



PRC 2000 SYSTEMS

SERVICE MANUAL



MANUAL NO. 5050-0344

REV. C



*Systems for Development, Production
and Repair of Electronic Assemblies*

PACE Incorporated retains the right to make changes to specifications contained herein at any time, without notice.

Contact your local authorized PACE Distributor or PACE Incorporated to obtain the latest specifications.

The following are registered trademarks and/or servicemarks of PACE Incorporated, Laurel Maryland U.S.A. and may only be used to identify genuine PACE products or services:

AdapTip, Arm-Evac, Cir-Kit, ComForm I, ConducTweez, CRAFT, Dual Path, Flo-D-Sodr, FuseSet, HandiPik, HotSpot, LapFlo, MBT, Micro Portable, MicroChine, MiniChine, Mini-Wave, PACE, Pacenter, Ped-A-Vac, PETS, Pik-Vac, PRC, PRINT, Pro-Evac, Redi-Rak, ResistTweez, SensaTemp, SMR, Snap-Vac, Sodr-Pen, Sodr-X-Tractor, SR-3, SR-4, ST, StripTweez, SwaPlater, ThermoBand, Thermo-Drive, ThermoJet, ThermoPart, ThermoPik, ThermoTweez, Tip-Evac, VisiFilter.

The following are trademarks and/or servicemarks of PACE Incorporated, Laurel Maryland U.S.A. and may only be used to identify genuine PACE products or services:

Auto Off, Cubby-Vac, Datastore, Dust Evac, EKO, Lab Evac, MicroSpin, PaceLink, PaceNet, Pik & Paste, Prep-Set, Pulse Plate, Spa-Kleen, ThermoBond, TinSpin, TweezPik, Uni-Frame, V-A-N, Ventur-Evac.



Since 1958, PACE Incorporated has provided advanced technology training in all aspects of hand soldering, rework and repair.

Additional copies of this manual or other PACE literature may be obtained from:

PACE Incorporated (301) 490 - 9860
Sales Administration (301) 498 - 3252 Fax
9893 Brewers Court
Laurel MD 20723-1990

TABLE OF CONTENTS

TITLE	PAGE
General Information	1
Introduction	1
Specifications	1
Parts Identification	4
Safety	16
Heading Guidelines	16
Precautions	17
Repair	19
Repair Procedure	19
Service Hints	20
Corrective Maintenance	21
VisiFilter Element Replacement	21
SensaTemp Handpieces	22
MicroChine Handpiece	23
Power Source	25
Calibration	30
Disassembly/Assembly	32
Disassembly	32
Assembly	37
Flow Charts	39
Power	40
TMC	42
Pik & Paste	44
MicroChine	46
Pulse Plate	48
Pulse Heat	50
Wiring Diagram	52
Multifunction PCB Assembly Schematic	54
Microprocessor PCB Assembly Schematic	60
Display PCB Assembly Schematic	64
Assembly Drawing	66
Air Hose Routing	68
Replacement Parts	69
Power Source	69
Power Source Accessories	73
Handpieces	74
Handpiece Accessories	76
Manual Improvement & Comment Form	77

TABLES & FIGURES

TABLE	PAGE
Table I Heater Assembly Checkout Procedures	22
Table II MicroChine Handpiece Checkout Procedures	24
Table III Corrective Maintenance, Power Source	25
Table IV Power Source Replacement Parts	69
Table V Power Source Accessories	73
Table VI Replacement Handpieces	74
Table VII Replacement Handpiece Accessories	76

FIGURE	PAGE
Figure 1. Power Switch/Foot Pedal Selector Switch	4
Figure 2. Pulse Heat Section	5
Figure 3. Pulse Plate Section	6
Figure 4. MicroChine Section	7
Figure 5. Pik And Paste Section	9
Figure 6. Thermal Management Center Parts I.D.	12
Figure 7. Rear Panel Parts I.D.	15
Figure 8. VisiFilter Element Replacement	21
Figure 9. Connector Plug Wiring	23
Figure 10. MicroChine Wiring	23
Figure 11. Thermocouple Attachment	31
Figure 12. Removing Rear Panel Screws	33
Figure 13. Removing Front Panel	34
Figure 14. Removing Bolt Assemblies	35
Figure 15. Removing Power Source From Case	36
Figure 16. Power Flow Chart	40
Figure 17. Thermal Management Center Malfunction Flow Chart	42
Figure 18. Pik & Paste Malfunction Flow Chart	44
Figure 19. MicroChine Malfunction Flow Chart	46
Figure 20. Pulse Plate Malfunction Flow Chart	48
Figure 21. Pulse Heat Malfunction Flow Chart	50
Figure 22. PPS 400, PPS 400J, PPS 400E Wiring Diagram	52
Figure 23. MultiFunction PCB Assembly Schematic	54
Figure 24. Microprocessor PCB Assembly Schematic	60
Figure 25. Display PCB Assembly Schematic	64
Figure 26. Assembly Drawing	66
Figure 27. Assembly Drawing Cont'd	67
Figure 28. Air Hose Routing	68
Figure 29. Power Source Replacement Parts	70
Figure 30. Power Source Replacement Parts Cont'd	71
Figure 31. Power Source Replacement Parts Cont'd	72

GENERAL INFORMATION

INTRODUCTION

The information contained in this manual will assist the technician in performing preventive maintenance and repair of the PACE PRC 2000 Systems. For details on operation of the system, refer to the System Operation & Maintenance Manual (PACE part number 5050-0313). If you encounter any difficulty operating or repairing your system, call PACE Customer Service directly at Tel. (301) 490-9860 or FAX (301) 604-9215.

The PRC 2000 is a Process Control System for Universal Assembly and Repair of Electronic Assemblies. The system combines the latest technology available for all types of component installation/removal, circuit board preparation and repair into one self-contained workstation.

The SR-4 "Safety Rating" designation on the back panel is your assurance that the PRC 2000 meets or exceeds all applicable civilian and military standards (including *MIL-STD-2000A, and *WS-6536), EOS/ESD and worldwide electrical codes. ***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".

