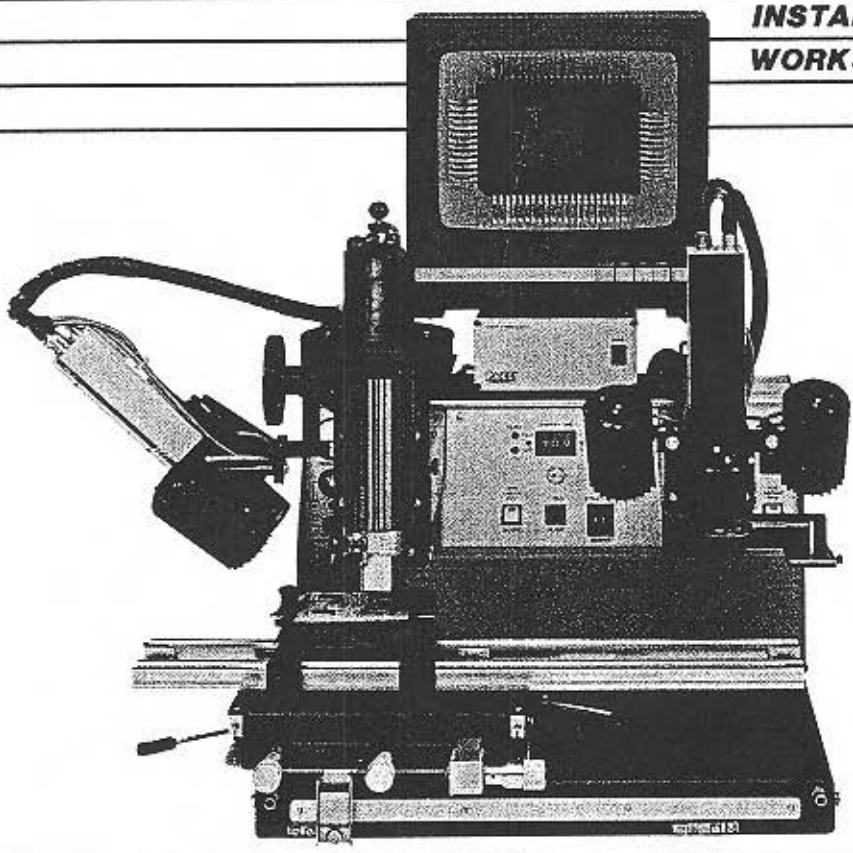
PACE®
INCORPORATED

CRAFT® 25 & 15

SURFACE MOUNT INSTALLATION/REPAIR WORKSTATION



SERVICE & MAINTENANCE MANUAL

MANUAL NO. 5050-0261
REV. A

SPECIFICATIONS

POWER REQUIREMENTS:

CRAFT 15 (DOMESTIC VERSION)—115 VAC, 60 Hz, 12.8 AMPS, 1500 WATTS

CRAFT 15E (EXPORT VERSION)—230 VAC, 50 Hz, 6.5 AMPS, 1500 WATTS

CRAFT 25 (DOMESTIC VERSION)—115 VAC, 60 Hz, 12.8 AMPS, 1500 WATTS

CRAFT 25E (EXPORT VERSION)—230 VAC, 50 Hz, 6.5 AMPS, 1500 WATTS

OPERATING TEMPERATURE (ALL MODELS):

SETTINGS—500°F (260°C) NOMINAL, MINIMUM

SETTINGS—800°F (427°C) NOMINAL, MAXIMUM

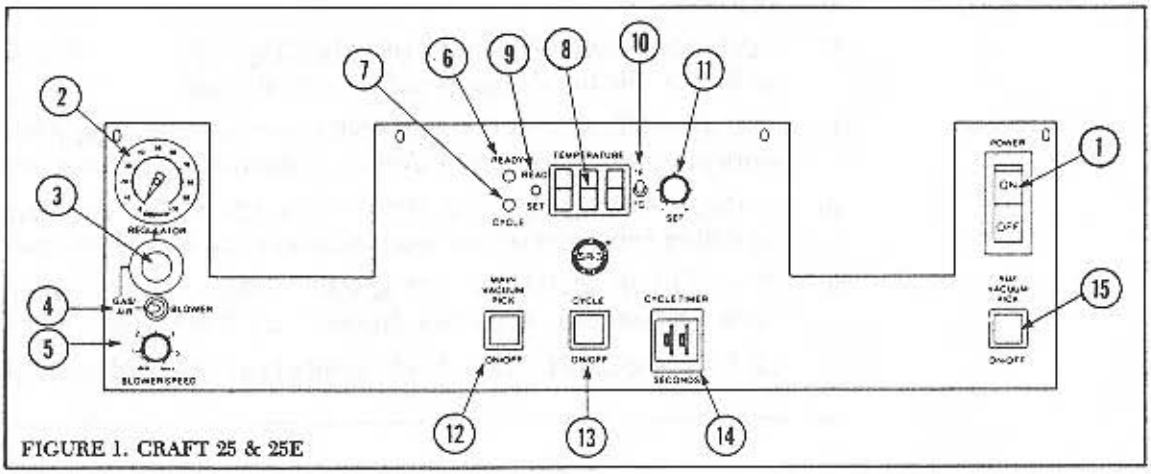


FIGURE 1. CRAFT 25 & 25E

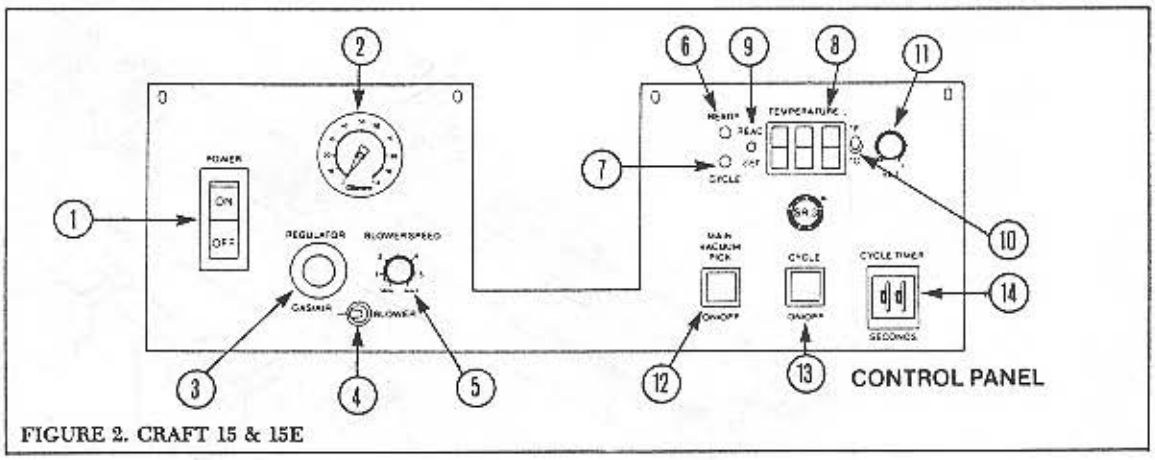


FIGURE 2. CRAFT 15 & 15E

INDEX ASSEMBLY

Assembly present on the CRAFT 25 and CRAFT 25E systems only.

22. INDEX KNOB—Allows work platform to be moved between the reflow station and the placement station.
23. EARTH GROUND TERMINALS—Provide grounding points for connecting the CRAFT 25 system to the workpiece to prevent static charges from damaging sensitive components or for attaching a wrist strap.

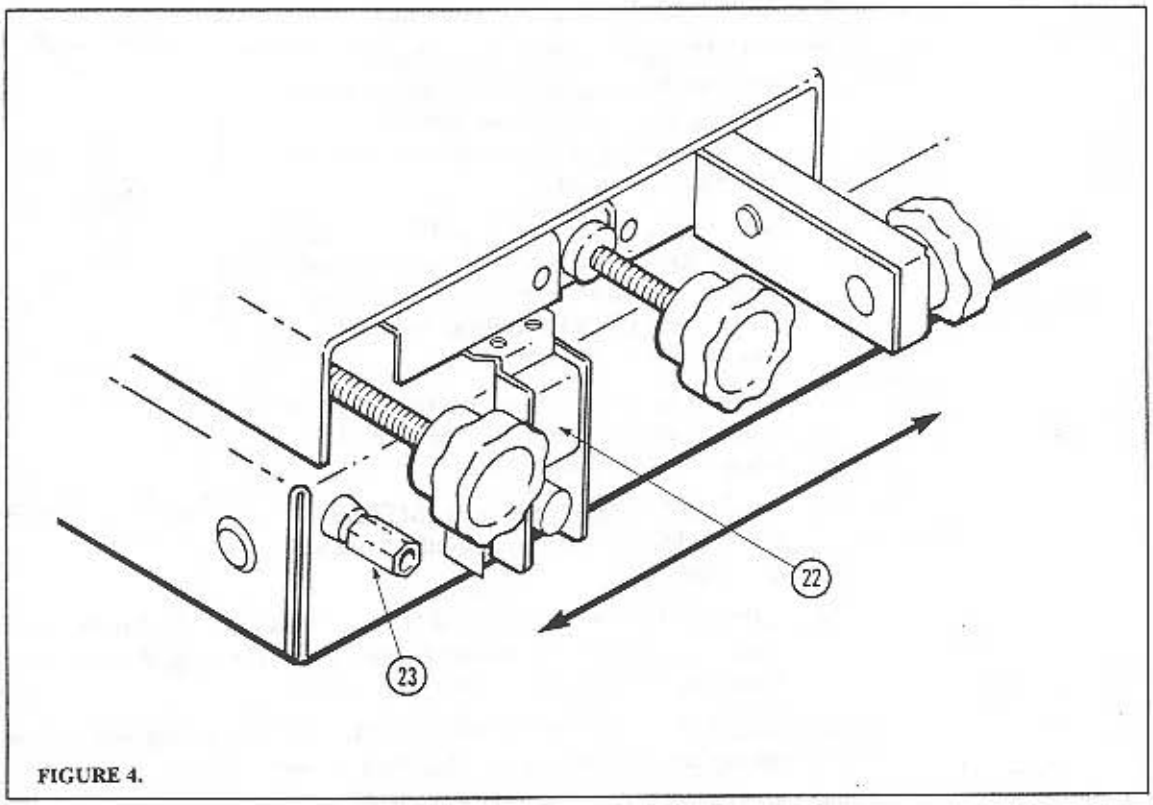


FIGURE 4.

PLACEMENT STATION

Assembly present on the CRAFT 25 and CRAFT 25E systems only.

34. AUXILIARY VACUUM PICK ASSEMBLY—Provides a means to lift replacement component from component locating fixture and place on land pattern of the PCB undergoing repair.
35. Z-AXIS CONTROL WHEEL—Moves the vacuum pickup assembly in the Z direction to precisely lower components onto the PCB land area.
36. ACCESSORY MOUNTING SHAFT—Provides a means for attaching video, lighting and microscope options onto placement station.
37. LIGHTING OUTPUT RECEPTACLE—Connects power from the CRAFT system to the optional dual halogen lighting system.
38. COMPONENT LOCATING FIXTURE—Holder for replacement component. Holds component in proper position and orientation for pickup by the placement station vacuum pickup assembly.
39. STOP COLLAR—Provides a resting surface for video mounts and includes a stop pin for positioning of video camera over rework area.

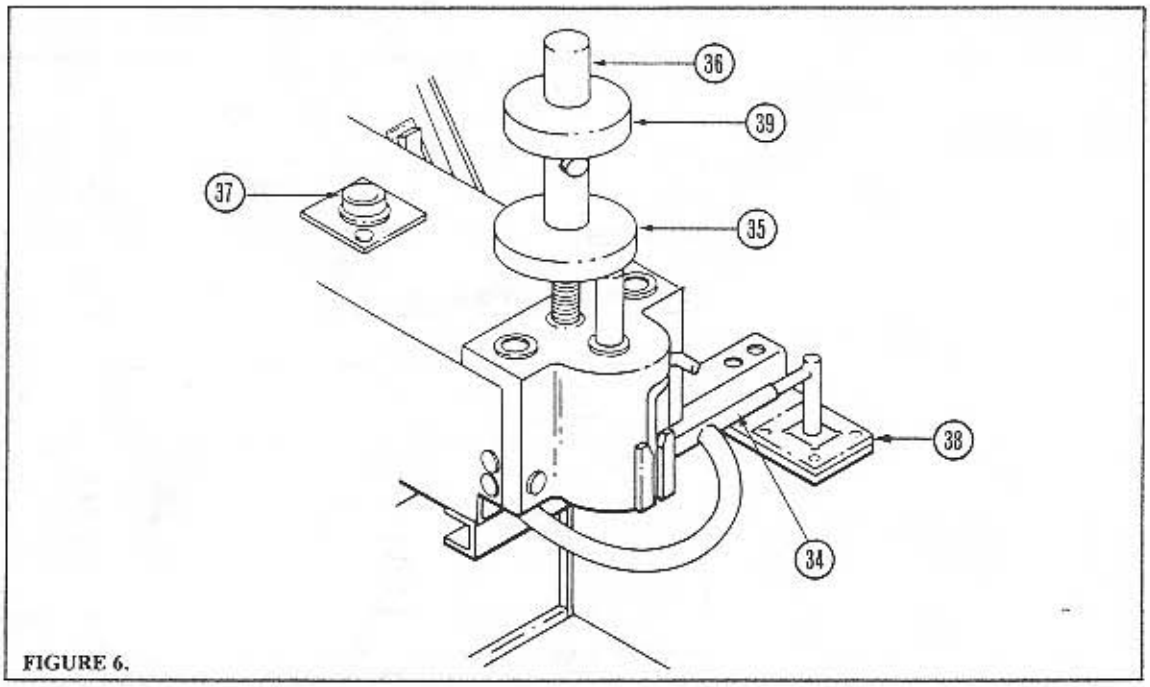


FIGURE 6.

OPTICS AND LIGHTING

46. REFLOW STATION OPTICS AND LIGHTING—Provides illumination and viewing of removal and placement functions. Views at an angle of 45 degrees to the PCB and swings on the mounting structure in an arc of 180 degrees which allows inspection of three sides of the component.

47. PLACEMENT STATION OPTICS AND LIGHTING—Feature on CRAFT 25 and CRAFT 25E units only. Provides illumination and viewing of placement function for gull-wing and flat pack type components. Views at an angle of 90 degrees to the PCB displaying the entire component (including leads).

SERVICE HINTS (Cont'd)

2. VACUUM CONTROL: In cases where the vacuum control does not appear to work properly and the remote control accessory is being used with the system, unplug the control from the rear panel connector and test the system. The remote control may be defective or could be used improperly by the operator. The remote control has switching circuits parallel to those contained in the system. If either switch (in the system or remote control) is set to the "on" position the vacuum control circuit will remain activated.

3. UNEVEN OR IMPROPER SOLDER REFLOW: Failures of this type can be mechanical in nature. Check to insure that the bottom edge of an installed nozzle is parallel to the surface of the PCB undergoing rework when the PCB is mounted onto the work platform and clamped in place. If this is not the case, refer to the "Repair—Reflow Head Alignment" section of this manual for assistance.

4. COMPONENT PLACEMENT: When adjusted properly, the vacuum pickup system(s) will allow the user to position a wide variety of components easily. When experiencing difficulty in component placement, check to insure that the land pattern of the PCB undergoing repair is properly prepared. If the surface of the lands is uneven, retin the area. Also check to insure that when the replacement component is lowered onto the land pattern, all four sides of the component touch simultaneously (component parallel to PCB surface). If this is not the case, refer to the "Alignment Tool Instruction" section of this manual for assistance.

5. LIGHTING ASSEMBLY MALFUNCTION: In most cases, the Lighting Assembly lamp or the fuse on the rear panel of the system will be the source of the malfunction. If that is not the case, cabling and receptacle connections will be the most likely source. If your system is a CRAFT 25 or CRAFT 25E model and the second Lighting Assembly is functioning properly, plug the defective Lighting Assembly into the receptacle occupied by the functioning assembly. If the Lighting Assembly still does not work, check both the receptacle pins (on the system) and the plug pins on the Lighting Assembly. If any of the pins are pushed back in the receptacle, the receptacle in question must be repaired or replaced. Contact PACE Customer Service for assistance at this point or replace the defective pin(s) using the tools listed below.

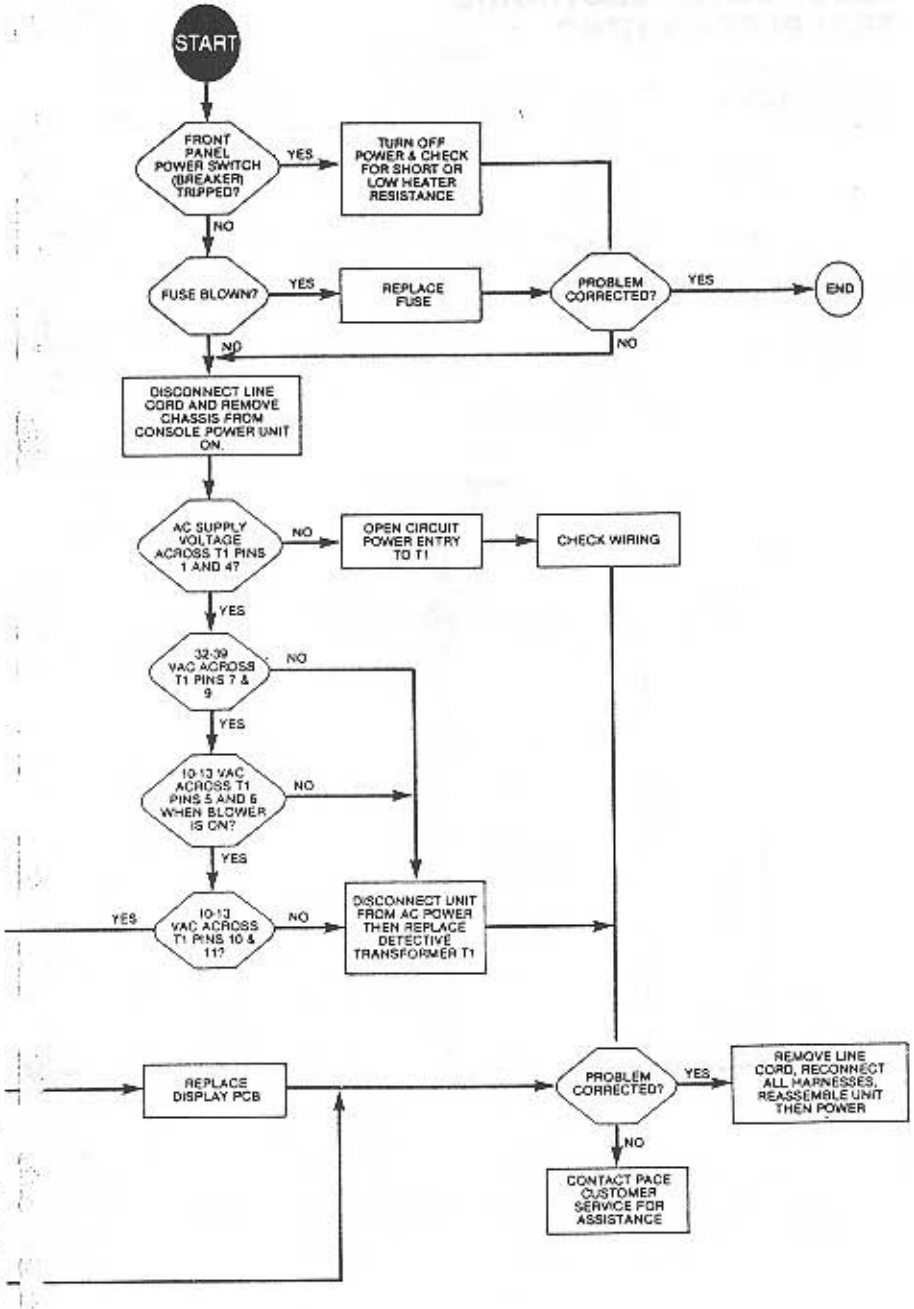
    1. AMP PIN REMOVER #91136-1
    2. AMP CRIMPING TOOL #90363-1-E

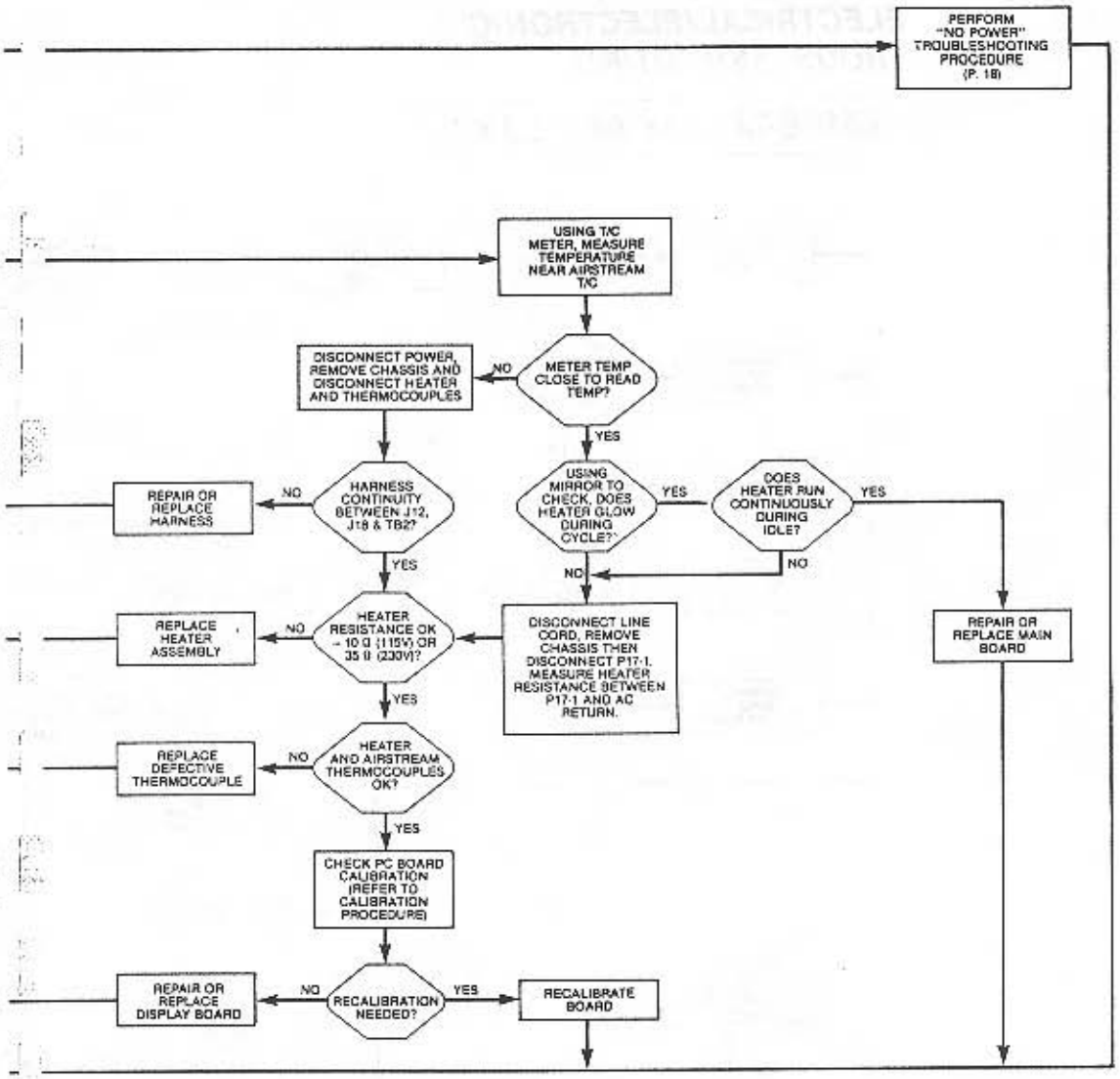
6. VIDEO MALFUNCTION: When encountering a video malfunction, check all connections, associated cabling and control setting on the monitor and camera(s). If unable to correct the problem, contact PACE Customer Service for assistance.

