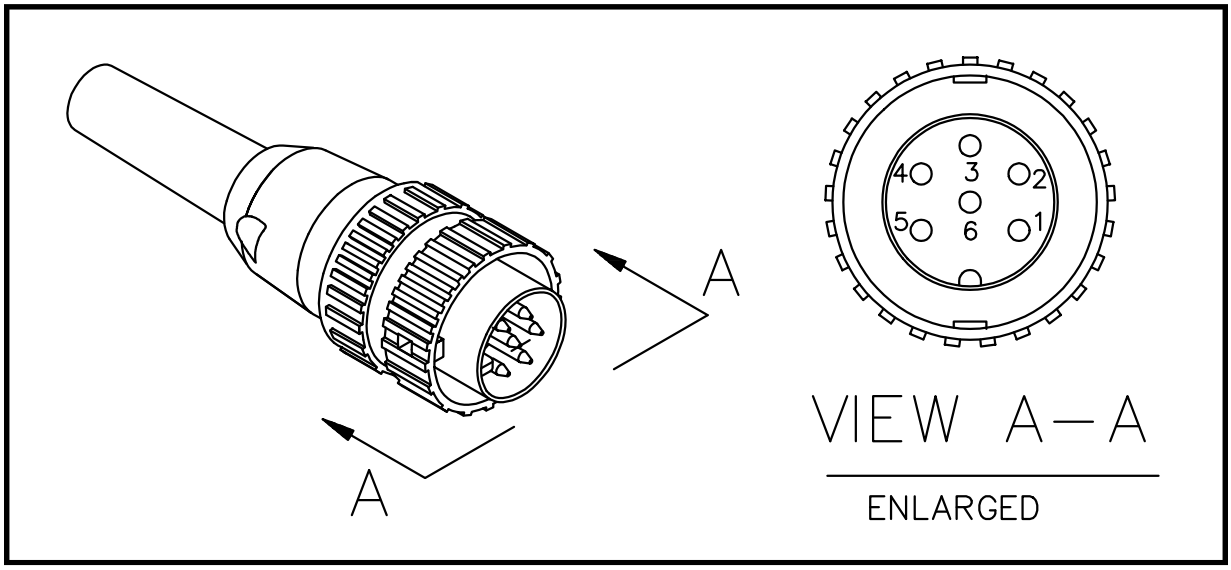


Figure 9. Connector Plug Wiring

MICROCHINE HANDPIECE

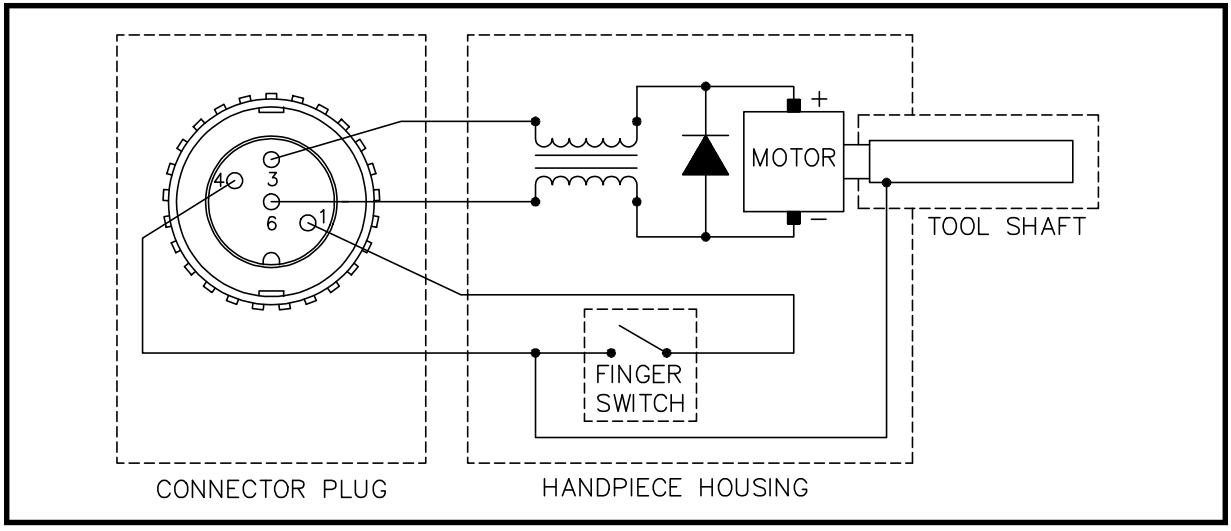


Figure 10. MicroChine Wiring

MICROCHINE HANDPIECE CONT'D

SYMPTOM	CHECKOUT PROCEDURE	CAUSE	SOLUTIO
Motor will not run. Status LED illuminated Red in color.	Unplug all SensaTemp handpieces. If motor now runs and Status LED turns off -	Shorted SensaTemp handpiece.	Repair shorted SensaTem handpiece.
Motor will not run. Status LED not illuminated Red in color.	Check resistance - Pin 1 to Pin 4 with Finger Switch depressed. If resistance is greater than 1 ohm -	Open Switch circuit.	Replace MicroChine Handpiece.
	Check resistance - Pin 3 to Pin 6. Resistance should be 3 to 40 ohms. If not -	Defective Motor circuit.	Replace MicroChine Handpiece.
Motor runs continuously.	Check resistance - Pin 1 to Pin 4. Resistance should read open circuit. If not -	Shorted Finger Switch.	Replace MicroChine Handpiece.
No Ground on tip of installed Tool.	Check resistance - Pin 4 to a NEW Tip. Resistance should be less than 2 ohms. If not -	Oxidation in drill collet.	Clean MicroChine Collet.
		Open ground circuit.	Replace MicroChine Handpiece.

Table II. MicroChine Handpiece Checkout Procedures

POWER SOURCE

Contact PACE Customer Service at Tel. (301) 490-9860, FAX (301) 604-9215 to obtain any replacement parts. Refer to the "Replacement Parts" section of this manual for part numbers.

SYMPTOM	PROBABLE CAUSE	SOLUTION
Digital Readout is blank. No functions on system.	Blown Fuse (F1)	Replace Fuse F1 located on rear of Power Source in the AC Receptacle.
E-1 displayed on Digital Readout.	All Channels are unplugged on Thermal Mgmt. Center.	Plug SensaTemp handpiece into CH 1, CH 2 OR CH 3.
	Open sensor in SensaTemp handpiece.	Refer to handpiece Operation Manual for Corrective Maintenance procedures.
E-2, E-3 or E-4 displayed on Digital Readout.	Defective heater assembly in SensaTemp handpiece.	Unplug all SensaTemp handpieces. Plug handpieces back in one at a time. When defective handpiece is connected, "E" code will be displayed. Refer to handpiece Operation Manual.
No heat on SensaTemp handpiece(s) at Thermal Management Center. Digital Readout displays very low temperature.	Open heater.	Refer to handpiece Operation Manual.
	Blown 12 Amp Fuse.	Replace 12 amp Fuse located on rear of Power Source.Disconnect all SensaTemp handpieces before powering system up. Plug SensaTemp handpieces back in one at a time. If the fuse blows when a handpiece is plugged in, the handpiece is shorted. Repair the handpiece.
	Handpieces connected to AUX receptacles. SensaTemp handpieces are not AUX compatible.	Disconnect incompatible handpieces from AUX Receptacles. Connect to Power Receptacles on front panel.
	Damaged Power Receptacle.	Replace Power Receptacle.
	System overload. Check for defective SensaTemp handpiece.	Disconnect defective handpiece. 220 Volt version only: Overtemp cutout in transformer may open. Allow transformer to cool.
	Microprocessor pcb defect.	Replace Microprocessor pcb.

Table III. Corrective Maintenance, Power Source

POWER SOURCE CONT'D

Contact PACE Customer Service at Tel. (301) 490-9860, FAX (301) 604-9215 to obtain any replacement parts. Refer to the "Replacement Parts" section of this manual for part numbers.

SYMPTOM	PROBABLE CAUSE	SOLUTION
Foot Pedal does not activate vacuum or air pressure for Thermal Management Center.	Foot Pedal connected to incorrect receptacle for Thermal Mgt. Center motor pump activation.	Connect Foot Pedal to any spare AUX Power Receptacle on Thermal Management Center.
	Defective Foot Pedal.	Check switch closure at Foot Pedal connector plug. Repair Foot Pedal if defective.
	Defective Motor Pump.	Replace Motor Pump.
	Microprocessor pcb defect.	Replace Microprocessor pcb.
Keys on Thermal Management Center don't function properly.	Key caps binding.	Clean and/or adjust Key caps.
	Display pcb misaligned or defective.	Replace Display pcb.
	Microprocessor pcb defect.	Replace Microprocessor pcb.
Cannot adjust Offset or Set Tip Temperature on Thermal Management Center. Digital Readout displays "P--".	System is requesting Password entry.	Enter Password.
	Operator forgot Password.	Clear Password. See "Clearing a Password" instructions.
Digital Readout on Thermal Management Center is inaccurate when using a known good handpiece.	System out of calibration.	Wait 4 minutes for system to perform automatic internal recalibration.
	Microprocessor pcb defect.	Replace Microprocessor pcb.

Table III. Corrective Maintenance, Power Source Cont'd

Contact PACE Customer Service at Tel. (301) 490-9860, FAX (301) 604-9215 to obtain any replacement parts. Refer to the "Replacement Parts" section of this manual for part numbers.

SYMPTOM	PROBABLE CAUSE	SOLUTION
Insufficient SNAP-VAC (vacuum) or air pressure. Excessive motor pump noise.	Air hose(s) and/or filter(s) clogged.	Replace any clogged filters and clear all air hoses.
	Defective motor pump.	Replace motor pump.
	Microprocessor pcb defect.	Replace Microprocessor pcb.
Digital Readout display is erratic.	Shorted handpiece or accessory.	Disconnect handpieces and accessories one at a time until Digital Readout display is normal.
	Low AC line voltage.	Check line voltage.
	Display pcb defect.	Replace Display pcb.
	Microprocessor pcb defect.	Replace Microprocessor pcb.
Paste dispenser pressure is insufficient or nonexistent.	Poor air hose connections.	Check air hose connections outside and inside of system power source.
	Clogged air filter.	Replace filter.
	Defective pump, valve or reservoir.	Replace defective part.
Excessive noise during paste dispense operation.	Defective dispense pump.	Replace dispense pump.
	Multifunction pcb defect.	Replace Multifunction pcb.

Table III. Corrective Maintenance, Power Source Cont'd

POWER SOURCE CONT'D

Contact PACE Customer Service at Tel. (301) 490-9860, FAX (301) 604-9215 to obtain any replacement parts. Refer to the "Replacement Parts" section of this manual for part numbers.

