PUDU

PUDU

欢乐消 2 机器人

Puductor2 Robot

快速指南 V1.0
Quick Guide

目录

声明

目录

安全须知

1.1 使用须知

- 本产品在紫外消毒模式下工作，需在无人环境下进行。
- 本产品仅用于室内空气和物表消毒杀菌，对室外消毒杀菌效果无法保证，故不建议使用。
- 本产品仅为超干雾化设备，使用超干雾消杀时，需要严格依照消毒液的使用说明。并与消毒液供应商确认人能否与干雾共处同一个空间。
- 大部分消毒液遇热受光易分解，建议超干雾消毒任务结束后将超声室消毒液回流至消毒液箱中，并将消毒机器人停靠在阴暗处。
- 消毒机器人紫外线消杀时会发出紫外线强光，严禁直接照射眼睛和皮肤，请确保操作人员在防护状态下开启使用，工作期间严禁人员靠近。
- 紫外线装置只在工作时会旋出，并在工作结束后会自动旋入。如发现紫外装置处于未完全旋入或旋出状态，请重启消毒机器人。若仍然无法解决问题，请将机器人关机，并联系普渡工作人员。
- 请勿将机器人倾倒，若在消毒液箱中有液体的情况下倾倒，将造成液体泄露导致机器人电路损坏。
- 超干雾模式消毒过程中，会有少量雾化液滴留存于机器人表面，属于正常现象。消毒工作完成后请用干纸巾、布等擦拭干净。
- 请勿在消毒机器人作业过程中拖拽消毒机器人，出现紧急情况请按下紧急按钮，或通过远程控制终端暂停消毒机器人。
- 消毒机器人需在平坦环境使用，如地板、瓷砖、薄地毯等。请勿用于户外（如开放式阳台）、崎岖地面（如阶梯）等环境，请勿在环境高于 40℃或低于 5℃或湿滑地面使用。
- 请勿在机器人开机状态下，反向推消毒机器人。
- 禁止遮挡机器人传感器，否则可能导致消毒机器人行走异常。
  使用前请先将环境中地面各种线材收起，避免机器人运行时拖拽。请将地面尖锐物体（如装修废料、玻璃、铁钉等）清除，以免对机器底盘造成伤害。
- 为保证安全建议将机器人速度调整至 0.8m/s 及以下，禁止在机器人前方 1m 范围内嬉戏打闹，以避免不必要的伤害。机器人有自动避障功能，但存在识别盲区，故严禁在机器人高速行驶期间突然阻挡消毒机器人。机器人最佳通行宽度应大于 80cm，长通道场景宽度大于 1m 流畅性最佳，宽度大于 2m 通道支持两台机器人对向会车行驶，具体使用部署由技术支持现场确定。
- 机器人设计最大爬坡角度为 5°，为防止出现斜坡后溜，应避免在机器人上坡期间暂停机器。为防止机器人在斜坡上意外跌落，斜坡宽度不应小于最小通行宽度 80cm，侧翻角度不允许超过 5°。
- 需要在阶梯边沿、下坡的入口等有机器人跌落风险的地方增加栅栏或者其他阻挡防护。
- 地面高度 16~22cm 之间有纯黑色（如踢脚线）、镜面（如墙面）、全透明（如落地玻璃窗）的物件，可能干扰机器人激光雷达正常探测，造成机器人行走异常，需要对场地进行一定的改造让激光雷达能反射（如粘贴贴纸）。
- 待机点并列放置两台机器人，之间需有 35cm 的空间，离后墙需有 15cm 空隙，与侧墙的距离需有 35cm。请依照说明书或快速指南指示使用本产品，如因使用不当造成任何损失由用户自行承担。
- 本产品激光雷达符合 1 类激光安全标准，不会对人体产生危险的激光辐射。

1类激光产品

1.2 电源与用电须知

- 请勿使用任何第三方电池、电源线、充电设备。
- 请勿私自拆卸、修理、改装电池或充电设备。
- 报废机器／电池前，必须断开电源，将电池从机器中取出环保报废。
- 请勿将机器人靠近易燃易爆物体、热源（如暖气片等）放置或者充电。
- 严禁将机器人以及充电设备放置于高温区域 (>40℃)。
- 严禁将装有消毒液的机器放置于低温区域（<5℃）。
- 严禁充电设备与外物碰撞，造成充电设备损坏。
- 如需运输产品，请确保主机处于关机状态，并清空所有消毒液。建议使用原包装箱进行包装保护。
- 为保证消毒机器人的使用效率和电池寿命，请随时把消毒机器人电量保持在 10% 以上。
- 发现充电设备损坏或异常，请拔除电源并及时通知普渡工作人员进行维修或更换。
- 充电完成后请及时断开电源，请勿在机器满电量状态下长时间充电。
- 请指定专门负责人对机器人进行充电，请勿在无人值守情况下为消毒机器人充电。
- 若长时间不使用机器人，请充满电后关机，关闭钥匙开关，并放置于阴凉干燥处。
- 每个月至少需要对机器人充电一次，避免电池损坏。

