

OIL HEATING UNIT

HOP5010 HOP5020
HOP5030 HOP5050

INSTRUCTIONS MANUAL

Thank you for your choosing our product.

Read the instructions before use and keep in the convenient place for future reference.





 **HAKKO ELECTRIC CO., LTD.**



FOR SAFE USE

Observe the following instructions to prevent danger to the operator or others and property damages.









■ The following two categories are the degrees of danger and damages if the device is operated improperly.

 WARNING	Improper use may cause the danger of death or injury.
 CAUTION	Improper use may cause the danger of slight injury or property damage.

■ Pictographs are categorized as follows.

	These pictographs represent "don't" .
	These pictographs represent "do" .

WARNING

- **Do not use with any power voltage other than the indicated.**
Otherwise it may cause fire and electric shock. 
- **Do not alter or disassemble the unit.**
Otherwise it may cause fire and electric shock. 
- **Do not use at the location in danger of explosion nor in an explosive gas atmosphere.**
Otherwise it may cause explosion or fire. The unit has no explosion protection system. 
- **Heat oil at temperatures sufficiently lower than the flashing point.**
The heater unit may overshoot the preset temperature. 
- **Use at temperatures below 120°C and sufficiently lower than the flashing point of the oil.**
Otherwise it may cause explosion or fire. 
- **Do not heat oils or liquids of which flashing point is low, such as gasoline or alcohol.**
Otherwise it may cause explosion or fire. 
- **Do not heat corrosive liquids.**
Otherwise it may cause fire or failures. The heater is made from iron. 
- **Do not heat oil without oil flow. Do not block the inlet or the outlet while heating.**
Otherwise it may cause failures, explosion or fire. 

● **Do not heat in the closed circulation.**

Otherwise it may cause failures, explosion or fire. Design the piping system which can release the pressure to outside air.



● **Power on/off is controlled by the external breaker or switch.**

Do not use the preset dial of the thermostat for shutdown. Otherwise it may cause fire or electric shock.



● **Do not mix air with oil.**

Otherwise it may cause failures, explosion or fire.



● **Do not touch the unit while heating or just after shutdown.**

Otherwise it may cause electric shock or burns.



● **Connect the ground terminal to the ground.**

Otherwise it may cause fires or electric shocks.



 **CAUTION**

● **Turn off power before moving the unit.**

Otherwise it may cause electric shock or burns.



● **Screw up cables tightly with the crimping terminals.**

Otherwise it may cause fire, electric shock or failures.



● **Remove remaining air inside the unit before use.**

Otherwise it may cause electric shock or burns.



● **Install pipes correctly.**

Otherwise it may cause fire, electric shock or failures.



● **Do not pour liquids on the part of electric component.**

Otherwise it may cause fire, electric shock or failures.



● **Apply adjustable pipes for the inlet and outlet.**

Heat expansion may cause leakage of oil.



