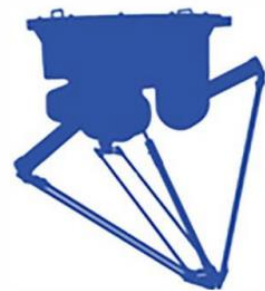


AP25X Robot

User Manual



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User's Manual

AP25X Robot

AP25X-1130-1543

AP25X-1130-1544

AP25X-1600-1543

AP25X-1600-1544

AP25X-2200-1543

AP25X-2200-1544

Dongguan Liqun Automation Technology Co., Ltd

QKM Technology (Dongguan) Co., Ltd.

Document version V2.0.1

Release date 2025-08-25

Previous

Thank you for purchasing our robots

This manual records what is required for the proper use of the robot

Please read the contents of this manual carefully before using it

Please keep this handbook safe for future reference

General

This manual describes the product features, main components, installation guidance, system debugging, and technical specifications of the robot in detail. It is convenient for users to systematically understand and use the robot correctly.

reader object

This manual is applicable to:

Customer engineer

Application engineer

Installation and commis-
sioning engineer

Technical support engineer

Illustrated meaning

The illustrations in this document will clearly explain all the hazards, warnings, precautions, and instructions that may occur when performing the work described in this manual; Please pay attention when the following figure appears in the manual.

The following table describes the diagrams that appear in this manual:

Figures	Description
 DANGER	It indicates that serious dangerous situations will occur, such as the death or serious injury of personnel if not avoided.
 WARNING	It indicates that potential dangerous situations may occur, such as personal injury and equipment damage if not avoided.
 NOTICE	Unpredictable situations may occur, such as device damage, performance degradation, and data loss.
 NOTE	Description of key information and operation tips.

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1 Safety precautions

This chapter describes the safety precautions. Please read this manual carefully before using this product. This product should be used in an environment that meets the design specifications. Do not modify the product without authorization, otherwise it may cause product failure, personal injury, electric shock, fire, etc.

The personnel who use this product for system design and manufacturing must be trained by the company or the corresponding organization or have equivalent professional skills. All personnel involved in robot installation, operation, teaching, programming, and system development must carefully read this manual and strictly follow the specifications of the operation manual to use the robot.

1.1 General Security



The robot is a live device, and non-professionals are not allowed to change the circuit at will, otherwise it may cause harm to the equipment or personal injury.

Please use the robot within the specified environmental range. Using the robot beyond the specifications and load conditions will shorten the service life of the product or even damage the equipment.

Personnel responsible for installing, operating, and maintaining Liquin automation robots must undergo strict training, understand various safety precautions, and master the correct operation and maintenance methods before operating and maintaining the robots.

Users need to ensure that the robot is operating under safe conditions, and there are no objects around the robot that may harm the robot. Due to the movement of movable mechanical parts, there may be risks such as scratches and collisions to the robot. Users should conduct risk assessments based on the environment and set up specific protective facilities.

The dangerous area of the robot is the space of the action area + 100 mm. To prevent personnel from entering the action area of the robot by mistake, safety barriers must be set up to prevent personnel from entering the dangerous area.

When the temperature is close to the freezing temperature, it should be operated at a speed of 10% or less for more than 10 minutes for preheating. After the robot is warmed up, other actions can be performed.

Highly corrosive cleaning is not suitable for cleaning robots, and anodized parts are not suitable for immersion cleaning.

Non-professionally trained personnel are not allowed to repair faulty products or dismantle the electrical control cabinet without authorization. If the product malfunctions, please contact Liquin Automation customer service in a timely manner.

The user should perform routine inspection and regular maintenance on the equipment according to the maintenance manual and related requirements, and replace faulty parts in a timely manner to ensure the safe operation and service life of the equipment.

If the product is scrapped and you want to discard it, please comply with relevant laws and properly handle industrial waste to protect the environment.

1.2 Operation Safety



When installing and maintaining the robot, the power should be cut off to prevent accidents. Do not enter the work area after the robot is powered on to prevent danger.

In order to prevent the robot from falling at the end of the robot due to sudden power failure in the upper servo state, causing personal injury and property damage, The AP25X robot has added a delayed power-off protection function, which ensures that the robot does not drop significantly when encountering a power outage in the upper servo state. However, this function must not be used as a routine shutdown method, otherwise it may affect the service life of the robot.

The following safety rules should be followed when installing, teaching, and programming the robot:

During the handling and installation process, please be careful. Place the robot with care according to the instructions on the packaging box, and place it correctly in the direction of the arrow. Otherwise, the robot may be easily damaged.

Before operating the robot, familiarize yourself with the position of the emergency stop switch and ensure that you can quickly press the emergency switch in case of emergency.

Before the robot starts running, ensure that there are no people in the robot's movement area and guardrail. If you accidentally enter the operating range of the running robot or have direct contact with the robot, it may cause dangerous accidents.

When operating the robot with a computer or a teaching device, do not enter the working range of the robot at will, otherwise it may cause harm to the robot or itself.

During the normal operation of the robot, do not remove and insert the power supply Filament and communication Filament.

In the event of abnormal power supply or sudden power failure, please turn off the product power supply. Otherwise, the robot may suddenly start moving when the power supply is restored.

2 Product Overview

The AP25X robot is developed by Dongguan Li qun Automation Technology Co., Ltd. (hereinafter referred to as: Li Qun Automation (QKM) independently developed Delta configuration integrated parallel robot, which is a high-speed, heavy-duty parallel robot mainly used in food packaging, 3C consumer electronics packaging, pharmaceutical packaging, and other fields. It can replace manual labor to achieve fast grabbing, high-speed sorting, and dynamic tracking of conveyor belts.

2.1 Meaning of Model

The AP25X robot comes in three sizes, each with three-axis and four-axis models. That is, AP25X-1130-1543, AP25X-1130-1544, AP25X-1600-1543, AP25X-1600-1544, AP25X-2200-1543, AP25X-2200-1544, as shown in Figure 2-1. Figure 2-1 shows the overall differences between each model.

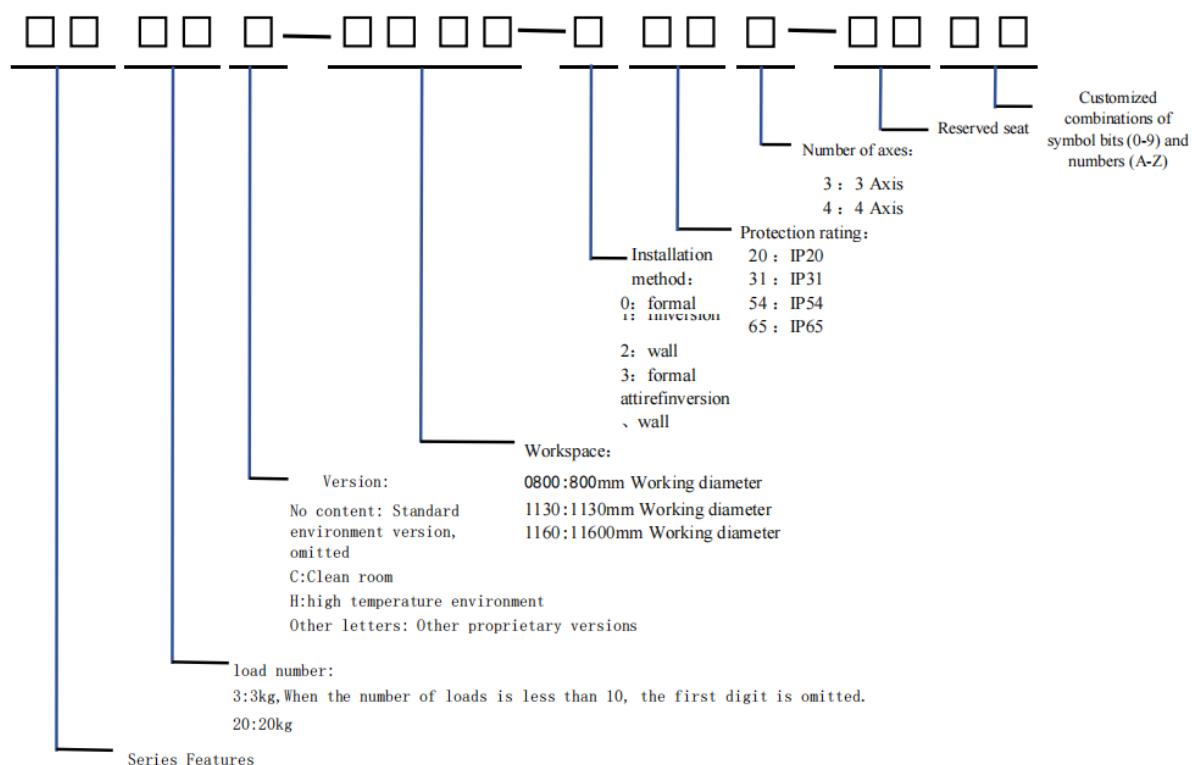


Figure 2-1 Meaning of model

Model	Work space	Degree of freedom	Rotating axes	Moving platform
AP25X-1130-1543	1130 mm	3 Axes	None	Rotating shafts cannot be installed
AP25X-1130-1544	1130 mm	4 Axes	Yes	Rotable shaft
AP25X-1600-1543	1600 mm	3 Axes	None	Rotating shafts cannot be installed
AP25X-1600-1544	1600 mm	4 Axes	Yes	Rotable shaft
AP25X-2200-1543	2200 mm	3 Axes	None	Rotating shafts cannot be installed
AP25X-2200-1544	2200 mm	4 Axes	Yes	Rotable shaft

Table 2-1 Robot parameters

2

2.2 Overall Introduction

The appearance of the AP25X robot is shown in Figure 2-2. The main components include the base, driving arm, driven arm, moving platform, rotating shaft, interface panel, etc., as shown in.

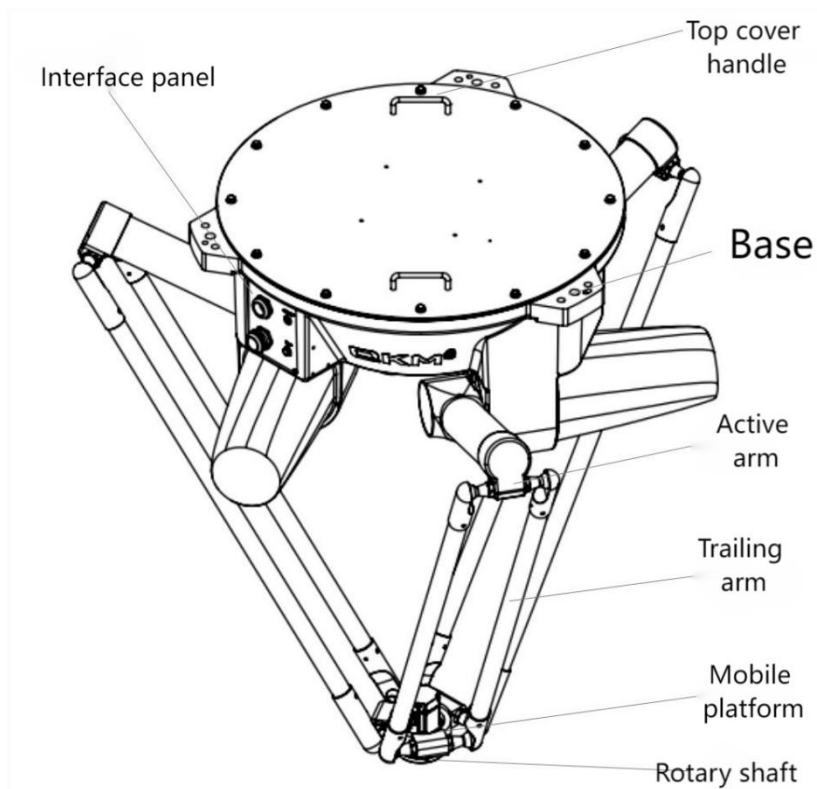


Figure 2-2 Appearance of the robot

**NOTE**

The AP25X three-axis robot (AP25X-1130-1543, AP25X-1600-1543, AP25X-2200-1543) does not include a rotating axis, and the dynamic platform part is slightly different from the four-axis robot.

