iNexBot

Palletizing Process

Catalogue

Palletizing Process

Usage scenarios

Robot palletizing is mainly used in food, beverage, logistics and other industries, and is also a typical example of industrial robot application, combined with different grippers, it can realize the crating and palletizing of various shapes of finished products in different industries. The value of palletizing is to palletize piles of goods in a certain pattern, so that the goods can be easily handled, unloaded and stored.

Traditionally, palletizing is done by hand, and in many cases this type of palletizing cannot be adapted to today's high-tech development. When the speed of the production line is too fast or the weight of the product is too large, manpower would be difficult to meet the requirements, and the use of manpower for palletizing requires a large number of people and high labor costs, yet it does not improve productivity.

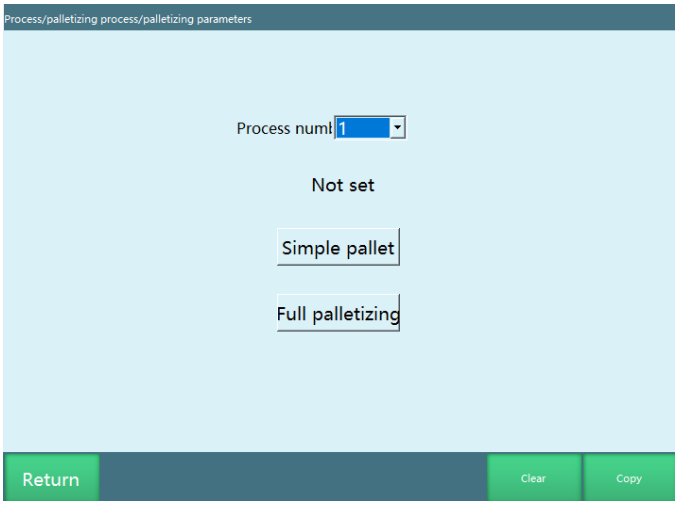
In order to improve the efficiency of handling and unloading, improve the quality of palletizing, save labor costs and ensure the personal safety of the employees, the application of palletizing robots will become more and more widespread.

Simple palletizing/Complete palletizing

Enter [Process/Palletizing process/Palletizing parameters], there are 99 process numbers in the "Process number" parameter. You can also select "Simple palletizing" or "Complete palletizing" here.

Clear parameters: Clear the parameters of complete palletizing/simple palletizing of the process number you currently selected.

Copy parameters: Copy the parameters of complete palletizing/simple palletizing of the currently selected process number to the process number you want.

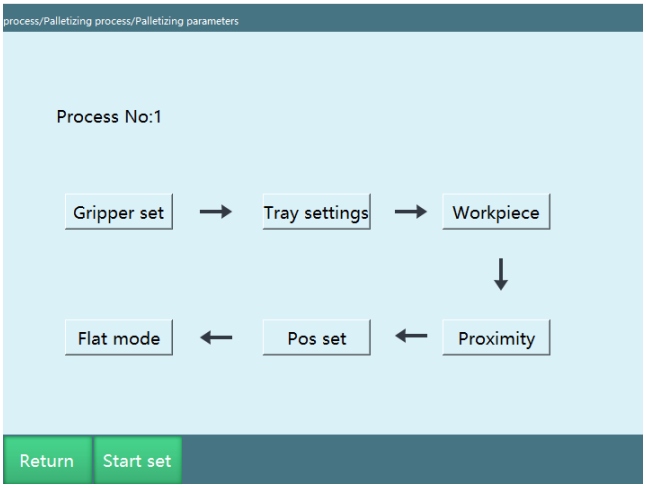


Note: It is better not to choose the same process number for simple palletizing and complete palletizing. If the process number for simple palletizing is 1, after setting the parameters, if you change the process number 1 to complete palletizing, then you have to reset the parameters for complete palletizing. Choosing different process numbers can save time and avoid errors when the program is running.

Complete palletizing

Parameter setting

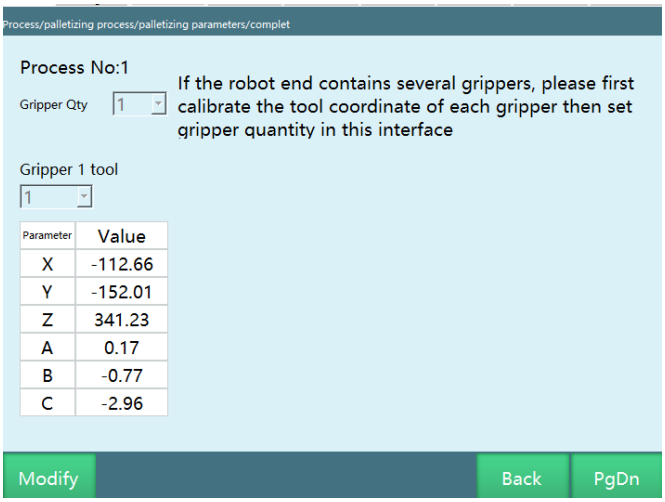
Complete palletizing process includes gripper setting, pallet setting, workpiece parameters, overlap mode, position setting and plane mode.



Gripper setting

The gripper setting is to set the tool hand used in the palletizing process.

1. If two suction cups pick up material separately (after one suction cup picked up material, switch to the other suction cup to pick up material), then set two grippers.
2. If two suction cups pick up material at the same time, then set one gripper.
3. If two suction cups discharge material separately (after one suction cup discharged material, switch to the other suction cup to discharge material), then set two grippers.
4. If two suction cups discharge material at the same time, then set one gripper.



Please go to the [Setting - Tool hand calibration] interface to calibrate the gripper (tool hand) in advance, and then set the gripper in this interface.

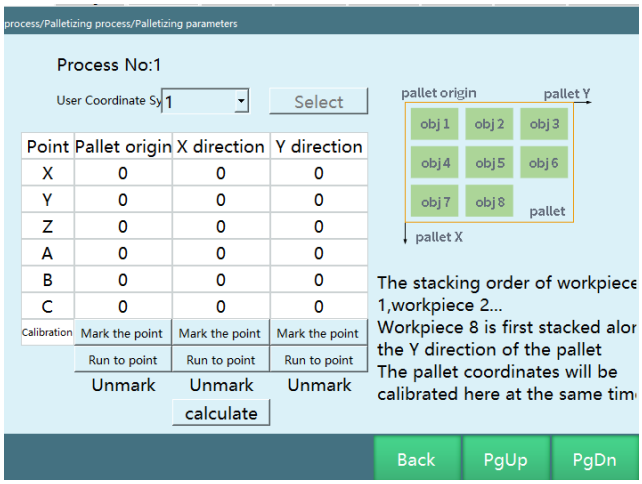
Number of grippers: The number of grippers, set it according to the actual situation, up to 4 grippers can be set.

Gripper X tool number: Set the tool hand number corresponding to the gripper, tool hand parameters need to be calibrated in advance.

Parameter value: The parameter value of each axis after selecting the calibrated tool hand number in this interface after the tool coordinates are calibrated in the tool hand calibration interface.

Pallet setting

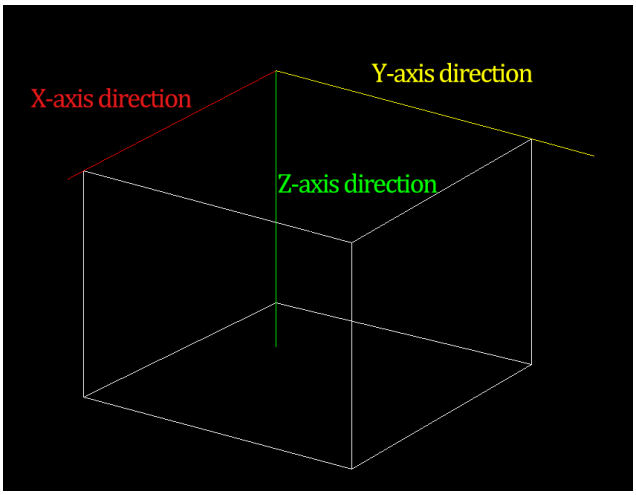
The pallet setting is to set the pallet user coordinates. The origin of the pallet, the Y direction of the pallet and the X direction of the pallet need to be calibrated in this interface.



User coordinate system: pallet coordinates, select the user coordinates to be calibrated as needed, calibrate the pallet coordinates (user coordinates), if you change the position of the coordinate system in the user coordinate calibration later, the coordinate system here will also change.

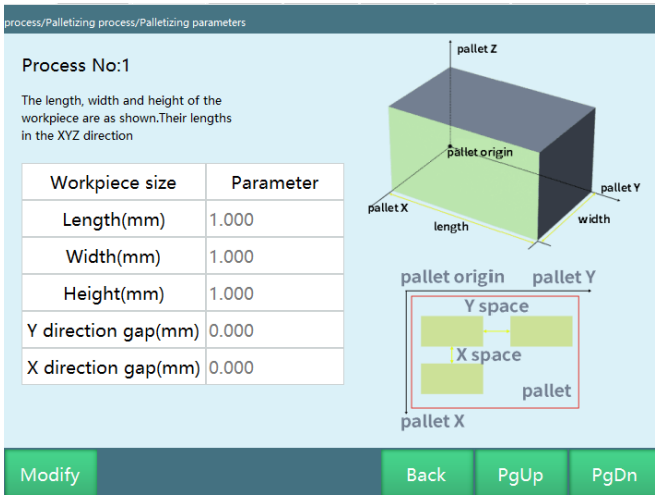
Note: Please use the tool hand selected by gripper 1 for calibration. When the user coordinates (pallet coordinates) are not calibrated, the parameter values of the user coordinates are 0, the user coordinate system will be consistent with the Cartesian coordinate system.

The X and Y directions must be marked based on the original X and Y directions of the robot, otherwise the marked Z direction of the pallet will be downwards and the second layer will be palletized downwards when palletizing.



Workpiece parameters

In the "Workpiece parameters" interface, you can set the length, width, height and clearance of the palletized workpiece under the user coordinate system.



The length, width and height are respectively the lengths in the YXZ direction under the pallet coordinate system (user coordinate system)

Workpiece size: parameter description

Length: the length of the workpiece in the Y direction under the pallet coordinate system

Width: the length of the workpiece in the X direction under the pallet coordinate system

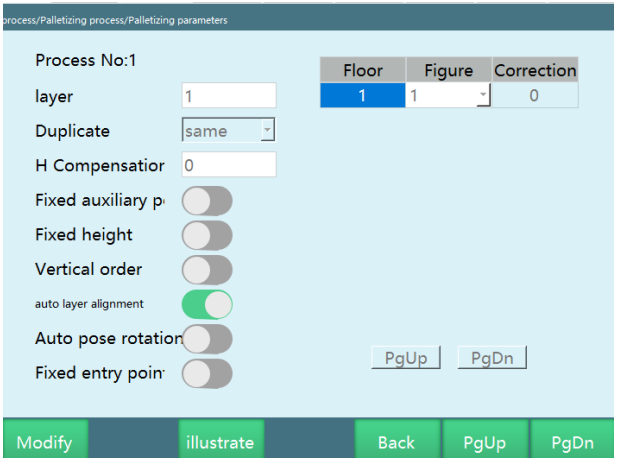
Height: the length of the workpiece in the Z direction under the pallet coordinate system

Pallet Y-direction clearance: the length of the clearance distance between two workpieces in the Y-axis direction under the pallet coordinate system

Pallet X-direction clearance: the length of the clearance distance between two workpieces in the X-axis direction under the pallet coordinate system

Overlap mode

In the "Overlap mode" interface, you can set the palletizing layer and other related parameters, and select graphic template.



Number of layers: the total number of layers for palletizing, fill in according to actual needs

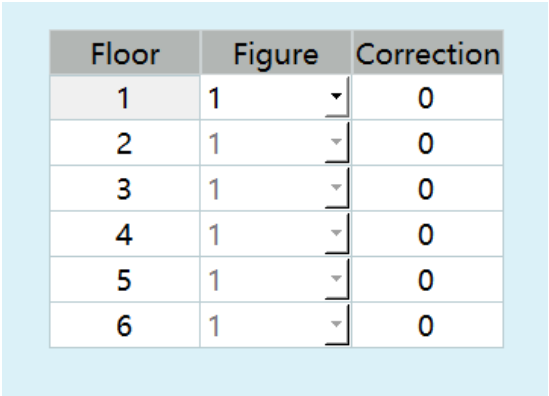
Duplicate relationship: duplicate relationship between each layer.

Select "Same": the same graphic template will be used for each layer;

Select "Alternate": alternate graphic templates for every two layers;

Select "Custom": user has to choose the graphic template used for each layer;

Same: Each layer has the same graphic template, and the same graphic template is used for palletizing. When this option is selected, only the first layer can be modified in the list on the right, and all the following layers are changed accordingly after the modification. In the following figure, the number of layers is 6, and the duplicate relationship is "same".



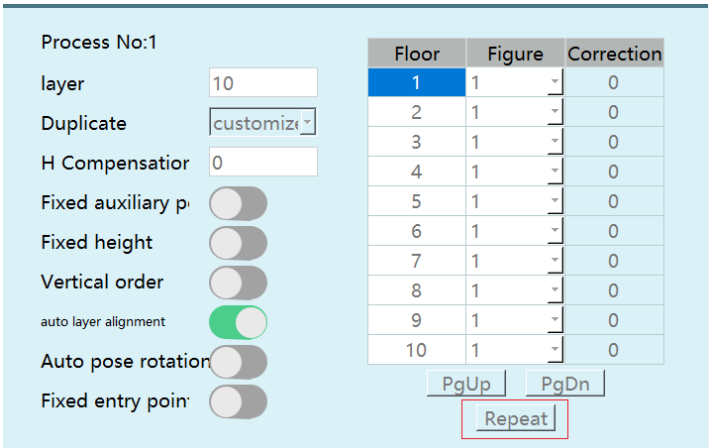
Alternate: Two graphic templates are used alternately. After selecting this option, only the first two layers in the list on the right can be modified, and all the following layers repeat the graphic number of the two layers after modification. In the following figure, the number of layers is 6, and the duplicate relationship is "alternate".

Floor	Figure	Correction
1	1	0
2	2	0
3	1	0
4	2	0
5	1	0
6	2	0

Custom: The graphic template can be set individually for each layer. In the following figure, the number of layers is 6, and the duplicate relationship is "custom".

Floor	Figure	Correction
1	1	0
2	2	0
3	3	0
4	4	0
5	5	0
6	6	0

Repeat: When the duplicate relationship is "custom" and the number of layers is large, if all layers repeat the graphic template of the previous N layers, then after filling the graphic template of the previous N layers, select the N+1th layer and click this button, the following layers will repeat the graphic template automatically.