The PRC 2000 system is available using power sources in either the 100 VAC version, the 115 VAC version or the 230 VAC version. The 230 VAC version system (production as of Sept. 1995) bears the CE Conformity Marking which assures the user that it conforms to all the requirements of council directive EMC 89/336/EEC.

SPECIFICATIONS

POWER REQUIREMENTS

- PPS 400 (PRC 2000 system):** 115 VAC System - Operates on 97-127 VAC, 60 Hz. 400 Watts.
- PPS 400J (PRC 2000J system):** 230 VAC System - Operates on 90-115 VAC, 50/60 Hz. 400 Watts.
- PPS 400E (PRC 2000E system):** 100 VAC System - Operates on 195-264 VAC, 50/60 Hz. 400 Watts.

PHYSICAL PARAMETERS

- Size:** 35 cm W x 17.5 cm H x 23 cm D (13.75 in W x 6.9 in H x 9.25 in D)
- Weight:** 13.6 Kg (30 Lbs)

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

THERMAL MANAGEMENT CENTER

VACUUM AND AIR

Measurements at Front Panel **SNAP-VAC** and **PRESSURE** Ports of power source.

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:	13 SLPM (0.46 SCFM) maximum

HANDPIECES

Set Temperature Range of SensaTemp Handpieces:	38°C to 482°C (100°F to 900°F) (see note).
Digital Readout Resolution:	± 1° (°C or °F)
Tip Temperature Stability:	± 1.1°C (± 2°F) at idle from Set Tip Temperature.

NOTE

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

EOS/ESD

Tip-To-Ground Resistance:	Less than 5 ohms.
AC Leakage :	Less than 2 millivolts RMS from 50Hz to 500Hz.

PIK AND PASTE

Vacuum (at PIK-VAC Port):	7.6 cm Hg. (3 in. HG.) min.
Pressure (at PASTE DISP Port):	2.41 Bar (35 P.S.I.) min.

GENERAL INFORMATION

MICROCHINE

HANDPIECE

Nominal Output Speed Range:	2,500 rpm, min. to 10,000 rpm, max.
Output Torque:	14 N•mm (2.0 inch-ounces), min.
Speed Regulation:	+10/-15% over Line/Load range of 0 to 14 N•mm (0 to 2 inch-ounces) from low line to high line voltage.
Duty Cycle:	Application Dependent. Continuous loading to maximum torque (Status LED Amber in color) will cause the handpiece case to overheat. Continuous heavy loading without a cooling period may cause damage to the handpiece and/or the power source.
Shaft Run-Out at Collet:	.13mm (0.005 inches) TIR (Total Indicator Reading) max.

EOS/ESD

Tip-To-Ground Resistance:	Less than 5 ohms.
AC Leakage :	Less than 2 millivolts RMS from 50Hz to 500Hz, min.

PULSE PLATE

Output Voltage Range:	0 - 10 volts unfiltered, full wave DC.
------------------------------	--

PULSE HEAT

Output Voltage Range:	0 - 2.3 VAC RMS
------------------------------	-----------------

GENERAL INFORMATION

PARTS IDENTIFICATION

SYSTEM

1. **POWER SWITCH** - Turns system ON ("1") and OFF ("0"); controls input power to the system.
2. **FOOT PEDAL SELECTOR SWITCH** - Control knob provides foot pedal connection to Pik and Paste (**PD**), MicroChine (**MC**), Pulse Plate (**PP**) or Pulse Heat (**PH**) features.

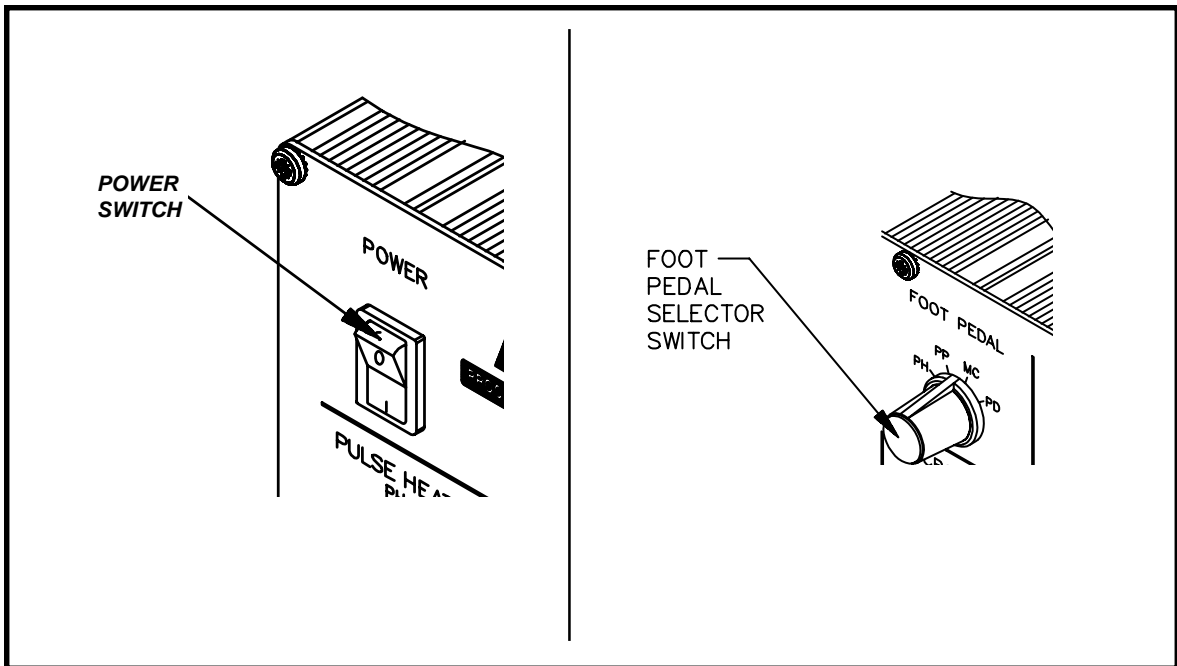


Figure 1. Power Switch/Foot Pedal Selector Switch

GENERAL INFORMATION

FRONT PANEL FEATURES

PULSE HEAT

3. **PULSE HEAT OUTPUTS** - Low voltage AC power outputs for Low Voltage, Pulse Heat handpieces.
4. **PULSE HEAT OUTPUT CONTROL** - Controls low voltage AC power at **PULSE HEAT** Outputs.
5. **PULSE HEAT LED** - Illuminates Green in color when power is applied (by foot pedal through **FOOT PEDAL** Selector Switch) to the **PULSE HEAT** Outputs.

