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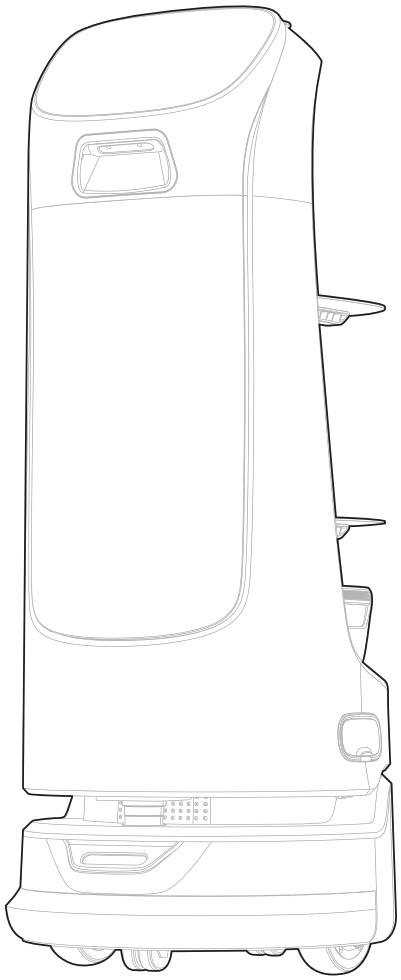

葫芦机器人 · *KettyBot*

用户手册 V1.1

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用户手册 V1.0

User Manual

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English 29/60

声明

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1. 安全说明

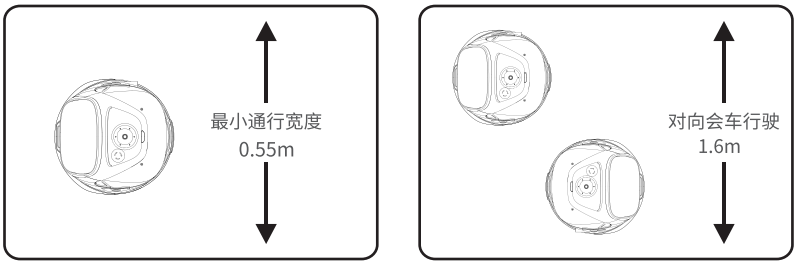
1.1 使用须知

- 本产品为轮式机器人，仅限于室内平坦环境使用，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°C或低于 0°C或地面有任何液体及粘稠物的环境下使用。
- 托盘上禁止放超过承重物品：建议不超过 10kg/ 层。
- 点击完成机器人会马上递送下一任务，请先取完菜品再点击完成。
- 请勿在运行过程中取放菜品，如有需要，请点击屏幕暂停后再进行取放，巡航模式暂停时间为 10s，其他模式暂停时间为 10s，暂停时间过后机器会自动恢复行走。
- 如偶然因遮挡等因素导致机器人进入错误的位置请及时暂停任务并推至正确路线再继续任务。
- 运行过程中请勿拉拽机器人，如需推动或者搬运机器人请先点击屏幕让其暂停。
- 请勿在机器人开机状态下，反向推机器人。
- 禁止遮挡机器人元器件或放置超过装载空间的物品，否则可能导致机器人行走不正常或定位丢失。
- 禁止拍打设备或用力按压敲击屏幕，否则易造成设备损坏。
- 禁止机器人超载运行，禁止放明火炉具，不得承放任何可燃固、气、液体。
- 禁止在机器人行进中临时性的装载调整，一切操作都应在点击屏幕，使得机器人暂停行驶后开展。
- 禁止在机器开机运行状态下做清理和维护工作。
- 使用前请先将环境中地面各种线材收起,避免主机运行时拖拽。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机器人，否则可能引发安全事故。
- 在没有特殊定制，原则上不建议机器人进行汤水配送，使用时需防止汤水泼洒以及汤水高温烫伤。配送高温餐具或汤锅时请避让机器人，防止与机器人碰撞造成高温烫伤。

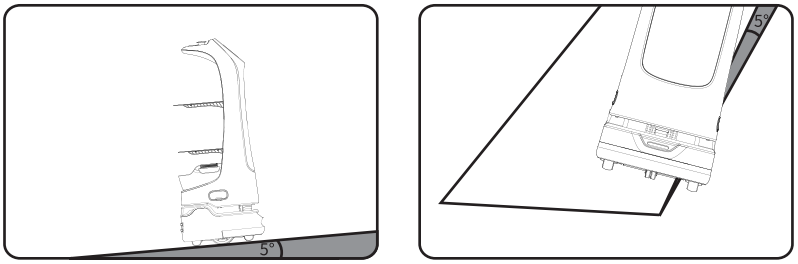
1.2 环境须知

- 本机器人适用于使用环境平坦地面，如地板 , 瓷砖 , 薄地毯等，对于环境内有台阶，坡度过大，过于紧密的环境不适宜使用。
- 不建议将机器人使用在潮湿或有明显积水的地面。
- 散落地面的电源线等杂物可能绊住或缠绕机器人，使用前请务必移除。
- 地面突出物如门槛等明显凸出物状态下使用本产品，可能会导致菜品撒出等现象，请确认场地突出物高度在 0.5cm 以内。

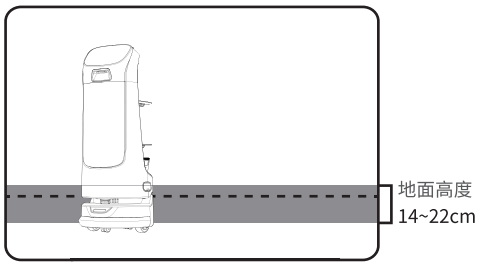
- 机器人最佳通行宽度应大于 0.55m，长通道需要宽度大于 0.6m 流畅性最佳，宽度大于 1.6m 通道可设置两台机器人对向会车行驶（具体宽度由技术人员根据实际场景评估）。



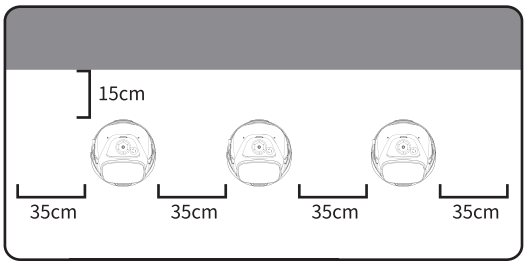
- 机器人设计最大爬坡角度为 5°，但为防止运载菜品倾洒，运载菜品建议坡度在 4° 内为宜，最大不超过 5°；为防止机器人滑坡后溜导致可能风险，严禁在机器人上坡或下坡期间暂停机器；为防止机器人斜坡上意外跌落，斜坡宽度不应小于最小通行宽度 0.8m，侧翻角度不允许超过 5°；



- 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 14~22cm 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，可能干扰机器人雷达反射，造成机器人行走异常，可能需要对场地进行一定的改造让雷达能反射（如粘贴贴纸）。



- 后厨标准入口大于 1.2m 为佳，小于 1.2m 可能造成人机拥堵。
- 待机点机器人并列放置两台之间需有 35cm 空间，离后墙需有 15cm 空隙，与侧墙的距离需有 35cm。



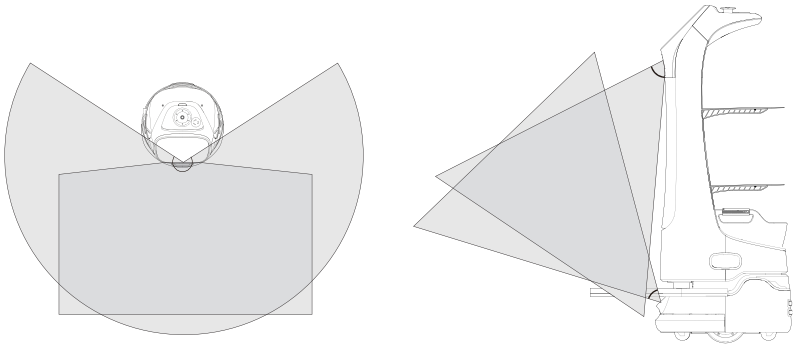
1.3 电源与用电须知

- 对于首次开箱使用，请充电至 100% 后使用；
  机器人剩余电量小于 20%，请及时充电，长时间低电量运行可能会缩短电池使用寿命；
- 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；
- 若长时间不使用机器人，请及时按下将产品断电以保护机器电池；
- 务必使用原厂专配的可充电电池与充电设备，严禁使用非原厂充电器对机器人充电；
- 按照充电器铭牌标识的电源电压为主机充电；
- 确保电源电压符合充电器上标注的电压，否则可能导致充电器损坏；
- 小心保护电源线，避免拉拽，扭曲；
- 请指定专门负责人对机器充电，请勿在无人值守情况下为机器人充电或者单独为电池充电；
- 请勿将机器放置于易燃易爆物体附近充电；
- 机器人存放及充电位置请保持干燥、常温，严禁将机器以及充电器放置于高温区域（＞ 40°C），严禁机器以及充电器进水；
- 严禁充电器与外物碰撞，造成充电器损坏；
- 发现充电器损坏，充电电流异常请及时更换充电器；
- 收到机器人报警，请立即断开充电设备。

1.4 安全须知

- 托盘上禁止放明火炉具，不得承放任何可燃固、气、液体。
  禁止在机器开机运行状态下做清理和维护工作。
- 为保证安全建议将机器人速度调整至 0.8m/s 及以下，禁止在机器人前方嬉戏打闹以避免不必要的伤害。
- 禁止在机器人行进中进行临时性的托盘配载调整，一切操作都应在点击屏幕，使得机器人暂停行驶后开展。

- 当机器人送餐到达指定桌号区域时，机身未停稳前请勿进行端菜等操作以免造成意外碰撞所带来的菜品损失和人身伤害。
- 如出现机器人乱走且屏幕操作失效，或其他紧急情况，请用按下急停开关。
- 使用前请先将环境中地面各种线材收起，避免主机运行时拖拽。使用前请将地面尖锐物体（如装修废料、玻璃、铁钉等）清除，以免对机器底盘造成伤害。
- 在机器运动过程中推动或者搬运机器人请先点击屏幕让其暂停。
- 请勿将任何液体洒入本产品内部。
- 请勿将任何非可运输物体（包括儿童、宠物）放置在静止或者运行中的主机上。
- 机器人有自动避障功能，但严禁在机器人高速行驶期间突然阻挡机器人，否则可能引发安全事故。
- 机器配置有向下传感器，识别区域如下图所示：