SYMPTOM	PROBABLE CAUSE	SOLUTION
MicroChine Status LED continuously illuminated Red in color.	Shorted SensaTemp handpiece or accessory on Thermal Management Center.	Turn system power OFF for 1 minute. Disconnect handpieces and accessories. Turn system power ON and run MicroChine. LED will turn off if the problem is caused by a handpiece or accessory. Repair handpiece or accessory.
	Multifunction pcb defect.	Replace Multifunction pcb.
MicroChine Probe Brake activates prematurely.	Probe Brake test lead is connected to or exciting a circuit having less than 500 ohms resistance to ground.	Remove ground lead from pcb.
MicroChine continues to run after release of finger switch or foot pedal.	Defective MicroChine handpiece.	Refer to Table II to check MicroChine handpiece. Replace MicroChine handpiece if defective.
MicroChine Probe Brake reacts sluggishly or is inoperable.	Probe Brake test lead is connected to inappropriate conductor on workpiece.	Connect Probe Brake test lead to proper conductor.
	Bit in MicroChine is not conductive (non metallic).	Install conductive bit.
	Defective MicroChine handpiece.	Replace handpiece.
	Multifunction pcb defective.	Replace Multifunction pcb.
MicroChine will not operate. Probe Brake LED is illuminated Green in color.	Damaged Power Receptacle.	Replace Power Receptacle.
	Defective MicroChine handpiece.	Replace handpiece.
	Multifunction pcb defective.	Replace Multifunction pcb.

Table III. Corrective Maintenance, Power Source Cont'd

Contact PACE Customer Service at Tel. (301) 490-9860, FAX (301) 604-9215 to obtain any replacement parts. Refer to the "Replacement Parts" section of this manual for part numbers.

SYMPTOM	PROBABLE CAUSE	SOLUTION
MicroChine speed is grossly inaccurate.	MicroChine is overloaded. Status LED is illuminated Yellow in color.	Disengage MicroChine from workpiece. Resume operation exerting less pressure on handpiece.
	Defective handpiece.	Replace handpiece.
	Multifunction pcb defect.	Replace Multifunction pcb.
Pik-Vac has insufficient vacuum.	"Low Pressure" output on power source rear panel is obstructed.	Remove obstruction.
	Defective Pik-Vac pump assembly.	Replace Pik-Vac pump.
Pulse Heat handpieces do not heat. Pulse Heat LED is illuminated Green in color.	Loose connection at Pulse Heat Outputs or handpiece connector.	Tighten connections.
	Defective Universal Power Cord.	Check voltage at Pulse Heat Outputs. Replace Universal Power Cord if defective.
	Multifunction pcb defect.	Replace Multifunction pcb.
Foot Pedal does not operate in PH, PP, MP or PD position.	Foot pedal connected to incorrect receptacle.	Connect foot pedal to receptacle on rear panel of power source marked "FOOT PEDAL".
	Defective foot pedal switch.	Check for switch closure at foot pedal connector plug pins. Repair foot pedal if defective.
	Multifunction pcb defect.	Replace Multifunction pcb.

Table III. Corrective Maintenance, Power Source Cont'd

REPAIR

CALIBRATION

All PACE SensaTemp controllers can be checked for calibration without the need to adjust any internal controls. If there is a requirement to check the actual tip temperature of a SensaTemp handpiece, perform the following procedure for attaching a thermocouple wire to the handpiece tip. A Process Monitor is available from PACE which will provide a temperature readout and can perform a variety of additional tests such as Tip to Ground resistance and vacuum checks.

A thermocouple may be attached to a tip by spot welding a thermocouple wire onto the end of the tip or by embedding the wire into a drilled hole at the tip end. Either method will produce accurate results. Tips (for PACE equipment) with embedded K type thermocouples are available from PACE.

Pulse Heat handpieces are not closed loop temperature controlled and require no calibration.

MATERIALS REQUIRED

1. **PACE Process Monitor or Temperature Meter**.
2. **Soldering Iron Tip**. Listed below are the available tips PACE uses (with and without embedded thermocouples).
   a) Use PACE part number 7021-0004-P1 tip with embedded thermocouple or tip only part number 1121-0337 on handpieces with 4.76 mm (3/16 inch) heater bore.
   b) Use PACE part number 7021-0003-P1 tip with embedded thermocouple or tip only part number 1121-0130 on handpieces with 3.18 mm (1/8 inch) heater bore.

NOTE
When using tips with embedded K type thermocouples supplied by PACE with a K type Temperature Meter, a PACE part number 1332-0164-P1 RCA to Omega-style, K-type, thermocouple adapter must be used.

The following items are needed if you are **NOT** using the PACE part number 7021-0003-P1 or 7021-0004-P1 embedded tips.

3. **Thermocouple**, 30 AWG ("K" type when using Process Monitor or type compatible with Temperature Meter).
4. **Copper Wedge** (used when embedding thermocouple) or 16 AWG Bare Copper Wire (1.22 mm (.048 inch) O.D.).
5. **Drill Bit** (used when embedding thermocouple), 1.5 mm (.059 inch) diameter.

SPOTWELDING PROCEDURE

1. Place the thermocouple end onto the tip just past the tinned end (approximately 6.35 mm (.25 inch)).
2. Spotweld the thermocouple to the tip. Check to insure that the thermocouple is properly attached to the tip.

EMBEDDING PROCEDURE

1. Drill a 1.5 mm (.059 inch) hole just past the tinned end of the soldering tip (approximately 6.35 mm (.25 inch) when using one of the recommended PACE tips). Drill to a depth of 2.54 mm (.100 inch).
2. Place the end of the thermocouple wire into the hole. Ensure that the end of the wire bottoms out in the hole.
3. Wedge the thermocouple into place using the copper wedge or bare copper wire. The thermocouple should be wedged as air tight as possible.

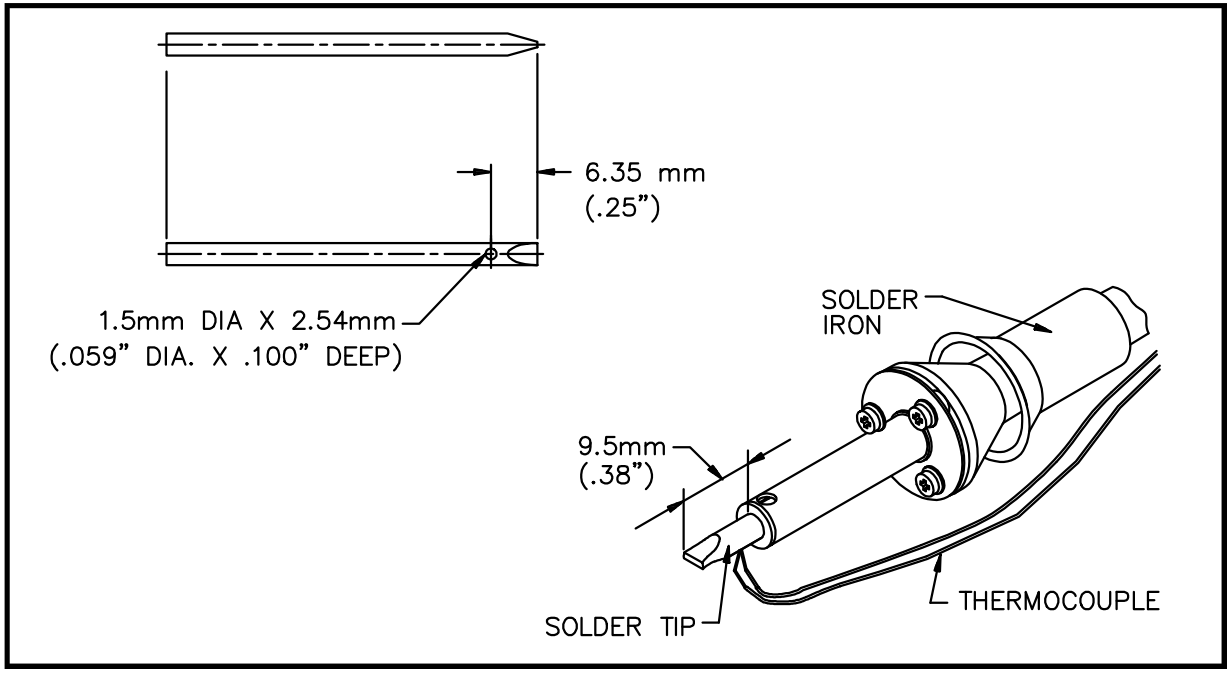


Figure 11. Thermocouple Attachment

TIP TEMPERATURE TEST

1. Install the tip into the handpiece to be tested with the end of the tip properly seated. The recommended PACE tips are shown extending out of the heater 9.5mm (3/8 inch).
2. Connect the free end of the thermocouple wire to the PACE Process Monitor (or temperature meter).
3. Apply power to the handpiece and allow temperature to stabilize.

REPAIR

DISASSEMBLY/ASSEMBLY

DISASSEMBLY

To disassemble the unit for servicing, perform the following procedure step by step, in sequence using the illustrations as a guide. The procedure directs the technician to remove the power source from the chassis.

WARNING

POTENTIAL SHOCK HAZARD The following 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.

1. Place the unit on a suitable work surface. Insure that the Power Cord has been disconnected from the back of the power source.

2. Position the PRC 2000 power source with the rear panel facing forward.

3. Remove the 3 rear panel mounting screws indicated on the rear panel. DO NOT remove any other rear panel mounting screws.