产品介绍

2.1 产品信息

产品名称：
欢乐消 2 机器人

产品型号：
PJ1

主要功能：
欢乐消 2 机器人是一款消毒机器人，同时支持超干雾和紫外线两种消毒模式。超干雾模式通过将食品级过氧化氢等消毒溶液雾化形成微米级干雾，通过大流量出风口充分快速弥散到室内环境中，进而杀灭包括细菌、真菌、病毒以及高抗性的细菌芽孢等各类微生物。紫外线模式开启后，能够通过一定时间照射破坏自然菌 DNA、RNA 结构，达到对室内环境中有害病菌的杀灭效果。
欢乐消 2 机器人，拥有自主导航、智能启停、和人体感应等技术，能够通过不同消消毒模式进行自主杀灭，在使用过氧化氢等对人体有害的消毒液以及紫外线照射消毒模式时，可实时进行人体感应和消毒中止，达到自动、定时、精准、安全。低电量情况下，可自主返回充电设备处进行充电，智能无忧。
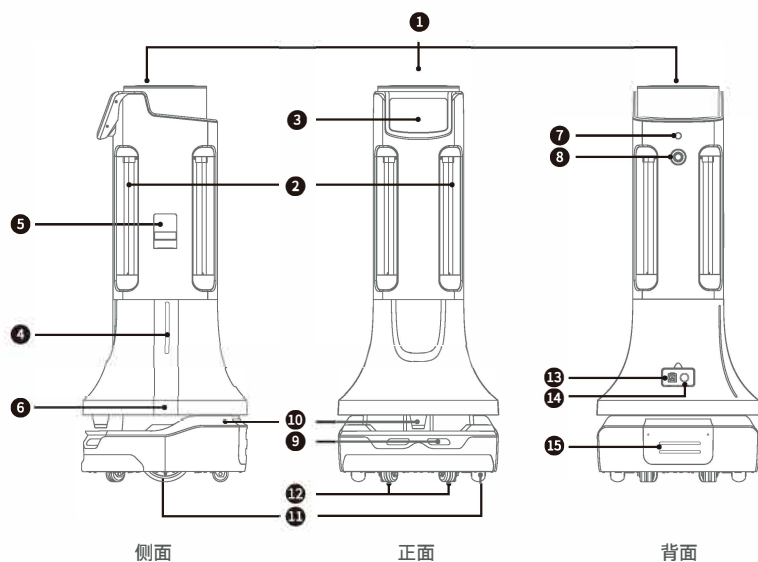
2.2 适用范围

适用于对感染防控有要求的医疗机构、公共场所、实验室、宠物医院、企业学校等室内环境，针对室内环境中的硬质物表和空气进行智能化自主消毒灭菌。
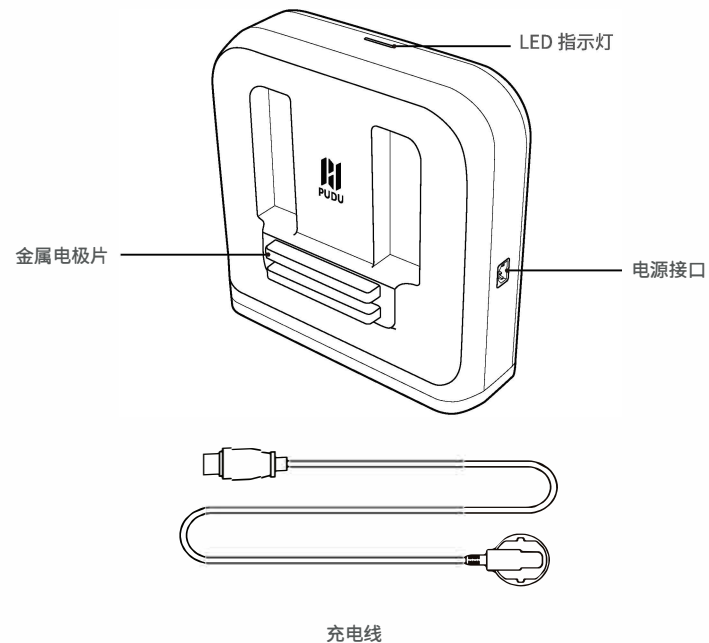
2.3 包装清单

整机 ×1、《说明书》×1、合格证 ×1、保修卡 ×1、充电桩 x1、充电线 x1（选配）、定位标贴 ×1、电源钥匙 ×1。

2.4 外观部件说明

LED 指示灯

金属电极片

电源接口

充电线

侧面   正面   背面

❶ 超声室   ❻ 排液口   ⓫ 驱动轮
❷ 紫外灯   ❼ 开机按键   ⓬ 辅助轮
❸ 屏幕   ❽ 急停开关   ⓭ 充电插孔
❹ 液位显示   ❾ 深度视觉传感器 ⓮ 钥匙开关
❺ 补液口   ❿ 激光雷达   ⓯ 自动回充

2.5 性能参数

产品特性	描述
产品型号	PJ 2
充电器输入	AC 100-240V, 50/60Hz
充电器输出	29V-8A
主机输入	DC 29V/8A
工作电压	DC 23-29V
充电时间	8h
连续消毒时间	6h
运行速度	0.1~1.2m/s
爬坡坡度	≤ 5°
整机材质	ABS/ 航空级铝合金

电池容量	51.2Ah
整机重量	68kg
整机尺寸	544x 538x1290mm
额定功率	232W
超干雾	4 组喷头，30°喷洒
喷雾速率	2L/h
水箱容量	15L
雾化颗粒	小于 10um
支持消毒液	过氧化氢、次氯酸、二氧化氯等
紫外灯	4 组灯管
紫外波长	UV-C 254nm
紫外照度	1m 处大于 180μW/cm²
紫外灯防护	自动收放
屏幕规格	7 寸高清触摸彩屏
音响功率	20W*2 立体声音响
设计寿命	5 年
工作环境	5~40℃，相对湿度 85%
存储环境	-40~65℃，相对湿度 85%
充电方式	手动充电与自动回充
环境污染	等级 3
导航方式	激光雷达定位建图导航
传输方式	Wifi
频率波段	2.4G/5G
传输标准	802.11b/g/n/ac
工作海拔	<2000m
路面要求	室内环境，平坦地面
防护等级	IP20
环境光照强度要求	<70000lux

