SMC Smith Machinery Company, Inc.

Metal Deburring Machine
Operation Instruction

Contents

Preface

Thank you for purchasing the laser cutting machine of Smith Machinery Company. We will serve you sincerely. If you are using our product for the first time, please carefully read this Guide before installation and use.

This operation instruction, working only as a using guide, helps operators to know how to operate the equipment safely and maintain it normally. Manufacture equipment will be upgraded aperiodically without prior notice and there will be changes in partial functions and pages. Consult with manufacture technical staff when any problem cannot be resolved through reading this instruction book.

The user shall read the operation instruction before installing and operating the equipment, preventing faults and personal injuries during equipment usage and repair.
Since this equipment belongs to serialized products, partial diagram forms and descriptive items in this instruction book are taken as references.

Attention

If you find the accessories do not match with the packing list when you open the box or if you have any questions about the use of the machine, please contact the cutting department of our factory by letter in time, and please indicate the product model, specification and factory number in the letter. In order to help you better understand the machine, please read the instruction manual carefully before installation and use. Please read the manual carefully before installing and using the machine. You must understand the installation, adjustment, operation and other matters in the manual. Pay special attention to safety measures and electrical installation. For the use of the process due to improper operation or unsuitable use of maintenance caused by the machine damage and personal injury by the use of their own responsibility.

2 Equipment Usage and Main Technical Parameters

2.1 Equipment Usage and Features

The deburring machine is use for the burrs from High-power laser cutting, laser air cutting, plasma, water jet cutting and punching. Depending on the shape, material and dimensions of the component, various grinding and deburring machines are used for mechanical deburring.

1) With the equipment body welded by high strength sectional materials, the equipment is rigid enough and has a high service life.

2) The large diameter of the sanding belt driven roller increases the sanding belt's service life. Therefore, the sanding belt can work stably together with accurate dynamic balance.

3) In addition, the sanding belt driven roller uses the rubber covered roller to ensure a good polishing effect.

4) The conveyor belt resistant to wear and ironing is used for feeding. With the variable-frequency variable-speed function equipped, the feeding speed can reach 15 m/min, realizing high production efficiency.

2.2. Main Equipment Configuration and Parameters

2.2-1 Models Basic Configurations

Model	Power（Kw）	Power Cable	Breaker	Air Piping（OD)	Air Pressure
SSD1300	57	≥25mm²	250A	Ø8	0.4～0.7Mpa
SSD1000	50	≥25mm²	250A	Ø8	0.4～0.6Mpa
SS1300	43	≥16mm²	200A	Ø8	0.4～0.6Mpa
SS1000	36	≥16mm²	150A	Ø8	0.4～0.6Mpa
SSS1000	51	≥25mm²	250A	Ø8	0.4～0.6Mpa
SS630	13	≥10mm²	100A	Ø8	0.3～0.5Mpa

2.2-2 Main equipment parameters

Processing width	0-1600 mm (according to the model)

Processing thickness	2-50 mm
Processing length	≥ 10 mm
Sanding belt motor	5.5-30 kw (according to the model)
Sanding belt speed	1100m/min
Sanding belt dimensions	(according to the model)
Automatic feeding system motor	4 kW
Conveyor belt adjustable speed	0-7m/min
Jacking system	1.1 Kw - 2.2 KW (according to the model)
Brush roller motor	2.2kw*2
Working air pressure	0.4-0.7 MPa
Control way	Touch screen +PLC
Adjusting accuracy	0.02 mm
Weight	1500 kg - 5800 kg (according to the model)

3. Equipment Basic Components

This equipment is composed of:

1) Machine body: connects equipment parts such as the sanding belt drive mechanism, feed mechanism, elevator mechanism, etc.

2) Lifting handwheel (equipped on partial models of equipment): is used for fine tuning of material feeding workbench lifting.

3) Power mechanisms: provide power for operations of the sanding belt drive mechanism, feed mechanism, elevator mechanism, and the chamfering mechanism.

4) Lifting mechanism: The material feeding workbench supported at the top of the guide screw can be lifted and lowered based on the guide screw lifting and lowering, which is driven by the reducer through chain transmission.

5) The feed mechanism is composed of the conveyer belt driving roller, conveyer belt driven roller, swaging roller, and machine tool body. The 4 kW motor adjusts the speed using the reducer and the frequency changer, reaching the feeding speed of 0-7m/min.

6) Swaging roller: There are seven swaging rollers, which are driven feed rollers and play the role of swaging. Locations and pressing force of rollers will affect polishing quality of large workpieces. Factory parameters have been properly adjusted and do not need to be adjusted with no special necessity.

7) Brush roller: is used to remove burrs occurred after the sanding belt is polished.

8) Electrical control box: Electrical components of the machine are converged in it. Refer to the attached diagrams for the electrical schematic diagrams.

9) Operation panel: is used for equipment operation control and status display.

4. Equipment Installation

The customer shall check whether any part inside the equipment is loosened or falls off after disassembling the equipment. The equipment can be installed for use after it is confirmed that there is no any exception.

4.1 Eqipment Levelling

Four eyes at the top of the equipment are used when the equipment is lifted. To keep balance, long wire ropes (or chains) shall be used and the wire ropes (or chains) shall be solid and reliable. Or, forklift is used for loading and unloading. Forklift operations shall be performed at the specified parking place.

If the ground is hard, the equipment can be installed on it. To ensure the equipment levelness in vertical and horizontal directions, you can place a levelling ruler on the delivery platform, place a gradienter on the levelling ruler, and then adjust the sizing block.

If the ground is soft and cannot bear the equipment weight, a cement base shall be irrigated as the foundation with preformed holes kept. Expansive cement and foundation bolts shall be placed inside the preformed holes. Install the equipment, adjust it to the proper horizontal positions in both vertical and horizontal directions, and lock the nuts of foundation bolts after cement inside the preformed holes is dried.

