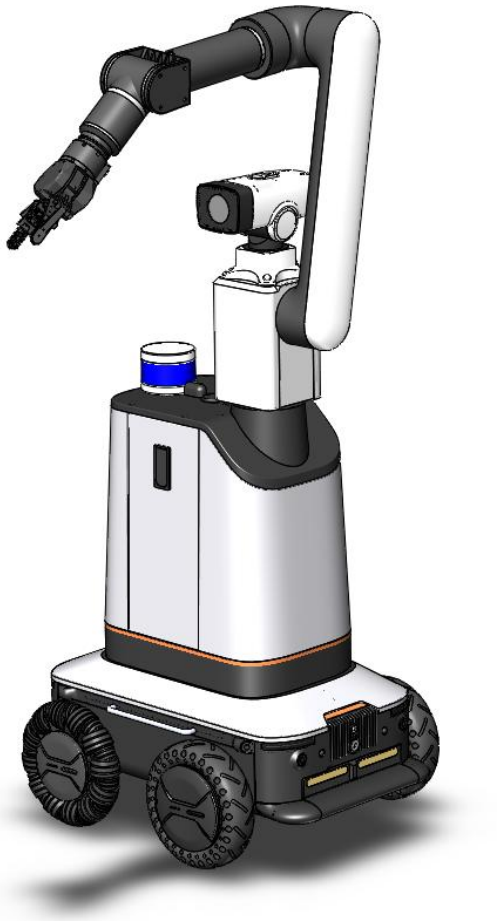
MH3000 Composite robot

Performance parameter table



V 1.0

1. Product use, function and composition

The robot is mainly based on trackless navigation technology and four-wheel drive sports chassis, which integrates a variety of technologies, including chassis drive unit, mechanical arm, navigation unit, cradle and other modules, and has the ability of trackless, adjustable, intelligent and long-term operation.

The system integrates the body operation system, background management platform and remote control. The functions can include photo upload and object detection (default example switch cabinet door and button operation program), and other goals need to be developed twice (based on the existing communication interface, provide interface documents). Through the remote control network, the product can replace the manual, to achieve routine inspection and special inspection.

The system takes robot body, based on trackless navigation technology and four-wheel drive chassis; including safety protection unit, drive unit, power supply unit, main control unit, communication unit, navigation unit, mechanical arm unit and other modules, has the advantages of trackless, deployable, intelligent, cluster and long-time operation.

The robot can mainly provide fixed point path inspection, designated point inspection, remote control inspection, high-definition visible light real-time video monitoring and other functions.

2. Product function description:

The robot has the ability to walk, observe and record, and the combination of these functional units gives the robot rich operation ability.

The robot can perform example patrol, special patrol, manual operation, one-button return task, complete automatic navigation and walking, visible light photography, and claw clip operation. Combined with our non-code control system, we can easily realize the above functions for different sites. According to the demand of unmanned operation, the functions of low-power automatic charging and offline operation are developed. Work at night.

The mechanical arm supports remote manual control. If the mechanical arm autonomous grasping operation is realized, the customer needs to develop the mechanical arm grasping target identification according to the application scenario, and then set the automatic grasping action combined with our teaching function. We can provide a mechanical arm communication protocol that can feedback the mechanical state data to facilitate secondary development.

motor function

1) Laser navigation and positioning

Robot using 3d laser navigation mode, using the process is: through the field deployment for station 3 d point cloud map, artificial set path and virtual track,

the robot to a coordinate robot according to the current coordinates, target coordinates and virtual track automatically generate navigation path, automatically walk along the path to the specified coordinates and stop at the specified location.

2) Road condition detection and safe driving

The robot obtains local road conditions through the road condition sensing sensor to automatically prevent dangerous actions.

3) collision prevention: the robot by ultrasonic distance for obstacles, when obstacles above 300mm, less than 0.5m when the robot began to slow down, 250mm from obstacles robot stop movement, obstacles can recover after walking, if the distance ranging sensor detection failure, robot contact with obstacles, the secondary protection, safety touch for flexible hollow rubber material, has buffer function, at the same time in contact with obstacles to the robot parking instructions, forced robot to stop movement.

4) Anti-drop: the robot detects whether there is a pit in front of the wheel through the geodesic sensor. When the width of the pit is greater than 200mm and the height is greater than 80mm, the robot immediately stops moving to prevent falling.

3) Shortest path selection

When the robot performs the "go to the xx location" command, it can automatically find the shortest path according to the virtual map.

4) one key

The system end issues the "one-button return home" command, and the robot immediately returns to the robot workstation.

5) Task interruption and switching

The robot has a task execution list, which supports the project switching of example patrol, special patrol and manual remote control mode.