Layer	Graphic number	Height correction
1	2	0
2	4	0
3	3	0
4	1	0
5	2	0
6	4	0
7	3	0
8	1	0
9	2	0

Layer	Graphic number	Height correction
1	7	0
2	4	0
3	3	0
4	5	0
5	1	0
6	1	0
7	1	0
8	1	0
9	1	0

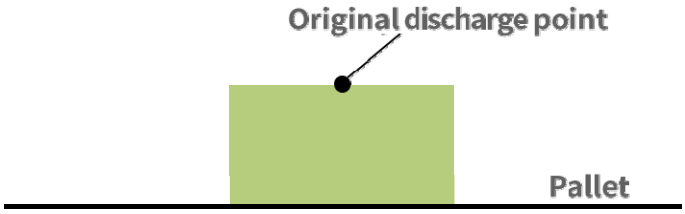
"Repeat" button

Layer	Graphic number	Height correction
1	7	0
2	4	0
3	3	0
4	5	0
5	7	0
6	4	0
7	3	0
8	5	0
9	7	0

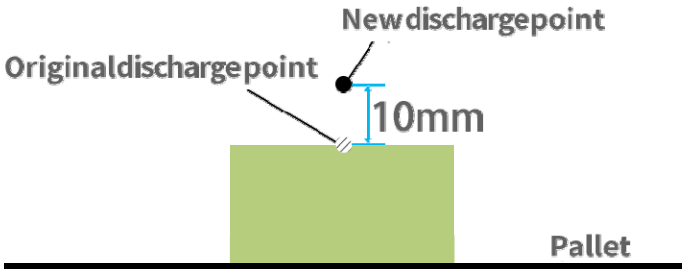
Fixed auxiliary point height: If the number of layers of palletizing is two, when this button is turned on, the auxiliary point of the first layer of workpieces and the second layer of workpieces is the same point, and the auxiliary point will not be offset in the Z+ direction when operating the second layer of workpieces.

For example, you need to palletize the workpieces in a closed box, if the number of workpieces to be palletized is large, the height of workpiece auxiliary point set when each workpiece is palletized will increase with the number of workpieces palletized, which will probably exceed the limits of the robot's joint parameters. In order to prevent such errors, we can turn on the "Fixed auxiliary point height" button and set the fixed auxiliary point height position, so that as the number of palletized workpieces increases, the auxiliary point will always be at the same height position, so that the limits of the joint parameters will not be exceeded, and the safety of the operator will be guaranteed.

Discharge point height compensation: After filling in, the height of the discharge point of all workpieces will be offset, and the height offset can be filled in according to actual needs. If the value is positive, it will be offset in the Z+ direction, and if the value is negative, it will be offset in the Z- direction (this parameter is invalid when depalletizing)

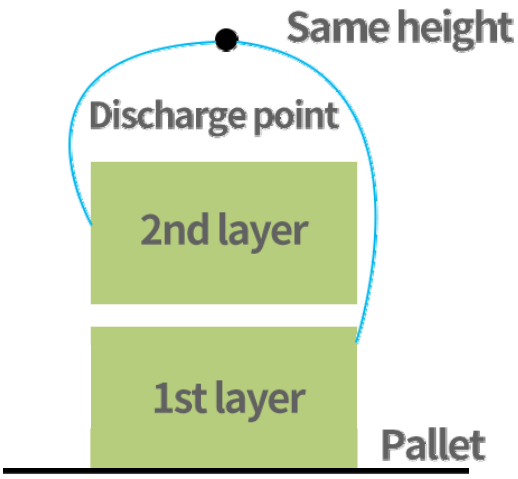


After "Discharge point height compensation" is set to 10:



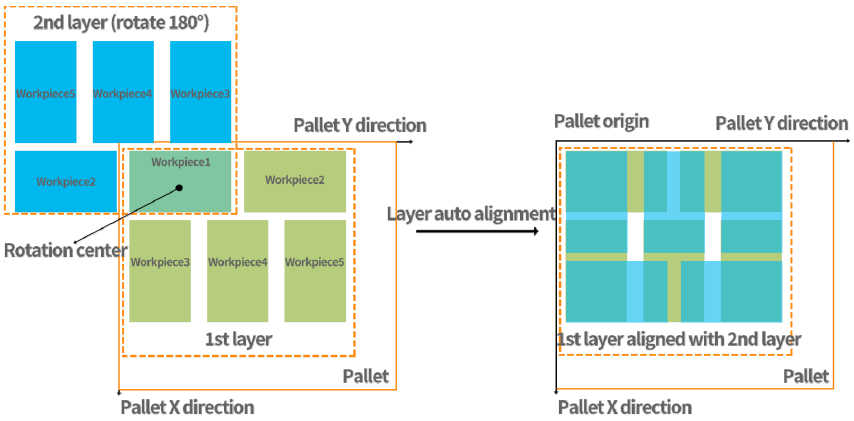
Fixed discharge point height: When selected, the height of the discharge point is the same for each layer of palletizing, and the height is the marked workpiece point height (only valid when palletizing).If the number of layers of palletizing is greater than one (for example, two layers), when this button is turned on, the workpiece point of each workpiece on each layer will be at the same height, and the height of the workpiece point will not be offset in the Z+ direction during palletizing the second layer.

Fixed discharge point height

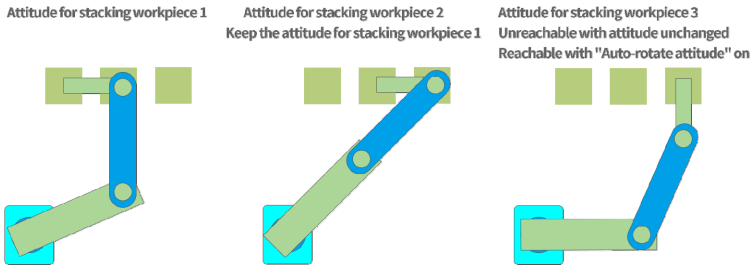


Vertical alignment: After selecting "Vertical alignment", you will first palletize a vertical column and then palletize the next vertical column.

Layer auto alignment: If "Layer auto alignment" is selected, the template of each layer will be automatically aligned, and the X-axis and Y-axis offsets will be calculated automatically.



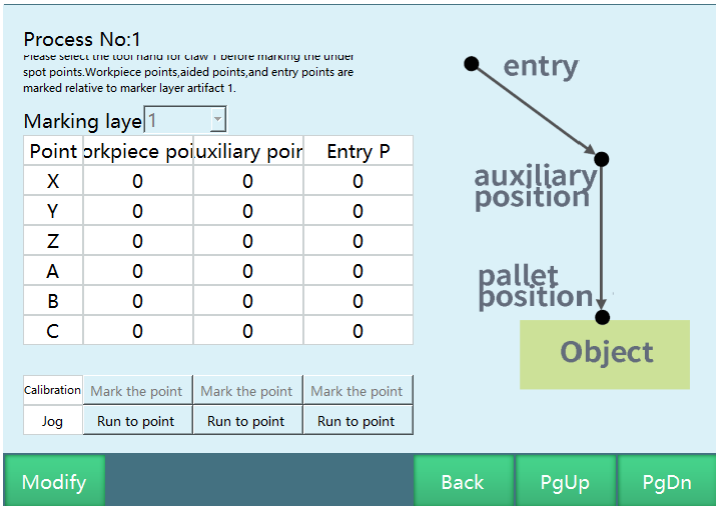
Auto-rotate attitude: When selected, if the tool hand cannot reach the auxiliary point and the discharge point with an inherent attitude during palletizing, but can reach by rotating the attitude of the tool hand, then it will automatically rotate. This function is only available when both auxiliary and workpiece points use joint interpolation.



Fixed entry point position: After picking, each workpiece will be palletized with the same entry point, and the Z axis will be optimized during entering the entry point

Position setting

In the "Position setting" interface, you can set the palletizing workpiece point, auxiliary point and entry point, please use the tool hand set on the "Gripper setting" interface to mark the position.



Marked layer number: which layer is the current calibrated workpiece point on; eliminating the need to clear the stacks and allowing you to directly choose to mark the current layer.

Workpiece point: the first pickup point or the last discharge point of the marked layer

Note: The order of the workpieces in the palletizing parameter setting interface is the palletizing order, while the depalletizing order is the opposite.

Auxiliary point: used in conjunction with the workpiece point, so that the workpiece can be placed to the workpiece point more safely, it is generally set above the workpiece point, if the workpiece needs to rotate some angle, it will rotate before reaching the auxiliary point, which will follow the placement position of the workpiece and make automatic offset.

Entry point: the entry point of the pallet. To prevent the robot from colliding with other objects, try to set the safe position of the robot as the entry point, which will follow the placement position of the workpiece and make automatic

offset in the Z-axis direction. The PALENTER instruction turns on XYZ optimization, and the ABC axis coordinates change when running to the entry point

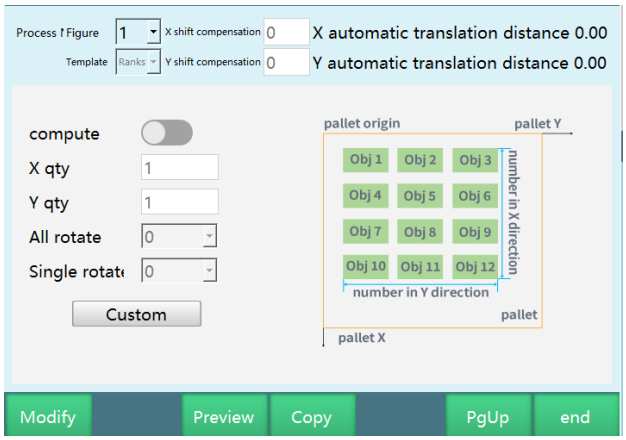
Mark this point: Click "Mark this point" after the robot has moved to the position.

Run to this point: The workpiece can only move to the marked point after clicking "Save" to save the marked values, if not saved, the workpiece will move to the previously marked point, and to move to the marked point, you need to click this button after pressing the DEADMAN button.

Note: Please use the tool hand set on the "Gripper setting" interface to mark the position.

Plane mode

In the "Plane mode" interface, you can set the graphic templates for palletizing.



Graphic number: the number of the graphic template

Template selection: There are 4 fixed graphic templates (row-column, criss-cross, hollow square, five-flower stack),you can also select "custom" to customize graphic template.

X translation compensation: offset of the overall graphic template relative to the original palletizing position on the X-axis of the pallet coordinate system

Y translation compensation: offset of the overall graphic template relative to the original palletizing position on the Y-axis of the pallet coordinate system

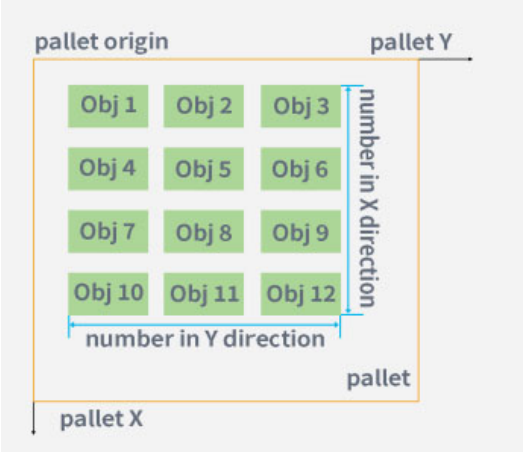
Automatic calculation: According to the pallet setting interface, the calibrated user coordinate system generates a rectangular pallet, and automatically

calculates how many workpieces can be put in X direction and how many workpieces can be put in Y direction according to the workpiece size.

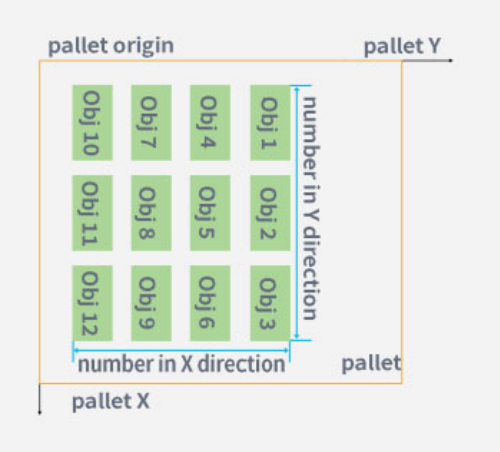
Number in X direction (row-column template, criss-cross template): the number of workpieces in X direction (criss-cross template: number of the workpieces with long side on X axis)

Number in Y direction (row-column template, criss-cross template**):** the number of workpieces in Y direction (criss-cross template: number of the workpieces with long side on Y axis)

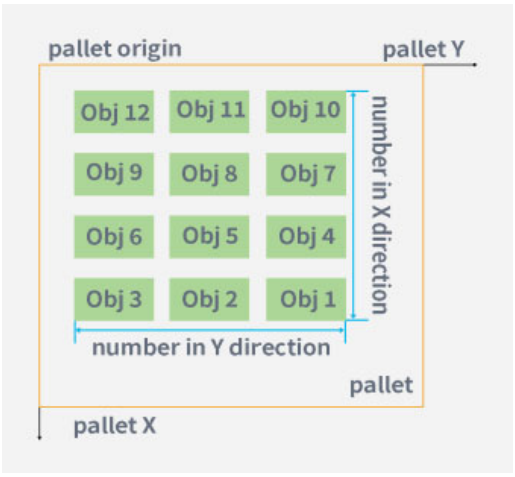
Overall rotation angle (row-column template, criss-cross template, hollow square template)**:** the angle that the whole rotates clockwise around the first workpiece point: 0°, 90°, 180°or -90°



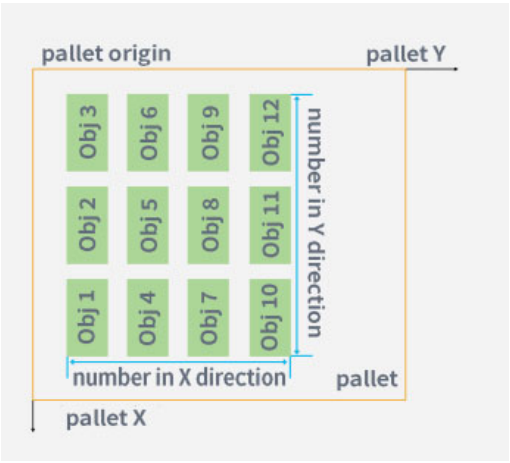
(overall rotation angle: 0°)



(overall rotation angle: 90°)



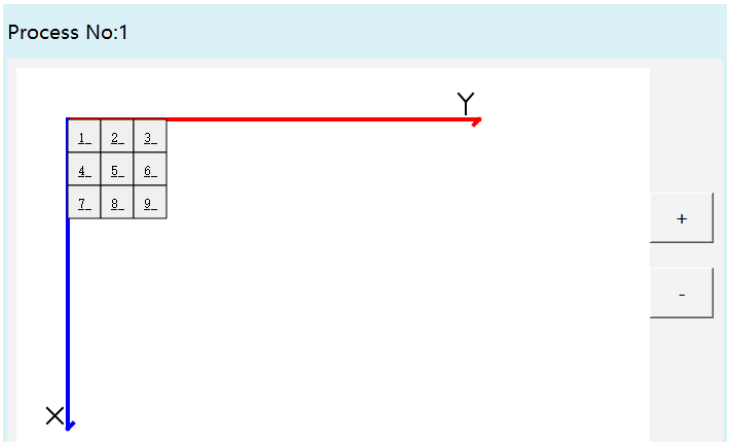
(overall rotation angle: 180°)



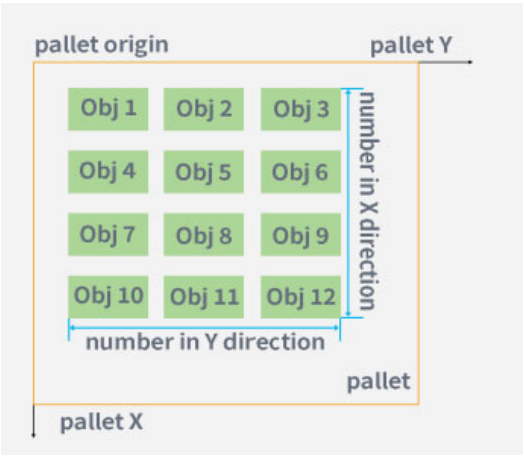
(overall rotation angle: -90°)