Note: Concrete with strength grade of C10 and above shall be used as the base material. The embedding of foundation bolts shall be completed through secondary pouring of the preformed holes. Fine aggregate concrete with higher strength grade than foundation concrete shall be used

inside the preformed holes. Expansive cement would be the best choice. Equipment foots shall be fixed at the same horizontal plane. The equipment shall not have any shake when working normally. Flammable and explosive sundries shall not be placed around the equipment and the road shall be unobstructed to prevent this equipment from inflicting with others. Items about equipment placing shall be arranged according to the actual situation.

4.2 Fixed Mount Disassembly

To prevent damage to the internal structure in the transportation process, temporary fixing parts irrelevant to the actual use inside or outside the equipment shall be removed after the equipment is fixed.

4.3 Equipment Electricity Wiring and Grounding

Ensure that the main power supply in the workshop can meet the power consumption demand. Check and make the main voltage to match the equipment working voltage. Determine the cable cross sectional area according to the equipment total power and ensure the equipment must be grounded reliably.

Determine the cable inlet, connect the cable to the equipment distribution bus, and check the motor rotation direction and feeding direction.

Note: Wiring shall be performed according to requirements on the electrical schematic diagram equipped with the equipment randomly. The equipment electrical system shall be wired and maintained by well-trained electricians.

4.4 Installation of Equipment Dust Suction System

All suction inlets and dust collect plants on the equipment are connected by the user. Ensure that all suction inlets on the equipment are firmly connected with the dust suction pipe.

Ensure the vacuum degree of 110 - 130 mm water column height at the inlet after the dust suction pipe is connected to the suction inlet.

The average airflow velocity of the dust suction device must reach 25 - 30 m/s and the air flow for dust suction shall reach 120, 000 m3/h;

Note: The dust collect plant shall be away from the heat dissipation plant and moist & HV place.

4.5 Connection Between Compressed Air and Equipment

Ensure that air supply in the workshop can meet the equipment requirement. Sufficient air supply can ensure that the equipment has the optimal using performance. Compressed air from the air source shall meet parameters required by the equipment:

------- Internal diameter of air supply pipe ≥Φ6.5 mm

------- Air pressure 0.3 - 0.7 Mpa

------- Air consumption 1.48 m^3/min

Connect the air supply pipe with the air inlet end of the oil-water separator at the equipment bottom. Know the principles and operations of the pneumatic elements according to the pneumatic schematic diagram.

1) Oil-water separator

The oil-water separator is used to separate impurities like water content and oil content from the compressed air. Manually drain away water periodically.

2) Manual valve

This switch is installed at the beam end on the equipment operation side and used for tensioning the sanding belt.

3) Two-position five-way solenoid valve

Five two-position five-way solenoid valves are used to control the direction of the sanding belt oscillating cylinder on the sander head, actions of the pressed pneumatic cylinder, and the braking of the main motor.

4) One-way throttle valve

The one-way throttle valves are installed at both sides of the sanding belt and used for adjusting the airflow size, changing the swing frequency of the sanding belt.

5) Pressure relief valve and pressure gage

One pressure relief valve and one pressure gage are integrated on the oil-water separator, and used for adjusting the equipment's proper gas consumption. The user shall adjust the pressure relief valve to ensure the working air pressure of about 0.5 Mpa, to tension the sanding belt and stabilize the sanding belt.

5.Equipment Safety Control System

To ensure the equipment's safe working and high precision machining performance, and prevent the operator from being damaged and the workpiece, sanding belt, and conveyer belt from being damaged, this equipment is equipped with the following different and interlocked safety devices according to General Safety Rules for National Mechanical Equipment.

5.1 Equipment Emergency Braking

Both the equipment control panel and the rear closure plate are equipped with an emergency stop button. In an emergency situation, you can press the emergency stop button to brake the machine immediately.

5.2 Sanding Belt Protection

The machine shall be braked immediately if the sanding belt is off the roller due to off tracking.

5.3 Motor Protection

The motor automatic overload protection function is equipped in the control line.

5.4 Feeding Workbench Lifting Protection

If the feeding workbench lifting deviates by 0-50 mm opening range, the upper/lower limit switch will be touched. Then the feeding workbench will stop lifting immediately. If in operations, the range is exceeded with the set thickness, press the emergency stop button.

5.5 Air Pressure Protection

Models equipped with air pressure sensors will monitor the working air pressure in real time. When the air supply pressure is smaller than the set minimum pressure or higher than the maximum pressure, the equipment will alarm.

5.6 The equipment will be braked immediately when the equipment alarms due to other abnormal conditions.

Note: The braking process will last for 3-8s for different pressure values and the brake pad attrition rate.

6 Equipment Basic Operations

6.1 Precautions for Equipment Operations

1) Before operating the equipment with high performance and advanced technology, you must read the equipment operation instruction carefully and be clear about the operating procedures shown on the setup unit. Therefore, this equipment can be reasonably operated and maintained in various working environments.

2) Ensure that the equipment is effectively grounded.

3) Personal belongings are the caused for leading to the server injuries. Before the machine is started, articles such as watches and bracelets shall be well placed. Tighten the sleeve openings, tie the longhair, take off the tie, and do not wear slippers.

4) Never process any oversize or small-sized workpieces. The workpiece feed speed and processing volume shall be confirmed in accordance with specific conditions. Do not start the machine at an excessive speed or with the excessive processing volume.

5) Ensure that thickness of any workpiece placed in the machine is consistent with the set actual polishing thickness. Workpieces with different thickness cannot be polished together. Two or more workpieces cannot be piled for polishing.

6) Never use a sanding belt with scratches or cracks. Before the sanding belt is installed, ensure that each working roller's surface is smooth with no dirt and indentation and the sanding belt running direction is consistent with the direction of the sign on the back. After the sanding belt is installed, check the sanding belt actuating device and ensure that the actuating device is locked with the center bracket solidly.

7) Check whether each safety device is installed in place and turn off all doors.

8) Before any cleaning or maintenance, the machine must be stopped with the power off and a dedicated warning must be used to remind staff around.

9) Keep working surfaces inside the equipment and the surrounding floor clean and lubricate the machine periodically according to the lubrication requirements. The above operation is the significant premise to ensure equipment machining precision and service life prolonging.

