

5. OPERATION

A. Selecting the desired mode

Use the MODE button to select the desired mode. (See Table 1 for checking the status of the lamps corresponding to individual modes.)
Normal modes: Select the appropriate normal mode if you want to control the preheater by setting only the output/temperature.
Auto modes : Select the appropriate auto mode if you want to control the preheater using a specific profile setting
(e.g., output/temperature, time).

CAUTION

- If the preheater is used in combination with a hot air rework station, be sure the heater is not exposed directly to the hot air.
- Do not look directly at the heater lamp for a long time when power is on. Doing so may cause affecting the eyes.

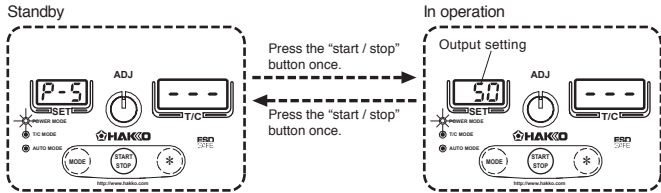
Normal modes

● Power mode

LED lamp :

POWER MODE

SET indicator and T/C indicator
is shown in right illustration.

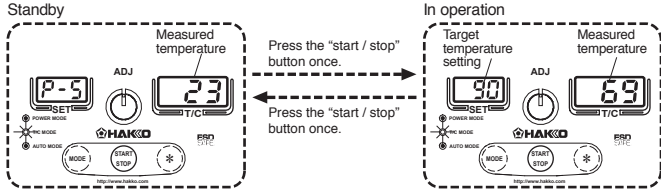


● T/C mode

LED lamp :

T/C MODE

SET indicator and T/C indicator
is shown in right illustration.



■ Auto mode

In auto modes, the preheater automatically returns to its previous state when all associated operations are completed.
The unit will return to standby even when pressing the START/STOP button during operation.

● Power auto mode

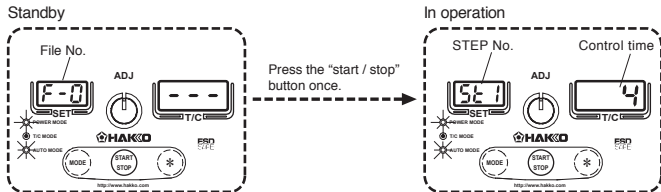
The output (%) and time (sec) are controlled
according to the profile set in 3 steps.

LED lamp :

POWER MODE

AUTO MODE

SET indicator and T/C indicator
is shown in right illustration.



● T/C Auto Mode

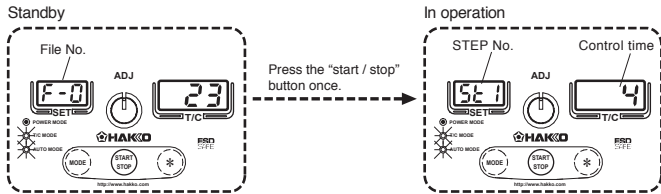
The thermocouple is used to control the
temperature of a specific location of measurement
for a specific length of time according to the profile
set in 3 steps.

LED lamp :

T/C MODE

AUTO MODE

SET indicator and T/C indicator
is shown in right illustration.



If the thermocouple is attached to the T/C connector while the preheater is in power mode/power auto mode, temperature readings are indicated on the T/C indicator for monitoring; otherwise, the symbol " --- " will be indicated.

B. Changing the settings used in normal mode

Changing the settings used in power mode

Be sure that the setting in power mode is
between 0% and 100%.

- Initially, the setting is 50%.

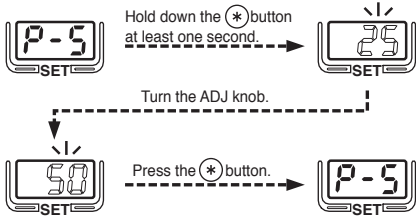
EX: To change from 25% to 50%,

1. **Hold down the (*) button found on the front panel for at least one second.**
The SET indicator flashes to indicate the current setting.

2. Changing the Setting

Turn the ADJ knob until the desired setting is indicated.
When the desired setting is indicated, press the (*) button
to complete the task.

NOTE :
You can change the setting while the preheater is in operation.



