INSTRUCTION

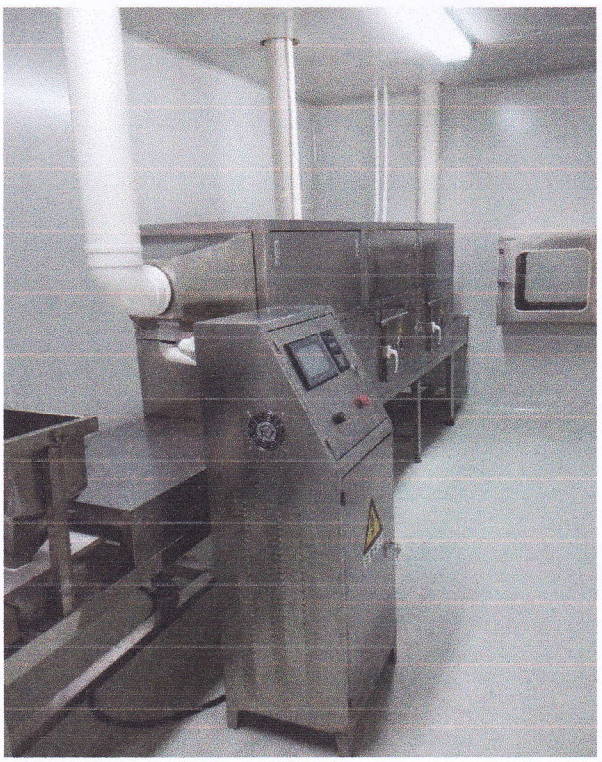
YANTAI MAX MACHINERY CO., LTD

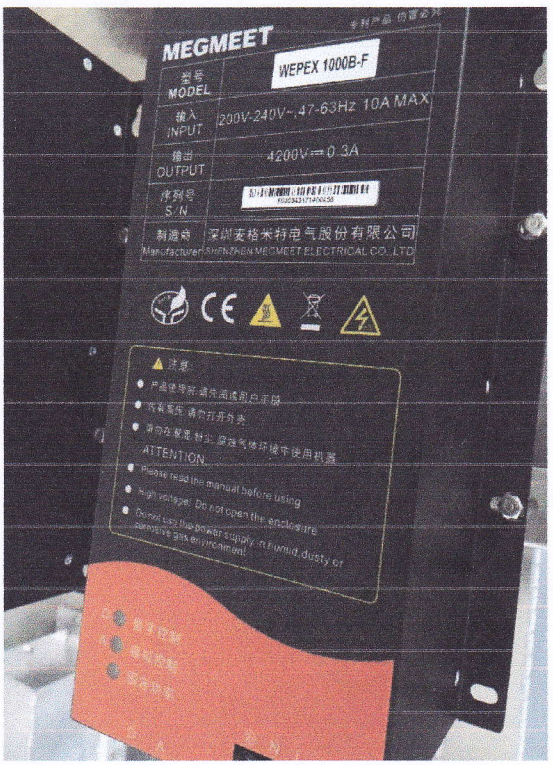
www.maxindustrialmicrowave.com

Max Industrial Microwave is located in YanTai City Shandong Province China. Since established in 2003, Max Industrial Microwave design and manufacture industrial microwave machine and system actively. Max Industrial Microwave offers an efficient solution for heating, drying, bonding, curving, sterilizing, reacting, cooking, pasteurizing. Generally, Max Industrial Microwave yields over 50~70 sets of different types of microwave dyer, including conveyor belt and batch oven. Top quality machine, premium design and excellent after-sale service help us move into the international market.

We not only offer a simple machine to your work site, but also provide better solution and outstanding service.

MAX Industrial Microwave is your reliable partner.





Content

Ⅰ. Microwave Introduction

1 What is microwave

Microwave is a form of electromagnetic radiation with wavelengths ranging from one meter to one millimeter, with frequencies between 300 MHz (100 cm) and 300 GHz (0.1 cm).

2 Microwave Heating

The process that water, fat, and other substances in the food absorb energy from the microwaves called dielectric heating. Many molecules (such as those of water) are electric dipoles, meaning that they have a partial positive charge at one end and a partial negative charge at the other, and therefore rotate as they try to align themselves with the alternating electric field of the microwaves. Rotating molecules hit other molecules and put them into motion, thus dispersing energy. This energy, when dispersed as molecular vibration in solids and liquids (i.e. as both potential energy and kinetic energy of atoms) is heat.

