Hangzhou NeoDen Technology Co., Ltd

User Manual
Reflow Oven NeoDen IN6

-Full hot-air convection
-Built-in welding smoke filtering system

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

1. Brief Introduction

IN6 is a newly designed, environmentally friendly reflow oven with stable performance. It can achieve full hot-air convection, excellent soldering performance. It has 6 temperature zone, light and compact. Intelligent temperature control with high sensitivity temperature sensor, temperature can be stable within ±0.2°C. It adopts Japan NSK hot air motor bearing and Swiss imported heating wire, which is durable and stable. CE approved, provide authoritative quality assurance.

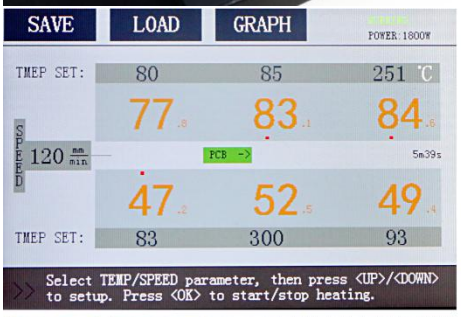
2. Specification

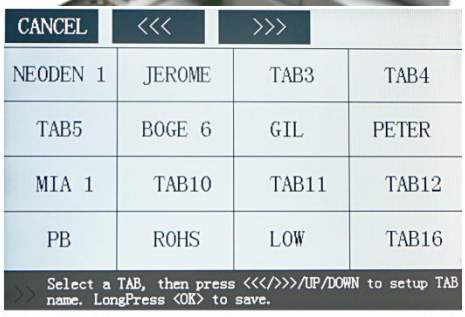
Model	IN6
Heating Zone Quantity	Upper 3/ Down 3
Heating Type	Nichrome wire and aluminum alloy heating
Cooling Zone Quantity	1
Conveyor Speed	5~30cm/min（2~12inch/min）
Standard Height Max(mm)	30mm
Temperature Range	Room temperature ~ 300℃
Heat-up Time	Approx. 20-30min
Soldering Width	260mm(26.8inch)
External Dimension	1020mm*507mm*350mm
Max Rated Power	~2000W
Working Power	~700W
Electricity Supply	110V/220V Single Phase
Operating Direction	Left → Right
Net Weight	49kg