5. OPERATION

Changing the setting used in T/C mode

Be sure that the setting used in T/C mode is
between 50°C and 200°C (122°F to 392°F)

- Initially, the setting is 100°C (212°F).

EX: To change from 50°C (122°F) to 125°C (257°F),

1. **Hold down the (*) button found on the front panel for at least one second.**
The SET indicator flashes to indicate the current setting.

2. Changing the Setting

Turn the ADJ knob until the desired setting is indicated.
When the desired setting is indicated, press the (*) button
to complete the task.

D. Changing the file used in auto modes

Each file (indicated as F-0 through F-9) used in auto modes
permits the specification of 10 profile settings. Before
selecting a different file, be sure that the preheater is in auto
mode (i.e., the AUTO MODE lamp is on).

1. **Hold down the (*) button found on the front panel for at least one second.**
The SET indicator flashes to indicate the current setting.

2. Changing the Setting

Turn the ADJ knob until the desired setting is indicated.
When the desired setting is indicated, press the (*) button
to complete the task.

E. Changing the settings used in auto modes

Changing the Settings Used in Power Auto Mode

Table 1 Indications of Profile Nos.

Setting	Setting	Setting
P 1: STEP1 Power (%)	P 3: STEP2 Power (%)	P 5: STEP3 Power (%)
P 2: STEP1 Time (s)	P 4: STEP2 Time (s)	P 6: STEP3 Time (s)

1. **Hold down the (MODE) (MODE) and (*) buttons found on the front panel simultaneously for 1 sec or more.**

The SET indicator flashes to indicate the profile number
while the T/C indicator indicates the current setting.

2. Select the profile No. you want to edit.

Turn the ADJ knob until the desired profile No. is
indicated. (For the profile setting corresponding to each
profile No., see Table 1.) When the (*) button is pressed,
the T/C indicator flashes to permit changing the set value.

3. Edit the profile settings as necessary.

Turn the ADJ knob to edit the setting used in each STEP
indicated on the flashing T/C indicator.

4. When the setting change is completed, hold down the (*) button until the display reads " ".

When " " is indicated on the SET indicator and the
(*) button is pressed, the preheater returns to its standby
state (i.e., to end the task).

Changing the settings used in T/C auto mode

Table 2 Indications of Profile Nos.

Setting	Setting	Setting
t 1: STEP1 Temp (C/F)	t 3: STEP2 Temp (C/F)	t 5: STEP3 Temp (C/F)
t 2: STEP1 Time (s)	t 4: STEP2 Time (s)	t 6: STEP3 Time (s)

1. **Hold down the (MODE) (MODE) and (*) buttons found on the front panel simultaneously for 1 sec or more.**

The SET indicator flashes to indicate the profile number
while the T/C indicator indicates the current setting.

2. Select the profile No. you want to edit.

Turn the ADJ knob until the desired profile No. is
indicated. (For the profile setting corresponding to each
profile No., see Table 2.) When the (*) button is pressed,
the T/C indicator flashes to permit changing the set value.

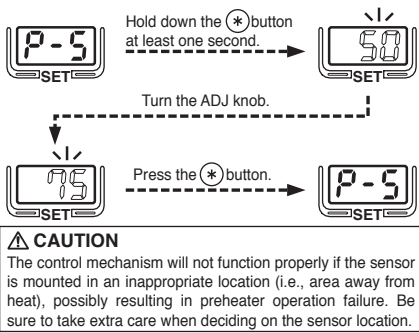
3. Edit the profile settings as necessary.

Turn the ADJ knob to edit the setting used in each STEP
indicated on the flashing T/C indicator.

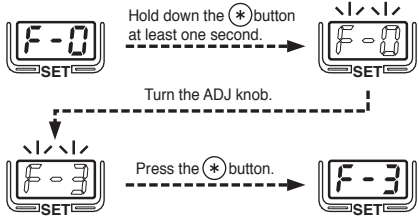
4. When the setting change is completed, hold down the (*) button until the display reads " ".

When " " is indicated on the SET indicator and the
(*) button is pressed, the preheater returns to its standby
state (i.e., to end the task).