2.6 消毒介绍

杀菌原理：

确认消毒位置除操作人员无其他人，封闭门窗；在常温条件下开启相应的消毒模式。

消毒液干雾以及紫外线共同作用，对物体表面细菌、真菌、病毒以及高抗性的细菌芽孢等的各类微生物进行消灭，达到消毒目的。

杀菌因子及其作用环境：

产品特性	描述
杀菌因子	过氧化氢，紫外线
杀菌因子强度	过氧化氢溶液，以 2L/H 的速度雾化后扩散到空气中。 4 根 UV-C 灯管，单根根管 36W，单根灯管一米处照射强度 ≥ 180μW/cm²
作用对象	硬质物表和空气
杀灭微生物类别	细菌、真菌、病毒以及高抗性的细菌芽孢
UV-C 紫外灯装置	
功率	单根 UV-C 灯管功率 36W
波长	UV-C 254nm
照明强度	≥ 180μW/cm²（一米处）
灯管数量	4 组灯管
消毒液超干雾	
超干雾	4 组喷头，30°喷洒
喷雾速率	0-2L/H 可调
雾化颗粒	小于 10μm
储液罐容量	15L

消毒液添加：

当机器提示液位过低时，需人工添加消毒液。加液口 ❺ 位于侧身，拉开注液口，添加即可。

> **注意：** ⚠
> 加消毒液时，应遵循消毒液使用规范，以免造成伤害，应使用同类别、同浓度的消毒液；加消毒液时
> 应观察液位情况 ❹ ，以防止加液过多造成溢出。

消毒液排放：

因特殊情况需将机器内部消毒液排出时，先确认超声室消毒液已经回流到消毒液箱中，否则先进行回流操作。
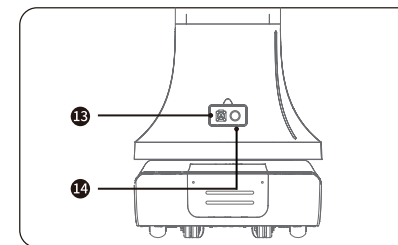打开排液口 ❻ ，拧开开关，即可开始排液工作并做环保处理，排完后拧上开关、合上排液口。

产品使用

3.1 开关机说明

钥匙开关：

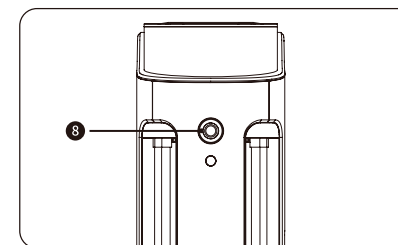钥匙开关 ⓮ 可实现打开 / 关闭消毒机器人整机电源，实现消毒机器人锁定功能，位置如下图所示：

开机：

推至初始位置 - 打开钥匙开关 - 长按开关按键 2 秒，底部灯带显示蓝色。

关机：

长按开关按键 3 秒关机，灯管和屏幕熄灭。

3.2 紧急处理

当消毒机器人处于非正常运行状态或者出现意外情况，有可能对周围环境造成伤害等紧急情况时，用户可以
通过按下背后的急停开关 ❽ ，使消毒机器人停止运行。在急停情况下，方可手动推动机器。

3.3 充电

消毒机器人通过充电桩进行充电。主要的充电方式有以下三种：

• 收到返航充电指令；

• 默认低电量自主回充；

• 按下急停、推动机器人靠上充电桩进行充电。

注意： ⚠

如遇充电故障、无法充电等问题，请联系普渡技术支持提供应急充电的方法。可通过机器人底盘提示灯与语音获取当前电量状态。

低电量提示：

当前电量	提示信息
0% - 2%	底盘灯带红色闪烁，语音提示
2% - 5%	底盘灯带红色常亮，语音提示
5% - 10%	底盘灯带黄色常亮，语音提示

充电状态显示：

当前电量	底盘灯带状态
0% - 19%	红色呼吸状态
20% - 39%	橙色呼吸状态
40% - 59%	黄色呼吸状态
60% -79%	绿色呼吸状态
80% - 99%	蓝色呼吸状态
100%	蓝色常亮

3.4 功能说明

快速消毒：

用户可推动至消杀位置，根据设置的消毒时长和方式，开始消毒工作，消毒工作完成后原地待命。

定点消毒：

可设置不同的消毒任务，每个任务可设置多个抵达点，并设置各个抵达点消毒时长和方式，消毒机器人将会自动规划至所有抵达点完成消毒，消毒工作完成后返回停靠点。

巡航消毒：

可设置巡航消毒路线，并设置消毒时长，消毒机器人会按照路线巡航往复消毒，消毒工作完成后返回停靠点。

消毒方式组合：

快速消毒、定点消毒、巡航消毒三种模式都可以灵活选择消毒液消毒、单独紫外线消毒、消毒液和紫外线一起消毒状态。

远程 APP：

可通过专用 APP 远程查看机器人工作状态，暂停或开始清洁任务。

人体感应：

在快速消毒和定点消毒模式下，若使用对人体有害的消毒液或紫外线消毒，机器人检测到周边 5m 范围有移动的人体时，将会停止工作，待周边无人时继续消毒任务。避免在消毒过程中突然出现的人受到伤害。

自动回充：

机器人可通过点击本体 APP 的一键回充，自动返回充电桩充电。当机器人低电量时，将会自动返回充电桩充电。

3.3 灯光说明

底盘灯带状态说明：

灯光	状态
红色常亮	电量低，行驶路线受阻
橙色常亮	自检失败、定位失败、设备异常、灯带位置异常
黄色常亮	电量低
蓝色常亮	待机，运行中，充电满
橙色呼吸	低电量充电中
黄色呼吸	低电量充电中
绿色呼吸	充电中
蓝色呼吸	充电中
红色闪烁	充电中异常，电量低，电池故障
蓝色闪烁	快速模式 / 定点模式 / 巡线模式暂停状态

头部雾化装置提示灯状态说明：

灯光	状态
橙色闪烁	设备初始化异常、紫外灯初始位置异常
黄色闪烁	暂停状态，水箱液位低
蓝色闪烁	快速模式 / 定点模式 / 巡线模式暂停状态
蓝色常亮	消毒状态中，待机状态中

