Zhejiang NeoDen Technology Co., Ltd.

User Manual V1.1
Reflow Oven NeoDen IN12

Power saving
with built-in smoke filtering system
With smart temperature curve testing system
Easy operation

Content

Attention ! Please read the user manual carefully before operating this machine.

1. Introduction

IN12 is a newly designed and manufactured reflow oven by NeoDen Tech. It has 12 temperature zones, unique heating module design, intelligent control system, built-in soldering smoke filtering system, which makes it intelligent, innovative, compact and high-performance.

Features

1. Built-in soldering smoke filtering system, effective filtration of harmful gases, elegant appearance and eco-friendly, more in line with the high-end use environment.

2. The control system has features of high integration, timely response, low failure rate and convenient maintenance.

3. The unique design of heating module has the characteristics of high temperature control accuracy, uniform temperature distribution in the thermal compensation area, high thermal compensation efficiency and low power consumption.

4. Hot air convection, excellent soldering performance.

5. High-performance aluminum alloy heating plate instead of heating pipe, both energy-saving and high-efficient, and transverse temperature deviation is significantly reduced compare to the similar reflow oven products in the market.

6. Heat insulation protection design, the casing temperature can be effectively controlled.

7. Smart control with high sensitivity temperature sensor, the temperature can be effectively stabilized.

8. Intelligent, the custom developed intelligent control system, easy to use and powerful.

9. Professional and unique 4-way board surface temperature monitoring system, can give timely and comprehensive data feedback in actual operation, which can effectively cope with any complex electronic products.

10. 40 working files can be stored for an easy loading during the working process.

11. PCB soldering temperature curve can be displayed based on real-time measurement.

12. Lightweight, miniaturization, professional industrial design, flexible application site, more user-friendly.

13. Energy saving, low power consumption, low power supply requirements, the ordinary civil electricity can meet the use. Compared with similar products in the market, the electricity costs that this machine can save for you within one year, enables you to purchase your second IN12.

14. The custom-developed stainless steel B mesh belt is durable and wear-resistant. Not easy to deform after long time using.

15. Beautiful and elegant indicator design with red, yellow and green alarm function.

16. Custom-developed drive motor based on the characteristics of the B mesh belt to ensure uniform speed and long life.

17. 17 .The mesh sprocket made of high-precision profile technology and the unique support structure can effectively reduce the vibration of the PCB in the reflow zones, and easily cope with the soldering of small size components such as 0201 and complex chips such as BGA/QFP/QFN.

18. The cooling zone with independent circulating air design completely isolates the influence of the external environment on the internal temperature chambers.

19. The optimized soldering fume filter systems tested by the dedicated airflow simulation software can filter harmful gases as well as ensuring IN12 can keep room temperature, reducing heat loss and reducing working power consumption.

20. The unique heating plate design effectively ensures IN12 will cool down evenly once the heating is stopped, and effectively prevents the deformation and damage caused by the rapid temperature drop

21. The internal thermostat is made of stainless steel, which is environment friendly and has no peculiar smell. The inner sides are equipped with insulation cotton to effectively prevent heat loss.

22. Hidden screen design is convenient for transportation, easy to use.

23. The control system adopts imported chips, and the temperature control accuracy reaches ±0.5%.

24. Adjustable wind speed in all heating zones and cooling zones, easily coping with various soldering requests.

25. The upper temperature cover is automatically limited once opened, effectively ensuring the personal safety for the operators.

26. Exclusively designed PCB guide device to realize the direct connection between the mesh chain and the conveyor.

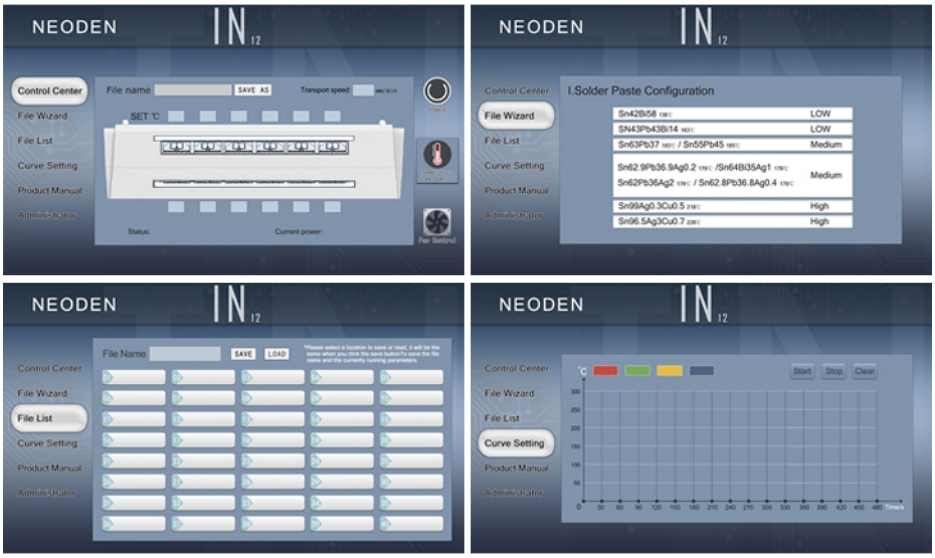
2. Specification

Model	NeoDen IN12
Heating Zone Quantity	Upper6 / Down6
Cooling Fan	Upper4
Controller	VGUS Microcomputer
Transmission	Mesh Chain Drive
Heating Type	Nichrome Wire & Aluminum Alloy Heating
Conveyor Speed	50～600 mm/min
Temperature Range	Room temperature～300℃
Temperature Accuracy	1℃
PCB Temperature Deviation	±2℃
Max Soldering Width (PCB Width)	350mm
Length Process Chamber	1354mm
Heat-up Time	30 min
Max Soldering Height (mm)	35mm (includes PCB thickness)
Operation Direction	left→right
Electricity Supply	AC 220v/single phase
Starting Power	2.4kw～4.8kw (adjustable)
Typical Working Power	approx. 2kw(1.5mm fiberglass PCB)
Machine Size	L2300mm×W650mm×H1280mm
Packing Size	L2420mm×W730mm×H1430mm
Net Weight	300KGS
Gross Weight	383KGS

