

Palletizing Workstation Packaging

Disassembly and Installation Manual

V1.0

Overview

The purpose of this tutorial is to guide users in unpacking and installing the new version of the palletizing workstation and its accessories upon receipt, and to provide instructions for basic debugging and testing.

Disclaimer

We have tested the content described in this document. However, errors are inevitable, and we cannot guarantee its absolute accuracy or that it will fully meet your usage needs. The content of this document may be updated at any time, and we welcome your suggestions for improvements. Please note that the document may be updated without prior notice in case of any changes.

Revision History



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Preface

This tutorial is designed to guide users in unpacking and assembling the palletizing workstation and its accessories upon receipt, and to provide instructions for basic debugging and testing.

The palletizing workstation is part of an ecological suite. We have provided a suite with many features, but it is not limited to specific use scenarios. Users are free to make secondary modifications to adapt it to more complex operational environments. However, please note that FAIRINO will not provide any support for issues caused by secondary modifications.

The palletizing workstation can be used in conjunction with an air circuit kit, and customers can choose the configuration based on their operational scenario. This manual will explain the installation of the standard air circuit.

Chapter 1: Description of Palletizing Workstation Goods

The packaging and shipment of the palletizing workstation includes the following two types:

- ① Type A: Does not include the robot; only the palletizing workstation body is packaged.
- ② Type B: Includes the robot, which has already been pre-installed onto the palletizing workstation body for packaging.

1.1 Packaging Specifications

Type	Type A	Type B
External Packaging Material	Engineered compressed wood board crate	Engineered compressed wood board crate
Internal Filler	Foam board	Foam board
Packaging Dimensions	1270*1000*1380 /mm	1570*1000*1650 /mm
Total Weight	280KG	390KG
Goods Details	Palletizing robot base *1 Base support legs *1 Forklift arm *1 Ramp auxiliary plate *1	Palletizing robot body *1 Collaborative robot *1 Base support legs *1 Forklift arm *1 Ramp auxiliary plate *1

Table 1-1: Packaging Specifications

1.2 Palletizing Workstation Bill of Materials

This list presents the overall components of the palletizing workstation upon completion, with some items being optional or to be installed by the user.

Palletizing Workstation Components			
Serial No.	Name	Quantity	Remarks
1	Base	1	
2	Electrical Control Cabinet	1	
3	Lifting Column	1	
4	Collaborative Robot Body	1	
5	Balance Leg	1	
6	Pneumatic Components	1	

Table 1-2 Palletizing Workstation Components

Base Components			
Serial No.	Name	Quantity	Remarks
1	Base	1	
2	Hydraulic Forklift	1	
3	Pallet Sensor	1	

Table 1-3 Base Components of the Palletizing Workstation

Electrical Control Cabinet Components			
Serial No.	Name	Quantity	Remarks
1	Rotary Circuit Breaker	1	
2	Air Switch	1	
3	Easy 521 PLC	1	
4	10A Three-Prong Socket (National Standard)	1	
5	16A Three-Prong Socket (National Standard)	1	

6	48V Switching Power Supply	1	
7	Gigabit Switch (8-slot)	1	
8	Collaborative Robot Control Box	1	
9	Cooling Fan	2	
10	Lifting Column Drive	1	

Table 1-4 Electrical Control Cabinet
Components for Palletizing Workstation

Lifting Column Components			
Serial No.	Name	Quantity	Remarks
1	Lifting Column	1	
2	Cable Drag Chain	1	

Table 1-5 Components of Lifting Column for Palletizing Workstation

Pneumatic System Components (Optional)			
Serial No.	Name	Quantity	Remarks
1	Pneumatic Component Mounting Plate	1	
2	Air Hose	1	
3	Suction Cup Connector	1	
4	Suction Cup Assembly	1	

Table 1-5: Components of the Lifting Column for Palletizing Workstation

Chapter 2: Palletizing Workstation Setup Process

2.1 Palletizing Workstation Assembly and Disassembly Steps

2.1.1 Assembly and Disassembly of Type A Packaging

① Place the palletizing workstation's packaging wooden crate on a flat surface.

Open the butterfly latches on the crate and remove the surrounding packaging boards.



② Unwrap the strapping bands and take out all the components:



In addition to the base, the package also includes the following components:

Ramp auxiliary board:



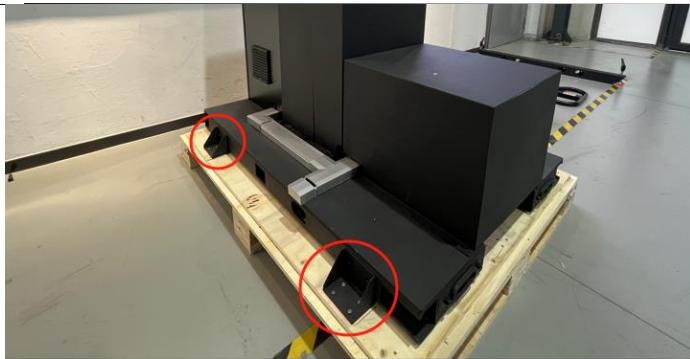
Hydraulic forklift arms:



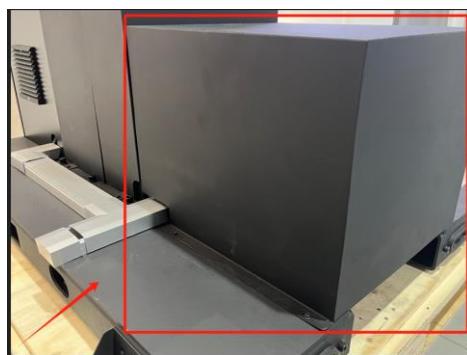
Base balance stabilizers:



- ③ Use a cross screwdriver and an Allen wrench to remove the four fixed angle irons on both sides of the base.



