MULTIFIT®
众能力电

Tracking Solar Cleaning Robot (MR-T1 Series)

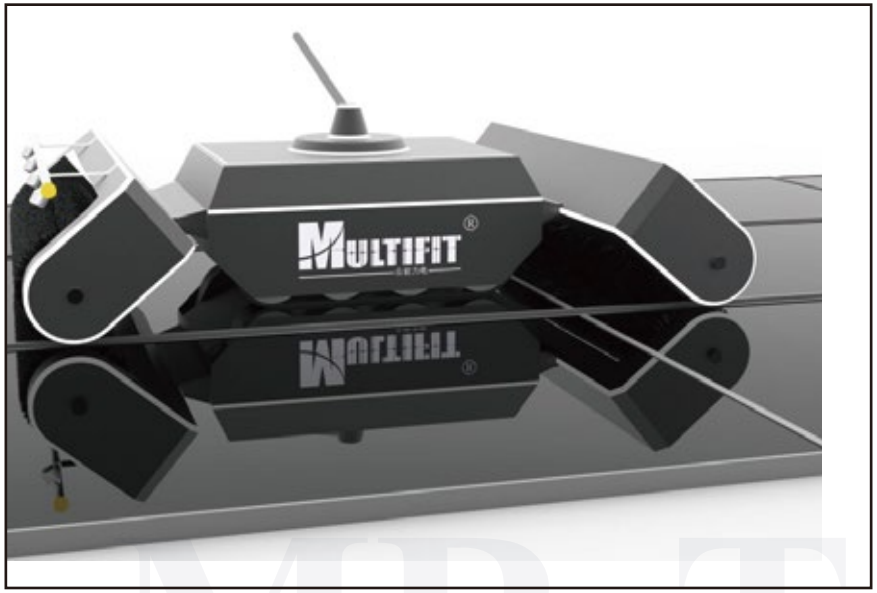
Beijing Multifit Electrical Technology Co., Ltd

The importance of cleaning solar power station

According to statistics, most of the solar cleaning jobs are still done by manual work. For better improving the cleaning efficiency and lowering the manpower cost. Since solar power stations are usually built in places with high terrain, sufficient sunshine, strong wind and lack of water resources, it is easy to accumulate sand and dirt on solar panels. If the dust and dirt are not removed in time, the power generation efficiency will be seriously affected by 8% to 30%. The hot spot problem on the pv panels caused by dust also greatly reduces the service life.

In order to solve above problems, Multifit Solar had developed many different kinds of cleaning robots suitable for different solar power stations.Its included Tracking Robot,Rail-type Full Automatic Cleaner Car,4-wheel Drive Robot,Crawler-type Robot and Semi-automatic Solar Cleaning Brush.

Multifit Solar had set up Smart Remote Control and Management Cloud Platform for our patent cleaning robot.In the process of intelligent cleaning, robots can automatically detect, track, locate, communicate and control groups, to meet the demands of different kinds of devices control and management.



Design Concept

◆ Based on the visual recognition algorithm, through the method of deep learning established a map of the boundary information of all photovoltaic modules, and the centimeter-level positioning accuracy, they can provide a drift-free and accurate global visual positioning information for the robot.

◆ The multi-sensor fusion technology can accurately obtain the slippage information of the robot moving on the photovoltaic module. Even if the visual information is lost for a short time, the basic positioning of the robot can be guaranteed. Our Robot has the extremely high positioning and the accuracy.

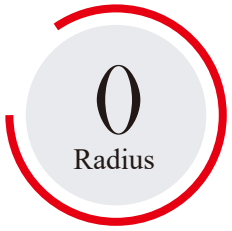
◆ The robot can completely accomplish high-precision tasks such as the point-to-point navigation and regional coverage in complex photovoltaic module scenarios. Our robot can achieve 100% coverage at one time to achieve clean photovoltaic panels without the dead ends. Through this way, it can effectively increase the power generation.

Tracking Solar Cleaning Robot

Multifit photovoltaic technology can enable our robots to obtain semantic information around glass reflective environments, allowing robots to recognize objects in glass reflective environments, and making more reasonable operating behaviors according to different environments. This technology is the core technology of the robot in the glass environment.

Product Features

- The visual positioning accuracy is less than 1 cm, and the accidental falling design is prevented. Global power planning and intelligent alarm function.
- Safe from falling, single person can move it， Easier to transport and load, Easily replace the consumable components， Multiple consumables can be reused， Eco-friendly economy.
- The path planning passes 100% coverage at one time, and only needs one key operation. The new sensing system and the algorithm accomplish the fully autonomous operation.
- A single machine can replace 10 labours, and one single person can monitor up to 100 MR-T1s. For Large-scale photovoltaic power plants, they can realize large-scale manual replacement.



