Be sure to hand this instruction manual
to the end user.

6-001 2023/03

SPOT HEATER

SH series MANUAL

In order to improve the quality of this machine, the heater is annealed (oxide film formation) at the time of shipment.
Please note that the heater case may show a burnt color due to this treatment, but there is no problem with performance.

KANSAI ELECTRIC HEAT CORP.

SPOT HEATER

SH serirs Safty Instruction

Introduction

- Thank you for purchasing the Spot Heater SH series.
- This manual describes the necessary items for handling the spot heater SH series correctly and safely
- In order to fully demonstrate the performance of the Spot Heater SH series, prevent accidents, and continue good operation for a long period of time, not only maintenance and inspection after operation but also from acquisition to actual operation Optimal handling is required at each stage.
  Before transporting, installing, piping, wiring, operating / operating, maintaining / inspecting, repairing / disassembling the Spot Heater SH Series, be sure to familiarize yourself with this manual and handle it correctly and safely.
- For safety, do not modify the spot heater SH series.
  Our company will not be responsible for any accident caused by modification.
- Please make sure that this manual is delivered to the person handling it.
- Please keep this manual in a safe place so that you can read it whenever you need.
- We may revise this manual and improve the spot heater SH series without notice.
- If you have any questions, please contact us.

SPOT HEATER SH series

It is a clean and safe electric heat source that uses industrial air (gas) as a medium, which has a built-in A sensor (sensor for detecting hot air temperature of outlet) and B sensor (sensor for detecting internal temperature of heater).Optimal heater for heating, heat processing and reaction acceleration, especially for resin spot melting, solder melting and removal, tube spot shrinkage, caulking with hot air, etc.
For this reason, hot air (gas) is generated depending on the purpose of use, so there are important things to handle.

●In this manual, the following displays are used to handle the Spot Heater SH series safely.

DANGER : When it is assumed that a dangerous situation may occur resulting in **death** or **serious injury** if mishandled.。

CAUTION : If mishandling could lead to a dangerous situation that could result in **moderate damage** or **minor injuries,** and if only property damage is expected.

Note that the items described in the caution may lead to serious results depending on the situation.
Please be sure to observe these as important contents are described.

DANGER	
GENARAL	●Transport, installation, piping, wiring, operation / operation, maintenance / Inspection, repair / disassembly should be performed by an expert who is familiar with the handling of Spot Heater SH series. There is a risk of injury, electric shock, or fire. ●Do not use the spot heater SH series in an explosive atmosphere. There is a risk of injury or fire. ●Be sure to turn off the power before transporting, installing, piping, wiring, operating / operating, maintaining / inspecting, repairing / disassembling. There is a risk of injury, electric shock, or fire. ●When turning on the power to the machine, do not touch the heating element. There is a risk of electric shock.
Installation	●Do not install the spot heater SH series in an unstable place. There is a risk of injury.
PIPING WIRING	●Be sure to connect the ground wire. There is a risk of electric shock. ●Do not forcibly bend, pull or pinch the wiring. There is a risk of electric shock or fire. ●Be sure to attach the spot heater SH series terminal cover removed for piping and wiring work to the original position. There is a risk of electric shock.
OPERATION CONTROL	●Make sure that the discharged hot air does not hit the human body. There is a risk of burns. ●Be sure to stop operation when there is a power failure. There is a risk of injury. ●Do not touch the main body and piping during operation, as they will be hot. There is a risk of burns. ●If an abnormality occurs, stop operation immediately. There is a risk of fire.
Maintenance inspection	●Allow the main unit and piping to cool before performing maintenance and inspection work. There is a risk of burns.

