

User's Manual

TOF People Counter

FP221

Contents

1. Product Structure	3
1.1 Packing List	3
1.2 Product size	3
1.3 Appearance and Function	4
2. Installation Instructions	5
2.1 Installation Instructions	5
2.2 Installation height	5
2.3 Factors Affecting Accuracy	6
3. Installation Steps	6
3.1 Ceiling installation	6
4. Configuration page operations	8
4.1 Configuration Notes	8
4.2 Power on the device	8
4.3 Device Connection	9
4.4 Login Configuration Page	110
4.5 Rule Settings	11
4.5.1 Height setting	11
4.5.2 Counting Strategy	11
4.5.3 Other Settings	15
4.6 Data Push	16
4.7 Time Settings	18
4.7.1 Business Hours	18
4.7.2 Time Synchronization	18
4.8 Statistics Query	19
5. Cloud platform binding operation	20
5.1 Device Binding Operation	20
5.2 Quick Query of People Counting	25
5.3 Analysis Report	26

1. Product Structure

1.1 Packing List



TOF people counter*1



Quick guide*1



IO & 485 terminal block*1
Power terminal block*1



Mounting bracket*1



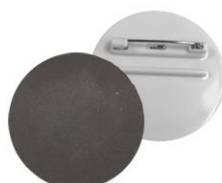
RJ45 waterproof cap * 1



Power adapter (12V/2A) * 1



304 cylindrical head
combination screw * 4
Hexagon wrench*1



Staff Shoulder Badge(Optional)

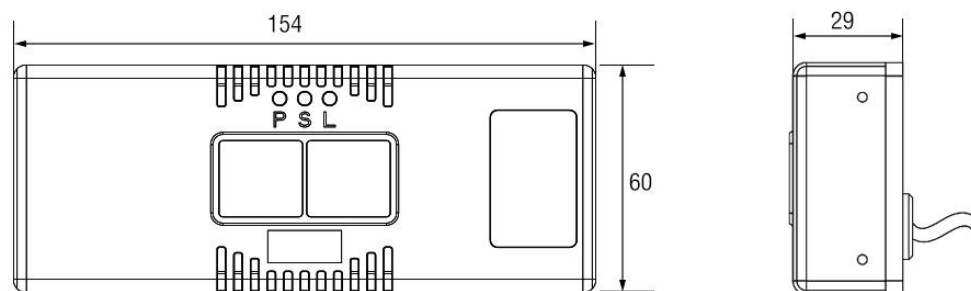


Staff Lanyard(Optional)

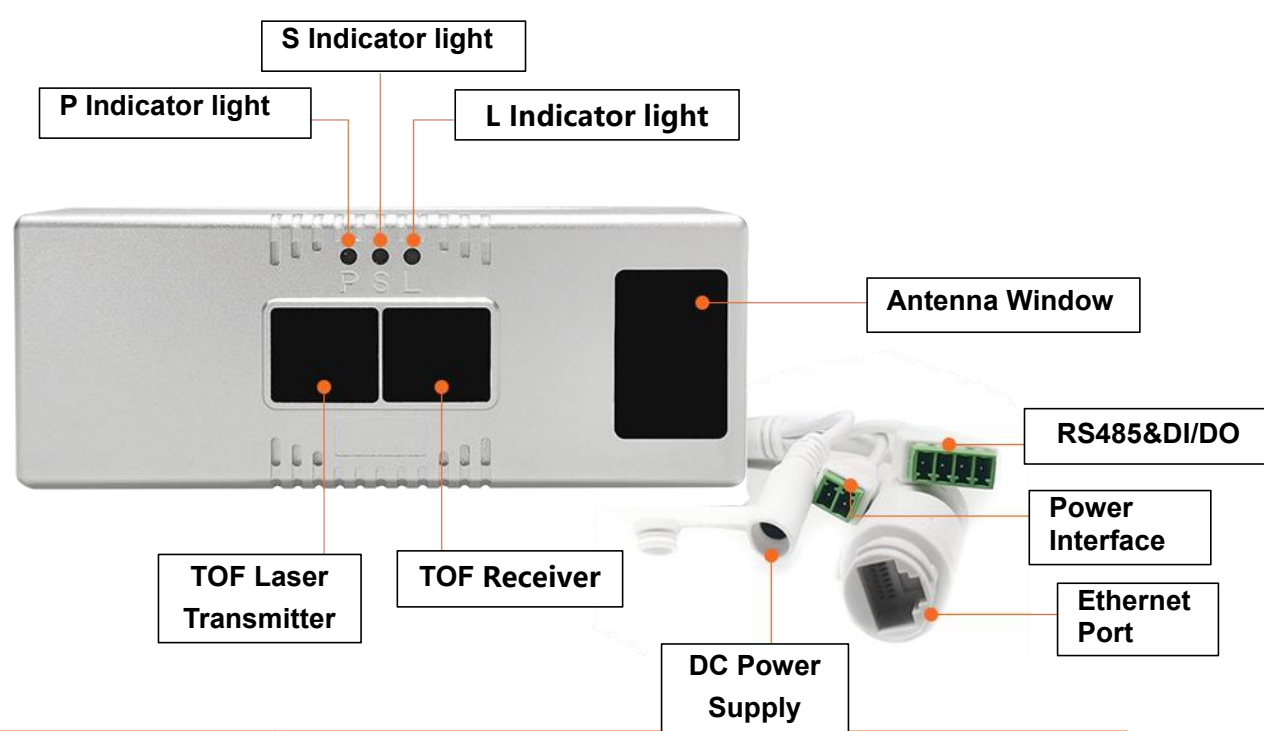
⚠ If any of the above items are damaged or lost, please contact your supplier in time .

1.2 Product size

Unit: mm



1.3 Appearance and Function



Name	Explain
Power Indicator	P Indicator light is always on
Flashing On Startup	PSL three indicator lights flash once
Network Status (Link Light)	① Plug in the network cable : L indicator light is always on ② During data communication : L indicator light flashes ③ When there is no network cable or communication : L indicator light is off

System Operating Status	① The system is not operating normally: S Indicator light is off (Problems with the calibration file were detected, etc.) ② The system is running normally and the connection to the server is normal: S Indicator light is always on ③ The system is running normally but is not connected or the communication with the configured server is abnormal: S Indicator light flashes
Rs485 & DI/Do Port	1 Port : 485A, 2 Port : 485B, 3&4 Ports : DI and DO interfaces ⚠ For ports 1234, please refer to the numbers on the device interface.
Ethernet Port	RJ45 port
Power Interface	3.5mm-2Pin power interface (9-36V)
Dc Power Supply	5.5-2.1 power interface (9-36V)

2. Installation Instructions

2.1 Installation Instructions

- ❖ When installing, be careful not to get too close to the wall. It is best to keep a distance of 50cm.
- ❖ There should be no wiring harnesses or objects near the device, as this may interfere with device detection.
- ❖ The device needs to be installed horizontally and does not support tilted installation

2.2 Installation height

⚠ It is recommended to find an installation location at a suitable height based on the coverage required.

⚠ The field of view is the visible range of the screen, not the actual detection range.

