

# Bat Series Heavy-payload Robot |

## Quick Start Guide |



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**TOUCH YOUR DREAMS  
WITH ROBOT FINGERTIPS**

## Preface

To ensure the proper operation of the product, please read this Guide carefully before operation. This Guide is applicable to Bat series heavy-payload robots such as Bat1100M-S15, Bat1100C-S15, Bat1300M-S15, and Bat1300C-S15. If you have any doubts about the functions and performance, please contact our technical support for the correct operation of the product.

### Target readers

Operators, robot programmers, maintenance personnel, technical support, and salesperson.

### List of related manuals

The manuals related to the product are listed below for your reference as needed.

| Reference                                                           |
|---------------------------------------------------------------------|
| <i>Bat Series Heavy-payload Robot User Manual — Mechanical Part</i> |
| <i>Bat Series Robot User Manual — Electrical Part</i>               |
| <i>YiKingSoft Software Manual</i>                                   |
| <i>Modbus Communication Manual</i>                                  |
| <i>Kingkong Instruction Manual — Bat Series</i>                     |
| <i>ConfigIO Configuration Manual</i>                                |
| <i>YiKingSoft Vision Application Manual</i>                         |
| <i>Socket Communication Manual</i>                                  |
| <i>Independent External Axis Function Manual</i>                    |

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# 1. Overview

## 1.1 Safety notice



### **Danger**

- ◆ Failing to comply with product safety requirements may result in personal injury or death.
- ◆ This Guide only contains general instructions for the product. Please read the safety precautions in other manuals carefully before using the product.

- 1) To ensure personal and equipment safety, please follow all safety precautions stated on the equipment and in the manual when installing, operating, and maintaining the equipment.
- 2) Note that the contents marked with "Caution", "Warning", and "Danger" in this Guide do not represent all safety precautions that should be observed, but only serve as a supplement to safety precautions.
- 3) Use the equipment in an environment that meets the design specifications. Otherwise, it may cause failure. Any malfunction or component damage caused by failure to comply with relevant specifications is not within the scope of equipment quality assurance.
- 4) Our company will not bear any legal responsibility for personal safety accidents and property losses caused by improper operation of equipment.

## 1.2 Manual acquisition

This Guide is shipped with the product. If an electronic PDF file is required, you can obtain it in the following ways:

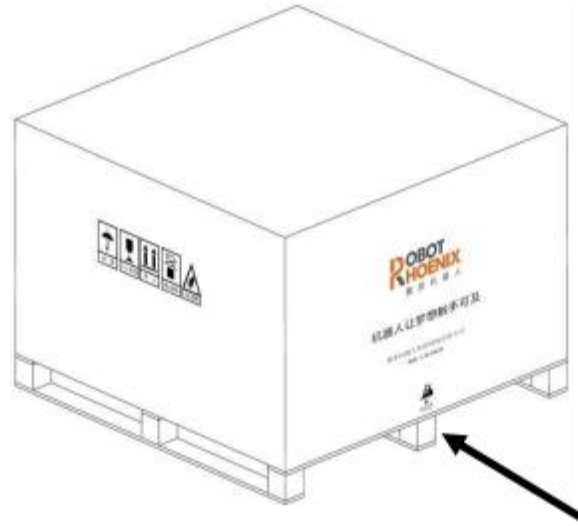
- Log in to the official website of RobotPhoenix (<http://www.robotphoenix.com>) to download.

## 2. Handling and Unpacking

### 2.1 Handling procedures

Preparation for handling: It is recommended to use a 1-ton forklift.

The packing box is a carton. Please prepare a 1-ton forklift, fork the carton from the transport truck according to the direction shown in the diagram, and transport the carton to the equipment installation position.



Forklift insertion position

Figure 2-1 Carton handling

### 2.2 Unpacking procedures

Preparation for unpacking: M10 hex wrench, adjustable wrench, scissors/utility knife (×1), and safety gloves (×1).

Step 1: Remove the outer packaging.

Wear safety gloves, cut off the strap of the carton with scissors/utility knife, and remove the carton. After unpacking, check whether the objects in the carton are consistent with the packing list, whether the parts are dry and complete, and whether the robot body is displaced, scattered, cracked, etc. If there is any abnormality, please contact our technical support.

Tools: safety gloves and scissors/utility knife.



#### Caution

- ◆ Use scissors/utility knife to unpack for safety.
- ◆ Wear safety gloves to prevent scratches, as the cut strap has sharp corners.

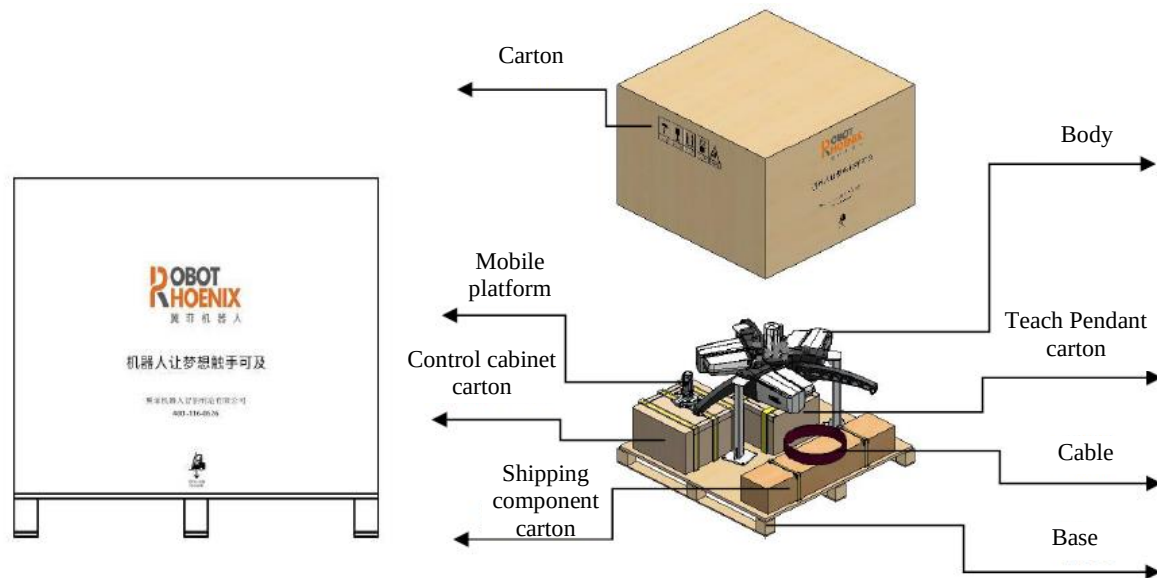


Figure 2-2 Carton removal

Step 2: Remove the cable and the cartons of the Teach Pendant, control cabinet, and shipping components.

