XINJE

RX3H-S Series control cabinet

User's Manual

WUXI XINJE ELECTRIC CO., LTD

XINJE

Basic Description

- Thank you for purchasing Xinje Robot products.
- This manual mainly introduces the product information of XR Robot System (XINJE Robot).
- Before using the product, please read this manual carefully and use it with a full understanding of its contents.
- Please deliver this manual to the end user.
- This manual introduces the installation, various functions, and maintenance of the XINJE Robot operating system, making it easy for users to understand and use the XR operating system to control the robotic arm.

Applicable objects

- Customer
- Sales Engineer
- Installation and testing engineer
- technical support engineer

Ways to obtain the manual

- Electronic manual
- Log in to the official website of Xinje www.xinje.com to download.

Responsibility Statement

- Although the content in the manual has been carefully checked, errors are inevitable and we cannot guarantee complete consistency.
- We will regularly check the content of the manual and make corrections in subsequent versions. We welcome valuable feedback.
- The content introduced in the manual is subject to change without prior notice.

Contact information

If you have any questions about the use of this product, please contact the agent or office where you purchased the product, or you can directly contact Xinje Company.

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- Hotline: 400-885-0136
- Fax: 0510-85111290
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List of XR product related manuals

Manual Name	Description
User Manual for RX3H-S Series Control Cabinet (this manual)	This manual introduces the installation method of the RX3H-S series four axis robot system control cabinet, as well as the specifications and functions of each part of the entire control system. It details the steps from unboxing to installation and subsequent maintenance of the entire system, ensuring that users can complete the installation of the system.
RX3-A6 Series Control Cabinet Manual	This manual introduces the installation method of the RX3-A6 series six axis robot system control cabinet, as well as the specifications and functions of each part of the entire control system. It details the steps from unboxing to installation and subsequent maintenance of the entire system, ensuring that users can complete the installation of the system.
XR Universal Robot System V4.0 User Manual	This manual aims to help users quickly understand the basic functions and usage methods of the XR system. The content includes product introduction and basic operation guide. By combining text and images, explain in detail how to operate the robot correctly to ensure that users can fully utilize its functions. Both beginners and experienced users can obtain practical operation guidance from this manual.
XR Universal Robot System V4.0 Instruction Manual	This manual provides a detailed list of all instructions supported by the robot and their usage methods, suitable for developers or advanced users. The content includes instruction syntax, parameter descriptions, example code, etc. Through this manual, users can gain a deeper understanding of the robot's command content and meet specific needs.
XR system warning codes and error codes	This manual provides all possible error codes and their solutions for robots. Each error code is accompanied by a description, including the cause of the error, handling, and solutions. Users can quickly locate problems and take corresponding measures through this manual to ensure the normal operation of the robot.
Robot Body Manual	This manual provides a detailed introduction to the hardware structure, technical specifications, and maintenance methods of the robot. The content includes functional descriptions, installation guides, and connection methods for each component. Through this manual, users can gain a deeper understanding of the hardware design of robots, master correct maintenance and upkeep techniques, and extend the service life of equipment.

April 2025

Safety precautions

Before using this product, please read this section carefully and operate it after fully understanding the product's usage, safety, precautions, and other related information. Please wire the product correctly while paying close attention to safety.

The potential issues that may arise during the use of the product are basically listed in the safety precautions, and are all indicated in two levels of caution and danger. For other matters not covered, please follow the basic electrical operating procedures.

	Notice	When used incorrectly, it may pose a danger and result in moderate or minor injuries, as well as potential property damage.
	Dangerous	Misuse may cause danger, personal injury or serious injury, and serious property damage.

Product Confirmation Attention

1. Do not install damaged electrical cabinet, electrical cabinet with missing parts or electrical cabinet with unqualified model

Precautions for storage and handling

1. Do not place or store in a place with direct sunlight, ambient temperature exceeding (safety-placement) temperature condition/relative humidity exceeding (safety-placement) humidity condition/large temperature difference/condensation.
2. Do not store and handle the equipment in the place with corrosive and combustible gas and much dust.
3. Do not store or handle the equipment in a place where strong vibration or shock may be transmitted directly to the electrical cabinet.
4. It is strictly forbidden to hold only the control cabinet cables during handling.

Precautions for installation

1. Flammable gas shall not be placed nearby, or fire may occur.
2. Please be sure to follow the installation direction requirements to prevent electrical cabinet failure.
3. It is strictly forbidden to expose this product to the places with moisture, corrosive and flammable gases, otherwise it will cause electric shock and fire hazards.
4. Before installation, be sure to disconnect the power and confirm that the power indicator is off to prevent

electric shock.

5. Do not directly touch the conductive part of the product, which may cause malfunction, failure, or even electric shock.

Wiring precautions

1. Please correctly connect AC220V power supply to special power socket of electrical cabinet
2. Do not connect the three-phase power supply to the power supply.
3. Please connect the ground wire correctly. Bad grounding may cause electric shock. Use 2mm wire to ground the electrical cabinet.
4. Please lock the fixing screw of the terminal; otherwise, it may cause fire.
5. Before wiring the electrical cabinet, be sure to disconnect all external power supplies.
6. For wiring, please ensure that the encoder wire, power wire and Teach Pandent cable are in loose state and not tightened to avoid cable damage.

Precautions for operation

1. Do not place the electrical cabinet in the motion range of the robot to prevent injury.
2. During the test run, in order to prevent accidents, please test run the robot at low speed; otherwise, it may cause personal injury.
3. When the robot body is connected, please set appropriate parameters before operation, or the machine may be out of control or faulty.
4. Do not touch the radiator during operation, as there is a risk of being burned.
5. Do not change the wiring when it is electrified, which may cause injury.
6. Do not switch the power supply frequently. If the power supply is required to be switched on and off repeatedly, it shall be controlled within 2 minutes once. Otherwise, the charging resistance of the driver in the electrical cabinet may be damaged. As the relay is energized before being switched on and off frequently, tripping may be caused.

Inspection and maintenance

1. The power supply shall be turned on and off by professionals.
2. Gasoline, acid, thinner and alkaline detergent shall not be used to avoid damage or discoloration of the shell.
3. If the drive needs to be replaced, please transfer the parameters of the original drive to the new drive and then restart the operation; otherwise, it will cause mechanical damage or even personal injury.
4. It is forbidden to change the wiring when it is electrified; otherwise, it may cause electric shock or injury.
5. Do not remove the servomotor during operation, otherwise electric shock or injury may occur.
6. Do not touch the inside of the servo driver and the servo motor during operation; otherwise, electric shock or injury may be caused.
7. Do not touch the terminal blocks within 10 minutes of power off, otherwise residual voltage may cause electric shock or injury.

Attention to wiring

1. Do not lay or bind the power line and control signal line in the same pipe, so as to avoid signal distortion, equipment malfunction or communication interruption caused by electromagnetic interference, which will affect the stable operation of the system.
2. The maximum length of signal input line is 3m.
3. Please conduct wiring correctly and reliably; otherwise, it will cause control cabinet failure and personal injury.
4. It is strictly prohibited to use it when the power supply is in poor condition or exceeds the specified voltage change range, otherwise it will cause electrical damage.
5. Please take proper shielding measures in the places with static electricity, strong electromagnetic field, radiation of radiation and nearby power lines.

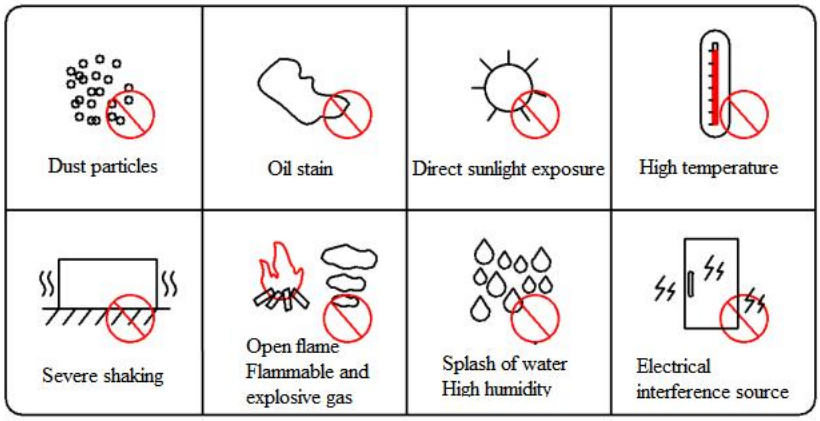
Catalog

1. Install

This chapter describes how to install a robotic system.

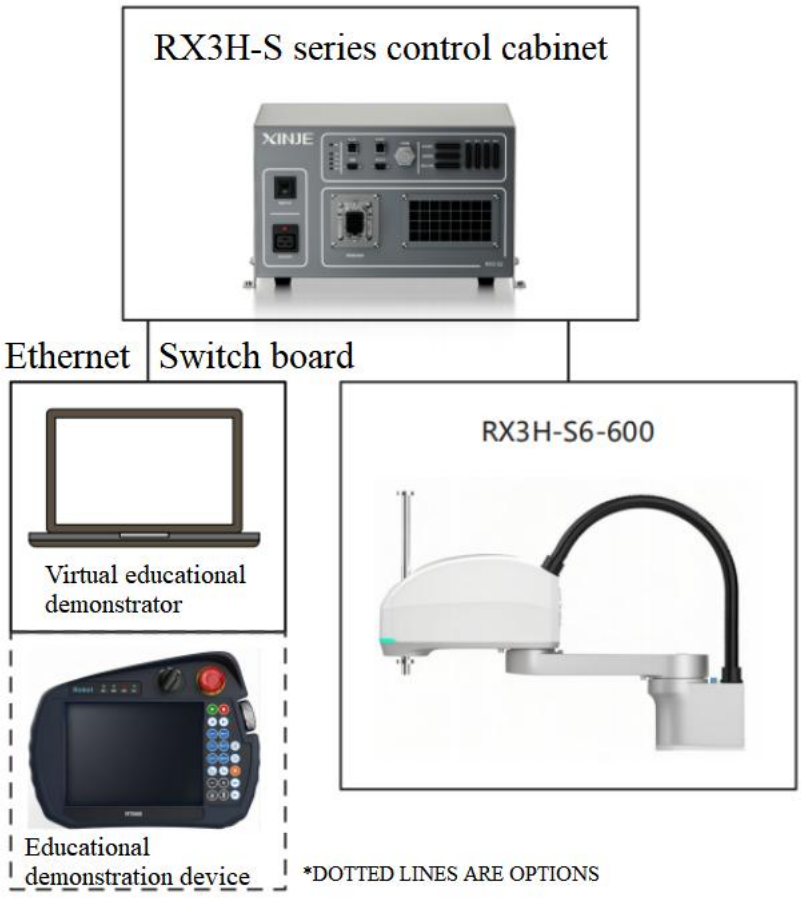
1.1 Installation environment

The installation position shall avoid direct sunlight, splashing water and moisture, and ensure sufficient operation space in front. Regularly clean the equipment in the cabinet, check the status of wiring terminals, switches and contactors, and troubleshoot overheating. At the same time, regularly check the sealing performance of the control cabinet to prevent small animals from entering or internal condensation. Moisture traps or dryers are required in areas with high humidity. In addition, ensure that the installation position is secure and free from deflection or shaking.



