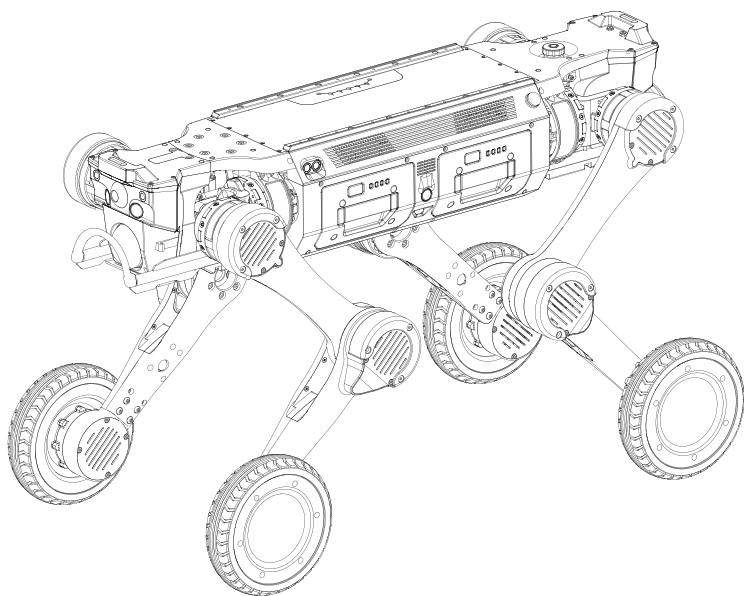


铜锤 M1

操作手册



版本号: V1.2

手册目的

- 用于指导铜锤 M1 的专业操作人员完成安装、调试、运行、维护等工作，保障设备安全稳定运行及操作人员人身安全。

适用范围

- 本手册适用的设备型号（铜锤® 系列）：ZSM-1

声明

- 在使用本产品及相关服务前，请务必仔细阅读并透彻理解本《操作手册》的全部内容。您实际使用本产品之行为，即视为已阅读、充分理解并同意接受本手册的全部条款，以及本公司后续可能对本手册内容所作的任何修订。如您不同意本手册的任何内容，请立即停止使用本产品及相关服务。
- 您理解并同意，为保障本产品功能的完整实现、服务的安全稳定运行、产品性能的持续优化及履行本手册所约定之义务，您在此明确、全面且不可撤销地授权本公司，依据本手册的规定，在整个服务周期内对由您或本产品产生的、与本产品使用相关的各类数据与信息进行收集、使用、存储、处理、分析及传输（以下简称“处理”）。本公司承诺将采用符合行业标准的安全技术及管理措施，切实保障相关数据的安全。
- 本手册所有内容（包括但不限于文字、图表、照片、技术参数等）及手册适用设备的知识产权均归智身科技（北京）有限公司（以下简称“智身”）所有，智身具有本手册适用设备的自主知识产权（包括但不限于品牌名称、产品名称、公司标识、产品外观、结构设计、控制软件等），受《中华人民共和国著作权法》《商标法》等相关法律法规保护。严禁任何单位或个人以任何形式（包括但不限于复制、摘抄、传播、改编、汇编）转载、传播本手册内容，同时严禁侵犯智身及本手册适用设备的自主知识产权，未经智身书面授权的转载行为及侵犯知识产权行为，智身将依法追究其法律责任。
- 智身不提供本手册未明确提及的任何保证，包括但不限于隐含的商业适销性保证、

前言 /

特定技术用途适配保证，亦不承诺设备功能可满足用户的全部个性化需求。

- 智身不保证设备在使用过程中“完美无缺、无任何故障或中断”，因设备本身技术局限性、使用环境差异、操作习惯不同等因素导致的轻微功能偏差，不属于质量缺陷范畴。
- 智身将尽最大努力提供设备售后支持，但不保证可修复所有设备缺陷，对于因技术迭代、配件停产等客观原因无法修复的故障，将按售后政策提供合理解决方案。
- 智身对产品的责任仅限于产品本身。无论何种情况，智身均不就本手册内容或设备使用过程，对用户承担直接损失（如设备故障导致的生产停滞损失）、间接损失（如第三方索赔、商业机会丧失等）的赔偿责任，除非该损失系因智身故意或重大过失导致。
- 本声明及手册所有条款的最终解释权归智身所有。智身有权根据法律法规更新、产品技术升级等情况，在不提前通知用户的前提下，对本声明条款及手册内容进行修改、改版或终止使用，更新后的条款自发布之日起生效。
- 用户必须在充分阅读本手册全部内容后，方可操作机器狗；操作过程中需严格遵循手册指引，尤其需重点关注并执行手册中带有“警示提示”（如  红色紧急警告、 橙色重要提醒）标识的条款，因未按手册操作导致的设备故障或人身伤害，智身不承担责任。
- 手册中的图表、照片仅为功能性示意，允许与实物在外观细节、部件排布上存在合理差异，具体以实际交付设备为准。
- 若用户发现手册内容存在遗漏、错误或与设备实际功能不符，需及时通过智身官方渠道（如售后热线、企业邮箱）反馈，智身将根据反馈情况评估是否更新手册。
- 禁止用户自行拆装、改造机器狗的任何部件（包括但不限于电池、电机、传感器、控制系统），凡因用户私自拆装、改造导致的设备故障、性能异常或安全事故，智身将终止该设备的保修服务，并有权拒绝提供后续技术支持。
- 用户有义务在安全、合法且可控的环境下使用本产品，并承诺遵守所有适用的法律法规，不得将本产品用于任何非法或未经授权的目的。

安全提示

- **适用人群界定：**铜锤 M1 为行业级机器狗，非玩具类产品，仅允许 18 周岁及以上、具备完全民事行为能力且经设备操作培训的人员使用；18 周岁以下人员禁止操作，也不得在无人监护的情况下靠近设备。
- **儿童安全防护：**若使用场景（如工厂车间、实验室）可能出现儿童误入，需提前设置物理隔离区（如加装防护栏、张贴“儿童禁止入内”标识）；若儿童不慎误碰设备，需立即按下急停按键切断设备动力，检查儿童是否受伤，同时将设备转移至儿童无法接触的区域，待确认安全后再重启操作。
- **手册阅读要求：**在进行设备操作、运输、日常保养、故障检修等任何操作前，必须完整熟读本操作手册，重点掌握“警示提示”章节内容（含红色紧急警告、橙色重要提醒标识条款）；若对操作流程存疑，需联系智身技术支持确认，禁止在未明确操作方法的情况下擅自操作。
- **开机前警示标识核查：**开机前需逐一检查机器狗机身各警示标识是否完整、清晰，若发现标识磨损、脱落，需立即联系智身补发并重新粘贴；同时确认标识所示风险区域（如狗腿运动范围、轮足转动区域）无障碍物，避免开机后引发碰撞。
- **视线与安全距离要求：**遥控机器狗运行期间，操作人员需确保设备始终处于视线可及范围内，禁止在设备脱离视线后继续远程操控；同时需与设备保持安全距离——设备静止时距离 ≥ 2 米，移动或执行作业任务（如机械臂抓取、爬坡）时距离 ≥ 3 米，避免设备运动部件（如车轮、机械爪）意外触碰人体。
- **特殊场景安全防护：**当机器狗执行上下楼梯、爬坡、高台作业等高危动作时，严禁任何人员近距离站在设备正下方或运动轨迹下方；需在设备作业区域周围设置警示带，安排专人现场监护，若设备出现卡顿、倾斜等异常，立即按下急停键，待设备稳定后再评估是否继续作业，禁止在设备未停稳时靠近救援。
- **异常情况应急处理：**若机器狗在运行中出现剧烈晃动、失控、异响等情况，需第一时间触发应急机制：优先按下遥控器“软急停”键，若软急停失效，立即跑到设备旁按下机身侧面的“硬急停”按键；设备停稳后，断开电池供电，检查设备运动部件、控制系统是否故障，未排除故障前禁止重启。
- **双电池使用与低电量保护：**设备支持双电池热插拔功能，可单电池独立供电；当机

前言 /

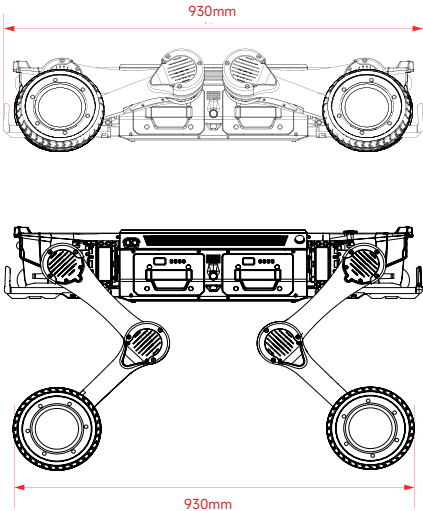
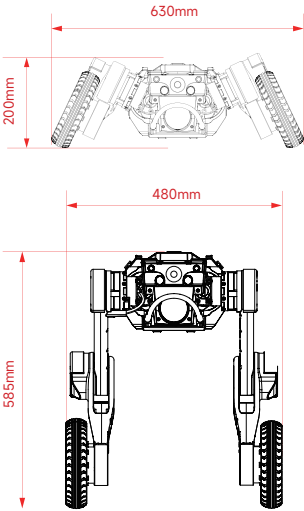
器狗上的每块电池电量显示仅剩 1 格（通过电池指示灯或配套 APP 查看）时，必须立即停止作业并关机，按照“先关闭电池，再拔出电池”的顺序取出电池充电，禁止在低电量状态下继续运行，若电池电量耗尽导致机器狗工作过程中自动关机，可能造成机器狗、电池等损坏，此类损坏不在保修范围内。

- **机器狗关机操作：**执行机器狗关机操作时，需先通过遥控器 APP 执行“趴下”指令（确保设备腿部完全贴合地面，机身处于稳定状态），待设备姿态锁定后，长按电池侧面的电源键 3 秒至指示灯熄灭，确认设备完全断电后再拔出电池；严禁在设备未趴下时直接关机，以避免机器狗断电造成摔伤，降低使用寿命。
- **充电设备限制：**仅允许使用智身原厂配套充电器，禁止使用第三方充电器、非标准电源（如自制变压器、大功率拖线板串联供电），否则可能导致电池过充、鼓包，甚至引发火灾。
- **充电环境要求：**充电时需将电池与充电器放置在通风干燥的水平平面上（如木质工作台，禁止放在地毯、沙发等易燃物品表面），充电器与电池周围 1 米内不得堆放纸张、布料、酒精等易燃物，且远离明火与高温源等危险环境。
- **充电时长控制：**单 / 双电池充电时长 ≤ 2 小时（电池电量从 1 格充至满电），最长充电时间不得超过 6 小时，当充电器指示灯全部常亮后，需在 30 分钟内拔除充电器与电池的连接，禁止长期插电过充。
- **温湿度工作范围：**设备需在指定温湿度范围内工作（ -20°C - 55°C ），操作人员需通过设备显示屏实时监测环境温湿度；若设备在超出该范围的环境下运行，可能造成设备部件永久性损坏，此类损坏不在保修范围内。
- **禁忌环境管控：**禁止在爆炸性环境（如存放易燃易爆气体、粉尘的仓库）、腐蚀性环境（如化工车间、酸碱溶液存储区）、高粉尘环境（如矿山作业面）中开机或运行设备；若违反此规定，导致设备外壳腐蚀、内部电路短路，或引发环境爆炸、污染等事故，智身概不承担设备维修责任及环境损害赔偿責任，相关后果由操作人员及所属单位自行承担。
- **对于因您违反上述安全提示、操作不当或重大过失等直接或间接导致的任何人身伤害、财产损失或数据丢失，本公司不承担任何责任。**

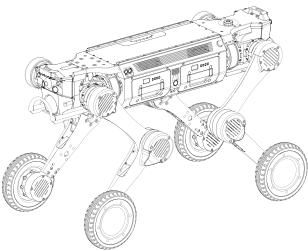
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1.1 产品概述

铜锤 M1 是一款轮足式仿生四足机器人，具备自重轻、负载大、续航长、防护强、运动灵活稳定等特点；机器狗每条腿配备 3 个关节电机和 1 个轮毂电机，支持轮足 / 点足更换；配备激光雷达、光学相机、超声波雷达、IMU、补光灯、RTK 模块等传感器，内部搭载高算力主控平台，用于实现运动控制、自主导航定位、环境侦检等功能，提供丰富的供电和通信接口，支持多品类的任务载荷的扩展。



1.2 产品清单

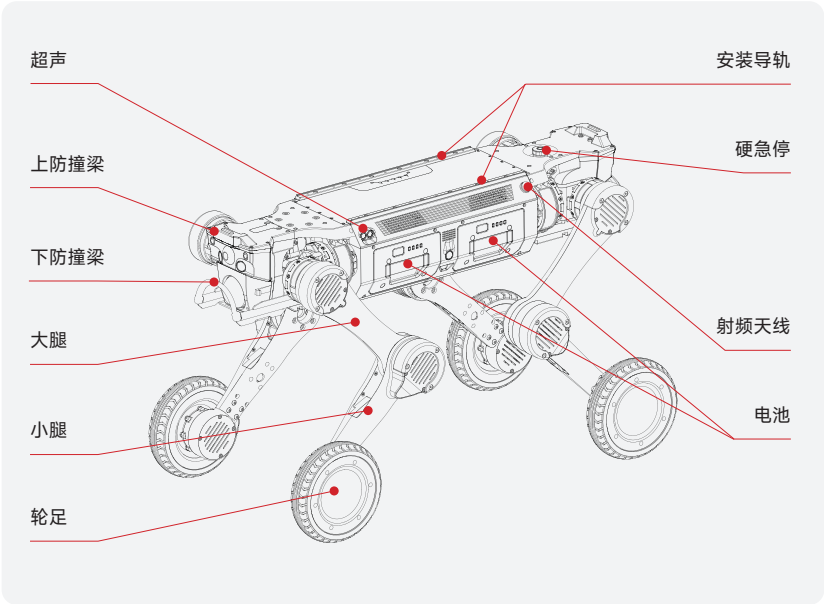


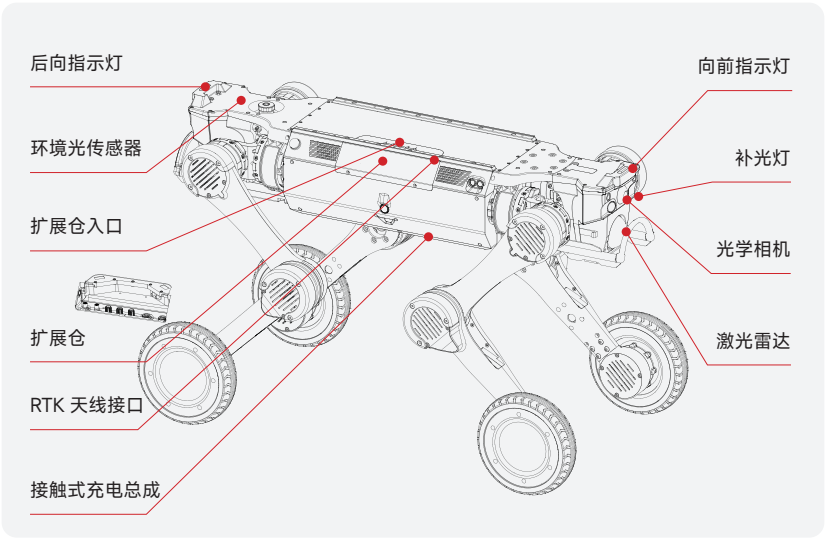
铜锤 M1 本体 ×1 (不含电池)



类别	名称	数量	单位
主件	机器狗本体	1	个
	遥控器 (G20 航模遥控器)	1	个
	电池	2	个
配件	航空包装箱 (含内衬)	1	个
	双电池充电座	1	个
	电源线	1	根
	维保工具配件	1	个
	航空插头线包	1	套
	操作手册	2	份
	合格证	1	份
	装箱清单	1	份