3. Main Parts

3.1 Reflow Oven Main Body

3.2 Operating Panel



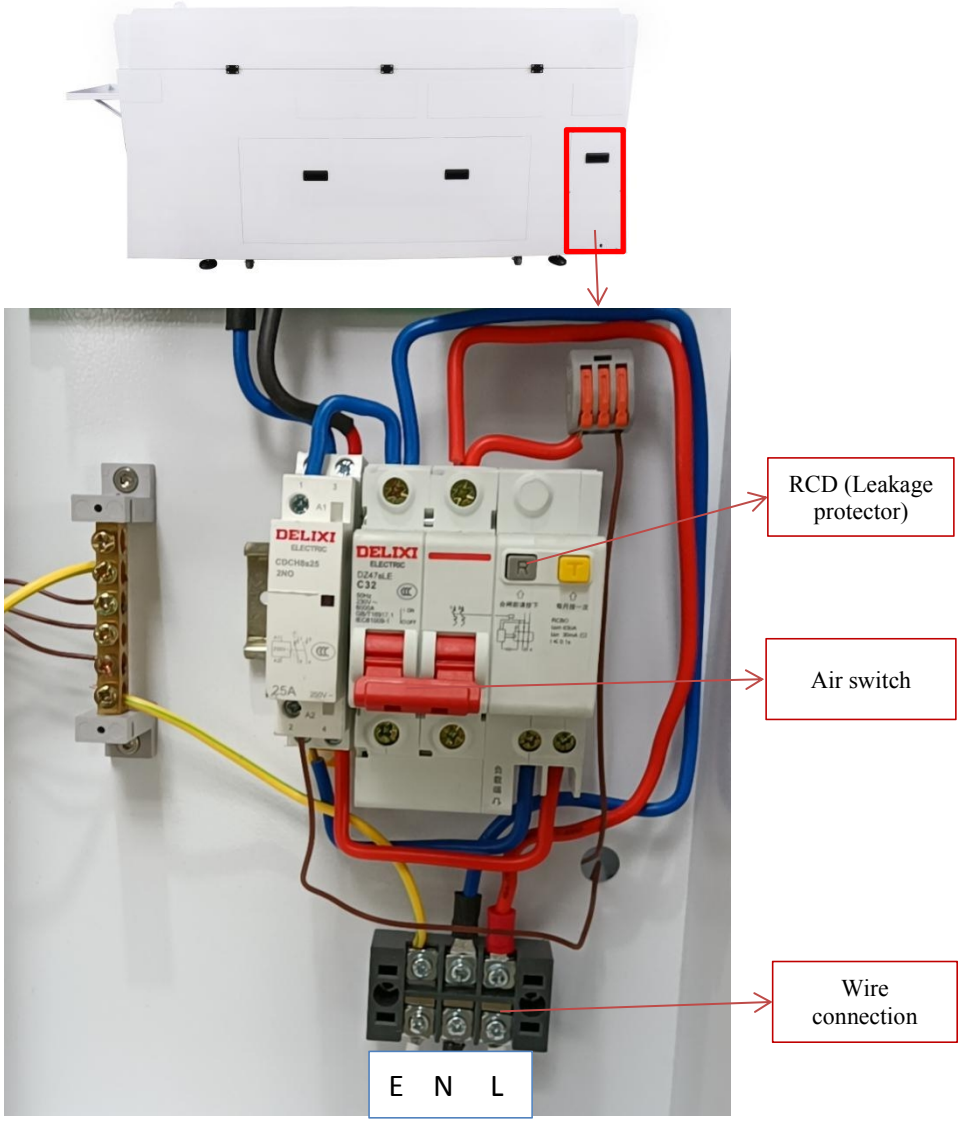
3.3 Cover and Heating Zone

3.31 Heating Zone

4. Installation Instruction

4.1 Power Supply Connection

IN12 power connection is single phase 220V, please connect it against local users actual situation. Connection as below picture: Open the cover on bottom right corner, L stands for the live wire, N stands for the zero wire, and E stands for the ground wire, connect to the 220V power supply. According to the wiring requirements, the L should be connected to one live wire, and the N should be connected to one zero wire; the E should be connected to one ground wire properly.



4.2 Installation Attentions

♦ Put down the bearing foot cup, level it and then connect it to the power supply, voltage requirement 220V；

♦ The electricity wire need no less than 2.5mm^2, it's better to directly use 4mm^2 (If 2.5mm^2, then it can only connect with one set of IN12 Reflow oven, other equipment Will not be allowed to connect together.

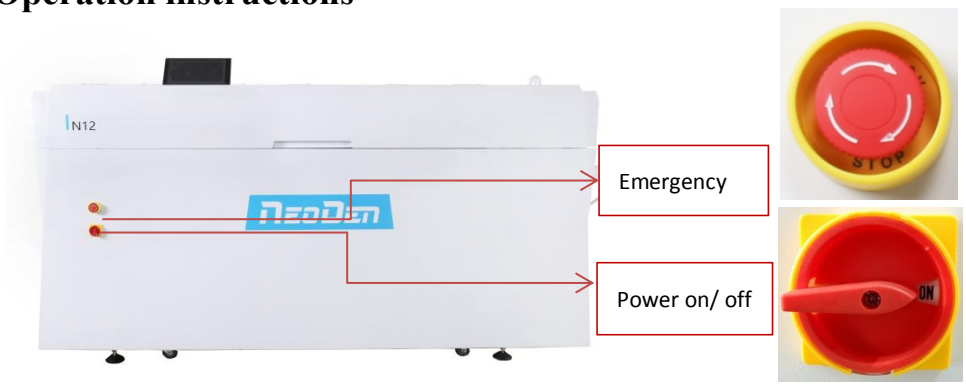
♦ The machine should be set in standard SMT workshop, stay away from flammable and explosive if couldn't meet previous requirements.

♦ Exposed wire harness should be well protected, prohibit to expose at the passage or flue in case of causing any accident.

4.3 Status of Indicators

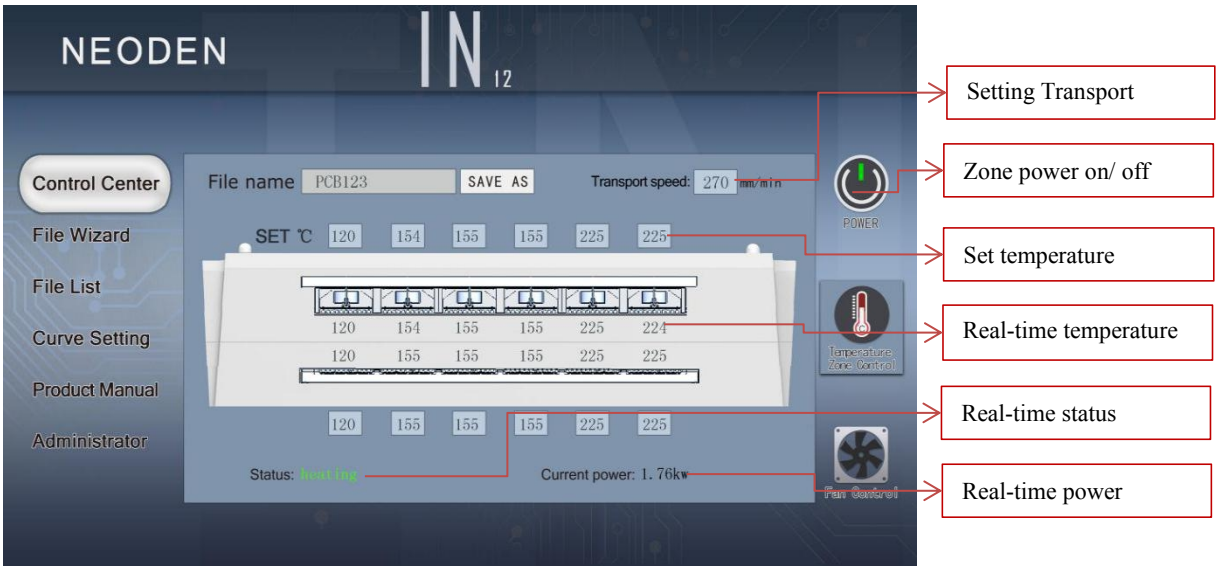
There's tri-color light on top of the cover, it is used to indicate whether all zones' temperature have reached the well-set temperature. When all temperature reach to well-set temperature, indicator light up green; While in the heating-up status, indicator will flash as yellow; Only when the temperature zone is closed (without flash) or in any faulty (in flash status), it will show as red .

4.4 Operation instructions



♦ Power on

Switch the button to ON status, machine start up. Please check the emergency button, air switch and RCD before power on the machine.