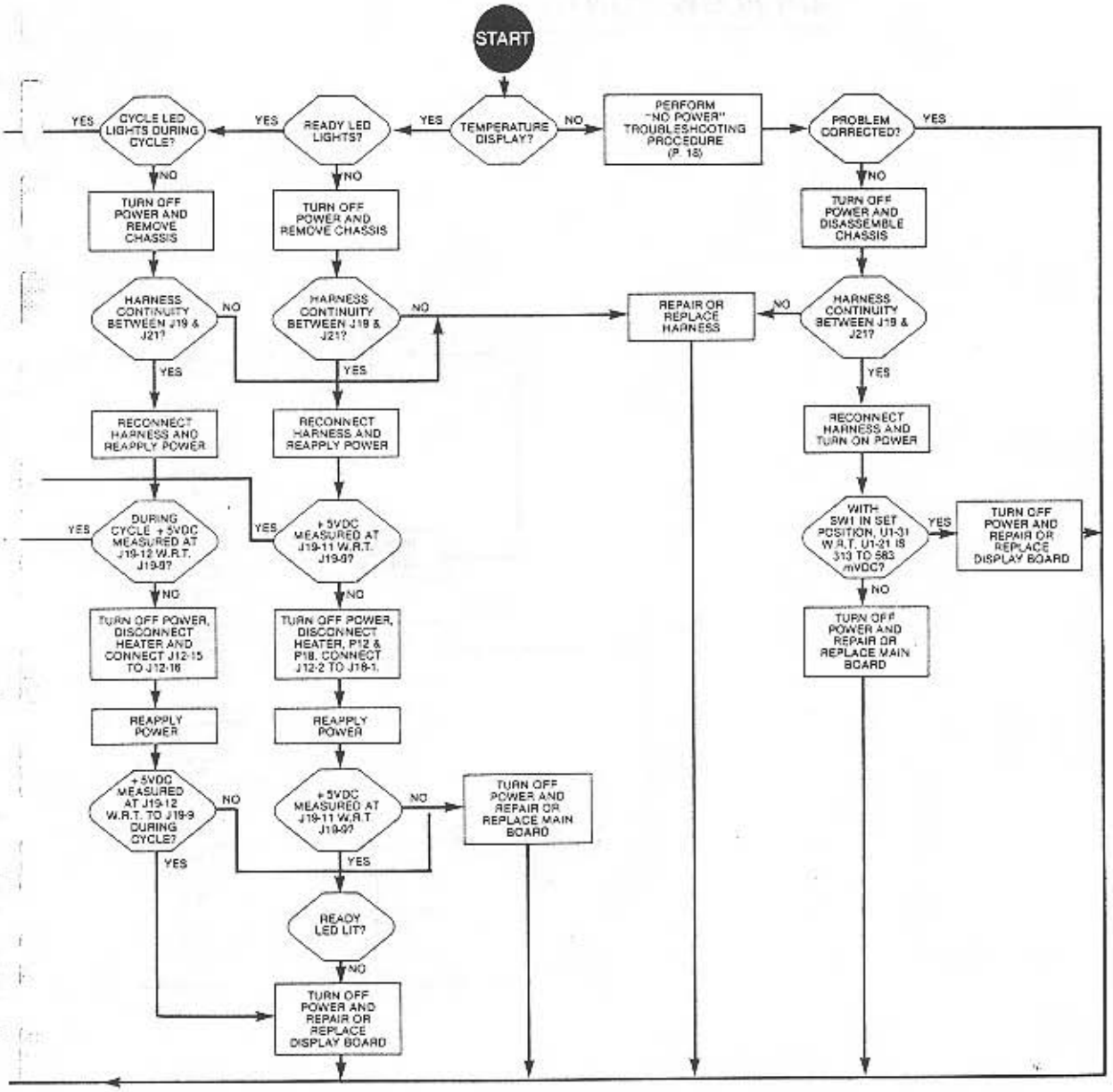
CORRECTIVE MAINTENANCE

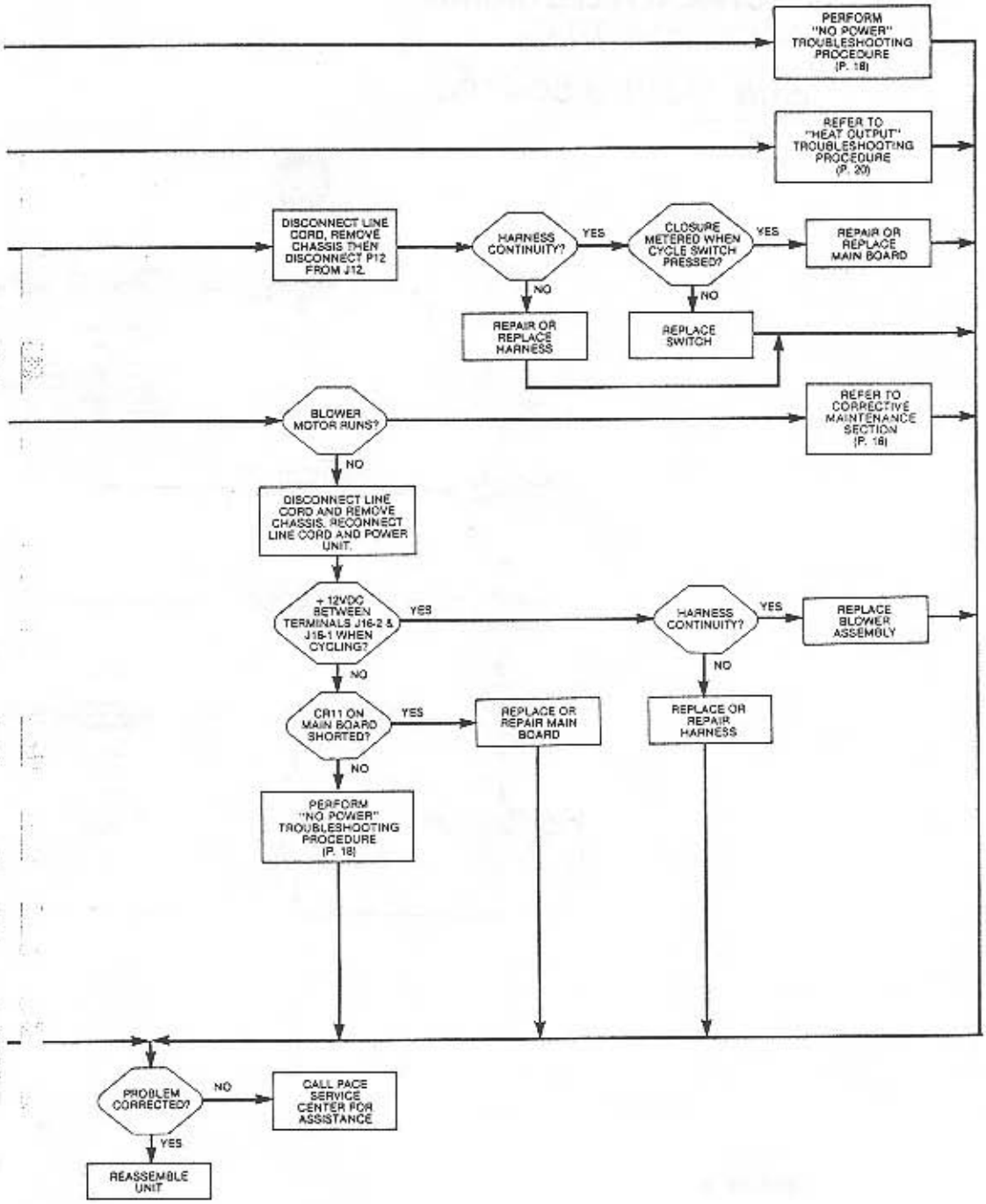
TABLE 1 (cont'd)

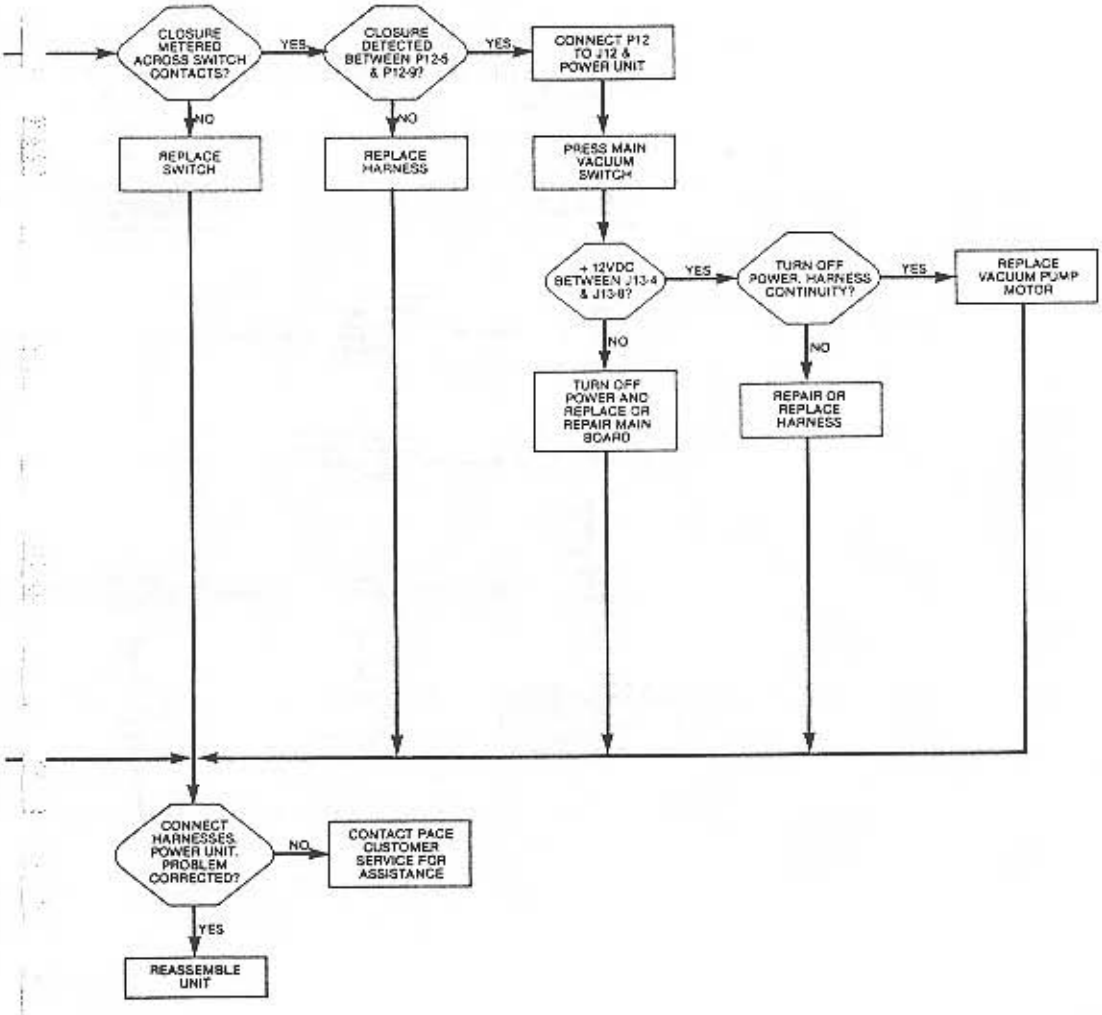
SYMPTOM	POSSIBLE CAUSE	SOLUTION
UNIT DOES NOT CYCLE—Display reads "88".	Over-temperature cutoff circuit has activated.	CRAFT 25/E, check Blower Supply Cutoff Control.
		CRAFT 15/E, check flapper valve inside chassis for proper operation.
	Defective Airstream thermocouple.	Contact PACE Customer Service.
READY LED DOES NOT LIGHT—Read temperature is at or near room temp.	Defective Heater Assembly.	Contact PACE Customer Service.
READ TEMPERATURE DOES NOT REACH SET TEMPERATURE	Air flow obstructed.	1. Check Blower Supply Cutoff control (CRAFT 25/E only). 2. Check Blower Switch setting. 3. Check for kinked, or broken air flow tube in unit.
	Defective Airstream thermocouple.	Contact PACE Customer Service.

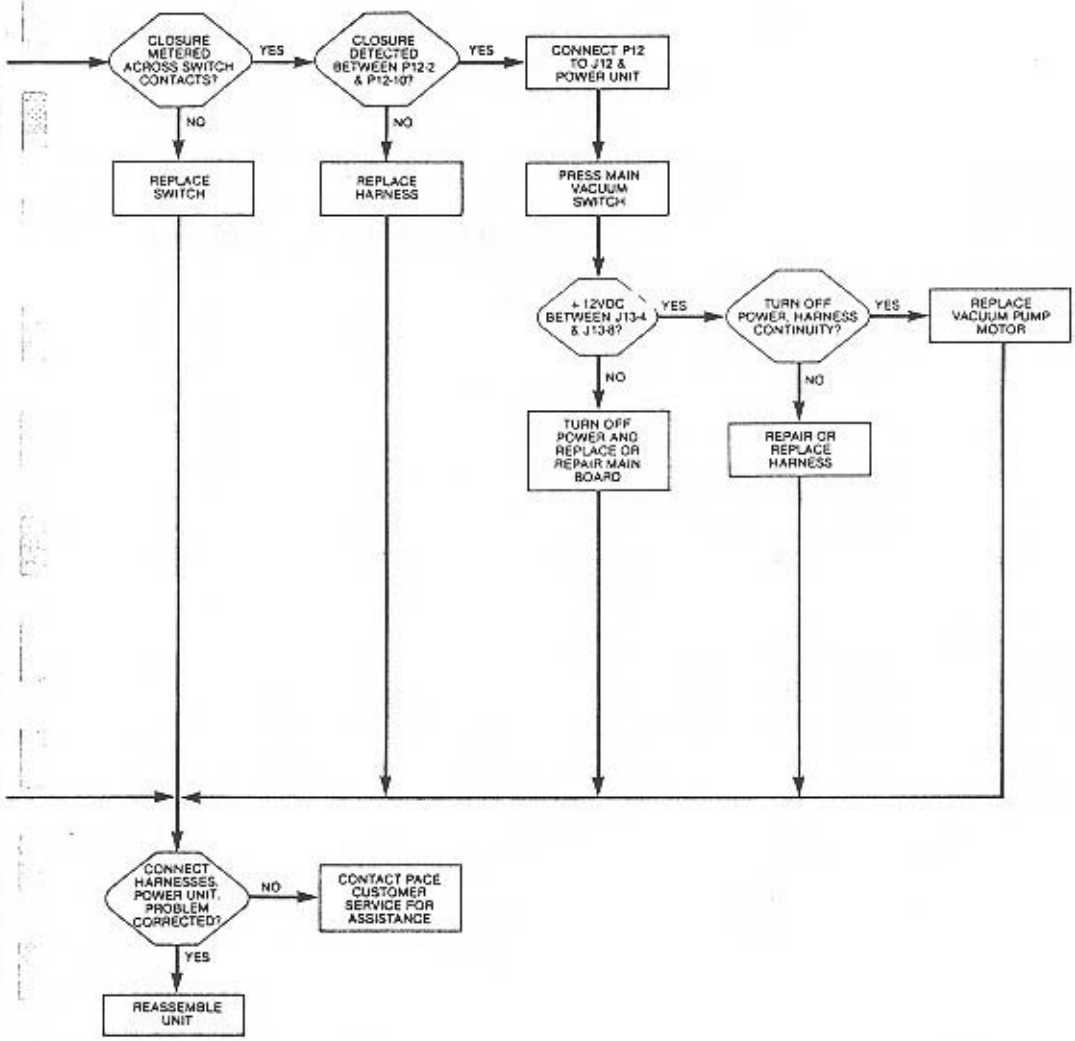

START
FRONT PANEL POWER SWITCH (BREAKER) TRIPPED?
YES
TURN OFF POWER & CHECK FOR SHORT OR LOW HEATER RESISTANCE
NO
FUSE BLOWN?
YES
REPLACE FUSE
PROBLEM CORRECTED?
YES
END
NO
NO
DISCONNECT LINE CORD AND REMOVE CHASSIS FROM CONSOLE POWER UNIT ON.
AC SUPPLY VOLTAGE ACROSS T1 PINS 1 AND 4?
NO
OPEN CIRCUIT POWER ENTRY TO T1
CHECK WIRING
YES
32-39 VAC ACROSS T1 PINS 7 & 9
NO
YES
10-13 VAC ACROSS T1 PINS 5 AND 6 WHEN BLOWER IS ON?
NO
YES
YES
10-13 VAC ACROSS T1 PINS 10 & 11?
NO
DISCONNECT UNIT FROM AC POWER THEN REPLACE DETECTIVE TRANSFORMER T1
REPLACE DISPLAY PCB
PROBLEM CORRECTED?
YES
REMOVE LINE CORD, RECONNECT ALL HARNESSES, REASSEMBLE UNIT THEN POWER
NO
CONTACT PACE CUSTOMER SERVICE FOR ASSISTANCE


PERFORM "NO POWER" TROUBLESHOOTING PROCEDURE (P. 18)
USING T/C METER, MEASURE TEMPERATURE NEAR AIRSTREAM T/C
METER TEMP CLOSE TO READ TEMP?
NO
DISCONNECT POWER, REMOVE CHASSIS AND DISCONNECT HEATER AND THERMOCOUPLES
YES
USING MIRROR TO CHECK, DOES HEATER GLOW DURING CYCLE?
YES
DOES HEATER RUN CONTINUOUSLY DURING IDLE?
YES
NO
NO
HARNESS CONTINUITY BETWEEN J12, J18 & TB2?
NO
REPAIR OR REPLACE HARNESS
YES
DISCONNECT LINE CORD, REMOVE CHASSIS THEN DISCONNECT P17-1. MEASURE HEATER RESISTANCE BETWEEN P17-1 AND AC RETURN.
HEATER RESISTANCE OK ~ 10 Ω (115V) OR 35 Ω (230V)?
NO
REPLACE HEATER ASSEMBLY
YES
REPAIR OR REPLACE MAIN BOARD
HEATER AND AIRSTREAM THERMOCOUPLES OK?
NO
REPLACE DEFECTIVE THERMOCOUPLE
YES
CHECK PC BOARD CALIBRATION (REFER TO CALIBRATION PROCEDURE)
RECALIBRATION NEEDED?
NO
REPAIR OR REPLACE DISPLAY BOARD
YES
RECALIBRATE BOARD


START
TEMPERATURE DISPLAY?
YES
NO
PERFORM "NO POWER" TROUBLESHOOTING PROCEDURE (P. 18)
READY LED LIGHTS?
YES
NO
CYCLE LED LIGHTS DURING CYCLE?
YES
NO
PROBLEM CORRECTED?
YES
NO
TURN OFF POWER AND REMOVE CHASSIS
TURN OFF POWER AND REMOVE CHASSIS
TURN OFF POWER AND DISASSEMBLE CHASSIS
HARNESS CONTINUITY BETWEEN J19 & J21?
NO
YES
HARNESS CONTINUITY BETWEEN J19 & J21?
NO
YES
REPAIR OR REPLACE HARNESS
HARNESS CONTINUITY BETWEEN J19 & J21?
NO
YES
RECONNECT HARNESS AND REAPPLY POWER
RECONNECT HARNESS AND REAPPLY POWER
RECONNECT HARNESS AND TURN ON POWER
DURING CYCLE +5VDC MEASURED AT J19-12 W.R.T. J19-9?
YES
NO
+5VDC MEASURED AT J19-11 W.R.T. J19-9?
YES
NO
WITH SW1 IN SET POSITION, U1-31 W.R.T. U1-21 IS 313 TO 583 mVDC?
YES
NO
TURN OFF POWER AND REPAIR OR REPLACE DISPLAY BOARD
TURN OFF POWER, DISCONNECT HEATER AND CONNECT J12-15 TO J12-16
TURN OFF POWER, DISCONNECT HEATER, P12 & P18. CONNECT J12-2 TO J18-1.
TURN OFF POWER AND REPAIR OR REPLACE MAIN BOARD
REAPPLY POWER
REAPPLY POWER
+5VDC MEASURED AT J19-12 W.R.T. TO J19-9 DURING CYCLE?
NO
YES
+5VDC MEASURED AT J19-11 W.R.T J19-9?
NO
YES
TURN OFF POWER AND REPAIR OR REPLACE MAIN BOARD
READY LED LIT?
NO
TURN OFF POWER AND REPAIR OR REPLACE DISPLAY BOARD


PERFORM "NO POWER" TROUBLESHOOTING PROCEDURE (P. 18)
REFER TO "HEAT OUTPUT" TROUBLESHOOTING PROCEDURE (P. 20)
DISCONNECT LINE CORD, REMOVE CHASSIS THEN DISCONNECT P12 FROM J12.
HARNESS CONTINUITY?
YES
CLOSURE METERED WHEN CYCLE SWITCH PRESSED?
YES
REPAIR OR REPLACE MAIN BOARD
NO
REPAIR OR REPLACE HARNESS
NO
REPLACE SWITCH
BLOWER MOTOR RUNS?
REFER TO CORRECTIVE MAINTENANCE SECTION (P. 18)
NO
DISCONNECT LINE CORD AND REMOVE CHASSIS. RECONNECT LINE CORD AND POWER UNIT.
+ 12VDC BETWEEN TERMINALS J16-2 & J16-1 WHEN CYCLING?
YES
HARNESS CONTINUITY?
YES
REPLACE BLOWER ASSEMBLY
NO
NO
CR11 ON MAIN BOARD SHORTED?
YES
REPLACE OR REPAIR MAIN BOARD
REPLACE OR REPAIR HARNESS
NO
PERFORM "NO POWER" TROUBLESHOOTING PROCEDURE (P. 18)
PROBLEM CORRECTED?
NO
CALL PACE SERVICE CENTER FOR ASSISTANCE
YES
REASSEMBLE UNIT


CLOSURE METERED ACROSS SWITCH CONTACTS?
YES
CLOSURE DETECTED BETWEEN P12-5 & P12-9?
YES
CONNECT P12 TO J12 & POWER UNIT
NO
REPLACE SWITCH
NO
REPLACE HARNESS
PRESS MAIN VACUUM SWITCH
+ 12VDC BETWEEN J13-4 & J13-8?
YES
TURN OFF POWER, HARNESS CONTINUITY?
YES
REPLACE VACUUM PUMP MOTOR
NO
TURN OFF POWER AND REPLACE OR REPAIR MAIN BOARD
NO
REPAIR OR REPLACE HARNESS
CONNECT HARNESSES, POWER UNIT. PROBLEM CORRECTED?
NO
CONTACT PACE CUSTOMER SERVICE FOR ASSISTANCE
YES
REASSEMBLE UNIT


CLOSURE METERED ACROSS SWITCH CONTACTS?
YES
NO
REPLACE SWITCH
CLOSURE DETECTED BETWEEN P12-2 & P12-10?
YES
NO
REPLACE HARNESS
CONNECT P12 TO J12 & POWER UNIT
PRESS MAIN VACUUM SWITCH
+12VDC BETWEEN J13-4 & J13-8?
YES
NO
TURN OFF POWER AND REPLACE OR REPAIR MAIN BOARD
TURN OFF POWER, HARNESS CONTINUITY?
YES
NO
REPAIR OR REPLACE HARNESS
REPLACE VACUUM PUMP MOTOR
CONNECT HARNESSES, POWER UNIT. PROBLEM CORRECTED?
NO
CONTACT PACE CUSTOMER SERVICE FOR ASSISTANCE
YES
REASSEMBLE UNIT

INTRODUCTION

The following section of this manual will enable the technician to properly reassemble, disassemble, replace failed parts and make necessary adjustments to the system during the process of correcting a malfunction. The instructions given are applicable to both the CRAFT 15, 15E, 25 and 25E systems except where noted. Select the system area requiring attention and using the applicable illustration(s) as a guide, follow the procedure step by step, in sequence, to insure proper system operation.

