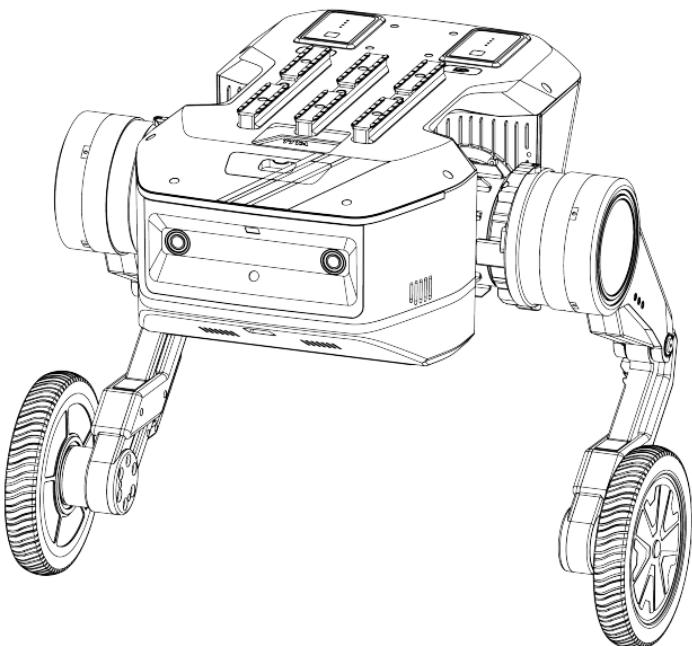


TITA

User Manual



Safety Precautions

Legal Statement

Before using this product, please read this user manual carefully and operate the product according to its contents.

If the user violates the contents of this manual when using the product, causing any property loss or personal injury, our company will not assume any responsibility. This manual has been made to include as much information as possible about the product's functions and instructions. However, as products are continuously updated, there may be discrepancies with the product purchased by the user. If the user needs the latest version of the manual, they can contact customer service for a download link. The illustrations in this manual may differ from the actual product in terms of color, appearance, etc., and users should refer to the actual product.

This statement is subject to the laws of the People's Republic of China (excluding the laws of the Hong Kong and Macao Special Administrative Regions and Taiwan).

Usage Restrictions

Before using this product, make sure to familiarize yourself with its functions and operating methods.

User Groups: This product should not be used by people with physical, sensory, or intellectual disabilities and those without relevant experience and knowledge (including minors under the age of 18). The use of this product by children under 18 is prohibited.

Usage Environment: Do not use this product in harsh environments such as high temperature, high pressure, humidity, sand, rain, snow, etc. Please use this product in open areas.

Cleaning Notes: This product should not be cleaned with water flow; it should be wiped with a clean cloth to remove stains.

Safety Inspection

Before using this product, please inspect the battery for any damage. If there is any, please stop using it and contact customer service for replacement.

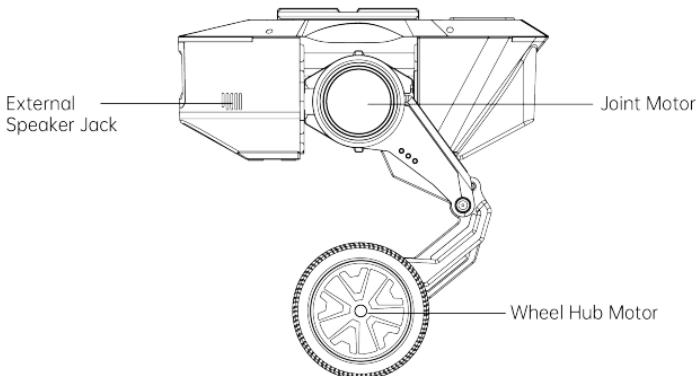
After starting this product, please check whether the product is fully charged. If it is not fully charged, it is recommended to charge it first and then use it when fully charged.

