

IP1000 Palletizing Craft Package User Manual

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1. Process Introduction

Robot palletizing is mainly used in food, beverage, logistics and other industries, and is also a typical example of industrial robot applications. With different grippers, it can realize packaging and palletizing of finished products of various shapes in different industries. The significance of palletizing is to pass the piles of items into a stack through a certain pattern, so that the items can be easily transported and unloaded. and storage.

Traditional palletizing is done manually. This palletizing method has high labor costs and low production efficiency, which can no longer be adapted to today's Automation requirements for production.

To improve handling efficiency AND: Palletizing quality、Labor cost savings 、Ensure the personal safety of employees of the company, production In, more palletizing robots will be applied.

1.1. Introducing new features

2403 Added process optimization of the palletizing interface, by referring to Point setting and modification of morphological values can make the palletizing process more Lancar

Here are the specific instructions:

Enter the process/Palletizing process/Position debugging interface, add [Additional Parameters] page in the lower right corner, click [Settings] You can enter the [Additional Parameters] page.



Additional Parameters Page:



Morphology: You can set the morphology value of the current workpiece, including the entry point, auxiliary point, and workpiece point morphology, whichMediumState value is 0-8.

Reference point: You can select the zero position to move to the target point, and alsois the movement from the current position to the target point.

1.When the zero point is selected, the position of the workpiece will be based on the zero point position to determine whether it can be reached. If displayedThe position is unreachable, you can change the selection morphology value. If displayed, enterThe entry point is unreachable, and the entry point morphology value can be modified. Ex: Current workpiece 9, the entry point is not reachable when the reference point is zero.



Artifacts can be 9The entry point morphology of was changed to 4, the entry point can be reached when the reference point is zero.



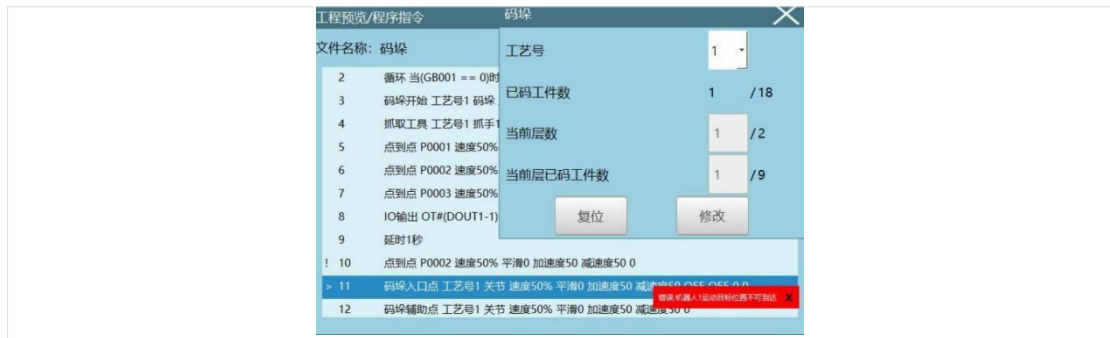
2. When the current position is selected, the workpiece position will move forward according to the current position. The line reference determines if it is reachable. If displayed, the position is unreachable, you can change the selection morphology value. If the entry point is unreachable, you can modify the entry point morphology value. Ex: Current workpiece 1, when the reference point is the current, the workpiece point, the auxiliary points and entry points are unreachable.



Artifacts can be 1. The shape of the artifact point, auxiliary point, and entry point has been changed to 4, the reference point is the current time. The position of the workpiece can be reached.



3. Palletizing to generate files. If joint interpolation is used, run the job statement. The error location is not reachable when the device is in use, you can debug at the location. Attach the parameter page and change the morphological value of the corresponding workpiece.



At this time, the entry point position is unreachable when the second workpiece is in the code, and the workpiece can be modified in the position debugging. 2The morphological value of the entry point of is 4
o.



When running the work file, after modifying the workpiece point morphology value, it is possible that the bit will appear when returning to the pickup point position. Make it unreachable.



Pickup safety points can be manually modified (P0001) has a morphological value of 8, and you're up and running.

工程预览/程序指令/指令插入/参数设定

MOVJ

参数名	参数	注释	形态B	无	无
点位	P0001	更多 已存点位: 3	关节	直角	
VJ	50	更多 范围(1-100)	轴	当前位置	P0001
PL	0	更多 范围(0-5)	一	92.75	809.5570
ACC	50	更多 比率(1-100)	二	9.07	-3.7890
DEC	50	更多 比率(1-100)	三	-37.09	1054.8400
TIME	0	更多 自然数(ms)	四	0.01	-3.0830
			五	-28.00	0.0560
			六	-87.23	-3.1240

将机器人移动到P点
将手动位置设置为P点

手动修改: ☒

示例: MOVJ P0001 VJ = 10% PL = 0 ACC = 10 DEC = 10 0

确定 取消

2. Easy Palletizing/Full Palletizing

Enter the process/Palletizing process/Stacking parameters, support 99 process number parameters, easy stacking and finishing can be selected Whole pallet, as shown in the figure below.

Clear Parameters: Empty is the currently selected process number, full palletizing/Parameters for simple palletizing.

Copy Parameter: Process number currently selected, full palletizing/Simple stacking parameters can be copied as you wish Inside the craft number of the system.

工艺/码垛工艺/码垛参数

工艺号: 1 注释:

未设定

简易码垛

完整码垛

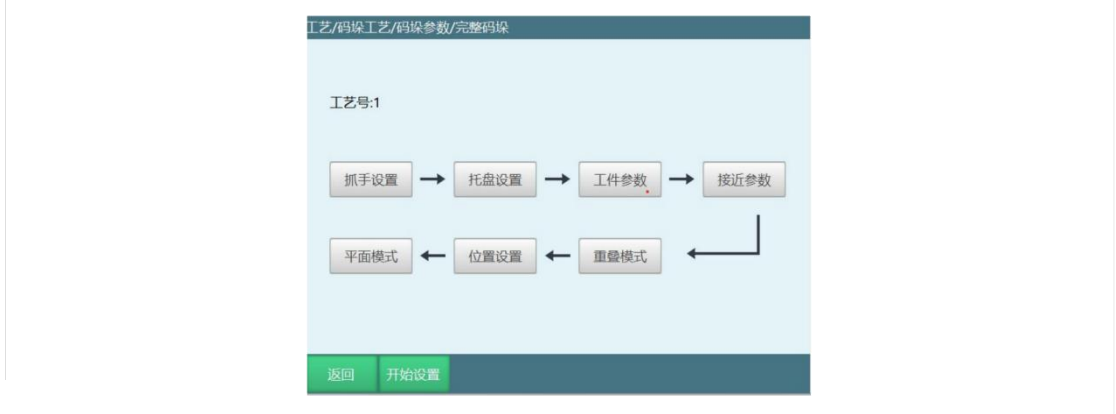
返回 修改 清空参数 复制参数

Note: Simple palletizing process number It is best not to choose the same process number as the full palletizing process number, if it is simpleThe process number of the pallet is 10Once the parameters are set, place the process number 1Replace it with a full pallet, you have to reset the fullStacking parameters, selecting different process numbers can save time,Avoid errors while the program is running.

3. Full palletizing

3.1. Parameter settings

Complete palletizing according to the process can be gripper setting, pallet setting, workPart parameters, proximity parameters, overlap modes, Position settings, plane mode, as shown in the following figure:



3.2. Gripper Settings

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

Two suction cups take the material separately (one suction cup finishes suction and then switches to the other suction cup to take the material), Then set it toTwo grippers;

If two suction cups are taken out at the same time, they are set as one gripper;

If two suction cups are discharged separately (after one suction cup is discharged, switch to the other suction cup for discharging) , At this time, two grippers need to be set;

If two suction cups are discharged at the same time, they are set as one gripper.

The menu described is shown below.

参数	值
X	0.0000
Y	0.0000
Z	0.0000
A	0.0000
B	0.0000
C	0.0000

Note: Please go to [Settings] in advance-Tool hand calibration]
Calibration gripper in the interface (tool hand) , Then set it on this interfaceHold the gripper.
Interpretation of terms
Number of grippers:The number of grippers, set according to the actual situation, the maximum can be set 4a gripper.

Gripper XTool number:Set the tool number corresponding to the gripper (X In the diagram, the value is 1) , Tool hand parameters need to be calibrated in advance.

Value:Tool hand calibration interface After calibrating the tool coordinates, in this interfaceSelect the marked tool hand numberParameter values for each rear axis.

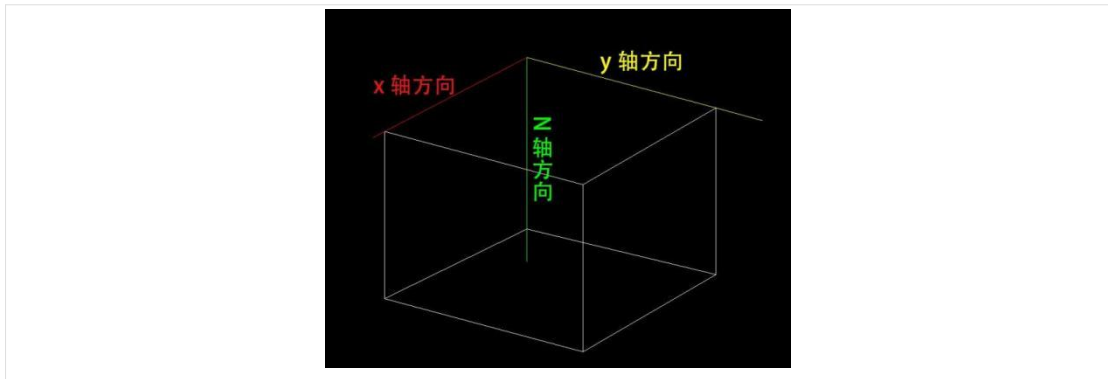
3.3. Pallet Settings

The setting of the pallet is the project of setting the user coordinates of the pallet. In this interface, the origin of the pallet, the palletright of privacy YDirectional and tray X emerge.



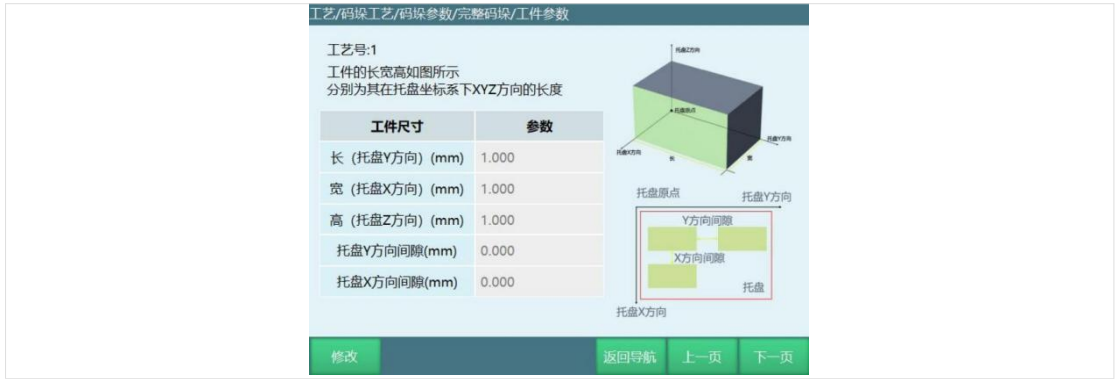
User coordinate system:Pallet coordinates, select the user coordinates to be calibrated as needed, calibrate the pallet coordinates (userCoordinate) , If the position of the coordinate system is changed later in the user coordinate calibration, the coordinate system will also change here. .NOTE: Please use the gripper 1The selected tool hand is calibrated. When the user coordinates (tray coordinates) are not calibrated, the user coordinate parameter value is 0is consistent with the rectangular coordinate system.

Marking XDirection vs. YIn the direction, be sure to use the robot X、YOrientation based, otherwise marked trayZThe direction will be down, and the second layer will be down when palletizing!



3.4. Workpiece parameters

The workpiece parameters can set the length, width, height and gap of the coded workpiece under the user coordinates;
 The length, width, and height are as follows under the pallet coordinate system (user coordinate system) **XYZ**The length of the orientation, as shown in the following figure:



Description of workpiece dimensional parameters:
 Long: The workpiece is under the pallet coordinate system **Y**The length of the direction.
 Width: the workpiece is under the pallet coordinate system **X**The length of the direction.
 High: The workpiece is under the pallet coordinate system **Z**The length of the direction.
 Tray **Y**Directional clearance: under the tray coordinate system **Y**Axial direction, gap distance between two workpiecesUNIT
 Tray **X**Directional clearance: under the tray coordinate system **X**Axis direction, between two workpiecesThe length of the gap distance.

3.5. OverlapMode

Overlay mode allows you to set stacking and graphic template selection for your palletInand other relevant parameters, as shown in the figure belowHere is an example to calculate weighted words

工艺/码垛工艺/码垛参数/完整码垛/重叠模式

工艺号:1

层	图形编号	高度修正
1	1	0

层数: 1

重复关系: 相同

放货点高度补偿: 0

固定辅助点高度: ☐

固定放货点高度: ☐

竖直方向排列: ☐

层自动对齐: ☒

姿态自动旋转: ☐

固定入口点位置: ☐

上一页 下一页

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Interpretation of terms

Story Count:The total number of layers of the pallet, filled in according to actual needs.

Duplicate relationships:Duplicate relationships between each layer.

Same selection:Then each layer uses the same graphical template.

Select Alternate:Then the graphic templates alternate every two layers.

Choose BouquetThe user selects the graphical template to use for each layer.

The sameEach layer of graphic template is the same, the pallet is the same graphic template, select theWhen the option is selected, only the first layer of the list on the right can be modified, and all the layers below are changed accordingly. The figure below shows the number of layers selected as 6Layer, HeavyComplex relation selection is the same.

层	图形编号	高度修正
1	1	0
2	1	0
3	1	0
4	1	0
5	1	0
6	1	0

AlternatingThe two graphic templates are used interchangeably. After selecting this item, the right columnOnly the first two layers of the table

can be modified, and after modification, all the layers below repeat the graphic numbers of the two layers. The figure below shows the number of layers selected as 6Layer, repeat relationship selection intersectionSubstitute.

层	图形编号	高度修正
1	1	0
2	2	0
3	1	0
4	2	0
5	1	0
6	2	0

Custom. Each layer of graphic template can be set individually. The figure below shows the number of layers selected as 6Layer, Repeat RelationshipSelect from Definition, as shown below:

层	图形编号	高度修正
1	1	0
2	2	0
3	3	0
4	4	0
5	5	0
6	6	0

RepeatWhen the repetitive relationship uses a custom and has a large number of layers, if all layersBefore all repetitions Ngraphical templates for layers,Then, before filling in the NAfter the graphical template of the layer, select the N+1layer, click the button, each of the followingLayer AutoUlangi(This feature can only be used on the first page), shown below.

工艺/码垛工艺/码垛参数/完整码垛/重叠模式

工艺号:1

层数: 10

重复关系: 自定义

放货点高度补偿: 0

固定辅助点高度: ☐

固定放货点高度: ☐

垂直方向排列: ☐

层自动对齐: ☒

姿态自动旋转: ☐

固定入口点位置: ☐

层	图形编号	高度修正
1	1	0
2	1	0
3	1	0
4	1	0
5	1	0
6	1	0
7	1	0
8	1	0
9	1	0
10	1	0

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重复

修改 说明 返回导航 上一页 下一页

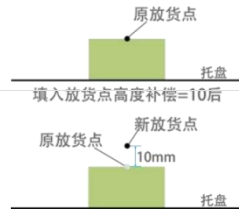
层	图形编号	高度修正
1	1	0
2	2	0
3	3	0
4	4	0
5	1	0
6	2	0
7	3	0
8	4	0
9	1	0
10	2	0

层	图形编号	高度修正		层	图形编号	高度修正
1	1	0		1	1	0
2	2	0		2	2	0
3	3	0		3	3	0
4	4	0		4	4	0
5	1	0	重复按钮 →	5	1	0
6	1	0		6	2	0
7	1	0		7	3	0
8	1	0		8	4	0
9	1	0		9	1	0
10	1	0		10	2	0

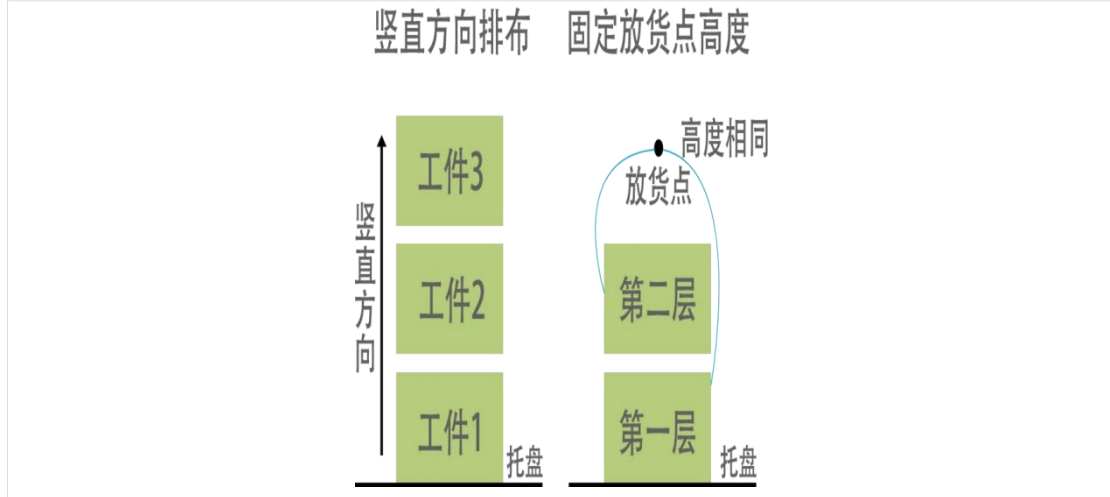
Fixed auxiliary point height: If the number of layers of the pallet is two, open this button, The first layer of workpieces and the second layer The auxiliary point of the workpiece is the same point and will not run the second layer again Auxiliary point direction when working Z+Direction offset. For example, in a closed box around the palletized workpiece, if there are more palletized workpieces, the workpiece auxiliary point set by each workpiece will increase with the increase in the number of palletized workpieces, and the auxiliary point will likely exceed the limit of the robot joint parameters. In order to prevent such errors, we can open the fixed auxiliary point height button and set the fixed auxiliary point height position, so that with the increase in the number of palletized workpieces,

the auxiliary point height is always at the same position, and there will be no joint parameter overrun, which can also ensureSafety of the operator.