1.3 部件名称





1.4 核心规格

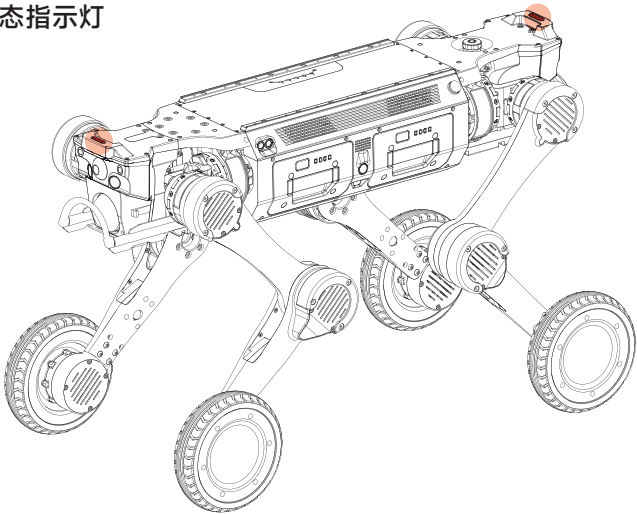
基本信息	产品型号	M1
	材质信息	铝合金 + 高强度工程塑料
	站立尺寸 (长 × 宽 × 高)	930mm*480mm*585mm
	趴地尺寸 (长 × 宽 × 高)	930mm*630mm*200mm
	整机重量 (含电池)	41kg
	电池重量	3.3kg/ 个
	轮足尺寸	8 寸
环境适应性	防护等级	IP67
	工作温度	-20℃ ~ 55℃
运动性能	自由度	12+4dof
	标配最大速度	6m/s
	稳定行走负载	30kg
	最大站立负载	150kg
	最大爬坡角度	45°
	持续攀爬高度 (楼梯)	25cm

运动性能	最窄通过尺寸	50cm
	垂直越障高度	80cm
电池参数	电池容量	54V, 9.35AH*2
	空载续航时间	5h
	满载续航时间	3.5h
	空载续航里程	29km
	满载续航里程	18km
	充电座输入电压	AC220V
	充电座输出电压 / 电流	DC63V, 最大充电电流 10A
	充电时长	单电池≤ 2h (充电座支持双电池同时充电)
传感器	激光雷达	2 个
	FPV 相机	2 个
	补光灯	4 个
	超声波雷达	2 个
	IMU	1 个
	RTK 模块	1 个
通信	WIFI 通信	支持
	射频通信	支持
	蓝牙	支持
算力主控	智驾主控	100TOPS 算力平台

※ 以上数据为实验室环境下的测试结果，与实际数据或有偏差。

1.5 灯效说明

1.5.1 状态指示灯



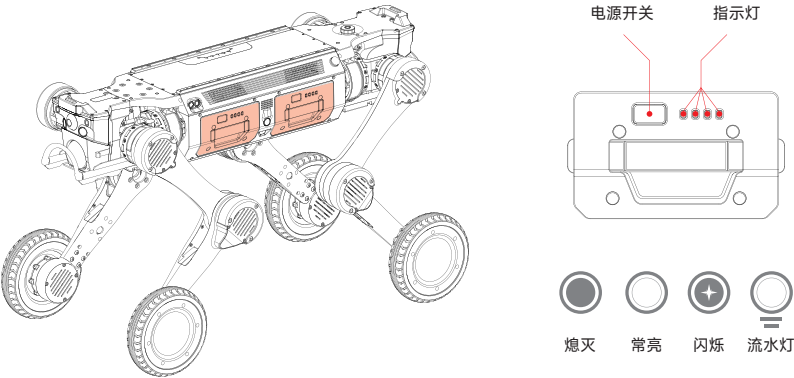
指示灯颜色	指示灯灯效	机器狗状态
白灯	慢闪	开机中
	常亮	手动控制 / 机器工作态
	呼吸	待机
绿灯	慢闪	定位中 / 自动回程中
	常亮	自动任务执行中
黄灯	快闪	告警态
	常亮	低电
红灯	快闪	故障态
	常亮	软急停
蓝灯	常亮	升级中
/	呼吸态	充电中（选配充电桩）



警示提示

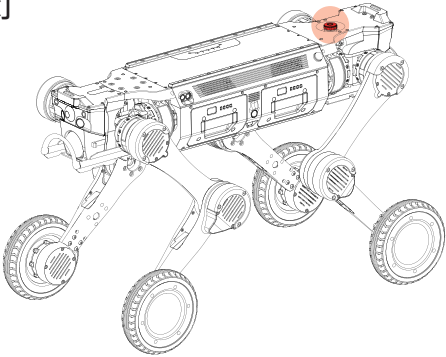
- 硬急停：硬急停触发后，指示灯红灯常亮。
- 前后向切换：机器狗切换前后向时，对应方向的状态灯白色频闪，然后前后指示灯全亮。
- 除前后主方向状态切换时，前后灯有差异，其他情况下前后灯一致。

1.5.2 电池指示灯



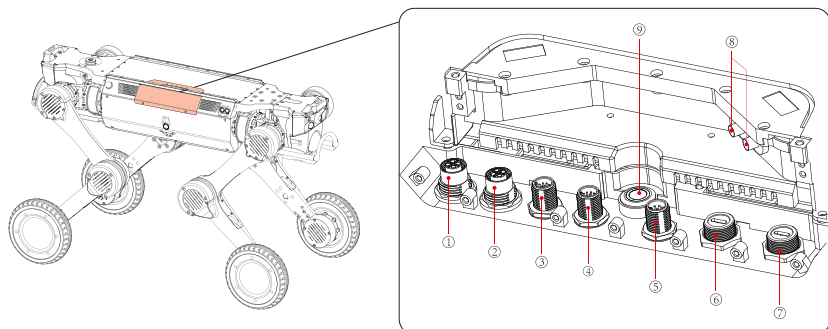
电池指示灯灯效	灯效说明	电量说明
○ ○ ○ ○	4 颗 LED 灯常亮	电量为 75%~100%
○ ○ ○ ●	前 3 颗 LED 灯常亮	电量为 50%~75%
○ ○ ● ●	前 2 颗 LED 灯常亮	电量为 25%~50%
○ ● ● ●	第 1 颗 LED 灯常亮	电量为 0%~25%
● ● ● ●	第 1 颗 LED 灯闪烁	电量为 0%
≡ ≡ ≡ ≡	4 颗 LED 灯依次点亮	显示充电中，满电后 4 颗 LED 灯常亮

1.5.3 急停指示灯



● 熄灭	硬急停未触发
○ 红灯常亮	硬急停被触发

1.6 扩展接口



序号	接口名称
①	48V (10A) x1
②	24V (20A) x1
③	24V (3A) + 网口, 1个
④	12V (5A) + 网口, 1个
⑤	串口 (RS232 x1、RS485 x1、SBUS x2、PPS x1)
⑥、⑦	USB3.0 (5V、1A) , 2个
⑧	RTK 天线接口
⑨	扩展仓电源按键



- 在机器狗后背加装设备时，设备的重心、位置、接口、走线等规划设计，请务必在正式加装之前咨询售后人员；
- 所有供电接口的供电总功率在 480W 以内；
- 航插头配备防护盖，以确保 IP67，不用的航插头务必盖好防护盖；
- 扩展仓电源按键用于控制扩展接口的供电，在进行上装接线时，务必先关闭扩展仓的电源。

1.7 运动模式

机器狗标配强化运动模型，具备原地模式、运动模式、巡航模式、登阶模式：

原地模式	该模式下，机器狗保持原地不动，机器狗躯干执行旋转、俯仰、高低等各种动作。
运动模式	能够自动适应平地、斜坡、楼梯、各类复杂路面（山地、林地、瓦砾碎石）； 能进行前进后退直线运动、进行原地旋转等运动； 可以执行站立、匍匐、卧倒、锁定等动作；执行爬高台、扭一扭等特技。
巡航模式	该模式下可创建地图，地图生成完成后，即可基于该地图启用定点巡航功能，实现自动化巡检与定点作业。
登阶模式	该模式下，机器狗可自主规划步态，在多级楼梯间稳健跨越，适用于多层空间作业。



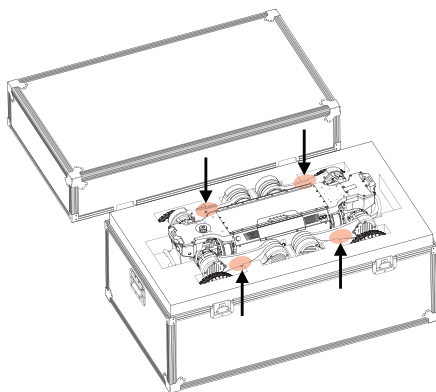
警示提示

- 机器狗在执行爬高台特技时，确保电量在 2 格电以上，同时确保机器狗空载。请保持机器狗在视线范围内，同时与周围人群保持 2 米以上的安全距离；
- 机器狗在楼梯、斜坡等路面时，请确保没有人在机器狗的正上方、正下方、行进轨迹上；
- 运动模式下，机器狗标配分为低速、中速、高速档，为了保证机器狗安全执行任务，在中速、高速档，限制机器狗执行左右平移和原地旋转等动作。

2.1 环境要求

- 操作者在进行开机操作之前，充分阅读本手册，熟悉机器狗的各类功能状态、操作细节、注意事项等；
- 初次操作尽量避免机器狗超出视线范围，并保证机器狗周围 2 米以内没有工作人员和障碍物，以避免碰撞；
- 温度要求：请在 -20°C ~ 55°C 的环境温度下应用机器狗；
- 天气要求：请勿在大雾天、雷雨天、沙尘暴、龙卷风等恶劣天气下开机工作；
- 电磁环境要求：尽量避免在强电磁干扰（高压电线、高压输电站、通信信号塔等）环境下，以避免强磁击穿；
- 通信环境要求：请勿在通信信号干扰环境下开机并遥控操作，以避免机器狗通信干扰，造成失联。

2.2 开箱



机器狗包装箱为航空箱，将包装箱放置在平整地面，方向向上，打开并移走包装箱上盖，将机器狗、电池、遥控器、充电座等依次搬出，放置在硬质平面上。



警示提示

- 搬出机器狗时，按照指示图抓住图示的搬运点，注意警示标签位置和内容，以避免在搬运过程中夹手、划伤；
- 搬运过程中对机器狗、电池、遥控器、充电座轻拿轻放；
- 搬运完成后，检查铜锤 M1 的急停按键、电池电源按键等未被触发。

2.3 启动前检查

A.外观与机械结构检查

- 整体外观完整性：检查机身外壳是否存在裂痕、变形或脱落，重点关注关节连接处、传感器保护罩等易受损部位；观察机身表面是否有明显污渍、液体残留或异物附着，尤其是散热孔、接口处。
- 关节与运动部件检查：逐一检查机器狗的腿部关节、轮足，确认关节活动是否顺畅，无卡顿、异响或松动迹象。轮足 / 点足需确认防滑纹路是否清晰，无开裂、脱落；确认关节处的螺丝、卡扣等紧固件无缺失、松动。

B.电池状态检查

- 电池外观：查看电池组外壳是否鼓包、漏液、破损，若出现鼓包可能是电池老化或过充，严禁使用，需立即更换，避免发生起火、爆炸风险。
- 电池连接：检查电池与机身的连接接口是否清洁，无氧化、锈蚀或异物，插合时需确保卡扣扣紧，避免接触不良导致供电中断。
- 电量检查：开机前可通过指示灯初步判断电量，至少有一个电池的电量在 2 格电以上，单击电池电源按键，即可显示电量；低电量状态下需先充电，避免开机后因电量不足导致中途停机，影响设备寿命。

C.环境感知传感器检查

- 光学传感器：检查摄像头、激光雷达的镜头是否清洁，无污渍、划痕或遮挡物。
- 距离 / 避障传感器：检查超声波传感器等避障部件的探头是否完好，无遮挡。

D.遥控器检查

- 检查遥控器的按键是否灵敏，无卡顿，电池电量是否充足（可通过遥控器指示灯判断），确保开机后能正常操控机器狗。
- 检查机身显示屏、指示灯、扬声器等反馈部件，确认显示屏无损坏、花屏，指示灯能正常亮起，便于开机后及时获取设备运行状态（如电量、故障提示）。

2.4 启动前准备

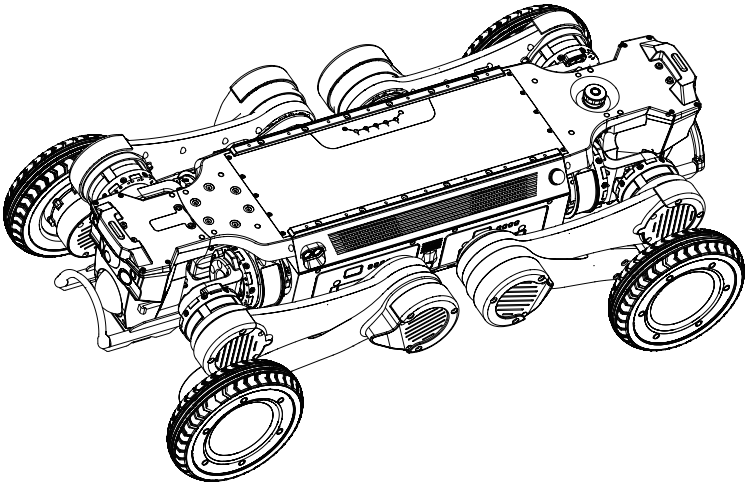
A. 安装电池

机器狗配备双电池仓，支持单电池供电、双电池供电两种模式，将两块电池对准电池仓的电池接口（有防插反设计），提拉电池的手带，将电池推入电池仓，到底后，松开手带，听到“咔嚓”声即卡扣锁紧。安装好后，检查电池安装状态，电池外面应与机器狗机身面处于平齐状态。

机器狗的标准使用条件为双电池应用，尽量避免单电池下工作。

B. 机器狗摆放

采用水平趴卧姿势，即腹部完全贴紧地面，腿部采用自然分列机身两侧，小腿呈最小收拢姿态，4个膝关节与轮足平放在地面上，确保没有大腿小腿没有被躯干压住。



2.5 启动及操作

A. 机器狗开机流程

机器狗开机过程即为电池开机过程，具体操作为：短按电池按键，激活电池，电池指示灯常亮显示电池电量，然后长按电池3秒，电池开启，机器狗启动，状态指示灯白色频闪代表启动中，白色常亮代表启动完成，机器狗进入到通用运动模式。

机器狗支持单电池供电、双电池供电两种模式，具体开机分为如下：

机器狗电池状态	开机流程
机器狗处于关机状态， 没有电池插入时	只插一块电池：直接插入开机后的电池，或者直接先插入关机的电池， 然后为电池开机，机器狗启动；
机器狗处于关机状态， 插入一块关机电池时	插入另一块开机电池，机器人启动；已经插入的关机电池，插入 1min 后， 电池自动启动； 插入另一块关机电池，启动任意一个电池，机器狗开机；
机器狗处于关机状态， 插入两块关机电池	任意电池开机，整机开机，另一块电池无需启动，自动接通。

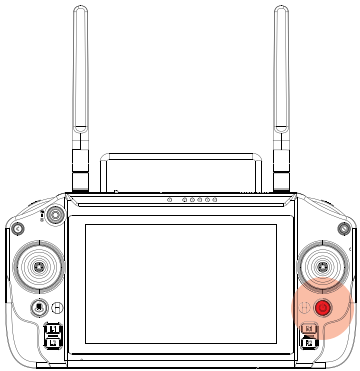


警示提示

- 双电池具备互相唤醒功能，在双电池模式下，只具备双开、双关等两种状态，不支持电池一开一关的状态。
- 在单电池供电条件下，机器狗的运动功能受到限制，同时要保持另一个电池仓的保持干净整洁，避免异物进入。
- 铜锤 M1 单电池开机状态时，插入另一块开机 / 关机电池，该电池自动启动接通。

