

Hakko Electric will solve all your problems and worries  
about hot plates!!

# HOPL

〈Specialty hot plate solutions and related control products〉

 **HAKKO ELECTRIC CO., LTD.**  
[www.hakko.co.jp](http://www.hakko.co.jp)

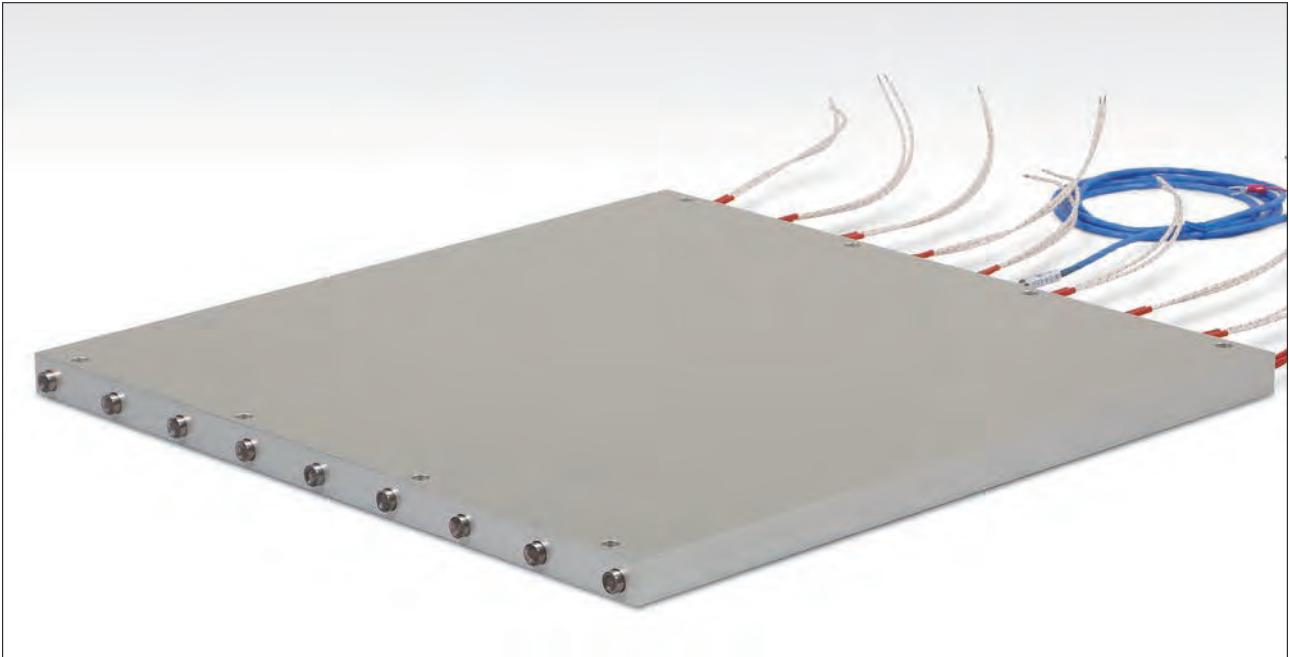
Hakko Electric offers total solution from hot plate design and manufacturing to temperature sensors and controllers. We study the design requirements according to the environment such as operating temperature, temperature distribution, temperature gradient, used material, mounting space, gas replacement or vacuum conditions. Using our original designed cartridge heater or Saikan® heaters as heat source, we can propose hot plate solution that could better meet your needs.

Up to now, we have introduced many solutions to various industries. Semiconductor, automation, electrical machinery, chemical, textile, steel, medical, food processing...

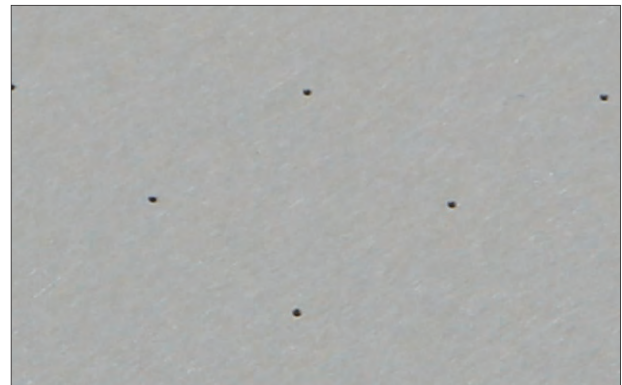
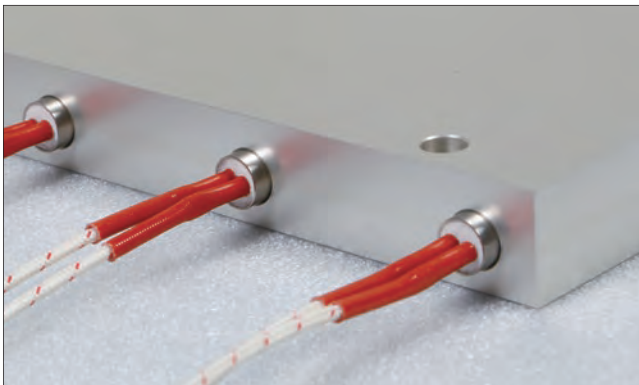
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# SUCTIONING HOT PLATE



Enlarged picture of suction holes on the plate surface



## Specifications

Rated power	3P AC200V 4.5kW
Plate dimension	510×510×25
Operating temperature	120°C
Temperature uniformity	Surface temperature difference R* 4°C 120°C control, within 450×450, when temperature is stable
Plate material	A5052
Flatness	0.01mm
Suction hole diameter	φ 0.5

\* R : Range (Max. temp. - min. temp.)

## Features

- That can hold the workpiece on by suctioning while heating it.
- Prevents warping of workpiece when heating.
- Uniform heating even for workpiece that warp easily.
- Suitable for heating thin sheet workpieces.

