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Debugging Manual

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Catalogue

Debugging Manual

> Safety Instructions

Warnings

⚠️

- This manual covers robot parameters, external axis parameters, system settings and other operations.

- You must read carefully and fully understand the instructions in the manual before using this system.

- Please consider anything not described in the manual as "not allowed" or "prohibited".

Cautions

⚠️

- The diagrams in the manual are only to demonstrate some detailed parts, you need to install the complete equipment before using this system

- Due to system function improvement, the manual will be revised appropriately, and the revised manual will update the manual version number

> Safety tips level

This manual includes safety precautions to ensure the personal safety of operators and prevent machine damage, and describes them in the main text as "Warnings" and "Cautions" according to their importance in terms of safety. The relevant supplementary notes are described as "Notes". Before using, users must read carefully the items described in "Warnings", "Cautions" and "Notes".

Warnings

⚠️

- Used in situations where there may be a danger of death or serious injury to the user due to incorrect operation

Cautions
⚠️
• Used in situations where there may be dangers such as minor or moderate injury, damage to objects, etc. due to incorrect operation

Notes
ℹ️
• Used to describe items other than warnings or cautions

Robot and External Axis Parameters
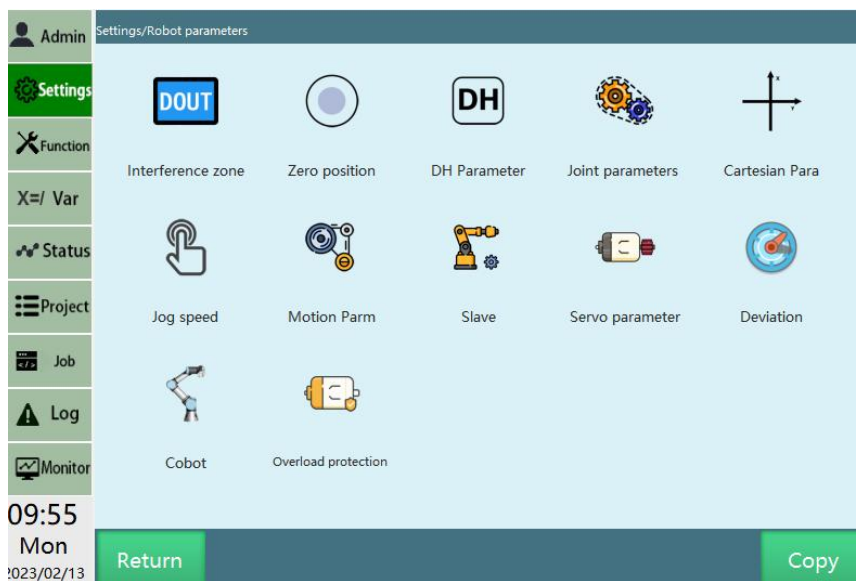
› Robot Parameters

In the "DH parameters" interface, we provide the "Preset robot" function. If this drop-down list contains the robot model you are using, you can use this function to quickly and easily set up the parameters of your robot.

1. Click [Preset robot] in the upper left corner of the "DH Parameter" interface, you can select the robot model that has been adapted, and the DH parameters and joint parameters of the robot will be filled in automatically after selection.

2. You need to modify the zero point manually after selecting the preset robot.

Notes
ℹ️
• The configuration method of the preset robot can be obtained by contacting the system manufacturer

Slave configuration

Warnings
⚠️
• Please do not switch to servo-ready mode, power on, run and do other operations

You can go to [Settings] - [Robot parameters] - [Slave configuration] to modify the robot settings.

The relevant steps are as follows:

Enter [Settings] - [Robot parameters] - [Slave configuration] interface;

This interface displays the number of slaves currently connected to the controller; you can modify the communication cycle and bus type which is divided into EtherCAT and CANopen, and the modification takes effect after restarting.

Bus type: EtherCAT
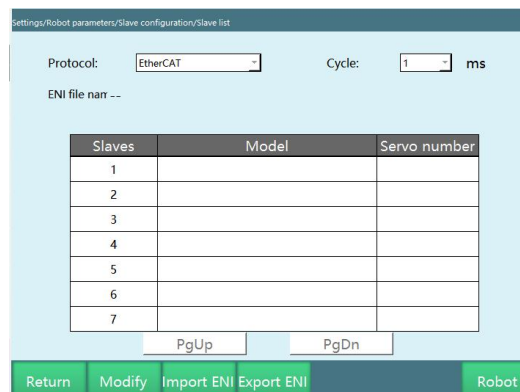
Bus type: CANopen
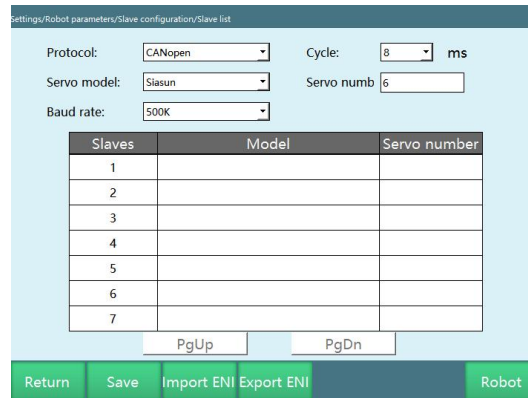
Enter [Robot] interface

You can set the number of robots, robot type and number of external axis groups, and do servo selection in this interface;
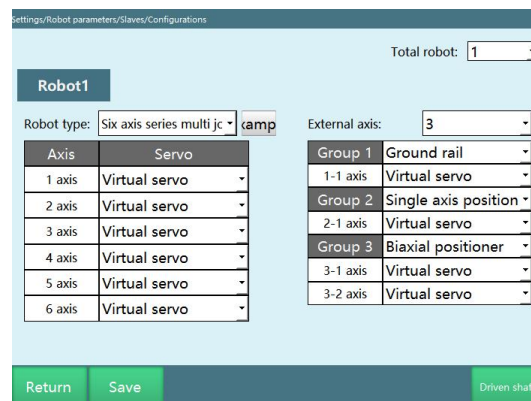
After the number of robots is modified, there will be a prompt box indicating a restart is required to make the modifications effective, other parameter modifications take effect immediately. *The parameters will be reset after modifying the robot type, so be careful when changing the robot type*
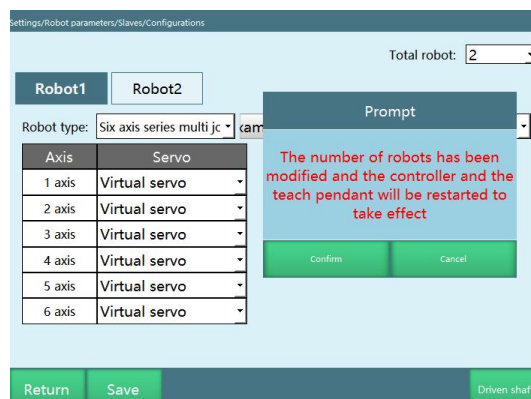
Enter [Slave axis] interface

You can set the number of slave axes, reduction ratio, number of encoder bits and direction relative to the master motor, and do servo selection in this interface.
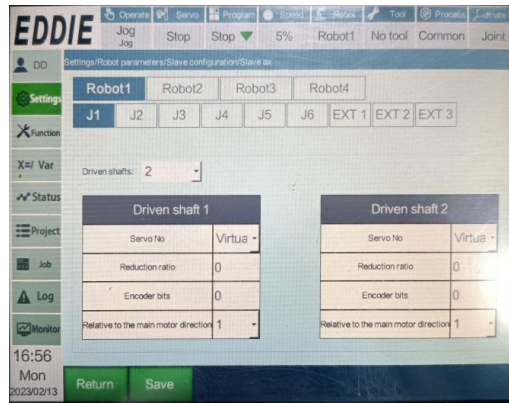
Meaning of each parameter

- **Robot communication cycle**

1ms, 2ms, 4ms or 8ms

- **Number of robots**

One controller supports up to 4 robots

- **Robot type**

6-axis tandem multi-joint, 6-axis collaborative, 6-axis painting, 6-axis special-shaped one, 5-axis tandem multi-joint, 4-axis SCARA, 4-axis SCARA special-shaped one, 4-axis linkage palletizing, 4-axis palletizing screw, 4-axis parallel robot, 4-axis tandem multi-joint, 4-axis Cartesian, 4-axis polar coordinate special-shaped, 3-axis SCARA, 3-axis Cartesian, 3-axis Cartesian special-shaped one, 2-axis SCARA, 7-axis tandem multi-joint, single-axis, gantry welding model, wine tank model

- **Number of external axis groups**

External axis type supports ground rail, single/dual axis positioner, and supports up to 3 groups of external axes, the total number of axes is up to 5, and there can only be one ground rail

- **Servo serial number**

Servo's corresponding serial number, model

- **The currently supported servo types are as follows**

  Note: This table is no longer updated after 20.06 because the function of adding servo files has been added, and users can configure themselves

- **The currently supported IO types are as follows**

IO board manufacturers	IO model
HUATAI	HUATAI
	HUATAI PWM

Metrotech	Metrotech
	Metrotech old
ITEGVA	ITEGVA
GPG	GPG
INEXBOT	R1
	R1_PWM
	R2
	R2A
	R2B
	R3
	R4
	R4P
	High precision clock
Xiling	Xiling EJ1861
	Xiling EJ1862
MT	MT
Leadshine	Leadshine
YENWARE	YENWARE CATIOA

Joint parameter setting

Warnings
⚠️
• Please do not switch to servo-ready mode, power on, run and do other operations without configuring this parameter

You can go to [Settings] - [Robot parameters] - [Joint parameters] to modify the joint parameters.

The relevant steps are as follows:

1. Enter [Settings] - [Robot parameters] - [Joint parameters] interface.

2. At this time, the input box is grayed out and no value can be entered.

3. After clicking "Modify", the "Modify" button becomes "Save", the input box becomes white, and you can enter the value after the respective parameter.

4. Click "Save" and the modification is successful.

Meaning of each parameter

- **CW limit**

Maximum range of robot joints in positive direction.

- **CCW limit**

Maximum range of robot joints in reverse direction. (This value must be negative)

- **Reduction ratio**

Reduction ratio of the reducer.

- **Encoder bits**

Number of bits of the encoder.

- **Rated positive RPM**

The rated rotation speed of the motor in the positive direction.

- **Rated reverse RPM**

The rated rotation speed of the motor in the reverse direction. (This value must be negative)

- **Maximum positive RPM**

The maximum rotation speed of the motor in the positive direction; its value is a multiple of the rated positive RPM. If the rated positive RPM is 3000 rpm and the maximum positive RPM needs to be 6000 rpm, then fill in 2 times here.

- **Maximum reverse RPM**

The maximum rotation speed of the motor in the reverse direction; its value is a multiple of the rated reverse RPM. If the rated reverse RPM is -4000 rpm and the maximum reverse RPM needs to be -6000 rpm, then fill in -1.5 times here. (This value must be negative)

- **Rated positive speed**

The rated positive speed of the robot joint; it is automatically calculated from the rated positive RPM, encoder bits and the reduction ratio (the axis 3 of the 4-axis SCARA and axis 1 of the 4-axis SCARA special-shaped robot also need to add the pitch), no need to fill in.

- **Rated reverse speed**

The rated reverse speed of the robot joint; it is automatically calculated from the rated reverse RPM, encoder bits and the reduction ratio, no need to fill in. (This value must be negative)

- **Maximum acceleration**

The maximum acceleration of the robot joint movement; its value is a multiple of the rated positive (reverse) speed. If the rated positive speed is 300 degrees/s, the maximum acceleration needs to be 1500 degrees/s², then fill in 5 times here.

- **Maximum deceleration**

The maximum deceleration of the robot joint movement; its value is a multiple of the rated positive (reverse) speed. If the rated positive speed is 300 degrees/s, the maximum acceleration needs to be 1200 degrees/s², fill in -4 times here. It is recommended that the maximum acceleration and maximum deceleration values be the same. (This value must be negative)

- **Model direction**

The model direction should be set by referring to the joint positive direction diagram below, and the direction of the jogging "+" key of each axis should be the same as the joint positive direction diagram (choosing 1 for the same and -1 for the opposite)

- **Actual joint direction**

Set the actual direction of the joint relative to the model direction (joint positive direction legend below), choose 1 for the same direction as the model direction and -1 for the opposite direction, set it according to the actual needs.

Note:

1. Please configure the model direction first and then configure the actual direction of the joint

2. To use the "Actual joint direction" function, you need to go to [Settings] - [Operation parameters] interface, turn on the button after the "Actual joint direction"

3. The "Actual joint direction" is in the [Settings] - [Robot parameters] - [Joint parameters] - [Other parameters] interface

- **Gear backlash**

The angle to compensate for the filled value whenever the joint moves in the opposite direction

Note: The "Gear backlash" is in the [Settings] - [Robot parameters] - [Joint parameters] - [Other parameters] interface

Joint positive direction diagram:
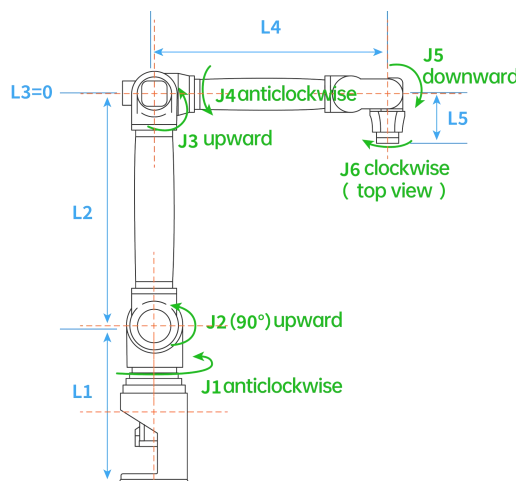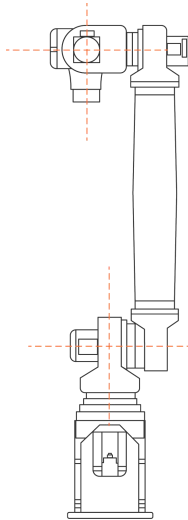
Robot type	Axis	Positive direction (top view or left view)
6-axis	J1	anticlockwise
	J2	upward
	J3	upward
	J4	anticlockwise
	J5	downward
	J6	clockwise
4-axis SCARA	J1	anticlockwise
	J2	anticlockwise
	J3	upward
	J4	clockwise
4-axis	J1	anticlockwise

palletizing	J2	upward
	J3	upward
	J4	anticlockwise
4-axis joint	J1	anticlockwise
	J2	upward
	J3	upward
	J4	upward
5-axis joint	J1	anticlockwise
	J2	upward
	J3	upward
	J4	anticlockwise
	J5	downward
2-axis SCARA	J1	anticlockwise
	J2	anticlockwise
3-axis SCARA	J1	anticlockwise
	J2	anticlockwise
	J3	downward

single-axis	J1	anticlockwise

Multi-turn value overflow counting

You can go to [Settings] - [Robot parameters] - [Joint parameters] to modify the joint parameters.

