

Weller® Tech Sheet

Model EC1000/EC2000, EC1000D/EC2000D Electronic Soldering Stations

PRODUCT DESCRIPTION

The EC1000 and the EC2000 Soldering Stations offer the ultimate in controlled temperature hand soldering. Tip temperature is electronically controlled throughout the temperature range of 350°F (177°C) to 850°F (454°C). The units are calibrated to within $\pm 10^\circ\text{F}$ (6°C). Temperature setting and tip temperature are displayed on a three digit LED readout (EC2000 only) with a resolution of $\pm 1^\circ\text{F}$ or 1°C. Tip temperature control is maintained within specification over line voltage variations of $\pm 10\%$ and ambient temperature range of 60°F (15°C) to 110°F (43°C).

Dynamic response to soldering load variation is insured by use of a rapid response platinum sensor and full proportional heater control. The sensor is positioned deep inside the solid copper, iron plated tip to insure quick response.

The electronic system utilizes thyristor power control with zero voltage thyristor drive. This ensures that no high voltage spikes will be present on the soldering tool tip. In addition, the power unit is isolated from the A.C. line by a transformer and only 24 VAC isolated voltage is used to drive the heating element. The soldering tip is also grounded through the power unit three wire line cord. These features combine with the calibrated temperature control to give the ultimate in safety for sensitive, expensive electronic circuit, hand soldering.

Physically the EC1000/2000 is divided into two units—the power unit and the soldering tool. The power unit houses the transformer, on-off switch, calibrated temperature adjustment knob, extra tip receptacle, soldering tool holder and tip wiping sponge. The EC2000 has in addition a set/read switch and digital display. The soldering tool contains the soldering tip, stainless steel heating element, platinum sensor, thermoplastic handle, non-burning silicone rubber cord and locking male plug that mates with the receptacle on the power unit.

Soldering tools are interchangeable without recalibration of the unit. This is made possible by the use of a high precision platinum temperature sensor. The precision sensor also makes it possible to check the calibration of the tool using only precision resistors or potentiometers and a precision resistance measuring instrument. Low drift hybrid circuitry using laser trim adjustments with no mechanical adjustments insure calibration accuracy over the normal life of the tool without time consuming recalibration.

A selection of iron plated tips from .032 screwdriver to 1/8" chisel are available, however, due to the tight temperature control specifications of this unit, only Weller standard category tips are specified for use. The other category tips may be used with only minor degradation in calibration accuracy. (See tip selection chart.)

The EC1000/2000, EC1000D/2000D is normally supplied with an ETA screwdriver point.



EC1000/2000 Operating Instructions

Unpack unit carefully. Place tool holder in slot provided in top of power unit. Dampen wiping sponge with water. Distilled water is preferred, especially in areas where tap water contains high mineral content. Insert tool in holder. Insert tool plug into tool receptacle on power unit. After insertion, rotate plug housing to lock plug into receptacle.

The EC1000/2000 units are U.L. listed or C.S.A. certified.

Insert line cord plug into properly grounded A.C. receptacle. Turn unit on with rocker switch.

EC1000—Set temperature control knob to desired tip temperature (approach desired temperature by turning CCW). Wait 30 seconds. Remove tool from holder and tin tip with solder. Unit is now ready for use.

EC2000—Move "set-read" switch to "set" position. Rotate control knob until the digital display reads the desired temperature. Move "set-read" switch to "read" position. Tip temperature is now displayed. When tip reaches 400°F (204°C), remove tool and tin the tip. When tip temperature reaches desired temperature, the tool is ready for use.

Always use lowest temperature that will handle the load you are soldering. The Weller electronic control provides maximum power to the heated load even when set to the lowest temperature, therefore, there is no need to use high temperatures to handle heavy soldering loads. By using lower temperatures and properly selecting tip styles, sensitive components will be protected from heat damage.

During soldering operations, with the "set-read" switch of the EC2000 in "read" position, the tip temperature as shown by the digital display will fluctuate. This fluctuation is normal and represents the control system response to the changing load. Tip selection may be optimized for a particular soldering job by observing the tip temperature fluctuations during the soldering operation. Normally, the tip should be selected for minimum fluctuation. This will provide the shortest soldering time, however, some applications may require fast response at low or high temperature

with total fluctuation not critical. In critical applications the EC2000 allows the user to optimize the tool for the job.

CAUTION: Do not operate tool without tip in place. Heater will be ruined.

Clean power unit case with mild detergent only. Do not use solvents.