B.遥控器开机

长按遥控器电源按键，遥控器屏幕点亮、遥控器电源指示灯电量，由于出厂前遥控器与机器狗进行一对一匹配，因此遥控器启动后会自动与机器狗连接。



遥控器开启后，点击屏幕的 APP，进入到 APP 控制界面，确认 APP 的健康状态后，即可进行机器狗操控。

C.操作引导

遥控操作说明，参看《铜锤 M1 遥控器使用说明书》。

D.首次开机验证

- 基础运动测试：通过遥控器的 APP 控制机器狗完成简单动作，如站立、趴下、前后左右直线运动、转弯等，确认关节运动顺畅，若出现卡顿、异响或无法站立，需立即关机检查关节是否卡滞或姿态错误。
- 传感状态测试：视觉、激光、超声、惯导等各类传感器运行正常，数据能在 APP 上正常显示。
- 状态反馈检查：观察指示灯、显示屏或 APP 显示的设备状态，确认电量、连接信号、固件版本等信息正常，若有故障提示需按操作手册排查。

2.6 急停与保护

A.硬急停触发与解除

- 硬急停触发：机器狗在自主运动状态、遥控状态下，出现失控、故障等问题时，操作者拍下机器狗背部的红色硬急停按键，硬急停红色灯常亮，触发硬急停保护，机器狗缓慢趴下，保持静止不动；APP 端同步弹窗示警。
- 硬急停解除：顺时针旋转硬急停按键，即解除硬急停。

B.软急停触发与解除

- 软急停触发：机器狗在自主运动状态、遥控状态下，出现失控、故障等问题时，操作者可以触发遥控器软急停按键，机器狗停止当前的动作，保持静止站立姿态；APP 端同步弹窗示警。
- 软急停解除：确认机器狗与周围环境安全后，在 APP 端解除软急停，APP 和机器狗恢复正常状态。

C. 过热保护

- 机器狗具备全面的温度检测功能，一旦机器狗出现关节、主控、电池等过热时，机器狗将进入过热保护状态，机器狗将停止当前的所有运动，并趴下，保持不动；APP端可查看过热的部位和温度，待温度降低到正常值后，可继续操作机器狗。

D. 低电量保护

- 当两块电池的电量均低于 20% 时，机器人会进入低电量预警状态，此时应立即充电；当两块电池的电量均低于 10% 时，机器人会触发低电量保护，它将自动趴下，不再响应手柄的遥控指令，请更换电池后再继续使用。

E. 摔倒保护

- 机器狗在摔倒之后，在强化学习运控模型的控制下，会尽量恢复站立状态；在周围环境不允许时，机器狗保持固定动作不变，并进行报警。

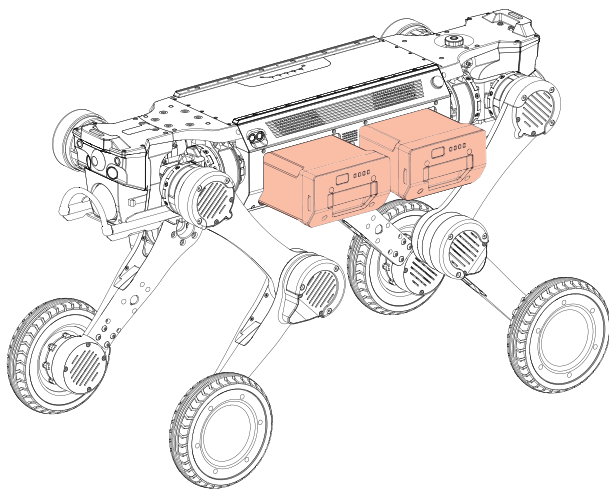
F. 扩展仓供电保护

- 扩展仓配备单独的电源按键，可以单独控制扩展仓的上电、断电情况。在整机上电情况下，需要更换上装载荷时，可以触发扩展仓按键，直接给扩展仓所有的接口断电，而不用给整机断电。扩展仓电源按键在舱体里面，以避免在外被误碰，上装直接掉电。

2.7 换电与关机

A. 换电池

机器狗具备双电池、热插拔功能，在双电池共同供电的情况下，可以直接拔下一个开机电池，换上一个开机 / 关机状态的电池，机器狗在换电池过程中保持正常工作，并实现双电池供电；



B. 关机

机器狗关机：在单电池、双电池供电模式下，关闭任意电池，电池灯灭，机器狗状态指示灯熄灭，机器狗关机；

遥控器关机：长按遥控器电源键，即可实现遥控器关机。

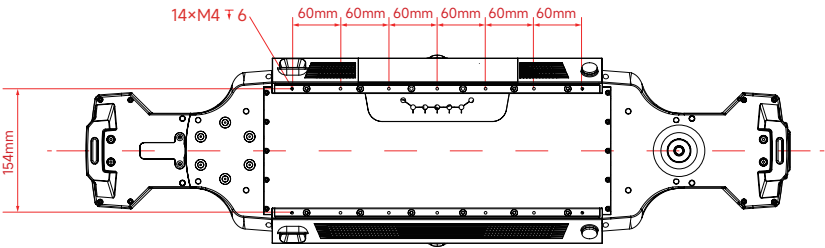


警示提示

- 尽量先调整机器狗到水平趴卧姿态，再进行关机姿态；限制在机器狗站立姿态下，直接进行关机。
- 当机器狗只有一个开机电池时，禁止通过直接拔出开机状态电池来进行关机。

2.8 载荷扩展

机器狗背部的空间平整，负载 30kg，背部部署有双导轨，支持上装载荷便捷安装，双导轨具体尺寸如下：



机器狗背留有扩展仓入口，内部部署的各类接口详见章节 1.6；应用时，上装载荷的供电通信线缆进入扩展仓与航插头对接，即可实现机器狗与上装载荷的供电和通信；



警示提示

- 机器人加装负载后，请勿使用爬高台特技。
- 当在机器人背部加装载荷时，机器人的运动性能可能会受影响，请务必在加装前向售后人员咨询相关事宜。
- 使用外接供电口对负载供电时，应注意，供电口可对外提供的总功率不超过 480W。
- 为保证 IP67，所有接口采用 IP67 航插头并有防护盖，未使用的航插接口请用航插口盖盖好。
- 在进行上装载荷安装时，在对接供电接口时，确保机器狗关机、或者扩展仓关机。

2.9 设备充电

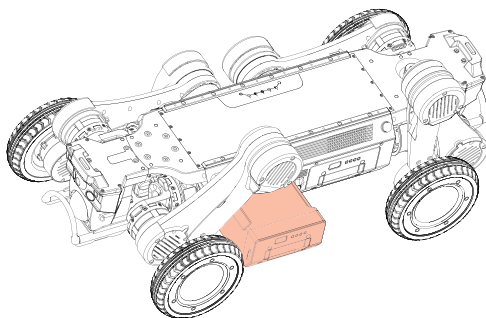
2.9.1 机器狗电池充电

机器狗配备的双电池均采用插拔式快换设计，充电时只需要将电池拔下，通过配备双电池充电座和充电适配器对电池进行充电，具体操作如下：

A. 拔下电池

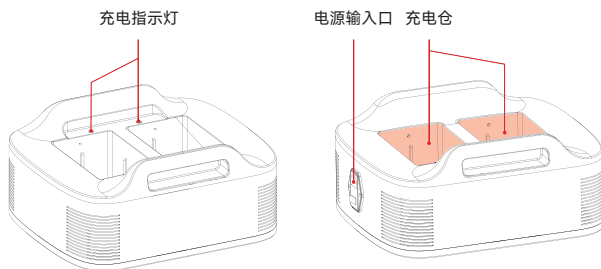
- 采用水平趴卧姿势，腹部完全贴紧地面，腿部自然放置于机身两侧，小腿呈完全收起状态，4 个膝关节与轮足平放在地面上；将电池侧的前 / 后腿依次抬起，为拔出电池留出空间。

- 也可在机器狗关机前，直接执行换电姿态，机器狗则自动水平趴卧，抬起电池侧的前后腿，为拔出电池留出空间。
- 轻拉电池手带，解锁电池卡扣，进而拔出电池，即可将电池从机器狗中取出。



B. 充电准备

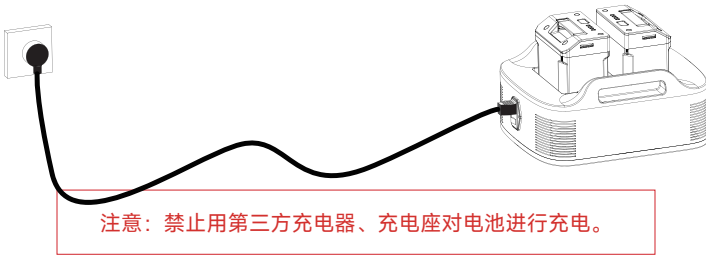
- 电池外观完好检查，确认电池没有鼓包、漏液等破损情况出现。
- 将充电座布置在硬质平面以保证放置平稳，充电过程中不会倾倒。
- 充电器接通 220V 交流电源，打开充电座船型开关，开关红色常亮显示充电座接通。
- 充电环境需干燥阴凉，远离易燃易爆物品，充电座周围的环境温度 0-50℃。



C. 电池充电

- 将电池与充电座的充电接口对准，插入电池座，电池座支持单电池充电和双电池充电。

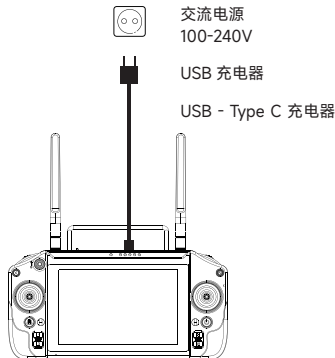
- 确保充电座对应的电池充电状态的指示灯绿色常亮，处于稳定充电状态。
- 电池指示灯呈现流水灯状态，常亮的灯代表已充满对应的电量，频闪的灯代表正在充新的电量。
- 电池充满时，4 颗指示灯常亮，请及时拨下电池或者断开充电座电源；**充电时间不超过 6 小时。**
- 电池充满电被取下后，及时关闭充电座，以避免充电座插头带电，出现触电风险。



2.9.2 遥控器充电

当遥控器电量指示灯显示低电量时，对遥控器进行充电，如下图所示：

- 请使用请使用原装 USB 充电器充电。
- 充电过程中遥控器的指示灯流水等状态，常亮的灯代表已充满对应的电量，频闪的灯代表正在充新的电量。
- 为保持遥控器电池最佳状态，请确保每一个月对电池进行一次完全充电。

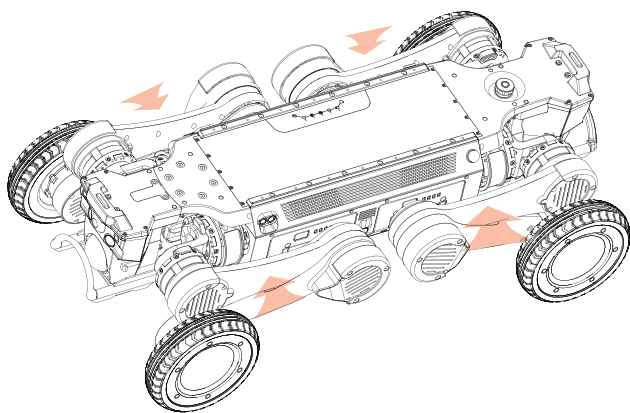


2.10 搬运

机器狗支持关机搬运和开机搬运两种搬运模式。

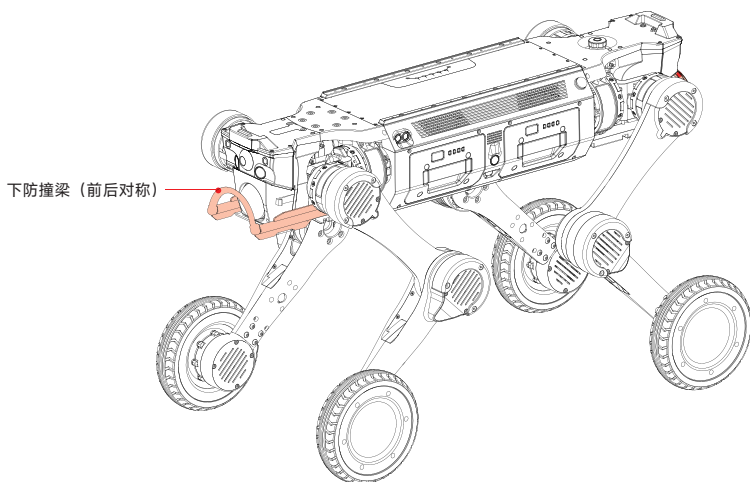
A. 关机状态搬运

- 机器狗按照水平趴卧姿势放置，腹部完全贴紧地面，腿部自然放置于机身两侧，小腿呈完全收起状态，4个膝关节与轮足平放在地面上。
- 搬运时，由两个人分别站在机器狗的头尾，双手抓取指定搬运点（小腿靠近膝关节的位置），将大腿和小腿向上提拉至关节限位，避免狗腿晃动，即可实现机器狗搬运。
- 搬运到目的地后，机器狗依然采用水平趴卧姿态放置于地面。



B. 开机状态搬运

- 机器狗开发了锁定姿态，在开机状态下，可将四肢锁定，因此1名工作人员可以双手抓住防撞梁，即可搬运机器狗。



警示提示

- 搬运时注意机器狗的警示标识，以避免狗腿夹手。
- 机器狗开机或者刚关机时进行搬运，手部抓取位置尽量远离关节、电池；以避免电池、关节发热对手部造成烫伤。

2.11 存储

A. 存储前准备工作

- 环境准备：存储环境温度在 $-20^{\circ}\text{C} \sim 60^{\circ}\text{C}$ 之间，干燥通风，需远离强磁场（如大型变压器、电磁铁等）和强振动源（如发电机、破碎机 etc）。
- 清洁处理：机器狗机身、遥控器、电池、充电座表面进行，去除灰尘、污渍等杂质；注意避免液体进入机器狗的接口、散热孔等部位，防止内部元件受潮损坏。
- 状态检查：检查机器狗、遥控器、电池、充电座等确保外观无破损、功能状态完好。
- 电量调节：将电池电量充至 $50\% \sim 60\%$ ，此电量范围能有效避免电池因过度放电导致亏电损坏，同时防止满电长期存储造成电池容量衰减。

B. 各部件存储方法

- 机器狗存储：将清洁干净的机器狗关机，拔出电池，平稳放入专用包装箱内。

- 电池存储：将拆卸后的两个电池放在包装箱中，每个电池独立放置，避免多个电池相互挤压、碰撞，同时防止电池正负极与金属物品接触，避免发生短路现象。
- 遥控器存储：关闭遥控器电源，将遥控器放入专用的遥控器保护套中，一起放在包装箱中；避免遥控器受到剧烈撞击或挤压，防止遥控器外壳破裂、按键损坏或显示屏破碎。
- 充电器储存：将充电器放入专用的充电器收纳袋或包装箱内的充电器存储区域，确保充电器与其他金属部件隔离，避免充电器接口受到磨损或损坏；检查充电器插头是否完好，若发现插头有破损、生锈等情况，需及时更换后再进行存储。
- 包装箱存储：将包装箱折叠整齐，放置在干燥、通风的环境中，避免包装箱受潮发霉或被重物挤压变形，影响后续使用。若包装箱出现破损、承重能力下降等情况，需及时更换新的专用包装箱，确保设备存储和运输安全。

