PalletStation

DUCO Robots CO., LTD.

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CHAPTER

ONE

INTRODUCTION

1.1 Overview of Palletizing Workstation System

The DUCO PalletStudio palletizing workstation is an integrated hardware and software solution for box stacking applications that includes DUCO’ s high payload collaborative robot GCR25, a palletizing base and a software package for control. Compared to traditional industrial robotic arms, the collaborative robotic arms form a palletizing workstation with a smaller footprint, higher safety, electronic safety fencing supplemented by collision detection of the collaborative robots, and no need for additional fencing for protection, making it more agile. This brochure helps customers to understand this palletizing workstation and provides information on how to set up and activate your palletizing configuration.

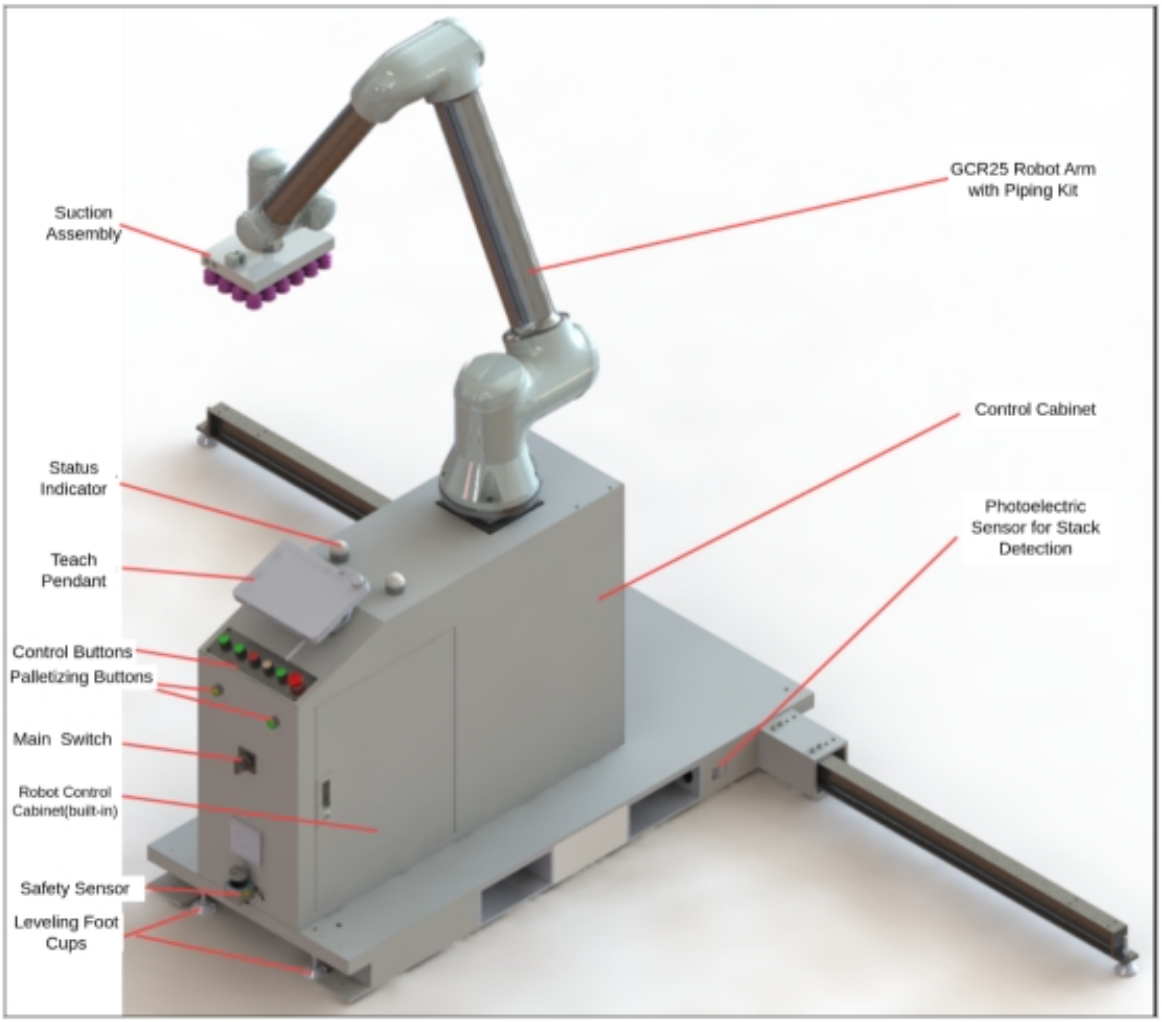

Figure 3.1 Schematic diagram of the palletizing workstation (front)

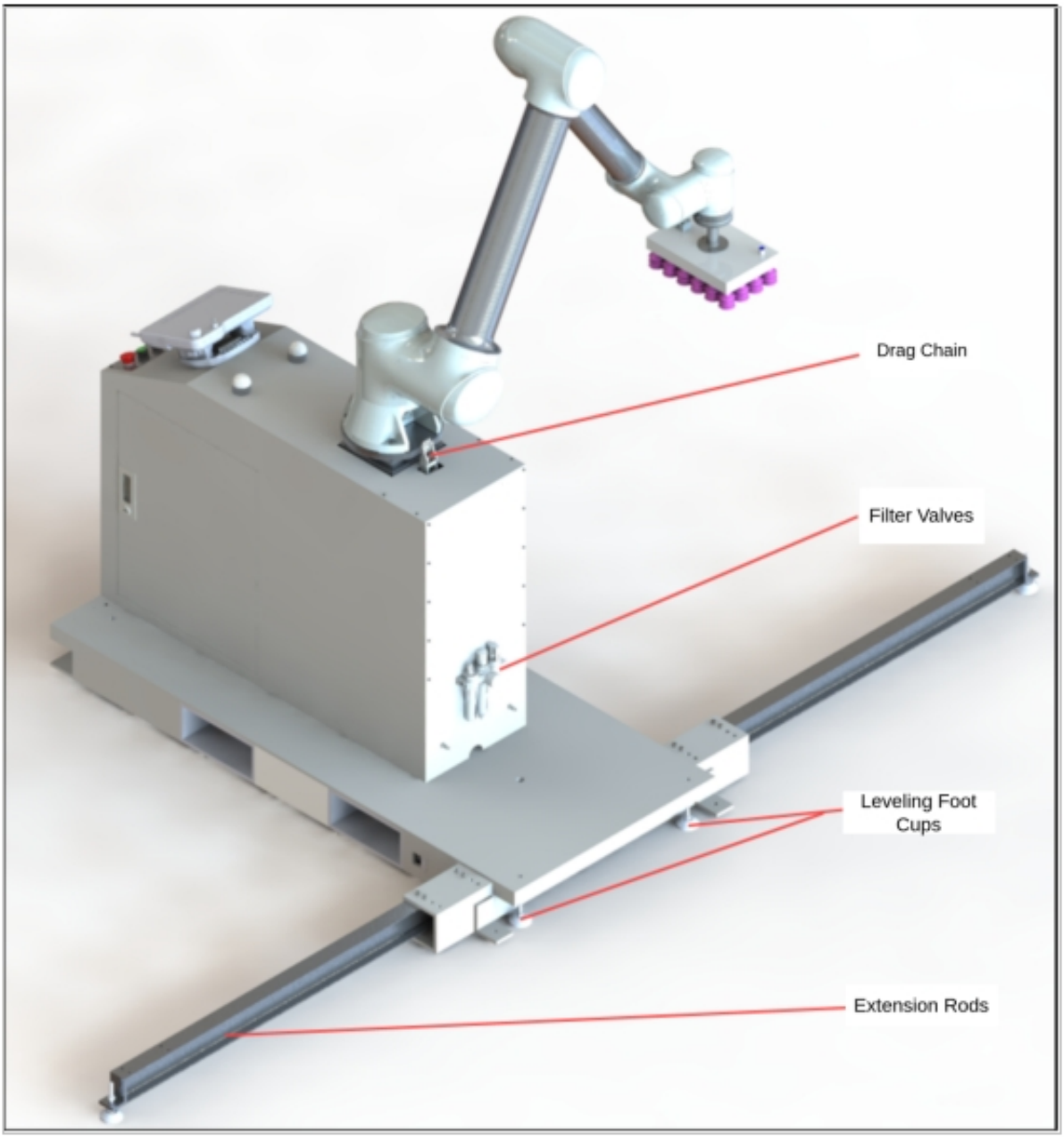

Figure 3.2 Schematic diagram of the palletizing workstation (back)

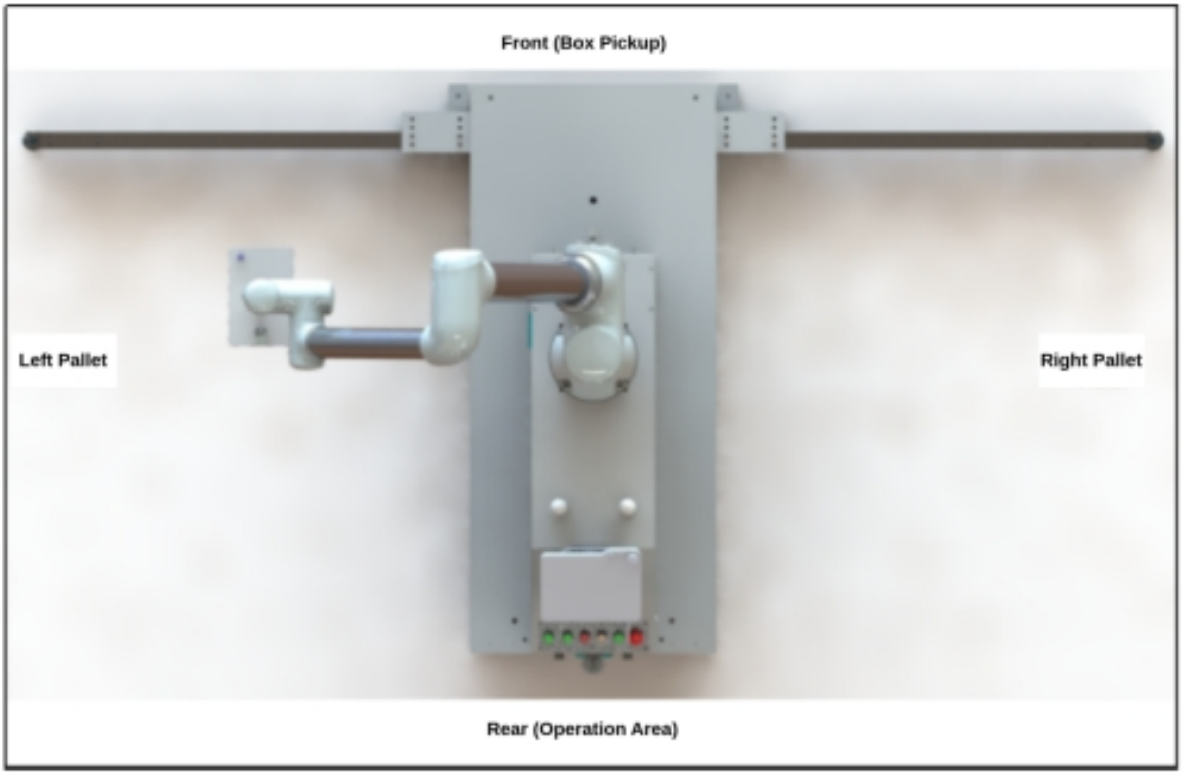

Figure 3.3 Top view of palletizing workstation

1.2 Introduction to Palletizing Workstations

The palletizing workstation consists of the DUCO-GCR25 collaborative robot, the electrical control cabinet (including the robot controller DC30D-J9), the portable mobile base and pallet positioning system, and the palletizing control system. The overall palletizing workstation can be fully controlled by our control cabinet.

Figure 3.4 Schematic diagram of the components of the Code Multi workstation

1 DUCO-GCR25 Collaborative Robot

The collaborative robotics system consists of the following main components:

- Robot
- Robot control cabinet
- Connection cable
- Software
- Other options, accessories

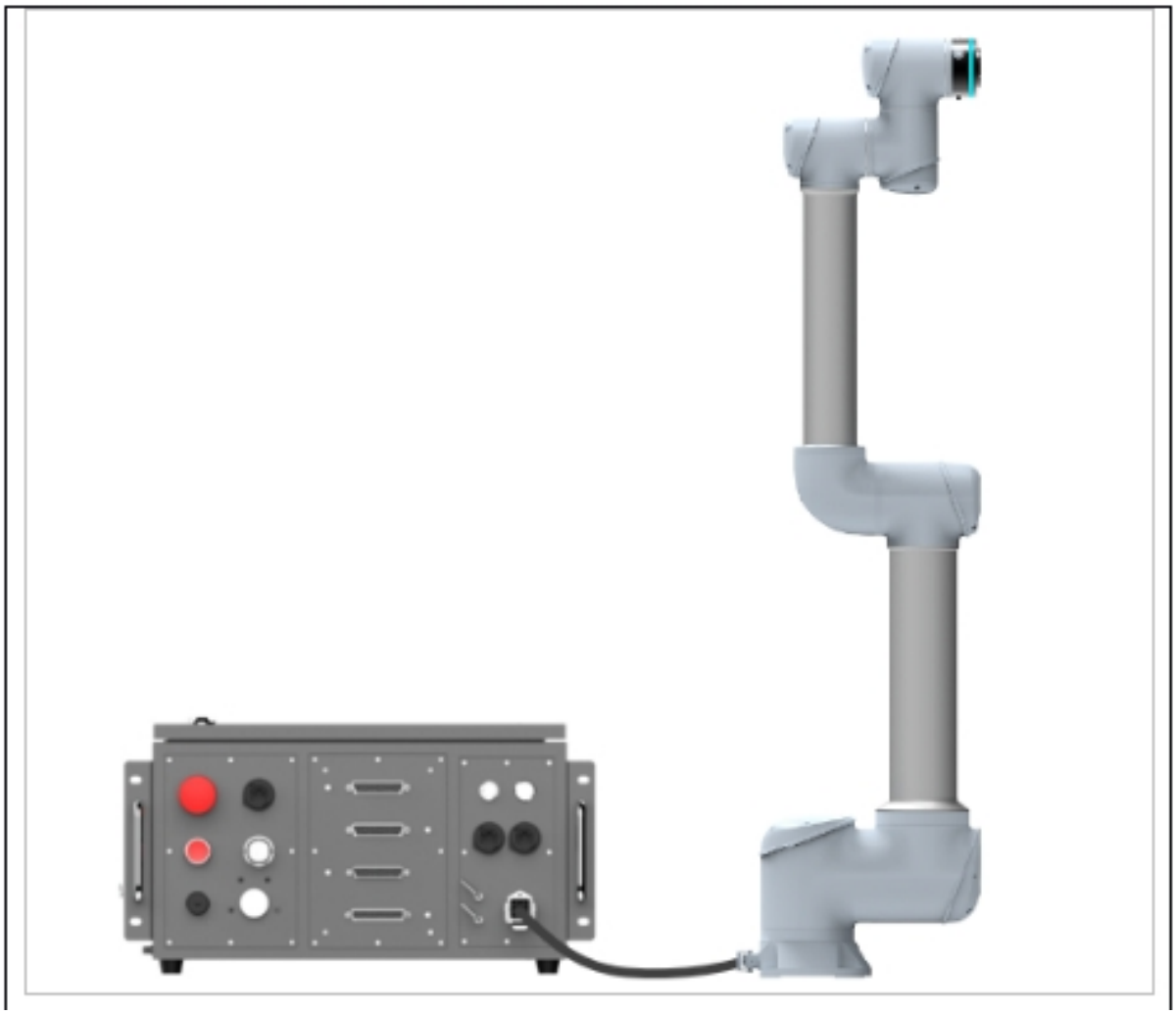

Figure 3.5 Overview of the robot system

System Parameters	
Degrees of freedom: 6	Load (TCP): 25kg
Workspace: 1800mm	Repeat positioning accuracy:±0.05mm
Working Temperature: -10~45	IP rating: IP54
Installation: Floor-mounted	

2 Pneumatic suction assembly

a Air tube: Including two φ8 air tubes for inlet and outlet, the outlet is used to create negative pressure, and the inlet is used to release items.

b Suction devce (including negative pressure sensors): used to suck up palletized items, the sensor will output a high level signal after reaching a certain negative pressure threshold.

c Robot Tubing Kit: The robot tubing kit is designed to hold the cables for the air tubes and negative pressure sensors along the arm so that they do not get tangled in the arm during suction cup rotation to cause risks such as the air tubes falling out.

3 Lifting column (or fixed column): controls the raising and lowering of the robot arm, determines the number of layers that can be palletized, and includes the drive and motor.

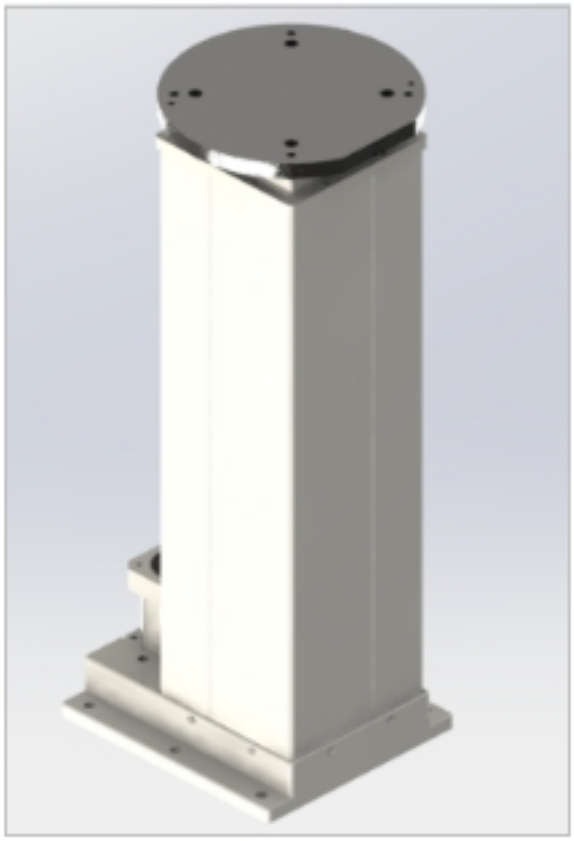

Figure 3.6 Schematic diagram of the lifting column

4 Control cabinet components

a DC30D-J9 Controller: The GCR25 is equipped with a controller capable of controlling all the tasks of the overall palletizing station, in the form of a modular workstation in the form of a control cabinet, for rapid deployment and maintenance.

Figure 3.7 DC30D-J9 controller

b Circuit breaker: Circuit breakers can be used to protect circuits and equipment from damage caused by overloads, short circuits and other faults, and to ensure the safe operation of circuits. They can also be used to switch circuits and control the start, stop and operation of various electrical equipment.

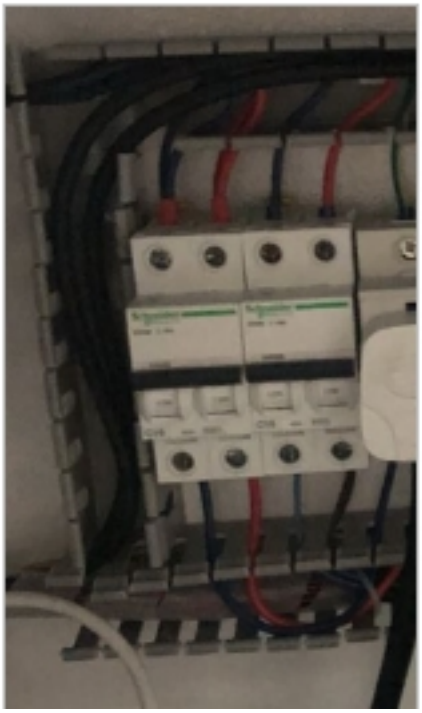

Figure 3.8 Circuit breaker

c On-off switch: Controls the up and down power of the whole station. The white arrow pointing horizontally to the left to O means the circuit is closed, and turning the switch to the right by 90° to point to I will turn on the circuit.

Figure 3.9 On-off switch

d Safety sensors (optional) for setting up safety zones: used to ensure that the machine stops when there is a person or foreign object in the designated area, and also to monitor that the robot stops when a person enters the robot’s work area.

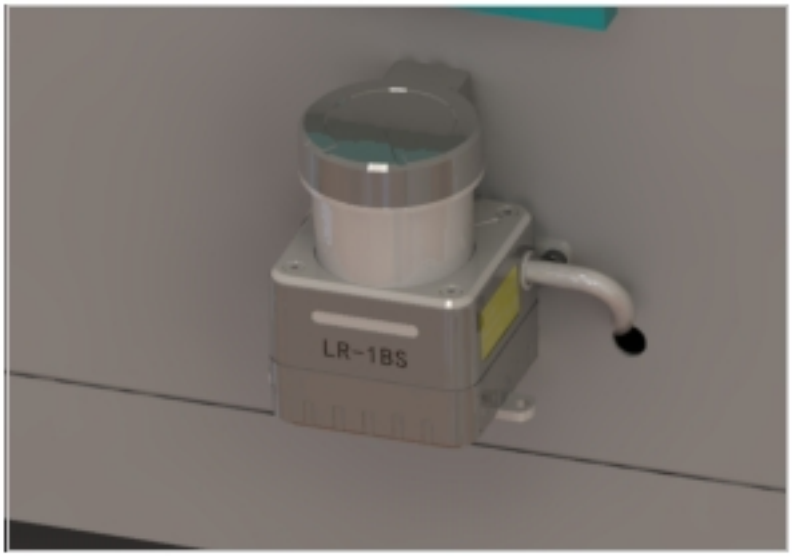

Figure 3.10 Safety sensors

e Three-color light with buzzer: Provide present status indication, warning to remind the current status.

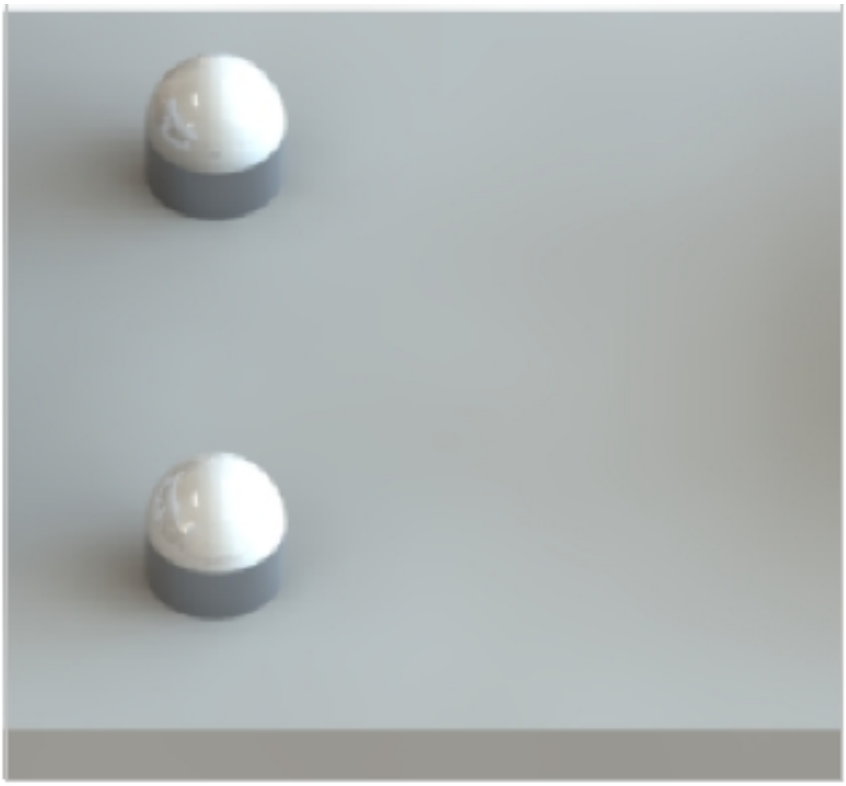

Figure 3.11 Three-color light with buzzer

f Drag chains: Regulate the movement of air hoses and robot cables with the lifting column to avoid entanglement and abrasion.

Figure 3.12 Drag chain

g Buttons: physical buttons that control the palletizing workstation, with the specific functions shown in the figure

Figure 3.13 Buttons

1.3 Palletizing Workstation Specifications

Model number	DUCO-PS-0-0	DUCO-PS-80-1
Working radius	1800 mm	
Maximum pallet size	1200×1200	
Maximum height	1700 mm(Fixed base)	2500 mm(Lifting base)
Height of lifting column	not have	850 mm
Maximum lifting height	not have	800 mm
Palletizing speed packages per minute	6-8 boxes min	
Repeat Positioning Accuracy	±0.05	
Communication method	TCP IP	
IP Class	IP54	
Temperature range	0~55	
Rated power	1.5 kW	
Power supply (of an appliance etc)	100~220 AC	
Weight	522 kg	472 kg
Area	3320×1665(including extension rod)	

CHAPTER

TWO

TRANSPORTATION, INSTALLATION AND USE

2.1 Size of the Whole Station

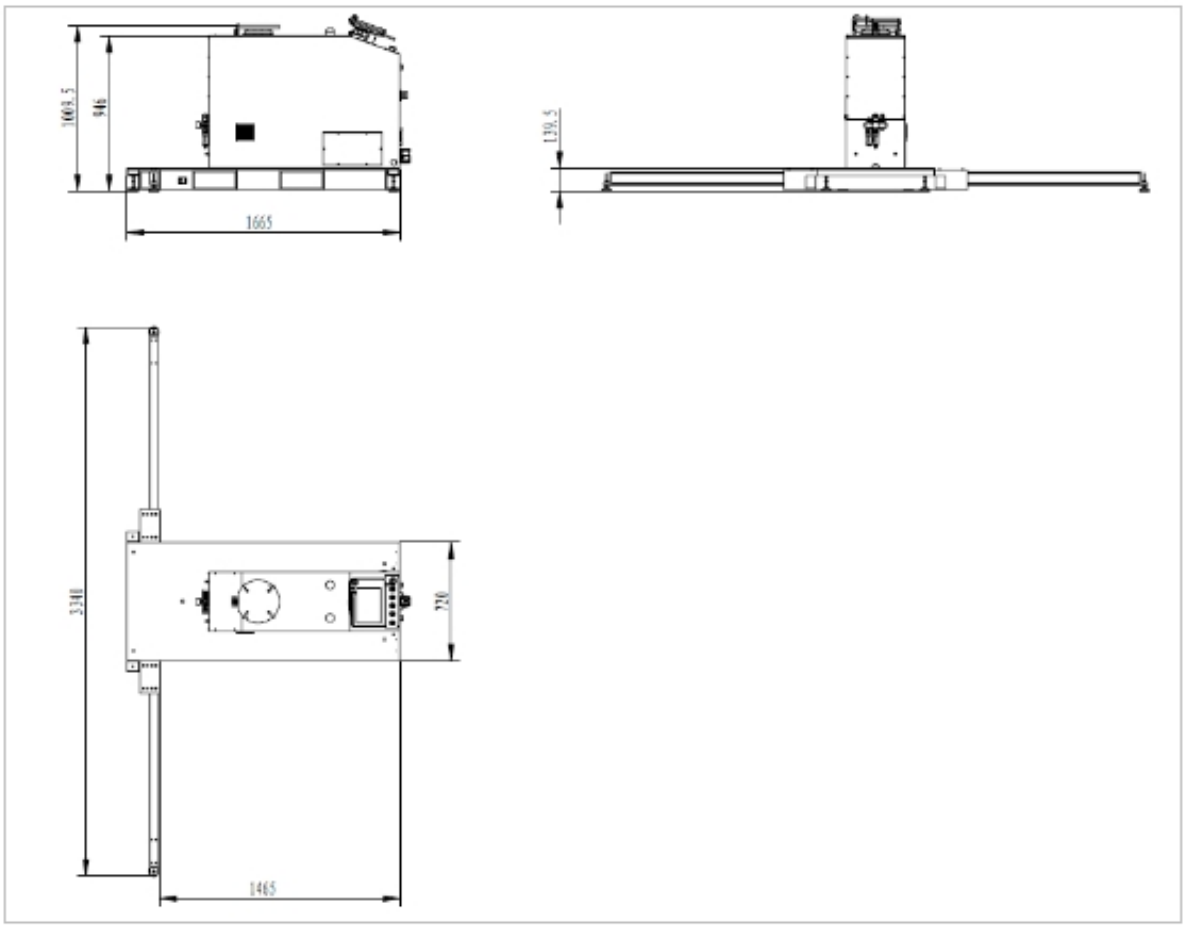

Figure 4.14 Dimensional drawing of the whole station

2.2 Transportation of Palletizing Workstations

The palletizing workstation is transported using a forklift truck and the base of the palletizing workstation allows it to be lifted from the left, right and rear directions. The following diagram shows the alignment of the slots and the base and the corresponding dimensions.

Figure 4.15 Alignment of slots and bases and corresponding dimensions

Figure 4.16 Recommended Packing Pose

Tips:

- If the robot is still mounted on a column or lifting post during handling, it needs to be adjusted for attitude, and after the end is turned sideways, the robot arm must be tied up with sturdy packing materials to protect it from potential damage.

- Pallet Applicable Size:

Refer to the standard “GB/T 2934-2007 Intermodal Transportation Flat Pallet Main Dimensions and Tolerances”.

2.3 Deployment Requirements

1 Extension rod assembly (take care that the foot cups are not screwed down too low in advance): the extension rod is used to prevent tipping and to assist in limiting the pallet.

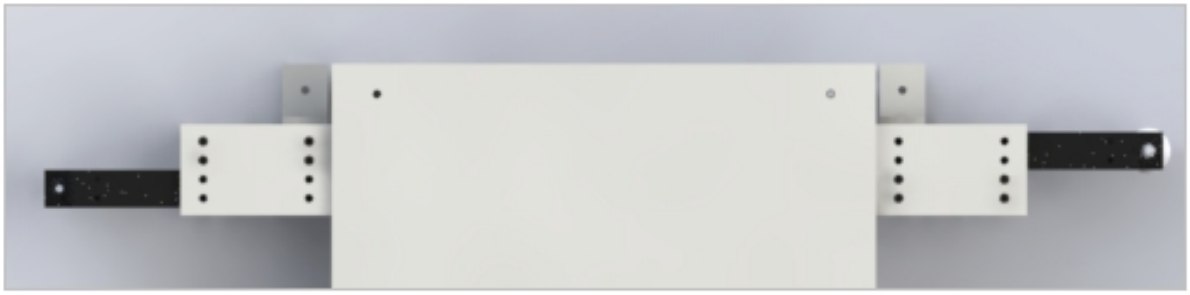

Figure 4.17 Extension rod assembly diagram

When the palletizing workstation arrives, the reach rod will be secured to the inner end. It will be necessary to remove the 8 x M8 screws and then pull out the extension rods and align the holes in the lower end separately to secure them. The final molding is shown.

Figure 4.18 Formed extension rod

2 When placing the workstation, use a flat surface as much as possible. When encountering a non-flat surface, use a wrench to adjust the leveling seat to avoid wobbling.