IMPORTANT: Several design changes have been incorporated into these systems since introduction. If the assembly or feature on your particular system is different than the one shown contact PACE Customer Service for assistance. The PACE telephone number is (301) 490-9860 and the FAX number is (301) 604-9215.

CHASSIS

6. Disconnect the two Light Receptacle Plugs. See Figure 17, page 32.
7. Remove the Chassis from the CRAFT Housing by lifting the bottom rear of the Chassis up and out of the system. Pull the Chassis out just far enough to allow it to rest on the work bench surface. NOTE: Insure that the top front of the chassis slides under the mounting lips of the Housing.

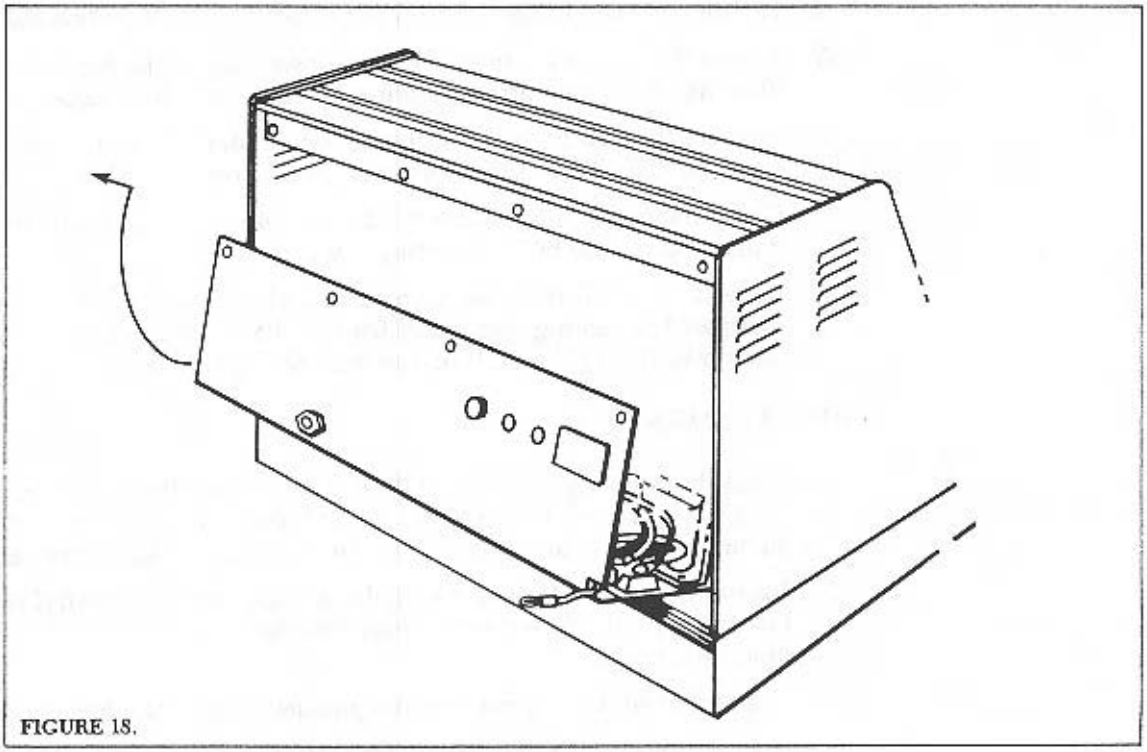


FIGURE 18.

The system control circuits are now accessible for troubleshooting. Power can be applied to the system to operate all controls with the exception of Heater air flow.

REPLACEMENT

Reinstall the Chassis into the CRAFT Housing in reverse order of the instruction listed under "Disassembly". Insure that the top front of the Chassis slides under and in front of mounting lips.

MAIN PC BOARD (Cont'd)

REPLACEMENT

8. Insure that none of the wiring or hosing touches any of the metal heat sinks protruding from the PCB Assembly. NOTE: This step is essential. Heat generated by these heat sinks can melt wire insulation and plastic hosing.
9. Reinstall the 4 Front Panel mounting screws removed in "Removal" step 1.
10. Recheck wire and hose routing.

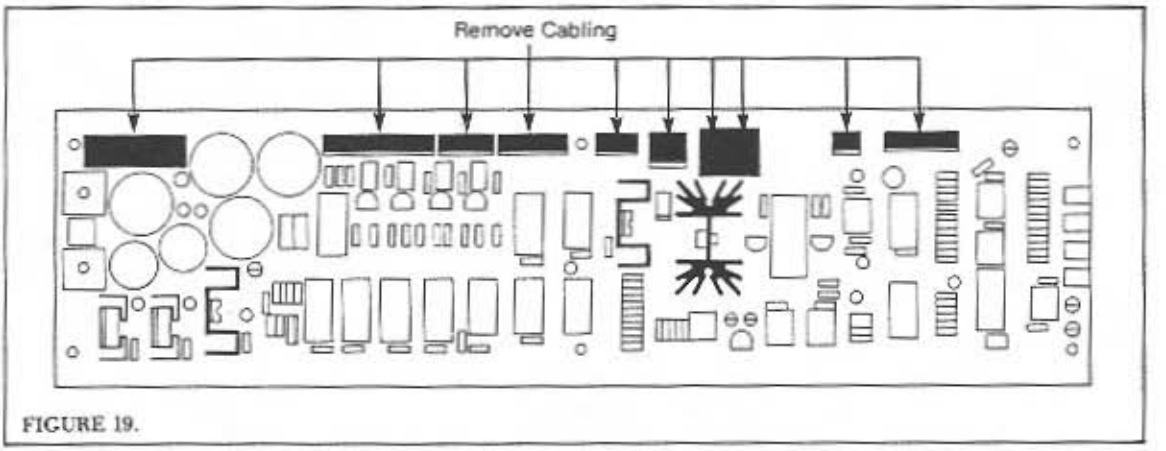


FIGURE 19.

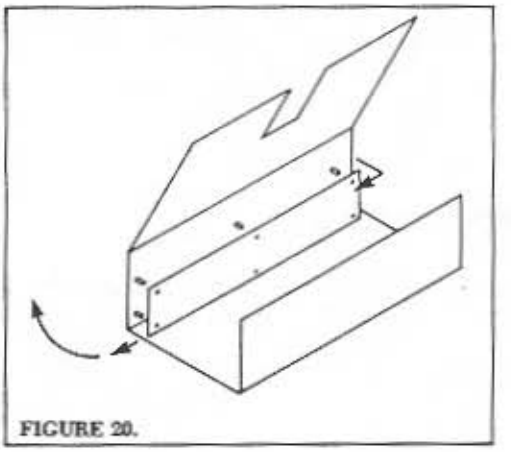


FIGURE 20.

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CHASSIS LAYOUT

CRAFT 15 & 15E

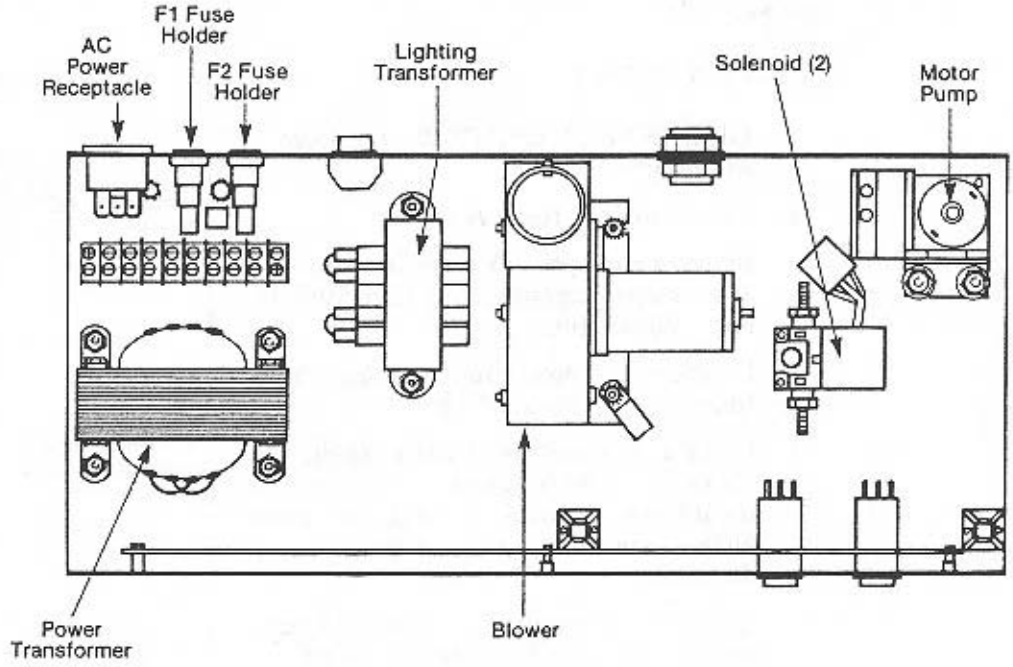


FIGURE 24.

REFLOW HEAD ASSEMBLY (Cont'd)

6. Carefully lift Vacuum Pick up and out through the top of the Reflow Head Assembly.

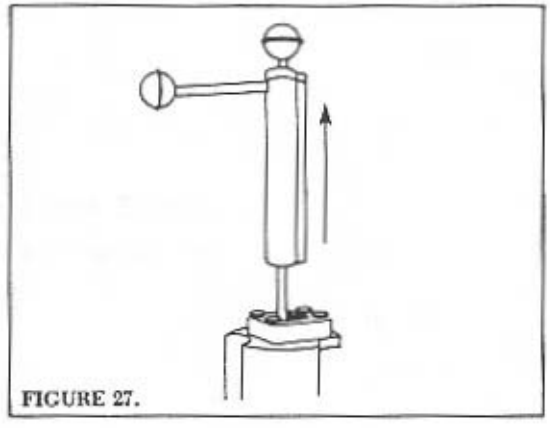


FIGURE 27.

7. Remove the two Optics Ring mounting screws and the two Block Mounting Screws.

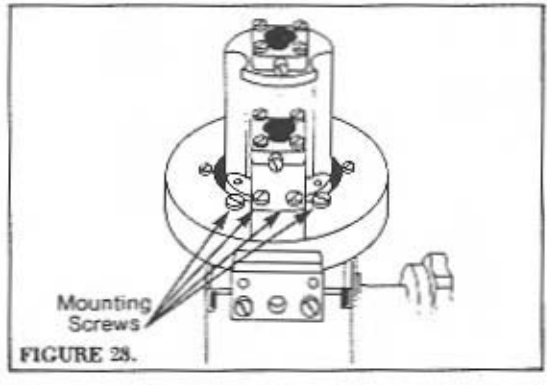


FIGURE 28.

8. Lift Optics Ring and Block from Reflow Head Assembly.
9. Set Optics Ring and Block aside.

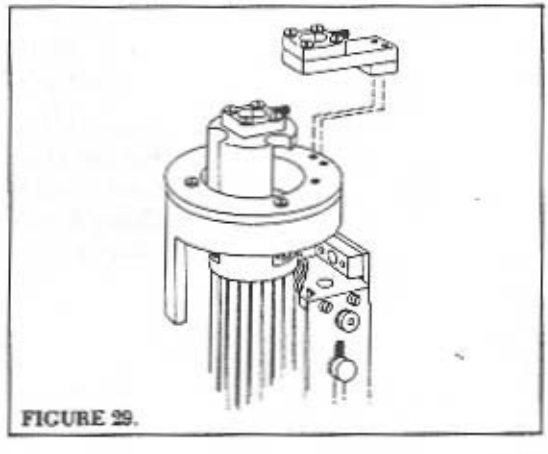


FIGURE 29.

HEATER/VACUUM PICKUP

REMOVAL (Cont'd)

HEATER ASSEMBLY

13. Remove the 4 Reflow Head mounting screws. While holding the Assembly in place with one hand, gently pull the top of the Reflow Head forward to expose the green ground wire attached to a metal stud on the rear of the Reflow Head Assembly. Remove the Green ground wire by inserting the proper size nut driver through the opening exposed by removal of the Cover Plate in step 12.

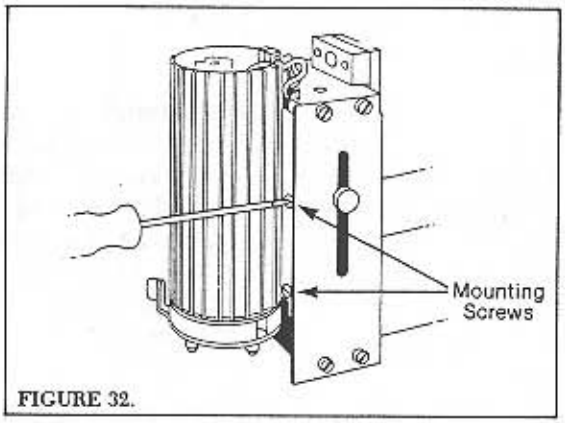


FIGURE 32.

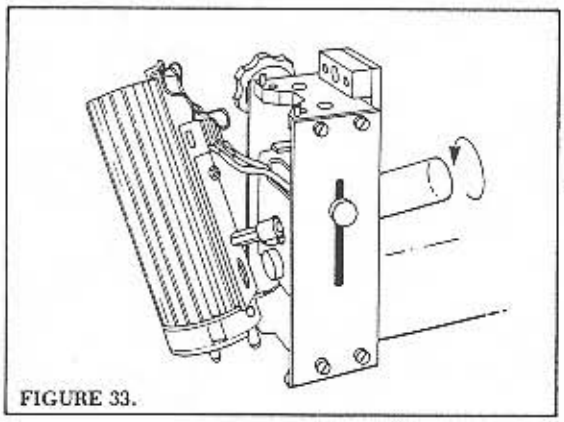


FIGURE 33.

14. Locate the terminal strip mounted at the rear of the Reflow Head Assembly. Disconnect the wires attached to the top of terminals 1, 2, 3 & 4 of the terminal strip.

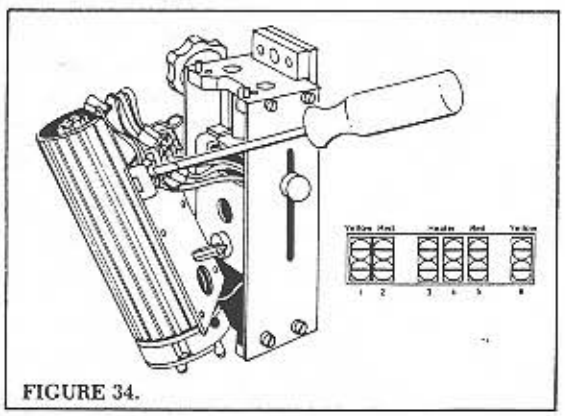


FIGURE 34.

HEATER/VACUUM PICKUP (Cont'd)

REPLACEMENT (Cont'd)

HEATER ASSEMBLY

17. Connect the 4 Heater Core Assembly wires to the top screws on the terminal strip in the manner shown. Insure that each wire is attached to the proper terminal and that each attachment screw is tightened securely against the stripped metal portion of the wire and not the insulation. Press wiring against metal housing to prevent interference with Z travel assembly.

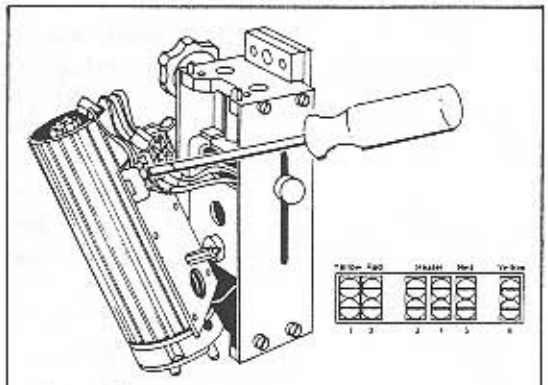


FIGURE 37.

18. Reattach the Green ground wire removed in step 13.
19. Check the hole in the lower rear portion of the Reflow Head assembly. There is a rubber O ring placed in position around the opening perimeter. Insure that this O ring is centered around the opening. Place the Reflow Head in position and mount to the Reflow Station using the 4 screws removed in step 14. Insure that the metal air supply tube slips properly into the rubber O ring. Tighten screws to secure in place.

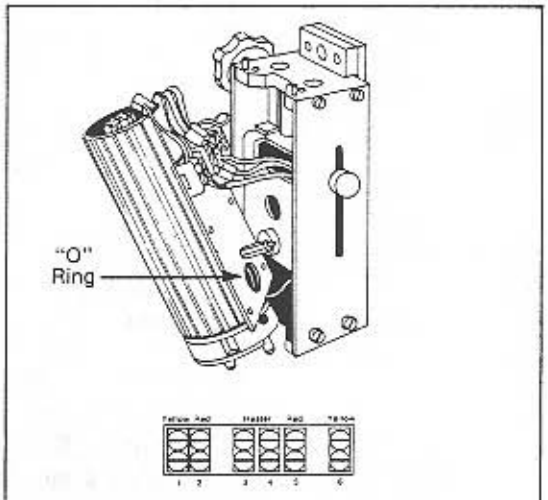


FIGURE 38.

REFLOW HEAD ASSEMBLY (Cont'd)

REPLACEMENT

VACUUM PICKUP:

22. To install, carefully slide the end of the Vacuum Pick down through the top of the Reflow Head Assembly and through the hole at the bottom of the assembly. Insure that the locking lever is facing forward. If the end of the Vacuum Pick is difficult to insert, rotate the Pick back and forth while maintaining a slight downward pressure until the Pick slides into place. Contact PACE Customer Service for assistance if unable to insert Vacuum Pick.
23. Tighten the three Top Cap mounting screws to secure Cap in place.

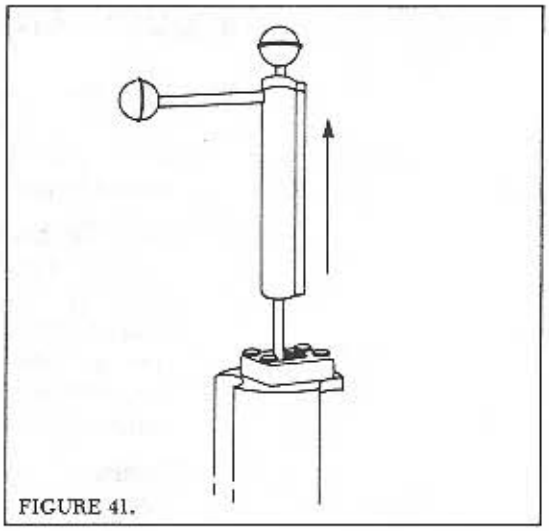


FIGURE 41.

ADJUSTMENT

24. Using a .125 inch hex head wrench, tighten the front Vacuum Pick adjustment screw. Turn the wrench 2 complete rotations in a clockwise direction.
25. Check the Vacuum Pick for freedom of "Z" (up and down) movement with the Locking Lever in the unlocked position. Turn the Vacuum Pick adjustment screw slowly in a clockwise direction until restriction is felt in movement of the Reflow Head Assembly.

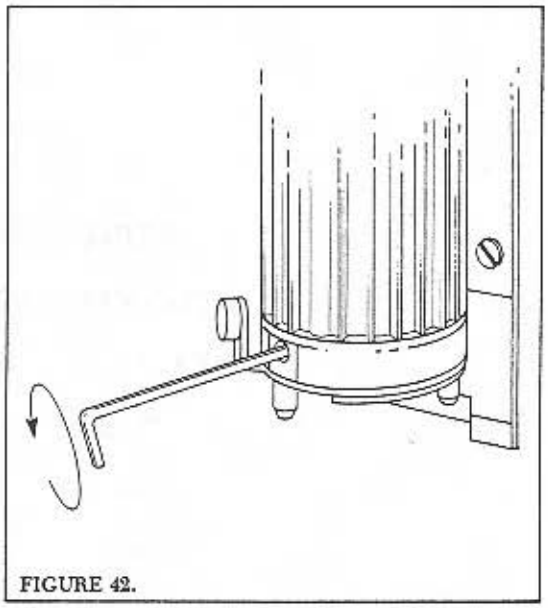


FIGURE 42.

AIR FLOW SENSOR

The following instructions will allow the technician to remove and replace the Air Flow Sensor. Using the illustrations as a guide, perform the procedure step by step, in sequence, to insure proper operation.

REMOVAL

1. DISCONNECT CRAFT unit from AC supply.
2. Locate Reflow Head Assembly.
3. Remove any optics (Video Camera, Microscope, Lighting etc.) from Reflow Head Optics Ring.
4. Disconnect silicone rubber vacuum hose from top of Vacuum Pick.
5. Remove the two Optics Ring mounting screws.

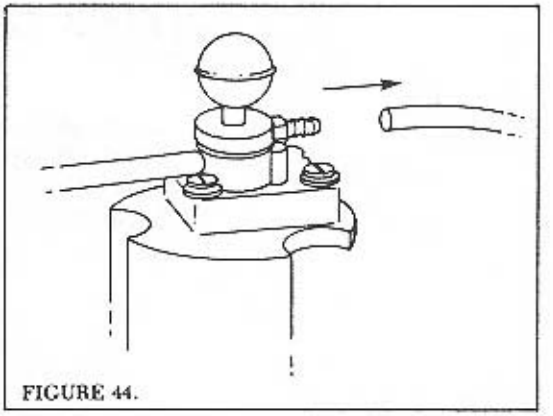


FIGURE 44.

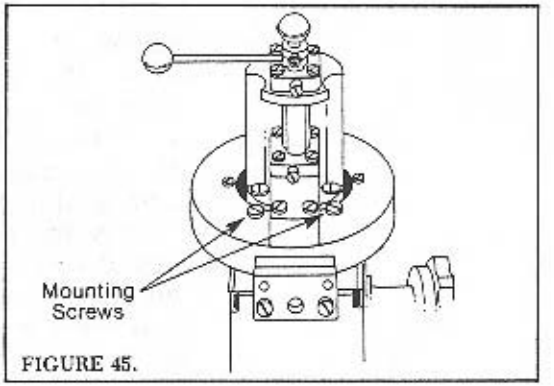


FIGURE 45.

6. Lift the Optics Ring off its 2 mounting pins.

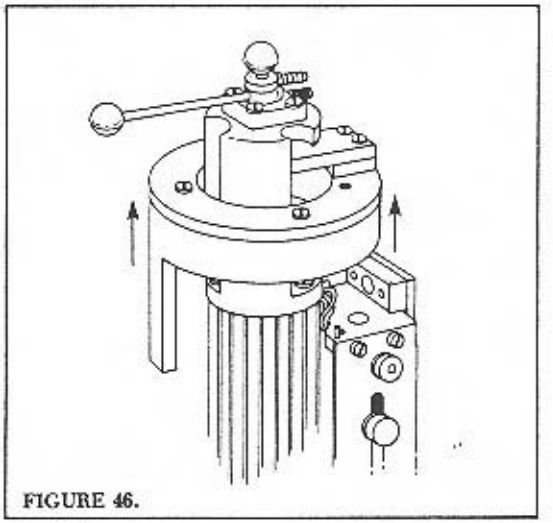


FIGURE 46.

AIR FLOW SENSOR (Cont'd)

9. Locate the terminal strip mounted at the rear of the Reflow Head Assembly. Disconnect the wires attached to the top of terminals 5 & 6 of the terminal strip.