2.3 Size Parameters

The overall dimensions of the AP25X robot are shown in Figure 2-3. In the origin position, the dimension parameters are described in Table 2-2.

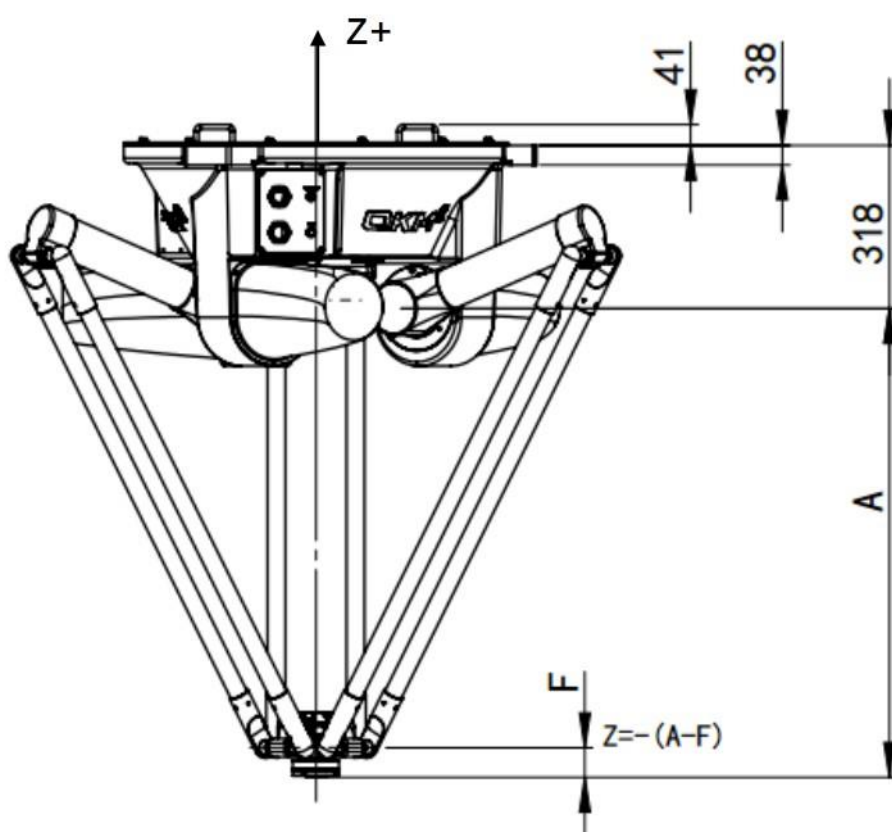


Figure 2-3 Overall size of the robot

Size parameters (mm)	AP25X-1130-1543	AP25X-1130-1544	AP25X-1600-1543	AP25X-1600-1544	AP25X-2200-1543	AP25X-2200-1544
A	635	670	888	923	1150	1188
F	23	58	23	58	23	58
Z	-612	-612	-865	-865	-1127	-1130

Table 2-3 Overall size parameters of the robot

2.4 Work Space

The motion space of the AP25X robot is shown in Figure 2-4 and Figure 2-5. The size parameters of the robot are described in Table 2-2.

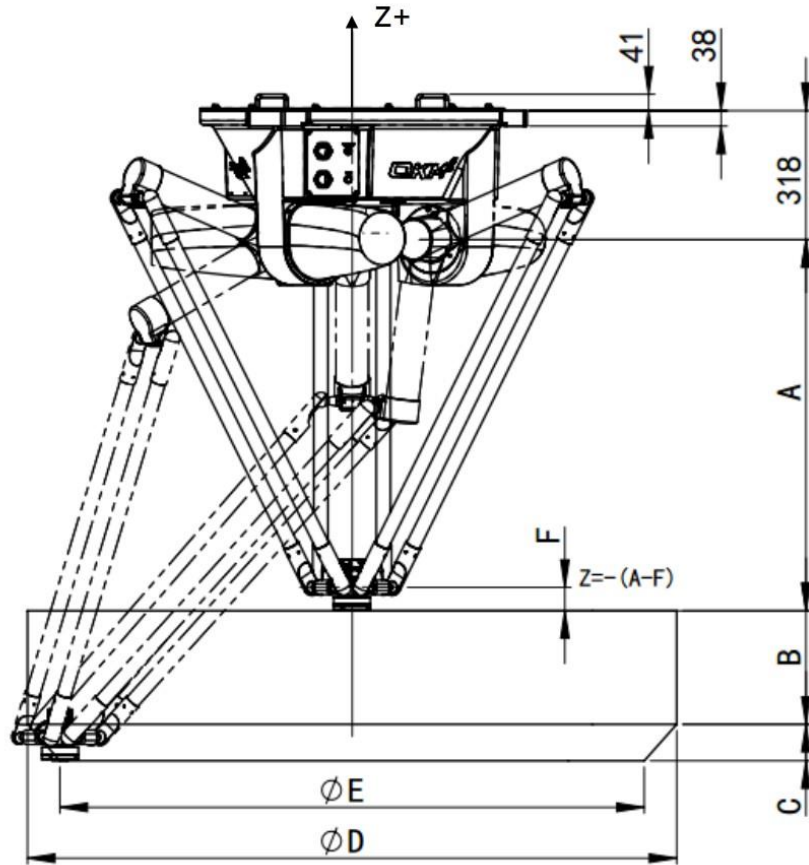


Figure 2-4 Main view of the robot working space

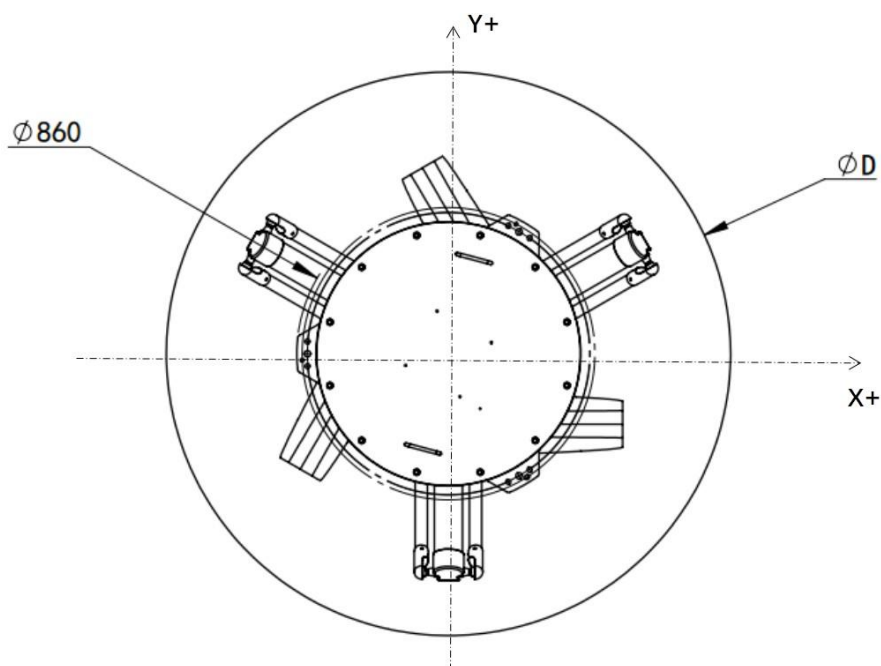


Figure 2-5 Top view of the robot working space

Work space (mm)	AP25X- 1130-1543	AP25X- 1130-1544	AP25X- 1600-1543	AP25X- 1600-1544	AP25X- 2200-1543	AP25X- 2200-1544
B	230	230	280	280	360	360
C	180	180	120	120	350	350
D	1130	1130	1600	1600	2200	2200
E	720	720	1200	1200	1250	1250

Table 2-4 Robot working space parameters

**NOTICE**

When using a robot, avoid bringing the actual working area of the robot close to the limit position of the theoretical working area.

2.5 Robot Coordinate System

The world coordinate system of the AP25X robot is shown in Figure 2-6, where the X-axis of the robot is parallel to the axis 1 of the active arm next to the panel, as shown in Figure 2-7 is the output axis 1 and the label.

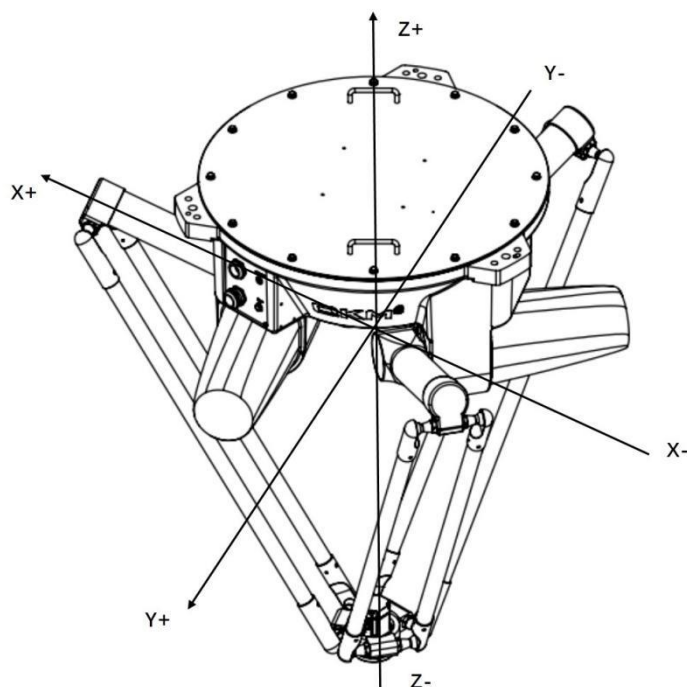


Figure 2-6 World coordinate system

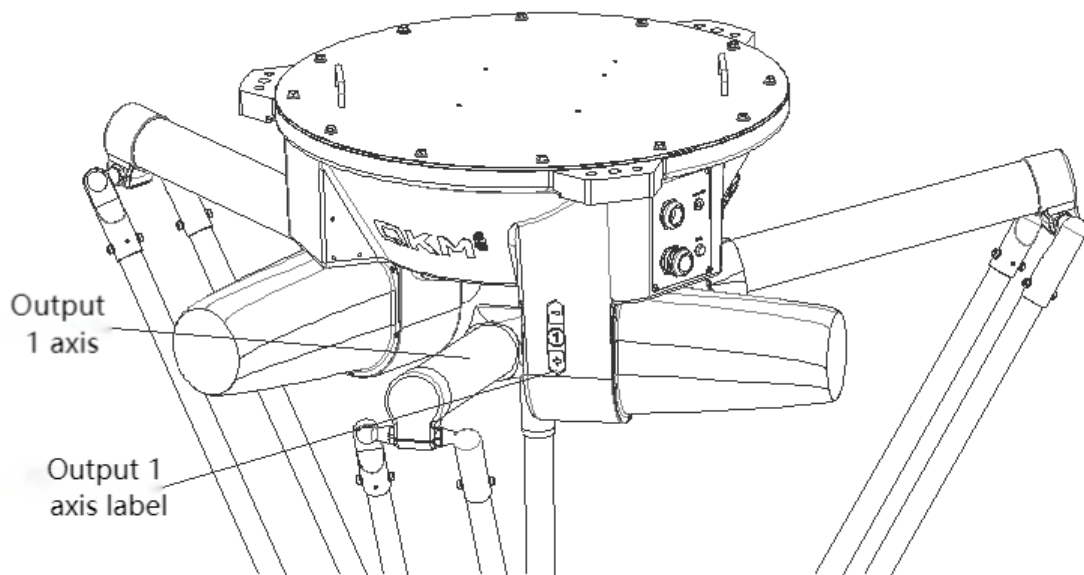


Figure 2-7 Output 1 axis and label

2.6 Product Features

The AP25X robot has great advantages in fast grabbing and sorting applications. The features of this product are as follows:

The speed is fast, with a standard trajectory beat of 0.31 s. It can be flexibly applied to precision assembly, sorting, and packaging.