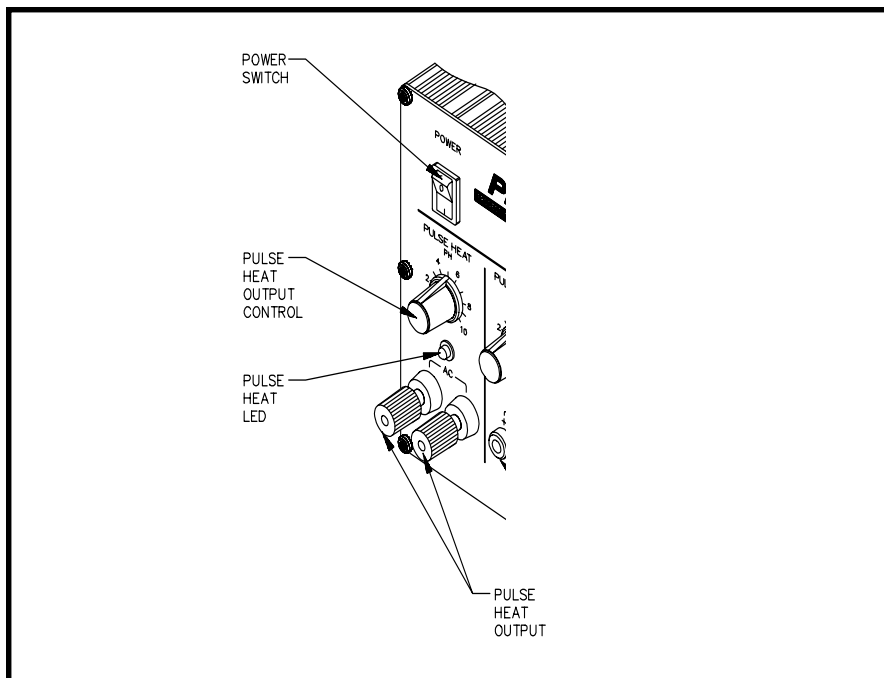


Figure 2. Pulse Heat Section

GENERAL INFORMATION

PULSE PLATE

6. **PULSE PLATE OUTPUTS** - DC power connections for PACE SwaPlater plating system.
7. **PULSE PLATE OUTPUT CONTROL** - Controls DC power at **PULSE PLATE** Outputs.
8. **PULSE PLATE LED** - Illuminates Green to indicate when power is applied (upon foot pedal actuation) at the **PULSE PLATE** Outputs. Illuminates Red if an overcurrent condition occurs during plating.

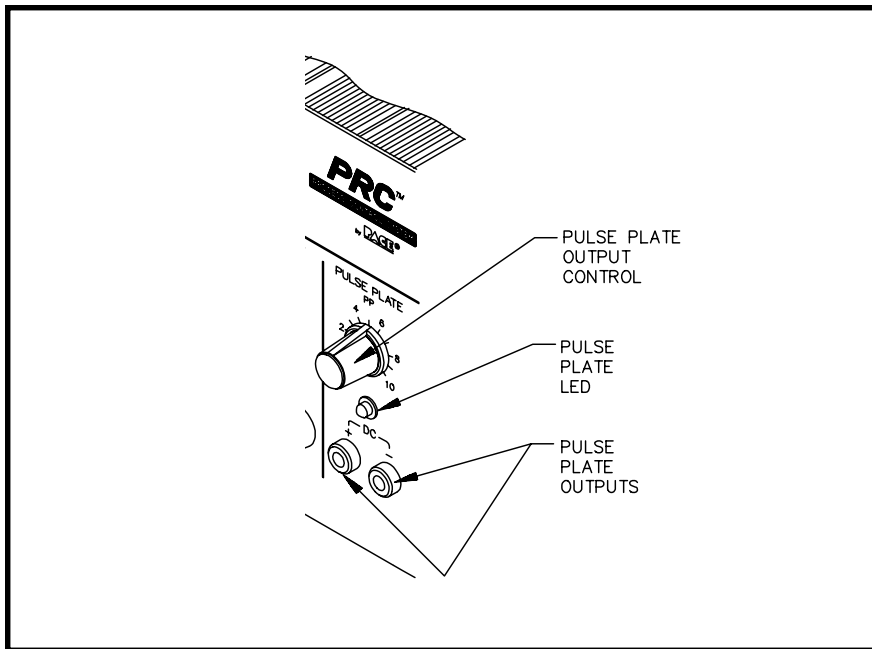


Figure 3. Pulse Plate Section

GENERAL INFORMATION

MICROCHINE

9. **MICROCHINE POWER RECEPTACLE** - Provides power, speed control, tip ground and finger switch connection for the MicroChine handpiece.
10. **VARIABLE SPEED CONTROL** - Controls motor speed (2,500 - 10,000 RPMs) of MicroChine handpiece.
11. **PROBE BRAKE RECEPTACLE** - Provides Probe Brake connection for the MicroChine Probe Brake feature. See MicroChine portion of this manual for details.
12. **STATUS LED** - Illuminates Green to indicate MicroChine operation. Illuminates Amber if maximum torque load is reached. Illuminates Red to indicate braking status when Probe Brake circuit is activated.

