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OPERATION AND MAINTENANCE
INSTRUCTIONS FOR THE

CRAFT™ 100A
System

MANUAL NO. 5050-0155

REV. D

GENERAL INFORMATION

Before using your PACE Craft™-100A System, read the following instructions and procedures to become familiar with its proper operation and maintenance. Used and maintained properly, it will perform reliably for many years.

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INTRODUCTION:

The PACE Craft-100A System (refer to Figure 1) is designed to conveniently remove and replace surface mounted components in a matter of seconds. The system consists of a fast rise, high density hot gas/air generator with precise directional heating pattern control.

The system operates from clean dry air at 60-100 psi (3 cfm).

AVAILABLE OPTIONS:

- Switching between Inert Gas and Hot Air for soldering and desoldering.
- Ten (10) power Stereo Microscope with Dual Swivel Arms and optical aids mechanism for accurate component pre-positioning and solder joint inspection.
- Power Converter is used for converting export current (230V) to domestic current (115V). This Converter is used in conjunction with the Craft System for export usage.
- HotSpot™ Preheat Unit provides auxiliary heat to the printed circuit board.
- FlexSpot™ Lighting System provides dual halogen lights for illumination of printed circuit board rework area.

SPECIFICATIONS:

- **Power Requirements:**
 - 115V, 50/60Hz, 310W (domestic)
 - 230V, 50/60Hz, 310W
- **Physical Parameters:**
 - 20½"H x 25"W x 20½"D
 - (52 cm H x 64 cm W x 52 cm D)
 - 50 lbs.
 - (23 kg)
- **Circuit Board Capacity**
 - 16" W x 16" L (maximum)
 - (40.6 cm W x 40.6 cm L)
- **Component Sizes:**
 - 1½" (maximum)
 - (3.8 cm)
- **Component Types:**
 - Leaded and unleaded surface mount

GENERAL INFORMATION

PRODUCT APPLICATION:

The following sections of this manual will familiarize you with the parts and operation of the unit. This product is very versatile however, and may be used to satisfy a variety of application requirements. If you require assistance in the use of this product in your particular application, contact your local authorized PACE dealer or call PACE Applications Engineering at (301) 490-9860.

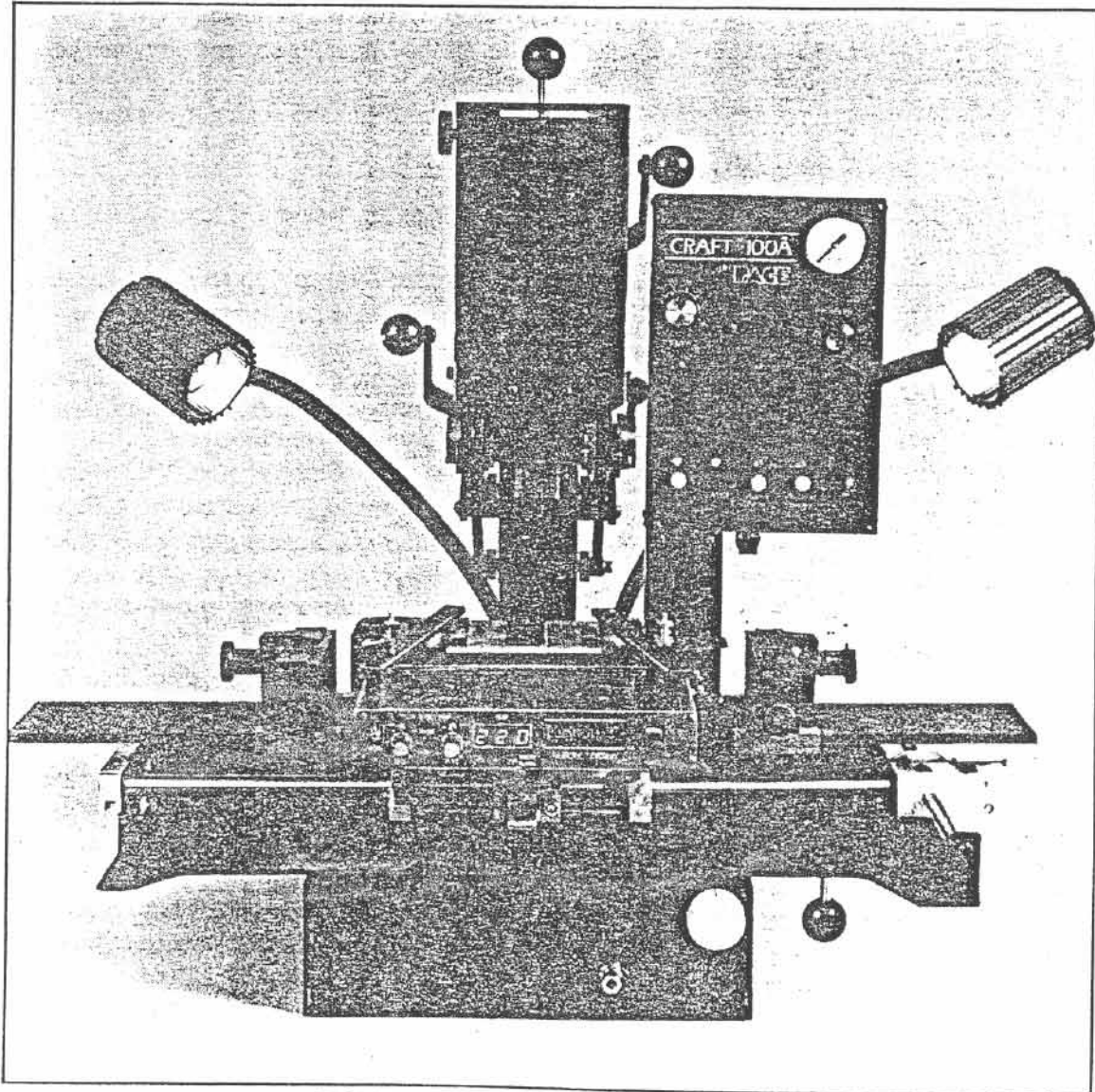


FIGURE 1. PACE CRAFT-100A SYSTEM
(Shown with optional HotSpot Preheating Unit and FlexSpot Lighting System)

GENERAL INFORMATION

SYSTEM IDENTIFICATION

Table 1 and Figure 2 refers to identification and location of each part required for the operation of the PACE Craft-100A System.