1 Turn the upper hexagonal nut clockwise to loosen the leveling feet.

2 Turn lower hex nut clockwise to lower leveling foot cups

3 Turn the lower hexagonal nut counterclockwise to raise the leveling feet.

4 Turn the upper hexagonal nut counterclockwise to lock the leveling foot cups.

If the palletizing workstation is not frequently relocated, it can be fixed to the floor by means of foot positioning points (adjust the foot cups upwards so that the whole base plate lands on the floor). The diagram below provides a reference for the dimensions of the fixing points:

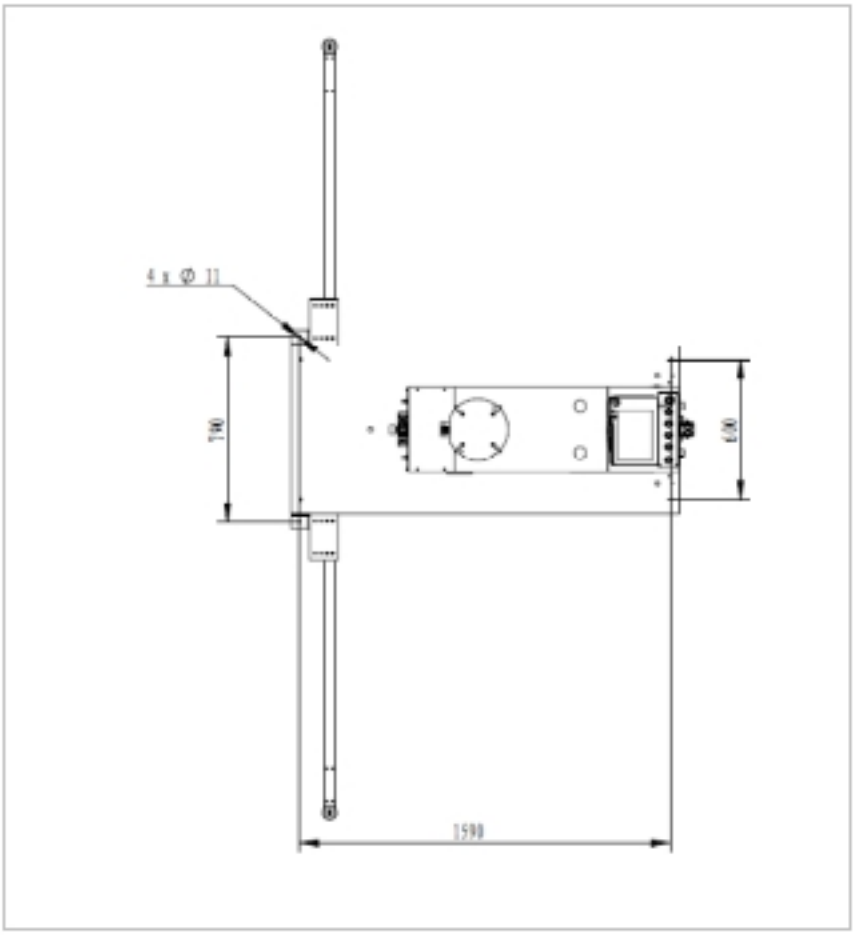

Figure 4.19 Fixed Point Dimension Reference Diagram

At least 2 people should perform the robot installation at the installation site at the same time, otherwise there is a risk of damage to the machine or personal injury, never by a single person.

The robot and the control cabinet are fixed on the base plate as a finished product and should not be disassembled in principle. If necessary, please contact the technical support to operate under guidance, the robot body is heavy and requires at least 4 people to assist in carrying.

3 Air pipe connection: the front reserved air pipe is connected with the air source, diameter φ10; The on-site gas source pressure needs to be stabilized at 0.5-0.6Mpa. The threshold value of the digital pressure switch is set as follows:

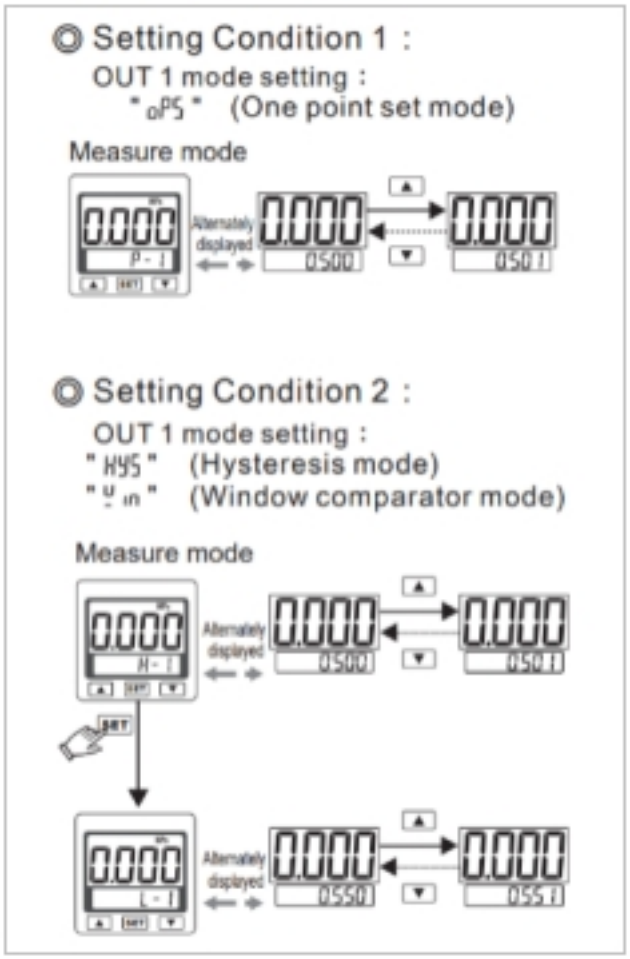

Figure 4.20 Threshold Setting Reference

4 External 220V power connection: The power cord here needs to be connected to an external 220V power source, please refer to the electrical schematic diagram for details. The switch of the control cabinet will be turned on by default, if there is a need to turn off, remove the left side panel to operate the switch.

2.4 Maintenance

After the completion of equipment commissioning, the maintenance work shall be carried out according to the specified maintenance period.

Maintenance Term Regulations Form

Maintenance activities	Period Maintenance	Every 1 month	Every 6month	Every 12 month	Every 36 month
Clean the control box (Replace the filters)	X				
Clean the lifting column, add lubricating oil	X		X		
Clean the lifting column and fill with lubricating oil	X	X			
Clean the robot	X		X		
Inspection activity					
Check the robot base mounting bolts	X	X			
Check the mounting bolts of the robot end wash plate	X	X			
Check the robot joint mounting bolts	X	X			
Check light strip seals	X	X			
Check joint seams for grease spills	X				
Check the information label and nameplate	X			X	
Check the cable harness	X		X		
Check robot joint back cover and bolts	X	X			
Check the emergency stop	X	X			
Check teach pendant 3-position enable switch	X	X			
Check control cabinet safety inputs and outputs	X	X			
Check teach pendant cables and conectors	X		X		
Check control cabnet fan filter	X			X	
Check control cabnet IO terminal block	X	X			
Check control cabnet power connector	X			X	

Period maintenance:

It is referring to the regular implementation of the relevant maintenance. The actual interval depends on the robot’s operating period, work environment and sports mode. In general, the shorter the operating period; the more serious the work environment pollution; the more rigorous exercise mode, the shorter the interval of regular maintenance should be.

When performing a job on the maintenance list, a visual inspection must be carried out based on the following points:

- Check the safety device, plug connection and printed circuit board is securely installed;
- Check the label, nameplate is clear and unspoiled;

- Check if the cable is damaged;
- Check the connection of the ground potential equalization lead;
- Check all equipment components for wear or damage.

Lifting column maintenance instructions:

Raise the lifting column to the highest position, clean and check the outer surface of the lifting column to ensure that the surface is free of collisions, pits and other abnormalities.

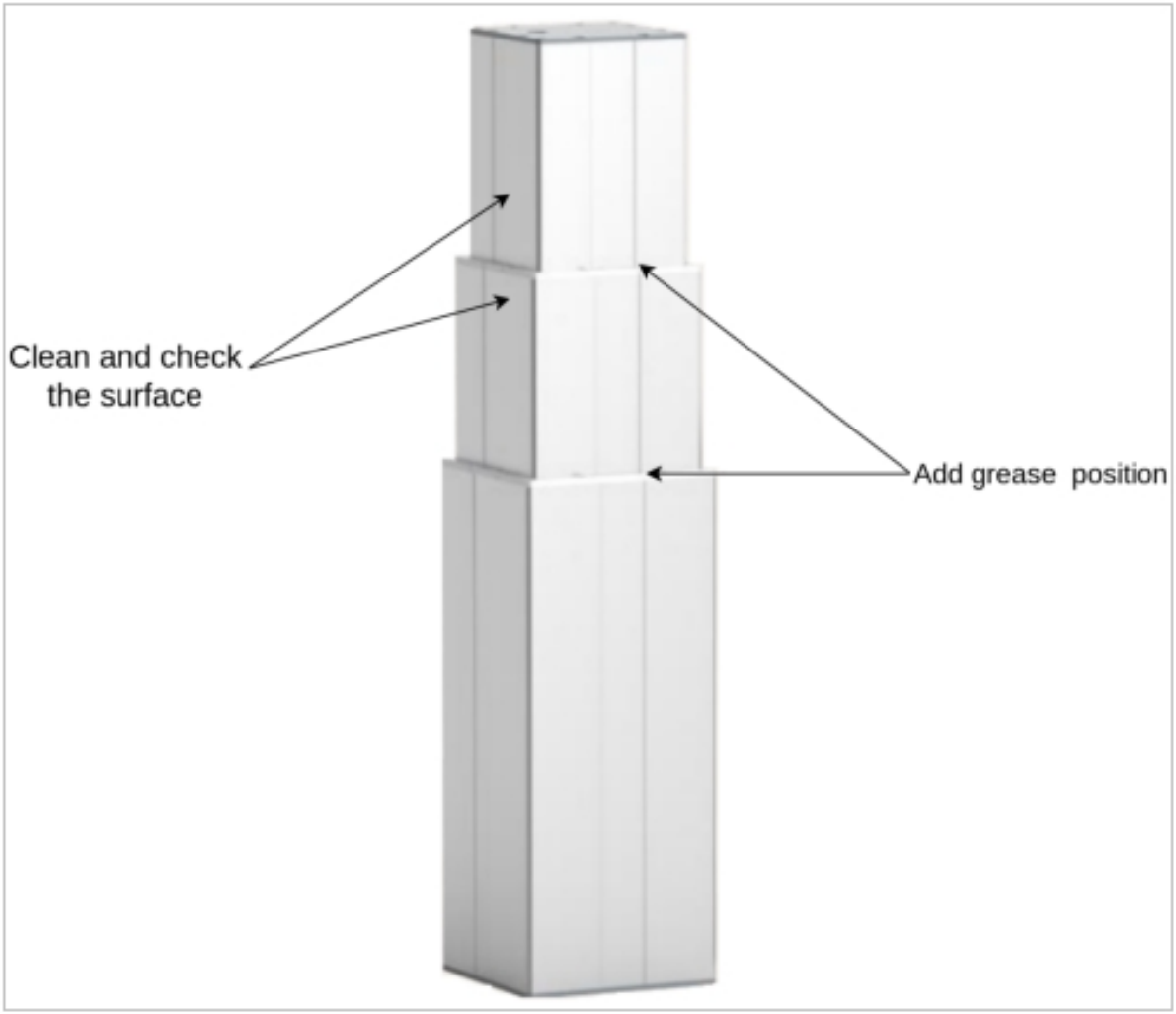

Figure 4.21 Lifting Column Maintenance Reference

Apply grease evenly as shown in the above figure, and then the column will be slowly lowered to the lower limit, and the maintenance action will be completed after three times of up and down (10mm/s).

Recommended use of food-grade fully synthetic fluorine gre

CHAPTER

THREE

PALLETSTUDIO CONFIGURATION PROCESS

PalletStudio Configuration Process includes Basic Configuration , Advanced Configuration, Self-Check Test and System Configuration.

- Basic configuration: the basic parameters that must be configured for a palletizing station.
- Advanced configuration: advanced parameters to be configured on a case-by-case basis for the palletizing station.
- Self-test: for pallet accessibility checking and related semaphore status confirmation
- System configuration: clear/import/export system configuration and reset system password

3.1 Inicialized Basic Configuration

3.1.1 Language Configuration

When initializing the configuration, click on “English” in the upper right corner to change the language mode, as in

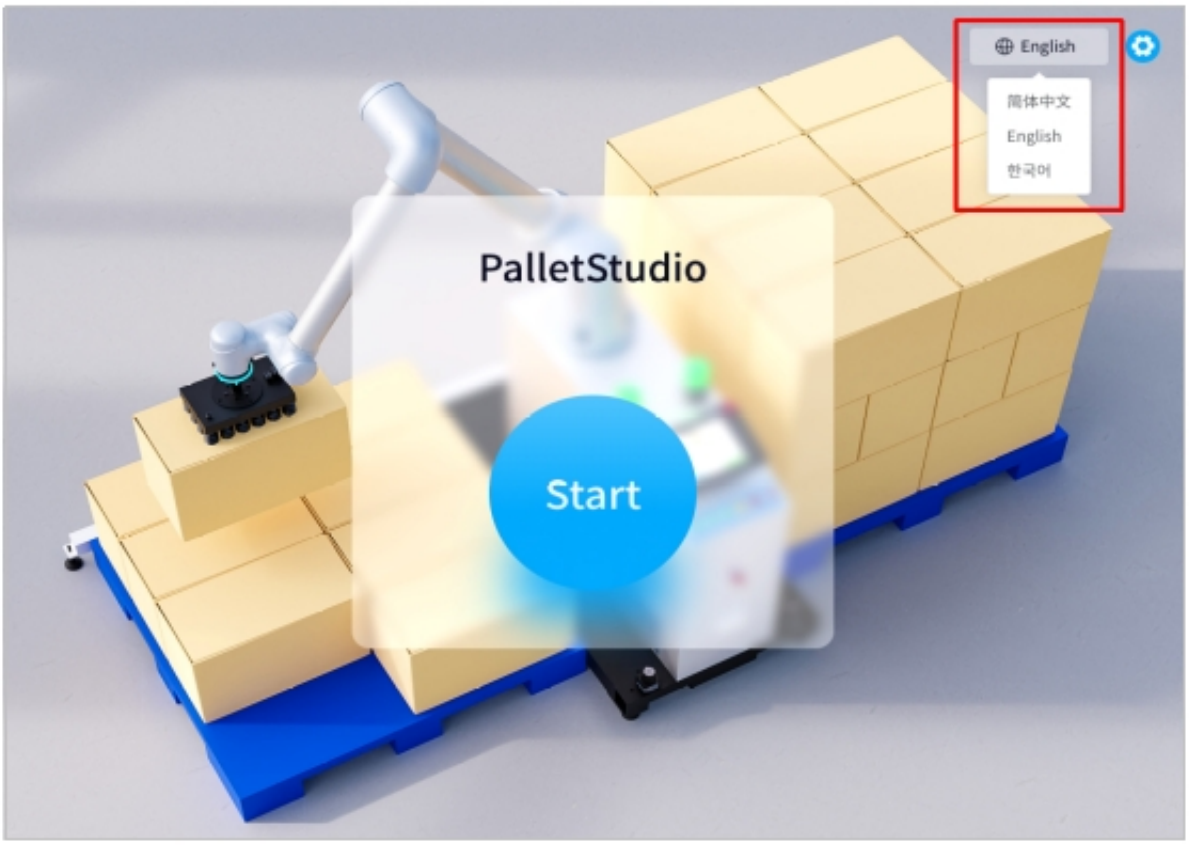

Figure 5.22 Language Switching Configuration

3.1.2 Workstation Configuration

Start Point Configuration

1 First of all, you should set the Start Point of the robot, click “Teach” to enter the teaching pop-up window, as in Figure 5 .23

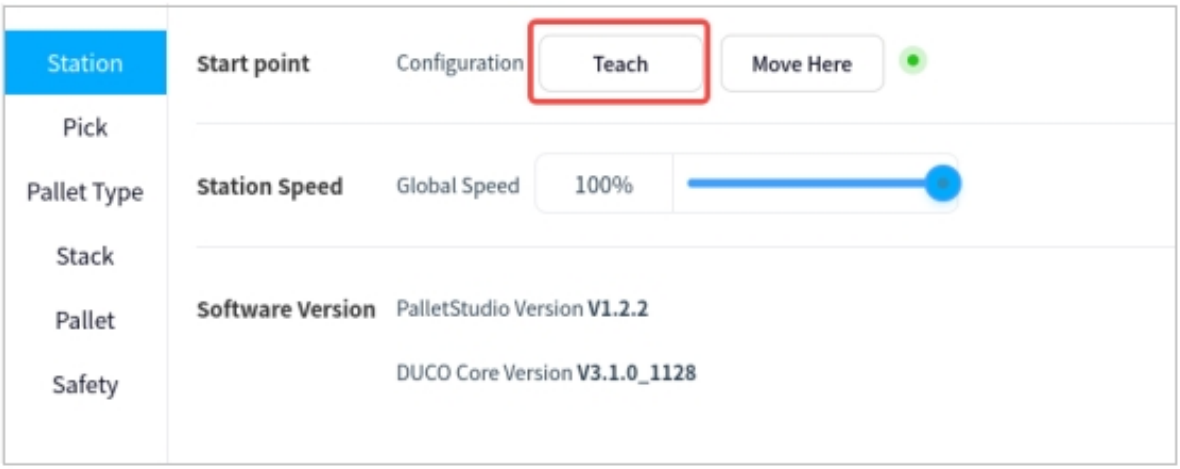

Figure 5.23 Start Point Configuration

In the pop-up window, perform manual teaching, of which the first column is the joint point movement, the second column is the end six degrees of freedom point movement, and the third column is the elevation

axis point movement. Click “Record” after the teaching is finished, as in 2

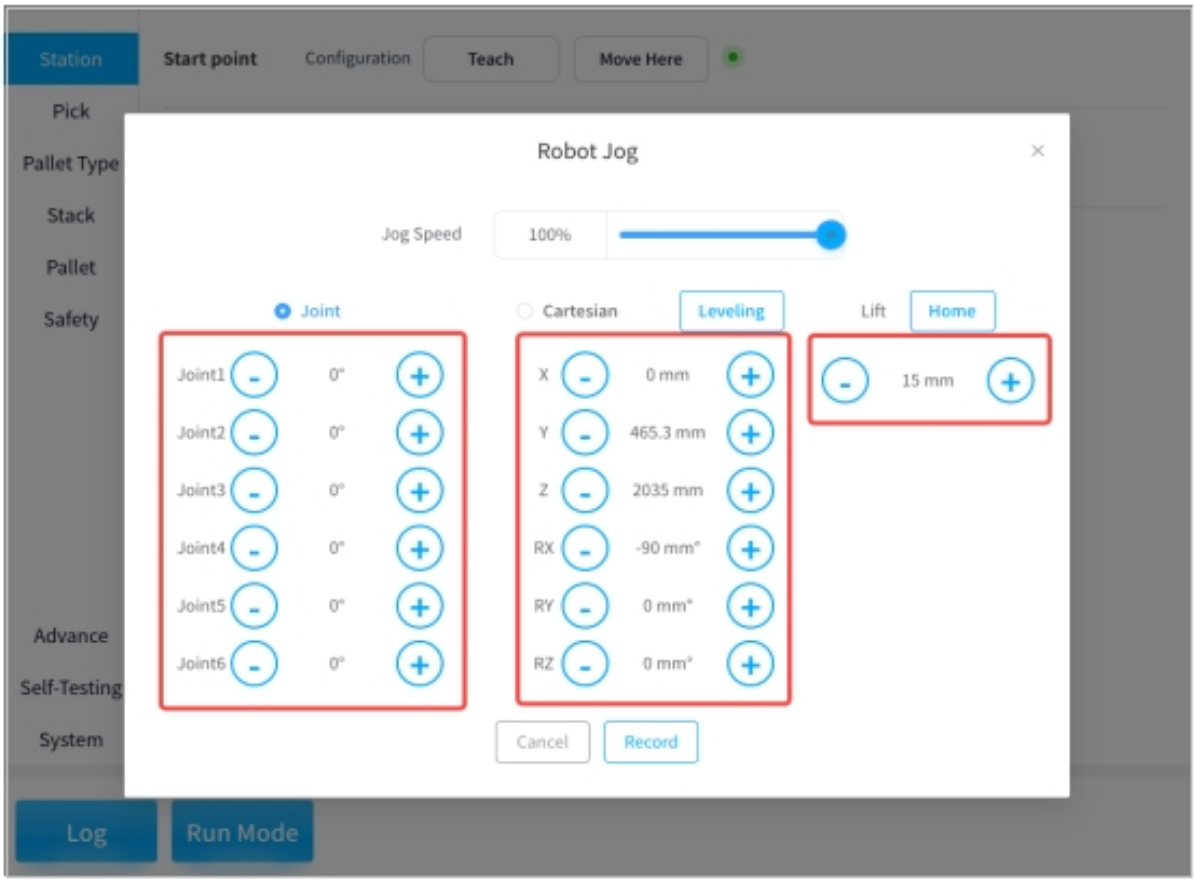

Figure 5.24 Start Point Teaching Pop-Up Window

Tips:

- By clicking “Leveling”, the attitude parameters RX and RY of the robot end can be adjusted to the level of the end;
- Press and hold on “Home” to lower the elevator shaft position until it returns to zero, release to stop immediately;
- Click “Record” to make this position adjustment effective;
- The subsequent demonstration process can be referred to here, and will not be explained later.

3 Click “Move Here” to move the end of the robot to the initial position just taught, as in Figure 5 . 25

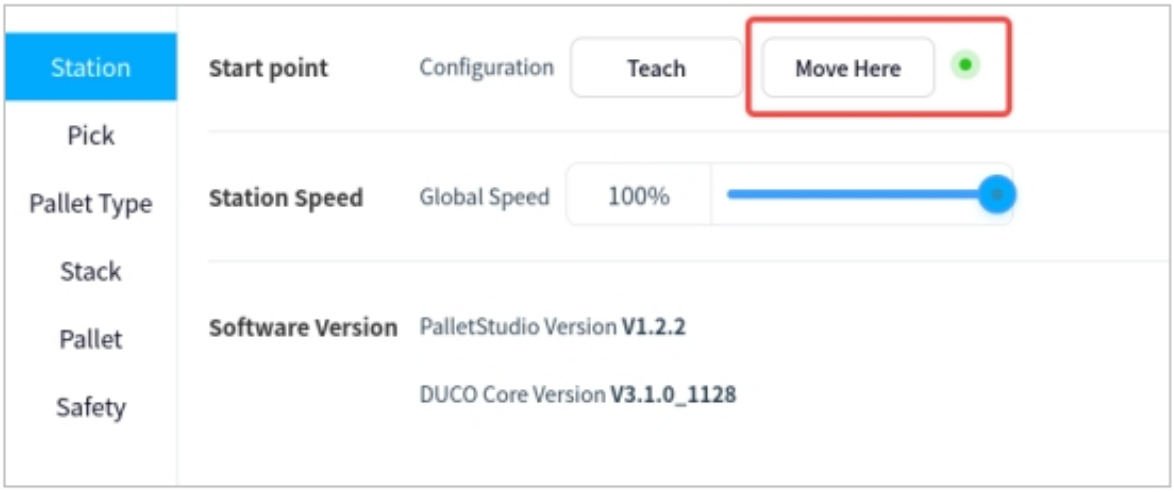

Figure 5.25 Initial Position Configuration

Tips:

- Pressing and holding “Move Here” will cause the robot to continue moving, releasing it will abort it, and pressing and holding will not work once it reaches the preset point, so please be aware of the risk of collision and interference during the movement process, which will not be repeated hereafter.

Station Speed Configuration

The global running speed of the station is adjusted by means of a slider, as shown in

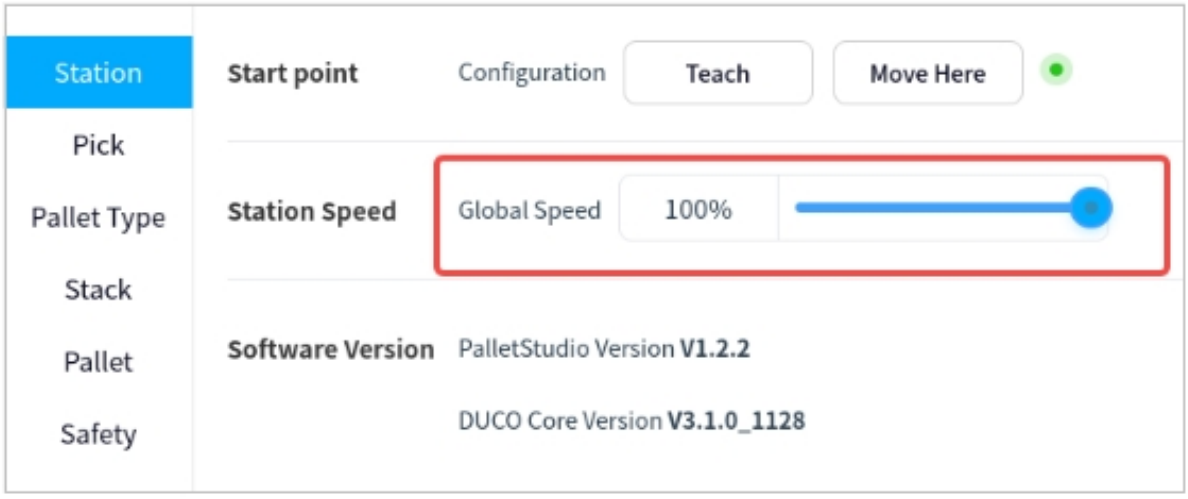

Figure 5.26 Schematic Diagram Of Workstation Speed

Software Version

The current PalletStudio software version and DUCO Core version requirements are displayed here, as shown in Figure 5 .27

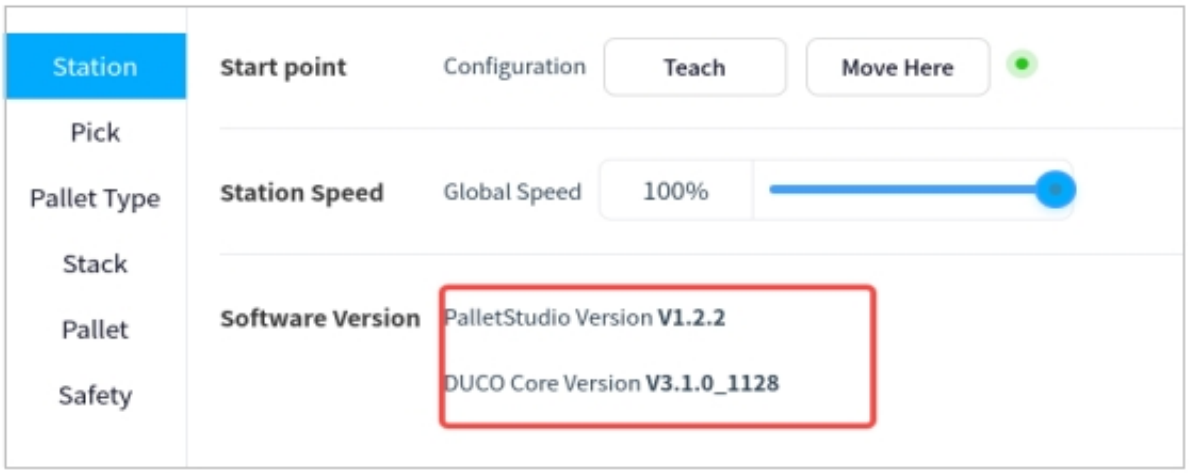

Figure 5.27 Schematic Diagram Of Software Versions

3.1.3 Pickup Configuration

The pickup position demonstration involves a pick wait point, a pick lift point, a pick point, and a pick lift height, with the point relationships shown in Figure 5 .28. Among them, the pick lift point is used to set a transition point above the pick point that can avoid the interference of the baffle plate on the box.

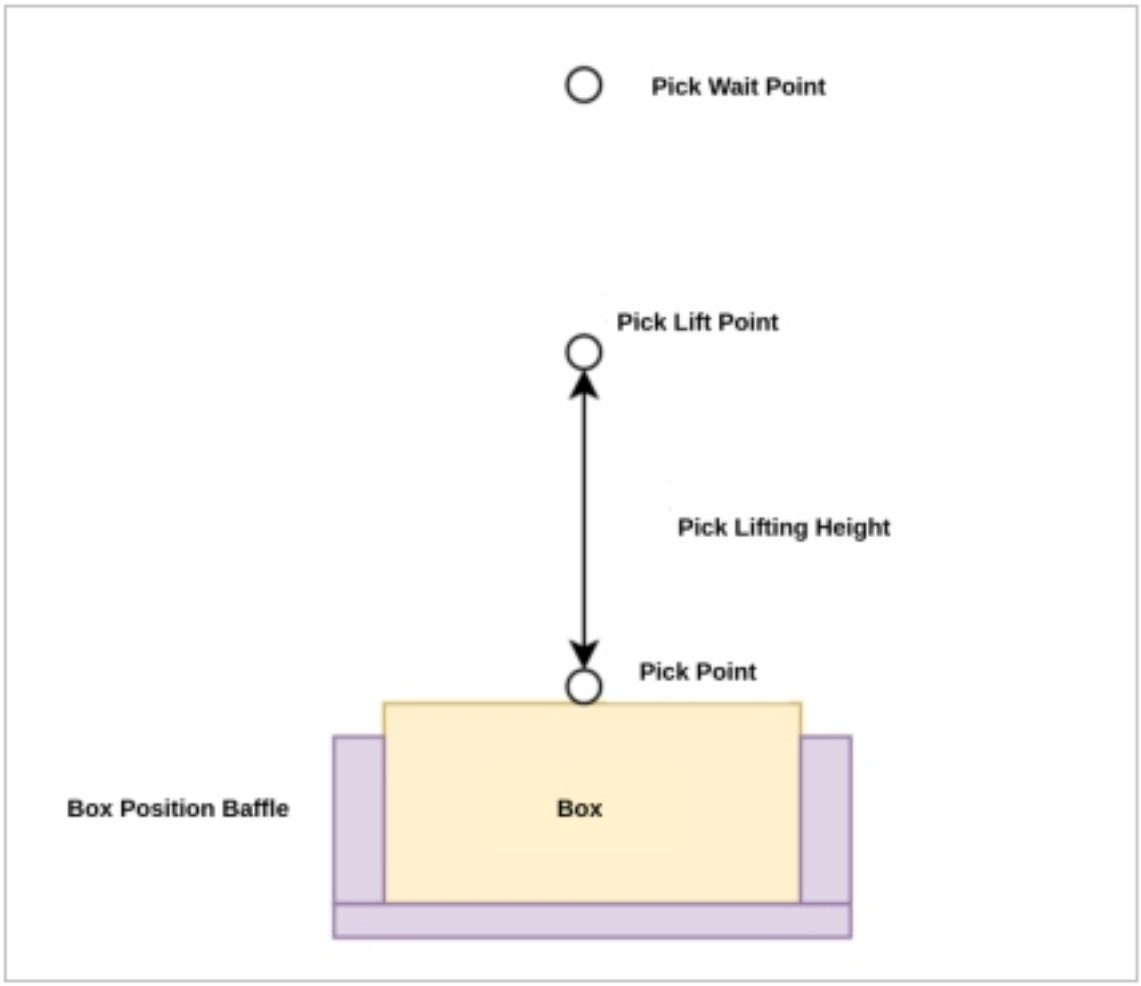

Figure 5.28 Plot of Pick Wait Point, Pick Lift Point Vs. Pick Point

Pick Wait Point Configuration

The pick wait point is generally located above the pick lift point, this point is used to wait for the box in place signal to be triggered.