Highly integrated controller, servo drive.

High positioning accuracy, with a repeat positioning accuracy of ± 0.1 mm. It meets most applications.

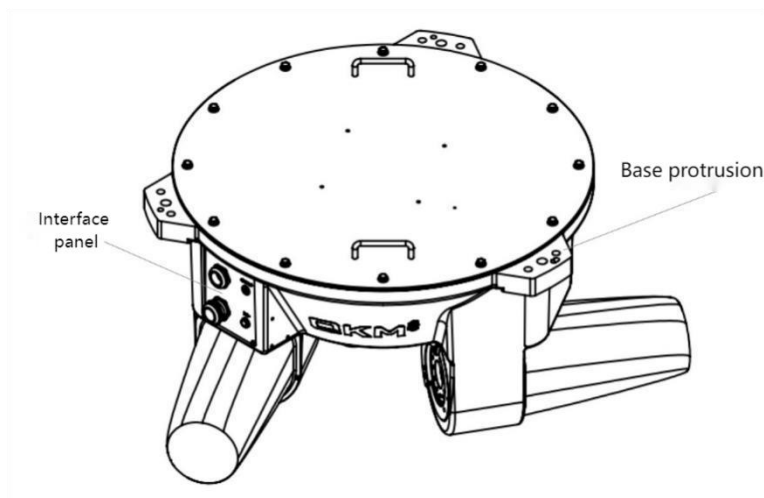
IP54 protection level.

Rich function expansion, strong openness, strong flexibility, and can be developed for secondary purposes.

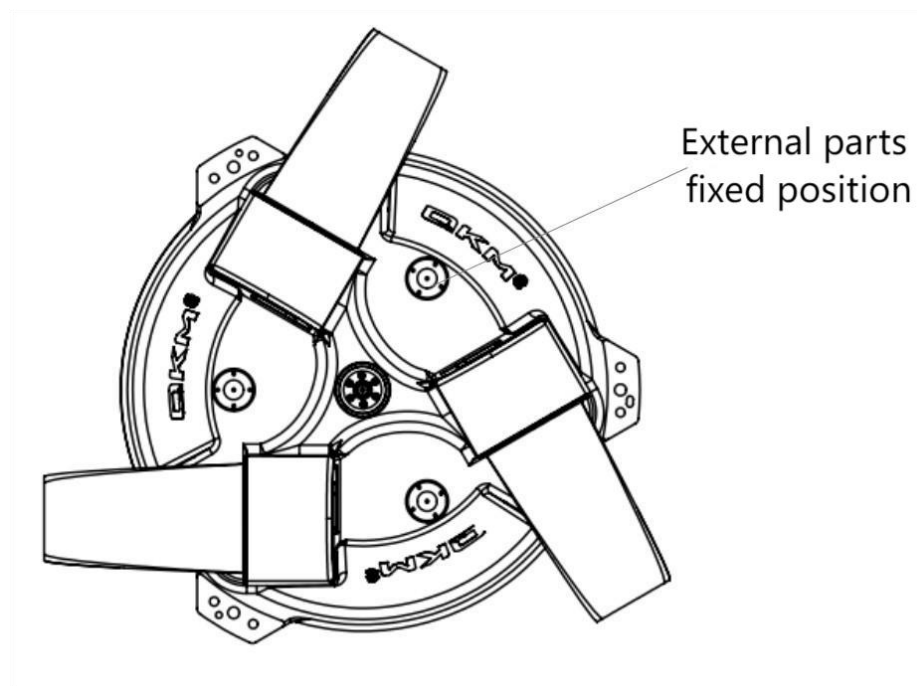
3 Introduction to Main Components

3.1 Base

The base of the AP25X robot is made of high-strength cast aluminium alloy, as shown in Figure 31, and the servo motor is installed on the base; An interface panel is set on the side of the base. The interface panel can be used for status display, device power connection, and communication connection. For the function definition of the interface panel, refer to the Panel Description in section 4.1. The base is provided with three base bosses, each of which is provided with one through hole and two threaded holes for installing bolts to fix the base. The bottom of the base is provided with an external part fixing position. Figure 3-1 Base



(a) Base diagram



(b) Base bottom view

Figure 3-1 Base

3.2 Active Arm

The driving arm is connected to the motor through a high-precision reducer. The CARBON FIBER tube and workpiece on the active arm are assembled by special process, and the ball joint is locked at the end of the active arm, as shown in Figure 32. The rotation angle of the active arm is limited by a hard limit on the base. Figure 3-2 Active arm

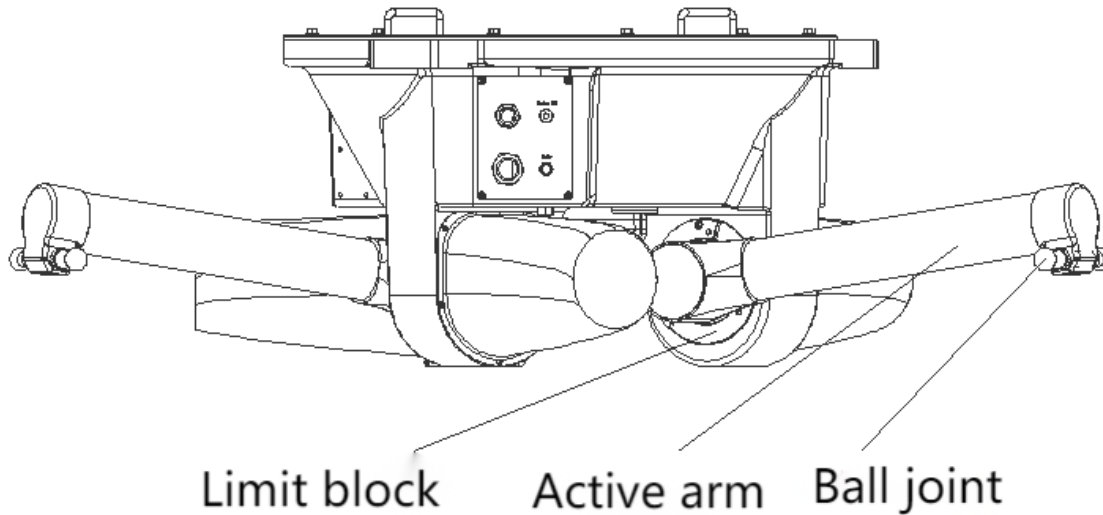


Figure 3-2 Active arm

3.3 Driven Arm

The driving arm and the driven arm are connected and positioned by a ball joint, and the tension is provided by a spring between the ball hinges at both ends of the driven arm. Figure 33 shows the diagram of the driven arm. Figure 3-3 Slave boom

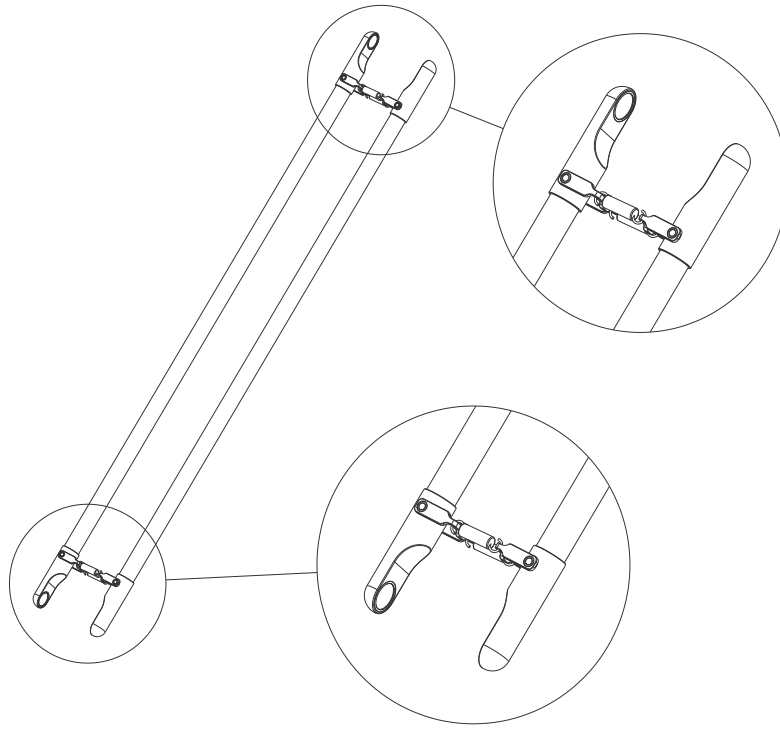
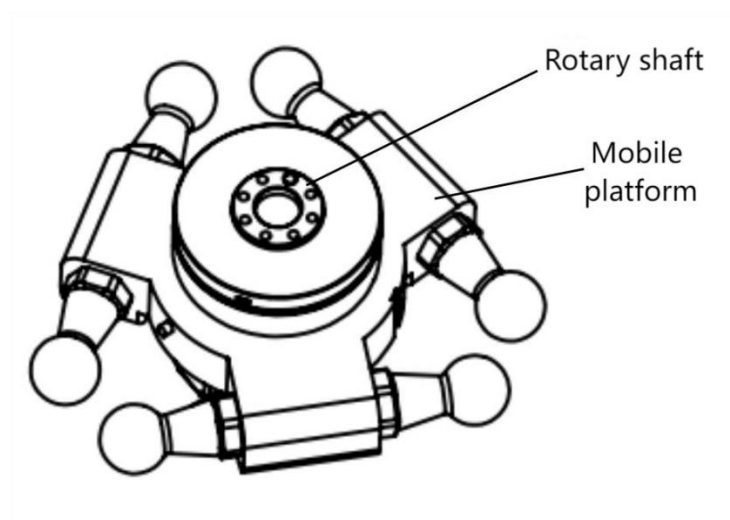


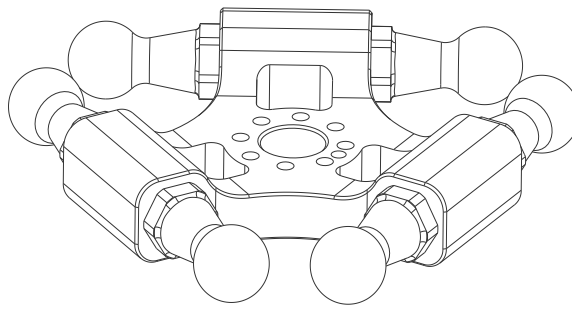
Figure 3-3 Slave boom

3.4 Moving Platform

The AP25X four-axis robot platform has a rotating shaft in the middle, which adopts a sealed design and can be directly rinsed with clean water. The lower end face of the shaft is the connecting flange of the working fixture, and the upper end of the shaft is connected to the rotating shaft. Figure 34 shows the dynamic platform.错误!未找到引用源。



(a) Four-axis platform



(b) Three-axis platform

Figure 3-4 Mobile platform



NOTE

AP25X three-axis robots (AP25X-1130-1543, AP25X-1600-1543, AP25X-2200-1543) have no rotating shaft in the moving platform.

4 Introduction to Electrical Functions

4.1 Panel Description

The AP25X robot achieves electrical connection between the internal and external parts of the robot through the interface panel. One interface panel is located on the side of the base output axis 1, and the interface panel is described as follows:

The interface panel includes the PG connector of the power line and Signalis line, system indicator, and loose lock switch, as shown in Figure 4-1.