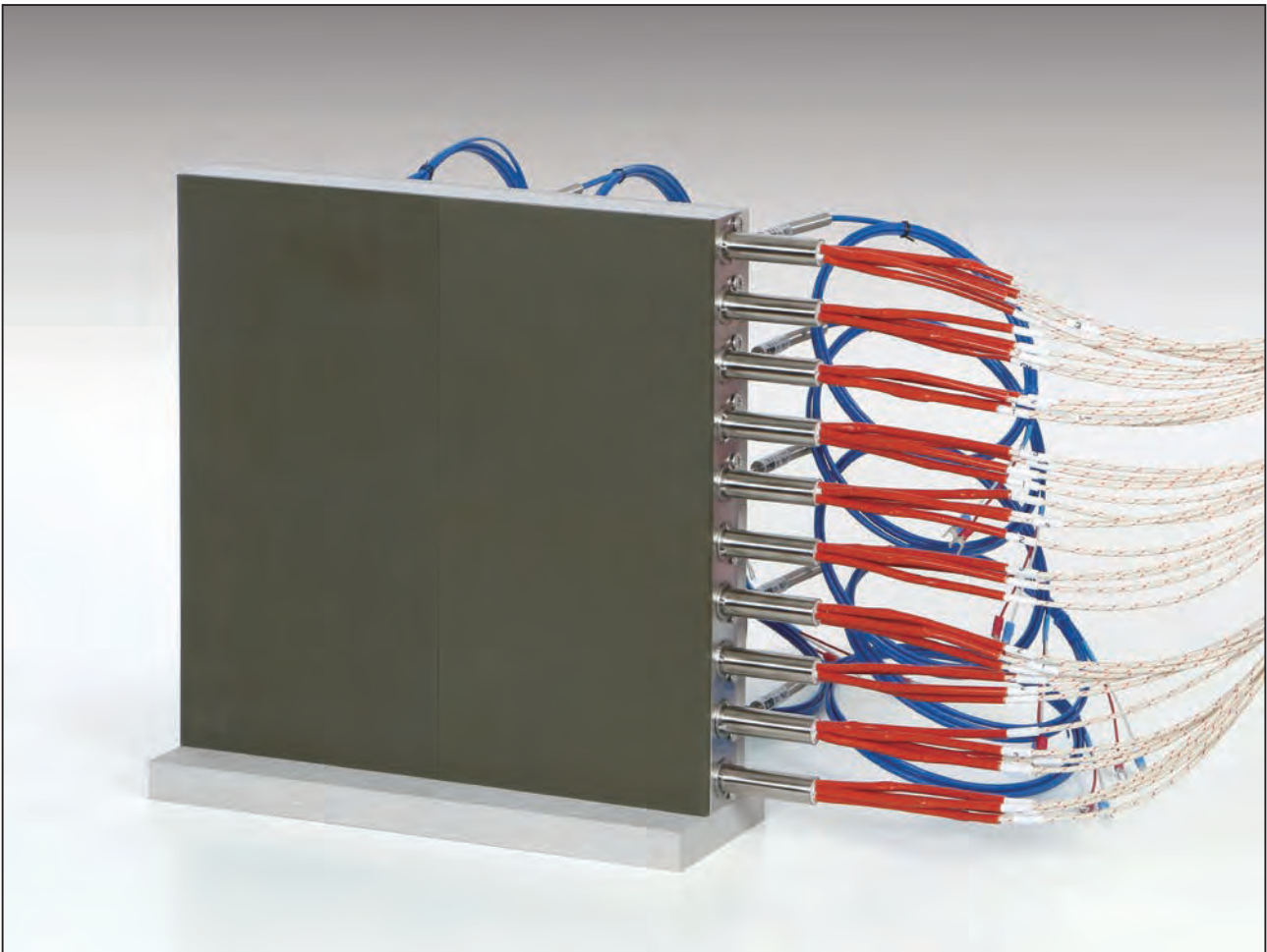
## Applications

- Heating of plastic film
- Heating of glass
- Heating of metal foil

## Major industries

- Plastic materials
- Semiconductor
- FPD
- Research and development related

# MULTI-POINT CONTROL HOT PLATE



## Specifications

Rated power	1P AC200V 15.7kW
Plate dimension	300 × 300 × 35
Plate material	SUS304 / SUS310S
Operating temperature	600°C
Surface finish	Blackening treatment (SUS310S)

## Applications

- Heat welding for automotive drive parts
- Continuous hot press
- Non-contact heating at high temperature
- Battery pack seal

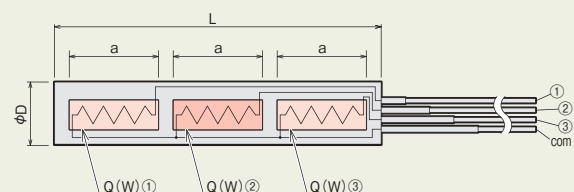
## Major industries

- Semiconductor
- Automotive and related parts
- Electrical or precision machinery
- Medical and pharmaceutical product manufacturing
- Research and development related

## Features

- Hot plate with multiple temperature control points using 3 circuit cartridge heater.
- Uniform temperature distribution of maximum 600°C independent of horizontal or vertical configuration.
- Surface is treated with our original coating which enables uniform and high coefficient of thermal radiation. Oxidation unevenness due to high temperature will not occur.

## What is 3 circuit cartridge heater..

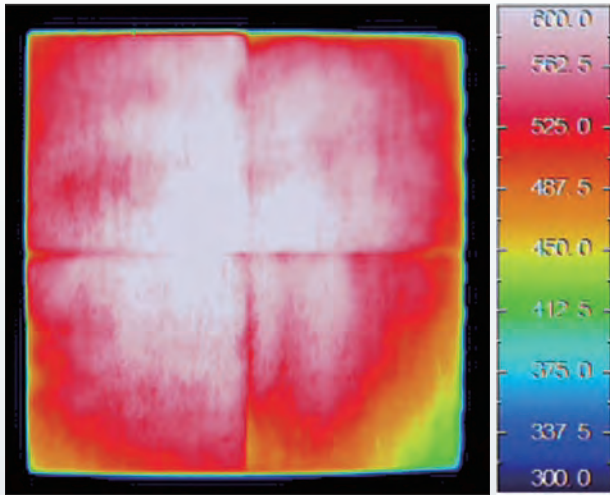


Temperature control is possible for each heating element (circuit)

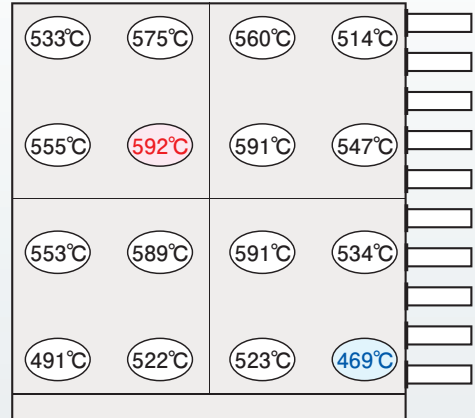
# Comparison between normal cartridge and 3 circuit cartridge heater

## ● Operating using normal cartridge heater

Temperature control with 1 point at the plate center



Temperature measurement using non-contact thermometer

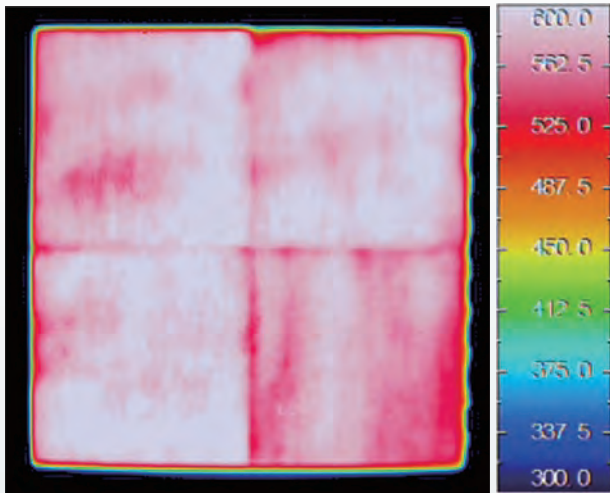


Surface temperature point measurement using contact thermometer (Within 250×250)