TITA Robot

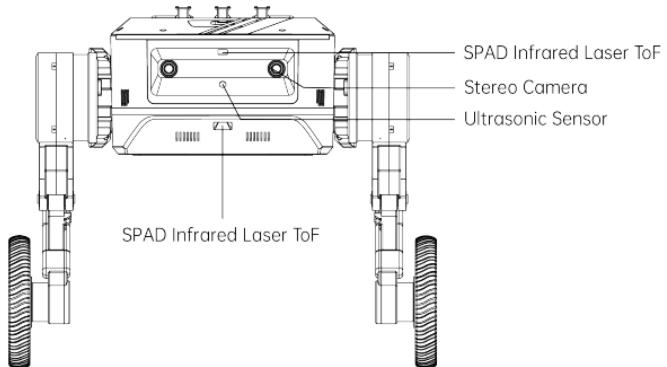
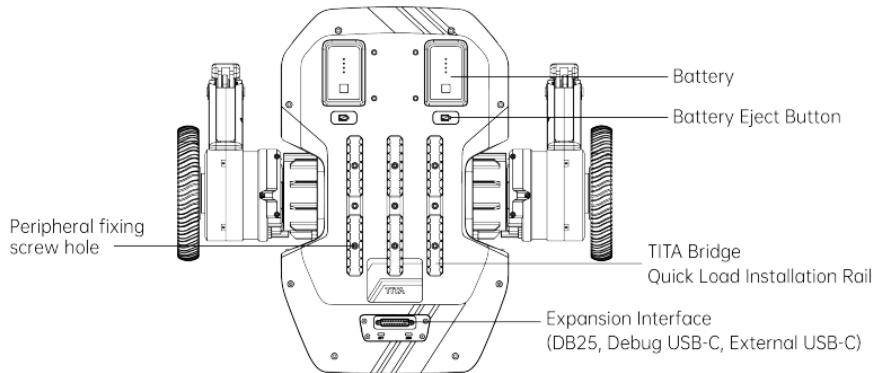
Product Introduction

The TITA robot is a high-sensitivity and decision-making direct-drive wheel-legged robot that perfectly combines the speed and agility of wheeled robots with the strong adaptability of legged robots. At the same time, it adopts a modular structure and open interface, which can be equipped with vision modules, communication modules, AI hosts, edge processors, and various sensors. It can be used in smart parks, mines, and various complex industrial environments to perform efficient patrols, load transportation, data collection, scanning and mapping, and other tasks.

1. Parts Introduction



* The illustrations of products, accessories, and user interfaces in the manual are schematic and for reference only. Due to product updates and upgrades, there may be slight differences between the product and the schematic. Please refer to the actual product.



2. Product Parameters

Basic Information

Product Name	TITA Robot
Model	D1002B111
Standing Size (mm)	510*590*490
Squatting Size	510*590*300
Standard Voltage	43.2V
Operating System	TITA OS

Motion Performance

Degrees of Freedom	8 for the entire machine
Maximum Jump Height	20cm
Maximum Jump Distance	20cm
Maximum Speed	3m/s (5m/s can be unlocked via API)
Mobile Load Weight	10kg
Jump Load Weight	2kg
Maximum Static Load Weight	20kg

Processor and Storage

Processor	NVIDIA Jetson Orin NX 16G
Computing Power	100 TOPS

Sensors

Ultrasonic	CH101
SPAD ToF	ST VL53L5CX
Camera	LI-AR0234CS-STEREO-GMSL2-30
Temperature and Humidity Sensor	SHT30

Onboard Communication

WiFi + Bluetooth Modul	Intel AX210NGW
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External Interfaces

External USB-C
Debug USB-C
DB25

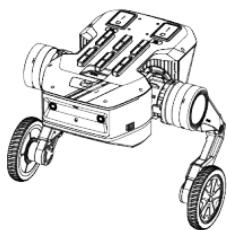
Power Adapter

Input Voltage	100-240Vac
Input Frequency	50/60Hz
Input Current	5.00A
Output Voltage	50.40±0.20V
Output Current	3.00±0.20A
Output Power	151.2W
Execution Standards	IEC/EN6236-1, GB4943.1-2011, EN55014-1/2, EN55032-1, EN61000-3-2/-3

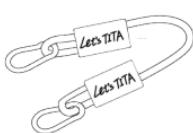
TITA Bridge

Size	193mm x 22mm x 16mm
Material	Aluminum Alloy 6061
Interface Standard	Custom F22 Quick-assembly Interface

