华企正邦
HUAQI ZHENGBANG

ZB300BF Series Wave Soldering

Operation Instruction

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Warning：

★ .Untrained and non-professionals must not disassemble or repair this equipment to avoid causing casualties.

★ . Before powering on, please confirm again whether the power voltage is consistent with the working voltage of the equipment.

★ .This equipment is a high-temperature heating and transmission device. During operation, pay attention to personal safety.

Note：

1. Before using or operating this device, please read this manual carefully.
2. Please keep this manual for future use during maintenance, servicing and repair.

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I. Overview

Thank you for purchasing and using the ZB300BF Series Automatic Peak Wave Soldering Machine manufactured by Zhejiang Huaqi Zhengbang Automation Technology Co., Ltd. This model is a high-end soldering system developed specifically for through-hole electronic products, representing the latest design achievement utilizing modern high-tech technology.
It automatically completes the entire soldering process – from PCB flux coating, preheating, soldering, to board output – in a fully automated sequence. In short-lead soldering operations, it offers high efficiency, energy savings, strong stability, and a high degree of automation that allows for unattended operation. Compared with manual soldering, its efficiency is several times higher. Moreover, it delivers incomparable energy-saving advantages over other similar products, making it widely adopted by electronics manufacturers.

This series can solder a wide variety of product types, including:
1. Communication electronics:

Cordless telephones, power adapters, video phones, mobile phones and accessories, etc.

2. Computer and peripherals:

Motherboards, routers, multimedia speakers, various expansion cards, wireless mice, monitors, etc.

3. Networking equipment:
Switches, network interface cards, hubs, etc.

4. Audio/Video products:
VCD/DVD decoder boards, high-end amplifiers, tuners, wireless microphones, radios, CD players, MP3 players, satellite TV receivers, etc.

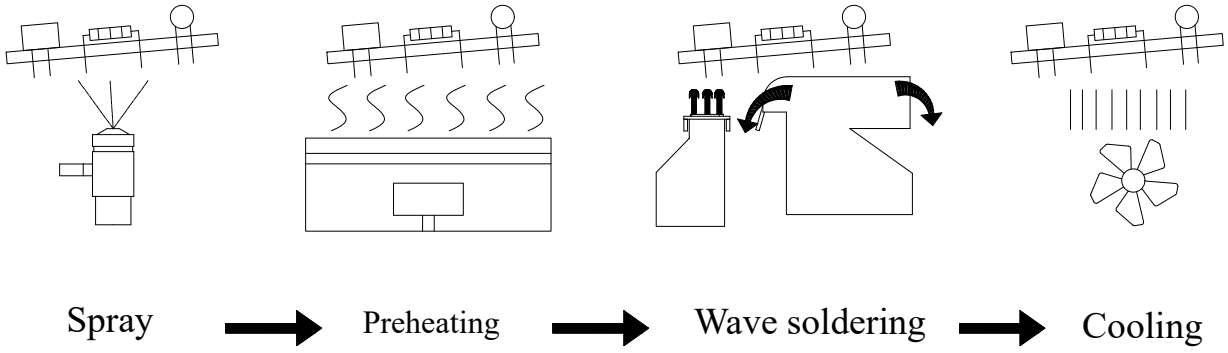
5. Home appliances and others:
Air conditioner and washing machine control boards, remote controls, video doorbells, security door locks, digital cameras, electronic scales, electricity meters, etc.

II. Structural Features and Working Principle

1. Streamlined exterior design, compact and aesthetically pleasing. Large pull-type tempered glass doors provide ample internal maintenance space.
2. The board loading unit is integrated with the front conveyor system, ensuring smooth PCB transfer into the conveyor line. An imported photoelectric sensor is used for entry detection, ensuring accurate board sensing and preventing flux application errors.
3. The spray system is driven by a stepper motor and equipped with an A-100 high-precision nozzle and a high-accuracy flow meter, ensuring uniform flux application. Width adjustment is set manually; length-wise tracking is achieved automatically via photoelectric sensor.
4. The preheating system features forced hot-air heating with a modular design, divided into three modules. The total length is 1350 mm, ensuring uniform and sufficient preheating of the PCB surface. Temperature is controlled via a closed-loop PID + SSR system, guaranteeing precise and stable control.
5. The solder pot system features a modular design, allowing for easy maintenance or replacement of individual modules. In addition, the compact solder pot design requires only 280 kg of solder, significantly reducing operating costs. The pot heater is equipped with a timing function, allowing pre-heating to be scheduled in advance so that the machine is ready for use immediately at the start of the shift.
6. The control system uses a touchscreen + microcontroller configuration, making operation simple and convenient, with improved stability.

7.The alarm system uses scrolling text notifications and a buzzer when a fault occurs, clearly indicating the fault point for easy troubleshooting.

8.The workflow and principle of this series are shown in Figure 1:



(Figure 1）

Process Description:

The PCB board, with components already inserted and ready for soldering, is placed smoothly onto the input conveyor chain. The board is then transferred at a certain angle to the double-hook chain. Along the double-hook chain, the PCB sequentially undergoes flux spraying, preheating, and then enters the wave solder pot for first-wave soldering, second-wave soldering, and cooling. Finally, the board is delivered out via the double-hook chain, completing the soldering process.

Ⅲ. ZB300BF Technical Parameter

1.Complete Machine:	
Model	ZB300BF
Outline Size	L3400*W1240*H1650mm
Weight	900KG
Power Supply	AC380V/50Hz (50A)
Starting Power	23KW
Operating Power	8KW
Control System	Touch screen+ single-chip microcontroller
PCB Transport Height	760±20mm
2.Spray System:	
Transmission mode	Stepper motor + digital driver + linear guide rail
Spray pressure	0.25MPa-0.4MPa
Type of nozzle	A100-1.0（Taiwan Wena）

Flow control method	Flow meter (Chengfeng Instrument)
Flux storage tank	5.5L
3.Preheating System:	
Heating method	Modular full hot air heating
Temperature control method	PID+SSR
Number of preheating zones	3 Zones
Length of preheating zone	1350mm
Adjustable temperature range of preheating zone	Room temperature-250℃
Power of preheating zone	9KW
4.Convey System:	
PCB board width	50mm-300mm
PCB conveying direction	L→R
Conveying speed range	200-2200mm/min
Allowable PCB component pin length	＜10mm
Speed control method	Touch screen controls digital speed regulation
Welding angle	4-7°
Guide rail width adjustment method	Manual width adjustment
5.Tin furnace System	
Type of tin pot	External heating tin pot
Material of tin pot	316L stainless steel / titanium alloy δ = 4.0mm
Power of tin pot	4500W * 3 = 13.5KW
Type of solder wave	One wave disturbance wave Two wave flat wave
Height of solder wave	0-12mm
Temperature of tin pot	Room temperature - 320℃
Capacity of tin pot	280KG (tin rod 63/37)
Time for tin pot to melt	70 minutes (set temperature 245℃)
Control method of tin pot	PID+SSR
Lifting method of tin pot	Manual
Entry and exit method of tin pot	Manual (optional electric)
Timed activation of tin pot	Have
6.Cleaning System:	
Cleaning agent	Alcohol
Sprayer alcohol tank capacity	2.4L
Paw wash alcohol tank capacity	2.4L
7.Cooling System:	
Cooling method	Natural convection cooling