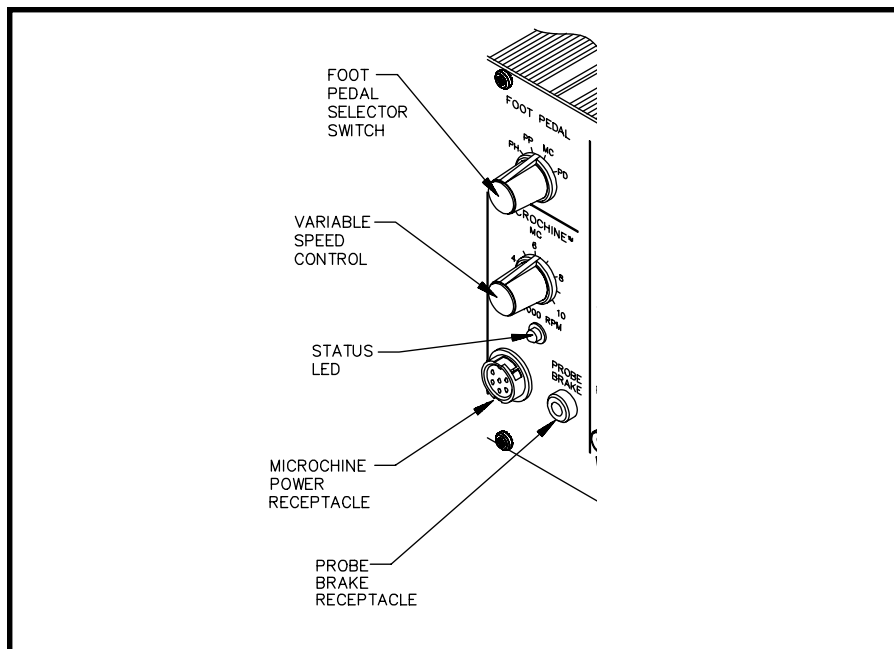


Figure 4. MicroChine Section

GENERAL INFORMATION

PIK AND PASTE

13. **PIK-VAC POWER SWITCH** - Turns power "ON" (1) or "OFF" (0). Controls power to the Pik-Vac vacuum pump.
14. **PIK-VAC LED** - Illuminates Green to indicate Pik-Vac vacuum pump operation.
15. **PIK-VAC PORT** - Quick connect fitting which provides vacuum for Pik-Vac handpiece.
16. **PIK AND PASTE TIMER CONTROL** - Determines variable time controlled shot (0.1 - 10 seconds) of Paste Dispense (**PASTE DISP**) air pressure upon foot pedal actuation (Foot Pedal Selector Switch in **PD** position). Operates when **TIMED/CONT** Switch is in the **TIMED** position.
17. **TIMED/CONT SWITCH** - In **CONT** position, continuous air pressure is delivered from **PASTE DISP** Port upon foot pedal actuation (Foot Pedal Selector Switch in **PD** position). In **TIMED** position, measured interval of air pressure (0.1 - 10 seconds) is delivered from **PASTE DISP** Port upon foot pedal actuation (Foot Pedal Selector Switch in **PD** position).
18. **PASTE DISP LED** - Illuminates Green when air pressure is delivered from the **PASTE DISP** Port. Illuminates Yellow when the paste dispense pump reservoir is charging (no air pressure delivery from **PASTE DISP** Port).
19. **PASTE DISP PORT** - Quick connect fitting which provides air pressure (timed or continuous) to dispensing barrel.

