# ST 1600 Four Zone Pre-Heater
# Operation and Maintenance Manual

# Manual number 5050-0558 RevB

# **PACE ST 1600 *Table of Contents***

## Packing Contents, Standard Items

| | | |
|---|---|---|
| 6000-0380 | Assembly, Thermo Couple Mount | 1 |
| 7008-0302 | Assembly, ST-1600, 120V, (8007-0563) | 1 |
| 7008-0303 | Assembly, ST-1600E, 230V, (8007-0564) | 1 |
| 7021-0009 | Thermocouple Probe, PCB | 1 |
| 1332-0094 | Domestic Power Cord, (8007-0563) | 1 |
| 1332-0093 | Export Power Cord, (8007-0564) | 1 |
| 1332-0280 | Export Power Cord, Type G (8007-0564) | 1 |

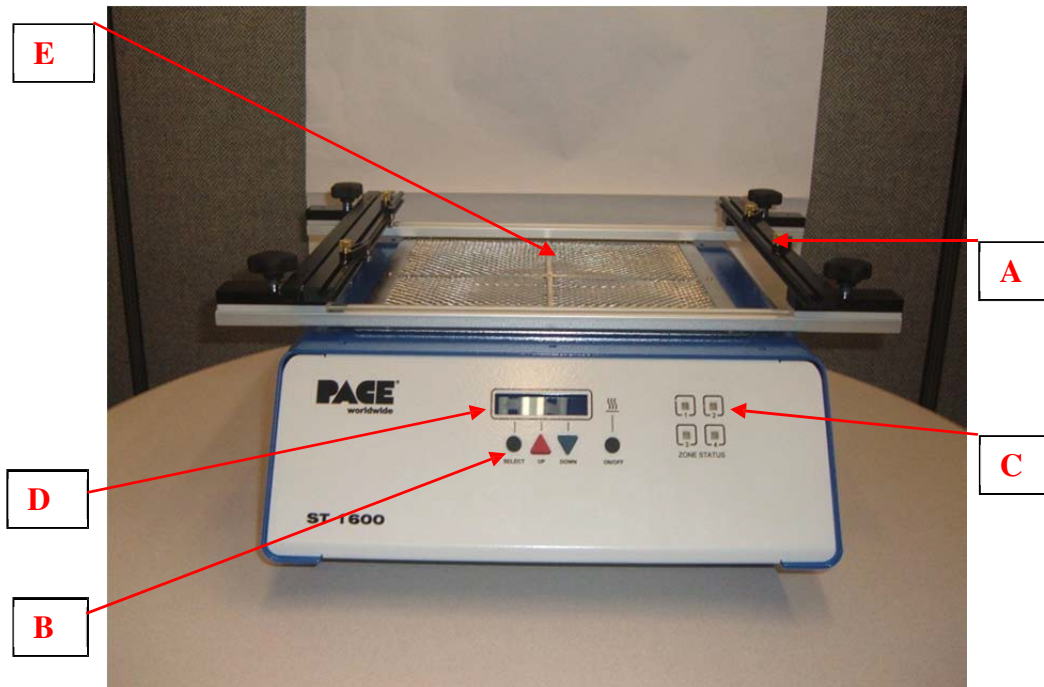*Also the Board Holders Assembly Kit; Parts are identified in the Board Holder Installation Procedure on Page 5.*