充电桩灯光显示：

灯光	状态
蓝灯常亮	充电桩待机，未充电
绿灯闪烁	机器人与充电桩对接中
绿灯常亮	充电桩工作，充电中
红灯常亮	充电桩异常

维护与故障排查

4.1 维护与保养

- 每年应定期进行一次以上的检查，如果出现任何问题或无法自行进行检查，请联系本公司售后人员。
- 如果在检查中发现问题和故障可采用"常见问题与故障"中措施，如仍无法解决可与本公司联系。
- 机身脏污，有灰尘可以使用柔软、干净的无尘布擦拭清洁。
- 机器底盘：❾ 深度视觉传感器为精密光学传感器，脏污、灰尘等异物偏多均会影响主机的智能避障灵敏度，请及时使用柔软、干净的无尘布擦拭清洁。

- 若长时间不使用消毒机器人，请充满电后关闭主机，用钥匙关闭，并放置于阴凉干燥处；
- 请至少每月充电一次以避免电池出现损坏。
- 使用中的灯管，在灯管前方垂直距离 1m 的中心处，测量辐照度值应≥ 70μW/cm² 。低于此值者应予更换。
- 更换灯管时，先按压紫外灯管头部弹簧固定座，取下灯管即可。
- 若雾化片出现脏污，请及时使用柔软、干净的无尘布擦拭清洁。

> **注意：** ⚠
> - 请勿使用洗涤剂或喷雾剂等化学用品清洁。
> - 视觉传感器被遮盖，会导致物体识别等功能失效，避障能力下降。
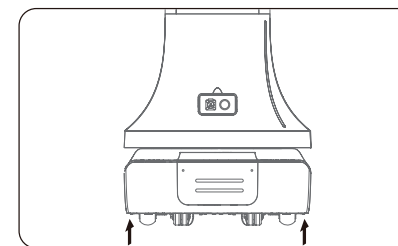
4.2 运输、搬运、贮存、开箱

运输：
本产品属于精密设备，在运输时需格外小心，尽量使用原包装箱，不承压，禁止放倒，倾斜运输。

搬运：
产品为贵重设备，当需要人为搬动机器时，请严格按照下列说明进行操作：
如下图所示，搬运机器时可将底盘作为受力部位（箭头所指），搬运过程中请注意保持机器直立姿态。

贮存：
包装后的产品应贮存在无腐蚀性气体、通风良好、无尘积的室内。
贮存温度范围：-40~65° C。

开箱：
请在宽敞的场景下进行开箱。

4.3 常见问题与故障

常见问题：

故障现象	可能原因及解决办法
无法开机	1. 电池电量不足，请充满后使用。 2. 环境温度过低（低于 0℃）或过高（高于 40℃）
无法充电	1. 充电线没连接好，检查线路，确保充电周围有足够空间 2. 锂电池损坏，更换锂电池（由技术人员更换）
功能异常	关机后重新开机，不能解决请联系我方技术人员
底盘灯带红色闪烁且无电量低提示，3 分钟后关机。	电池故障，请联系我方技术人员解决
雾化装置中消毒液无法雾化消毒	请联系我方技术人员解决
紫外装置无法打开	请联系我方技术人员解决

故障排除：

故障提示	解决方法
电量过低，请充电	请将主机放回充电区域充电，电满后再使用
屏幕报电机参数异常	重启机器即可

售后服务

5.1 维护与保养

公司承诺符合以下情况，自产品收货之日起，在产品有效保修期内（产品的不同部件保修期限有所不同），符合如下情况的将提供免费的产品保修服务。

• 自购买产品在规定的产品保修期限内正常使用，出现非人为的质量问题；
• 无擅自拆机、无非官方说明书指引的改装或加装、其它非人为引起的故障；
• 产品序列号、出厂标签及其他标示无撕毁、涂改迹象；
• 提供有效的购买证明、单据及单号；
• 免费保修期内更换的损坏备件属公司所有，应按公司要求寄回。

5.2 保修范围外的售后服务

对于不在免费保修范围内的售后服务（超出保修期或者在保修期内不符合免费保修条款），公司提供收费售后服务；

• 公司官方提供线上和远程技术支持渠道，客户需配合技术工程师进行问题诊断和故障处理；
• 经技术工程师诊断必须上门解决问题的，指派专业技术人员提供上门服务；
• 不在免费保修范围内的售后服务，需按照要求填写《售后服务记录表》；
• 服务费用包含：售后维护费用以及备件费用。

5.3 售后服务咨询

如果您有任何问题需要咨询，请联系普渡科技客服热线：400-0826-660。
普渡科技售后人员服务工作时间是：每周一至周六，上午 9:30 至 12:00，下午 13:30 至 18:30。

Statement

Contents

Safety Instructions

1.1 Instructions for use

- An unmanned environment is necessary for the UV disinfection mode.
- Puductor2 Robot is only suitable for disinfecting indoor air and surfaces and is not recommended for outdoor use.
- Puductor2 Robot can only function as an ultra-dry atomizer. During ultra-dry disinfection, make sure to follow the user instructions for your disinfectant.
- Check with your disinfectant supplier whether it is safe for people to be in the same space with dry mist.
- Many disinfectants decompose quickly under heat and light. It is recommended to divert disinfectants in the ultrasonic chamber back to the disinfectant tank and keep the robot in the shade after ultrasonic dry mist disinfection.
- While the robot is performing UV disinfection, it emits strong UV rays, to which direct exposure of eyes and skin should be avoided. Make sure that operators are well protected, and no people should get close to the robot when working.
- The UV device will be screwed out only when it is working, and it will be screwed in automatically after the UV disinfection is over.
- Please restart the disinfection robot when the UV lamp is found not fully screwed in or screwed out. If the problem cannot be solved, please turn off the robot and contact Pudu staff.
- DO NOT knock over the robot when there is liquid in the disinfectant tank, otherwise, it will cause liquid leakage which may damage the circuit in the robot.
- In the ultra-dry mist disinfection mode, a small amount of atomized liquid may remain on the robot surface, which is normal.
- After disinfection is completed, wipe the robot clean with dry tissue or cloth.
- DO NOT pull the robot while it is working. In case of an emergency, press the emergency button or stop the robot using the remote control terminal.
- The robot can only be used in flat indoor environments, such as floorboard floors, tile floors, and floors with thin carpets,and may not be used in any outdoor environments such as an open balcony or on any rugged ground such as a staircase. DO NOT use the robot in any environment with a temperature above 40 ° C or below 5 ° C or on any wet slippery ground surfaces.
- DO NOT push the robot in the opposite position while it is powered on.
- DO NOT block the sensor, or the robot may fail to move properly.
- Before use, put away any wire or cable in the environment to prevent the robot from being dragged around.
- Remove sharp objects on the ground, such as decoration waste, glass, and nails, to avoid any damage to the base.

