

USER MANUAL

TMT-PH600 IR PREHEATER



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WARRANTY

All equipment and accessories are warranted by Thermaltronics to be free from defects in materials and workmanship as follows:

Part Number	Description	Warranty Period
TMT-PH600-1	100-110V IR Preheater	1 Year
TMT-PH600-2	220-240V IR Preheater	1 Year
PH-HE600-1	100-110V Heating Element	30 Days
PH-HE600-2	220-240V Heating Element	30 Days

This warranty does not apply to equipment or goods which have been tampered with, misused, damaged through improper installation or used in a manner contrary to supplier instructions. Normal “wear and tear” of equipment or goods is not covered by this warranty. If the product should become defective within the warranty period, Thermaltronics will repair or replace it free of charge at its sole option. Warranty period is from the date of purchase by the original owner. If the date of purchase cannot be substantiated the date of manufacture will be used as the start of the warranty period.

WARNING:

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

TMT-PH600 SPECIFICATIONS

Input Line Voltage:	TMT-PH600-1	100-110VAC/50Hz,2000 Watts
	TMT-PH600-2	220-240VAC/50Hz,1500 Watts
Temperature Range:		50C - 400C
Heating Area (W x L):		310mm x 310mm
Heating Method:		Infrared
Fuse:	TMT-PH600-1	250V 16A
	TMT-PH600-2	250V 10A
Size (W x H x D):		520mm x 380mm x 100mm
Weight:		9 KG
Certification Marks:		CE, ETL

INTRODUCTION

Congratulations on your purchase of the TMT-PH600 IR preheater. This unit has been tested and inspected by Thermaltronics prior to shipment, and with proper maintenance will give you years of reliable performance.

SYSTEM FEATURES

The TMT-PH600 IR uses advanced intelligent temperature control technology for accurate temperature control. Three heating modes allow the unit to handle leaded & lead-free preheating processes and are suitable for use with PCB containing BGA and SMD components.

Functions and Features

1. CPU controlled IR Heater provides accurate temperature control.
2. Three heating modes to meet different soldering requirements.
3. Professional board holder allows three dimensional adjustments.
4. Electrostatic Discharge (ESD) free.
5. Large quartz infrared heating element allows work on large sized PCBA and reduces PCBA warping.
6. External sensors can be used for temperature verification or used to control preheater temperature.
7. Temperature and heating profiles can be saved for repeat use.
8. Automatic Temperature Protection features shuts off the system when external sensor temperature exceeds 430C or internal sensor temperature exceeds 600C.

SAFETY PRECAUTIONS

Warning

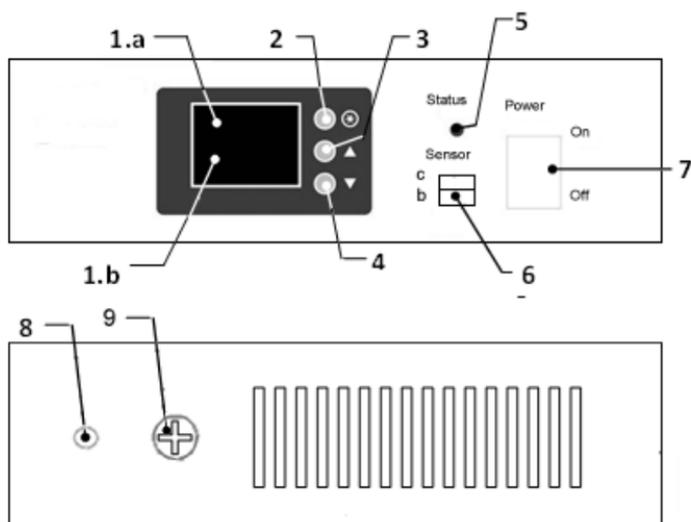
A fire may result if this equipment is not used with care and for intended applications. To avoid electric shock or injury, please follow the instructions below strictly:

1. The unit must be properly grounded.
2. The unit can reach extremely high temperatures when switched ON.
 - Do not use the device near flammable materials or gases
 - Do not touch heated parts, which can cause severe burns
 - Do not expose skin to infrared light for prolonged periods of time
3. Never operate the equipment with wet hands.
4. Always disconnect the power cord and allow the unit ample time to cooldown before performing maintenance.
5. Use only genuine replacement parts.

Caution

1. Use this equipment in a well-ventilated area, away from combustible equipment.
2. Disconnect the power cord if unit is not used for extended period of time.
3. Handle with care.
 - Never drop or sharply jolt the unit.
 - The unit contains delicate parts that can be damaged if subjected to physical force.
 - Do not spill any liquids into the unit.
4. Do not operate on uneven surfaces.
5. Allow to cool down before storage.
6. Turn off the power when the unit is not in use.
7. Do not alter the unit in any manner.