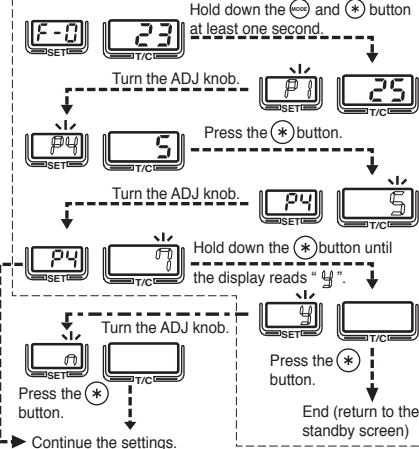
NOTE :
You can change the setting while the preheater is in operation.



EX: To switch from file No. 0 to file No. 3,

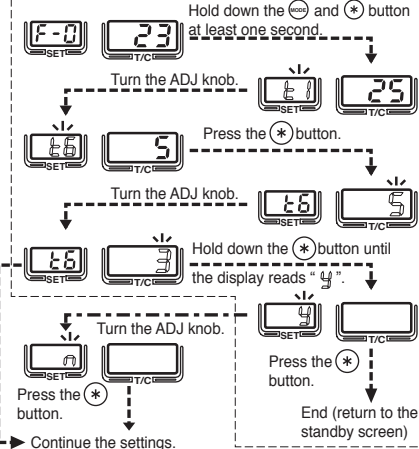


EX: To change the control time in STEP 2 from 5 sec to 7 sec,



You can edit the settings as many times as you need until
all settings are as you desire. If the power is removed while
settings are being edited, the previous settings will remain
valid.

EX: To change the control time in STEP3 from 5 sec to 3 sec



You can edit the settings as many times as you need until
all settings are as you desire. If the power is removed while
settings are being edited, the previous settings will remain
valid.

6. PARAMETER SETTINGS

Table 3 Parameters and Their Settings

Parameter	SET indicator	T/C indicator	Setting	Initial setting
°C /°F switchover	01	1 or 2	1 : °C 2 : °F	1 (2**)
Temperature upper limit	02	3-digit value (0~537°C / 32~999°F)	Temperature upper limit alert	537 (999**)
Temperature lower limit	03	3-digit value (0~537°C / 32~999°F)	Temperature lower limit alert	0 (32**)
Auto shutoff	04	2-digit value (0~30min)	Shutoff time	0
Heater power alert time	05	2-digit value (0~30min)	Heater power alert time	0
Protection level	06	C-1 / C-2 / C-3	Protection level	C-1

* For the particulars of protection levels, see Table 5.

** For U.S.A.

Particulars of Parameters

°C /°F switchover function

Permits selection of either Celsius or Fahrenheit temperature indication.

Temperature upper limit alert function

Turns on the upper limit temperature alert to stop heater control if the temperature rises above the upper limit after reaching its predetermined level.

Temperature lower limit alert function

Turns on the lower limit temperature alert to stop heater control if the temperature drops below the lower limit after reaching its predetermined level.

Auto shutoff function

Stops heater control after a specific period of time following the start of control. The auto shutoff function will not operate if the timer is set to 0.

Heater power alert function

Turns on the heater power alert to stop heater control if the temperature fails to reach the predetermined level after a specific period of time following the start of control. The heater power alert function will not operate if the timer is set to 0.

Table 4 Protection Levels and Particulars of Protection

Protection level	Setting
C-3	Permits only the START/STOP operation.
C-2	In addition to C-3 operation, permits setting the output (temperature) and changing auto mode settings.
C-1	In addition to C-2 operation, permits switching modes.

● Editing the Parameters

1. Turn on the power while holding down the MODE button.

SET indicator: Indicates parameter Nos.

T/C indicator : Indicates parameter settings.

You can change the item on the flashing indicator.

2. Select the desired parameter No.

See that the parameter No. on the SET indicator is
flashing while the parameter setting on the T/C indicator
remains on. Turn the ADJ knob to select the desired
parameter No., and press the (*) button to confirm the
change.

