Sparkoz Technology

Commercial Cleaning Robot
TN70 Brochure

01

Performance Introduction

1. Product Performance Introduction

1.1 Appearance

1. Product Performance Introduction

1.2 Product Solutions

TN70 Background

- The aging of the world is serious, and there is a shortage of labor force; the content of cleaning operations is repetitive and boring; the labor cost of the cleaning industry is high, and the efficiency of traditional cleaning is low. The market has an urgent demand for the implementation of robot technology in the commercial field;
- In 2020, affected by the novel coronavirus epidemic, the demand for commercial cleaning robots in public spaces will be even stronger, and commercial cleaning robots will be accelerated in many application scenarios such as airports, hospitals, and supermarkets. The epidemic has given large commercial floor cleaning machines a huge market potential.

TN70 Advantages

- Vision and laser fusion navigation and positioning, combined with multi-sensing and AI algorithms, realize autonomous obstacle avoidance;
- Small and flexible body, fast driving speed , high efficiency , large-capacity water tank, cleaning and disinfection at the same time, long battery life;
- The product complies with the requirements of European standard safety regulations, and the large battery compartment meets the requirements of safe lead-acid batteries;
- Automatic operation, unmanned driving technology and intelligent identification technology;
- Digital information management.

Customers will benefit from

- Release the cleaners from heavy and repetitive work, reshape the cleaning process, and improve human efficiency;
- Automatic disinfection is normalized, scientifically, accurately and standardized do a good job in epidemic prevention and control, saving manpower and avoiding virus infection;
- Improve technology image and digital management level.

SPARKOZ TN70 Autonomous Cleaning Robot

1.3 Product Parameters

	Specification	Sparkoz TN70
Basic Parameters	DimensionsL *W*H	116cm*58cm*121cm (45.6′ *22.8′ *47.6′)
	Weight	254kg / 439lbs (excluding water)
Performance Parameter	Cleaning width	510mm / 20′
	Suction rake width	790mm / 31′
	Ground pressure	27kg / 59.5 lbs
	Pressure per unit area of brush plate g/cm ^{2}	13.2 g/cm^2 / 0.187psi
	Clean water tank volume	70L / 18.5gal
	Sewage Tank Volume	50L / 13.2gal
	Speed	Automatic: 4km/h ; Manual: 4km/h
	Work efficiency	2040m ^{2} /h
	Gradeability	6%
Electronic System	Voltage	DC24V
	Battery life	3~4h
	Battery capacity	DC24V, 120Ah
Smart System (UI)	Navigation scheme	Vision + Laser
	Sensor Solution	Panoramic monocular camera / 270 ° laser radar / 360 ° depth camera / 360 ° ultrasonic / IMU / electronic anti-collision strip
	Driving recorder	Optional
Disinfect module	Reserved port	Optional

1. Product Performance Introduction

1.4 Main Features

40 sensors, safety guarantee

- Self-developed visual and laser multi-sensor fusion mapping and positioning technology, robot control technology based on model predictive control, depth sensor environment perception and intelligent obstacle avoidance technology;
- The average repeated positioning accuracy is less than 3cm, the success rate of regional system relocation is higher than 95%, and the average error of the teaching path is less than 5cm, and the repeated error of a single route is less than 3cm;
- It achieves higher positioning accuracy and positioning reliability, and has stronger adaptability to the scene.

Easy to operate

- The process of map building and path learning is visualized. QR codes are arranged in the target area, and the codes are scanned to build maps. The map building capacity is **30,000 square meters** . After the map is built, the work can be automatically covered, and the route can also be specified in the map. There are two modes: automatic and manual. The operation is simple and easy to learn.
- Multi-role management logic, the task code starts the task at a fixed point, and the cleaning staff can easily start the task in
- 10 -inch touch display screen with simple and easy-to-understand icons, APP optimizes user practical logic and interaction details, and polishes the "zero learning cost" robot operating system

Professional Cleaning Chassis

- Professional scrubbing system, 19 -inch neutral brush plate or scouring pad, 27Kg ground pressure, super cleaning ability
- Great suction, no residue on various brick surfaces.

Small body, flexible and efficient

- The body is light and compact, but it is equipped with a **70L** large-capacity water tank, and the 58cm body is convenient for special occasions;
- In the set map area, automatic cleaning operation according to the path, the speed can reach 1.2m/s , and the cleaning efficiency is **2040 m² /h**
- Scrubbing and disinfection work at the same time.