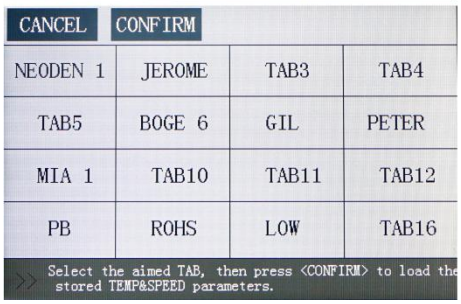
3. Main Parts

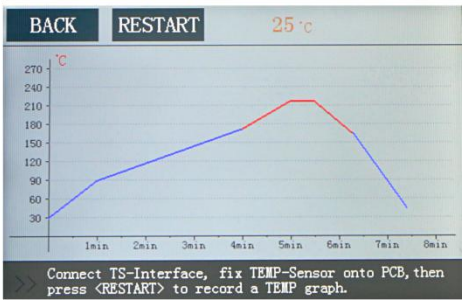
3.1 Reflow Oven Main Body

3.2 Operating Panel







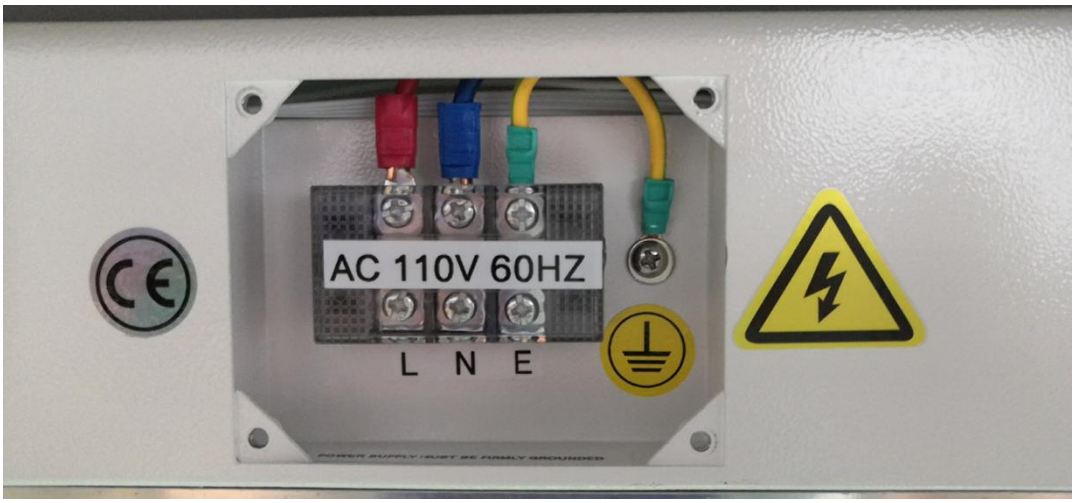


3.3 Pedestal

4. Installation Instruction

4.1 Power Supply Connection

IN6 is used in 110V/220V single-phase connection mode and is connected according to the user environment. Wires connection method is shown as picture. L stands for the live wire, N stands for the zero wire, and E stands for the ground wire, connect to the 220V (110V) 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

♦Power supply requirement:110V/220V
♦For desktop reflow oven, should be working on workbench, don't suggest to use wooden material
♦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 is a green bar indicator at the PCB entrance that indicates whether the temperature in all zones has reached the set temperature. This indicator lights up when the actual temperature of all zones reaches the set temperature.

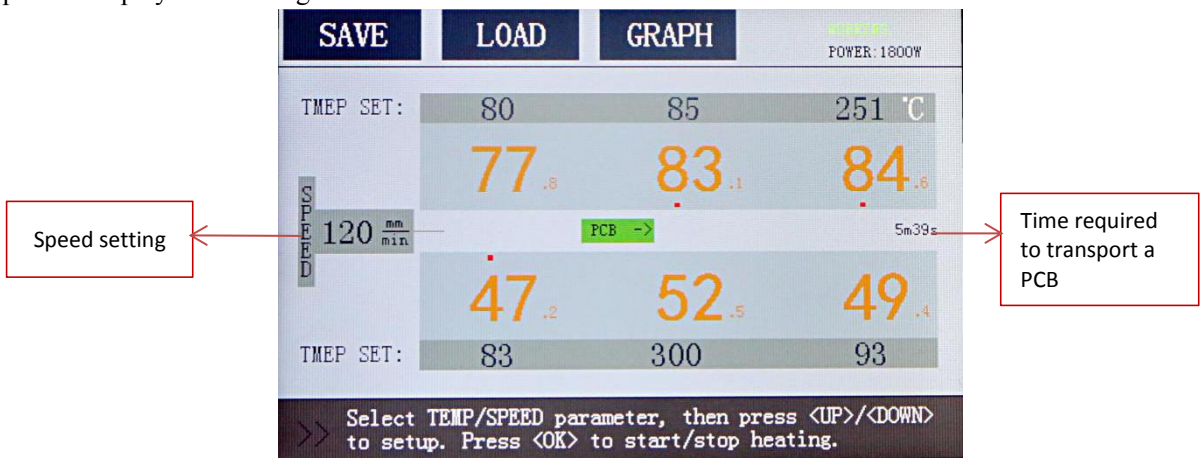
4.4 Operation instructions

♦ Power-on

Turn the red power switch to the ON position and the machine starts.

♦Transfer chain speed setting

Tap the speed parameter on the screen and press the Up/Down button to set the appropriate transfer chain rotation speed. When the speed is set, the time required to transport a PCB at this setting speed is displayed on the right side of the screen.



