

Pallet Cleaning Machine

Operation & Maintenance Manual

Model: SME-5200



V3.1

(Machine configuration and spec may change without prior notice)

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1 Introductions

1.1 MANUAL RANGE

This manual introduce operation, maintenance and spare parts of “SME-5200 Pallet 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: pallet cleaning process, 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. Please pay special attention to chapters like safety, operation, maintenance. Please contact our aftersales service staff or your local SME agent’s technical staff if you do not understand the contents.

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 Chemical liquid

Some chapters may concern chemical liquid. As chemical liquid’s information are not the contents of this manual, please refer to your chemicals suppliers for further information. Such as:

1. MSDS
2. Operation manual
3. Analysis process

1.5 APPENDIX

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

Caution: In order to chase new developing technology and customer requirements, we reserve the right of upgrade and modify this machine without prior notice,such as:Design, SPEC and Parts change...

2 Safety regulations

2.1 GENERAL INFORMATION

- * How to safety operate and maintain “SME-5200 Pallet 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.
- * All the people who will operate and maintain “SME-5200 Pallet Cleaning Machine” must obey the safety regulations of this manual.
- * In addition, Please obey to the local relevant accident protection regulations and safety provisions.

Shenzhen Southern Machinery Sales And Service Co. Ltd. (SM) 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. SME 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 SME design standard. In this machine, blower, blower heater, water-base cleaning liquid heater, temporary tank heater and pumps total power are about 33KW.

The installation, test and adjustment of “SME-5200 Pallet Cleaning Machine” must be conducted by SME professional staff or SME 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 SME, 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, SME 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 sickle cell 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 SME 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 may 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 SME or SME 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 SME engineers or SME agent technical staff	
Adjust and operation	Only SME engineers or SME agent technical staff	
Start、operate、stop	√	√
Trouble shooting、repair and maintenance		√
Dissemble	Only SME engineers or SME 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 SME or SME agent, only SME technicians or SME 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:



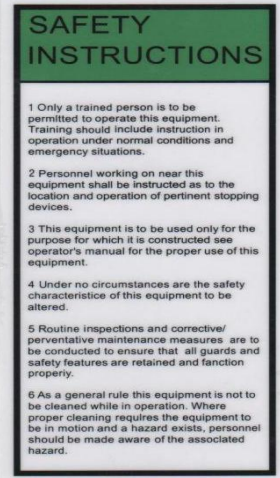
(1) EMG STOP button: Installed on the operation panel, red press button with yellow base. It can cut off all electric control circuit, pumps, motors immediately according to CE regulations.

(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.

 <p>No Flame</p>	<p>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</p>
 <p>Wearing your labor-gloves!</p>	<p>Protection sign: This sign reminds you to put on industrial plastic rubber gloves during operating of the machine, especially when touching liquid or water.</p>
 <p>Wearing your goggle before operation!</p>	<p>Protection sign: This sign reminds you to put on industrial goggles before operating the machine, especially add or discharge liquid and water.</p>
 <p>Please read the manual carefully before power on!</p>	<p>Manual sign: This sign reminds you to read this manual thoroughly before operating on the machine</p>
	<p>Electric shock prevention sign: This sign reminds you be care of electric parts to prevent electric shock when operating on the machine.</p>
	<p>Turn off power supply sign: This sign reminds you to turn off machine power supply before opening the electric box.</p>
	<p>High temperature sign: This sign reminds you not to touch the high temperature parts and area.</p>
	<p>Clipping hands sign: This sign reminds you no to touch mechanical transmission parts to prevent clipping hands when the machine is running.</p>

	<p>Infuse grease sign: This sign reminds you to infuse grease to mechanical transmission part periodically to make it lubricated and smooth.</p>
	<p>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)</p>
	<p>Safety instructions sign : This sign reminds you to operate the machine according to sign content and understand the content.</p>

2.8 SAFETY PROCEDURE

(1) General summary

SME 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.

SME 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 SME 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

SME-5200 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 liquid testing or do liquid 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 goggles, 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 would 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 may break out and will cause injury to people around the machine. Cleaning liquid or rinse water may heat to 50~60°C, 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 aid 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

“SME-5200 Pallet 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 occasionally.

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



3 Machine specifications

3.1 WORKING PRINCIPLE

“SME-5200 Pallet Cleaning Machine” is used to clean flux residuals or solder balls on pallets of wave soldering process. By using the latest and advanced water-base liquid spray cleaning technology, “SME-5200 Pallet Cleaning Machine” can make the pallets 100% clean and dry.

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 dirt pallets into the machine manually, setting cleaning parameters, close and lock the upper door, pressure “Start” button, the pallets 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 pallets cleaning system. It can greatly improve pallet cleaning quality and efficiency.

The whole process:

1. Clean process:

- A. Water-base liquid is used to clean flux on pallets; Liquid are heated to setting temperature →
- B. Clean liquid pump absorb liquid from liquid tank , drive them through filter barrel, pipes, rods and nozzles to form a liquid curtain to clean flux residuals off from pallets→
- C. Cleaning liquid flow back to liquid tank through Triple valve →
- D. Air blow off residual liquid out from the pipes, rods and nozzles and flow back to liquid tank.

2. Rinse process:

- A. Tap water is used to rinse the stencil after liquid clean process. Water are heated to setting temperature →
- B. Rinse water pump absorb water from water tank , drive them through filter barrel, pipes, rods and nozzles to form a water curtain to rinse cleaned pallets→
- C. Rinse water flow back to water tank through Triple valve →
- E. Air blow off water out from the pipes, rods and nozzles and flow back to water tank.

3. Dry process:

Hot air are used to blow the stencil dry after water rinse process. The high pressure generate large volume of blow air and goes through air heater and air knives. Hot air blow to the surface of pallets to drive water off and make it into vapor and dry.

3.2 MACHINE FEATURES

- 1) One key easy operation; Batch clean; water-base liquid clean+water rinse+hot air blow dry.
- 2) In-line, real-time filter design, guarantee better cleaning and rinse result.

- 3) Liquid and water add/drain automatically.
- 4) PLC control, TP operation, friendly interface, programs can be edit and change according to requirements.
- 5) Liquid and water heat and temperature keeping functions, make pallet cleaning easier.
- 6) SUS304 stainless steel construction, anti-corrosion and easy to clean and maintenance.
- 7) The whole process can be observed through visible window.
- 8) High pressure, large volume air blower and high speed air knives, better dry efficient and quality.
- 9) Separate liquid and water pipe systems, greatly reduce the consumption amount of liquid
- 10) Part of machine covers are adhered with sound-proof cotton, great reduce noises of air blower and improve working environment.
- 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 right 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 for upper 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) In-line, real-time filter function, solder paste ball and dusts are filtered and never go back to pallets' surface any more.
- 3) Liquid and water are recirculation used.
- 4) Spray rods screw fixed, easy to be quick assembled, disassembled and cleaned.
- 5) Spray pressures meters, easy to observe spray liquid and water pressure. Electrical pressure detecting sensors auto detecting liquid and water pressure automatically.
- 6) Small stainless filter net on pipes to stop particles goes into nozzles, greatly improve nozzle block probabilities.
- 7) Filter elements and stainless steel filter net combination design for better filtering function.

3.5 MAIN SPECIFICATION

Basket size: 1000mm(ϕ) \times 200mm(H) as max

Pallet size: 450mm(H) as max (some machines may have different cleaning height)

Liquid tank capacity: 80L

Water tank capacity: 80L

Clean method: Liquid high pressure spray clean, stencil moves back and forth.

Dry method: High pressure hot air blow

Clean time: 5-15minutes

Liquid flow back time: 1 minute (adjustable according to liquid flow back condition)

Rinse time: 1-2 minutes

Dry time: 10-20minutes

Filter accuracy: 20 μ m (solder paste ball, particles...)

Liquid heat temperature: room temp \sim 80 $^{\circ}$ C(normally set it to 40 \sim 45 $^{\circ}$ C)

Water heat temperature: room temp \sim 80 $^{\circ}$ C(normally set it to 40 \sim 45 $^{\circ}$ C)

Air heat temperature: room temp \sim 90 $^{\circ}$ C(normally set it to 80 \sim 90 $^{\circ}$ C)