6) Network interruption works offline

After the robot is disconnected from the on-site server network, the robot continues to perform the task according to the pre-set walking route and inspection points, and the task data is stored in the ontology. After the network is restored, the task data can be transmitted to the system end.

7) Automatic charging

When the robot power is lower than the set threshold, it will automatically return to the robot workstation for charging.

8) Manual remote control

The manual remote control function is mainly used for the robot transfer, deployment and exception handling. Remote control instructions can be controlled from the system end under the interface

Hair, can also be used with the standard handle connection robot for remote control.

9) Ontology parameter configuration

The parameters of the robot can be configured through the system end, including the maximum running speed of the robot, the obstacle detection distance, etc.

10) Body self-test and alarm

With real-time power display, ultrasonic obstacle detection, anti-collision strip

detection.

11) Heat dissipation system
Circulation circulation inside the fan

3. Technical indicators

3.1 Technical parameter table

Table 2-1 Technical parameters table

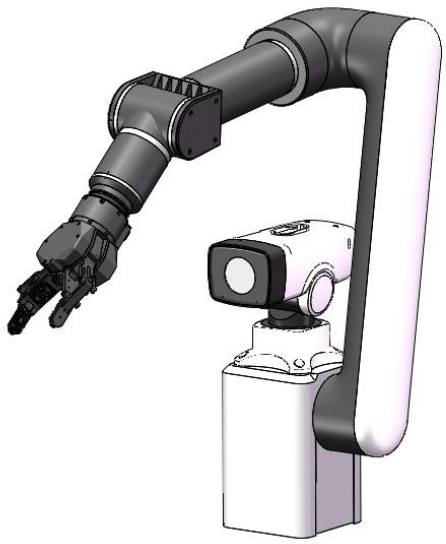
	order number	type	parameter
Navigation chassis	1	Drive form	4 Wheel differential drive
	2	To avoid obstacles	There are 8 ultrasonic sensors, 2 anti-collision bars (front and rear), and 4 geodesic sensors
	3	Body material	High carbon steel material interior structure, plastic shell
	4	Radar model	Radium god 16-line radar
			Laser safety level: Class1 Human eye safety ranging ability: 70 meters measuring distance Horizontal FOV: 360° Horizontal angular resolution: 0.36° Frame rate: 10Hz
	5	Chassis positioning accuracy	±10cm
	6	Maximum navigation speed	1m/s
	7	Maximum remote control speed	1.5m/s
	8	Vertical barrier height	30mm
	9	Across the ditch ability	50mm
	10	turning radius	pivot steering
	12	climbing capacity	10°
	13	duration of flight	6h
	14	How to work	Full autonomy, man-machine collaboration, remote expert mode
	15	Wireless remote	Wifi / 4g / Handle remote control

		control	
	16	Master controller performance	CPU : Intel-i5 8265U Memory expansion: 16G Hard disk: 120G SSD bit Provide the upper computer control interface (network port) and communication protocol, and support the secondary development.
	18	Software supporting	Slam navigation
			Client software (navigation control, robotic arm instruction, real-time control) Support for running on windows and Ubuntu
			Support for cloud head remote control
			The operating environment of the robot body is the Ubuntu18.04 system platform
	19	charging interval	≤2h
	20	Battery capacity and endurance	48v20ah, at 6h working hours
	21	charging pile	EU plug, 220-230VAC 50Hz
			400mmX360mmX300mm
Cloud Terrace	22	Visible optical resolution	1080p
	23	Double	The optical doubled by 4 times
	24	angle of rotation	Horizontal 360 ° continuous rotation, vertical-35° - -40°
arm	16	End load	3kg
	17	Terminal line speed	≤1m/s
	18	6-axis robotic arm arm span	1000mm
	19	The waist can be lifted	0.5m
	20	Combined post-end work height range	0.2m-3m
MH3000 Complete machine parameters		Minimum pass width	800mm
		Long, width and height (storage status)	762mm * 610mm * 1350mm
		conduct oneself with dignity	110kg
		IP grade	IP44