10) Check the ampere meter monitoring value on the control panel at any time when the equipment works, to predict whether there is any overload phenomenon.

6.2 Equipment operation processes

1) Before the equipment is powered on, check whether there are any remaining workpieces inside the equipment and whether the current, voltage and air pressure are normal.

Measure the thickness of the workpiece and adjust it to the appropriate thickness of the workpiece (emphasis on trying the thickness of the workpiece first)

Pull hand pull valve tension belt, this switch is installed at the end of the beam on the control side of the equipment

Start the conveyor belt forward rotation first when you ready to put the parts on.

Start the first sand roller under downward pressure and observe whether the adjustment cylinder runs smoothly.

Normal (cylinder running time is about every 0.5-2 seconds to run back and forth) after the current is stable, then start the second sand roller, and so on.

5)When use the edge rounding function, please start the rotation axis first before you start running the bruch rollers.

6) When the machine ready to work, put a workpiece to see the workpiece grinding effect. Making sure there is a good deburring effect before starting batch production. Do not put the different thickness workpieces on the convoyer table at the same time. Putting the workpiece back and forth, left and right to keep distance and do not put superimposed.

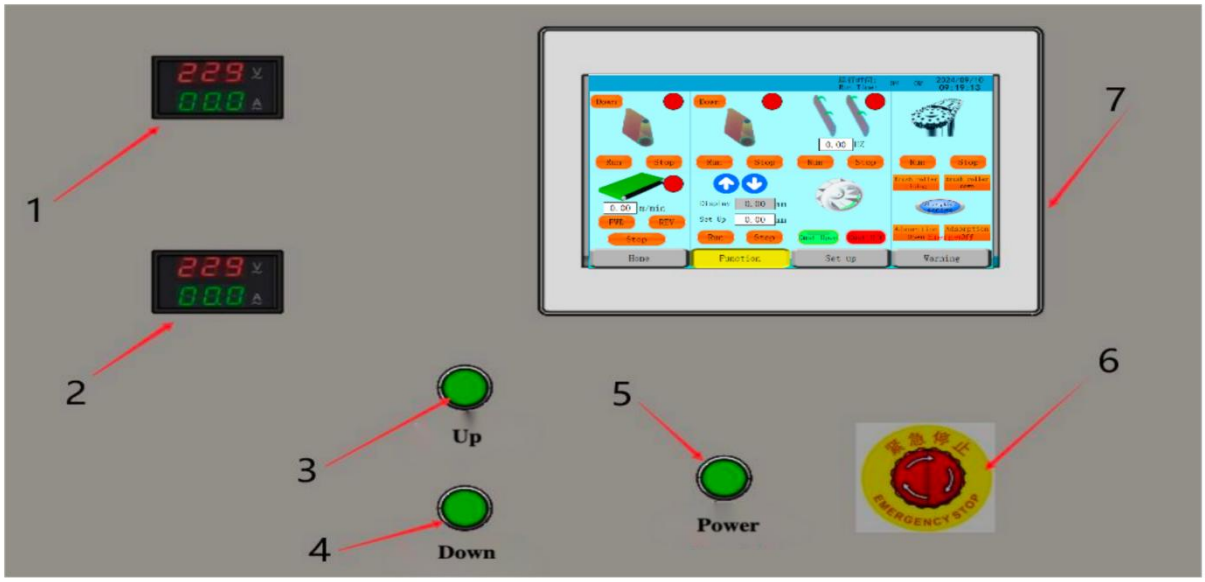
7) After the end of production, stop the operation in sequence (1. Stop the sand belts 2. Stop edge -rounding part 3. Stop conveyor belt) Check whether there are any remaining workpieces in the equipment after completely shutdown.

8) Clean the inside and outside of the equipment, check whether the cots, motors, bearings, cylinders, electrical appliances are loose and worn, check the comprehensive equipment maintenance.

9) Attention! When the vacuum adsorption equipment needs edge-rounding, first observe the conveyor belt corresponding to the vacuum adsorption tank on the platform, start the vacuum fan, and then operate according to the above steps

6.3 Electrical Part Operating Instructions

6.3-1 Operations on the Control Panel



No.1 Volt-Ammeter meter No.2 Volt-Ammeter meter
No.3 Conveyor table up No.4 Conveyor table down
No.5 Power switch No.6 Emergency stop
No.7 Control screen

Ampere-voltage meters 1 and 2 are used to show working current and voltage of two main motors. When the displayed current exceeds 30A, the main motor is overloaded. At this time, belt grinding or feed rate shall be reduced to reduce the main motor load.

Parts 3 and 4 are the buttons that control the workbench lifting or lowering.

Part 5 refers to the power supply switch. After the machine is connected to the power supply or the machine is stopped abnormally, press this switch and you will hear the pickup of the contactor. At this time, control circuits for operations on the touch screen are required for power supply. Then, other control operations can be performed. Otherwise, control buttons on the touch screen cannot work.

Part 6 is the control system stop button. After you press this switch, the control circuits are powered off and the main motor is braked. Note: Do not use this button in non-emergency situations. Otherwise, the machine will be damaged. This button shall return to the original position after its work is completed. If this button is not reset, the machine cannot be started.

Part 7 refers to the WECON PI-series 10.2-inch HD HMI PI3102i touch display screen. Refer to operating instructions in WECON PI-series 10.2-inch HD HMI PI3102i for operations and usage.

