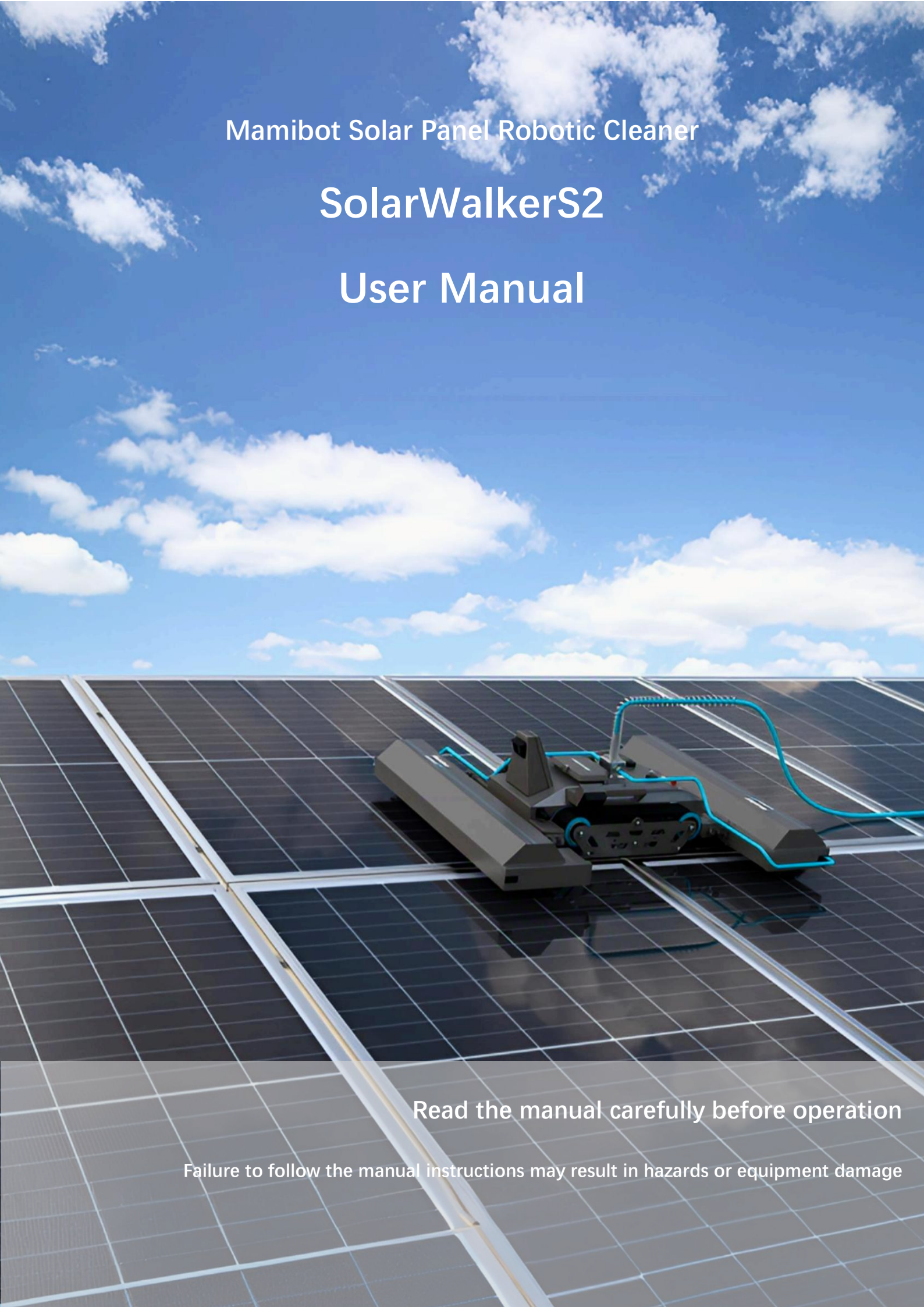
Mamibot Solar Panel Robotic Cleaner

SolarWalkerS2

User Manual



Read the manual carefully before operation

Failure to follow the manual instructions may result in hazards or equipment damage

Contents

CHAPTER 1. General Safety Instructions

Do not use the SolarWalker PV Cleaning Robot in non-photovoltaic (PV) module array scenarios.

Do not use the SolarWalker in environments of Non-PV Module Cleaning purposes;

Do not use the SolarWalker if the inclination angle of the PV module array exceeds 25° (for automatic cleaning mode) or 30° (for manual cleaning mode); or obstacles exist within 50 cm of the PV module array edges.

Do not use the SolarWalker if:

The inclination angle of the installed PV module array exceeds 25°, and the distance from the frame of the PV modules on the side closer to the ground to the ground exceeds 2 meters, while there is no protective measures are installed around the array;

Do not use third-party batteries or chargers. If battery damage is suspected, contact professional personnel from the manufacturer or authorized distributors for replacement.

Do not use the SolarWalker in environments with open flames, flammable materials, or fragile items.

Do not use the SolarWalker in extreme temperatures: above 45℃ (high temperature) or below -20℃ (low temperature).

Keep human hair, clothing, fingers, or other body parts away from the SolarWalker's moving components.

Do not use non-handle components (e.g., roller brushes, anti-fall sensor brackets) as handles.

Do not perform violent installation, disassembly, or plugging/unplugging of device connectors or other components.

Under no circumstances incinerate the SolarWalker, as its battery may explode as a result.

Do not turn off the power during an OTA update, which may cause the SolarWalker to fail to start.

Use the SolarWalker in accordance with the instructions in the operating manual, and only use accessories recommended or supplied by the manufacturer.

Ensure the power supply voltage matches the voltage marked on the charger.

Before using the SolarWalker, confirm that the battery and outer casing are properly installed and the battery is fully charged.

Do not use damaged batteries or chargers. If the power cord is damaged, to avoid hazards, it must be replaced by professional personnel from the manufacturer, its service department, or a similar authorized unit.

Before cleaning or maintaining the SolarWalker, first turn off its power switch and remove the battery.

When the SolarWalker is powered off and not in operation, ensure the waterproof covers for connectors and socket components are fully closed to prevent device damage.

Before placing the SolarWalker at the initial position on the PV module array, confirm in advance that the surface of the initial position is dry and free of excessive contaminant buildup, which could cause the device to slip or fall.

After cleaning operations, first wipe the anti-fall sensors with a damp towel, then dry them with a dry towel to prevent malfunctions caused by dust accumulation.

Before disposing of the SolarWalker, turn off the power switch and remove the battery.

The battery must be removed and disposed of separately in compliance with local laws and regulations. Handle the battery with care.

If the SolarWalker will not be used for an extended period, turn off the power switch and disconnect it from the power supply.

It is recommended to wear anti-static gloves when touching the SolarWalker.

Turn off the device and disconnect it from the power supply during severe weather conditions.

For rooftop PV power plant cleaning:

If there are no guardrails or safety nets around the PV array, install protective facilities that meet national standards before operating the SolarWalker to prevent personal injury or property damage caused by accidental device falls.

Do not enable full automatic mode without guardrails; only operate in semi-automatic or manual mode with an operator present.

Operators must be trained, familiar with all device functions and emergency response measures, and strictly follow high-altitude hazardous operation requirements by wearing safety helmets and, if necessary, safety ropes.

When potential safety hazards exist, install safety protection devices such as guardrails and protective sheds around the PV module array to prevent safety accidents.

When the SolarWalker operates at heights of 2 meters or more (including 2 meters) above the fall height reference plane with a risk of falling, the Technical Code for Safety of High-Altitude Operations in Construction must be followed.

If the SolarWalker fails to work normally due to falling, damage, or other factors, do not continue to use it.

To avoid injury, the SolarWalker must be repaired by the manufacturer or its authorized distributors/after-sales service providers.

Use this device strictly in accordance with the operating manual. The company shall not be liable for any losses or injuries caused by improper use.

Warning: When performing cleaning in the cliff-edge of Roof PV systeems, strictly control the robot's operation scenarios

Verify weather conditions: No strong winds (≤ Beaufort Scale Force 6), torrential rain, or heavy rain;

Strictly verify the inclination angle of PV modules in the working area;

Ensure PV modules are firmly installed with no looseness in connecting parts;

Confirm there is no damage, foreign objects, or obstacles on the surface of PV modules;

Arrange wet cleaning hoses in advance to avoid tangling or obstructing robot operation;

Evacuate personnel in the area below the cliff in advance;

Operators must monitor the entire cleaning operation and must not leave the site without permission;

Remove and evacuate valuable items (such as vehicles, etc.) below the cliff in advance.

CHAPTER 2. Safety Preparation Before Operation

1. Rooftop Environment Safety Inspection

Verify rooftop load-bearing capacity: For distributed rooftops (color steel tile / concrete / PV bracket type), a load-bearing test report must be provided to ensure the capacity is ⩾ 1.5 times the robot's own weight (including cleaning load). Operation is prohibited on rusted color steel tiles or areas with loose brackets.

Inspect rooftop protective facilities: The height of parapet walls must be ⩾ 1.05m; temporary guardrails / safety nets must be installed in missing areas. Rooftop edges, skylights, drainage outlets, and ventilation openings must be marked with warning signs, and no-operation zones for the robot shall be designated.

Remove rooftop obstacles: Clear debris such as tools, cables, and pipelines; flatten protruding rivets / weld seams to prevent robot jamming or collision. The width of the passage between PV module arrays must be ⩾ 40cm to ensure flexible steering of the robot.

Confirm environmental conditions: No rainstorms, thunderstorms, or gusts exceeding Beaufort Scale Force 6 within 1 hour before operation; no ponding, ice, or condensation on the rooftop surface (to prevent slipping of the robot or operators); avoid operation during high-temperature periods (⩾ 40℃) to prevent physical discomfort of operators caused by extreme heat.

2. PV System Safety Inspection

PV Module Condition Inspection: Inspect whether the module glass is damaged, the frame is loose, and the junction box is properly sealed. Damaged modules must be marked in advance and avoided during operation.

Electrical Safety Pre-processing: Confirm that combiner boxes and inverters are properly grounded. If the robot is of the water-washing type, cover the electrical interfaces with waterproof covers or disconnect the module strings from the combiner boxes to prevent short circuits caused by cleaning water.

Power Generation Status Confirmation: If live-line operation is required, test that the insulation resistance of the module surface is ⩾ 1MΩ. Maintain a safety distance of ⩾ 1.5m between the operation area and inverters/distribution boxes.

3. Robot Safety Commissioning

Performance Testing:

Test that the remaining battery power of the robot is ⩾ 80% and the charging interface is properly sealed (waterproof);

Ensure cleaning brushes/roller brushes are free of damage, have appropriate hardness, and no deformation.

Navigation and Sensor Calibration:

Power on the robot and turn on the remote controller to confirm normal communication between the robot and the remote controller, as well as normal FPV video transmission channel (for FPV-equipped versions);

Verify that there are no sensor abnormality alerts on the remote controller's operation interface.

Emergency Function Testing:

Confirm the effectiveness of the emergency stop button (dual-control: on the robot body + remote controller);

Test the automatic shutdown logic for faults: when the inclination angle is ≥ 32°, the robot will have difficulty climbing slopes but will automatically adjust its posture and shut down.

CHAPTER 3. Operation Process Safety

1. Autonomous Operation Safety

Path Planning Monitoring: During high-altitude operations, operators must be present at all times and monitor the robot's operation trajectory continuously. With guardrails installed, real-time FPV visual monitoring of the robot's status when cleaning the edges of PV arrays is mandatory to prevent colliding with walls or obstacles.

Cleaning Parameter Control:

For dry-cleaning robots: Brush rotation speed ≤ 200 r/min;

For water-washing robots: Water pressure ≤ 2 MPa, water flow rate ≤ 10 L/min;

Directing high-pressure water flow at the sealant on the edges of PV modules is strictly prohibited.

Real-Time Status Monitoring:The robot must be attended by a dedicated operator during operation (monitoring distance ≤ 50 m), with inspections conducted every 15 minutes. Focus on monitoring battery temperature (≤ 60℃) and motor noise (no abnormal sounds).