1. Product Performance Introduction

1.5 Selling points

➢ USP :

- Multi-sensor combination, 360 ° body without dead angle, safer;
- 70L large water tank capacity, 27Kg ground pressure, more thorough cleaning;
- The body is compact, and even narrow scenes can be cleaned easily.

- ✓ Sensor matrix configuration: lidar, ultrasonic, electronic anti-collision strip, single-point laser, IMU inertial measurement instrument
- ✓ laser and visual AI recognition, unmanned intelligent cruise
- ✓ Realize fully automatic operation, save manpower, and effectively improve cleaning efficiency
- ✓ Professional cleaning chassis structure, professional scrubbing system
- ✓ 27Kg ground pressure, ultra-sealed soft suction rake
- ✓ No fear of dirty ground, no residue after wiping
- ✓ 70L large-capacity water tank, the cleaning speed can reach up to 1.2m/s , and the cleaning efficiency can reach 2150 m^2/h
- ✓ Compact body, flexible and adaptable to more scenarios

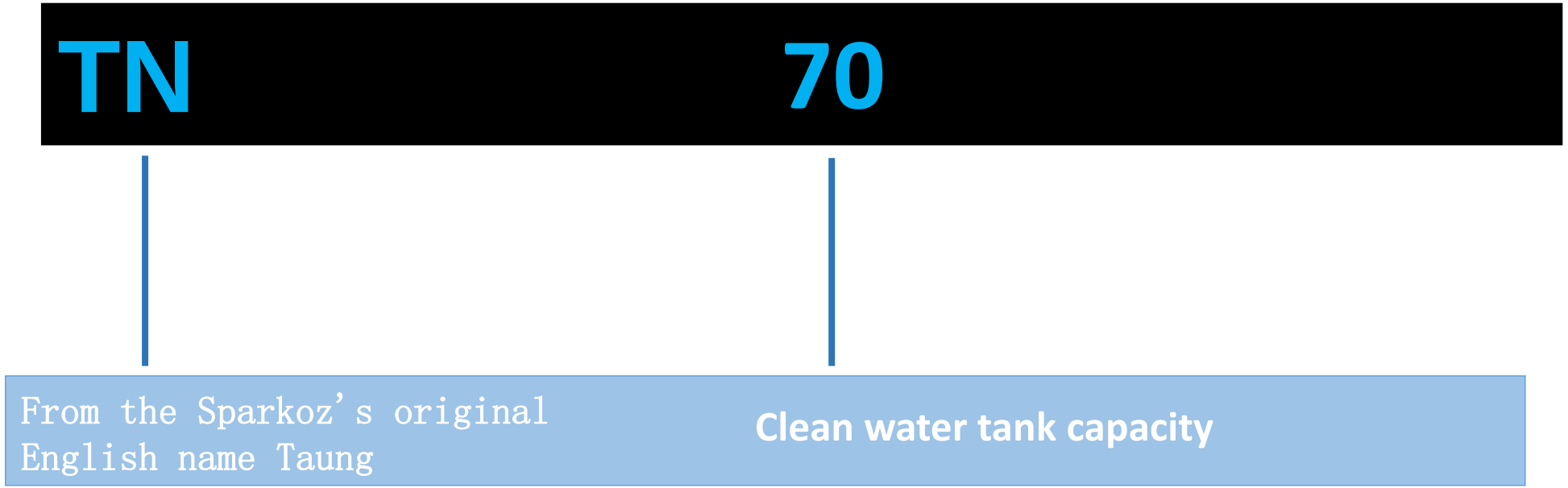
Classification	TN70 series
Size of application	Suitable for medium to large places
Scenarios Type	narrow to wide field
Disinfect module	The interface is reserved, and the disinfecting package can be selected
Target scene	Commercial housing, commercial real estate, medical centers, shopping malls, supermarkets, exhibition halls, airports, stations, factories
Part No	61001003

02

Product Introduction

2. Product Introduction

2.1 The Origin of the Name



2. Product Introduction

2.2 Product features, overview of highlights

Warning Light

Wide Angle Depth Camera

Lidar

Ultrasonic radar

Turn signal

Electronic bumper

Single point laser

Front monocular

Disinfect module

210 ° super large viewing angle, millimeter-level positioning accuracy

5 depth cameras, high frame rate, super sensitive for subtle capture, wide viewing angle

2 laser radars, high speed, long distance measurement, precision distance measurement

Surrounded by ultrasound, accurate distance measurement and obstacle avoidance

In the event of an accidental collision, the emergency stop device is triggered immediately to ensure safety