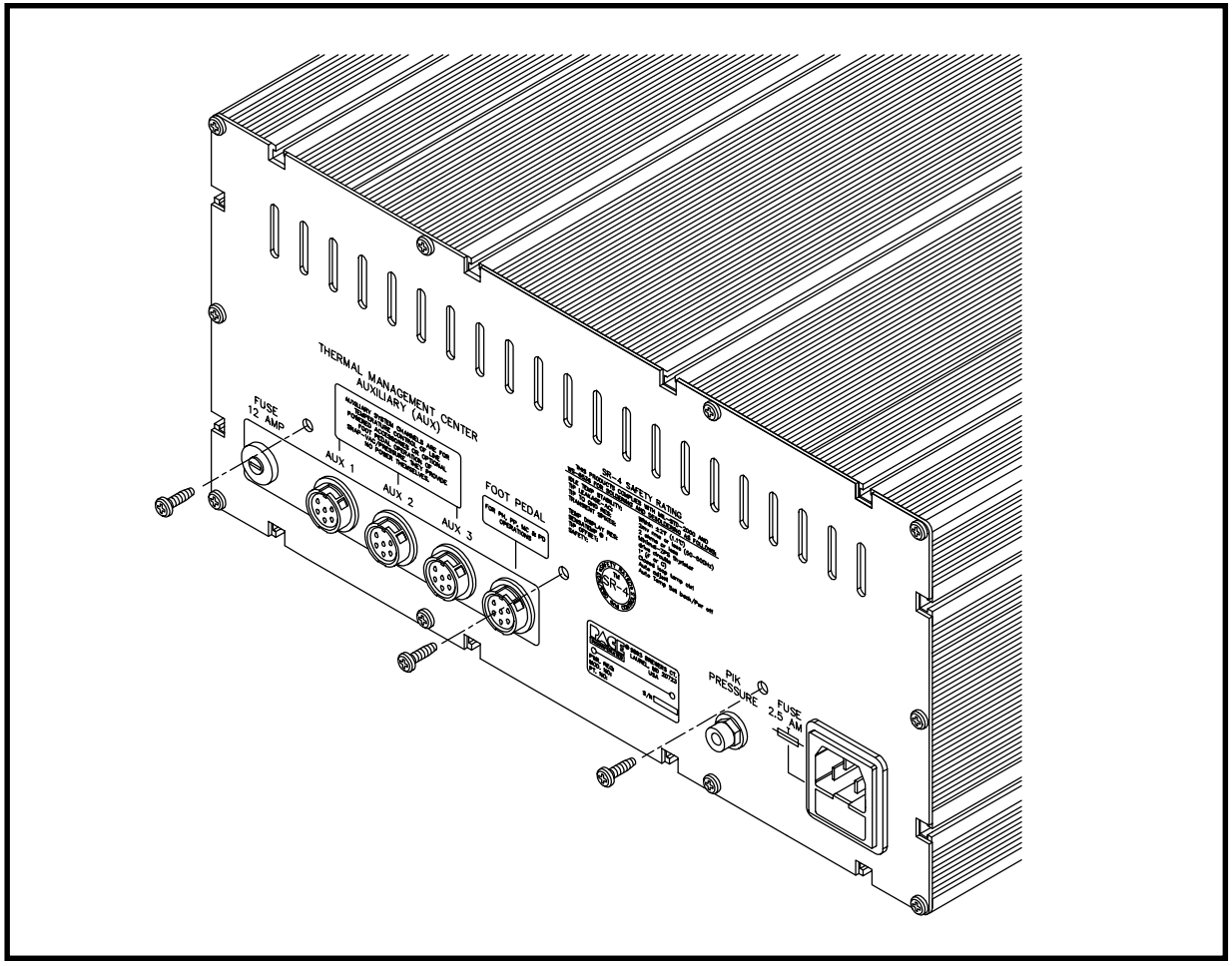


Figure 12. Removing Rear Panel Screws

DISASSEMBLY CONT'D

4. Reposition the unit with the Front Panel of the Power Source facing forward.

5. Remove the 10 Front Panel Mounting Screws.

6. Pull the Front Panel forward 2 inches to expose the interior of the Power Source. DO NOT disconnect any electrical or air hose connections.

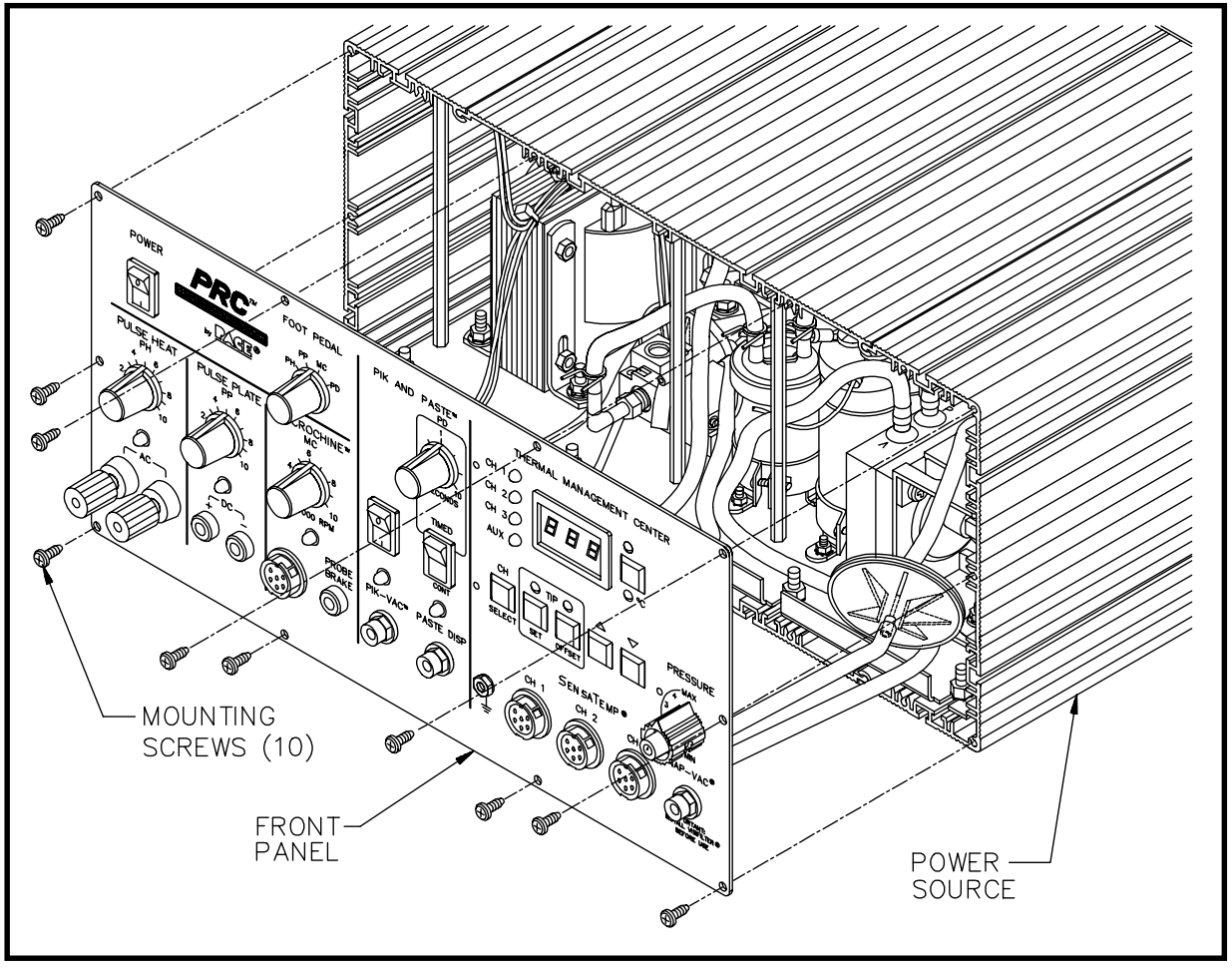


Figure 13. Removing Front Panel

7. Locate the 4 Bolt Assemblies across the front, inside, bottom edge of the Power Source case.

8. Loosen each of the Hex Nuts on the 4 Bolt Assemblies.

9. Slide each of the Bolt Assemblies forward and remove the assemblies from the Power Source.

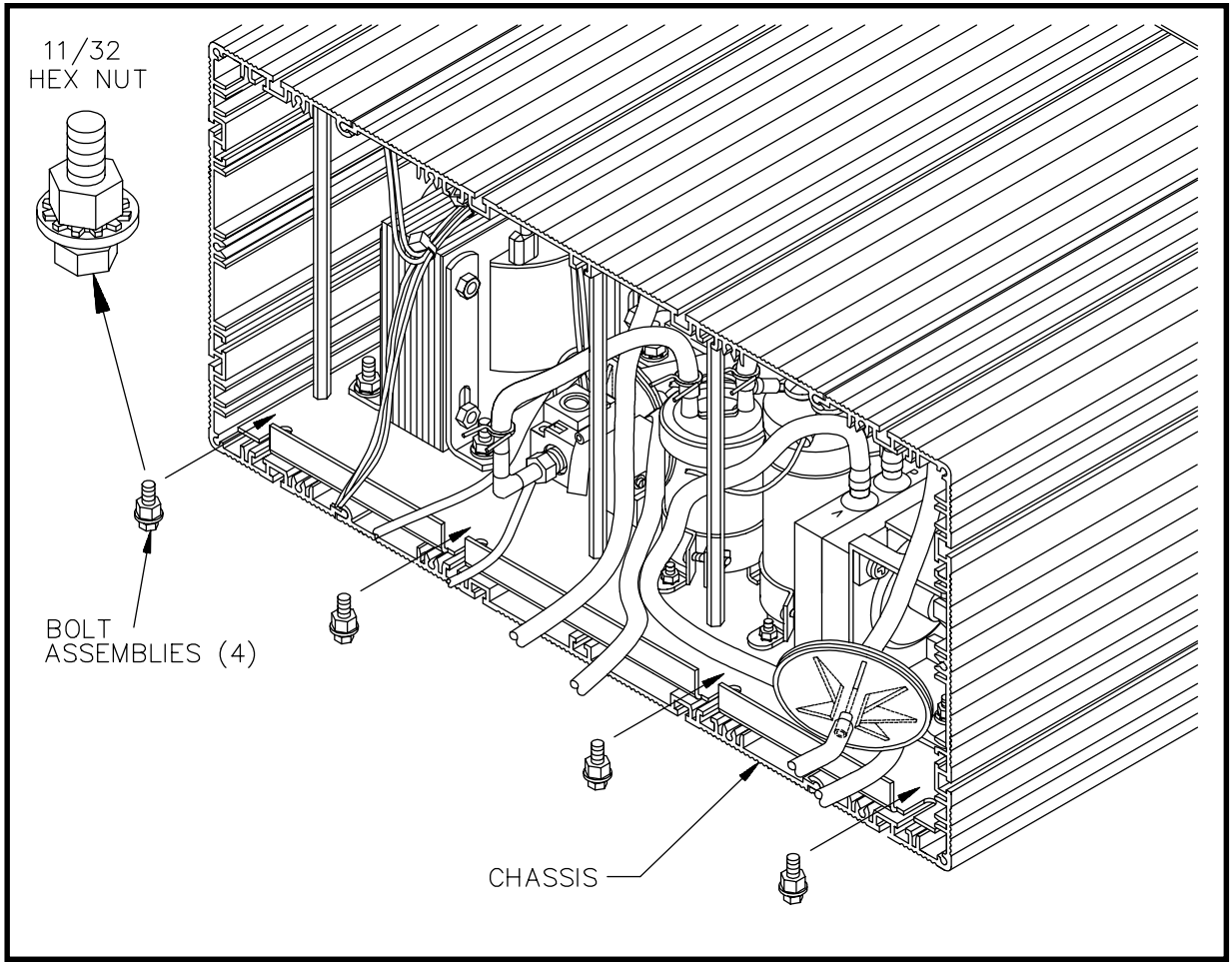


Figure 14. Removing Bolt Assemblies

DISASSEMBLY CONT'D

10. Remove the power source from the case by grasping 2 of the metal posts which connect the pc boards to the power source chassis. Pull the power source forward and out of the case.

