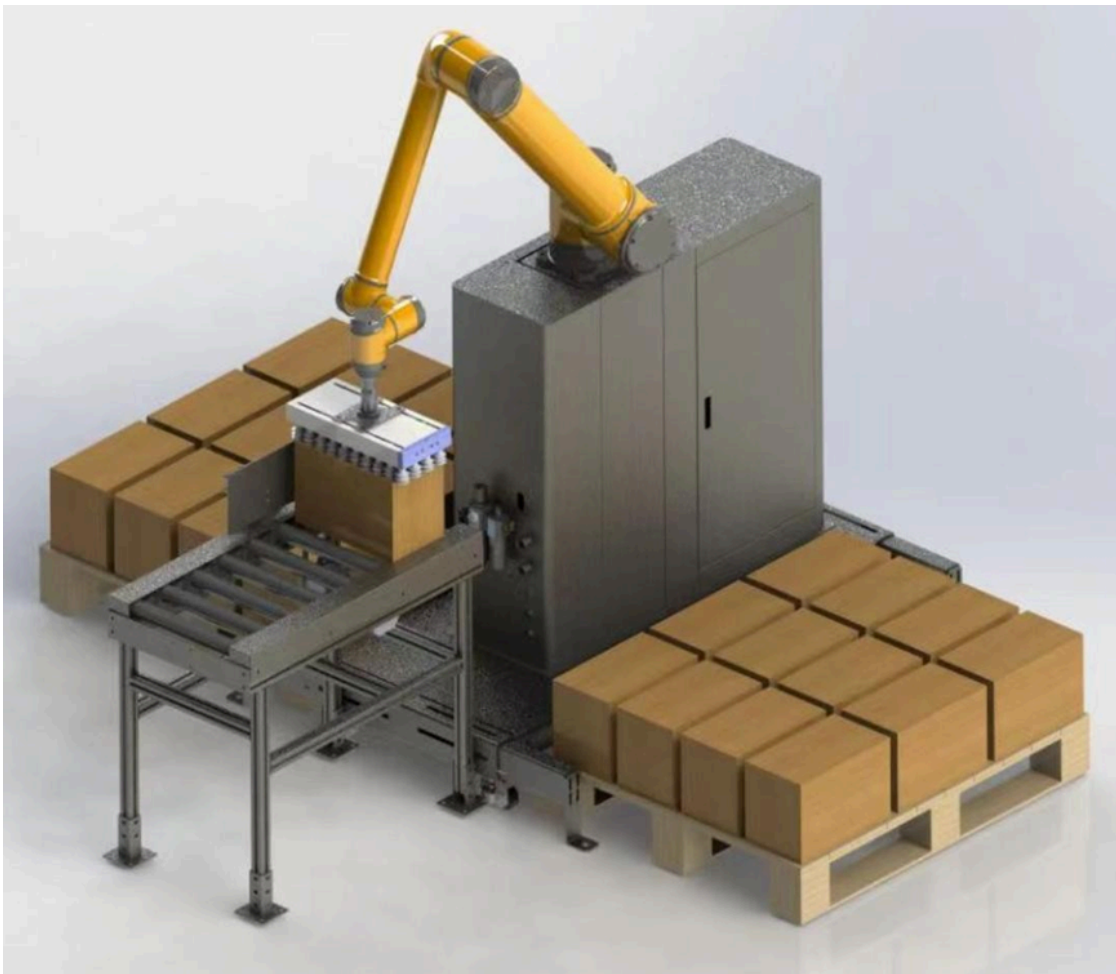




AUBO Robotics USA

Palletizing Workstation User Manual



Version 1.1

This manual is applicable as of November, 2024. For details, please refer to the version information section of this manual. Please check the actual product version information carefully before use to ensure consistency.

The information contained herein is the property of AUBO Robotics USA, Inc. & AUBO (Beijing) Robotics Technology Co., Ltd. Further referred to as "AUBO Robotics" in this document and shall not be reproduced in part or whole without written approval from AUBO Robotics. The information in this manual is subject to change without notice and should not be regarded as a commitment by AUBO Robotics. The user manual will be checked and revised periodically, and the updated content will appear in the latest version.

Aubo Robotics assumes no responsibility for any errors or omissions in this document. AUBO Robotics assumes no responsibility for incidental or consequential damages arising from the use of this manual and products described herein.

Please read this manual before installation or use.

Please keep this manual to read and as reference any time.

The pictures in this manual are for reference only, please refer to the actual product received.

Copyright © 2015-2024 AUBO All rights reserved.

Table of Contents

1. Installation for AUBO Palletizer Software.....	4
1.1 Upgrading the AUBO PE Software.....	4
1.2 Upgrading the AUBO palletizer software.....	6
1.3 Overview of the AUBOPallet Folder.....	9
1.4 Conveyor Parameters Configuration.....	10
2. Overview of the AUBO Palletizer Software.....	13
2.1 Main Interface.....	13
2.2 IO.....	16
2.3 Setting.....	17
2.3.1 Project.....	18
2.3.2 Workstation.....	35
2.3.2.1 End Tooling.....	35
2.3.2.2 Pick-up Point.....	36
2.3.2.3 Separator.....	45
2.3.2.4 Pallet Coordinate System.....	51
2.3.2.5 Process Parameters (a set of standard parameters is provided by default)..	52
2.3.2.6 Safety Parameters.....	53
2.3.2.7 Conveyor.....	56
2.3.2.8 Other.....	57
2.3.3 AUBO Cobot Arm.....	58
2.3.4 System.....	60
2.4 Logs.....	68
3. External Buttons and Indicator Lights for the Palletizing Workstation.....	69
3.1 Overview.....	69
3.2 Operating Procedure.....	71
3.2.1 Normal Startup of the AUBO Palletizer Software.....	71
3.2.3 Press the Start Button.....	73
3.2.4 Press Left or Right Start Button.....	74
3.2.5 Palletizing Completion.....	75
3.4.6 Replacing the Pallet.....	76
4. Special Situations and Troubleshooting.....	78
4.1 Manually Adjusting the Current Box Number During Palletizing.....	78
4.2 Joint Collision.....	79
4.3 Suction Cup Status Error.....	80
5. OEM Branding Replacement.....	81
5.1 AUBO Palletizer Software Title and Logo Replacement.....	81
5.2 Replacing the 3D Simulation Box Logo.....	83

1. Installation for AUBO Palletizer Software

1.1 Upgrading the AUBO PE Software

Importing the IS20 Model

📁 AUBOPallet	2024/2/20 9:49	文件夹	
📄 AUBOPalletUpdate_v2.2.4_2024-02-02_16h14m.tar.gz	2024/2/2 16:30	WinRAR	63,642 KB
📄 AuboProgramUpdate_4.5.57_IS20_TP2_2024-01-31_10h36m.tar.gz.aubo	2024/2/1 8:19	AUBO 文件	187,676 KB
📄 pallet_file_2024-02-20_09h53m.tar.gz	2024/2/20 9:53	WinRAR	3,141 KB

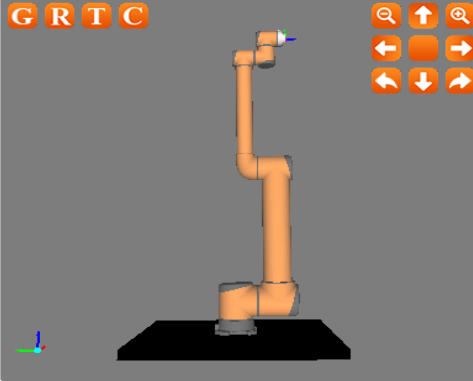
The upgrade package with the TP2 suffix is specifically for upgrading the IS series mini teaching pendant, which is currently the standard configuration for AUBO palletizer workstation.

After completing the upgrade of the AUBO PE software, verify that the model is the IS20.

AUBO admin

Robot Teaching Programming Settings Extensions System Info About

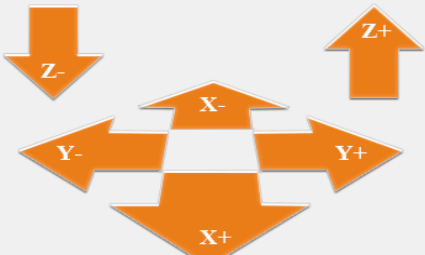
G R T C



Work Mode
 Real Robot
 Simulation Robot

Step Mode
 Step Mode
 Position Step: - 1.0 mm +
 Orientation Step: - 0.5 deg +
 Joint Step: - 0.5 deg +

Position Control



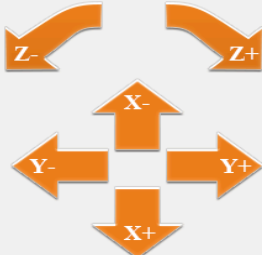
Reference Coord System
 Base

Manipulator Pose

Pos(m)	Ori(deg)
X: 0.000000	RX: 89.999962
Y: -0.289300	RY: 0.000000
Z: 1.832500	RZ: 0.000000

Target
 flange_center

Orientation Control



Joint Control unit(deg)

Joint 1:	-	0.000000	+
Joint 2:	-	0.000000	+
Joint 3:	-	0.000000	+
Joint 4:	-	0.000000	+
Joint 5:	-	0.000000	+
Joint 6:	-	0.000000	+

Zero Pose Init Pose 0.00 2024-11-02 03:09:56 Speed: 50%

AUBO admin

Robot Teaching Programming Settings Extensions System Info About

About
 Version
 Disclaimer



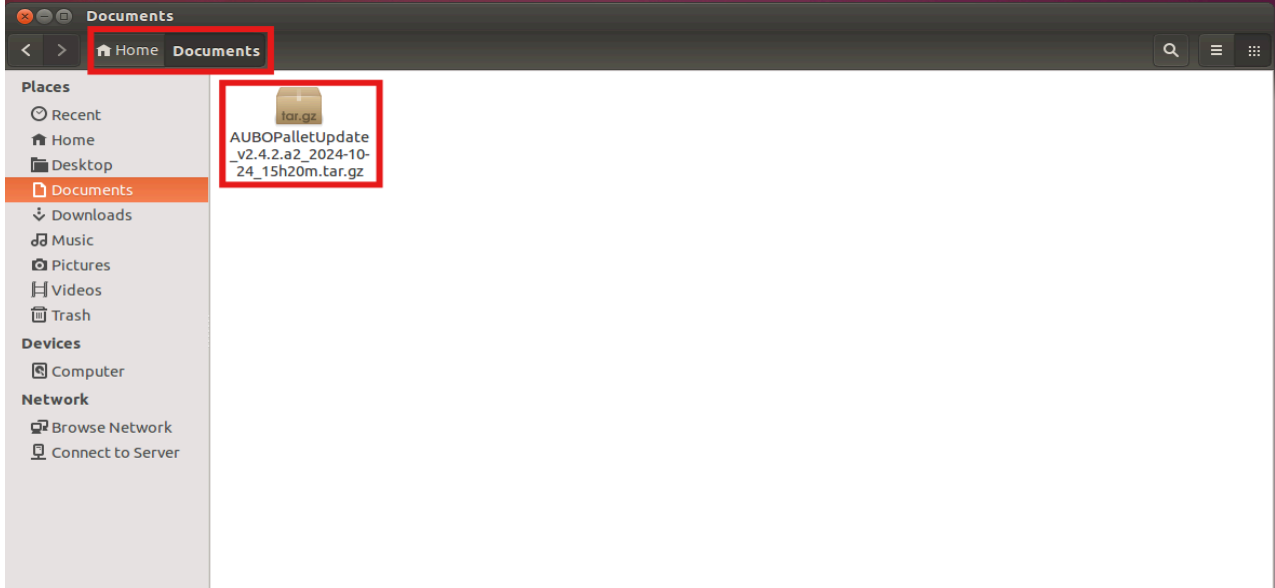
Teachpendant Version : V4.5.57-a16_0ed520c
 Built on Mar 29 2024 at 17:30:03
 Sdk Version : V2.5.3_813eebd
 Server Version : V4.5.111.8502d12-Alpha
 Copyright(c) 2015 - 2024
<http://aubo-robotics.cn>

Help

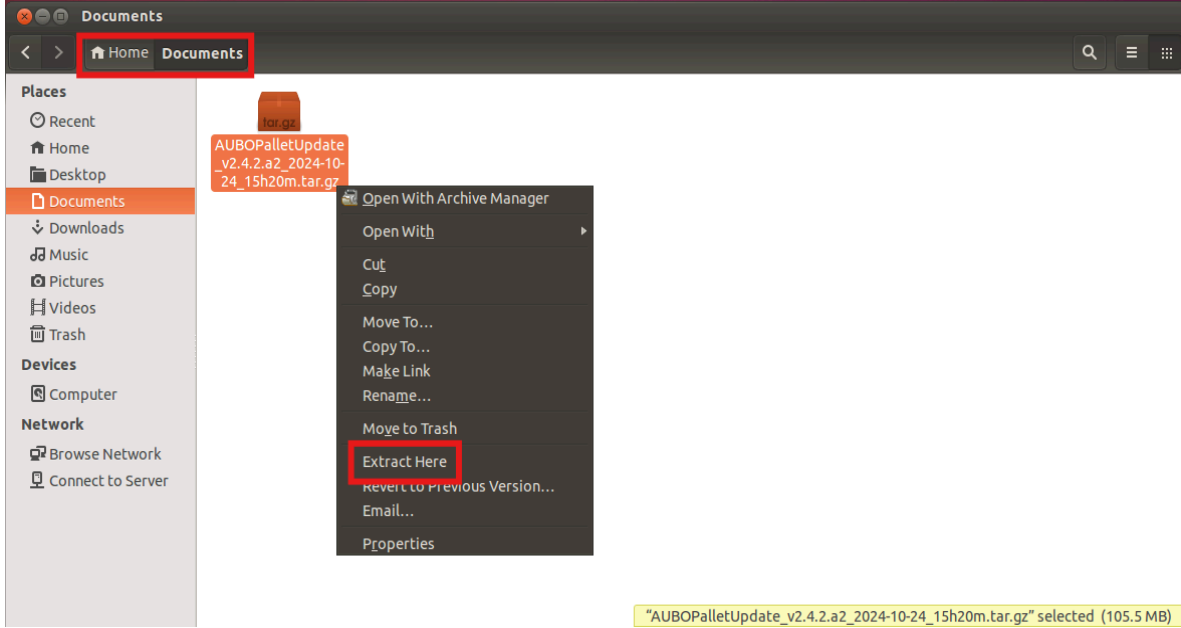
Zero Pose Init Pose 0.00 2024-11-02 03:12:32 Speed: 50%

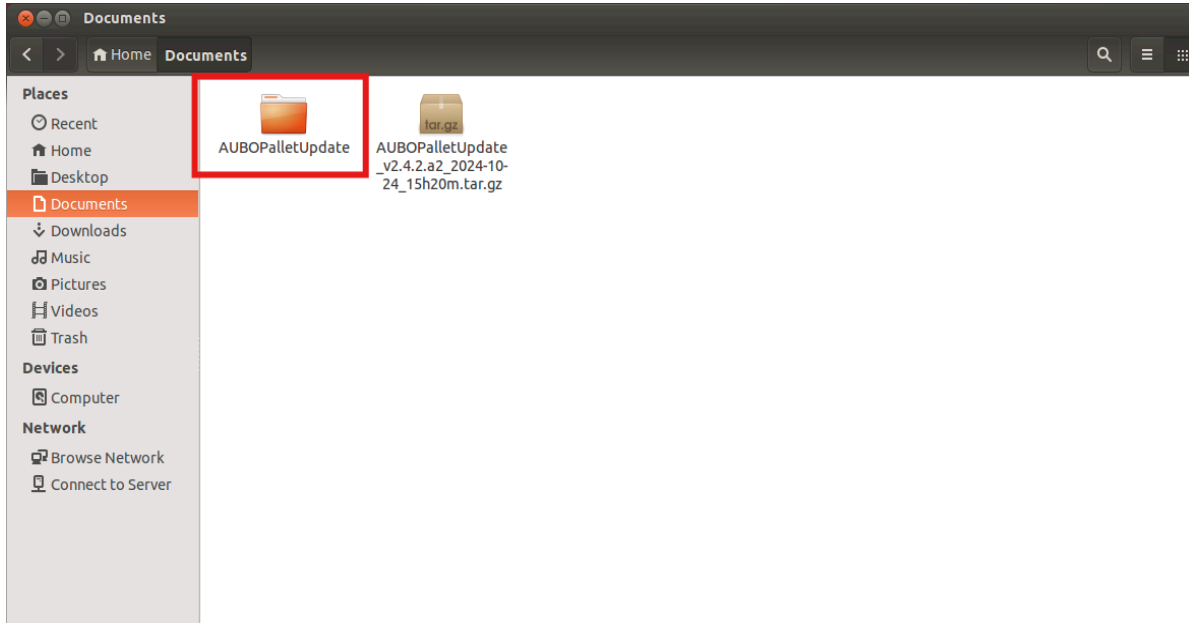
1.2 Upgrading the AUBO palletizer software

Export the AUBO palletizer software update package to the teaching pendant folder via a USB drive.

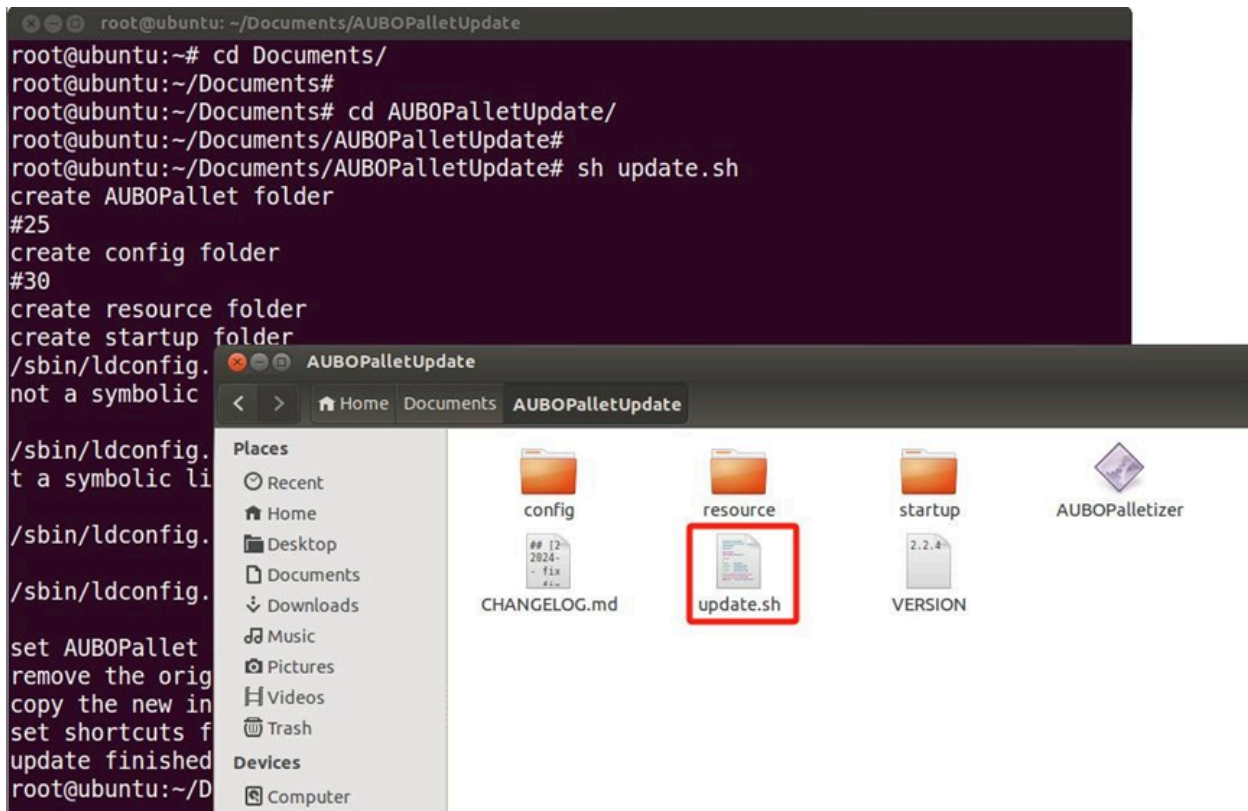


Unzip the Compressed Package



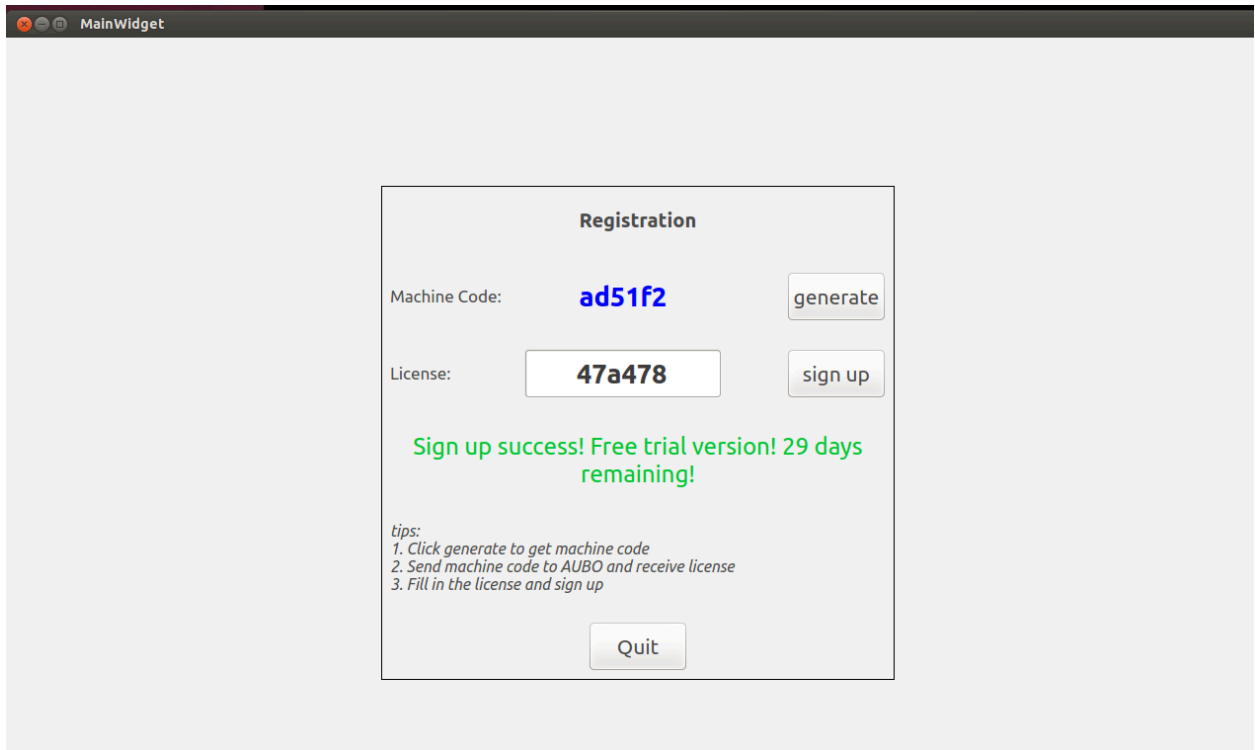
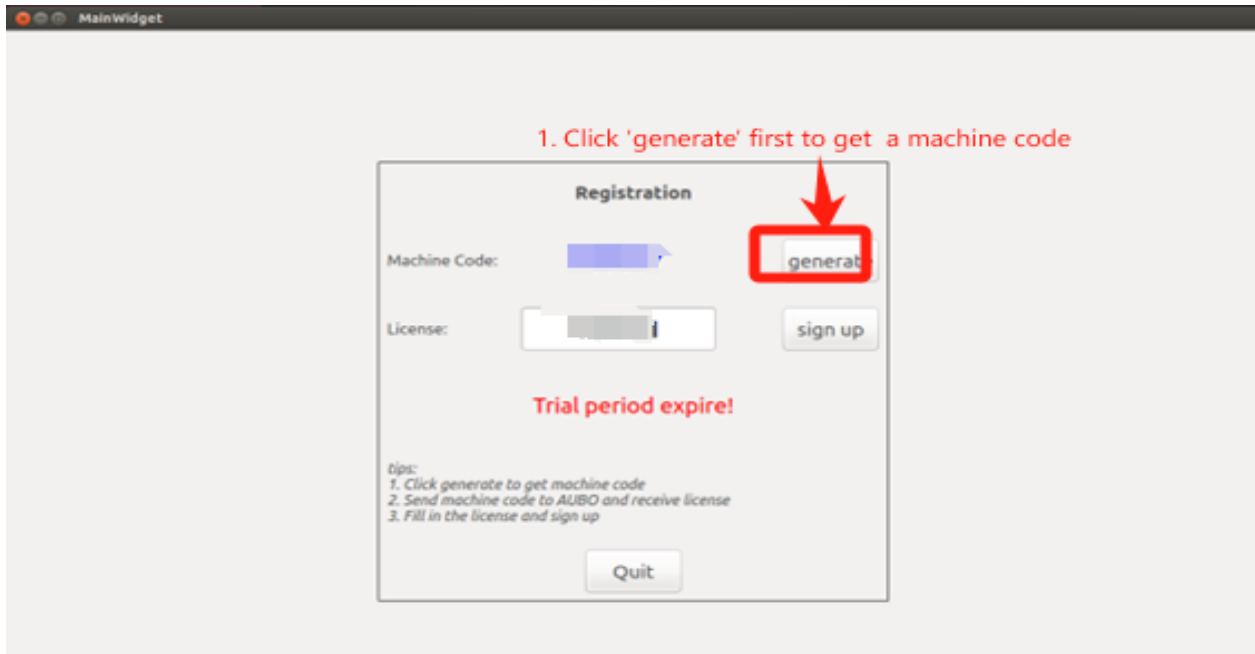


Install the AUBO palletizer software through console commands.

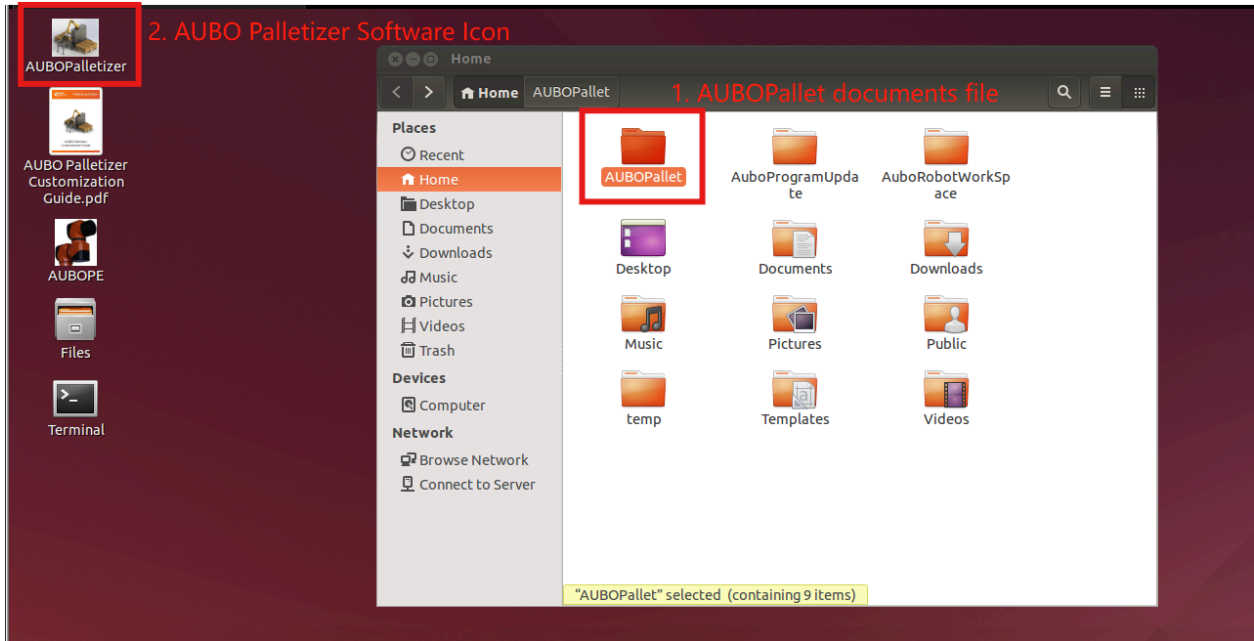


Restart the virtual machine. Upon the first startup, a registration interface will appear; send the Machine Code to AUBO after-sales support to generate a License code.

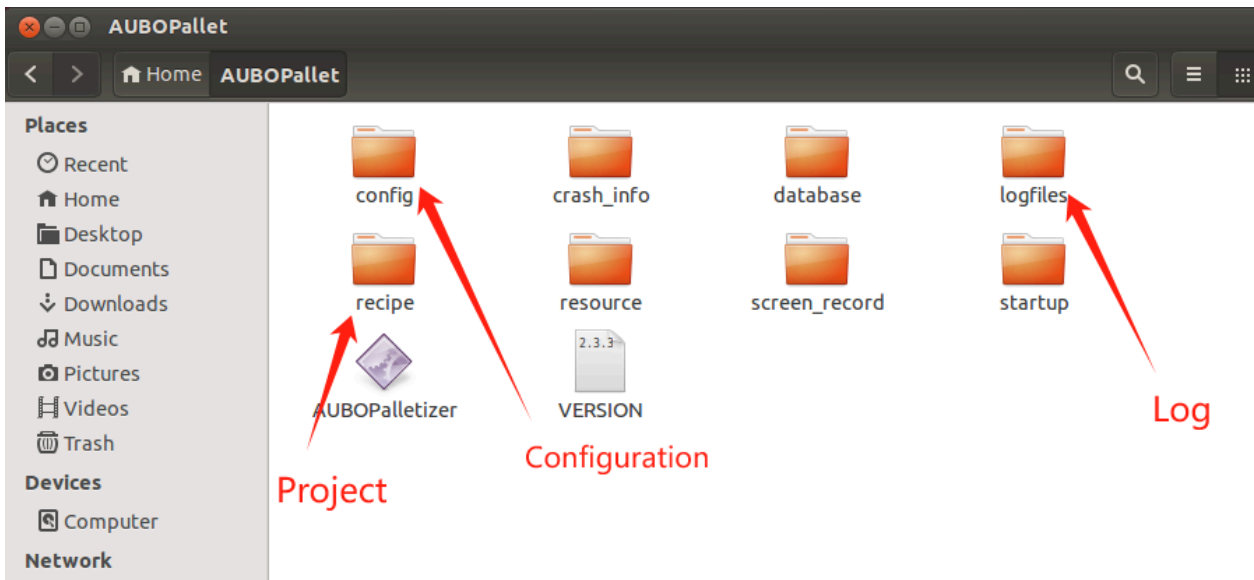
The factory-default AUBO palletizer software comes with a one-month trial version. Contact AUBO technical support for a registration code update based on on-site needs.



