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SCM5600 PCBA Cleaning Machine

Operation & Maintenance Manual

V5.1

(Machine configuration and spec may change without prior notice)

Contents

1 Introductions

1.1 Manual range

This manual introduce operation, maintenance and spare parts lists of "SCM5600 PCBA Cleaning Machine" in details to users. It has 11 chapters and the index of each chapter are lists on the Contents. Other important information such as: Operation method, application range, safety regulations… are also include in it.

1.2 Guidance

For each parts introductions in details, please check the related chapters which list on content.

1.3 Diagrams and Charts

The standard work direction is from Left to Right. Left to right direction is defined by the direction which operators using the machine to clean. The Diagrams and charts are drawn by the direction from left to right.

For the machine which work direction is from Right to Left, these diagrams and charts are also correct, but need visualization by mirror image. In order to better understand these diagrams and charts, the work direction is very important.

1.4 Appendix

Normally, the printed manual appendix is put in the electric control box, including: Circuit diagrams (main circuit and control diagrams), Parts list (electric parts). Sometimes shown on manual.

Caution： Some chapters may concern chemical liquid. As chemical liquid's MSDS and its operation instructions are not the contents of this manual, please refer to your chemicals suppliers for further information**.**

2 Safety regulations

2.1 General information

（1）How to safety operate and maintain “SCM5600 PCBA Cleaning Machine” , how to solve the problems or accidents which may happen during operation and maintenance, how to deal with daily operation, you must read this manual thoroughly.

（2） All the people who will operate and maintain “SCM5600 PCBA Cleaning Machine” must obey the safety regulations of this manual.

（3）In addition, Please obey to the local relevant accident protection regulations and safety provisions.

Shenzhen Southern Machinery Sales And Service Co. Ltd. reminds our customers:
Do please read this manual carefully and thoroughly and conduct standard operation on the machine. Especially the contents of “chapter 2--safety regulations”, please pay more attention to it. SM will have no duty on the loss or damage which caused by people who are not obey to safety regulations of this manual.

This manual can help customers: quick familiar with our machine functions, safety conduct cleaning work, correct operate on the machine according to procedures and solve problems.

This manual are made according to SM design standard. In this machine, blower, blower heater, waterbase cleaning liquid heater, temporary tank heater and pumps total power are about 21KW.

The installation, test and adjustment of “SCM5600 PCBA Cleaning Machine” must be conducted by SM professional staff or SM authorized technical persons. After testing or adjusting of the machine, customer or agent technical staff must accept theory and real operation training on operation and safety regulations. It is forbidden to do any operation on the machine before transferring to customers formally.

Cautions：
If you can’t understand the contents of this manual, please contact SM, we will help you to know the machine in details to avoid accident caused by rule-breaking operation because of misunderstanding the contents. Operators must obey the rules of this manual, if there is anything conflicts between the manual contents and the guidance of our technicians, SM technician’s guidance will be the main reference.

2.2 Magnetic field

For most of people, magnetic field is safe. But to people who installed specific medical devices, the magnetic field will be potential harmful and can’t goes into the scope of certain strength magnetic field. For example: individuals who has pace-maker, implanted defibrillator, metal heart valve, inner wound clips (surgery), metal devices or sicklemia disease. If possible, please consult special advices to health care department before operating the machine.

2.3 Safety regulations

（1）Please install the machine on the flat ground in order to ensure the properly and stability operation of the machine.

（2）Please avoid damage to machine out shape or inner parts because of collision in the time of machine transportation or move.

（3）Please check if the power supply specification match the requirement of the machine to avoid damage to the machine.

（4）Please make sure to connect the machine to the ground with the earth line with “PE” sign before turning on the machine.

（5）There is a safety sign on electric box. This electric box belongs to electric control system, please do not modify or assemble or disassemble the inner circuit if you are not professional persons who has authorized to do it.

（6）Any parts of the machine which has protection signs indicates that it may has certain danger in the process of machine running, do please understand the meaning of them and do not get close to these parts in order to avoid any unnecessary hurt.

（7）Please do not change inner setting of the machine, if you need to change inner setting, please consult SM technicians to avoid unnecessary damage or personal hurt.

（8）The cleaning liquid or water temperature will be heated and rise to setting degrees in the process of machine running, do not touch it. Please do not stand by the side of drain pipes to avoid personal hurt.

（9）Keep the working area tidy and pass lane clear. Dirty and untidy working area is easy to cause accident.

（10）Operators do not have loose clothes, do not have ties, scarfs, rings and bracelets, please put on antiskid shoes at working area. People who has long hair must put on hats to keep it.

（11）Concentrate on your work, please stop to operate the machine when you are tired. Do not open the front door and side window casually in the process of machine running, the machine will stop immediately once the door or the window is opened. At this time, the liquid are flowing back, please do not access into the machine, or else, it may cause hurt.

（12）Please maintain the machine in regularly time according to maintenance sheet of this manual and your factory rules to keep it in good function and condition.

（13）Please use professional tools to maintain the machine to avoid bad impact on machine.

（14）Do not use the machine on humid environment and do not expose it in the rain. Machine installation place must be bright, ventilate and without high light.

（15）It is forbidden to remove any parts on the machine. Please keep the good habit to check the machine condition before starting it. Check and inspect whether all the parts are in their original positions, whether there is any part loose or drop off. Maintain the machine after the day work finished. Do please turn off the main power and cut off power supply break before starting maintenance.

（16）It is forbidden that other people who are not trained to operate the machine privately; Any pets cannot be taken to working area.

（17）It is forbidden to stand and climb or crawl on the machine, or else machine my fall or power supply may connected by accident and cause severe hurt or damage. All the people must keep safety distance away from the machine before turning on the main power of the machine.

2.4 Maintenance

If the machine is kept in good condition and get well maintained, the lifespan of the machine will be extend except some wearing parts.

At the time of maintenance：

（1）The machine must be maintain or repair by professional staff or assigned engineers. If need to replace parts, please use original parts to replace it. The broken parts or protective device must be replace in time.

（2）Maintain the machine carefully. Check each parts if the machine and erase potential danger. Keep the working environment clean, comfortable for safety and efficient cleaning.

（3）Please check the replaced or repaired parts and its devices to judge whether they can work properly or not; Check whether they can reach the expected effect or not;　Check whether the transmission parts are adjusted well and firmly installed and solve any factors which will affect the proper running of the machine.

（4）Please pay high attention to the local laws on treatment of waste water and waste gas. Please take are of waste water during maintenance process and protect the environment.

2.5 Safety work requirement

Only the people who are trained, familiar with the machine or authorized can operate the machine, they must be qualified：

（1） Operator’s training

Operators must be trained on the following aspects:
1> Potential danger at the time of machine running and have self-protective sense.

2> Machine working process, working theory and properly operate methods.

3> Machine functions and parameter setting.

The one who are trained by SM or SM agent, read and understand this manual can operate on the machine.

Only the operators over 18 years old adults can operate this machine.

（2）Different operate level on the machine, the operator must have different technical level. Please see the sheet：2-1

Operate content	Trained technician，（qualified person）	Trained engineers
Assemble and installation	Only SM engineers or SM agent technical staff	
Adjust and operation	Only SM engineers or SM agent technical staff	
Start、operate、stop	√	√
Trouble shooting、repair and maintenance		√
Dissemble	Only SM engineers or SM agent technical staff	√

sheet 2-1

（3）Professional personnel: Who accepted machine technical training; have relevant technology level and experience; totally understand machine regulations; evaluate the top level danger which authorized operator to operate the machine.

Manufacturer must guide and inform the operators the following information:

A. Possible and potential danger and the possible result and preventive measures.

B. Take safety measures to the machine in the case of risk.

C. Preventive device for operator.

D. Safety equipment.

E. Safety operation requirement.

F. Troubles and problems which may occur at the process of machine running.

Anyone who don't have these knowledge or can not properly operate this machine are forbidden to use this machine.

To the customers who have signed maintenance contract with SM or SM agent, only SM technicians or SM authorized technical staff can conduct maintenance and repair work.

2.6 Safety and protective devices

Make sure all protective devices are equipped and work properly before starting machine. Safety protective devices can only be turned off at the following situations: Machine stopped and make sure it can not normally start again or machine installation, repair and maintenance process.

The safety protective devices of the machine are：

（1）EMG STOP button: Installed on the operation panel, red press button with yellow base. It can cut off all electric control circuit, pumps, motors immediately according to CE regulations.

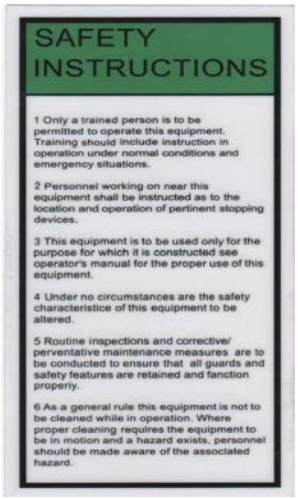
(2) Leakage protective breaker: can cut off power supply automatically in the case of electric leakage, person electric shock and machine circuit short to protect operator and machine safe.

2.7 Safety signs

There are signs adhered on the machine. Please check all the labels periodically. Replace them if some of them became indistinct. The signs on the sheet is normal labels. Operators and technical staff must recognize and understand the meaning of them.

	Inflammable sign：This sign reminds you to keep the machine away from fire. Be careful of fire on storage, transportation and use of inflammable goods Protection sign：This sign reminds you to put on industrial plastic rubber gloves during operating of the machine, especially when touching liquid or water. Protection sign：This sign reminds you to put on industrial goggles before operating the machine, especially add or discharge liquid and water. Manual sign：This sign reminds you to read this manual thoroughly before operating on the machine Electric shock prevention sign：This sign reminds you be care of electric parts to prevent electric shock when operating on the machine.

	Turn off power supply sign：This sign reminds you to turn off machine power supply before opening the electric box.
	High temperature sign： This sign reminds you not to touch the high temperature parts and area.
	Clipping hands sign：This sign reminds you no to touch mechanical transmission parts to prevent clipping hands when the machine is running.
	

	Infuse grease sign: This sign reminds you to infuse grease to mechanical transmission part periodically to make it lubricated and smooth.
	Safety reminds sign：This sign reminds you never open the front door when the machine is running. Press “pause” to stop the machine and wait for about 20 seconds and then open the door. (if have pause key)
	Safety instructions sign：This sign reminds you to operate the machine according to sign content and understand the content.

2.8 Safety procedure

（1）General summary

SM equipment are manufactured according to the latest technical stand and main stream safety regulations. But it may have safety risk when operating the machine, so operators and technical staff must obey machine regulations when operating the machine.

SM equipment can only use at the time of the following conditions are satisfied:
In the scope of machine design, all the safety devices are in normal condition, defects which related to safety are solved, this manual are put near the equipment; local accident protect and environmental protect rules are also put nearby(not in SM manual), all safety warning sign and characters are clear.

（2）Normal operation condition

Operator must satisfied certain conditions and working environment must satisfied certain situations. General includes:

A）Check and make sure no one is in danger area before starting the machine;

B）The machine can only be started when all the safety and protective devices are in proper conditions;

C）Do not operate the machine at the time of protective covers are moved out;

D）Do not install or change safety devices casually;

E）Check and confirm EMG STOP button and visible machine parts are good or abnormal condition at the time of each work shift every day;

F）All the operators must know the positons of EMG STOP button, main power breaker and chemical liquid close valve；

G）Keep your clothing and body away from moving part, for example: Gears, rotary devices…etc；

H）Please put on googles when working around the machine；

I）Put on protective garments when operate with chemical liquids；

J）The assigned responsible person must confirm all the safety devices, protective devices and ventilation devices are in proper conditions；

K）Do not run the machine under the temperature not right for the machine construct material.

（3）Electric system

Electric system must be kept in good working conditions. Only professional staff can allowed to change and repair the electric system; engineers must check the electric system periodically and when you find the

connector lose or cables are broken, they must be repaired or replaced in time. Electric control box must be kept in lock state, only in particular case, it can be opened. Make sure never leave anything in the electric box, these leaving things may cause electric short.

（4）Chemical liquid

SCM5600 machine needs to use water-base chemical liquid, so we must obey the following chemical liquid using safety regulations:

Make sure to put on suitable protective garments when using chemical liquid. Chemical liquid in the machine must be treated according to relevant safety procedure and regulations;

Maintenance staff only can start work after chemical liquid in the liquid tank was drained empty. Maintenance staff can only do maintenance work after no liquid leftover in the pipes and no liquid pressure on the pipes.

At the time of testing liquid or do sample analysis, operators must put on protective garments and stop transmission system and pumps—Machine must be in complete stop condition.

Do not mix chemical liquid in the liquid by hand.

Some chemical liquid may release a large amount of heat to cause liquid splashed out and may cause damage to your machine and hurt operators.

Do not use any liquid that does not comply with the liquid requirements of machine.

（5）Air and vapor

If there is no good ventilation system, the air or vapor which released by the machine may pollute the working environment, some vapor may affect the health or working status of operators, so must equip special protective device on to treat the air and vapor from the machine. Check the ventilation system periodically according to regulations. Check each separate ventilation joints are sealed well or not along the pipes when installing ventilation system.

（6）Temperature

The temperature of liquid tank and other spare parts may rise and become hot. Operators must avoid to contact the high temperature surface and put on protective garments when working at temperature rise area and pay attention to the high temperature signs.

（7）special situation

Related person must know MSDS of chemical liquid manufacture, before opening the liquid tank lid or entering the inner area of the machine. Obey the recommend treatment from the chemical liquid manufacture. Familiar with the emergency response and handling methods. Shut off mechanical transmission system and cleaning pump and wait for several minutes to let liquid flow back to liquid tank from the cleaning cabinet and pipes. Put on googles, gloves, apron and respirator…etc. Put back lid or close door, start the machine again according to operation procedure.

2.9 Personnel protection

People in working area, must put on qualified safety auxiliary devices such as anti-corrosion gloves, glasses,

masks and prepare suitable safety devices.

Here are some common protection devices signs：

	Antistatic clothing
	Gloves
	Antistatic shoes
	Mask

2.10 Danger

（1）Electric circuit danger

To ensure safe of engineers, please obey the safety regulations and make sure the machine main power is turned off before conducting the replacing and repair work of any electric parts. Only the qualifications are matched, then you can conducting relevant operation: Turned off the main power of the machine, lock it to prevent it turned on by accident; Put on warning signs on electric box; check whether the power is shut off or not; cover or isolate electric parts nearby.

If contact the electric parts, the machine working voltage wound be fatal, so must forbidden to operate on the machine with electricity or leakage electricity.

The electric cable and breaker which connected with the machine must meet the requirements to prevent overload, or else it may cause short circuit or over heat to cause fire.

If there is power supply problems happened, please turn off the power immediately.

Electric system must be in safe condition at any time and check the electric lines and control parts in regular time. If find parts broke or aging, please report and arrange to replace the parts immediately.

Electric box must be keep closed, only the authorized people can conduct maintain and replace work to the electric parts. Electric device must be connected to the earth through earth line and prevent statics.

Electric circuit detecting and maintain devices must be isolated and check if they are has electricity leakage problem.

（2）Danger caused by liquid pressure

Machine must work under its max liquid pressure or else it my may be break out and will cause injury to people around the machine. Cleaning liquid or rinse water may heat to 50~60℃， be careful to the heat liquid or water and do not touch the parts contact liquid or water to avoid personal hurt. Please let the liquid or water cool down before inspect, maintain and repair the machine. Do relevant protection actions before liquid leak out and cause environmental pollution problem.

（3）Fire danger

At the time of fire danger, please stop the machine immediately (push down EMG stop and shut off power

supply), warning the people nearby, take first add to distinguish fire, withdraw through EMG gate and call the fire policeman immediately if it is severe.

2.11 Personal injury accident

We must try our best to avoid personal injury accident happen at the process of operating the machine. At the time of personal injury accident happens, we must do the following procedures ：

A）Stop the machine and do emergency rescue, protect injured people and put him on safety place；

B）If injured severely, please call the rescue agencies like fire bridge or hospital.by telephone or mobile phone ；

C）Then inform the responsible people of your company as soon as possible, put on warning signs and keep the pass lane clear to make the rescue people take rescue actions.

To avoid accident happens, the machine can be only used to clean specified stencils and the machine must be in normal working conditions. When you find something wrong with the machine, do please not run the machine before solving the problems.

2.12 Emergencies

Emergencies means the abnormal or sudden occurred accidents which happened during machine running. You must push down EMG STOP button immediately to stop the machine. Restart the machine after accident was solved or machine recovery to normal condition or operators are not affected anymore.

Please take the following steps as the following accident happens：

（1）PCBA jammed

A）Press down EMG STOP button to stop the machine.

B) Observe the area which PCBA jammed carefully and try to find the problem.

C）Put on protective garment or protective device to avoid cleaning liquid spray on to your body.

D）Move out jammed PCBA and solve the problem.

E）Check mechanical parts to make sure they are on right position and have good function after solving the problems.

F）Start the machine again according to relevant procedure.

（2）Contact chemical liquid

A）Stop the machine.

B）Help the people who contacted chemical liquid to treat according to relevant procedures.

C) Start the machine again after solving the problem.

2.13 Operation

All the operators must qualified with the following qualifications：

（1） Familiar with or accept operation training of this machine.

（2） Thoroughly understand safety work rules and the prevention of accident.

2.14 Repair

All repair and maintenance staff must be qualified with the following qualifications at least ：

（1）must know and understand the content of the machine.

（2）have professional repair technology.

（3）Skillful and enough experience to take the repair and maintenance task of the machine.
Please using lift devices at the time of replacing big or heavy parts. Check if all the safety and protection devices are working properly after finishing repair and maintenance work.

2.15 Application range

“SCM5600 PCBA Cleaning Machine” is specially designed for PCBA of electronics manufacturing industry. The machine has its own using rules, it is forbidden to use the machine to clean any other masks or things, we will have no duty to any damage or hurt caused by it.

2.16 Repair and maintenance

Please take the reference of chapter 7 to maintain the machine in regular time, this can help to keep its long life and greatly reduce the chance of repair and accident, or you can add maintenance times in a regular time according to your real machine situation. Before conducting any inspection and maintenance work, please shut off the machine: turn off main switch, take off key (if have) and put on warning signs to prevent other people turn on the machine accidently.

