

Penguin PG01

Plasma Air Disinfection Robot

Product Manual

V 1.0.2



BooCaX Technology Co; Ltd



400 -161- 8661

Safety and Precautions

The use of plasma air sterilizing robot shall follow the operation instructions. Use beyond the range is prohibited!

BooCax will not assume any responsibilities for the losses caused by improper operation .

01/ Safety instructions for the use of robots

1) The following acts are prohibited

- ① Do not use the robot in flammable gas and similar dangerous environments;
- ② Do not throw any foreign objects into the cabin;
- ③ Do not perform unnecessary operations such as cleaning and maintenance when the robot is turned on;
- ④ Do not disassemble the robot for repair or debugging;
- ⑤ Do not touch the circuit terminals when the robot is charging;
- ⑥ Do not replace any parts. If necessary, please do so under the direction of BooCax .

2) Safety instructions For Use

- ① The robot should be parked in a flat and solid place at normal temperature ;
- ② If there is odor or abnormal noise DURING DISINFECTING, please immediately turn off the power of robot and report it to the after-sale service ;
- ③ Before starting the robot, please check whether the safety components (sensor, emergency stop switch, etc.) are in normal conditions;
- ④ If the floor is waterlogged and greasy, please clean the floor promptly ;
- ⑤ The robot body must be maintained by a trained professional ;
- ⑥ Before using the machine, please install the outlet grille, filter screen and inlet grille in place;

02 / Robot Daily Maintenance Instructions

When cleaning the robot fan, please make sure that the robot is turned off, the ventilation grille is removed, and the power supply is unplugged or away from the charging station! Otherwise, electric shock or serious malfunction may result.

It is strictly forbidden to use tap water to directly flush the robot and charging pile, which may cause the accumulation of water vapor or water in the device, resulting in serious and irreparable failures.

1) Cleaning

- ① Regularly use wet paper towel to clean the dust on the fan;
- ② Regularly use a brush to clean the surface of the driving wheel and universal wheel of the robot to remove foreign objects such as hair dust;
- ③ Gently wipe the outer surfaces of the robot regularly with detergent and a lint-free cloth;
- ④ Regularly contact the after-sales service for maintenance work such as oiling and

- dustproofing of the shock-absorbing spring and universal wheel bearing;
- ⑤ The LiDAR sensor is an expensive and precise part in the robot, and should be wiped with a clean cloth on a regular basis. Do not use force or other cleaning agents to wipe it, otherwise it will easily cause functional damage;
 - ⑥ When the robot is not in use for a long time, try to store it in a dry and cool place indoors .

2) Check if the screws are loose

Shake the components lightly periodically to observe whether there is an abnormal sound when the components are loosened with the shaking. All the screws of the robot have been treated with anti-loosening treatment and are not easy to loosen. But for the sake of safety, in case of looseness, please contact "BooCax Official After-sales Service Center" regularly.

03/ Disclaimer and other legal statements

BooCax Technology owns a number of patents related to atomization and disinfection robots, which are not allowed to be used by any institution or individual.

The internal structure of the robot is very precise, and unauthorized disassembly can easily affect safety. Except for the authorized personnel of BooCax Technology, no one shall disassemble the robot without permission, otherwise the warranty qualification of the product will be lost. For any damage, failure and property/personal damage caused by unauthorized disassembly, BooCax Technology will not assume any responsibility. Determination of unauthorized disassembly will be based on the anti-disassembly mark on the body of the robot.

04/ After-sale Support

If you have any questions about maintenance and safety during the use of BooCax atomization disinfection robot, you can contact us by phone / email as shown in this manual. We are very willing to provide you with product related services.

目录

1. Overview

1.1. Disinfection principle	4
1.2. Scope of application and object of action	4
1.3. Main bactericidal factors and their intensity	4
1.4. Killing microorganism	4
1.5. Machine life	4
1.6. Product advantages	4

2. Product Features 5**3. Disinfection Effect** 5**4. Product Specification** 6**5. Appearance Size** 8**6. Function Module** 9**7. Preparation before use**

7.1. QR code deployment	10
7.2. Clean up barriers	11

8. Assembly and use

8.1. Unpack & inspect items	12
8.2. Assembly robot	12
8.3. Download & install app	13
8.4. Start-up, registration	14
8.5. Connect robot	16
8.6. Build the map	16
8.7. Deploy route	17
8.8. Setting the air volume	18

9 Set the scheduled startup time 19**10. Start disinfection** 20**11. More function settings** 21**Appendix 1: Robot disinfection effect test report** 23**Appendix 2: Robot qualification** 24

1. Overview

BooCax Penguin PG01 plasma air sterilizing robot produces plasma rapidly by the air exchange method can effectively purify the ambient air in the space; Because it does not produce harmful substances, it can coexist with humans and machines. The robot has the autonomous movement function can sterilize the environmental space at regular intervals and kill harmful microorganisms and viruses in the air, thereby to achieve the purpose of self-cleaning space.

1.1. Disinfection principle

Through the rapid generation of plasma and the ventilation of fans, the effective purification of the ambient air in the space is realized. Amino acids are prone to chemical reactions with active particles in the plasma, oxidizing amino acids and destroying cell membranes. Active particles in the body are the most fundamental cause of cell death.

1.2. Scope of application and object of action

It can be used for air disinfection in closed and non-closed space environments, and the effective volume of a single disinfection up to 255m³/2h, the maximum air exchange rate of the equipment can reach 560m³/h.

1.3. Main bactericidal factors and their intensity

The plasma density is $1.65 \times 10^{18} / \text{m}^3 \sim 9.10 \times 10^{18} / \text{m}^3$

Plasma density represents the amount of plasma generated, and the unit is units/m³.

The higher the plasma density, the higher the disinfecting rate of the passing airKilling microorganism category

Plasma is effective against harmful microorganisms and diseases such as Staphylococcus albicans and natural bacteria in the air.

The poison has a strong killing effect, and the killing and inactivation can be completed in an instant

1.4. Service life of the whole machine

The product is valid for 5 years.