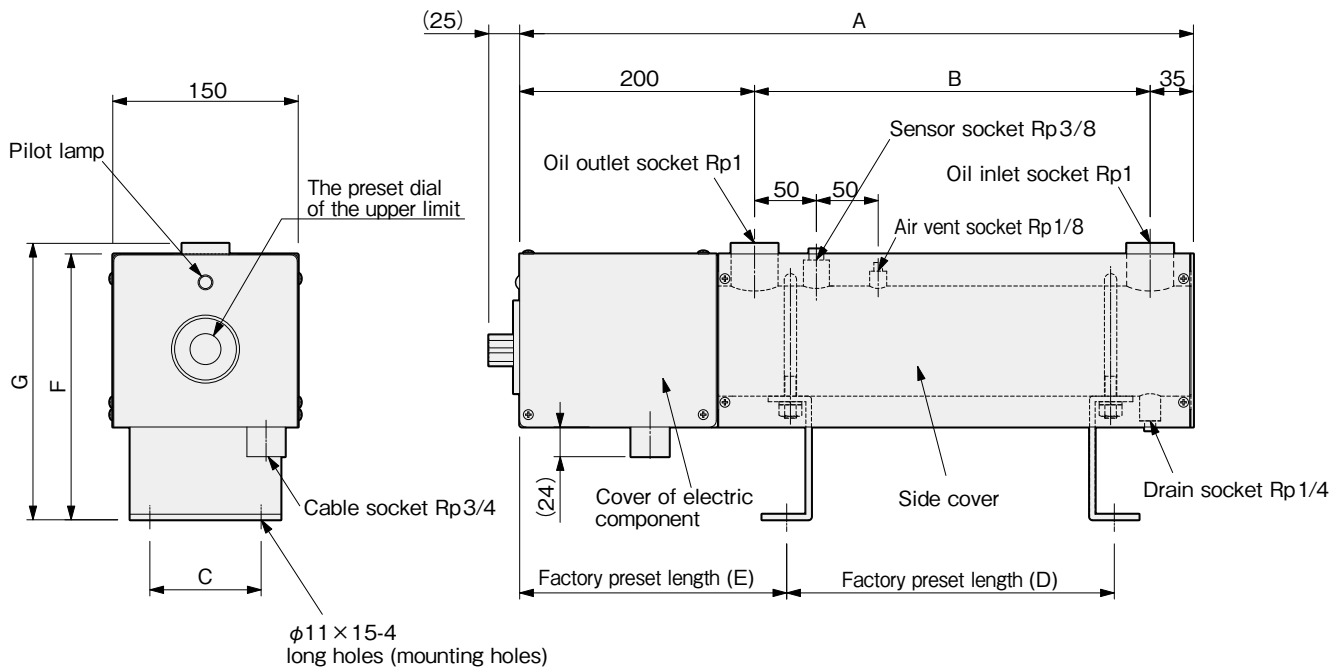
● **Do not stop the flow downstream of the unit.**

Otherwise it may cause fire, electric shock or failures. Stop upstream to avoid excess pressure.



1. SPECIFICATIONS

NAMES AND DIMENSIONS OF PARTS



SPECIFICATIONS

Model no.		HOP5010	HOP5020	HOP5030	HOP5050
Product code		00881410	00881420	00881430	00881440
Rated voltage		3-phase 200V			
Rated power		1 kW	2 kW	3 kW	5 kW
Dimensions (mm)	A	435	555	755	905
	B	200	320	520	670
	C	90			100
	D	145	265	465	615
	E	226			
	F	215			221
	G	223			236
Volume in tube		1.2 liter (approx.)	1.7 liter (approx.)	2.6 liters (approx.)	4.2 liters (approx.)
Weight		11 kg	13 kg	16 kg	20 kg
Maximum temperature in use		120 °C			
Operating ambient temperature		0 ~ 40 °C			
Maximum pressure in use*		0.1 MPa			
Test pressure		0.4 MPa			
Thermostat specifications		Liquid expansion thermostat: 33~120°C			
Overtemperature thermal fuse		139 °C			
Power density on the heater surface		2.5 W/cm ²			
Material of the heater sheath		STKM11A (Steel)			
Material of the heater case		STPG (Steel)			