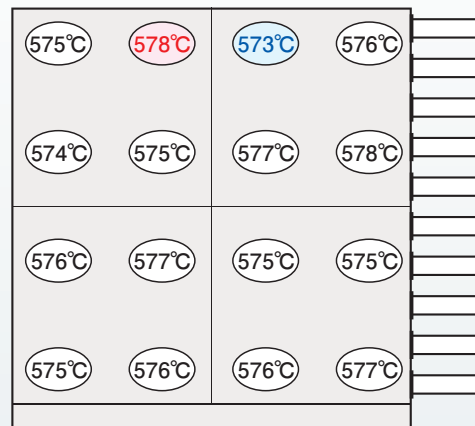
Max. temperature	592 °C
Min. temperature	469 °C
Temperature difference	123 °C

## ● Operating using 3 circuit cartridge heater

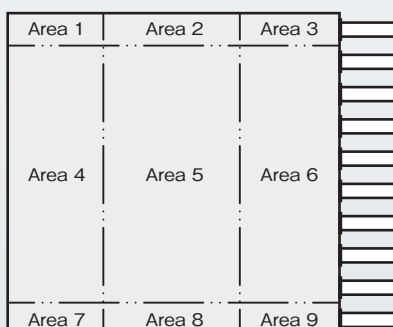
Independent temperature control in the following 9 areas



Temperature measurement using non-contact thermometer



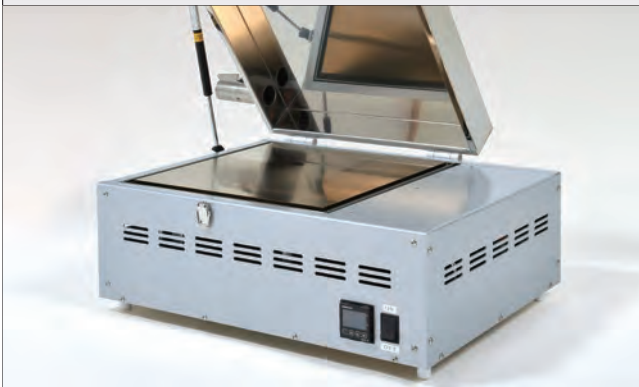
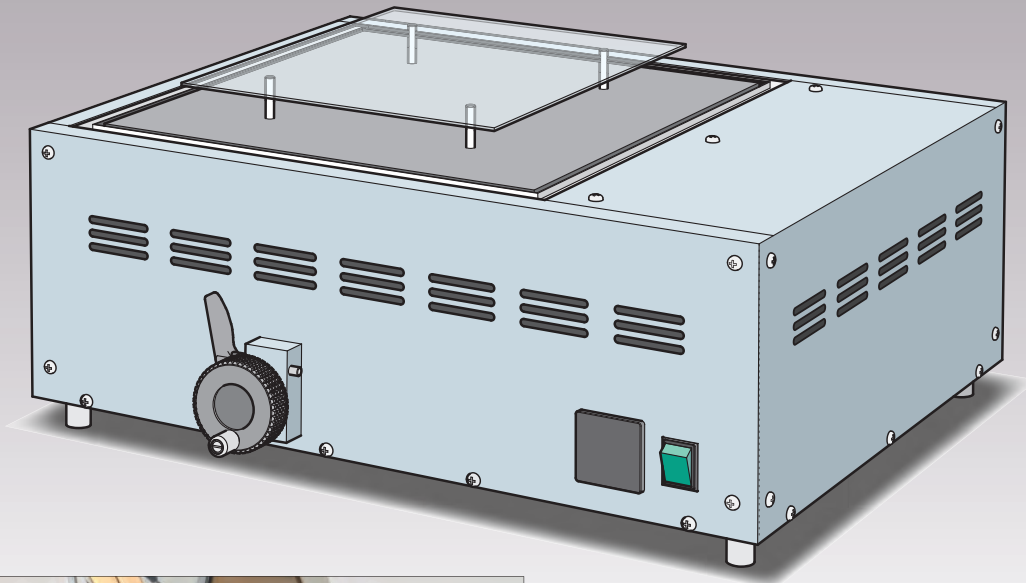
エリア分けのイメージ図



Surface temperature point measurement using contact thermometer (Within 250×250)

Max. temperature	578 °C
Min. temperature	573 °C
Temperature difference	5 °C

# LIFT PIN / PROXIMITY PIN HOT PLATE



## Specifications

Rated power	1P AC200V 2.4kW
Plate dimension	350 × 350
Operating temperature	300°C
Temperature uniformity	Surface temperature difference R* 5°C at 300°C control, within 300×300, when temperature is stable
Plate material	A5052
Flatness	0.3mm
Lift pin	20mm lifting stroke with manual handle

\* R : Range (Max. temp. — min. temp.)

## Features

- Hot plate with temperature controller that can lift or lower the workpiece for contact or non-contact heating.
- The lifting function is also convenient for moving the workpiece.
- Using the proximity pin, non-contact heating in close proximity with the hot plate is also possible.

## Applications

- Heating of glass
- Heating of plastic substrate

## Major industries

- Semiconductor
- FPD
- Research and development related

# Hi Power Heater Plate



## Specifications

Rated power	1P AC200V 5.14kW
Plate dimension	200 × 300 × 5
Operating temperature	300°C
Temperature rising speed	20°C to 300°C in approximately 90s.
Plate material	SUS430

## Features

- Thin hot plate with fast temperature rising and high power, realized by our original manufacturing technology.
- SAIKAN heater can be wired to specially shaped plates, allowing the hot plate to be designed in any shape.
- Using high hardness material for plates is also available.  
(Example hardness HRC52)

## Applications

- Heat source for equipment that requires high cycle of heating and cooling
- Molding of CFRP
- Heating of molding parts

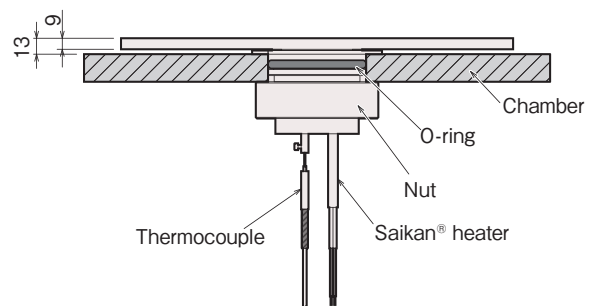
## Major industries

- Automotive parts
- Plastic molding
- Research and development of new materials

# THIN TYPE HOT PLATE FOR VACUUM APPLICATION



Dimensional drawing



## Specifications

Rated power	AC100V 630W
Plate dimension	270 × 320 × 9
Operating temperature	100°C
Temperature uniformity	Surface temperature difference R* 2°C at 100°C control, within 182 × 267, when temperature is stable
Plate material	A5052
Operating environment	Depressurized atmosphere

\* R : Range (Max. temp. - min. temp.)