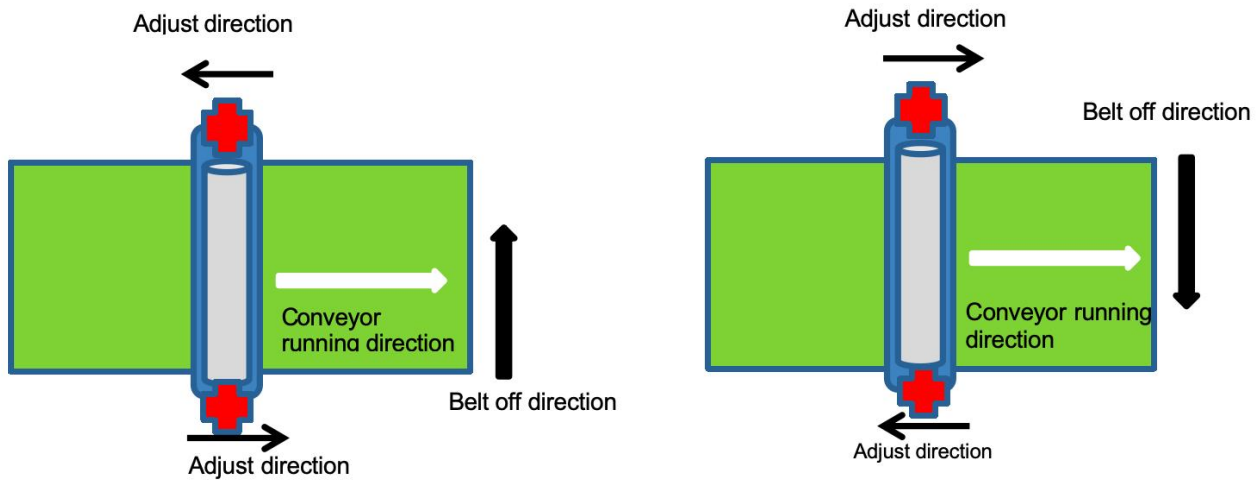
7 .Equipment Adjustment

7.1 Equipment Debugging

1) After the equipment is powered on, start the machine, determine whether the power phase sequence is correct by manually clicking the platform lifting/lowering, and ensure that the machine running direction is correct.

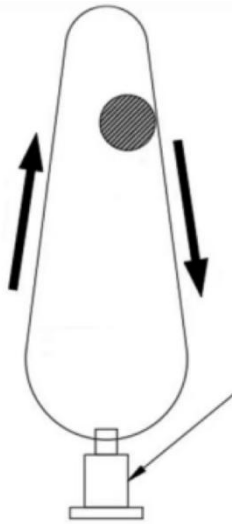
2) Manually adjust the platform to adjust the current thickness to 30 and modify the set thickness to 20. Start and observe the platform adjustment direction and whether the final values are correct, with a deviation of less than or equal to 0.05 mm.

3) Start the conveyer belt and keep it running forward at a speed of 10 m/min. In normal situations, keep it in idle running for 3 minutes and observe whether the belt is off tracking. If it is, make adjustment until it can run stably. See the following figure for the adjustment method:



4) Start the Edge-rounding motor, and observe whether all motors work normally and whether the running directions are correct.

5) With normal supply, the manual valve can be used to control the loosing and tensioning of the sanding belt. Select a sanding belt with proper specification and install it according to the direction shown inside the sanding belt.



6) When the sanding belt is loosened, adjust the sanding belt and make it to be in the middle of the rubber covered roller. At this time, the optoelectronic switch and the limit switch shall be not triggered.

7) Click the sanding belt for starting and ensure that the sanding belt is correctly installed.

8) Click the sanding belt for starting and ensure that the sanding belt is correctly installed. Refer to the schematic diagram pasted on the equipment. Continue to adjust the handle until the sanding belt running is stable and balanced.

8 Equipment Lubrication and Maintenance

8.1 After work of each shift is completed

1) Clean the whole equipment to ensure that surfaces of the feeding workbench panel and sanding roller are free of dust.

2) Check the compressed air filter and clean coagulation in it.

- After work of each week is completed,

3) Lubricate all lubricating points of the equipment according to lubrication requirements shown in the table.

4) Check the air filter and clean coagulation in it.

8.2 After work of each month is completed

1) Lubricate all lubricating points of the equipment according to lubrication requirements shown in the table.

2) Check the tensity of the equipment feeding transmission and lifting transmission chains. If necessary, tighten the chains.

3) Check the tensity and degree of wear of each transmission triangular belt. Tighten or replace the belt if necessary.

8.3 Pay attention to the following matters during lubrication

1) During lubrication, clean the nozzle with a brush and no sundries are allowed.

2) Proper grease shall be filled to lubricate the bearing. The filling quantity accounts for 1/3-1/2 of the space between the bearing and the housing.

3) Bearing lubrication shall be made when the equipment keeps still. After the lubrication, the bearing shall be manually rotated for a few minutes, balancing the grease inside the bearing. Do not start the equipment immediately at a high speed

4) Make selections according to different season temperature during lubrication:

No.	Name	Lubrication Time	Quantity	Lubricant
1	Feed roller bearing	3000 h	Appropriate amount	Molybdenum disulfide lubricant
2	Sanding belt bearing	1000 h	Appropriate amount	Molybdenum disulfide lubricant
3	Tensioning the roller bearing	5000 h	Appropriate amount	Molybdenum disulfide lubricant
4	Sanding belt balance-roller bearing	1000 h	Appropriate amount	Molybdenum disulfide lubricant
5	Motor	2400 h	Appropriate amount	Sodium soap grease
6	Lifting screw	400 h	Appropriate amount	Engine oil #20-40
7	Tensioning air cylinder	200 h	Appropriate amount	Engine oil #20-40
8	Feed reducer	1500 h	Replace	Middle load industrial gear oil
10	Chain, sprocket bearing	1000 h	Appropriate amount	Molybdenum disulfide lubricant

9. WECON PI-series 10.2-inch HD HMI PI3102i

WECON PI-series 10.2-inch HD HMI PI3102i, with brown-out storage, is an intelligent displacement controller, which allows site function setting.