1. 2 System composition

RX3H-S series is the robot series of SWRA, taking RX3H-S6-600 as an example to introduce the components of the robot system.



Four-axis robot system consists of virtual demonstrator, control cabinet and mechanical body, optional physical demonstrator.

The virtual Teach Pandent is used to operate the robot to execute actions, editrunning programs, etc; The control cabinet is installed with the electrical equipment required for controllingthe robot, such as driver, PLC controller, IO module, etc; The mechanical body is the actuator in the robotsystem, which completes the controller commands.

Follow the steps in the following sections to complete the installation of the robot system.

1. 3 Open the box

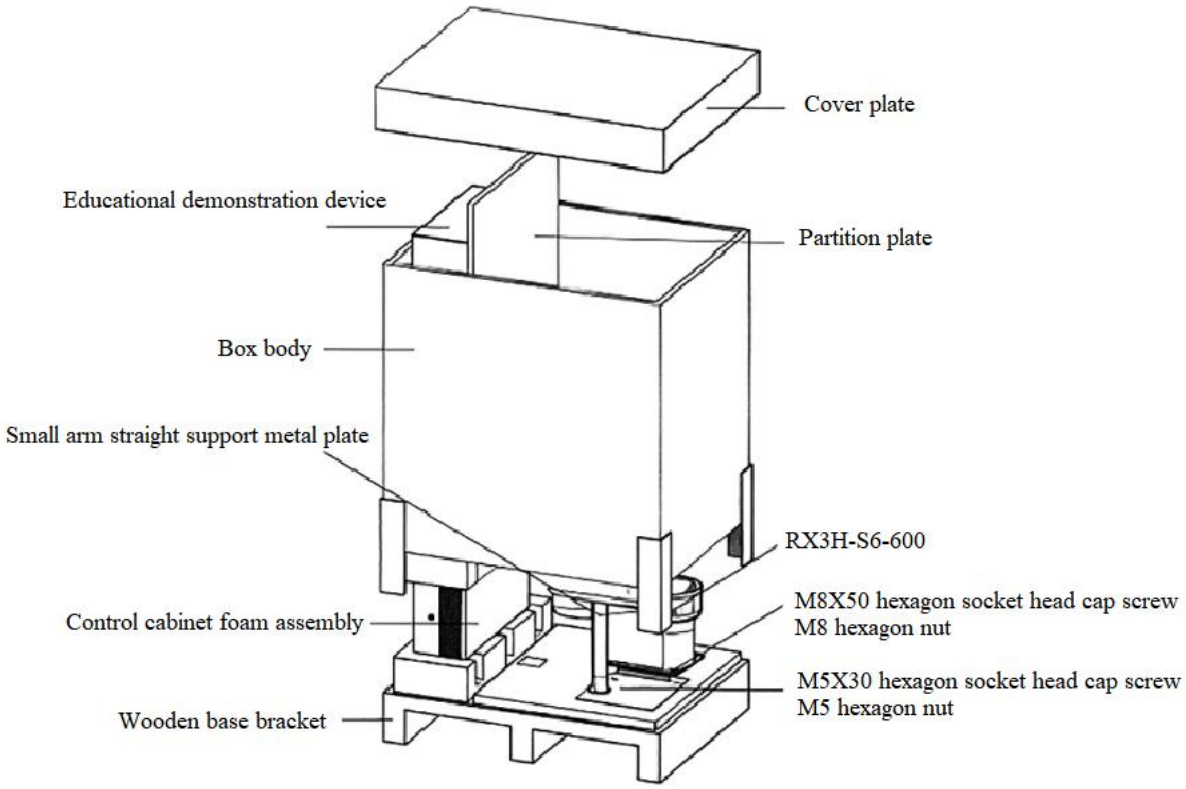
As this product is a precision equipment, special attention shall be paid to its packaging and handling. When handling the control cabinet, it shall not be vibrated or dropped; otherwise, it may cause personal injury or damage to the control cabinet. Do not knock or drop it when unpacking.
Detailed unpacking steps and precautions are as follows:

■ Preparations before unpacking

Project	Explain
Inspect the outer package	Before unpacking, please carefully check whether the outer package is intact and whether there is obvious impact, damage or moisture. If any abnormality is found, please contact the logistics company or after-sales personnel immediately.
means of preparation	Prepare tools required for unpacking, such as scissors, art knife, gloves, etc. to ensure safe and smooth unpacking process.
Confirm the environment	Select an area suitable for the installation environment for unpacking operation.

■ Unpacking steps

1. Remove the cover plate and take the trainer from above;
2. Take out the middle partition, and pay attention to prevent the control cabinet from falling;
3. Take out the control cabinet from above and take out the built-in calcium chloride desiccant;
4. Take out the box, unscrew four M5 × 30 hexagon socket head cap screws connecting the small arm support metal plate with the small arm and the wooden base, and then unscrew four M8 × 50 hexagon socket head cap screws, gaskets and M8 hexagon nuts connecting the RX3H-S6-600 robot and the wooden base, i.e. the robot can be separated from the base. Please avoid inclination of the robot and prevent the robot from toppling due to loose screws during disassembly.



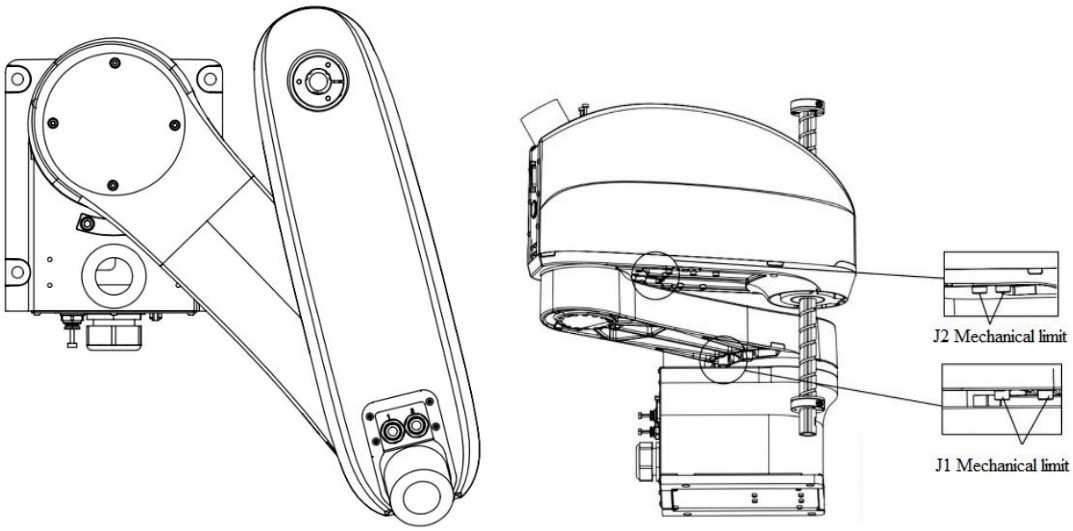
5. Disposal of packaging waste materials: In order to facilitate repacking, please properly keep the carton, base, all screws and nuts used for connection and other parts. Please keep the above materials in a dry and clean indoor place to prevent the materials from being affected with damp, pressure, heated or close to the fire source; If it is not necessary to retain the above materials, please properly dispose according to the relevant disposal methods of industrial waste products; The packaging bag and calcium chloride desiccant cannot be used again after unpacking, please properly handle according to the relevant treatment methods of industrial waste products; Industrial robot waste disposal must be carried out in accordance with national laws, regulations and standards.

■ Equipment inspection

- Appearance inspection: carefully check the robot body and accessories for scratches, dents or other damages. If any problem is found, please take photos and contact after-sales service.
- Functional inspection: before installation, it is suggested to conduct basic functional inspection on the robot, such as check whether the mechanical arm moves smoothly and whether the cable interface is intact.
- If you have any questions, please contact the technical support in time.

1.4 Transport

RX3H-S6-600 handling attitude is as shown in the figure：



Handling Precautions：

- Please try to transport the robot by trolley in the same way as delivery.
- During handling, try to make J1 close to the negative mechanical limit and J2 close to the positive mechanical limit; otherwise, it may topple due to unstable center of gravity.
- When handling the robot, please fix the robot on the handling tool (such as cart) or hold the lower part of the first mechanical arm and the lower part of the base with hands and carry it by more than 2 persons; When holding the underside of the base, take full care not to pinch fingers.
- For long-distance handling, please directly fix the robot on the handling equipment to prevent overturning.
- Please carry out the same packaging as the delivery according to the needs before handling.

1. 5 System installation

■ Strictly observe the following before proceeding with installation：

- Ensure that the installation personnel must pass the relevant training of the company and can only carry out the installation work under the condition of complying with the international and local laws and regulations.
- Ensure that all parts are free from collision and damage after unpacking.
- Ensure that the installation environment of each component meets the requirements of Section 1.2 of this manual.
- Ensure that the installation site of the robot can bear the pressure or tension caused by the robot and its load. Refer to the manual of the robot body for specific values.
- Before installation, remove the ribbon fixing the stop block.

■ The following tools may be required (maybe more depending on how they are installed)：

- A set of Allen wrenches
- Movable wrench
- Torque wrenches of different specifications, etc

1.5.1 Robot

■ Robot installation method

The fixation mode of support fixation can be selected appropriately according to the user's service environment.

Parts and components required are shown in the following table:

Name of parts	Remarks:
Robot set screw	Capscrew (Grade 12.9) 4 Nos
Robot fixed plate	Mm thick, 1 piece (prepared by the customer)

■ Fixation steps

1. In the handling posture (refer to Chapter 1.5 of this manual), transfer the robot above the mounting bracket, adjust the direction of the robot, and align the through-hole position of the base with the threaded hole position of the mounting bracket;
2. Check that the base fits snugly against the surface of the mounting bracket and secure the robot base to the bracket with a wrench using 4 screws (strength class 12.9).