3 single-point lasers, spot <1cm , high accuracy, anti-interference, anti-drop

Sparkoz high computing power control platform

2. Product Introduction

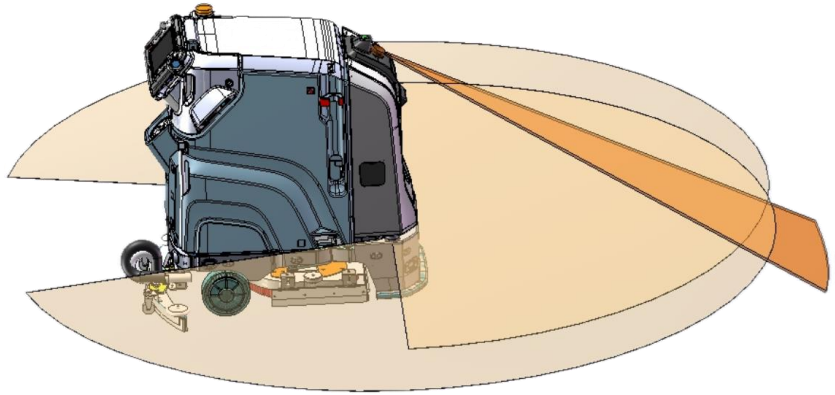
2.2 Product features, overview of highlights

- Brand-new UI user interaction concept, visual map construction task, simple and clear human-computer interaction system
- Unique self-developed laser and vision dual fusion positioning composition AI algorithm navigation system is more accurate and stable
- Dedicated robot control platform with a computing power of up to 30,000 times per second, making the processing system more intelligent and agile
- The self-developed multi-sensor matrix is deeply integrated with 40+ sensors around the configuration, and the perception system is more suitable for safety
- Deeply create a new generation, 70L integrated body structure, and the cleaning system is more professional and excellent
- Air atomization disinfection and ground disinfection, automatic patrol disinfection instead of manpower, more professional and thorough disinfection

2. Product Introduction

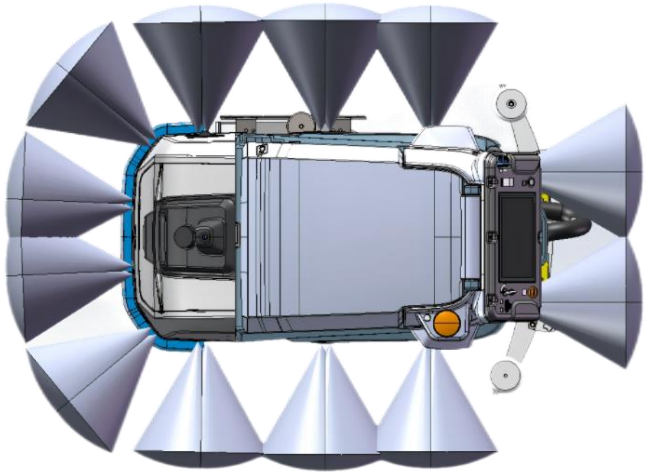
2.2 Product features, overview of highlights (Details)

Sensor coverage range:



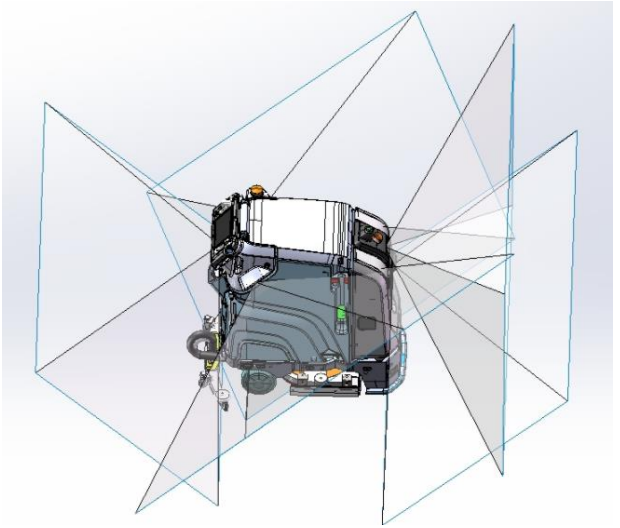
Laser coverage and application:

- 2x Flat Laser: Mapping, Positioning, Obstacle Avoidance
- 1x Oblique Laser: Cliff Detection



Ultrasonic sensor coverage and application:

- 12x Ultrasonic: Deceleration and Avoidance



3D vision sensor TOF :