Noise: \leq 70 DB

Air supply: 0.5Mpa \sim 0.7Mpa,400 \sim 600L/Min

Power supply: AC380V 50HZ 63A

Power: total power 33KW

Net weight: about 600Kg

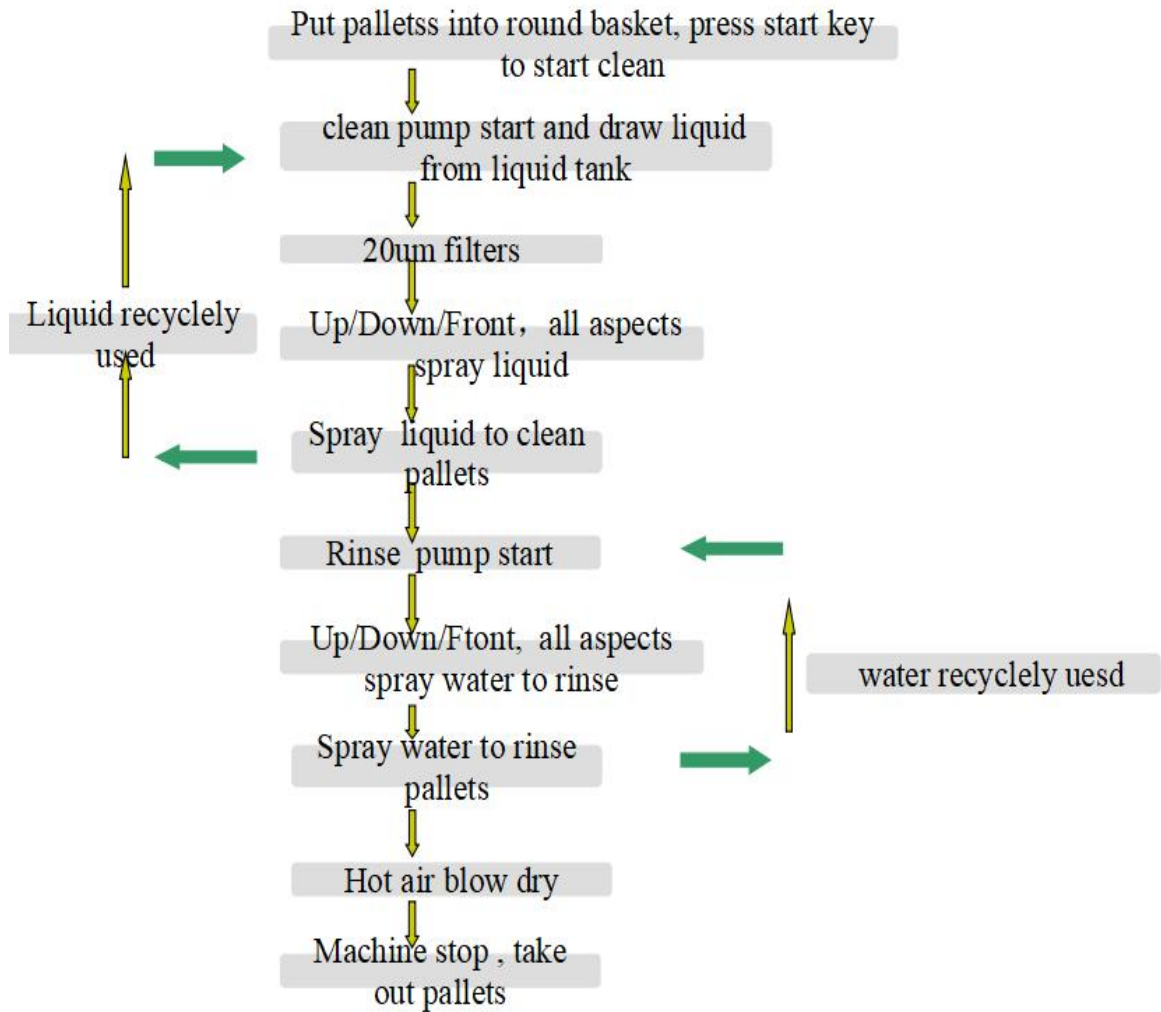
Vent size: Φ 120mm

Machine size: 1400mm(L) \times 2000mm(W) \times 1500mm(H)

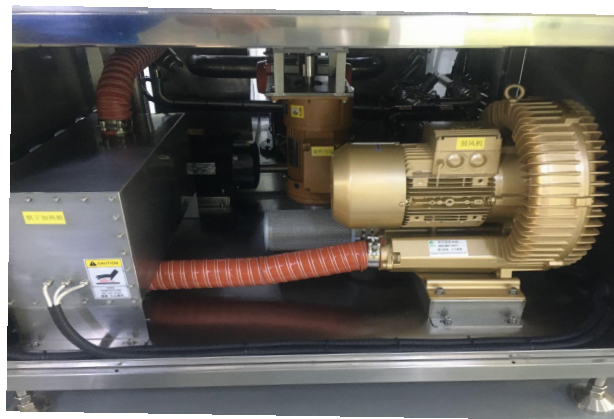
(Different cleaning height machine may have different machine size).

3.6 CLEAN PROCESS&RINSE PROCESS

Pallets cleaning process flow chart:



3.7 MACHINE UNIT INTRODUCTION



- 1)、 Indicator: Indicate machine status.
- 2)、 EMG STOP button: on operational panel, press down to stop the machine if there is any abnormal situation occurs.
- 3)、 Power SW: Turn on/ Turn off the machine.
- 4)、 Start, stop, reset, jog button: start, stop, reset the machine, jog-- trun the round basket step by step.
- 5)、 Touch panel: HMI operation window.
- 6)、 Cleaning pressure meter: indicate cleaning liquid r pressure.
- 7)、 Rinse pressure meter: Indicate rinse water pressure..
- 8)、 Air pressure: Indicate machine air supply pressure.
- 10)、 Round basket, Inner basket: Where pallets put in
- 11)、 Air springs: To hold the upper cover when it open; push right side button first to release it when you want to close the upper cover.
- 12)、 High pressure air blower: Generate high volume air to blow water off.
- 13)、 High pressure electric pumps: Vertical liquid electric pump and horizontal water electric pump.

- 14)、 Air pump: Add in or take back liquid (water) between liquid tank (water tank) and temporary tank.
- 15)、 Liquid/Water heater: Heat to make liquid/water temperature rise to setting degrees.
- 16)、 Air heater: Heat high pressure air from air blow to setting degrees, help to shorten dry time.
- 17)、 Basket motor: Drive round basket to turn at a setting speed.
- 18)、 Filter barrel: To stop labels, solder paste balls and other impurity substance.
- 19)、 Spray rods: upper, lower and front side , which nozzles are installed 3 for liquid and 3 for water.
- 20)、 Vent: Vent for air and vapor, need to connect outside air extract pipes.
- 21)、 Cleaning cabinet(room): Where basket, spray rods, air knives are installed in it.
- 22)、 Liquid/water tank: Storage liquid and tap water.
- 23)、 Caster and foot cup: Carry and move machines.

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, 63A 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) Liquid add pipe: for auto add liquid, please connect one soft hose to liquid add port.

3) Water add pipe: This machine must connect 1 tap water inlet pipe(1" female coupling, water flow rate \geq 30L/Min, water pressure \leq 0.5Mpa, must have water pressure or it can not add water automatically. (Figure 4-1 water inlet pipe) .

4) Liquid and water drain pipe: This machine must connect 1" external discharge pipe, bear pressure \leq 0.4Mpa. (Figure 4-1 discharge pipe)

5) Air vent : There is a \varnothing 120mm 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: 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°C、 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: 1400mm(L)x2000mm(W)x1400mm(H)

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

Please leave about 1.5m space distance for the front side; 1m space distance for detergent or solvent add in and discharge operation side.

8) Liquid and water requirement:

* DO Please use **WATER BASE** flux cleaning Liquid, **NO FOAM** type.

* If there is foam arising in liquid and water tank, please add 20ml defoamer each time. Normally, It will last for one day. **Never** let foam over flow from the tanks or it will damage the heaters.

* Please use tap water.

* **Pallets height** must less than the max cleaning height or it will damage the machine. (please check the machine specifications for max height.)

* Power supply and air supply must be same as the machine spec.

Compressed air (ø12 soft air hose port)

Clean tank、rinse water drain(outlet) port (1" female)

water add(inlet) port (1" female)

Liquid add(inlet) port (1" female)

Power cable port (3 phase, AC380V 50HZ)



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 add 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 more than 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 discharge should obey local laws and protect environment.
- 5) Connect the right 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.(5~10 degrees, same angle)
 - C. Check no impurity substance in liquid tank, water tank and cleaning room.
 - D. Check all electric parts and pneumatic parts are fixed well
 - E. Check all pipes connected firmly, not 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. Customers must connect electric control cabinet and this machine by themselves. The connecting cables must be 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 Pre-start

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 add and drain water pipes are installed correct or not? How about the seal effect?
- 3) Add 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 barrel need clean?

- 6) All the covers, lids and glasses are put on well?
- 7) No other things are on mechanism transmission device?
- 8) Does ventilation device working well?

4.4.2 Machine start

Start the machine after finishing the pre-start inspections;

Notice:

1. Please use clean tap water as clean liquid and start machine to clean the liquid pipes for 1~2 hours before conducting formal Pallet cleaning process.
2. Drain out all the cleaning tap water in the machine.
3. Add cleaning liquid and tap water to liquid tank and water 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(power switch) 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 water base cleaning liquid to liquid tank and tap water tank to normal working level and check liquid type is correct or not.
 - 6) Setting liquid/water heat temperature, input temp values in the cleaning procedure.
 - 7) Liquid or water will heat 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 Inspections after machine start.

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

- 1) Operation software is OK or not.
- 2) Cleaning basket turning is OK or not.

- 3) Cleaning pump and rinse pump are running OK or not.
- 4) Air pump is running OK or not.
- 5) Pressures on all meters are in normal range or not.
- 6) Liquid isolation is Ok or not.
- 7) Cleaning liquid and rinse water 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 pallets are moved out from the machine cleaning basket.
- 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 on walls after machine is 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 tap water and use moist cleanroom wiper to clean machine and then use dry wiper to clean again;
- 2) Add tap water to liquid tank high level and start machine to clean for 10 minutes and then drain the used water.
- 3) Repeat step 2 for 3~5times and drain the used water;

After finishing these steps, add cleaning liquid and water to each 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 cleaning room 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

Special Attention: This pallet cleaning machine is electric machine, we use electric pumps and heaters, so we must use water base cleaning liquid to wash and tap water to rinse. Never use solvent, otherwise it will cause fire or explosion.