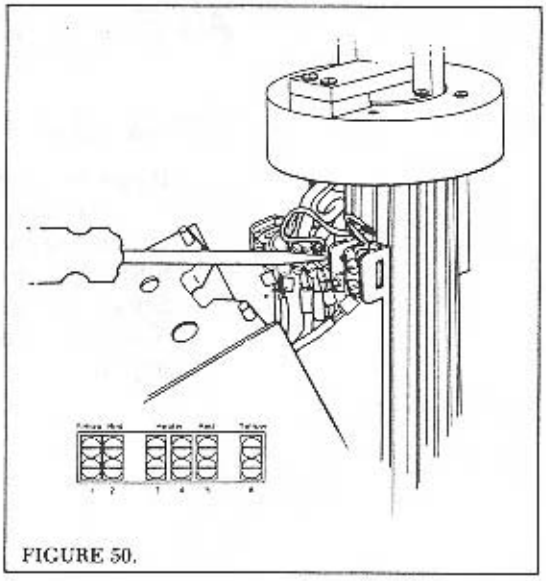


FIGURE 50.

10. Remove the Air Flow Sensor mounting screw and ground strap (if present). Gently pull Sensor from Heater Housing. Remove Insulating Sleeve from Sensor Assembly.

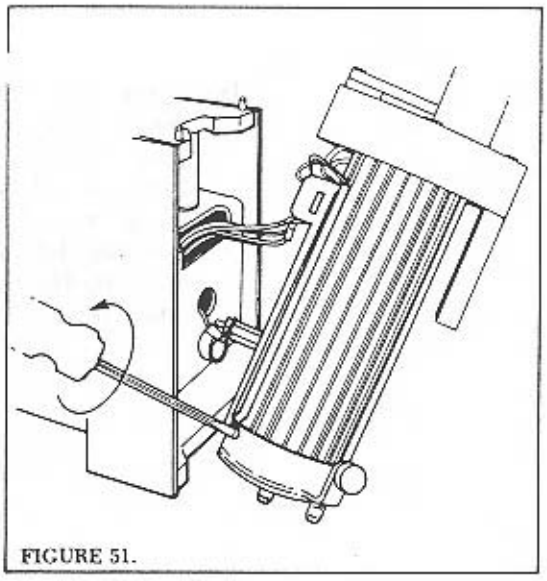


FIGURE 51.

AIR FLOW SENSOR (Cont'd)

13. Slide the Insulating Sleeve over the ends of the Sensor wires to a point 1/4 inch from the Sensor mounting screw.
14. Gently tuck the Insulating Sleeve in position between the Heater Housing and Mounting Plate.

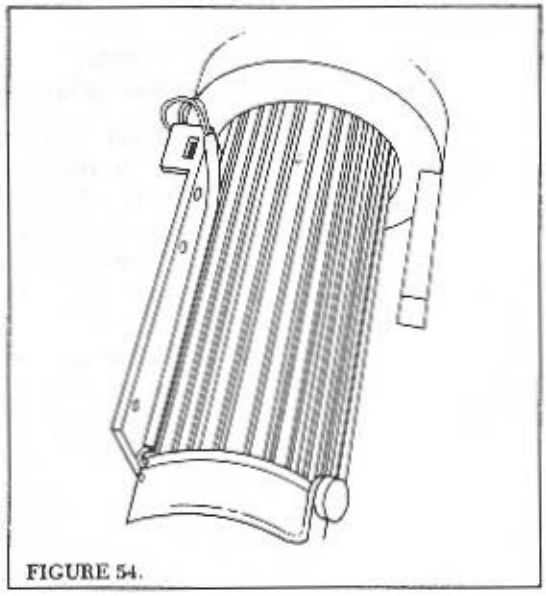


FIGURE 54.

15. Connect the Z Sensor Assembly wires to the top screws on the terminal strip in the manner shown. Insure that each wire is attached to the proper terminal and that each attachment screw is tightened securely against the stripped metal portion of the wire and not the insulation. Press wires against Heater Housing to prevent interference with Z travel assembly.

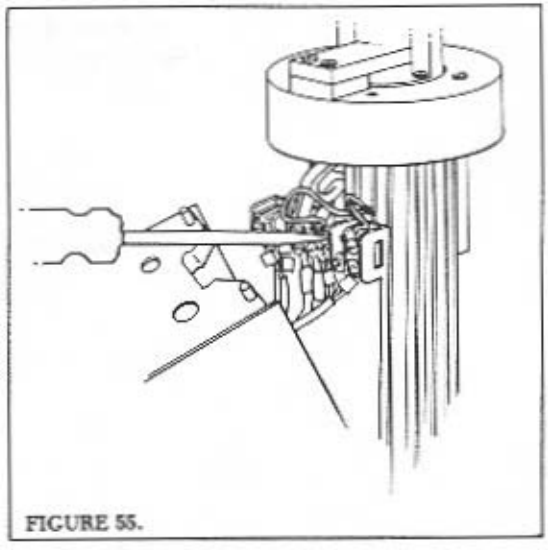


FIGURE 55.

AIR FLOW SENSOR

REPLACEMENT

20. Check alignment of Reflow Head Assembly using PACE Alignment Tool Kit. If this kit is not available, use the largest available nozzle and a flat metal plate or PCB. The bottom edge of the Reflow Alignment Tool (or nozzle) must be parallel to the surface of the installed Work Holder Plate (or PCB). If adjustment is required, loosen the four Reflow Head mounting screws and align Reflow Head Assembly. Tighten the four screws and recheck alignment.

21. Check the unit for proper operation. Install a mid size nozzle (approx. .5" × .5" (1.3 cm × 1.3 cm). Set Temperature to 750°F (400°C), Blower Speed to 4 and Time to 25 seconds. Cycle the heater. The "Read" temperature must reach the "Set" temperature during the 25 second cycle period. Once the air temperature reaches the "Set" temperature, the air temperature will exceed the "Set" point before settling back to the "Set" temperature.

22. Reinstall all optics removed in step 3.

INTRODUCTION

The Z Travel Assembly is the mechanism which moves the Reflow Head Assembly in the Z (up and down) direction of travel. If this assembly does not function properly, perform the following procedure step by step, in sequence, to insure proper results. Use the illustrations as a guide.

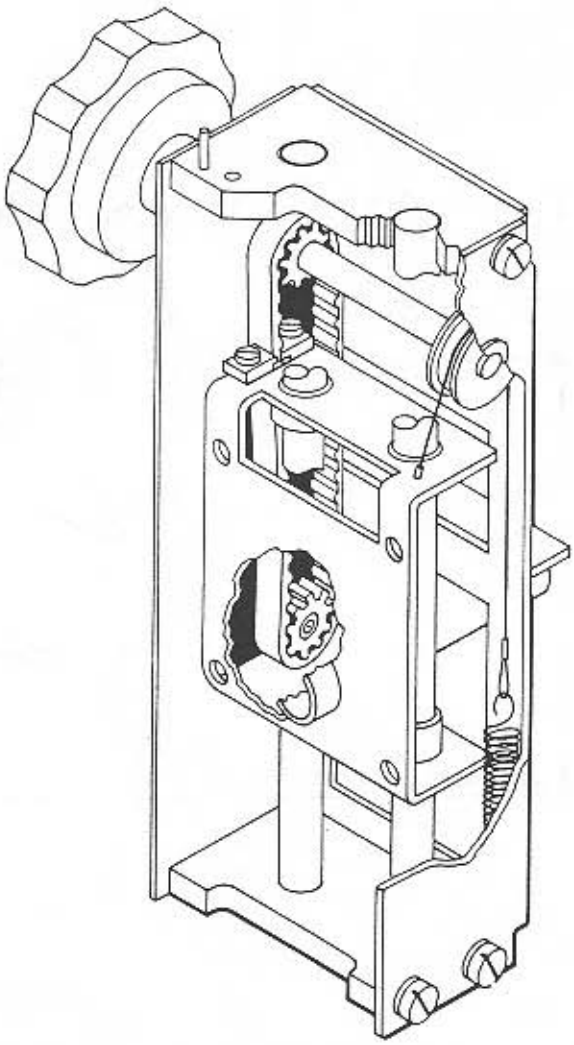


FIGURE 61.

VIDEO MOUNT

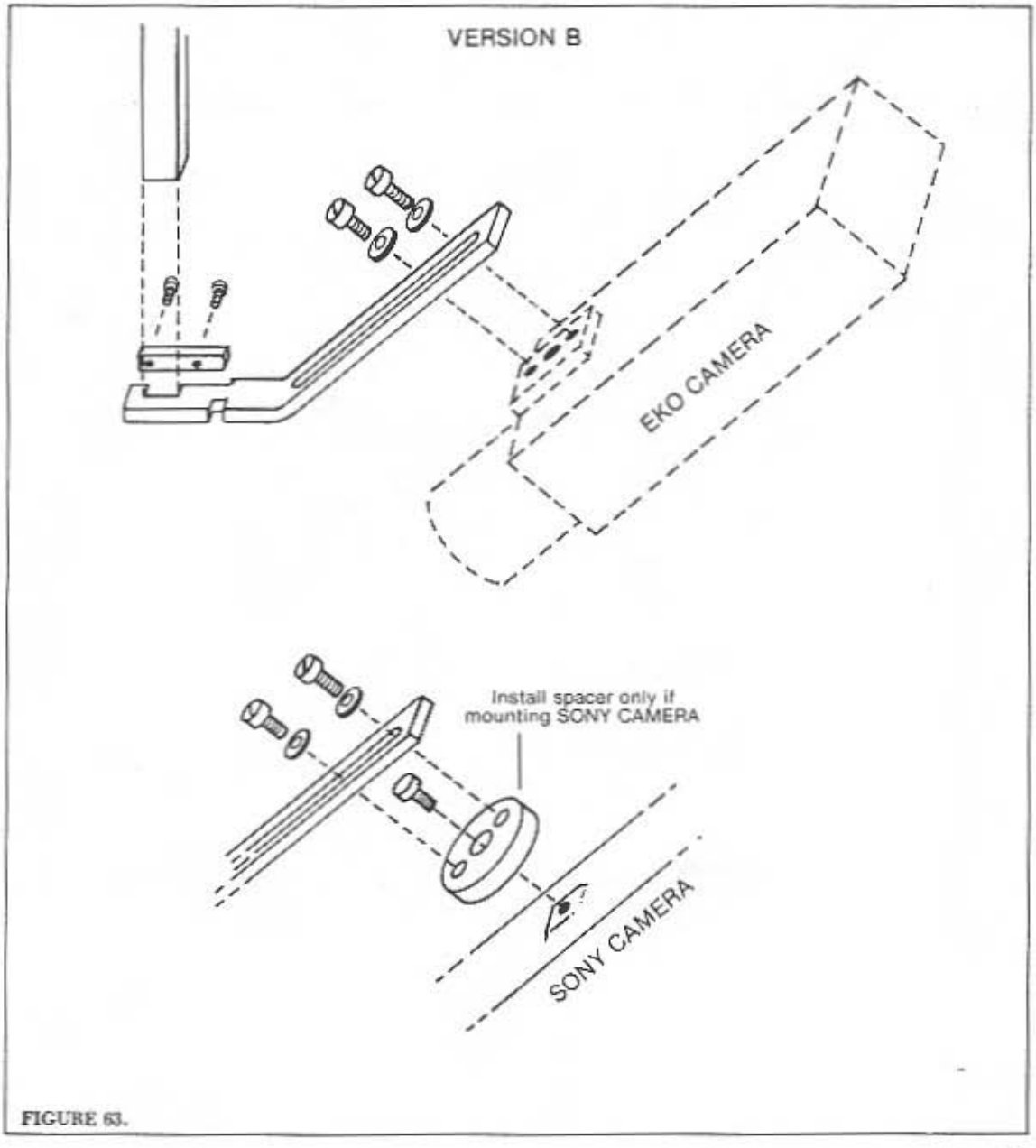


FIGURE 63.

VACUUM PICK

Realignment of the system is required after replacing or adjusting parts on this assembly. Refer to "Alignment Tool Instruction," page 94.

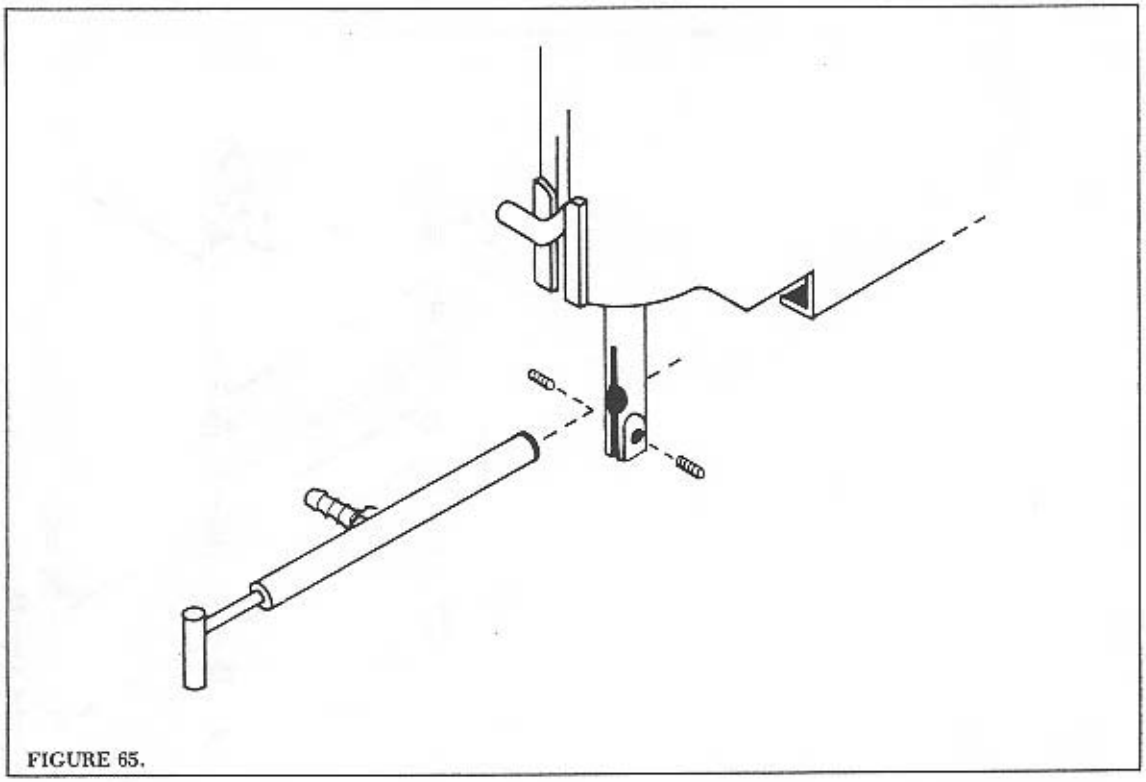


FIGURE 65.

VIDEO MOUNT

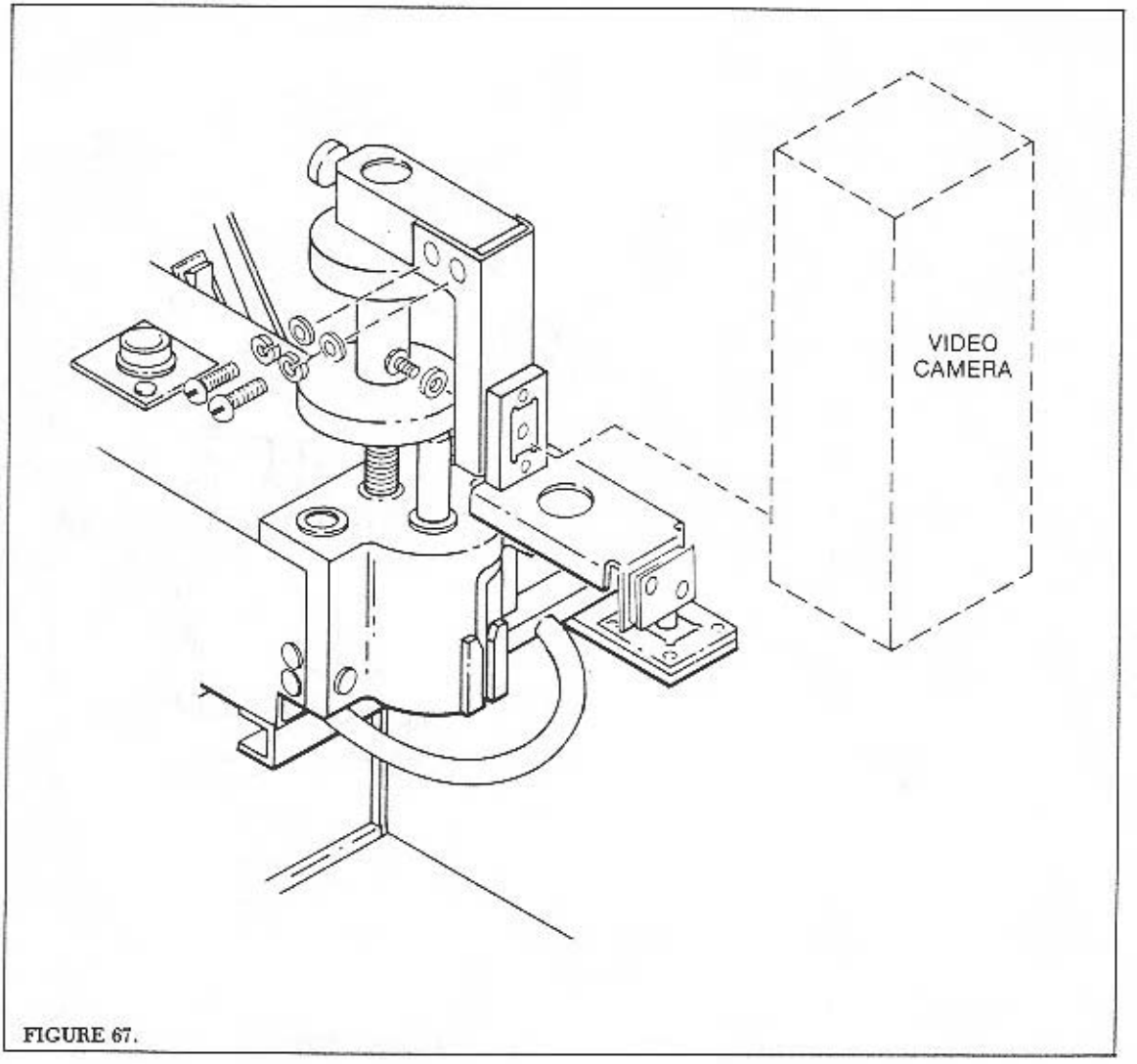


FIGURE 67.

WORK PLATFORM

This section of the service manual is applicable to the Work Platform on most CRAFT 15, 15E, CRAFT 25 and 25E systems. Early production systems however, incorporated a completely different design. If the Work Platform on your system does not closely match the drawing on page 8, figure 3, contact PACE Customer Service directly at (301) 490-9860 for assistance.

The following procedures will allow the technician to make any necessary adjustments for proper operation of the Work Platform. These procedures are broken down into the following segments.

1. TROUBLESHOOTING FLOW CHART—Easy to follow chart which allows the technician to determine the extent of disassembly and the procedural starting point required for correction of the malfunction.
2. DISASSEMBLY INSTRUCTIONS—Enables the technician to properly dismantle the Work Platform.
3. ADJUSTMENT PROCEDURE—Divided into 5 segments (adjustment levels) that enable the technician to perform only those adjustments required for correction of the malfunction.

IMPORTANT: IN ORDER TO ACHIEVE THE MOST EXPEDIENT REPAIR, THE TECHNICIAN MUST FOLLOW THE PROCESS LISTED BELOW STEP BY STEP, IN SEQUENCE. FAILURE TO DO SO WILL MAKE THE REPAIR MUCH MORE DIFFICULT.

1. Use the flow chart on page 66, figure 69 to determine extent of disassembly and the starting point (Adjustment/Assembly level) required for correction of the malfunction.
2. Perform the required "Disassembly" steps as identified in the Flow Chart.
3. Perform the "Adjustment/Assembly" procedure starting at the "Level" identified in the Flow Chart.

DISASSEMBLY

Perform the following steps in sequence. IMPORTANT: PERFORM ONLY THE STEPS IDENTIFIED IN THE FLOW CHART . Refer to page 68, figure 70.

1. Remove the 4 slide block mounting screws. Lift Upper Slide Assembly off work platform.
2. Remove the 4 fine X upper guides, adjustment nuts and washers.
3. Remove Plate Nut.
4. Slide Intermediate Plate past end of Plate Nut Stud and lift off Work Platform.
5. Remove the 4 Lower Fine X Guides.
6. Remove 4 upper theta guides, adjustment nuts and washers.
7. Remove 4 Work Platform mounting screws. Refer to page 77, figure 74.
8. Lift remaining Control Assembly and Base Plate portion of Work Platform off system.
9. Position Control Assembly and Base Plate with the Base Plate up. Remove the Center Pivot mounting screw plus the Theta Pivot nut and washer.
10. Separate Base Plate from Control Assembly.

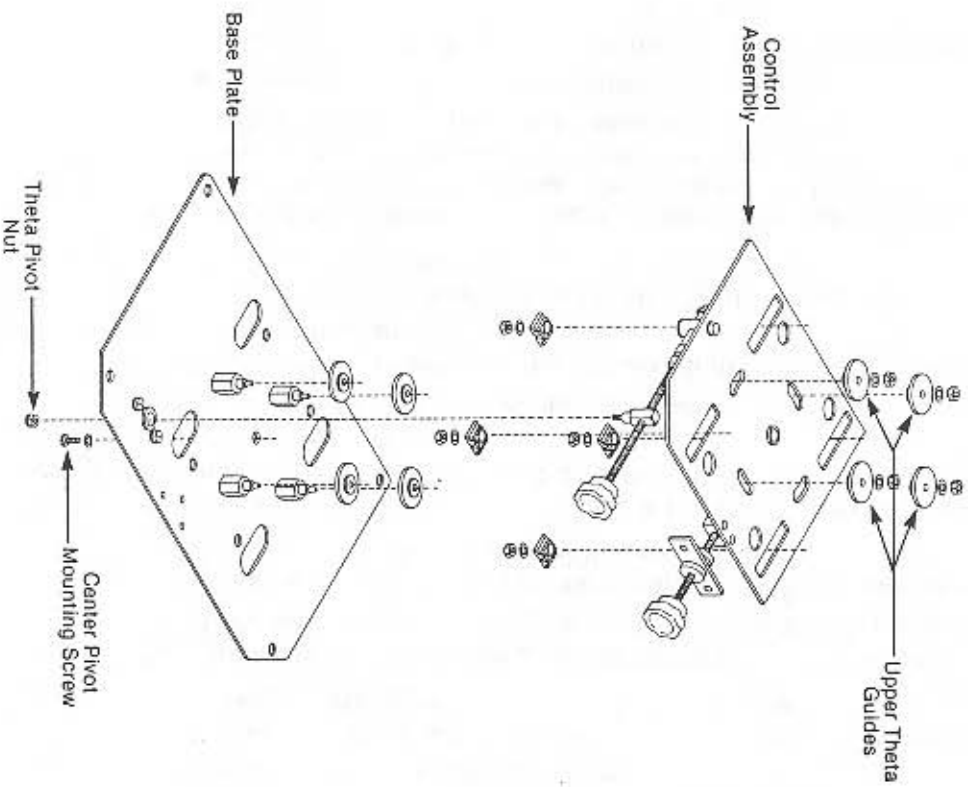

Base Plate
Control Assembly
Theta Pivot Nut
Center Pivot Mounting Screw
Upper Theta Guides

FIGURE 70.