- ◆ Remove the cable and keep the cable and packaging bag properly for later use.
- ◆ Remove the winding film and fastening tape of the mobile platform, and place it on the pallet for later use.
- ◆ Cut off the strap of the control cabinet, Teach Pendant, and shipping component cartons with scissors/utility knife. Remove the Teach Pendant carton, control cabinet carton, and shipping component carton from the base in turn, open the carton, remove the protective parts such as EPE foams, take out the Teach Pendant, control cabinet, lower arm assembly, and sleeve, and place the control cabinet in the proper direction.

Tools: scissors/utility knife/claw hammer.

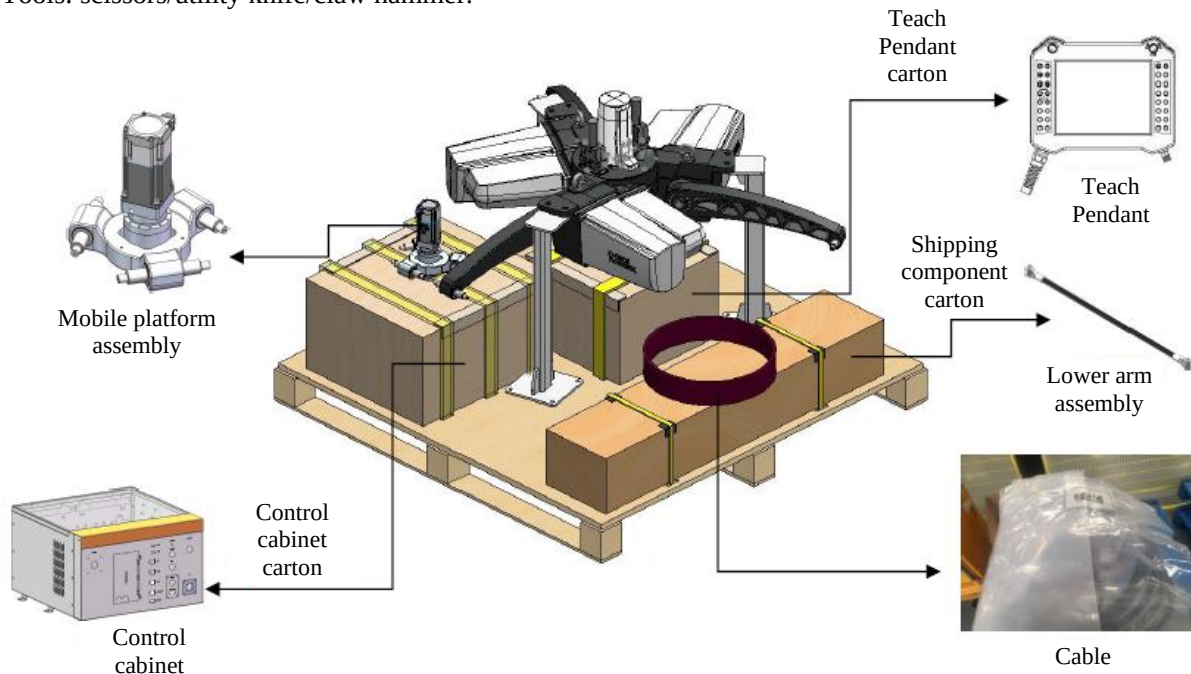


Figure 2-3 Removal of the cable and the outer packaging of the Teach Pendant, control cabinet, and shipping components

### 3. Installation and Fixing

**Danger**

- ◆ Do not conduct equipment installation, wiring, maintenance, and inspection, or part replacement by non-professional personnel.
- ◆ Install safety fences on the system. Otherwise, it may cause serious safety accidents.
- ◆ When installing the system, do not interfere with surrounding buildings, structural parts, or equipment. Otherwise, serious injury or major damage may occur.
- ◆ Fix the robot body before turning on the power supply or operating system. Otherwise, it may cause body tipping, resulting in serious injury or major damage.

**Warning**

- ◆ Do not modify the equipment.
- ◆ Do not install the equipment in places with a strong electric field or strong electromagnetic interference.
- ◆ Remove the mounting screws of the robot body and hold the robot body to prevent it from tipping.

### 3.1 Body installation and fixing

Step 1: Remove the bracket.

Remove the fixing screws of the bracket and the base with the hex wrench and adjustable wrench.