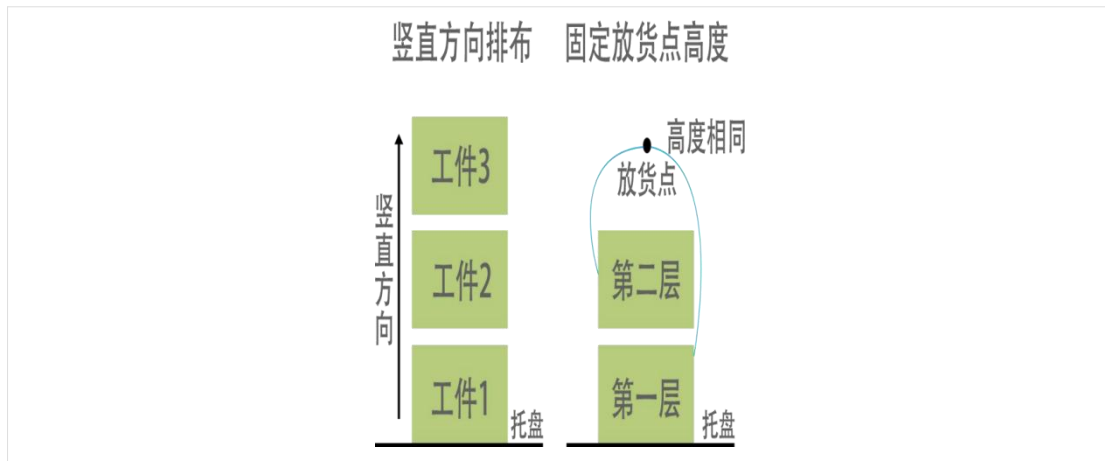
Drop Point Height Compensation:When filled in, the height of the drop-off point of all workpieces will be offset, and the offset height can beto fill in as needed. Values are regularZ+Offset in the direction, if the value is negative, it is in the directionZ-FangOffset Toward (UnloadingThis parameter is invalid when stacking, only the height compensation effect can be seen when the program is running).



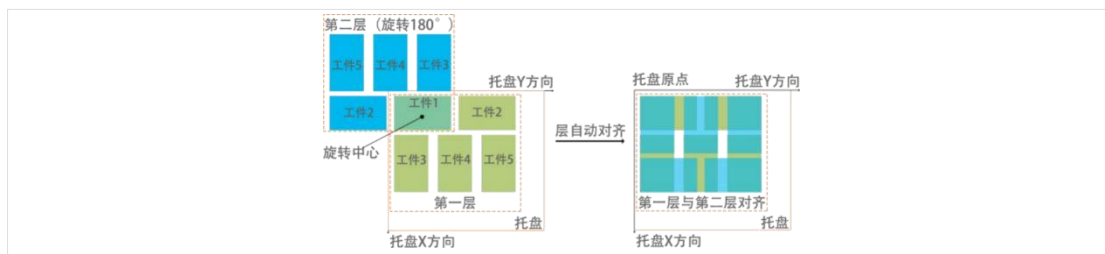
Fixed drop-off point height: When selected, the height of the drop-off point is the same for each layer of the code,Height markedWorkpiece point height (valid only when palletizing) , If the number of layers of the pallet is greater than one (taking two layers as an example) , Open this button, the workpiece point of each workpiece is the same height on each layer, not on the second layer of the palletWorkpiecePoint Height OrientationZ+Direction offset.



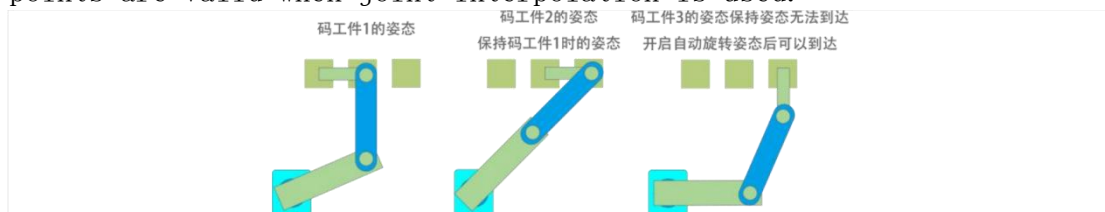
Vertical alignment:After selecting the vertical direction, the code will finish one column in the vertical direction and then code the next vertical column.



Layer auto alignment: Automatic alignment of selected layers will auto align each layer templateAlignment, will be calculated automatically XaxleYAxial deviationShift.

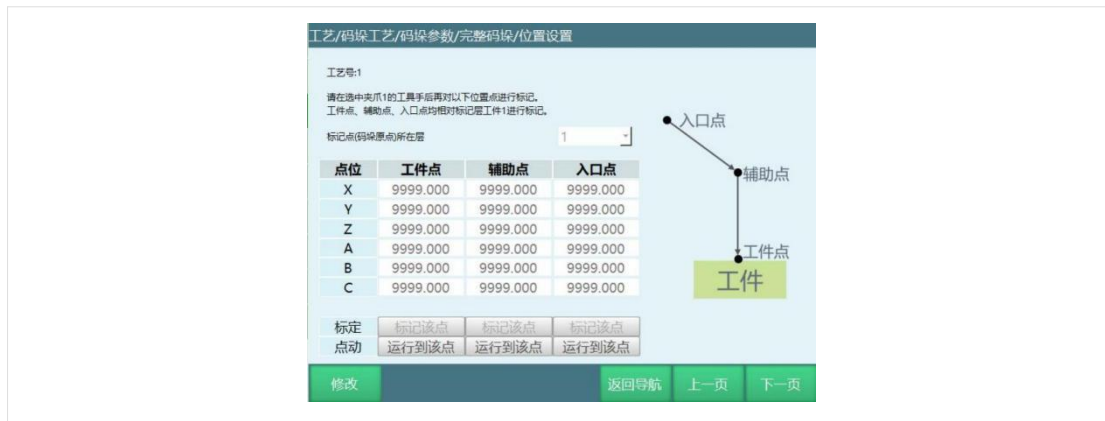


Pose autorotation: After checking, when palletizing, the tool hand fails to reach the auxiliary point and discharge in an inherent mannerpoint, but when the gesture of the tool hand is reached by rotating it, it will rotate automatically. This function only works at auxiliary pointsPiece points are valid when joint interpolation is used.



Fixed entry point position:After sampling, one workpiece per yard will be at the same entry point, atEntry point processMedium will optimize Zaxle

Location SettingsStacking workpiece points, auxiliary points, entrances can be setpoint, please take the gripper to set the selected tool hand Mark the location.



Marker Layer Number: The current calibration workpiece point is located on the first floor, Eliminate the process of clearing the stack, you can directly select the label Remember the current layer.

job point: The first or last discharge point of the marking layer
(Note: Worker of palletizing parameter setting interface The pieces are sorted in palletizing order, and the unstacking order is reversed).

guide point: Used in conjunction with the workpiece point, so that the workpiece can be placed into the workpiece more safely Piece point, generally set at work Above the part point, if the workpiece needs to be rotated, it will rotate before reaching the auxiliary point, which will follow The position of the workpiece is automatically offset.

Entry Point The entry point of the tray, in order to prevent the robot from colliding with other objects, Measure the safety position of the robot Placement is set to the entry point, which will follow the placement of the workpiece Z Proceed in axial direction Automatic offset. Palletizing Entry point command open XYZ Optimization, when running to the entry point ABC Axis coordinates have changed.

Mark the point: The robot moves to the position first, then clicks to mark the point.

Run to this point: The value of the marker can only be moved to after clicking Save Marked point, when not saved, moved to is the previously marked point, to move to it, press DEADMAN After pressing the key, click the button (Note: Please take the gripper to set the selected tool hand for position marking).

3.6. FlatMode

This mode sets the graphical template for the pallet:



Graphic No.: The number of the graphic template.

Template Selection Divided into: 4 Fixed graphic templates and custom graphic templates, which are rows and columns, vertical and horizontal, respectively 错Hui zigzag, five flower pile, Custom.

XTranslation Compensation: The position of the overall graphical template relative to the original pallet in the pallet coordinate system X On-axis The offset of.

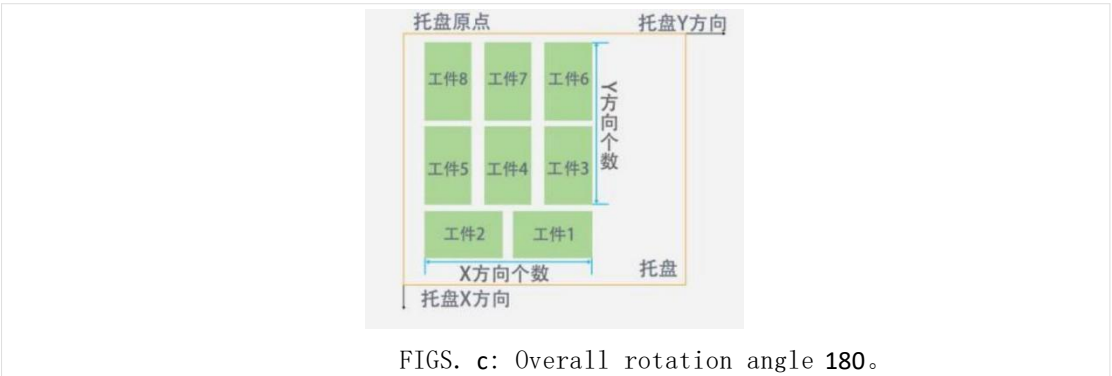
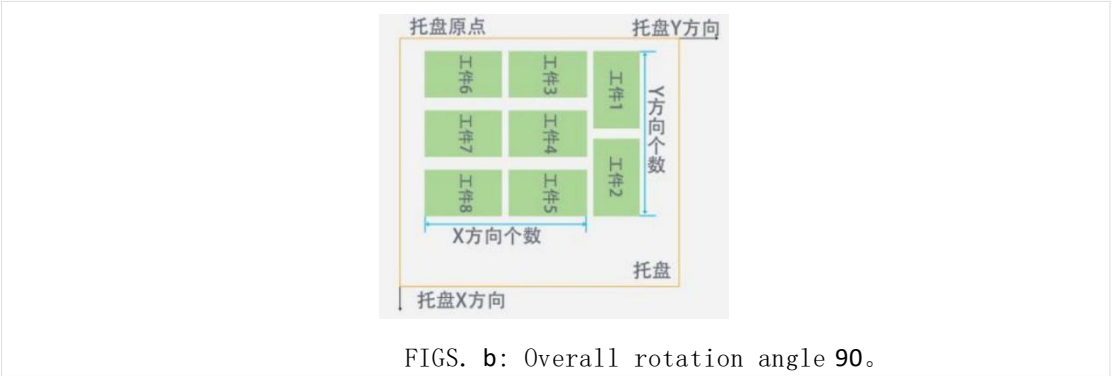
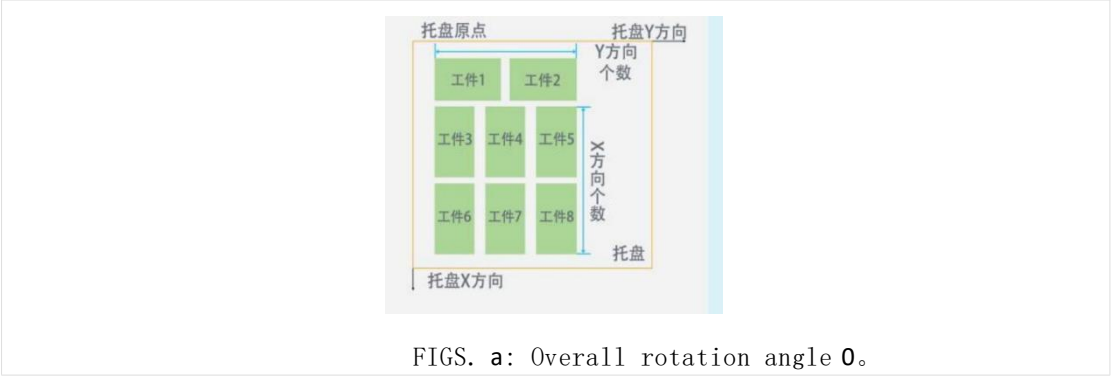
YTranslation Compensation: The position of the overall graphical template relative to the original pallet in the pallet coordinate system Y The offset on the axis.

Automatically calculate: According to the pallet setting interface, the calibrated user The coordinate system produces a rectangular tray, root Automatic calculation according to workpiece size X the number of workpieces that can be placed in the direction, Y How many directions can be placed Workpiece

XNumber of directions (Line and column template, vertical and horizontal staggered template) : Artifacts in X Number in direction (crisscrossed X The number in the direction is the number of long edges of the workpiece in the X number on the axis).

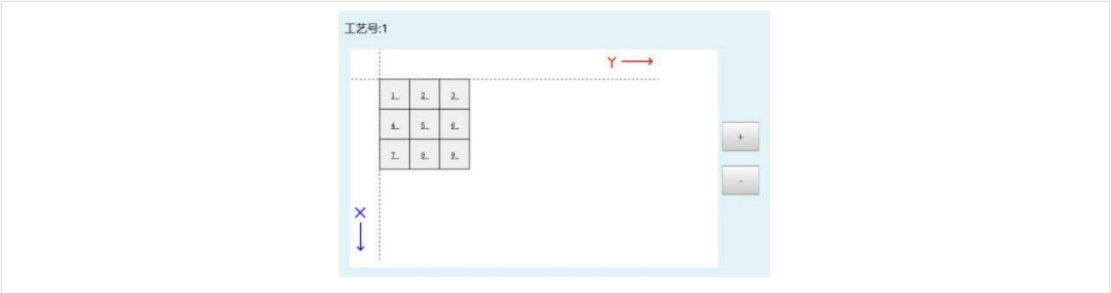
YNumber of directions (Line and column template, vertical and horizontal staggered template) : Artifacts in Y Number in direction (portrait and landscape Interlaced Y The number in the direction is the number of long edges of the workpiece in the Y number on the axis).

Overall Rotation Angle(Line and column templates, crisscross templates, glyph templates): Overall around the first work pointAngle to rotate clockwise. Can rotate 0° , 90° , 180° , -90° As shown in the figure below:

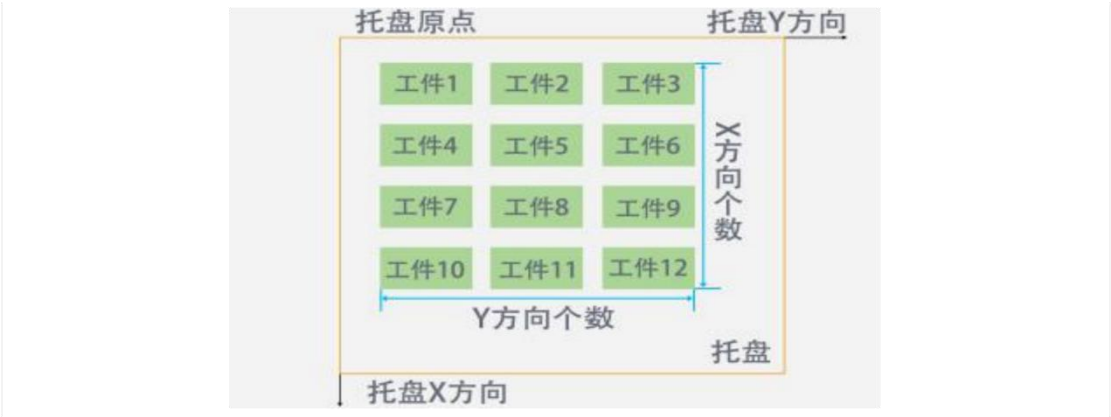


Workpiece rotation angle (row and column template, vertical and horizontal staggered template, glyph-shaped die)Plate, Five Flower Pile Plate) : Graphics modeThe angle at which all workpieces of the board are rotated clockwise and can be rotated 0°, 90°, 180°, -90°.