Select “Pick Wait Point” → “Teach” to enter the teaching pop-up window for adjusting the waiting point for picking up materials at the end of the robot. Teach in the pop-up window (refer to the previous section for the teaching process).As shown in Figure 5 .29

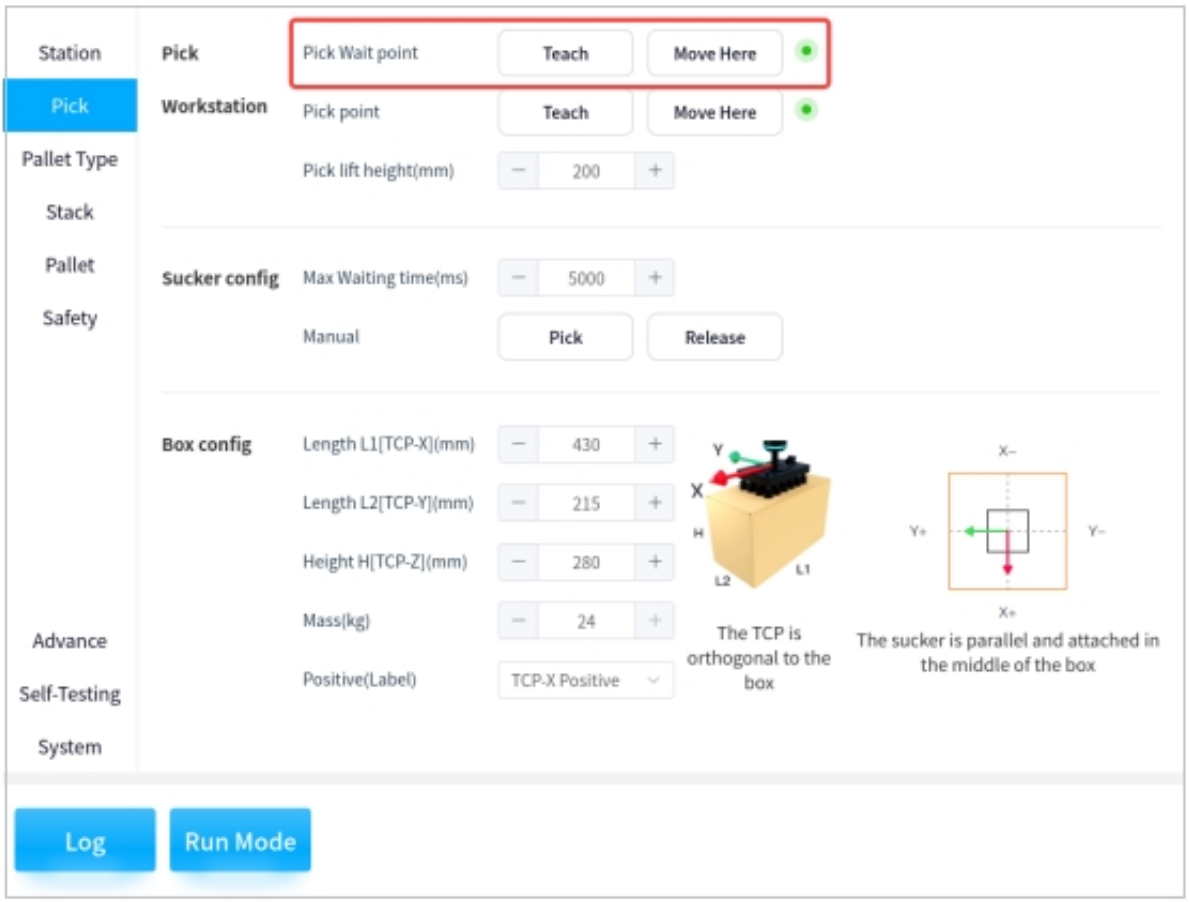

Figure 5.29 Configuration Interface of Pick Wait Points

Pick Point Configuration

The pick point is the point at which the end of the robot sucks up the box.

Select “Pick Point” → “Teach” to enter the teaching pop-up window for adjusting the pickup point at the end of the robot. Teach in the pop-up window, as shown in Figure 5 .30

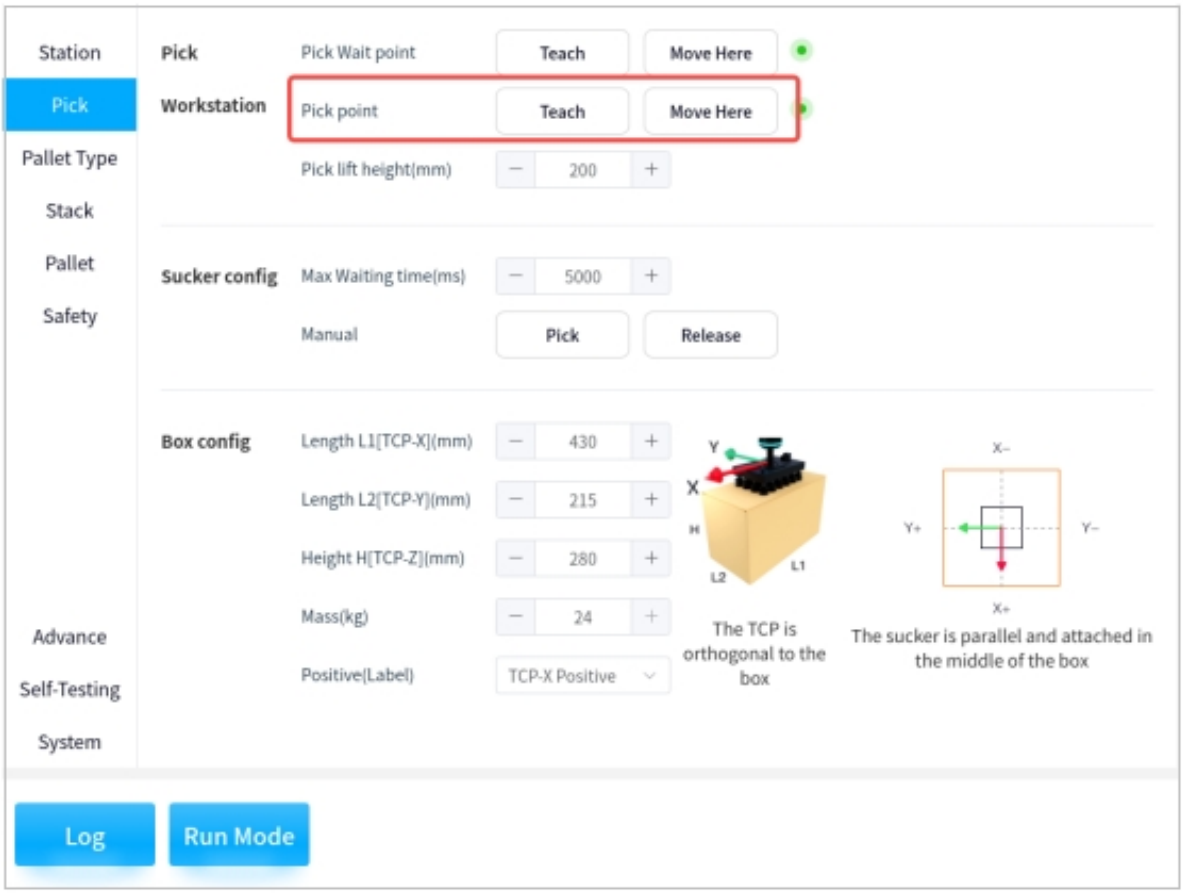

Figure 5.30 Configuration Interface of The Pick Point

Tips:

- When teaching the pick point, please note that the position of the suction cups should be placed so that the distance from the suction cups to the upper and lower (left and right) edges of the box are approximately the same, such as Figure 5 .31

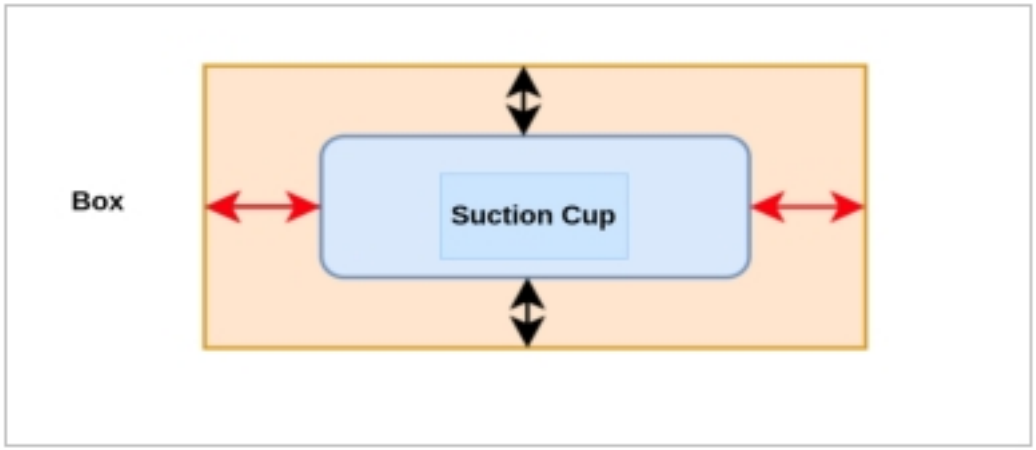

Figure 5.31 Schematic Diagram of Suction Cup Position

Pick lift Height Configuration

The purpose of setting the pick lift height is to avoid the interference of the baffle plate during the pickup process at the end of the robot by adjusting the pick lift height.

Click directly on the number to activate the keypad for input, or select “+” and “-” to adjust the lifting height (in millimeters) of the robot end to pick up the material. As shown in Figure 5 .32:

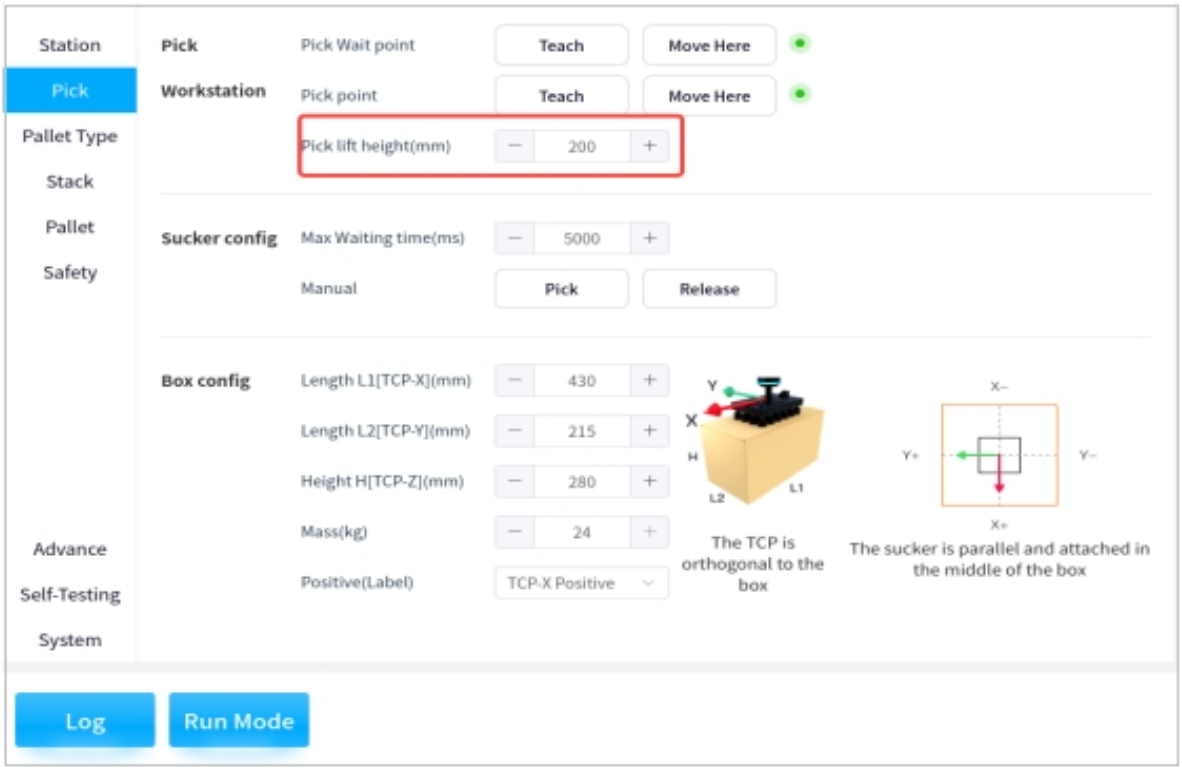

Figure 5.32 Configuration of the Pick Lift Height

Suction cup Parameter Configuration

The Maximum Vacuum Wait Time (ms) is the maximum amount of time that the robot end needs the suction cups to generate enough vacuum while sucking up the box. If sufficient vacuum is not generated within the specified time, a fault is reported.

The max waiting time can be determined according to the actual situation, and the suction cups can be operated manually by clicking on “Pick” or “Release” .As shown in Figure 5 .33

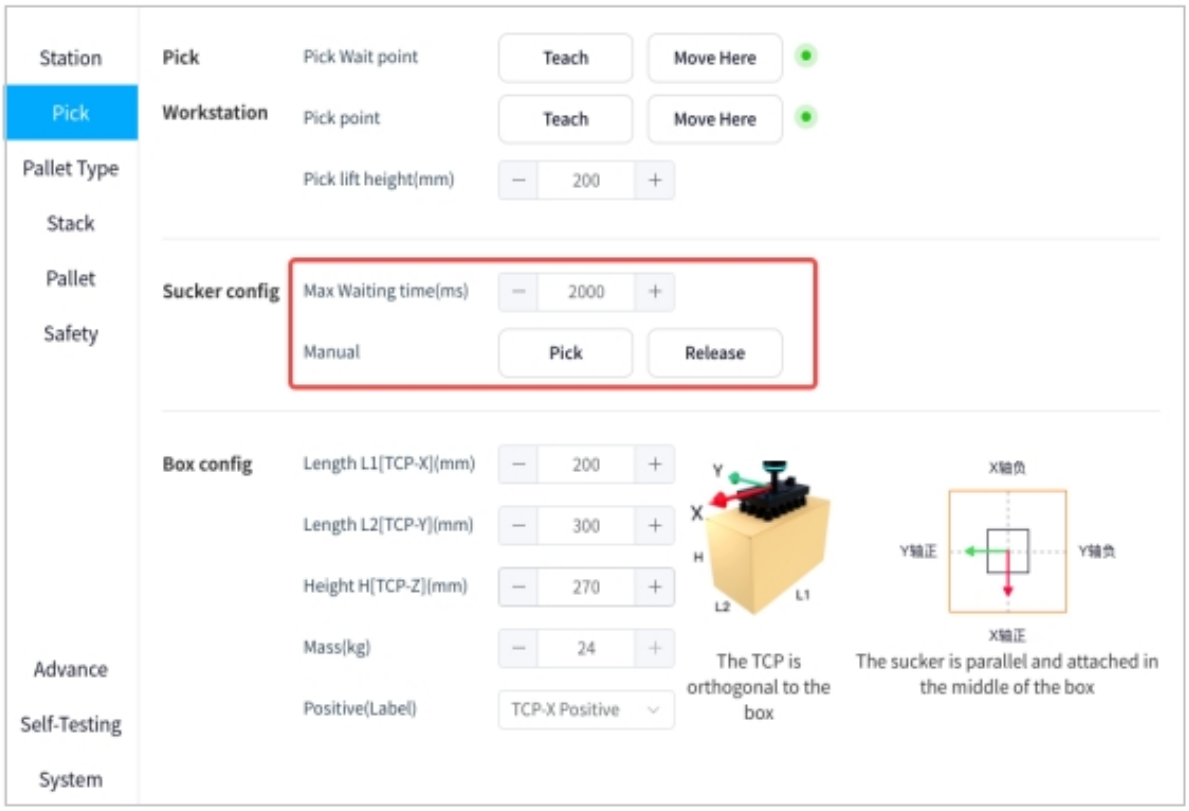

Figure 5.33 Suction Cup Configuration

Box Parameter Configuration

The box parameters (in millimeters) and the box mass (in kilograms) are adjusted according to the actual situation, where the length L1, length L2, and height H of the box are along the X-, Y-, and Z-axes of the TCP coordinates, respectively.

The box front face (labeling direction) is related to the later stack configuration. If accurate control of the box orientation (pattern side or label side) is required, correctly select the box front orientation (based on the positive and negative directions of the X and Y axes of the end TCP coordinate system) and ensure consistent orthogonality of the box orientation.

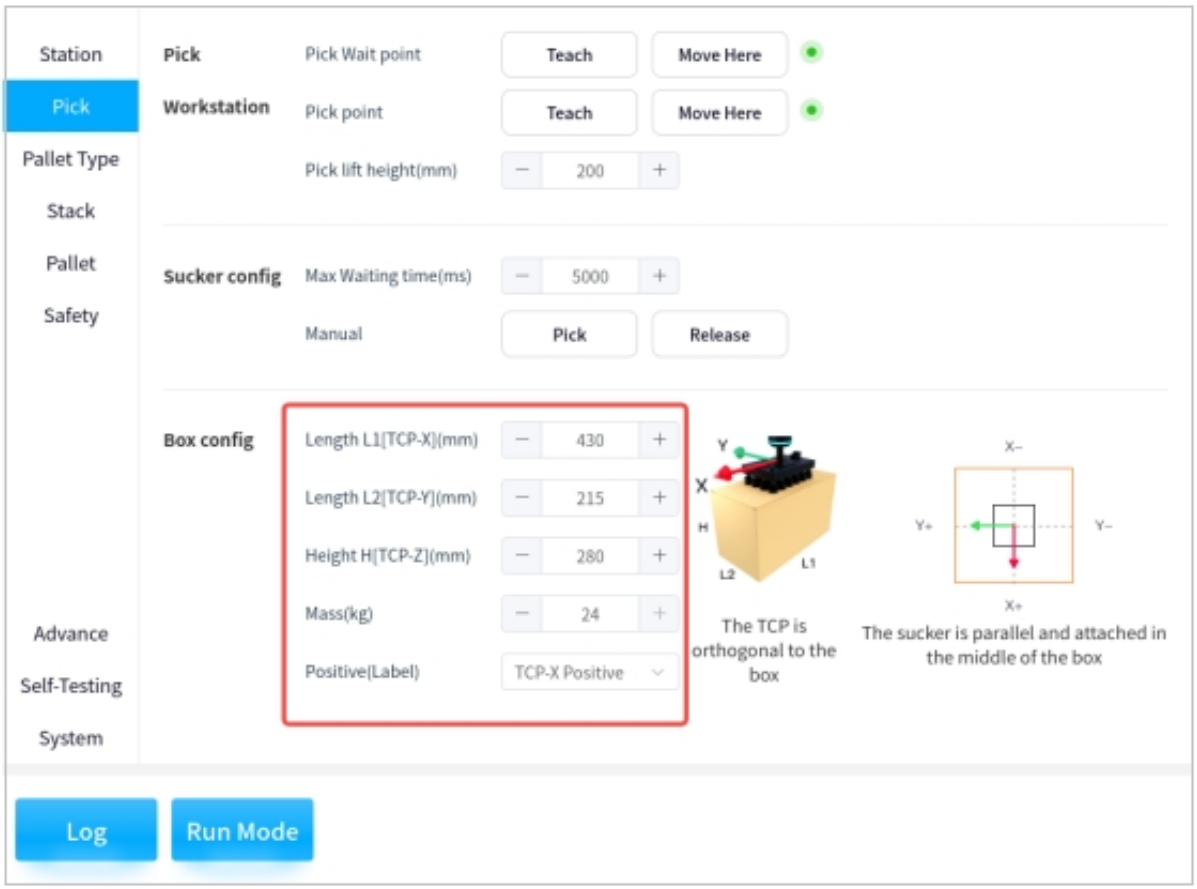

Figure 5.34 Box Configuration

Tips:

- The suction cup tool coordinate system is orthogonal to the box, as shown in Figure 5 .35

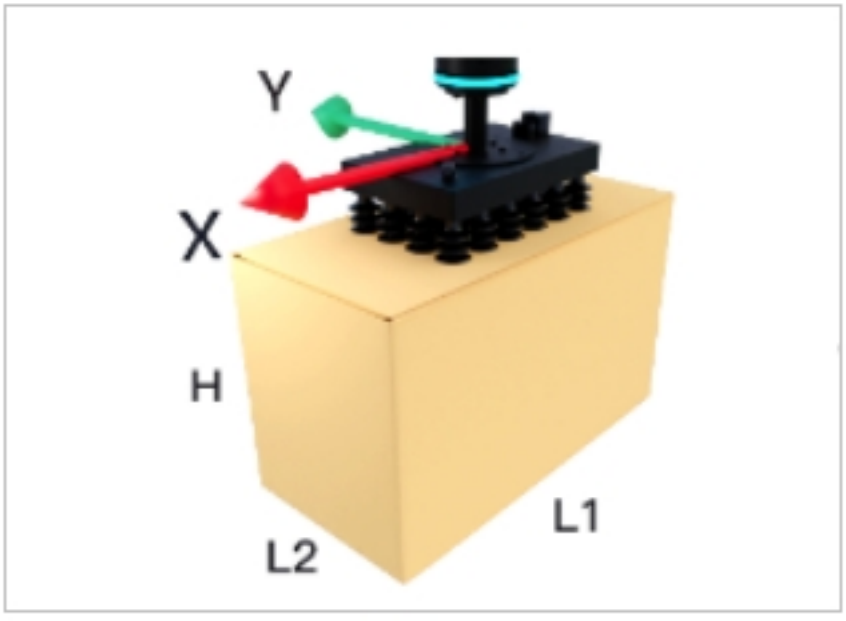

Figure 5.35 Coordinate System of Suction Cup Assembly

- As shown in Figure 5 .36, please select the front orientation of the box correctly according to the

following TCP coordinate system

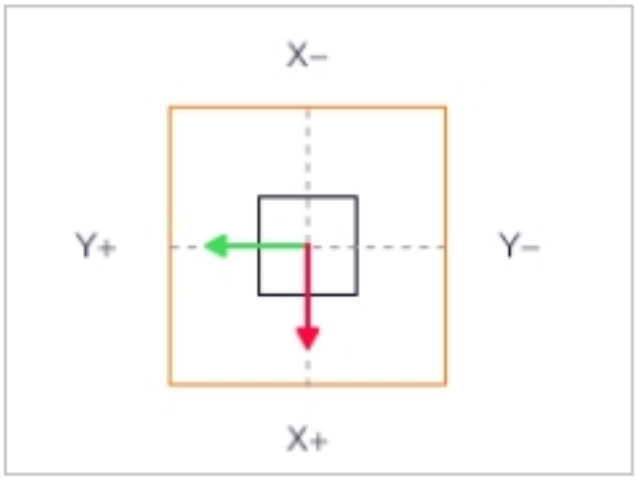

Figure 5.36 Selection of the TCP Coordinate System for the Box Front Orientation

3.1.4 Pallet Type

Click on “Pallet Type” → “Open” to access the configuration pop-up window for stacks and layers, as shown in the following figure.

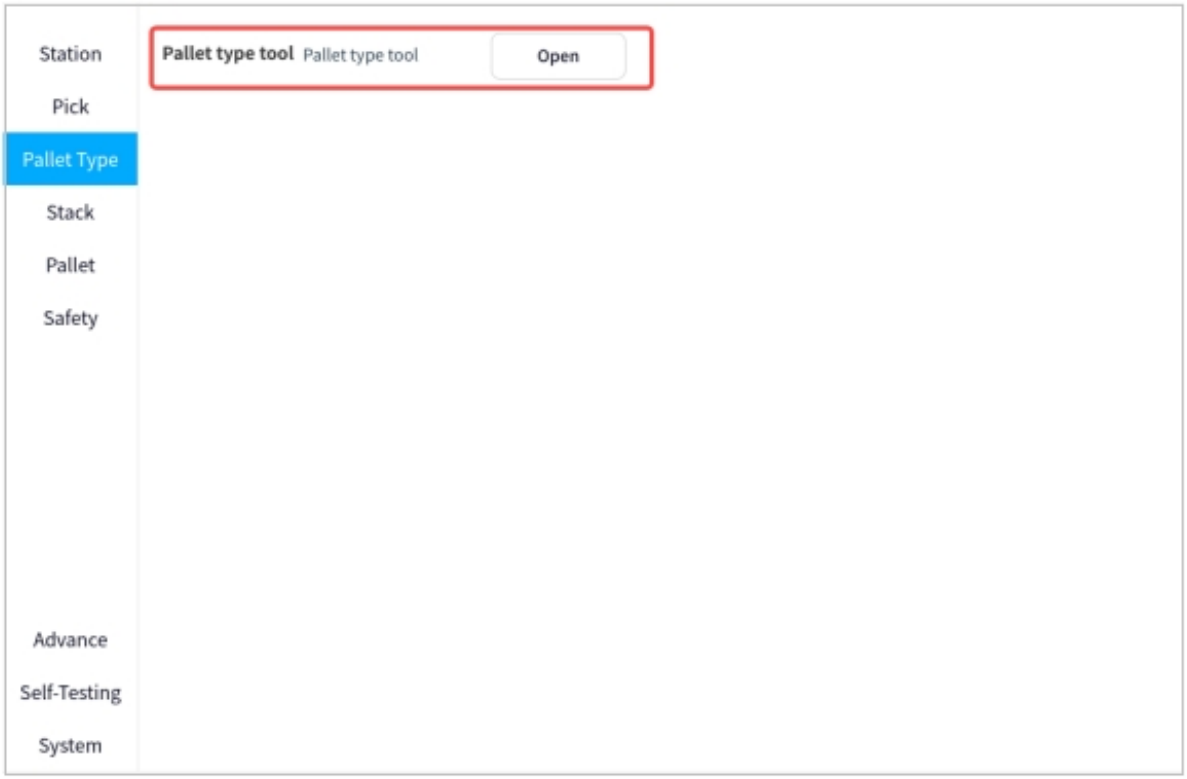

Figure 5.37 Pallet Type Tool

Pallet Type Base Configuration

As shown in the figure below, it is possible to manually switch the configuration scheme of Pallet types and layers directly

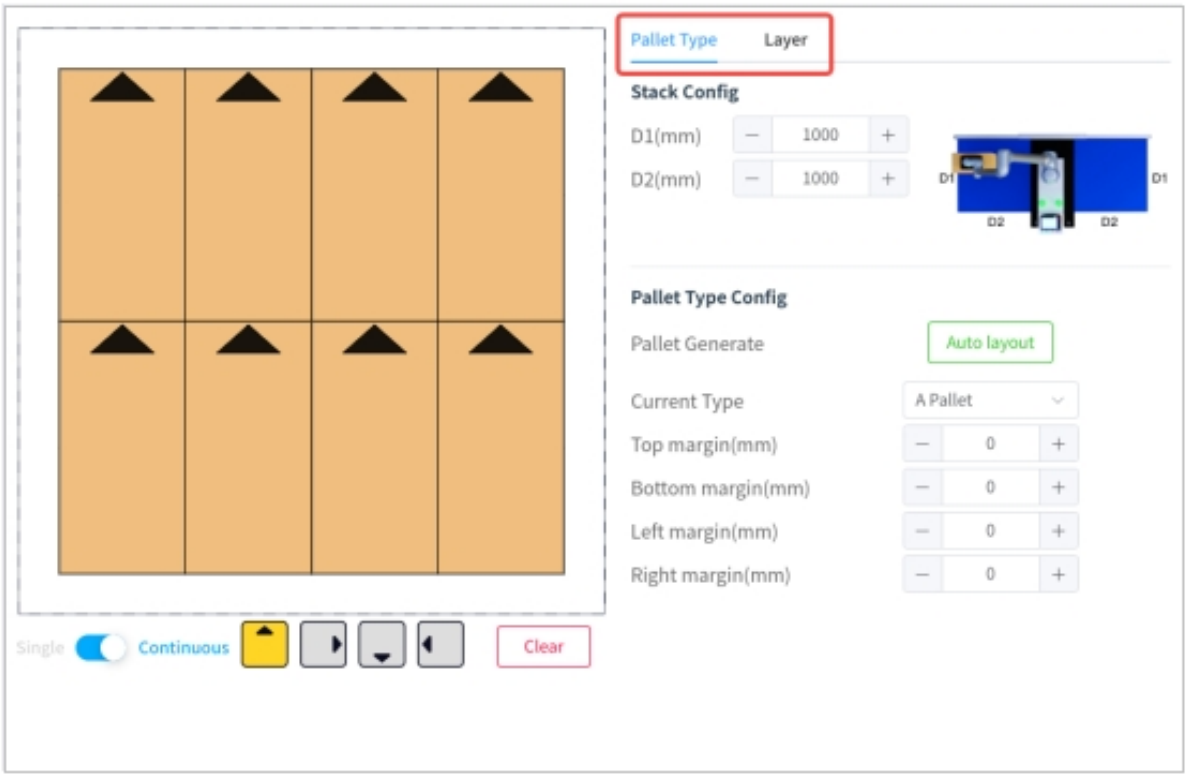

Figure 5.38 Schematic Diagram of Pallet Type and Layer Configuration Scheme

The parameters of the pallet can be adjusted according to the actual situation (in millimeters), where D1 and D2 are the side lengths of the pallet, as shown in the following figure.