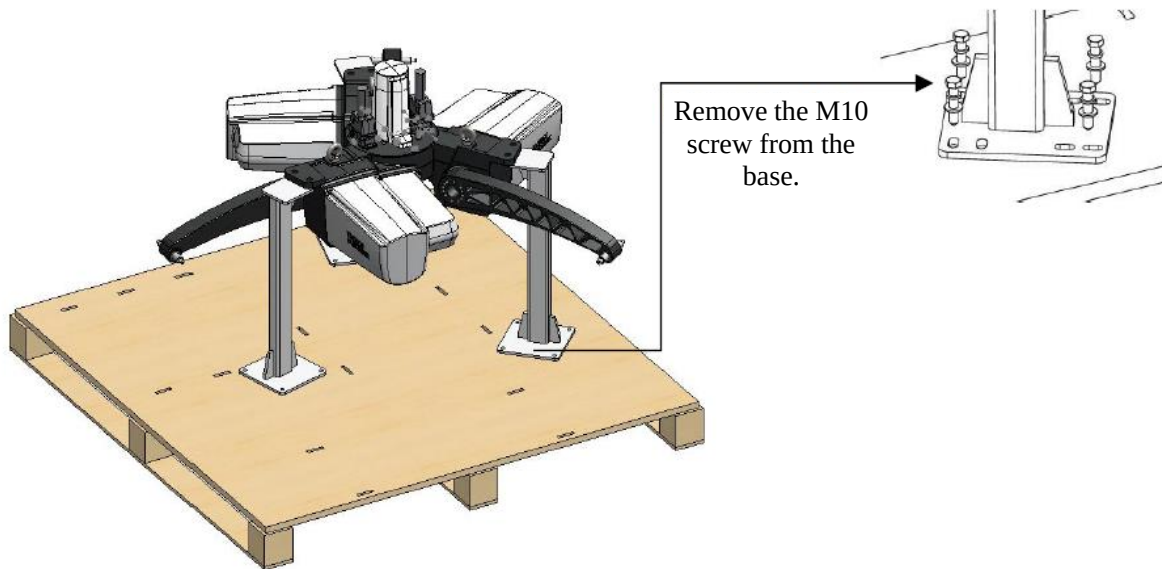


Figure 3-1 Bracket removal

Step 2: Prepare for installation.

1) Adjust the frame prepared in advance to the level to ensure the flatness of the three fixing plates on the frame (recommended value  $\leq 0.1$  mm). If the flatness deviation is too large, use the adjusting shim. Otherwise, it will have a great impact on the control and operating accuracy of the robot.

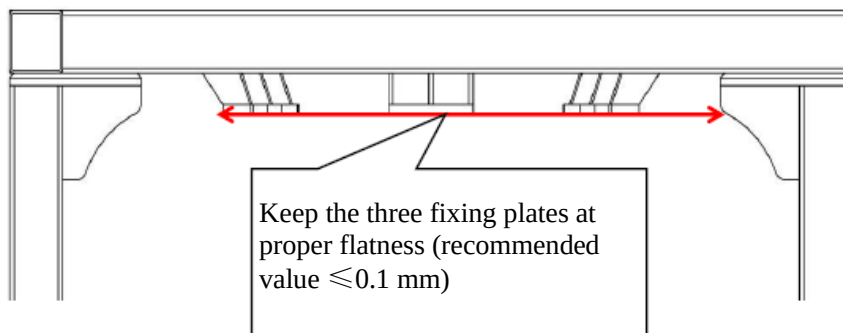
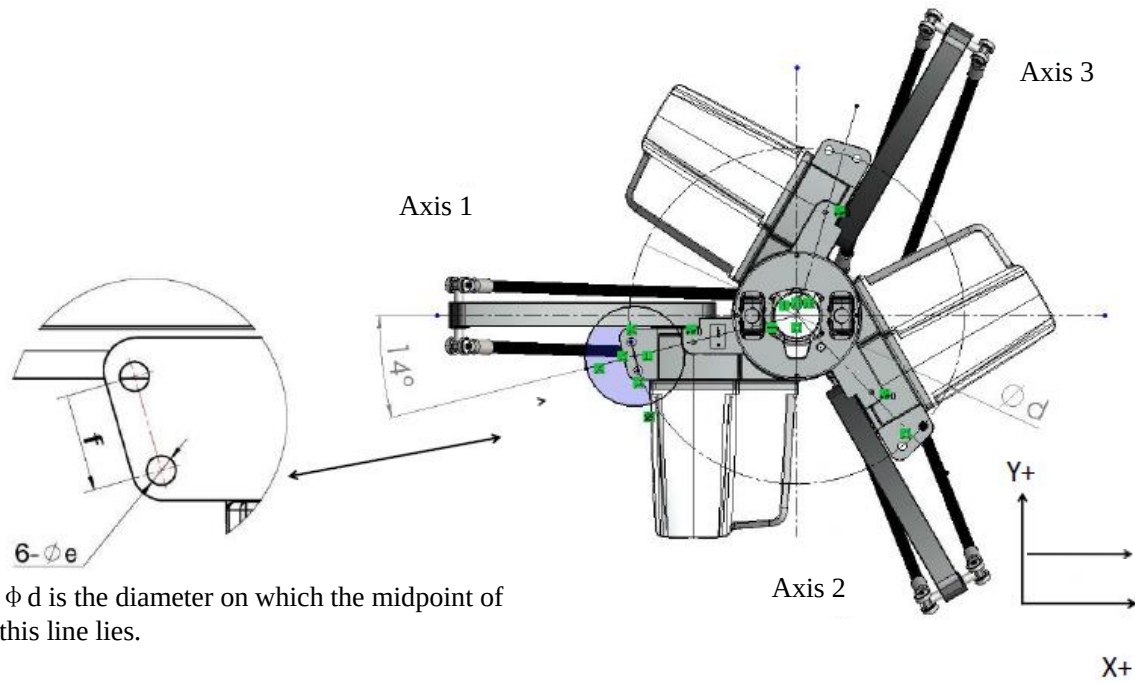


Figure 2.4.2 Flatness of fixing plates

2) Keep the X axis of the default coordinate system of the robot parallel to the axis 1 of the body. To balance the force output of each axis as much as possible, when designing the frame, try to avoid making the body axis parallel to the main movement direction in the working process. Refer to Figure 3-3 for the installation direction and installation hole size of the robot.



$\phi d$  is the diameter on which the midpoint of this line lies.

Figure 2.4.3 Diagram of robot installation direction and installation hole size

Table 3-1 Dimensional parameters

| Model        | d   | e  | f  |
|--------------|-----|----|----|
| Bat1100M-S15 | 694 | 18 | 60 |
| Bat1300M-S15 |     |    |    |
| Bat1100C-S15 |     |    |    |
| Bat1300C-S15 |     |    |    |

Step 3: Install the robot body.

1) Pass the rope/sling through the eyebolt of the body, lift the rope/sling with a forklift, and move the body slowly close to the frame. When the forklift moves the equipment, keep the equipment less than 0.5 m from the ground, and pay attention to safety. Avoid bumps in the body, housing, and other parts, and the stress on the upper arm and other parts.