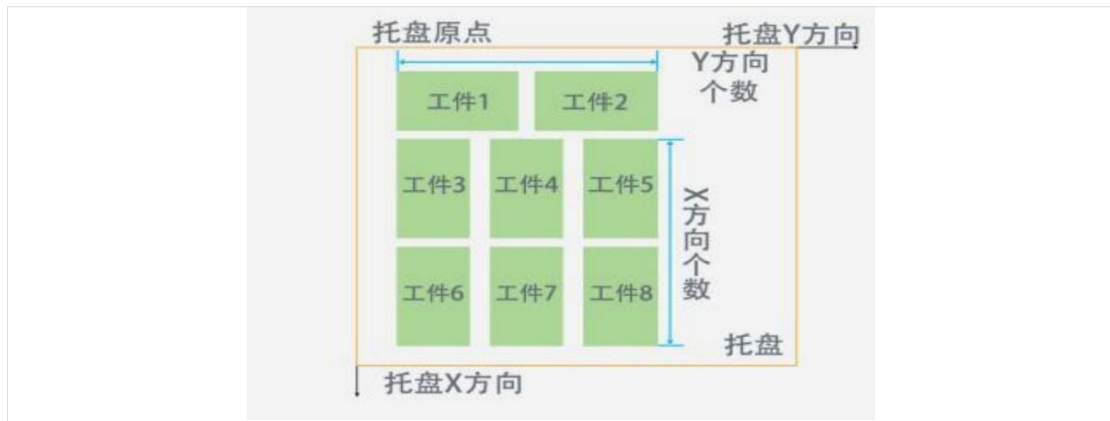
Prev: A graphical template for preview settings that can be used to check if the graphical template is set correctly. Select a staggered template here,XThe number of directional workpieces is 3 , YNumber of directions is 3。



KDD Train :: The workpiece directions of the entire layer of graphic templates are the same, and they are placed in sequence. The following figure shows XThe number of directional workpieces is 4 , YNumber of directions is 3。

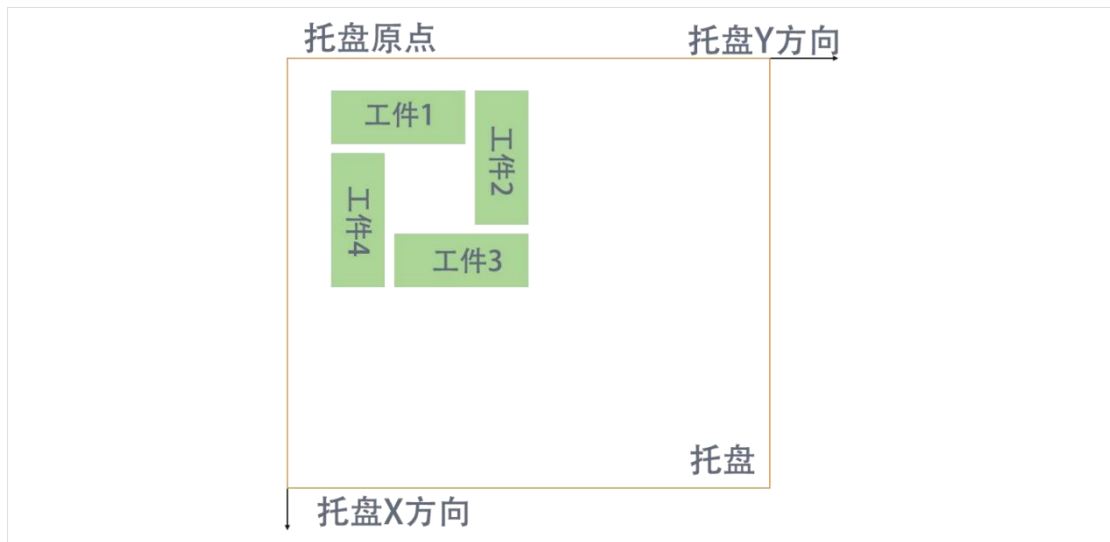


criss-crossed: horizontal, vertical, staggered in the direction of the workpiece (the template's XThe number of directions is the workpieceGrowing in Xnumber of axes, YThe number of directions is the length of the workpiece in Ynumber of axes).



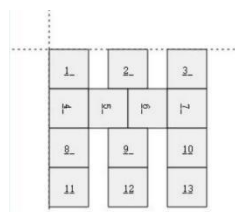
Gypsum: Artifact 1st Floor 4, arranged in a gyro shape (the second workpiece rotates clockwise than the first workpiece) 90degrees, the third workpiece rotates clockwise from the first workpiece 180degree, the fourth workpiece is better than the first workpiece

Rotate counterclockwise 90Degree



Five Flowers Stack: The workpiece is divided into three areas: AArea BArea Cinterval; A District vs. C The number of columns in a section can be set together Settings? B Set the number of columns individually in the section (as shown in B Artifacts in Zone 4~7 Compare A Artifacts in Zone 1-3 And C Artifacts in Zone 8-13 Rotated clockwise 90 degrees) as shown in the figure eshown A District and C Artifacts in Zone With the most columns B Area is the benchmark insurance Hold the workpiece to the left and right alignment.

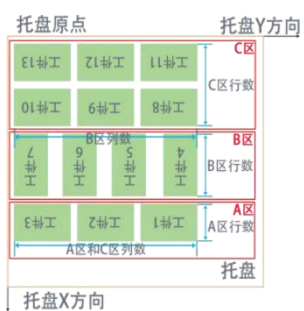
A区行数	1
B区行数	1
B区列数	4
C区行数	2
A区和C区列数	3
整体旋转角度	0
工件旋转角度	0
转换为自定义模板	



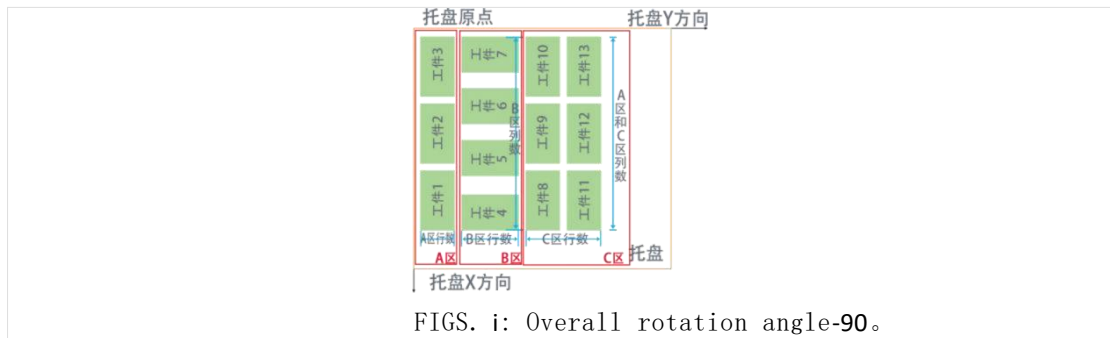
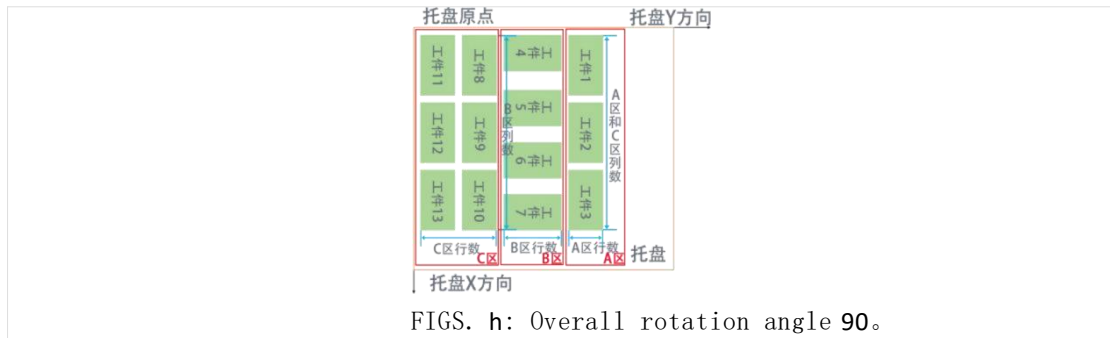
FIGS. e



FIGS. f: Overall rotation angle 0.



FIGS. g: Overall rotation angle 180.



Customizable: Customize the graphic template.

工艺/码垛工艺/码垛参数/完整码垛/平面模式

工艺号:1 图形编号 1 X平移补偿 0 X自动平移距离0
模板选择 自定义 Y平移补偿 0 Y自动平移距离0

层工件总数 9 (1-999) 标定 上移 下移 拖动设置

X偏移和Y偏移是工件相对于第一个工件点在托盘坐标系下的偏移量

工件	X偏移	Y偏移	旋转角	高度修正	接近方向	接近速度	离开速度
1	0	0	0	0	上	0	0
2	0	50	0	0	上	0	0
3	0	100	0	0	上	0	0
4	50	0	0	0	上	0	0
5	50	50	0	0	上	0	0
6	50	100	0	0	上	0	0
7	100	0	0	0	上	0	0

页数 1 / 2 应用到当前层 上一页 下一页

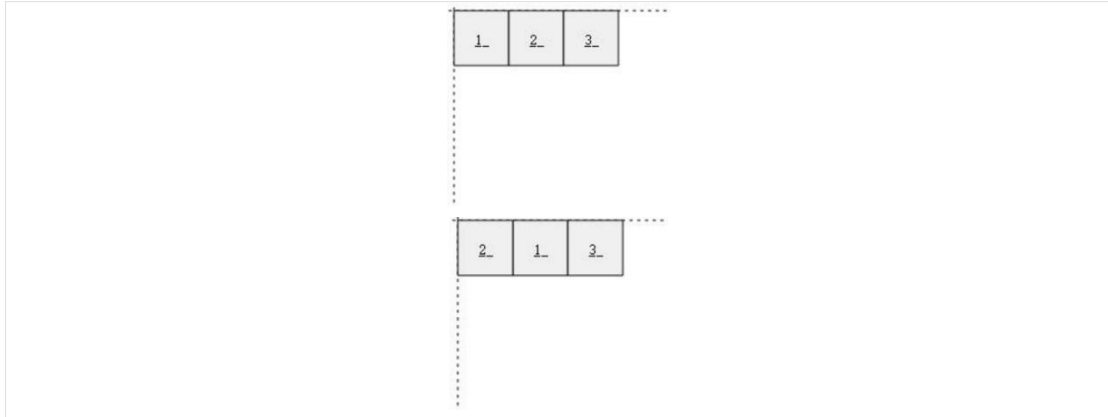
修改 预览 复制图形 接近说明 上一页 结束

Total number of layer artifacts:The total number of palletized workpieces, set according to actual needs. Note: modifying the total number of artifacts will clear the artifact parameters.

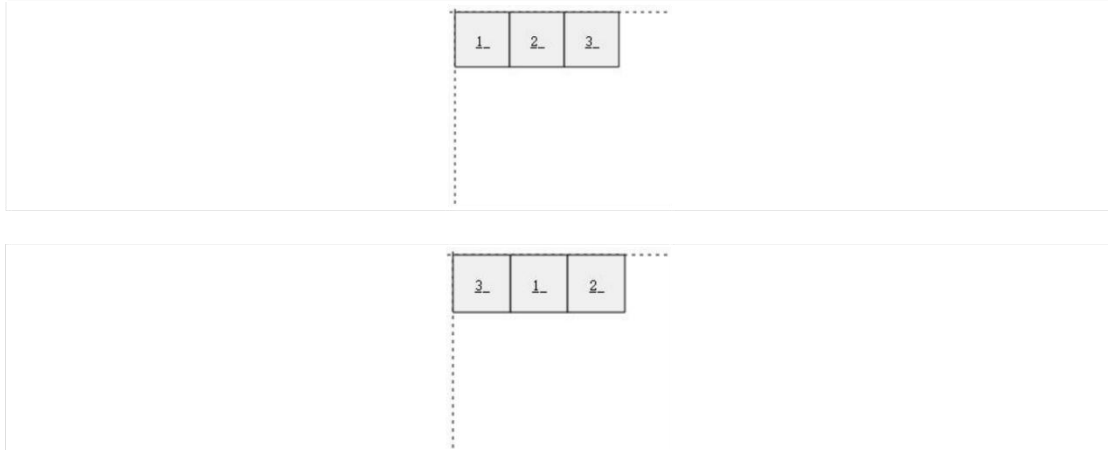
calibration:You can set the point when stacking the workpiece yourself, click Calibration after determining the pointbutton. If the firstIf you want to modify the position of the workpiece at the time of palletizing of the secondary setting, you can click the number of the workpiece,Move the robotClick the calibration after reaching the desired position, so that the point of the workpiece is modified.

Move Up:After the workpiece point calibration is completed, you want to palletize the workpiece 2Position set to palletized workpiece 1Location of "%s" You can click the move up button so that the workpiece 1the location

changes. Here are two artifacts as an example. Workpiece 2 After moving up, as shown in the figure:



Move Down: After the workpiece point calibration is completed, you want to palletize the workpiece 1 Position set to palletized workpiece 3 position, you can click the down button, so that the workpiece 3 the location changes. Workpiece 1 After moving down, as shown in the figure:



X Bias: job point at X The offset on the axis.

Y Bias: job point at Y The offset on the axis.

Rotation Angle: The angle at which the workpiece rotates relative to the previous workpiece point.

Height correction: After filling in, job point, auxiliary point, entrance The height will be offset when pointing to the workpiece pallet, value Is Regular Z+Offset in the direction, if the value is negative, it is in the direction Z-Direction offset, can be applied to workpiece points, auxiliary points, entrances Point height for correction.

Drag and drop settings: After setting the number of palletized workpieces, click the drag and drop setting button, as shown in the figure, you can put

the workpiece pointDrag anywhere you want. Custom In addition to can be filled in XY offset, or directly into the workpieceLine drag.

Note: Before entering the drag and drop settings, first set the total number of layers in the custom, click Save, and then clickClick to modify-Drag and drop settings; after the drag and drop settings are completed, click the Save button in the drag and drop settings to return to theCustomize the interface and click Save again.



Boost: Increase the number of workpieces, and increase the number of workpieces according to your needs.

The reduction in the: Reduce the number of artifacts.

Workpiece/Canvas: The button closes to drag the workpiece,

the button opens toDrag the canvas.**Reset:** Resets the canvas.

scene+: Zooms in.

scene-: Zooms out.

Single Piece/All of itSingle Piece/Integral artifacts inXor YOffset of direction, open single piece/All of itbuttons for all artifacts Xor YOffset of direction, closing single piece/The overall button, which can be used for your currentSelected artifacts for Xor YThe offset of the direction.

X+/X-: Overall to XPositive or negative direction offset step value.

Y+/Y-: Overall to YPositive or negative direction offset step value.

Stepper: Artifacts in X or Y The offset of the direction.

Angle: Set the angle of each rotation, open the single piece/Overall button, all artifacts will proceed Rotation (Off) Closed single piece/The Integral button allows you to rotate your currently selected workpiece.

Forward Rotation/invert: The workpiece rotates itself to set the angle value

4. Simple palletizing

4.1. Parameter settings

Simple palletizing parameter setting According to the process, gripper setting and position setting can be performed.



Current use type: When simple palletizing and full palletizing share the palletizing number, the correct type needs to be set before use.

4.2. Gripper Settings

The gripper setting allows you to select the gripper of the pallet (tool hand) , Please go to [Settings] in advance-Tool hand calibration] interface Successfully calibrated gripper (tool hand), Then set the gripper on this interface, as shown in the figure:

Column end: Column when palletizing (user coordinates X Axis) Direction LastThe location point of the artifact.

Row End: Line during palletizing (user coordinates Yaxis) direction of the last workpiecePosition Dot

High-end: The position point of the first workpiece in the last layer when palletizing.

