PACE® INCORPORATED

ISO 9001 CERTIFIED

MBT 250, MBT 220 SYSTEMS

OPERATION & MAINTENANCE MANUAL

MANUAL NO. 5050-0380

REV. C

SYSTEM QUICK START

The MBT 250 and MBT 220 systems are very easy to operate and can be quickly set up for use in standard soldering/desoldering operations. **To begin operation of your new system quickly, perform the "Set-Up" and "Quick Start - Basic Operation" procedures detailed on pages 16 through 25 of this manual.** When performing other operations which require use of large or specialized tips, PACE recommends that the user read and fully understand the "Operation" portion of this manual in order toutilize the features of this system.

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Systems for Development, Production and Repair of Electronic Assemblies

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GENERAL INFORMATION

USE OF THIS MANUAL

The information contained in this manual will provide the user with the knowledge necessary to properly operate and maintain the PACE MBT 250 & MBT 220 systems. **When using your new system in standard soldering/desoldering operations, you can begin operation quickly by performing the "Set-Up" and "Quick Start - Basic Operation" procedures detailed on pages 16-25 of this manual.** To fully utilize the features of the system, PACE Strongly recommends that the user read and fully understand the "Operation" and "Calibration" portions of this manual. The use of these features is especially important when performing operations which require the use of large or specialized tips. The "Quick Reference" guide is provided as a convenient reference for day-to-day operation of the system. If you encounter any difficulty operating your system, call your local authorized PACE dealer or contact PACE Applications Engineering directly at Tel. (301) 490-9860 or FAX (301) 604-8782.

GENERAL INFORMATION

INTRODUCTION

MBT 250 & MBT 220 Universal Soldering and Repair Systems provide the user with the power and versatility to remove and install virtually all SMD and Thru-Hole components. The power source incorporates the highly responsive SensaTemp (closed-loop) temperature control system which provides up to 182 watts of total power to the three output channels (see Power Management, Page 12). Microprocessor controlled circuitry allows the user to quickly configure the system to their requirements and easily recalibrate the system to maintain accuracy and peak performance. Accessory SensaTemp handpieces (standard & optional) and a wide variety of special use tips, employing different shapes and sizes, allow the user to remove and replace a wide variety of component configurations.

Virtually all of today's specialized handpieces with large SMD tips suffer from a problem in which the actual tip temperature that the work sees can be more than 55°C (100°F) cooler than the Set Tip Temperature displayed. The MBT 250 and MBT 220 systems feature PACE's unique Tip & Temperature Selection System with Auto Tip Offset Compensation which allows the user to *Set* and *Display* the *True, Correct Tip Temperature* for any size and type of tip or handpiece.

The MBT 250 & MBT 220 systems utilize the PPS 85 power source which is available with an integral vacuum/ pressure motor pump assembly or with an integral air venturi assembly (Shop Air system).

The MBT 250 & MBT 220 systems are available in either the 115 VAC, 100 VAC or 230 VAC versions. The 230 VAC version systems bear the CE Conformity Marking which assures the user that it conforms to all the requirements of council directive EMC 89/336/EEC. The systems include the power source with a selection of accessories and functional aids.

PACE uses the following suffix letters on all MBT 250 & MBT 220 system and associated PPS 85 power source identifications to indicate the specific design configuration.

A (e.g., MBT 250**A**) - 115 VAC system (or power source) with integral motor pump assembly.

AJ (e.g., MBT 220**AJ**) - 100 VAC system (or power source) with integral motor pump assembly.

A E (e.g., PPS 85**AE**) - 230 VAC system (or power source) with integral motor pump assembly.

V (e.g., MBT 220**V**) - 115 VAC system (or power source) with integral integral air venturi assembly.

VJ (e.g., PPS 85**VJ**) - 100 VAC system (or power source) with integral integral air venturi assembly.

V E (e.g., MBT 250**VE**) - 230 VAC system (or power source) with integral integral air venturi assembly.

GENERAL INFORMATION

The system configurations are as follows:

MBT 250A & MBT 250V Systems - Consist of PPS 85A or PPS 85V (115 VAC, 60 Hz Version) Power Source, SX-70 Sodr-X-Tractor, SP-2A Sodr-Pen Soldering Iron, TJ-70 Mini ThermoJet Handpiece, TT-65 ThermoTweez Handpiece, SP Tip & Tool Stand, SX Tip & Tool Stand, TT Tip & Tool Stand, Tip Maintenance Station, PACE's unique Tip & Temperature Selection System and Accessory Kit.

MBT 250AJ & MBT 250VJ Systems - Consist of PPS 85AJ or PPS 85VJ (100 VAC 50/60 Hz Version) Power Source, SX-70 Sodr-X-Tractor, SP-2A Sodr-Pen Soldering Iron, TJ-70 Mini ThermoJet Handpiece, TT-65 ThermoTweez Handpiece, SP Tip & Tool Stand, SX Tip & Tool Stand, TT Tip & Tool Stand, Tip Maintenance Station, PACE's unique Tip & Temperature Selection System and Accessory Kit.

MBT 250AE & MBT 250VE Systems - Consist of PPS 85AE or PPS 85VE (230 VAC 50 Hz Version) Power Source, SX-70 Sodr-X-Tractor, SP-2A Sodr-Pen Soldering Iron, TJ-70 Mini ThermoJet Handpiece, TT-65 ThermoTweez Handpiece, SP Tip & Tool Stand, SX Tip & Tool Stand, TT Tip & Tool Stand, Tip Maintenance Station, PACE's unique Tip & Temperature Selection System and Accessory Kit.

MBT 220A & MBT 220V Systems - Consist of PPS 85A or PPS 85V (115 VAC, 60 Hz Version) Power Source, SX-70 Sodr-X-Tractor, SP-2A Sodr-Pen Soldering Iron, SP Tip & Tool Stand, SX Tip & Tool Stand, PACE's unique Tip & Temperature Selection System and Accessory Kit.

MBT 220AJ & MBT 220VJ Systems - Consist of PPS 85AJ or PPS 85VJ (100 VAC 50/60 Hz Version) Power Source, SX-70 Sodr-X-Tractor, SP-2A Sodr-Pen Soldering Iron, SP Tip & Tool Stand, SX Tip & Tool Stand, PACE's unique Tip & Temperature Selection System and Accessory Kit.

MBT 220AE & MBT 220VE Systems - Consist of PPS 85AE or PPS 85VE (230 VAC 50 Hz Version) Power Source, SX-70 Sodr-X-Tractor, SP-2A Sodr-Pen Soldering Iron, SP Tip & Tool Stand, SX Tip & Tool Stand, PACE's unique Tip & Temperature Selection System and Accessory Kit.

The SR-4 "Safety Rated" designation on the front panel is your assurance that the MBT 250A & MBT 220A systems: Meet all applicable EOS/ESD, temperature stability and other government and industry specification requirements (including *MIL-STD-2000A and *WS-6536); Contain PACE's unique SensaTemp temperature management system for high performance and safety; feature Auto Tip Offset Compensation for superior thermal process control, and Auto Temperature Setback/Power Off for energy conservation and safety. ***NOTE -** Systems equipped with a special current limiting option (1 meg ohm tip to ground resistance) comply with EN 100015-1. PACE refers to these systems as "Soft Ground Systems".

PRODUCT APPLICATION

The following sections of this manual will familiarize you with the parts and operation of the system. Please read the "Set-Up" & "Quick Start - Basic Operation" sections before attempting to use the system. If you require assistance in the use of this product for your particular application, contact your local authorized PACE dealer or PACE Applications Engineering at Tel.# (301) 490-9860, Fax# (301) 604-8782.

GENERAL INFORMATION

SPECIFICATIONS

POWER REQUIREMENTS

PPS 85A - Version operates on 97-127 VAC, 50/60 Hz.
185 Watts, 1.6 Amp max, 100% Duty Cycle, Motor on.

PPS 85AJ - Version operates on 99-110 VAC, 50/60 Hz.
150 Watts, 2.5 Amp max, 100% Duty Cycle, Motor on.

PPS 85AE - Version operates on 196-253 VAC, 50 Hz.
212 Watts, 0.92 Amp max, 100% Duty Cycle, Motor on.

PPS 85V - Version operates on 97-127 VAC, 50/60 Hz.
185 Watts, 1.6 Amp max, 100% Duty Cycle

PPS 85VJ - Version operates on 99-110 VAC, 50/60 Hz.
150 Watts, 2.5 Amp max, 100% Duty Cycle

PPS 85VE - Version operates on 196-253 VAC, 50 Hz.
212 Watts, 0.92 Amp max, 100% Duty Cycle

PHYSICAL PARAMETERS

Size: 13.5 cm H x 16.5 cm W x 26 cm D (5.3"H x 6.5"W x 10.25"D)

Weight: 4.5 Kg. (10 Lbs.)

VACUUM AND AIR (motor operated systems)

Measurements at front panel **AUTO SNAP-VAC** and CONTROLLABLE **PRESSURE** Ports.

Vacuum Rise Time:	Evacuates 33 cc (2 cubic inch) volume to 25 cm Hg. (10 in. Hg.) in 150 ms.
Vacuum:	51 cm Hg. (20 in. Hg.) (nominal)
Pressure:	.48 Bar (7 P.S.I.) (nominal **MAX** setting)
Air Flow:	9 SLPM (0.32 SCFM) maximum

SHOP AIR INPUT REQUIREMENTS (air operated systems)

Pressure: 5.48 Bar (80 p.s.i.) recommended
6.17 Bar (90 p.s.i.) maximum

Air Flow: 4.53 SLPM (1.6 SCFM) minimum

NOTE

The system must be connected to a clean, dry, filtered air supply. Connection to air supplies with moisture or contaminents will affect system performance and may cause damage to the air venturi system.

TEMPERATURE SPECIFICATIONS

Tip Temperature Range: 38°C to 482°C (100°F to 900°F) nominal (see note).

Digital Readout Resolution: ±1° (°C or °F)

Tip Temperature Stability: ±1.1°C (2°F) at Idle from Set Tip Temperature.

NOTE

Actual minimum and maximum Operating Tip Temperatures may vary depending on handpiece & tip selection.

EOS/ESD

Tip-To-Ground Resistance: Less than 5 ohms (except on Soft Ground Systems).

AC Leakage: Less than 2 millivolts RMS from 50Hz to 500Hz (except on Soft Ground Systems).

ENVIRONMENTAL REQUIREMENTS

Ambient Operating Temperature: 0°C to 50°C (32°F to 120°F)

Storage Temperature: -40°C to 100°C (-40°F to 212°F)

GENERAL INFORMATION

CAPABILITIES

All capabilities are dependent upon the use of the appropriate Functional Accessories or Work Aids (refer to Basic Operation section). Available SensaTemp handpieces and their associated assembly and repair functions are listed below. An Operations and Maintenance Manual is provided separately with each handpiece which describes the applications and recommended procedures for that particular tool.

SP-2A Sodr-Pen Soldering Iron - Provides a wide range of SMD and thru-hole installation and removal capability as well as unsurpassed thermal performance on heavy, multilayer thru-hole assemblies at safe, lower working temperatures. A wide variety of 3/16" shank, quick change thru-hole and SMD tips (for chip components, SOTs, SOICs and other components) are available.

SP-1A Sodr-Pen Soldering Iron - Uses 1/8" shank tips and features a slimmer, more compact heater than the SP-2 Sodr-Pen for easier access on densely populated assemblies.

SX-70 Sodr-X-Tractor handpiece - Air handpiece ideal for thru-hole desoldering on extra high mass multilayer boards. Also ideal for removal of TSOP & TQFP surface mount components and for “Flo” desoldering during surface mount land preparation.

TT-65 ThermoTweez handpiece - Performs removal of PLCC (J Leaded), LCCC (leadless) and other surface mount devices.

TP-65 ThermoPik handpiece - Air handpiece performs removal of Flat Pack, QFP & PQFP surface mount devices.

DTP-80 Dual ThermoPik handpiece - Air handpiece performs removal of large Flat Pack, QFP, PQFP & BGA surface mount devices.

TJ-70 Mini ThermoJet handpiece - Air handpiece. Focused hot air reflow handpiece used for installation of all types of surface mount devices.

NOTE

The MBT 250 & MBT 220 products feature PACE’S unique SensaTemp closed loop temperature management system which will function only with the SensaTemp handpieces listed above. Do not attempt to use any other handpiece. Likewise, use SensaTemp handpieces on only those systems with a SR-3 or SR-4 rating (marked on front panel of power source). These include other MBT systems (MBT 101, MBT 201 and higher) and all ST series systems.

GENERAL INFORMATION

GENERAL INFORMATION

PARTS IDENTIFICATION

Listed below is a description of the system power source parts. Use Figures 1 & 2 as a guide.

1. **CH 1 POWER RECEPTACLE** - Provides power, tip ground, sensing circuitry and finger switch connection from MBT system to handpiece connected to Channel 1 (**CH 1**).
2. **CH 2 POWER RECEPTACLE** - Provides power, tip ground, sensing circuitry and finger switch connection from MBT system to handpiece connected to Channel 2 (**CH 2**).
3. **CH 3 POWER RECEPTACLE** - Provides power, tip ground, sensing circuitry and finger switch connection from MBT system to handpiece connected to Channel 3 (**CH 3**).
4. **POWER SWITCH** - Turns system ON ("1") and OFF ("0"); controls input power to the system.
5. **AUTO SNAP-VAC PORT** - Quick connect fitting provides quick-rise vacuum for Sodr-X-Tractor, ThermoPik and Dual ThermoPik handpieces. Vacuum is present when handpiece finger switch or optional foot pedal is actuated. Vacuum ceases 1.2 seconds after switch (or foot pedal) released.
6. **CONTROLLABLE PRESSURE PORT** - Quick connect fitting with adjustable valve which provides variable air flow for Mini ThermoJet handpiece (in Hot Jet Mode) and Sodr-X-Tractor handpiece. Air pressure is present when handpiece finger switch or optional foot pedal is actuated. Air pressure ceases 1.2 seconds after switch (or foot pedal) is released.
7. **DIGITAL READOUT** - Provides a three digit display of the Current Channel (channel with illuminated LED; CH 1, CH 2 or CH 3) temperature information. This includes: Operating Tip Temperature in Temperature Display Mode (normal operation), Tip Offset Constant in Tip Offset Mode, Set Tip Temperature in Tip Set Mode and other information in Calibration (CAL) Mode.
8. **°F\°C KEY** - Selects °F or °C display of Set and Operating Tip Temperatures and Tip Offset Constants.
9. **°F LED** - Illuminates when Set and Operating Tip Temperatures, and Tip Offset Constants are displayed in °F.
10. **°C LED** - Illuminates when Set and Operating Tip Temperatures, and Tip Offset Constants are displayed in °C.
11. **CH 1 LED** - Illuminates when Channel 1 (**CH 1**) is the “Current Channel” i.e., the channel (with connected handpiece\tip) whose temperature information is displayed on the digital readout.
12. **CH 2 LED** - Illuminates when Channel 2 (**CH 2**) is the “Current Channel” i.e., the channel (with connected handpiece\tip) whose temperature information is displayed on the digital readout.
13. **CH 3 LED** - Illuminates when Channel 3 (**CH 3**) is the “Current Channel” i.e., the channel (with connected handpiece\tip) whose temperature information is displayed on the digital readout.