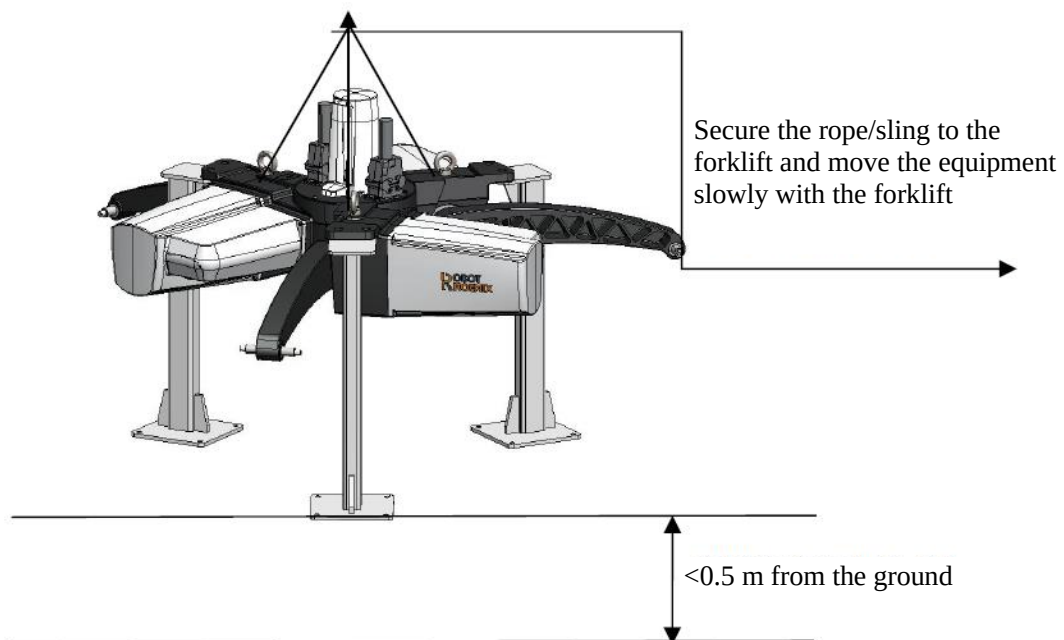


Figure 3-5 Removal of the robot body

2) Move the body close to the frame, lift and move the body into the frame with a forklift, put the body on the ground in the frame, remove the rope/sling from the forklift, and lower the hook of the crane into the frame. During this process, protect the personnel from injury and the body/housing from crushing and breaking.

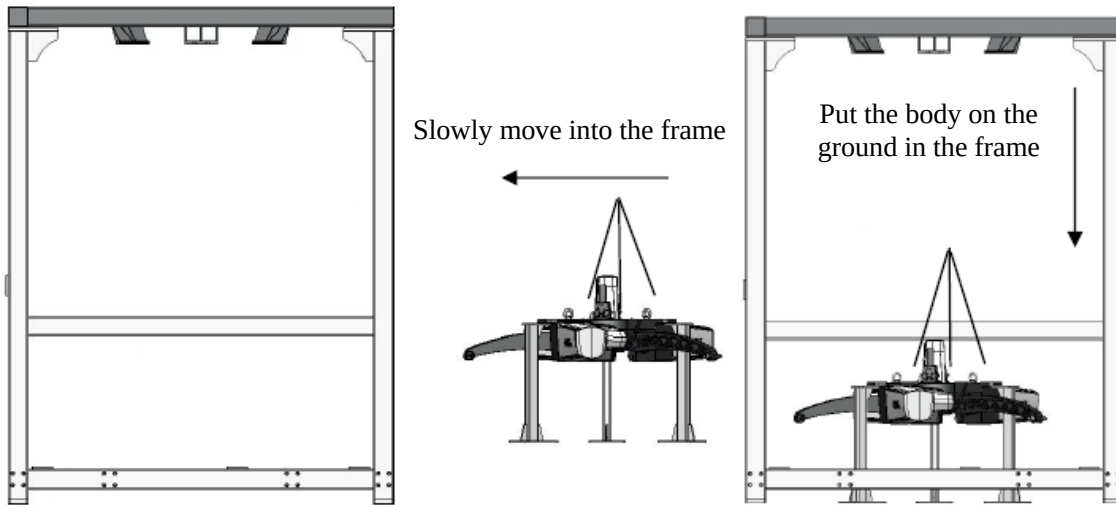


Figure 3-6 Moving the body into the frame and fixing

3) Slowly lift the body about 0.5 m from the ground with a crane, remove the bracket, slowly lift the equipment close to the frame fixing plate, and fix the body robot to the frame with screws and spring washers removed from the bracket, as shown in Figure 3-7.

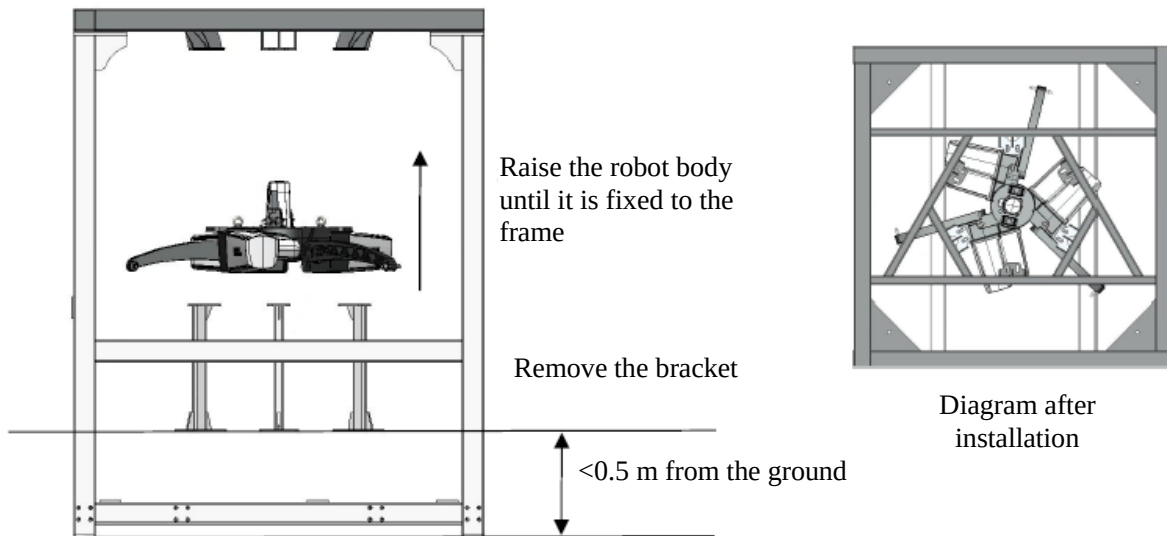


Figure 3-7 Diagram of body robot lifting and installation

4) Put the sleeve into the upper arm rotating shaft, and fix the lower arm to the upper arm rotating shaft with M5×12 hexagon socket head cap screw s. Note: The upper arm with the lashing point mark is on the left side of the axis 1 upper arm.

