HCT-1000

HCT-1000
User Guide

METCAL
ELECTRONICS BENCH TOOL SOLUTIONS

INTRODUCTION

The HCT-1000 is a hand-held convection rework tool. It features digital controls, multiple modes of operation, internal or external feedback control and integrated vacuum pick-up for component placement and removal. Additionally, this unit may be connected to the PCT-1000 as part of the Modular Rework System.

CONTENTS

SAFETY

Intended Use:

WARNING: Use of this equipment in ways other than those described in this User Guide may result in injury to persons or damage to property. Use this equipment only as described in this User Guide.

OK International cannot be responsible for injuries or damages resulting from unintended applications of its equipment. Unintended uses may result from taking the following actions:

- Making changes to equipment that has not been recommended in the User Guide
- Using incompatible or damaged replacement parts
- Using unapproved accessories or auxiliary equipment

Safety Precautions:

- Do not operate this unit in excess of maximum ratings/settings
- Always wear appropriate personal protective clothing or apparel
- This equipment is for indoor use only

Warranty

OK International warrants the HCT-1000 hand-held convection rework tool power supply against any defects in materials or workmanship for one (1) year from the date of purchase by the original owner.

OK International warrants the HCT-1000 hand-held convection rework tool hand-piece (HCT-HV1) against any defects in materials or workmanship for one (1) year from the date of purchase by the original owner.

OK International warrants the HCT-1000 heater assembly (HCT-HTRASSY) against any defects in materials or workmanship for ninety (90) days from the date of purchase by the original owner.

This Warranty excludes normal maintenance and shall not apply to any opened, misused, abused, altered or damaged items. If the product should become defective within the warranty period, OK International will repair or replace it free of charge at its sole option. The replacement item(s) will be shipped, freight prepaid, to the original purchaser. The warranty period will start from the date of purchase. If the date of purchase cannot be substantiated the date of manufacture will be used as the start of the warranty period

2. HCT-1000 SPECIFICATIONS

Size	9” x 7” x 6” (229 mm x 178 mm x 152 mm)
Weight	12lbs (5.44 Kg)
Input Voltage	100-240 VAC, 50/60 Hz
Rated Power	600W
Pollution Degree Category	II
Storage Temperature	-10°C to 60°C (14°F to 140°F)
Operating Temperature	0°C to 50°C (32°F to 122°F)
Air Pump Type	Diaphragm
Air Flow	5-25 l/min
Vacuum Pump	15” Hg (381 mm Hg)
Control Temperature	450°C
Surface Resistivity	$10^{7}\Omega$ to $10^{11}\Omega$
Noise Level	< 55 dB
Certifications	TUV, CE
Max. Relative Humidity	80% for temperature up to 31°C (87.8°F) Decreasing linearly to 50% relative humidity at 40°C (104°F)
System Modes	HCT, MRS
Operational Modes	Setup, Run, Manual, Active Setup
Memory Locations	50
Display	LCD 20 X 4 display segments

System Includes	Description
HCT-PS1000	HCT-1000 Power Supply
HCT-HV1	Hand-piece with integral vacuum, cord and connector
HCTA-TH1	Hand-piece tool Holder
HNA-1	Nozzle Adapter
HCTA-NW1	Nozzle Wrench
HCTA-VC-KIT	Vacuum Cup Kit (4), 3/16", 1/4", 5/16", 7/16"
AC-TCK-36-36	Thermocouple, 36 AWG
HCTA-CC	Communications Cable, 4’
HN-J0005	Nozzle 5mm Diameter
Accessories	
HCTA-VC24	Vacuum Cup, 3/32” (2.38mm)
HCTA-VC50	Vacuum Cup, 3/16” (5.00mm)
HCTA-VC64	Vacuum Cup, ¼” (6.4mm)
HCTA-VC80	Vacuum Cup, 5/16” (8mm)
HCTA-VC11	Vacuum Cup, 7/16” (11mm)
AC-TCK-40-36	Thermocouple, 40 AWG
HCT-HTRASSY	Heater Assembly
HCT-FS2	Footswitch, Dual, HCT-1000
HCT-NC	Nozzle Carrier, HCT-1000 nozzles