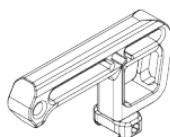
3. Product List



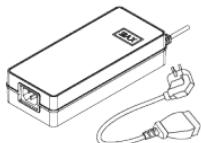
TITA *1



Tying Rope *2



Handle *1



Power Adapter & Charging Cable *1



Charging Dock *1



Battery *2



Controller *1



Flashing cable *1



Manual *1

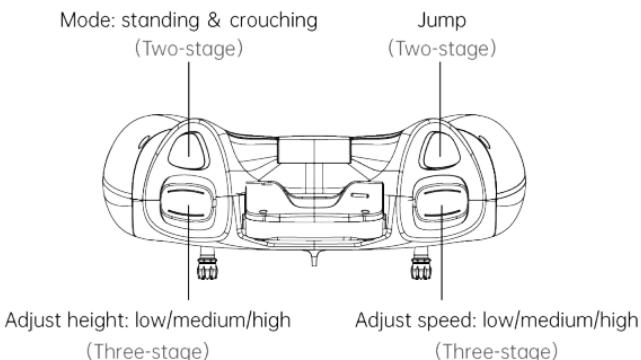
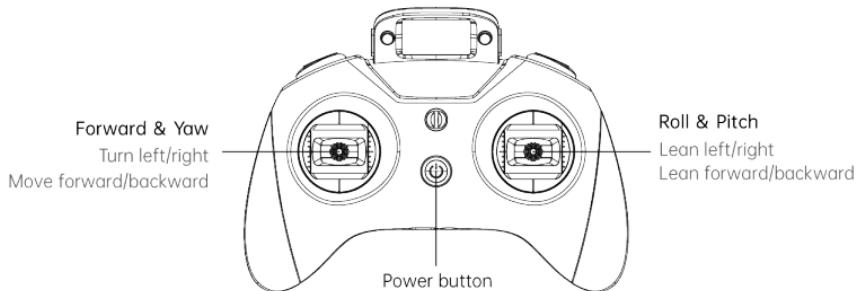


Fridge Magnet *1

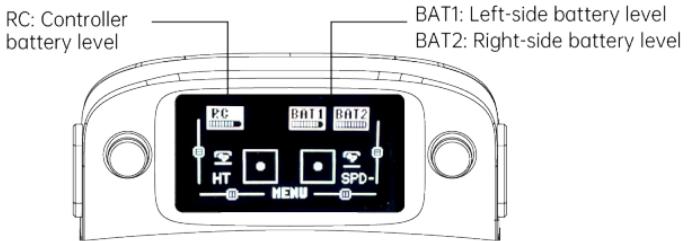
*Note: Batteries and control handles are packaged separately. Refrigerator magnets are randomly included as a gift.

Operation Methods

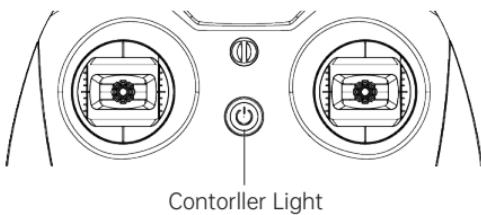
Controller



Ps: After the robot is turned on, it will be in a crouching posture. You should first use the button of Channel 5 to make it stand.



Contorller LED Status



Charging Light Effects	Connection Successful	ROS Disconnection	Disconnected State
Red Light Solid On	Blue Light Solid On	Blue Light Blinking	No Light

Upper Computer

Connect your phone to the hotspot emitted by the robot.

The robot's hotspot name is: AP-TITA-XXX.

Password: 12345678.