TABLE 1. SYSTEM IDENTIFICATION OF PACE CRAFT-100A SYSTEM

- CONTROLLER PANEL—conveniently located panel of all electrical, pneumatic, time cycle controls and indicators (see Table 2 and Figure 3 for Controller Identification).
- UPPER HEATER ASSEMBLY—protective housing for the Upper Heater and Vacuum Pick-up Cup and Tube Assembly.
- UPPER HEATER—provides heated inert gas or air directly to the solder joint areas.
- VACUUM PICK-UP AND TUBE ASSEMBLY—provides vacuum pick-up of components during removal and positive holding of components for pre-positioning during replacement.
- UPPER HEATER ASSEMBLY LEVER—lever type handle for raising and lowering the Upper Heater Assembly.
- VACUUM PICK-UP KNOB—raises and lowers the Vacuum Pick-up Cup and Tube Assembly.
- VACUUM PICK-UP LOCKING KNOB—provides a positive locking position for the Vacuum Pick-up Cup and Tube Assembly.
- NOZZLE HOLDER ASSEMBLY WITH NOZZLE—a quick change, positive positioning holder for various size Nozzles. The Nozzle directs inert gas or heated air from the Upper Heater to the solder joint areas for either soldering or desoldering of components.
- X-AXIS ADJUSTMENT KNOB—allows precision side to side movement of the Work Platform.
- Y-AXIS ADJUSTMENT KNOB—allows precision front to rear movement of the Work Platform.
- Z-ROTATION ADJUSTMENT KNOB—rotates Work Platform for a more precise alignment of Work Platform.
- WORK PLATFORM AND CLAMPS—provides a surface for the mounting and clamping of circuit boards.
- MICROSCOPE BASE—provides a base to attach the Stereo Microscope (optional).
- STEREO MICROSCOPE (OPTIONAL)—provides ten (10) power magnification for component pre-positioning and solder joint inspection.
- NOZZLE ACTUATOR LEVER—lever type handle raises and lowers the Nozzle Holder Assembly.
- NOZZLE LOCKING LEVER—provides a positive locking of the Nozzle Holder Assembly.
- GROUND RECEPTACLE—provides a positive ground for Wrist Strap.
- AC RECEPTACLE FUSE (F1)—provides overload protection for Craft-100A System.
- MAIN POWER LINE CORD—provides main power input to Craft-100A System.
- NOZZLE HEIGHT ADJUSTMENT KNOB—provides a position setting for the Nozzle Holder Assembly to the selected clearance height above printed circuit board.
- SHEAR KNOB—provides a shearing feature for use on components bonded to PC assemblies.
- NOZZLE CHIP TOOL—a device used for the removal/replacement of PCB components within the Nozzle and the removal of "HOT" Nozzles.

