



TABLE TOP REFLOW OVEN T100A

User's Manual



Madell Technology Corporation
<http://www.madelltech.com>

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1. Specifications

Specifications of the T100A table top reflow oven:

- 10, 20 or 40 temperature and time control points. Can be specified to suit different solder paste and circuit boards. Default 20 control points. Changing to 10 or 40 can be accomplished with micro programming.
- Temperature accuracy: $\pm 2^{\circ}\text{C}$
- Reflow time: $3\text{min}\pm 1\text{min}$
- Highest temperature: 320°C
- Heating mode: IR + hot air
- Heating area: $310\text{mm}\times 210\text{mm}$ (Max PCB size: $350\text{mm}\times 245\text{mm}$)
- Can save one 40 points profile, or two 20 points profile, or four 10 points profile.
- Fan cooling
- Power supply: 220V, 50Hz, single phase
- Power consumption: 3.7KW, average: 1.4KW.
- Weight: 39Kg
- Dimension: $610\text{mm}\times 440\text{mm}\times 310\text{mm}$

2. Installation

Please check for shipping damages and missing accessories after receiving your order.
Please read this manual carefully before using your reflow oven.

2.1 Location and environment:

Do not install the reflow oven in an area with the following conditions: dust, corrosion gas, damp, high temperature, strong RF emission, shaking and rocking. Do not leave any flammable objects or chemicals close to the reflow oven.

Environmental requirements:

- Temperature: $0\sim 38^{\circ}\text{C}$
- Moisture: $< 85\%RH$
- Storage temperature: $-10\sim 60^{\circ}\text{C}$
- Storage moisture: $< 85\%RH$

2.2 Installation

- Make sure the power supply cable and socket should support at least 15A, with a reset fuse.
- Power supply should be single phase 220V, $> 3.7\text{KW}$.

- The reflow oven uses a 3-pin power plug; make sure the ground connection is good.
- The working table should be strong enough to support the weight of the reflow oven.

2.3 Front Panel Controls



There are four display windows on the front panel, as described below:



PV window: shows the actual oven temperature inside the working area. This window also shows assembly symbols for high level programming.



SV window: shows the programmed temperature.



STEP window: shows the control point the reflow process is at.



PN window: shows the number of profile the reflow process is running.

Reflow status LED's:



These LED's indicate the working status of the reflow oven at the current time.



Green ascending LED, indicating the oven temperature is rising.



Green horizontal LED, indicating the oven temperature is maintaining.



Green descending LED, indicating the oven temperature is falling.



Out LED, indicating the heating tubes are on.
Run LED, indicating the reflow process is on.
HLD LED, program execution is stopped.



EV1 indicates the cooling fan is on. Ev2 indicates the done music is on. The other two LED's are for manual PID control. Please ignore them in general use.

Control keys:



Cycle key, press to enter into the next screen, mainly used to program duration in a control point.



Up and down keys, to increase or decrease temperatures or time durations.



Press to save a newly entered value.



Press to switch to program mode.



Profile select key.



Control point select key.



Press to start or stop the reflow process.

2.4 Start to use

A. Before Power on:

- Check for loose wires, short circuits caused by transportation or installation. Check carefully if the power supply plug is shorted to ground, and also the power socket has good ground connection.
- Make sure your power supply meets specifications listed above.
- Make sure no packing material inside the heating draw.

B. Power on:

Turn on the power switch.

Put the PCB inside the heating area, close the draw, and press the RUN key. The reflow process starts. Real time temperature displays in the PV window. The reflow process is finished when the music is on. Open the draw, get out the PCB. Repeat the same procedure for another reflow process.

3. Reflow Profiling

3.1 Factory default profile. The following table shows the factory default profile in Profile #1.

Control Point	Temperature	Time	Total Time
1	88	0.10	10
2	100	0.08	18
3	130	0.10	28
4	135	0.05	33
5	140	0.05	38
6	146	0.05	43
7	148	0.04	47
8	151	0.15	62
9	155	0.12	74
10	165	0.30	104
11	170	0.08	112
12	176	0.05	117
13	183.5	0.08	125
14	198	0.06	131
15	200	0.08	139
16	210	0.05	144
17	222	0.05	149
18	2	0.05	154

3.1 Program mode

After power on, if the STEP window shows a - sign, the reflow oven is in programming mode. If not, press the PRG key on the control panel to enter into programming mode.

Note: The PV window may display irregular symbols at this mode. Please ignore it. They are for service use.

3.2 Profile setting

When the reflow oven is in program mode, press the PRG key, the PV window displays “PROG”. Press the STEP key, the STEP window displays 1, indicating the first control point in the current profile. The SV window shows the set temperature at this point. Press the ▲ OR ▼ key to change the temperature. Press the ENT key to save the new temperature. Press the Cycle key to set the duration at this control point. The SV window displays the duration at this control point. Press the ▲ OR ▼ key to change the time duration. Press the ENT key to save.