Diagonal end: Row end diagonal end line intersects column end diagonal end lineposition point to calibrate the codePosition offset problem when there are many stacking points

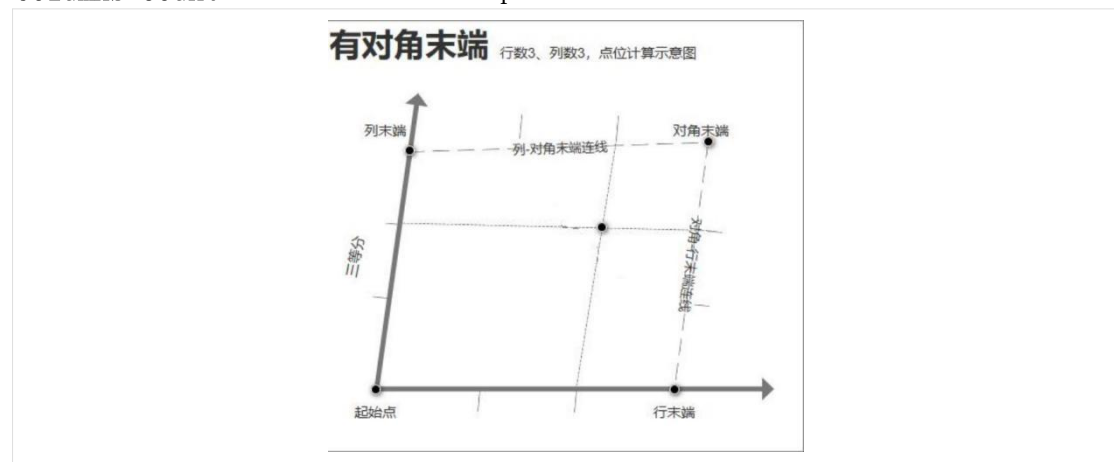
guide point: The auxiliary point of the pallet, recommended to be set above the starting workpiece point.

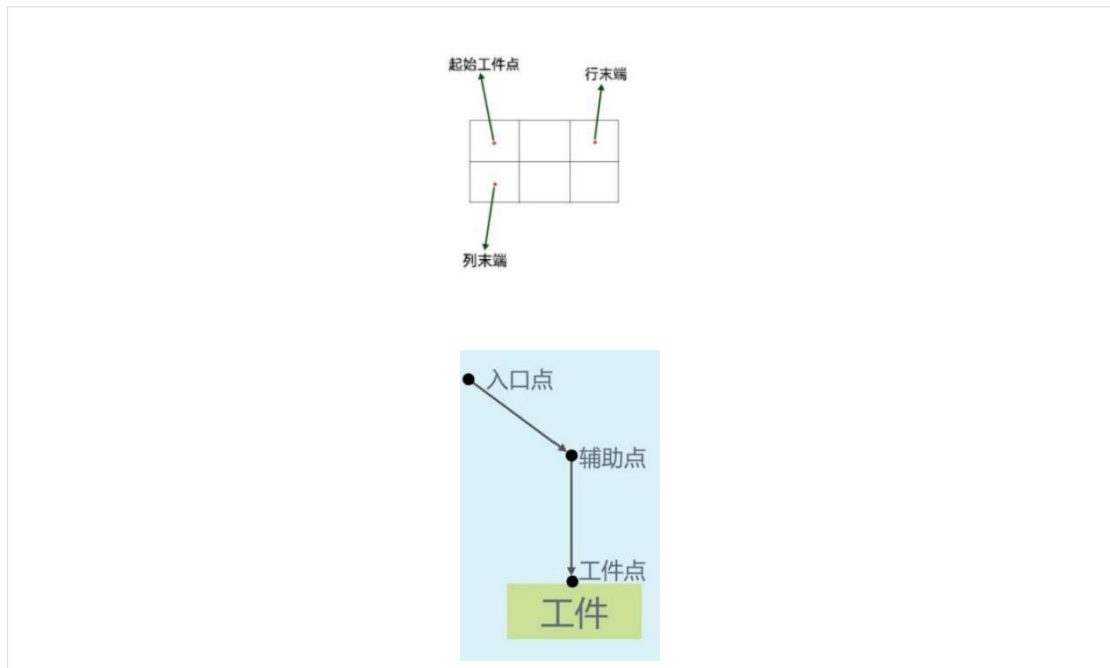
Entry Point: The entry point at the time of palletization, it is recommended to set it as a safety point outside the pallet.

Stacks: The total number of layers of the pallet.

of Lines: Total number of rows for palletizing.

Columns count: Total number of palletized columns.





5. Generate file

Generation files can be used to generate standard palletizing, unstacking procedures, which requireSet the parameters in the process number in advance.Simple palletizing file generation function, no IO Do not use. As shown in the following figure:

The screenshot shows a software window titled '工艺/码垛工艺/生成文件'. It contains several input fields and dropdown menus: '工艺号' (Process No.) with a dropdown menu showing '1', '程序名' (Program Name) with a text input field, '功能' (Function) with a dropdown menu showing '码垛' (Palletizing), and '单层码垛/卸垛顺序' (Single-layer Palletizing/Unstacking Sequence) with a dropdown menu showing '正序' (Normal Sequence). At the bottom, there are two green buttons: '返回' (Return) on the left and '下一页' (Next Page) on the right.

Current use type: When simple palletizing and full palletizing share the palletizing number, the correct type needs to be set before use.
Parameter introduction:

Process No.: After selecting the process number, confirm whether the current use type of the pallet is set.

Program Name: needs to start with an English letter(Pure Chinese is also acceptable)。

Function: Palletizing, unstacking.

Single-layer palletizing/Unstacking: positive order, reverse order.



Mark the point: Teach to the corresponding point Click to mark the point.

Run to this point: Click Run to this point to verify that the point location teaching is correct.



Gripper solenoid valveGripper: IOOutput signal, gripper solenoid valve DOUTPort must be set, generating file worksCan only support 1Channel output, multiple outputs are required. The output signal can be returned to the engineering modification after the job file is generated.Let

Pickup Allowance Signal: Wait for the picking allowance signal before picking up the pallet, and choose according to your own situation.

Gripper Pickup Success Signal: Judge the success signal of gripper retrieval.



NOTE:Current Code Total, Current Palletize Layers, Current Palletize Layers if inThe generation job does not select the variable type, we can do this in the process bar when executing the palletizing procedure-YardsThe stacking process interface is viewed.

Current yardage total: Cache the value of the current yardage total variableinto the set variable.

Current Number of Pallet Stacks: Cache the value of the current stack layer variableinto the set variable.

Current Number of Layers: Cache the value of the current layer stacking number variableinto the set variable.

Pallet End Judgement: After the palletizing is completed, change the variable value to jump out whileLooping:



Pickup process: Above the picking point, the picking point can be changed to joint interpolation or linear interpolation.

Intermediate process: Pick-up safety point, pallet entry point, can be changed toJoint or linear interpolation.

Palletizing process: Palletizing auxiliary points, workpiece points, can be changed to joint interpolation or linear interpolation.

XY Path optimization:: After clicking on open, you can optimize the tray's XYThe path to the direction.

Z Road optimization: After clicking on open, you can optimize the tray's ZThe path to the direction.

Pose Sync:

- Off: The gesture is executed according to the set point.
- Manual Write: Move to the entrance in a hand filled position.
- Automatic calculation of attitude: according to the ratio of the distance from the entry point to the auxiliary point and from the auxiliary point to the workpiece point, Automatic meterCalculate the trajectory attitude between the entry point running to the auxiliary point and the workpiece point during the movementCPositionIt rotates all the time. For example, the distance ratio of the entry point to the auxiliary point and the auxiliary point to the workpiece point is 2:8 , fromEntry point to job pointCThe posture has changed altogether 100° then 1Transferred from job point to auxiliary point 20° 剩下的80°The transition is completed between the auxiliary point and the job point.

6. Position debugging



Parameter introduction:

Process No.: Process number of the current parameter.

Total number of layer artifacts: Total number of artifacts in this layer.

Upper layer: Switches to the previous floor.

Lower layer: Switches to the next layer.

Workpiece/Canvas: The button closes to drag the workpiece,
the button opens to drag the canvas. **Reset:** Resets the
canvas.

scene+: Zooms in.

scene-: Zooms out.

Overall Offset: operates the overall workpiece offset.

X+: Overall to XPositive direction offset step value.

X-: Overall to XNegative direction offset step value.

Y+: Overall to YPositive direction offset step value.

Y-: Overall to YNegative direction offset step value.

Z+: Overall to ZPositive direction offset step value.

Z-: Overall to ZNegative direction offset step value.

Quantity step Sets the step value for each offset.

Angle: Sets the angle of each rotation.

Forward Rotation The overall clockwise rotation angle value of each
workpiece.

Invert: The overall counterclockwise rotation angle value of each
workpiece.

Apply to Same Layer: Applies the parameters of the current layer setting
to a layer with the same graphic number.

Notes:

- Set the offset of the point by filling in the value of the current workpiece row, and save the current workpiece offset of the current layer after saving. Effective. If you need to apply to a layer with the same number, the step is to click to modify--->Modify Current WorkerOffset value of one line of items--->Click the Apply to Same Layer button--->Click Save (apply to sameLayer Apply Only xBiasyOffset and Angle Offset,zoffset is not applied to the same layer).
- Set the overall offset by the overall offset of a column of fill values, and save all the workpiece offsets of the current layer after saving. Effective. If you need to apply to a layer with the same number, the step is to click to modify--->Modify WholeThe offset value of a column of body offsets--->Click under each workpiece angleFace Confirmation Button--->Click Apply to Phase Same Layer Button--->Click Save (Apply to Same Layer Apply Only xBiasyOffset and Angle Offset,zoffset is not applied to the same layer).



PRESENT PIECES: 1Indicates the number of the workpiece;
X Represents the workpiece directionXAxis positive or negative offset;
Y Represents the workpiece directionYAxis positive or negative offset;
Z Represents the workpiece directionZAxis positive or negative offset;

The angle indicates how many degrees the workpiece is currently selected.

Workpiece/Canvas Feature Demo

The button opens and drags the entire canvas, but does not affect the workpiece coordinates.



Reset Feature Demo

After clicking the reset button, the canvas returns to its original position, but the canvas size is not reset.



scene+scene-Featured Presentations

Tap the screen+, zoom in on the canvas.



Tap the screen-, the canvas zooms out.



Single Piece/Overall Offset Function Demo

Fill in the coordinate value, which is also the offset X、Y、Z, Angle (because it's flat, so Z Axis does not see the effect) of Value, e.g. fill in X:400, Y:300, Z:0 Angle 45.



7. Pallet status

The palletization state can be used to view the current palletization state. If the palletization needs to start from the middle, it can be achieved by setting the number of layers and the number of required codes.

The number of pallets will be cleared after the controller is restarted, and the operation will be unclear again. None.

The palletization status can be found in the [Status bar-technology-Palletizing], there are two ways; can be set in the operating parametersPlace, select the palletizing process in the process selection bar (the palletizing will always be selected by default in the operating parameters)Palletizing process); AlsoYou can select the pallet directly in the navigation bar process above the teach, as shown in the figure:

Process No. : The process number of the pallet.

Number of artifacts encoded: Number of artifacts encoded/Total number of artifacts.

Current layer::Number of layers currently in code/Total number of layers (if the stacking needs to start in the middle, set the number of layers that need to be yard) , Taking two layers of palletizing as an example, when the robot is performing the first layer of workpiece palletizing, the current number of layers can be set to **2**, and then the robot will proceed to the second layerThe stacking of workpieces, and the display of the number of workpieces that have been coded are also

Number of coded artifacts in the current layer:Number of coded artifacts in the current layer/Total number of artifacts in the current layer (If the palletizing needs to start in the middle,Set the number of codes required) For example, now in progress at **3 Pcs**Palletize the workpiece, if you want to **7**Start palletizing the pieces, then you can modify the number of coded pieces in the current layer, and start palletizing according to the number of pieces you need.

Reset: Clears the recorded palletizing data.

Change: During the robot palletizing process, click Modify to modify the current number of layers and the current layerCoded artifactsQuantity

8. Palletizing Instructions

8.1. Palon (start palletizing)

Function: The palletizing begins to judge.

Process No. : Process No. 1-99。

&Genre: Palletizing, unstacking.

Single-layer palletizing/Unstacking: positive order, reverse order.

Current Yardage Total Variable: Cache the value of the current code total variable into the set variable. Note: The layer of the code can be controlled by reading the variables of the layer of the workpiece.

Current Pallet Number Variable: Cache the value of the current stack number variable into the set variable. Note: The layer of the code can be controlled by reading the variables of the layer of the workpiece.

Current stack number variable: Caches the value of the current stacking number variable into the set variable.

Note: The layer of the code can be controlled by reading the variables of the layer of the workpiece.

Example: PALON ID=1 SORT=0 TYPE=0 [Variables][Variables][Variables] 。

Note: Start of palletizing **PALON OPERATION 3** count variables are written directly to the configuration, no writing is required PCS **FORCESET** Instruction

8.2. PALGRIPPER (switch gripper)

Function: Select the gripper.

Process No.: Process No. 1-99。

GripperGripper: 1Gripper 2Gripper 3Gripper 4。

EXAMPLE: PALGRIPPER ID=1 GRIPPERS=1。

8.3. PAENTER (palletizing entry point)

Function: The entry point for palletizing.

Process No.: Process No. 1-99。

Interpolation method: Joint interpolation, linear interpolation, arc interpolation, portal interpolation.

Joint Interpolation: The robot will move to this point in the form of a joint interpolation.

Linear interpolation: The robot will move to this point in a straight line interpolation.

Arcs and Splines: The robot will be interposed with two other points (previous dotted **MOVJ/MOVL**, Next point **MOV** Composition Arc trajectory.

Door type interpolation: Portal track motion is widely used for material handling and 3c Industry. The robot arm passes through the door type railTrace (Ascending-->TRANSLATION-->Descending) Movement to the target point to avoid material friction.

VJ Velocity range 1-100.

PL: Smooth transition range 0-5.

ACC: Acceleration range 1-100.

DEC: Deceleration range 1-100.

XY Optimize Mathematical optimization XY Axis motion path.

Z Optimize Mathematical optimization Z Shaft movement path, need to insert a fixed point before palletizing.

When the entry point height is lower than the fixed point, the entry point is at the height will be at the same value line as the fixed point and the auxiliary point Up (looks sideways at the same line, looks down is not the same line, XY Axis unchanged).

When the entry point height is between the fixed point and the auxiliary point, the entry point height does not change.

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

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

Posture: Off: The posture is executed according to the set point.

Manual Write: Move to the entrance in a hand filled position.

Automatically calculate gestures: There is a gesture before and after the entry point, and the entry point gesture is calculated between the two gestures.

TIME: time, range non-negative integer, unit, ms execute next instruction in advance.

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

8.4. PALSHIFT (palletizing auxiliary point)

Function: Palletizing auxiliary points.

Process No. : Process No. 1-99.

Interpolation method: Joint interpolation, linear interpolation, arc interpolation, portal interpolation.

Joint Interpolation: The robot will move to this point in the form of a joint interpolation.

Linear interpolation; The robot will move to this point in a linear interpolation.

Arcs and Splines: The robot will be interposed with two other points (previous dotted MOVJ/MOVL, Next point MOVCCompositionArc trajectory.

Door type interpolation: Portal track motion is widely used for material handling and 3c Industry. The robot arm passes through the door type railTrace (Ascending-->TRANSLATION-->Descending) Movement to the target point to avoid material friction.

VJVelocity range 1-100.

PL: Smooth transition range 0-5.

ACC: Acceleration range 0-100.

DEC: Deceleration range 0-100.

TIME: time, range non-negative integer, unit ms, execute the next command ahead of time.

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

8.5. Palreal (palletizing workpiece points)

Function: Palletizing workpiece points.

Process No. : Process No. 1-99。

Interpolation method: Joint interpolation, linear interpolation, arc interpolation, portal interpolation.

Joint Interpolation: The robot will move to this point in the form of a joint interpolation.

Linear interpolation: The robot will move to this point in a straight line interpolation.

Arcs and Splines: The robot will be interposed with two other points (previous dotted MOVJ/MOVL, Next point MOVCCompositionArc trajectory.

Door type interpolation: Portal track motion is widely used for material handling and 3c Industry. The robot arm passes through the door type railTrace (Ascending-->TRANSLATION-->Descending) Movement to the target point to avoid material friction.

VJVelocity range 1-100。

PL: Smooth transition range 0-5。

ACC: Acceleration range 1-100。

DEC: Deceleration range 1-100。

TIME: time, range non-negative integer, unit ms, execute the next command ahead of time.

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

8.6. PALCLEAR (pallet reset)

Function: The palletizing is reset, and the palletizing status is emptied.

Process No. : Process No. 1-99。

Example: PALCLEAR ID=1。

8.7. PALOFF (palletization end judgment)

Function: End of palletizing judgment.

Process No.: Process No. 1-99。

End Judgment Variable: Determine the conditions for the end of palletizing.

