Intelligent Collaborative Palletizing Robot

Manual

Preface

Thank you for choosing our collaborative palletizing robot. This manual is intended to provide you with comprehensive guidance on debugging and maintenance, ensuring your equipment operates safely and efficiently. Please read all instructions and safety information carefully before using this equipment.

Terminology Definitions

- **Collaborative Palletizing Robot:** An automated robot designed to work alongside human workers, capable of performing repetitive tasks such as palletizing.
- **User:** Personnel responsible for operating and maintaining this equipment.
- **Maintenance Personnel:** Individuals who have received professional training and are responsible for conducting regular inspections and repairs on this equipment.
- **Safe Operating Procedures:** A set of operational guidelines to ensure the safety of users and maintenance personnel during the operation and maintenance of the robot.

Table of Contents

Preface....1
1. Safe Operating Procedures....3
2. Installation Environment....4
3. Robot Workstation Installation....5
    3.1 Return the robot to the home position....5
    3.2 Inspect the robot's zero-point scale and check for damage to components....7
    3.3 Install the pallet board....8
    3.4 Install the photoelectric sensor....9
    3.5 Install the suction cup....10
4 Switching to Administrator Mode....12
    4.1 Setting Administrator Mode....12
5 Creating a New Recipe....16
    5.1 Carton Palletizing Pattern Configuration....16
    5.2 Creating a New Recipe....18
6 Multiple Pick-and-Place Setup....36
    6.1 Multiple Pick-and-Place Configuration....36
    6.2 Conveyor Line Settings....38
    6.3 Carton Feeding Direction Selection....39
    6.4 Creating Multiple Pick-and-Place Recipes....40
7 Teaching Pick Points....41
    7.1 Carton Pick Configuration....41
8 Pallet Coordinate System Settings....48
    8.1 Setting Pallet Height Difference....48
9 Setting the Collision Avoidance Function....49
10 Production Settings....51
    10.1 Entry Point Position Compensation Parameter Description....52
11 Robot Jogging....54
    11.1 Single-Axis Jogging of the Robot....54
    11.2 Robot World Coordinate Jogging....56
    11.3 Robot Mechanical Scale Zero Setting....58
12 Robot Startup....63
    12.1 Precautions for Starting Robot Operation....63
Conclusion....70
Update Log....70

1. Safe Operating Procedures

1.1 General Safety Guidelines

- **Electrical Safety:** Ensure proper grounding of the equipment to prevent electrical accidents.
- **Operating Environment:** Keep the work area clean and free of obstacles, and ensure there is sufficient space for robot operation.
- **Personnel Training:** All operating and maintenance personnel must undergo professional training and be familiar with the equipment's functions and safety procedures.

1.2 Personal Protective Equipment Requirements

- **Safety Helmet:** Prevents head injuries.
- **Safety Shoes:** Prevents foot injuries.
- **Protective Gloves:** Prevents hand injuries.
- **Hearing Protection:** Wear hearing protection when working in high-noise environments.

1.3 Emergency Stop Procedures

- **Emergency Stop Button:** The equipment is equipped with an emergency stop button. Press it immediately in case of an emergency.
- **Power Cut-Off Procedure:** Be familiar with the power cut-off procedure to ensure that the power supply can be quickly disconnected in emergency situations.

1.4 Power Management

- **Power Connection:** Use power cables that meet the required specifications to connect the equipment.
- **Stable Voltage:** Ensure the power supply voltage is stable to prevent damage to the equipment caused by voltage fluctuations.

1.5 Avoiding Collisions and Pinch Injuries

- **Work Area Monitoring:** Before operation, ensure that there are no people or obstacles within the work area.
- **Robot Motion Range:** Be aware of the robot's range of motion and avoid entering hazardous areas.

2. Installation Environment

2.1 Environmental Requirements

- **Temperature:** The equipment should operate in an ambient temperature range of 0°C to 45°C. (When operating under low-temperature conditions, the higher viscosity of grease and lubricating oil may cause errors or overload. In such cases, preheat the robot at a low speed.)
- **Humidity:** Relative humidity should not exceed 85% (without condensation).
- **Floor:** The equipment should be installed on a solid and level surface.

3. Robot Workstation Installation

3.1 Return the robot to the home position

This is the robot's posture as configured at the factory [Figure 3-1]. The robot should be installed in an appropriate position. After powering on the robot, it is recommended to set the speed at approximately 30% and return the robot to the home position [Figure 3-2].

Figure 3-1

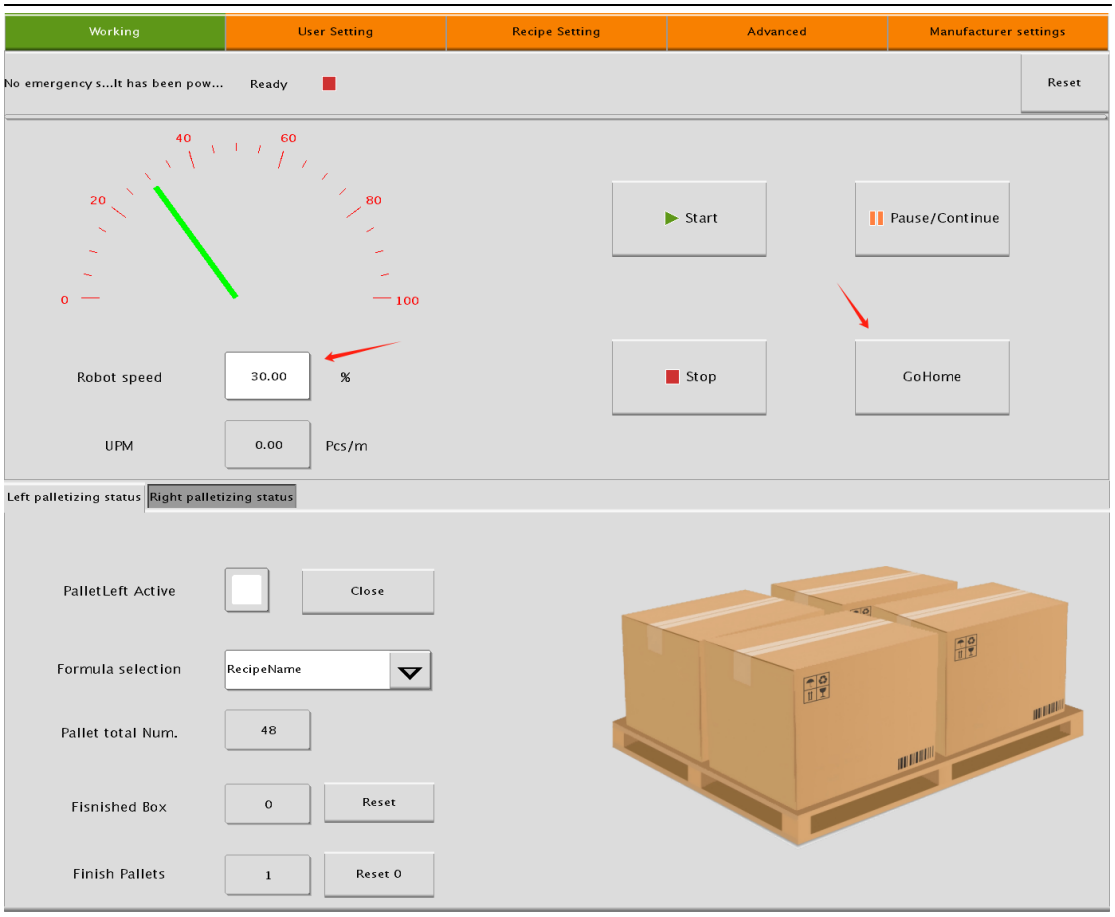

Working
User Setting
Recipe Setting
Advanced
Manufacturer settings
No emergency s...lt has been pow...
Ready
Reset
0
20
40
60
80
100
Start
Pause/Continue
Robot speed
30.00
%
Stop
GoHome
UPM
0.00
Pcs/m
Left palletizing status
Right palletizing status
PalletLeft Active
Close
Formula selection
RecipeName
Pallet total Num.
48
Fisnished Box
0
Reset
Finish Pallets
1
Reset 0

Figure 3-2

3.2 Inspect the robot's zero-point scale and check for damage to components

This is the robot's posture at the home position. Check whether there is any damage to the surface of the robot's joints, and verify whether the scale aligns with the robot's standard home position reference (see the section on jogging the robot) [Figure 3-3].

Figure 3-3

3.3 Install the pallet board

Place the left or right pallet board flush against the diagonal of the robot's base corner [Figure 3-4].

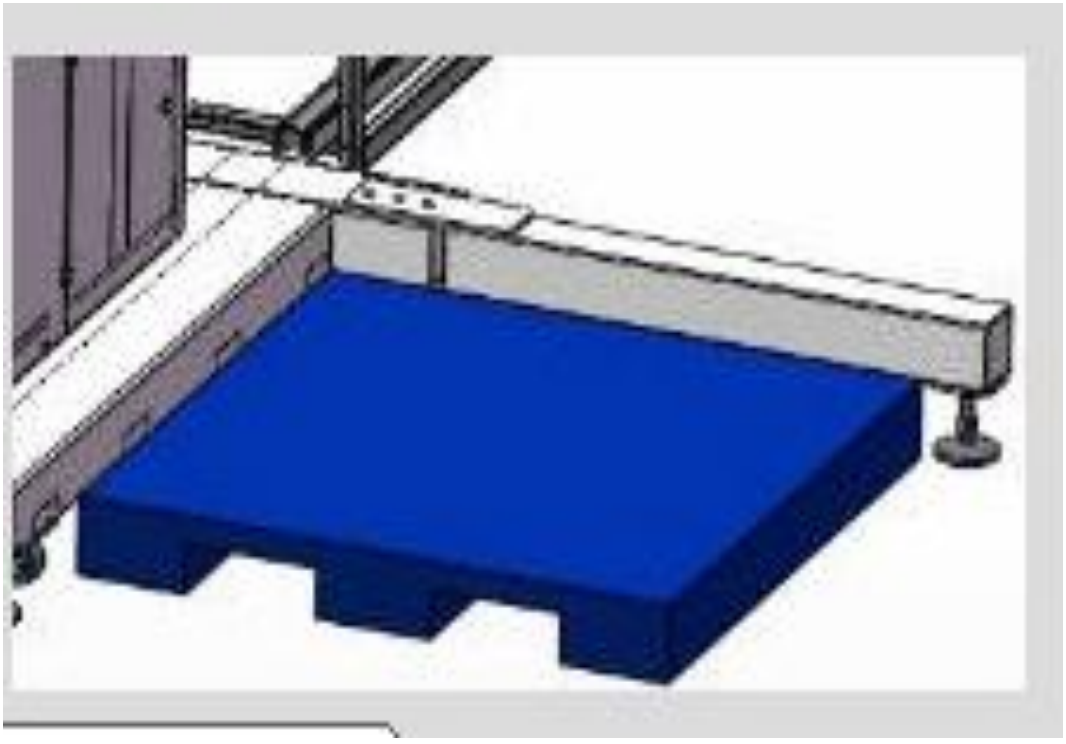


Figure 3-4

3.4 Install the photoelectric sensor

Install the photoelectric sensor on the conveyor roller line. Adjust the sensor sensitivity for both the left and right incoming lines, as well as the conveyor roller line [Figure 3-5].

Figure 3-5

3.5 Install the suction cup

Manually move the robot's fifth axis to an appropriate position, then install the suction cup and air tube. After installation is complete, return the robot to the home position [Figure 3-6].

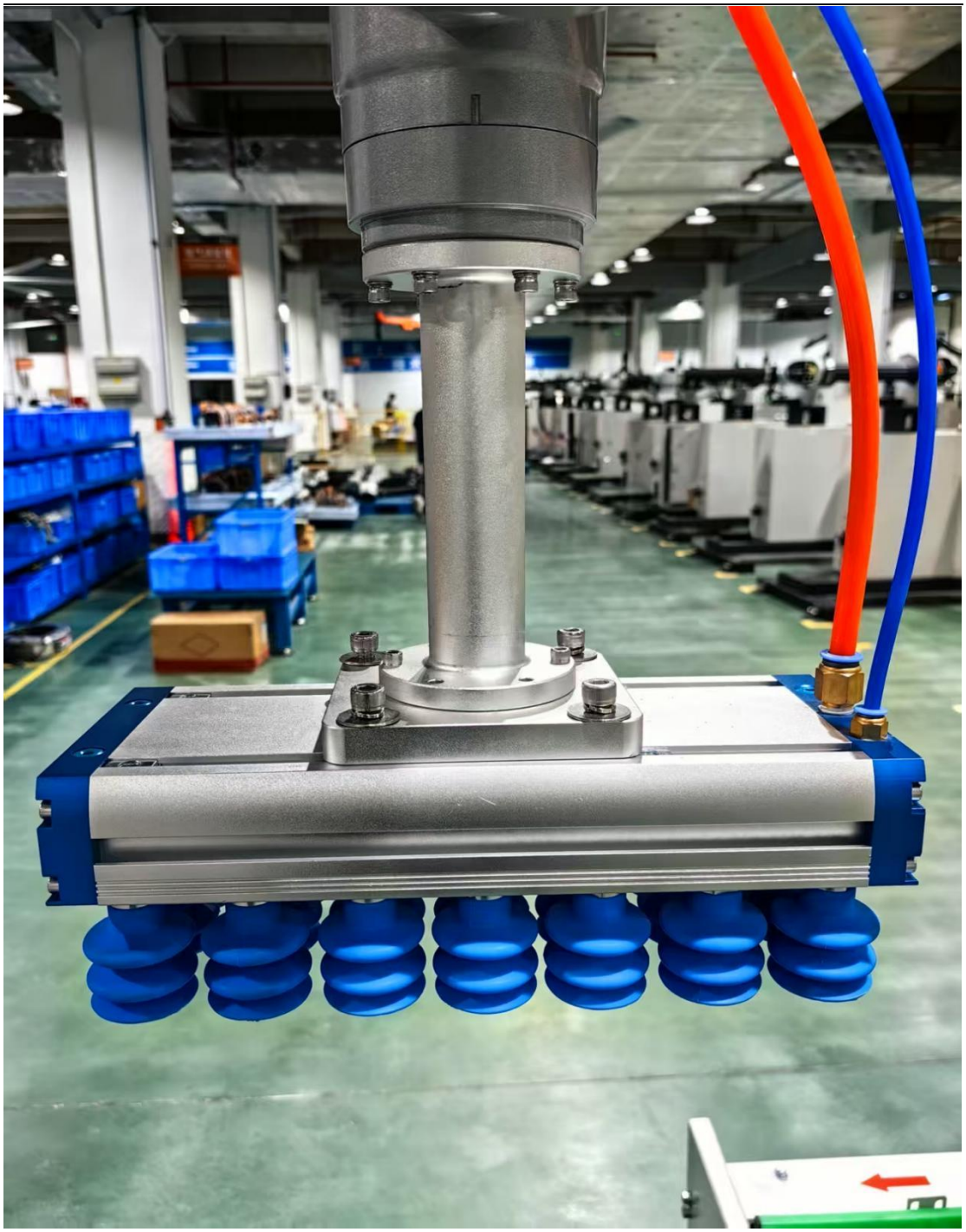


Figure 3-6

4 Switching to Administrator Mode

4.1 Setting Administrator Mode

Click on "Recipe Settings." If the interface appears as shown in [Figure 4-1], the current mode is Operator Mode. You need to switch to Administrator Mode, because Operator Mode does not allow you to create or modify new recipes or teaching pickup points. The purpose of Operator Mode is to retain the existing recipe in the event of a power outage. The method for switching to Administrator Mode is as follows.

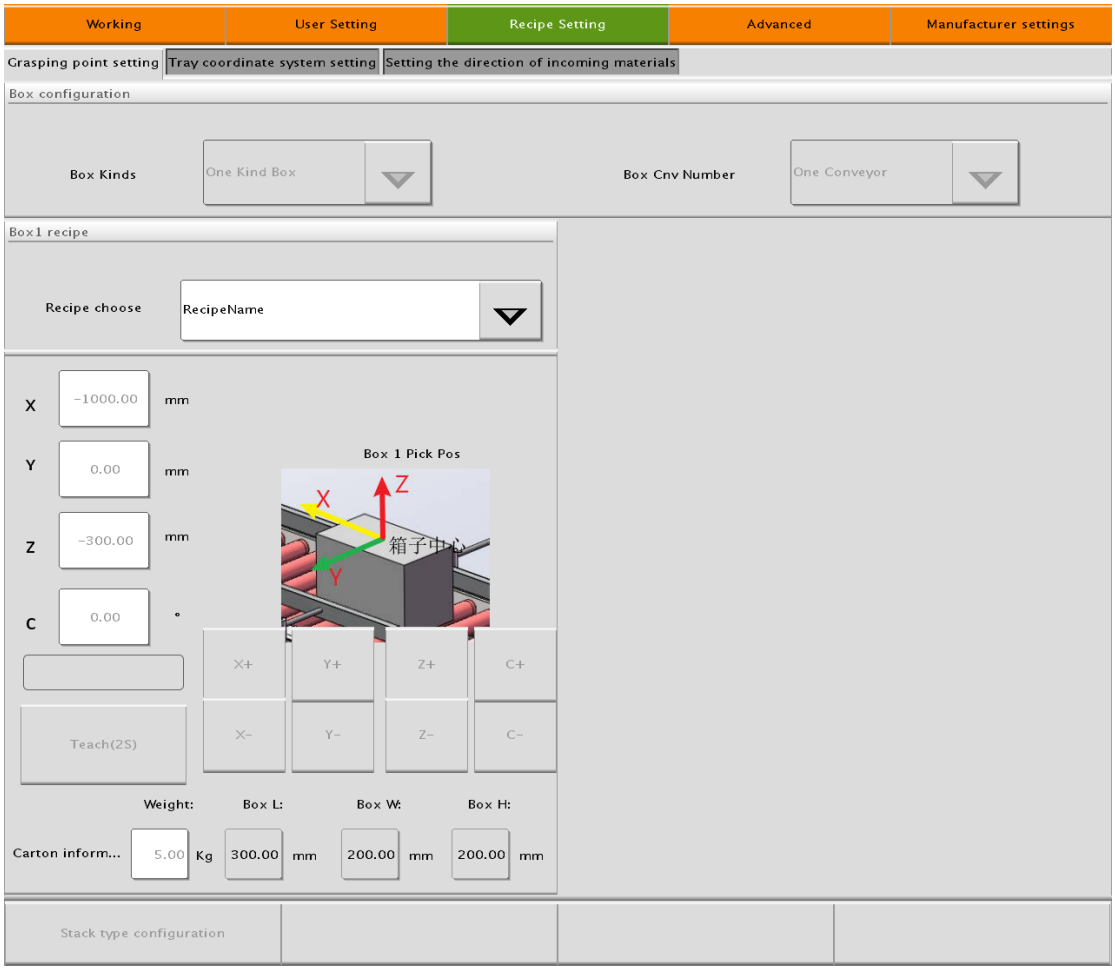


Figure 4-1

Click "Manufacturer" to enter the interface, then click "User Login" to proceed to the next step [Figure 4-2].

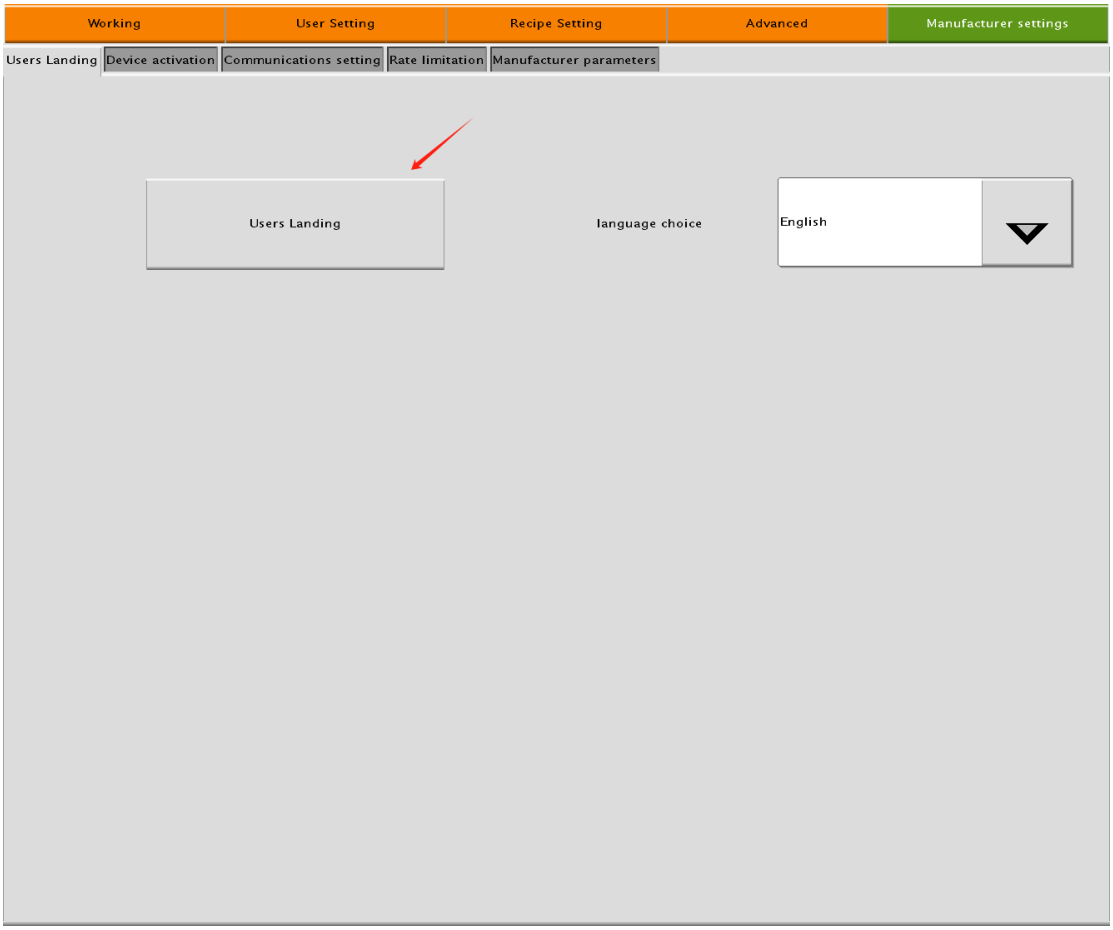


Figure 4-2

On the "Login" interface, click the drop-down arrow and select "Administrator" [Figure 4-3].

