SMTmax Corporation

WP-8800: 16 Zone Reflow Oven

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Chapter 1: Overview

SMTmax Corporation, based in Chino California, is a leading provider of SMT (Surface Mount Technology) equipment. We specialize in the research and development, design, sales, and service of a comprehensive range of SMT equipment. Our focus is on delivering high-quality products and exceptional customer service to domestic and international clients.

At SMTmax Corporation, we adhere to the principles of integrity and customer satisfaction. Our mission is to offer cutting-edge SMT solutions and top-notch after-sales support to meet the needs of our valued customers.

Our product line includes a variety of reflow soldering machines, such as the WP series. These machines are sourced from trusted overseas manufacturers and are available in different models, including AS for small-scale applications, the AE for medium-scale inline reflow soldering, and the WP series for large-scale reflow soldering. The control options range from intelligent instrument control to computer control. Depending on your requirements, we offer standard models with three, four, five, six, eight, or ten temperature zones. If needed, we can also provide customized solutions tailored to your specific needs.

At SMTmax Corporation, we are committed to delivering advanced SMT equipment and outstanding service, solidifying our position as a leader in the industry.

Chapter 2: Equipment Fundamentals

Section 1: Heating Principles

1. ***Heating Element Types:***

The heating elements used in the equipment primarily consist of conventional heating wires and a small amount of far-infrared heating elements.
- Conventional Heating Wires: These elements consist of high-grade nickel wires installed within metal tubes. The tubes are filled with calcium silicate material, allowing for efficient transfer of heat to the outer surface of the heating tubes and the surrounding air.
- Far-Infrared Heating Elements: In addition to conventional heating wires, the machine also incorporates an infrared structure. This structure comprises high-grade nickel wires installed within ceramic tubes. These tubes are filled with calcium and magnesium silicate material and coated with a special coating. The coated tubes generate far-infrared electromagnetic waves with a central wavelength of 4.5um. The heat storage plate features hot air circulation holes at regular intervals of 25mm, with an inner diameter of φ 6 and an outer diameter of φ8. These holes facilitate the downward flow of laminar hot air.

2. ***Heating Method:***

The heating process in the equipment involves the use of high-temperature hot air emitted through the holes on the heat storage plate. This hot air directly reaches the surface of the PCB and various components, as well as the tin paste (also known as patch glue). The laminar flow of the air can be adjusted to control the speed, ensuring efficient heat transfer to the PCB solder and maintaining temperature distribution within the machine.

Furthermore, the equipment employs far-infrared electromagnetic waves with a central wavelength of 4.5um. These waves interact with air molecules, PCBs, flux, solder components, and other substances, generating additional heat. Far-infrared electromagnetic waves within the wavelength range of 3~10um can cause resonance with the atomic and chemical molecules present in PCBs, additives, solder, and other materials. The resonance leads to intensified vibration and increased molecular motion, resulting in the rapid conversion of vibrational energy into heat. This thermal reaction occurs promptly, ensuring effective heating without the need for ultra-high temperature radiation. The specific wavelength of 4.5um has low spectral transmittance to air, making it an optimal wavelength for heating air. Therefore, specific infrared wavelengths can aid in air heating as well.

3. Characteristics of the Heating Mode:

(1) The heating mode offers several distinctive features:
- High-temperature and low-speed hot air blown from the heat storage plate efficiently transfer heat to the PCB, solder, and components, providing the following benefits:
  - Direct heating of solder in the shadowed areas under special-shaped components.
  - Direct heat transfer to pads and solder joints.
  - Prevention of component overheating.
  - Attainment of temperature balance among solder joints of different components.
  - Attainment of temperature balance among solder joints of components in different positions.
  - Ability to solder PCBs made of different materials, including flexible boards.

(2) Combination with Infrared Heating:
- The equipment incorporates infrared heating as an auxiliary function, which offers additional advantages:
  - Heating the air through 4.5um wavelength infrared rays reduces the need for extensive air circulation.
  - Reduction of oxidation levels in solder parts.
  - Minimization of overall power consumption.
  - Acceleration of temperature rise.
    - From room temperature to the operating temperature in approximately 30 minutes.
    - Faster temperature changes achieved within around 10 minutes.
  - Far-infrared electromagnetic waves possess a self-cleaning effect, ensuring the furnace remains uncontaminated by additives.
    - Resin components in the additives can be decomposed by far-infrared electromagnetic waves.

4. ***Heated Structure:***

(1) Configuration of Temperature Zones:
Different models of the equipment feature varying numbers of temperature zones, along with corresponding upper and lower heaters. Here are the specifications for some models:

Models	Number of temperature zones	Number of upper heaters	Lower number of heaters	Starting power	Operating power
WP—F536	Up 5/Down 5	6 groups	6 groups	12kW	6kW
WP—F535B	Up 5/Down 5	5 groups	5 groups	24kW	9kW
WP—MF535C	Up 5/Down 5	5 groups	5 groups	24kW	9kW
WP—5500	Up 5/Down 5	5 groups	5 groups	26kW	9kW
WP—6600	Up 6/Down 6	6 groups	6 groups	30kW	12kW
WP—8800	Up 8/Down 8	8 groups	8 groups	38kW	16kW

