

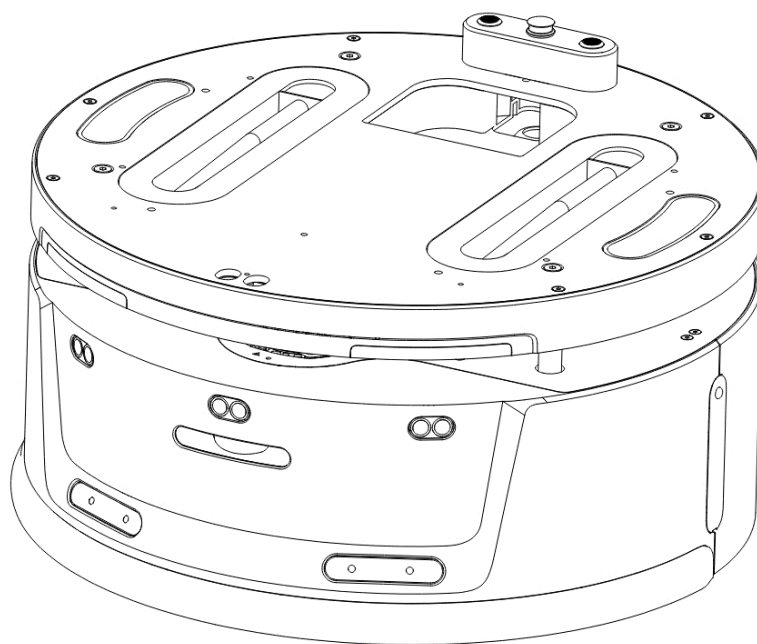
Apollo 2.0

General Robot Platform

Usermanual

Model: A5M31

Industrial Safety Rim
3cm High Obstacle Detection
360° Multi-sensor Fusion Protection



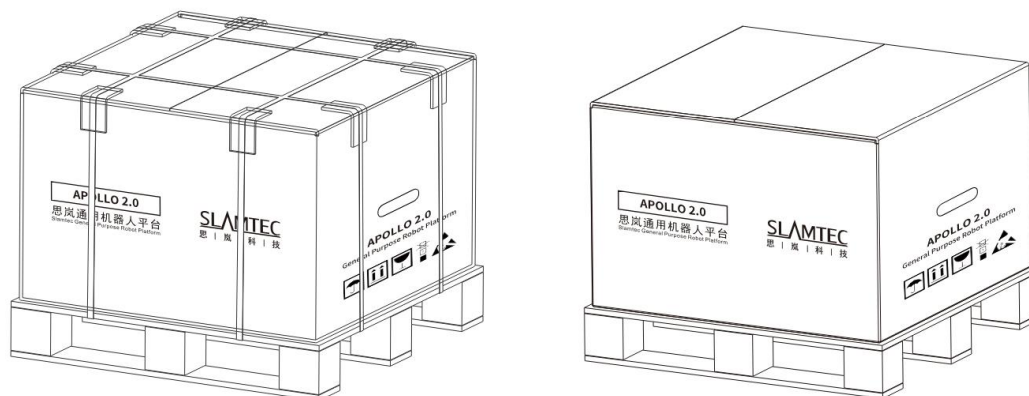
Apollo 2.0 is a medium-sized, extension design supported robot platform developed by SLAMTEC to meet the requirement of medium-size robot application development like patrol robot, industry delivery robot, hotel delivery robot, food delivery robot, etc.

Product List

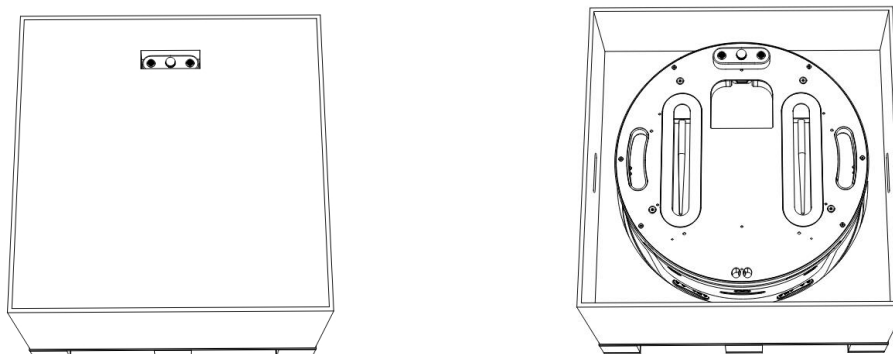
| Item | Quantity | Note |
|---|----------|---|
| Apollo 2.0 robot base | 1 | Apollo robot base |
| Charging station | 1 | Charging station used for charging Apollo |
| Charging station power cable | 1 | Packing with the charging station. Used for connecting the charging station with the 220V power supply. |
| Charging station emergency charging cable | 1 | Packing with the charging station. Used for connecting the robot base with the charging station. |

Unpack

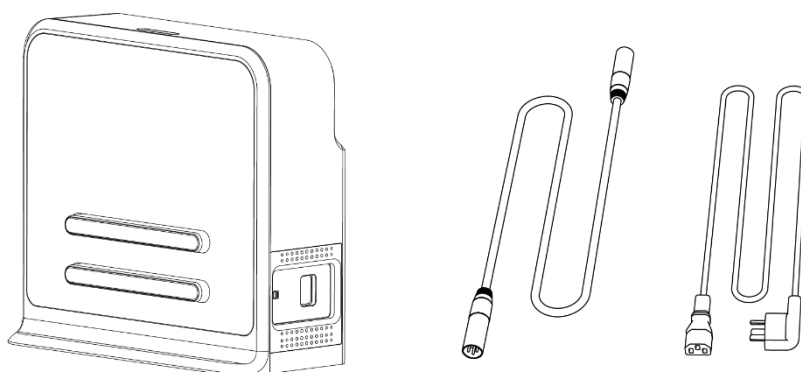
After receiving Apollo 2.0, please check whether the package is in good condition as shown in the following left figure. If the whole package is intact, please cut the packing straps through and remove all of them, as shown in the following right figure.



Open the box and the inside is shown in the following left figure, please take the large top protective EPE out of the box and then hold the two handles to lift the robot base out of the box.



Please take out the charging station and related cables out the charging station box.



1

Charing Station

2

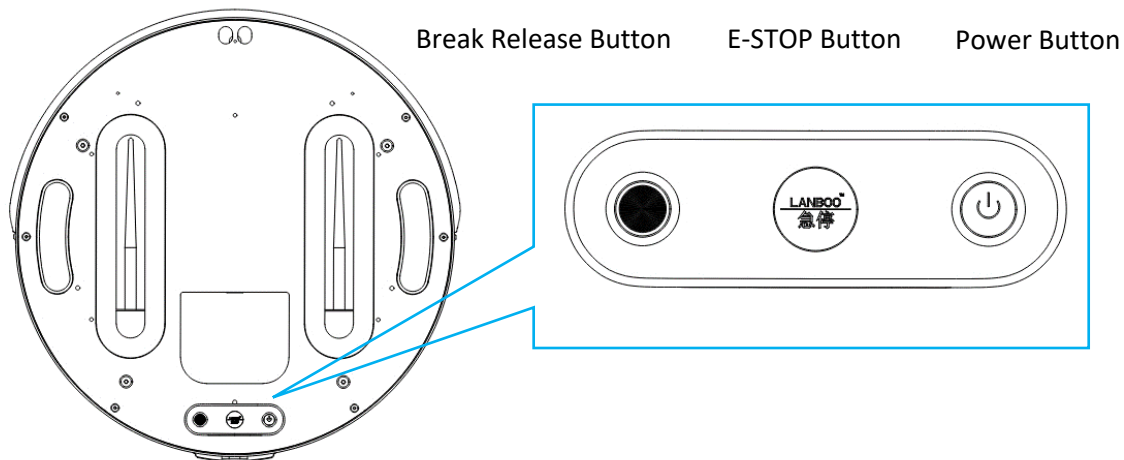
Emergency Charing Cable

3

Charing Cable

User Button Usage

Apollo 2.0 has power button, emergency stop button and break release button shown as in the following figure:



1. Power on & Power off

Manual power-on: Press the power button. The button indicator lights up, indicating that the startup command is successfully triggered. When the robot base front light belt lights up, the robot base is successfully powered on.

Manual power-off: Press and hold the power button until the power button indicator is off, indicating that the shutdown command is successfully triggered. When the robot base front light belt lights off, the robot base is successfully shut down.

Automatic power-on: If the charging station of Apollo 2.0 is connected to the 220V power supply, please push the robot base to the charging station and make sure the electrodes of them are connected well, then the robot base will automatically power on, and the power button light will turn on automatically.

Note: When the robot base is connecting with the charging station, it cannot be powered off.

2. Emergency Stop Button

When the emergency stop button is pressed, the emergency stop function is triggered. At this time, the robot base stops moving and does not respond to any motion control command and it cannot be manually pushed to move. Press the emergency stop button again, the button springs up, the emergency stop function is restored, and the robot base is restored to normal state.