No-Operation Zone Control:The robot is strictly prohibited from entering areas with damaged PV modules, above rooftop drainage outlets, or areas with loose PV brackets. In case of sudden gusts ≥ Beaufort Scale Force 5, immediately activate remote shutdown.

2. Electrical and Fire Safety

Live-Line Operation Taboos: Do not allow the robot to touch PV module junction boxes or combiner box terminals. If sparks or unusual odors occur during operation, immediately activate remote shutdown and turn off the main switch of the PV system.

Special Requirements for Water-Washing Operation:

Prohibit the use of acidic or alkaline cleaners;

Clean from the top edge to the bottom edge of PV modules to avoid water accumulation at the module edges (to prevent water seepage).

Fire Prevention Measures:

If the robot is equipped with lithium-ion batteries, prohibit prolonged operation in high-temperature

environments;

Place ABC-type dry powder fire extinguishers at the rooftop entrance, within 10m of the operation area.

3. Personnel Safety Protection

Operator Protection Requirements: Personnel accessing the rooftop must wear safety helmets, non-slip shoes (with a sole tread depth of ⩾ 3mm), and safety harnesses (with secure anchorage points; dual-hook anchorage points are mandatory for high-rooftop operations). Loose clothing is prohibited, and operating the remote controller while wearing gloves is forbidden (to prevent accidental activation).

Prohibition of Unauthorized Personnel Entry: Post a "Work in Progress - No Entry" warning sign at the rooftop entrance. When working on residential distributed rooftops, inform surrounding residents to stay away from the area below the rooftop (to prevent falling objects).

Operational Discipline & Liability: Staff must maintain unobstructed communication during operations. Unauthorized departure from the post or handing over operations to unqualified personnel is strictly prohibited. The company shall not be liable for any safety accidents or losses arising therefrom.

CHAPTER 4. Post-Operation Safety

1. Robot Retrieval and Maintenance

Equipment Inspection:

Clean dust and water stains from the robot body; check the wear condition of the brushes (replace if wear ⩾ 5mm).

Charge the battery only after it has cooled to room temperature to avoid high-temperature charging (prevents swelling).

Storage Requirements:

Store the robot in a dry and well-ventilated area (humidity ⩽ 60%), away from flammable and explosive materials.

When not in use for an extended period (⩾ 15 days), charge the battery to 50% and then disconnect the power.

2. PV System & Rooftop Re-inspection

Inspect each PV module one by one for scratches, damage, or watermark residues on the surface.

Check junction boxes and combiner boxes for traces of water ingress (e.g., condensation, rust).

Rooftop Environment Restoration:

Clean residual water stains and debris on the rooftop (to prevent blockage of drainage outlets).

Verify that temporary protective facilities have been removed and restore the rooftop to its original condition.

3. PV Module Condition Re-inspection

Inspect each module one by one for scratches, damage, or watermark residues on the surface; check junction

boxes and combiner boxes for traces of water ingress (e.g., condensation, rust).

Rooftop Environment Restoration: Clean residual water stains and debris on the rooftop (to prevent blockage of drainage outlets); verify that temporary protective facilities have been removed and restore the rooftop to its original condition.

4. Safety Records Filing

Record Operation Information: Include the operation date, weather conditions, robot operation duration, number of cleaned PV modules, and fault handling details.

Potential Hazard Closed-Loop Management: Establish an accounting ledger for identified issues such as damaged PV modules and loose rooftop structures, and require rectification within a specified time limit; retain robot operation trajectory logs (for ⩾ 3 months) to facilitate the traceability of safety issues.

CHAPTER 5. Supplementary Safety Requirements for Special Scenarios

1. For Different Types of Roof-tops

Color Steel Tile Rooftops: Prohibit operating the robot to move at high speed on corrugated protrusions (to prevent rollover); avoid color steel tile joints (to prevent the robot from getting stuck). Ensure that the environment between the module installation position and the color steel tile surface can trigger the anti-fall mode (the operator shall stand by at the edge, turn on the automatic mode, and check whether the robot can automatically identify the edge and decelerate or stop; if not triggered, switch to manual mode in advance for operations at the edge).

Inclined Rooftops (slope ⩾20°): When the slope is too high and there are no safety guardrails around the array, prohibit using the robot to perform high-altitude automatic operations.

Residential Distributed Rooftops: Prohibit placing the robot on the rooftop edges; avoid falling tools and accessories during operation (set up a safe warning zone below).

2. Emergency Response Process

Robot Jamming / Loss of Control:

Immediately press the remote emergency stop button and disconnect the robot's power supply; when handling the issue on the rooftop, two-person collaboration is required—fasten the safety rope first before using tools to move the robot.

PV Module Damage / Water Ingress:

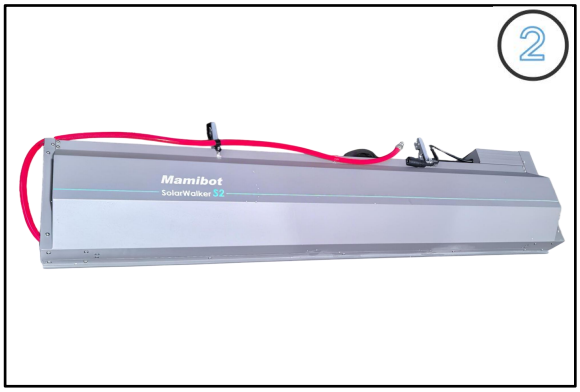
Stop operations immediately, mark and isolate the damaged modules (disconnect the corresponding combiner box branch circuit); if water ingress involves the electrical system, contact professional personnel for maintenance before closing the switch.

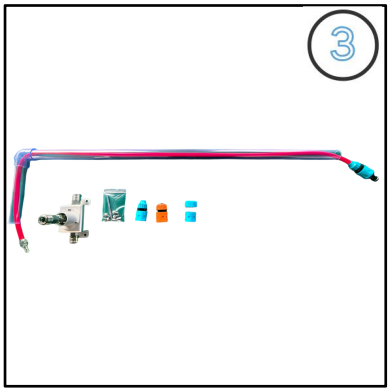
Personnel Fall / Electric Shock:

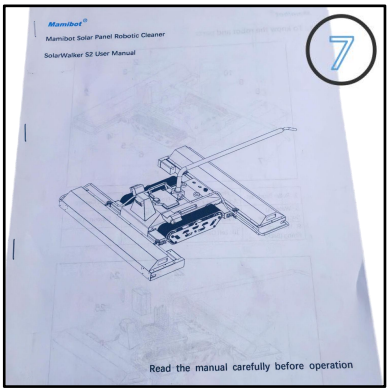
Immediately cut off the power supply of the PV system and call emergency services; after separating the electrocuted person from the power supply, perform cardiopulmonary resuscitation (CPR) and wait for medical personnel to arrive.

CHAPTER 6. Unboxing List of a Standard Configuration Package

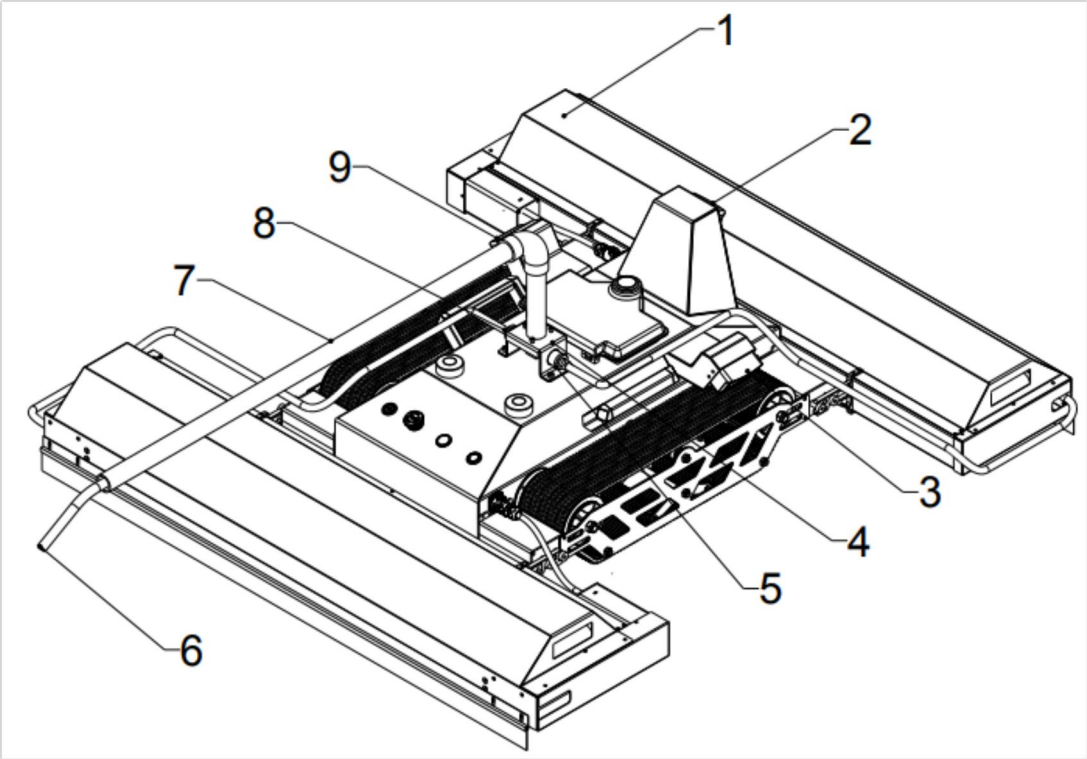
S.n.	Description	Qty	S.n.	Description	Qty
①	Robot Main Unit	1	②	Roller Brush Kit	2
③	Water Hose Fitting	1	④	Battery Pack	1
⑤	Charger	1	⑥	Tool Kit	1
⑦	User Manual	1	⑧	Remote Control with FPV	1
⑨	Remote Control Charger	1			