Workpiece rotation angle (row-column template, criss-cross template, hollow square template, five-flower template): the angle that all workpieces in the graphic template rotate clockwise: 0 °, 90 °, 180 ° or -90 °

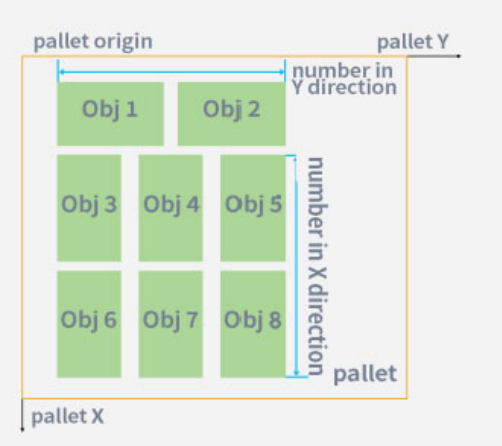
Preview: Preview the set graphic templates, which can be used to check whether the graphic template is set correctly, here we select the criss-cross template, the number of workpieces in X direction is 2, and the number of workpieces in Y direction is 3



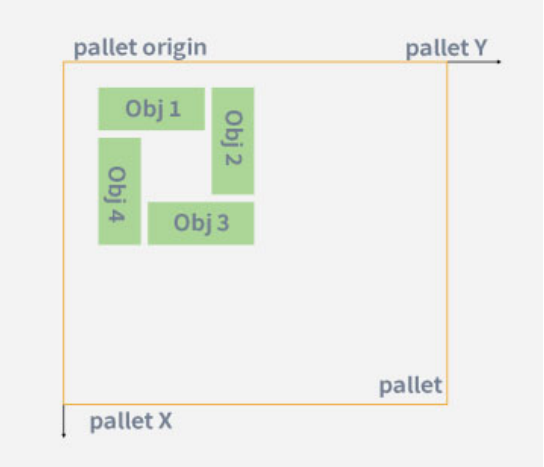
Row-column: the direction of the workpieces on the whole layer of the graphic template is the same, and the workpieces are palletized in sequence. As shown in the figure below, the number of workpieces in the X direction is 4, and the number of workpieces in the Y direction is 3



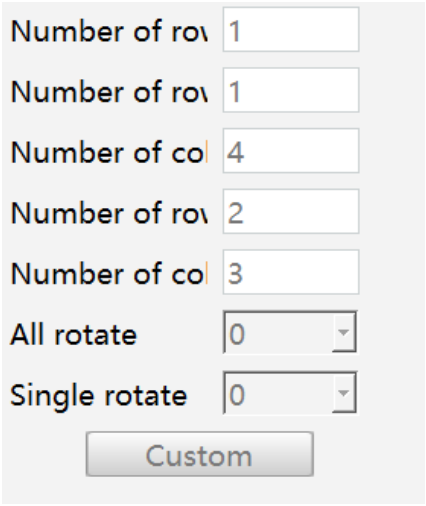
Criss-cross: the direction of the workpieces can be horizontal or vertical,the workpieces are arranged in a crisscross pattern (in this template, the number of workpieces in X direction is the number of the workpieces with long side on X axis, the number of workpieces in Y direction is the number of workpieces with long side on Y axis)

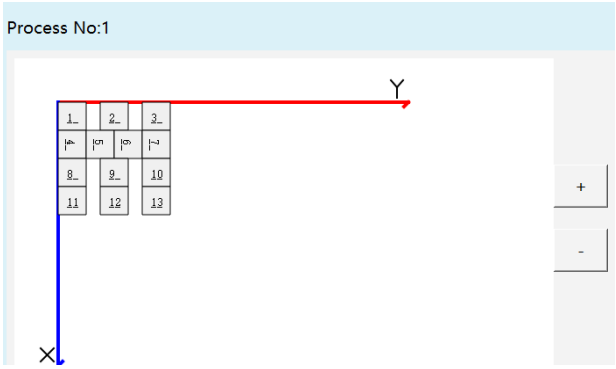


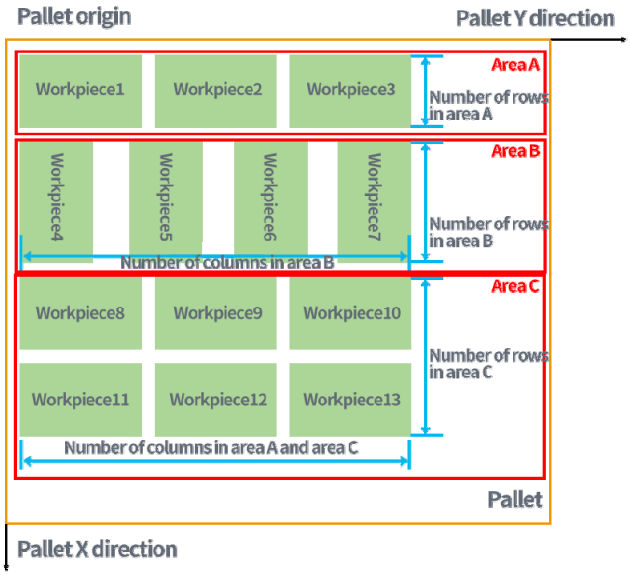
Hollow square: 4 workpieces on one layer, arranged in the form of a hollow square (the second workpiece rotates 90 degrees clockwise from the first workpiece, the third workpiece rotates 180 degrees clockwise from the first workpiece, and the fourth workpiece rotates 90 degrees counterclockwise from the first workpiece)



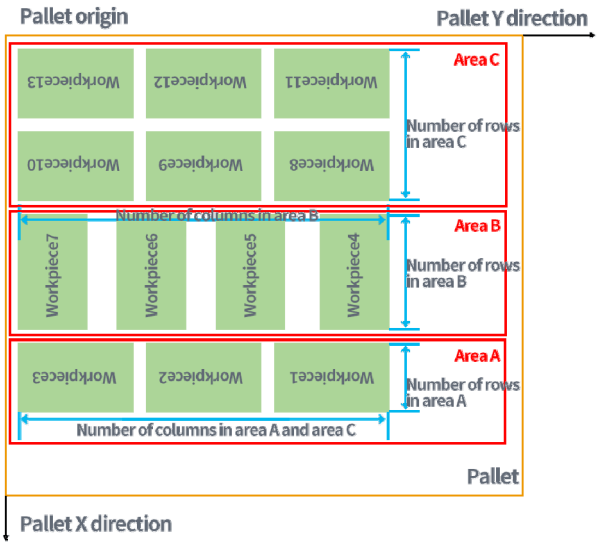
Five-flower stack: The workpieces are divided into three areas: area A, area B, area C; the number of columns in area A and area C can be set together, and the number of columns in area B can be set separately (as shown in the figure, workpieces 4-7 in area B are rotated clockwise by 90 degrees compared to workpieces 1-3 in area A and workpieces 8-13 in area C). The workpieces in area A and area C are left and right aligned with area B with the highest number of columns in the stack, as shown in Figure 1.



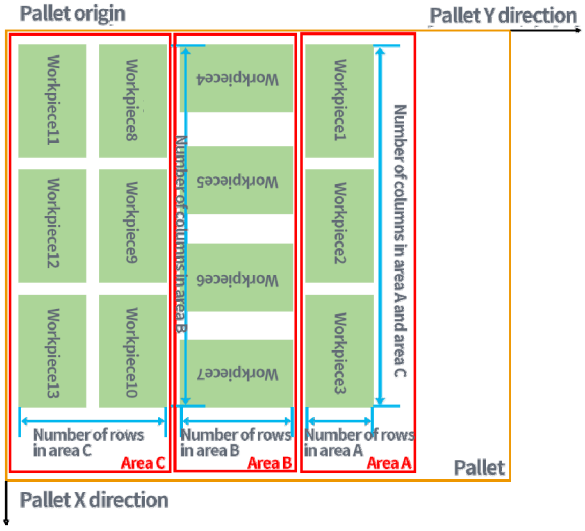




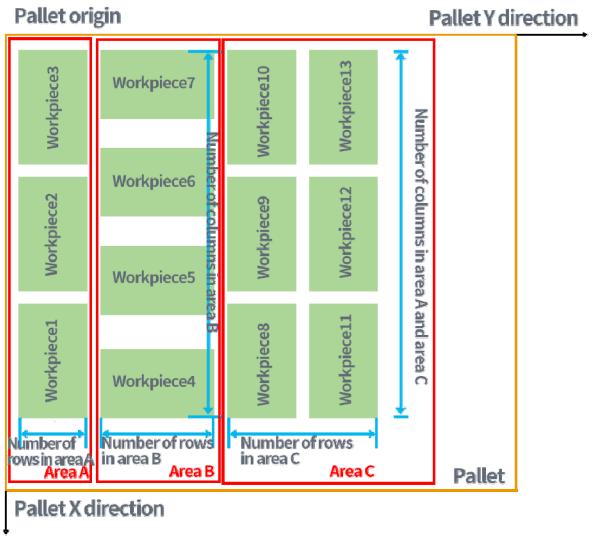
overall rotation angle: 0°



overall rotation angle: 180°

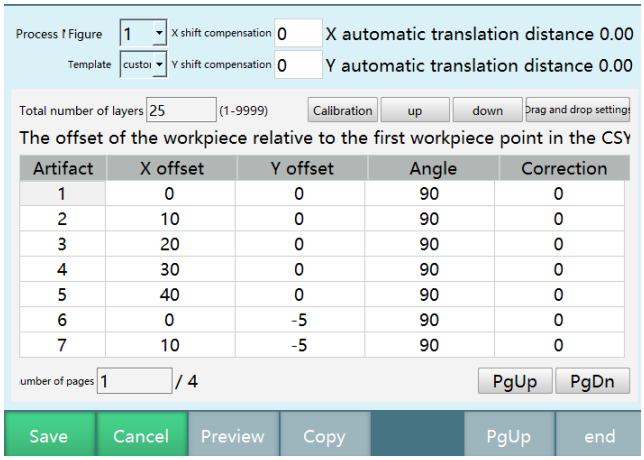


overall rotation angle: 90°



overall rotation angle: -90°

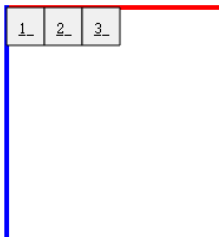
Custom: Customize the graphic template

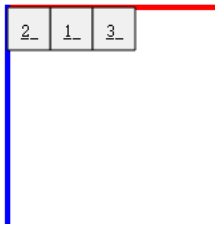


Total number of layer workpieces: total number of palletized workpieces, set according to actual needs. Note: Modifying the total number of workpieces will clear all workpiece parameters.

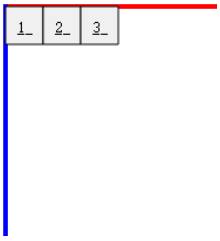
Calibration: You can set the workpiece point of palletizing by yourself, determine the point and click on the "Calibration" button. If you want to modify the workpiece point of palletizing set for the first time, you can click on the number of the workpiece, move the robot to the position you want and click on the "Calibration" button to complete the modification of workpiece point.

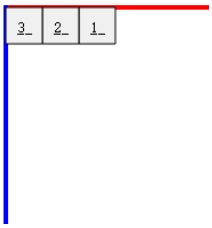
Up: After the workpiece point calibration is completed, if you want to set the position of palletized workpiece 2 to the position of palletized workpiece 1, you can click on the "Up" button, so that the position of workpiece 1 is changed. Here we take two workpieces as an example.





Down: After the workpiece point calibration is completed, if you want to set the position of palletized workpiece 1 to the position of palletized workpiece 3, you can click on the "Down" button, so that the position of workpiece 3 is changed.





X offset: the offset of the workpiece point on the X axis

Y offset: the offset of the workpiece point on the Y axis

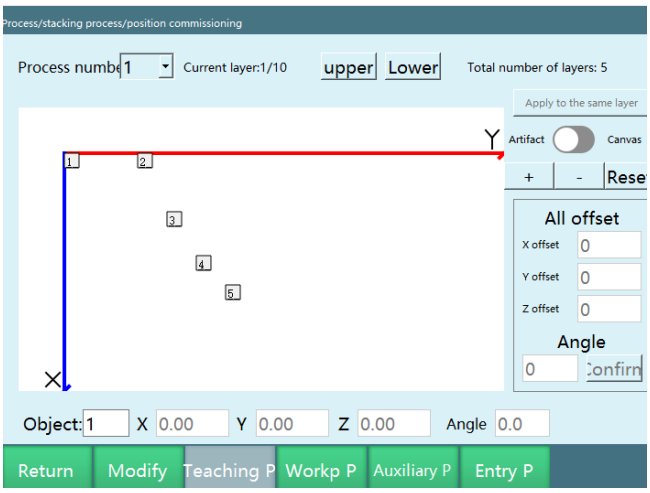
Rotation angle: the rotation angle of the workpiece relative to the angle of the first workpiece point

Height correction: After filling in, the height of the workpiece point, auxiliary point and entry point will be offset when the workpiece is palletized. If the value is positive, it will be offset in the Z+ direction, and if the value is negative, it will

be offset in the Z- direction, we can correct the height of the workpiece point, auxiliary point and entry point

Dragging Setting: After setting the number of palletized workpieces, click the "Dragging Setting" button, as shown in the figure, you can drag the workpiece point to any position you want. In the custom template, in addition to filling in the XY offset, you can also drag the workpiece directly

Note: Before entering the "Dragging setting", set the total number of layer workpieces in the custom template, click "Save", and then click "Modify - Dragging setting"; after the dragging setting is finished, click the "Save" button in the "Dragging setting" first, return to the "Custom" interface, and click "Save" again.



Increase: increase the number of workpieces according to your needs

Reduce: reduce the number of workpieces

Workpiece/Canvas: drag the workpiece when the button is off, drag the canvas when the button is on

Reset: reset the canvas

Screen+: zoom in

Screen-: zoom out

Single/Whole: the offset of single workpiece/the whole in the X or Y direction; turn on the "Single/Whole" button to offset all workpieces in X or Y direction, and turn off the "Single/Whole" button to offset your currently selected workpiece in X or Y direction

X+/X-: offset step value in the positive or negative direction of X as a whole

Y+/Y-: offset step value in the positive or negative direction of Y as a whole

Step: the offset of the workpiece in the X or Y direction

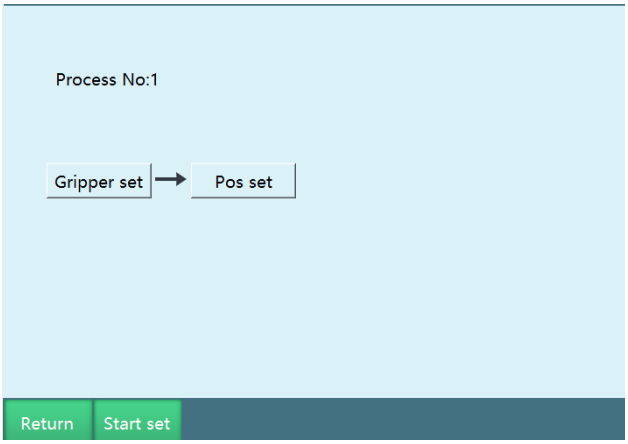
Angle: set the angle of each rotation; if the "Single/Whole" button is turned on, all workpieces will be rotated; if the "Single/Whole" button is turned off, you can rotate the workpiece you currently selected.