Cautions before operation:

For the sake of operators and engineers during machine operation and maintenance, please read and understand the following rules:

- 1.1 Never adopt any operation method beyond these manual. Please contact our after-sales service engineers or our local agent's technical staff.
- 1.2 Operators must know and understand all machine parts working function and their working principles and all the button and keys on panel and Touch panel.
- 1.3 Never put any scared spare parts on machine. Anyone who have loose dress or hair untied, can not operate this machine.
- 1.4 Never smoke or use lighter around the machine.
- 1.5 Operators who are not trained , can not use this machine.
- 1.6 Pls close upper cover and put on googles, gloves, masks to protect eyes and skin when operation on this machine.

Confirm works before starting the machine:

- 1.1 Confirm Power spec is the same as the machine spec
- 1.2 Confirm compressed air spec is the same as the machine spec.
- 1.3 Confirm air vent hose are connected.
- 1.4 Confirm liquid and water add hose, liquid and water drain hose are connected well, add enough liquid to liquid tank manually, confirm LS (liquid switch) positon is Ok.
- 1.5 Confirm filter elements are put in filter barrels, tighten filter up covers and liquid release valve is closed.
- 1.6 Confirm all pipes are in good conditions
- 1.7 Put pallets into cleaning basket, never put pallets out of basket.

Operation process:

- A、 Turn on the machine, Please check all machine parts are in good condition.
- B、 Open the upper cover, put dirty pallets into the cleaning racks of baskets. If the upper cover are not closed, the sensor will detects it, machine can not start to clean.
- C、 Setting cleaning parameters:
Select Procedure No and setting clean time, air blow time, rinse time, air blow time, dry time, clean temperature, rinse temperature and dry temperature on touch panel.
- D、 Release EMERGENCY STOP if needed.
- E、 Pusn START button, machine starts to work. It will conduct all steps according to Procedure No you selected. Liquid clean—air blow—water rinse—air blow—hot air blow dry. Machine stops.
- F、 Open the upper cover, take out clean and dry pallets.

1. Please check liquid level or water level are ok or not. If not enough, please add.

2. Please check nozzles if they are blocked or not.

3. Please replace liquid or water is cleaning effect is decreased.

4. Please put 20~30ml deformers into liquid tank or water tank if foams are rise up.

5.1 MACHINE START OPERATION

This machine adopt PLC+ Touch Panel software control system.

A) Turn on Power SW, the Start Menu initializing will appears.

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

Enter **Start menu**



C) To enter operation menu, please click **Enter Main Menu** to jump to **Main menu(Auto menu)**.; You can choose CN to use Chinese interface or choose EN to use English interface.

Main menu screen (Auto Menu screen)

Manual Menu		I/O Menu		Auto Menu		Alarm Menu		Setting Menu		Procedure Setting	
	Clean time (sec)	Air blow after Clean	Rinse time (sec)	Air blow after Rinse	Dry time (sec)	liquid °C temperature	Rinse °C temperature	Dry °C temperature	Turn speed (r/min)		
SV	300	120	120	120	900	45.0	25.0	80.0	15		
PV	0	0	0	0	0	0.0	0.0	0.0	0		

Procedure NO: 01 Main Menu

Rinse water low, please add liquid

Auto Run Condition: Up cover Heat status Total time: Clean tank level Rinse tank level

OFF

OPEN

Heating

Heating OK

0

0.00

0.00

Start

Pause

Stop

Main menu summary: This menu shows all the operation functions of the machine:

Auto Menu, manual Menu, Parameter Setting menu, Procedure Setting Menu, I/O Menu and Alarm Menu.

Manual Menu		I/O Menu		Auto Menu		Alarm Menu		Setting Menu		Procedure Setting	
	Clean time (sec)	Air blow after Clean	Rinse time (sec)	Air blow after Rinse	Dry time (sec)	liquid °C temperature	Rinse °C temperature	Dry °C temperature	Turn speed (r/min)		
SV	300	120	120	120	900	45.0	25.0	80.0	15		
PV	0	0	0	0	0	0.0	0.0	0.0	0		

Procedure NO: 01 Main Menu

Rinse water low, please add liquid

Auto Run Condition: Up cover Heat status Total time: Clean tank level Rinse tank level

OFF

OPEN

Heating

Heating OK

0

0.00

0.00

Start

Pause


Stop

Auto Menu are consists of cleaning procedure No, Setting values, Present values, Current status, System status, Total working time, machine alarm message bar, Start, Pause, Stop, Tank levels, Door status.

- Procedure No: Please select one column of parameters for the machine.
- Start: Click to run the machine automatically according to the Procedure No contents.
- Stop: Control the machine to stop cleaning process.
- Pause: Control to stop the machine temporarily and press Start to continue the previous process.
- Clean time: Liquid cleaning time
- Rinse time: Tap water rinse time
- Dry time: Hot air blow time
- Clean temperature (°C): Liquid temperature in tank
- Rise temperature(°C): Tap water temperature in tank
- Dry temperature(°C): Hot blow air temperature in cleaning cabinet
- Turn speed: Basket turning speed.
- clean liquid tank level: Clean liquid level in tank
- Rinse water tank level: Rinse water level in tank
- Auto run condition: Machine is auto working or not.
- Up cover: Up cover is open or closed.
- Heat Status: Heaters are working or stop.

5.2 PROCEDURE EDIT (PROGRAM EDIT)

Click **Procedure Setting Menu** on **Main Menu**, jumps to



Manual Menu I/O Menu **Auto Menu** Procedure Setting

147369

	Clean time (sec)	Air blow after Clean	Rinse time (sec)	Air blow after Rinse	Dry (sec)	liquid °C temperature	Rinse °C temperature	Dry °C temperature	Turn speed (r/min)
SV	0	0	0	0	0	45.0	25.0	80.0	15
PV	0	0	0	0	0	0.0	0.0	0.0	0

Procedure NO: 00

Auto Run Condition: OFF, OPEN, Heating OK, Heating OK

Total time: 0

Clean tank level: 0.00, Rinse tank level: 0.00

Start Pause Stop

, Enter password: 147369 jumps to **Procedure Setting Menu**. There are 10 different procedures you can choose.

	Clean time (sec)	Air blow after Clean	Rinse time (sec)	Air blow after Rinse	Dry time (sec)	liquid °C temperature	Rinse °C temperature	Dry °C temperature	Turn speed (r/min)
1	300	120	120	120	900	45.0	25.0	80.0	15
2	600	120	120	120	900	45.0	25.0	80.0	15
3	0	0	0	0	0	0.0	0.0	0.0	0
4	0	0	0	0	0	0.0	0.0	0.0	0
5	0	0	0	0	0	0.0	0.0	0.0	0
6	0	0	0	0	0	0.0	0.0	0.0	0
7	0	0	0	0	0	0.0	0.0	0.0	0
8	0	0	0	0	0	0.0	0.0	0.0	0
9	0	0	0	0	0	0.0	0.0	0.0	0
10	0	0	0	0	0	0.0	0.0	0.0	0

liquid °C temperature
45.0

If you want to change liquid temperature to 40°C, Click **Main Menu**, then input 40. Click **Main Menu**, jump

back to **Main Menu** screen after finish setting, press **Start** to start edit cleaning process.

Auto operation summary:

Procedure setting value ranges are listed below:

Clean time: 1~3600sec (adjust according the real situation normally set it to 300~600sec)

Clean temperature: 0°C~80°C (adjust according the real situation, normally set it to 40~50°C)

Air blow after clean: blow residual liquid out from the cleaning pipes, rods and nozzles and blow residual liquid from the pallets surface.

Rinse time: 1~3600sec (adjust according the real situation, normally set it to 120~180sec)

Rinse temperature: 0°C~80°C (adjust according the real situation, normally set it to 30°C)

Air blow after rinse: blow residual water out from the rinse pipes, rods and nozzles and blow residual water from the pallets surface.

Dry time: 1~3600sec (adjust according the real situation, normally set it to 600~900sec)

Dry temperature: 0°C~99°C (adjust according the real situation, normally set it to 80~90°C)

Turn speed: Change according to pallet cleaning result and quality, normally set it to 15~20r/min.

5.3 OPERATION METHOD

There are two operation mode, auto mode and manual mode:

5.3.1 Auto mode

Enter **Main Menu** screen. Click **Auto Menu**, jumps to Auto Menu, click Start to enter clean mode:



Manual Menu I/O Menu **Auto Menu** Alarm Menu Setting Menu Procedure Setting

	Clean time (sec)	Air blow after Clean	Rinse time (sec)	Air blow after Rinse	Dry time (sec)	liquid °C temperature	Rinse °C temperature	Dry °C temperature	Turn speed (r/min)
SV	300	120	120	120	900	45.0	25.0	80.0	15
PV	0	0	0	0	0	0.0	0.0	0.0	0

Procedure NO: 01

Rinse water low, please add liquid

Auto Run Condition: OFF (selected), OPEN, Heating, Heating OK

Total time: 0

Clean tank level: 0.00, Rinse tank level: 0.00

Start Pause Stop

In auto mode, set machine auto run parameters.