GENERAL INFORMATION

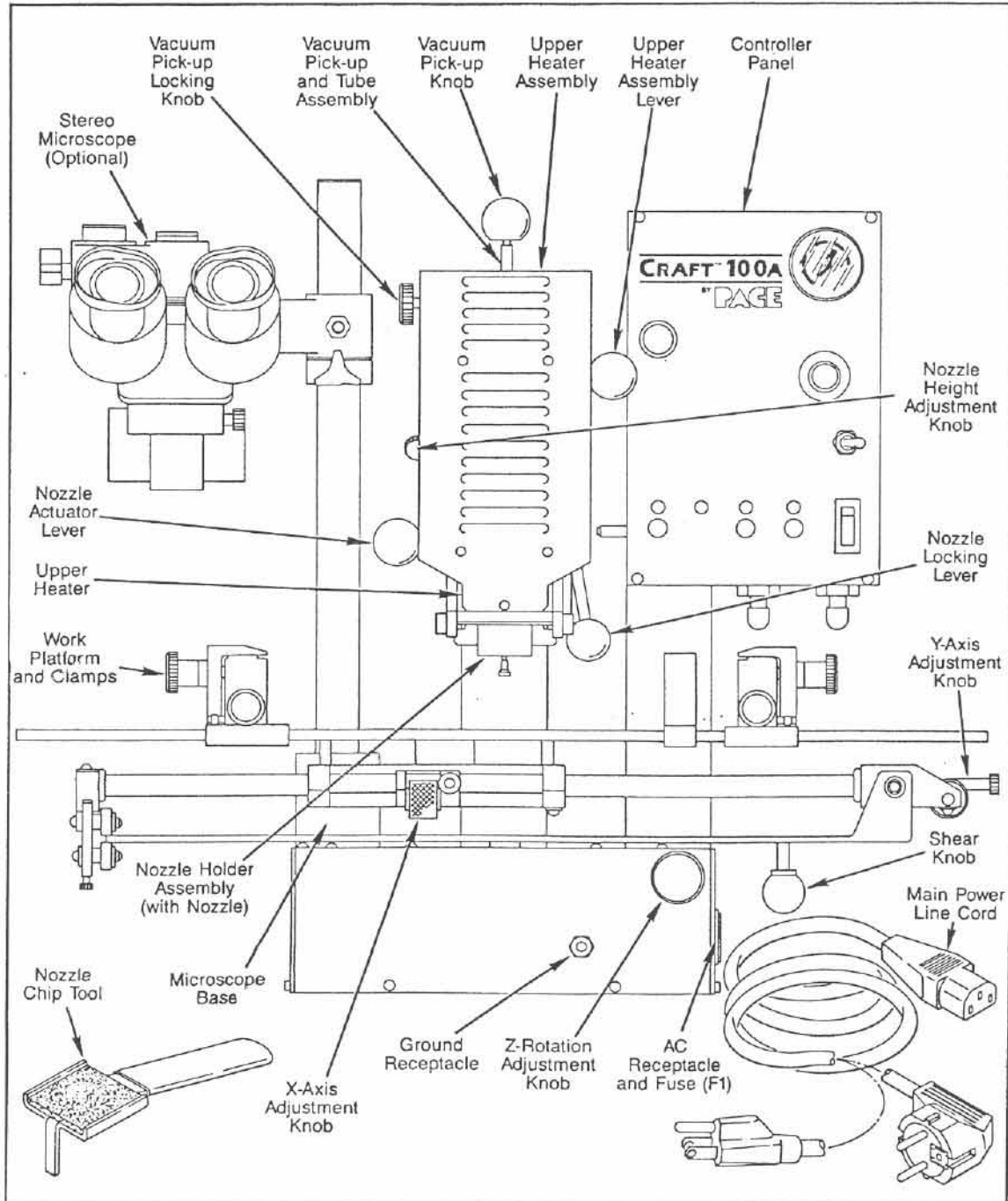


FIGURE 2. SYSTEM IDENTIFICATION OF THE PACE CRAFT-100A SYSTEM

GENERAL INFORMATION

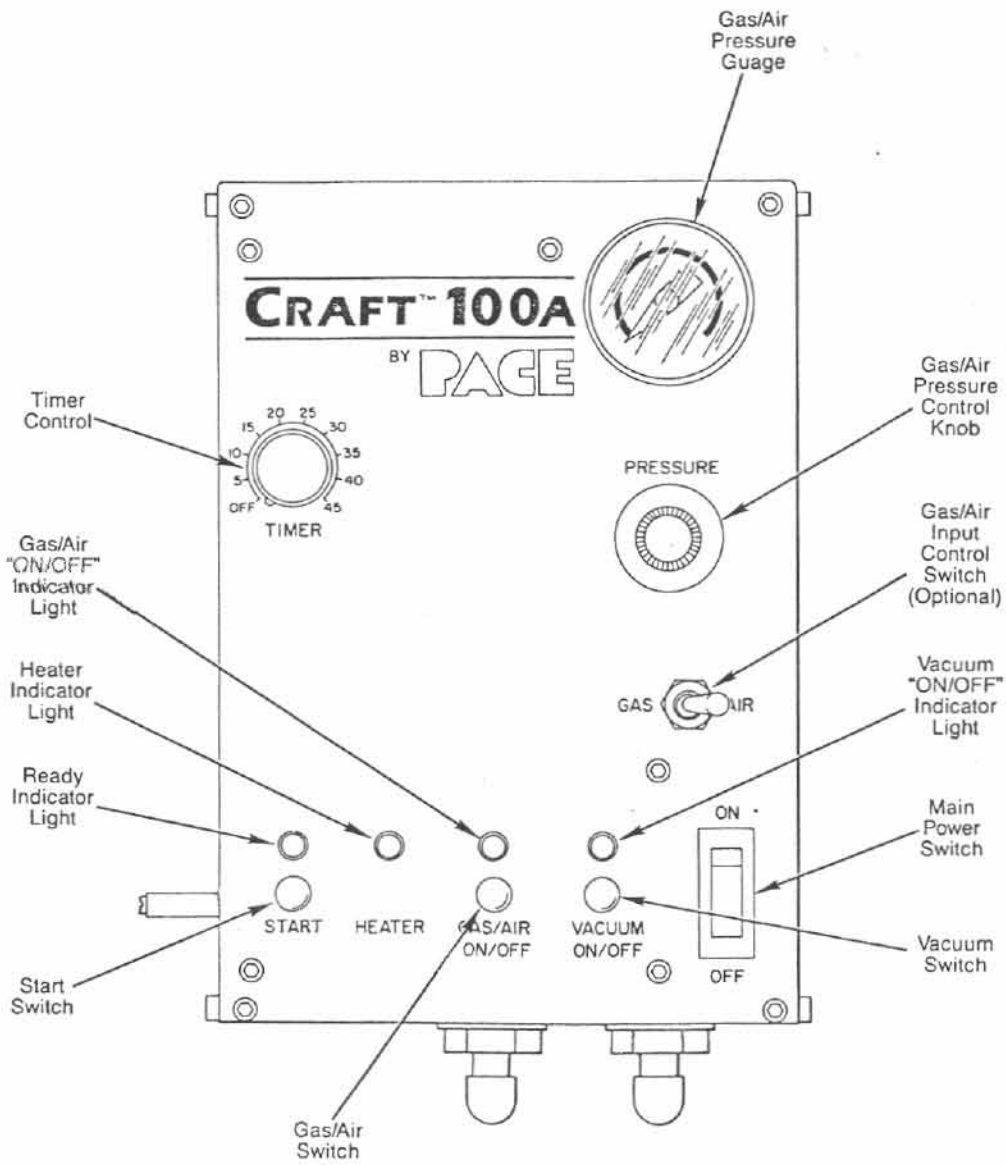


FIGURE 3. CONTROLLER PANEL IDENTIFICATION OF THE PACE CRAFT-100A

GENERAL INFORMATION

PANEL IDENTIFICATION

Table 2 and Figure 3 refers to identification and location of controls and indicators required for the operation of the PACE Craft-100A System.

TABLE 2. PANEL IDENTIFICATION OF PACE CRAFT-100A SYSTEM

- MAIN POWER SWITCH—controls input power within the Craft-100A System. Red light indicates power is "ON".
- VACUUM "ON/OFF" INDICATOR LIGHT—yellow light indicates Vacuum Switch is either "ON" or "OFF".
- VACUUM SWITCH—activates Vacuum Pick-up.
- GAS/AIR "ON/OFF" INDICATOR LIGHT—yellow light indicates Gas/Air flow to Nozzle.
- GAS/AIR SWITCH—activates Gas/Air to Nozzle (manual operational mode only).
- HEATER INDICATOR LIGHT—yellow light indicates Heater temperature cycle.
- READY INDICATOR LIGHT—yellow light continuously on for approximately seven (7) minutes on initial start-up. Flashing light indicates System is ready for operation. (NOTE: System will not operate until Main Heater is at a operating temperature).
- START SWITCH—activates heated Gas/Air flow to Nozzle per Timer Control setting.
- TIMER CONTROL—allows setting of the hot Gas/Air flow to the Nozzle for the selected operating cycle.
- GAS/AIR PRESSURE GAUGE—indicates Gas/Air operating pressure for operation at Gas/Air Regulator.
- GAS/AIR PRESSURE CONTROL KNOB—allows selection and regulation of pressure flow.
- GAS/AIR INPUT CONTROL SWITCH (OPTIONAL)—provides switching between gas or air input to Upper Heater Assembly.

SET-UP:

Place the PACE Craft-100A System on a work-bench or suitable work surface, become familiar with the various parts of the whole system, refer to Figures 2 and 3:

- provide a clean, dry air supply, regulated to 60-100 psi at 3 cfm capacity,
- attach the air supply hose to Air Input Fitting ($\frac{1}{8}$ " and $\frac{1}{4}$ " NPT adapters supplied) located at rear of Controller Panel. If Inert Gas option is present, attach Inert Gas supply hose to the Inert Gas Fitting. (NOTE: Adjust the Inert Gas pressure to 60 psi), refer to Figure 4,

IMPORTANT

DO NOT attach the hose to an unregulated gas or air source.