This function is used to eliminate the effect of jumps between encoder max/min values.

For example, the encoder multi-turn value range is [-2147483648,2147483647], the current encoder multi-turn value position is 2147483647, if you rotate 1 unit in the positive direction, the position will be -2147483648, if the system does not know the encoder multi-turn value range, it will think that the robot suddenly jumps, and will not know that only 1 unit was actually rotated, then the robot is prone to be out of control.

Warnings
⚠️
• This parameter must be filled in, otherwise the following problems may occur
——Large jumps in points, such as a sudden change from 4 degrees to 40 degrees
——Out of control
• If the slave axis is configured, the encoder max/min value of the slave axis must also be filled in
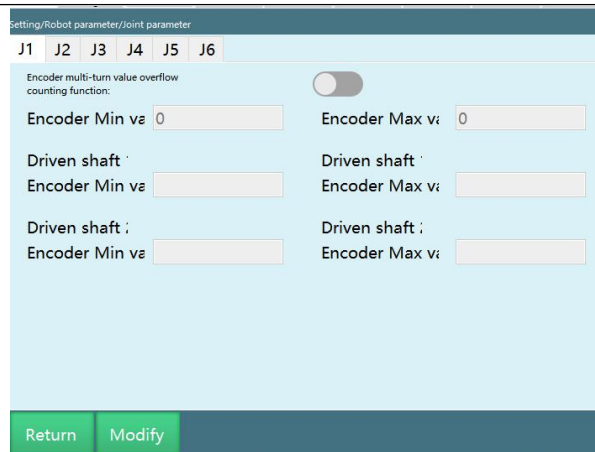
Encoder multi-turn value overflow counting function: turn on the button for this joint to use this function.

Minimum value of multi-turn value: calculate and fill in by yourself according to the body servo parameters (negative value is required).

Maximum value of multi-turn value: calculate and fill in by yourself according to the body servo parameters.

Calculation method:

Maximum value of multi-turn value=$2^{\text{digits of single-turn value+digits of multi-turn value}}-1$

(The maximum value should not exceed $2^{31}-1=2,147,483,647$, if it exceeds, fill in the maximum value)

Minimum value of multi-turn value=$-2^{\text{digits of single-turn value+digits of multi-turn value}}$

(The minimum value should not exceed $-2^{31}=-2,147,483,648$, if it exceeds, fill in the minimum value)

Notes

i

- There are two encoder multi-turn value ranges

$$——[-2^{31}, 2^{31} - 1]$$
$$——[0, 2^{32} - 1]$$

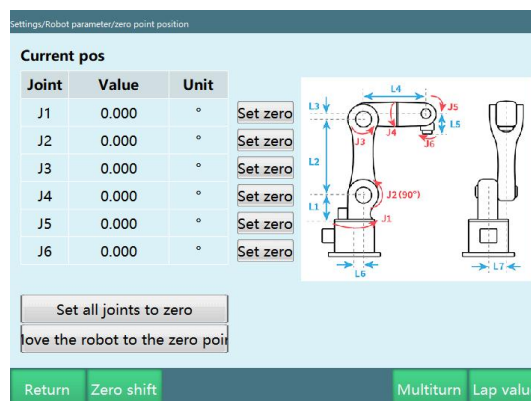## Robot zero position

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Warnings

⚠

- After modifying the zero position, all job programs are unavailable, please do not use
- Zero point calibration requires correct slave configuration and joint parameters configuration

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Zero calibration

If the robot zero position is a non-standard zero position, users can align the robot according to the robot's alignment hole, and then set the current robot position coordinates to the zero position on the robot zero position interface.

The specific operation steps are as follows:

1. Open the [Settings] - [Robot parameters] - [Zero position] interface.

2. When the "joint coordinate mode" is set, the attitude of each joint of the robot at the zero position is as shown in the following figure, in which the lower arm is in a vertical state, the forearm is in a horizontal state, and the wrist (fifth joint) is also in a horizontal state. In general robots, the zero position interface (such as grooves, scribe lines, rulers, etc.) has been considered in the body design process.

3. Click the [Set to zero] button corresponding to the axis you want to set the zero point, or set all joint coordinates to zero point at once by clicking the [Set all joints to zero] button.

4. In the modification prompt box that pops up, click [OK] to set the robot zero points as shown in the figure.

5. The zero position of this axis (all axes) is set successfully.

- In the servo-ready state, press the DeadMan button and then press [Move robot to the zero point] to ensure that the robot is safe.

- The speed value is automatically adjusted to 5% and can be manually adjusted to increase the movement speed.

- After setting the current position to zero, the axis coordinates of the current position become (0,0,0,0,0,0,0).

- You can set the current position coordinates of one or more axes to the zero point coordinates, at this time, the zero point coordinates of unset axes are the original zero point coordinates.
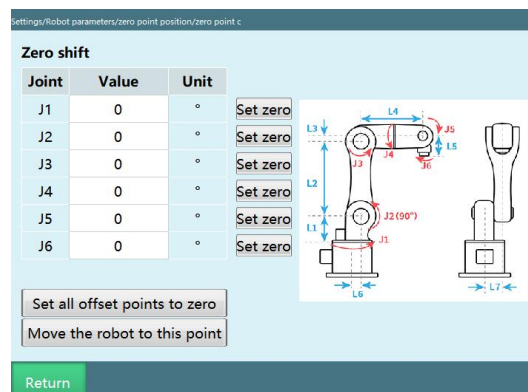

Warnings

⚠️

- Teaching and playback operations cannot be performed without calibration of the origin position.

- For systems that use multiple robots, each robot must perform origin position calibration.

- When there is a coupling relationship between joint axes, such as the common coupling relationship between the fifth axis and the sixth axis of a robot, the fifth axis must be at the zero position, then the zero data recorded for the sixth axis will be valid, otherwise, the zero data recorded for the sixth axis will be invalid. So the zero data of the sixth axis must be recorded with the fifth axis at the zero position. If there is no coupling relationship, each axis can calibrate the zero position individually, and the respective zero position will not affect the zero position of other joints.

Zero offset

The zero offset can be used when the user needs to adjust the zero point, you can enter the value manually and the operation method is similar to the zero point calibration.
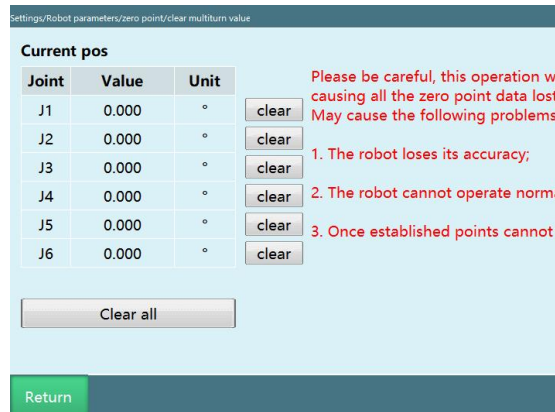

Clear multi-turn value

Warnings

⚠️

- Please operate with caution. This operation will cause the robot encoder value to be cleared, resulting in the factory zero data being cleared.

    May cause the following problems:

    i. The robot loses accuracy;

    ii. The robot can't operate properly;

    iii. The points ever established are not working.

Clear all axes' multi-turn values: clear all axes' multi-turn values for the robot at once (excluding external axes)

"Clear" after each joint: clear the multi-turn value for that axis

Single-turn value

This function can modify the single-turn value corresponding to each axis

---

Warnings

⚠️

- Please operate with caution. This operation will cause the robot encoder value to be cleared, resulting in the factory zero data being cleared.

   May cause the following problems:

   i. The robot loses accuracy;

   ii. The robot can't operate properly;

   iii. The points ever established are not working.
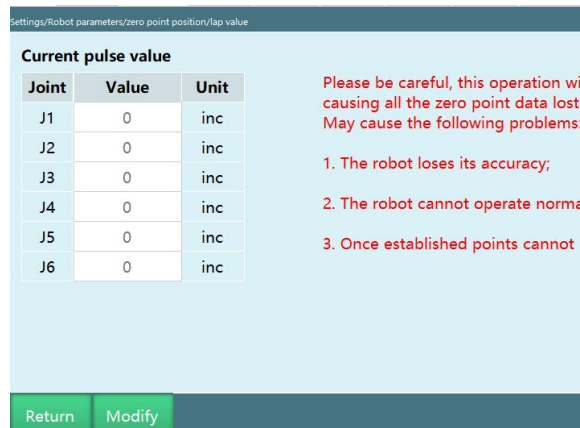
How to retrieve the lost zero point

Prerequisites:

1. The robot loses the zero point just because of an operation error, and the lost zero point cannot be retrieved in the event of a collision

2. Recorded the single-turn value before the zero point was lost (when the multi-turn value is not cleared, the value displayed in the single-turn value interface is the data of the last zero calibration)

Steps:

1. Find the single-turn value recorded before the zero point is lost for backup

2. Teach the robot to the mechanical zero position

3. Clear the multi-turn value of all axes of the robot (this operation will clear the multi-turn values and single-turn values, please operate with caution)

4. Calibrate the zero point of all axes of the robot

5. Enter the single-turn value data prepared in step 1 in the single-turn value interface

6. Return the robot to zero point

7. Confirm that the zero point is correct
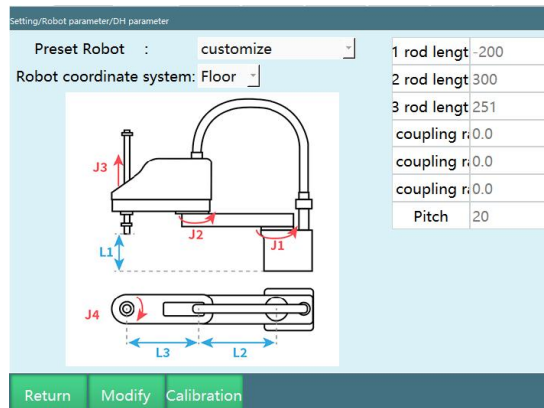
DH parameters

Warnings

> ⚠️
>
> - Please do not switch to servo-ready mode, power on, run and do other operations without configuring this parameter
> - Zero calibration needs to be configured before configuring DH parameters
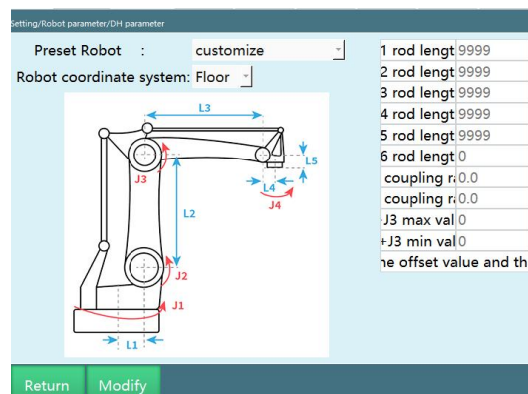
The relevant steps are as follows:

1. Enter the [Settings] - [Robot parameters] - [DH parameters] interface;
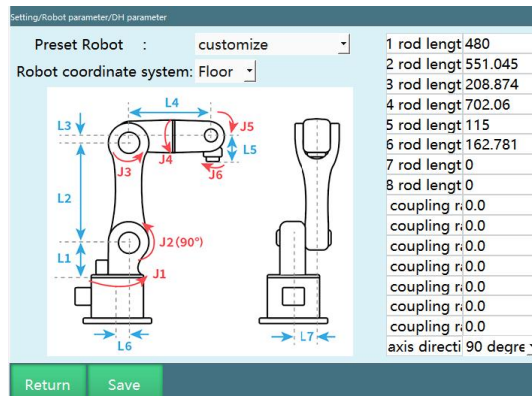
6-axis tandem multi-joint:
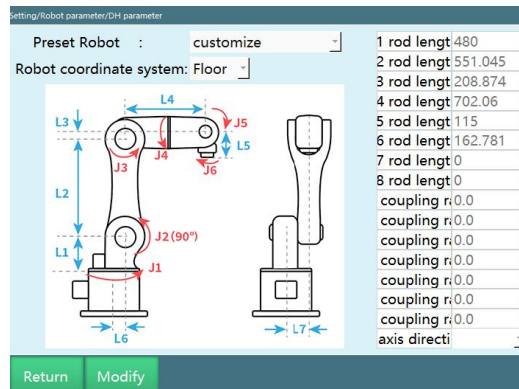
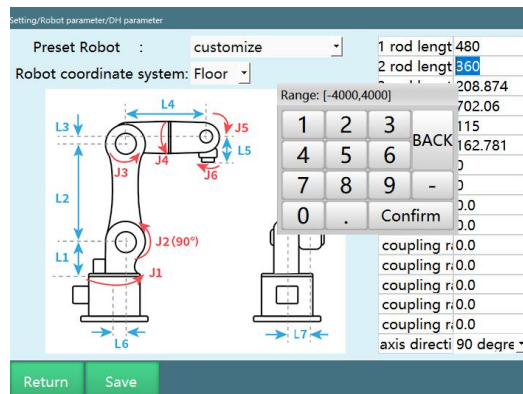4-axis SCARA/4-axis SCARA special-shaped 1:

4-axis linkage palletizing:

2. Click the [Modify] button at the bottom.

3. Fill in the parameter values according to your robot.

4. Click the parameter value you want to modify (such as L2), then the soft keyboard will appear, enter the number you want to replace, and click "OK".