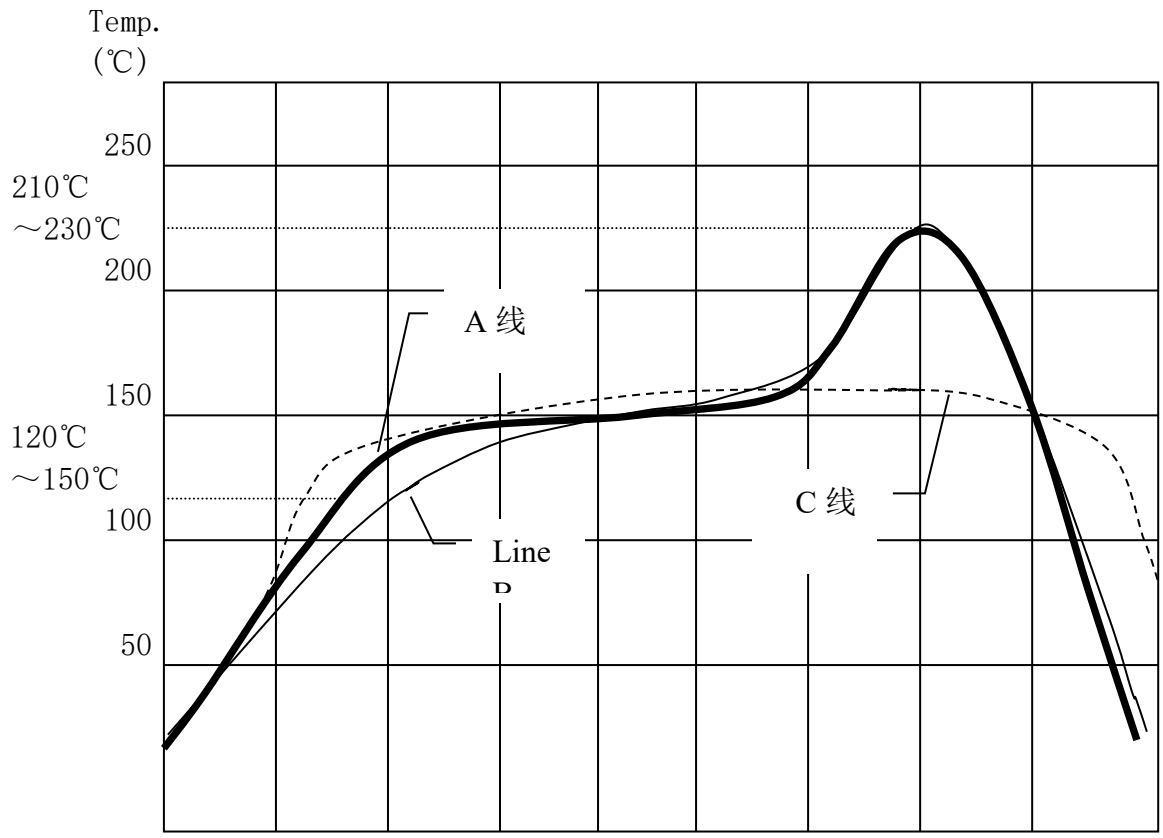
(2) Temperature Control Detection Point:
Each temperature zone is equipped with a standard thermocouple detection point. This point serves as a static temperature detection point, representing the temperature of the space in which the object is located. The position of this detection point is precisely calibrated before the machine leaves the factory and should not be adjusted without confirmation from the factory.

(3) Temperature Controller:
The industrial control computer is responsible for temperature detection and PID control for each temperature zone. It utilizes an SSR (Solid State Relay) high-power drive program.

Second, the Temperature Curve:

To achieve the desired soldering results without causing any damage to the PCB and components (such as burning or discoloration), the WP series machines are designed to heat the solder paste on the PCB surface and ensure its proper melting and reflow.

The following temperature profile, based on IPC standards, is recommended:



A-line: This temperature profile is typically used for solder paste soldering. Within 60 seconds, the PCB pad temperature rises from room temperature to 120-150°C at a rate below 3°C/s. From 60 to 180 seconds, the temperature stabilizes around 150°C, below the melting point of the solder paste (183°C), ensuring temperature equilibrium before the paste liquefies. The profile then holds at 183 to 210-230°C for 30 seconds to fully reflow the solder.

B-line: This profile is suitable for soldering technologies involving micro-pitch ICs and tiny components (e.g., 1005). It controls the rate of temperature rise in the preheating zone, delaying the softening of the flux in the solder paste and the formation of solder balls from tiny tin powder particles.

C-line: This profile is commonly used for curing adhesive for general surface mount components. The temperature is maintained at around 150°C for approximately 3-5 minutes.

To achieve maximum output in a highly automated SMT production environment, it is crucial to set the heating temperature carefully according to the specified solder paste temperature chart before starting the machine. Supervision during operation is also recommended. Additionally, using a waste PCB to assist in setting up the digital

temperature monitor of the machine can help obtain the desired solder paste temperature chart.

<u>Third, as a Temperature Curve:</u>

To achieve the desired temperature curve, the hot air reflux or infrared heating reflux system should be employed. This process involves determining the fixed temperature settings and belt speed according to various factors, such as the type of base plate, thickness, component type, arrangement density, pad size, solder paste type, and shape and thickness of the printed tin. These factors impact the time/temperature profile for the product.

The hot air reflux or infrared reflux equipment with zonal and graded heating allows the product to pass through heating stages step by step. The first stage is rapid heating, quickly warming up the PCB. The second stage is slow heating to dry the solder on the PCB. The third stage is the melting and reflux zone, where the solder paste is rapidly heated, melted, and then reflowed. Finally, the tin slurry undergoes rapid cooling in the cooling zone to complete the temperature curve.

Top heating serves the purpose of facilitating surface mount soldering. It can be achieved through infrared heating reflux or hot air heating reflux, depending on the specific requirements. The top and bottom heaters can be controlled independently, allowing selective heating on either surface. By adjusting the belt speed, the residence time of the PCB in the machine can be matched to the soldering process, considering factors such as PCB thickness and desired temperature equilibrium.

The setting of the Temperature Curve:

The process of setting the temperature curve begins with classifying the PCB boards and analyzing their heat absorption characteristics, as well as considering factors such as the type, density, and welding difficulty of each PCB, along with the required production volume. This information helps determine the appropriate heating strategy for the top, bottom, and reflow zones. To facilitate this process, it is beneficial to insert a thermocouple into the machine at a specific tin point or component. However, this step is not mandatory and can be omitted.

Here is a suggested starting point for the temperature curve:

ZONE 1: Upper warm-up zone	ZONE 2: First upper drying zone
ZONE 3: Second upper drying zone	ZONE 4: Upper reflux zone
ZONE 5: Lower warm-up zone	ZONE 6: First lower drying zone
ZONE 7: Second lower drying zone	ZONE 8: Lower reflux zone

The cooling function of the temperature curve is typically accomplished through the natural cooling of the machine.

It's important to note that these are general starting points based on a four-stage, eight-temperature controlled reflow soldering process. For other configurations, such as the AE-F630's four-temperature zone full hot fan with four groups of control, the zones can be extrapolated accordingly. For example, zones 1 and 5 can be combined into a single preheating zone, zones 2, 6, 3, and 7 can be combined into two drying zones, and zones 4 and 8 can be combined into a reflux zone. Once the temperature curve for a specific PCB board is established, similar PCB boards can use the PCB temperature diagram (with increased belt speed) as a starting point.