3. Break Release Button

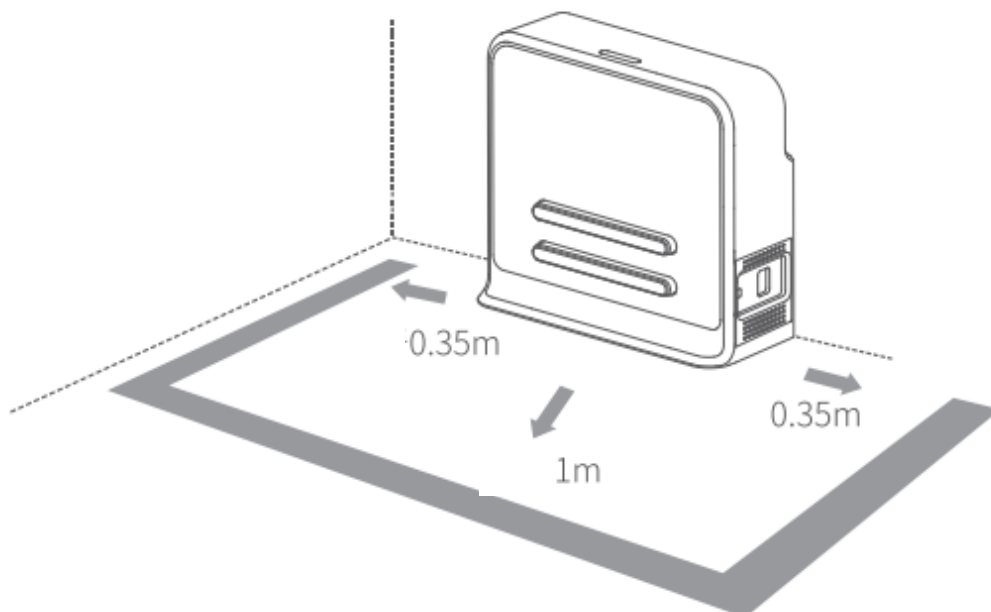
When the brake release button is pressed, the brake release function is triggered, and the robot base stops moving and does not respond to any motion control command. At this time, the robot base can be pushed manually. When the brake release button is pressed again, the button will spring up and the brake function will recover, and the robot base can return to normal state.

Charging Station Configuration and Usage

1. Charging Station Configuration

Apollo 2.0 realizes automatic return charging function through the charging station, so the placement and deployment of the charging station will affect the automatic return charging function. When the robot base returns to the charging station, it will generate a driving force, so it is recommended that the charging station be placed against the wall, and the wall meets the following conditions:

- a. The charger should fit the wall closely and there are no obstacles between them. The wall with skirting line is not recommended.
- b. The wall should not be made of transparent material like mirror or glass.
- c. The wall should be at least three times the width of the charging station.
- d. The wall should be a straight wall instead of a curved one.
- e. There should be more than 0.35 meters left on both sides and more than 1 meter in front of the charging station;



The charging station requires a 220V power supply and its external power supply wire is 1.5m in length. So it's better that there is a power port on the wall for the charging station (the power board is not recommended since it may cause danger due to messy wires).

The ground in front of the charging station should meet the following requirements:

- a. Open. There are no obstacles in front of the charging station (with the charging station as the center and within a radius of 2 meters from the center).
- b. Level. There is no slope on the ground.
- c. There is no soft carpet on the ground which leads Apollo sinking into it more than 2cm.

Please always launch Apollo from the charging station to ensure that it can recharge itself properly.

Note: if the charging station is moved to a different place when using Apollo, user should reset the position accordingly when loading the map. Please refer to the detailed interfaces description in our SDK document.

2. Charging

There are two ways to charge Apollo battery: Automatic charging and manual charging. Before charging Apollo, please connect the charging station with 220V power supply with the power cable.

Automatic Charging

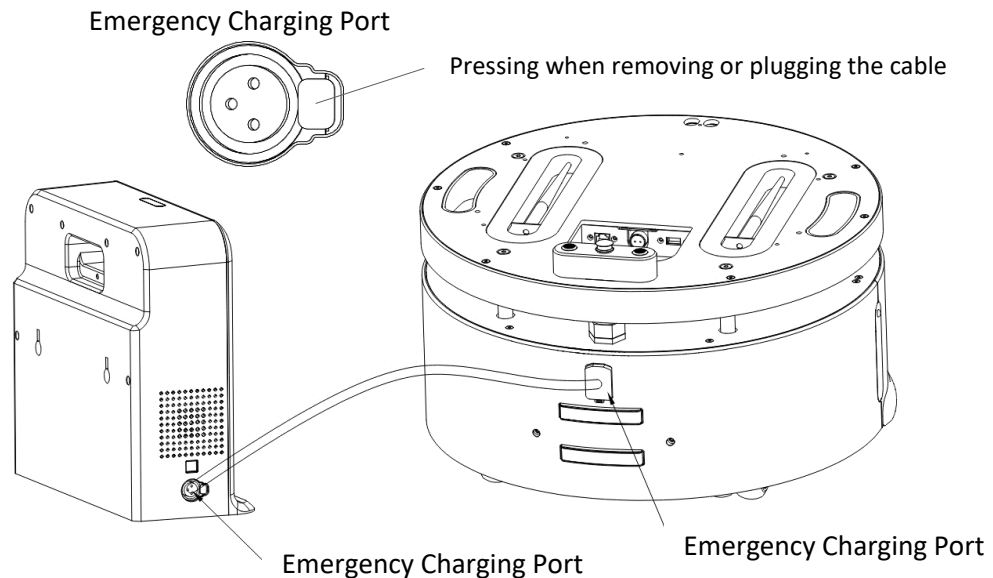
If using Apollo for the first time, please press the brake release button after the robot base is power on, then push it to the front of the charging station, and ensure their electrodes connecting well. At this time, the indicator on the top of the charging station breathes green, indicating Apollo is in charging status. Once Apollo is fully charged, the indicator is turns into steady green.

The Apollo robot base supports automatic recharging function. When the upper side system is developed and the automatic recharging interface is successfully invoked, the robot base will automatically go back to the charging station and start charging automatically.

Manual Charging

In some unexpected situations, like Apollo cannot recharge itself temporarily, user can use emergency charging cable to charge Apollo. The emergency charging

port of Apollo is shown in the following figure. Please use the emergency charging cable to connect the emergency charging port on the charging station and the charging port on Apollo



The indicator on the top of the charging station breathes yellow indicates the charging station starts charging for Apollo. Once Apollo is fully charged, the indicator is turns into steady yellow.

Caution: please do not use the charging station to charge any devices which are not authorized by SLAMTEC.

3. Caution:

- a) Please do not use the charging station in humid environment;
- b) Please do not use the charging station in current unstable environment;

Please do not use the charging station in the place near any inflammable and explosive articles,

Connect to Computer

1. Download and Install RoboStudio

RoboStudio graphical tool is used for testing and controlling Apollo. Please download it from our official website as below:

<https://www.slamtec.com/en/Support#apollo>

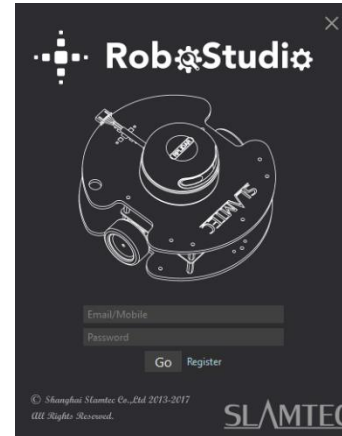
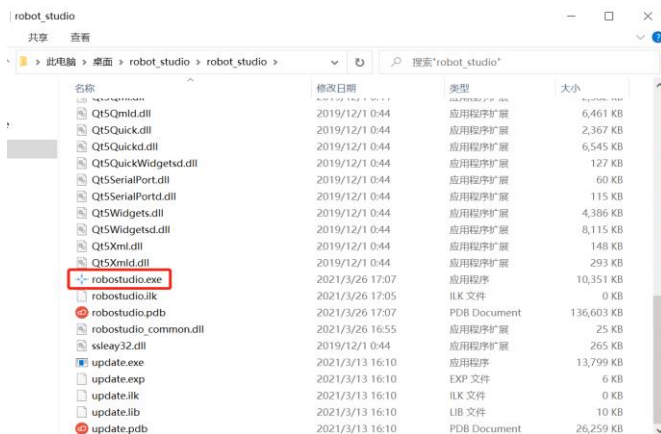


Tools

Slamtec RoboStudio (Latest Version: 1.9.0_rtm)

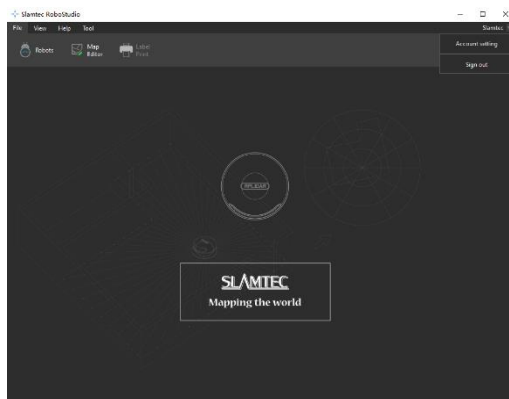
RoboStudio

After downloading and installing RoboStudio, please run "RoboStudio.exe" to complete the account registration and login, as shown below.



2. Connect to Robot Base

Click "File-Robot" in the menu-toolbar area of RoboStudio, and a docking window named Robot will appear on the left side of the workspace, as shown below. The user can connect or disconnect to the robot base through this window.