5. Click the [Save] button to complete the parameter modification.

Meaning of each parameter

- **Preset robot**

By importing the robot joint parameters and DH parameters into the controller in advance, you can eliminate the need to fill in the parameters repeatedly

Note: For specific usage, please contact the manufacturer

- **Robot coordinate system**

floor mounting

ceiling mounting

- **Rod length**: robot size

- **Coupling ratio**: some robot bodies are designed so that the motor spans many axes to drive a particular axis, which creates a coupling between the two axes. For example, if we rotate axis 2, axis 3 follows, which is axis coupling. To counteract this coupling effect, a coupling ratio is needed.

The calculation formula for the coupling ratio is:

$$coupling\ ratio = \frac{following\ axis\ rotation\ angle}{main\ axis\ rotation\ angle}$$

For example, if we rotate axis 2 by 10º and find that axis 3 follows the rotation by 15º, then the coupling ratio is

$$\frac{15}{10} = 1.5$$

- **Axis 5 direction**: direction of axis 5 at zero point calibration

Horizontal direction

Vertical direction

- **Pitch**

Pitch of the link responsible for up and down movement in 4-axis SCARA (axis 3 of 4-axis SCARA and axis 1 of 4-axis SCARA special-shaped robot)
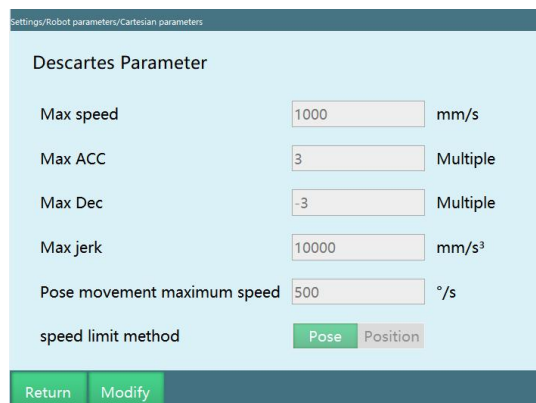
- **J2+J3 min/max**

Let the axis 2 and axis 3 of the 4-axis palletizing robot move to J2max/J3max, J2min/J3max, J2max/J3min and J2min/J3min respectively, and record the values of J2+J3 in the four cases. Remove the highest and lowest values of the four, and the remaining two are the **J2+J3 min/max values**.

Cartesian parameters

You can go to [Settings] - [Robot parameters] - [Cartesian parameters] to modify the Cartesian parameters.
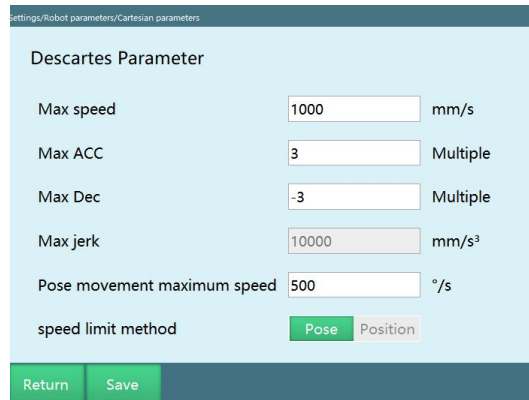
The relevant steps are as follows:

1. Enter [Settings] - [Robot parameters] - [Cartesian parameters] interface.

2. The input box is grayed out and no value can be entered.

3. After clicking "Modify", the "Modify" button becomes "Save" and the input box turns white, allowing you to enter values after the respective parameters.

4. Click "Save" and the modification is successful.

Meaning of each parameter

- **Maximum speed**

The maximum linear speed of the robot during operation.

- **Maximum acceleration**

The maximum acceleration of the robot during operation; its value is a multiple of the maximum speed. If the maximum speed is 1000mm/s and the maximum acceleration needs to be 3000mm/s², then fill in 3 times here.

- **Maximum deceleration**

The maximum deceleration of the robot during operation; its value is a multiple of the maximum speed. If the maximum speed is 1000 mm/s and the maximum deceleration needs to be -3000 mm/s², then fill in -3 times here. It is recommended that the maximum acceleration and maximum deceleration values be the same and the same as the maximum acceleration and maximum deceleration in the joint parameters. (This value must be negative)

- **Maximum jerk**

This parameter is a reserved parameter and is currently invalid.

- **Pose movement maximum speed**

The maximum speed of the robot during attitude movement, if the instruction speed exceeds this value, it will be decelerated

- **Speed limit method**

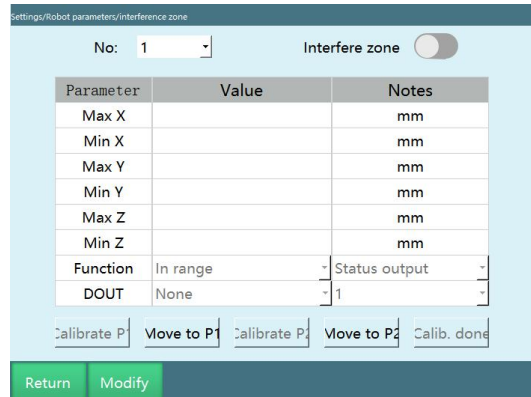**Pose:** The robot's linear interpolation motion is limited by both the maximum speed and the pose movement maximum speed

Position: The robot's linear interpolation motion is limited only by the maximum speed

Interference area range setting

The robot range limit is used to limit the robot's range of motion. It can be set in two ways: "manual fill" and "calibration".
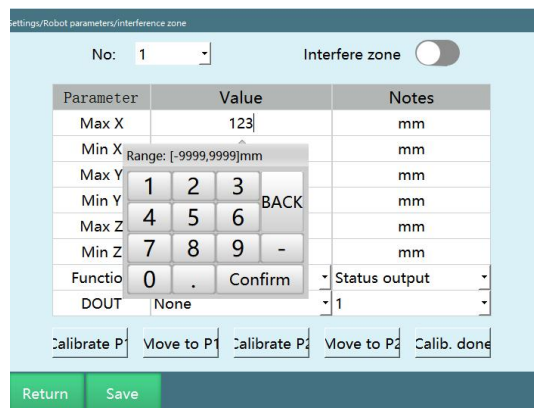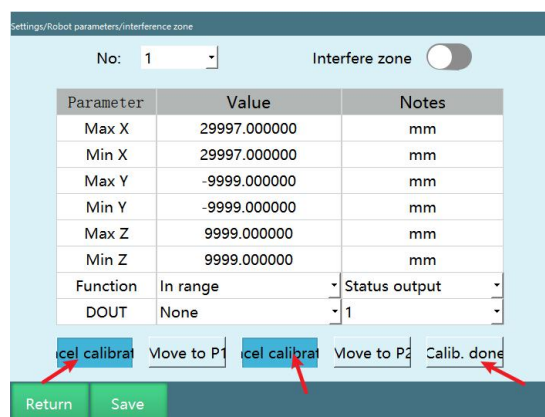
Interface:

Button	Meaning
Min X	Motion range X-axis minimum value
Max X	Motion range X-axis maximum value
Min Y	Motion range Y-axis minimum value
Max Y	Motion range Y-axis maximum value
Min Z	Motion range Z-axis minimum value
Max Z	Motion range Z-axis maximum value
Process number	9 process numbers can be selected, you can use multiple process numbers at the same time
Interference area enable	When this switch is turned on, the interference area takes effect
Function	When the robot is inside\outside the area, prohibit the robot from running\trigger status output
	Inside the area-state output: when the robot is inside the interference area, trigger status output
	Outside the area-state output: when the robot is outside the interference area, trigger status output
	Inside the area-no motion: when the robot is inside the interference area, prohibit it from running
	Outside the area-no motion: when the robot is outside the interference area, prohibit it from running
Output IO	Valid when the "Function" option is "state output"; output the interference

	area state
"Calibrate P1" and "Calibrate P2"	Calibrate the maximum and minimum values of the range
"Move to P1" and "Move to P2"	Move the robot to the calibrated position
Calibration completed	Automatic calculation of maximum and minimum values

When setting the range using the manual fill method, the maximum and minimum coordinate values that the robot can move in the X, Y, and Z axes can only be set after clicking the "Modify" button.

When setting the range using the range calibration method, you can move the robot and click on [Calibrate P1] and [Calibrate P2] on the interface to determine the maximum and minimum values, and then click on "Calibration completed" after the calibration is completed.
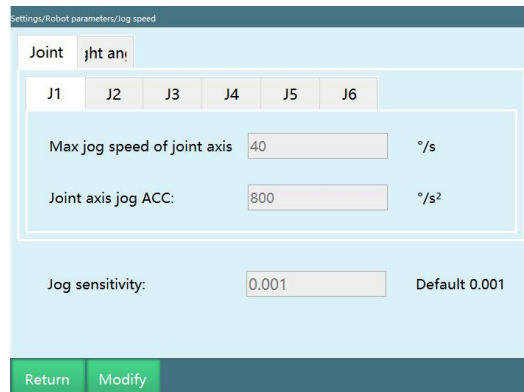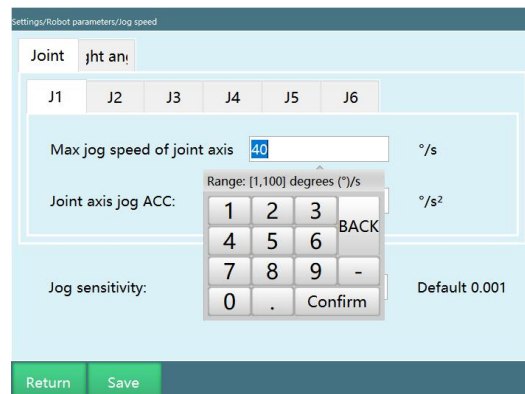

Jog speed

You can go to [Settings] - [Robot parameters] - [Jog speed] to modify the jog speed.

The relevant steps are as follows:

1. Enter the [Settings] - [Robot parameters] - [Jog speed] interface.

2. The input box is grayed out and no value can be entered.

3. After clicking "Modify", the "Modify" button becomes "Save" and the input box turns white, allowing you to enter values after the respective parameters.

4. Click "Save" and the modification is successful.

Meaning of each parameter

- **Joint axis maximum jog speed**

omitted

- **Joint axis jog acceleration**

omitted

- **Cartesian coordinate maximum jog speed**

omitted

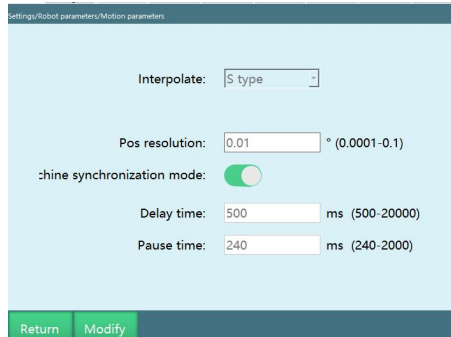- **Cartesian coordinate jog acceleration**

omitted

- **Jog sensitivity**

After power on, the jog operation is invalid when the jitter range of the robot is greater than the jog sensitivity

Motion parameters
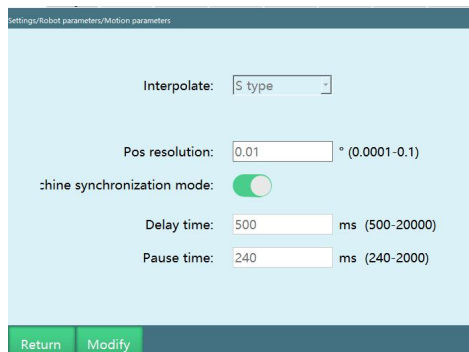
[Motion parameters] interface provides two robot motion interpolation methods, as shown in the following figure.

"Enable dual-robot synchronization mode" switch is only valid when both robots are 6-axis tandem multi-joint robots
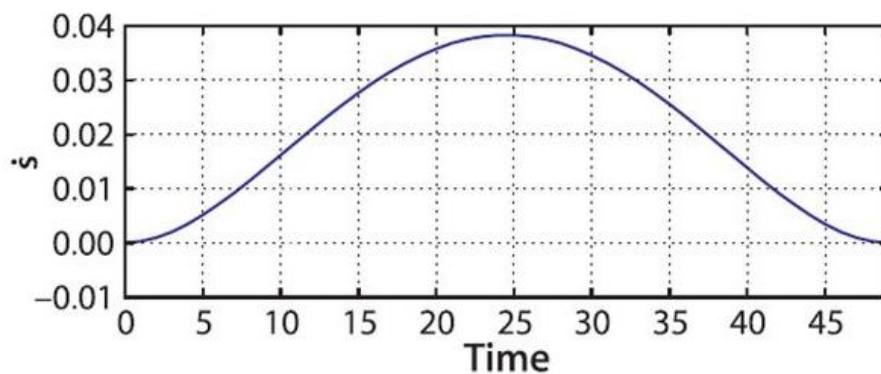
1. Click the [Modify] button;
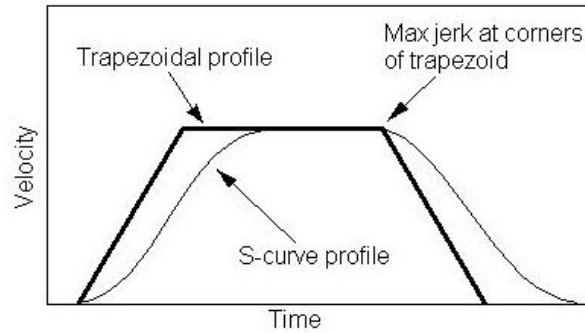
2. Select robot interpolation method;
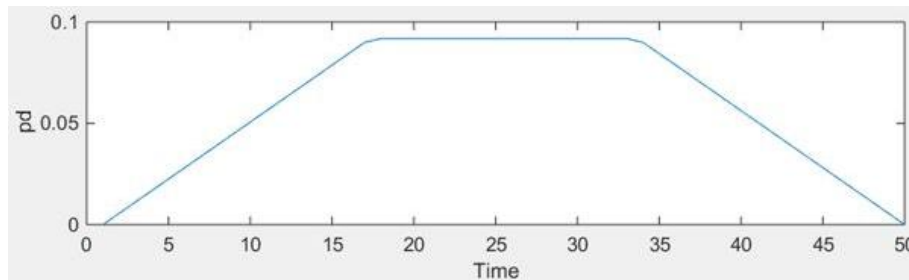

3. Click the [Save] button.

Meaning of each parameter

- **S-shaped interpolation**

- **Trapezoidal interpolation**

- **Remote mode speed**

Remote mode actual running speed = remote mode speed * global speed

- **Absolute position resolution**

When the operating point is 2 points whose difference is less than the resolution, it will be executed as 1 point

- **Enable dual-robot synchronization mode**

Dual-robot mode switch, when off, is multi-robot mode, two 6-axis tandem multi-joint robots are independent of each other; when on, is dual-robot mode, can use dual-robot instruction in robot 1 program to control robot 2 collaboration. Turn off dual-robot collaboration and restart the controller to take effect

Note: This function is displayed when two 6-axis tandem multi-joint robots are configured in the slave station.

