

# **GS-Phantas**

## **S1**

### **DEPLOYMENT GUIDE**



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## INTRODUCTION

The Cleaning Robot Phantas S1 by Gausium (alias "Gaussian Robotics"), Singapore, is a commercial floor cleaning robot that boldly integrates 4-floor cleaning modes, which grants it unrivaled versatility and usability for cleaning spaces with different types of flooring, both hard and soft.

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## 1. DELIVERY & UNPACKING INSTRUCTIONS

Before the delivery acceptance, check the crate, and the robot's appearance to confirm the robot functions well. If there is anything abnormal, please take photos and contact a product service representative.



**NOTE:**

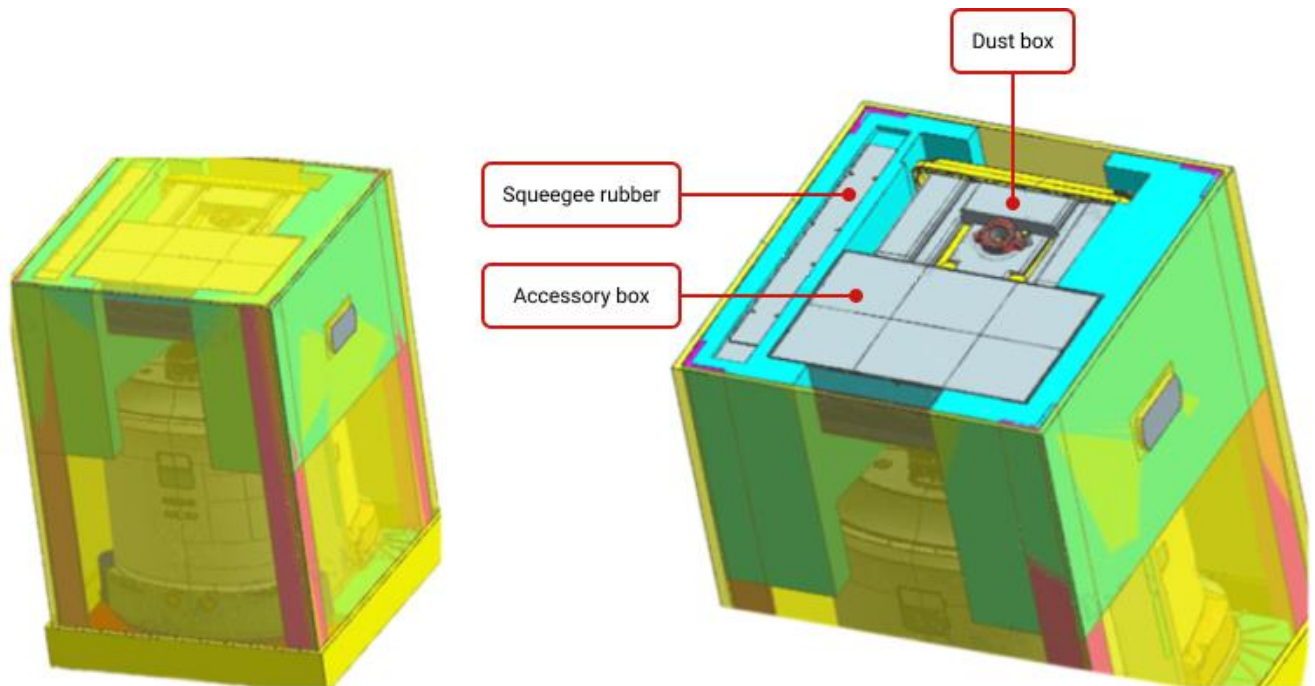
- For unpacking, you will need a utility knife or scissors.

### 1.1. Unpacking Procedure

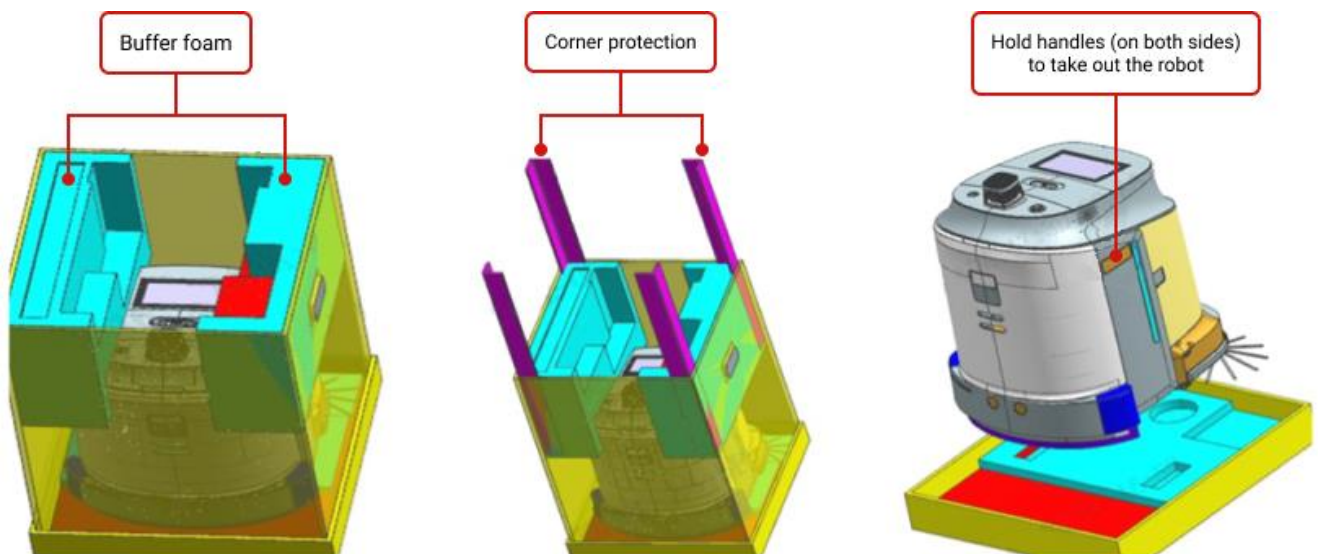
1. First, check the robot's appearance. If any scratches, dents, dirt, or other cosmetic issues are discovered, please notify AROS Technical Support accordingly.
2. Remove the shockproof package and put the machine on flat ground.



3. Remove the top cover. You will see the top accessory layer. Take out the squeegee rubber, accessory box, and dust box.



4. Remove buffer foams, corner protections, and outer box so that the machine can be lifted from the bottom.+



5. Check the **Packing List** and make sure there is no shortage of shipment for the listed stuff.



		<b>销售发货清单</b>		版本	A		
GS-WH-3H-01-06		上海高松自动化科技发展有限公司		修订号	0		
合同编号:		发货日期:		页码	1/2		
客户名称:		收货联系人:					
客户地址:							
类别	序号	物料描述	规格型号	数量	单位	选择	装车方式
整机	1						
	2						
标配附件	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						
	16						

**收货注意事项:**

请您确认物品完整性,收货2个工作日内请核对发货清单(控制盒及配套发出的所有产品,是否有遗漏或破损),并在该送货单上签字并扫描上传给送货单位,若超过2个工作日(以快递送达的时间开始计算)尚未回传,则视为正常收货。

送货单位:上海高松自动化科技发展有限公司      收货单位及签收人:

(签字盖章)      (签字盖章)

上海高松自动化科技发展有限公司  
Gaussian Automation Technology Development Co., Ltd.  
地址: 上海浦东新区唐陆路1199号1611室  
Rm.1116,Build 1,No.809 Dengui Road,Pudong District,Shanghai

- Ensure the **Product Quality Certificate** is provided along with the robot, and that all the information mentioned is accurate.



**产品合格证**  
Product Quality Certificate

产品名称: 搬运机器人  
Product Name: Automatic Transporter

型号: S1-Pro  
Model No: S1-Pro

制造单位: 上海高松自动化科技发展有限公司  
Manufacturer (Unit): Gaussian Automation Technology Development Co., Ltd.

检验员:  
Inspector

检验日期:  
Inspection Date



本产品经检验合格,准予出厂。  
This product has passed all inspection and result has been certified.



- Complete and send us a copy of the signed **Delivery Acceptance Form** based on the actual findings.