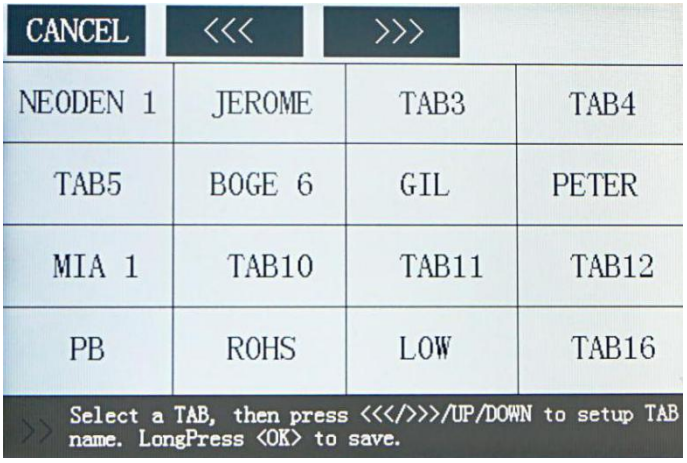
♦Temperature zone setting

Tap the temperature parameter on the screen and press the up/down buttons to set the temperature. Black is “the set temperature”, and orange is “the real-time temperature”.

♦Save and Usage of speed and temperature settings

After setting the transfer chain speed and the temperature of each zone, you could press the SAVE button to save the setting parameters of the transfer chain and the zone temperature. When the SAVE button is pressed, it will enter the TAB interface. Click on a TAB, then you can use the "<<<", ">>>" "Up" and "Down" buttons to change the TAB name, long press OK to save these parameters to this TAB.

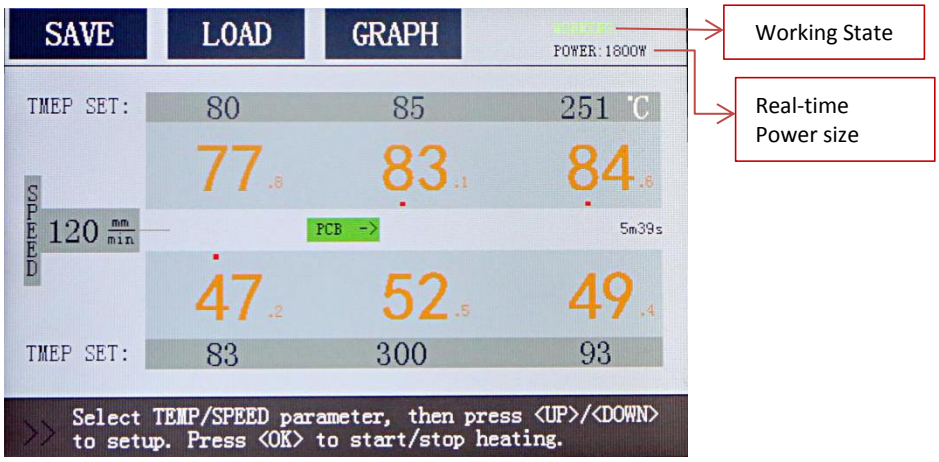
When you would like to call the previously saved speed and temperature of the transport chain, click the LOAD button on the screen to enter the TAB interface, click the TAB name, and then click the CONFIRM button to load the speed and temperature settings of the transport chain.



♦Start or stop heating

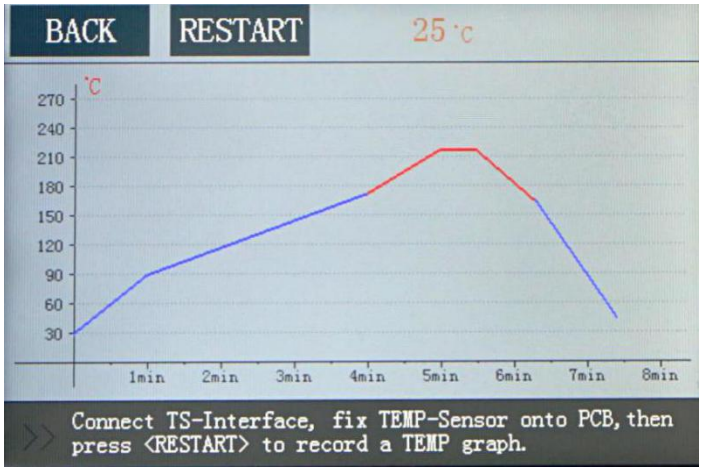
Press the OK button in the main interface, the machine will switch from STANDBY state to WORKING state, and begin to warm up.