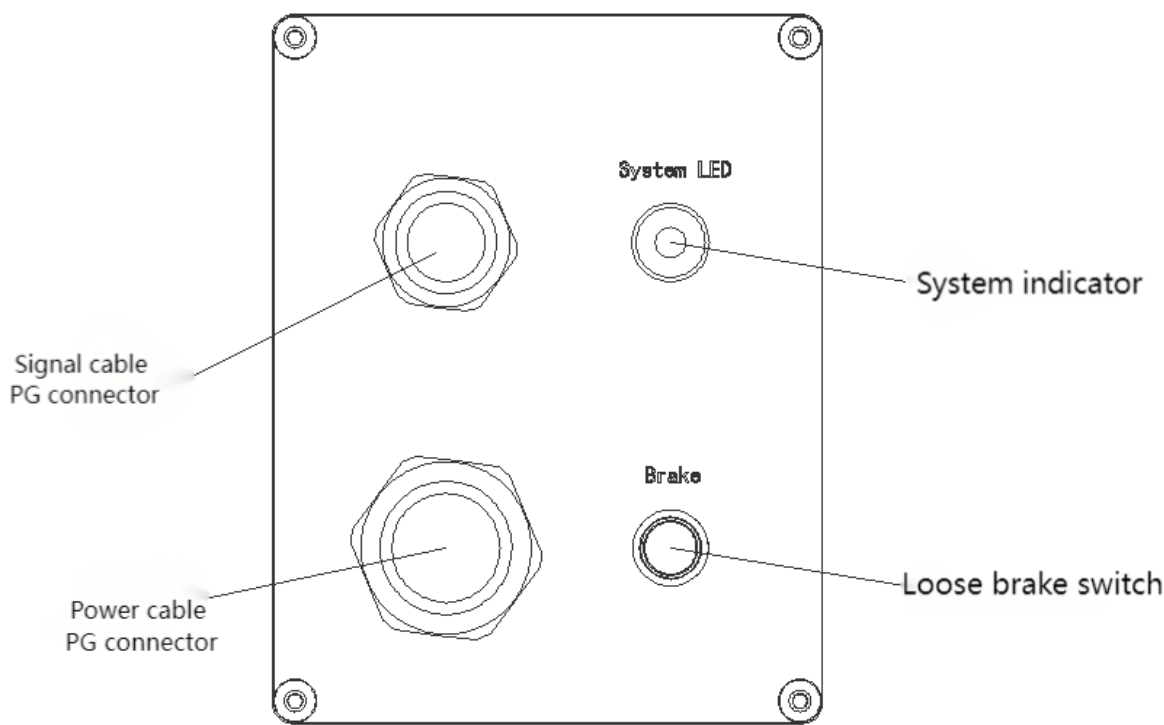


Figure 4-1 Interface panel

4.2 Description of Indicators

Table 4-1 describes the functions of the indicators. Table 4-1 Signals lamp function

2

Panel silk screen	Function	Description
System LED	Robot servo status indicator	"Blinking"-indicates that the robot servo has just been powered on, or is being powered on

Panel silk screen	Function	Description
		"Stand on"-indicates that the robot servo has been powered on "Still off"-indicates that the robot servo is not powered on

Table 4-1 Signals lamp function

2



When pressing the "Brake" button, it is necessary to support the end of the moving platform, otherwise the moving platform may fall freely, causing damage to the moving platform or accidents to personal safety.

5 Installation Robots

5.1 Unpacking Inspection

5.1.1 Case Handling

The robot is packaged in wooden boxes, and the wooden box is fixed with fixed bolts to fix the bottom plate and top cover. The dimensions of the wooden box are shown in Figure 5-1 (unit: mm). The actual size is subject to the actual product.

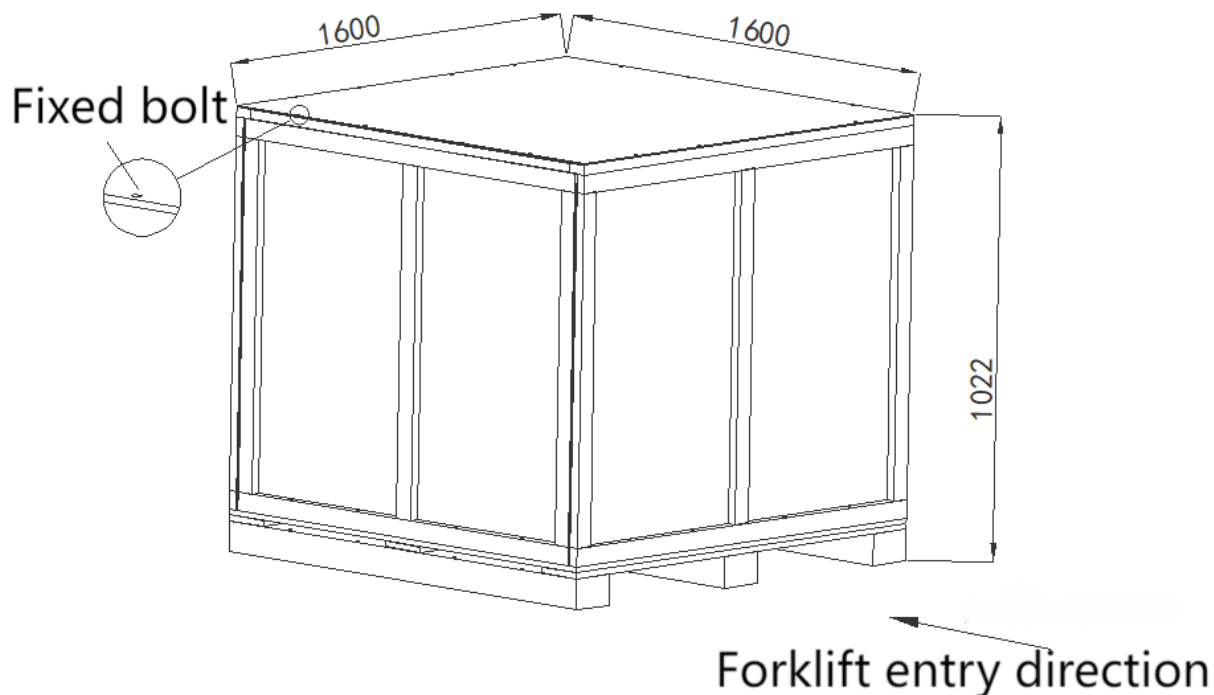


Figure 5-1 Packing box



When the robot is not used for a long time, it needs to be disassembled and fixed in the packaging box according to the factory method.

5.1.2 Unpacking Inspection

After the robot is delivered to the user's site, please check and confirm:

The packaging wooden box is placed vertically upward and the box is dry.

The packaging wooden box is intact.

After inspection, remove the items from the box as follows:

Remove the fixing bolt (M6) from the top cover of the packing box.

Take off the top cover of the packing case. The contents in the case are shown in Figure

52. Figure 5-2 Items in the box

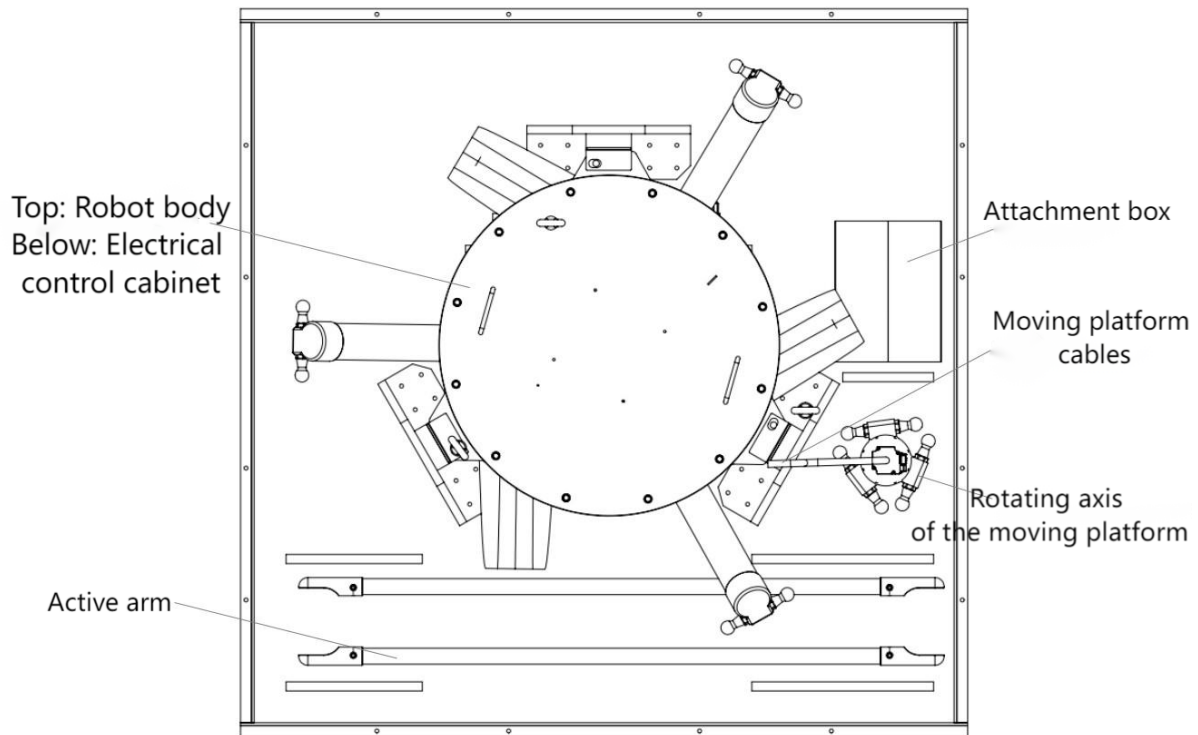


Figure 5-2 Items in the box

Take out the rotating shaft, driven arm, and moving platform components (already packed together) together with the beam, remove the strapping buckle and strapping, and separate the beam from the component.

Remove the external hex screw M8 (as shown in Figure 5-3) that connects the robot body to the frame inside the box.

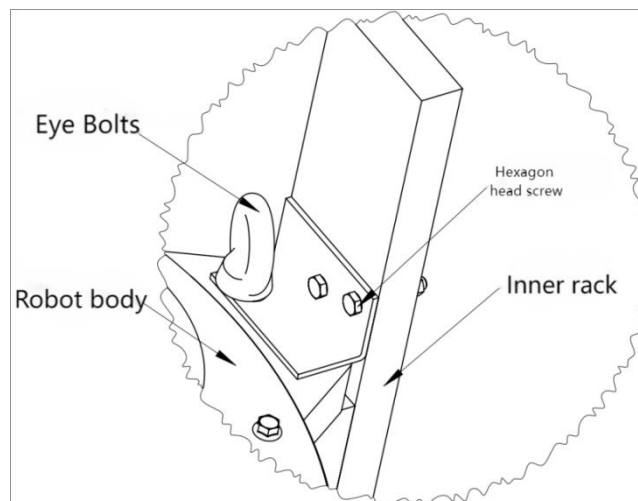


Figure 5-3 Fixing inside the robot body box

Take out the robot using the already assembled lifting ring screws, as shown in Figure 5-4, and finally remove the large plastic bag that wraps the robot from bottom to top.

