SSC-003 Robotic Peeling & Material Unloading System Operating Manual

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Preface

SSC-003 Robotic Peeling & Material Unloading System is not liable for any direct, indirect, special, incidental, or consequential damages or liabilities arising from the improper use of this manual or the product.

Chapter 1: Overview

1.1 Equipment Overview

Thank you for choosing our SSC-003 Robotic Peeling & Material Unloading System! Our equipment is compatible with various types of transfer paper adhesives to meet your different equipment transfer requirements.

With advanced motion control technology, the equipment operates at higher speeds, and its user-friendly human-machine interface operating system effectively enhances production efficiency. The control equipment adopts linear modules to ensure smoother mechanical operation, reduce machine noise, and extend mechanical lifespan.

Before use, please carefully read the user manual to ensure correct operation. Please keep the manual properly for future reference. Due to different configurations, some machines may not have all the functions listed in this manual. Please refer to the corresponding operational functions for details.

1.2 Precautions

Please refrain from allowing non-professionals to conduct maintenance and debugging on the equipment's mechanical and electrical systems, as this may compromise the equipment's safety performance, escalate faults, and even result in personal injury or property damage.

Avoid cluttering around the control box, and regularly clean the surface of the control box to remove dust during use, ensuring proper ventilation and heat dissipation for the equipment.

Unauthorized modifications to the product are strictly prohibited, and the company bears

no responsibility for any consequences resulting from such alterations.

Warning:

When it is absolutely necessary to open the machine cabinet cover, the power must be cut off for 5 minutes, and only under the guidance of a professional, are individuals allowed to access the components inside the electrical control box!

Prohibited:

While the machine is in operation, it is prohibited to touch any moving parts or open the control equipment, as this may cause personal injury or lead to the machine's malfunction!

Electrical equipment is prohibited from operating in damp, dusty, corrosive gas, or flammable and explosive gas environments, as this may result in electric shock or fire!

1.3 Working Environment

Good ventilation, clean environment, minimal dust.

Storage space temperature: 0-50° C.

Working space temperature: 5-40° C.

Relative humidity in the working space: 30%-90% without condensation.

1.4 Equipment Power Supply and Grounding

1.4-1 Power Supply Requirements

The equipment operates on single-phase AC220V power supply for the servo control system, with the electrical control utilizing a DC24V DC power supply. It is safe for power supply consumption, consuming power between 1.5-1.6KW.

1.4-2 Grounding Requirements

To prevent electric shock or fire accidents caused by leakage, overvoltage, insulation, etc.,

please ensure reliable grounding of the power supply control.

The grounding resistance should be less than 100 ohms, with the wire length within 20 meters and wire cross-sectional area greater than 4.0x4 square millimeters.

Moving machinery can be hazardous! Users are responsible for designing effective fault handling and safety protection mechanisms within the machinery. The automatic feeder equipment is not obligated or responsible for any consequential damages resulting from this.

1.4-3 Equipment Technical Parameters

- Model：SSC-003
- Workbench Stroke Range: 800 (X-axis) - 400 (Y-axis) - 150 (Z-axis) mm - Y2-axis 600 mm
- Maximum Speed: 300 mm/sec
- Resolution: 0.5 mm

Repeatability: ±0.2 mm

Transmission Method: Servo Motor / Linear Module
Power Supply: Single-phase AC220V 50-60Hz 1.6KW

Working Environment:
Humidity: 20-90%, Temperature: 0-40° C

Machine Dimensions: LWH=12008001780
Spraying Color: Natural color for the frame + Fifty-Ling blue for sheet metal
Steel parts are hard chrome plated, aluminum parts are sandblasted
Air Pressure Requirement: 4-7 bar
Proximity Switch: Omron
Rails, Modules: Taiwan Dongyouda, Shangyin
Pneumatic Components: Airtac
Huichuan Servo Motor
Pressure Regulating Valve: Airtac, Vacuum Pressure Display: Panasonic
Stepper Motor: Shenzhen Leisai
Touch Screen: Weilun

User Manual Purpose

The user manual serves as a guide for users to understand the basic functions of the SSC-003, as well as how to debug and maintain the equipment effectively.

Intended Users of the User Manual

This programming manual is suitable for equipment debugging personnel who possess basic knowledge of transfer paper machines and have a certain understanding of the adhesive paper process.

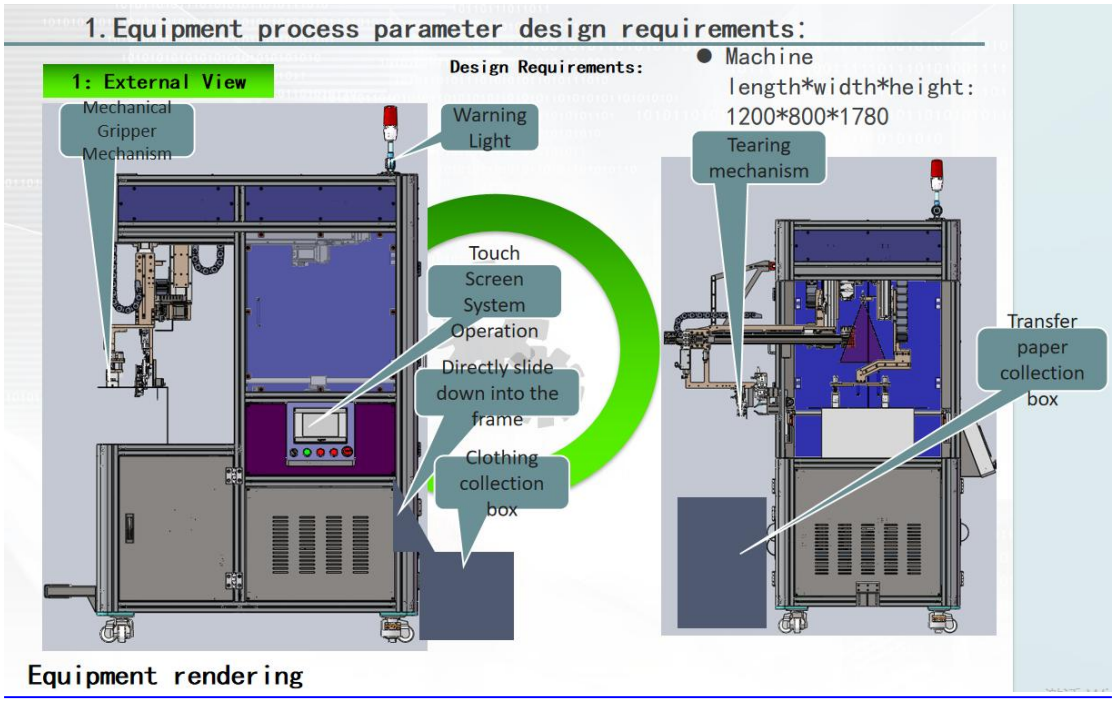
Main Contents of the User Manual

The manual consists of thirteen chapters and appendices, covering the functions of the R operating system of the equipment extensively.