IV. Installation and Commissioning

4.1 Working Environment and Conditions

- The equipment shall be placed in a factory building with a flat floor, good ventilation, and dry conditions. The operating ambient temperature shall be between 5°C and 45°C, with a relative humidity range of 20% – 95%.
- A stable 3-phase 5-wire 380V power supply (including neutral and grounding conductors, with reliable contact) with the rated current capacity shall be used.
- The equipment can be transported and stored within a temperature range of -25°C to 55°C. Within a 24-hour period, it may withstand temperatures up to 65°C. During transport, avoid excessive humidity, vibration, pressure, and mechanical shock.
- An industrial air supply with a stable pressure of 0.4 MPa or above shall be used.
- Do not install the machine near sources of electromagnetic interference.

4.2 User Precautions

- During operation, do not place any objects other than workpieces inside the machine.
- Pay attention to high temperatures during operation to avoid burns.
- When performing maintenance, carry out work at room temperature whenever possible.
- When servicing the machine, always turn off the power and disconnect the supply to prevent electric shock or short circuits.
- After moving the machine, inspect all parts thoroughly, especially the solder pot position, which must be kept at the same distance from its original position before the move; otherwise, impact damage to the machine may occur.
- The machine must remain stable, without tilting or instability. Adjust the leveling feet at the bottom to ensure each section of the conveyor chain is horizontal, preventing soldering defects on the PCB.
- The exhaust end of the wave soldering machine must be equipped with forced extraction. The airflow rate of the exhaust duct should ideally be 75 m^3/min or above.

4.3 Equipment Installation

1. After unpacking, place the machine on the floor. First install the inlet docking device, the right-side cooling guard, and all accessories.
2. Raise and adjust the fixed leveling feet at the bottom of the frame to lift the castors off the floor (by 10–20 mm) so that the top surface of the conveyor chain is approximately 750 mm above the floor. Use a spirit level to adjust the tilt of the machine in all directions (front/back, left/right) until the frame is perfectly level (as shown in Figure 2).
3. Adjust the conveyor angle according to the PCB design and soldering requirements. The factory default conveyor angle is 5°. When adjusting the angle, take care to lower the solder pot height to prevent damage to the chain (see Figure 3 for angle adjustment).

4. Adjust the solder pot height to the appropriate position.
5. Connect the power supply.
6. Connect the air supply.
7. Adjust the conveyor width so that the chain claws grip the PCB securely but not too tightly (the board should be able to be pushed forward along the transport direction by hand).
8. Add flux to the flux tank and open the ball valve (close the alcohol tank ball valve).

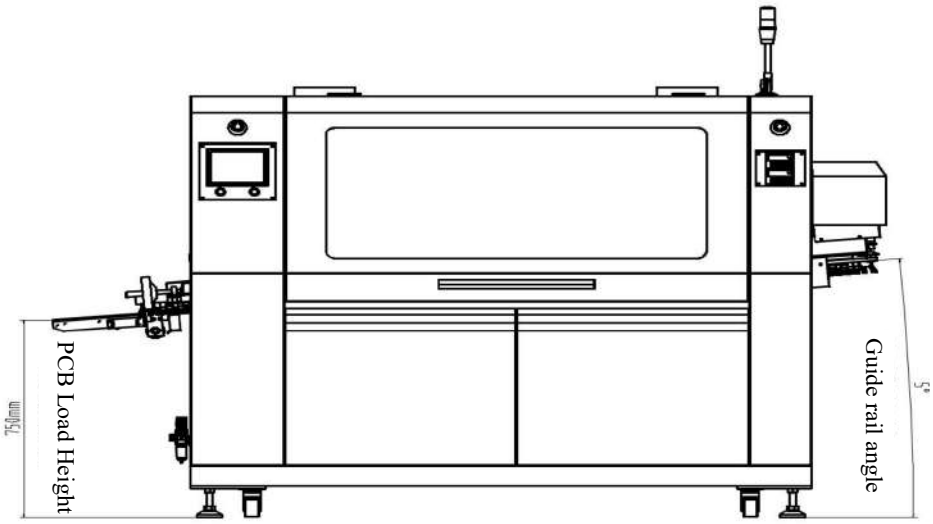
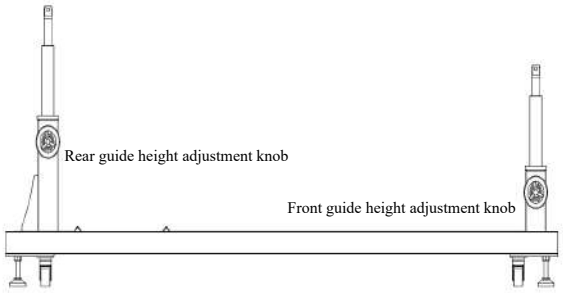


Figure 2



Peak wave machine rear view

Figure 3

4.4 Equipment Commissioning

- Spray System Adjustment

1. Working Principle

After compressed air is supplied to the equipment, flux flows into the spray nozzle by gravity and is atomised by the compressed air. The nozzle is driven by a stepper motor to perform a reciprocating motion, spraying the flux evenly onto the underside of the PCB. The air curtain effectively prevents flux from contaminating the equipment and the surrounding environment.

2. Adjustment Methods

① Air Supply Connection: Connect the air compressor tube to the inlet port of the air filter assembly (see Figure 4). Adjust the air pressure clockwise to 0.6 MPa.

② Spray air curtain adjustment: Turn clockwise to increase airflow, and counter-clockwise to decrease airflow, as shown in Figure 6. (Generally, it is recommended to adjust to 0.3–0.4 MPa.)

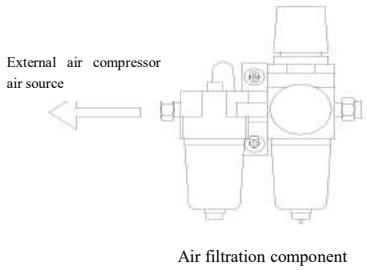
③ Nozzle Height Adjustment: Loosen the nut on the nozzle bracket screw, adjust the nozzle to the desired height, then retighten. (Recommended distance from the nozzle to the PCB bottom: 50–90 mm.)

④ Spray Air Pressure Adjustment: Turn clockwise to increase pressure; turn counter-clockwise to decrease pressure. This adjustment controls the nozzle start/stop switching. (Recommended setting: 0.4 MPa.)