- **Run delay time**

Run delay at program startup

- **Pause time**

The time taken from running to stop when the program is stopped due to mode switch, paused due to mode switch, remotely stopped, or remotely paused during operation

Servo parameters

<table>
<tr><td align="center">

Warnings

⚠️

• Please modify carefully and test in a safe area after modification

</td></tr>
</table>

Open [Settings] - [Robot parameters] - [Servo parameters] interface, you can view and modify the parameters of the servo in this interface.

At present, we can only read and modify the parameters of Tsino-Dynatron and HUACHENG servos.

NP parameters

Open [Settings] - [Robot parameters] - [NP parameters] interface, there are functions such as drag teaching and collision detection for human-machine collaborative robots

Following error

Open [Settings] - [Robot parameters] - [Following error] interface, you can set the maximum static error, maximum dynamic error, etc., unit ‰ range 1 - 20000000.
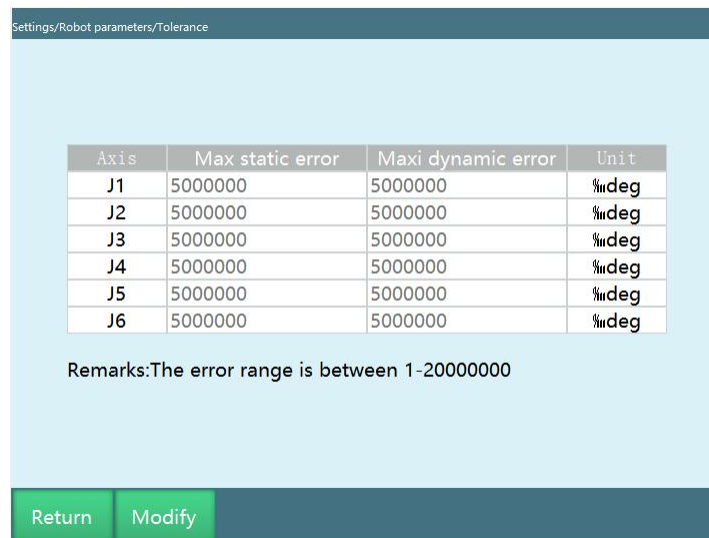
Collaborative robot

This interface is the parameter setting interface for collaborative robots, other types of robots do not need to set.
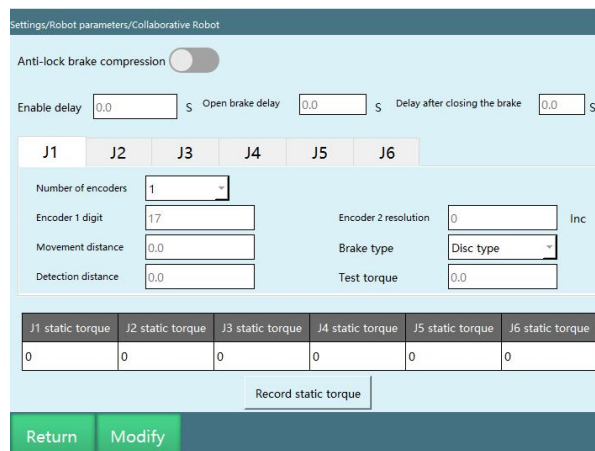
Enable delay: The delay time after pressing the enable key before issuing the enable instruction to the servo

Brake open delay: The delay time after issuing the enable instruction before issuing the brake open instruction to the servo

Delay after the brake is closed: The delay time elapsed from the closing of the brake until the servo responds to the next operation

Number of encoders: The number of encoders in single joint

Encoder 1 bits: The same as the encoder bits in the joint parameters

Encoder 2 resolution: The inc value of another encoder in single joint

Movement distance: The jogging distance of the joint before the brake is opened, generally 20; the value is the encoder value, the unit is inc.

Brake type: Brake disc brake and pin-type brake; the value is the encoder value, the unit is inc.

Detection distance: The joint movement distance used to detect whether the brake is open after opening the brake

Detection torque: After opening the brake, if the torque exceeds the detection torque when the joint runs detection distance, it is considered that the brake has failed to open.

> External Axis Parameters

Joint parameters

Same as robot joint parameters configuration, please refer to robot joint parameters for configuration

---
Warnings

⚠️

- Please do not switch to servo-ready mode, power on, run and do other operations without configuring this parameter
---

Zero position

Same as the robot zero position configuration, please refer to the robot zero position for configuration

---
Warnings

⚠️

- Please do not switch to servo-ready mode, power on, run and do other operations without configuring external axis joint parameters.

External axis calibration

Notes

ⓘ

- Make sure the robot tool hand is calibrated before calibrating the external axes
---

> • Jog to verify that the external axis parameters are accurate

The [External axis calibration] interface contains the calibration status of the set external axis group and the current collaborative external axis group number.
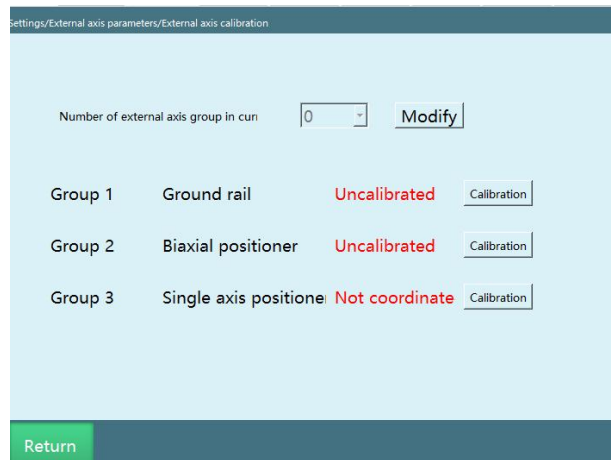
External axis positive direction:
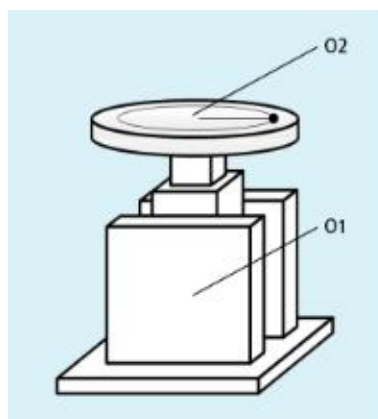
O1 (lower flip axis): The positive direction is the direction facing away from the robot

O2 (upper rotation axis): The positive direction is anticlockwise from top to bottom

External axis calibration:

- **Ground rail calibration**: After setting the ground rail joint parameters and rack and pinion ratio, turn on the collaboration switch and consider it calibrated.

X-direction conversion ratio: error value; rotate the ground rail by 360º, fill in the X-axis direction error here. Fill in 0 if there is no error.

Y-direction conversion ratio (rack and pinion ratio): rotate the ground rail by 360º,fill in the Y-axis movement value here.

Z-direction conversion ratio: error value; rotate the ground rail by 360º, fill in the Z-axis direction error here. Fill in 0 if there is no error.

<div style="border:1px solid">

Notes

ⓘ

- The positive direction of the ground rail is parallel to the Y+ direction of the robot

- Y-direction conversion ratio calculation method: first fill in 360 for the pitch, measure the actual movement distance (mm) when the axis moves 360º, and fill in this distance into the pitch.

- The robot can't be powered on when the XYZ direction conversion ratio is 9999
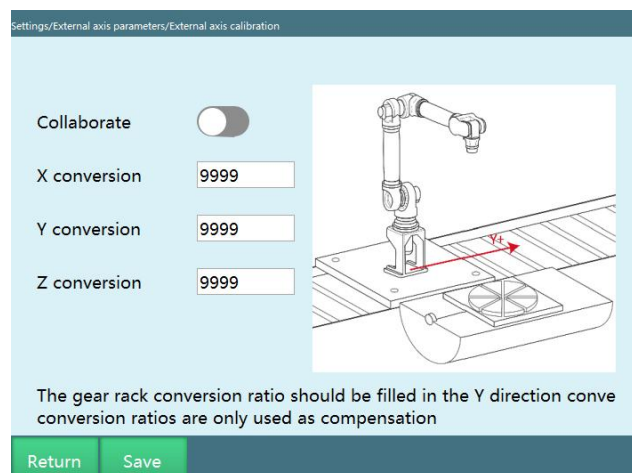
</div>

- Dual-axis positioner calibration:
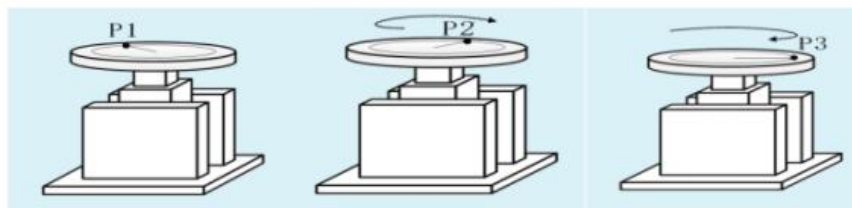
1. Return the external axis to zero point and find a point on the turntable as the reference point A

2. P1: Rotate the external axis 2 about 100 degrees in the positive direction. At this time, the reference point A is P1 in the figure, move the robot end to P1, and calibrate P1

3. P2: Rotate the external axis 2 about 50 degrees in the reverse direction. At this time, the reference point A is P2 in the figure, move the robot end to P2, and calibrate P2

4. P3: Return the external axis to zero point. At this time, the reference point A is P3 in the figure, move the robot end to P3, and calibrate P3
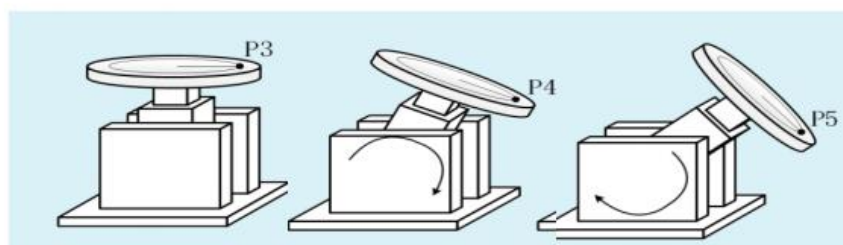
5. P4: Rotate the external axis 1 about 25 degrees in the positive direction. At this time, the reference point A is P4 in the figure, move the robot end to P4, and calibrate P4

6. P5: Rotate the external axis 1 about 25 degrees in the positive direction again. At this time, the reference point A is P5 in the figure, move the robot end to P5, and calibrate P5

7. Click "Calculate"

- **Single-axis flip positioner calibration:**

1. Return the external axis to zero point and find a point on the platform as the reference point A

2. Rotate the external axis 50 degrees in the positive direction, at this time, A is P1, move the robot end to point P1, and calibrate P1

3. Rotate the external axis 25 degrees in the opposite direction, at this time, A is P2, move the robot end to point P2, and calibrate P2

4. Return the external axis to zero point, at this time, A is P3, move the robot end to point P3, and calibrate P3

- **Single-axis rotary positioner calibration:**

1. Return the external axis to zero point and find a point on the platform as the reference point A

2. Rotate the external axis 100 degrees in the positive direction, at this time, A is P1, move the robot end to the P1 point, and calibrate P1

3. Rotate the external axis 50 degrees in the opposite direction, at this time, A is P2, move the robot end to point P2, and calibrate P2

4. Return the external axis to zero point, at this time, A is P3, move the robot end to point P3, and calibrate P3
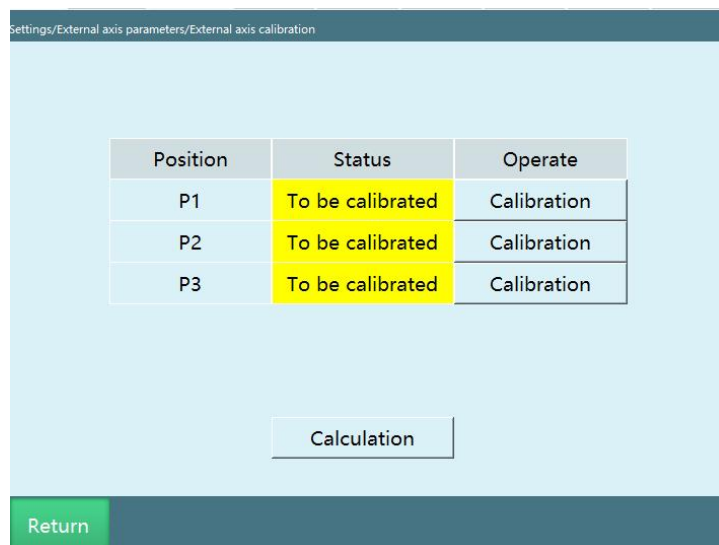
Notes on external axis instructions:

-When there are multiple groups of positioners, the robot can only cooperate with one group of positioners at the same time, and the currently coordinated external axis group can be switched through the coordinate system class - switch external axis.

-MOVJEXT (external axis point-to-point): Select two points on the external axis, and insert E001 and E002 for robot alignment point (the E point coordinates include the position data of the robot and the external axis).

-MOVLEXT (external axis straight line): Select two points on the external axis, and insert E001 and E002 for robot alignment point (the E point coordinates include the position data of the robot and the external axis); when inserting, select "Yes" for "SYNC" synchronization, if the external axis is not calibrated or collaboration group numbers is not selected, then Synchronous operation cannot be enabled.

-MOVCEXT (external axis arc): Select three points on the external axis, insert MOVJEXT or MOVLEXT at the first point; insert E001, E002, E003 for robot alignment point (E point coordinates include the position data of robot and external axis); when inserting, select "Yes" for "SYNC" synchronization, if the external axis is not calibrated or collaboration group numbers is not selected, then Synchronous operation cannot be enabled.