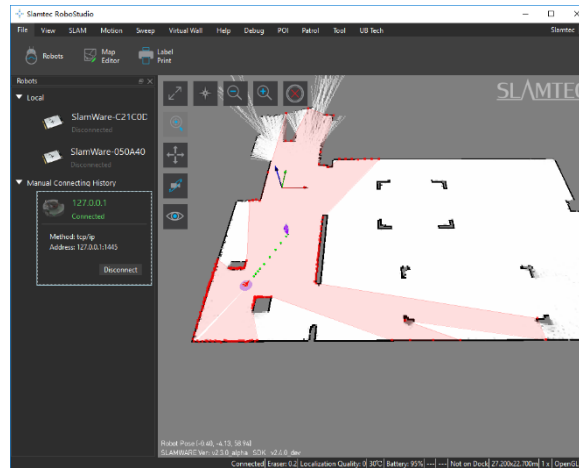


Right click the whitespace of the robot list, and enter the IP address and port number in the prompt dialog box as shown in the upper right corner.

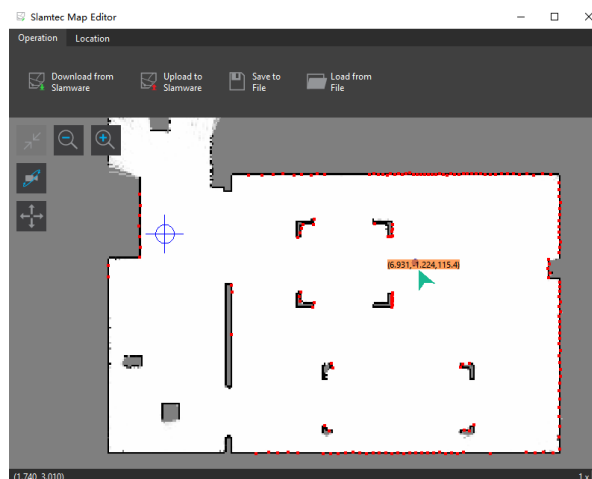
Please open the network adapter on computer and find the SSID hotspot of the robot (you can check it on robot base label), and then click the SSID name and click **Connect** in the extended box. (Note: that your wireless network adapter IP address should be set to automatically obtain using DHCP)

Build Map

Once connected successfully, the major work area will show the robot, map information and its status. The robot name will turn to green and the robot status will turn to **Connected** as shown in the following figure.



Left click a point in the area where you want to build the map and let Apollo run and build it. After the map is completed, please click "File - Map Editor" and choose to save the file or upload it to firmware to save the map.



Upload Map By SDK

The following is a reference for how to use the SDK to complete the boot and load a specific map on the host computer

PUT `/api/core/slam/v1/maps/stcm` Set up a composite map ^

Set the map to the slamware system, and read the stcm file as the request body in binary mode.
[Attention] The map will not be saved persistently and will become invalid after restart.

Parameters Try it out

No parameters

Request body application/octet-stream ▾

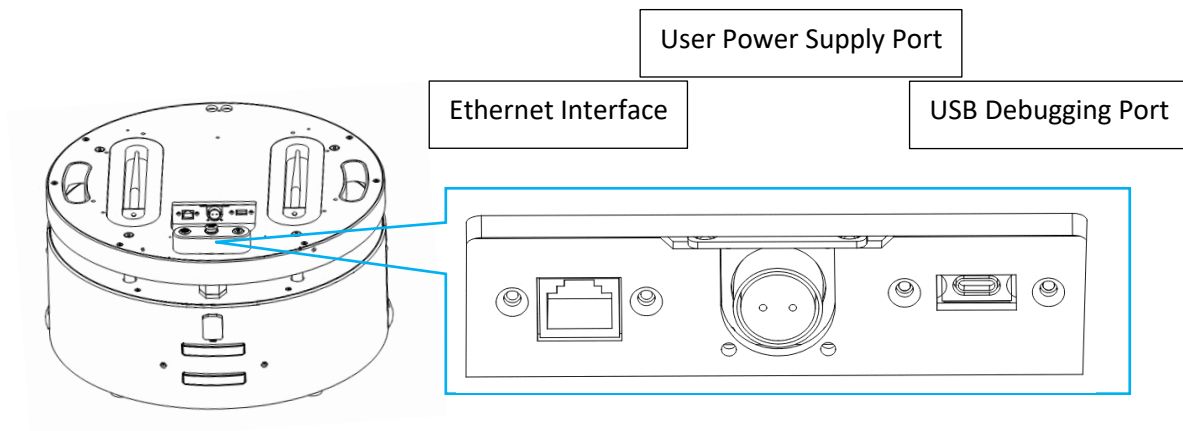
Example values are not available for application/octet-stream media types.

Responses

| Code | Description | Links |
|------|-------------|-----------------|
| 200 | OK | <i>No links</i> |

User Interface Introduction

The Apollo 2.0 user interface consists of an Ethernet interface, a user power supply port, and a USB debugging port. The three interfaces are located in the following position:



| Interface Name | Parameters | Function | Note |
|------------------------|-----------------------------|---|---------------------------------|
| Ethernet interface | 1000/100/10Mbps | Standard RJ45 network port, used for configuring network, connecting robot base, connecting upper side system | |
| User power supply port | DC 24V 10A | 24V power supply port, used for providing supply power to the upper computer or device | Support 20A+ with customization |
| USB debugging port | Standard Type C, USB Female | Used for internal algorithm board debugging or general USB function, also used for connecting robot base | |

Robot Base Indicator

| | Event | Light Location | Light Status | Light Color |
|------|-------------|----------------------|---------------------------|-------------|
| | Power off | All lights | Go out | / |
| | Standby | Front light | Breathing light keeps on | Blue |
| Base | Working | Front light | Keep on | Blue |
| | Turn | Front light | Single side blink | Blue |
| | Break (TBD) | Back light (if have) | Blink only while breaking | Red |

| | | | | |
|------------------|--------------------------|-----------------------------|---------|--------|
| | Charging | Front light | Blink | Green |
| | Fully charged | Front light | Keep on | Green |
| | Power supply | Front light | Keep on | Yellow |
| | Move back | Front light | Blink | Orange |
| | Ambient light | / | / | / |
| Error | Road blocking | Front light | Blink | White |
| | Base launching | Front light | Keep on | White |
| | Need technical support | Front light | Keep on | Red |
| | Emergency stop triggered | Front light | Keep on | Red |
| | Break triggered | Front light | Blink | Yellow |
| Charging Station | Idle | Top on the charging station | Keep on | Orange |
| | Charging | Top on the charging station | Blink | Green |
| | Error | Top on the charging station | Keep on | Red |

Charging Station Port

| Port | Parameters | Description |
|-------------------------|---------------------|---|
| Charging port | 100-240VAC,50/60 Hz | Used for providing power supply for charging station |
| Charging electrodes | 25.5VDC 10A MAX | Used for charging robot platform automatically |
| Emergency charging port | 25.5VDC 10A MAX | Used for charging robot platform in emergency situations, like charging electrode not working |
| Debug port | Serial port | Used for upgrading firmware of the charging station and debugging. |

Charging Station Indicator Status

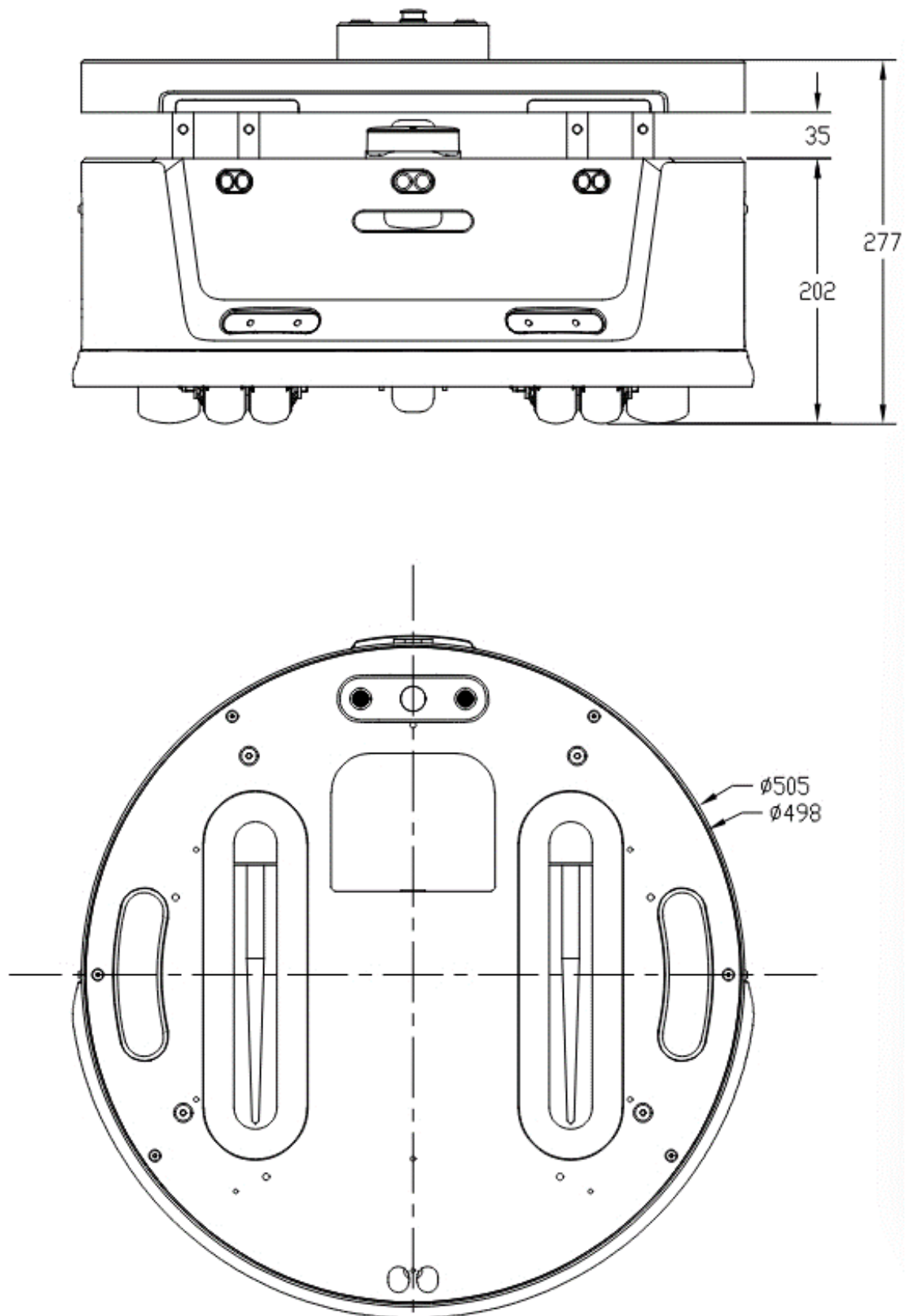
| Process | Preset Condition | LED Status | Description |
|--------------|---------------------------|--------------------|--|
| Power On/off | Charging station power on | Red light keeps on | It indicates the charging station power on normally. |
| | Charging station power | Light goes out | It indicates the charging station power off. |