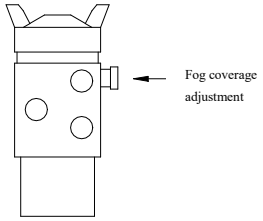
⑤ Spray Flow Adjustment: Turn the knob below the flow meter clockwise to decrease flow; turn counter-clockwise to increase flow. (Recommended setting: approximately 10 ml/min.)
(Note: The knob below the nozzle also controls flow -clockwise decreases, counter-clockwise increases.)

⑥ Spray Atomisation Adjustment: Turn clockwise to reduce droplet size; turn counter-clockwise to increase droplet size. (Recommended setting: 0.2–0.3 MPa.)

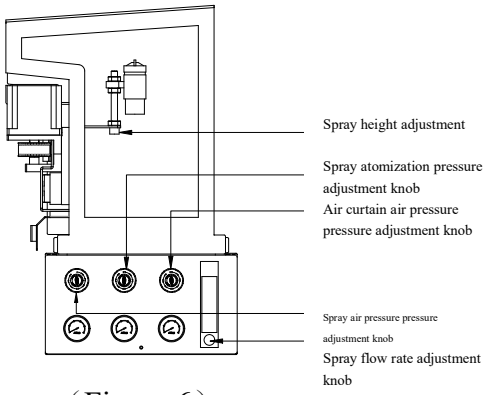
⑦ Spray Width (Mist Width) Adjustment: Turn clockwise to narrow the spray pattern; turn counter-clockwise to widen it. Adjust according to board width and nozzle height (see Figure 5).



(Figure 4）



（Figure 5）



（Figure 6）

3. Adjustment Procedure

Commissioning steps: Connect air supply → Open flux tank valve → Click Spray in self-test mode → Turn atomisation air pressure counter-clockwise to close → Adjust spray air pressure to 0.4 MPa → Adjust spray flow to 10 ml/min → Flux should flow out from the nozzle → Gradually increase atomisation air pressure from minimum to the appropriate setting.

4. Precautions

① The entry photoelectric sensor in the spray chamber should be kept clean at all times. If excessive dirt accumulates, wipe the sensor lens surface with alcohol.

② When excessive flux accumulates in the spray collection trough, clean it regularly with alcohol.

- Preheat System Commissioning

1. Working Principle

The preheat system consists of multiple independent preheat modules, offering convenient maintenance and servicing. Each module is constructed from heat-resistant and corrosion-resistant stainless steel, with insulation wool placed between layers for thermal insulation. The working principle: a heat-resistant long-shaft motor drives a centrifugal impeller, which increases air pressure via a booster cover, and hot air is then blown out through a perforated plate. Cold air enters the circulating air duct from both sides, is heated by the heating tubes, and enters the pressurised chamber. After being blown out through the perforated plate, the air is drawn back into the front and rear inlets for continuous circulation. This design significantly reduces heat loss.

2. Adjustment Method

The preheat chamber is factory-set and requires no mechanical adjustment. Only the preheat temperature needs to be set on the touchscreen according to the specific PCB requirements. (Recommended preheat temperature range: 80°C-130°C)

- Solder Pot System Commissioning

1. Working Principle

The wave solder pot consists of four parts: Wave 1 assembly, Wave 2 assembly, the solder pot liner, and the solder pot movable frame (see Figure 7).

Wave 1 and Wave 2 assemblies use motors to drive impellers, which pump molten solder through the nozzles.

Wave 1 produces a turbulent solder wave. Its main function is to use the rapidly flowing solder wave to wash away flux residues trapped behind surface-mounted components due to the shadowing effect, ensuring reliable wetting of solder joints and preventing missed soldering.

Wave 2 produces a smooth, laminar solder wave. Its main function is to trim and refine the solder joints after Wave 1, producing a perfect solder joint finish.

2.Ajustment Method

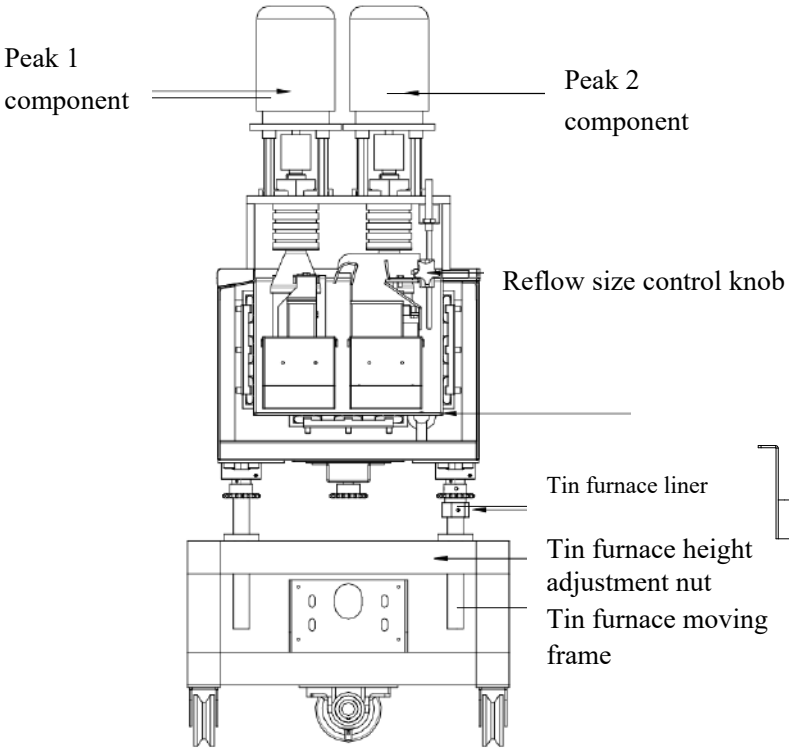
① Solder pot temperature is set on the touchscreen. (Default setting: 245°C.)

② The wave height is controlled by adjusting the frequency via the inverter panel keys on the right side of the machine. To minimise dross formation, the wave height should be kept as low as possible while maintaining soldering quality. Recommended solder penetration depth for Wave 2 (smooth wave) is 1/2 to 2/3 of the PCB thickness. Recommended Wave 1 height: 10–15 mm; Wave 2 height: 6–10 mm.

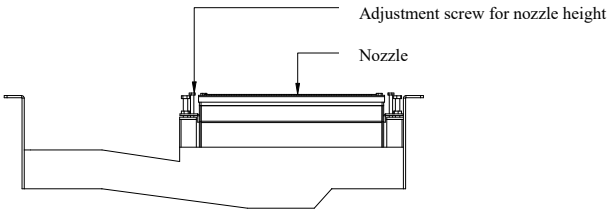
③The nozzle height should be adjusted according to the conveyor angle (see Figure 8 for adjustment screws).

④ The flow control knob on the right side of Wave 2 adjusts the laminar wave shape by changing the baffle height (see Figure 7). Different component types have different wave requirements: components with large thermal mass and connectors generally suit a smooth (laminar) wave, while small thermal mass components and connectors suit an arched wave. In general, a small amount of solder flow at the rear overflow to remove dross is sufficient to maintain a stable wave shape. Specific settings should be determined according to actual conditions.