Example: PALOFF ID=1[Variables]。

Note: If the total number of workpieces for a certain process number is **n** Execute **PALREAL** Pre-command **n-1** times, the variable value will be set to **0** No. **n** executions **PALREAL** directive, the variable value will be set to **1**. Midway through the palletizing reset, the variable will be reset to **0**。

8.8. Pallet_POS (get job point)

Function: Get the job point.

Process No.: Process number for storing palletizing parameters.

Layer ID: The layer on which the workpiece is located.

NO.: The number of the workpiece.

Get Point Type: Corresponds to the point type of the workpiece.

Example: PAL_POS ID=1 1 1 P0001。

Read the number of workpiece points in the layer by variables.

8.9. Pal_set_example (Simple Palletizing Instruction)

Function: Simple palletizing instruction.

Process No.: Process number for storing palletizing parameters.

Start job point: The position point of the first workpiece when palletizing.

Column end: The position point of the last workpiece in the column direction when palletizing.

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

High-end: The position point of the first workpiece in the last layer when palletizing.

guide point: The auxiliary point of the pallet is generally above the starting workpiece point.

Entry Point: The entry point of the pallet is generally a safe point outside the pallet.

of Lines: Total number of rows for palletizing.

Columns count: Total number of palletized columns.

Stacks: The total number of layers of the pallet.

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

Simple palletizing instructions run after all parameters are filled in, and the parameters will be filled in the palletizing process accordingly/In simple palletizing, Local points need to be set in the variable (this instruction is the same as the simple palletizing position setting in the palletizing process).

9. Usage scenarios

9.1. Scenario 1: The collection point is fixed, and the discharge point is stacked layer by layer

9.1.1. Parameter settings

1. Click on the [Menu Bar] on the right-technology-Palletizing process-Full palletizing].
2. Select the process number according to the actual situation, select the process number here 1。
3. Tap Gripper Settings.
4. Select the gripper, select according to the actual situation, select the number of grippers here 1, gripper tool number 1(scratching

artisanalThe number is the hand number of the tool, and the gripper needs to arrive first [Setting-Tool hand calibration] Interface settings), Here you can onlyto select it and click Save.

5. Click Next to access the tray settings (or click Back Navigation to access the tray settings).

6. Calibrate the pallet coordinate system according to the actual pallet (user coordinate system) , Click “ Save”

Note: When calibrating the pallet, hand calibration with tools is required, and the calibration coordinate systemZ The axis cannot be facing downwards.

7. Click Next to access location settings (or click Back Navigation to access location settings).

8. Calibrate the workpiece point, auxiliary point, and entry point according to the actual situation, and click Save.

Note: Manual calibration with tools is required for calibration.

9. Click on the next page to enter the workpiece parameter settings (or click backNavigate back and enter the workpiece parameter settings).

10. Fill in the workpiece size parameters according to the actual situation, here set to long“50”Width“30”High“15”<g id=“Bold”>Prescription Time:</g>Gap is 0Click “ Save”

11. Click on the next page to enter the proximity parameter settings (you can also click back to the navigation to enter the proximityParameter settings

12. Depending on the actual situation, you can skip it if you don’t need it.

13. Click on the next page to enter the overlay mode settings (or click back to navigate againentering overlay mode).

14. The number of layers is filled in according to the actual situation, and the number of layers here is set to“10”, repeat relationship set to“The same”, First layer graphic number selection“1” If other parameters are not filled in, click Save.

15. Click on the next page to enter the flat mode settings (or click back to navigate againPlane mode).

16. Select Graph Number“1”Template Selection“criss-crossed”、 X Number of directions filled“1”、 Y Number of directions filled“3”、

Other parameters are not filled in by default, click Save, and click Preview to view the graphical template of the settings.

Note: The overall rotation is the overall rotation at the center of the first workpiece 180 misalignment.

17. Click Finish to complete the parameter setup.

9.1.2.Coding

NOP //Getting Started

BOOLEAN A001 = 0 //Insert Variable

```

PALCLEAR ID = 1 //Empty previous palletization data
WHILE (A001 == 0) //Loop statement
MOVJ P001 VJ = 30 % PL = 0 ACC = 20 DEC = 20 //Pickup Inlet Point
WAIT (DIN4 == 1) T = 10 //Pick-up 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 //Time Delay
MOVJ P003 VJ = 30 % PL = 0 ACC = 20 DEC = 20 //Pickup Auxiliary Point
PALON ID = 1 TYPE = 0 [-] [-] [-] MULTI = 0 //Palletizing started
PALGRIPPER ID = 1 GRIPPERS = 1 //Gripper Selection
PALENTER ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20 OFF OFF //Discharge
Inlet 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 //Discharging workpiece
point
DOUT OT#(5) 0 //Discharge signal
TIMER T = 1 //Time Delay
PALSHIFT ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20 //Discharge auxiliary
point
PALOFF ID = 1 A001 //End of palletizing
ENDWHILE //loop end
END //END

```

9.2. Scenario 2: The loading point is fixed, and the height of the loading point is compensated

9.2.1. Parameter settings

Open [Process-Palletizing process-Full palletizing-Overlap mode], placement point height compensation padding“100”, click Guarantee存 For other parameter setting steps, please refer to the scenario 1 step.

9.2.2. Coding

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

NOP //Getting Started

BOOLEAN A001 = 0 //Insert Variable

PALCLEAR ID = 1 //Empty previous palletization data

WHILE (A001 == 0) //Loop statement

MOVJ P001 VJ = 30 % PL = 0 ACC = 20 DEC = 20 //Pickup Inlet Point

WAIT (DIN4 == 1) T = 10 //Pick-up 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 //Time Delay

MOVJ P003 VJ = 30 % PL = 0 ACC = 20 DEC = 20 //Pickup Auxiliary Point

PALON ID = 1 TYPE = 0 [-] [-] [-] MULTI = 0 //Palletizing started

PALGRIPPER ID = 1 GRIPPERS = 1 //Gripper Selection

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

Inlet 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 //Discharging workpiece point

DOUT OT#(5) 0 //Discharge signal

TIMER T = 1 //Time Delay

```

PALSHIFT ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20 //Discharge auxiliary
point
PALOFF ID = 1 A001 //End of palletizing
ENDWHILE //loop end
END //END

```

9.3. Scenario 3: The picking point is fixed, and the layer height is corrected

9.3.1. Parameter settings

Open [Process-Palletizing process-Full palletizing-Overlay mode], fill in the height correction for each layer“50” clickssaved.

9.3.2. Coding

```

NOP //Getting Started
BOOLEAN A001 = 0 //Insert Variable
PALCLEAR ID = 1 //Empty previous palletization data
WHILE (A001 == 0) //Loop statement
MOVJ P001 VJ = 30 % PL = 0 ACC = 20 DEC = 20 //Pickup Inlet Point
WAIT (DIN4 == 1) T = 10 //Pick-up 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 //Time Delay
MOVJ P003 VJ = 30 % PL = 0 ACC = 20 DEC = 20 //Pickup Auxiliary Point
PALON ID = 1 TYPE = 0 [-] [-] [-] MULTI = 0 //Palletizing started
PALGRIPPER ID = 1 GRIPPERS = 1 //Gripper Selection
PALENTER ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20 OFF OFF //Discharge
Inlet 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 //Discharging workpiece
point
DOUT OT#(5) 0 //Discharge signal
TIMER T = 1 //Time Delay
PALSHIFT ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20 //Discharge auxiliary
point
PALOFF ID = 1 A001 //End of palletizing
ENDWHILE //loop end
END //END

```

9.4. Scenario 4: Pick-up point/drop-off point height fixed, vertical alignment

9.4.1. Parameter settings

Open [Process-Palletizing process-Full palletizing-Overlap Mode] Check the vertical alignment and click Save.

Note: Use vertical alignment, repetitive relationships need to be changed to "The same" clicks "Vertical alignment" Press after Button, the repeating relationship will automatically change to "The same".

9.4.2. Coding

```

NOP //Getting Started
BOOLEAN A001 = 0 //Insert Variable
PALCLEAR ID = 1 //Empty previous palletization data
WHILE (A001 == 0) //Loop statement
MOVJ P001 VJ = 30 % PL = 0 ACC = 20 DEC = 20 //Pickup Inlet Point
WAIT (DIN4 == 1) T = 10 //Pick-up 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 //Time Delay
MOVJ P003 VJ = 30 % PL = 0 ACC = 20 DEC = 20 //Pickup Auxiliary Point

```

```

PALON ID = 1 TYPE = 0 [-] [-] [-] MULTI = 0 //Palletizing started
PALGRIPPER ID = 1 GRIPPERS = 1 //Gripper Selection
PALENTER ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20 OFF OFF //Discharge
Inlet 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 //Discharging workpiece
point
DOUT OT#(5) 0 //Discharge signal
TIMER T = 1 //Time Delay
PALSHIFT ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20 //Discharge auxiliary
point
PALOFF ID = 1 A001 //End of palletizing
ENDWHILE //loop end
END //END

```

9.5. Scenario 5: The collection point is fixed, the discharge point is rotated 180 degrees as a whole, and XY is flatMove Compensation

9.5.1.Parameter settings

1. Open [Process-Palletizing process-Full palletizing-Overlap Mode
2. The number of layers is filled in according to the actual situation, and the number of layers here is set to“10”, repeat relationship set to“Alternating”No.Layer 1 Graphic Number Selection“1”Second layer graphic number selection“2”If other parameters are not filled in, click Save.
3. Open [Process-Palletizing process-Full palletizing-Flat Mode】。

4. Select Graph Number“2”Template Selection“criss-crossed”、X Number of directions filled“1”、Y Number of directions filled“3”、Overall Rotation Angle Selection“180”、X Translation Compensation“50”、Y Translation Compensation“100”, other parameters do not default toFill in, click Save, and click Preview to see the graphical templates for your settings.

9.5.2.Coding

NOP //Getting Started

BOOLEAN A001 = 0 //Insert Variable

PALCLEAR ID = 1 //Empty previous palletization data

WHILE (A001 == 0) //Loop statement

MOVJ P001 VJ = 30 % PL = 0 ACC = 20 DEC = 20 //Pickup Inlet Point

WAIT (DIN4 == 1) T = 10 //Pick-up 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 //Time Delay

MOVJ P003 VJ = 30 % PL = 0 ACC = 20 DEC = 20 //Pickup Auxiliary Point

PALON ID = 1 TYPE = 0 [-] [-] [-] MULTI = 0 //Palletizing started

PALGRIPPER ID = 1 GRIPPERS = 1 //Gripper Selection

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

Inlet 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 //Discharging workpiece point

DOUT OT#(5) 0 //Discharge signal

TIMER T = 1 //Time Delay

```

PALSHIFT ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20 //Discharge auxiliary
point
PALOFF ID = 1 A001 //End of palletizing
ENDWHILE //loop end
END //END

```

9.6. Scenario 6: The feeding point is fixed, and the workpiece at the discharging point is rotated by 90 degrees

9.6.1.Parameter settings

1. Open [Process-Palletizing process-Full palletizing-Overlap Mode
2. The number of layers is filled in according to the actual situation, and the number of layers here is set to“10”, repeat relationship set to“The same”FirstLayer Graph Number Selection“3” If other parameters are not filled in, click Save.
3. Open [Process-Palletizing process-Full palletizing-Flat Mode].
4. Select Graph Number“3”Template Selection“KDD Train :”、X Number of directions filled“2”、Y direction (s)Number Fill“3”EngineeringPiece rotation angle selection“90”, other parameters are not filled in by default, click Save, clickTap Preview to view the diagram of the settingsShape template.

9.6.2.Coding

```

NOP //Getting Started
BOOLEAN A001 = 0 //Insert Variable
PALCLEAR ID = 1 //Empty previous palletization data
WHILE (A001 == 0) //Loop statement
MOVJ P001 VJ = 30 % PL = 0 ACC = 20 DEC = 20 //Pickup Inlet Point
WAIT (DIN4 == 1) T = 10 //Pick-up 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 //Time Delay
MOVJ P003 VJ = 30 % PL = 0 ACC = 20 DEC = 20 //Pickup Auxiliary Point
PALON ID = 1 TYPE = 0 [-] [-] [-] MULTI = 0 //Palletizing started
PALGRIPPER ID = 1 GRIPPERS = 1 //Gripper Selection
PALENTER ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20 OFF OFF //Discharge
Inlet 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 //Discharging workpiece
point
DOUT OT#(5) 0 //Discharge signal
TIMER T = 1 //Time Delay
PALSHIFT ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20 //Discharge auxiliary
point
PALOFF ID = 1 A001 //End of palletizing
ENDWHILE //loop end
END //END

```

9.7. Scenario 7: The feeding point is fixed, and the height of the auxiliary point is fixed

9.7.1.Parameter settings

1. Open [Process-Palletizing process-Full palletizing-Overlap Mode
2. The number of layers is filled in according to the actual situation, and the number of layers here is set to“3”, repeat relationship set to“The same”FirstLayer Graph Number Selection“1”, open the fixed auxiliary point button, the layer is automatically aligned, the pose is automatically rotated,

Click “ Save”

3. Open [Process-Palletizing process-Full palletizing-Flat Mode】。
4. Select Graph Number“1”Template Selection“KDD Train :”、X Number of directions filled“3”、Y Number of directions filled“4”, Other parameters are not filled in by default, click Save, and click Preview to view the graphical template of the settings.

9.7.2.Coding

NOP	开始
BOOLEAN A001 = 0	插入变量
PALCLEAR ID = 1	清空前一次码垛数据
WHILE (A001 == 0)	循环语句
MOVJ P001 VJ = 30 % PL = 0 ACC = 20 DEC = 20	取料入口点
WAIT (DIN4 == 1) T = 10	取料判断
MOVJ P003 VJ = 30 % PL = 0 ACC = 20 DEC = 20	取料辅助点
MOVJ P002 VJ = 30 % PL = 0 ACC = 20 DEC = 20	取料工件点
DOUT OT#(5) 1	取料信号
TIMER T = 1	延时
MOVJ P003 VJ = 30 % PL = 0 ACC = 20 DEC = 20	取料辅助点
PALON ID = 1 TYPE = 0 [-] [-] [-] MULTI = 0	码垛开始
PALGRIPPER ID = 1 GRIPPERS = 1	抓手选择
PAENTER ID = 1 <u>MovJ</u> VJ = 30 % PL = 0 ACC = 20 DEC = 20 OFF OFF	放料入口点
PALSHIFT ID = 1 <u>MovJ</u> VJ = 30 % PL = 0 ACC = 20 DEC = 20	放料辅助点
PALREAL ID = 1 <u>MovJ</u> VJ = 30 % PL = 0 ACC = 20 DEC = 20	放料工件点
DOUT OT#(5) 0	放料信号
TIMER T = 1	延时
PALSHIFT ID = 1 <u>MovJ</u> VJ = 30 % PL = 0 ACC = 20 DEC = 20	放料辅助点
PALOFF ID = 1 A001	码垛结束
ENDWHILE	循环结束
END 结束	

9.8. Scenario 8: Unstacking

9.8.1. Parameter settings

1. Click on the [Menu Bar] on the right-technology-Palletizing process-Full palletizing].
2. Select the process number according to the actual situation, select the process number here 1.
3. Tap Gripper Settings.
4. Select the gripper, select according to the actual situation, select the number of grippers here 1, gripper tool number 1 (scratching artisanalThe number is the hand number of the tool, and the gripper needs to arrive first [Setting-Tool hand calibration] Interface settings) , Here you can onlySelect Not Calibrable and click Save.
5. Click Next to access the tray settings (or click Back Navigation to access the tray settings).
6. Calibrate the pallet coordinate system according to the actual pallet (user coordinate system) , Click “ Save”

Note: When calibrating the pallet, hand calibration with tools is required, and the calibration coordinate systemZ The axis cannot be facing downwards.

7. Click Next to access location settings (or click Back Navigation to access location settings).
8. Calibrate the workpiece point, auxiliary point, and entry point according to the actual situation, and click Save.

Note: When calibrating, manual calibration with tools is required. The unstacking workpiece points are still calibrated according to the stacking. The unstacking will be calibrated from the highestThe last job start code of the layer.