■ Precautions

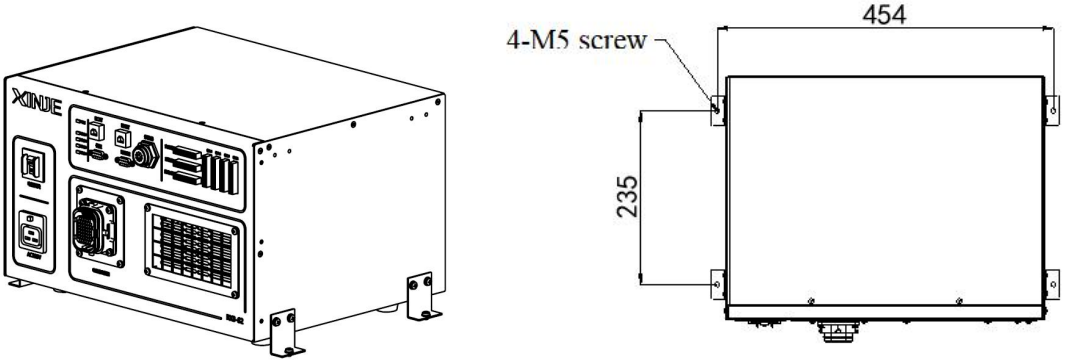
- Refer to the robot body manual for the screw model of the robot.
- The bracket required for the robot installation is not provided, which shall be designed and manufactured by the customer. Refer to the robot body manual for the bracket design.
- When installing the robot, the strength of the foundation installation surface shall be fully considered. The inclination of the robot installation ground shall be less than 5 °, so as to ensure that the overall pose of the robot conforms to the dynamic model and prevent additional joint load caused by the gravity component.
- It is suggested that the installation surface of the robot shall be made of steel plates with a thickness of more than 20mm, and the installation shall be fixed to ensure no movement, so as to avoid large impact and vibration on the base when the robot moves back and forth at high speed, and ensure the accuracy and stability during operation.
- The installation surface of the support shall meet certain flatness requirements, and the flatness of the installation surface shall be within 0.5, so as to ensure that the robot base and the installation surface are closely fitted, and avoid stress concentration or uneven bolt preload due to local concave-convex.

1.5.2 Control cabinet

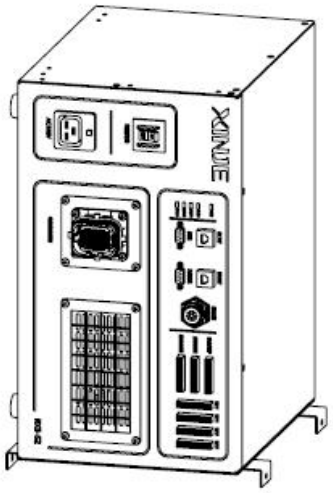
■ Installation method of control cabinet

The control cabinet supports two installation modes, which can be appropriately selected according to the user's service environment.

- Horizontal installation（Unit：mm）



- Vertical installation



Parts and components required are shown in the following table：

Name of parts	Remarks:
Control cabinet fixing screw	M5 × 4 hexagon socket head cap screws (Grade 12.9) 4 Nos

■ Fixation steps

1. Place the control cabinet stably in the installation area and adjust the direction according to the site layout to ensure sufficient space for cable connection;
2. Correspond the bottom of the control cabinet to the position of the mounting hole, and use M5 × 4 hexagon socket head cap screws (strength class 12.9) to fix the control cabinet with a wrench.

■ Precautions

- The installation ground shall have sufficient bearing capacity, and the bearing capacity per square meter shall not be less than 1.5 times of the full load weight of the control cabinet.
- If it is installed on a non-horizontal ground (such as slope, step and other special scenes), a special mounting base shall be designed in advance to ensure the stability of the control cabinet.
- Avoid violent vibration during installation to prevent internal electronic components from loosening or damage.

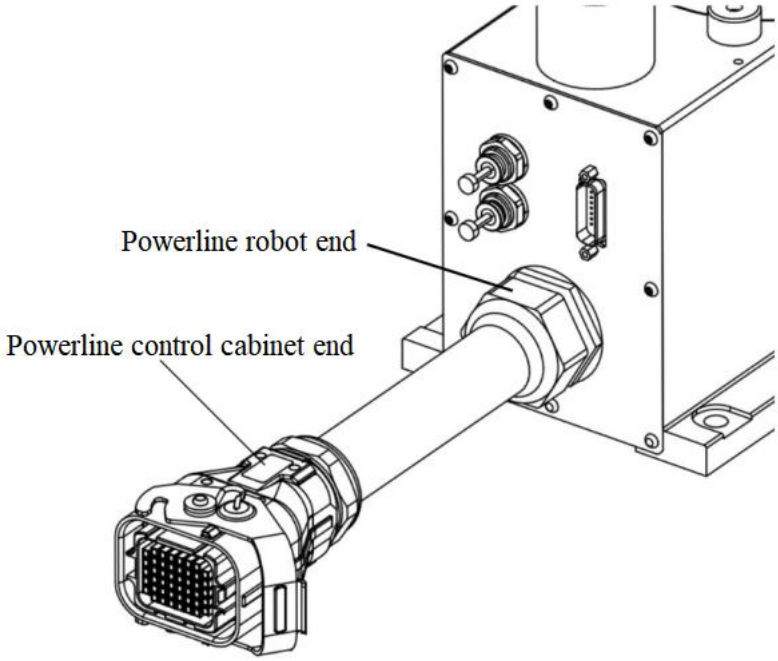
1.5.3 Connect

■ Power line connection

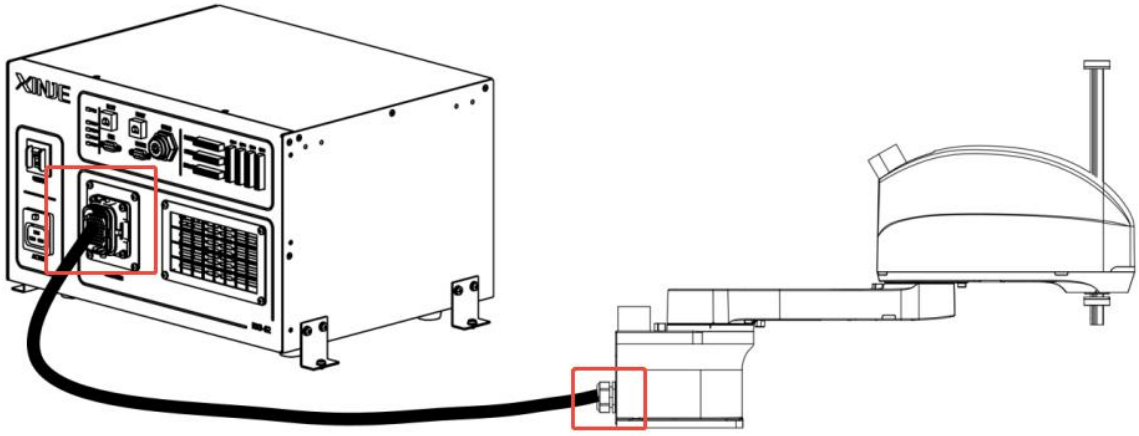
The power line is used to connect the robot body and the control cabinet, and is responsible for transmitting the motor drive power.

■ Connection mode

- The power line is divided between the robot end and the control cabinet end, the left side is the control cabinet end, and the right side needs to be fixed on the robot end.
- Control cabinet end: insert the control cabinet power interface and lock it.
- Robot end: fixed to the cable connector of the robot base.



- Insert the robot end of the power line into the base connection port and tighten it clockwise. Insert the control cabinet end of the power line into the power line connection interface of the control cabinet and fasten the lock catch.



■ Precautions

- Before connection, please check and confirm that the pin is not bent, otherwise the interface will be damaged or the robot system will be faulty.
- Make sure the equipment is powered off during connection.

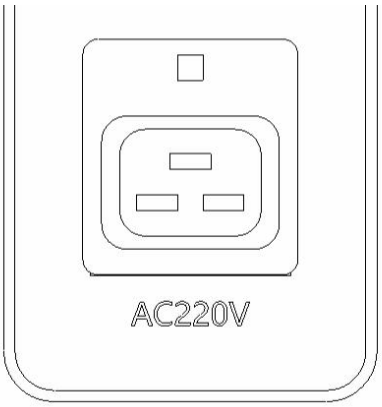
- Ensure that the plug is fully locked to avoid looseness during operation.
- The power line cannot be disassembled. Please consult the manufacturer for replacement.

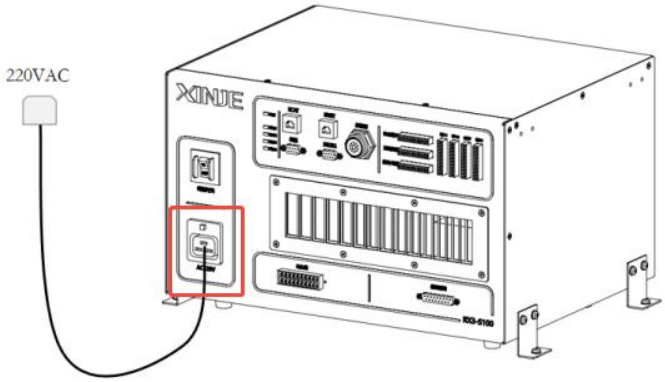
■ Power line connection

The power line is used to connect the control cabinet with the external power supply system and provide working power for the robot system.

■ Connection mode

- Power supply terminal: connected to plant power supply.
- Control cabinet end: fixed to the control cabinet power input interface.
- Connect the control cabinet and insert the power line plug into the power line connection port of the control cabinet.





■ Demonstrator connection

RX3H-S series is not configured with RT860, please contact after-sales personnel for configuration.

1.5.4 Power on

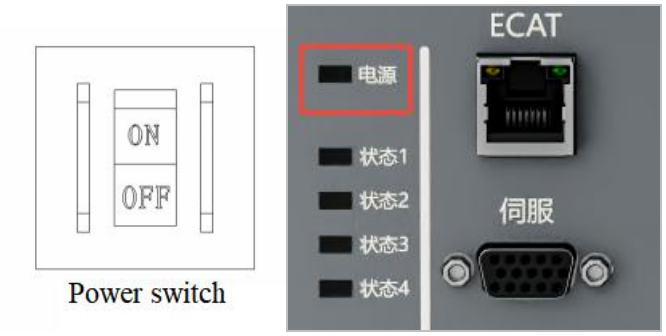
■ Confirm before power-on

- Check that the cables of the robot system are correctly connected.
- Confirm that the safety short circuit module of the control cabinet is normally connected, and the following figure shows the normal connection status.

- Confirm that the site power supply voltage and current meet the requirements of the control cabinet (provide 220VAC voltage and meet the peak current load of at least 10A).

■ Power-on steps

1. Connect the power supply and insert the three-head plug of the power cord into the power socket.
2. Switch the rocker switch from "OFF" to "ON" after power supply, and start the control cabinet. Meanwhile, the power indicator will be on and red.



3. If power failure is required, please confirm that the program has stopped running. After the motor is powered off, turn off the switch on the control cabinet to turn it off. Do not pull out the power line directly.

1. 6 Connection of XR system

When the control cabinet is installed and powered on, it is necessary to operate with the XR system. This section describes the necessary steps for connecting the XR system. XR system is downloaded in the Teach Pandent , including virtual Teach Pandent and
RT860. RX3H-S series four-axis mechanical arm is not configured with RT860 by default. Please follow the steps of virtual Teach Pandent .