If you need to switch from WORKING state to STANDBY state, just press the OK button in WORKING state.



♦Temperature curve

Connect the temperature sensor to the TEMP SENSOR connector, attach the temperature sensor to the PCB, and then click the “Restart” button on the Graph interface after PCB is put into the oven to get the temperature curve.

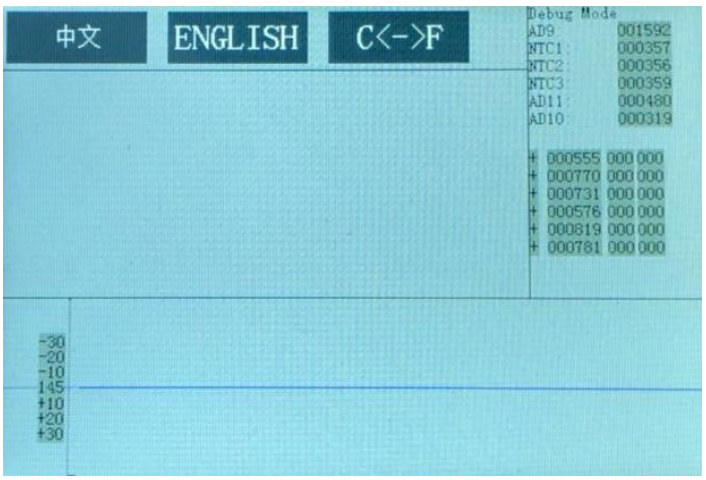


♦Power-off

Turn the red power switch to the OFF position and turn off the machine.

♦Change language and the unit of temperature in machine

After the power switch is turned to ON, the NeoDen logo will be displayed on the screen. Long press the OK button to enter the Debug mode interface. In this interface, you can change the language and temperature unit of the machine.



5. Temperature wave setting principle

5.1 The reflow soldering theory and the temperature wave

When the PCB goes into heat up area (dry area), the solvent and gas in the solder paste will evaporate. At the same time, the flux can wet the pad and the component tip and foot. The solder paste melts, caves in and covers the pad, leading to the pad and component pins insulate the oxygen. PCB goes into heat preservation area. PCB and components get full preheating. In case of damaging the PCB and components when it goes into the welding area and the temperature heats up quickly. When PCB goes into the welding area, the temperature heats up and the solder paste melts. When PCB goes into cooling area, the liquid solder paste the soldering points solidify. The reflow process is finished.

The temperature is the key to welding quality. The actual and the setting temperature warming slope and the peak temperature should be accordant. Before the temperature reaches 160℃, please control the heat up speed in about 1℃/S. If heat up too quickly, the PCB and the components will be damaged, and the PCB may be out of shape. On the other side, the flux volatilizes too fast. And it is easy to make soldering tin ball. Set the peak temperature 20℃-40℃ higher than the solder paste melting point. Set the reflow time 10S-60S. If the peak temperature is low or the reflow time is short, it will affect the welding quality, and serious is causing the solder paste does not melt. If the peak temperature is high or the reflow time is long, the metal power will be oxidized and affect the welding quality and serious is causing the component and PCB damaged.

5.2 The set of the temperature wave

Set the wave according to the solder paste and the above foundation. Different solder paste, choose and set different waves. In addition, the temperature wave has related to the PCB, the density and size of components. Generally lead-free welding temperature should be higher 40℃ than melting point.

6. Details about temperature area setting

♦Set the temperature and belt speed to initial value, to the cooling oven, should be preheated for 25 minutes.