1.5. Product Advantages

The BooCax PG01 plasma air disinfection robot can realize autonomous navigation, and can walk autonomously to reach the designated area for full disinfection; it is controlled by App, which can be controlled remotely, and the coexistence of man and machine; at the same time, it is simple to deploy and easy to maintain and manage.

2. Product Features

- ①The fuselage is small and flexible, and is not restricted by the passage of space;
- ②The maximum ventilation volume is 560m³/h;
- ③High-efficiency plasma generator, which can realize "one-shot" air sterilization;
- ④Precise ozone controlled release
- ⑤App, button panel control, support two disinfection modes: timed and instant;
- ⑥ The disinfection log is automatically recorded for 120 days, and the log export is supported;
- ⑦With high-precision autonomous navigation function, it can independently set the working area (room) and working time;
- ⑧ Support multi-area (room) and complex layout applications to ensure the uniformity and consistency of disinfection;
- ⑨ With automatic obstacle detection and voice reminder function;
- ⑩ Support automatic charging, which can completely eliminate the trouble of line charging;
- ⑪ Filter installation reminder, disinfection tasks will be prohibited when no filter is installed;
- ⑫ Support fixed position use, support manual fixed point disinfection.

3. Disinfection Effect

In a confined space of about 100m³ without human indoors, turn on the plasma disinfection function for 90 minutes, the elimination rate of natural bacteria in the air reached 93.81%; Within 120 minutes, the elimination rate of natural bacteria in the air reached 96.25%.

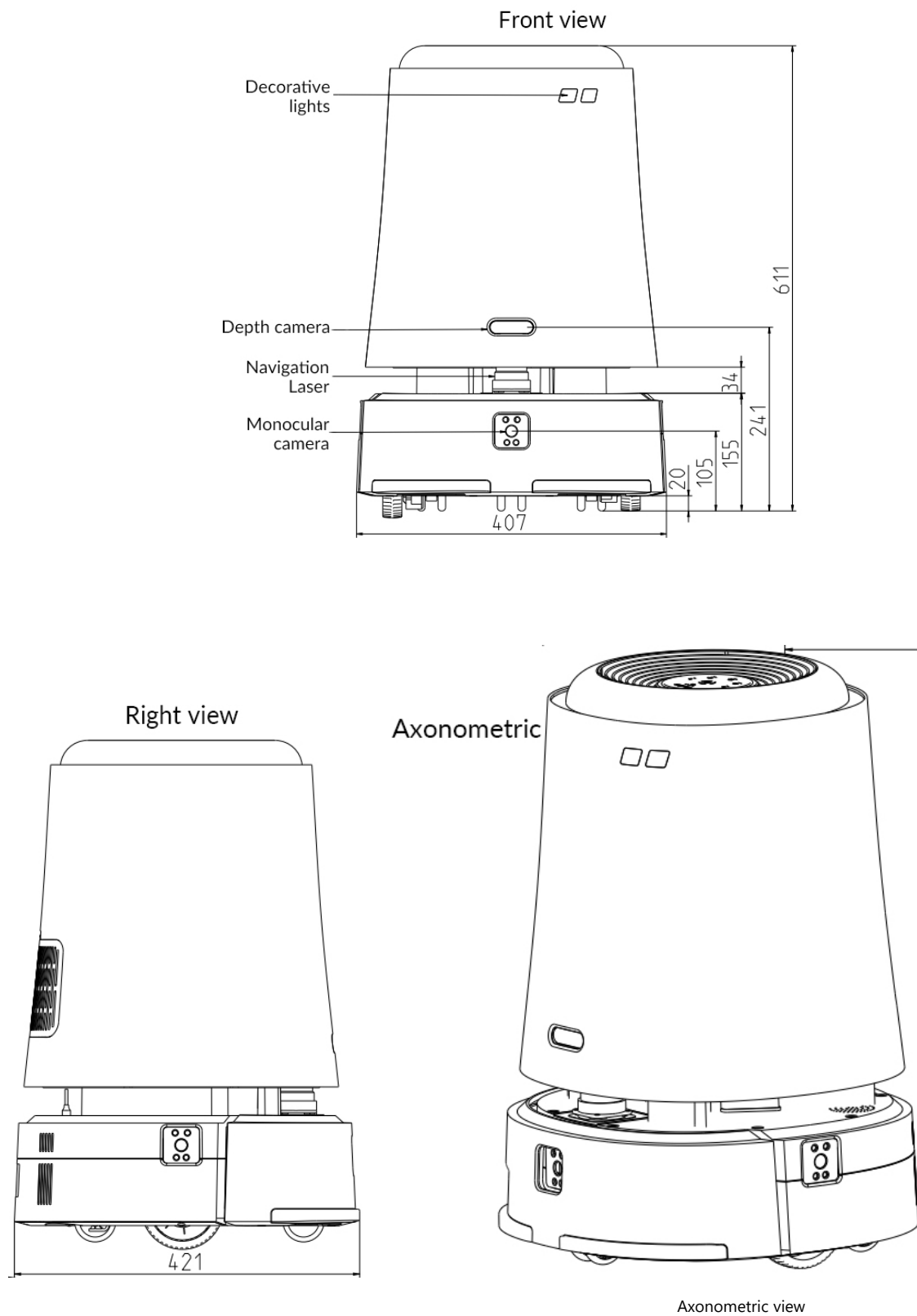
In a confined space of about 30m³ without human indoors, turn on the plasma disinfection function, the elimination rate of HCoV-229E reaches 99.98% in 20 minutes; The elimination rate of coronavirus (HCoV-229E) reaches more than 99.99% in 30 minutes.