GENERAL INFORMATION

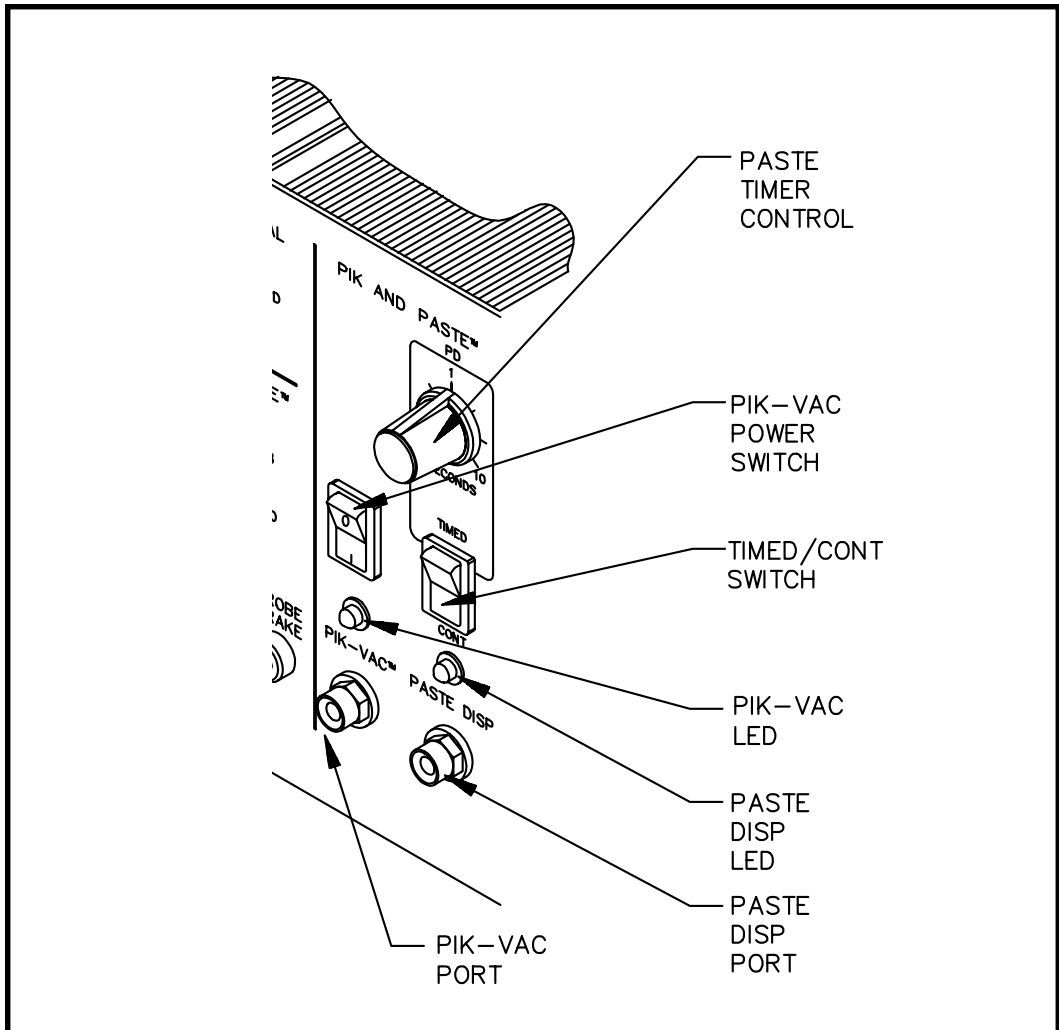


Figure 5. Pik And Paste Section

GENERAL INFORMATION

THERMAL MANAGEMENT CENTER

Refer to the illustration following for location of parts.

- 20. **CH 1 POWER RECEPTACLE** - Provides power, tip ground, sensing circuitry and finger switch connection from PRC 2000 system to handpiece connected to Channel 1 (**CH 1**).
- 21. **CH 2 POWER RECEPTACLE** - Provides power, tip ground, sensing circuitry and finger switch connection from PRC 2000 system to handpiece connected to Channel 2 (**CH 2**).
- 22. **CH 3 POWER RECEPTACLE** - Provides power, tip ground, sensing circuitry and finger switch connection from PRC 2000 system to handpiece connected to Channel 3 (**CH 3**).
- 23. **SNAP-VAC PORT** - Quick connect fitting which provides quick-rise vacuum for Sodr-X-Tractor or ThermoPik handpieces.
- 24. **CONTROLLABLE PRESSURE PORT** - Quick connect fitting with adjustable valve which provides variable air flow for Mini ThermoJet handpiece and Sodr-X-Tractor handpiece (in Hot Jet Mode).
- 25. **DIGITAL READOUT** - Provides a three digit display of the Current Channel (channel with illuminated LED; **CH 1**, **CH 2**, **CH 3** or **AUX 1**, **AUX 2**, **AUX 3**) temperature information. This includes: Operating Tip Temperature in Temperature Display Mode (normal operation), Tip Temperature Offset Constant in **TIP OFFSET** Mode, Set Tip Temperature in **TIP SET** Mode, and other information in Calibration (CAL) Mode.
- 26. **°F/°C KEY** - Selects °F or °C display of Set and Operating Temperatures and Tip Temperature Offset Constants.
- 27. **°F LED** - Illuminates when Set and Operating Tip Temperatures and Tip Temperature Offset Constants are displayed in °F.
- 28. **°C LED** - Illuminates when Set and Operating Tip Temperatures and Tip Temperature Offset Constants are displayed in °C.
- 29. **CH 1 LED** - Illuminates when Channel 1 (**CH 1**) or Auxiliary Channel (**AUX 1**) is the Current Channel (i.e., the channel (with connected handpiece/tip or auxiliary accessory) whose temperature information is displayed on the Digital Readout).

GENERAL INFORMATION

- 30. **CH 2 LED** - Illuminates when Channel 2 (**CH 2**) or Auxiliary Channel (**AUX 2**) is the Current Channel (i.e., the channel (with connected handpiece/tip or auxiliary accessory) whose temperature information is displayed on the Digital Readout).
- 31. **CH 3 LED** - Illuminates when Channel 3 (**CH 3**) or Auxiliary Channel (**AUX 3**) is the Current Channel (i.e., the channel (with connected handpiece/tip or auxiliary accessory) whose temperature information is displayed on the Digital Readout).
- 32. **AUX LED** - Illuminates when an auxiliary channel (on system rear panel) is the Current Channel (i.e., the channel (with connected handpiece/tip or auxiliary accessory) whose temperature information is displayed on the Digital Readout). One of the **CH 1**, **CH 2** or **CH 3** LEDs will illuminate simultaneously with the Auxiliary LED to indicate, respectively, which of the auxiliary channels is active (**AUX 1**, **AUX 2** or **AUX 3**).
- 33. **CH SELECT KEY** - Selects the Current Channel (among “Active Channels” i.e., those with a connected handpiece or auxiliary accessory).
- 34. **TIP SET KEY** - Allows the operator to adjust the Set Tip Temperature for the handpiece/tip combination or Set Temperature for the auxiliary accessory connected to the Current Channel. Places the **THERMAL MANAGEMENT CENTER** in the **TIP SET** (Tip Temperature Set) Mode.
- 35. **TIP SET LED** - Flashes when **TIP SET** Key is pressed indicating that the **THERMAL MANAGEMENT CENTER** is in **TIP SET** Mode.
- 36. **TIP OFFSET KEY** - Allows the operator to adjust the **TIP OFFSET CONSTANT** for the handpiece or auxiliary accessory connected to the Current Channel. Places the **THERMAL MANAGEMENT CENTER** in the **TIP OFFSET** (Tip Temperature Offset) Mode.
- 37. **TIP OFFSET LED** - Flashes when **TIP OFFSET** Key is pressed indicating that the **THERMAL MANAGEMENT CENTER** is in the **TIP OFFSET** Mode. Remains illuminated (not flashing) in Temperature Display Mode (normal operating mode) when a Tip Temperature Offset Constant of greater than “3” for °C (“6” for °F) is entered.
- 38. **SCROLL UP KEY** - Increases the Set Tip Temperature (in **TIP TEMPERATURE SET** Mode) and Tip Temperature Offset Constant (in **TIP TEMPERATURE OFFSET** Mode) in one, then ten degree increments. Also used in “CAL” (Calibration) Mode.