## Applications

- Film heating in vacuum chamber
- Annealing in vacuum
- Preheat for vapor deposition

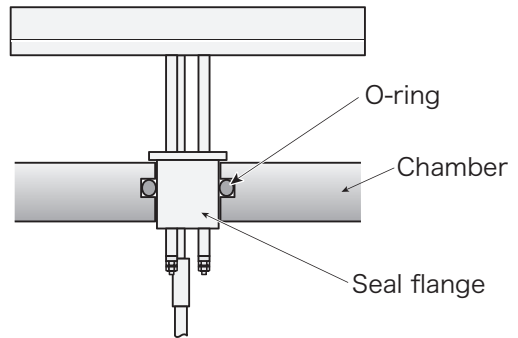
## Features

- Thin and light hot plate that uses Saikan® heater. It can heat workpiece inside vacuum chamber.
- Saikan® heater is arranged densely to realize uniform heating.



# CHAMBER INSTALLATION EXAMPLES OF HOT PLATE FOR VACUUM APPLICATIONS / OTHER VACUUM PARTS INSTALLATION EXAMPLES

## Installation using seal flange

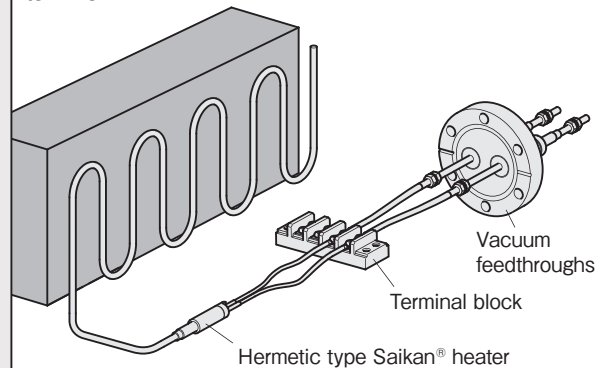


Using seal flange, it is possible to carry out terminal wiring safely under atmospheric environment.

## Wiring example using hermetic type Saikan® heater

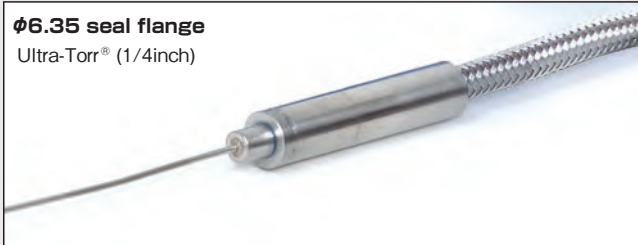


In cases where the seal flange cannot be installed on the bottom of the device and the installation space in the chamber is also limited, wiring can be done inside the vacuum chamber by using a vacuum introduction terminal.



## Installation using thermocouple or heater sleeve as seal flange

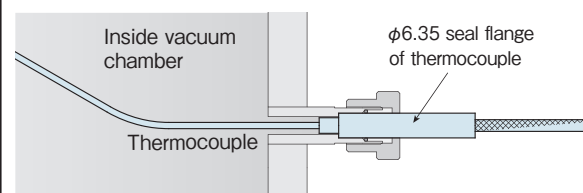
**φ6.35 seal flange**  
Ultra-Torr® (1/4inch)



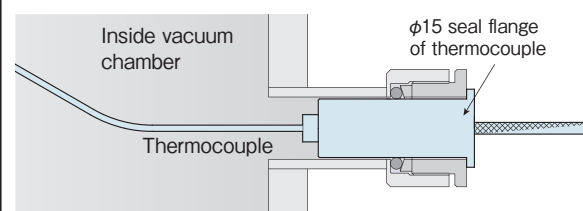
**φ15 seal flange**  
(for φ15 adapter)



Installation with vacuum fittings using the sleeve of Saikan heater® or thermocouple as seal flange (seal surface).



Installation example using Ultra-Torr fitting (Swagelok) and standard product HT-180 thermocouple for vacuum application with φ6.35 seal flange.



Installation example using φ15 adapter and standard product HT-180 thermocouple for vacuum application with φ15 seal flange.

# CONTROLLER PRODUCT LIST

*Our controller products consists of various types and models that aims to provide safer and better control, with our experience in the characteristics of heater.*

*Please choose the product according to the heater rated power and heating control purpose.*



## Thermo 200 H325 × W256 × D140

Operating/ input power supply voltage	3P 200 / 220V (220V is limited to 60Hz)
Max. load/power consumption	3P 8.5kW, 1P 5kW
Control / drive system	Dry contact PID control (Depending on selection of options, some are combined with wet ON/OFF contact)
Control range and sensor	0-600 °C (factory settings), K-type thermocouple: Included (build to order for RTD)
Overcurrent and short circuit protection	Fast acting fuse + CT detection
Temperature error detection/event	External alarm output: Wet contact open → close, error lamp lights up, load output OFF
Other features	Models with optional timer, overheating protection, 2-point control, etc are available. For high function types, program operation, logging of temperature or other parameters (logging requires separate PC), external temperature error input, input terminal for water level detection, and start/stop using external control are possible.



## Thermo 50SS H325 × W256 × D142

Operating/ input power supply voltage	3P 200 / 220V (220V is limited to 60Hz)
Max. load/power consumption	3P 15kW
Control / drive system	Dry contact PID control
Control range and sensor	0-600 °C (factory settings), K-type thermocouple: Included (build to order for RTD)
Overcurrent and short circuit protection	Fast acting fuse + CT detection
Temperature error detection/event	External alarm output: Wet contact open → close, error lamp lights up, load output OFF
Other features	External temperature error input, input terminal for water level detection, and start/stop using external control are possible. Although the product is compact, it can control heater with high rated power.



## Unit Thermo H850 × W600 × D250 ~ H1150 × W800 × D250

Operating/ input power supply voltage	3P 200V
Max. load/power consumption	3P 12kW × 2 to 3P 18kW × 3
Control / drive system	Dry contact PID control
Control range and sensor	0-600 °C (factory settings), K-type thermocouple: Sold separately (build to order for RTD)
Overcurrent and short circuit protection	Fast acting fuse + MCCB
Temperature error detection/event	External alarm output: Wet contact open → close, error lamp lights up, load output OFF
Other features	External temperature error input, input terminal for water level detection, and start/stop using external control are possible. Heater power consumption and other various requirements are also possible.