EC1000(D)/EC2000(D) Specifications

POWER UNIT EC1002B/2002B

1. Power input: 120 VAC \pm 10%, 60Hz, 60 watts. (EC1002DB/2002DB 240 VAC, 50/60 Hz.)
2. Power unit output voltage: isolated 24 VAC (Full Load).
3. Size: 6 $\frac{1}{4}$ " W x 7-3/8" L x 3 $\frac{3}{4}$ " H
159mm W x 187mm L x 95mm H
Not including tool holder and soldering tool.
4. Line cord: 3 wire.
5. Tip temperature control range: 350°F (177°C) to 850°F (454°C).
6. Control setting resolution: EC1000 10°F (5°C)
EC2000 1°F or 1°C
7. Control accuracy: \pm 10°F (\pm 6°C) of setting at idling temperature.
No load—30 minute power unit warm-up.
60°F (15°C) to 110°F (43°C) ambient
8. Temperature read out accuracy (EC2000): \pm 10°F (6°C) \pm 1 digit.
Temperature readout type: .30" LED - 7 segment - 3 digit.
9. Temperature readout resolution (EC2000): 1°F or 1°C
(EC1000): None
10. On-Off switch with indicator light. (No indicator light on EC2000.)
11. Case: Flame retardant thermoplastic 94V-O, U.L. approved.

SOLDERING TOOL—EC1201P

1. Wattage—42 watts at 24 VAC.
2. Tip voltage to ground: Less than 2 mv. RMS from heater barrel to line cord ground pin.
3. Tool weight—2.0 ounces (without cord).
4. Tool material—Thermoplastic handle and stainless steel.
5. Heater Type: Fiberglass and ceramic insulated nickel-chromium element.
Reverse wound for low leakage and magnetic field cancellation.
Encased in stainless steel. Modular three pin plug-in type.
6. Tip Type: Replaceable copper with heavy iron, nickel and chromium plating for long life. 14 styles available.
7. Platinum R.T.D. (resistance temperature detector) probe. Fits deep inside the tip. Precision calibrated for tool interchangeability.
8. Handle design: Heat insulated two piece design for low grip temperature.
9. Tool cord: Silicone rubber—burn resistant—4 feet long.
10. Cord connector: Polarized 5 Pin locking design.
11. Recovery time: (From 100°F drop with ETA tip at 700°F) = 10 sec.

WARNING: DO NOT REMOVE GROUND PRONG FROM LINE CORD PLUG. REMOVAL MAY CAUSE TIP TEMPERATURE CONTROL TO BE ERRATIC.

EC1000(D)/EC2000(D) Power Unit Calibration Check

The EC1000/2000 uses a high precision temperature sensor and therefore, soldering tools are interchangeable and cannot be calibrated. The power unit is factory calibrated and cannot be recalibrated. However, the power unit calibration may be easily checked using the following procedure: Two precision resistors, resistor A (36.4 \pm .01 ohm), resistor B (51.4 \pm .01 ohm), and a 13 ohm 40 watt load w/indicator lamp are required. The 13 ohm, 40 watt load may be a resistor with a 24 volt lamp connected in parallel across it. Alternatively, the EC1201P iron may be used in place of the 13 ohm resistor by using short jumper leads from pins 2 and 1 of the receptacle to pins 2 and 1 of the iron plug. Attach resistors and lamp to .057 dia (1.45mm) insert pins (do not use long wire). Refer to the wiring diagram figure for pin numbers and locations. A calibration reference unit (WC1000) is available as an accessory where frequent calibration verification is required.

CAUTION: Momentary contact with receptacle pins other than those indicated may damage the electronic components. To prevent this, turn unit off when removing or inserting resistors or indicators. Momentary shorts when connecting probes to test points will cause permanent damage to circuit components.

EC1000/EC1000D Calibration Check

1. Remove soldering tool plug and insert resistor B in socket pins 3 and 4 and indicator lamp and load in socket pins 2 and 1; or use WC1000 Calibration Reference Unit.
2. Rotate temperature set knob fully CCW and turn unit on. Indicator lamp should be out. Allow unit 30 minute warm-up before continuing.
3. Rotate temperature set knob fully CW. Indicator lamp should be on. Rotate temperature set knob CCW until indicator lamp starts flashing, note reading. Continue rotating temperature set knob CCW until indicator lamp just stops flashing. Temperature set should = 745°F \pm 10° (396°C \pm 6°) and the indicator lamp should have started flashing approximately 35°F (20°C) higher.
4. Replace resistor B with resistor A. Rotate temperature set knob CCW until indicator lamp starts flashing, note reading. Continue rotating temperature set knob CCW until indicator lamp just stops flashing. Temperature set should = 395°F \pm 10° (202°C \pm 6°) and the indicator lamp should have started flashing approximately 35°F (20°C) higher.