Installation Height(m)	Field Of View (m)	Detection Range(m)
2.0	4.6*3.34	0.69*0.5
2.1	4.83*3.51	0.92*0.67

2.2	5.06*3.67	1.15*0.83
2.3	5.29*3.84	1.38*1
2.4	5.52*4.01	1.61*1.17
2.5	5.76*4.2	1.84*1.34
2.6	5.98*4.36	2.07*1.51
2.7	6.21*4.53	2.3*1.68
2.8	6.44*4.7	2.53*1.85
2.9	6.67*4.87	2.76*2.01
3.0	6.90*5.03	2.99*2.18
3.1	7.13*5.20	3.22*2.35
3.2	7.36*5.37	3.45*2.52
3.3	7.57*5.51	3.68*2.67
3.4	7.82*5.68	3.91*2.84

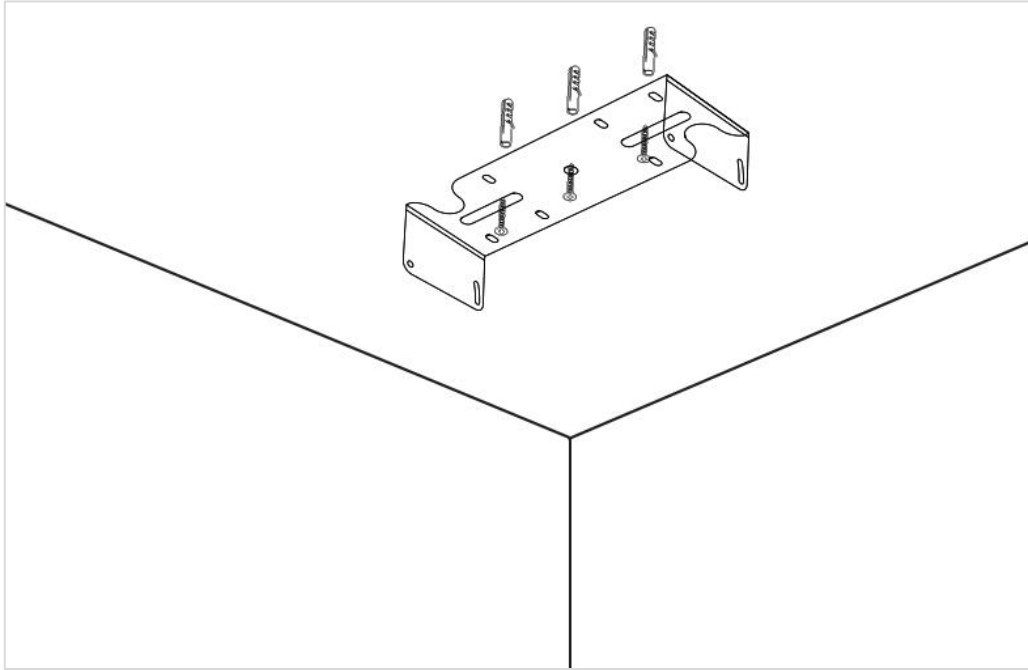
2.3 Factors Affecting Accuracy

- ❖ There should be no objects near the device, which may interfere with the device's detection.
- ❖ The detection line should only cover the ground, not other higher objects.
- ❖ If there are other similar sensor devices nearby, there may be interference.

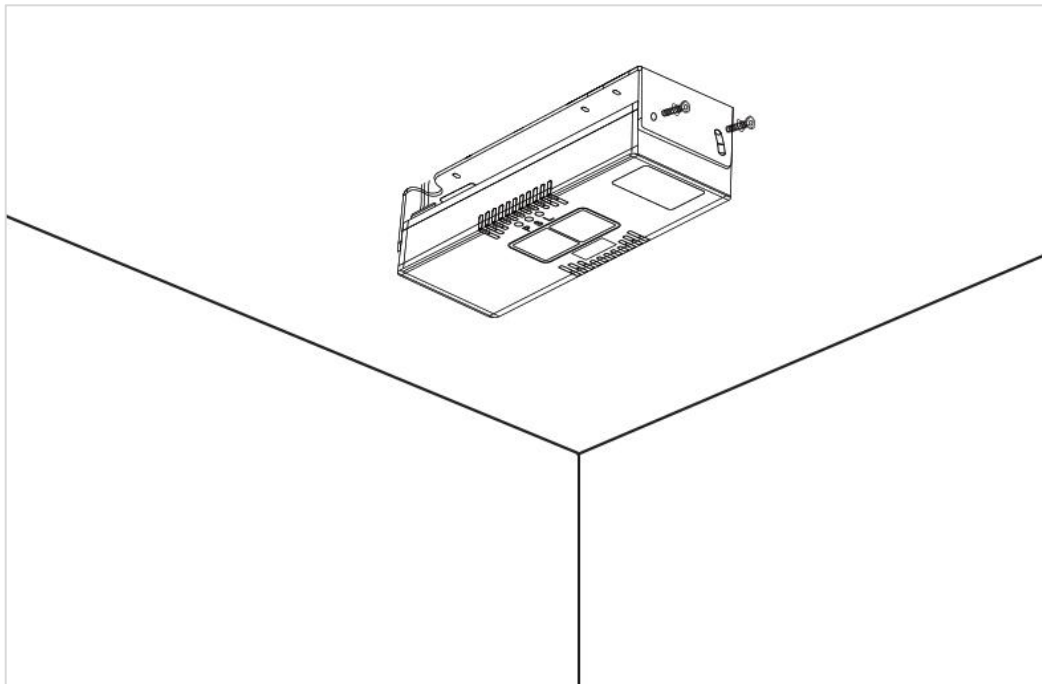
3. Installation Steps

3.1 Ceiling installation

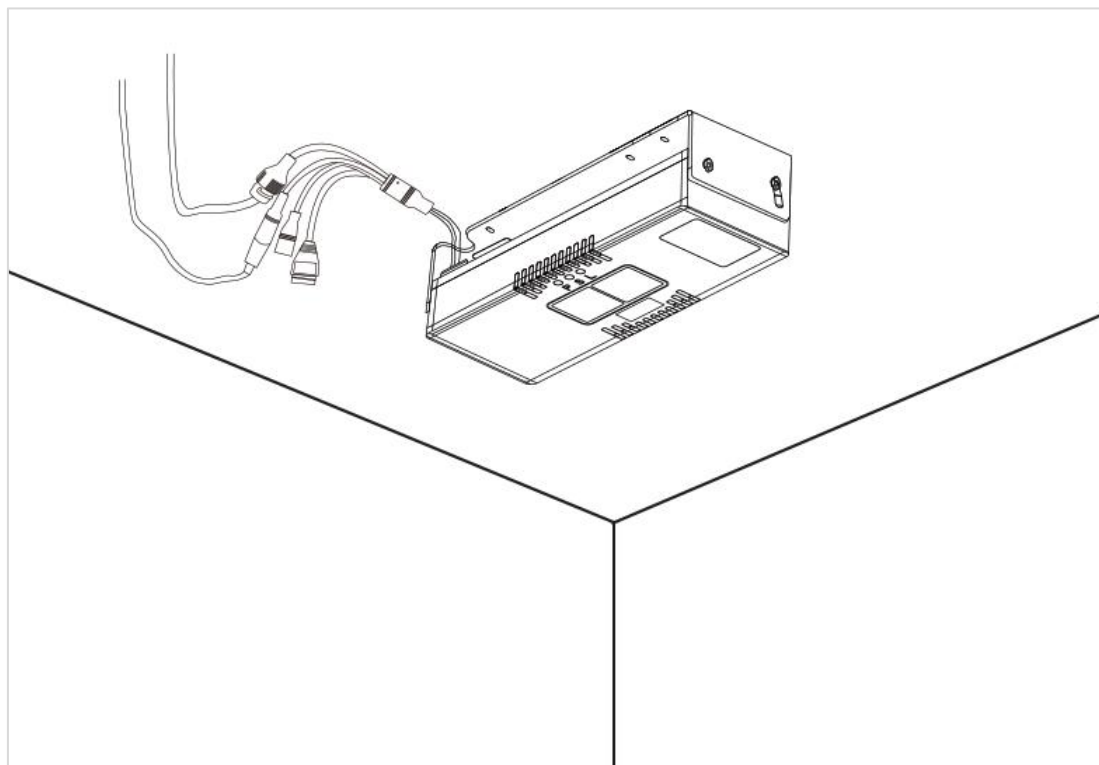
Step 1: Mark the installation position of the bracket with a marker, drill the installation holes with an electric drill, fix the expansion screw slots in the holes on the ceiling, and install the bracket firmly with expansion screws.