		How to work	Full autonomy, man-machine collaboration, remote expert mode
		communication mode	WiFi/4G/5G
		English materials	Provide the operating instructions in English
		software	Support English
		Logo ask	No logo, the software supports independent upload logo
		Summary of the machine	Drawing ability: · Construction of scene 3 D map by multi-line lidar; · The 3 d map area reaches 250,000 square meters; · Map construction grid resolution of 5cm; · Mobile obstacles can account for no more than 10% of the map area to realize the map building function · The map can be edited twice, and the virtual path can be drawn; · Global initialization function
			To avoid obstacles · Stop or detour according to the path; · In stop mode, set the safe distance where obstacles can be found and stop at the safe distance. · In the obstacle winding mode, it can identify the static obstacles on the navigation path and re-choose other feasible paths;
			self-contained navigation · With fixed-point autonomous navigation, support for hand-drawn path, track mode, and other path planning planning methods; · In the fixed-point navigation mode, the optimal path can be generated independently, and the navigation accuracy of reaching the target point is 5cm; · In the hand-painted path mode, it can run along the hand-drawn route, and independently optimize the path to smooth the path; · Navigation maximum speed of 5 km/h;
		Communication protocol function	Provide detailed communication protocol documents, to meet the control of all

			parts of the robot 1. Chassis communication: moving action control, light control, lifting control, etc 2. Navigation communication: navigation real-time information, map editing, road network information, etc 3. Mechanical arm communication: point-to-point position control, continuous point trajectory motion control, etc
		Predeposit teaching action	1. High, middle and low shooting of the robotic arm 2 Knob operation (as an example only) 3. Switch the cabinet door operation (as an example only) 4. Grab the preparatory action

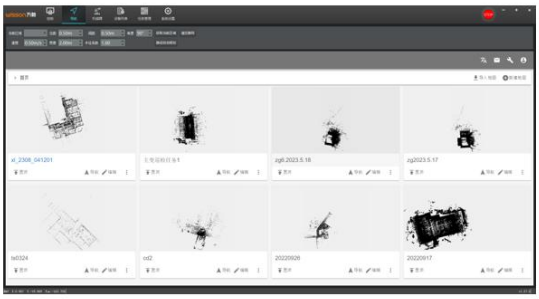
Mechanical arm picture:



Chassis picture (lidar removal part):

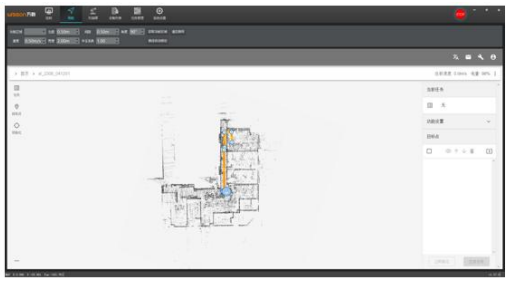
else:

Map Edit Page



地图选择页面

2.1.1 获取地图列表
2.1.2 获取当前地图
2.1.3 获取地图缩略图
2.1.4 地图重命名
2.1.5 删除地图工程
2.1.6 地图工程下载前压缩
2.1.7 下载地图工程压缩包
2.1.8 导入地图工程
2.1.9 地图工程组件列表
2.1.10 新建地图
2.1.11 切换地图



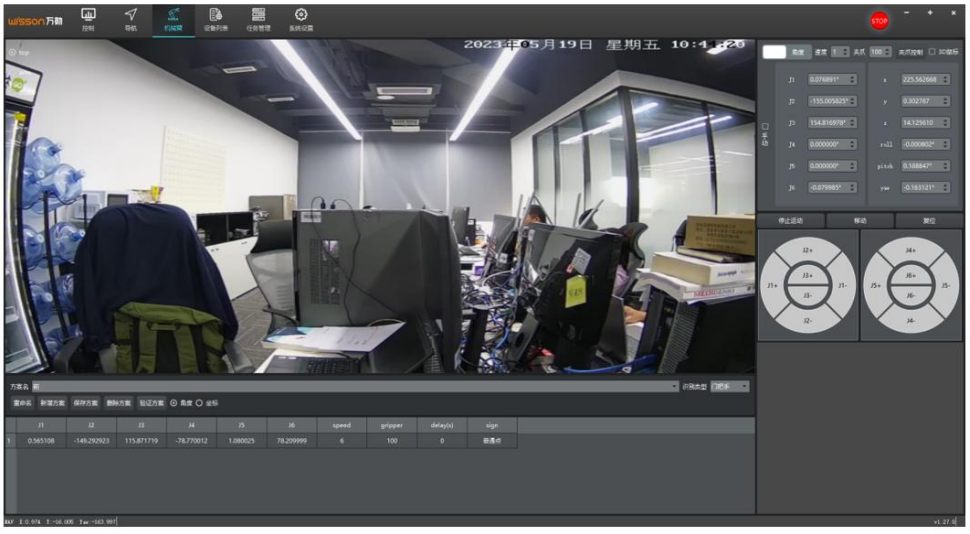
2.5 传感数据
2.5.1 获取实时点云数据
2.6 错误码
2.7 定位
2.7.1 机器人实时位姿
2.7.2 位姿初始化