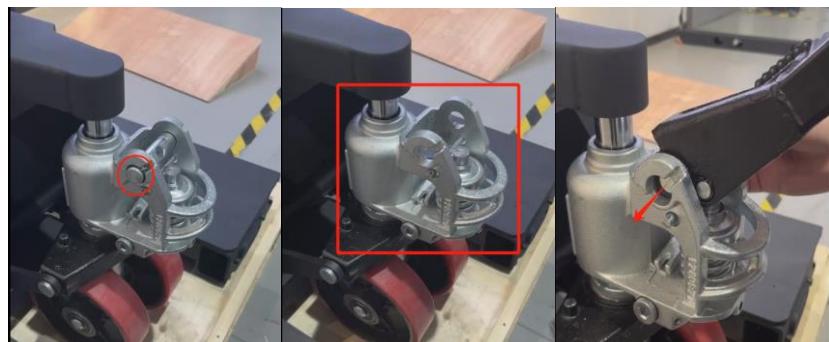
- ④ Use an Allen wrench to remove the forklift protective cover at the front of the robot, exposing the forklift body.



The following image is of the forklift hydraulic cylinder :



- ⑤ Remove the pin from the forklift connecting rod, pull out the connecting rod, and reattach the forklift arm to the hydraulic body using the connecting rod.



Gently press down on the forklift arm and remove the limit pin located below the connecting rod.



- ⑥ Place the ramp auxiliary plate in front of the pallet to form a unloading ramp.

Use the forklift to unload the stacking workstation base and place it on another flat surface.



- ⑦ Lower the hydraulic forklift to the ground, remove and store the forklift arm, and reinstall the forklift guard.



- ⑧ Remove the four fixing screws on the front end of the base's support legs, then insert the balance support legs into the limit holes. Use the left and right screw jacks to level the entire machine.



- ⑨ Take out the robot and install it onto the lifting column. Note that the cable exit hole should face the right side of the electrical control cabinet, as shown in the figure below:



Figure: Robot Arm Installation Posture



Figure: Direction of the Cable Exit Hole during Robot Arm Installation

- ⑩ Open the side buckle of the drag chain on the lifting column using a tool. Route the robot's heavy-duty cable along the drag chain, passing it through the side hole of the electrical control cabinet and into the cabinet. Use any tie strap to secure the heavy-duty cable.



Figure: Opened Cable Carrier Chain



Figure: Routing the Heavy-Duty Cable into the Cable Carrier Chain



Figure: Routing the Heavy-Duty Cable into the Electrical Control Cabinet

- ⑪ Use the provided key to open the control cabinet, and then use tools to remove the control box bracket.



Figure: Using the Key to Open the Control Box Lock

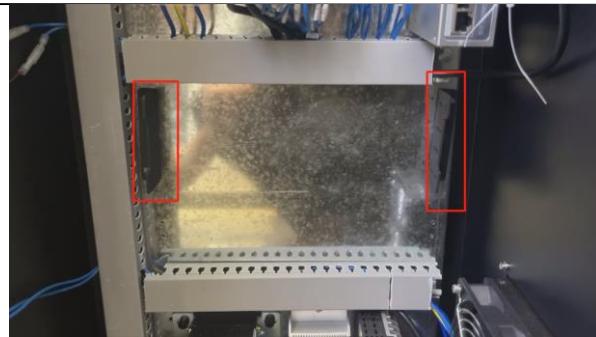


Figure: Control Box Bracket

- ⑫ Remove the fixing screws on both sides of the control box, install the control box bracket, and then mount the control box inside the electrical control cabinet.



Figure: Side Mounting Screws of the Control Box



Figure: Installing the Control Box Bracket onto the Control Box



Figure: Installing the Control Box into the Control Cabinet

- ⑬ Pass the teach pendant/button box through the wire outlet hole at the bottom right side of the electrical control cabinet.



- ⑭ Connect the heavy-duty cable and the teach pendant/button box connection cable to the control box.



- ⑯ Connect the power cable of the control box to the three-hole socket in the electrical control cabinet.



- ⑯ Take the three-color alarm light from the control box, pass the signal wiring harness of the alarm light through the cable hole at the bottom right side of the electrical control cabinet, and connect it to the PLC I/O card.



Figure: Cable Entry Hole of the Electrical Control Cabinet

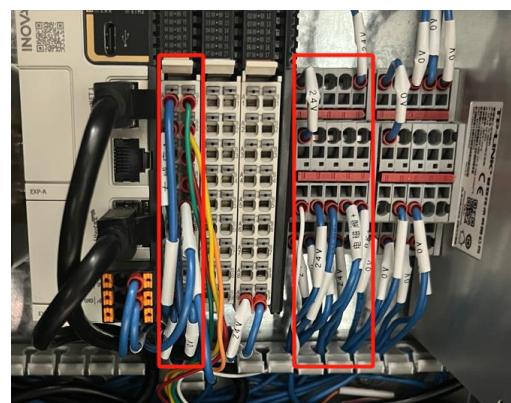
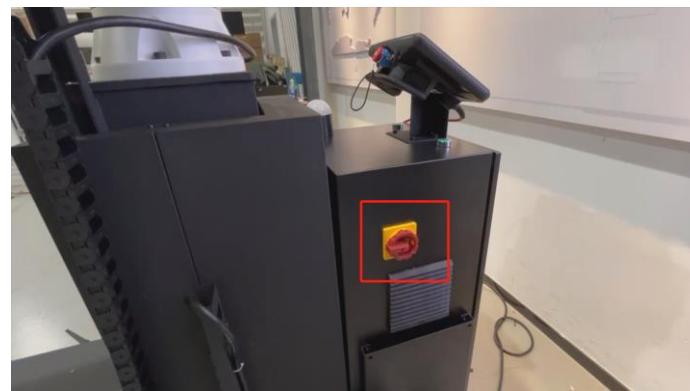


Figure: Cable Passing Hole of the Electrical Control Cabinet

The following diagram is the I/O interface definition diagram for the PLC signal light:

Serial No.	I/O Interface	Alarm Light Function	Cable Color
1	Y0	Green Light	Green
2	Y1	Yellow Light	Yellow
3	Y2	Red Light	Red
4	Y3	Buzzer	Orange
5	Power Terminal Block	24V	White

- ⑯ Connect the main power cable of the workstation to the external power socket, and rotate the rotary switch on the side of the electrical control cabinet to power on the entire system.