3. Unit Identification

Figure 1 HCT-PS1000 Power Supply

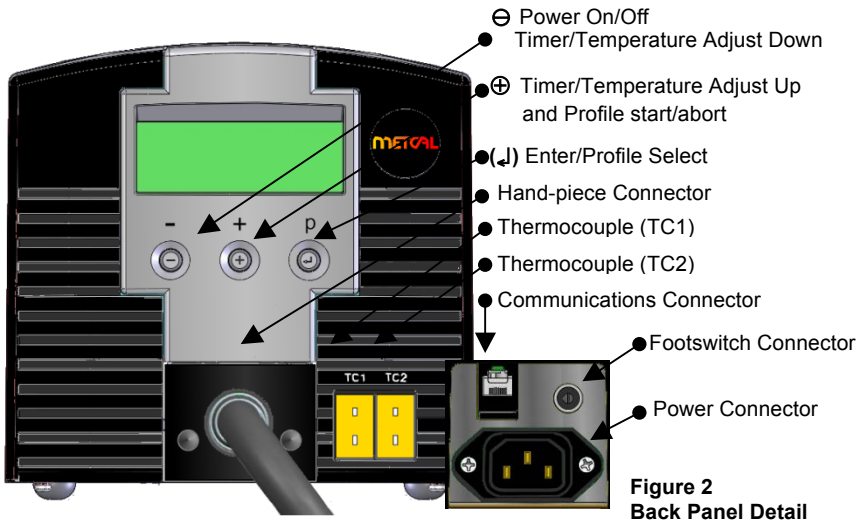


Figure 2
Back Panel Detail

Figure 3: Run Mode, Before Profile Start

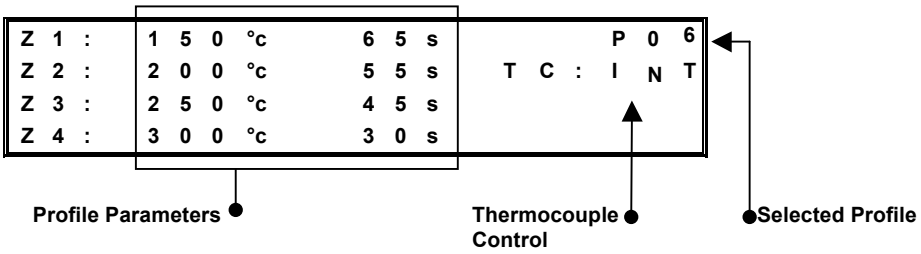
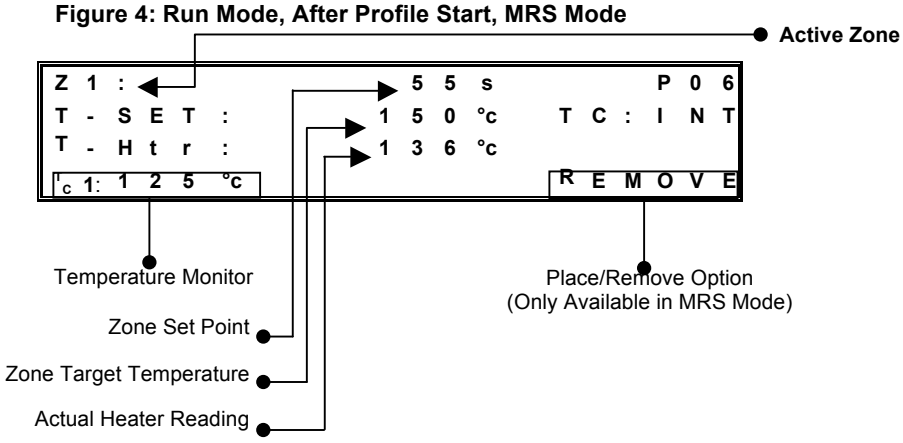