Jog speed

Same as robot jog speed configuration, please refer to robot jog speed for configuration

> New Robot Configuration Steps

- When you get a new control system, please first configure the number of robots, robot type, robot servo type, external axis type, external axis servo type and IO model, otherwise the error message "Cannot connect to servo" will appear after power on, and the servo cannot be used.

- Please configure the number of robots, robot type, robot servo type, external axis type, external axis servo type and IO model strictly according to your actual wiring. If you confirm that you have strictly followed the actual wiring, but the error message "Cannot connect to servo" still appears, please contact our technical support staff and provide the servo model and IO model you are using.

- When the servo type and IO model are not configured correctly, it will take a while to connect the controller and the teach pendant after the system is started. Therefore, if "Disconnected" is displayed on the top of the teach pendant after the system is started, this is a normal phenomenon.

The following are the complete parameter configuration steps:

1. Switch permissions to "Admin", the default password is 123456;

2. Configure the number of robots, robot communication cycle, robot type, and servo model in "Settings - Robot parameters - Slave configuration"; (please select the correct robot model, otherwise the robot will not be able to move normally!)

The servo list displays the number and model of servos read after the current controller is turned on, and the communication cycle can be set in this interface.
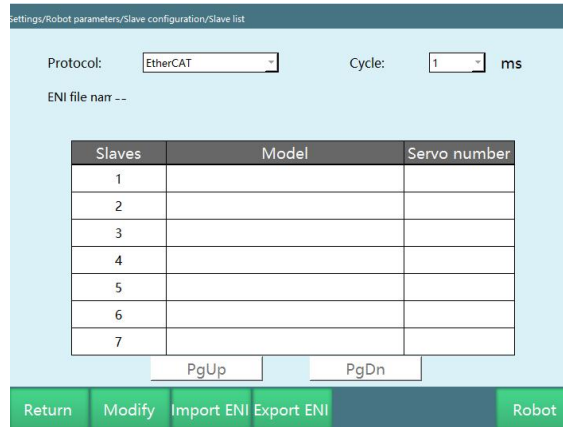
In the robot servo configuration interface, you can configure the number of robots, robot type, number of external axis groups and do servo selection
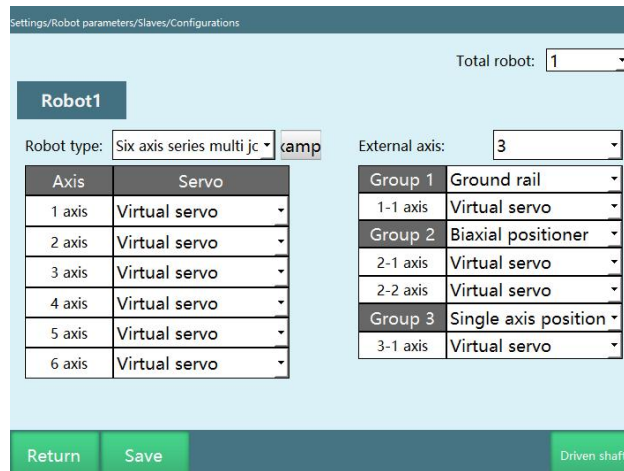
In the slave axis setting interface, you can set the number of slave axes and the slave axis servo

3. Configure the serial port analog IO type and the number of virtual IO in "Settings-IO-IO configuration", no settings are needed for normal EtherCAT IO;

Settings/IO/IO configuration

Current num   2   No virtual IO

IO board 1 model:SIMU_I(4

IO board 2 model:SIMU_I(

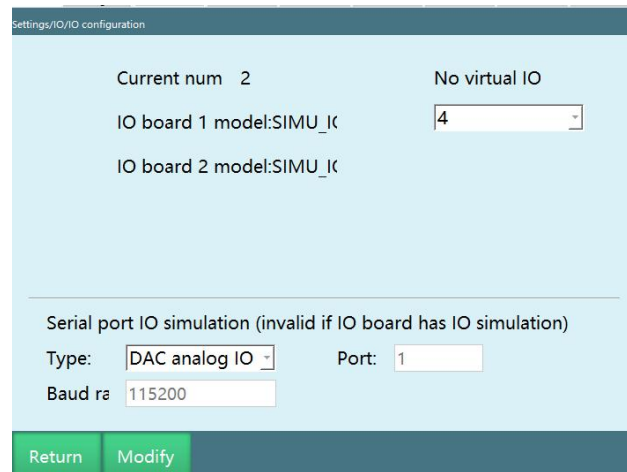Serial port IO simulation (invalid if IO board has IO simulation)

Type: DAC analog IO ▾   Port: 1

Baud ra 115200

Return   Modify

Note: The ENI file is slightly different when using HUATAI IO

4. Restart the system (After the robot configuration is modified, it will take effect after restarting);

Settings/System setting/More setting

Factory reset   Clear job   Restart   elete databas

Return
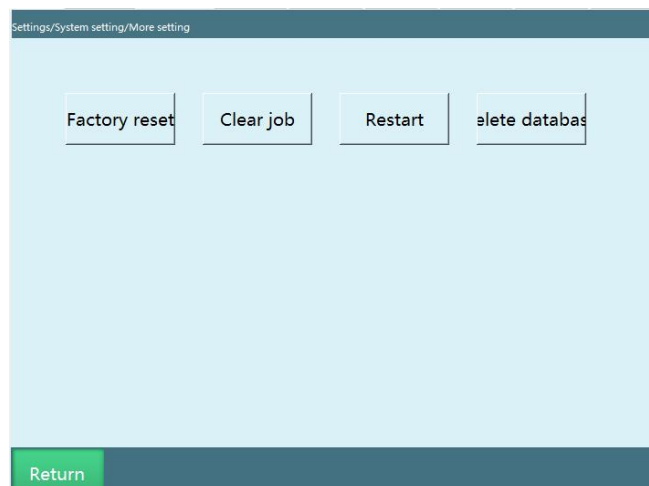
5. In the "DH parameters" interface, we provide "Preset robot" function. If this drop-down list contains the robot model you are using, you can use this function to set up the parameters of the robot quickly and easily.

6. Select the robot coordinate system according to the actual assembly (ceiling mounting: Cartesian coordinates, tool coordinates, user coordinates; same operating habits as floor mounting)
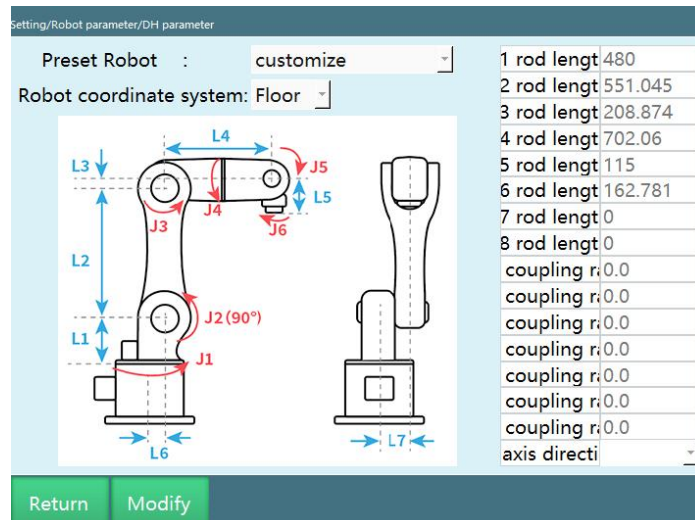
7. Click [Preset robot] in the upper left corner of the "DH parameters" interface, you can select the robot model that has been adapted, and the DH parameters and joint parameters of the robot will be automatically filled in after selection.

8. You need to modify the zero point manually after selecting the preset robot.

9. If your robot is not listed in this option, please follow the steps below to fill in the parameters manually;
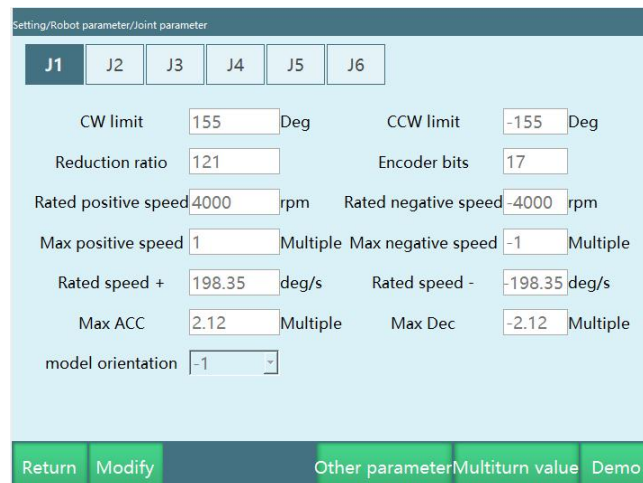
10. Fill in the parameters in "Settings-Robot parameters-Joint parameters", and set the limit of each joint to (-3000, 3000); (Please jog each axis of the robot individually to check whether the positive direction of each axis of the robot is correct!)

L4

J5
downward

L3=0

J4 anticlockwise

J3 upward

L5

J6 clockwise
（top view）

L2

J2（90°）upward

L1
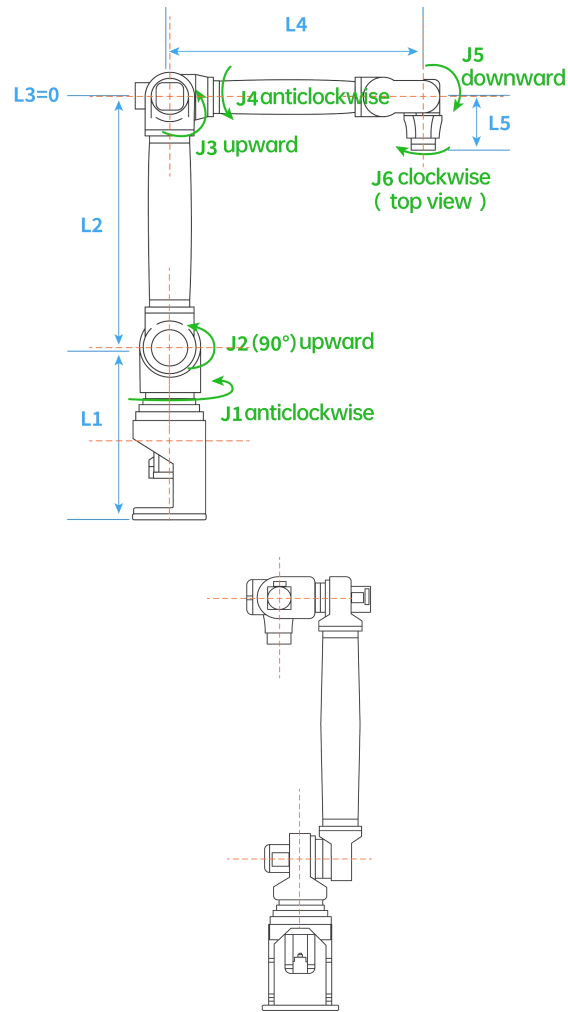
J1 anticlockwise

Robot Type	Axis	Positive direction
6-axis	J1	anticlockwise
	J2	upward
	J3	upward
	J4	anticlockwise
	J5	downward
	J6	clockwise

4-axis SCARA	J1	anticlockwise
	J2	anticlockwise
	J3	upward
	J4	clockwise
4-axis palletizing	J1	anticlockwise
	J2	upward
	J3	upward
	J4	anticlockwise
4-axis joint	J1	anticlockwise
	J2	upward
	J3	upward
	J4	upward
5-axis joint	J1	anticlockwise
	J2	upward
	J3	upward
	J4	anticlockwise
	J5	downward

2-axis SCARA	J1	anticlockwise
	J2	anticlockwise
3-axis SCARA	J1	anticlockwise
	J2	anticlockwise
	J3	downward
single-axis	J1	anticlockwise
4-axis SCARA special-shaped	J1	upward
	J2	anticlockwise
	J3	anticlockwise
	J4	clockwise

11. Set the robot zero point in "Settings - Robot parameters - Zero position". If the zero position of the robot is axis 5 vertically downward, please select "90º" for "Axis 5 direction" in the last line of the "DH parameters" interface. If it is horizontal, then select "0º" for "Axis 5 direction" in the "DH parameters" interface;

12. Set the joint limits of each axis according to the actual operating environment in "Settings - Robot parameters - Joint parameters".

13. Fill in the "Settings - Robot parameters - Joint parameters" according to the actual parameters of the robot, where the acceleration and deceleration can be set to 4-6 times the maximum positive and negative speed;

14. Check whether the parameters in the "Cartesian parameters", "Jog speed", and "Motion parameters" interfaces are correct.

System settings

This chapter will mainly introduce how to check and upgrade the software version, set the system date and time, and set the controller IP.

Make a U disk in FAT32 format

To upgrade programs, import and export parameters and procedures in this system, a U disk in FAT32 format is required. The steps to make a U disk in FAT32 format are as follows:

1. Prepare a computer and a U disk, please note that the production process will empty all the contents of the U disk, this is an irreversible step, so please back up the contents of the U disk;

2. Insert the U disk into the USB port of the computer;

3. Open "My Computer" on your computer or "This PC" interface in Windows 10 system;
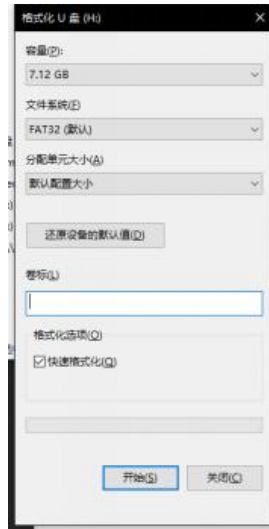

4. At this point there should be a U disk drive letter , if not, please re-plug the U disk, if it still does not appear, please replace the U disk;

5. Right-click the drive letter and click "Format" in the menu that appears;

6. The settings in the pop-up interface are as shown below;

7. Click the [Start] button and click the [OK] button in the confirmation box that pops up;

8. When the "Format Complete" window pops up, the U disk in FAT32 format is created.


Version check and upgrade

In the "Settings-System settings-Version upgrade" interface, you can check the software version of the teach pendant and the controller, and upgrade the teach pendant software.