After successful installation, an AUBOPallet folder will be generated in the root directory, and an icon for the AUBO palletizer software will appear on the interface.



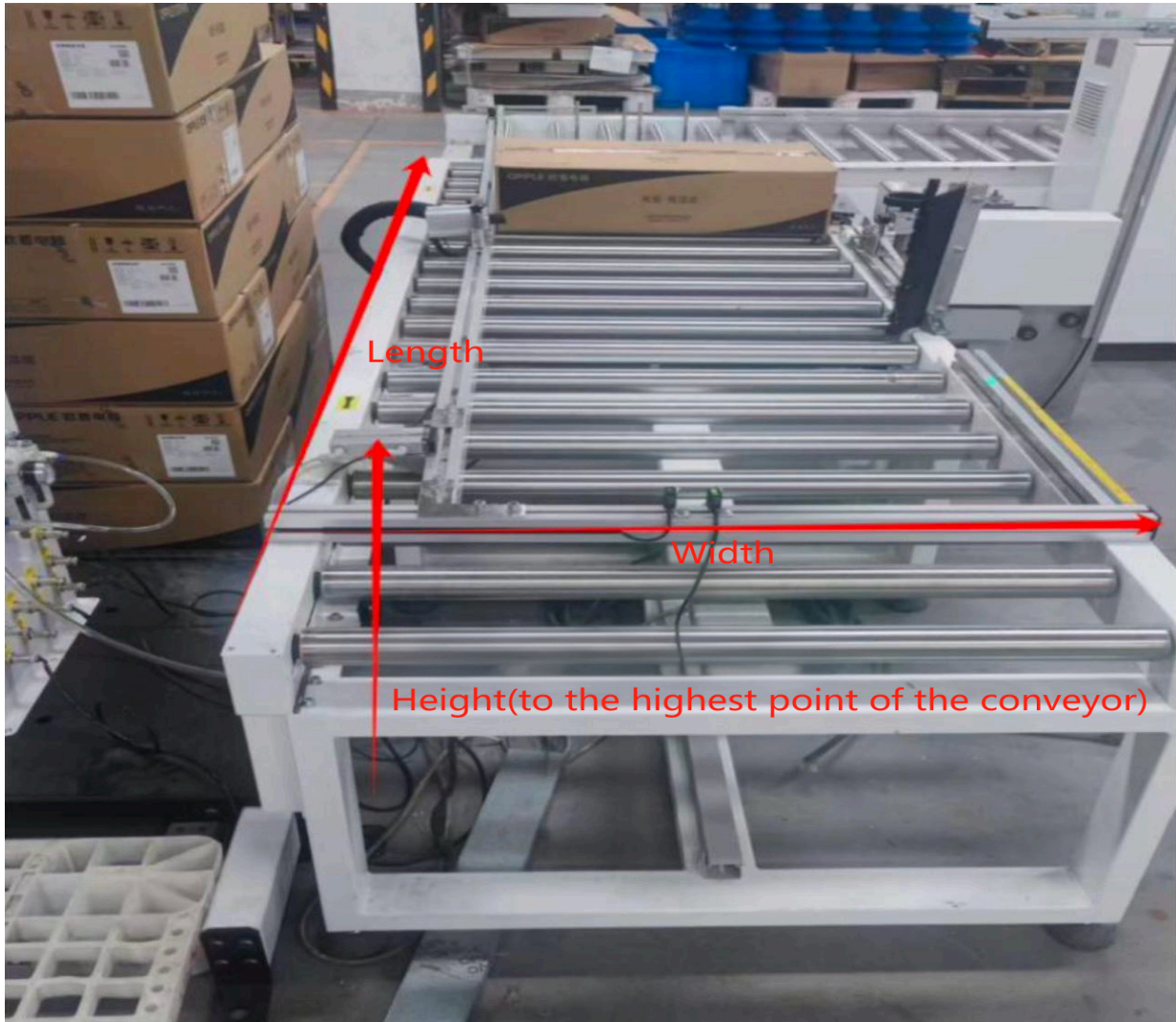
1.3 Overview of the AUBOPallet Folder

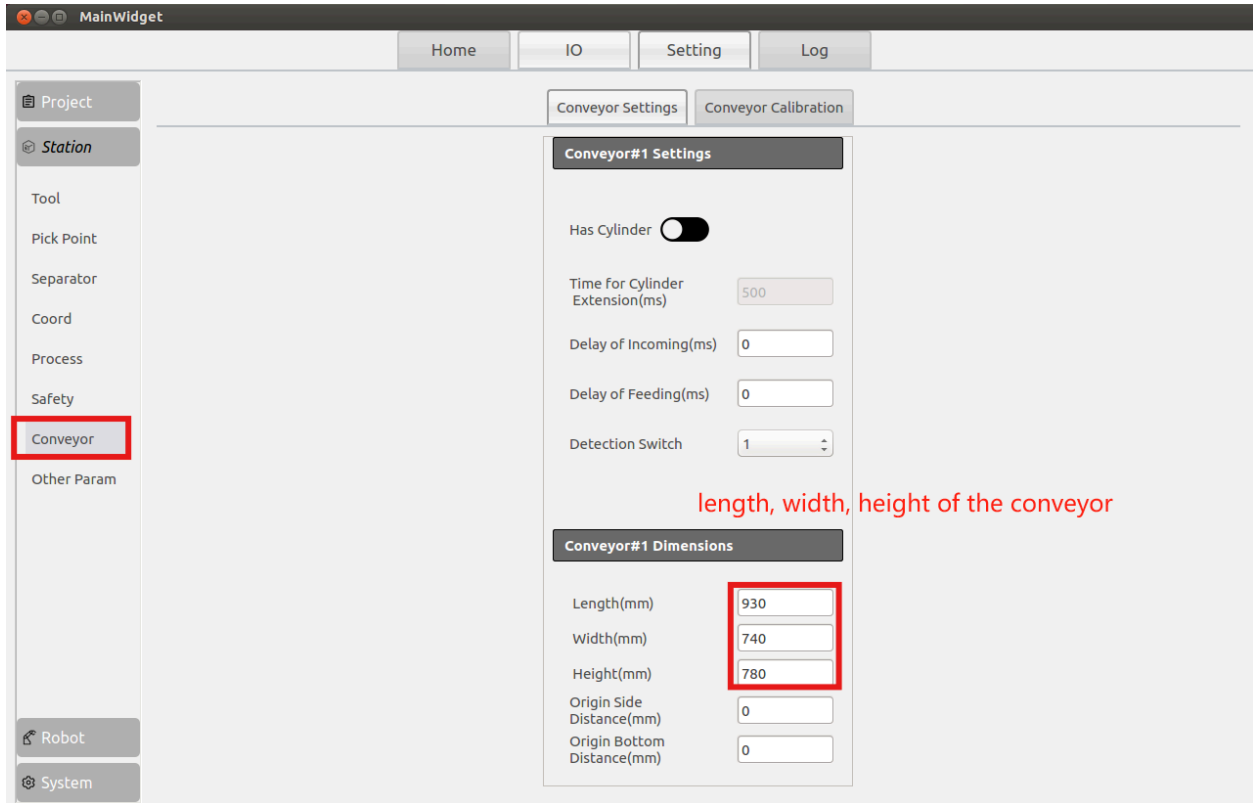


1.4 Conveyor Parameters Configuration

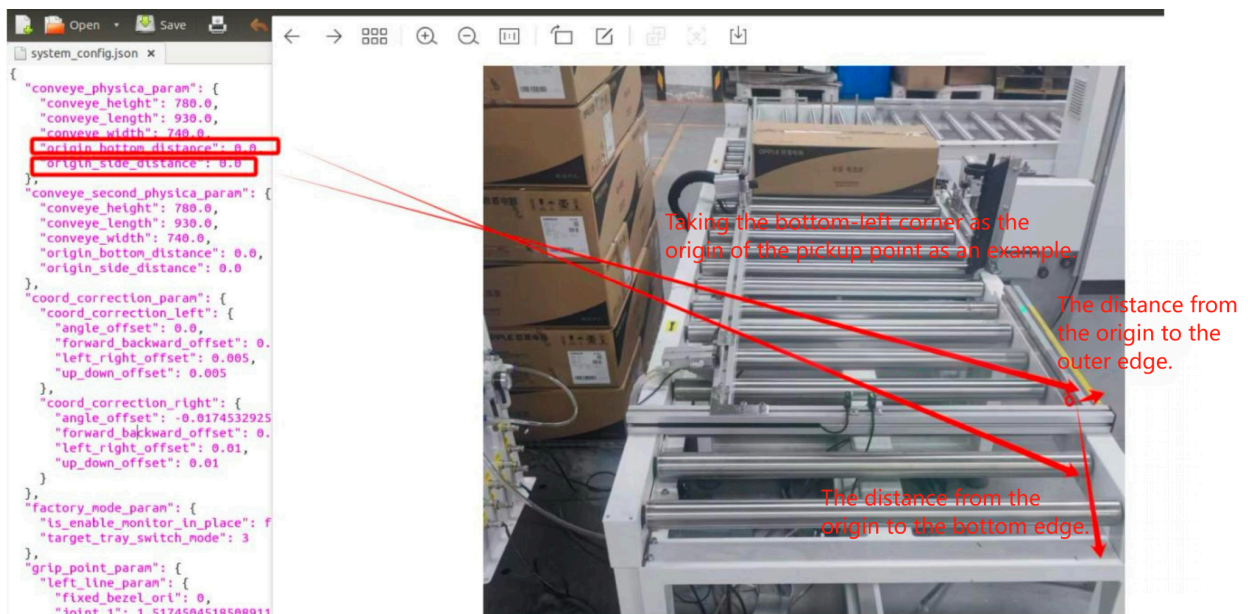
Measure the conveyor's dimensions on-site to adjust conveyor parameters (mainly to address potential interference issues between boxes and the robotic arm during palletizing).

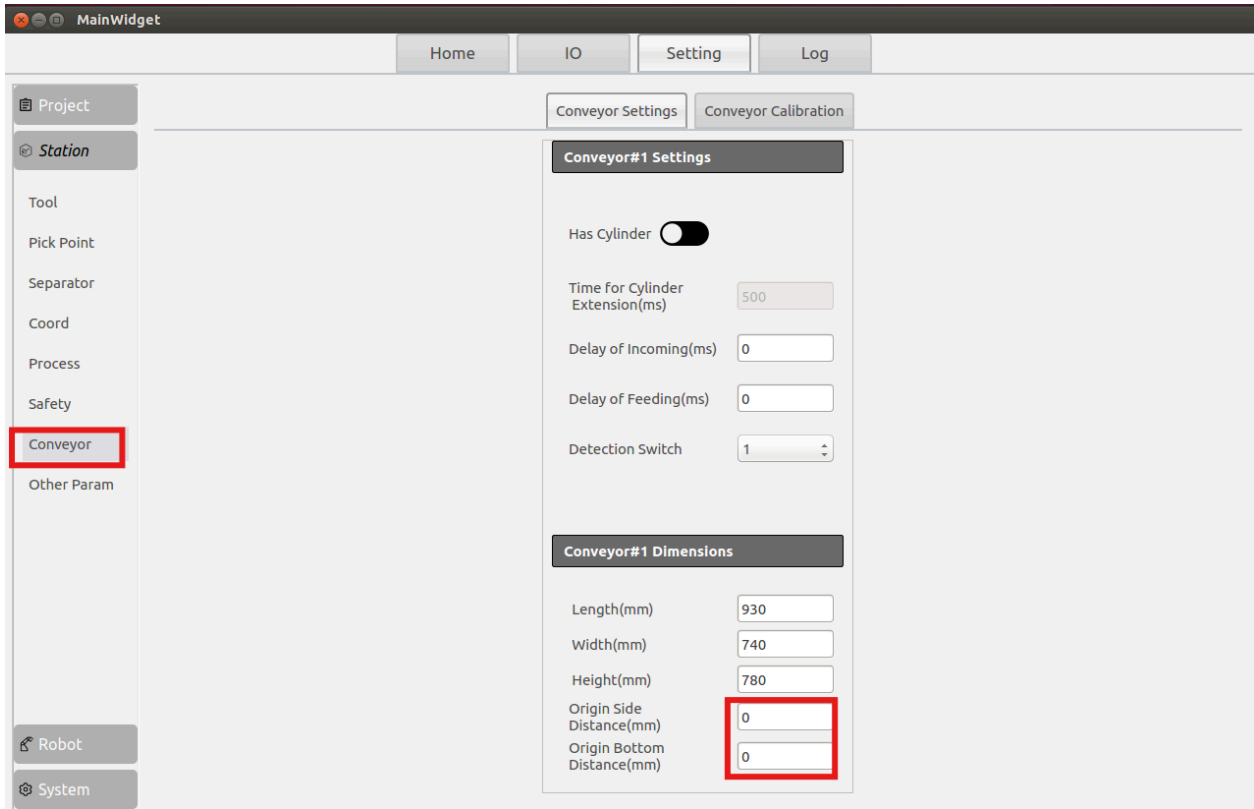
Key parameters include the length, width, and height of the conveyor.





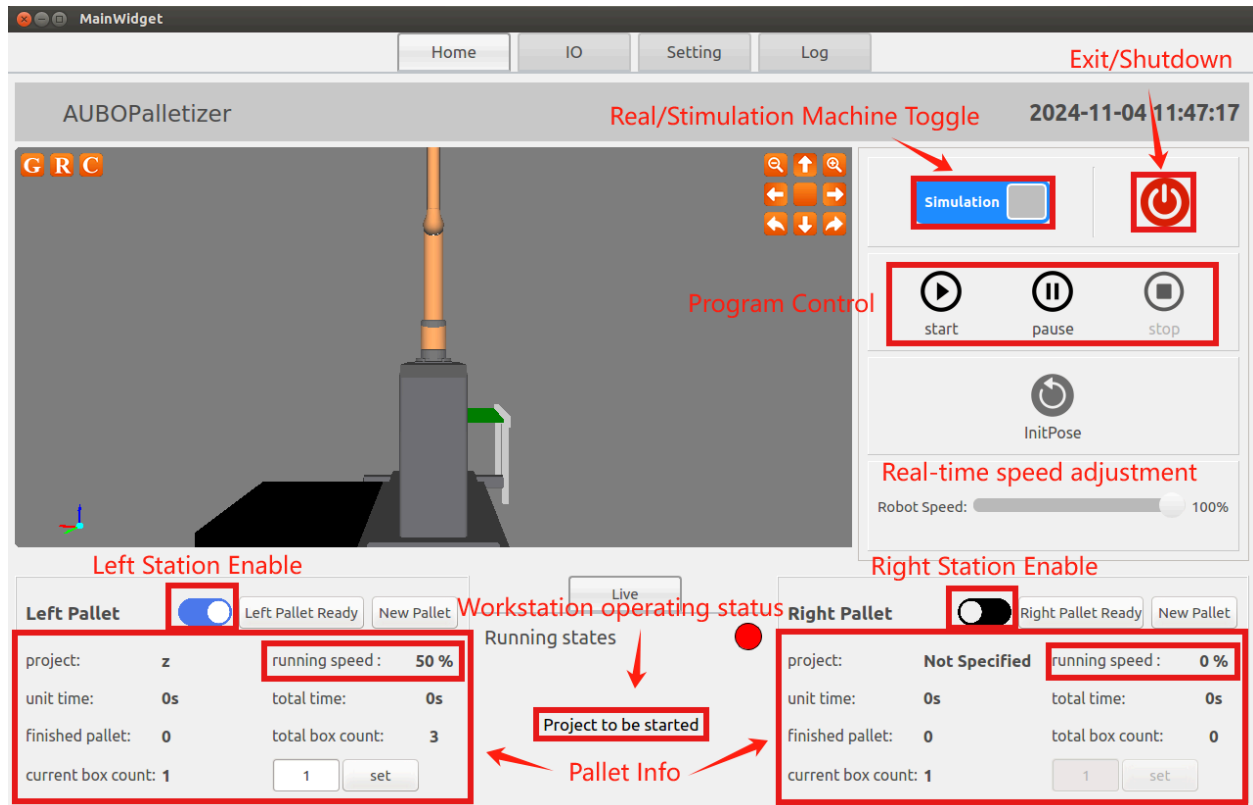
As well as the origin point of the pick-up position on the conveyor and the distance between the conveyor's base and its surroundings.





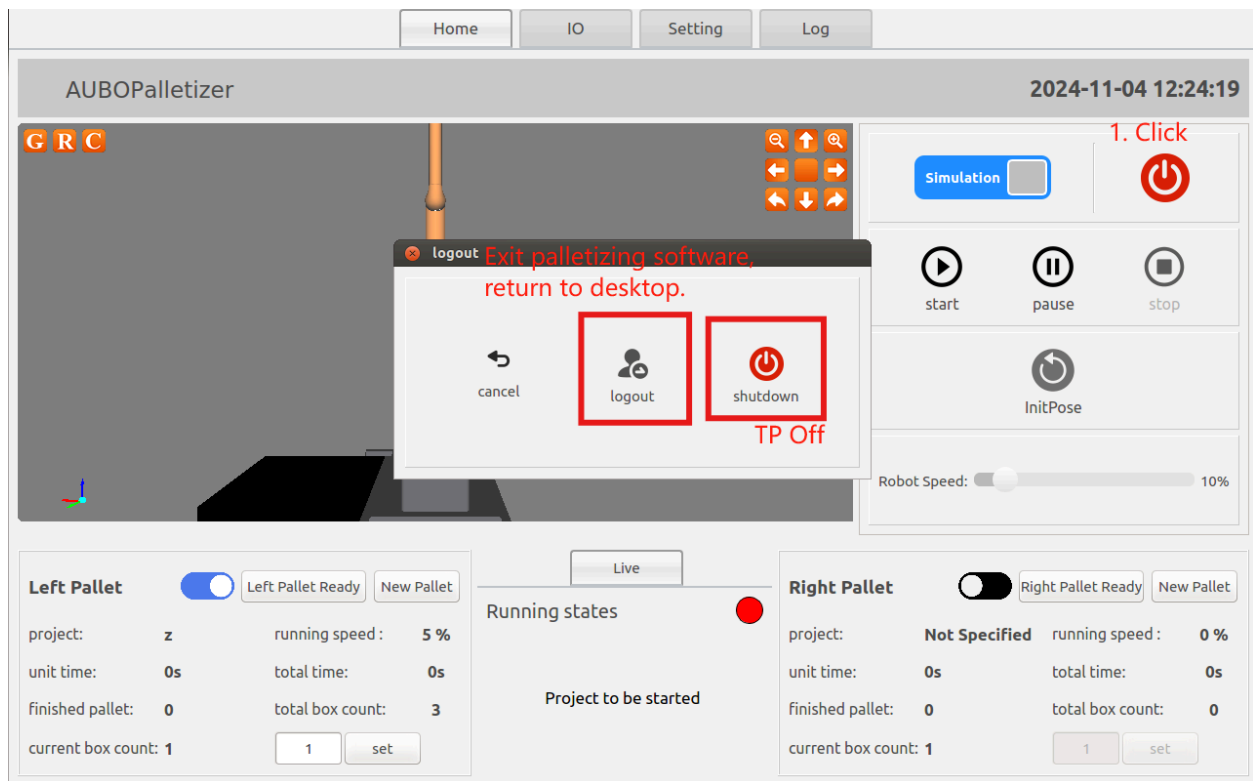
2. Overview of the AUBO Palletizer Software

2.1 Main Interface



Real/Simulation Mode Switching: Used to toggle between real cobot control mode and simulation mode. It is recommended to run the simulation mode after configuring palletizing information, and, if everything runs smoothly, switch to real mode for operation.

Exiting Software and Shutting Down:



Program Control: Manages the program's start, pause, resume, and stop functions.

Operating Speed: The cobot arm's speed can be adjusted in real-time.

Enable Function: Left and right enable options. Palletizing operations can only proceed when the system is in an enabled state.

Operation Status Indicator: Displays status information during the palletizing process.

Palletizing Information: Shows details such as the recipe name, single-box duration, full-pallet duration, current box number, and total box count.

Operating Speed (Left/Right Station): In the project interface, the base operating speed for each recipe can be set (default is 50%). The left/right station speed equals the operating speed multiplied by the corresponding base speed for each station.

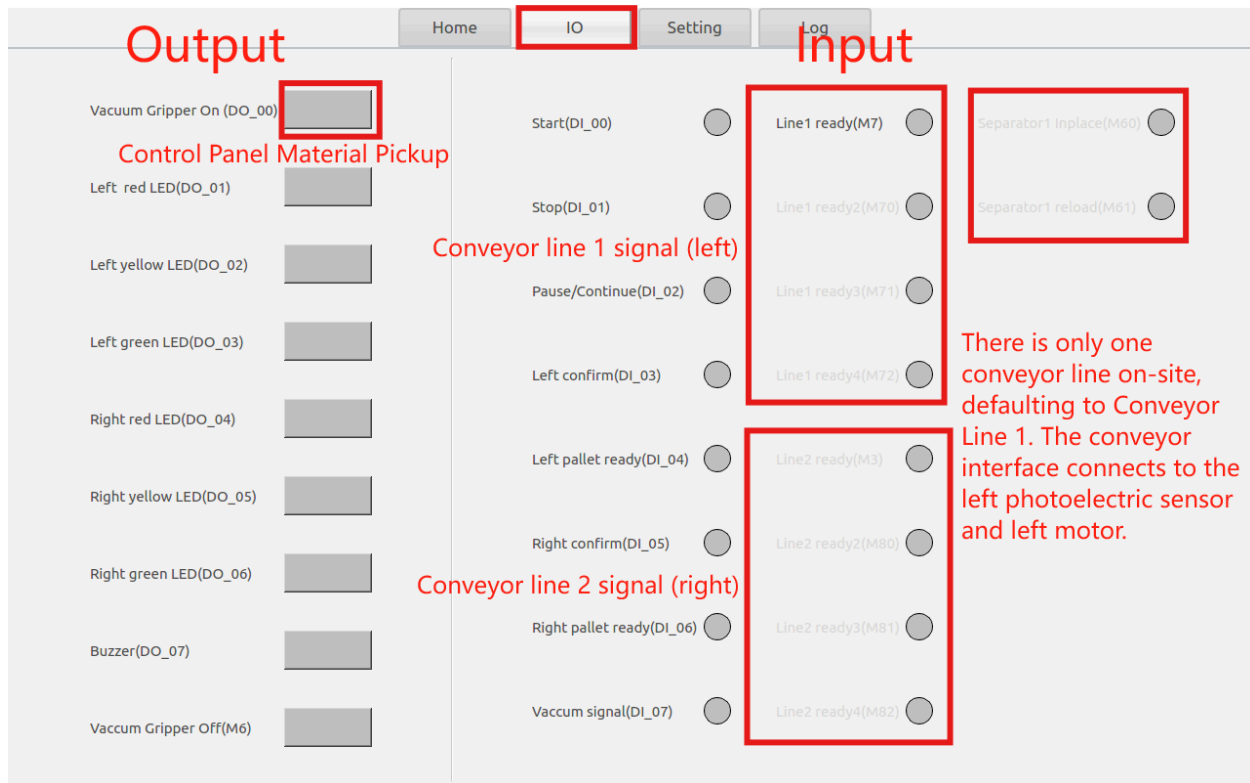
1

2

3. Default station speed is 50, adjustable manually

Left Project		Right Project	
Station	z	Station	Not Specified
Buttons	Clear Project Change Project	Buttons	Clear Project Change Project
Pallet Height(mm)	100	Pallet Height(mm)	100
Bind Speed(%)	50	Bind Speed(%)	null
Total Volume(m ³)	1.52	Total Volume(m ³)	null
Space Utilization(%)	66.7	Space Utilization(%)	null
Box Info(L*W*H,mm)	1000*800*600	Box Info(L*W*H,mm)	null
Total Weight(kg)	15	Total Weight(kg)	null
Stack Info(L*W*H,mm)	1200*1000*1900	Stack Info(L*W*H,mm)	null
Total Layers	3	Total Layers	null

2.2 IO



Vacuum Gripper On (DO_01): Controls the suction and release of materials with the suction cup.

Vacuum Gripper Off (M6): Primarily used to blow air when releasing materials to prevent residual materials.

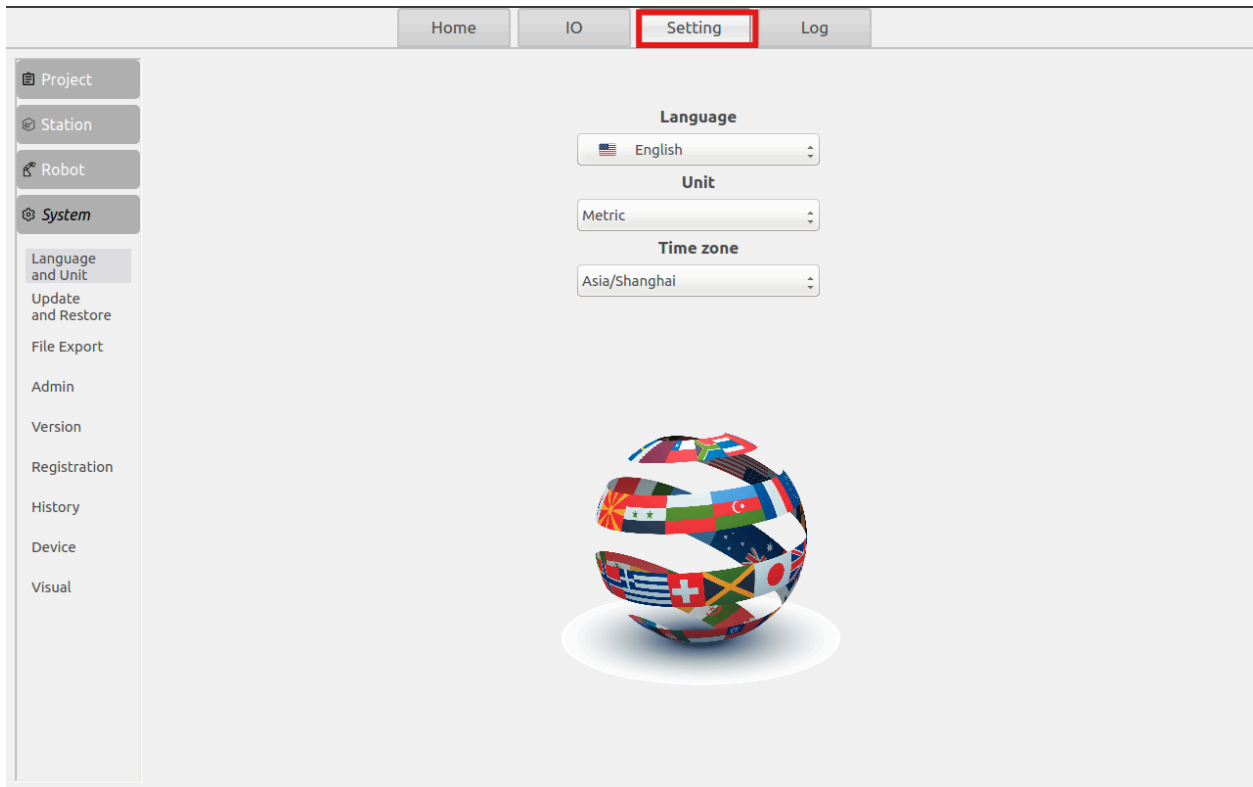
Left pallet ready (DI_04): Detects whether the left pallet is positioned correctly (detects rising edge).

Right pallet ready (DO_06): Detects whether the right pallet is positioned correctly (detects rising edge).

Conveyor Line 1 Material Positioning (supports up to 4 materials): Corresponds to the left photoelectric sensor and left motor in the conveyor's reserved interface. A single conveyor line defaults to using the left photoelectric sensor and motor interface.

Conveyor Line 2 Material Positioning (supports up to 4 materials): Corresponds to the right photoelectric sensor and right motor in the conveyor's reserved interface.

2.3 Setting



Settings include four functional options: Project, Workstation, AUBO Robotics, and System.

2.3.1 Project

Utilizing Project

Home IO Setting Log

Project

Use

New

View

Width

Length

Height

Switch to the corresponding project according to on-site requirements.