Forward/Reverse: the workpiece rotates by itself to set the angle value

Simple palletizing

Parameter setting

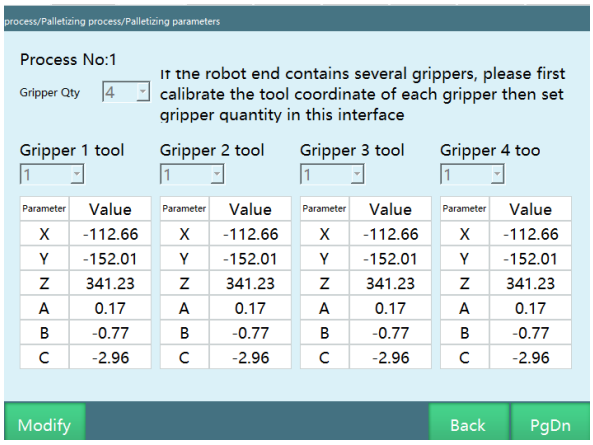
Simple palletizing parameter setting process includes gripper setting and position setting



Current type of use: when simple palletizing and complete palletizing share the same palletizing number, you need to set the correct type before use

Gripper setting

In the "Gripper setting" interface, you can choose the gripper (tool hand) for palletizing, please go to [Setting - Tool hand calibration] interface to calibrate the gripper (tool hand) first, and then set the gripper in this interface.



Number of grippers: the number of grippers, set according to the actual situation

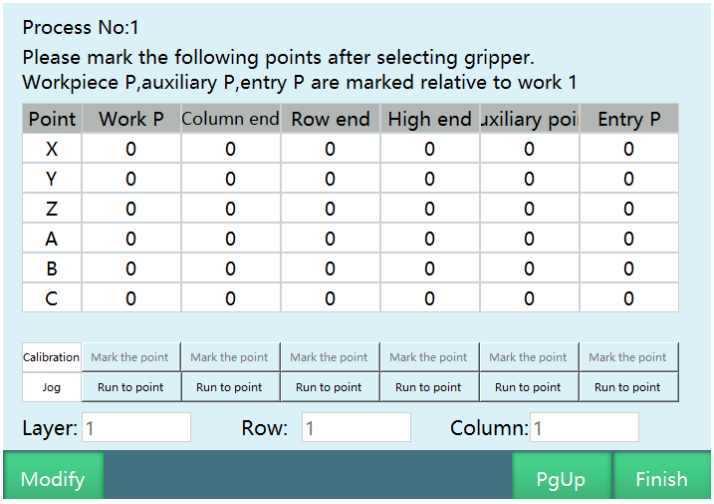
Gripper X tool number: set the tool hand number corresponding to the gripper, tool hand parameters need to be calibrated in advance

Parameter value: the parameter value is the offset of the end of the tool hand, which can only be selected here, but not calibrated

Position setting

Simple palletizing only supports row-column template. All palletizing directions and position points are marked, even if the marked pattern is not a rectangular palletizing pattern, it will also follow the marked directions during palletizing.

In the simple palletizing process, you only need to set the palletizing grippers and mark 6 position points. The settings of the grippers are the same as for complete palletizing. If the palletizing has more than one gripper for picking and palletizing separately, please mark the position points with the first gripper, the actions of the other grippers will be calculated automatically



Starting workpiece point: the position point of the first workpiece when palletizing.

End of column: the position point of the last workpiece in the column (user coordinate X axis) direction when palletizing.

End of row: the position point of the last workpiece in the row (user coordinate Y axis) direction when palletizing.

Height end: the position point of the first workpiece on the last layer when palletizing.

Auxiliary point: the auxiliary point of palletizing, it is recommended to set it above the starting workpiece point.

Entry point: the entry point of palletizing, it is recommended to set it to a safety point outside the pallet.

Number of layers: total number of layers of palletizing.

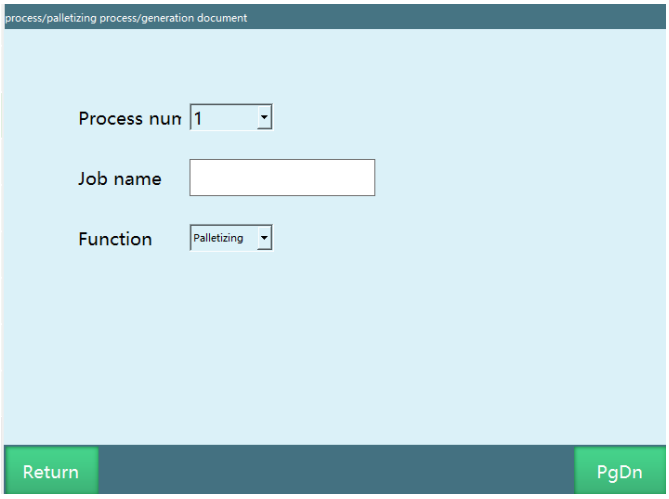
Number of rows: total number of rows of palletizing.

Number of columns: total number of columns of palletizing.

Generating file

Standard palletizing and depalletizing procedures can be generated using the "generating file" function, and the parameters of the process number need to be set in advance

Simple palletizing's "generating file" function is forbidden when there is no IO

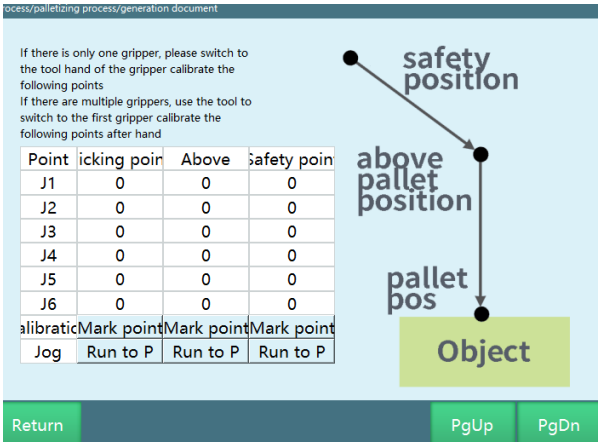


Current type of use: when simple palletizing and complete palletizing share the same palletizing number, you need to set the correct type before use

Process number: after selecting the process number, it is necessary to confirm whether the current palletizing type of use is the set one

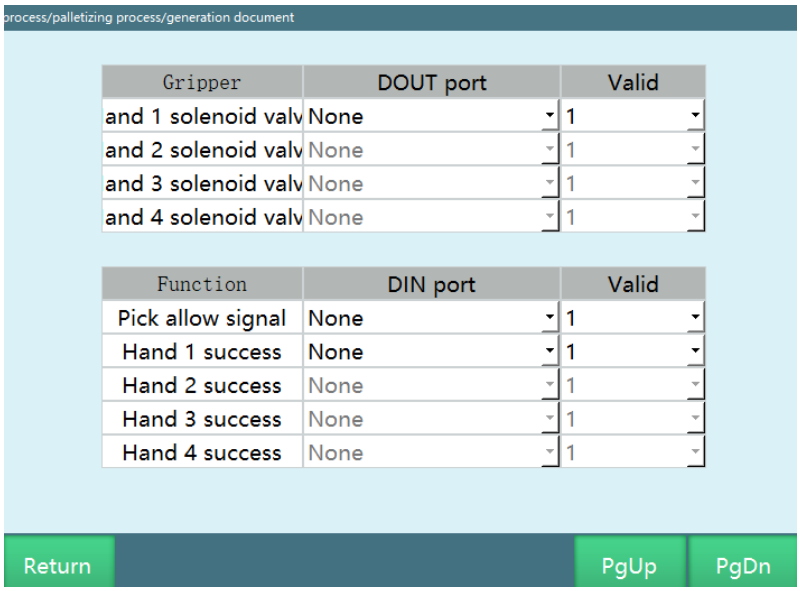
Program name: need to start with English letters (Pure Chinese is also OK)

Function: palletizing, depalletizing



Mark this point: teach to the corresponding point and click "Mark this point"

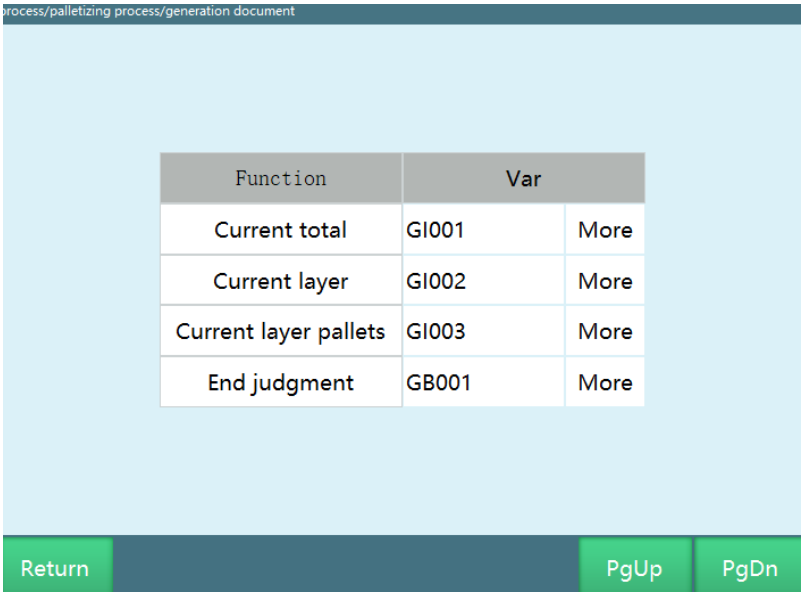
Run to this point: Click "Run to this point" to verify whether the point teaching is correct



Gripper solenoid valve: gripper IO output signal; the DOUT port of the gripper solenoid valve must be set, the "generating file" function only supports 1 output, if multiple outputs are required, you can return to the project after the job file is generated to modify the output signal instruction

Picking permission signal: wait for picking permission signal before palletizing picking, select according to your situation

Gripper picking successful signal: the signal to judge whether the gripper picking is successful



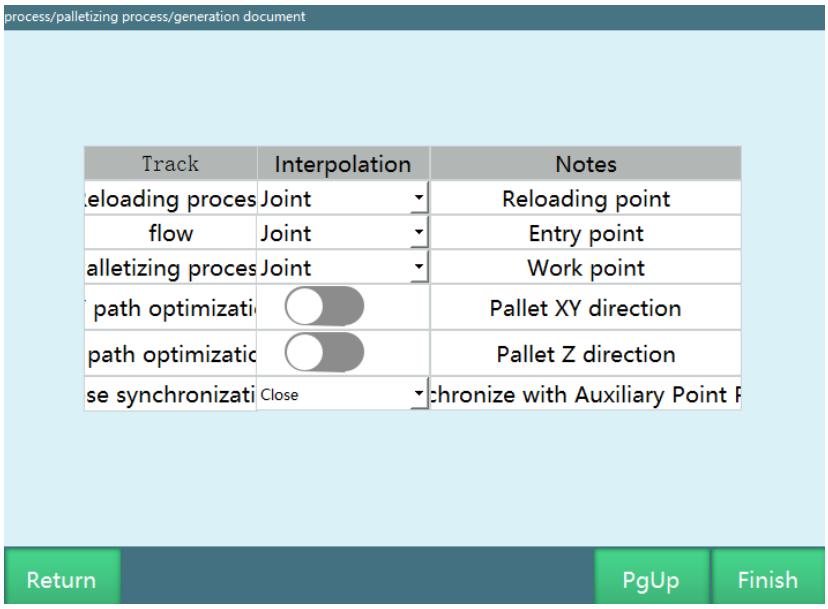
Note: For the "Current total number of palletized workpieces", "Current palletizing layer" and "Number of palletized workpieces on current layer" functions, if you do not select the variable type when generating the job file, we can check it in the [Process - Palletizing process] interface when executing the palletizing program.

Current total number of palletized workpieces: Cache the value of the "current total number of palletized workpieces" variable into the set variable

Current palletizing layer: Cache the value of the "Current palletizing layer" variable into the set variable

Number of palletized workpieces on current layer: Cache the value of the "Number of palletized workpieces on current layer" variable into the set variable

Palletizing end judgment: After palletizing is completed, change the variable value to jump out of the while loop



Pickup process: above the pickup point - pickup point; the interpolation method can be changed to joint interpolation or linear interpolation.

Intermediate process: above the pickup point - palletizing entry point; the interpolation method can be changed to joint interpolation or linear interpolation.

Palletizing process: palletizing entry point - palletizing auxiliary point - workpiece point; the interpolation method can be changed to joint interpolation or linear interpolation.

XY path optimization: Click to turn on to optimize the path of the pallet in XY direction

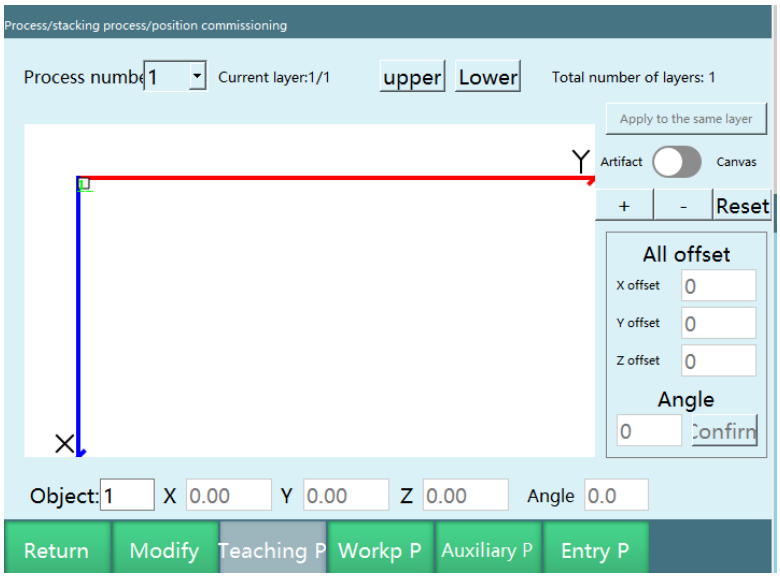
Z path optimization: Click to turn on to optimize the path of the pallet in Z direction

Attitude synchronization:

- Off: Attitude is executed according to the set point
- Auxiliary point attitude synchronization: Move to the entry point with the attitude of the auxiliary point
- Automatic attitude calculation: Calculate the trajectory attitude between the entry point, auxiliary point and the workpiece point according to the ratio of the distance from the entry point to the auxiliary point and the distance from the auxiliary point to the workpiece point automatically. The C attitude during the movement is always rotating. For example, the ratio of the

distance from the entry point to the auxiliary point and the auxiliary point to the workpiece point is 2:8, and the C attitude from the entry point to the workpiece point has rotated 100° in total, then 1 will rotate 20° from the workpiece point to the auxiliary point, and the remaining 80° will be rotated between the auxiliary point and the workpiece point.