Fourth, Function Description of the Temperature Zones:

1. Warm-up Area:
The warm-up area, also known as the rapid heating zone, is responsible for preheating the PCB and increasing the temperature of the solder paste to the point where its flux begins to boil. In a bottom-heating strategy, the warm-up zone plays a crucial role. As the energy enters this area, sufficient time is available for conduction or radiation to effectively heat the PCB, allowing it to quickly reach thermal stability. The drying area's time requirement is also guaranteed through the warm-up zone.

It is essential to ensure that the heating rate remains within 3°C/s to prevent damage to heat-sensitive components caused by thermal strain.

2. Drying Area:
The drying area is a slow, extended temperature zone where the PCB spends the most time. As the PCB passes through the rapid preheating zone, the temperature fluctuations become minimal within this zone. The uniform temperature environment enables efficient and rapid physical and chemical reactions among various components and the tin paste. This stage prepares the PADS position on the PCB, which is plated with copper and tin, for the subsequent melting and reflux process, while gradually drying the tin paste.

3. Reflux Area:
The reflux area represents the solder reflow zone, where the hot air heating system or infrared heater of the infrared machine provides sufficient energy to melt and reflux the solder slurry. Typically, the preset temperature value of the upper reflux zone is higher than that of the lower reflux zone to facilitate reflow at the top of the PCB.

5. Temperature Zone Setting:
1. Set the temperature and belt speed in the temperature zone to their starting values, usually provided by the manufacturer's guidelines.
2. Preheat the cold furnace for 20-30 minutes.
3. Once the temperature reaches equilibrium, pass a sample PCB through the heating reflux system, ensuring that the tin paste reaches the critical point of reflow under the current settings. If reflow does not occur, proceed to step 4. If reflow is excessive, reduce the temperature setting proportionally while maintaining the correct temperature ratio. Repeat the process until the critical point of reflow is reached. Move to step 4 only if no-reflow or insufficient reflow occurs.

4. If reflux does not occur, reduce the belt speed by 5-10%. For example, if the belt speed is currently 500mm/min without reflux, adjust it to around 460mm/min. Reducing the belt speed by 10% generally increases the product's reflow temperature by about 30°F. Alternatively, without changing the belt speed, slightly increase the temperature setting while referencing the standard temperature curve. Adjust the set temperature in increments of approximately 5°C, ensuring not to exceed the PCB's thermal capacity and component limits.
5. Pass the PCB through the reflux system again at the new belt speed or adjusted temperature. If reflow still does not occur, return to step 4 for further adjustments. If reflow occurs, proceed to step 6 for fine-tuning the temperature curve.
6. The temperature curve can be moderately adjusted based on the PCB's complexity. Fine-tuning can be achieved by adjusting the belt speed within a secondary range of 1-5%. Lowering the belt speed increases the product's temperature while raising it decreases the temperature.
7. Tip: When a PCB with components passes through the reflow system but does not undergo complete reflow, it can be adjusted appropriately and reprocessed through the system for secondary reflow without adverse effects on the PCB or components.
8. Generally, temperature settings should progress from low to high. If the temperature amplitude exceeds the reflux temperature limit, increase the belt speed or adjust the setting temperature accordingly. This step is the opposite of step 4.

Chapter 3: Equipment Installation

Section 1: Installation Site

1. Ensure a Clean Environment:
Please ensure that the machine is operated in a clean environment, free from dust and contaminants.
2. Avoid Extreme Temperature and Humidity:
To maintain optimal performance, avoid installing or storing the machine in high-temperature and high-humidity environments.
3. Prevent Electromagnetic Interference:
Do not install the machine near sources of electromagnetic interference to ensure proper operation.
4. Consider Airflow:
During installation, ensure that the reflow furnace is not placed near fans or windows where it may be exposed to excessive airflow.

Section 2: Safety Precautions

1. Prevent Foreign Objects:
Do not place any objects other than the workpiece inside the machine during operation.

2. Beware of High Temperatures:
Exercise caution and avoid burns when operating the machine due to the high temperatures involved.

3. Start at Room Temperature:
Whenever possible, start the machine at room temperature when carrying out maintenance procedures.

Section 3: Operating Environment for this Series of Models

1. Ambient Temperature:
The working environment temperature for this series of dryers should be maintained between 5°C and 40°C, regardless of whether the dryer is operational or not.

2. Relative Humidity:
The recommended relative humidity range for operating this series of machines is between 20% and 95%.

3. Transportation and Storage:
During transportation and storage, the machines can withstand a temperature range of -25°C to 55°C. However, for a duration of 24 hours, the machine should not be exposed to temperatures exceeding 65°C. Please ensure to avoid excessive humidity, temperature variations, vibration, pressure, and mechanical shocks during transportation.

Section 4: Power Supply

1. Electrical Requirements:

Please connect the machine to a reliable three-phase 4-wire 220V power supply. The grounding must be properly executed by a qualified electrician.

Section 5: Height Adjustment of Reflow Soldering

The conveyor height and level of the dryer can be adjusted using the adjustable feet located at the bottom of the machine. Use an industrial or alcohol level meter to ensure a level position. Adjust the machine horizontally in the front, back, left, and right directions until it is completely leveled.

Section 6: User Precautions

1. Maintain a Clean Environment:

To ensure high-quality soldering, operate the reflow soldering machine in a clean environment.

2. Avoid Extreme Environmental Conditions:

Do not use or store the machine in open-air environments with high temperatures and humidity.

3. Prevent Electrical and Magnetic Interference:

Avoid installing the machine near sources of electrical or magnetic interference to maintain proper functioning.

4. Safety during Maintenance:

When performing maintenance, turn off the machine and disconnect the power supply to prevent electric shock or short circuits.

5. Post-Maintenance Inspection:

After maintenance, thoroughly inspect all parts, especially the position of the mesh belt, to ensure it is not stuck or dislodged.

6. Maintain Stability:

Ensure that the machine remains stable with no tilting or instability. Adjust the lower foot cups of the machine to keep the conveyor chain in a horizontal position, preventing displacement of the PCB board during transportation.

7. Beware of High Temperatures:

Exercise caution to avoid scalding when operating the machine due to the high temperatures involved.

8. Consider Workpiece Size and Heat Absorption:

Avoid transferring workpieces that are too large or have excessive heat absorption to this reflow soldering machine to prevent damage to the mesh belt and ensure consistent temperature

Chapter 4: Operating Instructions

Section 1: Preparing for Operation

1. Check Power Supply:
Ensure that the power supply voltage is 4-wire 220V+G 3xphase

2. Verify Electrical Connections:
Check the main circuit wires in the electric box for any loose or unreliable connections.