14. **CH SELECT KEY** - Selects the Current Channel (among "Active Channels" i.e., those with a connected handpiece).

15. **TIP SET KEY** - Allows the operator to adjust the Set Tip Temperature for the handpiece\tip combination connected to the Current Channel. Places the system in the Tip Set Mode.

16. **TIP SET LED** - Flashes when **TIP SET** Key is pressed indicating that the system is in Tip Set Mode.

17. **TIP OFFSET KEY** - Allows the operator to adjust the Tip Offset Constant for the handpiece connected to the Current Channel. Places the system in the Tip Offset Mode.

18. **TIP OFFSET LED** - Flashes when **TIP OFFSET** Key is pressed indicating that the system is in Tip Offset Mode. Remains illuminated (not flashing) in Temperature Display Mode (normal operating mode) when a Tip Offset Constant of greater than "3" for °C ("6" for °F) is entered.

19. **SCROLL UP KEY** - Increases the Set Tip Temperature (in Tip Set Mode) and the Tip Offset Constant (in Tip Offset Mode) in one, then ten degree increments. Also used in “CAL” (Calibration) Mode.

20. **SCROLL DOWN KEY** - Decreases the Set Tip Temperature (in Tip Set Mode) and the Tip Offset Constant (in Tip Offset Mode) in one then ten degree increments. Also used in “CAL” (Calibration) Mode.

21. **EARTH GROUND RECEPTACLE** - provides positive earth ground to which a ground cable can be connected from the workpiece or work surface as part of a static control program.

22. **TIP & TEMPERATURE SELECTION SYSTEM CHART HOLDER** - Holds PACE’s Tip & Temperature Selection System Charts which enable the operator to accurately set and display the true, correct operating tip temperature for any handpiece\tip configuration.

23. **AC POWER RECEPTACLE/FUSE HOLDER** - Receptacle for providing power to the system from AC outlet through power cord. Also location of Fuse (F1) which protects system from overcurrent conditions.

24. **CAL/SET KEY LOCK** (optional) - In the "**LOCK**" position, Set Tip Temperatures and Tip Offset Constants cannot be changed. In addition, the system cannot be put into "CAL" Mode. In the "**UNLOCK**" position, all system functions operate normally.

25. **FOOT PEDAL RECEPTACLE** - Input for Foot Pedal (optional) which actuates vacuum or pressure to the air-operated handpieces.

26. **AIR HOSE FITTING** ("V" systems only) - Fitting for connection of house air supply to power source air venturi assembly.

26. **FUSE** - Provides overload protection for system.

PARTS IDENTIFICATION CONT'D

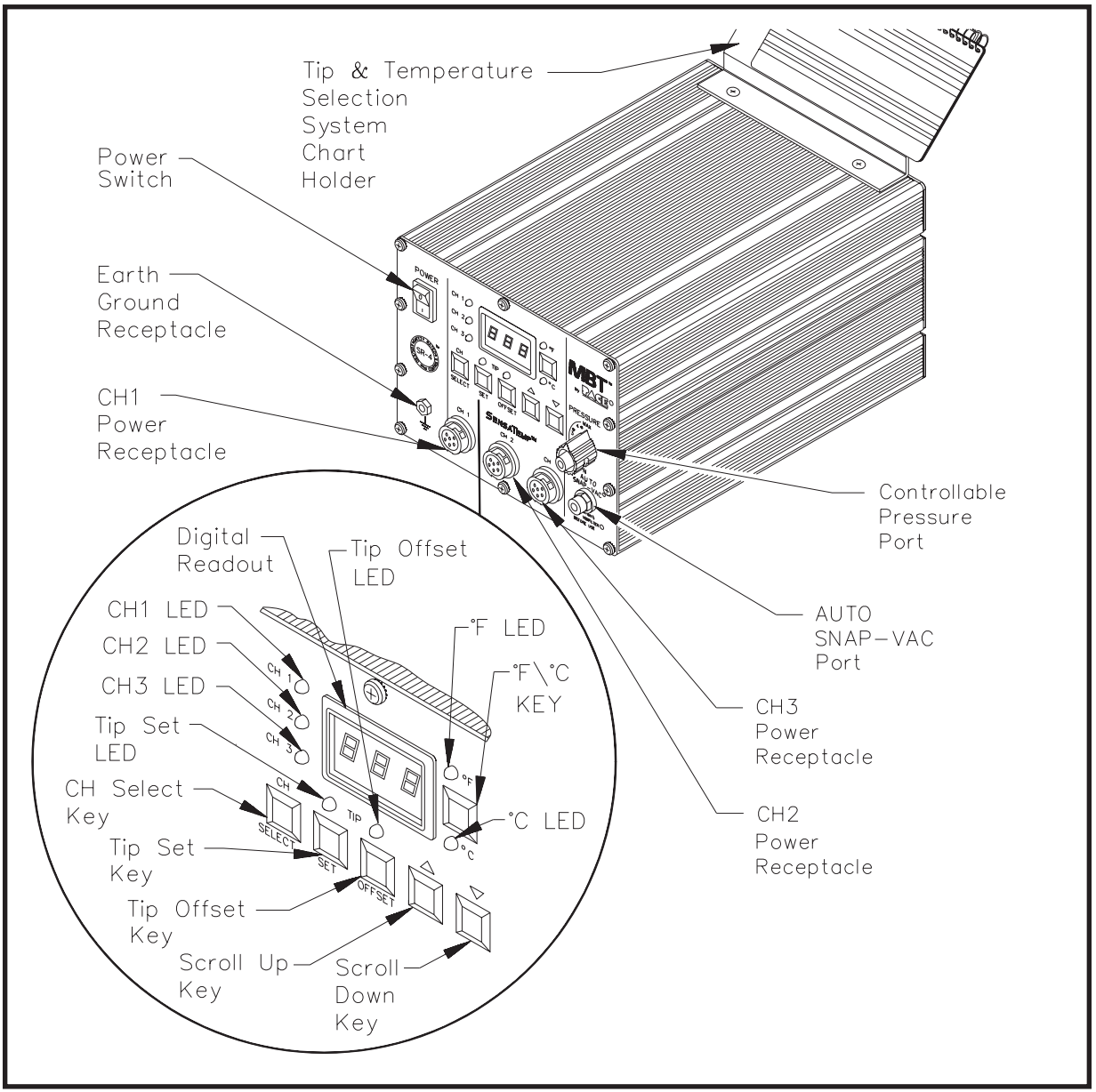


Figure 1. Parts Identification, Front View

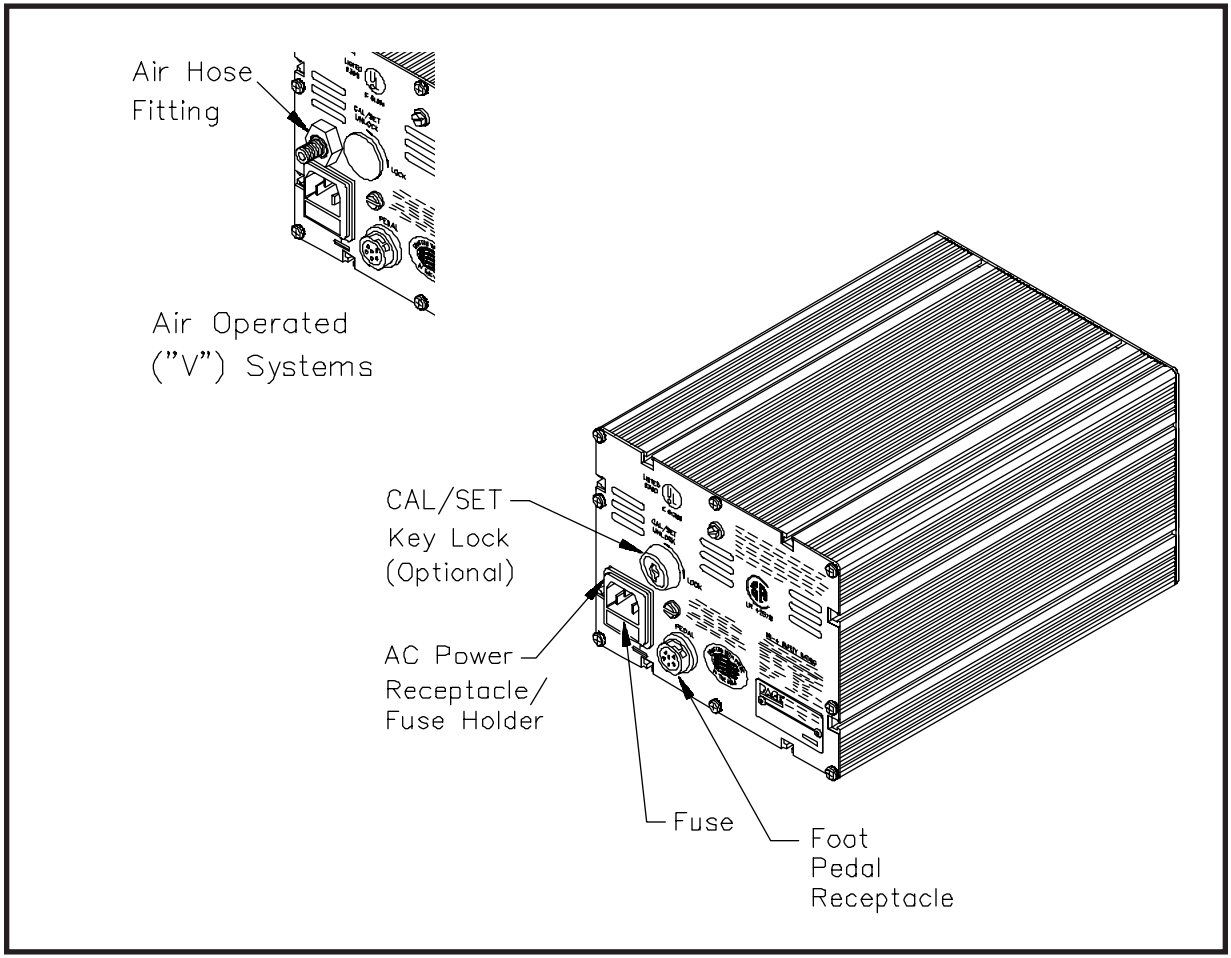


Figure 2. Parts Identification, Rear View

GENERAL INFORMATION

POWER MANAGEMENT

IMPORTANT
POWER MANAGEMENT NOTE

The MBT 250 and MBT 220 systems will perform nominally when using any combination of handpieces with a total of 197 Watts or less. When using 2 TT-65 ThermoTweez or DTP-80 Dual ThermoPik handpieces on the system, PACE recommends that the operator leave the third Power Receptacle vacant to insure optimum performance.

	MAX. POWER
1. SP-2A Sodr-Pen Soldering Iron	54 Watts
2. SP-1A Sodr-Pen Soldering Iron	37 Watts
3. SX-70 Sodr-X-Tractor handpiece (air handpiece)	48 Watts
4. TT-65 ThermoTweez handpiece	74 Watts (37 Watts each heater)
5. TJ-70 Mini ThermoJet handpiece (air handpiece)	75 Watts
6. TP-65 ThermoPik handpiece (air handpiece)	43 Watts
7. DTP-80 Dual ThermoPik handpiece	74 Watts (37 Watts each heater)

NOTE

Although 2 air handpieces can be powered up and idle at set temperature simultaneously, only one may have its air hose attached to the unit and operate at a time. In addition, any other combination of handpieces with a total of 197 Watts or less will perform nominally (add the Wattage designations on the heater flange(s) of each handpiece to calculate total Watts). For example, you may want to have two or more SP-2A Sodr-Pens with different tips powered up at one time for convenience.

PACE recommends the purchase of a ST series system power source which can be used in conjunction with a MBT 250 or MBT 220 system. For example, you may want to power a TJ-70 Mini ThermoJet, SP-2A Sodr-Pen and a SX-70 Sodr-X-Tractor handpiece on your MBT 250A, and power a TT-65 ThermoTweez handpiece on your ST 20-TT system to suit your particular application. If you have any further application questions, please contact PACE Applications Engineering or your local distributor.

The purpose of this "SAFETY" section is to inform users of the heading guidelines used in this manual to indicate special Notes, Cautions, Warnings or Dangers. Also included are recommended precautions which must be observed when operating or servicing this product.

HEADING GUIDELINES

PACE adheres to the following Heading Guidelines (based on OSHA guidelines) when listing special information or precautions to be taken. Especially important are all procedures and practices which, if not strictly observed, could result in injury or loss of life.

These "NOTES", "CAUTIONS","WARNINGS" and "DANGERS" are inserted in this manual whenever deemed necessary. They appear in a blocked off form with double outline and a shaded background to highlight the information as shown below.

NOTE
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

NOTE

Used to indicate a statement of company recommendation or policy. The message may relate directly or indirectly to the safety of personnel or protection of property. NOTE is not associated directly with a hazard or hazardous situation and is not used in place of "CAUTION", "WARNING" or "DANGER".

CAUTION

Used to indicate a hazardous situation which may result in minor or moderate injury. May also be used to alert personnel to conditions, procedures and practices which, if not observed, could result in damage to or destruction of the product or other equipment.

WARNING

Used to define additional information that if not closely followed might result in serious damage to equipment and represent a potential for serious personnel injury.

DANGER

Defines additional information that if not closely followed might result in severe personnel injury or death. Danger is not used for property damage unless personal injury risk is present.

SAFETY

PRECAUTIONS

The following are general safety precautions which personnel must understand and follow when using or servicing this product. These precautions may or may not be included elsewhere in this manual.

USEAGE PRECAUTIONS

CAUTIONS

1. SensaTemp handpiece heaters and installed tips are hot when handpiece is powered on. **DO NOT** touch either the heater or tip. Severe burns may result! Always store handpiece in the appropriate Tip & Tool Stand when not in use.

2. Always use this system in a well ventilated area. A fume extraction system such as those available from PACE are highly recommended to help protect personnel from solder flux fumes.

3. Exercise proper precautions when using materials (e.g., solder paste). Refer to the Material Safety Data Sheet (MSDS) supplied with each chemical and adhere to all safety precautions recommended by the manufacturer.

NOTES

1. The standard solder collection chamber in the PACE Sodr-X-Tractor is made of glass. Never remove this chamber using pliers. Breakage of the chamber may result. Always remove using the procedures recommended by PACE in the associated handpiece manual.

2. The front end (heater end) of the solder collection chamber in the PACE Sodr-X-Tractor is hot when the handpiece is in use. When removing the chamber for cleaning, grip the chamber at the rear seal. Never touch the front end of the chamber with bare hands. Allow the chamber to cool before cleaning.

3. Always store any connected handpiece in the appropriate Tip & Tool Stand.

SERVICING PRECAUTIONS

DANGERS

POTENTIAL SHOCK HAZARD - Repair procedures performed on this product should be performed by qualified service personnel only. Line voltage parts will be exposed when equipment is disassembled. Service personnel must avoid contact with these parts when servicing the system.

NOTES

Refer to the MBT 250, MBT 220 Service Manual (P/N 5050-0352) whenever service is required.

To insure continued peak performance, use genuine PACE replacement parts.

SET-UP

SYSTEM

Set up the MBT 250 or MBT 220 system using Figures 3 through 12 and the following steps.