Preliminary Acceptance Checklist (Phantas S1 Pool)				
Customer Name	Demonstration Date	Version		
Customer Address	Delivery Status	File No.		
Customer's Area	Quantity of Delivery	Vehicle Number		
<b>GAUSEUM</b>				
No.	Checklist	Details	Result (Y/N)	Remark
1	Overall appearance	No scratches or discoloration		
2	Water tank/dust tank	No dirt or damage inside the water tank/dust tank		
3	Sensor appearance	No dirt, scratches, damage on LiDAR, cameras, ultrasonic sensors		
4	Wheel hub motor	No damage on the motor and no abnormal noise upon rotating		
5	Motor contact with the gear	✓ (change, ✓ dust box, ✓ cable brush, ✓ roll chain included)		
6	Connections	connections include rubber strip / dust bag / roller brush / cable brush / Haps a. The roller brush is pre-installed on the machine b. ✓ cable brush correctly with the cap c. The front and rear rubber strips are pre-installed on the suspension d. ✓ dust bag pre-installed in the dust box e. Haps is pre-installed on the machine		
10	Light strip	Under normal conditions, the color of the light strip is blue		
11	Cover plate	Manually open the cover plate, no interference and abnormal noise during the opening process		
12	Start information	Check whether it is consistent with the HPS on the suspension		
13	Turn on	Can press the button to turn on normally and enter the APP		
14	Display	No splash screen, black screen or stuck		
15	Search information	Enter the APP after loading, no fault alarm (except positioning fault)		
16	Emergency stop button	After pressing the emergency stop button, the light strip turns red, and the machine cannot be started. After releasing the emergency stop button, the light strip turns blue, and the machine can be started in manual mode		
17	Product number	Check the label number on the machine product number, which needs to be consistent with the number on the suspension of the cover and the delivery note		
18	Backpack Connection (charging function)	RS signal can be the top right-hand corner of display is normal		
19	Water absorption effect	Robot can charge normally		
20	Mapping	Perform the mapping task manually to check the water absorption effect		
21	Mapping	Map can be created normally without deformation or ghost		
22	Map saving	Map can be saved normally		
23	Task execution	Task executed in accordance with created path and obstacles could be avoided normally		
24	Obstacle avoidance V-ster	When encountering pedestrians, the obstacle avoidance state can be broadcasted normally without noise		
25	Charging cable (input and output)	No leakage operation at the rear end of the backpack Put water into the rear tank of the backpack, no water leakage After adding water turn on the distribution function, and the automatic operation can begin in manually	Pass	
26	File	SV 1.0, 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 2.0, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 3.0, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 4.0, 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 5.0, 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.8, 5.9, 6.0, 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 7.0, 7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 7.7, 7.8, 7.9, 8.0, 8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 8.7, 8.8, 8.9, 9.0, 9.1, 9.2, 9.3, 9.4, 9.5, 9.6, 9.7, 9.8, 9.9, 10.0, 10.1, 10.2, 10.3, 10.4, 10.5, 10.6, 10.7, 10.8, 10.9, 11.0, 11.1, 11.2, 11.3, 11.4, 11.5, 11.6, 11.7, 11.8, 11.9, 12.0, 12.1, 12.2, 12.3, 12.4, 12.5, 12.6, 12.7, 12.8, 12.9, 13.0, 13.1, 13.2, 13.3, 13.4, 13.5, 13.6, 13.7, 13.8, 13.9, 14.0, 14.1, 14.2, 14.3, 14.4, 14.5, 14.6, 14.7, 14.8, 14.9, 15.0, 15.1, 15.2, 15.3, 15.4, 15.5, 15.6, 15.7, 15.8, 15.9, 16.0, 16.1, 16.2, 16.3, 16.4, 16.5, 16.6, 16.7, 16.8, 16.9, 17.0, 17.1, 17.2, 17.3, 17.4, 17.5, 17.6, 17.7, 17.8, 17.9, 18.0, 18.1, 18.2, 18.3, 18.4, 18.5, 18.6, 18.7, 18.8, 18.9, 19.0, 19.1, 19.2, 19.3, 19.4, 19.5, 19.6, 19.7, 19.8, 19.9, 20.0, 20.1, 20.2, 20.3, 20.4, 20.5, 20.6, 20.7, 20.8, 20.9, 21.0, 21.1, 21.2, 21.3, 21.4, 21.5, 21.6, 21.7, 21.8, 21.9, 22.0, 22.1, 22.2, 22.3, 22.4, 22.5, 22.6, 22.7, 22.8, 22.9, 23.0, 23.1, 23.2, 23.3, 23.4, 23.5, 23.6, 23.7, 23.8, 23.9, 24.0, 24.1, 24.2, 24.3, 24.4, 24.5, 24.6, 24.7, 24.8, 24.9, 25.0, 25.1, 25.2, 25.3, 25.4, 25.5, 25.6, 25.7, 25.8, 25.9, 26.0, 26.1, 26.2, 26.3, 26.4, 26.5, 26.6, 26.7, 26.8, 26.9, 27.0, 27.1, 27.2, 27.3, 27.4, 27.5, 27.6, 27.7, 27.8, 27.9, 28.0, 28.1, 28.2, 28.3, 28.4, 28.5, 28.6, 28.7, 28.8, 28.9, 29.0, 29.1, 29.2, 29.3, 29.4, 29.5, 29.6, 29.7, 29.8, 29.9, 30.0, 30.1, 30.2, 30.3, 30.4, 30.5, 30.6, 30.7, 30.8, 30.9, 31.0, 31.1, 31.2, 31.3, 31.4, 31.5, 31.6, 31.7, 31.8, 31.9, 32.0, 32.1, 32.2, 32.3, 32.4, 32.5, 32.6, 32.7, 32.8, 32.9, 33.0, 33.1, 33.2, 33.3, 33.4, 33.5, 33.6, 33.7, 33.8, 33.9, 34.0, 34.1, 34.2, 34.3, 34.4, 34.5, 34.6, 34.7, 34.8, 34.9, 35.0, 35.1, 35.2, 35.3, 35.4, 35.5, 35.6, 35.7, 35.8, 35.9, 36.0, 36.1, 36.2, 36.3, 36.4, 36.5, 36.6, 36.7, 36.8, 36.9, 37.0, 37.1, 37.2, 37.3, 37.4, 37.5, 37.6, 37.7, 37.8, 37.9, 38.0, 38.1, 38.2, 38.3, 38.4, 38.5, 38.6, 38.7, 38.8, 38.9, 39.0, 39.1, 39.2, 39.3, 39.4, 39.5, 39.6, 39.7, 39.8, 39.9, 40.0, 40.1, 40.2, 40.3, 40.4, 40.5, 40.6, 40.7, 40.8, 40.9, 41.0, 41.1, 41.2, 41.3, 41.4, 41.5, 41.6, 41.7, 41.8, 41.9, 42.0, 42.1, 42.2, 42.3, 42.4, 42.5, 42.6, 42.7, 42.8, 42.9, 43.0, 43.1, 43.2, 43.3, 43.4, 43.5, 43.6, 43.7, 43.8, 43.9, 44.0, 44.1, 44.2, 44.3, 44.4, 44.5, 44.6, 44.7, 44.8, 44.9, 45.0, 45.1, 45.2, 45.3, 45.4, 45.5, 45.6, 45.7, 45.8, 45.9, 46.0, 46.1, 46.2, 46.3, 46.4, 46.5, 46.6, 46.7, 46.8, 46.9, 47.0, 47.1, 47.2, 47.3, 47.4, 47.5, 47.6, 47.7, 47.8, 47.9, 48.0, 48.1, 48.2, 48.3, 48.4, 48.5, 48.6, 48.7, 48.8, 48.9, 49.0, 49.1, 49.2, 49.3, 49.4, 49.5, 49.6, 49.7, 49.8, 49.9, 50.0, 50.1, 50.2, 50.3, 50.4, 50.5, 50.6, 50.7, 50.8, 50.9, 51.0, 51.1, 51.2, 51.3, 51.4, 51.5, 51.6, 51.7, 51.8, 51.9, 52.0, 52.1, 52.2, 52.3, 52.4, 52.5, 52.6, 52.7, 52.8, 52.9, 53.0, 53.1, 53.2, 53.3, 53.4, 53.5, 53.6, 53.7, 53.8, 53.9, 54.0, 54.1, 54.2, 54.3, 54.4, 54.5, 54.6, 54.7, 54.8, 54.9, 55.0, 55.1, 55.2, 55.3, 55.4, 55.5, 55.6, 55.7, 55.8, 55.9, 56.0, 56.1, 56.2, 56.3, 56.4, 56.5, 56.6, 56.7, 56.8, 56.9, 57.0, 57.1, 57.2, 57.3, 57.4, 57.5, 57.6, 57.7, 57.8, 57.9, 58.0, 58.1, 58.2, 58.3, 58.4, 58.5, 58.6, 58.7, 58.8, 58.9, 59.0, 59.1, 59.2, 59.3, 59.4, 59.5, 59.6, 59.7, 59.8, 59.9, 60.0, 60.1, 60.2, 60.3, 60.4, 60.5, 60.6, 60.7, 60.8, 60.9, 61.0, 61.1, 61.2, 61.3, 61.4, 61.5, 61.6, 61.7, 61.8, 61.9, 62.0, 62.1, 62.2, 62.3, 62.4, 62.5, 62.6, 62.7, 62.8, 62.9, 63.0, 63.1, 63.2, 63.3, 63.4, 63.5, 63.6, 63.7, 63.8, 63.9, 64.0, 64.1, 64.2, 64.3, 64.4, 64.5, 64.6, 64.7, 64.8, 64.9, 65.0, 65.1, 65.2, 65.3, 65.4, 65.5, 65.6, 65.7, 65.8, 65.9, 66.0, 66.1, 66.2, 66.3, 66.4, 66.5, 66.6, 66.7, 66.8, 66.9, 67.0, 67.1, 67.2, 67.3, 67.4, 67.5, 67.6, 67.7, 67.8, 67.9, 68.0, 68.1, 68.2, 68.3, 68.4, 68.5, 68.6, 68.7, 68.8, 68.9, 69.0, 69.1, 69.2, 69.3, 69.4, 69.5, 69.6, 69.7, 69.8, 69.9, 70.0, 70.1, 70.2, 70.3, 70.4, 70.5, 70.6, 70.7, 70.8, 70.9, 71.0, 71.1, 71.2, 71.3, 71.4, 71.5, 71.6, 71.7, 71.8, 71.9, 72.0, 72.1, 72.2, 72.3, 72.4, 72.5, 72.6, 72.7, 72.8, 72.9, 73.0, 73.1, 73.2, 73.3, 73.4, 73.5, 73.6, 73.7, 73.8, 73.9, 74.0, 74.1, 74.2, 74.3, 74.4, 74.5, 74.6, 74.7, 74.8, 74.9, 75.0, 75.1, 75.2, 75.3, 75.4, 75.5, 75.6, 75.7, 75.8, 75.9, 76.0, 76.1, 76.2, 76.3, 76.4, 76.5, 76.6, 76.7, 76.8, 76.9, 77.0, 77.1, 77.2, 77.3, 77.4, 77.5, 77.6, 77.7, 77.8, 77.9, 78.0, 78.1, 78.2, 78.3, 78.4, 78.5, 78.6, 78.7, 78.8, 78.9, 79.0, 79.1, 79.2, 79.3, 79.4, 79.5, 79.6, 79.7, 79.8, 79.9, 80.0, 80.1, 80.2, 80.3, 80.4, 80.5, 80.6, 80.7, 80.8, 80.9, 81.0, 81.1, 81.2, 81.3, 81.4, 81.5, 81.6, 81.7, 81.8, 81.9, 82.0, 82.1, 82.2, 82.3, 82.4, 82.5, 82.6, 82.7, 82.8, 82.9, 83.0, 83.1, 83.2, 83.3, 83.4, 83.5, 83.6, 83.7, 83.8, 83.9, 84.0, 84.1, 84.2, 84.3, 84.4, 84.5, 84.6, 84.7, 84.8, 84.9, 85.0, 85.1, 85.2, 85.3, 85.4, 85.5, 85.6, 85.7, 85.8, 85.9, 86.0, 86.1, 86.2, 86.3, 86.4, 86.5, 86.6, 86.7, 86.8, 86.9, 87.0, 87.1, 87.2, 87.3, 87.4, 87.5, 87.6, 87.7, 87.8, 87.9, 88.0, 88.1, 88.2, 88.3, 88.4, 88.5, 88.6, 88.7, 88.8, 88.9, 89.0, 89.1, 89.2, 89.3, 89.4, 89.5, 89.6, 89.7, 89.8, 89.9, 90.0, 90.1, 90.2, 90.3, 90.4, 90.5, 90.6, 90.7, 90.8, 90.9, 91.0, 91.1, 91.2, 91.3, 91.4, 91.5, 91.6, 91.7, 91.8, 91.9, 92.0, 92.1, 92.2, 92.3, 92.4, 92.5, 92.6, 92.7, 92.8, 92.9, 93.0, 93.1, 93.2, 93.3, 93.4, 93.5, 93.6, 93.7, 93.8, 93.9, 94.0, 94.1, 94.2, 94.3, 94.4, 94.5, 94.6, 94.7, 94.8, 94.9, 95.0, 95.1, 95.2, 95.3, 95.4, 95.5, 95.6, 95.7, 95.8, 95.9, 96.0, 96.1, 96.2, 96.3, 96.4, 96.5, 96.6, 96.7, 96.8, 96.9, 97.0, 97.1, 97.2, 97.3, 97.4, 97.5, 97.6, 97.7, 97.8, 97.9, 98.0, 98.1, 98.2, 98.3, 98.4, 98.5, 98.6, 98.7, 98.8, 98.9, 99.0, 99.1, 99.2, 99.3, 99.4, 99.5, 99.6, 99.7, 99.8, 99.9, 100.0		
27	Training	Robot training		
Customer feedback, demand			Customer Stamp	
Signature (after water department)		Signature (customer)		

## 1.2. Preliminary Check

- The main power switch is positioned at the right bottom side: "—" means ON, and "O" means OFF.





- Press the button for 5 seconds to start the robot and release the button when the light bars on both sides of the robot body light up.