C. 存储期间维护与检查

a) 短期存储（1-3 个月）

- 每月对机器狗、电池、遥控器、充电器进行一次外观检查，确认各部件无损坏、变形、生锈等情况。
- 对电池进行一次电量检查，若电池电量低于 40%，需将电池充电至 50%-60% 后再继续存储。
- 检查存储环境的温度、湿度是否符合要求，及时更换失效的干燥剂。

b) 长期存储（3 个月以上）

- 每 2 个月对机器狗进行一次通电测试，将机器狗连接电源（或安装电池），开机运行 5-10 分钟，检查机器狗各功能是否正常，关节活动是否顺畅。
- 每 1 个月对电池进行一次充放电维护（将电池电量放电至 30%，再充电至 60%），防止电池出现记忆效应，保障电池容量。
- 每 3 个月对遥控器和充电器进行一次功能检查，测试遥控器按键灵敏度、充电器充电功能是否正常，若发现异常，需及时联系售后维修。

D. 存储注意事项

- 不得将机器狗及其配件倒置或倾斜存储，尤其是机器狗，倒置存储可能导致内部元件移位、损坏，影响设备正常运行。
- 存储过程中，不得在设备或包装箱上堆放重物，防止设备受压变形、部件损坏。
- 若需将设备从存储环境中取出使用，需先将设备放置在常温环境中静置 1-2 小时（若存储环境和使用环境温度差较大），待设备温度与环境温度一致后再进行开机操作，避免因温差过大导致设备内部结露，损坏电子元件。
- 非专业人员不得在存储期间擅自拆卸机器狗、电池、遥控器或充电器，若发现设备故障或异常，需及时联系厂家售后人员，由专业人员进行检修，避免因自行拆卸导致设备损坏或安全事故。
- 存储相关的记录（如存储时间、检查时间、维护情况等）需做好详细登记，便于后续追溯设备存储状态，及时发现并解决潜在问题。

Q 无法开机 / 启动失败

- A
- 轻按电池开关，检查电池电量；
 - 重新安装安装：确保电池与整机表面齐平，拉手带不能晃动则证明彻底插入，反之需拔出电池再次用力插入；
 - 清洁接口：用干布或橡皮擦擦拭电池与机身的金属触点，去除氧化层。

Q 遥控器连接异常怎么办？

- A
- 先确认机器人是否开机正常，若正常看急停状态是否已关闭，若未关闭，请先排查故障，排查完成后再关闭急停状态；若急停状态已关闭且依然无法操控机器人，请重启机器人。若仍有异常，请联系售后。

Q 机器人开机站立姿态异常，是否还能继续使用？

- A
- 此时不要控制机器人移动，请立刻按下软急停使机器人趴下，关机重启，再次尝试操控机器人站立。若仍有异常，请联系售后。

Q 图传画面模糊 / 无信号

- A
- 用镜头布轻擦摄像头表面，去除灰尘和污渍；
 - 优化信号环境，避开 Wi-Fi、蓝牙等强干扰源，将控制端与机器狗距离缩短至 10 米内；
 - 关闭机器人和控制端，重新启动后测试图传。若重启后仍无信号，请联系售后。

Q 机器人可以适应哪些地形？

- A
- 机器人可适用于平地、草地等起伏较为平缓的地面，也可攀爬楼梯、斜坡等复杂地形，但请避免在极端地形（如冰面等过于光滑的表面、尖锐或起伏较大的地形、高处边缘等）中操作和使用机器人。

Q 遇到查阅本手册后依然无法解决的问题时该如何处理？

- A
- 保存数据并及时联系售后。

A. 机器狗应用

- 地形地貌：请尽量避免在玻璃、冰面等光滑路面行走，如必须行走，请尽量降低机器狗行走速度，以避免打滑摔倒。
- 气候天气：请尽量避免在大雾、雷雨、沙暴、大风天等恶劣天气应用机器狗。
- 通信干扰：请勿在有 WIFI、射频等通信信号干扰严重的环境下操控机器狗，如必须，则务必关闭通信信号干扰源，或者降低信号源干扰。
- 电磁干扰：请勿在高压电线、高压电站、通信基站、信号塔等强电磁干扰环境下操控机器狗，如必须，请先咨询售后。
- IP 防护：机器狗的防护等级为 IP67, 可以水下 1 米潜行 30 分钟。在进行功能应用时，需要提前确保机器狗的状态，包括外观无破损、扩展接口盖盖好、电池和电池仓干燥无水等；在执行完 30 分钟潜行之后，需要将机器狗及时脱离水面，并将机身擦拭干净干燥处理和维护后，再进行下次潜行操作。因长时间浸水等原因造成机器狗故障，则不在保修范围内。
- 最大速度：机器狗最大速度可达 6m/s，冲击力巨大，因此在高速状态下，请确保机器狗远离人群。
- 运动模式：机器狗运动模式分为原地模式、运动模式、导航模式、登阶模式等，在使用过程中，请根据环境场景，切换不同的运动模式。
- 摔倒恢复：机器狗摔倒后恢复站立姿态需要空间，为避免碰撞，请确保机器狗周围 2 米内没有人和物体，请勿在机器狗硬急停没有触发的情况下拖拽摔倒的机器狗。

B. 电池应用

- 在首次使用前，如果电池发出明显的异味、发热或锈蚀迹象，请联系电池供应商。
- 给儿童使用前成人必须讲解清楚如何使用设备和电池，并定期跟踪确认，以确保儿童正确使用。
- 请勿在极高温（例如超过 60°C，如强烈的阳光直射下或处于极热环境的车辆内）下使用或放置电池。否则，电池可能会过热、起火，其性能会退化，使用寿命会缩短。

- 请勿在静电超过 1000V 的环境中使用电池，因为这可能会损坏保护电路，并造成安全隐患。
- 电池只能在 0 ~ 50°C 的温度范围内充电。在此温度范围外充电可能会导致电池漏液、发热，或造成严重损坏。这也可能导致电池的性能和寿命退化。
- 请不要靠近易燃材料充放电电池，否则可能产生起火隐患。
- 电池在检测到单体欠压时自动进入仓储模式，该模式下电池不响应开关且电池指示灯常灭，电池充电后可退出仓储模式。
- 电池按键关机后处于休眠模式，通讯、按键、充电都可以唤醒电池。
- 如果电池电路端子弄脏，使用前应用干布抹净，否则可能因接触不良导致性能异常甚至失效。
- 电池应当在室温下存放，应充电到 30% ~ 60% 的电量。为防止电池过放，建议每 3 个月按标准充电方式进行充电至 50%；如储存时间超过一年，建议每年按标准充放电方式进行一次充、放电循环以激活电池。
- 如果电池长期未使用，它可能会因为电池本身自放电而处于过放电状态（低于过放保护电压或者电芯的过放电压），甚至电芯过放到 0V。这种电池如果继续使用是有风险的。为防止过放电的发生，应定期将电池充电，让电池电压维持在 30% ~ 60% 电量。
- 插头线承受拉力有限，拉力过大会造成电池损坏。将电池装入机器后，确保电池和插头线不会随意摇摆。
- 禁止在靠近火、加热器或高温 (>80°C) 环境中使用或搁置电池。
- 禁止使用未经授权的充电器，由此造成的电池损害，不在保修范围内。
- 禁止将电池极性反转连接，禁止使用导线等金属物体直接连接电池正负极短路电池。
- 禁止焚烧电池或对其进行加热，禁止撞击、抛掷、践踏等对电池的过度机械冲击，禁止使用钉子或其它尖锐物体刺穿电池。
- 禁止拆解电池，一经拆解，保修无效！

C.其他注意事项

- 如果机器狗出现进水现象，第一时间关闭机器狗电源，拔出电池，进行干燥晾晒。
- 如果机器狗出现冒烟、起火现象，优先选用二氧化碳、干粉等品类的灭火器灭火，切忌用泡沫灭火器灭火。
- 机器狗出现狗腿摆动等运动失控时，优先触发软急停、硬急停，在确保工作人员安全的情况下，关机拔电池，然后再进行问题排查；对于疑难问题，可反馈给我司技术支持人员，进行问题排查、设备维修、设备更换等。
- 禁止私自拆卸机器狗，一经拆卸，保修无效！

A.日常清洁规范

使用机器后，若表面有污渍请及时清洁机身表面，擦拭机身前请先关闭电源，使用干燥且干净的软布对机身进行擦拭，尤其关注相机和雷达是否擦拭干净并注意避免用硬物刮擦镜头。

清洁过程中禁止使用酒精、消毒液等腐蚀性液体擦拭。

B.定期检查维护

为保障机器狗运行稳定性、延长设备使用寿命，需定期开展预防性检查与针对性维护。

维护周期	维护模块	具体维护项目
日常检查 (每次使用前， 约 5 分钟)	外观与结构	检查机身、腿部连杆有无变形、裂纹； 检查关节、足部固定螺丝是否松动； 检查足部轮胎有无脱落、严重磨损（纹路磨平），若有请及时更换。
	电池与供电	检查电池外壳无鼓包、漏液和底部针孔无异物进入； 确保电池与整机表面齐平，拉手带不能晃动则证明彻底插入，反之需拔出电池再次用力插入； 通过设备屏幕 / APP 查看电量（低于 20% 需充电）；
	功能测试	启动设备，操作摇杆测试各关节活动是否流畅，有无卡顿、“咔咔”异响； 检查摄像头、传感器镜头无遮挡，图传画面清晰； 测试 10 米内遥控信号是否稳定（无延迟）。
每周维护 (每周 1 次， 约 20 分钟)	整机保养	用干软布擦拭机身外壳（油污处可蘸少量清水轻擦）； 用镜头布轻擦摄像头、激光雷达表面灰尘； 用毛刷清理传感器周围缝隙杂物； 用镊子清理轮胎缠绕的杂草、线头，避免卡顿。
	关节维护	用干燥软布擦拭所有关节的表面及缝隙，清除泥沙、灰尘；涉水后用吹风机低温档吹干轴承处； 手动活动各关节，确认无卡顿、异响，螺丝无松动，线缆无缠绕磨损。

每月维护 (每月 1 次, 约 30 分钟)	软件更新	通过配套 APP 或官网检查固件更新; 按提示下载并安装更新 (升级期间确保电量 $\geq 50\%$, 勿断电)。
	整机保养	用软毛刷或吹气球清除内部缝隙的积尘、碎屑; 检查轮胎、腿部、躯干连接处所有螺丝, 若发现松动检查轮胎磨损状态, 如有破损, 请及时更换。
	电池保养	每月对电池进行一次充放电维护 (将电池电量放电至 30%, 再充电至 60%), 防止电池活性下降; 每月检查电池外观、底部电路端子, 需及时清理灰尘、异物, 如有破损, 请及时更换。



注意事项

- 维护时需关闭设备电源, 避免误操作导致损伤。
- 更换备件 (如轮胎、电池) 请使用原厂配件, 非原厂配件可能影响设备安全。
- 如遇复杂故障 (如关节卡死、传感器失灵), 请勿自行拆解, 联系售后技术支持。

A.您购买的产品主要部件保修时间如下表所示：

部件名称	保修期
整机	1 年
主板	12 个月
关节模组	7 个月
电池	6 个月 /200 次循环

注：外壳、足部轮胎等易损件及运输箱等配件不在保修范围，如有需要，请咨询售后支持。产品针对不同零部件提供不同的保修期限并设置了公里数限制。产品的行驶公里数和特定零部件的保修期，二者任一标准超出上表限值，保修将自动转为有偿维修。

您购买本产品后，保修期自您签收货物当日算起，为保护您的权益，敬请您在签收产品时务必当场检查确认产品及其随货物品 / 资料处于完好或正常状态，否则请立即联系乙方。根据物流公司的理赔要求，因物流运输导致的物品损坏，需在发现物流致损事件的 24 小时内联系售后部门解决，逾期将无法为您受理。

B.免费售后服务的例外情形以下任一情形，将使您处于保修期内的产品丧失免费售后服务的权利，但您仍可在具备可能性的前提下选择有偿售后服务；

- 发生非产品本身质量问题（例如：人为原因等）导致的碰撞、跌落、烧毁等损坏；
- 产品进行二次开发（不论是否事先得到授权）或硬件改装、拆解等行为；
- 擅自维修部件、电路改造、电池组改造、充电器使用不当导致的损坏；
- 产品因浸入液体、进杂物、接触化学物质、划伤等原因导致的损坏；
- 超过产品安全载重限值情况下使用造成的损坏
- 产品长时间搁置不用导致的损坏；
- 未按产品说明书的要求进行激活、安装、使用所造成的损坏；
- 使用非原厂配件（包括但不限于替换、加装等情形）导致的产品故障或损坏；
- 因操作失误 / 故意导致产品撞击硬物、跌落，以及产品表面存在明显摔打、碰撞或划痕痕迹等情况；

- 因不可抗力或极端恶劣环境（包括但不限于强磁、强干扰、高温、低温、自然灾害等）导致的损坏；
- 在地形尖锐、起伏较大、光滑地面等环境操作导致的损坏。

C.送修说明；

- 联系获取售后服务时，请详细说明产品存在的问题。将先尝试通过电话、电子邮件、远程协助等方式诊断并解决您的问题。
- 如上述方式难以解决您的问题，您可将产品寄送乙方进行进一步检测，然后据此作出相应安排或决定。如经检测不符合免费保修政策，您可选择有偿售后服务（届时乙方将与您确认有关售后项目和收费）或原机退回。

※ 您在将产品寄往乙方时需先行承担邮寄费用。

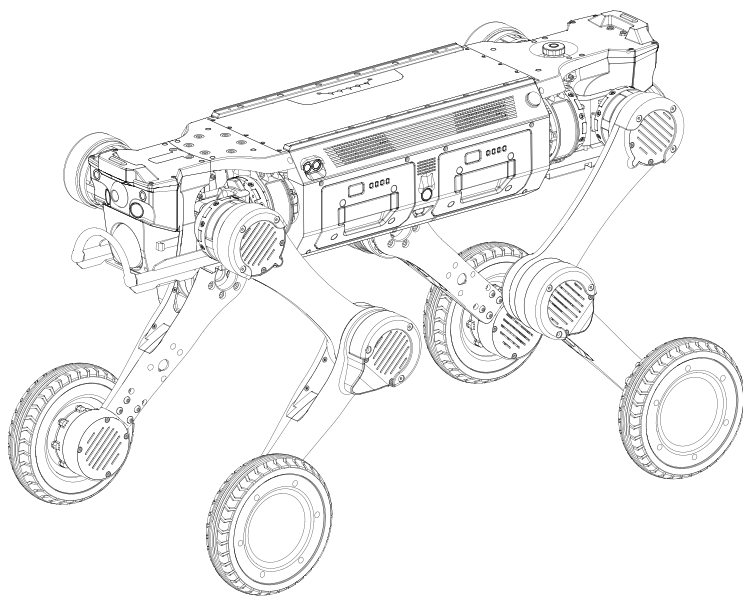
※ 乙方收到寄回产品后，将对产品进行故障检测以确定问题责任。若经检测属于产品本身质量缺陷且在保修期内，相关费用及寄回的快递费将由乙方承担。

※ 若产品经过检测不符合免费维修条件，您可以选择付费维修或将问题产品寄回。乙方会与您确认维修方案，如接受，则甲方按照确认的维修方案支付所有费用；如无法接受，则设备退回甲方，由此产生的相关检测费、人工费、运费等由甲方承担。

※ 如产品本体、充电器、遥控器发生进水情况，会严重影响产品性能，且不具备维修价值，故乙方无法提供维修服务，但可视情况提供有偿更换产品服务，请知悉并酌情寄回。

Genisom M1

User Manual



Version Number: V1.2

FOREWORD/

Purpose

- To guide professional operators of the Genisom M1 in completing installation, commissioning, operation, maintenance and other tasks, ensuring the safe and stable operation of the equipment and the personal safety of operators.