## Specifications:
## ST 1600 4 Zone Pre-Heater

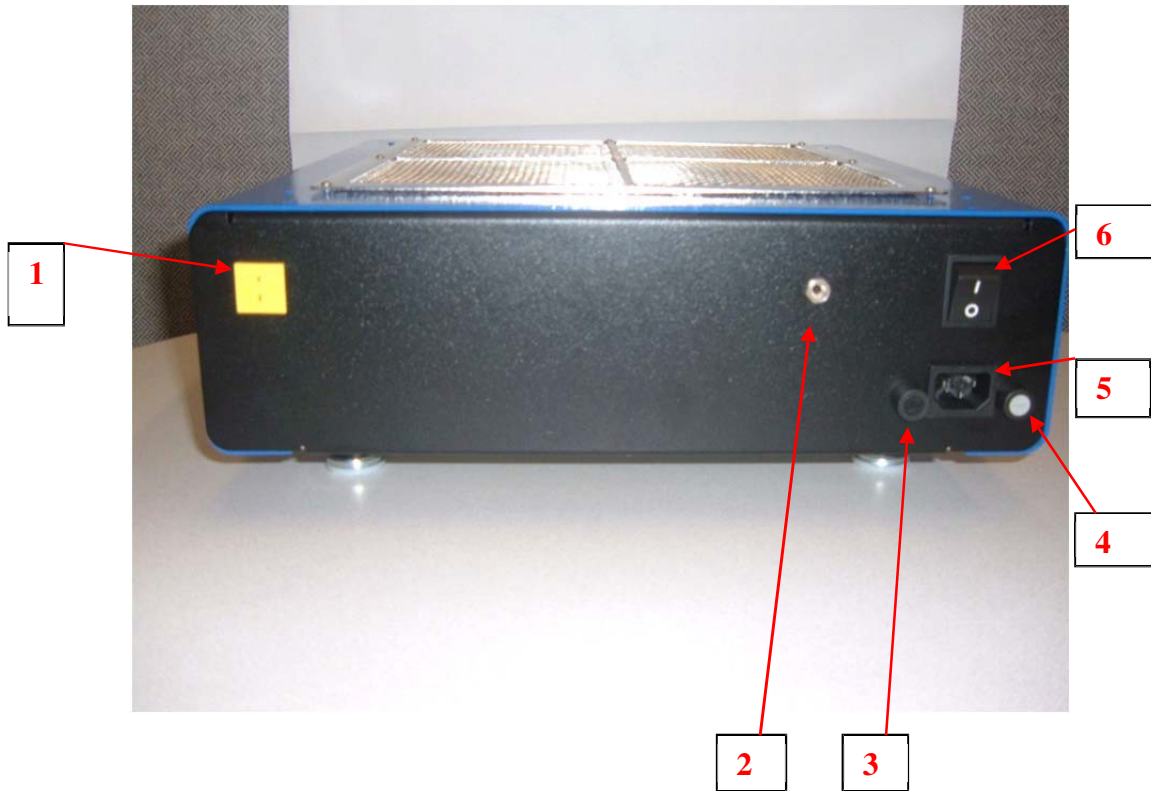| Part Number | (*Domestic*)- 8007-0563<br>(*Export*)- 8007-0564 |
|---|---|
| Dimensions | 127mm **H (without PCB holder)** x 381mm **W** x 457.2mm **D** *(5" x 15" x 18")* |
| Weight | 13.15kgs (29lbs) |
| Power Requirements | 115 VAC, (Domestic), 14 Amps (1600W)<br>230 VAC, (Export), 7 Amps (1600W) |
| Pre-Heaters | 4 Ceramic Infra Red (IR) Heaters<br>  - 4 zone heaters of 400 Watts/1600 Watts in total |
| Control | LED Digital Display & Keypad |
| PC Board Size | 305mm x 406mm, 12" x 16" |
| RoHS | YES |
| Calibration | NO |
| Temp Range | *38 ℃ - 232 ℃  or  100 ℉ - 450 ℉* |

# ST 1600 4 Zone Pre-Heater Parts Identification



## Front 1 Figure of ST 1600

| | | |
|---|---|---|
| **A.** | *PC Board Holder* | Mounts and positions the PCB into secure position |
| **B.** | *Function Buttons "Soft Keys"* | Allows selection of the programming functions, and control of the process parameters. |
| **C.** | *Zone Pre-Heat Indicator Lights* | Illustrates which heaters are on, when a heater is heating up it displays an amber color, and when the Pre-heater status is ready it displays Green<br>When you select a certain heater the zone status indicator light will be blinking. |
| **D.** | *LED display* | Digitally displays menus, operations, parameters etc… |
| **E.** | *4 Zone Pre-Heaters* | Ceramic IR heating source used to provide bottom-side board Pre-heating. There are 4 individual 400 Watt heaters |

**Figure 2 Rear Panel Identification**

| 1 | K-Type thermocouple input | Thermocouple used to control temperature on PCB in Ext thermocouple, as it helps to develop profiles |
|---|---|---|
| 2 | External Ground | Used for connecting an external ground |
| 3 | Fuse | Domestic- 0.5A SB, PACE # 1159-0248 Export- 0.5A Time Lag, PACE # 1159-0213 |
| 4 | Main fuse | Domestic- 15A SB, PACE # 1159-0279 Export- 7A Time Lag, PACE # 1159-0278 |
| 5 | AC Power Connection | 115 VAC, (Domestic), 14 Amps (1600W) 230 VAC, (Export), 7 Amps (1600W) |
| 6 | On / OFF Switch | Used to turn system on/off. |

## Safety Information:

a. Do not contact the Pre-heaters or its peripheral parts during operation.
b. Once turned off, let the heaters cool completely before contacting. The Heaters are hot and will cause burns.
c. Let PCBs cool before touching after heat application
d. Do not use near combustible vapors.
e. Do not leave the equipment unattended when in use.
f. Do not open the unit without disconnecting the main power cord.
g. ST 1600 should only be used by a trained operator.