off

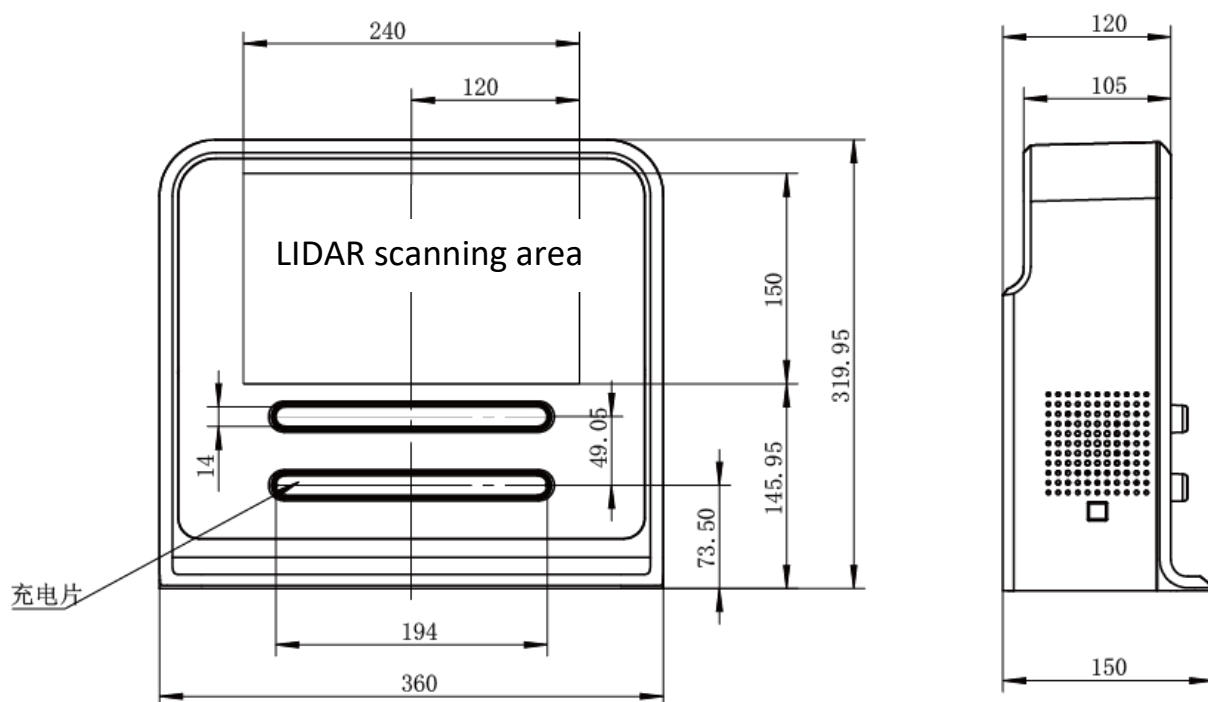
| | | | |
|--------------------|--------------------------|--|--|
| Automatic charging | Charging robot | Green breathing light keeps on | It indicates the robot is charging via charging electrodes. |
| | Fully charged | Green light keeps on | It indicates the robot is fully charged. |
| Emergency charging | Charging robot | Yellow breathing light keeps on | It indicates the robot is charging via emergency charging cable. |
| | Fully charged | Yellow light keeps on | It indicates the robot is fully charged. |
| Error status | Power on self-test error | Red light blinks quickly | Bumper error. Please check whether the charging electrodes are properly installed. |
| | Fuse error | Red breathing light keeps on | Self-healing fuse triggered, please press down to reset it. |
| | Operation error | Red & Green breathing light keeps on alternatively | Charging station error or robot error (if the robot is not connected with charging station, the charging station is not working properly). |