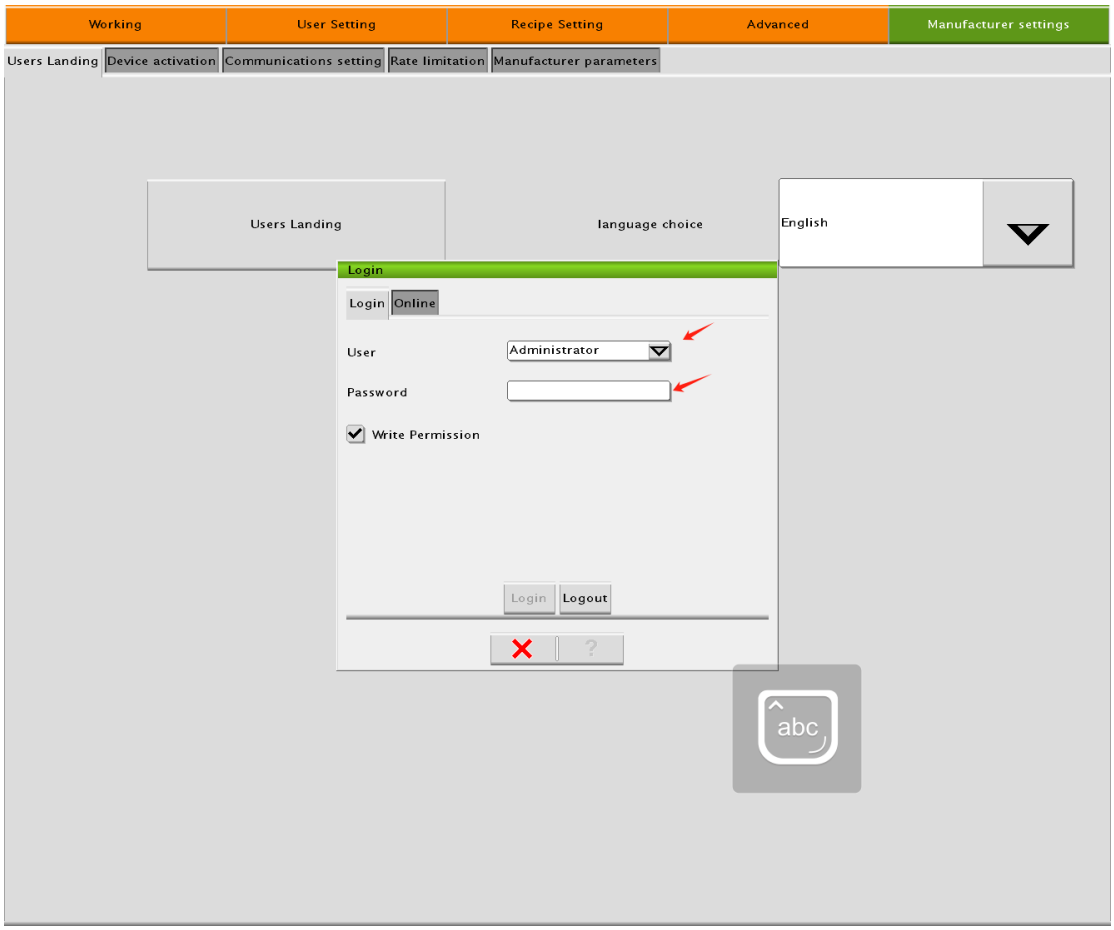


Figure 4-3

Enter the password: pass, then click Login. Administrator Mode will be successfully enabled.

5 Creating a New Recipe

5.1 Carton Palletizing Pattern Configuration

Click "Recipe" to enter the interface [Figure 5-1].

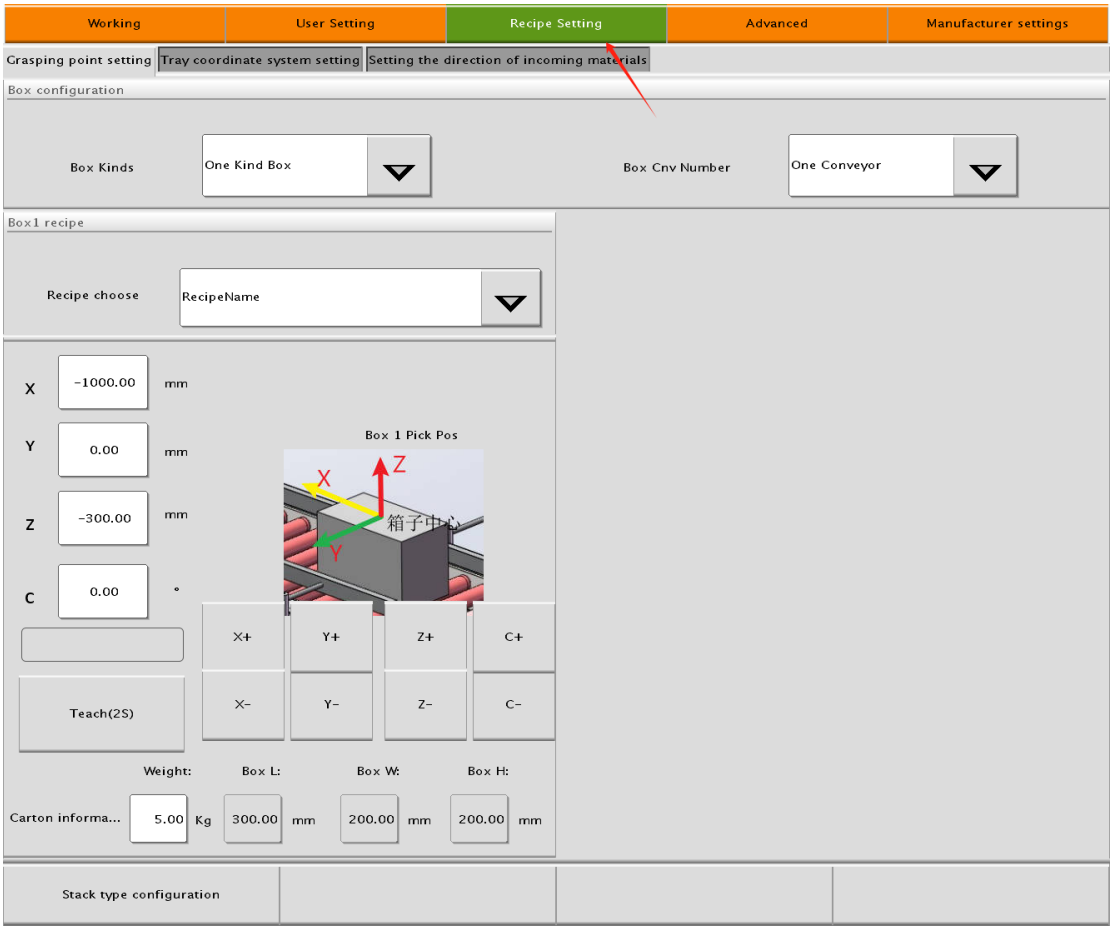


Figure 5-1

Click "Pattern Configuration" to enter the interface [Figure 5-2].

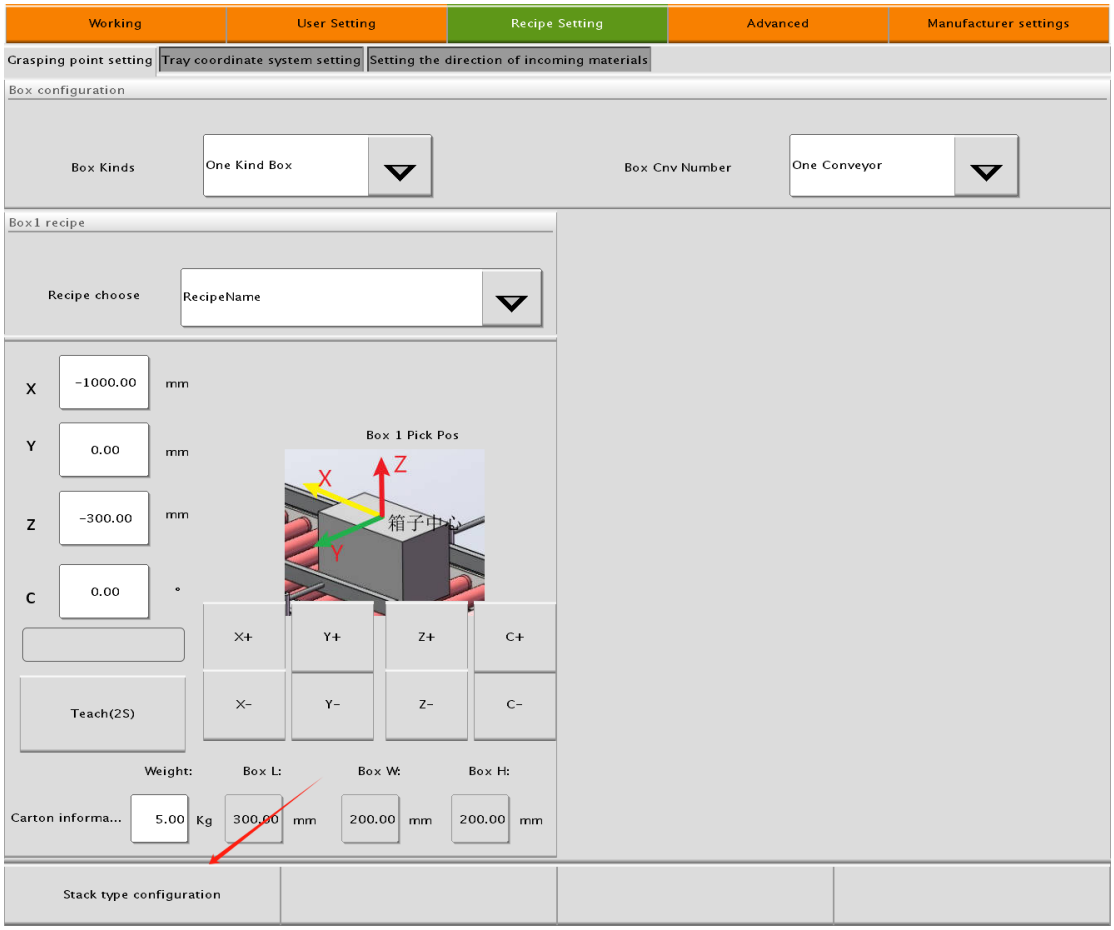


Figure 5-2

5.2 Creating a New Recipe

Click "New" recipe [Figure 5-3].

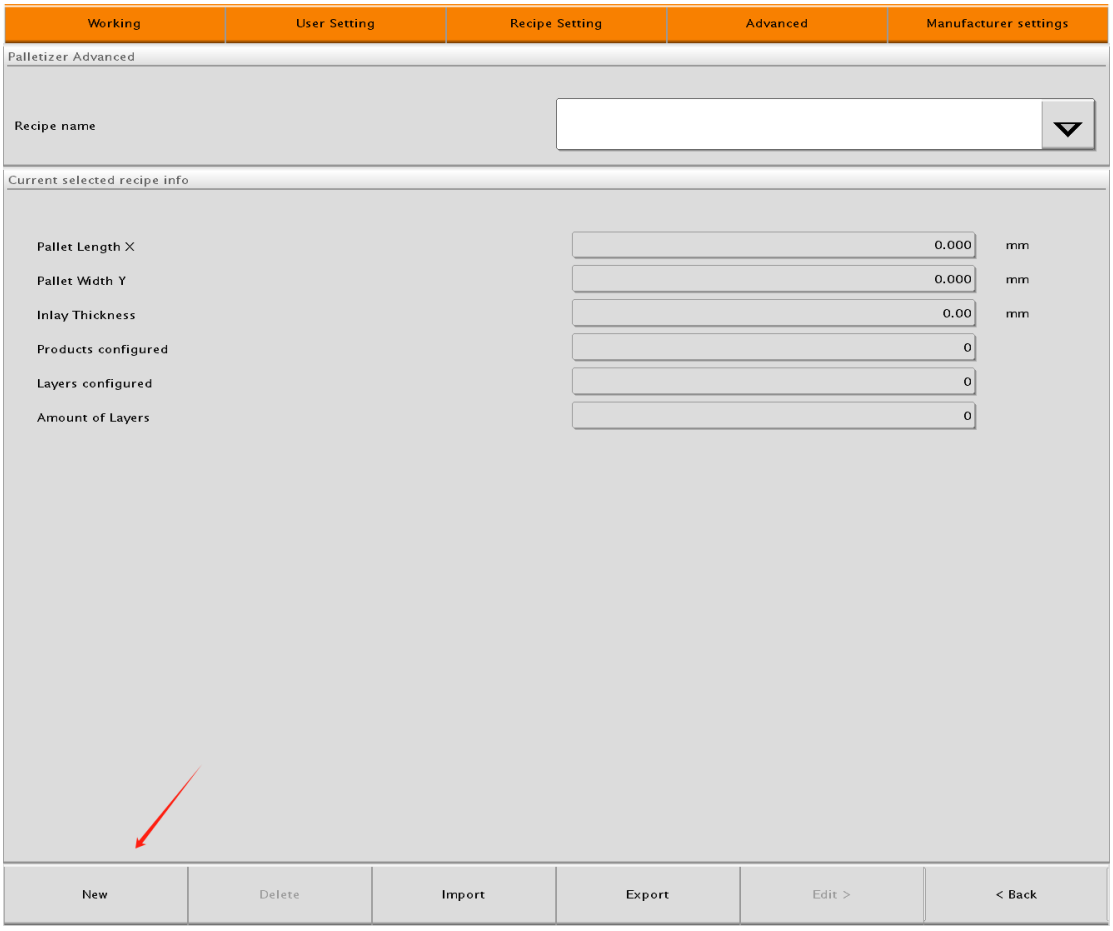


Figure 5-3

Enter the recipe name, then click "✔" [Figure 5-4].

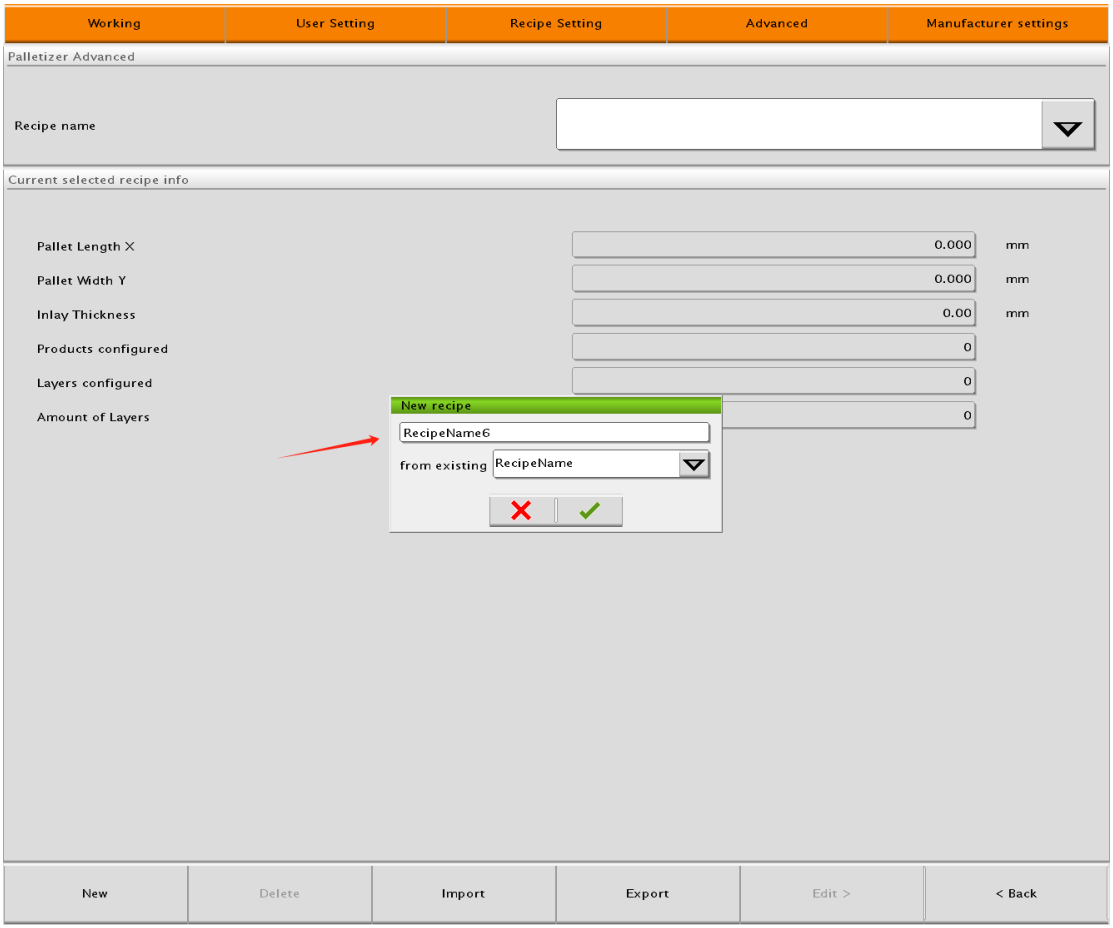


Figure 5-4

Click "Edit" recipe [Figure 5-5].

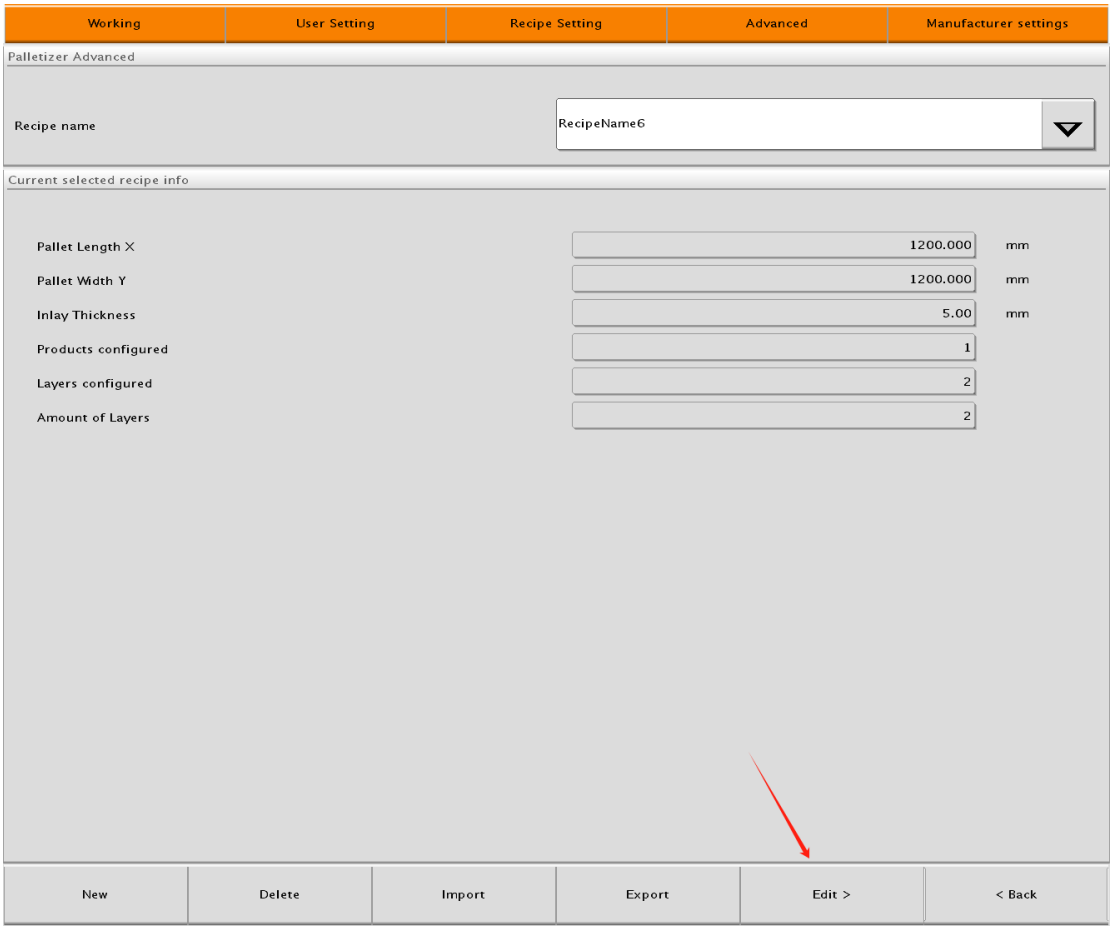


Figure 5-5

Click the "Drop-down Arrow" to select a standard pallet size or manually enter the pallet length (X) and width (Y) [Figure 5-6]. After entering the pallet dimensions, click "Next Page."