## Full Pack Thermo H381 × W250 × D100 / H416 × W270 × D115

Operating/input power supply voltage	3P 200V
Max. load/power consumption	3P 10kW / 3P 17kW
Control / drive system	Wet contact ON/OFF control
Control range and sensor	0-100 °C/50-200 °C Dedicated thermistor: Sold separately
Overcurrent and short circuit protection	MCCB
Other features	External temperature error input, input terminal for water level detection, load output OFF. Perfect for controlling liquid heating with immersion heaters, etc.



### CH Controller (CH2-200) H220 × W270 × D295

Operating/ input power supply voltage	3P 200/220V (220V is limited to 60Hz)
Max. load/power consumption	1P 3kW × 2 circuit
Control / drive system	Dry contact PID control
Control range and sensor	0-600 °C (factory settings), K-type thermocouple: Sold separately (build to order for RTD)
Overcurrent and short circuit protection	Fast acting fuse + MCCB
Temperature error detection/event	External alarm output: Alarm buzzer sound, error lamp lights up, load output OFF
Other features	External temperature error input, input terminal for water level detection. 2 load circuits can be controlled with 1 unit.



### Digital Fine Thermo (DG3P) H335 × W107 × D150

Operating/ input power supply voltage	3P 200/220V
Max. load/power consumption	3P 6kW / 1P 3kW
Control / drive system	Dry contact PID control
Control range and sensor	0-999 °C, K-type thermocouple: Sold separately
Overcurrent and short circuit protection	None (Please install a separate fuse between the output and the load)
Temperature error detection/event	External alarm output: Wet contact open → close or close → open (can be selected), error lamp lights up
Other features	Although it is compact, it can directly control 3P load.



### Digital Fine Thermo (DG2N-200) H210 × W66 × D33

Operating/ input power supply voltage	1P 200/220V
Max. load/power consumption	1P 3kW
Control / drive system	Wet contact ON/OFF control
Control range and sensor	0-750 °C, K-type thermocouple: Included (Water resistant and other options are available)
Overcurrent and short circuit protection	Short circuit protection fuse
Other features	Various models of the same series are available such as "DG2-SSR" for 300-600W heater with 100V-1P220V power supply controlled with dry contact ON/OFF, "DG2N-12/24" dedicated to low voltage heater with input power supply of 12-24V(AC/DC), "DG2LH" and "DG2LC" that directly drives solenoid valve or electromagnetic contactor. Reverse operation of heating using "DG2LC" for controlling the cooling side.



### Fine Thermo (F-3) H122 × W87 × D55

Operating/ input power supply voltage	100V / 1P 200V
Max. load/power consumption	1.5kW / 1P 200V 3kW
Control / drive system	Wet contact ON/OFF control
Control range and sensor	0-50 °C / 0-100 °C Dedicated thermistor: Sold separately
Overcurrent and short circuit protection	Short circuit protection fuse
Other features	Popular analog type that is still selling.



### Log Thermo H151 × W102 × D53

Operating/ input power supply voltage	100V - 1P 220V
Max. load/power consumption	1kW for 100V / 2kW for 1P 200V
Control / drive system	Wet contact ON/OFF control
Control range and sensor	0-600 °C, K-type thermocouple: Included (measurement sensors are sold separately)
Overcurrent and short circuit protection	Short circuit protection fuse
Temperature error detection/event	External alarm output: Wet contact open → close, error lamp lights up
Other features	SD card recording for date, temperatures of 4 points, supply voltage/current, power consumption, etc. Heat treatment history for heated object can definitely be saved.

# LIST OF CONTROLLER MODEL NUMBER,

## Heater rated power supply voltage 100V

Product name	Model no.	Controllable heater's rated power consumption		Control type	
				ON/OFF	PID
DG2N-SSR	DGC1230	300W		<input type="radio"/>	
Log Thermo	DGL0200	1000W		<input type="radio"/>	
Fine Thermo (F-1)	FFC0150	1500W		<input type="radio"/>	
	FFC0110			<input type="radio"/>	
Fine Thermo (F-3)	FFC1050			<input type="radio"/>	
	FFC1100			<input type="radio"/>	
DG2N-100	DGC1151			<input type="radio"/>	
DG2P	DGC2310				<input type="radio"/>
CH Controller	HMC1211	1500W × 2		<input type="radio"/>	
Thermo100	HTM3101	3000W		<input type="radio"/>	<input type="radio"/>
	HTM3102			<input type="radio"/>	<input type="radio"/>
	HTM3103			<input type="radio"/>	<input type="radio"/>
Double Thermo 100	HTM3104			<input type="radio"/>	<input type="radio"/>
Thermo 100 High Function Type	HTM3105			<input type="radio"/>	<input type="radio"/>

## Heater rated power supply voltage 1P 200V

Product name	Model no.	Controllable heater's rated power consumption		Control type	
				ON/OFF	PID
DG2N-SSR	DGC1230	600W		<input type="radio"/>	
Log Thermo	DGL0200	2000W		<input type="radio"/>	
Fine Thermo (F-3)	FFC2050	3000W		<input type="radio"/>	
	FFC2100			<input type="radio"/>	
DG2N-100	DGC2151			<input type="radio"/>	
DG3P	DGC2330				<input type="radio"/>
CH Controller	HMC1212	3000W × 2		<input type="radio"/>	
Thermo 200	HTM3201	5000W		<input type="radio"/>	<input type="radio"/>
	HTM3202			<input type="radio"/>	<input type="radio"/>
	HTM3203			<input type="radio"/>	<input type="radio"/>
Double Thermo 200	HTM3204			<input type="radio"/>	<input type="radio"/>
Thermo 200 High Function Type	HTM3205			<input type="radio"/>	<input type="radio"/>
Full Pack Thermo 30F (When use for 1P)	ATC0030	6000W		<input type="radio"/>	
	ATC0033			<input type="radio"/>	
Thermo 50N	HTM5010	8500W		<input type="radio"/>	
Thermo 50SS	HTM5030			<input type="radio"/>	<input type="radio"/>
Full Pack Thermo 50F (When use for 1P)	ATC0050	9000W		<input type="radio"/>	
	ATC0053			<input type="radio"/>	

## Heater rated power supply voltage 3P 200V

Product name	Model no.	Controllable heater's rated power consumption		Control type	
				ON/OFF	PID
DG3P	DGC2330	6kW		<input type="radio"/>	<input type="radio"/>
Thermo 200	HTM3201	8.5kW		<input type="radio"/>	<input type="radio"/>
	HTM3202			<input type="radio"/>	<input type="radio"/>
	HTM3203			<input type="radio"/>	<input type="radio"/>
Double Thermo 200	HTM3204			<input type="radio"/>	<input type="radio"/>
Thermo 200 High Function Type	HTM3205		<input type="radio"/>	<input type="radio"/>	
Full Pack Thermo 30F	ATC0030	10kW		<input type="radio"/>	
	ATC0033			<input type="radio"/>	
Thermo 50N	HTM5010	15kW		<input type="radio"/>	
Thermo 50SS	HTM5030			<input type="radio"/>	<input type="radio"/>
Full Pack Thermo 50F	ATC0050	17kW		<input type="radio"/>	
	ATC0053			<input type="radio"/>	