Characteristics: Cortex A35°1.2GHz CPU; resolution ratio: 1024*600

High speed for picture switch and update

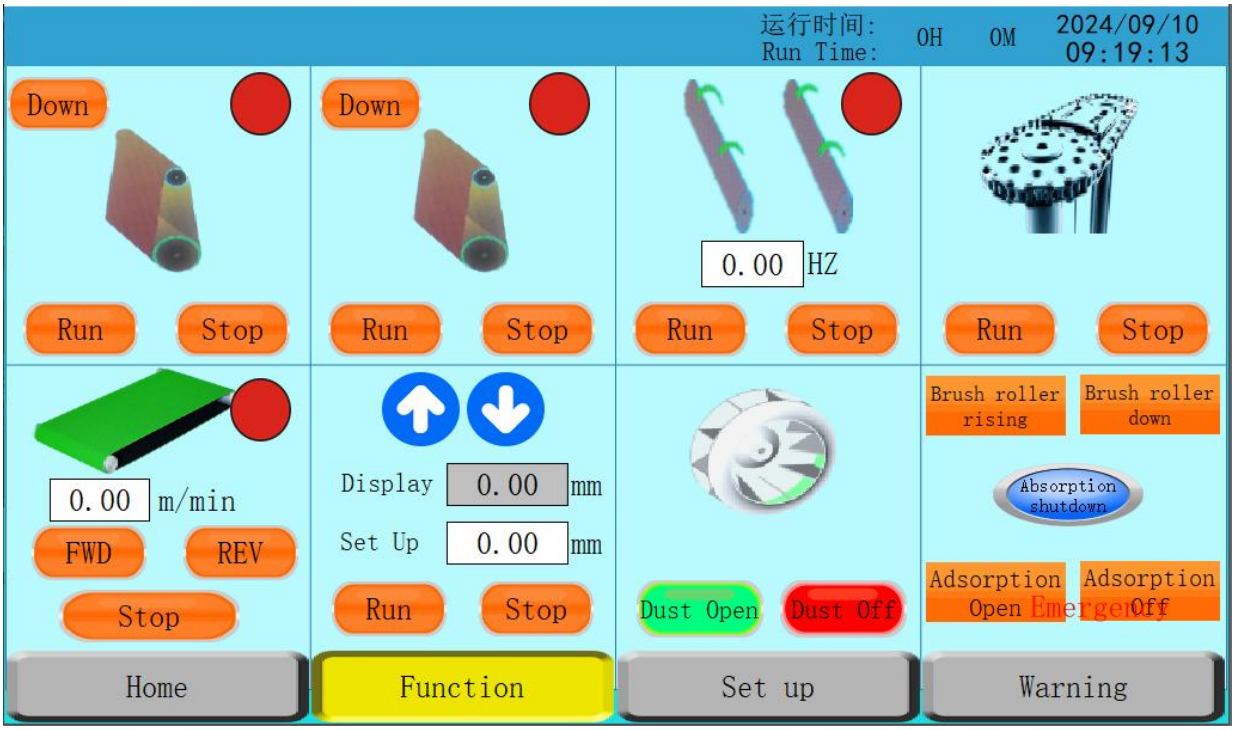
Large map storage capacity, high software security, and stable communication

Convenient use of PIStudio software configuration

9.1 Home Screen

Home Screen is the promotional page of the company and no any operation is required on this page. Enter the Home Screen after the equipment is started.

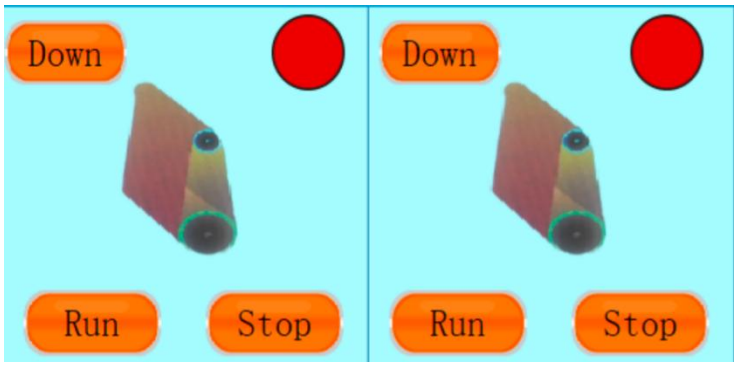
9.2. Operation Interface



On the interface, 1# sanding belt control, 2# sanding belt control, brush roller axial-direction control, and brush roller radial-direction control are shown in the first row from the left to the right.

On the interface, conveyer belt control, polishing thickness control, dust exhausting fan control, and chamfer height control are shown in the second row from the left to the right.

a. Sanding belt control part



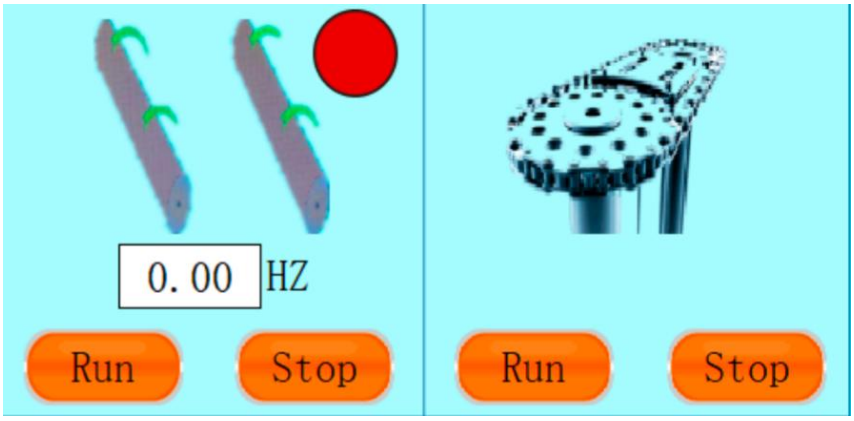
After "Run" is clicked, the motor is started and the sanding belt works.  indicator turns green and flashes.

After "Stop" is clicked, the sanding belt stops automatically and the indicator  turns red and stops flashing. (At this time, the brake does not work. Under effect of inertia, it takes a long period from the sanding belt motor stopping to the complete machine stop).

During normal work, ensure that this button "Down" is green. This function is released when the equipment is abnormally stopped and the brake is enabled. The sanding belt working space enlarges, playing the role of protection. This function is prohibited during the polishing process. This function is not necessary. Consult the manufacture to check whether this function is equipment on the machine.