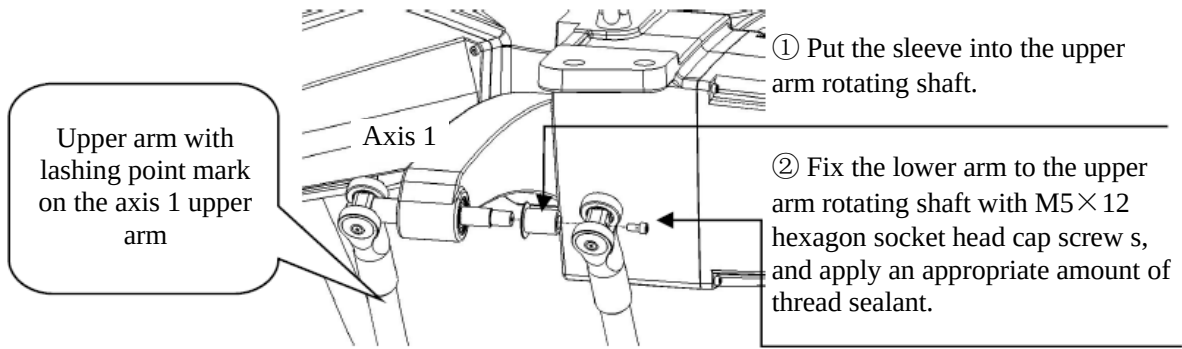


Figure 3-8 Installation of lower arm assembly

5) Remove the outer packaging of the mobile platform carton with a utility knife, put the sleeve into the mobile platform rotating shaft, and then fix the lower arm to the mobile platform rotating shaft with M5×12 hexagon socket head cap screws. Note: The servo motor outlet orientation mark is on the left side of the lower arm.

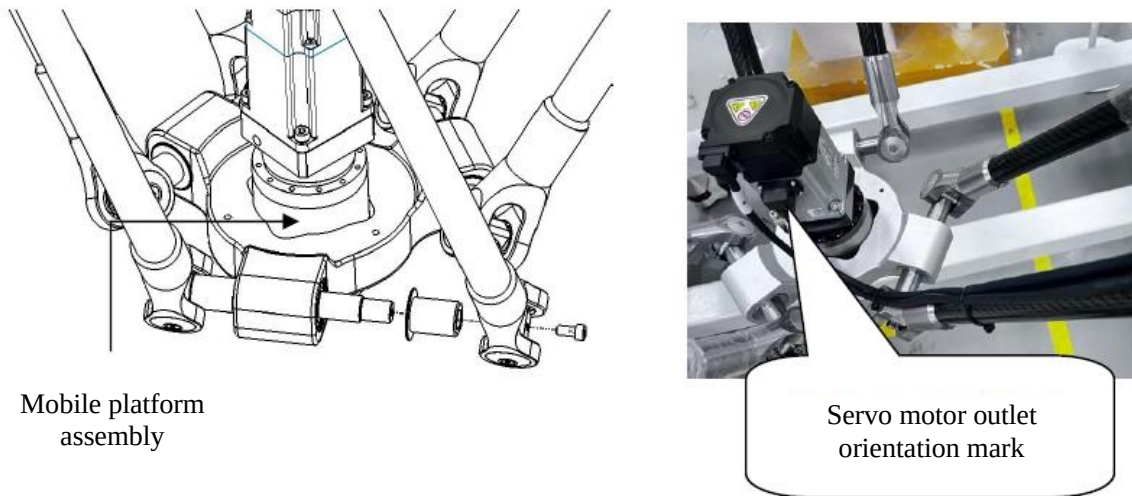


Figure 3-9 Installation of mobile platform assembly

6) When installing the cable, pay attention to the following: according to the cable tie lashing points on the lower arm assembly, align the cable tie lashing points and fix the cable with the lower arm assembly and the motor with the cable tie. There are 3 lashing points in total.