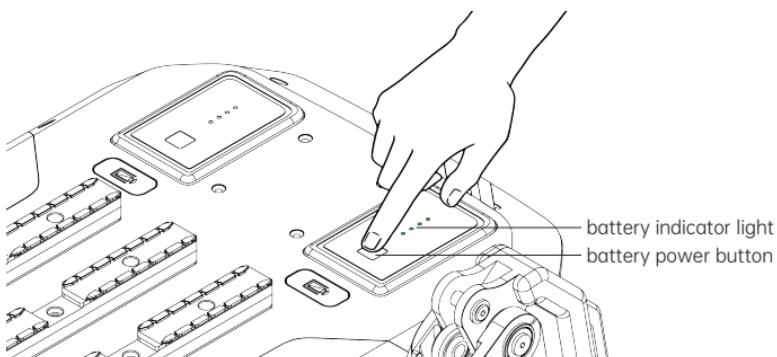
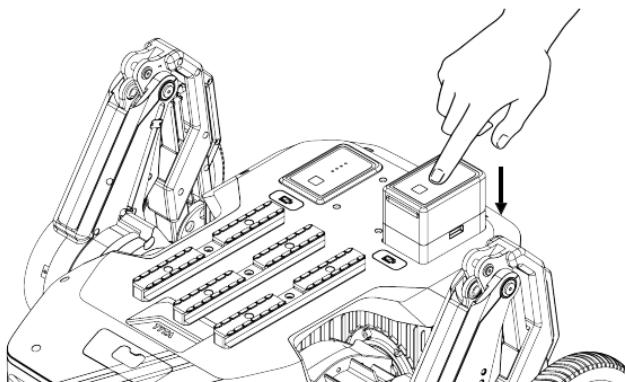
After the hotspot connection is successful, the mobile phone can scan the QR code or enter the web address (<https://192.168.12.1>) to access the control page of the upper computer.



Instructions for Use

1. Power-On Preparation

- ① TITA supports operation with a single battery. Place the battery correctly into the machine's battery compartment.
 - ② Press the battery power button once, and wait for the battery indicator light to turn on.
 - ③ Then press and hold the battery power button for 3 seconds, and wait for the battery indicator lights to light up in sequence followed by a prompt tone, indicating that the robot has successfully powered on.
- * Wait until the self-check is completed and the voice broadcast can be operated.

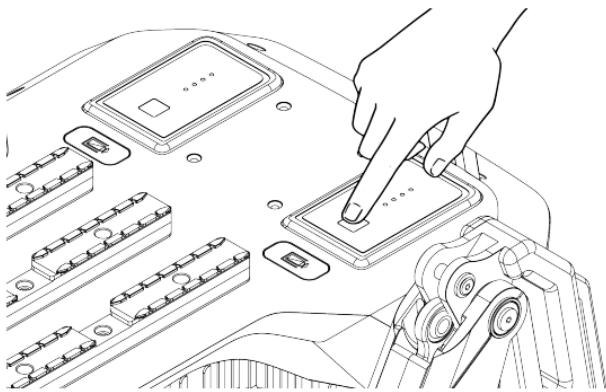


2.Shutdown Instructions

Power off can be achieved by pressing the battery button or by ejecting the battery from the battery compartment.

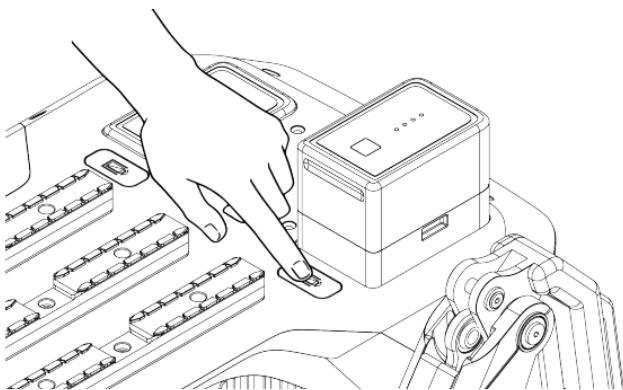
Battery Button:

Short press + hold for three seconds to turn off all batteries, the machine will automatically crouch and enter the power-off state.



Eject Battery from Battery Compartment:

Press the battery compartment button to eject all batteries, the machine will automatically crouch and enter the power-off state.



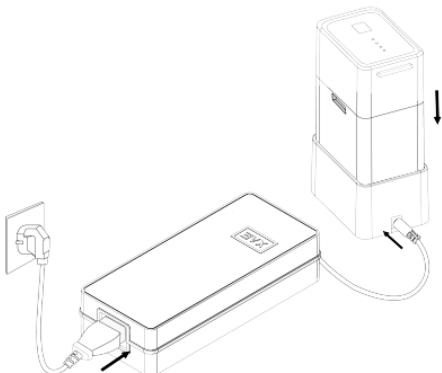
3.Charging Instructions

Battery Charging:

When the battery is about to run out, charge it through the power adapter.