Microwave heating is more efficient on liquid water than on frozen water, where the movement of molecules is more restricted. Dielectric heating of liquid water is also temperature-dependent: At 0 °C, dielectric loss is greatest at a field frequency of about 10 GHz, and for higher water temperatures at higher field frequencies.

3 Microwave Heating Features

★ Quickly Heating

Microwave energy at the speed of light (3 × 1010cm/s) spread in the object, the instant (about 10 - 9 seconds) can make the microwave energy into the material of heat, and heat penetration into the heated material, without heat conduction process.

★ Fast Response

Quick start, stop and adjust the output power, simple operation.

★The Uniform Heating

Both core and surface heating achieve an evenly heating result.

★ High Heating Efficiency

Polar molecules in the material to rotate and produce thermal energy in a process known as dielectric heating. Microwave heat material quickly and efficiently because excitation is fairly uniform in the outer 25–38 mm (1–1.5 inches) of a homogeneous, high water content material item.

★Offer a good working environment improve working condition

4 Microwave Sterilization Principle

Sterilization and pasteurization of pathogen microorganisms (Salmonella, Coliform bacillus, Staphylococcus and others), mildews and insect liquidation (e.g. mealy bugs) in hygienically or healthy risky dry products, such as spices, seasoning, fruitage, cereal diets, etc.

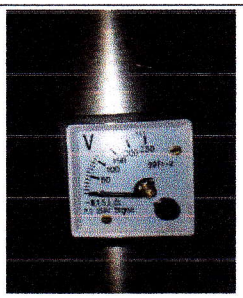
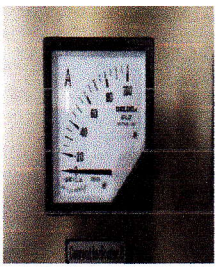
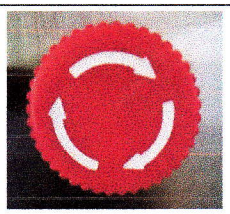
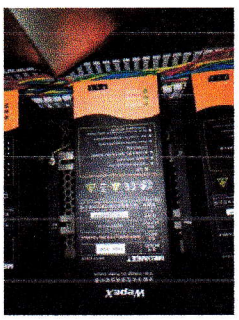
The best results are achieved by MW heating to 85-95 C for 3 - 8 minutes. In this range of temperatures, the speed of destruction of microorganisms is faster than the degradation of product characteristics. Especially in the herbs, spices seasoning, the appearance and flavor are very important to maintain during the pasteurization process. Traditional food pasteurizations take a long sterilization time and high temperature which deteriorate food original flavor.

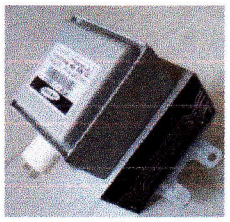
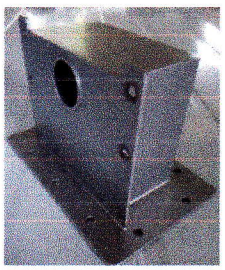
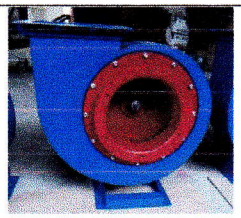
Our company achieved world-wide excellent results with the hygienization of dry food products. Beside pasteurization and sterilization those include enzymatic inactivation and sensitive drying.