The steps for upgrading the teach pendant software are as follows:

1. Put the upgrade file (.zip format, no unzip required, and no special characters such as brackets in the file name) into the root directory of the U disk, (the U disk must be in FAT32 format) and insert the U disk into the USB port of the teach pendant.

2. Click the [Detect upgrade] button under [Settings] - [System settings] - [Versions and upgrades].
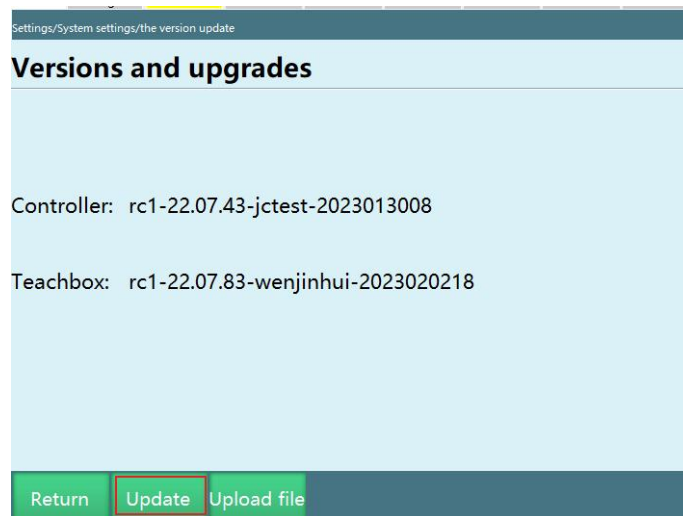
3. Select the automatically detected upgrade file from the list.

4. Click the [OK] button.

5. After successful upgrade, the teach pendant will restart automatically, and the upgrade will be successful after restarting.

Upload file

To upload a file such as an ENI file to the controller, follow these steps:
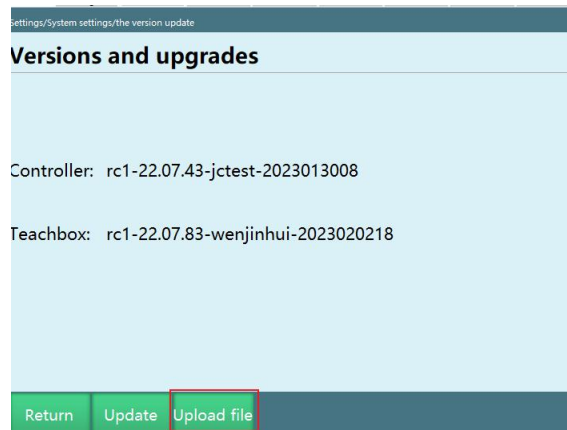
1. Prepare a computer and a U disk;

2. Create a new folder named "upgrade" in the U disk;

3. Put the files to be uploaded into the "upgrade" folder;

4. Insert the U disk into the USB port of the teach pendant;

5. Open "Settings - System settings - Version upgrade" interface;

6. Click the "Upload file" button;

7. Select the file you want to upload from the detected files pop-up and click the "OK" button.

System date and time setting

You can set the system date and time in the "System settings" interface.

The specific steps are as follows:

1. Open the "Settings - System settings - Time setting" interface.

2. Click the [Modify] button.

3. Select the year, month, day, hour and minute in the date and time setting.
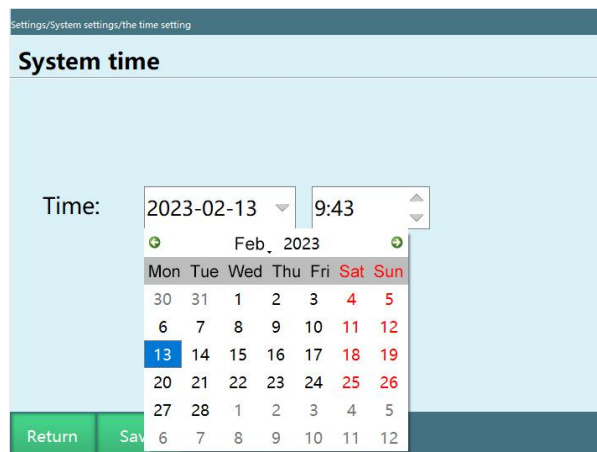
4. Click the [Save] button.

IP setting

- You can modify the controller IP, teach pendant IP, and the IP to which the teach pendant is connected in the "Settings - System settings - IP setting" interface.

- Please do not modify the IP under unnecessary circumstances, so as not to cause malfunctions.

- If you modify the controller IP to a non-default value (192.168.1.13), please record the IP of the controller by yourself.

- The teach pendant connection IP is used for switching when one teach pendant is connected to multiple controllers at the same time.

- The "Reset network configuration" function is only available for T20.

- The specific steps to modify the current connection IP are as follows:

1. Click [System settings] - [IP setting].

2. Click the [Modify] button corresponding to "Connection IP".

3. Modify it to the required IP address and it will take effect immediately.

4. Modify the "Connection IP" to the IP filled in step 3.

The specific steps to modify the IP of the current controller are as follows:

1. Click [System settings] - [IP setting].

2. Click the [Modify] button corresponding to "Modify controller IP".

3. Modify it to the required IP address and it will take effect immediately.

4. Modify the "Connection IP" to the IP filled in step 3.

The specific steps to modify the IP of the teach pendant are as follows:

1. Click [System settings] - [IP setting].

2. Click the [Modify] button corresponding to "Teach pendant IP".

3. Modify it to the required IP address, and restart the teach pendant to take effect.

4. Modify the "Connection IP" to the IP filled in step 3.

Export program
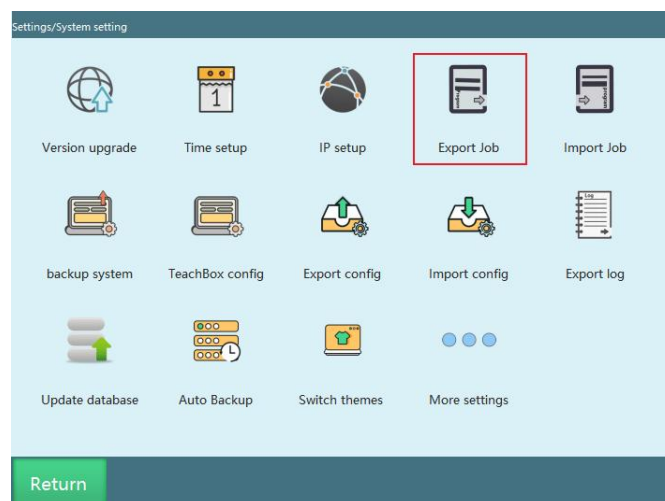
Click the [Export program] button in the "System settings" interface to export the program to a U disk.

The specific steps are as follows:

1. Insert the U disk (must be in FAT32 format) into the USB port of the teach pendant.

2. Click [Settings] - [System settings] - [Export program].

3. The exported programs are separated by date and type. Export the program to the "robotJobxx-xx-xx-xx (current date and time)" directory in the root directory of the U disk.

Import program

Click the [Import program] button in the "System settings" interface to import the program into the teach pendant.

The specific steps are as follows:

1. Create a new folder named "robotJobxxx (digital)" in the U disk, and create a new folder named "R1" in this folder;

2. Put the program with the suffix ".JBR" in the R1 folder;

3. Insert the U disk (must be in FAT32 format) into the USB port of the teach pendant;

4. Click [Settings] - [System settings] - [Import program];

5. The system will pop up all the relevant directories in the U disk, select the directory of the program you need to import, then R1-R4 will be displayed according to the number of robots configured on the actual teach pendant, the corresponding robot job files in the U disk will be displayed in the white dialog box below, click [Select All] to select all robot job files, or you can customize the files you need and click [OK] to import the job files.

One-click backup system

Click the [One-click backup system] button on the "System settings" interface to back up all related files such as job files, teach pendant program, controller program, robot configuration to a U disk at one time.

The specific steps are as follows:

1. Insert the U disk into the USB port of the teach pendant.

2. Click [Settings] - [System settings] - [One-click backup system].

Modify teach pendant configuration

Click the [Modify teach pendant configuration] button in the "System settings" interface to modify some function parameters saved on the teach pendant.

The specific steps are as follows:

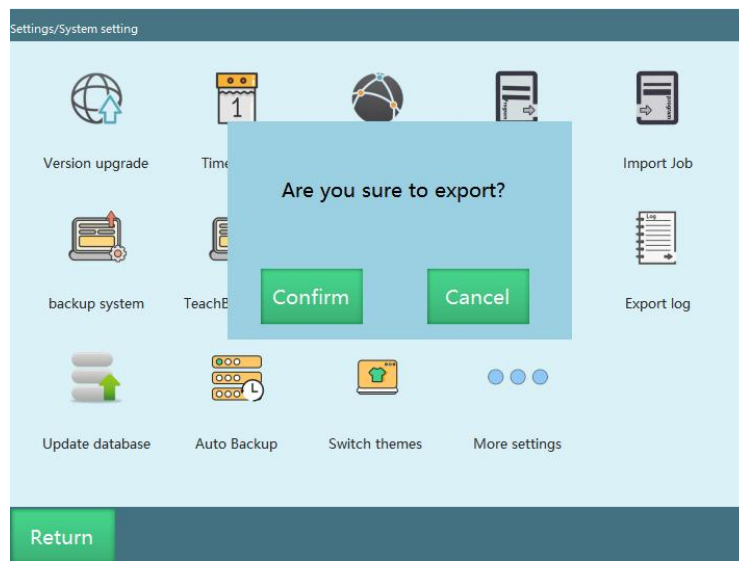Click the "Modify" button, modify the parameters, and click "Save"

Export controller configuration

Click the [Export configuration parameters] button in the "System settings" interface to export the controller configuration parameters to a U disk.

The controller configuration parameters save configuration parameters such as robot, IO, external axis, and process parameters.

The specific steps are as follows:

1. Insert the U disk into the USB port of the teach pendant.

2. Click [Settings] - [Export configuration parameters] button.

3. Click the [OK] button.

4. Wait for the export operation to complete.

Import controller configuration

Click the [Import configuration parameters] button in the "System settings" interface to import the local configuration parameters into the teach pendant.

The specific steps are as follows:

1. Insert the U disk into the USB port of the teach pendant.

2. Click [Settings] - [Import configuration parameters] button.

3. The system will pop up all the relevant directories in the U disk, select the directory of the program you need to import, and the configuration file of the corresponding robot in the U disk will be displayed in the white dialog box below. Click the configuration file of the desired robot and then click [OK] to enter the detailed configuration parameters selection interface, you can select all or the required configuration parameters. Click the [OK] button.

4. Wait for the import operation to complete.

Export log

The export of the log involves the teach pendant log and the controller log;
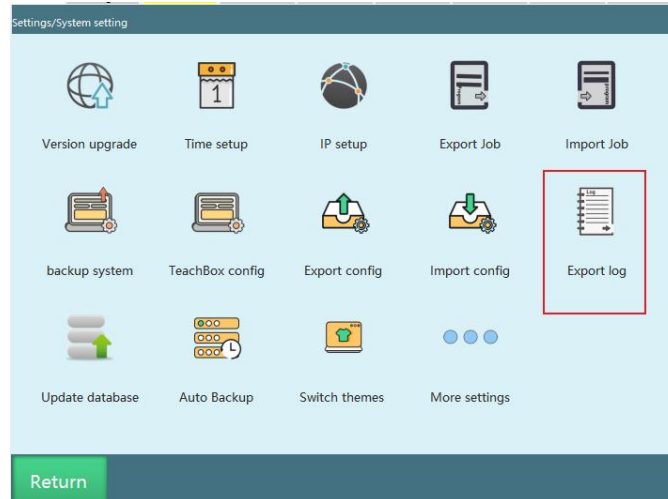
Click the [Export log] button in the "System settings" interface/[Export] button in the "Log" interface to import the log, crash logs, robot parameter configurations and job files to the U disk. *The controller log is the most commonly used when we look for the cause of robot errors. The specific steps are as follows:

Insert a U disk in FAT32 format into the USB port of the teach pendant;

Enter the "Settings - System settings" interface/"Log" interface of the teach pendant;

Click the [Export controller log] button in the "System settings" interface/the [Export] button in the "Log" interface, you can choose to export 5/30/100/500 logs;

After the export is complete, there will be four folders in the U disk. The controller logs, configuration, job files and the crash log (dumplog) generated by the program when it crashes are saved in the "controllerLogs-current date and time", "configFile-version information-current date and time", "robotJob-current date and time" and "dumplog-current date and time" directories of the U disk respectively; the logs of the teach pendant are saved in the teachbox.db file in the "controllerLogs-current date and time" directory.