GENERAL INFORMATION

39. SCROLL DOWN KEY - Decreases the Set Tip Temperature (in **TIP SET** Mode) and Tip Temperature Offset Constant (in **TIP OFFSET** Mode) in one, then ten degree increments. Also used in "CAL" (Calibration) Mode.

40. 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.

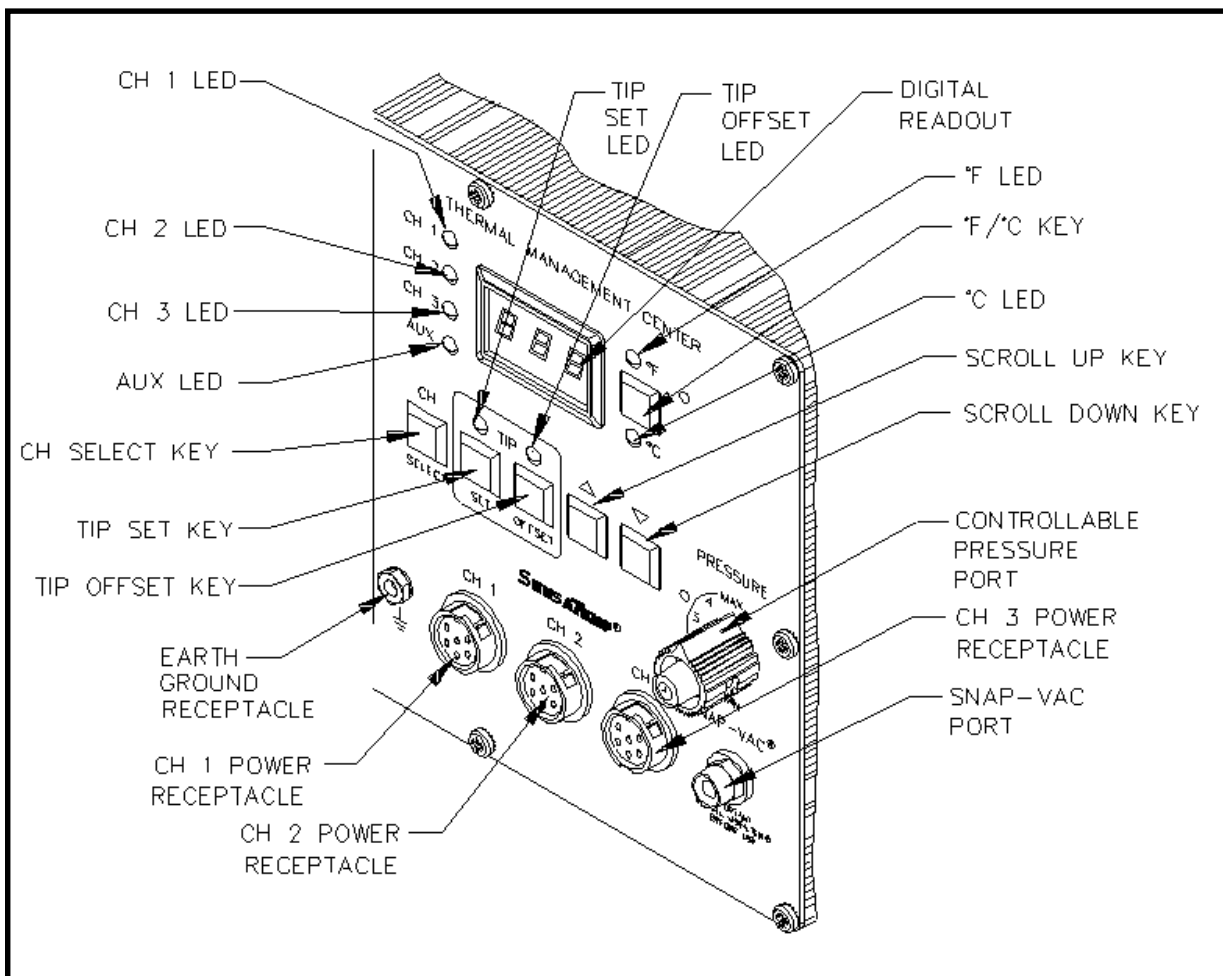


Figure 6. Thermal Management Center Parts I.D.

GENERAL INFORMATION

GENERAL INFORMATION

REAR PANEL

- 41. **AC POWER RECEPTACLE/FUSE HOLDER** - Receptacle for providing power to the PRC 2000 system from AC outlet through power cord. Also location of fuse (F1) which protects the system from overcurrent conditions.
- 42. **FUSE F1** - Provides overload protection for PRC 2000 system.
- 43. **FOOT PEDAL RECEPTACLE** - Input for foot pedal which operates the Pik and Paste, MicroChine, Pulse Plate or Pulse Heat features of the system as determined by the **FOOT PEDAL** Selector Switch. This receptacle is not connected to the Thermal Management Center controls.

NOTE
The Auxiliary Power Receptacles listed below (items 44-46) will provide temperature control for line operated auxiliary accessories or foot pedal operation only. SensaTemp handpieces will not function properly if connected to these outputs.

- 44. **AUX 1 POWER RECEPTACLE** - Provides temperature control, tip ground sensing circuitry and finger switch connection from **THERMAL MANAGEMENT CENTER** to the auxiliary accessory connected to Auxiliary Channel 1. Foot pedal attachment to this receptacle will allow vacuum/pressure pump operation through foot pedal actuation.
- 45. **AUX 2 POWER RECEPTACLE** - Provides temperature control, tip ground sensing circuitry and finger switch connection from **THERMAL MANAGEMENT CENTER** to the auxiliary accessory connected to Auxiliary Channel 2. Foot pedal attachment to this receptacle will allow vacuum/pressure pump operation through foot pedal actuation.
- 46. **AUX 3 POWER RECEPTACLE** - Provides temperature control, tip ground sensing circuitry and finger switch connection from **THERMAL MANAGEMENT CENTER** to the auxiliary accessory connected to Auxiliary Channel 3. Foot pedal attachment to this receptacle will allow vacuum/pressure pump operation through foot pedal actuation.
- 47. **FUSE F2** - Provides overload protection for **CH 1**, **CH 2** and **CH 3** power receptacles.
- 48. **PIK PRESSURE PORT** - Low pressure output with quick connect fitting. Controlled by **PIK-VAC** Power Switch (front panel).