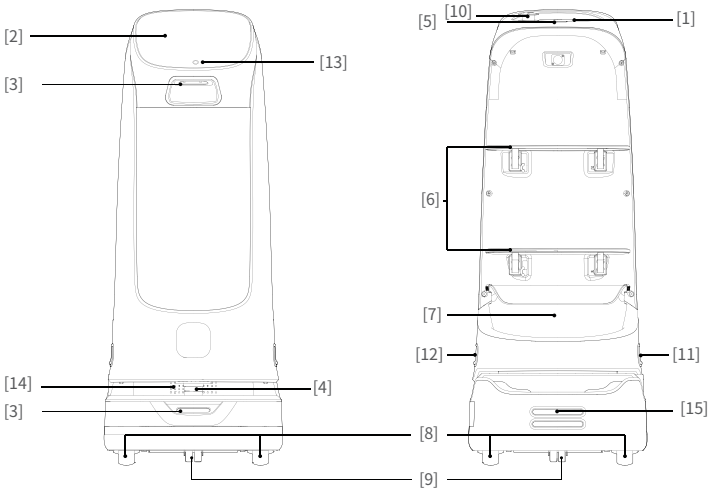
* 功能不定期更新，详细功能说明可在 www.pudutech.com。

2. 产品组成

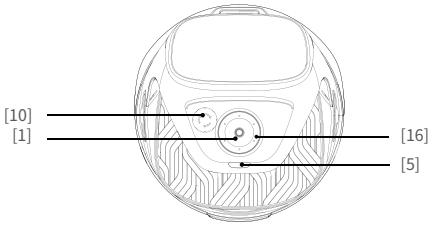
2.1 包装清单

整机 ×1、《葫芦用户手册》×1、合格证 ×1、保修卡 ×1、充电器 ×1、二维码 ×100、电源钥匙 ×2。

2.2 外观部件介绍

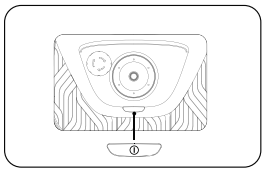


正面　　背面

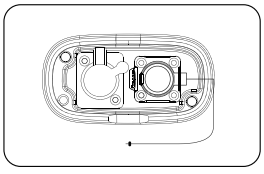


顶部

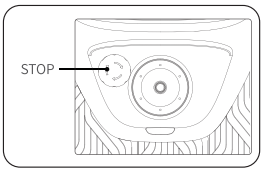
[1] 视觉传感器
[2] 屏幕
[3] 深度视觉传感器
[4] 激光雷达
[5] 电源开关
[6] 托盘
[7] 回收框
[8] 驱动轮
[9] 辅助轮
[10] 急停开关
[11] 充电插孔
[12] 钥匙开关
[13] 前置定位摄像头
[14] 音响
[15] 回充电极
[16] 麦阵



开 / 关机键



充电线

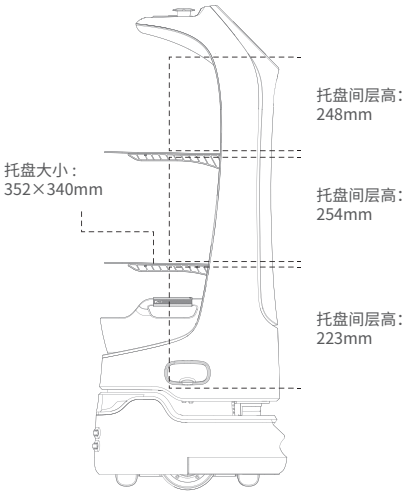


急停开关

2.3 性能参数

产品特性	描述
产品型号	PNT
工作电压	DC 23-29V
电源输入	AC 100-240V, 50/60Hz
电源输出	29V-8A
充电时间	4.5h
工作时间	>8h
巡航速度	0.5~0.9m/s 可调节
托盘数量	2 层托盘 +1 收纳筐
托盘承重	10kg/ 层
爬坡坡度	最大 5°
整机材质	ABS/ 航空级铝合金
电池容量	25.6Ah
整机重量	38kg
整机尺寸	435*450*1120 (mm)
屏幕规格	10.1 寸高清触摸彩屏
音响功率	20W*2 立体声音响
设计寿命	5 年
工作温度	0~40°C
储存温度	-10~60°C
充电方式	手动插拔充电 , 支持自动回充
工作湿度	相对湿度 0~95%（无凝露）
广告屏尺寸	18.5 寸 409.8*230.4（mm）
ESP32	频率范围：2.4 GHz ~ 2.5 GHz
WIFI	2.4G, 频率范围 : 2.400 GHz ~ 2.497 GHz (2.4 GHz ISM Band); 5G, 频率范围 : 4.900 GHz ~ 5.845 GHz (5.0 GHz ISM Band)
工作海拔	2000m 以下
工作环境	室内环境，平坦光滑地面
防护等级	IP20

2.4 托盘尺寸及层高



3. 产品使用

3.1 充电须知

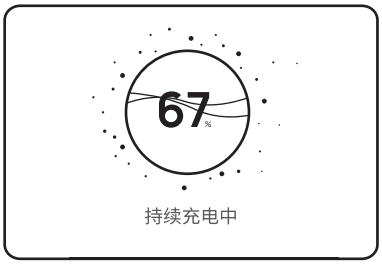
充电方式 :

将机器人充电接口连接充电线，保证机身充电口与充电线连接，如果连接成功，机器人将会提示正在充电。

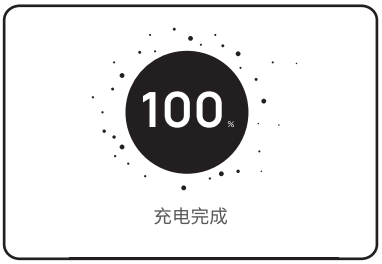
充电注意 :

1. 为保证机器人的使用效率和电池寿命，请随时把机器人电量保持在 10% 以上；
2. 当电量低于 10% 时，机器人处于低电量状态，需尽快充电；
3. 当电量低于 2% 时，处于电池保护状态，机器人将不能执行任务，需充电后再使用。

3.2 充电界面



屏幕显示正在充电的指示，表示机器正在充电 。

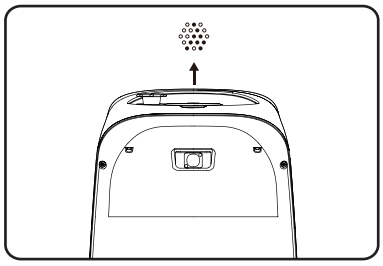


充电完成后，屏幕显示充电容器饱和的提示。

3.3 开机、关机、暂停、启动

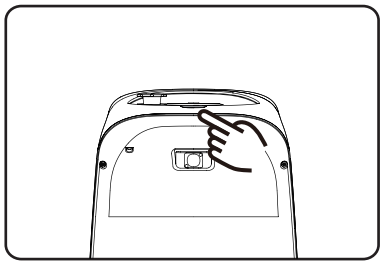
开机前

每次开机前将机器人移动到视觉标记正下方，
并确认钥匙开关已打开。



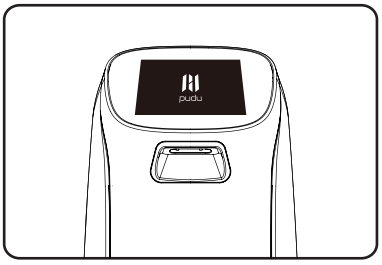
开机

长按开机键 0.5 秒左右，底部灯带显示蓝色。



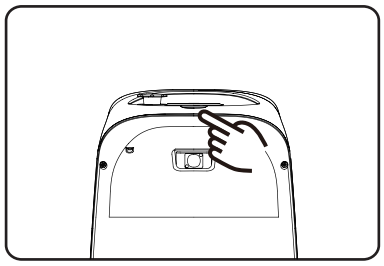
正在开机

屏幕进入工作模式，表示开机成功。



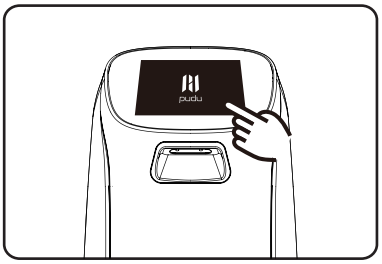
关机

长按关机键 3 秒，屏幕提示正在关机，成功关机至屏幕黑屏，表示关机成功。长按关机键 8 秒，可实现机器强行断电关机（若非机器异常情况，不推荐使用此功能）。



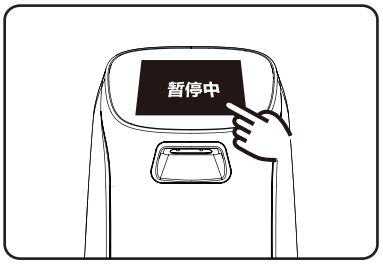
暂停

在机器人运行过程中，触摸点击屏幕，机器人暂停工作。



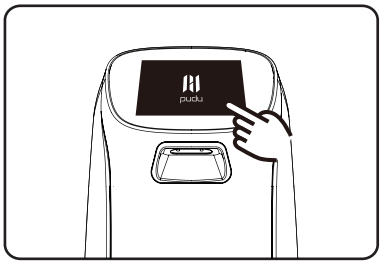
暂停中

屏幕进入暂停界面。



启动

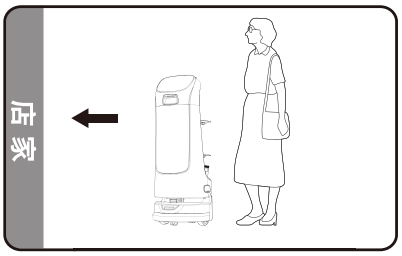
如果需要继续运行，需要再次点击屏幕。暂停界面如果无任何其他动作，巡航模式下机器 10s 后会自动恢复行走，其他模式下 10s 后恢复自动行走。