Figure 4: Run Mode, After Profile Start, MRS Mode



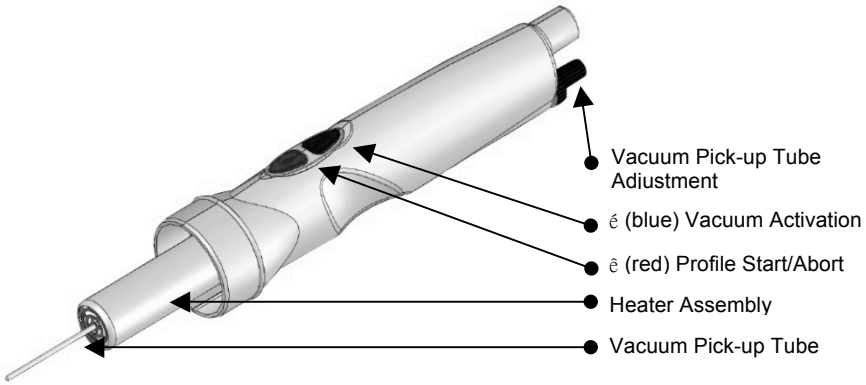


Figure 5 HCT-HV1 Hand-piece Assembly

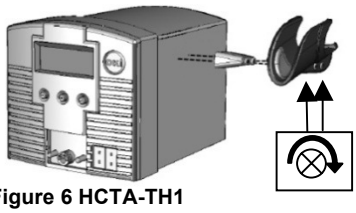


Figure 6 HCTA-TH1

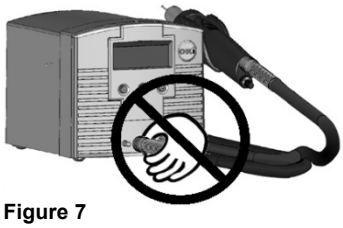


Figure 7

4. Setup and unit operation

1. Basic unit setup

1. Connect the hand-piece assembly, HCT-HV1, to the power supply.
2. Plug the power cord into the power connector (Figure 2). Plug the power cord into a grounded wall socket of the rated input line voltage.
3. Turn On the unit by pressing the Power button ⊖ momentarily.
4. To Abort a Profile (to the Cool-Down zone*) press and hold the ↓ (red) on the footswitch or ↓ (red) on the hand-piece down while in Run Mode.
5. Once the cool zone is finished, turn off the unit by pressing the Power button ⊖ momentarily. **Note ~** you must be out of set-up mode in order to do this. I.e. no flashing numbers on the display.

2. System Mode Selection

The HCT-1000 has two system modes of operation.

- The first mode is **HCT**. In this mode, the HCT-1000 is used as a standalone handheld convection rework tool.
- The second mode is **MRS.** In this mode, the HCT-1000 is used as part of a **M**odular **R**ework **S**ystem. The unit is connected via cable to a PCT-1000 and may be used with the ATH-1100A Adjustable Tool Holder. In this mode the HCT-1000 provides timing control for both units and the ATH-1100A allows repeatable place and remove operations.
- Plug the Communications Cable into the Communication Connector (Figure 2 above) on the HCT-1000 and the PCT-1000. When connected in MRS mode the time setting on the PCT-1000 will display "- -".
- Selection of the System mode is made in Setup mode, refer to section 3.1. Additional operational options are available, refer to section 3.5.

3. Operational Mode Selection

The HCT-1000 has four operational modes. The operational modes are Setup, Run, Manual and Active Setup. The Setup mode is for modifying system or profile parameters. The Run mode is for operating the unit with a profile that uses four zones of heating. The Manual mode is for operating the unit with a single zone of heat and no time limit. The Active Setup mode allows for the changing of parameters within a running profile.