- 5x : front, left, right, rear for obstacle avoidance
- Oblique TOF: Obstacle Avoidance + Cliff Detection

2. Product Introduction

2.2 Product features, overview of highlights (details)

Multi-sensor combination:

- Laser and 3D TOF visual AI recognition technology It realizes the real practical obstacle avoidance ability, can clean the operation in the environment with many obstacles and complex roads, plan the best route, continue to scan at breakpoints , and complete the cleaning task efficiently with a high coverage rate.
- Surrounded by 3D TOF visual sensors , it can perceive the distance of obstacles on the vehicle body at 360 ° , and cooperate with ultrasonic sensors to decelerate and avoid stops;
- TOF under the front slope cooperates with the single-point laser under the chassis to accurately detect cliffs;
- High precision
- Security

Identify low obstacle forklifts and avoid them accurately

2. Product Introduction

2.2 Product features and highlights overview (details)

Intelligent IoT (optional):

The optional elevator control module can be integrated with elevators, gates, access control and other systems for linkage control and smooth operation, making it easy to realize fully automatic cross-floor operations.

Gate

Elevator

2. Product Introduction

2.2 Product features, overview of highlights (Details)

Quick battery replacement + Explosion-proof cabinet charging to meet safety requirements:

- Lithium battery quick-change solution is optional for long-term operation demand scenarios, and the 25kg lithium battery is lightweight
- Multiple sets of lithium batteries, stored and charged in a professional explosion-proof cabinet
- Small-area operation areas can also provide high-safety lead-acid battery solutions, charging safety

- Lithium battery realizes fast charging, charging regardless of time period, to meet the demand for long battery life
- Lightweight 25kg battery, a single person can quickly change it within 1 minute
- Storage and charging in professional explosion-proof cabinets to meet charging scenarios with high safety requirements such as factories and airports

2. Product Introduction

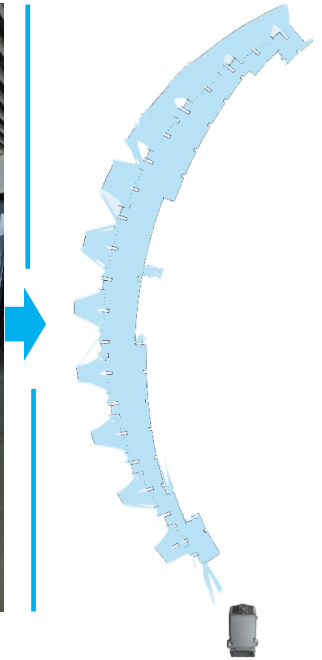
2.2 Product features, overview of highlights (Details)

Radar mapping and positioning:

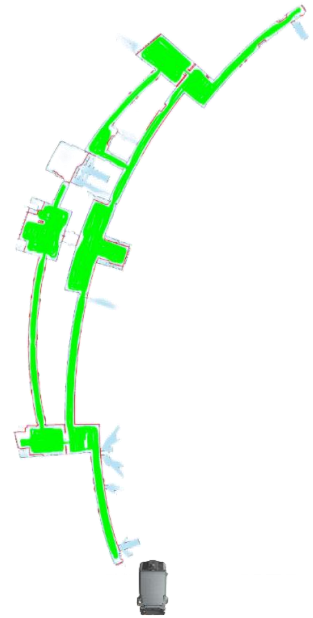
- Task starting point, scan the task code
- Quickly create maps in the scene
- The screen interface clearly shows the status of the map
- Save the map and complete the scene building

- Mapping and positioning capabilities for long channels in various large scenes
- A single map meets the needs of a 30,000 - square-foot scene

① into the environment



② Complete the map



③ complete cleaning tasks

2. Product Introduction

2.2 Product features, overview of highlights (Details)

Path Learning:

- At task starting point, TN70 scans the task code to start path learning;
- Promote robots where cleaning is required, establish cleaning paths, and view real-time route information through the screen;
- After the path learning is completed, save the task and complete the task setting. It is possible to adapt cleaning parameters, such as intensive or energy-saving mode .

- High-precision path repeat function to meet high-demand repetitive cleaning tasks.