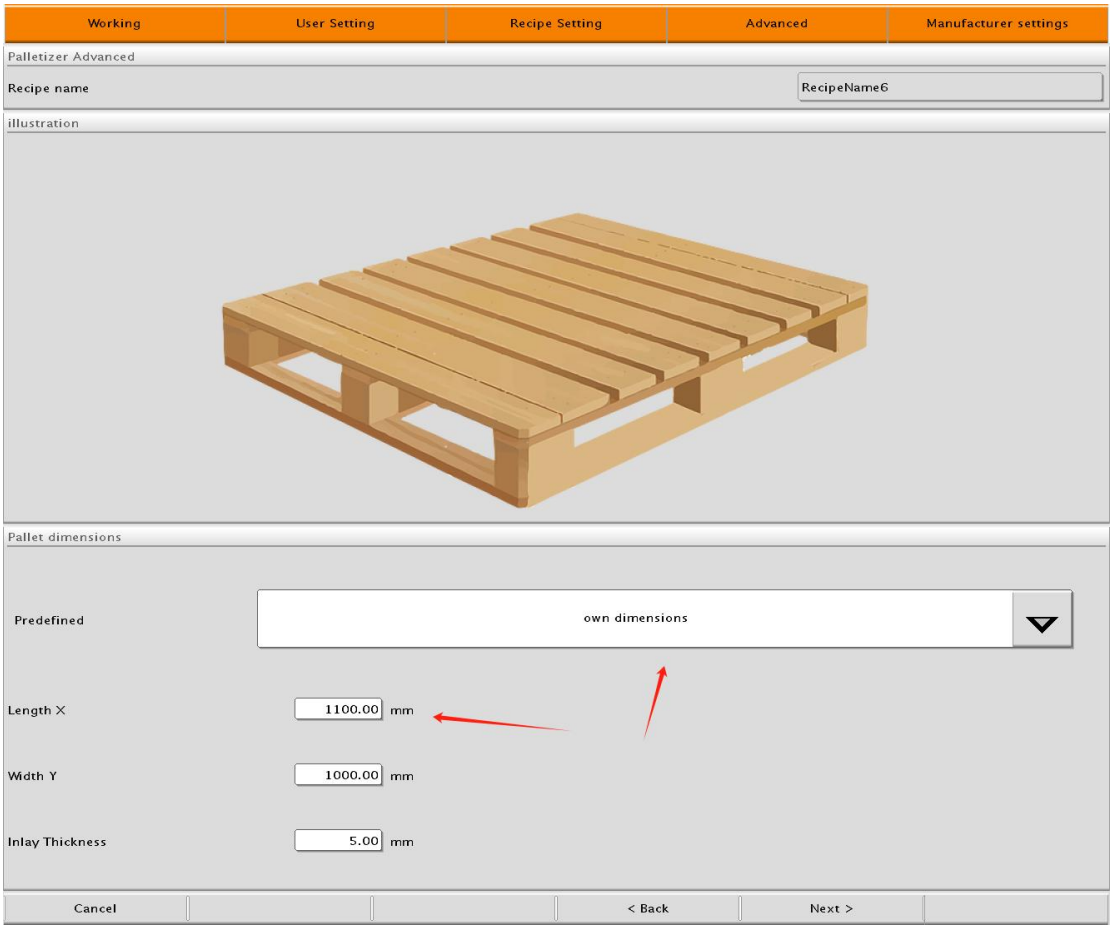

Working
User Setting
Recipe Setting
Advanced
Manufacturer settings
Palletizer Advanced
Recipe name
RecipeName6
illustration
Pallet dimensions
Predefined
own dimensions
Length X
1100.00
mm
Width Y
1000.00
mm
Inlay Thickness
5.00
mm
Cancel
< Back
Next >

Figure 5-6

Click "New" to create a product (the name can be customized as needed) [Figure 5-7].

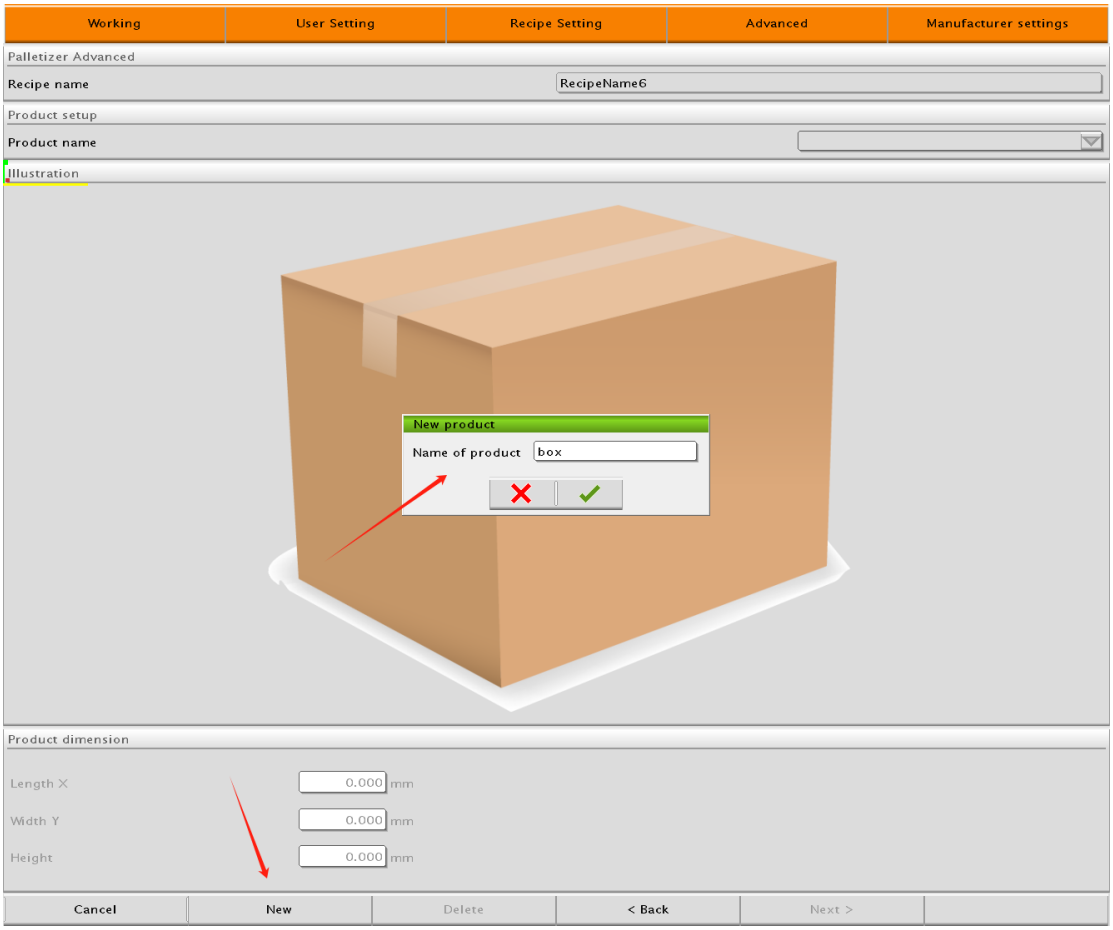


Figure 5-7

In the product parameters, you need to enter the carton's dimensions: length (X), width (Y), and height [Figure 5-8]. After entering the carton dimensions, click "Next Page" to proceed.

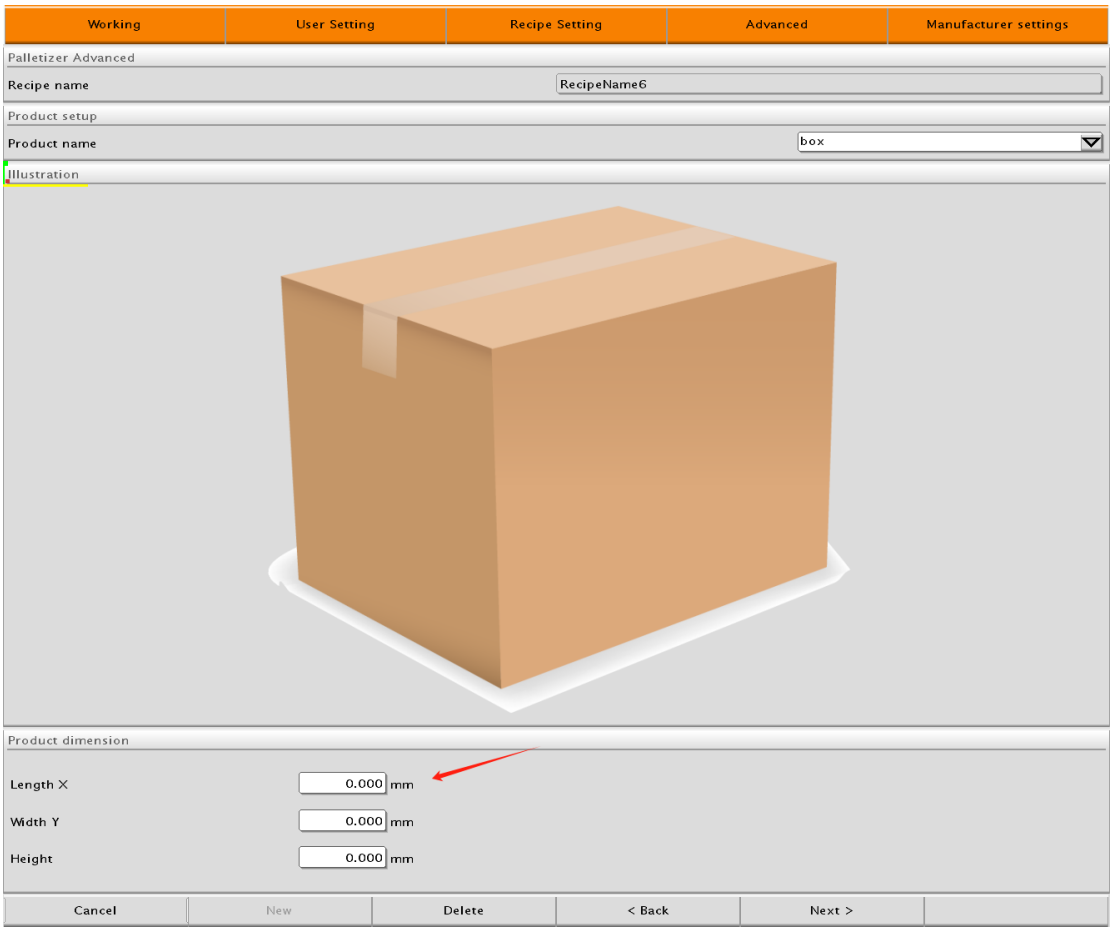


Figure 5-8

Click "Add" palletizing pattern. You can add up to four palletizing patterns [Figure 5-9].

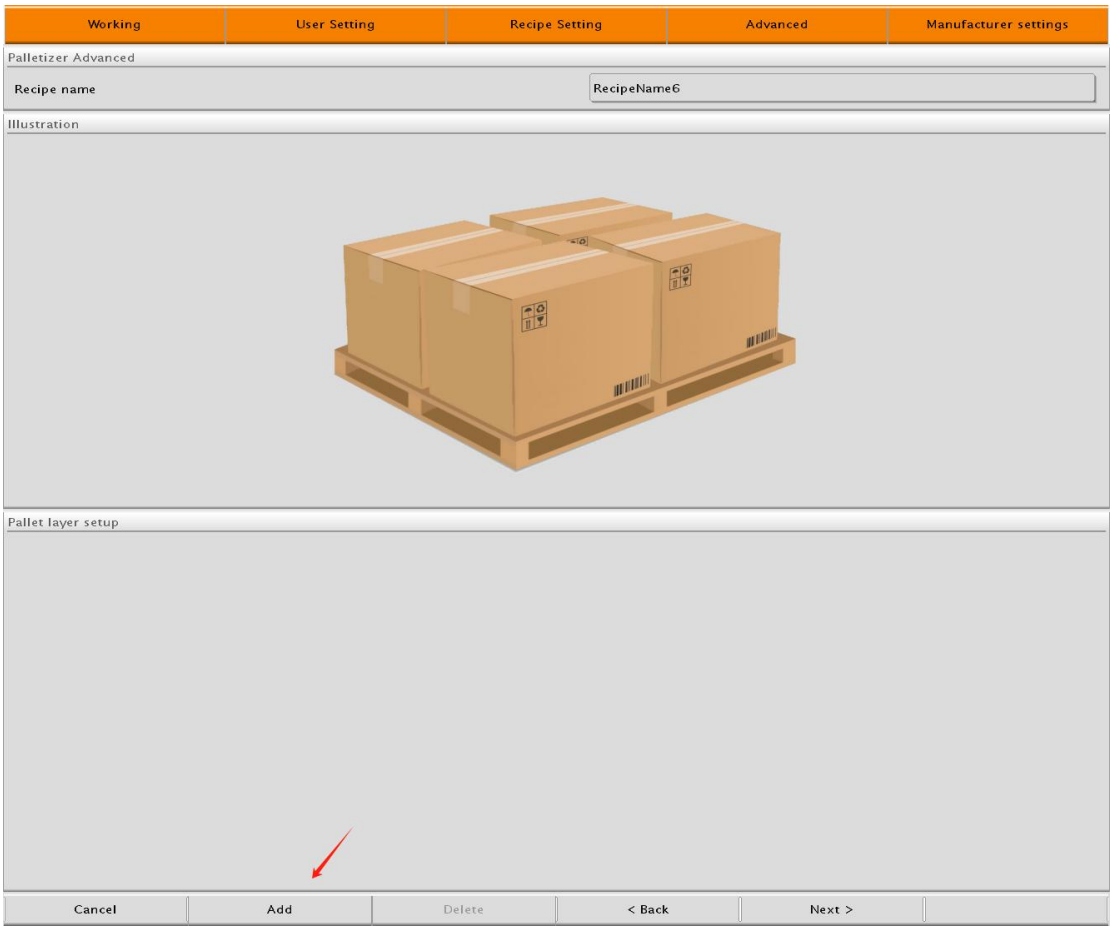


Figure 5-9

First, enter the number of cartons to be palletized for Pattern A; Pattern B is handled similarly [Figure 5-10].

Then click "Edit."

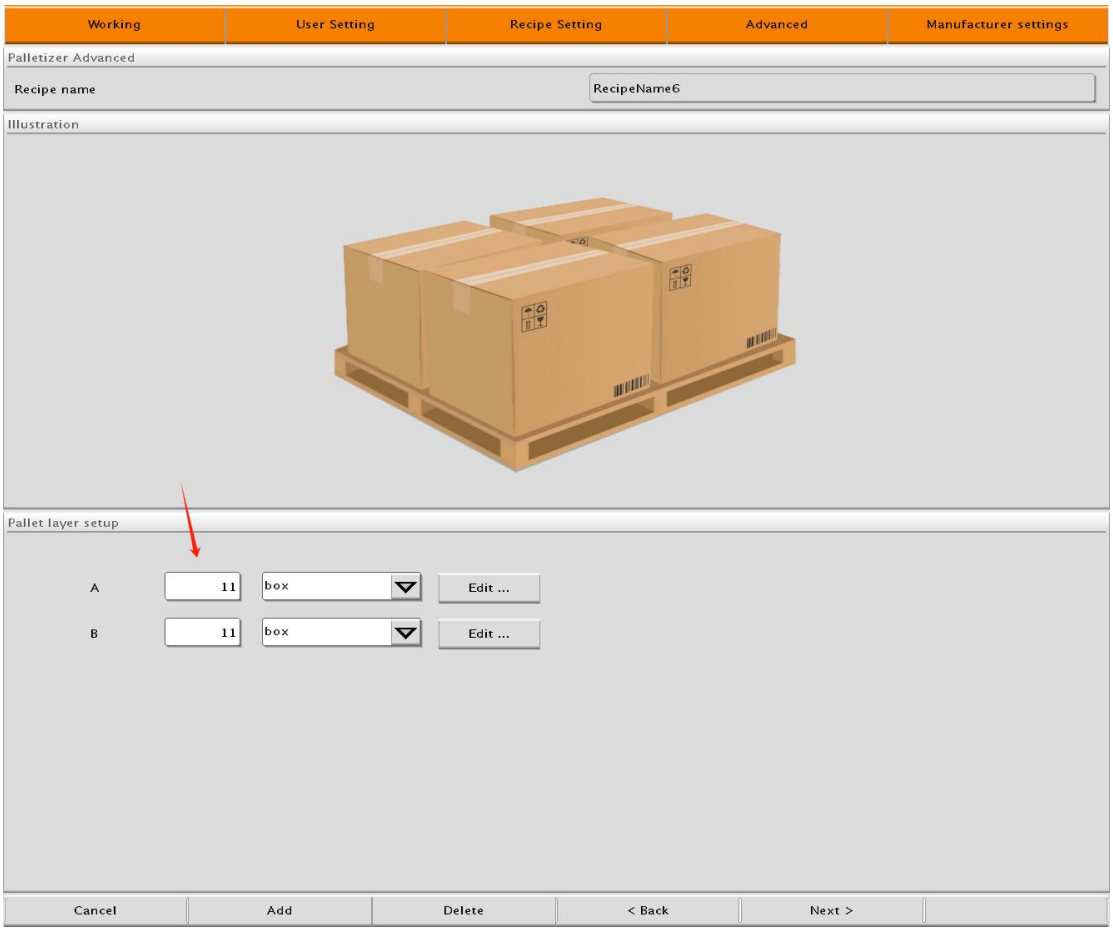


Figure 5-10

Select "Pattern Template" to see if the required pattern is available [Figure 5-11].

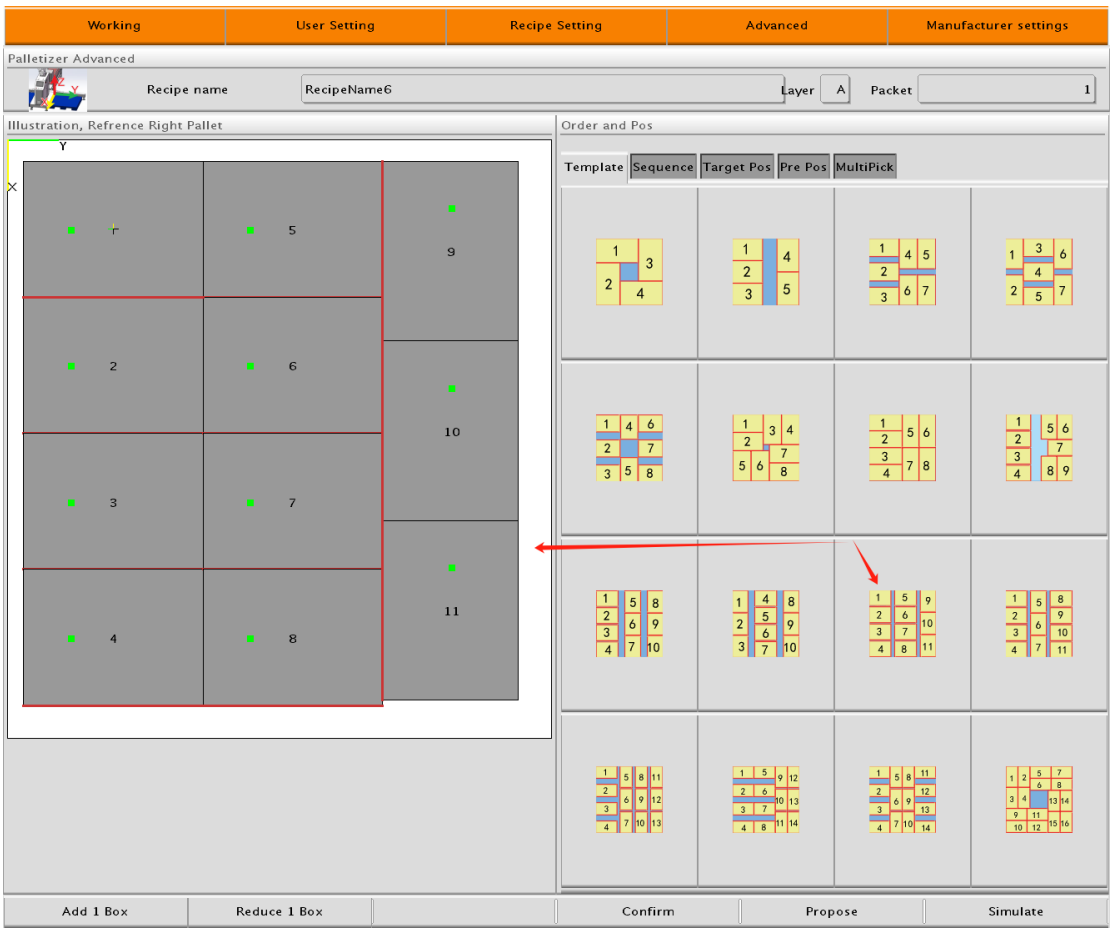


Figure 5-11

If the pattern template does not include the required pattern, refer to [Figure 5-12] to adjust the positions of the cartons. You can manually move the cartons and use the functions in the following table to create the desired pattern.