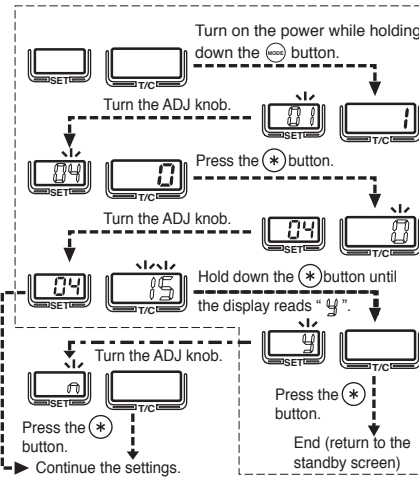
3. Edit the parameter setting.

When you have selected the desired parameter No., the
flashing moves from the SET indicator to the T/C
indicator. Turn the ADJ knob to edit the parameter setting,
and press the (*) button to accept.

4. Save the change.

When you have finished changing all parameters you
want to change, hold down the (*) button for a while
(possibly at the end of 2. or 3.). When " " is indicated
on the SET indicator, press the (*) button once again to
end the task and return the preheater to a standby state.

EX: To set the auto shutoff time to 15 min

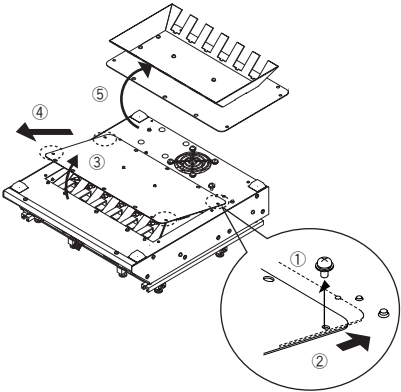


7. MAINTENANCE

In order for you to use the preheater in optimum condition for a long time, it is important that you perform maintenance work on a regular basis. The degree of wear and tear the preheater may incur varies depending on the temperatures it is used at and the environment it is used in. Provide appropriate care according to the conditions of its use.

⚠ WARNING
Exercise sufficient care, as the product becomes extremely hot. Unless otherwise instructed, be sure to turn off the power and disconnect the power cord before starting the work.

1. Cleaning the Reflector



- Turn over the preheater body. (Place it in such a way that it remains stable throughout the work.)
- Remove the 4 screws used to fix the bottom plate in place.
- Hold the bottom plate, and detach it together with the reflector from the preheater body.

⚠ CAUTION
• Separate the part at an angle. It will not come off when pulled straight.
• Take care to avoid contact with the heater lamp and the wiring.

- Remove the dirt using alcohol.

⚠ CAUTION
• Use a soft cloth or the like to remove the dirt while taking care not to damage the reflector.
• Do not use powerful chemicals or the like to clean the reflector or scrape it with a tool.
• If the damage or dirt is excessive and does not permit cleaning, replace the reflector.

- Put the reflector back in place by reversing the foregoing steps.

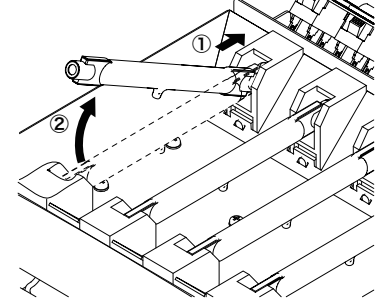
8. Inspection

■ Burned-out heater lamp

Figure 4

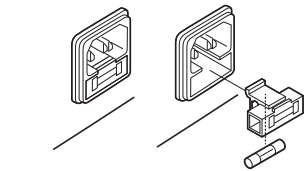


■ Replacing the heater lamp



Mount the lamp so that the protrusion faces downward.

■ Replacing the Fuse



Measure the resistance of the heater. Measure the resistance across the segment indicated in Figure 4. If the heater lamp has an open circuit, replace the lamp.

1. Remove the screws from the both sides of the unit and detach the cover.

⚠ CAUTION
Do not remove the nuts securing the grounding strap to the heater lamp cover.

3. Replace the heater lamp.

⚠ CAUTION
• Do not subject the heater lamp to excessive impact.
• Do not hold the lamp by its glass portion at the center with bare hands.
• For replacement, hold the end of the lamp, and detach it from the socket at an angle.

4. Put the lamp back in place by reversing the foregoing steps.

⚠ CAUTION
• Mount the lamp so that the sealing at the center faces downward (on the reflector side).
• Be sure that the grounding wire of the lamp cover is properly connected.