⚠ CAUTION	
GENARAL	●Please check if the product is as ordered. Do not use it wrong. There is a risk of injury or damage. ●Do not use the Spot Heater SH series with any specifications other than those listed in the instruction manual.There is a risk of injury, electric shock, or damage. ●Do not use a damaged spot heater SH series. There is a risk of injury, electric shock, or damage. ●Do not insert foreign matter or fingers into the openings or gaps of the spot heater SH series. There is a risk of injury, electric shock, or damage. ●Do not apply a heavy load to the spot heater SH series. There is a risk of injury or damage.
conveyance	●Be careful not to drop it during transportation work. There is a risk of injury or damage.
Installation	●Do not place flammable materials around the spot heater SH series. There is a risk of fire. ●Make sure the nameplate is always readable. Also, do not remove it. There is a risk of accident.
PIPING	●Install the spot heater SH series piping so that it will not come off or leak.There is a risk of burns, fire, or damage.
WIRING	●Check that the rated voltage of the spot heater SH series and the nominal voltage of the input voltage match. There is a risk of damage or fire. ●For wiring work, a qualified person should carry out the work in accordance with the electrical equipment technical standards and extension regulations. There is a risk of electric shock or fire.
OPERATION CONTROL	●Before driving, check safety and take safety measures so that no one other than the person in charge will be in danger. There is a risk of injury, burns, and damage.
Maintenance inspection	●When measuring the insulation resistance of the spot heater SH series, do not touch the terminals. There is a risk of electric shock. ●Be sure to attach the parts removed for maintenance and inspection work to their original positions.There is a risk of injury or damage.
WASTE	●When discarding the Spot Heater SH series, treat it as general industrial waste. There is a risk of accident.
OTHER	●Depending on the equipment that incorporates the Spot Heater SH series, it is necessary to comply with the Industrial Safety and Health Act and the regulations of fire prevention regulations of each local government.

CONTENTS

1. CONFIRM BEFORE USE

1-1 PROCEDURE

When using this machine, follow the procedure below.

confirm the items　1－2　Refer to the confirmation of the actual item.

↓

confirm model and part no.　－3　Refer to the confirmation of model and part number.

↓

confirm inspection stamp　1－4　Refer to the confirmation of the inspection stamp

↓

install　Please install it referring to P2.

↓

wiring　Refer to P3, P4, P5 and P6 for wiring.

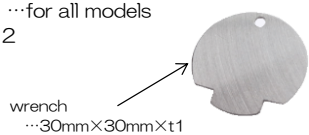
↓

operation

1-2 Confirm the items

Check that the following contents are included and that there are no abnormalities.

- ●main unit ●this manual ●adiabatic cover
- ●code（３００mm・connector付×１）…for ＳＨ０２・２２
- ●Anti-seizure agent for screws（×１）…for all models
- ●wrench（ＳＵＳ１ｔ×１）…for ＳＨ２２
- ●starainer (MS-8) … for ＳＨ０２



wrench
…30mm×30mm×t1

1-3 Confirm model & part no.

Please check the contents below to see if your product is the same.

model & part no.		power supply and heater vol.	noted place
・ＳＨ０２	１１００－０７Ｋ	Single phase １００Ｖ７００Ｗ	body tail end
	１２００－０５５Ｋ	Single phase ２００Ｖ５５０Ｗ	
・ＳＨ２２	１２００－０６Ｋ	Single phase２００Ｖ６００Ｗ	body tail end
	１２００－０８Ｋ	Single phase２００Ｖ８００Ｗ	
	１２００－１．２Ｋ	Single phase ２００Ｖ１２００Ｗ	
・ＳＨ３１	１２００－２Ｋ	Single phase２００Ｖ２０００Ｗ	chamber
	１２００－３Ｋ	Single phase ２００Ｖ３０００Ｗ	

1-4 Confrim inspection stamp

As for the spot heater SH series, all products have been thoroughly tested for hot air operation, so we have shipped complete products. After the inspection, the pass mark is stamped on the spot heater discharge port cap part (dustproof cap at the time of shipment), so be sure to confirm that the pass mark is stamped.

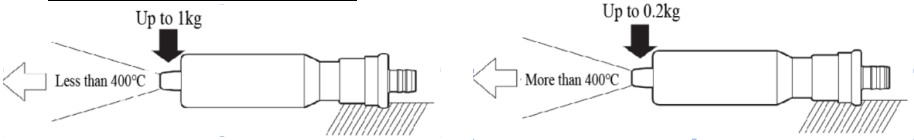
2. INSTALL

2-1 INSTALLATION

- ●Use it at an ambient temperature of -10° C or more and +60° C or less (do not freeze).
- ●Keep the combustible materials away from the outside of the heater as it will become hot.
- ●Installation is free if it is installed horizontally or if the hot air outlet is in the upward range, but if it is downward, the heat inside the heater will flow back and the air supply port and the terminal of the main unit will overheat when the air flow is stopped. Please be sure to perform the cooling operation before stopping the air blow (Fig. 1 on the next page)
- ●Do not install in the following places.