EC2000/EC2000D Calibration Check

1. Remove soldering tool plug and insert resistor B in socket pins 3 and 4 and indicator lamp and load in socket pins 1 and 2; or use WC1000 Calibration Reference Check.
2. Rotate temperature set knob fully CCW and turn unit on. Indicator lamp should be out. Allow unit 30 minute warm-up before continuing.
3. Place SET/READ switch to SET. Display should = $335^{\circ}\text{F} \pm 15^{\circ}$ ($168^{\circ}\text{C} \pm 8^{\circ}$). Rotate temperature set knob fully CW. Indicator lamp should be on. Display should = $875^{\circ}\text{F} \pm 15^{\circ}$ ($468^{\circ}\text{C} \pm 8^{\circ}$).
4. Place SET/READ switch to READ. Display should = $755^{\circ}\text{F} \pm 5^{\circ}$ ($402^{\circ}\text{C} \pm 3^{\circ}$).
5. Place SET/READ switch to SET. Rotate temperature knob CCW until indicator lamp starts flashing, note reading. Continue rotating temperature set knob CCW until indicator lamp just stops flashing. The indicator lamp should have started flashing approximately 35°F (19°C) before going out.
6. Replace resistor B with resistor A. Place SET/READ switch to READ. Display should = $395^{\circ}\text{F} \pm 10^{\circ}$ ($202^{\circ}\text{C} \pm 6^{\circ}$).
7. Place SET/READ switch to SET. Rotate temperature set knob CCW until indicator lamp starts flashing, note reading. Continue rotating temperature set knob CCW until indicator lamp just stops flashing. The indicator lamp should have started flashing approximately 35°F (19°C) before going out.
8. Run unit with tool at 400°F (205°C) until stable. "SET" and "READ" display must match within $\pm 10^{\circ}\text{F}$ ($\pm 6^{\circ}\text{C}$).
9. Run unit with tool at 750°F (400°C) until stable. "SET" and "READ" display must match within $\pm 10^{\circ}\text{F}$ ($\pm 6^{\circ}\text{C}$).

NOTE: If unit does not pass above checks, refer to the appropriate calibration troubleshooting guide.

SELECTION OF WELLER ET SERIES TIPS

Weller ET tips are solid copper, plated with iron, nickel and chromium. The nickel and chrome are removed in the working area and the tips are pretinned with tin/lead solder. The nickel and chromium protects the shank from corrosion and solder creep. The Weller electronic units use ET series tips. These tips are designed to mate with the sensor probe. Due to the difference in length and mass of some tips, the unit calibration is slightly affected. When using ETA, ETB, ETC, ETH, ETP, ETD, ETCC, and ETDD no change in calibration will be required. When using ETL, ETM, and ETR the tip temperature will be 15°F (8°C) cooler than the setting at 850°F (454°C). The ETK, ETS, and ETO tips will be 25°F (14°C) cooler than the setting at 850°F (454°C). The error will be less at lower temperatures. **Use only original Weller soldering tips, parts and accessories for this product.**

TIP TABLE



GRAPHIC VIEW	CATALOG NUMBERS	DESCRIPTION	DIMENSIONS		
			-A-	-B-	-C-
 STANDARD	ETA	SCREWDRIVER	1/16	5/8	3/32
	ETB	SCREWDRIVER	3/32	5/8	3/32
	ETC	SCREWDRIVER	1/8	5/8	1/8
	ETD	SCREWDRIVER	3/16	3/4	3/16
 CONICAL	ETH	SCREWDRIVER	1/32	5/8	1/8
	ETP	CONICAL	1/32	5/8	—
	ETCC	SINGLE FLAT	1/8	5/8	3/32
 SINGLE FLAT	ETDD	SINGLE FLAT	3/16	3/4	3/16
	ETDD	SINGLE FLAT	3/16	3/4	3/16
 LONG CONICAL	ETO	LONG CONICAL	1/32	1	—
	ETS	LONG CONICAL	1/64	1	—
	ETK	LONG SCREWDRIVER	3/64	1	7/16
 LONG SCREWDRIVER	ETL	LONG SCREWDRIVER	5/64	1	1/2
	ETM	LONG SCREWDRIVER	1/8	1	3/4
 NARROW SCREWDRIVER	ETR	NARROW SCREWDRIVER	1/16	5/8	1/8

CARE OF WELLER ET SERIES TIPS

1. Keep tip tinned; wipe only before using.
2. Use rosin or activated rosin fluxes. Acid type fluxes will greatly reduce tip life.
3. Remove tip and clean with suitable cleaner for flux used. The frequency of cleaning will depend on the type of work and usage. Tips in constant use should be removed and cleaned at least once a week. Corrosion between tip and sensor can cause erratic temperature control.

WARNING:

If tip does not remove easily do not force it. The platinum sensor will be damaged. Try removing the tip while heated. If this does not work, return tool to Weller service.

When installing new tips, tips should slide freely over stainless steel probe.

4. Don't try to clean tip with abrasive materials and never file tip; to do so will greatly reduce tip life. Tip wettability is affected by contact with organics, such as, plastic resins, silicone grease, and other chemicals. If the tip becomes unwettable it may be cleaned hot with a soft steel or brass wire brush using solder flux as a solvent. Do not overdo this or the iron plating will be removed and the tip ruined. Retin tip immediately to prevent oxidation.
5. Don't remove excess solder from heated tip before storing. The excess solder will prevent oxidation of the wettable surface when tip is reheated.
6. Do not use any compound or anti-seize material on Weller tips or sensor probe. They will cause wettability problems and may cause seizing after long heated periods.