CONTROL PANEL



Legend

- | | |
|---------------------------------|---------------------------|
| 1.a - Upper Digital Display | 5 - Status Light |
| 1.b - Lower Digital Display | 6 - External Sensor ports |
| 2 - Selection button | 7 - Power Switch |
| 3 - "▲" Increase / Enter button | 8 - Power Socket |
| 4 - "▼" Decrease button | 9 - Fuse Holder |

Digital Display - Suffix

- A - Set temperature for Operation Mode 0 and 1
- b - Actual temperature of external sensor b
- c - Actual temperature of external sensor c
- d - Actual temperature of internal sensor d
- C - Set temperature for profile
- t - Set duration/time (seconds) for profile

UNPACKING/ASSEMBLY/OPERATION

Please read this manual and follow the directions before using the equipment.

The carton contains:

1. Instruction manual
2. TMT-PH600 Preheater
3. PH-KTC-1 Sensors

Important: Keep all shipping materials until satisfactory operation has been verified.

Operation - Preparation before powering on

1. Remove TMT-PH600 Preheater from its box and place on a suitable work bench.
2. Attach PH-KTC-1 sensors to the sensor ports. ("6" in control panel diagram). Verify that the sensors are properly inserted.
3. Connect the AC plug to a suitable AC power outlet. Make sure the power outlet has grounding. ("8" in control panel diagram)
4. Turn the unit on. ("7" in control panel diagram)

Note: "SENS ERRX" will display if external sensor port X is not connected properly.

Operation - Mode selection

1. The digital display on default shows "TYPE 0", press "▲" and "▼" ("3" and "4" in control panel diagram) to choose between 3 operation modes (TYPE 0, 1, 2)
2. Press the selection button ("2" in control diagram) to confirm selection.
3. If you need to select another mode at this stage, please turn off power and then turn on power.

OPERATION - MODE 0

Mode "0" - Operation

When the preheater is set to Mode "0", the system uses the internal temperature sensor to control preheater temperature. The external temperature sensors are used for additional monitoring and can be placed at the bottom of the PCB and/or near the components that are being worked on.

1. Follow "Operation - Mode Selection" Instructions
2. The digital display will show:
 - (1.a) upper digital display will show "SET"
 - (2.a) lower digital display will show "XXXA" (xxx denotes temperature)Press the "▲" button or "▼" button to adjust temperature
Note: The set temperature is adjustable from 50C to 400C in this mode.
3. Press the selection button to confirm the set temperature, the preheater will begin to heat up to the set temperature.

Mode "0" - Display

Viewing the actual temperature of external sensor "b"

Press the selection button ("2" in control diagram) repeatedly until the upper digital display shows "ACT1". The lower digital display will show the actual temperature of "b".

Viewing the actual temperature of external sensor "c"

Press the selection button ("2" in control diagram) repeatedly until the upper digital display shows "ACT2". The lower digital display will show the actual temperature of "c".

Viewing the actual temperature of internal sensor "d"

Press the selection button ("2" in control diagram) repeatedly until the upper digital display shows "ACT3". The lower digital display will show the actual temperature of "d".

Simultaneously viewing the actual temperature of external sensor "b" and "c"

Press the selection button ("2" in control diagram) repeatedly until the upper digital display shows "XXXB" and the lower display shows "XXXC".

OPERATION - MODE 1

Mode "1" - Operation

When the preheater is set to Mode "1", the system uses the external temperature sensor "b" ("6b" in control diagram) to control the preheater temperature. The external temperature sensor "c" is used for additional monitoring. **Note: In order to measure temperature correctly, kapton tape must be used to securely fix sensor B to the PCBA or component. If sensor B cannot accurately report temperature then the preheater temperature may run out of control.**

1. Follow "Operation - Mode Selection" Instructions
2. The digital display will show:
 - (1.a) upper digital display will show "SET"
 - (2.a) lower digital display will show "XXXA" (xxx denotes temperature)Press the "▲" button or "▼" button to adjust temperature
Note: The set temperature is adjustable from 50C to 280C in this mode.
3. Press the selection button to confirm the set temperature, the preheater will begin to heat up to the set temperature.

Mode "1" - Display

Viewing the actual temperature of external sensor "b"

Press the selection button ("2" in control diagram) repeatedly until the upper digital display shows "ACT1". The lower digital display will show the actual temperature of "b".

Viewing the actual temperature of external sensor "c"

Press the selection button ("2" in control diagram) repeatedly until the upper digital display shows "ACT2". The lower digital display will show the actual temperature of "c".

Simultaneously viewing the actual temperature of external sensor "b" and "c"

Press the selection button ("2" in control diagram) repeatedly until the upper digital display shows "XXXB" and the lower display shows "XXXC".

Note: Under Mode "1", it is not necessary to monitor the internal temperature sensor's read out.