Step 2: Insert the device into the bracket, align the holes on the side of the bracket with the screw holes on the device, and secure it with the standard 304 cylindrical head hexagon screws.



Step 3: Supply power to the device and the grid.



4. Configuration page operations

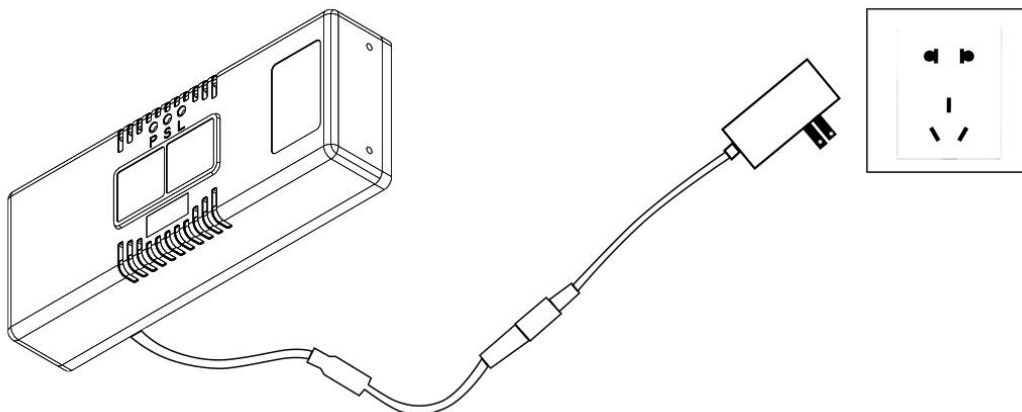
4.1 Configuration Notes

- ❖ The device is factory set to a static IP. The device needs to be in the same LAN as the computer, and the computer IP needs to be changed to the same network segment as the device before you can enter the configuration page.
- ❖ If you set the device IP to be obtained automatically, you can connect the computer and the device to the same LAN, and use the tool to search for the device in the target network segment to enter the configuration page.
- ❖ This configuration page can only be used within the local area network and is used for basic device parameter configuration and local data query.

4.2 Power on the device

TOF people counter terminal power supply mode: powered by power adapter (12V/2A).

DC: 9 ~ 36V power supply: Insert the standard DC 12V power adapter into the 220V power supply, and connect the 12V output harness terminal to the 12V power supply port of the device .

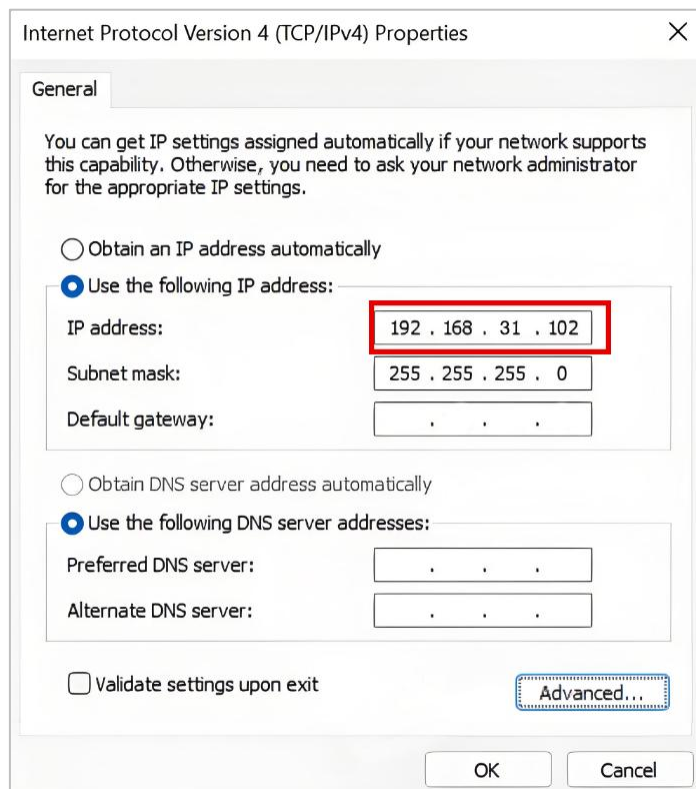


4.3 Device Connection

After the device is powered on, connect the device and the debugging computer to the same network, and manually set the computer IP address segment to the same segment as the device IP: **192.168.31.XX**.

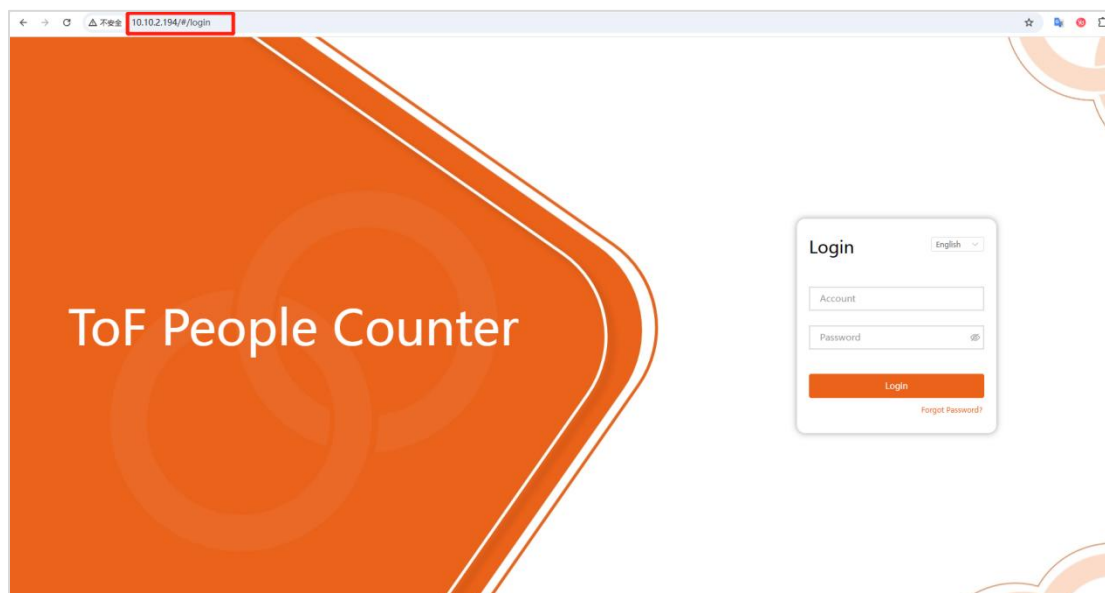
⚠ **Device static IP address: 192.168.31.100**