⑤ The overall solder pot height can be adjusted using the supplied 36 mm open-end wrench on the solder pot height adjustment nut (see Figure 7).



(Figure 7）



（Figure 8）

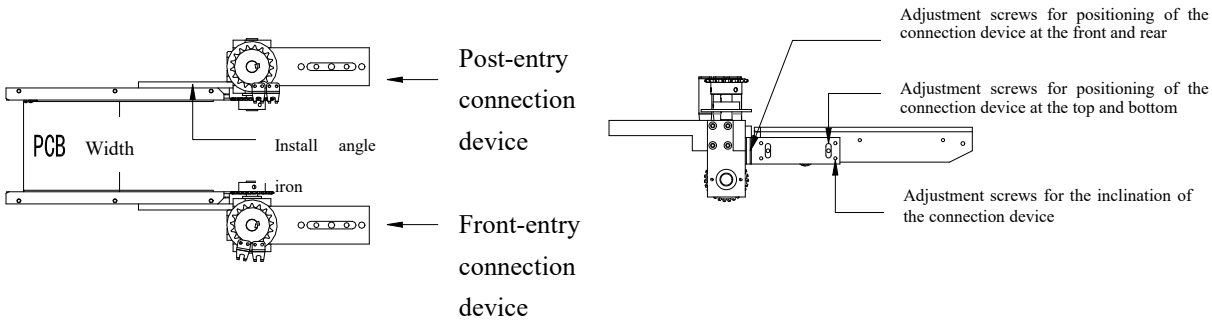
- Inlet Docking Device Commissioning

1. Working Principle

The inlet docking device connects the upstream equipment on the left side with the double-hook chain on the right side, ensuring smooth transfer of PCBs into the double-hook chain. It features an integrated drive structure with good synchronisation and high strength.

2. Adjustment Method

Mount the assembled inlet docking device onto the guide rail fixing aluminium blocks using the mounting brackets. Adjust the front/rear position, vertical position, and tilt angle using the respective adjusting screws to align the inlet docking device with the double-hook chain, ensuring proper linearity and width alignment. The width of the inlet docking device should be 0.5–1 mm wider than the double-hook chain width (see Figure 9).



(Figure 9）

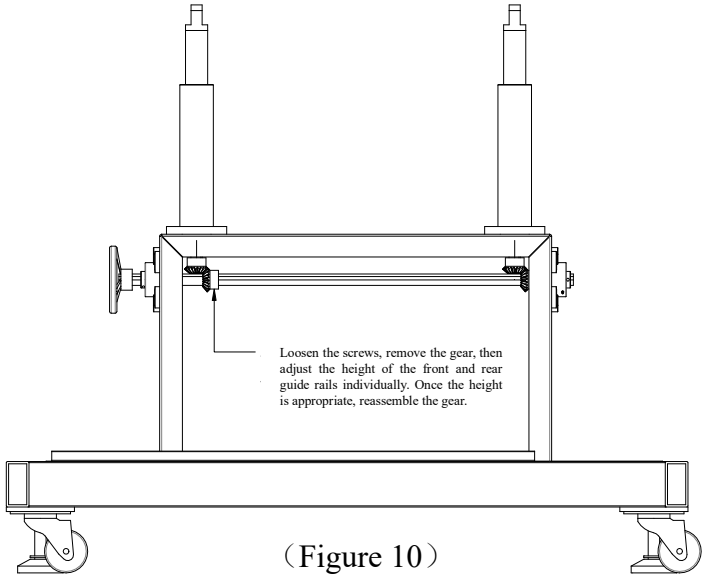
- Conveyor Frame Transmission Device Commissioning

1. Working Principle

The transmission system consists of a gear motor, chains, sprockets, and a control unit. Its function is to transport PCBs smoothly and controllably to each functional zone. The control unit includes a frequency inverter, a speed encoder, and a microcontroller, enabling speed adjustment and monitoring.

2. Adjustment Method

The conveyor guide rail angle is factory-set at 5°. If adjustment is required, it can be done via the left and right height adjustment handwheels. If uneven PCB soldering occurs due to an unlevel floor (e.g., partial missing solder joints caused by front-rear height differences), adjust the front and rear guide rail heights individually until both are parallel to the wave solder surface (see Figure 10). If a chain claw is deformed or damaged and needs replacement: first turn off the power and remove the protective cover, then install the new claw in the same position as the original.



（Figure 10）

V.Operating Instruction

5.1 Power-On Procedure

1. Turn on the main power switch inside the electrical cabinet.
2. Press the green Start button on the control panel.
3. Turn on the solder pot switch and wait until the temperature reaches the setpoint.
4. Press the Start button to begin operation.
5. The screen will light up and display the startup screen as shown below.



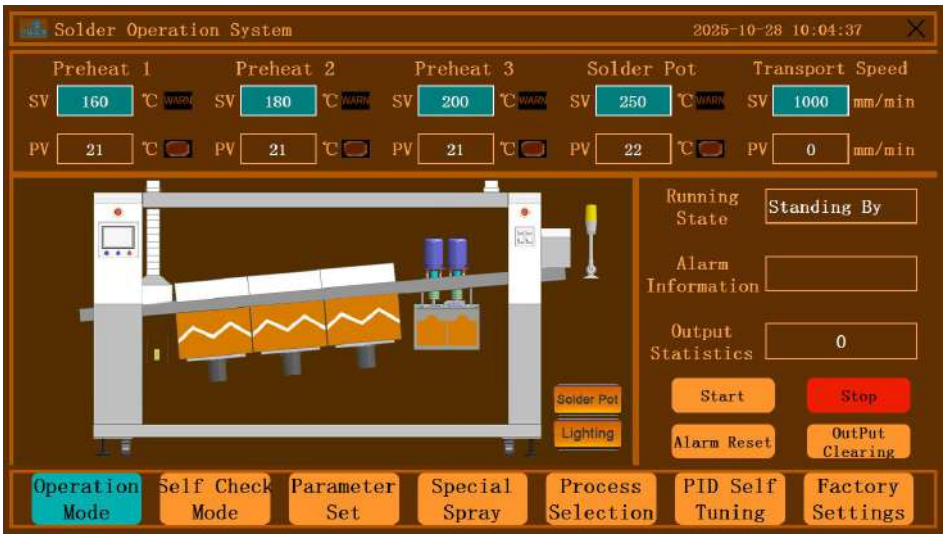
6. Tap anywhere on the startup screen to enter Operation Mode (hereinafter referred to as the main page), as shown below. Click the Solder Pot button -the icon will change, indicating that solder pot heating has started. After the solder pot temperature reaches the preset value, click Start to begin; the conveyor and preheat systems will start simultaneously, and PCBs can then be loaded onto the entry conveyor.