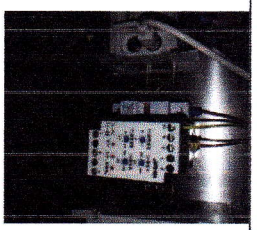
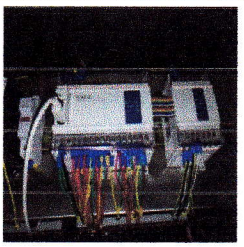
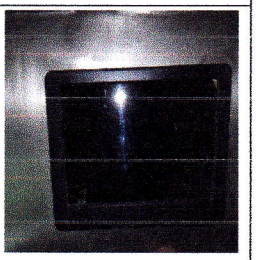
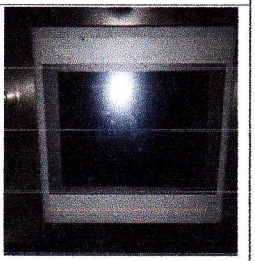
Ⅱ.Function

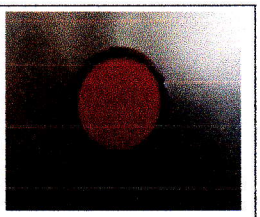
1 Function

No	Name	Quantity	Function is introduced	Style
1	Key Switch	1	Control the switch of the main power supply of the equipment.	

2	Voltage Transfer Switch	1	Three phase voltage switch	
3	Voltage Indicator	1	Display current working voltage （A.B.C）, conveniently inspect machine running voltage change in order to avoid lower voltage or over voltage which may cause machine disfunction	
4	Ampere Indicator	3	Display current working ampere. Also display 1-8 microwave magnetron current ampere, used for machine troubleshooting (switch on single microwave magnetrons to check ampere).	
5	Emergency Stop Button	1	It is used to turn off the main power supply of the equipment in case of emergency. The button should be released when idle.	
6	Microwave Integrated Power Supply	96	High voltage power supply for microwave generator; Built-in fault detection display.	

7	Microwave Generator	96	The main electrical components that produce microwaves. Microwave emission through high voltage power supply provided by microwave integrated power supply.	
8	Microwave Guide Waveguide	96	26#, introduce the microwave generated by microwave generator into the microwave cavity to the maximum extent, so as to achieve uniform field strength on the material.	
9	Moisture Exhaust Fan	1	It is installed on the top of the equipment's wet pipe and connected with the outside air pipe to discharge the steam generated by microwave heating in time.	
10	Internal Main Switch	1	Control and protect all electrical components inside the equipment.	
11	Microwave Single Breaker	96	Control single microwave magnetron switch	

12	VFD	1	Adjust the speed of the belt	
13	Voltage protector	1	Protect machine from over voltage or lower voltage damage.	
14	PLC control system	1	The control core of the equipment	
15	VFD control panel	1	The speed of conveyor belt can be operated on the panel of control cabinet	
16	CCTV	1	CCTV	
17	Control Screen	1	Operation Manual	

18	Power Indication Light	9	Indicate cabinet power condition	

2 Functional explanation

explanation of electrical components

①. Equipment power supply: the equipment control cabinet has the main power supply of the machine, ensure the circuit breaker in the closed state before opening the equipment;

②.Voltmeter: the voltmeter on the power will show the current voltage in real time, convenient to observe the voltage change in the operation of the equipment, so as to avoid the equipment operation failure caused by voltage undervoltage or overvoltage;

③. Ampere meter: can display the running current of the equipment in operation and can directly observe the working state of the electrical components of the equipment. If the running current of the equipment is abnormal, it can be detected by the ammeter in time. The fault of the electrical components can be detected by opening a single microwave source.

④. Microwave generators: microwave generator is the main component of the equipment work, using cooling water to reduce the temperature of the microwave generator, the temperature of cooling water cannot exceed 35°;

⑤. Microwave power supply: high voltage power supply is provided to microwave generator. Equipped with fault detection lamp, the normal state is always bright, green, if frequent flashing or put out, there is a fault, should repair.

Input voltage range	180Vac to 264Vac
Normal voltage range	200Vac to 240Vac
Frequency range	47Hz--63Hz

Max input ac current	10A max. at full load condition
Leakage current	Less than 0.3mA, @ 240Vac input
Normal input power	WepeX 1000a 1280w
Max. endure input voltage	300Vac (power source can not damaged)

⑥. Wet exhaust fan: discharge the steam generated by the material in the process of processing, to prevent the formation of condensed water falling on the material;

⑦. Emergency stop button: it is the emergency stop button in case of abnormal situation of the equipment, which shall be rotated to reset after the emergency is lifted;