※1 Standard product: K type thermocouple Custom build to order product: J, T or E type thermocouple, 3-wire RTD

※2 Standard product: K type thermocouple Custom build to order product: J, T, E, N, R, S or B type thermocouple, 3-wire RTD

# FUNCTION & OTHER DETAILS

Control sensor		Alarm output	Safety function	Temperature set range (factory settings)	Operation after recovery from power shortage	Remarks
Thermocouple	Thermistor					
○				0 ~ 750 °C	Continue operation	
○		○		0 ~ 600 °C	Continue operation	Data logging
	○			0 ~ 50 °C	Continue operation	
	○			0 ~ 100 °C	Continue operation	
	○			0 ~ 50 °C	Continue operation	
	○			0 ~ 100 °C	Continue operation	
○				0 ~ 750 °C	Continue operation	
○		○		0 ~ 999 °C	Continue operation / stop	
○※1				0 ~ 999 °C	Continue operation	2CH control
○※2		○	○	0 ~ 600 °C	Continue operation	
○※2		○	○	0 ~ 600 °C	Continue operation	Built-in timer
○※2		○	○	0 ~ 600 °C	Continue operation	Built-in temperature controller for overheating protection
○※2		○	○	0 ~ 600 °C	Continue operation	2-point control
○※2		○	○	0 ~ 600 °C	Continue operation	Program function

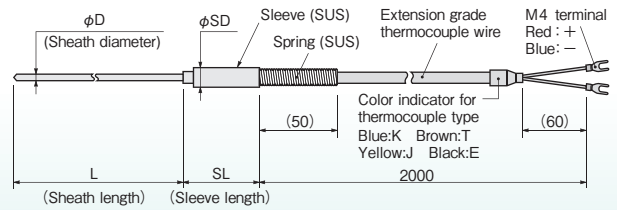
Control sensor		Alarm output	Safety function	Temperature set range (factory settings)	Operation after recovery from power shortage	Remarks
Thermocouple	Thermistor					
○				0 ~ 750 °C	Continue operation	
○		○		0 ~ 600 °C	Continue operation	Data logging
	○			0 ~ 50 °C	Continue operation	
	○			0 ~ 100 °C	Continue operation	
○				0 ~ 750 °C	Continue operation	
○		○		0 ~ 999 °C	Continue operation / stop	
○※1				0 ~ 999 °C	stop input	2CH control
○※2		○	○	0 ~ 600 °C	stop input	
○※2		○	○	0 ~ 600 °C	stop input	Built-in timer
○※2		○	○	0 ~ 600 °C	stop input	Built-in temperature controller for overheating protection
○※2		○	○	0 ~ 600 °C	stop input	2-point control
○※2		○	○	0 ~ 600 °C	stop input	Program function
	○		○	0 ~ 100 °C	stop input	
	○		○	50 ~ 200 °C	stop input	
○※2		○	○	0 ~ 600 °C	stop input	
○※2		○	○	0 ~ 600 °C	stop input	
	○		○	0 ~ 100 °C	stop input	
	○		○	50 ~ 200 °C	stop input	

Control sensor		Alarm output	Safety function	Temperature set range (factory settings)	Operation after recovery from power shortage	Remarks
Thermocouple	Thermistor					
○		○		0 ~ 999 °C	Continue operation / stop	
○※2		○	○	0 ~ 600 °C	stop input	
○※2		○	○	0 ~ 600 °C	stop input	Built-in timer
○※2		○	○	0 ~ 600 °C	stop input	Built-in temperature controller for overheating protection
○※2		○	○	0 ~ 600 °C	stop input	2-point control
○※2		○	○	0 ~ 600 °C	stop input	Program function
	○		○	0 ~ 100 °C	stop input	
	○		○	50 ~ 200 °C	stop input	
○※2		○	○	0 ~ 600 °C	stop input	
○※2		○	○	0 ~ 600 °C	stop input	
	○		○	0 ~ 100 °C	stop input	
	○		○	50 ~ 200 °C	stop input	

# THERMOCOUPLES

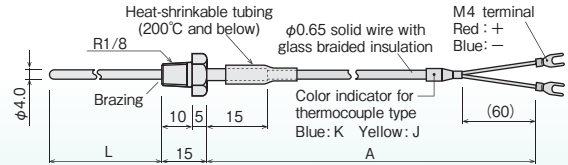
Various types of thermocouple  
(Please refer to our general catalog for details)

## HT-20 Sheath type

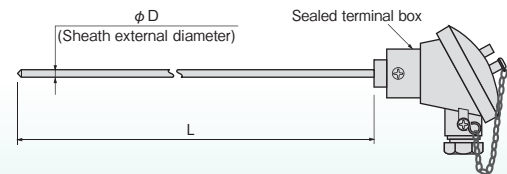


Please operate with the sleeve at 90°C and below

## HT-160 Direct lead type with screw

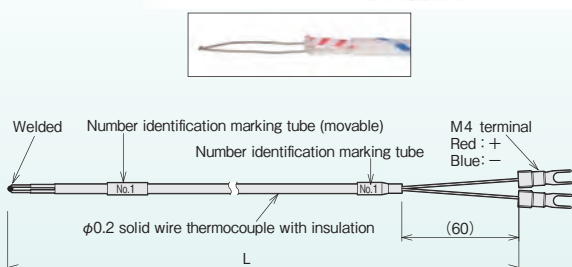
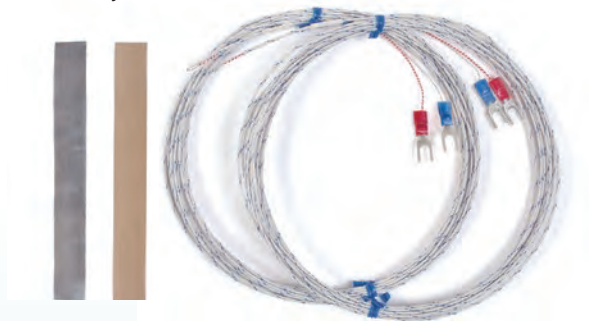


## HT-60 Sheath type

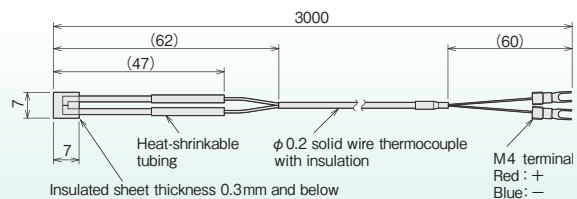


## Temperature measurement thermocouple kit

- A set of 5 insulated thermocouples with welded junction and adhesive tape for attachment.
- Two types of insulation can be chosen, fluorocarbon resin or fiberglass braided.
- The thermocouple has a marking tube for number identification, which is very convenient.