- ⑰ Once the robot is powered on, use the drag button on the robot's end effector to adjust the robot to its standard working pose as shown in the diagram below. At this point, the installation of the robotic arm for the palletizing workstation is complete.



2.1.2 B Assembly and Disassembly of Type B Packaging

- ① Place the palletizing workstation's packaging wooden crate on a flat surface.

Open the butterfly latches on the crate and remove the surrounding packaging boards.



- ② Remove the straps and take out all the materials. The materials are as follows:



- ③ Remove the robot's support rod clamp.



- ④ Insert the teach pendant/button box through the wiring hole at the bottom right side of the electrical control cabinet.



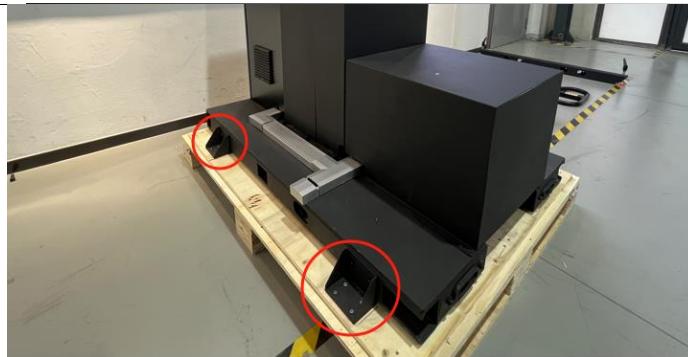
- ⑤ Connect the teach pendant/button box cable to the control box.



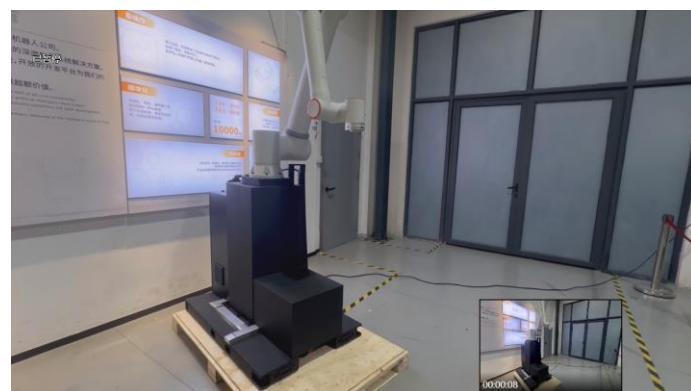
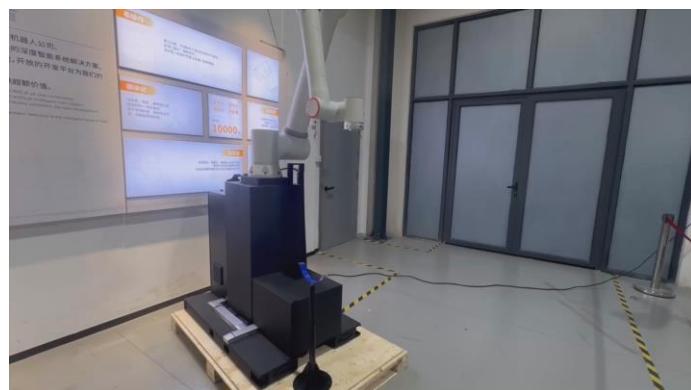
- ⑥ Connect the main power cable of the workstation to the external power outlet, and rotate the rotary switch on the side of the electrical control cabinet to power on the entire system.



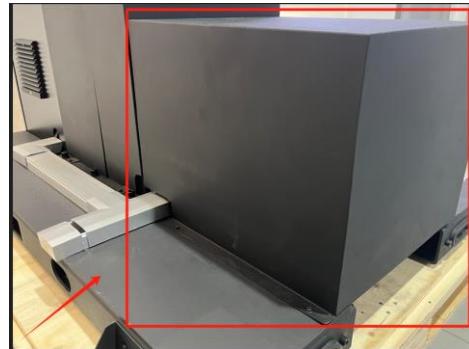
- ⑦ Connect the main power cable of the workstation to the external power outlet, and turn the rotary switch on the side of the electrical control cabinet to power on the entire system.



- ⑧ After the robot is powered on, use the drag button on the robot's end effector to adjust the robot to its normal working pose, then remove the robot support frame.



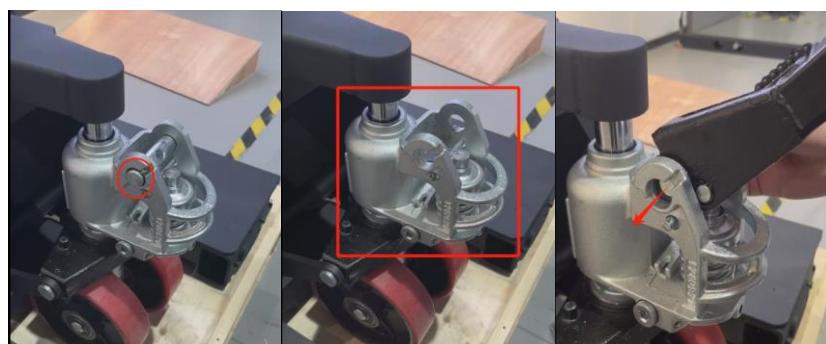
- ⑨ Use an Allen wrench to remove the forklift shield at the front of the robot, exposing the forklift body.