EC1000/EC2000 Power Unit Troubleshooting Guide

WARNING: AC line voltage is present inside power unit even when power switch is off. Refer service to qualified personnel.

Note: Access to internal parts may be gained by removing four bottom screws and removing bottom case.

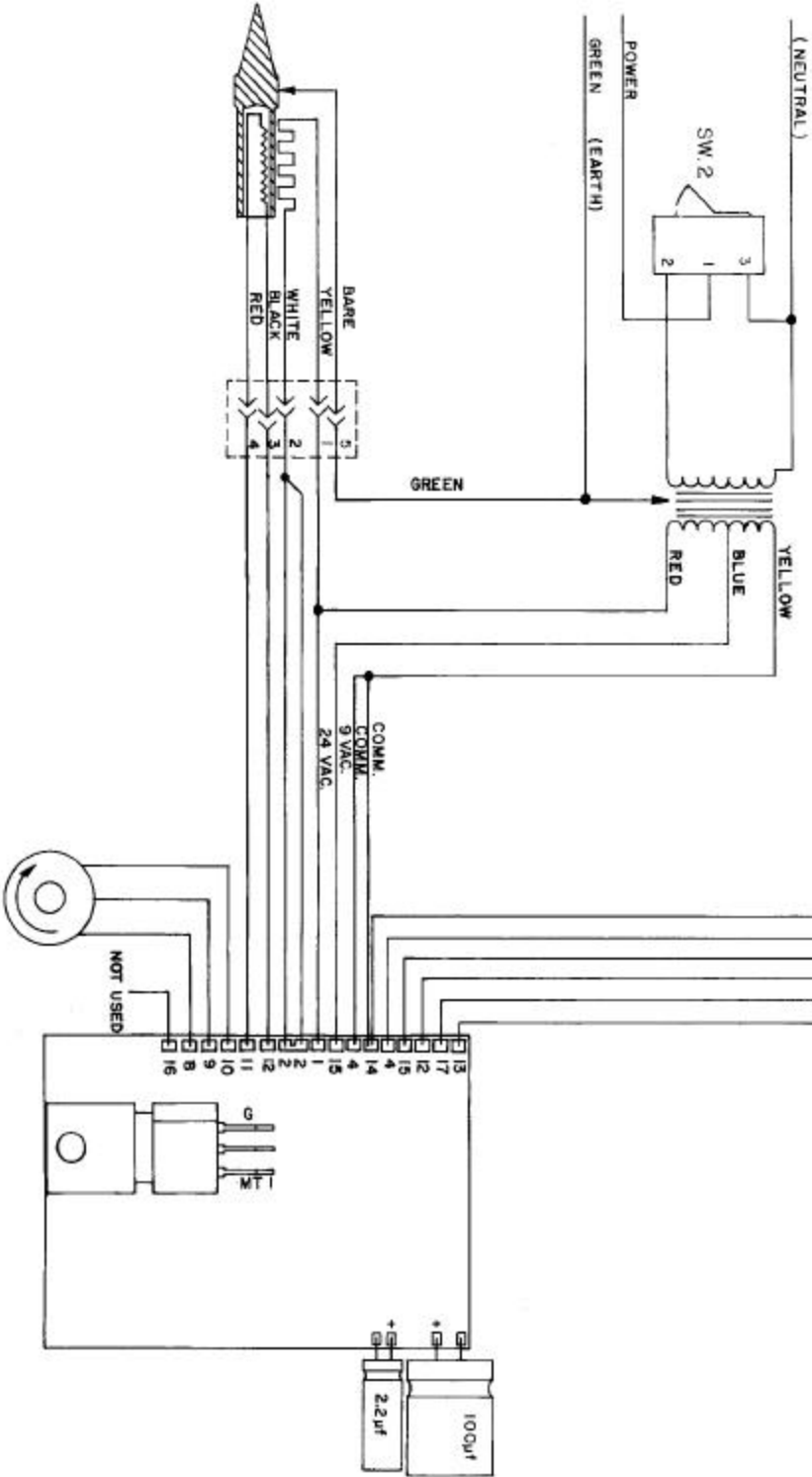
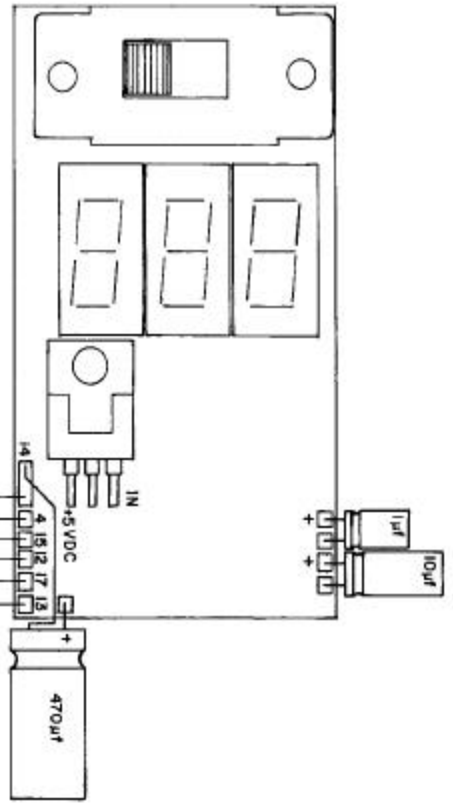
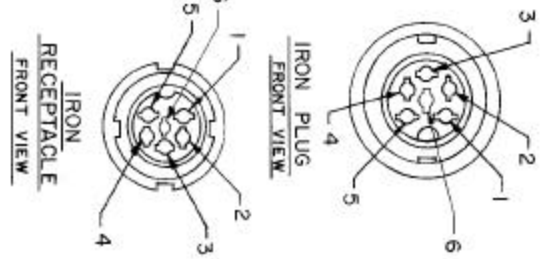
- I. Tool does not heat
 - A. Display not illuminated (EC2000B), or on-off switch light not illuminated (EC1000B).
 1. Check power line for correct voltage.
 2. With power switch in ON position, measure resistance of primary circuit, 12-15 ohms at line cord blades.
 - a. Line cord open—replace.
 - b. Switch defective—replace.
 - c. Transformer primary open—replace.
 3. Test for 26 VAC \pm 2V (117 VAC line voltage) at TP1 on control board and yellow TRANSFORMER lead. Replace transformer.
 4. Test for 26 VAC \pm 2V between TP1 and TP 4 on control board.
 - C. Display illuminated (EC2000B), or on-off switch light illuminated (EC1000B).
 1. Troubleshoot EC1201P tool.
 2. Test for 26 VAC \pm 2V between TP1 and TP4 on control board.
 3. Check continuity from receptacle pins to control board.
 4. Repair or replace receptacle/leads.
 5. With tool attached—check for 26V \pm 2V at heater terminals TP1 and TP2 on control board. Replace control board.
- II. Tool Overheating
 - A. Troubleshoot EC1201P—See EC1201P Troubleshooting Guide.
 - B. Rotate control full CCW.
 1. Tool stops overheating—check calibration.
 2. Tool still overheats—replace control board.
- III. Tool does not pass calibration check or tip temperature testing shows errors in tip temperature greater than \pm 10 degrees F.
 - A. Tip temperature testing errors
 1. Temperature testing **must** be done using 30 gauge thermocouple wire welded (resistance weld) to the center of the wetted area on the tip. A Weller WTT1000 "Zero Load" tip temperature measuring instrument may also be used. Other methods or heavier gauge thermocouples will cause errors.
 2. Replace EC1201P with different EC1201P and recheck tip temperatures with one of the methods above. If this corrects the readings, the sensor in the original EC1201P should be replaced.
 - B. EC1000 calibration troubleshooting