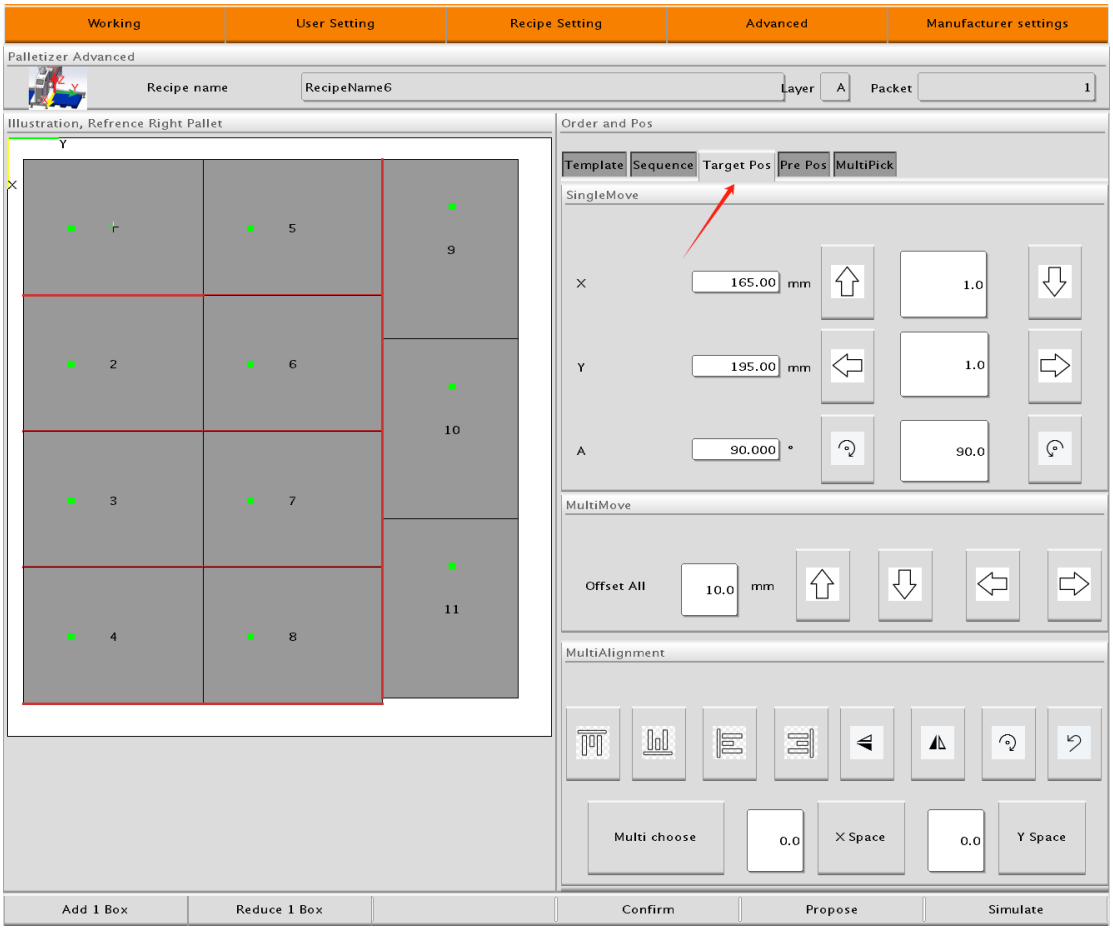


Figure 5-12

	1. Move Up: You can move a single carton or select multiple cartons to move them upward.
	2. Move Down: You can move a single carton or select multiple cartons to move them downward.
	3. Move Left: You can move a single carton or select multiple cartons to move them to the left.
	4. Move Right: You can move a single carton or select multiple cartons to move them to the right.
	5. Rotate Clockwise: Enter the desired rotation angle. You can rotate a single carton or select multiple cartons to rotate them.
	6. Rotate Counterclockwise: Enter the desired rotation angle. You can rotate a single carton or select multiple cartons to rotate them.
	7. Move All Up: Move the entire set of cartons on the pallet upward to ensure the robot places the cartons more accurately in the desired position on the pallet during palletizing.
	8. Move All Down: Move the entire set of cartons on the pallet downward to ensure the robot places the cartons more accurately in the desired position on the pallet during palletizing.
	9. Move All Left: Move the entire set of cartons on the pallet to the left to ensure the robot places the cartons more accurately in the desired position on the pallet during palletizing.
	10. Move All Right: Move the entire set of cartons on the pallet to the right to ensure the robot places the cartons more accurately in the desired position on the pallet during palletizing.
	11. Align Top: This function aligns cartons with each other. For example, to align carton 4 with carton 3, first use the "Multi-Select" function in the interface, then select carton 4 and carton 3, and finally click the "Align Top" label.
	12. Align Bottom: This function aligns cartons with each other. For example, to align carton 4 with carton 3, first use the "Multi-Select" function in the interface, then select carton 4 and carton 3, and finally click the "Align Bottom" label.
	13. Align Left: This function aligns cartons with each other. For example, to align carton 2 with carton 1, first use the "Multi-Select" function in the interface, then select carton 2 and carton 1, and finally click the "Align Left" label.
	14. Align Right: This function aligns cartons with each other. For example, to align carton 7 with carton 8, first use the "Multi-Select" function in the interface, then select carton 7 and carton 8, and finally click the "Align Right" label.
	15. Vertical Mirroring: Apply vertical mirroring to the entire set of cartons on the pallet.
	16. Horizontal Mirroring: Apply horizontal mirroring to the entire set of cartons on the pallet.

	17. Rotate Entire Pallet Clockwise: Rotate the entire set of cartons on the pallet.

Select "Carton Sorting," choose the carton whose sequence number you wish to change, and select the desired sequence number from the drop-down list. After sorting, click "Simulation Palletizing" to ensure correctness.

The conventional palletizing sequence is to palletize the carton closest to the pallet origin first. Refer to [Figure 5-13].

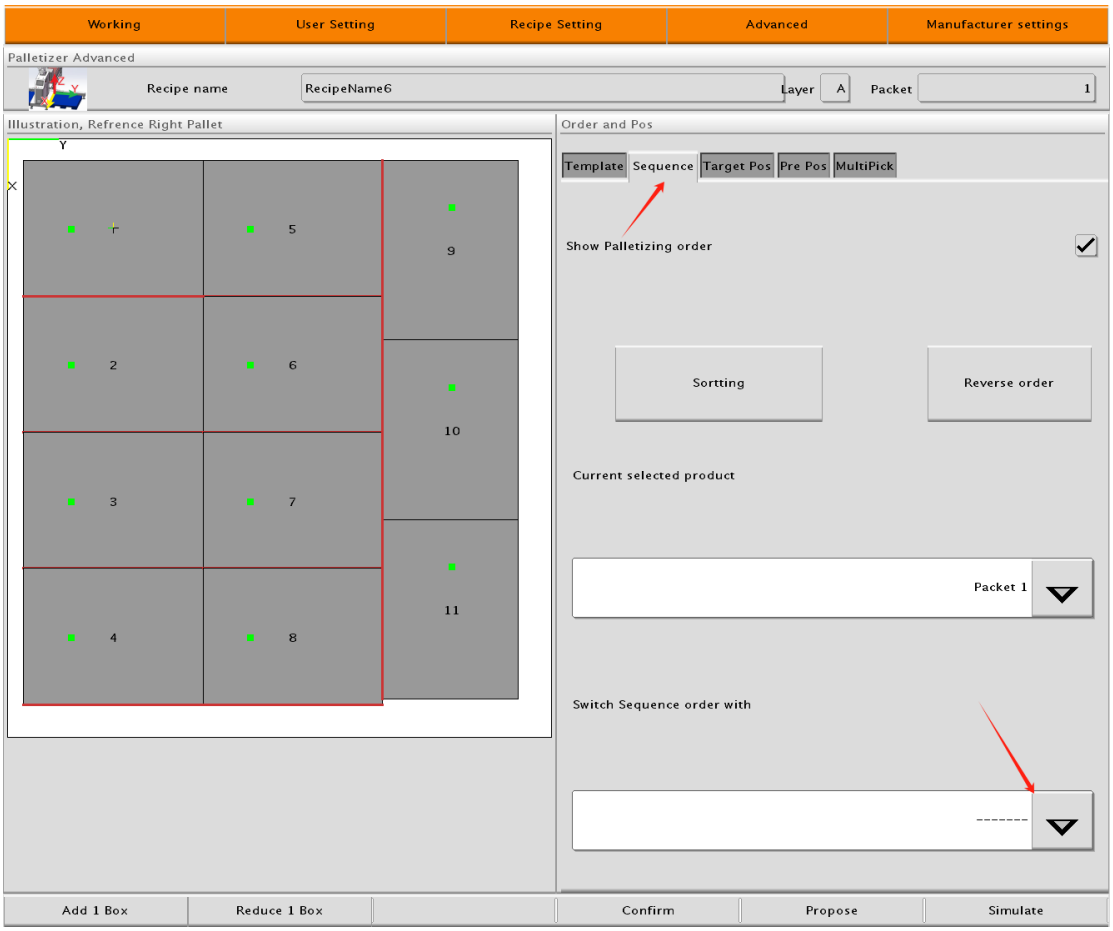


Figure 5-13

Select "Entry Position" and enter X: 60, Y: 60, Z: 325 (the Z value for the entry position is the carton height 265 plus 60, totaling 325). Check "Use Entry Position," then click "Write All." If the palletizing sequence starts with the carton farthest from the pallet origin,

then X: -60, Y: -60. Once you are proficient in setting entry positions, you may also configure other desired values. After setting the entry position, observe whether the small green cross on the carton is located in the desired position. Once pallet pattern editing is complete, click the "Confirm" button at the bottom to finish editing the pattern. Refer to [Figure 5-14].

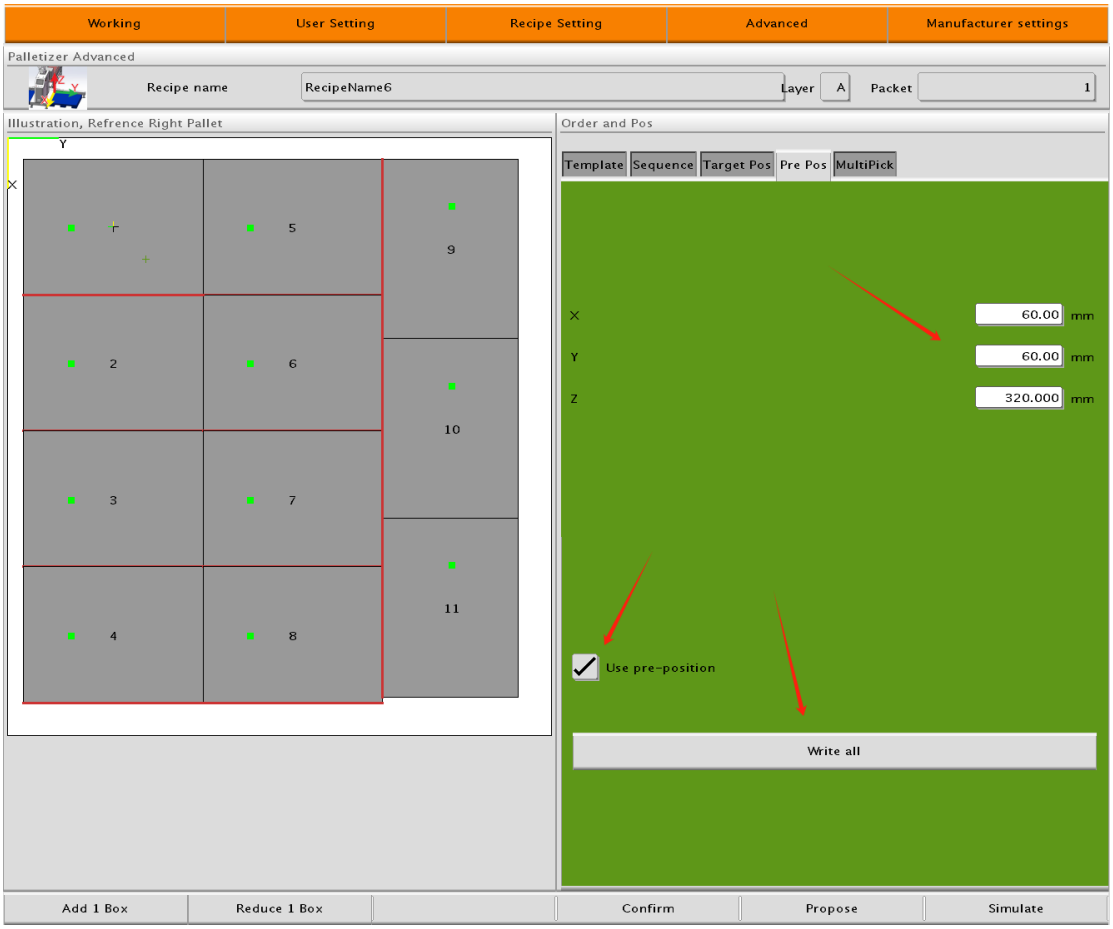


Figure 5-14

The following are examples of entry positions.

For example: In the coordinate system shown in [5-15], the reference is the diagonal at the base of the robot (X and Y). The entry point offset is set relative to this coordinate system. If the carton to be offset is in the negative direction of the coordinate system, then set the offset value as "–"; if it is in the positive direction, then set the offset value as "+". For more details

on setting the entry point offset, refer to the actual photos below for a clearer understanding.

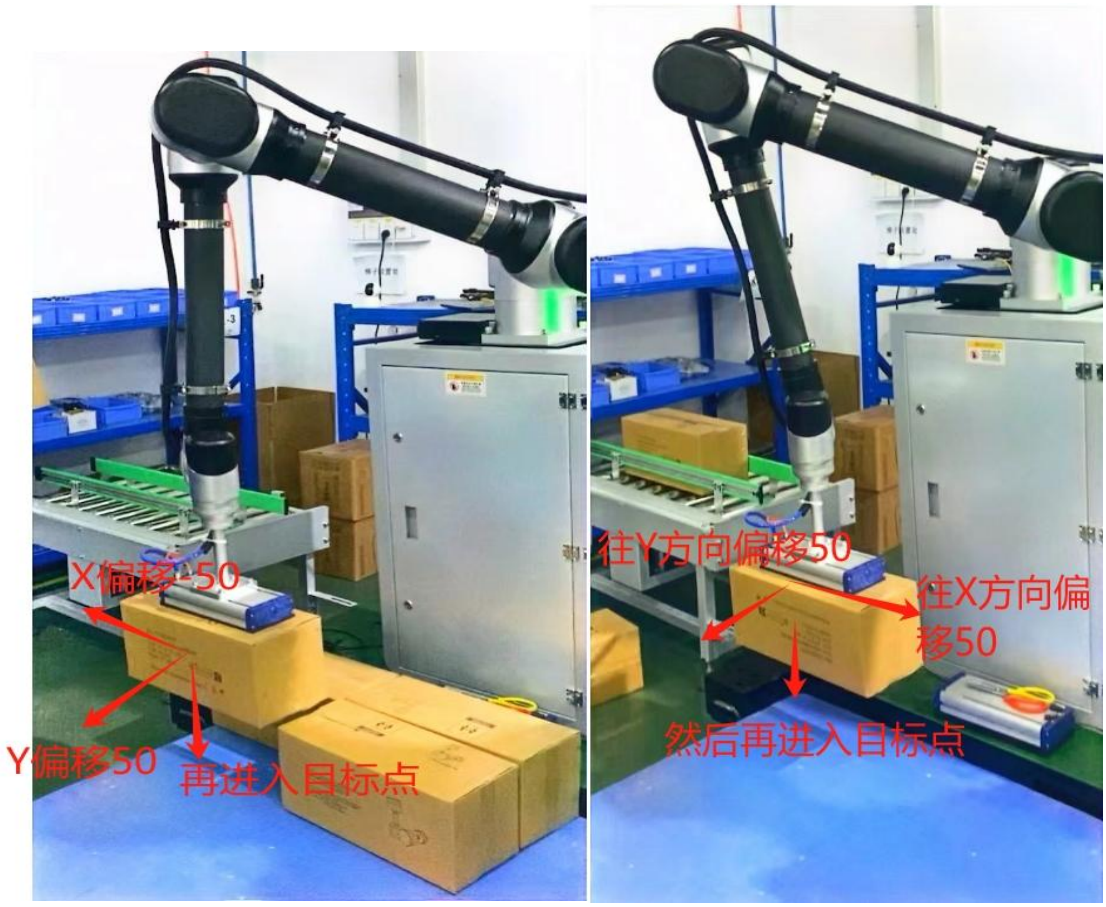


Figure 5-15

Click "Next Page" [Figure 5-16].

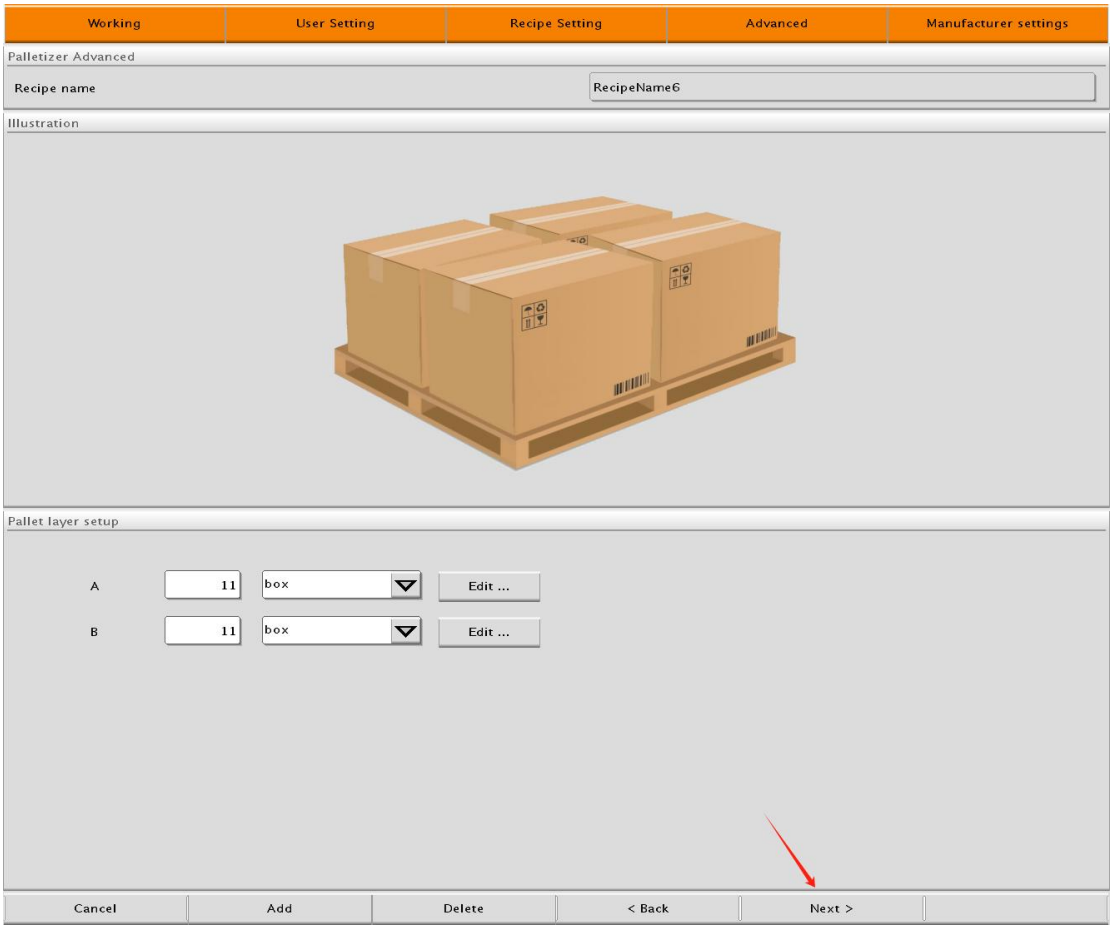

Working
User Setting
Recipe Setting
Advanced
Manufacturer settings
Palletizer Advanced
Recipe name
RecipeName6
Illustration
Pallet layer setup
A
11
box
Edit ...
B
11
box
Edit ...
Cancel
Add
Delete
< Back
Next >

Figure 5-16

After both Pattern A and Pattern B have been edited, select the number of layers and then click "Save." The recipe will then be successfully created.
If the recipe cannot be saved, it is because the palletizing activation in the "Daily Operation" interface is showing red. Click "Close," then return to the interface shown in [Figure 5-17] and save again; this should resolve the issue.
If you want to reduce the number of layers from the default five, simply select "empty."

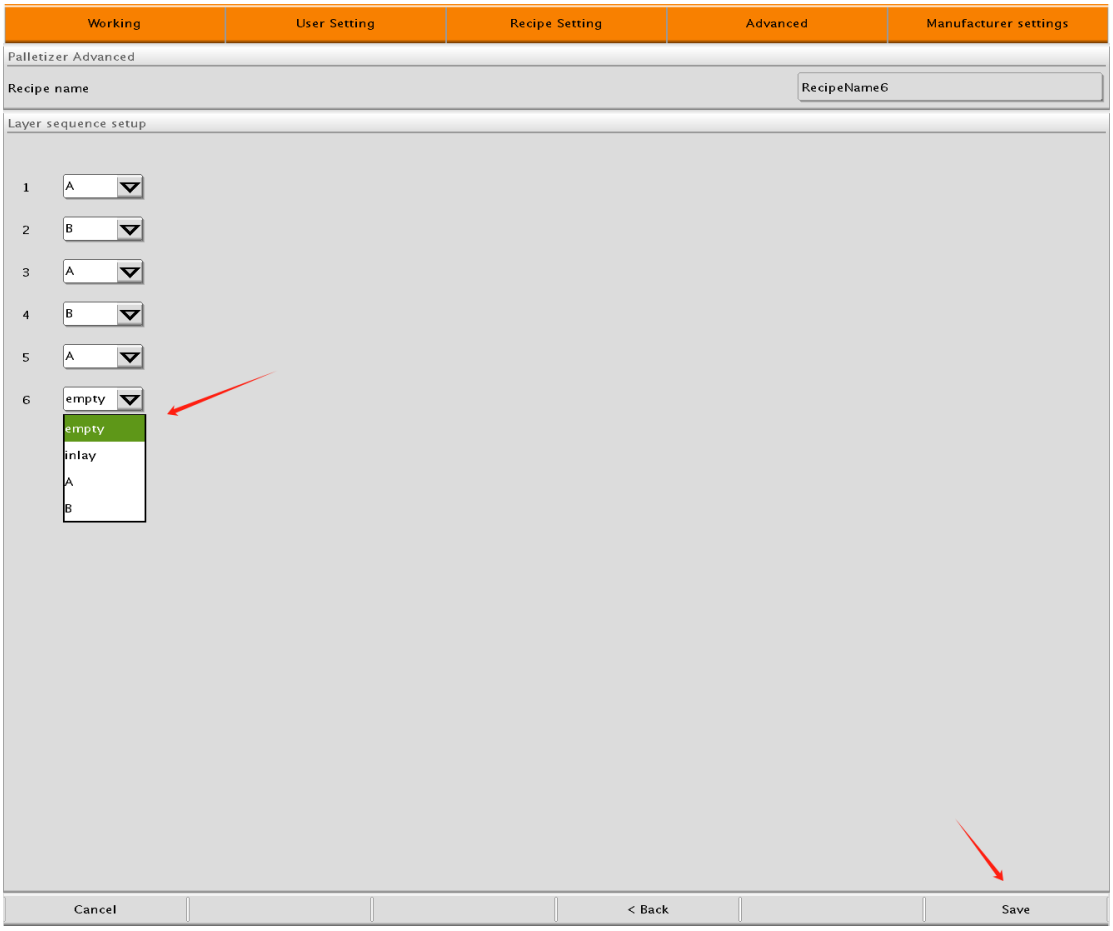


Figure 5-17

6 Multiple Pick-and-Place Setup

6.1 Multiple Pick-and-Place Configuration

Instructions for configuring multiple pick-and-place settings

1. First, check the option to enable the multiple pick function;

2. Set the number of suction cups for multiple pick. Note that the number set must match the actual number of suction cups, and each suction cup must be controlled by an independent solenoid valve;

3. The suction cups should be installed in the X direction of the robot, arranged in the order 1/2/3/4, with suction cup 1 being closest to the robot base and suction cup 4 farthest from the base;

4. In the mode of picking and placing once, the program determines the number of cartons to pick up based on the properties of the cartons to be palletized. For example, if the cartons to be palletized are grouped as three individual cartons, then three cartons are picked up at once by activating suction cups 1, 2, and 3. After picking up three cartons from the end of the conveyor line, all three are placed at once.