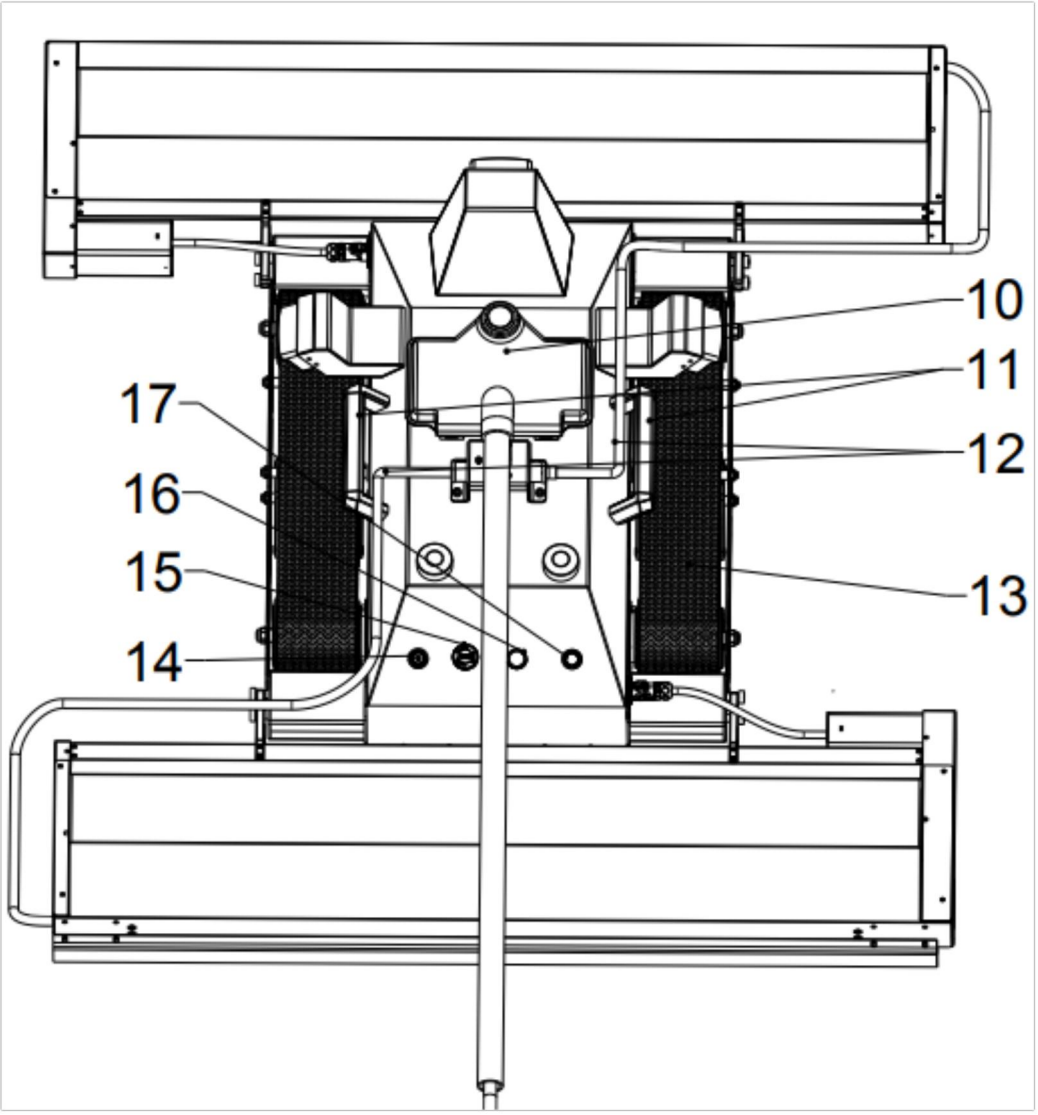




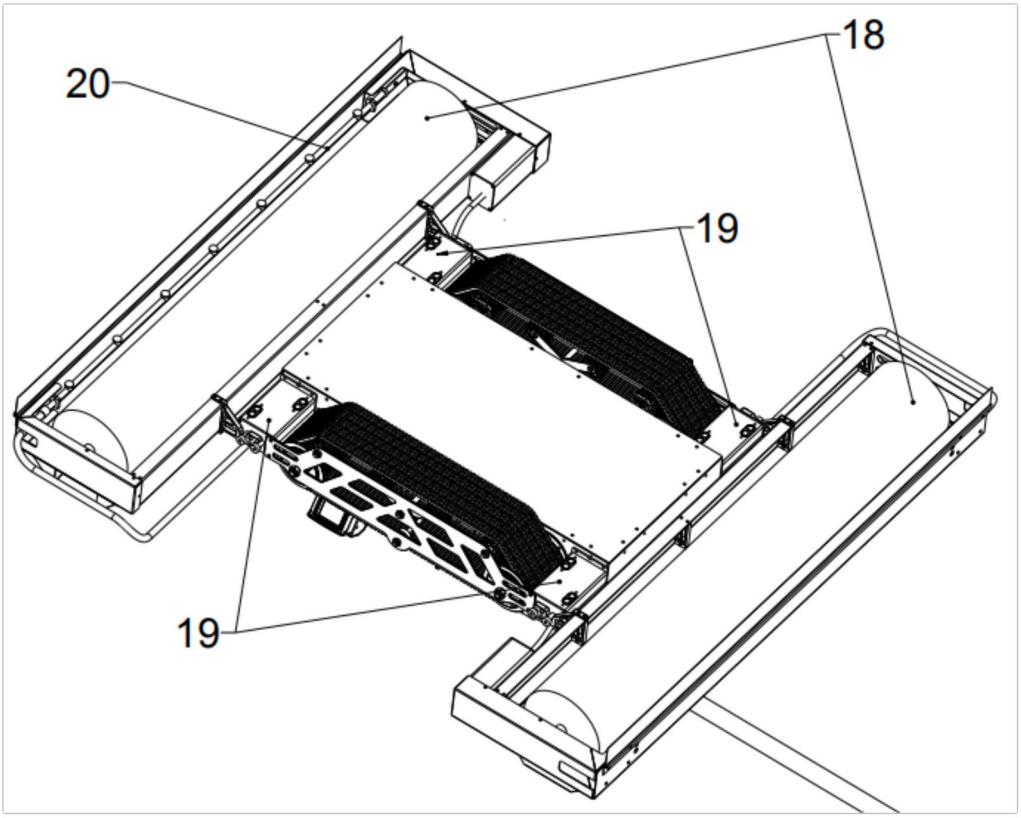
CHAPTER 7. Diagram and Components List

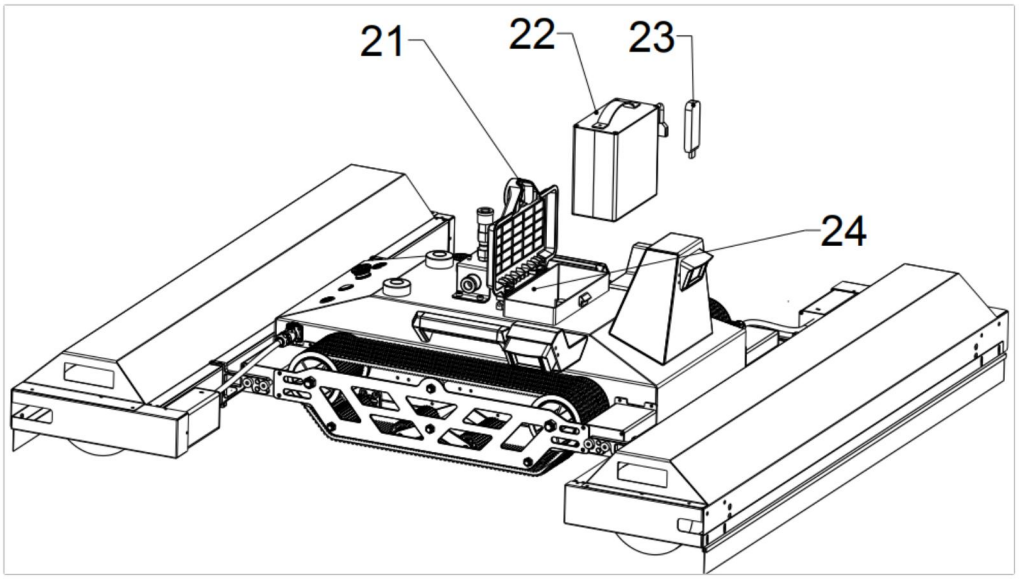


1. Roller Brush Set	2. Front Camera	3. Right Camera	4. Watering Support Frame
5. Water Hose Fitting (Front)	6. Water Pipe (User-supplied)	7. Support Tube	8. Water Hose Fitting (Back)
9. Left Camera			



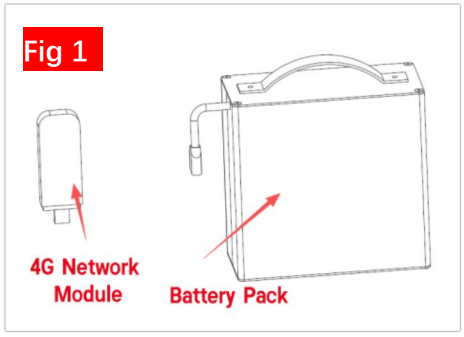
10. Battery Compartment Cover	11. Handle	12. Water Pipe	13. Driving Belt
14. Power On/Off Button	15.Emergency Stop Button	16. Indicator Light	17. Reserved Button (not in use)

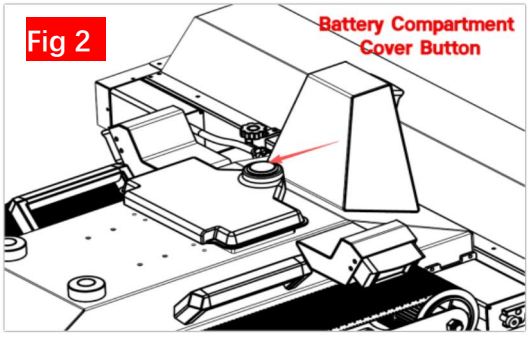


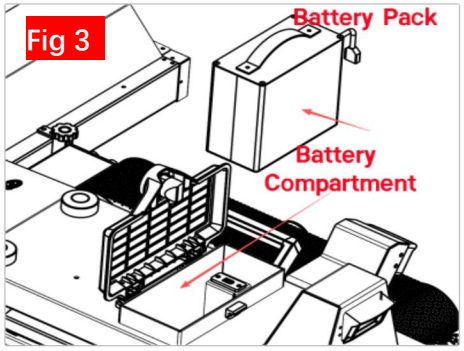


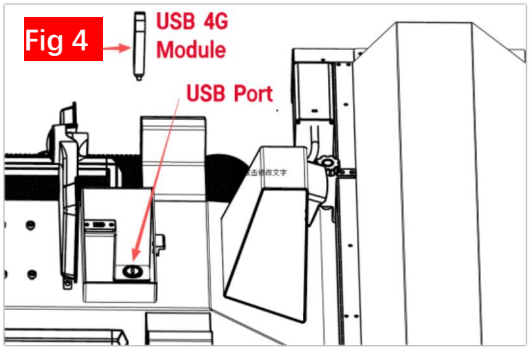
18. Brush Bristles	19. Anti-falling Sensors	20. Water Sprayer with Multi Nozzles	21. Battery Compartment Cover Button
22. Battery Pack	23. **4G** Network Module (USB type, User-supplied Sim Card)	24. Battery Compartment	

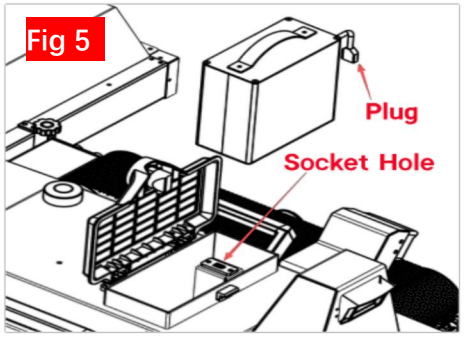
CHAPTER 8. Installation of Battery Pack and 4G Network Module

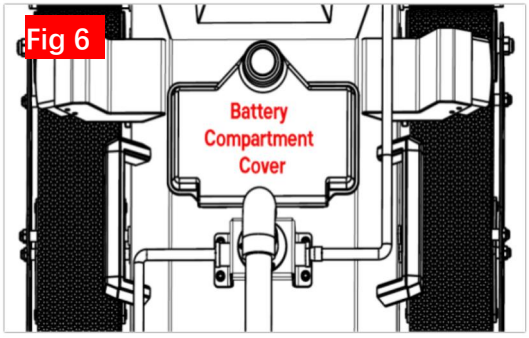












1. Take out the battery pack. Install the sim card into the 4G Network Module (sim card should be prepared by user) [Fig 1].

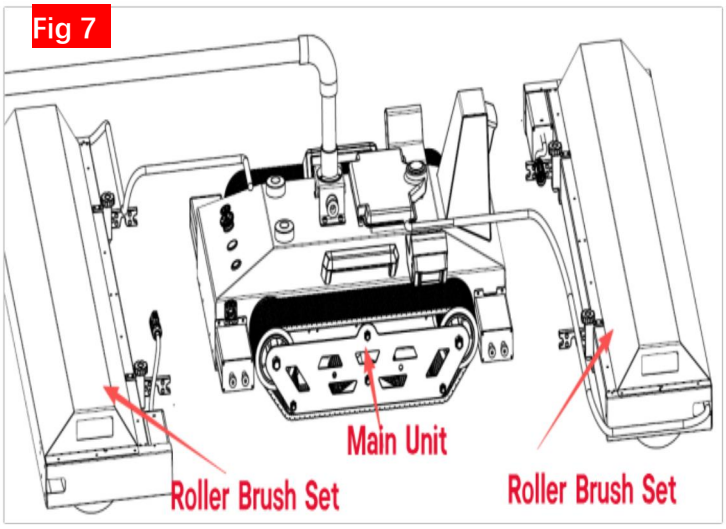
2. As shown in [Fig. 2], press the circular button on the battery compartment cover—after pressing, the button cap will pop up. Then rotate the button cap while lifting it vertically upward to open the battery compartment cover. Insert the battery vertically downward into the battery compartment as shown in [Fig. 3], with the end featuring the wiring connector facing the indicated terminal socket.