Position debugging



Process number: the process number corresponding to the current parameter

Total number of layer workpieces: total number of workpieces on current layer

Upper layer: switch to the upper layer

Lower layer: switch to the lower layer

Workpiece/Canvas: drag the workpiece when the button is off, drag the canvas when the button is on

Reset: reset the canvas

Screen+: zoom in

Screen-: zoom out

Overall offset: workpiece overall offset

X offset: offset step value in the positive or negative direction of X as a whole

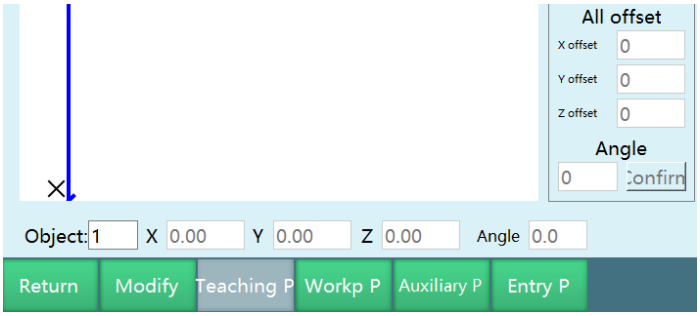
Y offset: offset step value in the positive or negative direction of Y as a whole

Z offset: offset step value in the positive or negative direction of Z as a whole

Angle: set the angle of each rotation

Each workpiece angle: overall offset angle

Apply to same layer: apply the parameters set for the current layer to the layers with the same graphic number



Current workpiece: 1 indicates the number of the workpiece

X indicates positive or negative offset of the workpiece to the X axis

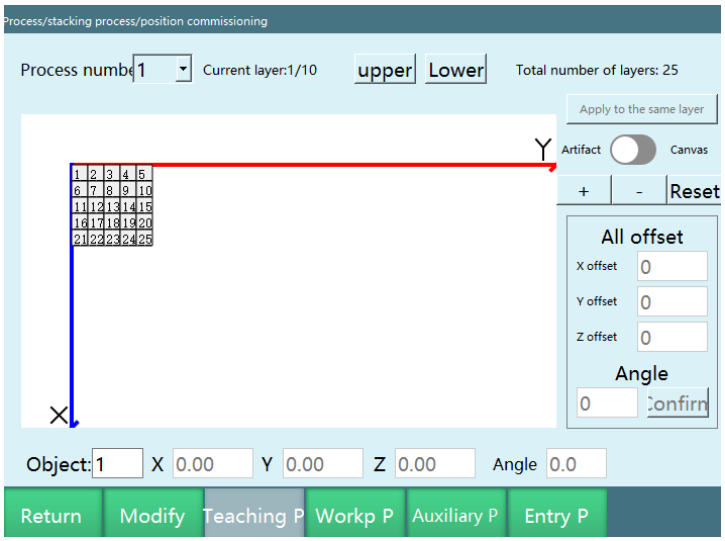
Y indicates positive or negative offset of the workpiece to the Y axis

Z indicates positive or negative offset of the workpiece to the Z axis

Angle indicates the degrees currently selected for the workpiece

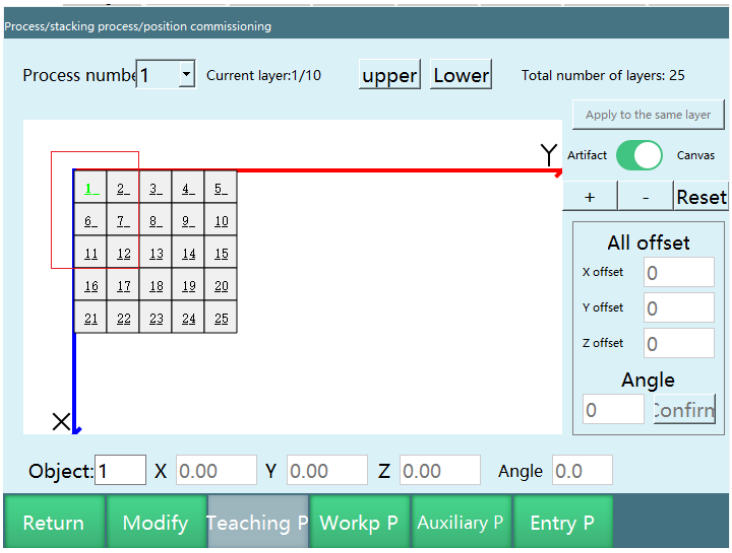
Workpiece/Canvas function demo

1. Turn on the button to drag the entire canvas, but this does not affect the coordinates of the workpiece.



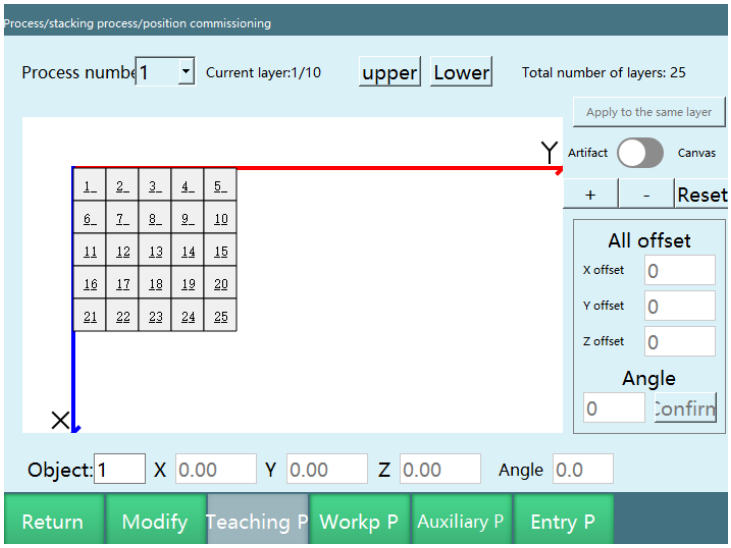
Reset function demo

2. After clicking the "Reset" button, the canvas returns to the initial position, but the canvas size is not reset

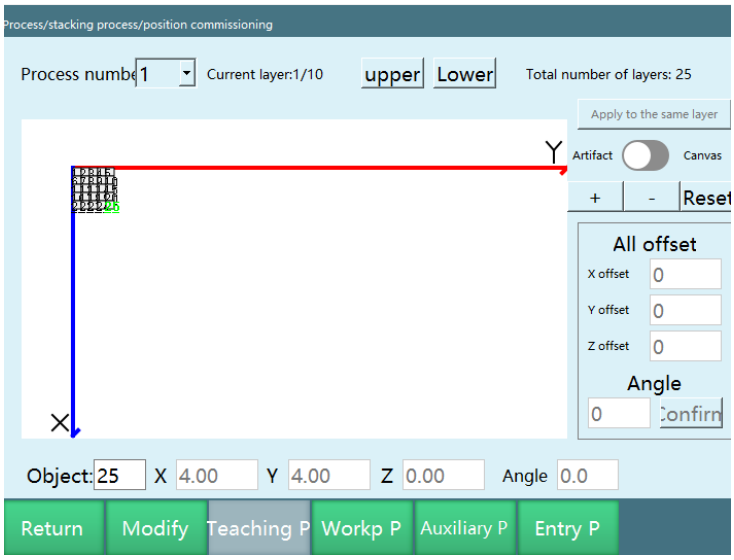


Screen+/Screen- function demo

3. Click "Screen+", the canvas zooms in

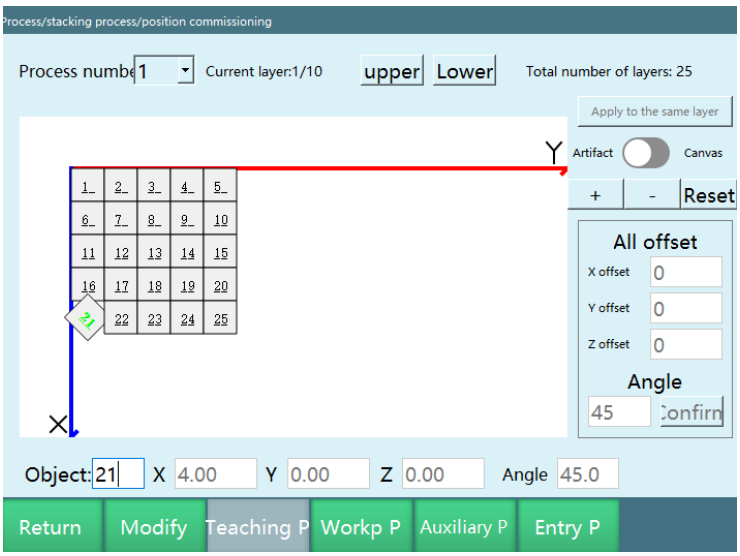


4. Click "Screen-", the canvas zooms out



Single/Whole offset function demo

5. Fill in the coordinate values, ie the value of X offset, Y offset, Z offset and angle (because this is a plane, so we can not see the effect on the Z axis), for example, fill in 26, 10, 1 and 45 respectively

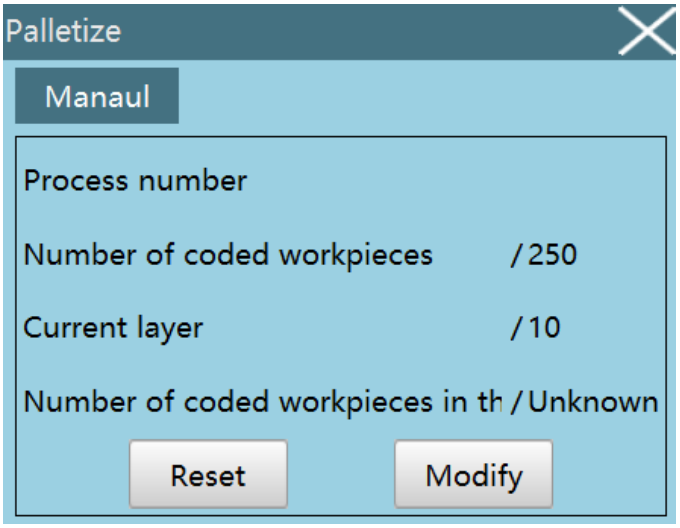


Palletizing status

The palletizing status can be used to check the current palletizing status, if the palletizing needs to start in the middle, it can be achieved by setting the number of layer and the number of workpiece to be palletized.

The number of palletized workpieces will be cleared after the controller restarts, but will not be cleared after re-running

You can view the palletizing status in [Status bar - Process - Palletizing]. There are two methods: you can select the palletizing process from the process selection bar on the "Operation parameters" interface (If palletizing is selected on the "Operation parameters", the palletizing process will always be displayed by default); you can also directly select palletizing from the process navigation bar on the teach pendant.



Process number: the process number of palletizing

Number of palletized workpieces: number of palletized workpieces/total number of workpieces

Number of current layer: the number of the layer currently being palletized/total number of layers (if the palletizing needs to start in the middle, set the number of layer to be palletized).Here we take two-layer palletizing as an example. When the robot is palletizing the first layer of workpieces, you can set the number of current layer to 2, then the robot will palletize the second layer of workpieces, and the display of the number of palletized workpieces will change.

Number of palletized workpieces on current layer: number of palletized workpieces on current layer/total number of workpieces on current layer (if the palletizing needs to start in the middle, set the number of workpiece to be palletized).For example, if you are palletizing the 3rd workpiece and want to start palletizing from the 7th workpiece, you can modify the number of palletized workpieces on current layer and start palletizing from the workpiece as you need.

Reset: clear the recorded palletizing data

Modify: when the robot is palletizing, click "Modify" to modify the current number of layer and the number of palletized workpieces on current layer.

Palletizing instructions

PALON (start palletizing)

Function: palletizing start judgement

Process number: 1-99

Type: palletizing, depalletizing

Current total number of palletized workpieces: Cache the value of the "Current total number of palletized workpieces" variable into the set variable

Note: You can control the number of layer and workpiece to be palletized by modifying the variables

Current palletizing layer: Cache the value of the "current palletizing layer" variable into the set variable

Note: You can control the number of layer and workpiece to be palletized by reading the variables

Number of palletized workpieces on current layer: Cache the value of the "Number of palletized workpieces on current layer" variable into the set variable

Note: You can control the number of layer and workpiece to be palletized by reading the variables

Example: PALON ID=1 TYPE=0 [variable name][variable name][variable name]

Note: The 3 count variables of the PALON (start palletizing) instruction will be written directly to the configuration, without the need to use the FORCESET (write file) instruction

PALGRIPPER (switch grippers)

Function: Select gripper

Process number: 1-99

Gripper: gripper 1, gripper 2, gripper 3, gripper 4

Example: PALGRIPPER ID=1 GRIPPERS=1

PALENTER (palletizing entry point)

Function: palletizing entry point

Process number: 1-99

Interpolation method: joint interpolation, linear interpolation, circular interpolation

Joint interpolation: The robot will move to the point by joint interpolation

Linear interpolation: The robot will move to the point by linear interpolation

Circular interpolation: The robot will form a circular path with two other points (previous point: MOVJ/MOVL; next point: MOVC)

VJ: speed range 2-9999

PL: position level 0-5

ACC: acceleration range 1-100

DEC: deceleration range 1-100

XY optimization: Optimize XY axis motion path

Z optimization: Optimize Z axis motion path, need to insert a fixed point before palletizing

When the entry point is lower than the fixed point, the entry point will be in the same line with the fixed point and the auxiliary point in height (the same line in side view, not the same line in top view, XY axis is unchanged)

When the entry point is between the fixed point and the auxiliary point, the height of entry point remains unchanged

When the entry point is above the fixed point and auxiliary point, the height of entry point will be optimized to the level of the fixed point

When the entry point and the auxiliary point are both higher than the fixed point, the height of entry point will be optimized to the level of the auxiliary point

Attitude: Off: Attitude is executed according to the set point

Auxiliary point attitude synchronization: Move to the entry point with the attitude of the auxiliary point

Automatic attitude calculation: There is an attitude before and after the entry point, and the entry point attitude will be calculated between these two attitudes

TIME: Time, the range is a non-negative integer, and the unit is ms. Early execution time of the next instruction.

Example: PALENTER ID=1 MOVJ VJ=10% PL=0 ACC=20 DEC=20 OFF OFF OFF 0

PALSHIFT (palletizing auxiliary point)

Function: palletizing auxiliary point

Process number: 1-99

Interpolation method: joint interpolation, linear interpolation, circular interpolation

Joint interpolation: The robot will move to the point by joint interpolation

Linear interpolation: The robot will move to the point by linear interpolation

Circular interpolation: The robot will form a circular path with two other points (previous point: MOVJ/MOVL; next point: MOVC)

VJ: speed

PL: position level 0-5

ACC: acceleration range 1-100

DEC: deceleration range 1-100

TIME: Time, the range is a non-negative integer, and the unit is ms. Early execution time of the next instruction.

Example: PALSHIFT ID=2 MOVJ VJ=30% PL=2 ACC=20 DEC=20

PALREAL (palletizing workpiece point)

Function: palletizing workpiece point

Process number: 1-99

Interpolation method: joint interpolation, linear interpolation, circular interpolation

Joint interpolation: The robot will move to the point by joint interpolation

Linear interpolation: The robot will move to the point by linear interpolation

Circular interpolation: The robot will form a circular path with two other points (previous point: MOVJ/MOVL; next point: MOVC)

VJ: speed

PL: position level 0-5

ACC: acceleration range 1-100

DEC: deceleration range 1-100

TIME: Time, the range is a non-negative integer, and the unit is ms. Early execution time of the next instruction.

Example: PALREAL ID=2 MOVJ VJ=30% PL=2 ACC=20 DEC=20

PALCLEAR (palletizing reset)

Function: palletizing reset, palletizing status clear

Process number: 1-99

Example: PALCLEAR ID=1

PALOFF (palletizing end judgment)

Function: palletizing end judgment

Process number: 1-99

End judgment variable: Conditions for judging the end of palletizing

Example: PALOFF ID=1[variable name]

Note: If the total number of workpieces of a process number is n, the variable value will be set to 0 for the first n-1 times of executing PALREAL instruction, and will be set to 1 for the nth time of executing PALREAL instruction. If PALCLEAR is performed in the middle, the variable will be reset to 0.