5.3.2 Manual mode

Click **Manual Menu** on **Main Menu** screen, jumps to **Manual Menu** screen.



Auto Menu I/O Menu **Manual Menu** Alarm Menu Setting Menu 19/11/01

	Clean time (sec)	Air blow after Clean	Rinse time (sec)	Air blow after Rinse	Dry time (sec)	liquid °C temperature	Rinse °C temperature	Dry °C temperature	Turn speed (r/min)
SV	300	120	120	120	900	45.0	25.0	80.0	15
PV	0	0	0	0	0	0.0	0.0	0.0	0

Clean pump: Start Stop

Rinse pump: Start Stop

Clean Liquid In: Start Stop

Rinse Water In: Start Stop

Clean Liquid Out: Start Stop

Rinse Water Out: Start Stop

Air blower: Start Stop

Turn Basket: Start Stop

Air blow after Clean: Start Stop

Air blow after Rinse: Start Stop

Air Heater: OFF

Liquid Heater: OFF

Water Heater: OFF

Clean tank level: 0.00, Rinse tank level: 0.00

Manual operation summary:

Manual operations are listed below:

Clean pump: Click to start or stop clean pump.

Rinse pump: Click to start or stop rinse pump.

Clean liquid in: Click to start or stop add liquid to liquid tank automatically.

Clean liquid out: Click to start or stop drain liquid from liquid tank automatically.

Rinse water in: Click to start or stop add tap water to water tank automatically.

Rinse water out: Click to start or stop drain water from water tank automatically.

Air blower: Click to start or stop air blower.

Rotate basket: Click to start or stop basket turn.

Air blow after clean: Click to start or stop compressed-air blow.

Air blow after rinse: Click to start or stop compressed-air blow.

Air heater: Click to start or stop air heat (together with air blower at the same time)

Liquid heater: Click to start or stop liquid heat.

Water heater: Click to start or stop water heat.

5.3.3 I/O Menu

Click **I/O Menu** on **Main Menu**, jumps to **I/O Menu** screen:

Auto Menu		I/O Menu	
X0	Step	X12	Up cover
X1	EMG stop	X13	Blower overload alarm
X2	Power Phase sequence alarm	X14	Main air pressure alarm
X3	Clean pump alarm	X15	Rinse tank water level HH
X4	Rinse pump alarm	X16	Rinse tank water level H
X5	Rotary motor alarm	X17	Rinse tank water level M
X6	Clean tank liquid level HH	X20	Rinse tank water level L
X7	Clean tank level H	Y0	Air blower
X10	Clean tank level M	Y1	Liquid add in
X11	Clean tank level L	Y2	N/A
		Y3	Basket Motor braker
		Y4	Water add in
		Y5	Air pump
		Y6	Clean pump
		Y7	Rinse pump
		Y10	Liquid heater
		Y11	Air blow valve
		Y12	Triple Valve
		Y14	Liquid drain Valve
		Y15	Water drian valve
		Y16	Clean valve
		Y17	Rinse valve
		Y20	Alarm Buzzer
		Y21	Liquid Out Shared Valve

I/O menu summary:

I/O status are listed below:

Clean tank liquid level HH: Liquid in tank upper limit. Over this limit level, machine alarms and stops automatically to prevent liquid overflow the tank.

Clean tank liquid level H: Liquid auto add to H level and then air pump stops autoamtically.

Clean tank liquid level M: Liquid in tank low, reminds you to add liquid.

Clean tank liquid level L: Liquid in tank lower limit. Lower than this limit level, machine alarms and stops automatically to protect heater and pump.

Rinse tank liquid level HH: Water in tank upper limit. Over this limit level, machine alarms and stops automatically to prevent water overflow the tank.

Rinse tank liquid level H: Water auto add to H level and then air pump stops automatically.

Rinse tank liquid level M: Water in tank low, reminds you to add water.

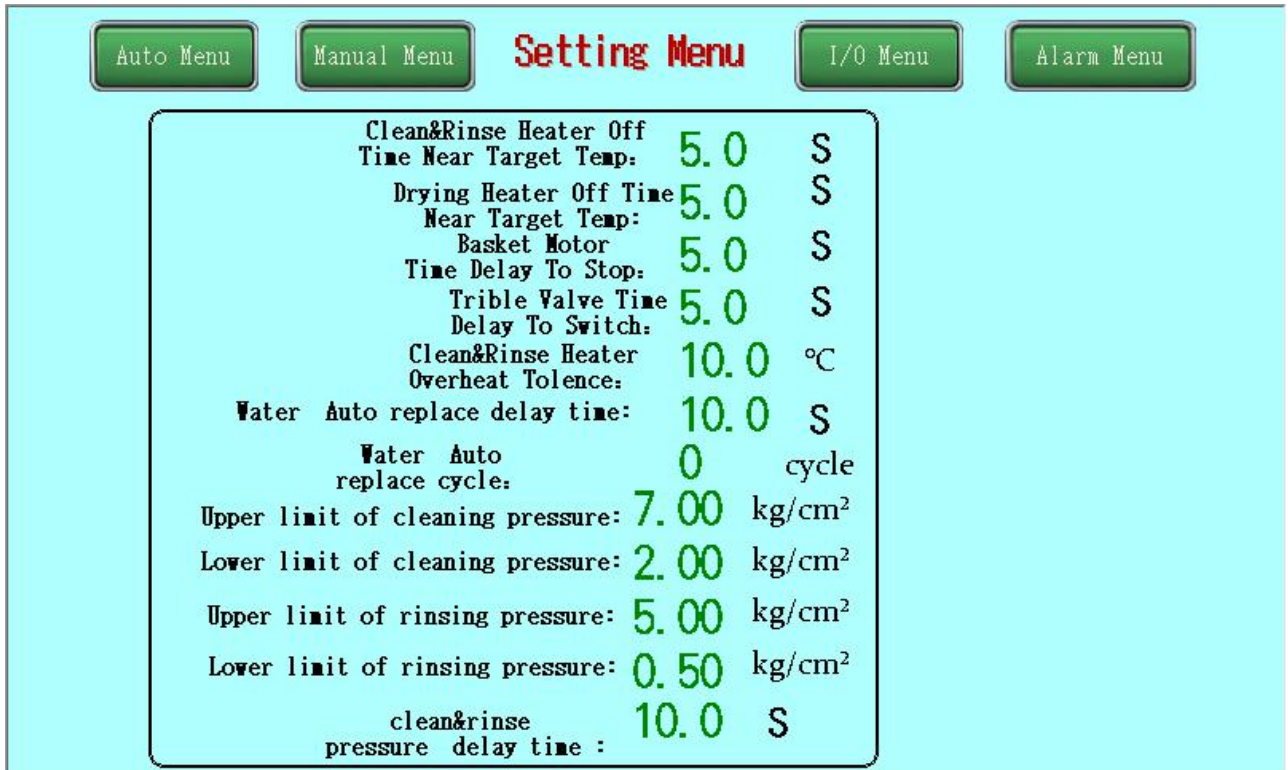
Rinse tank liquid level L: Water in tank lower limit. Lower than this limit level, machine alarms and stops automatically to protect heater and pump.

Triple valve: Triple valve change to liquid tank or water tank.

Liquid out shared valve: Wasted liquid or water drain out through this valve.

Click **Auto Menu** on left up corner, jumps to **Auto Menu**.

5.3.4 Setting Menu



Setting Menu summary:

Setting Menu explanation are listed below:

Clean & Rinse Heater Off Time Near Target Temp: 5.0s--- When clean liquid or rinse water heat and approaching the setting temperature, the heater will heat every 5.0s to let temperature detector detect the temperature in time.

Drying Heater Off Time Near Target Temp: 5.0s--- When blower air heat and approaching the setting temperature, the heater will heat every 5.0s to let temperature detector detect the temperature in time.

Basket Motor Time Delay to Stop: 5.0s--- When basket motor receive signal to stop at the time of turning, it will last 5.0s to stop.

Triple Valve Time Delay to Switch: 5.0s---When triple valve receive signal to switch, it will delay 5.0s to switch.

Clean & Rinse Heater Overheat Tolerance: 10.0°C--When heater overheat than setting temperature, the tolerance is +10°C. Over this tolerance, the machine will alarm.

Water auto replace delay time: 10.0s---When air motor receiving a signal to stop add water, it will delay 10.s to stop.

Water auto replace cycles: 0 cycles---Setting the cycles to replace rinse water automatically (for example: 30, after cleaning 30 batches of pallets, the machine replace the rinse water automatically, be careful the water supply and drain pipes must be connected when using this function.)

Upper limit of cleaning pressure: 7.0kg/cm²—when liquid pressure is over than 7.0kg/cm², the machine will stop and alarms to protect the machine.

Lower limit of cleaning pressure: 2.0kg/cm²—when liquid pressure is lower than 2.0kg/cm², the machine will stop and alarms to protect cleaning performance.