1. Disconnect the power cord from the power receptacle.

2. Pull out the fuse holder.

3. Replace the fuse with a new one.

4. Put the fuse holder back in place.

9. TROUBLESHOOTING

⚠ WARNING
Be sure to disconnect the power plug before inspecting the inside of the preheater or replacing its part to avoid electric shocks.

- The unit does not operate when the power switch is turned on.

- The heater lamp is not powered.

⚠ CAUTION
A single block has a set of 3 heaters. Keep in mind that an open circuit in one heater deprives the other heaters in the same block of power.

- S-E is indicated.
(in T/C mode, T/C auto mode)

- H-E is indicated.
(in T/C mode, T/C auto mode)

- O-E is indicated
(in T/C mode, T/C auto mode)

- U-E is indicated.
(in T/C mode, T/C auto mode)

- The heater fails to exert control, the control mechanism is not normal, or the temperature indication remains unchanged.

- Settings cannot be edited. The mode cannot be changed.

CHECK : Is the power cord or the power plug disconnected?
ACTIONConnect the cord or the plug.
CHECK : Has the fuse blown?
ACTIONFind out why the fuse has blown; then, replace the fuse. If the fuse blows once again, ship the preheater body together with the fuse for necessary repairs.

CHECK : Has the START/STOP button been pressed?
ACTIONPress the START/STOP button.
CHECK : Is the selector switch off?
ACTIONTurn on the selector switch.
CHECK : Is the heater lamp out of the socket?
ACTIONFit the heater lamp properly in the socket.
CHECK : Is the heater lamp burned out?
ACTIONIf the result indicates that the lamp has burned out, replace it.

CHECK : Is the thermocouple connected to the preheater body?
ACTIONConnect the thermocouple to the preheater body.
CHECK : Does the thermocouple have an open circuit?
ACTIONIf feasible, correct the open circuit; otherwise, replace the thermocouple.

CHECK : Is the selector switch off?
ACTIONTurn on the selector switch.
CHECK : Is the heater lamp burned out or out of place?
ACTIONSee "● The heater lamp is not powered."
CHECK : Is the setting for the heater power alert too low (set to too short a time)?
ACTIONChange the heater power alert to an appropriate setting.
CHECK : Is the location of measurement for the thermocouple inappropriate or is the thermocouple mounted improperly?
ACTIONMount the thermocouple to an appropriate location of measurement.

CHECK : Is the setting for the temperature upper limit too low?
ACTIONChange the temperature upper limit to an appropriate setting.

CHECK : Is the setting for the temperature lower limit too high?
ACTIONChange the temperature lower limit to an appropriate setting.

CHECK : Is the thermocouple displaced from the location of measurement or is it mounted improperly?
ACTIONMount the thermocouple in an appropriate location of measurement.

CHECK : Is the protection level C-2 or higher?
ACTIONBy referring to "● Editing the Parameters," change the protect level to one that permits changing of the settings.

10. ERROR MESSAGES

All error indications occur only in T/C mode or T/C auto mode.

- Sensor error



S-E is indicated when the thermocouple is not properly connected to the preheater body or has an open circuit.

- Heater error



H-E is indicated when the selector switch is off or the heater lamp has burned out or is detached from the preheater body.H-E is also indicated when the heater power alert goes on.

- Temperature upper limit setting error



O-E is indicated when the temperature rises above the predetermined upper limit for some reason after it has stabilized during preheating.