III. Technical Parameters

1 Basic Parameter

Input voltage（AC）	380V±10% 50HZ±1% Three phase five wires
Microwave Frequency	2450±50MHZ
Microwave Output Power	≥77KW(Adjustable)
Input Power	≤120KVA
Environment Temperature	0~40℃
Environment Humidity	≤80%
Microwave Leakage Rate	Follow Chinese Safety Standard

Working Environment	No corrosive gas and less dusty

2 Features of Structure

MAXIMC-96S industrial microwave dryer consists of control panel, microwave generator system, microwave heating chamber, heat-extraction system and moisture exhaust system. There are multiple of microwave waveguide in the heating chamber, we adopt digital simulation design to avoid microwave mutual interference, and achieve uniform heat. There is a moisture exhaust system on the top of microwave heating chamber which exhaust evaporated moisture from heating material. Heat-extraction system will immediately vacuum the heat generated by electrical components to assure excellent drying result and reliable electrical component working environment.

There are two ways in control system, one way is meter display and normal button control; one way is PLC control. Microwave generator consists of multiple of independent power supply magnetrons, the features are flexible select, uniform heating, simple operation, each Sumsang brand magnetron is equipped with water cooling solution and longer lifespan. Microwave transformer is equipped with air cooling solution, which is working stable, easy maintenance and low failure rate. There are four sets of infrared thermometers on the top of machine, which detect temperature between 0 ~500℃, detect temperature precisely, working stable can achieve automatically control in order to control product quality. In a word, the whole machine is simple operation, easy transportation and high quality standard.

3 Working principle

Connect with power, microwave generator distributes wave to microwave heating chamber though microwave magnetrons, moisture exhaust system evaporate water of material through microwave energy for drying and sterilization purpose.

Ⅳ. Operating instructions

1 Warning

1.1 Don't run machine without loading material! Loading material should be over 0.5kg

1.2 Metal material and explosive material are prohibited in the microwave heating chamber.

1.3 Don't block other material around machine in 50cm.

1.4 Don't open the door when the machine is running.

It is a brief introduction in the operation, staff who operate machine in the jobsite must go through electrical professional training.

2 Preparation

2.1 Inspect machine stable on the ground, and lock sheathing and door of machine.

2.2 Prepare material or fake loading material (water).

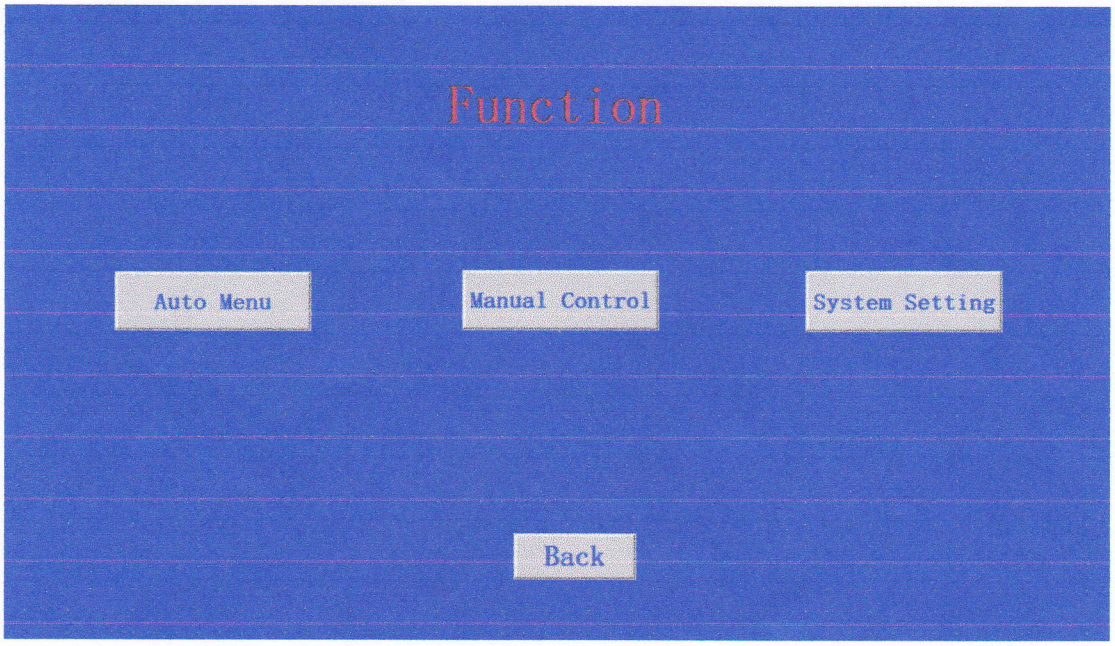
2.3 Close the internal switch, reset all switch (except for key switch).