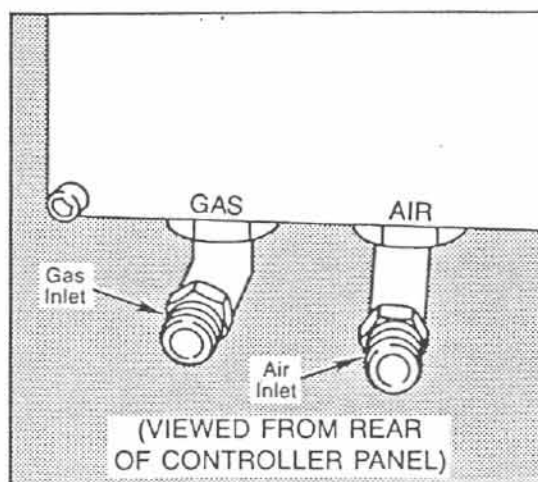


FIGURE 4. AIR/GAS ATTACHMENT FITTINGS

OPERATION

- attach the Craft-100A Microscope System (optional) to the Microscope Base (refer to Manual No. 5050-0191 for installation instructions),
- insert Mirror Viewing System from the Craft-100A Microscope System into the Nozzle Holder Assembly (refer to Manual No. 5050-0191 for installation instructions),
- plug the Main Power Cord into a three (3) wire grounded AC outlet (115V),
- adjust the Gas/Air Pressure level. (NOTE: For carriers set at 50-60 psi, for small components set at 30-45 psi).

SET-UP (For export usage):

Set-up for your Power Converter is as follows:

- place the Power Converter on a workbench or suitable work surface,
- plug the Power Converter Power Line Cord into a convenient outlet,
- place the Craft-100A System adjacent to the Power Converter,
- turn the Power Converter Main Power Switch to the "ON" position, (NOTE: Red Indicator Light illuminates),
- plug the Craft-100A Main Power Line Cord into the AC receptacle located on the front panel of the Power Converter,
- turn the Craft-100A Main Power Switch to the "ON" position, (NOTE: Red Indicator Light illuminates).

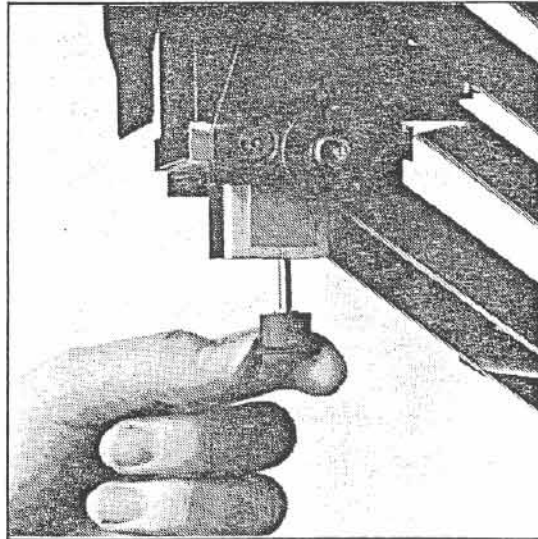


FIGURE 5. ATTACHING VACUUM PICK-UP

OPERATION:

The Craft-100A System is now set-up and ready to place into operation. Perform the following steps to become operable, refer to Figures 2 and 3:

COMPONENT REMOVAL

Manual Mode:

- select the proper Nozzle size,
- attach the proper Vacuum Pick-up Cup to the Vacuum Pick-up, refer to Figure 5,
- slide Nozzle into Nozzle Holder Assembly, make certain Nozzle is fully seated, refer to Figure 6,
- clamp circuit board to Work Platform, position component under Nozzle, refer to Figure 7,
- apply a small amount of liquid flux to the solder joints,

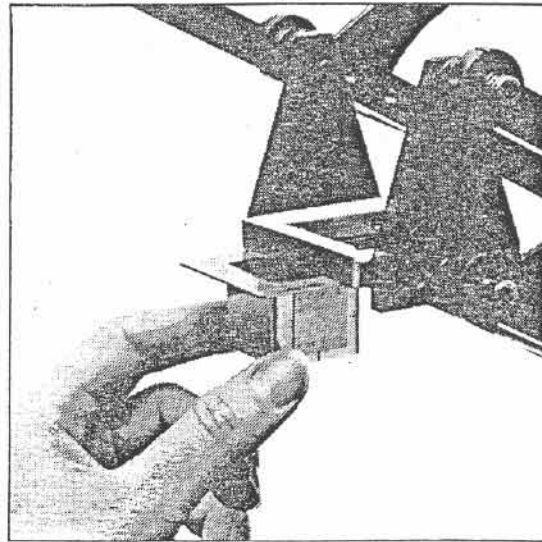


FIGURE 6. POSITIONING NOZZLE

OPERATION

- lower the Nozzle Holder Assembly, refer to Figure 8,
- using Nozzle Height Adjustment Knob, set Nozzle 1/32" above PCB, refer to Figure 9,
- secure Nozzle Height Adjustment Knob with Nozzle Height Locking Nut to maintain a constant setting. (NOTE: Make certain that a 1/32" clearance has been maintained),
- align component with Nozzle using the X and Y-Axis Knobs along with Z-Rotation Knob. (NOTE: Check for correct alignment and readjust if needed).
- set the Timer and Pressure Controls,

IMPORTANT

PRE-HEATING—If laminate pre-heating is necessary, pre-heat the PCB to the required temperature.

- using Vacuum Pick-up Locking Knob, secure Vacuum Pick-up in the upmost position,
- lower the Upper Heater Assembly, refer to Figure 10,
- loosen the Vacuum Pick-up Locking Knob to lower Vacuum Cup onto component,
- depress Vacuum Switch to activate vacuum, gently pull upward on the Vacuum Pick-up Knob making certain the Vacuum Cup is seated onto the component body,
- depress the Gas/Air Switch. Observe solder melt while gently pulling upward on Vacuum Pick-up Knob until component lifts from PCB,
- tighten Vacuum Pick-up Locking Knob and lift Nozzle Holder Assembly to upmost position,
- loosen Vacuum Pick-up Locking Knob to release the Vacuum Pick-up,
- depress Vacuum Switch to terminate vacuum, releasing component onto the Nozzle Chip Tool, refer to Figure 11,