3.4 模式选择

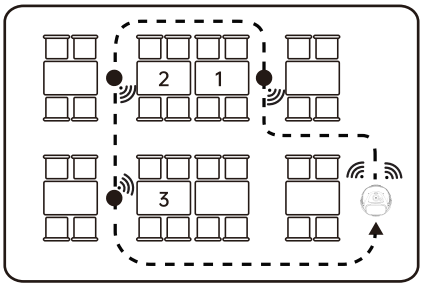
揽客模式：

在揽客模式下，机器人可以在揽客区感知经过的行人，并播放揽客话术。可以在此模式下与机器人对话，查看优惠、特色餐等信息，并选择由机器人带领前往店家门口。



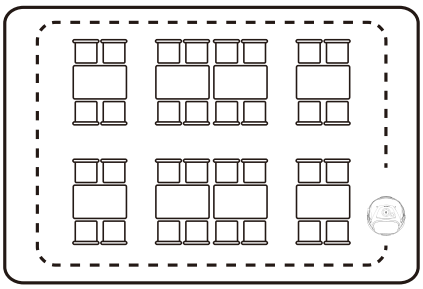
领位模式：

在领位模式下，机器人可以对进店的客人主动打招呼问好，并可带领客人前往座位就坐，在领位完成后自动返回。



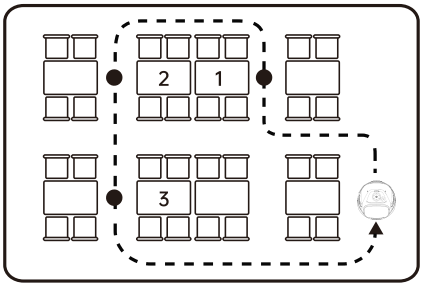
巡航模式：

巡航模式中，它可以载着自助饮料酒水、甜点小吃，或者是餐布纸巾，沿着服务员制定好的循环路径一遍遍的运行，并通过语音来邀请顾客取用或品尝。也可通过打开交互开关，让机器人在门口巡航揽客。



送餐模式：

在送餐模式下，机器人可以单次同时为多桌送餐。在几个托盘上放置不同顾客点单的菜肴，然后输入相应的桌号，它可以自己规划最佳路径，将菜肴送达。送餐完成后自动回到取餐点。

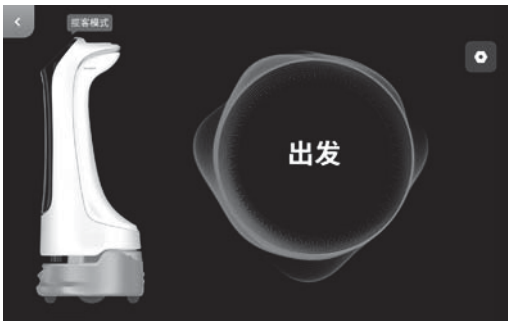


生日模式：

生日模式下，机器人可以提供运送生日蛋糕或礼物的服务，在运输过程中自动播放生日歌曲。

3.5 揽客模式

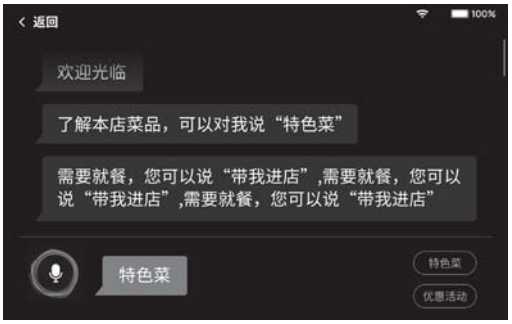
揽客模式是一种通过机器人门前揽客的方式，将潜在食客吸引并像其宣传店家特色，最终将其在消费者转化为进店就餐的食客的功能，具体步骤如下：



1. 选择主菜单揽客模式。
2. 进入揽客界面，点击设置可选择揽客点，并编辑揽客话术。
3. 点击出发，机器人前往揽客点开始主动招揽。

4. 点击屏幕暂停任务，再次点击恢复任务，也可选择取消任务。

5. 机器人到达揽客点后，播报揽客话术，当识别到有人靠近时，会自动切换到交互界面。



6. 此时可与机器人语音对话，查看特色菜品，并选择由机器人带领前往店家。

7. 机器人带客人到店后，可选择回去继续揽客，或领客人就坐。

3.6 领位模式

领位模式用于机器人带领进店就餐的客人前往餐桌就坐，具体步骤如下：

1. 在主页菜单选择领位模式。
2. 点击需要领位的桌号，机器人播报领位语音，并带领客人前往对应餐桌。

3. 点击屏幕暂停领位，再次点击恢复任务，也可选择取消任务或返回领位点。

4. 到达座位后，点击完成返回领位点，或 10 秒计时结束后自动返回。

3.7 巡航模式

巡航模式是一种常用模式，机器人在特定环境中巡航行走，进行小食分发或宣传招揽，具体步骤如下：
1. 在菜单选择巡航模式。

2. 选择自动巡航路线，巡航交互开关打开后可在巡航期间带客人进店。

3. 巡航设置可对巡航话术和播放间隔进行设置。
4. 选择出发，机器人开始执行巡航任务。

3.8 送餐模式

送餐模式是一种常用模式，任务式送餐，用于送餐到指定位置点，具体步骤如下：
1. 在主菜单选择送餐功能。

2. 将菜品放置到托盘上。
3. 点击菜品所在的托盘，选择目的地座号。默认情况下会自动选择高层托盘，选择对应桌号即可。
4. 桌号输入完成后点击出发，机器人开始执行任务。

5. 机器人按照既定的轨迹，快速到达任务地点。在送餐过程中，可以触摸机器人屏幕停止指令，机器人会即刻停止等待，10 秒后若没有接收到再次触摸指令，则机器人会继续启动执行任务。

3.9 生日模式

生日模式用于需要过生日时运送礼物并播放生日歌，具体步骤如下：
1. 在主菜单选择生日模式。

2. 将礼物放置到托盘上，每次仅支持一个目标点。
3. 选择目标点桌号。
4. 桌号输入完成后点击出发，机器人开始执行。机器人开始播放生日模式设置的歌单。
5. 机器人按照既定的轨迹，快速到达任务地点。在送餐过程中，可以触摸机器人屏幕停止指令，机器人会即刻停止等待，10 秒后若没有接收到再次触摸指令，则机器人会继续启动执行任务。暂停后屏幕进入此界面，可以进行修改任务、提前取餐、取消全部和返航等操作。

6. 到达任务点，点击完成返回取餐点。

3.10 报警提示

以下情况，机器人将停止工作并发出报警提示音，界面会提示相应的指示，此时机器将需要您的协助。

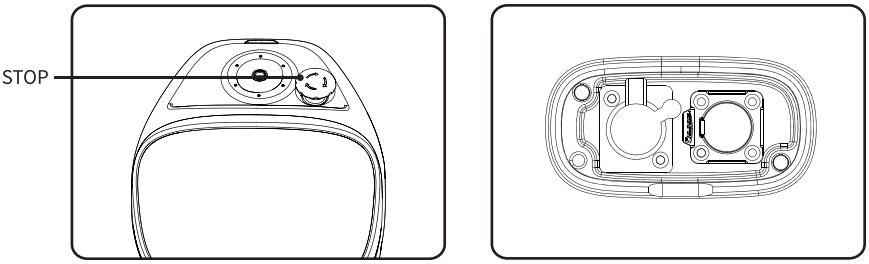
报警提示	解决方法
电池电量过低	请及时推机器人返回充电（图 1）
定位丢失	请将机器人推到视觉标记正下方（图 2）
驱动轮、辅助轮被卡住或者缠绕	请清理驱动轮、辅助轮
悬空未落地	请将机器人放到平整地面

图 1

图 2

3.11 紧急处理

当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，用户可以通过按压顶部的急停开关，使机器人停止运行。



4. 服务功能

4.1 地图设置

地图设置功能可进行多地图的选择。在机器人一对一停靠模式下，选择当前地图，可配置需要机器人停靠点。

4.2 语音设置

语音设置提供语音包替换以及语音自定义设置功能。语音包替换操作步骤如下：

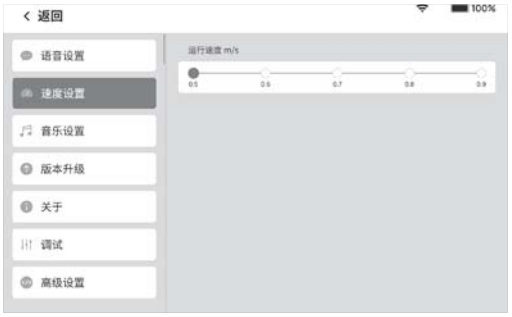
1. 查看可供支持更新的语音包，选择下载语音包；
2. 下载完成后，选择对应的语音包可以进行语音包的替换；
3. 选择默认则恢复默认语音包；
4. 长按语音包，可以对语音包进行删除。

巡航语音自定制设置操作步骤如下：

1. 选择添加语音弹出语音文本编辑窗口，输入需要播放的文字，点击确定，可生成一条自定义语音；
2. 支持添加多条语音，选择多条语音则为随机播报；
3. 关闭巡航语音开关，则恢复默认语音包；
4. 点击可进行语音试播，长按语音包可进行删除。