⚠ **XX is a number between 0 and 255, and XX cannot be 100**

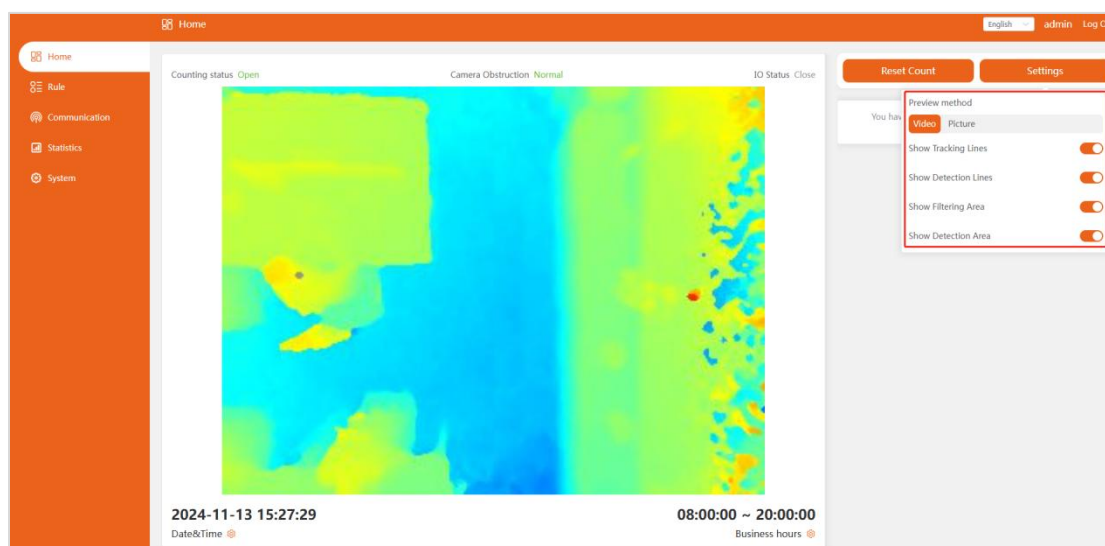


4.4 Login Configuration Page

Open the computer browser, enter the device IP: 192.168.31.100 in the address bar , and log in to the TOF people counter configuration page . Enter the account : admin, password : 123456 .

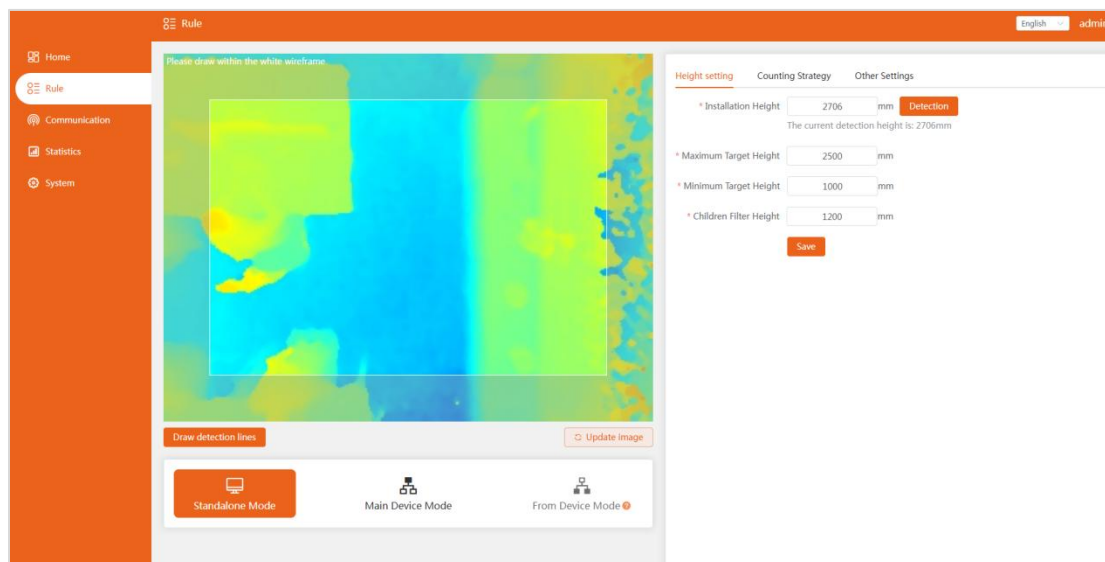


After logging in successfully, you will be redirected to the homepage. Click "Settings" on the right to turn on the functions of displaying tracking lines, displaying detection lines, and displaying detection areas. After the subsequent rules are set, you can view them on the homepage.



4.5 Rule Settings

4.5.1 Height setting



Parameter	Explain
Installation Height	The actual installation height of the equipment, in millimeters (mm); The detection button is the installation height of the equipment detection (auxiliary function)
Maximum Target Height	The highest height of the detection target. The device will not count if the height exceeds this value. Unit: millimeter (mm)
Minimum Target Height	The minimum height of the detected target. The device will not count below this height. Unit: millimeter (mm)
Children Filter Height	Classify targets by height. Set the maximum height for children. Devices below this height and above the minimum target height will be considered children. Unit: millimeters (mm) ⚠ You need to turn on "Children's Separation" in "Rules-Other Settings"

4.5.2 Counting Strategy

(1) Draw the detection line (in and out detection):

The direction of the detection line in/out depends on the drawing direction. The direction of the Δ vertex in the middle of the detection line is "in", and the opposite direction is "out". Detection targets are counted after crossing the line; support drawing up to 4 independent detection lines (detection line names can be modified).