3. Ensure Proper Grounding:
Confirm that the equipment is properly grounded.

4. Clear Electrical Box:
Check for any foreign objects inside the electrical box and remove them if found.

5. Inspect the Conveyor Belt:
Ensure that the conveyor belt is free from any foreign objects or obstructions.

6. Lubrication Check:
Inspect the lubrication of each transmission bearing and ensure they are properly lubricated.

7. Check High-Temperature Terminal:
Verify that the high-temperature terminal is secure and not lost or burned.

8. Confirm Control Card Connection:
Check the connection of the industrial computer control card to ensure it is reliably connected.

9. Transmission Chain Lubrication:
Ensure that the transmission chain is adequately lubricated with high-temperature lubricating oil.

10. Check the Exhaust Duct:
Inspect the external exhaust duct to ensure it is clear and unobstructed.

11. Verify Fan Motor:
Check the fan motor for any abnormalities or malfunctions.

12. Secure Inverter Extension Cable:
Check the inverter extension cable to ensure it is not loose or disconnected.

Section 2: Operating Procedures

1. Switch On:
Turn on the main power switch.

2. Electronic Control Switch Seat:
Turn on the electronic control switch seat.

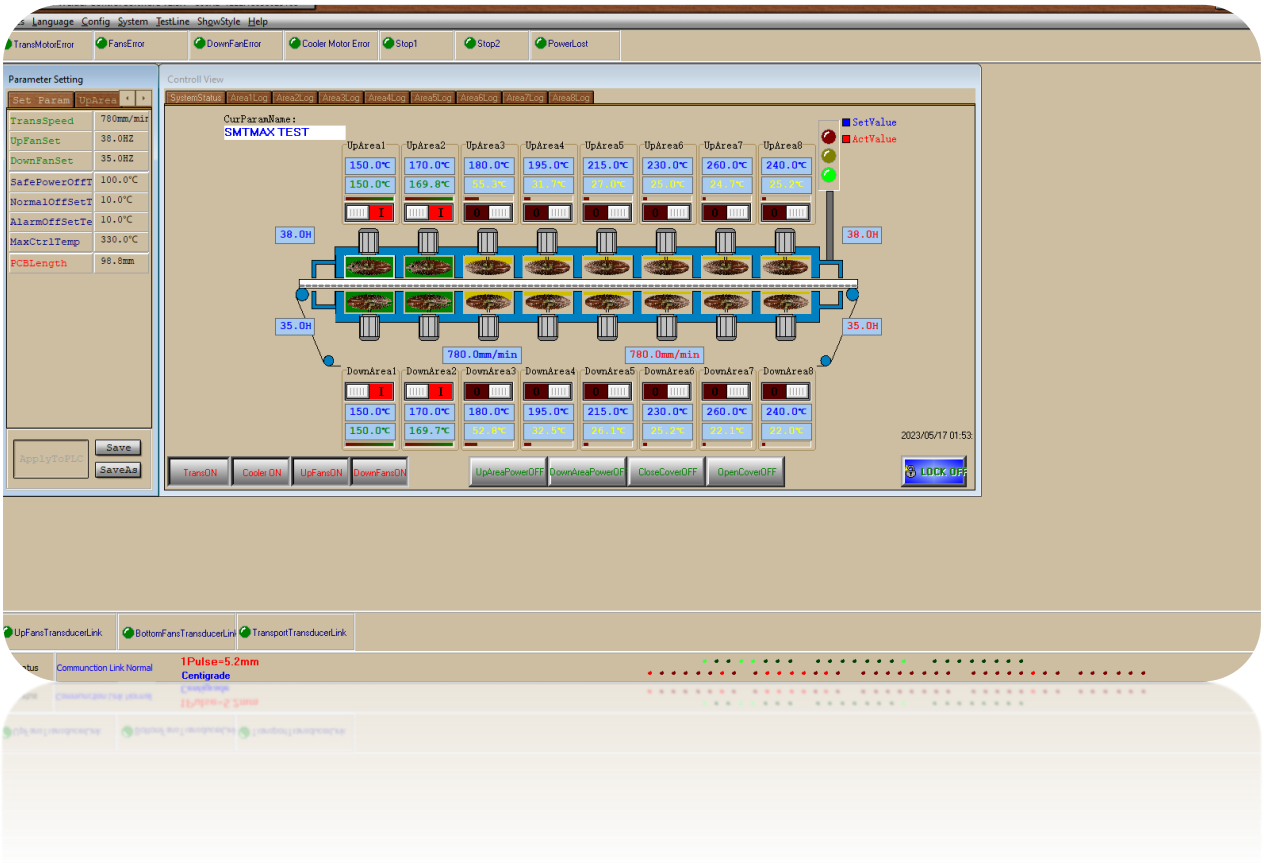
3. Start Button:
Press the start button.

4. Computer Startup:
Power on the computer.

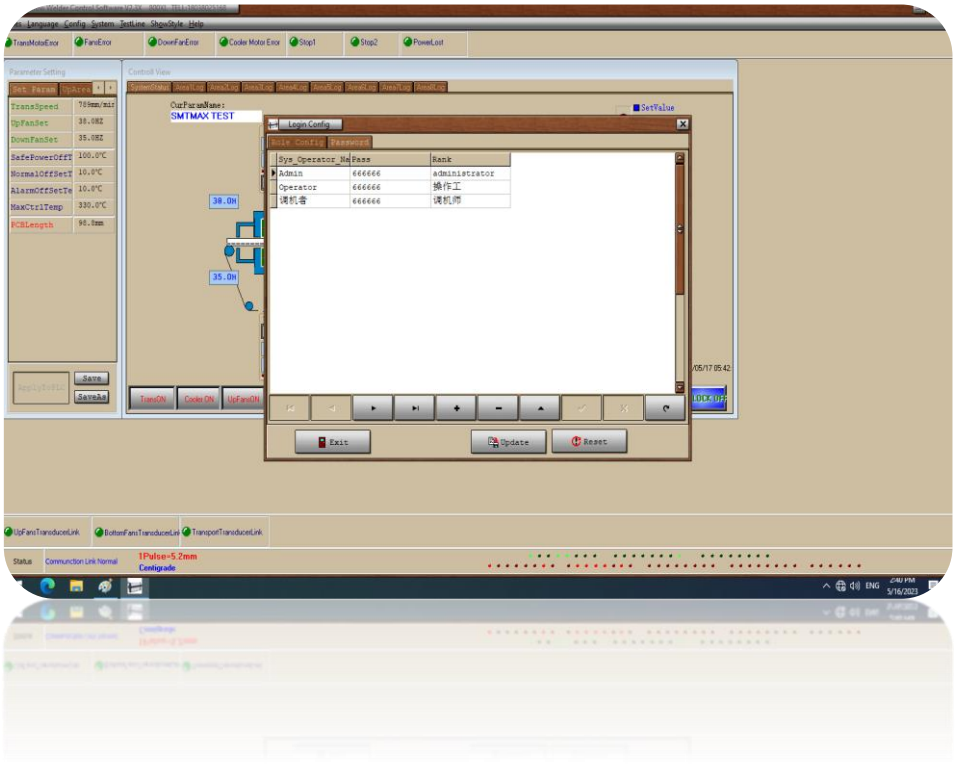
Accessories: Computer Software Operation