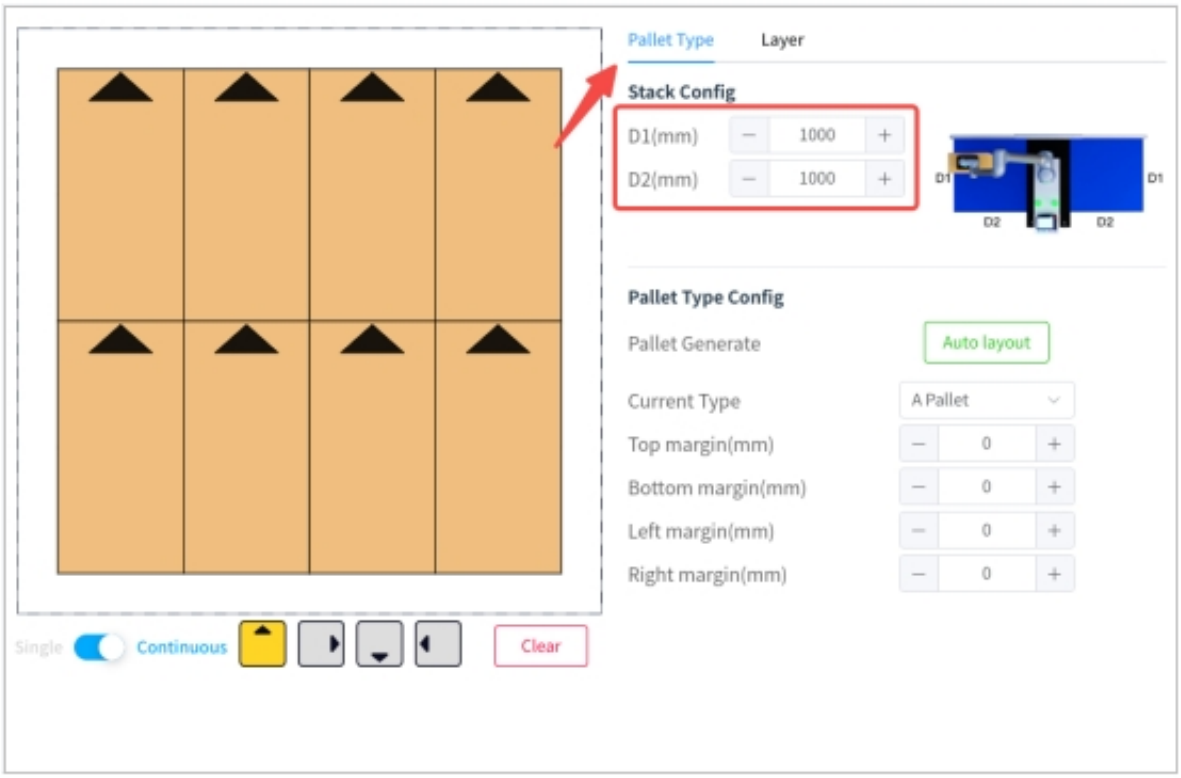

Figure 5.39 Configuration of Stack

Note: The diagram below shows the side lengths of the stack

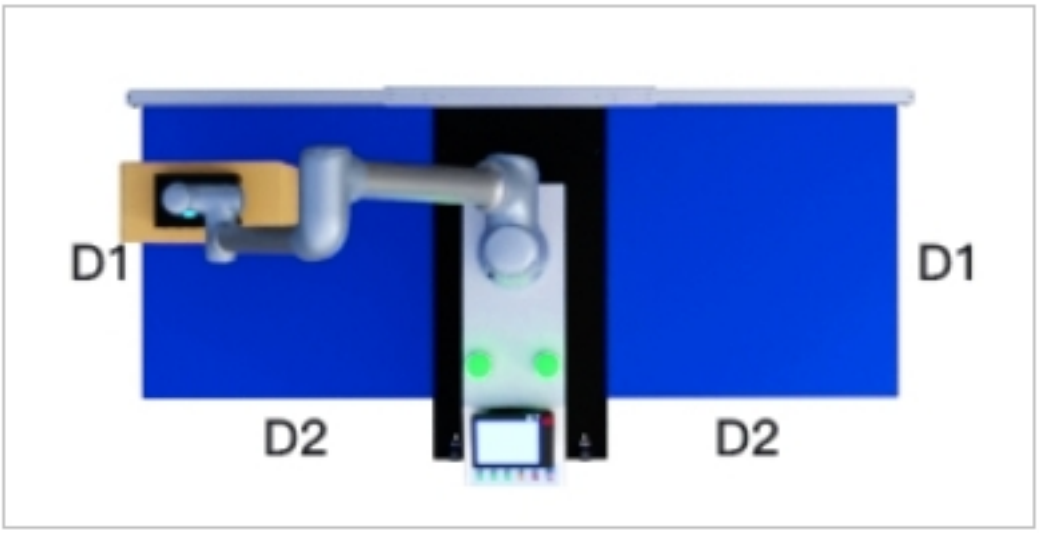

Figure 5.40 Schematic Diagram of the Side Lengths of the Pallet

Pallet Generate can choose “Auto layout”, which is explained in

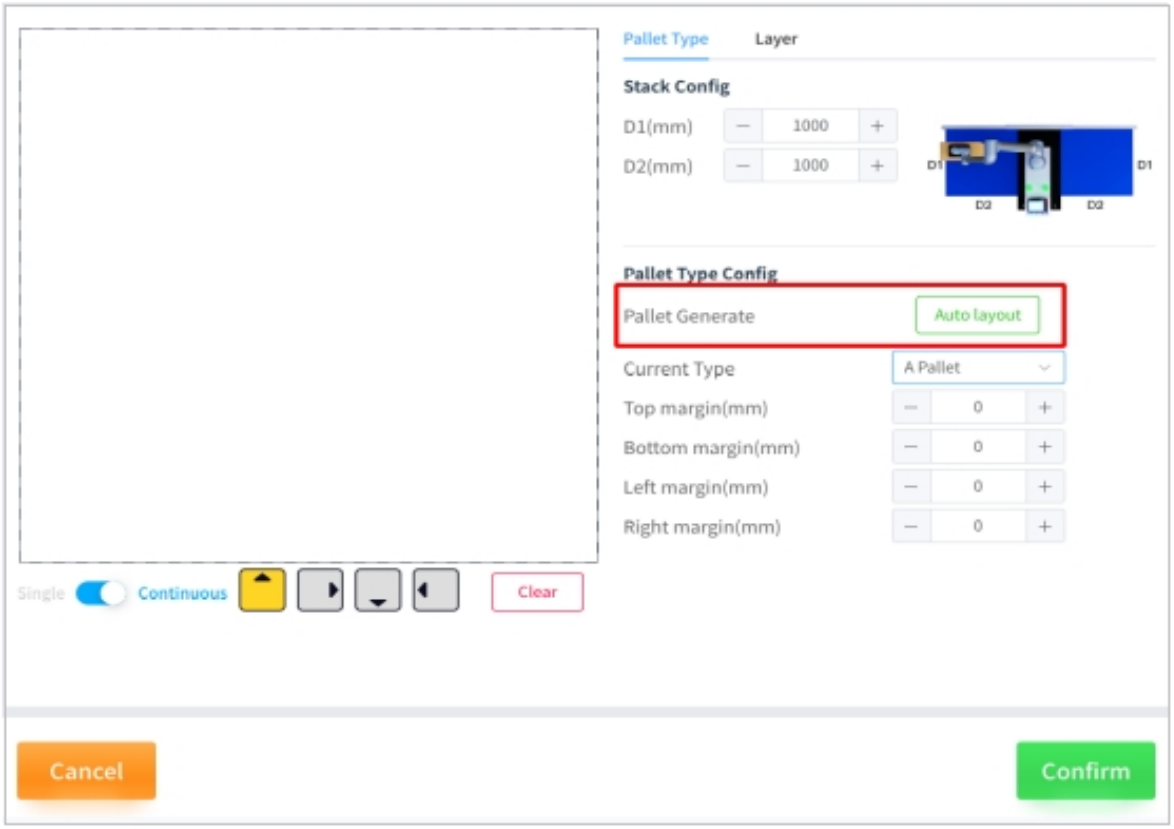

Figure 5.41 Auto Layout Configuration

The stack configuration allows you to select between stack A and stack B by using the drop-down boxes and to plan the stacks according to the icons at the bottom left, as shown in the following figure

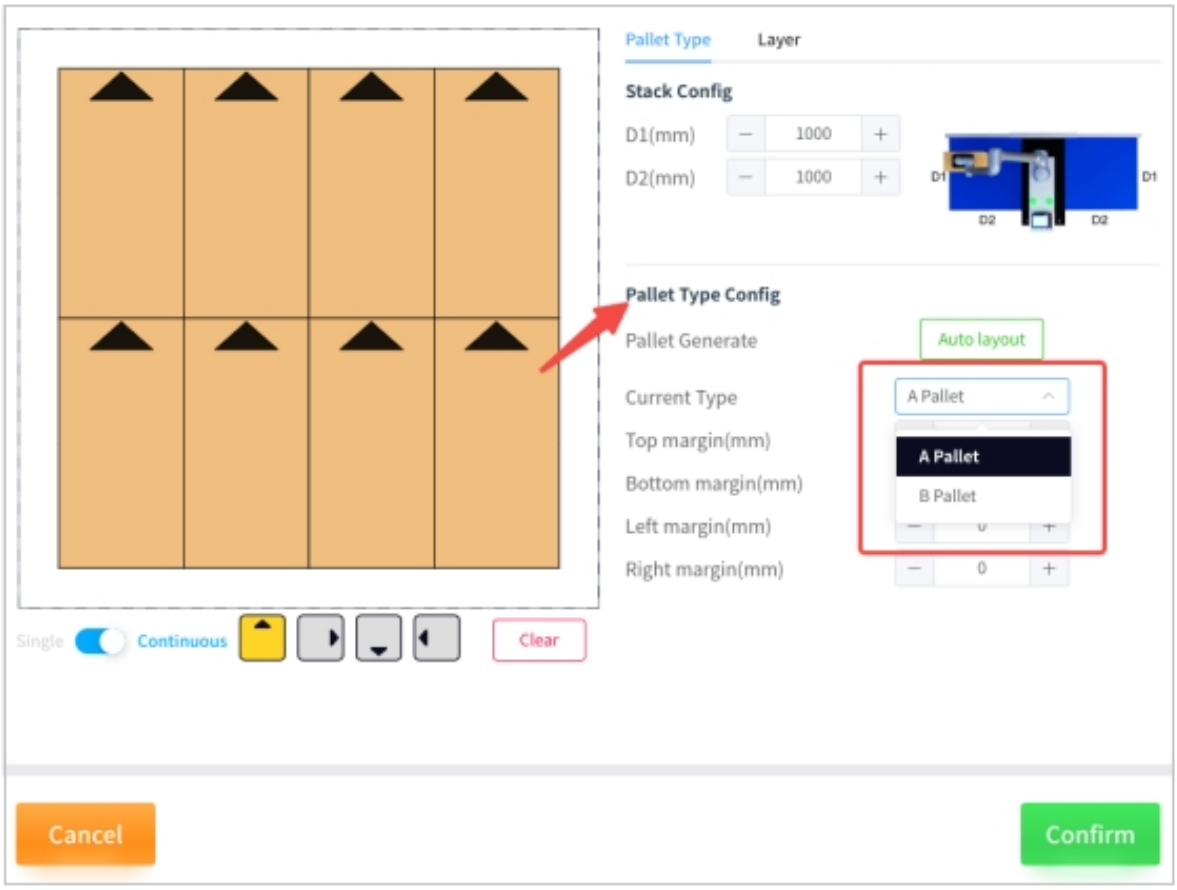

Figure 5.42 Pallet Type Configuration

Among the icons at the bottom of the left side, “Single/Continuous” determines whether or not the boxes are placed continuously on the layer, the four gray icons with arrows represent the four different box types with different frontal orientations, and “Clear” empty all the boxes placed on the layer. As shown in the figure below

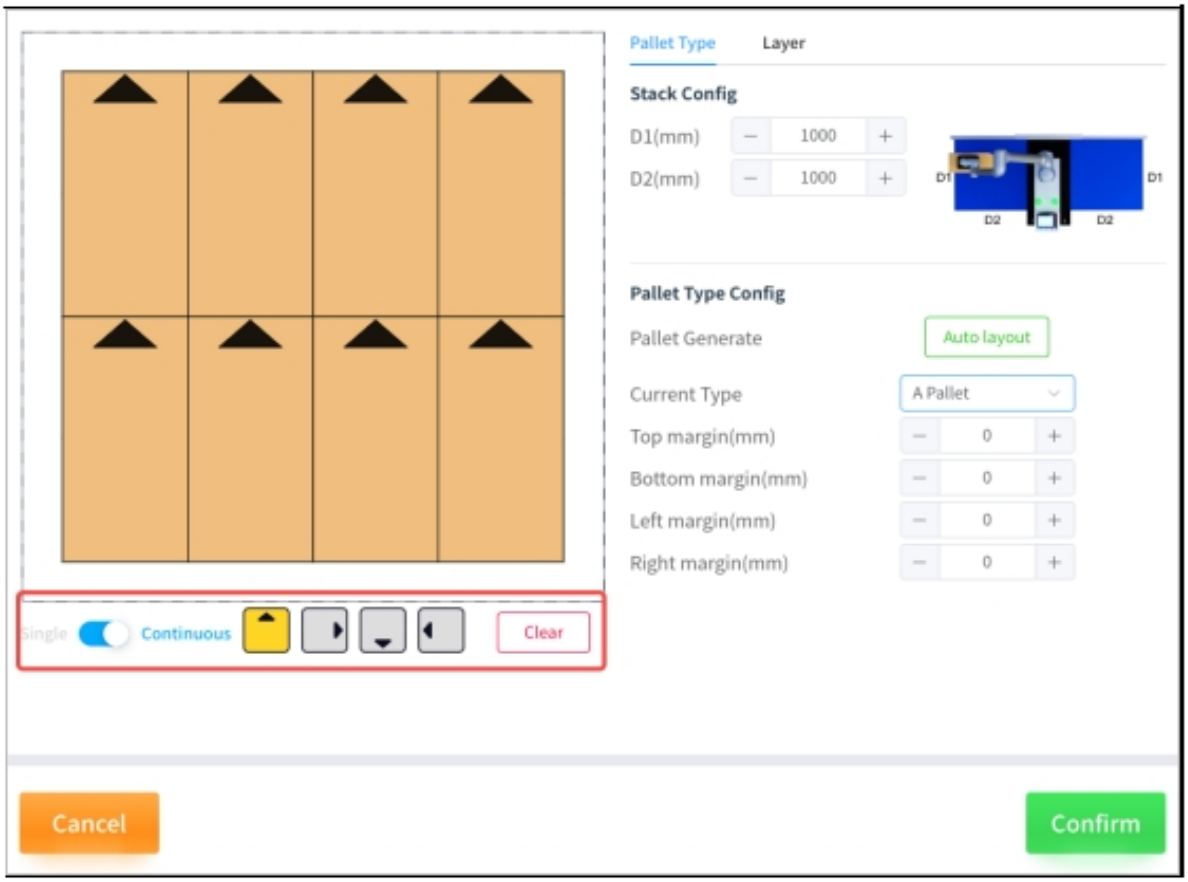

Figure 5.43 Bottom Icon

The upper, lower, left and right margins in the stack configuration are the reference boundary distances (in millimeters) between the box and the outer edge of the stack plate, with positive values being boundary inward expansion and negative values being boundary outward expansion. In the lower Figure 5 .44 the palletized plate configuration is shown as a solid line and the margin reference line is shown as a dashed line

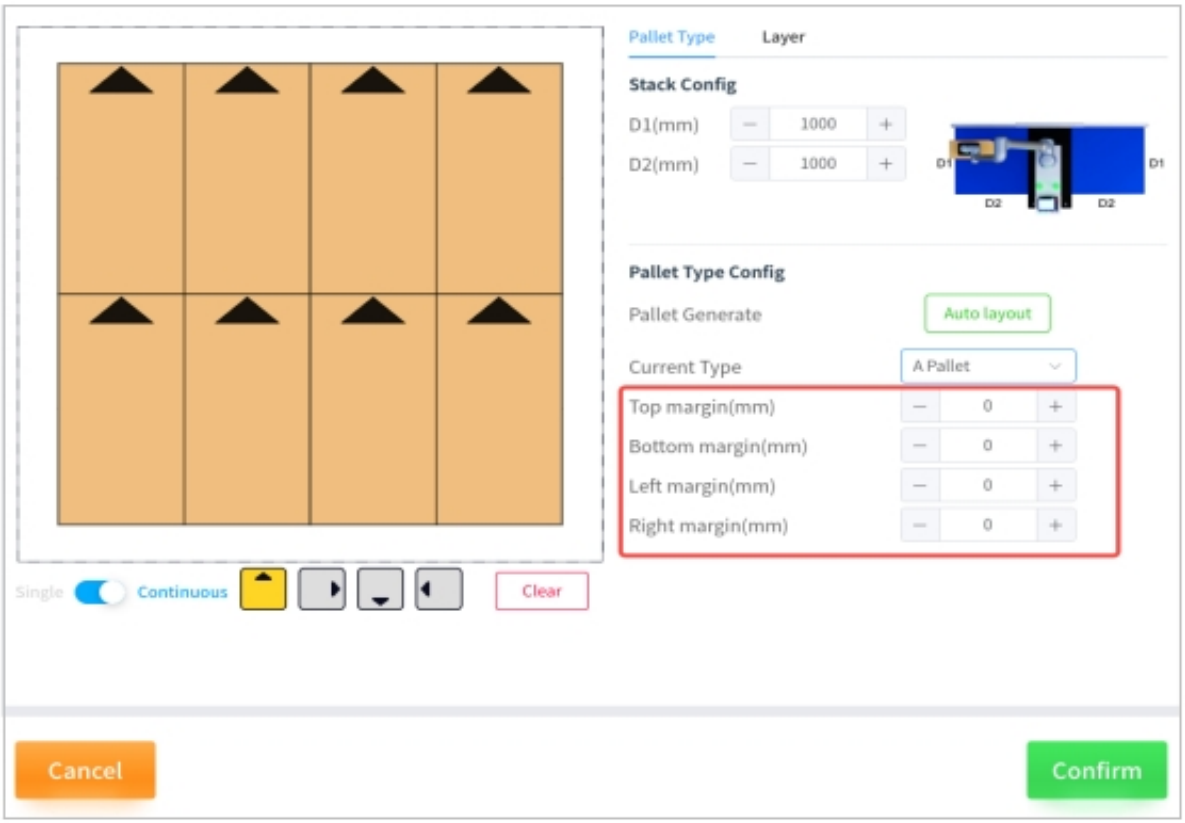

Figure 5.44 Configuration of the Stack Margins

In the layer configuration, it is possible to adjust the tolerance between layers, the number of layers, and the type of stack selected for each layer, as shown in Figure 5 .45. When the configuration is complete, click “Confirm”.

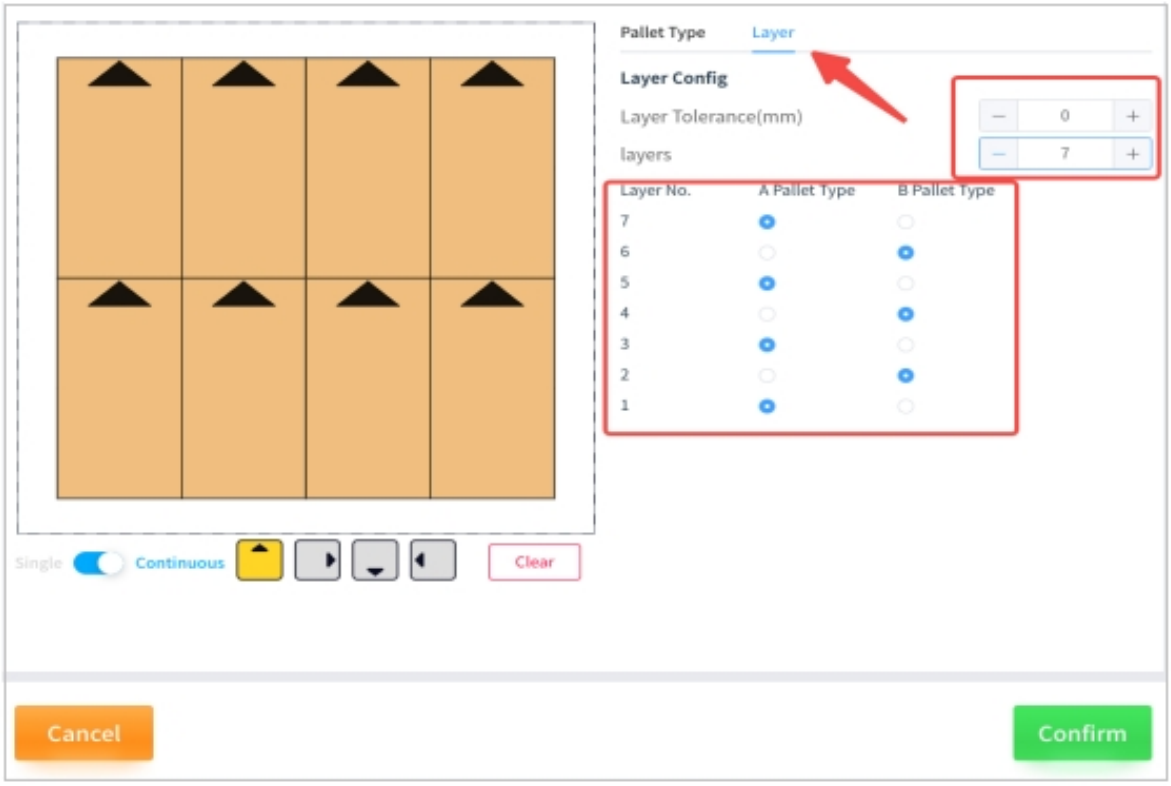

Figure 5.45 Layer Configuration

Tips:

- The “Layer Tolerance” is a certain height reserved for the box when the robot end is placed on the box, a positive value is the clearance, a negative value will be pressed, please fine-tune according to the actual situation. Below is the diagram for a positive layer tolerance.

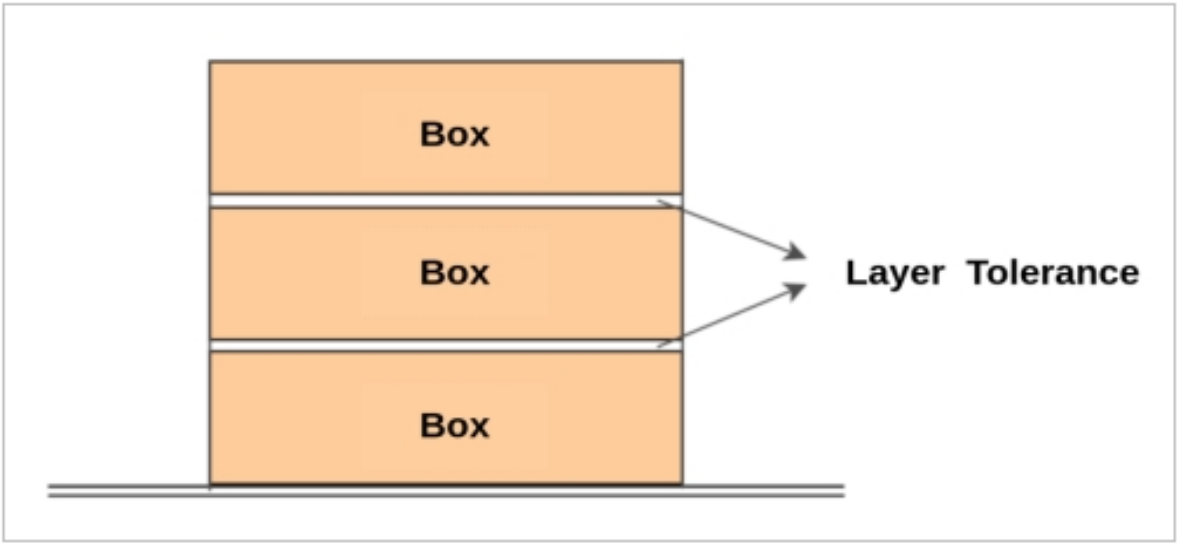

Figure 5.46 Layer Tolerance

Automatic Layout Configuration

After clicking on “Auto layout”, you can select the type of stack, the alignment mode, the orientation of the front side and the maximum stack height according to the actual situation, as shown in Figure 5 .47

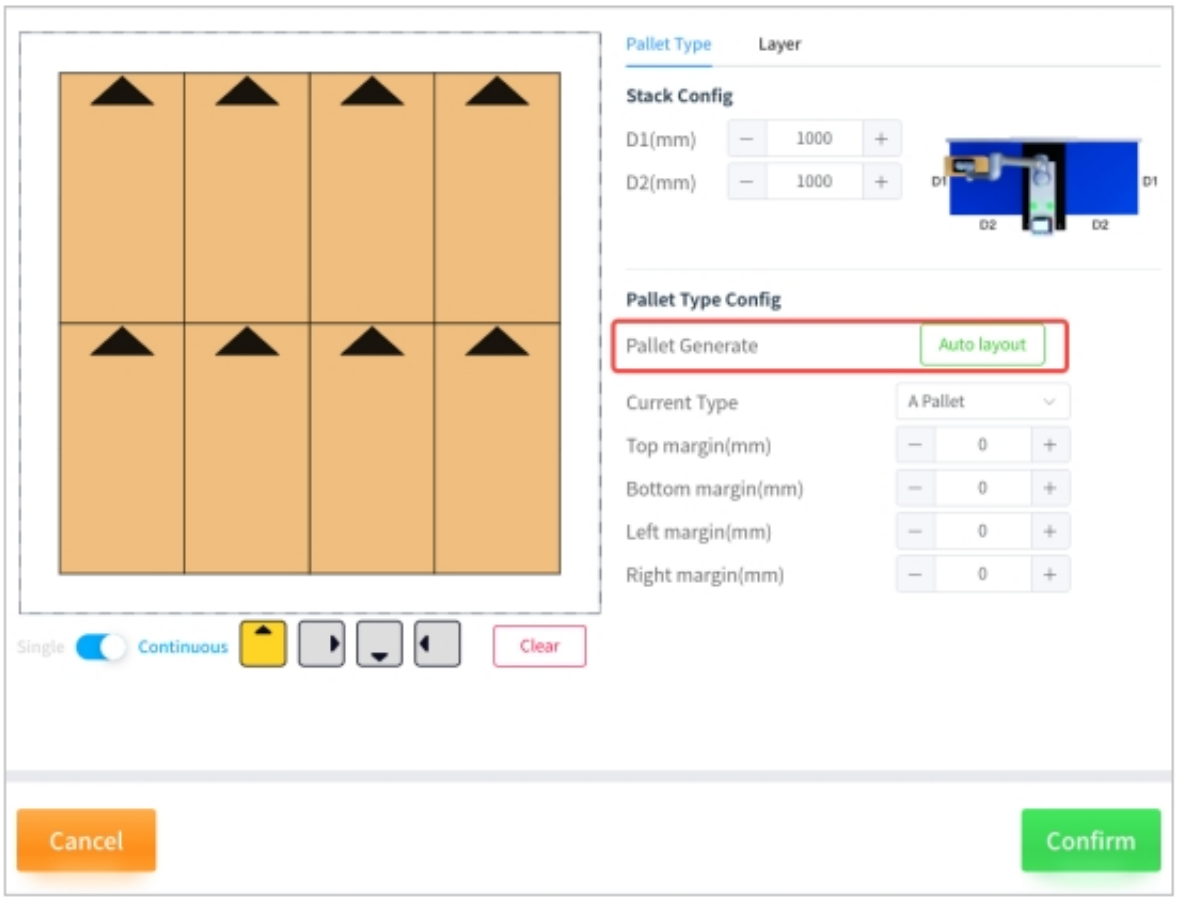

Figure 5.47 Auto Generate Layout

Among the types of stacks,

Cheessboard: The boxes are all placed horizontally or vertically;

Rotary-pattern: Place the box in a swingback fashion in circles;

Crosswise-pattern: Arrange the boxes in columns, vertically and horizontally.

In alignment mode,

Center: the boxes are gathered together and centered;

Stretch: The boxes are spread out with a certain distance between them.

In the frontal direction.

Uniform: the front orientation of the box labels are placed consistently, by column;

Outward: In circles, the front direction of the box label is placed outward.

In the maximum stack height setting,

Automatic: the accessibility check is carried out from the highest height, knowing that all boxes are accessible;

Customize: Start from the given height downwards to find the maximum height that meets the conditions.

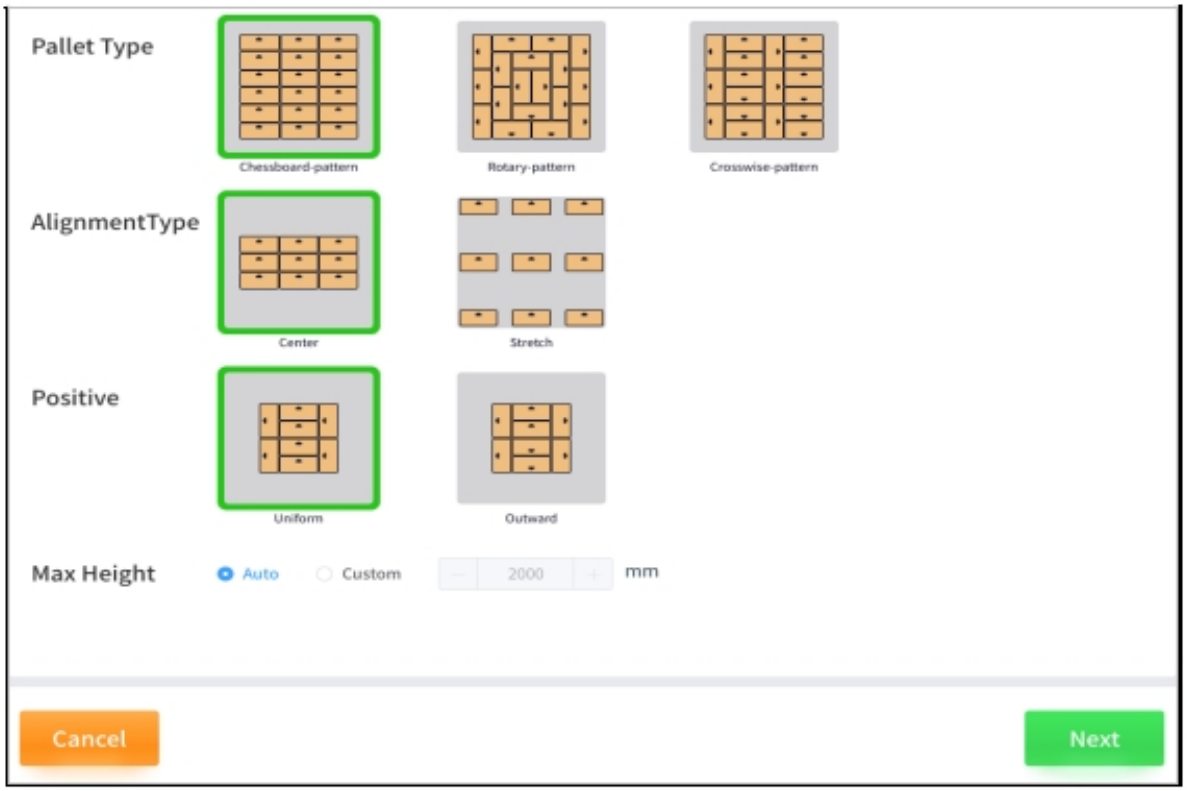

Figure 5.48 Auto Layout Configuration Diagram

Tips:

- Automatic Layout uses the stack type selected for the base configuration as the configuration template, and stack B is a 90-degree clockwise alignment of stack A;
- The outer contours of stacks A and B are aligned.

Clicking on "Next" displays the result of the automatic Layout and shows below the number of layers to be selected, the maximum possible stack height and the number of boxes per stack.

In the generated result, the

Number of layers: the number of reachable layers calculated automatically based on automatic or customized heights;

Pallet height: the corresponding stack height is automatically updated when the number of layers is modified;

Boxes per pallet: automatically update the corresponding number of boxes when modifying the number of layers.