- Ensure both the touch screen and display are normal, and the battery is above 40%.

## 1.3. On-Site Inspection

### 1.3.1. Site Investigation

Pay attention to the environmental requirements for robot operation:

Name	Description
<b>Suitability</b>	<p>Suitable scenario: Short-Hair Carpet Areas, Office Buildings, Banks, Hotels, and other small indoor areas with hard flat ground. (Single floor within <b>5000</b> square meters).</p> <p>Unsuitable scenario: Retail &amp; shopping malls, Shaggy Carpet Areas, Underground Parking lots, Outdoor Areas, Residential Road, Glass floors, and other large indoor and outdoor scenes.</p>
<b>Crossing ability</b>	Vertical obstacle climbing height: <b>2cm</b> .
<b>Passable width</b>	<p>The minimum width of the passage is <b>71cm</b>.</p> <p>The minimum height of the passage is <b>65cm</b>.</p> <p>The minimum width of a narrow passage where the robot can turn around is <b>71cm</b>.</p>
<b>Passable slope</b>	<p>On Manual mode, the machine could run through the slop less than <b>8°</b>.</p> <p>On Auto mode, it is not recommended to run through any slopes.</p>
<b>Laser detection</b>	The obstacles with black, highly reflective, transparent, and thin ( <b>4cm</b> ) surfaces are highly likely to cause light absorption or light drifting. To have a better scanning result, laser stickers shall be applied.

**Falling risk**

Make sure that there are anti-falling Areas with a risk of falls such as down steps, up/down escalators, slopes, and hollowed-out sewers, which need to be treated for anti-falling treatment.



**NOTE:**

- Stickers are used to improve the quality of scanning. Stickers must be placed at a height of 18-19 cm from the floor.
- If you put stickers on a glass door, make sure there are stickers on both sides of the door.

### 1.3.2. Communication with Customers

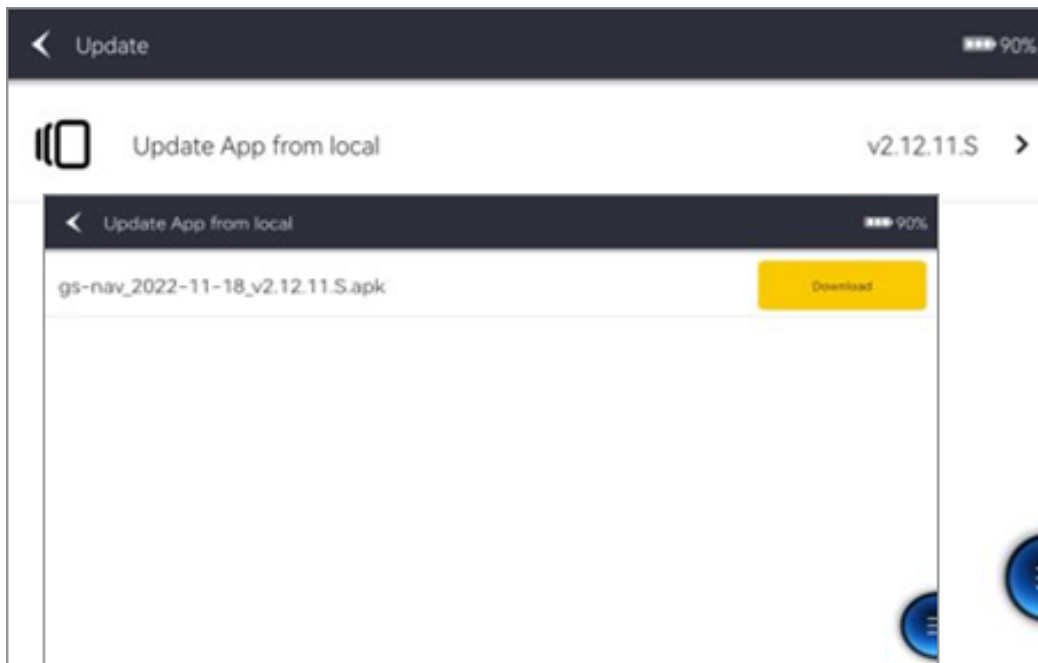
Name	Description
<b>Cleaning area</b>	Observe the cleaning area with the Customer at the site and take all relevant notes, photos, and videos for reference.
<b>Cleaning mode</b>	scrubbing, dust mopping, sweeping, vacuuming
<b>Cleaning time</b>	Communicate with the Customer about the task-starting time, task-performing areas, and each cleaning mode in specific areas and arrange tasks on "GaussianMobile".
<b>Robot placement</b>	Cleaning and maintaining location, parking point, charging point, and holiday storage location.
<b>Site environment</b>	Will the environment change frequently? Where are the areas with high falling risks? Avoid these places/obstacles when creating cleaning paths. For example, thin black rods, transparent doors, booths, stairs, escalators, etc.
<b>On-site assistance</b>	Request support from the Customer. A temporary charging may be needed to plan a field for testing and even open the fire door for inspection, etc.

## 2. ROBOT DEPLOYMENT

### 2.1. Deployment Preparation

#### Method 1

1. Install G-Mind on a phone or iPad.
2. Connect to the robot's Wi-Fi (format: **s\_line\_wifi\_\*\***) (password: gaussian705).
3. Log in as an admin user.
4. Update G-Mind using the path: **data management/Setup/Update/APP updates**.



#### Method 2

1. Login to the upper computer to download G-Mind APK by using the path: **/root/launch/tools/apk**.
2. Install APK to Android phone or iPad.





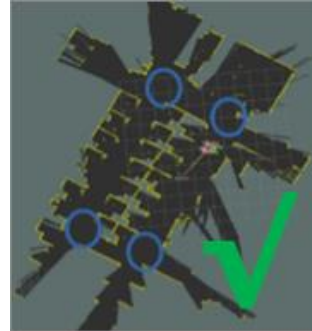
**NOTE:**

- Please contact your after-sales manager to get credentials for the robot.

## 2.2. Map Scanning

### 2.2.1. Starting Point

1. Find a good starting point first.
2. Select corners or places of characteristic features to scan.
3. Place the robot and make it parallel or perpendicular to the main wall/channel to get a good map.



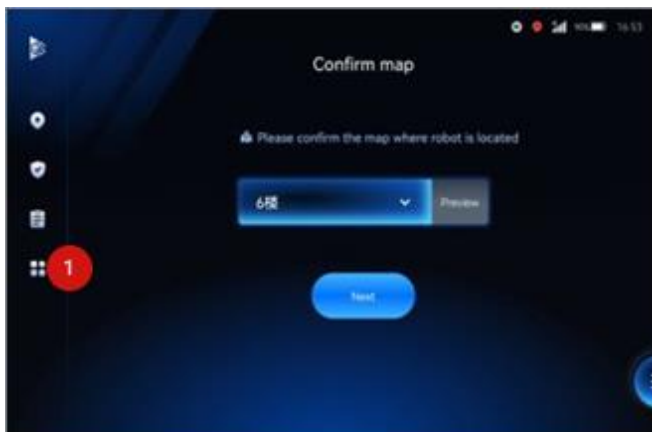
### 2.2.2. Defining the Robot's Position

1. Choose objects such as long corridors, symmetrical environments, and objects with high similarity.
2. Before scanning, use tape or markers to mark the position (within the range of **1m** around your starting point).
3. After scanning, return to this position to make sure that the laser point cloud overlaps with the map.

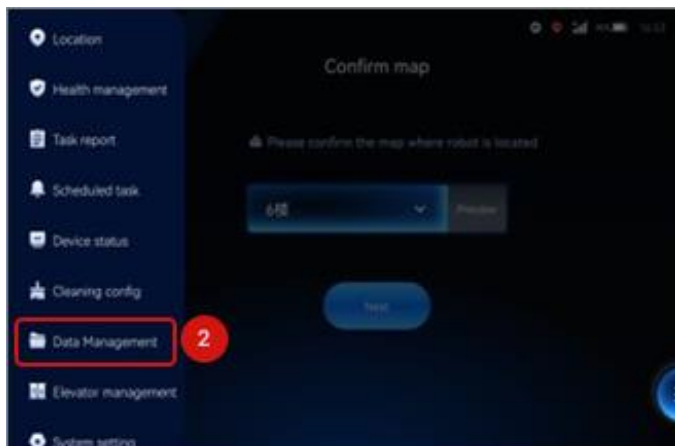


### 2.2.3. Entering the Scanning Interface via G-Mind

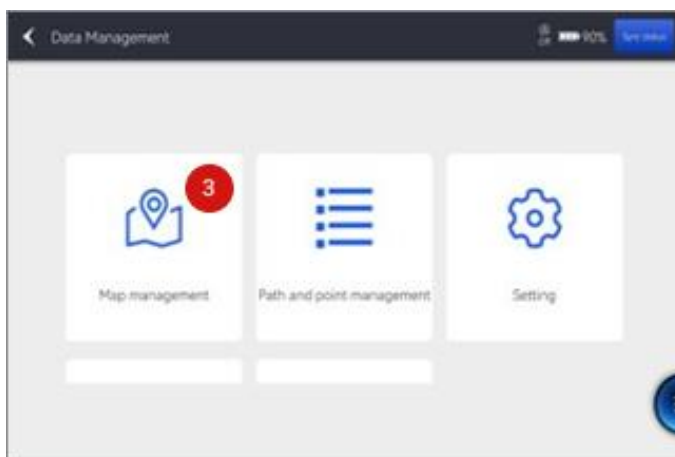
1. Tap the  button on the left.



## 2. Select **Data Management**.



## 3. Click **Map Management**.



### 2.2.4. Creating a Map

1. Follow steps 1-3 from the [previous instruction](#).
2. Click **Scan new map**.



3. Click **Start**.



4. Enter the map name.

5. Click **Confirm**.

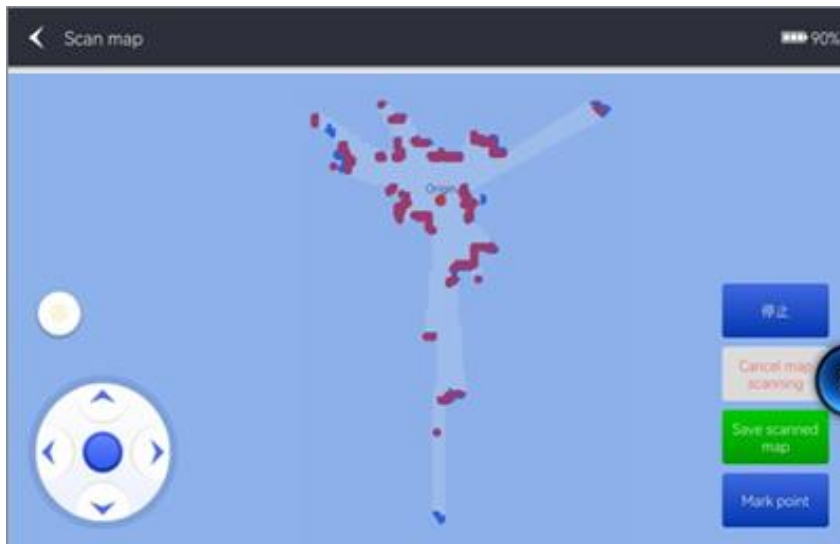


**NOTE:**

- If there are multiple floors, the floor number can be added to facilitate customers to find it.
- If there is only one floor, the cleaning area information should be added.
- Communication with customers about the name of the map.