4.3 速度设置

速度设置可分别对送餐速度以及巡航速度进行设置，速度设置支持 0.5m/s、0.6m/s、0.7m/s、0.8m/s、0.9m/s 速度设置。



4.4 广告屏设置

广告屏设置功能可以对广告屏当前状态进行查看，并可以对广告屏音量进行调整。

4.5 版本更新

版本升级功能可查看当前版本，以及当前版本是否是最新状态。若非最新状态，可以选择检查更新进行最新版本的下载更新操作。

4.6 停靠说明

根据餐厅位置的大小，可选择机器人三种停靠方式。

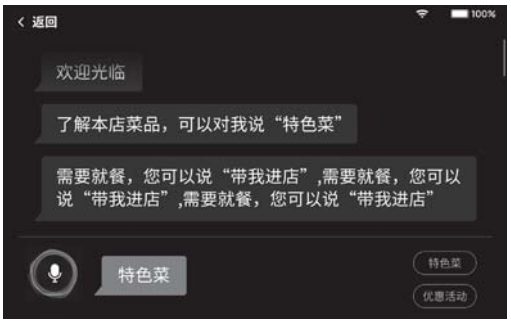
1. 一对一停靠：可设置每个机器人固定的停靠点。
2. 自由模式：可设置机器人多个停靠点，按照优先级停靠。
3. 停靠补位模式：除 1）、2）的停靠点设置外，还可以在其他区域设置临停点，在停靠点有空位时，机器人可自动前往停靠点补位。机器人在非停靠点无任务停靠时，可选择返航指令让机器人自动回到停靠点，或者将机器人推到停靠点。

* 临停点机器正常状态会显示“临时停靠中”，当取餐点有空位时，会自动前往取餐点停靠。

4.7 语音交互说明

机器人揽客、巡航（开启交互），可通过屏幕点击或语音唤醒，实现与机器人的语音交互。

1. 语音交互依赖网络，如果网络连接失败则不能语音交互；
2. 语音录入后，界面展示语音内容；
3. 系统回复内容以语音播放，并在界面显示具体文字内容；
4. 点击屏幕开启或结束语音交互，即可结束语音唤醒，一定时间未交互，系统也会自动退出。



4.8 自动回充说明

1. 机器人支持自动回充功能（充电桩需单独购买）；
2. 也可手动操作机器人前往充电桩充电，通过点击屏幕“一键回充”操作（如图）：

5. 产品保养

5.1 托盘，驱动轮及辅助轮

保持托盘的整洁，请至少一周检查清洁一次。用干净的棉布进行擦拭，当底部轮子被缠住或者杂物粘连，需要抬起机器人进行清理。

5.2 传感器保养

顶部定位传感器和立体避障传感器请至少一周检查清洁一次，如遇突发污损，务必立即处理，以免遮挡传感器造成机器运行异常；请用柔软纸巾或其他镜头清洁用品进行清洁。

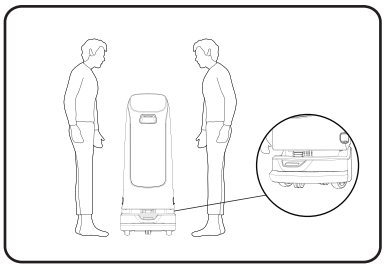
5.3 机身维护

保持机身的整洁，用干净的棉布进行擦拭。禁止抬、爬、撞、推、掰机器人，往机身堆放杂物等。机器如出现故障， 在未受到我方允许或者指导下， 禁止擅自拆上面的螺丝或者打开盖子维修。

5.4 搬运机器人

机器运输过程，需要满足 GB/T 4857.23-2012 关于钢簧减振卡车公路运输进行搬运要求，搬运时请使用叉车等搬运工具。

机器人为贵重设备，当需要人为搬动机器人时，请严格按照下列说明如图所示，机器人底盘上方为可受力部位（如图所示），您可以通过该部分上抬机器人。请双人左右同时提起机器人，注意保持平衡，搬运过程中请使用保持机器人的直立姿态，严禁通过提托盘或箱体进行搬运操作。



5.5 标识维护

在标识正下方不能有悬挂其他物体（比如气球，铁丝网，标语等物体），不能在离标识很近的地方悬挂广告牌或者安全出口指示牌等物体 ; 日常天花板清理、维护过程中注意不能损坏标识，标识位置不能移动、旋转。

6. 故障排除

6.1 开机自检不通过

确保机器人电量充足情况下，在定位标记下方重启机器人，如果还是自检不通过请及时联系售后服务人员。

6.2 机器人在运行过程中停车

1. 单击界面出现暂停页，机器人暂停运行，再次单击即可正常运行。
2. 语音提示“让一下”，点击屏幕暂停机器人，将机器人对正道路，再点击继续即可。

6.3 “信号丢失“提示

机器人界面提示“我迷路了请把我推到定位标记的正下方”，此时机器会发出语音提示求助，请将机器人推到定位标记正下方。

6.4 机器人不能正常开机

1. 检查急停开关是否被按下或损坏，如损坏请联系客服人员进行处理。
2. 电量不足，请通过适配器连接机器人充电。
3. 其他原因请联系客服人员进行处理。

7. 售后服务

7.1 免费保修服务

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。

7.2 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。

7.3 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

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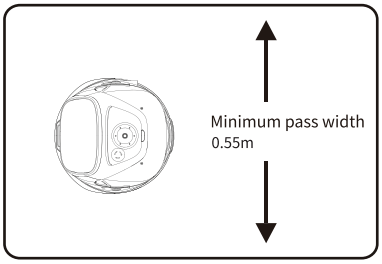
1.Safety Instructions

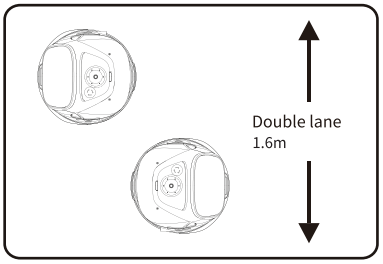
1.1 Instructions for Use

- This wheeled robot can only be used indoors on flat surfaces such as wood floors, ceramic tiles, and thin carpets. Using in outdoor space (for example, open balcony), on the rugged ground (for example, stairs), in a temperature above 40°C or below 0°C , or on surfaces covered with fluid or gooey stuff is not allowed.
- Items on the tray must not be of excessive weight. A maximum of 10 kg per tray is recommended. Tap Done and the robot will perform the next delivery task immediately. Please finish picking up the dishes and then tap Done.
- Do not pick and place dishes while the robot is moving. If necessary, tap on the screen to pause before picking and placing any dish. The pausing time is 20s in cruise mode and 10s in other modes. The robot will resume moving after the pausing time expires.
- If the robot accidentally enters into any incorrect position due to blocking and some other reason, please suspend the task promptly and push the robot to the correct route before continuing the task.
- Do not pull the robot while it is working. If you need to push or move the robot, tap on the screen to stop it from moving first.
- Do not push the robot backward when the power is on.
- Do not block the robot components or overfill the tray. Otherwise, the robot may fail to move properly or get lost.
- Do not pat the device or press or tap hard on the screen, or damages may be caused.
- Do not overload the robot or put open-flame stoves or any flammable solid, gas, or liquid on the tray.
- Do not adjust the load when the robot is moving. It is only allowed after the robot is paused by touching the screen.
- Do not clean or maintain the robot when the power is on.
  Cables on the ground should be put away in advance to prevent the robot from dragging them. All sharp-edge objects (such as decoration wastes, glasses, nails) should be removed from the ground to prevent damage to the robot chassis.
- A maximum speed of 0.8m/s is recommended for safe operation. No playing is allowed in front of the robot to avoid unnecessary harm. Although the robot features automatic obstacle avoidance, there is a blind spot. Blocking the robot moving at a high speed may cause accidents.
- Delivering soups is not recommended without special customization. If the soup is delivered, stay alert to spilling and scalds. Give way to robots delivering hot tableware and soup pots to prevent collisions and scalds.

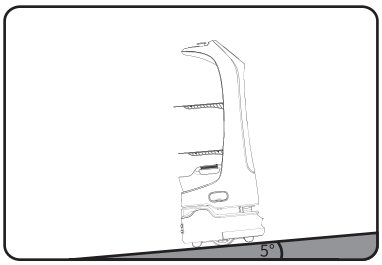
1.2 Environmental Instructions

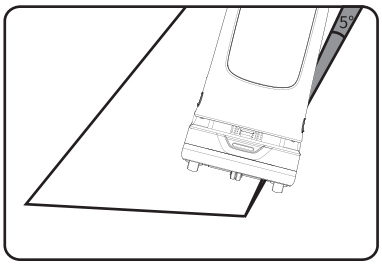
- This robot is suitable for use in flat grounds, such as wood floors, ceramic tiles, and thin carpets, and not suitable for environments that come with steps, large slopes, and are too compact.
- It is not recommended to use the robot on any ground that is wet or with obvious standing water.
- Put away any wire or other objects on the ground to prevent the robot from being tripped or dragging them around.
- Using this product with obvious protrusions, such as thresholds, on the ground may cause dishes to be spilled. Make sure that the protrusions are no more than 0.5cm high.
- The aisle should be at least 0.55m wide for the robot to pass. In the case of a long aisle, a width of 0.6m is recommended for smooth moving. A width of 1.6m allows two robots to move in two directions (The required width depends on the technician’ s evaluation of the scene).



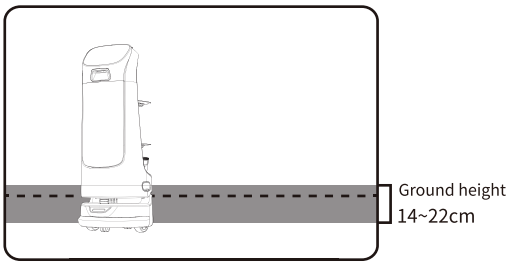


- The maximum possible slope is 5° for the robot. To prevent spilling, the suggested slope should be less than 4°, and the limit of 5° should not be exceeded. To prevent sliding, the robot should not be paused when moving uphill. To prevent falling, the slope should be at least 0.8m wide, and the roll angle should not exceed 5° .

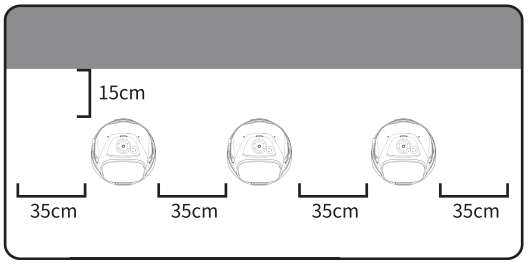




- Rails or other protective structures should be put in place at the edge of stairs, the entrance of downward slopes, and other locations where the robot may fall.
- Things that are black (for example, skirting line), polished (for example, wall), or transparent (for example, French window) at a height of 14 to 22cm or below may interfere with the radar and cause abnormal moving of the robot. Such sites should be modified to allow proper radar reflection (e.g., posting stickers).