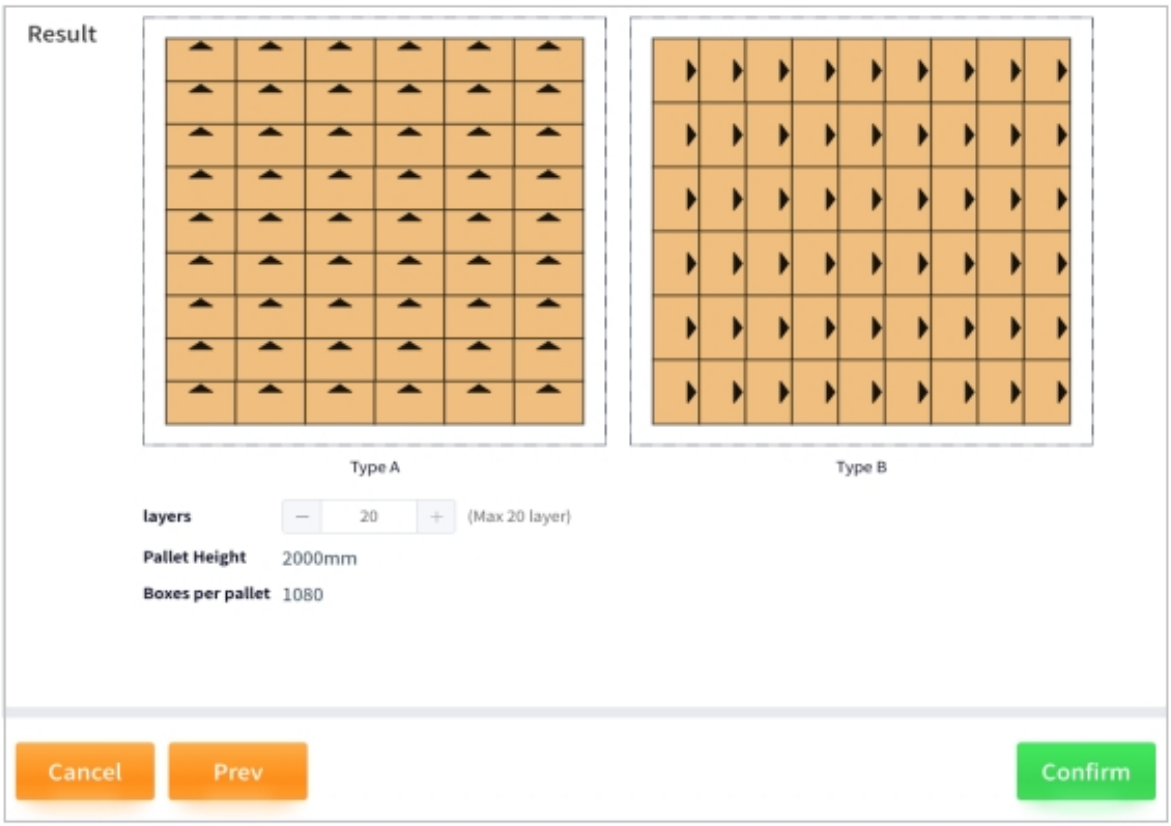

Figure 5.49 Generated Results of Automatic Layout

3.1.5 Stack configuration

Click on “Stack” and select “ON/OFF” to determine if the pallet configuration is enabled or disabled. If it is not enabled, the pallet will not place any boxes when palletizing. As shown in Figure 5 .50

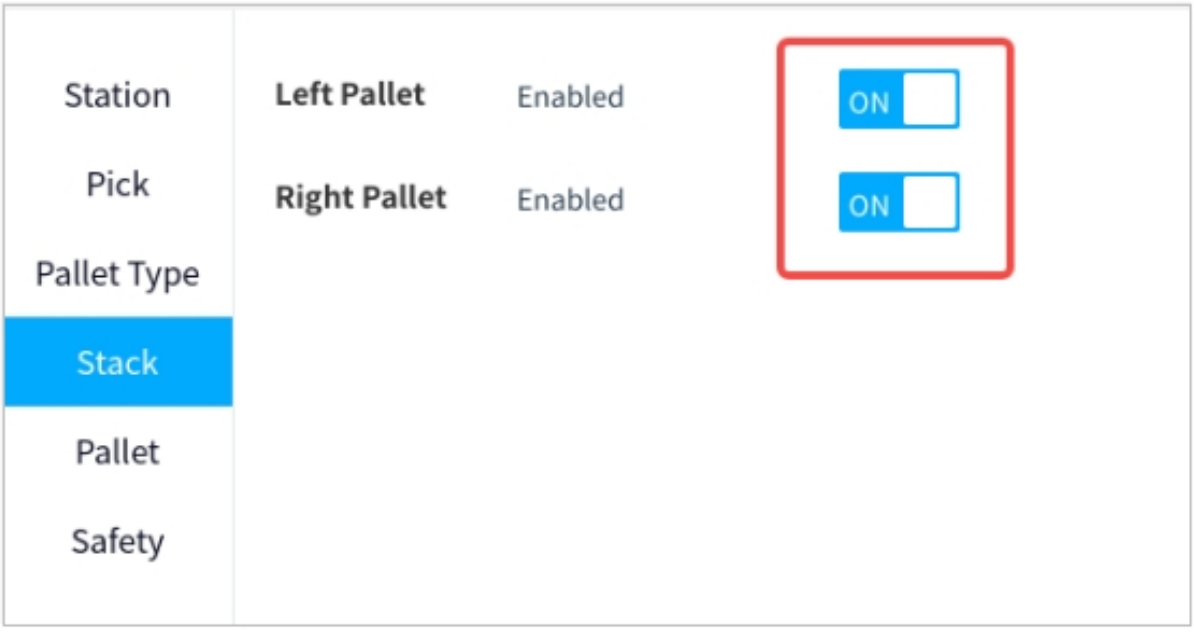

Figure 5.50 Stack Configuration

3.1.6 Palletizing Configuration

In palletizing, the transition point is the point of attitude position that needs to avoid obstacles and thus be set artificially during the process from the pickup waiting point to the subsequent placing point after the end of the robot picks up the box, i.e., the trajectory flow is as follows:

Pick-up wait point → Pick-Lifting point → Waypoint 1 (optional) → Waypoint 2 (optional) → Waypoint 3 (optional) → Placet points (automatically generated)

Note: Be sure to teach the transition point in the zeroed state of the elevator.

Waypoint Teach

1 Select “Left/Right Pallet” → “Waypoint 1/2/3” → “Teach” to enter the transition point teaching pop-up window, as shown below

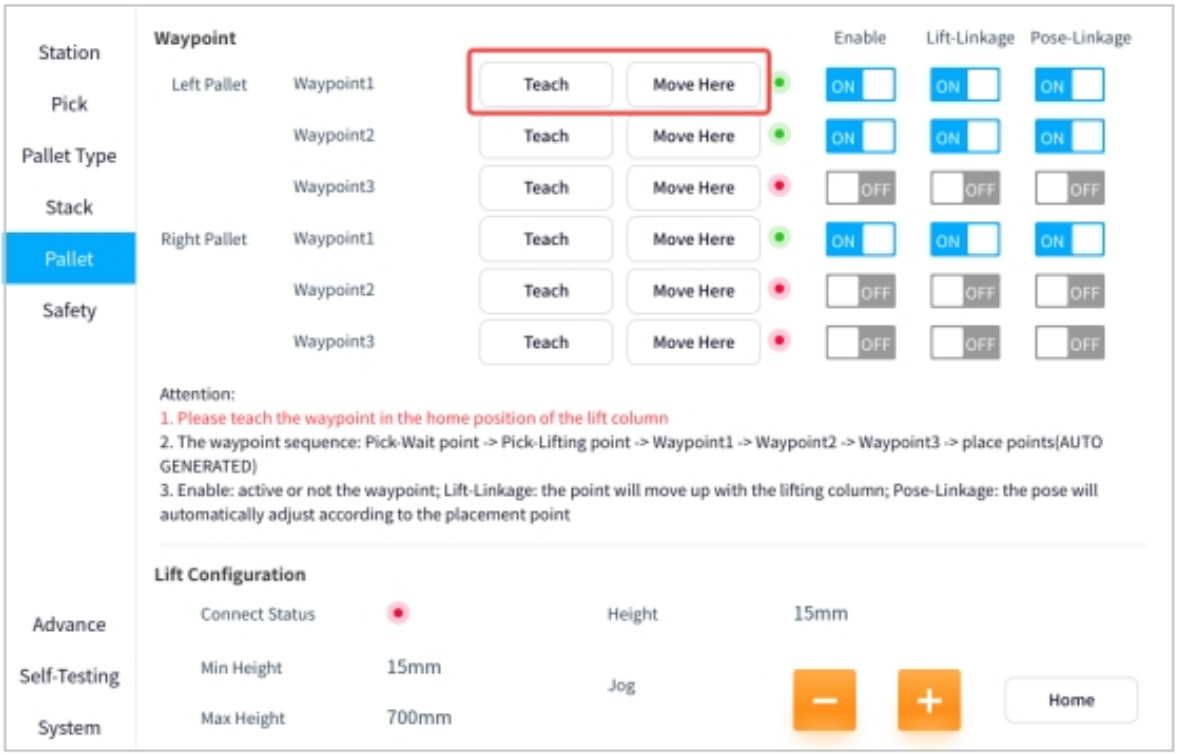

Figure 5.51 Illustrative Diagram of Waypoint

2 Select “ON/OF” to determine the Waypoint’s enable, lift linkage, and attitude linkage. Among them, “Enable” represents whether the Waypoint is activated or not, if not, it will not pass through this point; “Lift Linkage” represents whether the robot end will be lifted automatically with the elevator when it passes through this point; “Pose Linkage” represents whether the robot end will follow the placed box when it passes through this point or not. “Posture linkage” represents whether the robot end will automatically adjust its posture after passing the point based on the placed box. As shown in the following figure

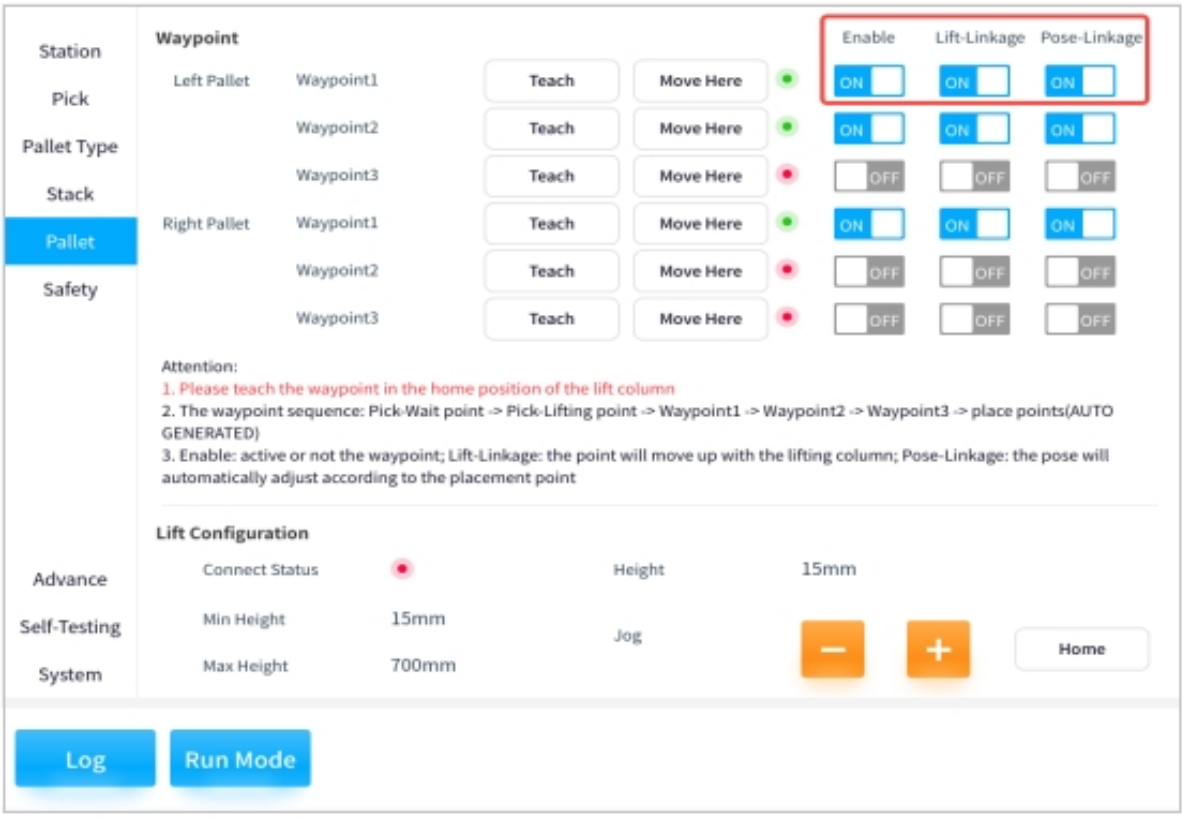

Figure 5.52 Illustrative Diagram of Waypoint

Tips:

- Figure 5 .53 is a schematic diagram of the “lift linkage”. The left subfigure shows the machine at the transition point. If the lift linkage is not turned on, the end of the robot does not rise when the elevator rises (i.e., as shown in the middle subfigure), but if it is turned on, the end of the robot rises when the elevator rises (i.e., as shown in the right subfigure).

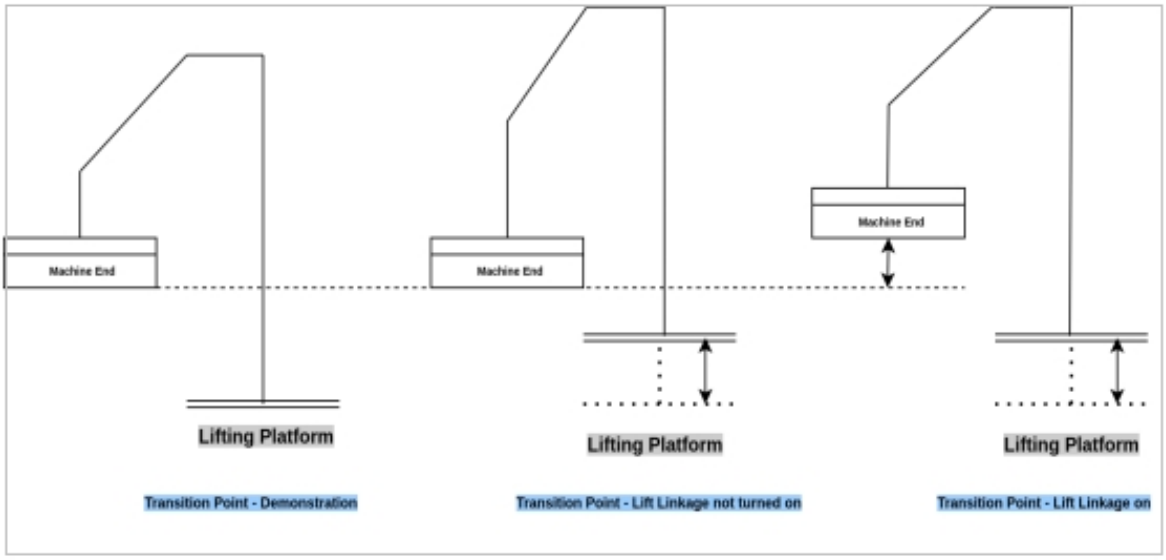

Figure 5 .54 shows the schematic diagram of “pose linkage”. The left subfigure shows the teaching state of the machine at the transition point. If the linkage is not turned on, the robot end will not automatically adjust its posture after the placement point when passing through the transition point (i.e., as shown

in the middle subfigure), and if the attitude linkage is turned on, the robot end will automatically adjust its posture after the placement point when passing through the transition point (i.e., as shown in the right subfigure).

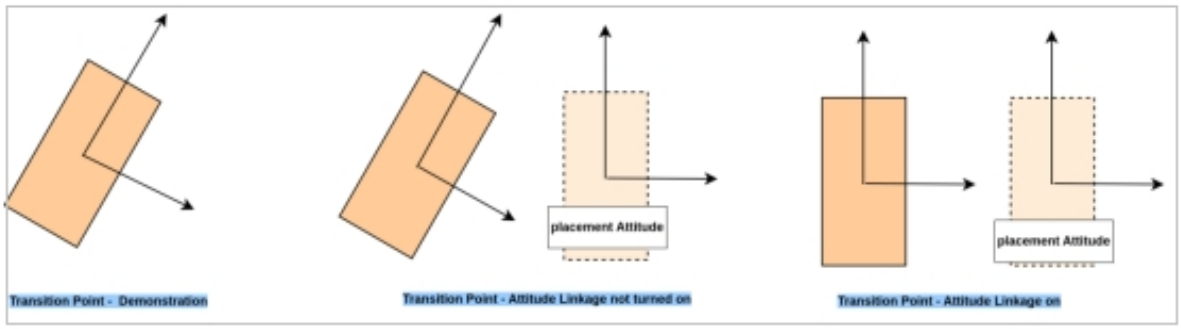

Figure 5.54 Pose Linkage

Lift Configuration

The current connection status of the elevator, the minimum/maximum height it can reach and the current height are displayed here, and the configuration of the elevator can be changed by manual adjustment. In this case, "Home" is used to return the elevator to the zero position. As shown in Figure 5 .55

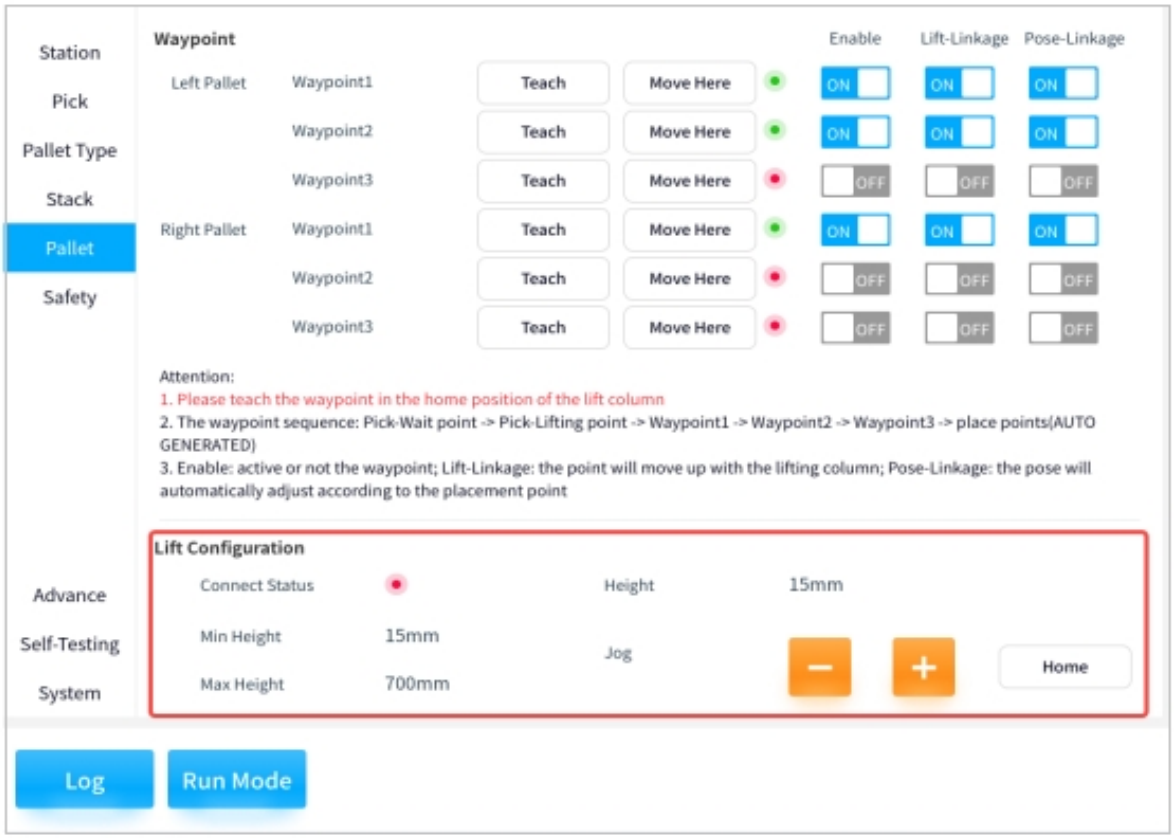

Figure 5.55 Lift Table Configuration Diagram

3.1.7 Safety Configuration

Currently undeveloped features

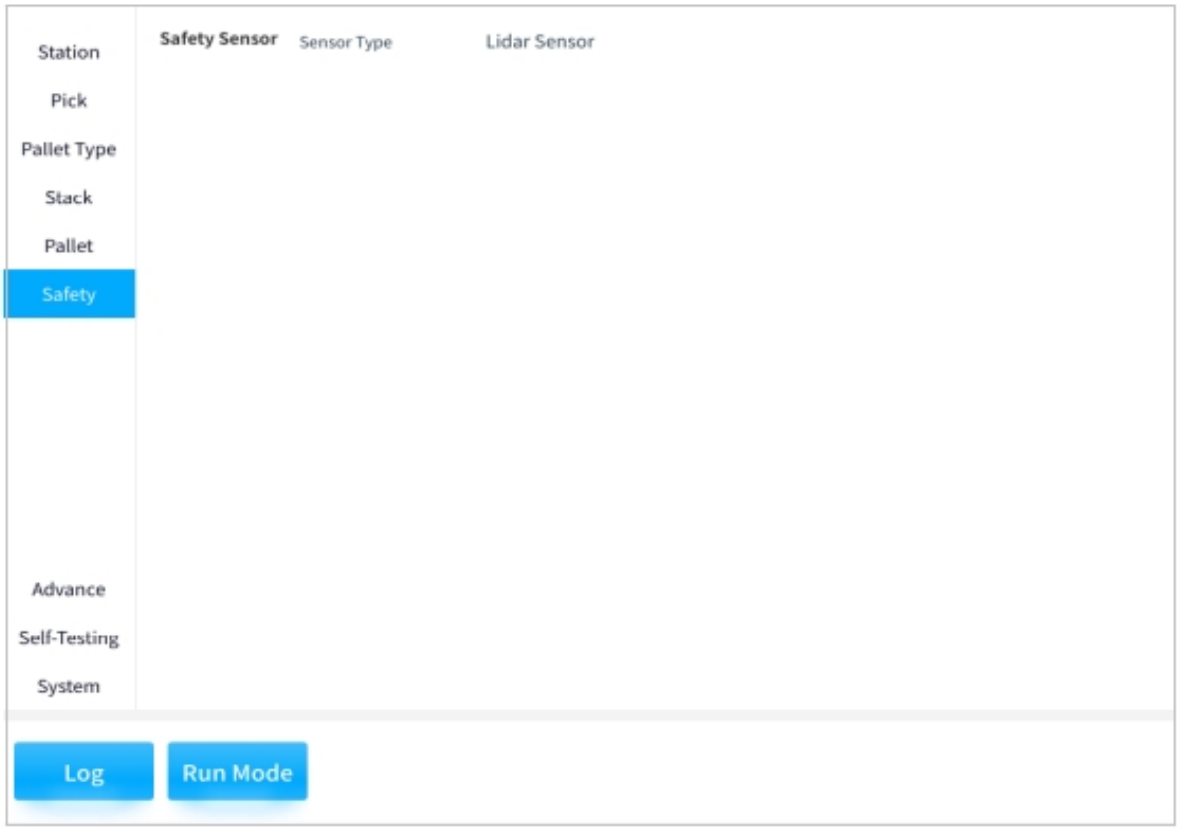

Figure 5.56 Safety Configuration

3.2 Advanced Configuration

3.2.1 Pallet Coordinate Offset Configuration

In order to cope with the problem that the ground on which the pallet is placed is not flat enough, the problem of the box placed at the end of the robot can be solved by setting the offset of the pallet’s coordinate system. As shown in the figure below

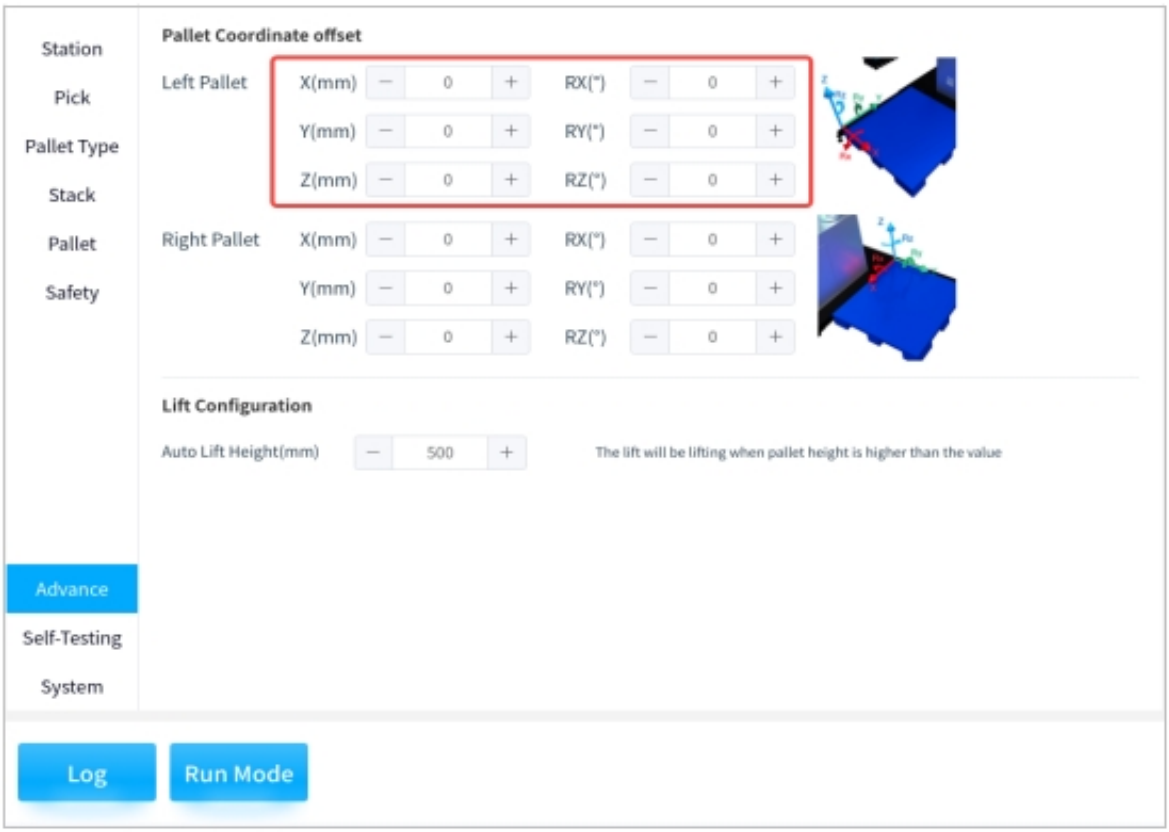

Figure 5.57 Configuration of the Pallet Coordinate System

Tips:

- The left and right stack coordinate system is shown below

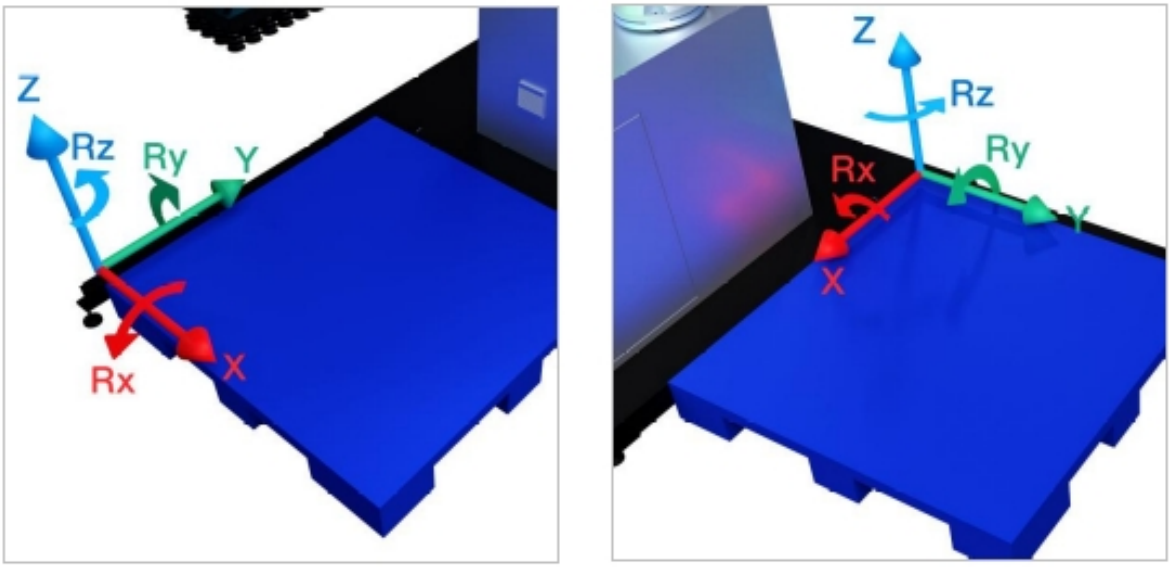

Figure 5.58 Coordinate System of the Left and Right Stack Pallets

3.2.2 Lift Configuration

According to the actual situation by setting the “Auto Lift Height(mm)”, to make the box can be automatically lifted when the position of the code is higher than the height. As shown in the figure below

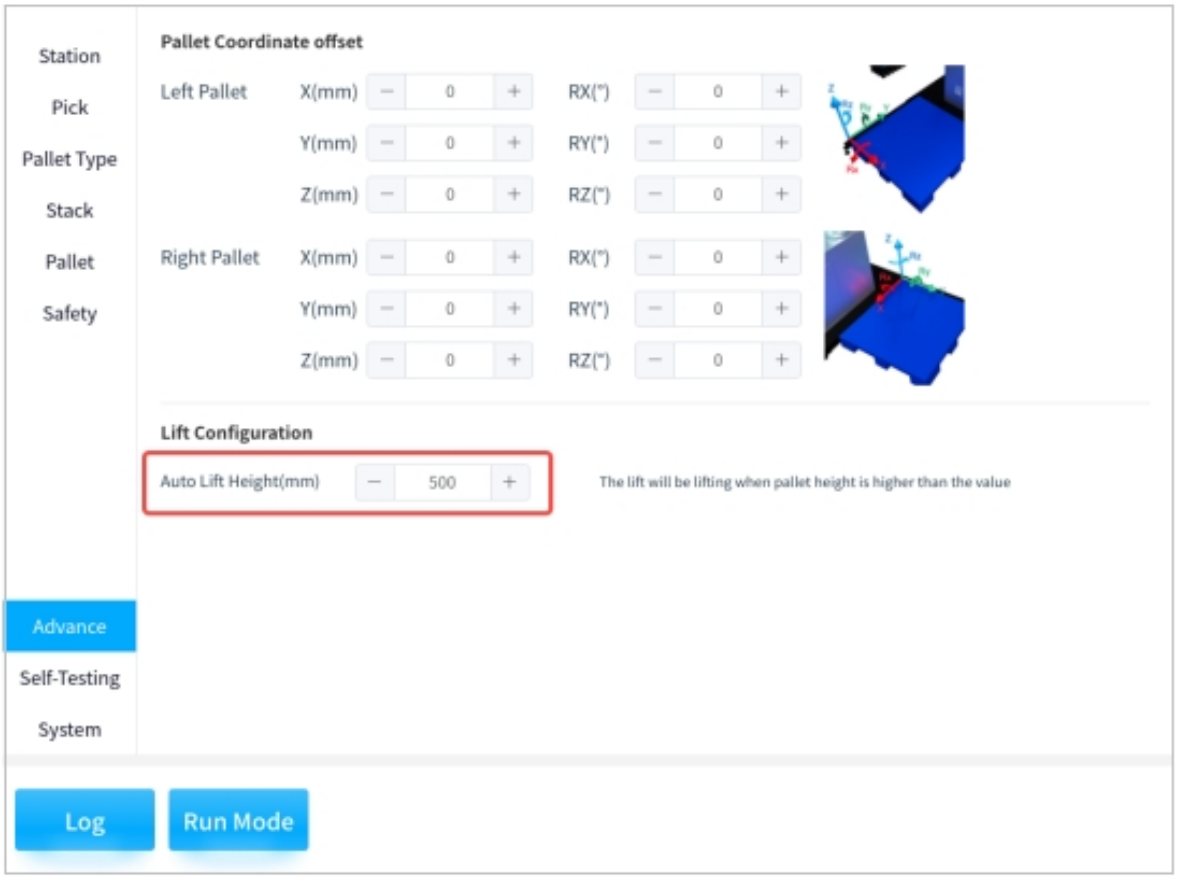

Figure 5.59 Lift Configuration

3.3 Self-Testing

3.3.1 Reachability Check

The result of the self-test will be displayed here, and if an abnormality is detected (as in Figure 5 .60), the X stack X layer is displayed, and the drop-down box and the layer on the right can be used to view the exact location of the anomaly box. If no abnormality is detected (as shown in Figure 5 .61), the “Abnormal Results” display will be empty.