6. Check the status through G-Mind when scanning.

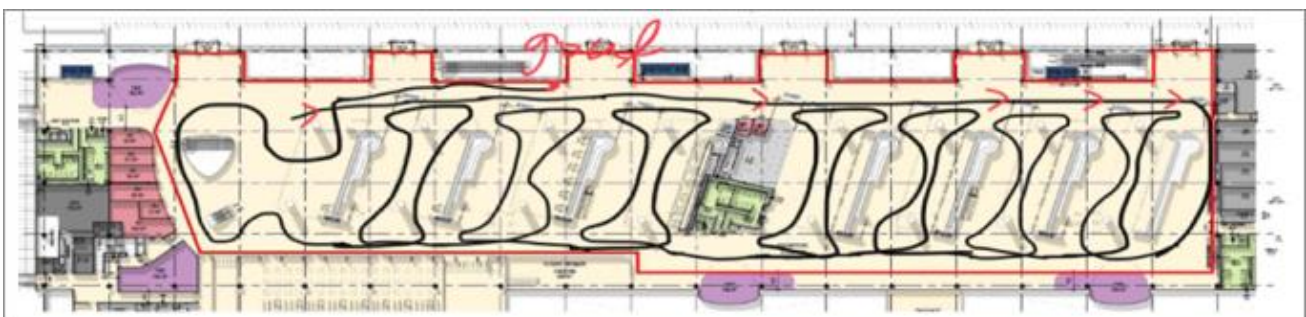


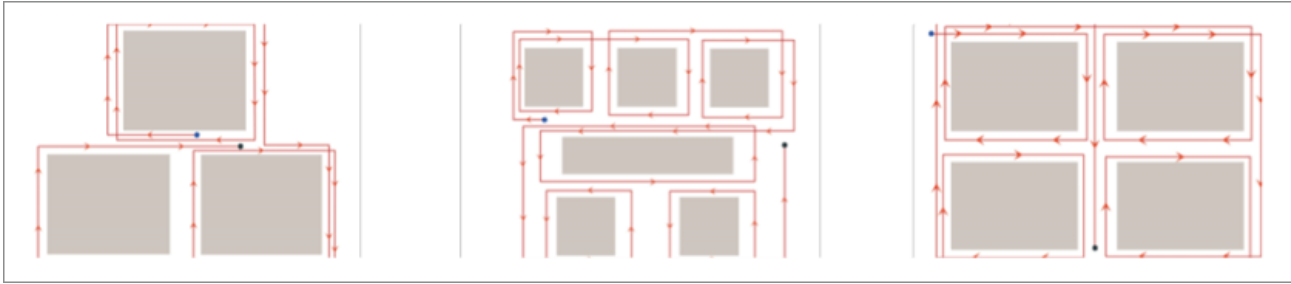


7. Three ways to control the robot:
  - a. manual push (**recommended**),
  - b. control by the handle,
  - c. clicking the blue area on the G-Mind screen.
8. Control the speed (move slowly during straight-line driving, rotating, or turning) and the route (avoid the curved route).
9. Design a route for the map scanning (small closed-loop first, then large closed-loop). Remember all the cleaning areas must be scanned.



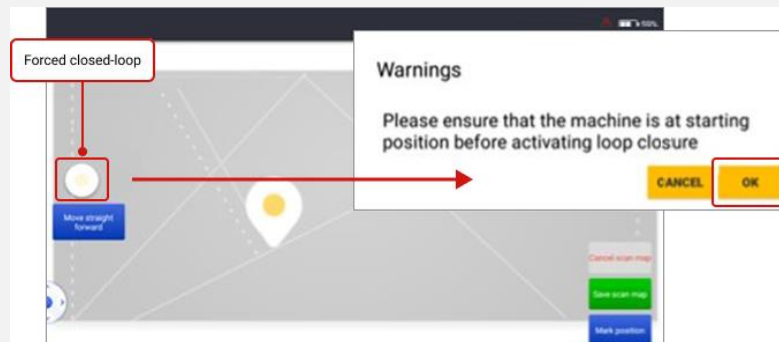
### Route example:





**NOTE:**

- Check if you need **Forced closed-loop** (FCL) after scanning!
  - If the map status is normal, you do not need FCL. Go on to the next page.
  - If the scene is simple and has clear features, you do not need FCL.
  - If abnormality including ghosting, distortion, unstable images, etc. is found 5 minutes after scanning, turn to FCL.



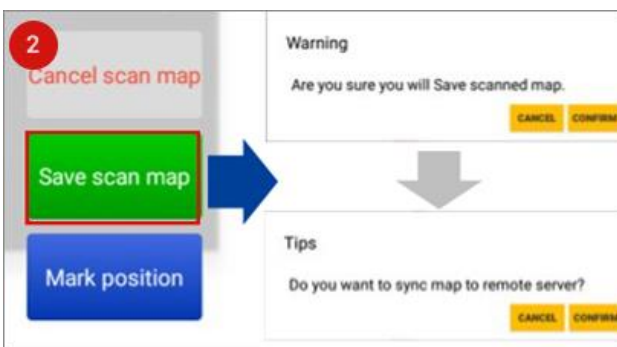
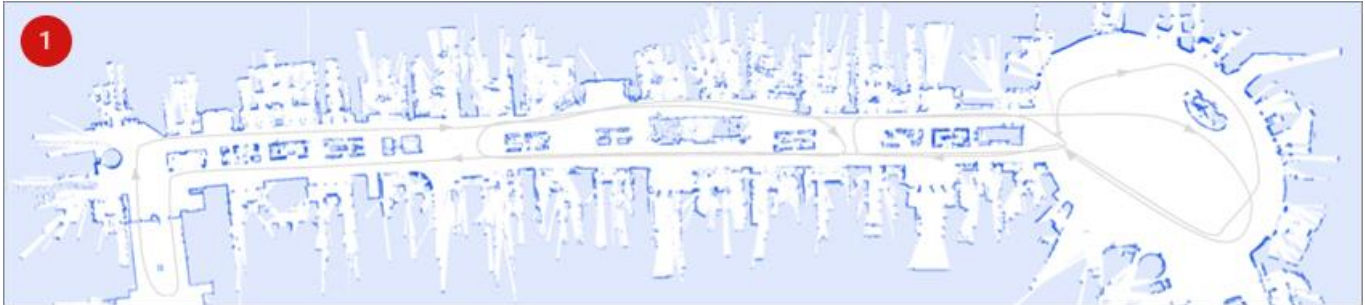
- Click **Forced closed-loop** → Click **OK**

FCL effect



## Confirmation & Saving

After scanning or finishing the forced closed-loop, check the following points before clicking **Save**:



- No distortion, ghosting, or missing image, otherwise, please use forced closed-loop.
- If a scanned map has distortion and ghosting due to the wrong closed loop, which cannot be revised, please scan the map again.
- No problem → Click **Save**.

### 2.2.5. Checking the Map Quality

If there are problems in the locality, delete the locality with **Map editing** and do the extended map scanning. If the map frame was distorted, please scan the map again.



#### NOTE:

- A poor-quality map would lead to random problems during operation. There might be no issues in the test run but there would be position loss or jams in daily operation.

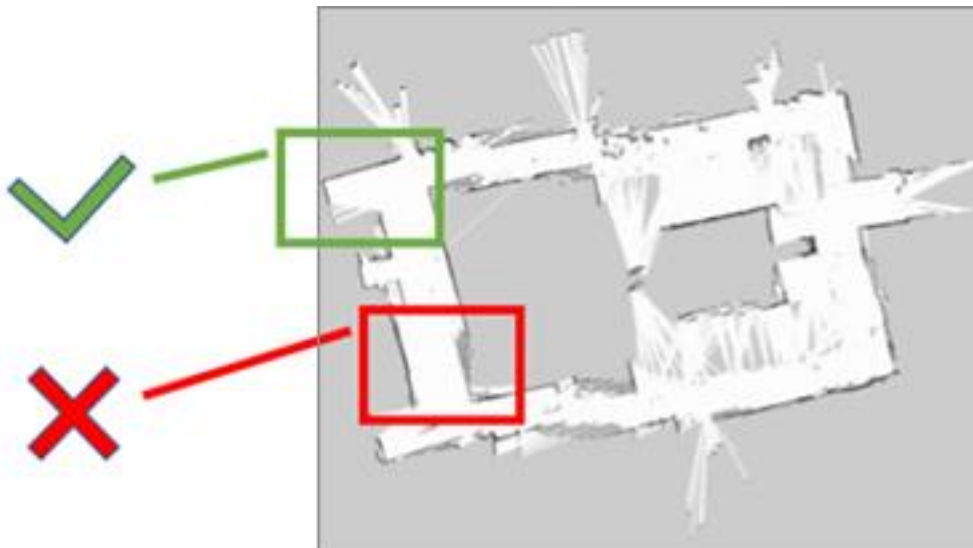
## Closed-loop

A successful closed-loop means that the same area scanned by the machine at various times can be overlapped. False or missing closed loops will lead to wrong maps, which cause locating deviation, and the robot may lose position or get stuck.



## Distortion

Distortion and ghosting are unacceptable. An example is 1 wall in actuality becomes 2 or more parallel walls on the screen. Distortion or ghosting will cause serious interference to navigation, such as deviation, position loss, or getting stuck.



### 2.2.6. Map Extension

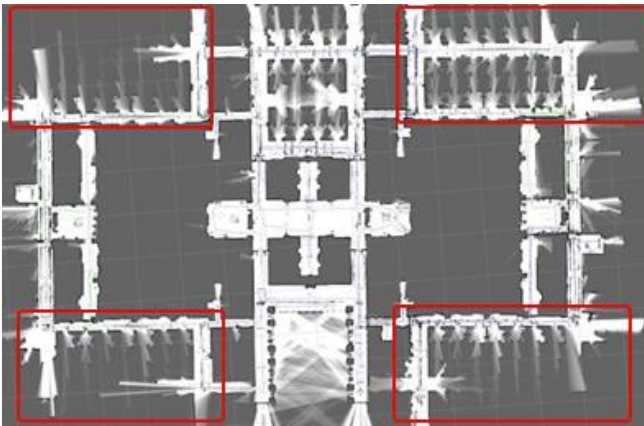
Map extension is needed because of adding new cleaning areas which were not covered by the original map. Besides, the cleaning area may be too large to scan only once.



**NOTE:**

- The map should not exceed 5K square meters.

1. Select the map that needs to be extended in your map list and click **Map extension**.
2. Choose an appropriate starting point for map extension: a small closed-loop first, then a big closed-loop. If no ghosting and distortion are discovered, click **Save**.
3. Locating the robot according to the original map, manually move the robot to the major route, then click **Map extension**. Push the robot for more than 2 meters before entering the new area. Map extension needs to follow the closed-loop rule as well.