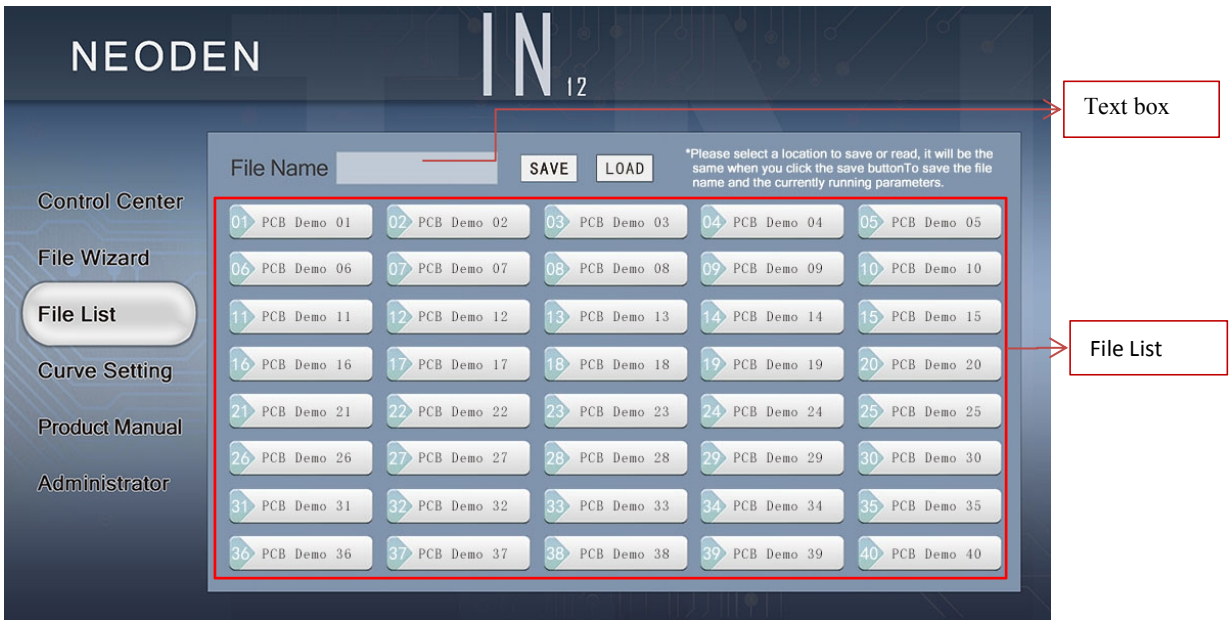


♦ Chain mesh speed setting

Click the speed parameter,a blank parameter dialog will pop out, type into the temperature you need set. Generally suggestion 250-300mm/min (Remarks: temperature will also be influenced once chain speed changed, please re- test the temperature curve and adjust temperature according to the test result)

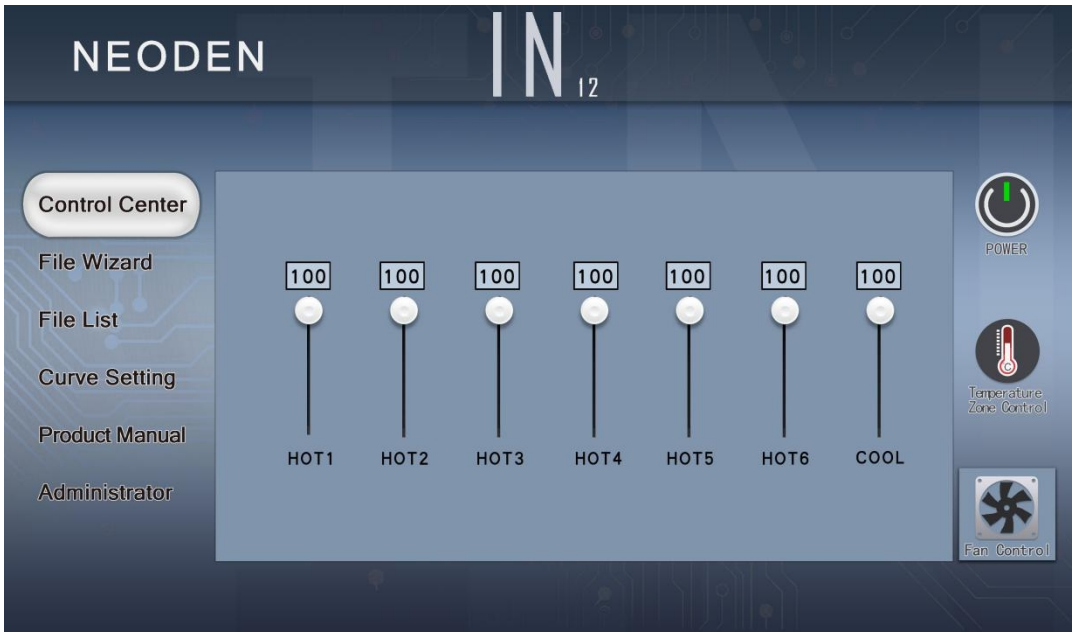
♦ Temperature setting

As above picture showed, data on upper side is well-set temperature from zone1 to zone6; data in the middle is the real-time temperature. Click the temperature parameter dialog, directly type into the set temperature, the heating zone will start heating and keep it in a stable situation while temperature reached.



♦Save and use of soldering formula

♦Save method: Click 'SAVE AS' on the main control page or click the file list page on the left to enter the file management page. Select the location you want to save (the file list box will turn green when selected). Click the SAVE button to save the current used formula and file name at the same time, there will be a beep after success.
♦How to modify the file name: select a location to be stored in the file list. At this time, the file name in the file list box will be updated to the text box of the file name. Click the text box of the file name to pop up the input keyboard. After filling in the required name, click OK, and then click the Save button. After success, there will be a beep.
♦Usage: select the required file and click the load button. After success, there will be a'beep' sound.

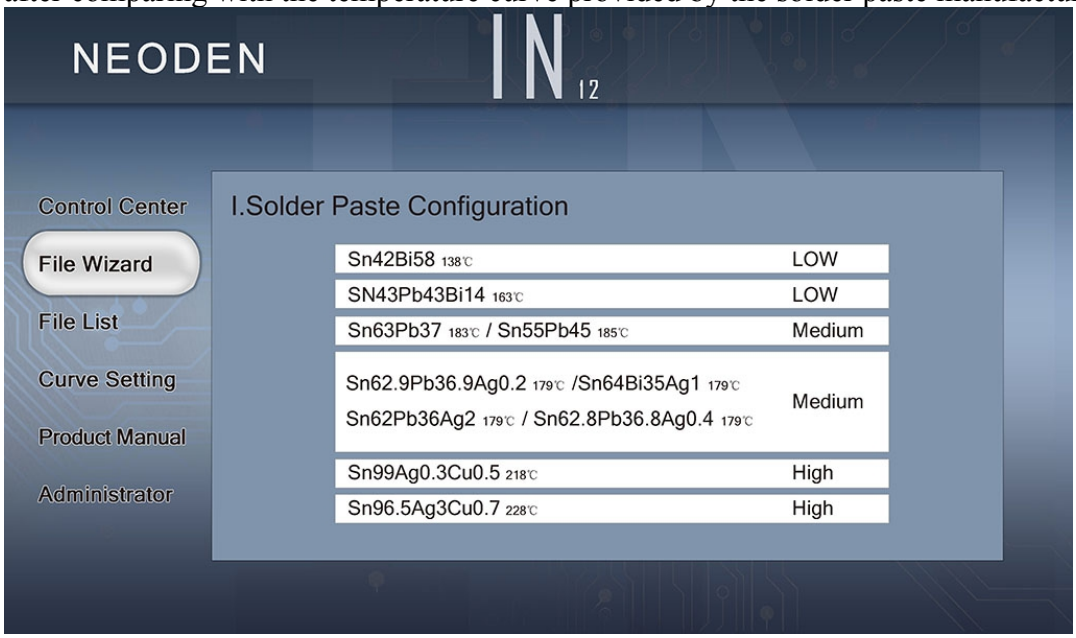


♦Fan management

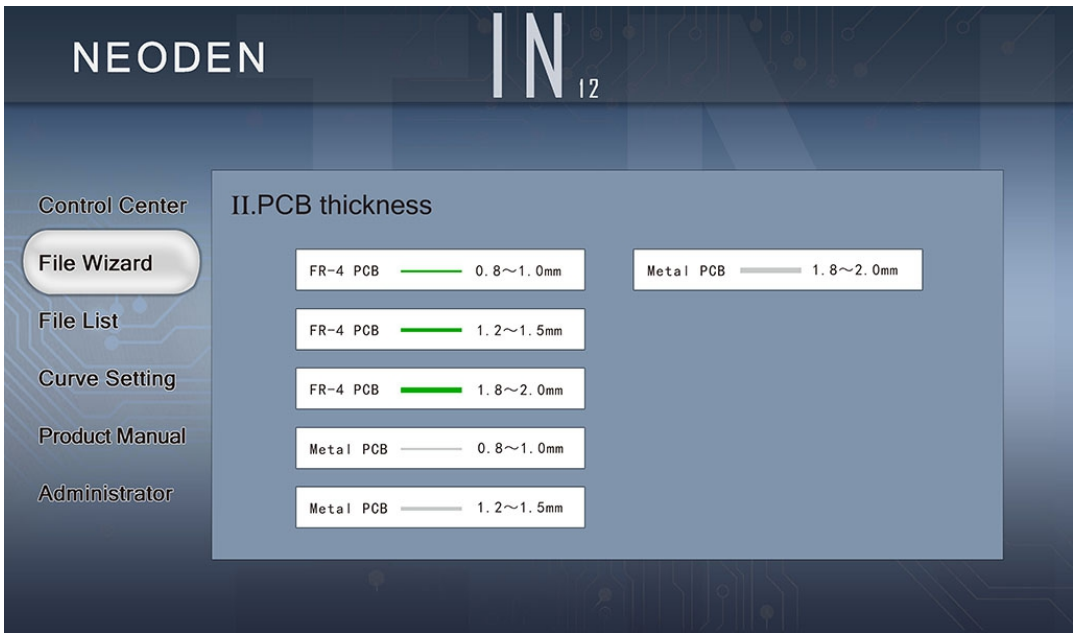
Click the Fan Control button in the lower right corner to enter the management page. Drag the adjustment button to adjust the required wind speed. The default value is 100. HOT1-HOT6 is the hot wind speed of 1-6 temperature zone, COOL is the wind speed of cooling zone.