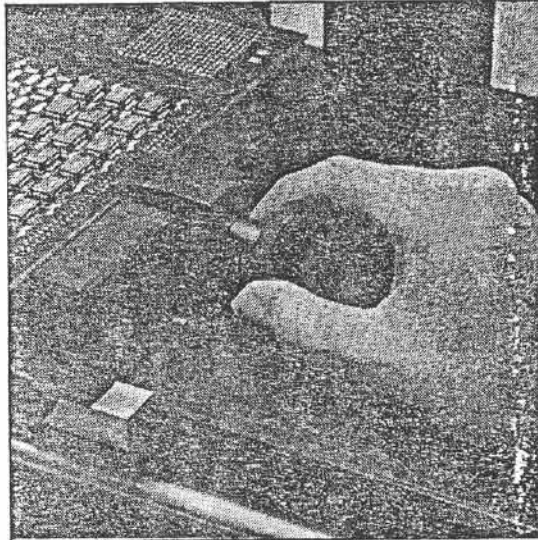


FIGURE 7. COMPONENT POSITIONING

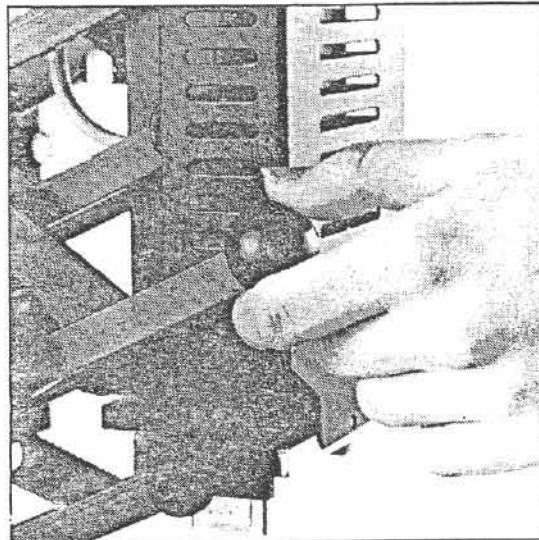


FIGURE 8. NOZZLE ASSEMBLY POSITION

WARNING

DO NOT retrieve component from Nozzle with hands or fingers, let component drop onto the Nozzle Chip Tool. Allow sufficient time for component cooling.

OPERATION

Semi-automatic Mode:

- select the proper Nozzle size,
- attach the proper Vacuum Pick-up Cup to the Vacuum Pick-up, refer to Figure 5,
- slide Nozzle into Nozzle Holder Assembly, make certain the Nozzle is fully seated, refer to Figure 6,
- clamp circuit board to Work Platform, position circuit board component to be removed directly under Nozzle, refer to Figure 7,
- apply a small amount of liquid flux to the solder joints,
- lower the Nozzle Holder Assembly, refer to Figure 8,
- using Nozzle Height Adjustment Knob, set Nozzle $1/32''$ above PCB, refer to Figure 9,
- secure Nozzle Height Adjustment Knob with Nozzle Height Locking Nut to maintain a constant setting. (**NOTE:** Make certain that a $1/32''$ clearance has been maintained),
- align component with Nozzle using the X and Y-Axis Knobs along with Z-Rotation Knob. (**NOTE:** Check for correct alignment and readjust if needed),
- set the Timer and Pressure Controls,

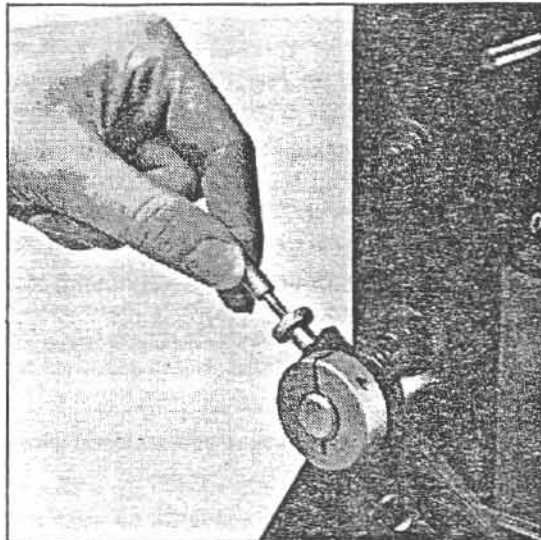


FIGURE 9. NOZZLE HEIGHT ADJUSTMENT

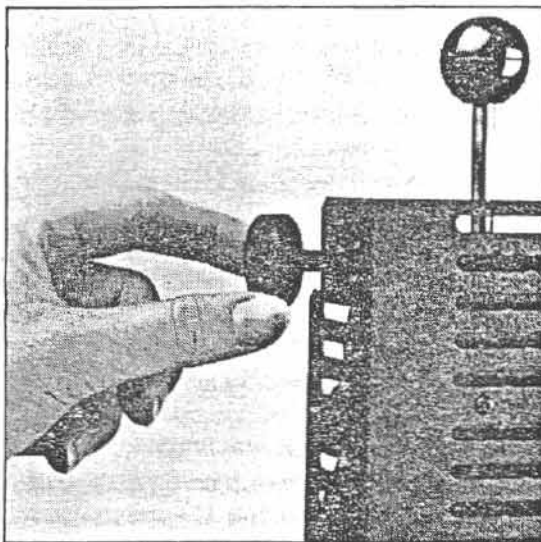


FIGURE 10. VACUUM PICK-UP LOCKING KNOB

IMPORTANT

PRE-HEATING – If laminate pre-heating is necessary, pre-heat the PCB to the required temperature.

- using Vacuum Pick-up Locking Knob, secure Vacuum Pick-up in the upmost position,
- lower the Upper Heater Assembly, refer to Figure 10,
- loosen the Vacuum Pick-up Locking Knob to lower Vacuum Cup onto component,
- depress Vacuum Switch to activate vacuum, gently pull upward on the Vacuum Pick-up Knob making certain the Vacuum Cup is seated onto the component body,
- tighten Vacuum Pick-up Locking Knob to secure Vacuum Pick-up Cup,
- activate Start Switch (**NOTE:** Air flow will terminate at completion of Time Cycle),

OPERATION

- lift the Nozzle Holder Assembly to upmost position,
- loosen the Vacuum Pick-up Locking Knob to release the Vacuum Pick-up,
- depressing the Vacuum Switch will terminate vacuum, releasing the component onto the Nozzle Chip Tool, refer to Figure 11,

WARNING

DO NOT retrieve Component from Nozzle with hands or fingers, let Component drop onto the Nozzle Chip Tool. Allow sufficient time for Component cooling.

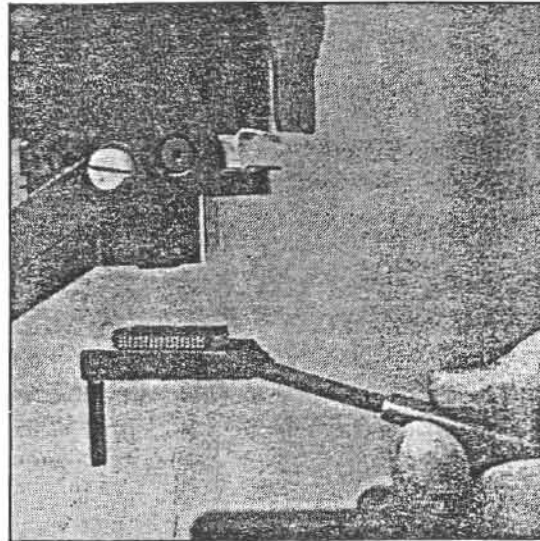


FIGURE 11. NOZZLE CHIP TOOL

BOARD PREPARATION

Proper preparation is the key to successful soldering. To obtain good solder joints, use the following:

- all component leads should be freshly tinned to insure solderability,
- leadless ceramic chip carriers with gold plating should be pre-tinned. For quality work, check for correct "solder deposition". The tinning process should not fill the "castillations" with solder,
- remove all flux applied during component removal process,
- all component leads should be cleaned prior to soldering
- component leads and circuit board lands should not be touched with bare fingers after cleaning,
- prepare the affected area per your specifications.