4. Product Specification

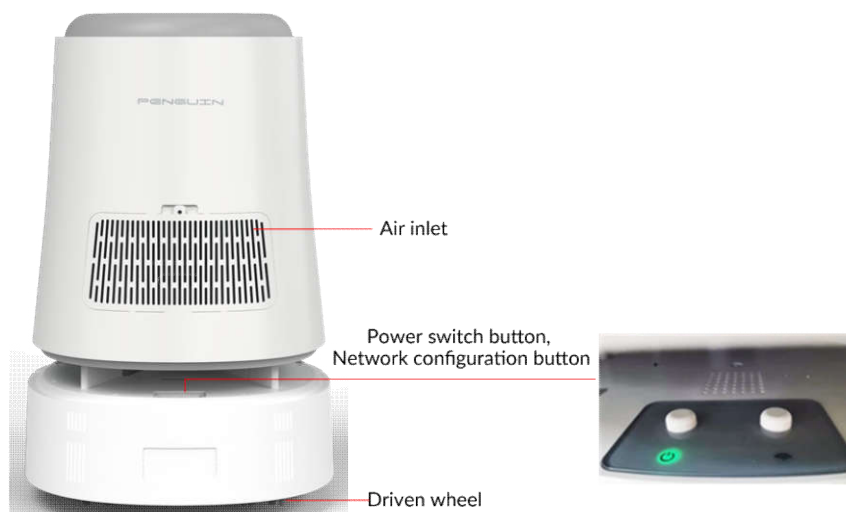
Types	Name	Penguin PG01 Plasma Air Disinfection Robot			
Basic parameter	Model	BKS-LTP-PG01			
	Application	Using plasma technology to disinfect germs in the air, remove odor, and remove formaldehyde			
	Appearance size	407mm*421mm*611mm			
	Body weight	20kg			
Performance parameters	Circulating air volume	Less than or equal to 560m ³ /h (3rd gear adjustable)			
	Applicable space	30 ~ 255m ³			
	Noise	≤65db, minimum gear45dB			
	Plasma density	$1.65 \times 10^{18}m^{-3} \sim 9.10 \times 10^{18}m^{-3}$			
	Elimination rate	Simulate the scene ≥99.9%, On-site natural conditions ≥90%			
	Notice		Wind speed gear	Circulating air volume m ³ /h	Noise dB
			1st gear	200	45
			2nd gear	360	55
			3rd gear	560	65
Mobility	Movement mode	Autonomous path planning and auto-navigation			
	Moving speed	0.3 m/s			
	Drive mode	Differential drive			
	Obstacle crossing ability	≤10 mm			

	Gradeability	$\leq 5^{\circ}$
	Travel lane width	$\geq 600 \text{ mm}$
Power supply capability	Continuous running hours	6h
	Charging method	Auto-charging
	Charging time	3h (0-80%)
	Charging pile	Support 110V ~ 240V wide voltage input Rated output: voltage 29.4V, current 5.0A
Safety and Environment	Safety protection	visual obstacle avoidance
	Bumper strip	1 group
	Working temperature	$0^{\circ} \sim 50^{\circ}$
	Ozone concentration	$\leq 0.046\text{PPM}$ (Human-machine coexistence)

5. Appearance Size



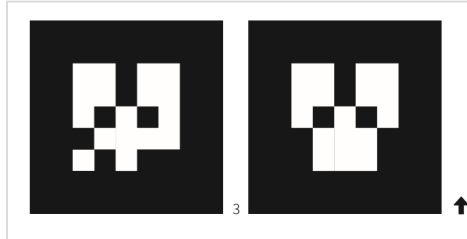
6. Function Module



7. Preparation before use

7.1. QR code deployment

In order to enhance the positioning accuracy of the robot, we are randomly equipped with a QR code to assist the robot to not lose its long-term running position.

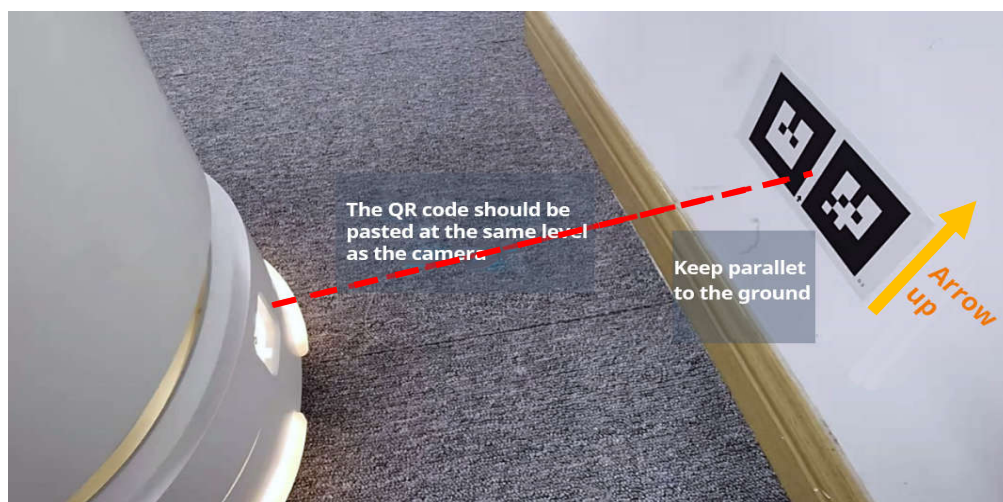


Regarding the use of the QR code, it is generally pasted in the position where the robot positioning is prone to deviation: such as corridors exceeding 15m, it is recommended to paste a QR code in the long corridor every 10 meters to assist the positioning. In addition, there are relatively empty scenes, the environmental characteristics are not obvious enough, and QR codes need to be posted to enhance positioning.

1) Precautions for QR code pasting

- Avoid deploying at a place with strong light, so as not to affect the camera to capture the QR code image;
- The QR code should be pasted at the same level as the camera;
- Paste the QR code in the direction as the arrow;
- If the QR code is damaged, replace it in time.