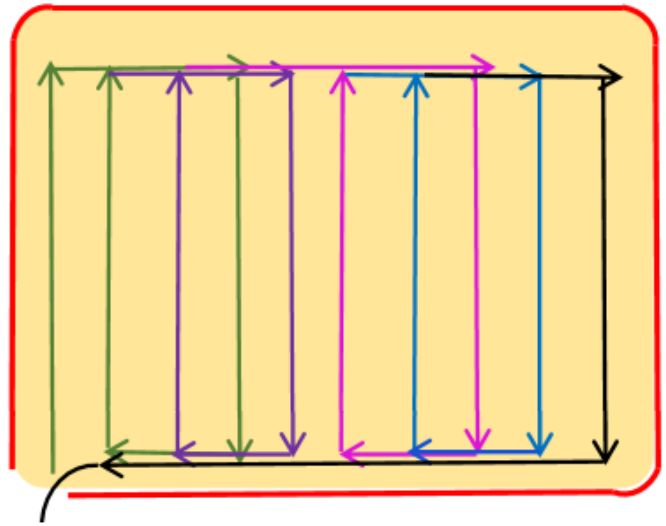
2. Product Introduction

2.2 Product features, overview of highlights (Details)

Auto Coverage:

- For large open areas, the frame selection area will be automatically covered after the map is built;
- I-shaped cleaning path
- The task code directly enters the automatic coverage mode

- Easy to use, high deployment efficiency



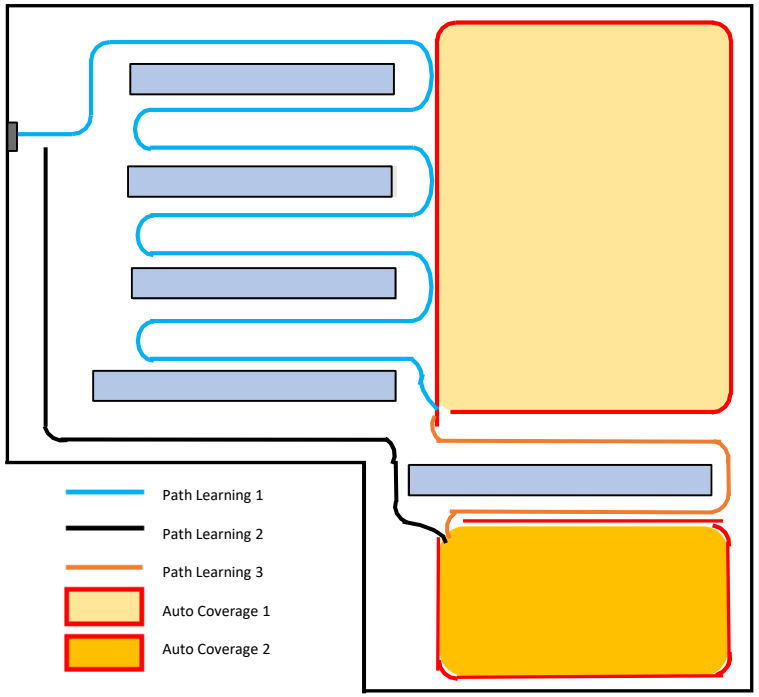
Open scene , intelligent coverage according to the size of the space

2. Product Introduction

2.2 Product features, overview of highlights (Details)

Group Tasks:

- For relatively complex and larger environments, group tasks can be play a role;
  - Large open areas can be automatically covered by frame selection;
  - A relatively narrow environment can perform automatic tasks after path learning;
  - As shown in the right picture, path learning 1 , 2 , 3 and automatic coverage area 1 , 2 are combined into a large and complex task, and the cleaning task can be completed by itself.



Complex Path to Group Task

- For a large and complex environment, only using path learning or only selecting automatic coverage is inefficient in this case, and you can choose the way of combining paths to meet the needs of efficient cleaning;
- The combined task setting is easy to learn, saves time, completes complex tasks in an optimal way, and improves efficiency.

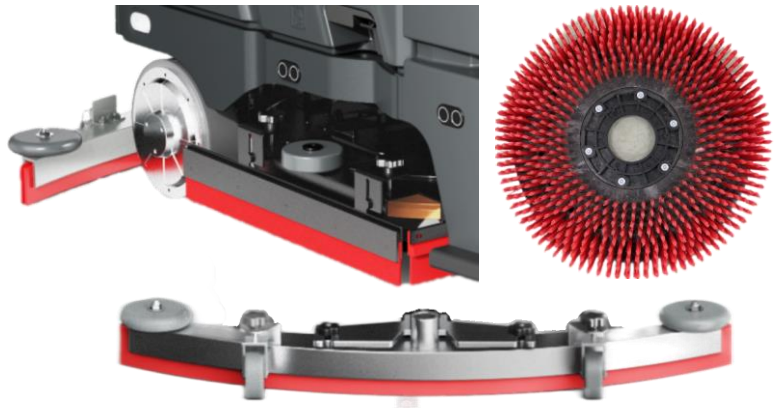
2. Product Introduction

2.2 Product features, overview of highlights (Details)

Professional scrubbing system:

- The pressure of the brush plate against the ground is >27kg , the pressure per unit area of the brush plate is 13.2g/cm ^{2}, super cleaning ability
- Great suction, no residue on various brick surfaces.
- ergonomic design

➢ The quick-release structure of the cleaning parts can complete the disassembly of the suction rake, brush plate, and side rubber strips without tools. It is more convenient to replace consumables. It conforms to the ergonomic design and is safer and more comfortable to use.