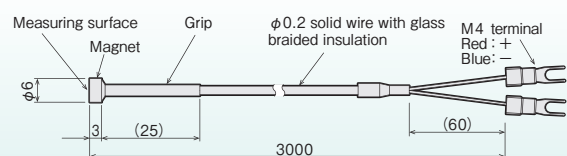
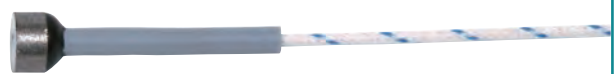


## Sheet thermocouple



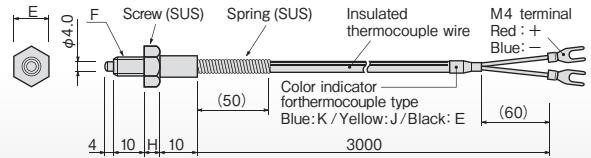
## Magnetic thermocouple

**⚠ Can not be used for temperature control**

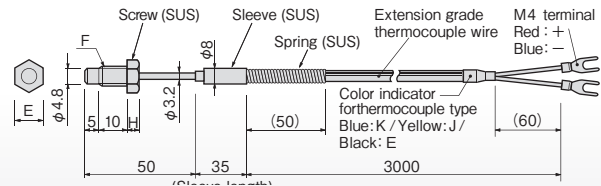


# Thermocouples for plastic injection molding

**HT-110** Screw type Protective tube type



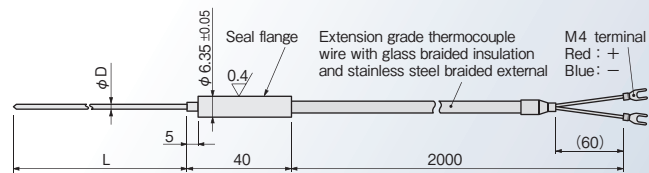
**HT-110** Screw type Sheath type



# Thermocouples for vacuum application

**HT-180** Seal flange type

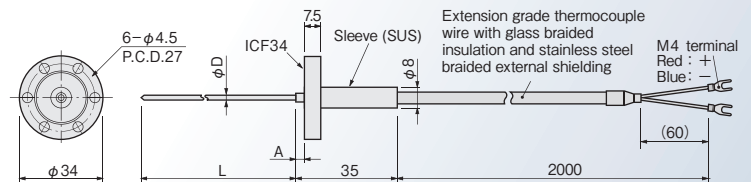
●  $\phi 6.35$  Seal flange (for Ultra-Torr<sup>®</sup> 1/4 inch)



**HT-190** ICF flange type

Thermocouple with ICF flange (ConFlat flange) for vacuum applications.

● ICF34

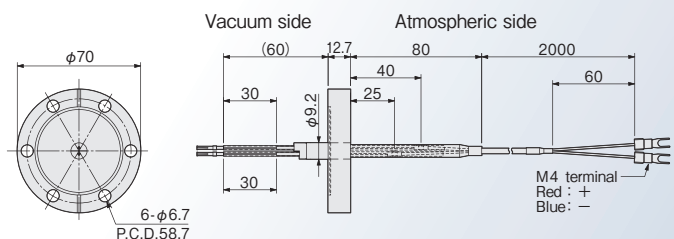


# Vacuum feedthroughs

● ICF70



1P use



# Manufacturing examples

## ● Hot plate manufacturing examples

Dimensions	Plate material	Operating environment	Operating temperature [°C]	Temperature uniformity (max. - min.) [°C]	Features (surface treatment, shape, applications, etc.)
φ 140	Aluminum	in the air	200	1	Hard alumite (anodizing) treatment
350×500	Aluminum	in vacuum	100	1	
380×380	Aluminum	in the air	90	1	
φ 240	Stainless steel	in vacuum	500	1	Stainless steel inner side is worked for high thermal conductivity
400×603	Aluminum	in the air	80	1	Hard alumite (anodizing) treatment
400×500	Aluminum	in vacuum	150	1	Hard alumite(anodizing) treatment. Clean room application
φ 190	Aluminum	in the air	300	1	Hard alumite(anodizing) treatment
360×294	Copper	in vacuum	200	1	Electroless nickel plating
350×400	Aluminum	in the air	270	2	Kashima Coat
2050×280	Aluminum	in the air	150	2	Elongated shape
470×570	Aluminum	in the air	250	2	Raydent treatment
290×316	Steel material for molds	in the air	250	2	Hot press application
280×280	Aluminum	in the air	200	2	Tufram® treatment. Clean room application
1160×1360	Aluminum	in the air	90	2	Large size
450×450	Stainless steel	in the air	550	2	High temperature accuracy
450×500	Aluminum	in the air	200	2	PTFE coating
φ 220	Copper	in the air	400	2	Kanigen® plating
900×900	Carbon steel	in the air	200	3	Electroless nickel plating
1600×2050	Carbon steel	in the air	40	3	Kanigen® plating. Large size
2000×755	Copper	in the air	360	3	Electroless nickel plating. Large size
330×140	Steel material for molds	in the air	250	3	Hard chrome plating. Hot press application
350×430	Invar alloy (low thermal expansion)	in the air	300	3	Kanigen® plating
650×780	Aluminum	in the air	100	3	Hard alumite (anodizing) treatment
460×590	Carbon steel	in the air	180	3	Electroless nickel plating
1150×1000	Aluminum	in the air	200	4	PTFE coating. Food processing application
330×330	Steel material for molds	in the air	320	4	Hot press (vertical installation) application
800×600	Carbon steel	in the air	300	4	With cooling function
900×900	Carbon steel	in the air	200	4	Electroless nickel plating
150×150	Nickel alloy	in the air	150	4	Hilex coating
700×700	Aluminum	in the air	360	8	High thermal emissivity coating
φ 190	Nickel alloy	in the air	500	10	Heater and plate junction is integrated
φ 340	Stainless steel	in vacuum	600	10	
600×700	Stainless steel	in vacuum	500	11	Stainless steel inner side is worked for high thermal conductivity. Suction structure
1600×300	Carbon steel	in the air	350	13	Electroless nickel plating
φ 180	Stainless steel	in vacuum	450	15	Specially worked for vacuum application
35×100	Stainless steel (SUS310S)	in the air	800		Blackening treatment. High temperature application
200×200	Stainless steel	in the air	500		Clean-S treatment
2500×2300	Casted aluminum	in the air	150	3	Hard alumite (anodizing) treatment. For FPD manufacturing equipment
400×450	Titanium	in the air	220		

## ● Surface treatment examples

Surface treatment	Purpose
Hard alumite (anodizing) treatment	Improve wear resistance
Tufram® treatment	Improve wear resistance and sliding property
Kashima Coat	
PTFE coating	Improve sliding property, adherence prevention
Raydent treatment	Improve wear resistance and sliding property, rust prevention
Electroless nickel plating	Rust prevention
Hard chrome plating	Improve wear resistance, rust prevention
Clean-S treatment	Improve wear resistance, sliding property, and corrosion resistance
Hilex coating	Improve thermal emissivity (Hakko Electric's original coating)
Blackening treatment	Improve thermal emissivity
High thermal emissivity coating	

※ Please refer to our general catalog for details on surface treatment. In addition, we can provide proposals according to the intended use and purpose, please contact our sales office for details.