2.17 Machine clean and clean material treated

We recommend to use WD40 or cleanroom wiper to clean the surface of machine, no water area. Please use DI water to wash inner cleaning room. All the clean material must be treated as local relevant rules. Do not touch electric parts with wet finger or wet wiper.

2.18 Machine control software

Please do not change machine software. Software are protected by password. Only the trained engineers or authorized technicians can operate on the soft parameter setting.

2.19 Machine structure

If you do not bought the machine from SM or SM local agents or vendors, SM will have no duty on the parts according to SM specified safety regulations. Please do not change or modify the machine structure including support welding parts unless you get the permission of SM.

3 Machine specifications

3.1 working principle

"SCM5600 PCBA Cleaning Machine" is used to clean PCBA. By using the latest and advanced water-base flux cleaning liquid and spray cleaning technology, "SCM5600 PCBA Cleaning Machine" can make the PCBA 100% clean.
Warning: Water-based liquid is a must by using this machine. Volatile organic cleaning solvent are strictly forbidden to use on this machine or else it may cause fire or explosion.

This machine consists of clean system, rinse system, dry system, filter system and electric control system. Put the PCBA into the machine 2-layers' cleaning basket manually, choose the procedure No, setting cleaning parameters, close the door, pressure "Start" button, the PCBAs will be cleaned, rinsed and dried automatically. After all the processes are finished, machine will stop and reset automatically and ready for the next cleaning process.

This machine is an easy operation, automatic, efficient, high performance and new generation PCBA cleaning system. It can greatly improve PCBA cleaning quality and make PCBA avoid from damage of other cleaning method like ultrasonic and brush cleaning.

The whole process:

1. Clean process: water-base flux cleaning liquid is used to clean PCBAs. Liquid are heated to setting temperature --→ air pump absorbs liquid from liquid tank and sends them to spray tank(under cleaning room)--→Electric pump absorb liquid in spray tank and drive them through filter pipes, rods and nozzles to spray onto surface of PCBA to form a liquid curtain to clean flux off--→air blow off residual liquid out from the pipes, rods and nozzles and flow back to spray tank--→air pump absorbs the liquid from the spray tank and sends them back to liquid tank.

2. Rinse process: DI water is used to rinse the cleaned PCBAs after liquid clean process. DI water are stored in DI water producing tank, air pump absorbs DI water from DI water producing machine DI water tank and sends them to spray tank(under cleaning cabinet)--→Electric pump absorb water in spray tank and drive them through pipes, rods and nozzles to spray onto surface of PCAB to form a water curtain to rinse the cleaned PCBAs and take off the residual liquid and ions from PCB→ air blow off residual water out from the pipes, rods and nozzles and air pump absorbs the liquid from spray tank and sends them out through water outlet port. --→3~4 times same DI water rinse process according to your setting rinse times.

3. Dry process: Hot air are used to blow the PCBAs dry after several times DI water rinse process. The hot air and goes through air heat device and enter into cleaning cabinet. Hot air bake PCBAs water and make it into vapor and dry.

3.2 Machine structure features

1） Machine front side has front door. The front door equipped with Observation window and inner tempered glasses, the ceiling of the cleaning room has LED light, so it is very easy to observe the

cleaning status. Dual-layer seal design, go seal effect.

2） Compact design, small foot print, small place needed.

3） Stable rotation spray mechanism, power cleaning effect.

4） Visible liquid level indication, easy for operator to inspect liquid level and quality.

5） SUS304 stainless steel construction, anti-corrosion and easy to clean and maintenance.

6） Low noise, large volume blower and high effective heater, better dry efficient and quality.

7） Unique compressed blow residual liquid in pipes and nozzles, greatly reduce the consumption amount of liquid.

10） Tilting design of liquid tank bottom, easy to drain liquid and easy to clean tank bottom.

11） There are liquid level detecting switches in the tanks to guarantee the machine is used in normal liquid level.

12） Humanization design, easy operation and maintenance.

3.3 Electric control system features

1） Electric control box are put on left side of machine, easy for control operation and maintenance work

2) PLC+TP interface, easy operation

3） Alarm sound and 3-color indicator design to ensure operator know the machine running status. If there is anything abnormal occurs, the buzzer alarm and the red light turns on and twinkle.

4） There are detecting sensor protection on front door to prevent the danger of forgetting to close door and window.

5） By adopting PID and analog control algorithm, heat and temperature control device can control temperature more accuracy and make temp rise up and get down more stable, save energy.

6） Over heat protection function of heaters to prevent over heat.

7） Overload protection function for motors to protect overload damage to machine

8） Trouble information will appear on Touch panel when trouble happens, easy to solve troubles.

3.4 Spray filter system features

1） Spray pressure are the same and no blind cleaning area due to good nozzles arrangement.

2）The most scientific nozzle design: the use of left and right incremental arrangement --- to enhance cleaning efficiency, back and forth movement of basket - completely solve the cleaning blind area.

3）Nozzles are easy to assembly and disassembly.

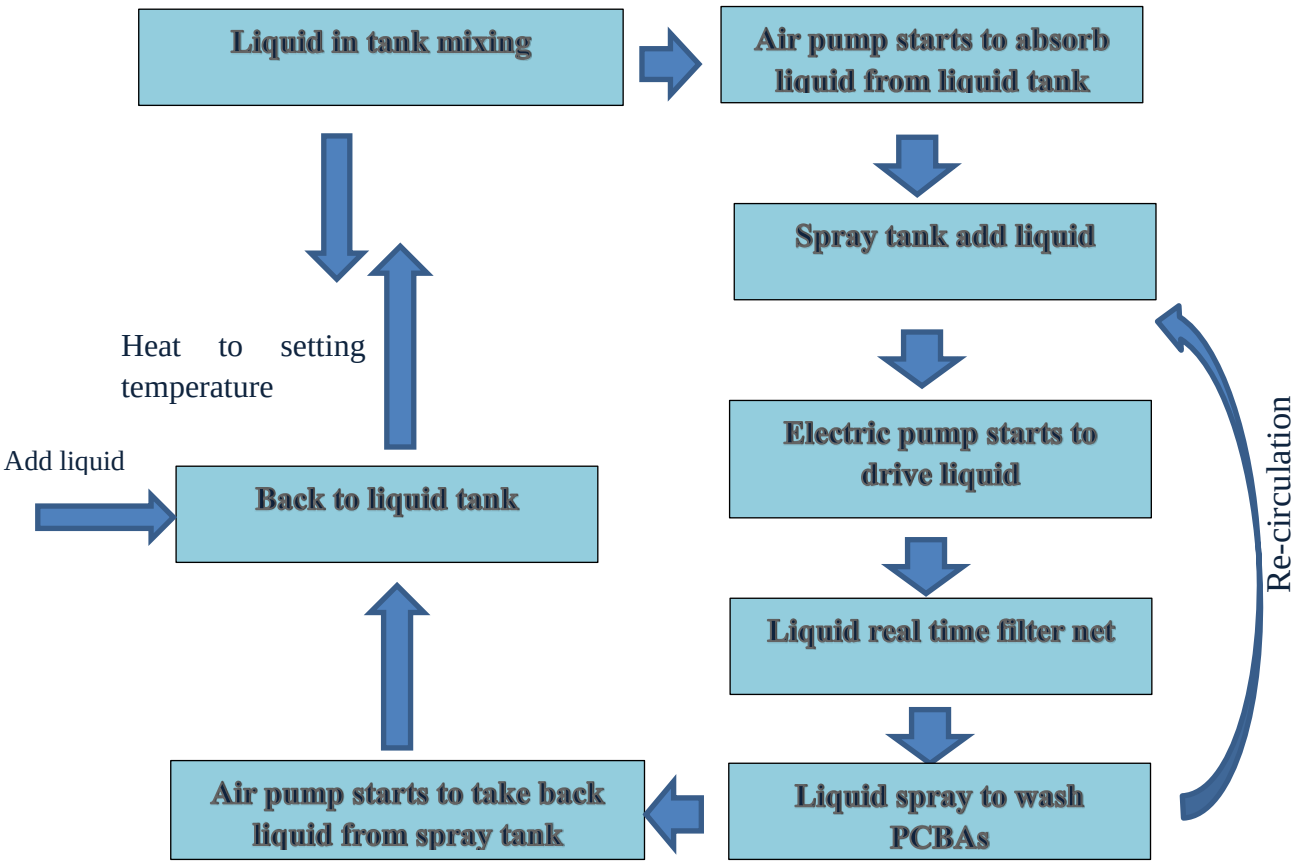
4）Spray pressures meters, easy to observe spray liquid and DI water pressure.

5）Stainless steel filter net in tanks and lower side of cleaning room combination design for better filtering function.

3.5 Main specification

S/N	Item	SPEC	Remarks
1	Cleaning basket size	L610 x W560 x H100(mm)x2 layers	As max
2	Dilution liquid tank capacity	60L	
3	Concentrated liquid tank capacity	30L	
4	Spray tank capacity	18L	
5	Clean time	10~20min(0~99min)	
6	Rinse time	1~3min/次（0~10min）	
7	Dry time	15~30min（0~60min）	
8	Rinse times	3~5times（1~59）	
9	Dilution liquid temperature	Room temp~75℃	
10	DI water temperature	Room temperature	
11	Dry temperature	Room temperature~99℃	
12	Dilution liquid heater	9KW	
13	Temporary liquid heater	6KW(only use in manual mode)	
14	Dry heater	7.5KW	
15	Resistivity range	0~18MΩ	
16	Spray electric pump	5.5KW	
17	Air pump	1inch	
18	Spray pressure	30~80PSI	
19	Liquid filter precise	0.22um	
20	DI filter precise	0.22um	
21	Vent size	φ100XH30(mm)	
22	Power supply/Air supply	AC380V,50/60HZ,65A /0.5~0.7Mpa	
23	Machine weight	About 600kg	
24	Machine size	L1300xW1200xH1850（mm）	

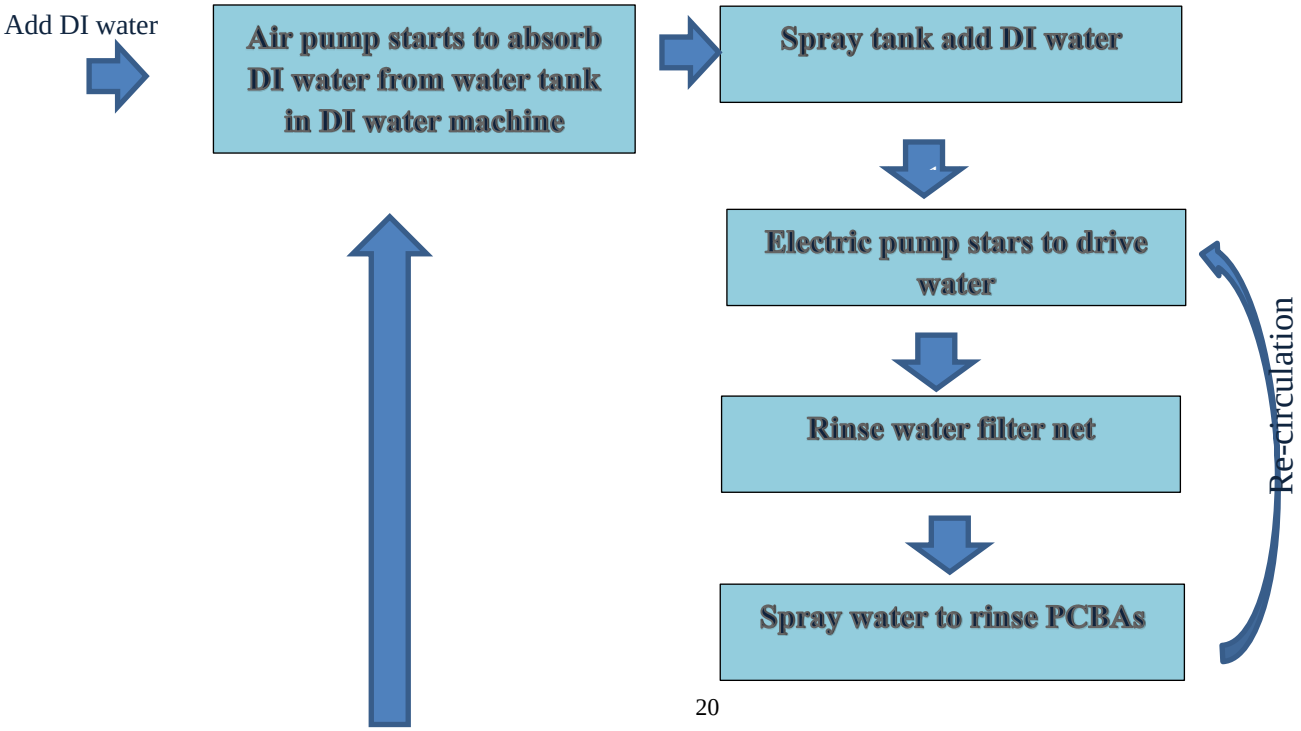
3.6 clean process & rinse process

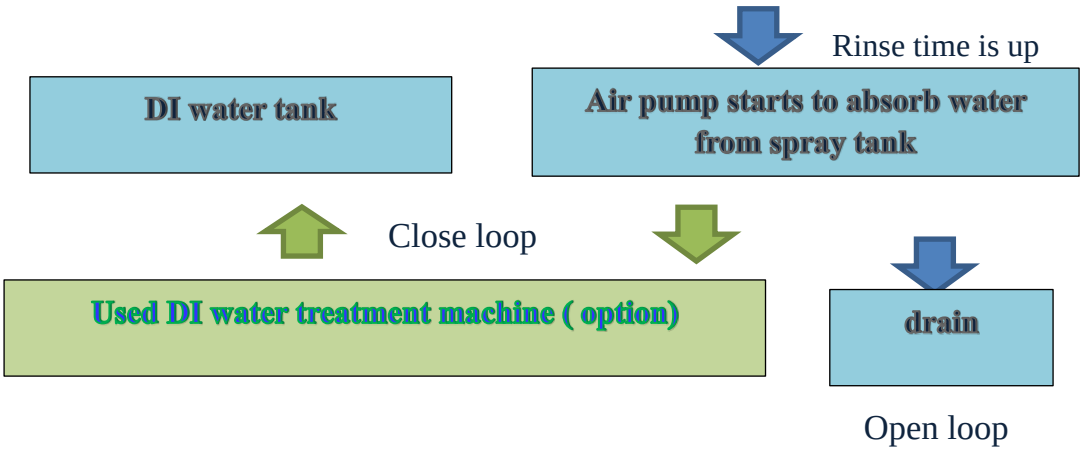


Clean time is up

Close loop

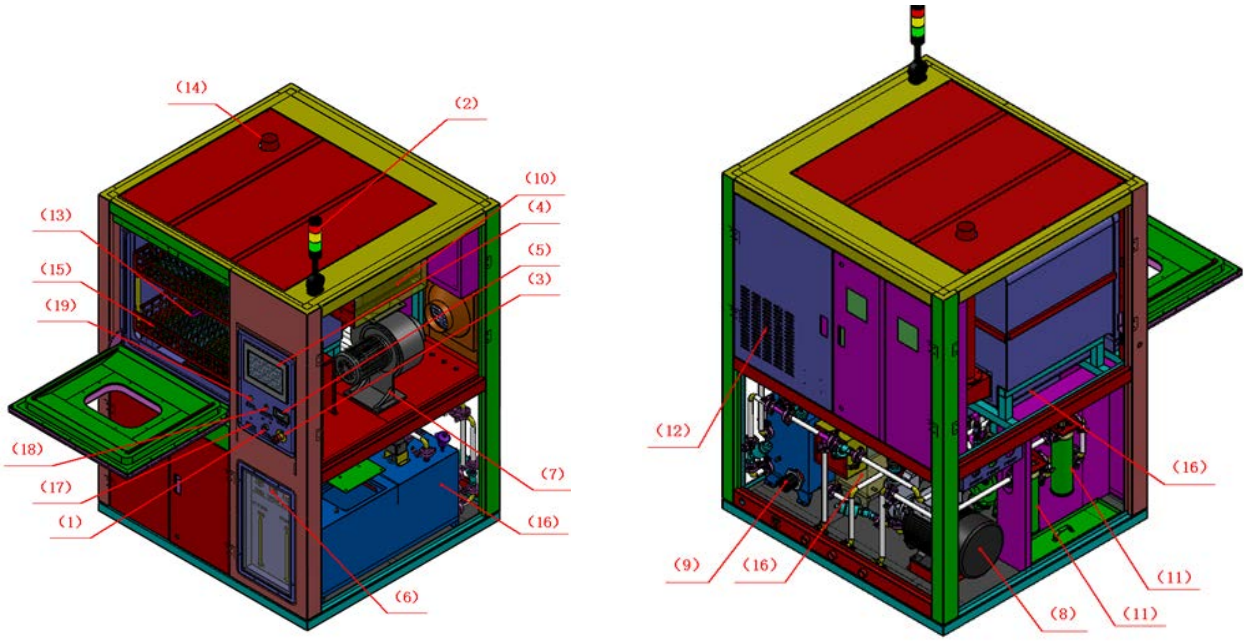
3.7 Rinse process





DI water rinse process may repeat 3~5 times as setting

3.8 Machine unit introduction



1）、Power SW：Turn on/ Turn off the machine.

Indicator：Indicate machine status.

2）、Buzzer： Alarm when machine is in abnormal condition or the whole cleaning process is finished.

3）、EMG STOP button：on operational panel, press down to stop the machine if there is any abnormal situation occurs.

4）、Touch panel：HMI operation window.

5）、Resistivity meter：Real time monitoring rinse DI water

6) 、Pressure meter: Indicate liquid spray pressure or DI water spray pressure.

7)、Air blower: Offer air for air dry process

8)、Electric pump: Spray liquid or DI water to PCBAs during cleaning or rinse process

9)、Liquid heater：Heat liquid to setting temperature.

10)、Blower air heater：Heat air to dry PCBAs.

11)、Liquid and water filter barrels：To stop solder balls, minor substance in liquid and DI water.

12)、 Air filter: To guarantee air quality.

13)、 Spray rods： 3 rotation spray cleaning rods with nozzles on it.

14)、 Vent：Vent for air and vapor, need to connect outside air extract pipes.

15)、 Cleaning basket：2 layers, where PCBAs are put in; move back and forth in real cleaning process.