11. Set the case aside.

12. The unit can now be connected to the house AC supply to troubleshoot the system.

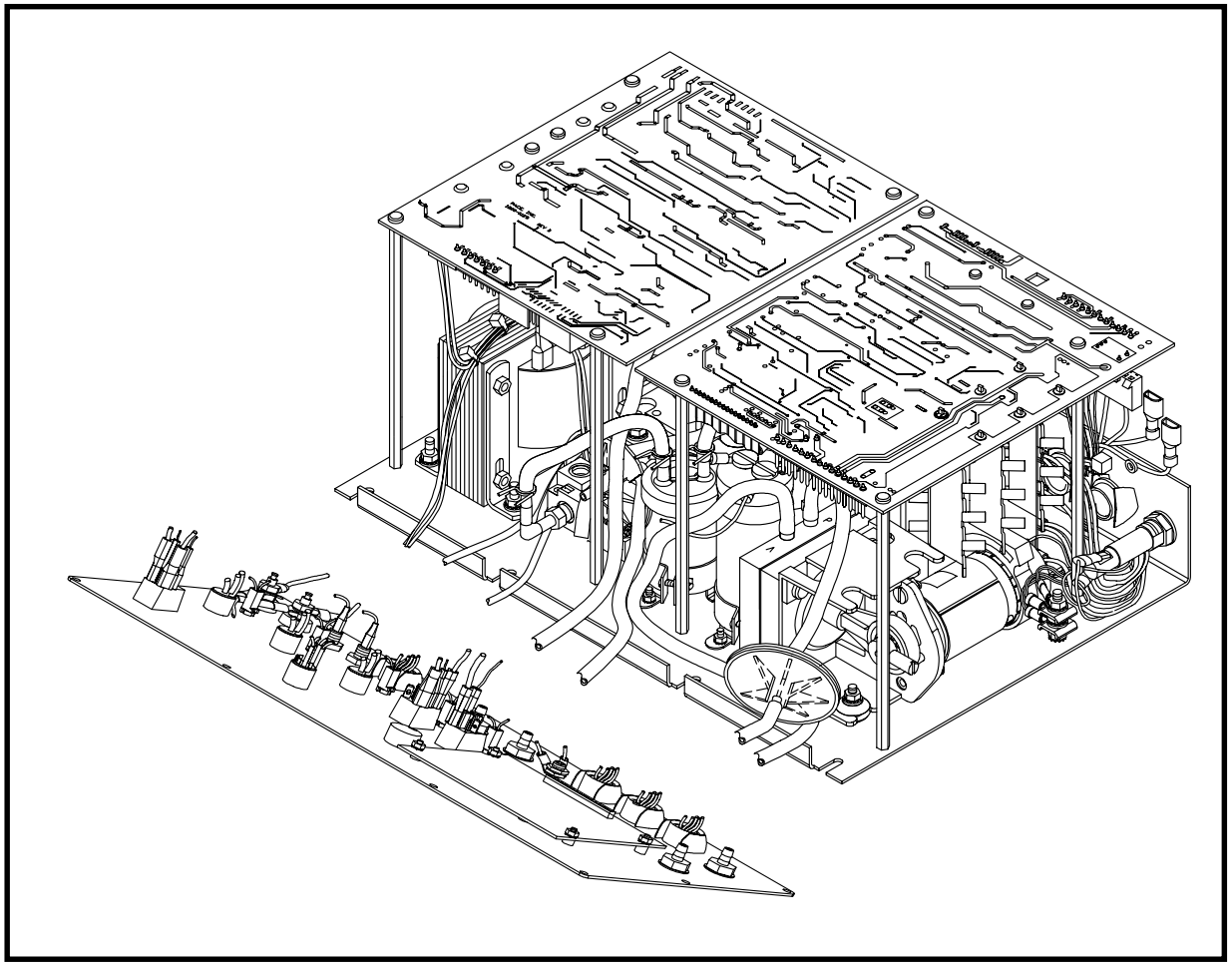


Figure 15. Removing Power Source From Case

ASSEMBLY

1. Disconnect the AC power cord.

WARNING

POTENTIAL SHOCK HAZARD Insure that the AC power is disconnected before proceeding to step 2.

2. Place the case directly behind the power source. Insure that the power source is facing forward.

3. Slide the power source back into the case.

4. Reposition the power source with the rear panel facing forward. Reinstall the 3 rear panel mounting screws.

5. Reposition the power source with the front panel facing forward. Reinstall the 4 bolt assemblies. Tighten the hex nuts on each bolt assembly to secure the power source in position.

6. Insure that all air hoses are properly connected to the front panel. Refer to the "Air Hose Routing" illustration.

7. Install the 10 front panel mounting screws to secure the panel to the case.

8. Check the power source for proper operation.

REPAIR

FLOW CHARTS

The following flow charts should be used to determine the source of a malfunction down to an assembly level. Locate the flow chart which best describes the malfunction. If you are unsure about which flow chart to use, begin with the "Power" flow chart which will direct you to the area of concern.

Insure that the power source has been removed from its case before performing the applicable procedure.

WARNING

POTENTIAL SHOCK HAZARD The following Flow Chart procedures are to be performed by qualified service personnel only. Line voltage parts are exposed. Service personnel must avoid contact with these parts when troubleshooting the power source.

POWER

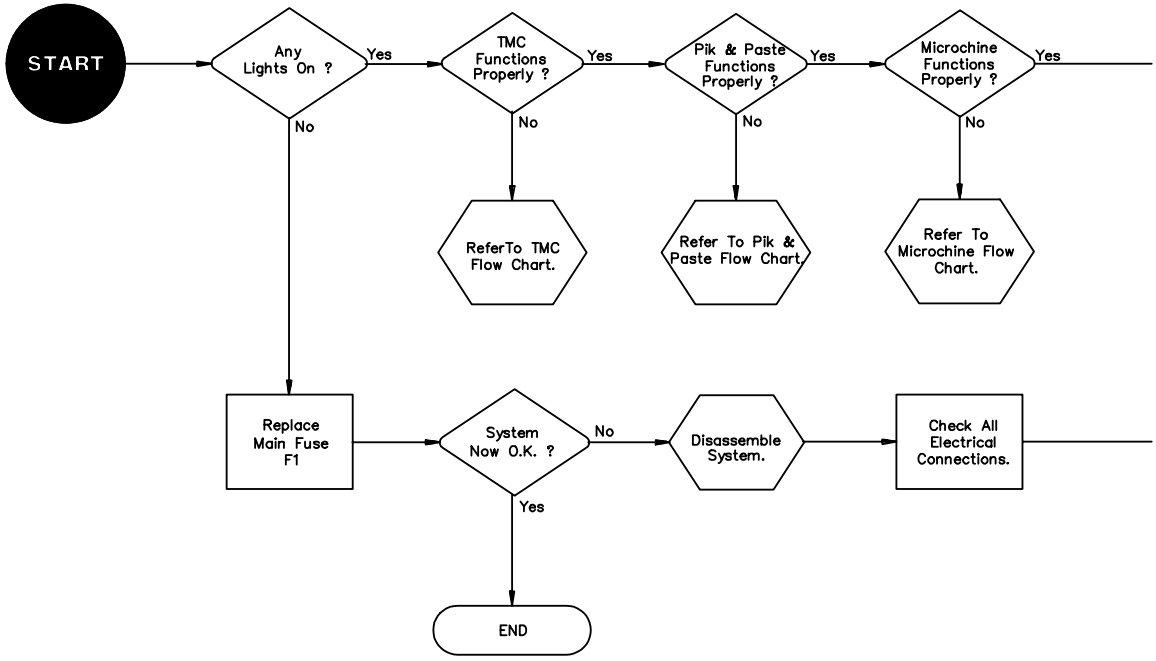
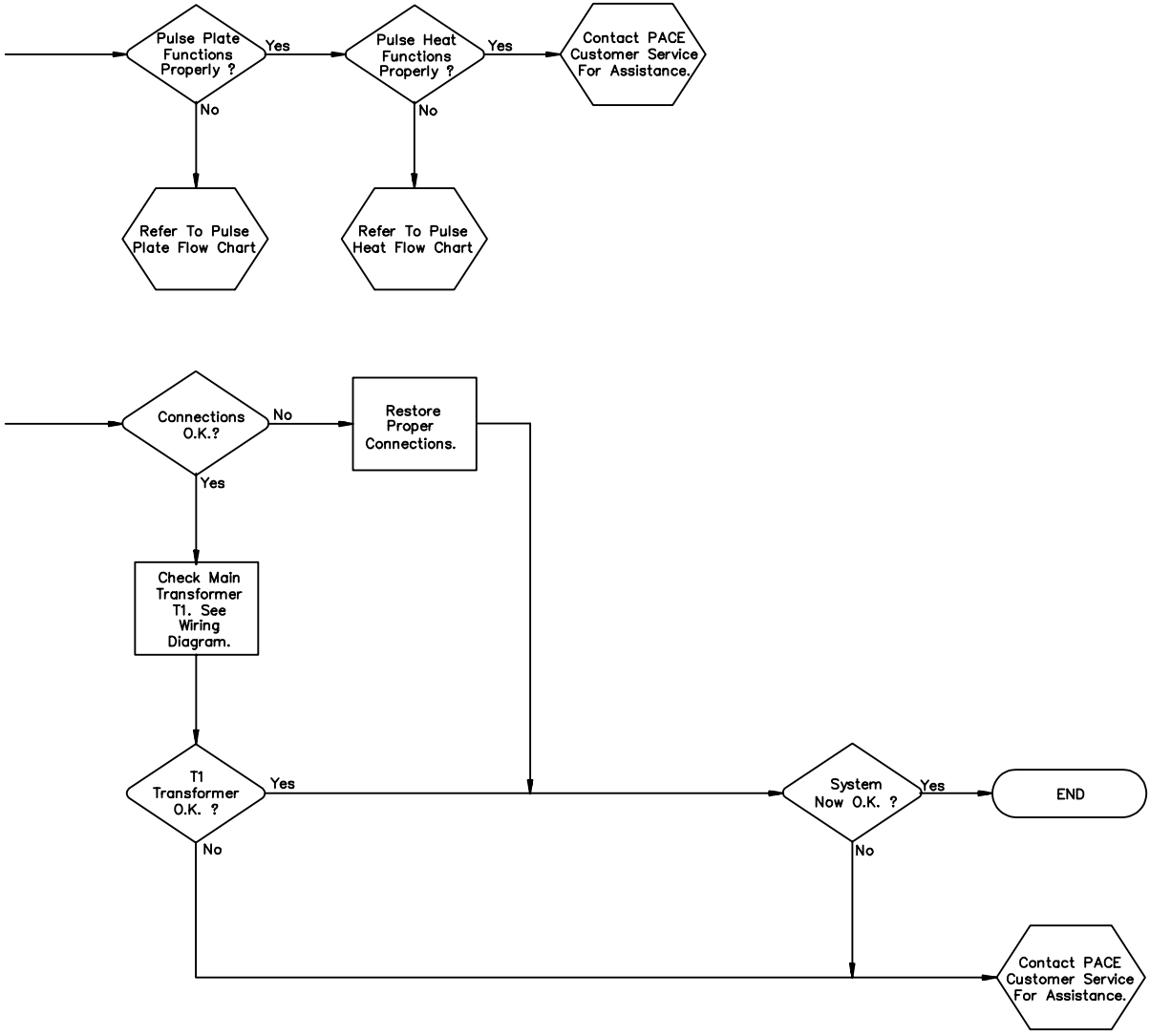