COMPONENT PRE-POSITIONING

Circuit board preparation should be completed prior to component pre-positioning and soldering.

To assure acceptable lead to land alignment, careful pre-position is necessary. The following information and procedures will help you to obtain acceptable results.

An optical aid is desirable for most operators. The PACE Craft-100A Microscope System and a glare free light source should also be provided.

TACK SOLDERING

The following procedures can be useful when mounting Leaded, Inverted Gull Wing and J-Lead Components:

- using a pair of tweezers for handling and holding, pre-position the component leads to align with the land areas,
- use a micro-tipped soldering iron, tack two or more leads at opposite corners of the component. This will provide positive stability during subsequent handling throughout the solder process.

OPERATION

STAKING MATERIAL

- apply a small dab of epoxy or other suitable staking material to underside of component,
- using a pair of tweezers for handling and holding, pre-position the component leads to align with the land areas,
- the staking material will stabilize the component during subsequent handling and soldering.
(NOTE: Solvent or water soluble solder mask can be removed after soldering in the vapor degreaser or hot water bath when your specifications preclude the use of epoxy between the component and printed circuit board).

COMPONENT REPLACEMENT

For component replacement, use the following steps along with Figures 2 and 3 for reference:

- make certain the replacement land area of the circuit board is still in alignment with the Nozzle,
- make certain the component is in correct orientation to land area prior to inserting into Nozzle,
- insert the replacement component into the Nozzle using the Nozzle Chip Tool, refer to Figure 12,

CAUTION

Nozzle is HOT! Use the Nozzle Chip Tool when inserting component.

- activate the Vacuum Switch and tighten the Vacuum Pick-up Locking Knob,
- lower Nozzle Assembly to approximately 1/16" above land area for pre-positioning,
- lock Nozzle Assembly into place with the Nozzle Locking Lever,
- loosen Vacuum Pick-up Locking Knob and lower component slightly below the Nozzle opening,
- check alignment of component with land area (use the optional Craft-100A Microscope System if available, (refer to Manual No. 5050-0191 for operation/inspection instructions),
- adjust the X, Y and Z-Axis for correct alignment of component,
- unlock Vacuum Pick-up Locking Knob, and lower component onto land area, check to insure that proper alignment has been maintained,
- turn Vacuum Switch off, set controls and indicators at proper settings and levels,
- perform the reflow of component in either the "manual" or "timed" modes, allow sufficient time for solder cooldown,
- loosen Nozzle Locking Lever and lift Upper Heater and Nozzle Assemblies to upright position,
- visually inspect for proper alignment and reflow of component,
- clean component area (per customer requirements),
- loosen Work Platform Clamps and remove circuit board,

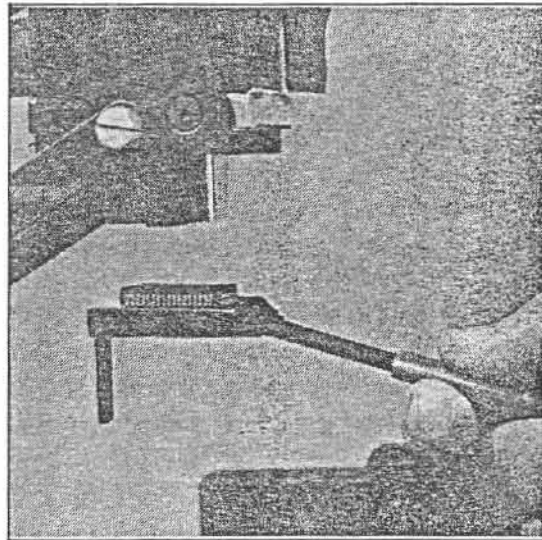


FIGURE 12. COMPONENT REPLACEMENT

MAINTENANCE

FUSE REPLACEMENT:

The main power Fuse (F1) is located in the top half of the AC Receptacle located on the side of the system (refer to Figure 12). The Controller Panel Fuse (F2) is located on the rear of the Controller Panel (refer to Figure 13).

When replacing Fuses, use the following steps to ensure safety to you and your system:

- unplug Main Power Cord from AC outlet,
- lift cover flap on top half of AC Receptacle to expose Fuse (F1),
- remove Fuse (F1) from Fuse Holder and replace with new Fuse,
- using a coin or a screwdriver, remove the Fuse Cap from Fuse Holder on the rear of the Control Panel,
- remove Fuse (F2) from Fuse Holder and replace with new Fuse.

CAUTION

When replacing Fuses, make certain that you replace with the same rating. *DO NOT* replace Fuse with a higher rating for this can create an overload to the system.

ELECTRICAL PROTECTION:

All electrical circuits of the system are fully protected and replacement of electrical components should not become necessary. If a problem occurs, refer to the PACE Craft-100A Service Manual and/or contact PACE, Inc. at (301) 490-9860 for the correct service procedures of your system.

MAINTENANCE:

Maintenance of the Craft System is simple and relatively easy to perform. When a problem in operation occurs (see Table 3. Corrective Maintenance), select the symptom which applies and follow the steps given in the "Solution" column.

MAINTENANCE

TABLE 3. CORRECTIVE MAINTENANCE

SYMPTOM	CONDITION	SOLUTION
No power to the system	Blown Fuse (F1)	Replace Fuse (F1) located in the top of the AC Receptacle on the right side of system. (NOTE: If Fuse continues to blow, then an electrical short is present in the system, contact your local Pace representative immediately).
	Bad Power Switch	Replace Switch Lamp Assembly.
Switch Lamp Assembly light is on, no power to the system	Blown Fuse (F2)	Replace Fuse (F2) on back of Control Panel. (NOTE: If Fuse continues to blow, then an electrical short is present in the system, contact your local Pace representative immediately).
Power ON, Heater Light "OFF" no heat Upper Heater Assembly	Defective Heater Temperature Sensor	Replace Heater Sensor.
Power ON, Heater Light "ON" no heat to Upper Heater Assembly	Heater open	Replace Heater Assembly.
Loss of vacuum	Vacuum Pick-up is clogged	Clean Pick-up Rod with a small wire or blow air through the Rod.
	Vacuum Hose is kinked or broken	Inspect Upper Heater Hose (located on back of Upper Heater Assembly), remove kink(s) if present and/or replace Hose if broken.
Vacuum Pick-up binding	Vacuum Pick-up has corrosion buildup	Clean with a fine grit Emery Cloth.