5. The carton palletizing configuration is set on the "Multiple Pick-and-Place" page of the palletizing pattern recipe. Cartons to be picked up by multiple picks must be added using the "Add Carton" button on the multiple pick page. Be sure to select horizontal or vertical feeding based on the actual incoming material situation.

Click "Production" and then click "Multiple Pick" [Figure 6-1].

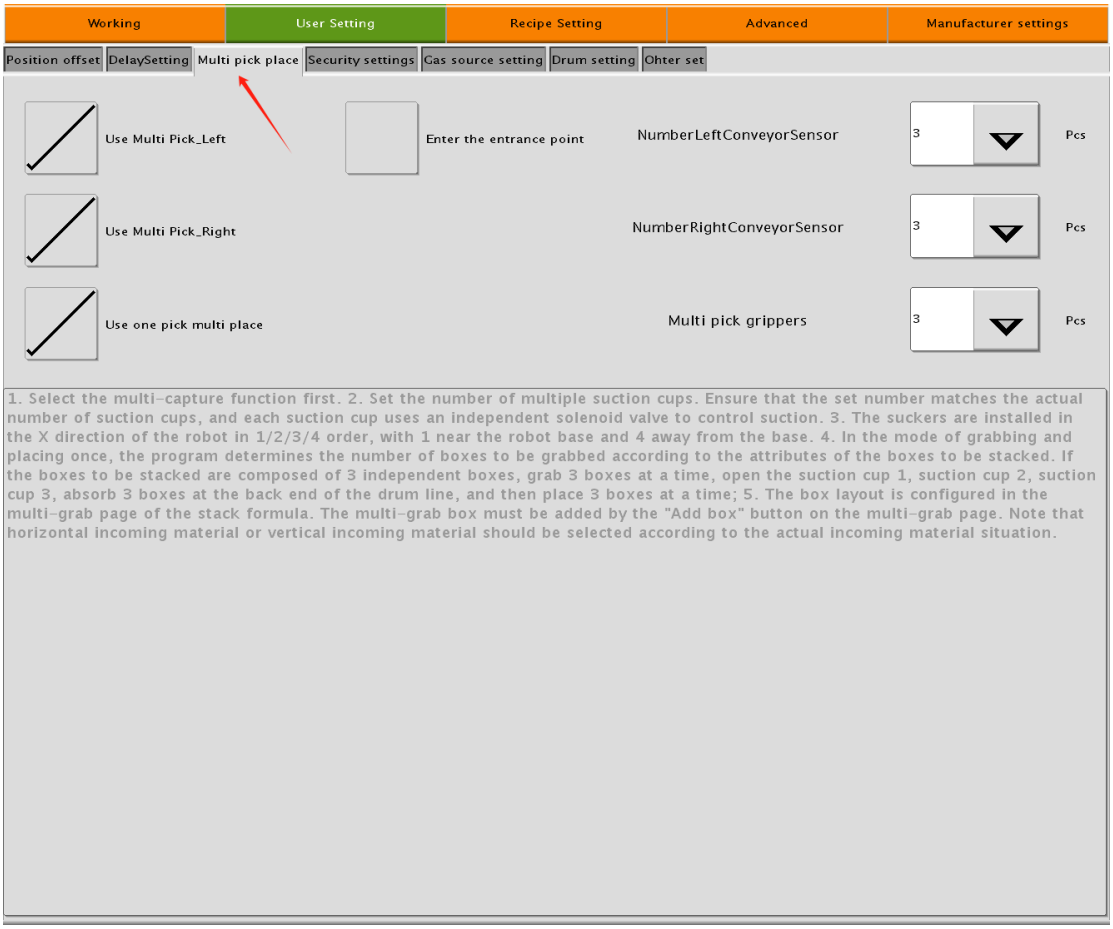


Figure 6-1

6.2 Conveyor Line Settings

Click "Recipe" and then "Pick Point" to enter the interface, as shown in Figure 6-2.

First, select the carton type, then select the number of conveyor lines, and finally select the previously created recipe.

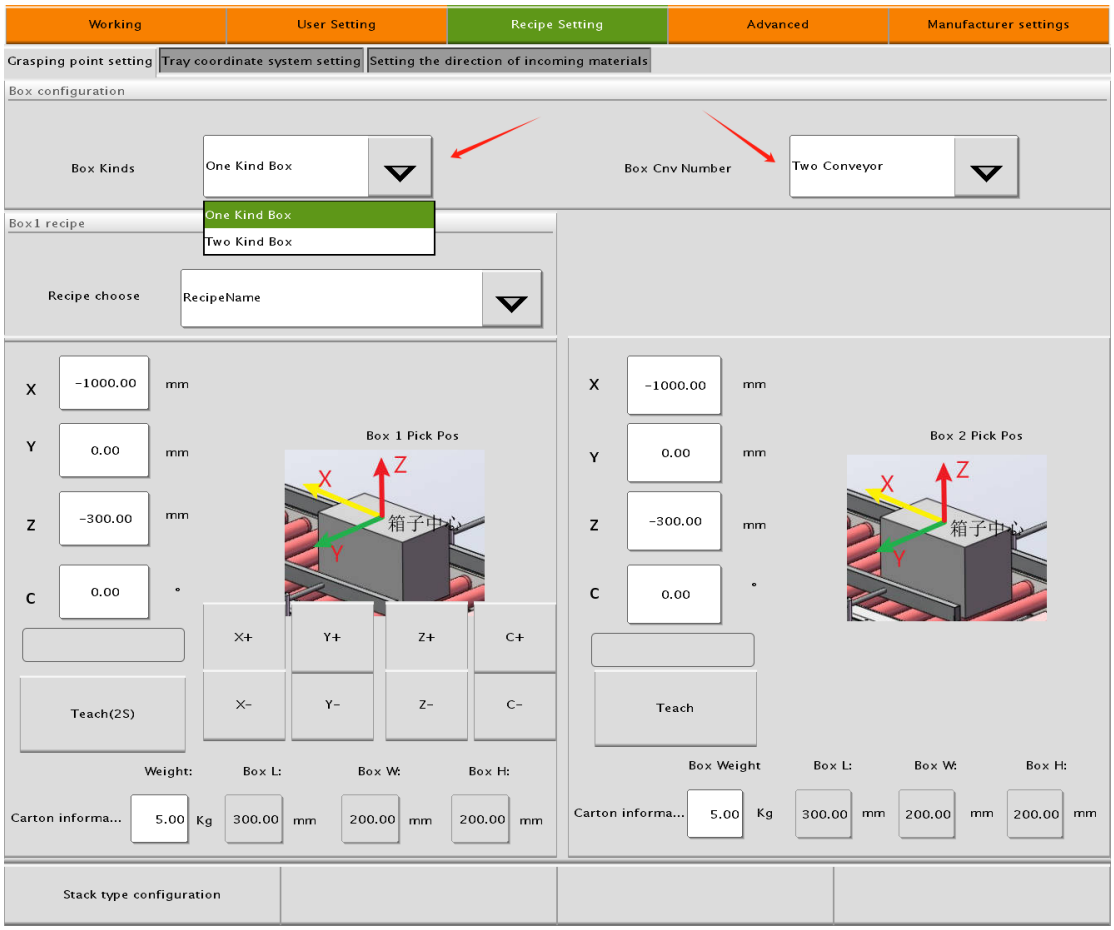


Figure 6-2

6.3 Carton Feeding Direction Selection

Click "Recipe" and then select "Feeding Direction." There are two feeding directions for cartons: vertical feeding and horizontal feeding. Choose according to the actual orientation of the cartons. Refer to [Figure 6-3].

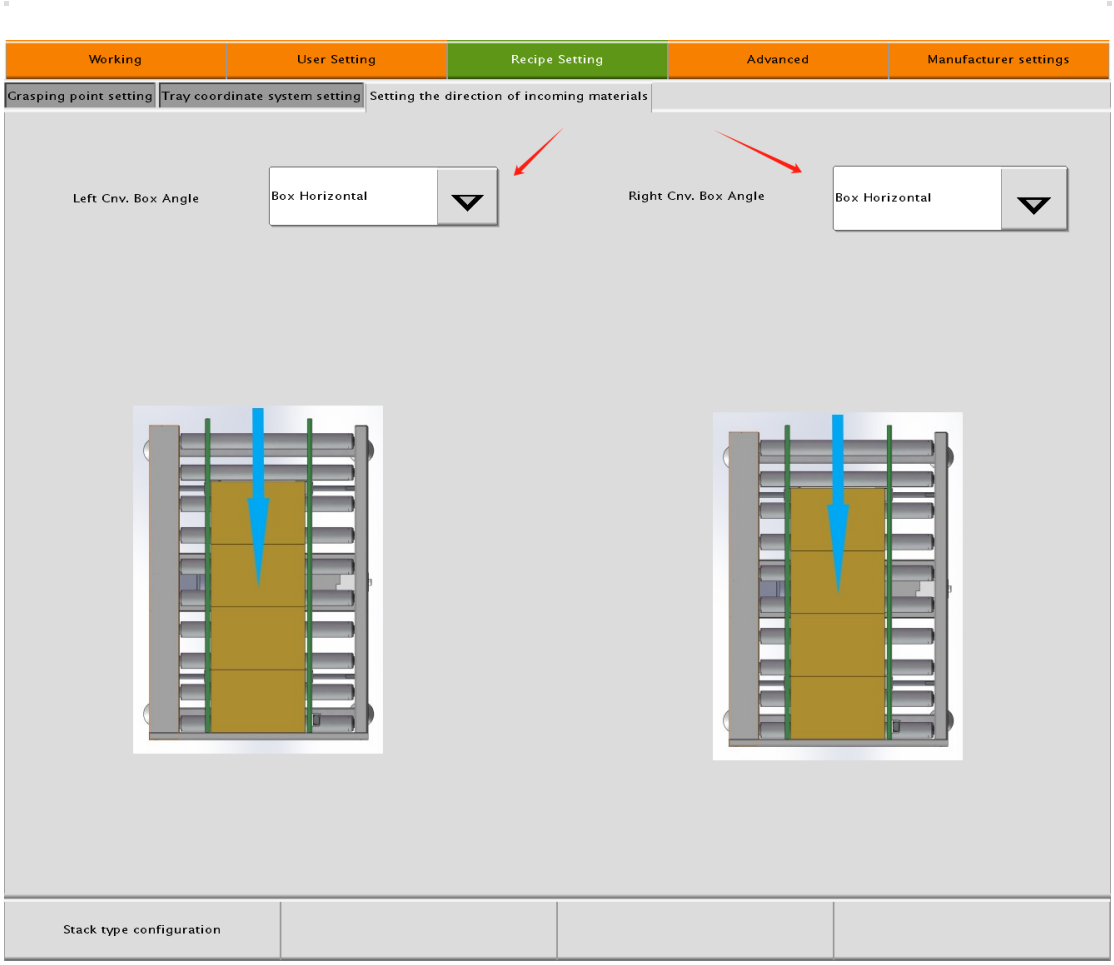


Figure 6-3

6.4 Creating Multiple Pick-and-Place Recipes

The feeding direction mode must match the "Feeding Direction" of the carton. Then, select the number of cartons to be picked up each time and confirm to add the cartons. If you choose to pick once and place multiple times, for example: pick up four cartons and place three first, then place one more. At this point, be sure to pay attention to the carton's rotation direction to avoid compressing the cartons. Refer to [Figure 6-4].

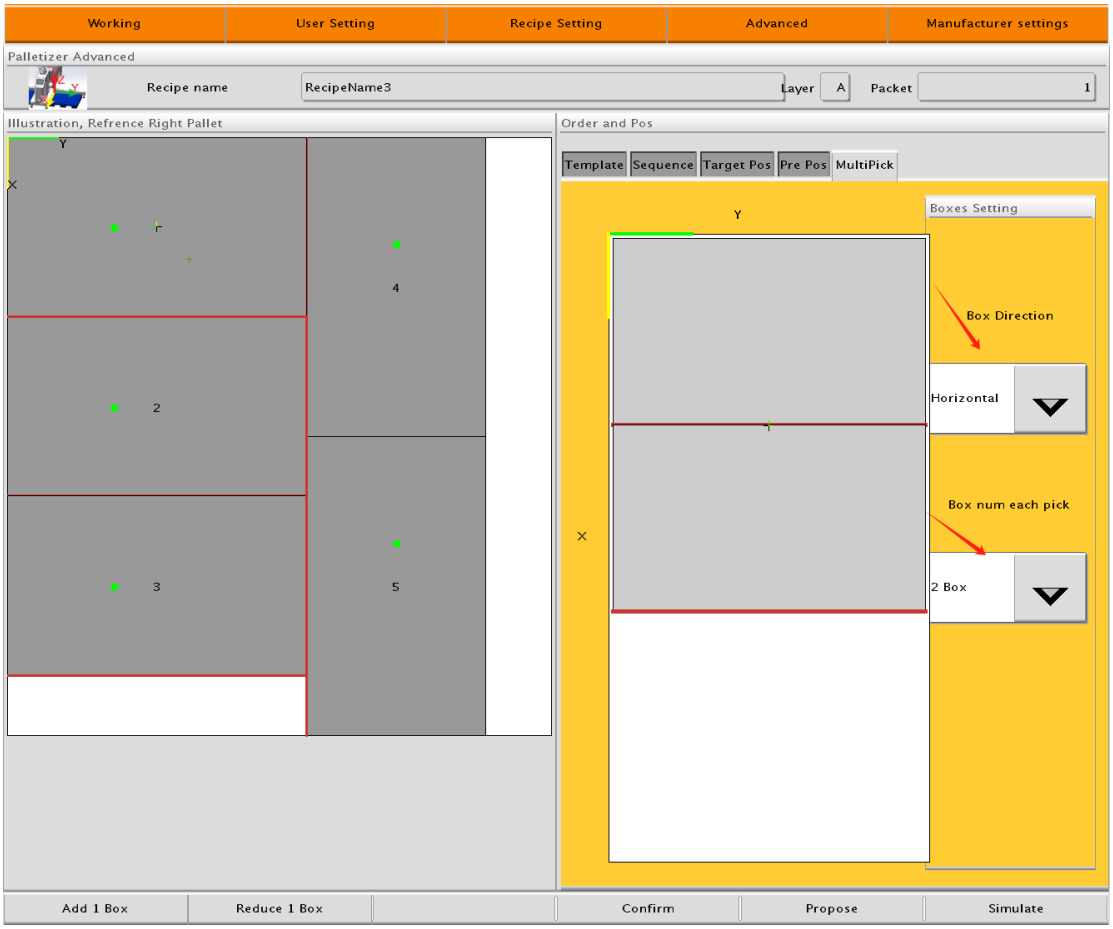


Figure 6-4

7 Teaching Pick Points

7.1 Carton Pick Configuration

Click "Enable," and then click "Recipe" as shown in [Figure 7-1].

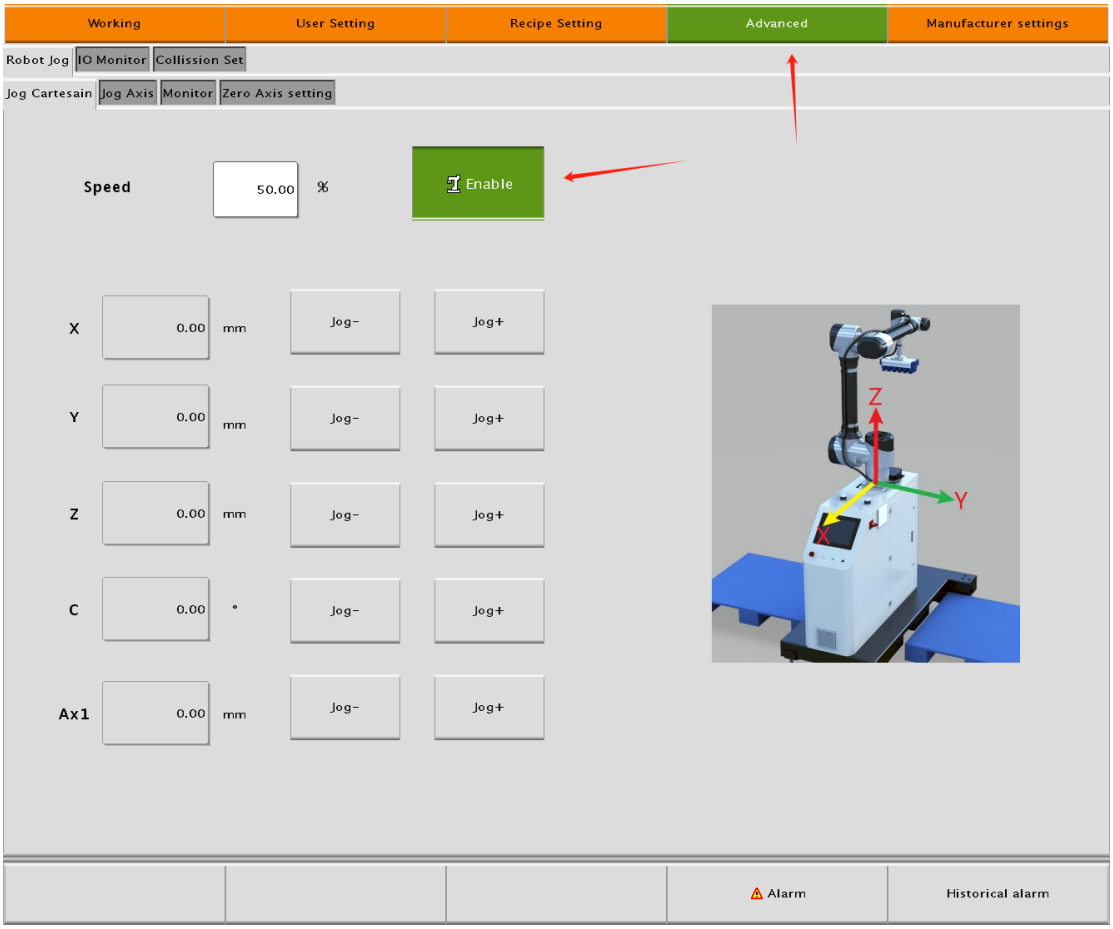


Figure 7-1

Select the carton type and quantity, as well as the number of incoming conveyor lines.

1. If there is only a single type of carton and a single conveyor line, select

the corresponding recipe, jog the robot to the center point above the carton, then use "Teaching (press and hold for 2 seconds)" to set the pick point. Refer to [Figure 7-2].

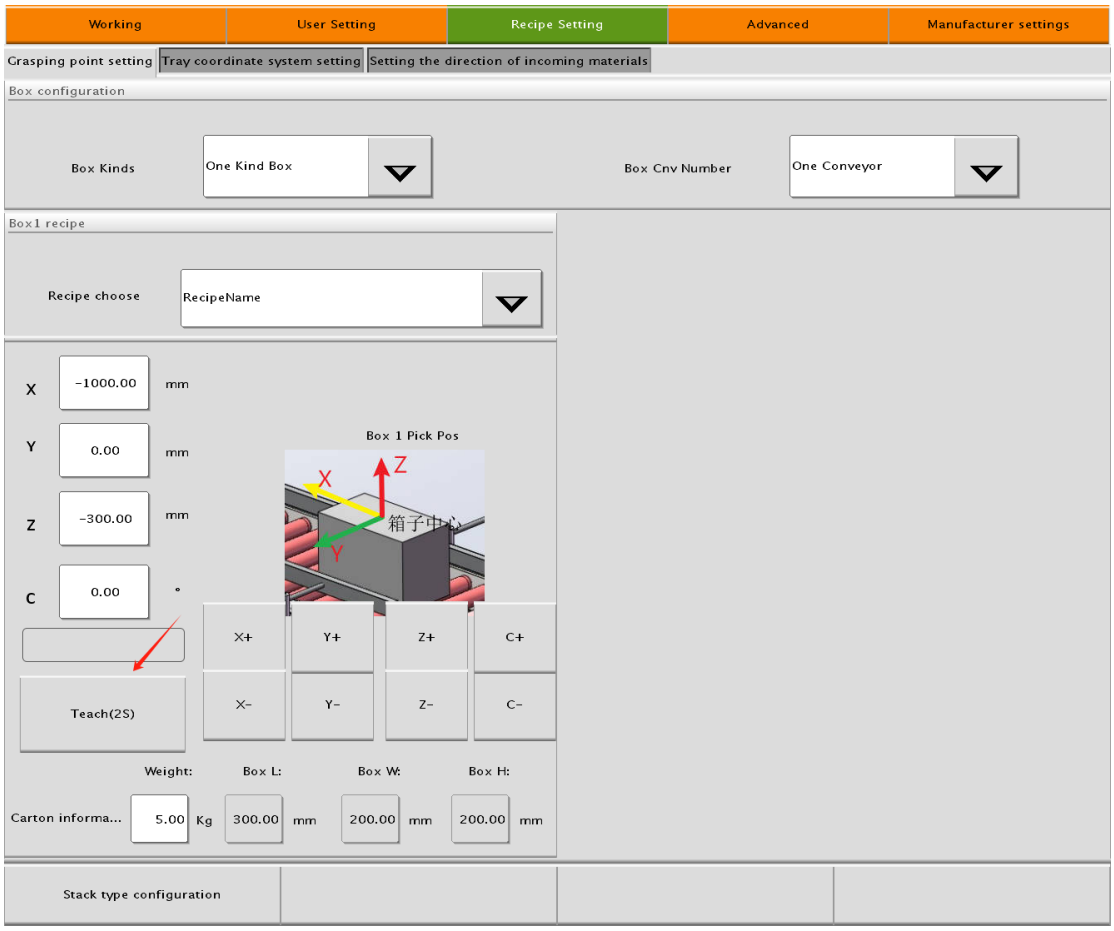


Figure 7-2

2. If there are two types of cartons, select the dual-carton option, which will display the left and right teaching pick point functions. Be sure to select the corresponding recipes for both carton types, then perform teaching for the pick points. Move the robot above the left carton and use "Teaching (press and hold for 2 seconds)" for the left conveyor; for the right, move the robot above the right carton and use "Teaching (press and hold for 2 seconds)" for the right conveyor. Refer to [Figure 7-3].