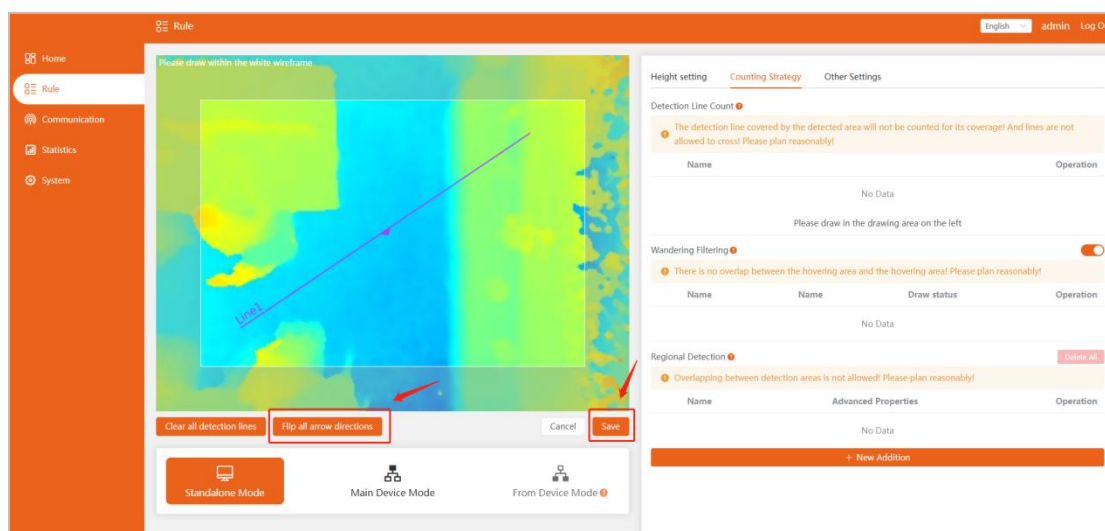
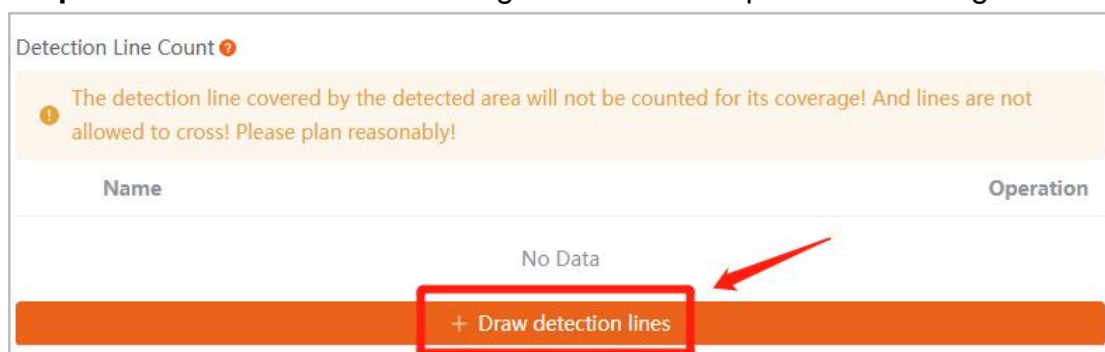
⚠ Intersection between detection lines is not allowed.

Step 1 : Click the "Draw Detection Lines" button, move the mouse to the depth map on the left, and start drawing in the white box.

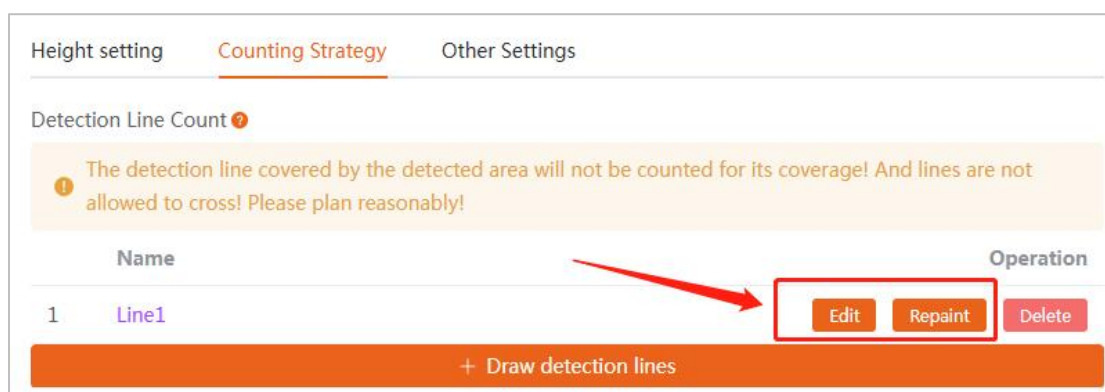
Step 2 : Click the left mouse button to start drawing the starting point, drag the mouse to draw the line, and click the left mouse button again to end drawing.

Step 3: Click the left mouse button to select the detection line, and confirm the in and out direction by clicking "Flip Arrow Direction".

Step 4: Click "Save" in the lower right corner to complete the drawing.



After drawing, you can click "Edit" to modify the name of the detection line; click "Repaint" to re-enter the editing state, move the mouse to the detection line, it will turn into a four-cornered arrow, hold down the left mouse button and drag the detection line to a new position, you can readjust the entry and exit direction, and click "Save" when finished.



(2) Draw the wandering filter region:

The device has a wandering filtering function, which can eliminate people who wander around the passage but do not actually enter or leave, thereby preventing duplicate counting. If a person passes through the detection line multiple times without leaving the wandering area, the data will be recorded as one data.

⚠ When the wandering filter function is enabled, a wandering filter area needs to be set for each detection line.

⚠ The wandering filter area needs to wrap around the corresponding detection line.

⚠ Wandering areas are not allowed to overlap, and line segments within a single wandering area are not allowed to intersect.

Step 1 : Enable the button corresponding to the wandering filter, then click the "Draw" button, move the mouse to the white box on the left side of the depth map screen and start drawing. A maximum of 10 edges can be drawn in the wandering filter area.

Detection Line Count ⓘ

ⓘ The detection line covered by the detected area will not be counted for its coverage! And lines are not allowed to cross! Please plan reasonably!

	Name	Operation
1	Line1	Edit Repaint Delete

+ Draw detection lines

Wandering Filtering ⓘ

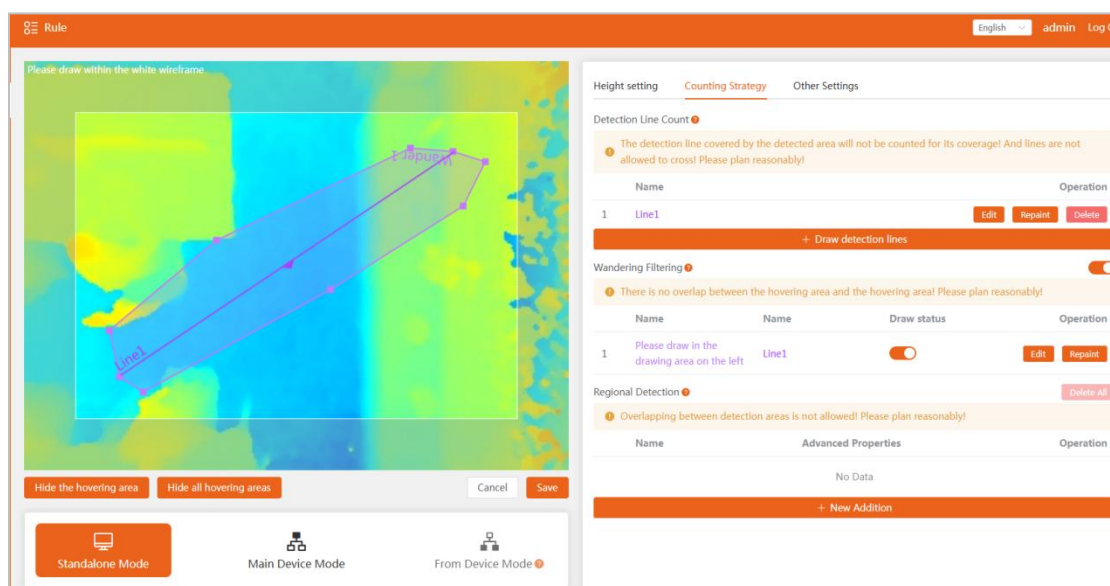
ⓘ There is no overlap between the hovering area and the hovering area! Please plan reasonably!