♦File generation Wizard

(Note: due to the great difference in complexity of each product, the temperature parameters generated are only used as reference. In order to achieve the best solder effect, it is necessary to measure the temperature curve and improve the parameters after comparing with the temperature curve provided by the solder paste manufacturer.)



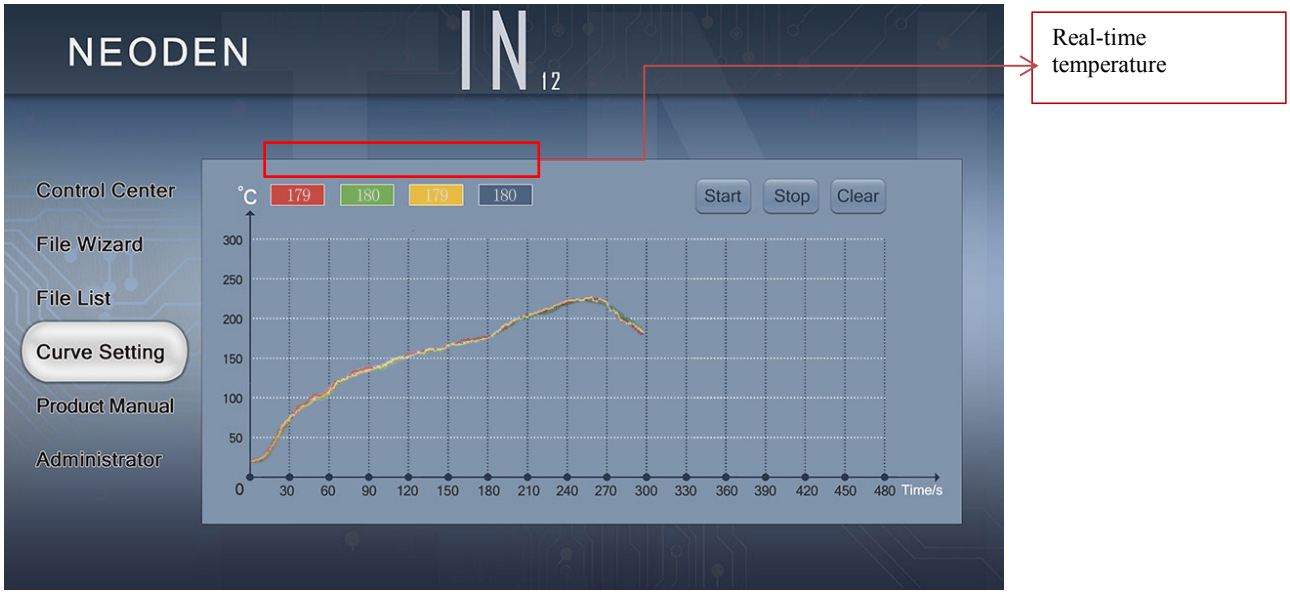
Step 1: select the type of solder paste to solder the product. If the model is not found in the list, please go to search in the appendix, or ask the solder paste manufacturer about the melting point, and then select the option with the closest melting point.



Step 2: select the material and thickness of PCB to be soldered.
After selection, the system will automatically generate the corresponding soldering formula.

♦Temperature curve

Connect the Temperature sensor to the SENSOR CONNECTOR, attach the sensor to PCB, and then click "start" button in the curve setting interface after PCB is put into the oven to get the temperature curve, click "stop" to pause the generation of temperature curve, and click "clear" to clear the temperature curve record. The "red, green, yellow and blue" sub table represents the real-time temperature of sensor on four interfaces corresponding to the same color.



♦Power off

Click the temperature zone switch on the main control page to close the temperature zone. Turn the switch to the off position, and the machine will turn off.

5.Temperature wave setting principle

5.10 what is the heating unit temperature?

the real-time temperature of the heating plate.

5.11 what is oven temperature?

the air temperature between the chain surface and the heating plate.

5.12 what is PCB surface temperature?

the temperature of component soldering feet when PCB is soldered. (the guide temperature on the soldering wave provided by the solder paste manufacturer refers to the PCB surface temperature.)

When working, the temperature displayed in the temperature zone on the panel is the actual temperature of the heating unit, which does not represent the temperature in the oven and the actual temperature of the plate surface. Therefore, the temperature displayed will be about 20-40 degrees higher than the temperature in the oven. The actual use is related to the chain speed, PCB size, thickness, material and component density.

5.1 Principle of reflow soldering and temperature wave

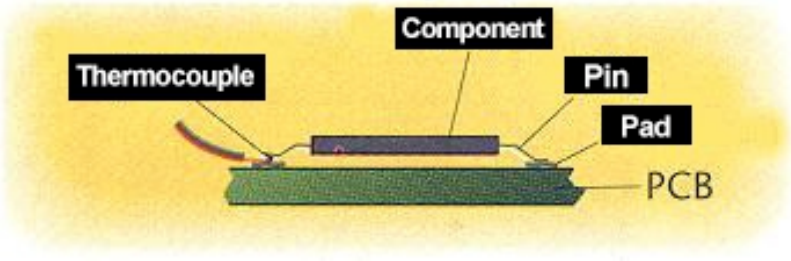
When the PCB enters the heating zone (dry zone), the solvent and gas in the solder paste evaporate. At the same time, the flux in the solder paste moistens the pad, component ends and pins. The solder paste softens, collapses and covers the pad, isolating the pad and component pins from oxygen. When the PCB enters the heat preservation area, the PCB and components are fully preheated to prevent the damage of PCB and components caused by the rapidly raise of temperature.When the PCB enters into the soldering area, the temperature rises rapidly to make the solder paste melt. The liquid soldering tin enters the cooling area to solidify the solder joint and complete the reflow soldering. The temperature wave is the key to ensure the soldering quality. The temperature rise slope and peak temperature of the actual temperature wave and the solder paste temperature wave should be basically consistent. Before 160 ℃, the heating rate should be controlled at about 1 ℃ / s. if the heating rate is too fast, on the one hand, the components and PCB will be heated too fast, which will damage the components and easily cause PCB deformation; on the other hand, the solvent in solder paste will volatilize too quickly, which will easily splash metal components and produce solder balls. The peak temperature is generally set at 20 ℃ - 40 ℃ higher than the melting temperature of solder, and the reflow time is 10s-60s. If the peak temperature is low or the reflow time is short, the soldering will not be sufficient, and in serious cases, the solder paste will not melt; if the peak value is too high or the reflow time is long, it will cause metal powder oxidation, affect the soldering quality, and even damage the components and PCB.