◇A place exposed to wind and rain outdoors ◇Near combustibles ◇Places with a lot of dust and dust
◇Places where electrically conductive substances (carbon fibers, etc.), acidic gases, corrosive gases, etc. are suspended

Load capacity of hot air outlet



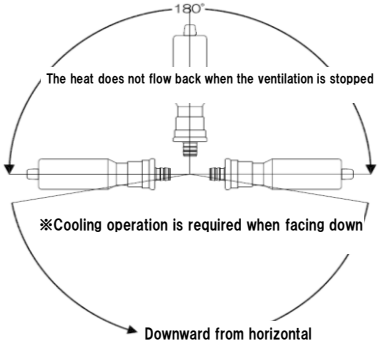
●During hot air operation, if a load is applied to the discharge port, it may be deformed due to high temperature and trouble may occur

Please refer to the above figure for installation and piping.

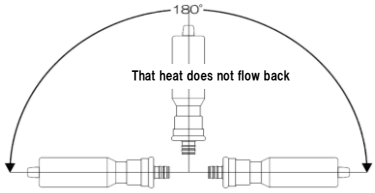
⚠ **Do not fix this machine only with the screw part of the discharge port of the spot heater.**

INSTALLATION

図1 【NORMAL OPERATION】



【HOT-START OPERATION…TRC202 IS REQUIRED】



Cannot be used when facing downward from horizontal

※For downward operation, perform cooling operation until the hot air temperature at the A sensor position falls below 70° C.。

⚠ The hot air outlet should be horizontal or above horizontal so that heat does not flow backwards.

3. WIRING

●The spot heater SH series is a heater with two built-in thermocouples [K]: A sensor (for detecting the hot air temperature of the discharge port) and B sensor (for detecting the temperature inside the heater). By using the A and B sensors and controlling the temperature with the multi-controller TRC202, the heater can be used in all situations without fusing.

By using the multi-controller TRC202, it is possible to control the performance of the spot heater SH series to 100%.

⚠ Do not use the spot heater SH series without securing the B sensor as a protection circuit. Not only will it prevent the heater from breaking, but it may also lead to serious accidents.

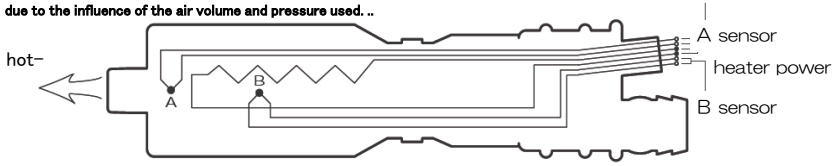
⚠ Please note that the operating temperature of the spot heater SH series will be low when the multi-controller TRC202 is not used.

	WITH TRC202	WITHOUT TRC202
outlet hot-air temp. (A sensor)	MAX 800℃	MAX 500℃
hot-start temp. (B sensor)	MAX 500℃	unavailable
overheat prevention temp. (B sensor)	700℃	500℃

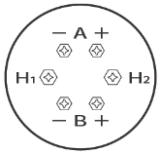
3-1 INTERNAL

●About the temperature detected by each temperature sensor

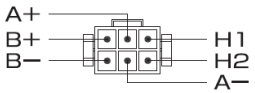
…There is a temperature measurement (space) distance between the heating element (heater) and each temperature sensor, and even with the same product, a temperature difference will occur in the temperature detected by each temperature sensor due to the influence of the air volume and pressure used. ..