2) The example is shown below :

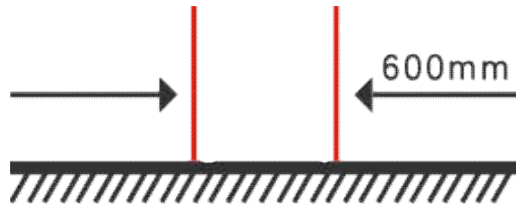


3) Precautions for saving QR code

- No duplicate QR code boards can appear in the same environment;
- When mapping, the robot stops at the QR code board for 1-2 seconds to ensure that the QR code is saved (Voice prompt will be given for successful identification)

7.2 Clean up barriers

- 1) Before using the spray robot, remove the barriers in the aisle to avoid affecting the working and return to charging ;



The minimum walking width of the robot is 600mm

- 2) Make sure that there is no vertical step over 10mm in the spraying area, and no objects (books, boards, stones, etc.) over 15m m in height on the working path;



The surmounting height of the robot is 10mm

- 3) Make sure that there are no big slopes on the site, if so, please try to avoid :



The maximum gradeability of the robot is 5°

8. Assembly and use

8.1. Unpack & inspect items

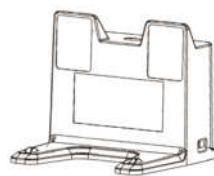
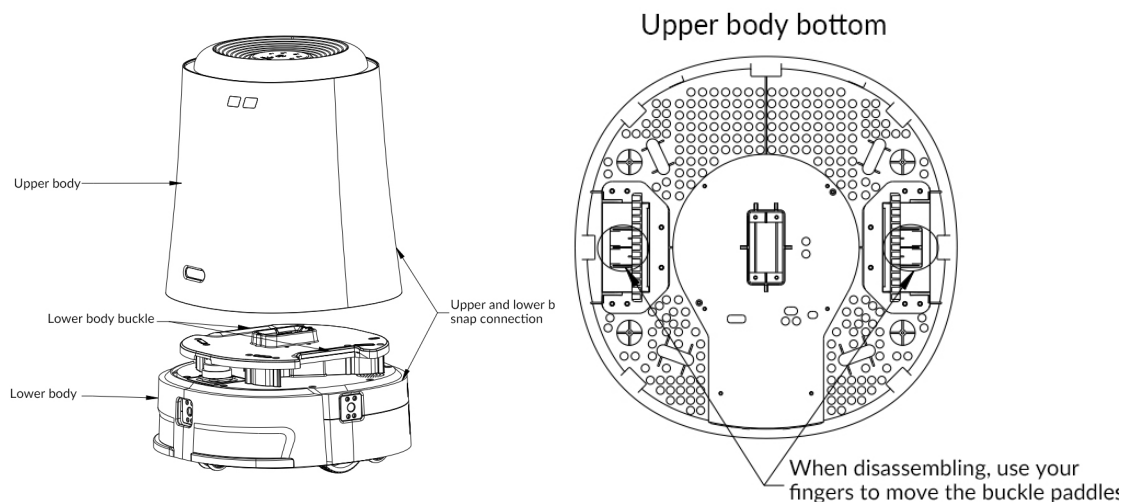
The contents of the packing case include:

- ① Robot cabin; ② Robot Chassis; ③ Charging pile, power cord;
- ④ Warranty card; ⑤ Quick Guide; ⑥ Positioning QR Cod;

8.2. Assembly robot

The machine adopts a split quick release design. When you receive the product, you can complete the assembly by docking the cabin with the chassis:

- 1) As shown in the picture, first align the upper and lower parts of the fuselage;
- 2) Hold the atomization device cabin in hand and align it with the chassis front and rear;
- 3) Then put it down vertically and smoothly, and then press gently to ensure that the cabin is installed in place.



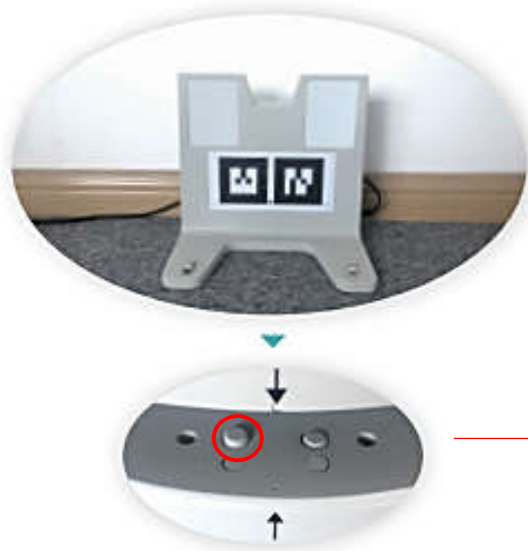
Charging pile

Note: The charging pile must be placed against the wall to ensure stability

8.3 Download & install app



8.4. Startup & registration

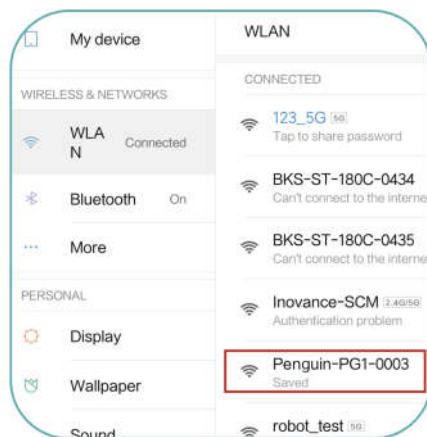


Deploy the charging pile:

Before starting up, deploy the charging pile of the robot in a safe and clean position, place it horizontally, and back against the flat wall. Then insert the power plug into the 110V/220V AC socket to complete the power

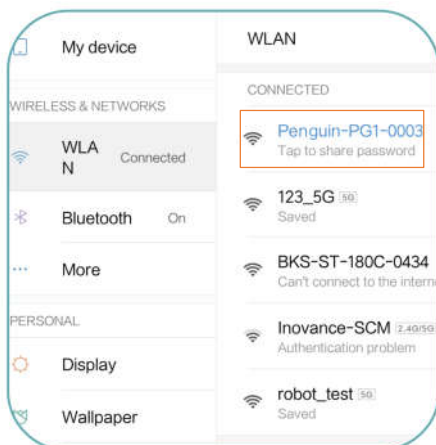
On/Off:

Press and hold the power button on the back of the fuselage for **3 seconds** to turn on (and long press for 3 seconds to turn off the



(3) Turn on the Wifi of the Android device and connect the Wifi name of Penguin;

(4) As shown in the figure, click on Bubble Fish Wifi name Penguin-PG01-XXXX, and prompt "tap to share password" robot 123, the connection is successful.