- A maximum speed of 0.8 m/s is recommended for safe operation. No playing is allowed within 1 m in front of the robot to avoid unnecessary harm.
- Although the robot features automatic obstacle avoidance, there is a blind spot. Therefore, never block the robot moving at a high speed.
- The optimal travel width of the robot should be greater than 80 cm. A width greater than 1 m is needed for the robot to move smoothly through a long passage. Passages with a width of greater than 2 m can accommodate two robots passing each other. (The appropriate width is evaluated by the technician based on the use case required.)
- The maximum possible slope is 5° for the robot. To prevent sliding, the robot should not be paused when moving uphill.
- To prevent the robot from falling, the slope should be at least 80 cm wide, and the roll angle should not exceed 5° .
- It is necessary to add fences or other barriers at the edge of a staircase, entrance to a downslope, or other places where the robot is at risk of falling.
- Pure black (such as baseboards), specular (such as walls), and fully transparent (such as floor-to-ceiling glass windows) objects that are 16 to 22 cm high from the ground may interfere with the lidar detection of the robot and cause the robot to move abnormally. Make some necessary modifications to the space to allow the lidar to reflect (such as sticking some stickers).
- Robots at the standby point, if arranged side by side, should stay apart from each other at a distance of 35 cm, from the back wall at a distance of 15 cm, and from the side wall at a distance of 35 cm.
- The product must be used according to the User Manual or this Quick Guide. Loss caused by improper use shall be borne by users.
- The product's lidar meets safety standards for Class 1 laser and would not cause harmful laser radiation.

> Class I

1.2 Instructions on power supply and power usage

- DO NOT use any third-party batteries, power cables, or chargers.
- DO NOT dismantle, repair, or modify the batteries or charger without permission.
- The power must be disconnected and the batteries removed before scrapping the robot or its batteries.
- DO NOT place or charge the robot near flammables, explosives, or heat sources (including the radiator).
- DO NOT place the robot or the charger in an area of elevated temperatures (> 40 ° C).
- DO NOT place the robot loaded with disinfectant in an area of low temperatures (< 5 ° C).
- DO NOT collide the charger with other objects to avoid any damage.
- When being transported, the robot should be shut down and the disinfectant should be emptied.

- Use the original package to protect the robot.
- To maximize the efficiency and battery life of the robot, always keep the battery level above 10%.
- Disconnect the power and timely contact Pudu staff for repair or replacement when the charger is found damaged or abnormal.
- Unplug the charger timely after the charging cycle is complete. DO NOT leave the charger plugged in for a long time if the robot is fully charged.
- Designate a person to charge the robot. DO NOT charge the robot in an unattended manner.
- If the robot is not used for a long time, please fully charge the battery, turn off the machine with the key, and put it in a cool and dry place.
- Charge the battery at least once every month to avoid battery damage.