16)、 Liquid tank(dilution)：Keep dilution liquid and where liquid heater, LS in.

17)、 Anti-statics port：For sensitivity PCBAs, operators' antistatic wrist connect to this port to protect PCBAs.

18)、 Start button：To start machine when all parameters are setting ok.

19)、 Reset button：To reset the machine after problems are solved and recovery to normal condition.

20) Air pump：Add in or take back liquid (water) between liquid tank (water tank) and temporary tank.

4 Installation and adjustment

4.1 Preparations before installation

Before the arrival of the machine, we will send out installation preparations and adjustment documents, please do the preparation works according the requirements. Machine installation ground should be solid, flat, tidy and have enough space for maintenance and repair work.

Please check if there is any damage on the plywood case. Please take photos and inform us at the first time.

If the plywood case is good, please open the case carefully and please move the machine onto the ground by using auto forklift.

Never exposure the machine to the hot sunshine and rain. Never put it onto the place of high temperature or high humidity.

1) Power supply:

This machine must supply with 3phase 380VAC, 60A power (TN-S), must have green cable connect to

ground.

Air supply:

0.5~0.7Mpa, dry and clean and free of oil compressed air, air flow rate is 400~600L/Min

2）DI water supply:

This machine must be supplied with outside DI water, water flow rate is 30~60L/Min， water pressure≦0.4Mpa, (1inch female coupling,（Figure 4-1 water inlet pipe））

3) Drain pipe：

This machine must connect 1inch external drain pipe, bear pressure≦0.4Mpa.（Figure 4-1 drain pipe）

4) Air supply:

This machine must supply Φ12mm, 0.5~0.7Mpa compressed air. Air rate is 200~400L/Min.

5) Air vent:

There is a ∉76mm air vent on the top of the machine, please prepare one PVC tube or Tin tube and connect one end to the air vent by using sus304 clamp or Nylon cable tie.

If the other end of the tube equipped with exhaust fan, the air speed must be under 3M/s (if there is less than 2 PCS 90°elbows, then no need exhaust fan).

Never connect the tube with other tubes with heat and fire resources, or else, it may caught fire especially when you use solvent.

6) Installation area:

In keep operator safe and prevent damage to the machine, it must be installed on the ground or environments listed below:

A、Installation ground must be separate to other machines, there must be an exhaust air vent around the machine. No big electric devices around the machine.

B、Never exposure the machine to the hot sun and keep it off the fire and heat resources devices such as heat treatment oven

C、Please install the machine to the environment of 0~30℃、humidity less than 85% (no dew),no corrosive and flammable gas.

D、Please do not install the machine on the place with vibration or impact force, or else it may damage the machine.

E、Good ventilation, dry, clean and dust free surroundings.

7) Space requirement: please leave enough space for the machine installation, spare parts replace and maintenance.

Machine outlines: 1300mm(L)x1200mm(W)x1850mm(H)

Suggested space: 3000mm(L)x3000mm(W)x2500mm(H)

Please leave about 1.5m space distance for the front side; 1m space distance for liquid add in and drain operation side.

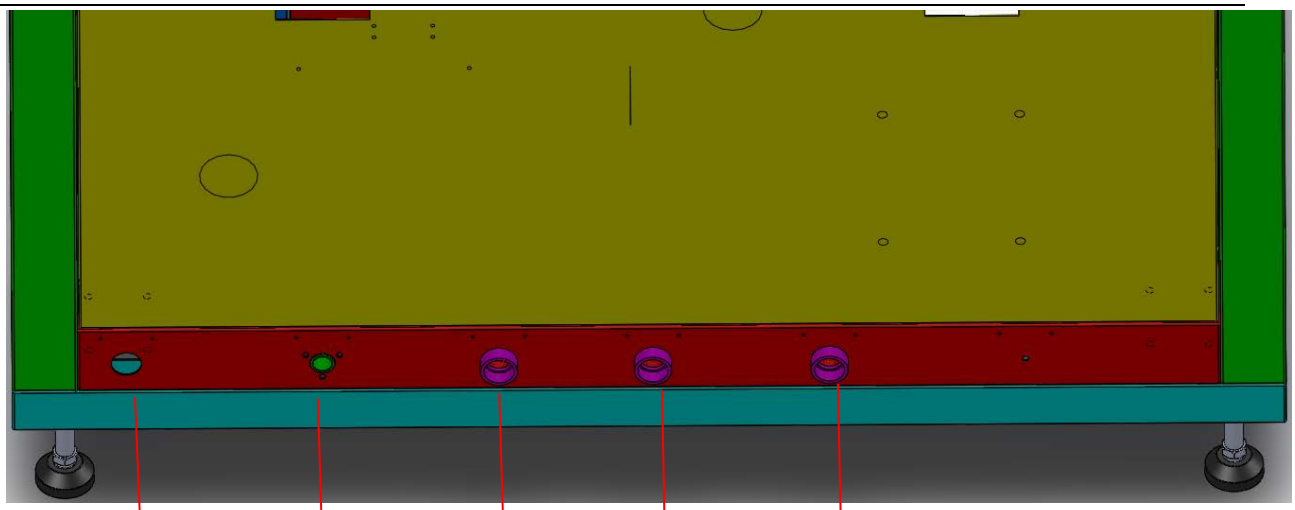


Figure 4-1 Machine connecting port
（This figure is on the rear right side of machine）

4.2 Machine installation steps

1）Disassemble machine package and put it on to flat ground, move it to install place.

2）Connecting inlet and drain hose according to labels on machine. Please use PTFE tape on the joints, make sure they are connected and fixed well.

3）Connecting vent hose to the main ventilation hose of the factory. If outside absorb force is too weak or the hose is longer than 6m or have 2pcs of 90°elbows, please add extract fans. Make sure hose kept firmly, use strip or PTFE tape to ensure no air leak out.

4）Air exhaust and liquid/water drain should obey local laws and protect environment.

5）Connect the qualified power to machine according to the requirement of this manual and electric circuit diagram. Make sure the cables are bigger enough and connect method is correct and firmly, tide the cables and put on signs.

6) Check all the important parts of machine because some parts may damage during transport and installation, please pay special attention to the following aspects：

A. Check if mechanism transmission device is in good condition or not.

B. Check nozzles whether they are on right angles.
C. Check no impurity substance in liquid tank.
D. Check all electric parts and pneumatic parts are fixed well
E. Check all pipes connected firmly, no loose.
F. Check each screw are tighten or not, especially check and tighten pipe clamps

4.3 Electric control system installation

Electric control system include single, remote electrical control cabinet and connect to this machine. Customers must connect electric control cabinet and this machine by themselves. The connecting cables must put in water-proof pipes, recommend to use hard PVC pipe.

Please use the air breaker and earth line according to the power supply requirement. Machine main power supply means the full load electric current and the capacity of main power switch. You can find the full load on machine nameplate.

4.4 Machine adjustment

4.4.1 Inspection before machine

We must do the following inspection before starting after machine installation is finished

1) Input power spec is comply with or not? Connect method is correct?

2) Do the inlet and drain water pipes are installed correct or not? How about the seal effect?

3) Inlet pipe to the machine have water or in correct water pressure?

4) All the water control valves are in correct position?

5) Do all the filter net and filter barrels need clean?；

6) All the covers, lids and glasses are put well?

7） No other things are on mechanism transmission device?

8） Does ventilation device working well?

4.4.2 Inspection after machine power is turning on

Start the machine after finishing the pre-start inspections;

Notice:
1. Please use DI water as clean liquid and start machine to clean the liquid pipes for 1~2 hours before conducting formal PCBA cleaning process.
2. Drain all the cleaning DI water in the machine.

3. Add cleaning liquid to liquid tank.

1）Turn the main breaker in the electrical control cabinet to ON position to supply power to electric control system of the machine.

2）Turn on the Power on the operational panel to start the machine.

3） Operation software system is started.

4） Start liquid add function after enter into operation interface.

5）Add relevant liquid to each liquid tank to normal working level and check each liquid is correct or not.(Caution: Water based dilution liquid to liquid tank and concentrated liquid to concentrated liquid tank.)

6）Setting liquid heat temperature, set the heater on in the interface. The liquid temperature will continue to rise until reaches to setting temperature.

7）All the liquid tank heated to setting temperature.

8）Set all parameters of the whole cleaning process on the Touch panel menu and start relevant switches to ON condition.

9）Machine running automatically according to setting program.

4.4.3 Inspection after machine started

To guarantee proper working, we must carry on the following inspections after the machine is started:

1）Operation software is OK or not.

2）Stencil carrier transmission is OK or not.

3）Cleaning pump is running OK or not.

4）Air pump running OK or not.

5）Pressures on all meters are in normal range or not.

6）Chemical isolation is Ok or not.

7）Cleaning liquid and water rinse liquid heat function are OK or not.

8）Air heat function is OK or not.

9）Hot air recirculation is OK or not.

10）Liquid pipes are sealed well and not leakage?

11）Nozzle spray angles are the same angles?

12）Ventilation device is OK or not.

4.4.4 Turn off machine

Please do the following steps if you want to turn off the machine：

1）Check all the cleaned stencil are moved out from the machine.

2）Click Pause key on Touch panel menu, all the machine functions are stopped.

3）Turn off the power SW after closing software menu.

4）Turn the breaker to OFF position after machine completely closed.

4.5 Machine clean method and cautions:

There must be some oil or grease mixed into machine during transportation, installation and testing, please clean oil before using it to clean according to the following steps:

1) Dip into DI water and use moist cleanroom wiper to clean machine and then use dry wiper to clean again;

2) Add DI water to liquid tan high level and start machine to clean for 10 minutes and then drain the used water.

3) Repeat step 2 for 3~5times and discharge the used water;

After finishing these steps, add cleaning dilution liquid to liquid tank and concentrated liquid to concentrate liquid tank and get prepared for formal clean process.

Please pay attentions to the following items during cleaning ；

1) Collect the impurity substance in the tanks and tidy them to avoid pollution of new liquid or water.

2) Check all the machine units are working properly and in good conditions, no leakage；

3) Please do the upper steps to clean machine thoroughly and do rust prevention treatment when machine is stop and not used for a long time.

5 Operation introduction

5.1 Machine Operation

5.1) Introduction of operational panel

1. Cleaning Liquid pressure：Indicate liquid pressure when it is spraying.

2. Air pump pressure：Indicate air pump liquid or water pressure when it is working.

3. DI water pressure: Indicate supply DI water pressure.

4. Touch panel: Software operational interface.

5. Resistivity meter: Monitoring DI water resist in time to guarantee DI water quality.

6. Power switch: Machine turn on and turn off key.

7. Alarm reset: Alarm when abnormal situation happens; push one time to release alarm.

8. EMG stop: When abnormal situation happens, push this button to stop the machine.

5.2 MACHINE START OPERATION

This machine adopt PLC+ Touch panel software control system.

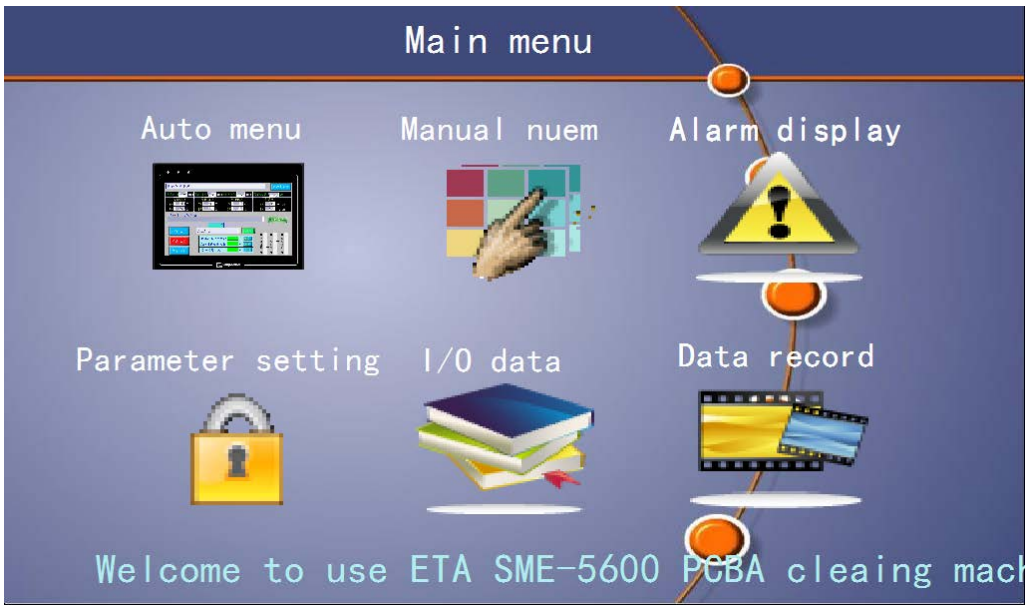
5.21 Turn on Power SW, the start screen initializing appears.

5.22 Initializing menu will last for 1 minute and the screen will change to colorful screen (energy saving mode)

Enter Start menu

5.23 To enter operation menu, please click Enter the operation Menu to jump to Main menu.

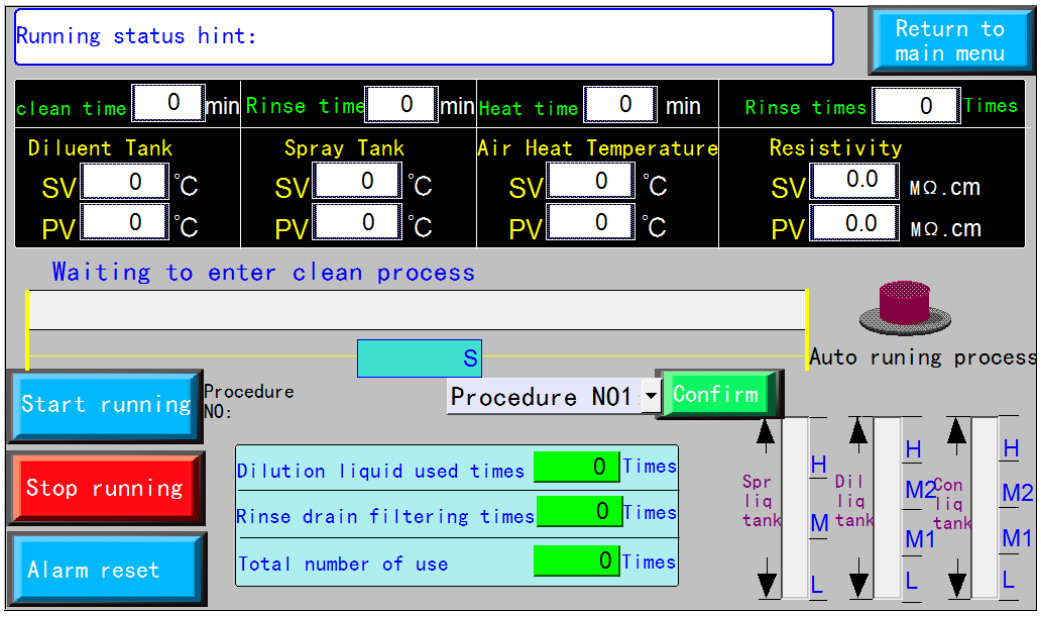
Main menu screen



Main menu summary：This menu shows all the operation functions of the machine: Auto Menu, manual Menu, Alarm display Menu, Parameters Menu, I/O date Menu and Date record.

Click Auto Menu one time, jump to Auto Menu screen:

Auto Menu are consists of cleaning procedure No, Setting values, Present values, Machine status, Cleaning process, Clean time, Rinse time heat time and Rinse times, Start, Stop, Alarm reset, Spray tank levels, Diluent liquid tank level and Concentrate liquid level.

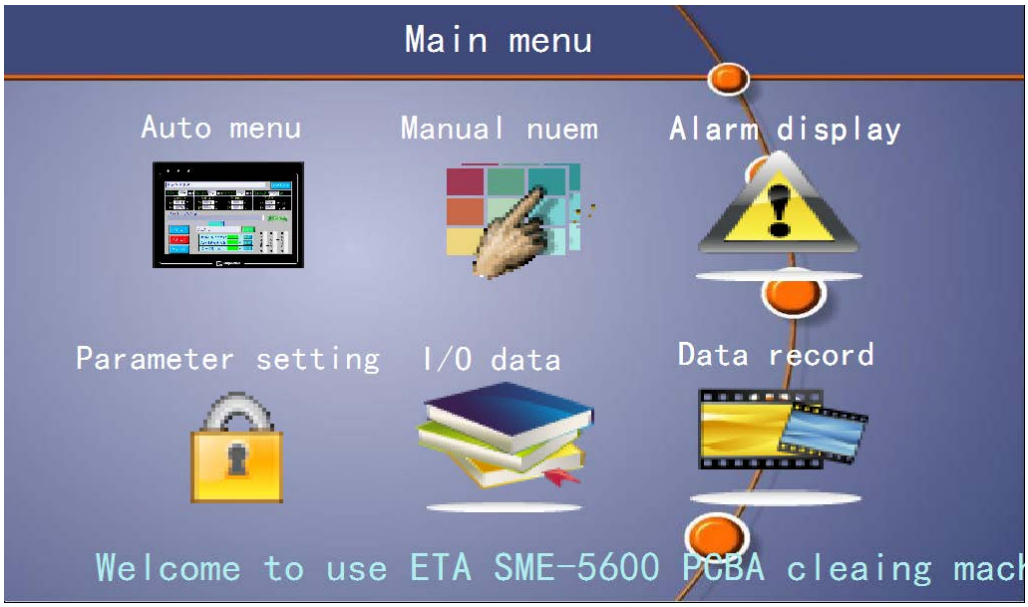


- Procedure No：Please select one column of parameters for the machine.
- Start running：Click to run the machine automatically according to the Procedure No contents.
- Stop running：Control the machine to stop cleaning process.
- Alarm reset：Control to release the machine from abnormal siutation.