ADJUSTMENT/ASSEMBLY (Cont'd)

LEVEL *B* (Cont'd)

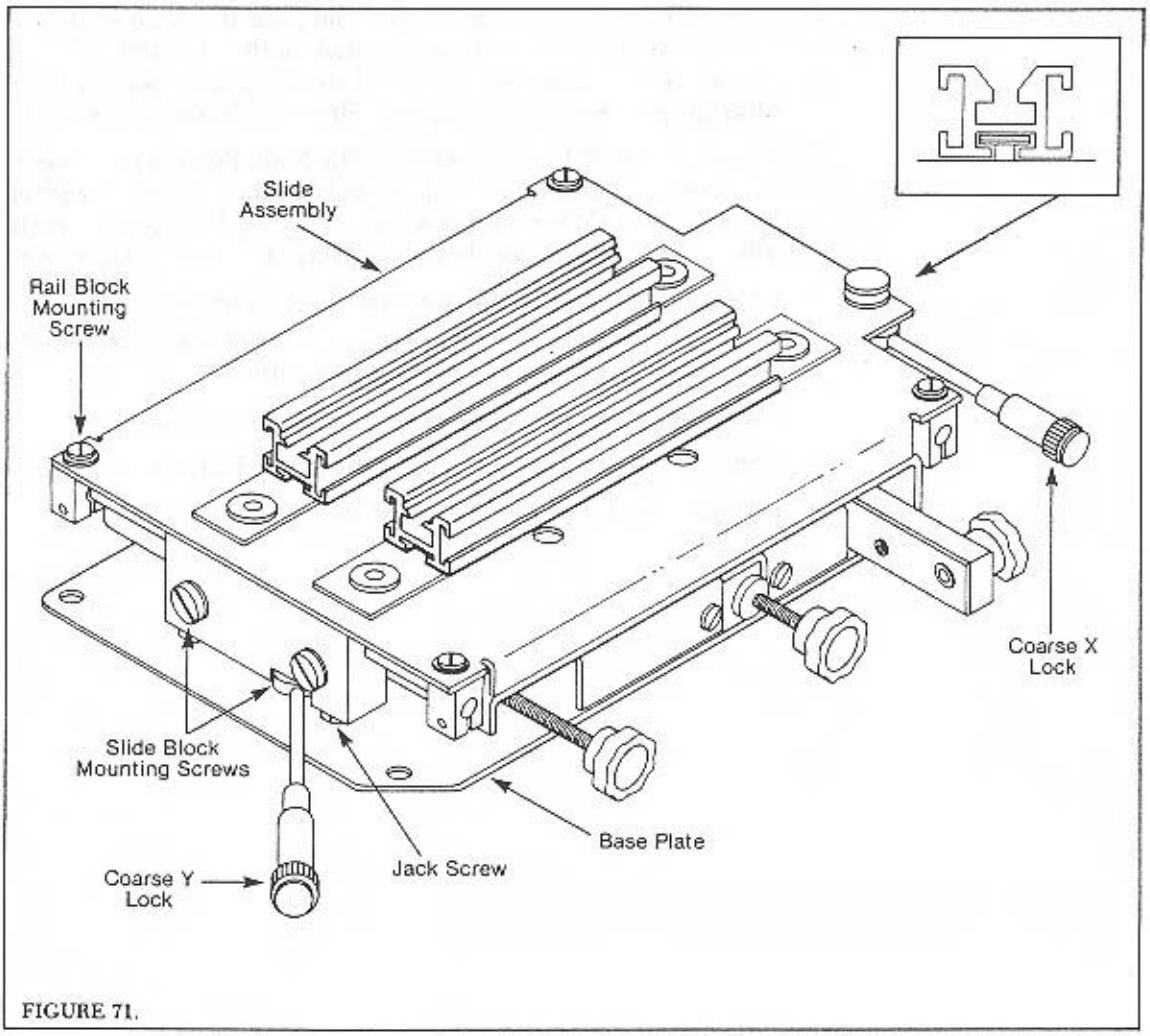


FIGURE 71.

ADJUSTMENT/ASSEMBLY (Cont'd)

LEVEL 1

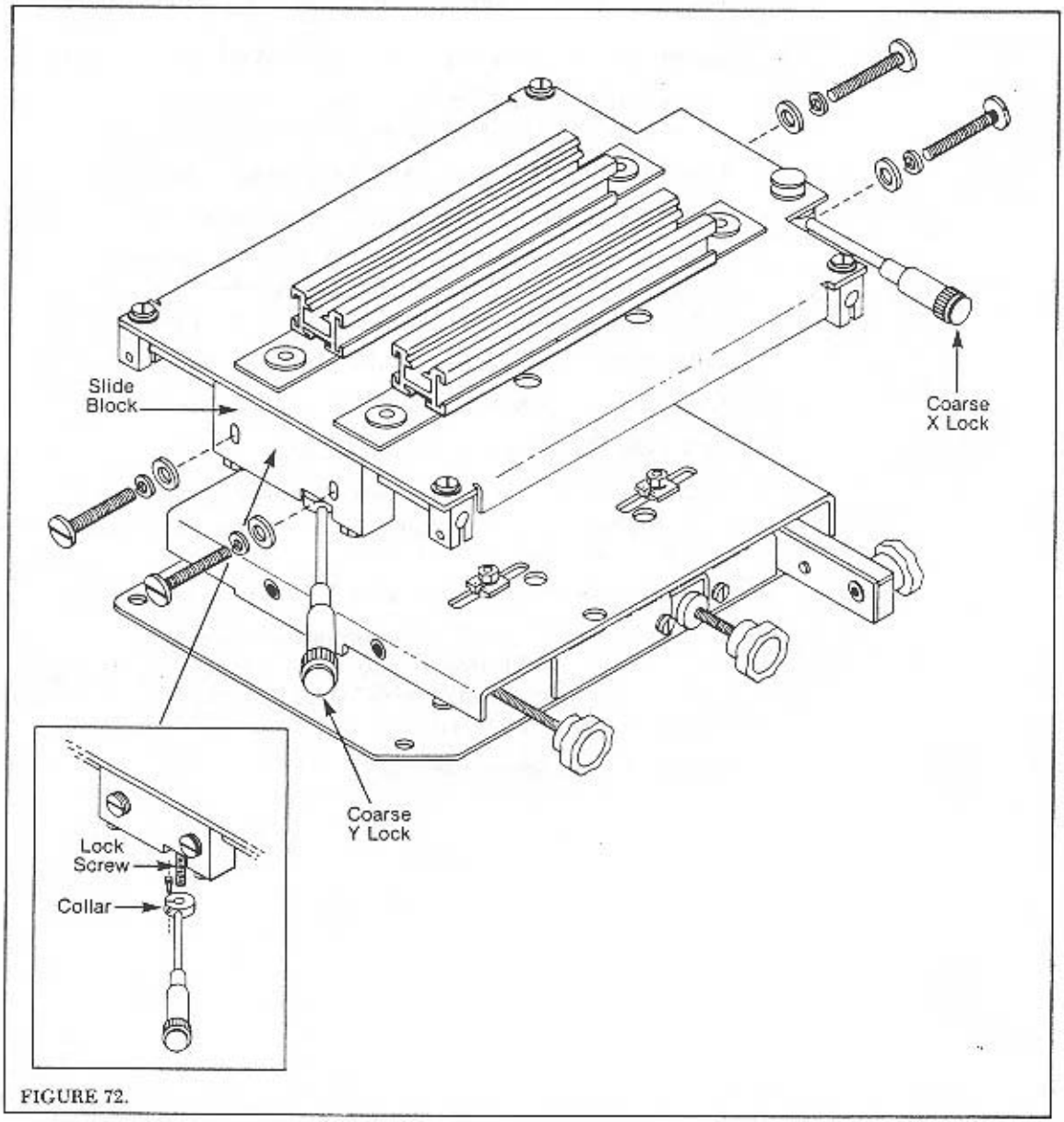


FIGURE 72.

ADJUSTMENT/ASSEMBLY (Cont'd)

LEVEL 2

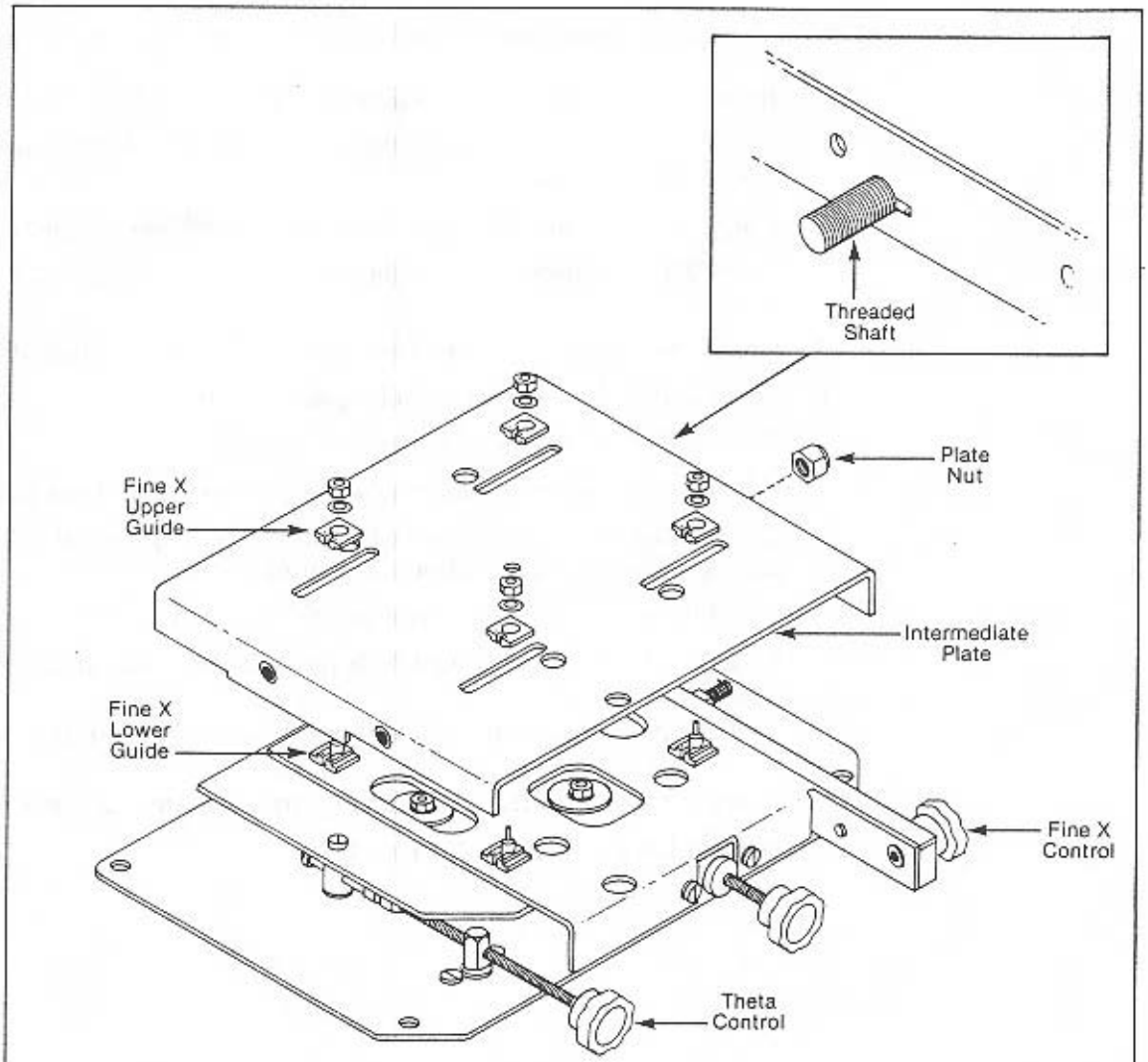


FIGURE 73.

LEVEL 3

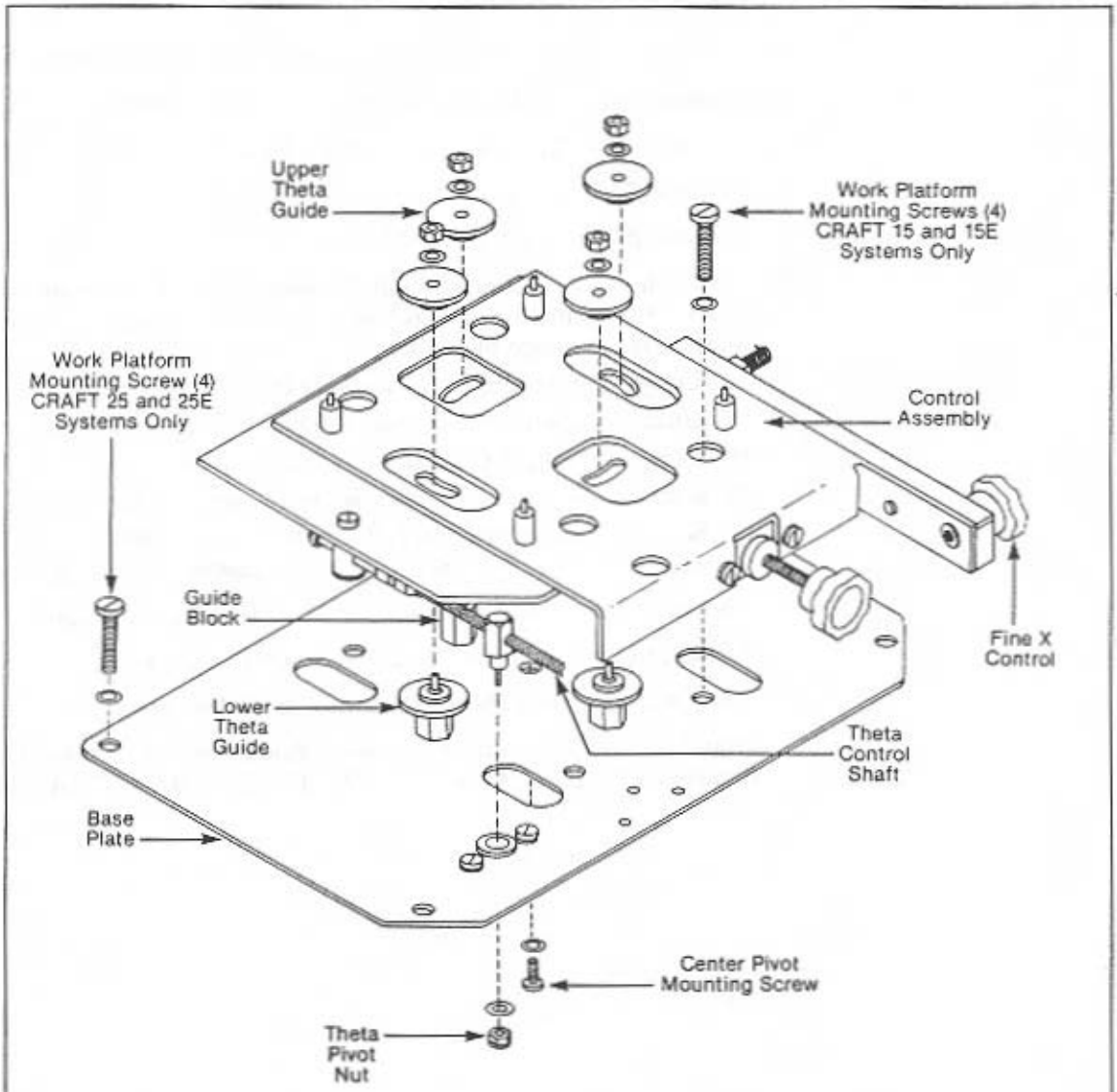


FIGURE 74.

ADJUSTMENT/ASSEMBLY (Cont'd)

LEVEL 4

10. Pull the Y Control and attached Control Plate to the forward limit.
11. If the Y Control Shaft was removed in step 5, position Collars and Washers against Control Mounting Bracket and tighten Collar set screws. The Y Control Shaft should turn easily with a minimum of play. If not, readjust the Collars.
12. Tighten the 2 Y Control Mounting Bracket Screws.
13. Install the 4 Fine Y Lower Guides exactly as shown on page 80, figure 75.
14. Install the 4 Fine Y Adjustment Nuts and washers. Tighten each nut individually in the following manner.
    a) Tighten Adjustment Nut until restriction is observed when operating Fine Y Control.
    b) Loosen Nut slowly until Fine Y Control operation becomes smooth.
15. Perform Level 3 procedure, page 76.

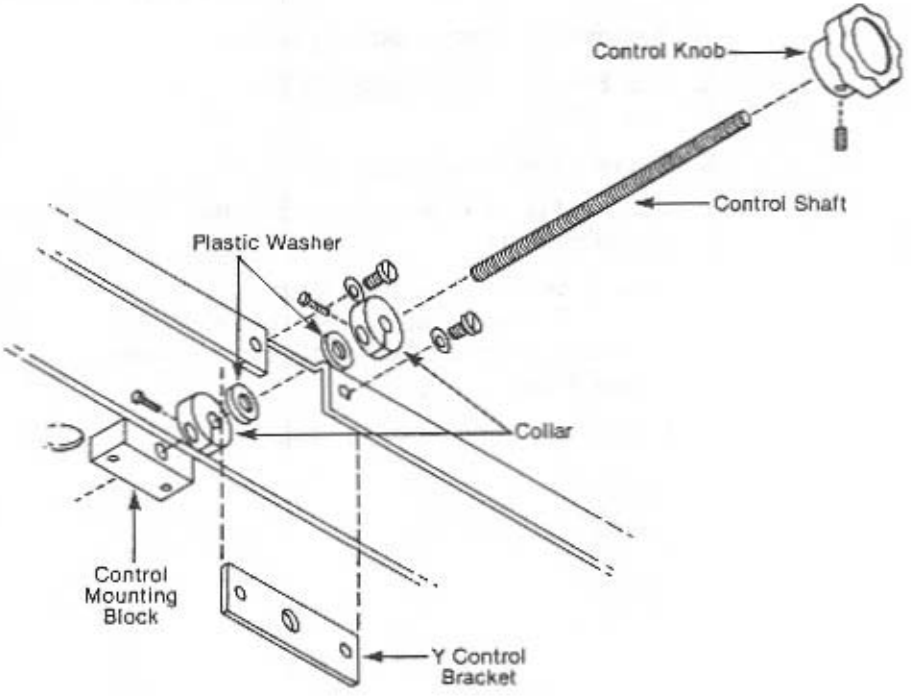

Control Knob
Control Shaft
Plastic Washer
Collar
Control
Mounting
Block
Y Control
Bracket

FIGURE 76.

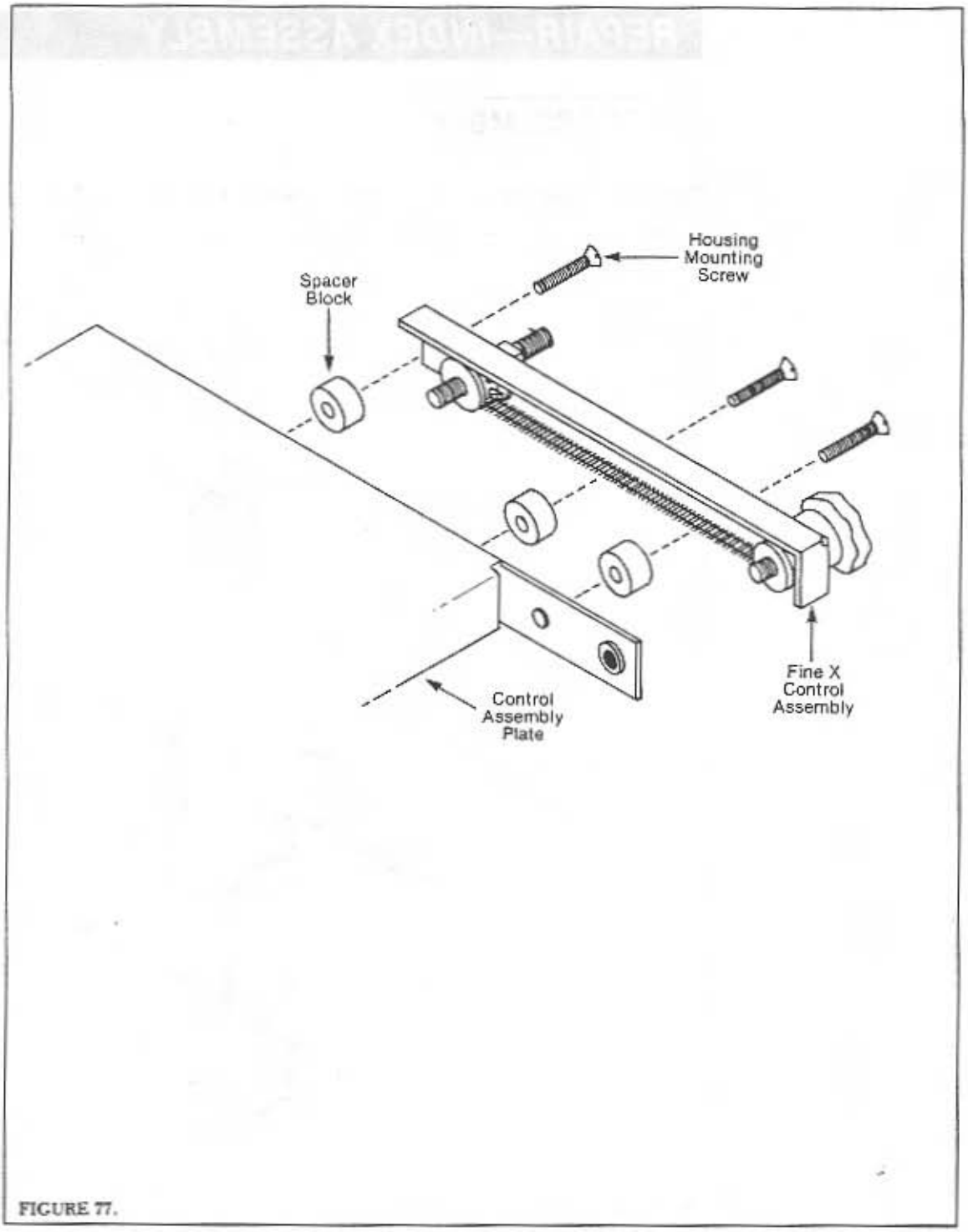

Housing
Mounting
Screw
Spacer
Block
Fine X
Control
Assembly
Control
Assembly
Plate

FIGURE 77.

WIRING DIAGRAM

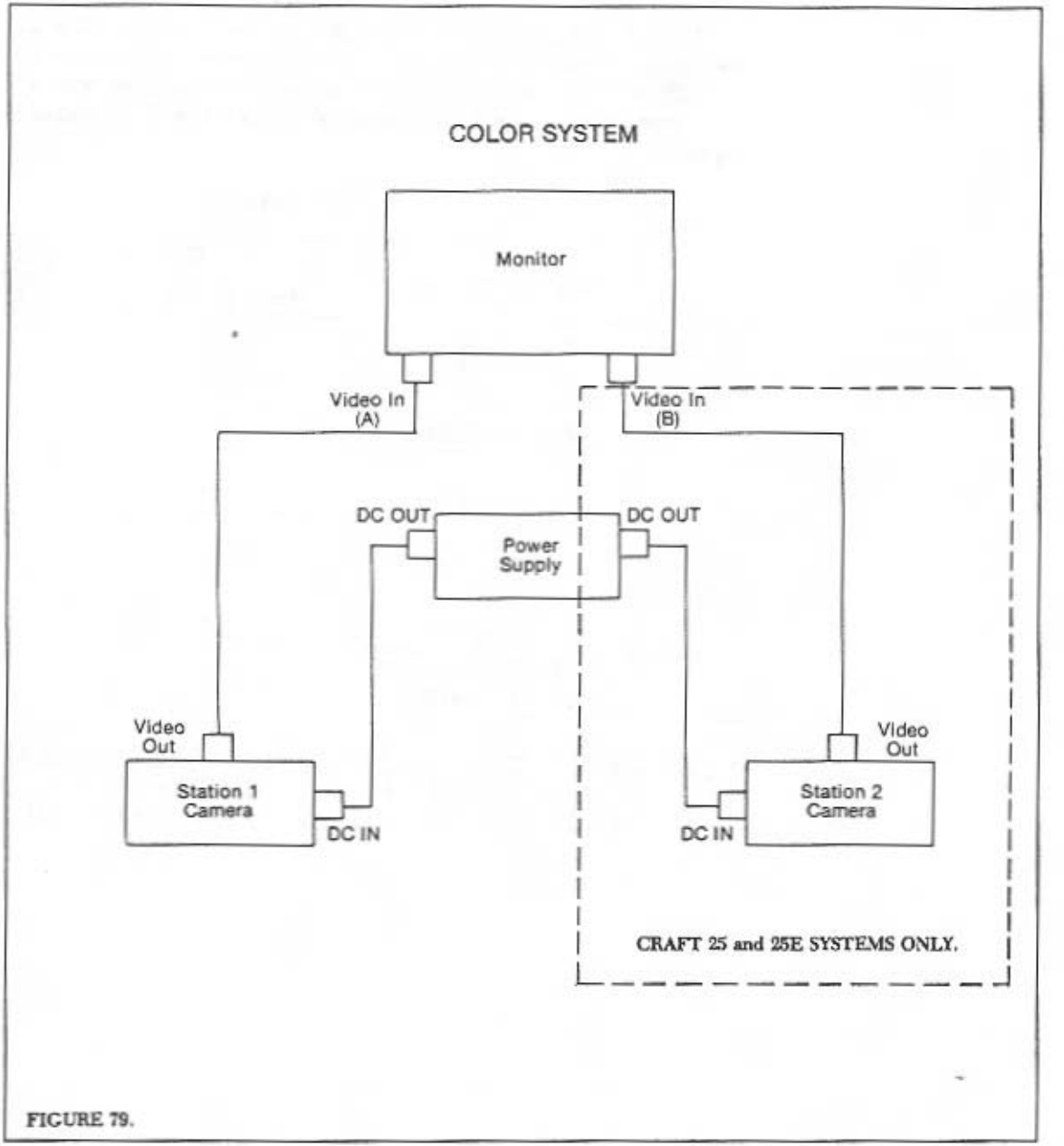


FIGURE 79.