Product Overview

2.1 Product information

Product Name:
Puductor2 Robot

Model:
PJ1

Features:
Puductor2Robot boasts both Ultrasonic Dry Mist Disinfection and Ultraviolet-C Disinfection.
Ultrasonic Dry Mist Disinfection is achieved by atomizing food-grade hydrogen peroxide and other disinfectant solutions into micron-level dry fog, which is fully and quickly dispersed into the indoor environment through the high-flow air outlet. The dry mist can kill various microorganisms including bacteria, fungi, viruses and highly resistant bacterial spores.
In the UV mode, Puductor2 Robot can destroy the DNA and RNA structure of natural bacteria when exposed to ultraviolet rays for a certain time, thus killing harmful germs indoors.
Powered by technologies like self-navigation, intelligent start-stop, and human induction, Puductor2 Robot can work independently in different disinfection modes. When using harmful disinfectant solutions like hydrogen peroxide and operating in the UV mode, Puductor2 Robot can automatically stop when humans are detected, to enable automatic, timed, accurate, and safe operation.
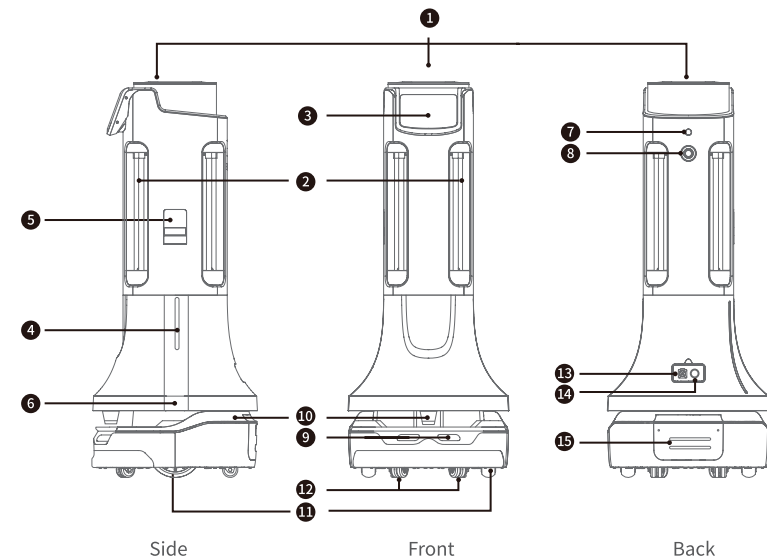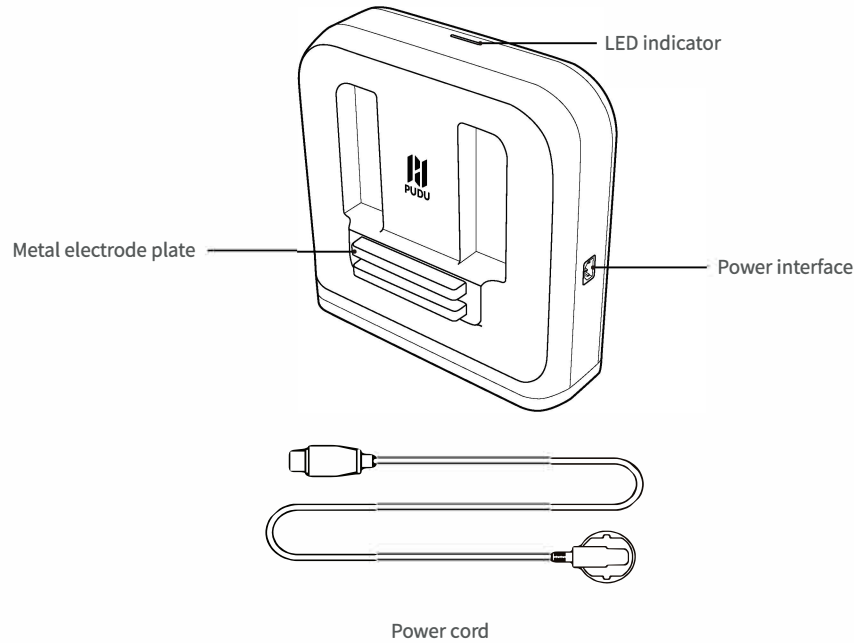Puductor2 Robot boasts carefree charging and can return on its own when the battery is low.

2.2 Applicable scenarios

Puductor2 Robot can disinfect the hard surface and indoor air of medical institutions, public places, labs, pet clinics, enterprises, schools, and other indoor locations requiring infection prevention and control measures.

2.3 Packing list

Robot*1, User Manual*1, Quality Certificate*1, Warranty Card*1, Charging Pile*1, Charging Cable*1 (optional), Positioning Sticker*1, Power Key*1.

2.4 Exterior and components

Side   Front   Back

❶ Ultrasonic chamber   ❻ Liquid outlet   ⓫ Drive wheel
❷ UV lamp   ❼ On/Off switch   ⓬ Auxiliary wheel
❸ Screen   ❽ Emergency stop switch   ⓭ Charging jack
❹ Level indicator   ❾ Depth vision sensor   ⓮ Key switch
❺ Liquid inlet   ❿ Lidar   ⓯ Auto charging port

Metal electrode plate — LED indicator — Power interface

Power cord

2.5 Performance parameters

Feature	Description
Model	PJ2
Power input	AC 100-240V, 50/60Hz
Power output	29V-8A
Robot input	DC 29V/8A
Operating voltage	DC 23-29V
Charging time	8h
Continuous working time	6h
Moving speed	0.1~1.2m/s
Climbing angle	⩽ 5°
Machine material	ABS/aviation grade aluminum alloy

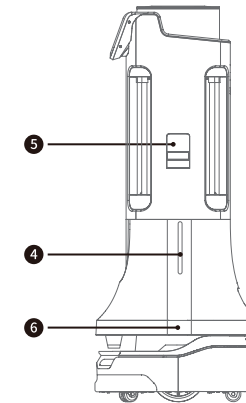|	
Battery capacity	51.2Ah
Robot weight	68kg
Machine dimension	544x 538x 1290mm
Rated power	232W
Ultra-dry spray	4 sets of nozzles, spray angle: 30°
Spraying output	2L/h
Disinfection liquid capacity	15L
Spray particle size	< 10 μm
Applicable disinfectants	Hydrogen peroxide, hypochlorous acid, and chlorine dioxide
UV lamp	4 sets of lamps
UV wavelength	UV-C 254nm
UV illuminance	> 180 μW/cm2 at 1 m
Protection against UV rays	Autonomously retractable UV lamps
Screen size	7-inch HD color touch screen
Speaker power	2 × 20W stereo speakers
Design life span	5 years
Working environment	5 ° C to 40 ° C, RH: 85%
Storage environment	-40 ° C to 65 ° C, RH: 85%
Charging mode	Manual and auto charging
Level of environmental pollution	Level 33
Navigation	Lidar-based positioning and navigation
Transmission mode	Wi-Fi
Band	2.4G/5G
Transmission standard	802.11b/g/n/ac
Working altitude	< 2000m
Operation environment	Indoor environment, flat and smooth ground
IP grade	IP 20
Illuminance	< 70,000 lux

2.6 Disinfection

Sterilization principle:

Confirm there are no people except the operator in the location to be disinfected. Close the doors and windows. Start the right disinfection mode at room temperature.

Dry mist and UV rays work together to kill bacterias, fungi, viruses, highly resistant bacterial spores, and other microorganisms on the surface.