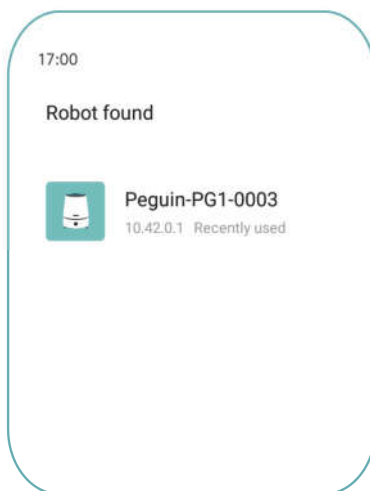


8.5. Connect Robot

Penguin
APP

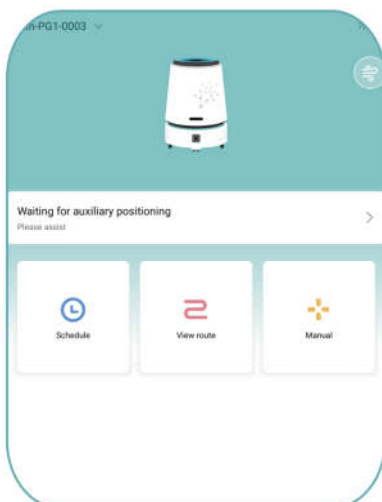


Serial
Number



Next, open the Penguin APP, display the Penguin serial number (shown as below), click to enter the APP interface

Home
page



8.6. Build a map

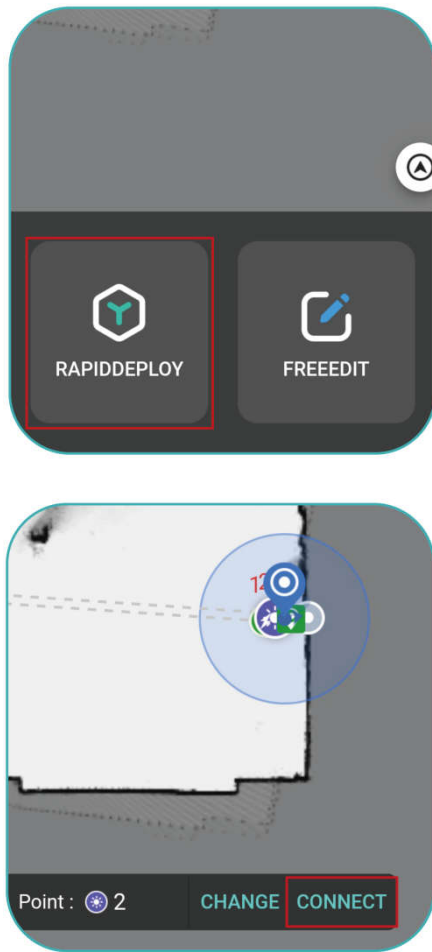


- (1) Click "Deploy" at the bottom of the homepage - "Build a map";
- (2) Click "Build New Map", start building the scene, at this point you can name the newly built map;
- (3) Push or remotely control the robot to build a map of the area to be delivered (LIDAR scanning). It is recommended to push the robot by hand when building the map to improve efficiency.

Precautions for composition:

- (1) When composing a picture, it is recommended to start from 1m in front of the charging pile; after scanning the work area, you need to return to the starting point of the composition and use the APP to complete the composition;
- (2) When building a map, do not get too close to the wall and keep a distance of at least 0.5m;
- (3) The operator must stand behind the robot to avoid leaving image noise on the map;
- (4) When turning, walk slowly to allow the robot to collect as much feature point data as possible.
- (5) In abnormal environments (glass, mirror, pure black objects, grids, etc.) lidar will not be able to identify accurately, it is recommended to use appropriate Auxiliary processing, such as pasting frosted stickers, gray tape, reflectors, etc.;
- (6) If the scene is too large, you can use "INCREMENT" to repair and expand the map;
- (7) When passing through the QR code, stay in front of it for more than 1s and there will be a corresponding voice prompt when the entry is successful.

8.7. Deploy route



- (1) Deploy route - rapid deploy, follow the prompts to set the “charging point”, “path point” and “disinfection point”:

Disinfection point :

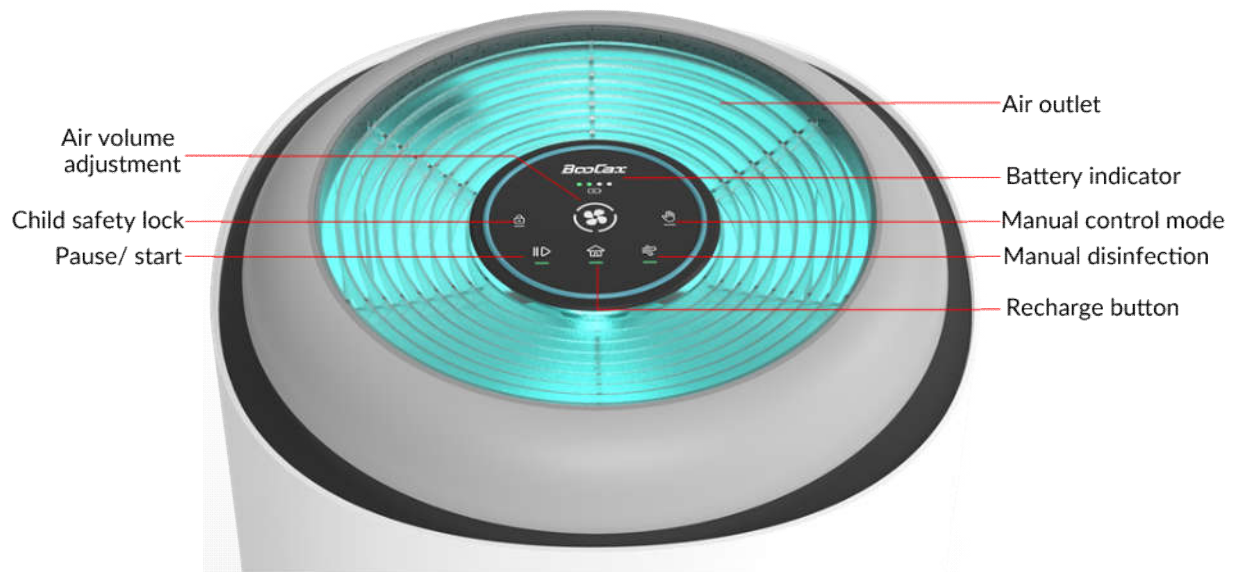
the point where disinfection must pass;

Path point:

assist in setting the working path.