The following image shows the forklift hydraulic cylinder:



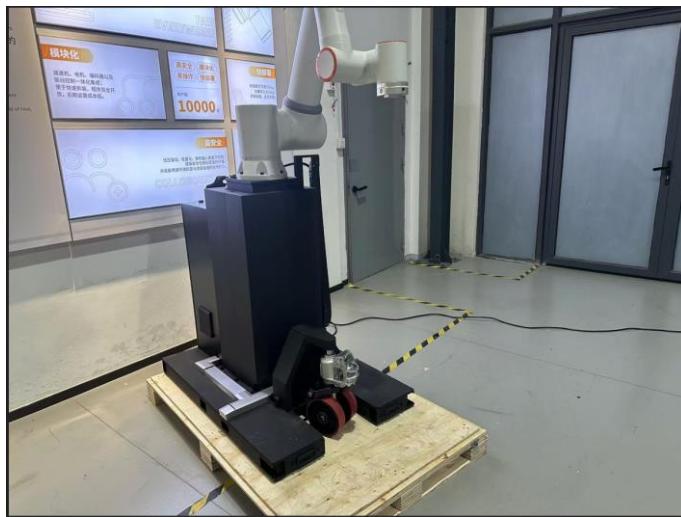
- ⑩ Remove the pin from the forklift linkage, pull out the linkage, and reattach the forklift arm to the hydraulic chassis using the linkage.



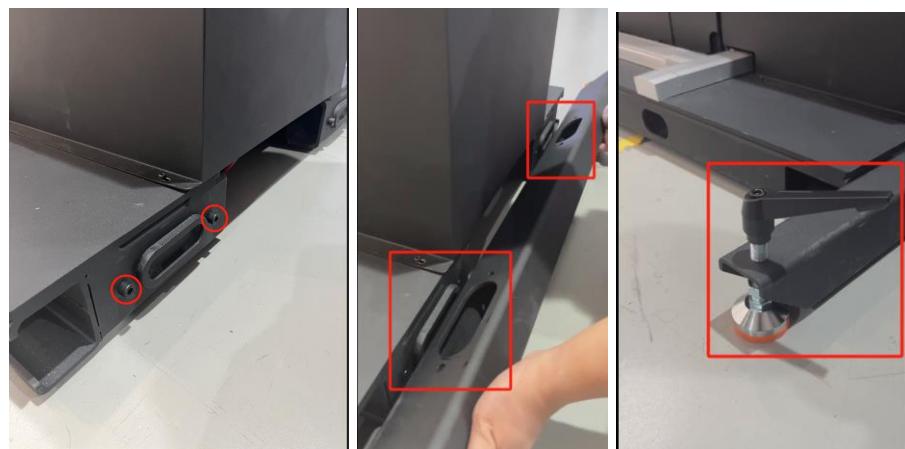
Gently lower the forklift arm and remove the limit pin beneath the connecting rod:



- ⑪ Lightly press down on the forklift arm and remove the limit pin beneath the connecting rod.



- ⑫ Remove the 4 fixing screws at the front end of the base, secure the balance leg into the limit hole, and use the left and right screw jacks to level the entire machine.



- ⑬ Remove the 4 screws securing the support legs at the front of the base, and hook the balance legs into the limit holes. Use the spiral foot supports on the left and right to level the entire machine.



Chapter 3: Installation of the Air Circuit Kit

3.1 Installation of the End Air Circuit

- ① Taking some standard components provided by FAIRINO as an example, the installation instructions for the end air circuit are provided. The air circuit includes the following components:

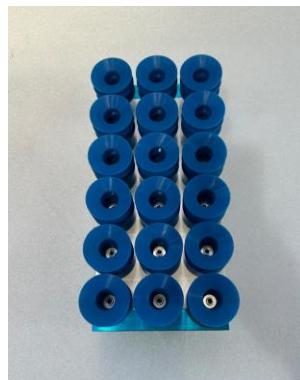


Figure: Suction Cup



Figure: Suction Cup Connector

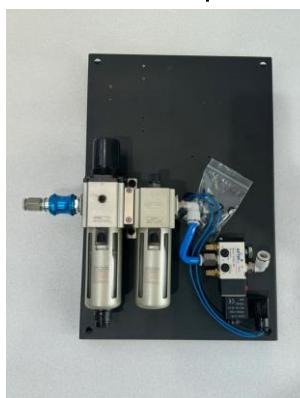


Figure: Pneumatic Component Mounting Plate

- ② Connect the solenoid valve signal wires from the pneumatic component mounting plate to the control cabinet through the wire passage hole on the

left side of the cabinet. Then, use the provided M3*12 screws to mount the pneumatic component mounting plate onto the side panel.

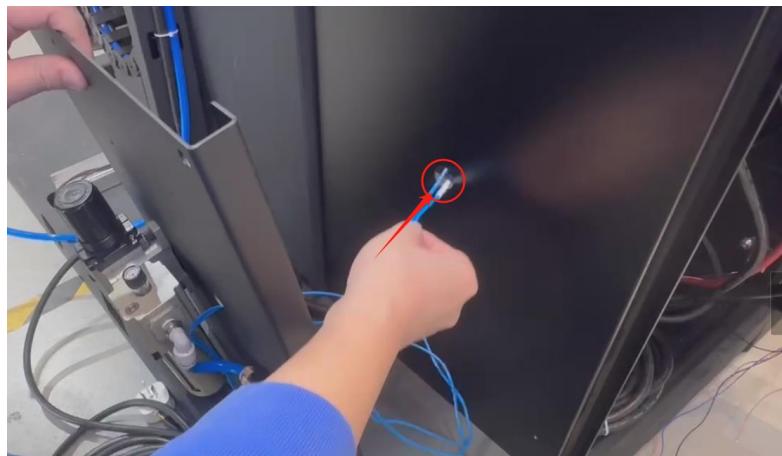
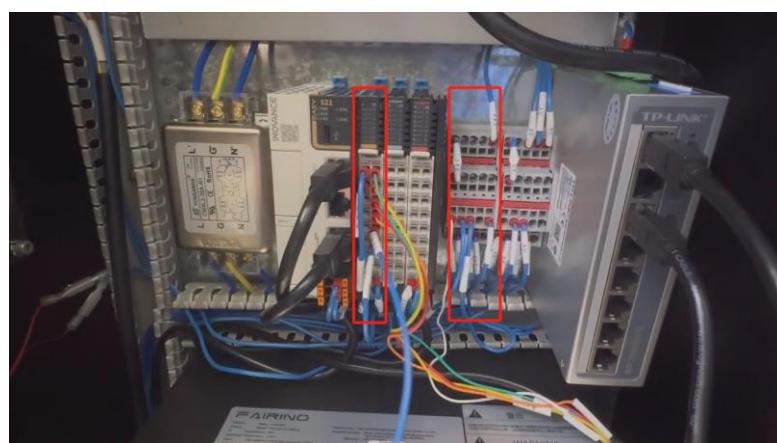