* : Maximum pressure in use is selected on the basis of top lift of pumps

2. INSTALLATION

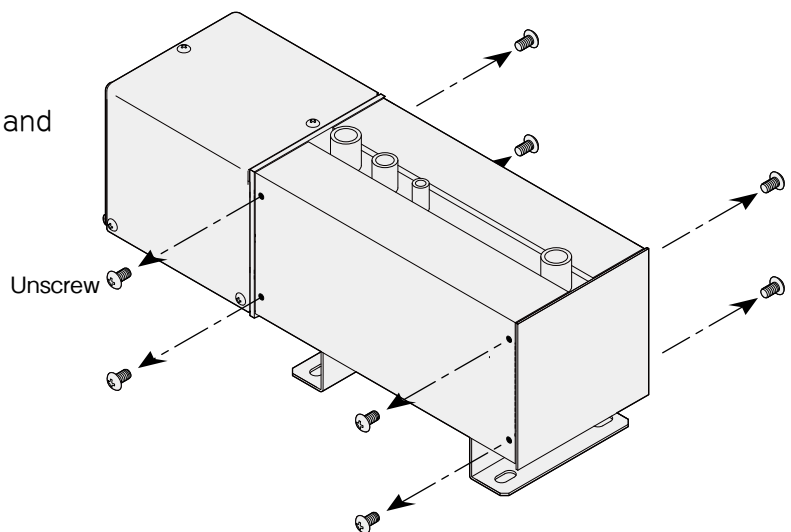
2-1 INSTALLATION LOCATION

◎ The unit is designed for indoor use. Observe the following conditions for the installation location.

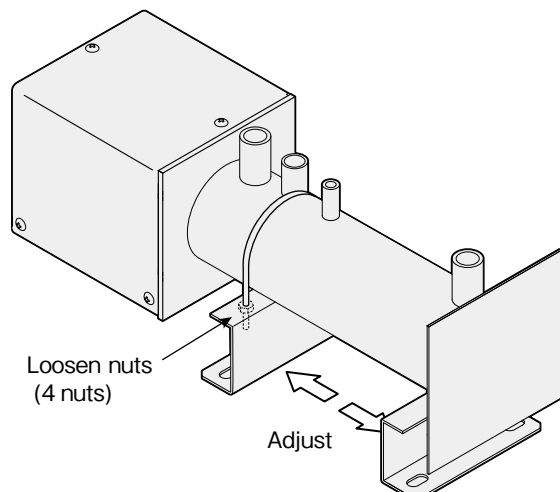
- Ambient temperature: 0 ~ 40°C .
 - Relative humidity: 80% or less.
 - Do not expose to explosive gases.
 - Do not expose to corrosive gases.
 - Indoor kept from rain and wind.
 - Little dust
 - Not in closed space
 - On flat, hard and level floor
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2-2 INSTALLATION

- ① Lay the unit horizontally.
- ② Unscrew (4 screws each side) and take off both the side covers.



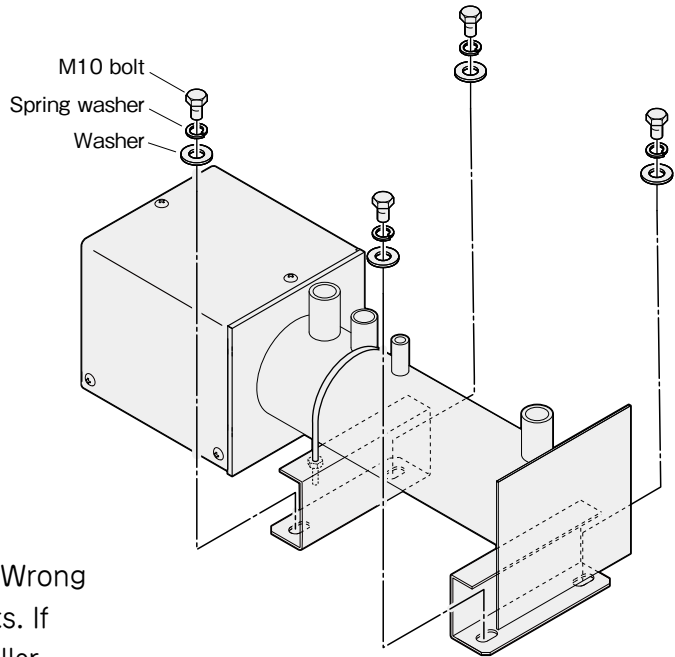
- ③ Loosen M10 nuts at U bolts and adjust the mounting holes with the position to fix. Fasten nuts tightly after adjusting.



2. INSTALLATION (CONTINUED FROM THE PREVIOUS PAGE)

- ④ Fix the unit by M10 bolts, washers, and spring washers through the mounting holes (four).

No bolts, washers and spring washers attached with the unit.