1. Setup Mode

1. Press the Mode button **(↵)** once to start "P:" flashing
2. Use the ⊕ / ⊖ buttons to scroll through the profiles
3. Press **(↵)** to select the desired profile
4. Press and hold **(↵)** for 3 seconds to activate program mode (first temperature in zone 1 will flash).
5. **Run Mode setup; proceed to step 3.1.6.1; Manual Mode setup proceed to step 3.1.7.1.**
6. **Run Mode Setup**
    1. Use the ⊕ / ⊖ buttons to change the temperature to the desired value. (**Note**: continually pressing either the ⊕ or ⊖ buttons for 5 seconds will change the count up/down in an accelerated mode)
    2. When the value is set, press **(↵)** to move to the next parameter.
    3. Repeat steps 3.1.6.1 & 3.1.6.2 until profile is programmed. **Note**: In the Cool-Down Zone you can only modify the Time parameter
    4. Proceed to step 3.1.8.
7. **Manual Mode Setup**
    1. Use the ⊕ / ⊖ buttons to change the temperature to the desired value. (**Note**: continually pressing either the ⊕ or ⊖ buttons for 5 seconds will change the count up/down in an accelerated mode)
    2. Set the Time for Zone 1 to a value greater than 300 seconds. The display will now show the word MANUAL and Z2, Z3, Z4 will no longer be shown on the display.
       Note: Manual mode profiles do not have a time requirement and once activated will run until the profile is stopped. . However, during the cool zone, the profile can be restarted at any time by pressing ⊕ (or the red button on the footswitch or handpiece)
8. Press **(↵)** to move to the next parameter. This is the **HCT** or **MRS** option. Use ⊕ or ⊖ to switch between **HCT** or **MRS** or press **(↵)** to skip
9. Press **(↵)** to move to the next parameter. This is the Internal or External TC option. Use ⊕ or ⊖ to switch between **Int** or TC1 or press **(↵)** to skip.
   Note: When TC1 is selected, TC1 becomes the master thermocouple and provides feedback to the power supply.
10. Press **(↵)** to move to the next parameter. This is the Airflow option (**AF**). Use ⊕ to increase or ⊖ to decrease the airflow. The range is adjustable from 1-10. Note: The Air Pump will turn on while adjusting the Airflow. Press **(↵)** to skip.
11. Press **(↵)** to move to the next parameter. This is the Security Lockout function. HCT-1000 systems are supplied with a lockout feature to prevent operators from editing profiles etc. To activate this function, a 4 digit number must be entered within a program setup as explained below.If the pass code is set at 0000 the programs are not protected.
    1. When C: 0000 appears on the screen, you can select a 4 digit pass code.

2. When the first digit flashes, use the ⊖ or ⊕ buttons to select the preferred number.
3. Press **(↵)** and repeat step 2 for all digits.
4. Press-and-hold **(↵)** to quit code entry.
5. From this point on you can only edit profiles after entering the correct code

Security Lockout Notes:

- You can 'turn off' the pass-code protection by 1st going into Program mode, entering the current code then setting the new code to '0000' – All users now have full access to all program functions.
- One code protects all profiles, not individual profiles.
- If the Pass-code is lost or forgotten then the Master Reset function will restore the factory defaults **including erasing the pass-code**

Master Reset.

To reset the unit it to factory settings, the following procedure can be used.

- Press and hold ⊕ and (↵)
- Whilst keeping ⊕ and (↵) depressed, switch the unit on using ⊖

PLEASE NOTE: Use of the master reset will erase all stored programs.

12. Once required changes have been made, press and hold **(↵)** for 3 seconds until the LCD stops flashing, to set the profile to memory and exit setup mode. This operation can be actioned at any step while in Setup Mode.