- The kitchen entrance should be at least 1.2m wide, otherwise, robots and the staff may block each other.
- Robots in the waiting area should be 35cm apart from each other, 15cm from the back wall, and 35cm from the sidewall.



1.3 Instructions on Power Supply and Power Usage

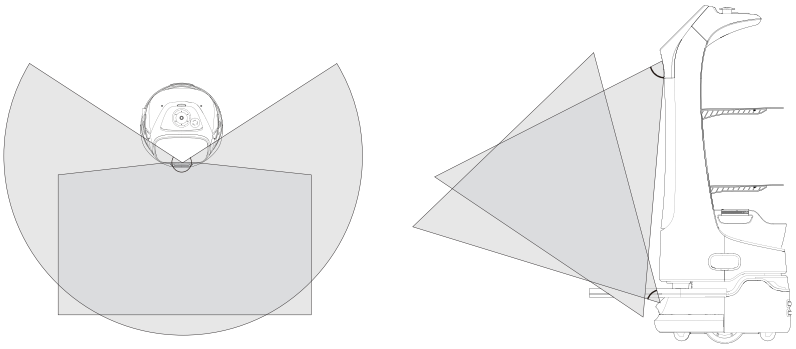
- Please charge the battery to 100% when you start to use the robot for the first time.
- When the battery drops to 20%, the robot should be charged timely. Running at a low battery for a long time may impair battery life.
- When the battery is fully recharged, the cable should be timely disconnected.
- If the robot is not going to be used for a long time, power it off in time so as to protect the battery.

- Always use exclusively original rechargeable batteries and chargers. Do not charge your robot using non-original chargers.
- Charge the robot according to the power voltage indicated on the charger nameplate.
- Make sure that the power voltage matches the voltage indicated on the charger, or it may cause damages to the charger.
- Take care to protect the power cord from being pulled or pinched.
- Someone should be designated to take over the charging. Unwatched charging of the robot or batteries is forbidden.
- Robots should not be charged in locations near flammable and explosive materials.
- Robots should be stored and charged in a dry location with a constant temperature no higher than 40°C . Both the robot and the charger should be protected from water.
- The charger should be protected from collision damage.
- In the case of abnormal charging currents or any other damage, replace the charger immediately.
- When the robot sends an alarm, disconnect the charger immediately.

1.4 Safety Instructions

- Do not put open-flame stoves or any flammable solid, gas, or liquid on the tray.
- Do not clean or maintain the robot when the power is on.
- A maximum speed of 0.8m/s is recommended for safe operation. No playing is allowed in front of the robot to avoid unnecessary harm.
- Do not adjust the load on the tray when the robot is moving. It is only allowed after the robot is paused by touching the screen.
- When the robot arrives at the designated table, wait until the robot stops completely before you serve the food or do something else. This is to avoid any food loss and personal injury caused by accidental collision.
- If the robot walks randomly, operations on the screen do not work, or any other emergency occurs, press the emergency stop switch.
- Cables on the ground should be put away in advance to prevent the robot from dragging them.
- Use All sharp-edge objects (such as decoration wastes, glasses, nails) should be removed from the ground before use to prevent damage to the robot chassis.
- Do not pull or transport the robot while it is working. If you need to do so, tap on the screen to stop it from moving first.
- Do not spill any liquid into the product.
- Do not place any non-transportable objects (including children and pets) on the robot, regardless of whether the robot is stationary or in motion.
- Although the robot features automatic obstacle avoidance, blocking the robot abruptly from moving at a high speed may cause accidents.

- The robot is equipped with a downward sensor, and the recognition area is as shown in the figure below:



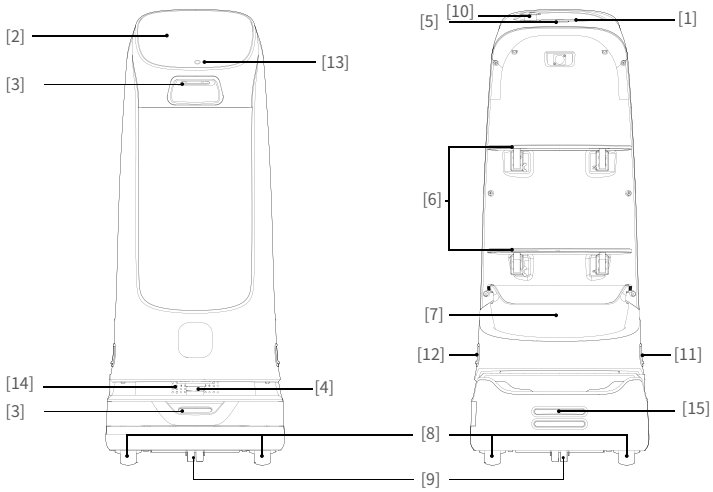
* The features are updated from time to time. More information on the features can be found at www.pudurobotics.com.

2. In the Box

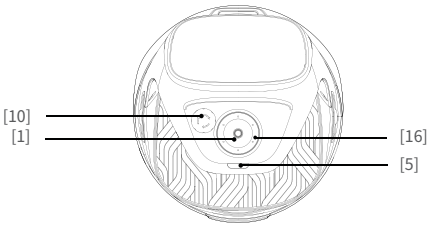
2.1 Packing List

Robot × 1, KettyBot User Manual × 1, Certificate × 1, Warranty Card × 1, Charger × 1, QR Code Stickers × 100, Power Key × 2.

2.2 Components

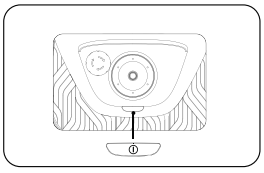


Front View　　Back View

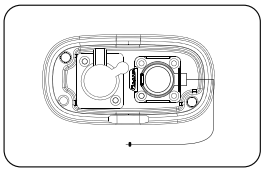


Top View

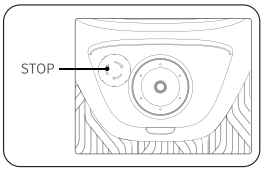
[1] Visual sensor
[2] Screen
[3] Depth Sensor
[4] Laser Radar
[5] Power Switch
[6] Tray
[7] Collection Box
[8] Driving Wheel
[9] Auxiliary Wheel
[10] Emergency Stop Switch
[11] Charging Port
[12] Key Switch
[13] Front camera
[14] Audio equipment
[15] Rechargeable pole
[16] Microphone array



Power Button



Charging Cable

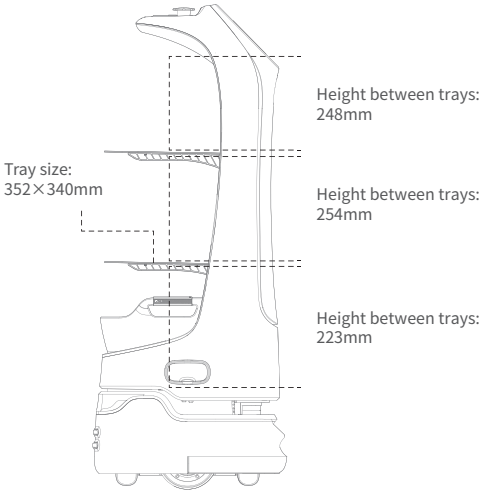


Emergency Stop Switch

2.3 Specifications

Feature	Description
Model	PNT
Working voltage	DC 23-29V
Power input	AC 100-240V, 50/60Hz
Power output	29V-8A
Charging time	4.5h
Battery life	>8h
Cruise speed	Adjustable between 0.5~0.9m/s
No. of trays	Two trays+one storage basket
Tray load	10kg/tray
Climbing angle	Max 5°
Machine material	ABS/Aviation Grade Aluminum Alloy
Battery capacity	25.6Ah
Robot weight	38kg
Robot dimensions	435*450*1120 (mm)
Screen size	10.1-inch HD color touch screen
Speaker power	2 × 20W stereo speakers
Design life span	5 years
Working temperature	0~40°C
Storage temperature	-10~60°C
Charging mode	Charging with manual charging, automatic self-charging supported
Working humidity	Relative humidity 0~95% (without condensation)
Ad screen size	409.8mm*230.4 mm
ESP32	Frequency range: 2.4 GHz ~ 2.5 GHz
WIFI	2.4G, Frequency range: 2.400 GHz ~ 2.497 GHz (2.4 GHz ISM Band); 5G, Frequency range: 4.900 GHz ~ 5.845 GHz (5.0 GHz ISM Band)
Working altitude	Below 2000m
Working environment	Indoor environment, flat and smooth ground
IP grade	IP20

2.4 Tray Size and Height between Trays



3. How to Use

3.1 Charging Instructions

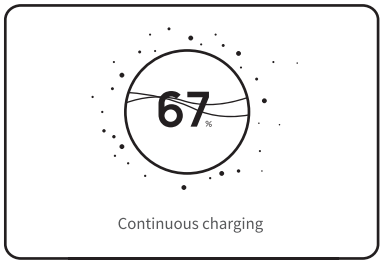
How to charge:

Plug the charging cable into the charging port of the robot. When successfully connected, the robot will display a prompt.

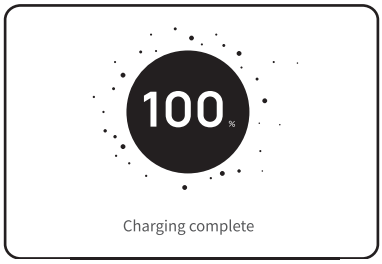
Notes for charging:

1) To maximize the efficiency and battery life of the robot, always keep the battery level above 10%.
2) A battery level lower than 10% means that the robot will soon run out of power and needs to be charged as quickly as possible.
3) A battery level lower than 2% means that the battery is under protection. In this case, the robot will be unable to perform tasks and must be charged before it can be used again.

3.2 Charging screens



This screen appears indicating the robot is charging.