5.2 Operation Page Descriptions

1. Main Page

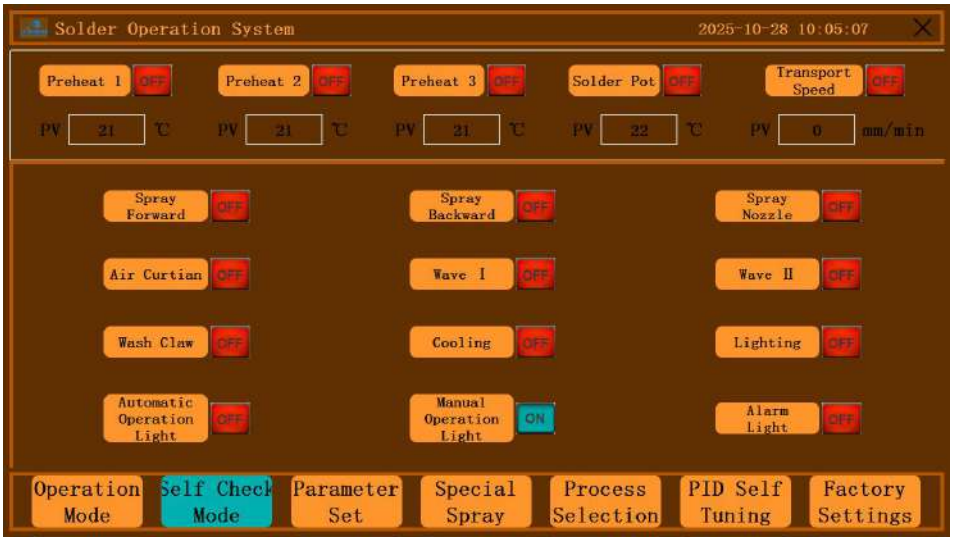
As shown in the main page above, the header bar displays Preheat (default 100°C), Solder Pot (default 245° C), and Transport Speed (default 1000 mm/min) – all can be adjusted at any time with real-time status tracking. The right side displays Run Status, Alarm Information, and Production Count. The lower right corner shows Start, Stop, Reset, and Production Counter Reset. If an alarm occurs, check the alarm message, resolve the issue, click Reset, then restart.

The bottom navigation bar shows seven sub-pages: Operation Mode (main page), Self Check Mode, Parameter Set, Special Spray, Process Selection, PID Self Tuning, and Factory Settings.



2. Self Check Mode

Self-Test Mode is used to check and test individual machine functions. The header bar allows testing of Preheat 1, Preheat 2, Preheat 3, Solder Pot, and Transport Speed, with real-time status display. The function buttons below are manual operation buttons – click once to activate, click again to deactivate.



3. Parameters Setting

The boxes can be filled with numerical values. Refer the following figure as an example, the meanings are as follows:

- Preheat Overheat Deviation: When the actual preheat temperature exceeds the preset value by 20°C, the machine triggers an alarm.
- Solder Pot Overheat Deviation: When the actual solder pot temperature exceeds the preset value by 20°C, the machine triggers an alarm.
- Lower Limit Tem. Of Sloder Pot: When the actual solder pot temperature falls below 230°C, the machine cannot start and triggers an alarm.
- Sectional Tem. Of Solder Pot: When the solder pot temperature reaches 210°C during heating, the bottom heating plate stops heating and only the left and right heating plates continue.
- Spray Velocity: Sets the reciprocating speed of the spray in start mode.
- Spray Distance: Spray lead-in distance (mm).
- Spray delay: Spray delay distance (mm).
- PCB Width Set: PCB width; must be reset when changing PCB types.
- Wave Start Distance: In normal mode, for the first PCB or when Economy Wave mode is enabled, the wave starts 500 mm before the PCB reaches the wave.
- Wave Delay: In Economy Wave mode, the wave is turned off 100 mm after the PCB passes the wave.

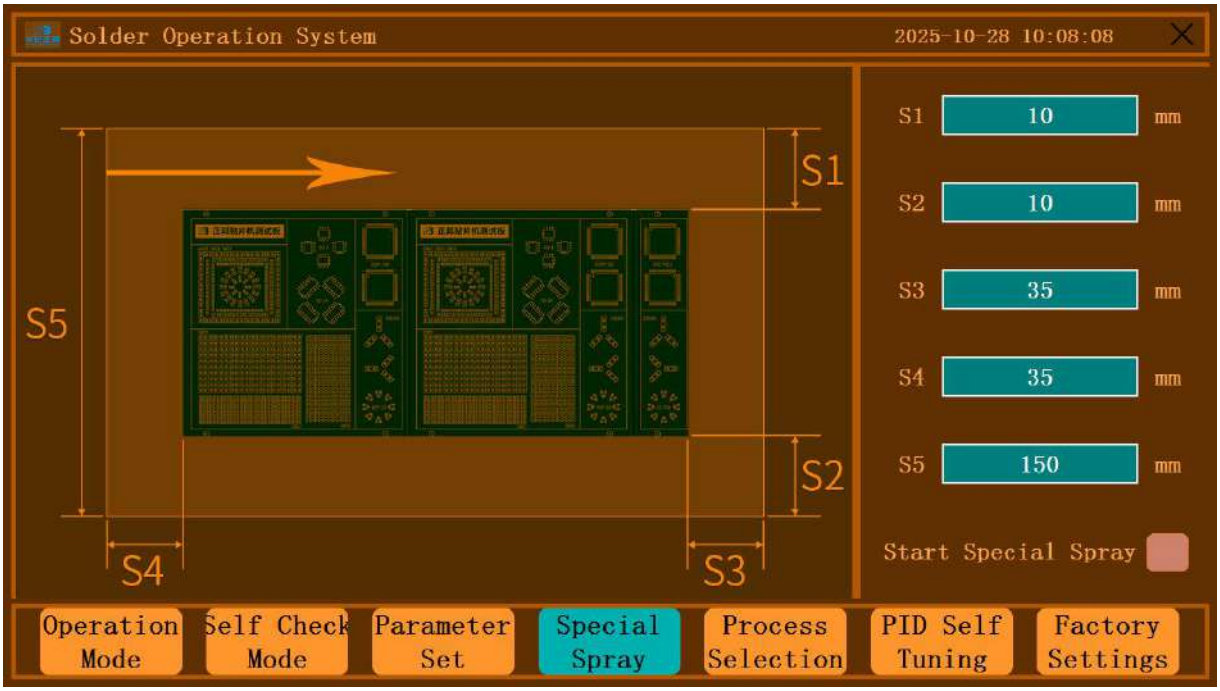
Among the check boxes, only the functions can be selected. Taking the data in the following figure as an example, their meanings are as follows:

- When the main page Start button is pressed, all checked functions will be activated; unchecked functions will not start.
- Power-on Solder Pot: Enables pre-heating of the solder pot at the start of each shift.