5.2 Setting of temperature wave

Set according to the temperature wave of solder paste and the soldering principle provided above. Solder paste with different metal content should have different temperature wave, and the reflow temperature wave should be set according to the temperature wave provided by the solder paste manufacturer. In addition, the temperature wave is also related to the density and size of the heated PCB and

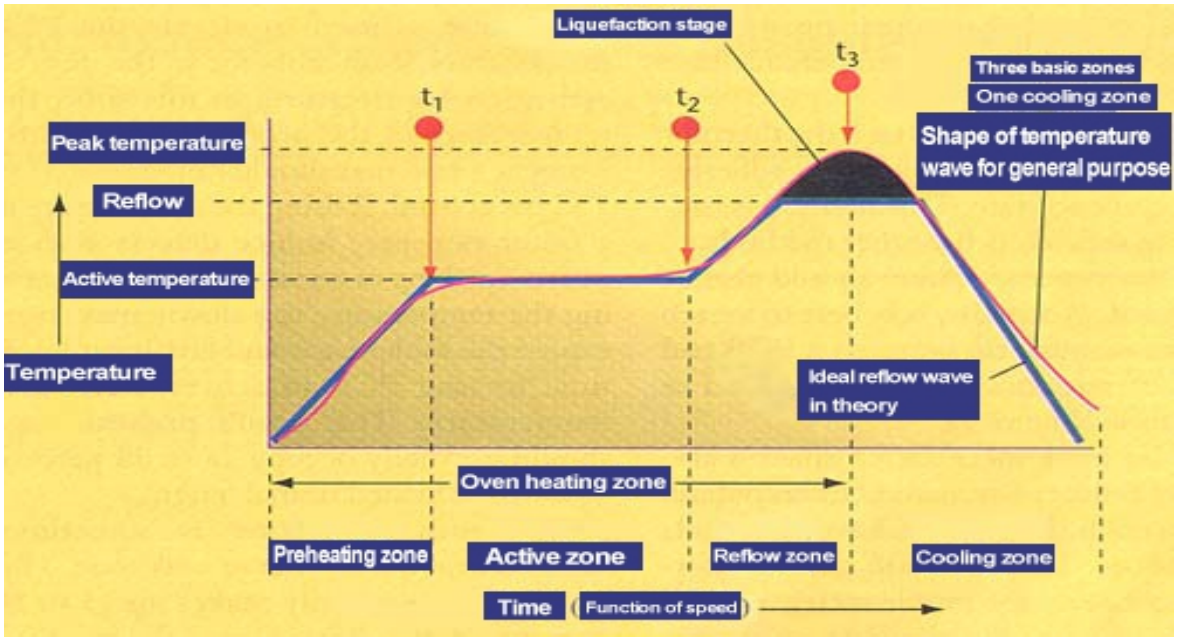
components.

An optimized reflow temperature wave is one of the most important factors to obtain high quality solder joints in printed circuit board (PCB) assembly using surface mount components. The temperature wave is a function of the temperature applied on the circuit assembly to time. During the reflow process, it represents the temperature at a specific point on the PCB to form a wave at any given time. Several parameters affect the shape of the wave, the most important of which is the belt speed and the temperature setting of each zone. The belt speed determines the duration of exposure of the board to the set temperature of each zone. Increasing the duration allows more time for the circuit assembly to approach the temperature setting of the zone. The total duration of each zone determines the total processing time.
The temperature setting of each zone affects the temperature rising speed of PCB, and high temperature produces a large temperature difference between PCB and zone temperature. The set temperature of the increase zone allows the board to reach the given temperature faster. Therefore, it is necessary to make a figure to determine the PCB temperature wave. Next is the outline of this step to generate and optimize the graphics.
The following equipment and Auxiliary tools are required before starting the wave procedure
High precision temperature profiler (with IN12), thermocouple (with IN12), tools for attaching thermocouple to PCB (mainly high temperature tape) and solder paste parameter table.
There are several ways to attach thermocouple to PCB. The better way is to use high temperature solder such as silver / tin alloy, and the solder joint should be as small as possible.
Another acceptable method is fast, easy, and accurate enough for most applications. A small amount of thermal compound (also known as thermal paste or grease, which is often used on computer CPU or graphics card CPU) spots cover the thermocouple, and then stick it with high-temperature tape (such as Kapton).
Another way to attach thermocouple is to use high-temperature adhesives, such as cyanoacrylate adhesives. This method is usually not as reliable as other methods.
The attachment position should also be selected. It is usually better to attach the thermocouple tip between the PCB pad and the corresponding component pin or metal end.



(Figure 1. Attach thermocouple tip between PCB pad and corresponding component pin or metal end)
The table of solder paste characteristic parameters is also necessary, and the information contained in it is very important to the temperature wave, such as the desired duration of temperature wave, the active temperature of solder paste, the

melting point of alloy and the desired maximum temperature of reflow.
Before you start, you must have a basic understanding of the ideal temperature wave. Theoretically, the ideal wave consists of four parts or sections, the first three regions are heated and the last one is cooled. The more the temperature zone of the oven, the more accurate and close the profile of the temperature wave can be achieved. Most pastes can be successfully reflowed with four basic temperature zones.



(Fig. 2. Theoretically, the ideal reflow wave consists of four zones, the first three zones are heated and the last zone is cooled.)
It is also used to warm up the ambient temperature of the PCB from the active zone. In this region, the temperature of the product rises continuously at a rate of no more than 2-5℃ per second
If the temperature rises too fast, it will cause some defects, such as tiny cracks in ceramic capacitors. If the temperature rises too slowly, the solder paste will feel too much temperature, and there is not enough time for PCB to reach the active temperature. The preheating zone of the oven generally accounts for 25 ~ 33% of the total length of the heating channel.
The active area, sometimes called dry or wet area, generally accounts for 33 ~ 50% of the heating channel, and has two functions. The first is to sense the temperature of PCB at a relatively stable temperature, allowing components of different quality to be homogeneous in temperature, so as to reduce their considerable temperature difference. The second function is to allow the flux to be activated and volatile substances to volatilize from the solder paste. The general active temperature range is 120 ~ 150℃. if the temperature of the active zone is set too high, the flux does not have enough time to activate, and the slope of the temperature wave is an upward increasing slope. Although some solder paste manufacturers allow some temperature increase during activation, the ideal wave requires a fairly stable temperature so that the PCB temperature is equal at the beginning and end of the active zone. Some ovens on the market can not maintain a flat active temperature wave. Choosing a oven that can maintain a flat active temperature wave will improve the weld performance, and users will have a larger processing window.
The reflow zone is sometimes called the peak or final heating zone. The function of this area is to increase the PCB assembly temperature from the active temperature to the recommended peak temperature. The activation temperature is

always lower than the melting point of the alloy, and the peak temperature is always at the melting point. The typical peak temperature range is 205 ~ 230℃. if the temperature is set too high in this area, the temperature rise slope will exceed 2 ~ 5℃ per second, or the reflow peak temperature will be higher than recommended. This situation may cause excessive crimping, delamination or burning of PCB, and damage the integrity of components.

Today, the most commonly used alloy is Sn63 / Pb37, and this proportion of tin and lead makes the alloy eutectic. Eutectic alloy is an alloy that melts at a specific temperature. Non eutectic alloy has a melting range, not a melting point, sometimes called plastic loading. All the examples described here refer to eutectic tin / lead, which has a melting point of 183℃, because it is widely used.

The ideal cooling zone wave should be a mirror image of the reflow zone wave. The closer to this mirror relationship, the closer the solid structure of solder joint is, the higher the quality of solder joint is and the better the integrity of solder joint is.

The first parameter to be considered for the temperature wave is the speed setting of the conveyor belt, which will determine the time spent in the heating channel of the PCB. Typical solder paste factory parameters require a heating wave of 3-4 minutes. Dividing the total heating channel length by the total heating temperature sensing time is the accurate belt speed. For example, when the solder paste requires four minutes of heating time, using six feet of heating channel length, the calculation is: 6 feet ／ 4 minutes = 1.5 feet per minute = 18 inches per minute.

Next, it is necessary to determine the temperature setting of each zone. It is important to understand that the actual interval temperature is not necessarily the display temperature of the zone. The display temperature only represents the temperature of the thermocouple in the area. If the thermocouple is closer to the heating source, the displayed temperature will be relatively higher than the interval temperature. The closer the thermocouple is to the direct channel of PCB, the displayed temperature will be more able to reflect the interval temperature. It is advisable to consult the oven manufacturer to understand clearly the relationship between the displayed temperature and the actual interval temperature. In this paper, the interval temperature rather than the display temperature will be considered. Table 1 lists the interval temperature settings for typical PCB assembly reflow.

Table 1. Typical PCB return zone temperature setting

Interval	Interval temperature setting	Actual plate temperature at the end of interval
Preheating	210℃	140℃
Activity	177℃	150℃
Reflow	250℃	210℃

The interval temperature is set to the actual plate temperature at the end of the interval

After the speed and temperature are determined, they must be input to the oven controller. Once all parameters are input, start the machine, and after the oven is stable (i.e., all the actual displayed temperatures are close to the set parameters), the wave can be started. The next PCB is placed in the conveyor belt, which triggers the thermometer to start recording data.