Figure 16. Power Flow Chart


Pulse Plate Functions Properly ?
Yes
Pulse Heat Functions Properly ?
Yes
Contact PACE Customer Service For Assistance.
No
No
Refer To Pulse Plate Flow Chart
Refer To Pulse Heat Flow Chart
Connections O.K.?
No
Restore Proper Connections.
Yes
Check Main Transformer T1. See Wiring Diagram.
T1 Transformer O.K. ?
Yes
System Now O.K. ?
Yes
END
No
No
Contact PACE Customer Service For Assistance.

TMC

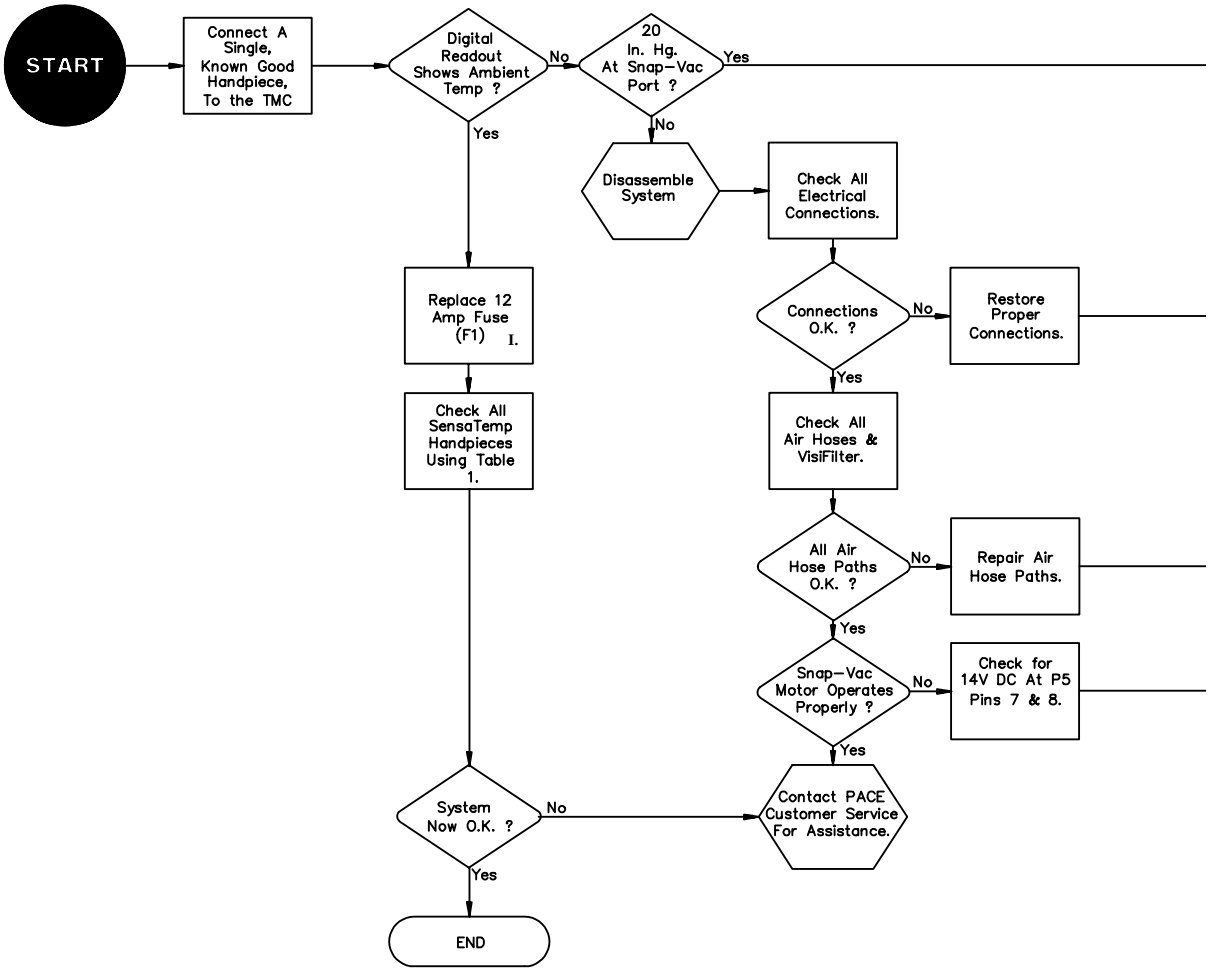
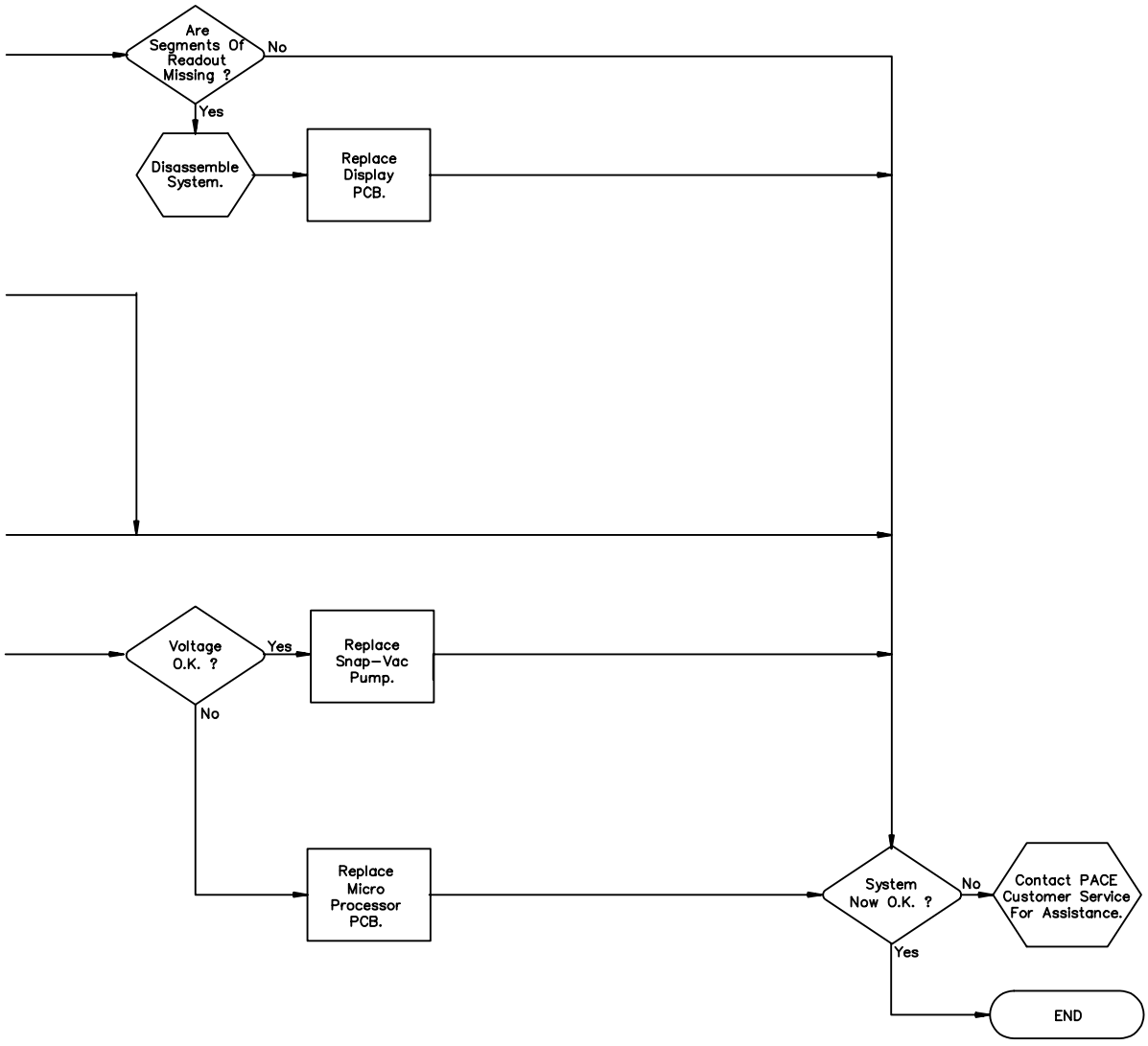


Figure 17. Thermal Management Center Malfunction Flow Chart


Are Segments Of Readout Missing ?
No
Yes
Disassemble System.
Replace Display PCB.
Voltage O.K. ?
Yes
Replace Snap–Vac Pump.
No
Replace Micro Processor PCB.
System Now O.K. ?
No
Contact PACE Customer Service For Assistance.
Yes
END