GENERAL INFORMATION

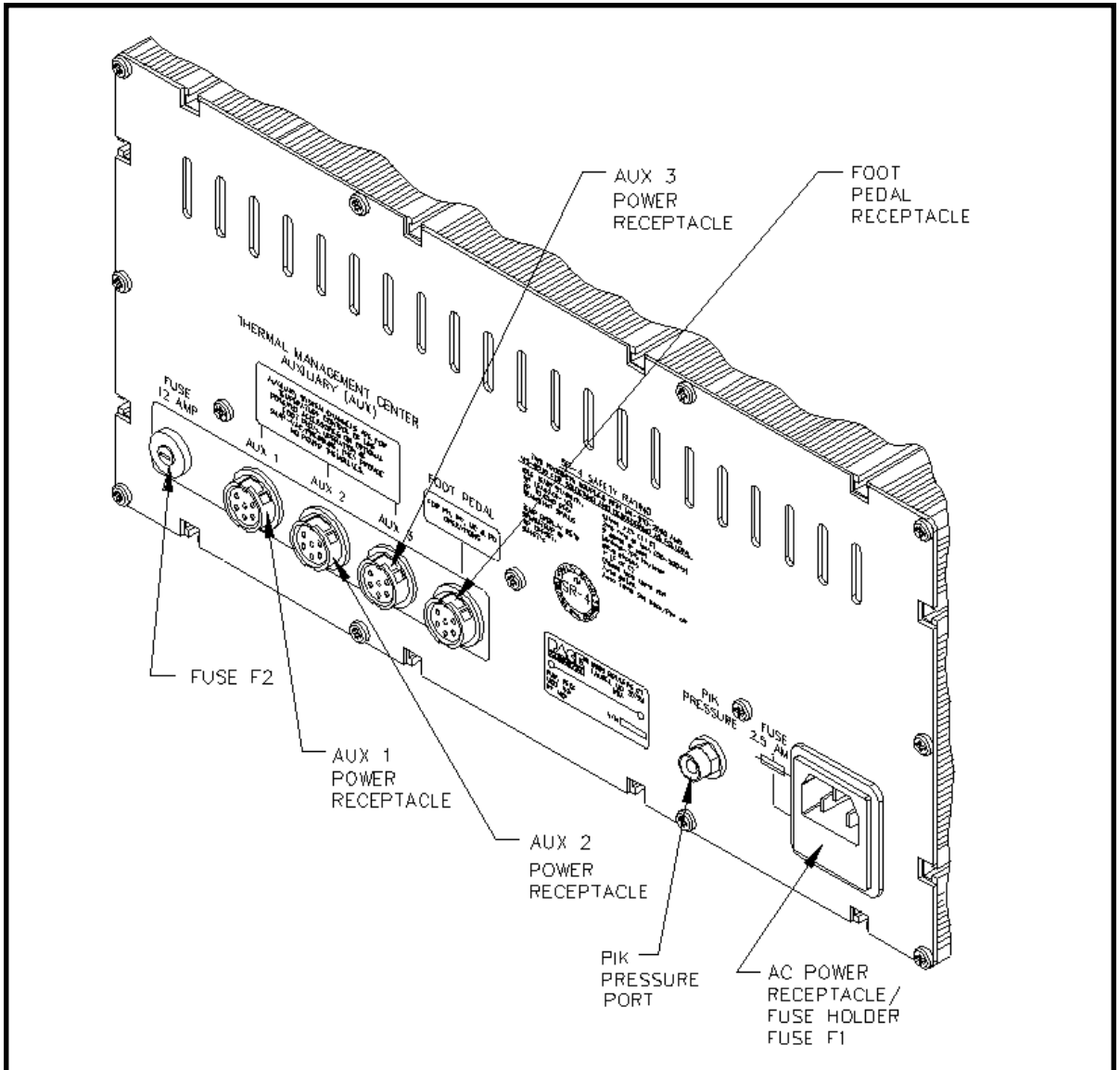


Figure 7. Rear Panel Parts I.D.

SAFETY

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
XX

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 personnel injury risk is present.

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 cubby 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 protect personnel from solder flux fumes.
3. Exercise proper precautions when using materials (e.g., fluxes & solder paste). Refer to the Material Safety Data Sheet (MSDS) supplied with each chemical and adhere to all safety precautions recommended by the manufacturer.
4. The use of Safety Glasses is recommended when plating or machining.

NOTES

1. The 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 glass solder collection chamber in the PACE Sodr-X-Tractor is hot when the handpiece is in use. When removing the chamber for cleaning, never touch the glass with bare hands. Allow the chamber to cool before cleaning.
3. Disconnect the MicroChine handpiece from the power source or turn the power switch off before installing or changing tools.

SAFETY

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 troubleshooting the power source.

NOTES

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

REPAIR PROCEDURE

The "REPAIR" section of this manual provides the technician with the information necessary to determine the source of a malfunction and take the necessary steps to correct it. In order to perform the most expedient repair, the technician must follow the process listed below step by step, in order. Failure to do so will make the diagnosis and repair much more difficult.