Left Project

Right Project

z Clear Project Change Project

Not Specified Clear Project Change Project

Parameter	Left Project	Right Project
Pallet Height(mm)	100	100
Total Volume(m ³)	1.52	null
Bind Speed(%)	50	null
Space Utilization(%)	6.7	null
Box Info(L*W*H,mm)	1000*800*600	null
Total Weight(kg)	5	null
Stack Info(L*W*H,mm)	1200*1000*1900	null
Total Layers	3	null

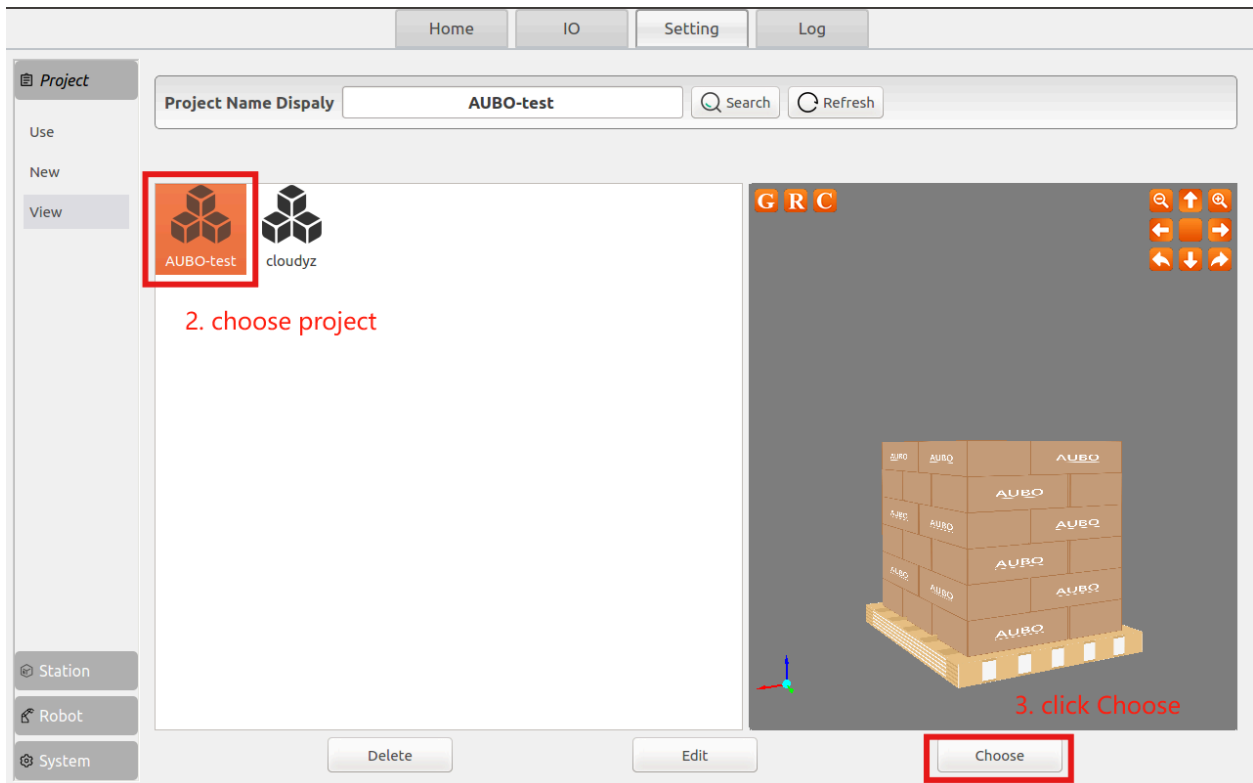
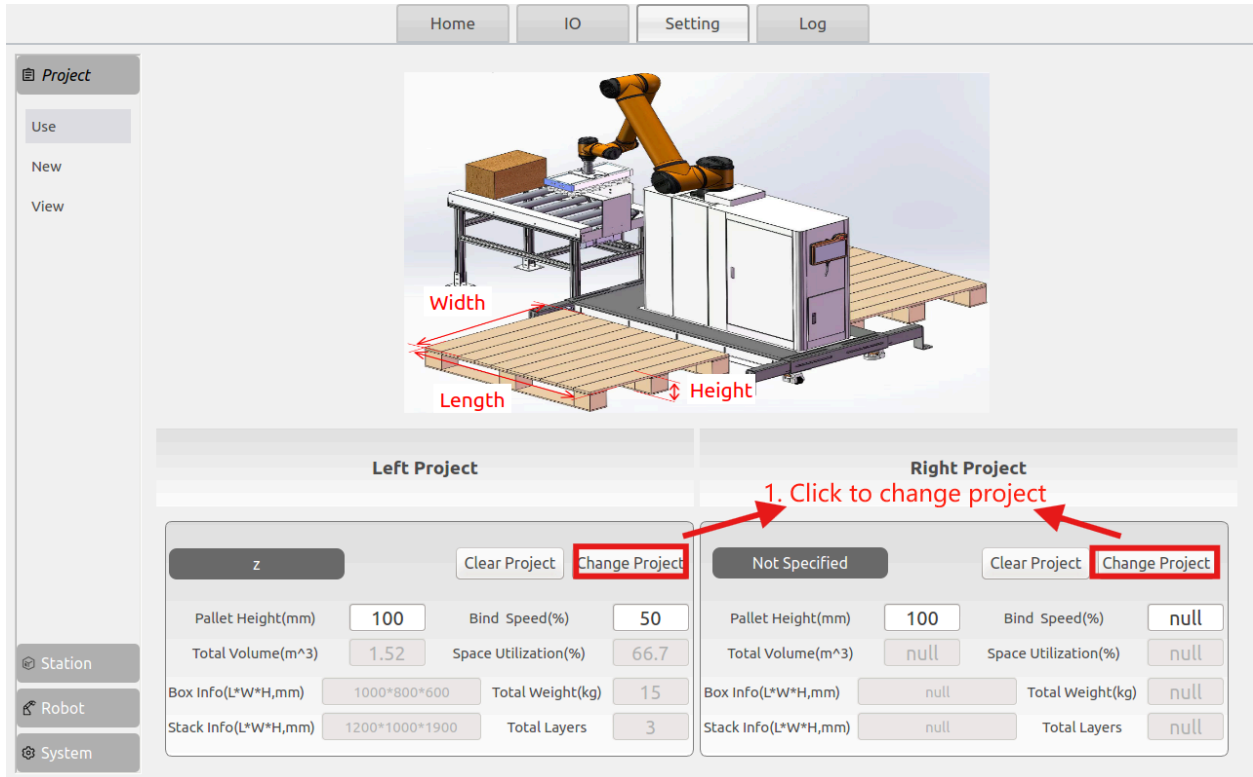
Measure and input pallet height on-site

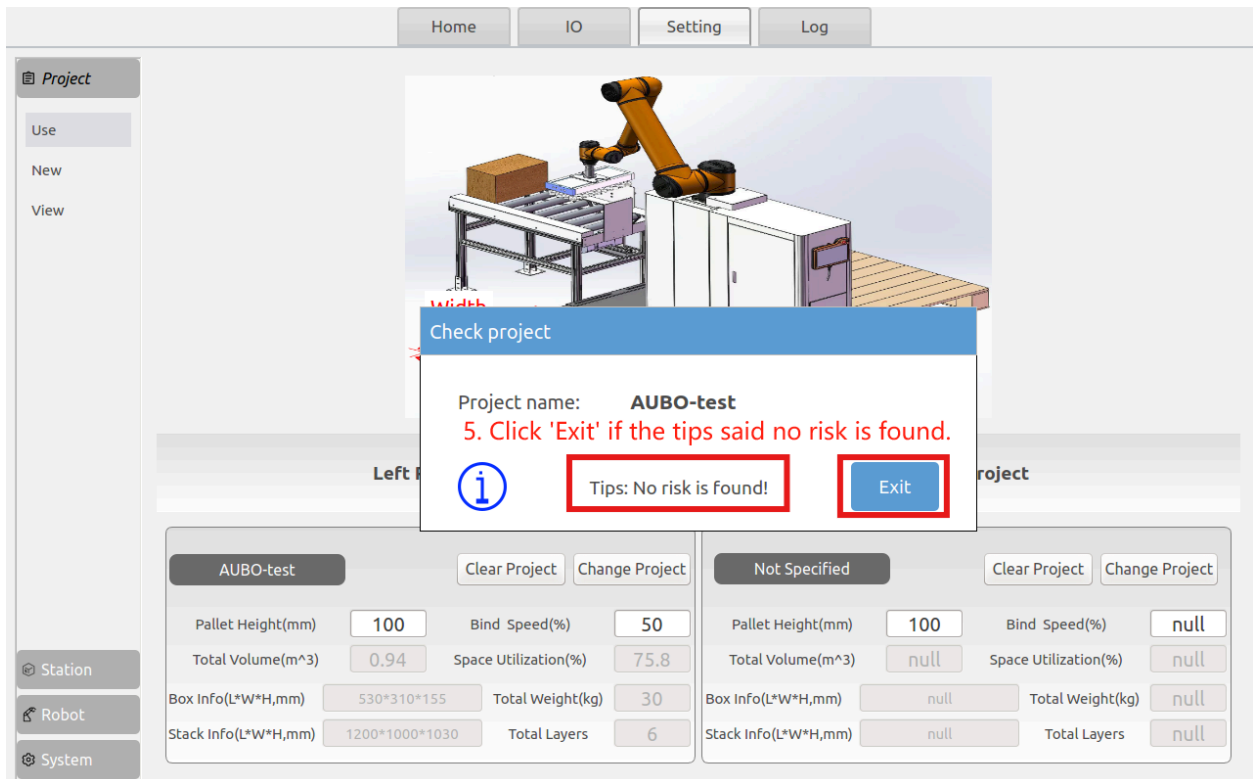
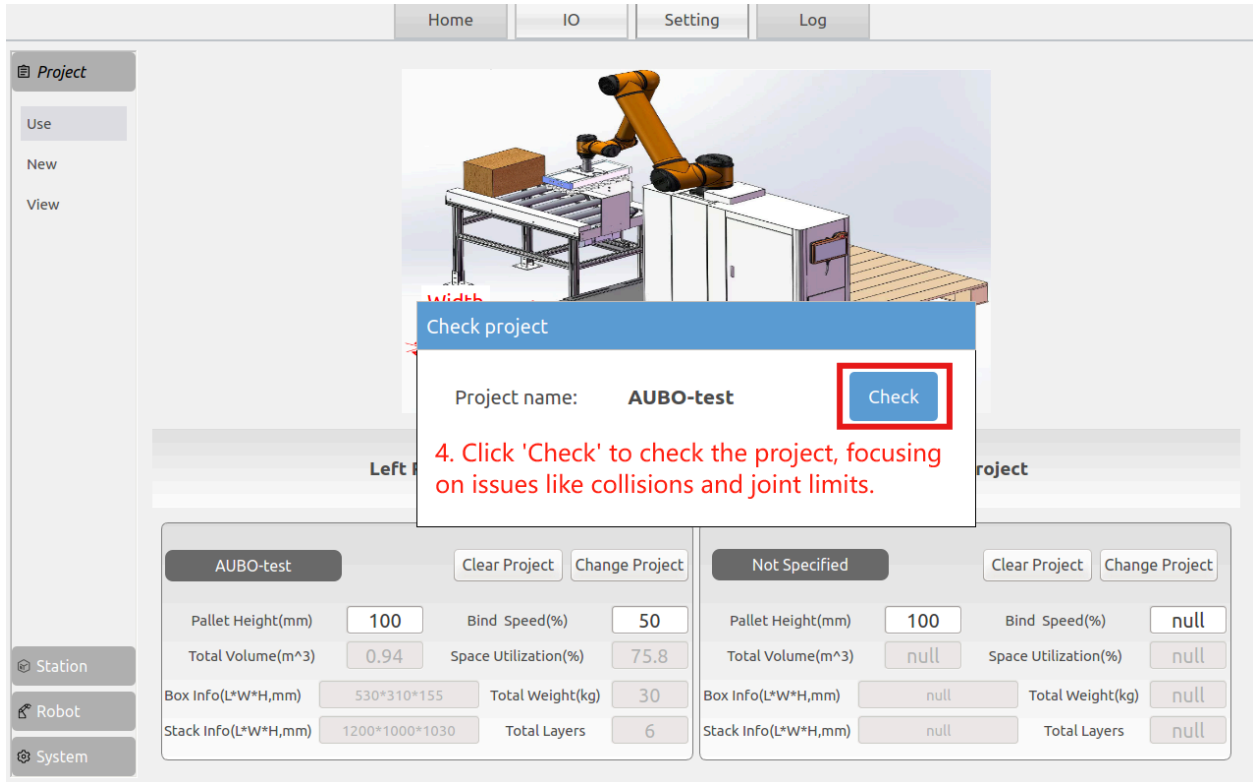
Set according to the speed of the left and right stations

Station

Robot

System





Error Handling

Issue 1: Box Interference Issue

When there is interference with the box, click 'Details' to view the collision information.

Check project

Project name: **AUBO-Separator**

Box 2 on the layer 6 collisions with other box!

Detail

Ignore Exit

1. Check if the sorting of the recipe stack boxes is correct.
2. Check if the entry point is too close to the pallet, and re teach the entry point.

Space Utilization(%)	75.8	Total Volume(m ³)	0.94	Space Utilization(%)	75.8	
0*155	Total Weight(kg)	30	Box Info(L*W*H,mm)	530*310*155	Total Weight(kg)	30
00*1030	Total Layers	6	Stack Info(L*W*H,mm)	1200*1000*1030	Total Layers	6

Solution: Adjust the entry point direction and position away from the pallet while avoiding conveyor interference by clicking the 'set' button.

The screenshot shows a control interface for a robotic station. On the left is a sidebar with a menu: Project, Station, Tool, Pick Point, Separator, Coord, **Process** (highlighted with a red box), Safety, Conveyor, and Other Param. At the bottom of the sidebar are 'Robot' and 'System' buttons. The top navigation bar contains 'Home', 'IO', 'Setting', and 'Log'. The main area has two tabs: 'Base params' and 'Obstacle-avoiding points'. Under 'Base params', there are four input fields: 'pre-pick height(mm)' (500), 'after-pick height(mm)' (500), 'conveyor hold time(ms)' (400), and 'stack hold time(ms)' (400). The central part of the interface is a 3D simulation of a robotic arm and a conveyor. The 'left enter point' and 'right enter point' sections each have 'move here', 'set', and 'reset' buttons. The 'set' button in the 'left enter point' section is highlighted with a red box. A red text overlay reads: 'Interference between boxes is usually caused by the entry point being taught too close to the pallet. This can generally be resolved by re-teaching the entry point, moving it further away from the pallet.' Below the simulation, there are input fields for 'left pre-place height(mm)' (100), 'left after-place height(mm)' (100), 'right pre-place height(mm)' (100), and 'right after-place height(mm)' (100).

Issue 2: Waypoint Inverse solution Failure

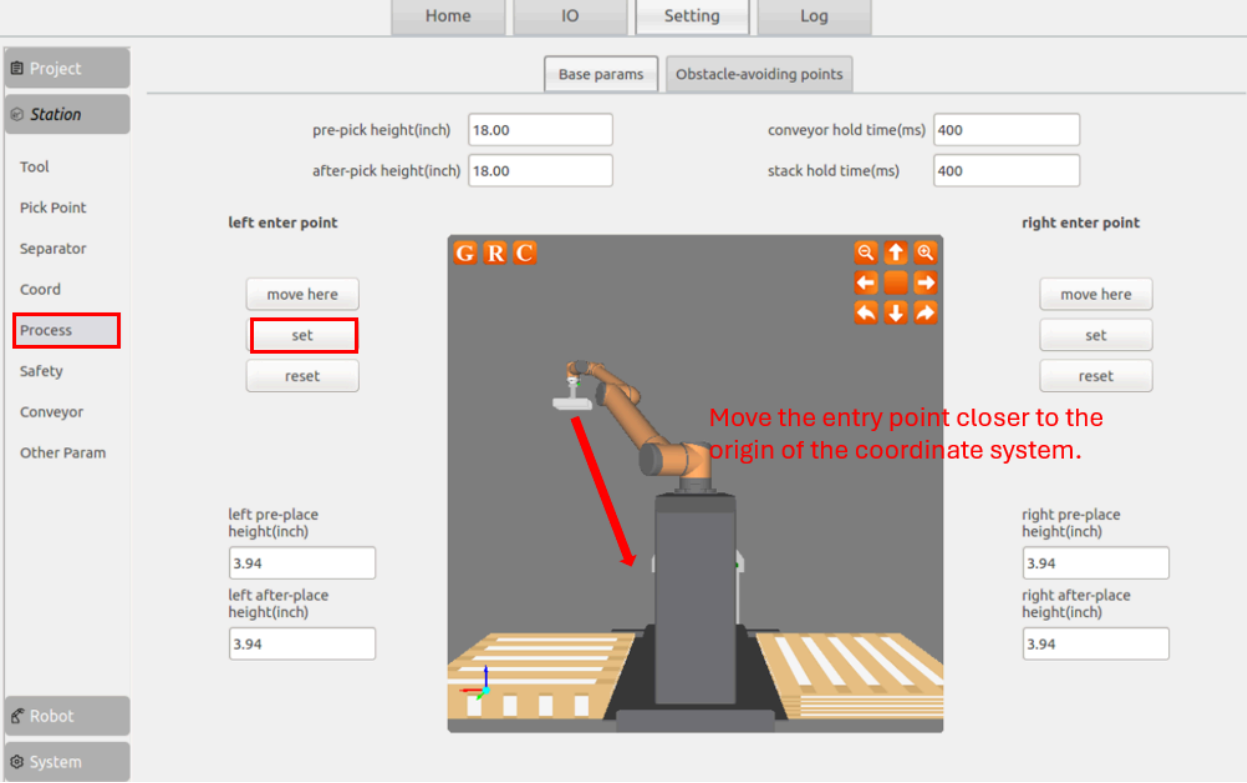
The screenshot shows a control interface with a central warning dialog box. The dialog box has a yellow header with the text 'Warning' and the timestamp '2024-11-13 04:48:50'. Below the header is a yellow triangle with an exclamation mark icon. To the right of the icon, the text 'Point ik Failed' is enclosed in a red box, followed by the text 'Usually, a joint limit exceeded issue'. Below this, a tip reads: 'Tips: Please adjust the point parameters according to the details and restart the operation'. At the bottom of the dialog are two buttons: 'Auto Recovery' and 'OK'. The background interface includes a top navigation bar with 'Home', 'IO', 'Setting', and 'Log'. On the left, there is a 'Project' menu with options 'Use', 'New', 'View', and 'Bind'. Below the dialog, there are two identical control panels for 'Test' operations, each with fields for 'Pallet Height(inch)', 'Bind Speed(%)', 'Total Volume(m^3)', 'Space Utilization(%)', 'Box Info(L*W*H,inch)', 'Total Weight(lb)', and 'Stack Info(L*W*H,inch)'. The 'Station', 'Robot', and 'System' status indicators are visible on the far left.

Check the information from the Log page.

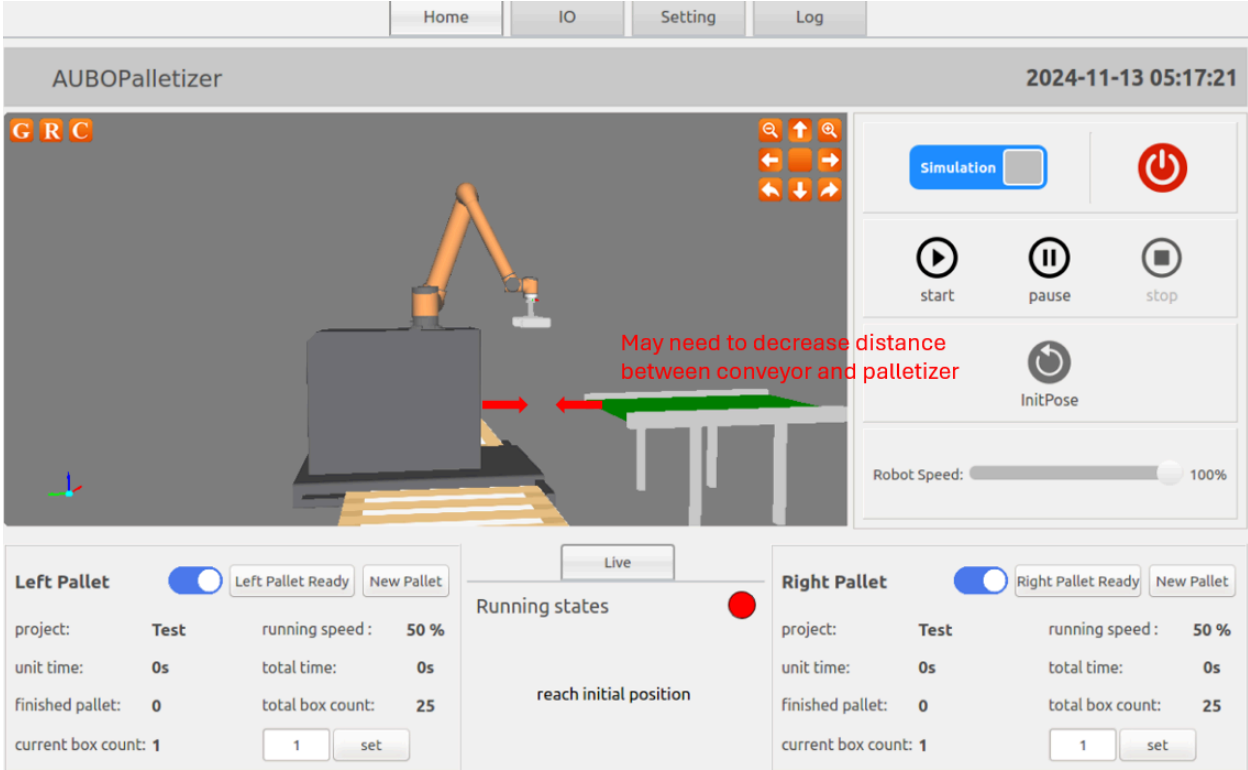
The screenshot shows a log page with a header bar containing the date and time '2024/11/13 04:52:18' and a 'Start Rec' button. Below the header are checkboxes for log levels: 'Info', 'Debug', 'Warning', 'Error', and 'Fatal', all of which are checked. A 'Clear' button is located on the right. The log entries are displayed in a table with columns for 'DateTime', 'Level', and 'Information'. The entries include various system events such as 'pbn_position_backward released', 'pbn_position_up pressed', 'IK failure ps: 1200 The controller has an exception and the inverse kinematics failed', and 'Point ik failed ps: -1 The inverse solution of the 509 mm left pick point failed'. A red text annotation is overlaid on the log, stating: 'Point IK failure can be split into pick point IK failure and entry point IK failure. Pick point IK failure requires adjusting relative position between conveyor and palletizer. Entry point IK failure requires adjusting the entry point'.

DateTime	Level	Information
2024/11/13 04:43:22.487	DEBUG	pbn_position_backward released
2024/11/13 04:43:23.275	DEBUG	pbn_position_up pressed
2024/11/13 04:43:25.289	WARN	IK failure ps: 1200 The controller has an exception and the inverse kinematics failed
2024/11/13 04:43:25.295	INFO	[Move Control] ---start control move stop
2024/11/13 04:43:25.295	INFO	[Move Control] ---move stop control failed, error_code = 11025
2024/11/13 04:43:25.296	DEBUG	pbn_position_up released
2024/11/13 04:43:30.669	INFO	[Recipe Preview] Open recipe file success !
2024/11/13 04:43:32.271	INFO	[Recipe Preview] Open recipe file success !
2024/11/13 04:43:32.939	INFO	[Recipe Preview] Open recipe file success !
2024/11/13 04:43:39.047	INFO	[Recipe Preview] Open recipe file success !
2024/11/13 04:44:03.314	DEBUG	pbn_position_forward pressed
2024/11/13 04:44:07.177	DEBUG	pbn_position_forward released
2024/11/13 04:44:08.234	INFO	[Param Change] Station Pick Point Param without RoadPoint Save Success.
2024/11/13 04:44:11.494	INFO	[Recipe Preview] Open recipe file success !
2024/11/13 04:44:13.269	INFO	[Move Control] ---start control move stop
2024/11/13 04:44:13.270	INFO	[Move Control] ---move stop control success
2024/11/13 04:44:13.270	WARN	Point ik failed ps: -1 The inverse solution of the 509 mm left pick point failed.
2024/11/13 04:48:49.019	INFO	[Recipe Preview] Open recipe file success !
2024/11/13 04:48:50.932	INFO	[Move Control] ---start control move stop
2024/11/13 04:48:50.934	INFO	[Move Control] ---move stop control success
2024/11/13 04:48:50.934	WARN	Point ik failed ps: -1 The inverse solution of the 509 mm left pick point failed.

Solution: If the entry point encounters inverse kinematics failure, adjust the entry point downward toward the origin of the pallet coordinate system, avoiding interference.



For pick-up point inverse kinematics failure, adjust the spacing between the conveyor and workstation.



Once the project has been validated and switched, palletizing operations can be performed in simulation or real mode in the main interface.

The screenshot displays the AUBOPalletizer control interface. At the top, there are navigation tabs for Home, IO, Setting, and Log. The main header shows the application name 'AUBOPalletizer' and the current date and time '2024-11-08 05:02:10'. Below this is a 3D simulation area with a robot arm and two palletizing stations. To the right of the simulation are control buttons for Simulation, start, pause, stop, and InitPose. A red text overlay reads: 'Verify that the information for the left and right workstations is correct; once confirmed, palletizing operations can proceed.' Below the simulation are two panels for 'Left Pallet' and 'Right Pallet', each with a 'New Pallet' button and a 'set' button. The 'Running states' section shows a red indicator light and the text 'Project to be started'.

Station	Project	Running Speed	Unit Time	Total Time	Finished Pallet	Total Box Count	Current Box Count
Left Pallet	AUBO-Separator	50 %	7.5 s	0s	0	30	1
Right Pallet	AUBO-Separator	50 %	0s	0s	0	30	1

Creating a New Project

1. Enter Pallet Dimensions

Standard pallet sizes can be selected from the dropdown menu

Pallet size can also be entered manually

Pallet Info(mm)	
Standard(L * W)	ASIA 1: 1200 * 1000
Pallet Length	1200
Pallet Width	1000

Once the pallet dimensions are set, click **Next**.

2. Enter Box Dimensions

After entering the box dimensions, click **Next**.

Box Info(mm)

Recently used(L * W * H ,Wt) Please Choose

Box Length 530

Box Width 310

Box Height 155

Box Weight(kg) 1

Multipick Mode

Max Multipick Box count

2

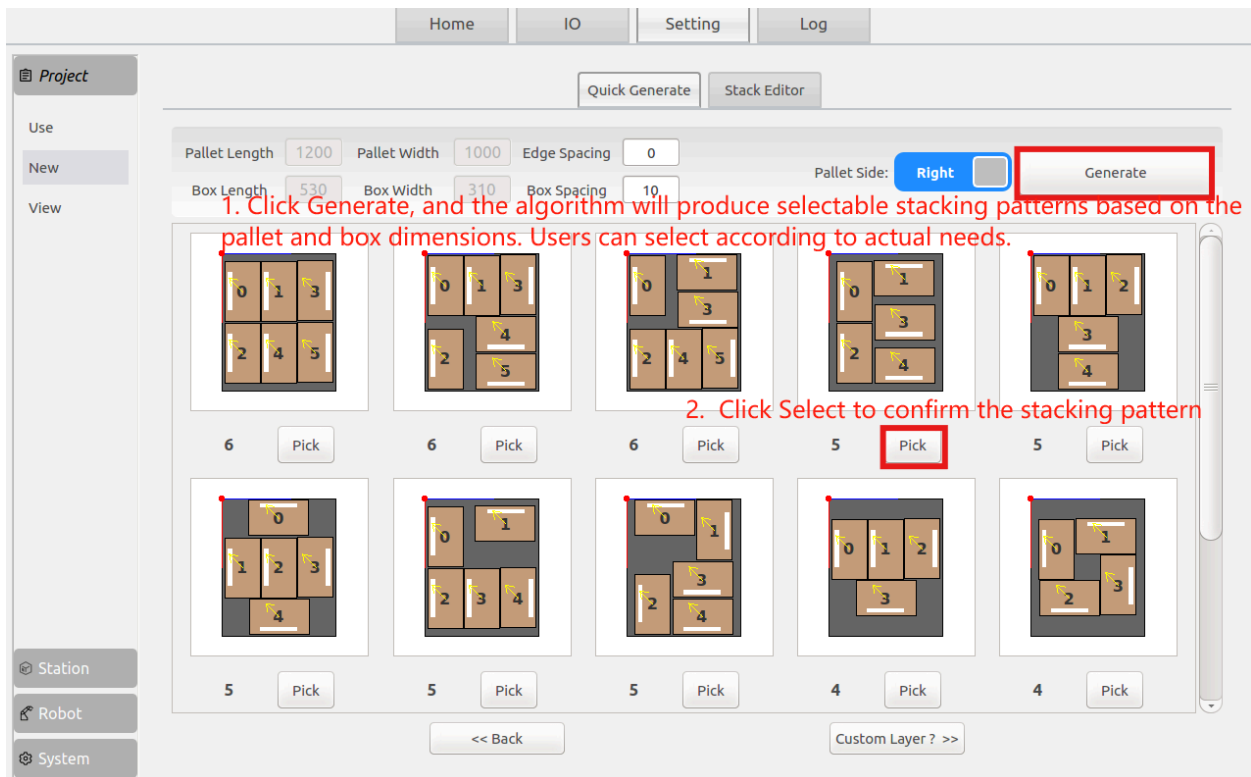
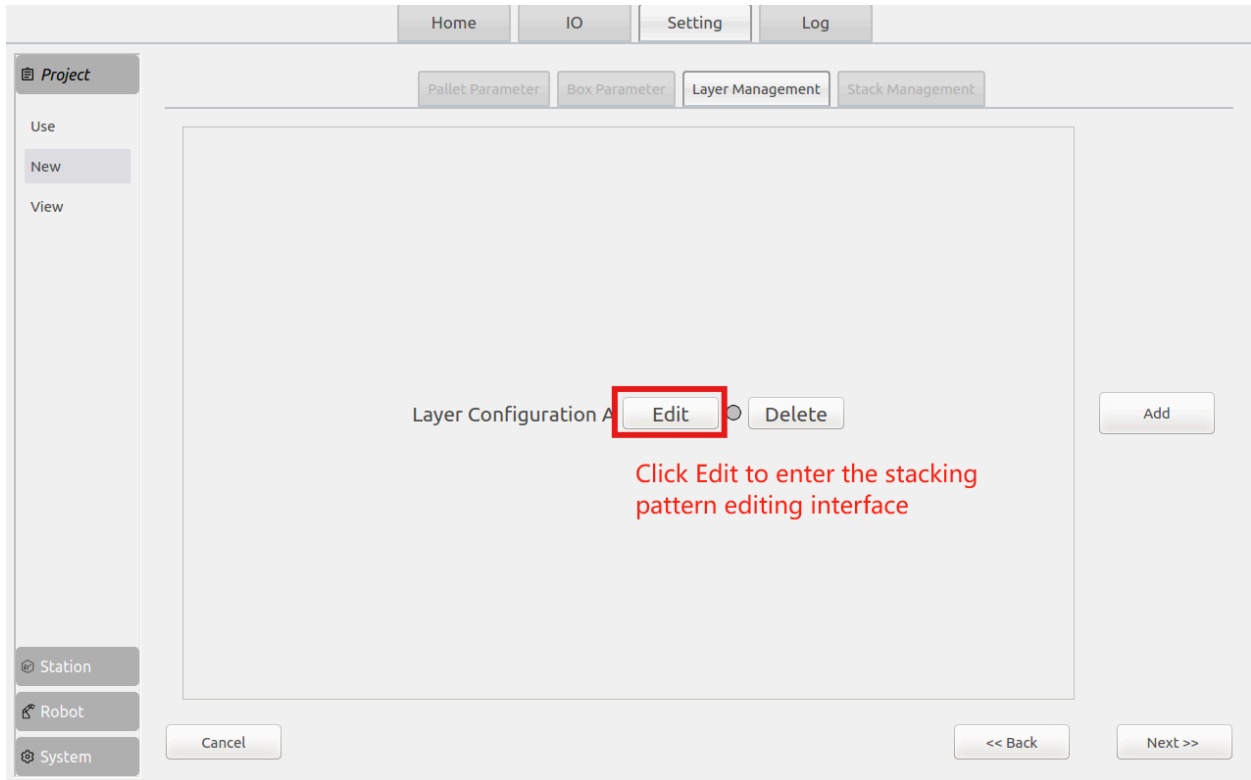
3

4

When multipick is need, you can select Multipick Mode and set the maximum pick quantity. The stacking algorithm will automatically calculate the picking method. (Note: Multipick Mode is typically used when boxes are small and the conveyor has multiple material sensors.)