3-2 TERMINAL LAYOUT

SH31 TERMINAL	TERMINAL No.	TERMINAL SIZE	TERMINAL NAME	USAGE
	H1・H2	M3	HEATER TERMINAL	HEATER POWER SUPPLY
	A+・A−	M3	A SENSOR TERMINAL 〔K〕	DETECTING OUTLET HOT-AIR TEMP.
	B+・B−	M3	B SENSOR TERMINAL 〔K〕	DETECTING HOT-START TEMP
				DETECTING OVERHEAT TEMP

SH02・22 connector (SH SIDE)

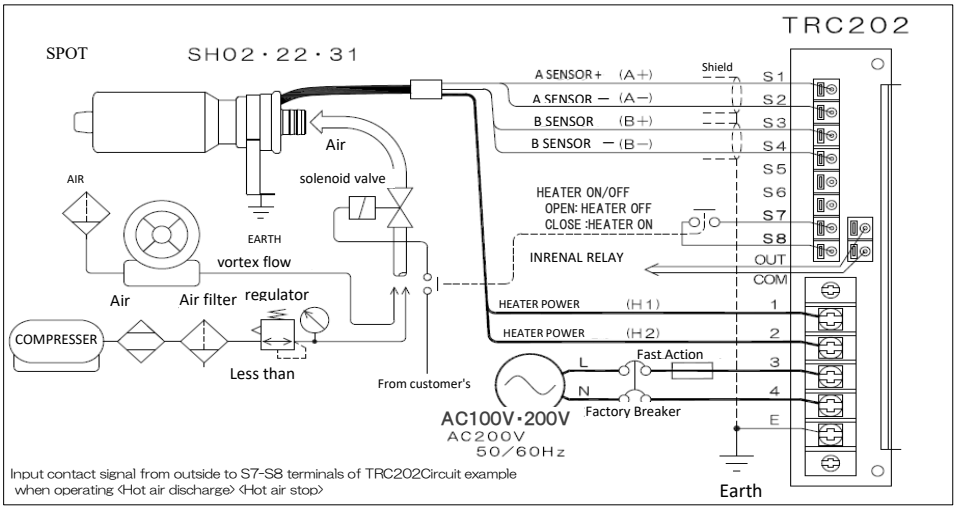


- For SH02・22, the terminal No. is written on the mark tube of the attached wiring code (300 mm length, with connector). This wiring cord is always required when wiring
- Ask an electrician for power connection and grounding work.
- In order to prevent electric shock accidents, perform class D (class 3) grounding work.

※Each sensor of the spot heater may have energy equivalent to static electricity due to electrostatic induction and electromagnetic induction when the heater is energized. Therefore, do not touch the terminals of each sensor directly while the heater is energized. You may feel a current of about static electricity. If it is unavoidable to touch it directly during temperature measurement, it is recommended to treat the sensor terminal with a connector.

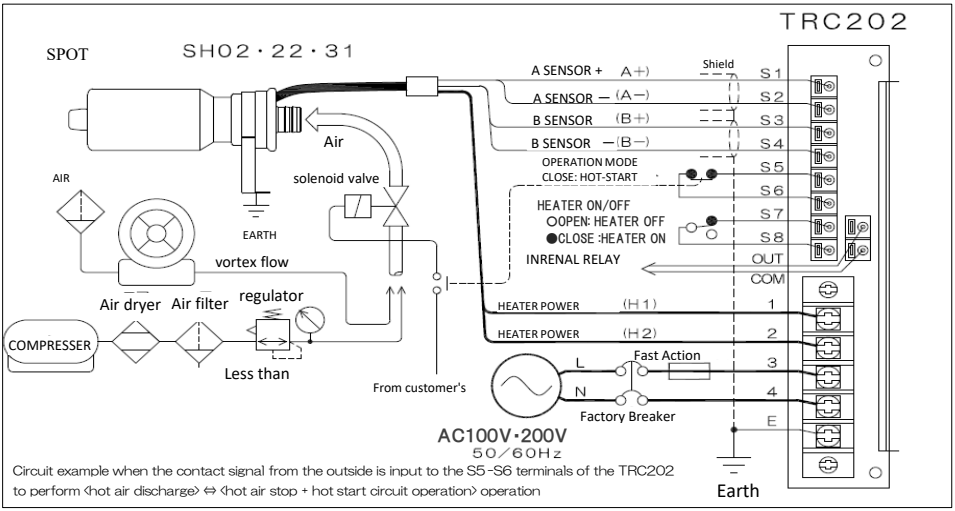
3-3 WIRING

(1) NORMAL … NORMAL OPERATION BY DETECTING OUTLET HOT-AIR TEMP (A SENSOR)



（2）HOT START

…Operation to energize the heater to perform preheating operation when there is no wind and to discharge the required hot air discharge temperature at the same time as blowing air.