1. Store the shipping container(s) in a convenient location. These containers can be reused to prevent damage if you ship or store the system.

2. Place **POWER** Switch in the "OFF" or "0" position.

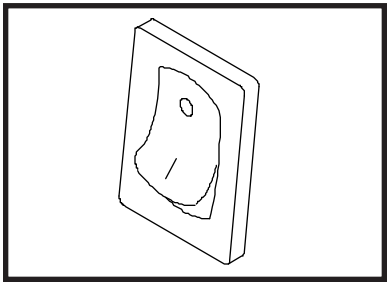


Figure 3. Power Off

3. Position the system on a convenient bench.

AIR SUPPLY CONNECTION *("V" systems only)*

On MBT 250V & MBT 220V systems, the PPS 85V power sources utilize an integral air venturi system to provide air pressure and vacuum for any connected PACE SensaTemp air handpiece. Your in-house air supply (regulated to 5.48 Bar (80 p.s.i.); see "Specifications") must be connected to the power source; use the following procedure to make the connection.

1. Attach a Small, Flexible Air Hose to the Air Hose Fitting on the rear of the power source using the following procedure.

NOTE
PACE recommends the use of a small flexible air hose for connection to the power source. Connections using quick connect fittings and large air hoses may affect the stability of the system.

a) 230 VAC Systems only: A metric adapter fitting (PACE part number 1259-0081) is included for use with 230 VAC systems. Install this fitting onto the rear of the Air Hose Fitting; turn fitting finger tight. Using an appropriate wrench, tighten the metric adapter fitting an additional 1/4 turn.

NOTE

DO NOT overtighten connections. Damage to the system could occur if excessive torque is applied to the Air Hose Fitting, metric adapter or Connector.

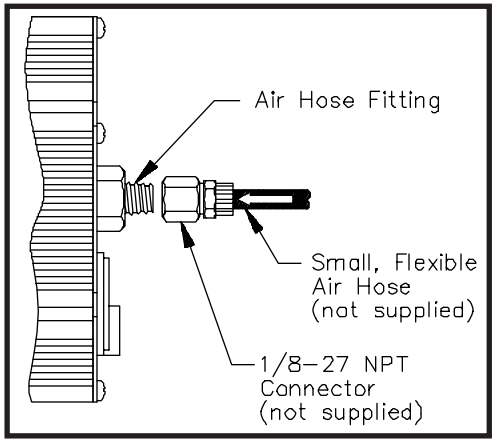


Figure 4. Air Supply Connection

b) Install the Connector (with Small, Flexible Air Hose) onto the Air Hose Fitting (or metric adapter); turn finger tight. Using an appropriate wrench, tighten the metric adapter fitting an additional 1/4 turn/. **DO NOT** overtighten.

2. Connect the free end of the air hose to your air supply using the appropriate fittings.

NOTE

The system must be connected to a clean, dry, filtered air supply. Connection to air supplies with moisture or contaminents will affect system performance and may cause damage to the air venturi system.

SET-UP

ACCESSORIES

6. Assemble Tip & Tool Stands . Attach to the power source if desired. Assembly instructions are enclosed with each Tip & Tool Stand.

7. Using Figure 5 as a guide, install the Tip & Temperature Selection System Chart Holder to the top of the power source. The chart holder is a standard item on MBT 250 systems and is an optional item on MBT 220 systems. The Temperature Selection System Charts (in booklet form) are shipped with both systems.

8. Install the Temperature Selection System booklet onto the Chart Holder.

9. Place handpieces into the Tip & Tool Stands.

10. Connect handpiece connector plug(s) to power receptacle(s) **CH 1**, **CH 2** and/or **CH 3** in the following manner.
    a) With the Connector Key end facing the power source, turn the Locking Ring fully counterclockwise.
    b) Orient guide on connector with slot of power receptacle.
    c) Insert connector into power receptacle.
    d) Turn Locking Ring fully clockwise to lock in place.

11. To avoid confusion among handpieces, PACE recommends the use of colored cable markers (P/N 6993-0136 Cable Marker Kit) to identify the particular handpiece . Attach any two like colored markers, one to each end of the handpiece power cable or air hose. Select and use a different colored marker for each handpiece. Labels are also provided to mark Tip & Tool Stands with the name of the associated handpiece.

12. If you have purchased an optional foot pedal, insert the connector plug into the **PEDAL** Receptacle on the rear panel of the power source. Install additional handpieces and accessories as necessary.

13. Plug the prong end of the power cord into a convenient three wire grounded AC power outlet. The system is now ready for operation.

14. Read the "OPERATION" section of this manual thoroughly before operating the system.

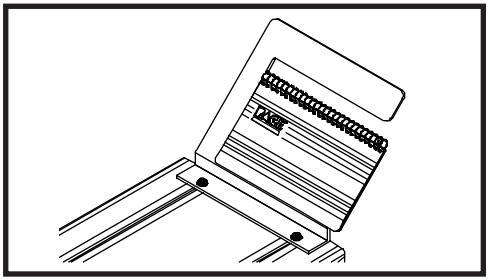


Figure 5. Chart Holder

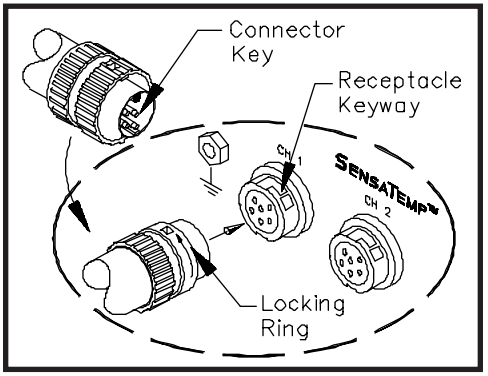


Figure 6. Handpiece Connection

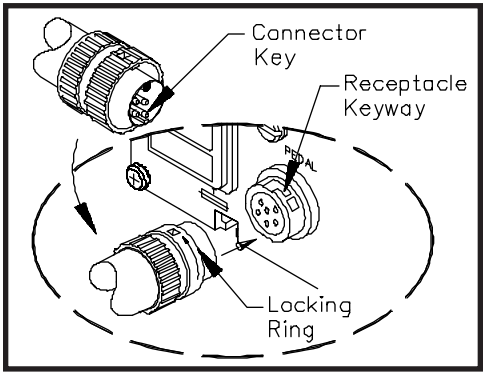


Figure 7. Foot Pedal Connection

HANDPIECE VACUUM/PRESSURE

The SX-70A, TP-65 and DTP-80 handpieces require the use of the **AUTO SNAP-VAC** (vacuum) Port and the TJ-70 handpiece requires the use of the Controllable **PRESSURE** Port .

There are two preferred methods for connection of the Air Hose. The advantages of each method are discussed in the paragraph below. Select the method best suited to your particular application.

1. TRADITIONAL METHOD - Best suited for single air handpiece configurations. Configuration allows the Air Hose to be attached to the handpiece power cable. Any TJ-70 Mini ThermoJet handpiece should be configured using this method.

2. QUICK CONNECT METHOD - Best suited for configurations which include multiple air handpiece attachment. A single Air Hose can be easily transferred between handpieces using quick connect Fittings attached to the rear of each handpiece.

PROCEDURES:

TRADITIONAL METHOD

1. Connect the 54 inch (137cm) length of Air Hose to the metal tube in the back of the air handpiece.

2. Insert the ribbed end of a male quick connect hose mount Fitting (P/N 1259-0087) into the free end of the 54 inch (137cm) Air Hose. Secure the Air Hose to the handpiece power cable with cable clips (P/N 1321-0085-01).

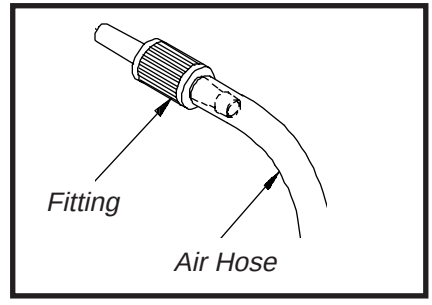


Figure 8. Air Hose To Fitting

3. Prepare a VisiFilter in the following manner.
   a) Connect a 1 inch (2.5cm) length of clear pvc Air Hose to each side of the VisiFilter; push and turn hose onto VisiFilter nipple to seat.
   b) To the free end of the air hose connected to the FLOW IN side of the VisiFilter, insert the ribbed end of a female quick connect hose mount fitting (P/N 1259-0086).
   c) Insert the ribbed end of a male quick connect hose mount fitting (P/N 1259-0087) in the free end of the air hose connected to the FLOW OUT side of the VisiFilter.
   d) Connect VisiFilter Air Hose (with attached male quick connect hose mount Fitting) to the power source **AUTO SNAP-VAC** Port**.**

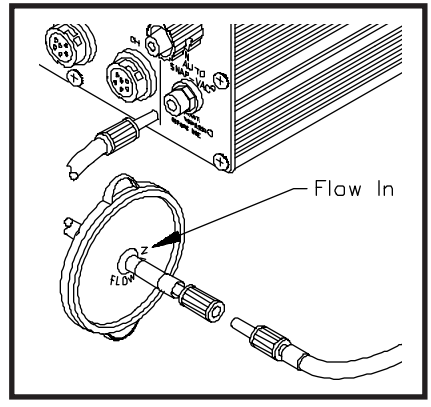


Figure 9. VisiFilter Preparation

TRADITIONAL METHOD (CONT'D)

4. For vacuum, insert male quick connect hose mount Fitting connected to long Air Hose into female Fitting on 1 inch (2.5cm) Air Hose (connected to VisiFilter). For pressure, insert male quick connect hose mount Fitting directly into the Controllable **PRESSURE** Port.

CAUTION
When removing any Air Hose, turn and pull. DO NOT attempt to pull Air Hose directly off. Damage to or breakage of fitting or VisiFilter may occur.

5. Connect the handpiece power cable connector plug to one of the Power Output Receptacles. For convenience, PACE recommends the use of **CH 3** for air handpieces.

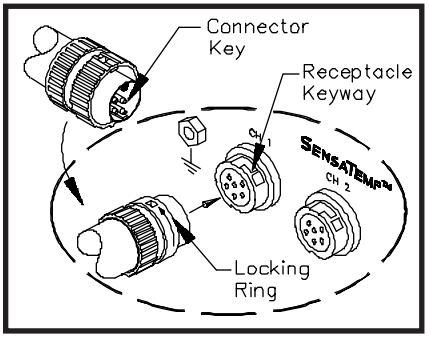


Figure 10. Handpiece Connection

NOTE
If more than one air-operated handpiece is connected to the power source, insure that only one of the Air Hoses is connected to either the VisiFilter assembly (connected to the **AUTO SNAP-VAC** Port) or the Controllable **PRESSURE** Port. Attachment to both simultaneously will cause a deterioration in performance.

QUICK CONNECT METHOD

May be used with any SensaTemp handpiece except the TJ-70 Mini ThermoJet.

1. Prepare a VisiFilter in the following manner.

   a) Connect a 1 inch (2.5cm) length of clear pvc Air Hose to each side of the VisiFilter; push and turn hose onto VisiFilter nipple to seat.

   b) To the free end of the Air Hose connected to the FLOW IN side of the VisiFilter, insert the ribbed end of a female quick connect hose mount Fitting (P/N 1259-0086).

   c) Insert the ribbed end of a male quick connect hose mount Fitting (P/N 1259-0087) into the free end of the Air Hose connected to the FLOW OUT side of the VisiFilter.

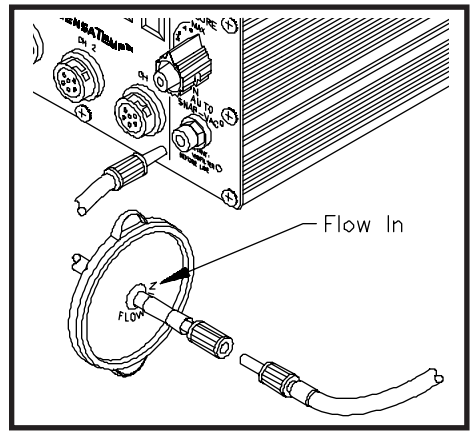


Figure 11. VisiFilter Preparation

2. Insert a male quick connect hose mount Fitting (attached to VisiFilter assembly) into the female **AUTO SNAP-VAC** Port on the front panel of the power source.

3. Attach the ribbed end of a male quick connect hose mount Fitting (P/N 1259-0087) to each end of the 54 inch (137cm) translucent Air Hose. Push and turn hose onto each Fitting to seat properly. You may install metal hose clamps (enclosed with system) to further secure connections.

4. For each air handpiece, attach ribbed end of a female quick connect hose mount Fitting to a 1 inch (2.5cm) length of clear pvc Air Hose; push and turn hoses onto Fittings to seat properly. You may install a metal hose clamp (enclosed with system) to further secure the connection.

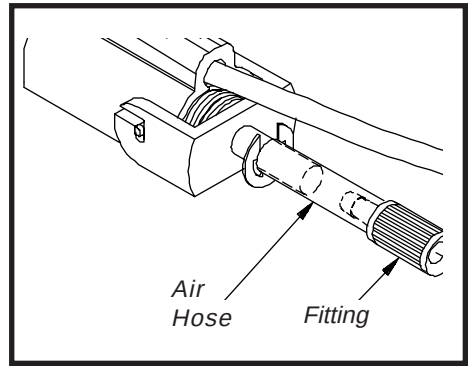


Figure 12. Air Hose To Handpiece

QUICK CONNECT METHOD (CONT'D)

5. Attach the opposite end of the 1 inch (2.5cm) length of clear pvc Air Hose to the metal tube located at the rear of each handpiece.

6. Connect one end of the long Air Hose (with attached male quick connect hose mount Fitting) to the 1 inch (2.5cm) clear pvc Air Hose attached to the rear of the handpiece.

7. For vacuum, insert male quick connect hose mount Fitting attached to the remaining end of the long Air Hose into female quick connect hose mount Fitting on 1 inch (2.5cm) clear pvc Air Hose (connected to VisiFilter). For pressure, insert male quick connect hose mount fitting directly into the Controllable **PRESSURE** Port.

8. The long Air Hose may now be easily transferred between air handpieces by removal of male quick connect hose mount Fitting (attached to long Air Hose) from female quick connect hose mount Fitting at rear of air handpiece and attachment to another air handpiece.

CAUTION
When removing any Air Hose, turn and pull. DO NOT attempt to pull Air Hose directly off. Damage to or breakage of Fitting orVisiFilter may occur.

9. Connect the handpiece power cable connector plugs of each air handpiece to the Power Output Receptacles.

QUICK START - BASIC OPERATION

INTRODUCTION

The MBT 250/220 systems are very easy to operate. As received from the factory, the system can be quickly set up for use in standard soldering/desoldering operations. Simply perform the following Quick Start Procedure to begin system operation.

QUICK START PROCEDURE

1. Insure that the Set-Up procedure has been performed; check for the following:

   a) VisiFilter connection to the **AUTO SNAP-VAC** Port on the front panel of the power source.

   b) Handpiece cable and air hose connections to the power source.