- (2) Set the walking path interface, you can use the “CHANGE” and “CONNECT” button to improve efficiency. “CHANGE” means to switch different position points, and “Connect” can connect two position points ;
- (3) Road planning supports editing functions to facilitate the adjustment of the robot's walking route at any time .

8.8 .Setting the air volume

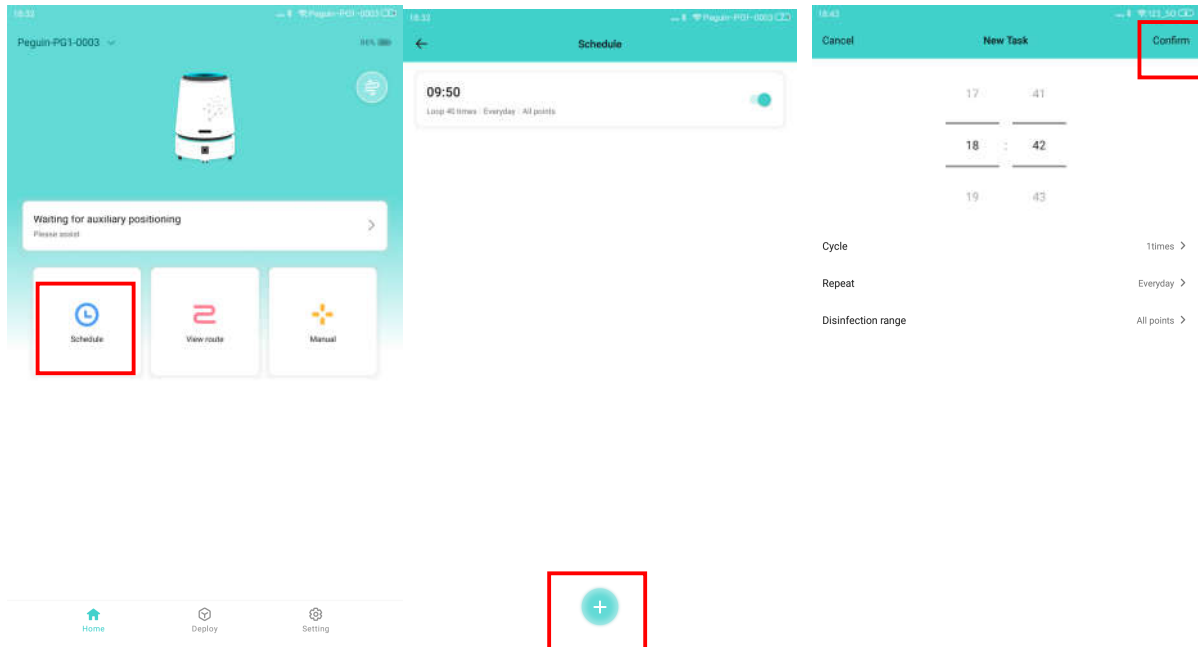


Precautions:

- 1) When adjusting the air volume, first press the "child safety lock", and then adjust the air volume (small, medium, large) ;
- 2) Function button status light description:
 - Green always on-task's being executed(Under disinfection)
 - Blinking Green- Pause work

9 Set the scheduled startup time

According to the needs, you can freely set (add/modify) the time to start the killing time for each area (as shown in the figure below)



Click "Schedule" on the home page to enter the editing interface

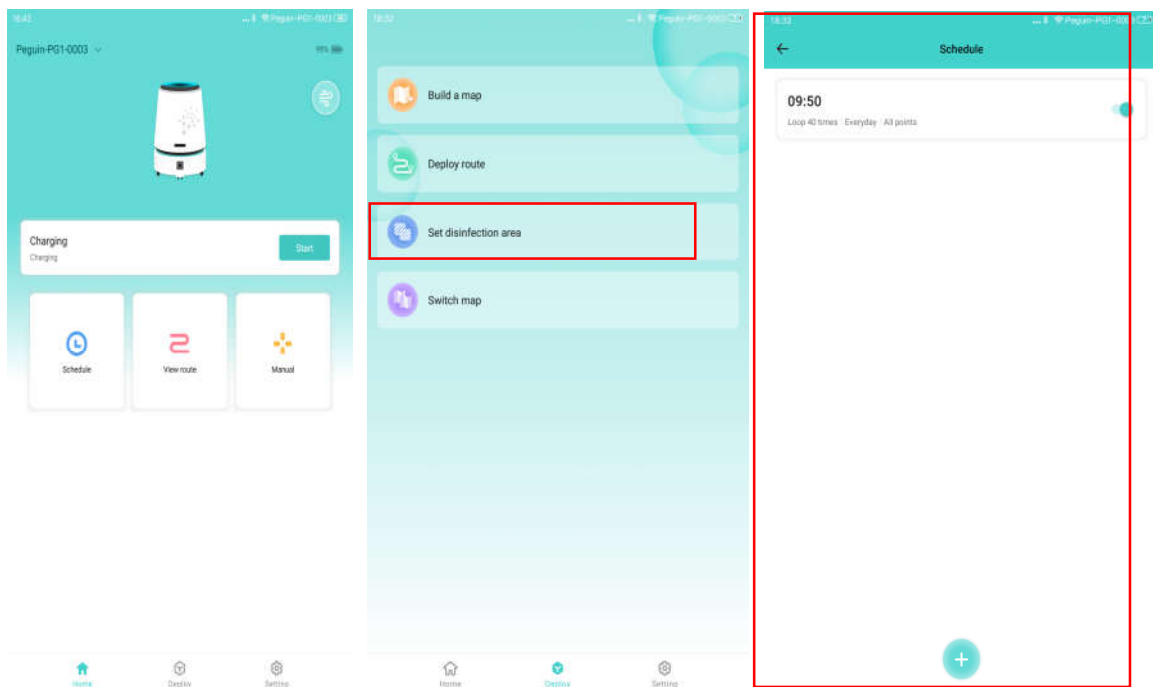
Then click the "+" button to set the startup time and disinfection area

After the time and areas are set, click "confirm" in the upper right corner to save

10.Start disinfection

Return to the home page of the app, click the "Start " button, and select "All areas / Selected areas", and the robot can start the disinfection work according to the set path and disinfection times.