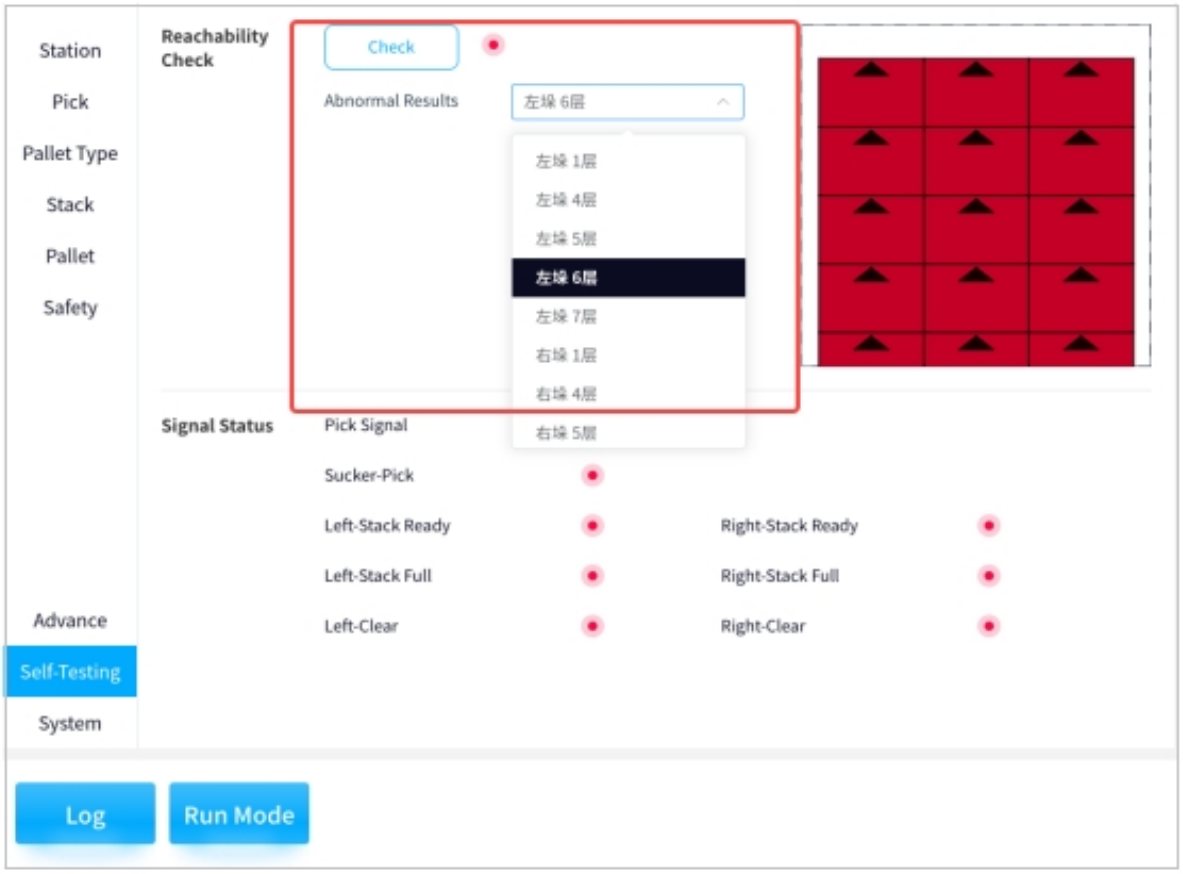

Figure 5.60 Reachability Check (anomaly)

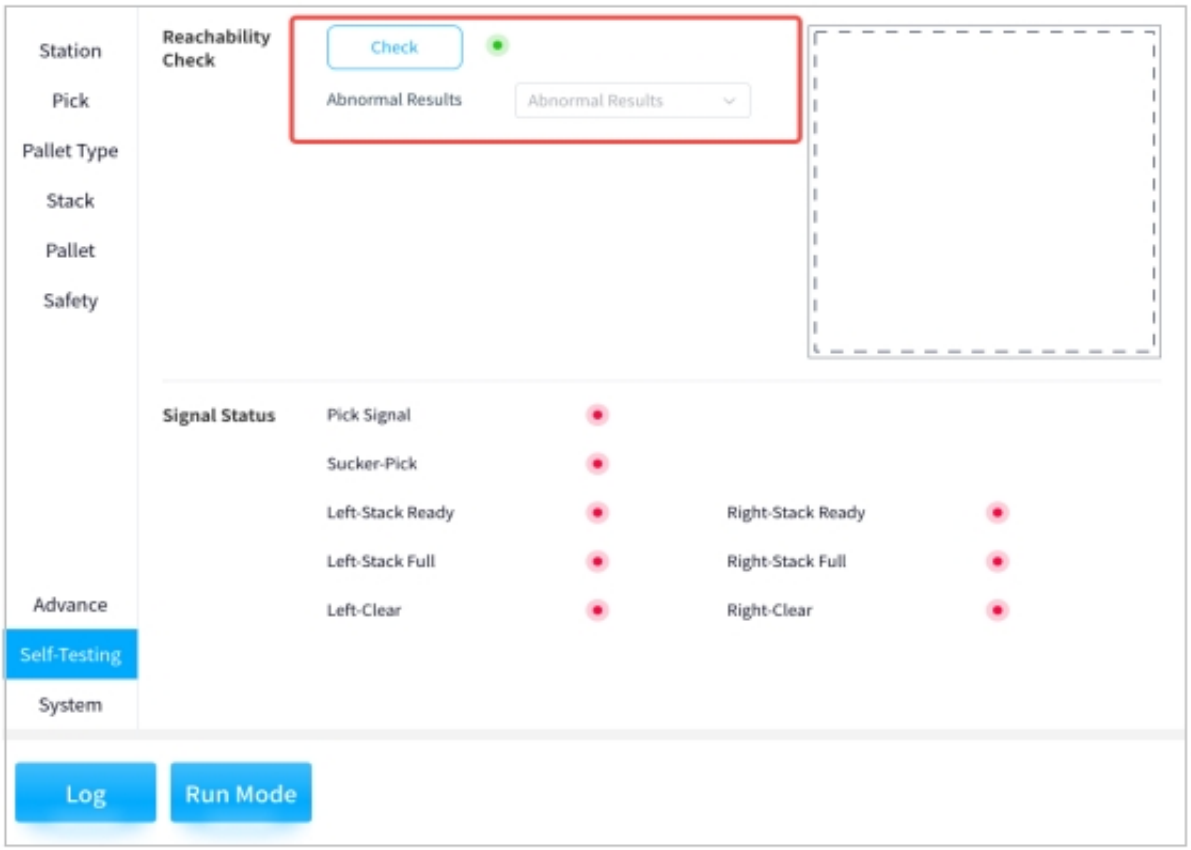

Figure 5.61 Reachability Check (normal)

3.3.2 Signal Status

The status signals of the pickups, sucktion cup and pallets are displayed here as shown below

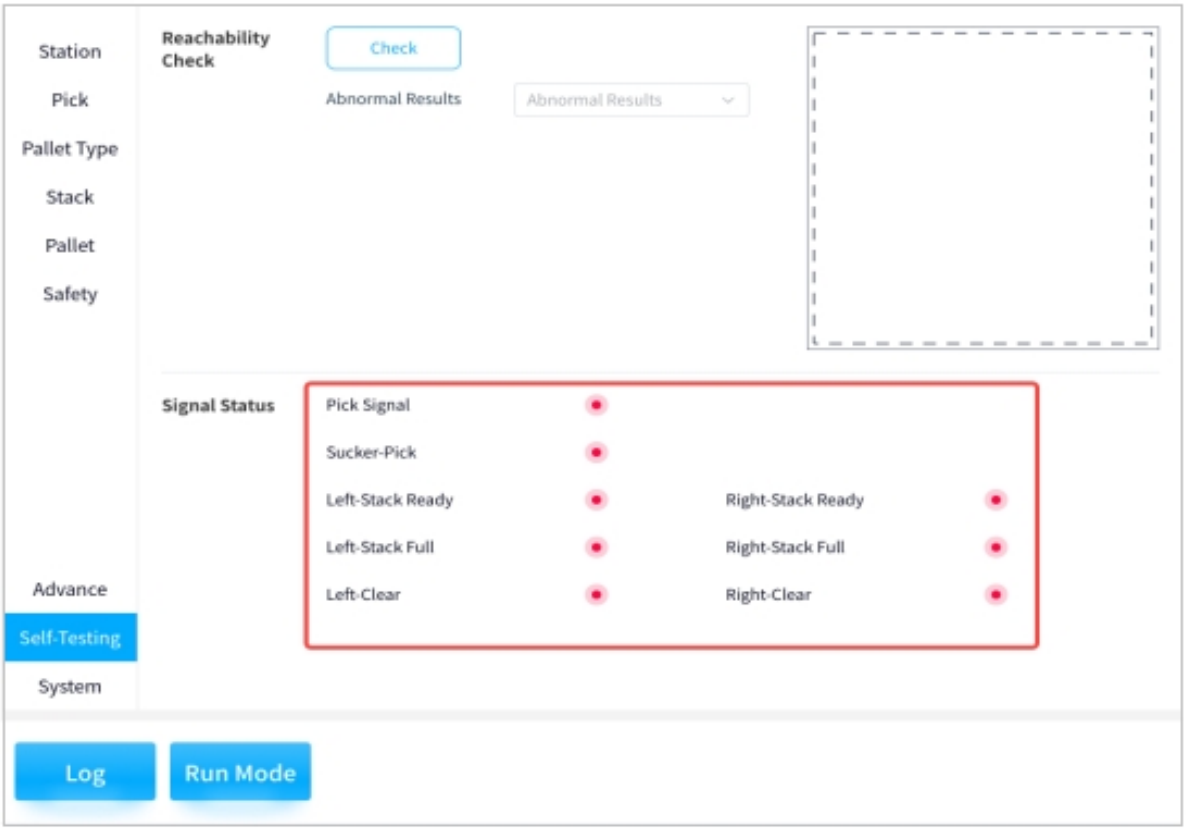

Figure 5.62 Signal Status

3.4 System Configuration

3.4.1 Whole Station Configuration

Current Configuration

Displays the current system configuration. The imported configuration is displayed if an import has been performed, otherwise it is displayed as default. As shown in the following

Figure 5 .63

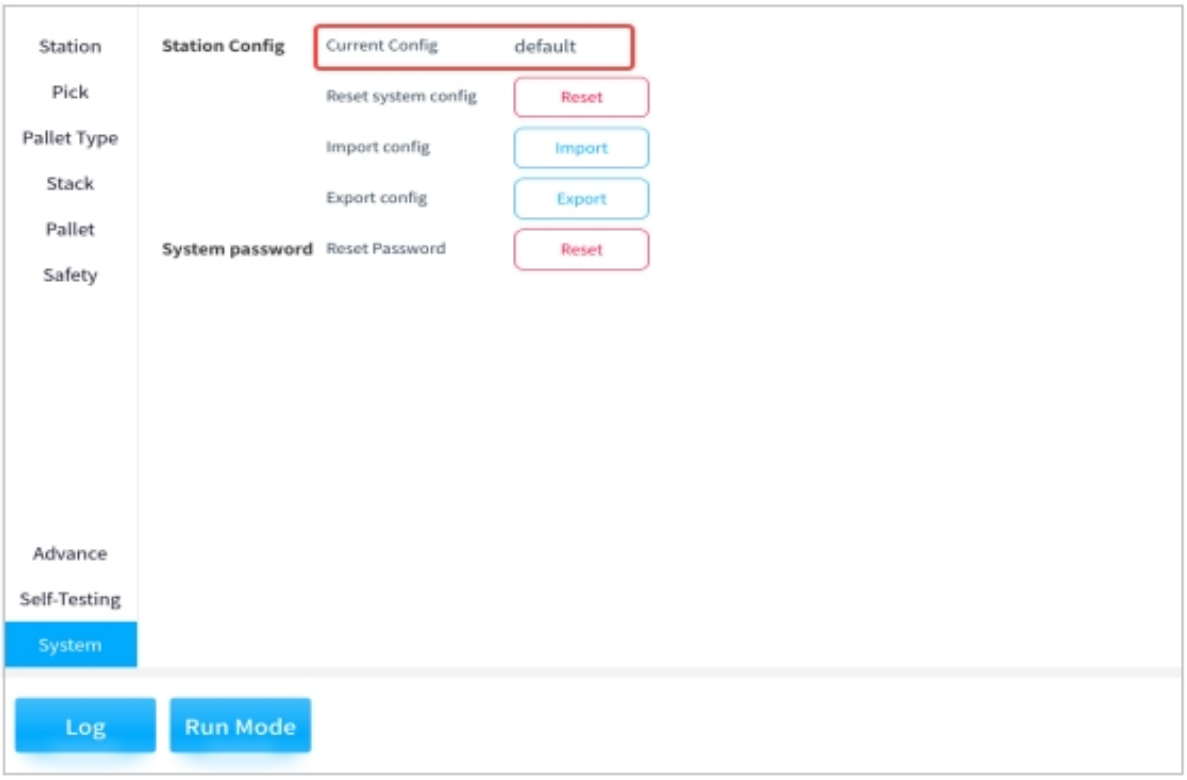

Figure 5.63 Current Configuration

Reset System Configuration

If you need to clear the system configuration, click “Reset” → “OK” to clear all the data, as shown in the figure below.

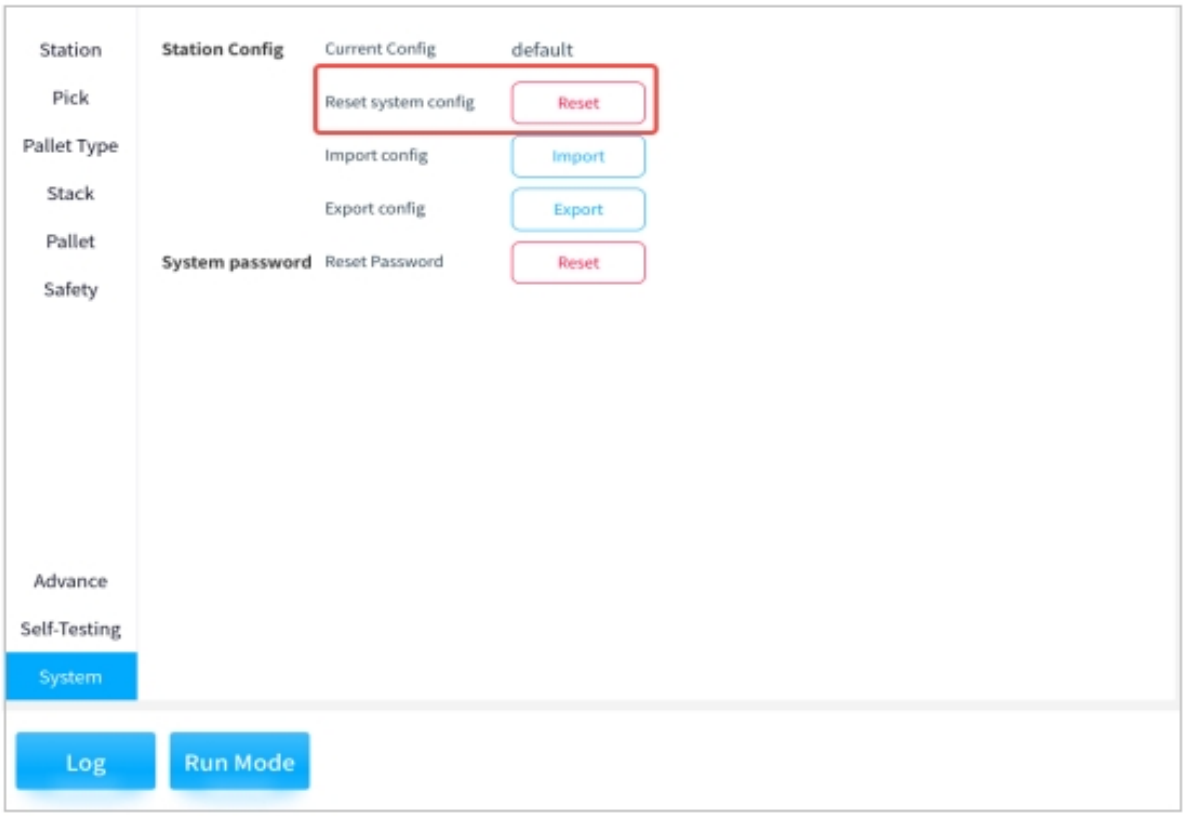

Figure 5.64 Reset System Configuration1

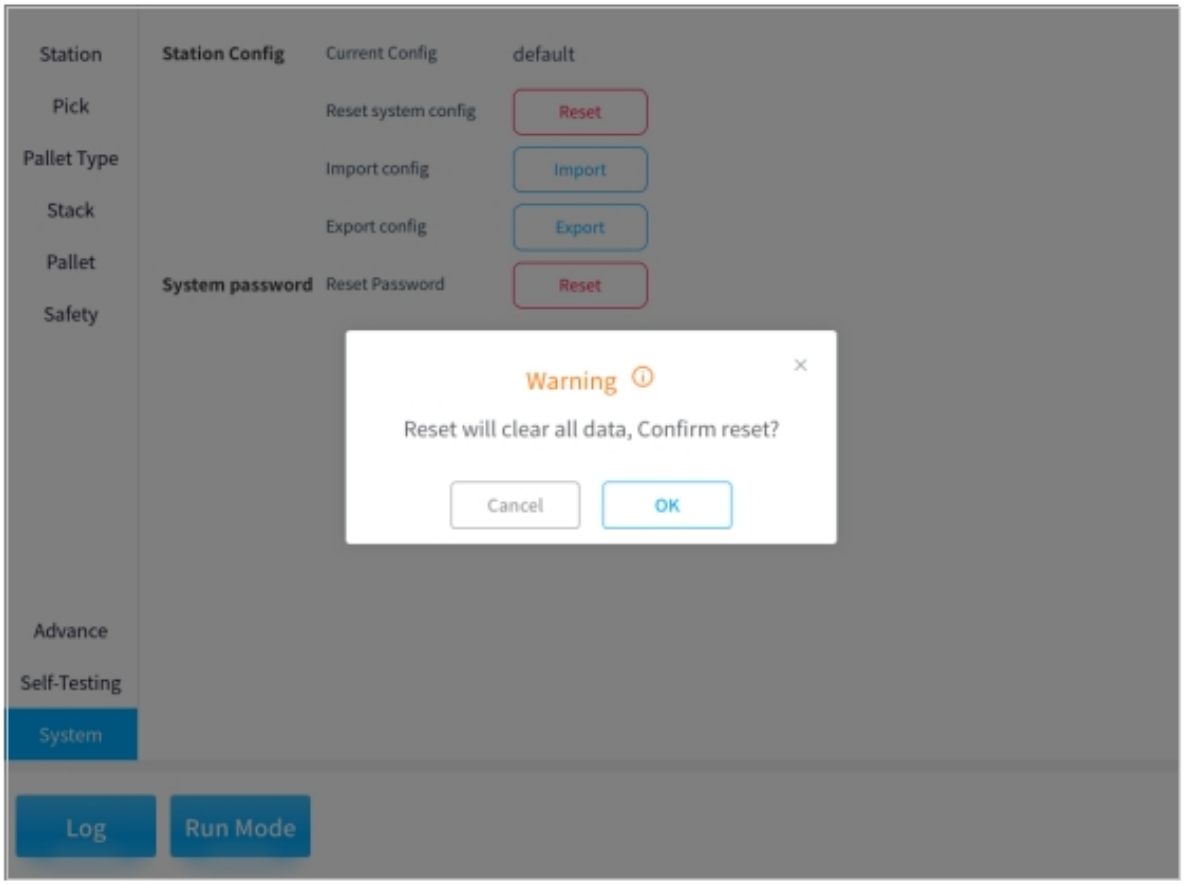

Figure 5.65 Reset System Configuration2

Import Configuration

You can import the configuration from system storage, removable storage or USB, click “Import” and select the place where you want to import the configuration. As shown in the figure below

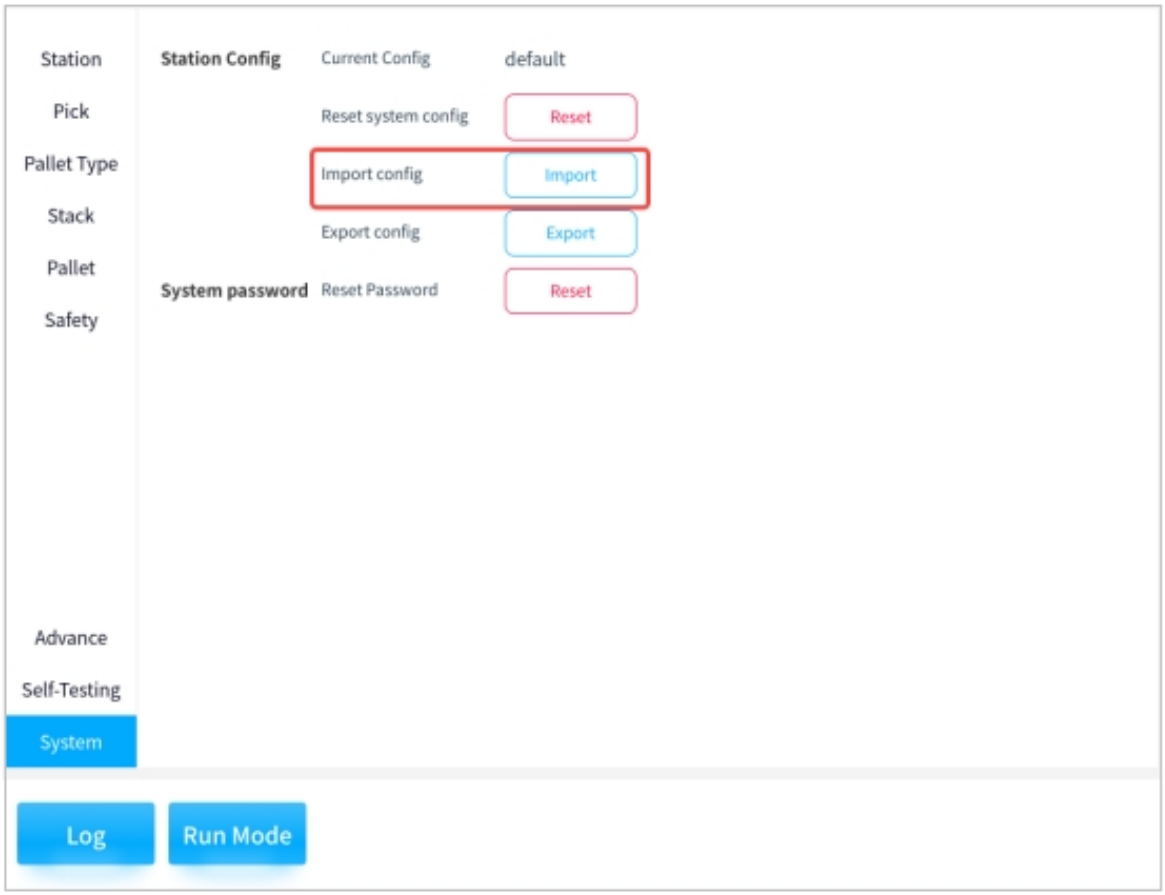

Figure 5.66 Import Configuration Diagram 1

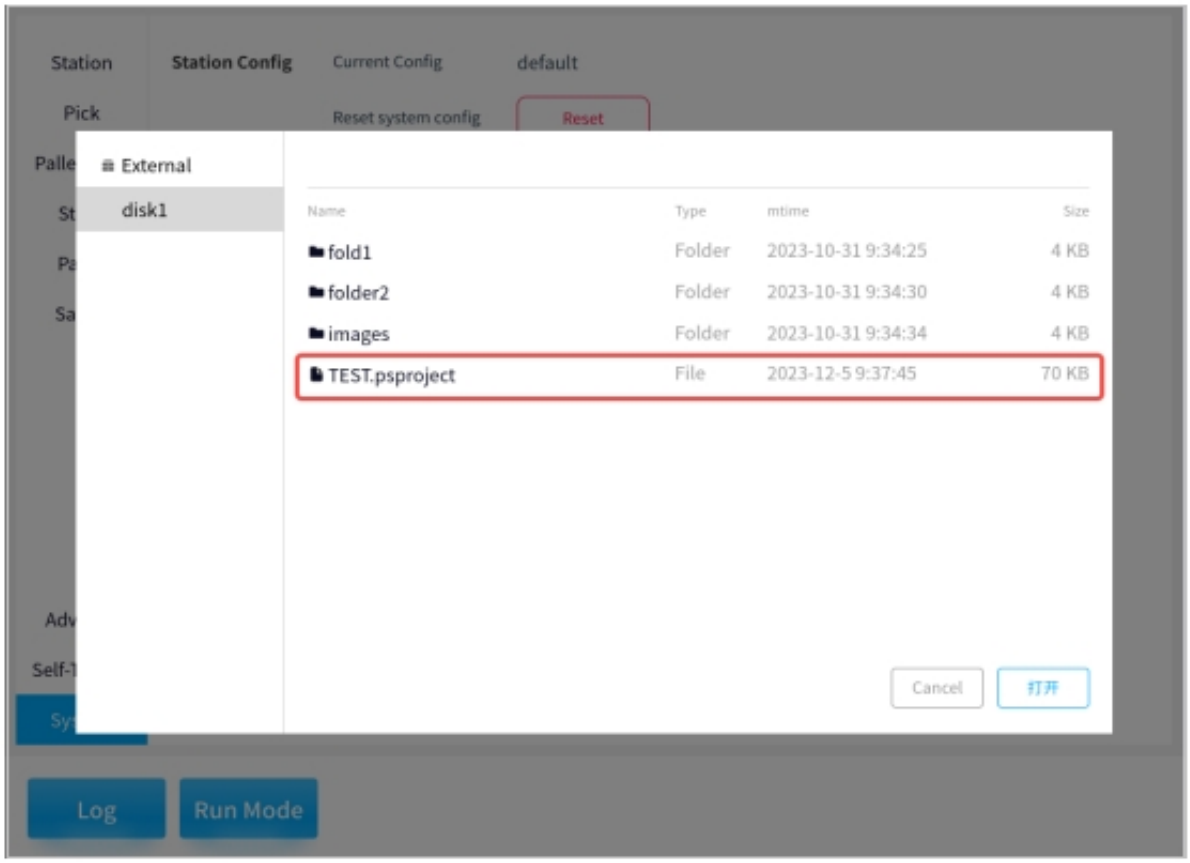

Figure 5.67 Import Configuration Diagram 2

Export Configuration

You can export the configuration from the system storage, removable storage or USB, click “Export” and select the place where you want to export the configuration, please refer to “Importing Configuration” for the way of exporting files. Please refer to “Import Configuration” for the way of exporting file.