PALLET_POS (get the workpiece point)

Function: get the workpiece point

Process number: the process number where the palletizing parameters are stored

Layer number: the layer where the workpiece is on

Number: number of the workpiece

Get point type: the point type corresponding to the workpiece

Example: PALLET_POS ID=1 1 1 P0001

Read the workpiece point of xth workpiece on xth layer by variables

PAL_SET_EXAMPLE (simple palletizing instruction)

Function: simple palletizing instruction

Process number: the process number where the palletizing parameters are stored

Starting workpiece point: the position point of the first workpiece when palletizing

End of column: the position point of the last workpiece in the column direction when palletizing

End of row: the position point of the last workpiece in the row direction when palletizing

Height end: the position point of the first workpiece on the last layer when palletizing.

Auxiliary point: the auxiliary point of palletizing, it is recommended to set it above the starting workpiece point.

Entry point: the entry point of palletizing, it is recommended to set it to a safety point outside the pallet.

Number of rows: total number of rows of palletizing.

Number of columns: total number of columns of palletizing.

Number of layers: total number of layers of palletizing.

Example: PAL_SET_EXAMPLE ID=1(P0001 P0002 P0003 P0004 P0005 P0006)

The PAL_SET_EXAMPLE instruction will run after filling all parameters, which will be filled into the palletizing process/simple palletizing accordingly, and the local points need to be set in the variables (this instruction is the same as the simple palletizing position setting in the palletizing process)

Usage scenarios

Scenario 1 - pickup point fixed, palletizing layer-by-layer at discharge point

Parameter setting

1. Click [menu bar - Process - Palletizing process - Complete palletizing] on the right side
2. Select the process number according to the actual situation, here we select process number 1
3. Click "Gripper setting"
4. Select the gripper according to the actual situation, here we select "1" for number of grippers, and "1" for gripper tool number (gripper tool number is the tool hand number, we need to go to the [Settings - Tool hand calibration] interface to set the gripper first), here we can only choose, click "Save"
5. Click "PgDn" to enter the pallet setting (you can also click "Back" and then enter the pallet setting)
6. Calibrate the pallet coordinate system (user coordinate system) according to the actual pallet and click "Save"

Note: When calibrating the pallet, you need to calibrate it with tool hand, and the Z-axis of the calibrated coordinate system cannot face downward

7. Click "PgDn" to enter the position setting (you can also click "Back" and then enter the position setting)
8. Calibrate the workpiece point, auxiliary point and entry point according to the actual situation and click "Save"

Note: Calibration needs to be done with tool hand

9. Click "PgDn" to enter the workpiece parameter setting (you can also click "Back" and then enter the workpiece parameter setting)
10. Fill in the workpiece size parameters according to the actual situation, here we set length "50", width "30", height "15", clearance "0", then click "Save"

11. Click "PgDn" to enter the proximity parameter setting (you can also click "Back" and then enter the proximity parameter setting)
12. Set according to the actual situation, if not needed, you can skip it directly
13. Click "PgDn" to enter the overlap mode setting (you can also click "Back" and then enter the overlap mode)
14. Fill in the number of layers according to the actual situation, here we set the number of layers to "10", the duplicate relationship to "Same", and select "1" for the graphic number of the first layer, and leave other parameters blank, click "Save"
15. Click "PgDn" to enter the plane mode setting (you can also click "Back" and then enter the plane mode)
16. Select "1" for graphic number, select "Criss-cross" for the template selection, fill in "1" for the number in X direction, "3" for the number in Y direction, and leave other parameters blank by default, click "Save". Click "Preview" to view the set graphic template

Note: The overall rotation here refers to rotating 180 degrees as a whole with the center of the first workpiece as the center of rotation

17. Click "Finish" to complete the parameter settings

Programming

NOP
Start

BOOLEAN A001 = 0
Insert variable

PALCLEAR ID = 1
Clear the previous palletizing data

WHILE (A001 == 0)
Loop statement

MOVJ P001 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Pickup entry point

WAIT (DIN4 == 1) T = 10
Pickup judgment

MOVJ P003 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Pickup auxiliary point

MOVJ P002 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Pickup workpiece point

DOUT OT#(5) 1
Pickup signal

TIMER T = 1
Delay

MOVJ P003 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Pickup auxiliary point

PALON ID = 1 TYPE = 0 [-] [-] [-] MULTI = 0
Palletizing start

PALGRIPPER ID = 1 GRIPPERS = 1
Gripper selection

PALENTER ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20 OFF OFF
Discharge entry point

PALSHIFT ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20
Discharge auxiliary point

PALREAL ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20
Discharge workpiece point

DOUT OT#(5) 0
Discharge signal

TIMER T = 1
Delay

PALSHIFT ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20
Discharge auxiliary point

PALOFF ID = 1 A001
Palletizing end

ENDWHILE
Loop end

END
End

Scenario 2 - pickup point fixed, discharge point height compensation

Parameter setting

1. Open [Process - Palletizing process - Complete palletizing - Overlap mode], fill in "100" for the discharge point height compensation, and click "Save"
2. For other parameter setting steps, please refer to scenario 1

Programming

Note: Please fill in the relevant parameters according to the actual situation

NOP
Start

BOOLEAN A001 = 0
Insert variable

PALCLEAR ID = 1
Clear the previous palletizing data

WHILE (A001 == 0)
Loop statement

MOVJ P001 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Pickup entry point

WAIT (DIN4 == 1) T = 10
Pickup judgment

MOVJ P003 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Pickup auxiliary point

MOVJ P002 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Pickup workpiece point

DOUT OT#(5) 1
Pickup signal

TIMER T = 1
Delay

MOVJ P003 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Pickup auxiliary point

PALON ID = 1 TYPE = 0 [-] [-] [-] MULTI = 0
Palletizing start

PALGRIPPER ID = 1 GRIPPERS = 1
Gripper selection

PALENTER ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20 OFF OFF
Discharge entry point

PALSHIFT ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20
Discharge auxiliary point

PALREAL ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20
Discharge workpiece point

DOUT OT#(5) 0
Discharge signal

TIMER T = 1
Delay

PALSHIFT ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20
Discharge auxiliary point

PALOFF ID = 1 A001
Palletizing end

ENDWHILE
Loop end

END
End

Scenario 3 - pickup point fixed, layer height correction

Parameter setting

1. Open [Process - Palletizing process - Complete palletizing - Overlap mode], fill in "50" for height correction of each layer, and click "Save"

Programming

NOP
Start

BOOLEAN A001 = 0
Insert variable

PALCLEAR ID = 1
Clear the previous palletizing data

WHILE (A001 == 0)
Loop statement

MOVJ P001 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Pickup entry point

WAIT (DIN4 == 1) T = 10
Pickup judgment

MOVJ P003 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Pickup auxiliary point

MOVJ P002 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Pickup workpiece point

DOUT OT#(5) 1
Pickup signal

TIMER T = 1
Delay

MOVJ P003 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Pickup auxiliary point

PALON ID = 1 TYPE = 0 [-] [-] [-] MULTI = 0
Palletizing start

PALGRIPPER ID = 1 GRIPPERS = 1
Gripper selection

PALENTER ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20 OFF OFF
Discharge entry point

PALSHIFT ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20
Discharge auxiliary point

PALREAL ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20
Discharge workpiece point

DOUT OT#(5) 0
Discharge signal

TIMER T = 1
Delay

PALSHIFT ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20
Discharge auxiliary point

PALOFF ID = 1 A001
Palletizing end

ENDWHILE
Loop end

END
End

Scenario 4 - pickup point fixed, discharge point height fixed, vertical alignment

Parameter setting

1. Open [Process - Palletizing process - Complete palletizing - Overlap mode], check the "Vertical alignment" and click "Save"
2. Note: When using vertical alignment, the duplicate relationship needs to be changed to "Same", click the button after "Vertical alignment", the duplicate relationship will be automatically changed to "Same"

Programming

NOP
Start

BOOLEAN A001 = 0
Insert variable

PALCLEAR ID = 1
Clear the previous palletizing data

WHILE (A001 == 0)
Loop statement

MOVJ P001 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Pickup entry point

WAIT (DIN4 == 1) T = 10
Pickup judgment

MOVJ P003 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Pickup auxiliary point

MOVJ P002 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Pickup workpiece point

DOUT OT#(5) 1
Pickup signal

TIMER T = 1
Delay

MOVJ P003 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Pickup auxiliary point

PALON ID = 1 TYPE = 0 [-] [-] [-] MULTI = 0
Palletizing start

PALGRIPPER ID = 1 GRIPPERS = 1
Gripper selection

PALENTER ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20 OFF OFF
Discharge entry point

PALSHIFT ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20
Discharge auxiliary point

PALREAL ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20
Discharge workpiece point

DOUT OT#(5) 0
Discharge signal

TIMER T = 1
Delay

PALSHIFT ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20
Discharge auxiliary point

PALOFF ID = 1 A001
Palletizing end

ENDWHILE
Loop end

END
End

Scenario 5 - pickup point fixed, rotating 180 degrees as a whole at discharge point, XY translation compensation

Parameter setting

1. Open [Process - Palletizing process - Complete palletizing - Overlap mode].
2. Fill in the number of layers according to the actual situation, here we set the number of layers to "10" and the duplicate relationship to "Alternate", and select "1" for the graphic number of the first layer and "2" for the graphic number of the second layer, leave other parameters blank, click "Save"
3. Open [Process - Palletizing process - Complete palletizing - Plane mode]
4. Select "2" for graphic number, select "Criss-cross" for the template selection, fill in "1" for the number in X direction, "3" for the number in Y direction, "180" for overall rotation angle,"50" for X translation compensation and "100" for Y translation compensation, leave other parameters blank by default, click "Save". Click "Preview" to view the set graphic template

Programming

NOP
Start

BOOLEAN A001 = 0
Insert variable

PALCLEAR ID = 1
Clear the previous palletizing data

WHILE (A001 == 0)
Loop statement

MOVJ P001 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Pickup entry point

WAIT (DIN4 == 1) T = 10
Pickup judgment

MOVJ P003 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Pickup auxiliary point

MOVJ P002 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Pickup workpiece point

DOUT OT#(5) 1
Pickup signal

TIMER T = 1
Delay

MOVJ P003 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Pickup auxiliary point

PALON ID = 1 TYPE = 0 [-] [-] [-] MULTI = 0
Palletizing start

PALGRIPPER ID = 1 GRIPPERS = 1
Gripper selection

PALENTER ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20 OFF OFF
Discharge entry point

PALSHIFT ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20
Discharge auxiliary point

PALREAL ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20
Discharge workpiece point

DOUT OT#(5) 0
Discharge signal

TIMER T = 1
Delay

PALSHIFT ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20
Discharge auxiliary point

PALOFF ID = 1 A001
Palletizing end

ENDWHILE
Loop end

END
End

Scenario 6 - pickup point fixed, workpieces rotate 90 degrees at discharge point

Parameter setting

1. Open [Process - Palletizing process - Complete palletizing - Overlap mode]
2. Fill in the number of layers according to the actual situation, here we set the number of layers to "10" and the duplicate relationship to "Same", select "3" for the graphic number of the first layer,leave other parameters blank, click "Save"
3. Open [Process - Palletizing Process - Complete Palletizing - Plane Mode]
4. Select "3" for graphic number, select "Row-column" for the template selection, fill in "2" for the number in X direction, fill in "3" for the number in Y direction, select "90" for the workpiece rotation angle, and leave other parameters blank by default, click "Save". Click "Preview" to view the set graphic template

Programming

NOP
Start

BOOLEAN A001 = 0
Insert variable

PALCLEAR ID = 1
Clear the previous palletizing data

WHILE (A001 == 0)
Loop statement

MOVJ P001 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Pickup entry point

WAIT (DIN4 == 1) T = 10
Pickup judgment

MOVJ P003 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Pickup auxiliary point

MOVJ P002 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Pickup workpiece point

DOUT OT#(5) 1
Pickup signal

TIMER T = 1
Delay

MOVJ P003 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Pickup auxiliary point

PALON ID = 1 TYPE = 0 [-] [-] [-] MULTI = 0
Palletizing start

PALGRIPPER ID = 1 GRIPPERS = 1
Gripper selection

PALENTER ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20 OFF OFF
Discharge entry point

PALSHIFT ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20
Discharge auxiliary point

PALREAL ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20
Discharge workpiece point

DOUT OT#(5) 0
Discharge signal

TIMER T = 1
Delay

PALSHIFT ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20
Discharge auxiliary point

PALOFF ID = 1 A001
Palletizing end

ENDWHILE
Loop end

END
End

Scenario 7 - pickup point fixed, auxiliary point height fixed

Parameter setting

1. Open [Process - Palletizing process - Complete palletizing - Overlap mode]
2. Fill in the number of layers according to the actual situation, here we set the number of layers to "3" and the duplicate relationship to "Same", select "1" for the graphic number of the first layer, check "Fixed auxiliary point height", "Layer auto alignment" and "Auto-rotate attitude", click "Save"
3. Open [Process - Palletizing process - Complete palletizing - Plane mode]
4. Select "1" for graphic number, select "Row-column" for the template selection, fill in "3" for the number in X direction, fill in "4" for the number in Y direction, and leave other parameters blank by default, click "Save". Click "Preview" to view the set graphic template

Programming

NOP
Start

BOOLEAN A001 = 0
Insert variable

PALCLEAR ID = 1
Clear the previous palletizing data

WHILE (A001 == 0)
Loop statement

MOVJ P001 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Pickup entry point

WAIT (DIN4 == 1) T = 10
Pickup judgment

MOVJ P003 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Pickup auxiliary point

MOVJ P002 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Pickup workpiece point

DOUT OT#(5) 1
Pickup signal

TIMER T = 1
Delay

MOVJ P003 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Pickup auxiliary point

PALON ID = 1 TYPE = 0 [-] [-] [-] MULTI = 0
Palletizing start

PALGRIPPER ID = 1 GRIPPERS = 1
Gripper selection

PALENTER ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20 OFF OFF
Discharge entry point

PALSHIFT ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20
Discharge auxiliary point

PALREAL ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20
Discharge workpiece point

DOUT OT#(5) 0
Discharge signal

TIMER T = 1
Delay

PALSHIFT ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20
Discharge auxiliary point

PALOFF ID = 1 A001
Palletizing end

ENDWHILE
Loop end

END
End

Scenario 8 - depalletizing

Parameter setting

1. Click [menu bar - Process - Palletizing process - Complete palletizing] on the right side
2. Select the process number according to the actual situation, here we select process number 1
3. Click "Gripper setting"
4. Select the gripper according to the actual situation, here we select "1" for number of grippers, and "1" for gripper tool number (gripper tool number is the tool hand number, we need to go to the [Settings - Tool hand calibration] interface to set the gripper first), here we can only choose but not calibrate, click "Save"
5. Click "PgDn" to enter the pallet setting (you can also click "Back" and then enter the pallet setting)
6. Calibrate the pallet coordinate system (user coordinate system) according to the actual pallet and click "Save"

Note: When calibrating the pallet, you need to calibrate it with tool hand, and the Z-axis of the calibrated coordinate system cannot face downward