1. **Desktop Location:**
After turning on the industrial computer and booting into the operating system, locate the shortcut icon on the desktop named "Reflow Welder." This icon represents the reflow equipment monitoring program of our company. Double-click the icon to launch the reflow monitor. Note: Double-click the icon once and wait a few moments for the monitor to start running.

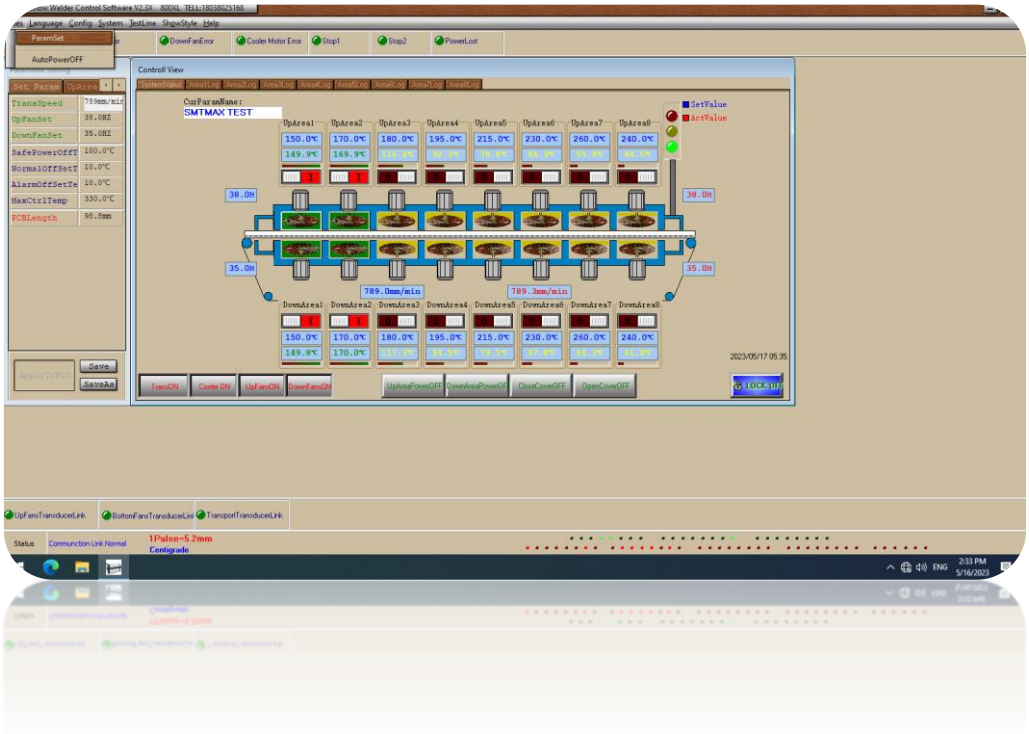
Section 1: Splash Screen



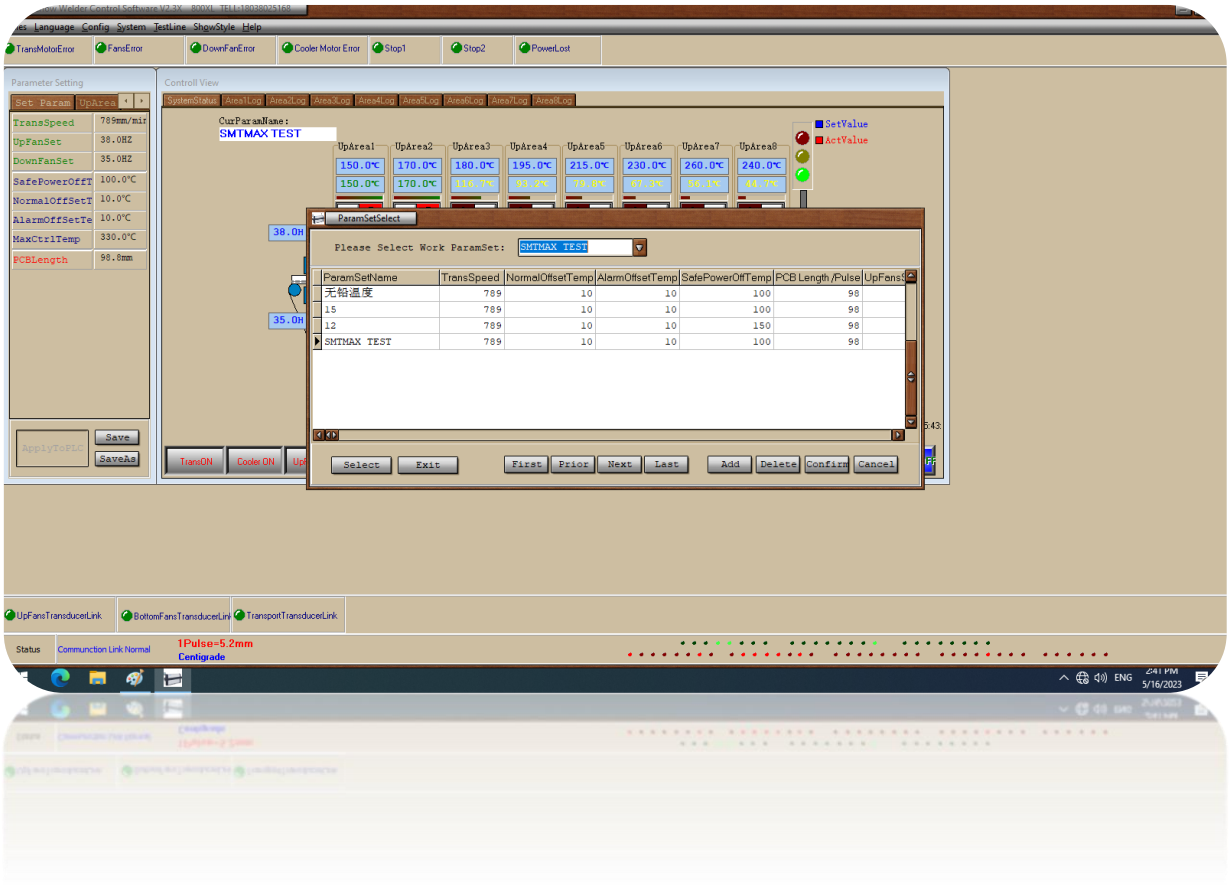
Config Settings. **Login: Password 666666,**