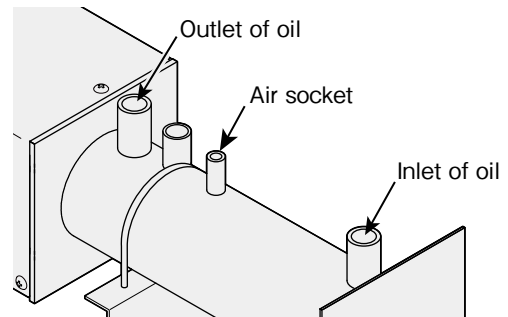


- ⑤ Install pipes of the inlet and the outlet. Wrong installation may cause serious accidents. If you use an external temperature controller, refer to page 10 “Temperature control of the unit” and install a temperature sensor.

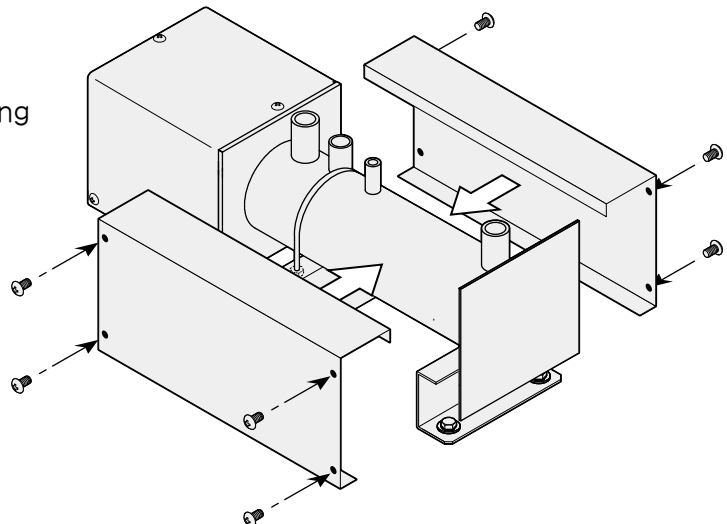
- ⑥ After pipe installation, pass oil and check if there are any leakages from the parts.

CAUTION
Use adjustable tubes to connect the inlet and the outlet.

- ⑦ Pass oil carefully through the unit controlling flow. Open the spigot on the air socket to expel remaining air until oil comes out. Oil may squirt out of the socket when the flow is too much. After looking oil, stop the oil flow and close the spigot tightly.



- ⑧ Set the side covers again after expelling air.

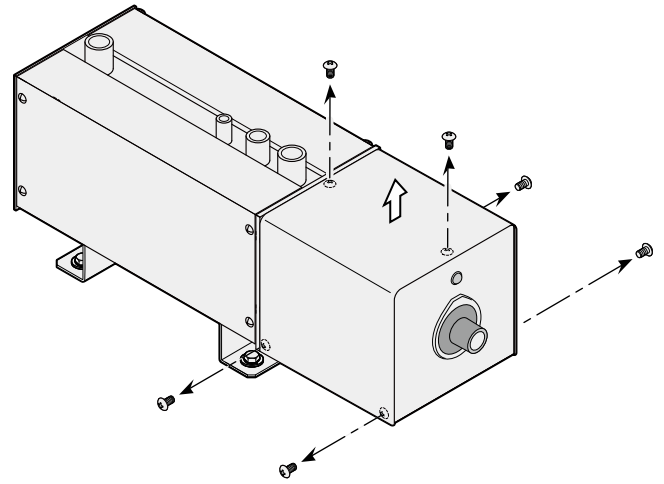


3. WIRING

- ① Unscrew the cover of the electric component (6 screws) and take off the cover.

⚠ CAUTION

Do not wire in the unit except a qualified person.