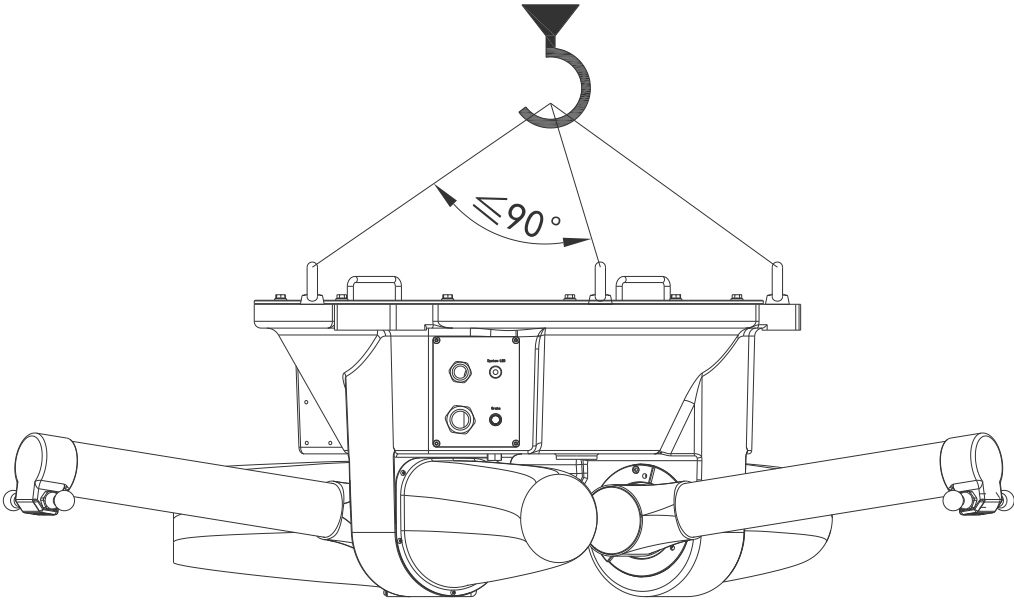


Figure 5-4 The way to remove the base

5.2 Mounting Racks

Users should design and manufacture racks according to actual requirements. Section 5.2 provides only the relevant rack parameters for reference.0



The three planes of the rack-mounted robot must meet certain flatness requirements. The rack in this example may not meet the user's requirements. This document provides only the rack data for reference. You can fill the rack with sand or cement to reduce the possibility of resonance.

5.2.1 Introduction to the Rack

The reference rack dimensions are shown in Table 5-1.

Type	L*W*H (unit: mm)	Weight (in kg)	Applicable objects
rack	2500*2500*2300	1125	AP25X-1130-1543
			AP25X-1130-1544
			AP25X-1600-1543
			AP25X-1600-1544
			AP25X-2200-1543

Type	L*W*H (unit: mm)	Weight (in kg)	Applicable objects
			AP25X-2200-1544

Table 5-1 Frame reference dimensions

The overall frame is mainly made of square steel pipes with a cross-sectional size of 120×120 mm and a thickness of 5 mm, 25 mm thick steel plates, and 10 mm thick steel plates, which are made by welding process. The structure is shown in Figure 55.

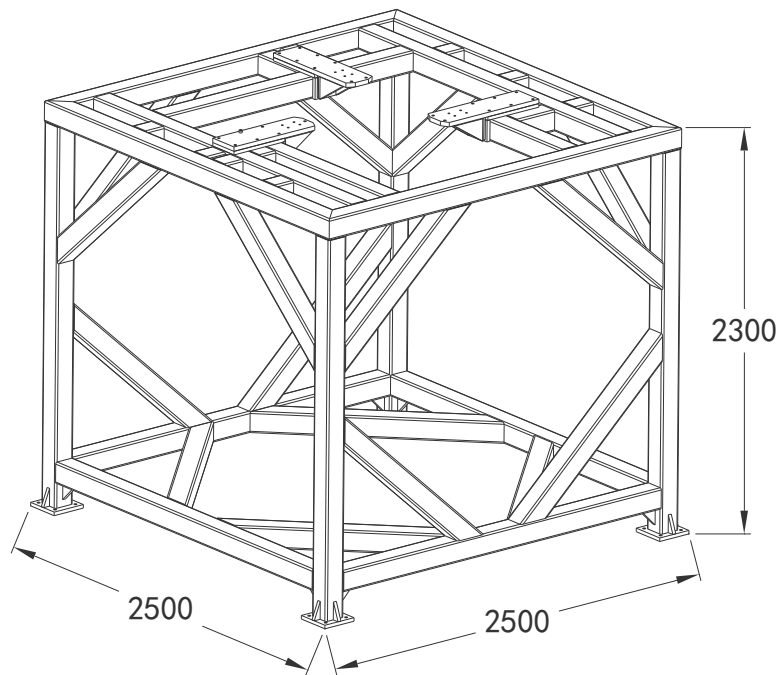


Figure 5-5 A reference rack

01

5.2.2 Description of Installation

During the working process of the robot, due to its own components, load inertia, and acceleration and deceleration during the motion process, a certain reaction force will be transmitted to the installation frame of the robot, causing the frame to generate vibration within a certain frequency range. This vibration will have adverse effects on the positioning accuracy and Control performance of the robot.

To extend the service life of the frame, the components of the welded frame should be welded with stainless steel or ordinary carbon steel and then painted with anti-rust paint. The weld position should be polished smooth, and the protruding sharp components should be rounded as much as possible to ensure the safety of operators. In this example, the frame is made of 5mm thick 120120 steel pipe profiles, and users can design and manufacture the frame according to their usage.

For the AP25X robot, the maximum horizontal working space is 1130 mm, 1600 mm, and 2200 mm circles, and the smaller frame will interfere with a part of the working space. If the size of the rack is limited, or if the user needs to have a higher working frequency in a small working space, a smaller rack can be used. On the other hand, if a heavier load or a larger working space is used, a larger rack is required to ensure better rigidity.

5.2.3 Rack Installation

Place the rack on the concrete floor to be installed.

Use a $\Phi 23$ drill bit to drill holes on the concrete floor according to the holes on the four installation plates on the rack.

Use M16 x 150 expansion bolts to secure the rack to the concrete floor (pre-tightening torque of 125 N·m), as shown in Figure 5-6.

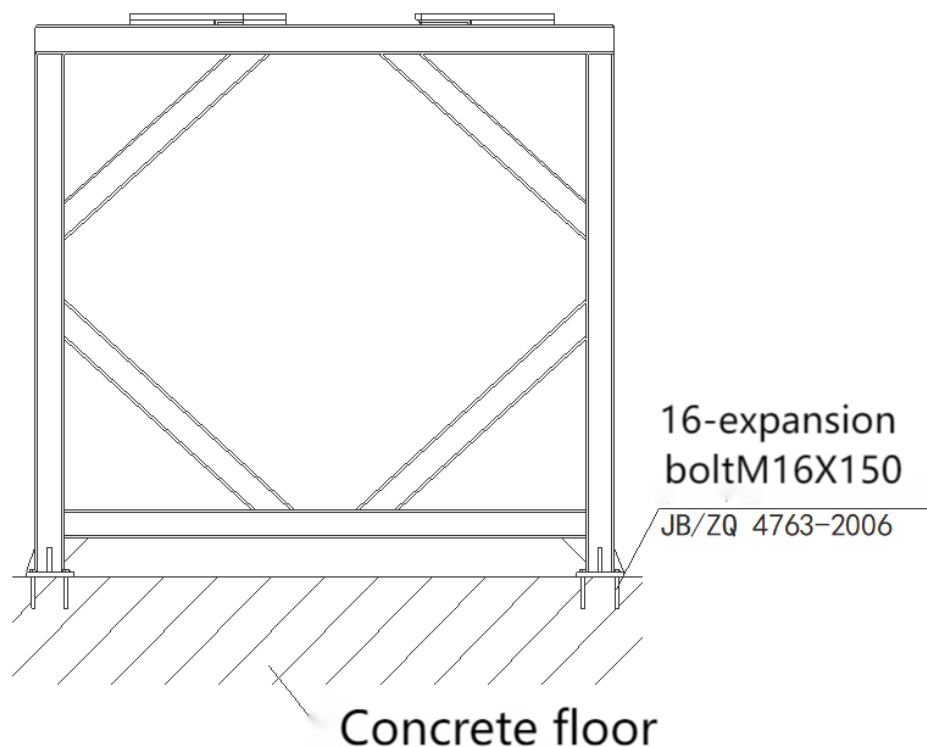


Figure 5-6 Fixing expansion bolts and foundation

5.3 Mounting Base

When the base is fixed on the rack, it is divided into the following types according to the installation space:

- (1) Downward installation: the base boss is located above the support mounting plate;
- (2) Upward installation: The base boss is located below the support mounting plate.

5.3.1 Introduction to the Installation Surface

The installation surface should have a certain flatness (recommended ≤ 0.75 mm). If the flatness deviation is too large, it is recommended to adjust the shim to ensure the flatness, otherwise it will greatly affect the robot Control and work accuracy. There are corresponding bolt connection holes on the rack mounting surface and robot base mounting boss. The bolt size is M16 x 65.

The connection hole is shown in Table 52, and the size of the pin hole waist hole in the figure is 10±0.01mm (the pin hole can be used or not used during installation).

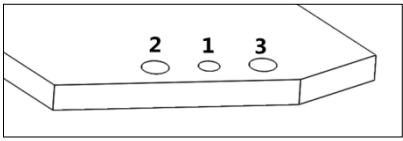
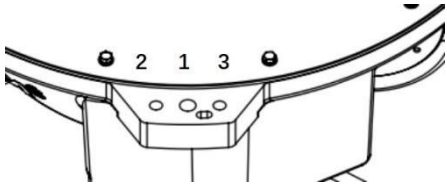
Category	Legend	1	2	3
rack installation surface		screw hole	through hole	through hole
robot base boss		through hole	screw hole	screw hole

Table 5-2 Mounting panel

During use, in order to prevent the bolts from loosening after long-term use, each bolt needs to be equipped with elastic washers and flat washers. The bolt installation torque is 70 Nm.as shown in figure 57Figure 5-7 Bolt Assembly

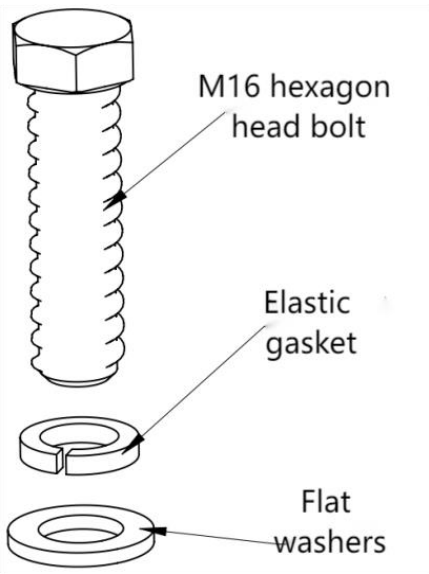


Figure 5-7 Bolt Assembly

5.3.2 Downward Installation (Preferable)

When there is enough space above the top of the rack to lift the base, the downward lifting method is preferred. That is, the base boss is located above the rack installation plate. The downward installation method facilitates the installation of the rack and the base.The weight of the AP25X robot body is approximately 150 kg.Equipped with lifting eye screws, it can be lifted by lifting equipment.

The X-axis coordinate of the robot is parallel to the output axis 1. To facilitate the layout of the Filament and keep the robot in good working condition, it is recommended that the No. 1 axis be installed parallel to the direction of the work object, as shown in Figure 5-8. The user can also select other axes (2 or 3 axes) parallel to the direction of the conveyor belt movement.