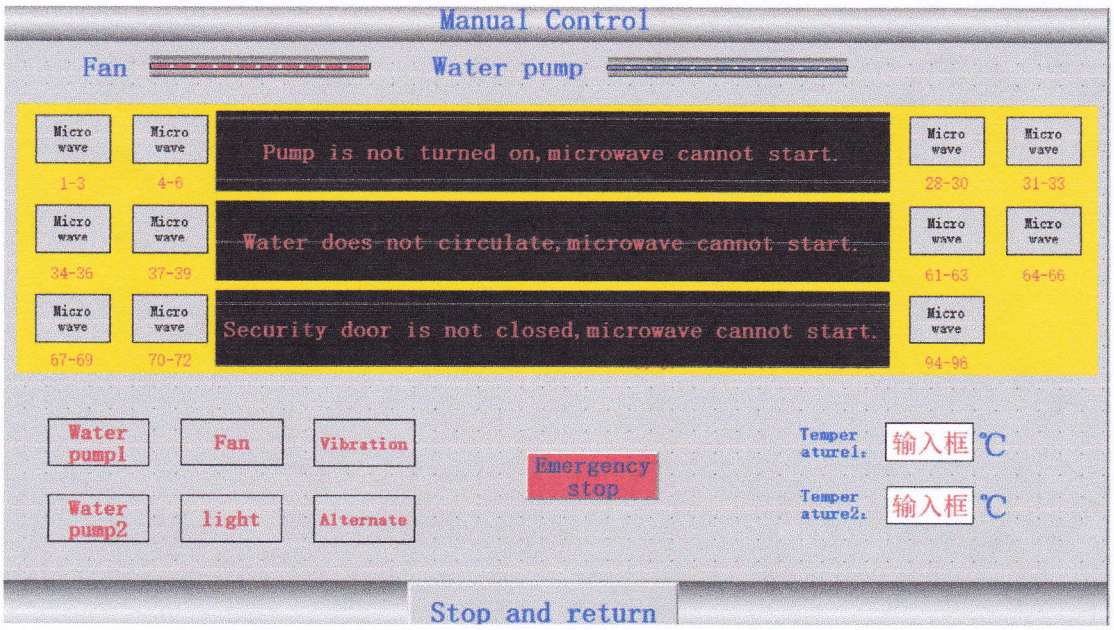
3 Control Solution

Function Introduction

3.1 Touch Screen

All parameters and buttons are integrated on the touch screen





3.1.1 Pump ON/OFF: Water pump turn ON/OFF controls water circulation function, must turn on water pump prior to start machine (have set up in the protection program).