Figure: Connecting Solenoid Valve Signal Wires



Figure: Screw Locking Positions for Pneumatic Component Mounting Plate

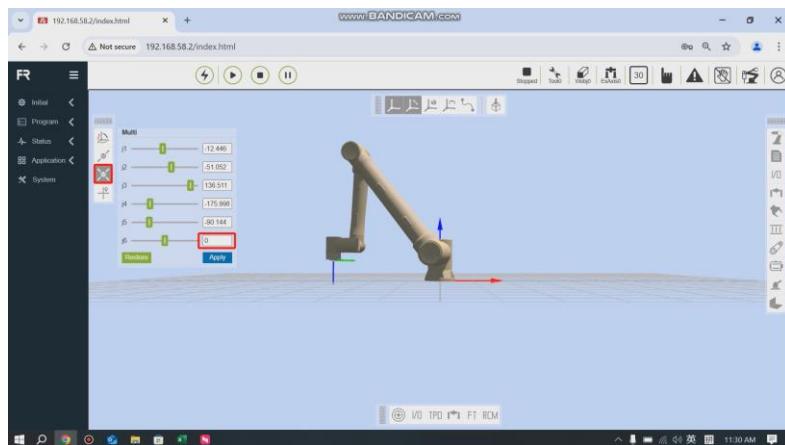
- ③ Connect the solenoid valve signal wires to the I/O interface of the PLC.



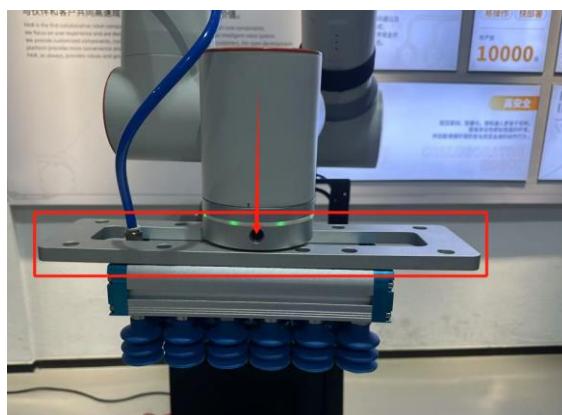
The corresponding wiring table for the extension axis I/O is as follows:

No.	I/O Interface	Wire Label
1	Y4	Solenoid Valve -
2	24V	Solenoid Valve +

- ④ Use the webapp interface and the joint movement function to move the 6-axis joint to 0°.



- ⑤ Install the suction cup mounting plate to the robot's end effector, and adjust the T-nuts on the suction cup to secure it to the mounting plate. (Note: The long side of the mounting plate should be aligned with the face of the 5-pin connector, as shown in the diagram below.)



- ⑥ Route the air hose along the robot arm, through the heavy-duty cable drag chain, and connect it to the exhaust port of the solenoid valve on the pneumatic component mounting plate.



- ⑦ Connect the external air source hose to the inlet of the regulator assembly, operate the manual sliding valve to supply air to the workstation, and use the pressure adjustment knob on the regulator assembly to adjust the air pressure.



Figure: Insert the external air source hose and operate the manual sliding valve



Figure: Lift the pressure adjustment knob to regulate the airflow

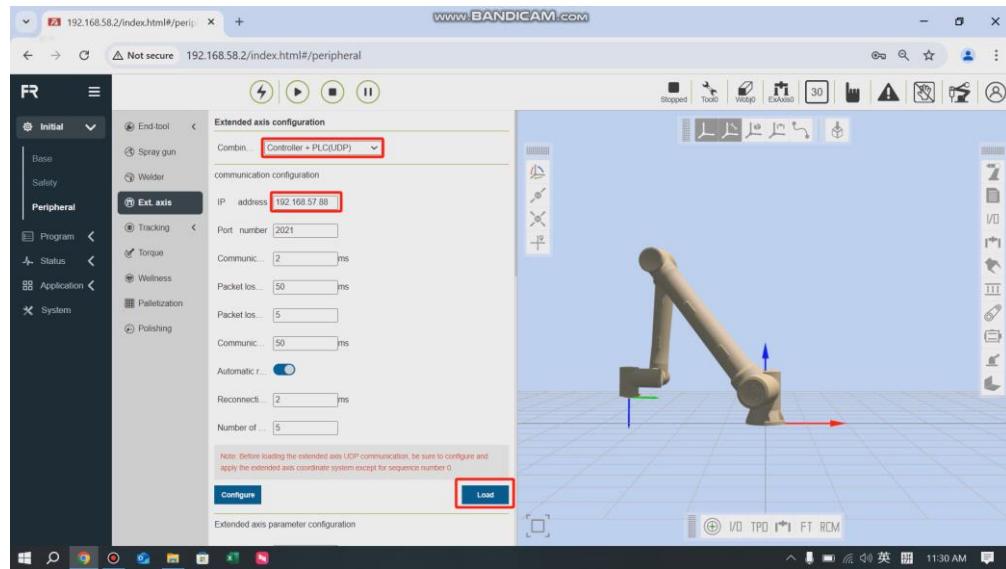
The air circuit assembly has been completed. The completed diagram is as follows:



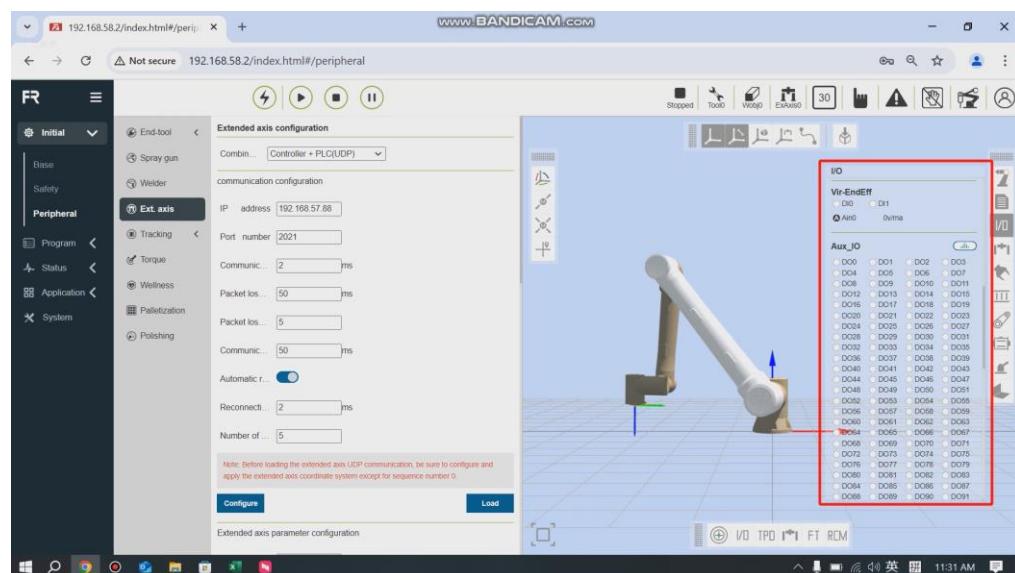
Chapter 4: Functional Testing

4.1 Robot UDP Communication Test:

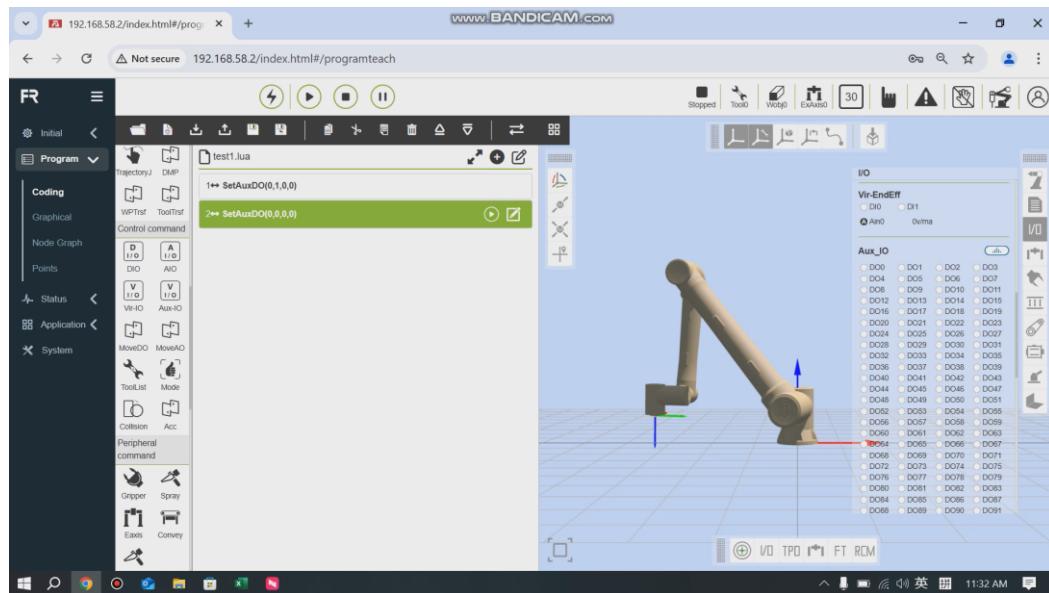
- ① In the web interface, go to "Initial" → "Peripheral" → "Ext.axis", select the combination mode as "Controller + PLC (UDP)", change the IP address to "192.168.57.88", and click "Load Function".



- ② Open the side IO panel to monitor the robot's extension IO status.



- ③ Enter the program teaching interface, create a new program, and add the program through "aux-io"



Write the Program:

NO.	Name	Explanation
1	SetAuxDO(0,1,0,0)	Turn ON DO0, Green light
2	WaitMs(1000)	Wait for 1 second
3	SetAuxDO(0,0,0,0)	Turn OFF DO0, Green light
4	WaitMs(1000)	Wait for 1 second
5	SetAuxDO(1,1,0,0)	Turn ON DO1, Yellow light
6	WaitMs(1000)	Wait for 1 second
7	SetAuxDO(1,0,0,0)	Turn OFF DO1, Yellow light
8	WaitMs(1000)	Wait for 1 second
9	SetAuxDO(2,1,0,0)	Turn ON DO2, Red light
10	WaitMs(1000)	Wait for 1 second
11	SetAuxDO(2,0,0,0)	Turn OFF DO2, Red light
12	WaitMs(1000)	Wait for 1 second
13	SetAuxDO(3,1,0,0)	Turn ON DO3, Buzzer
14	WaitMs(1000)	Wait for 1 second
15	SetAuxDO(3,0,0,0)	Turn OFF DO3, Buzzer
16	WaitMs(1000)	Wait for 1 second
17	SetAuxDO(4,1,0,0)	Turn ON Solenoid valve
18	WaitMs(1000)	Wait for 1 second
19	SetAuxDO(4,0,0,0)	Turn OFF Solenoid valve

- ④ In the interface, in manual mode, click the execution button next to the instruction to execute the program step by step and check if the signal light lights up properly.