导航点控制页面

2.2 瓦片地图
2.2.1 获取瓦片地图参数
2.2.2 获取地图瓦片
2.3 路网矢量数据
2.3.1 获取路网数据
2.3.2 路网数据保存

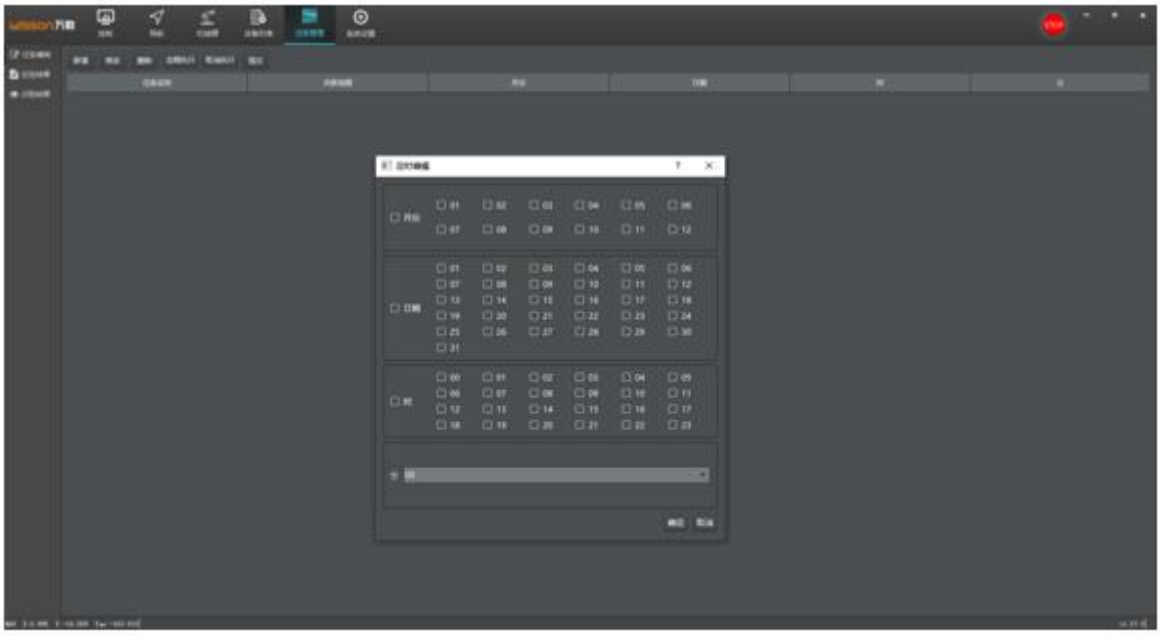
地图编辑页面

The ic arm teaching page



6.1、机械臂急停
6.2、机械臂复位
6.3、机械臂方向键自动走坐标
6.4、机械臂方向键自动走角度
6.5、机械臂走坐标
6.6、机械臂走角度
6.7 、机械臂走方案
6.8 、机械臂验证方案
6.9 获取机械臂方案名
6.10 保存机械臂方案
6.11 删除机械臂方案
6.12 获取机械臂方案的示教点
6.13、夹爪控制
6.14、3D鼠标控制

This interface can teach the action of the robotic arm, and the stored action set can be selected and set the execution time at the task point editing place of the control page. The teaching interface has three methods to control the robotic arm: 1,3d mouse control.2. Terminal coordinate control.3. Angle control of each axis.



任务定时编辑页面

巡检结果页面

3.2 Standard accessories

charging pile

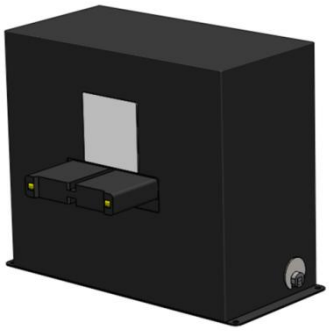


Photo: Autonomous charging device

remote-control handle

The remote control handle is used to control the movement of the robot, which can simply and conveniently realize the transportation of the robot and the artificial transfer of the robot.

Figure: Remote control controller

4. Environmental condition requirements

4.1 Ambient temperature

Working conditions: -10℃ ~ + 40℃;
Storage condition: -0℃ ~ + 40℃.

4.2 Relative humidity

Working conditions: relative humidity: 10~90%, 40℃, no condensation;
Storage condition: not more than 93% (temperature 30℃).

4.3 Protection grade

Prevent dust and moisture prevention. Protection level IP 44.

Warranty time: 1 year

Packaging method: wooden box bottom tray

Provide remote technical support