LIGHTING ASSEMBLY

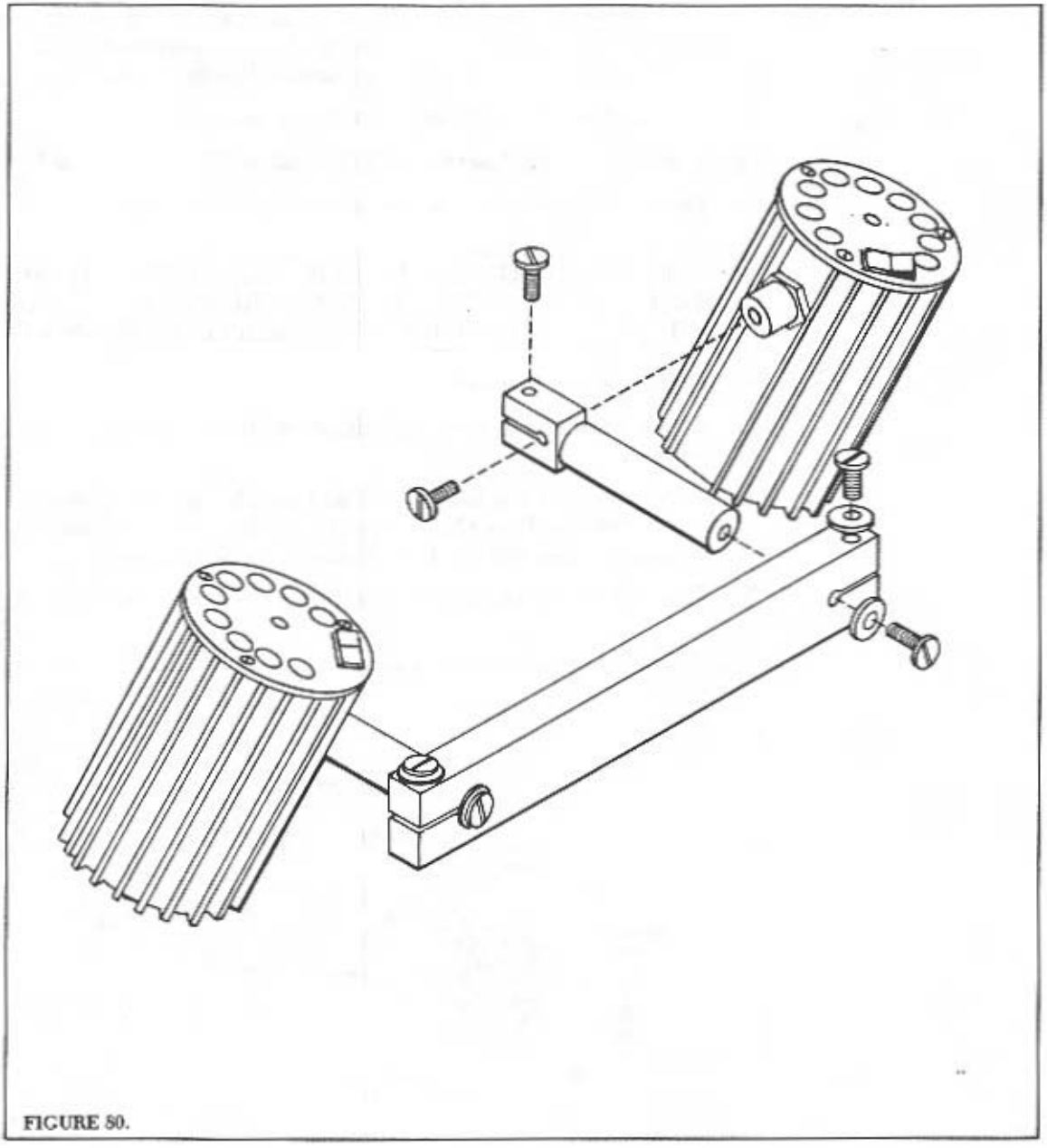


FIGURE 50.

REMOTE CONTROL

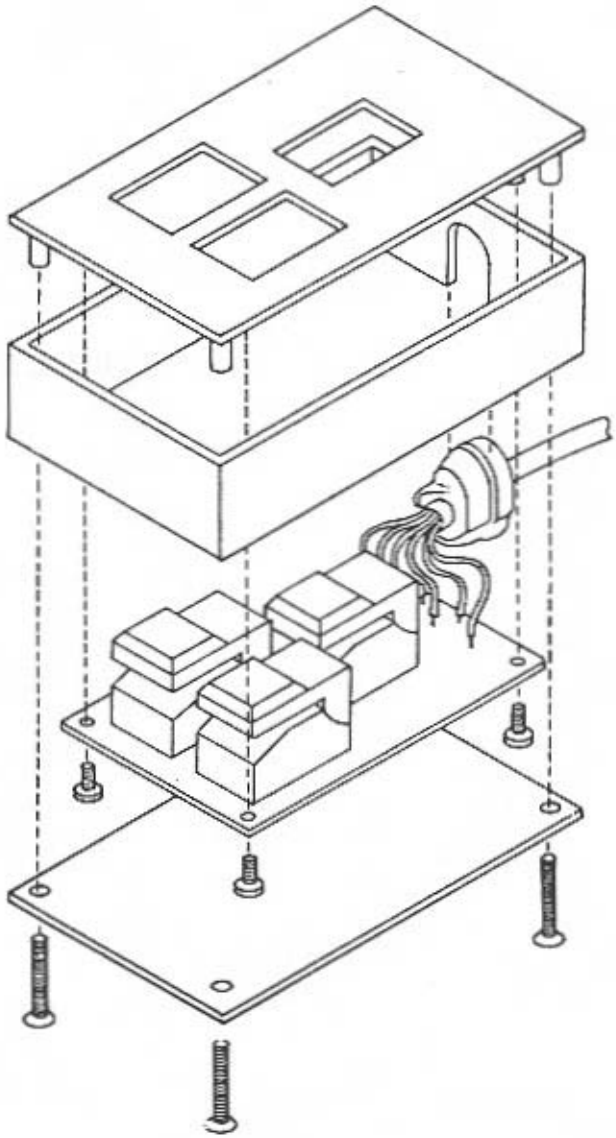


FIGURE 82.

TEMPERATURE CALIBRATION

INTRODUCTION

The following procedure should be performed annually to insure proper system operation. Perform the following procedure step by step in sequence to insure proper operation. Refer to page 93, figure 83.

WARNING!

TURN OFF POWER AND DISCONNECT LINE CORD TO CRAFT SYSTEM BEFORE PREPARING UNIT FOR CALIBRATION. FAILURE TO TURN OFF POWER AND DISCONNECT LINE CORD PRIOR TO CALIBRATION SET-UP CAN RESULT IN PERSONNEL INJURY OR DEATH OR EQUIPMENT DAMAGE.

EQUIPMENT REQUIRED

OMEGA CL-477 Hand Held Calibrator
Copper-Copper Millivolt Test Leads with T/C Plug
Alligator Clip to Mini-Hook Test Leads (2)
2-position Shunt (AMP P/N 2-530153-2 or equivalent)
Screwdriver
Electrical Tape
CRAFT 25 or CRAFT 15 to be Calibrated
Set-Up Procedure

DISASSEMBLY

1. Turn off power to CRAFT system.
2. Remove power cord.
3. Remove rear access panel from unit. See page 32, figure 15.
4. Disconnect black 14 AWG wire from p.c. mount terminal block J17, terminal 1, on the CRAFT Main Board and wrap with electrical tape to prevent short to chassis.
5. Disconnect thermocouple extension wires from connector J18 on the CRAFT Main Board.
6. Install shorting block over pins 1 and 2 of jumper field W1.
7. Connect " + " test lead of calibrator to pin 4 of header J18 on Main Board.
8. Connect " – " test lead of calibrator to pin 3 of header J18 on Main Board.

CALIBRATION PROCEDURE (Cont'd)

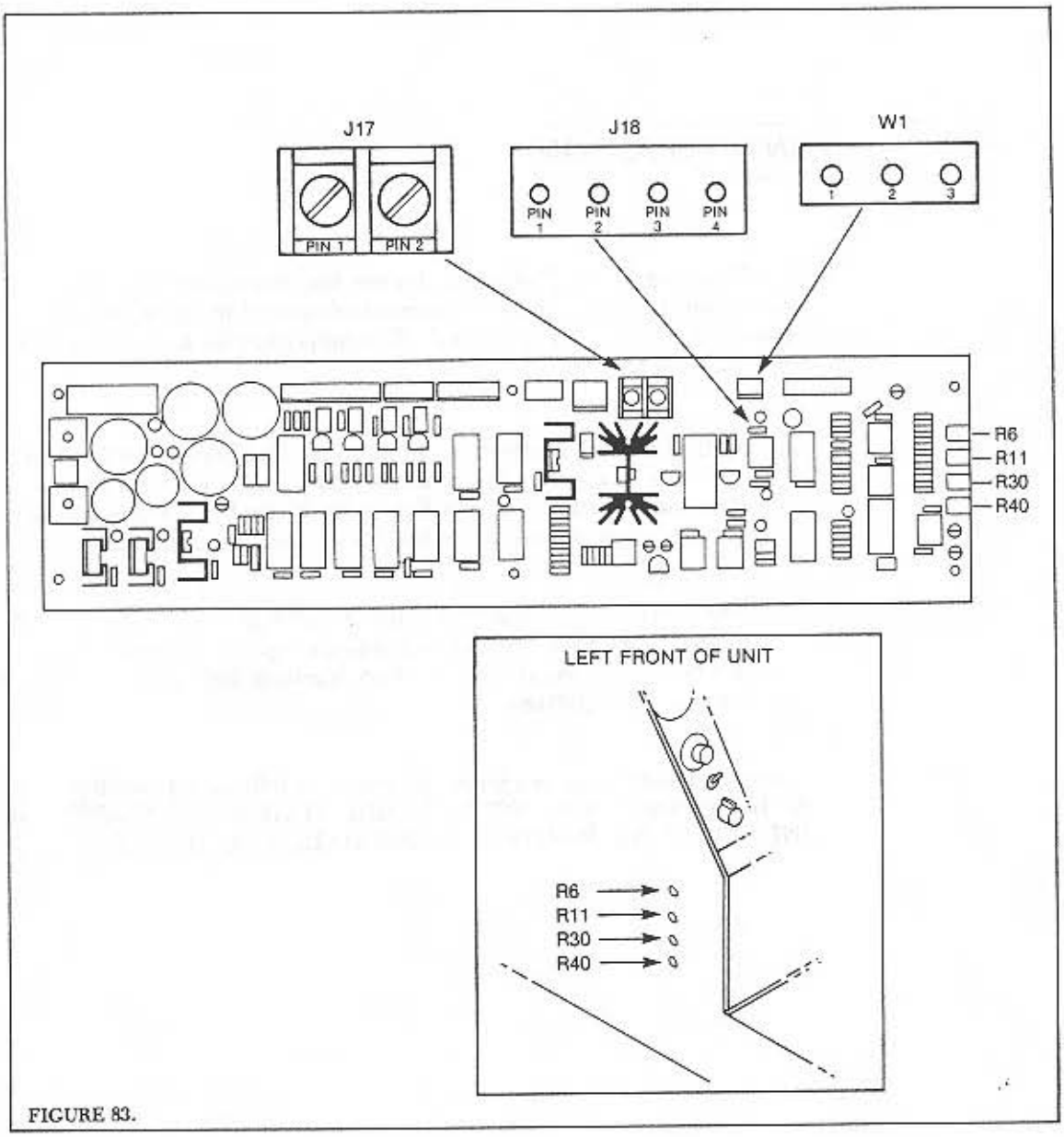


FIGURE 83.

REFLOW STATION

1. With the Work Platform adjusted square to the front edge of the Craft 25 unit, insure that an installed Craft 25 Nozzle is square to the front edge of an installed PCB. If this is not the case, adjust the theta position of the Nozzle as described below, before proceeding.

   a. Lower the Heater Assembly to a position just off the installed PCB.

   b. Using an Allen wrench, adjust the Theta Control Set Screw to align the installed Nozzle assembly square with the PCB.

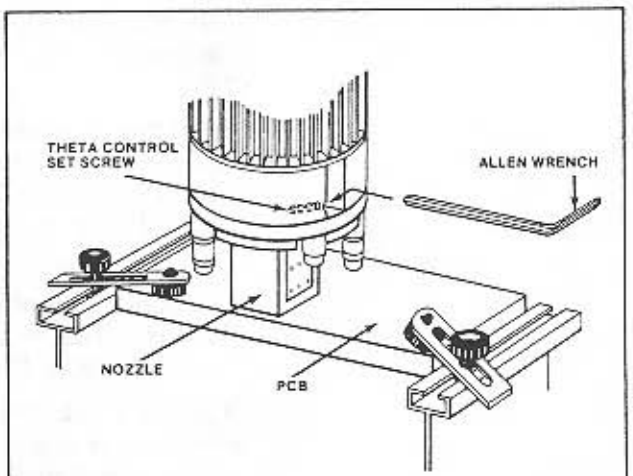


FIGURE 84.

PLACEMENT STATION (Cont'd)

12. Index the Work Platform to the Placement Station (Station 2).
13. Remove the rubber "O" ring (if present) from the Auxiliary Vacuum Pick.
14. Insert the Placement Alignment Tool into the Work Holder Plate as shown.
15. Swing the Auxiliary Vacuum Pick over the Work Platform. Gently lower the Pick into the hole of the Placement Alignment Tool. The Pick should slide freely into the hole. If this is not the case, perform the following adjustments:
    a. Loosen the Vacuum Pick set screw.
    b. Adjust the Vacuum Pick tube in the "Y" (front to back) direction so that it centers over the hole in the Placement Alignment Tool.
    c. Gently lower the Pick into the hole of the Placement Alignment Tool. The Pick should now slide freely into the hole. Perform step 15d only if the Pick is out of alignment in the "X" (side to side) direction.

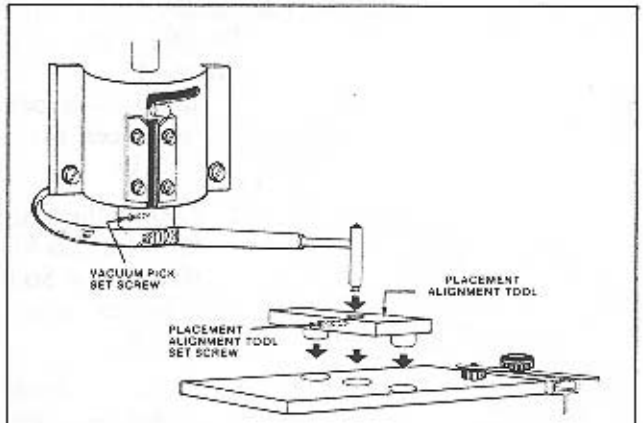


FIGURE 86.

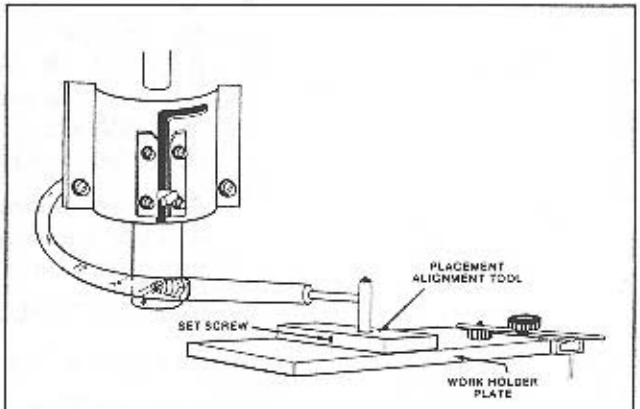


FIGURE 87.

COMPONENT LOCATING FIXTURE

16. Install the Locating Plate onto the Component Locating Fixture as shown.

17. Swing the Auxiliary Vacuum Pick (with attached Placement Alignment Tool) over the Locating Plate. Gently lower the Pick into the holes of the Locating Plate. The Placement Alignment Tool pins should now slide freely into these holes. If this is not the case, perform the following adjustments:
    a. Loosen the Theta Locking Screw.
    b. Loosen the two Component Fixture mounting screws.
    c. Adjust the position of the Component Locating Fixture until the Placement Alignment Tool pins (attached to Vacuum Pick) slide freely in the Placement Alignment Tool holes. In some cases it may be necessary to also loosen the two Fixture Arm mounting screws.
    d. Retighten all mounting screws and the Theta Locking Screw. Recheck Pick for freedom of movement.

18. Recheck all alignments made in steps 1 thru 17.

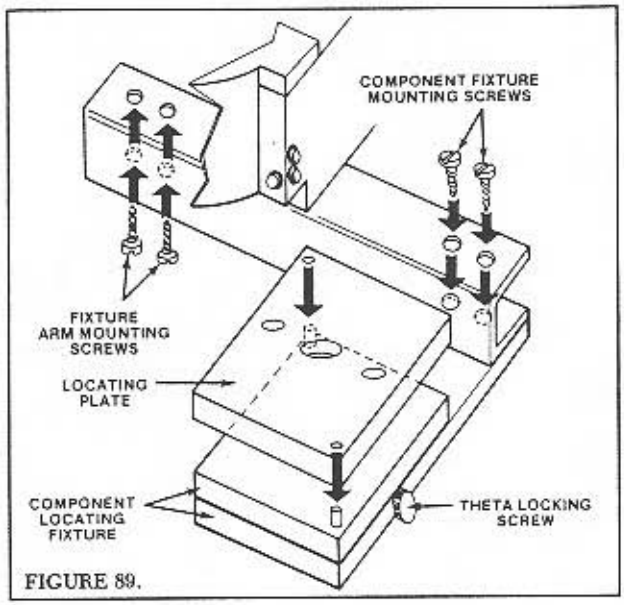


FIGURE 89.

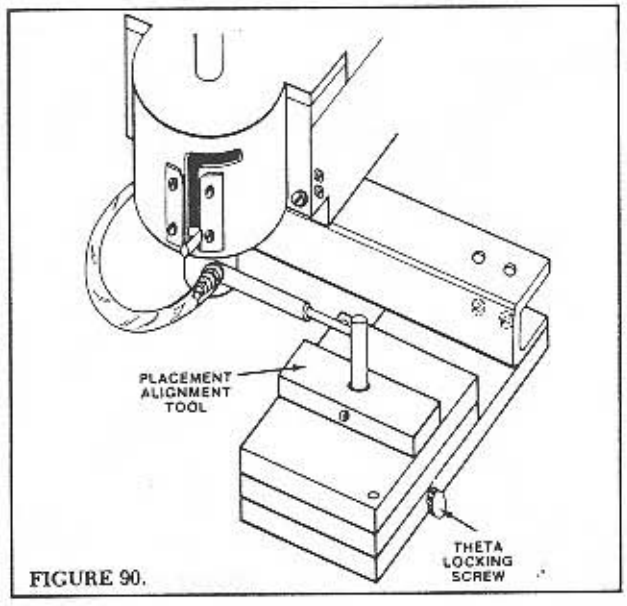
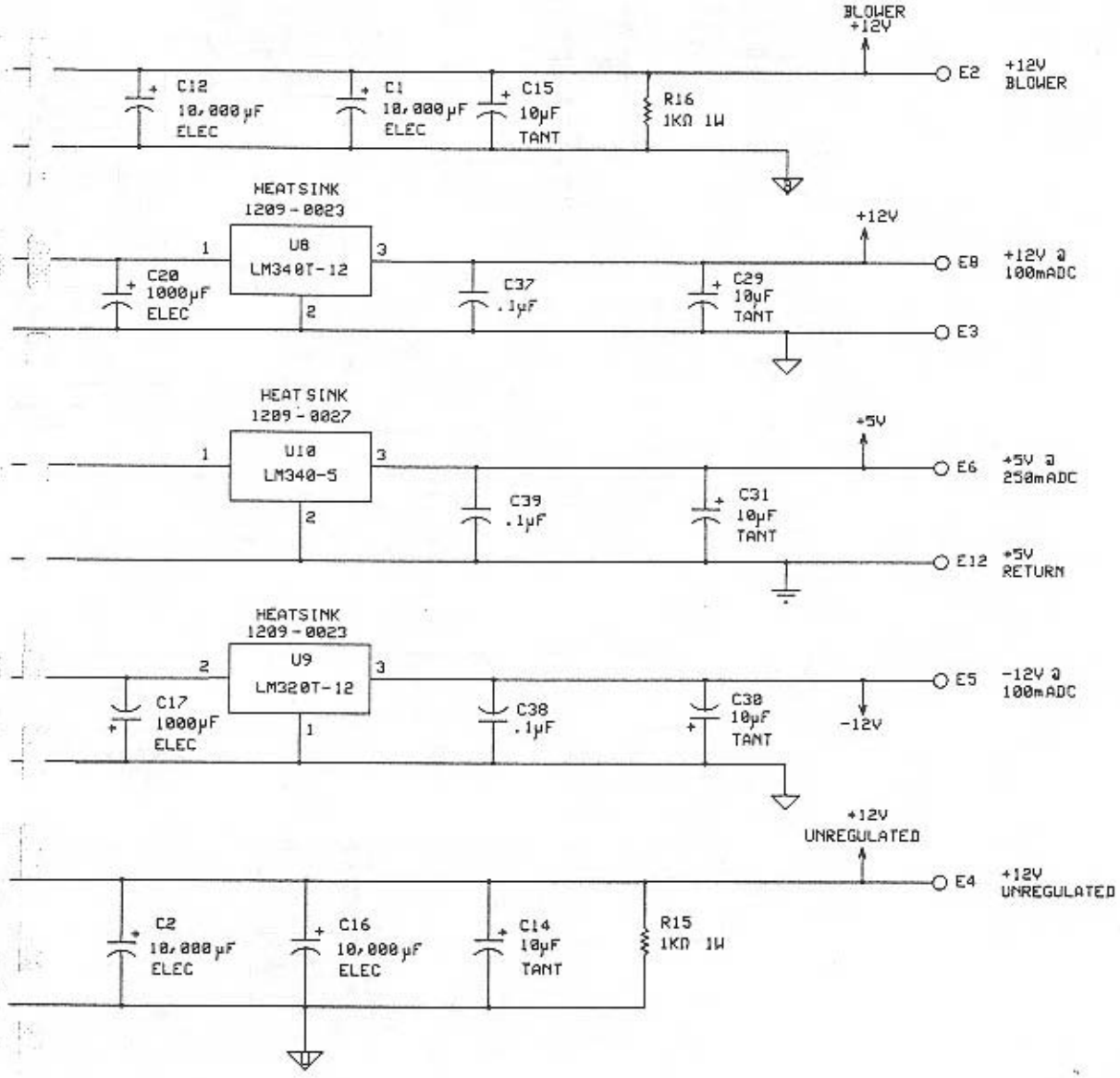
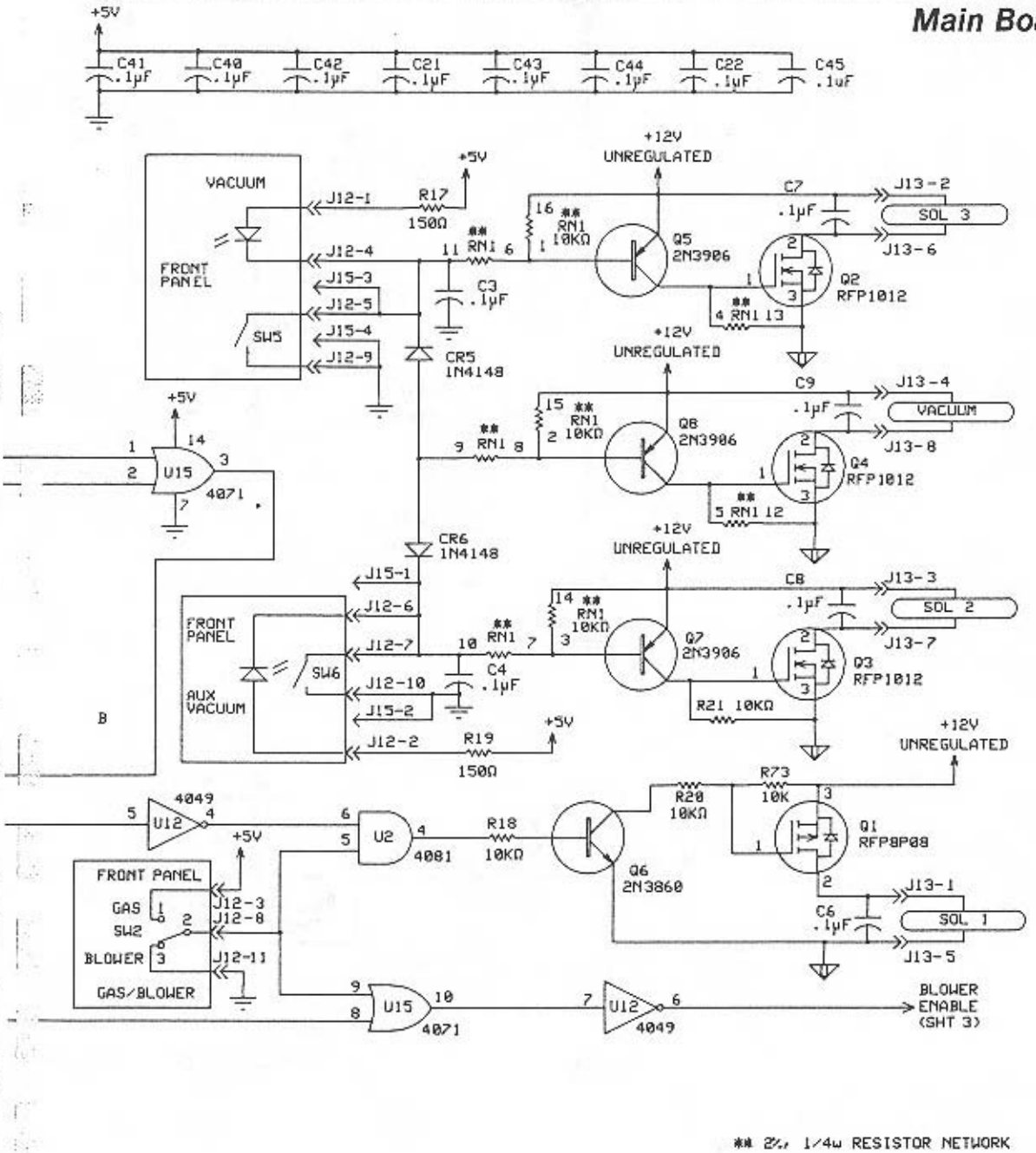