NOTE
If more than one air-operated handpiece (SX-70,TJ-70,TP-65 or DTP-80) is connected to the power source, insure that only one of the Air Hoses is connected to either the VsisFilter assembly (connected to the **AUTO SNAP-VAC** Port) or the Controllable **PRESSURE** Port. Attachment to both simultaneously will cause a deterioration in performance.

   a) All handpiece Tip & Tool Stands set up as desired (using instructions enclosed).

   b) Proper tips installed in handpieces.

   c) Power cord connection between the house AC supply receptacle and the power source.

2. Turn the Power Switch "On" ("l").

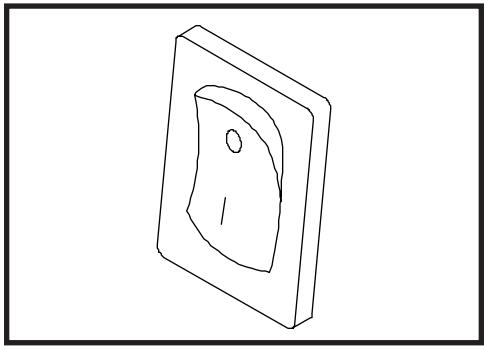


Figure 13. Power On

3. Perform the following to set handpiece tip temperatures.

   a) Press the **TIP SET** Key.

   b) Immediately press the Scroll Up (▲) Key to increase the desired Tip Temperature. Press the Scroll Down (▼) Key to decrease the Tip Temperature.

   c) Press the **TIP SET** Key.

   d) Press the **CH SELECT** Key to select the next channel with a connected handpiece.

   e) Perform steps 3a through 3d until the desired Tip Temperature has been set on all connected handpieces.

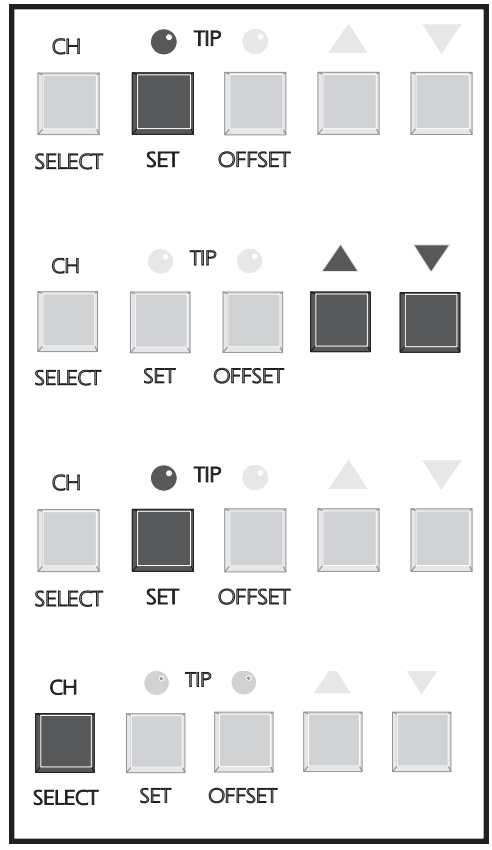


Figure 14. Quick Start

4. Observe the Digital Readout as the Set Tip stabilizes at the desired Tip Temperature. Press the **CH SELECT** Key to observe the Tip Temperature of handpieces connected to other channels. The channel displayed on the Digital Readout is indicated by the illumination of the channel LEDs.

NOTE
Read the "Operation" and "Calibration" sections of this manual to utilize the full capabilities of the system. This is especially important when using large soldering tips. Refer to the enclosed handpiece manuals for a complete description handpiece capabilities.

OPERATION

DEFINITIONS

Please read and become familiar with each of the following definitions. Each term is used repeatedly in the following operational procedures to avoid any possible confusion as to the intent of any particular instruction.

ACTIVE CHANNEL - Any channel with a connected handpiece.

AUTOMATIC POWER DOWN - Feature which turns off power to all three channels 90 minutes after all Active Channels have entered Temperature Setback.

AUTOMATIC TEMPERATURE SETBACK - System feature which, when enabled, will independently set back each channel's SET TIP Temperature to 180°C (350°F) after a user selected period of handpiece inactivity (10 to 90 minutes settable in 10 minute increments). This feature is enabled in the "CAL" Mode.

CALIBRATION (CAL) MODE - Mode of operation (indicated by "CAL" on the Digital Readout) in which the operator can quickly and easily recalibrate the system to insure accuracy and peak performance.

CURRENT CHANNEL - The channel whose temperature information may be set and displayed on the Digital Readout. The Current Channel is indicated by an illuminated LED next to its designation.

INACTIVE CHANNEL - Any channel without a connected handpiece.

SET TIP TEMPERATURE - Operator selected idle tip temperature entered into the system memory in Tip Set Mode for handpiece/tip combination connected to Current Channel.

TEMPERATURE DISPLAY MODE - Normal operating mode in which the true operating tip temperature of the handpiece/tip connected to the Current Channel is displayed on the Digital Readout.

TIP OFFSET CONSTANT - Specific value for a given handpiece/tip combination upon which the system automatically calculates the correct Tip Temperature Offset at the entered Set Tip Temperature.

TIP TEMPERATURE OFFSET - Temperature value difference between the point in the handpiece heater assembly at which temperature is sensed and the working end of the attached tip.

TIP OFFSET MODE - Mode of operation in which the Current Channel's Tip Offset Constant value can be viewed or altered. In this mode, the Tip Offset LED flashes and the stored value appears on the Digital Readout.

TIP SET Mode - Mode of operation in which the Current Channel's Set Tip Temperature can be viewed or altered. In this mode, the Tip Set LED flashes and the stored value appears on the Digital Readout.

OPERATING TIP TEMPERATURE - The true tip temperature at which the handpiece tip operates at any given time. This temperature is displayed on the Digital Readout in Temperature Display Mode (normal operation) for the Current Channel.

NOTE

As with any system, Set and Operating Tip Temperatures are only exactly equal when the handpiece is idling (unloaded at equilibrium) During use, (i.e., under load) the Operating Tip Temperature will usually be lower.

SYSTEM

POWER UP

1. Insure that the system is properly prepared for operation. Refer to the "Set-Up" portion of this manual. The handpieces selected for your application should be connected to the unit. Remember, PACE recommends connecting any air handpiece (which requires a vacuum hose) to channel number 3 (**CH 3**). Connect any single vacuum hose to either the **AUTO SNAP-VAC** Port or Controllable **PRESSURE** Port.

2. Turn the **POWER** Switch ON ("1").

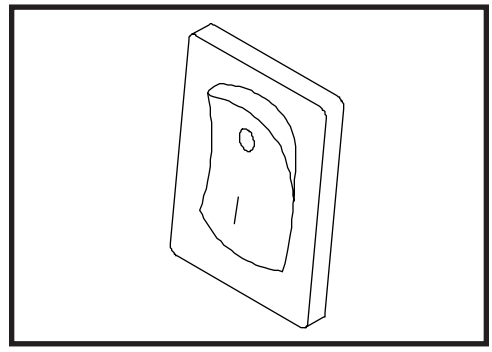


Figure 15. Power On

KEY LOCK FEATURE

3. An optional Key Lock feature is available from PACE which prevents unauthorized alteration of: Stored Tip Temperatures, Tip Temperature Offset values, the Automatic Temperature Setback, Automatic Power Down and recalibration features. Check the rear panel of the system power source. If the Key Lock feature is present there will be a **CAL/SET** Key Lock switch located in the upper left portion of the panel. Use the key to turn the switch to the **UNLOCK** position. If the feature is not present, there will, instead, be a round plastic filler plug at that location.

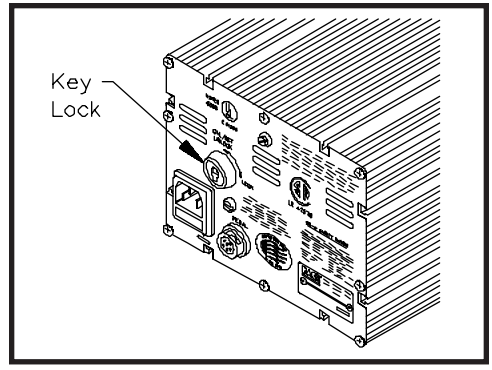


Figure 16. Key Lock

OPERATION

CHANNEL LED OPERATION

4. The Channel LED (**CH 1**, **CH 2** or **CH 3**) of the first Active Channel encountered by the system (channel with connected handpiece) will be illuminated. This is the Current Channel. If no channels are active, "E-1" will be displayed on the Digital Readout and the CH 1 LED will be illuminated.

5. Disconnect the handpiece from the Power Receptacle associated with the Current Channel (e.g., If CH 1 LED is illuminated, disconnect the handpiece connected to **CH 1**). The unit will now select the next Active Channel encountered as the Current Channel and illuminate the corresponding LED.

> **NOTE**
>
> If no other Power Receptacles have handpieces attached, the CH 1 LED will be illuminated and "E-1" will be displayed on the Digital Readout.

6. Reconnect the handpiece removed in step 5.

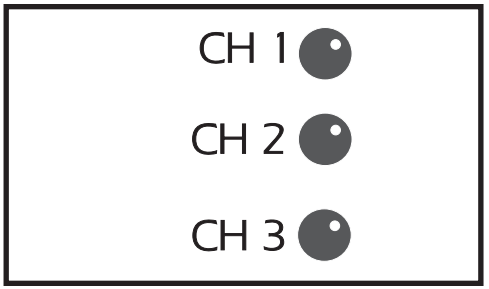


Figure 17. Channel LEDs

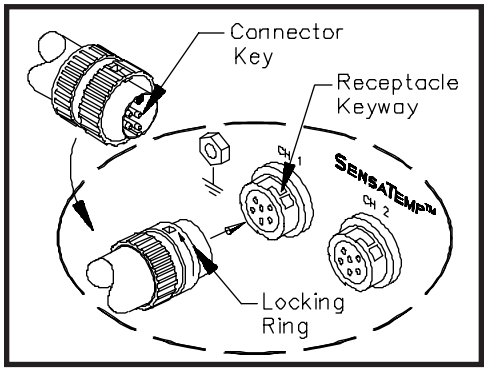


Figure 18. Handpiece Connection

DIGITAL READOUT OPERATION

7. The Digital Readout provides a 3 digit display of the Current Channel (**CH 1**, **CH 2** or **CH 3**) temperature information. The Digital Readout will show the Set Tip Temperature in the Tip Temperature Set Mode, Tip Temperature Offset values in Tip Temperature Offset Mode and the True Operating Tip Temperature in the Temperature Display Mode (normal operation).

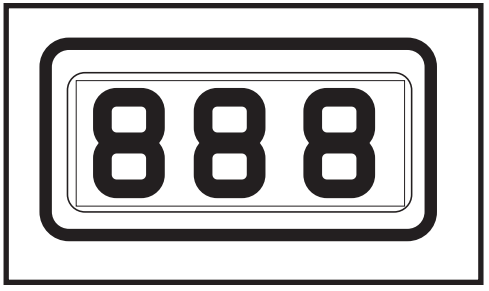


Figure 19. Digital Readout "888"

PANEL CONTROLS

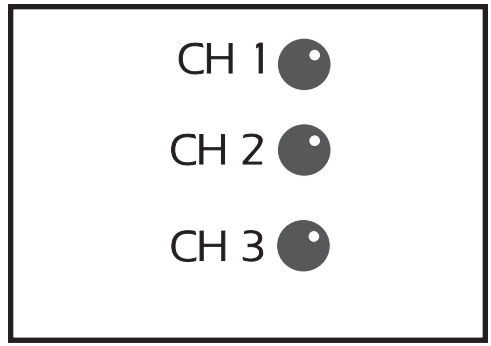


Figure 20. Channel LEDs

8. With three handpieces connected to the system, press the **CH SELECT** Key several times to observe the lighting of the CH 1, CH 2 & CH 3 LEDS. Each subsequent pressing will turn an LED off and turn the next Active Channel's LED on. The illumination sequence will be CH 1 to CH 2 to CH 3 and then back to CH 1. Unplug any one of the handpieces and repeat. The LED of any Inactive Channel (no attached handpiece) will not light. The next Active Channel in sequence will light.

NOTE

CH 1 LED will illuminate and "E-1" will be displayed on the Digital Readout if there are no Active Channels.

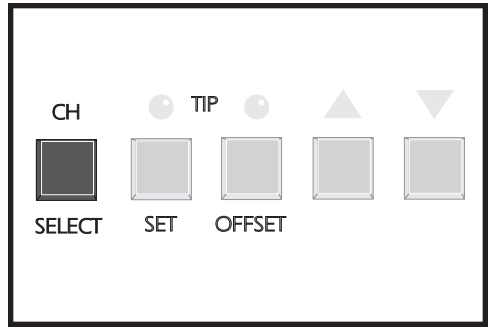


Figure 21. Press CH Select Key

9. Press the **TIP SET** Key once. The **TIP SET** LED will flash and the Digital Readout will display the stored Set Tip Temperature for the Current Channel. This is TIP Temperature Set Mode. As received from the factory, the Digital Readout will display "OFF". If no other operation occurs within 5 seconds, the LED will turn off and the Digital Readout will revert to the Temperature Display Mode (normal operation). Pressing of the **TIP SET** Key a second time will eliminate the time out period and immediately place the system in this mode.

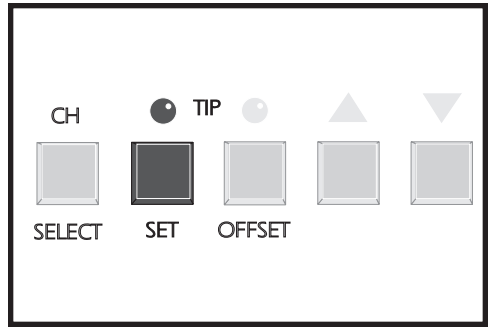


Figure 22. Press Tip Set Key

PANEL CONTROLS CONT'D

10. Press the **TIP SET** Key once again to enter the Tip Temperature Set Mode. Press and hold the Scroll Up Key. Observe as the displayed Set Tip Temperature increases first in 1°, then in 10° increments (°C or °F). Release the key when the Digital Readout reads 316°C (or 600°F). Immediately press the **TIP SET** Key once again. Observe the Digital Readout as the Operating Tip Temperature reaches 316°C (or 600°F).

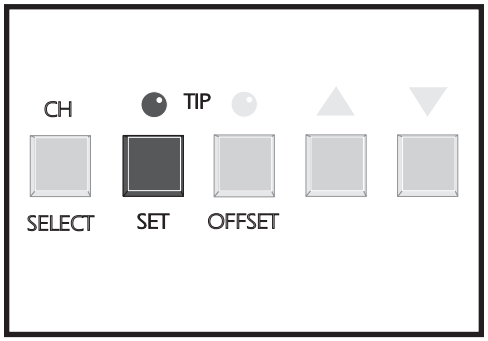


Figure 23. Enter Tip Temp. Set Mode

11. Press the **°F/°C** Key several times to observe the alternating illumination of the °F & °C LEDs. Each subsequent pressing of the key will turn one LED on and the other off. Also notice as the Digital Readout changes to display the Operating Tip Temperature in °F when the °F LED is illuminated and in °C when the °C LED is illuminated.