1.6.1 Virtual Teach Pandent

1. Ethernet connection to PC

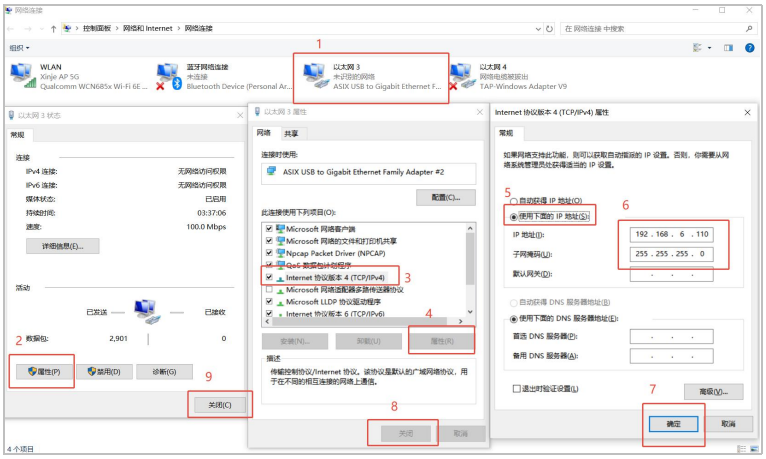
The Ethernet network port of the control cabinet is connected with the PC network port through the network cable, and also supports the connection through the switch.

2. Modify the network segment to be consistent with the controller

Upon completion of network cable connection, IP address of PC end shall be changed to the same network segment as the controller. For example, if the IP address of the controller is 192.16the IP address of the PC can be set to 192.16to ensure that the network segment is consistent and avoid conflicts with other device IP addresses.

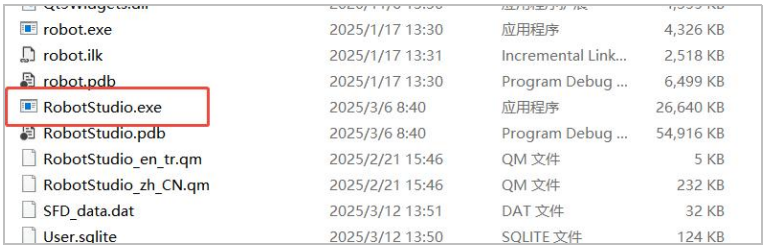
You can modify the IP address of the PC side by entering Change Adapter Settings.

In the network connection setting, select the connected Ethernet interface (such as "Ethernet 3" in the figure) and modify its IP address according to the steps in the figure.



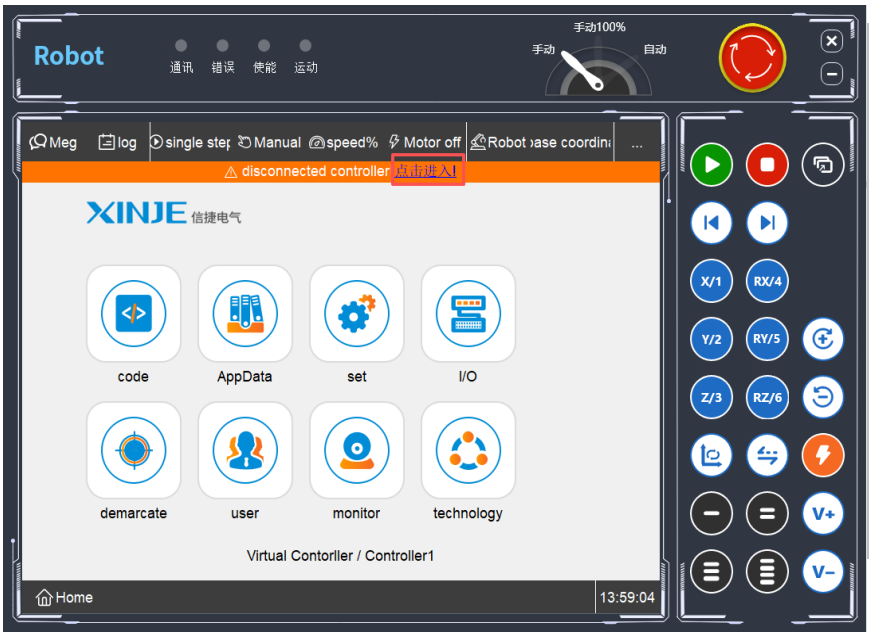
3、Start virtual demonstrator

Find the RobotStudiofile in the saved virtual demonstrator folder and double-click it to start. A progress bar will display during the loading process.



4、Connecting the Controller

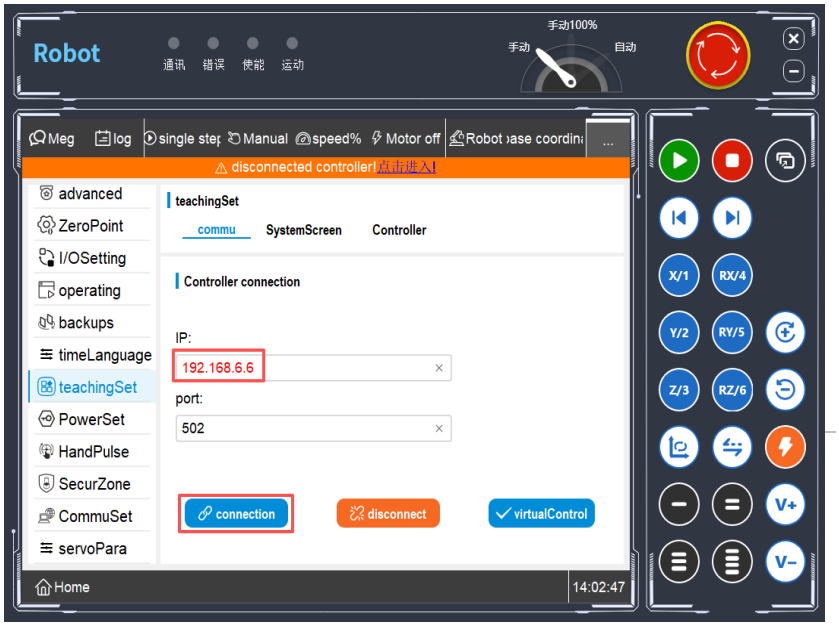
When an unused virtual demonstrator is loaded, "Controller not connected" will be displayed by default.



In this case, connect it to the controller manually. Specific operations are as follows:

Mode 1: enter [Setup] - [Teach Pandent Setup] interface, and modify the IP input box as the IP address of the controller;

Method 2: Click [Click Enter] at the end of orange prompt bar to directly jump to the connection interface.



Click [Connect], and the interface will not display "Controller not connected" after successful connection.

The virtual demonstrator connection is now complete. The virtual demonstrator allows the user to control the robot movements.


Robot
通讯
错误
使能
运动
手动100%
手动
自动
Meg
log
single step
Manual
speed30%
Motor off
Robot base coordin
...
XINJE 信捷电气
code
AppData
set
I/O
demarcate
user
monitor
technology
Virtual Contorller / Controller1
Home
14:04:48
X/1
RX/4
Y/2
RY/5
Z/3
RZ/6
V+
V-

2. Function information

Chapter 1 completes the installation of the robot system. This chapter introduces the functional information of the robot system, and continues the content of Chapter 1. Take RX3H-S6-600 as an example.

2.1 Control cabinet

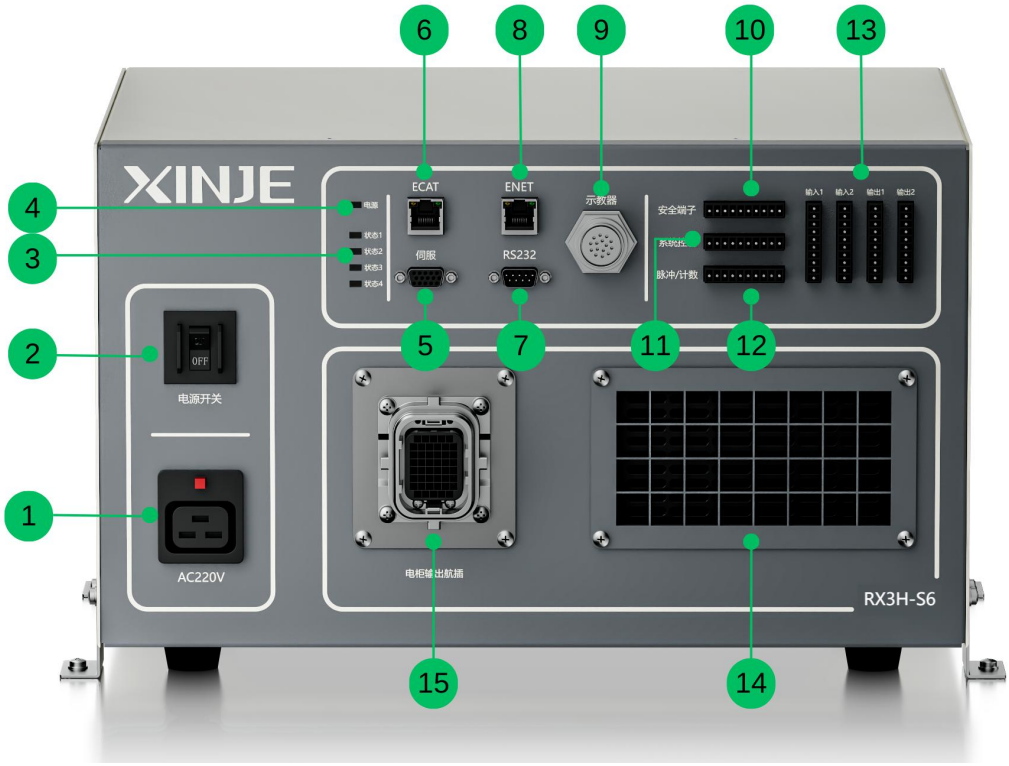
The control cabinet contains the electrical equipment required to control the robot.

2.1.1 Control cabinet naming and parameters

RX3H - S 6 - 600 - S1
① ②③ ④ ⑤

Meaning		
①	Robot series	RX3H：RX3H series robot RX4：RX4 series robot
②	Model	S：SCARA
③	Maximum load	3：3KG 6：6KG 12：12KG
④	Arm length	400：400mm 600：600mm 700：700mm
⑤	Version	S1：DS5C1 S2：DS5C2

2.1.2 Information of each component



■ 220V AC power socket

Power supply input port of control cabinet（1PH AC 200-240V 10A 50/60Hz）。

■ Power switch

Power on and off the control cabinet.

■ User indicator light

Output terminal	State	Colour
Y14	Ready	Green
Y15	In operation	Green
Y16	Cease	Red
Y17	Error	Red

The output terminal corresponding to the status lamp is fixed, and the corresponding status can be configured through [Setup] - [I/O Setup] of the XR system.

■ Power indicator

When the control cabinet is powered on, it will be red (DC 24V).

■ Servo connection port

Reserved, no actual function.

■ ECAT network port

- It is used to expand EtherCAT slave station, which is led out from the output port of the last drive in the control cabinet and needs to be connected to the IN port of the extension slave station.
- At most 5 external axes can be connected. The mapping number of the external axis is a fixed address, requiring one-to-one correspondence. The EtherCAT interface is connected in sequence.