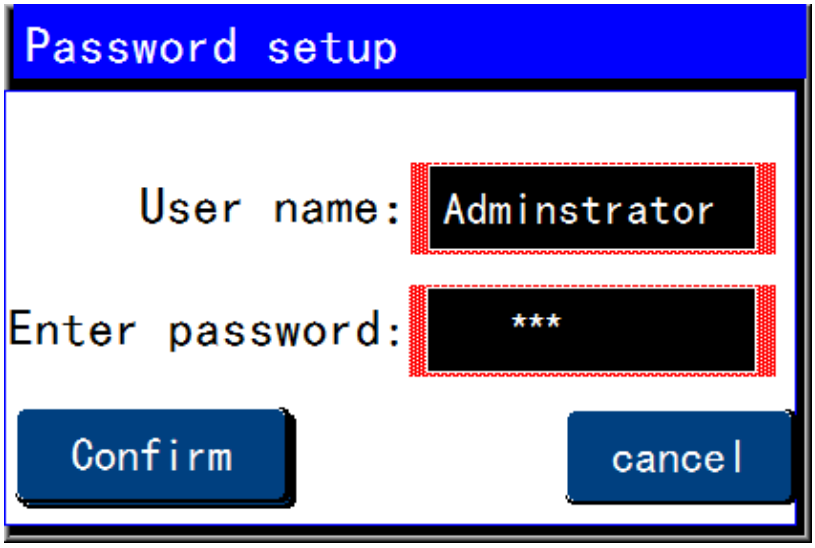
- Clean time：Diluent liquid cleaning time
- Rinse time：DI water rinse time
- Dry time：Hot air dry time
- Rinse times: How many times you set to use DI water rinse the PCBA
- Diluent temp (℃)：Diluent liquid temperature in diluent tank
- Spray temp(℃)：Diluent liquid or DI water temperature in spray tank
- Air dry temp(℃)：Hot air temperature spray into cleaning room
- Resistivity：Rinse DI water resistivity value.
- Spray tank level：Diluent liquid or DI water level in spray tank
- Diluent tank level：Diluent liquid level in diluent tank
- Concentrate tank level：Concentrate liquid level in concentrate tank.
- Diluent liquid used times：Indicate diluent liquid use times
- Rinse drain filtering times：Indicate rinsed DI water drain times
- Diluent liquid recycle used times：Indicate diluent liquid recycle used times

5.3 PROCEDURE EDIT (PROGRAM EDIT)

Click “Return to main menu” and jump to “Main menu” screen.

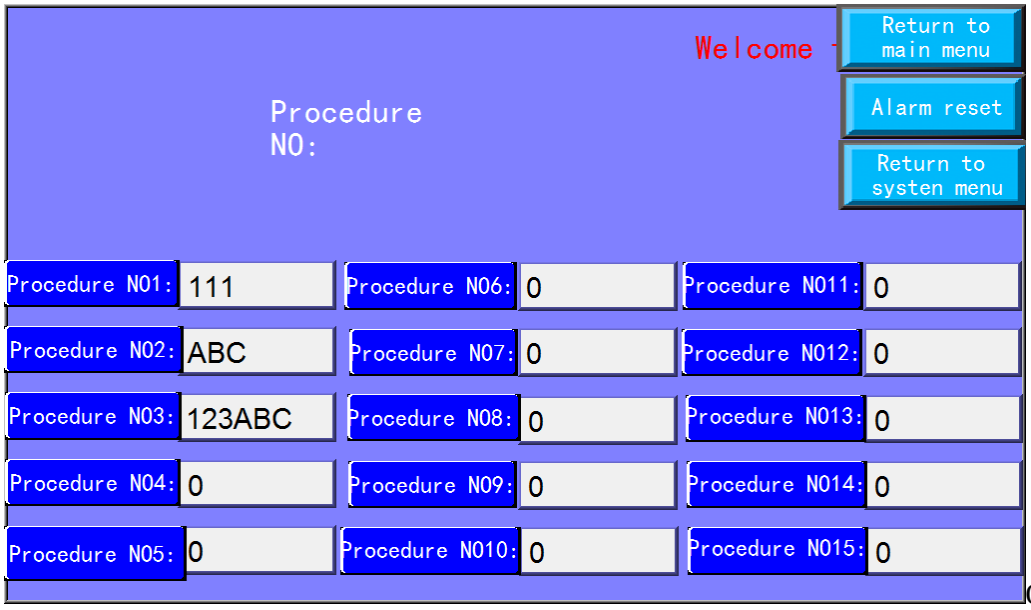


Click "Parameter setting Menu" on "Main Menu", jumps to password confirm screen



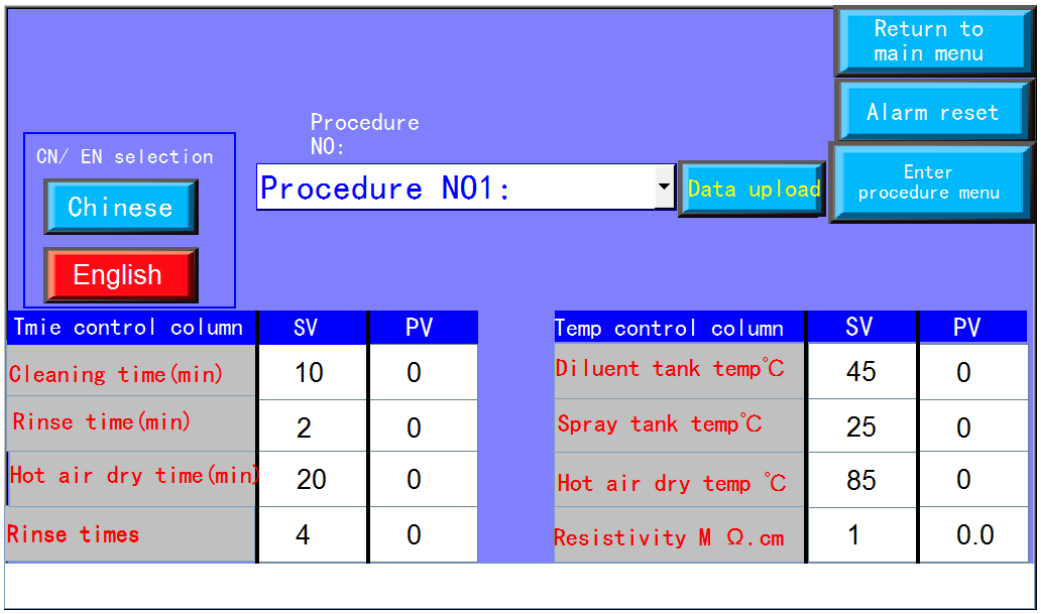
Original password is : 3333

Choose user name Adminstrator and enter relative password and confirm to enter "Parameter setting menu"

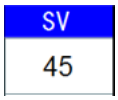


On this Menu, you c

In this menu, you can input PCBA name, Click Procedure NO.1 to enter Parameter setting in details



For example: If you want to change diluent tank liquid temperature from current value 45 to 60，Click



，then input the number 60. Click Main Menu, and click Date upload to finish temperature edit. jump back to Main Menu screen after finish setting, press Start to start new cleaning process.

Auto operation summary：
CN/EN selection: Select Chinese menu or English menu.

Parameters setting value ranges are listed below:

Time control column
Clean time：1min~60min（adjust according the real situation）

Rinse time：1min~60min（adjust according the real situation）

Rinse times: 1~99 times（adjust according the real situation ,normally set it to 3~5） (each time after rinse, rinsed DI water is sent out of machine spray tank)

Hot air dry time: 1min~60min（adjust according the real situation）

Temp control column
Diluent tank temp：0℃～80℃ diluent liquid temp in tank（adjust according the real situation）

Spray tank temp: 0℃～60℃, spray liquid or DI wate temperature, normally set it to 25℃

Hot air dry temp: 0℃～90℃, Hot air temperature to dry PCBAs

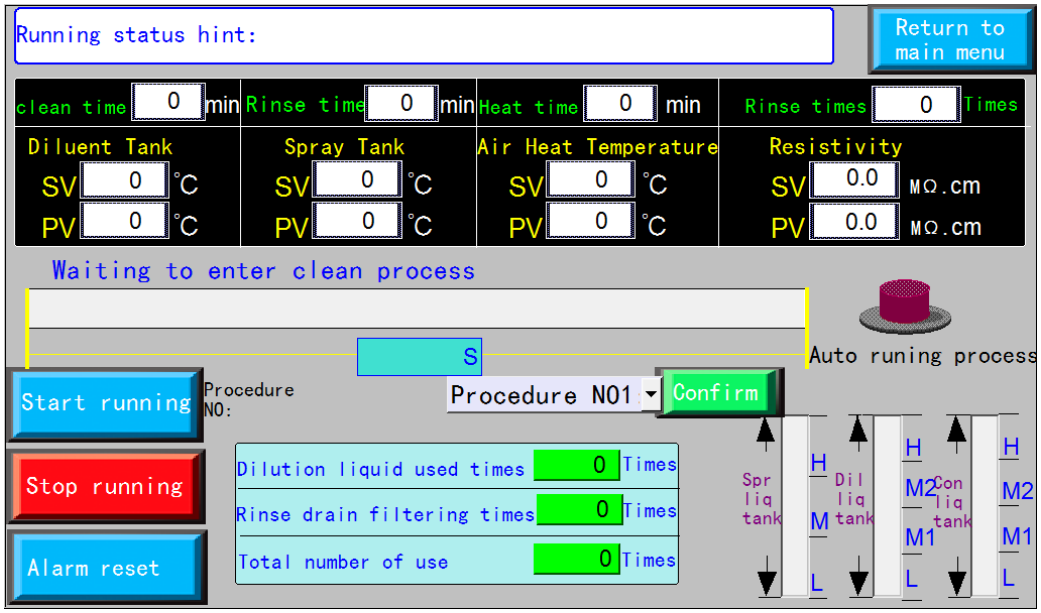
Resistivity M.Ω：Current resistivity value (DI water rinsing)

5.4 OPERATION METHOD

"SCM5600 PCBA Cleaning Machine" can be operated by auto and manual mode:

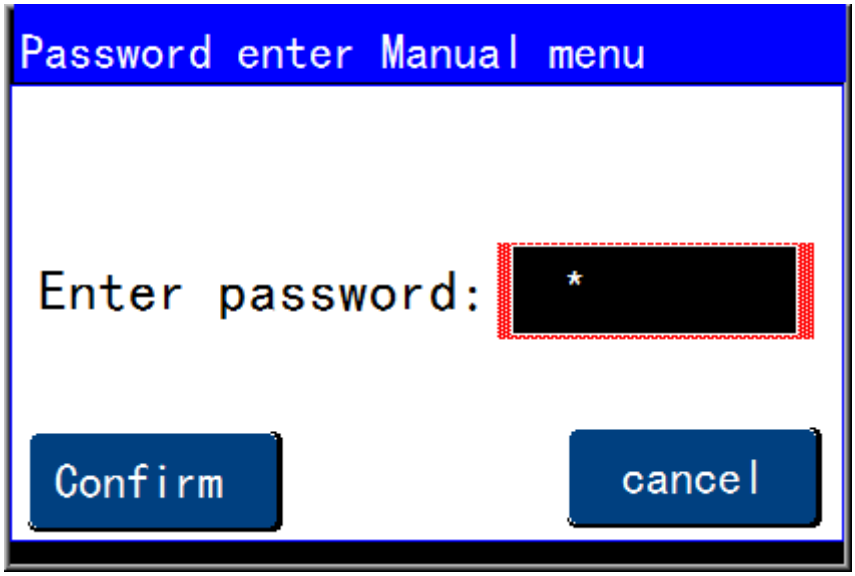
5.4.1 Auto running mode

Enter Main Menu screen. Click Auto Menu, jumps to Auto Menu, choose Procedure No and click Start to enter auto clean mode:



5.4.2 Manual mode

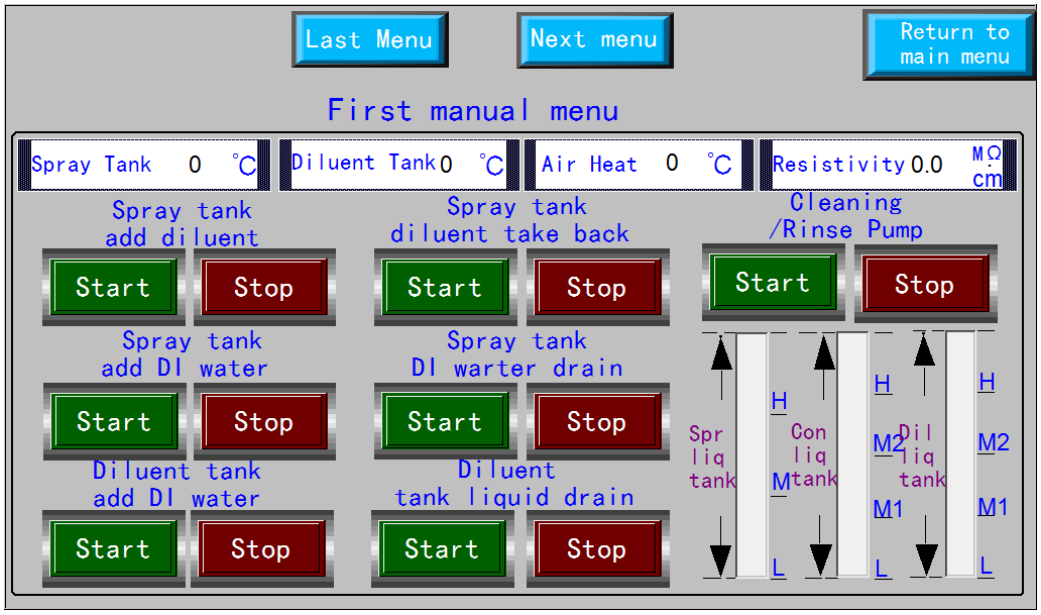
Click Manual Menu on Main Menu screen, jumps to Manual Menu screen and jump to



The manual password is: 2222. Input 2222 and press enter to enter into Manual Menu

Use CR to delete if input wrong number.

Manual Menu consists of 3 sub screens: First manual menu, Second manual menu and Third manual menu.



Please choose the function you need to perform.

First manual operation summary：

● Spray tank add diluent：Click 

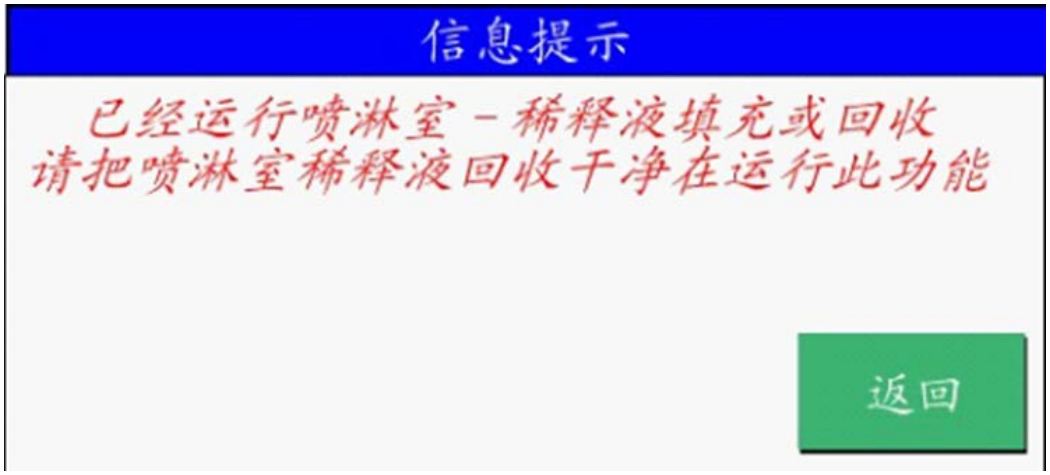
or 

to start or stop adding diluent liquid into spray tank from diluent liquid tank.

● Spray tank diluent take back：Click 

or 

to start or stop taking back diluent liquid from spray tank to diluent liquid tank.



If you want to add or drain liquid from spray tank, this screen will appear and you have to enter Manual menu again.

●Spray tank add DI water：Click 

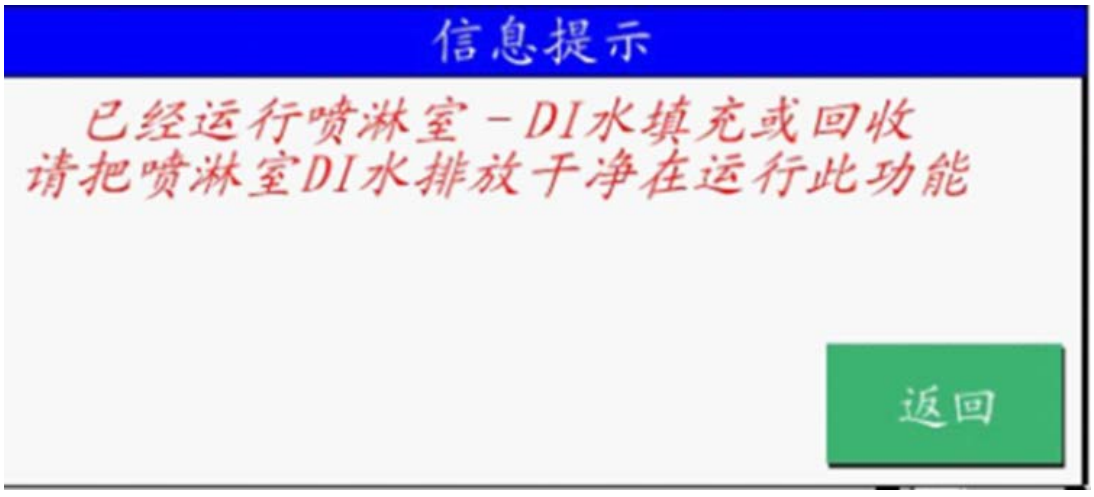
or 

to add DI water into spray tank from DI water inlet port (DI water machine tank).

● Spray tank DI water drain：Click 

or 

to start or stop draining Di water from spray tank to outlet port (drain outside of machine).



If you want to add DI water into spray tank or drain DI water from spray tank, this screen will appear and you have to enter Manual menu again.

●Diluent tank add DI water：Click 

or 

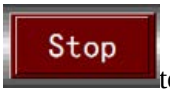
to add DI water into Diluent tank from DI water inlet port (DI water machine tank).It is usually use to clean diluent tank by using new DI water at the time of maintenance or you use DI water to clean water -soluble flux.

When you click 

, this confirm screen will appear

Please click Enter. It will stop automatically after reach to H level position.

- Diluent tank liquid drain: Click 

or 

to start or stop draining diluent liquid from diluent tank.