	Name	Name	Draw status	Operation
1	Wander 1	Line1	☐	Edit Draw

Step 2 : Click the left mouse button to draw the starting point, drag the mouse to draw the line, click the left mouse button again to draw the second vertex, and so on, until the box formed by all the points wraps the detection line.

Click the right mouse button to end the drawing.

Step 3: Click "Save" in the lower right corner to complete the drawing.



(3) Draw the detection area:

The device supports counting the number of people in a specified area and the length of time they stay in the area.

⚠ The device supports drawing up to 4 independent detection areas, and each detection area can have up to 10 edges .

⚠ Detection areas are not allowed to overlap, and line segments within a single detection area are not allowed to intersect .

⚠ The detection area and the wandering area are not allowed to overlap.

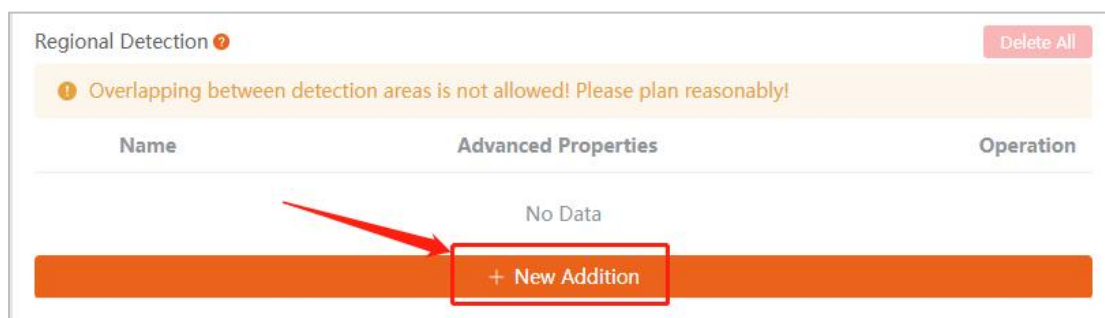
⚠ When the detection area and the detection line overlap, the overlapping part is not counted.

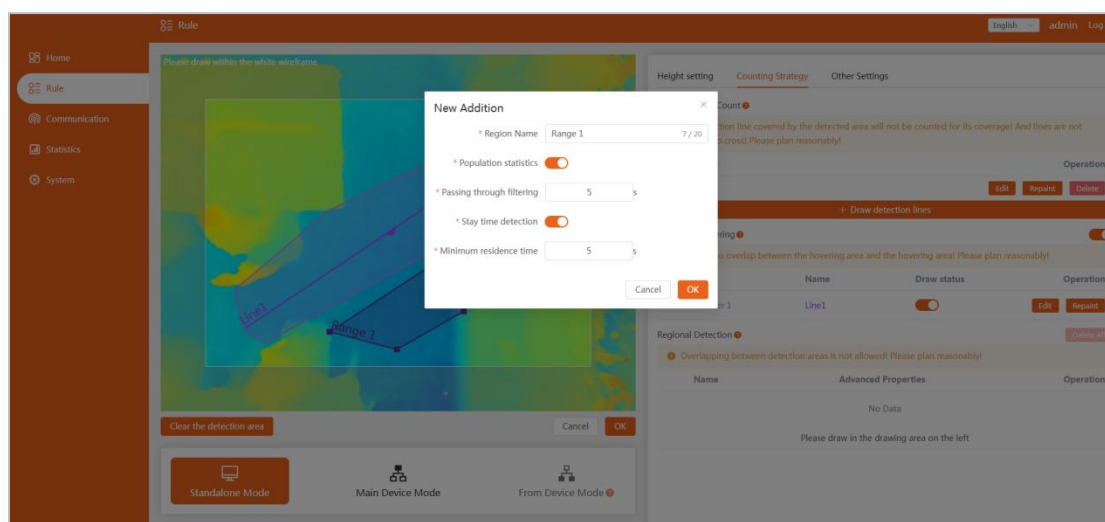
Step 1 : Under Area Detection, click the "Add" button, then move the mouse to the white box on the left side of the depth map screen and start drawing.

Step 2 : Click the left mouse button to draw the starting point, drag the mouse to draw the line, click the left button again to draw the second vertex, and so on, until the box formed by all the points covers the range to be detected.

Click the right mouse button to end the drawing.

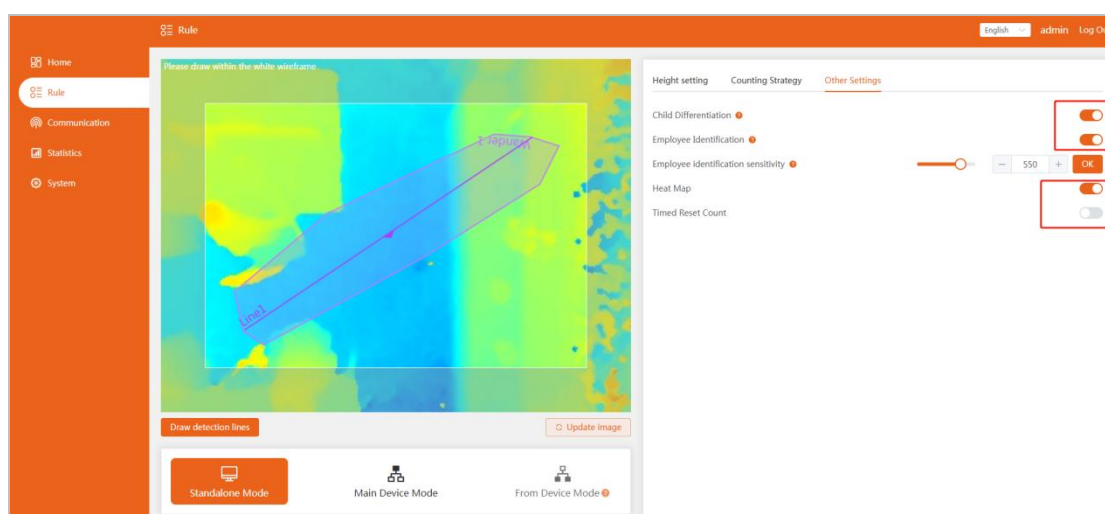
Step 3 : After the area is drawn, click "OK" in the lower right corner of the depth map to pop up the parameter setting page.





Parameter	Explain
Region Name	Custom region name.
Regional Population Statistics	Area people counting can be enabled or disabled.
Passing Filter	The detected target will be counted in the area only if it stays in the corresponding area for more than the specified time.
Dwell Time Detection	Dwell time detection can be enabled or disabled .
Minimum Stay Time	The detection target will be counted in the residence time only when it stays in the corresponding area for more than the specified time, which is used to calculate the average residence time.