The method for operating sanding belt 1# is the same as that for operating sanding belt 2#. To ensure the polishing effect, sanding belt 1# and sanding belt 2# shall be simultaneously used.

b. Edge-rounding control part



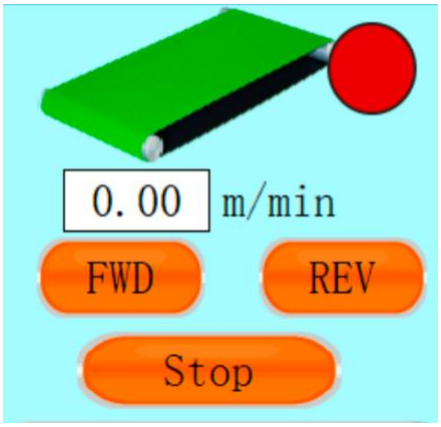
After "Run" is clicked, the chamfer motor is started and the indicator turns green and flashes.

After "Stop" is clicked, the chamfer motor stops and the indicator turns red and stops flashing.

Two directions shall be separately controlled and shall be turned on simultaneously when being used.

The rotating speed is adjusted by entering values to 0.00 HZ with the unit of HZ. Refer to the national power supply frequency for the adjustment range.

c. Conveyor belt control part



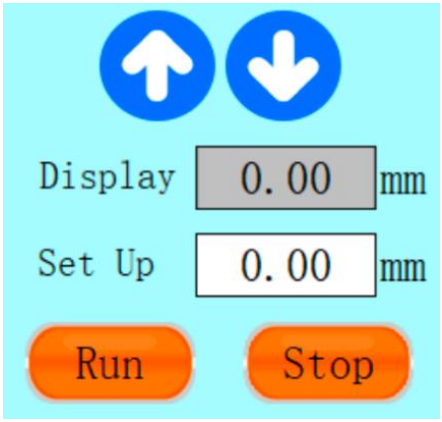
After "FWD "is clicked, the conveyor belt drives the workpiece to move inward the machine. To ensure the normal working direction, this function is used and the button turns green.

After "REV "is clicked, the conveyor belt moves in a direction that is reverse to the forward direction. This function is used when the equipment is debugged and in special condition. When this function is used, the button turns green.

After "Stop " is clicked, belt running forward/backward is stopped.

Adjust the conveyor belt speed by entering values in 0.00 m/min. Relevant values can be modified according to the polishing effect. Refer to the equipment parameter table for the value adjustment range. It cannot be set to an excessive large value.

d. Platform lifting/lowering control part



Click “Run” to automatically lift/lower the platform to the set thickness;

In the process of automatically adjust the platform lifting/lowering, click "Stop" to stop the lifting/lowering.

When the platform lifts automatically or is manually lifted, this indicator  flashes.

When the platform lowers automatically or is manually lowered, this indicator  flashes.

The current thickness is displayed on and the value cannot be modified.

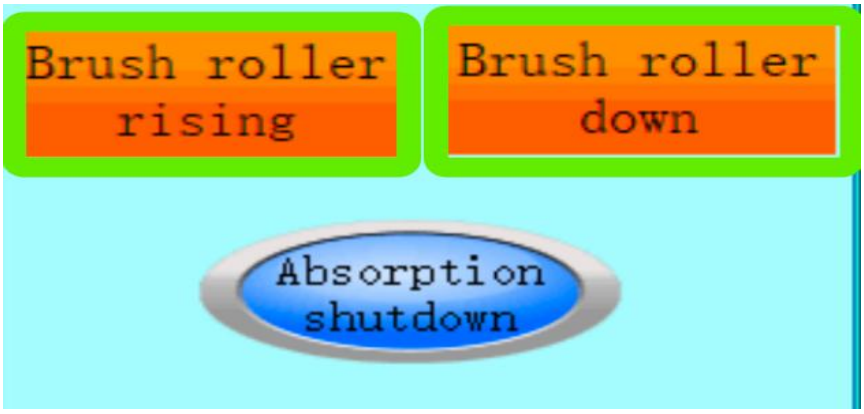
Values on the Set up" can be manually modified to the required values. (This value shall be within the normal stroke range. Refer to the equipment parameter table for the specific range value.)

e. Fan control par

Click “Dust Open ”to start the dust exhausting fan. Click “Dust Off " to stop the dust exhausting fan.

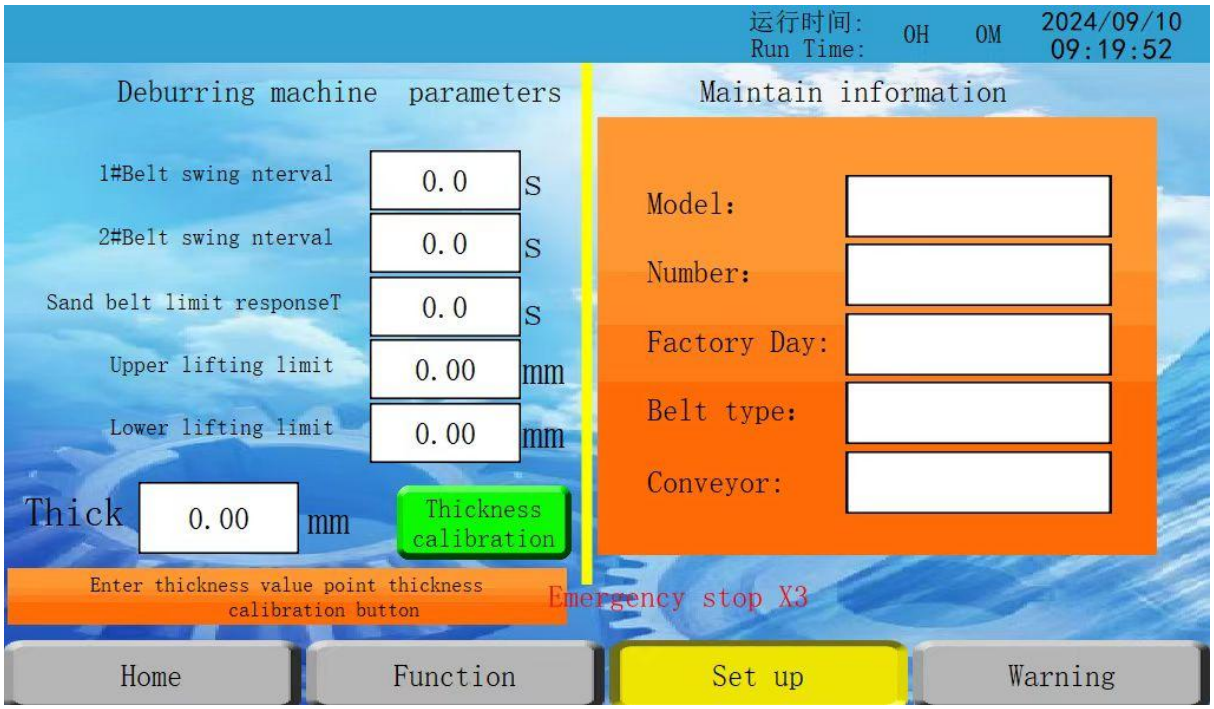
The dust exhausting fan is not a must, and the customer can configure devices according to the interfaces reserved by the manufacture. Valid dedusting is required for using the equipment.