Before charging, please make sure whether the battery charging dock is connected to the charging adapter. After confirmation, place the battery into the charging dock for charging.

During charging, please pay attention to whether the light on the adapter changes from red to green to indicate charging status.



Controller Charging:

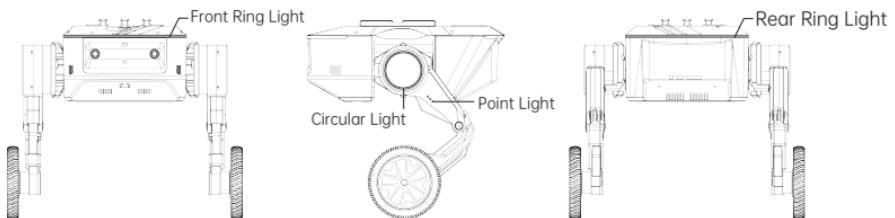
When the Controller is about to run out of power, please select an appropriate power adapter to charge it, and turn off the Controller while charging.

Please use a USB-C charging cable for charging, and it is recommended that the charger power be 5V1A.



*Please select the appropriate adapter according to your region, and prohibit using this product's adapter to charge other items or electrical appliances.

4. Lighting Description



Front Ring Light	Rear Ring Light	Circular Light	Point Light	Status
Yellow breathing light effect	Yellow breathing light effect	Yellow breathing light effect	Yellow breathing light effect	On standby
Yellow solid light effect	Yellow solid light effect	Yellow solid light effect	Yellow solid light effect	Standing in place
Blue to green extending gradient	Blue to green extending gradient	Blue to green rotating	Solid blue	Low-speed movement
Green to yellow extending gradient	Green to yellow extending gradient	Green to yellow rotating	Solid green	Medium-speed movement
Yellow to red extending gradient	Yellow to red extending gradient	Yellow to red rotating	Solid yellow	High-speed movement
Red breathing light effect	Red breathing light effect	Red breathing light effect	Red breathing light effect	Low battery
Yellow breathing light effect	Yellow breathing light effect	Red breathing light effect	Red flashing light effect	Operating malfunction

Battery

Product Model	SP03BAT
Standard Naming	12INR19/65
Rated Capacity	129.6Wh, 3000mAh
Nominal Voltage	43.2V
Dimensions (mm)	57.8*89.2*138.3
Charging Time	1h
Endurance Time	50min (single battery)
Execution Standard	ISO 9001:2015
Certification	UN38.3

*The endurance test for a single battery is conducted under the following conditions:
continuous low-speed forward movement until it automatically stops.

Notes:

1. Please refer to local laws and regulations for battery disposal methods.
2. Do not disassemble, puncture, electrify, or burn the battery in a fire.
3. Do not use the battery for scenarios other than this product.
4. If the battery leaks and the electrolyte enters the eyes, do not rub them. Immediately rinse your eyes with water and seek medical treatment.
5. If any abnormalities occur during charging, such as strange odors, smoke, deformation, etc., please immediately unplug the power adapter, do not touch the product, and promptly report to after-sales service.
6. Do not use damaged power adapters.
7. Only use official power adapters, do not use unofficial power adapters, as this may lead to lithium battery leakage, heating, fire, or explosion.
8. Do not use adapters provided by others for charging to avoid causing fires or other accidents.

Controller

Product Model	SP03CT
Rated Capacity	2000mAh
Dimensions (mm)	348.5*258.5*135.5
Charging Time	2h under 5V1A
Endurance Time	15h
Certification	UN38.3

Docking Board

Product Model	SP01DB
Dimensions (mm)	761.5*257.9*10 (上)、367*260*10 (下)
Material	6061-T6
Product List	Top Docking board *1, bottom Docking board *1, connection cable *2, connection box *1, screws *42, magic tape 5 meters

Trotter

Product Model	SP02TR
Dimensions (mm)	118*87.5*58.5
Material	TPU, 6061-T6, SUS304
Product List	Trotter*2

*The Docking board and Trotter are additional accessories and are not included in the TITA product list. If needed, they can be purchased separately; the Controller, battery, and original factory wheels are included in the TITA product list. If there is an additional need, you can also choose to purchase them.