ELECTRICAL PROTECTION

All electrical circuits of the Craft-100A System is fully protected and replacement of electrical components should not be necessary. However, if a problem develops that you think may be an electrical problem, contact a PACE representative at (301) 490-9860 before attempting circuitry repair.

REPLACEMENT PARTS

REPLACEMENT PARTS:

When ordering replacement parts for your PACE Craft-100A System, refer to Tables 4 and 5, Table 6 and Figure 13, and Table 7 and Figure 14 locating the desired part(s). Use the item number in the Figure(s), then refer to the Table(s) for that item number, part description and PACE part number.

TABLE 4. CRAFT-100A STANDARD NOZZLES

PACE PART NO.	COMPONENT APPLICATION	COMPONENT SIZE (MAX.) IN.
4018-0010-130	16 Pin SOIC (.150 Body)	.244 x .394
4018-0010-137	14 Pin SOIC (.150 Body)	.244 x .344
4018-0010-127	8 Pin SOIC and small components	.250 x .250
4018-0010-123	18 J Lead PLCC	.327 x .467
4018-0010-112	20 J Lead PLCC	.395 x .395
4018-0010-113	28 J Lead PLCC	.495 x .495
4018-0010-106	44 J Lead PLCC	.695 x .695
4018-0010-114	52 J Lead PLCC	.795 x .795
4018-0010-103	68 J Lead PLCC	.995 x .995
4018-0010-119	84 J Lead PLCC	1.192 x 1.192
4018-0010-133	20 Pin SOIC (Wide Body)	.512 x .419
4018-0010-139	24 Pin SOIC (Wide Body)	.610 x .419

TABLE 5. CRAFT-100A STANDARD HV ALIGNMENT NOZZLES

(HV Alignment Nozzles incorporate inserts which automatically register the replacement component squarely in the Nozzle.)

PACE PART NO.	COMPONENT APPLICATION	COMPONENT SIZE (MAX.) IN.
4018-0027-001	18 J Lead PLCC	.327 x .467
4018-0027-002	20 J Lead PLCC	.395 x .395
4018-0027-003	28 J Lead PLCC	.495 x .495
4018-0027-004	44 J Lead PLCC	.695 x .695
4018-0027-005	52 J Lead PLCC	.795 x .795
4018-0027-006	68 J Lead PLCC	.995 x .995
4018-0027-007	86 J Lead PLCC	1.192 x 1.192

NOTES:

1. All Nozzles for J Leaded Carriers have corner radii of .063 on all corners. When using Carriers with sharp corners, contact PACE for proper application.
2. Maximum Component size refers to outer perimeter of Carrier including Leads.
3. PACE can prepare special Nozzle configurations to address any specific requirements not satisfied through the use of standard Nozzles. Use the "Craft 100—Special Nozzle Requirements" form (PACE Part No. 5050-0170) or contact PACE, Inc. at (301) 490-9860 (Telex 87446).

REPLACEMENT PARTS

**TABLE 6. LIST OF REPLACEMENT PARTS COMMON TO
PACE CRAFT-100A SYSTEM**
(Refer to Figure 13 for Item Number)

ITEM NO.	DESCRIPTION	PACE PART NO.
	Craft-100A System (Standard)	7018-0026-07
	Craft-100A System (Gas/Air)	7018-0026-08
1	Heater Assembly*	6010-0052
2	Thumb Screw	1405-0553
3	Knurled Thumb Nut	1348-0497
4	Knob, Knurled	1222-0038
5	Controller Assembly, Standard (refer to Table 6 and Figure 14)	6018-0032
	Controller Assembly, Gas/Air (refer to Table 6 and Figure 14)	6018-0033
6	Table Assembly	6018-0030
7	Handle Assembly	6018-0019
8	Knob	1222-0028
9	Nozzle**	4018-0010
10	Line Cord	1332-0094
11	AC Receptacle	1207-0123
12	Regulator	1263-0030
13	Solenoid	1194-0015
14	Vacuum Pump	1338-0050
15	Fuse (F1), 3.15 SloBlo	1159-0221
16	Vacuum Pick-up Assembly	4010-0088
17	Vacuum Cup, .625" Dia. (Pkg. of 2)	1121-0280-P2
	Vacuum Cup, .400" Dia. (Pkg. of 2)	1121-0281-P2
	Vacuum Cup, .312" Dia. (Pkg. of 2)	1121-0282-P2
	Vacuum Cup, .200" Dia. (Pkg. of 2)	1121-0288-P2
18	Gasket (Pkg. of 5)	5001-0012-P5
19	Nozzle Chip Tool	1100-0228
20	Craft-100A Microscope System (Optional)	6018-0034
—	Operation and Maintenance Manual	5050-0155

* You may choose to have your Heater Assembly repaired/reconditioned instead of replacing it with a new Heater Assembly.

** Refer to Table 4. Craft-100A Standard Nozzles and Table 5. Craft-100A Standard HV Alignment Nozzles (page 15) for a complete listing of Nozzles.