Mechanical Dimension

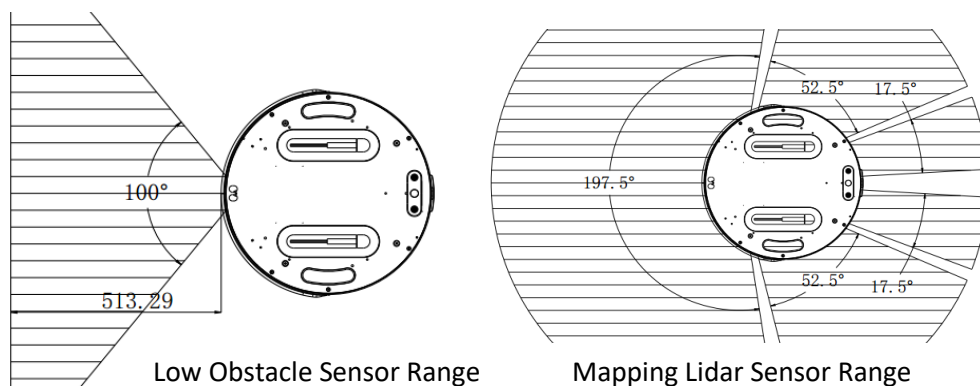
1. Apollo 2.0




2. Charging Station

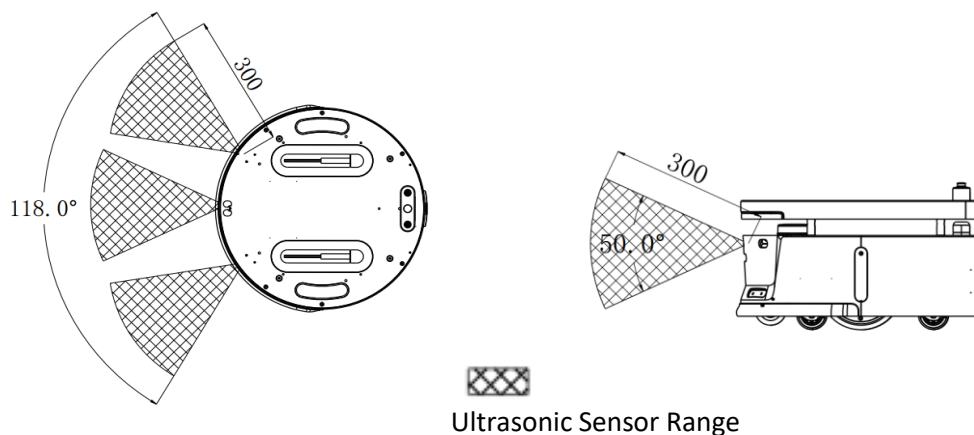


Sensor Range



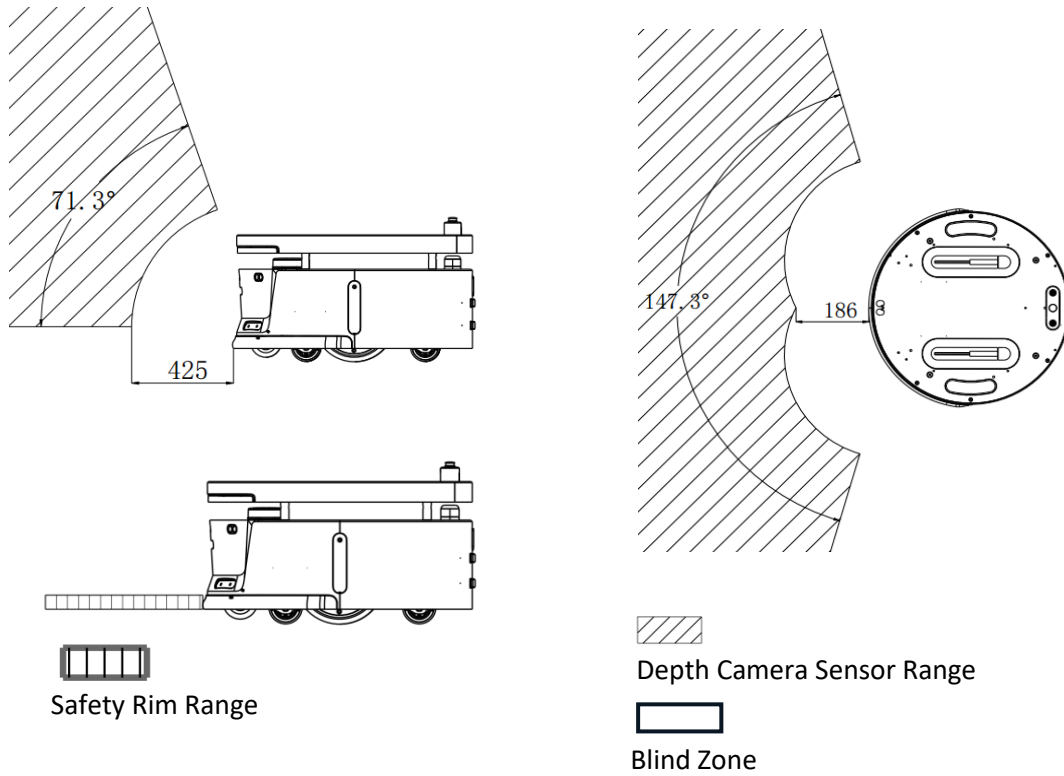


Laser Lidar Sensor Range

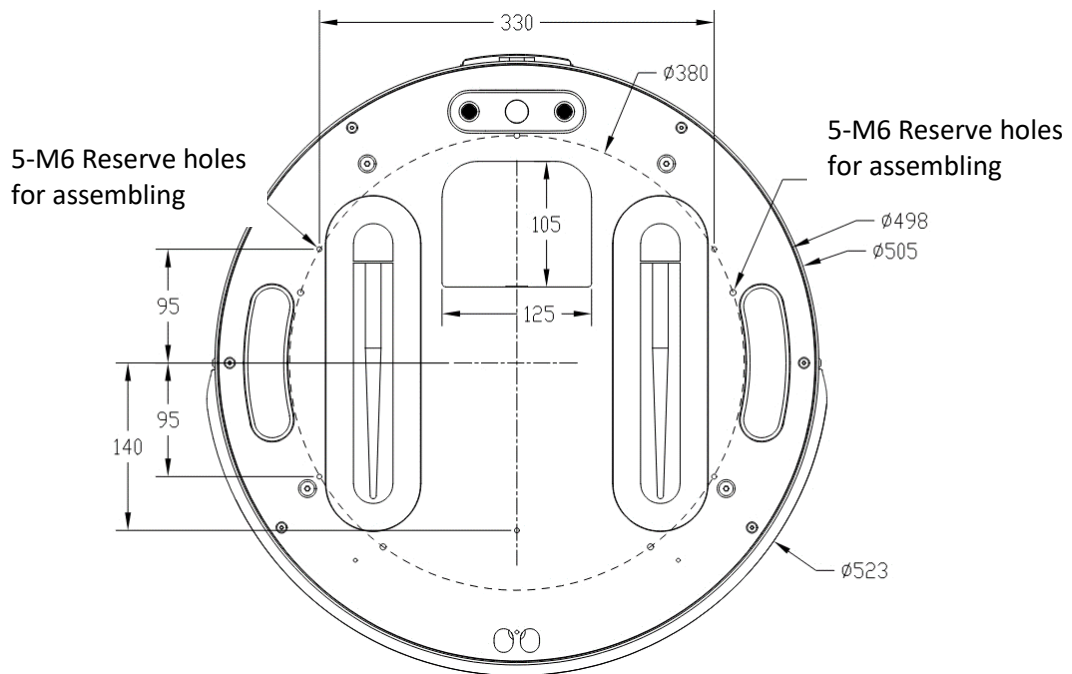




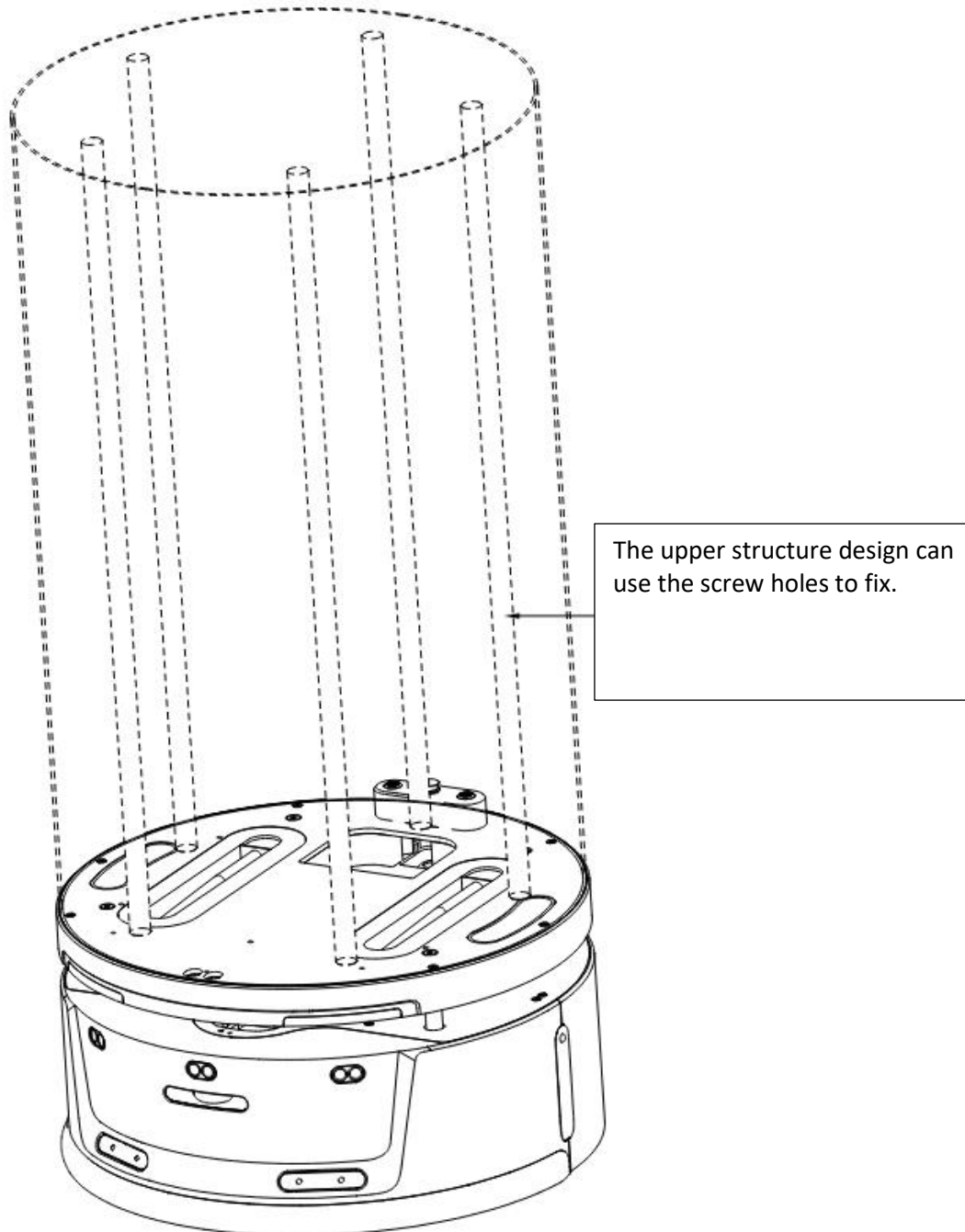
Ultrasonic Sensor Range



Extended Platform for Upper Structure Design



As shown in the figure above, Apollo 2.0 is designed with a total of 5 M5 and 5 M6 through thread holes for the installation and fixing of the upper structure. It is recommended to use screws with spring pads and anti-turpentine glue.