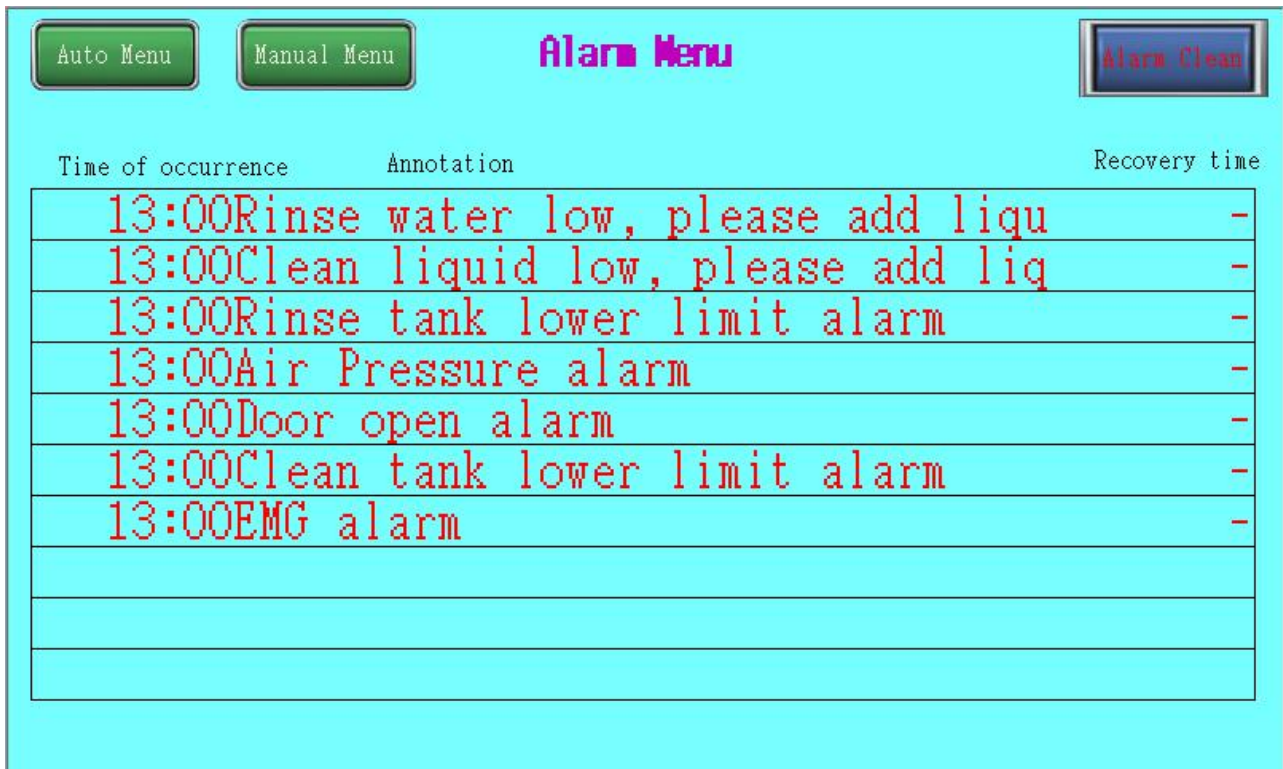
Upper limit of rinsing pressure: 5.0kg/cm²—when water pressure is over than 5.0kg/cm², the machine will stop and alarms to protect the machine.

Lower limit of rinsing pressure: 0.5kg/cm²—when liquid pressure is lower than 0.5kg/cm², the machine will stop and alarms to protect cleaning performance.

Clean& Rinse pressure delay time: 10.0s—the internal time the pressure detector detect the pressures on clean and rinse pipe.

5.3.5 Alarm Menu

Click **Alarm Menu** on **Main Menu**, jumps to **Alarm Menu**:



Alarm Menu 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 to reset the machine and then start the machine according to normal procedures.

5.5 TURN ON MACHINE

1. Please turn on **Main Breaker** in the electrical control cabinet at the first time start the machine (please see it in 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 tap water.
6. Confirm liquid and water has arrived standard level (H level) .
7. Put the pallets into the rack of the basket, confirm pallets height lower than the height spec.
8. Confirm again pallets will not over than the upper air knife and nozzles lower side.
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 finding and solving the problem.

Notice: For the sake of operators' safety, please do not have ties, loose clothes or untied long hair.

5.6 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, please push **Stop** button on operation menu and let the machine stop.
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 drain them until the hot liquid or water cool down to avoid danger.

6 Maintenance

6.1 MAINTENANCE SHEET

Machine Unit	Maintenance items	Maintenance steps
Machine covers	Machine covers clean	Use cleanroom wipers and WD-40 to clean machine covers.
Cleaning room	1.Basket and rack clean; 2.Cleaning room dust clean 3.Check and clean nozzles if needed	Use wipers and cloth
Clean unit	Liquid and water tank clean	Start air pump.
		Drain the used liquid in tank.
		Use brush to clean if it is too dirty. Please be careful of inner heater and liquid switch and temp detector
		Take out the steel filter net and steel filter box blow it with an air gun and make it clean.
	Clean the steel filter net on pipe	Check and clean it
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.	
Rinse unit	Water tank clean	Start air pump.
		Drain the used water in tank.
		Use brush to clean if it is too dirty. Please be careful of inner heater and liquid switch and temp detector
		Take out the steel filter net and steel filter box blow it with an air gun and make it clean.
	Clean the steel filter net on pipe	Check and clean it
	No rinse filter barrel	No rinse filter need to be replaced
Dry unit	Air blower filter	Please turn off the air filter on air blower and take it out by hand.
		Blow it clean by using an air gun to make it clean.
		install the filter by hand.
	Air knives	Blow the air knives with compressed-air gun to make it clean.
	Air hose	Check air hose leak or not

6.2 CAUTIONS ON MAINTENANCE PROCESS

6.2.1 Basket turn system

- 1) Open the left up cover, push the “STEP” button to check the basket rotate free or not.
- 2) Check the 4 basket support blocks and bearings’ positions, no scratch noises give out when the basket turns, adjust their heights if needed.

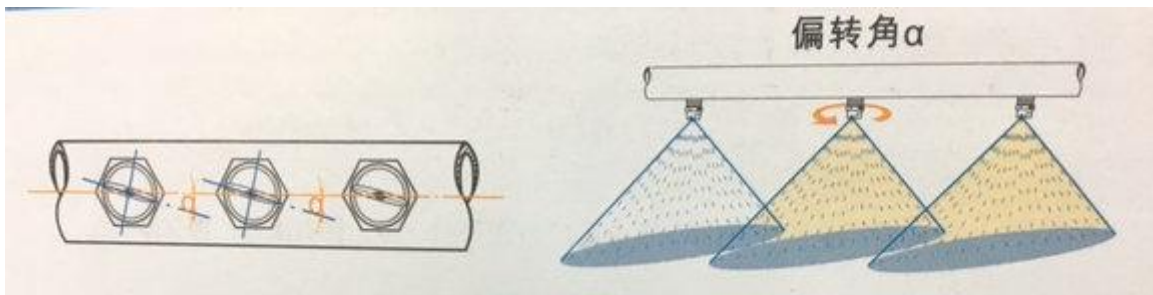
6.2.2 Clean and rinse system

- 1) Start cleaning pump and inspect if there is any loss on liquid pressure, if have, it indicate that the nozzles , fitter nets on pipes, filter nets in tanks, filter boxes in tanks, filter elements are blocked.

Assemble and disassemble of nozzles:

- a、 Disassemble of nozzles: Open the right side window, turn nozzles off by wrench counterclockwise.
- b、 Assemble of nozzles: Blow them with 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 (use PTFE tape if necessary), so the spray curtain not interfere each other. For example:

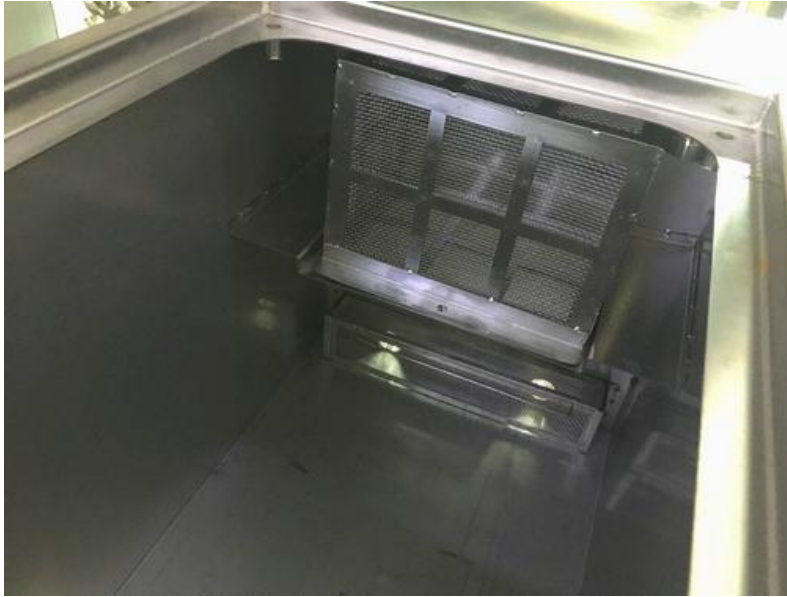


- 2) Check and clean filter nets on cleaning and rinse pipes:



Open it with a wrench and clean the filter net.

3) Clean filter net and filter boxes in cleaning and rinse tank



6.2.3 Dry system

- 1) Check every week, if you find the blow air from the air knives getting weak, please check whether the air filter of air blower is blocked or not.
- 2) The air filter are made by SUS304 net, so it may have dusts adhered on it, turn it off and clean it with a compressed-air gun.
- 3) The air knives are set well and adjusted to best angles, please do not adjust them casually.