For convenient using,some thermometer includes a trigger function to automatically start the thermometer at a relatively low temperature, which is typically slightly higher than the human body temperature of 37°C (98.6°F). For

example, the automatic trigger of 38°C (100°F) allows the thermometer to start working as soon as the PCB is put on the conveyor chain and into the furnace, so that the thermocouple will not be triggered by mistake when it is handled by the human.
Once the initial temperature profile is generated, it can be compared with the profile recommended by the solder paste manufacturer or the profile shown in Figure 2.
First, it must be verified that the total time from the ambient temperature to the peak temperature of the reflux is compatible with the desired stay time of the heating curve. If it is too long, increase the conveyor speed proportionally; if it is too short, decrease the conveyor speed proportionally.
In the next step, the shape of the temperature profile must be compared with the desired one (Figure 2). If the shape is not compatible, then compare it with the following figures (Figures 3-6). Choose the most compatible temperature profile compared to the actual shape of the profile. Should consider the deviation from left to right (process sequence). For example, if there is a difference between the preheating and soldering zones, first adjust the difference in the preheating zone correctly. Generally, it is best to adjust one parameter at a time and test in run before making further adjustments.Because a change in a given zone will also affect the results of subsequent zones. We also recommend that novices had better make small adjustments. Once you gain experience on a particular oven, you will have a better "feel" to make more big adjustments.