Point: System Settings



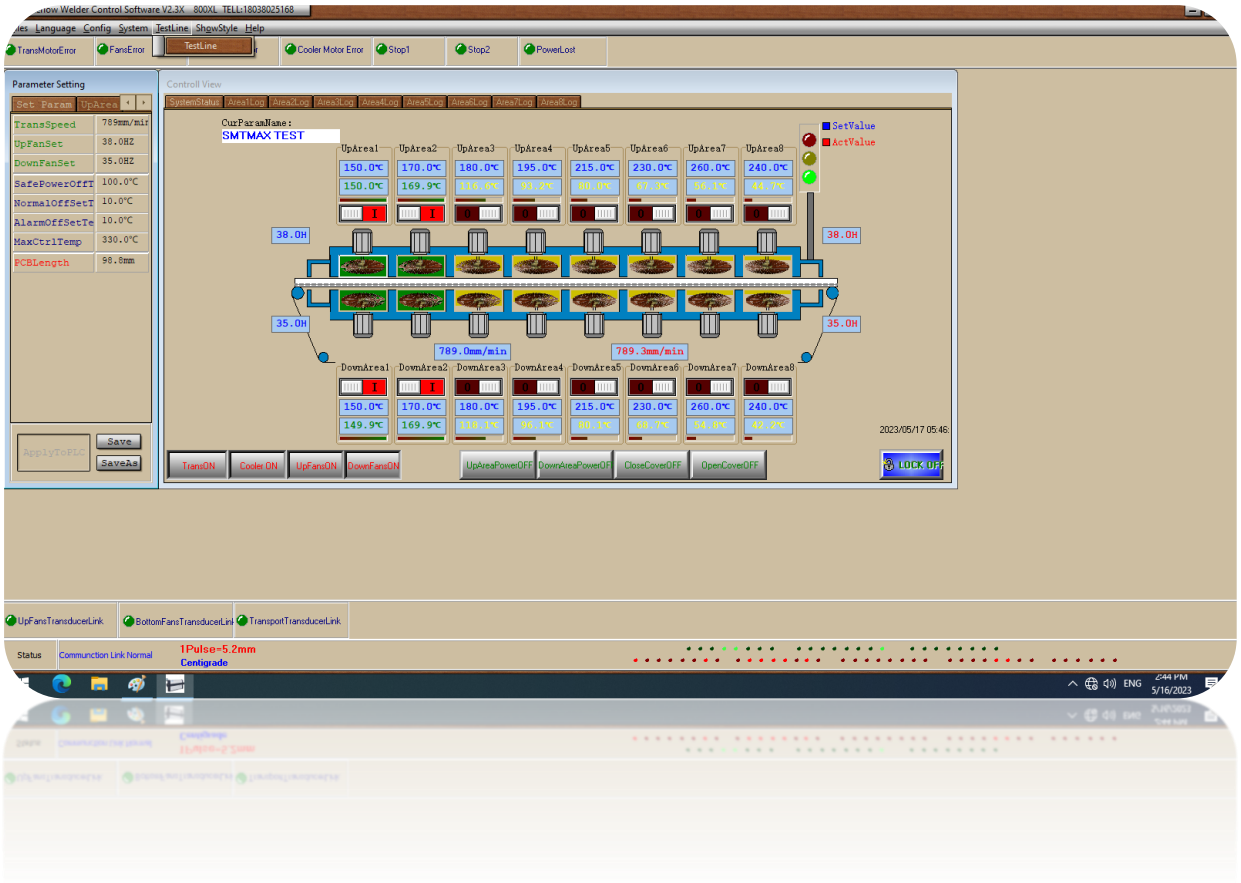
You can save multiple profiles and save under the desired name.