⚠ Hot start operation can be performed only when using TRC202.

⚠ Do not perform hot start operation for more than 10 minutes continuously.

caution on hot-air start operation

●The maximum continuous operation time for hot start should be 10 minutes.

●When switching from hot start operation to normal operation (hot air operation), perform normal operation (hot air operation) for at least the following time.

Half or more of the last hot start operation time

HOT-START OPERATION → Operate less than 10 minutes。 → NORMAL OPRRATION (HOT-AIR) → Operate more than 1/2 of the last hot start operation time。 → HOT-START OPRRATION

eg) Hot start operation = continuous 5 minutes→ Subsequent hot air operation requires 2 minutes and 30 seconds or more.

◆Do not perform hot start operation for more than 10 minutes continuously◆

Attention

●During normal operation, keep the S5-S6 terminals of TRC202 open.

●Close the S5-S6 terminals of TRC202 during hot start operation, and open the S5-S6 terminals of TRC202 for normal operation (hot air discharge) at the same time as blowing air.

●Be sure to use shielded compensating lead wire [K] for A sensor and B sensor wiring and perform shield grounding work.

●Keep the A sensor, B sensor, S5 to S8, and COM-OUT wiring as short as possible. Also, wire it so that it is not affected by noise or surge voltage.

●Do not apply voltage to the A sensor, B sensor and S5 to S8 terminals.

●If the A sensor and B sensor connections are reversed, the heater will overheat and disconnect.

(Out of warranty)

Attention (Continuing from the previous page)

●Do not wire the A sensor, B sensor, S5 to S8, COM-OUT wiring and main circuit (AC) in the same duct. It may cause a malfunction.

●When wiring SH02・22, it is necessary to connect the attached wiring cord (300 mm length, with connector) to the connector of SH02・22.
Or use the optional extension cord (with connector).

※If you do not use the attached wiring cord or optional extension cord for the SH02/22 connector, and do not match the size, it may cause contact failure.

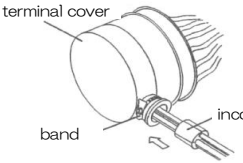
●Due to the characteristics of solid state contactors and triacs, the circuit may become conductive in the event of an abnormality, so be sure to incorporate a final safety circuit.

※ For wiring between the spot heater and the multi-controller TRC202, be sure to check the instruction manual for the multi-controller TRC202.

3-4 WIRING

－SH31－

Insert each wire into the rubber wire, insert the wire together with the rubber wire hrough the wire hole of the terminal cover, and wire to each terminal of the spot heater (the rubber wire has cuts).
After wiring, fit the terminal cover and tighten the wire rubber with a band.



《Applicabe wire》
・heater wire … heat resistant wire （ＬＦＦ）2㎟
・compensating lead wire … shielded compensating lead wire （ＶＸ-Ｇ）0.5㎟

●If you do not use the incomig rubber wire, the waterproof function of the terminal will be impaired.
If you use wires other than the above applicable wires for wiring, the waterproof function may be impaired even if you do not enter the incoming rubber or tighten with a band.

⚠ **At the end of wiring, make sure that there are no debris or chips left on the terminal.**

－SH02・SH22－

Since the wiring part of SH02/SH22 is a connector, be sure to use the attached wiring cord (300 mm length, with connector).
We also sell an extension cord (with connector) as an option.

⚠ **f you do not use the attached wiring cord or optional extension cord for the SH02/22 connector, and do not match the size, it may cause contact failure.**

《accesories wiring code (length 300mm with connector.) 》
・heater … AWG１８ (0.75㎟・no terminal treatment)
・A sencor 、B sensor compensating lear wire K
… 0.3㎟ (no terminal treatment)
※ACCESORIES The terminal No. is written on the mark at the end of the wiring code.

●When connecting/disconnecting the spot heater connector and the wiring cord connector
Do not insert or remove them slowly and without applying excessive load. If the wiring part is pulled strongly or excessive force is applied, the contact of the wiring part may be damaged and the connector part may be damaged.

⚠ **At the end of wiring, make sure that there are no debris or chips left on the terminal.**

4. PIPING

Attention

●Use pipes, gas pipes, tubes, etc. that withstand the blowing pressure and have sufficient heat resistance for the hot air outlet.