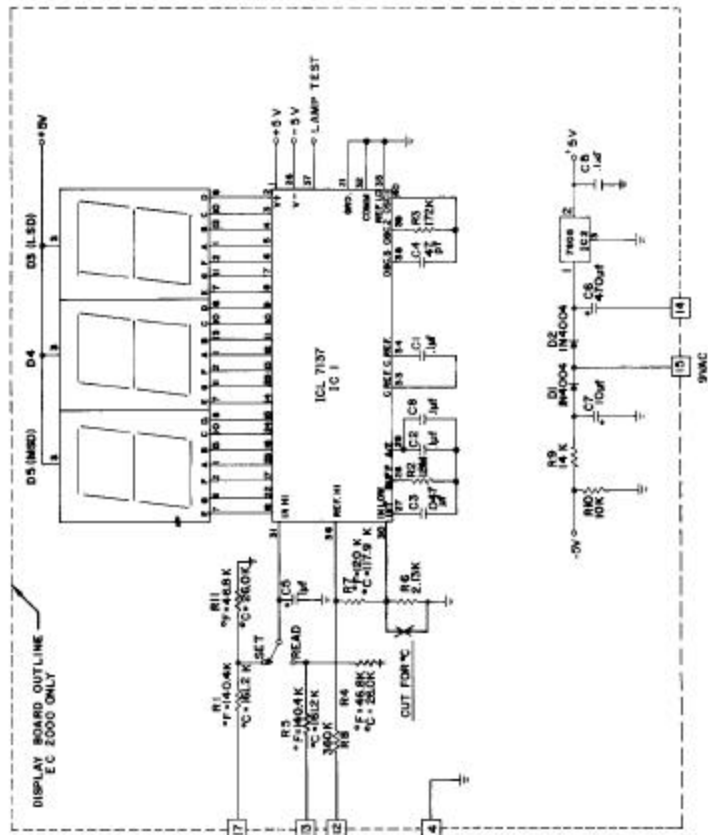
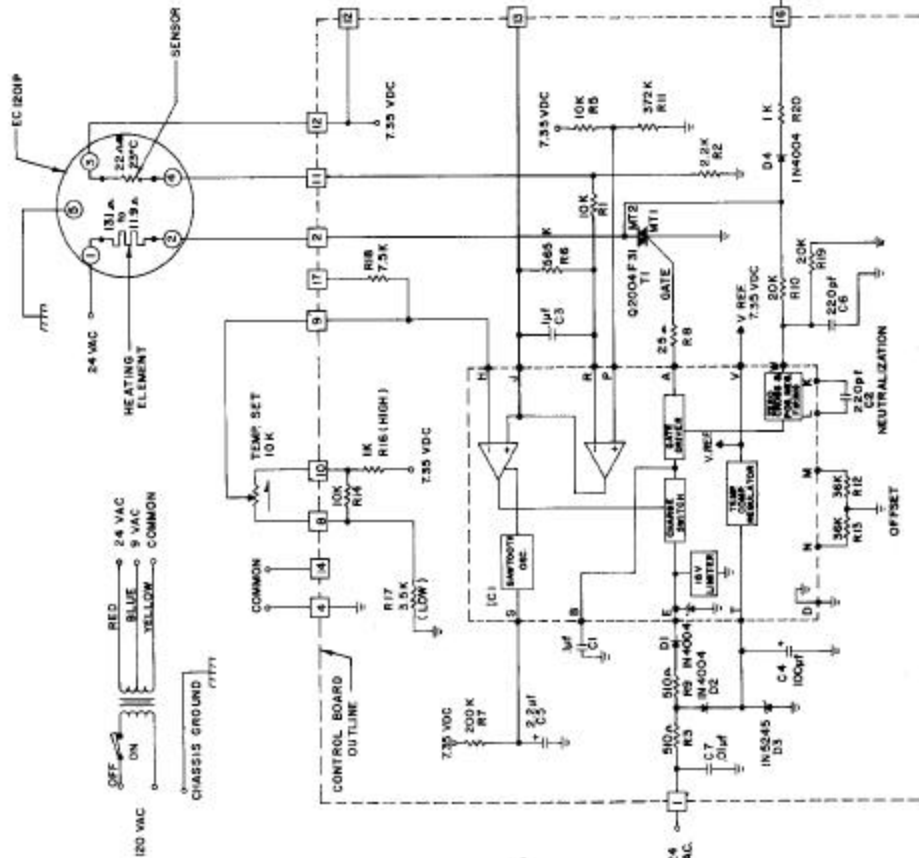
The following assumes use of WC1000 calibration reference unit.