f. Edge-rounding adjustment part



This part is manually controlled through the point contact way. Use of excess stroke is prohibited.

9.3. Parameter Interface



The displayed thickness value cannot be changed and is consistent with the current thickness on the running interface.

The set thickness value cannot be changed and is consistent with the set thickness on the running interface.

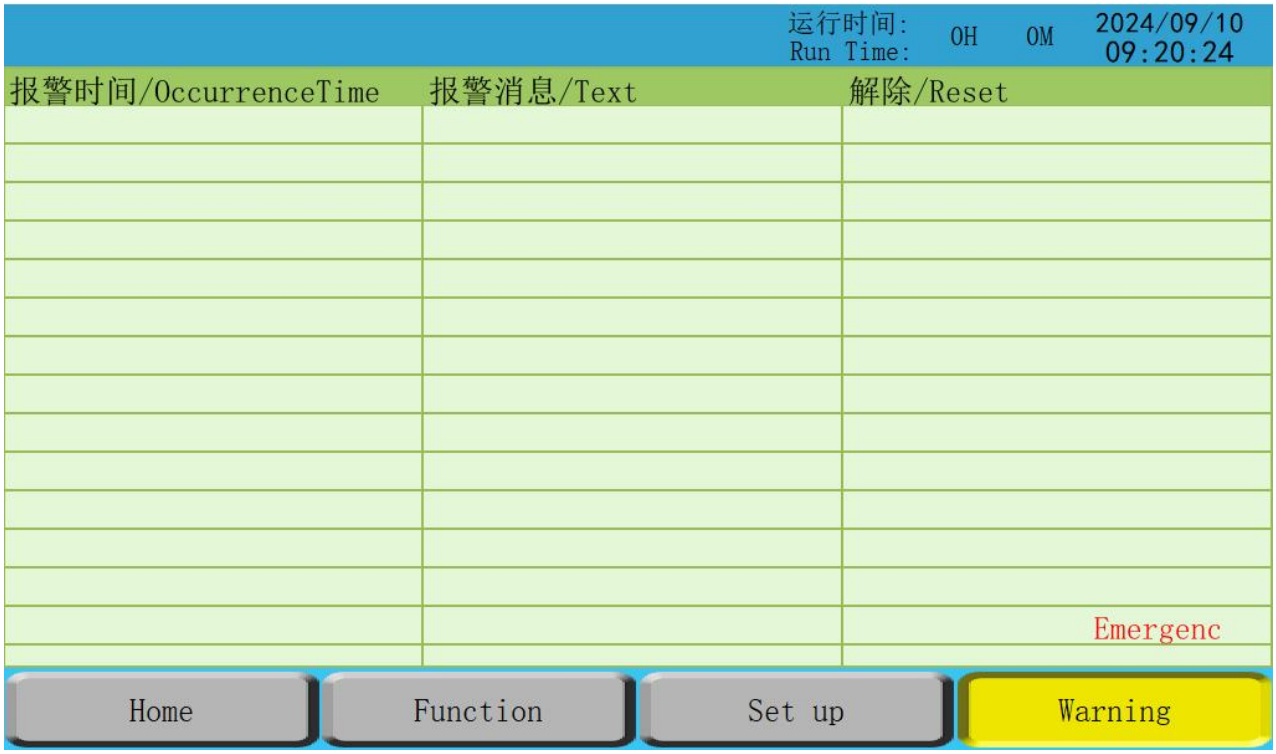
The thickness calibration value can be changed. When the displayed thickness value is inconsistent with the actual workpiece thickness, manually adjust the platform height until the best polishing effect of the workpiece is reached. Then, manually input the workpiece's actual

thickness, click the "Thickness calibration button, and the current thickness is corrected to the entered value.

Parameter values shown in this figure can only be adjusted by technicians from the manufacture. Consult the manufacture if there is any problem.

Impulse dust-collection parameters are integrated on the parameter interface. Injection T and injection delay control four solenoid valve actions, respectively. Detailed settings are made according to the usage environment and filter element aging degree. Parameters in this figure are required to be set only for equipment models with dedusting function provided by the manufacture.