As you click Enter, a confirm screen will appear

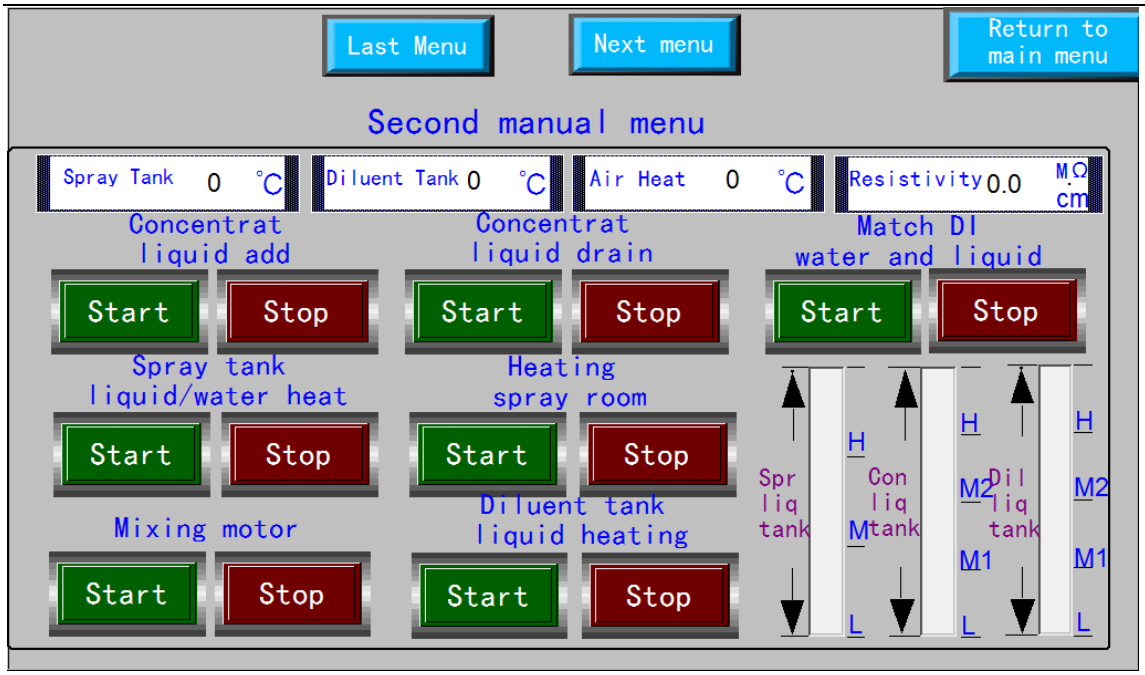
Click Enter to drain. Please click stop then you can run other functions.

● Cleaning or Rinse pump：Click 

or 

to start or stop eletric pump.

Click Next Menu to enter into Second Manual Menu



Please choose the function you need to perform.

The second manual menu summary:

●Concentrate liquid add：Click 

or 

to start or stop adding concentrate liquid into concentrate liquid tank from outside.

●Concentrate liquid drain：Click 

or 

to start or stop draining concentrate liquid from concentrate liquid tank to outside.

Click Enter you can start drain. After finish draining, please click stop then you can run other functions

●Spray tank liquid/water heat: ： Click 

or 

to start or stop heating liquid or DI water in spray tank.

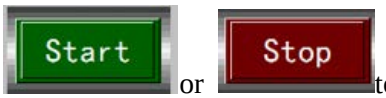
● Dry air heat: Click 

or 

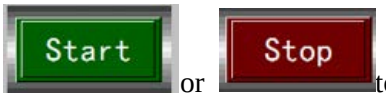
to start or stop heating air from air blower (the air blower start together with air heater at the same time).

●Mixing motor: Click 

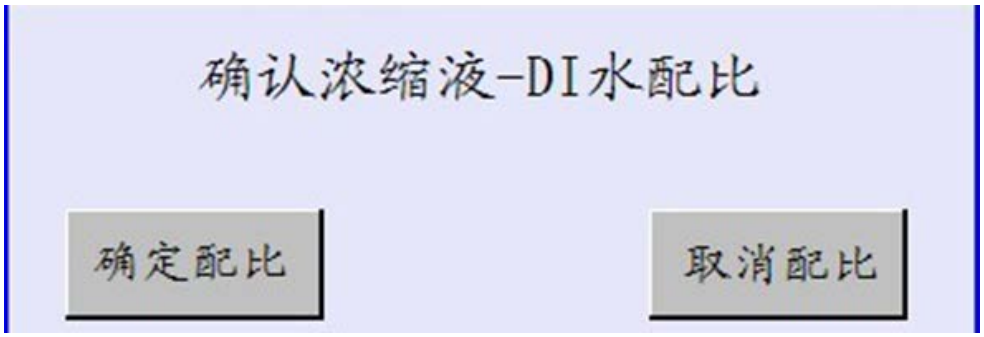
to start or stop mix liquid in diluent liquid tank.

●Diluent tank liquid heat: Click 

to start or stop liquid heat in diluent tank

●Match DI water and liquid: Click 

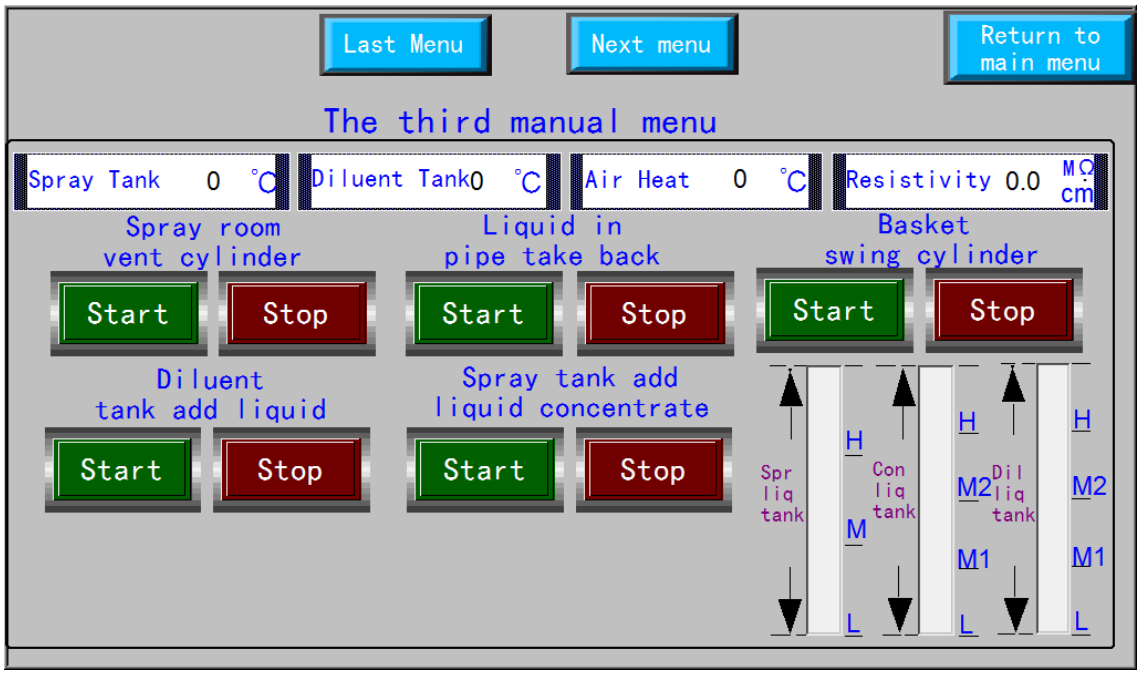
to start or stop mix DI water and concentrate liquid. Using a proportional pump to match DI water and concentrate liquid into diluent liquid and send it to diluent tank.(Proportional pump is Option)

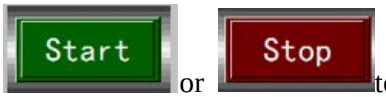


Please click to start.

Caution: Please check outside DI water must have enough pressure and there is enough concentrate liquid in concentrate tank.

Click Next Menu to enter into Third Manual Menu



●Cleaning (spray) room vent cylinder: Click 

to start or stop air vent cylinder on top of spray (cleaning) room.

●Liquid in pipe take back: Click 

or to start or stop blowing residual liquid out from pipes and flow back to spray tank.

●Diluent tank add liquid: Click 

or to start or stop adding liquid to diluent tank.

●Spray tank add concentrate liquid: Click 

or to start or stop adding concentrate liquid to spray tank.

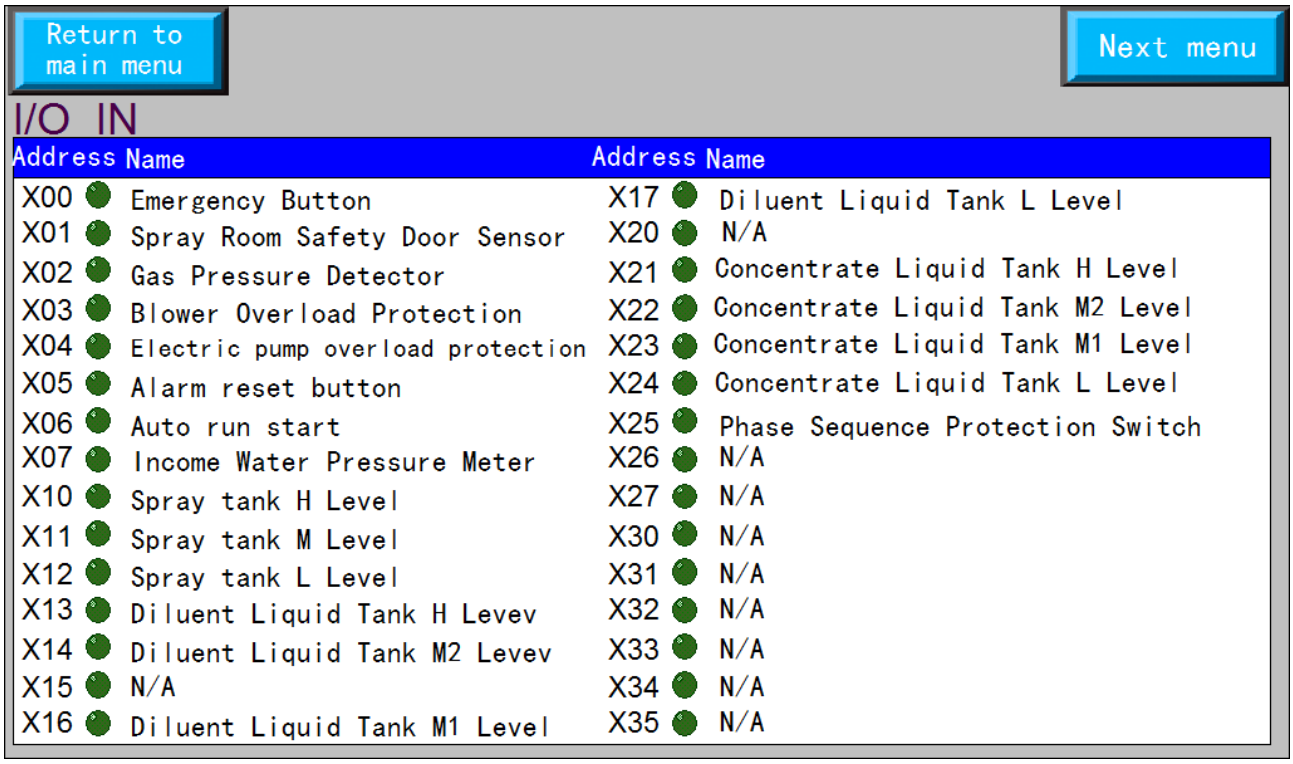
●Basket swing cylinder: Click 

or to start or stop basket moving back and forth by cylinder.

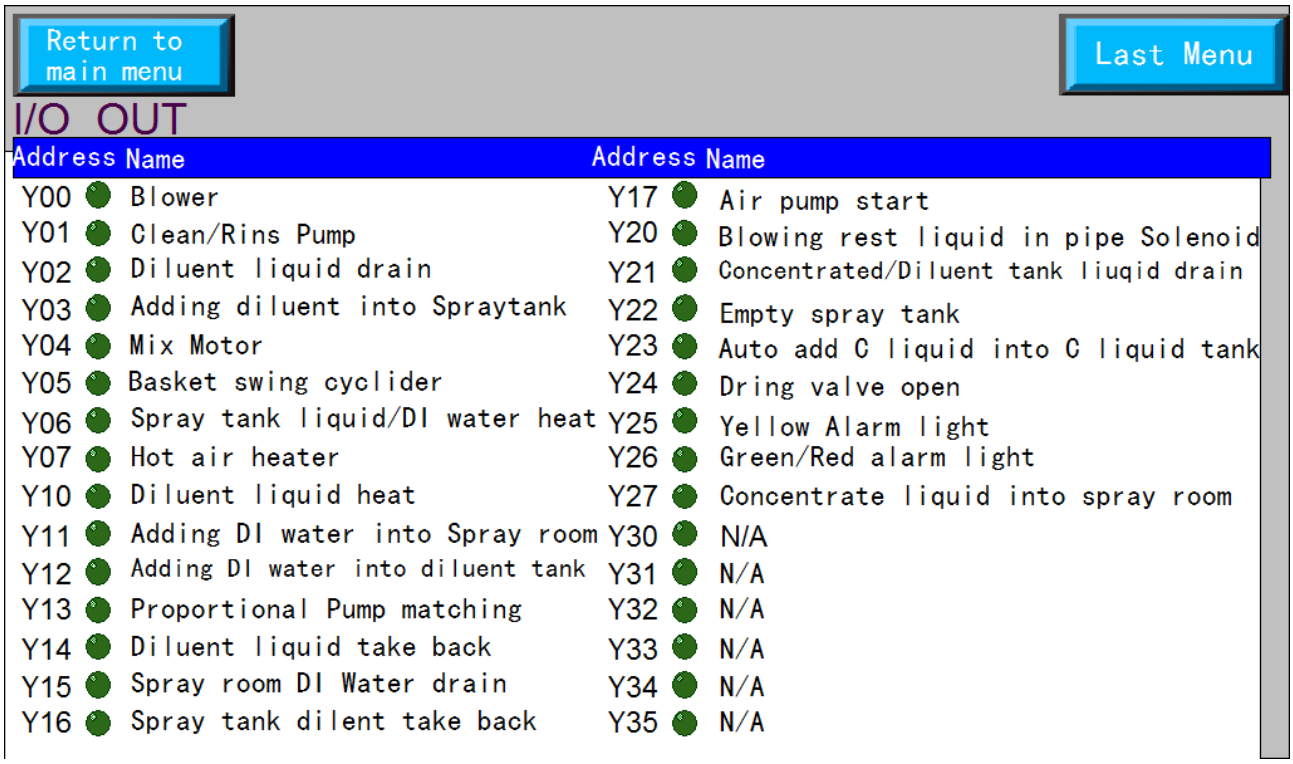
5.5 I/O Menu

Click "I/O data" on "Main Menu", jumps to "I/O date" screen：

I/O IN Menu is used to monitor PLC input signals.



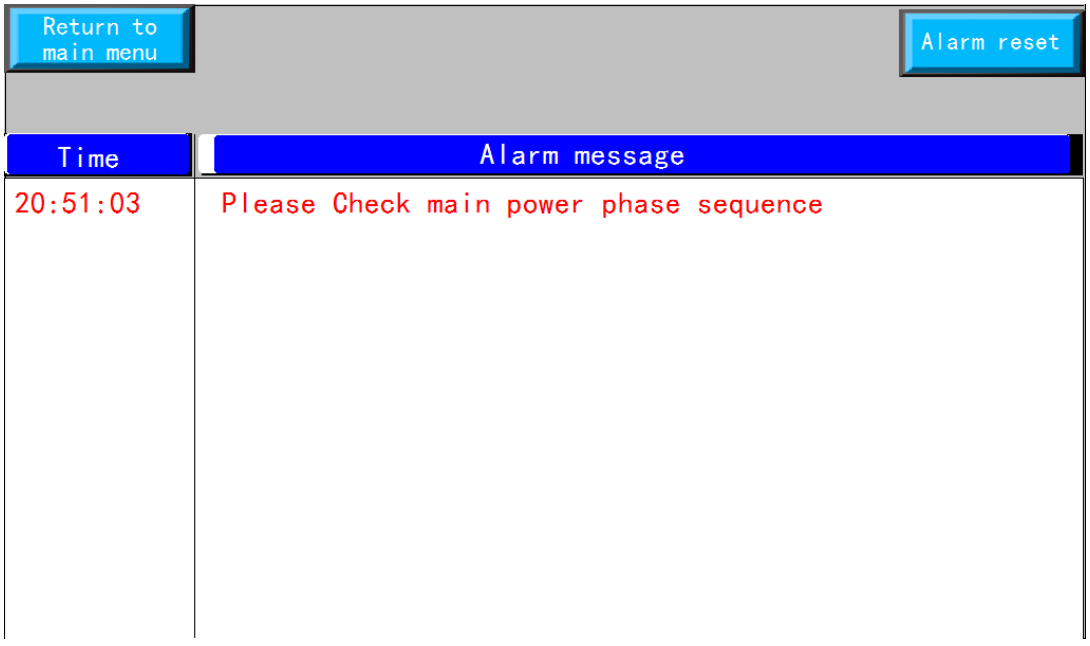
Click "Next menu" jump to I/O OUT menu.



C liquid=concentrate liquid
I/O OUT Menu is used to monitor PLC output signals
Click "Last Menu" on right corner of I/O Input screen, jumps to "I/O IN" screen:
Click "Return to main menu" on left up corner, jumps to "Main Menu".