Scope of Application

- Equipment model applicable to this manual (Genisom M1 series): ZSM-1

Declaration

- Before using this product and related services, read and fully understand this User Manual. Your use of the product constitutes acceptance of all terms herein and any future revisions. Discontinue use immediately if you disagree with any content.
- To ensure product functionality, service stability, performance optimization, and obligation fulfillment, you irrevocably authorize our company to collect, use, store, process, analyze, and transmit product-related data throughout the service cycle. Industry-standard security measures will be applied to protect data.
- All content of this manual (text, diagrams, technical parameters, etc.) and the applicable equipment's IP rights (brand, design, software, etc.) belong to Genisom AI (Beijing) Co., Ltd., protected by PRC laws (Copyright Law, Trademark Law, etc.). Reproduction, distribution, or IP infringement (without written authorization) is prohibited; legal action will be taken against violations.
- Genisom AI makes no warranties not explicitly stated in this manual, including but not limited to implied warranties of merchantability or fitness for a particular technical purpose. It does not guarantee the equipment will meet all user-specific needs.
- Genisom AI does not warrant "flawless, uninterrupted operation" of the equipment. Minor functional deviations caused by technical limitations, environmental variables, or operating habits are not considered quality defects.
- Genisom AI will use reasonable efforts to provide after-sales support but does not guarantee all defects can be repaired. For issues unresolvable due to technical obsolescence or part discontinuance, a reasonable solution will be offered per after-sales policies.

- Genisom AI's liability is limited to the product itself. Under no circumstances shall Genisom AI be liable for direct losses (e.g., production downtime from equipment failure) or indirect losses (e.g., third-party claims, lost business opportunities) arising from this manual or equipment use, unless such losses result from Genisom AI's intentional misconduct or gross negligence.
- Genisom AI reserves the final right to interpret all terms in this declaration and manual. It may revise, update, or discontinue the manual/terms without prior notice (effective upon publication) to align with legal changes or technical upgrades.
- Users must read the entire manual before operating the robot dog, and strictly follow all instructions—especially warning clauses (e.g.,  red emergency alerts,  orange critical reminders). Genisom AI assumes no liability for equipment damage or personal injury caused by non-compliance.
- Diagrams/photos in this manual are functional illustrations only; minor differences in appearance or component layout from the physical product are permissible. The delivered equipment shall prevail.
- Users shall report manual omissions, errors, or inconsistencies with actual equipment functions via Genisom AI's official channels (e.g., after-sales hotline, corporate email). Genisom AI will assess whether to update the manual based on feedback.
- Users are prohibited from disassembling or modifying any components (batteries, motors, sensors, control systems, etc.). Genisom AI will terminate warranty services and may refuse technical support for issues caused by unauthorized disassembly/modification.
- Users must operate the product in a safe, legal, and controlled environment, and comply with all applicable laws. The product shall not be used for illegal or unauthorized purposes.

Safety Precautions

- **User Eligibility:** The Genisom M1 is an industrial robot dog (not a toy product). It is only allowed to be used by personnel aged 18 and above, who have full civil capacity and have received operation training; personnel under 18 are prohibited from operating it, and must not approach the equipment without adult supervision.

FOREWORD/

- **Child Safety Protection:** If the use scenario (e.g., factory workshop, laboratory) may have children entering, physical isolation areas (e.g., installing protective barriers, posting "No Entry for Children" signs) must be set in advance; if a child accidentally touches the equipment, press the emergency stop button immediately to cut off the equipment power, check whether the child is injured, and move the equipment to an area inaccessible to children before restarting it.
- **Manual Reading Requirement:** Before any operation (equipment operation, transportation, daily maintenance, fault inspection, etc.), this manual must be read in full, with focus on the content of the "Warning Reminder" chapters (including red emergency warnings, orange important reminder marked clauses); if you are unsure about the operation process, contact Genisom technical support for confirmation, and it is prohibited to operate without a clear operation method.
- **Pre-Startup Warning Label Check:** Before powering on, check whether all warning labels on the robot dog are complete and clear. If the labels are found to be worn or fallen off, contact Genisom to replenish and reattach them immediately; at the same time, confirm that there are no obstacles in the high-risk areas indicated by the labels (e.g., robot leg movement range, wheel rotation area) to avoid collisions after startup.
- **Line of Sight and Safety Distance Requirements:** During remote control operation, the operator must keep the equipment within sight; maintain a safe distance from the equipment: when the equipment is stationary, keep a distance of ≥ 2 meters; when moving to perform operation tasks (e.g., robot arm grasping, climbing), keep a distance of ≥ 3 meters; avoid external contact between the equipment's moving parts (e.g., wheels, mechanical claws) and the human body.
- **Special Scenario Safety Protection:** When the robot dog performs high-risk actions (e.g., climbing stairs, climbing slopes, working at heights), it is strictly prohibited for any personnel to stay close to the area directly below the equipment or in the movement path; set a warning zone around the equipment's operation area, and arrange on-site supervision personnel; if the equipment gets stuck or tilts, press the emergency stop button immediately, and do not approach until the equipment stabilizes.
- **Abnormal Situation Emergency Handling:** If the robot dog shows violent shaking, out-of-control, abnormal noise, etc. during operation, trigger the emergency stop at the first time: first press the "soft emergency stop" button on the remote control; if the soft emergency stop fails, immediately press the "hard emergency stop" button on the side of the device body; after the equipment stabilizes, disconnect the battery power, check whether the equipment's moving parts and control system are faulty,

and it is prohibited to restart before the fault is eliminated.

- **Dual-Battery Use and Low-Power Protection:** The equipment supports hot-swapping of dual batteries and can be powered by a single battery independently; when the power display of each battery on the robot dog shows only 1 bar (check via the battery indicator light or the supporting app), operation must be stopped and the machine must be turned off immediately, and the battery must be removed for charging in the order of "turn off the battery first, then pull out the battery"; continuous operation in a low-power state is prohibited. If the robot dog shuts down automatically during operation due to battery power exhaustion, it may cause damage to the robot dog and battery, and such damage is not covered by the warranty.
- **Robot Dog Shutdown Operation:** When shutting down the robot dog, first send the "lie down" command via the remote control app (ensure the equipment's abdomen is fully attached to the ground and stable), then press and hold the power button on the battery side for 3 seconds until the indicator light goes out, confirm the equipment is completely powered off before pulling out the battery; it is strictly prohibited to turn off the machine directly when the equipment is not lying down, to avoid reducing the service life due to falls caused by the robot dog's power-off.
- **Charging Equipment Restriction:** Only the original charger provided by Genisom AI is allowed to be used; the use of third-party chargers and non-standard power sources (e.g., self-made transformers, high-power extension cord parallel connection) is prohibited, otherwise it may cause the battery to overcharge, swell, or even cause a fire.
- **Charging Environment Requirements:** When charging, place the battery and charger on a well-ventilated, dry, horizontal surface (e.g., wooden workbench); it is prohibited to place them on flammable and explosive material surfaces; flammable and explosive materials (e.g., paper, cloth, alcohol) are not allowed to be placed within 1 meter around the charger and battery, and keep away from open flames and high-temperature environments.
- **Charging Time Control:** The charging time of single/dual batteries is up to 2 hours (from 1 bar of battery power to full); the maximum charging time must not exceed 6 hours; after all the charging indicator lights are on, the connection between the charger and the battery must be disconnected within 30 minutes, and long-term overcharging is prohibited.
- **Temperature and Humidity Operating Range:** The equipment must work within the specified temperature range (-20 °C — 55 °C) ; the operator needs to monitor

FOREWORD/

the ambient temperature and humidity in real time through the equipment display screen; if the equipment operates in an environment beyond this range, it may cause permanent damage to the equipment components, and such damage is not covered by the warranty.

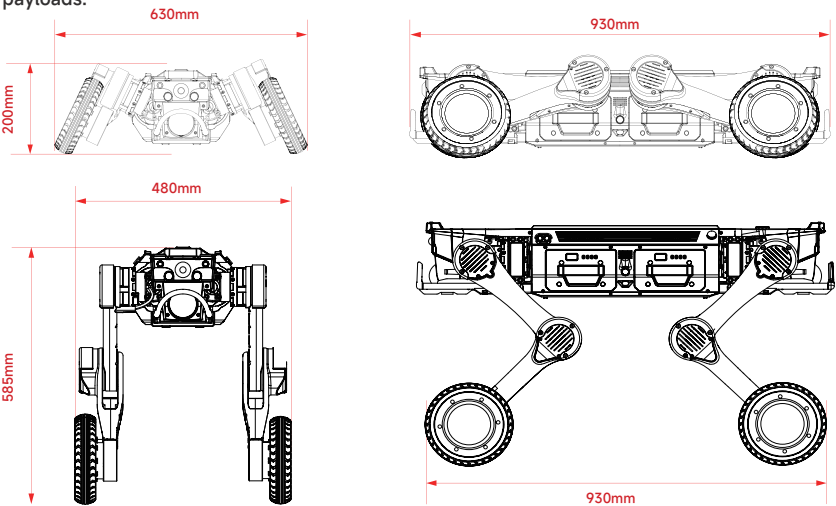
- **Prohibited Environment Operation:** It is prohibited to power on or operate the equipment in explosive environments (e.g., warehouses storing flammable and explosive gases, dust), corrosive environments (e.g., chemical workshops, acid and alkali storage areas), and high-dust environments (e.g., mining operations); if Genisom's regulations are violated, it may cause corrosion of the equipment shell, short circuit of internal circuits, or environmental explosions, pollution, etc., and Genisom will not be responsible for equipment maintenance and environmental pollution compensation; the relevant consequences shall be borne by the operator and the unit to which he belongs.
- For any personal injury, property loss or data loss caused directly or indirectly by intentional violation of the above safety reminders, improper operation or gross negligence, Genisom AI shall not bear any responsibility.

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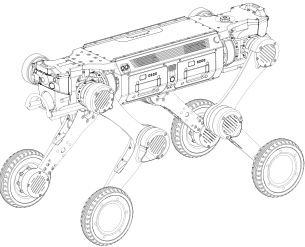
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1.1 Product Overview

Genisom M1 is a wheel-legged quadruped robot featuring lightweight design, high load capacity, long endurance, strong protection, and flexible, stable movement. Each leg of the robot dog is equipped with 3 joint motors and one hub motor, supporting wheeled/ pointed leg replacement. It is equipped with sensors such as LiDAR, optical cameras, ultrasonic radar, IMU, fill lights and RTK modules; internally incorporating a high-performance main platform for motion control, autonomous navigation and positioning, environmental detection and the like function, providing a rich set of power supply and communication interfaces, supporting the expansion of multiple categories of mission payloads.



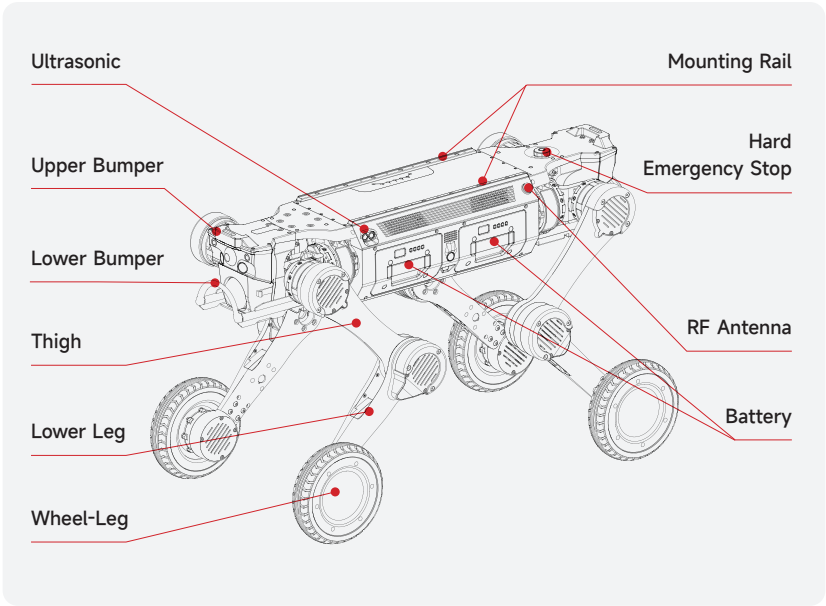
1.2 Package Contents

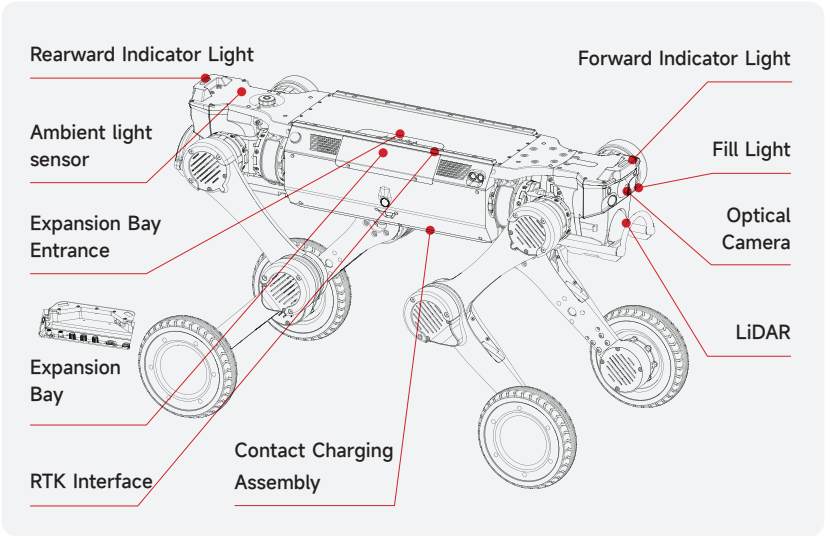


Genisom M1 Main Unit ×1 (battery not included)

Category	Name	Quantity	Unit
Main Components	Genisom M1 Main Unit	1	pc
	Remote Controller (G20 Aerial Remote Controller)	1	pc
	Battery	2	pc
Accessories	Aviation Shipping Case (with liner)	1	pc
	Dual-Battery Charging Dock	1	pc
	Power Cord	1	pc
	Maintenance Tool Kit	1	pc
	Aviation Plug Cable Set	1	set
	User Manual	2	copy
	Certificate of Conformity	1	copy
	Packing List	1	copy

1.3 Component Name





1.4 Core Spec

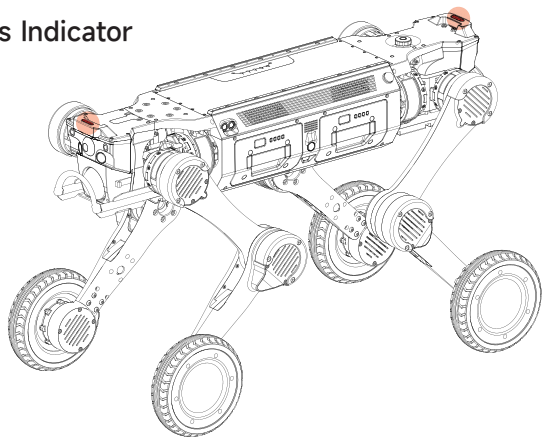
Basic Information	Product Model	M1
	Material	Aluminum Alloy, High-Strength Engineering Plastic
	Size (Standing)	930mm*480mm*585mm
	Size (Lying Prone)	930mm*630mm*200mm
	Machine Weight (with battery)	41kg
	Battery Weight	3.3kg/pc
	Wheel Size	8 inches
Environmental Adaptability	Ingress Protection	IP67
	Operating Temperature	-20℃ ~ 55℃
Motion Performance	Degrees of Freedom	12+4dof
	Standard Max Speed	6m/s
	Stable Walking Payload	30kg
	Max. Standing Payload	150kg
	Max. Climb Angle	45°
	Continuous Climbable Step Height	25cm

Motion Performance	Minimum Passing Width	50cm
	Vertical Obstacle Crossing Height	80cm
Battery Parameters	Battery Capacity	54V, 9.35AH*2
	No-Load Runtime	5h
	Full-Load Runtime	3.5h
	No-Load Range	29km
	Full-Load Range	18km
	Charging Dock Input Voltage	AC220V
	Charging Dock Output Voltage/ Current	DC63V, Max Charging Current 10A
	Charging Time	≤ 2h per battery (charging dock supports dual-battery simultaneous charging)
Sensors	LiDAR	2 units
	FPV Camera	2 units
	Fill Light	4 units
	Ultrasonic Radar	2 units
	IMU	1 unit
	RTK Module	1 unit
Communication	WIFI Communication	Supported
	RF Communication	Supported
	Bluetooth	Supported
Computing & Control	Computing Power	100Tops

※ The above data are test results under laboratory conditions and may deviate from actual performance.