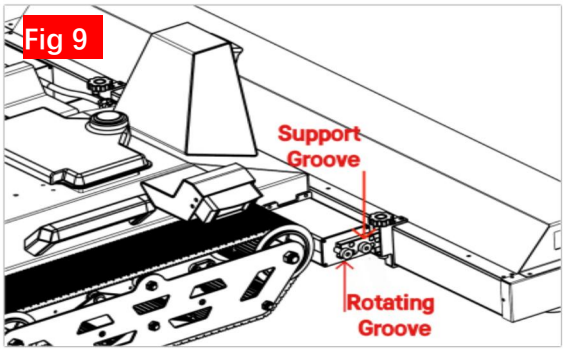
3. Insert the 4G module into the port, make sure it's properly installed [Fig 4].

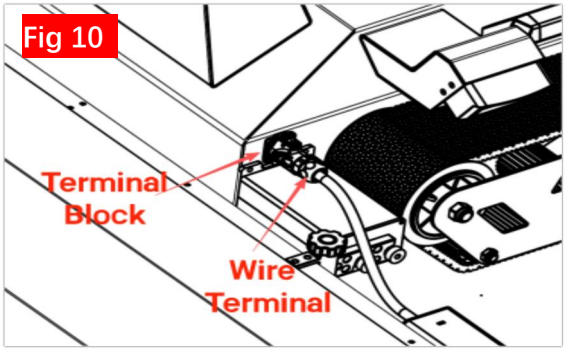
4. Lift the battery pack handle and lower the battery vertically into the compartment, align the terminal end toward the socket and connect it to the socket. [Fig 5].

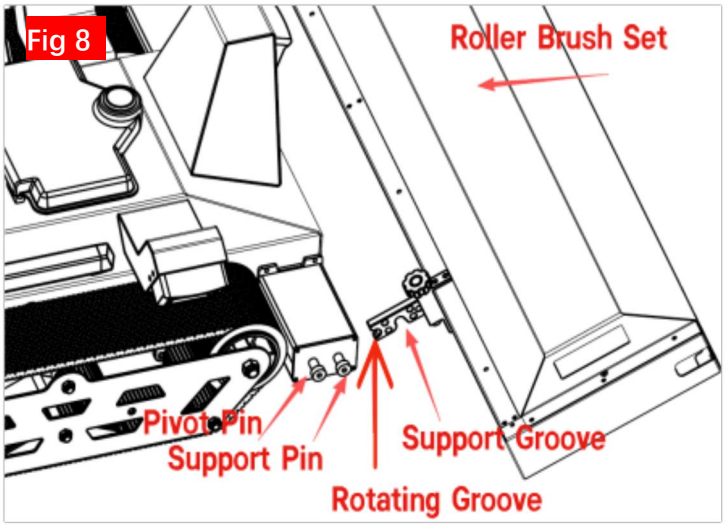
5. Close the cover and press the button to lock it. Switch on the Power Button to check if the power supply is On. [Fig 6]

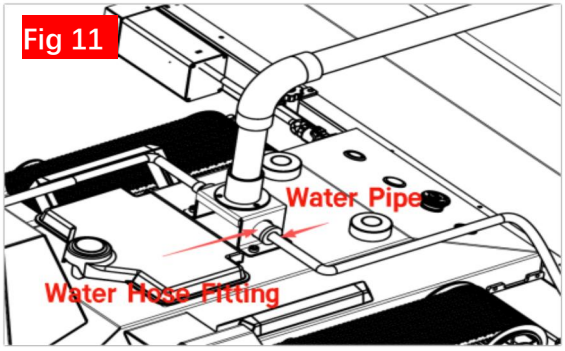
CHAPTER 9. Installation of Roller Brush Sets and Height Adjustment











1. Place the main unit on the panel, and position the roller brush assembly in front of the main unit. [Fig 7].

2. Refer to [Fig 8], Pivot Pin/Support Pin, Rotating Groove and Support Groove. Lift the roller brush and tilt 30-45 degrees, insert the rotating groove to the pivot pin, lay down the roller brush set, make sure the brush set is installed properly. [Fig 9]。

3. Align the wire terminal to the terminal block and insert it terminal to the bottom until hearing a 'Click' sound. [Fig 10], pull it to confirm it's tightly connected.

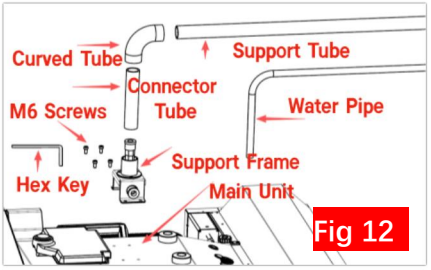
4. Connect the water pipe to the water hose fitting until hearing a 'Click' sound, make sure it's tightly connected. [Fig 11]。

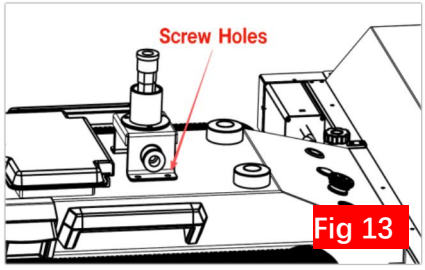
CHAPTER 10. Watering Set Installation

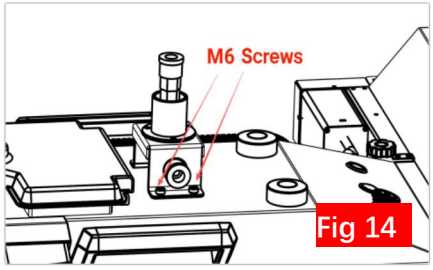
1. Take out all parts including the watering support frame, M6 screws, hex key, curved tube, connector tube, support tube, and water pipe. [Fig 12].

2. Align the watering support frame to the top of the robot, insert the 4 M6 properly. [Fig 13].

3. Use the hex key to tighten the 4 M6 screws, make sure all the screws are properly installed. [Fig 14].



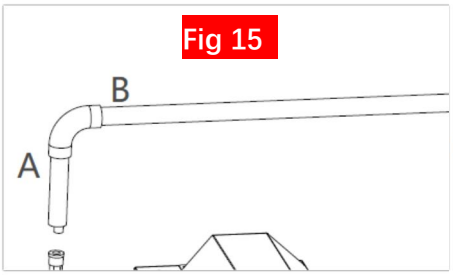


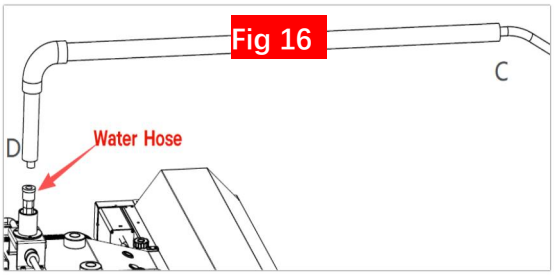


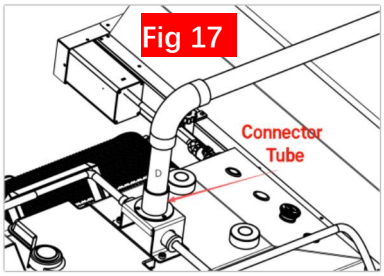
4. Connect all the tubes,including the curved tube, support tube, and connector tube, make sure every joint is tightly installed. [Fig 15].

5. Insert the in (inner diameter 8mm, outer diameter 12mm) water pipe from end C to end D, connect the water pipe to the hose tight. [Fig 16].

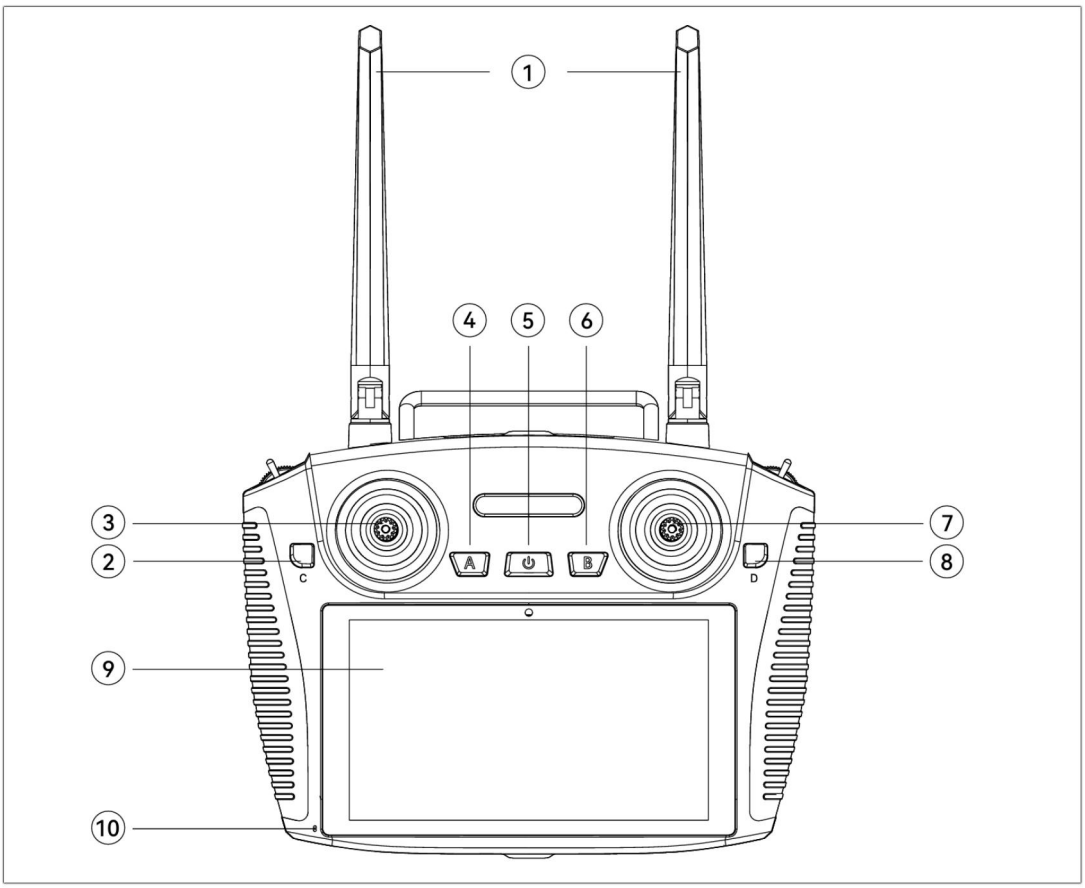
6. Insert end D of the connector tube to the watering support frame, pull the water pipe to check if it can rotate smoothly. Connect the water pipe to water source. Check for water leakage in the water circuit. After ensuring there is no leakage, you can start the water washing. [Fig 17].