Sterilizing factors and working environment:

Feature	Description
Sterilizing factors	Hydrogen peroxide, ultraviolet rays
Sterilization intensity	Hydrogen peroxide solution, atomized at a rate of 2 L/H and then diffused into the air. ≥ 180μW/cm² 4 x 36 w UV-C lamps with an industry-leading ultraviolet illumination of 180 μW/cm² at 1 meter
Applicable target	Hard surface and air
Target microorganisms	Bacteria, fungi, viruses, and highly resistant bacterial spores
UV-C lamps	
Power	36 w for each UV-C lamp
UV wavelength	UV-C 254 nm
Illuminance	≥ 180 μW/cm² (at 1 meter)
Number of lamps	4 sets of lamps
Ultra-dry atomizer	
Ultra-dry spray	4 sets of nozzles, spray angle: 30°
Spraying output	Adjustable between 0–2 L/h
Spray particle size	< 10 μm
Disinfectant tank capacity	15 L

Disinfectant refill:

When the robot prompts a low liquid level, the disinfectant should be added manually.

The liquid inlet is by the side ❺ . Open the liquid inlet and add the disinfectant.

> **Note:** ⚠
> When refilling the disinfectant tank, corresponding use guidance should be followed to avoid injury, and the disinfectant added should be of the same type and concentration. The liquid level should be observed when refilling ❹ to prevent overflow.

Disinfectant discharge:

When the disinfectant should be discharged from the robot, make sure that the disinfectant in the ultrasonic chamber has flowed back to the disinfectant tank. If not, make it so first.
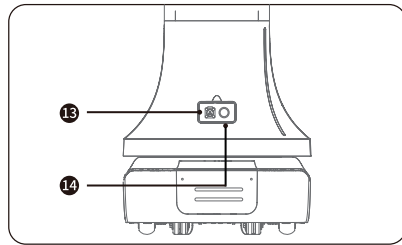
Open the liquid outlet ❻ and unscrew the switch for the disinfectant to be discharged. When fully discharged, screw the switch and close the liquid outlet.

How to Use

3.1 Powering on and off

Key switch:

Use the key switch ⓮ to turn on/off the power of the robot and to lock the robot. See the following figure for its location:
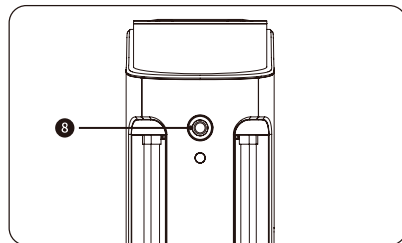
Powering on:

Push to the initial position → Turn on the key switch → Press and hold the on/off switch for 2 seconds, and wait until the bottom appears in blue.

Powering off:

Press and hold the on/off switch for 3 seconds, at which point the light tube and screen are off.

3.2 Emergency handling

When the robot is not working properly, in an unexpected condition or in any other emergency that may cause harm to the surrounding environment, you can stop the robot by pressing the emergency stop switch ⑧ on the back. The robot can only be manually pushed during an emergency stop.

3.3 Charging

The robot is charged through the charging pile. There are three charging modes:

• The robot returns for charging on command;

• The robot returns and charges on its own when the battery is low;

• The emergency stop is pressed and the robot is manually pushed against the charging pile for charging.

> **Note：** ⚠
> In case of charging failure, please contact Pudu staff for emergency charging methods. The battery level is displayed through the bottom light and voice notification.

Low batterynotification:

Battery level	Reminder
0% - 2%	Bottom light strip flashes red with voice notification
2% - 5%	Bottom light strip remains red with voice notification
5% - 10%	Bottom light strip remains yellow with voice notification

Charging status:

Battery level	Bottom light strip
0% - 19%	Breathing red
20% - 39%	Breathing orange
40% - 59%	Breathing yellow
60% -79%	Breathing green
80% - 99%	Breathing blue
100%	Steady blue

3.4 Functions

Quick disinfection:
Users can push the robot to the destination to be disinfected. The robot will start disinfection based on the disinfection time and method specified, and stand by after the disinfection is completed.

Fixed-point disinfection:
Different disinfection tasks can be set, with multiple destinations available for each task. Users can set the disinfection time and method for each destination. The robot will automatically make the plan to disinfect all destinations. After the disinfection is completed, the robot will return to the docking location.

Cruise disinfection:
Users can specify a disinfection path and select the total disinfection time and method. The robot will circulate along the specified path for disinfection. After the disinfection is completed, the robot will return to the docking location.

Disinfection methods:
Disinfectant, UV-C, and Disinfectant+UV-C can be selected for Quick Disinfection, Fixed-point Disinfection, and Cruise Disinfection.

Remote app:
Users can view robot working status and stop or start the disinfection remotely via an app.

Human induction:
In the Quick Disinfection and Fixed-point Disinfection modes, if harmful disinfectant or UV-C is used, the robot will automatically stop when it detects any moving human body within a 5 m radius. It will resume disinfection when there are no humans around. This can prevent humans who suddenly appear during the disinfection from being hurt.

Automatically return to charging:
The robot can automatically return to the charging station to charge by clicking the one-key recharge of the main body APP. When the battery is low, the robot will automatically return to the charging station for charging.

3.3 Indicator description

Bottom light strip:

Light	Status
Steady red	Low battery, blocked route
Steady orange	Self-inspection failure, positioning failure, equipment exception, light strip in the wrong position
Steady yellow	Low battery
Steady blue	Standby, in operation, full charge
Breathing orange	Low battery, charging
Breathing yellow	Low battery, charging
Breathing green	Charging
Breathing blue	Charging
Flashing red	Abnormal charging, low battery, battery failure
Flashing blue	Quick/Fixed-point/Cruise Disinfection Modes paused

Atomizer light:

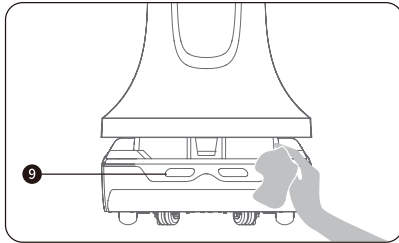| Light	Status
Flashing orange	Robot initialization exception, abnormal position of the UV lamp
Flashing yellow	Pause mode, low disinfectant level
Flashing blue	Quick/Fixed-point/Cruise Disinfection Modes paused
Steady blue	Disinfecting, standby

Charging pile light:

Light	Status
Steady blue	On standby/not charging
Flashing green	Robot docking with the charging pile
Steady green	Charging
Steady red	Charging pile exception

Maintenance and Troubleshooting

4.1 Maintenance and care

- The device should be checked regularly, at least once every year. In case of any problem or failure in self-check, please contact Pudu after-sales personnel.
- Please refer to "FAQs and Troubleshooting" for solutions to any problems and faults. If no solutions are available, please contact Pudu.
- When the robot gets dirty or dusty, wipe it with a soft, clean lint-free cloth.
- Chassis: ❾ When the depth vision sensor, a precision optical device, becomes dirty or dusty, the machine will become less sensitive in intelligent obstacle avoidance. Please wipe it with a soft, clean lint-free cloth.