Figure: AUX_IO Signal Monitoring



- ⑤ In manual mode, click the start button of the solenoid valve command to check if the end suction cup is sucking air. You can use a cardboard box for verification.



- ⑥ At this point, the UDP communication test verification is complete.

4.2 Lift Column Function Test

- ① On the web interface, navigate to "Initial" → "base" → "Coordinate" → "Ext.axis", create a new coordinate system named "exaxis1", and then click "Para config" to configure it.

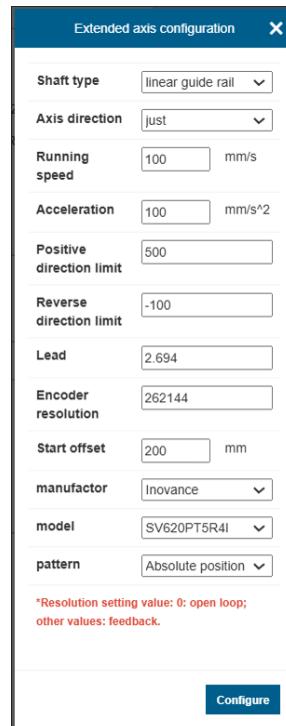
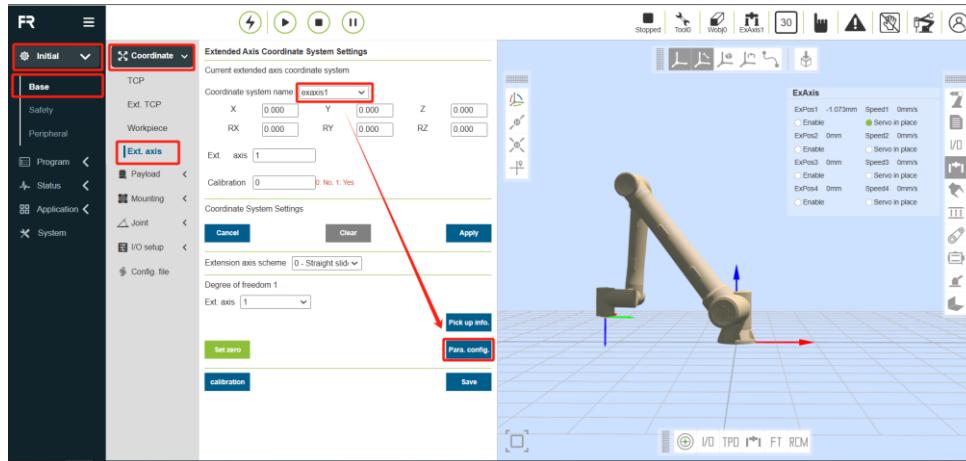
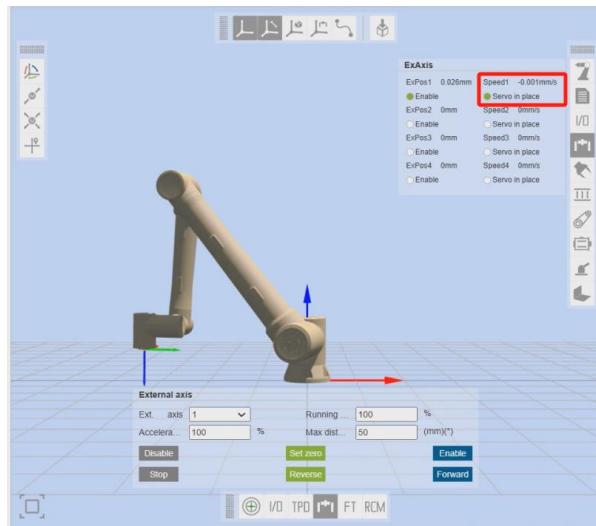
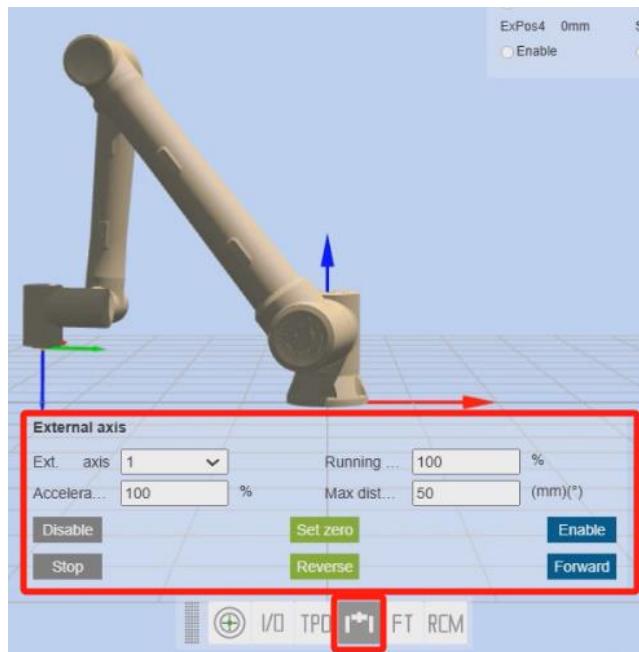


Figure: Extended Axis Parameter Configuration

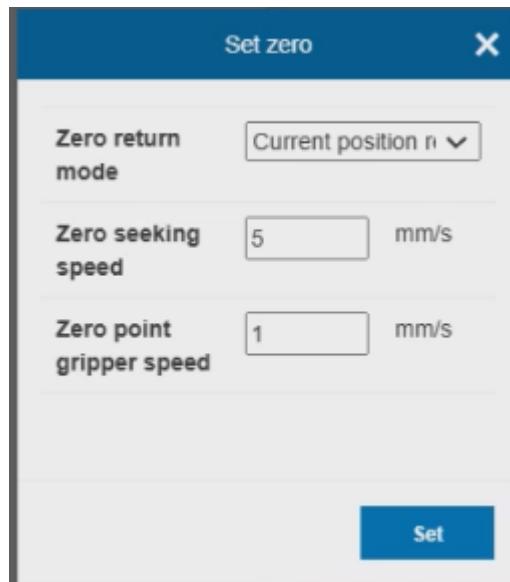
- ② After completing the configuration, click "Apply Coordinate System" to check the monitoring signal of the external extended axis and verify whether the extended axis position signal is present. (Note: UDP communication must be loaded in advance.)