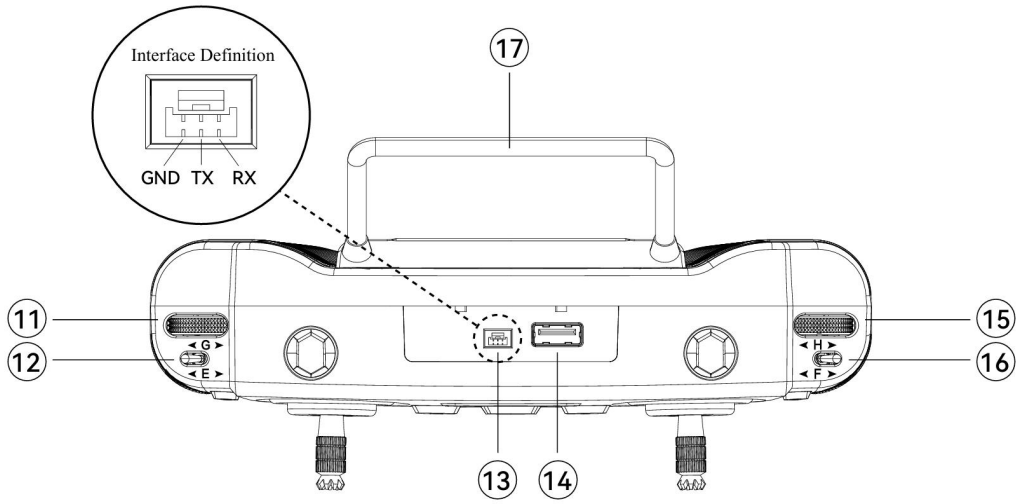




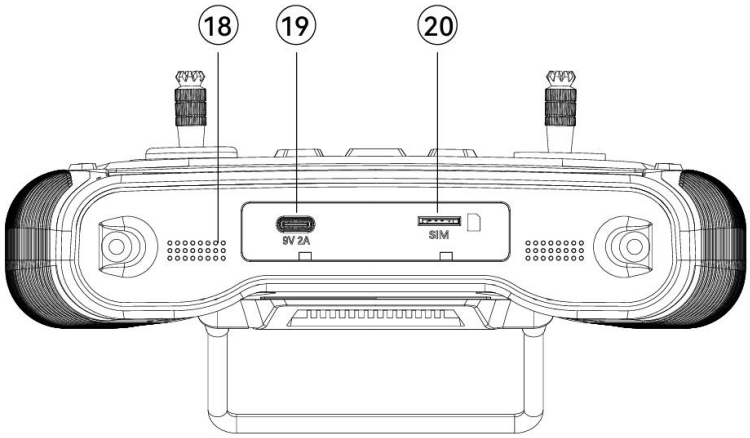
CHAPTER 11. To Know the Remote Control



S.N.	Function/Descriptions	S.N.	Function/Descriptions
1	2.4G/5.8G 4dB Antenna	6	One-Press U-turn (in Auto Mode)
2	Reserved Button C (No-use)	7	Right Rocker(Left/Right direction)
			Lock/Unlock (Push up 2s: Unlock; Push down 2s: Lock)
3	Left Rocker (Up/down: forward/backward)	8	In Manual Mode: Press the D button to activate Cruise Control mode; press it again to switch back to Manual mode In Auto Mode: Press to Pause/Resume
4	Enter/Exit Auto Mode	9	LCD Screen
5	Power On/Off Button	10	MIC (No-use)



S.N.	Function/descriptions	S.N.	Function/descriptions
11	Control Dial G (No-use)	15	Control Dial H(No-use)
12	Control Pole E (Moving Speed Control) L3>L2>L1	16	Control Pole F (Brush Rotating Control) L3>L2>L1. Manual L3> Auto L3
13	PPM Output (No-use)	17	Handle
14	Upgrading Port (No-use)		



S.N.	Function/Descriptions	S.N.	Function/Descriptions
18	Speaker	20	SIM Card Slot
19	TYPE-C （charging）		

- There are 2 rockers on the remote control:The left rocker controls the robot's forward/backward movement via its up/down direction. The right rocker controls the robot's left/right turning via its left/right direction; it can be used in combination with the left rocker during operation.
- The up/down direction of the right rocker controls the robot's locking and unlocking functions. The SolarWalker is in the locked state by default. After the SolarWalker is turned on, when the yellow indicator light appears, push the right rocker upward for 2 seconds to unlock it. When the SolarWalker is not in use, push the right rocker downward for 2 seconds to lock it.
- The mode switching gear only takes effect when the robot is unlocked. In manual mode, the robot remains stationary by default; in automatic mode, the SolarWalker starts operating directly.

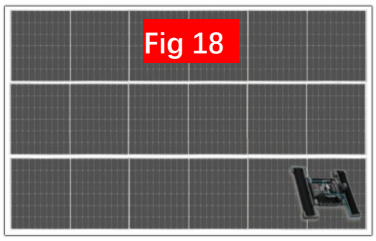
CHAPTER 12. Indicator Lighting

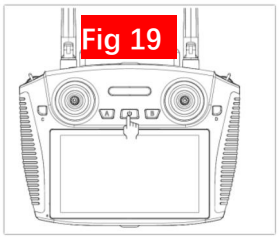
					
Red	Purple	Green	Cyan	Yellow	Blue

Light Color	Light Status	Machine Status
RED	Constantly On	Emergency Stop
	Flashing (5Hz)	OTA upgrading
	Flashing (2Hz)	Battery low <20%
PURPLE	Constantly On	Remote Control Offline or Disconnected
	Flashing (2Hz)	Anti-falling Sensor/Camera Abnormal
GREEN	Constantly On	Auto Mode or Cruise Control Mode on
	Flashing (1Hz)	Paused
CYAN	Flashing (2Hz)	Powered On
YELLOW	Constantly On	Locked
BLUE	Constantly On	Manual Mode

CHAPTER 13. How to Use Fast Guiding

1. Pre-Power-On Preparation

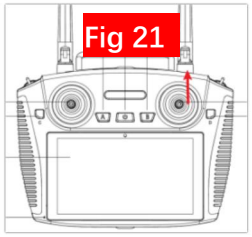


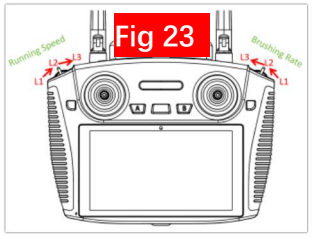


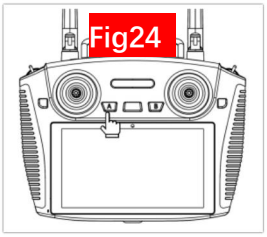
1) Place the robot on the photovoltaic panel to be cleaned, install the water pipe connector, and attach the roller brush. For the automatic mode, turn the robot head toward the right, and position the SolarWalker at a safe distance of one SolarWalker body from both the right edge and the lower edge of the array boundary. [Fig 18].

2) Press the Switch button of the remote control for 2 seconds to turn it on. [Fig 19].

3) Press the Power button of the robot, and wait for about 16 seconds. The robot starts self-check. The indicator light runs in Yellow means self-check is finished. [Fig 20].







4) Push the Right Rocker upward for 2 seconds [Fig 21], until hearing a 'beep' sound, it means the robot is unlocked. The indicator light turns to Blue. [Fig 22].

5) The Control Pole E from Left to Right controls the running speed, while the Control Pole F from Left to Right controls the brush rotating speed, (L3>L2>L1) [Fig 23], The running/rotation speed in Manual mode is faster than in Auto Mode.

6) **Auto/Manual Modes Switching [Button A]**:

a) In default Manual Mode, press Button A is not activated, with no indicator light on Button A [Fig 24]. After unlock the robot, don't press Button A, Button A turns stays in Blue [Fig 22], Manual Mode is on. Operate the robot by using the 2 rockers on the remote control to perform actions such as forward movement, backward movement, left turning, and right turning.

b) Press Button A—the green indicator light for Button A stays on continuously [Fig 25], and the machine enters Automatic Mode. In Automatic Mode, after setting the startup parameters on the App and confirming operation (parameter settings shown in [Fig 26], the robot will work independently, and the indicator light remains green. The rockers of the remote control is inactive in Automatic Mode. When Button A is pressed again, the machine will exit Automatic Mode, stop operating, and switch to Manual Mode. Before starting Automatic Mode, the pre-operation startup parameter settings must be confirmed on the remote control's App; refer to the App Usage section for details.。

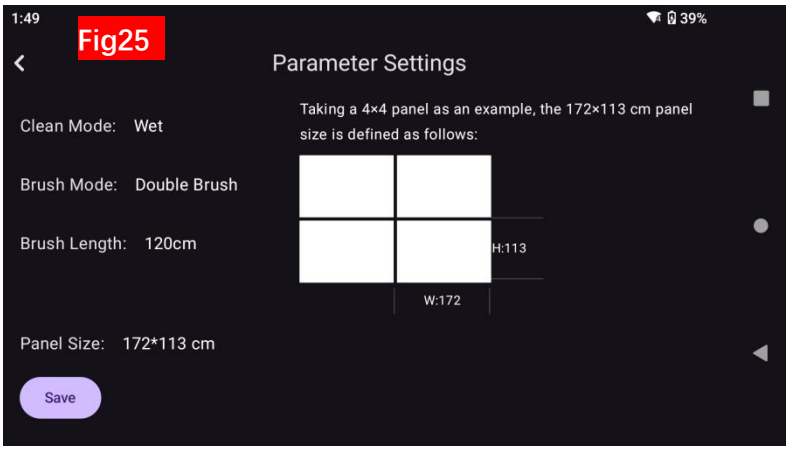


Fig25

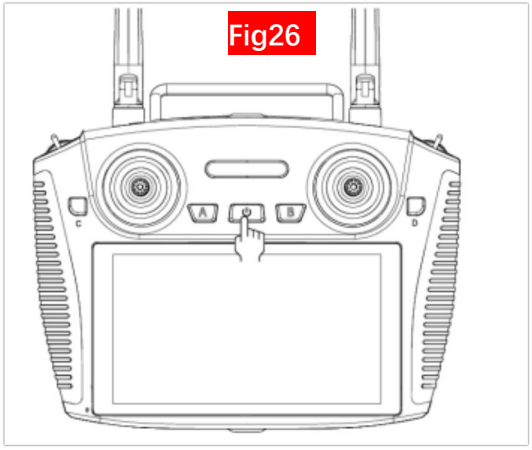


Fig26

7) Firstly, press the Power On/Off button of the robot to switch if off. Press the remote control On/Off button for 2 seconds to switch of the remote control [Fig 26].

2. Emergency Stop

In cases involving safety risks or other emergency faults during SolarWalker operation, press the emergency stop switch.

The emergency stop light will illuminate, and the SolarWalker will stop immediately.

To release the emergency stop switch: Turn the emergency stop switch clockwise until it pops up and resets. Meanwhile, the SolarWalker needs to be restarted to resume operation.

Attention

- When operating the robot to move on photovoltaic panels in manual mode, control the SolarWalker to move within the safe area. It is strictly prohibited to go beyond the array boundary to prevent the SolarWalker from falling.
- The recommended distance for operating the SolarWalker with the remote control shall not exceed 50 meters.
- Each remote control is one-to-one paired with a specific SolarWalker unit. Before using the remote control, confirm that it is correctly matched with the target SolarWalker.

3. Manual Cleaning Mode

The robot supports dry brush/wet wash operations in manual mode. The specific operating procedures are as follows:

(1) Place the SolarWalker on the photovoltaic array to be cleaned.
(2) Rotate the emergency stop button clockwise until it is in the released state.
(3) Press and hold the remote control's power button for 2 seconds to turn on the remote control.
(4) Press the SolarWalker's power switch. After a self-check period of 16-20 seconds, the SolarWalker's indicator light will turn yellow.
(5) Push the right rocker on the remote control upward and hold it for 2 seconds to unlock the SolarWalker.
(6) Ensure Button A is not pressed (the indicator light for Button A will be off if it is not pressed), and the machine's indicator light stays steadily blue. Use the two rockers on the remote control to perform movements such as forward, backward, left turn, and right turn. The up/down direction of the left rocker controls the machine's forward/backward movement, while the left/right direction of the right rocker controls left/right turns.

(7) During cleaning, you can adjust the travel speed by toggling the 3-position switch on the left side of the remote control; adjust the roller brush speed via the 3-position switch on the right side. The 3-position switches correspond to three different speed levels (L1, L2, L3) from bottom to top, with L3 > L2 > L1.
(8) During operation, you can enable the FPV mode in the APP for remote control. The supported operation distance in open areas is 200 meters, but for safety purpose, please limit it within 50 meters.
(9) After the operation is completed, press the power switch to turn off the SolarWalker.
Attention:** In Manual mode, if the machine is inactive for 30 seconds, it will automatically lock and stop operating for safety purpose, and the roller brush will stop rotating. To re-enter Manual mode, you need to unlock it first.

4. Cruise Control Mode in Manual Cleaning

The SolarWalker Supports Cruise Control Mode when it's in Manual Cleaning Status:

(1) Refer to the Manual mode instructions to switch the machine to Manual mode.
(2) In Manual mode, press the D button on the remote control to switch the machine to Cruise Control mode. The machine's indicator light will remain steadily green, and the machine will maintain the travel speed and roller brush speed set by the three-position switches, moving straight and performing cleaning operations. It will stop automatically when encountering edges.
(3) Cruise Control mode is mainly designed for scenarios where the area around the photovoltaic (PV) array may have obstacles, or there are guardrails, walls, etc. at the ends—making full auto mode unsuitable—or when the user prefers manual control. In such cases, the operator does not need to continuously hold and operate the remote control to control the machine's travel path. Simply adjust the machine's front to the desired direction, then activate Cruise Control to allow the machine to travel straight at the current speed to the other side of the PV array.
(4) When the machine is in Cruise Control mode, you can exit the mode by pressing the D button again or pushing the rocker up or down (the rocker controlling travel speed). The machine will then switch back to Manual mode. The location of the D button on the remote control is shown as [Fig 27].