OPERATION - MODE 2

Operation - Mode "2"

When the preheater is set to Mode "2", the system uses a custom temperature/time profile to control temperature. The external temperature sensor "b" ("6b" in control diagram) is used to control the preheater temperature. The external temperature sensor "c" is used for additional monitoring. **Note: In order to measure temperature correctly, kapton tape must be used to securely fix sensor B to the PCBA or component. If sensor B cannot accurately report temperature then the preheater temperature may run out of control.**

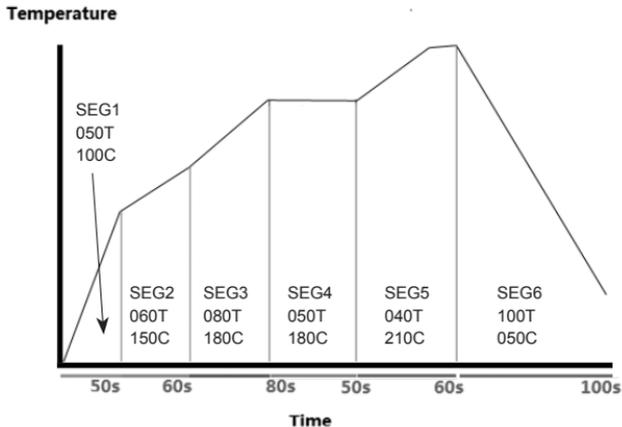
1. Follow "Operation - Mode Selection" Instructions
2. Press the selection button ("2" in control diagram), the display will show "RUN PROF"
3. Press the selection button. The digital display will show:
 - (1.a) upper digital display will show "SEG1"
 - (2.a) lower digital display will show "XXXT" (xxx denotes time in seconds)Press the "▲" button or "▼" button to adjust the time (5 to 200 seconds)
- Note: For safety, the temperature rise is limited to no more than 3C per second.**
4. Press the selection button. The digital display will show:
 - (1.a) upper digital display will show "SEG1"
 - (2.a) lower digital display will show "XXXC" (xxx denotes temperature)Press the "▲" button or "▼" button to adjust the temperature (50C to 250C)
5. Repeat step 3 and 4 setting the time and temperature for segments 2 through 6 (SEG2/3/4/5/6).
6. To start the preheating profile, repeatedly press the selection button until "RUN PROF" is displayed, than press the "▲" button to start. A three second countdown will commence before the profile is initiated.
7. To see the current segment, the running time, or the temperature of the sensors, repeatedly press the selection button to switch between the different display modes.
8. After the profile finishes running, the display will show "END"
9. Press the press the "▲" button to save the profile and exit to profile adjustment mode.

Note: To exit the running profile before the process finishes, press the "▲" button. The system will exit and return to the profile adjustment display.

TEMPERATURE PROFILE

Temperature Profile Analysis - Example

An example temperature profile with 6 segments is shown below.



1. (SEG1) Heating zone - Temperature ramps up to 100 celsius in 50 seconds
2. (SEG2) Heating zone - Temperature ramps up to 150 celsius in 60 seconds
3. Therefore it takes 110 seconds (50s + 60s) to get to 150 celsius

Calculating the Temperature Ramp Rate

The temperature ramp rate is calculated as the following:

$$\text{Ramp rate} = \text{Temp. Change} / \text{Time}$$

If two heating zones have the same temperature then the temperature stays constant.

1. (SEG1) Heating zone - Temperature ramps up to 100 celsius in 50 seconds

$$\text{Ramp rate} = 100 / 50$$

$$\text{Ramp rate} = 2 \text{ celsius} / \text{second}$$
2. (SEG2) Heating zone - Temperature ramps up to 150 celsius in 60 seconds

$$\text{Ramp rate} = (150 - 100) / 60$$

$$\text{Ramp rate} = 0.833 \text{ celsius} / \text{second}$$

FREQUENTLY ASKED QUESTIONS

Q: The unit has no power.

A: Check if the unit is switched on and the power cord is plugged in. Verify that the fuse has not blown out.

Q: Status Light definitions.

Red Light - Standby State

Red / Green Light - Preheat State

Green Light - Operating State

Q: Unit display screen is showing unknown characters

A: Please turn off power and back on. If the problem persists have the unit serviced by a certified technician.

Q: Error Messages (ERRX, where X = digit)

A: One or more sensors may need to be replaced. Please turn the unit off and then on again.

Q: Error Messages (ERR0)

A: Check external sensor C and make sure it is connected properly. If issue persists replace with new one (PH-KTC-1).

Q: Error Messages (ERR1)

A: Check external sensor B and make sure it is connected properly. If issue persists replace with new one (PH-KTC-1).

Q: Error Messages (ERR2)

A: Check internal sensor D and make sure it is connected properly. Please consult your local vendor.

Q: Error Messages (ERR3)

A: Indicates a bad sensor connection or no temperature increase. Please consult your local vendor.

Q: Other problems

A: Please contact your vendor or Thermaltronics at the email address: support@thermaltronics.com.

ORDERING GUIDE

SPARE PARTS

PART#	DESCRIPTION
TMT-PH600-1	IR Preheater 100V - 110V
TMT-PH600-2	IR Preheater 220V - 240V
PH-HE600-1	100-110V Heating Element for TMT-PH600-1
PH-HE600-2	220-240V Heating Element for TMT-PH600-2
PH-KTC-1	Thermocouples - K Type (2 Pack)