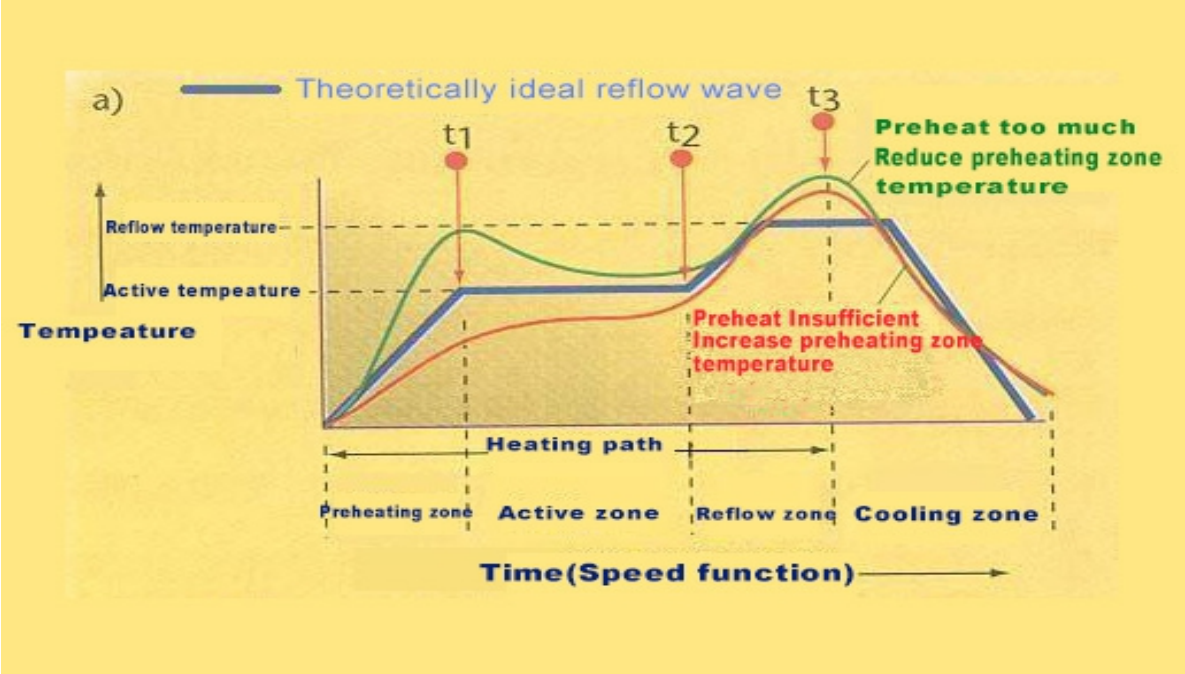


Figure 3:Preheat too much/little soldering profile

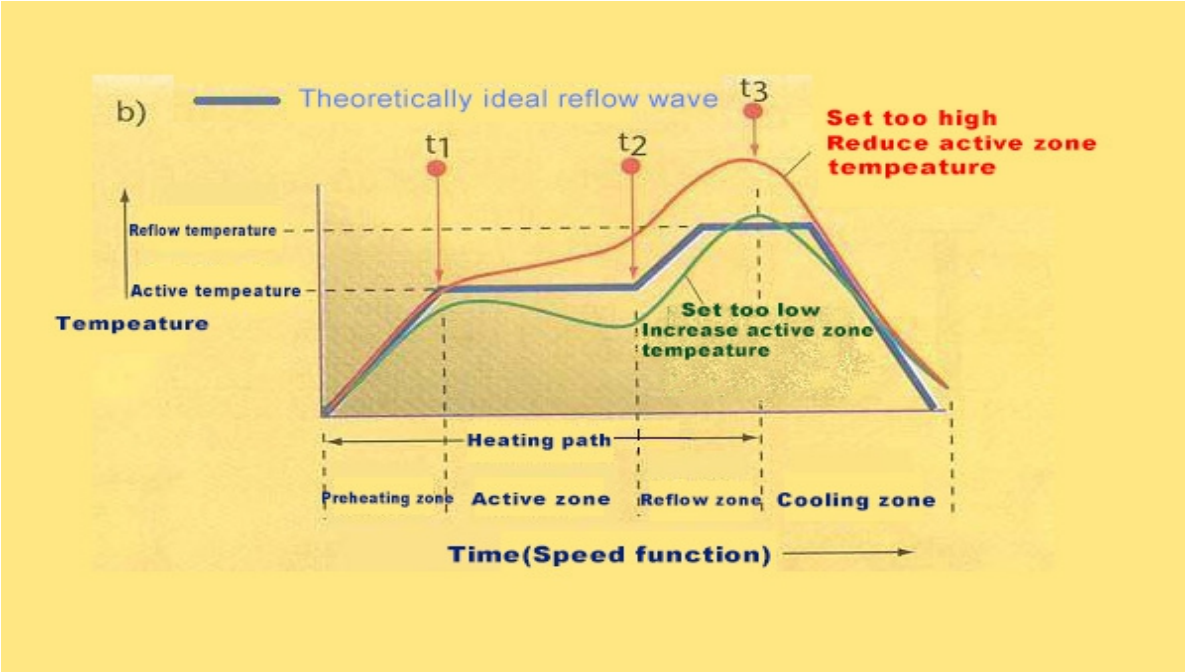


Figure 4:Set too high/low temperature of active zone

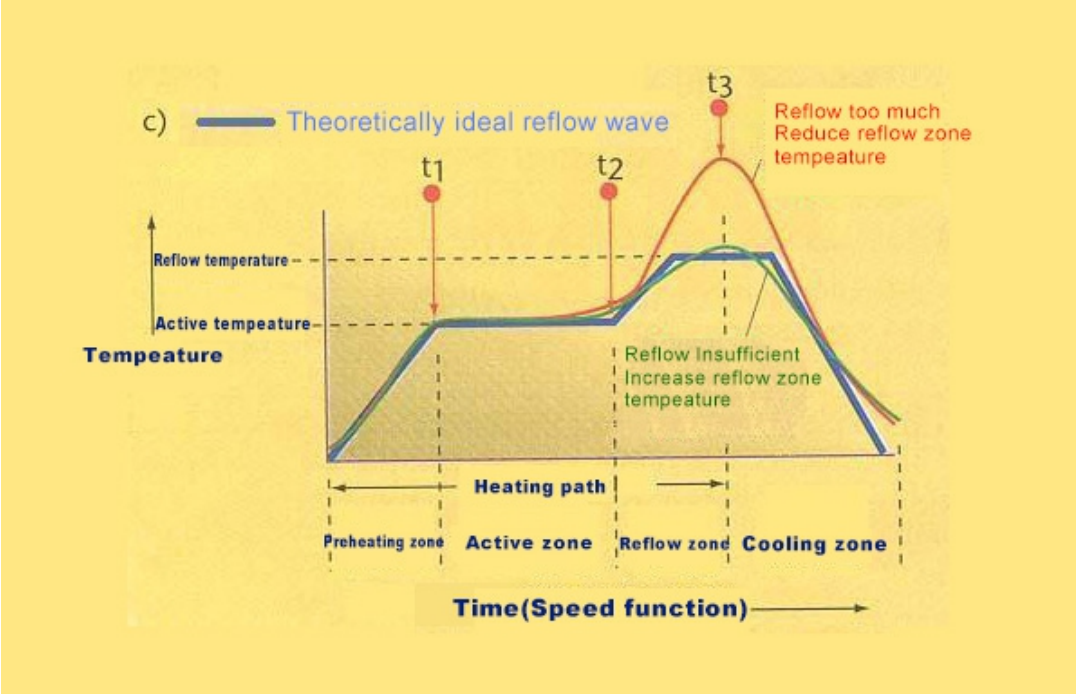


Figure 5:Soldering too much/little

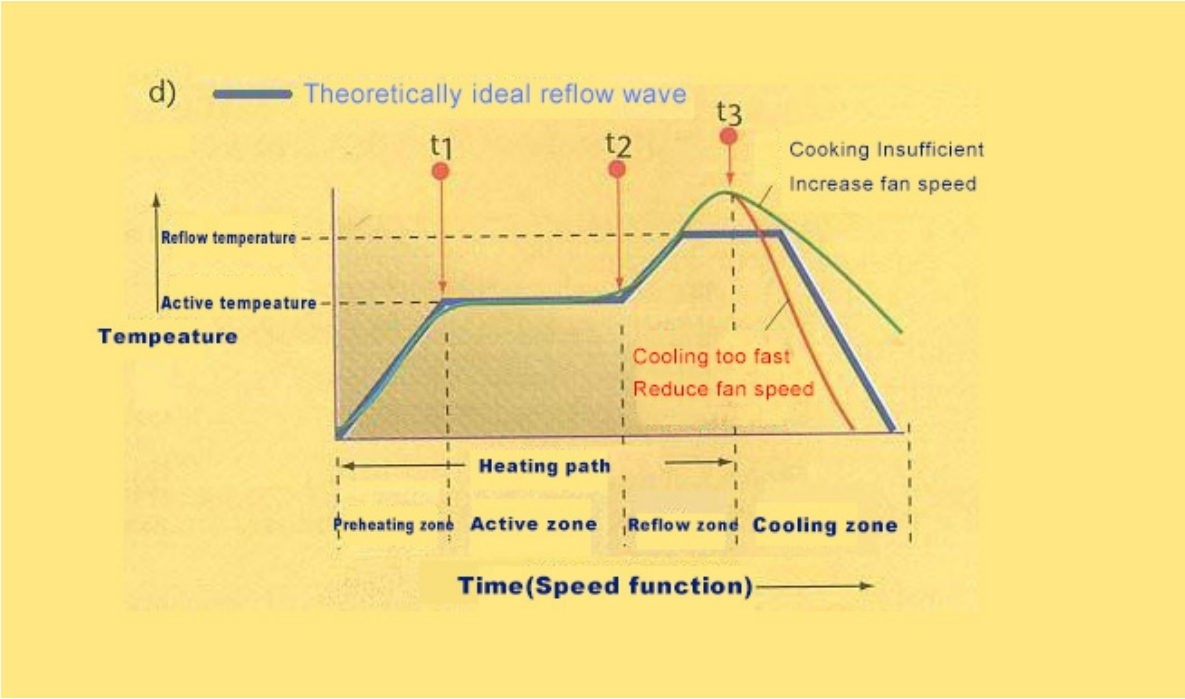


Figure 6:Cooling too much/little

When the final temperature profile is as close as possible to the desired profile, tke record or store of the parameters for later use. Although this process is slow and laborious at first, it can eventually gain proficiency experience, resulting in high-efficiency production of high-quality PCBs.

6. Temperature profile setting method

♦Set the temperature of each zone and the speed of the conveyor chain from the initial value. For cold oven, preheat for ~30 minutes.

♦After the preheating is completed, let the PCB go through the heating soldering system. If soldering does not occur, the conveyor chain speed can be appropriately reduced. Or on the premise of not changing the transmission chain speed,increase the set temperature appropriately, and pay attention to not exceeding the bearing capacity of the PCB and components when adjusting the set temperature.

♦Let the PCB go through the new conveyor chain under new speed or the adjusted set temperature,if no soldering occurs,then do the adjustment of the previous step, otherwise proceed to the next step to fine-tune the temperature profile.

♦The temperature profile can be adjusted appropriately according to the complexity of the PCB.Can reduce the speed of the conveyor chain and increase the soldering time; on the contrary, add the speed of the conveyor chain will reduce the soldering time.

♦Generally, when the PCB with components mounted on passes through the soldering system but is not completely slodered, it can be properly adjusted and then put into the soldering system for soldering again. Generally, it won't effect on the PCB and components.

♦The temperature setting is generally from low to high. If the soldering temperature range exceeds the set temperature much, should increase the speed of the conveyor chain or reduce the set temperature.

♦Different PCB boards have different heat transfer rates and heat absorption, then the heating time and temperature required by soldering are also different. For double-layer boards and multilayer boards and PCBs with more areas and pads, the setting temperature is relatively higher , And for single-sided boards or paper plastic boards or

different areas, the setting temperature of PCBs with few pads is correspondingly lower. There is also a certain connection with the amount of boards released per unit time. However, in normal production, the soldering machine has its own adjustment system for general PCB board changes. The soldering machine can be used for normal production at the recommended temperature during training, unless the heat absorption of the PCB changes significantly.,then need do adjust accordingly.

7.Temperature Testing Way

♦Attach the temperature thermocouple sensor to a same or similar size PCB to observe the soldering. Put the PCB to the conveyor chain,then generate the temperature profile,compare to the recommended temperature profile. If it is same or similar to the self-adjusting profile, then you can start production, otherwise, according to the temperature profile, adjust the temperature control area to increase and decrease the set temperature by about 5 degrees in large temperature difference area, or do comprehensive adjustment of whole machine to get a temperature profile that can be used for production work.

♦When starting to put PCB or abruptly change the number of PCB, there is a difference between the actual temperature and setting temperature. The difference will turn to normal range when putting the PCB with constant speed for a while.

8. Double sided board soldering instruction

♦Use hot air reflow soldering can finish double-side component soldering. Double-side soldering design means components are in double-side of the PCB need to soldering. Double side soldering includes double-side soldering tin and single-side soldering tin and another side drying glue, as for single-side soldering tin and another side drying glue, it is easier. First, finish one side's soldering tin as the same as single-side, then finish another side tape glue drying in low temperature, finish double-side SMT craft, after that carry on the next step plug-in or tin process on craft. Double-side soldering is generally treated as below follows:

♦Start the reflow oven, set up the transfer chain speed controller, finish the A side components reflow soldering with normal soldering craft.

♦Upend the PCB, repeat normal procedure to mount the component, adopt top heating strategy to let the B side reflow soldering, but the upend A side has been reflow soldering, the compounds in thick liquid volatilize, the melting point of tin is higher than the solder paste, which in order to keep the A side components not fall out.