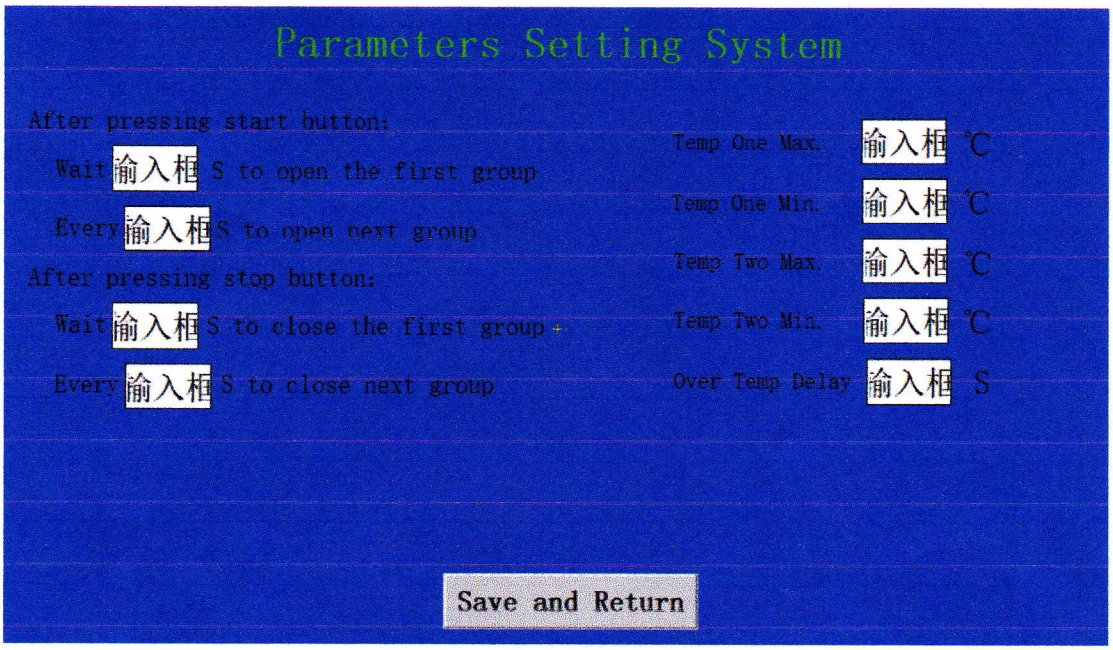
3.1.2 Light ON/OFF: Conveniently inspect material condition in the heating chamber.

3.1.3 Fan: exhaust the extra water vapor and heat generated by electrical components to outside.

3.1.4 Temperature display: machine is equipped with four temperature sensors which are installed on four areas to detect material surface temperature. The temperature sensor immediately reflects material temperature assure material heating appropriately.

3.2 System Setting

System setting is based on the machine automatic works which require the parameter have set up, to meet with products demands and reduce the labor.



3.2.1 Set up the wait time of first group: the first group wait time is based on the counting time after pressing start button on the main panel, the suggestion is 0~5s.

3.2.2 Set up the interval time of second group: the second group interval time is set up based on the conveyor speed, namely after turning on the first group of magnetrons, the second group of magnetrons will turn on according to the setting time, and so on until all equipment heating source open.

3.2.3 Set up the stop waiting time of first group: the first group stop waiting time set up is based on the counting time after pressing stop button on the main panel, the suggestion is 0~5s.

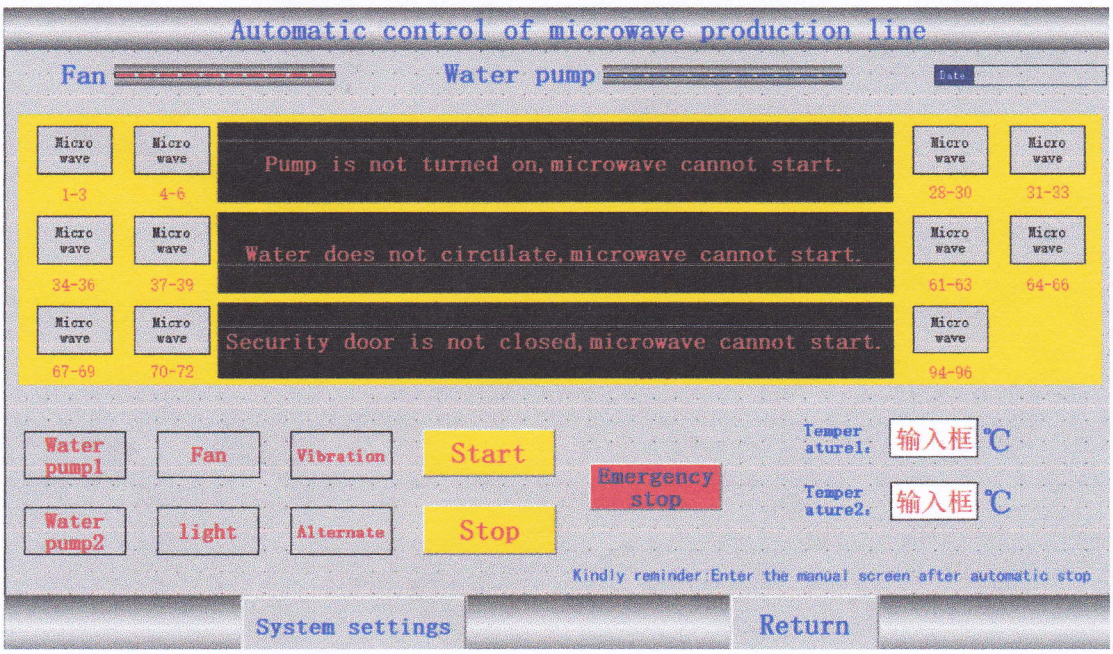
3.2.4 Set up the stop interval time of second group: the second group stop interval time is set up based on the conveyor speed, namely after turning off the first group of magnetrons, the second group of magnetrons will turn on according to the setting time, generally the close down time is set up less than opening time.