Note :(1) the machine has the function of regional disinfection, that is, "selected disinfection", which can be set at different time points in different areas according to the use scene; (2) In the case of no partition, the disinfection function of the all areas /all disinfection point is the same .



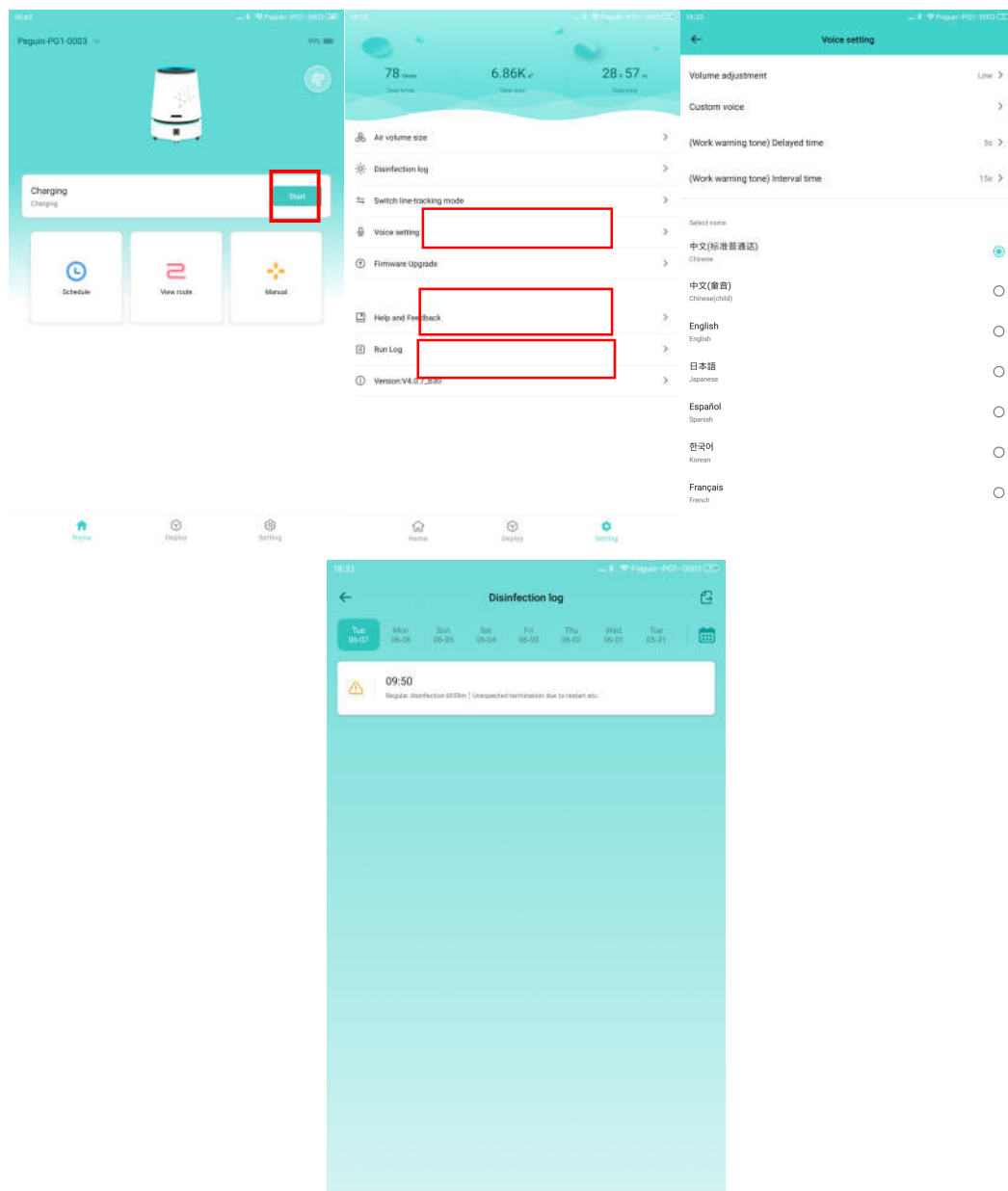
In the following days, the robot will regularly start to perform disinfection work in each area according to the set time.