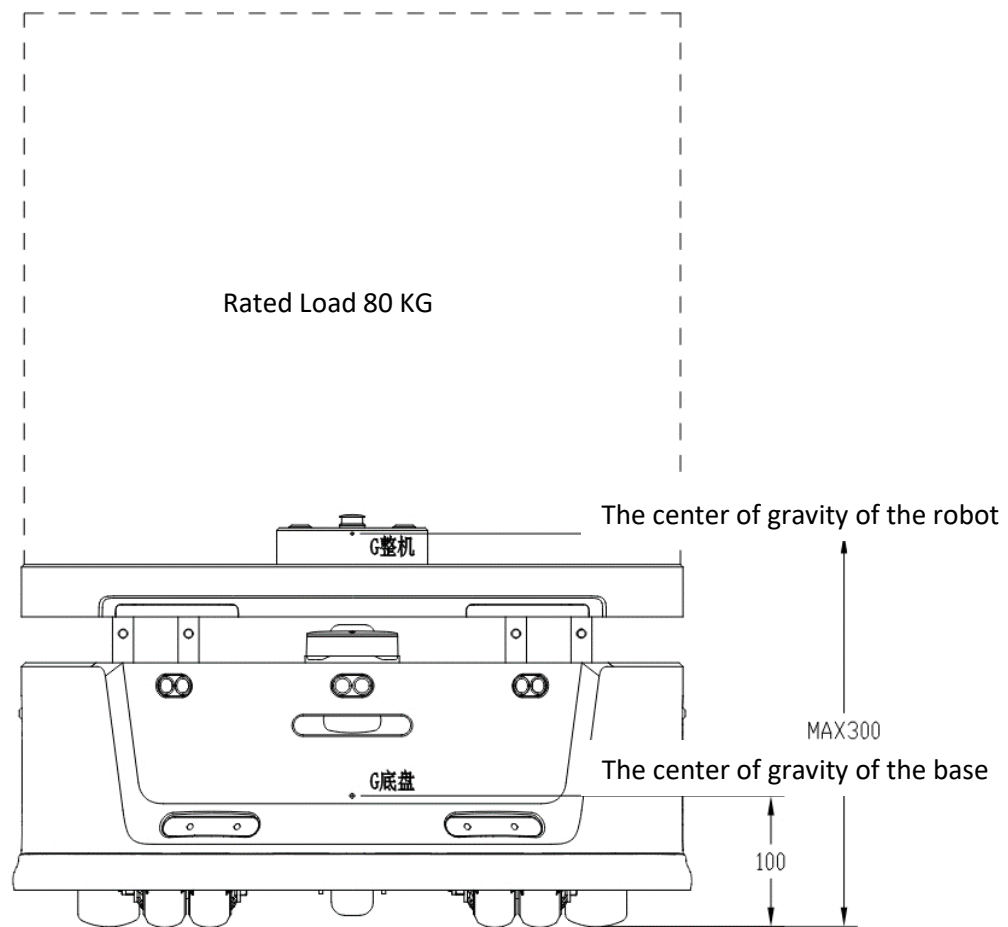


Load Limit Notice

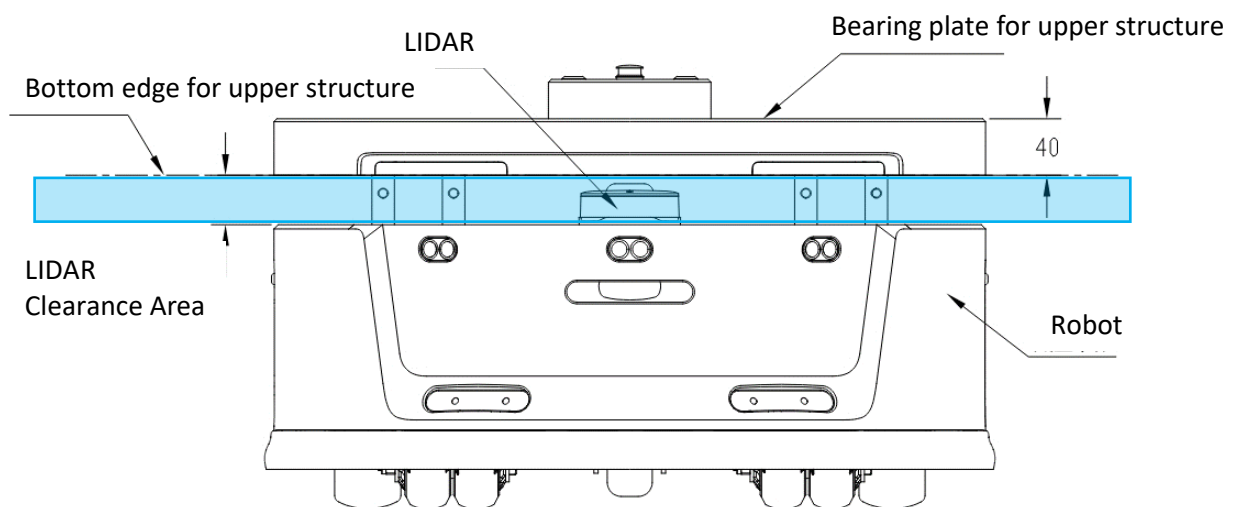
The maximum load of the upper structure is 100kg, and the rated load is about 80kg, as shown in the following figure.

- *It is recommended that the center of gravity of the robot be no higher than 300mm from the ground during installation.
- *The center of gravity of Apollo 2.0 provided by Slamtec is 100mm high;
- *The center of gravity of the whole robot needs to be comprehensively considered after the overall design of the robot is completed

*If the center of gravity of the robot exceeds 300mm, there may be attenuation of climbing and obstacle crossing performance.



LIDAR Clearance Area

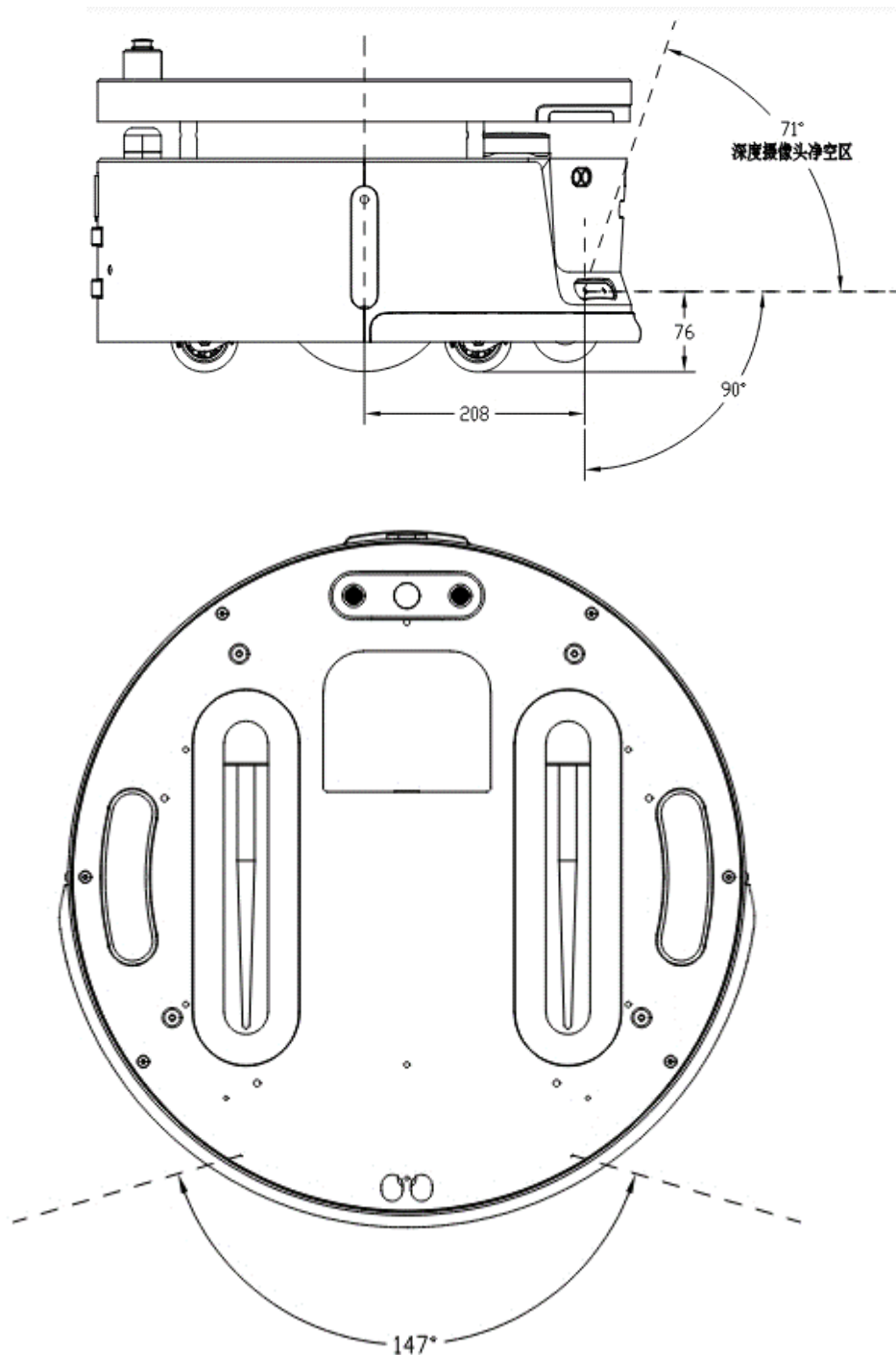


There is a LIDAR between the robot base and the upper side structure. When designing the upper side structure, please make sure that the LIDAR layer is 360

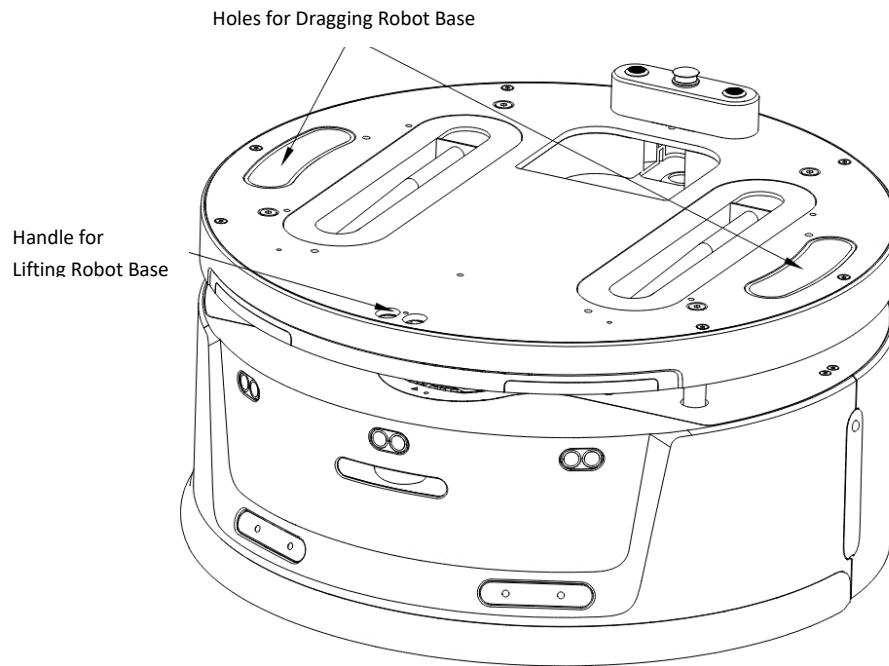
degrees free of obstructions; otherwise, LIDRA mapping and obstacle avoidance will be affected. The LIDAR layer is shown in blue in the above figure.

