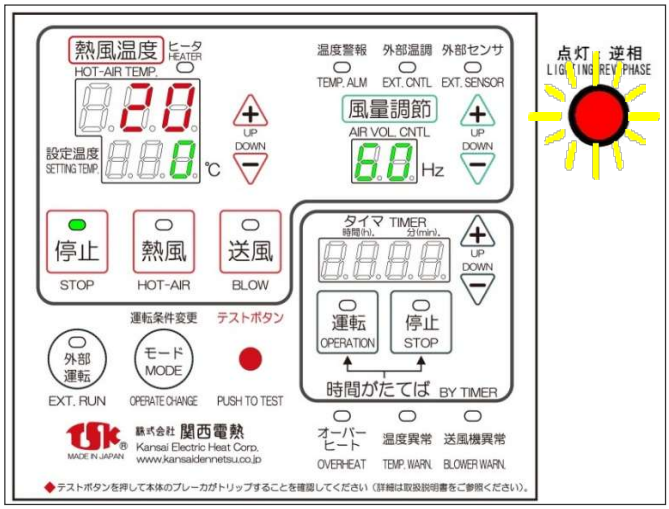
- Reverse connection due to sensor wiring adjustments
- Atmosphere and intake temperature below freezing

《Reset Method》

Please turn off the power and request repairs.

●Inverse phase abnormality

◆If the power cord connections are reversed or a phase is missing, the hot air generator will become inoperable.



・During reverse phase or T-phase loss, the display will show the same information as when the main circuit breaker (NFB) is switched ON, and the reverse phase lamp will illuminate.

・If R or S phase is missing, all displays on the control panel and the reverse-phase indicator light will also go out. (No display will be shown.)

《Reset Method》

- Reverse phase

...If the phase is reversed, switch the power off and swap the positions of any two of the power supply cables.

- Phase loss

...If the phase reversal persists even after taking the necessary measures and switching the power on, there may be a phase loss. Switch the power off, then check the original power supply (factory power supply) terminals, the connectors and sockets on the one-touch connector cable, and the power cord.

s disconnect the main power supply (factory power) before checking wiring or making adjustments during

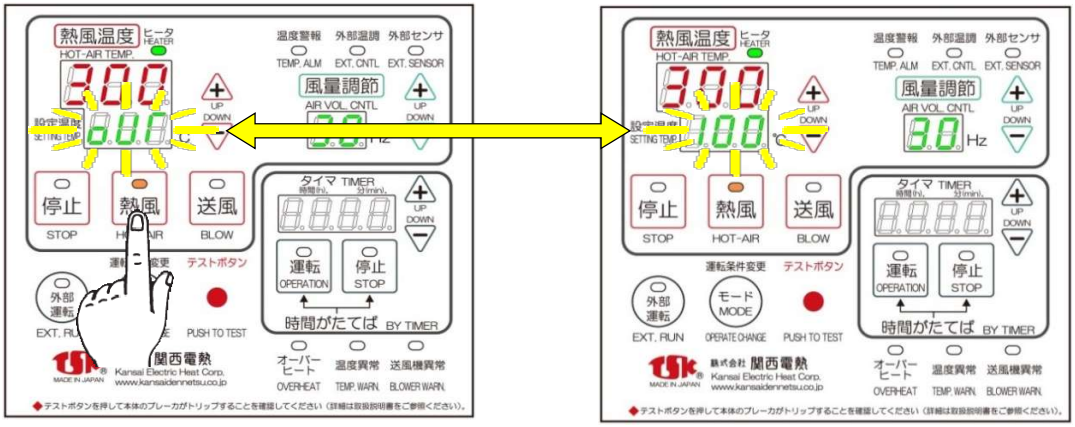
9. Other Functions

9-1 Heater Output Display

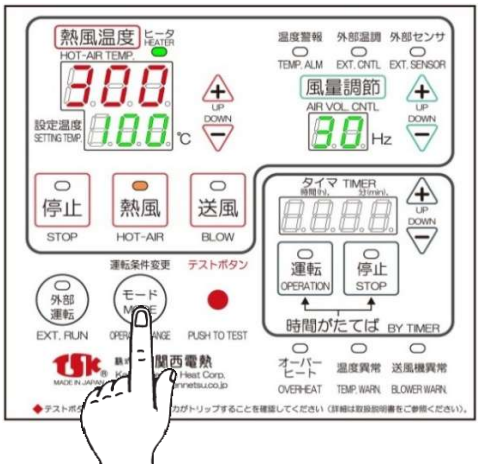
◆You can display and confirm the current heater output during hot air operation. Use this for data collection on heat consumption, etc.

① Press and hold the hot air switch during hot air operation. (Approximately 5 seconds)

The SV setting section will alternately display 'OUT' and 'Current Heater Output (%)'.



② key once.



10.theRemote Controller (Optional)

●Mold Dryer X-3MS, 4MS The main unit's operation panel and the remote controller can be perated simultaneously.

Model **Remote Controller RCT-10MC (Optional)**

①

...Install the remote controller using the following method and secure it firmly.

・Flush mounting into a control panel (use the included screws).

・Floor-standing or suspended installation using mounting brackets or suspended.

・Wall mounting using mounting brackets

*The remote cable can be attached to any of the top, bottom, left or right sides of the remote controller (it is attached to the bottom as standard). Please use the cable entry holes (knock-outs) on each side to attach it in your preferred position. Furthermore, if you change the mounting position, please fit the supplied rubber grommet to the bottom cable entry hole to protect it.

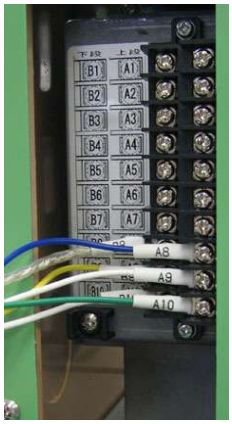
②Wiring

...Connect the remote cable to the service terminals of the hot air generator.

〈RCT-10MC〉

Connect the remote cable to the service terminal through the entry hole in the cover (rubber bushing), then connect the Y-terminals of the remote cable to terminals A8, A9 and A10, and B8, B9 and B10 on the hot-air generator's service terminals.

※Please ensure that you connect the marked tubes on the remote cable to the correct terminal numbers on the service terminal. Incorrect connections will cause a fault.



※Once the connection has been made, be sure to refit the service terminal cover and secure the remote cable to ensure that no tension is placed on the terminals during use.

③Start operation according to the Basic Operation Manual.Basic Operation Manual.

...The mold dryer main unit's operation panel and remote controller are linked (operation is possible from either).

Caution: Do not run the remote cable alongside AC power cables, power lines or harmonic lines, nor should it be bundled with them. Noise may cause damage to the internal electronic components.

Caution: Always disconnect the main power supply (factory power) before connecting the remote controller.

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