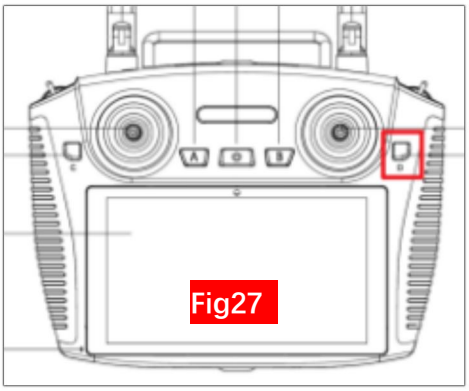
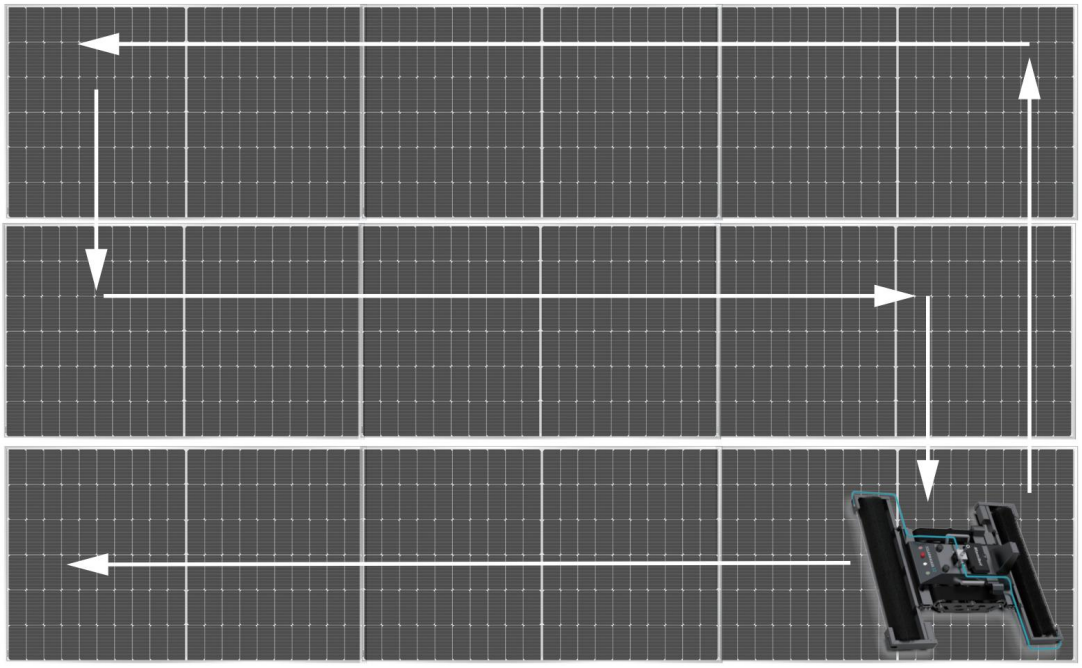


Fig27

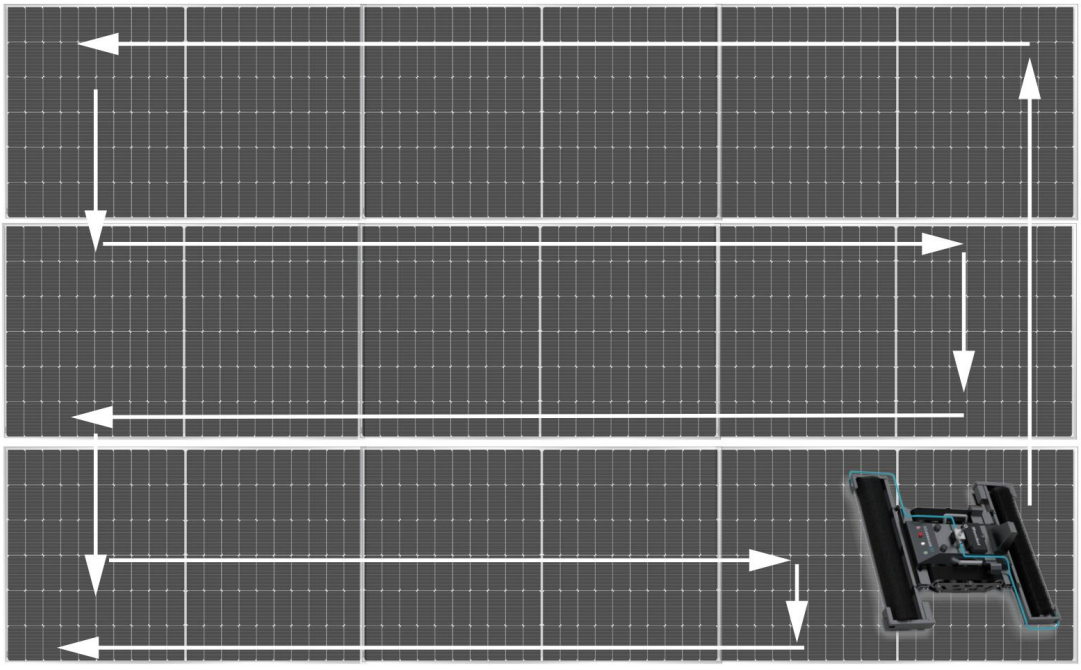
5. Auto Cleaning Mode

The SolarWalker support wet/dry cleaning in Auto Mode:

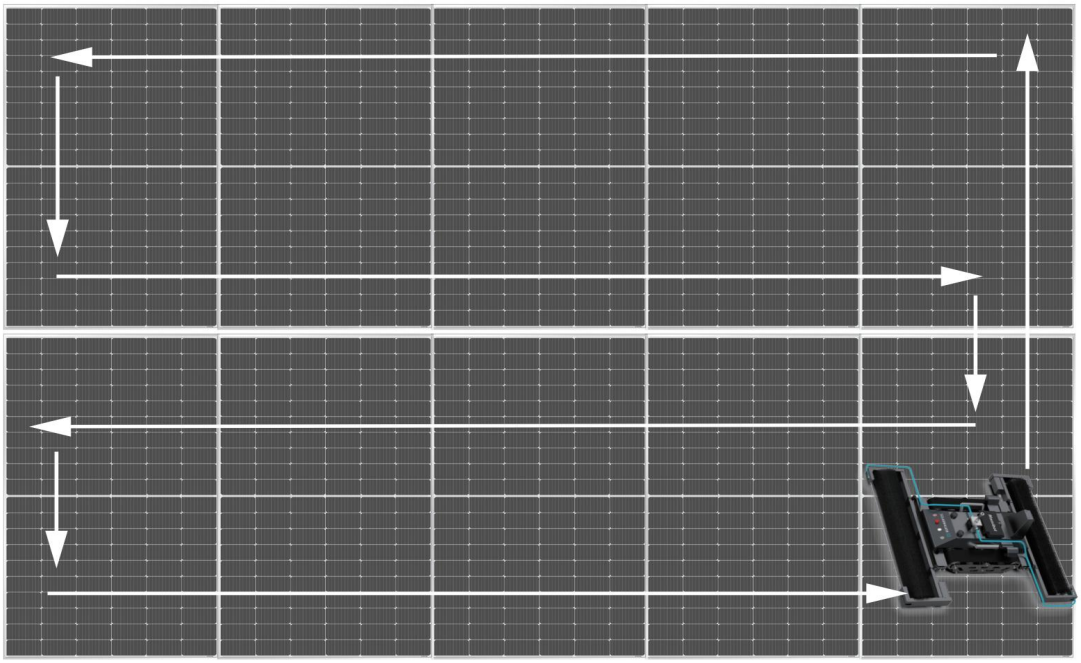
❖ **Horizontal Cleaning Path**: The length of the roller brush is at least 10 cm longer than the width of the photovoltaic panel:



❖ **Horizontal Cleaning Path**: The length of the roller brush is shorter than the width of the photovoltaic panel:

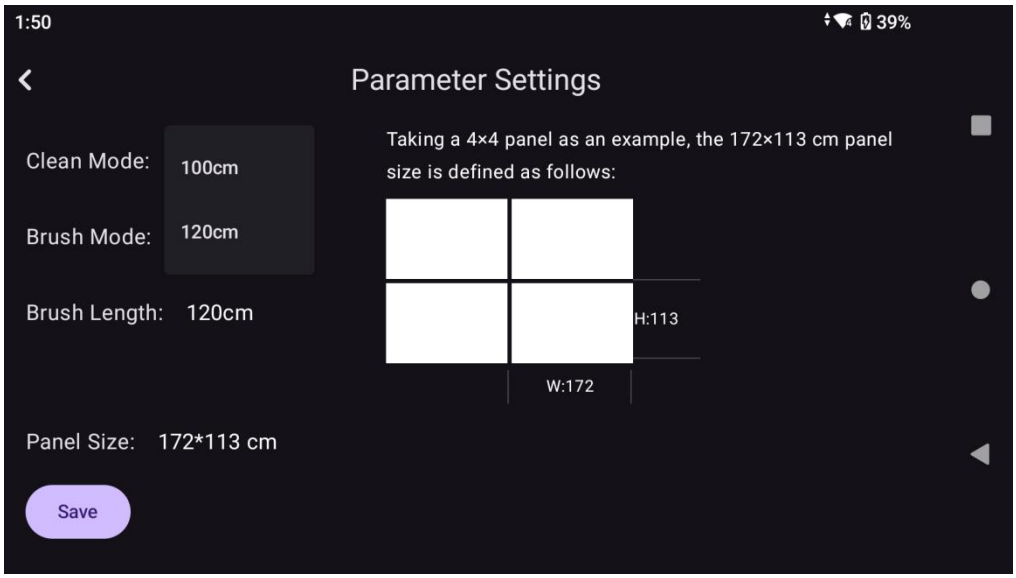


❖ **Vertical Cleaning Path**:



Horizontal Cleaning Setting Up: (Note: The arrangement shown in the figure is for demonstration purposes only; there is no restriction on the number of vertical rows or columns in actual cleaning)

(1) Place the SolarWalker at the starting position of the photovoltaic array to be cleaned, with the front of the SolarWalker facing right. The SolarWalker only needs to maintain a safety distance of one SolarWalker body length from the right edge and lower edge of the array boundary.
(2) Rotate the emergency stop button clockwise until it is in the released state (Default in Released State).
(3) Press and hold the remote control's power button for 2 seconds to turn on the remote control.
(4) Press the power switch; after the SolarWalker undergoes a 16-20 second self-check, the SolarWalker's indicator light will turn yellow.
(5) Open the App on the remote control, go to the settings interface, and set parameters such as roller brush length, panel length and width, and single/double roller brushes. This step is very important, as the automatic mode will perform operations based on these parameters. E.g., Installed Panel Width*Height =172*113cm, refer to below:



(6) Push the right rocker on the remote control upward and hold it for 2 seconds to unlock the SolarWalker.
(7) Press Button A on the remote control. At this point, the green indicator light for Button A will remain steadily on, and the machine will switch to Auto mode (the machine's indicator light will also stay steadily green). Meanwhile, a Start button ⏵ will appear between the two existing buttons in the bottom right corner of the APP. After ensuring the parameter settings in Step 5 are completed, press the Start button—the green light strip around the machine's indicator button will remain steadily on, and the SolarWalker will start automatic mode.
(8) The cleaning path is as shown in the figure. Considering the different widths of components and different lengths of roller brushes, the SolarWalker may adjust the cleaning path.
(9) After the SolarWalker completes the cleaning of the entire panel, it will stop at the end of the cleaning path and be manually moved to other arrays.You can carry the robot to other arrays for continuous cleaning.