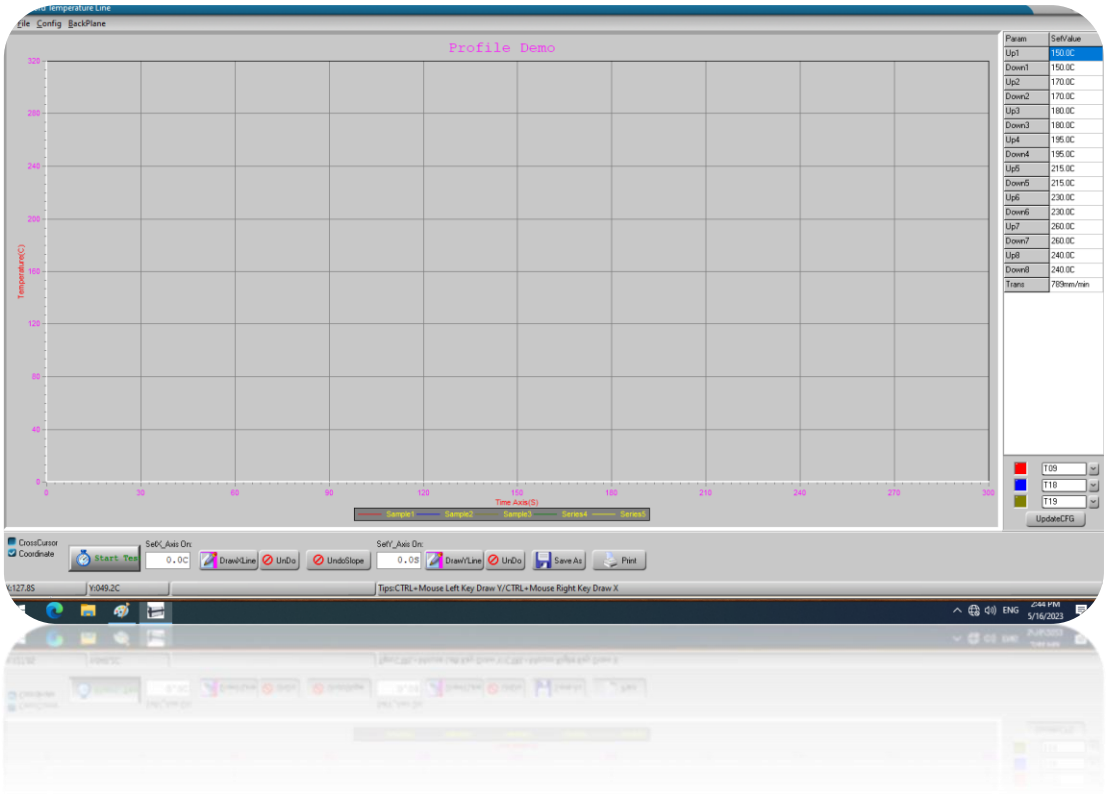


Note: Once PID debugging is completed and the system is running, please refrain from making any further changes. The PLC backup data and factory backup have already been completed, so there is no need to perform additional backups. Making backups again may result in all data being reset to 0, so exercise caution and remember this important instruction.

Temperature Profile Test:

To conduct a temperature profile test, click on the "Parameter Settings" and then select:





To begin drawing the temperature curve, click on the "Start Test" button. The curve test screen will display the X-coordinate as time in seconds (S) and the Y-coordinate as the temperature value in degrees Celsius (°C). The maximum value for the X-coordinate is 2 hours, and the maximum value for the Y-coordinate is 400°C.
To end the curve test, click on the "Stop Test" button.
If you wish to save the temperature curve, click on the "Save" button. Enter the desired file name and save it in .BMP format.
To open a previously saved temperature curve, click on the "Open" button. Enter the file name, and you will be able to access the history of saved temperature curves.

6.5 Precautions:

1. To maintain the equipment, please follow the correct boot order, ensuring that the computer is powered on last.
2. After starting the computer, you will find a program shortcut on the desktop. Double-click the icon to launch the program.
3. While the reflow control program is running, avoid opening unrelated programs on the operating system.
4. Please adhere to proper shutdown procedures and avoid illegal shutdowns, such as directly turning off the power. Follow the recommended process for powering down.

5. During normal production, avoid unplugging the power cord and communication lines arbitrarily.

6. When saving parameters, ensure that the board name is entered and not left empty.

7. Follow the specified switch opening sequence: transportation, wind wheel, heating, cooling.

6.6 Operational Precautions:

1. The CX series full hot air reflow soldering machine is equipped with two exhaust ports, both with a diameter of 150mm. It is essential to connect the two exhaust outlets to the main ventilation duct of the factory. Failure to do so may result in unstable welding temperature due to inconsistent airflow. Use a flexible connector to connect the exhaust duct to the ventilation duct for easy maintenance.

2. The UPS (Uninterruptible Power Supply) should be kept active. In the event of a power failure, the machine will automatically switch to the built-in UPS, allowing the conveyor motor to continue running and safely transport the workpieces out of the furnace cavity.

3. In case of an emergency, you can press the "emergency system" buttons located at both ends of the machine.

4. The control computer should not be used for purposes other than operating the reflow soldering machine.

5. To prevent high-temperature deformation, avoid leaving the temperature measuring socket and plug in a high-temperature state for an extended period. After each temperature measurement, quickly remove the temperature measuring line from the furnace.

6. Once the installation program is completed, refrain from deleting any supporting files to avoid unnecessary program failures.

7. Temperature Setting Reference of Each Heating Zone:

Note: Normally, the temperature difference between preheating zones should not exceed 50°C, and the temperature difference between preheating zones and the welding zone should not exceed 80°C. Otherwise, the actual temperature of the heating zone with a lower temperature setting may exceed the set value.

Transportation, Handling, and Storage of Machines:

7.1 Basic Environment:

- Ambient temperature: The working environment temperature for this series of reflow soldering machines should be between 5~40°C, regardless of whether there is a workpiece inside the machine.
- Relative humidity: The working environment relative humidity range for this series of machines should be 20~95%.
- Transportation and storage: These machines can be transported and stored within the temperature range of -25~55°C. They can withstand temperatures not exceeding

65°C for up to 24 hours. During transportation, please take precautions to avoid excessive humidity, vibration, pressure, and mechanical shock.

7.2 Machine Transportation:

1. To ensure the accuracy of the machine, the two rails must be securely fixed using fixing parts before transportation. A warning label should be affixed to the front of the machine, indicating that the fixings must be removed before the first operation.
2. Transportation should be conducted in accordance with the specified transportation and storage environment. Adequate moisture-proof measures, such as adding desiccants, should be taken before transportation. If transported by sea, the machine should also be vacuum-packed.
3. Pay attention to securely fastening the machine during transportation, and ensure that it is supported by foot cups.
4. During long-distance transportation, the machine should be protected from significant impacts and should be shipped in a sturdy wooden box.

7.3 Handling of Machines:

1. To prevent damage to the machine, it should be hoisted and moved without opening the wooden box.
2. During hoisting, proper handling principles must be followed to ensure personnel safety. No one should be underneath the machine during the lifting process.
3. When moving the machine within the facility on a flat surface, a push-pull forklift can be used. The foot cups and casters must be lifted off the ground during movement.
4. For short-distance movement within the facility, the foot cups can be raised off the ground while personnel push the machine, with the casters supporting the movement. The ground should be smooth and free of depressions to prevent damage to the casters. Once the machine reaches its destination, lower the foot cups to the ground for support.

7.4 Storage of Machines:

1. The storage of the machine should adhere to the principles mentioned in "7.1 Basic Environment."
2. When the machine is not stored for a long time, the total power supply and gas source should be disconnected and dismantled.
3. Prior to storage, the machine should be cleaned.
4. Measures should be taken to protect the machine from moisture and rust during storage.
5. Anti-rat measures should be implemented to prevent rodents from damaging wires and cables.
6. When storing the machine, it should be covered with a shield to prevent dust accumulation.