Contents

Chapter 2: Exterior Functions

2.1 Functional Operation

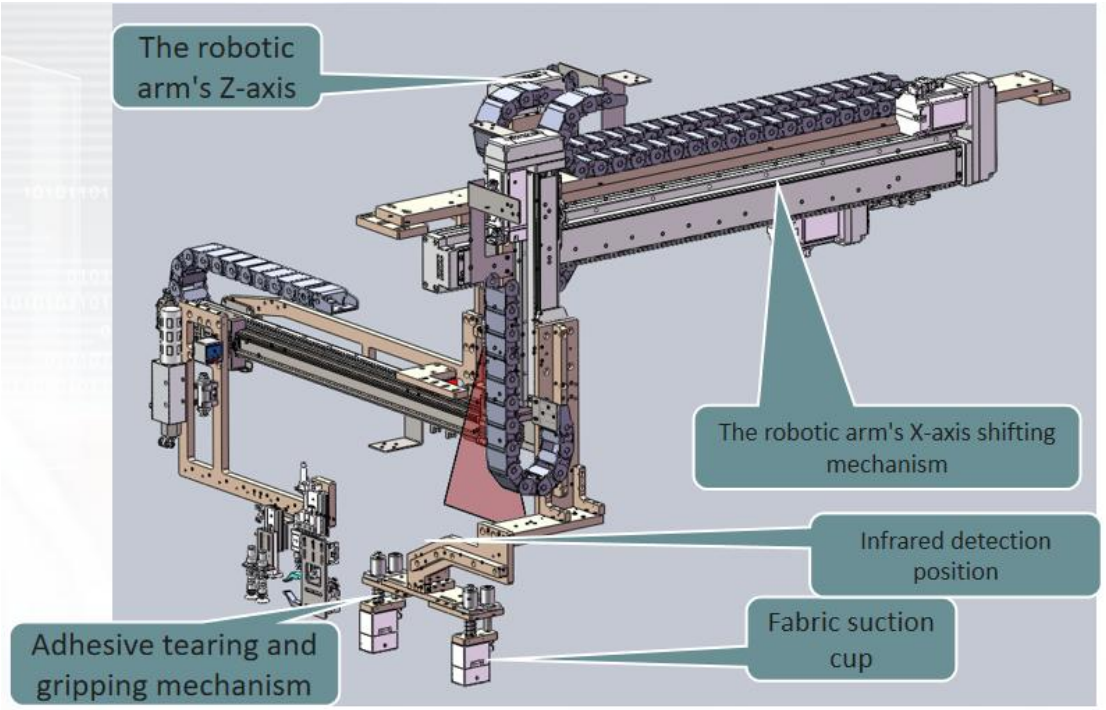


1. The robotic arm's Z-axis infra
2. red detects the transfer position.

The robotic arm's Z-axis infrared detects the transfer position.

Descend to the position, fabric suction cup presses down.

The adhesive paper suction cup, vacuum suction lifts to position, Z-axis rises, and tears the paper. After gripping the adhesive paper, it moves back and tears it off. Meanwhile, the fabric suction cup lifts the robotic arm's R-axis and moves it to the specified position.



2.2 Functional Workflow

The robotic arm's Z-axis optical sensor detects the position for transfer printing.

It descends into position, and the fabric suction cup presses down.

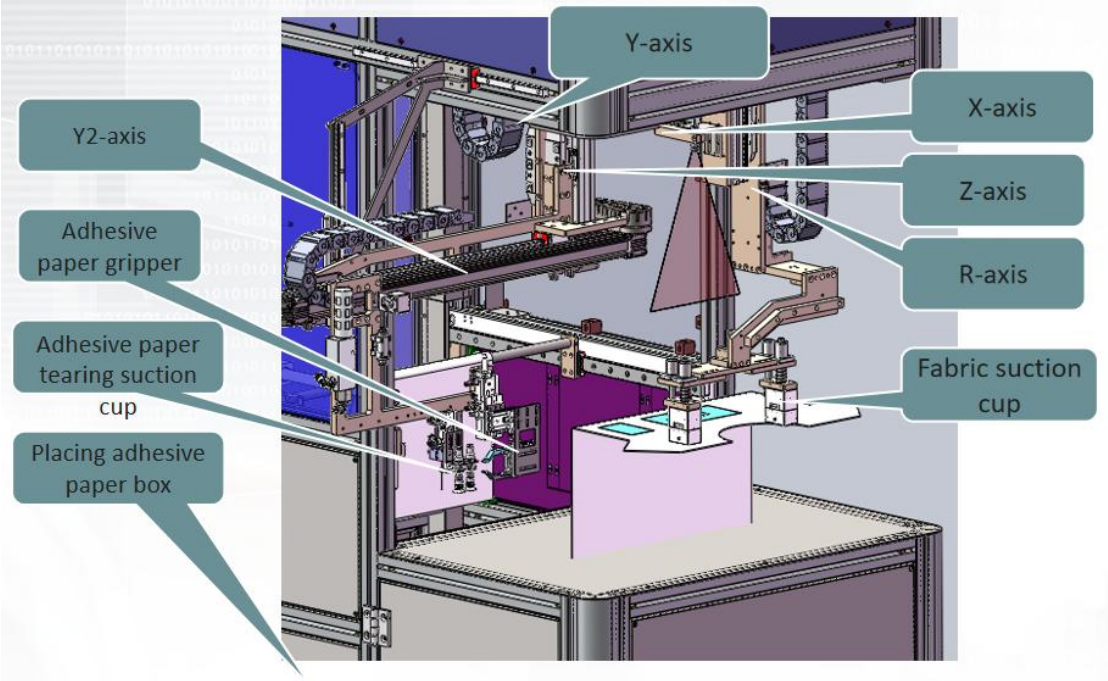
The adhesive paper suction cup tears off the paper, vacuums it into position, and the Z-axis rises.

The adhesive paper clamp grips it, moves it to tear it off, while simultaneously, the fabric suction cup sucks the robotic arm's R-axis up, then moves it to a designated position.

3.Equipment Action Process：

2.3 Tearing Layout for the Adhesive Paper

The fabric suction cup descends into position, presses down for alignment. Y2-axis shifts to descend into place, the vacuum suction cup holds, Z-axis rises while tearing the adhesive paper. Y2-axis shifts to the adhesive paper box position to place it down, R-axis rises, X-axis shifts to retrieve the fabric.