Language change

The language of instructions and interface of this system can be switched between Chinese, English and Korean respectively. To switch the language, please follow the steps below:

1. Enter the "Settings - System settings - Modify teach pendant configuration" interface;
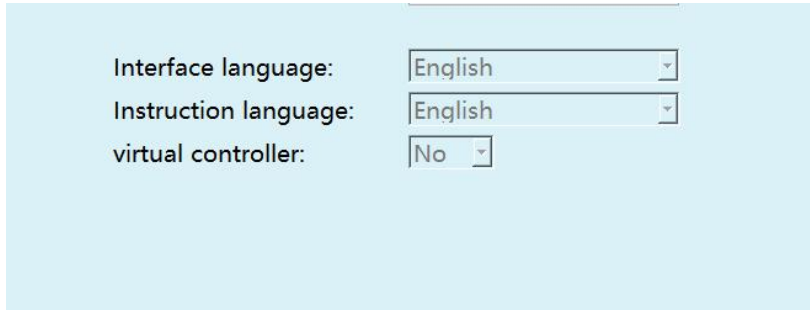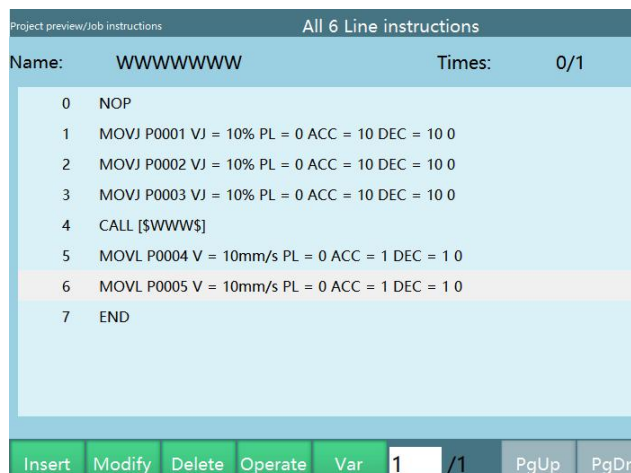
2. Click the "Modify" button;

3. Select the required instruction language or interface language;

4. Click "Save". After saving, the instruction language takes effect immediately, and the interface language requires a reboot to take effect.
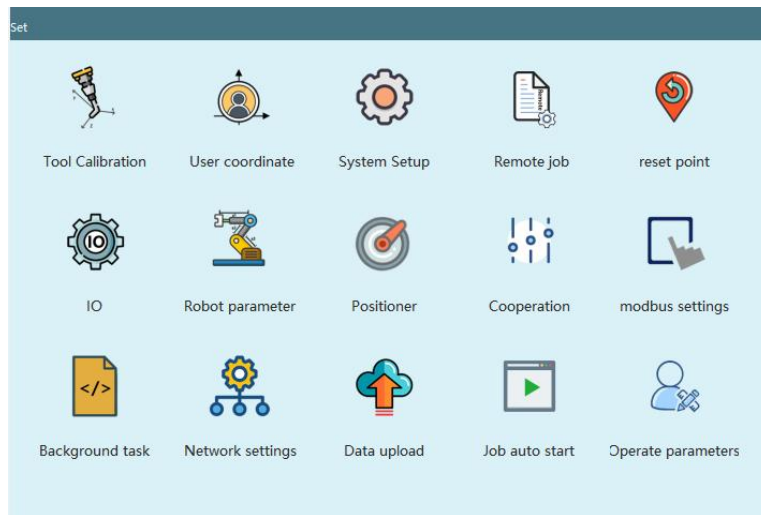
Chinese instruction

English instruction

Chinese interface

English interface

Korean interface

Database upgrade

It is used to upgrade the config.db file, which saves the configuration of the teach pendant, such as ip, some parameters in the operation parameters, etc.

Import/export ENI

When the robot eni file does not exist, it is necessary to import the eni file. When importing ENI, it is necessary to ensure that there is an eni file under the USB disk.

1. Create a new upgrade folder in the U disk, and upload the eni file to the upgrade folder.

2. Insert the U disk into the USB interface of the teach pendant.

3. Click [Settings] - [Robot parameters] - [Slave configuration] button.

4. Click [Import ENI] and select the ENI file to be imported in the USB disk directory to directly import it.

5. Wait for the import.

[Export ENI] is used to export the eni used by the current system. When you are ready to replace a new eni or replace the controller, you can use this function to export the eni in use and make a good backup. To import/export eni, please follow the steps below:

1. Insert the USB disk into the USB port of the teach pendant.

2. Click [Settings] - [Robot parameters] - [Slave configuration] button.

3. Click [Export ENI] to start the export work directly.

4. Wait for the export.
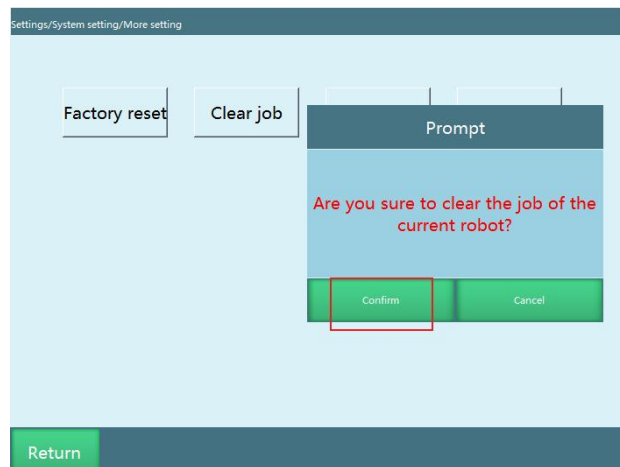
Clear program

The "Clear program" function can clear all the programs in the system at one time, which is used when there are many useless programs.

The clear steps are as follows:

1. Enter the "Settings - System settings - More settings" interface;

2. Click the "Clear program" button;
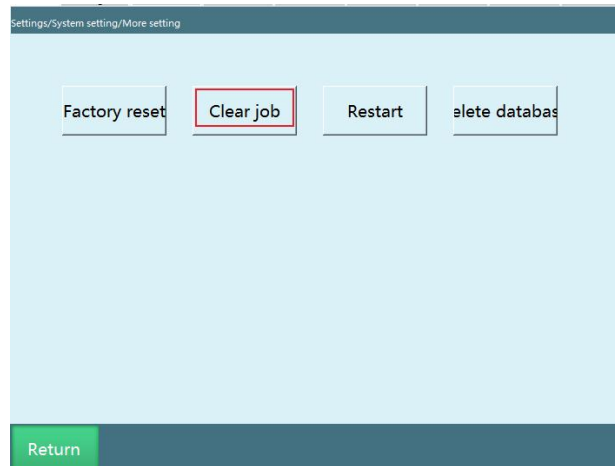
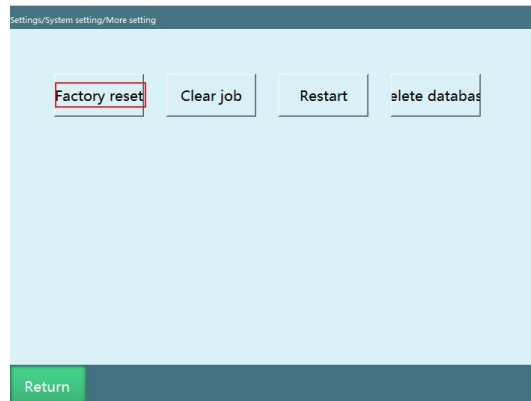3. Click the "OK" button in the pop-up dialog box.
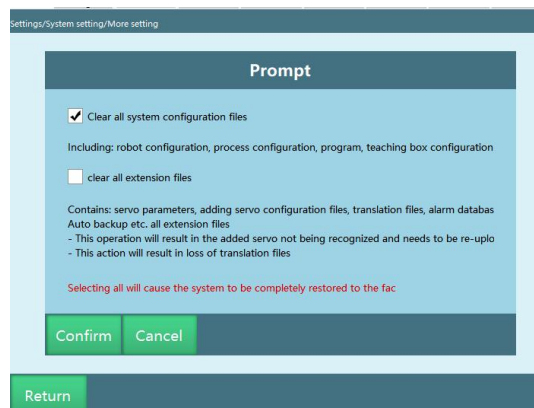

Restore factory settings

Restoring factory settings will clear all robot parameters and programs, so please be careful! Please be sure to back up all parameters and program files before performing this operation!
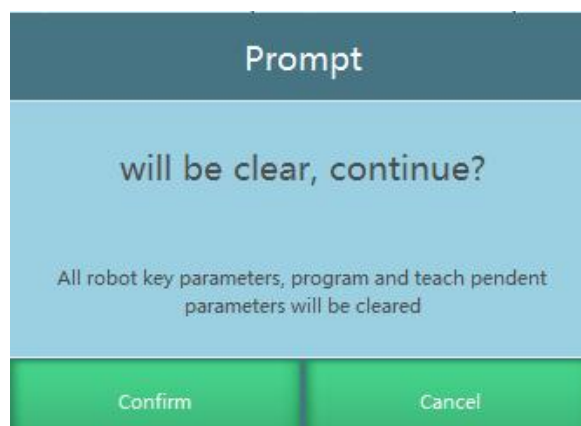
The steps are as follows:

1. Enter the "Settings - System settings - More settings" interface;

2. Click the [Restore factory settings] button;

3. There are two options in the pop-up prompt window, which can clear the system configuration files and all extension files. You can choose the configuration file you want to clear.

4. Click the [OK] button and the selected configuration files will be restored to its factory settings.


Delete database

Function: After clicking, the database of the teach pendant will be deleted, which generally contains information on the user side, the created user and all passwords will be reset, the connection controller IP will be reset, the currently set voice will be reset, and the color theme of the teach pendant will be reset.

The steps are as follows:

1. Enter the "Settings - System settings - More settings" interface.

2. Click the [Delete database] button.
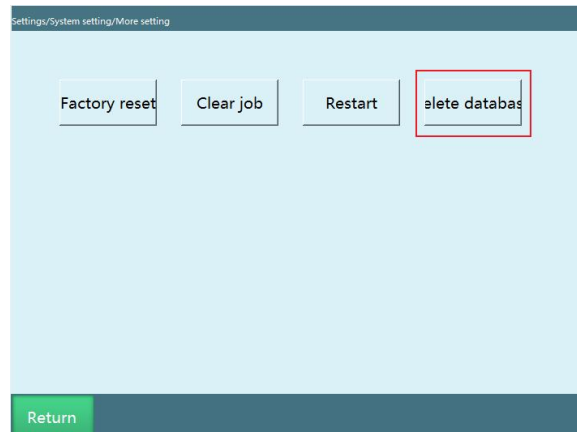
3. Click the [OK] button and the data will be reset.
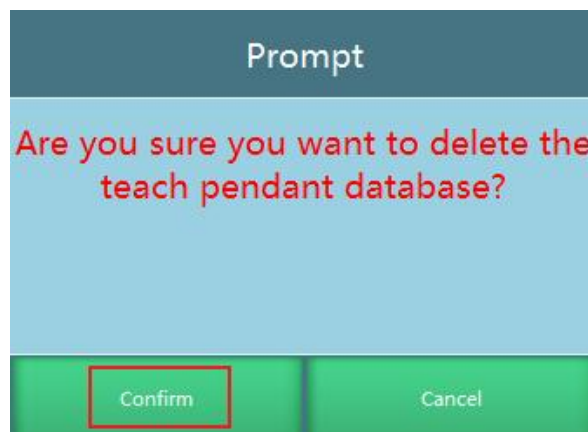
Screen calibration

The screen calibration function is available for the T30 teach pendant.

The steps are as follows:

1. In the power-on state, press the left [O] + middle [Coordinate] + right [STOP] physical buttons at the same time, and the teach pendant will pop up a message, prompting "Calibration file has been deleted, restart the teach pendant to take effect", restart the teach pendant manually to enter the calibration interface.

2. Follow the example and click on the cross center of each of the 1-5 points with the stylus to complete the calibration.
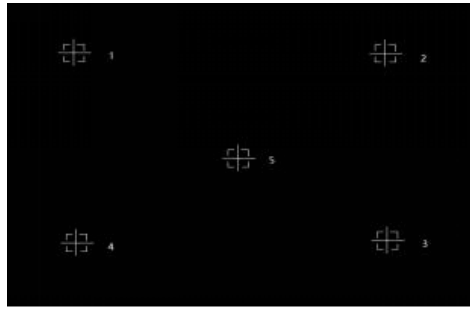
Automatic backup

Controller automatic backup function

Backup content: program, parameter, software (nrc.out)

Number of backups: maximum 10, the newest replaces the oldest

Backup naming: by prerequisite, version, time

Example: If you modify parameters at 13:10 on September 10, 2020, then the backup name will be "parameter-20.04-3.3.7-202009101310"

Prerequisites for triggering backup: power on, parameter modification, program modification, upgrade

Backup frequency:

Back up once if the version and parameters are confirmed to be normal when starting up;

Back up once if the parameters are not modified again within 5 minutes after the parameters are modified;

Back up once if the program is not modified again within 5 minutes after the program is modified (insert instruction, modify instruction);
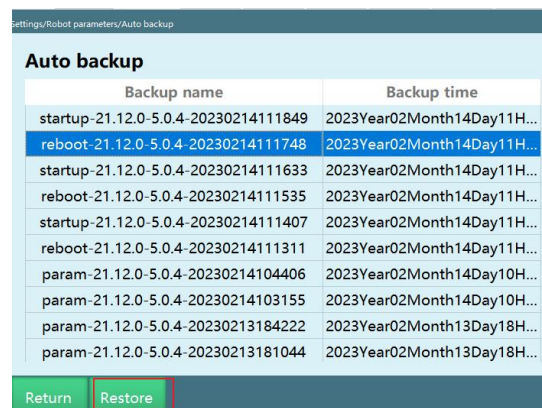
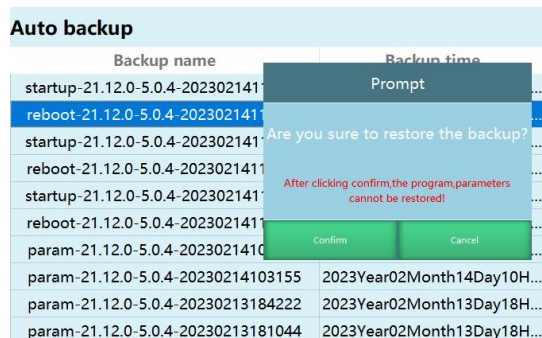Back up once before upgrading

Backup restore method

1. Select the backup you want to restore, the cursor will be displayed after selection
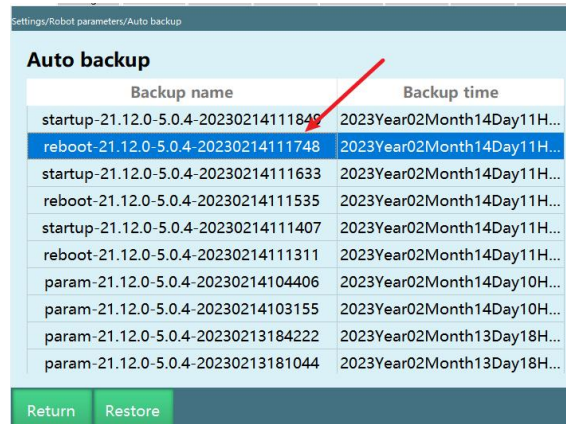
2. Click the "Restore backup" button.