●If the piping becomes long, pressure loss will occur due to the friction coefficient, diameter, bending of the tube, etc., which will reduce the air flow and cause the heater to overheat. Therefore, be careful when selecting the piping.

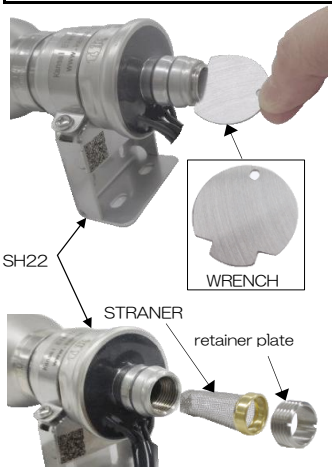
●The longer the pipe is from the hot air outlet, the more the heat will drop, causing the temperature to drop sharply. Therefore, place it as close as possible to the object to be heated, or install sufficient heat insulating material.

●Connect the piping securely so that there is no air leakage.

●If cutting chips, etc. enter the spot heater from the air supply port during piping construction, it will cause a short circuit inside the heater, which is extremely dangerous. Please pay attention to the piping work.

●When inserting an air hose, etc. into the air supply port, do not use tools such as pliers, and do not use excessive force to insert it by hand.

SH22 When using the piping screw of the air supply port

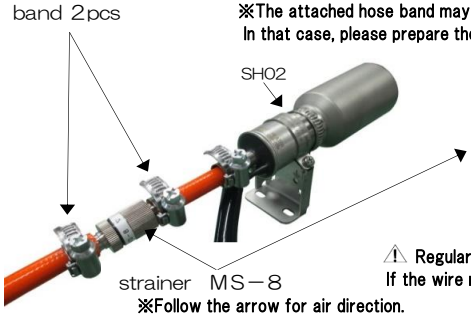


1) There is a notch in the << strainer holding metal fitting >> of the air supply port. You can remove the <Strainer holding metal fitting> by inserting the included <SH accessory wrench> into this notch and rotating it.
2) After removing the <Strainer holding metal fitting>, connect to the piping screw (Rp3/8 [10A]) at the air supply port.

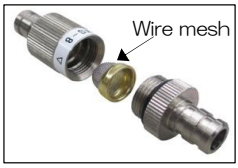
⚠ If you remove the strainer retainer, the inside of the air supply portContains a coarse strainer. 《Strainer》 enteredPlease use the piping screws as they are.Do not remove this Strainer.
⚠ If you lose the <<SH Wrench>>, use a 1 mm thick plate instead.
※ 30mm×30mm×t1mm

⚠ Check the <Strainer> regularly for clogging.
⚠ Strainer is a coarse type. Be sure to install an air filter, mist separator, air dryer, etc., as the supplied air is clean air from which moisture, dust, oil, solvent and other foreign matter have been removed.

To prevent foreign matter from entering SH02, attach the attached strainer in the middle of the suction side pipe before use.



※The attached hose band may not fit depending on the air hose used.
In that case, please prepare the hose band for the air hose used.



⚠ Regularly check and clean the wire mesh inside the strainer.
If the wire mesh is clogged, the spot heater will overheat abnormally.

※Follow the arrow for air direction.

5. OPERATION ···Attention

●When operating SH22 and SH31 at 650° C or higher, be sure to perform a break-in operation only at the initial operation.

※It is necessary to use the multi-controller TRC202.

The TRC202 is equipped with a function (soft start) that suppresses the maximum temperature rise for 1 second in order to suppress the overheat of the spot heater outlet temperature. However, depending on the method of use, the spot heater Reaches maximum temperature within a few minutes. By performing a break-in operation, an oxide film can be formed on the nichrome wire, and stable hot air performance can be exhibited even at high temperatures.

《Running-in method (eg:When operating with hot air at 800° C)》

① Setting 500℃ × 1 hour hot air operation → ② Setting 650℃ × 1 hour hot air operation → ③ Setting 800℃ × 1 hour hot air operation

※ During trial operation, do not limit the air flow to an extremely high level in order to accelerate the temperature rise.

●If the heater is energized without control without blowing air, the heater will overheat and break the wire within a few minutes.