Depth Camera Clearance Area

There is a depth camera on the robot base and it has a FOV as shown in the following figure. When designing the upper side structure, please make sure that the above FOV is not obscured or interfered with.



Carrying Design Description



The Apollo 2.0 upper mounting plate is designed with two lifting handles on the left and right side, so that the user can transfer and carry the robot base easily. In addition, the front side of the robot base is also designed with hanging holes, so that the user can move and carry it by dragging with a rope or hook.

RoboStudio

RoboStudio graphical tool is used for testing and controlling Apollo. Please download it from our official website as below:

<https://www.slamtec.com/en/RoboStudio>

In the same page, we also provide a document to introduce the usage of this tool.

Web Portal Tool

During developing, debugging and using SLAMWARE devices, various operations can be carried out on the device through the Web Portal tool, such as checking basic information, upgrading firmware and configuring WiFi. (Default username: *admin*. Default password: *admin111*).

Our Web Portal currently supports the following features:

1. Check the information of the robot;
2. Restart the SLAMWARE module;
3. Upgrade firmware

Slamtec provides Apollo 2.0 firmware renewal and upgrade regularly. Our users can upgrade firmware via the Web Portal tool. Please ask for the latest firmware from our support engineers or sales representatives. The upgrade progress lasts for 5~10 minutes.

Apollo will restart once the upgrade finished. Before that, please ensure that Apollo has sufficient electricity.

4. WiFi configuration;
5. Start diagnosing SLAMWARE core;
6. Modify admin password;

For usage details, please refer to the following document:

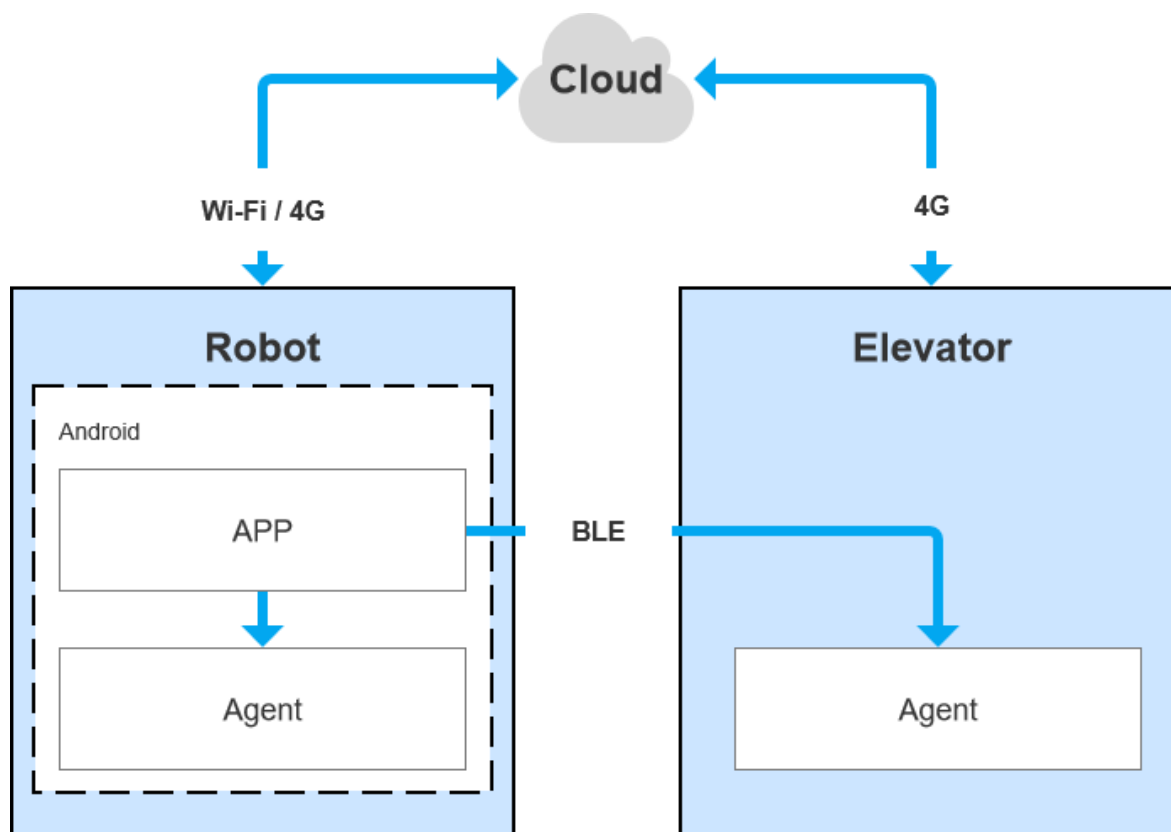
<https://wiki.slamtec.com/display/SD/KBSW180153+SLAMWARE+Web+Portal+Function+Overview+1>

Start

Apollo 2.0 Agent SDK is developing based on C++ language to reduce user access costs and improve the robustness of the SDK, while strong compatibility of supporting Java, C++, C, Kotlin and other languages. The following is a detailed introduction to the Agent SDK.

Framework between Systems

Robot App controls robot localization, movement and recharging through communication; It also sends commands according to different service scenarios. Robot Agent provides data interfaces, task operation interfaces, and service services to Robot App.



System Function Introduction

1. Robot Agent

Robot Agent is a service program running on the Apollo, through which the cloud and elevator control terminal communicate with the elevator control device. Inside the Robot system, the Robot Agent communicates with the Robot App, receives instructions from the Robot App to control the Robot and sends the Robot status at the same time.

The core functions of Robot Agent are:

Communicate with Robo Cloud and Robot APP to report robot status and receive control commands

2. Elevator Agent

Elevator Agent is a service program running on the Linux system of the elevator control box, through which the cloud and robot communicate with the elevator control device. In the Elevator control system, the Elevator Agent communicates with the Elevator Controller through UDP to send elevator control commands and obtain elevator status.

The core functions of Elevator Agent are:

Communicate with Robo Cloud and Robot APP to report elevator status and receive elevator control instructions

Communicate down with the Elevator Controller to get the elevator status and send the elevator control command

3. Robot Cloud

Robo Cloud is a group of services provided to achieve remote management, scheduling and control of robots. It runs in the cloud and communicates with robots and elevator control devices, so elevator control is one part of the functions. The Robo Cloud communicates with the Elevator Agent running on the elevator control box through the MQTT protocol.

Its core functions include:

- a) Give instructions to control the elevator to the specified floor
- b) Give instructions to control the elevator to open the door
- c) Give instructions to control the elevator to close the door
- d) Obtain the status of the elevator
- e) Get the current floor information of the elevator

4. Robot App

Open-source application-food delivery App

The restaurant food delivery App is a service program running on the robot, and the application scene is the restaurant. It draws a map through the RoboStudio graphic tool and loads it to the local robot, which applies human-computer interaction in general and realizes multi-point task delivery.

Core features are:

- a) Get device battery status
- b) Get device health information
- c) Get POI information
- d) Get operation password
- e) Create new action
- f) Get current action
- g) End current action
- h) Shutdown or restart robot

Program Examples

1. Use Robot APP to invoke Robot Agent interface to query battery status

GET <http://127.0.0.1:1448/api/core/system/v1/power/status>

The return data format is application/json

```
interface AgentApi {
    /**
     * get方式调用 value: 接口地址
     * PowerStatus: 接口返回json格式对应的bean格式的数据 class的值
     */
    @GET("/core/system/v1/power/status")
    fun queryPowerStatus(): Call<PowerStatus>
}

/**
 * batteryPercentage : 90电池电量百分比, 0 ~ 100
 * dockingStatus : 对桩状态
 * isCharging : 是否正在充电...
 */
data class PowerStatus(
    val batteryPercentage: Int, val dockingStatus: String, val isCharging: Boolean,
    val isDCConnected: Boolean, val powerStage: String, val sleepMode: String
)

/**
 * retrofit接口代理类
 */
object AgentServiceCreator {
    fun <T> create(serviceClass: Class<T>, timeout: Long): T =
        Retrofit.Builder().baseUrl("http://127.0.0.1:1448/api/")
            .addConverterFactory(GsonConverterFactory.create()).client(
                OkHttpClient.Builder().retryOnConnectionFailure(true)
                    .connectTimeout(timeout, TimeUnit.SECONDS)
                    .addInterceptor { chain ->
                        val originalRequest = chain.request()
                        val requestBuilder =
                            originalRequest.newBuilder().addHeader("Connection", "close")
                        chain.proceed(requestBuilder.build())
                    }.build()
            ).build().create(serviceClass)
}

// 查询电量, 返回值为powerstatus
val powerStatus = AgentServiceCreator.create(AgentApi::class.java, 1L).queryPowerStatus().await()
Result.success(powerStatus)
```