Chapter 5: Brief Description of Lead-Free Processes

1. Lead-Free Solder:
- Alloy Composition, Dissolution Temperature, Tensile Strength, Elongation:
- SN-3.5AG-0.7CU: 217-220°C, 39, 31
- SN-3.1AG-1.3CU: 217°C, 50, 32
- SN-0.3AG-0.7CU: 216-227°C, 25, 40
- SN-3.0AG-0.5CU: 217-221°C, 37, 33
- SN-0.7CU: 227°C, 28, 34
- SN-3.5AG: 221°C, 43, 45
- SN-37PB: 183°C, 49, 44

2. Solder Paste:
- When using solder paste, whether it is ordinary (63/37) or lead-free, the temperature curve provided by the solder paste supplier must be followed. Additionally, the transportation speed for each temperature zone should be set accordingly.

WP-8800 Lead-Free Reflow Soldering Machine with Computer

1. Model Description:

The WP-8800 model is a hot air circulation type reflow soldering system with eight sections and eight or sixteen temperature control zones. It consists of sixteen groups of heating systems, including six rapid preheating areas, two reflow soldering areas, and eight slow drying areas. The temperature zones utilize ordinary convection transmission to heat PCBs by transferring heat through the hot air in the heating furnace body. This gentle heating method ensures uniform heating of components with different shapes and provides stable heat for reflow soldering. The absence of infrared heaters allows for a wider range of PCB selection and better control over the penetration and shielding effects on components.

2. Body Specifications:

- Dimensions: L5000×W1400×H1500mm
- Machine Weight: Approximately 2800kg

3. Transportation System:

- Transmission Mode: Mesh Belt + Guide Rail
- Network Belt Width: 600mm
- Mesh Belt Height: 900±20mm

- Pass Time: 4-8 minutes
- Speed Adjustment: Frequency Conversion Control
- Actual Linear Speed: 200-1330mm
- Transportation Direction: Left to Right (Right to Left optional)

4. Control Parameters:

- Power Supply: 4-wire 3-phase 220-240V 50/60Hz
- Startup Power: 38kW
- Working Power: 9kW
- Heating Time: Approximately 15 minutes
- Temperature Control Mode: Full Computer + PLC Centralized Control
- Temperature Control Accuracy: ±2ºC
- PCB Temperature Distribution Deviation: ±2ºC
- Temperature Adjustment Range: Room Temperature - 400°C
- Abnormal Alarm: Sound and Light Alarm for Ultra-High or Ultra-Low Temperature

5. Heating Part Parameters:

- Number of Heating Zones: 8 Upper and 8 Lower
- Heating Method: Independent Small Circulation Full Hot Air
- Number of Cooling Zones: 1
- Cooling Mode: Frequency Conversion Air Cooling

6. Equipment Installation Requirements:

- Power Supply: 4-wire 3-phase 220-240V 50/60Hz

7. Functional Area Description:

- Previous/Next Temperature Zones: Preheating Zone with Fully Computerized Digital Temperature Control, 4kW
- Upper Two/Lower Two Temperature Zones: Second Preheating Zone with Fully Computerized Digital Temperature Control, 2.5kW
- Upper Three/Lower Three Temperature Zones: Third Preheating Zone with Fully Computerized Digital Temperature Control, 2.5kW

- Upper Four/Lower Four Temperature Zones: First Drying Zone with Fully Computerized Digital Temperature Control, 2.5kW

- Upper Five/Lower Five Temperature Zones: Second Drying Zone with Fully Computerized Digital Temperature Control, 2.5kW

- Upper Six/Lower Six Temperature Zones: Third Drying Zone with Full Computer Digital Temperature Control, 2.5KW

- Upper Seven/Lower Seven Temperature Zones: Fourth Drying Zone with Full Computer Digital Temperature Control, 4KW

- Upper Eight/Lower Eight Temperature Zones: Main Welding Zone with Full Computer Digital Temperature

Chapter 6: Repair, Maintenance, and Fault Analysis

1. ***Precautions:***

To ensure safe and effective operation, the following precautions must be observed:

1. Ensure reliable grounding of the machine.

2. Designate a dedicated operator responsible for the operation.

3. Lubricate the transmission chain with high-temperature lubricating oil once every 7 days.

4. Stop working when the red light is on.

5. Keep flammable and explosive items away from the reflow soldering machine.

6. Avoid placing hands or body parts inside the reflow soldering machine while it is operational.

7. Do not change the parameters of the frequency device or temperature control meter without proper authorization.

8. Prevent foreign objects from entering the machine's conveyance system.

9. Apply high-temperature grease to machine bearings once a month.

10. Strictly follow the instruction manual for operation and maintenance.

2. ***Daily Maintenance:***

Perform the following maintenance tasks on a daily basis:

1. Keep the electrical circuit clean.
2. Check for any looseness in the fan shaft sleeve.
3. Ensure smooth operation of the fan transmission.
4. Inspect the fan and transmission motor for abnormal noise.
5. Remove any foreign objects obstructing the inlet and outlet holes.
6. Check the tension of the transmission belt; ensure it is not too loose.
7. Inspect electrical appliances in the electrical box for abnormal noise.
8. Check for any loose parts or abnormal noise in the transmission system.
9. Before starting the machine, verify the working voltage is within the safe range and stable. Ensure consistency between the current startup and previous shutdown parameters. When shutting down, avoid stopping the conveyor belt while it is still at high temperature to prevent accelerated aging.
10. Clean the machine shell and air outlet of residual debris daily to maintain a neat and tidy appearance and ensure smooth operation.

9. Conveyor Belt:

Follow these maintenance procedures for the conveyor belt:

A. Lubricate the drive roller chain with high-temperature lubricating oil (molybdenum disulfide) every two months.

B. Keep the tension slide clean and free from dust for proper tension maintenance of the conveyor belt. Adjust the top wire exposed near the follow-up roller if required for two-roll parallelism adjustment.

10. Motor:

Take care of the machine motor by adding high-temperature lubricating oil to its axle wheel at least twice a week to ensure smooth operation.

11. Fan:

Regularly clean the fan and motor to remove residual debris that may cause short circuits or damage to the fan.

12. Ground Wire:

When using a three-phase four-wire system, ensure proper grounding by connecting the machine to the earth with a ground wire. Before starting, verify the ground wire is properly connected. (A three-phase five-wire system is preferable.)

2. Common Faults:

The following are common faults and their troubleshooting steps:

1. Red light is on:

- Check if the control buzzer time relay is working.
- Verify if the control thermocouple has an open

If you have any questions feel free to contact us at:

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