●Use clean air free from dust, oil mist, water, etc. as the air supply source.If dust, oil mist, or water gets inside the heater, the insulation of the heater will deteriorate and the life of the heater will be shortened. Also, if dust gets inside the heater, it will be heated by the heat of the heater and will fly out from the hot air outlet in the form of sparks, which is dangerous.

●It is safe to use an insulation transformer to prevent an electric shock accident when water gets inside the heater.

●When using compressor air as the air supply source, reduce the supply pressure to 490 kPa or less and supply air at the maximum usable air volume or less. Also, use an air filter, micro alescer, etc.

※However, keep the supply pressure below 300 kPa during intermittent operation.

●The withstand pressure of 490 kPa of the main unit does not maintain that pressure continuously, and a slight amount of air leakage may occur.

※However, the withstand voltage of the main unit during intermittent operation will be 300 kPa or less.

●When supplying compressed air to the heater with a solenoid valve etc., shock pressure may be generated at the time of release due to the pressure difference between the primary side and the secondary side of the solenoid valve. This phenomenon may cause damage to the heater.
Take measures by incorporating an air tank or slow start valve between the solenoid valve and the heater.

●If dust or the like gets inside the heater, the heater or sensor will be disconnected or damaged. It is recommended to install a dust removal filter to remove dust in the supply air.

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

●Use the supply air at a temperature of 0° C to +70° C and humidity of 90%RH or less (non-condensing).

●It is dangerous to use it when flammable gas or flammable liquid vapor is mixed.

●Since the heater case gets hot during operation, do not remove the accessory insulation cover etc. to prevent burns.

●After the operation is stopped, if the humidity in the piping is high, condensation may form. If the insulation deteriorates due to condensation, blow it for a few minutes to remove the condensation and restore the insulation.

5. OPERATION ···Attention

●When using SH22 (600W) with hot air temperature of 600℃ to 800℃, be sure to remove the heat insulation cover.Since the heat radiation from the SH22 body is huge, the temperature may not rise to over 600℃.

※The temperature range of the two-dot chain line —··—··— of the SH22 hot air curve in the catalog

●If the outlet of the spot heater is open to the atmosphere, if there is a slight breeze above the level of natural convection in the installation atmosphere, the cooling effect from the outlet of the spot heater may increase, which may prevent the hot air temperature from rising. .. Especially when using SH22 (600W), the hot air temperature may not rise above 600℃.

※The temperature range of the two-dot chain line —··—··— of the SH22 hot air curve described in the catalog

●When using SH31 near the maximum temperature, do not suddenly increase the supply air amount in order to cool or lower the operating temperature. The heater insulator will be damaged.

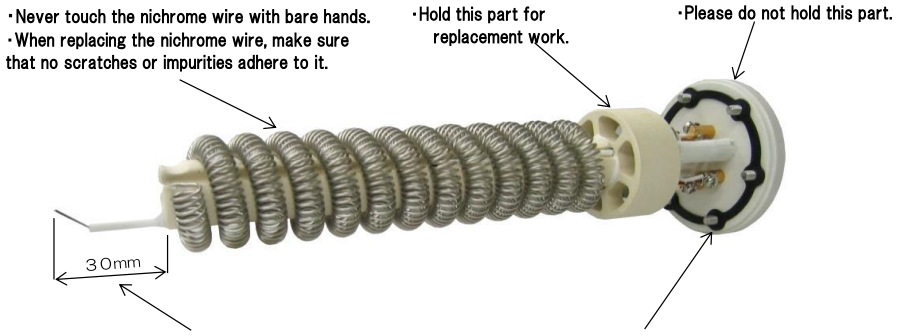
●For SH31 only, if the heater breaks during use, the spare heater can be replaced. Since the spare heater is annealed, never touch the nichrome wire with bare hands when replacing the spare heater.