REPLACEMENT PARTS

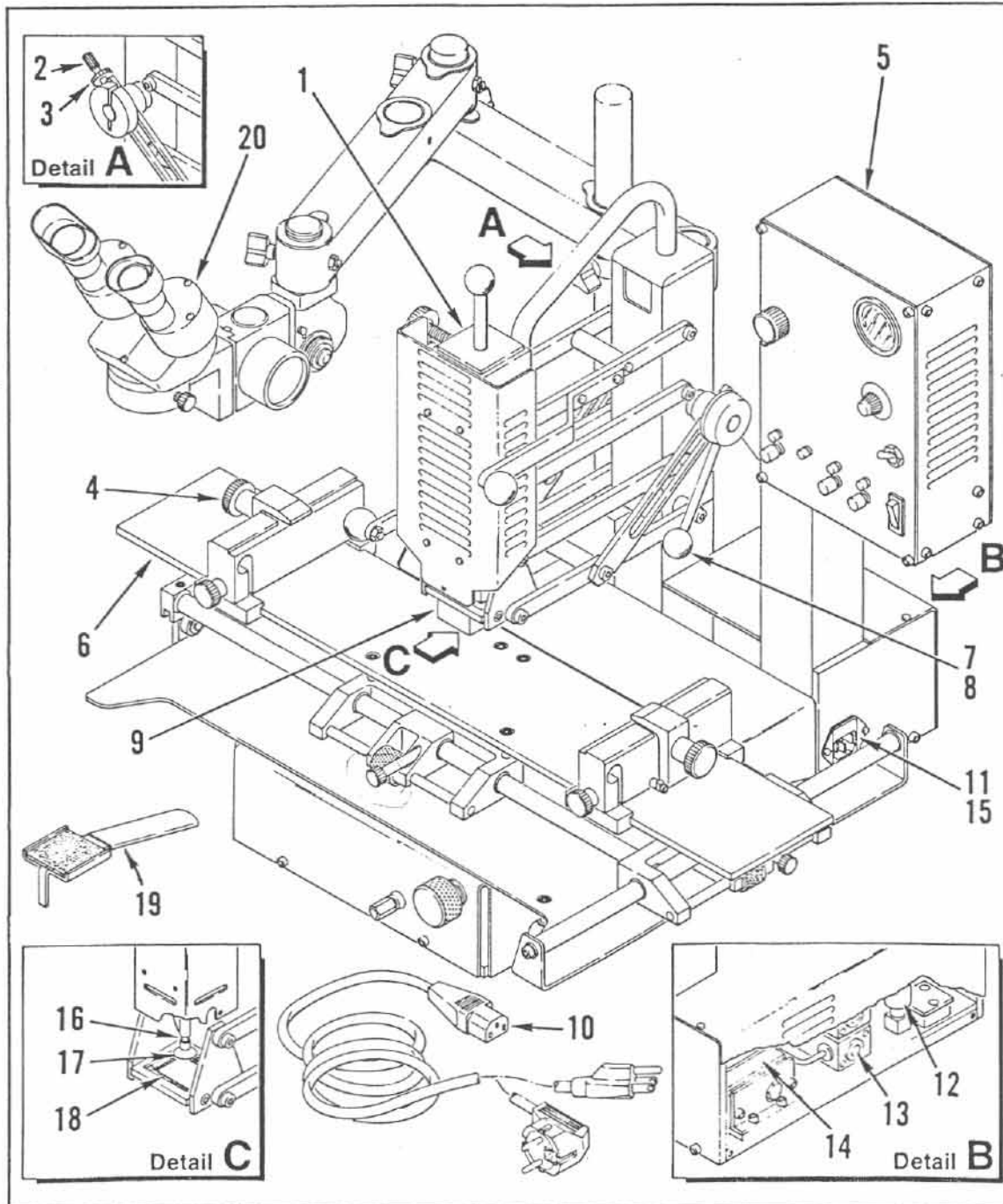


FIGURE 13. REPLACEMENT PARTS FOR CRAFT-100A SYSTEM

REPLACEMENT PARTS

TABLE 7. LIST OF REPLACEMENT PARTS COMMON TO PACE CRAFT-100A CONTROLLER ASSEMBLY
(Refer to Figure 14 for Item Number)

ITEM NO.	DESCRIPTION	PACE PART NO.
	Controller Assembly, Standard	6018-0032
	Controller Assembly, Gas/Air	6018-0033
1	PC Board Assembly	6008-0112
2	Knob	1222-0021
3	Switch Lamp Assembly	1157-0027
4	Regulator	1263-0030
5	Regulator Knob	1222-0033
6	Pressure Gauge	1108-0005
7	Lens, Yellow	1171-0004
8	Fuse (F2), 100mA (Fast Acting)	1159-0243
9	Fuse Holder	1161-0008

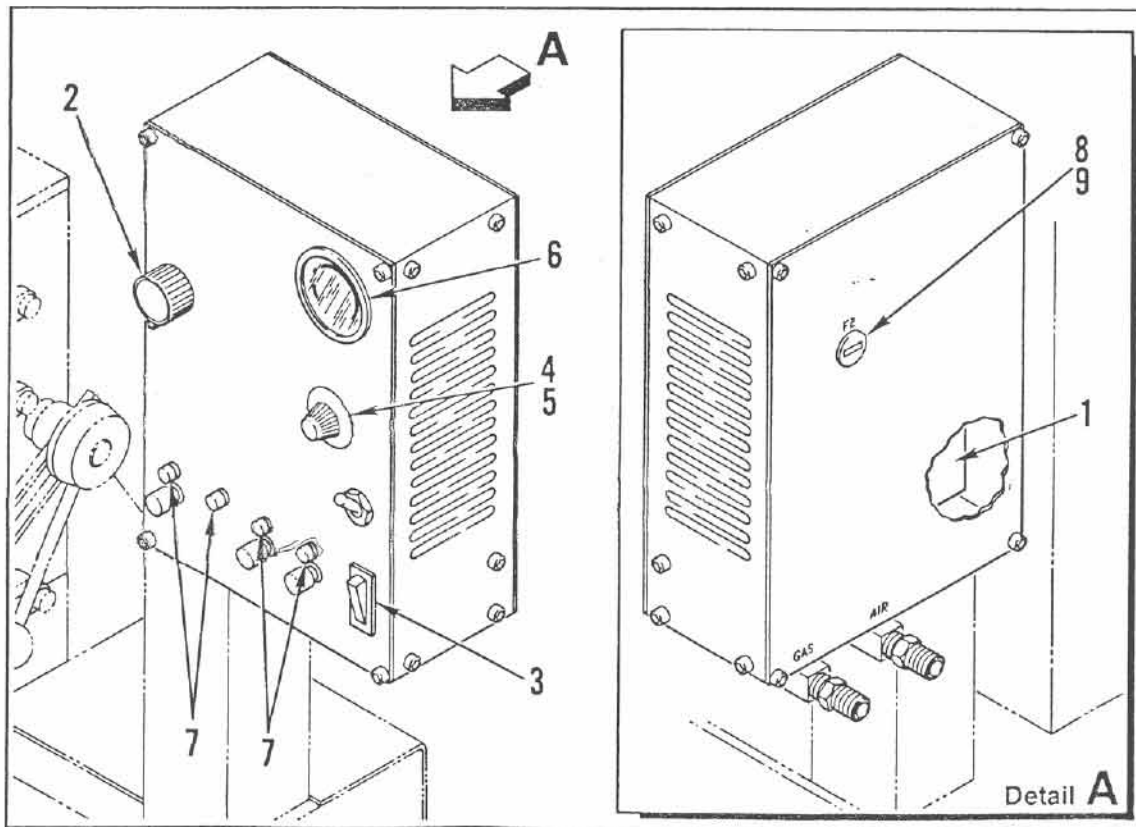


FIGURE 14. REPLACEMENT PARTS FOR PACE CRAFT-100A CONTROLLER ASSEMBLY



9893 BREWERS COURT
LAUREL, MARYLAND 20707 USA
(301) 490-9860
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