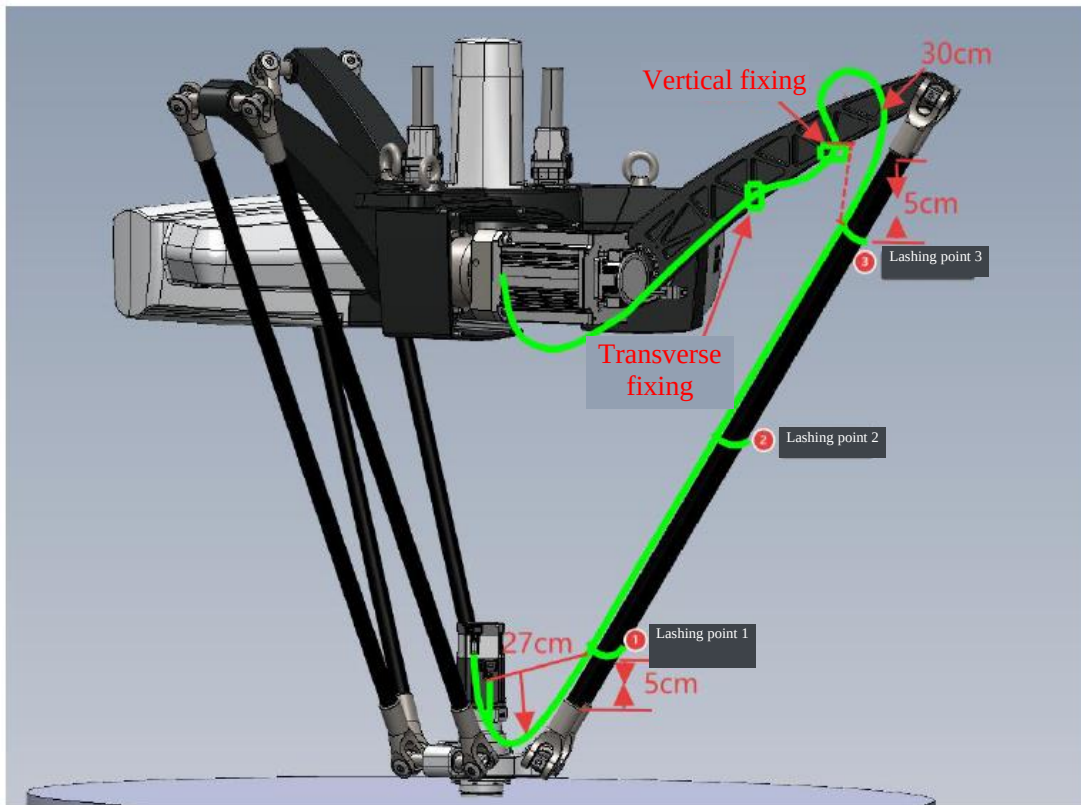


Figure 3-10 Diagram of cable routing

### 3.2 Control cabinet installation and fixing

Step 1: Prepare for the installation.

Before fixing the product, check the product size and ensure enough space. Please refer to the manual of each product for the installation size.

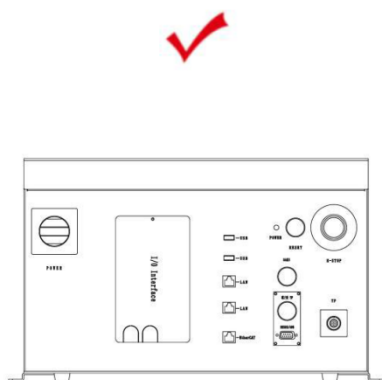
Step 2: Install and fix.

In the standard installation position, keep the mounting surface stable and flat, without tipping or deformation.

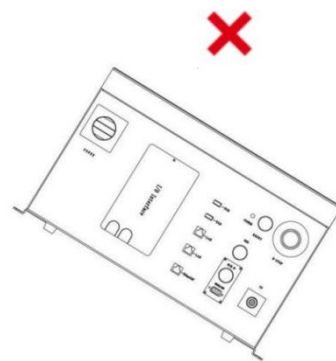
Secure the control cabinet to the mounting surface with accompanying brackets and screws, as shown in Figure 3-9.

Horizontal installation

Horizontal installation



Horizontal placement



Oblique placement

Figure 3-9 Control cabinet installation and fixing

**Caution**

- ◆ If repackaging is required, please follow the above steps in reverse order.
- ◆ Wear safety gloves to prevent scratches and operate carefully to prevent damage to the equipment.
- ◆ Take out the equipment carefully to avoid bumping.

## 4. Connection

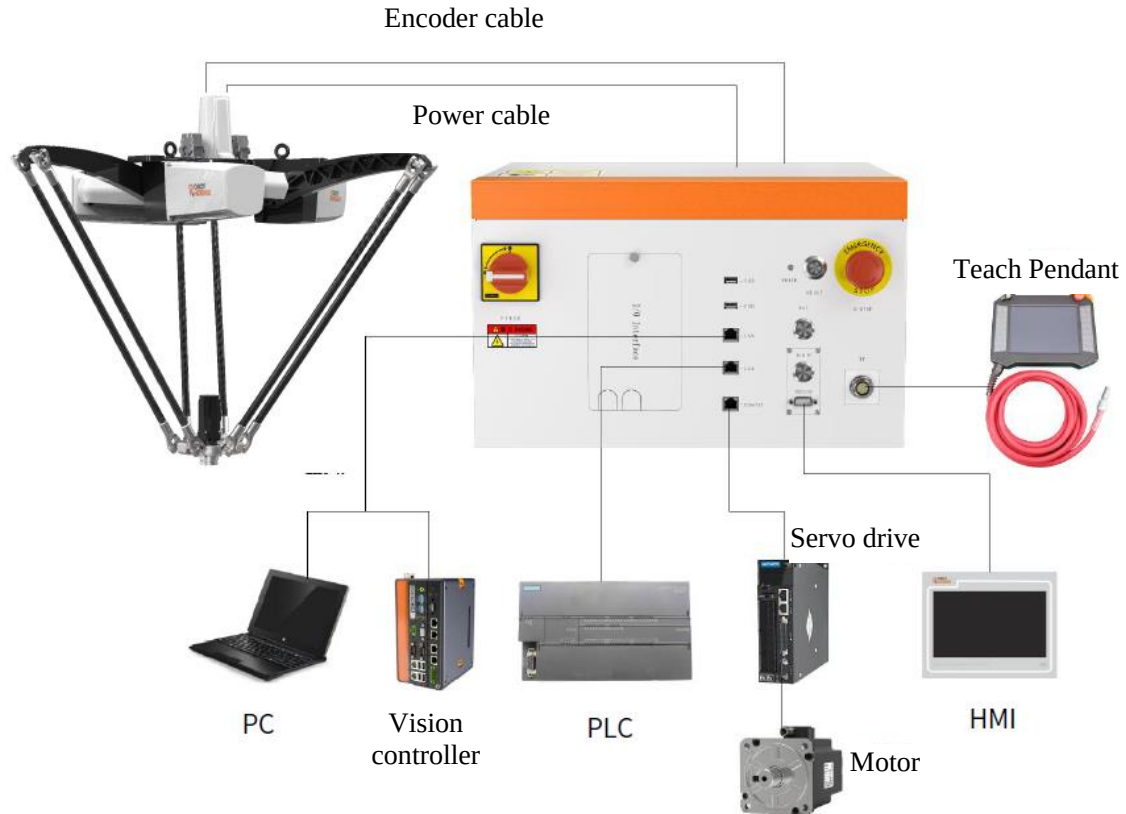


Figure 4-1 Typical system application wiring diagram

Connect the power cable and encoder cable led out from the two plastic connectors on the base side respectively to the power plug and encoder plug of the control cabinet shown in the figure, tighten the corresponding fixing screws, and connect the plug on one side of the Teach Pendant to the TP plug of the control cabinet. Refer to the *YiKingSoft Software Manual* for detailed operation of the Teach Pendant.