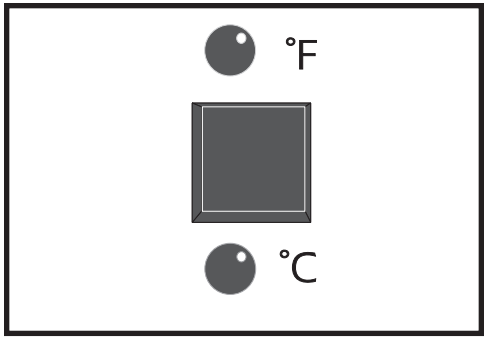


Figure 24. °F/°C Selection

12. Press the **TIP SET** Key once to enter the Tip Temperature Set Mode. Immediately press & hold the Scroll Down Key. Observe as the displayed Set Tip Temperature decreases first in 1° and then in 10° increments (°C or °F). Release the key when the Digital Readout displays 288°C (550°F). Immediately press the **TIP SET** Key once again (or wait 6 seconds) and observe the Operating Tip Temperature decrease to 288°C (550°F).

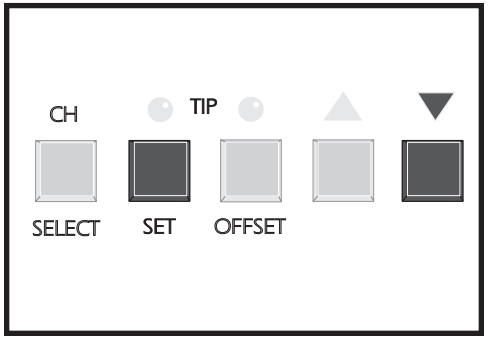


Figure 25. Lower Set Tip

13. Press the **TIP SET** Key once again and use the Scroll Up and Scroll Down Keys to enter your desired SET Tip Temperature. Immediately press the **TIP SET** Key to exit the Tip Temperature Mode. This enters the new Set Tip Temperature for the Current Channel (which you've already keyed in) into system memory.

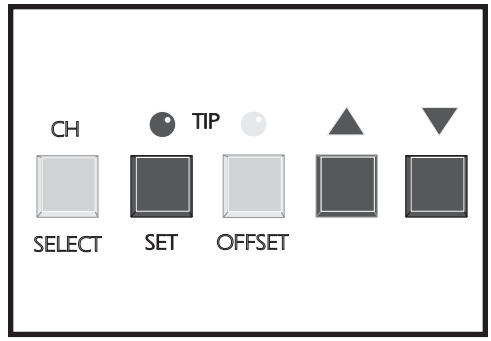


Figure 26. Adjust Set Tip Temp.

14. Press the **TIP OFFSET** Key. The **TIP OFFSET** LED will illuminate and the Digital Readout will display the Tip Temperature Offset value for the Current Channel. As received from the factory, the Digital Readout will display "3" FOR °C ("6" FOR °F). If the **TIP OFFSET** Key is immediately pressed again, or if no other operation occurs within 5 seconds, the LED will turn off and the Digital Readout will revert to the Temperature Display Mode (normal operation).

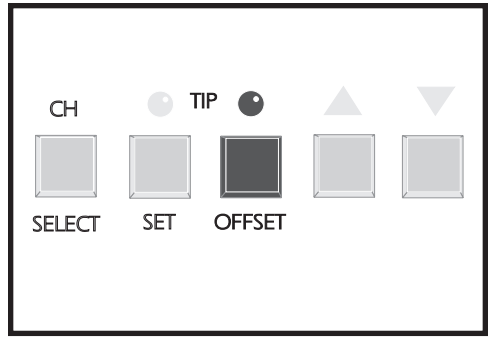


Figure 27. Enter Tip Offset Set Mode

NOTE

Refer to "Tip & Temperature Selection" for a complete discussion of Tip Temperature Offset function.

PANEL CONTROLS CONT'D

15. Press the **TIP OFFSET** Key once to enter Tip Temperature Offset Mode. Immediately press and hold the Scroll Up Key. Observe the displayed Tip Offset Constant increase, first in 1° and then in 10° increments. Release the Scroll Up Key when the Tip Temperature Offset value reads "33" for °C ("60" for °F).

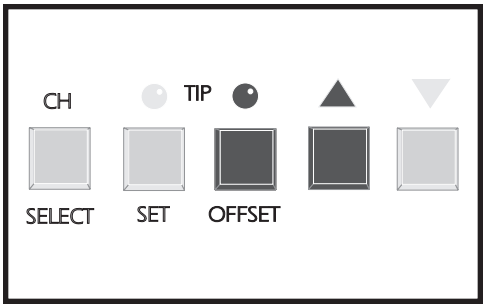


Figure 28. Increase Tip Offset Value

16. While still in the Tip Temperature Offset Mode (Tip Offset LED illuminated) press and hold the Scroll Down Key. Observe the displayed Tip Offset Constant decrease first in 1° and then in 10° increments. Release the key when the Digital Readout displays "28" for °C ("50" for °F).

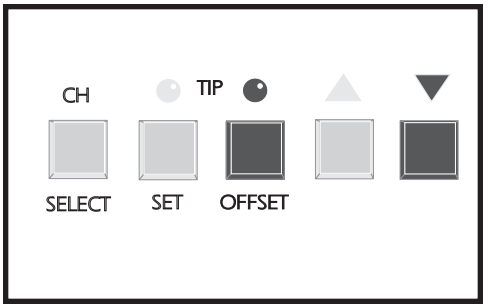


Figure 29. Decrease Tip Offset Value

17. Immediately press the **TIP OFFSET** Key to exit the Tip Temperature Offset Mode and enter the new Tip Offset Constant for the Current Channel into the system memory. Notice that the Tip Offset LED remains illuminated.

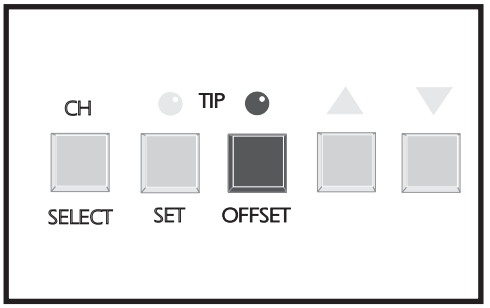


Figure 30. Store Tip Offset Value

NOTE

Only if a Current Channel has aTip Offset Constant value greater than the default ("3" for °C or "6" for °F) does this LED remain illuminated.

18. The system will retain stored Set Tip Temperatures and Tip Offset Constants even when power is removed.

19. Note the Current Channel displayed on the system. Turn the **POWER** Switch to the OFF ("0") position. Turn the switch back to the ON ("1") position. Using the **CH SELECT** Key, select the channel displayed at the beginning of this step.

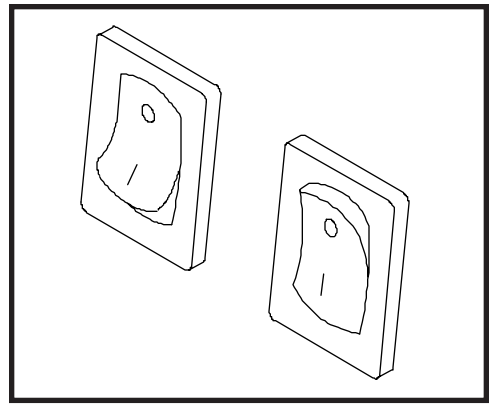


Figure 31. Power On/Power Off

20. Press the **TIP OFFSET** Key. Notice that the system has retained the stored Tip Offset Constants. Press the key once again to exit Tip Temperature Offset Mode.

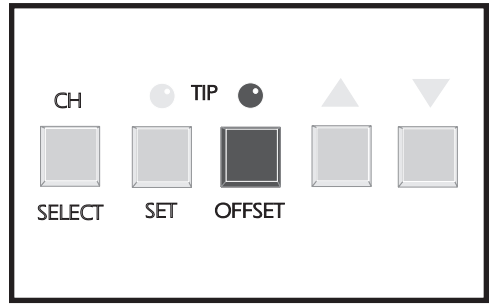


Figure 32. Tip Offset Key Activation

21. Press the **TIP SET** Key. Notice that the system has retained the stored Set Tip Temperature in memory. Immediately press the **TIP SET** Key once again to exit Tip Temperature Set Mode.

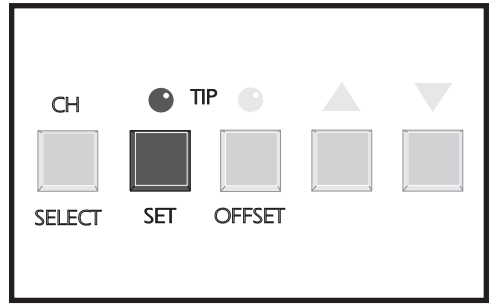


Figure 33. Pressing TIP SET Key

PANEL CONTROLS CONT'D

22. In order to prevent a handpiece/tip combination from inadvertently operating at an incorrect Tip Temperature, the system will not retain a stored Tip Offset Constant if a handpiece is disconnected. The Tip Temperature Offset will return to the default value of "3" for °C ("6" for °F). Disconnect the handpiece connected to the Current Channel. Reconnect the handpiece to the same channel. Notice that the Current Channel changes to the next Active Channel.

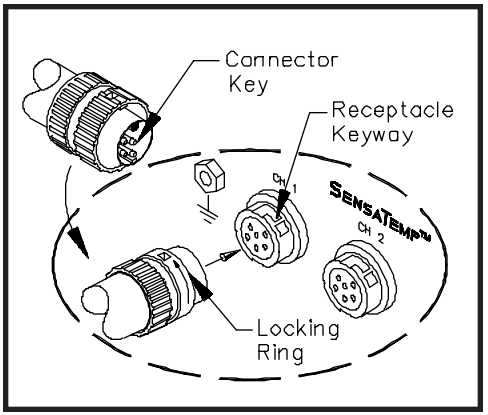


Figure 34. Handpiece Connection

23. Press the **CH SELECT** Key, as necessary, to change the Current Channel to the channel disconnected in step 22.

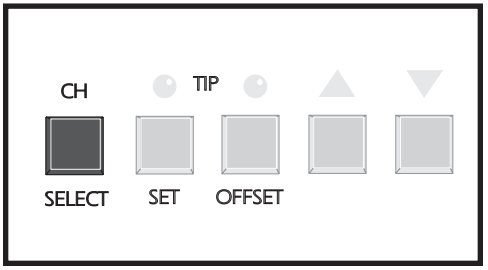


Figure 35. Change Current Channel

24. Press the **TIP OFFSET** Key. Notice that the Tip Offset Constant has now changed to the default value of "3" for °C ("6" for °F) and the Tip Offset LED turns off. Whenever a channel becomes inactive, the system memory automatically reverts to the default.

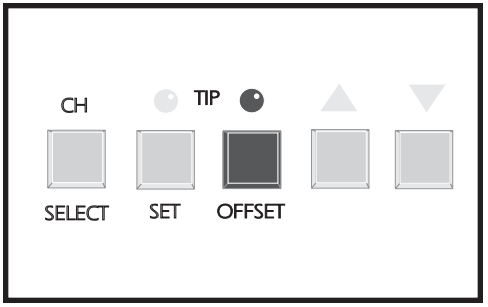


Figure 36. Storing Tip Offset Constant

25. While in Tip Temperature Offset Mode (Tip Offset LED illuminated), use the Scroll Up and Scroll Down Keys to set Tip Offset Constant values as desired. Press and release the **TIP OFFSET** Key to exit Tip Temperature Offset Mode and enter this value into system memory.

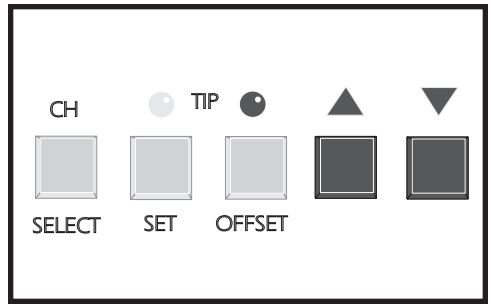


Figure 37. Storing Tip Offset Value

26. Using the **CH SELECT** Key, select each Active Channel in sequence, making it the Current Channel (temperature information displayed on Digital Readout). Using the procedures described in previous steps 9 thru 17 and step 25 as a reference, enter and store desired Tip Temperature information into system memory. Refer to the "Tip & Temperature Selection System" booklet sent with your unit and the Tip & Temperature Selection section of this manual for more detailed information on selection of the proper tip, handpiece and temperature options for your particular application.

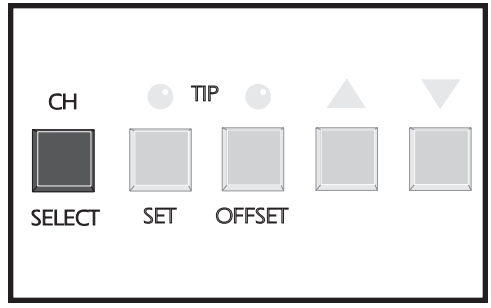


Figure 38. Changing Current Channel

PANEL CONTROLS CONT'D

NOTE

The MBT 250 & MBT 220 systems embody a "Dynamic Offset" feature which automatically adjusts the stored TIP OFFSET CONSTANT (stored value is for Tip Offset at 371°C or 700°F) for any Set Tip Temperature established by the operator. This ensures the maintenance of true, accurate Tip Temperatures. Simply stated, any operating Tip Temperature displayed on the digital readout will be correct.

Always set the appropriate TIP OFFSET CONSTANT for the selected handpiece/tip combination (listed in the shaded area on the Tip & Temperature Selection System booklet charts) before entering the desired Set Tip Temperature. The Set Tip Temperature + the Dynamically Adjusted Tip Offset value (usually different from the entered TIP OFFSET CONSTANT) cannot exceed 489°C (912°F). If this limit is exceeded, the system will automatically lower the maximum possible Set (and Operating) Tip Temperature accordingly.

27. If the Key Lock option is present (from step 3), turn the Key to the "Lock" position. Notice that no changes in Set Tip Temperature or Tip Offset Constants are possible with the Key Lock in this position thereby preventing any unauthorized alteration of settings.

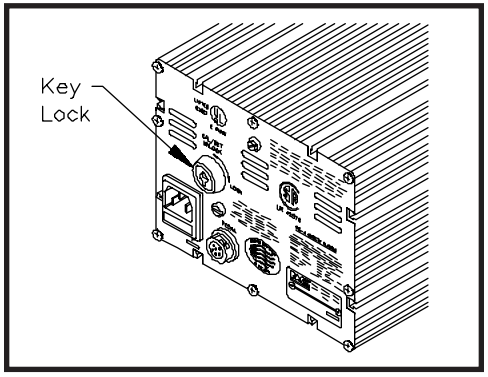


Figure 39. Key Lock Option

FACTORY SETTINGS

The MBT 250 & MBT 220 systems come equipped with a number of features which may be adjusted, enabled or disabled as desired by the user. Listed below are the features and factory settings of each. To change and/or learn about any of these features, refer to the applicable part of the "Calibration" section of this manual.