3.2.5 MAX temperature limit: Maximum temperature limit setting up is based on the material highest temperature tolerance（Don't change material appearance, color and nutrition）.

3.2.6 MIN temperature limit: Minimum temperature limit setting up is based on the material lowest temperature tolerance（Don't change material appearance, color and nutrition）, this temperature will have a range of fluctuation according to the feed or moisture of material.

3.2.7 Overtemp delay: after the temperature sensor detect temperature is higher than set up temperature, it avoids machine adjust temperature frequently due to higher temperature of just one point and influence the stability of material, the suggestion time is 5~10s.

3.3 Manual operation



Manual operation is a setting panel for small amount of material processing, equipment testing and maintain. Every button can be turn on manually, without according to the setting procedure. When we process a small amount of materials, put the material on the belt, click the first button when the material enters into the first chamber (mark 1-3), click the second button when the material arrive the middle of first chamber (mark 4-6), click the third button when the material arrive the end of first chamber (mark 7-9), and so on, until the whole button start. If the front end of material enters the third chamber and the tail end of material is in the first chamber, please shut down the first button of heating source according to the process speed (mark 1-3), and shut down every button follow the material speed. This operation need a operator keep operating all the time.

3.3.1 Pump: Operator must turn on water pump prior to switch on magnetrons.

3.3.2 Light: Operator can use light to inspect the microwave chamber heating material.

3.3.3 fan can discharge extra heat and moisture out of machine. Namely, the electronical component generate heat, and moisture is evaporated from material.

3.3.4 Conveyor Belt: Operator can adjust the conveyor speed by set up parameter, Please check with attachment

3.3.5 Temporary Shut Down: Need temporarily shut down machine, follow below procedures.

Reset key Switch (Emergency).

Turn off microwave button, stop microwave input (normal shut down).

Restart machine is the same as above procedures.

3.4 Turn on/off Machine Procedures

3.4.1 Turn on Machine

Key switch → load material on feeder → Setup parameter →Turn on pump → Start belt → Turn on vibration motor → Turn on light → Start fan →Observe material enter into the beginning part of first chamber → Turn on the start button on the main panel

3.4.2 Turn off Machine

Turn off vibration motor → Observe the rear material arrive the middle of the first chamber → Click the stop button on the main panel → Affirm all the material leave the belt → Turn off the belt → Turn off fan Turn off light → Turn off pump → Turn off key switch →Turn off main breaker.