4. Scan the major frame first, then scan the details in all connected areas.



5. Extend the map in turn if all areas are connected only in one place.

## 2.3. Editing Map

Edit mode	Description	Available shapes	Remarks
<b>Virtual wall edit</b>	It is mainly used to mark the area that cannot be scanned by a laser, to prevent the robot from colliding in the above area and causing danger. For example, shops, fragile goods, etc.	Line/Polygon/Circle	<b>Black</b> lines



<b>Original map editing</b>	<p><b>Clear area:</b> modify the noise and obstacles on the original map and clear them by box selection (frame selection).</p> <p><b>Restore unknown areas:</b> navigation and tasks are prohibited (in progress).</p>	Polygon	An area surrounded by <b>black</b> lines
<b>Carpet area</b>	Avoid this area. If there is no other way to go, stop operating and restart the operation after passing through this area. Mark carpet area by <b>Virtual wall edit</b> .	Polygon/Circle	Green
<b>Elevator area</b>	This function will only be used on the site where the elevator control is installed, that is, the elevator car position.	Line/Polygon/Circle	Purple line
<b>No falling risk area</b>	<p>Indicates that there is no risk of falling in this area and that the anti-fall function is not triggered. Common environments: glass stands, glass floors, black floors, etc.</p> <p>Avoid the robot from triggering the robot to prevent falling and causing the machine to stutter and nod during operation.</p>	Polygon	Celadon line
<b>Bottom track area</b>	Edit this area to avoid the robot's frequent passing through trunking and bottom track.	Polygon	Blue

### 2.3.1. Editing Virtual Wall

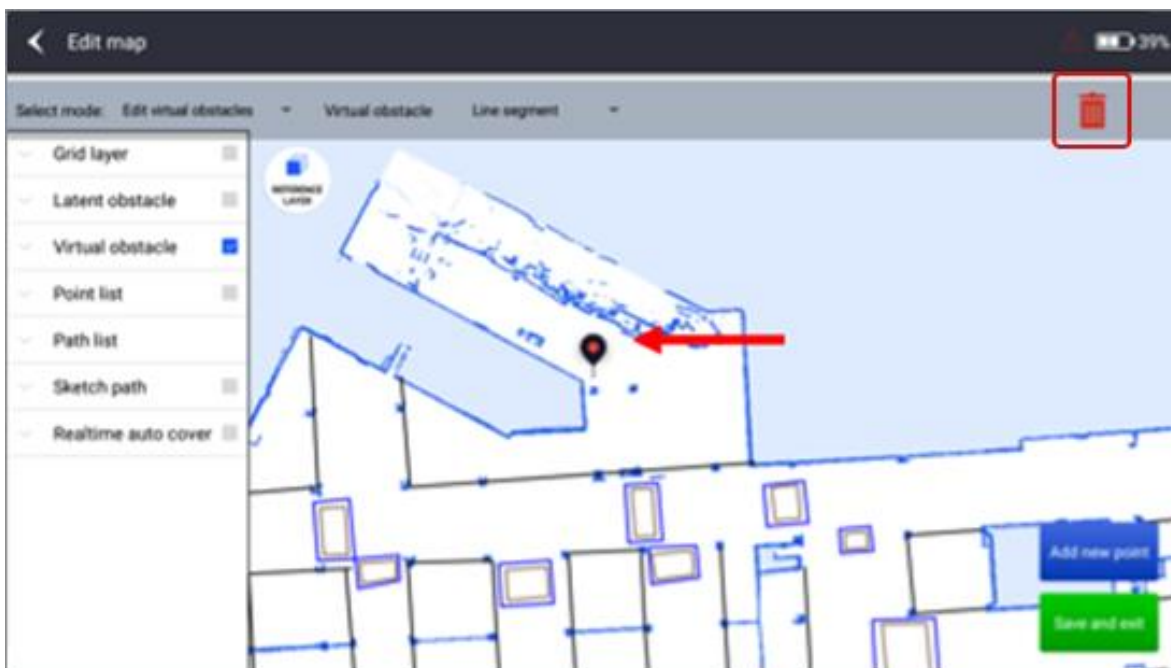
1. Click **Map editing** → **Reference layer** → **Virtual wall**. Then you can see the previously added virtual wall.
2. Drag the buoy to a suitable position on your touch screen and click **Add new point**. Then move the buoy to the next target position and click **Connect to**. A line will be generated. This line is the virtual wall. You can stop drawing at any time, not limited by quantity or length.
3. Try to use polylines to draw virtual walls so that you can delete and redraw them at any time in case of a wrong drawing.
4. After editing the virtual wall, select **Save All and exit** in the lower-right corner, and click **Confirm**.





### 2.3.2. Deleting Virtual Wall

1. Click the virtual wall that needs to be deleted. The virtual wall changes from **black** to **red**.
2. Click the deletion icon in the upper-right corner to delete the virtual map.

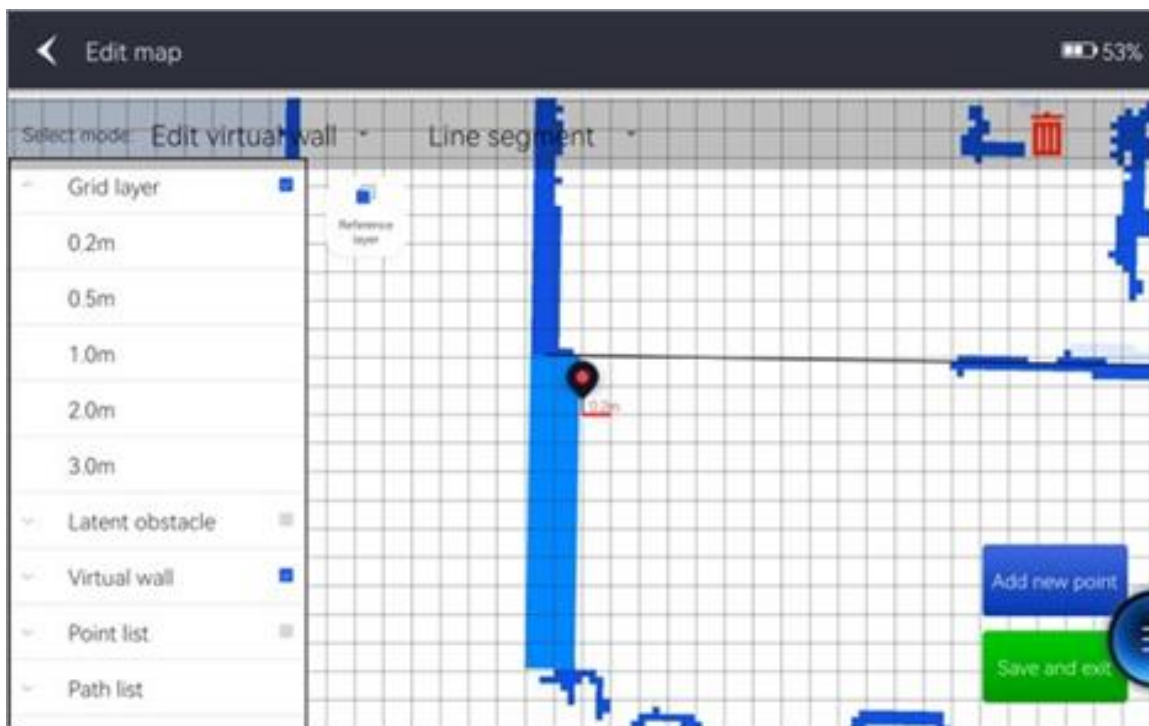


### 2.3.3. Drawing Virtual Walls in Special Areas

When encountering scenes where the outline cannot be scanned normally, such as glass doors and protruding platforms, you need to use the approach described below:



1. After scanning the map, move the robot to the actual location where you need to draw the virtual wall.
2. Follow the outer edge of the opened glass door to complete the virtual wall drawing.
3. Also, you can paste stickers on glass doors. The height of the stickers must match the height of the laser (sticker height: **58-63cm**).



### 2.3.4. Editing Original Map

1. Modify the noise and obstacle parts on the original map, and empty or fill them as needed.
2. Currently, only the **Empty area** function can be used. The **Fill area** function can be replaced by editing a virtual wall.



**NOTE:**

- Do not remove the real wall, only remove the extraneous noise points.
- Steps to reproduce: Select mode → Edit original map → Find the noise points → Draw a frame and select noise points by **Connect to point** → Click **Complete** → Select **Empty area** → **Save and exit**.



### 2.3.5. No Falling Risk Area

The robot automatically ignores the falling risks in this area and will not trigger the anti-fall function when passing nearby.

**Principle:**

Use **Virtual wall editing (VWE)** to separate the task zone and falling area. The virtual wall should be drawn far away from the falling area, preferably, more than **0.5m**.

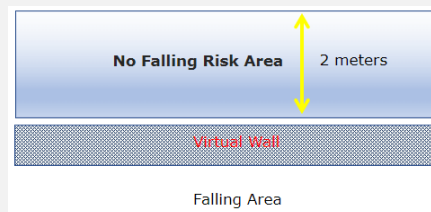
## Scenario:

Transparent doors and windows, fire doors that may open (the robot can detect falling areas when passing through here.)



### NOTE:

- Make sure that the **No falling risk area** is separated from the falling area by **Virtual wall editing (VWE)**.
- **No falling risk area** width: **2m**.



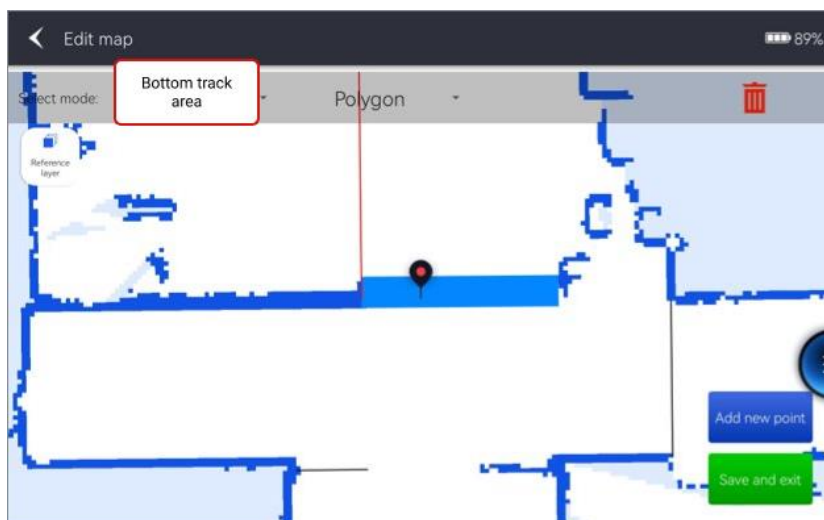
## 2.3.6. Bottom Track Area

1. Edit this area to avoid the robot's frequent passing through trunking and bottom track so that the robot can perform different cleaning modes even if the material of the ground is the same.
2. While passing through the bottom track area, the robot can lift roller brushes to avoid getting stuck.



### NOTE:

- Steps to reproduce: Select mode → Bottom track area → Find the actual bottom track area → Click **Connect to point**, draw a frame and select → Click **Finish** → **Save and exit**.



### 2.3.7. Elevator Area

1. When creating elevator area maps, click **Edit original map** to erase noise points around the elevator door or inside the elevator.
2. Draw the 4 walls (A, B, C, D) to enclose the entire elevator. Pay attention to the shape and length of the **C** wall because the robot uses the **C** wall to calculate the distance (as shown below).
3. The robot uses the **B** and **D** walls to determine if it is in the middle of the elevator.