6.3 MAINTENANCE SCHEDULE

Machine unit	Maintenance item	Maintenance interval	Remarks
Machine covers	Machine covers clean	Every week	
Nozzles	Check blocked or not, clean them	Every week	
Air regulator	Check if air regulator cup full of water, if have, please drain it	Every week	
LS(liquid switch)	Check status	Every week	
Clean tank	Steel filter net and filter box clean (in liquid tank) Filter net clean(on pipe)	Every month	
	Filter barrel elements replacement	Every month	15~30days
Rinse tank	Steel filter net and filter box (in liquid tank)	Every month	

	Filter net clean(on pipe)		
Dry system	Air filter clean	Every month	
	Air knives clean	Every 3 months	
Basket and rack	Dust clean	Every month	
Motor ,pumps	Check status	Every month	
Heater, temp detectors	Clean the surface of them with soft cloth carefully	Every month	
Safety cover sensor	Check status	Every week	
Safety cover seal strip	Check status	Every 3 weeks	

7 Trouble shooting

7.1 BASKET TURN SYSTEM

Abnormal situations	Possible reasons	Trouble shooting
1、 basket doesn't turn	A、 Basket is blocked. B、 Shaft is blocked. C、 Motor broken	A、 Check the support blocks and bearings' positions, adjust them to proper positions so they can not affect the basket turning. B、 Check if bearing is broken, if broken, replace it. C、 Replace with new motor.
2、 There is abnormal sounds during basket turning	A、 4 support blocks and bearing positions are too high. B、 shaft bearing is broken	A、 Lower support positions B、 Replace shaft bearing

7.2 CLEAN& RINSE SYSTEM

Abnormal situations	Possible reasons	Trouble shooting
1.Spray liquid pressure is not stable	A、 Filter net on pipe is blocked and the filter net, filter box in tank are covered with substance.	Clean filter nets on pipe and filter net , filter box in tank.
	B、 Nozzles are blocked.	Disassemble nozzles and clean them.
	C、 Liquid is not enough.	Add liquid to normal working level.
	D、 Filter elements are blocked.	Replace used filter elements in barrel with new elements.
	E、 Pressure meter is broken	Replace meter
	F、 Too much foams in liquid tank	Pls add defoamer liquid to reduce foams
2.Cleaning result is no good	A、 Cleaning liquid is no good	Liquid can not clean flux any more
	B、 Liquid tank is too dirty	Clean liquid tank
	C、 Tap water quality is not pure enough	Check and replace tap water
	D、 Liquid heat switch is not on	Turn on liquid heat switch

	E、 Nozzles and filters , filter elements blocked	Clean nozzles, filter nets and replace filter elements
	F、 Basket turning speed is too high	Adjust turning speed to 15~20r/min
	G、 Too much foams in liquid tank	Pls add defoamer liquid to reduce foams
3.Water tank lack of water	A、 inlet water port is not open	Turn on water inlet port
	B、 solenoid valves trouble, can't supply water	Supply water manually, then replace solenoid valves
4.Pump stop working	A、 Pump accepted overload current	Replacing Pump
	B、 Overload protective breaker tripped or pump broken.	Press rest key to make it recovery
	C、 Pump switch is not on in electric control box.	Start pump switch in electric control box
5.Liquid temperature is not correct	A、 Setting liquid temperature is exceed the range	Change to correct the value at range
	B、 Heater or temp detector is broken	Replace heater or temp detector
	D、 Liquid quantity is not enough	Add liquid to normal working 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	Clean air filter on air blower
	B、 Air hose is broken	Replace new hose
2.Blow dry result is not good	A、 Air knives setting angle is not good	Air knives angle are set and adjust well, do not change them casually
	B 、 Air heat temperature is not correct	Adjust air heat temperature
	C、 Air blower is not started	Check and start the air blower
3.Air blower stops working	A 、 Air pump accepted overload current	Replace air blower
	B 、 Overload protective breaker tripped	Press reset to recovery
	C 、 Air blower switch in electric box is not on	Turn on the air blower switch

7.4 ELECTRIC CONTROL SYSTEM

Abnormal situation	Possible reasons	Trouble shooting
1.Liquid or water over temperature	A、 Solenoid valve broken	Replace solenoid valve
	B、 Liquid level low	Add liquid to working level
2. Unable to heat	A、 Inspect leakage breaker is tripped or not	Recovery leakage breaker
	B、 Unable to start leakage breaker	Check if there is any current leakage
3.Unable to supply liquid or water	A、 Solenoid valve trouble	Add liquid manually, then replace solenoid valve
	B 、 Liquid or water level switch(LS) is broken	Replace level switch

8 Spare parts replacement and repair

8.1 FILTER 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.

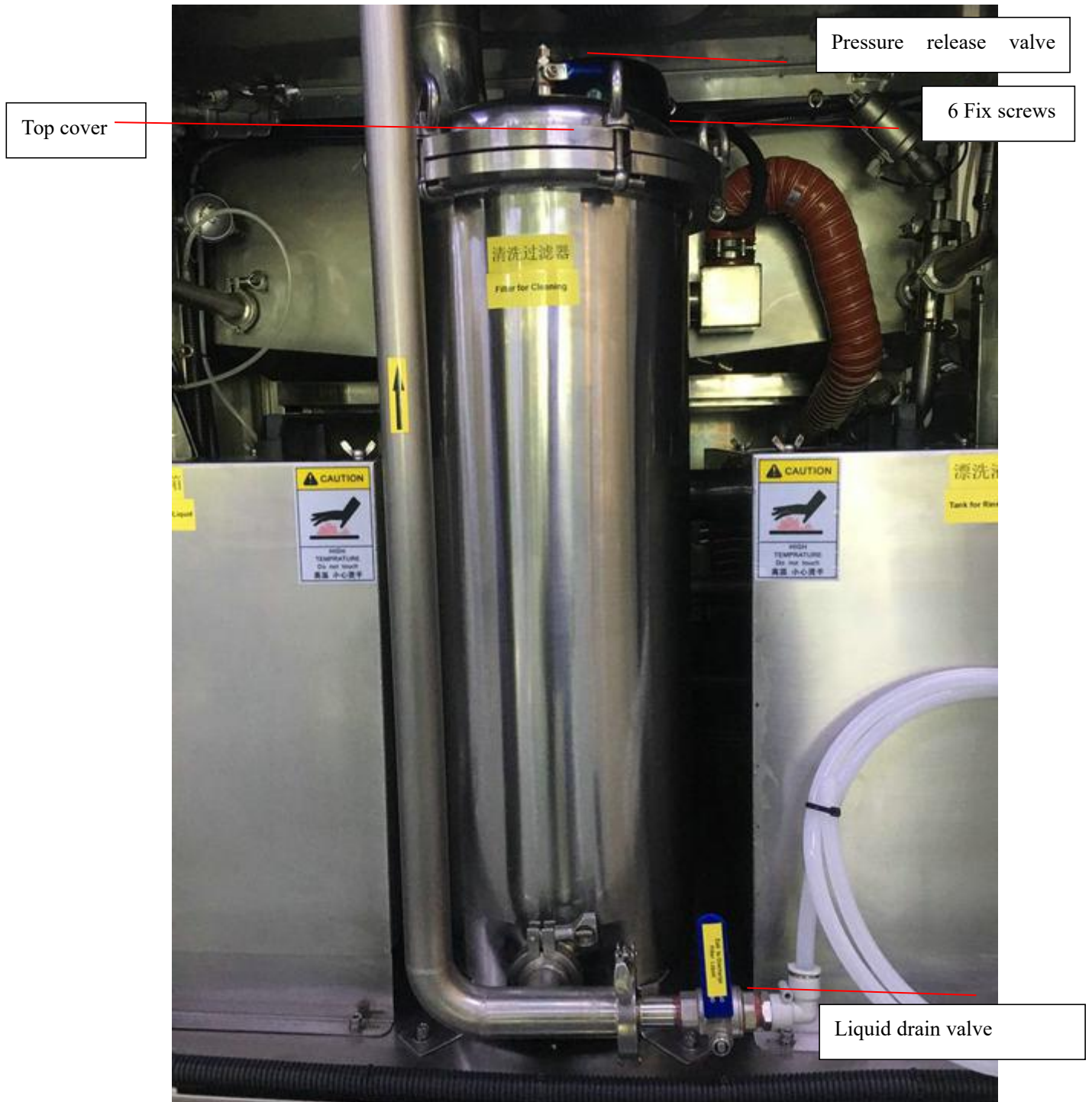


Figure 8-1 filter barrel

- 1) Hold the white hose and insert it into liquid tank, open the liquid drain valve to release liquid pressure in

filter barrel for about 15 seconds, some liquid will flow into liquid tank through the white hose.

- 2) Open the upper pressure release valve;
- 3) Loose the 6 fixing screws of filter barrel;
- 4) Turn off the fixing screw counterclockwise and take off the fixing plate;
- 5) Take off 5 plastic top covers and 5 old filter elements.
- 6) Clean the barrel. Take out solder balls or other particles if there is any in the bottom of barrel.
- 7) Replace the old filter elements with new elements.
- 8) Put back top cover and fixed the 6 screws, close the pressure release valve.
- 9) Turn off the liquid drain valve and collect the white liquid hose.
- 10) Check whether this is any liquid leakage from the barrel after adding liquid to it.