9. Trouble shooting

9.1 Soldering analysis

Problem	Possible causes	Solutions be available
Incomplete reflow	Inadequate heating	lower the transfer chain speed
	Shadows from components	a. Increase the transfer chain speed b. Increase bottom heat
	Due to the middle layer of copper foil	Decrease transfer chain speed and increase temperature
Inadequate moist	PCB, components without enough solder paste	Pre-paste to components and PCB
	No enough moist time	Increase the temperature of heating zone
PCB bend	Exceeding upper and lower temperature difference limits	Reduce temperature difference between preheating zone and bottom temperature zone
		Increase transfer chain speed
PCB discoloration	Exceeding tin temperature on the board, exceeding temperature gradient or	Increase transfer chain speed
		Decrease the preset zone temperature

	heating speed	Decrease transfer speed and temperature
Excessive fines	Top layer temperature out of limit	Reduce top heat and increase bottom zone temperature
Tin balls	Due to dry too fast	Decrease transfer chain speed and temperature
	Solder pasting is unqualified or PCB re-paste	Use PCB after cleaning and drying
Flux coking	Over heating	Add transfer chain speed, lower temperature
Components wrong position	PNP wrongly, the tin on the solder pad is irregular or asymmetrical, drying too fast causes airflow to blow components	Check place position
		Check the shape and thickness of tin
		Lower transfer chain speed and temperature
Tin bridging	Misposition	Check position
Tin migration	Moist overtime	Increase the belt speed
		Lower pre-setting temperature
Solder skips	The solder paste is not enough on pad, the unevenness of the micro-component, the PCB coplanarity problem	Thickened tin paste coating
		Try to make the solder on the pad even
		Check component pin stability
PCB over heat	Heating speed too fast	Decrease transfer chain speed and temperature

Analysis on the cause of the solder joints not shining

In the SMT soldering process, customers will have requirements for the brightness of the solder joints. It is often just a subjective consciousness of the customer. We can only get the conclusion of the brightness through comparison. Because there is no standard for the brightness of the solder joints; roughly speaking, the reasons for the non-bright solder joints are as follows:

1. There will be difference between the solder paste with or without silver. Customers should explain their soldering requirements to the supplier when choosing solder paste.
2. The tin powder in the solder paste is oxidized.
3. The flux in the solder paste has an additive that causes a matting effect.
4. After soldering, there are rosin or resin residues on the surface of the solder joints, which is a phenomenon we often see in actual work. Especially when choosing rosin-type solder paste, although rosin-type flux will make the solder joints slightly brighter than no-clean flux, the presence of its residues often affects this effect. It is more obvious in larger solder joints or IC foot parts; if it can be cleaned after soldering, I believe the gloss of solder joints should be improved.
5. The preheating temperature of reflow soldering is low, and there are non-volatile residues on the surface of the solder joint.

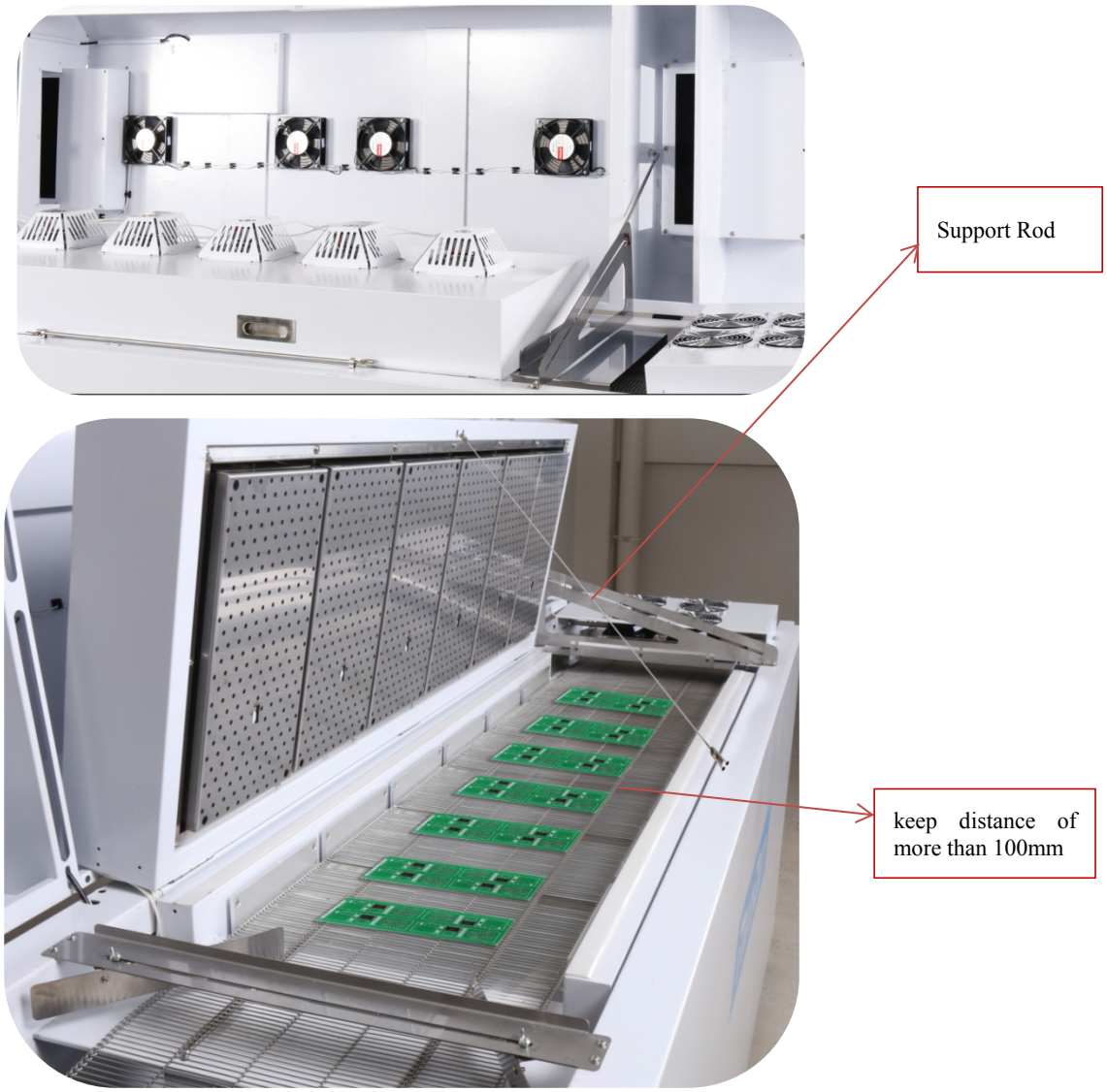
The main reasons for solder joints not full are as follows:

1. The activity of the flux in the solder paste is not enough, and the oxidized substances on the PCB pads or SMD solder joints are not completely removed.
2. The moisture retention of the flux in the solder paste is not good.
3. PCB pads or SMD soldering positions have serious oxidation.
4. During reflow soldering, the preheating time is too long or the preheating temperature is too high, cause the failure of flux activity in the solder paste.
5. If the solder paste has not been fully stirred or the flux and tin powder have not been fully fused. If, there will be insufficient tin on some solder joints.
6. Reflow zone temperature too low.
7. Insufficient amount of solder paste at the solder joint.

9.2 Precautions

*Keep a certain distance of more than 100mm when PCB size exceeds 100mm.
*If the PCB length is longer than the ESD tray, the ESD tray needs to be replaced by

other suitable carriers to place the soldered PCB.
*It is not recommended to open the incubator when it is not necessary. If it must be opened, the incubator must be supported by a support rod before the next work can be carried out.
*The upper cover and incubator can only be opened after the bottom caster is lay down.
*The power board and control board should not be touched when the power is on.
*The change of chain speed will affect the plate surface temperature, so after adjusting the chain speed, be sure to retest the plate surface temperature curve, and adjust the temperature setting according to the actual test results.



9.3Machine maintenance

♦Replace the filter element assembly regularly

The filter assembly needs to be replaced regularly, and the service life of the filter assembly is 8 months (depending on the service frequency).

The following is the replacement tutorial. Prepare the filter assembly and a cross screwdriver before replacement;

Filter installation chamber and filter assembly

Filter installation chamber

Filter (back)

Filter (front)

+

Carbon fiber cotton

Filter assembly

Replace the left filter assembly: remove the fixing screw of the left wind shield and take down the left wind shield --> remove the screw of the left concave and take down the left concave --> remove the fixing screw of the left filter cover and push out the left filter cover to the right --> push out the filter installation chamber and the filter assembly to the right together --> replace the prepared filter assembly and install it in the reverse order of disassembly

Replace the right filter assembly: remove the fixing screw of the right filter cover, push the right filter cover out to the right -- > push the filter installation chamber and the filter assembly out to the right together --> replace the prepared filter assembly, and install it in the reverse order of disassembly

♦Regularly add high temperature lubricating oil to transfer chain bearings.