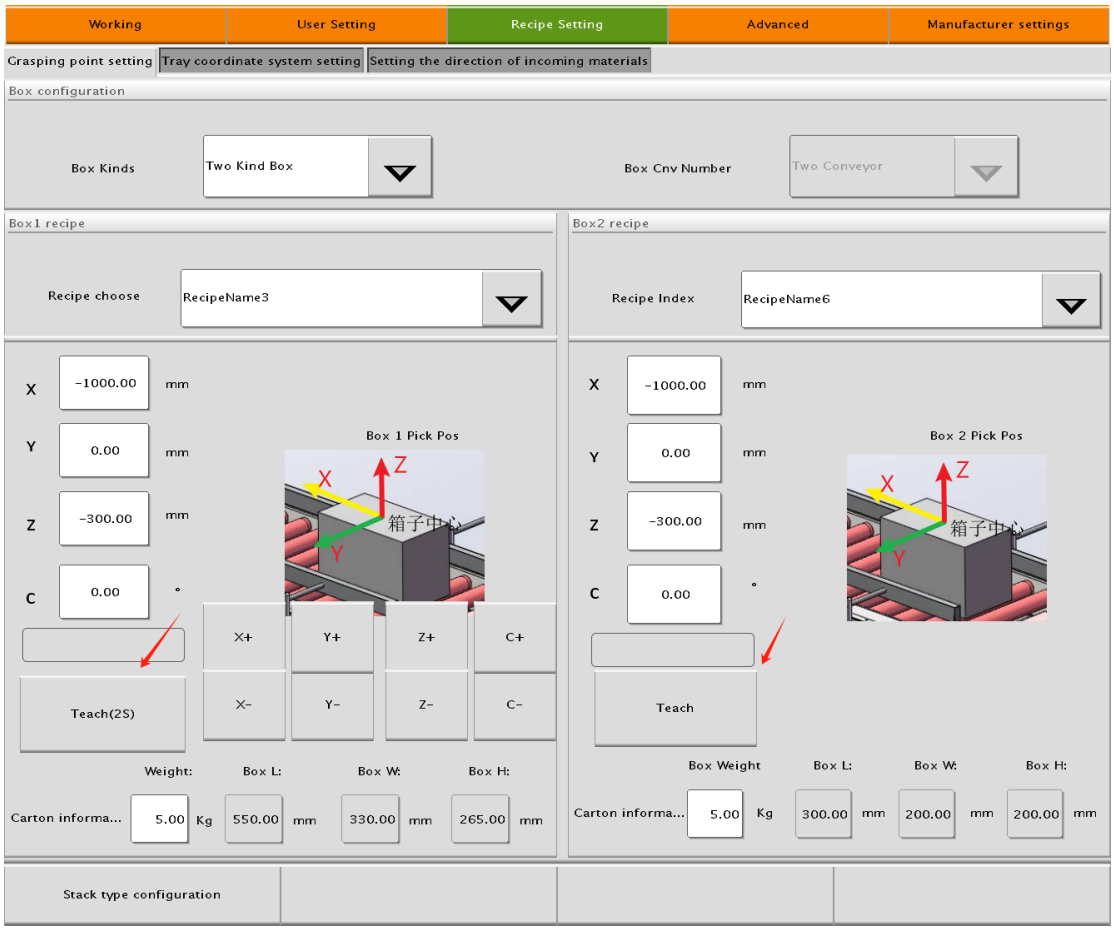


Figure 7-3

3. If there is only a single type of carton but with dual conveyors, proceed as in (2). Select dual conveyors to display both left and right teaching pick point functions, select the appropriate recipe, and use "Teaching (press and hold for 2 seconds)" on the left and right conveyors respectively. Refer to [Figure 7-4].

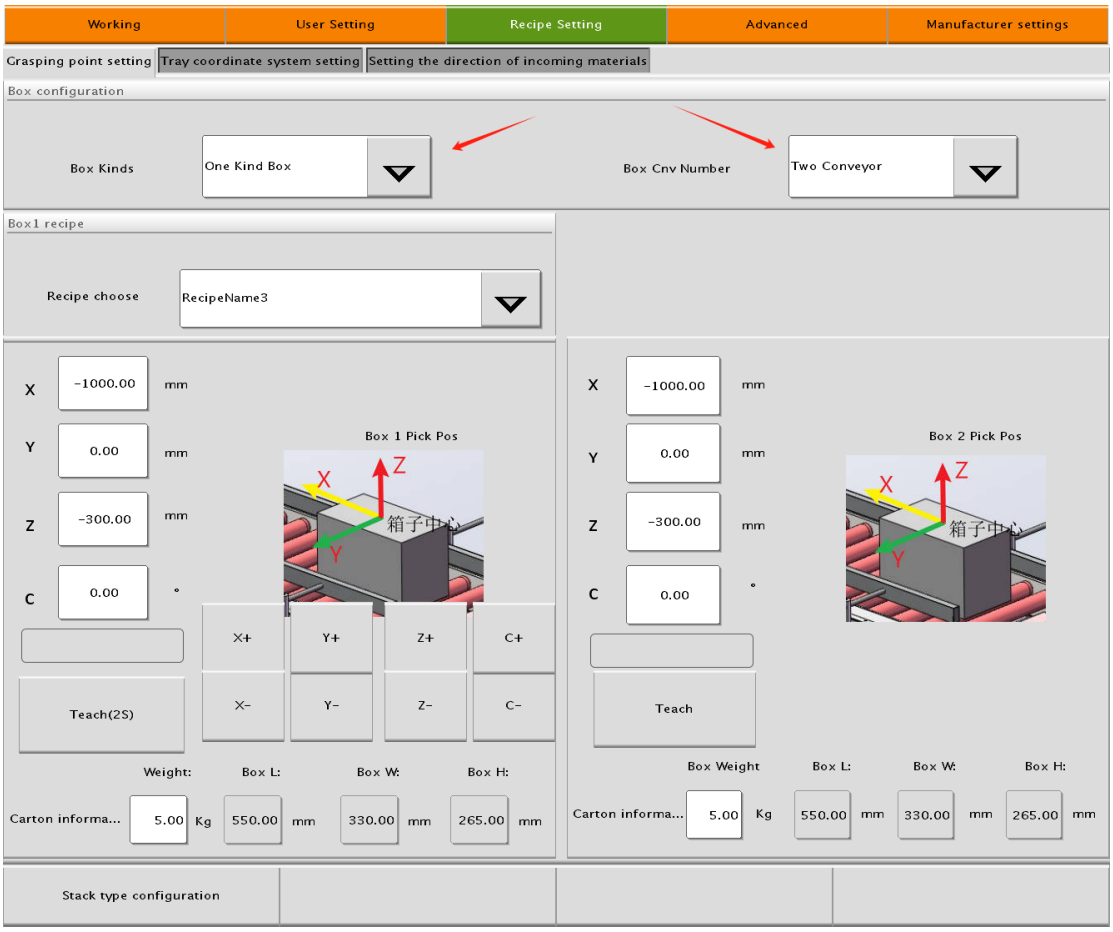


Figure 7-4

4. For the left-side recipe: the pick point is on the left, and palletizing is also on the left.

5. For the right-side recipe: the pick point is on the right, and palletizing is also on the right.

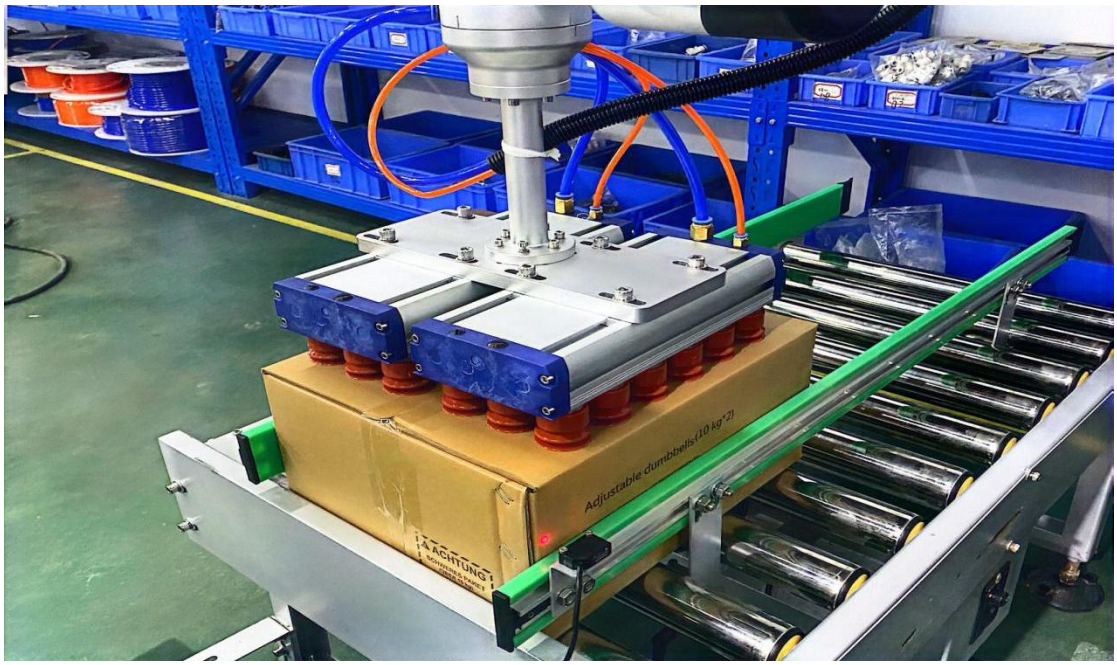


Figure 7-5

After the pick point has been successfully taught, return to the "Daily Production" interface and click "Return to Home Position" [Figure 7-6].

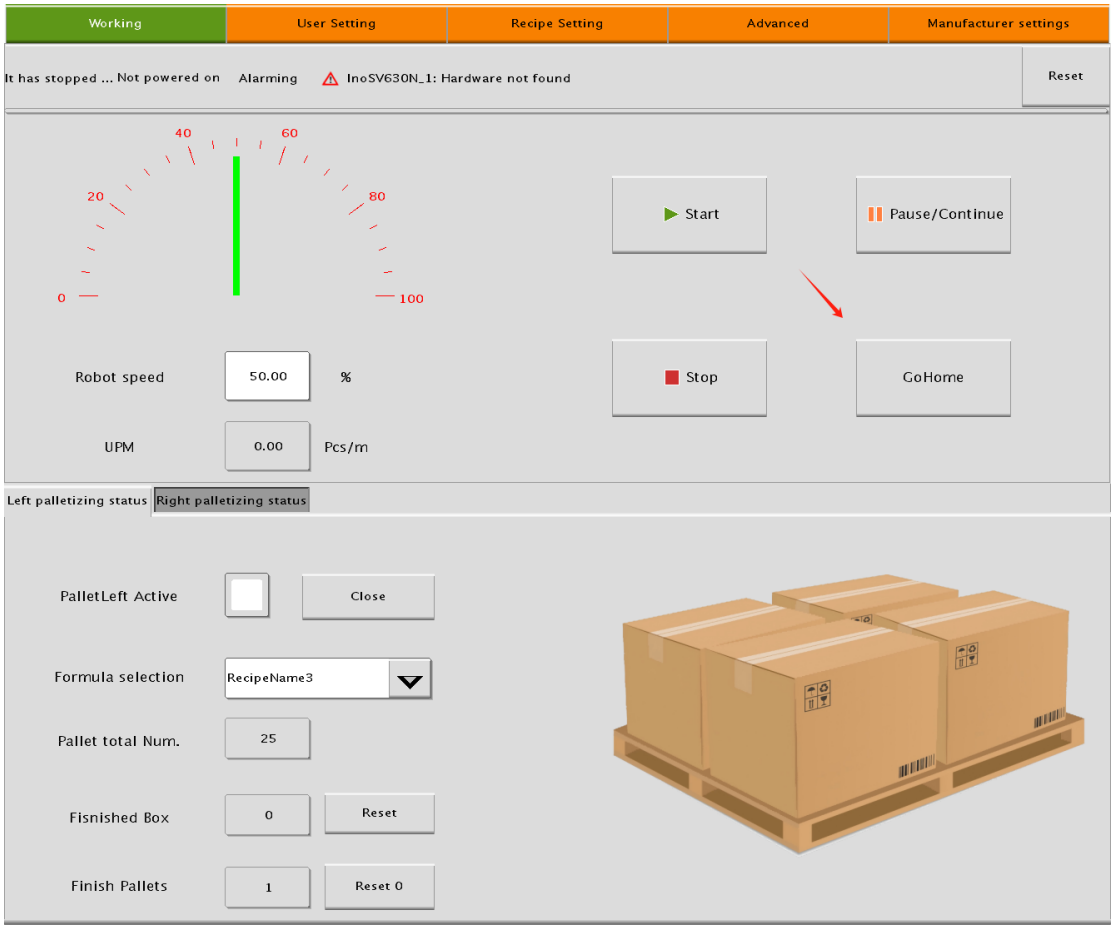

Working
User Setting
Recipe Setting
Advanced
Manufacturer settings
It has stopped ... Not powered on
Alarming
InoSV630N_1: Hardware not found
Reset
0
20
40
60
80
100
Start
Pause/Continue
Robot speed
50.00
%
Stop
GoHome
UPM
0.00
Pcs/m
Left palletizing status
Right palletizing status
PalletLeft Active
Close
Formula selection
RecipeName3
Pallet total Num.
25
Fisnished Box
0
Reset
Finish Pallets
1
Reset 0

Figure 7-6

8 Pallet Coordinate System Settings

8.1 Setting Pallet Height Difference

On the "Pallet Coordinate System" page, only the "Left Pallet Height Difference" and "Right Pallet Height Difference" need to be modified. This refers to the height from the top surface of the pallet to the top surface of the base. Use a tape measure to measure the height difference between the pallet and the base, and then enter the measured value into the left or right "Pallet Height Difference" field. Refer to [Figure 8-1].

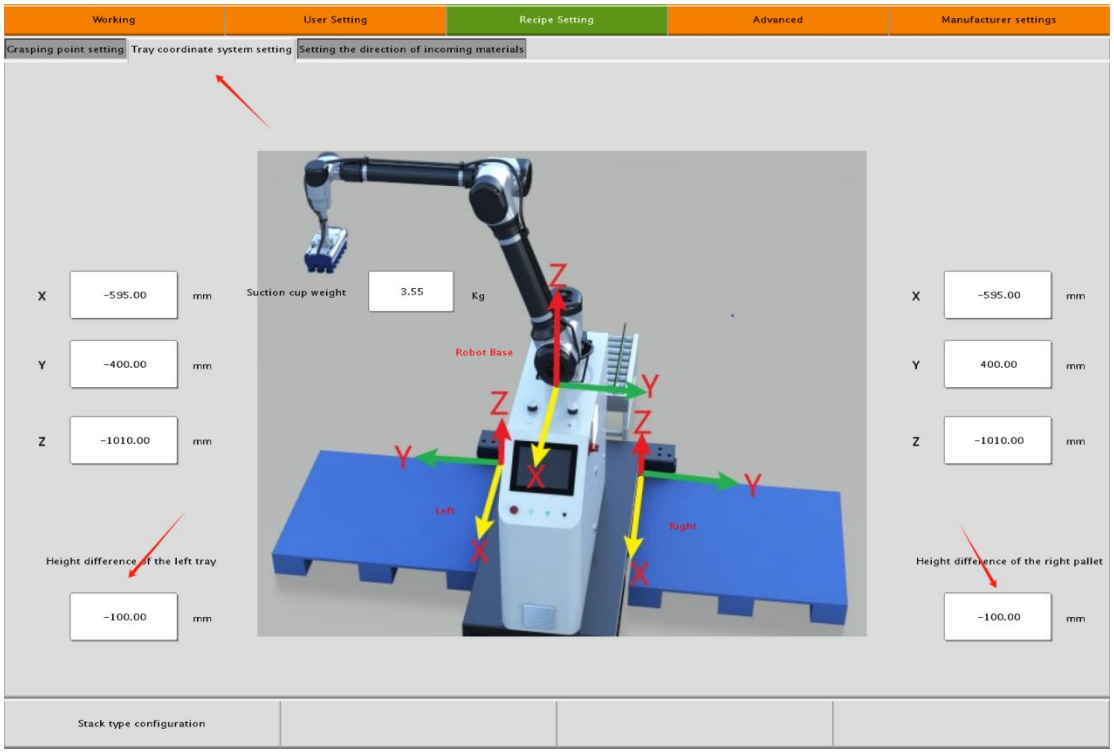


Figure 8-1

9 Setting the Collision Avoidance Function

The collision avoidance setting is found on the Debug and Maintenance page. Simply check "Enable" to activate the collision avoidance function. You can also adjust the collision alarm threshold for each axis to accommodate different sensitivity requirements.

The default alarm threshold is 30. The lower the value, the higher the sensitivity. Refer to [Figure 9-1].

Note: The above collision avoidance function can only serve as auxiliary safety protection to a certain extent and cannot fully replace safety devices such as safety doors, safety light curtains, etc. In certain situations (for example, when picking up a large load or after setting a large collision avoidance redundancy value), a collision with a person—especially with vulnerable body parts such as the head—may still cause injury. Therefore, when using this collaborative palletizing robot, a safe distance should always be maintained. If necessary, additional safety devices such as safety doors, safety light curtains, or human shape detection equipment may also be installed as supplementary safety measures.

Figure 9-1

Handling Collision Alarms:

In cases where operation can continue, first click "Reset"; this will clear the alarm notification. Then, click the "Pause/Continue" button, and the robot arm will resume its current operation.

In cases where operation cannot continue, the first press of the stop button resets the alarm, while the second press will turn off the suction cup vacuum. If there is a risk of the product falling from the suction cup, you can, after resetting the alarm, jog the robot arm to a safe position before pressing the stop button a second time to disable the vacuum and allow the product to safely fall. Afterward, you can press the "Return to Home Position" button to have the robot arm return to the home position.

(However, it is essential to ensure that there are no obstacles within the robot's working range when returning to the home position. If there are obstacles, remove them or manually move the robot to a safe area before executing "Return to Home Position." Additionally, make sure that the number of cartons already palletized matches the quantity on the pallet to prevent secondary collisions with cartons.)

Refer to [Figure 9-2].