 1. Indicator lamp not flashing approximately 35 degrees F before going out.
 - a. Verify C5 (2.2uf capacitor) is connected to circuit board. Waveform across capacitor is 1 volt P-P 10 Hz saw tooth. Replace capacitor or replace control board.
 2. Unit out of calibration equal amount on both A & B resistor.
 - a. Loosen locknut on temperature set potentiometer and rotate potentiometer body to align knob with correct temperature.
 3. Check capacitors for attachment on control board. Check Pin 3 to Pin 4 on tool socket for 7.35 volts \pm .6 volts. Replace control board.
 - C. EC2000 calibration troubleshooting

The following assumes use of WC1000 calibration reference unit.

 1. Check unit by changing the set knob from full CW to full CCW. Indicator light should be off at full CCW and on at full CW. Replace control board.
 2. Indicator lamp not flashing approximately 35 degrees F before going out.
 - a. Verify C5 (2.2uf cap.) is connected to control board. Check waveform across C5: 1 volt P-P 10 Hz saw tooth.
 3. Fails calibration checks on "Set" side.
 - a. Connect a jumper from TP12 to TP17 at display board. Place "Set/Read" switch to "Set". If display reads $<$ 997 or $>$ 003 over range.
 - b. Replace display board.
 4. Fails calibration check on "Read" side.
 - a. Connect a jumper from TP12 to TP13 at display board. Place "Set/Read" switch to "Read". If display reads $<$ 996 or $>$ 004 over range.
 - b. Replace display board.
- IV. Display problems
 - A. No display or low brightness display.