The mapping numbers are as follows：

NO.	Mapping No.
Outer shaft 1	6
Outer shaft 2	7
Ground Rail	8
Outer shaft 3	9
Outer shaft 4	10

If it is necessary to add remote IO, frequency conversion, stepping and other equipment supporting EtherCAT, the mapping number 12 and later shall be manually configured, but the network cable connection sequence is not required.

■ RS232 communication interface

RS232 is a serial communication standard, mainly used for serial data communication. Standard direct-connected DB9 connecting line is used. Pin definition is as follows:

PIN NO	Signal	Function	PIN NO	Signal	Function
1	DCD	Carrier detection	6	DSR	Data set ready
2	RXD	Receive data	7	RTS	Request to send
3	TXD	Send data	8	CTS	Clear Send
4	DTR	Data terminal is ready	9	RI	Ringing indication (ringing indication)
5	GND	Signal ground			

The control cabinet integrates an RS232-RS485 conversion circuit, which can be used for RS485 communication through this interface.

■ ENET Net port

- Ethernet communication interface is led out from the PLC controller ENET port inside the control cabinet and supports free format communication. Network cable can be used to connect virtual controller, XDP upper computer program or other equipment.
- When it is necessary to communicate with multiple devices, it can be connected to the switch. Note that the controller is in the same network segment, and the default network segment of the controller is 192.16.

■ 15 Core round thread socket

The demonstrator connection socket and four-axis control cabinet series do not support connection with the demonstrator RT860, please contact the technical support.

■ Safety terminal

Two emergency stops, two safety doors and one demonstrator failure, please refer to Chapter 2.4.

Name	Function	Terminal
ES1+	Emergency stop 1	X2
ES1-		
ES2+	Emergency stop 2	X2
ES2-		
ED1+	Safety door 1	X5
ED1-		
ED2+	Safety door 2	X5
ED2-		
TPL+	Failure of Teach Pandent	X2
TPL-		

■ System control

System built-in input and output. User can switch on external switch control.

Input/Output	Name	Function	Terminal
Input	STP	Cease	X4
	SET	Clear error	X10
	SIN	Enable the	X13
Output	RDY	Ready	Y10
	MOV	In operation	Y11
	PUS	Cease	Y12
	ERR	Error	Y13

■ Pulse counting

- User high speed count/pulse I/O port.
- Channel 0 (HSD0): X0+, X0 -, X1+, X1-
- Channel 2 (HSD4): X6, X7

■ User I/O

Channel input port and 16-channel output port, user I/O starts from 10000, for example: user X1 is X10001, and the name displayed on the demonstrator is X1_0; User Y1 is Y10000 and the name Y1_0 is displayed on the demonstrator.

- Heat sink

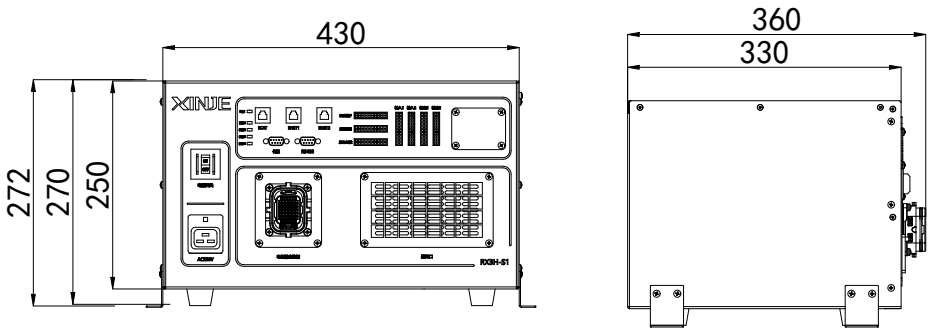
The air inlet and dustproof cotton of control cabinet equipment can be replaced.

- Power line interface

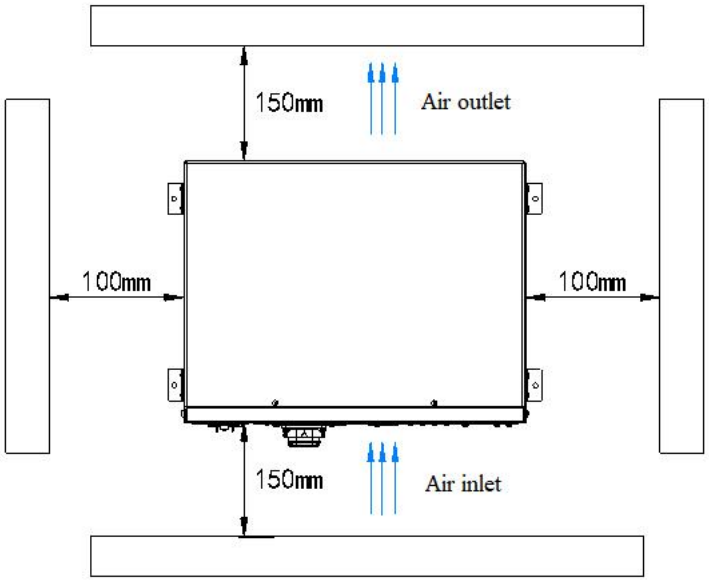
Robot motor power line and brake line interface.

2.1.3 Appearance and distribution inside the cabinet

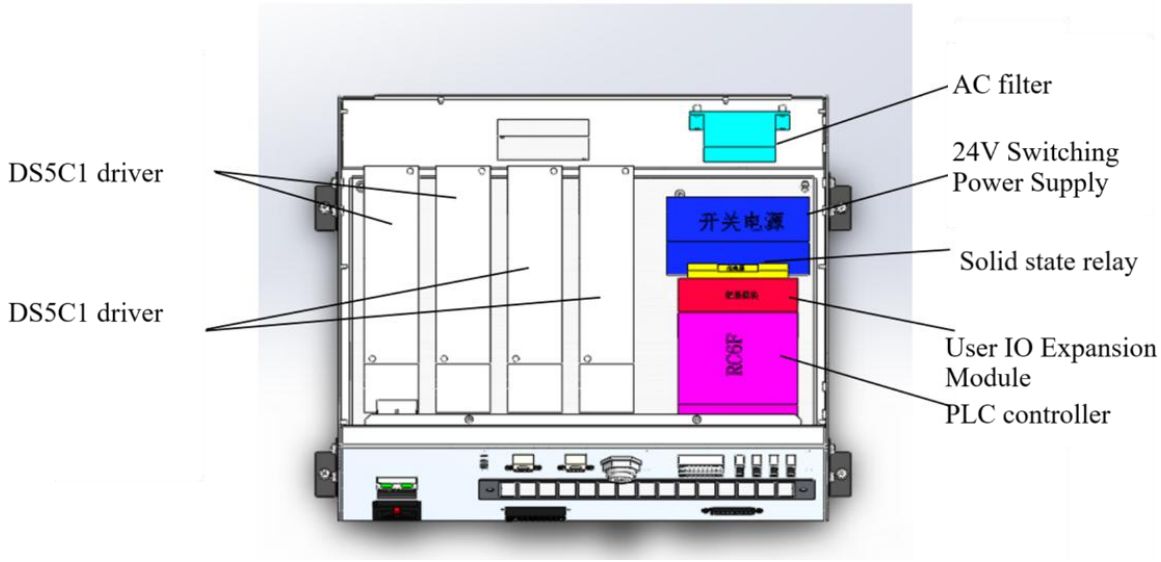
- Overall dimensions（Unit：mm）



- Safe distance



■ Distribution of modules inside the cabinet



The control cabinet layout is as shown in the diagram, consisting of:

1× PLC controller

4× DS5C1 servo drives
(The servo models of different models are different, and the power of each axis is also different)

1× I/O expansion module

1× Switching power supply

Other electrical components

2.1.4 Technical specifications

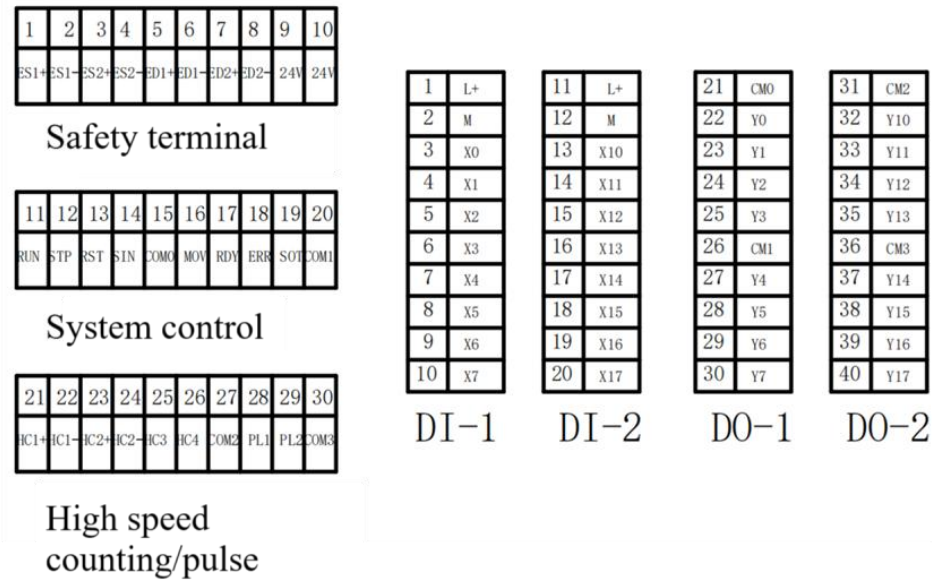
Item	Specification
Size	430×330×250mm
Weight	16KG
Maximum output power	1300KW (Actual value, measure at full-load/max-speed)
Output voltage range	1PH 200VAC~240VAC； 50Hz~60Hz
Current range	10A (Actual value ,measure at full-load/max-speed with power meter)
Protection level	IP32

Item	Specification
Ambient temperature	-10~55℃
Ethernet	1channel
EtherCAT	1channel
RS232	1channel
RS485	1channel；ModBus protocol
IO	16 DI (Digital Input); 16 DO (Transistor Output)
Input power supply	Single phase AC200-240V；50/60HZ
Number of Control Axes	4-axis+5 (maximum support for 5 external axes)
Standard IO points	16 bit input and 16 bit output (the faster the response, the better<10ms)
Insulation resistance	Above 100MΩ
Operating Temperature	-10-50℃
Ambient humidity	Below 90% RH (non condensation)
Vibration	4.9m/s² (Ensure that the parts will not loosen during transportation, and that there will be no functional abnormalities during long-term use in a vibrating environment on site. Test and understand the ultimate strength and performance of the control cabinet)
Electrostatic Discharge (ESD) Immunity	Below 6kV
Environment	Installed indoors Avoid direct sunlight Keep away from open flames, flammable gases, etc. No strong interference sources (must comply with EMC standards) No dripping or splashing water No significant vibration or impact

2.1.5 IO wiring

- System IO

The system IO is divided into 【safety terminal】, 【system control】, and 【high-speed counting/pulse】.