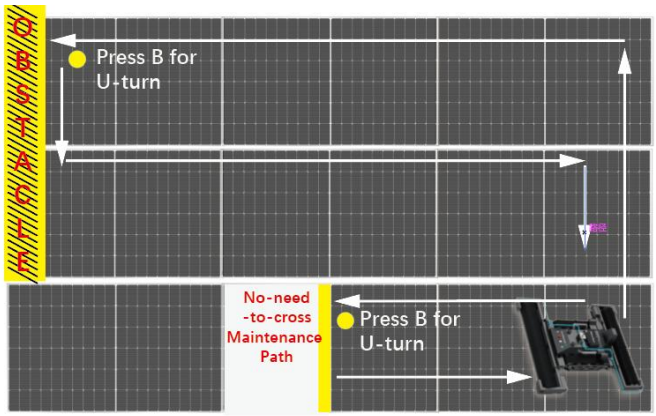
*****Attention***:**

(1) During the cleaning process, when the machine is performing horizontal cleaning, press the "D" button on the remote control to switch the machine to Pause mode. At this point, the machine will stop, and manual operation of the machine is allowed. Press the "D" button again to exit Pause mode, switch back to Auto mode, and resume operation. (This function is used when the machine deviates from the intended path unexpectedly in Auto mode and requires manual adjustment.) The machine cannot switch to Pause mode during turning or rotation.During the cleaning process, when the machine is performing horizontal cleaning, press the "D" button on the remote control to switch the machine to Pause mode. At this point, the machine will stop, and manual operation of the machine is allowed. Press the "D" button again to exit Pause mode, switch back to Auto mode, and resume operation. (This function is used when the machine deviates from the intended path unexpectedly in Auto mode and requires manual adjustment.) The machine cannot switch to Pause mode during turning or rotation.
(2) During the machine's operation, the travel speed and roller brush speed can be adjusted at any time.

❖ **One-Press U-turn in Automatic Mode**:

When the machine is in Automatic Mode and encounters an insurmountable obstacle ahead during travel on the PV array (e.g., a wall, guardrail, water pipe, or cable tray at the end), or when the water pipe length is insufficient requiring an immediate U-turn, or when there are too many or overly long PV arrays installed in the same horizontal direction on the same roof (and the machine's direct traversal of the maintenance channel between two arrays would instead reduce cleaning efficiency), you can press Remote Control **Button B** when the machine reaches the position where a **U-turn** is needed. The machine will then perform an automatic U-turn and travel back.

This mode takes effect once per use for special scenarios. Press Remote Control **Button B manually** each time a U-turn is required.

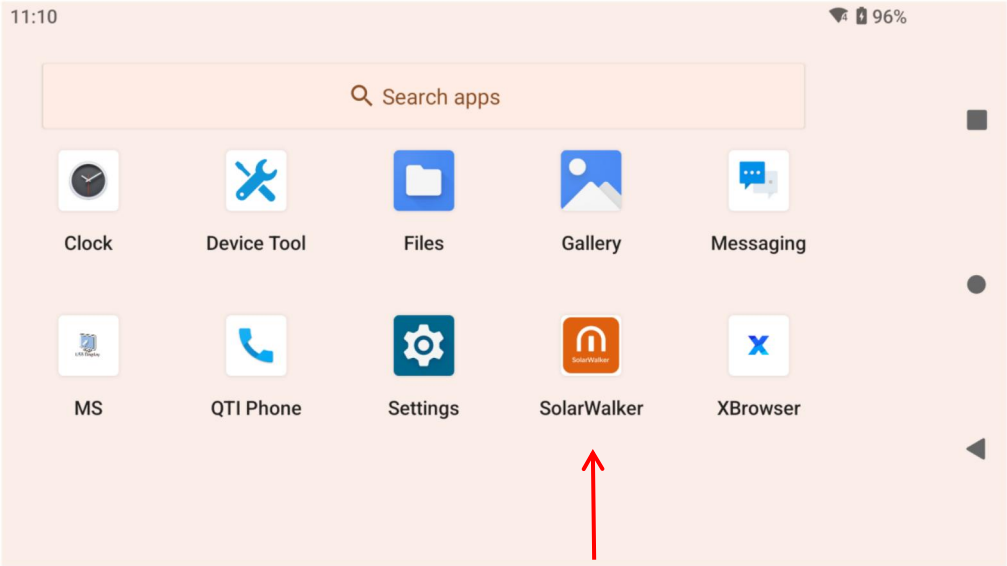


CHAPTER 14. Troubleshooting

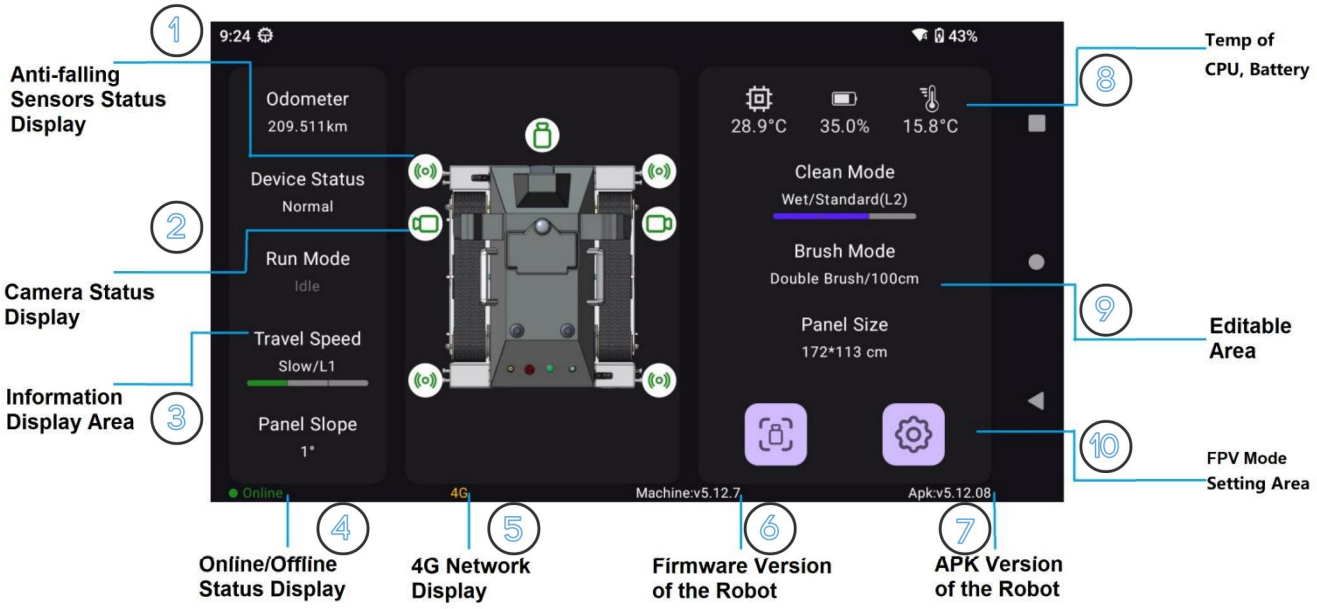
Faults	Possible Reason	Solution
Flash Red Light	Low Power	Recharge the battery or replace a new battery
Purple light Steadily on	Remote control signal lost	Check if the remote control is turned on and make sure the distance between the remote control and the robot is not more than 200m; Check if the remote control is in low power; Ensure there are no signal jammers around the remote control
Flash Purple Light	Abnormal Ultrasonic sensor/Camera	Check the APP and review the message, contact after-sales service

CHAPTER 15- App Using

❖ Turn on the remote control, and find the App named **SolarWalker**



1. Interface Page



① Anti-falling Sensors Status Display

There are 8 sets of anti-falling sensors. Any set of sensors in abnormal condition, the Icon turns to Red。

② Camera Status Display

Three cameras are built at front/left/right side of the robot. Any camera in abnormal condition, the Icon turns to Red.

③ Information Display Area

The Information Display Area includes: Odometer, Machine Status, Machine Operation Mode (including Idle mode, Manual mode, Auto mode, Cruise Control mode, Pause mode), Machine Travel Speed (with three speed levels: L1, L2, L3, from low to high), and PV Panel Incline.

④ Online/Offline Status Display

When the robot is on and connected to the remote control, it shows Online. Otherwise, it shows Offline.

⑤ 4G Network Display

The 4G network card icon has three color states:

When displayed as white, it indicates no 4G network card is inserted.

When displayed as yellow, it indicates the 4G network card is inserted but the machine cannot connect to the network, you may need to top up for your 4G Card.

When displayed as green, it indicates the machine has successfully connected to the network.

⑥ Firmware Version of the Robot

This displays the machine's firmware version.

⑦ APK Version of the Robot

This displays the machine's APK version.

⑧ CPU Temp, Battery Level and Temp Display

When it shows the CPU Temp is over 80, it's over-heated, the robot may run abnormally.

When battery runs lower than 20%, the Icon turns to Yellow, with voice prompt reading "Low Battery, please recharge", the robot can still be operated until it runs to 10% with Icon turns to RED, the robot will be stopped automatically, brushes stop, but can be operated to move to the safe location by the remote control.

When the battery temperature is too high, please immediately stop operation

⑨ **Editable Area**

Long press the Editable Area to quickly access the Auto Mode Settings interface, or access it via the main Settings interface. The roller brush speed display is also located in this area, with three speed levels from low to high: L1, L2, and L3.

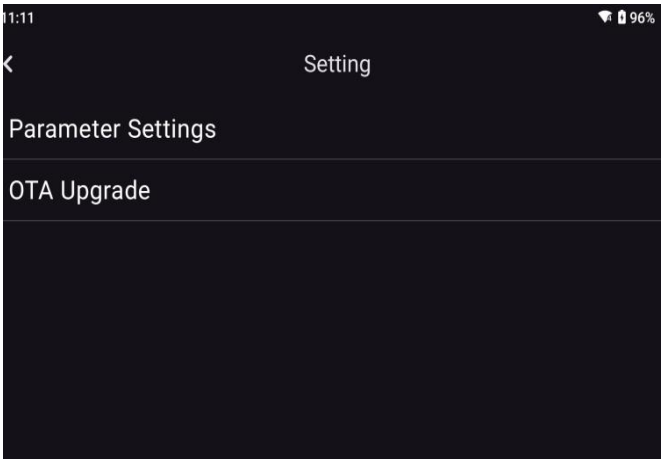
⑩ **FPV Mode Setting Page**

When entering FPV mode, you can turn the FPV navigation line prompt on/off via the settings button.

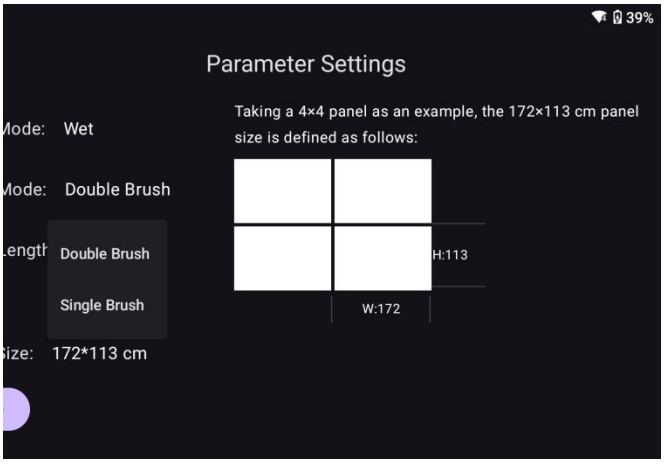
With the FPV navigation line prompt enabled, when operating the equipment in manual mode, you only need to ensure the photovoltaic panel stays within the red line to prevent the equipment from falling

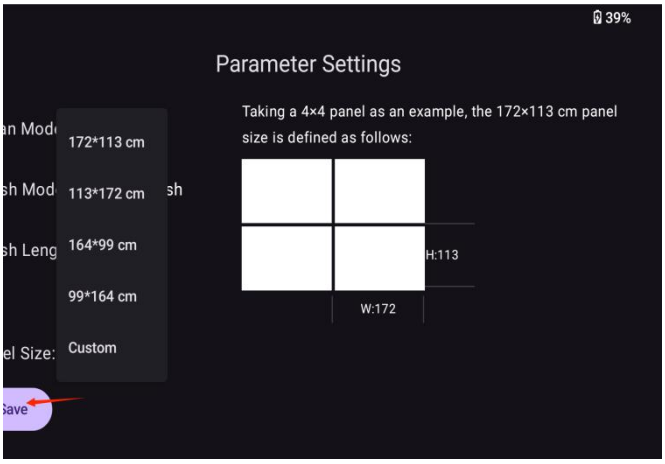
2. Parameters Setting Up

Set the parameters before the machine runs in Automatic Mode via the Parameter Setting Interface (see the diagram for details below). Note: The roller brush length needs to be selected or manually defined based on the actually equipped roller brush length. Set the panel width and height according to the on-screen prompts.