5.6 Alarm display Menu

Click "Alarm display" screen on "Main Menu", jumps to Alarm display screen：



Alarm display screen shows abnormal alarm information description, alarm time. For example: Power

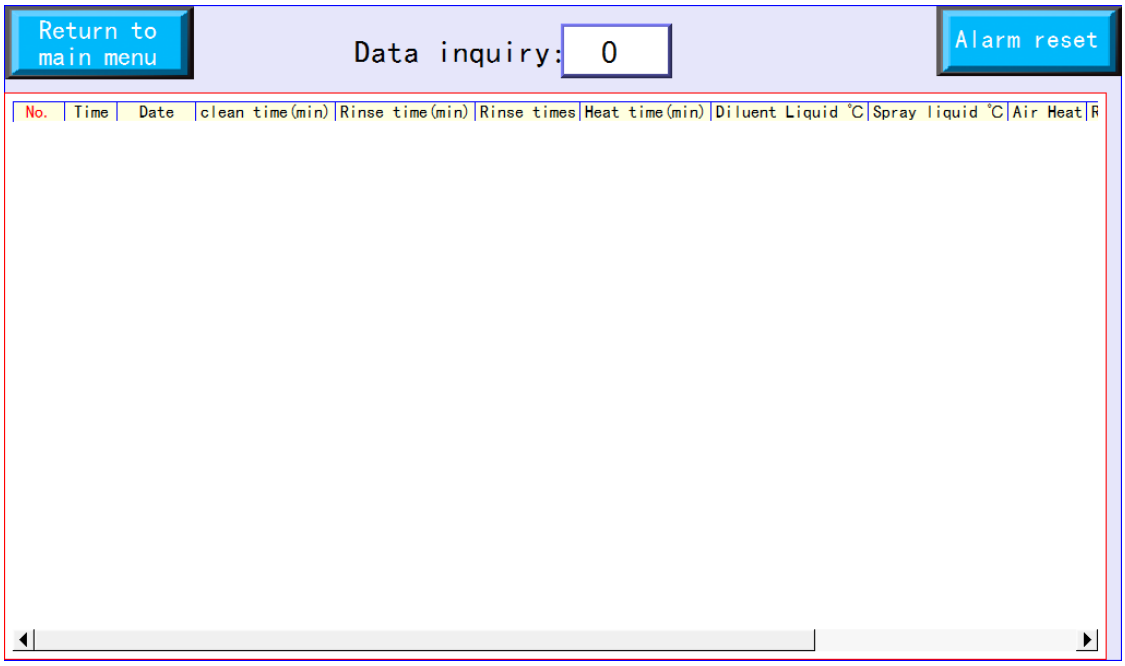
supply open phase(lack of phase), low voltage, overload, programmer abnormal, PLC memory battery voltage low and some assistant I/O signal abnormal alarm…etc. Abnormal alarm content are shown on it. Technical staff can quick find and solve the problems according to the contents.

Operators find the alarm reason and adopt relevant action to solve the problems according to the point out information. Press reset key or click “Alarm reset” to reset the machine and then start the machine according to normal procedures.

5.7 Data record

Click 

on main menu enter “Date record” screen



Data record is used to record setting parameters such as (cleaning) time,(diluent liquid) temperatures…for the convenience of data inquiry.

5.8 Manually add/discharge liquid or water

Add liquid:

Click Manual Menu on Main Menu screen, jumps to Manual operation menu. Please select relevant Manual Menu. Click Start or Stop, the button will be highlight to add or drain liquid or water.

Adding liquid or water:

Please make sure you put on self-protective devices when adding or draining liquid or water and pay attention to the following points:

1. Liquid type is correct or not.

2. Confirm machine start condition and relevant device are ok.

3. Add method is correct or not.

4. Liquid add pipe insert into liquid barrels and press start button.

5. Stop the machine and adjust relevant pipe valve to normal production status after finishing liquid adding process.

Drain liquid or water:

Please make sure you put on self-protective devices when adding or draining liquid or water and pay attention to the following points:

1. Make sure auto drain switch is correct or not.

2. Confirm machine start conditions and relevant device are ok.

3. Insert drain pipe into bare liquid barrel and press start button.

4. Stop the machine and adjust pipe valve to normal production status after finishing liquid drain process.

5.9 Turn on machine

1. Please turn on Main Breaker in the electrical control cabinet at the first time start the machine（please reference the electrical control cabinet inside）.

2. Turn on the Power SW on the operational panel。

3. Enter Main Menu screen.

4. Set each parameters to standard values.

5. Start to add liquid or DI water.

6. Confirm liquid and water has arrived standard level and start the machine again.

7. Put the stencil into the carrier, adjust fix screws and tighten them to hold the stencil, setting stencil carrier moving speed after the liquid temperature reach to the setting value.

8. Confirm again whether stencil are fixed well or not to avoid collision damage when the stencil moving back and forth.

9. Click Auto Menu on Main Menu to enter Auto Menu screen. Click Start to start the machine and then they machine will conduct clean, rinse and dry process automatically.

10. Inspect the cleaning result after trail cleaning process. If the result is good then conduct normal cleaning work.

11. If the buzzer alarms or there is any emergency case occurs, please press down the EMG STOP button on the operational panel. Restart the machine after found and solved the problem

Notice：For the safe of operators, please do not take ties, dress loose clothes or put on woolen gloves.

5.10 Turn off machine

Do the following steps at the time of each day get-off work and about to turn off the machine:
1. Please clean your working area and recovery to initial condition after daily cleaning work.

2. If the machine is in “running” condition or the transmission device is not in original position (zero point), please click Stop or Stencil carrier goes back to zero position button on operation menu and let the machine recovery to normal condition.

3. Close the inlet water valve.

4. Turn off the Power SW on the operational panel. 。

5. Turn off the Main Breaker in the electrical control cabinet.

* **Caution:** Do please not discharge them until the hot liquid or water cool down to avoid danger.

6 Maintenance

6.1 Machine start

1. Turn on the main power breaker in the electric cabinet when first time start the machine.

2. Turn the power switch to ON on operational panel.

3. Enter Main menu.

4. Set all the parameters to standard values.

5. Start to add cleaning liquid or DI water

6. Confirm the liquid level reach the high level, set **diluent liquid and air dry** temperature.

7. Set **Resistivity—cleaning time—rinse time—dry time—rinse times** one by one and then enter program name, click upload data, waiting for 3 seconds to upload data.

8. Put PCBAs into cleaning basket and fix them with jigs; put basket into spray cleaning room after diluent liquid reach the setting temperature.

9. Confirm PCBA are fixed well to avoid collision and damage of PCBAs caused by PCBA moving by spray liquid or water force.

10. Click Start on Main menu, the machine start to auto run. It will automatically conduct diluent liquid clean, DI water rinse, hot air dry process. Please do trial cleaning and observe spray cleaning pressure and machine running condition.

11. Start formal cleaning after confirm the trail cleaning process.

12. Push down EMG STOP button on panel when machine alarm or emergency happens; Release EMG stop and push Alarm rest to recovery the machine if abnormal status is solved.

13. Caution: Operators do not take tie, dress loose or put on fluffy gloves.

6.2 Machine shut off

1. Please shut off **diluent liquid –spray cleaning room—air dry heaters** after the daily cleaning process is finished.

2. Click STOP key on touch panel to stop all the actions of machine after waiting for about 5 minutes to let the other parts stopped.

3. Close water inlet valve.

4. Turn off **Power switch** on operational panel.

5. Turn off **Main power breaker** in electric cabinet.

Caution!! Please do wait the heated liquid cool down and then drain it to avoid risk.

6.3 Maintenance sheet

Machine Unit	Maintenance items	Maintenance steps
Machine covers	Machine covers clean	Use cleanroom wipers and dip little DI water to clean machine covers.
Temporary tank	Filter nets	Drain all the liquid in temporary tank Take off dusts on filter nets and it
Clean unit	Dilution and concentrate Liquid tank clean	Start air pump.
		Drain all the liquid in tank.
		Use brush to clean if it is too dirty.
		Close the drain valve.
	Air pump inlet filter net clean	Take out the filter net. Blow it with compressed-air gun and make it clean.
	Nozzles	Check all nozzles blocked or not, if blocked, disassembly nozzles , blow them with an air gun, then assembly them on
	Spray rods	Turn them by hand to check if they are turning smoothly
	Filter elements replacement	Take off filter barrel top cover and take out the used filter elements.
		Put in new filter elements, fix them and put back the top cover and tighten the six screws.
Air filter	Air blower filter	Please turn the air filter fix screws loose and take it out by hand.
		Blow it clean by using compressed-air gun to make it clean.
		Put the filter back the filter.

6.4 Cautions on maintenance process

1) Cleaning basket moving back and forth system:
The cleaning basket is driving by a cylinder which install on back side of cleaning room to pull and push

cleaning basket back and forth when machine is working to avoid blind area

The cylinder is self-lubricated and no need to maintenance.

2) Cleaning system:

Start the machine to check liquid pressure are OK or not. If pressure is low ,it means nozzles or filter nets are blocked, need to clear.

Disassembly the nozzles with a wrench, blow them with an air gun to make it clean and them put them on (Cautions: The angles and directions of the nozzles should be the same as their original angles and positions)

3) Dry system:

Please check air filter every week, clean it with an air gun or replaced it with a new one if it is really dirty.

6.5 Clean system

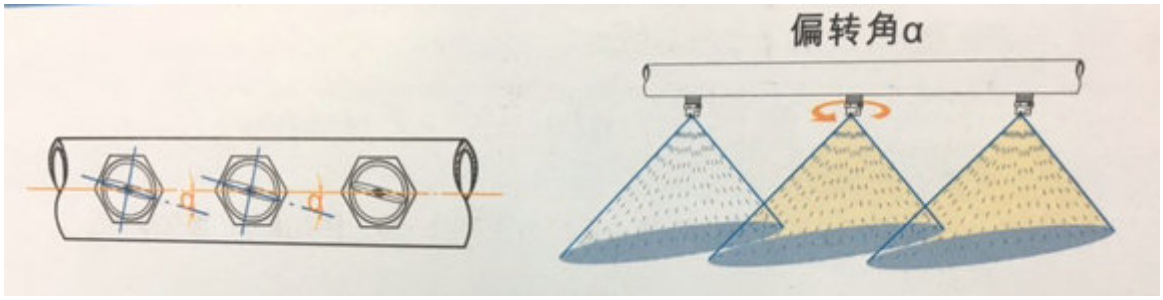
1) Start cleaning pump and inspect if there is any loss on liquid pressure, if have, it indicate that the nozzles or filter elements are blocked，please take off blocked nozzles and clean them.

Assemble and disassemble of nozzles：

a、Disassemble of nozzles： Open the front door, turn nozzles off by wrench counterclockwise.

b、Assemble of nozzles: Blow them with a compressed-air gun, clean the impurity substance and then assemble them clockwise.

Cautions: All the nozzles on one spray rods must in the same direction and are almost in the same angles (10~15°，use PTFE tape if necessary), so the spray curtain not interfere each other. For example:



6.6 Maintenance schedule

Item	NO	Maintenance content	Maintenance period	Remarks
Machine covers	1	Machine covers clean	Every week	
Cleaning room	2	Air pump filter net clean	Every week	
		Cleaning room filter net clean	Every week	
Dilution liquid tank	3	Filter clean	Every week	

Concentrate liquid tank	4	Tank clean	Every week	
Nozzles	5	Nozzle clean	Every week	
Spray rods	6	Rotation check	Every week	
Filter barrels	7	Filter elements replacement	Every month	
Air filter	8	Filter net clean or replacement	Every month	
Cylinder	9	Cylinder movement check	Every month	
Liquid heaters	10	Liquid heater in tanks surface clean	Every month	
LS	11	Liquid level switch check	Every month	
Motor	12	Turning condition check and blades clean	Every 3 month	
Air pump	13	Absorb function	Every 3 month	
Electric pump	14	Absorb function	Every 3 month	
Air blower	15	Air blow function	Every 3 month	

7 Trouble shooting

7.1 Basket back and forth movement

Abnormal situations	Possible reasons	Trouble shooting
Cylinder don not move in auto running mode	a. Magnetic plate missing b. Cylinder broken	a. Put on new magnetic plate. b. Replace new cylinder.

7.2 Clean system

Abnormal situations	Possible reasons	Trouble shooting
1.Spray liquid pressure is not stable	A、Filter nets are blocked	A、Clean filter nets and filter net in tank.
	B、 Nozzles blocked.	B、Disassemble nozzles and clean them.
	C、Liquid is not enough.	C、add liquid to H level.

	D、Electric pump is broken.	D、Replace pump.
	E、Pressure meter is broken	E、Replace meter
2.Cleaning result is no good	A、Cleaning liquid is no good	A、Check liquid or water is good or not
	B、Liquid tank is too dirty and cause pollution	B、Clean liquid tank
	C、DI water quality is not pure enough	C、Check DI water machine
	D、Liquid heat switch is not on	D、turn on liquid heat switch
	E、Nozzles and filter nets are blocked	E、Clean nozzles, filter nets
	F、Cleaning time is not long enough to take off flux on PCBAs	F、Reset and increase cleaning time
	G、Liquid used too many times	G、Replace liquid in time to recovery cleaning ability
3、Lack of water	A、inlet water port is not open or no water supply	A、Turn on water inlet port, supply water to port
	B、solenoid valves trouble, can't supply water	B、Supply water manually, then replace solenoid valves
4、Pump stop working	A、Pump accepted overload current	A、Replacing Pump
	B、Overload protective breaker tripped to cause pump stop.	B、Press rest key to make it recovery
	C、Pump breaker is not on in electric control box.	C、Turn on pump breaker
5、liquid temperature can not rise to setting value	A、Setting liquid temperature is exceed the temperature range	A、Change to correct temp value at range
	B、Heater broken	B、Replace heater
	C、Less liquid	C、Add liquid to H level

7.3 Dry system

Abnormal situations	Possible reasons	Trouble shooting
1、Air blow starts but air volume and air force is not good	A、Air filter is blocked, income air volume is not enough	A、Clean air filter on air blower
	B、Air hose is broken	B、Replace new hose
2、Air dry result is not good	A、Air filter is dirty	A、Clean or replace air filter
	B、Air dry time is too short	B、Adjust and increase air dry time
	C、Air blower is not started	C、Check and start the air

		blower
3、Air blower stops working	A、Air pump accepted overload current	A、Replace air blower
	B、Overload protective breaker tripped	B、Press reset to recovery
	C、Air blower beaker in electric box is not on	C、Turn on the air blower breaker

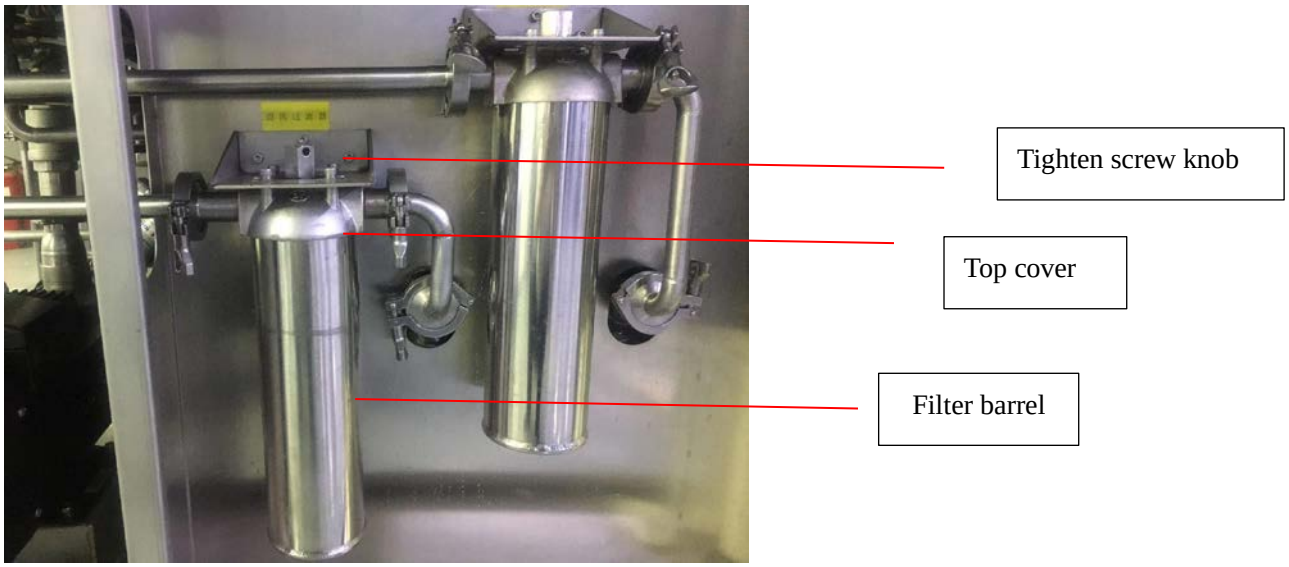
7.4 Electric control system

Abnormal situation	Possible reasons	Trouble shooting
1.Liquid over temperature	A、Solenoid valve broken	A、 Replace solenoid valve
	B、Liquid level low	B、 Add liquid to H level
	C、Temperature detector is broken	C 、 Replace the broken temperature detector
2. Unable to heat	A 、 Inspect leakage breaker is tripped or not	A、Recovery leakage breaker in electric control cabinet
	B、Unable to start leakage breaker	B 、 Check if there is any current leakage
	C、Heater is broken	C、 Replace heater
3. Unable to supply water	A、Solenoid valve trouble	A、Add liquid manually, then replace solenoid valve
	B、Liquid level floating switch is broken	B、Replace liquid floating level switch

8 Spare parts replacement and repair

8.1Filter elements replacement

Replace the filter elements according to the maintenance schedule. Replace them in time when they are blocked. Figure 8-1 is the filter barrel picture. Please stop the machine before replacing filter elements. Please do the replacement step by step.



Picture 1 filter barrel

1) Loose the tighten screw knob by using a wrench counterclockwise.

2) Hold the filter barrel by 2 hands and turn it counterclockwise to take off barrel.

3) Take off used filter element.

4) Clean the filter barrel and take out solder ball and other dust.

5) Check O-ring seal expose or broken, if expose, put it to its right position, if broken, replace it.

6) Replace with new element and put barrel back, tighten the screw knob by using a wrench.

Caution: Please check no liquid leak out after finishing replacement.

8.2 Heater replacement

There are 3 heaters in the machine, they are installed at the read side of diluent liquid tank, bottom of spray tank and connect with air blower. Here are brief introduction of the 3 heaters.

(1) Heater on diluent liquid tank: 9KW frank fixed heater, to heat diluent liquid to setting temperature, figure 2. The replacement steps are listed as below:

Picture 2

A、Drain all the liquid in the tank;

B、Shut off machine power switch, push main power breaker to OFF position. Put on warning signs to guarantee maintenance staff safety.

C、Turn off the plastic cover by hand counterclockwise and disassemble the power lines of heater by electronic staff.

D、Turn off the heater with big wrench counterclockwise.