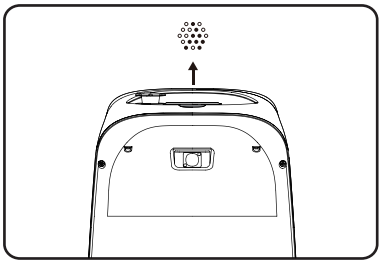


This screen appears indicating the charging cycle is complete and the battery is fully charged.

3.3 Power On, Shut Down, Pause, and Start

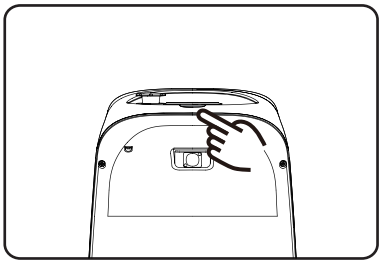
Before power on

Before turning on the power, place the robot below the visual mark, verify that the key switch is turned on.



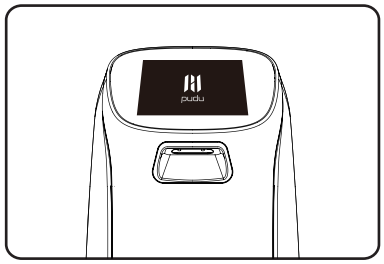
Power on

Press and hold the power button for about 0.5 seconds, and the bottom light strip will appear in blue.



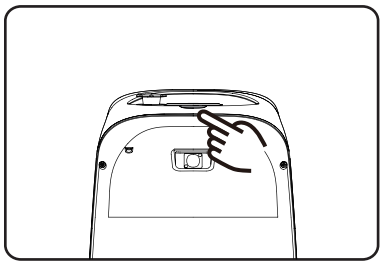
Powering on

The screen enters the working mode, indicating that the robot is successfully powered on.



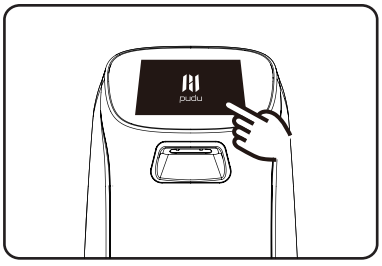
Power Off

Press and hold the power button for 3 seconds, and the screen will indicate the robot is shutting down. The screen turns black, indicating a successful shutdown. Press and hold the power button for 8 seconds, and the robot can be forcibly powered off and shut down. (This function is not recommended unless anything abnormal happens to the robot.)



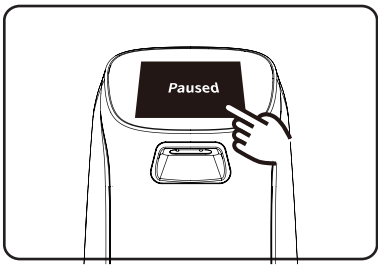
Pause

When the robot is moving, touch the screen to pause the robot.



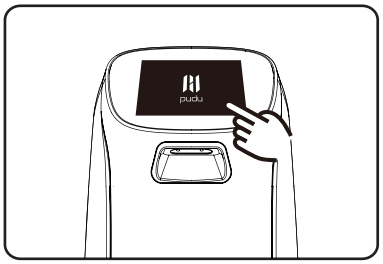
Paused

The screen shows “Paused”.



Start

Touch the screen again for the robot to move again. Paused robots will automatically resume moving if there are no operations in 10 seconds (Cruise Mode) or 10 seconds (other modes).

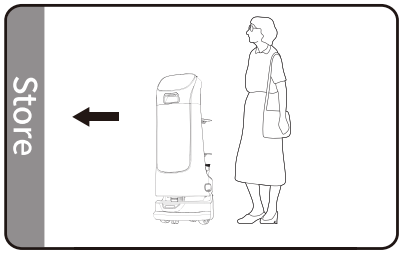


3.4 Mode Options

* The Queuing Mode is only available on robots within mainland China.

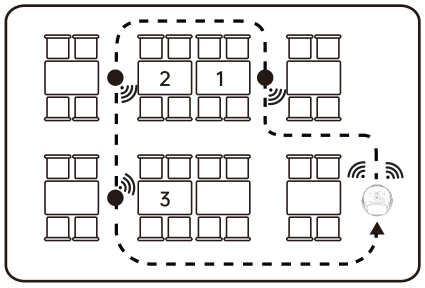
Customer Attraction Mode:

The robot can sense passers-by in the attraction area and play speech to attract customers. Customers can talk to the robot, view information such as discounts and special dishes, and choose to be led by the robot to the restaurant.



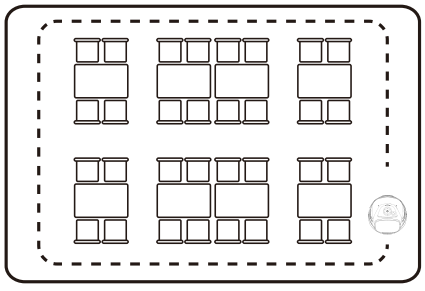
Escorting Mode:

The robot can sense passers-by in the attraction area and play speech to attract customers. Customers can talk to the robot, view information such as discounts and special dishes, and choose to be led by the robot to the restaurant.



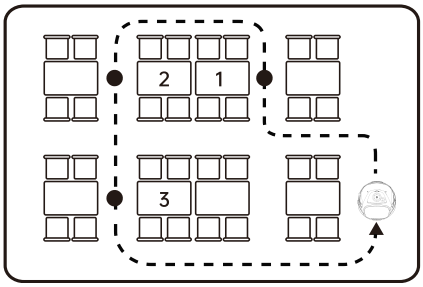
Cruise Mode:

The robot circulates along a predetermined path with self-service drinks, desserts or napkins, and recommends them to customers by voice. You can also turn on the interaction switch to make the robot cruise around the door to attract customers.



Delivery Mode:

The robot delivers food to multiple tables at the same time. After the dishes ordered by different customers are placed on the trays and the table numbers are entered, the robot automatically plans the best route for delivery. After that, the robot automatically returns to its home base.

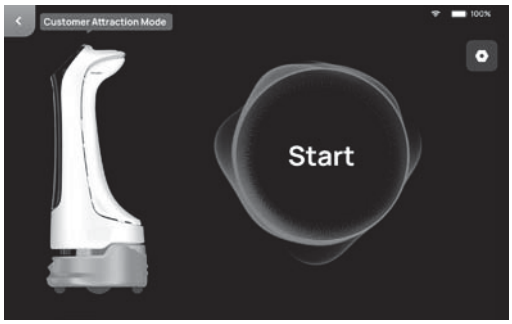


Birthday Mode:

The robot delivers birthday cake or gifts to guests, with a birthday song automatically played during delivery.

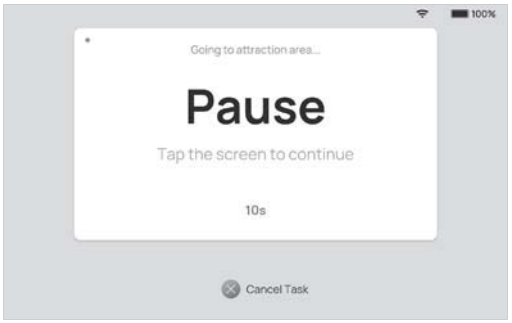
3.5 Customer Attraction Mode

The robot stands at the door to attract potential customers, talks to them about what’ s unique about its restaurant, and finally persuades them into dining here.



1. Select Customer Attraction Mode on the home screen.
2. On the Customer Attraction screen that appears, tap Settings to select a location for customer attraction and compose the speech.
3. Tap Go, and the robot will go to the location and start attracting customers proactively.

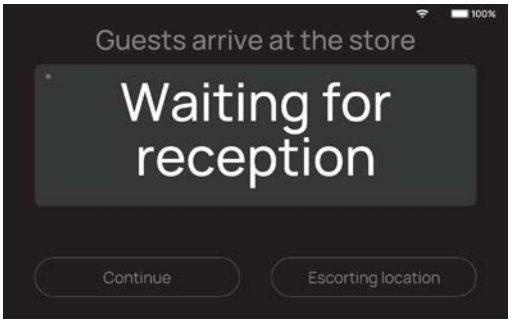
4. Tap on the screen to pause the task, and tap again to resume. You can also select Cancel Task to cancel the task.



5. Upon arrival at the specified location, the robot plays the speech and automatically switches to the interaction screen when it detects someone coming near.

6. Customers can talk to the robot, check the special dishes, and choose to be led by the robot to the restaurant.

7. When it has led the guests to the store, the robot can go back to attract more customers or escort the customers to their table.

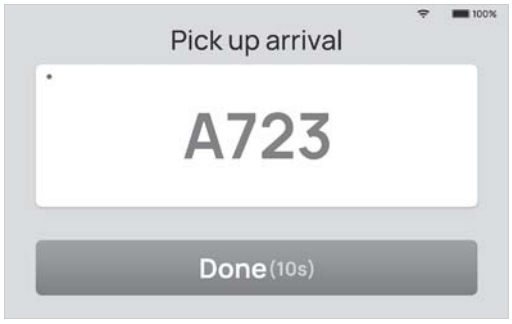


3.6 Escorting Mode

This mode is used to get the robot to escort customers to their table. Perform the following steps Escorting Mode:

1. Select Escorting Mode on the home screen.
2. Tap the table number that requires escorting, and the robot plays the escorting speech and leads the guests to their table.

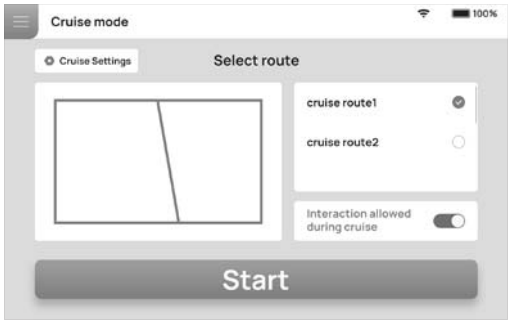
3. Tap on the screen to pause the task, and tap again to resume. You can also select Cancel Task or Return to Escorting Location.