- If the robot is not used for a long time, please fully charge the battery, turn off the machine with the key, and put it in a cool and dry place.
- Please charge the battery at least once every month to avoid battery damage.
- Measure the irradiance of a UV lamp in use at a vertical distance of 1 m in front of and at the center of the lamp. The measured value should be ≥ 70 μW/cm2. If not, replace the lamp.
- First press the spring holder on the head of the lamp, and then remove the lamp.
- When the atomizer is dirty, please wipe it with a soft, clean lint-free cloth.

> **Note**: ⚠️
> - DO NOT use chemical detergents or sprays.
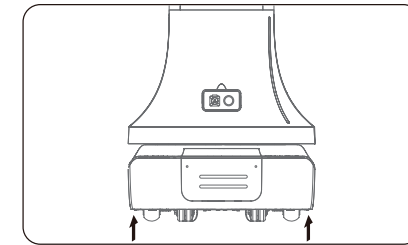> - The covered vision sensor will result in object recognition failure and reduced obstacle avoidance ability.

4.2 Transport, Handling, Storage, Unpacking

Transport:
The product is a precision instrument. Please handle with great care during transportation. Keep the original package intact and away from pressure, and avoid turning the product upside down or tilting it.

Handling:
Please strictly follow the instructions below when manually moving the valuable device:
When moving the machine, hold on to the chassis (marked with an arrow) as shown on the down and be careful to keep it upright.

Storage:
The packaged product should be stored in a well-ventilated, dust-free indoor area without corrosive gas.
Temperature range: -40 ° C to 65 ° C

Unpacking:
Please unpack in an open space area.

4.3 FAQs and Troubleshooting

FAQs:

Troubles	Possible Causes and Solutions
Start failure	1. Low battery and please fully charge the battery. 2. The ambient temperature is too low (lower than 0° C) or too high (higher than 40 ° C).
Charging failure	1. The charging cable is not properly connected. Please check the wiring and ensure enough space around the charging robot. 2. The Li-ion battery is damaged and please replace or contact technicians to replace the battery.
Functional failure	Turn off and restart the robot. If the problem persists, contact our technical support.
The bottom light flashes red without low battery notification and the robot is powered off in three minutes.	Battery failure, please contact our technical support.
Atomization failure	Please contact our technical support.
Failure to start the UV lamps	Please contact our technical support.

Troubleshooting:

Warning	Solution
Low battery, please charge	Please place the robot back to the charging dock and start charging until the battery is fully charged.
Abnormal motor parameters on the screen	Restart the robot.

After-Sales Service

5.1 Free Warranty

When the robots are under warranty (different warranty periods for different components, calculated from the receipt of the robot), Pudu offers a free warranty if:

- Defects are caused by non-human factors;
- There are no unauthorized disassembly, modification or addition not included in the user manual, or other faults caused by non-human factors;
- The robot S/N sticker and other labels are not removed or altered;
- Effective purchase certificate, receipt, and order number are provided;
- Damaged components are sent back to Pudu as required.

5.2 Paid Services

Pudu offers paid after-sales services when the robot is out-of-warranty or the policy of free warranty is not applicable:

- Online and remote technical support is provided, and customers should cooperate with engineers for diagnosis and troubleshooting;
- Technicians will offer on-site service when necessary;
- The "After-sales Service Form" should be filled when the policy of free warranty is not applicable;
- Customers should pay for both maintenance and spare parts.

5.3 Contact

For any questions, please call +86-400-0826-660.
Working hours: 9:00 - 12:00, 14:00 - 18:00, Monday to Saturday (GMT+8).

Compliance information

FCC Compliance Statement

1. This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC information

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
—Reorient or relocate the receiving antenna.
—Increase the separation between the equipment and receiver.
—Connect the equipment into an outlet on a circuit different from that to which the receiver is
   connected.
—Consult the dealer or an experienced radio/TV technician for help.
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Industry Canada compliance statement

This device complies with part 15 of the FCC rules and RSS-247 of Industry Canada. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
Cet équipement est conforme aux limites d'exposition aux rayonnements de la IC établies pour unenvironnement non contrôé. Cet équipement doit être installé et fonctionner à au moins 20cm de distance d'un radiateur ou de votre corps.
5G WIFI statement
The device is restricted to indoor use when operated in 5150MHz~5350MHz to reduce the potential for interference.
NOTE:
Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

WEEE information

The Waste Electrical and Electronic Equipment (WEEE) Directive aims to minimize the impact of electrical and electronic goods on the environment, by increasing re-use and recycling and by reducing the amount of WEEE going to landfill. The symbol on this product or its packaging signifies that this product must be disposed separately from ordinary household wastes at its end of life. Be aware that this is your responsibility to dispose of electronic equipment at recycling centers in order to conserve natural resources. Each country should have its collection centers for electrical and electronic equipment recycling. For information about your recycling drop off area, please contact your related electrical and electronic equipment waste management authority, your local city office, or your house hold waste disposal service.

5G WIFI statement
The device is restricted to indoor use when operated in 5150MHz~5350MHz to reduce the potential for interference.

www.pudutech.com