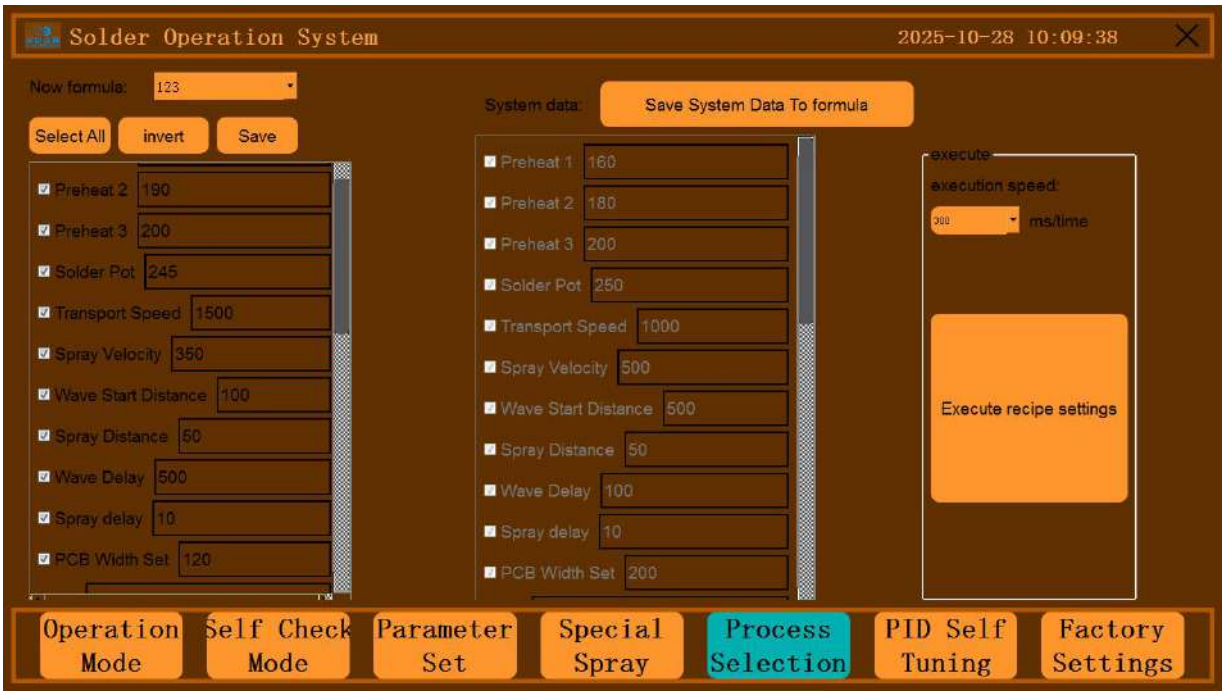
4. Special Spray

When PCBs are loaded with fixtures, Special Spray can be enabled to save flux. The S1, S2, S3, S4, S5 values can be entered based on measured fixture board dimensions. When Special Spray is enabled, the Board Width Setting in the Parameter Setting page will be overridden.



5. Process Selection

The system has three preset process parameter groups. Users simply select the desired process and click Import, as shown below.



5.3 Shutdown

1. Wait until all PCBs inside the equipment have been completely conveyed out.
2. Press the Stop button on the main page of the touchscreen.
3. Press the red Stop button to cut off the power supply.

5.4 Emergency Stop

In case of an emergency, press either of the two emergency stop buttons on the front panel. The wave solder and conveyor will stop immediately. After manual intervention, release the emergency stop button; the wave solder and conveyor will return to normal operation.

5.5 Alarms

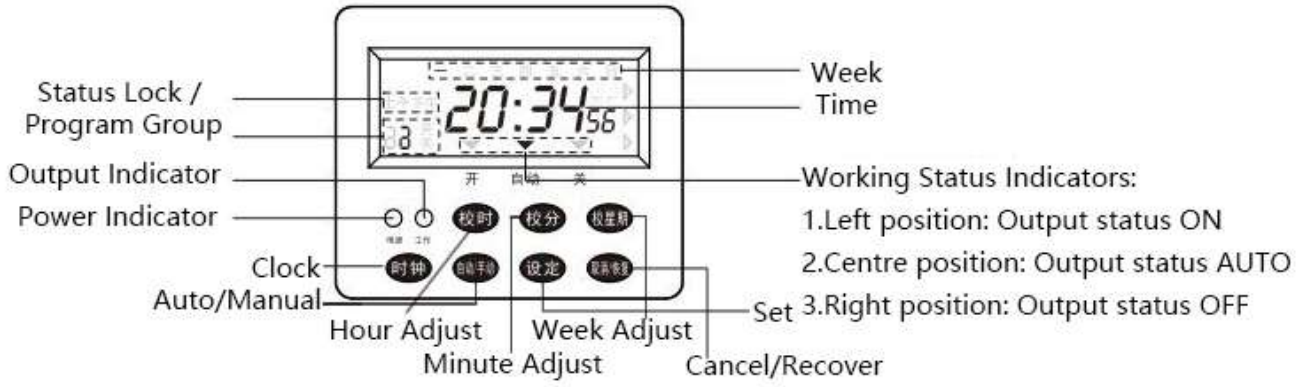
The equipment will trigger an alarm in the following situations:

1. Preheat overheat alarm
2. Solder pot overheat alarm
3. Solder pot temperature lower limit alarm
4. Inverter communication error alarm
5. Emergency stop activated alarm
6. Spray home position lost alarm

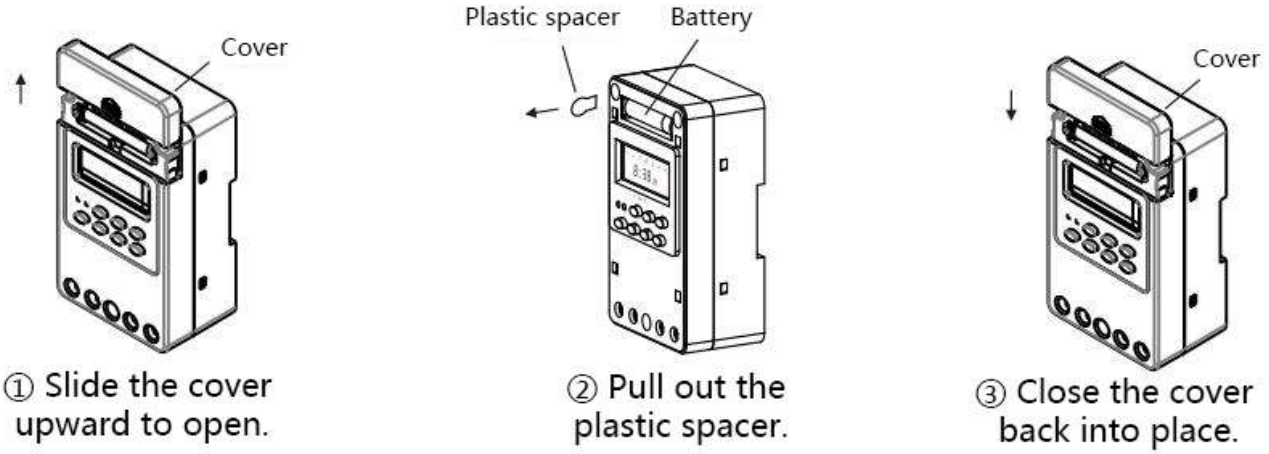
5.6 Solder Pot Timer Setting (Reference)

If the customer needs to schedule the solder pot start, they should turn on the timer switch power supply inside the electrical cabinet, check the "Power-on Solder Pot" option in the parameter setting interface, and adjust the timer switch setting. For time adjustment and calibration, follow the operation as shown in the figure below.