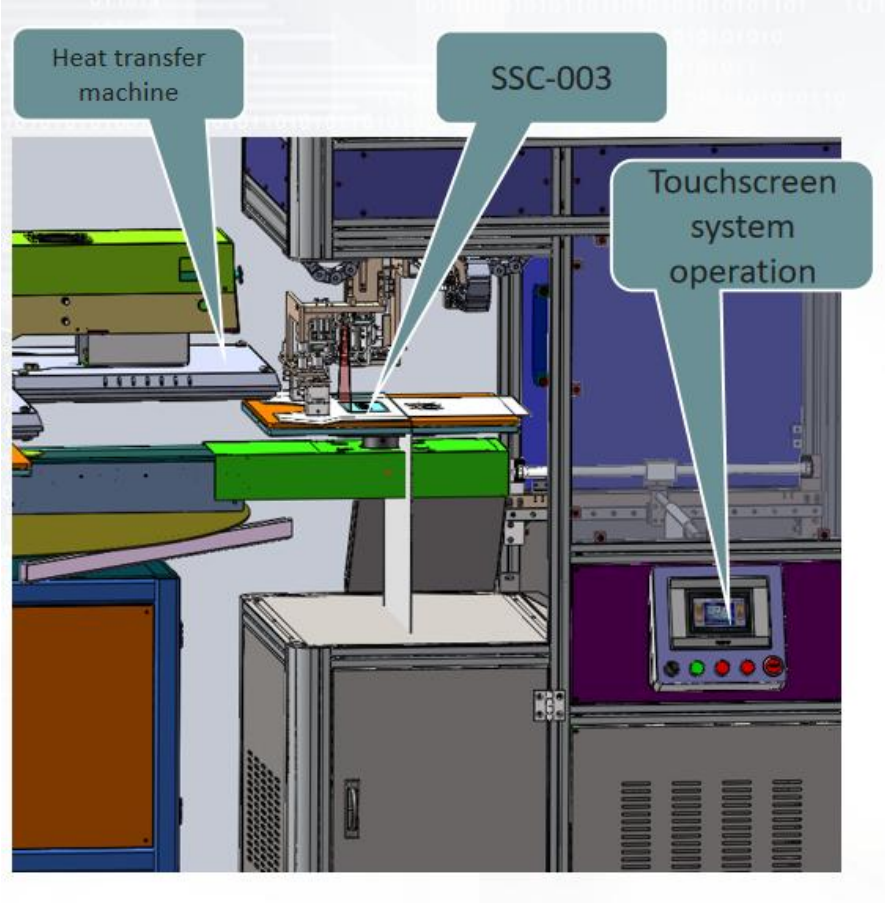


Fabric suction cup descends into position, presses for alignment, and the Y2-axis shifts to descend into position. The vacuum suction cup grasps the fabric, the Z-axis ascends simultaneously tearing the adhesive paper. The Y2-axis shifts to place the adhesive paper in the box, lowers it, while the R-axis ascends, and the X-axis shifts to retract the clothing.

2.4 Startup Operation

The heat transfer position is in place, detected by the automatic feeder which then

automatically grips and tears the adhesive paper to the specified position.



Setup Procedure:

Press the start button on the human-machine interface.

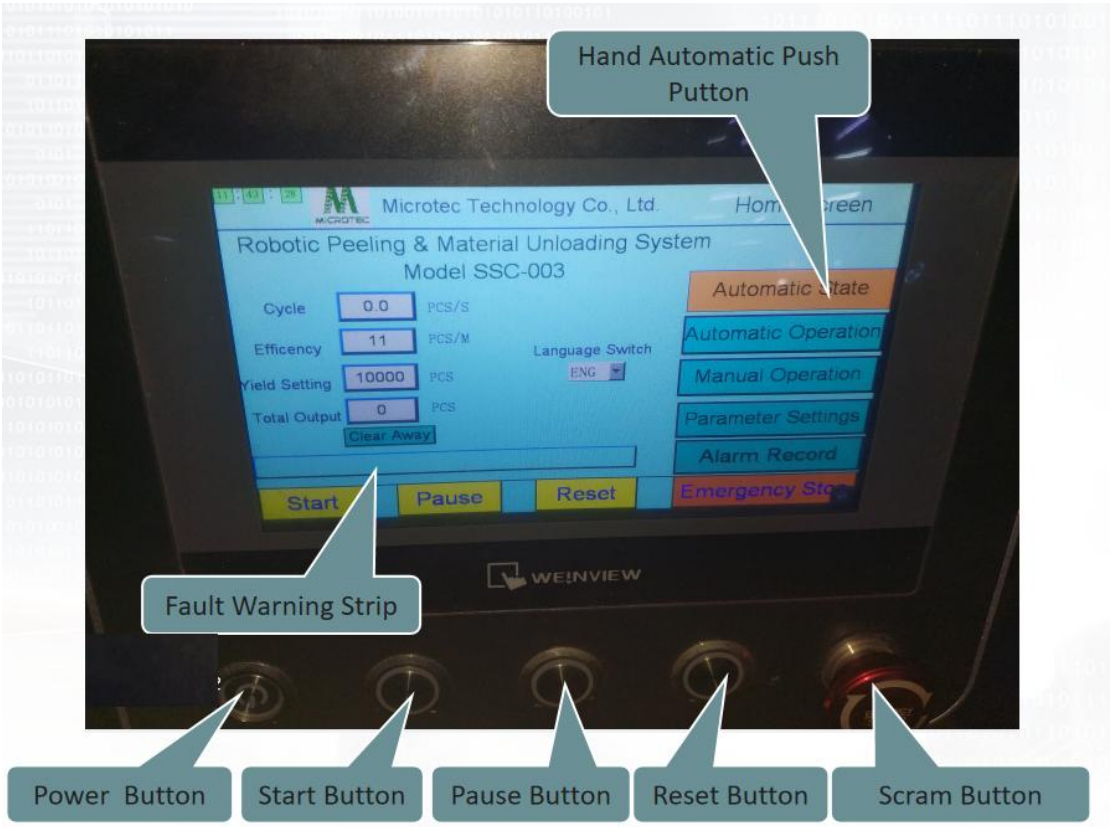
Wait for the workstation to reach its designated position and confirm its position detection.

Ensure that the four positions for heat transfer printing are in place and detected.

Detect the automatic feeder paper machine, then automatically grip and place the transfer paper onto the fabric from the fixture.

After placing the transfer paper onto the fabric, automatically retract to the original position, grip, and repeat the next action for continuous operation.