♦When the temperature is stable, let PCB pass heat reflow system. If there is no reflow, can properly reduce the transfer chain rotation speed. Another way is that, do not adjust the speed, and increase the temperature properly. When adjust the temperature, notice that it cannot exceed the PCB and component bearing capacity.

♦Let the PCB pass the reflow system in the new speed or new set temperature. If there is no reflow, turn to redo the above step. Otherwise, need temperature fine-turning.

♦The heat temperature wave is adjustable according to the PCB. You can adjust the transfer chain rotation speed to adjust the temperature. Reduce the transfer chain rotation speed can increase the product heat temperature. On the contrary, you can reduce the product heat temperature.

Attention：

♦If the PCB has been placed components, the PCB pass the reflow and it reflow not very completely, suggest you adjust then reflow again. Normally, it will not impact the PCB and components.

♦From low to high when set temperature. If the heat range is over the reflow temperature too high,

should increase the transfer chain rotation speed or reduce the set temperature.

♦Different PCBs boards have different heat transmission rate and heat absorption capacity, so it requires the reflow oven offers different heated time and quantity of heating. To double-side PCB, multi-board and other PCBs with many bonding pads, they have a higher temperature setting. To one-side PCB, paper board and less bonding pads' PCB, they have a lower temperature setting. And it also be affected by quantity of PCB that you place. During actual work, reflow oven will adjust itself automatically to some changes of PCB. If based on our suggested temperature, the machine can work well, unless very big change of PCB's absorption capacity, then it needs to adjust properly.

7. Temperature measurement method

♦Attach the temperature thermocouple sensor to the PCB which is the same or similar size as the working PCB in order to observe the reflow. Put the PCB on the transfer chain, then will get the temperature profile, after that compare with the recommend temperature profile. If it is the same to the standard profile or correspond with automodulation profile, then you can start to produce, otherwise follow the temperature profile, the temperature controller with large temperature difference is used to set the compensation temperature by 5 degrees, or the whole machine integrated adjustment, in order to achieve the temperature profile can be produced

♦When starting to put PCB or abruptly change the number of PCB to be reflow oven, there is a difference between the actual temperature and setting temperature, put the PCB with constant speed for a period of time, the temperature difference will turn to normal temperature difference range.

8. Both side 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 heating speed	Increase transfer chain speed
		Decrease the preset zone temperature
		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-	Use PCB after cleaning and drying

	paste	
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

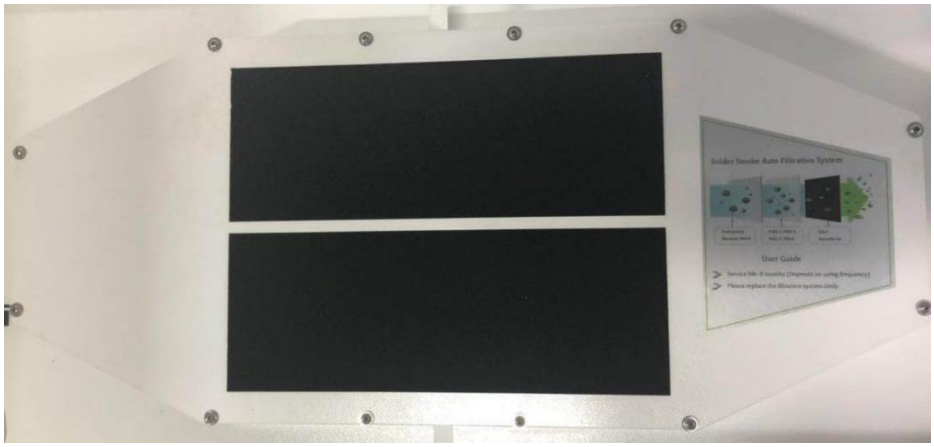
9.2 Precautions

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.

9.3 Machine maintenance

♦Change the filter regularly

It is necessary to replace the filter regularly. The service life of filter is 8 months (depending on the frequency of use). When it's needed to replace the filter, you could find the welding smoke automatic filter system in the figure below. Remove the 12 screws above and replace the filter.



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