2. Use Robt App to invoke Robot Agent interface to realize robot cross-floor moving

POST <http://127.0.0.1:1448/api/core/motion/v1/actions>

The request data format is: application/json

```
{
  "action_name": "slamtec.agent.actions.MultiFloorMoveAction",
  "options": {
    "target": {
      "poi_name": "201" //表示前往名称为 201的poi
    }
  }
} // JavaScript Document
```

Robot API List(Details in <https://docs.slamtec.com/>)

| Function Module | API List |
|---|--|
| SLAM/Localization and mapping related functions | Get the robot pose |
| | Set the robot pose |
| | Get localization quality |
| | Whether to support positioning |
| | Start/Pause localization |
| | Reset localization status |
| | Mapupdate mode or localization mode |
| | Open/Pause mapping |
| | Get the location of the charging station |
| | Set the location of the charging station |
| | Get known area map |
| | Get the current map |
| | Get a composite map |
| | Set a composite map |
| | Clear the map |
| Artifact / Manually map elements mark | Get virtual line segment |
| | Add virtual line segment |
| | Modify virtual line segment |
| | Clear a certain type of virtual line segment |
| | Delete a virtual line segment |
| | Get rectangular area |
| | Add rectangular area |
| | Clear a certain type of rectangular area |
| | Delete a rectangular area |
| | Get all POIs in the current map |
| | Add a POI |
| | Clear POI |
| Find POI by ID | |
| Modify POI | |
| Delete POI | |
| Motion / Robot motion control | Get all supported actions |

| | |
|--|--|
| | Get current action |
| | Abort current action |
| | Create a new action |
| | Query action status |
| Firmware upgrade | Get firmware upgrade progress |
| Android application management (ARM only) | Get all custom installed apps |
| | Install an APP |
| | Uninstall an APP |
| Multi-floor / Multi-floor map and POI management, elevator and other functions | Move across floors |
| | Cross-floor back to charging station |
| | Get all floor information |
| | Get the current floor information of the robot |
| | Set the floor information of the robot |
| | Get POI information |
| | Upload the map to the robot |
| | Delete saved map |
| | Keep the current map even if restarted |
| | Reload the map |
| Delivery / Delivery service related interfaces | Get operation password |
| | Set operation password |
| | Get configuration information |
| | Get delivery settings information |
| | Get all cargo information |
| | Get all box information of a cargo |
| | Get box information |
| | Operate box |
| | Query box operation results |
| | Get occupied cargos |
| | Query task information |
| | Create a task |
| | Cancel all tasks |
| | Cancel task according to task ID |
| | Cancel task according to order ID |
| | Add order event |
| | Get current task status |
| | Pause/resume task |
| Start picking up | |
| End picking up | |
| Get delivery event information | |
| Note: please contact our sales representatives for delivery APIs | |
| System resource | Get robot capabilities |
| | Get the robot power status |
| | Shutdown or restart the robot |
| | Hibernate (stop lidar) |
| | Wakeup the robot |

Restart module

Get device information

Get device health status information

Clear the error status information

Get current laser scan

Get system parameters

Set system parameters

Get network status

Set network status

Get routing information

Set routing information

Set Cube configuration

Restricted Use Scenarios

To avoid robot base failure or damage, please do not use the Apollo 2.0 in the following scenarios.

(1) Over-limit/heavy transport

Do not put items exceeding the maximum weight on the base to avoid affecting the normal use of Apollo 2.0. For details about the maximum load weight, please check the Apollo 2.0 datasheet.

(2) Overpass height

Please make sure that there are no obstacles higher than 20mm in front of the Apollo 2.0. When driving the Apollo, try to avoid rough ground or other environments with large height difference.

(3) Man-made impact

Do not push or strike the Apollo 2.0 while it is in normal use.

(4) Temperature/humidity

Do not place Apollo 2.0 in an area with high temperature, humidity, or water stains.

(5) Ground obstacles

For the places that the robot base will travel through, please ensure that the ground is clean and free of linear obstacles and debris.

(6) Outdoor

Do not use the robot base outside.

(7) Altitude

It is safe to use at altitudes below 2000m.

Emergency Handling for Temporary Malfunction

- (1) Please press the brake button;
- (2) Push the robot base back to the charging station;
- (3) The robot base can be forced to switch on.

* For emergency use only.

Attention

1. Storage:

The robot base should be stored in a cool and dry place. If you are intend to keep the robot base for a long time (3 months or longer) without using it, it is recommended that the robot base should be stored under the dry environment with temperature during 10-25°C and without corrosive gas. And the robot base should be charged at least one time every six months to ensure the voltage of the battery is between 3.6V-3.9V.

2. Package:

Packaging material has a certain strength and toughness, can withstand the transport of slight vibration, extrusion, friction, and collision;

3. Transportation and handling:

Handle gently to prevent falling, collision, drag, inversion;

The stack needs to be solid compact, solid, stacked.

4. Miscellaneous Attention:

- Handle Apollo base gently(do not kick, thrust or drag it).
- Do not spill any liquid on Apollo.
- Do not use the recharging function of Apollo when it is walking on a soft carpet which can sag more than 2cm.
- Ensure that Apollo always starts on its charger.
- Do not change or replace anything in the machine without authorization.
- Ensure that the load of Apollo meets the requirement of the specification.
- Do not use Apollo under environment with too many highly transparent materials.

General Maintenance

- (1) Lidar cleaning: When the robot base is powered off and not working, check around the Lidar to ensure that there is no shelter.
- (2) Universal wheel cleaning: When the robot base is powered off and not working, gently lift the robot base, wipe the universal wheel with a soft dry cloth, and remove the surrounding foreign matter.
- (3) Depth camera cleaning: Please wipe the lenses of 2 depth cameras with a soft dry cloth when the robot base is powered off.
- (4) Charging station cleaning: Please wipe the charging station and charging electrodes with a soft dry cloth when the charging station is disconnected from power
- (5) Safety rim cleaning: Please wipe the safety rim with a soft dry cloth when the robot base is powered off and not working, and ensure that there is no silk, paper and other foreign matter stuck on the rim.

Maintenance cycle

For the robot base maintenance, it is mainly including the depth camera lens inspection, safety rim inspection, clearance inspection around the LIDAR, foreign matter inspection around the drive wheel and universal wheel, and charging station inspection. The interval of the maintenance cycle can be adjusted according to the environment, using frequency and temperature of the robot.

| Apollo Recommended Maintenance Schedule | | | Time interval | | |
|---|-------------------|-------------------|---------------|-------|------|
| No | Device | Maintenance Level | Year | Month | Week |
| 1 | Depth Camera Lens | Wipe | -- | -- | 1 |
| 2 | Safety Rim | Wipe | -- | -- | 1 |
| 3 | LIDAR Layer | Tidy Up | -- | 1 | -- |
| 4 | Universal Wheel | Tidy Up | -- | -- | 1 |
| 5 | Drive Wheel | Tidy Up | -- | -- | 1 |
| 6 | Charging Station | Wipe | -- | 1 | -- |
| 7 | Robot Base | Inspect | 1 | -- | -- |

| No. | Trouble Description | Possible Cause | Solution |
|-----|---|---|--|
| 1 | There are noisy points on the map built by Apollo 2.0(laser points appear in a place of the map that has no obstacles in the related actual place). | There is dirt on the surface of the Lidar. | Please use microfiber cloth to clean the dirt on the Lidar. |
| | | There are obstacles near the radar, such as wires. | Please remove the obstacles. |
| | | Other causes | Please contact SLAMTEC technical support for further help. |
| 2 | Apollo 2.0 cannot power on | The battery becomes low. | Charge Apollo via emergency charging cable. |
| | | The wire connection of build-in system switch or designed switch goes wrong. | Please check the Control Port Definition and connect related wires properly. |
| 3 | After launching Apollo 2.0, you cannot control it moving via computer application. | The red emergency switch is pressed down (You cannot push Apollo 2.0 moving in this condition). | Pull up the red emergency switch. |
| | | The release switch is pressed down (You can push Apollo moving in this condition). | Recover release switch. |
| | | Other causes | Please contact SLAMTEC technical support for further help. |
| 4 | The range of Lidar on the map is less than its standard range and the laser light edge is in line. The range will go back to normal if uplifting the front of Apollo. | The ground is not level or flat. | Please use Apollo on a level and flat ground. |
| | | Other causes | Please contact SLAMTEC technical support for further help. |
| 5 | The Apollo cannot go back to charge itself normally. | The charger is move to a different place. | Rebuild the map and do not move the charger. |
| | | The charger position is not set in the map. | Set the position of the charger in the map. |
| | | The charger is disconnected to power. | Check whether the charger is properly connected to power. |

Product Carried Standard

GB 4943.1

GB/T 15706

GB/T 16855.1

GB/T 37283

GB/T 37284

* Do not use the product beyond the instructions to avoid or cause damage to Apollo.

* We reserve the right to update the product.

* User manual version V1.0.