1.5 Description of Light Effect

1.5.1 Status Indicator



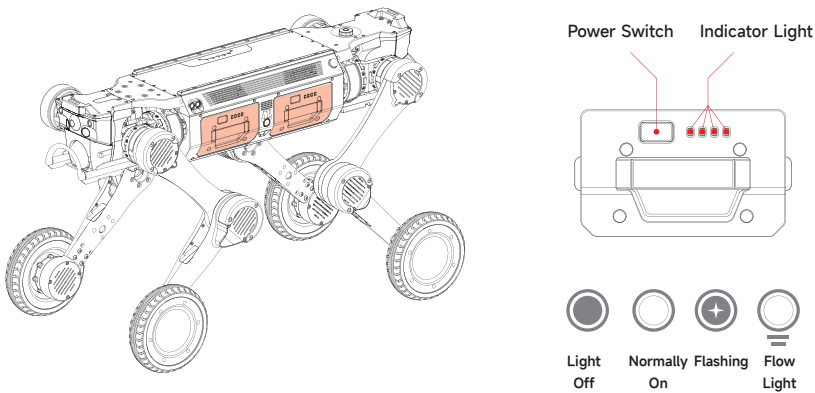
Indicator Color	Indicator Effect	Robotic Dog Status
White Light	Slow Flash	Startup in progress
	Normally ON	Manual Control/Machine Work State
	Breathe	Standby
Green Light	Slow Flash	Locating/Auto Return in Progress
	Normally ON	Auto Task Execution in Progress
Yellow Light	Quick Flash	Alarm State
	Normally ON	Low Battery
Red	Quick Flash	Fault State
	Normally ON	Soft Emergency Stop
Blue Light	Normally ON	Upgrading
/	Breathing State	Charging (Optional Charging Pile)



Warning Prompt

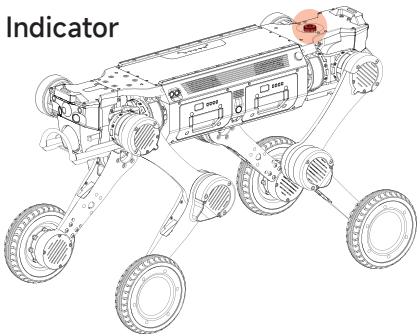
- Hard Emergency Stop: the red light of the indicator is normally ON and the red light of the hard emergency stop button is normally ON.
- Forward/Reverse Direction Switch: When the robotic dog switches between forward and reverse directions, the status light on the corresponding direction will be illuminated, followed by the execution of the aforementioned lighting effect.
- Except when switching between the forward and reverse main direction states, where the front and rear lights differ, they are consistent in all other situations.

1.5.2 Description of Light Effect



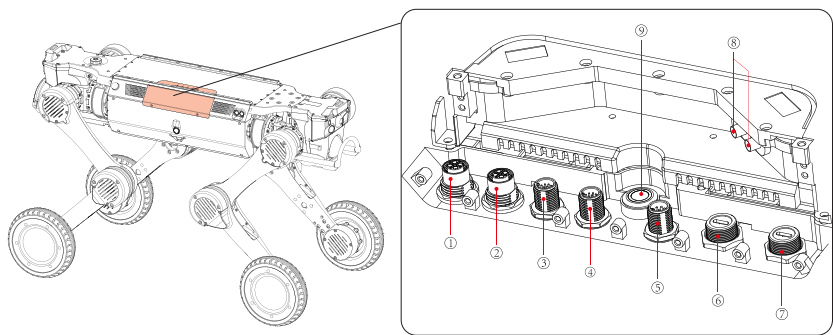
Battery Indicator Light Effect	Description of Light Effect	Battery Level Description
○ ○ ○ ○	4 LEDs normally ON	Battery Level 75%~100%
○ ○ ○ ●	The first 3 LEDs are normally ON.	Battery Level 50%~75%
○ ○ ● ●	The first 2 LEDs are normally ON.	Battery Level 25%~50%
○ ● ● ●	The first LED is normally ON.	Battery Level 0%~25%
⊕ ● ● ●	The first LED is flashing.	The battery level is 0%.
≡ ≡ ≡ ≡	4 LEDs are illuminated in sequence.	"Charging" is displayed and all 4 LED indicators stay lit when fully charged.

1.5.3 Emergency Stop Indicator



● Light Off	Hard Emergency Stop Not Triggered
○ Red Light Normally On	Hard Emergency Stop Triggered

1.6 Expansion Interface



Serial Number	Interface Name
①	48V (10A) x1
②	24V (20A) x1
③	24V (3A) + 1xEthernet Port
④	12V (5A) + 1xEthernet Port
⑤	Serial Port (RS232 x1, RS485 x1, SBUS x2 and PPS x1)
⑥、⑦	2xUSB3.0 (5V and 1A)
⑧	RTK Interface
⑨	Expansion Bay Button



Warning
Prompt

- When installing additional equipment on the back of the robotic dog, regarding the planning and design of its center of gravity, position, interface and wiring, please consult our after-sales service staff before proceeding with the formal installation;
- The total power supplied by all power interfaces is $\leq 480W$;
- If an aviation plug is used, a protective cap shall be equipped to ensure IP67 rating; the protective cap shall be secured if the aviation plug is not used.
- The expansion bay button is used to control the power supply to the expansion interface; when connecting assemblies, be sure to power off the expansion bay first.

1.7 Mode of Motion

The robot dog comes standard with an Reinforcement Learning Locomotion Model, featuring Stationary Mode, Sport Mode, Navigation Mode, and Stair Climbing Mode.

Stationary Mode	The robot dog remains stationary while its torso performs various actions including rotation, pitch, and height adjustment.
Sport Mode	The robot dog can automatically adapt to flat ground, slopes, stairs, and various complex terrains such as mountains, forests, and rubble. It supports forward and backward movement, in-place rotation, and can perform standing, crawling, prone, and locked postures, as well as advanced maneuvers like climbing elevated platforms and twisting motions.
Navigation Mode	In this mode, maps can be created. Once map generation is complete, point-to-point cruising can be enabled based on the map to achieve automated inspection and point-based operations.
Stair Climbing Mode	In this mode, the robot dog autonomously plans its gait to traverse multi-level staircases with stability, suitable for multi-level space operations.



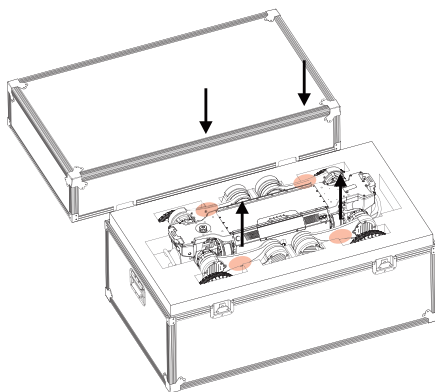
Warning Prompt

- When performing high-platform climbing stunts, ensure the robot dog has ≥ 2 battery bars and is unloaded, keep it in sight and maintain a safety distance of ≥ 2 meters from bystanders.
- When navigating stairs, slopes, or similar surfaces, ensure no one is directly above, below, or within the robot's path.
- In Motion Mode, the robot dog features standard low, medium, and high-speed settings. To ensure safe task execution, lateral movement and in-place rotation are restricted during medium and high speeds.

2.1 Environment Requirement

- Before performing the power-on operation, the operator shall thoroughly read this manual to familiarize himself/herself with all functional states, operational details and precautions of the robotic dog;
- In the process of initial operation, try to avoid the robotic dog moving out of sight and ensure no person nor obstacle within 2m around it so as to prevent collision;
- Temperature Required: Please be sure use the robotic dog within an ambient temperature range of -20°C to 55°C ;
- Weather Required: please Do Not power on and use the robotic dog in severe weather conditions such as heavy fog, thunderstorms, sandstorms, tornadoes, etc.
- Electromagnetic Environment Required: Avoid using the robotic dog in environments with strong electromagnetic interference (e.g., high-voltage power lines, high-voltage transmission substations, communication signal towers, etc.) to prevent magnetic breakdown;
- Communication Environment Required: please Do Not power on and use the robotic dog remotely in environments with communication signal interference to avoid its communication disruption and loss of connection.

2.2 Unpacking



The robotic dog is packed in a flight case, so please place the case on a flat surface with the correct orientation upward; open and remove the lid; then, sequentially remove the robotic dog, battery, remote control, charger cradle, etc., and place them on a hard and flat surface.



Warning Prompt

- When moving out the robotic dog, hold the designated lifting points shown in the diagram as instructed, and pay close attention to the location and content of warning labels to avoid pinching or scratching hands in the process of transporting;
- Handle the robotic dog, battery, remote control and charger cradle gently in the process of transporting;
- After the transporting is completed, check and make sure that AGIBOT D1 Max's emergency stop button, battery power button, etc., have not been triggered.

2.3 Pre-start Inspection

A. Appearance and Mechanical Structure Check

- Overall Exterior Integrity: Check the body shell for cracking, deformation or detachment, focusing on vulnerable parts like joint connections and sensor protective covers; observe whether there are obvious stains, liquid residue or foreign matters on the body surface, especially around radiator holes and interfaces.
- Joint and Moving Part Check: Check each of the robotic dog's leg joints and wheel legs one by one to confirm that the joint motion is smooth, without signs of sticking, abnormal noise or looseness. For wheel-legs/point-legs, confirm that the anti-slip tread is clear, without cracking or peeling. Confirm that fasteners such as screws and clips at the joints are not missing or loose.

B. Battery Status Check

- Battery Appearance: Check whether the battery pack shell is bulging, leaking or damaged; bulging may indicate that the battery is aged or overcharged, so please Do Not use any batter aged or overcharged but make replacement immediately to avoid fire or explosion risk.
- Battery Connection: Check whether the connection interface between the battery and the body is clean, free from oxidation, corrosion or foreign matters; ensure the latch is fastened securely when inserting to avoid power interruption due to poor contact.
- Battery Level Check: Before power-on, you can initially judge the battery level via the indicator, on which, at least one battery should have more than 2 bars of charge; click the battery power button to display the exact charge level; in a low-battery state, charge first to avoid mid-operation shutdown due to insufficient power after startup, which could affect the lifespan the equipment.

C. Environmental Perception Sensor Check

- Optical Sensor: Check whether the lenses of its cameras and LiDAR are clean, free from stains, scratches or obstructions.
- Distance/Obstacle Avoidance Sensor: Check whether the probes of obstacle avoidance components like ultrasonic sensors are intact and unobstructed or not.

D. Remote Control Check

- Check whether the remote control button is responsive without sticking, and whether the battery has sufficient charge (indicated by the indicator of the remote control) to ensure normal operation of the robotic dog once powered on.
- Check the body's display screen, indicator lights, speakers and the like feedback components; confirm that the display screen is undamaged and free of distortion, and that the indicators can be illuminated normally for facilitating timely acquisition of its operating status (e.g., battery level, fault warning) once powered on.

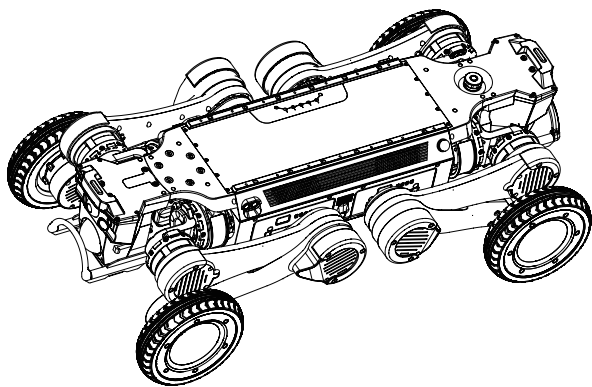
2.4 Pre-start Preparation

A. Install the Battery

The robotic dog is equipped with dual battery compartments, supporting both single-battery and dual-battery power supply modes, so please align the battery with the battery interface of the compartment (featuring foolproof design to prevent incorrect insertion), pull up the battery's hand strap, push the battery into the compartment till bottomed out, then release the hand strap; a "clatter" sound heard means that the latch is locked. Once installed, please check the battery installation status. The outer surface of the battery should be kept flush with the surface of the robotic dog body.

B. Place the Robotic Dog

Adopt a horizontal prone posture, i.e., abdomen fully flush with the ground, legs naturally positioned on either side of the body, lower legs in a minimally retracted stance, with all 4 knee joints and wheel feet flat on the ground, to keep no thigh or lower leg compressed by the torso.



2.5 Startup and Operation

A. Robotic Dog Power-On Process

The power-on process for the robotic dog is initiated through its battery and the specific procedure is as follows: briefly press the battery button to activate the battery, the indicator of which will be normally on and display its current charge level, then, press and hold the battery button for 3s to turn on the battery and boot up the robotic dog. A white blinking status indicator signifies the startup in progress, while a steady white light indicates that the startup is completed and the robotic dog has entered the Mode of Universal Motion.

The robotic dog can be supplied power by single-battery and dual-battery. The specific power-on procedures are detailed as follows

Robotic Dog Battery Status	Power-On Process Flow
When the robotic dog is powered off and no battery is inserted	Insert only one battery: Either directly insert a battery once powered on, or first insert a powered-off battery and then power on the battery to start the robotic dog;
When the robotic dog is powered off and a powered-off battery is inserted	Insert another powered-on battery to start the robot; for an inserted powered-off battery, it will be automatically started 1 min after insertio; Insert another powered-off battery to start any one battery and power on the robotic dog;
When the robotic dog is powered off and 2 powered-off batteries are inserted	Either battery can be powered on to start up the robotic dog as a whole. The other battery will be automatically engaged without the need for manual activation.

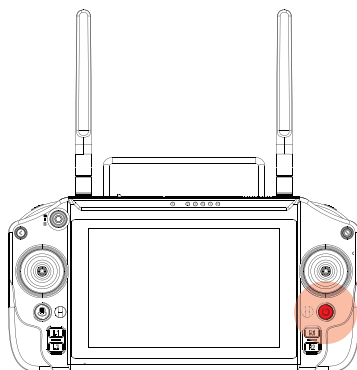


Warning Prompt

- Dual batteries feature mutual wake-up functionality. In dual-battery mode, only the states of both batteries ON or both OFF are supported; a state with one battery ON and one OFF is not supported;
- When Genisom M1 is powered on with a single battery, inserting another powered-on/off the battery will automatically activate and connect such battery.

B. Power on the Remote Control

If you press and hold the power button of remote control, the remote control screen and power indicator will be illuminated; since the remote control is paired one-to-one with the robotic dog before it is delivered from the factory, it will be automatically connect with the robotic dog upon startup.



Once the remote control is turned on, click the APP icon on the screen to enter the APP control interface. Once the health status of APP is confirmed, you can proceed to control the robotic dog.

C. Operation Guide

For remote control operation, please refer to the Genisom M1 Remote Controller User Manual.