### 4.1 Grounding requirements



#### Warning

- ◆ To prevent electric shock, ground the robot and control cabinet.

To improve the anti-interference ability of the system, ensure that the robot body is reliably grounded, and the incoming terminal of the body base is equipped with a grounding rod.

### 4.2 Power connection



#### Warning

- ◆ Do not operate by non-professional personnel, instead by qualified personnel.
- ◆ To prevent electric shock, ground the control cabinet after cutting off the power supply to the control cabinet.
- ◆ Connect the power cable to the plug that complies with local safety specifications or disconnected devices, instead of the factory power supply.
- ◆ Please read and understand the *Bat Series Robot User Manual — Electrical Part* before operation.

The control cabinet adopts a single-phase AC 220 V power supply. Before delivery, it is equipped with a proper cable, of which one end is a 3-core power plug, and the other end is a customer-selected plug. If the customer chooses the cable, it must comply with the safety specifications as follows: cross-sectional area  $\geq 1.5 \text{ mm}^2$ , rated current  $>10 \text{ A}$ . The recommended specifications for the external circuit breaker are as follows: rated current  $\geq 16 \text{ A}$ , trip curve C.



### Danger

- ◆ Please be sure to follow the correct order when connecting the power cord to avoid electric shock caused by wrong connection and short circuit.

## 4.3 Power and encoder cable connection

The product is equipped with the encoder and power cables to be connected to the robot body. Please connect according to the figure below.

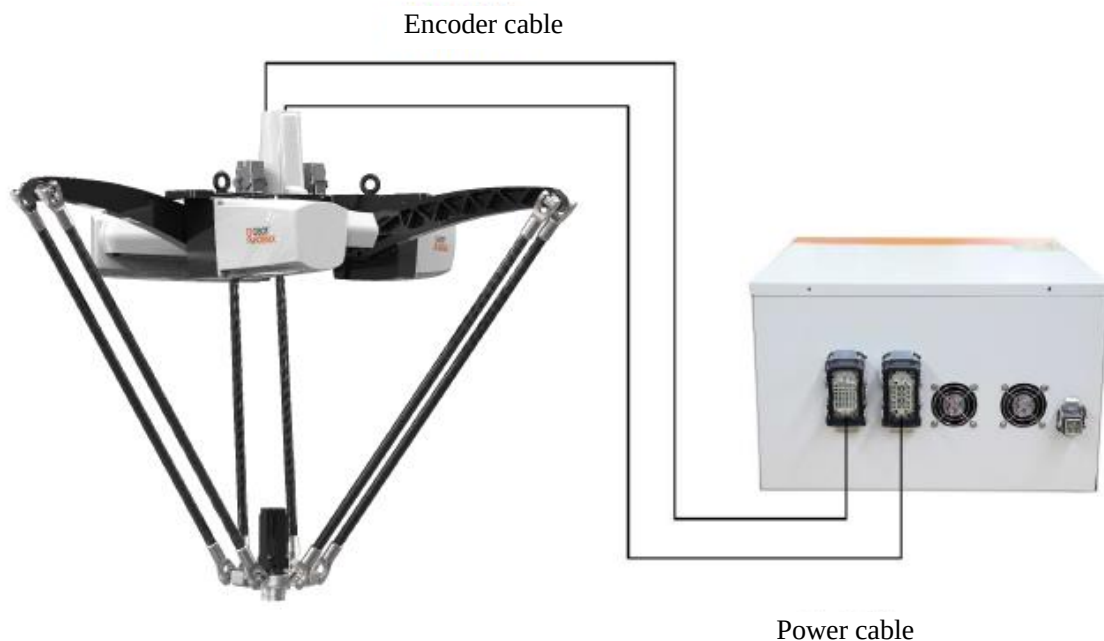


Figure 4-2 Encoder/Power cable connection diagram



### Caution

- ◆ When connecting the encoder and power cables of the control cabinet to the body, do not make mistakes. Otherwise, the robot system may fail to operate normally, and serious safety accidents may occur.

## 4.4 Teach Pendant connection

The product is equipped with a Teach Pendant for robot teaching. Please refer to the *YiKingSoft Software Manual* for detailed operation of the Teach Pendant.

The connection between the Teach Pendant and the control cabinet is as follows:



Figure 4-3 Teach Pendant connection diagram

4.5 Input and output I/O wiring

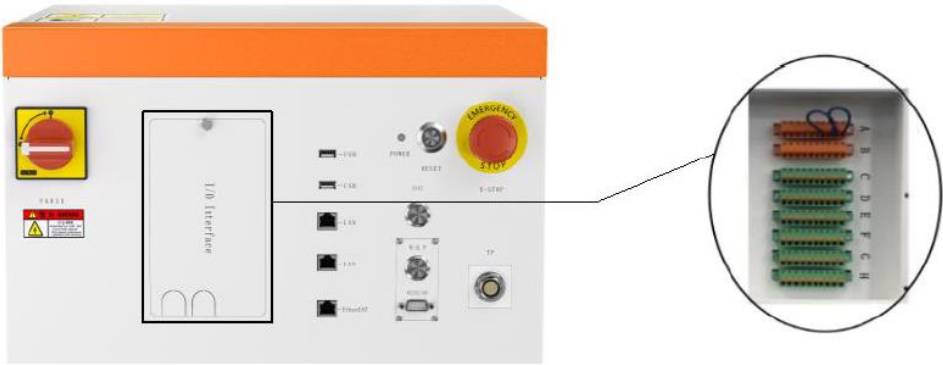


Figure 4-4 External I/O wiring interface of control cabinet

This interface is an external active output point, with a maximum output current of 3 A. The standard configuration is active at the high level, and the special configuration is active at the low level. The high and low levels can be distinguished by the label on the outside of the cabinet.