PLC terminal wiring definition (safety terminal, system control, high-speed counting/pulse)

Safety terminal	**Definition**	**System control terminal**	**Definition**	**High speed counting/ pulse terminal**	**Definition**
ES1+	External emergency stop 1; X2	RUN	Start up; X3 internal conversion single ended signal	HC1+	High speed counting X0+
ES1-	External emergency stop 1	STP	stop it; X4 internal conversion single ended signal	HC1-	High speed counting X0-
ES2+	External emergency stop 2; X2	RST	Clear the alarm; X10	HC2+	High speed counting X1+
ES2-	External emergency stop 2	SIN	Enable; X13	HC2-	High speed counting X1-
ED1+	Safety Gate 1; X5	COM0	System X signal COM common terminal 0V (internal)	HC3	High speed counting X6
ED1-	Safety Gate 1	MOV	Automatic operation status; Y10	HC4	High speed counting X7
ED2+	Safety Gate 2; X5	RDY	Ready state; Y11	COM2	High speed X signal COM common terminal 0V (internal)
ED2-	Safety Gate 2	ERR	Alarm status; Y12	PL1	High speed pulse Y0
TPL+	Teaching pendant	SOT	Pause state; Y13	PL2	High speed pulse

Safety terminal	Definition	System control terminal	Definition	High speed counting/ pulse terminal	Definition
	failure; X2				Y1
TPL-	Teaching pendant failure	COM1	System Y signal COM common terminal (external)	COM3	High speed Y signal COM common terminal (external)
TPL is not connected when using the teaching pendant, and TPL is short circuited when not using the teaching pendant.					
Rear switch for teaching pendant - X14, reserved.					
Teaching pendant code wheel A-X11.					
Teaching pendant code wheel B-X12.					

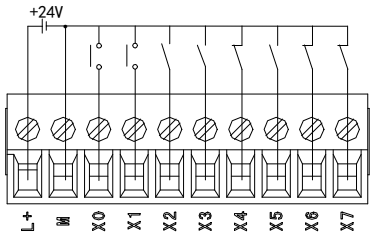
Pay attention to the connection between the control terminal and the COM port when connecting.

■ Expand IO

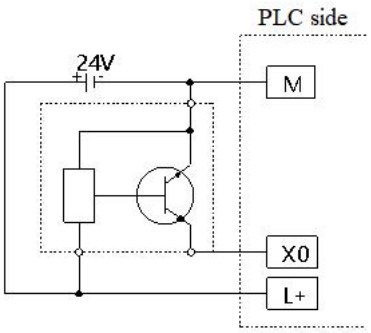
【DI-1】,【DI-2】,【DO-1】, 【D0-2】are extension IOs, and when using extension IOs, 24V DC power needs to be provided to the terminal block of the extension IO.

■ DI-1 and DI-2 input terminal wiring

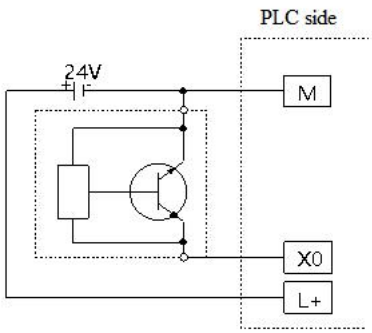
- Example of NPN input wiring



Example of switch button wiring

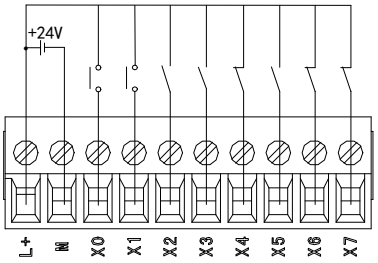


Three wire (NPN type) proximity switch wiring example

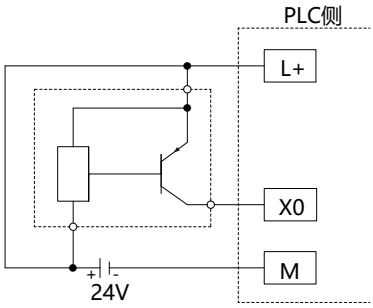


Two wire system (normally OFF or normally ON) proximity switch wiring example

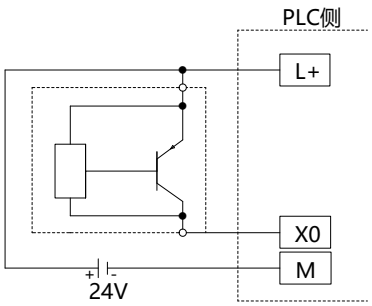
- Example of PNP input wiring



Example of switch button wiring



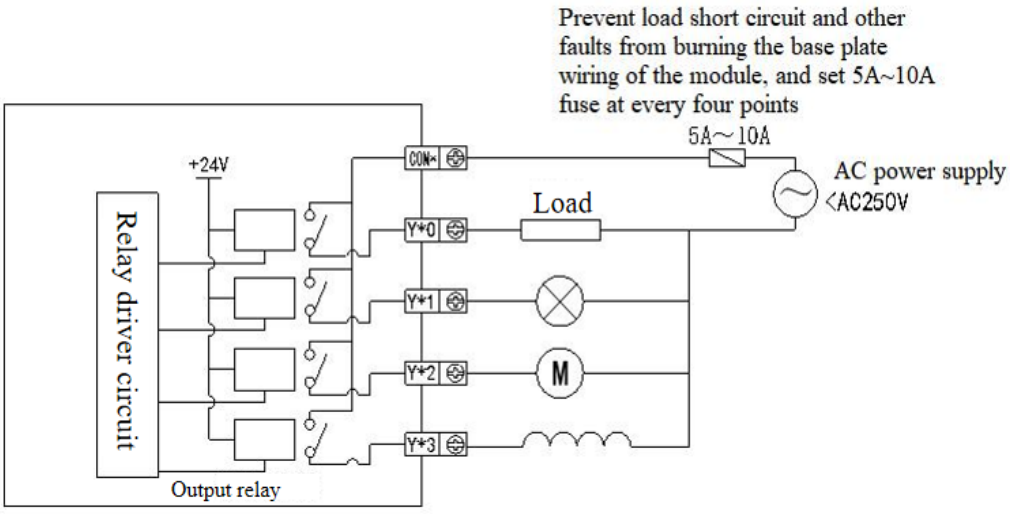
Three wire (PNP type) proximity switch wiring example



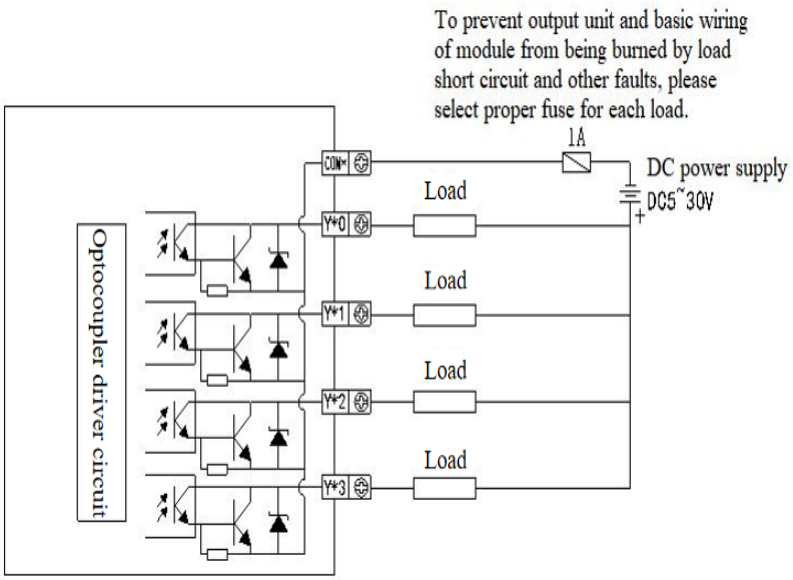
Two wire system (normally OFF or normally ON) proximity switch wiring example

■ DO-1、DO-2 Output terminal wiring

- Relay type

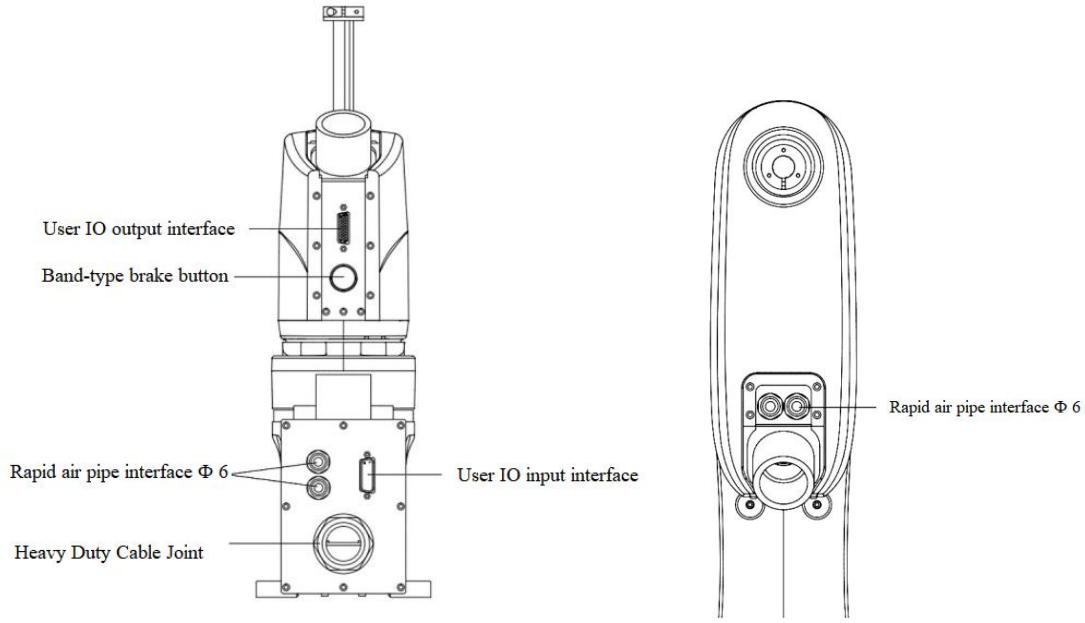


- Transistor type


To prevent output unit and basic wiring of module from being burned by load short circuit and other faults, please select proper fuse for each load.
1A
DC power supply
DC5~30V
COM
Y0
Y1
Y2
Y3
Load
Load
Load
Load
Optocoupler driver circuit

2.2 Body

RX3H-S series robot base has power line connector, air pipe connector and user IO input interface, and small arm has brake button, user IO output interface and air pipe connector.



As shown in the figure：

- The lower part of the base is the power line connector, the upper left is two φ 6 fast air pipe connectors, and the upper right is the user IO input interface;
- There are user IO output interface and brake button behind the small arm;
- There are two φ 6 quick air pipe connectors above the small arm.

Refer to the corresponding robot body manual for details of body interface and work scope.