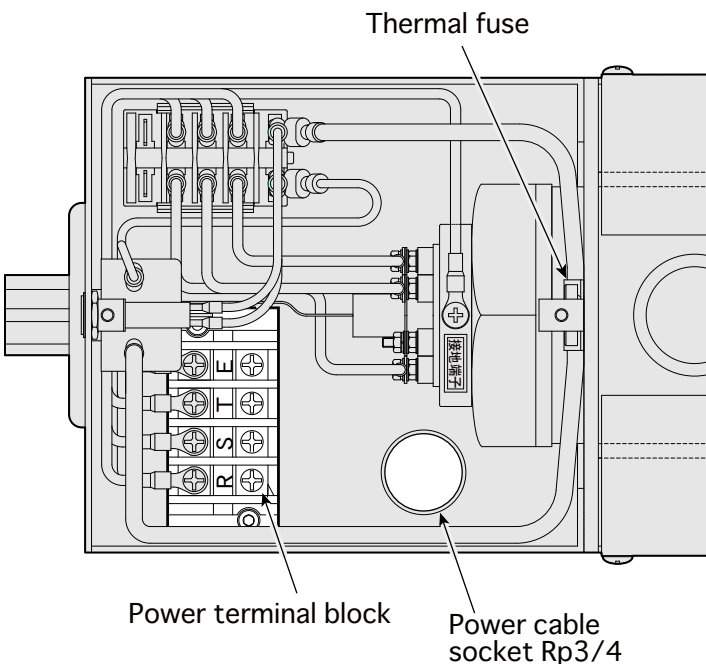
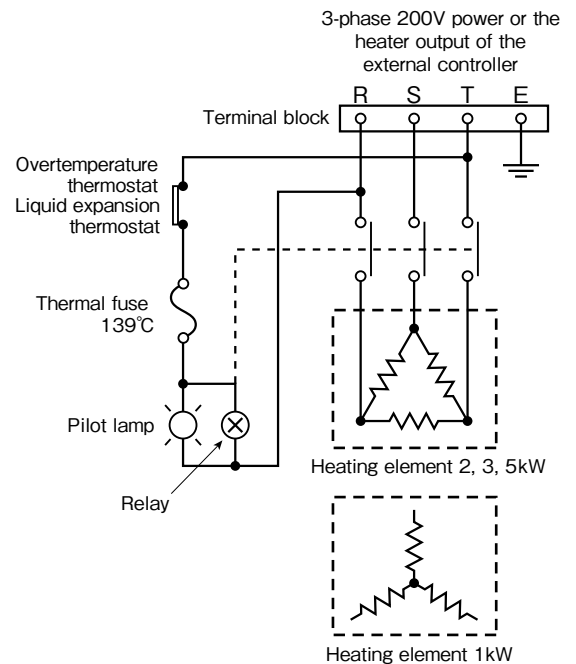


- ② Put the power cable through the cable socket. The cable size is must be as large as indicated on Table-1 with heat resistance.
- ③ Connect 'R', 'S' and 'T' on the terminal block with cables of the relative phase with round crimping terminals. (The size of terminal screw is shown on Table-1.)
- ④ Connect 'E' (ground terminal) on the terminal block with the ground cable using M4 round crimping terminal.
- ⑤ Connect the other end of the power cable with the power breaker. (If you use the external temperature controller, connect with the heater output.)
- ⑥ Set the cover of electric component again.

Table-1 Correct cables and terminal screw

Model No.	Cable	Terminal screw
HOP5010	0.75 mm ²	M4
HOP5020	1.25 mm ²	
HOP5030	2.0 mm ²	
HOP5050	3.5 mm ²	

[CIRCUIT DIAGRAM]



⚠ CAUTION

Screw up cables tightly with the crimping terminals.

⚠ CAUTION

Wire with appropriate cables of indicated size or more.

4. OPERATION

4-1 HOW TO OPERATE

① **Pass oil.**

Pass oil carefully through the unit by controlling flow. Open the spigot on the air socket to expel remaining air until oil comes out if the unit has not been used for long time. Oil may squirt out of the socket when the flow is too much. Stop the oil flow and close the spigot tightly. And pass oil again.