Cancel << Back Next >>

3. Edit Stacking Pattern



If the required stacking pattern cannot be generated based on pallet and box dimensions, adjust the edge and box spacing and click **Generate** to create additional stacking pattern options.

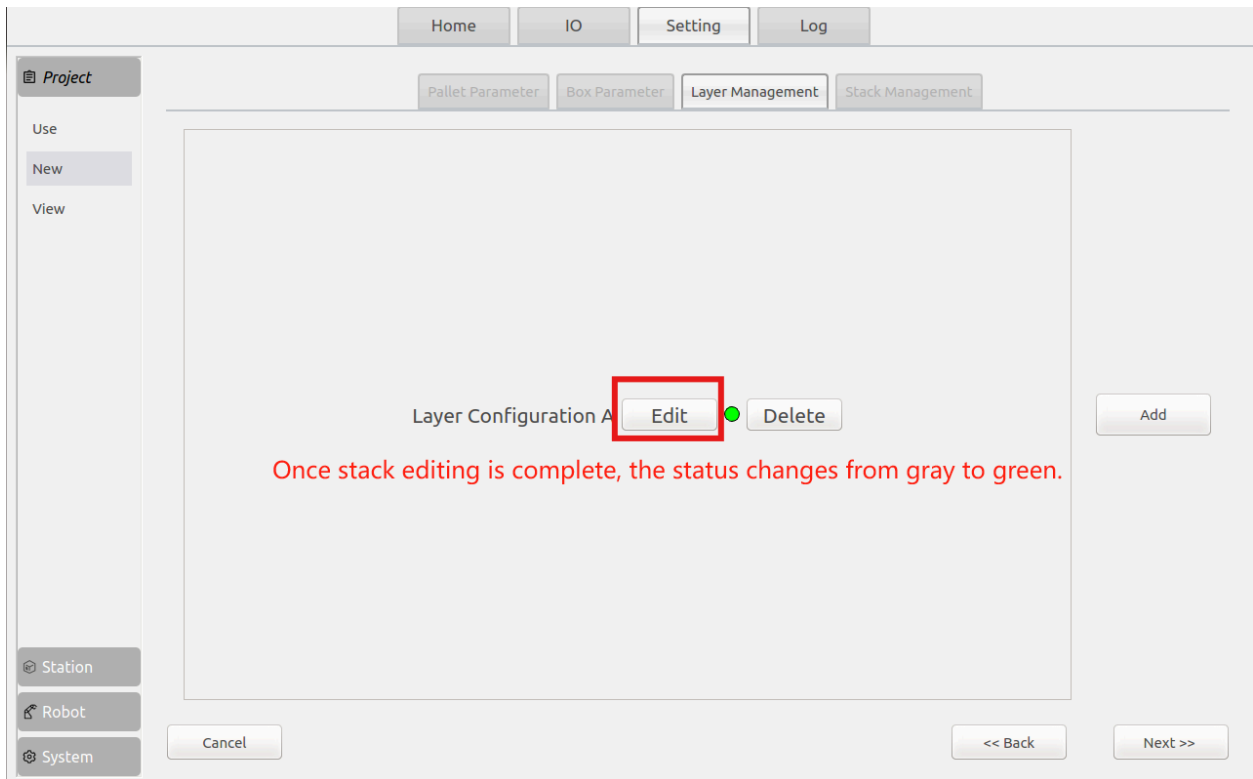
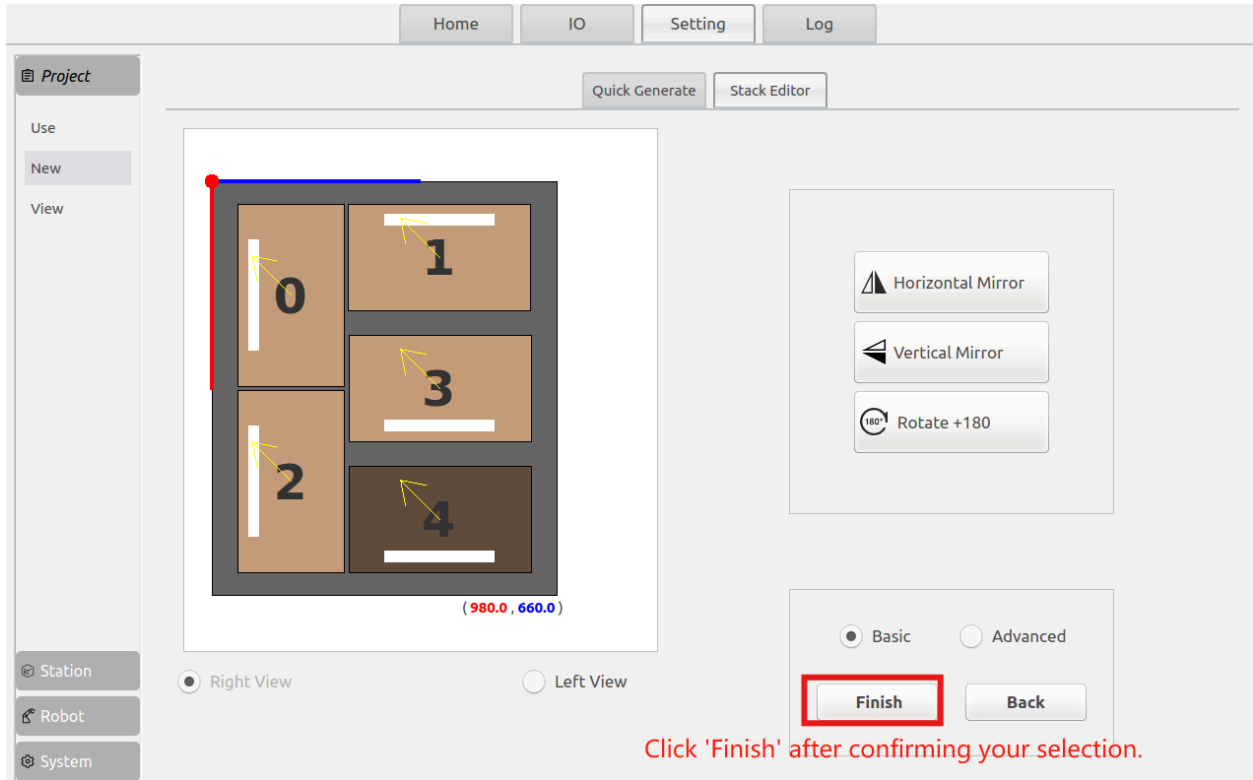
Edge spacing should be positive, indicates how many millimeters the boxes extend beyond the pallet.

Edge spacing and box spacing can be adjusted to generate more optional stacking patterns.

Box spacing indicates the minimum allowable distance between boxes, measured in millimeters.

Station
Robot
System

<< Back Custom Layer ? >>



4.Layer Configuration

The screenshot displays the GRC (Goods Receiving Control) interface for layer configuration. The main window is titled 'G R C' and features a 3D visualization of a stack of brown boxes on a pallet. The boxes are labeled 'AUBO'. The interface includes several control panels:

- Navigation:** Home, IO, Setting, Log.
- Project Management:** Project (Use, New, View), Station, Robot, System.
- Configuration Panels:** Pallet Parameter, Box Parameter, Layer Management, Stack Management.
- Layer Configuration:** A list of layers from Layer 1 to Layer 6, each with a dropdown menu set to 'A'.
- Current Height:** A field showing '1030' mm.
- Stack Management:** Buttons for 'Add Layer' and 'Delete Layer', and an 'Edit Stack' dropdown menu set to 'Rotate 180'.
- Actions:** Cancel, Save Project, << Back, Use this project >>.

Three red annotations provide additional context:

1. The algorithm can automatically sets stacking patterns for odd and even layers based on stack characteristics, but users can modify this according to actual needs.
2. Users can add or remove layers according to actual needs.
3. Automatically calculate the current palletizing height (from ground level) base on pallet height and number of layers.

Home IO Setting Log

Project

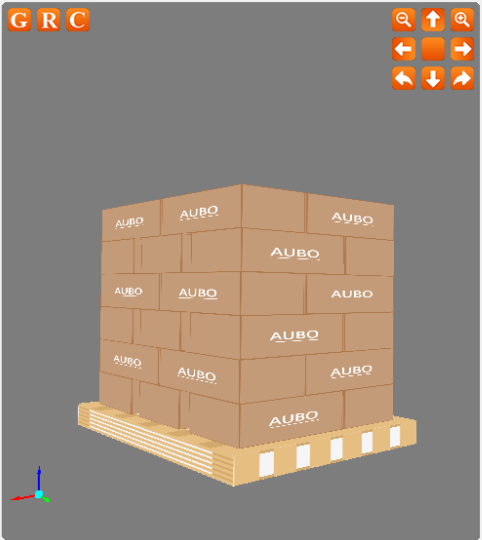
Pallet Parameter Box Parameter Layer Management Stack Management

Use
New
View

Layer 6 A
Layer 5 A
Layer 4 A
Layer 3 A
Layer 2 A
Layer 1 A

Current Height(mm):
1030
Add Layer
Delete Layer
Edit Stack:
Rotate 180

G R C



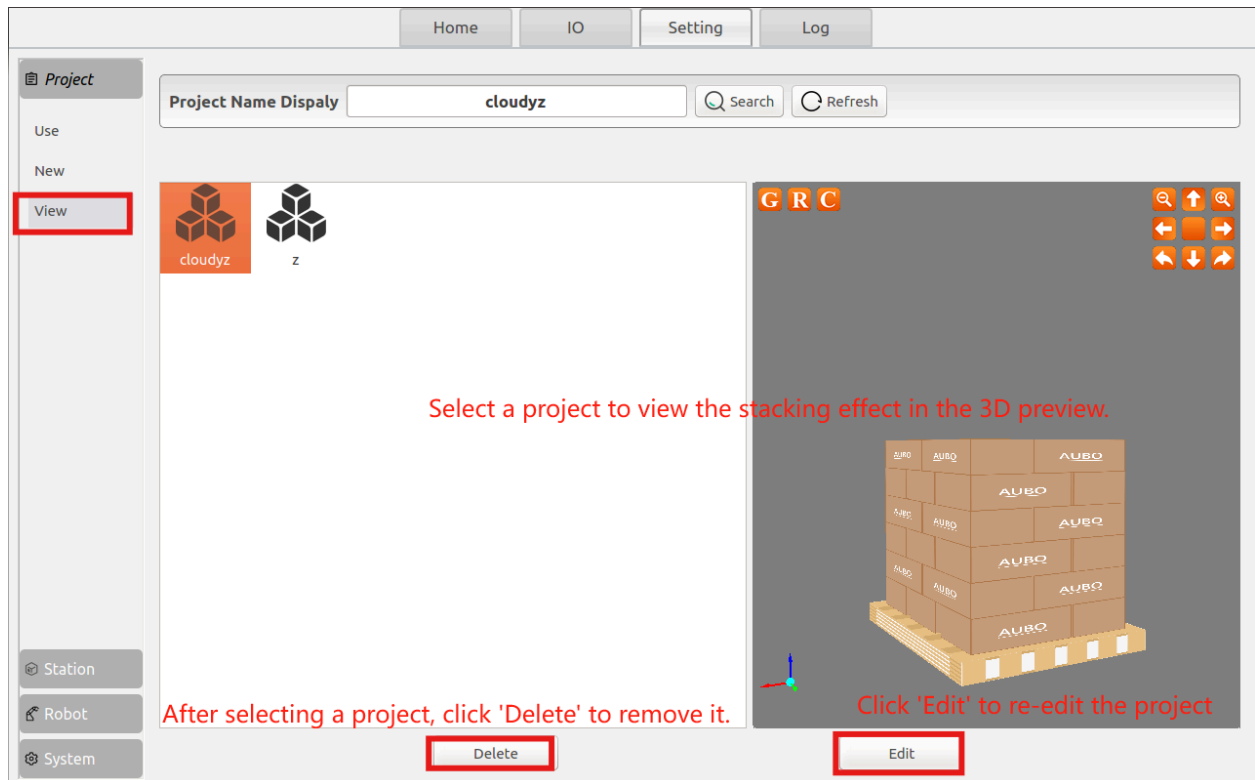
Station
Robot
System

Cancel

cloudyz Save Project Click to save.

q w e r t y u i o p
a s d f g h j k l
↑ z x c v b n m
?123 **En** Switch between Chinese and English input methods.

View the project.



Home IO Setting Log

Project

Use

New

View

Station

Robot

System

Project Name Display cloudyz Search Refresh

cloudyz z

GRC

Select a project to view the stacking effect in the 3D preview.

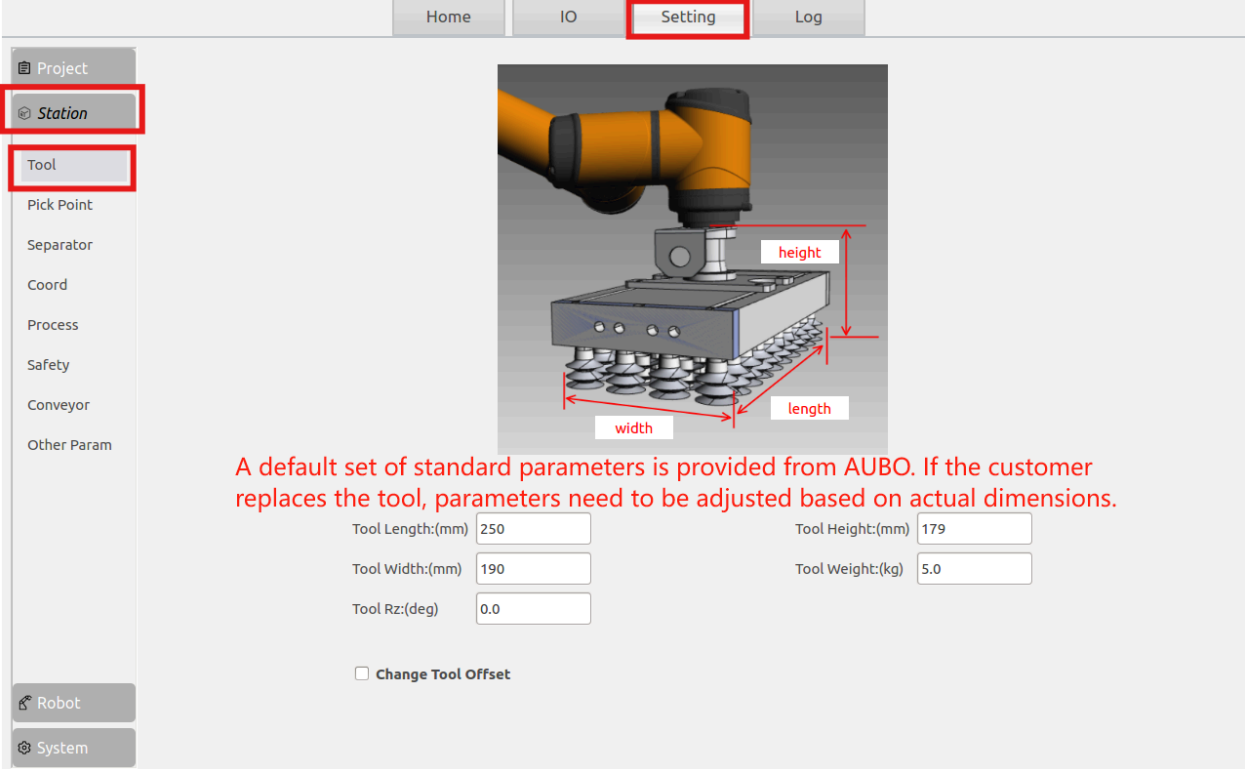
Click 'Edit' to re-edit the project

After selecting a project, click 'Delete' to remove it.

Delete Edit

2.3.2 Workstation

2.3.2.1 End Tooling



The screenshot displays the AUBO workstation software interface. At the top, there are navigation tabs: Home, IO, Setting (highlighted with a red box), and Log. On the left side, a vertical menu contains several options: Project, Station (highlighted with a red box), Tool (highlighted with a red box), Pick Point, Separator, Coord, Process, Safety, Conveyor, and Other Param. Below the 'Tool' option, there are several input fields for tool parameters:

- Tool Length:(mm) 250
- Tool Width:(mm) 190
- Tool Rz:(deg) 0.0
- Tool Height:(mm) 179
- Tool Weight:(kg) 5.0

Below these fields is a checkbox labeled "Change Tool Offset" which is currently unchecked. To the right of the input fields, there is a 3D diagram of a robotic arm holding a tool. The tool is a rectangular block with a grid of small circular elements on its bottom surface. Red dimension lines indicate the tool's "width", "length", and "height".

A default set of standard parameters is provided from AUBO. If the customer replaces the tool, parameters need to be adjusted based on actual dimensions.

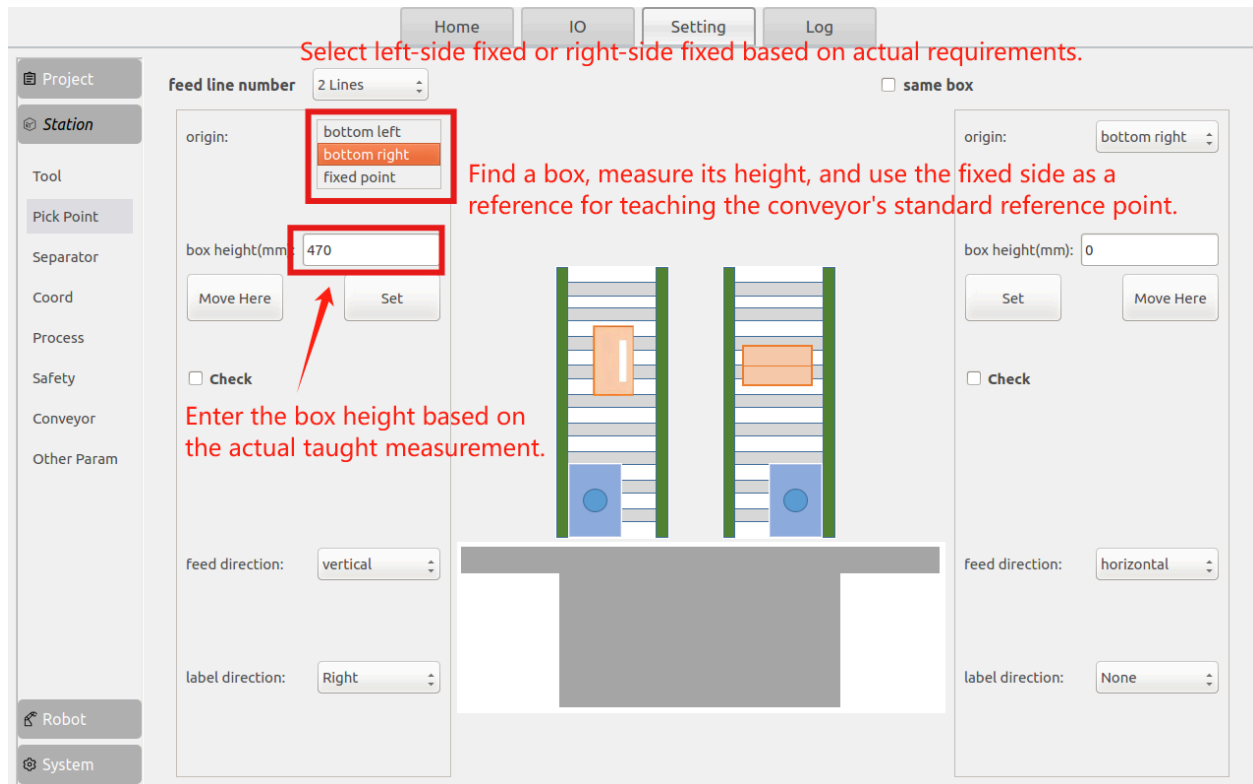
2.3.2.2 Pick-up Point

Select single or double conveyor line feed based on on-site conditions.

The screenshot displays a software interface for configuring a Pick-up Point. The interface is divided into several sections:

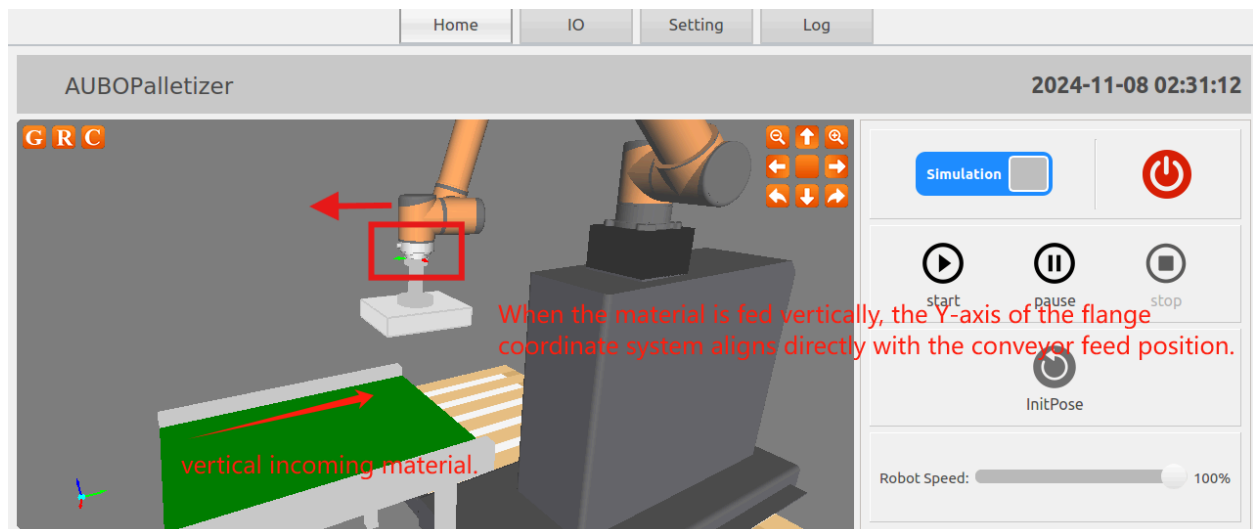
- Navigation:** Home, IO, Setting, Log tabs at the top.
- Left Panel:** Project, Station, Tool (Pick Point is selected), Separator, Coord, Process, Safety, Conveyor, Other Param, Robot, System.
- Feed Line Number Selection:** A dropdown menu showing "1 Line" (selected) and "2 Lines".
- Configuration for 1 Line:**
 - origin: bottom left
 - box height(mm): 470
 - Move Here, Set buttons
 - Check
 - feed direction: vertical
 - label direction: Right
- Configuration for 2 Lines:**
 - origin: bottom right
 - box height(mm): 0
 - Set, Move Here buttons
 - Check
 - feed direction: horizontal
 - label direction: None
- Additional Settings:** same box
- Central Diagram:** A schematic showing two conveyor lines with boxes and a robot arm positioned between them.

Set the standard position of the pick-up point,



Set the standard position of the pick-up point, with the flange's Y-axis end facing the conveyor (view green arrow direction in simulation).

For Vertical Feed:



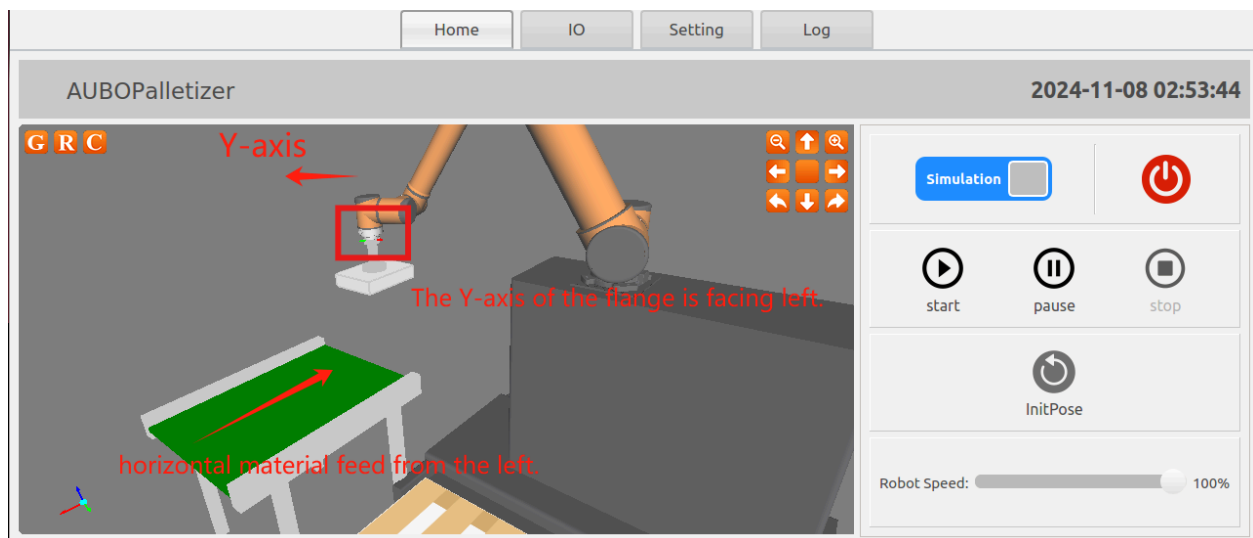
Joint Control the approximate range of Joint 6

Joint 1	-	92.81	+
Joint 2	-	49.27	+
Joint 3	-	-114.37	+
Joint 4	-	-74.11	+
Joint 5	-	-90.28	+
Joint 6	-	7.34	+

%

For Horizontal Feed:

Case 1: Left-side Feed



Joint Control the approximate range of Joint 6

Joint 1	-	92.81	+
Joint 2	-	49.27	+
Joint 3	-	-114.37	+
Joint 4	-	-74.11	+
Joint 5	-	-90.28	+
Joint 6	-	-85.17	+

Case 2: Right-side Feed

Home IO Setting Log

AUBOPalletizer 2024-11-08 03:03:34

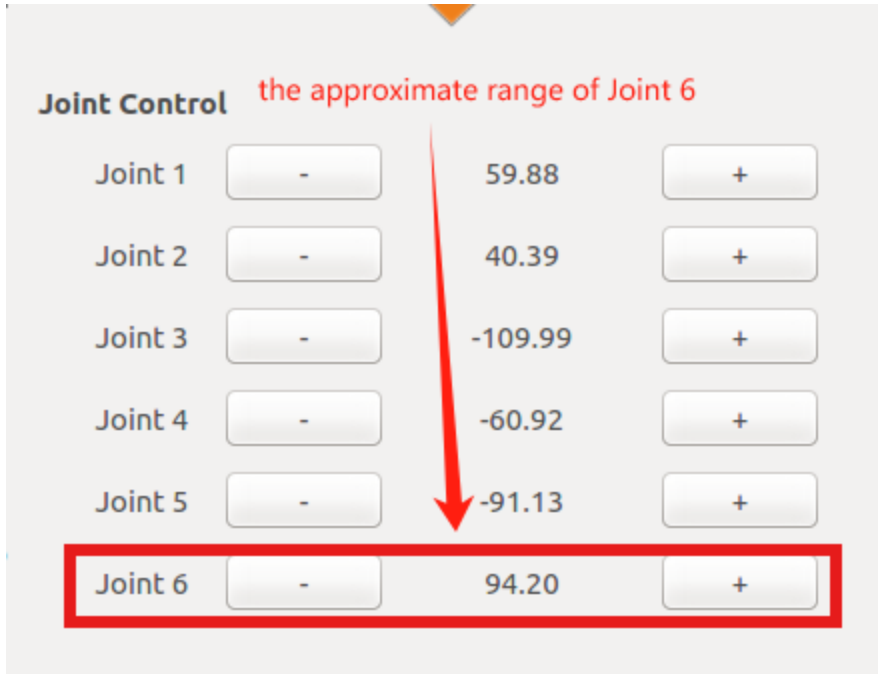
G R C the Y axis direction of the flange

Simulation ⏻

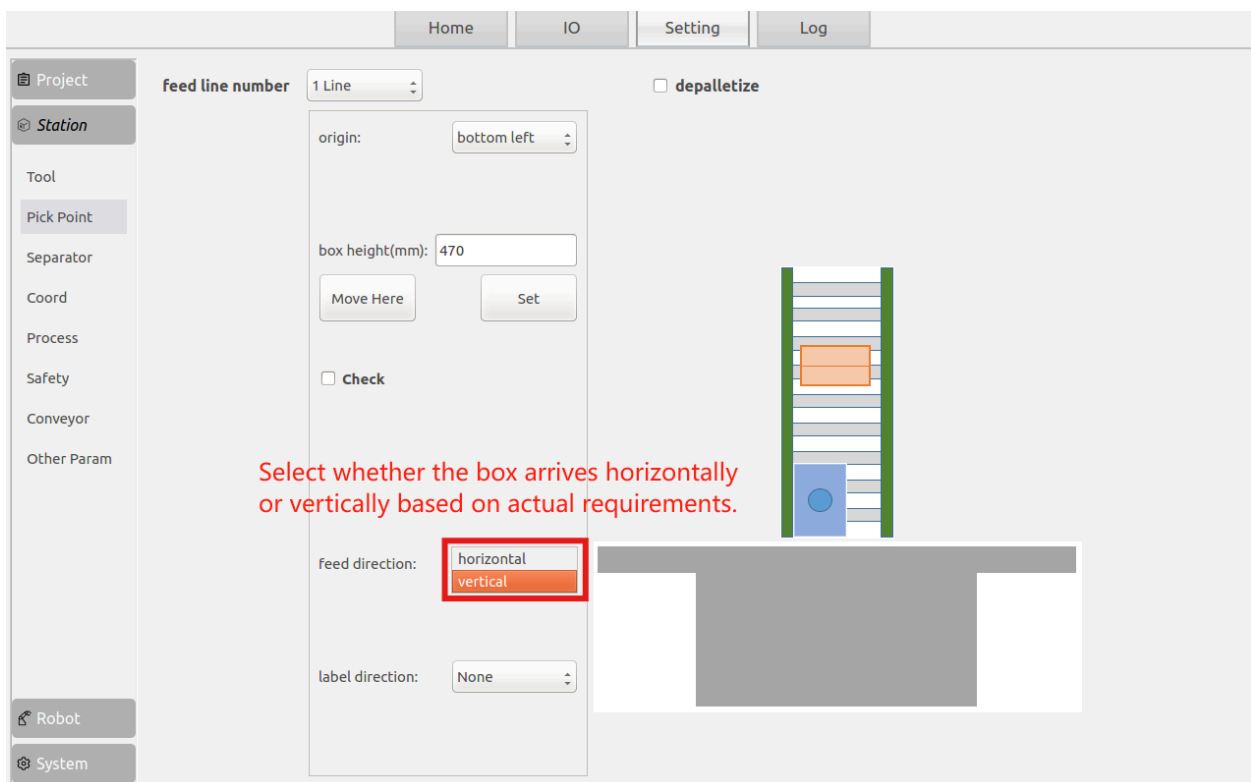
start pause stop

InitPose

Robot Speed: 100%



Set the feed method for boxes; choose between horizontal or vertical feed and, if needed, enable label positioning (with consistent outward-facing labels). Adjust the label direction based on actual conditions.