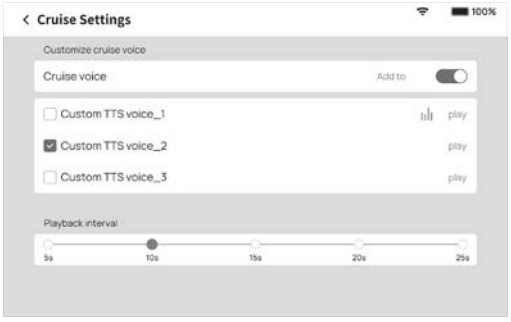
4. Once the customers sit down, tap Done for the robot to return to the escorting location, or the robot automatically returns in 10 seconds.

3.8 Cruise Mode

A commonly used mode in which the robot cruises in a specific environment, gives away snacks, or attracts customers. Perform the following steps for the Cruise Mode:
1. Select Cruise Mode on the home screen.



2. Select an automatic cruise route. After the interaction switch is turned on, the robot can lead customers to the restaurant during the cruise.



3. For cruise settings, you can set the cruise speech and interval.
4. Select Go, and the robot starts cruising.

3.9 Delivery Mode

A commonly used mode in which the robot makes task-based delivery to designated locations. Perform the following steps for Delivery Mode;
1. Select the delivery function on the home screen.

2. Put the dishes on the tray.
3. Tap the tray which holds the dishes, and select the desired table number. The top tray is automatically selected by default, simply select the desired table number.
4. Tap Go, and the robot starts performing the task.

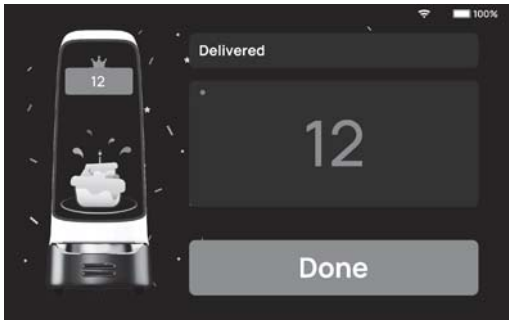
5. The robot quickly arrives at the designated location by moving along the predetermined path. During delivery, touch the stop command on the screen and the robot will immediately stop and wait. If the command is not touched again in 10 seconds, the robot will restart to continue the task.

3.10 Birthday Mode

Deliver gifts and play birthday songs for customers who are celebrating their birthdays. Perform the following steps for Birthday Mode:
1. Select Birthday Mode on the home screen.

2. Place the gift on the tray, and the gift can only be delivered to one location at a time.
3. Select the desired table number.
4. Tap Go, and the robot starts performing the task. The robot plays songs in the set playlist for Birthday Mode.
5. The robot quickly arrives at the designated location by moving along the predetermined path. During delivery, touch the stop command on the screen and the robot will immediately stop and wait. If the command is not touched again in 5 seconds, the robot will restart to continue the task. On the paused screen, you can Modify Task, Pick Up in Advance, Cancel All, and Return.

6. Tap Done upon arrival at the designated location, and the robot will return to the pickup location.



3.11 Warning Prompts

If any of the following circumstances occurs, the robot will stop working and sound an alarm, and certain prompt messages will appear on the screen. The robot will need your help at this point.

Prompt	Solution
Low battery	Push the robot back for charging (Figure 1)
Loss of location information	Move the robot below the visual mark (Figure 2)
Driving or auxiliary wheel stuck or entangled	Clean the driving or auxiliary wheel
Suspended, off the ground	Place the robot on flat ground

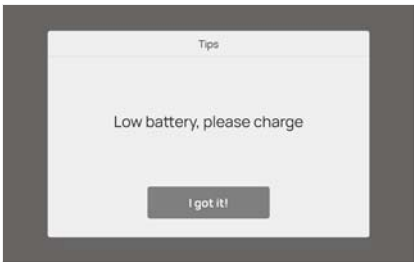
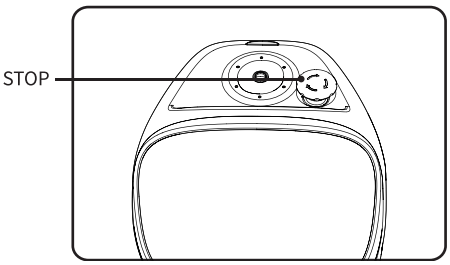


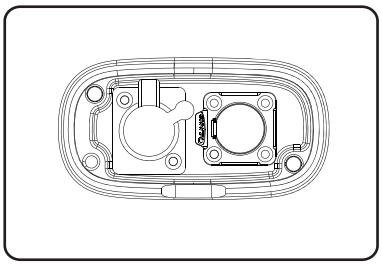
Figure 1

Figure 2

3.11 Emergency Handling

When the robot is not working properly or in any other emergency that may cause harm to the surrounding environment, you can stop the robot by pressing the emergency stop switch on the top.

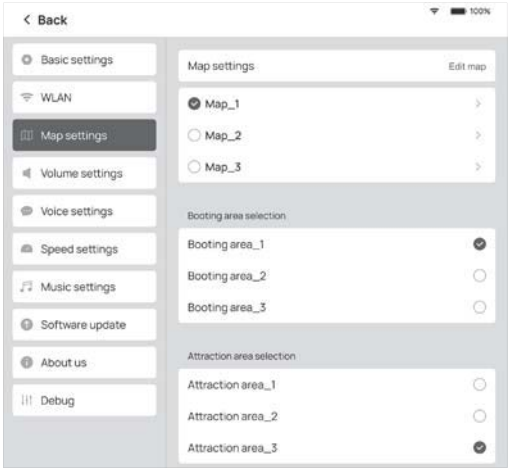




4.Service Features

4.1 Map Settings

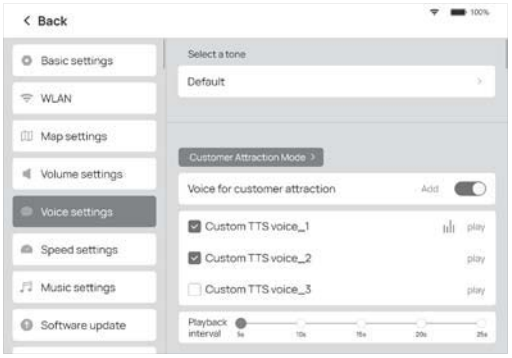
Map Settings enable multiple map selection. When the robot is in one-to-one mode, set a docking location for the selected map.



4.2 Voice Settings

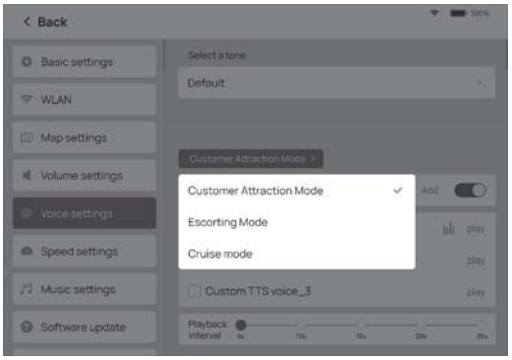
Voice Settings provide voice pack replacement and voice custom settings. The voice pack can be replaced by doing the following:

1. Check for available voice packs, select and download a voice pack.
2. After the download completes, select the desired voice pack to replace the old one.
3. Selecting Default will reset the robot back to its default voice pack.
4. Tap and hold the voice pack to delete it.



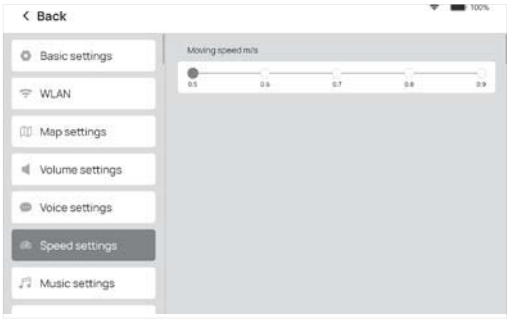
Customize the cruise voice by performing the following steps:

1. Select Add Voice, and the voice text editing window appears. Enter the text to be played, and tap OK to generate a custom voice.
2. You can add multiple voices, which will be played in random order.
3. Turn off the cruise voice switch to restore the default voice pack.
4. Tap on a voice to play it, and tap and hold a voice pack to delete it.



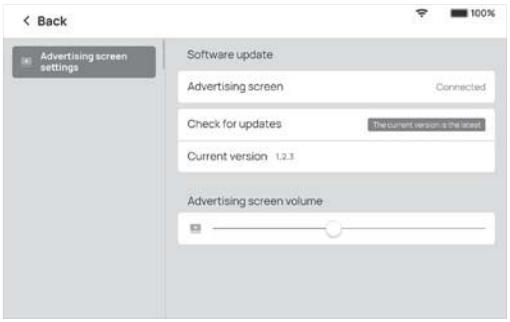
4.3 Speed Settings

Set the delivery speed and cruise speed with the options of 0.5m/s, 0.6m/s, 0.7m/s, 0.8m/s, and 0.9m/s.



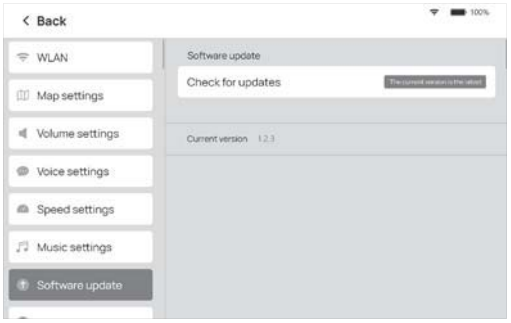
4.4 Advertising Screen Settings

The advertising screen setting function can view the current status of the advertising screen and adjust the volume of the advertising screen.



4.5 Version Update

Check which version is currently installed and whether it is the latest version. If it is not the latest version, you can check for, download, and update to the latest version.



4.6 Docking Instructions

Three docking modes are available for different sizes of restaurants.