D. First Power-On Verification

- Basic Motion Test: Use the APP of the remote control to command the robotic dog to perform simple actions such as standing, going prone, moving straight forward/backward/leftward/rightward and turning; confirm that the joint can move freely; in case of jerking, abnormal noise or inability to stand, power off immediately and check

for joint jamming or incorrect posture.

- **Sensor Status Test:** All sensors of vision, laser, ultrasonic, and inertial navigation can function normally and data can be displayed properly on the APP.
- **Status Feedback Check:** Observe the equipment status indicated by the LED, LCD or the APP to confirm normal battery level, connection signal, firmware version, etc. If any fault prompt has appeared, be sure to shoot the trouble according to the operation manual.

2.6 Emergency Stop and Protection

A. Hard Emergency Stop Trigger and Release

- **Hard Emergency Stop Trigger:** When the robotic dog, whether in autonomous motion or remote control mode, is out of control or malfunctioning, the operator shall press down the red hard emergency stop button on the robotic dog's back, in which case, the hard emergency stop red light will be normally on to trigger the hard emergency stop protection, and the robotic dog will slowly lie down and remain motionless; a real-time pop-up alert will be displayed on APP.
- **Hard Emergency Stop Release:** if you turn the hard emergency stop button clockwise, the hard emergency stop will be released.

B. Soft Emergency Stop Trigger and Release

- **Soft Emergency Stop Trigger:** When the robotic dog, whether in autonomous or remote-control mode, is out of control or malfunctioning, the operator can press down the soft emergency stop button on the remote control, then the robotic dog will cease its current action and remain stationary in a standing posture; a real-time pop-up alert will be displayed on APP.
- **Soft Emergency Stop Release:** Once the robot dog and its surrounding environment are confirmed safe, please release the soft emergency stop via the APP, restoring both the APP and robotic dog to normal status.

C. Overheat Protection

- The robotic dog is equipped with comprehensive temperature detection functionality; once the joint, main control and battery of the robotic dog is overheated, it will enter the state of overheat protection, ceasing all current motion, going prone and remaining still. The overheat location and temperature can be viewed on the APP;

once the temperature has dropped to the normal level, you can continue to operate the robotic dog.

D. Low Battery Protection

- When the charge level of both batteries is below 20%, the robotic dog will enter the low battery warning state and charging should be performed immediately. When the charge level of both batteries is below 10%, the robotic dog will trigger low battery protection so that it will automatically go prone and no longer respond to remote control commands from the handle. Please replace the batteries before continuing use.

E. Fall Protection

- The robotic dog is designed to attempt recovery to the standing position after a fall, under the control of a reinforcement learning motion control model. When the surrounding environment does not permit recovery, the robotic dog will maintain a fixed posture and give an alarm.

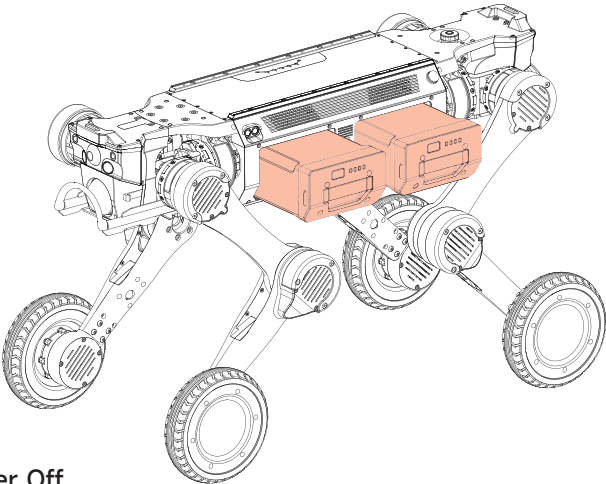
F. Expansion Bay Power Supply Protection

- The expansion bay is equipped with a separate power button, allowing independent control of its power on/off status. When the machine is powered on as a whole and the mounted payload has to be replaced, the expansion bay button can be triggered to directly power off all interfaces in the expansion bay without power outage of the machine as a whole. The expansion bay button should be inside the compartment to avoid accidental external contact causing the upper assembly to power down directly.

2.7 Battery Swapping and Power-Off

A. Change the Battery

The robotic dog features dual batteries with hot-swap capability. When powered by both batteries, you can directly unplug one powered-on battery and replace it with a battery in either an ON or OFF state; the robotic dog can be maintained operating normally in the process of battery changing and powered by dual batteries;



B. Power Off

Robotic Dog Power Off: In the single-battery or dual-battery power supply mode, turn off any battery. The battery indicator will be turned off, the robotic dog status indicator will be turned off and the robotic dog will be powered off;

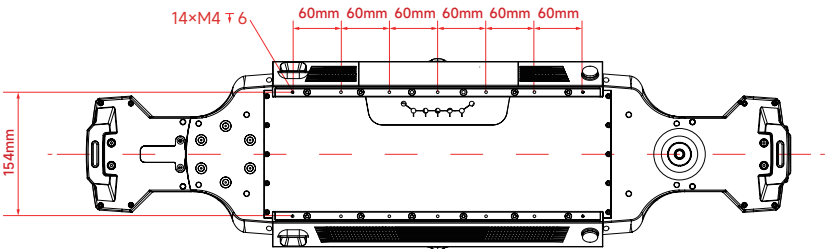


Warning Prompt

- Whenever possible, please first adjust the robotic dog to a horizontal prone posture once powered off; avoid powering off directly while the robotic dog is in a standing posture.
- When the robotic dog has only one powered-on battery, it is prohibited to shut down by directly pulling out the powered-on battery.

2.8 Payload Expansion

The space on the robotic dog's back is flat, with a load of 30kg. It is equipped with dual rails on the back to facilitate the easy installation of mounted payload. The specific dimensions of dual rails are detailed as follows:



The back of robotic dog has an expansion bay entrance. The power and communication cables of the mounted payload enter the expansion bay and connect to the aviation plug, enabling power supply and communication between the robotic dog and the mounted payload;



Warning Prompt

- The robot, once fitted with a payload, shall only support the Basic Mode of Motion, so please Do Not use the Elevated Platform Mode after adding a payload.
- When adding a payload to the back of the robot, its motion performance may be affected, so please be sure to consult our after-sales service staff for related matters before installation.
- When using an external power interface to supply power to a load, please note that the total power the interface can provide externally does not exceed 480W.
- To ensure IP67 rating, all interfaces shall use IP67 aviation plugs with protective caps. Please cover any unused aviation plug interfaces with caps.
- When installing a top-mounted payload and connecting the power interface, be sure to have the robotic dog powered off or have the expansion bay powered off.

2.9 Charging

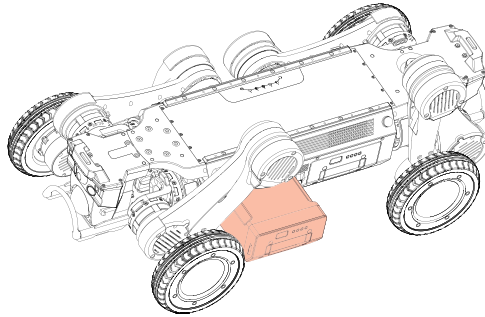
2.9.1 Robotic Dog Battery Charging

The dual batteries equipped on the robotic dog both feature a plug-and-play quick-change design, so for charging, you are only required to remove the batteries and charge them using the attached dual-battery charger cradle and charging adapter. The specific operations are detailed as follows:

A. Unplug the Battery

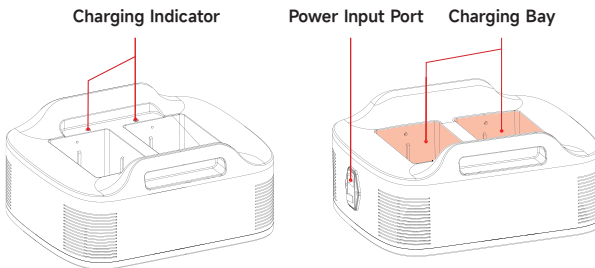
- Assume a horizontal prone posture, with the abdomen completely against the ground, legs naturally placed on both sides of the body, lower legs fully retracted, and all 4 knee joints and wheel-leg flat on the ground; lift the front/rear legs on the battery side in sequence to leave space for unplugging the battery;
- Alternatively, before turning off the robotic dog, directly execute the battery swapping posture, in which case, the robotic dog will automatically assume a horizontal prone posture and lift the front and rear legs on the battery side to leave space for unplugging the battery;

- Gently pull the battery hand strap to unlock the battery latch, then pull out the battery from the robotic dog.



B. Charging Preparation

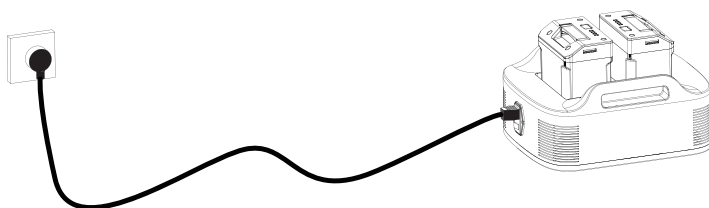
- Check the battery's exterior for integrity and confirm no bulging, leakage or other damage.
- Place the charger cradle on a hard and flat surface to ensure stable placement and prevent tipping in the process of charging.
- Connect the charger to a 220V AC power; turn on the charger cradle's rocker switch, on which the red light normally ON means that the charger cradle is connected and powered on.
- The charging environment should be kept dry and cool, away from anything flammable and explosive, with the ambient temperature around the charger cradle ranging from 0 to 50° C.



C. Battery Charging

- Align the battery with the charging interface on the charger cradle and insert it into the battery holder, which will support single-battery and dual-battery charging.

- Keep the indicator's green light on the charger cradle corresponding to the battery's charging status normally ON, indicating stable charging.
- The battery indicator will be illuminated in sequence to display the charging progress; and the LED normally ON denotes that its corresponding battery segment is fully charged, whereas a rapidly flashing LED denotes the segment presently under charging.
- When the battery is fully charged, all 4 indicator lights will remain normally ON, then please promptly disconnect the battery or the power source of charger cradle; **the time for charging should not be longer than 6 hours.**
- Once a fully charged battery is removed, please promptly turn off the charger cradle to avoid the charger cradle's plug being live, posing the risk of electric shock.

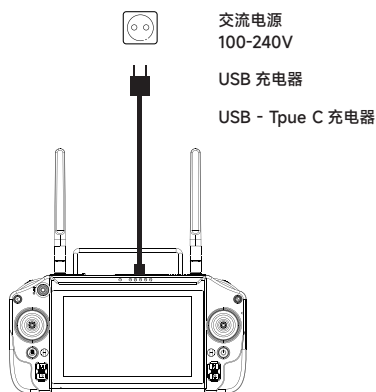


Note: It is prohibited to charge the battery using third-party chargers or charger cradles.

2.9.2 Remote Control Charging

When the battery indicator of remote control shows low level, please charge the remote control as shown in the figure below:

- Please charge the battery with the original USB charger.
- In the process of charging, the battery indicator of remote control will be illuminated in sequence to display the charging progress; and the LED normally ON denotes that its corresponding battery segment is fully charged, whereas a rapidly flashing LED denotes the segment presently under charging.
- To maintain the remote control battery in its optimal condition, please be sure to have it fully charged once a month.

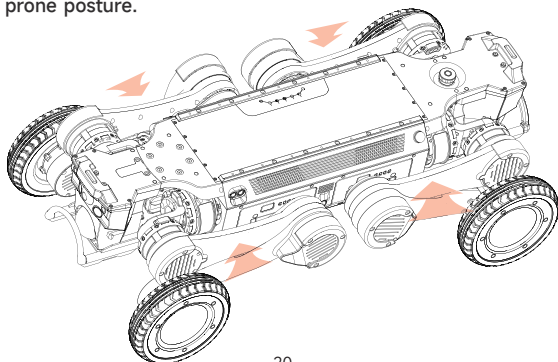


2.10 Transporting

2 modes of transporting are supported by the robotic dog: transporting while powered off and transporting while powered on.

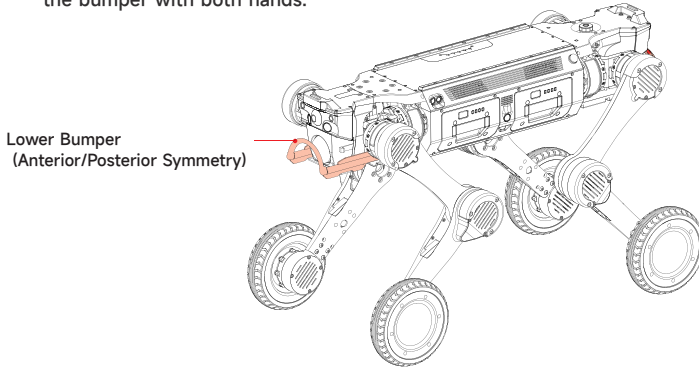
A. Transporting in Powered-Off State

- Place the robotic dog in a horizontal prone posture, with its abdomen completely flush against the ground, legs naturally placed on either side of the body, lower legs fully retracted, and 4 knee joints and wheel-legs lying flat on the ground.
- In the process of transporting, 2 persons shall be caused to stand at the head and tail of the robotic dog respectively, use both hands to hold the designated lifting points (the position of lower leg near the knee joint); lift the thigh and lower leg upward to the joint limit to prevent the dog's legs from swinging, enabling successful transporting of the dog.
- Once transported to the destination, place the robotic dog on the ground, still in a horizontal prone posture.



B. Transporting in Powered-Off State

- The robotic dog features a locked posture well developed. While powered on, its limbs can be locked, allowing a single worker to carry the robotic dog by gripping the bumper with both hands.



Warning Prompt

- Please pay close attention to the warning labels on the robotic dog in the process of transport to avoid pinching hands with the dog's legs.
- When transporting the robotic dog while it is powered on or immediately once powered off, grasp it at positions as far away from the joints and battery as possible to avoid burns from heat generated by the battery or joints.

2.11 Storage

A. Preparation before Storage

- **Environmental Preparation:** The storage environment shall be at the temperature of -20°C $\sim$ 60°C , kept dry and ventilated, and kept away from strong magnetic fields (e.g., high-power transformers, electromagnets) and strong vibration sources (e.g., generators, crushers).
- **Cleaning:** Remove dust, stains and other impurities from the surfaces of the robotic dog body, remote control, battery and charger cradle. Avoid liquids entering the robotic dog's interfaces, radiator holes, etc., to prevent its internal components from being damaged by moisture.
- **Status Check:** Check the robotic dog, remote control, battery, charger cradle, etc., to ensure no physical damage and keep them in a good functional state.
- **Battery Power Regulation:** Charge the battery to 50%~60%. This power range can

effectively prevent battery damage due to excessive discharge, while also avoiding its capacity degradation caused by long-term storage at full charge.

B. Storage Method for Each Component

- **Storage of Robotic Dog:** Power off a cleaned robotic dog, pull out its batteries and place it stably inside the dedicated packing case.
- **Storage of Battery:** Place the two removed batteries in the packing case, each battery stored separately to avoid mutual compression or collision; and prevent the battery's positive and negative poles from contacting any metal object to avoid short-circuiting.
- **Storage of Remote Control:** Power off the remote control, place it into the dedicated remote control protective sheath, and store both together in the packing case; avoid severe impact or compression to prevent the remote control shell from cracking, the buttons from being damaged or the display screen from breaking.
- **Storage of Charger:** Place the charger into the dedicated charger storage bag or the charger storage space inside the packing case; keep the charger isolated from other metal components to prevent wear or damage to the charger interface; check whether the charger plug is intact or not; if any damage or rust is found on the plug, replace it promptly before storage.
- **Storage of Packing Case:** Fold the packing case neatly and place it in a dry and ventilated environment; avoid moisture, mold or deformation from any heavy object pressing upon the case, which could affect its subsequent use. If the packing case is damaged or its load-bearing capacity is reduced, please promptly replace it with a new dedicated packing case to ensure safe storage and transportation of the equipment.