0 turning radius

One-click
simple operation

Brush disassembly and
assembly time

Eliminate manual cleaning defects，Always the same cleaning quality

Avoid the "hot spot effect"

Autonomous Cross-Barrier Program Array Spacing Bridging Scheme

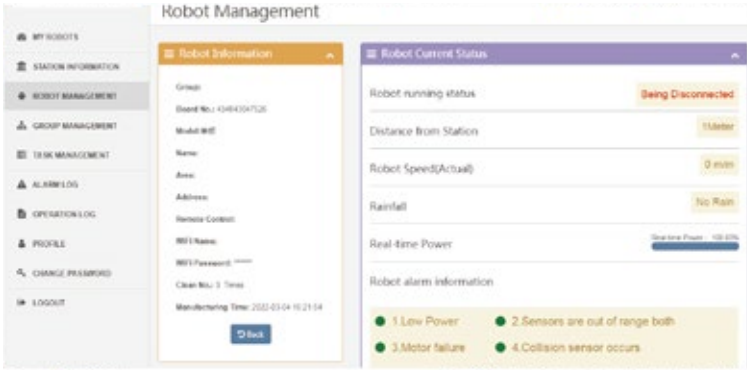
Deep learning database covers all solar panel types

MR-T1 Series Platform Parameters

Control method:

Remote controller 

Smart Management Control System



- Based on Windows operating system
- Based on the Navigation technology of Multifit vision
- Based on the Path Planning Technology of Multifit Platform
- Based on MR-T1 operating platform

MR-T1 Series Manipulation Parameters

- The maximum number of cleaning Robots that can be controlled by one person: 100
- It is recommended that one person control the maximum number of cleaning Robots on slopes: 4
- It is recommended that one person control the maximum number of cleaning Robots for the roof: 8
- Software maintenance upgrade: OTA/remote
- Can work at night: yes
- Whether the cleaning log can be viewed in real time: Yes
- Whether the cleaning Robots can automatically return to the station: yes
- Obstacle crossing distance: 20-40mm
- Whether it can be used for unmanned operation: Yes
- Remote control: yes

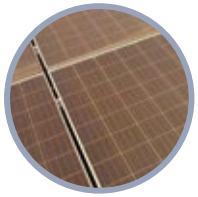
Fully automatic unmanned operation
Autonomous Cross-Barrier Program
Array Spacing Bridging Scheme

MR-T1 Series Cleaning Ability

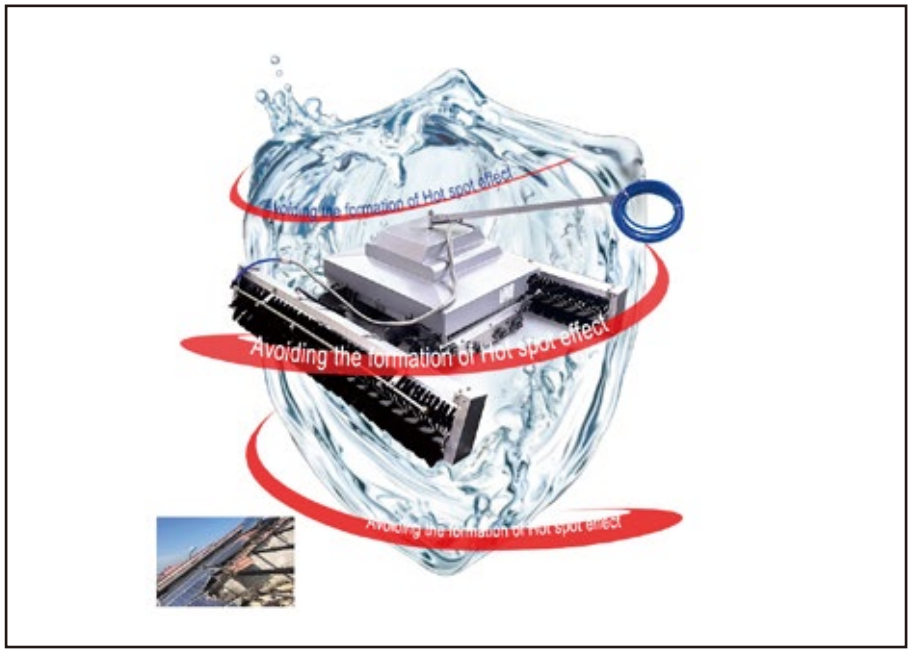
- Sink-float dust (adhesion ≤10-6N) cleaning result ≥99%
- Dust accumulation (adhesion ≤10-4N) cleaning result ≥99%
- Dry bird droppings (adhesion ≤10-2N) cleaning result ≥99%
- Heavy metal contamination (adhesion ≤20-10N) cleaning result ≥99%
- Cleaning efficiency (square meter/hour) ≥ 600


Bird droppings


Dust accumulation


Pollution dust


Cleaning residue



MR-T1 Series Technical Parameter

Model	MR-T1
Body Size (mm)	685*600*500
Body Weight	29 Kg
Total Weight	37.5 Kg (Brush Weight 8.5Kg)
Cleaning Efficiency/Hour	600 ㎡
Waterproof Level	IP65
Warranty	2 Years
Design Life	10 Years
Battery Capacity	10 Ah
Working Time	6-8 Hours
Charging Time	3.5 Hours
12 Hours Working Time	Replace the Battery Every Four Hours
The Angle of PV Panels	Dry Cleaning Mode:0~20° Washing Cleaning Mode:0~15°
Wind Resistance	50~61 km/h
Work at Night	Yes
Obstacle Crossing Distance	20-90 mm

Security Capability

- Working mode: autonomous operation (pre-planned path); remote control;
- Positioning method: AI vision
- Positioning accuracy: ≤10mm
- Steering mode: crawler-type maneuvering
- Anti-falling protection: AI vision + gravity sensing
- Anti-slip protection: crawler-type resistance + sucker
- Anti-tilting protection: AI self-correcting algorithm
- IP Level: IP65

Recommended Working Conditions

- Ambient temperature: -10~50℃
- Component Humidity: 5%~95% （No condensation）
- Component splicing gap: 20~90mm

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