PIK & PASTE

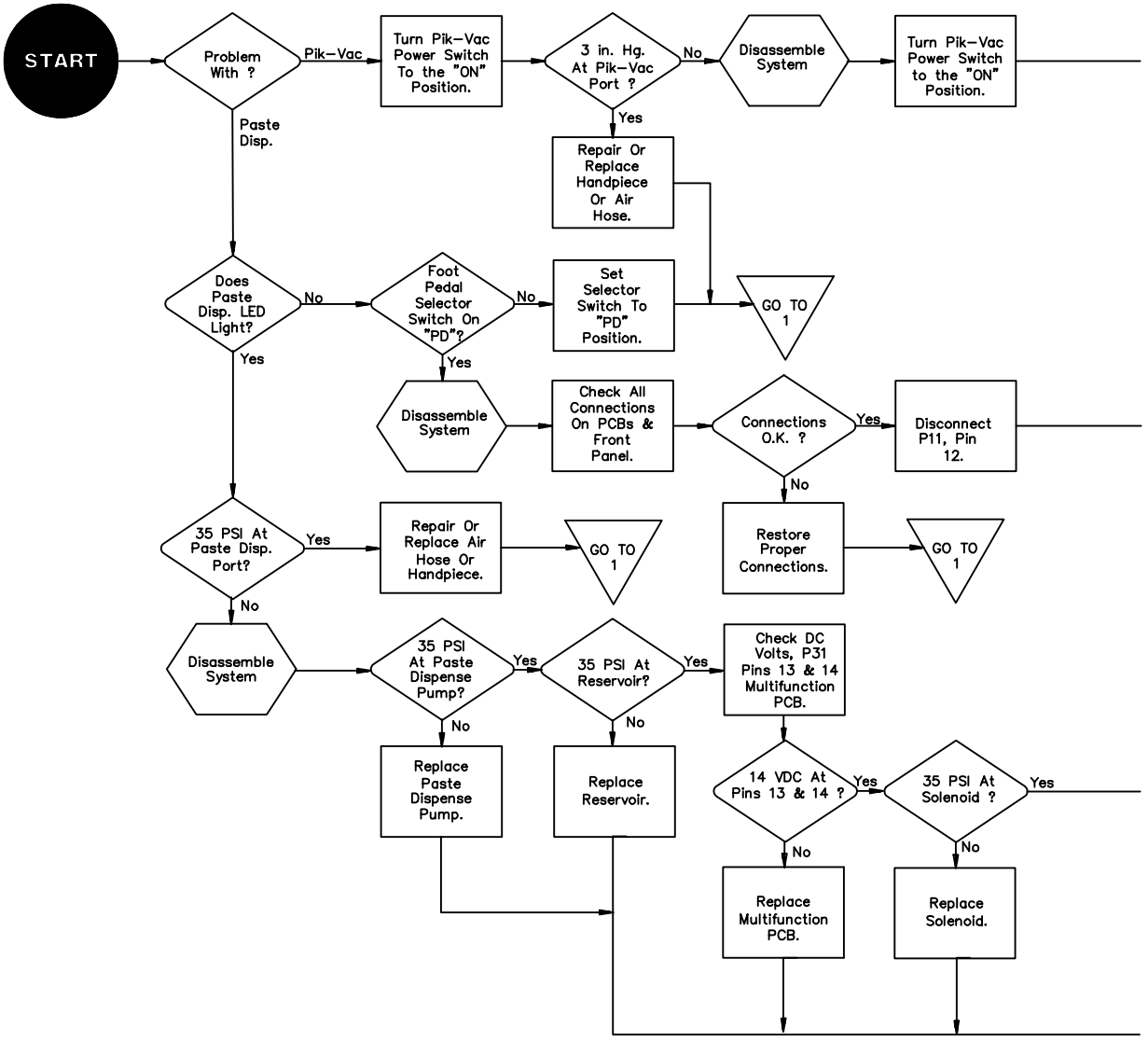
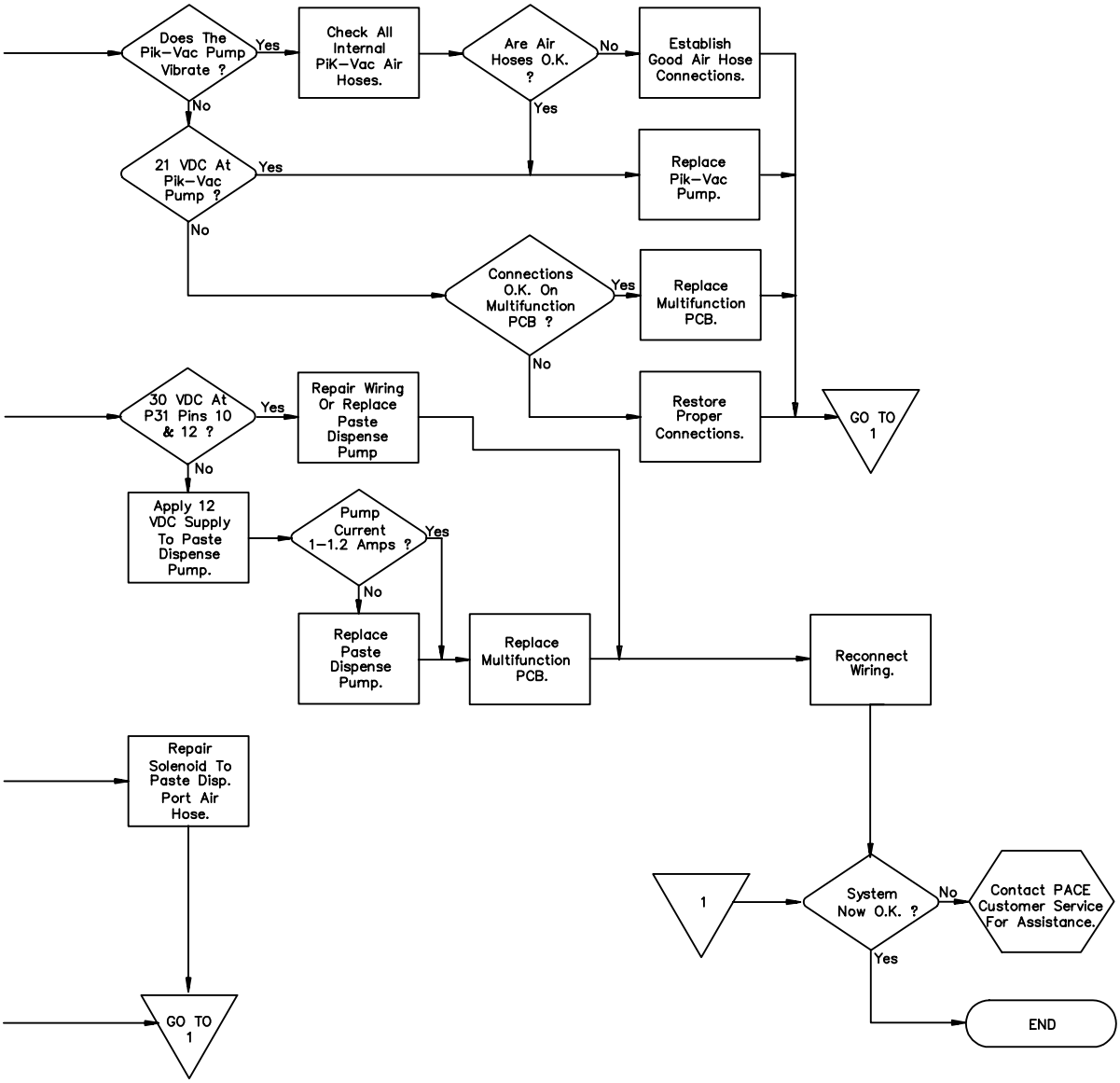


Figure 18. Pik & Paste Malfunction Flow Chart


Does The Pik–Vac Pump Vibrate ?
Yes
No
Check All Internal PiK–Vac Air Hoses.
Are Air Hoses O.K. ?
No
Yes
Establish Good Air Hose Connections.
21 VDC At Pik–Vac Pump ?
Yes
No
Replace Pik–Vac Pump.
Connections O.K. On Multifunction PCB ?
Yes
No
Replace Multifunction PCB.
Restore Proper Connections.
GO TO 1
30 VDC At P31 Pins 10 & 12 ?
Yes
No
Repair Wiring Or Replace Paste Dispense Pump
Apply 12 VDC Supply To Paste Dispense Pump.
Pump Current 1–1.2 Amps ?
Yes
No
Replace Paste Dispense Pump.
Replace Multifunction PCB.
Reconnect Wiring.
Repair Solenoid To Paste Disp. Port Air Hose.
GO TO 1
1
System Now O.K. ?
No
Yes
Contact PACE Customer Service For Assistance.
END