## Features:

- The ST 1600 is ideal for Pre-heating PCBs where temperatures must be controlled/monitored to protect adjacent components or other surface areas.
- Offers the flexibility to control 4 ceramic Pre-heaters individually; each Pre-heater can be turned on or off while others are still active.
- The ST 1600 consists of 4 ceramic IR 400 watts Pre-heaters; total of 1600 Watts.
- Clear LCD display with functional soft-keys to perform operations.
- The IR ceramic Heaters are advanced and able to heat up to set temperature within a minute or two. *Cold to high temperature may take 5 minutes or lower.*

## Board Holder Set-up:

| Parts List | | | |
|------|-----|-------------|-------------------|
| **Item** | **QTY** | **Part Number** | **Description** |
| 1 | 1 | 6993-0289 | PC Board Holder |
| 2 | 4 | 1405-0966 | Screw, 6-32 x 0.5 |
| 3 | 4 | 1215-0257 | Spacer, #6 x 0.25 |



### Circuit Board Holder Installation Procedure

**Attach the board holder using the four screws and four spacers on top of the system into the 4 screw holes as show in the figure above.**

## Start Up/System Operation Main Menu:

*Note: **4 zones mode** and **Ext Thermocouple** Mode are chosen in the set-up menu by powering on the system while holding down the "Select Key". Refer to page 7-8 for Set-up menu.*

### 4 Zones Mode:

- Turn on Power switch on rear of unit.
- The digital display on the front panel will indicate which heater is on/off and what the set temperature is.
- The zone status indicator lights will show an amber color when a specific heater is heating up to a set temperature; it will turn green when the heater is up to temperature.
- Specific Heaters can be selected to be turned on by pushing " Select Key" and it will allow you to navigate between the desired heaters; as you navigate between heaters, the heater that displays on the digital display will be blinking on the zone status indicator light; you can only change temperatures of heaters when that certain heater is selected
- When you select a heater to be turned on, simply push the "On/Off Key" and that heater will begin heating to the set temperature; Individual Heater temperatures can be adjusted using the "Red Up and Blue Down" Keys up to 232°C.
- Once you have selected a heater, for example heater #1, the zone status indicator light for Pre-heater #1 will become an amber color indicating it is heating up
- When the zone status lights turn from amber to Green then the selected Pre-heaters are up to temperature
- Once a temperature is set, it will begin heating up to the desired temperature. The temperature of each heater can not be changed unless it is selected and the heater indicator light is blinking as well as displayed on the LCD screen

### External Thermocouple Mode:

*\*Thermocouples are used for profiling; they are used to measure the temperature at or around a component, as the primary means of developing a profile\**

- Turn on power switch on the back of the unit.
- Install supplied thermocouple into receptacle on rear of unit
- The LCD screen will illustrate the temperature that the thermocouple is reading; the digital display screen will change between the thermocouple reading, and the set pre-heat temperature for the particular heaters that are selected.
- The LCD screen does not indicate which heater is selected and turned on; the zone status indicator lights show which heater is on with an amber color and will turn Green once temperature is reached.
- To change parameters and turn on other heaters, you hit the "Select Key" to navigate between heaters
- If you want to turn on heater #1, you hit select until the zone status light for heater one is blinking, then you hit "On/Off Key" to turn on heater #1.
- Only one temperature is set for external thermocouple mode, and that is the temperature that the board is trying to reach; you can individually turn on/off heaters but they will all work toward bringing the board up to that specific temperature.

## Pre-heating Basics

Preheating of a printed circuit assembly is normally required in the repair process whenever any one or more of the following situations exist.