C. Maintenance and Inspection during Storage

a) Short-term storage (1~3 months)

- Conduct a monthly visual inspection on the robotic dog, batteries, remote control and charger to confirm no damage, deformation, rust or other defects on all components.
- Check the charge level of batteries once; if below 40%, charge them to 50%~60% before continuing storage.
- Check whether the temperature and humidity of the storage environment are satisfactory or not, and promptly replace any desiccant that has become ineffective.

b) Long-term storage (over 3 months)

- Conduct a power-on test on the robotic dog once every 2 months. Connect the robotic dog to a power source (or install batteries), power it on and run it for 5~10min; check whether all functions of the robotic dog are normal and whether any joint can move freely.
- Perform the charge-discharge maintenance on batteries once every month (discharge the battery to 30% and then recharge to 60%) to prevent memory effect and ensure battery capacity.
- Perform a functional check on the remote control and charger once every 3 months; test the sensitivity of remote control button and the charger's charging function for normal operation; if any abnormalities are found, promptly contact our after-sales service for repair.

D. Precautions for Storage

- Do Not store the robotic dog or its accessories upside down or tilted, especially the robotic dog itself, since upside-down storage may cause its internal components to shift or become damaged, thus affecting its normal operation.
- In the process of storage, Do Not place any heavy object on the equipment or its packing case to prevent deformation from deformation under pressure or component damage.
- If the equipment has to be taken out of storage for use, first place it in a room-temperature environment to rest for 1~2 hours (if there is a significant temperature difference between the storage and usage environments). Wait until the device temperature matches the ambient temperature before performing the startup operation. This prevents internal condensation and damage to electronic components due to excessive temperature differences.
- Do Not let any non-professional disassemble the robotic dog, battery, remote control or charger during storage; if equipment malfunctions or abnormalities are detected, promptly contact the manufacturer's after-sales service staff for professional inspection and repair to avoid any equipment damage or safety accident caused by self-disassembling.
- Detailed records related to storage (e.g., time for storage, time for inspection, maintenance status, etc.) must be properly registered to facilitate subsequent tracing of the equipment storage condition and timely identification and solution of potential problems.

Q Power dead and startup failed

A Gently press the battery switch to check battery level;
Reinstall the battery: Keep batteries aligned with the machine body interface and install them properly until you hear a "click" sound;
Clean Interfaces: Wipe the metal contact of the battery and the machine body with a dry cloth or eraser to remove oxidation.

Q What to do if the remote control connection is abnormal?

A First, confirm whether the robot is powered on normally; if so, check whether the emergency stop status is deactivated, if not, shoot the trouble first, then deactivate the emergency stop after troubleshooting is completed; if the emergency stop is deactivated and the robot still cannot be controlled, restart the robot. If the abnormality persists, please contact after-sales service staff.

Q The robot's standing posture is abnormal upon power-on. Can it still be used?

A Do Not control the robot's movement at this time, but immediately press down the soft emergency stop to make the robot go prone, then power off and restart, before attempting to make the robot stand again. If the abnormality persists, please contact after-sales service staff.

Q Blurry/No Signal in Image Transmission Screen

A Gently wipe the camera surface with a lens cloth to remove dust and stains; optimize the signal environment by avoiding strong interference sources like Wi-Fi and Bluetooth, and shorten the distance between the control terminal and the robotic dog to be $\leq 10\text{m}$;
Turn off the robot and the control terminal, then restart and test the image transmission. If there is still no signal after restarting, please contact after-sales service.

Q What terrains can the robot adapt to?

A The robot is suitable for relatively flat terrain like plains and grasslands, and can navigate complex terrains such as stairs and slopes. However, please avoid operating and using the robot on extreme terrains (e.g., overly smooth surfaces like ice, sharp or highly uneven terrain, edges at heights, etc.).

Q What to do when encountering unsolvable problems even after consulting this manual?

A Save data and promptly contact after-sales service.

A. Application of Robotic Dog

- **Terrain:** Please try to avoid walking on smooth surfaces such as glass or ice; if walking is necessary, try to reduce the robotic dog's walking speed to prevent slipping and falling.
- **Climate/Weather:** Please avoid deploying the robotic dog in severe weather conditions such as heavy fog, thunderstorms, sandstorms or strong winds whenever possible.
- **Communication Interference:** Please Do Not operate the robotic dog in any environment with severe communication signal interference from sources like WiFi or RF; if necessary, be sure to turn off the interference sources or reduce their interference.
- **Electromagnetic Interference:** Please Do Not operate the robotic dog in environments with strong electromagnetic interference, such as near high-voltage power lines, high-voltage substations, communication base stations or signal towers. If necessary, please consult our after-sales service first.
- **IP Protection:** The robotic dog has a protection rating of IP67, allowing it to walk 1m underwater for 30min. Before application of functions, be sure to keep the robotic dog in proper condition, including keeping its exterior undamaged, the expansion port cover securely closed, and the battery and its compartment dry and free of moisture; after completing the 30-min walking underwater, promptly remove the robotic dog from the water, thoroughly wipe and dry its body, and perform any required maintenance before the next operation underwater. Any malfunction of the robotic dog caused by prolonged water immersion and so on may void the warranty.
- **Maximum Speed:** The robot dog can reach the maximum speed of 6m/s, with significant impact force; therefore, at any high speed, please be sure to keep the robot dog away from crowds.
- **Mode of Motion:** The modes of motion of robotic dog is divided into Normal Mode and Elevated Platform Mode. Please switch between different Mode of Motions according to the environmental scenario in the process of use.
- **Recovery from a Fall:** The robotic dog requires space to regain its standing posture after a fall. To avoid collisions, please ensure no persons or objects within the 2m extent around the robotic dog; and Do Not drag a fallen robotic dog when its hard emergency stop has not been triggered.

B. Battery Application

- If the battery emits a noticeable odor, shows signs of overheating or exhibits corrosion before initial use, please contact the battery supplier.
- Before allowing children to use the equipment, adults must clearly explain how to use the equipment and the battery, and periodically follow up to confirm and ensure their proper use.
- Please Do Not use or place the battery in an extremely high temperature (e.g., over 60 °C, such as under intense direct sunlight or inside an extremely hot vehicle), otherwise, the battery may be overheated or even catch fire, its performance may degrade and its service life may be shortened.
- Please Do Not use the battery in any environment with electrostatic discharge over 1,000V, as this may damage the protection circuit and create a safety hazard.
- The battery can only be charged within the temperature range of 0 to 50°C. Charging outside this temperature range may cause the battery to leak liquid, overheat or severe damage. This may also cause degradation of the battery's performance and lifespan.
- Please Do Not charge or discharge the battery near anything flammable, as this may create a fire hazard.
- The battery will automatically enter the storage mode upon a single-cell under-voltage condition is detected. In this mode, the battery will make no response to the power switch and the battery indicator light will be kept normally off. The battery can exit the storage mode after being charged.
- Once powered off via the battery button, the battery will enter the sleep mode and can be awakened by communication, pressing the button or charging.
- If the battery circuit terminal has become dirty, please wipe it clean with a dry cloth before use; otherwise, poor contact may lead to performance failure.
- The battery should be stored at room temperature and charged to 30%~60% of its capacity. To prevent the battery from being over-discharged, it is recommended to charge the battery to 50% with the standard charging method once every 3 months; if the battery has been stored for over one year, it is advised to perform one full charge-discharge cycle annually with the standard method to activate the battery.
- A battery, if left unused for an extended period, may be in an over-discharged state

due to its own self-discharge (below the over-discharge protection voltage or the over-discharge voltage of cell), or even the cell may be discharged to 0V. Continued use of such battery may carry risk. To prevent over-discharge, please be sure charge the battery regularly to maintain its voltage between 30% and 60% of its capacity.

- The plug cord has limited tension resistance and excessive pulling force may damage the battery. Once the battery is installed into the machine, be sure not to swing the battery and the plug cord freely.
- Do Not use or store the battery near fire or a heater or in high-temperature environment ($>80^{\circ}\text{C}$).
- The use of any unauthorized charger is prohibited and any damage to the battery caused thereby is not covered under warranty.
- Do Not connect the battery with reversed polarity nor short-circuit the battery by directly connecting the positive and negative terminals with wires or any other metal objects.
- Do Not incinerate or heat the battery nor cause any excessive mechanical shock on the battery such as striking, throwing or stomping. Do Not pierce the battery with nails or any other sharp objects.
- Do Not disassemble the battery, since disassembling will void the warranty!

C. Other Precautions

- If the robotic dog shows signs of water ingress, immediately turn off its power, remove the battery and allow it to dry thoroughly.
- If the robotic dog smokes or catches fire, prioritize using fire extinguishers such as carbon dioxide or dry powder. Do Not use foam fire extinguishers.
- If the robotic dog exhibits uncontrolled motion such as leg swinging, prioritize triggering the soft or hard emergency stop and ensure the safety of personnel, then power off and remove the battery before proceeding with troubleshooting; in case of any knotty problems, report them to our technical support officers for troubleshooting, equipment repair or replacement.
- Unauthorized disassembly of the robotic dog is prohibited. Warranty will be voided if disassembled!

A. Routine Cleaning Guidelines

After using the machine, if there are stains on the surface, please clean them promptly; before wiping the body, first turn off the power, then use a dry, clean and soft cloth to wipe, pay special attention to whether the camera and radar are cleaned thoroughly and avoid scratching lens with any hard object.

Do Not use corrosive liquids such as alcohol or disinfectants for cleaning.

B. Regular Inspection and Maintenance

To ensure the robotic dog's operational stability and extend its lifespan, regular preventive inspection and targeted maintenance are required.

Maintenance Cycle	Maintenance Module	Specific Maintenance
Daily Check (Approx. 5min before each use)	Appearance and Structure	Check the body and leg links for any deformation or crack; Check whether joint and foot fastening screws are loose or not; Check the foot tires for detachment or severe wear (tread worn smooth); if present, please replace them promptly.
	Battery and Power Supply	Check whether the battery shell has exhibited no bulging or leakage; Have the battery securely installed to prevent loosening in the process of operation; Check the battery level via the screen/app (charge if below 20%)
	Functional Test	Start the equipment and operate the joystick to test whether all joints can move freely and whether there is any stuttering or abnormal "Click" sound; Check and make sure that the camera and sensor lenses are unobstructed and that the image transmission screen is clear; Test whether the remote control signal is stable within 10m (no delay).

Weekly Maintenance (Once a week, approx. 20min)	Overall Machine Maintenance	Wipe the body shell with a dry and soft cloth (for oily stains, lightly dampen with a small amount of clean water and then wipe gently); Gently wipe dust off the camera and LiDAR surfaces with a lens cloth; Use a brush to clean debris from gaps around sensors; Use tweezers to clean weeds or threads entangled in the tires to prevent jamming.
	Joints and Drive System	Wipe all joint surfaces and crevices with a dry and soft cloth to remove mud and dust; after wading, dry the bearing part using a hairdryer in low-temperature gear; Manually articulate each joint to confirm no jamming, abnormal noise, loose screws or tangled/worn cables.
Monthly Maintenance (Once a month, approx. 30min)	Software Update	Check the firmware update via the ancillary APP or official website; Download and install the update as prompted (keep the battery level ≥ 50% during upgrade; Do Not cut power).
	Whole Machine Maintenance	Use a soft-bristled brush or air duster to remove dust and debris from the internal gaps of the robot. Inspect all screws at the connection points of the tires, legs, and trunk. Tighten any loose screws immediately. Check the wear condition of the tires. Replace them promptly if any damage is found.
	Battery Maintenance (Monthly)	Perform a charge-discharge maintenance on the battery once a month (discharge the battery power to 30%, then recharge it to 60%) to prevent the decline of battery activity. Inspect the battery appearance and bottom circuit terminals monthly. Timely clean up dust and foreign objects. If any damage is found, replace the battery promptly.



Precautions

- Power off the equipment during maintenance to avoid damage from accidental operation.
- When replacing spare parts (e.g., tires, batteries), please use genuine parts; non-genuine parts may compromise the equipment safety.
- In case of any complex malfunction (e.g., joint jamming, sensor malfunction), please Do Not disassemble it yourself, but contact after-sales technical support.

A. The warranty periods for main components of the product you purchased are as shown in the following table:

Component Name	Warranty Period
Overall Unit	1 year
Mainboard	12 months
Joint Module	7 months
Battery	6 months/200 cycles

Note: Vulnerable parts such as the outer shell, foot tires and accessories like the transport case are not covered under the warranty. Please consult after-sales support if needed. Different warranty periods are offered for different components of the Product and mileage limits for them are set. If either the mileage of the Product or the warranty period for specific components exceeded the limit stated in the table above, the warranty would be automatically converted to paid repair service.

After you purchase this product, the warranty period shall be commenced from the date you sign for its receipt. To protect your interest, please be sure to check and confirm on the spot that the product and its attached articles/data are in good or normal condition upon signing for the receipt, otherwise, please contact Party B immediately. According to the logistics company's requirement for claim settlement, for any damage caused by logistics transportation, you shall contact the after-sales department within 24 hours of discovering the logistics-related damage; otherwise, your request cannot be processed.

B. Exceptions to Free After-Sales Service: Under any of the following circumstances, the entitlement of free after-sales service for your product under warranty will be void. However, you may still opt for paid repair services if available.

- Damage from collisions, drops, burns, etc., not caused by the product's own quality defects (e.g., human factors)
- Any acts of secondary development of the product (with or without prior authorization), hardware modification, disassembly, etc.;
- Damage caused by unauthorized repairs of components, circuit modifications, battery

- pack alterations or improper use of chargers;
- Damage caused by immersion in liquid, debris ingress, chemical contact, scratches, etc.
 - Damage caused by any use beyond the safe load limit of the product;
 - Damage caused by prolonged inactivity of the product;
 - Damage caused by failure to activate, install or use the product as required by the user manual;
 - Product malfunction or damage caused by the use of non-genuine accessories (including but not limited to replacement, retrofitting, etc.);
 - Damage caused by operational errors/intentional actions leading to the product impact against any hard objects, drops or evident signs of impact, collision or scratches on the product surface;
 - Damage caused by force majeure or extreme adverse conditions (including but not limited to strong magnetism/strong interference/high temperature/low temperature/natural disasters);
 - Damage caused by operation in environments with sharp terrain, significant undulations, smooth surfaces, etc.

C. How to Send for Repair;

- When contacting for after-sales service, please describe all defects of the product in detail. We will first attempt to diagnose and solve your problems via phone, email or remote assistance.
- If the above methods are unavailable to solve your problems, you may send the product to Party B for further test, upon which corresponding arrangements or decisions will be made. If, upon inspection, it does not comply with the free warranty policy, you may choose paid after-sales service (Party B will then confirm the relevant after-sales services and charges with you) or have the original machine returned.
 - ※ You are responsible for advance payment of the mailing fees when sending the product to Party B.
 - ※ Party B, upon receipt of the returned product, will conduct fault detection to determine liability for problems found. If it is confirmed through test to be the product's own quality defect and fall within the warranty period, then all related costs and courier fees for return will be borne by Party B.
 - ※ If the product, upon inspection, is not eligible for free repair, you may opt for paid repair or have the faulty product returned. Party B will confirm the repair program with you, if accepted, Party A will pay all fees and expenses according

to the confirmed program; if not accepted, the equipment will be returned to Party A, and all related inspection fees, labor costs or freights arising therefrom will be borne by Party A.

- ※ Water ingress to the main body of the product, charger or remote control, if occurred, will severely affect the product performance, as a result, the product will become irreparable. Therefore, Party B cannot provide repair services but may offer paid replacement services, as the case may be. Please be informed that and consider returning as appropriate.