1. Test for 9-10 VAC at TP4 and TP15 (117 VAC line voltage) on display—replace transformer or check wiring.
2. 9-10 VAC present—replace display board.
- B. Missing segments or numerals in LED display.
 1. Replace display board.
- C. Display readings not correct.
 1. Check calibration. Refer to Step III.
- D. Display readings unsteady.
 1. Check for steady readings on "Set".
 - a. Steady on "Set", unsteady "Read"—check EC1201P for defects.
 2. Unsteady on both "Set" & "Read".
 - a. Check AC line for excessive noise.
 - b. Low line voltage.
 - c. Check for attachment and value of 100 uf, 470 uf, 1 uf, 10 uf and 2.2 uf capacitors.
 - d. Replace display board.
- V. High tip voltage or indication of circuit component damage.
 - A. Check EC 1201P tool per step 3 of EC1201P troubleshooting guide.
 - B. Check continuity from pin 5 of tool receptacle to line cord ground pin—1 ohm max. Remove case bottom and check green wire continuity from line cord—replace line cord.

EC1201P SOLDERING TOOL TROUBLESHOOTING GUIDE

CAUTION: Disconnect from power supply before attempting repairs.

WARNING: Power unit can be damaged by defective tool. Do not plug into known good power unit before troubleshooting.

- I. **Tool does not heat**—power unit tests good.
 - A. Check resistance—Pin 1 to Pin 2, 12-14 ohms.
Pin 5 to barrel, 1 ohm max.
 1. Replace heating element. Remove two screws from element flange. Grasp handle and black heat insulator in one hand and pull heater unit with other hand to unplug it from the handle assembly. Check resistance at element pins. Two closely spaced pins should show 12-14 ohms, grd. pin should show less than 1 ohm.
If element checks good, proceed to step B. 1.
If element checks bad, replace with new element.
 - B. Check resistance—Pin 3 & Pin 4, 21-27 ohms.
Also check resistance—Pin 3 to Pin 5 and Pin 2 to Pin 5, 1 megohm minimum.
 1. If tool fails above test—Disassemble tool as follows.
 - a. Place tool on workbench with flat at rear of handle up.
 - b. Insert 3/16" flat blade screwdriver into slot at rear of handle. Compress cord by pushing downward and toward handle until cord is pushed into handle (do not pry on handle). This releases the strain relief catch. Slide handle down cord to expose sensor connections.
 - c. Check resistance—Black lead on sensor assembly to Pin 3—0.3 ohm max.—and red lead on sensor assembly to Pin 4—0.3 ohm max. If resistance is higher, repair or replace the cord connector assembly.
 - d. If measurements in step c. above are correct, unsolder black & red leads from sensor assembly. Remove sensor by pushing sensor out of heat insulator until spring snaps out of retaining groove in sensor body. Replace sensor by inserting sensor fully into heat insulator and forcing spring into retaining groove in sensor body. Resolder black & red wires to sensor terminals.
 - e. To replace line cord, grasp black wire with pliers, restrain heat insulator, and pull sharply to remove crimp receptacle from insulator. Repeat for white and green wires (crimp receptacles will be damaged by this, new crimp connectors are supplied with replacement cords). Discard old cord and thread blue handle over new cord. Insert crimp terminals into heat insulator (black and white wires in closely spaced (holes) with anti-rotation tabs on crimp terminals toward center of tool (terminals will not insert otherwise).
 - f. Install strain relief by forcing the two strain relief parts together on the cord 4.5" from flange with flat side of strain relief clamp aligned with one of the screws in the heat insulator. Gently pull handle up over sensor until it engages heat insulator. Align heat insulator screw holes with screw bosses in handle. Heat insulator is keyed such that it will not go in unless it is rotated to the proper position. Align strain relief flat with handle stop bar by looking into the small end of the handle. Pull cord evenly until strain relief snaps in place. If this cannot be accomplished, the strain relief may not be latched together properly on the cord or it is not aligned with the handle properly.
 - g. Install two #2x1" screws in flange. Do not overtighten. Check sensor freedom by removing tip barrel and checking tip for at least 1/16" spring action before bottoming in heater barrel.
- II. **Tool Overheating**—**Note:** Tool will overheat with tip removed. If Pin 3 to Pin 4 of tool receptacle is less than 21 ohms, sensor or sensor wiring is shorted. Refer to I.B.1.b. for disassembly and check sensor resistance at sensor terminals with wires removed. Replace sensor or cord.
- III. **High voltage on tip**—Indication of circuit component damage.
 - A. Check tip ground for maximum 1 ohm resistance from heater barrel to connector pins.
 - B. Remove heating element (Step I.A.1.). Check ground pin to barrel and pin 5 to receptacle in heat insulator.