2. Product Introduction

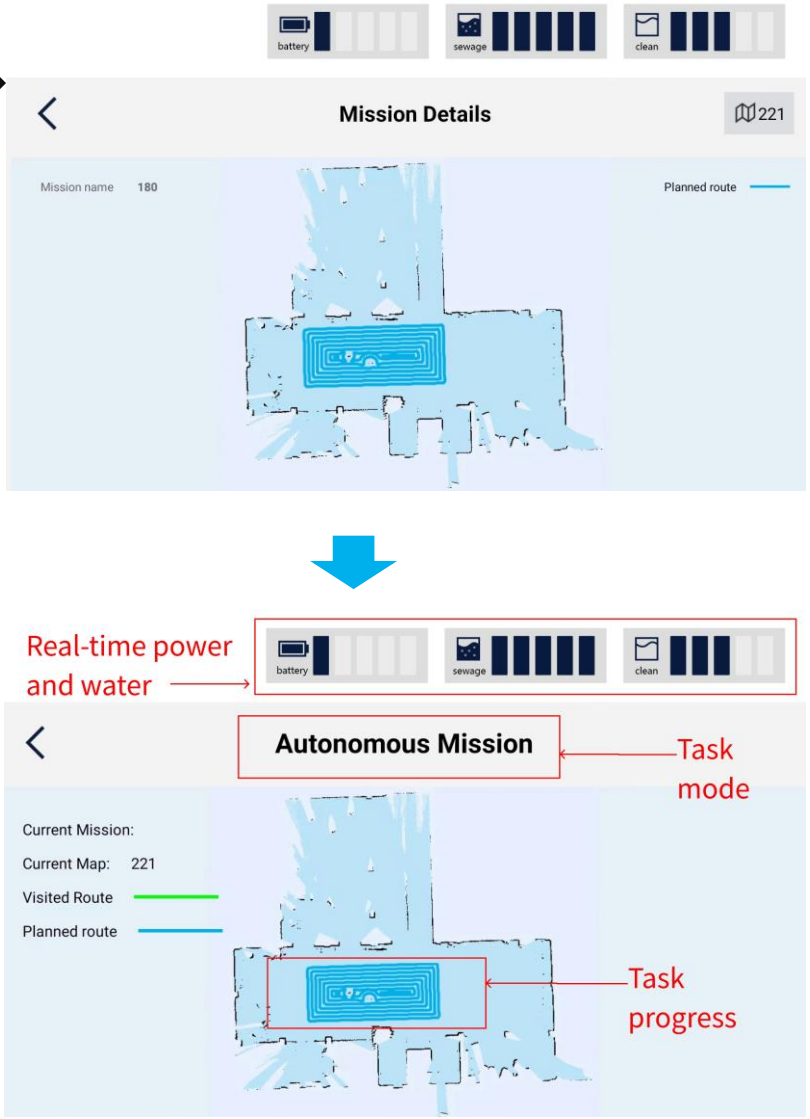
2.2 Product features, overview of highlights (Details)

User Interface:

- 10 -inch high-resolution touch screen, smooth operation;
- Vivid, vivid, concise human-computer interaction interface, clear process, easy to understand at a glance;
- Multi-account management, different users have independent settings, account numbers and passwords.

- UI interface is simple, and the icons are easy to understand, which simplifies the operation;
- The interface displays the water volume of the sewage tank, the water volume of the clean water tank, the power, and the status of the robot at a glance;
- Visual map building, path building, real-time dynamic path process, more effective human-computer interaction.