FEATURE	FACTORY SETTING
SYSTEM FEATURES	
Automatic Temperature Setback	Disabled
Automatic Power Down (Enabled automatically when Automatic Temperature Setback is enabled)	Disabled
CHANNEL FEATURES	
Default Temperature Scale (°C/°F)	°F
Set Tip Temperature (all Channels)	"OFF"
Lower Temperature Limit (all Channels)	38°C (100°F)
Upper Temperature Limit (all Channels)	482°C (900°F)
Tip Temperature Offset (all Channels)	"3" for °C ("6" for °F)

Table 1. Factory Settings

IMPORTANT

A value of "3" for °C ("6" for °F) is the Default Offset Value; no other value can replace this Default. WHENEVER A HANDPIECE IS DISCONNECTED FROM A CHANNEL, ITS TIP OFFSET CONSTANT VALUE REVERTS TO "3" for °C ("6" for °F). This is the lowest possible offset that can be entered for any channel. The maximum possible Offset is "139" for °C ("250" for °F). REMEMBER: The actual Dynamic Offset plus the Set Tip Temperature cannot exceed 489°C (912°F).

OPERATION

TIP & TEMPERATURE SELECTION

With any heating system, actual tip temperatures can differ greatly from temperature control settings. PACE's unique "Tip & Temperature Selection System" allows you to select and maintain True Tip Temperatures for any size and type of tip and handpiece using the appropriate Tip Temperature Offset value.
Included with your system is a Chart Holder which holds Procedural Instructions, a Quick Reference Guide, a Customer Log and a Chart(s) for each handpiece purchased. Follow the procedure given in the chart marked Introduction when using the charts for each particular handpiece. Listed below is the summarized procedure.

PROCEDURE

1. Select the appropriate handpiece and corresponding chart for your application.

2. Using the chart, select the correct tip for your application.

3. Locate the corresponding recommended "Tip Offset Constant" shown in the shaded area on the chart. In Tip Temp Offset Mode, enter this value for the Current Channel. Notice that the chart shows the reference Set Tip Temperature as 371°C (700°F).

4. Exit the Tip Temp Offset Mode and enter the Tip Temp Set Mode. Select your desired Set Tip Temperature.

5. Exit Tip Temp Set Mode. With PACE's Dynamic Tip Temperature Offset system, the True Operating Temperature of the working end of the tip will appear in the Digital Readout in Temperature Display Mode (normal operation).

INTRODUCTION

In Calibration (CAL) Mode, you can:

1. Change the Upper and Lower Temperature limits for each channel independently.
2. Set the Default Temperature scale to °F or °C as desired.
3. Enable or disable the Auto Temperature Setback/Power Down features.
4. Calibrate your MBT 250 or MBT 220 system to assure continued accuracy and peak performance using the optional Calibration Kit (see "Replacement Parts" section of this manual).

PROCEDURE

KEY LOCK OPTION

1. An optional Key Lock feature is available from PACE which prevents unauthorized alteration of temperature and offset settings or calibration of the system. Check the rear panel of the system power source. If the Key Lock feature is present there will be a Key Lock switch located in the upper left portion of the panel. Use the key to turn the switch to the **UNLOCK** position. If the feature is not present, there will be a round plastic filler plug present at that location.

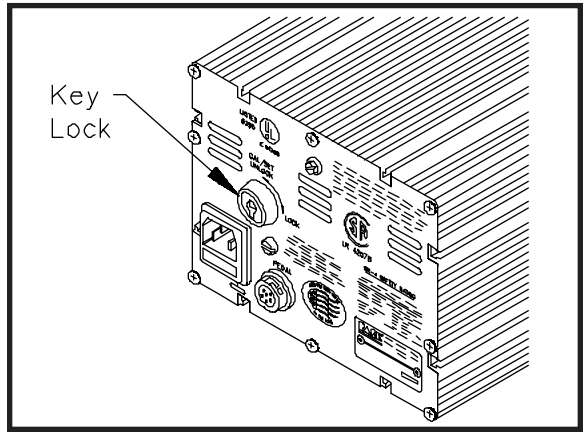


Figure 40. Key Lock Option

IMPORTANT

THhe Key Lock switch must be turned to the **UNLOCK** position to alter any of the data stored in memory or to calibrate the system.

CALIBRATION

ENTERING CALIBRATION (CAL) MODE

2. Place **POWER** Switch in the "OFF" ("0") position.

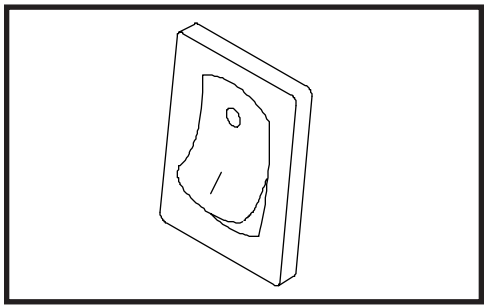


Figure 41. Power Off

3. Press and hold the **TIP SET** and Scroll Down Keys together.

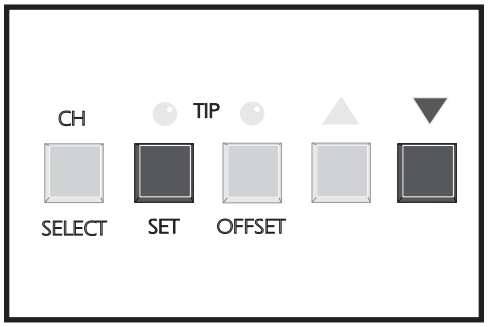


Figure 42. Calibration Entry

4. Place **POWER** Switch in the ON ("1") position. All of the system LEDs will light. The Temperature Display will read "888" and change to read the version of the microprocessor circuitry (displayed in the form "X-X").

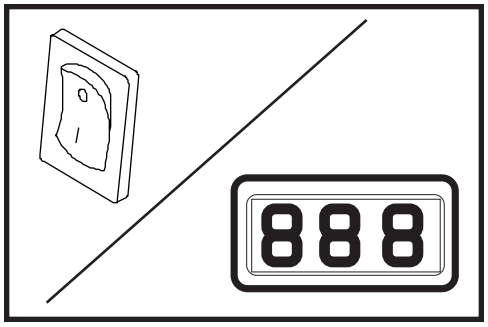


Figure 43. Power On

5. Release the **TIP SET** and Scroll Down Keys. The Digital Readout will now display "CAL" and only the three Channel LEDs will remain lit signifying that the system is now in Calibration (CAL) Mode.

Figure 44. Digital Readout "CAL"

°F/°C READOUT DEFAULT

6. Press and release the **TIP SET** Key. The Digital Readout will display "S - X" (X = "-" or 1-9). Either the **°F** or **°C** LED will be on. This is the default temperature scale of the Digital Readout (e.g., if the **°C** LED is on, the Digital Readout will display Tip Temperatures and Tip Offset Constant values in °C).

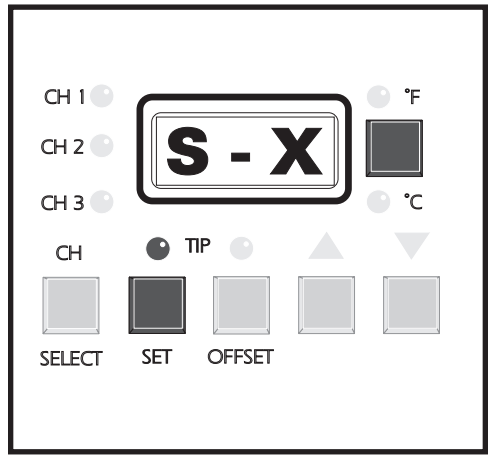


Figure 45. Digital Readout "S - X"

7. Press and release the **°F**/**°C** Key to change the default. Each subsequent press and release of the key will change the default.

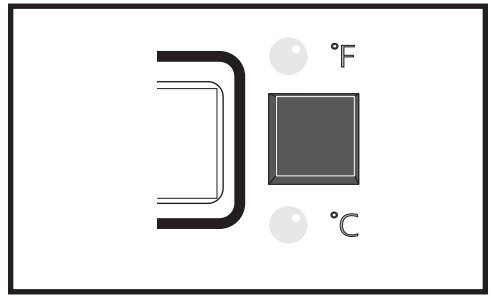


Figure 46. Change Temperature Default

AUTOMATIC SETBACK

8. As received from the factory, "S - -" will be displayed indicating that the Automatic Temperature Setback is turned off. A "1" thru "9" appearing on the right side of the Digital Readout indicates time to Automatic Setback in increments of 10 minutes. For example, "S-3" would indicate that any Active Channel will set back its handpiece's Set Tip Temperature to 177°C (350°F) after 30 minutes of handpiece inactivity (non-use). To change the time period or turn the Automatic Temperature Setback feature off or on, use the Scroll Keys. Press the Scroll Up Key to increase the time period and/or enable the feature. Press the Scroll Down Key to decrease the time period or disable the feature.

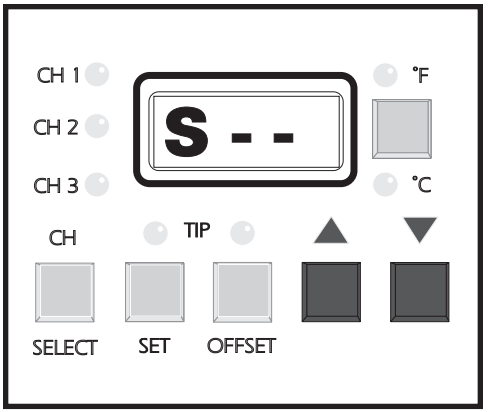


Figure 47. Digital Readout "S - -"

9. Press the **TIP SET** Key to store the °F/°C default and Automatic Temperature Setback time value in system memory. The Digital Readout will revert to "CAL" and only the CH 1 LED will remain lit.

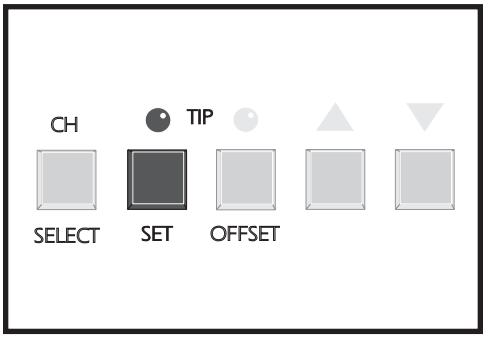


Figure 48. Press TIP SET Key

AUTOMATIC POWER DOWN

10. The Automatic Power Down feature operates when (and only when) the Automatic Temperature Setback feature is enabled. No additional steps are necessary. For example, power to all channels is turned off 90 minutes after the last Active Channel's Tip Temperature is set back. For additional information on this feature, refer to the "Automatic Power Down" section of this manual.

CHANNEL SELECTION

11. The CH 1 LED is now on signifying that Channel 1 is ready for calibration. Perform steps 12 through 21 to calibrate. Change channels as directed and repeat these steps for each channel.

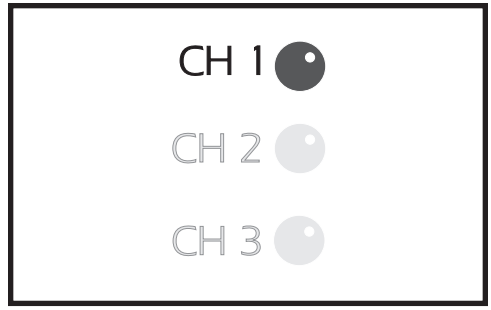


Figure 49. Channel 1 Current Channel

TEMPERATURE LIMITS

NOTE

All temperature limits are entered and stored in system memory in degrees F.

A) LOWER TEMPERATURE LIMIT SETPOINT

12. Press and release the **TIP SET** Key. The Digital Readout will now display "L-X" (X = 1-9). This is the stored value of the Lower Temperature Limit in increments of 100°F. For example, "L-5" is displayed, the Lower Limit is 500°F.

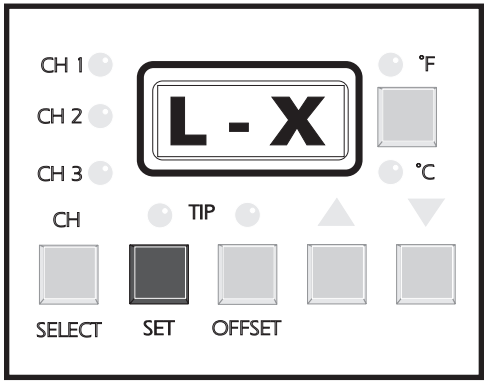


Figure 50. Lower Temp. Limit

13. Press Scroll Keys as necessary to increase (Scroll Up Key) or decrease (Scroll Down Key) the Lower Temperature Limit value.

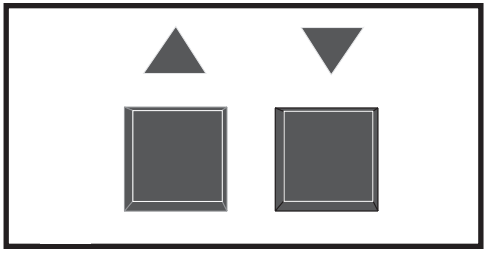


Figure 51. Change Lower Temp. Limit

14. Press and release the **TIP SET** Key to store the displayed value into memory.

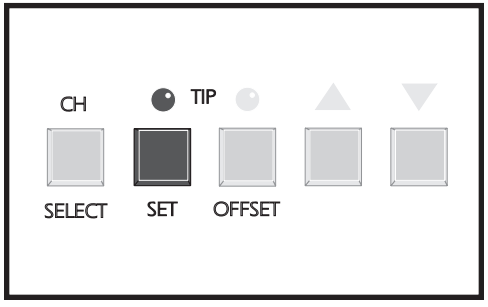


Figure 52. Press Tip Set Key

B) UPPER TEMPERATURE LIMIT SETPOINT

15. The Digital Readout now displays "H-X" (X = 1-9). This is the stored value of the Upper Temperature Limit in increments of 100°F.

Figure 53. Upper Temp. Limit

16. Press Scroll Keys as necessary to increase (Scroll Up Key) or decrease (Scroll Down Key) the Upper Temperature Limit value.

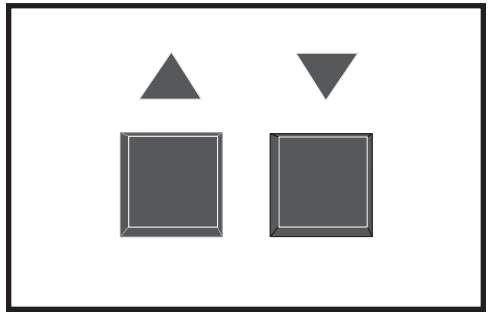


Figure 54. Change Upper Temp. Limit

B) UPPER TEMPERATURE LIMIT SETPOINT CONT'D

17. Press and release the **TIP SET** Key to store the displayed value into memory. The Digital Readout will now display "C-1".

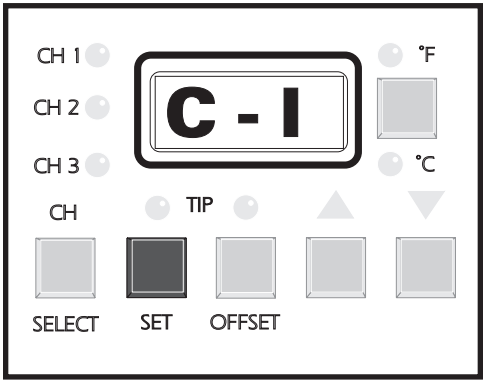


Figure 55. "C-1" Display

NOTE

If you do not have PACE P/N 6993-0133 Calibration Kit or if you do not wish to recalibrate for Digital Readout accuracy, press the **TIP OFFSET** Key and perform steps 12 through 17 to set Upper and Lower Temperature Limits for Channel 2: Repeat for Channel 3. After all channels have been calibrated, you may exit the Calibration Mode by pressing and releasing the **TIP OFFSET** Key again.