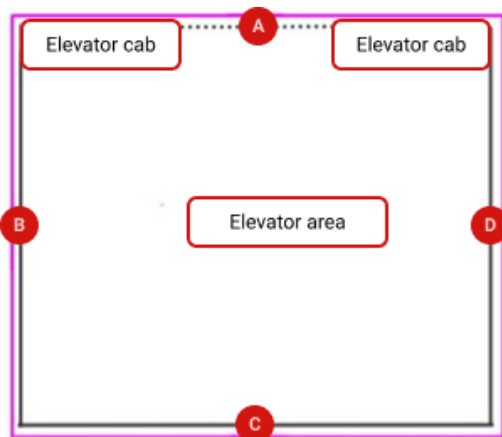
#### Location:

Scan the boundary of the elevator to demarcate and enclose the whole elevator area.

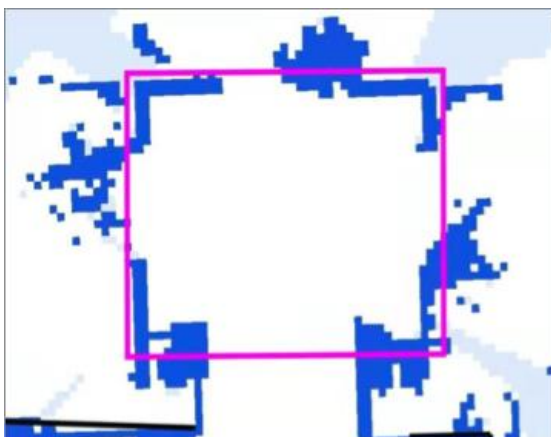


#### NOTE:

- Make sure that the **C** wall is consistent with the elevator outline.

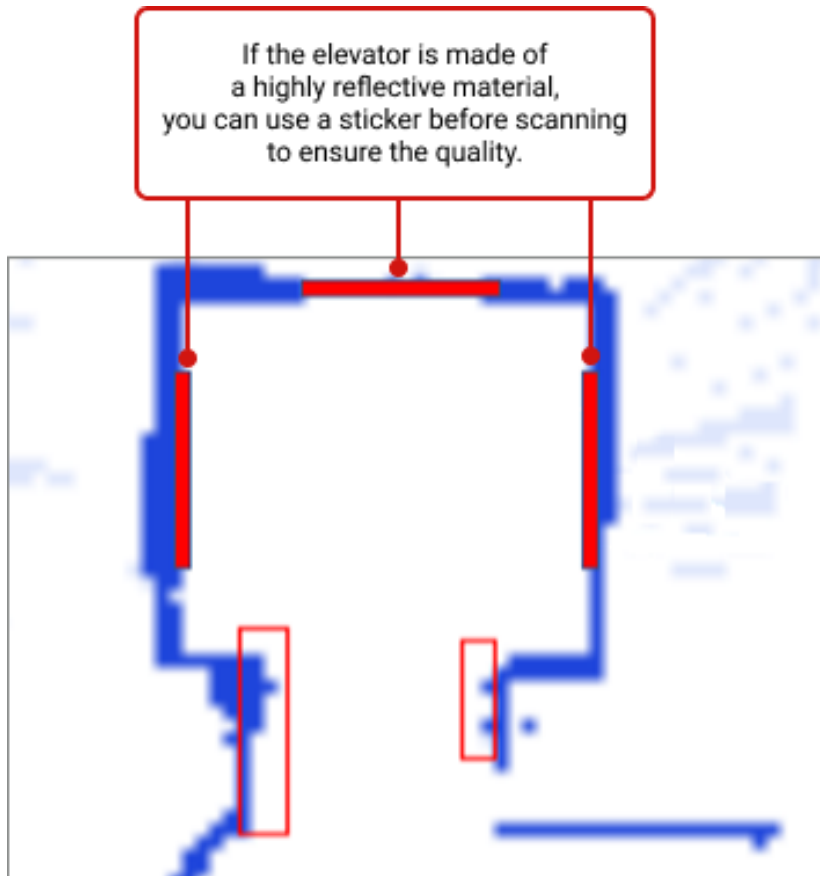


- If one side of the elevator map is too thick or irregular, it needs to be of the same thickness as elevators on other floors or the same with walls.

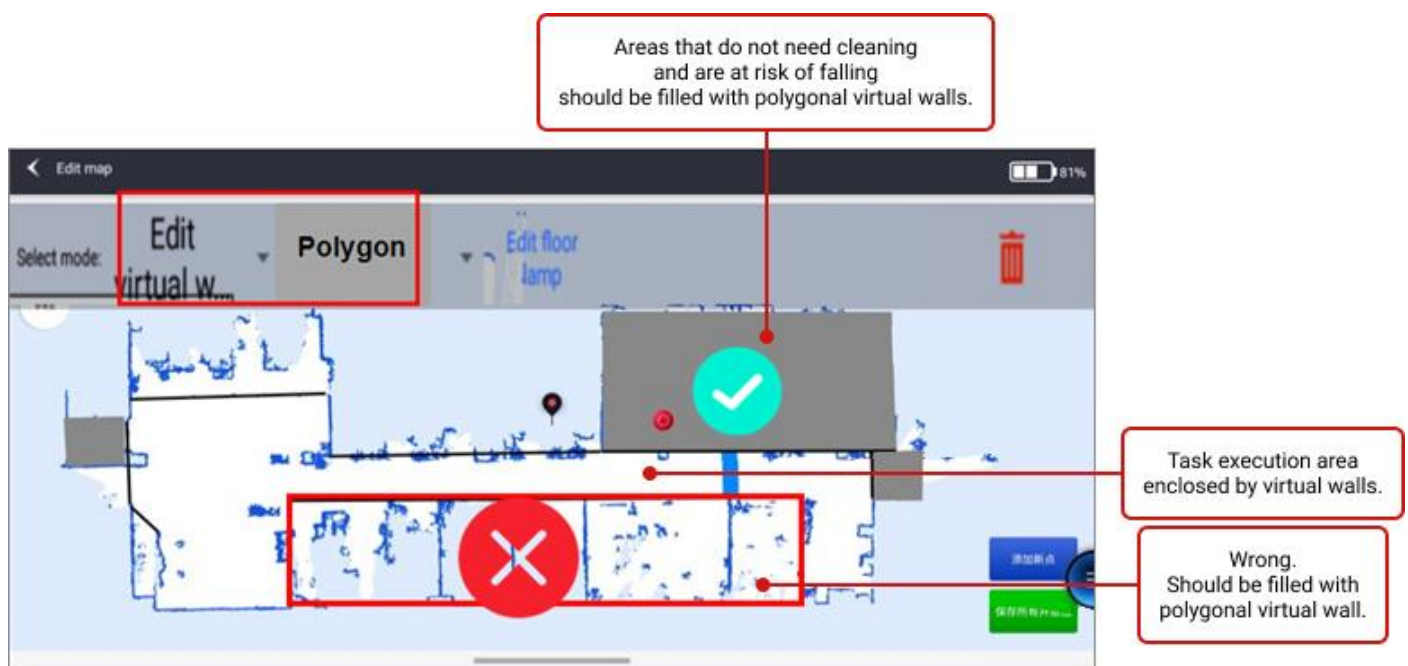




- Remove the protruding points on elevator walls to ensure the actual width of the elevator.



### 2.3.8. Operational Planning and Notes





## 2.4. Creating New Points

Create points to facilitate navigation around the premises. Currently, the system supports only the setting up of charging points and elevator points.

- Charging point — when the robot is of low energy or finishes a task, it will go to the charging pile.



### NOTE:

- Do not set up charging points when there is none, otherwise, the robot will stop **80cm** in front of the setting point.

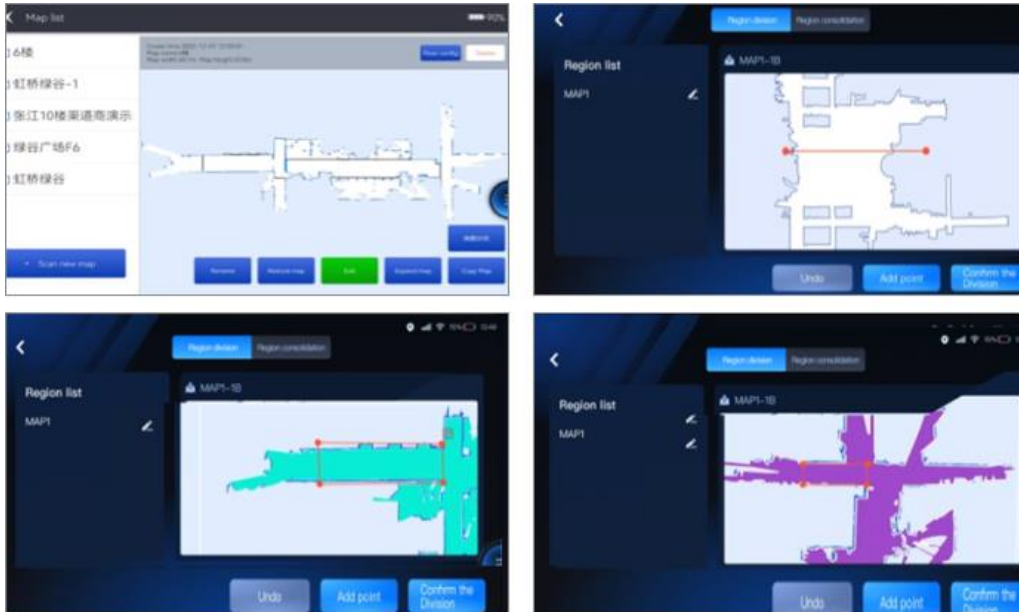
- Elevator (waiting) point — set up in front of an elevator under elevator task.



- Click on the type of point you need, then enter the point name at the bottom.
- When the robot is positioned correctly, push it to a designated position and click mark the point.
- Pass the slider to adjust the robot's direction (as shown by the arrow) and click OK. The point is created.

## 2.5. Zoning Maps

Set different cleaning modes for different zones based on materials of the ground on GaussianMobile.



## 2.6. Precautions of Deployment

### Map scanning

- The turning speed of the map scanning should be slow (not higher than **20°/s**), to avoid ghosting/deformation.
- For map scanning, you must take a small closed-loop first and then a large closed-loop (simple scenes only need a large closed-loop); the extended map must be also a closed-loop.
- If the quality of the map is poor, please re-scan it; because it will directly affect the robot's locating, please be careful.
- For the places with glass, tables, and chairs, it is recommended to put laser stickers first to improve the quality of scanning and stabilize the auto-locating of the robot.

### Map editing

- For any on-site deployment, please be sure to draw the virtual wall and highlighted area.
  - The virtual wall should completely encircle the cleanable area.
  - One highlighted area is drawn every about 5 to 10m, with no need to draw too many.
- When editing the original map, the real wall must not be deleted, but just the irrelevant image noise is to be deleted.
- In areas where there is a risk of falling, a virtual wall must be drawn slightly away from the risk area.
- All functional areas that have been edited are deleted in the same manner.
- The minimum passing height of S1 is **65cm**, and suspended obstacles below 65cm need to draw virtual walls.