4.5.3 Other Settings



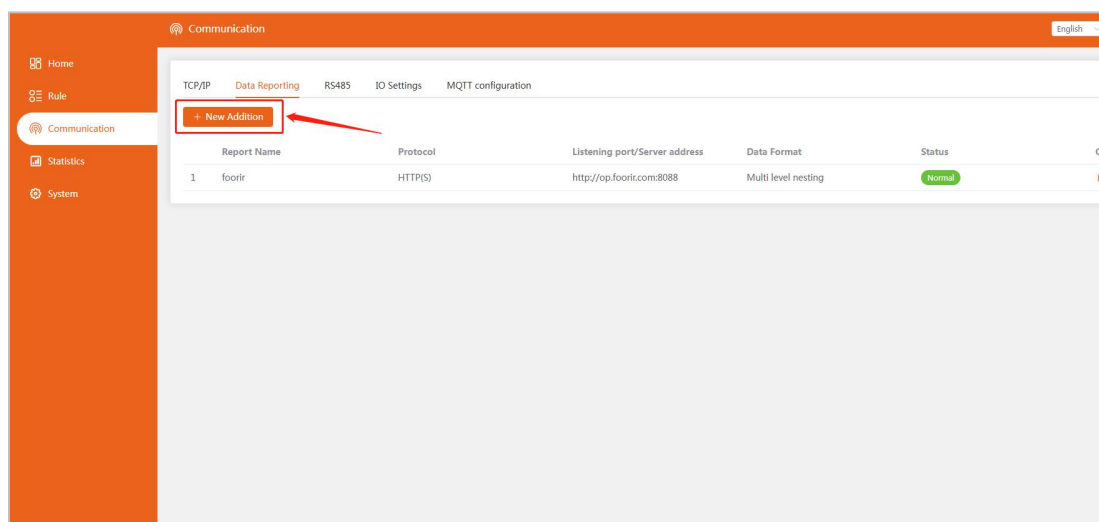
Parameter	Explain
Children's Classification	After it is turned on, the device will collect statistical data of children through the "Child Filter Height" in the "Height Settings";
Employee Recognition	Categorize targets by employee identification tags;
Employee Identification Sensitivity	The sensitivity of employee identification tag recognition, the smaller the value, the more sensitive it is ;
Heatmap	Used for statistical query; when turned on, it will be displayed on the statistics page, and you can query the movement heat map and stay heat map.
Timed Reset Count	Only the data count of the home page is reset to zero, which is the same as "Reset count" on the home page;

4.6 Data Push

The device supports data push via HTTP or HTTPS .

⚠ In this way, data can be pushed to the smart retail cloud management platform, and users can log in to vf.foorir.com to operate and use it.
For detailed operations, see < [Cloud Platform Binding Operation](#) >

Step 1 : Select "Communication- > Data Reporting" on the page and click "Add".



Step 2 : Fill in the report name, server address and server port in turn . Click the "Connection Test" button, and click Next after the test is successful. **If there is no special requirement, fill in the other options by default.**

Note: If the test fails, it means that the communication between the device and the target server is abnormal. You need to check the network.

New Addition

1 Basic information settings 2 Reporting strategy

Report Name Cloud Platform

Protocol HTTP(S)

Protocol selection ☒ HTTP ☐ HTTPS

* Server address op.foorir.com

Server Port 8088

Connection Testing (Test successful)

* Data reporting /api/Tofcamera/v2/DataUpload

Heartbeat /api/Tofcamera/v2/HeartBeat

User Name Please Enter

Password Please Enter

Cancel Next Step

Step 3 : If there is no special requirement, keep the default settings on this page . Click "OK".

New Addition

Basic information settings 2 Reporting strategy

Trigger reporting Trigger reporting Periodic reporting

Reported quantity ☒ Increment ☐ Total

Data Format ☒ Multi level nesting ☐ Flat format

Data retransmission ☒

Cancel Back OK

4.7 Time Settings

This function is used to set the device time and business hours. Select "System- > Time Configuration" on the page.

4.7.1 Business Hours

Set the business hours of the device (device working hours). Click the drop-down box to select the time, and click "Save" when finished.

⚠ Equipment is counted normally during business hours, and is not counted outside business hours.

The screenshot shows the 'System' configuration page with the 'Time' tab selected. The 'Business hours' section is highlighted with a red box and an arrow pointing to the 'Save' button. Below it, a time selection dialog is open, showing 'Start Time' and 'End Time' fields with a grid of time slots. The 'Save' button is also highlighted with a red box and an arrow.

4.7.2 Time Synchronization

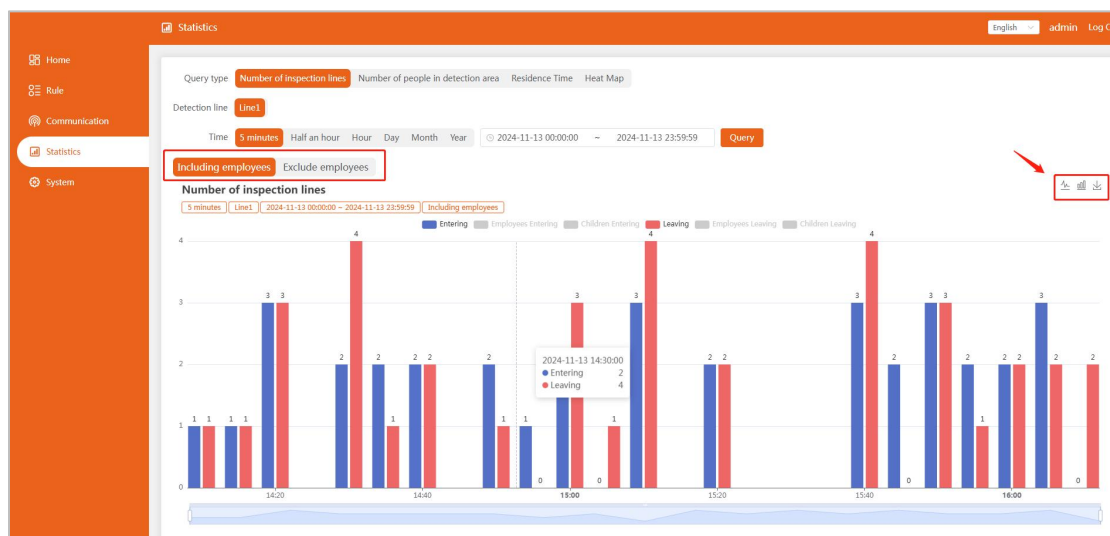
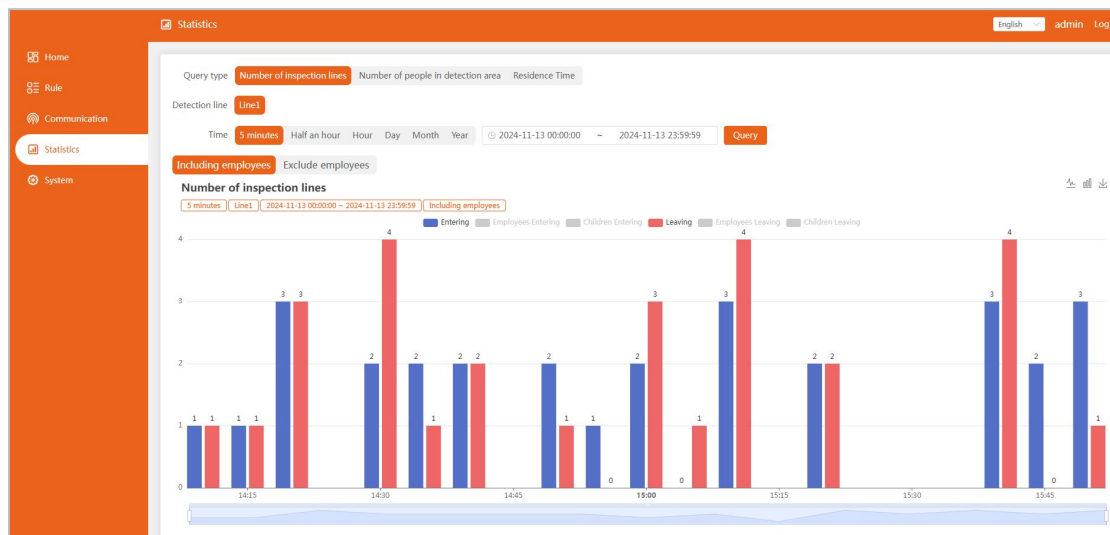
Select Manual Proofreading, click the Set Time drop-down box to select the time, and click "Save" when finished. Or use shortcuts to synchronize with the computer time.