1. **PERIODIC MAINTENANCE** - No periodic or special maintenance is required on this system.
2. **SERVICE HINTS** - Read these helpful hints which give information on operation and troubleshooting.
3. **CORRECTIVE MAINTENANCE** - A guide for resolving malfunctions caused by improper maintenance or handpiece failure. Locate the "Symptom" in the "Corrective Maintenance" section which best describes the malfunction of the failed unit. Check each point described under "Solution" in order of listing.
4. **CALIBRATION** - Lists procedures for performing tip temperature tests to check handpieces. Perform these procedures periodically or if operating tip temperatures appear to be incorrect.
5. **DISASSEMBLY/ASSEMBLY** - Contains Disassembly/Assembly instructions which enables the technician to disassemble and assemble the unit properly.
6. **FLOW CHARTS, SCHEMATICS** - Easy to follow Flow Charts, Assembly Drawings, Schematics and Wiring Diagrams which enable the technician to determine the source of a malfunction down to an assembly (e.g., Main PCB Assembly) level. Locate the Flow Chart which best describes the malfunction of the failed unit. Follow the instructions on the Flow Chart and perform the checks indicated to determine the source of the malfunction. The schematics shown are for systems produced at the time of publication of this manual. If any variances in components or wiring are detected on your system contact PACE Customer Service for assistance (see step #7 below).
7. **PACE CUSTOMER SERVICE** - If the cause for the malfunction has not been determined at this point, call PACE Customer Service at TEL:(301) 490-9860, FAX (301) 604-9215.

WARNING

POTENTIAL SHOCK HAZARD Repair Procedures are to be performed by qualified service personnel only. Removal of the power source panels exposes line voltage parts. Service personnel must insure that the AC Power Cord is disconnected prior to disassembly.

REPAIR

SERVICE HINTS

1. **OPERATIONAL PROBLEMS:** Refer to the PACE Operation & Maintenance Manual (P/N 5050-0313) for complete operational instructions on use of this product. If a Password has been installed by the system user, remove the Password before proceeding with the repair. The user can reinstall the Password after the system is repaired.
2. **VACUUM FAILURES:** Failures of this nature can be caused by either the unit or the SensaTemp handpiece. Remove the Air Hose (and attached VisiFilter) from the **SNAP-VAC** Port and check for vacuum at the port. If sufficient vacuum is present, the malfunction exists in the handpiece. Further, if vacuum is sufficient at the port, check the vacuum level at the end of the glass solder collection chamber (Sodr-X-Tractor handpieces only, chamber must be checked cold). Take the applicable steps shown following.
 - a) **Handpiece Failures:** Replace VisiFilter if necessary; clean heater bore and replace tip, check air hose for holes and ensure that glass solder collection chamber (Sodr-X-Tractor handpieces only) is properly seated against heater seal.
 - b) **Unit Failures:** Remove the unit front panel (see "Disassembly/Assembly"). Check internal hosing for kinks and replace internal VisiFilter (attached to pressure port on motor pump assembly).
3. **HEATING CONTROL CIRCUITS:** Must be checked under load (with handpiece/s plugged in). The output(s) are obtained by switching triacs on and off. The voltage level to the handpiece(s) does not change when adjusting the Set Tip Temperature. The control circuit of the unit varies the duty cycle of voltage application as required to achieve and maintain the set temperature of the handpiece.
4. **HEATING FAILURES:** Usually caused by defective SensaTemp handpiece heaters. Refer to the "Heater Assembly Checkout Procedures", Table I. When checking the system power source, use a known good handpiece.

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 **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.
9. Attach VisiFilter and hose assembly to Power Source by inserting male Fitting into the **SNAP-VAC** Port.

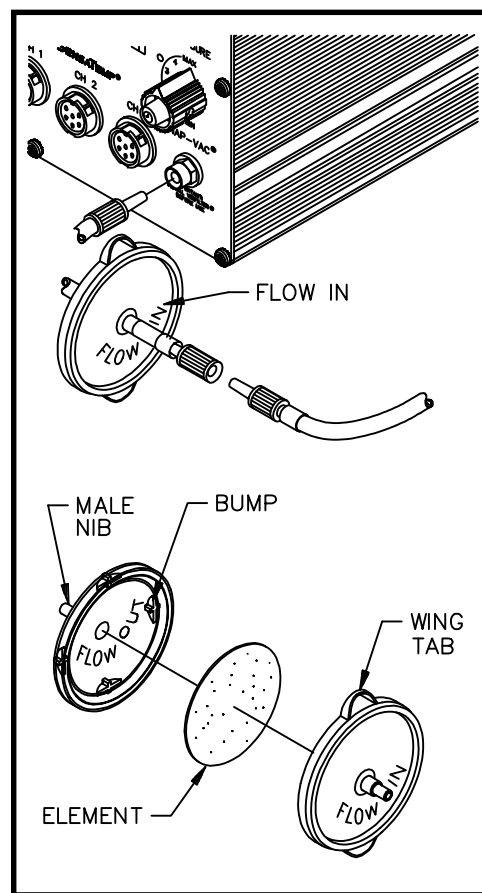


Figure 8. VisiFilter Element Replacement

REPAIR

SENSATEMP HANDPIECES

The following "Heater Assembly Checkout Procedures" are applicable to all PACE SensaTemp handpieces except for the TT-65 ThermoTweez handpiece. Refer to either of the TT-65 manuals (P/N 5050-0300 or 5050-0336) for troubleshooting procedures pertinent to that handpiece.

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

SYMPTOM	CHECKOUT PROCEDURE	CAUSE	SOLUTION	HEATER SPECIFICATIONS
No heat	Check resistance - Pin 2 to Pin 5. Refer to handpiece manual for resistance tolerances. If resistance is high -	Open Heater	Replace Heater Assembly.	SX-70 = 8 - 10 ohms SP-2A = 8 - 10 ohms
	Check resistance - Pin 3 to Pin 6. If circuit reads open -	Open Sensor	Replace Heater Assembly.	SP-1A = 10 - 12 ohms
Handpiece overheating	Check resistance - Pin 3 to Pin 6. Resistance should be 110 ohms. If circuit reads less than 105 ohms -	Shorted Sensor	Replace Heater Assembly.	TP-65 = 9 - 11 ohms TJ-70 = 6 - 8 ohms
Fuse blows when unit is turned on.	Check resistance - Pin 2 to Pin 5. Refer to handpiece manual for resistance tolerances. 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 using appropriate wire brush.	
		Defective Heater	Replace Heater Assembly.	

Table I. Heater Assembly Checkout Procedures