## 3. CHARGING DOCK DEPLOYMENT

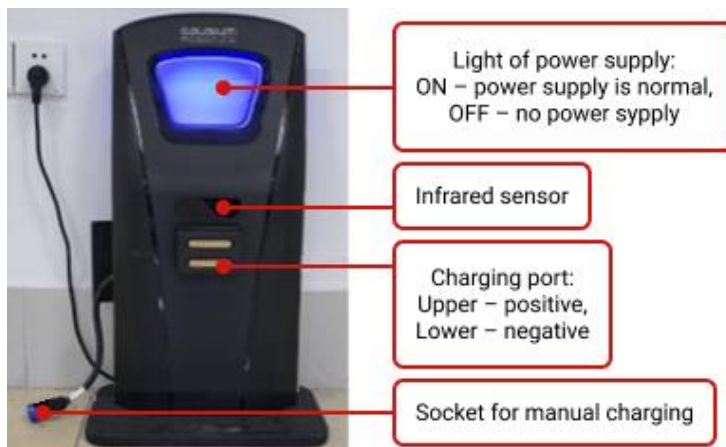
### 3.1. Basic Introduction

#### 3.1.1. Auto-Charging

- ❖ When the robot's power drops to 10%, it will go to the charging pile and do auto-docking for charging.
- ❖ Auto-charging is activated after finishing a cleaning task.
- ❖ Gmind-lite's auto-charging function can synchronize in about 20 mins after the charging point is set on GaussianMobile.
- ❖ Auto-charging also could be achieved by selecting a charging point and clicking "**Go Home**" on GaussianMobile.

#### 3.1.2. Charging Pile Recognition

- ❖ When the charging task is started, the robot navigates to the front of the charging pile and uses its laser to identify the shape (length and width) of the charging pile.
- ❖ If the charging pile position recognized by the robot has deviated, the robot will adjust the position automatically.



### 3.2. Charging Pile Deployment Requirements

Requirement	Description
<b>Pressure</b>	110V-220V
<b>Current</b>	10A
<b>Plug</b>	Type I
<b>Safety Scope</b>	Forward $\geq 180\text{cm}$ , Width $\geq 80\text{cm}$
<b>Fixed Method</b>	Need to be against the wall and perpendicular to the ground. Adjust the back foot to fit the wall and paste with 3M double-sided tape on the bottom to fix. Do not place debris 2 meters around the pile.
<b>Note1 (optional)</b>	It would be better to have a cleaning pool and sewer on the same floor, which is convenient for daily maintenance for robots.
<b>Note2</b>	Warning tapes can be applied to mark the location of the charging pile (if allowed by the customer.)
<b>Note3</b>	Make sure the charging pile is protected by virtual wall editing.



### 3.3. Setting the Charging Point

Check the position of the robot, push the robot to the charging pile, and wait for 3 seconds. Check if it is in charging status.

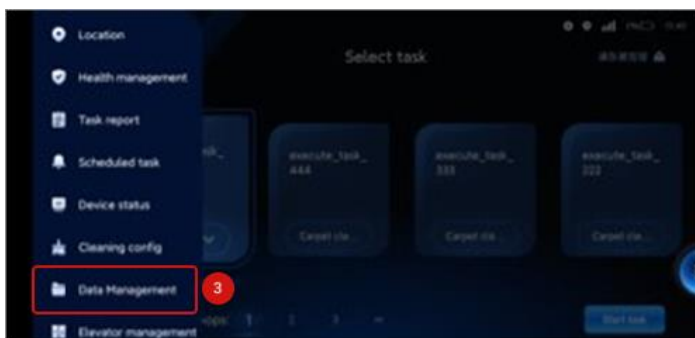
1. Log in to the app by entering the following credentials:
  - a. user: admin,
  - b. password: 123456.



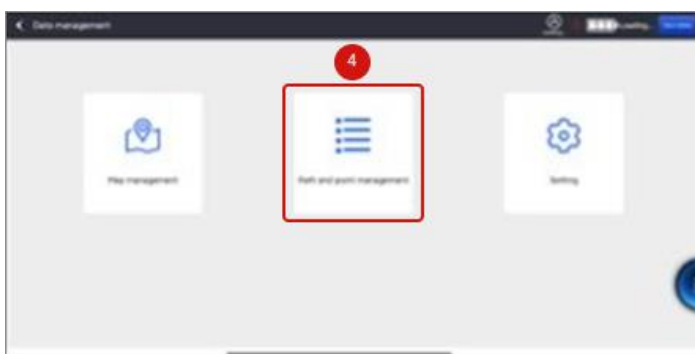
2. Tap the menu on the left side of the screen.



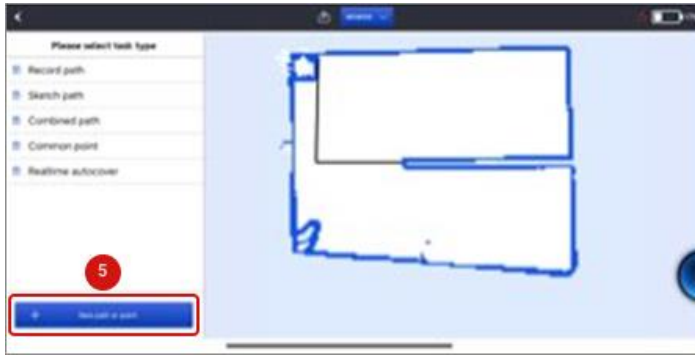
3. Select **Data Management**.



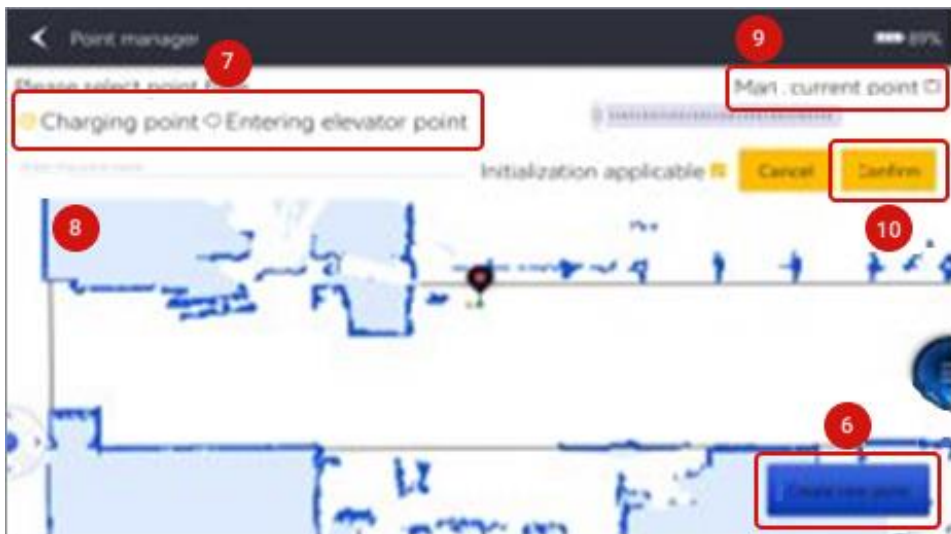
4. Select **Path and point management**.



5. Select **New path and point**.



6. Complete the creation of the charging point.



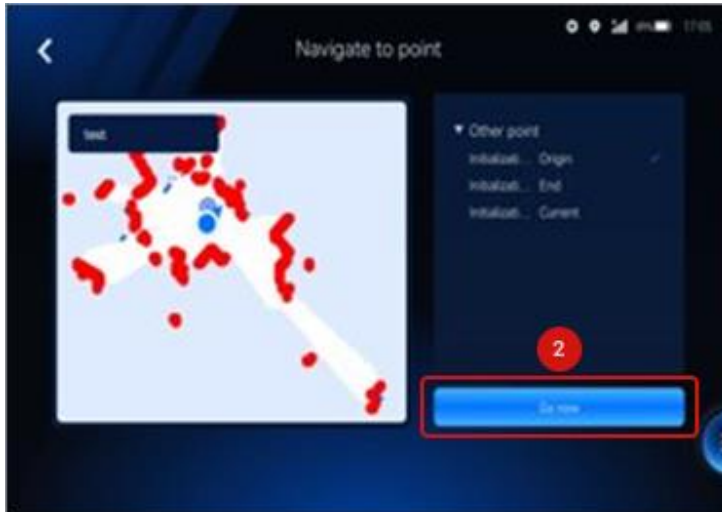
### 3.4. Deployment Verification

1. Click **Back to charging dock**.



2. Select the charging point and click **Go now**.





3. Check whether the charging is normal. The pop-up window will show **Charging** and a charging battery icon will be displayed.













**NOTE:**

- Manual charging and automatic charging cannot be used simultaneously.
- Do not turn off the robot when the automatic charge is on.
- Do not put debris on both sides of the charging pile.
- Only one charging point can be set in the application.
- If a charging point is set without a charging pile in place, the robot will stop **80cm** in front of the charging point.

## 4. DEBUGGING

### 4.1. Debugging Preparation

#### 4.1.1. Consumables

Cleaning Mode	Side Brush	HEPA	Main Brush	Sub Brush (bristle/cloth)	Dust Box	Dust Bag	Water Tank	Squeegee
Image								
Scrub	Not required	Required	Required	Required (short-bristled brush)	N/A	N/A	Required	Required
Vacuum	Required	Required	Required	Required (roller cloth/short-bristled brush)	Required	Required	N/A	Not required
Dust Mop	Required	Not required	Required	Required (roller cloth)	Not required	Not required	Not required	Not required
Sweep	Required	Not required	Required	Required (short-bristled brush)	Not required	Not required	Not required	Not required
In-place detection	nil	yes	Yes (on the roller brush quick-release box)		yes		yes	nil

#### 4.1.2. Rubber strips confirmation

Put a water tank in the robot, select a manual cleaning mode, push S forward, and check if the rubber strip can work smoothly.

##### Best situation:

- no deformation of the strips,
- rubber strips touch the ground fully (an angle of **45°** would be best.)

##### Adjustment:

- Use an open-end wrench to adjust the upper and lower nuts to change the height of the fixed screws (Do not move unless necessary.)



**NOTE:**

After the manual operation is finished, the suction function still runs for a while, the suction squeegee would be lifted after 30 seconds, then the suction would stop after 30 seconds.



### 4.1.3. Prolonged Suction

After the robot reaches the endpoint, it prolongs the time to close the suction and lifts the squeegee to avoid sewage leakage.

1. Normally, in auto-cleaning, the robot stops water cleaning before reaching the endpoint.
2. When reaching the endpoint, the robot stops to trigger prolonged suction and squeegee-lifting.
3. If the emergency stop button is pressed, this prolonged function will be triggered.

**Function:**

Lift the squeegee after T1 s, then stop suction after T2 s.

**Configuration:**

**Route:** /root/launch/param/device.yaml

T1: keep\_squeegee\_suction #water absorption delay (T1 defaults to 30s.)