7. Click "PgDn" to enter the position setting (you can also click "Back" and then enter the position setting)
8. Calibrate the workpiece point, auxiliary point and entry point according to the actual situation and click "Save"

Note: Calibration needs to be done with tool hand. The depalletizing workpiece point is still set according to the palletizing process, and the depalletizing starts with the last workpiece on the highest layer

9. Click "PgDn" to enter the workpiece parameter setting (you can also click "Back" and then enter the workpiece parameter setting)
10. Fill in the workpiece size parameters according to the actual situation, here we set length "50", width "30", height "15", clearance "0", then click "Save"
11. Click "PgDn" to enter the proximity parameter setting (you can also click "Back" and then enter the proximity parameter setting)

12. Set according to the actual situation, if not needed, you can skip it directly

13. Click "PgDn" to enter the overlap mode setting (you can also click "Back" and then enter the overlap mode)

14. Fill in the number of layers according to the actual situation, here we set the number of layers to "10", the duplicate relationship to "Same", and select "1" for the graphic number of the first layer, and leave other parameters blank, click "Save"

15. Click "PgDn" to enter the plane mode setting (you can also click "Back" and then enter the plane mode)

16. Select "1" for graphic number, select "Criss-cross" for the template selection, fill in "1" for the number in X direction, "3" for the number in Y direction, and leave other parameters blank by default, click "Save". Click "Preview" to view the set graphic template

Note: The overall rotation here refers to rotating 180 degrees as a whole with the center of the first workpiece as the center of rotation

17. Click "Finish" to complete the parameter settings of process number 1

Programming

NOP
Start

BOOLEAN A001 = 0
Insert variable

PALCLEAR ID = 1
Clear the previous palletizing data

WHILE (A001 == 0)
Loop instruction

PALON ID = 1 TYPE = 1 [-] [-] [-] MULTI = 0
Depalletizing start

PALGRIPPER ID = 1 GRIPPERS = 1
Gripper selection

PALENTER ID = 1 MovJ VJ = 20 % PL = 0 ACC = 20 DEC = 20 OFF OFF
Pickup entry point

WAIT (DIN4 == 1) T = 10
Pickup judgment

PALSHIFT ID = 1 MovJ VJ = 20 % PL = 0 ACC = 20 DEC = 20
Pickup auxiliary point

PALREAL ID = 1 MovJ VJ = 20 % PL = 0 ACC = 20 DEC = 20
Pickup workpiece point

DOUT OT#(5) 1
Pickup signal

TIMER T = 1
Delay

PALSHIFT ID = 1 MovJ VJ = 20 % PL = 0 ACC = 20 DEC = 20
Pickup auxiliary point

PALOFF ID = 1 A001
Depalletizing end

MOVJ P001 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Discharge entry point

MOVJ P003 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Discharge auxiliary point

MOVJ P002 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Discharge workpiece point

DOUT OT#(5) 0
Discharge signal

TIMER T = 1
Delay

MOVJ P003 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Discharge auxiliary point

ENDWHILE
Loop end

END
End

Scenario 9 - palletizing after depalletizing

Parameter setting

Depalletizing parameters

1. Click [menu bar - Process - Palletizing process - Complete palletizing] on the right side
2. Select the process number according to the actual situation, here we select process number 1
3. Click "Gripper setting"
4. Select the gripper according to the actual situation, here we select "1" for number of grippers, and "1" for gripper tool number (gripper tool number is the tool hand number, we need to go to the [Settings - Tool hand calibration] interface to set the gripper first), here we can only choose, click "Save"
5. Click "PgDn" to enter the pallet setting (you can also click "Back" and then enter the pallet setting)
6. Calibrate the pallet coordinate system (user coordinate system) according to the actual pallet and click "Save"

Note: When calibrating the pallet, you need to calibrate it with tool hand, and the Z-axis of the calibrated coordinate system cannot face downward

7. Click "PgDn" to enter the position setting (you can also click "Back" and then enter the position setting)
8. Calibrate the workpiece point, auxiliary point and entry point according to the actual situation and click "Save"

Note: Calibration needs to be done with tool hand. The depalletizing workpiece point is still set according to the palletizing process, and the depalletizing starts with the last workpiece on the highest layer

9. Click "PgDn" to enter the workpiece parameter setting (you can also click "Back" and then enter the workpiece parameter setting)
10. Fill in the workpiece size parameters according to the actual situation, here we set length "50", width "30", height "15", clearance "0", then click "Save"

11. Click "PgDn" to enter the proximity parameter setting (you can also click "Back" and then enter the proximity parameter setting)
12. Set according to the actual situation, if not needed, you can skip it directly
13. Click "PgDn" to enter the overlap mode setting (you can also click "Back" and then enter the overlap mode)
14. Fill in the number of layers according to the actual situation, here we set the number of layers to "10", the duplicate relationship to "Same", and select "1" for the graphic number of the first layer, and leave other parameters blank, click "Save"
15. Click "PgDn" to enter the plane mode setting (you can also click "Back" and then enter the plane mode)
16. Select "1" for graphic number, select "Criss-cross" for the template selection, fill in "1" for the number in X direction, "3" for the number in Y direction, and leave other parameters blank by default, click "Save". Click "Preview" to view the set graphic template
17. Click "Finish" to complete the parameter settings of process number 1

Note: The overall rotation here refers to rotating 180 degrees as a whole with the center of the first workpiece as the center of rotation

Palletizing parameters

1. Click "Complete palletizing"
2. Select process number 2 and fill in the parameters of process number 2 according to the steps of process number 1

Note: Depalletizing parameters are consistent with palletizing parameters

Programming

NOP
Start

BOOLEAN A001 = 0
Insert variable

BOOLEAN A002 = 0
Insert variable

PALCLEAR ID = 1
Clear the previous depalletizing data

PALCLEAR ID = 2
Clear the previous palletizing data

WHILE (A001 == 0)
Loop instruction

PALON ID = 1 TYPE = 1 [-] [-] [-] MULTI = 0
Depalletizing start

PALGRIPPER ID = 1 GRIPPERS = 1
Gripper selection

PALENTER ID = 1 MovJ VJ = 20 % PL = 0 ACC = 20 DEC = 20 OFF OFF
Pickup entry point

WAIT (DIN4 == 1) T = 10
Pickup judgement

PALSHIFT ID = 1 MovJ VJ = 20 % PL = 0 ACC = 20 DEC = 20
Pickup auxiliary point

PALREAL ID = 1 MovJ VJ = 20 % PL = 0 ACC = 20 DEC = 20
Pickup workpiece point

DOUT OT#(5) 1
Pickup signal

TIMER T = 1
Delay

PALSHIFT ID = 1 MovJ VJ = 20 % PL = 0 ACC = 20 DEC = 20
Pickup auxiliary point

PALOFF ID = 1
Depalletizing end

PALON ID = 2 TYPE = 0 [-] [-] [-] MULTI = 0
Palletizing start

PALGRIPPER ID = 2 GRIPPERS = 1
Gripper selection

PALENTER ID = 2 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20 OFF OFF
Discharge entry point

PALSHIFT ID = 2 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20
Discharge auxiliary point

PALREAL ID = 2 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20
Discharge workpiece point

DOUT OT#(5) 0
Discharge signal

TIMER T = 1
Delay

PALSHIFT ID = 2 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20
Discharge auxiliary point

PALOFF ID = 2 A001
Palletizing end

ENDWHILE
End

Scenario 10 - palletizing interrupted, continue palletizing

Parameter setting

1. Complete process parameter setting before palletizing starts
2. Complete process parameter setting after interruption
3. Open [Status - Palletizing status]
4. For the process number, choose the one selected when setting the process parameter, here we select the process number 1 set before
5. If the palletizing position has been set to the 5th of the first layer, fill in "1" for the current number of layer, "5" for the number of palletized workpieces on current layer, and click "Save"

Programming

NOP
Start

BOOLEAN A001 = 0
Insert variable

PALCLEAR ID = 1
Clear the previous palletizing data

WHILE (A001 == 0)
Loop statement

MOVJ P001 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Pickup entry point

WAIT (DIN4 == 1) T = 10
Pickup judgment

MOVJ P003 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Pickup auxiliary point

MOVJ P002 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Pickup workpiece point

DOUT OT#(5) 1
Pickup signal

TIMER T = 1
Delay

MOVJ P003 VJ = 30 % PL = 0 ACC = 20 DEC = 20
Pickup auxiliary point

PALON ID = 1 TYPE = 0 [-] [-] [-] MULTI = 0
Palletizing start

PALGRIPPER ID = 1 GRIPPERS = 1
Gripper selection

PALENTER ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20 OFF OFF
Discharge entry point

PALSHIFT ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20
Discharge auxiliary point

PALREAL ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20
Discharge workpiece point

DOUT OT#(5) 0
Discharge signal

TIMER T = 1
Delay

PALSHIFT ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20
Discharge auxiliary point

PALOFF ID = 1 A001
Palletizing end

ENDWHILE
Loop end

END
End

Scenario 11 - palletizing with multi-gripper

Parameter setting

1. Click [menu bar - Process - Palletizing process - Complete palletizing] on the right side
2. Select the process number according to the actual situation, here we select process number 1
3. Click "Gripper setting"
4. Select the gripper according to the actual situation, here we select "4" for number of grippers, "2" for gripper 1 tool number, "4" for gripper 2 tool number, "5" for gripper 3 tool number and "1" for gripper 4 tool number (gripper tool number is the tool hand number, we need to go to the [Settings - Tool hand calibration] interface to set the gripper first), here we can only choose, click "Save"
5. Click "PgDn" to enter the pallet setting (you can also click "Back" and then enter the pallet setting)
6. Calibrate the pallet coordinate system (user coordinate system) according to the actual pallet and click "Save"

Note: When calibrating the pallet, you need to calibrate it with tool hand (can be calibrated with any one of the grippers), and the Z-axis of the calibrated coordinate system cannot face downward

7. Click "PgDn" to enter the position setting (you can also click "Back" and then enter the position setting)
8. Calibrate the workpiece point, auxiliary point and entry point according to the actual situation and click "Save"

Note: Calibration needs to be done with tool hand

9. Click "PgDn" to enter the workpiece parameter setting (you can also click "Back" and then enter the workpiece parameter setting)
10. Fill in the workpiece size parameters according to the actual situation, here we set length "50", width "30", height "15", clearance "0", then click "Save"
11. Click "PgDn" to enter the proximity parameter setting (you can also click "Back" and then enter the proximity parameter setting)
12. Set according to the actual situation, if not needed, you can skip it directly
13. Click "PgDn" to enter the overlap mode setting (you can also click "Back" and then enter the overlap mode)
14. Fill in the number of layers according to the actual situation, here we set the number of layers to "10", the duplicate relationship to "Same", and select "1" for the graphic number of the first layer, and leave other parameters blank, click "Save"
15. Click "PgDn" to enter the plane mode setting (you can also click "Back" and then enter the plane mode)
16. Select "1" for graphic number, select "Criss-cross" for the template selection, fill in "1" for the number in X direction, "3" for the number in Y direction, and leave other parameters blank by default, click "Save". Click "Preview" to view the set graphic template

Note: The overall rotation here refers to rotating 180 degrees as a whole with the center of the first workpiece as the center of rotation

17. Click "Finish" to complete the parameter settings

Programming

NOP
Start

BOOLEAN A001 = 0
Insert variable

PALCLEAR ID = 1
Clear the previous palletizing data

WHILE (A001 == 0)
Loop statement

MOVJ P001 VJ = 30 %　PL = 0 ACC = 20 DEC = 20
Pickup entry point

WAIT (DIN4 == 1)　T = 10
Pickup judgement

MOVJ P003 VJ = 30 %　PL = 0 ACC = 20 DEC = 20
Pickup auxiliary point

MOVJ P002 VJ = 30 %　PL = 0 ACC = 20 DEC = 20
Pickup workpiece point

DOUT OT#(5) 1
Pickup signal

TIMER T = 1
Delay

MOVJ P003 VJ = 30 %　PL = 0 ACC = 20 DEC = 20
Pickup auxiliary point

PALON ID = 1 TYPE = 0 [-] [-] [-] MULTI = 0
Palletizing start

PALGRIPPER ID = 1 GRIPPERS = 1
Gripper selection

PALENTER ID = 1 MovJ VJ = 30 %　PL = 0 ACC = 20 DEC = 20 OFF OFF
Discharge entry point

PALSHIFT ID = 1 MovJ VJ = 30 %　PL = 0 ACC = 20 DEC = 20
Discharge auxiliary point

PALREAL ID = 1 MovJ VJ = 30 %　PL = 0 ACC = 20 DEC = 20
Discharge workpiece point

DOUT OT#(5) 0
Discharge signal

TIMER T = 1
Delay

PALSHIFT ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20
Discharge auxiliary point

PALOFF ID = 1 A001
Palletizing end

ENDWHILE
Loop end

END
End

Scenario 12 - Two stacks on one line (two stacks with same number of workpieces)

Parameter setting

1. Click [menu bar - Process - Palletizing Process - Palletizing parameters - Complete Palletizing]
2. Select the process number according to the actual situation, here we select process number 1 for the first stack
3. Click "Gripper Setting", select the gripper according to the actual situation, here we select "1" for number of grippers, and "1" for gripper tool number (gripper tool number is the tool hand number, we need to go to the [Settings - Tool hand calibration] interface to set the gripper first), click "Save" after modification
4. Click "PgDn" to enter the pallet setting (you can also click "Back" and then enter the pallet setting), calibrate the pallet coordinate system (user coordinate system) according to the actual pallet. Select the user coordinate system, first calibrate the origin of the pallet, the positive direction of the x-axis of the pallet, and the positive direction of the y-axis of the pallet. After the calibration is completed, you must click "Calculate". The positive direction of the z-axis without calibration is automatically calculated by the

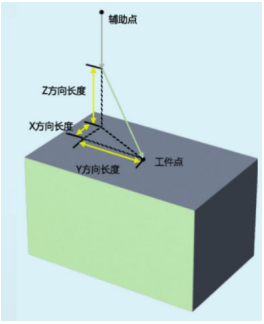
system according to the positive direction of the calibrated x-axis and y-axis. After all calibrations are complete, click "Save"

Note: When calibrating the pallet, you need to calibrate it with tool hand, and the Z-axis of the calibrated coordinate system cannot face downward

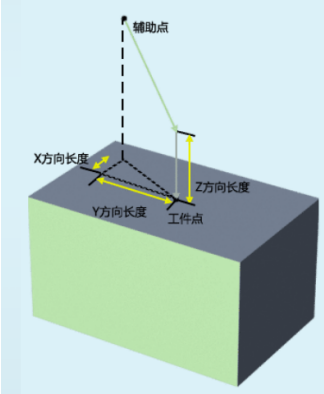
5. Click "PgDn" to enter the position setting (you can also click "Back" and then enter the position setting), calibrate the workpiece point, auxiliary point and entry point according to the actual situation and click "Save"
6. Click "PgDn" to enter the workpiece parameter setting, set the workpiece size according to the actual situation, here we set length "50", width "30", height "15", clearance "10", (The y-direction of the pallet is the workpiece length direction, the x-direction of the pallet is the workpiece width direction, the z-direction of the pallet is the workpiece height direction, and the clearance is the empty space between the workpiece and the workpiece), click "Save" after filling.
7. Click "PgDn" to enter the approach parameter setting (you can also click "Back" and then enter the approach parameter setting), and set the approach method and pallet detection. Choose whether to open or not according to the actual situation. Here, we turn on the approach enable switch and the pallet detection switch, set the length of pallet X direction "50", the length of pallet Y direction "50", the length of pallet Z direction "50", the thickness of pallet "10", and the total number of pallets "3".