V Notice of Maintenance

1 There must be a trained person in charge of the operation reserve and maintenance to assure machine run smoothly.

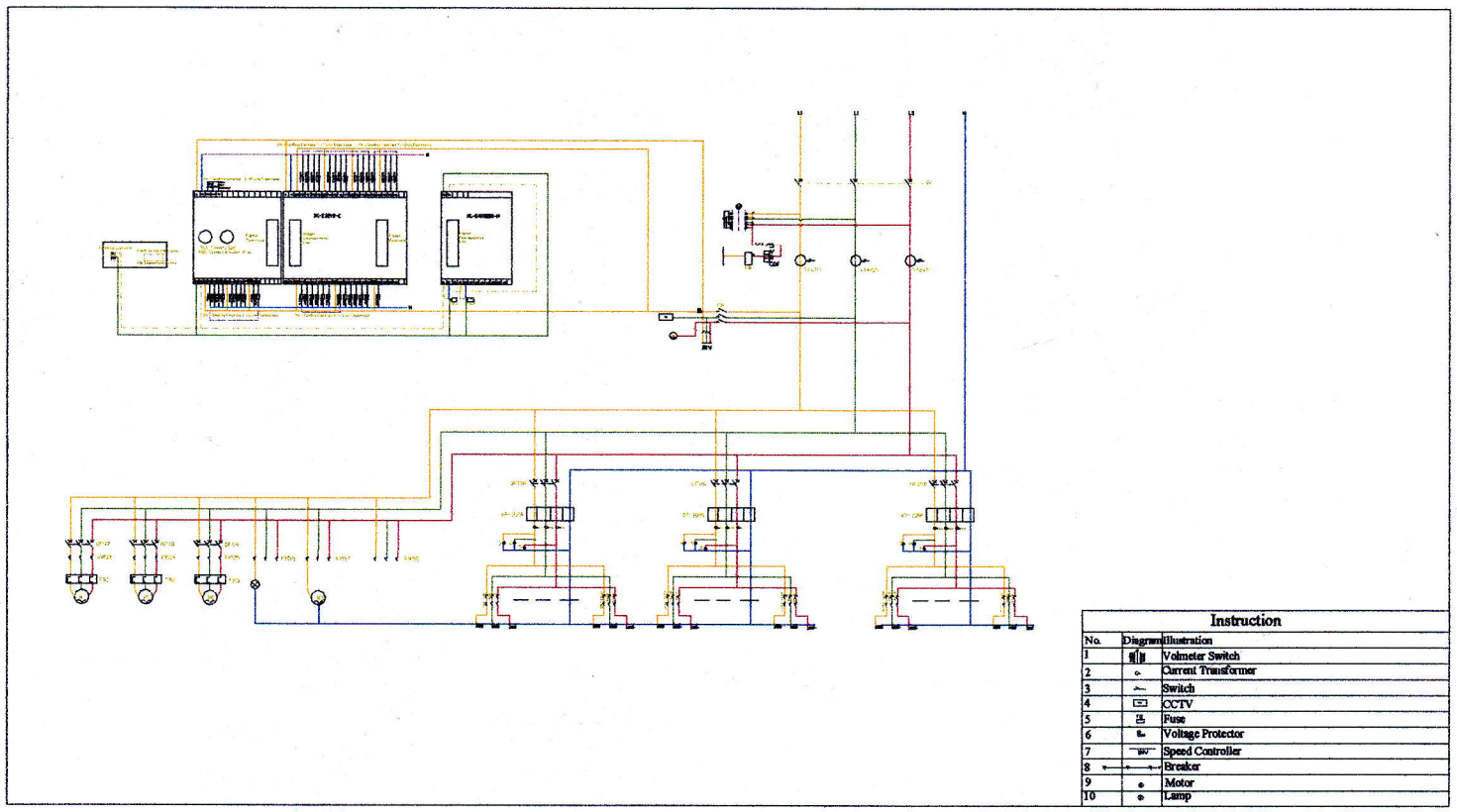
2 No metal in the microwave chamber, otherwise conveyor will be burn up due to the high frequent spark.

3 Must cut off power supply when we do maintenance, cathode filament of magnetrons is negative high voltage, be careful when do the maintenance.

4 Basic faults and resolution

Situation	Reason	Practice
Low voltage	The breaker is off or bad contact	Change breaker; check and screw the breaker joint
Can't push microwave button	Contact lines is burnout	Change contactor

Breaker tripping after start microwave button	1.Microwave Magnetron or industrial frequency power supply is damage	1.Change industrial frequency power supply or magnetron 2.Change magnetron
Microwave indicate abnormal	1. Plug contact undesirable; 2. Industrial frequency power supply damage 3. Magnetron filament burnout 4. Magnetron burn-in	Check and plug in properly Change industrial frequency power supply Change magnetron
The machine shell is with electricity power charged	1. Imperfect earth 2. Grounding wire is fall off	Check grounding wire to keep contact well, or solid connection again
Fan is inappropriate or voice is abnormal	1. Phase current supply loses phase 2. Fan blade touch the shell	Check the reason to trouble clearing, repair the fan blade



Instruction		
No.	Diagram	Illustration
1		Volmeter Switch
2		Current Transformer
3		Switch
4		CCTV
5		Fuse
6		Voltage Protector
7		Speed Controller
8		Breaker
9		Motor
10		Lamp