9. Click on the next page to enter the workpiece parameter settings (or click backNavigate back and enter the workpiece parameter settings).
10. Fill in the workpiece size parameters according to the actual situation, here set to long“50”Width“30”High“15”<g id="Bold">Prescription Time:</g>Gap is 0Click “ Save”
11. Click on the next page to enter the proximity parameter settings (you can also click back to the navigation to enter the proximityParameter settings

12. Depending on the actual situation, you can skip it if you don't need it.
 13. Click on the next page to enter the overlay mode settings (or click back to navigate againentering overlay mode).
 14. The number of layers is filled in according to the actual situation, and the number of layers here is set to "10", repeat relationship set to "The same", First layer graphic number selection "1" If other parameters are not filled in, click Save.
 15. Click on the next page to enter the flat mode settings (or click back to navigate againPlane mode).
 16. Select Graph Number "1" Template Selection "criss-crossed", X Number of directions filled "1", Y Number of directions filled "3", Other parameters are not filled in by default, click Save, and click Preview to view the graphical template of the settings.
- Note: The overall rotation is the overall rotation at the center of the first workpiece 180 misalignment.**
17. Click to end to complete the process number 1 Parameter settings

9.8.2.Coding

NOP //Getting Started

BOOLEAN A001 = 0 //Insert Variable

PALCLEAR ID = 1 //Empty previous palletization data

WHILE (A001 == 0) //Loop Instructions

PALON ID = 1 TYPE = 1 [-] [-] [-] MULTI = 0 //Start of unstacking

PALGRIPPER ID = 1 GRIPPERS = 1 //Select Gripper

PALENTER ID = 1 MovJ VJ = 20 % PL = 0 ACC = 20 DEC = 20 OFF OFF //Pickup Inlet Point

WAIT (DIN4 == 1) T = 10 //Pick-up 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 //Time Delay

PALSHIFT ID = 1 MovJ VJ = 20 % PL = 0 ACC = 20 DEC = 20 //Pickup Auxiliary Point

```

PALOFF ID = 1 A001 //End of unstacking
MOVJ P001 VJ = 30 % PL = 0 ACC = 20 DEC = 20 //Discharge Inlet Point
MOVJ P003 VJ = 30 % PL = 0 ACC = 20 DEC = 20 //Discharge auxiliary point
MOVJ P002 VJ = 30 % PL = 0 ACC = 20 DEC = 20 //Discharging workpiece point
DOUT OT#(5) 0 //Discharge signal
TIMER T = 1 //Time Delay
MOVJ P003 VJ = 30 % PL = 0 ACC = 20 DEC = 20 //Discharge auxiliary point
ENDWHILE //loop end
END //END

```

9.9. Scenario 9: Stacking after unstacking

9.9.1. Parameter settings

- Stacking parameters

1. Click on the [Menu Bar] on the right-technology-Palletizing process-Full palletizing].
2. Select the process number according to the actual situation, select the process number here 1.
3. Tap Gripper Settings.
4. Select the gripper, select according to the actual situation, select the number of grippers here 1, gripper tool number 1 (scratching artisanalThe number is the hand number of the tool, and the gripper needs to arrive first [Setting-Tool hand calibration] Interface settings) , Here you can only to select it and click Save.
5. Click Next to access the tray settings (or click Back Navigation to access the tray settings).
6. Calibrate the pallet coordinate system according to the actual pallet (user coordinate system) , Click “ Save”

Note: When calibrating the pallet, hand calibration with tools is required, and the calibration coordinate systemZ The axis cannot be facing downwards.

7. Click Next to access location settings (or click Back Navigation to access location settings).

8. Calibrate the workpiece point, auxiliary point, and entry point according to the actual situation, and click Save.

Note: When calibrating, manual calibration with tools is required. The unstacking workpiece points are still calibrated according to the stacking. The unstacking will be calibrated from the highestThe last job start code of the layer.

9. Click on the next page to enter the workpiece parameter settings (or click backNavigate back and enter the workpiece parameter settings).

10. Fill in the workpiece size parameters according to the actual

situation, here set to long“50”Width“30”High“15”<g

id="Bold">Prescription Time:</g>Gap is 0Click “ Save”

11. Click on the next page to enter the proximity parameter settings (you can also click back to the navigation to enter the proximityParameter settings

12. Depending on the actual situation, you can skip it if you don't need it.

13. Click on the next page to enter the overlay mode settings (or click back to navigate againentering overlay mode).

14. The number of layers is filled in according to the actual situation,

and the number of layers here is set to“10”, repeat relationship set

to“The same”, First layer graphic number selection“1”If other

parameters are not filled in, click Save.

15. Click on the next page to enter the flat mode settings (or click back to navigate againPlane mode).

16. Select Graph Number“1”Template Selection“criss-crossed”、X Number of directions filled“1”、Y Number of directions filled“3”、

Other parameters are not filled in by default, click Save, and click Preview to view the graphical template of the settings.

Note: The overall rotation is the overall rotation at the center of the first workpiece **180** misalignment.

17. Click to end to complete the process number 1 Parameter settings

● Stacking Parameters

1. Click Full Palletize.

2. Select Route Number 2, according to the process number 1 Step of filling in the process number 2 Parameters.

Note: The unstacking parameters are consistent with the stacking parameters.

9.9.2.Coding

```
NOP //Getting Started

BOOLEAN A001 = 0 //Insert Variable

BOOLEAN A002 = 0 //Insert Variable

PALCLEAR ID = 1 //Empty previous unstacking data

PALCLEAR ID = 2 //Empty previous palletization data

WHILE (A001 == 0) //Loop Instructions

PALON ID = 1 TYPE = 1 [-] [-] [-] MULTI = 0 //Start of unstacking

PALGRIPPER ID = 1 GRIPPERS = 1 //Select Gripper

PALENTER ID = 1 MovJ VJ = 20 % PL = 0 ACC = 20 DEC = 20 OFF OFF //Pickup Inlet
Point

WAIT (DIN4 == 1) T = 10 //Pick-up 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 //Time Delay

PALSHIFT ID = 1 MovJ VJ = 20 % PL = 0 ACC = 20 DEC = 20 //Pickup Auxiliary Point

PALOFF ID = 1 //End of unstacking

PALON ID = 2 TYPE = 0 [-] [-] [-] MULTI = 0 //Palletizing started

PALGRIPPER ID = 2 GRIPPERS = 1 //Select Gripper

PALENTER ID = 2 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20 OFF OFF //Discharge
Inlet 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 //Discharging workpiece
point

DOUT OT#(5) 0 //Discharge signal
```

```

TIMER T = 1 //Time Delay
PALSHIFT ID = 2 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20 //Discharge auxiliary
point
PALOFF ID = 2 A001 //End of palletizing
ENDWHILE //loop end

```

9.10. Scenario 10: Palletizing interrupted, continue palletizing

9.10.1. Parameter settings

1. Process parameter setting before starting palletizing.
2. Process parameter settings after interruption.
3. Open [Status-Palletizing status].
4. Process number Select the process number selected when the process parameter is set, here select the previously set processArt No. 1。
5. If the previous setting has reached the first 1 Layer 1 5 records.
6. Then fill in the current number“1”of layers and the number of coded artifacts at the“5”current layer, and click Save.

9.10.2. Coding

```

NOP //Getting Started
BOOLEAN A001 = 0 //Insert Variable
PALCLEAR ID = 1 //Empty previous palletization data
WHILE (A001 == 0) //Loop statement
MOVJ P001 VJ = 30 % PL = 0 ACC = 20 DEC = 20 //Pickup Inlet Point
WAIT (DIN4 == 1) T = 10 //Pick-up 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 //Time Delay
MOVJ P003 VJ = 30 % PL = 0 ACC = 20 DEC = 20 //Pickup Auxiliary Point
PALON ID = 1 TYPE = 0 [-] [-] [-] MULTI = 0 //Palletizing started

```

```

PALGRIPPER ID = 1 GRIPPERS = 1 //Gripper Selection
PAENTER ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20 OFF OFF //Discharge
Inlet 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 //Discharging workpiece
point
DOUT OT#(5) 0 //Discharge signal
TIMER T = 1 //Time Delay
PALSHIFT ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20 //Discharge auxiliary
point
PALOFF ID = 1 A001 //End of palletizing
ENDWHILE //loop end
END //END

```

9.11. Scenario 11: Multi-gripper with palletizing

9.11.1. Parameter settings

1. Click [Menu Bar Process-Palletizing Process-Complete Palletizing] on the right.
2. Select the process number according to the actual situation, select the process number here 1.
3. Tap Gripper Settings.
4. Select the gripper, select the number of grippers according to the actual situation, select the "4" gripper tool 1 number, select the "2" gripper 2 tool number, "4" select the 3 gripper tool "5" number, 4 select the gripper "1" tool number, select the gripper tool number, (the gripper tool number is the tool number, the gripper needs to first go to the [Setting] , tool hand calibration] interface Settings can only be selected here, click
5. Click Next to access the tray settings (or click Back Navigation to access the tray settings).

6. Calibrate the pallet coordinate system according to the actual pallet (the user coordinate) , system clicks to save (Note: When calibrating the pallet, it needs to be calibrated by hand with a tool (the coordinate system axis that can be calibrated by) , calibrating with any one of the grippers cannot be
7. Click Next to access location settings (or click Back Navigation to access location settings).
8. Calibrate the workpiece point, auxiliary point, and entry point according to the actual situation, and click Save (Note: Manual calibration with tools is required for calibration).
9. Click on the next page to enter the workpiece parameter settings (you can also click back to the navigation to enter the workpiece parameter settings).
10. Fill in the workpiece size parameters according to the actual situation, set "50" the gap "30" to be "15"、long, wide, 0 and high, and click
11. Click on the next page to enter the proximity parameter setting (you can also click back to the navigation and enter the proximity parameter setting, depending on the actual situation, you can skip it if you don't need
12. Click on the next page to enter the overlay mode settings (or click back to navigate to enter the overlay mode).
13. Fill in the number of layers according to the actual situation. Here, the number "10" of layers is set to, the repetition "relationship" is set to the same, the first layer graphic "1" number is selected, and other parameters are not filled in. Click
14. Click on the next page to enter the flat mode settings (you can also click back to the navigation to enter flat mode).
15. Select the graphic number, "1" the template selects "the number of"、X vertical and horizontal "1"、Y staggered directions, the number of directions is filled in, and other parameters are not filled in by default. Click Save, and click Preview to view the set graphic template (Note: The

overall rotation is based on the overall rotation **180** of the first workpiece

16. Click Finish to complete the parameter setup.

9.11.2. Coding

NOP //Getting Started

BOOLEAN A001 = 0 //Insert Variable

PALCLEAR ID = 1 //Empty previous palletization data

WHILE (A001 == 0) //Loop statement

MOVJ P001 VJ = 30 % PL = 0 ACC = 20 DEC = 20 //Pickup Inlet Point

WAIT (DIN4 == 1) T = 10 //Pick-up 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 //Time Delay

MOVJ P003 VJ = 30 % PL = 0 ACC = 20 DEC = 20 //Pickup Auxiliary Point

PALON ID = 1 TYPE = 0 [-] [-] [-] MULTI = 0 //Palletizing started

PALGRIPPER ID = 1 GRIPPERS = 1 //Gripper Selection

PALENTER ID = 1 MovJ VJ = 30 % PL = 0 ACC = 20 DEC = 20 OFF OFF 0 0 //Discharge
Inlet 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 //Discharging workpiece
point

DOUT OT#(5) 0 //Discharge signal

TIMER T = 1 //Time Delay

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

PALOFF ID = 1 A001 //End of palletizing

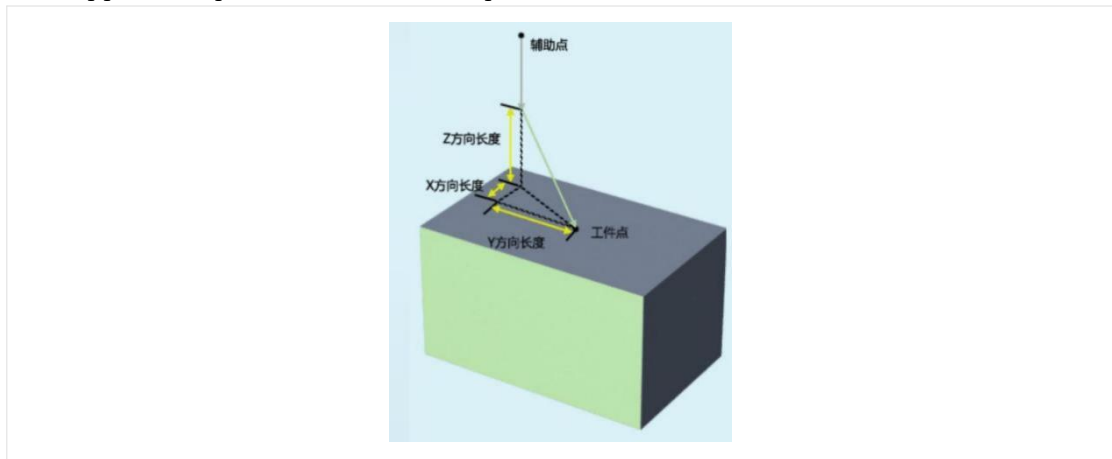
ENDWHILE //loop end

END //END

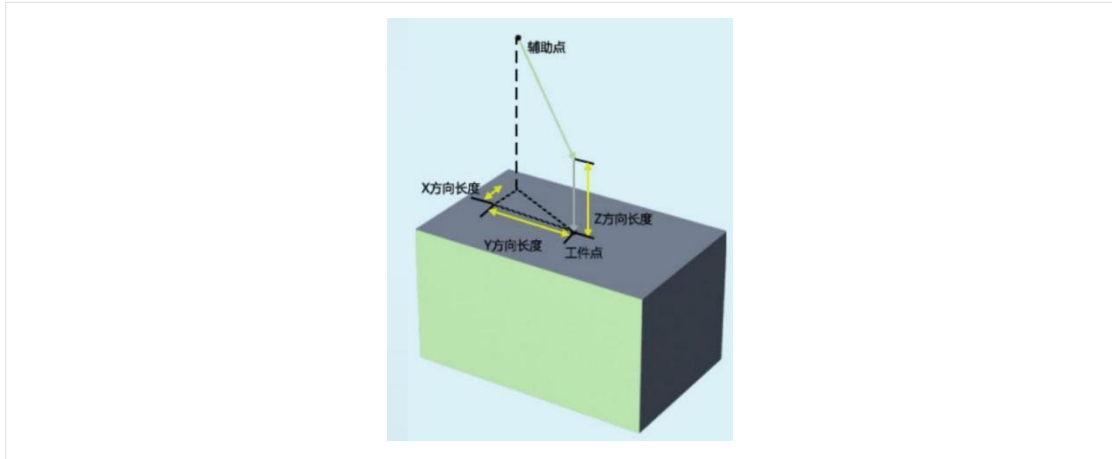
9.12. Scenario 12 (1) First-line two: stack (the number of pieces in two stack is the same)

9.12.1. General

Explanation: The proximity enable close program does not generate a palletization proximity point instruction (theoppo), site approachmode is the proximity drop and the proximity drop, respectively, if Approach descent: For example, according to the proximity parameters set above, the position of the approach point is different from the direction of the position of X the workpiece 50, Y point, and the 50, Z direction of the 50 difference is different, and the set approach method is used to move from the approach point to the workpiece



Descending proximity: For example, according to the proximity parameter set above, the position of the auxiliary point is different from the X direction of the 50, Y workpiece point, 50 and the set approach method is used to move from the auxiliary point to the approach point (the distance above the 50 workpiece), point is then descended vertically from the approach point to the workpiece



Pallet detection: The setting range of the total number of 1-5 pallets is [], and the fixed IO binding 2-1~2-5 ports is the port. The program will IO automatically detect whether to open or close to determine the number of pallets. For example, when the '3' total number of pallets '10' mm is, the pallet thickness is. Automatically IO 2-1, 2-2, 2-3 detects whether the program is open when it is started, and when the 2-1 number 2-2 or 2-3 of pallets is reduced by), one (or arbitrarily shut z down, the axial direction of all workpiece points is 10mm.

9.12.2. Parameter settings

1. Click [Process Palletizing-Process-Palletizing-Parameters-Complete Palletizing] in the menu
2. Select the process number according to the actual situation, here the first stack selects the process number 1.
3. Click on the gripper settings, and select the scene according to the actual situation, for example: the number "1" of grippers, 1 the grip "1" per tool number (the gripper tool number is the tool number, the gripper needs to go to the [Setting toolhand calibration]), interface to modify the settings, and then click Save.
4. Click on the next page to enter the pallet settings (you can also click back to the navigation and then enter the pallet settings to), calibrate the pallet coordinate system (user coordinate system) according to the actual pallet. The user coordinate system is selected to first calibrate the origin of the pallet, the positive x direction of the axis of the pallet,

and the y positive direction of the axis of the pallet. After the calibration is completed, the calculation must be z clicked. The positive direction of the axis that has not been x 、 y calibrated is automatically calculated by the system according to the positive direction of the calibration axis. After all calibrations are completed, click Save (Note: When--calibrating the pallet, you need to take a tool hand to calibrate the pallet with any of the Z grippers to calibrate, and the calibrated coordinate system axis cannot be

5. Click on the next page to enter the location settings (you can also click back to the navigation and then enter the location) , settings to calibrate the workpiece points, auxiliary points, and entry points according to the actual situation, and click
6. Click the next page to enter the workpiece parameters, set the workpiece size according to the actual situation, here set to length, width and "50"、height "50" t, the "50" clearance is the 10 , (positive y direction of the pallet is the length of the workpiece, the direction of the pallet is the width of z the workpiece, the direction of the pallet is the height of the workpiece, the clearance is the empty space), between the workpiece and the workpiece, click Save after
7. Click on the next page to enter the proximity parameter settings (also Click back to navigate and enter proximity parameter settings), set the approach method and pallet detection. Choose yes according to the actual situation No Open, close enable opens here Switches and tray detection switches, trays X Direction Length '50' Tray Y Direction Length '50' Tray Z Direction Length '50', Pallet Thickness '10', total pallets '3'.
8. Click on the next page to enter overlay mode (or click back to navigate to enter overlay mode) , Number of layers according to Fill in the actual situation, here the number of layers is set to '2' Ulangi Relationship set to 'The same', 1st level graphic number Choose "1", Other parameters are

not filled in, (The number of layers is the total number of layers of the workpiece, and the repetition relationship is the number of layers of Department) Click Save.