18. Disconnect the handpiece from the Current Channel's Power Output Receptacle and insert the "C-1" Calibration Module.

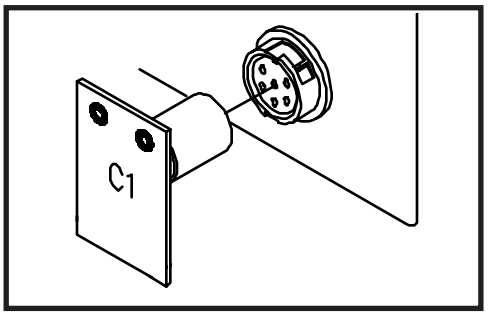


Figure 56. Insert "C-1" Module

DIGITAL READOUT ACCURACY

19. Press and release the **TIP SET** Key. The Digital Readout will flash "- - -" to indicate that the system microprocessor controlled temperature sensing and display circuitry is recalibrating one aspect of the system circuitry. "C-2" will now be displayed.

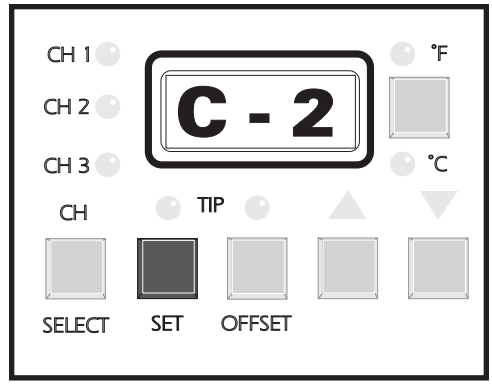


Figure 57. "C-2" Display

20. Remove the "C-1" Calibration Module and insert the "C-2" Calibration Module.

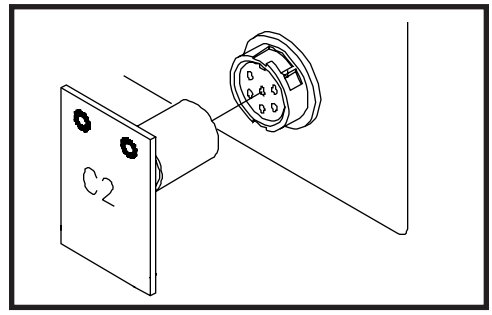


Figure 58. Insert "C-2" Module

21. Press and release the **TIP SET** Key once again. The Digital Readout will flash "- - -" to indicate that the system microprocessor controlled temperature sensing and display circuitry is recalibrating another aspect of the system. "CAL" will now be displayed, indicating that calibration of this channel is complete.

Figure 59. Digital Readout "CAL"

DIGITAL READOUT ACCURACY CONT'D

22. The system has now stepped to the next Active Channel. Repeat steps 12 through 21 to calibrate this channel. If all channels have been calibrated, proceed to step 23.

23. Press and release the **TIP OFFSET** Key two times to exit Calibration Mode. All values, features and defaults entered during the calibration are now stored in memory and all Set Tip Temperatures are turned "OFF". All Channel Tip Temperature Offset values are set to the default value of "3" for °C ("6" for °F).

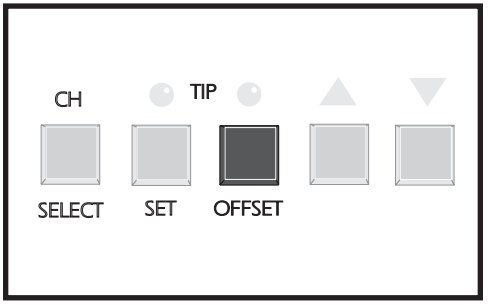


Figure 60. Exit Calibration Mode

DIGITAL READOUT MESSAGE CODES

Listed below are Message Codes and a description of each which may be displayed on the Digital Readout during the Calibration procedure.

DISPLAY MESSAGE	DESCRIPTION
C-1 OR C-2	Indicates system is ready to process Digital Readout accuracy calibration for a particular channel using the appropriate calibration module.
CAL	Indicates that system is in the Calibration Mode.
E-5	Input to control circuitry unstable. Indicates that no calibration module is connected to the channel being calibrated or the incorrect module has been inserted.
E-6	Loose connection. Calibration input is out of range. Normally occurs if incorrect calibration module is inserted.
H-X (X = 1 thru 9)	Indicates the Current Channel is ready to accept new Upper Temperature Limit setpoint X (X times 100°F).
L-X (X = 1 thru 9)	Indicates the Current Channel is ready to accept new Lower Temperature Limit setpoint X (X times 100°F).
OFF	This channel setpoint is below Lower Temperature Limit setpoint.
S--	Indicates that theAutomatic Temperature Setback (and Power Down) feature is disabled (turned off).
S-X	Indicates that theAutomatic Temperature Setback (and Power Down) feature is enabled (turned on) and will set each channels' Set Tip Temperature back after X times 10 minutes of handpiece inactivity (non-use).
--- (flashing)	Indicates that the system circuitry is proceeding with calibration using the proper calibration module (C-1 or C-2).

REFER TO "CORRECTIVE MAINTENANCE" SECTION FOR OTHER ERROR CODES

Table 2. Digital Readout Message Codes

TEMPERATURE SETBACK OPERATION

INTRODUCTION

The MBT 250 & MBT 220 systems are equipped with a Temperature Setback feature which, when enabled, will preserve tip life and reduce energy consumption.

PROCEDURE

ACTIVATION

There are two ways in which the system will enable the Temperature Setback feature.

1. AUTOMATIC OPERATION - The system memory can be programmed so that each Active Channel will automatically and independently set back its Set Tip Temperature to 180°C (350°F) after a selected period (10-90 minutes) of handpiece inactivity. See "Calibration" section for details on programming this feature.

2. MANUAL OPERATION - The operator can manually force the system to place all Active Channels in Temperature Setback by performing the following procedure.

a) Press and hold the Scroll Down Key.

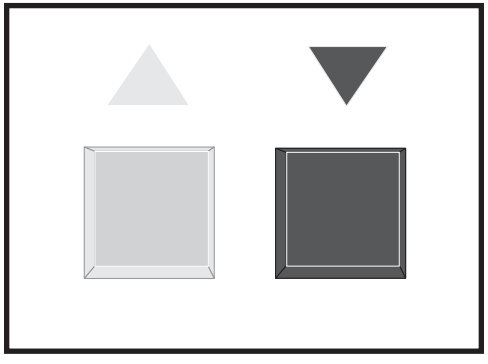


Figure 61. Forcing Temp. Setback

TEMPERATURE SETBACK OPERATION

b) Press the Scroll Up Key.

c) Release both keys.

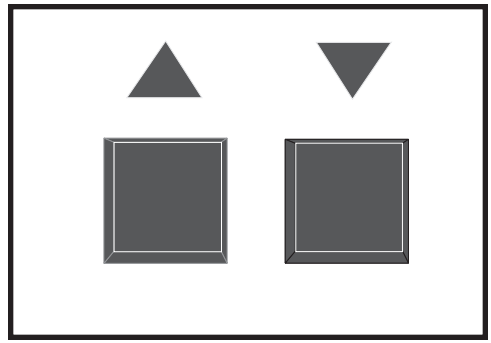


Figure 62. Temp. Setback Entry

OPERATION

1. Temperature Setback for each channel is indicated by the following.

   a) The Current Channel LED will flash off once every 2 seconds when that channel is in Temperature Setback Mode.

   b) Any Active, non-Current Channel LED will flash on once every 2 seconds when that channel is in Temperature Setback Mode.

2. Any Inactive Channel will not enter Temperature Setback Mode.

3. Any Active Channel whose Set Tip Temperature is less than 180°C (350°F) will enter Temperature Setback Mode but will remain at its original Set Tip Temperature.

TEMPERATURE SETBACK OPERATION

EXITING TEMPERATURE SETBACK MODE

Listed below are 4 different ways to exit Temperature Setback Mode.

1. For any individual channel, perform the following operation.

a) Press and release the **CH SELECT** Key until the Setback Channel becomes the Current Channel shown on the Digital Readout.

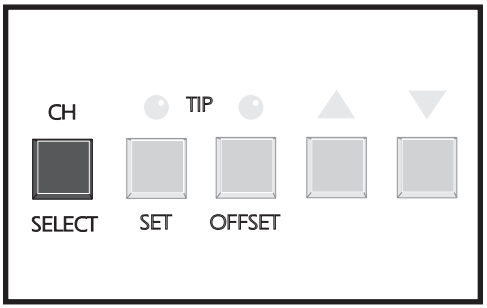


Figure 63. Changing Channel

b) Press and release the Scroll Up Key.

c) The system will now restore the previous Set Tip Temperature.

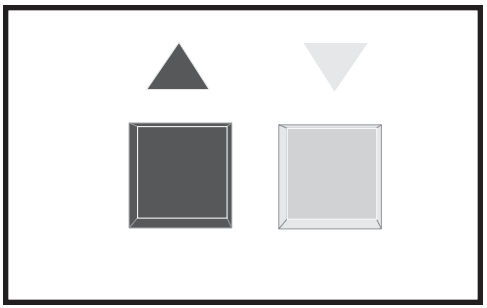


Figure 64. Restore Previous Tip Temp.

d) Observe the Digital Readout as the Operating Tip Temperature increases to the Set Tip Temperature (if above 180°C (350°F)). For optimum performance, do not attempt to use the attached handpiece until set temperature is achieved.

2. For any individual channel, the attached handpiece may be disconnected and reconnected. The previously stored Set Tip Temperature will be restored as in method #1, but the Tip Offset Constant value will change to the default value of "3" for °C ("6" for °F).

To exit Temperature Setback Mode for all channels, do either of the following.

3. Press and hold the Scroll Down Key; press the Scroll Up Key. Release both keys. This is the preferred method.

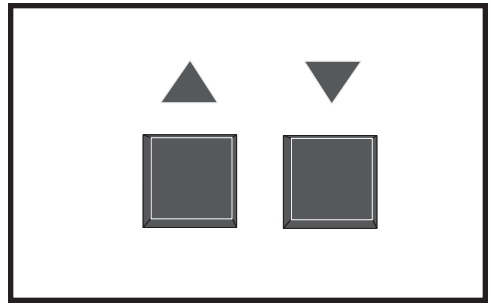


Figure 65. Exit Setback Mode

4. Method "3" is preferred but you can turn the **POWER** Switch "OFF" (0) and then back "ON" (1). Set Tip Temperature and Tip Offset Constants will be simultaneously restored on all channels.

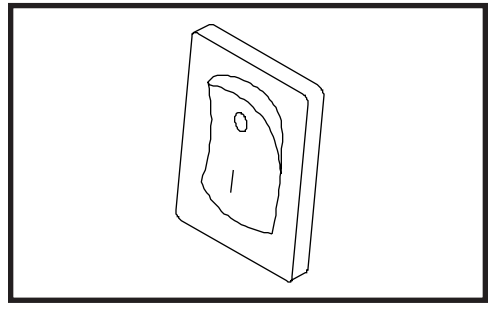


Figure 66. Power Off

AUTOMATIC POWER DOWN OPERATION

FACTORY DEFAULT

As received from the factory, the system will not go into Automatic Temperature SetBack. To enable this feature, refer to the "Calibration" portion of this manual.

The Automatic Power Down feature of the MBT 250 & MBT 220 systems is a safety feature which removes power from all channels 90 minutes after all Active Channels have entered the Automatic Temperature Setback Mode. This feature is not programmable and is automatically activated when the Automatic Temperature Setback feature is enabled.

OPERATION

When all Active Channels have entered Automatic Temperature SetBack Mode, a 90 minute timer within the system circuitry will start running.

1. If the system has no Active Channels (no connected handpieces), Automatic Shutdown will not occur.

2. If any key is pressed during the 90 minute time period, the timer is reset.

3. During the last minute before the 90 minute period expires, an audible tone will occur every 4 seconds to alert the operator.

4. At the end of the 90 minute period, the system will enter the Power Down Mode. Power is removed from all channels, all Channel LEDS will stop flashing and the Digital Readout will display a flashing "OFF".

EXITING POWER DOWN MODE

Power Down can be exited with all channels returning to normal operation by pressing any key or by turning the **POWER** Switch OFF ("0") and then back ON ("1").

QUICK REFERENCE

The Quick Reference Chart shown below may be used as a guide for quickly changing any particular parameter stored within the system. Locate the parameter you wish to change in the column marked "ACTION" and follow the simple instructions given under "Procedure". Remember that if the system is equipped with a Key Lock feature, the switch must be turned to the **UNLOCK** position before making any changes.

ACTION	PROCEDURE
SELECT CURRENT CHANNEL	PRESS KEY → CH SELECT
CHANGE SCALE °F/°C READOUT	PRESS KEY → °F / °C
ADJUST TIP OFFSET CONSTANT	PRESS KEYS → TIP OFFSET → [▲ or ▼] → TIP OFFSET
ADJUST SET TIP TEMPERATURE	PRESS KEYS → TIP SET → [▲ or ▼] → TIP SET

Table 3. Quick Reference Chart

QUICK REFERENCE

ACTION	PROCEDURE
ENTER CALIBRATION (CAL) MODE	PRESS & HOLD: TIP SET + ▼ → POWER ON → RELEASE AFTER 3 SECONDS: TIP SET + ▼
SET DEFAULT TEMP SCALE (°F/°C) **	PRESS KEYS → TIP SET → °F/°C → TIP SET → TIP OFFSET
CHANGE LOWER TEMP LIMIT **	PRESS KEYS → TIP SET → TIP SET → CH SELECT → TIP SET → [▲ or ▼] → TIP SET → TIP OFFSET *(Press Twice)*
CHANGE UPPER TEMP LIMIT **	PRESS KEYS → TIP SET → TIP SET → CH SELECT → TIP SET → TIP SET → [▲ or ▼] → TIP SET → TIP OFFSET → TIP OFFSET
AUTO TEMP SETBACK **	PRESS KEYS → TIP SET → [▲ or ▼] → TIP SET → TIP OFFSET
AUTO POWER DOWN **	Automatically enabled or disabled with AUTO TEMP SETBACK feature.

**** SYSTEM MUST BE IN CALIBRATION (CAL) MODE.**

Table 3. Quick Reference Chart Continued

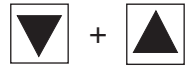
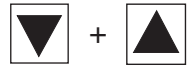
ACTION	PROCEDURE
MANUAL SETBACK ON ALL ACTIVE CHANNELS	PRESS & HOLD  RELEASE AFTER 1 SECOND 
EXIT SETBACK ON ALL ACTIVE CHANNELS	PRESS & HOLD  RELEASE AFTER 1 SECOND 

Table 3. Quick Reference Chart Continued

CORRECTIVE MAINTENANCE

VISIFILTER ELEMENT REPLACEMENT

Follow the procedure listed below to replace the VisiFilter element when it becomes clogged or discolored.