② **Power on.**

Turn on the power breaker or the external temperature controller. Set temperature following the instructions of the external controller if you use it.

③ **Adjust the dial of upper limit temperature.**

Adjust the dial of upper limit temperature in use between 33 and 120°C . Temperature must be preset below flashing point. The control dial of the unit is just designed for preventing oil from overtemperature. If you need to control temperature more precisely, use the external temperature controller.

④ **Heater lamp lights up while heater on.**

When you use the external temperature controller, it controls the heater's ON/OFF.

 **CAUTION**

For safety, pass oil through the unit before turning on the heater.

 **CAUTION**

Do not heat oil at the temperature higher than the flashing point. Confirm the flashing point of oil with the supplier before use.

4-2 SHUTDOWN

① **Turn off the unit.**

Turn off the power breaker or the power switch of the external controller if you use it.

② **Cool down the heater,**

Keep oil passing after turning off the heater and cool down the heater and the unit.

③ **Stop passing oil.**

Stop passing oil if needed.

 **CAUTION**

The control dial of the unit has no power switch. Turn off the power breaker of the unit when you need to power off.



The control dial of the unit is only designed for preventing oil from overtemperature. If you need to control temperature more precisely, use the external temperature controller.

5. TROUBLE SHOOTING

When malfunctions occur, turn off the heater and cool down the unit first. And tell the distributor or HAKKO Co., Ltd. to check and repair.

MALFUNCTION	CAUSE
Heater lamp does not light while oil is below the preset temperature.	Failures in relays, the temperature controller, or the heater lamp, or disconnection of the thermal fuse.
Heater lamp lights up but the temperature does not increase.	Insufficient heater power or failures in the heater or the controller.
Oil temperature increases higher than the preset.	Malfunction in the temperature controller.

STORAGE

In case of long term storage or disuse, observe the following advice to re-start safely.

- ① Detach the power cable.
After cut off the power supply.
- ② Drain oil of the unit through the drain socket.
Take off the side cover and Loosen the drain.
- ③ Store the unit in less humid place keeping from wind and rain.

PARTS FOR REPLACEMENT

Use the following heaters for replacement. Thermal fuse is available, too.

Model No.	Heater model No.	Rating
HOP5010	PAB3010	3-phase 200V 1kW
HOP5020	PAB3020	3-phase 200V 2kW
HOP5030	PAB3030	3-phase 200V 3kW
HOP5050	PAB3050	3-phase 200V 5kW

6. REFERENCES

《DISCHARGE AND TEMPERATURE INCREASE》

● Calculation formula

$$\Delta t = \frac{A \times \rho \times 3600}{Q \times C} \times \eta$$

Δt : Temperature increase [°C]

A : Heater wattage [kW]

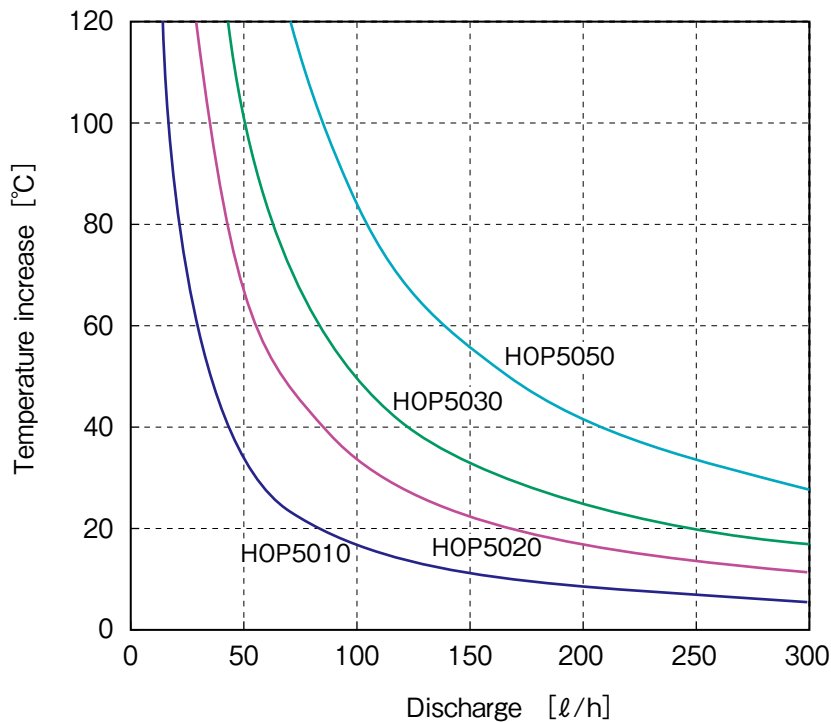
ρ : Density of oil [kg/ℓ = g/cm³]