9. Click Next to enter Flat Mode (or click Back to Navigation to enter Flat Mode) , Choose graphicsNO. "1" Template Selection "KDD Train : " 、 X Number of directions filled "2" 、 Y Number of directions filled "1" , other parameters silentConfirm or not, click Save, and click Preview to see the graphic mode settingsPlate (Note: overall rotation is based on One workpiece center rotates as a whole 180 Degree
10. Click Finish to complete the parameter setup.
11. According to the above method, the second stack is set according to the actual situation, and the process number is selected. 2 , (Caution; Process No. 2 The user coordinate system in needs to be recalibrated according to the actual situation or use the process number 1 I I Set up with Household Coordinate System 1) 。

9.12.3. Coding

NOP //Getting Started

PALCLEAR ID = 1 //Stacking reset process number1

PALCLEAR ID = 2 //Stacking reset process number2

WHILE (B001 == 0) //Loop statement

PALON ID = 1 TYPE = 0 [-] [-] [-] MULTI = 0 //1 Number 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 //Pickup Top 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 //Time Delay1s

MOVJ P002 VJ = 50 % PL = 5 ACC = 10 DEC = 10 0 //Pickup Top Point

PAENTER ID = 1 MovJ VJ = 50 % PL = 5 ACC = 10 DEC = 10 OFF OFF 0 //Discharge
 Inlet 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 //Discharging
 workpiece point
 DOUT OT#(1) 0 T = 0 0 //Discharge signal
 TIMER T = 1 //Time Delay1s
 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 //Pallet End Judgement
 PALON ID = 2 TYPE = 0 [-] [-] [-] MULTI = 0 //2 Number 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 //Pickup Top 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 //Time Delay1s
 MOVJ P002 VJ = 50 % PL = 5 ACC = 10 DEC = 10 0 //Pickup Top Point
 PAENTER ID = 2 MovJ VJ = 50 % PL = 5 ACC = 10 DEC = 10 OFF OFF 0 //Discharge
 Inlet 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

```

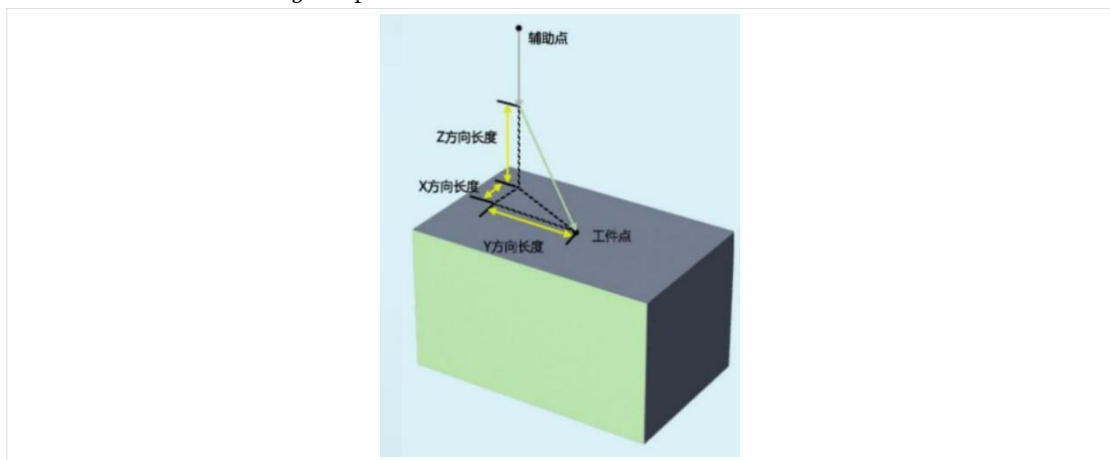
PALREAL ID = 2 MovJ VJ = 50 % PL = 5 ACC = 10 DEC = 10 0 //Discharging
workpiece point
DOUT OT#(1) 0 T = 0 0 //Discharge signal
TIMER T = 1 //Time Delay1s
PALAPPRO ID = 1 MovJ VJ = 50 % PL = 0 ACC = 20 DEC = 20 0 //Discharge Approach
Point
PALSHIFT ID = 2 MovJ VJ = 50 % PL = 5 ACC = 10 DEC = 10 0 //Discharge auxiliary
point
PALOFF ID = 2 B001 //Palletizing process number2 and Loop End Judgement
ENDWHILE //Finish loop
END //END

```

9.13. Scenario 12 (2): One line and two stacks (the number of workpieces in the two stacks is not the same)

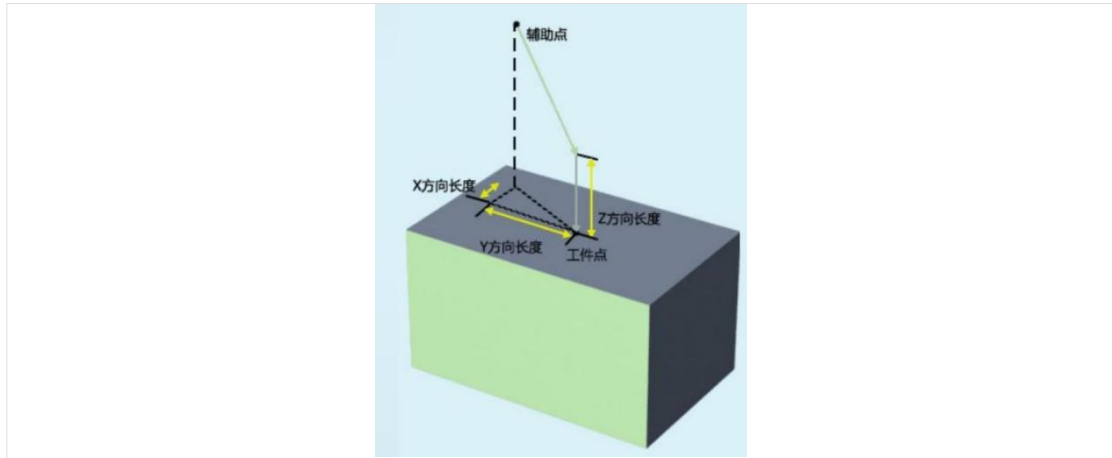
Explanation: Closing the proximity enablement program does not generate a palletization proximity point instruction (if enabled, theThis), Approaching directionsThe formula is divided into two types: approaching descent and approaching descent.

Proximity descent: For example, according to the proximity parameter set above, the position of the proximity point is from the position of the workpiece pointX Direction difference 50, Y Direction difference 50, Z Directional phaseC 50, from the approach point with the set approach methodMove to the job point as shown below:



Dropping proximity: For example, according to the proximity parameter set above, the auxiliary point is located away from the workpiece point. X

OrientationPhase difference 50 , Y Direction difference 50, moving from the auxiliary point to the approach point in the set approach mode (artifact pointTOP 50 Distance of) , Then descend vertically from the approach point to the workpiece point.



Pallet detection: The setting range of the total number of 1-5 pallets is [], and the fixed IO binding 2-1~2-5 port is the port. The program will IO automatically detect whether to open or close to determine the number of pallets. For example, when the 3' total number of pallets 10' mm is, the pallet thickness is. Automatically IO 2-1 , 2-2 , 2-3 detects whether the program is open when it is started, and when the 2-1 numb 2-2 er 2-3 of pallets is reduced by), one (or arbitrarily shut z down, the axial direction of all workpiece points is 10mm.

9.13.1. Parameter settings

1. Click the [Menu Bar]-technology-Palletizing process-Stacking Parameters-Full palletizing].
2. Select the process number according to the actual situation, here the first stackHeap Selection Route Number 1.
3. Click on the gripper setting, and select it according to the actual situation on the scene, for example: the number of grippers "1" Gripper 1 Tools. "1" (The tool number of the gripper is the tool number, and the gripper needs to arrive first [Setting-Tool hand calibrationInterface Settings), Click Save when finished.

4. Click next to access the tray settings (or click back to navigate to access the tray settings) , Based on the actualPallet calibration pallet coordinate system (user coordinate system). Select the user coordinate system to first calibrate the origin of the tray,of the tray **x** Positive direction of the shaft, tray's **y** Positive direction of the ax, the calculation must be clicked after the calibration is completed.
NoCalibrated **z** The positive direction of the shaft is that the system has been calibrated **x** , **y** Axis positive direction automatic meterCalculate. AllClick Save when the calibration is complete (Note: Tools are required to calibrate the palletHand calibration (with any of these graspsJust calibrate by hand) , Calibrated coordinate system**Z** Axis cannot face down).
5. Click on the next page to enter the location settings (you can also click back to the navigation to enter the location settings)) , Calibrate the workpiece point, auxiliary point, and entry point according to the actual situation, and click Save.
6. Click on the next page to enter the workpiece parameters, according to the actual situationPlace the workpiece size, set to long here“50”、width“50”High“50”, gap is 10 , 6f the tray **y** The positive direction is the length of the workpiece, the palletright of privacy **x** The direction is the width of the workpiece, the pallet's **z** The direction is the height of the workpiece, and the gap is the space between the workpiece and the workpiece.),Click Save when you're done.
7. Click on the next page to enter the proximity parameter settings (alsoClick back to navigate and enter proximity parameter settings), set the approach method and pallet detection. Choose yes according to the actual situationNo Open, close enable opens hereSwitches and tray detection switches, trays **X** Direction Length'50'Tray **Y** Direction Length'50'Tray **Z** Direction Length'50', Pallet Thickness'10', total pallets'3'.

- 8 ____ Click on the next page to enter overlay mode (or click back to navigate again Entering Overlay Mode) , The number of layers is filled in according to the actual situation, and the number of layers here is set to '2' Ulangi Relationship set to 'The same', 1st level graphic number Choose "1", Other parameters are not filled in, (The number of layers is the total number of layers of the workpiece, and the repetition relationship is the number of layers of Department) Click Save.
9. Click Next to enter Flat Mode (or click Back to Navigation to enter Flat Mode) , Choose graphics NO. "1" Template Selection "KDD Train : " 、 X Number of directions filled "2" 、 Y Number of directions filled "1", other parameters silent Confirm or not, click Save, and click Preview to see the graphic mode settings Plate (Note: overall rotation is based on One workpiece center rotates as a whole 180 Degree
10. Click Finish to complete the parameter setup.
11. According to the above method, the second stack is set according to the actual situation, and the process number is selected. 2 , (Note: Process No. 2 The user coordinate system in needs to be recalibrated according to the actual situation, or Use process number 1 set up in User coordinate system 1) 。

9.13.2. Coding

NOP //Getting Started

PALCLEAR ID = 1 //Stacking reset process number1

PALCLEAR ID = 2 //Stacking reset process number2

WHILE {(B003 == 0)} //Loop statement

IF {(B001 == 0)} //Go1 the Stack of Numbers if Judgment Statement

PALON ID = 1 TYPE = 0 [-] [-] [-] MULTI = 0 //1 Number 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 //Pickup Top 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 //Time Delay1s
MOVJ P002 VJ = 50 % PL = 0 ACC = 20 DEC = 20 0 //Pickup Top Point
PAENTER ID = 1 MovJ VJ = 50 % PL = 0 ACC = 20 DEC = 20 OFF OFF 0 //Discharge
Inlet 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 //Time Delay1s
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 //1 End of number palletizing judgment
ENDIF //End if
IF {(B002 == 0)} //Go2the Stack of NumbersifJudgment Statement
PALON ID = 2 TYPE = 0 [-] [-] [-] MULTI = 0 //2 Stack of Stacks 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 //Pickup Top 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 //Time Delay1s
MOVJ P002 VJ = 50 % PL = 0 ACC = 20 DEC = 20 0 //Pickup Top Point

```