1. Disconnect the handpiece air hose by gently turning and pulling the coupled Fittings.
2. Disconnect the Visifilter and hose assembly from the Power Source by gently turning and pulling the male Fitting inserted into the **AUTO SNAP-VAC** Port.
3. Disconnect VisiFilter from both attached 1 inch air hoses by gently turning and pulling the VisiFilter while holding each of the hoses.
4. Separate the 2 plastic housing halves of the VisiFilter in the following manner.
   a) Grasp the VisiFilter in the palm of the hand with the Male Nib (air hose connection) marked "FLOW IN" facing you.
   b) Pull against one of the Wing Tabs while pulling on the Male Nib with the free hand to open the interconnection of the plastic housings at that Wing Tab.
   c) Pull against the second Wing Tab while pulling on the Male Nib to open the remaining interconnection and separate the plastic housings.
5. Remove the old or discolored Element and discard.
6. Insert the replacement VisiFilter Element into the housing marked "FLOW IN". Center the Element in the housing well.
7. Squeeze the 2 plastic housing halves together using 4 plastic Bumps on the housing marked "FLOW OUT" as pressure points. The 2 plastic housings will snap together and lock the VisiFilter Element in position.
8. Reconnect the 1 inch air hoses (removed in step 3) to the VisiFilter.

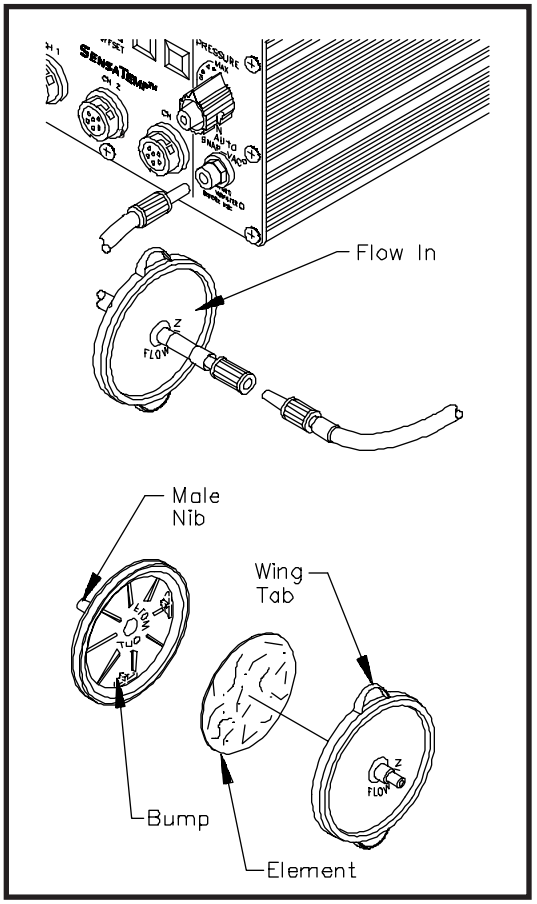


Figure 67. VisiFilter Element Replacement

POWER SOURCE

Most malfunctions are simple and easy to clear. Refer to Table 4 below to clear these malfunctions. If you encounter any difficulty clearing the malfunction, contact PACE Customer Service directly at Tel. (301) 490-9860, FAX (301) 483-7030.

Symptom	Probable Cause	Solution
Digital Readout is blank. No LEDs on. No motor.	Blown Fuse (F1)	Replace Fuse F1 located on rear of Power Source in the AC Receptacle.
	Defective handpiece.	Disconnect all handpieces. Check each handpiece using the applicable handpiece manual or Table 5 of this publication.
E-1 displayed on Digital Readout.	No handpiece connected to power source.	Plug handpiece into CH 1, CH 2 OR CH 3.
	Open sensor in handpiece.	Refer to handpiece Operation Manual for Corrective Maintenance procedures.
E-2, E-3,E-4 or room temperature displayed on Digital Readout.	Defective handpiece.	Disconnect the handpiece connected to the current channel (channel displayed on Digital Readout). Check the handpiece using the applicable handpiece manual or Table 5 of this publication.
Insufficient AUTO SNAP-VAC (vacuum) or air pressure.	Filter(s) and/or handpiece(s) require corrective maintenance.	Refer to applicable handpiece manual(s) for instructions on performing proper "Corrective Maintenance" procedures.

Table 4. Corrective Maintenance, Power Source

CORRECTIVE MAINTENANCE

HANDPIECES

The following "Heater Assembly Checkout Procedures" (Table 4) are applicable to all PACE SensaTemp handpieces except for the TT-65 ThermoTweez & DTP-80 Dual ThermoPik handpieces. Refer to the respective handpiece manuals for troubleshooting procedures pertinent to those handpieces. Use the Digital Readout Message Codes ("E-1", "E-2", "E-3" or "E-4") listed on Table 4 (under "POWER SOURCE") as a guide to pinpointing any malfunction associated with the handpiece.

Perform the "Heater Assembly Checkout Procedures" shown below with the handpiece (and heater) at room temperature. If the handpiece is warm, resistance reading will be different from those shown in the table below.

Symptom	Checkout Procedure	Cause	Solution
No heat	Check resistance - Pin 2 to Pin 5. Refer to "Heater Specifications" . If resistance is high -	Open Heater	Replace heater assembly.
	Check resistance - Pin 3 to Pin 6. If circuit reads open -	Open Sensor	Replace Heater Assembly.
Handpiece overheating	Check resistance - Pin 3 to Pin 6. If less than 105 ohms - -	Shorted Sensor	Replace Heater Assembly.
Fuse blows when unit is turned on.	Check resistance - Pin 2 to Pin 5. Refer to "Heater Specifications" column. If resistance is low - -	Solder short in Handpiece.	Remove Short. Replace Heater Assembly & Fuse F1.
		Shorted Heater	Replace Heater Assembly & Fuse F1.
No Ground on Tip.	Check resistance - Pin 4 to a NEW Tip. Resistance should be less than 2 ohms. If not - -	Oxidation buildup in Heater Bore.	Clean heater bore with proper wire brush.
		Defective Heater	Replace Heater Assembly.

Heater Specifications	
SX-70	= 8 - 10 ohms
SP-1A	=10 - 12 ohms
SP-2A	= 8 - 10 ohms
TP-65	= 9 - 11 ohms
TJ-70	= 6 ohms

Table 5. Heater Assembly Checkout Procedures

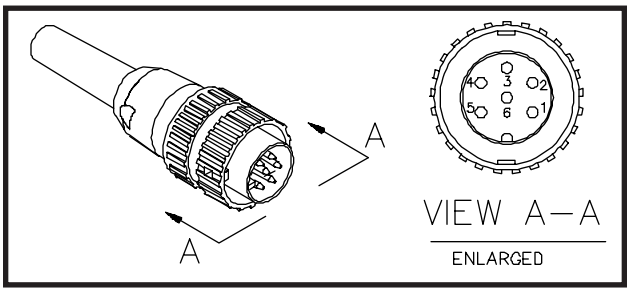


Figure 68. Handpiece Connector Plug

POWER SOURCE

Listed below are the power source parts which may be ordered directly from PACE sales or your local authorized PACE distributor. For handpiece replacement parts, refer to the associated Operation and Maintenance Manual. To obtain power source parts other than those shown, contact your local PACE distributor or PACE directly at Telephone (301) 490-9860, Fax (301) 483-7030.

Item No.	Description		PACE Part Number		
			PPS 85A PPS 85V	PPS 85AJ PPS 85VJ	PPS 85AE PPS 85VE
1	Fuse (F1)	2.0 Amp, Time Lag	1159-0247	- - - - - - - -	- - - - - - - -
		2.5 Amp, Time Lag	- - - - - - - -	1159-0260	- - - - - - - -
2		1.25 Amp, Time Lag	1159-0257	- - - - - - - -	1159-0217

Table 6. Power Source Replacement Parts

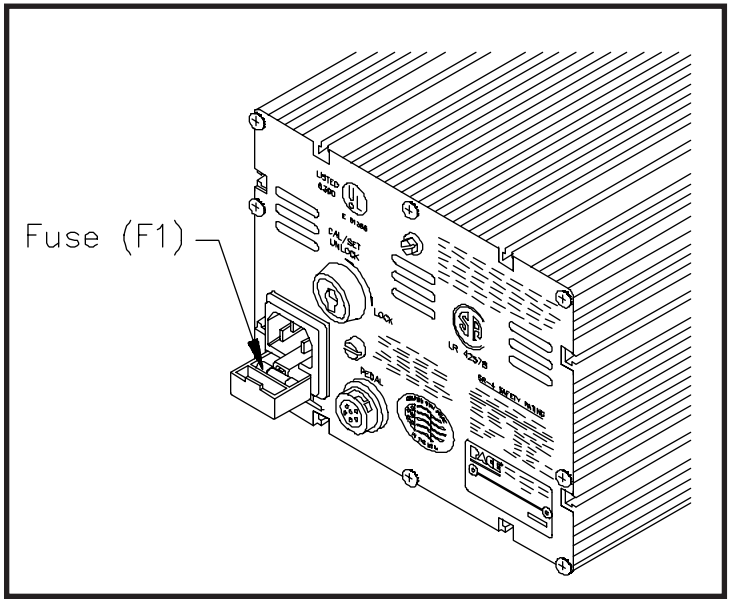


Figure 69. Power Source Parts

REPLACEMENT PARTS

HANDPIECES

Listed below are the handpieces available from PACE. The list is current at time of publication. Contact your local authorized PACE distributor for additional information.

Item Number	Description	Part Number
	SensaTemp Handpieces	
1	SP-2A Sodr-Pen	6025-0014-P1
2	SP-1A Sodr-Pen	6025-0013-P1
3	SX-70 Sodr-X-Tractor	6010-0077-P1
4	TJ-70 Mini ThermoJet	7023-0002-P1
5	TP-65 ThermoPik	7024-0001-P1
6	DTP-80 Dual ThermoPik	7029-0001-P1
7	TT-65 ThermoTweez	7025-0001-P1
	Tip & Tool Stands for SensaTemp Handpieces	
8	SP Tip & Tool Stand (used with items #1 & 2 above)	6019-0043
9	SX Tip & Tool Stand (used with items #3, 4 & 5 above)	6019-0044
10	TT Tip & Tool Stand (used with item #7 above)	6019-0046
11	DTP Tip & Tool Stand (used with item #6 above)	6019-0047
12	Tip & Tool Stand Redi-Rak	6021-0008
	Pulse Heat Handpieces	
13	LF-15 LapFlo	7013-0004-02
14	TW-15 ResisTweez	7009-0005
15	CT-15 ConducTweez	7020-0001
16	TS-15 StripTweez	7012-0002
17	Universal Power Cord (used with all pulse heat handpieces)	7000-0023
18	Handpiece Cubby	6019-0022
19	Handpiece Redi-Rak	6019-0023
	Special Application Handpieces	
20	MC-65 MicroChine	7026-0001
21	Probe Brake Patch Cord	1332-0159
22	Accessory Tool Kit	6005-0013
23	PV-65 Pik-Vac Vacuum Wand	7027-0001
24	Accessory Kit (assorted needles & vacuum cups)	6993-0154

Table 7. Handpieces

HANDPIECE ACCESSORIES

Listed below are the handpiece accessories available from PACE. The list is current at time of publication. Contact your local authorized PACE distributor for additional information.

Item Number	Description	Part Number
1	Glass Chamber, SX-70 Sodr-X-Tractor	1265-0009-P1
2	Silicone Rubber Chamber, SX-70 Sodr-X-Tractor	1265-0010-P1
3	VisiFilter, Fixed	1309-0020
4	VisiFilter, Replaceable	1309-0028
5	Replaceable VisiFilter Elements (available in quantities of 10, 25, 50)	1309-0027
6	Sodr-X-Tractor Filter (available in quantities of 10, 50)	1309-0018
7	Heater Set Screws	1348-0547-P10
8	Vacuum Tubing, Translucent Silicone (66" length)	1342-0001-14
9	Vacuum Tubing, Translucent Silicone (54" length)	1342-0001-13
10	Vacuum Tubing (DTP-80 only)	1342-0027
11	Hose Clamps (all except DTP-80 handpiece)	1321-0085-P6
12	Hose Clamps, DTP-80	1321-0274-P6
13	Quick-Disconnect Fitting (Male)	1259-0087
14	Quick-Disconnect Fitting (Female)	1259-0086
15	Quick-Disconnect Fitting, Male, w/vacuum release (DTP-80 only)	1259-0102
16	Cable Marker Kit (Colored Tabs for hose/cord identification)	6993-0136
17	Tip Tool	1100-0206
18	Tip & Vacuum Cup Tool (DTP-80 & TP-65)	1100-0239
19	Tip Alignment Tool, ThermoTweez	1100-0234
20	Bristle Brush	1127-0002
21	Wire Brush, 3/16" Diameter	1127-0014
22	Wire Brush, 1/8" Diameter	1127-0006
23	Tip Cleaner Kit	6993-0151
24	AdapTip	1360-0083-P1
25	Vacuum Cup Kit, (DTP-80 & TP-65)	6993-0153
26	Thermal Insulative Handpiece Sleeve (all SensaTemp Air Handpieces)	1346-0065
27	Cushion Grip Kit (TT-65 & DTP-80)	6993-0184
28	Replacement Pads for Cushion Grips (TT-65 & DTP-80)	1317-0029-P2

Table 8. Handpiece Accessories

REPLACEMENT PARTS

SYSTEM ACCESSORIES

Listed below are the system accessories available from PACE. The list is current at time of publication. Contact your local authorized PACE distributor for additional information.

Item Number	Description	Part Number
1	Tip Maintenance Station	6993-0138
2	Replacement Sponge for Tray (7 pieces)	4021-0007-P7
3	Fiber Cleaning Tool (for Surface Mount tips)	1100-0232
4	Replacement Fiber Filler (pkg. of 2)	1127-0013-P2
5	Sponge Cleaning Tool (for Surface Mount tips)	1100-0233
6	Replacement Sponge Filler (pkg. of 5)	4021-0006-P5
7	Cleaning Sponge, Tip & Tool Stands	4021-0008-P3
8	Tip Redi-Rak	6021-0007
9	Tip & Tool Stand Redi-Rak	6021-0008
10	Foot Pedal	6008-0115
11	Tip & Temperature Selection System Charts Booklet	5050-0251
12	Tip & Temperature Selection System Chart Holder	1257-0186-P1
13	Temperature Calibration/Set Key Lock	1273-0008-P1
14	Power Source Interlock Kit	6993-0141
15	Calibration Kit	6993-0133
16	Metric Adapter Fitting ("V" systems air line fitting)	1259-0081
17	PACE Screwdriver	1100-0230
18	One Year Consumable Kit	6550-0019
19	Service Manual	5050-0352

Table 9. System Accessories

MANUAL IMPROVEMENT & COMMENT FORM

Instructions

1. Duplicate this form and submit comments on the copy. Keep the original to make future comments.
2. Complete all requested information.
3. Submit completed form to: PACE Incorporated
   Applications Engineering Fax: (301) 604 - 8782
   9893 Brewers Court
   Laurel MD 20723-1990 U.S.A.

Document Nbr: **5050-0380**	Revision Level: **C**	Date of Submission:

Nature of Change (Identify page and paragraph and include proposed rewrite, if possible.)

Reason for Recommendation

Submitter:

Name:	Company or Organization:
Mailing Address:	Telephone (Include Area Code) Voice: Fax: e-Mail:

Thank you for your comments; they are greatly appreciated!