Q : Discharge [ℓ/h]

C : Specific heat of oil [kJ/kg°C]

η : Efficiency (≤ 1) ...in consideration of heat loss

● GRAPH



Density of Bunker C : 0.96 [g/cm³]

Specific heat : 1.8 [kJ/kg°C]

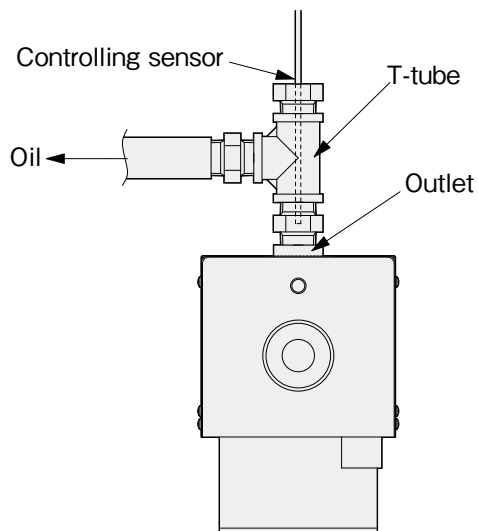
Calculated with efficiency : 0.8

Confirm the property (such as flashing point) of oil with the supplier.

Do not heat oil at higher temperatures than flashing point

《TEMPERATURE CONTROL OF THE UNIT》

Sample picture of connection



Temperature of the unit is controlled by ON/OFF system. If you need to control temperature more precisely, use the external temperature controller. Then the sensor is installed through the sensor socket as illustrated.

《RECOMMENDED TEMPERATURE CONTROLLER》

- Apply the following model when you use the external temperature controller.
- Besides the following models, controllers and sensors of HAKKO are available.

Model No.	Recommended temperature controller
HOP5010	HTM5010 (Thermo-50N)
HOP5020	
HOP5030	
HOP5050	



If you need to apply the external controller of PID-type, tell us to customize before use. Otherwise, the unit may break down earlier.

AFTER-SALE SERVICE

● If you have any questions,

If you have any questions about our products, contact with your distributors, or the Sales Head Office of HAKKO CO., LTD. The addresses and phone numbers are as follows.

CONTACT INFORMATION OF "HAKKO GROUP"

○ **HAKKO ELECTRIC CO., LTD.**

SALES HEAD OFFICE

1-7-9 Kamimeguro, Meguro-ku, Tokyo, 1530051, Japan
TEL. +81-3-3464-8500 FAX. +81-3-3464-8539

PRODUCTION HEAD OFFICE

1490 Isobe, Chikuma-shi, Nagano, 3890806, Japan
TEL. +81-26-275-0121 FAX. +81-26-275-4878

○ **HAKKO ELECTRIC THERMAL DEVICE (SHANGHAI) CO., LTD.**

No.512 Yutang Rd., Songjiang, Shanghai, 201600, China
TEL. +86-21-5774-3121 FAX. +86-21-5774-1700

○ **HAKKO (THAILAND) CO., LTD.**

9/41 Moo 5, Paholyotin Rd., Klong 1, Klong Luang, Patumthani, 12120, Thailand
TEL. +66-2902-2512 FAX. +66-2516-2155

Website <http://www.hakko.co.jp/>