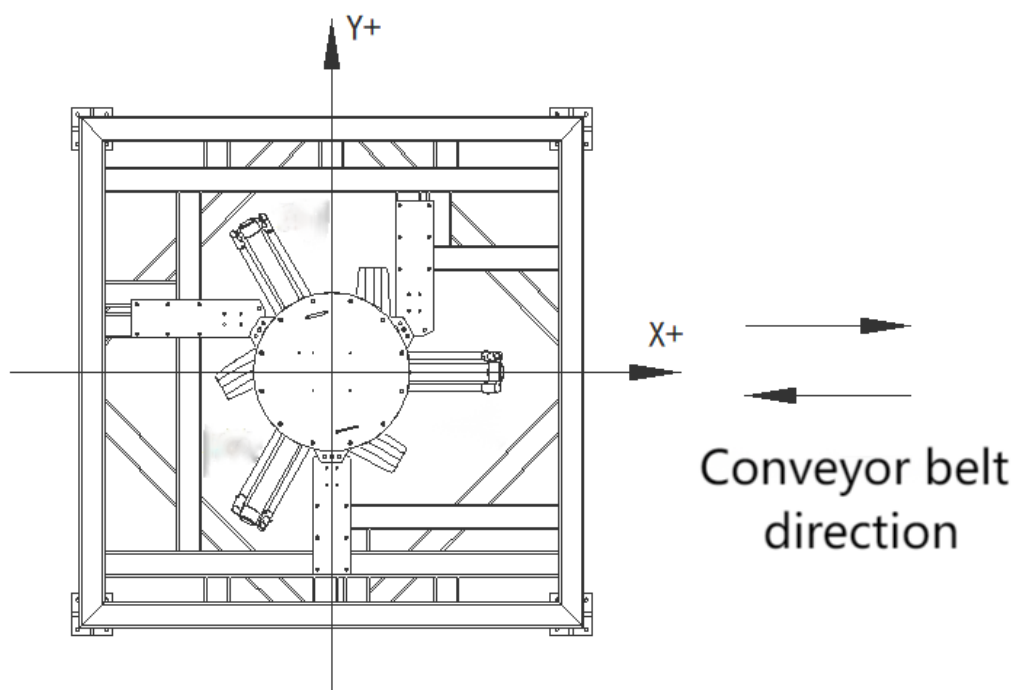


Figure 5-8 Base installation method

The installation procedure is as follows:

Lift the base from the outside of the frame to a suitable position above the top of the frame.

Translate the base directly above the rack.

Lower slowly and align the robot base mounting boss with the mounting surface on the frame, as shown in Figure 59.

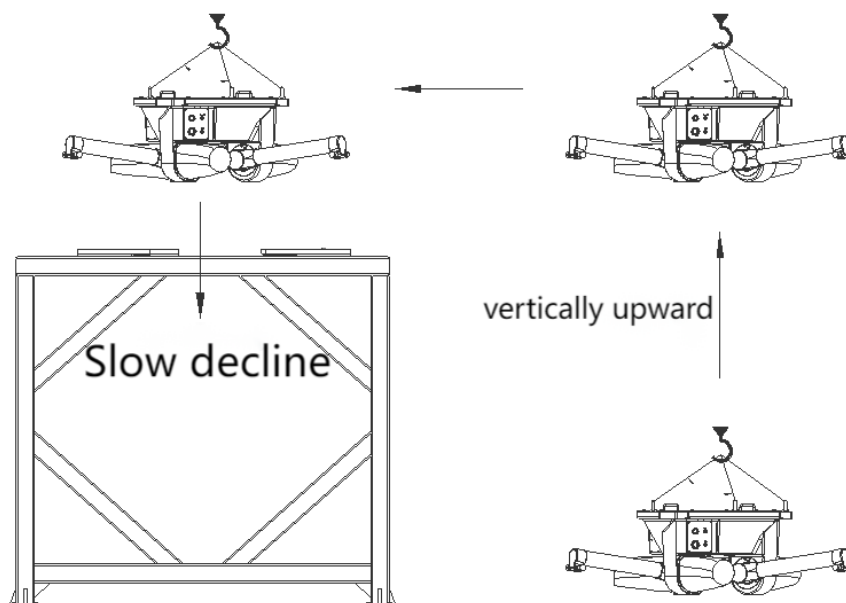


Figure 5-9 Base lifting diagram

**NOTE**

With this lifting method, the minimum lifting height of the hook of the lifting equipment should be greater than 2800 mm.

The installation method and bolt installation position are shown in Figure 5-10. The base boss is located above the rack installation surface, where 1, 2, and 3 are the bolts connecting the rack and the base installation surface.

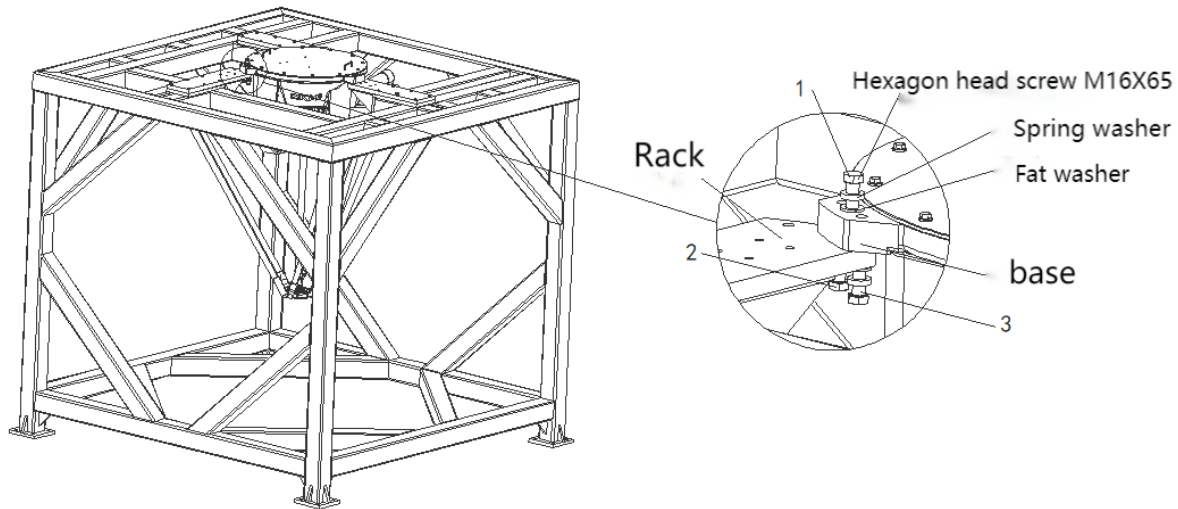


Figure 5-10 Downward installation02

If the lifting height is limited, use a forklift to transport the base into the frame, and then use a lifting device to lift the base upwards, as shown in Figure 511. When approaching the rack installation plate, adjust the base angle properly to avoid the interference of the rack installation plate on the mounting boss until the base is placed on the rack installation plate, and the installation is complete. Figure 5-11 Lifting and Hoisting of the Base3

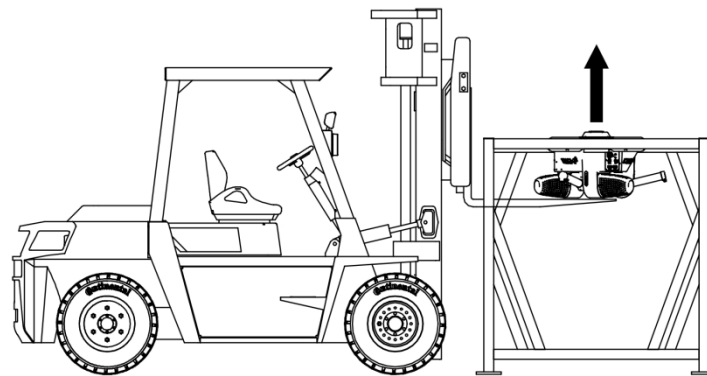


Figure 5-11 Lifting and Hoisting of the Base3

When using the downward installation method shown in Figure 5-10, the minimum inward diameter of the installation plate of the rack designed and manufactured by the user shall not be less than 750 mm of the outer circle diameter of the base.i.e. $\Phi D > 750 \text{ mm}$,As shown in Figure 512.

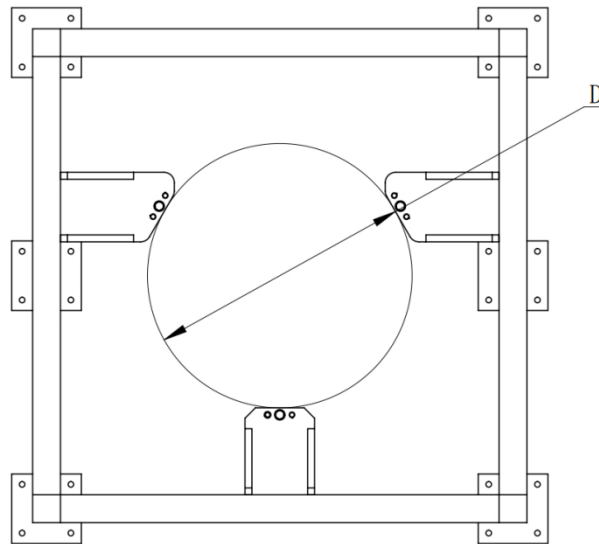


Figure 5-12 Inward cut diameter of the installation plate

5.3.3 Upward Installation Mode

If the installation space is limited, install it upwards, that is, the base boss is located below the rack installation plate.

Figure 5-13 shows the installation method of the corresponding bolts on the installation surface. Since the boss of the base needs to be directly matched with the mounting plate of the rack, the lifting eye screws must be removed when using this installation method. Use the lifting straps to lift, and the winding method is shown in Figure 5-14. The lifting method is similar to the lifting method of the downward installation. For details, see the downward installation procedure.

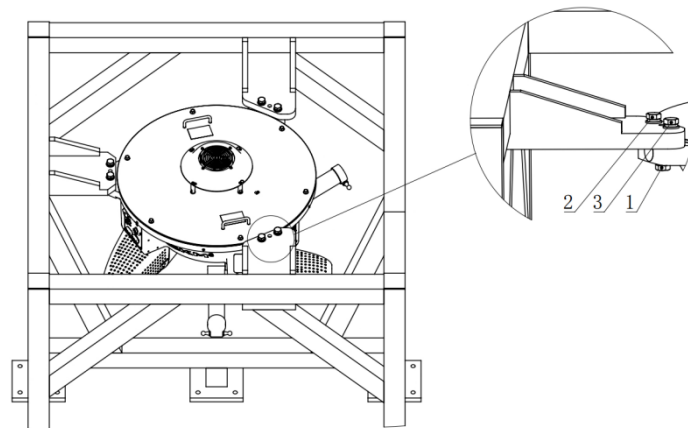


Figure 5-13 Upward installation

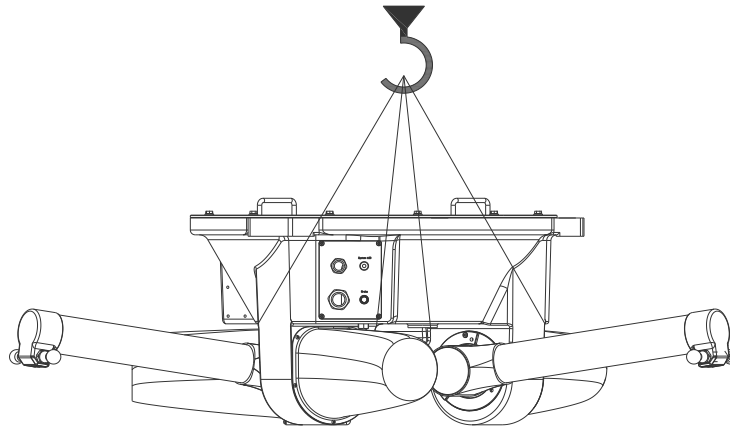


Figure 5-14 Winding mode of lifting straps installed upwards

**NOTICE**

No external force shall be applied to the active arm during the lifting process to prevent damage to the active arm and damage to the paint on the robot surface.

5.4 Fitting the Driven Arm

Connect the robot to the Control cabinet, connect the power supply to the Control cabinet, and power on the robot.

Press and hold the "Brake" key on the interface panel. At this time, the three active arms on the base body are in the free movement state. Manually move the three active arms of the robot from the initial position (a) to the installation position (b), as shown in Figure 5-15, and then power off.

Take out the slave boom from the packaging foam rack.

Fasten the two ball sockets with single spring end to the ball head of the driving arm respectively, and then hang the driven arm naturally, and install the other two groups of driven arms in this way, as shown in Figure 5-16.