Notice: Filter maintenance must include: Barrel inner wall clean; barrel bottom clean; take out solder balls; check the barrel O-shape seal ring; no liquid leakage phenomenon. Clean filter net on pipe and filter net and filter box in tank after replacing the elements.

8.2 HEATER REPLACEMENT

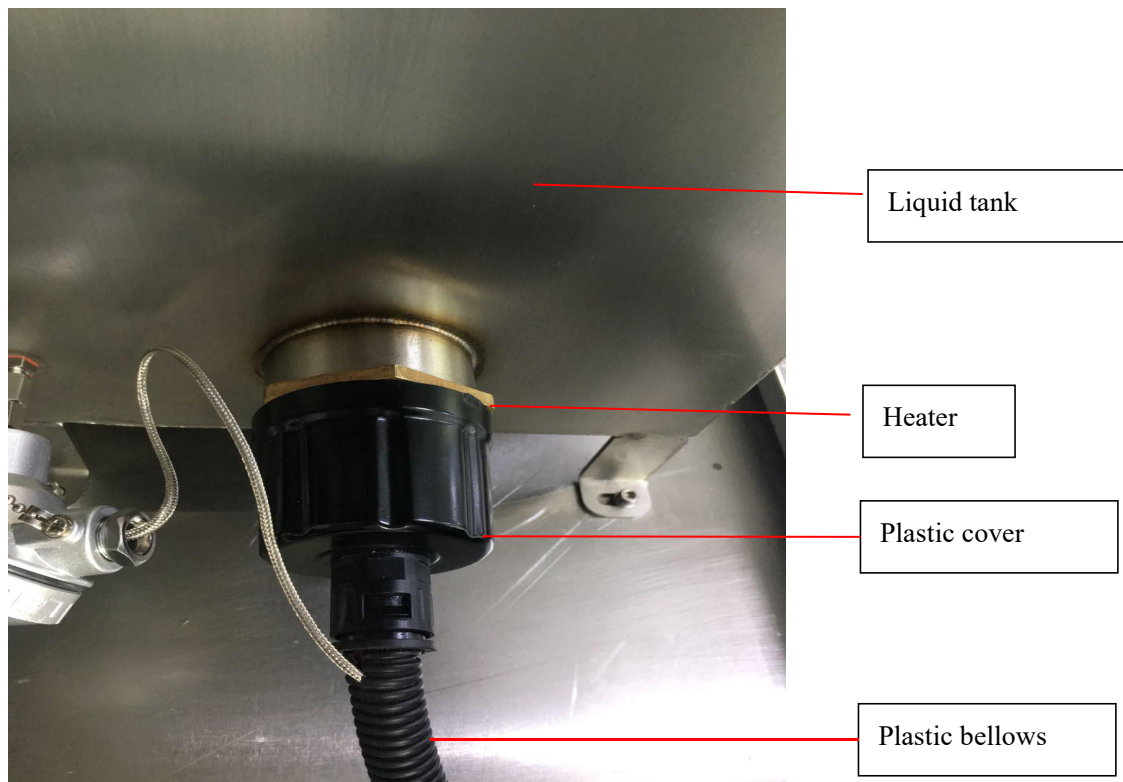


Figure 8-2 Heater

- 1) To guarantee safety of operators, turn off Power SW on operation panel and turn off main breaker in the electrical control cabinet and put on warning signs on electrical control cabinet before disassemble heater.
- 2) To guarantee safety of operators, please ask professional electrician to remove cables of heater.
- 3) Discharge all the liquid in liquid tank.
- 4) Turn off the heater with the big wrench counterclockwise.
- 5) Replace it with new heater. Make sure there is no liquid leak out from it.
- 6) Put the cables through plastic bellows and connect the cables to the machine electric box.
- 7) Turn on the black plastic cover, close the covers, replacement finished.

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

8.3 ANGLE VALVE REPLACEMENT

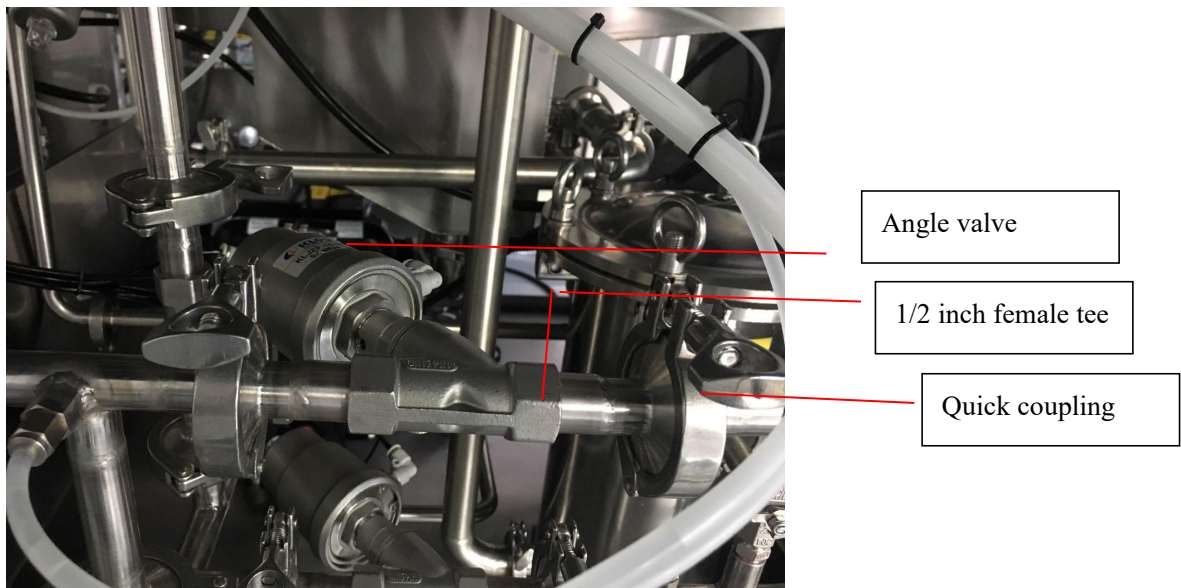


Figure 8-3 Angle valve

1. There are a lot of angle valves on the pipes of the machine. If any of them need to replace, please turn off main power SW on the operational panel and power supply main breaker in the electrical control cabinet; discharge all the liquid in liquid tank and pipes.
2. Close air supply and take off the hose connect to the angle valve, take off the quick coupling on the left and right side, use angle wrench to disassembly the 1/2 inch female tee. Replace with new angle valve, connect 1/2 inch female tees and quick coupling and air hose.



**SOUTHERN
MACHINERY**

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TEL: 0755-83203237; Email:info@smthelp.com; Website:www.smthelp.com