2.2.1 Power line

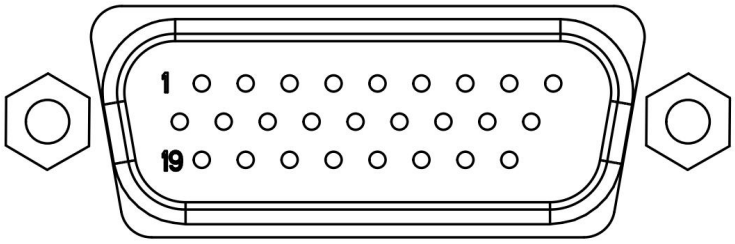
Connect the robot to the control cabinet, refer to chapter 1.5.3;

2.2.2 Trachea

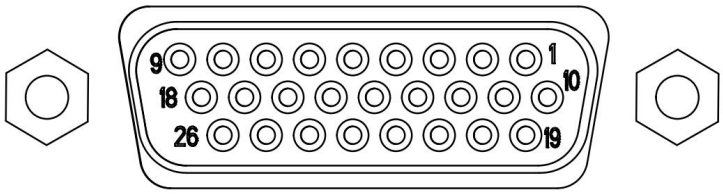
In order to provide compressed air for the pneumatic clamp/tool, two air pipe joints are reserved on the robot body for internal straight-through. After the blind plug is pulled out, φ 6 air pipe can be directly inserted, and the on-off is controlled by the external solenoid valve (such as opening and closing of clamping jaw).

2.2.3 User IO

The user I/O interface of RX3H-S6-600 robot is as shown in the figure：



- The I/O input interface is a male D26, located on the rear cover plate of the base, and connected with the control cabinet, switch and other output signals.



- I/O output interface is D26 female head, which is located on the corrugated pipe metal plate of the small arm assembly body and connects input signals of end tools and control valves.
- The first 20 channels of I/O interface are effective, customized by the user, and the connection harness is optional.

2.2.4 Band-type brake

The robot brake is a key component to ensure the safe and stable operation of the robot. It is mainly used to lock the robot joint when the robot is stopped, powered off or abnormal conditions occur, prevent it from moving due to gravity, inertia or external force, and avoid equipment damage and safety accidents.

State	Effect
Normal operating mode	When the robot is running, the brake is in the state of power-on release, which will not affect the movement
Brake mode	When the robot is de-energized, the brake is de-energized to stop the robot and keep the robot in a fixed position
Manual release mode	Under special circumstances, the band-type brake can be manually released through the band-type brake button, but this operation shall be carried out under the premise of ensuring safety, and the band-type brake state shall be restored in time after the operation

■ Operating steps for releasing the brake manually

1. Find the brake button on the small arm metal plate;
2. Power on the control cabinet;

3. Press the brake button to release the robot brake.

■ Precautions

- In order to prevent the output shaft from falling due to gravity when the brake is released, the operator base shall be fixed.
- When releasing the brake, the lower end of the output shaft shall be dragged to prevent the operator from being damaged due to fast falling.

2.3 Items in the same box

In addition to the robot body and control cabinet, some accessories are included.

Material name	Specification and model	Unit
Plug - Male	LZ-T4	1pcs
Power cable plug of electric cabinet	Male plug (10A three-plug)	1pcs
Power line	RVP3 * 2.5 black	1pcs
Panel IO accessories	Emergency stop terminal	1pcs
	IO connector	2pcs
Cat5e double-shielded network cable	M/3m/5m	1pcs

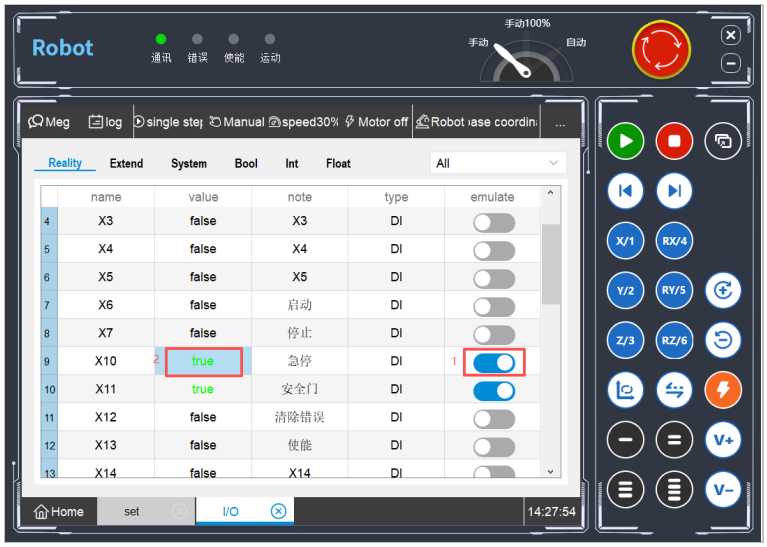
2.4 Security setting

2.4.1 Emergency stop

Emergency stop is an important safety protection function in the robot system, which is used to quickly stop the robot in an emergency state to avoid setting damage or casualties.

■ Virtual demonstrator

When virtual Teach Pandent is used, emergency stop terminal can not be connected.
Emergency stop of [Setup] - [I/O Setup] in XR system can be configured with X signal through simulation of emergency stop. When I/O is configured, select the corresponding output in [I/O] - [Body] to turn on the simulation switch and switch the value [false] to [true].



■ Physical emergency stop

When using the physical emergency stop device, two cables can be led out from the emergency stop signal input terminal (ES1/ES2) of the robot controller. Refer to Section 2.1.5 for the terminal blocks, which are respectively connected to both ends of the normally closed contact of the emergency stop button (e.g. ST1 and ST2 of RT860) to form a complete electrical and pneumatic circuit.

2.4.2 Safety Door

- The safety door is another safety protection function in the robot system, which is used to prevent personnel from entering the dangerous area during the operation of the equipment and ensure the operation safety.
- The setting mode and wiring mode of PSD are the same as those of emergency stop (using ED1/ED2), but the PSD can be configured as null, and it can be configured as null without detecting PSD signal in case of no use scenario.).

2.5 System authority and mode

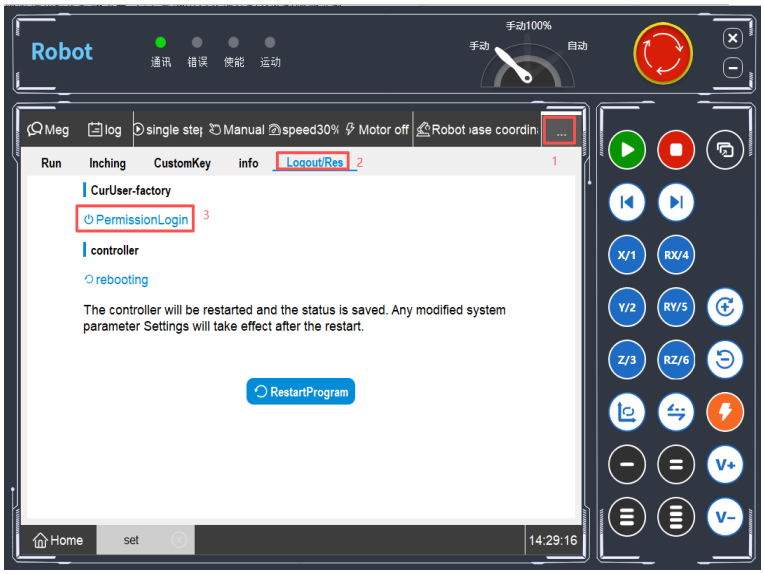
This chapter describes the authority management and operation mode setting of the robot system, aiming at helping the user reasonably allocate the system authority and select the appropriate operation mode to ensure the safe operation of the equipment.

2.5.1 Authority

The robot has three permissions: operator, administrator and manufacturer. Different permissions have different restrictions on system functions. The robot system requires administrator and above permissions to write programs and download projects. The default authority of the system after startup is the operator, who can perform inching, running block and other operations, but cannot write or modify blocks. These functions need to be switched to the administrator or above authority.

■ Switching authority

When the demonstrator is successfully connected, enter the logout and restart menu of shortcut system and click [Permission login].



Switch the window to the login interface, select the administrator and output the correct password, click [Login], and automatically switch back to the main interface after success.

2.5.2 Operating mode

The robot is equipped with three operating modes: manual, manual 100% and automatic.

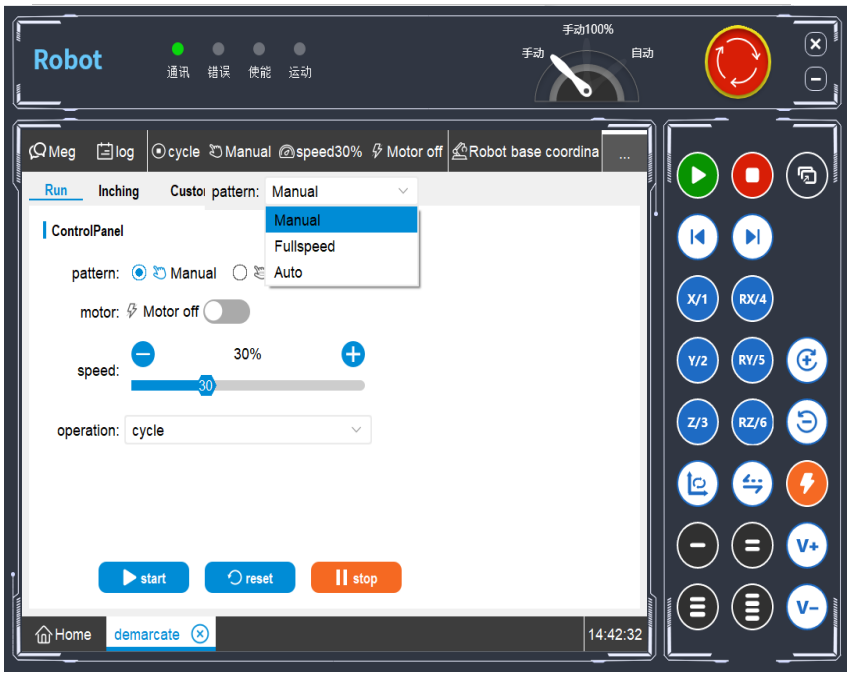
Mode	Explain
Manual operation	In the manual mode, the operator can control the robot through the virtual Teach Pandent , which is applicable to the debugging, teaching and other operations of the robot. In this mode, the system operates at a low speed to ensure safe operation
MANUAL 100%	The manual full-speed mode is evolved from the manual mode, allowing the robot to perform commissioning, teaching and other operations at high speed. Operators are required to be familiar with the robot system to a certain extent and have high safety awareness
automatic	In automatic mode, the robot can automatically execute according to the preset program, which is applicable to the scene of batch production. In this mode, the system runs fast

■ Change the operating mode

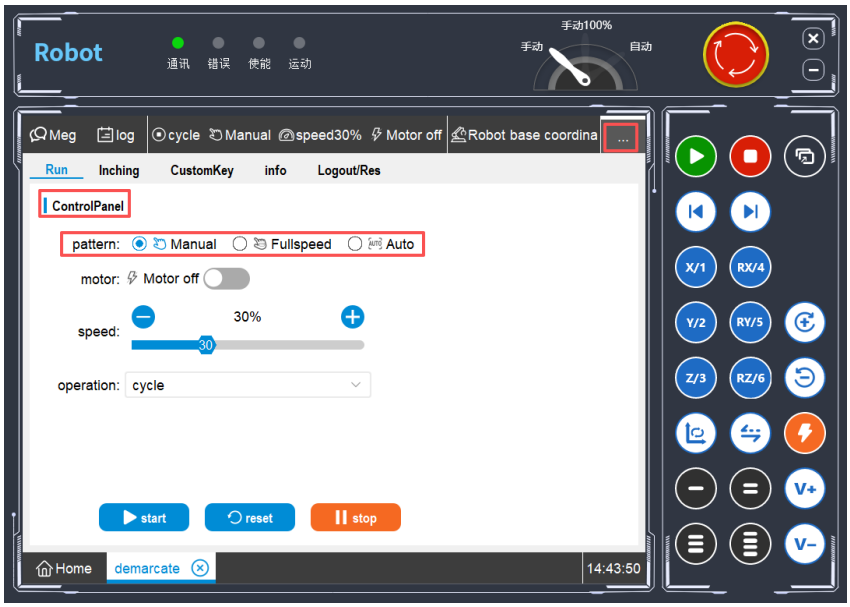
The operating mode can be modified in three ways on the XR system to support physical and virtual demonstrators.