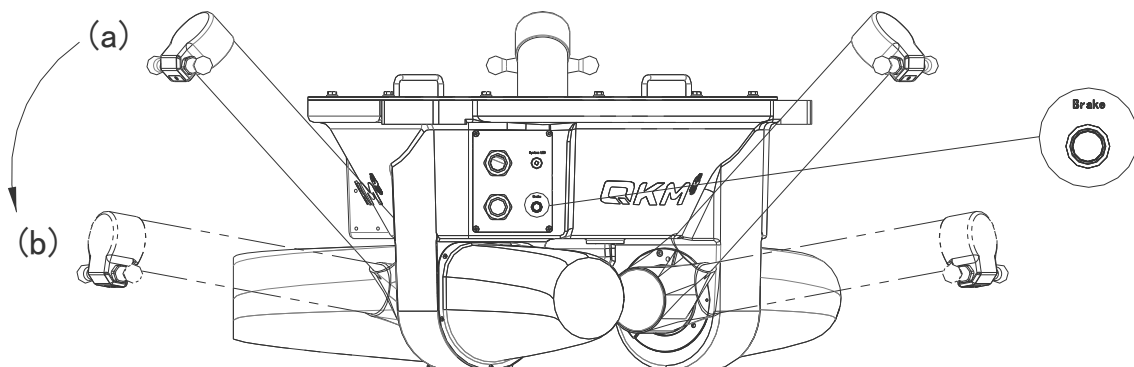


Figure 5-15 Active arm position adjustment

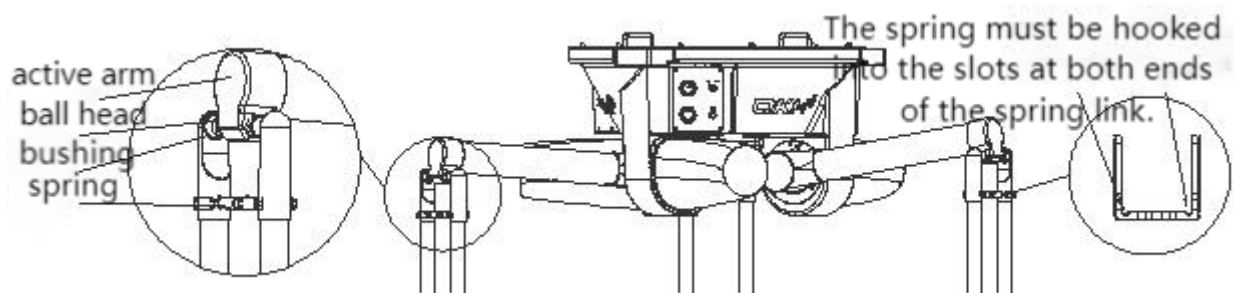


Figure 5-16 Mounting the driven boom

04

5.5 Mounting the Rotating Axis (limited to Four-axis Robots)

The motor outlet end at the end of the moving platform corresponds to the direction of the angle between the first axis and the second axis of the driving arm.

Any end of the boom is connected to the moving platform. Make sure that the two springs are installed in the two grooves outside the spring connection. Fasten the ball socket of the driven boom with the corresponding ball head of the moving platform. The four-axis robot's moving platform connection type is incorrect! No reference source found. 错误!未找到引用源。



During the assembly of the four-axis robot moving platform, it is necessary to prevent accidental falling of the moving platform and damage to the moving platform.

The two springs are correctly embedded, installed in the grooves on both sides, and in the same direction.

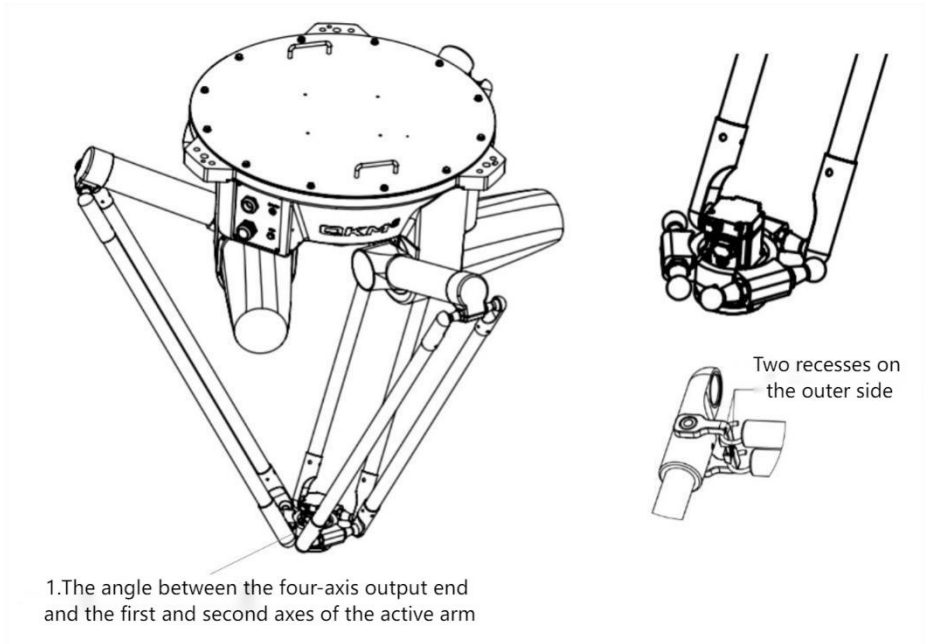


Figure 5-17 Mounting the rotating axis of the four-axis robot moving platform

Follow the above installation method to complete the coordination of the other two groups of driven arms and the moving platform in sequence.

Confirm that the outlet end of the motor of the moving platform corresponds to the angle between the first and second shafts of the driving arm, and confirm that all springs are snapped in the specified groove as required.

5.6 Robot Filament Installation

The main body M/C connection Filament is inserted into the M/C connector of the Control cabinet.

Connect the Ethernet port on the front panel of the Control cabinet to the computer, and connect the MCP port to the Filament connector of the emergency stop button.

Connect the power interface on the Control cabinet to the 220 V a.c. Power connection. For example, wrong! No reference source found. See. 错误!未找到引用源。

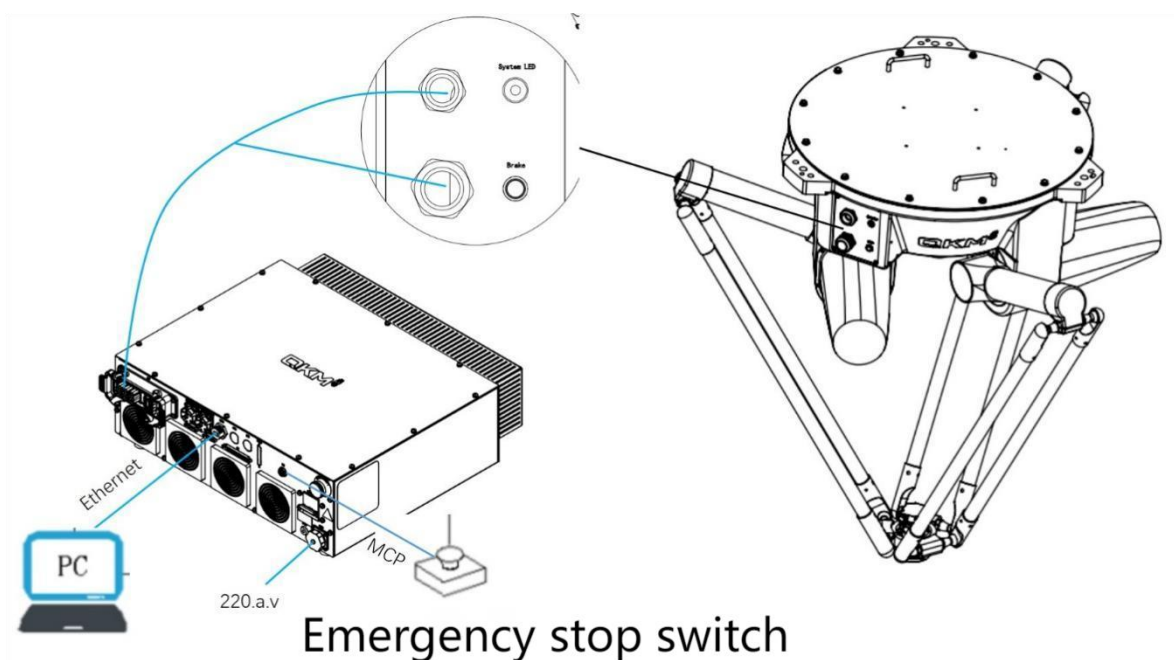


Figure 5-18 Filament installation

Please install and replace the Filament after the robot is powered off and the power adaptor is removed.

Unplugging the Filament connector in the power-on state may cause failure or electric shock.



Bending or breakage of the Filament connector pin or damage to the Filament may cause abnormal connection of the robot. Check the above phenomena before connecting.

When arranging the robot Filament, do not interfere with the working area of the robot; The robot Filament and the load attached to the robot front end are interference areas. Do not use them as working areas to avoid damage to the robot Filament.

Wiring should be carried out by certified operators or qualified personnel. Wiring work by a person who does not have the relevant

knowledge may cause injury or malfunction.

5.6.1 Check after Installation

After the Filament is installed, you need to check whether the robot is operational. The check items are as follows:

Check whether the plugs at all Filament ports are loose.

Ensure that the robot is in a safe working area and that there are no personnel within the robot's range of movement.

5.6.2 Pre-power-on Detection

Make sure that:

Check whether the fasteners of the robot are loose.

The necessary guards are properly installed and functional.

The voltage level of the powered electrical equipment is equal to the voltage level of the supplied power.

Check the power adaptor of the device for a short circuit with a multimeter before powering on.

Check that all cable heads and connecting busbars are correctly connected and installed firmly.

Check the safety function:

The equipment is in an environment with qualified insulation.

The main power line is grounded, and the triangle plug is tightly inserted into the socket to prevent electric shock.

The emergency stop button is connected to the robot.

6 Standard Parameters

6.1 Robot Parameters

The main specifications of the AP25X robot are shown in Table 6-1.

Project	Detailed parameters					
model	AP25X-1130-1543	AP25X-1130-1544	AP25X-1600-1543	AP25X-1600-1544	AP25X-2200-1543	AP25X-2200-1544
number of axes	3	4	3	4	3	4
load	Maximum: 25 kg					
Repeated location accuracy	±0.1 mm					
Rotating axes Repeated location accuracy	/	±0.1°	/	±0.1°	/	±0.1°
Work space (diameter)	1130 mm		1600 mm		2200 mm	
Standard beat period	0.31 s	0.33 s	0.31 s	0.33 s	0.32 s	0.34 s
Weight (body)	162 kg	163 kg	164 kg	165 kg	166 kg	167 kg
Weight (including packaging)	225 kg	226 kg	227 kg	228 kg	229 kg	230 kg
rated moment of inertia	/	0.1 kg·m2	/	0.1 kg·m2	/	0.1 kg·m2
Maximum moment of inertia	/	0.25 kg·m2	/	0.25 kg·m2	/	0.25 kg·m2
Rotating axes Angle range	/	±360°	/	±360°	/	±360°
Hard limit angle	- 34,82 ° to + 110.78 °		- 36.52 ° to + 109.08 °		- 38.54 ° to + 107.06 °	
Soft limit angle	- 30° to + 100°		- 35° to +105°		- 37 ° to + 105 °	
rated voltage	230 V a.c. 50/60 Hz					
Nominal/maximum power	10 kW / 25 kW					

Table 6-1 Specification parameters

**NOTICE**

The standard beat cycle in the above table is measured by the robot's round-trip $a*b*c$ with a 25 mm*305 mm*25 mm trajectory when the load is 2 kg, as shown in Figure 61. Figure 6-1 Standard beat cycle measurement track

The above parameters were measured at room temperature of 25°C.