Note: If the approach enable is turned off, then the program will not generate the palletizing approach point instruction (the opposite is true when the enable switch is turned on), and there are two approach methods: approach descent and descent approach.

Approach descent: For example, according to the approach parameters set above, the position of the approach point is 50 mm away from the position of the workpiece point in the X direction, 50 in the Y direction, and 50 in the Z direction. Use the set approach method to move from the approach point to the workpiece point



Descent approach: For example, according to the approach parameters set above, the position of the auxiliary point is 50 mm away from the position of the workpiece point in the X direction, 50 in the Y direction. Use the set approach method to move from the auxiliary point to the approach point (50 mm above the workpiece point), and then descent vertically from the approach point to the workpiece point



Pallet detection: The range of the total number of pallets is [1-5], and the fixed bound IO ports are 2-1~2-5 ports. The program will automatically detect whether the IO is open or closed to determine the number of pallets. For example, when the total number of pallets is "3", pallet thickness is "10" mm, if you start the program, it will automatically detect whether IO 2-1, 2-2, and 2-3 are open. When the number of pallets is reduced by one (2-1 or 2-2 or 2-3 is arbitrarily closed), the z-axis direction length of all workpiece points will be reduced by 10mm.

8. Click "PgDn" to enter the overlap mode setting (you can also click "Back" and then enter the overlap mode), fill in the number of layers according to the actual situation, here we set the number of layers to "2", the duplicate relationship to "Same", and select "1" for the graphic number of the first layer, and leave other parameters blank, (The number of layers is the total number of layers of the workpiece, and the duplicate relationship is the relationship between the placement of each layer), click "Save"

9. Click "PgDn" to enter the plane mode setting (you can also click "Back" and then enter the plane mode), select "1" for graphic number, select "Criss-cross" for the template selection, fill in "2" for the number in X direction, "1" for the number in Y direction, and leave other parameters blank by default, click "Save". Click "Preview" to view the set graphic template

Note: The overall rotation here refers to rotating 180 degrees as a whole with the center of the first workpiece as the center of rotation

10. Click "Finish" to complete the parameter settings

11. Use the above method to set the second stack according to the actual situation, select 2 for the process number. (Note: The user coordinate system in process number 2 needs to be recalibrated according to the actual situation or use the user coordinate system set in process number 1)

Programming

NOP
Start

PALCLEAR ID = 1
Palletizing reset, process number 1

PALCLEAR ID = 2
Palletizing reset, process number 2

WHILE (B001 == 0)
Loop statement

PALON ID = 1 TYPE = 0 [-] [-] [-] MULTI = 0
Stack 1 palletizing start

PALGRIPPER ID = 1 GRIPPERS = 1
Gripper selection

MOVJ P001 VJ = 50 % PL = 5 ACC = 10 DEC = 10 0
Pickup safety point

MOVJ P002 VJ = 50 % PL = 5 ACC = 10 DEC = 10 0
Point above the pickup point

MOVJ P003 VJ = 50 % PL = 5 ACC = 10 DEC = 10 0
Pickup point

DOUT OT#(1) 1 T = 0 0
Pickup signal

TIMER T = 1
Delay 1s

MOVJ P002 VJ = 50 % PL = 5 ACC = 10 DEC = 10 0
Point above the pickup point

PALENTER ID = 1 MovJ VJ = 50 % PL = 5 ACC = 10 DEC = 10 OFF OFF 0
Discharge entry point

PALSHIFT ID = 1 MovJ VJ = 50 % PL = 5 ACC = 10 DEC = 10 0
Discharge auxiliary point

PALAPPRO ID = 1 MovJ VJ = 50 % PL = 0 ACC = 20 DEC = 20 0
Discharge approach point

PALREAL ID = 1 MovJ VJ = 50 % PL = 5 ACC = 10 DEC = 10 0
Discharge workpiece point

DOUT OT#(1) 0 T = 0 0
Discharge signal

TIMER T = 1
Delay 1s

PALAPPRO ID = 1 MovJ VJ = 50 % PL = 0 ACC = 20 DEC = 20 0
Discharge approach point

PALSHIFT ID = 1 MovJ VJ = 50 % PL = 5 ACC = 10 DEC = 10 0
Discharge auxiliary point

PALOFF ID = 1
Palletizing end judgment

PALON ID = 2 TYPE = 0 [-] [-] [-] MULTI = 0
Stack 2 palletizing start

PALGRIPPER ID = 2 GRIPPERS = 1
Gripper selection

MOVJ P001 VJ = 50 % PL = 5 ACC = 10 DEC = 10 0
Pickup safety point

MOVJ P002 VJ = 50 % PL = 5 ACC = 10 DEC = 10 0
Point above the pickup point

MOVJ P003 VJ = 50 % PL = 5 ACC = 10 DEC = 10 0
Pickup point

DOUT OT#(1) 1 T = 0 0
Pickup signal

TIMER T = 1
Delay 1s

MOVJ P002 VJ = 50 % PL = 5 ACC = 10 DEC = 10 0
Point above the pickup point

PALENTER ID = 2 MovJ VJ = 50 % PL = 5 ACC = 10 DEC = 10 OFF OFF 0
Discharge entry point

PALSHIFT ID = 2 MovJ VJ = 50 % PL = 5 ACC = 10 DEC = 10 0
Discharge auxiliary point

PALAPPRO ID = 1 MovJ VJ = 50 % PL = 0 ACC = 20 DEC = 20 0
Discharge approach point

PALREAL ID = 2 MovJ VJ = 50 % PL = 5 ACC = 10 DEC = 10 0
Discharge workpiece point

DOUT OT#(1) 0 T = 0 0
Discharge signal

TIMER T = 1
Delay 1s

PALAPPRO ID = 1 MovJ VJ = 50 % PL = 0 ACC = 20 DEC = 20 0
Discharge approach point

PALSHIFT ID = 2 MovJ VJ = 50 % PL = 5 ACC = 10 DEC = 10 0
Discharge auxiliary point

PALOFF ID = 2 B001
Palletizing process number 2, cycle end judgment

ENDWHILE
Loop end

END
End

Scenario 13 - Two stacks on one line (Two stacks with different number of workpieces)

Parameter setting

1. Click [menu bar - Process - Palletizing process - Palletizing parameters - Complete palletizing]
2. Select the process number according to the actual situation, here we select process number 1 for the first stack
3. Click "Gripper setting", select the gripper according to the actual situation, here we select "1" for number of grippers, and "1" for gripper tool number (gripper tool number is the tool hand number, we need to go to the [Settings - Tool hand calibration] interface to set the gripper first), click "Save" after modification
4. Click "PgDn" to enter the pallet setting (you can also click "Back" and then enter the pallet setting), calibrate the pallet coordinate system (user coordinate system) according to the actual pallet. Select the user coordinate system, first calibrate the origin of the pallet, the positive direction of the x-axis of the pallet, and the positive direction of the y-axis of the pallet. After the calibration is completed, you must click "Calculate". The positive direction of the z-axis without calibration is automatically calculated by the system according to the positive direction of the calibrated x-axis and y-axis. After all calibrations are complete, click "Save"

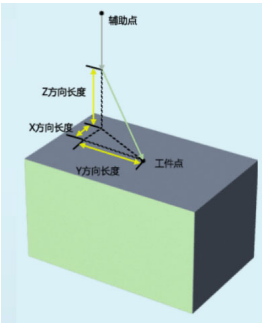
Note: When calibrating the pallet, you need to calibrate it with tool hand, and the Z-axis of the calibrated coordinate system cannot face downward

5. Click "PgDn" to enter the position setting (you can also click "Back" and then enter the position setting), calibrate the workpiece point, auxiliary point and entry point according to the actual situation and click "Save"
6. Click "PgDn" to enter the workpiece parameter setting, set the workpiece size according to the actual situation, here we set length "50", width "30", height "15", clearance "10", (The y-direction of the pallet is the workpiece length direction, the x-direction of the pallet is the workpiece width direction, the z-direction of the pallet is the workpiece height direction, and the clearance is the empty space between the workpiece and the workpiece), click "Save" after filling.

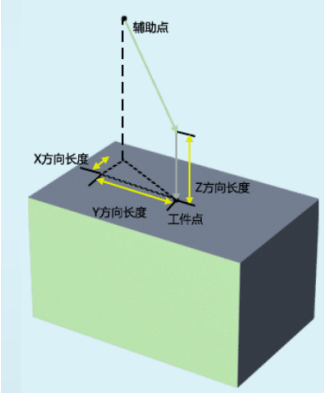
7. Click "PgDn" to enter the approach parameter setting (you can also click "Back" and then enter the approach parameter setting), and set the approach method and pallet detection. Choose whether to open or not according to the actual situation. Here, we turn on the approach enable switch and the pallet detection switch, set the length of pallet X direction "50", the length of pallet Y direction "50", the length of pallet Z direction "50", the thickness of pallet "10", and the total number of pallets "3".

Note: If the approach enable is turned off, then the program will not generate the palletizing approach point instruction (the opposite is true when the enable is turned on), and there are two approach methods: approach descent and descent approach.

Approach descent: For example, according to the approach parameters set above, the position of the approach point is 50 mm away from the position of the workpiece point in the X direction, 50 in the Y direction, and 50 in the Z direction. Use the set approach method to move from the approach point to the workpiece point



Descent approach: For example, according to the approach parameters set above, the position of the auxiliary point is 50 mm away from the position of the workpiece point in the X direction, 50 in the Y direction. Use the set approach method to move from the auxiliary point to the approach point (50 mm above the workpiece point), and then descent vertically from the approach point to the workpiece point



Pallet detection: The range of the total number of pallets is [1-5], and the fixed bound IO ports are 2-1~2-5 ports. The program will automatically detect whether the IO is open or closed to determine the number of pallets. For example, when the total number of pallets is "3", pallet thickness is "10" mm, if you start the program, it will automatically detect whether IO 2-1, 2-2, and 2-3 are open. When the number of pallets is reduced by one (2-1 or 2-2 or 2-3 is arbitrarily closed), the z-axis direction length of all workpiece points will be reduced by 10mm.

8. Click "PgDn" to enter the overlap mode setting (you can also click "Back" and then enter the overlap mode), fill in the number of layers according to the actual situation, here we set the number of layers to "2", the duplicate relationship to "Same", and select "1" for the graphic number of the first layer, and leave other parameters blank, (The number of layers is the total number of layers of the workpiece, and the duplicate relationship is the relationship between the placement of each layer), click "Save"

9. Click "PgDn" to enter the plane mode setting (you can also click "Back" and then enter the plane mode), select "1" for graphic number, select "Criss-cross" for the template selection, fill in "2" for the number in X direction, "1" for the number in Y direction, and leave other parameters blank by default, click "Save". Click "Preview" to view the set graphic template

Note: The overall rotation here refers to rotating 180 degrees as a whole with the center of the first workpiece as the center of rotation

10. Click "Finish" to complete the parameter settings

11. Use the above method to set the second stack according to the actual situation, select 2 for the process number. (Note: The user coordinate system in process number 2 needs to be recalibrated according to the actual situation or use the user coordinate system set in process number 1)

Programming

NOP
Start

PALCLEAR ID = 1
Palletizing reset, process number 1

PALCLEAR ID = 2
Palletizing reset, process number 2

WHILE {(B003 == 0)}
Loop statement

IF {(B001 == 0)}
Execute the if judgment statement of stack 1

PALON ID = 1 TYPE = 0 [-] [-] [-] MULTI = 0
Stack 1 palletizing start

PALGRIPPER ID = 1 GRIPPERS = 1
Gripper selection

MOVJ P001 VJ = 50 % PL = 0 ACC = 20 DEC = 20 0
Pickup safety point

MOVJ P002 VJ = 50 % PL = 0 ACC = 20 DEC = 20 0
Point above pickup point

MOVJ P003 VJ = 50 % PL = 0 ACC = 20 DEC = 20 0
Pickup point

DOUT OT#(1) 1 T = 0 0
Pickup signal

TIMER T = 1
Delay 1s

MOVJ P002 VJ = 50 % PL = 0 ACC = 20 DEC = 20 0
Point above pickup point

PALENTER ID = 1 MovJ VJ = 50 % PL = 0 ACC = 20 DEC = 20 OFF OFF 0
Discharge entry point

PALSHIFT ID = 1 MovJ VJ = 50 % PL = 0 ACC = 20 DEC = 20 0
Discharge auxiliary point

PALAPPRO ID = 1 MovJ VJ = 50 % PL = 0 ACC = 20 DEC = 20 0
Discharge approach point

PALREAL ID = 1 MovJ VJ = 50 % PL = 0 ACC = 20 DEC = 20 0
Discharge point

DOUT OT#(1) 0 T = 0 0
Discharge signal

TIMER T = 1
Delay 1s

PALAPPRO ID = 1 MovJ VJ = 50 % PL = 0 ACC = 20 DEC = 20 0
Discharge approach point

PALSHIFT ID = 1 MovJ VJ = 50 % PL = 0 ACC = 20 DEC = 20 0
Discharge auxiliary point

PALOFF ID = 1 B001
Stack 1 palletizing end judgment

ENDIF
End if

IF {(B002 == 0)}
Execute the if judgment statement of stack 2

PALON ID = 2 TYPE = 0 [-] [-] [-] MULTI = 0
Stack 2 palletizing start

PALGRIPPER ID = 2 GRIPPERS = 1
Gripper selection

MOVJ P001 VJ = 50 % PL = 0 ACC = 20 DEC = 20 0
Pickup safety point

MOVJ P002 VJ = 50 % PL = 0 ACC = 20 DEC = 20 0
Point above pickup point

MOVJ P003 VJ = 50 % PL = 0 ACC = 20 DEC = 20 0
Pickup point

DOUT OT#(1) 1 T = 0 0
Pickup signal

TIMER T = 1
Delay 1s

MOVJ P002 VJ = 50 % PL = 0 ACC = 20 DEC = 20 0
Point above pickup point

PALENTER ID = 2 MovJ VJ = 50 % PL = 0 ACC = 20 DEC = 20 OFF OFF 0
Discharge entry point

PALSHIFT ID = 2 MovJ VJ = 50 % PL = 0 ACC = 20 DEC = 20 0
Discharge auxiliary point

PALAPPRO ID = 2 MovJ VJ = 50 % PL = 0 ACC = 20 DEC = 20 0
Discharge approach point

PALREAL ID = 2 MovJ VJ = 50 % PL = 0 ACC = 20 DEC = 20 0
Discharge point

DOUT OT#(1) 0 T = 0 0
Discharge signal

TIMER T = 1
Delay 1s

PALAPPRO ID = 2 MovJ VJ = 50 % PL = 0 ACC = 20 DEC = 20 0
Discharge approach point

PALSHIFT ID = 2 MovJ VJ = 50 % PL = 0 ACC = 20 DEC = 20 0
Discharge auxiliary point

PALOFF ID = 2 B002
Stack 2 palletizing end judgment

ENDIF
End if

IF {(B001 == 1)} AND {(B002 == 1)}
Determine whether both stack 1 and stack 2 have finished palletizing

SETBOOL B003 = 1
Variable to jump out of loop

ENDIF
End if

ENDWHILE
Loop end

END
End