```

PALENTER ID = 2 MovJ VJ = 50 % PL = 0 ACC = 20 DEC = 20 OFF OFF 0 //Discharge
Inlet 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 //Time Delay1s
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 //2 Stack End Judgment
ENDIF //End if
IF {(B001 == 1)} AND {(B002 == 1)} //Judging1 Stack and2 Is the stacking all
over?
SETBOOL B003 = 1 //Variables that jump out of the loop
ENDIF //End if
ENDWHILE //Finish loop
END //END

```

10. Demo Case

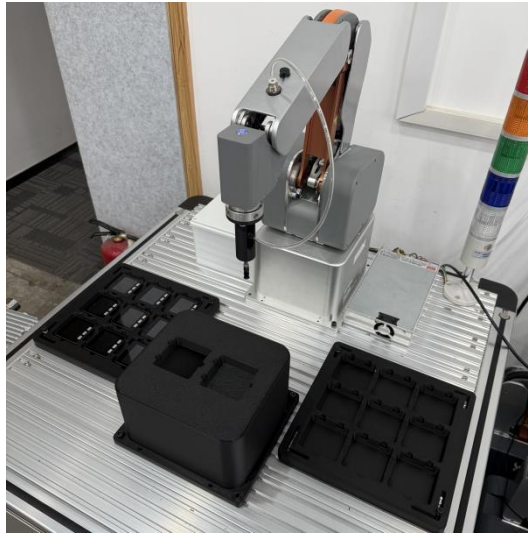
10.1. Case illustration:

In this case, the material is grabbed from the loading tray and placed on the transfer tray; after the test is completed, the material is grabbed from the transfer tray and discharged to the discharge tray. The entire process is performed 9 times in a loop.

- Loading point: loading tray (fixed position, simple stacking method, stacking type is 1 row x 3 columns x 3 layers)

- Transit point: Transit tray (for detection or temporary storage)
- Discharging point: Discharging tray (fixed position, simple stacking method, stacking type is 1 row $\times$ 3 columns $\times$ 3 layers)

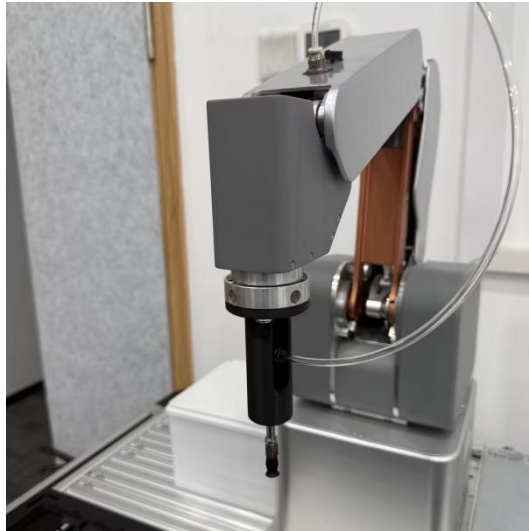
The robot needs to switch the posture of the tool according to the different grasping and placing positions, and complete the complete handling process of 9 workpieces.



10.2. Hardware Installation

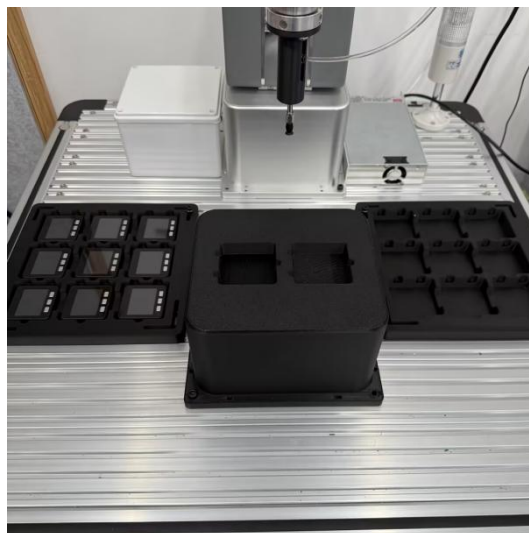
10.2.1. Robot end suction cup installation

- Install suction cups or clamping jaws on the robot flange for grabbing materials.
- Connect the suction cup air pipe to the solenoid valve, and the solenoid valve control cable is connected to the digital output port of the robot IO board (for example, DOUT2-6).
- After the installation is completed, recalibrate the tool coordinate system (TCP) and mark it as tool serial number 1.



10.2.2. Tray Layout

- Fix the loading tray in the designated position on the workbench to ensure that the robot can reach the loading point safely.
- Fix the transfer tray between the loading tray and the discharging tray at a moderate height.
- Fix the blanking tray within the reach of the robot for pallet placement.



10.3. Teach palletizing 1 craft pack

In this case, the loading point adopts a simple stacking method, and the stacking type is 1 row x 3 columns x 3 layers.

10.3.1. Into the palletizing process

1. Click the [Process] button at the bottom of the main interface of the system.
2. Find [Palletizing Process] in the process list and click to enter.



3. Click the [Palletizing Parameters] button to enter the palletizing parameter setting interface.



10.3.2. Select Easy Palletizing

1. In the Palletizing Parameters interface, select the process number (for example, process number 1).
2. Click [Current Usage Type] and select "Simple Palletizing".



3. Click [Gripper Settings].



10.3.3. Gripper Settings

1. Set the number of grippers to 1.
2. Gripper 1 tool number Select the marked tool number (for example, tool number 1).



3. Click [Save], and then click [Next] to enter the location setting interface.

10.3.4. Position settings (loading pallet)

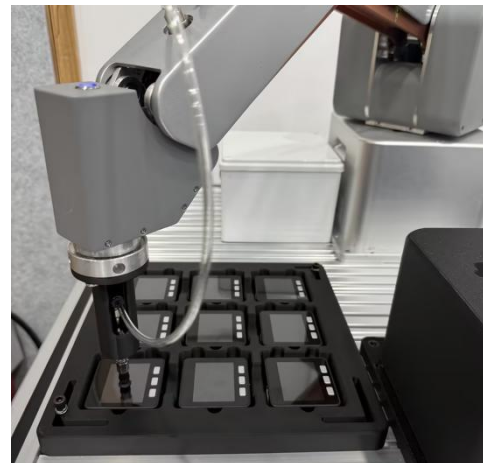
1. Number of layers: Fill in 3.
2. Number of rows: Fill in 1 (there is only one row in the Y direction).
3. Number of columns: Fill in 3 (3 workpieces in X direction).



4. Calibrate the starting workpiece point: manually move the robot to the first workpiece placement position of the blanking tray (the first one in the lower left corner), align the end of the tool with the placement point, click [Calibrate this point] after [Starting workpiece point].



5. Calibrate the end of the column: move the robot to the last workpiece placement position in the same row (the third in the X direction), click [Calibrate this point] after [Column End].



6. End of calibration line: Since the number of lines is 1, the end of the line can be the same as the starting workpiece point, or calibrated according to the actual Y-direction offset.



7. Calibrate the auxiliary point: Move the robot to the safety height directly above the starting workpiece point (for example, 50mm above), click [Calibrate this point] after [Auxiliary point].

点位	起始工件点	列末端	行末端	对角末端	高末端	辅助点	入口点
X	197.659	333.703	195.914	9999.000	9999.000	196.777	9999.000
Y	318.906	320.379	183.138	9999.000	9999.000	318.205	9999.000
Z	-133.369	-134.711	-130.910	9999.000	9999.000	-54.594	9999.000
U	-123.575	-109.254	-108.087	9999.000	9999.000	-123.631	9999.000



8. Click [Save] to complete the location setting.

CAUTION: The high end and diagonal end can not be calibrated in simple palletizing, and the system will automatically calculate the height offset according to the number of layers.

10.3.5. Complete process setup

Click [Done] to save the cutting and palletizing process parameters.



10.4. Teach palletizing 2 craft pack

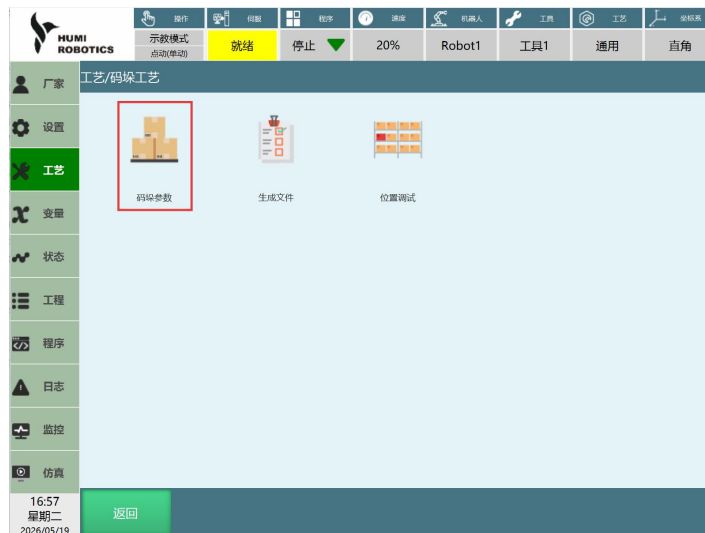
In this case, the unloading point adopts a simple stacking method, and the stacking type is 1 row x 3 columns x 3 layers.

10.4.1. Into the palletizing process

1. Click the [Process] button at the bottom of the main interface of the system.
2. Find [Palletizing Process] in the process list and click to enter.



3. Click the [Palletizing Parameters] button to enter the palletizing parameter setting interface.



10.4.2. Select Easy Palletizing

1. In the Palletizing Parameters interface, select the process number (for example, process number 2).
2. Click [Current Usage Type] and select "Simple Palletizing".



3. Click [Gripper Settings].



10.4.3. Gripper Settings

1. Set the number of grippers to 1.
2. Gripper 1 tool number Select the marked tool number (for example, tool number 1).



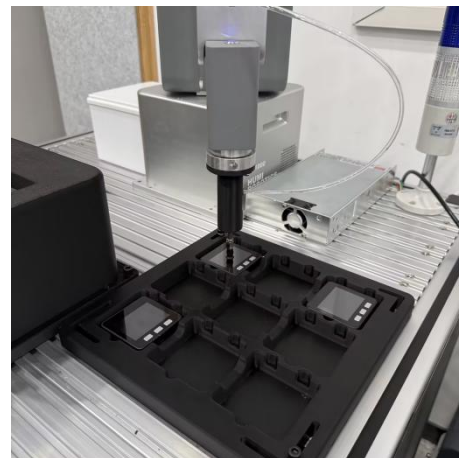
3. Click [Save], and then click [Next] to enter the location setting interface.

10.4.4. Position settings (loading pallet)

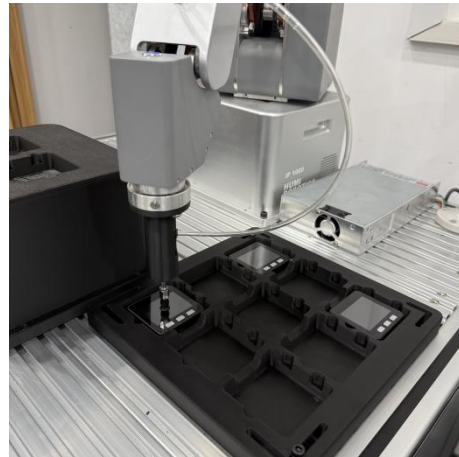
1. Number of layers: Fill in 3.
2. Number of rows: Fill in 1 (there is only one row in the Y direction).
3. Number of columns: Fill in 3 (3 workpieces in X direction).



4. Calibrate the starting workpiece point: manually move the robot to the first workpiece placement position of the blanking tray (the first one in the lower left corner), align the end of the tool with the placement point, click [Calibrate this point] after [Starting workpiece point].



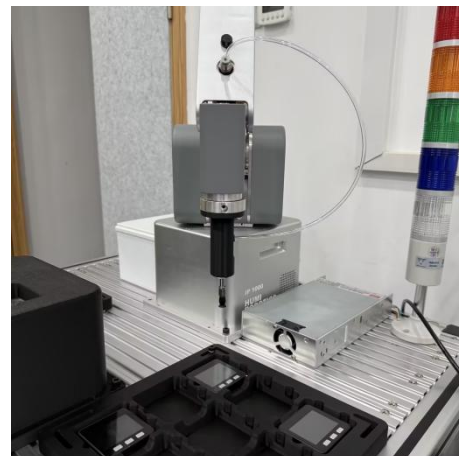
5. Calibrate the end of the column: move the robot to the last workpiece placement position in the same row (the third in the X direction), click [Calibrate this point] after [Column End].



6. End of calibration line: Since the number of lines is 1, the end of the line can be the same as the starting workpiece point, or calibrated according to the actual Y-direction offset.



7. Calibrate the auxiliary point: Move the robot to the safety height directly above the starting workpiece point (for example, 50mm above), click [Calibrate this point] after [Auxiliary point].



8. Click [Save] to complete the location setting.

Note: The high and diagonal ends may not be calibrated in simple palletizing, and the system will automatically calculate the height offset according to the number of layers.

点位	起始工件点	列末端	行末端	对角末端	高末端	辅助点	入口点
X	188.251	324.531	189.095	9999.000	9999.000	183.199	9999.000
Y	-158.710	-160.734	-293.582	9999.000	9999.000	-156.775	9999.000
Z	-130.017	-132.186	-131.849	9999.000	9999.000	-47.992	9999.000
U	-1.142	-0.466	7.119	9999.000	9999.000	7.912	9999.000

层数: 1 行数: 3 列数: 3

保存 取消 上一页 完成

10.4.5. Complete process setup

Click [Done] to save the cutting and palletizing process parameters.

抓手设置 → 位置设置

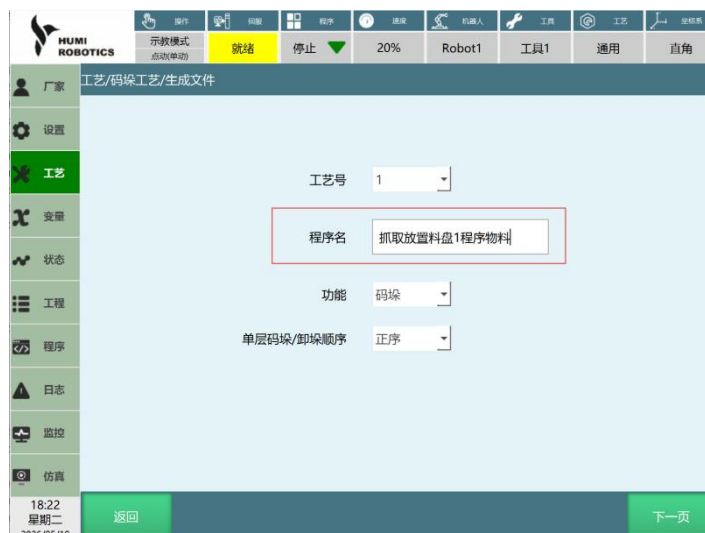
返回 开始设置

10.5. Generate Palletizing 1, 2 Procedures

1. Click the [Process] button at the bottom of the main interface of the system.
2. Find [Generate File] in the process list and click to enter.



3. Enter the program name: for example, the program for grabbing and placing the tray 1
4. Click [Next] to enter the function selection screen.



5. Click Edit, set the pickup point, and click Next.



- Set the gripping workpiece, sucker signal solenoid valve (e.g. DOUT2-6).



- Configure data variables related to palletizing (current total number of palletized, current number of palletized layers, current number of palletized layers, palletization end judgment).



- Configure the palletizing movement parameters (sampling process, intermediate process, palletizing process). Linear interpolation is used here, and the speed is set according to the on-site working conditions.



- Setup Done Click Done.



10. Follow the procedure above to generate the grab and place tray 2.



10.6. Case Procedure







11. Appendix 1: Palletizing Approach

11.1. Scenario

The workpiece is placed into the workpiece point at a set angular speed, which is suitable for some large packaging and placed in a relatively tight position, and this function supports the entry and exit speed and approach mode of each individual workpiece of any stacking type.

11.2. Full palletizing

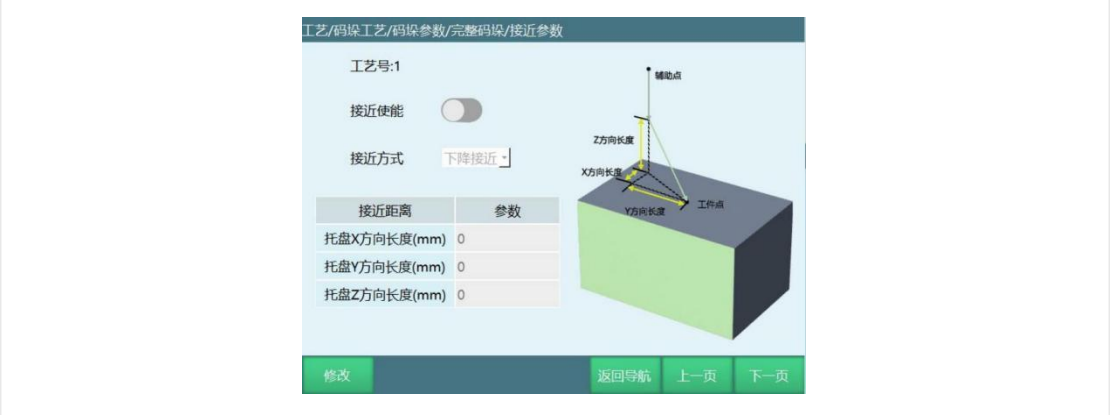
Enter the process/stacking process/stacking parameters and 99 support process number parameters. Simple palletizing and full palletizing can be selected, and full palletizing can be



There is one more proximity parameter than in the legacy process.

11.3. Proximity Parameters

The approaching mode can be set in the approaching parameter, which is divided into the approaching and approaching descent, XYZ and the offset distance in the



11.3.1. Proximity Enable

It needs to be turned on to use the palletizing proximity function. If the enable button is turned on but the proximity distance is not set, the proximity will not take effect.

11.3.2. Approach method

Descending proximity: The robot first reaches the auxiliary point and then moves to the approach point according to the offset distance, and then to the workpiece point.

Approach descent: The robot first reaches the auxiliary point and then moves to the approach point according to the offset distance, from the approach point to above the workpiece point and then to the workpiece point.

11.3.3. Flat Mode

Added to the custom stacking type in the stacking plane mode to set the entry and exit speed of individual workpieces, without filling in the default approach point command speed, different speeds according to the interpolation method of the instruction. If the interpolation method is a joint, the speed is less than the 100 corresponding value, greater than, the 100 acceleration and deceleration defaults to equal speed; if it is a straightline, the number is how much (except for negative numbers) can not be greater than the Cartesian parameter Acceleration and deceleration defaults to % of the 10.

It is also possible to set the direction of approach individually or as a whole.



11.3.4. Apply to current layer

Sets the approach direction of the selected workpiece into the exit velocity as a parameter for all workpieces of the entire layer.

11.3.5. Position debugging

In the position debugging, it is also possible to set the exit and entry speed and the approach direction of individual workpieces.

Gripper: The position debugging interface adds a gripper selection, as shown in the figure. Operation steps: process→palletizing→process position debugging,

Fit different palletizing positions by modifying different grippers.



11.3.6. Palletizing Approach Point

The new instruction palletizing approach point is the transition point between the auxiliary point and the workpiece point, that is, the point to be approached by the approach



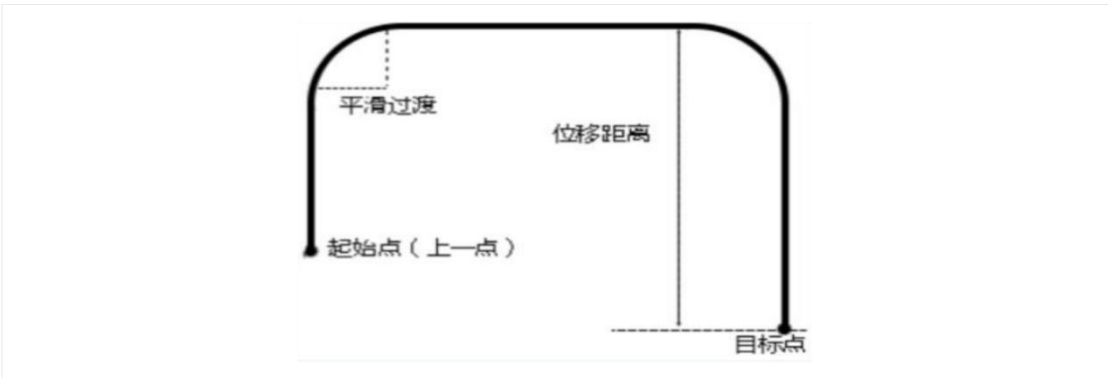
Parameter setting is the same as other points of the pallet.

12. Appendix 2: Palletized Door Type Interpolation

12.1. Method Introduction

Palletizing entry points Palletizing auxiliary points Palletizing workpiece points Added door type interpolation.

Door track movement is widely used in material handling and 3c industry. The robot arm passes the walk-through trajectory--> translational descent) to the target point to avoid material friction.



The actual use of palletizing can be run through two actual palletizing points (the collection point and the——workpiece point) , are shown as