1. Epoxy glass substrate with 4 or more layers.

2. Substrate with large ground planes.

3. Substrate of ceramic, polyimide or other high heat dissipative material.

4. Printed Circuit assembly with large metal heat sinks.

**Preheating of assemblies such as those listed above will accomplish the following objectives.**

1. Minimize thermal shock by elevating the assembly temperature to a level closer to solder melt temperature

2. Minimize the heat cycle reflow time

3. Overcome the heat dissipation characteristics of the assembly

4. Minimize adjacent melts on densely populated assemblies.

## Setup Menu:

The Setup Menu is entered by powering up the ST 1600 while **holding down the (Select Key) as the power is turned on;** holding it until the Version message is displayed. The following Message will then be displayed:

*"Password Needed?"*
*"Same    No    Yes"*

-Pressing the Soft-Key #1 *(Same Password)* will move you onto the next menu item, keeping the existing password in the system the same.
-Pressing the "Red Up Soft-Key" *(No)* will remove the password, and move onto the next menu item, temperature scale.
-Pressing the "Blue Down Soft-Key" (*Yes*) will bring up the password select menu as shown below:

*"Ent  New Password"*
*"Enter          Exit"          <->   "Password = 0000"*

-Pressing the "Blue Soft Key" will exit the password entry menu.
-Pressing the Soft-Key #1 (Enter) will allow you to enter a password, and this can be performed by following the step below:

Using the "Red Up" and "Blue Down" soft keys, a password from 1 -- 9999 may be set. A password of "0000" is considered to be no password.

-Pressing "Select Key", will move you to a display that reads

*" °F or °C Disp?"*

**" Same      ° F        ° C?**

-Pressing Soft-Key #1 (Same) will keep the temperature display on the original scale.
-Pressing the "Red Soft Key" will change the temperature scale to F and move you to the following menu.
-Pressing the "Blue Soft Key" will change the temperature scale to C and move you to the following menu below.

**"Zone Select?"**
**"Four        Ext TC"**

-Pressing "Soft-Key #1" (*Four*) will set you into four zone mode, and move you to the following menu
-Pressing the "Blue Soft-Key" (*Ext TC*) will set you into External Thermocouple Mode, and move you to a menu that will allow you to exit the Set-up menu.

**"Scan Needed?"**
**"Yes          No"**

-Pressing "S*oft-*Key #1" (*Yes*) will put the zone heaters into a scan mode by rotating between the 4 zones on the LCD screen and the zone indicator lights
        -*You will be prompted to set an "xxx" number of seconds before it moves on to the status of the next heater*
-Pressing "Blue Soft-Key" *(No)* will move you out of the scan display option and move you to the exit menu.

If Ext TC (External Thermocouple) was chosen above the following menu will appear:

**"Auto-Off"**
**"Yes        No"**

-Pressing "Soft-Key #1" (Yes) will put the system into an "Auto-Off" Mode
        -You will be prompted to set 1-10 hours before the system shuts off the heaters
        -When the system is in "Auto-Off" Mode, simply hit the "UP" bottom to turn the
        heaters back on
-Pressing the "Blue Soft key #3" (No) will bring you to the Exit Set-up display.

**"Exit Set-up?"**
**"Yes          No"**

-Pressing "Soft-Key #1" (*Yes)* will exit you out of Set-up mode and move you into "Main Menu".
-Pressing "Blue Soft Key #3" (*No)* will bring you back to the beginning of the Setup-mode menu *Password Needed?*

## Trouble Shooting:

***Maintenance beyond this should only be completed by a qualified PACE service technician.***

| Symptom | Problem | Solution |
|---|---|---|
| No Power to System | -*System not plugged into AC*<br>-*Main Fuse Blown* | -*Plug System into power outlet*<br>-*Replace Fuse* |
| No Power to Heaters | -*Heater fuse blown* | -*Replace heater fuse* |
| Forgot Set Password | -A *Password is set and operator can not remember* | -*Call **PACE** Tech Support* |

**<u>Service and Warranty:</u>**

***Please contact PACE or your local distributor for service and repair***

## <u>LIMITED WARRANTY</u>

Seller warrants to the first user that products manufactured by it and supplied hereunder are free of defects in materials and workmanship for a period of three (1) year from the date of receipt by such user. Blowers and motor pumps (which wear out during normal use) are warranted for a period of one (1) year.

This warranty does not cover wear and tear under normal use, repair or replacement required as a result of misuse, improper application, mishandling or improper storage. A consumable item such as tips, heaters, filters, etc. which wear out under normal use are excluded. Failure to perform recommended routine maintenance, alterations or repairs made other than in accordance with Seller's directions, or removal or alteration of identification plates in any way will void this warranty. This warranty is available only to the first user, but the exclusions and limitations herein apply to all persons and entities.

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Warranty service may be obtained by contacting the appropriate PACE Company or local Authorized PACE distributor as set forth below to determine if return any item is required or, if repairs can be made, by the user in the field.

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