- ③ Click on the extended axis operation interface below the robot model, then click "Servo Enable" to enable the extended axis.



→The extended axis is fixed at the origin position when it leaves the factory.
Click "Set Zero" and then "Current Position Zero Return to" to reset the extended axis position to zero.



→The new program is as follows:

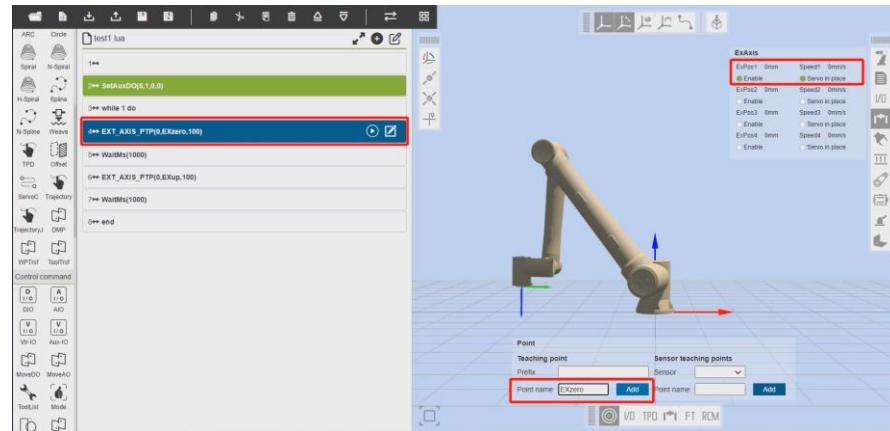
NO.	Program Content	Explanation
1	SetAuxDO(5,1,0,0)	Open the brake
2	while 1 do	Loop command
3	EXT_AXIS_PTP(0,EXzero,100)	Extend the axis to the "EXzero" position
4	WaitMs(1000)	Wait for 1 second
5	EXT_AXIS_PTP(0,EXup,100)	Extend the axis to the "EXup" position
6	WaitMs(1000)	Wait for 1 second
7	end	End the loop

→In manual mode, click to release the brake and unlock the lift column brake.

2↔ SetAuxDO(5,1,0,0)



→ At the zero position, select the 'Move to EXzero' command in the program list (non-execution instruction), and click to add the 'EXzero' waypoint.



→ In the extension axis control menu, enter the distance for a single movement, using 200 as an example. Click to rotate in the forward direction and check whether the lift column moves to a height of 200mm.

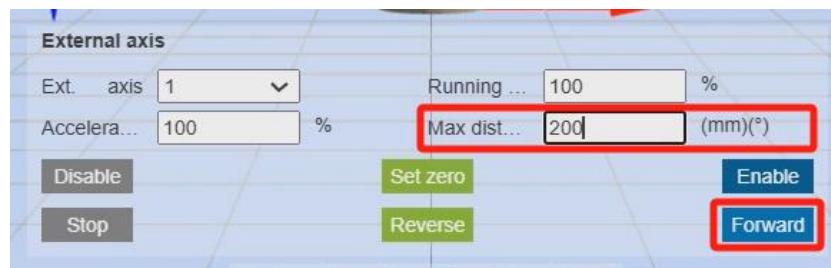
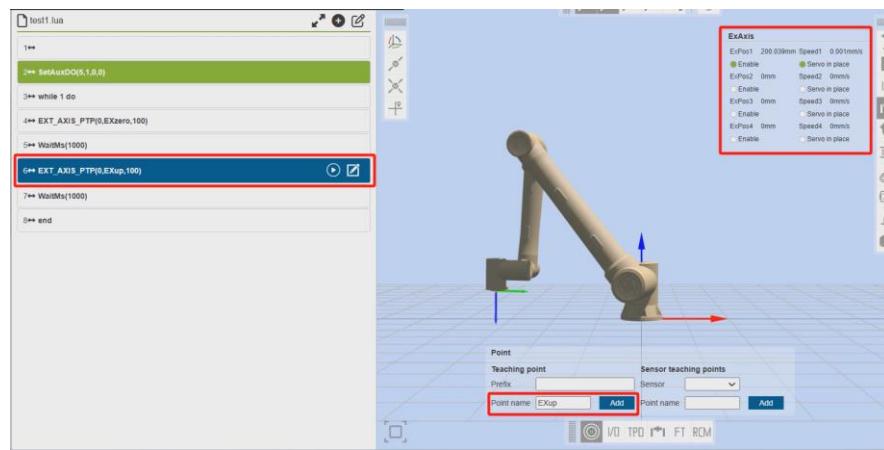


Figure: Extension Axis Monitoring Bar Position Feedback

→ At the zero position, select the 'Move to EXup' command in the program list (non-execution instruction), and click to add the 'EXup' waypoint."



→ In automatic mode, when running the program, the lift column will move back and forth between the 'EXzero' and 'EXup' waypoints.



Figure: Lift Column at the Lower Position



Figure: Lift Column at the Upper Position

- ④ With this, the lift column function verification is complete, and the palletizing workstation is now ready for operation.