MICROCHINE

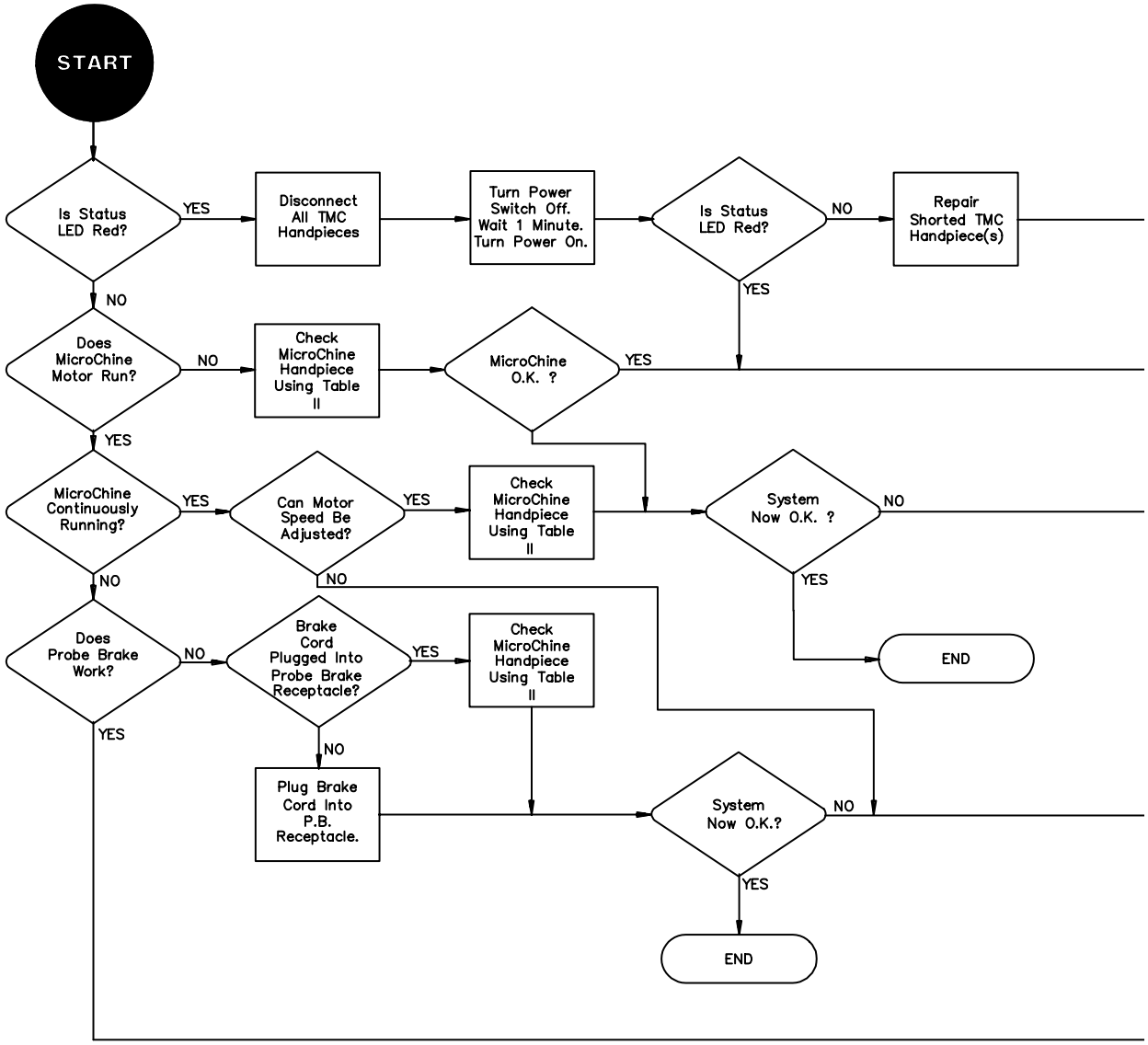
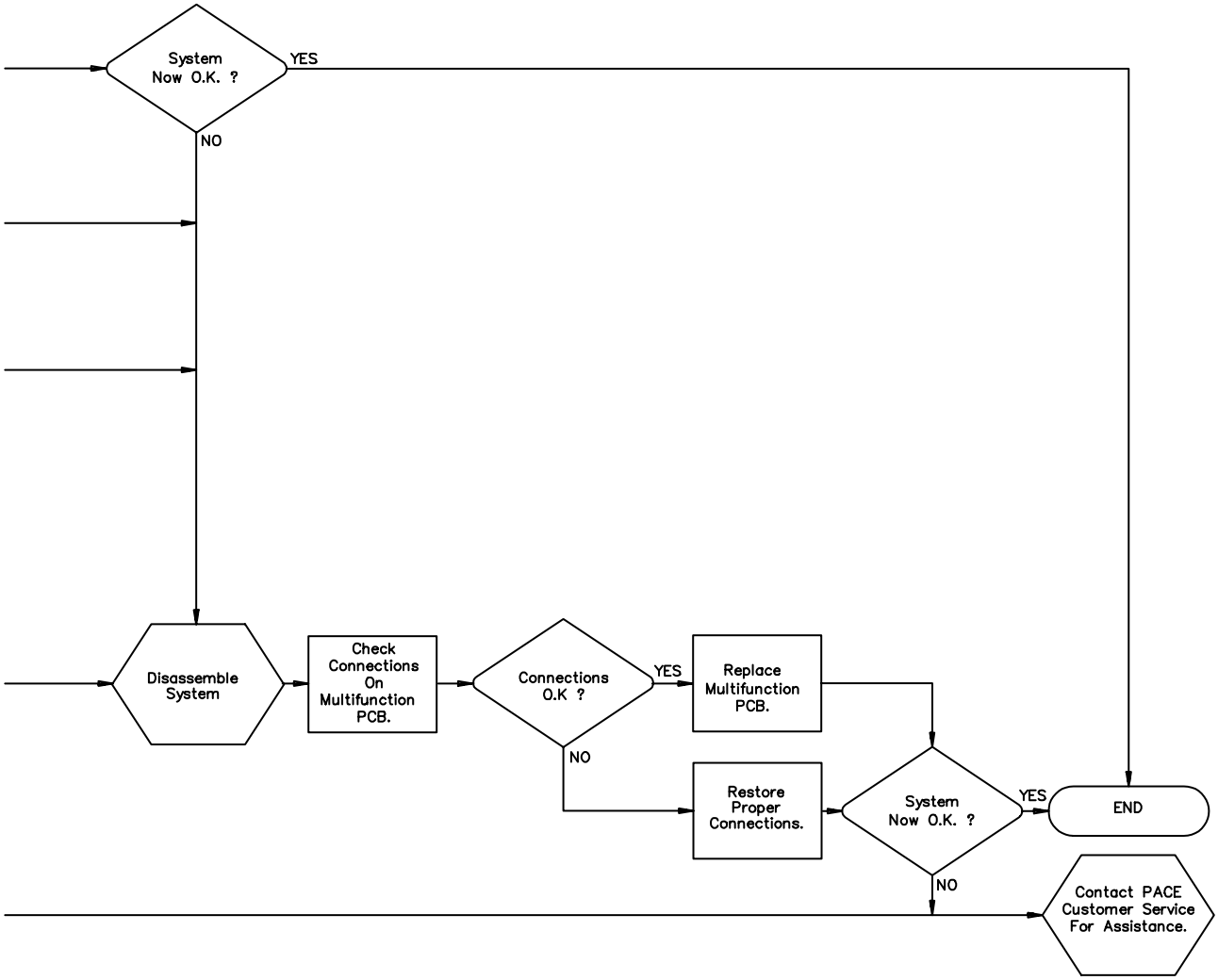


Figure 19. MicroChine Malfunction Flow Chart


System
Now O.K. ?
YES
NO
Disassemble
System
Check
Connections
On
Multifunction
PCB.
Connections
O.K ?
YES
Replace
Multifunction
PCB.
NO
Restore
Proper
Connections.
System
Now O.K. ?
YES
END
NO
Contact PACE
Customer Service
For Assistance.

PULSE PLATE

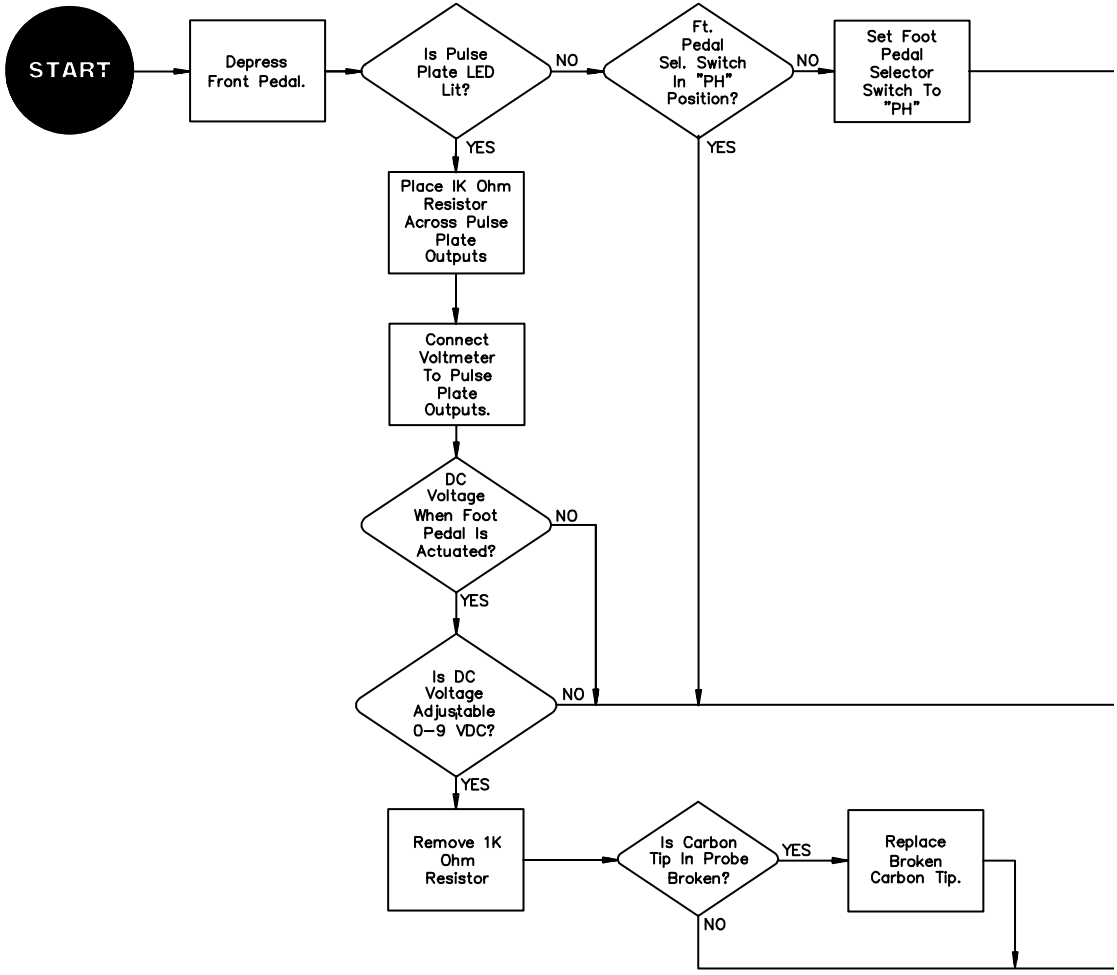
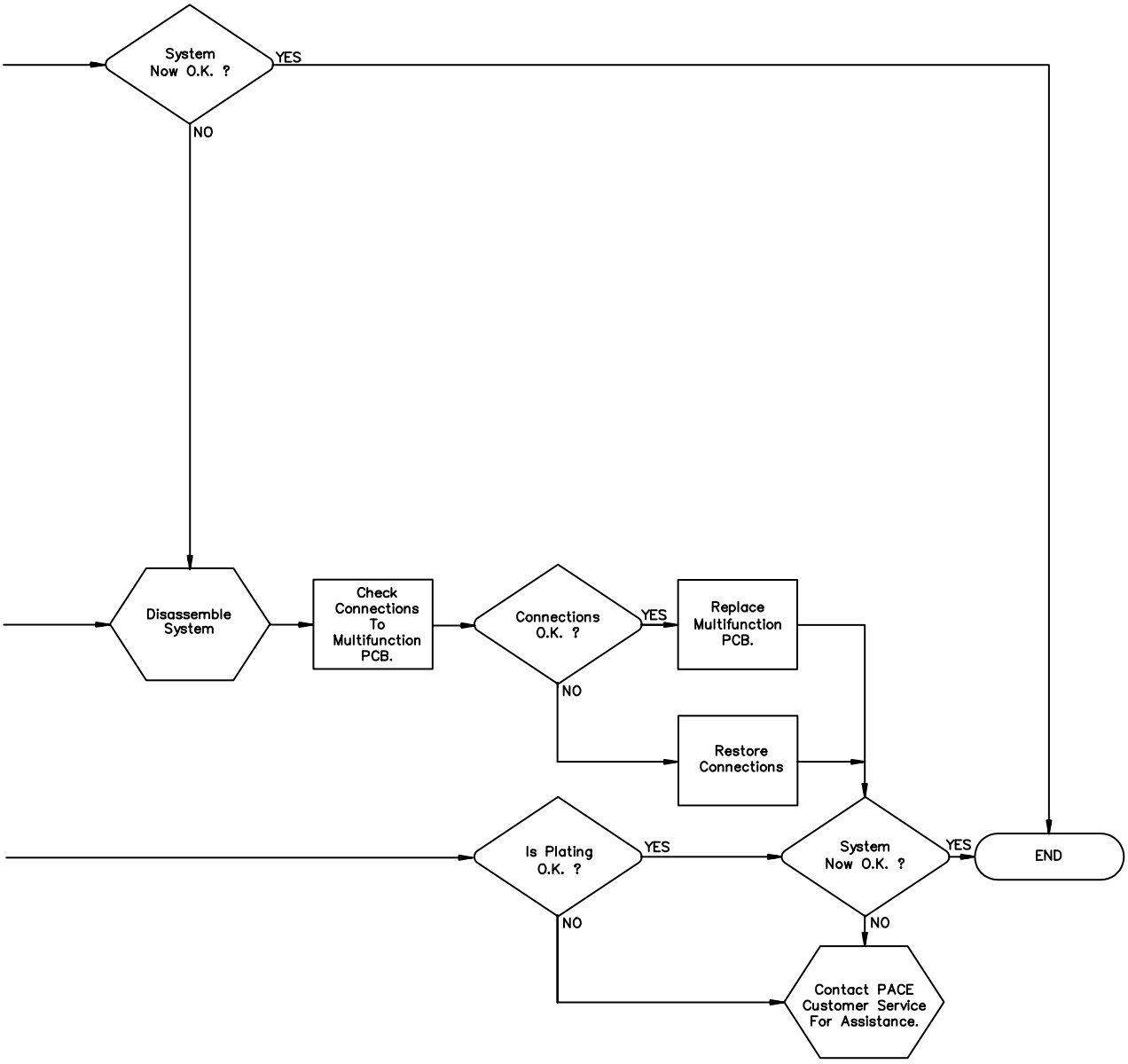