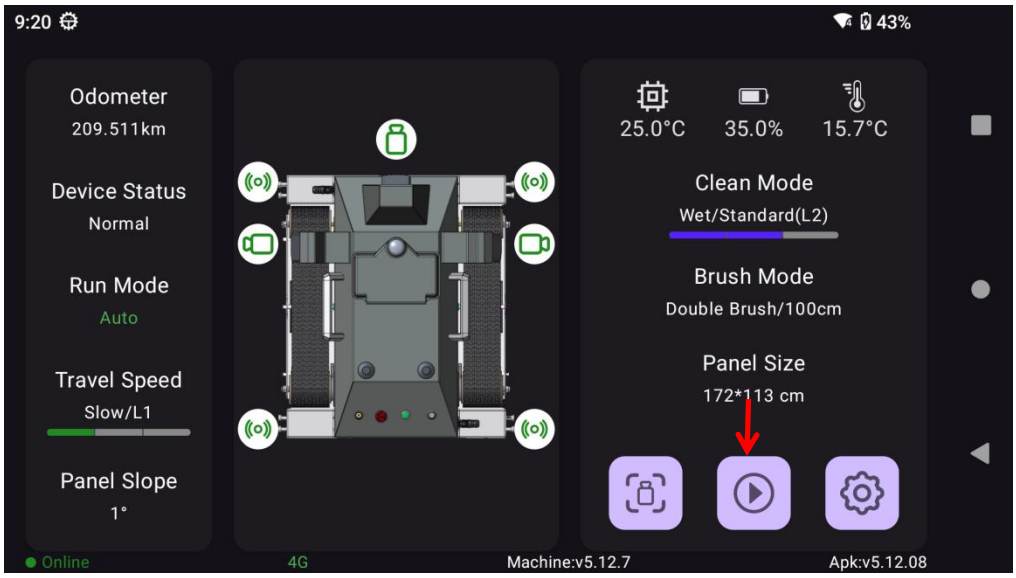


Each configuration item has a dropdown menu for selection. After confirming your choice, press the **Save** button to finalize the settings. You will then enter the device interaction interface and verify that the editable area displays the current configuration. If the parameters match, it indicates that the parameters have been successfully sent to the machine; otherwise, check if the remote control is connected to the machine and reconfigure the parameters. It is crucial to ensure that the configured parameters align with what is displayed on the device interaction interface.





3. How to Start Auto Cleaning

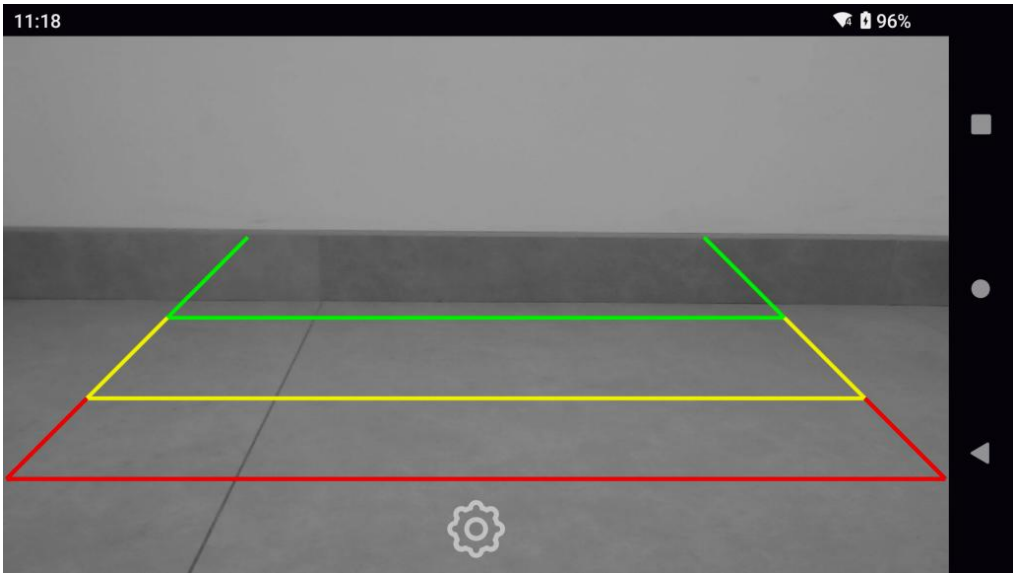


As shown in the figure above, when the remote control is switched to **Automatic Mode**, you will find a [Start] button ▶ appearing between the two original buttons in the lower right corner. After the parameters are set, you need to press this Start button to make the machine start running automatically.。

Attention: Before enabling Automatic Mode, the installed PV module array size of the project must be configured. Automatic Mode can only be executed after the settings are **saved**. If the cleaning scenario is changed and the module size differs next time, the settings must be reconfigured according to the on-site module size and saved. Otherwise, the machine will perform the cleaning task using the previously saved size data, which may cause deviation in the machine's traveling path. Therefore, it is crucial to configure the module size parameters based on actual conditions every time.

4. FPV Mode

Enter FPV Mode. You can enable or disable the FPV navigation line prompts via the Settings button (enabled by default). When the FPV navigation line prompts are enabled, simply ensure the PV panel remains within the red lines during Manual Mode operation to prevent the device from falling off.



5. OTA Upgrading Page

Perform the SolarWalker's OTA upgrade on the OTA upgrade interface. Enter the three digital password "**999**" and connect to WiFi (as shown by the network icon in the upper right corner of the figure below) to access the interface. Select the appropriate version from the listed OTA package list and press the "**Send**" button to start the upgrade. During the OTA upgrade, the SolarWalker needs to be plugged into a **4G** network module for internet access.

6. OTA Upgrading Steps

During the OTA upgrade, ensure both the remote control and the SolarWalker are successfully connected to the internet. The OTA upgrade is divided into two steps:

(1) Insert the 4G network module with a USB port into the USB interface inside the SolarWalker's battery. compartment, and ensure the SolarWalker connects to the internet after being turned on.

(2) Turn on the remote control and connect it to the internet, then open the App to enter the OTA upgrade page (refer to the APP OTA Upgrade section for specific steps) and select the appropriate version to confirm the upgrade.

(3) Within 1 minute, the App will return a prompt of either "Upgrade Failed" or "Restart SolarWalker for Upgrade". If the prompt is "Upgrade Failed", please confirm the SolarWalker has successfully connected to the internet and you can continue the upgrade. If the prompt is "Restart SolarWalker for Upgrade", you can directly restart the SolarWalker to enter the upgrade mode, the indicator light turns to flashing Red. The process lasts around 70s. When you hear three [Beeps-beeps-beeps] prompt, it means upgrading is succeeded. After a successful upgrade, the SolarWalker can be used normally. If the upgrade fails, you can try upgrading again.

7. OTA Upgrading Notes

During OTA update, ensure both the remote control and the machine are successfully connected to the network. The OTA update consists of two steps:
(1) Machine downloads the OTA package: This step is generally completed within 30 seconds. The exact time depends on the machine's network connection, with a 1-minute timeout.
(2) Restart the machine to start the update: After the machine successfully downloads the OTA package, the

remote control will receive a notification prompting to restart the machine for the update. Restart the machine at this point to enter the update mode.
(3) If the update fails, the App will receive a notification stating [Update failed. Please try again.]. Ensure both the machine and the remote control are connected to the network, and the network signal is free from interference. If the App interface displays a yellow [Offline] indicator, it means the machine is not connected to the remote control; if the [4G] icon is yellow, it indicates the machine's 4G network card is disconnected—please recharge the 4G card to activate the network.

CHAPTER 16. Limited Product Warranty Terms and Conditions

1. Definition of Warranty Period

The warranty period for this product is 1 year, or a cumulative operating distance of 2,000 kilometers, or a cumulative operating time of 2,000 hours—whichever comes first.
Warranty Start Date: Takes effect from the date the buyer receives the official sales invoice issued by the company.

2. Warranty Coverage and Liability

During the warranty period, if the product develops quality defects caused by non-human factors, the company will provide one of the following services:
Free spare parts (including component replacement);
Under specific limited circumstances (e.g., fundamental quality defects that cannot be repaired), provide replacement of main parts;
The company reserves the right to independently choose to use new components or factory-certified re-manufactured components for repairs. After repair, the product must meet the original factory technical standards.

3. Conditions for Free Spare Parts Replacement

To be eligible for free spare parts of replacement of main parts, all of the following conditions must be met:
The product is used normally within the warranty period specified in these terms;
The malfunction is a performance failure caused by non-human factors (excluding human-induced damage such as collision, drop, improper operation, etc.);
No unauthorized disassembly, modification, removal, or addition of components has been performed without official guidance;
Valid purchase proof can be provided (such as official sales invoices, purchase and sales contracts, etc.).
In specific cases, a test report issued by an authoritative third-party institution confirming non-human-induced damage may serve as important evidence for free Three Guarantees services. The company reserves the right of final determination on the cause of the malfunction and has the right to request the user to cooperate in providing relevant information such as product usage records and maintenance history.
For products beyond the warranty period or failing to meet the conditions for free spare parts, the company still provides paid repair services, with specific fees subject to the official after-sales quotation.

4. Warranty Exclusions (Situations Not Covered by Free Services)

The following situations are NOT eligible for free repair, replacement, or refund services:
Products beyond the warranty period as defined in Section 1 (either exceeding 1 year from invoice date, 2,000

cumulative kilometers of operation, or 2,000 cumulative hours of use, whichever comes first)
Damage caused by human factors including but not limited to:
Collisions, drops, or impacts
Improper operation (contrary to user manual instructions)
Misuse, abuse, or negligence
Foreign object intrusion or liquid damage
Unauthorized modifications or repairs:
Self-disassembly, modification, removal, or addition of components
Repairs performed by non-official service centers
Tampering with product seals or security features
Invalid or missing documentation:
No valid purchase proof (official sales invoice, purchase contract, etc.)
Altered, damaged, or missing serial numbers
Inconsistency between product model/serial number and warranty documentation
Other exclusions:
Acts of God/Force majeure (floods, fires, earthquakes, lightning strikes, etc.)
Damage caused by connecting to non-certified third-party devices or software
Wear and tear of consumable parts (unless specifically covered)
Damage resulting from commercial use or use beyond intended purpose
Note: For products falling under Warranty Exclusions, we still offer paid repair services at our official after-sales rates. The company reserves the final right to determine whether a defect is covered under warranty and may request usage records and maintenance history for verification.

5. Repair Process and Cost Liability

Customers are required to provide detailed information of the defects, including product serial number, images/videos of the defects, invoices/sales contracts of the purchase for verifying the defects and analyzing the causes.
After the defects are verified, and confirmed that the fault is due to the product's inherent quality defects (within warranty coverage), the company shall send the free spare parts or main parts to the buyer and bear the costs of round-trip shipping.
If the fault does not meet the conditions for free repair, the customer may choose paid repair or have the original product returned (the customer shall bear the return shipping cost for the latter option).
For faults not covered by warranty (e.g., human-induced damage, expired warranty, etc.), the company will charge fees for detection, parts, testing, labor, and round-trip shipping.
Special Handling: If the company receives severely damaged batteries (such as damaged, swollen, or leaking cells), the batteries will be disposed of as scrap in accordance with safety standards and will not be returned.
Address Liability: If the product is lost or damaged due to an incorrect delivery address provided by the customer or refusal to accept delivery, the customer shall bear all related losses.

After-Sales Service Card		
Product Model	**Client Company Name**	**Contact Phone No.**
Date of Purchase	**Service requirements**	**Contact Person**
Descriptions of the faults/defects in details		

The Company reserves the right of final interpretation with respect to the content of the above documents. For content updated due to product optimization, upgrading, or iteration, the Company is entitled to issue real-time content updates in accordance with the actual circumstances of product and technological advancements, without the need for prior separate notice.

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