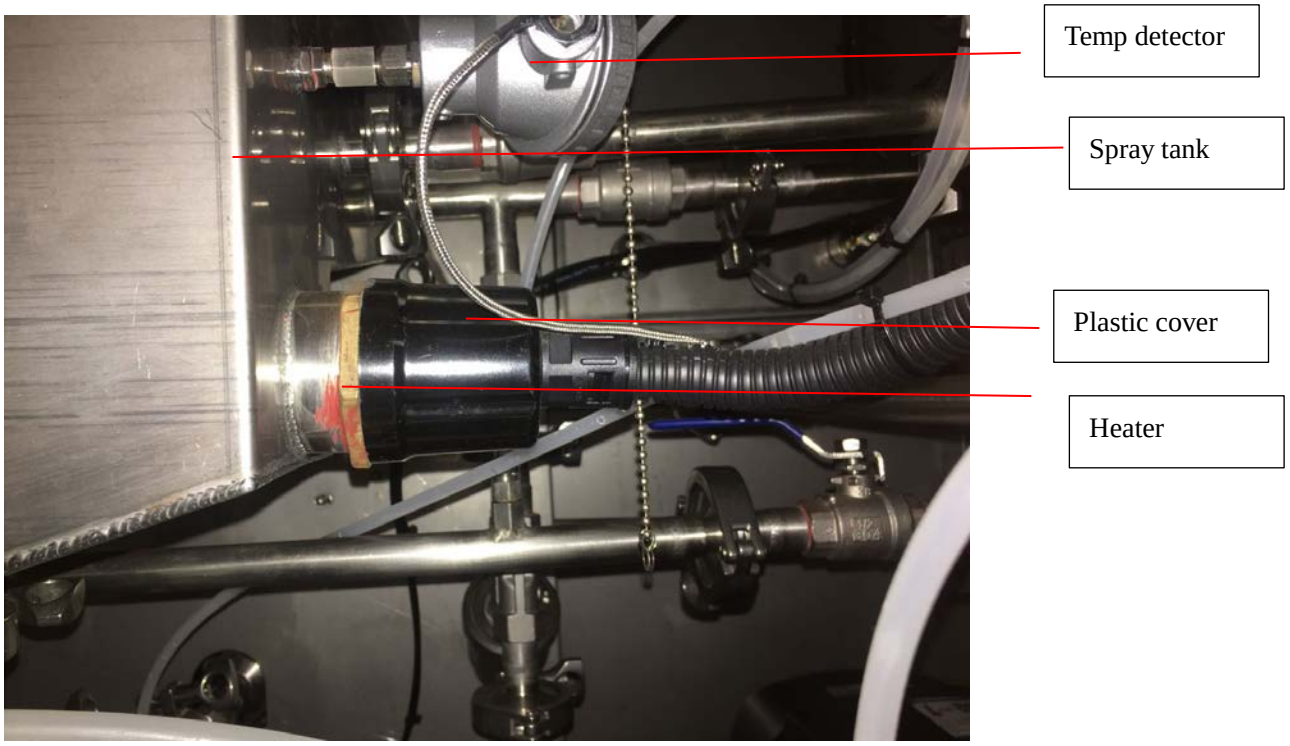
E、Replace it with new heater. Put some silicon seal glue or PTFE seal tape to make sure there is no liquid leak out from it.

F、Put the cables through plastic bellows and connect the cables to the machine electric box.

G、Turn on the black plastic cover, close the covers, replacement finished.

Notice: Make sure there is no liquid leak out after replacement.

（2）Heater on spray tank: 6KW heater, to heat liquid to setting temperature, figure 3. The replacement steps are listed as below:



Picture 3

A、Drain all the liquid in the tank;

B、Shut off machine power switch, push main power breaker to OFF position. Put on warning signs to guarantee maintenance staff safety.

C、Turn off the plastic cover by hand counterclockwise and disassemble the power lines of heater by electronic staff.

D、Turn off the heater by big wrench counterclockwise

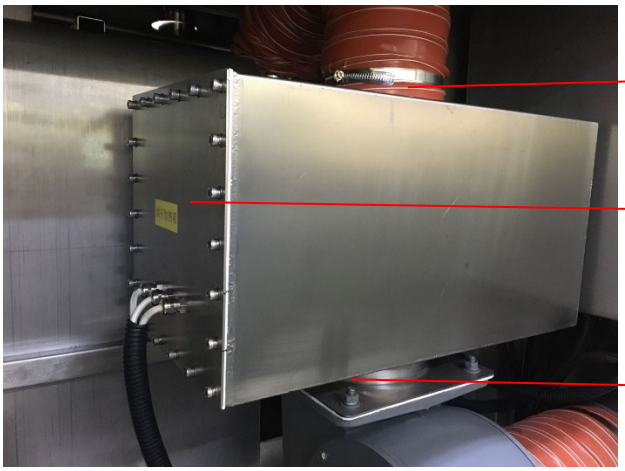
E、Replace it with new heater. Put some silicon seal glue or PTFE seal tape to make sure there is no liquid leak out from it.

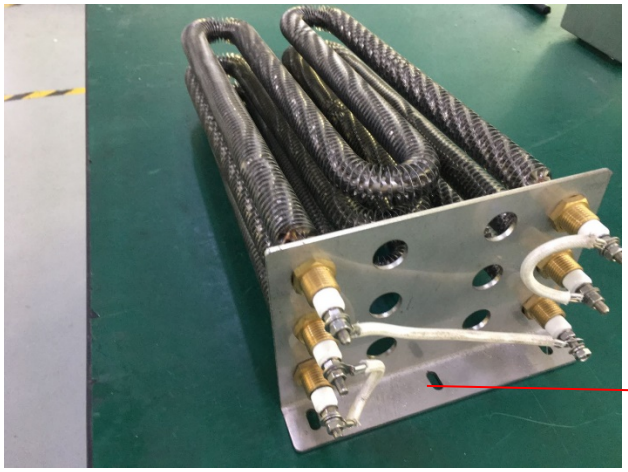
F、Put the cables through plastic bellows and connect the cables to the machine electric box.

G、Turn on the black plastic cover, close the covers, replacement finished.

Notice: Make sure there is no liquid leak out after replacement.

（3） Air dry heater: 6KW heater, to heat air from air blower and send it to spray cleaning room to bake PCBAs dry. Heater is installed and fixed on ceramic frank, figure 4. The replacement steps are list as below:





Picture 4

A、Shut off machine power switch, push main power breaker to OFF position. Put on warning signs to guarantee maintenance staff safety.

B、 Loose the upper strip to disconnect the air hose. Loose the lower 4 screws to disconnect from the air blower.

C、Loose all the screws on the front sealed plate and loose the 3 plate fixing screws.

D、Disconnect the 3 power lines and take out the heater unit.

F、Replace the 3 heater coils with new one and connect them according figure 4

G、Connect 3 power lines and 3 fixing plate screws , put on sealed plate and confirm it again.

F、Start the machine and test the heater.

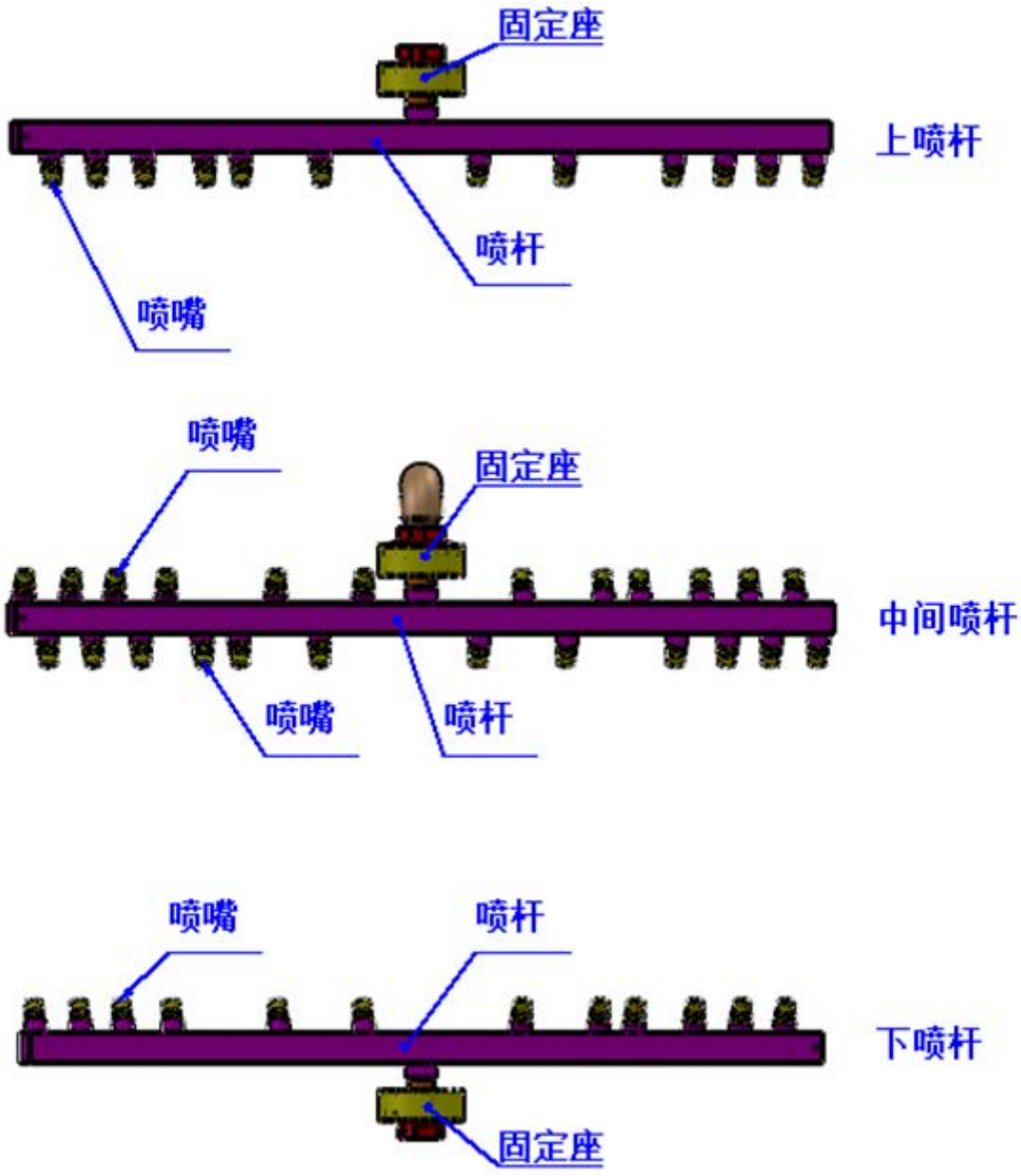
8.3 Nozzle:

Nozzle is one of the important parts to realize cleaning function, the cleaning result is heavily depend on nozzle. Since nozzle is made by SUS304 stainless steel, so it is not easy to be broken. The usual problem is

nozzle block.at this time, counterclockwise turn it off by using a wrench, take block material out and blow it with an air gun, put it back with some seal strip, adjust the nozzle spray angle(about 10°same to others).

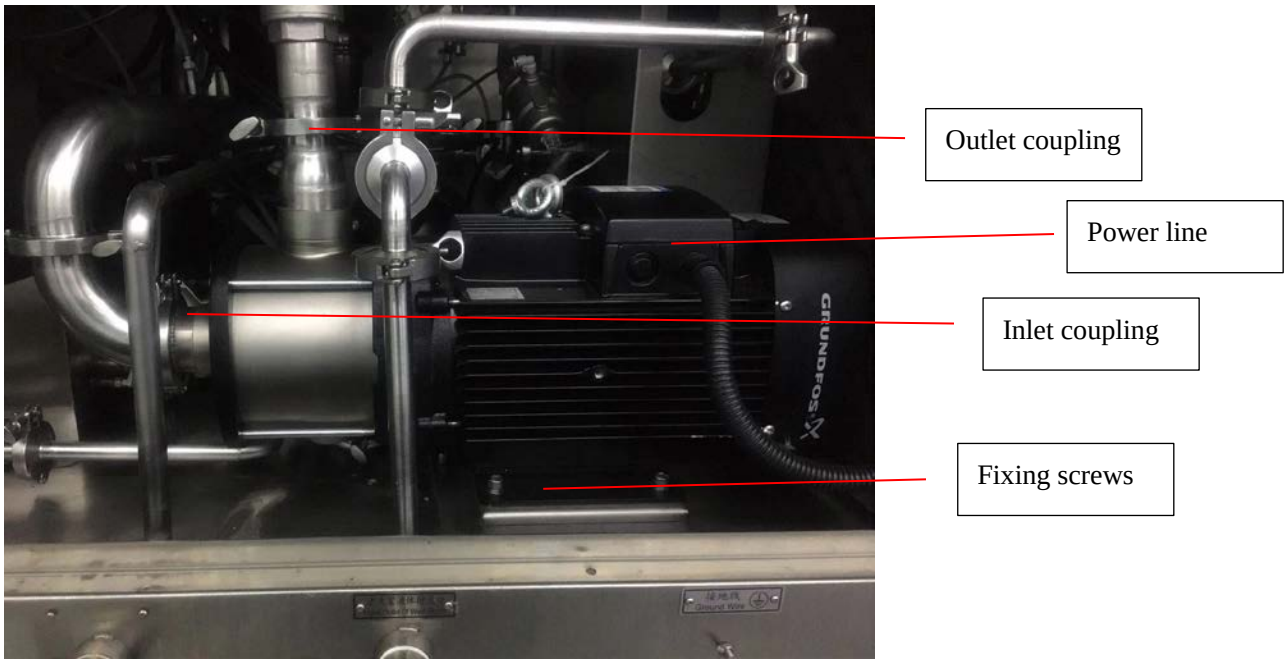
If nozzle is broken, please replace it, replace steps is the same as nozzle block.

Picture 5



8.4 Electric pump:

Electric pump is one of the most important parts to realize cleaning function. It is used to drive liquid or water and spray them to PCBAs through spray rods and nozzles. It is need to start frequently, this will shorten pump lifespan. The normal problems are 2 points:1. Pump motor broken; 2.materia enter into pump. We need to repair pump when this 2 troubles happens. Please dissemble according to the following instruction step by step (Picture 6).



Picture 6

（A）Drain all the liquid or water in the pipes, shut off machine power switch, push main power breaker to OFF position. Put on warning signs to guarantee maintenance staff safety. Ask electric staff disconnect pump power lines.

（B）Open the rear side lower door and right side lower door, you can see the electric pump. The left side of pump is liquid inlet port and the up side is liquid outlet port when you stay at the back side of the machine and facing the pump. Please loose quick couplings and disconnect the pump from the 2 pipes.

（C）Loose the inlet coupling and outlet coupling on machine by using a proper wrench.

（D）Loose the 4 fixing screws and take the pump out from right side.

（E）Replace with a new pump.(If need to repair, send the pumps to pump repair station or ask maker service staff to repair on site and then assembly it. Disassembly and assembly are reverse procedure.

（F）Close the door and start the machine to check new pump function.

Caution: Check there is no liquid leak out from inlet and outlet couplings.

9 Warranty terms

9.1 Warranty terms：

1）One year after installation is the warranty time（Please take the acceptance date as standard, so as blow）；

2）If machine arrived at customer's company， but not installed for 1 month, one year warranty time will be start from the beginning of second month.

9.2 GUARANTEE ITEMS：

1）Guarantee：Our company will be responsible to repair any parts free of charge if trouble happened in warranty time. Please write down your machine trouble in details and E-MAIL to info@smthelp.com or phone no.: (86)-755-83203237 to inform our after-sales department. Our after-sales department staff will analysis your machine trouble descriptions and offer service in time according to our guarantee permission.

2） Parts repair and technical support are free of charge under one year warranty. If you need our engineers to serve on site, please discuss（Consumable parts and parts damage caused by miss operation by operator are not include.）

3）Guarantee duty：

Our machine are carefully tested and inspected by our QC department. Our company will not have the duty to those troubles and damage caused by the following reasons. But you can choose compensable service.

A. Machine trouble or damage caused by mis-operation；

B. Improperly use or use not qualified spare parts or change air circuit, pneumatic parts and (software);

C. Consumable parts are not in the guarantee range, for example: filter cartridge, filter net, seal strip, customers can buy them from our company;

D. Troubles are not in guarantee range in "maintenance" and "spare parts replacement and repair" chapters of this manual;

E. Damage caused by improperly repair and incorrect parts;

F. The whole machine are expired warranty time;

G. Trouble and damage caused by force majeure (force majeure clauses: not foreseen and the results are unavoidable, insurmountable, such as war, heavy fire disaster, heavy blood, typhoon, earthquake… etc.)

H. Our company will charge on troubles which expiry warranty and not in guarantee range.

9.3 INSTRUCTION

1） This commitment is only suitable for PRC range, if other country law has other obligations on it, please obey the country law ；

2） Our company is responsible for the losses which caused by our engineers during repairing under warranty time.

3） Our company has the ownership of replaced spare parts in the warranty period.

In Addition: This commitment only has effects on this machine. Other derivative problems are not in this range. If you have any questions, do please contact our company for solutions.

10 Service range：

The selling amount (machine price) of this machine not include consumable parts and engineers onsite support costs. Our company will charge on the following situations even the machine is under warranty.