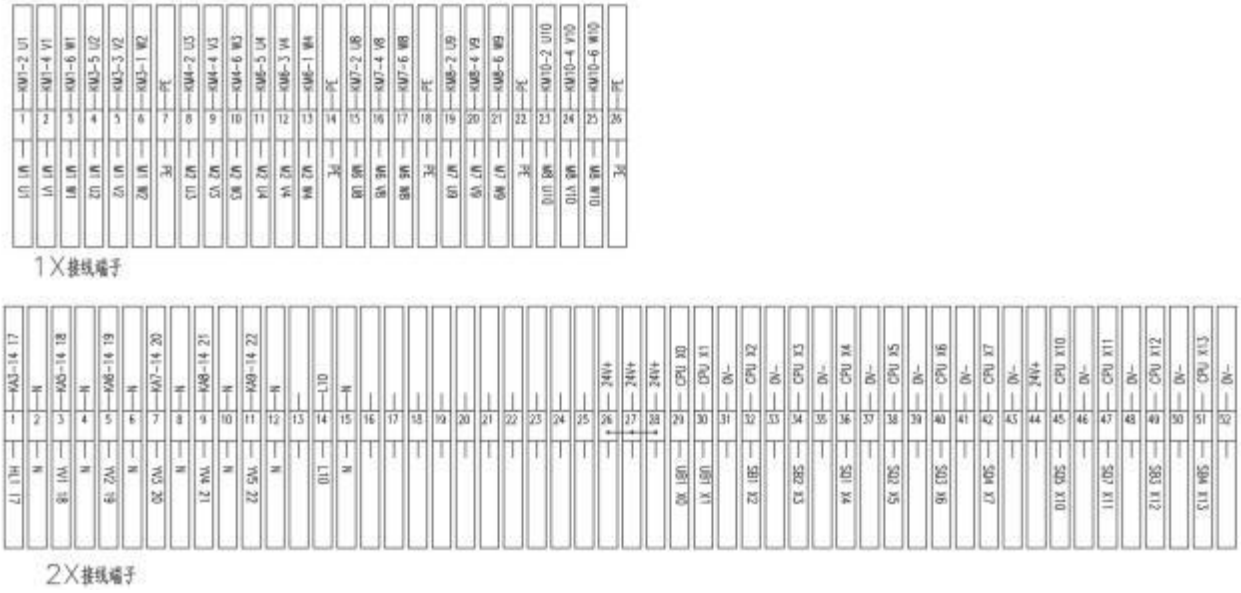
9.4. Warning Interface



This interface shows current and history alarm records. When the equipment reports an alarm, the customer can identify the cause according to the alarming content and automatically clear the alarm or contact the manufacture.

10. Attached Diagram

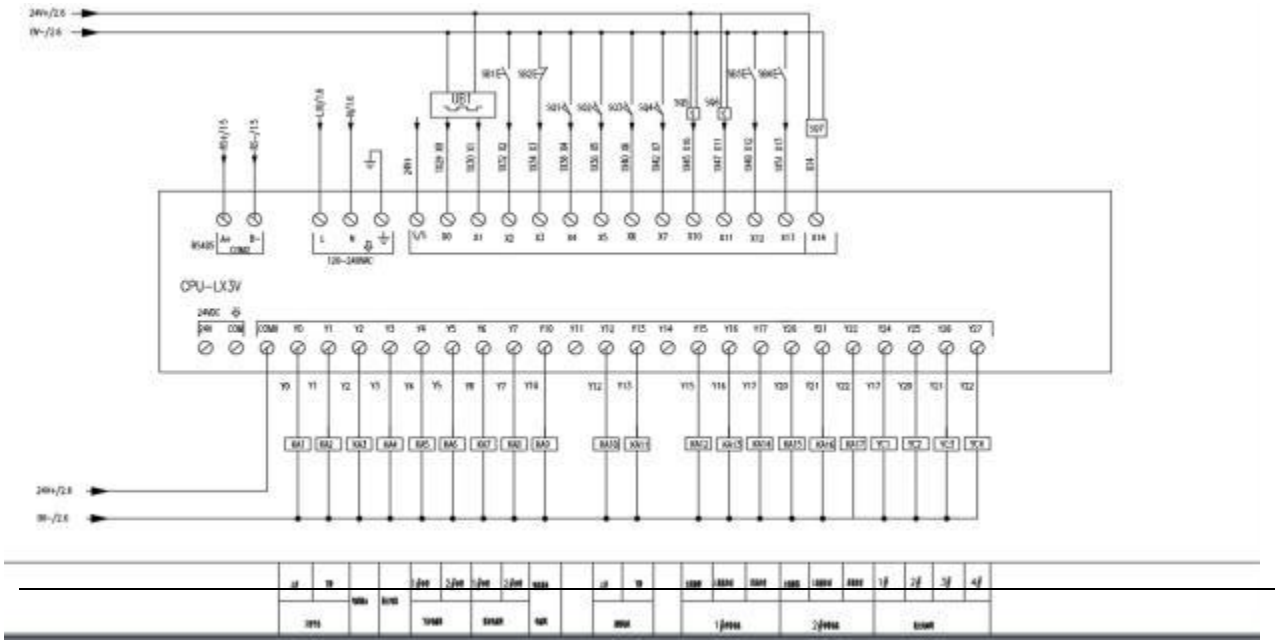
1) **Partial electrical schematic diagrams of the SSD1000 metal deburring machine**



1x: wiringterminal

2x:wiringterminal

2)



Attached table - machine model:

No.	Model	Working Range (mm)	Power (kW)	Weight (kg)	Optional
1	SS1000	1000 *L	35	2800	Magnet absorption/vacuum absorption/pulse dust connection

2	SSD1000	1000 *L	48	3800	Magnet absorption/vacuum absorption/pulse dust connection
3	SSD1300	1300 *L	55	4500	Magnet absorption/vacuum absorption/pulse dust connection
4	SSD1600	1600 *L	72	5600	Magnet absorption/vacuum absorption/pulse dust connection
5	SSS1000	1000 *L	50	3200	Magnet absorption/vacuum absorption/pulse dust connection

***L refers to the workpiece length with no dimensional limit. Table 2 - configuration**

No.	Name	Specification	Brand
1	PLC+display screen	LX3V2424MT + PI3102I -10 inch	WECON
2	Contact	NXC series	CHINT
3	Sensor	PSK1-C1C-R1/8	Autonics
4	Motor	5.5KW~30KW	Weinuo/Dingge
5	Transducer	3KW~11KW	Derris
6	Slip ring	MT3899F	MOFLON
7	Mounted bearing	207/209/210 etc.	Harbin/TR
8	Conveyor belt	PVC	HONGZHENBELT

The manufacture reserves the right to change part brands due to equipment upgrading or update without further notice.