3. A pop-up prompt will appear, click "OK".

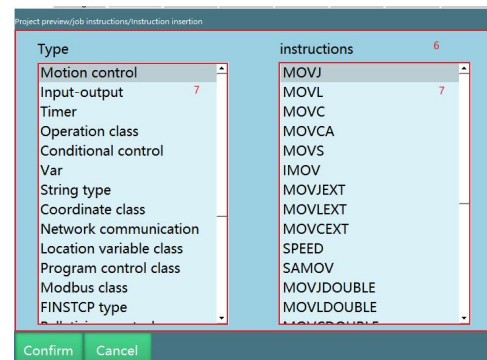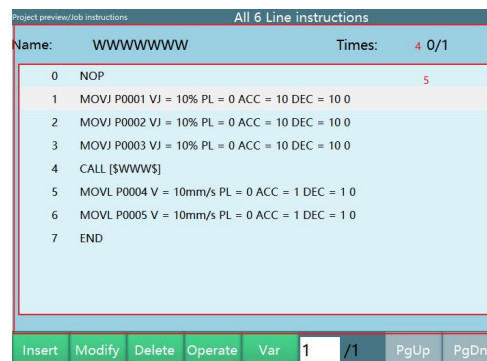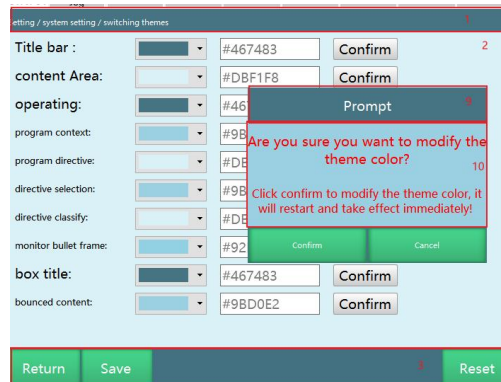4. Please do not power off during the restoring process.

Switch topics

Customize the background color of different areas (suppporting RGB).

After setting, the teach pendant needs to be restarted to take effect. Click "OK " after modification, and the teach pendant will restart automatically. For the PC version, you need to manually restart the teach pendant.

1. Title bar

2. Content area

3. Operation area

4. Program background

5. Program instruction background

6. Instruction selection background

7. Instruction selection classification background

8. "Monitor" pop-up box

9. Pop-up box title

10. Pop-up box content

› Operation parameters

This chapter will mainly introduce the usage and precautions of each parameter in the operation parameters.

Reservation mode

The reservation mode uses digital IO to control the running of programs. This mechanism is to set (reserve) in advance the programs to be started by IO and their running times and number them in the remote mode. After switching to the remote mode, sort the set programs by the IO signals. After pressing the "Run" button, the programs will be running according to the scheduled order and the running times. After all programs have been run, the operation stops. If you want to run again, you need to resort the programs.

If you need to make a single program run in an infinite loop, then set the running times of the program to 0 when making a reservation.

Enable description

When the "Reservation mode" is turned on, the operation process is: trigger remote IO program 1 signal → trigger start signal → robot running; if remote IO program 2 signal is triggered at this time, remote IO program 2 will be queued up, and remote IO program 2 will be executed after remote IO program 1 is executed.

When the "Reservation mode" is turned off, the operation process is: trigger remote IO program 1 signal → robot running; if remote IO program 2 signal is triggered at this time, it is invalid; you can run remote IO program 2 only after executing remote IO program 1.

Remote mode IO control is in reservation mode when turned on, and in non-reservation mode when turned off

The default is on

Setup steps

The steps of the reservation process are as follows:

1. Go to "Settings - Remote program settings";

2. Set 5 reserved programs and the running times;

3. Set the function of each IO input port in the "Settings-Remote program settings-Robot 1-Remote IO function", wherein program 1-program 5 correspond to the sorting function of the five programs in the "Remote program settings" interface;

4. Switch to remote mode;

5. Give the IO corresponding to the program serial number a high level for 2 seconds (set to active high) and release it, the program will enter the queue;

6. After the sorting is completed, if you want to cancel the sorting of a program, then give the IO corresponding to the program serial number a high level for 2 seconds again (set to active high) and release it;

7. Give the IO port corresponding to the program start signal a rising edge (set to active high) and the system starts running according to the running times of the programs in the queue;

8. You can also sort and cancel the queue during operation.

*If you turn on the "Run on reservation" switch, the first reserved program will start running as soon as it is reserved

*After the "Reservation mode" is turned off in the "Settings-Operation parameters", there is no reservation queue in the remote mode, and only one program can be run at the same time

Disable "Return to zero" button

Turn on to disable the "Return to zero" button

The default is off

Process selection

You can set general process, special process, palletizing process, welding process, cutting process

The default is general process

Disable wheel button

Turn on to disable the wheel button

The default is off

Switch to run mode for automatic power on

Turn on to switch to run mode for automatic power on

The default is off

Attitude value

Radian measure, degree measure

The default is radian measure

Remote IO breakpoint execution

Turn on to use breakpoint execution, turn off to not use it

The default is on

Remote IO current line execution

Turn on to use current line execution, turn off to not use it

The default is off

Switch back to user rights after running

Switch to operator privileges at the set time during running.

The default value of the parameter is 0, which means no switching.

Joint actual direction

After turning on, the robot and external axis joint parameter setting interfaces will display the joint actual direction parameter.

The default is off.

Switch to remote mode without teach pendant

After turning on, triggering the remote IO control signal will automatically switch to remote mode when the teach pendant is not connected

The default is on.

Reserve again while the remote IO program is running

After turning on, the reserved program can be reserved again during running;

After turning off, the reserved program cannot be reserved again, only the program in "reserved" and "unreserved" status can be reserved

The default is on.

Step/return to zero/reset point operation mode

Click to run: press the corresponding button, the robot will perform the corresponding function

Press to run: keep pressing the corresponding button, the robot will execute the corresponding function

Run mode startup default speed

After turning on, this refers to the initial speed set by the system every time you turn on the system and switch to the run mode

Synchronize operation modes when connecting controller

Function: Synchronize the operation modes when the controller and the teach pendant are connected for the first time

Follow controller: When the controller and the teach pendant are connected normally, the teach pendant will follow the mode sent by the controller

Follow mode knob: When the controller and the teach pendant are connected normally, switch the operation modes through the knob

Special case: When the program is running and the teach pendant is reconnected to the controller normally, you can also use the knob directly to switch the modes

Note:

1. After the teach pendant and the controller are reconnected normally, there will be a pop-up prompt: the robot is running, please press the "OK" button to confirm the synchronization. After clicking the "OK" button, the teach pendant will synchronize the knob operation mode

2. Before the pop-up window disappears: **only the OK button, stop button and knob are available, the rest are inoperable**

The default is "Follow controller".

Safety light curtain teach mode invalid

Function: After it is turned on, the safety light curtain limit is shielded in the teach mode, and the alarm can be used normally (default is off)

The default is off

Disable start button in run mode

Function: When turned on, the teach pendant is switched to the run mode, and the run status and physical start buttons cannot be clicked, including the START button of the PC version (default is off)

Note: The START button will also be disabled on the PC version
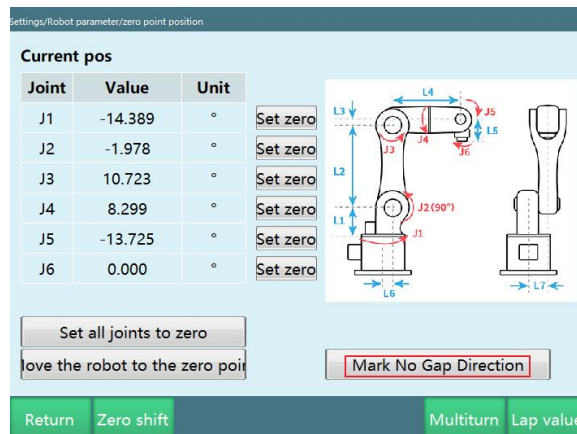
The default is off

NP parameters

Function: Display [Settings] - [Robot parameters] - [NP parameters] when turned on; hide when turned off

The default is off

Display motor coordinate position and calibration button

Function: Display [Settings] - [Robot parameters] - [Zero position] - [Mark no gap direction]

and [Monitor] - [Robot coordinates] - [Motor position] when turned on; hide when turned off

The default is off

Robot log

The system log is divided into teach pendant log and controller log. The teach pendant log mainly stores the log generated by the operations on the teach pendant. The controller log saves all logs of robot operations, parameter modifications, etc.
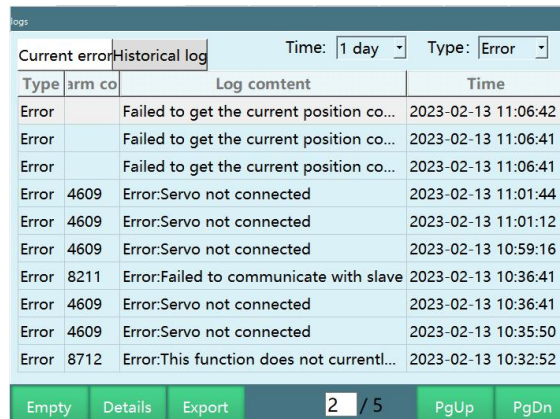
Note: If you want to export logs, please refer to "System settings - Export log".

Teach pendant log view

You can view operation and error logs in the "Log" interface.

The specific viewing steps are as follows:

1. Click [Log] to open the log view interface. If there is no error message, you will directly enter the "History log", otherwise you will see logs of error type by default;
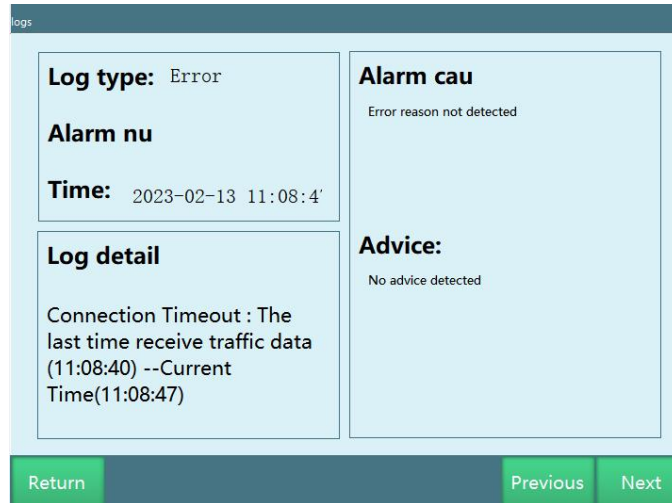

Note: The logs of "Error" type are displayed first when you enter the "Log" interface

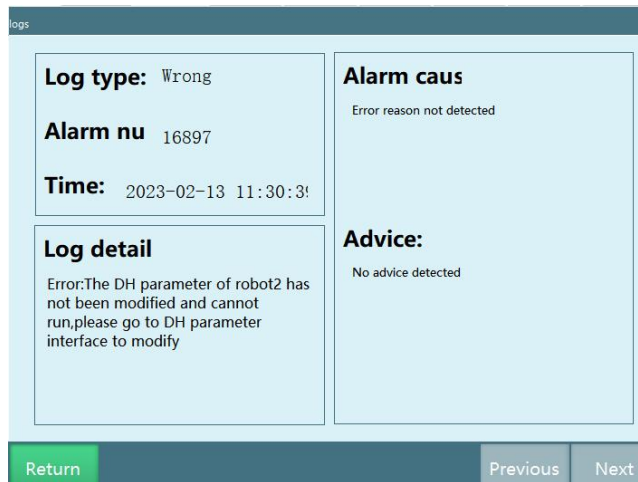If there is currently an error message, click [Log] to enter the "Current error" interface
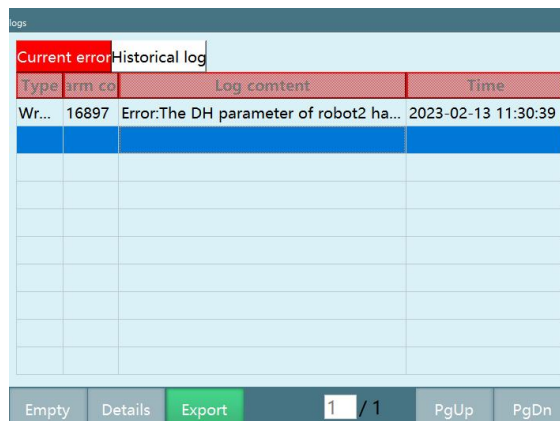
2. Click the "Type" tab above to switch the type of logs to be viewed.

3. After selecting a log, click the [Details] button below to view the log details;
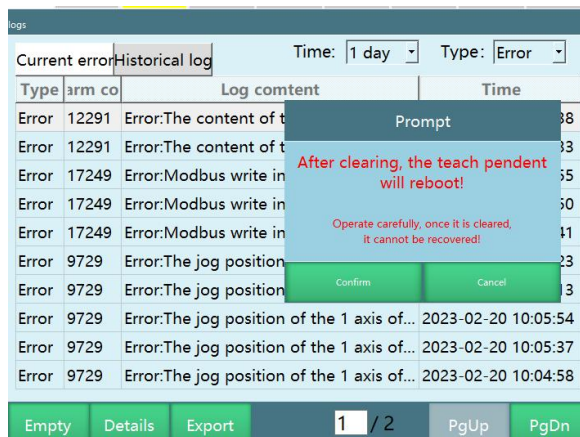
History log details interface:

Current error details interface:

Note: The fault cause and handling suggestions need to be uploaded to the corresponding database

Clear log:

Click the "Clear" button, then there will be a prompt box prompting that the teach pendant will be restarted after clearing and the logs cannot be restored after clearing

Log type

Log type includes "All", "Message", "Operation", "Warning", "Error". We mainly view "operation log" and "error log"

Operation log: This type of log saves the user's basic operations, such as creating a new program, renaming a program, inserting instructions, etc.

Error log: This type of log saves all system error and servo error information, including error code, error time, error type, error content, solutions and other information.

Troubleshooting

Encoder battery undervoltage error

Note: The following operations will cause the zero point to be lost, you must reset the robot points

Steps:

Disconnect the power supply of the controller, control cabinet and other equipment of the undervoltage robot, replace robot batteries by professionals while ensuring safety, after the replacement, reconnect the power supply and start the controller system

After the teach pendant and the controller are started normally, there is still a pop-up box reporting errors

Click the "Clear error" button on the teach pendant, and the "OK" button will appear in the pop-up box

Click the "OK" button to enter the zero calibration interface

After re-calibrating the zero point, it returns to normal

Check all the points that can be used by the program, make sure that the positions of the points are normal, and ensure that the points set in the process are normal

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