# COMMUNICATION SHEET HOT PLATE

## ◆ Sender

Company			
Address	〒 -		
Department		Title	
Name			
TEL		FAX	
E-mail			

**Hakko Electric Co., LTD. Sales HQ**

Please contact the nearest branch or sales office. Please see the back cover for telephone and fax numbers.

## Request for quotation / technical support

m /D /Y

Please check  the applicable items, and fill in specific information inside the bracket ( ).

1. Plate shape/dimensions

- Rectangular/square (    mm ×    mm × Thickness    mm)     Round ( φ    mm × Thickness    mm)  
 Others

2. Operating power supply

(1P / 3P) (    ) V

3. Power (watt density)

(    ) W     Leave it to us

4. Operating temperature

Normal operating temperature (    )°C or (    to    )°C     MAX (    )°C

5. Temperature rise time

(    )°C to (    )°C in (    ) minutes

6. Operating condition of uniform temperature hot plate

Use at stable temperature after temperature rising. Effective area of hot plate (    mm ×    mm) or φ (    mm), temperature uniformity within ± (    )°C at (    )°C

Use during rapid heating to reach target temperature. When rapid heating, temperature uniformity is (required / not required). If required, effective area of hot plate is (    mm ×    mm), temperature uniformity within ± (    )°C at (    )°C

For cooling, temperature uniformity for effective area of (    mm ×    mm) after (natural cooling / forced cooling)

7. Hot plate operating environment

Air at temperature (    )°C, humidity (    )%, pressure (    )Pa

Special gas at (    ) atmosphere, temperature (    )°C, humidity (    )%, pressure (    )Pa

Vacuum at (    )Pa, temperature (    )°C. During this, heater connection is ( in / not in ) the air.

8. For temperature sensor

Using (    ) sensor

9. Other noteworthy items

Please fill in details such as hot plate material, surface treatment, use of thermal insulation, installation method, surface roughness, etc.

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# COMMUNICATION SHEET CONTROLLER

## ◆ Sender

Company			
Address	〒 -		
Department		Title	
Name			
TEL		FAX	
E-mail			

**Hakko Electric Co., LTD. Sales HQ**

Please contact the nearest branch or sales office. Please see the back cover for telephone and fax numbers.

## Request for quotation / technical support

m /D /Y

Please check  the applicable items, and fill in specific information inside the bracket ( ).

- Rated voltage/power  
 Rated voltage (1P · 3P) ( )V, ( )W  Others
- Details for heater used  
 Standard heater (model no. : quantity : )  
 Customized heater ※ For customized heater, please fill in details for 12. other noteworthy items
- Temperature control  
 ON/OFF control  PID control  Others
- Number of circuits for control  
 1 circuit  Multiple, ( ) circuits  Others
- Range of set temperature  
 ( )°C ~ ( )°C (0 ~ 600°C if no instructions)  Others
- Type of input sensor  
 Thermocouple ( )  RTD ( )  Others
- Alarm functions  
 Temperature error alarm (default)  Input signal error (external input signal)  Overcurrent alarm  
 SSR malfunction alarm  Wire disconnected alarm  Others
- External output  
 Linked operation with external device ( )  Others
- Protective functions  
 MCCB  ELB rated sensitivity current ( ) mA  Circuit protector (default)  
 Fast acting fuse for SSR protection (for PID control)  Others
- Alarm  
 Abnormal temperature alarm  Abnormal signal input alarm (external input)  SSR Failure Alert  
 Disconnection alarm  Others
- Alarm reset  
 Automatic reset  Hold after error stop ( push button reset /  reset by turning power off and on)  
 Others
- Other noteworthy items  
 Please fill in details such as heater details, operating environment, wiring connections, operating method, safety features, etc.  


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# COMMUNICATION SHEET SHEATH THERMOCOUPLE

## ◆ Sender

Company			
Address	〒 -		
Department		Title	
Name			
TEL		FAX	
E-mail			

**Hakko Electric Co., LTD. Sales HQ**

Please contact the nearest branch or sales office. Please see the back cover for telephone and fax numbers.

## Request for quotation / technical support

m /D /Y

Please check  the applicable items, and fill in specific information inside the bracket ( ).

### 1 For customized products based on standard types

Please circle the applicable items in the table below, and fill in the relevant values. (※ please circle only when necessary)

Model	Sensing wire		Junction type	Sheath			Extension grade thermocouple wire			Terminal	
	Type	Classification		Material	External diameter	Length	Type	Insulation	Length	Size	Type
HT- <input type="checkbox"/>	K E J T R N AF	Class 1 (JIS C 1602)  Class 2 (JIS C 1602)	Grounded  Ungrounded  Exposed  ※ Stepped	SUS316  SUS310S  NCF600	mm	mm	Class 1 (JIS C 1602)  Class 2 (JIS C 1602)	Fiberglass Vinyl Silicone FEP  ※ Internal shield ※ External shield	m	M3 M4 M5	Fork terminal  Round terminal

(Note) Extension grade thermocouple wire is JIS1610-2012 equivalent build to order product.

Compression fitting	Nipple		Movable flange	Bayonet			Connector			
	Type	Size		Diameter	Type	Holder	Type	Set	Plug	Jack
R 1/8 1/4 3/8 1/2 3/4	G  R	1/8 1/4 3/8 1/2 3/4	KFL  KFS	φ 3.2  φ 4.8	Single slot  Double slot	Single slot  Double slot	Standard  Miniature	K J T E	K J T E	K J T E

### 2 Other noteworthy items

fill in details such as attachment to special parts, shapes, etc. if required.

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**光 HAKKO ELECTRIC CO., LTD.  
THERMAL DEVICE SALES DIVISION**

○ **HEAD OFFICE / TOKYO BRANCH**  
1-7-9 kamimeguro, Meguroku, Tokyo, 153-0051  
TEL.+81-3-3464-8500 FAX.+81-3-3464-8539

○ **SENDAI BRANCH**  
Sunline 66th Bldg 1F, 3-10-7 Tomeoka,  
Miyaginoku, Sendai City, 983-0852  
TEL.+81-22-257-8501 FAX.+81-22-257-8505

○ **UTSUNOMIYA BRANCH**  
1359-42, komanyu machi, Utsunomiya City,  
320-0065  
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Kanazawa City, 920-0024  
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Luminous center building 1-15-1 chigusa,  
chigusa-ku, Nagoya City, 464-0858  
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422-8064  
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(manufacturer)

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Nagano Pref. 389-0807

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389-0806