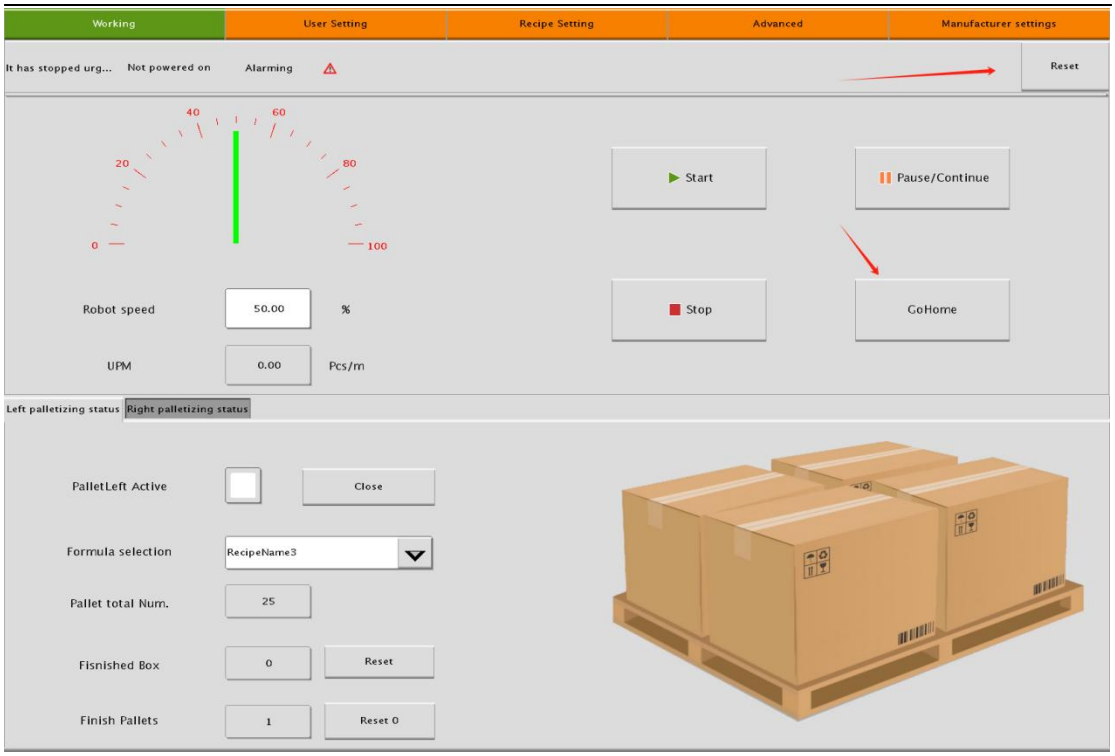


Figure 9-2

10 Production Settings

The "Production" page is primarily used to configure various palletizer parameters, which are generally set during the initial installation of the robot arm. As shown below. [Figure 10-1]

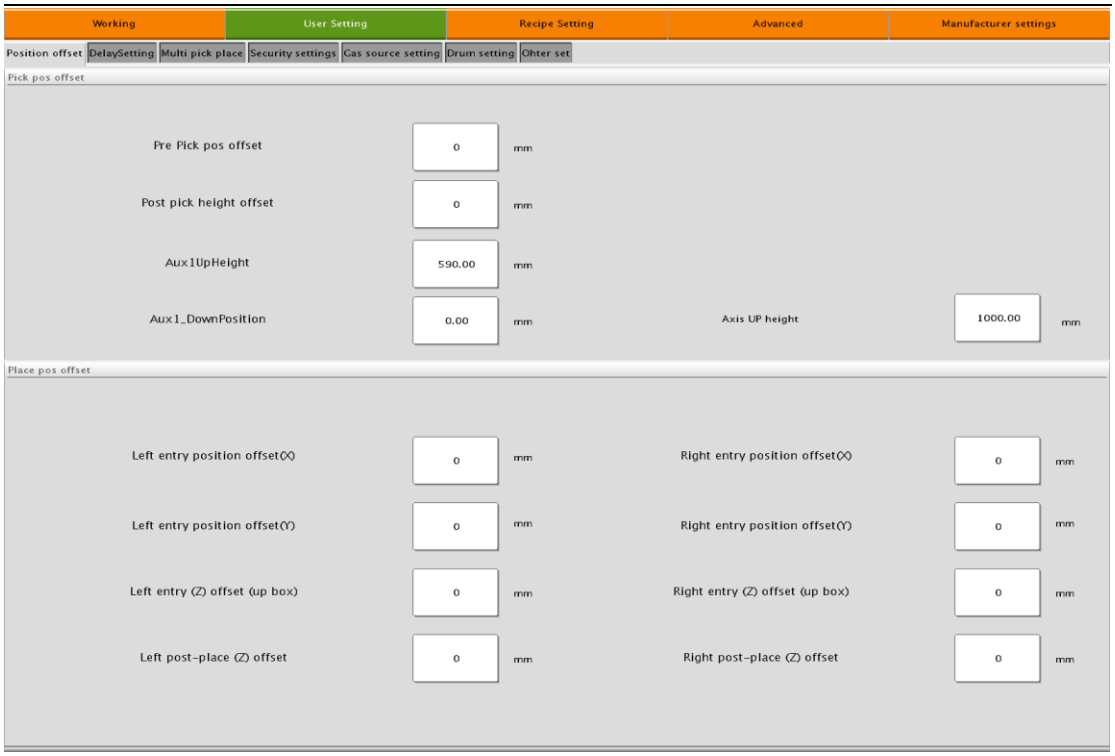


Figure 10-1

10.1 Entry Point Position Compensation Parameter Description

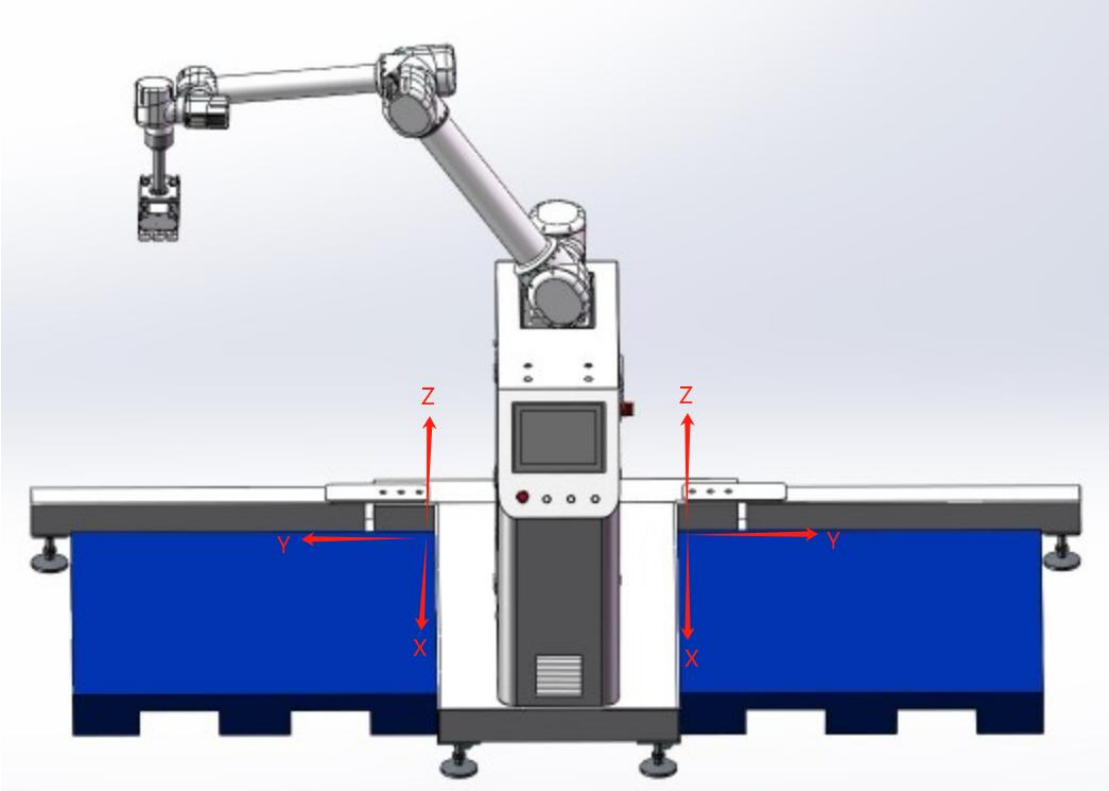
The entry point position compensation is referenced to the pallet coordinate system and adds compensation values to the default entry

point position in order to adjust the entry point. The compensation values for the left entry point are described below.

Left entry point front-back (X) compensation: Compensation is applied in the X direction of the left pallet coordinate system. A positive value offsets in the positive X direction, and a negative value offsets in the negative X direction. The same principle applies to the Y and Z directions.

The right entry point compensation value is referenced to the right coordinate system, with the same principle as the left entry point compensation.

Refer to the diagram below for the pallet coordinate system.



11 Robot Jogging

11.1 Single-Axis Jogging of the Robot

Click "Debug and Maintenance" to enter the interface, then click "Enable" to allow for manual jogging, world coordinate jogging, and zero-point calibration. Refer to [Figure 11-1] and [Figure 11-2]. **(Note: To calibrate the zero position, press and hold for 2 seconds to prevent accidental operation. Recalibration is generally unnecessary unless the robot's motor encoder battery is depleted or the motor has been replaced.)**

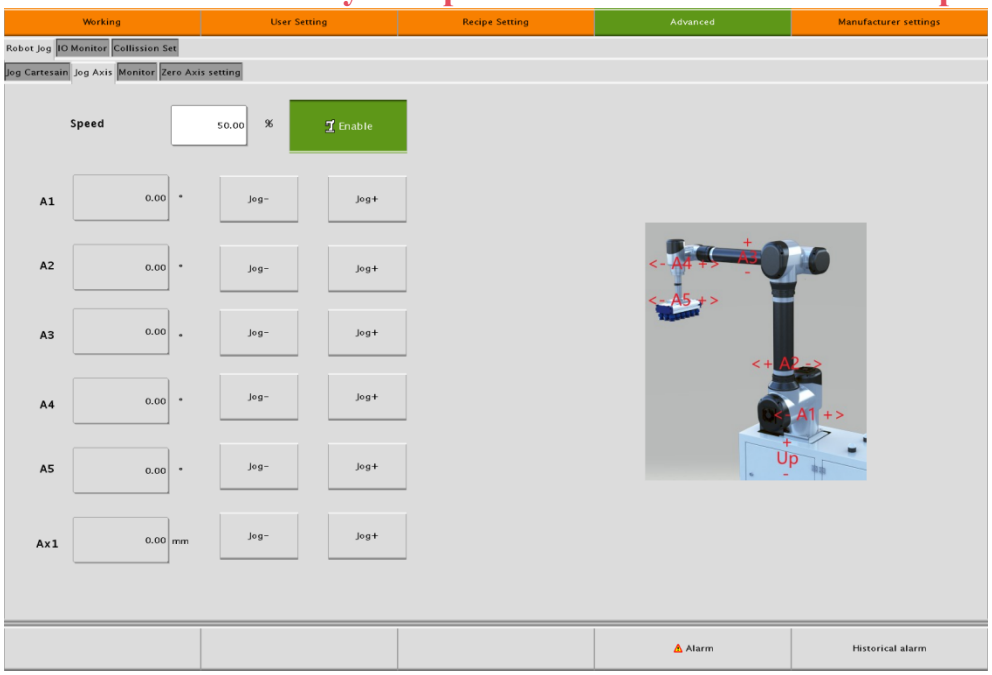


Figure 9-1

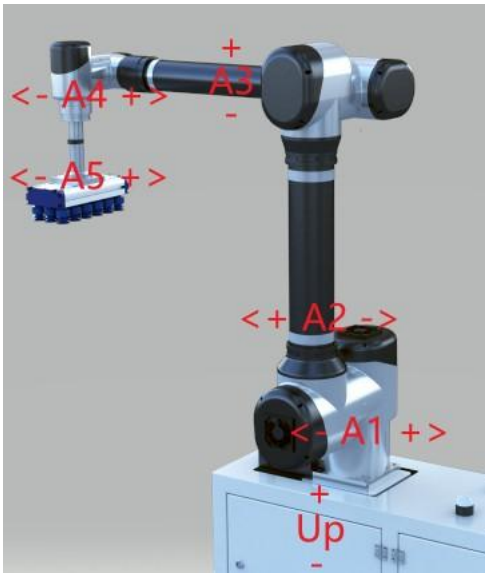


Figure 9-2

Jog Operation {Note: When the lift axis is at the zero position, it is recommended not to jog in the negative direction ("Jog –"), as this may trigger an axis limit alarm.}

A1 -0.37 ° Axis 1	Click 点动- to rotate left	Click 点动+ to rotate right
A2 84.03 ° Axis 2	Click 点动- to move up	Click 点动+ to move down
A3 -0.06 ° Axis 3	Click 点动- to move down	Click 点动+ to move up
A4 -84.06 ° Axis 4	Click 点动- to move forward	Click 点动+ to move backward
A5 -0.37 ° Axis 5	Click 点动- to rotate counterclockwise	Click 点动+ to rotate clockwise
Ax1 -0.01 mm Lifting Axis	Move down 点动-	Click 点动+ to move up

11.2 Robot World Coordinate Jogging

Refer to [Figure 11-3] [Figure 11-4]
Press the "+" or "–" button in the corresponding X/Y/Z direction to control the robot's movement in the X/Y/Z directions, as well as rotation of the C end.

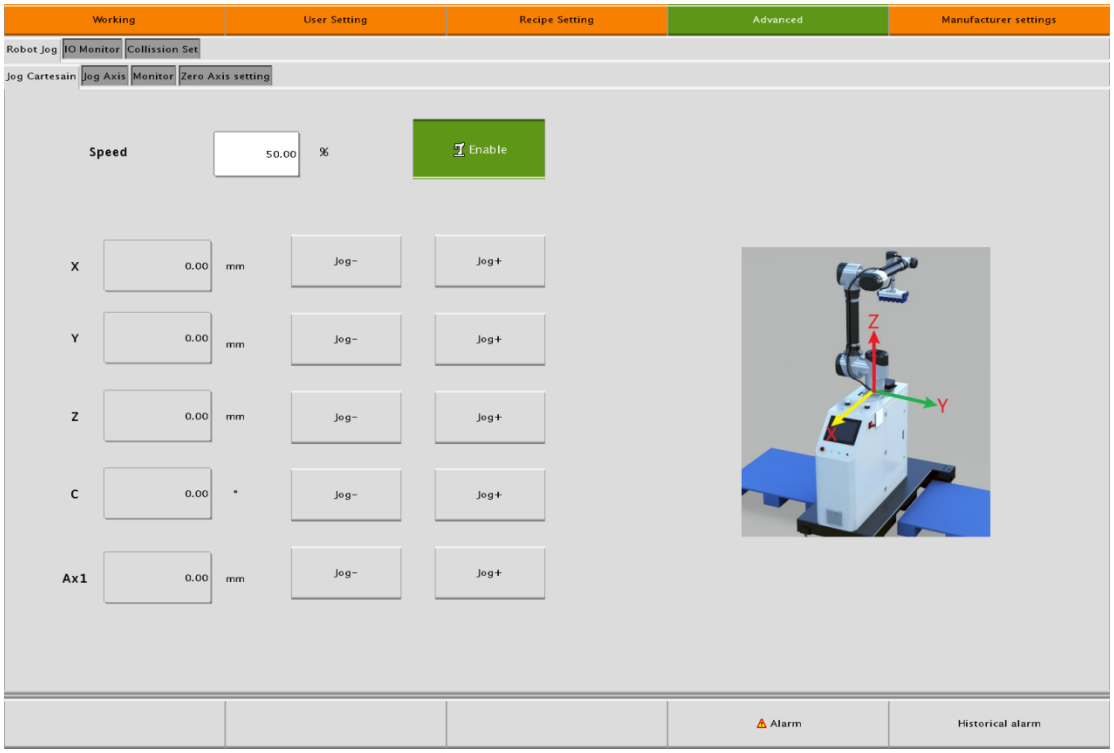


Figure 11-3

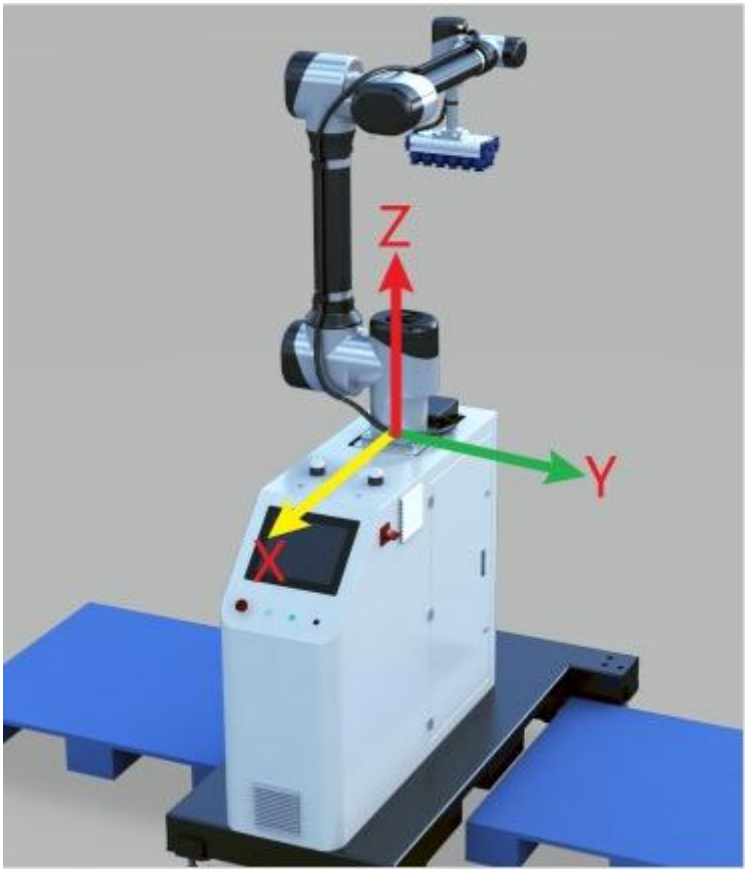


Figure 11-4

11.3 Robot Mechanical Scale Zero Setting

If the battery or motor has been replaced resulting in loss of the robot axis zero position, proceed as follows (Important: If there is no loss of zero position, do not attempt to reset the zero position yourself, as this may cause positional errors for the robot). Refer to [Figure 11-5].

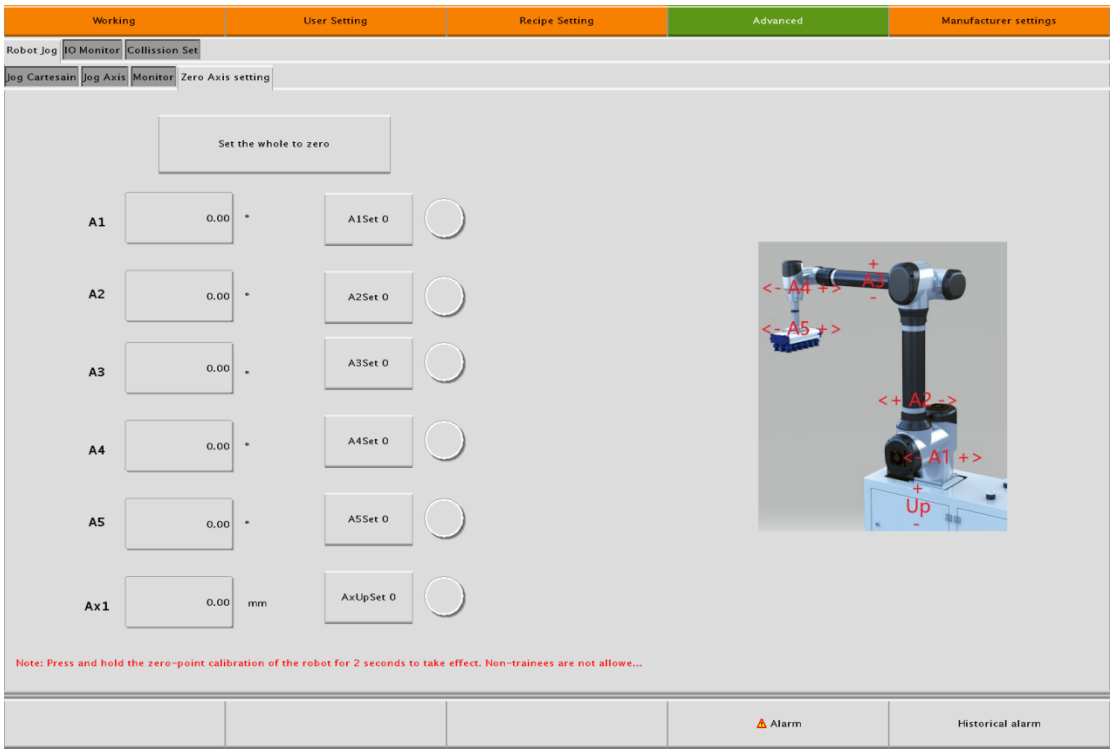


Figure 11-5

To set the zero position for Axis 1, use the jog function to move Axis 1 to the mechanical zero point and align it with the scale [Figure 11-6]. Then, press and hold "Axis 1 Zero Set" for 2 seconds. The current position will display as 0 degrees, and the circular icon on the right will turn black, indicating that the zero setting was successful [Figure 11-7].

Figure 11-6

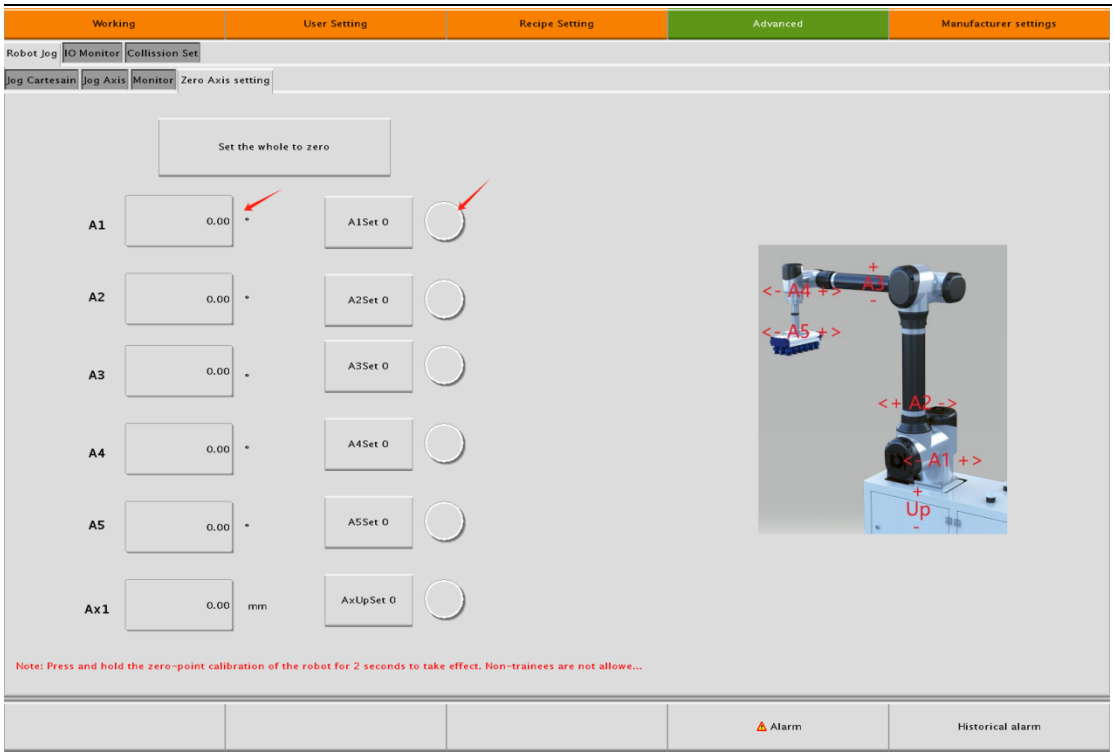


Figure 11-7

The procedures for zeroing Axes 2, 3, 4, and 5 are the same as for Axis 1.