6. HEATER EXCHANGE

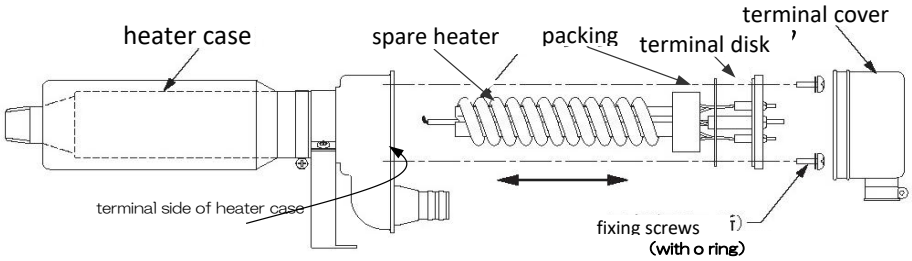
●If the spot heater SH31 heater breaks during use, the heater part can be replaced .Refer to the optional parts in the spot heater catalog (No. 6) and check the heater capacity before replacing.

⚠ The heater part of the spot heater SH02・22 cannot be replaced.		
FOR SH31 SPARE HEATER MODEL : SH-31S		
MODEL : 1200-2K	···SINGLE PHASE 200V 2000W	《Accessories》・PACKING (BLACK) ×1・VIS×6
MODEL : 1200-3K	···SINGLE PHASE 200V 3000W	・O RING OF VIS×6

●Please be aware of the following points when handling the spare heater.



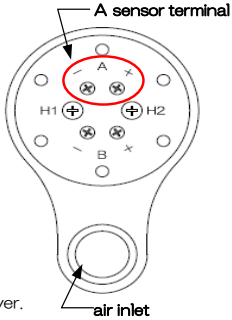
〔SPARE HEATER replacement procedure〕



※The old type spot heater used a washer for the fixing screw, but it is not used for this spare heater

① Make sure that the power is off, and then remove the terminal cover and each terminal.
※Never touch the nichrome wire with bare hands.

② (2) Remove the fixing screws (6 places) on the outer circumference of the terminal part and pull out the terminal together.At this time, remove any residue (heater wires, water, dust, etc.) inside the heater case.
※Discard the removed fixing screws, screw O-rings, and packings. Do not reuse.



③ After confirming that no dust or foreign matter adheres to the surface of the packing and the terminal surface of the heater case, insert the spare heater in the heater case and tighten the fixing screws firmly.
After installing, blow air once and check if there is any air leak.
＊Place the spot heater horizontally with the air supply port directly below, and insert the spare heater so that the A sensor terminal (A+/A-) is directly above. (See the figure on the right)

④ After checking each terminal and making connections correctly, attach the terminal cover.

Attention When tightening the spare heater with the fixing screw, be sure to tighten it diagonally.At this time, do not tighten each fixing screw completely at one time, but be sure to repeat it evenly several times.Finally, tighten each fixing screw evenly with a tightening torque of 20 kgf/cm2.

If the heater is broken, there is always something to do. Before starting operation again, carefully check and eliminate the cause before starting operation.

7. Failure diagnosis

If you suspect a malfunction, check the following items.

No wind or little wind	Malfunction of blower	Check the AIR source.
	The pipe is disconnected on the way	Check the connection part of the pipe.
	The pipe is too thin and too long, or there is a sharp bend in the pipe.	Design piping with low pressure loss.
	Filter clogging in the middle of piping	Clean the filter .
	Solenoid valve, Damper, etc. are closed	Check the opening and closing of the electric circuit and damper.
HOT-AIR does not come out	No power to heater	Check the wiring.
	Wiring is not correct	Check the electric circuit and wiring.
	Heater is disconnected.	Check the current value and heater resistance value.
Outlet temperature does not reach the set temp	Too much airflow for the set temperature	Adjust the air flow rate.
	Not properly set for use	Check the usage status and make the correct settings.

If the problem cannot be solved by the above contents, or if a problem other than the above occurs, please contact us.

In order to use this machine more safely, we recommend that you perform a self-inspection if the usage period exceeds 10 years.

【SELF-CHECK ITEMS】

●Insulation resistance measurement ●Heater current value measurement/resistance value measurement

●Re-tightening inspection of each terminal block ●Other visual inspection

●Inspection and cleaning of foreign substances in the inside and the suction port

For self-check , please contact your local electrician.

KANSAI ELECTRIC HEAT CORP
4-18, Takaidanishi 5-chome, Higashiosaka city
Osaka 577-8566 Japan

TEL(06)6785-6001(代) FAX(06)6785-6002
HP: **www.kansaidennetsu.co.jp**