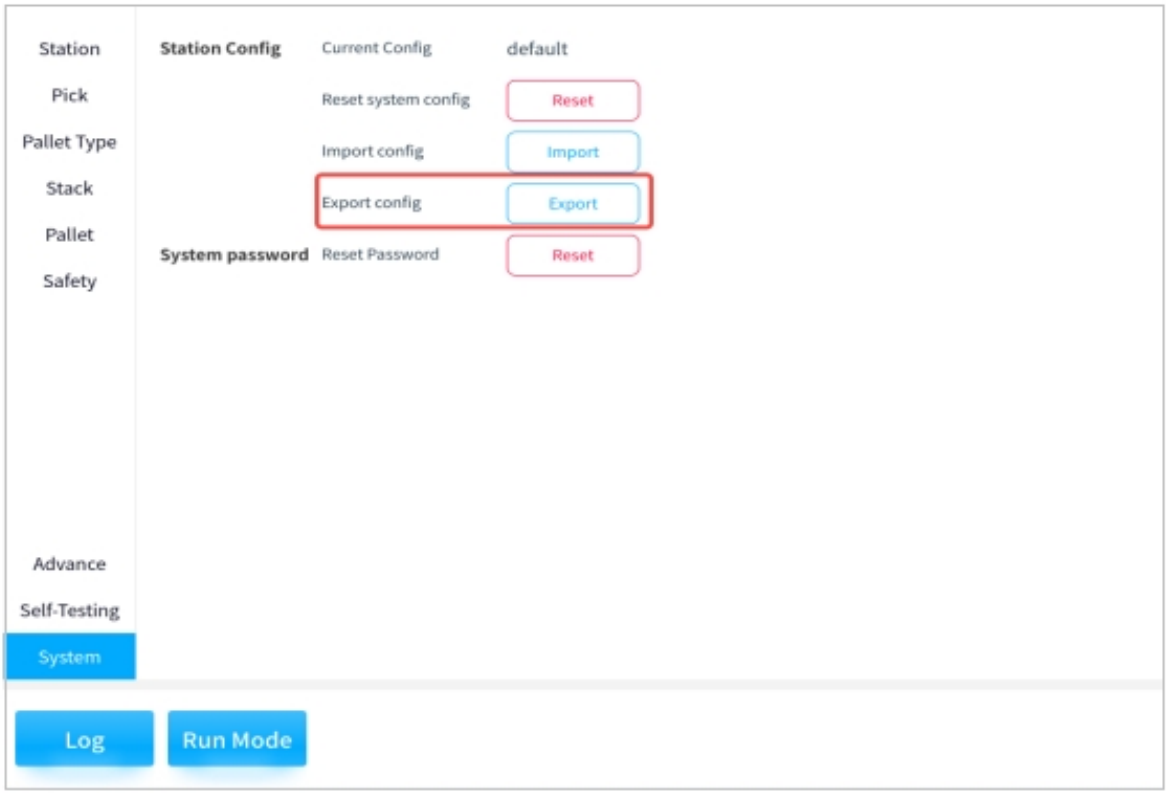

Figure 5.68 Exporting the Configuration Diagram

3.4.2 System Password

When you need to reset your password, click “Reset” and enter the original password first, then enter the new password you need to change and enter the new password again and click “Confirm”. As shown in the picture below

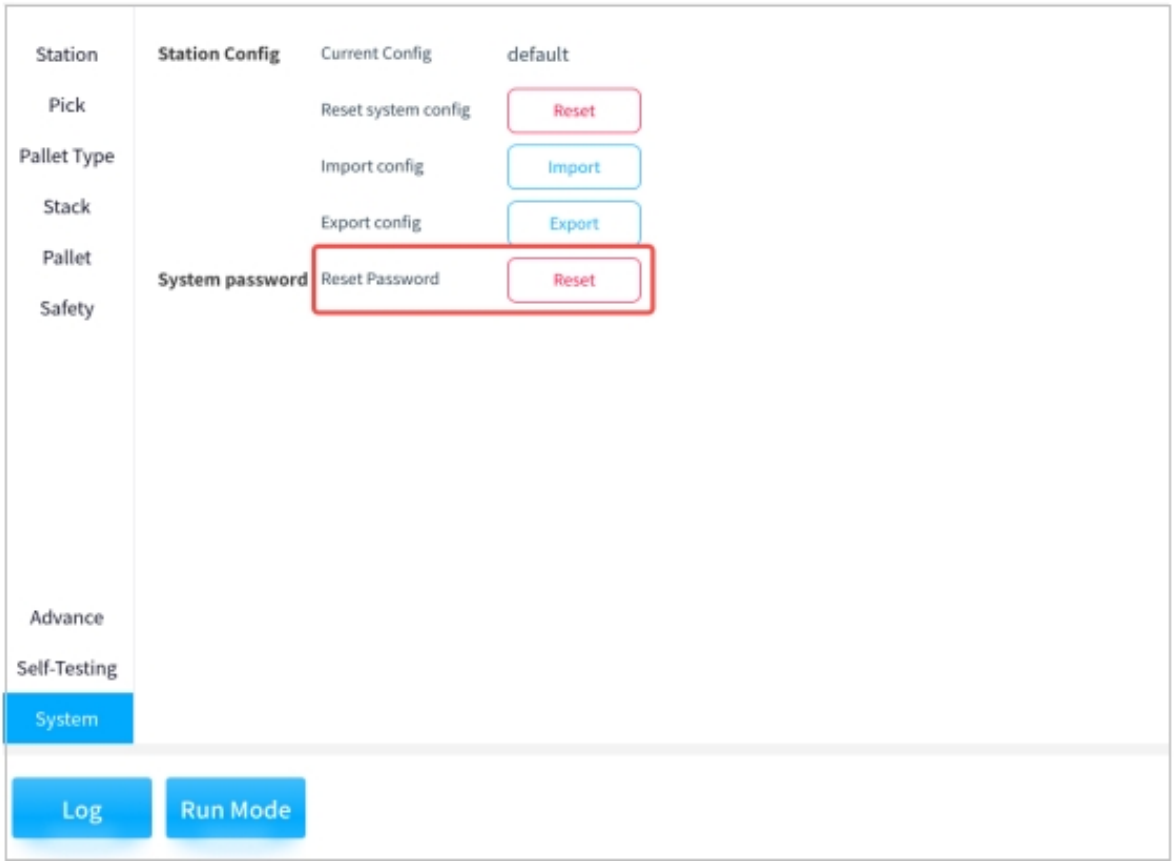

Figure 5.69 Reset Password 1

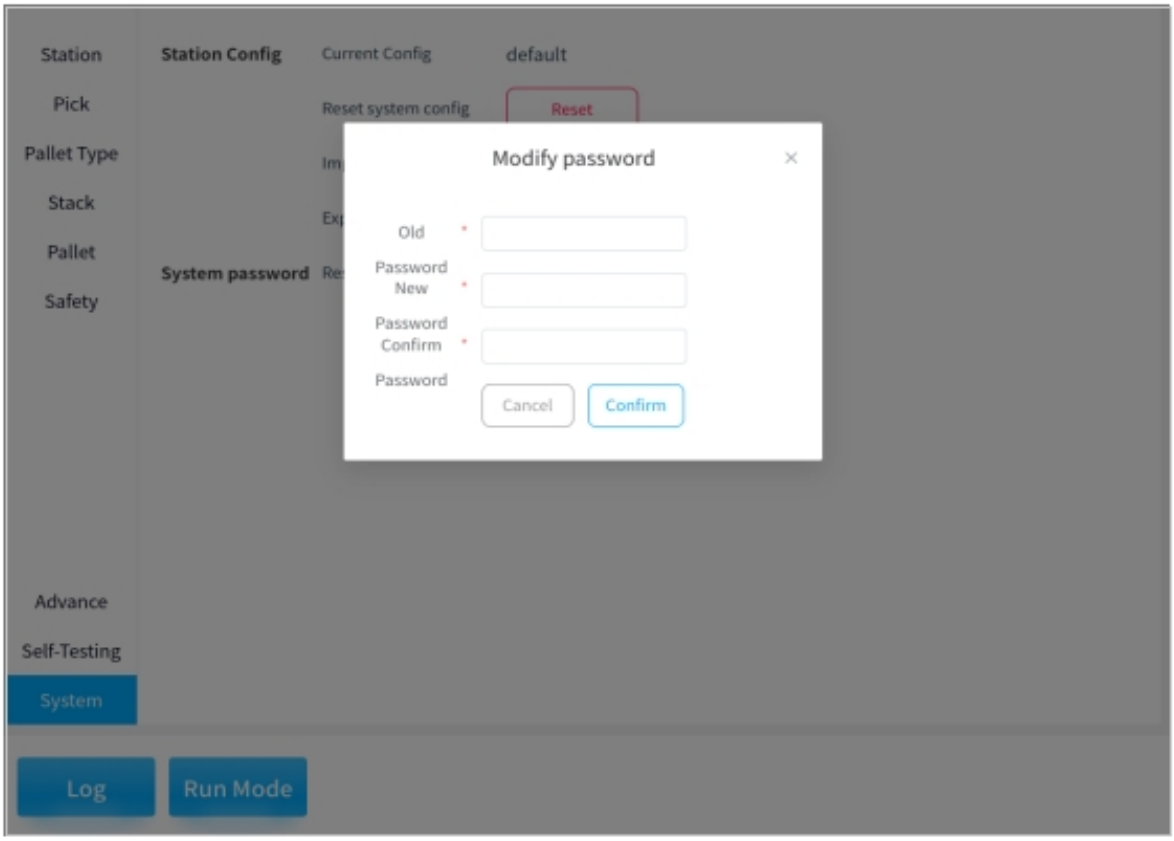

Figure 5.70 Reset Password 2

CHAPTER

FOUR

PALLETSTUDIO OPERATION PROCESS DESCRIPTION

The machine system operates in six operating states, namely, initialization state, standby state, fault state, reset state, pause state and running state.

4.1 Initialization State

In the initialization state, the tricolor light blinks yellow and waits for the system to boot up and complete the initialization, as shown in Figure 6 .71

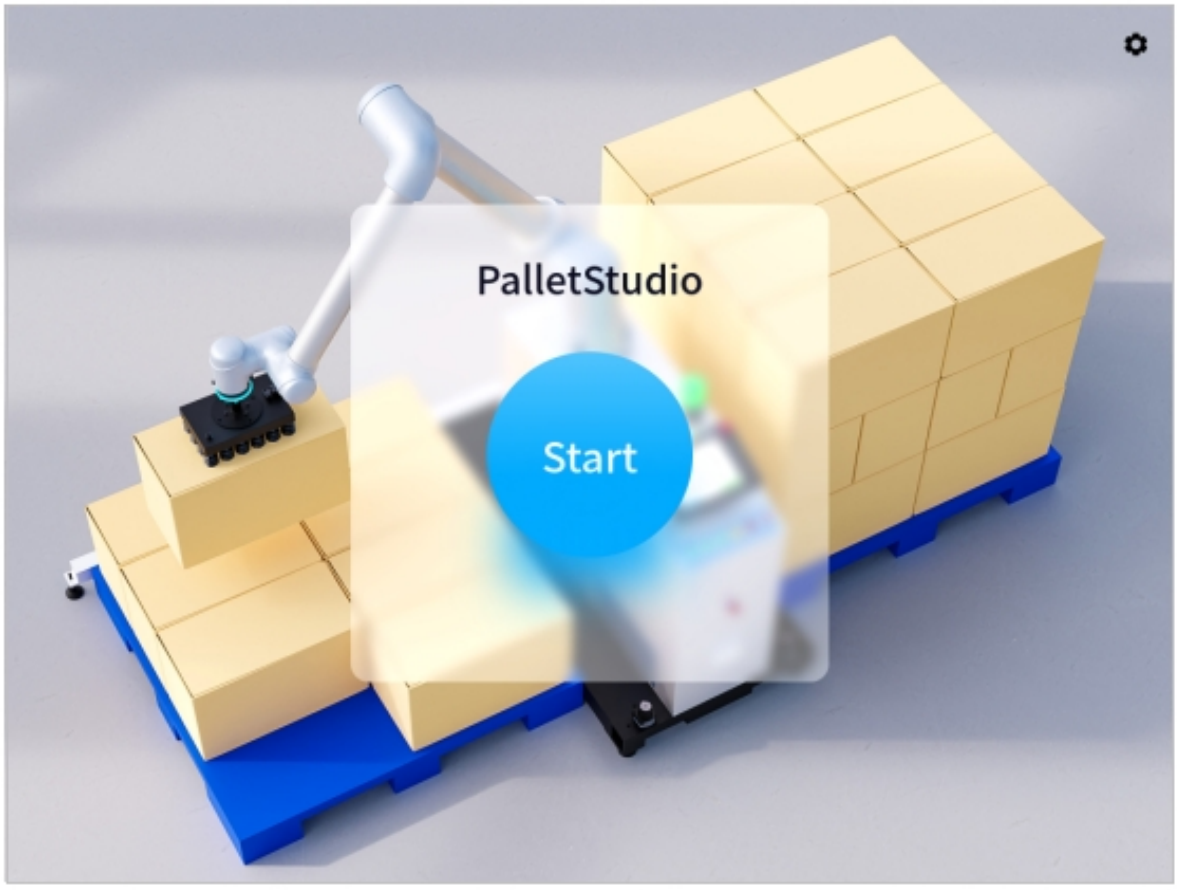

Figure 6.71 Initialization Status Interface

4.2 Standby Mode

After initialization is completed, the system is in standby mode. At this time, the tricolor light blinks yellow and the interface switches to the standby interface. The upper level of the standby interface is the status display area and the lower level is the operation area. As shown in Figure 6 .72

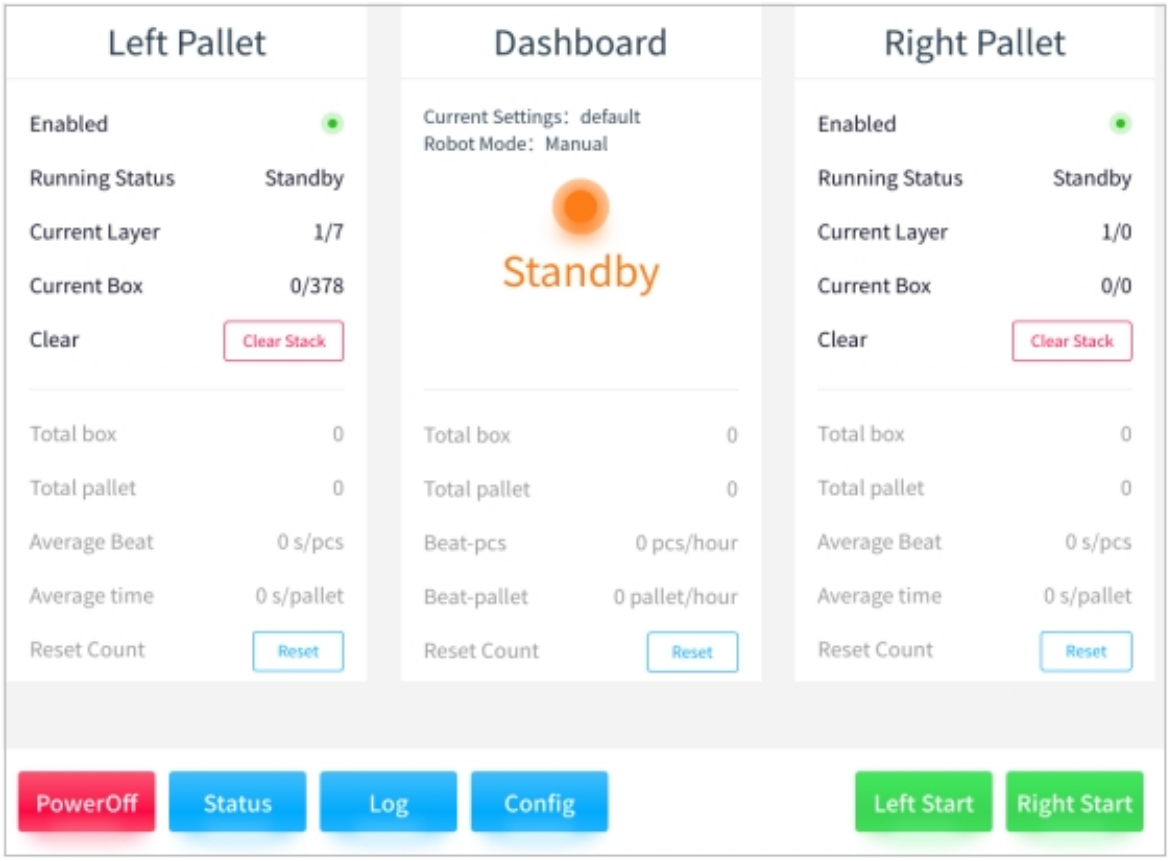

Figure 6.72 Standby Status Interface

4.2.1 Status Display Area

Take the left stack status area as an example:

- “Enabled Status” shows whether the left pallet is currently enabled or not;

  “Running status” This is an indication of the operational status of the left palletizer;

  “Current Layer” is the layer of boxes currently being palletized on the left palletizer;

  “Current box” i.e. the number of boxes being palletized in the current layer;,

  “Clear Stack” means that once the left pallet has been palletized and actually cleared, it is necessary to click on

  “Clear” to indicate that the left pallet is ready to start a new round of palletizing.

- Overview of the entire workstation:

  “Total box” indicates the number of cases that have been palletized so far;

  “Total pallet” is the number of stacks that have been palletized so far;

“Average beat” is the average time (in seconds per box) spent on each box in the current palletizing process;

“Average time ” This is the average time spent per pallet (seconds/pallet) in the current palletizing process;

“Reset Count” means to clear and reset all the current data of the left pallet board.

In the status area of the “Dashboard”, the “Current settings”, “Robot mode” and “System status” are displayed. “The current configuration, robot mode, and system operating status are displayed in the status area of the station overview. The “Robot Mode” includes manual and automatic modes. The information displayed in this status area, such as the “Accumulated Case Count,” is the average of the left and right stacks.

Refer to the left stack status area for the right stack status area.

4.2.2 Operating Area

If you click “Poweroff” → “OK” in standby mode, the system returns to the initialized state.

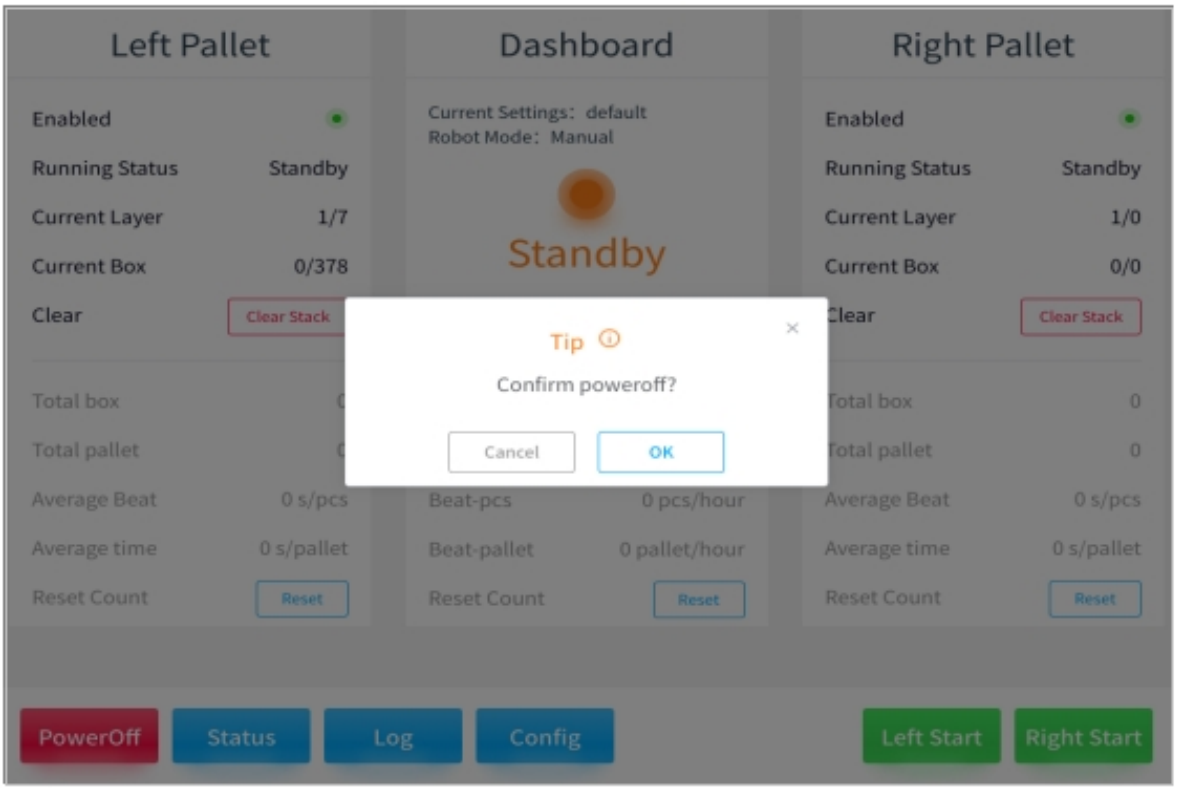

Figure 6.73 the Interface of PowerOff 1

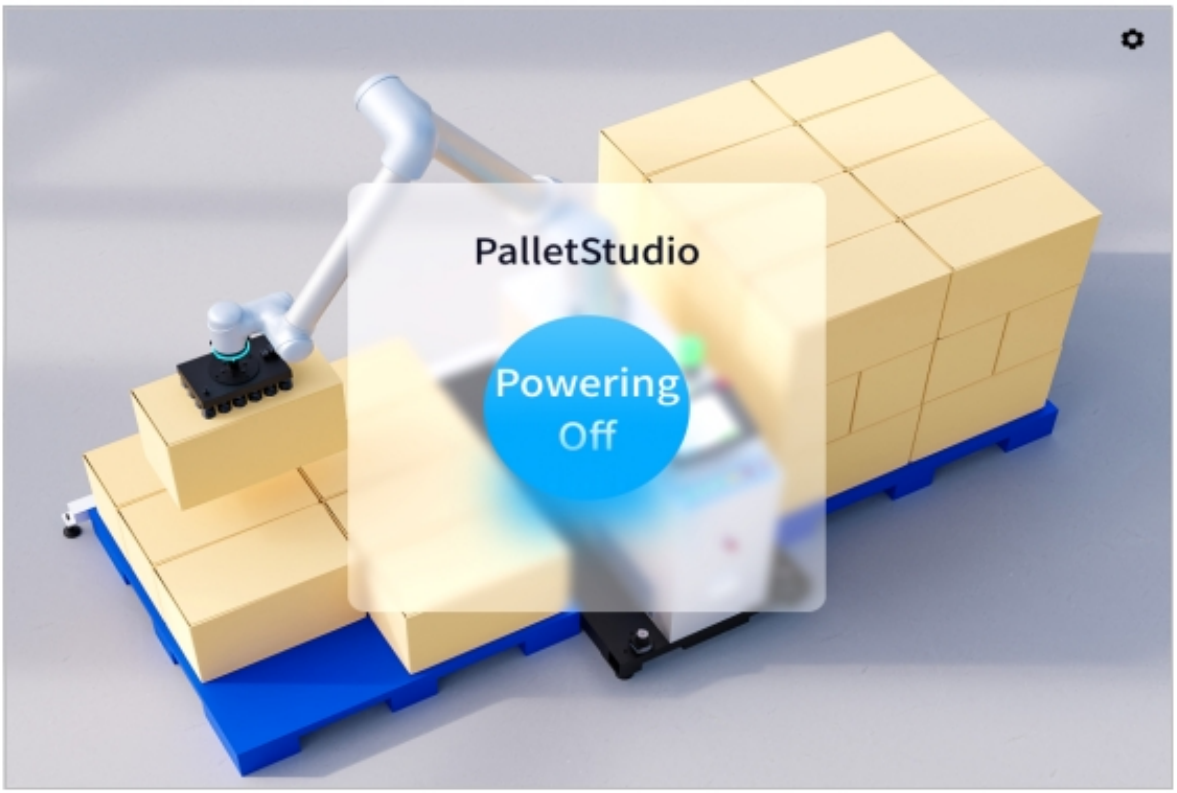

Figure 6.74 Interface in Powering Off 2

If you click on “Status” in standby mode, the current status signals of the picker, suction cups and palletizer are displayed. As shown in the figure below

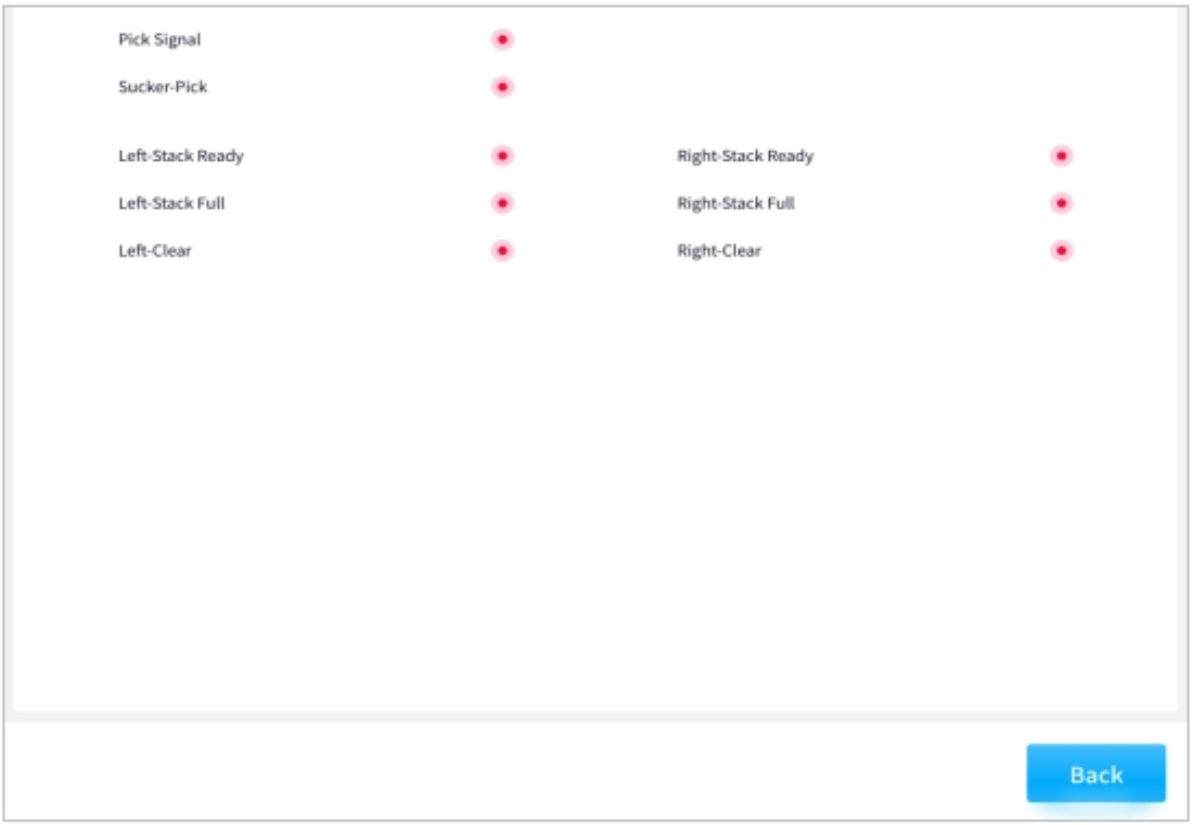

Figure 6.75 Interface for Status Information

If you click “Log” in standby mode and select the date, you can view the log of the day’s operation. Click “Export” to export the logs of all dates to the local area. As shown in the figure below

Figure 6.76 Interface of the Operation Log

If you click “Config ”in standby mode, enter “Verify Password”and refer to Chapter 4 for instructions. As shown in the figure below

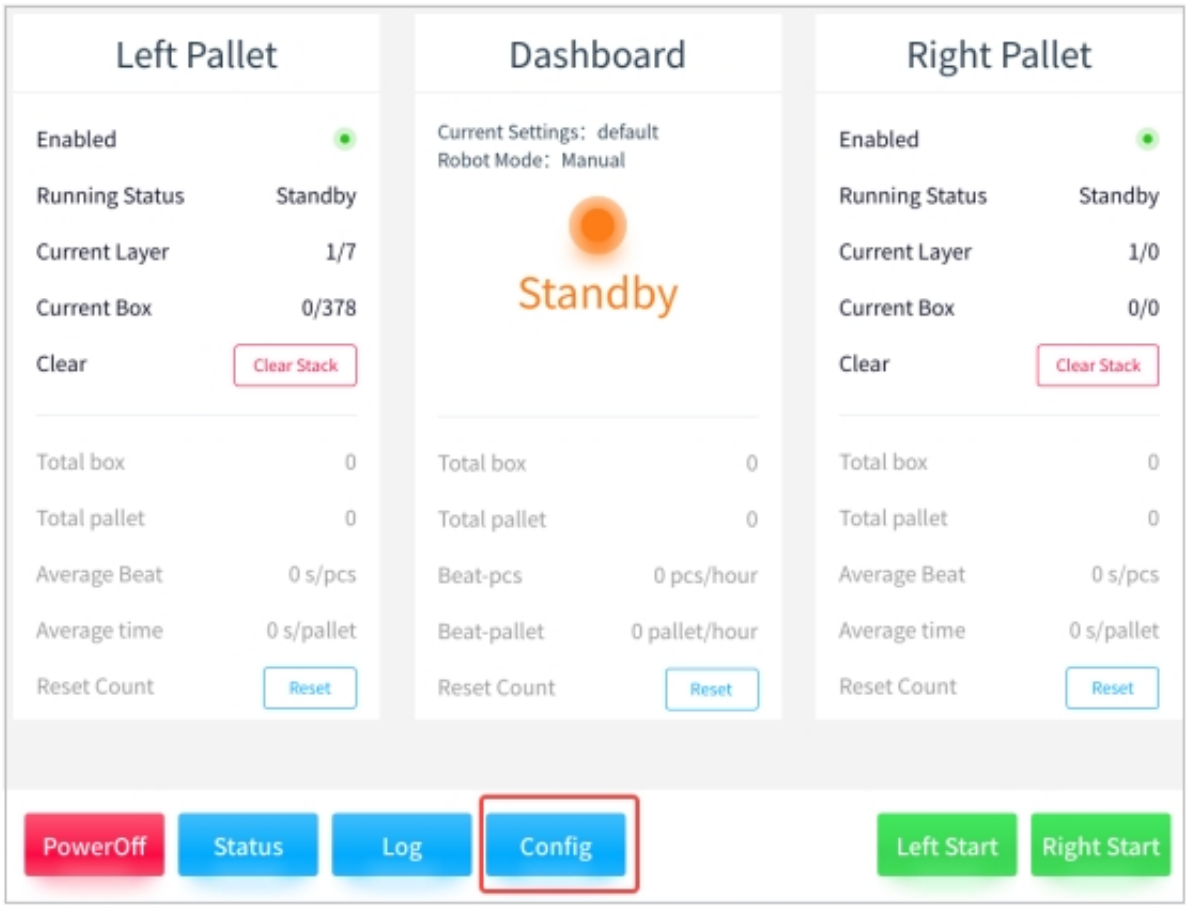

Figure 6.77 Interface of the Configuration Mode

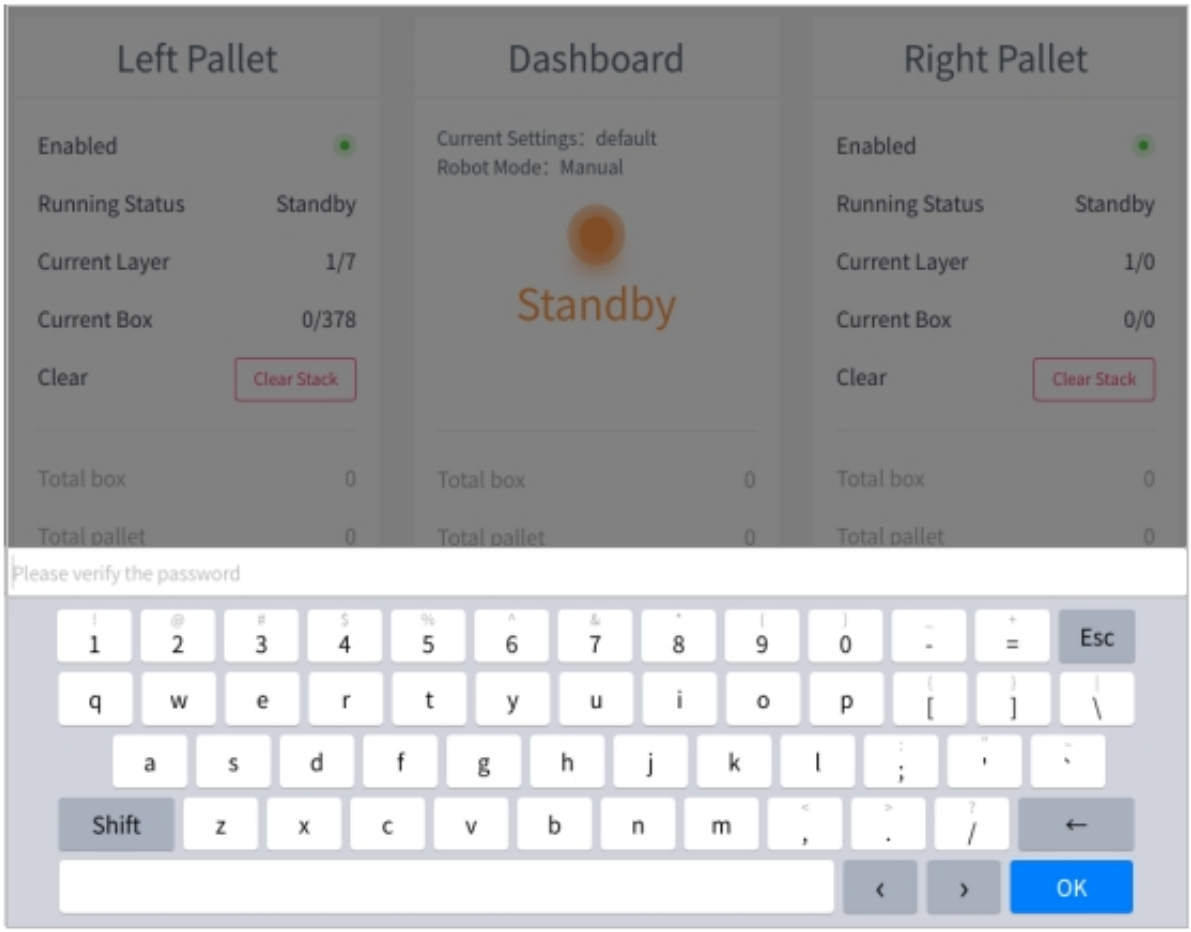

Figure 6.78 Entering the Authentication Password

4.3 Reset State

In standby mode, clicking on “Left/Right Start” will switch to the reset state, as shown in Figure 6 .79 below.