Panel Instruction

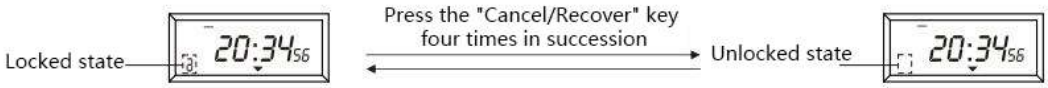


1.Battery Intallation

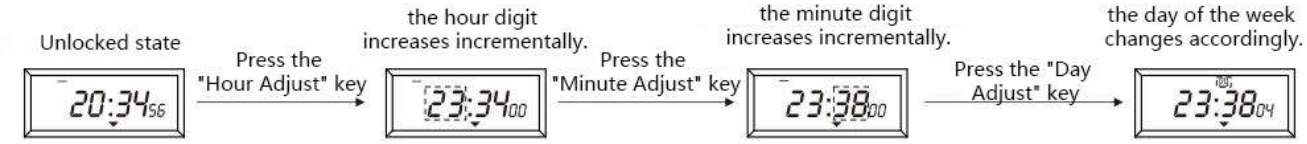


2.Keyboard Lock Usage:

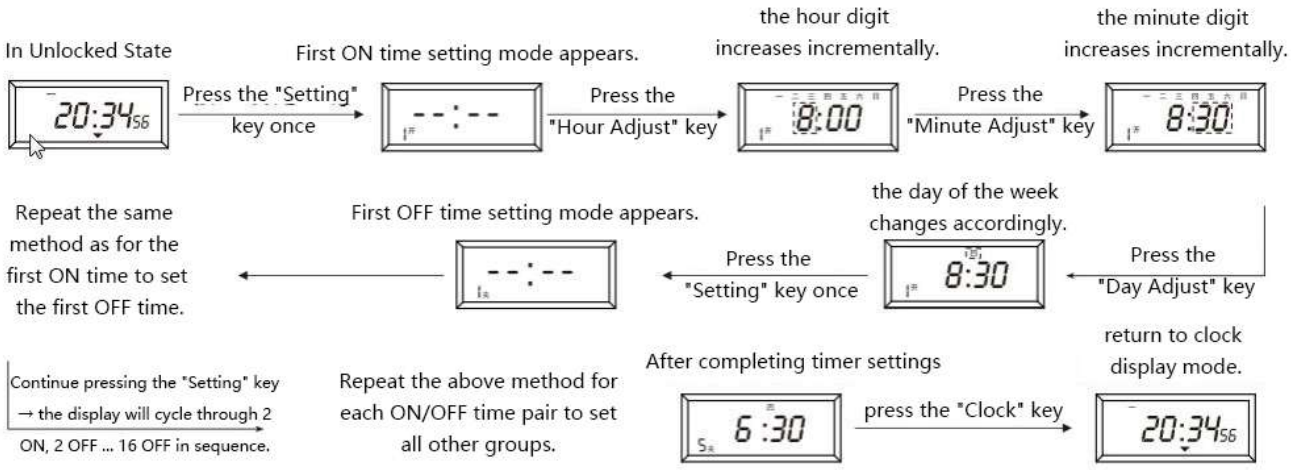
If the keyboard is not operated within 30 seconds, the timer switch will automatically lock to prevent accidental operation.



3.Clock Calibration



4.Timing Program Setting



5. Cancel/Restore scheduled program settings



6.Manual Operation

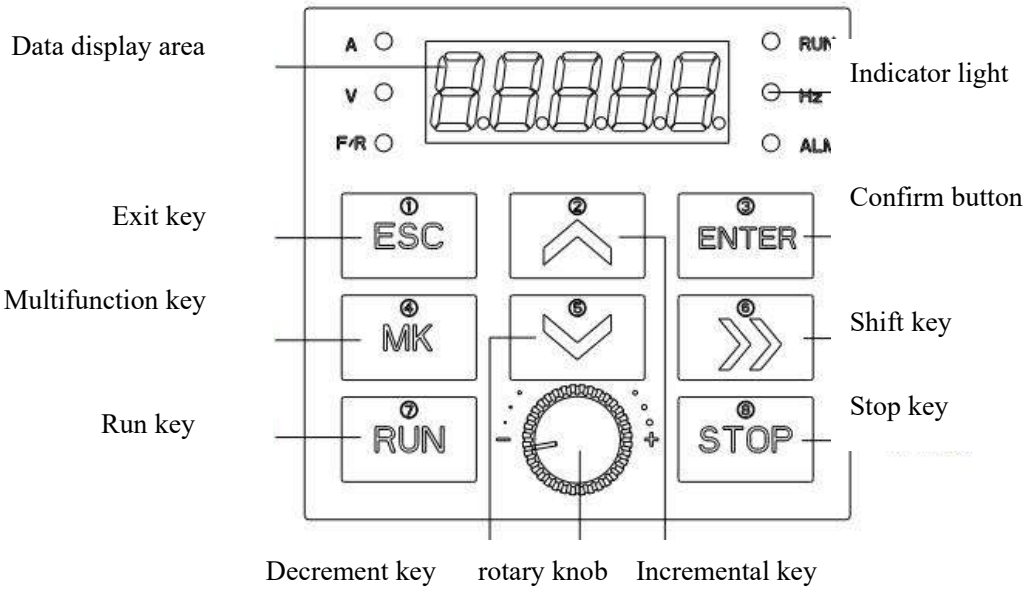


5.7 Inverter Settings

If inverter data is lost due to abnormal conditions or after replacing the inverter, please restore the data according to the process below:

1. Press the ENTER key on the inverter control panel to enter programming mode. The display will show a parameter number beginning with "F".
2. Press the ▲ and ▼keys to scroll through the parameters.
3. Press ENTER to display the current value of the selected parameter.
4. Press the ▲ and ▼keys to change the value, then press ENTER to confirm.
5. Press the ESC key to exit programming mode.
6. When the inverter is connected to an external control panel, all settings must be made via the external panel.