➢ The picture on the right shows the automatic cleaning task, task 13 , the real-time dynamic details of the completed task



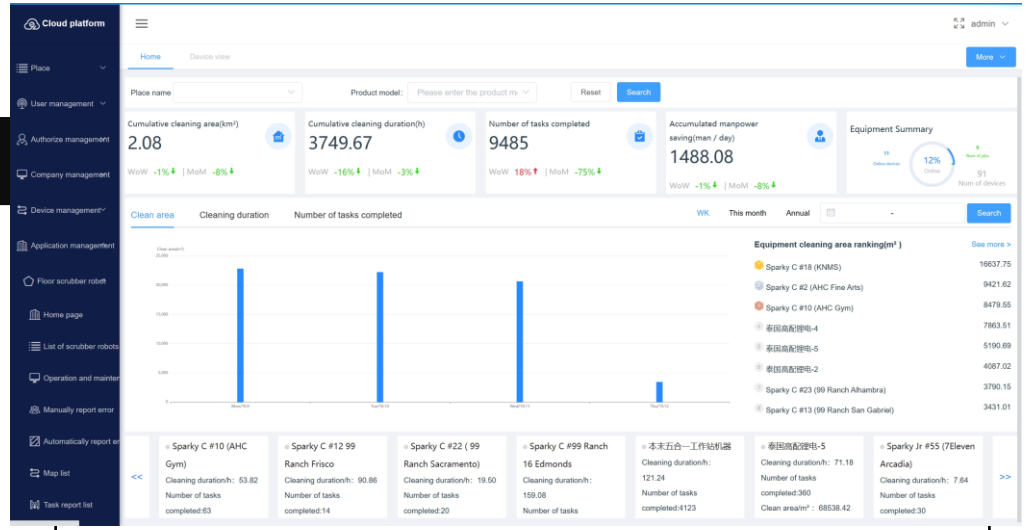
2. Product Introduction

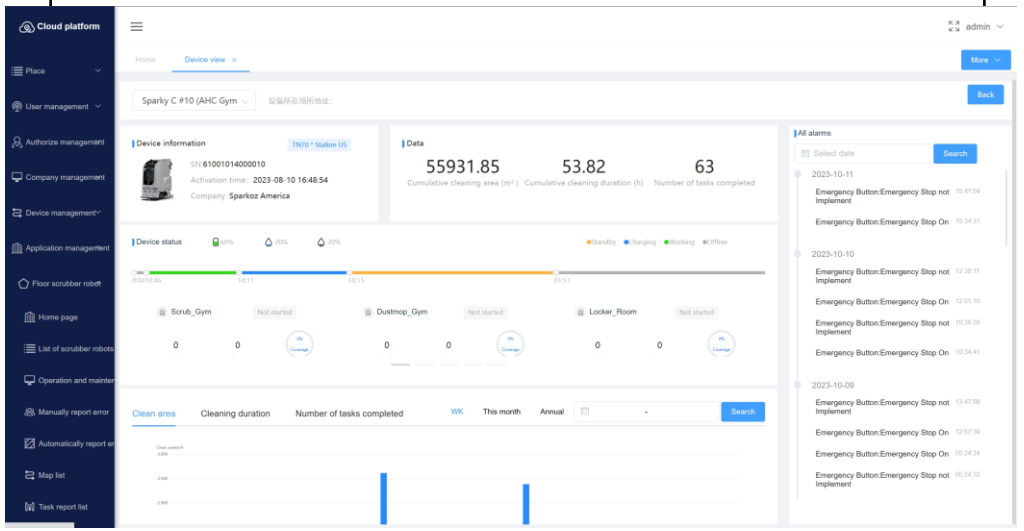
2.2 Product features, overview of highlights (Details)

Sparkoz digital management platform:

- Self-developed Sparkoz robot information management platform;
- In the robot list, you can view the corresponding robot information according to the SN , including:

① Current status, usage, software version, configuration information;
② overall working efficiency and utilization rate of the robot ;
③ Task information, map information, consumables management, fault information;
④ View task report, robot real-time information;
⑤ Remote deployment is also possible;
⑥ Support mobile phone text messages to receive task exceptions and task completion notifications.





- Realize the transparency of robot information, making supervision, operation and maintenance and other functions easier;
- Consumables management, provide regular maintenance reference, and guide customers to improve usage efficiency;
- When a fault occurs or a task is completed, a text message will be sent to notify the user, without affecting other work of the user;
- QTA software continuously improves work efficiency.