Home IO Setting Log

Project feed line number 1 Line depalletize

Station

Tool

Pick Point

Separator

Coord

Process

Safety

Conveyor

Other Param

Robot

System

origin: bottom left

box height(mm): 470

Move Here Set

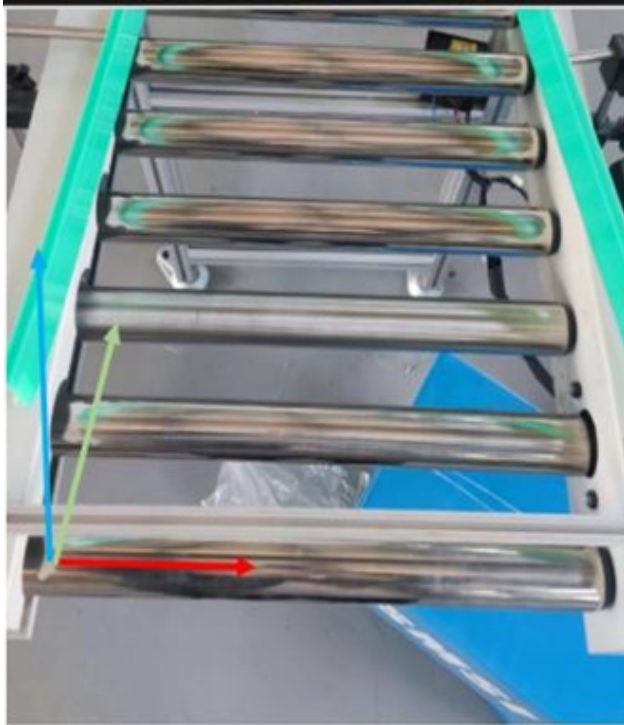
Check

feed direction: horizontal

label direction: None
Top
Down
Left
Right

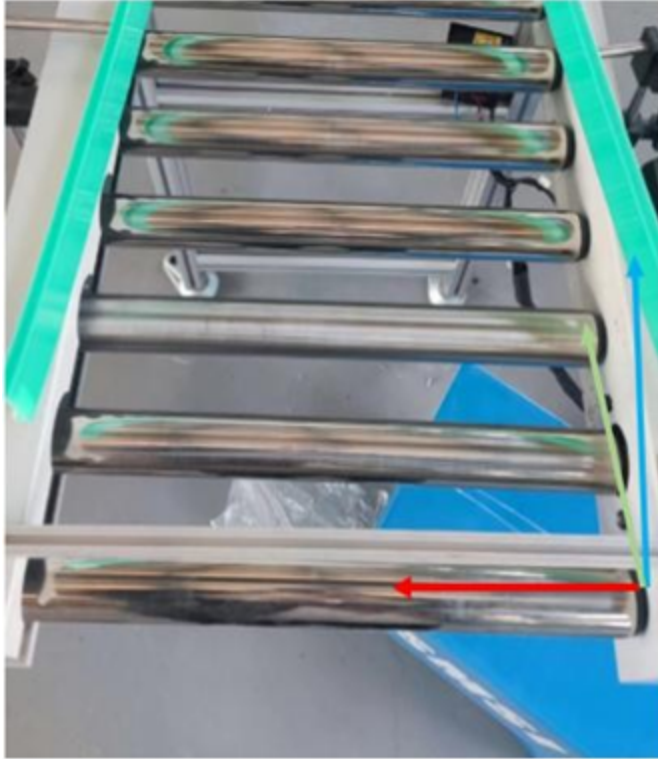
Based on the client's requirement for outward-facing labels, if applicable, select the label direction upon arrival.

Depalletizing Function: Currently supports single-line depalletizing. The teaching method is consistent with palletizing, requiring the Depalletize option to be selected and input of horizontal, vertical, and height offset values.



According to the above Example: When the origin point is set to the lower-left corner:

- **Horizontal direction:** Positive values correspond to the red arrow direction; negative values are the opposite.
- **Vertical direction:** Positive values correspond to the green arrow direction; negative values are the opposite.
- **Height direction:** Positive values correspond to the blue arrow direction; negative values are the opposite.



According to the above Example: When the origin point is set to the lower-right corner:

- **Horizontal direction:** Positive values correspond to the red arrow direction; negative values are the opposite.
- **Vertical direction:** Positive values correspond to the green arrow direction; negative values are the opposite.
- **Height direction:** Positive values correspond to the blue arrow direction; negative values are the opposite.

Home IO Setting Log

Project feed line number 1 Line depalletize

Station

Tool

Pick Point

Separator

Coord

Process

Safety

Conveyor

Other Param

Robot

System

origin: bottom left

box height(mm): 470

Move Here Set

Check

feed direction: horizontal

label direction: None

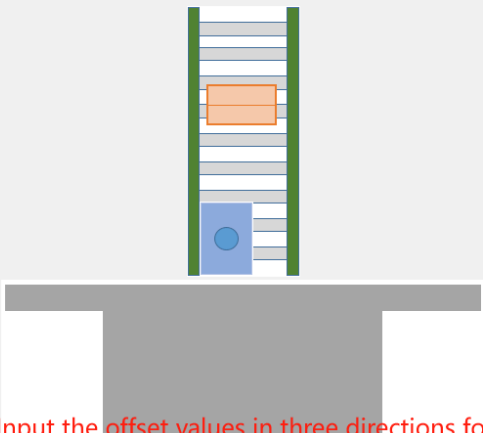
Depalletize place point offset

Horizontal offset(mm): 0

Vertical offset(mm): 0

Height offset(mm): 0

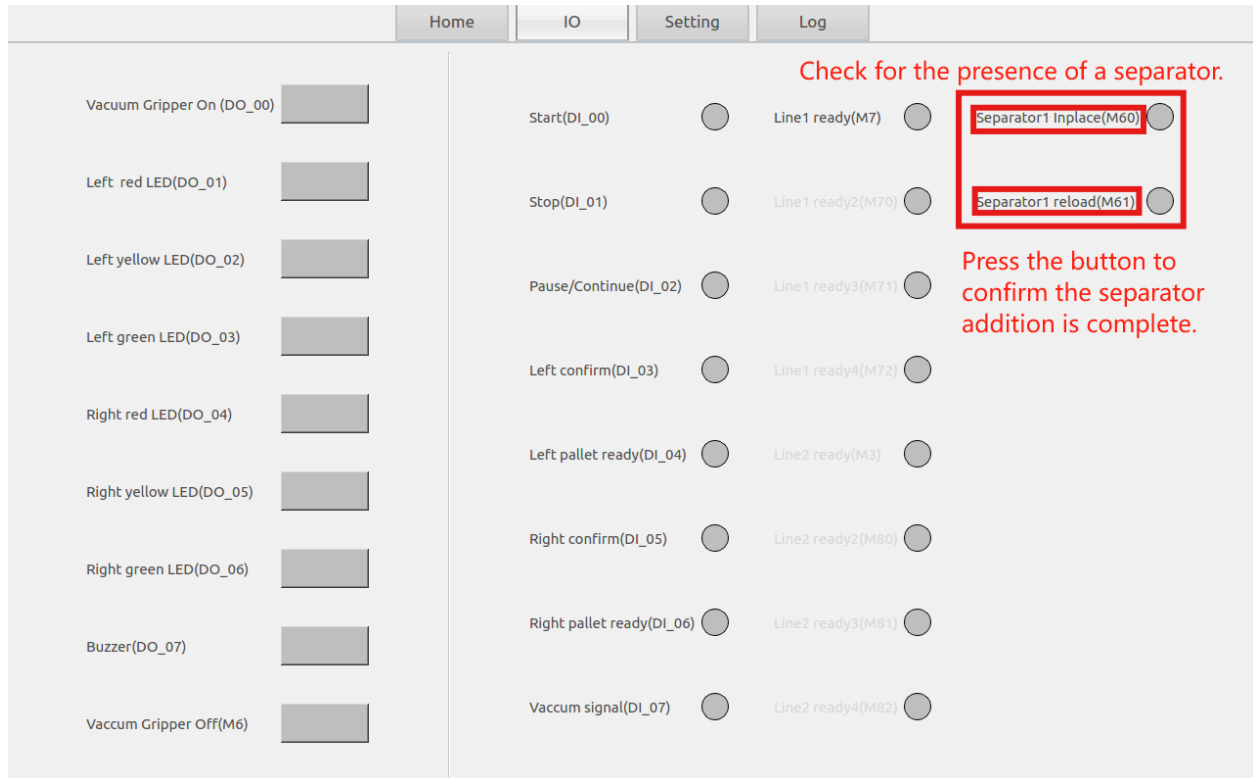
The teaching process for depalletizing is the same as for palletizing.

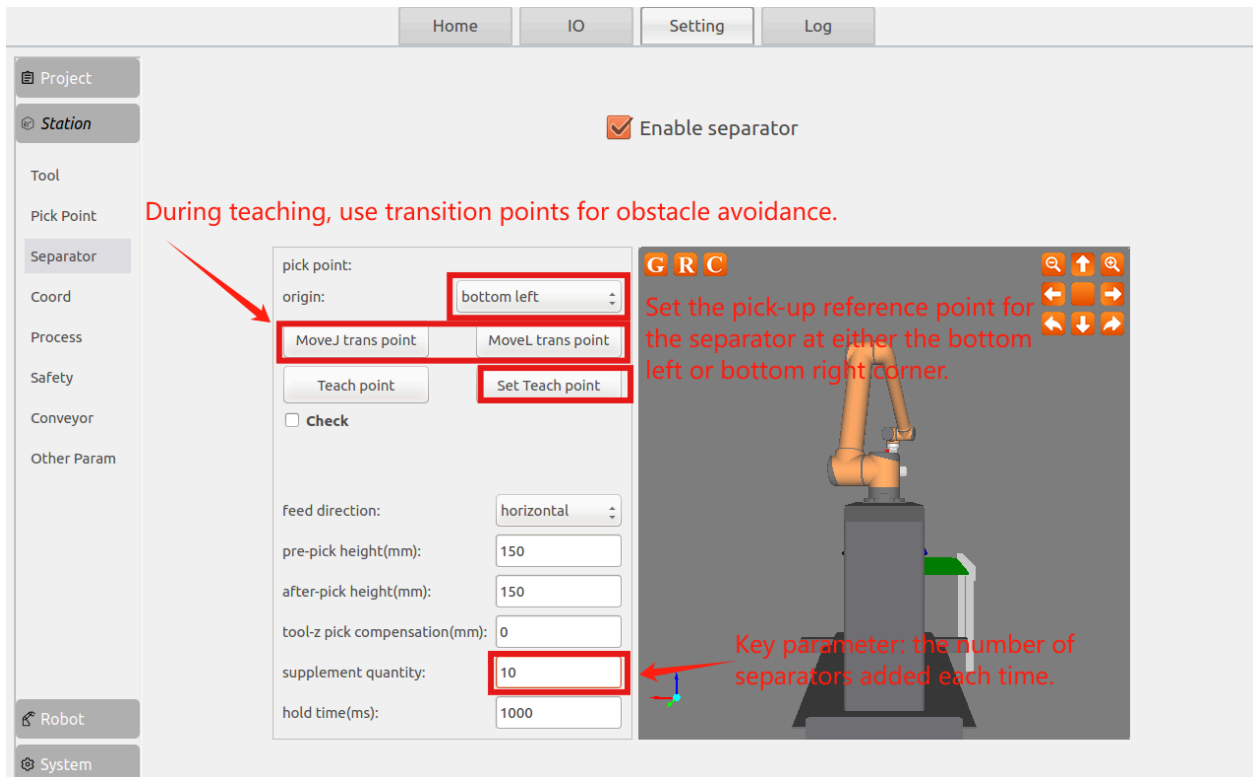


Input the offset values in three directions for the depalletizing pick-up point relative to the palletizing pick-up point.

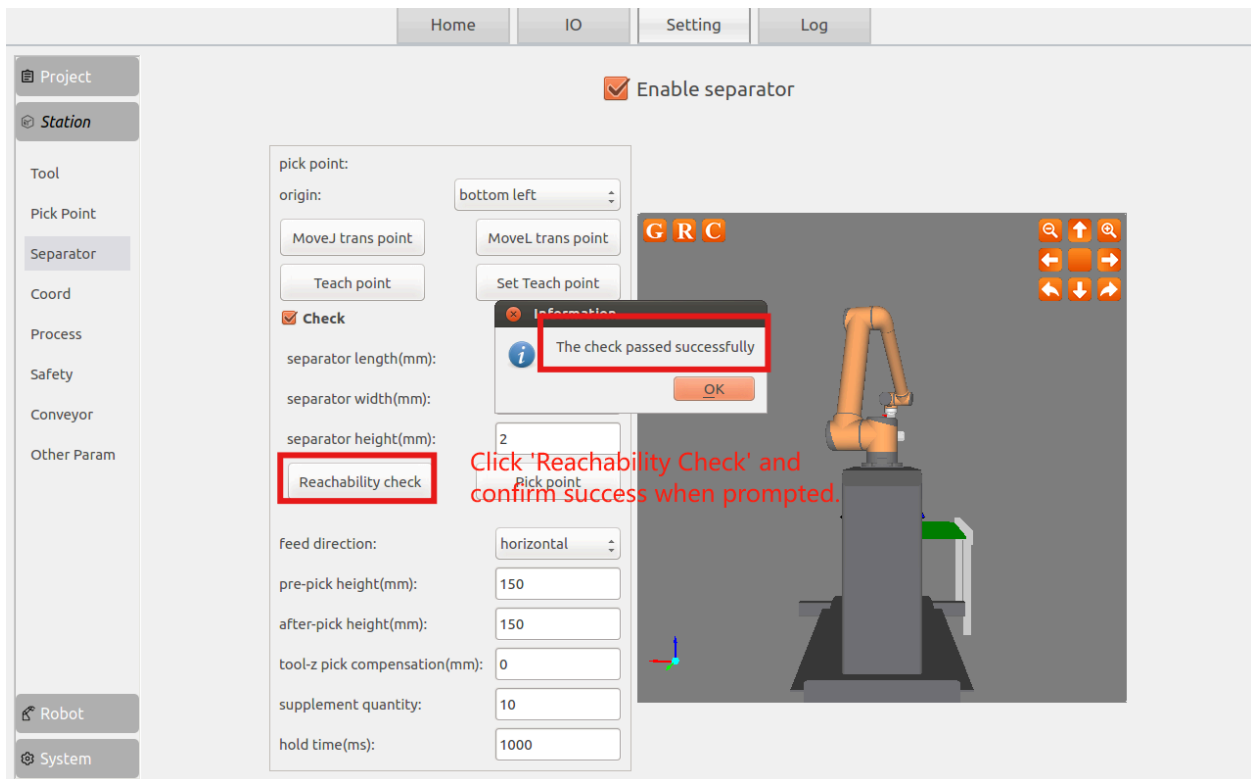
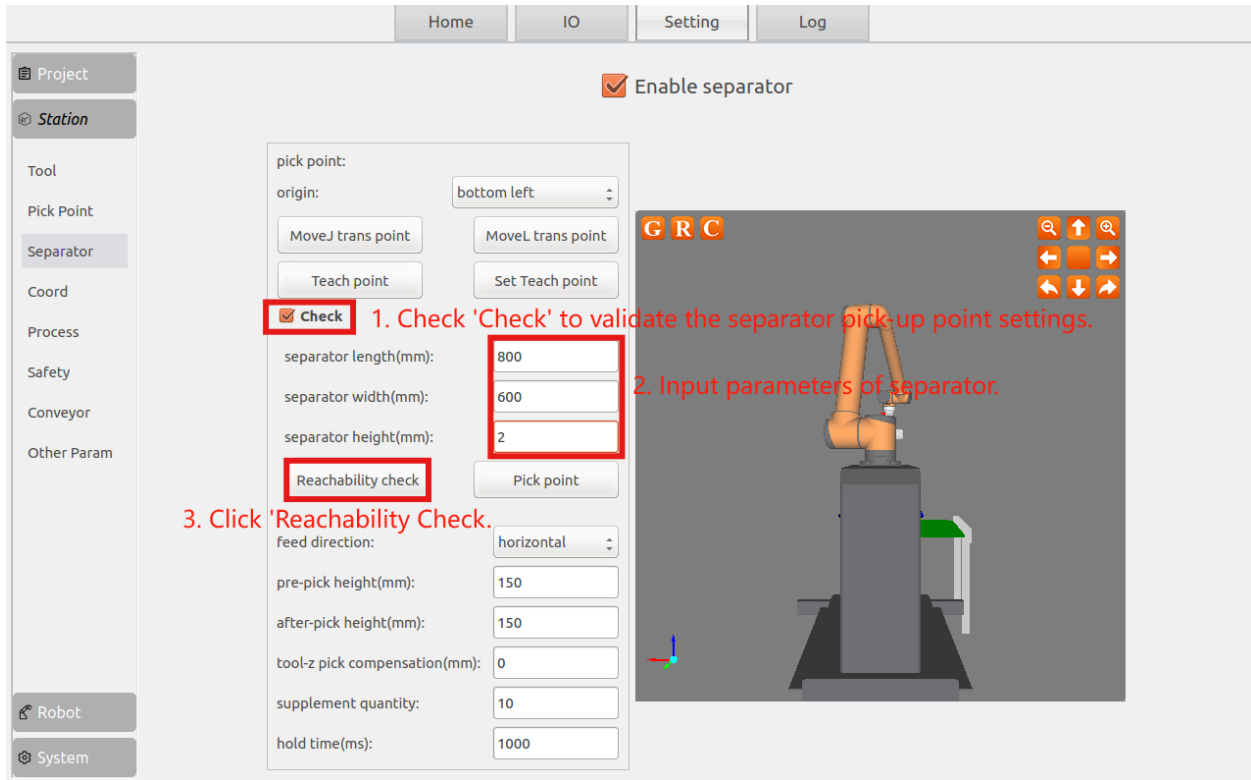
2.3.2.3 Separator

The separator tooling requires connection to the designated reserved interface(IO).





Pick-up Point Setting Verification



Press and hold 'Pick Point' to verify that the suction cup is centered over the separator.

The screenshot displays a control interface for a robot system. At the top, there are navigation tabs for 'Home', 'IO', 'Setting', and 'Log'. On the left, a sidebar menu includes 'Project', 'Station', 'Tool', 'Pick Point', 'Separator', 'Coord', 'Process', 'Safety', 'Conveyor', and 'Other Param'. The 'Separator' option is currently selected. The main area features a settings panel on the left and a 3D simulation on the right. The settings panel includes a 'pick point' dropdown set to 'bottom left', buttons for 'MoveJ trans point', 'MoveL trans point', 'Teach point', and 'Set Teach point', a checked 'Check' box, and input fields for 'separator length(mm): 800', 'separator width(mm): 600', and 'separator height(mm): 2'. A 'Pick point' button is highlighted with a red box. Below these are 'Reachability check', 'feed direction: horizontal', and height/compensation settings. The 3D simulation shows an orange robotic arm with a suction cup positioned over a blue and green separator. A red text overlay reads: 'Press and hold for 'pick point', then check if the suction cup is centered on the separator.'

To use a separator in the project, fill in separator-related parameters in the pallet dimensions and stacking pattern management.

Home IO Setting Log

Project

Use

New

View

Station

Robot

System

Cancel

Pallet Parameter Box Parameter Layer Management Stack Management

Pallet Info(mm)

Standard (L * W) Please Choose

Pallet Length 1200

Pallet Width 1000

Use Separator Check 'Use Separator'

Separator Info(mm)

Recently used (L * W * H ,WT) Please Choose

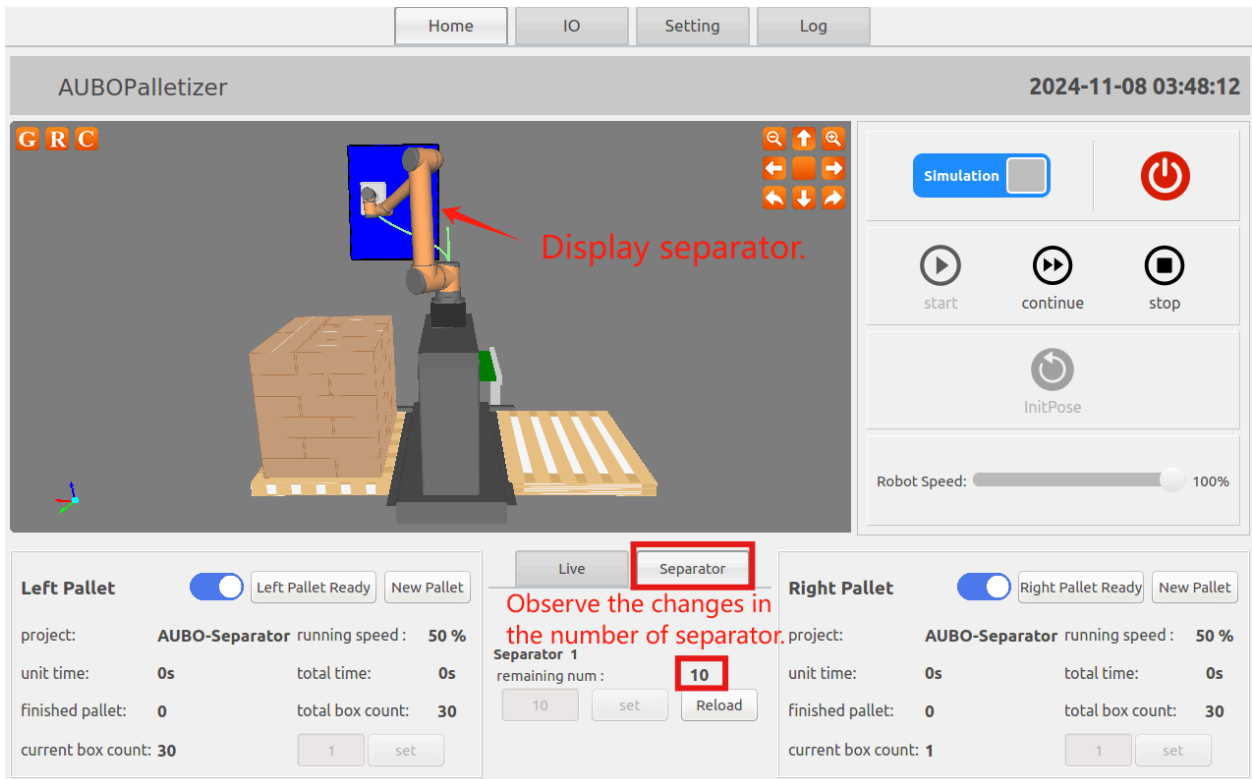
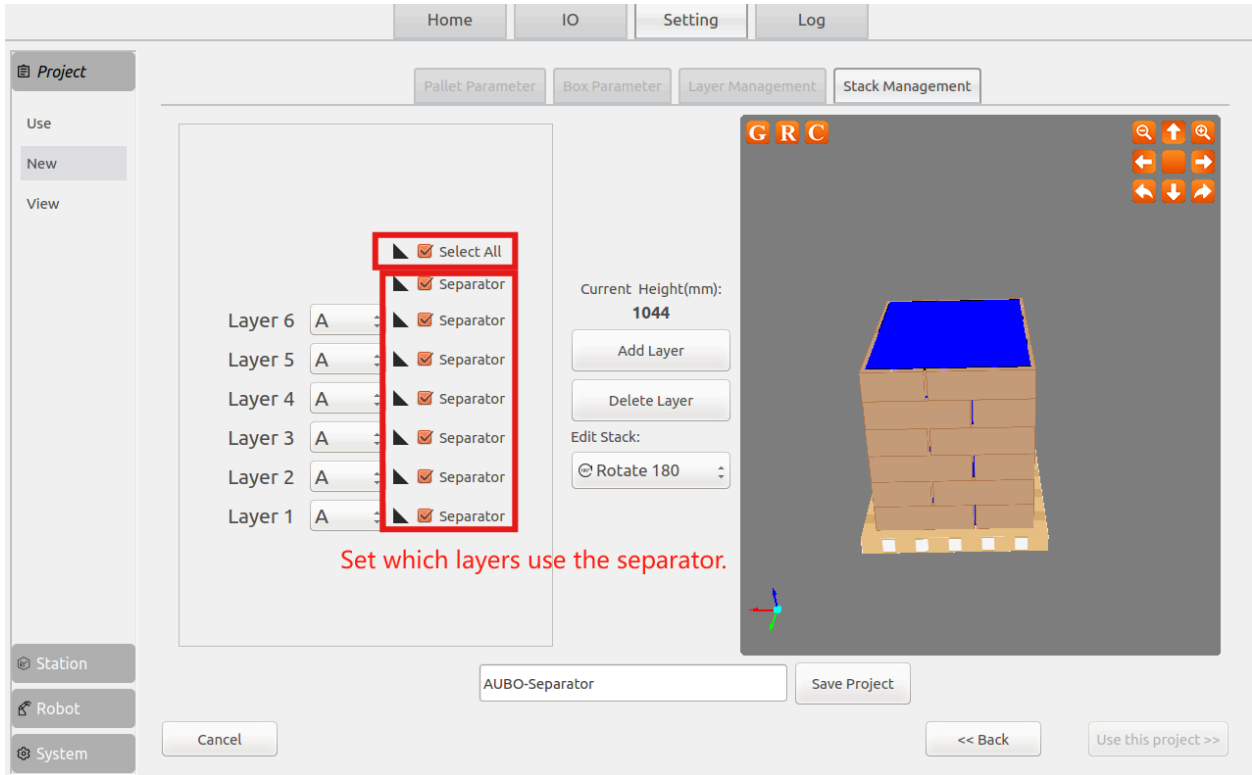
Separator Length 1000

Separator Width 800

Separator Thickness 2

Separator Weight(kg) 1

<< Back Next >>



2.3.2.4 Pallet Coordinate System

Home IO Setting Log

Project

Station

Tool

Pick Point

Separator

Coord

Process

Safety

Conveyor

Other Param

Robot

System

G R C

forward-backward(mm)
0

left-right compensation (mm)
0

height compensation (mm)
0

angle compensation (deg)
0.0

forward-backward(mm)
0

left-right compensation (mm)
0

height compensation (mm)
0

angle compensation (deg)
0

-1.0

Check

Obstacle Avoidance Point

Origin

Move Forward

Move Backward

Right

Directions are as follows:
front is positive, back is negative;
left is positive, right is negative;
up is positive, down is negative.

A default set of standard parameters is provided from AUBO. Avoid making changes on-site; if modifications are made, validation is required.