1. Installation, test and trial running of the machine.

2. Regular maintenance.

3. Educations on operation, process analysis.

4. Technical supports and educations on non-standard working flow.

5. Other charge service which we confirmed.

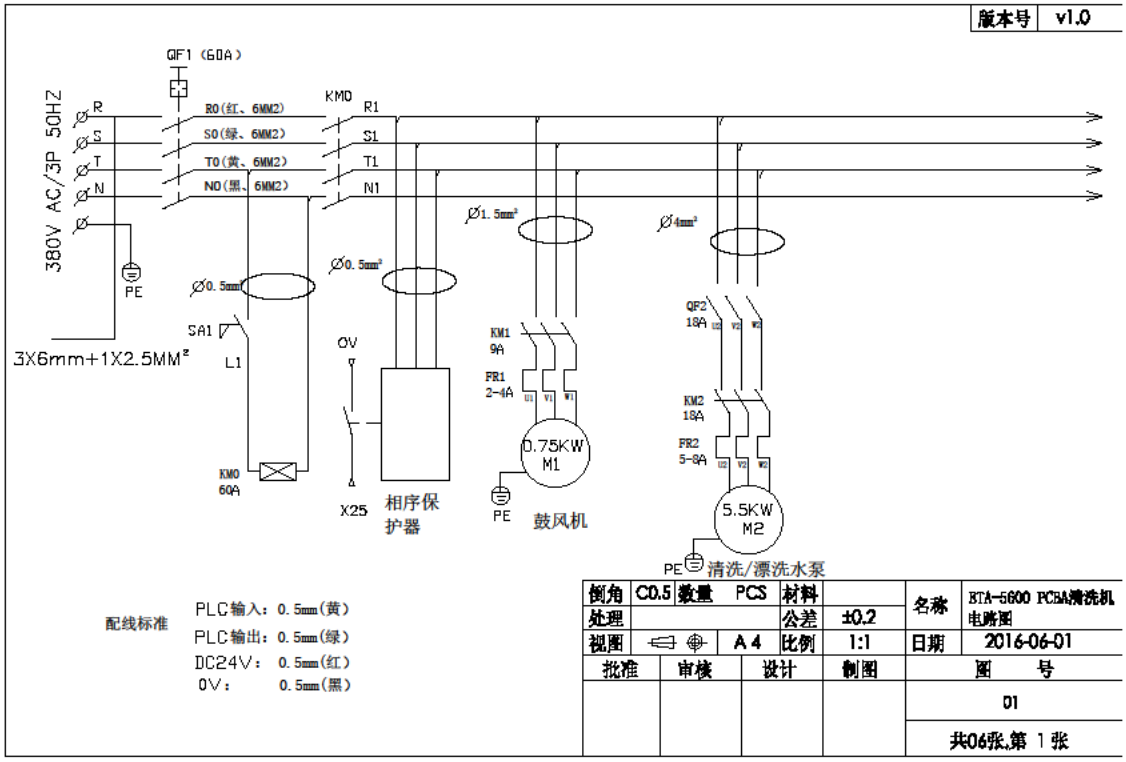
24 HOURS TECHNICAL SUPPORT!
If you have any technical questions, machine troubles or buy any consumable materials, please feel free to contact us at:
Tel: 86-755-83203237; E-mail: info@smthelp.com

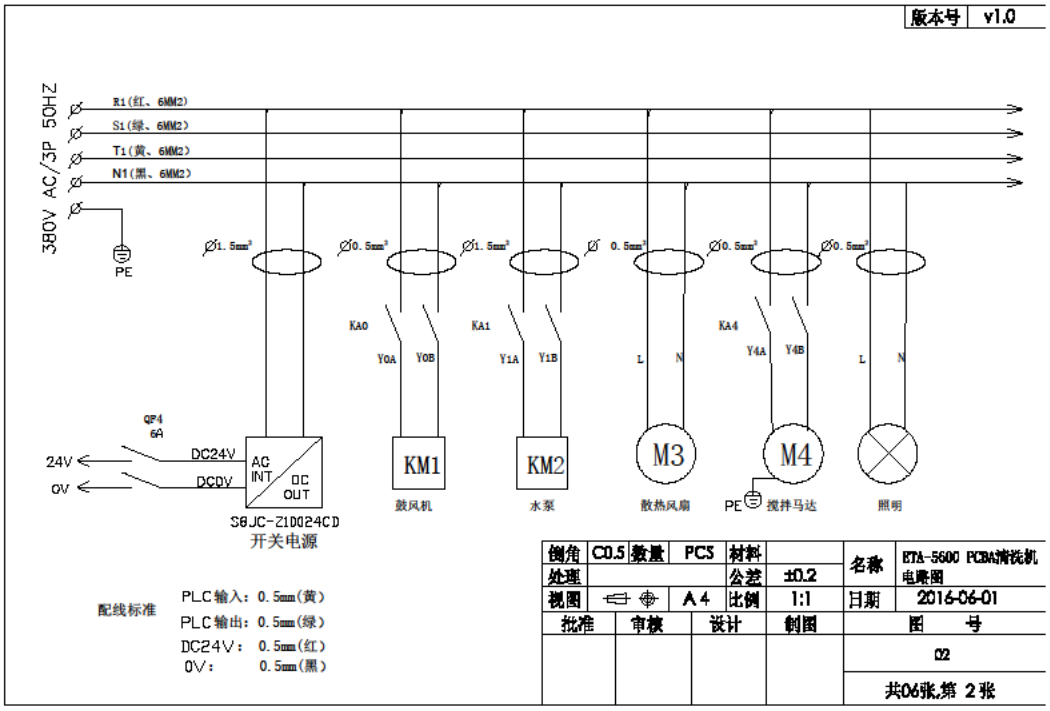
Appendix 1：Main material sheet

S/N	Item	Brand	SPEC	Quantity	Unit
1	Machine Frame	SM	SM Design	1	set
2	Machined parts	SM	SM Design	1	set
3	Liquid heater	SM	SM Design	2	set
4	Air heater	SM	SM Design	1	set
5	Liquid tank LS	SM	SM Design	1	pcs
6	Spray tank LS	SM	SM Design	1	pcs
7	Temp detector 80mm	Zhihui	K type	3	pcs
8	Clean pump	Grundfos	4.0KW	1	pcs
9	1 inch air pump	ARO	666120-344-C	1	pcs
10	Air blower5.5KW	Quanfeng	FMS-751	1	set
11	Air regulator	China Star	AW4000-04	1	pcs
12	Air meter	Japan SMC	GP46-10-02L5	1	pcs
13	Solenoid valve	Japan CKD	4JA219-06-3	14	pcs
14	Basket Cylinder	Chelic	TDXU20*40	1	pcs
15	Resistivity	China Createc	CCT-3300E,DC24V	1	set
16	Touch Panel	Weinview	MT6103IP	1	pcs
17	RS485 Modular	Mitsubishi	FX3U-485BD	1	pcs
18	Temp Control Modular	Mitsubishi	FX3U-4AD-TC	1	pcs
19	PLC	Mitsubishi	FX3U-64MR/ES-A	1	pcs
20	Window	Takigen	C-463-B-2030	1	set
21	Support Air Spring	SL	GSB22-D-D-S170	1	set
22	Panel button	IDEC	YW1 series	1	set
23	Circuit Breaker	Mitsubishi	BH/BV series	2	pcs
24	AC contactor	Schneider	LC1series	1	set
25	Heat overload rely	Schneider	LRD series	1	set
26	Phase Sequence Protector relay	Carlo Gavazzi	DPA51CM44	1	pcs
27	Door sensor	OMRON	TL-Q5MC1-Z	2	pcs
28	SSR+BASE	FOTEK	ESR-60DA-H	2	set
29	SSR+BASE	FOTEK	ESR-40DA-H	1	set

30	Relay	Schneider	RXM2LB2BD	1	set
31	Indicator	Patlite	MG-302BQ-RYG	1	pcs
32	Mixture motor	FTK	31K15GN-C 与 3GN 5K	1	set
33	Spray nozzle	NCY	6504	48	pcs
34	Filter barrel	BY	JA-10-14	2	set
35	Air valve	Kailing	SUS304 1/2 Inch	12	个

Appendix 2: Circuit diagram

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S1(绿、6MM2)
T1(黄、6MM2)
N1(黑、6MM2)
PE
KA0
Y0A
Y0B
KA1
Y1A
Y1B
KA4
Y4A
Y4B
L
N
QF4
6A
24V
0V
DC24V
DC0V
AC INT
DC OUT
S8JC-Z1D024CD
开关电源
KM1
鼓风机
KM2
水泵
M3
散热风扇
M4
搅拌马达
照明
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处理 公差 ±0.2
视图 A4 比例 1:1
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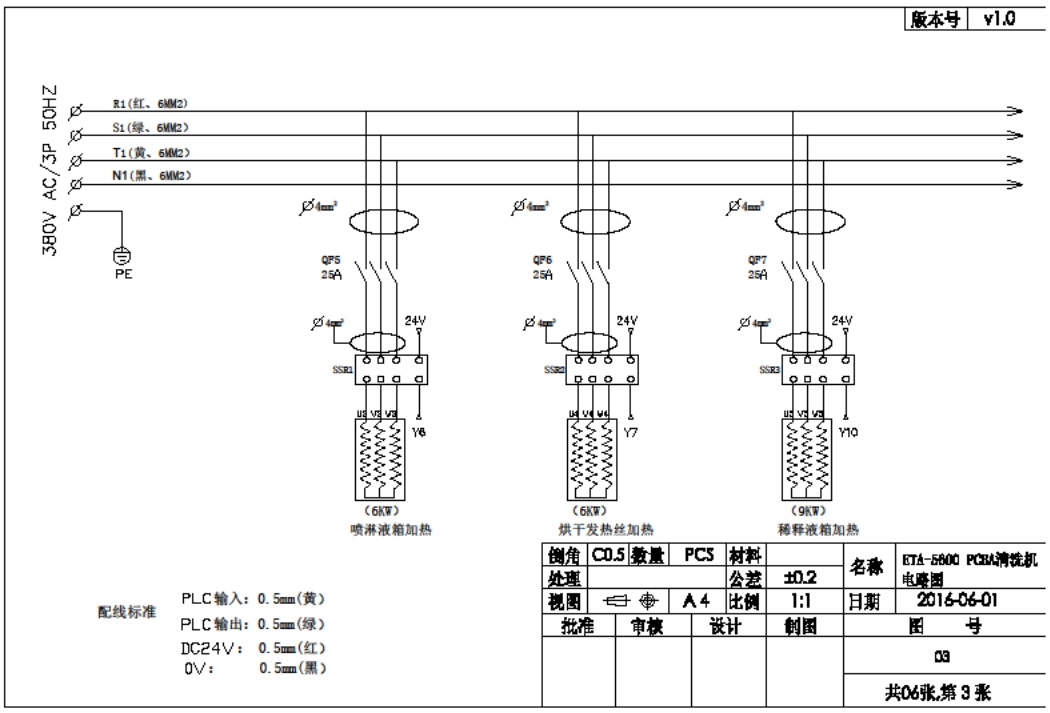
日期 2016-06-01
图号 02
共06张,第 2 张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T1(黄、6MM2)
N1(黑、6MM2)
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25A
QF6
25A
QF7
25A
24V
SSR1
SSR2
SSR3
Y6
Y7
Y10
(6KW)
(6KW)
(9KW)
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烘干发热丝加热
稀释液箱加热
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PLC输出：0.5mm(绿)
DC24V：0.5mm(红)
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处理 公差 ±0.2
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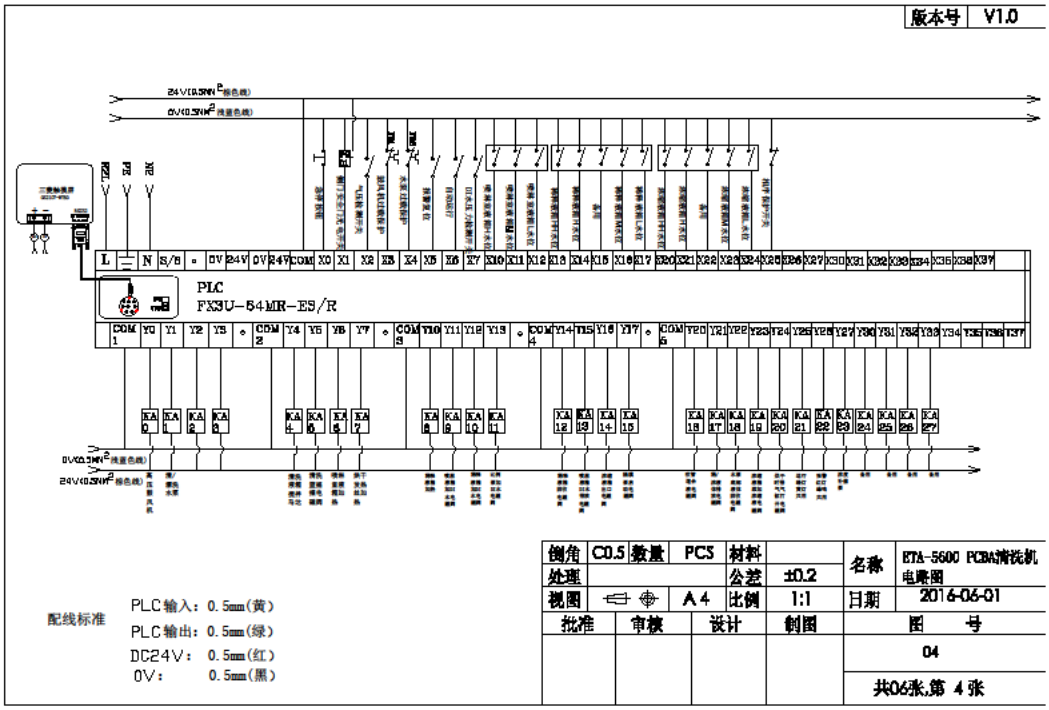
日期 2016-06-01
图号 03
共06张,第 3 张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日期 2016-06-01
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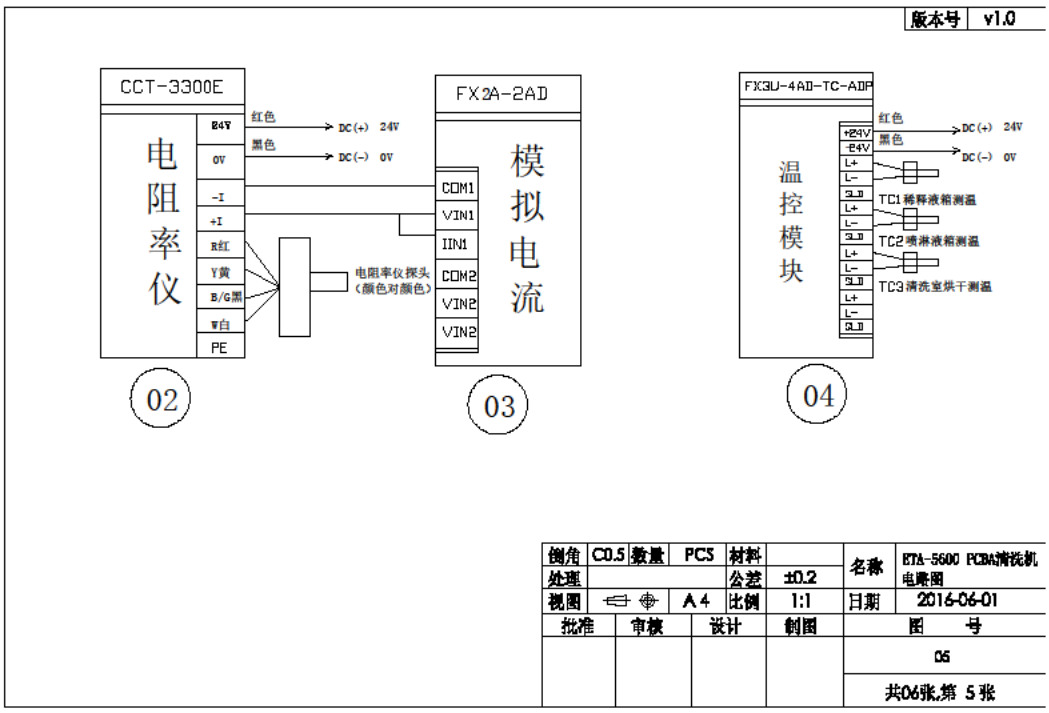
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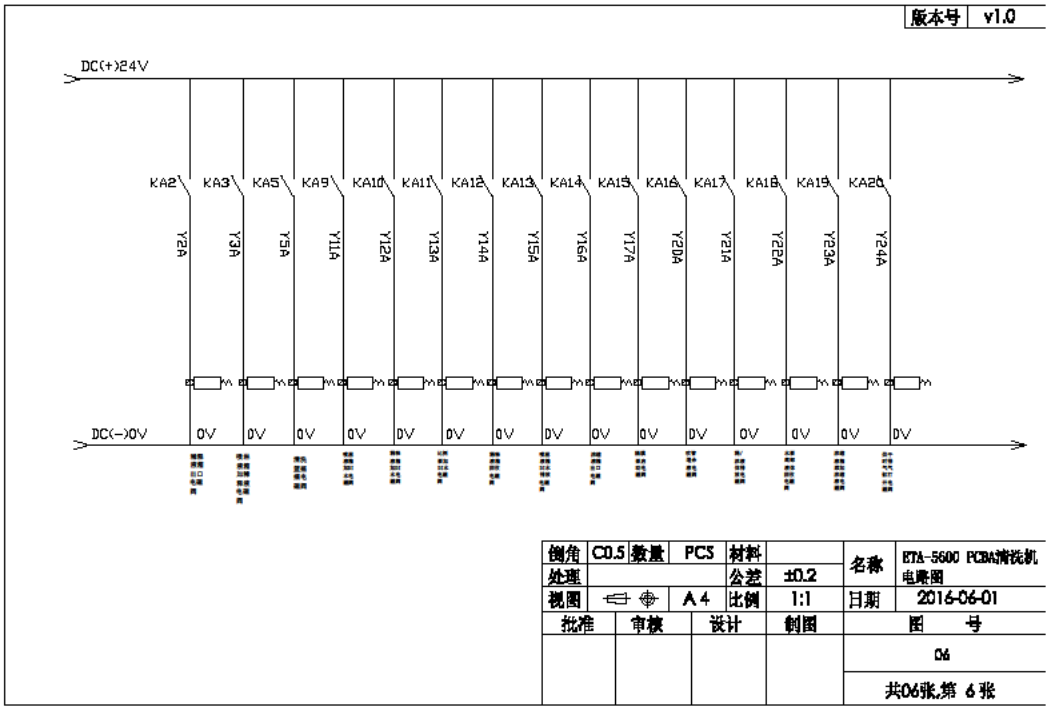
FX2A-2AD
模拟电流
温控模块
TC1 稀释液箱测温
TC2 喷淋液箱测温
TC3 清洗室烘干测温
02
03
04
倒角 C0.5 数量 PCS 材料
处理 公差 ±0.2
视图 A4 比例 1:1
批准 审核 设计 制图
名称 ETA-5600 PCBA清洗机电路图
日期 2016-06-01
图号 05
共06张,第 5 张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DC(+)24V
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处理 公差 ±0.2
视图 A4 比例 1:1
批准 审核 设计 制图
名称 ETA-5600 PCBA清洗机电路图
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图 号
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共06张,第 6 张