RP-U2-IO label

| A                           | B                        | C                 | D*        | E                  | F*         | G*        | H*        |
|-----------------------------|--------------------------|-------------------|-----------|--------------------|------------|-----------|-----------|
| 1 External emergency stop 1 | 1 Configuration input 1  | 1 General input 1 | 1 Input 1 | 1 General output 1 | 1 Output 1 | 1 A       | 1 A       |
| 2                           | 2 Configuration input 2  | 2 General input 2 | 2 Input 2 | 2 General output 2 | 2 Output 2 | 2 A-      | 2 A-      |
| 3 External emergency stop 2 | 3 Configuration input 3  | 3 General input 3 | 3 Input 3 | 3 General output 3 | 3 Output 3 | 3 B       | 3 B       |
| 4                           | 4 Configuration input 4  | 4 General Input 4 | 4 Input 4 | 4 General output 4 | 4 Output 4 | 4 B-      | 4 B-      |
| 5 Emergency stop output 1   | 5 Configuration output 1 | 5 General Input 5 | 5 Input 5 | 5 General output 5 | 5 Output 5 | 5 C       | 5 C       |
| 6                           | 6 Configuration output 2 | 6 General input 6 | 6 Input 6 | 6 General output 6 | 6 Output 6 | 6 C-      | 6 C-      |
| 7 Emergency stop output 2   | 7 Configuration output 3 | 7 General Input 7 | 7 Input 7 | 7 General output 7 | 7 Output 7 | 7 5V      | 7 5V      |
| 8                           | 8 Configuration output 4 | 8 General input 8 | 8 Input 8 | 8 General output 8 | 8 Output 8 | 8 0V      | 8 0V      |
| 9 External reset circuit    | 9 0V                     | 9 0V              | 9 0V      | 9 0V               | 9 0V       | 9 0V      | 9         |
| 10                          | 10 24V                   | 10 24V            | 10 24V    | 10 24V             | 10 24V     | 10 Shield | 10 Shield |

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Figure 4-5 External I/O definition of control cabinet



◆ Column A is listed as safe wiring, which has been short-circuited before delivery. Users need to remove the external emergency stop before connecting.



◆ Column B is configurable I/O, start, stop, camera trigger, alarm output, etc.

## 5. Commissioning Procedures

| Steps                            | Sub-steps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Robot installation inspection | a. Confirm that the robot body and control cabinet are installed firmly.<br>b. Confirm that the power cable and encoder cable of the control cabinet are tightly connected to the robot body.<br>c. Confirm that the cable plug of the control cabinet is connected correctly, and all connections are effectively protected.<br>d. Confirm that the Teach Pendant is properly connected to the control cabinet.<br>e. Confirm that the "mode switch" on the Teach Pendant is turned to manual.<br>f. Confirm that the emergency stop button is pressed.                                                                                                                                                                                                                     |
| 2. Power-on                      | a. Confirm that the supply voltage is within the required range.<br>b. Turn on the power supply.<br>c. Wait for the YiKingSoft to start automatically, or start the YiKingSoft manually.<br>d. Check whether the red light on the control cabinet flashes (status: emergency stop).<br>e. Pull up the emergency stop button, press the reset button, and check whether the green light flashes (status: ready).<br>f. Check the emergency stop button: <ul style="list-style-type: none"> <li>● Press the emergency stop button.</li> <li>● Check whether the red light on the control cabinet flashes (status: emergency stop).</li> <li>● Pull up the emergency stop button, press the reset button, and check whether the green light flashes (status: ready).</li> </ul> |
| 3. Zone detection                | a. Observe whether the robot is at the origin in the jog interface.<br>b. If it is not at the origin, please execute the return to origin.<br>c. After returning to the origin, observe whether the axis 4 of the robot is vertical.<br>d. Check whether the three upper arms of the robot are horizontal. <ul style="list-style-type: none"> <li>● If there is any abnormality, please contact the manufacturer.</li> </ul>                                                                                                                                                                                                                                                                                                                                                 |
| 4. Robot jog                     | a. Open the jog interface.<br>b. Turn the enable switch on the back of the Teach Pendant to the middle position (status: pause).<br>c. Click the axis jog button on the bottom left of the Teach Pendant to jog each axis of the robot (status: jog).<br>d. Release or turn the enable switch to the lower position, and the robot will stop moving (status: pause). <ul style="list-style-type: none"> <li>● For more operations, please refer to 13. <i>Jog</i> under Chapter 5 of the <i>YiKingSoft Software Manual</i>.</li> </ul>                                                                                                                                                                                                                                       |
| 5. Program editing               | a. Log in to the "Engineer" permission.<br>b. Create a new program or modify the original program.<br>c. Save the program.<br>d. Compile the program. If the compilation fails, modify the program according to the prompts until the compilation passes. <ul style="list-style-type: none"> <li>● Please refer to the <i>Kingkong Instruction Manual — Bat Series</i> for details.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                               |
| 6. Commissioning                 | Perform commissioning in manual mode or in automatic mode at a low speed.<br>a. Manual: Turn the enable switch to the middle position, and press the run button  or click "commissioning". If a warning message pops up, please confirm according to the prompt, move the cursor to the next command, and then press the run button  or click "commissioning" again.                                                                                                                                                                                                                                   |

|               |                                                                                                                                                                                                                           |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|               | b. Automatic: Turn the key to automatic mode, reduce the speed to less than 5%, and then press the run button  or click "commissioning". |
| 7. Formal run | a. Run at normal speed in automatic mode.<br>b. Turn the key to automatic mode.<br>c. Select and open the program in the run interface, and the robot will start running.                                                 |

### © Technical services

RobotPhoenix LLC is willing to provide information on the robot operation and troubleshooting and offer detailed consultations. If your robot malfunctions during operation, please contact our service center immediately and provide as detailed information about the robot as possible, and then we will provide you with a timely solution.

### © Contact information

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