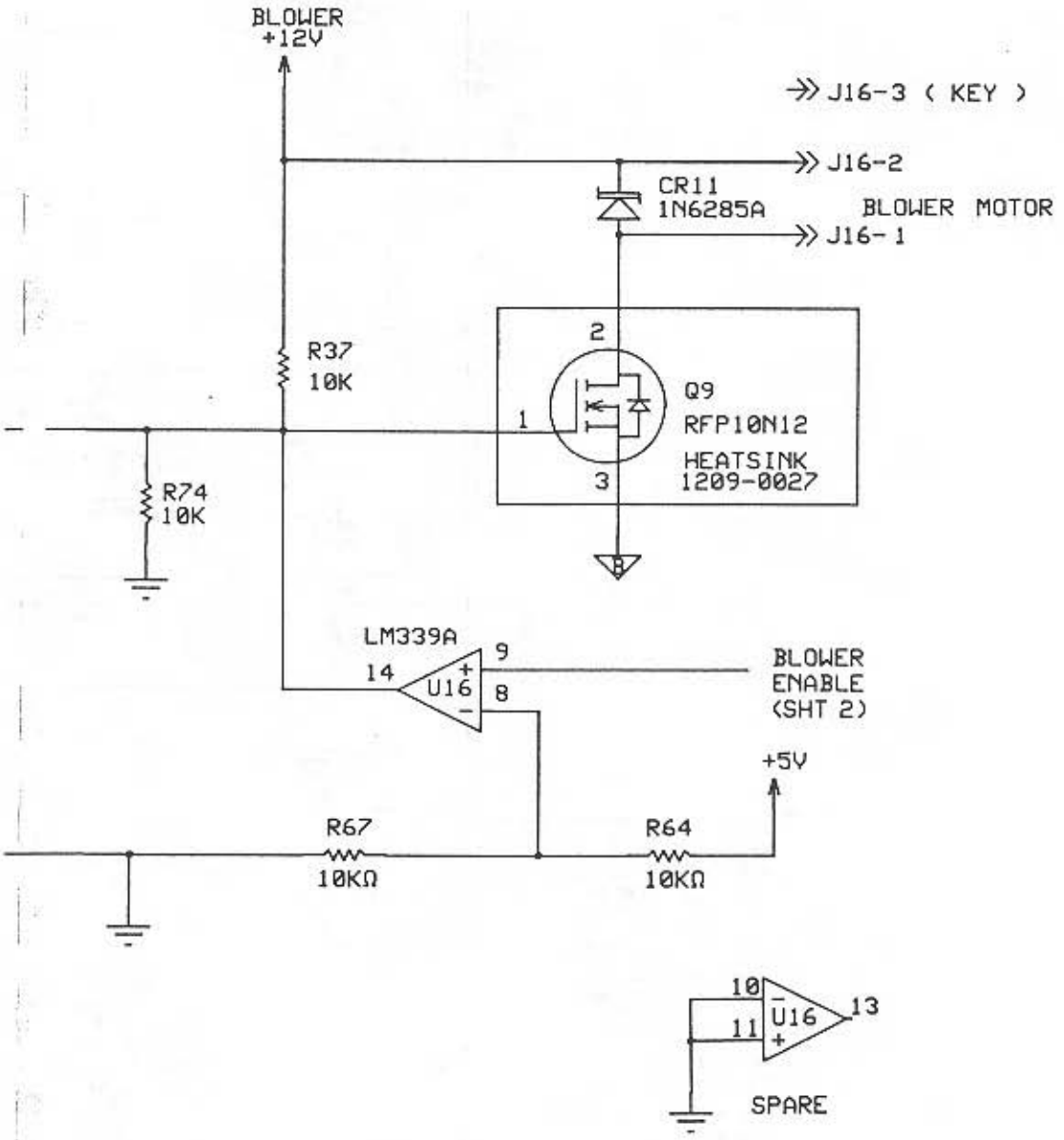
FIGURE 90.


BLOWER
+12V
E2
+12V
BLOWER
C12
10,000µF
ELEC
C1
10,000µF
ELEC
C15
10µF
TANT
R16
1KΩ 1W
HEATSINK
1209-0023
U8
LM340T-12
1
2
3
+12V
E8
+12V @
100mADC
C20
1000µF
ELEC
C37
.1µF
C29
10µF
TANT
E3
HEATSINK
1209-0027
U10
LM340-5
+5V
E6
+5V @
250mADC
C39
.1µF
C31
10µF
TANT
E12
+5V
RETURN
HEATSINK
1209-0023
U9
LM320T-12
E5
-12V @
100mADC
C17
1000µF
ELEC
C38
.1µF
C30
10µF
TANT
-12V
+12V
UNREGULATED
E4
+12V
UNREGULATED
C2
10,000µF
ELEC
C16
10,000µF
ELEC
C14
10µF
TANT
R15
1KΩ 1W

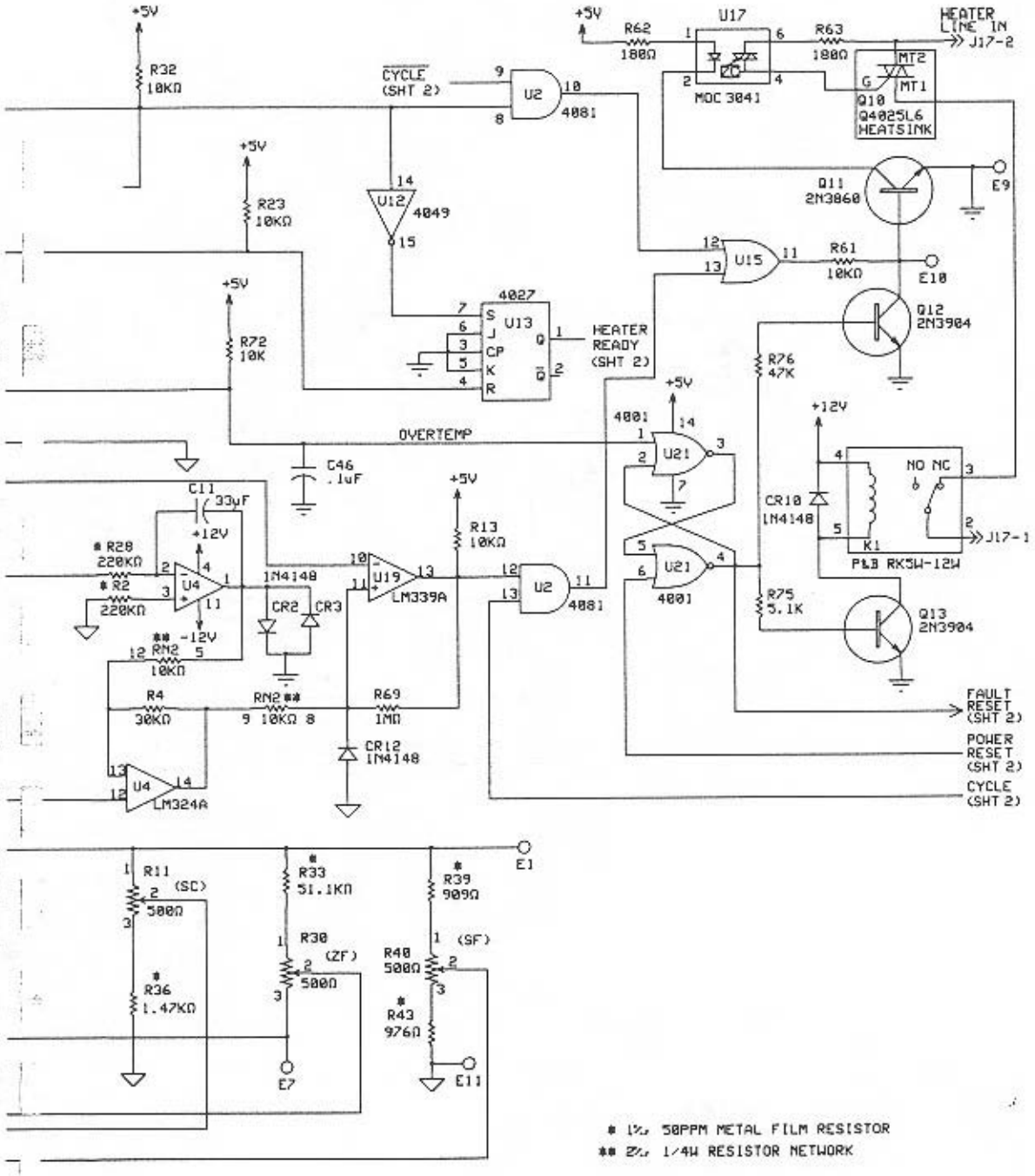
Main Board



** 2%, 1/4w RESISTOR NETWORK

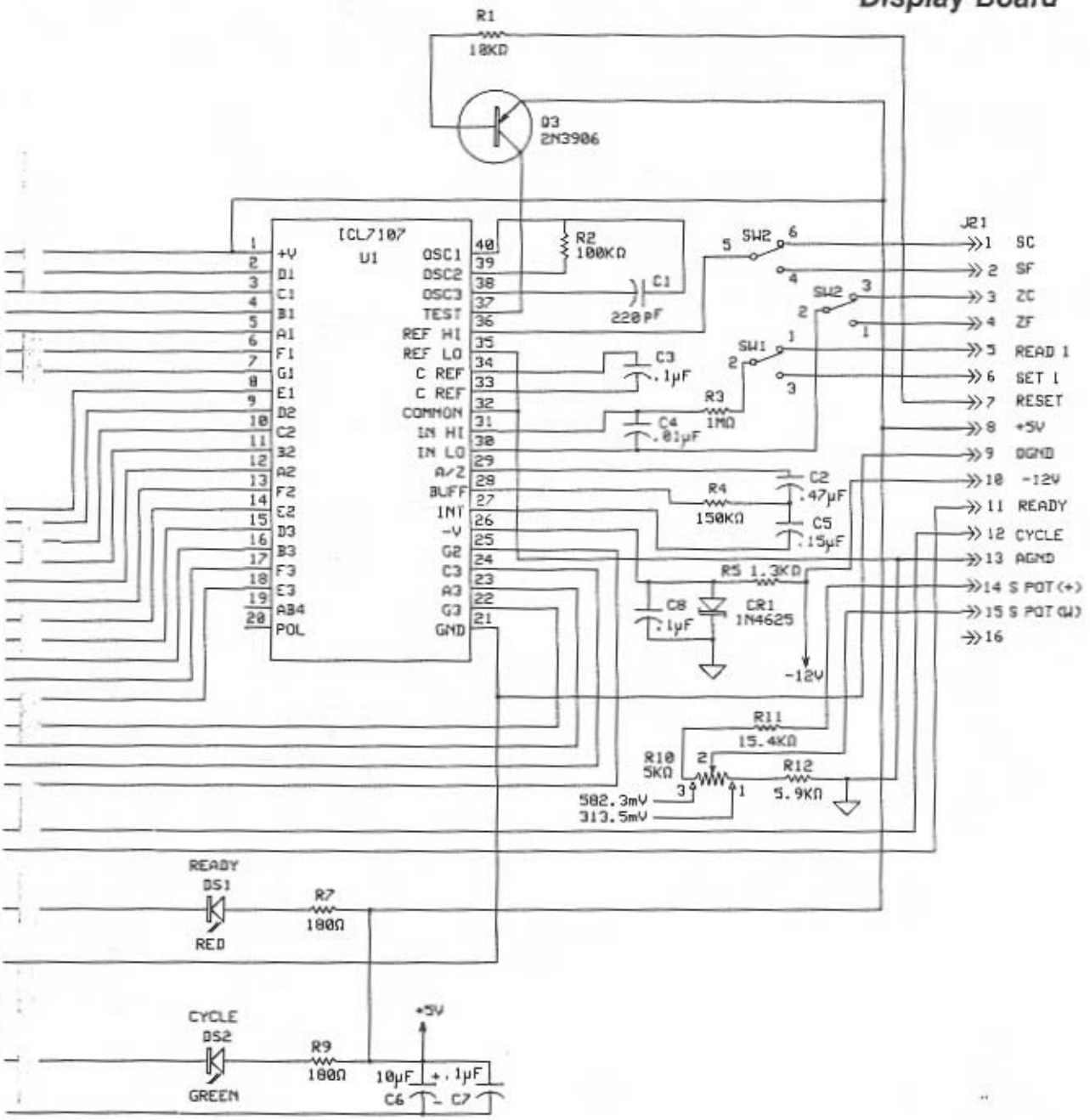

BLOWER
+12V
J16-3 (KEY)
J16-2
CR11
1N6285A
BLOWER MOTOR
J16-1
R37
10K
2
Q9
RFP10N12
HEATSINK
1209-0027
1
3
R74
10K
LM339A
14
U16
9
8
BLOWER
ENABLE
(SHT 2)
+5V
R67
10KΩ
R64
10KΩ
10
11
U16
13
SPARE

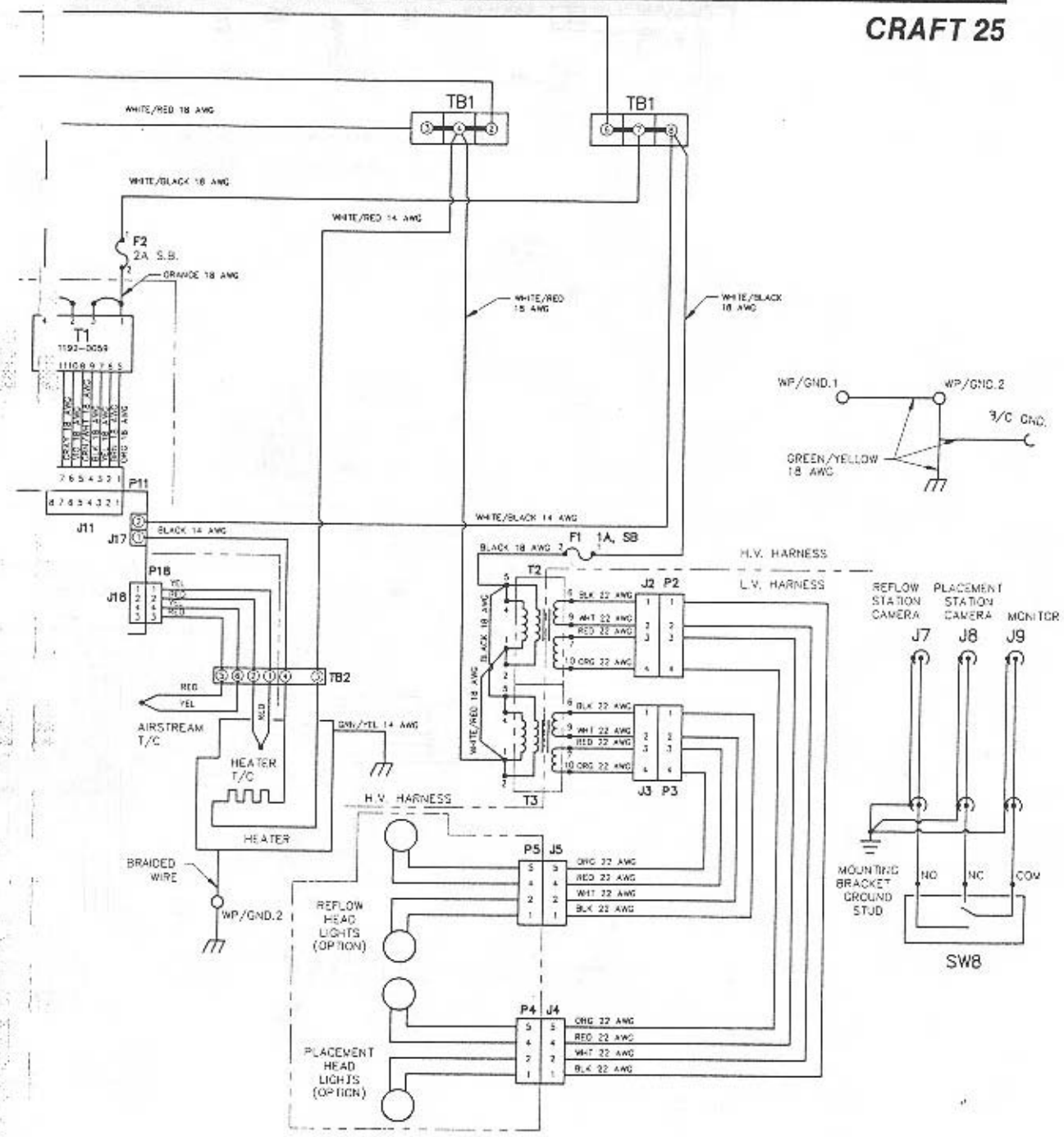
Main Board



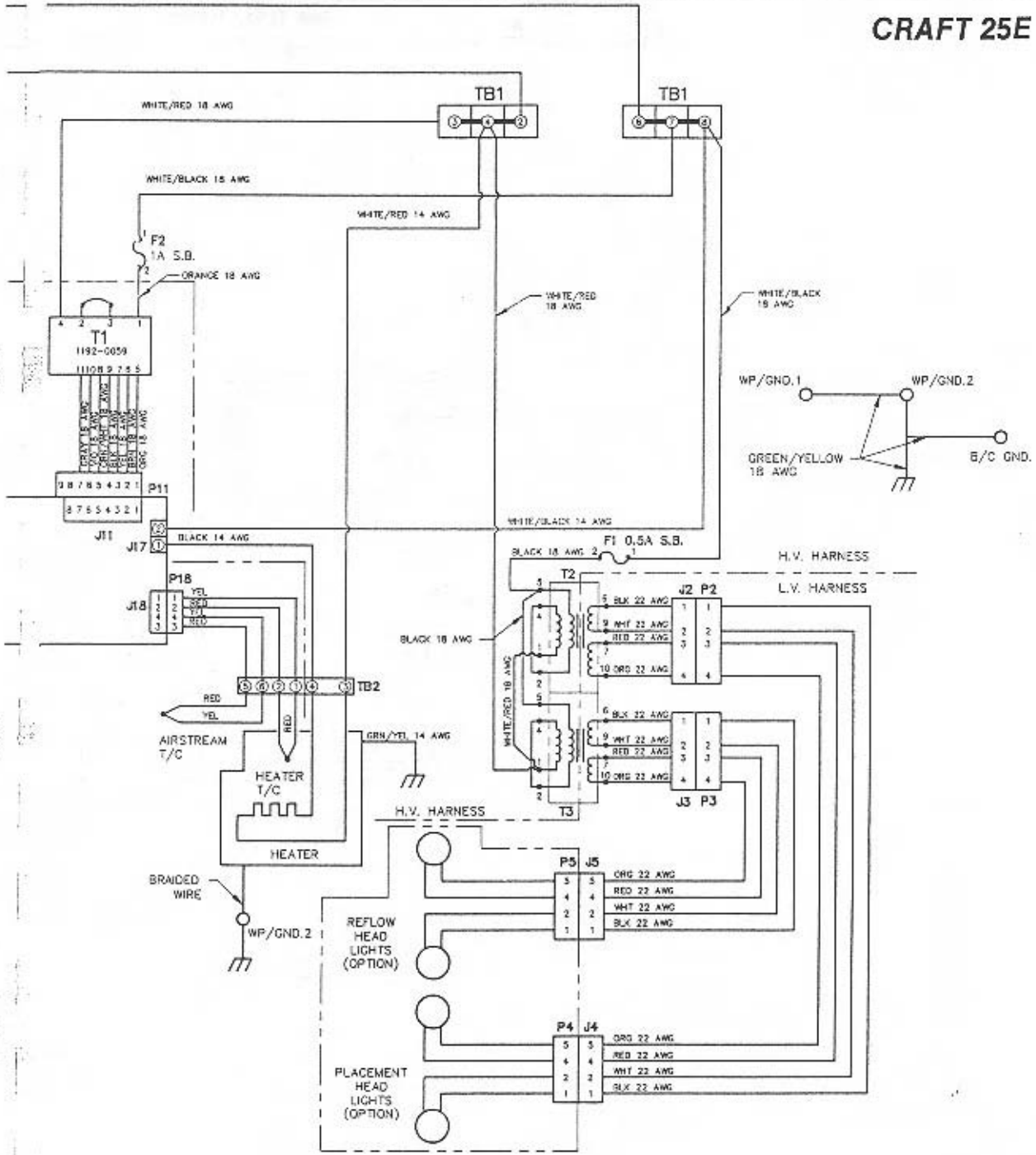
* 1% 50PPM METAL FILM RESISTOR
** 2% 1/4W RESISTOR NETWORK