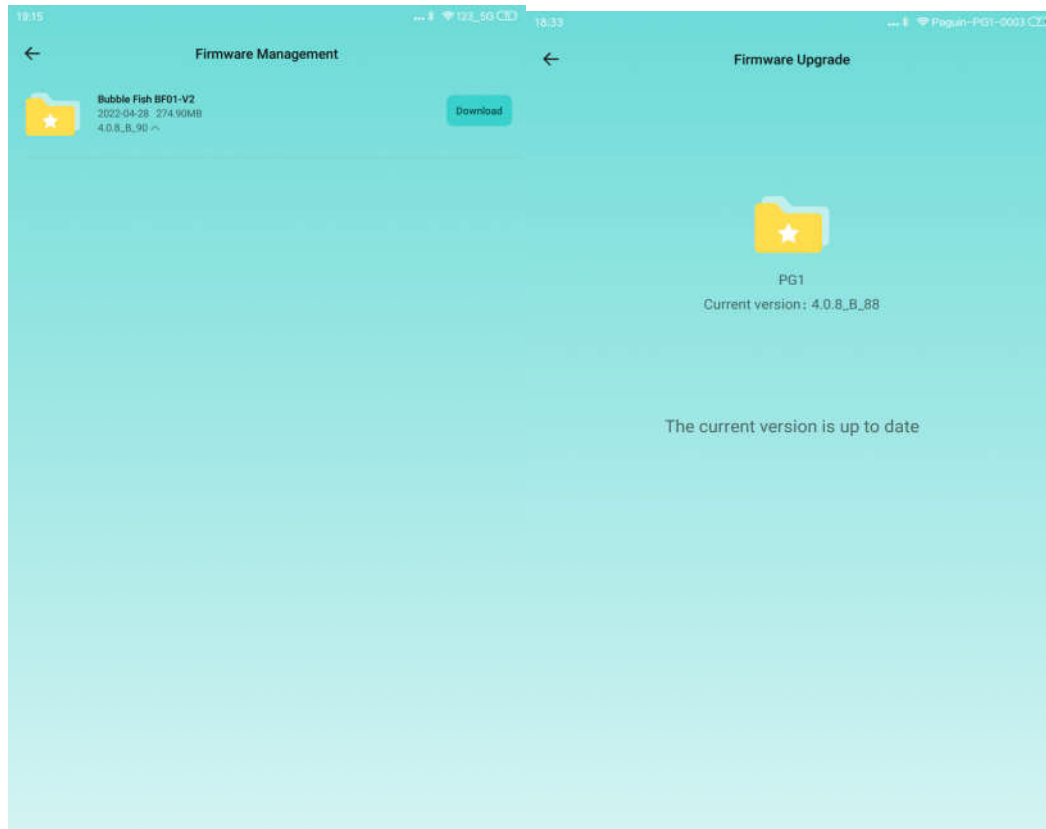
You can also press the
"Start / Pause"
"One-key disinfection"



11. More function settings

There is also a "manual control - disinfection" function on the home page of the app, click to enter - press the "nebulizer switch" to start. In addition, the "Settings" function interface has functions such as prompt language setting, volume adjustment, maintenance prompts, etc. Others such as disinfection log, line patrol mode selection, firmware upgrade, etc. are also on the "Settings" menu page. Users can set, Check:





Open the App, go to Settings - Firmware Upgrade

Click "Upgrade Firmware", the App will upload the downloaded upgrade file to the robot

Appendix 1: Robot disinfection effect test report

河南中科联创检测服务有限公司

检 验 报 告

样品受理编号: XDQX-20220137

第 1 页/共 8 页

样 品 名 称	布科思牌 PG01 型等离子消毒机器人	样 品 数 量	一台
送 检 单 位	河南布科思机器人有限公司	样 品 性 状	器械
生 产 单 位	河南布科思机器人有限公司	接 样 日 期	2022 年 03 月 10 日
生产日期或批号	20200309	检验完成日期	2022 年 04 月 06 日
规 格 或 型 号	BKS-PG-P1		

检验依据

《空气消毒机通用卫生要求》WS/T648-2019, 《室内空气中臭氧卫生标准》GB/T18202-2000 和《等离子体强度测定方法》作业指导书 ZKLC-LHFF006-2019。

评价依据

《空气消毒机通用卫生要求》WS/T648-2019。

检验结论

1. 外观: 设备外表面光滑、平整, 色泽均匀, 无锈斑、划痕等缺陷。
2. 杀灭微生物因子强度 (等离子体) 测定: 经检测, 布科思牌 PG01 型等离子消毒机器人, 正常工作中等离子体密度分布范围为 $1.65 \times 10^{18} \text{ m}^{-3} \sim 9.10 \times 10^{18} \text{ m}^{-3}$ 。
3. 臭氧泄漏量: 经检测, 布科思牌 PG01 型等离子消毒机器人, 在室内中央距地面 1.5m 处, 臭氧浓度均值为 $0.02 \text{ mg} / \text{m}^3$ 。符合《空气消毒机通用卫生要求》WS/T648-2019 的要求。
4. 布科思牌 PG01 型等离子消毒机器人置于体积约为 30 m^3 的房间中, 开机运行消毒 120min 后, 对空气中自然菌各次试验消亡率均 $\geq 90\%$, 符合《空气消毒机通用卫生要求》WS/T 648-2019 要求。
5. 布科思牌 PG01 型等离子消毒机器人开机运行消毒 120min 后, 对 20 m^3 空气实验室空气中白色葡萄球菌各次试验杀灭率均 $\geq 99.9\%$, 符合《空气消毒机通用卫生要求》WS/T 648-2019 要求。

Appendix 2: Robot Qualification

1. Production qualification:



2. National online filing information for disinfection products

Query URL: <https://credit.jdZX.net.cn/xdcp/> Search for "BooCax"

全国消毒产品网上备案信息服务平台

您现在的位置: 首页 >> 消毒产品信息查询 >> 布科思牌PG01型等离子体空气消毒机器人

布科思牌PG01型等离子体空气消毒机器人详细信息如下:

产品评价 投诉举报

风险提示: 本网站仅基于已受理的信息提供查询服务, 查询结果不代表本网站对被查询对象信用状况的评价, 仅供参考。请注意识别和防范信用风险。

基本信息

- 产品名称: 布科思牌PG01型等离子体空气消毒机器人
- 产品分类: 第二类消毒产品
- 评价日期: 2022-05-05
- 产品责任单位名称: 河南布科思机器人有限公司
- 市售产品标签(铭牌): 机身铭牌.png
- 市售产品说明书: 布科思牌PG01型等离子体空气消毒机器人产品说明.pdf
- 检验报告结论: 合格
- 卫生安全评价结论: 合格
- 备案日期: 2022-05-13

检验报告列表

检验机构名称	检验报告编号	检验报告结论
河南中科联创检测服务有限公司	B-XDQX-20220137(1-1B)	中科联创检测报告.pdf

生产企业信息

生产企业名称	生产企业卫生许可证号	生产企业卫生许可证
河南布科思机器人有限公司	豫卫消证字2021第0119号	河南布科思消毒产品卫生许可证.pdf

详细信息

- 剂型: BKS-LTP-PG01
- 型号:
- 产品使用范围: 用于室内空气消毒。



www.boocax.com

Business Cooperation / After-sale Hotline: 400-161-8661