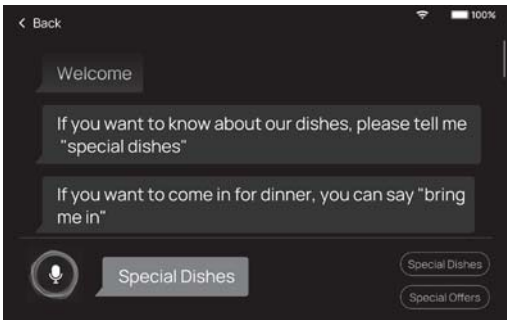
1. One-to-one docking mode: Set a fixed docking location for each robot.
2. Free docking mode: Set multiple locations for the robot to dock by priority.
3. Waiting mode: Apart from the abovementioned docking locations, you can also set a temporary docking location for robots to wait before a vacancy appears. When the robot docks at a non-docking location without a task, you may select the return command to make the robot automatically return to the docking location, or push it to the docking location.

* When the robot is in a temporary docking location, its state is shown as “Temporarily docked”. Once a vacancy appears in the pickup area, it will automatically go there for docking.

4.7 Voice Interaction

When the robot is in attracting customers, cruising (interaction turned on), you can tap on the screen or use wake-up voice to activate voice interaction with the robot.

1. Internet connection is required for voice interaction.
2. Entered voices will be displayed in text on the screen.
3. Responses of the system will be played in voice and displayed in text on the screen.
4. Tapping on the screen to start or end voice interaction will end voice wake-up. If no interaction occurs for a period of time, the system will automatically exit.



4.8 Automatic Self-charging

1. Automatic self-charging is supported (charging pile to be purchased separately).
2. You can also move the robot to the charging file, and tap “Charge Now” on the screen for a charge (as shown in the figure):

5. Maintenance and Care

5.1 Trays, Driving Wheel and Auxiliary Wheel

Keep the trays tidy; inspect and clean them at least once a week. Wipe the robot with a clean cotton cloth. When the bottom of the wheel is entangled or has some debris stuck on it, lift the robot to clean it up.

5.2 Sensor Care

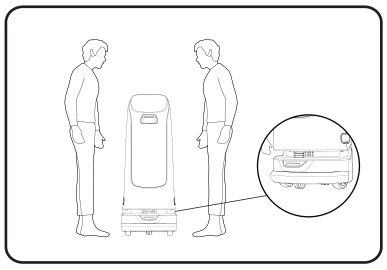
The top positioning sensor and the 3D obstacle avoidance sensor should be inspected and cleaned at least once a week. In case of unexpected contamination, make sure to address it immediately to avoid blocking the sensor and prevent the robot from working improperly. Use soft tissues or other lens cleaning supplies for the cleaning.

5.3 Robot Care

Keep the robot clean and wipe it with a clean cotton cloth. Do not lift, climb on, hit, push, or attempt to break off the robot, and pile any sundries on it. In case of malfunction, do not remove the screws or open the cover for repair without Pudu’ s permission or guidance.

5.4 Transporting the Robot

The robot should be transported following the GB/T 4857.23-2012 Requirements for Road Transportation with Steel Spring Damping Trucks and using a forklift or other transportation tools. The robot is a valuable device, so make sure to transport it as instructed in the following figure. You can lift the robot from the force-bearing area above the base (as shown in the figure). Lift the robot on both the left and right and keep it balanced. Keep the robot upright during transportation. Never attempt to transport it by lifting the tray or the box.



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6. Troubleshooting

6.1 Power-on Self-test Fails

After verifying there is sufficient power, restart the robot below the positioning mark. If the self-test still fails, please contact our after-sales service team for help.

6.2 Robot Stops During Operation

1. Tap on the screen to show the pause page indicating the operation is paused. Tap again to resume operation.
2. After hearing the voice prompt “Excuse me”, tap on the screen to pause the robot. Then, align the robot to the path, and tap again to continue.

6.3 “Loss of Signal” Warning

The message “I’m lost. Please push me directly below the positioning mark.” appears on the screen. At this time, the robot will issue a voice prompt for help. Please push the robot directly below the positioning mark.

6.4 Robot Cannot be Powered On

1. Check if the emergency stop switch is pressed or damaged. If it is damaged, contact our customer service team for help.
2. Check if the robot is out of power. If so, charge the robot by connecting it to an adapter.
3. For other reasons, please contact our customer service team for help.

7.After-sales Service

7.1 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.

7.2 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.

7.3 Contact

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

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.

To maintain compliance with FCC's RF Exposure guidelines, This equipment should be installed and operated with minimum distance between 20cm the radiator your body: Use only the supplied antenna.

Industry Canada compliance statement

CAN ICES-3(B)/NMB-3(B)

English:
This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:
1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

French:
L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique 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;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Manufacturer's Name: SHENZHEN PUDU TECHNOLOGY CO., LTD.
Address: Room 501, Building A, Block 1, Phase 1, Shenzhen International Inno Valley, Dashi 1st Road, Nanshan District, Shenzhen, China 518057
Product name : KettyBot
Model number: PNT
Operating Temperature: 0° C to 40° C
This device in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU. All essential radio test suites have been carried out.

1. The product shall only be connected to a USB interface of version USB 2.0
2. Adapter shall be installed near the equipment and shall be easily accessible.
3. The plug considered as disconnect device of adapter
4. The device complies with RF specifications when the device used at 20cm form your body
5. Operations in the 5.15-5.35GHz band are restricted to indoor usage only.

Restrictions in the 5 GHz band:

According to Article 10 (10) of Directive 2014/53/EU, the packaging shows that this radio equipment will be subject to some restrictions when placed on the market in Belgium (BE), Bulgaria (BG), the Czech Republic (CZ),Denmark (DK), Germany (DE), Estonia (EE), Ireland (IE), Greece (EL), Spain(ES), France (FR), Croatia (HR), Italy (IT), Cyprus (CY), Latvia (LV), Lithuania(LT), Luxembourg (LU), Hungary (HU), Malta (MT), Netherlands (NL), Austria(AT), Poland (PL), Portugal (PT), Romania (RO), Slovenia (SI), Slovakia (SK),Finland (FI), Sweden (SE), Turkey (TR), Norway(NO), Switzerland (CH), Iceland (IS), and Liechtenstein (LI).

According to Radio Equipment Regulations (SI 2017/1206), the packaging shows that this radio equipment will be subject to some restrictions when placed on the market in the United Kingdom (UK)

The WLAN function for this device is restricted to indoor use only when operating in the 5180 to 5240 MHz frequency range.

ES	LU	RO	CZ	FR
HU	SI	DK	HR	BE
BG	DE	EE	IE	EL
IT	CY	LV	LT	SK
MT	NL	AT	PL	PT
FI	SE	LI	TR	NO
CH	IS			

UK

RF POWER

Function	Operation Frequency	Max RF outputpower:	Limit
BLE	2402MHz–2480MHz	5.96dBm	20 dBm.
BT(BR+EDR)	2402MHz–2480MHz	8.49 dBm	20 dBm.
WIFI 802.11b/g/n(HT20,HT40) 2.4G	802.11b/g/n(20MHz): 2412~2472MHz; 802.11n(40MHz):2422~2462MHz	17.48 dBm	20 dBm.
5.2G WIFI 802.11a/n(HT20,HT40)	802.11a/ac/n20:5180~5240MHz; 802.11ac40/n40:5190~5230MHz; 802.11ac80：5210~5210MHz	12.81dBm	23 dBm.
5.3G WIFI 802.11a /n(HT20,HT40)	802.11a/ac/n20: 5260~5320MHz; 802.11ac40/n40: 5270~5310MHz; 802.11ac80:5290~5290MHz	12.65 dBm	23 dBm.
5.6G WIFI 802.11a/n(HT20,HT40)	802.11a/ac/n20: 5500~5700MHz; 802.11ac40/n40: 5510~5670MHz; 802.11ac80:5530~5610MHz	13.35 dBm	23 dBm.
5.8G WIFI 802.11a/n(HT20,HT40)	802.11a/ac/n20: 5745-5825 MHz 802.11ac40/n40: 5755-5795 MHz 802.11ac80:5775~5775MHz	13.85 dBm	13.98dBm
WCDMA Band 1	Tx(Uplink): 1920MHz~1980MHz; Rx(Downlink): 2110MHz~2170MHz	23.56dBm	Class3 24 (dBm) +1,7/-3,7 (dB)
WCDMA Band 8	Tx(Uplink): 880MHz~915MHz; Rx(Downlink): 925MHz~960MHz	23.43dBm	Class3 24 (dBm) +1,7/-3,7 (dB)
FDD-LTE Band 1	Tx(Uplink): 1920MHz~1980MHz; Rx(Downlink): 2110MHz~2170MHz	23.49dBm	Class3 23 (dBm)+2.7/-2.7(dB)
FDD-LTE Band 3	Tx(Uplink): 1710MHz~1785MHz; Rx(Downlink): 1805MHz~1880MHz	23.96dBm	Class3 23 (dBm)+2.7/-2.7(dB)
FDD-LTE Band 7	Tx(Uplink): 2500MHz~2570MHz; Rx(Downlink): 2620MHz~2690MHz	24.33dBm	Class3 23 (dBm)+2.7/-2.7(dB)
FDD-LTE Band 8	Tx(Uplink): 880MHz~915MHz; Rx(Downlink): 925MHz~960MHz	23.45 dBm	Class3 23 (dBm)+2.7/-2.7(dB)
FDD-LTE Band 20	Tx(Uplink): 832MHz~862MHz; Rx(Downlink): 791MHz~821MHz	23.36dBm	Class3 23 (dBm)+2.7/-2.7(dB)
FDD-LTE Band 28	Tx(Uplink): 703MHz~748MHz; Rx(Downlink): 758MHz~803MHz	23.81 dBm	Class3 23 (dBm)+2.7/-3.2(dB)
TDD-LTE Band 34	Uplink & Downlink: 2010 MHz to 2025 MHz	23.32 dBm	Class3 23 (dBm)+2.7/-3.2(dB)
TDD-LTE Band 38	Tx(Uplink): 2570MHz~2620MHz; Rx(Downlink): 2570MHz~2620MHz	24.76 dBm	Class3 23 (dBm)+2.7/-2.7(dB)
TDD-LTE Band 40	Tx(Uplink): 2300MHz~2400MHz; Rx(Downlink):	23.25dBm	Class3 23 (dBm)+2.7/-2.7(dB)

	2300MHz~2400MHz		
This product can be used across EU member states.			

www.pudutech.com