Press the STEP key at this time will start programming of the 2nd control point. The STEP window will display 2 at this time. Adjust the temperature and duration in the same procedure as in point 1. Control point 3, 4... can be adjusted similarly.

3.3 Profile selection

In program mode (see 3.1), press the PN key. The PN window displays 1, 2, and 3, F. Press the PN key to select profile 1, 2 or 3. **Do not select F. F is not for the T100A model. All the saved control points will be lost if F is selected.** Press ENT to save the selection. Profile 1 is factory default. It is supposed to suit most applications.

3.4 Reflow profile

Correct profiling is the key to a successful reflow process. The reflow oven profile should be as close as possible to the solder paste manufacturers' recommendation. Temperature rising rate should be controlled at 1-2°C/Second. Components and circuit boards may get damaged if temperature rises too fast. In addition, flux ingredients in the paste may boil and splash, generating tiny solder balls. **Reflow peak temperature is generally set 30-40°C higher than the paste melt temperature, reflow time 30~60 seconds.** Reflow temperature too low or reflow time too short will cause partial soldering or no soldering at all. Reflow temperature too high or reflow time too long will cause soldering point oxidization, damage components and circuit boards.

Considerations in profile setting:

- Set the profile by paste specifications.
- Set the profile by PCB material, thickness, layers, dimensions. Temperature should be higher for aluminum based circuit board than regular ones. Multi-layer or large circuit boards also need higher temperatures.
- Set the profile in consideration of circuit components density, size of components, color, BGA, CSP chips.
- The displayed temperature may not reflect the circuit board temperature. Board temperature normally is lower than the displayed temperature.

4. Operation

4.1 Operation

Press the RUN key to start the reflow process. The RUN and OUT LED's will be on. The OUT LED indicates the heating elements are emitting. The PV window displays the current actual temperature, SV windows display current set temperature. Press the RUN key again will stop the reflow process. All LED's will be off at this time. The cooling fan will be on after the reflow process is finished. Press the RUN key to stop the ending music and cooling fan.

Note:

- It is not possible to modify the profile when the oven is in a reflow process.
- The circuit board should be smaller than the effective heating area 310x210mm.

- Open and close the heating draw slowly to avoid components shifting.
- A specified operator should be by the reflow oven when it is running.
- Do not touch the temperature sensor inside the reflow oven.

4.2 Turn off the reflow oven

Wait till the temperature falls below 50°C before turning off the reflow oven.

5. Safety Precautions and Maintenance

5.1 Safety Precautions

- Use a power switch with reset fuse. It may cause physical injuries, shock and fire if not doing so.
- Make sure the power ground pin is connected to ground. Do not leave it unconnected. It may cause physical injuries, shock, damage, or fire if not doing so.
- Unplug the power cable whenever it is necessary to open the reflow oven enclosure. It may cause shock and fire if not doing so.
- Do not put fingers on the fan blades. It may cause physical injuries.
- Do not disassemble the reflow oven circuits and structure. It may cause permanent damage to the machine.
- Do not block the heat outlets. Do not place objects on the reflow oven. It may cause permanent damage to the machine.
- Do not watch too closely over the view window. Temperature of the view window glass may reach over 150°C. It may cause physical burn or injures.

5.2 Maintenance

- Cleaning: Wait till the reflow oven cools down before cleaning. Alcohol can be used to clean the inside.
- Temperature sensor: The temperature sensor is located on the up part, close to the heating elements. Do not hit or shock the tip of the sensor. Clean it regularly with 100% alcohol for accurate temperature measurement.
- Make sure power connection is good.

5.3 Trouble shooting

Solder paste does not melt:

It is necessary to check the heating elements if the solder paste does not melt at all after a reflow cycle. Heating elements can be checked visually from the front view window. Change burnt or damaged heating elements promptly. If the solder paste still does not melt, raise the temperatures 2-5°C at control points 12-15, and 3-10°C at control points 16-18. Please contact us if the reflow oven still does not work properly.

Note: It is import to change the heating elements by a trained technician or engineer. Otherwise, physical injuries or machine damage may happen.

Procedures to replace a heating element tube:

- A heating tube may be bad if it does not light up.
 - Tune off the power, unplug power cable, lift up the top cover of the machine, wait for the machine to cool done.
 - Loose the china caps on both sides of the heating tube, take them off. Unscrew the wire connectors.
 - Take out the bad heating tube. Install a new one in the opposite procedure.
- Close the top cover, plug in power, turn on the oven and check if the new tube works.

No display, fan does not work:

If power supply has no problem, it needs attention by a service professional.

Cooling fan makes noise:

Unplug the power cable, lift up the upper cover, and check if fan blades hit something. If it is true, adjust the fan blades position and tighten the screws.

Unusual smell:

PCB boards may get burnt because of too high reflow temperature setting, or paper, plastic get into the heating area.

View window glass break:

Reflow temperature set too high.

Happy Reflowing