2.3.2.5 **Process Parameters** (a set of standard parameters is provided by default)

Home IO Setting Log

Project

Station

Tool

Pick Point

Separator

Coord

Process

Safety

Conveyor

Other Param

Robot

System

Base params Obstacle-avoiding points

pre-pick height(mm) 500

after-pick height(mm) 500

conveyor hold time(ms) 400

stack hold time(ms) 400

Pre-position and post-position offset values relative to the pick-up point on the conveyor.

left enter point

right enter point

move here

set

reset

move here

set

reset

Enter the palletizing transition point, typically used to avoid interference with the conveyor and external mechanisms.

left pre-place height(mm) 100

left after-place height(mm) 100

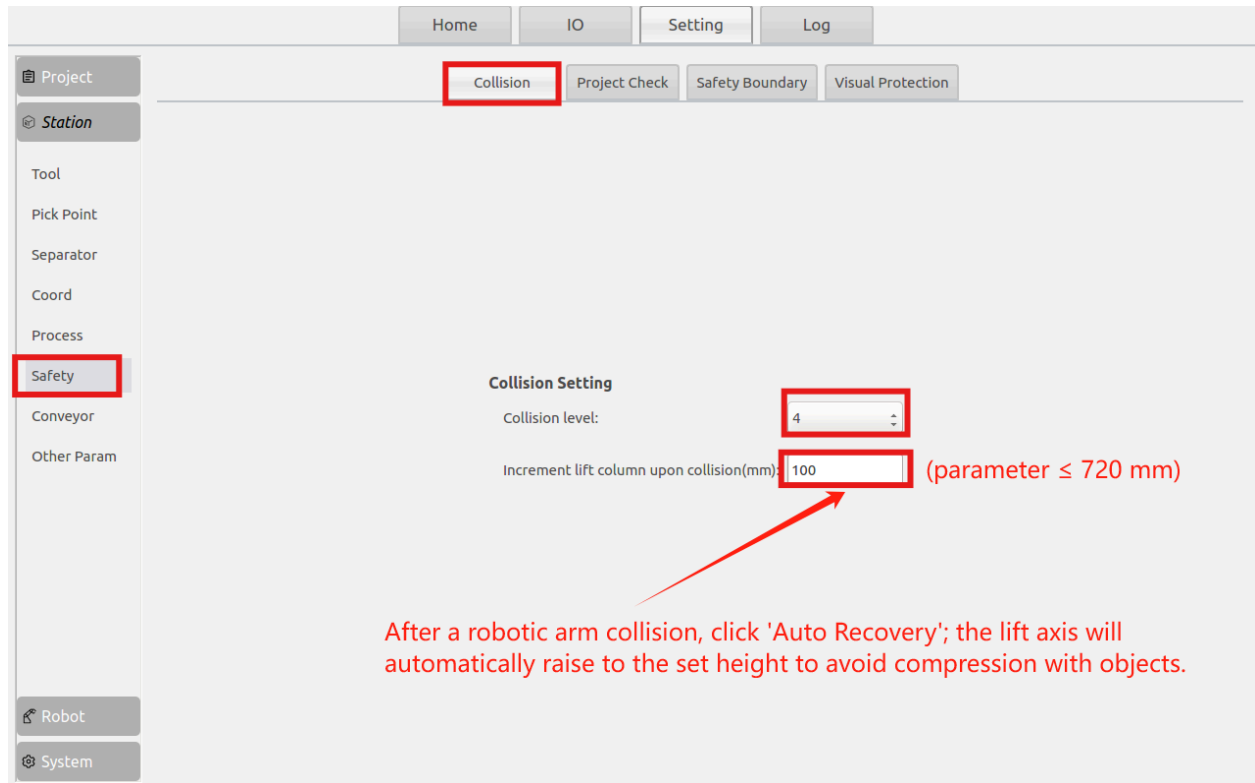
right pre-place height(mm) 100

right after-place height(mm) 100

Offset values for the pre-position and post-position points relative to the placement point for palletizing.

2.3.2.6 Safety Parameters

Collision Parameters



The screenshot displays the 'Collision Setting' interface. The sidebar on the left has 'Safety' highlighted. The main area shows two settings: 'Collision level' is a dropdown menu set to '4', and 'Increment lift column upon collision(mm)' is a text input field containing '100'. A red box highlights the '100' value, and a red arrow points from it to a text box below. The text box contains the instruction: 'After a robotic arm collision, click 'Auto Recovery'; the lift axis will automatically raise to the set height to avoid compression with objects.'

Collision Setting

Collision level: 4

Increment lift column upon collision(mm): 100 (parameter \leq 720 mm)

After a robotic arm collision, click 'Auto Recovery'; the lift axis will automatically raise to the set height to avoid compression with objects.

Project Checklist

The screenshot displays the 'Project Checklist' interface. At the top, there are navigation tabs: Home, IO, Setting, and Log. Below these are sub-tabs: Collision, Project Check (highlighted with a red box), Safety Boundary, and Visual Protection. On the left side, a vertical menu lists various project elements: Project, Station, Tool, Pick Point, Separator, Coord, Process, Safety (highlighted with a red box), Conveyor, and Other Param. At the bottom left, there are buttons for Robot and System.

The main content area is divided into three sections:

- Interference Check:** A red box highlights five checked items: Box, Conveyor, Robot arm, Machine frame, and Separator.
- Range of motion Check:** Includes input fields for 'Stack Height Limit(mm):' (2300) and 'Arm boundary height limit(mm):' (3600), each with a 'Change' button. A checked checkbox 'Enable move range check' is also present.
- Joint Position Limit:** A red box highlights a table of joint limits. The table has columns for Joint ID, Min Limit, Max Limit, and Range. The values are as follows:

Joint	Min Limit	Max Limit	Range
Joint 1:	-105.9	256.9	[-359.9, 359.9] (deg)
Joint 2:	-50.0	150.0	[-174.9, 174.9] (deg)
Joint 3:	-160.0	1.0	[-174.9, 174.9] (deg)
Joint 4:	-140.0	30.0	[-174.9, 174.9] (deg)
Joint 5:	-120.0	-60.0	[-174.9, 174.9] (deg)
Joint 6:	-359.9	359.9	[-359.9, 359.9] (deg)

Red text annotations are present: 'Select the interference items to check.' is placed above the Range of motion Check section, and 'A default set of standard key limit values is provided.' is placed below the Joint Position Limit table.

Safety Boundary

Home IO Setting Log

Collision Project Check **Safety Boundary** Visual Protection

Project

Station

Tool

Pick Point

Separator

Coord

Process

Safety

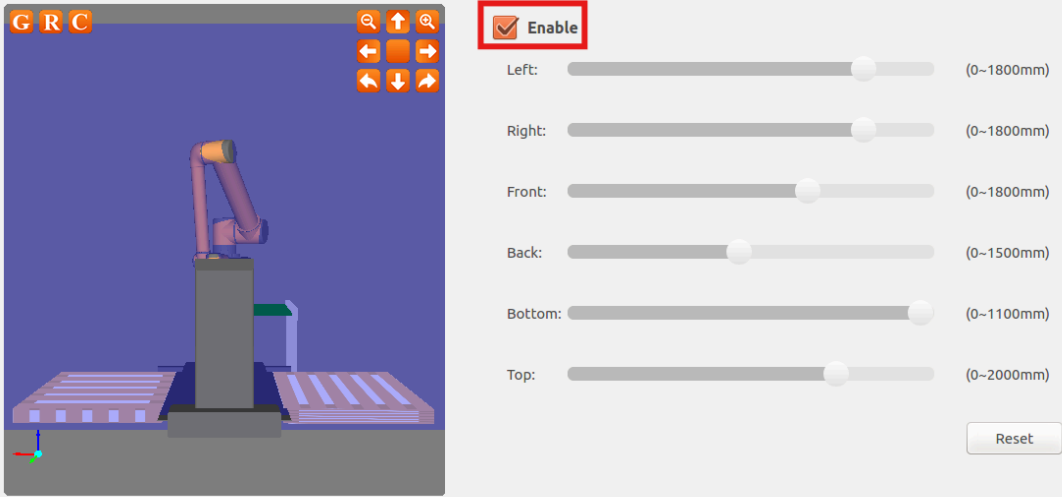
Conveyor

Other Param

Robot

System

Enable the safety control to set a virtual safety zone. A pop-up alert will appear if the center of the robotic arm's suction cup exceeds the safety control boundary.



Enable

Left: (0~1800mm)

Right: (0~1800mm)

Front: (0~1800mm)

Back: (0~1500mm)

Bottom: (0~1100mm)

Top: (0~2000mm)

Reset

2.3.2.7 Conveyor

The screenshot shows a software interface for configuring a conveyor. At the top, there are tabs for 'Home', 'IO', 'Setting', and 'Log'. Below these, there are tabs for 'Conveyor Settings' and 'Conveyor Calibration'. The 'Conveyor Settings' tab is active, showing 'Conveyor#1 Settings' and 'Conveyor#1 Dimensions' sections.

Conveyor#1 Settings

- Has Cylinder:** A toggle switch is currently turned off. *Is there a pusher cylinder, and if so, does it have a signal to indicate when it returns to the home position?*
- Time For Cylinder Extension(ms):** A text input field containing '500'.
- Delay of Incoming(ms):** A text input field containing '0'. *How long after the material is in place should the material-in-position signal be given?*
- Delay of Feeding(ms):** A text input field containing '0'. *How long after pick-up should the roller be activated?*
- Detection Switch:** A dropdown menu showing '1'. *Select the number of objects detected on the conveyor (i.e., the number of through-beam sensors). For multiple pick-and-place operations, typically select 2 or more.*

Conveyor#1 Dimensions

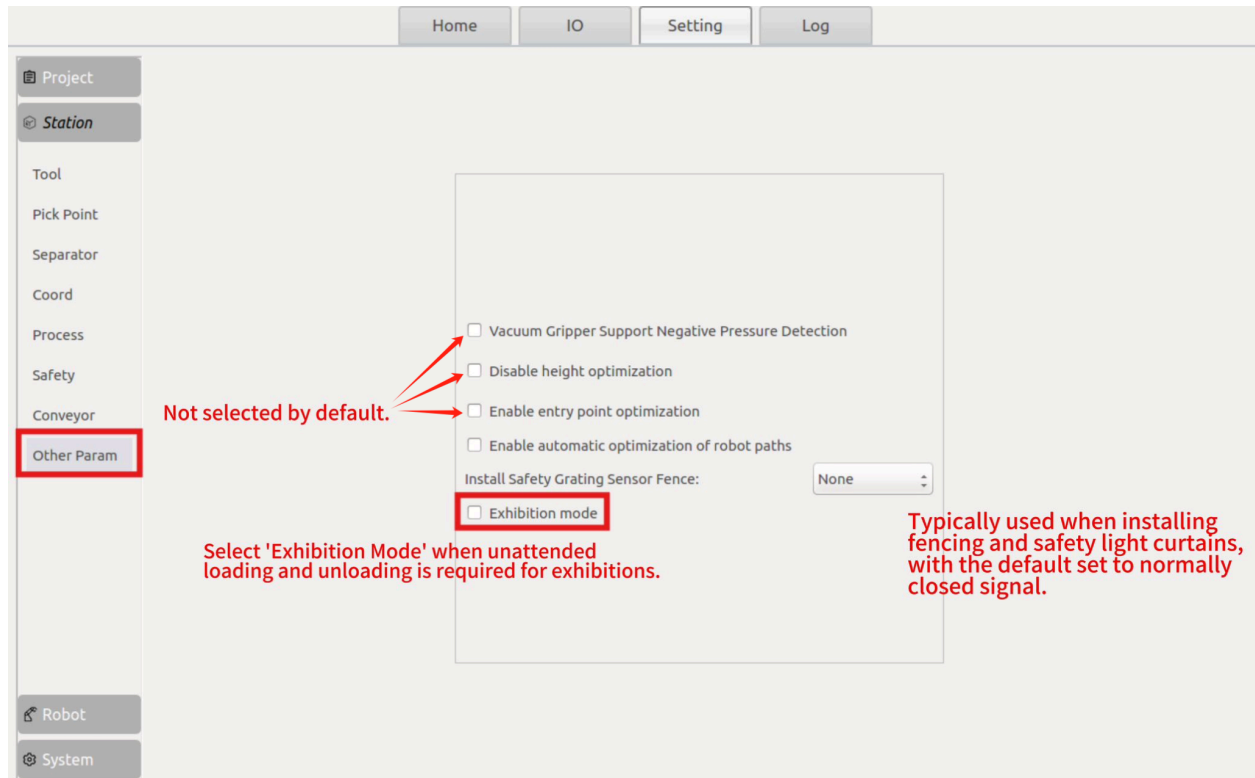
- Length(mm):** A text input field containing '930'.
- Width(mm):** A text input field containing '740'.
- Height(mm):** A text input field containing '780'.
- Origin Side Distance(mm):** A text input field containing '0'.
- Origin Bottom Distance(mm):** A text input field containing '0'.

Measure the actual dimensions of the conveyor and enter the data, primarily to check for interference between the boxes and the conveyor during palletizing.

On the left side of the interface, there is a sidebar with a tree view containing 'Project', 'Station', 'Tool', 'Pick Point', 'Separator', 'Coord', 'Process', 'Safety', 'Conveyor', and 'Other Param'. The 'Conveyor' item is highlighted with a red box.

2.3.2.8 Other

This section covers settings related to external material sensors, conveyor control, and external safety light curtains.



Palletizing Height Limit: Default is 2300; can be modified based on actual conditions.

Robot Arm Boundary Height Limit: Default is 3000; can be adjusted as needed.

Vacuum Gripper Support Negative Pressure Detection: Primarily used to verify the succession of pick-up through a vacuum gauge. Regular palletizing does not require this setting, but it should be enabled for depalletizing.

Disable Height Optimization: If unchecked, the underlying algorithm will choose between 45° forward-sequence stacking or -135° reverse-sequence stacking to achieve greater stack heights. However, if custom stacking order is needed, check this option to ensure stacking follows the defined sequence.

Enable Entry Point Optimization: Default is unchecked.

Exhibition Mode: Typically used for expo show displays. Set the depalletizing offset value and manually configure palletizing for the left station. When enabled, the system will continuously alternate between depalletizing and palletizing.

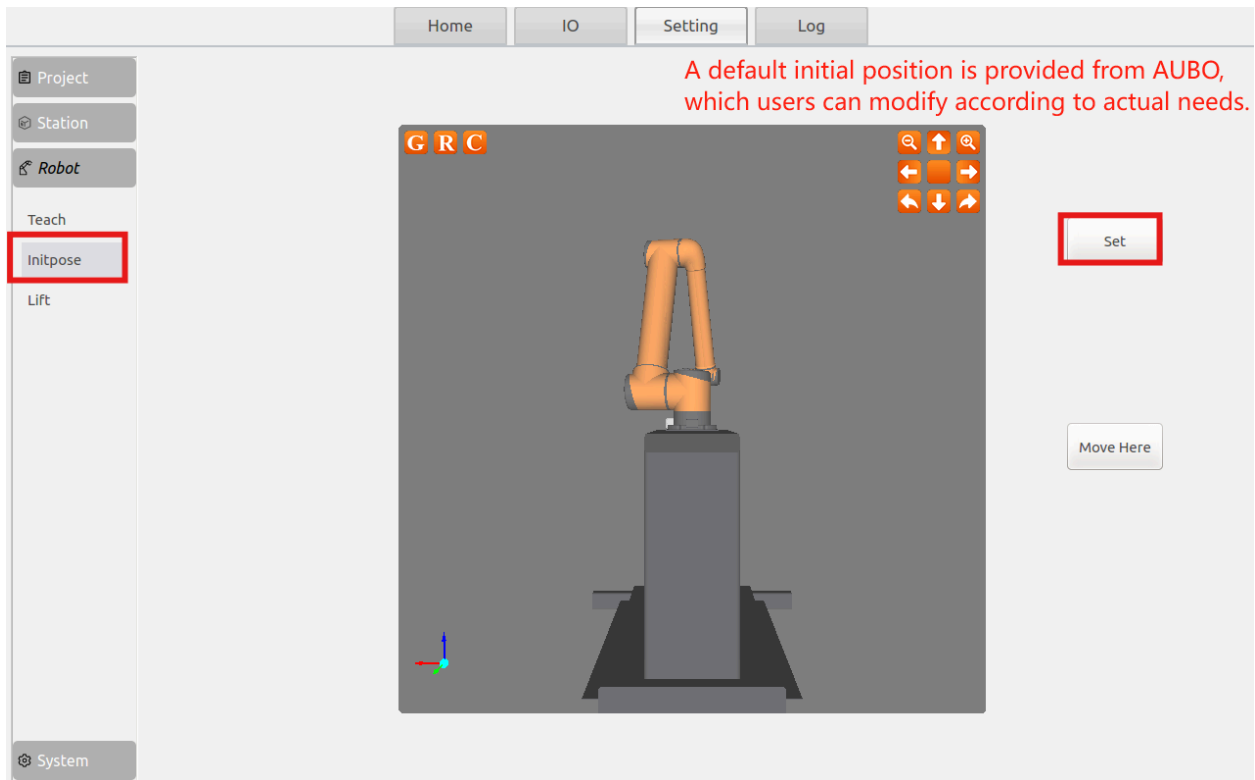
2.3.3 AUBO Cobot Arm

AUBO Robotics Teaching

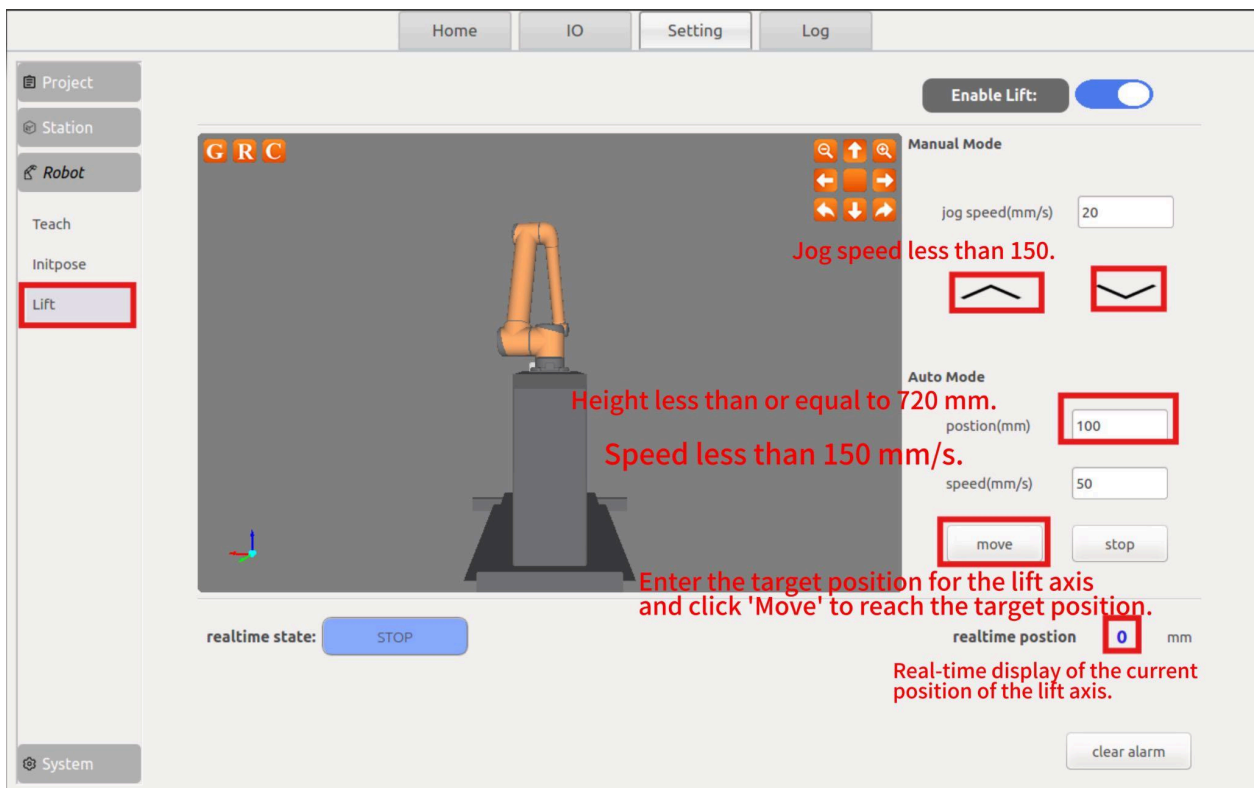
The screenshot displays the AUBO Robotics Teaching software interface. On the left, a sidebar contains navigation options: Project, Station, Robot, **Teach** (highlighted with a red box), Initpose, and Lift. The main workspace features a 3D model of the AUBO robot arm. Above the model are zoom and pan controls. To the right of the model are two sets of directional arrows: 'Position Control' (X-, X+, Y-, Y+, Z+, Z-) and 'Orientation Control' (X-, X+, Y-, Y+, Z-, Z+). Below the model, the 'Coordinate system' is set to 'Base'. There are buttons for 'Auto-leveling' and 'Init Pose'. At the bottom, a 'Teach Speed' slider is highlighted with a red box and labeled 'Adjustable speed for manual teaching.', currently set to 50%. On the right side, a 'Joint Control' table lists the current position and movement direction for each of the six joints.

Joint	Value	Direction
Joint 1	248.18	+
Joint 2	51.93	+
Joint 3	-137.62	+
Joint 4	-99.55	+
Joint 5	-90.00	+
Joint 6	159.21	+

Initial Position Setting (Safety Position)



Lift Axis Control



Switch to enabled state using the enable toggle button.

Manual Operation: First, set the jog speed (0-150 mm/s), then hold the up or down icon to move the lift axis.

Automatic Operation: Enter the target position (range: 0-720mm) and movement speed (0-150 mm/s), then click **Move**.

2.3.4 System

Language and Unit

Home IO Setting Log

Project
Station
Robot
System
Language and Unit
Update and Restore
File Export
Admin
Version
Registration
History
Device
Visual

简体中文
English
日本語
Unit

Metric

Time zone
Asia/Shanghai

Currently supports three languages. A restart is required for the change to take effect.

Currently supports metric and inch units. A restart is required for the change to take effect.

Update

Upgraded packages are stored locally. Click 'Local' to view them, and use local packages to roll back to a previous version if needed.

Select the upgrade package and click 'Upgrade' to proceed with the upgrade.

Copy the upgrade package to a USB drive, insert the USB drive into the teach pendant's USB port, and click the USB icon to scan for the upgrade package on the drive.

File Export

Name	Type	Size	Modified
<input checked="" type="checkbox"/> pallet.log	pallet	1.63 MB	2024/11/5 11:54
<input checked="" type="checkbox"/> trace_all_server.log	server	1.78 MB	2024/11/5 12:06
<input checked="" type="checkbox"/> record_2024_06_03_23-07...	screen-record	5.30 MB	2024/6/3 23:10

Select the log files or project files to export, then click 'Export'.

Home IO Setting Log

Project Station Robot System

Language and Unit Update and Restore File Export Admin Version Registration History Device Visual

Log

Open Directory

root Desktop

Create Folder

Name	Size	Modified
AUBOPalletizer.desktop	265 bytes	06/03/2024
AUBO Palletizer Customization Guide.pdf	724.9 kB	12/02/2023
AUBOPE.desktop	257 bytes	01/13/2021
gnome-terminal.desktop	560 bytes	01/13/2021
nautilus.desktop	688 bytes	01/13/2021

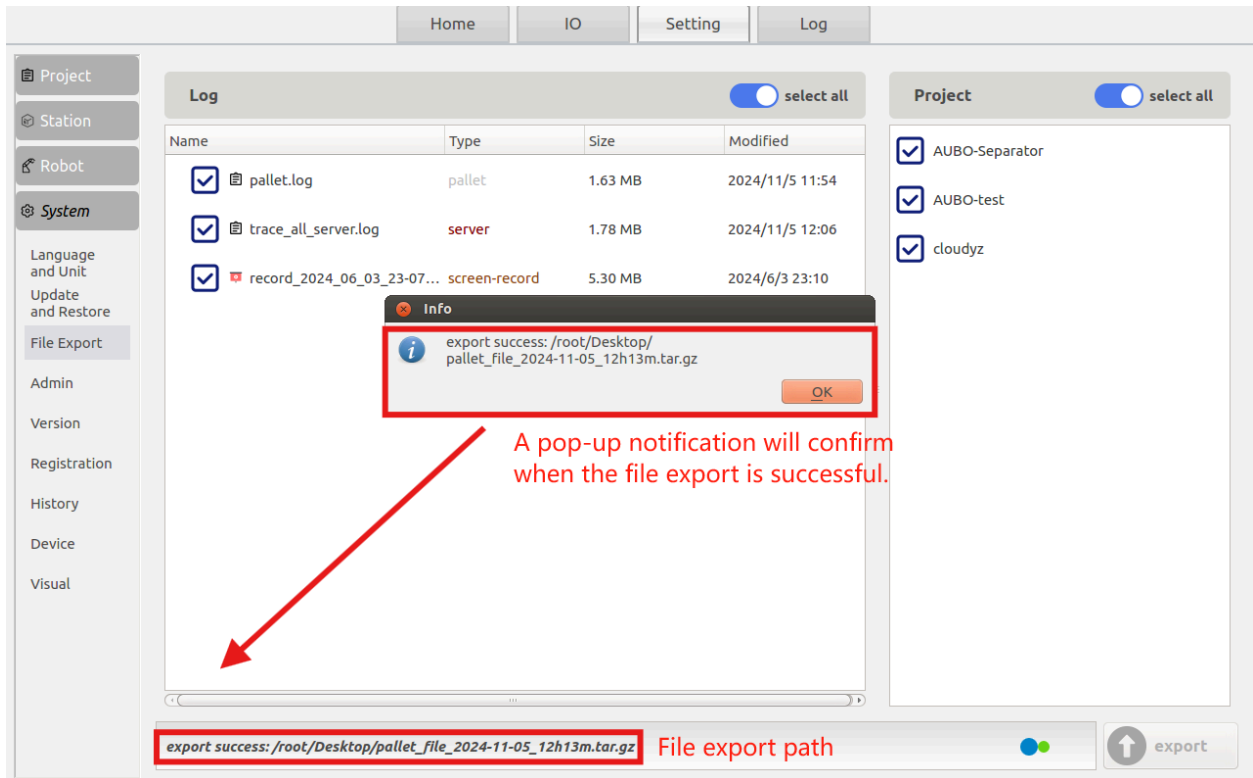
Generally, select your own USB drive for exporting files; here, we'll use the desktop as an example.

Cancel Open

Click 'Open'

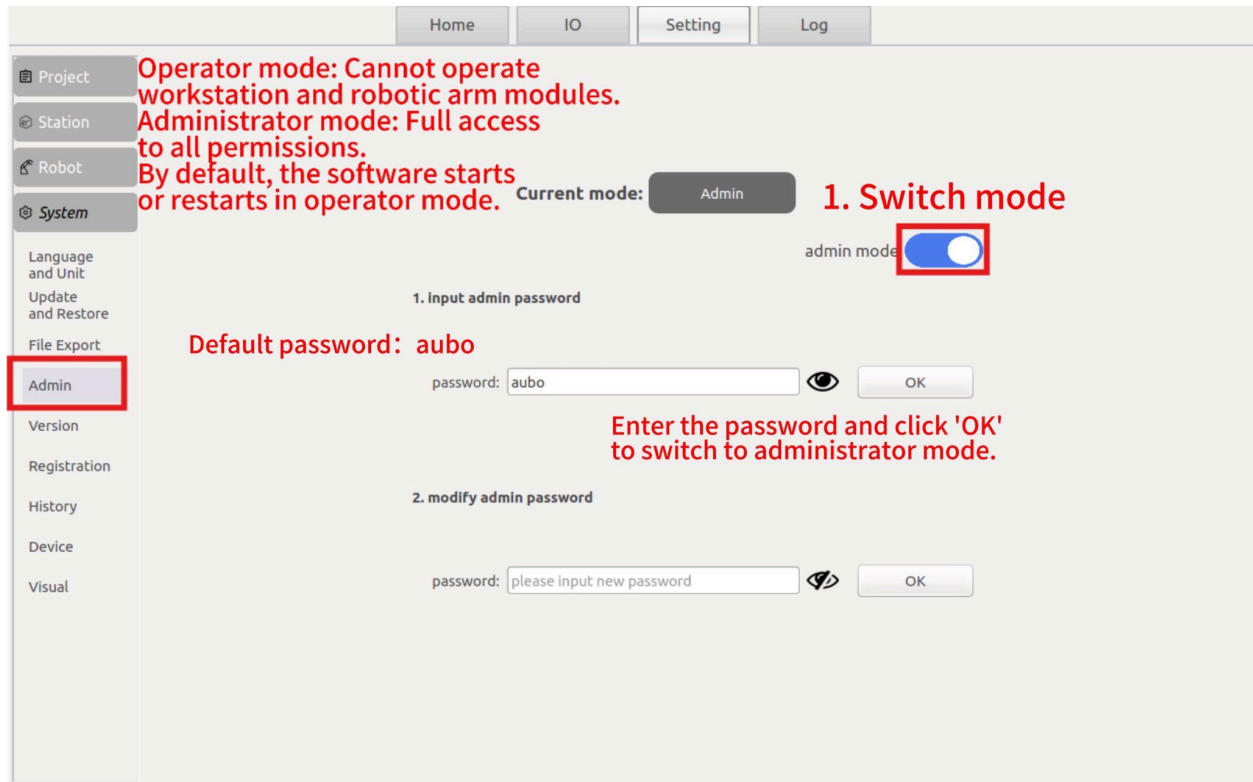
export success: /root/Desktop/pallet_file_2024-11-05_12h09m.tar.gz

export



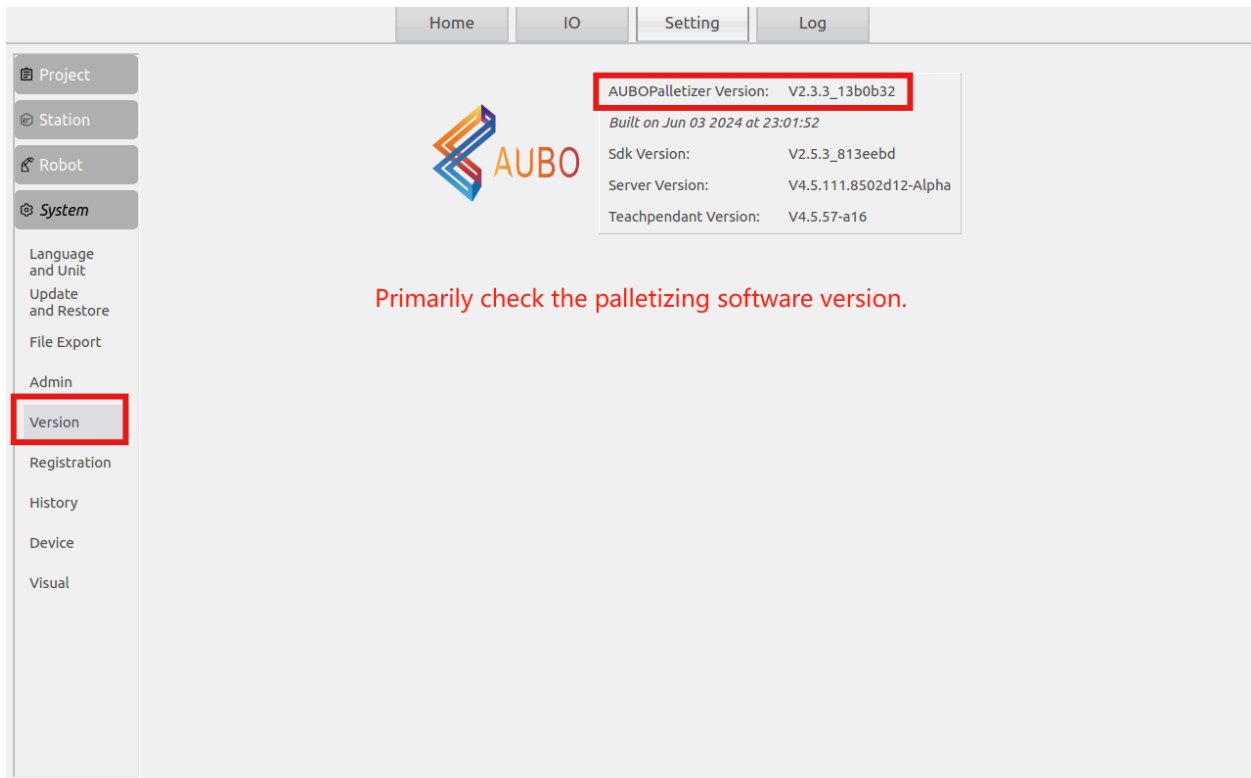
A pop-up notification will confirm when the file export is successful.