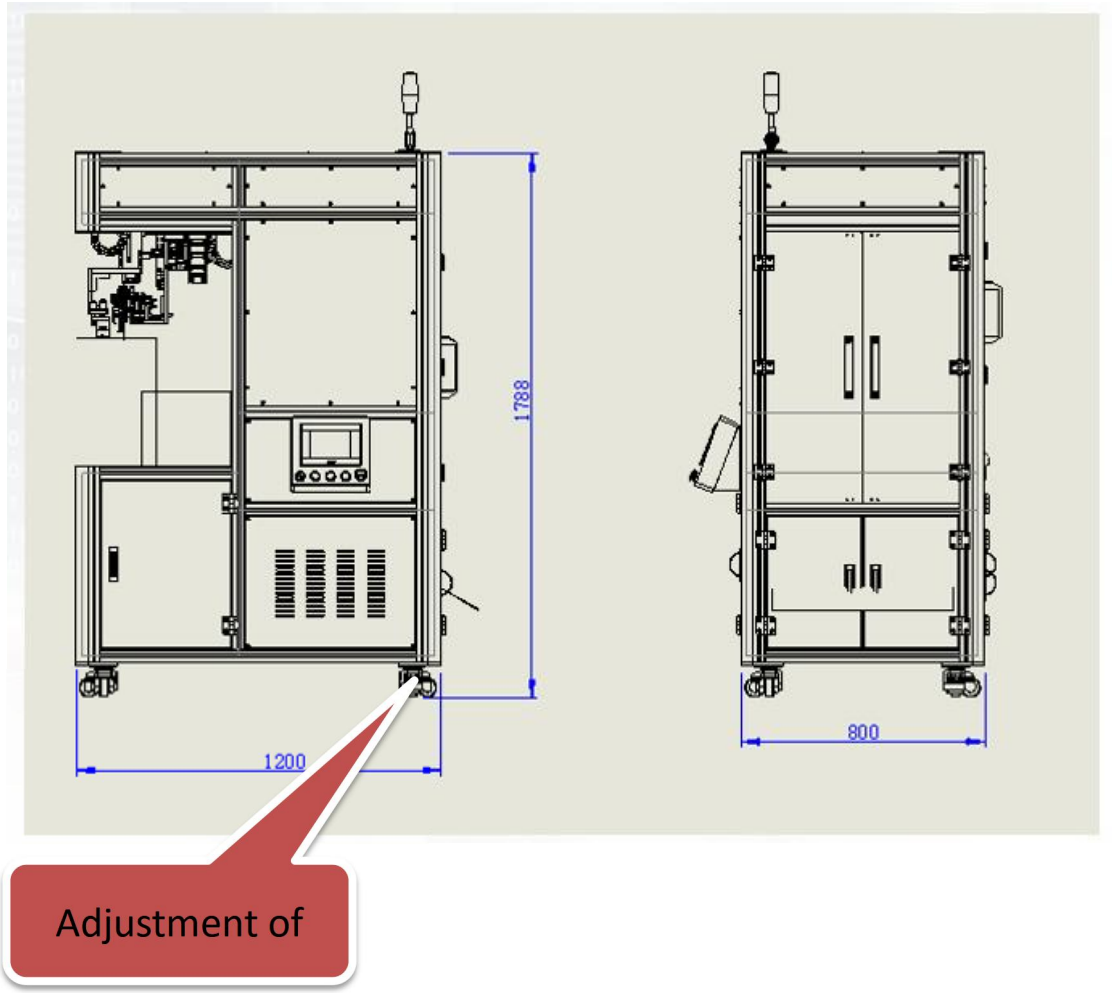
2.5 Manual Operation of the Human-Machine Interface



Automatic Clamp Replacement Method:

Replace the suction cup fixture manually by hand.
Use manual operation to manually retrieve the quick-change fixture.
Align the fixture directly, and on the human-machine interface manual screen, press the "Replace" button to install it with a single click.