Mode 1: Change the operation mode by rotating the switch and turn the switch to the corresponding mode

Mode 2: modify the operation mode in the shortcut drop-down box, and select the corresponding mode in the drop-down box



Mode 3: shortcut system - modify operation mode during operation



2.6 Optional configuration

Users can expand the functions of the robot system through optional modules according to the actual application requirements.

2.6.1 Teach Pandent RT860

RT860 is optional for the four-axis robot system, please contact technical support.

■ Product characteristics

Project	Specifications
Processor	TI AM3352 ARM Cortex-A8 32-bit，800MHz
Memory	256MB/512MB DDR3，4GB eMMC
LCD	TFT 8inch 800*600
Touch	Ruggedized 4-wire resistance screen
OS	LINUX 4.9.65
OpenGL	Supported (AM3354 for Processor)
Panel	Function key: 21 keys Indicating lamps: 4
USB port	USB 2.0: 1 个
Communication interface	Ethernet
Functional Parts	Emergency stop switch: 1 Rotary button: 1 Handwheel: 1 Touch pen: 1 Rear switch: 1
Rated input voltage/current	DC 24V / 0.5A
Operating ambient temperature	-20~70℃
Working environment humidity	90%
Weight:	1.2Kg

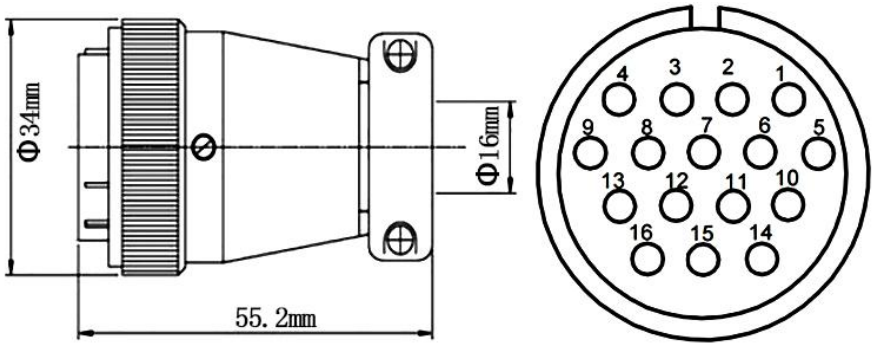
■ Functional components

Project	Specifications
Emergency stop switch	Robot and electrical part enter emergency stop state
Rotary Button	Switch operating mode
Hand wheel	Jog robot, jog robot
Touch Pen	Convenient for users to operate the screen

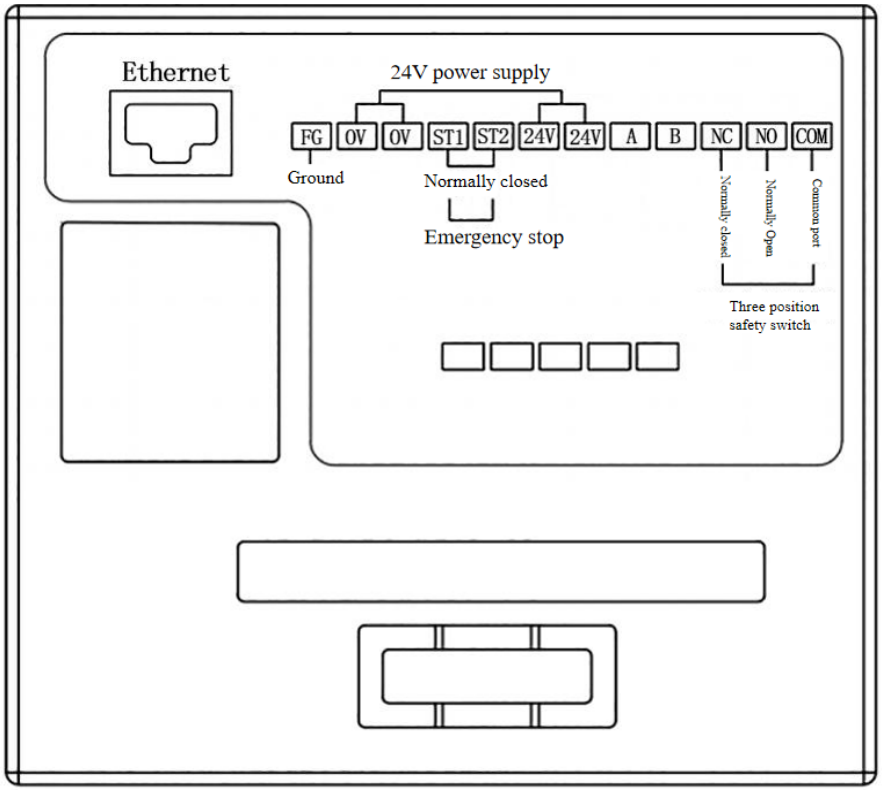
Rear switch	Toggle Robot Enable State

■ Wiring port

Aviation Plug:



Pin	Meaning	Pin	Meaning
1	Ethernet TX+	9	Emergency stop normally open point A
2	Ethernet TX-	10	Power supply 24V
3	Ethernet RX+	11	Power supply 24V
4	Ethernet RX-	12	Power supply 0V
5	Enable common terminal	13	Power supply 0V
6	Normally open point of rear switch	14	Grounding of enclosure
7	Normally closed point of rear switch	15	Emergency stop normally closed point 2
8	Emergency stop normally open point B	16	Emergency stop normally closed point 1


Ethernet
24V power supply
FG
0V
0V
ST1
ST2
24V
24V
A
B
NC
NO
COM
Ground
Normally closed
Emergency stop
Normally closed
Normally Open
Common port
Three position
safety switch

■ Connection mode

Screw the aviation plug of the Teach Pandent and the adapter box tightly.

Transfer box: in XR system, the transfer box only needs power supply and emergency stop terminal, the emergency stop terminal is connected to the safety terminal ES1/ES2 of the control cabinet, and the power terminal is connected to 24V/0V.

3. Maintenance

In order to ensure the safe use of the equipment and prevent faults, please carry out regular maintenance and inspection according to the regular maintenance cycle and contents described in this chapter.

3.1 RX3H-S inspection contents and frequency

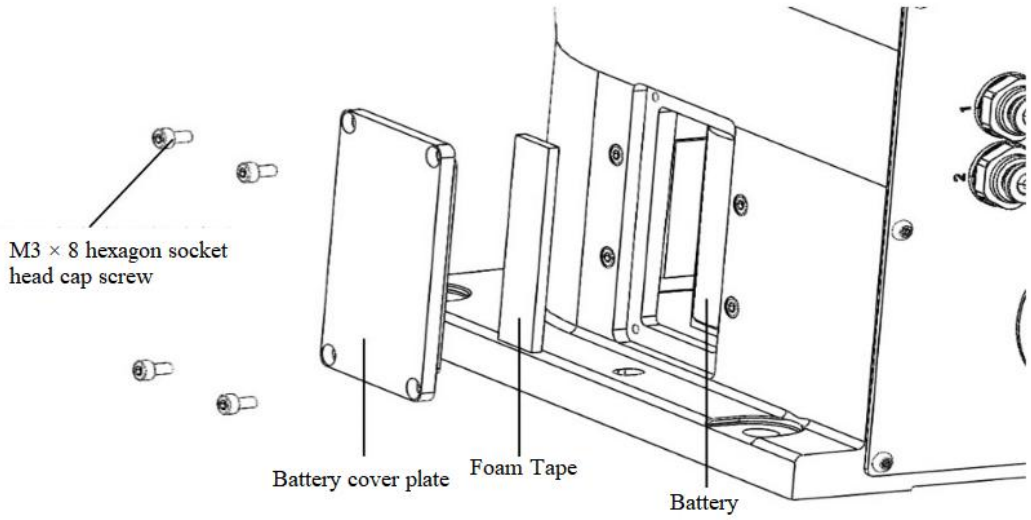
Contents of inspection	frequency	Inspection method	Normal phenomenon
Emergency stop and safety door	Every 3 months	Press the emergency stop and safety door	System stop and alarm
Air vent of control cabinet	Every 3 months	Check the surface and replace the dust proof cotton	No dust
Band-type brake button	Every 6 months	Toggle button to manually move the robot axis	The robot axis cannot be moved when not pressed; When pressed, the robot axis can be moved
Control cabinet	Every 1 year	Power on again	Normal startup and use
battery	Every 2 years	Check whether the system alarms and the battery is out of power	No alarm

4. Handling of common problems

4.1 Battery is dead

In case of [Absolute Servo Encoder Battery Low Voltage Alarm] and the alarm cannot be cleared on the system, the battery shall be replaced in time, or the absolute zero point of the encoder will be lost. It is recommended to replace the encoder battery when the control cabinet is powered on, or the absolute zero point of the encoder will be lost if the power supply of the controller is disconnected.

- Four-axis robot battery replacement



When the encoder battery is replaced, stop the manipulator and press the emergency stop to stop the peripheral equipment.

1. Remove the battery box cover plate;
2. Find the battery and remove the old battery;
3. Insert the corresponding axis parallel Ampere plug into the new battery;
4. Clear the alarm code;
5. Mount battery box cover.

- Battery specifications

RX3H series battery is purchased by the user, model: ER34615

- Specification of battery Ample plug

Hongxing Electric HX25064 - (RCY/SYP) - Strip connector (2.5mm)

Manual Update Log

The document number and version number of the Manual are recorded in the lower right corner of the cover of the Manual, and the revision records are summarized as follows:

No.	Chapter	Content updated
1	-	Release of the first version of the manual

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