Figure 20. Pulse Plate Malfunction Flow Chart


System
Now O.K. ?
YES
NO
Disassemble
System
Check
Connections
To
Multifunction
PCB.
Connections
O.K. ?
YES
Replace
Multifunction
PCB.
NO
Restore
Connections
Is Plating
O.K. ?
YES
System
Now O.K. ?
YES
END
NO
NO
Contact PACE
Customer Service
For Assistance.

PULSE HEAT

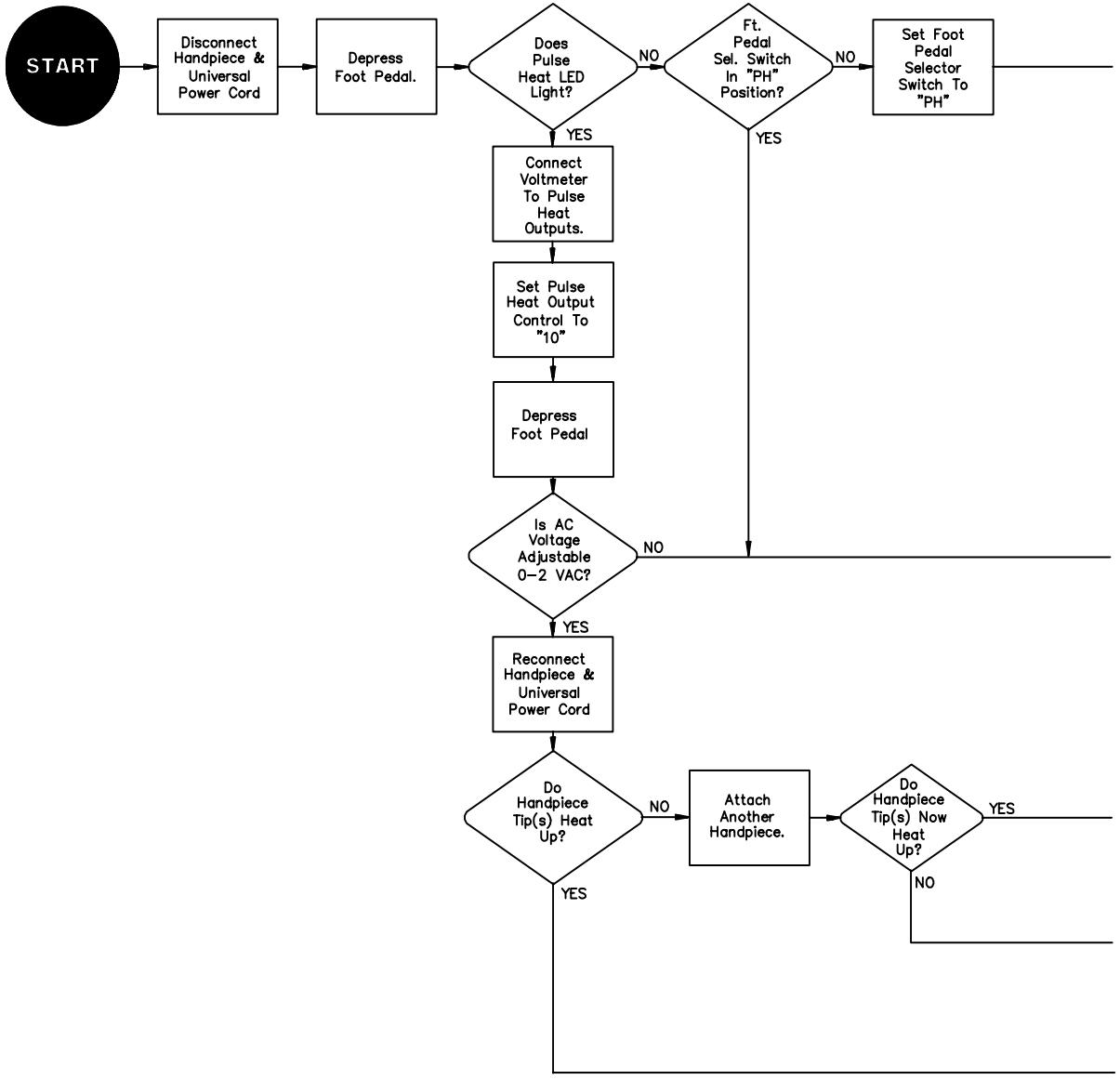
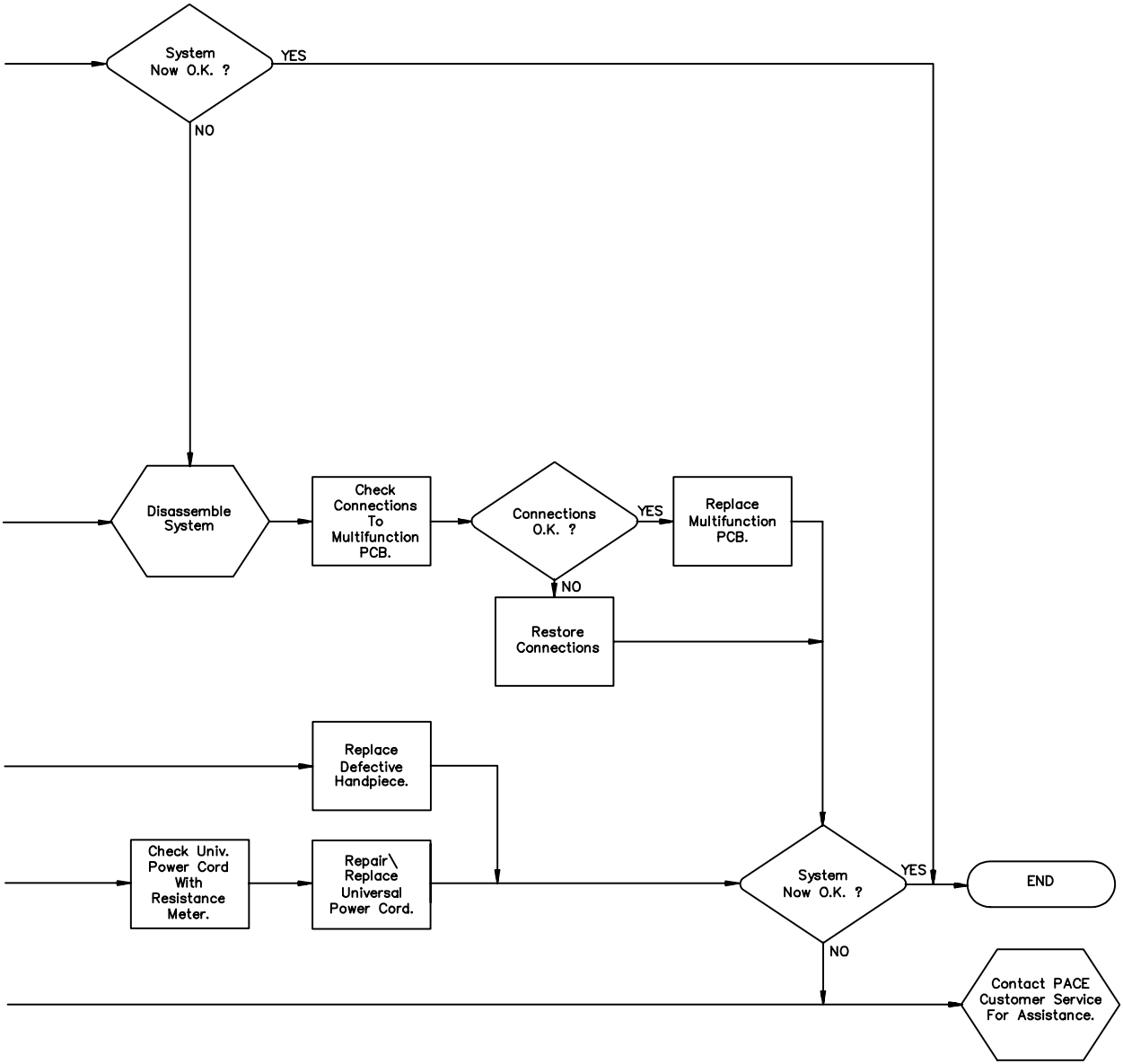


Figure 21. Pulse Heat Malfunction Flow Chart


System Now O.K. ?
YES
NO
Disassemble System
Check Connections To Multifunction PCB.
Connections O.K. ?
YES
Replace Multifunction PCB.
NO
Restore Connections
Replace Defective Handpiece.
Check Univ. Power Cord With Resistance Meter.
Repair\ Replace Universal Power Cord.
System Now O.K. ?
YES
END
NO
Contact PACE Customer Service For Assistance.