T2: keep\_suction #suction delay (T2 defaults to 30s.)

```
stop_fan_curve_radius: 0.01
keep_squeegee_suction: 30.0
keep_suction: 30.0
fan_level_while_keeping_suction: 80
keep_rotating_brush_time: 10.0
rolling_brush_spin_dry_time: 60.0
keep_flush_water: 300.0
flush_water_percent: 100
enable_dust_push: false
```

### Scrubbing mode:

If you think the prolonged time is too long, you can modify it manually (no less than 10s as recommended.)

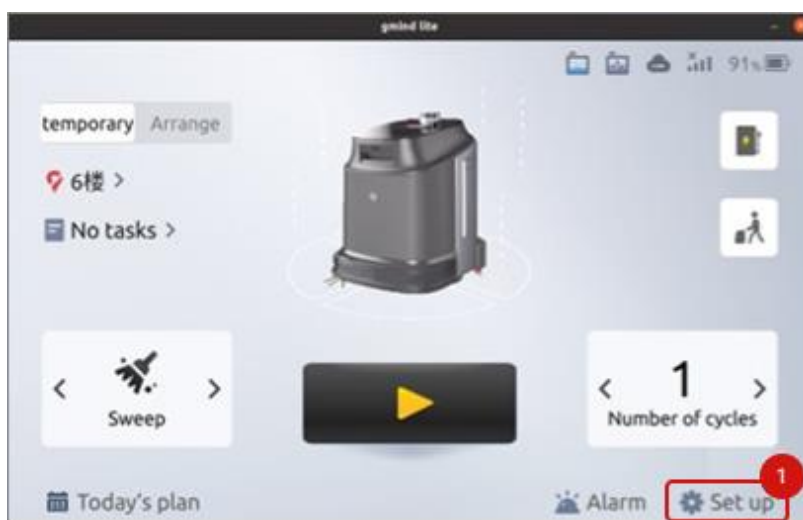
### Dust mopping mode:

Automatically defaults to 0.

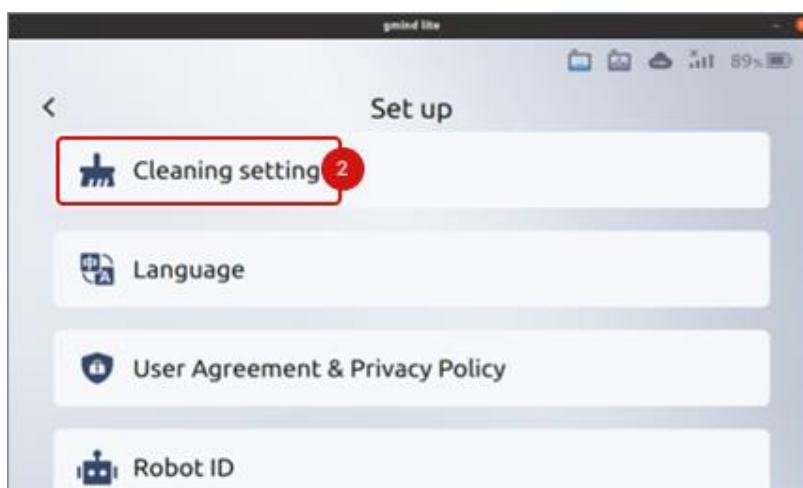
## 4.2. Cleaning Effectiveness

To set up a cleaning mode, follow these steps:

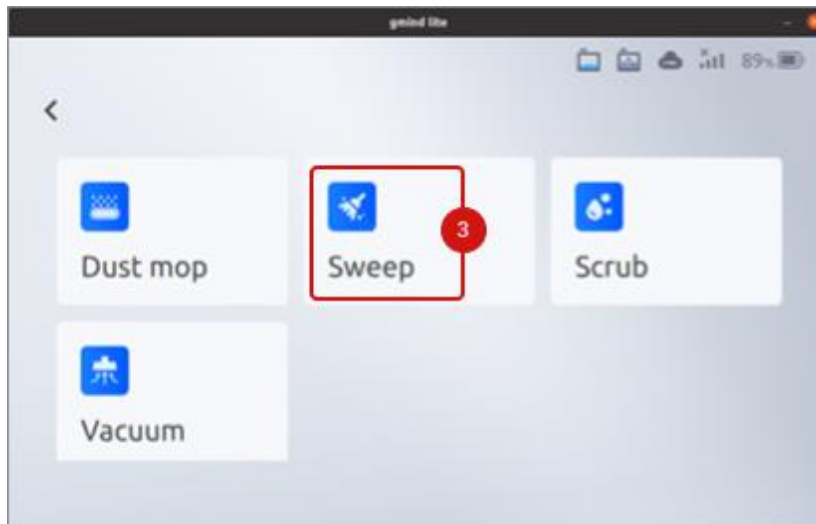
1. Click **Set up**.



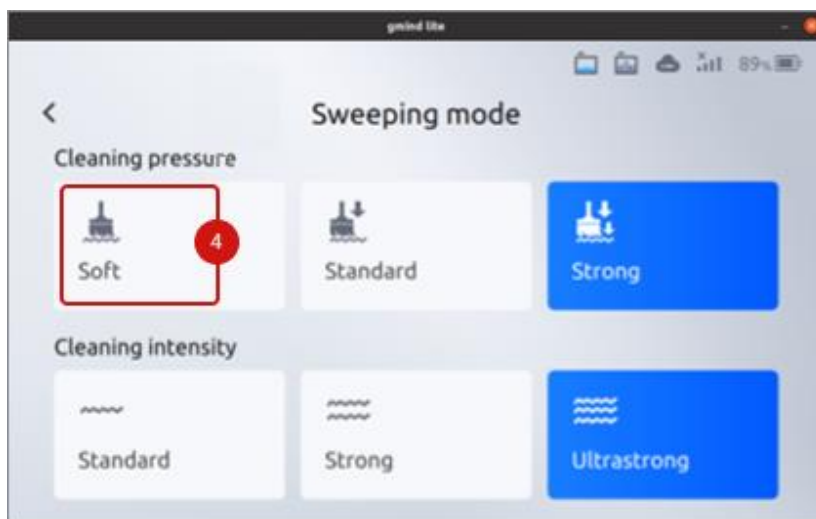
2. Click the **Cleaning setting**.



3. Select **Sweep**.



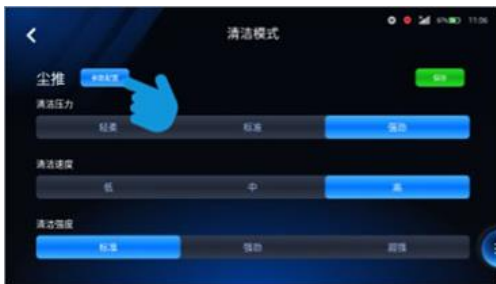
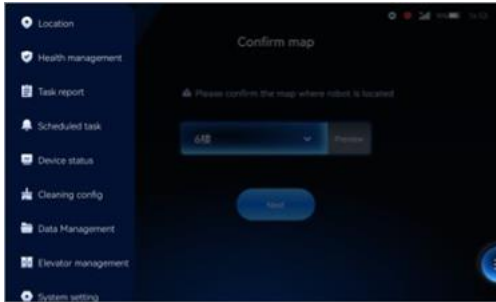
4. Select **Soft**.



Cleaning Mode	Cleaning Pressure (roller brush rotation speed)		Cleaning Intensity (side brush rotation speed)		Cleaning Speed	Water Volume	Suction
Dust Mop	Soft	Standard	Soft	Standard	Low Mid High	Nil	Nil
Sweep	Soft	Standard	Soft	Standard	Low Mid High	Nil	Nil
Scrub	Soft	Standard	Soft	Standard	Low Mid High	Low Mid High	Soft Standard Hard
Vacuum	Soft	Standard	Soft	Standard	Low Mid High	Nil	Soft Standard Hard
Note	You can set up the levels on GaussianMobile.						



### 4.2.1. Cleaning Config



Mode	Pressure (roller brush rotation speed)			Intensity (side brush rotation speed)			Speed			Volume			Suction		
Dust Mop	Soft	Std	Hard	Std	Hard	Ultra	Low	Mid	High	Nil			Nil		
	60	80	100	40	60	80	0.4	0.5	0.6						
Sweep	Soft	Std	Hard	Std	Hard	Ultra	Low	Mid	High	Nil			Nil		
	60	80	100	40	60	80	0.4	0.5	0.6						
Scrub	Soft	Std	Hard	Std	Hard	Ultra	Low	Mid	High	Low	Mid	High	Std	Hard	Ultra
	60	80	100	40	60	80	0.4	0.5	0.6	80	100	120	40	50	60
Vacuum	Soft	Std	Hard	Std	Hard	Ultra	Low	Mid	High	Nil			Std	Hard	Ultra
	60	80	100	40	80	60	0.4	0.5	0.6				40	50	60
Note	The config is by default and can be changed on G-mind only.														

## 4.3. Test Run

### 4.3.1. Locating on Gmind-lite

1. Click on the **Locate** icon.



2. Select a map.



3. Push the robot to a characteristic area to match the laser point cloud.



4. Click on the **Zoom in** and the **Rotate** icons to match the location with the point cloud.
5. Click **Confirm**.

Follow the steps below to start cleaning:

1. Select a map, cleaning area, and operation mode.



2. Select loop times.



3. Select a cleaning mode.

4. Click **Start**.



**NOTE:**

- Locating needs to be carried out in areas with characteristic features to increase accuracy.
- Cleaning task reports can only be displayed on **G-Mind** and **GaussianMobile**.
- Installing **G-Mind** for customers (**not recommended**) should pay attention to the following:
  1. Tasks cannot be started on G-Mind.
  2. The cleaning configuration cannot be adjusted on G-Mind.

## 5. APPENDIX A: TECHNICAL SPECIFICATION

Parameter Type	Parameter	Value
<b>DIMENSIONS</b>	Length	540mm   21.3 in
	Width	440mm   17.3 in
	Height	617mm   24.3 in
	Net Weight	46kg   101 lb
	Vacuuming/Sweeping Width	410mm   16.2 in
	Scrubbing Width	330mm   13 in
<b>CLEANING</b>	Cleaning Efficiency	400 - 700m <sup>2</sup> /h   4,305 - 7,534 ft <sup>2</sup> /h
	Water Tank Capacity	Coverage > 1000 m <sup>2</sup>   > 10,763 ft <sup>2</sup>
	Dust Bag	8 L   2.1 gal
	Trash Can	0.7 L   0.2 gal
<b>MOVEMENT</b>	Gradeability	8°
	Max. Cleaning Speed	0.8 m/s   1.8 mph
	Min. Passable Width	520mm   20.5 in
	Min. Passable Height	650 mm   25.6 in
	Min. Turn-around Width	620 mm   24.4 in
	Min. Height of Detected Obstacles	10 mm   0.39 in
	Edge Cleaning Capability	0 mm
<b>ELECTRICAL</b>	Runtime	Scrubbing 5h, Vacuuming 5h Sweeping 18h, Dust Mopping 10h
	Charging Time	2 hours
	Sound	< 65dB
<b>SENSING</b>	Standard	LiDARs, 3D Depth Cameras, RGB Camera Anti-drop Sensor, Anti-collision sensor
<b>ACCESSORIES</b>	Optional	Charging Dock, Water Tank Trolley