2. Run & Manual Mode

1. Turn on the unit by pressing the Power button⊖.
2. HCT start-up message and Software Rev # are momentarily displayed before displaying last-used profile settings. **Note**: The unit may display MRS if that was the last operational state.
3. **IMPORTANT** ~ If "TC: **TC1**" is displayed on the panel (see Figure 4 above) ensure that the external thermocouple is suitably positioned in the heat path. Neglecting to do this could result in premature heater failure and possible heat damage to items in the heater path.
4. Select the desired profile.
5. When the chosen profile is shown, press **(↵)** to select the desired profile
6. To start the profile, depress the 🡻 (red) on the footswitch or 🡻 (red) on the hand-piece once
7. As the profile runs you will see the current zone, time remaining, heater value and temperature set point. Manual mode profiles will display "Manual" and will not display time remaining.
8. To quit the profile, simply depress the 🡻 (red) on the footswitch or 🡻 (red) on the hand-piece. The profile will skip to the Cool-Down Zone. During the cool zone, the profile can be restarted at any time by pressing a red button on the footswitch or handpiece.

3. Active Setup Mode

1. Select Profile to be modified as per steps 1 → 3 above
2. To activate Active Setup Mode press **(↵)** for 3 seconds then depress the 🡻 (red) on the footswitch or 🡻 (red) button on the hand-piece once the temperature in Z1 has started to flash
3. Profile will start to run and 'SETUP' will be displayed on LCD
4. To modify the current zone set-temperature use the ⊕ / ⊖ buttons
5. To *increase* the time of the current zone press and hold the **(↵)** button as the zone ends. Instead of stepping onto the next zone the current zone

time-setting will increment the original setting for as long as you keep the **(↵)** button depressed. Releasing the button will allow the profile to progress onto the next Zone.*

6. To *decrease* the zone time, depress the 🡻 (red) on the footswitch or 🡻 (red) button on the hand-piece at the desired time. This will set the time to memory and advance the profile into the next zone.** **Note**: Steps 3.4.5 & 3.4.6 can be carried out simultaneously
7. Once required changes have been made, allow the profile to finish. Press and hold **(↵)**, until the LCD tops flashing, to set the profile to memory and exit setup mode
8. ***Note**: feature not available in Cool-Down Zone
9. ****Note**: This feature is NOTavailable in the Cool-Down Zone. Pressing a red button on the footswitch or handpiece will return you to Zone 1 again. If Cool Zone time adjustments are required they must be made in Run Mode Setup (step 3.1.5)

5. Additional Features

1. Integrated Vacuum Pick-up

The vacuum pick-up tube has 1.0" (25.4 mm) of travel and is spring loaded to prevent damage to components during attachment.
Use an appropriate sized vacuum cup to make a seal on the component.

2. HCT System Mode

1. Press the 🡹 (blue) on the footswitch or on the hand-piece once to activate the vacuum pump and again to deactivate.

3. MRS System Mode – Place or Remove selection

1. To toggle between Place and Remove; press and hold the 🡹 (blue) on the footswitch or on the hand-piece for 3 seconds.

4. MRS System Mode - Place

1. Press the 🡹 (blue) on the footswitch or on the hand-piece once to activate the vacuum pump and again to deactivate.

5. MRS System Mode - Remove

1. The integrated vacuum pick-up will automatically activate the vacuum and retract the vacuum pick-up tube at the completion of Zone 4 (Z4) in Run mode. The vacuum will be active for the duration of the ZC (Cool-Down Zone).

6. MRS System Mode – Positive Vacuum Indicator

1. VAC will be displayed when the vacuum has been activated while in Setup or Run Mode (Figure 4). VAC will blink when a positive seal has been achieved with the component.

7. External Thermocouple Control

1. When using the HCT-1000 with the external thermocouple (TC1 see Figure 4 above), TC1 is used to provide external feedback control. Ensure that the thermocouple is placed in the heat path. Failure to do so may result in an error or damage to the component. TC2 can be used for temperature monitoring (refer to 1.5.7)
2. When using the HCT-1000 with external thermocouples in MRS mode, TC1 on the HCT-1000 becomes the master thermocouple and is used to provide external feedback for the entire system. TC2 on the HCT-1000 and TC1 & TC2 on the PCT-1000 can be used for temperature monitoring only (refer to 1.9).