2. Product Introduction

2.2 Product features, overview of highlights (Details)

Disinfect module (optional)

■ Professional-grade sterilization application, small fog droplets, longer suspension time

Quad-core ultrasonic atomization disinfecting technology:

① Using electronic high-frequency oscillation, through the high-frequency resonance of the atomizing sheet, the liquid molecular bonds are scattered to generate detergent droplets;

② grade 316 stainless steel atomizing head, ceramic vibrating piece, good atomization effect and good corrosion resistance;

③ Corrosion-resistant box, suitable for various professional detergents;

④ Uniform atomization, the minimum droplet diameter is only 5μm , the suspension time is long, and the killing effect is good;

⑤ Four atomizing heads, maximum atomization volume of 1800ml/h , adjustable in two gears;

⑥ Self-protection design:

- Lack of liquid protection to avoid damage to the atomizer;
- Low battery protection, idle discharge affects battery life.

➢ The droplet size, suspension time and professionalism of the decontamination agent are the criteria for judging the effect of the atomization disinfection equipment.

The TN70 quad-core ultrasonic atomization disinfection module is the first choice for professional atomization disinfection with the smallest droplet size of only 5 μm .

03

Market & Service

3. Marketing / Service

3.1 Application Scenarios

01 Residential buildings

02 Estate

03 Medical center

04 Shopping mall

05 Supermarket

06 Pavilion

07 Airport

08 Station

09 Factory

3. Marketing / Sales / Service

3.2 Optional consumable models

The following consumables TN70 are suitable:			
	19" Magnetic Scrubbing Brush, Neutral Hair, Red		
	Red white cleaning pad		
	19 inch dial		
	Hanging water strip		
	90*16 dust push (not including hair length)		

04

Lead-acid or Lithium Battery & Charging Station

TN70 product parameters (lead- acid and lithium battery basic)

	Specification	TN70 (lead acid)	TN70 (lithium battery version)
Basic parameters	DimensionsL *W*H	1160*580*1210	1160*580*1210
	weight	**254kg** (excluding water)	**199kg** (excluding water)
Performance parameter	Cleaning width	510mm	510mm
	Suction rake width	790mm	790mm
	Ground pressure	27kg	27kg
	Pressure per unit area of brush plate	13.2 g/ cm^2	13.2 g/ cm^2
	Clean water tank volume	70L	70L
	Sewage Tank Volume	50L	50L
	Speed	Automatic: 4km/h ; Manual: 4km/h	Automatic: 4km/h ; Manual: 4km/h
	Work efficiency	2040m^2/h	2040m^2/h
	Gradeability	6%	6%
Electronic system	**Voltage**	**24V**	**25.6V**
	Battery life	**4 hours**	**3.5h**
	Battery capacity	**120Ah**	**100Ah**
Smart system (UI)	Navigation scheme	Vision + Laser	Vision + Laser
	Sensor Solution	Panoramic monocular camera / lidar / depth camera / ultrasonic wave /IMU/ electronic anti-collision strip	Panoramic monocular camera / lidar / depth camera / ultrasonic wave /IMU/ electronic anti-collision strip
Disinfect module	Reserved port	Optional	Optional

Sparkoz TN70 charging station

☐ Product Introduction

The TN70 charging pile is an automatic charging device specially designed for the TN70 , which can realize the automatic replenishment of the battery during the working process of the robot. In the absence of human intervention, the frequency of human intervention due to insufficient power is effectively reduced.

☐ Product Feature Highlights

- Automatic charging
- Scheduled tasks on the charging pile

Sparkoz TN70 Charging Station

Sparkoz TN70 charging station

	Specification	Parameter
Key Parameter	Size (L*W*H)	430*211*521
	Weight	20.65kg
	Input voltage / current	220V 5.5A
	Output voltage / current	29.2V 30A
	Installation requirements	220V 10A
	120Ah lead-acid battery	OK
	100Ah lithium battery	OK

05

TN70 Workstation

Sparkoz TN70 Workstation

☐ Product Introduction

The TN70 charging pile is an automatic charging and draining device specially designed for the TN70 , which can realize the automatic replenishment of electricity / water during the working process of the robot, improve the battery life of the robot, and realize the whole process of unmanned operation.

☐ Product Feature Highlights

- Automatic charging
- Automatically add water
- Automatic drain
- Scheduled tasks on workstations

Sparkoz TN70 Workstation

Sparkoz TN70 Workstation

	Specification	Parameter
Key Parameter	Size (L*W*H)	645*488*658
	Weight	35kg
	Rated input voltage	220V
	Rated output voltage	24V
	Rated power	1250W
	Operating Temperature	- 10 °C - + 45 °C
	Working humidity	20%-75%RH
	Storage temperature	-40°C- + 45°C
	Storage humidity	20%-93%RH
	Installation notes	Voltage: 220V Current: 10A household socket three hole socket

Thank you!