CUSTOMER SERVICE

Should your EC unit require repair or adjustment it may be sent to the following address:

COOPER GROUP — WELLER PLANT

State Road

Cheraw, SC 29520

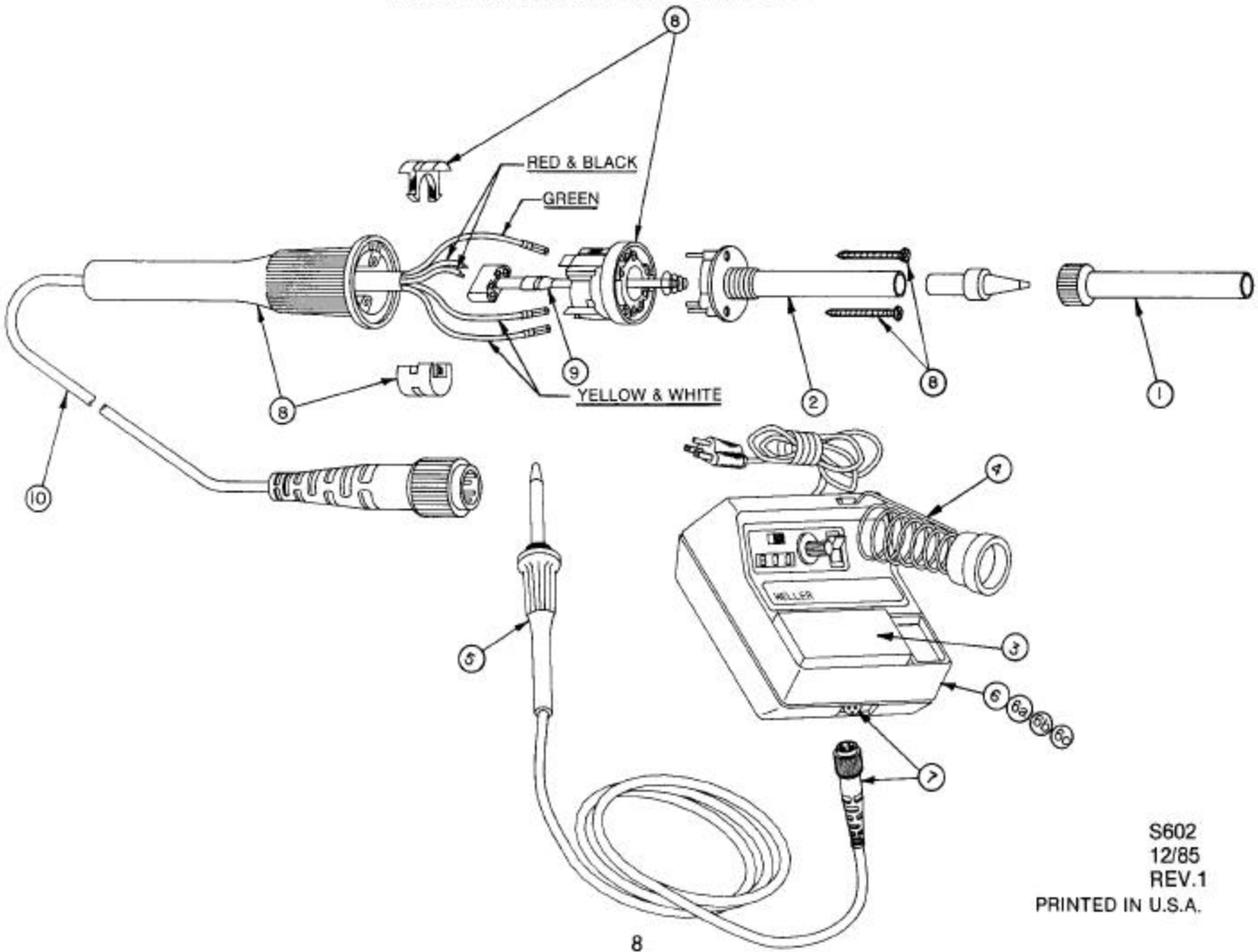
Attn.: Repair Dept.

REPLACEMENT PARTS FOR EC1000(D)/EC2000(D)

(Please state product model number when ordering)

KEY NO.	PART NO.	DESCRIPTION
1	BA60	Barrel Nut Assembly
2	EC234	Heater Assembly
3	EC205	Sponge
4	TC204	Iron Holder w/Funnel
5	EC1201P	Soldering Tool w/ETA Tip
6	EC2002B	Power Unit Only, 120V.
6a	EC2002DB	Power Unit Only, 240V.
6b	EC1002B	Power Unit, 120V.
6c	EC1002DB	Power Unit, 240V.
7	EC213	Plug Receptacle Kit
8	EC232	Handle Assembly
9	EC229	Sensor Assembly w/Spring
10	EC233	Cord Assembly
Not Shown	EC239	Control Board Complete—EC1000(D)
Not Shown	EC240	Control Board Complete—EC2000(D)
Not Shown	EC236	Display Board—Calibrated °F.
Not Shown	EC238	Display Board—Calibrated °C.
Not Shown	EC215	Power Transformer, 120V.
Not Shown	EC219	Switch
Not Shown	EC216	Power Transformer, 240V.
Not Shown	WC1000	Calibration Reference Unit
Not Shown	SF60	Funnel—Stainless Steel

REPLACEMENT PARTS ILLUSTRATIONS:



S602
12/85
REV.1

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