Administrator



Enter the password and click 'OK' to switch to administrator mode.


Version Information



Home IO Setting Log

Project
Station
Robot
System

Language and Unit
Update and Restore
File Export
Admin
Version
Registration
History
Device
Visual

 AUBO

AUBOPalletizer Version:	V2.3.3_13b0b32
<i>Built on Jun 03 2024 at 23:01:52</i>	
Sdk Version:	V2.5.3_813eebd
Server Version:	V4.5.111.8502d12-Alpha
Teachpendant Version:	V4.5.57-a16

Primarily check the palletizing software version.

Registration: The AUBO palletizer software in factory-default workstations is in trial mode, and registration is required based on actual needs.

The current palletizing workstation software comes with a free trial version. The trial period is one month, and a registration code update is required based on actual needs.

Registration

Machine Code: **ad51f2**

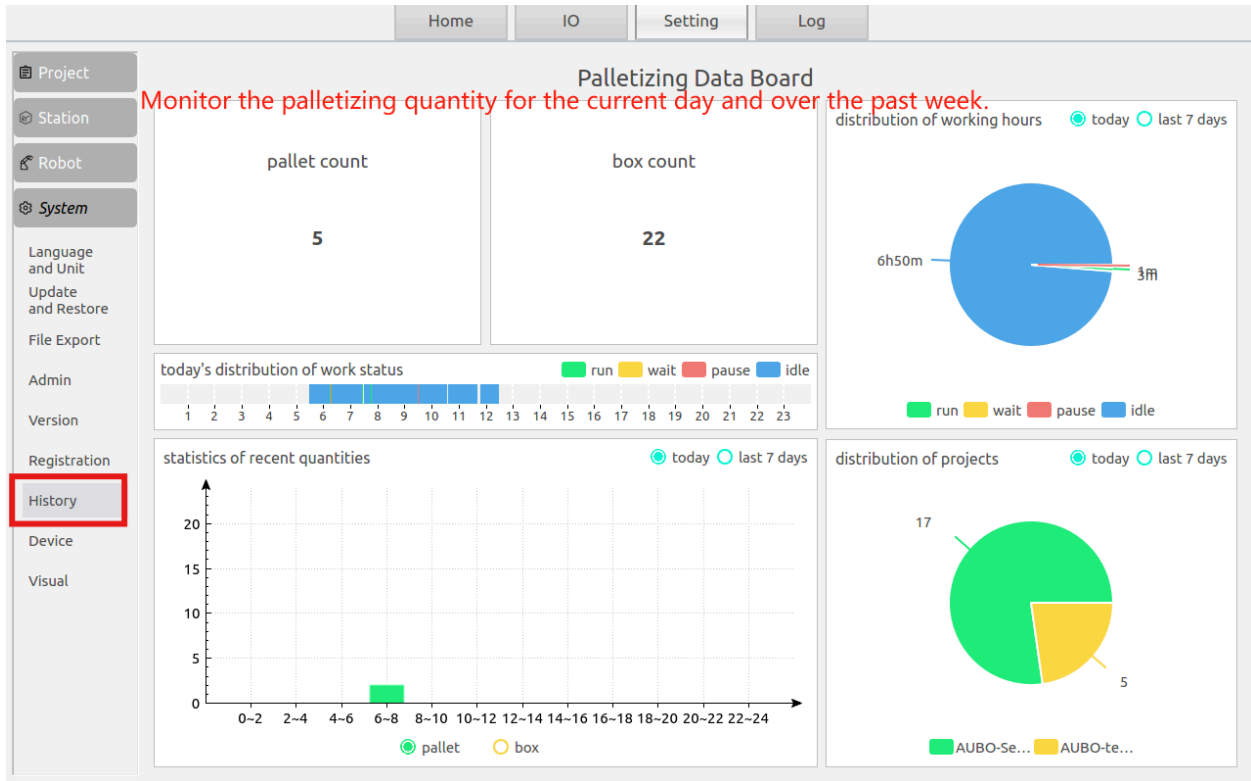
License: **47a478**

Sign up success! Free trial version! 26 days remaining!

tips:

1. Click generate to get machine code
2. Send machine code to AUBO and receive license
3. Fill in the license and sign up

Historical Data: Allows viewing of current or recent palletizing data, such as the number of pallets and boxes.



Device Status: Displays the status of devices such as the PLC, lift axis, and robot arm joints.

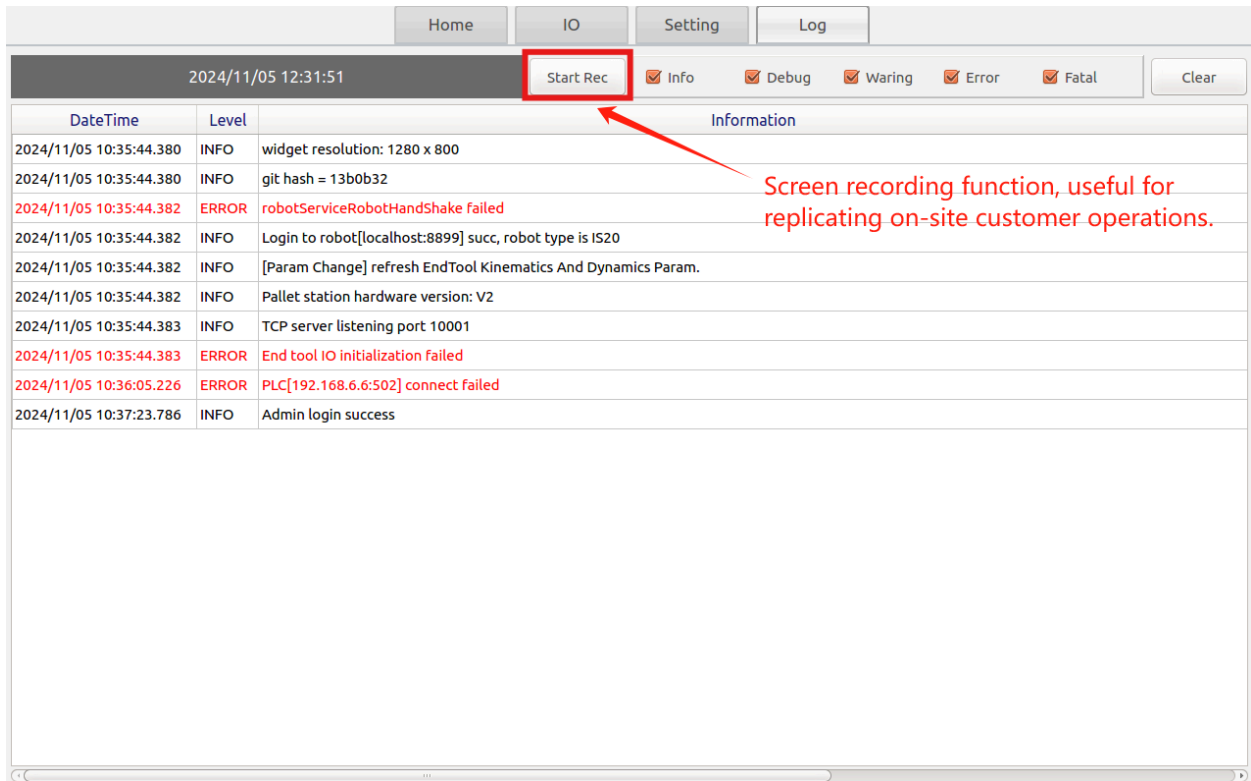
The screenshot shows a control interface with a top navigation bar (Home, IO, Setting, Log) and a left sidebar (Project, Station, Robot, System, Language and Unit Update and Restore, File Export, Admin, Version, Registration, History, Device, Visual). The 'Device Status' section is highlighted with a red box and contains the following items:

- PLC Connection Status:
- Enabling Status of Lift:
- Factory Aging Mode:
- Mobus Slave Tcp:
- Tcp Server: port:10001
- Hardware Version: v2
- Enabling Exhibition Mode:
- Enabling Monitor In Place:
- EIP Gateway Connected:
- Mobus Slave Rtu:
- Websocket Server:

The 'Joint Status' section is also highlighted with a red box and contains the following table:

Joint	Range	Voltage	Current	Temperature
Joint1	-359.9° ~ 359.9°	0.0 V	0 mA	0.0 °C
Joint2	-174.9° ~ 174.9°	0.0 V	0 mA	0.0 °C
Joint3	-174.9° ~ 174.9°	0.0 V	0 mA	0.0 °C
Joint4	-174.9° ~ 174.9°	0.0 V	0 mA	0.0 °C
Joint5	-174.9° ~ 174.9°	0.0 V	0 mA	0.0 °C
Joint6	-359.9° ~ 359.9°	0.0 V	0 mA	0.0 °C

2.4 Logs

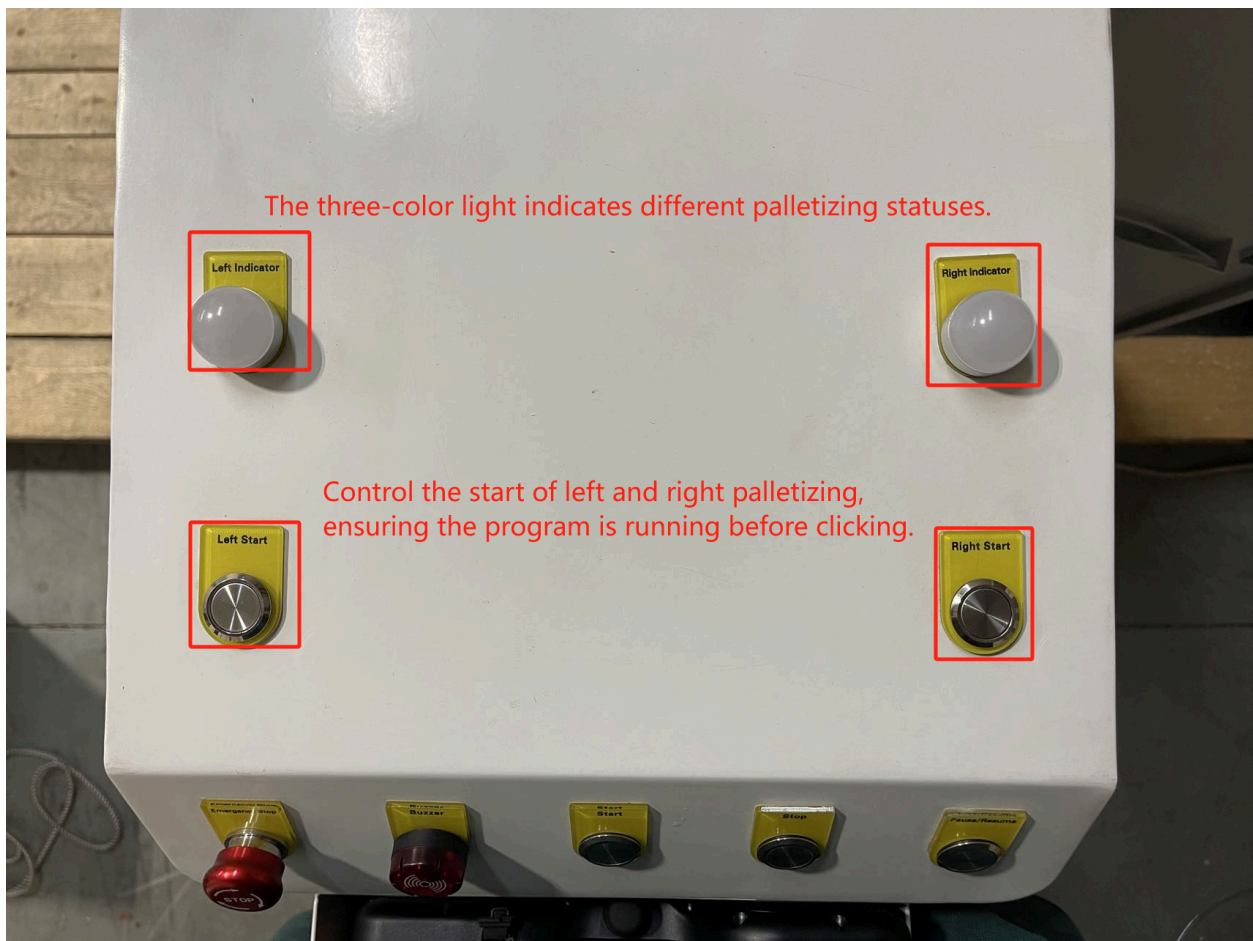


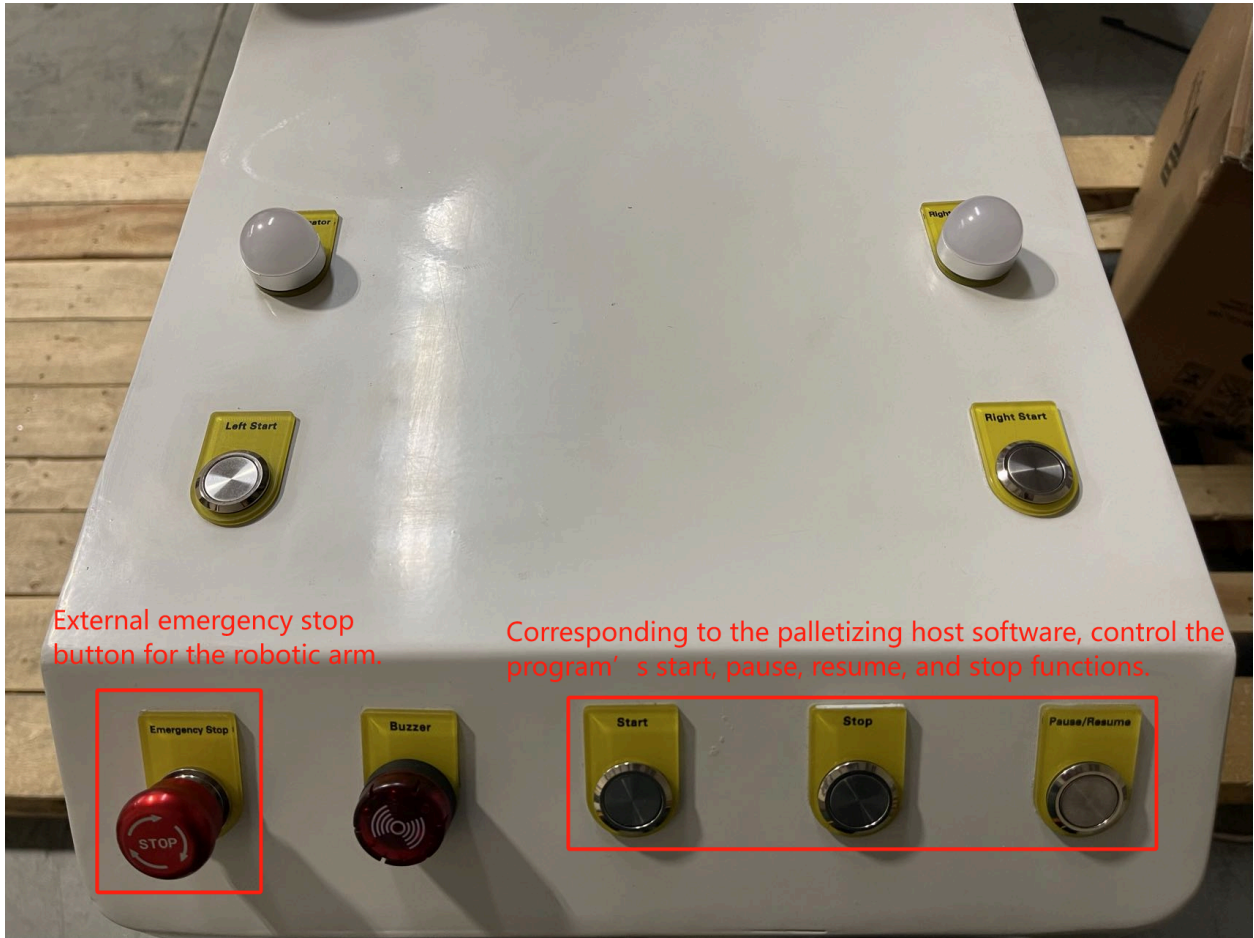
The screenshot shows a web-based log viewer interface. At the top, there are navigation tabs: Home, IO, Setting, and Log. Below the tabs, the current date and time are displayed as 2024/11/05 12:31:51. To the right of the date is a 'Start Rec' button, which is highlighted with a red box. Further right are checkboxes for log levels: Info, Debug, Warning, Error, and Fatal, all of which are checked. A 'Clear' button is located on the far right. Below the navigation and controls is a table with three columns: DateTime, Level, and Information. The table contains several log entries, including INFO and ERROR messages. A red arrow points from the text 'Screen recording function, useful for replicating on-site customer operations.' to the 'Start Rec' button.

DateTime	Level	Information
2024/11/05 10:35:44.380	INFO	widgit resolution: 1280 x 800
2024/11/05 10:35:44.380	INFO	git hash = 13b0b32
2024/11/05 10:35:44.382	ERROR	robotServiceRobotHandShake failed
2024/11/05 10:35:44.382	INFO	Login to robot[localhost:8899] succ, robot type is IS20
2024/11/05 10:35:44.382	INFO	[Param Change] refresh EndTool Kinematics And Dynamics Param.
2024/11/05 10:35:44.382	INFO	Pallet station hardware version: V2
2024/11/05 10:35:44.383	INFO	TCP server listening port 10001
2024/11/05 10:35:44.383	ERROR	End tool IO initialization failed
2024/11/05 10:36:05.226	ERROR	PLC[192.168.6.6:502] connect failed
2024/11/05 10:37:23.786	INFO	Admin login success

3. External Buttons and Indicator Lights for the Palletizing Workstation

3.1 Overview





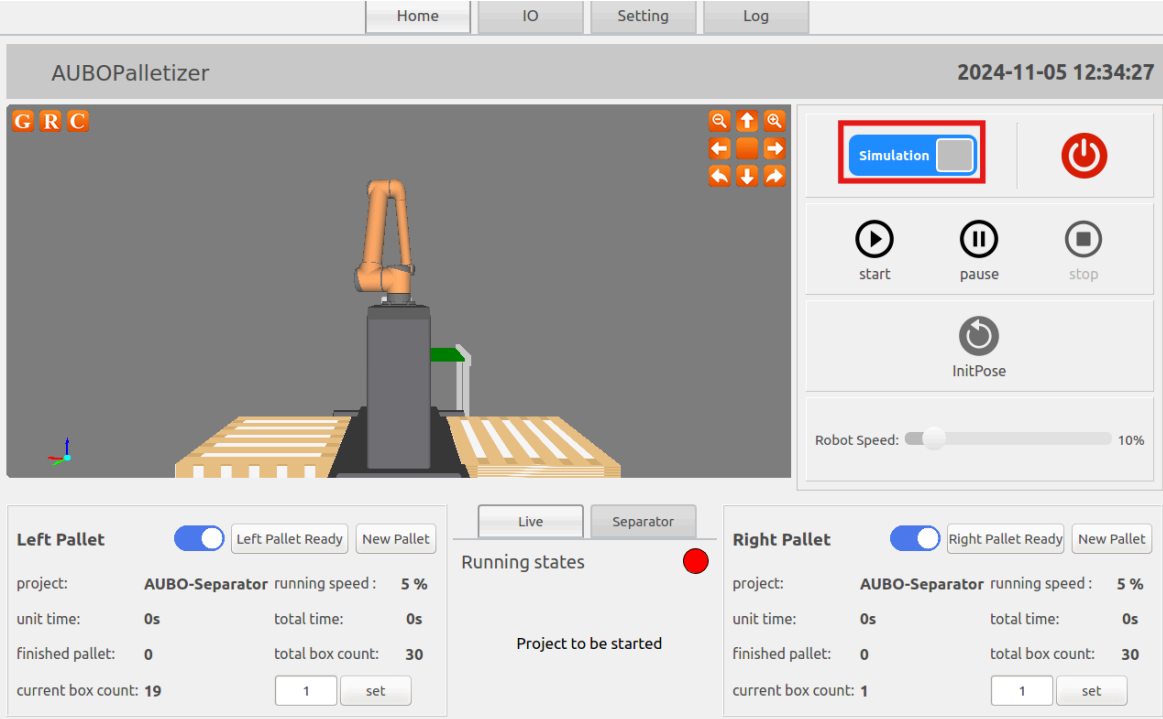
External emergency stop button for the robotic arm.

Corresponding to the palletizing host software, control the program's start, pause, resume, and stop functions.

3.2 Operating Procedure

3.2.1 Normal Startup of the AUBO Palletizer Software

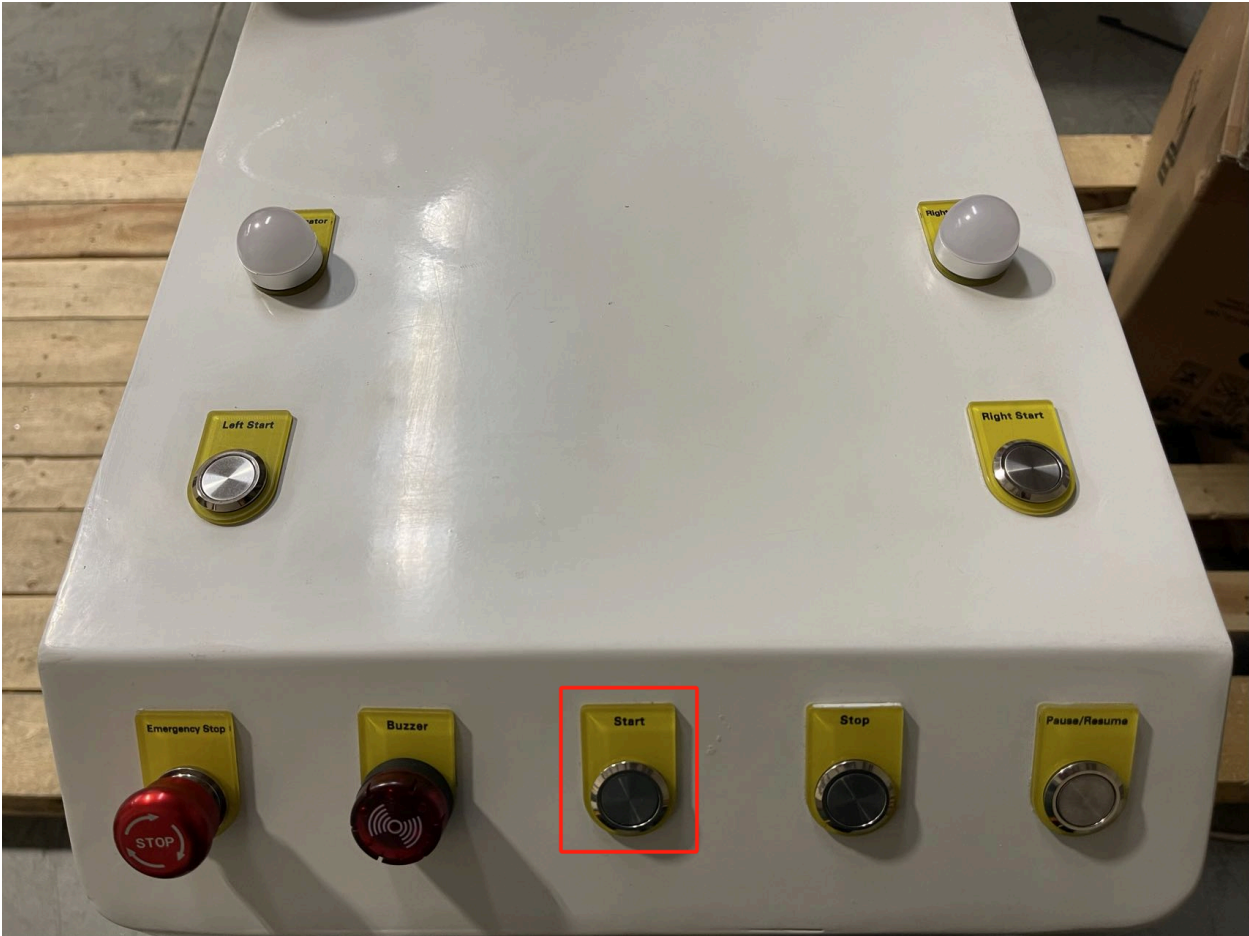
Choose either real mode or simulation mode based on actual requirements.