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

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

11 Appendix

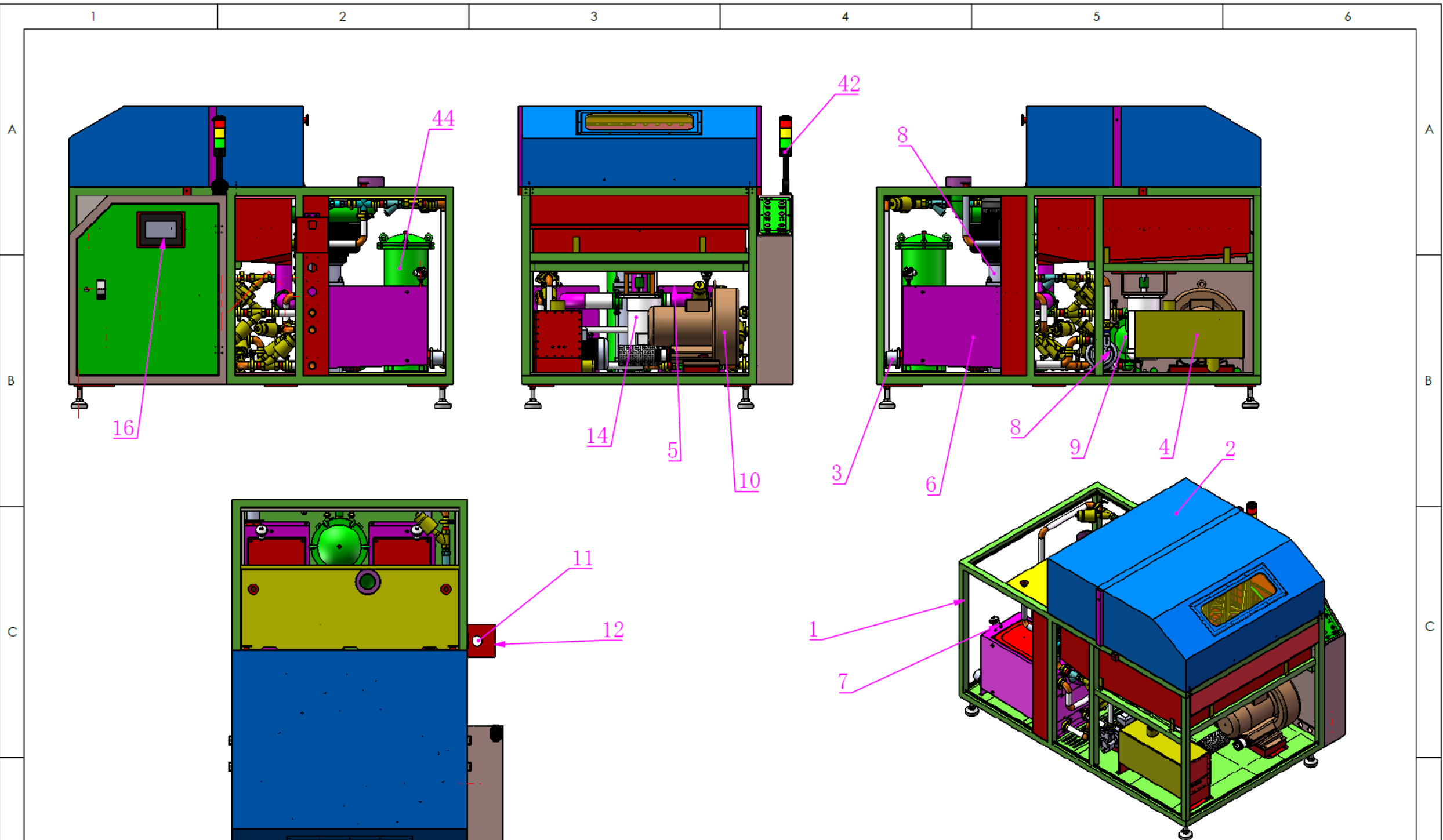
Appendix 1: Main material sheet

S/N	Item	Brand	SPEC	Quantity	Unit
1	Machine Frame	SME	SME Design	1	set
2	Mechanical parts	SME	SME Design	1	set
3	Liquid heater	SME	SME Design	2	set
4	Air heater	SME	SME Design	1	set
5	Liquid tank SW	SME	SME Design	2	pcs
6	Water tank SW	SME	SME Design	1	pcs
7	Temp detector 80mm	Zhihui	K type	3	pcs
8	Clean pump	Nanfang	CDLF4-12	1	set
9	Rinse pump	Nanfang	25QY	1	set
9	Air pump	ARO	666120-344-C	1	set
10	Air blower5.5KW	Goorui	GHBH 7D5 36	1	set
11	Air regulator	Star	AW4000-04	1	pcs
12	Air meter	SMC	GP46-10-02L5	1	pcs
13	Solenoid valve	CKD	4JA219-06-3	10	pcs
14	Motor	TCG	TCV-28	1	set
15	Inventor	Mitsubishi	FR-D740-0.4K	1	pcs
16	Touch Panel	Mitsubishi	GS2107-WTBD	1	pcs
17	RS485 Modular	Mitsubishi	FX3U-485BD	1	pcs
18	Temp Modular	Mitsubishi	FX3U-4AD-TC	1	pcs
19	PLC	Mitsubishi	FX3U-64MR/ES-A	1	pcs
20	Power Switch	OMRON	S8FS-C10024	1	pcs
21	Key SW	IDEC	YW1K	1	pcs
22	EMG Stop	IDEC	YW1B	1	pcs
23	Start Button	IDEC	YW1L	1	pcs
24	Reset Button	IDEC	YW1L-MF	1	pcs
25	Step Button	IDEC	YW1S-3E20	2	pcs
26	Stop Button	IDEC	YW1L-MF2E	1	pcs
27	LCB	Mitsubishi	BV-D 4P 63A	1	pcs
28	3-Pole Circuit Breaker	Mitsubishi	BH-D6-C16 3P	2	pcs
29	3-Pole Circuit Breaker	Mitsubishi	BH-D6-C25 3P	2	pcs

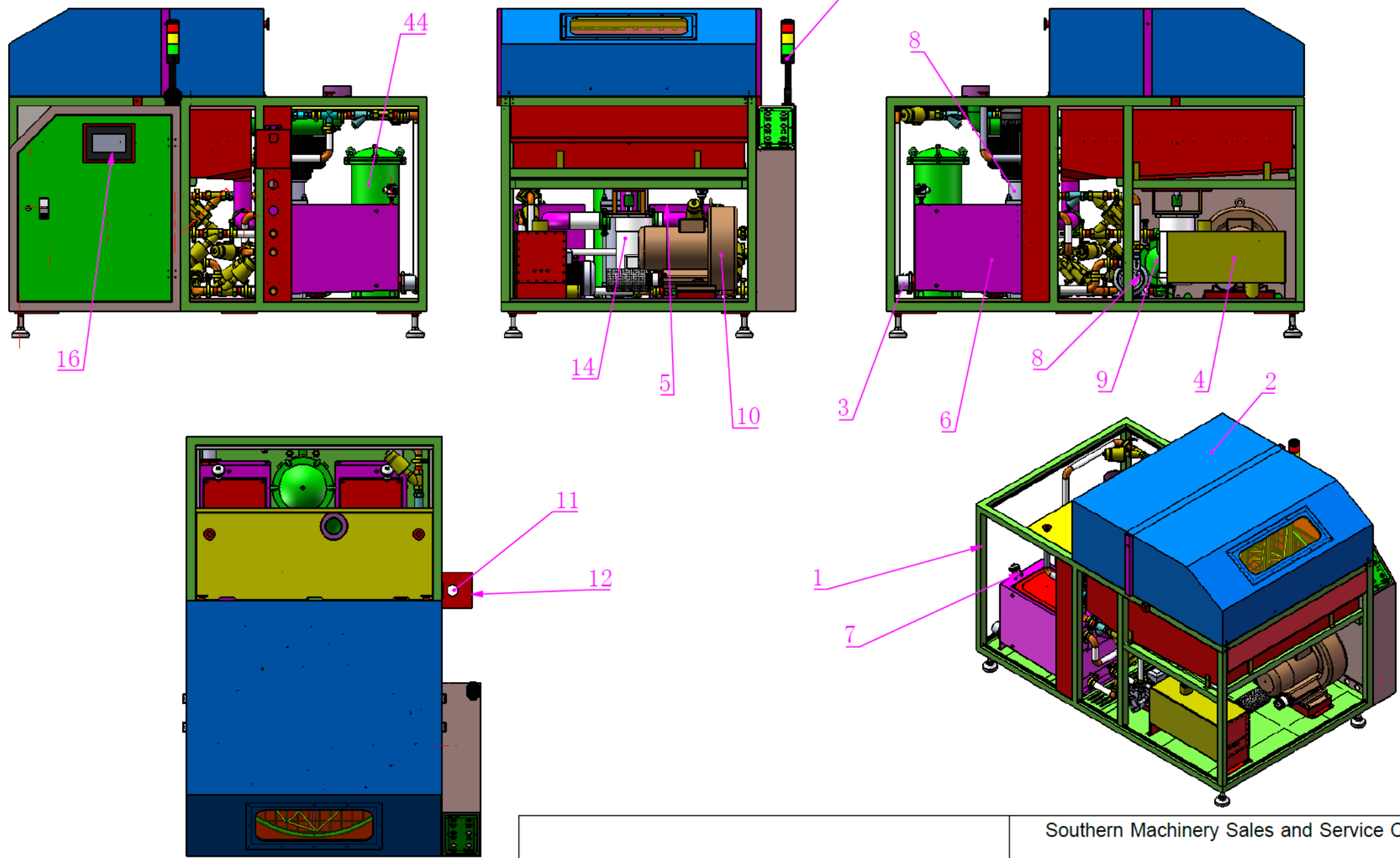
30	2-Pole Circuit Breaker	Mitsubishi	BH-D6-C6 2P	1	pcs
31	AC contactor	Schneider	LC1E6510M5N 220V 65A	1	pcs
32	AC contactor	Schneider	LC1D18M7C	1	pcs
33	AC contactor	Schneider	LC1D25M7C	1	pcs
34	Heat overload rely	Schneider	LRD 12 5.5-8A	2	pcs
35	Heat overload rely	Schneider	LRD 16 9-13A	1	pcs
36	Phase Sequence Protector relay	Carlo Gavazzi	DPA51CM44	1	pcs
37	Triple valve	YIHUA	φ 76mm	1	pcs
38	Door sensor	OMRON	TL-Q5MC1-Z	2	pcs
39	SSR+BASE	FOTEK	ESR-60DA-H	2	set
40	SSR+BASE	FOTEK	ESR-40DA-H	1	set
41	Relay	Schneider	RXM2LB2BD	3	pcs
42	Indicator	PATLITE	MG-302BQ-RYG	1	pcs
43	Spray nozzle	NCY	CC1/4-SS6504	48	pcs
44	Filter barrel	FULAITE	JYF-0310	2	set
45	Air valve	Kailing	SUS304 1/ 1/2 Inch	10	pcs



					Southern Machinery Sales and Service Co.,Ltd			
名称	SME-5200 Part list	数量	1 PCS	图号		制图		
材质	SUS304	日期	2022/3/30		共 1 张; 第 1 张	审核		
处理	拉丝	比例: 1:50	单位:mm	视图		A 4	批准	



					Southern Machinery Sales and Service Co.,Ltd			
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材质	SUS304	日期	2022/3/30		共 1 张; 第 1 张			审核
处理	拉丝	比例: 1:50	单位:mm	视图		A 4		批准



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处理	拉丝	比例: 1:50	单位:mm	视图		A 4	批准	

Appendix 2: Circuit diagram