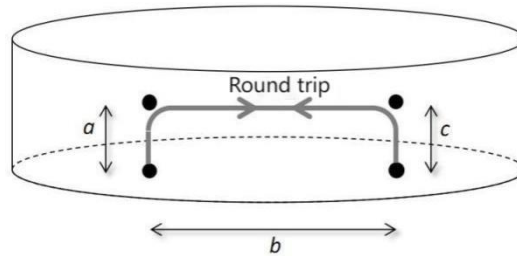


Figure 6-1 Standard beat cycle measurement track

6.2 Use Environmental Parameters

Set up the robot system in an environment in accordance with Table 62 to enable/maintain the performance of the machine and to use it safely. Table 6-2 Environmental parameters for use

Project	Technical parameters
Working temperature and humidity	temperature 0 to 45 °C, humidity 10 to 80 percent RH, No condensation
Storage/transportation temperature and humidity	temperature -20 to 60 °C, humidity 10% to 90 percent RH, No condensation
Work / Storage / Transport air pressure	70-106 kPa
electrical fast transient pulse group immunity	Power port: 2kV or below Signalis port: 1kV or less
Electrostatic immunity	Contact discharge: 4kV or below Air discharge: 8kV or below
Working, storage, transportation environment	Placed indoors to avoid precipitation (water, snow, hail), condensation, etc Avoid direct Sunlight exposure Keep away from dust, oil fumes, salt, iron filings, or other contaminants Keep away from flammable and corrosive liquids and gases Stay away from electrical interference sources Stay away from the explosion hazard area

	Avoid large amounts of radiation
Allowable range of vibration under working conditions	Class 3M11 according to IEC 60721-3-3 static random vibration (acceleration spectrum density): $0.01(\text{m/s}^2)^{1/2}/\text{Hz}$ Static random vibration frequency range: 5-200 Hz Displacement amplitude: 3mm Displacement frequency range: 2-5Hz static load without impact
Allowable range of vibration under storage	Class 3M11 according to IEC 60721-3-3 static random vibration (acceleration spectrum density): $0.1(\text{m/s}^2)^{1/2}/\text{Hz}$ Static random vibration frequency range: 5-200 Hz Displacement amplitude: 3mm Displacement frequency range: 2-5Hz static load without impact
Allowable range of vibrations in transportation	Class 3M11 according to IEC 60721-3-3 static random vibration (acceleration spectrum density): $0.1(\text{m/s}^2)^{1/2}/\text{Hz}$ Static random vibration frequency range: 5-200 Hz Displacement amplitude: 10mm Displacement frequency range: 2-5Hz Maximum static load 5 kPa
Elevation	1000m or less

Table 6-2 Environmental parameters for use

Robots are not suitable for working in harsh environments. If used in places that do not meet the above conditions, please consult our company.



When used in environments with large temperature and humidity changes, the inside of the robot may fog up.

It should not be used in corrosive environments such as acid or alkali, otherwise it will affect the normal use of the robot.

When the product is exposed to radiation (such as microwave, ultraviolet, laser, X-ray), appropriate protective measures should be taken to avoid robot misoperation and accelerate the aging of components.

7 Technical Service

Liqun Automation Technology Co., Ltd. is committed to providing technical information support for machine movement and operation, helping you troubleshoot and provide detailed consultation. If your robot or equipment malfunctions during use, you can contact our service organization and provide the following information as much as possible:

- The model and serial number of the robot or device
- Control system model and serial number
- Control system version number
- Companion software function package (optional)
- existing applications
- Other supporting additional product devices (vision, PLC, etc.)
- Problem description, duration and frequency of failure, etc.

8 Recycling and Disposing of Lithium Batteries

Please pay full attention to the use of lithium batteries. If the following incorrect usage methods are used, it may cause heating, leakage, explosion, or fire, which is very dangerous. In addition, it may cause security problems

error handling

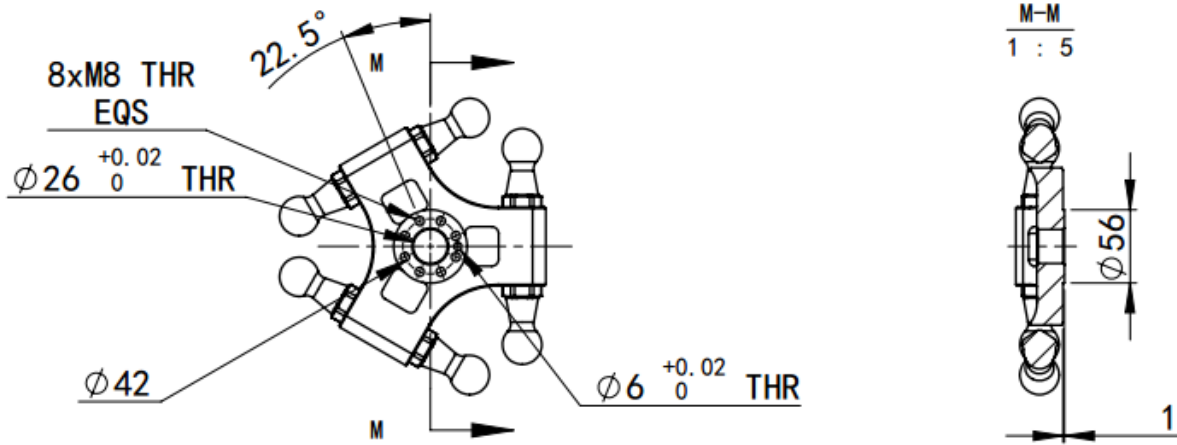


- Charging-Pressurization deformation
- Dismantling-Short circuit (+ level,-level)
- Inverted-heating (more than 85 °C)
- Put in fire-Solder (directly solder battery terminals)

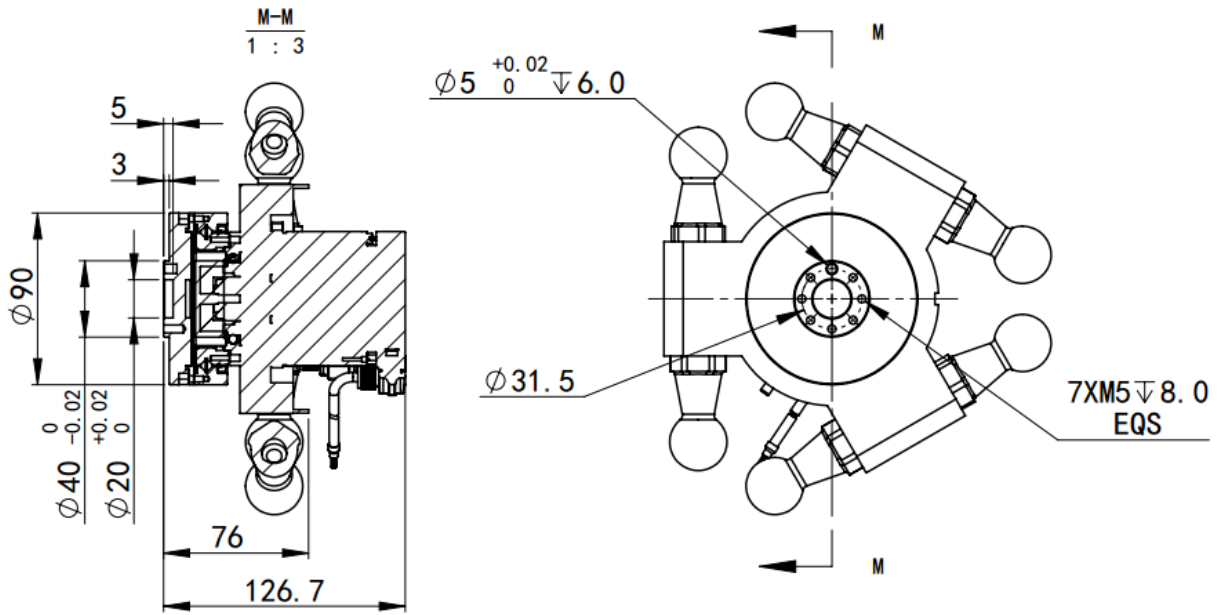
When disposing of batteries, consult a professional handling company or dispose of them according to relevant laws and regulations in various countries and regions. Even if the batteries have been used up, the terminals must be insulated. If you contact other metal or battery terminals, a short circuit may occur, which can cause heating, leakage, explosion, or fire.

Please connect the battery correctly, and do not mistake the polarity.

Appendix A: End face size of the Moving Platform

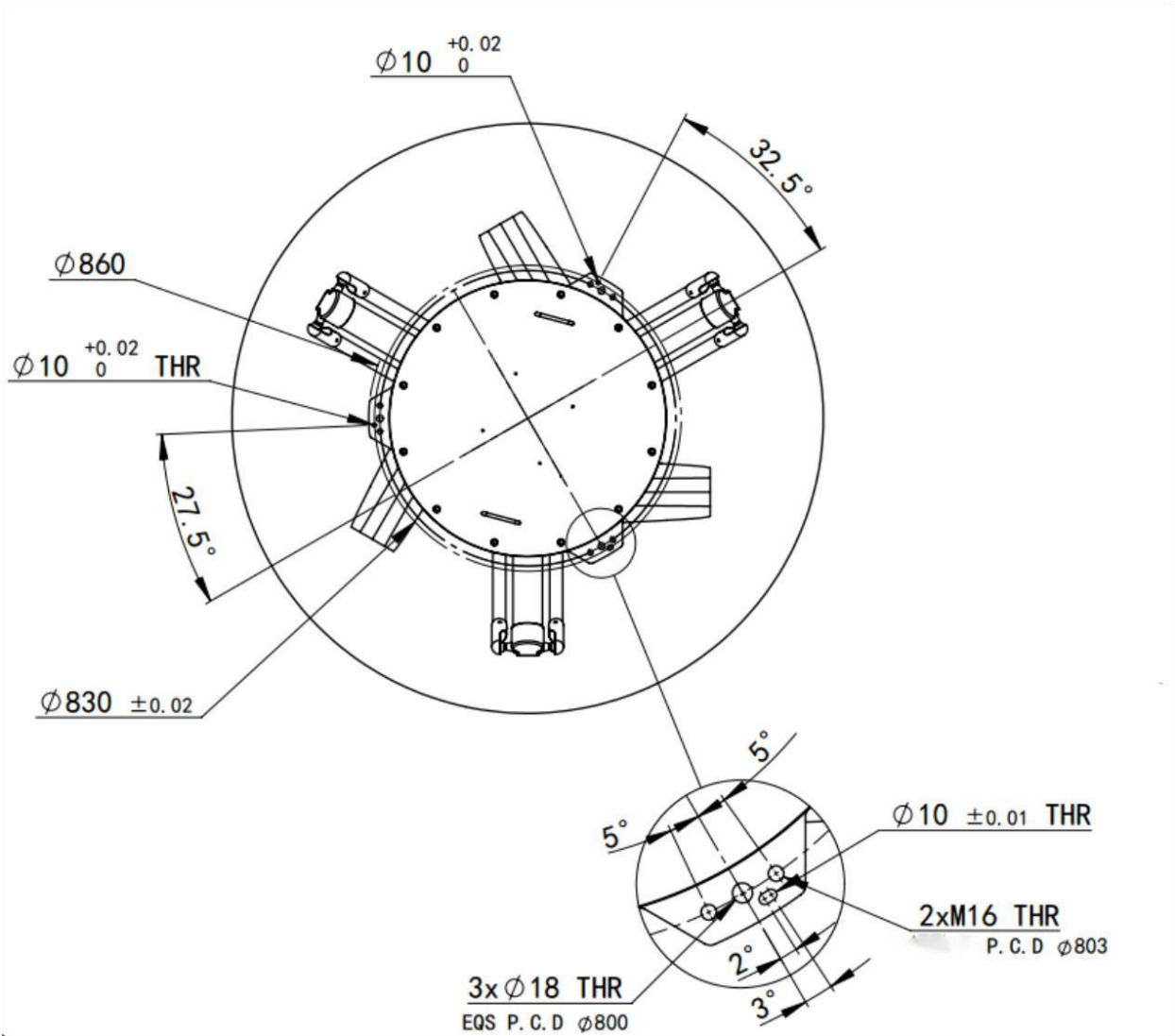


(a) Flange size of the output shaft end of the three-axis dynamic platform



(b) Flange size of the output shaft end of the four-axis platform

Appendix B Base Size



(c) Base top view and partial view dimensions



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