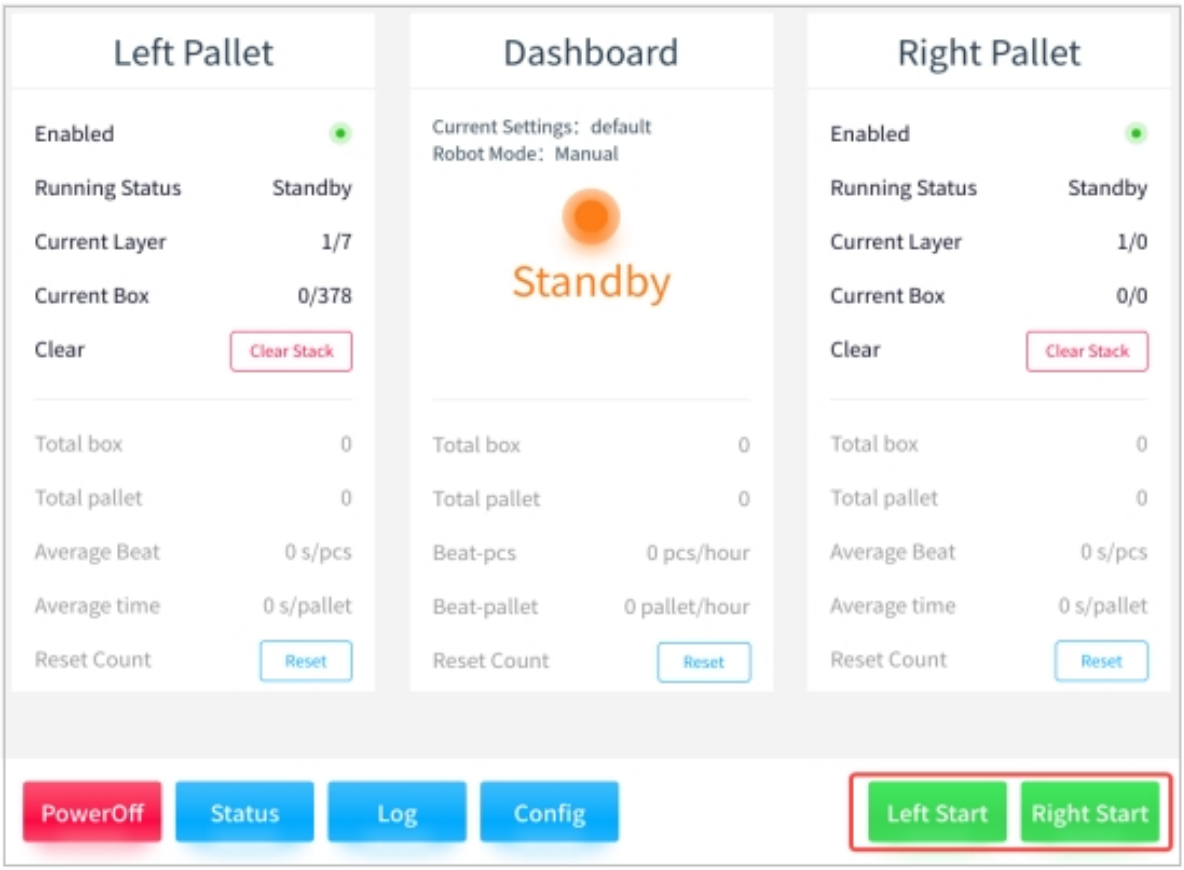

Figure 6.79 Reset State

As shown in the following Figure 6 .80, the lower figure shows the state of the robot when it is not reset

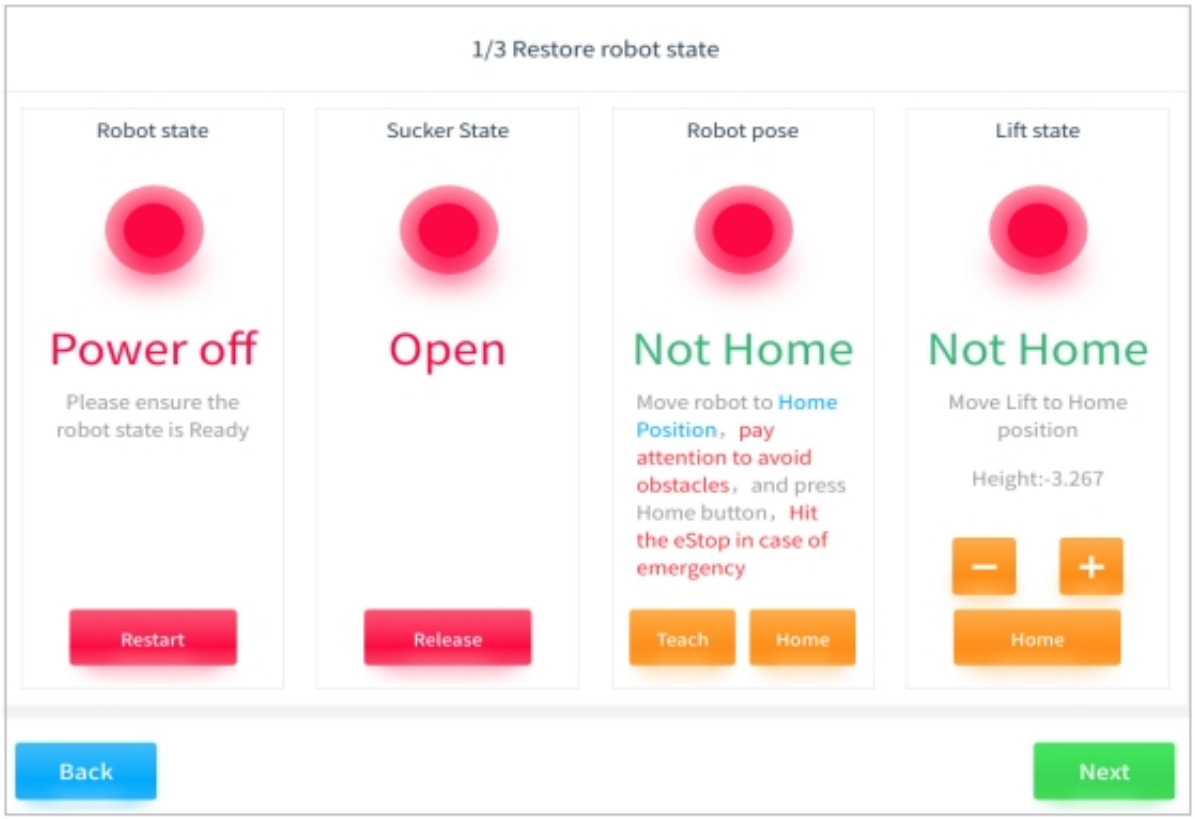

Figure 6.80 State of the Robot When it is not Reset

Tips:

- Robot status: Click “Restart”, the status will be normalized after the robot is powered on.
- Suction cup status: Click “Release”, the status will return to normal after the vacuum is released from the suction cup.
- Robot pose: first click “teach” to ensure that the robot can avoid obstacles when returning to the initial position, and then click “press and hold to return to zero” to make the robot return to the initial position (in case of emergency, please press the emergency stop), after the robot returns to the initial position, the state returns to normal.
- Lift state: under the premise of ensuring that the robot can avoid obstacles, the state of normalization after teaching the lift to return to the zero position

As you can see below, the lower robot is recovered

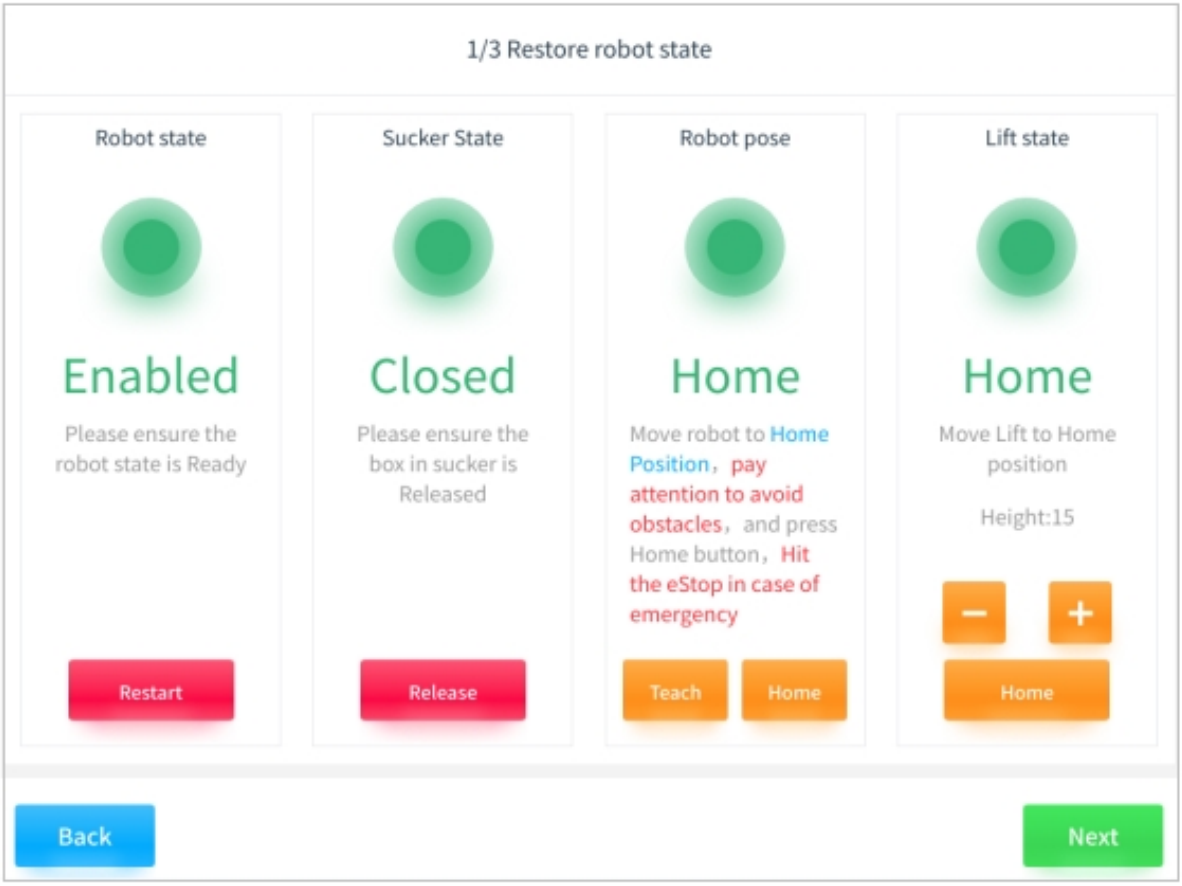

Figure 6.81 Robot State Reset Complete

As shown in the Figure 6 .82 below, check that the current actual left pallet and layer number matches the illustration on the left. If not, please reset according to the actual situation:

After the manual handling box is aligned, click “Next”;

Alternatively, empty the palletized boxes and click on“Clear”to manual depalletization, then“Next”.

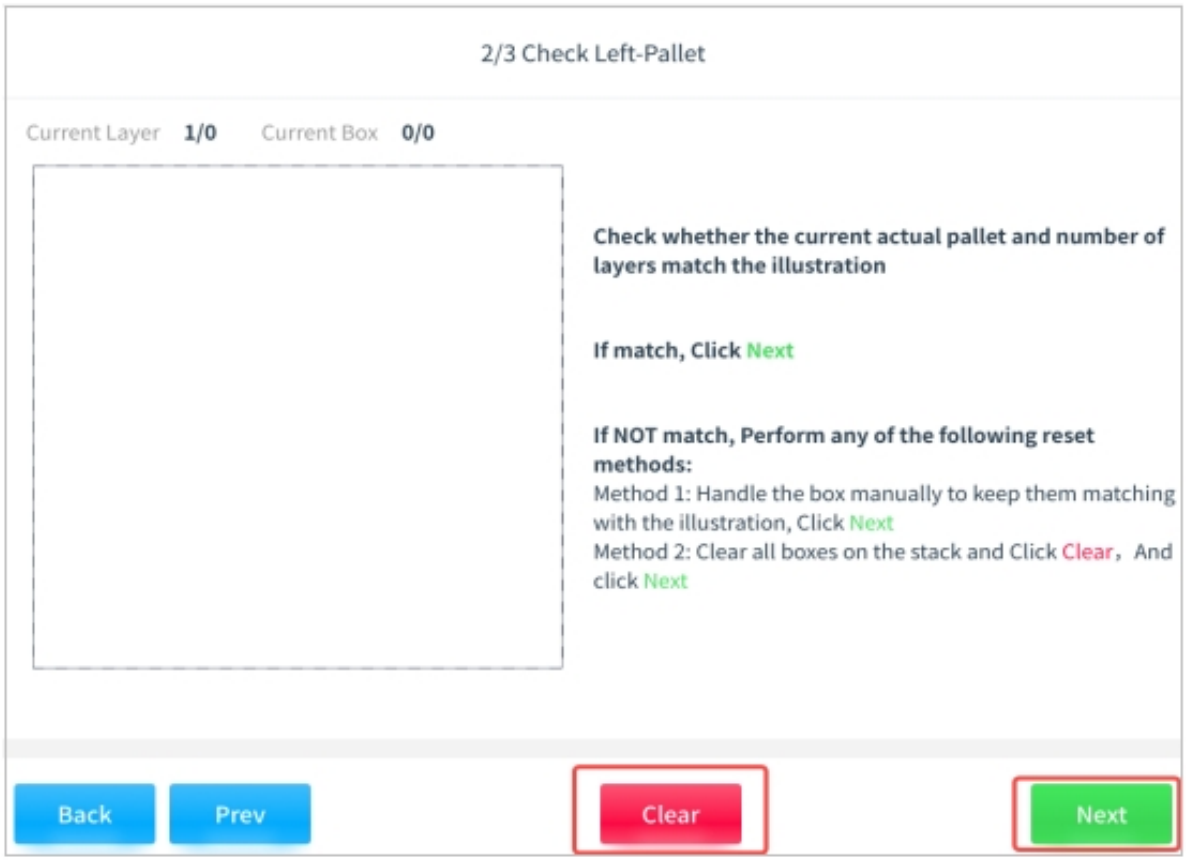

Figure 6.82 Checking the Left Stack Status During Reset

As shown in the following Figure 6 .83, check whether the current actual right pallet and number of layers match the figure on the left. If not, refer to the same procedure for the left pallet. Click on "Continue" after palletizing is complete.

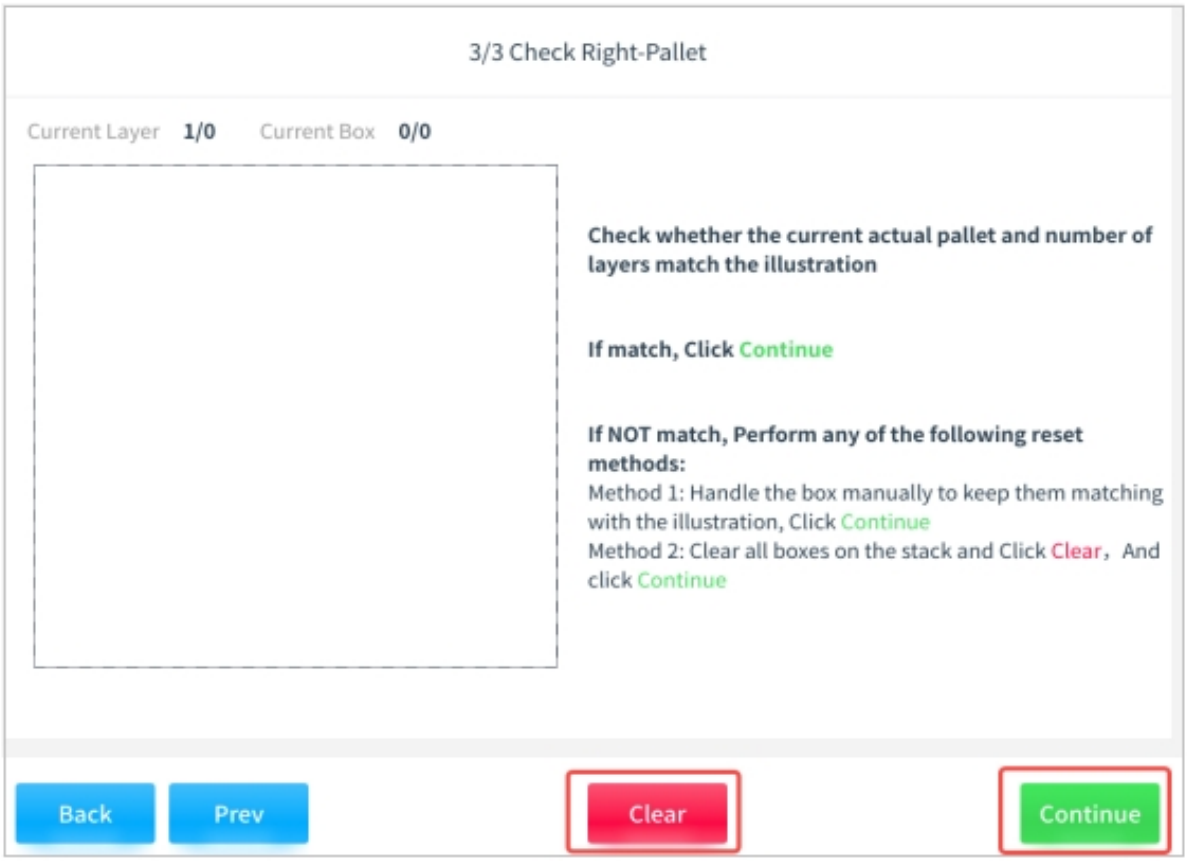

Figure 6.83 Checking the Right Stack Status During Reset

4.4 Operational State

If the reset is completed in the standby state, the system enters the running state. At this time, the three colors are green and bright (blinking for full stacks, and always bright for unstacked stacks), and the interface switches to the running interface. At the same time, the system will continue to check whether the necessary conditions for the current operation are met, and if a fault occurs, it will switch to the fault state, and clicking "Stop" will switch to standby. As shown in Figure 6 .84

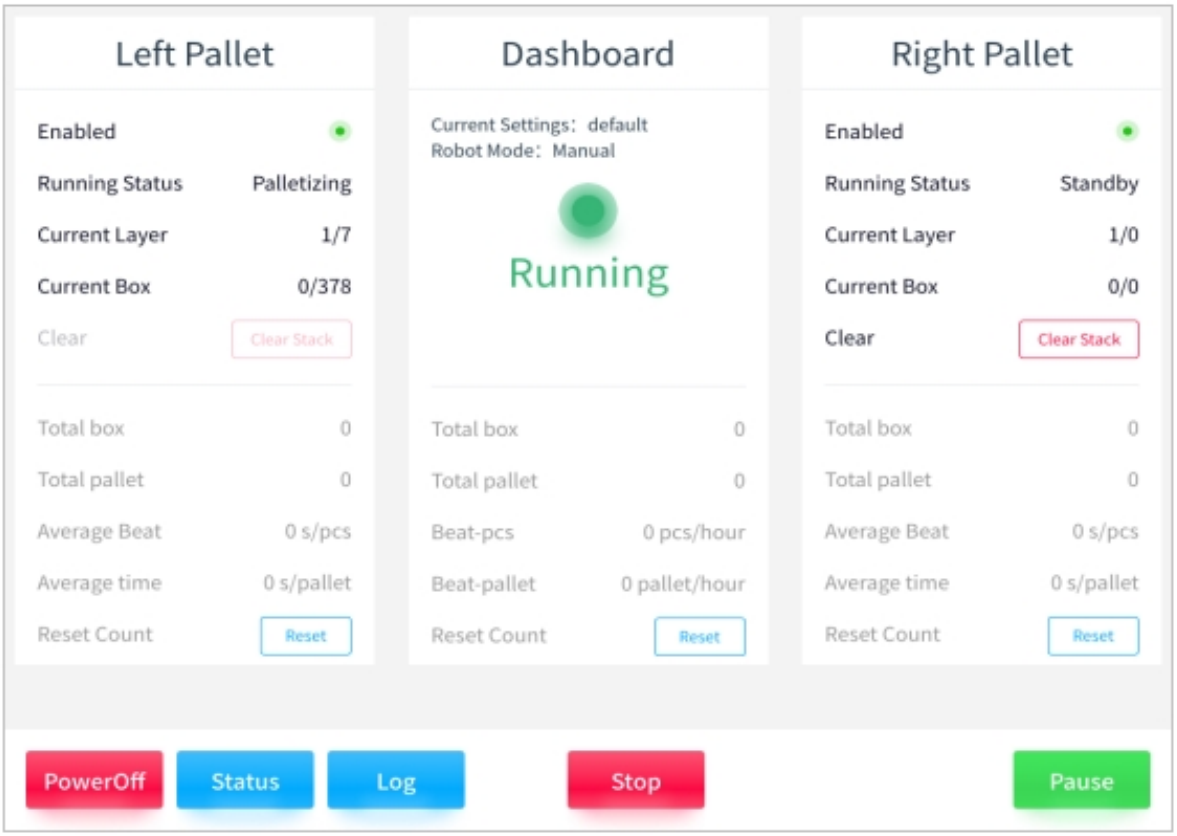

Figure 6.84 Running Status Screen

4.5 Paused State

If you click “Pause” in the running state, the system will enter the pause state. At this time, the three-color light flashes green and the interface switches to the pause interface. As shown in the Figure 6 .85 below

After clicking “Continue”, the system returns to the running state, and clicking “Stop” switches to standby.

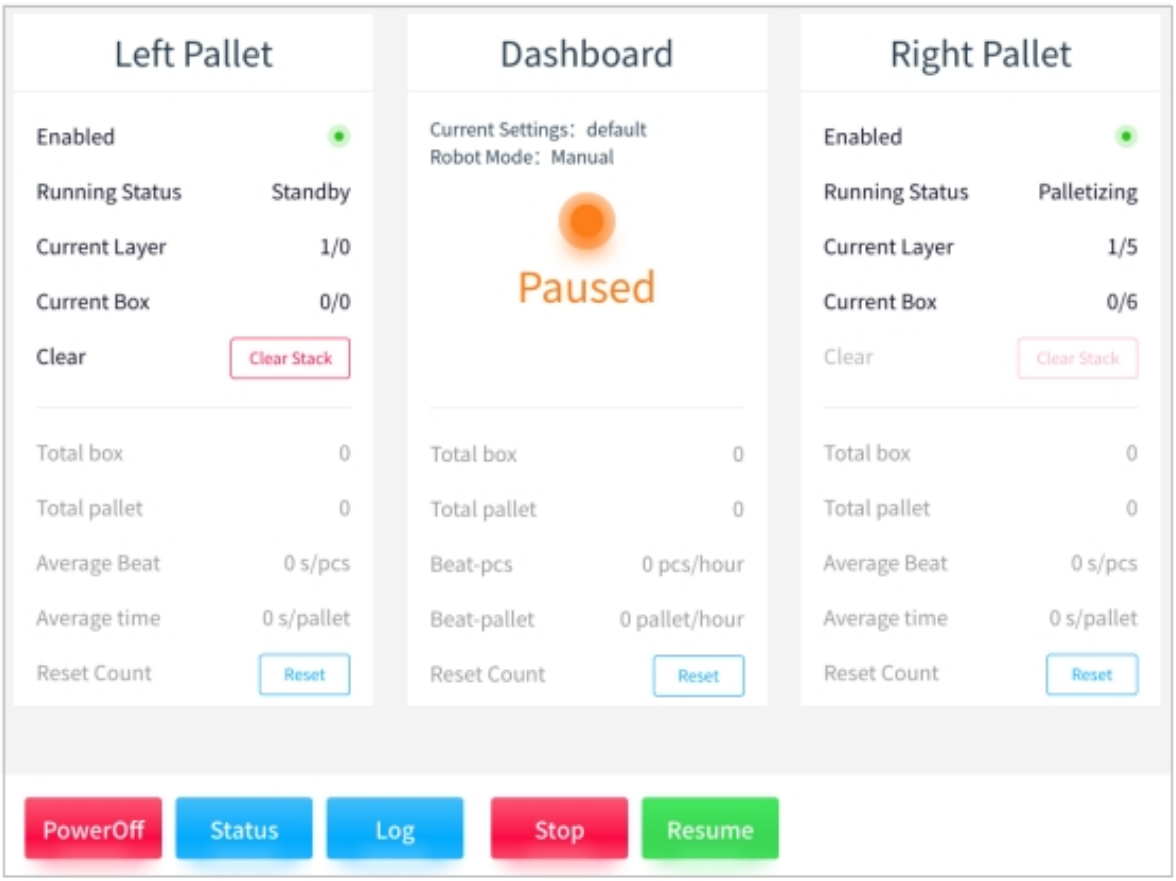

Figure 6.85 Interface of the Paused State

4.6 Error State

If an abnormal condition is detected in the standby state, or in the pause/run state, the system changes to the fault state if there is an abnormal safety sensor or an emergency stop. At this time, the tricolor light flashes red and the interface switches to the fault interface. As shown in Figure 6 .86

Click "Resume" to return to the running state after confirming that the high-priority faults have been resolved.

If you click "Stop" in the faulty state, it returns to the standby state.

If you select "Restore" in the fault state, the system enters the reset state. After confirming that the reset is completed, the system returns to the operation state.

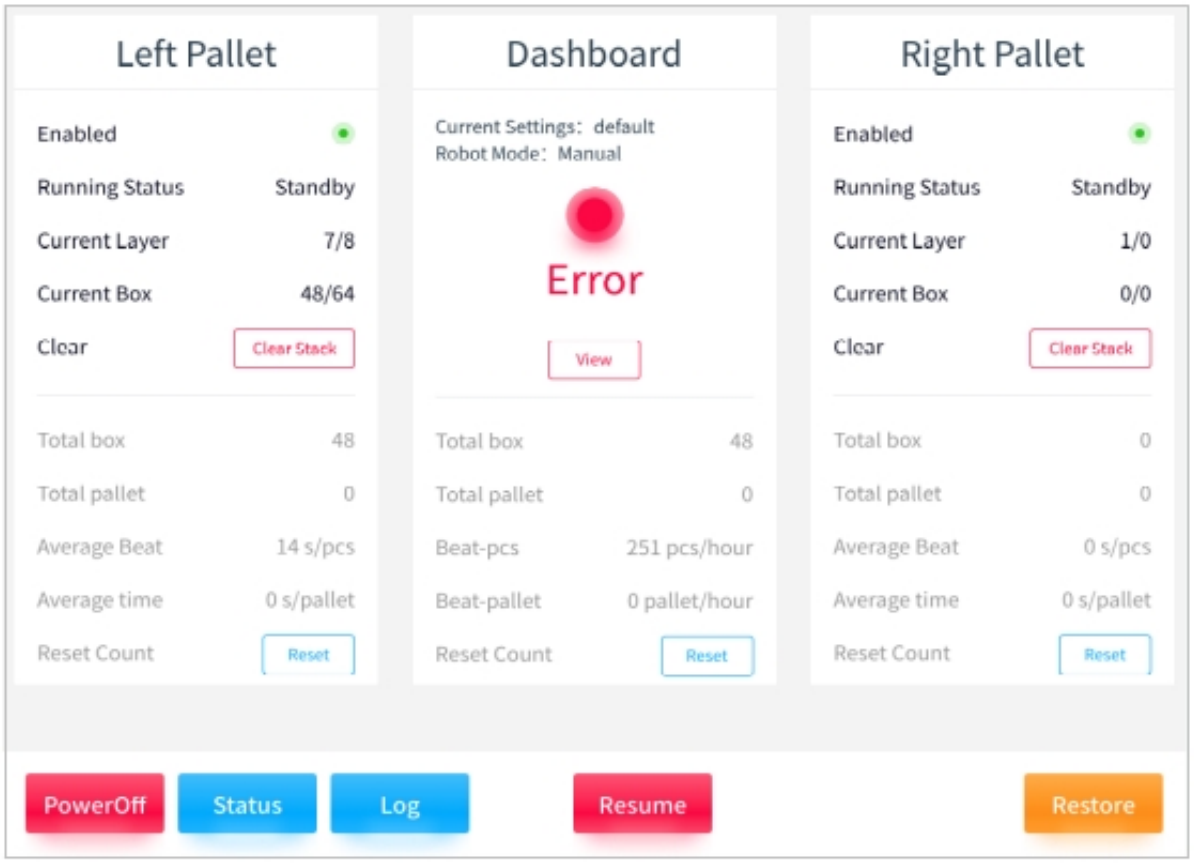

Figure 6.86 Interface of Errort Status

CHAPTER

FIVE

EXCEPTION HANDLING

Summarize problems in the use of palletizing process kits and provide solutions to related problems.

NO.	abnormal phenomenon	reason	method settle an issue	note
1	I got a “suck time-out” error when I picked up the box.	1. Higher setting of suction cup vacuum detection switch 2. Vacuum waiting time setting is short, the vacuum degree is not reached during the waiting time 3. There are sealing , problems with suction cups air circuits, etc. 4. Compressed air does not meet the requirements	1. Adjust the suction cup vacuum detection switch 2. Adjust the vacuum waiting time in the suction cup and 3. Check whether there is leakage air circuit 4. Check whether the compressed air meets the requirements	
2	Frequent collision detection during palletizing	1. Inappropriate load settings 2. Collision detection nsitivity is set too high	1. Detect whether the weight setting of the box is correct or not 2. Decrease the collision detection sensitivity on the robot page	
3	Large deviation when the box is placed forward and backward	The suction cup is not in the center of the box when picking up the material	Check and reset pickup point locations	
4	Robot does not move at the pickup wait	1. Failure of the pickup detection photoelectric switch 2. The pickup detection photoelectric switch is far away from the pickup position and be-	1. Check for failure of the pickup detection wide switch 2. Check the detection distance of the pickup detection photoelectric switch	