2.6. Equipment Dimensions



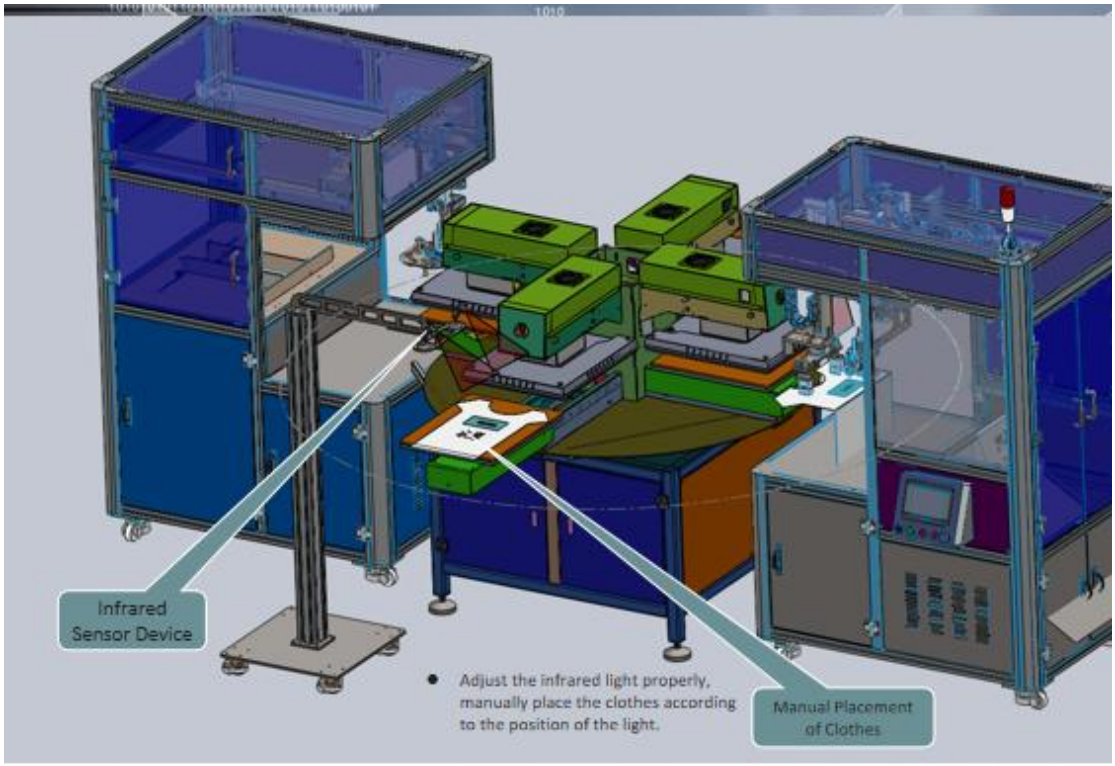
2.6 Button Function Update Instructions

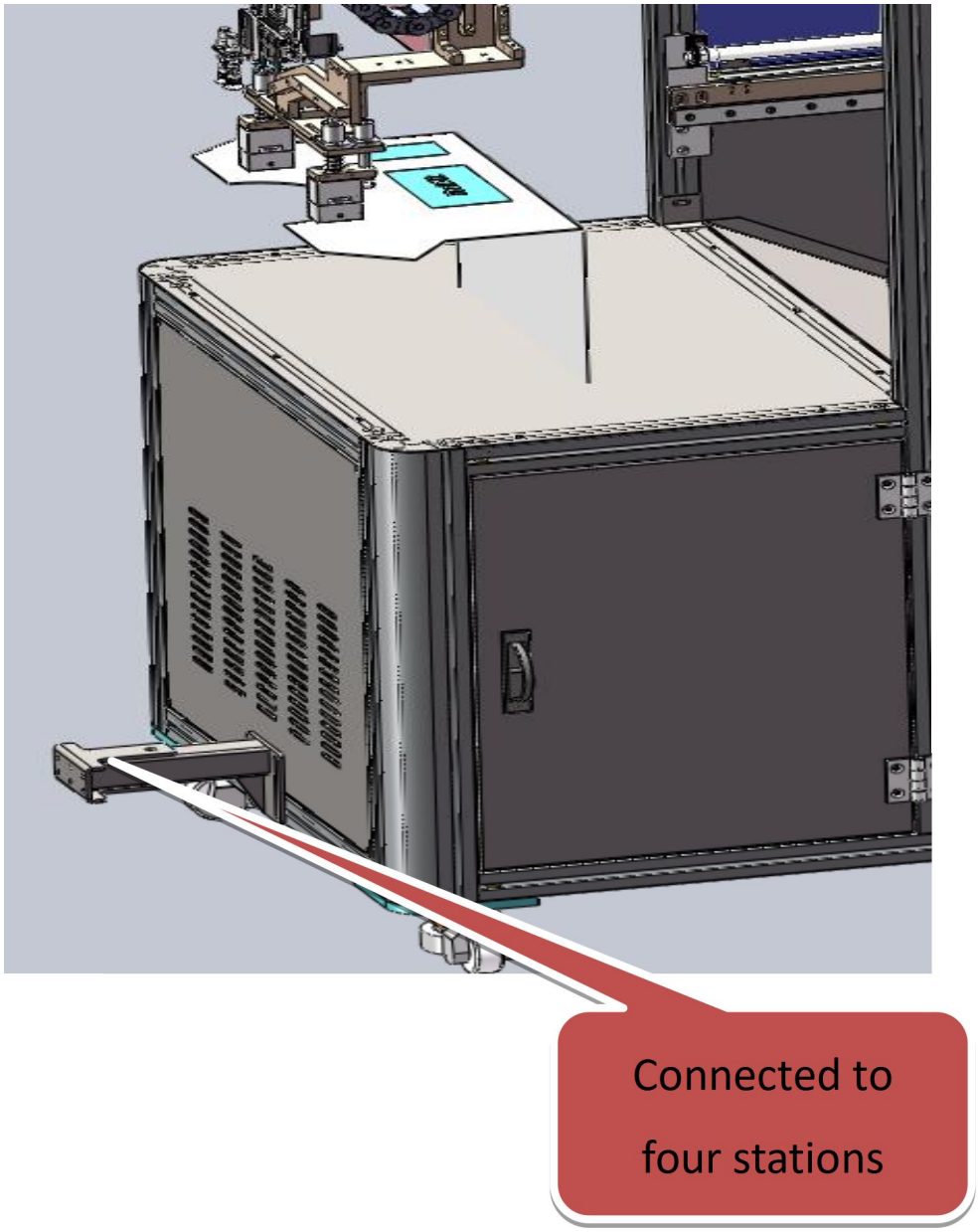
1.4.1 Human-Machine Interface (HMI) Operation Method:

Once the equipment is ready, turn on the power and press the reset button. The equipment will automatically reset to the standby position.