To set the zero position for the lifting axis, manually move the lifting axis to the position shown in [Figure 11-8]; the base of the lifting axis should be slightly higher than the chassis surface. Then, press and hold "Lifting Axis Zero Set" for 2 seconds. When it displays 0 degrees and the circular icon on the right turns black, the zero setting is successful.

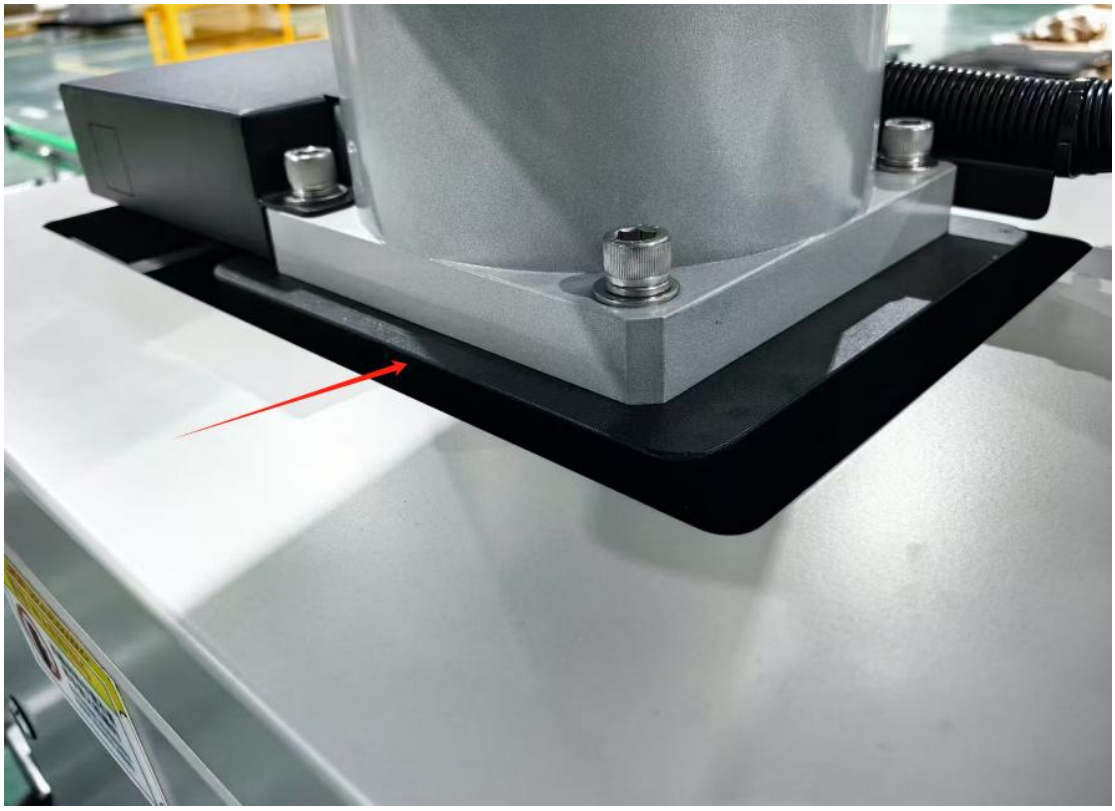


Figure 11-8

,

The robot's posture at the zero position is as shown below [Figure 11-9].

Figure 11-9

12 Robot Startup

12.1 Precautions for Starting Robot Operation

Precautions before starting the robot [Figure 12-1]

First: Check whether the number of cartons shown on the interface matches the number of cartons on the pallet.

Second: Check whether the recipe names to be used for the left and right pallets are correct.

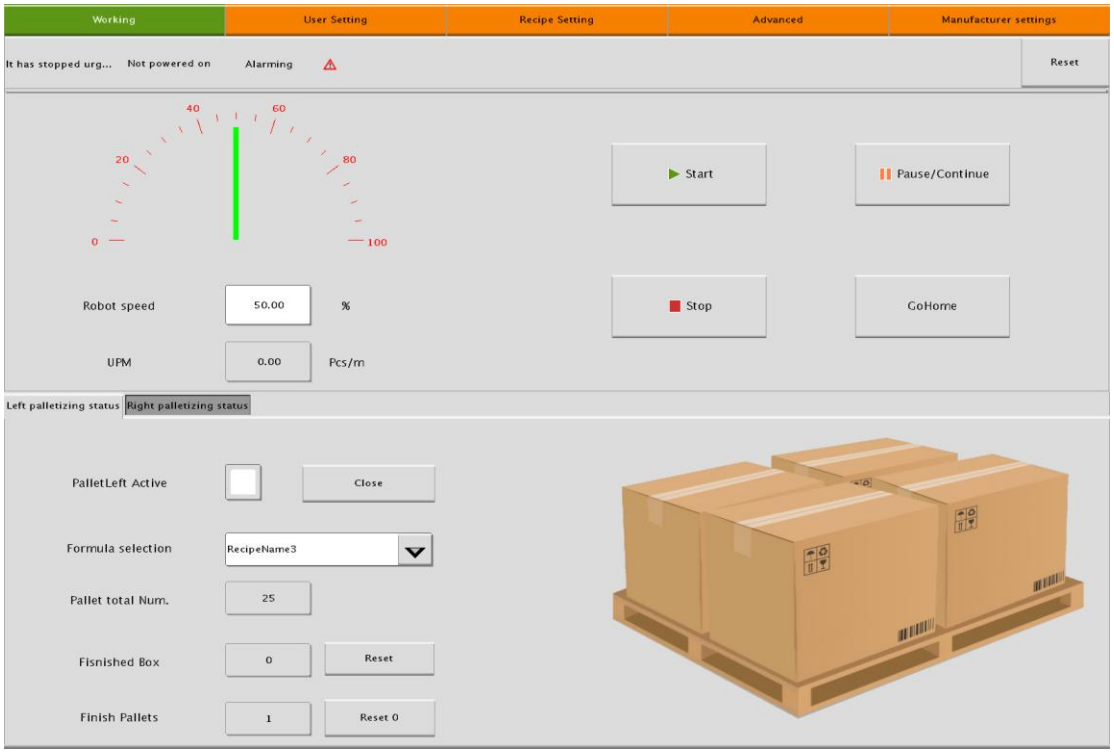


Figure 12-1

Check whether the input signals are functioning properly, for example: commonly used photoelectric signals I0.6 and I0.7.

[Figure 12-2]

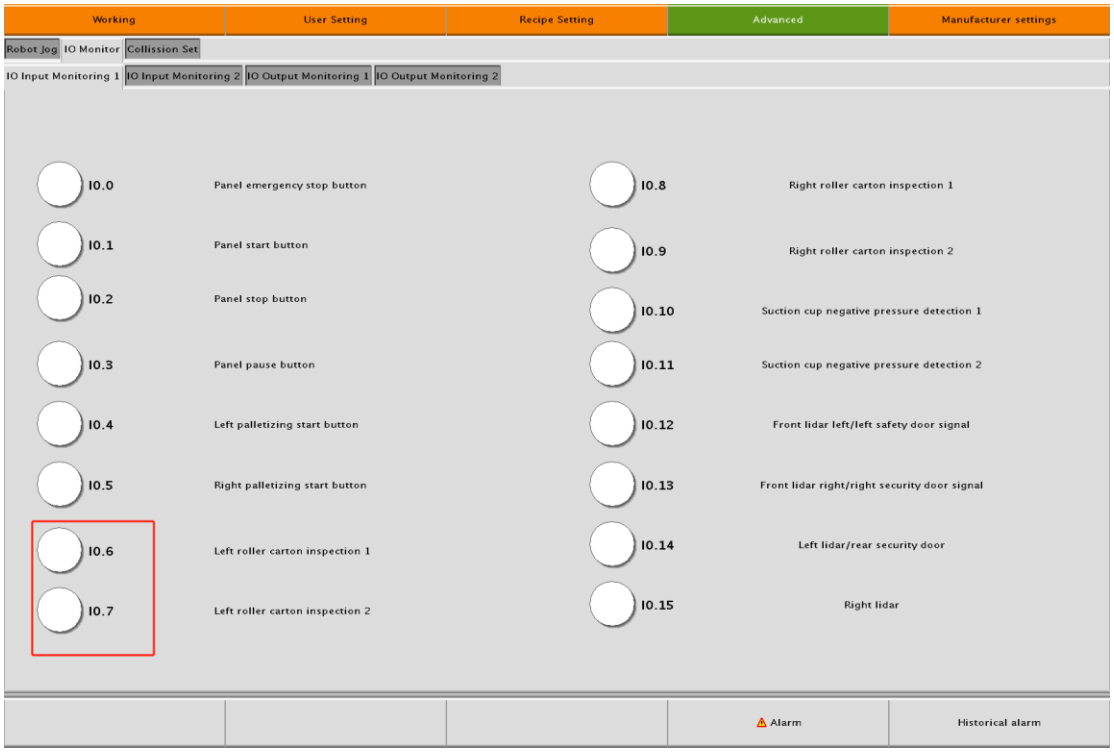


Figure 12-2

Check whether the required output signals are functioning properly [Figure 12-3].

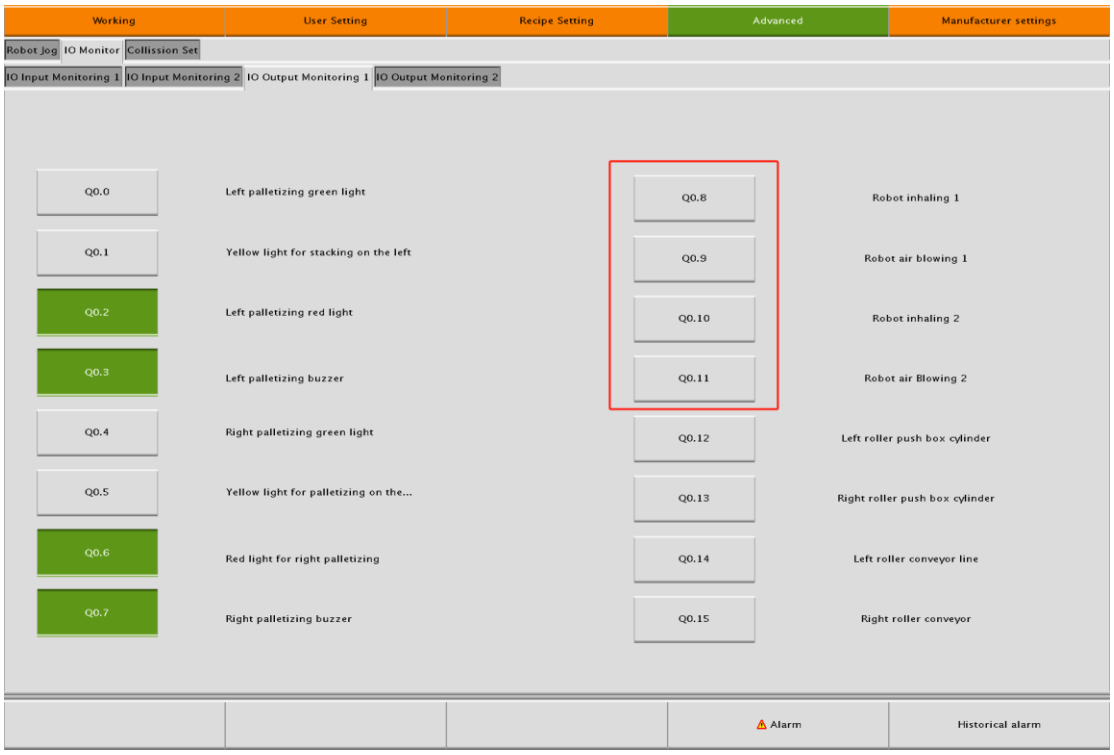


Figure 12-3

Check whether the "Pallet Height Difference" values for both the left and right pallets are correct [Figure 12-4].

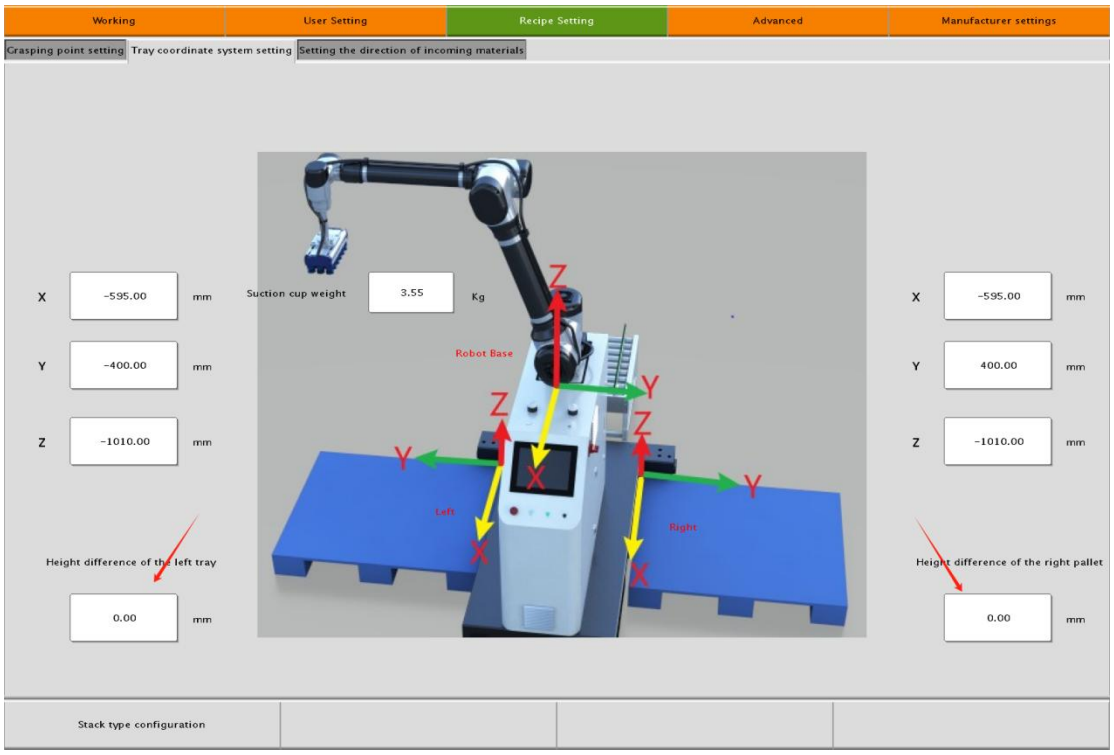


Figure 12-4

After verifying that all checks are correct, click "Start" [Figure 12-5].

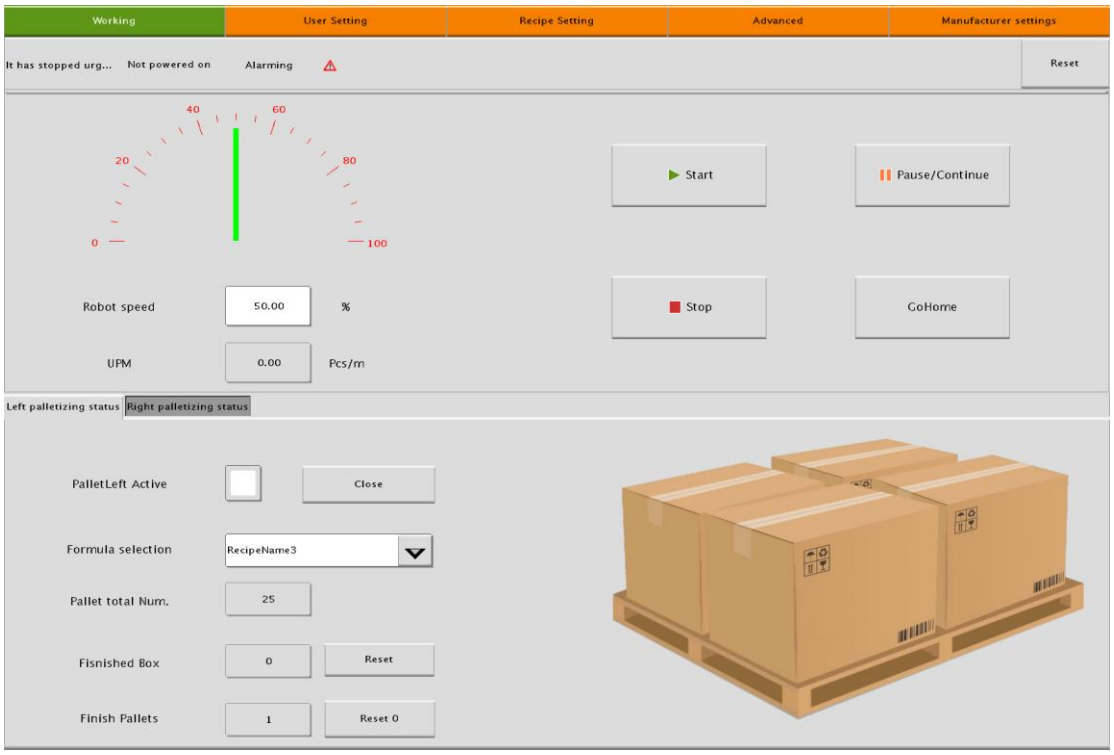


Figure 12-5

After clicking the start button, wait for the robot to complete its current operation. Then, press the "Left Start Button" and "Right Start Button," and the indicator will turn green, signaling that the robot has entered the working state.

Note: After clicking the "Start" button, if only the "Right Start Button" is pressed, the robot will only palletize on the right side; the same applies to the left side. If both the left and right palletizing start buttons are pressed, the robot will begin palletizing operations on both sides simultaneously. [Figure 12-6]

Figure 12-6

日常运行	Daily Operation
生产	Production
配方	Recipe
调试维护	Debug and Maintenance
厂家	Manufacturer
未急停	Not Emergency Stopped

已上电	Powered On
运行中	Running
复位	Reset
启动	Start
暂停/继续	Pause/Continue
停止	Stop
回零位	Return to Home Position
运行速度	Operating Speed
运行节拍	Operating Cycle
左码垛状态/右码垛状态	Left Palletizing Status / Right Palletizing Status
码垛指示	Palletizing Indicator
关闭	Close
配方选择	Recipe Selection
码垛总数	Total Palletizing Quantity
已码个数	Number of Palletized Cartons
已码垛数	Number of Palletized Layers
清零	Reset to Zero

Conclusion

Thank you for using our products!

This product is covered by a twelve-month warranty. During the warranty period, if the product malfunctions or is damaged under normal use according to the instruction manual, our company will provide free repair services.

During the warranty period, repairs resulting from the following causes will incur a service fee:

a) Damage to the machine caused by user error, unauthorized disassembly, repair, or modification;

b) Damage to the machine caused by fire, flood, abnormal voltage, other natural disasters, or secondary disasters;

c) Hardware damage caused by dropping or improper handling during transport after purchase;

d) Damage to the machine resulting from failure to operate according to our user manual;

e) Malfunctions or damage caused by external factors (such as issues with external equipment);

f) Damage to the machine resulting from improper debugging operations or human error.

Precautions During Debugging

a) During debugging, personnel must not approach the robot's working range to prevent unnecessary safety incidents.

b) During debugging, always keep your hand on the emergency stop button.

c) During debugging, keep the speed controlled between 10% and 30%.

d) The collision avoidance function must be enabled while the robot is operating.

e) When production is stopped, stop and reset the robot and disconnect the power supply.

f) During production, if any abnormal noise or irregularity occurs, the machine must be stopped immediately for inspection.

Update Log

III. Technical Data

1. Main technical data

1) Equipment abbreviation：WP20;
2) Designed palletizing speed: 8-10 times/min (depending on the product);
3) Tray size: L1200mm-W1200mm-H150mm;
4) Tray placement form: manual, one left and one right;
5) Robot load-bearing: maximum 30kg with gripper;
6) Palletizing height: maximum palletizing height 2000~2600mm(depending on the tray and box), lifting column 600mm;
7) Size of the work station: about 3410mm*1700mm*3100mm (length × width × height, including pallet position, after lifting);
8) Workshop required height: 2500mm+ lifting height;
9) Logistics wooden box size: 2150mm*1550mm*1900mm.
10) Total power: 3KW
11) Power supply: 220V±10%, 50Hz±5%, 24V DC control voltage
12) Air source: 0.5 ~ 0.7Mpa, air consumption: 200L/ min (customer prepares its own air source)
13) Weight: about 700kg
14) Noise: <80 dB
15) Machine color: silver gray

2. Performance and characteristics

WP-20 palletizing co-robot has the following characteristics

1. Easy operation, support a variety of palletizing formula, fool operation, easy to learn and understand;

2. Low energy consumption, low operating cost;

3. Less space, flexible and can be moved at will;

4. Safe and convenient, without guardrail.

IV. Standard parts list

1. Special tools list

Index	Name	Specification	number
1	WP-20 Manual	(normally electronic version)	1
2	Qualification		1
3	Phillips screwdriver		1
4	Straight screwdriver		1
5	Allen wrench		1

2. Main electronic parts list

Index	Name	Specification	number	comment
1	Robot controller	Austria KEBA	1	
2	Servo Drive	Austria KEBA	1	
3	Servo Motor	China Kossi	6	
4	E-Stop button	France Schneider	1	
5	Detection switch	Japan Panasonic	2	Box coming detection
6	load-disconnector switch	China TianYi	1	
7	Contactor	France Schneider	1	
8	Circuit breaker	France Schneider	1	
9	Solid-state relay	China Weide	4	Vacuum, broke vacuum
10	Vacuum sucker	China Shikun	1	Spongy or octopus sucker
11	Touch panel	China Zhixianda	1	12 Inch
12	DC power	China Taiwan Mingwei	1	
13	Rail	China Taiwan AirTAC	4	
14	Solenoid valve	China Taiwan AirTAC	2	
15	Electric actuator lift	China	1	600mm stroke