Display Board




TB1
TB1
WHITE/RED 18 AWG
WHITE/BLACK 18 AWG
WHITE/RED 14 AWG
F2
2A, S.B.
ORANGE 18 AWG
WHITE/RED 18 AWG
WHITE/BLACK 18 AWG
T1
1192-0059
P11
J11
J17
BLACK 14 AWG
WHITE/BLACK 14 AWG
F1 1A, SB
BLACK 18 AWG
H.V. HARNESS
L.V. HARNESS
P18
J18
T2
J2 P2
BLK 22 AWG
WHT 22 AWG
RED 22 AWG
ORG 22 AWG
TB2
RED
YEL
AIRSTREAM T/C
GRN/YEL 14 AWG
HEATER T/C
HEATER
H.V. HARNESS
T3
J3 P3
P5 J5
ORG 22 AWG
RED 22 AWG
WHT 22 AWG
BLK 22 AWG
BRAIDED WIRE
WP/GND.2
REFLOW HEAD LIGHTS (OPTION)
P4 J4
PLACEMENT HEAD LIGHTS (OPTION)
WP/GND.1
WP/GND.2
S/C GND.
GREEN/YELLOW 18 AWG
REFLOW STATION CAMERA
PLACEMENT STATION CAMERA
MONITOR
J7
J8
J9
MOUNTING BRACKET GROUND STUD
NO
NC
COM
SW8

CRAFT 25E


TB1
TB1
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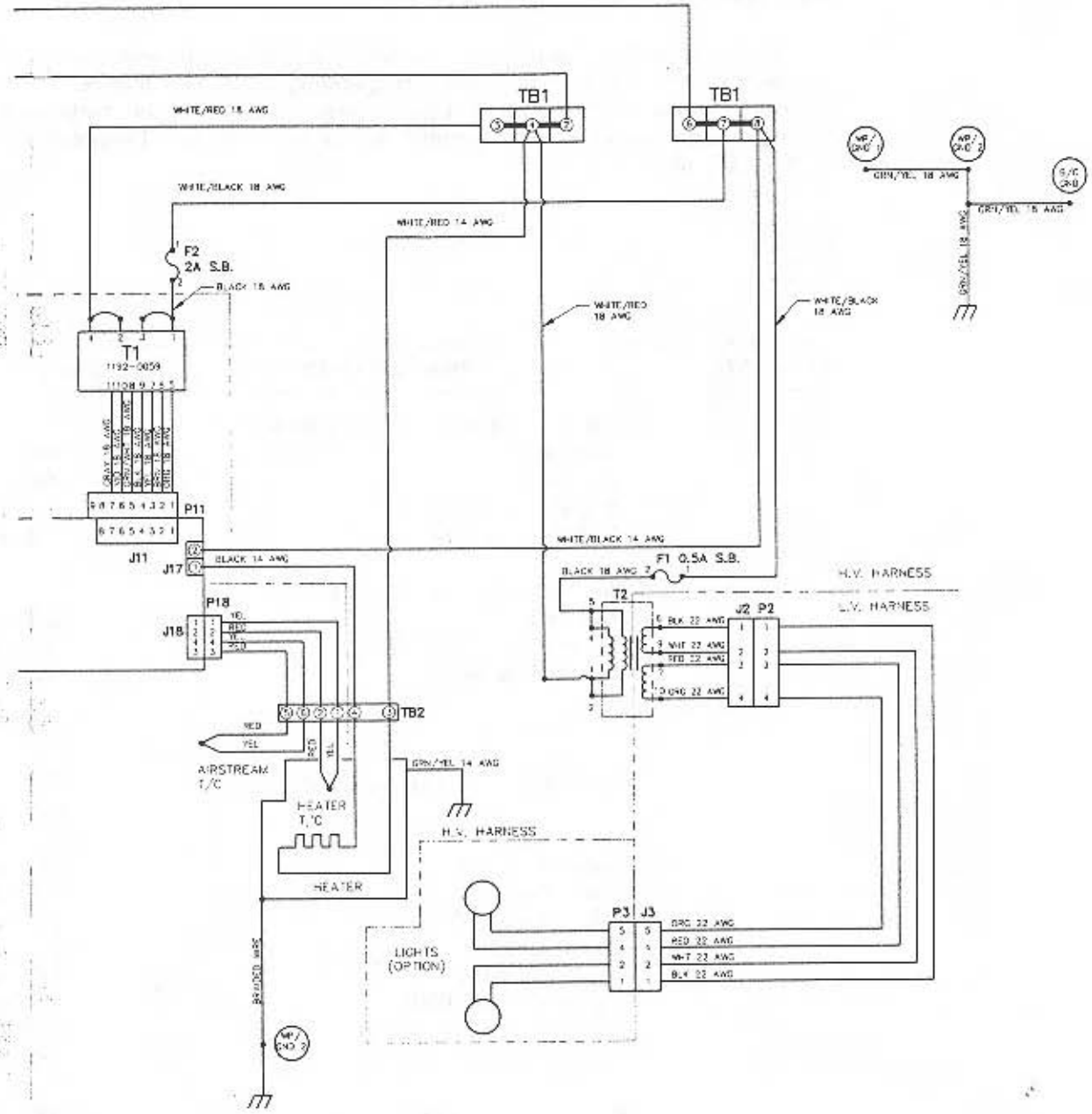
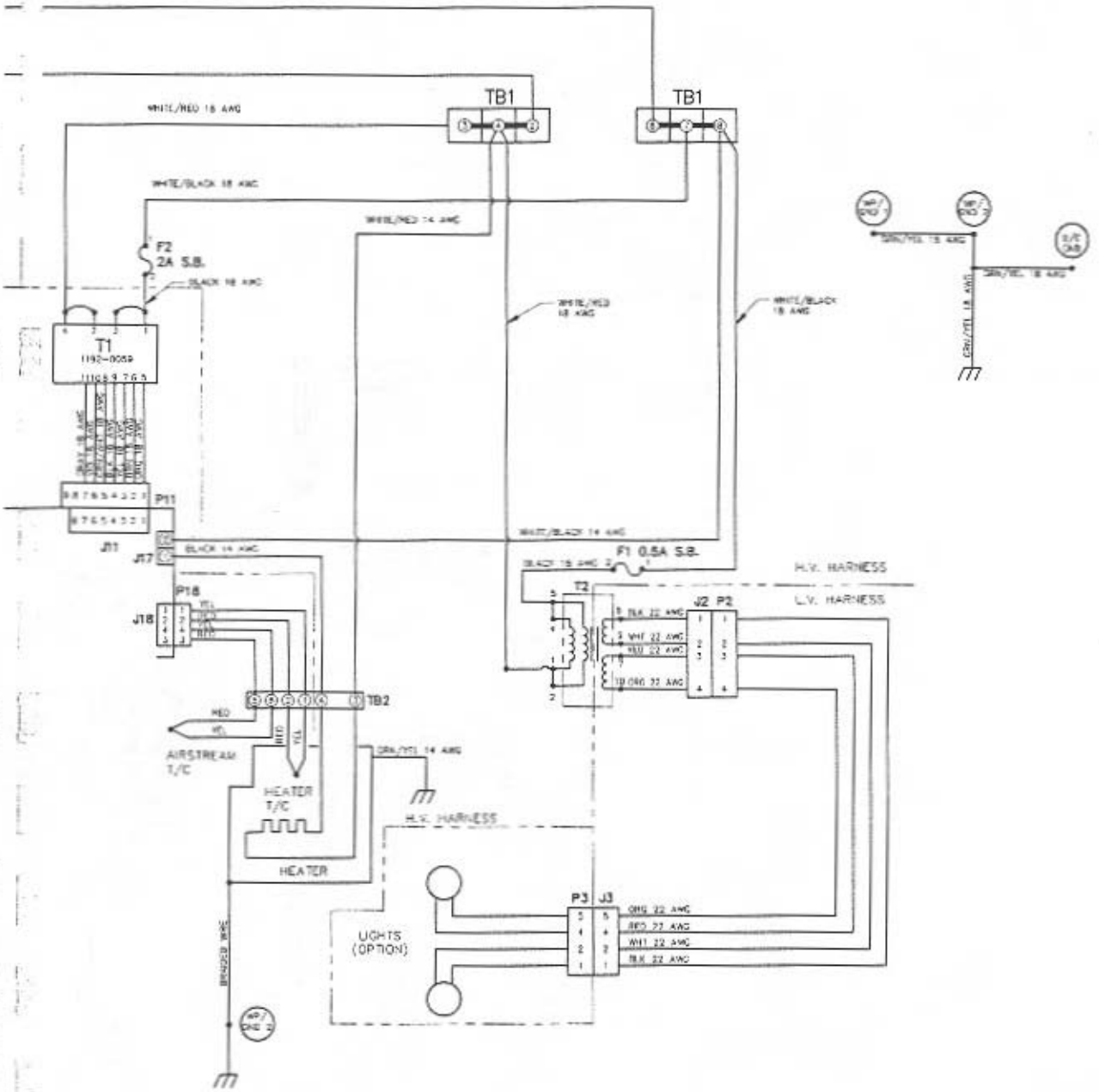
WHITE/BLACK 18 AWG
WHITE/RED 14 AWG
F2
1A S.B.
ORANGE 18 AWG
T1
1192-0059
WHITE/RED 18 AWG
WHITE/BLACK 18 AWG
WP/GND.1
WP/GND.2
GREEN/YELLOW 18 AWG
S/C GND.
P11
J11
J17
BLACK 14 AWG
WHITE/BLACK 14 AWG
F1 0.5A S.B.
BLACK 18 AWG
H.V. HARNESS
L.V. HARNESS
P18
J18
YEL
GRN
YEL
RED
T2
J2 P2
BLK 22 AWG
WHT 22 AWG
RED 22 AWG
ORG 22 AWG
BLACK 18 AWG
WHITE/RED 18 AWG
TB2
RED
YEL
AIRSTREAM T/C
RED
GRN/YEL 14 AWG
HEATER T/C
HEATER
T3
J3 P3
H.V. HARNESS
BRAIDED WIRE
WP/GND.2
P5 J5
ORG 22 AWG
RED 22 AWG
WHT 22 AWG
BLK 22 AWG
REFLOW HEAD LIGHTS (OPTION)
P4 J4
ORG 22 AWG
RED 22 AWG
WHT 22 AWG
BLK 22 AWG
PLACEMENT HEAD LIGHTS (OPTION)


TB1
TB1
WHITE/RED 18 AWG
WHITE/BLACK 18 AWG
WHITE/RED 14 AWG
F2
2A S.B.
BLACK 18 AWG
T1
1192-0059
P11
J11
J17
BLACK 14 AWG
WHITE/BLACK 14 AWG
F1 0.5A S.B.
BLACK 18 AWG
H.V. HARNESS
L.V. HARNESS
T2
J2 P2
P18
J18
TB2
AIRSTREAM T/C
HEATER T/C
HEATER
GRN/YEL 14 AWG
H.V. HARNESS
LIGHTS (OPTION)
P3 J3
BRAIDED WIRE
GRN/YEL 18 AWG


TB1
TB1
WHITE/RED 18 AWG
WHITE/BLACK 18 AWG
WHITE/RED 14 AWG
F2
2A S.B.
BLACK 18 AWG
T1
1192-0059
P11
J11
J17
BLACK 14 AWG
F1 0.5A S.B.
H.V. HARNESS
L.V. HARNESS
T2
J2 P2
P18
J18
TB2
AIRSTREAM
T/C
HEATER
T/C
HEATER
GRN/YEL 14 AWG
H.V. HARNESS
LIGHTS
(OPTION)
P3 J3
GRN/YEL 18 AWG
GRN/YEL 18 AWG
GRN/YEL 18 AWG

ACCESSORIES

TABLE 4

ITEM	DESCRIPTION	PACE PART NO.
1	Reflow Station Video Mount	6018-0042
2	Monitor Mount	6018-0044
3	4X Microscope	6018-0048
4	20X Eyepieces (EKO)	1106-0033
5	Reflow Station Microscope Mount	6018-0049
6	Placement Station Video Mount	6018-0043
7	Place Scope Assembly, 2.5 Objective Lens	6018-0050
8	Dual Halogen Lighting System	7007-0011
9	Polarizing Filter Kit	6018-0058
10	Remote Control	6018-0047
11	30" Work Holder Rail Kit	6993-0126
12	PCB Template Kit	6018-0064
13	Alignment Tool Kit	6018-0053

CRAFT 25 UNIT

TABLE 5 (Cont'd)

ITEM #	QTY.	PART NO.	DESCRIPTION	SUBASSEMBLY AREA
26	1	4010-0091	Heater Core, CRAFT 25 (115 V)	Reflow Stn.
	1	4010-0092	Heater Core, CRAFT 25E (230 V)	
27	1	4010-0093	Heater Tube Assembly	
28	1	4010-0094	Reflow Sensor	
29	1	4010-0095	Vacuum Pick Assembly	
30	2	1222-0061	Vacuum Pick Control Knob	
31	1	1222-0062	Nozzle Locking Lever Knob	
32	1	1222-0053	Z Axis Control Knob	
33	1	4018-0043	Vacuum Pickup Assembly	Placement Stn.
34	1	1213-0045-P5	Vacuum Pickup "O" Ring	
35	1	1332-0134	Power Cord, Domestic (115V)	Misc. Access.
36	1	1332-0135	Power Cord, Export (230V)	
37	1	1100-0228	Nozzle/Chip Tool	
38	2	1165-0023	Lamp, 12 V, 20 W	
39	1	1309-0020	Visifilter	
40	1	1121-0280-P2	Vacuum Cup, .625 Dia.	Consumables
41	1	1121-0281-P2	Vacuum Cup, .400 Dia.	
42	1	1121-0282-P2	Vacuum Cup, .312 Dia.	
43	1	1121-0288-P2	Vacuum Cup, .200 Dia.	
44	1	5050-0219	Operation Manual	

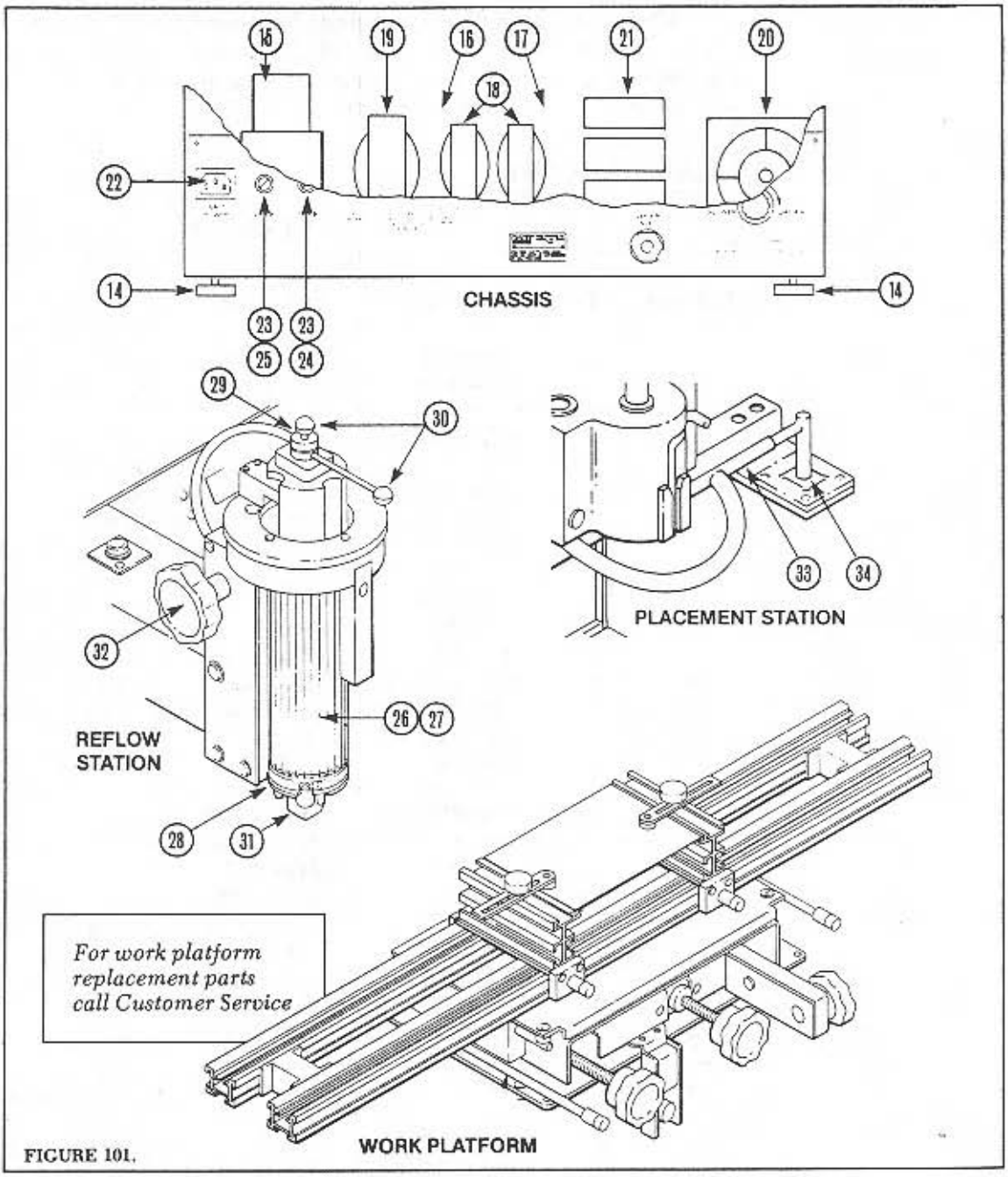

15
19
16
17
18
21
20
22
14
14
CHASSIS
23
25
23
24
29
30
32
26
27
REFLOW
STATION
28
31
33
34
PLACEMENT STATION
For work platform
replacement parts
call Customer Service
WORK PLATFORM

FIGURE 101.

CRAFT 15 UNIT

TABLE 6 (Cont'd)

ITEM #	QTY.	PART NO.	DESCRIPTION	SUBASSEMBLY AREA
26	1	4010-0091	Heater Core, CRAFT 15 (115 V)	Reflow Stn.
	1	4010-0092	Heater Core, CRAFT 15E (230 V)	
27	1	4010-0093	Heater Tube Assembly	
28	1	4010-0094	Reflow Sensor	
29	1	4010-0095	Vacuum Pick Assembly	
30	2	1222-0061	Vacuum Pick Control Knob	
31	1	1222-0062	Nozzle Locking Lever Knob	
32	1	1222-0053	Z Axis Control Knob	
33	1	1332-0134	Power Cord, Domestic (115V)	Misc. Access.
34	1	1332-0135	Power Cord, Export (230V)	
35	1	1100-0228	Nozzle/Chip Tool	
36	2	1165-0023	Lamp, Lighting Assembly (12V, 20W)	
37	1	1309-0020	Visifilter	
38	1	1121-0280-P2	Vacuum Cup, .625 Dia.	Consumables
39	1	1121-0281-P2	Vacuum Cup, .400 Dia.	
40	1	1121-0282-P2	Vacuum Cup, .312 Dia.	
41	1	1121-0288-P2	Vacuum Cup, .200 Dia.	
42	1	5050-0230	Operation Manual	

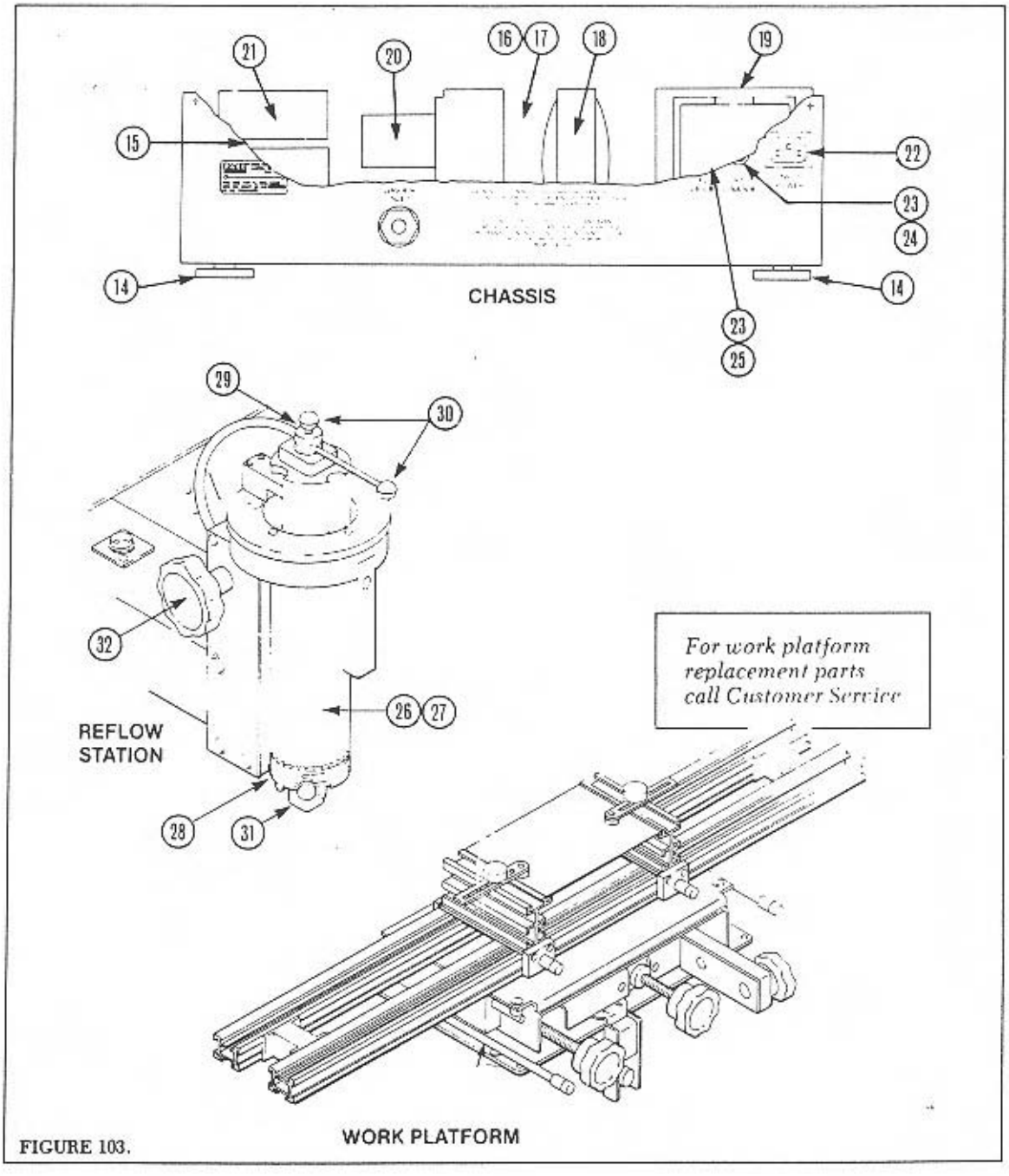

21
20
16
17
18
19
15
22
23
24
14
14
CHASSIS
23
25
29
30
32
26
27
REFLOW
STATION
28
31
For work platform
replacement parts
call Customer Service
WORK PLATFORM

FIGURE 103.