Maintenance and Care

Maintenance and Care

1. The operating temperature range for TITA is from -10° C to 45° C, and the storage temperature range is -20° C to 60° C.
2. Please check the appearance of each part of TITA for good condition and whether there is any damage caused by external forces. If there are any questions, please contact the manufacturer's after-sales technical support personnel or authorized agents.
3. Before cleaning and maintenance, please make sure that TITA is powered off and the battery is not in the battery compartment.
4. When replacing parts, please use original factory-specified parts to avoid damage to TITA due to incompatibilities.
5. Please regularly clean the surface dust of TITA's camera, sensors, and other components.
6. Unused power adapters should be placed in a cool and dry place, and should not be placed in environments exposed to direct sunlight or humidity.

Battery Maintenance and Care

1. The battery's charging temperature range is 0 to 45 ° C, the operating temperature range is -10 ° C to 45 ° C, and the storage temperature range is -20 ° C to 60 ° C. There may be a discharge phenomenon at temperatures that are too low.
2. If transportation is required, please transport the battery separately from the TITA.
3. If the battery is left idle for a long time, it will affect its performance.
4. The battery will automatically stop charging when it is full. It is recommended to disconnect the battery from the charging device after it is fully charged.
5. After the battery is under voltage protection, it will not be able to output externally and must be charged to return to normal. Please use wired charging to charge.

Environmental Requirements

1. Due to TITA's metal casing is hard and has a large kinetic energy when traveling at high speed, and it requires a certain braking distance when braking, therefore, this product should be used in open and safe places, and it is forbidden to use this product in crowded places and roads.
2. When using outdoors, do not use in bad weather conditions, such as strong wind, heavy snow, heavy rain, thunder, foggy weather, etc. It is forbidden to use TITA in the event of disasters such as fire, explosion, lightning, storm, tornado, heavy rain, flood, earthquake, sandstorm, etc.
3. Do not use this product in water-prone environments, and strictly prohibit this product from coming into contact with liquids or being submerged in water. To prevent the user from being injured or causing damage to the product, do not immediately power on the product after it has been rained on or fallen into the water. If accidentally wet, immediately stop the operation and press the emergency stop button, and wipe it with a soft dry cloth in time.
4. Do not use TITA in scenes with many wireless communication equipment working. Do not use TITA in environments with poor communication signals and strong electromagnetic interference. Make sure to use it in open and open places. Building walls, rocks, and forests may interfere with sensors and communication signals. It is forbidden to use TITA near electromagnetic interference sources. Electromagnetic interference sources include but are not limited to: Wi-Fi hotspots, routers, Bluetooth devices, high-voltage power lines, high-voltage substations, mobile phone base stations, and television broadcast signal towers. If the interference source is too large, TITA may not be controllable.

Safe Use

To avoid causing injury or loss to users, others, or property, please be sure to follow the following principles:

1. Prohibit the use of this product by people who have not read this product manual,Prohibit lifting up while TITA is standing.

2. Minors under the age of 18 and people with physical or intellectual disabilities shall not use this product alone and should use it under the supervision and accompaniment of a guardian.
3. Do not put your hands into the machine body, joint connections, or leg gaps of this product, and do not touch the joint motors to avoid injury.
4. It is forbidden to use in dawn, dusk, or at night and other situations with poor lighting.
5. When using this product, always stay alert and pay attention to safety to avoid causing injury or damage to pedestrians, property, or property around the use environment when TITA moves or moves.
6. Before using this product, make sure the place of use is open and safe, and it is forbidden to use this product near flammable materials or heat sources. When not using autonomous navigation functions, users should control this product within the line of sight and stay away from crowds, obstacles, and other objects that may be damaged by collisions. It is forbidden to use this product on crowded streets, roads, and highways to avoid causing injury to others.
7. When using TITA, be safety-conscious and always pay attention to TITA and passing vehicles and pedestrians. Be prepared to deal with the following situations at any time: people suddenly approaching; pedestrians or animals playing around; potholes, sewer grates, railway tracks, expansion joints, road construction, and surrounding obstacles, etc. These may lead to accidents.
8. It is forbidden to use medium and high-speed modes in front of children or the elderly, and always be vigilant to avoid children or the elderly approaching this product and causing accidental injuries.
9. Due to the potential danger of wires, small parts, and movable mechanical joints to children, children are forbidden to contact or use this product alone.
10. It is forbidden to disassemble, modify, add parts to TITA, and non-factory parts may not match the software, leading to motion control failure and inability to use normally.
11. It is forbidden to use this product to charge, drag, or launch any dangerous objects towards buildings, crowds, or animals.