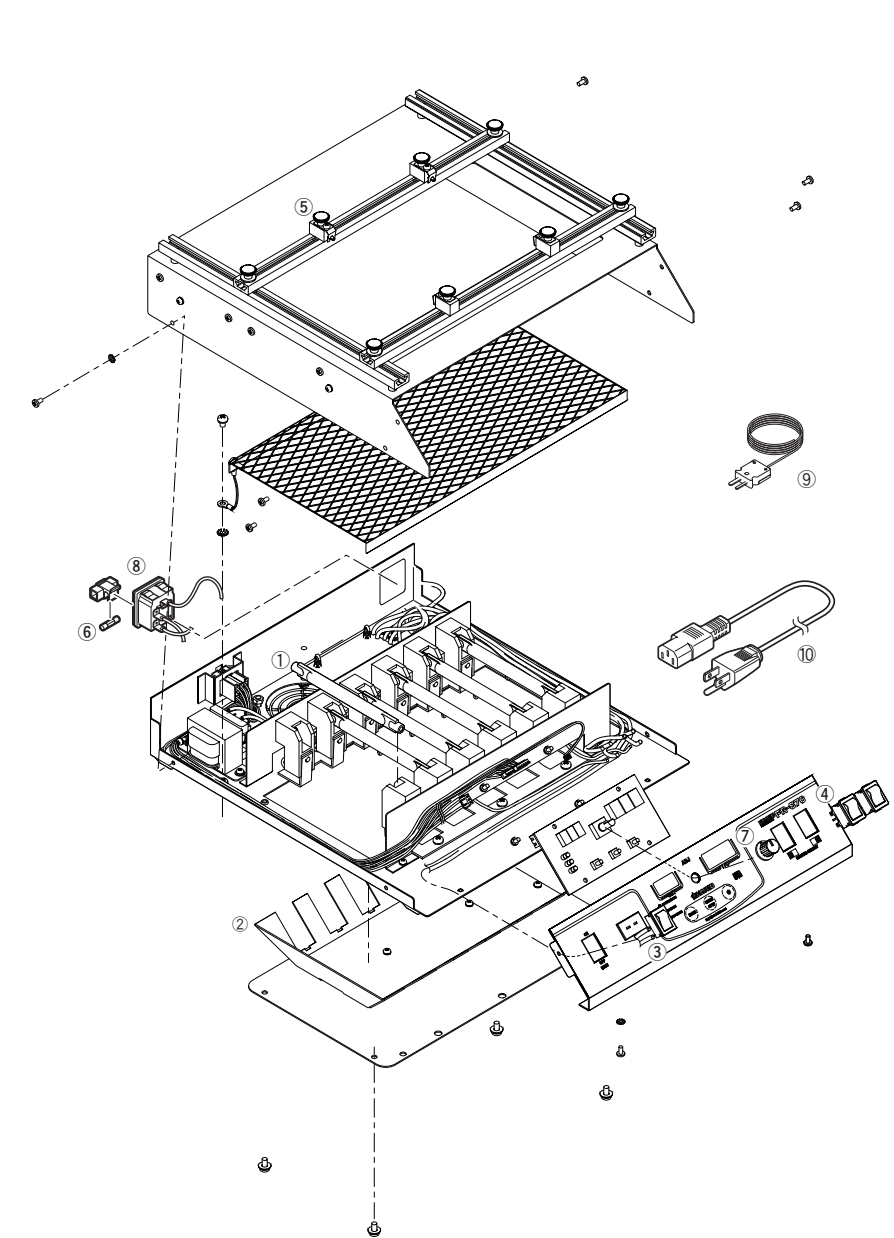
- Temperature lower limit setting error



U-E is indicated when the temperature drops below the predetermined lower limit for some reason after it has stabilized during preheating.

⚠ CAUTION
All error indications will remain until the preheater is turned off and then back on.

11. PARTS LIST



● HAKKO FR-870

Item No.	Part No.	Part Name	Specifications
①	A1574	Heater lamp	100-120V
	A1606	Heater lamp	220-240V
②	B3654	Reflector	
③	B3655	Switch	100-110V
	B3704	Switch	120V, 220-240V
④	B3656	Switch	For zone selector
⑤	B3658	P.W.B. holder	
⑥	B3527	Fuse / 250V-10A	100-120V
	B3705	Fuse / 250V-4A	220-240V
⑦	B1904	Knob	
⑧	B2384	Power receptacle	
⑨	B3516	Thermo couple	

Item No.	Part No.	Part Name	Specifications
⑩	B2419	Power cord, 3-wire cord & American plug	120V USA
	B2422	Power cord, 3-wire cord & BS plug	India
	B2424	Power cord, 3-wire cord & European plug	230V CE
	B2436	Power cord, 3-wire cord & Chinese plug	China
	B3508	Power cord, 3-wire cord & American plug	
	B3550	Power cord, 3-wire cord & SI plug	
	B3616	Power cord, 3-wire cord & BR plug	

● Optional parts

Item No.	Part No.	Part Name	Specifications
①	B3657	Connecting cable	For FR-803B
②	B3686	Connecting cable	For FM-206