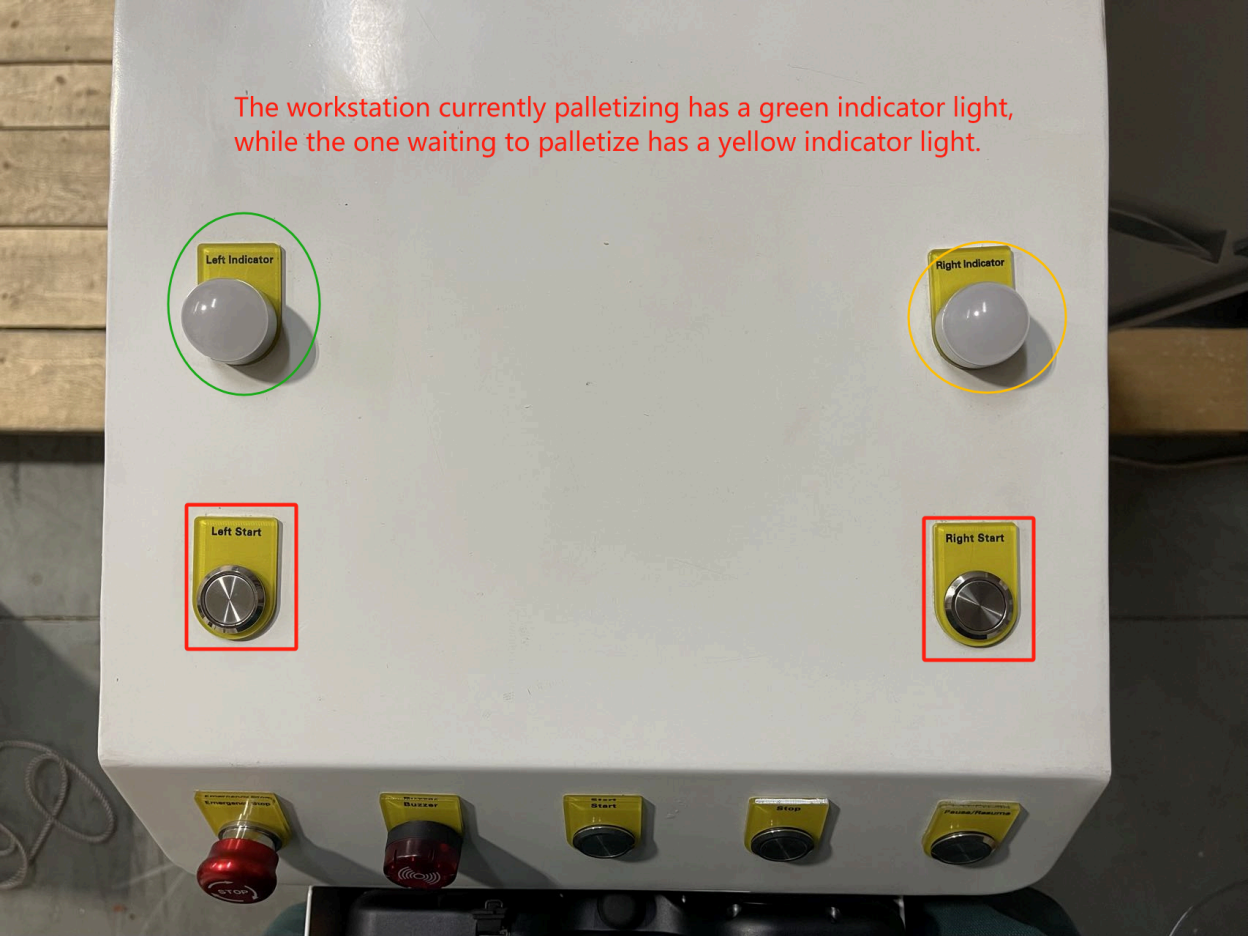
3.2.2 Position the Pallet Properly



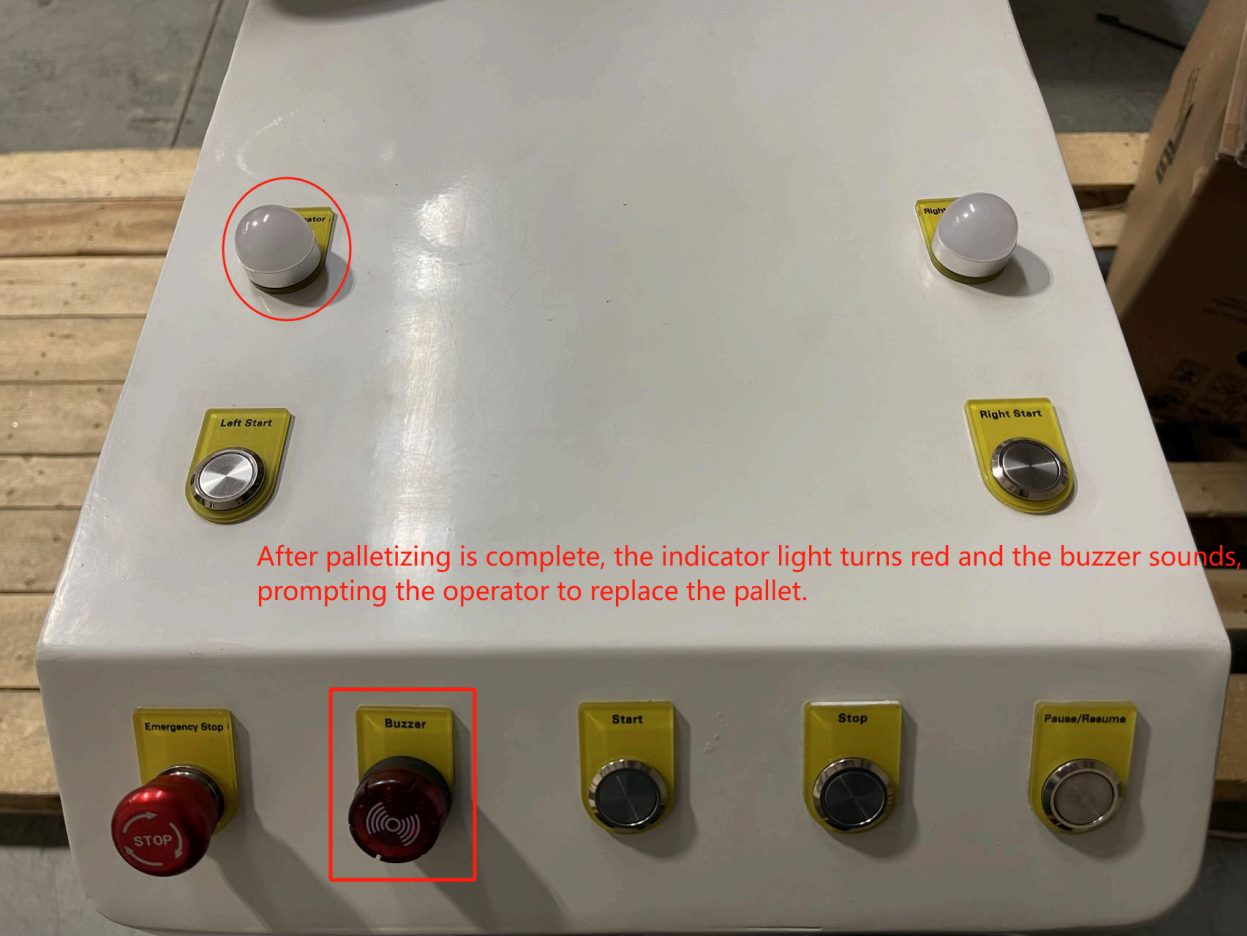
3.2.3 Press the Start Button



3.2.4 Press Left or Right Start Button



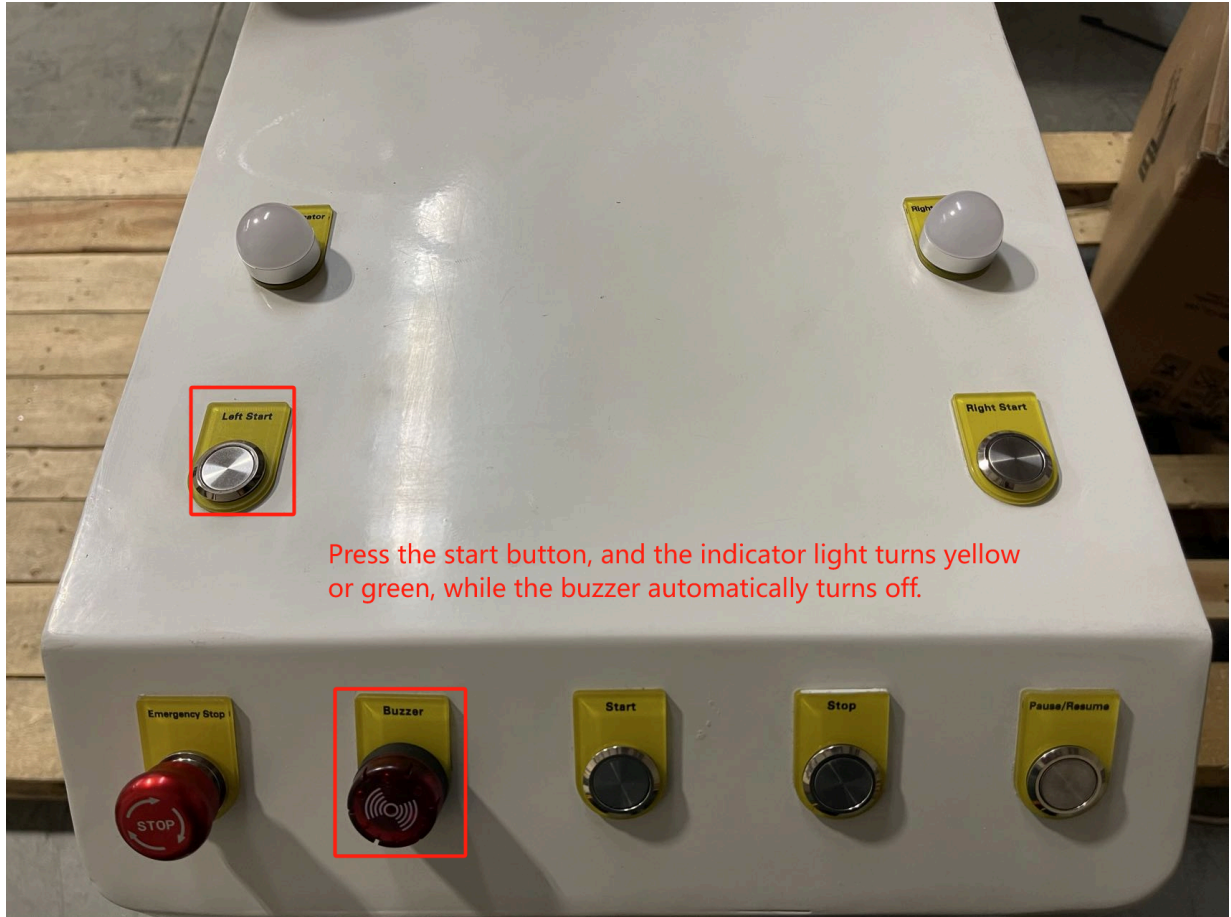
3.2.5 Palletizing Completion



3.4.6 Replacing the Pallet

Remove the completed pallet and replace it with a new one. Press the left or right start button corresponding to the respective end. The buzzer will turn off, and the indicator light will change from red to yellow (waiting for palletizing) or green (starting palletizing).





4. Special Situations and Troubleshooting

4.1 Manually Adjusting the Current Box Number During Palletizing

If there is a discrepancy between the manual palletizing sequence and the robotic arm's internal sequence, manually fill the current layer and continue palletizing from the next layer.

Home IO Setting Log

AUBOPalletizer 2024-11-08 04:23:25

GRC

Simulation

start pause stop

InitPose

Robot Speed: 100%

Left Pallet Left Pallet Ready New Pallet

project: AUBO-Separator running speed: 50 %

unit time: 6.7 s total time: 0s

finished pallet: 0 total box count: 30

current box count: 18 set

Right Pallet Right Pallet Ready New Pallet

project: AUBO-Separator running speed: 50 %

unit time: 0s total time: 0s

finished pallet: 0 total box count: 30

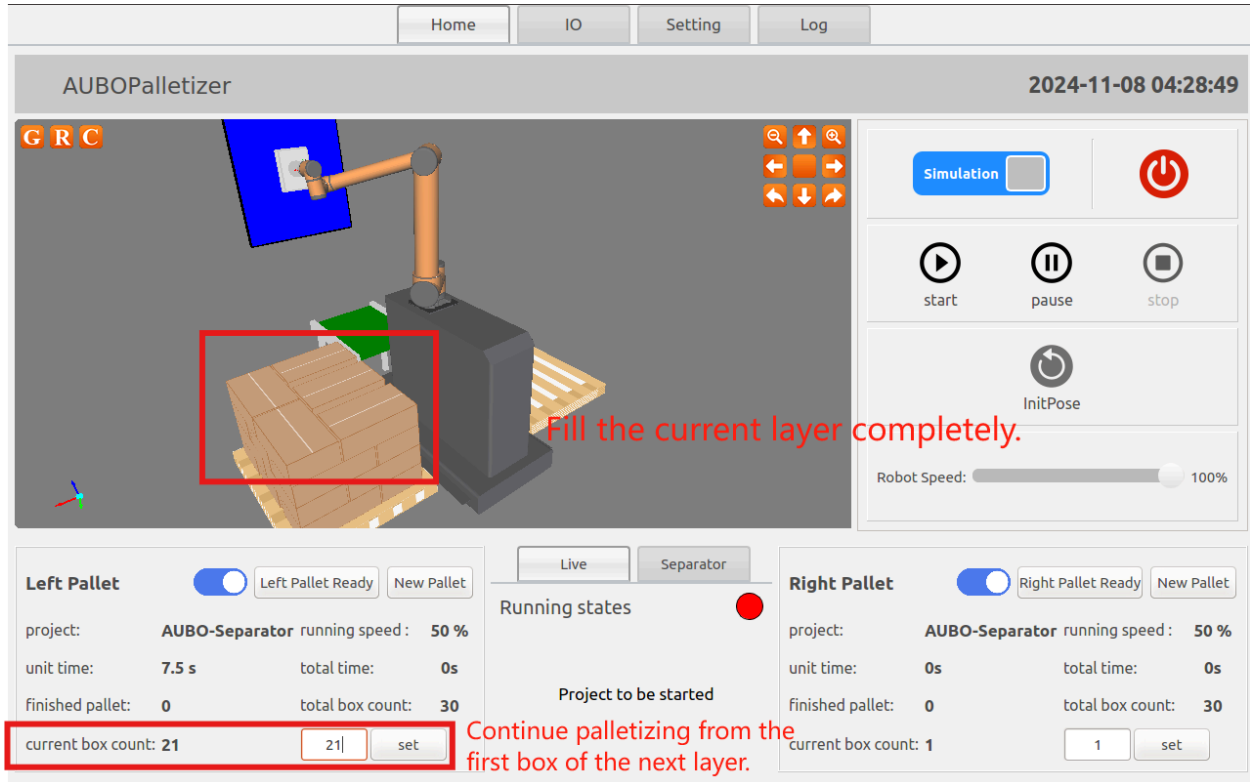
current box count: 1 set

Running states **Live** Separator

Project to be started

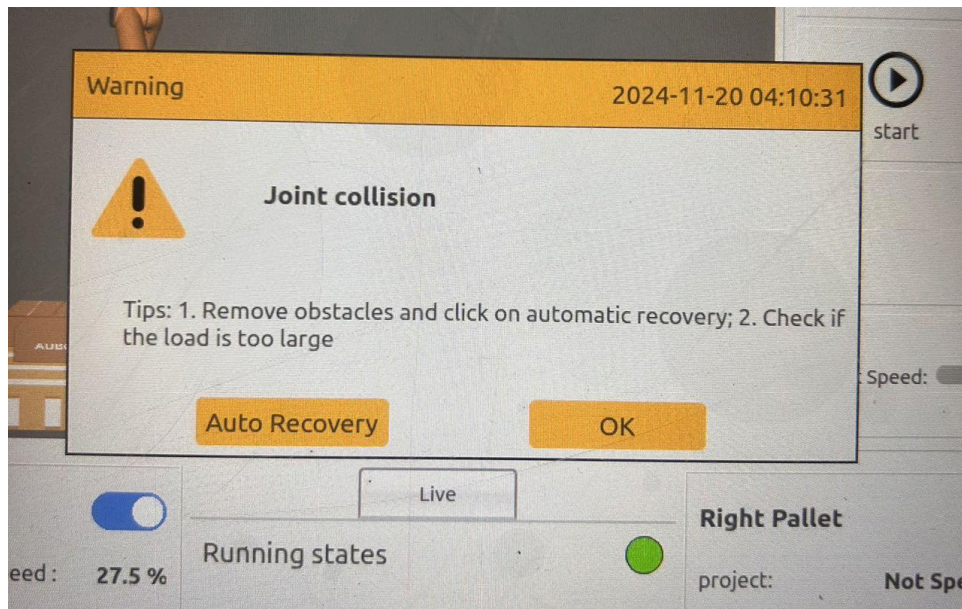
Note: The current box numbering starts from 1.

When manual palletizing completes part of the boxes and the workstation needs to continue, fill the current layer completely, then set the current box number to start palletizing from the next layer.



4.2 Joint Collision

When a joint collision is detected, a popup will notify the user, and the buzzer will sound an alert. Click "Auto Recovery" in the popup; the lift axis will elevate to a safe height.



Afterward, click "Stop" and check if any material is still on the suction cup. If so, manually remove the material and go to the IO interface to disable the suction. Resume palletizing as usual.

Note: If the collision occurs during material placement due to issues like box deformation from sealing, remove the affected box.

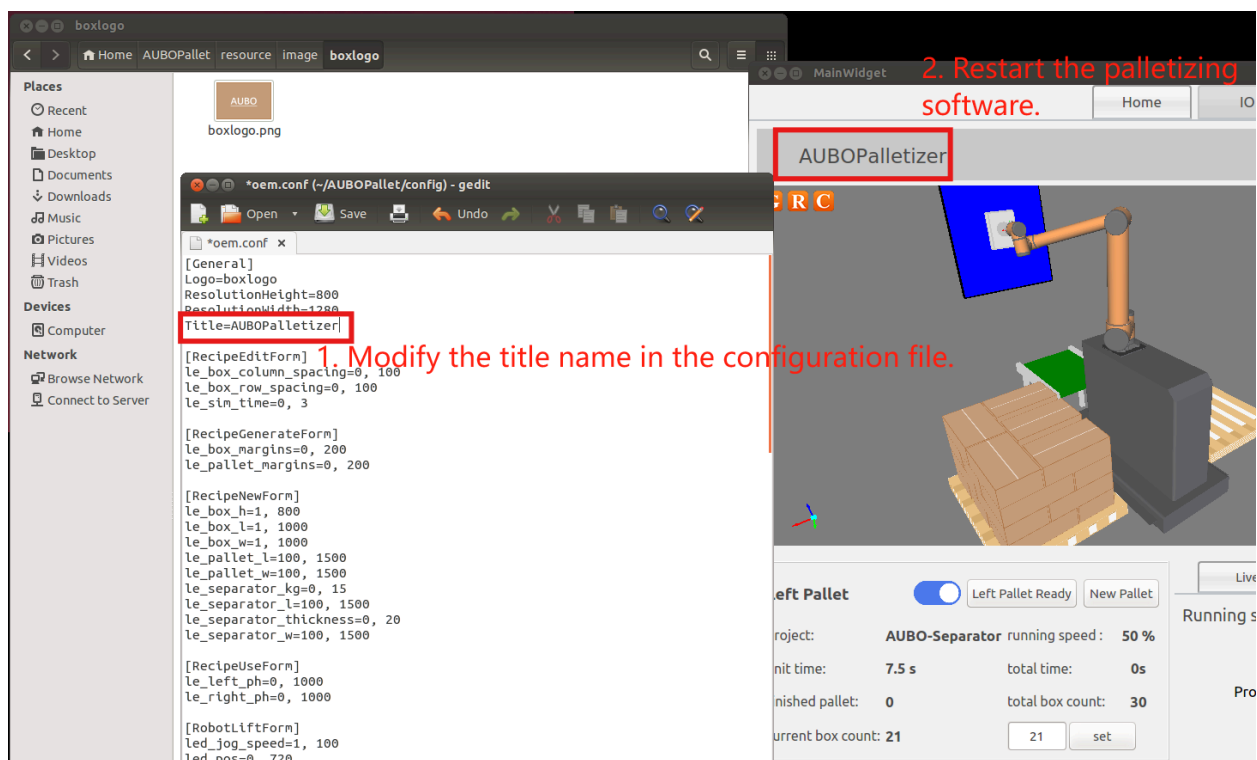
4.3 Suction Cup Status Error

If the suction cup is left on before starting the program, a popup will alert for a suction cup status error when starting. You can either proceed manually by resuming material handling or click **Confirm** and manually disable the suction in the IO interface.

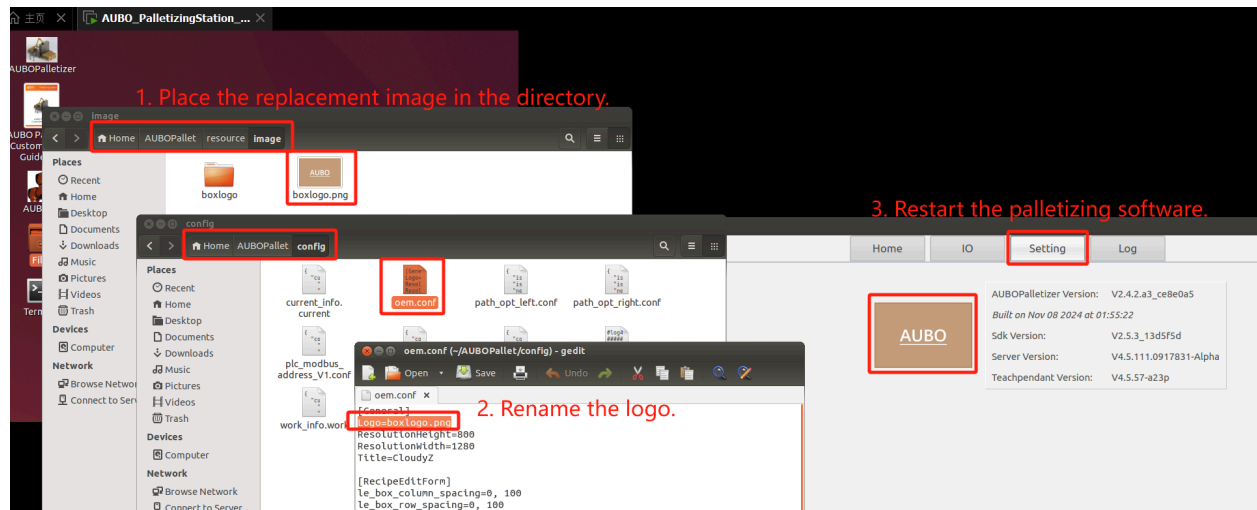
5. OEM Branding Replacement

5.1 AUBO Palletizer Software Title and Logo Replacement

To modify the main interface title, edit the title name in
`/root/AUBOPallet/config/oem.conf`



To update the logo in the version information interface, edit the logo name in /root/AUBOPallet/config/oem.conf

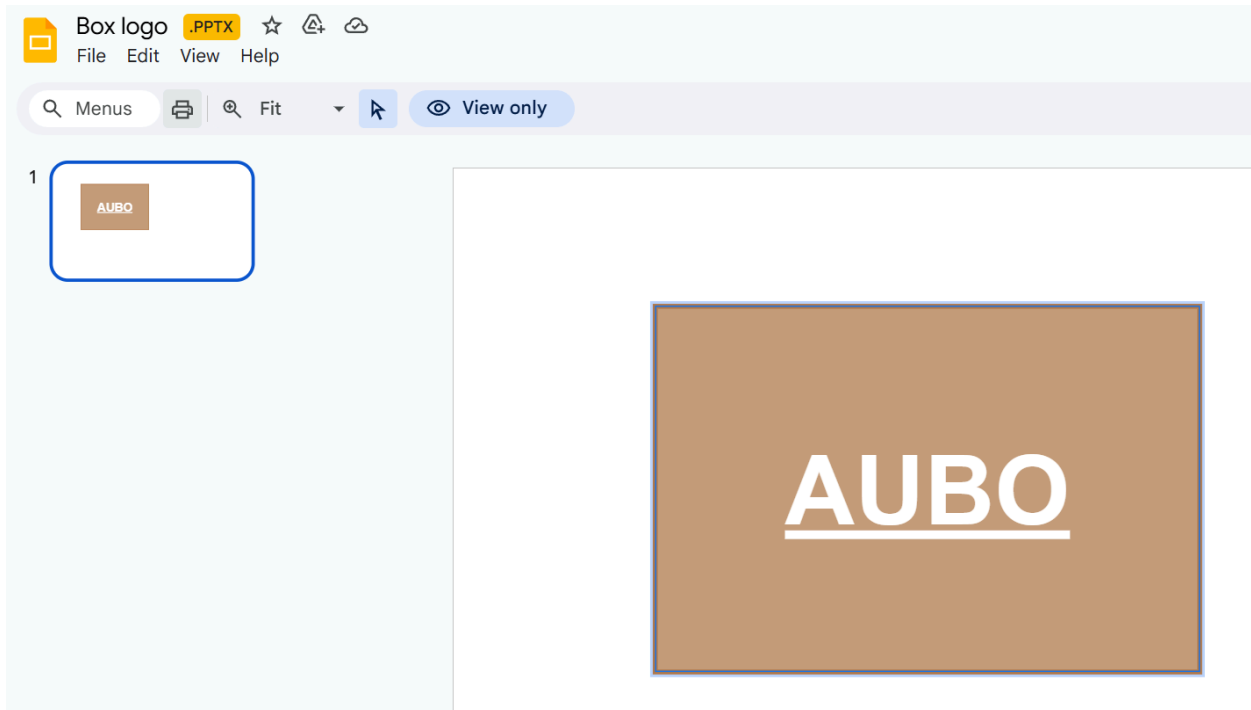


5.2 Replacing the 3D Simulation Box Logo

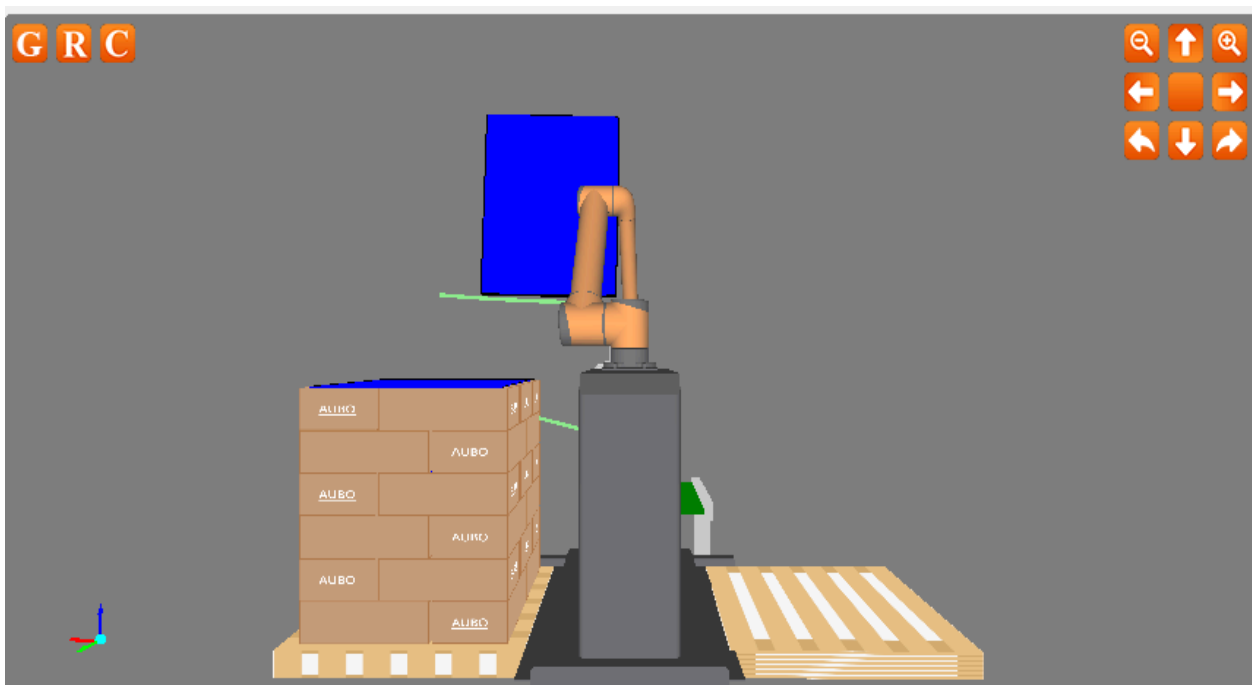
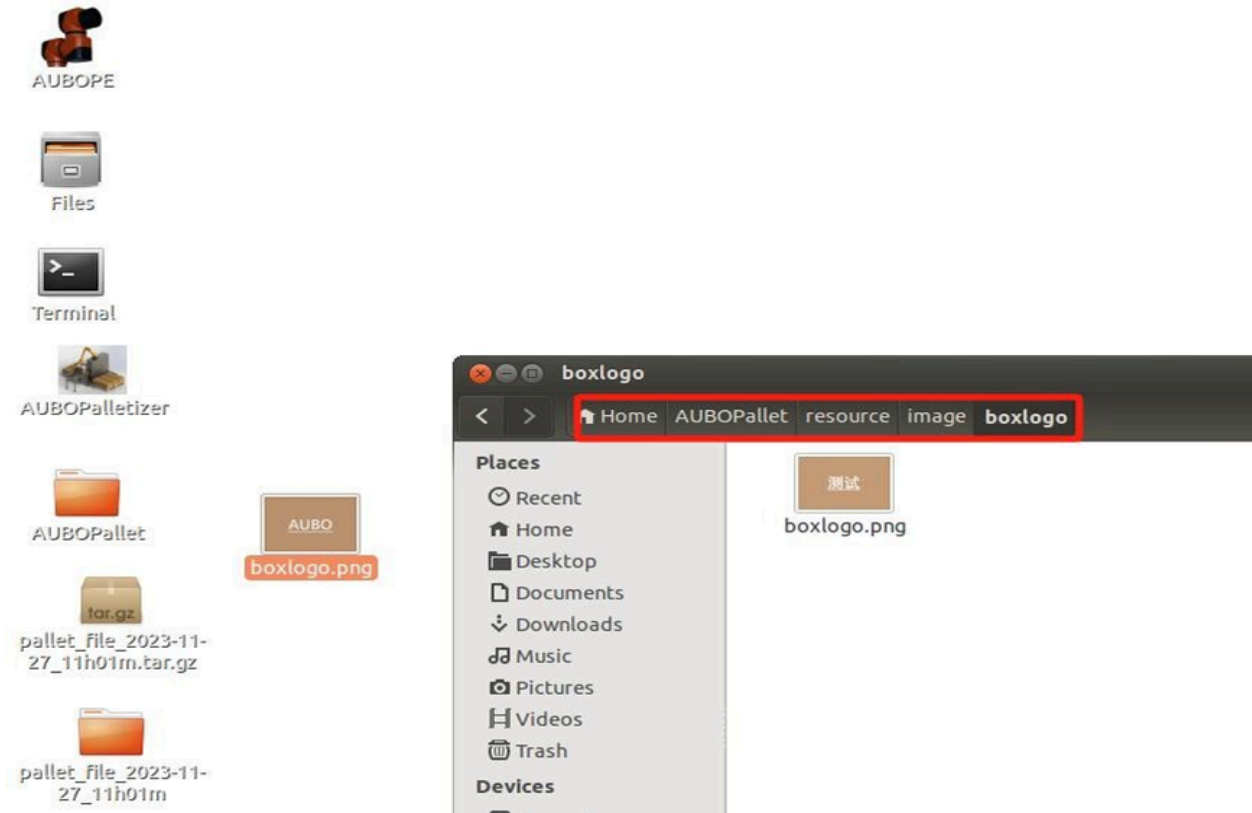
Template PPT download link:

https://drive.google.com/drive/folders/17BQoW7F1x_1n-Yo5SyBjp_3II9AuQIV3?usp=sharing

Open logo.pptx, update the logo, and save the image as boxlogo (in PNG format).



Replace the logo image in the corresponding folder, then restart the AUBO palletizer software.



If the logo on the box doesn't show up, go to Setting->Station->Pick Point->label direction->choose a direction, and try to restart the software again.



AUBO Robotics USA

Headquarters Address: 11701 Metro Airport Center Dr, Romulus, MI 48174

Tel: +1 833-282-6276

E-mail: sales@aubo-usa.com