1.4.2 Press the start button to initiate operation. The display will show "Running..." with the button flashing blue.

Layout for Equipment Installation

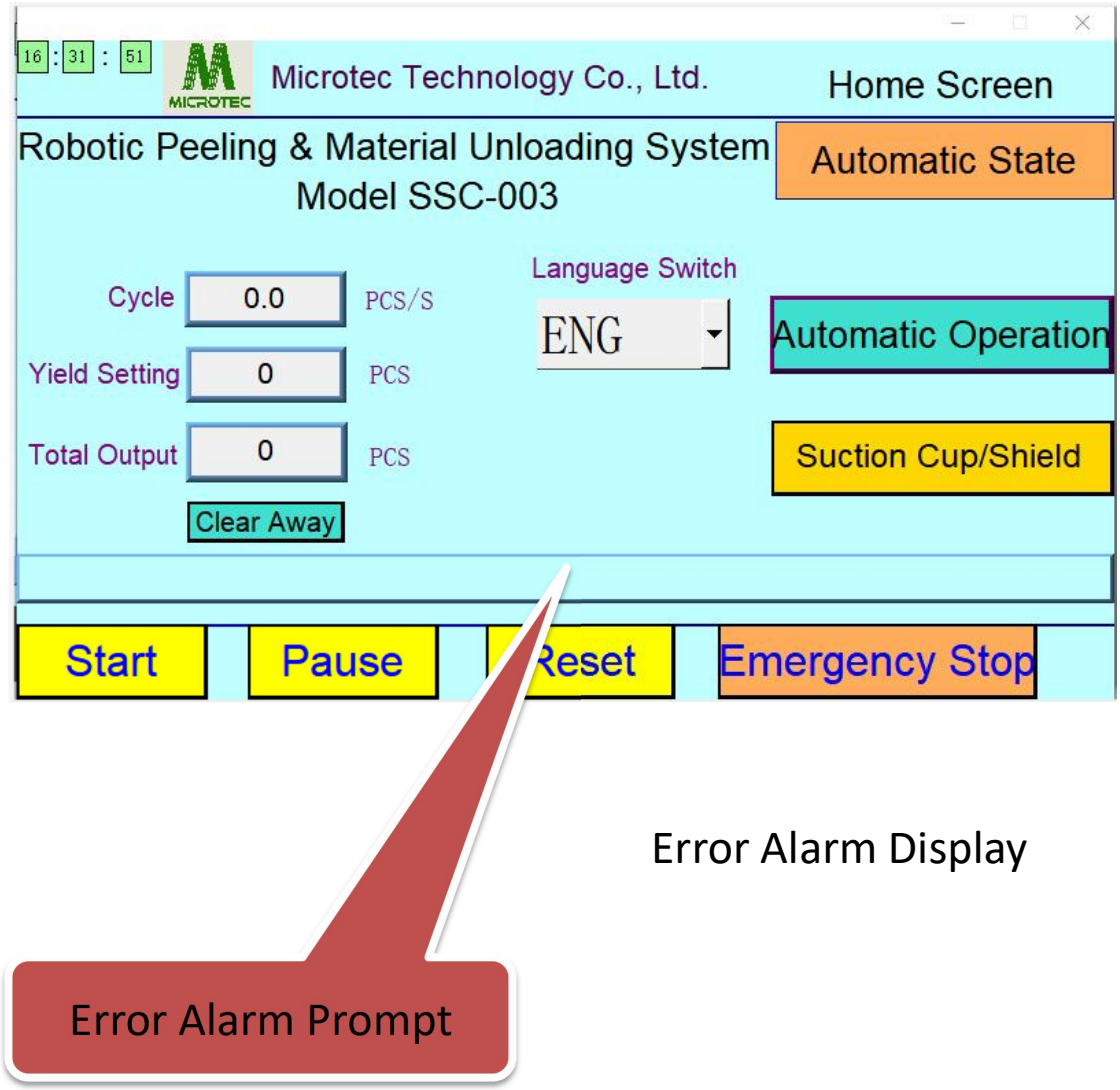




Chapter 3 Frequently Asked Questions (FAQs)

3.1Methods for Handling Alarms During Equipment Program Execution:

- During the operation of the equipment, the fault bar will be displayed on the human-machine interface and the machine will automatically stop. Follow the alarm messages to eliminate them one by one and press reset to clear them.



Chapter 4 |Handheld box programming method

4.1 Handheld box programming method:

Handheld box hardware features

Interface: Equipped with USB and serial ports, the USB port is used for connecting to a computer, while the serial port is used for connecting to a handheld box.

Storage: Flash memory chip.

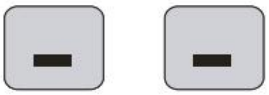
Display Configuration: Resolution of 320*240, 3.2-inch color LCD screen.

Part name	Type	Number	Introduction
Handheld box	Requisite	1	Operating teaching box
Controller	Requisite	1	Motion controller
SD card	Requisite	1	2G memory card
Data line	Requisite	1	Connecting line
Wiring board	Requisite	1	Wiring board

4.3 Handheld Box Keypad Diagram and Button Description

4.4 Handheld Box Button Description

Handheld Box Key Description

Appearance graphic of buttons	Name	Function
	Function key	Different pictures display different operation keys.
	Confirmation key	Enter key for data, parameter change and preservation.

	Direction key	XYZR direction key can control forward, backward, leftward and rightward, lifting and rotation motion of four axes. 〈MOVE〉 positioning key: used for manual point positioning and the needle alignment for the equipment.
	Numeric and alphanumeric key	Letter, number and point input. "#" switches input method.
Run	Start/download key	Download action command to the controller, start the machine.
Pause	Pause key	Suspense the current operation of the machine.
Reset	Reset key	The device is reset to zero.
F1	Multi-function key	Different images mean different functions.
F2	Multi-function key	Different images mean different functions.
F3	Multi-function key	Different images mean different functions.
F4	Multi-function key	Different images mean different functions.
CLR	Clear key	Clear the modified error parameter, numerical value. Clear the documents and instructions. Output cleared.

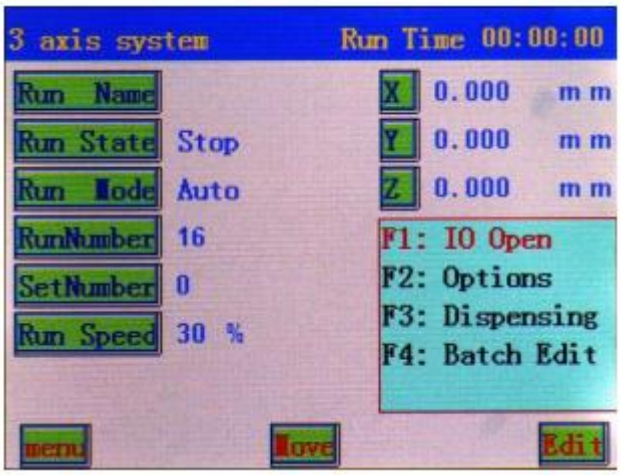
Warning

When operating this hand-held box, you must insert and pull out interface connnection wire when the power is disconnected, so as to prevent the controller and hand-held box from being burned.

4.5 Introduction to Startup Screen Handheld Box Operation

Instructions

After powering on, the handheld box automatically switches to the startup screen, displaying the current working screen, as shown in the following figure:

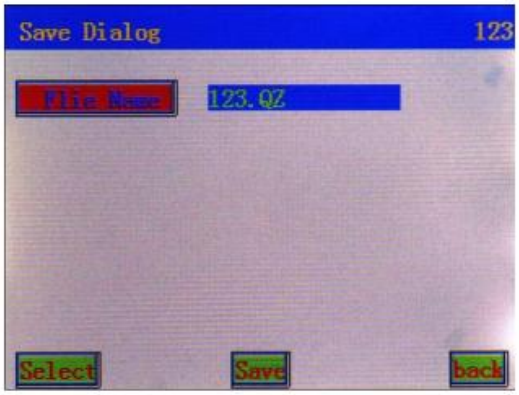


Processing File: Refers to the name of the processing file.
Working Status: Indicates the current working status of the machine, divided into three states: "Stopped, Paused, Running".
Working Mode: Refers to the operating mode of the machine, divided into two modes: "Manual Run, Auto Cycle Run".
Processed Quantity: Refers to the output completed by the machine during operation. When the processed quantity equals the set quantity, it indicates that the machine has completed the processing and will stop.
Set Quantity: Refers to the preset production quantity for the machine to run.
Working Speed: Refers to the speed of the equipment during operation, namely the trajectory speed of applying adhesive. This speed is a percentage of the speed set during instruction editing, ranging from 0 to 100%. On this screen, you can directly increase or decrease the percentage of the working speed by pressing the "Y" key on the directional keys. Pressing the "Z" key will increase or decrease the working speed percentage by 10 units. However, the working speed cannot be modified in real-time; changes to this speed will take effect during the next operation.
X: Refers to the current coordinate of the machine's X-axis.
Y: Refers to the current coordinate of the machine's Y-axis.
Z: Refers to the current coordinate of the machine's Z-axis.
R: Refers to the current coordinate of the machine's R-axis.