The control panel can be used to modify function parameters, monitor inverter operating status, and control inverter operation (start/stop). The panel layout and function areas are shown in the figure below:



No.	Parameter Instruction	Factory Default	Wave Inverter Setting
FO.02	Run command selection	0	1
FO.03	Main frequency command source	4	1
FO.17	Acceleration time 1	(machine-dependent)	1.0
FO.18	Deceleration time 1	(machine-dependent)	1.0
No.	**Parameter Instruction**	**Factory Default**	**Wave Inverter Setting**
FO.02	Run command selection	0	1
FO.03	Main frequency command source	4	9
FO.17	Acceleration time 1	(machine-dependent)	1.0
FO.18	Deceleration time 1	(machine-dependent)	1.0

VI. Fault Analysis and Troubleshooting

Phenomenon	Cause Analysis	Check & Remedy
Main power switch trips	1. Short circuit in load or wiring	1. Check all loads and related wiring; eliminate short circuit fault
	2. Poor contact in main power switch	2. Check the wiring terminals of the main power switch for looseness, overheating, or oxidation; check switch contacts for poor contact or arcing; repair or replace as necessary
Solder pot or preheat heats up slowly	1. Low supply voltage	1. Improve power supply quality
	2. Partially damaged heating wires/tubes	2. Replace heating wires/tubes
	3. Solid-state relay (SSR) open-circuit failure	3. Replace the SSR
Solder pot or preheat runaway overtemperature	1. High supply voltage	1. Check voltage and improve power supply quality
	2. Faulty temperature sensor	2. Replace the temperature sensor
	3. Damaged temperature module	3. Replace the temperature module
	4. SSR short-circuit failure	4. Replace the SSR

Spray does not output flux	1. Flux is insufficient / empty	1. Add flux
	2. Nozzle is blocked	2. Clean the nozzle
	3. Insufficient air pressure	3. Check air pressure and increase it
Spray does not move	1. Entry photoelectric sensor is dirty or damaged	1. Wipe the sensor or replace it
	2. Spray motor or driver is damaged	2. Replace the motor or driver
Wave does not start	1. Wave inverter is damaged	1. Replace the inverter
	2. Wave motor is damaged	2. Replace the motor
	3. Solder has not melted	3. Wait for the solder to melt completely

VII. Analysis of Welding Process Defects

Soldering Issue	Cause	Remedy
Insufficient wetting / Poor solderability	1. Solder pot temperature is too high	1. Lower the solder pot temperature
	2. Dipping time is too long	2. Shorten the soldering time
	3. Poor solderability of PCB component leads	3. Improve component quality
	4. PCB hole design too large (poor layout)	4. Improve PCB design
	5. Poor flux solderability	5. Replace the flux
	6. Excessive impurities in the solder bar	6. Replace the solder bar
Bridging (solder shorts)	1. Solder pot temperature is too low	1. Increase the solder pot temperature
	2. Insufficient flux wetting	2. Increase flux spray volume
	3. Poor flux solderability	3. Replace the flux
	4. Adjacent pads are too close	4. Improve PCB design/layout
	5. Poor solder purity	5. Improve solder quality
	6. Insufficient preheating	6. Increase preheat temperature

Localised non-wetting (uneven soldering)	1. Equipment is not level	1. Re-level the equipment using a spirit level
	2. Front/rear offset parameters are incorrectly set	2. Re-adjust the front/rear offset values
	3. Dipping mechanism has shifted	3. Adjust the level of the dipping mechanism
	4. PCB is warped or deformed	4. Improve PCB quality
Poor joint finish (dull/rough surface)	1. Excessive impurities in solder	1. Use high-purity solder
	2. Oxidised or contaminated copper foil and component leads	2. Improve component and PCB quality
	3. Poor flux solderability	3. Improve flux quality
	4. Inappropriate solder pot temperature	4. Increase soldering temperature appropriately
Solder balls / spattering around pads	1. Excessive flux spray volume	1. Reduce flux spray volume
	2. Insufficient preheating	2. Reduce conveyor speed / increase preheat temperature
	3. Flux has been stored for too long	3. Replace the flux
PCB warping	1. Preheat temperature is too high	1. Reduce preheat temperature
	2. Preheat time is too long	2. Increase conveyor speed
	3. Solder pot temperature is too high	3. Reduce solder pot temperature
Voids (blowholes) on pads	1. Excessive flux or insufficient solvent evaporation before soldering	1. Reduce flux spray volume
	2. Preheat zone temperature is too low	2. Increase preheat temperature
Cracks on pads	1. Vibration during soldering	1. Improve the machine operating environment
	2. Solder purity is too low	2. Improve solder quality

VIII. Maintenance & Service

- Spray System

1. Flush the spray nozzles with alcohol daily for at least ten minutes without the conveyor running.
2. Clean the filter screen and collection tray daily.
3. Remove and thoroughly clean the spray nozzles once a week.

- Preheating System

  Flux dripping from PCB bottoms accumulates on the preheat chamber top. Excessive buildup may cause smoke and trigger alarms. Clean weekly using alcohol.

- Solder Pot System

1. Remove oxidized solder dross from the solder pot daily.
2. Periodically disassemble the wave nozzles and clean the impeller filter screens and nozzle oxides.
3. Routinely check the molten solder level. When stopped, the level should not be more than 10mm below the pot rim.
4. Check all screws on the wave motor assemblies for tightness weekly.

- Conveyor System

1. All transmission components should be kept well-lubricated. Ordinary grease may be used on the angle adjustment mechanism, while high-temperature grease should be used on all other parts.
2. Check the tension of all transmission chains weekly and adjust as necessary.
3. Inspect all screws and fasteners weekly for any signs of loosening.

IX. Precautions

1. Never allow flux to drip into the preheat chamber or the solder pot.
2. Never allow flux to drip onto high-temperature areas of the equipment or into the electrical cabinet.
3. Never heat the solder pot continuously without solder inside.
4. Grounding must be reliable and properly connected.
5. When melting solder, always wear the necessary protective equipment to prevent burns.
6. Flux and cleaning agents are flammable. Pay attention to fire safety during use.
7. After each work shift, clean any flux residue that has dripped into the preheat zone to prevent accumulation that could cause a fire.
8. Never insert hands into the machine while it is running to avoid injury.
9. Wipe the sensing surfaces of the loading, unloading, and board-in photoelectric sensors every two weeks.
10. Clean the spray nozzle with alcohol after each shift.
11. Never block the photoelectric sensors or proximity switches with your hands while the machine is running.

X. Packing List

1. Instruction manual	1 PC
2. Certificate of conformity	1 PC
3. Titanium claws	20 PCS
4. Toolbox	1 PC
5. Cross screwdriver	1 PC
6. Adjustable wrench	1 PC
7. Hex key set	1 Set
8. Skimmer (solder dross ladle)	1PC
9. Nylon tube	3 Meters
10. Chain connecting link - single link - 3/8" pitch	20 Sets
11. 14 mm T-handle socket wrench	1 PC
12. 10 mm T-handle socket wrench	1 PC
13. Needle-nose pliers	1 PC
14. 36 mm open-end wrench	1 PC
15. Aluminium foil duct - 200 mm diameter	7 Meters

XI. After-sale Service

The warranty period of this machine is 12 months from the manufacturing date. Within warranty,we provide free repair (including replacement parts and after-sales support) for any damage not caused by the user. If the warranty period is over, we will charge the appropriate maintenance fee and maintain it for life.