12. It is forbidden to operate and use this product while drinking, drug abuse, drug anesthesia, dizziness, fatigue, nausea, and other poor physical or mental states.
13. If this product has an accident (such as collision, falling for no reason, etc.) or abnormal operation (such as unstable standing or uncontrollable), it should be stopped immediately and the power supply should be turned off. Do not continue to use the product until it is repaired by the original factory or the original factory-authorized agent.
14. It is forbidden to control and use this product on public roads to avoid affecting other pedestrians and vehicles.
15. It is forbidden to use this product in crowded places.
16. This product does not have a riding function. To avoid injury, no one is allowed to ride on this product.

Legal Use

1. Prohibit the use of this product for any illegal and criminal activities (including but not limited to espionage, military operations, and illegal investigative work). Prohibit the use of this product to infringe on the personal rights of others.
2. Prohibit the use of this product to infringe on the privacy and all other personal and property rights of others.
3. When using TITA for shooting, be sure to respect the privacy rights of others.
4. Prohibit any unauthorized surveillance activities using TITA, including but not limited to monitoring others, groups, activities, performances, exhibitions, or buildings.
5. Prohibit controlling TITA to enter sensitive buildings and facilities without official authorization. It may include: border lines, power stations, substations, prisons, transportation hubs, highways and highway transportation hubs, government buildings, and military base facilities.
6. If there are relevant regulations on the use of robots, cameras, and other electronic products in the user's region and country, use them in the manner prescribed by the local government.
7. Users have the obligation to know the laws of their area and comply with the applicable laws.

8. Users bear all responsibilities arising from secondary development or modification.

Frequently Asked Questions

1. Due to tire material issues, there may be some noise caused by friction with the ground when first used, which is a normal sound.
2. Due to the characteristics of the two-wheeled robot, there will be a certain amount of swaying back and forth when standing in place, which is a normal phenomenon.
3. To ensure machine safety performance, the speed limit of TITA at a low height is 2m/s.
4. At low height, the machine will automatically adjust its height during autonomous obstacle avoidance and remote control braking, and it will return to the previous height after braking is achieved.
5. The autonomous obstacle avoidance feature is turned off by default. If you need to use it, please enable it through the upper computer (After shutting down, it will revert to the default setting of being turned off). After this feature is enabled, the speed limit is set to 0.5 meters per second.
6. If you need to use the camera's measurement function, it is necessary to ensure that it is used in an environment with more than 200 lux and avoid direct sunlight, while also ensuring that the camera can obtain images with normal color information.
7. At the height gear, TITA will automatically adjust its height to ensure smooth operation.
8. When the TITA load reaches 10kg, to ensure machine safety, please do not use medium and high-speed gears.
9. To ensure safety, the jumping function can only be performed after TITA has stabilized.
10. When the total power is below 35% (battery voltage below 42.5V), TITA will restrict the use of jumping functions and high-speed operation.
11. The working environment temperature for the Controller is -15° C to 45° C, and the relative humidity is 20% to 75%. Please use the Controller under these conditions.

12. The Controller will automatically power off after 10 minutes of inactivity during operation.
13. Due to the limitations of TITA's sensor position, it cannot detect downhill and concave road surfaces, so the relevant functions cannot be used in this scenario.
14. If the motion control board is disconnected, please restart and try again. After shutting down, please wait for 3 seconds before turning on again.
15. For details on the use of accessories, please refer to the development manual.
16. Product specifications are for reference only. Some specifications may vary depending on the usage environment and should be based on actual usage.
The final interpretation rights belong to Direct Drive Tech.

Video Tutorial



Development Manual



User Manual



(This manual is v1.0. Due to the continuous updates and upgrades of the product, the product manual may be adjusted. Please refer to the electronic version of the manual.)



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V1.0