Press **"Edit"** to enter the instruction teaching dialog:

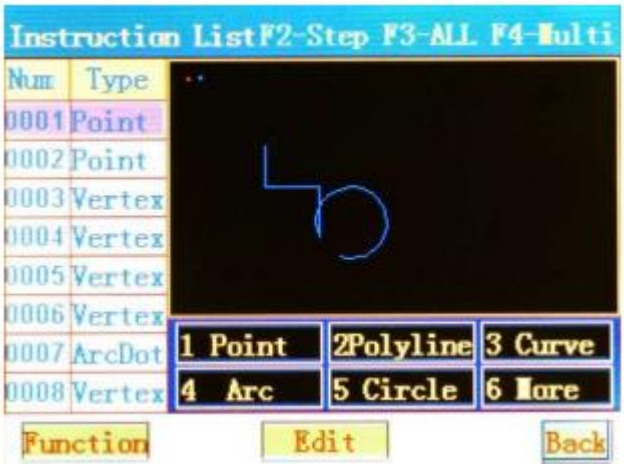
1. When there are no files in the controller, pressing "Edit" will create a new file. The system will automatically prompt the following dialog box:

The "Left Function Key" is for "Yes", and the "Right Function Key" is for "No". After selection, the system will automatically display the file saving dialog box. Enter the file name, press "Save", and you will enter the instruction teaching editing dialog box ("#" key is the switch key between numbers and letters). The instructions taught on this screen will be automatically saved under the file name just entered. As shown in the figure:



In the instruction list dialog box, pressing the number keys 1 to 5 allows you to edit the corresponding graphic elements shown in the figure. Pressing the number key 6 allows you to access more graphic options.

2. When there are files in the controller, pressing "Edit" will enter the instruction list dialog box, allowing you to modify and edit parameters and perform other operations. As shown in the figure:



Pressing the "X Key" on the keyboard's left side jumps to the first instruction in the current list, while the "X Key" on the right side jumps to the last instruction in the current list.
Pressing the "Y Key" on the keyboard's up side moves the current instruction upward, while the "Y Key" on the down side moves the current instruction downward. When multiple selections are made, the "Y Key" serves as the direction key for selecting instructions.
Pressing the "Z Key" on the keyboard's up side flips to the previous page of the instruction list, while the down key "Z Key" flips to the next page of the instruction list.
Pressing the "R Key" on the keyboard's up side enlarges the graphic display, while the down key "R Key" reduces the graphic display.
The "CLR" key clears the selected instructions in the list.

Pressing the "MOVE" key on the keyboard allows direct editing and modification of the coordinates of the selected instruction. (After multiple selections, pressing the MOVE key is for offset operation.)
Pressing the "#" key on the keyboard is used for aligning selected points. After alignment, all instructions in this file will be correspondingly offset.
In this screen:
"F1" is the jump selection function, which allows you to select non-continuous instructions (discontinuous instructions) for parameter editing.

Method: Select a target instruction, then press F1. The serial number position of the selected instruction changes color, indicating successful selection. Select the second target instruction, then press F1. By following this method, you can sequentially select all target instructions for parameter editing. To cancel jump selection, you can press F1 (to cancel a single instruction) or F4 (to cancel all).
"F3" is for selecting all instructions (i.e., select all).
"F4" is for selecting a segment of instructions (i.e., multiple selection), with cursor prompts.
Then, press "Operation" to perform operations such as copying instructions, array copying, offset operations, batch modification, automatic fillet, etc., on the selected instructions.

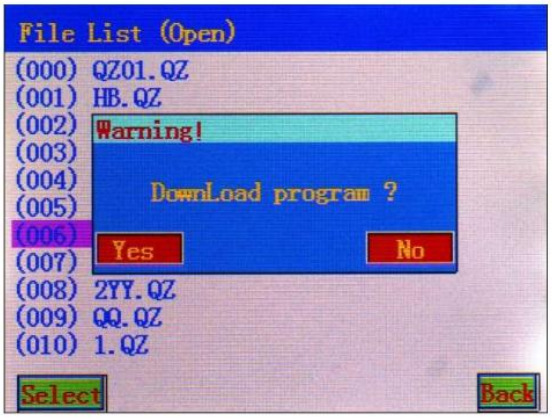
Copy Instructions: Refers to copying the selected instructions.
Array Copying: Refers to matrix copying of selected instructions.
Offset Operation: Refers to offsetting the selected motion instructions by a specified value.
Batch Modification: Refers to batch modification of a certain parameter, improving editing efficiency.
Automatic Fillet: Refers to the function of filleting between line segments, but only for filleting multiple lines.
In this screen, when the cursor selects only one instruction, pressing "Parameter Editing" will enter the following dialog box, allowing you to edit the parameters of the current instruction.

4.6 Main Menu Function Introduction

Press the menu key to enter the "Main Menu" screen, as shown in the following figure：

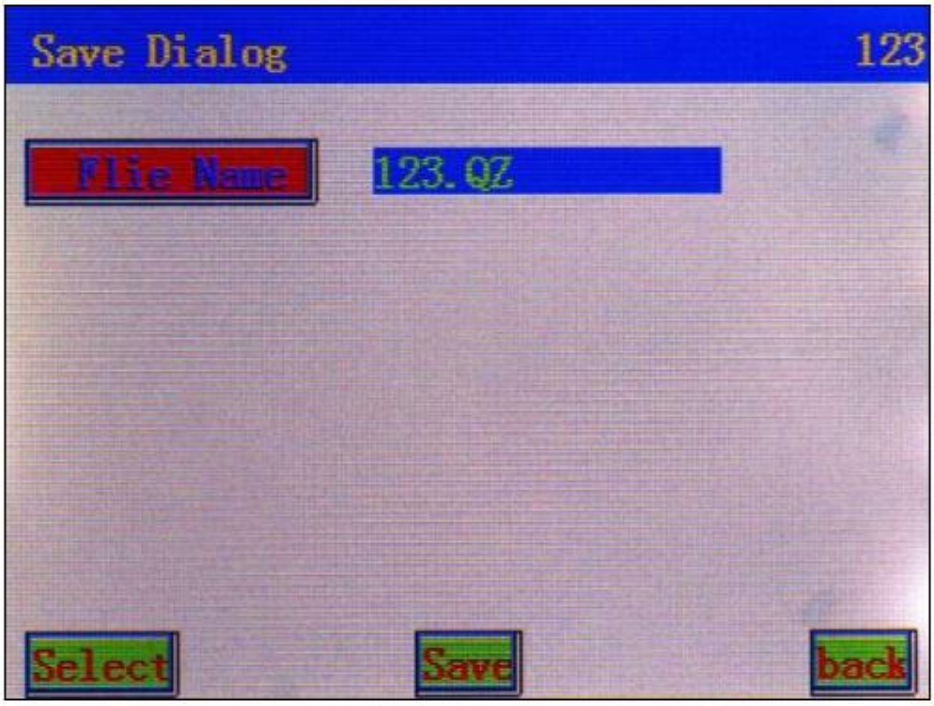
currently selected list of files, as shown in the following figure:

When select the file to be opened, it will prompt whether to download the program, "download" refers to that the instruction file is downloaded to the controller. As shown in figure:

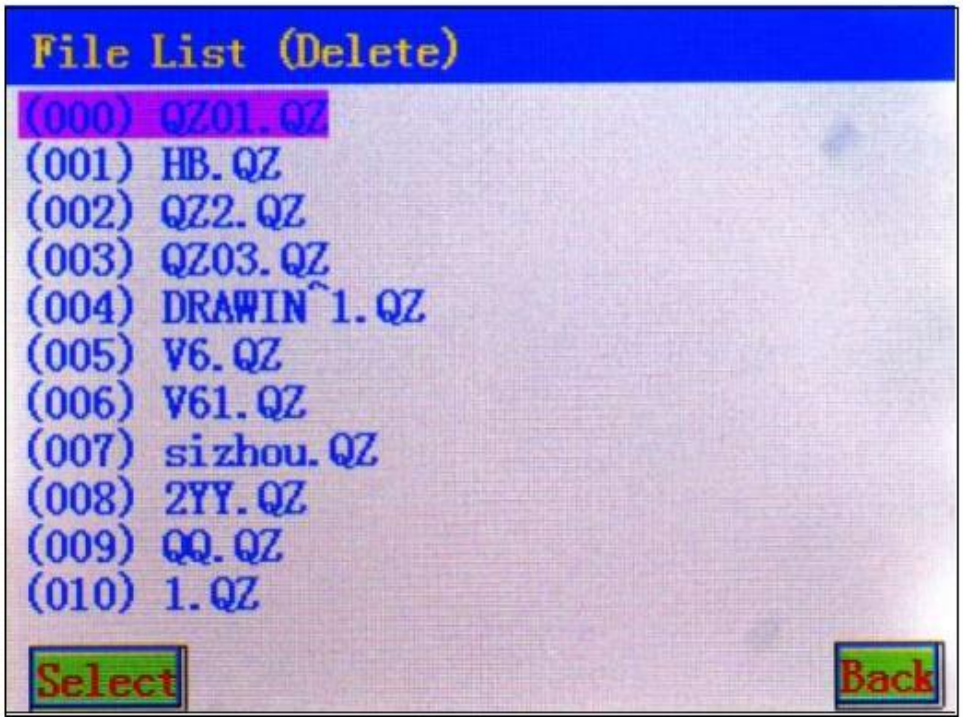


Selecting "Yes" will directly jump to the startup screen after the download is complete.
Selecting "No" will jump to the instruction list dialog box, displaying all instructions in the file, as shown in the figure：

Save the opened file as another file, after enter the file name, press "OK" key, the file is saved successfully; file name can be the number and English word, press "#" key to switch input method, as shown below:

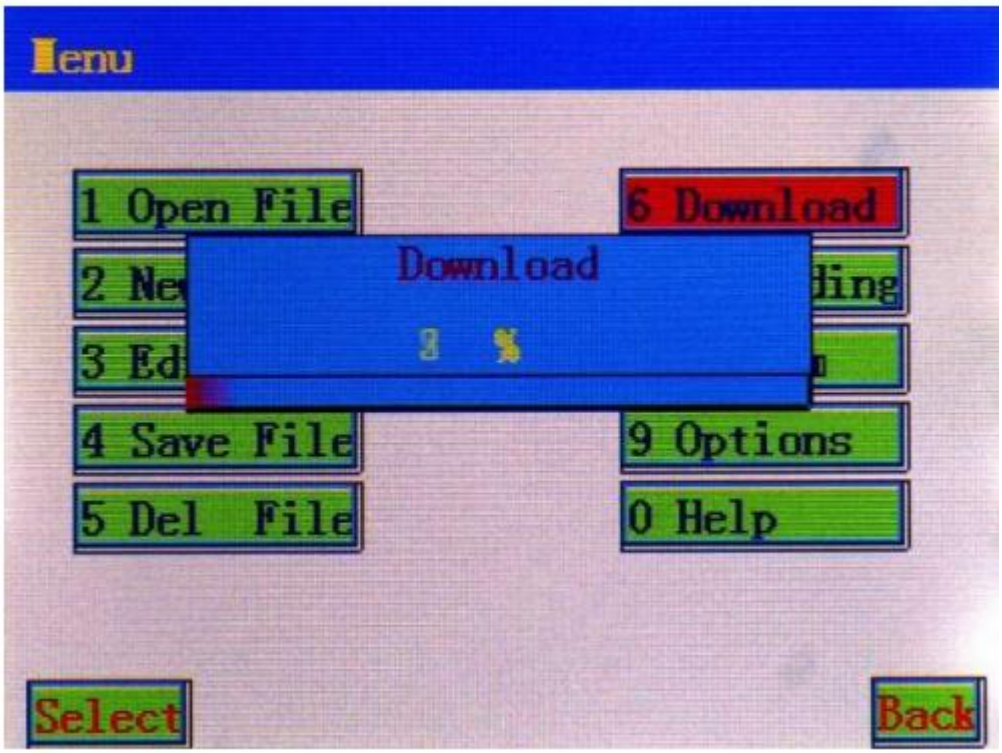


Delete the existing file name, press the "select" or "OK" button, then the files are deleted successfully; as shown below: select the file name to be deleted, press the "select" or "OK", then the files can be deleted successfully.



"Data download" menu

Download the files to the controller of device; as shown below:



4.11 Common Issues Explanation and Troubleshooting

This equipment installation is basically completed. The actual testing also needs to connect the gas path system for comprehensive debugging.

Notes on frequent problems	Troubleshooting
1. the system is not to reset	a) Check whether the power supply is normal; b) Check whether the drive is normal; c) Check whether the state of sensor is normal;
2. Communication is not normal	a) Check whether the serial port cable is damaged; b) Check whether the device completes the reset action; c) When the equipment is working properly, it only responses part of command "reset", "pause", other commands are not responsed.
3 3. The equipment can't start	a) Firstly check whether production has been completed, connect the handheld box to see, if production is completed, clear the yield; b) Check whether the start button is normal, you can use handheld box to control the equipment to start, to eliminate this failure; c) If the handheld box does not start, upload instruction from the controller with a hand-held box to check there is instruction in the controller; d) Check whether the device is authorized, when connecting with the handheld box, press the "start" button, pop-up the registered dialog box, the equipment is not authorized to use;