8. Temperature Monitoring

1. While using the HCT-1000 with the internal thermocouple (INT see Figure. 3 above), TC1 and TC2, the external thermocouples, may be used to monitor temperature.
2. Attach a thermocouple to TC1 and/or TC2 and attach to the area to be monitored. When attached, the appropriate thermocouple will be displayed (see Figure 4 above).

9. TC1 Input calibration.

1. TC1 Input calibration is possible using the following procedure.

- Connect a calibrated temperature input control box to TC1
- Run a complete profile to ensure the units internal temperatures are stable.
- To enter calibration mode, press and hold the ⊖ and **(↵)** buttons for five seconds.
- This will enter you into a calibration mode.
- Adjust temperature to suit external calibration box using + and – buttons.
- Press **(↵)** to return to normal run mode.

6. Nozzle Attachment

1. Secure the Nozzle Adapter (HNA-1) to Heater Assembly
   1. Loosen clamp screw counterclockwise (Figure 6, 1)
   2. Close the clamp (Figure 6, 2).
   3. Slide the Nozzle Adapter up the heater assembly (Figure 5) until it stops.
   4. Tighten the clamp screw clockwise (Figure 6, 1) for firm fit of the adapter to the heater assembly. Once adjusted, removing the adapter is done by opening the clamp and sliding the adapter off the heater assembly.

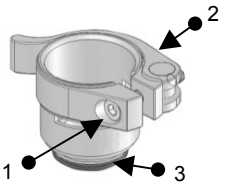


Figure 8: Nozzle Adapter (HNA-1)

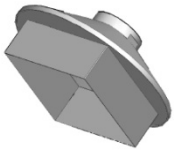
2. Nozzle to Nozzle Adapter
   1. Select the proper nozzle for the application.
   2. To attach; screw the nozzle to the nozzle adapter (Figure 6, 3); tighten clockwise with Nozzle Wrench.
   3. To remove; unscrew the nozzle from the adapter (Figure 6, 3); loosen counterclockwise with Nozzle Wrench.

3. Nozzle Selection
   1. Select the appropriate sized nozzle for the application. This is only a sample of the available nozzles.

HN-J0005,
5.0MM

HN-B1010
10MM x 10MM

HN-1818
18MM x 18MM



HN-B4040,
40MM x 40MM

7. Operation

1. **De-Soldering Components using convection heat**
   1. Select the proper nozzle, and secure it to the adapter.

2. Set the desired profile.
3. Move the nozzle close to the component leads; maintain 3-5 mm distance. Use the hot air to melt the solder
4. When solder is molten, use the integrated vacuum, tweezers or other suitable tool to remove the component from the circuit board

2. **Soldering Components using convection heat**
   1. Choose the proper nozzle, secure it to the adapter.
   2. Apply the right amount of solder to the circuit board; position the component on the circuit board.
   3. Set the desired profile.
   4. Move the nozzle closer to the component leads, blow hot air onto the leads and melt the solder.

8. Troubleshooting

1. Unit does not power ON
   - Check the power cord
   - Check to see that you have mains voltage
2. **OH** displayed on the LED screen
   - Unit has exceeded the internal safety cut-off
   - Allow unit to cool
   - Check placement of thermocouple (if used)
   - Reset the unit by cycling the power
3. **TCFAULT** displayed on LED screen
   - Check location of thermocouple
   - Ensure the thermocouple is firmly inserted into the correct TC connector
   - Replace thermocouple if problem persists
4. Flashing zone and temperature parameters while in Run Mode
   - Indicates the unit cannot meet the programmed time and temperature as set

9. Maintenance

The Hand-piece (HCT-HV1) will be part of OK International's Service Exchange Program or the heater assembly (HCT-HTRASSY) can be purchased separately as a replacement part.