The screenshot shows the 'time Synchronization' section. The 'Manual Proofreading' option is selected. The 'Set time' field shows '2024-11-13 15:51:54'. The 'Synchronize with computer time' button is highlighted with a red box and an arrow.

4.8 Statistics Query

The configuration page also supports data statistics functions, provides a variety of charts and data reports, and supports displaying data according to the time dimensions of 5 minutes/half hour/hour/day/month/year, and can also export data.

⚠ This statistical query function can only be used within the local area network



Parameter	Explain
Query Type	The options include: detection line population statistics, detection area population statistics, dwell time statistics and heat map. ⚠ The heat map will only be displayed after it is enabled in "Rule-Other Settings".
Time	Select the time range to generate the graph. The number of people counting on the detection line supports the time dimension of 5 minutes/half

	hour/hour/day/month/year. The time range can be selected through the dimension. Directly select the time range for detection area population statistics, residence time statistics, and heat map.
Including employees Exclude employees	data on the chart . ⚠ This feature will only be displayed after it is enabled in "Rule-Other Settings".
	Select the chart display type as Line Chart or Bar Chart.
	Export the icon as a PNG image based on the selected time unit. Export the data table to an Excel file based on the selected time unit.
Heatmap Type	Optional items: Movement heat map, Stay heat map, select and click "Query".

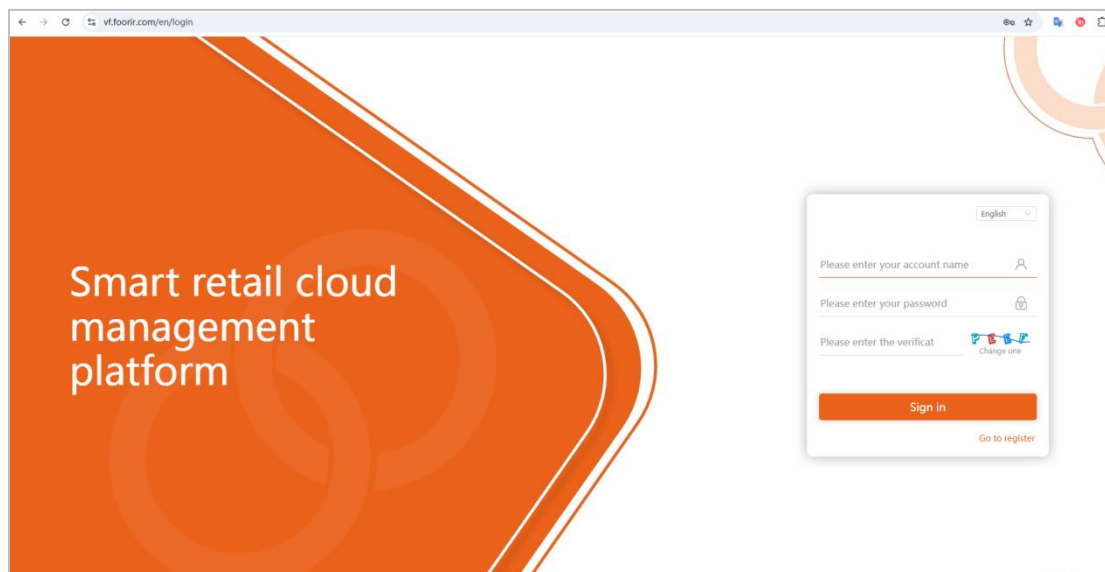
*** For more extended functions, please refer to the configuration page user manual**

5. Cloud platform binding operation

The smart retail cloud management platform relies on the online uploading of passenger flow data to realize data query and data analysis in parks, companies, stores, shopping malls, stations, hotels and other areas, and obtain visual curves and charts of intuitive passenger flow data. From data analysis, passenger flow KPI, holiday passenger flow, to trend analysis, users can customize the viewing on the cloud platform according to their actual needs.

5.1 Device Binding Operation

Step 1: Visit the Smart Retail Cloud Management Platform **vf.foorir.cn** to register an account.



Step 2: Add a device, select "Basic Module->Device Management->Add Device"

- ⚠ It is recommended to fill in the device installation location of the device name
- ⚠ The serial number (SN) is the unique identification code of the device and must be filled in strictly according to the serial number displayed on the device
- ⚠ The serial number (SN) is printed on the back label of the device and the packaging label

SN	Device name	Device type	Model	Entity	Entrance and exit	Device firm...	Presence	Code Status	Battery Level	Oper
201000002403180536	2010000024031...	Binocular p...	HX-CCD20	TD	TD	-	on-line	-	-	✓
20100000240811123	2010000024081...	Binocular p...	HX-CCD20	Chengdu Office	Front door	-	off-line	-	-	✓
20100000240811122	2010000024081...	Binocular p...	HX-CCD20	Shanghai Park	gate	-	off-line	-	-	✓
20100000240811121	2010000024081...	Binocular p...	HX-CCD20	Guangdong exhi...	door	-	off-line	-	-	✓
22124430002	22124430002	TOF passen...	FP221	Peking University	West gate	-	off-line	-	-	✓
201000002401180262	2010000024011...	Binocular p...	HX-CCD20	Shopping malls L...	1 door	V7.1.5-t2-V...	on-line	-	-	✓

Add

The newly added device needs to be bound in the entrance and exit management before it can be used normally!

* Device name

Shop 1, second floor

* SN

22124410001

* Device type

TOF passenger flow

* Model

FP221

Cancel

Confirm

Step 3: Create an entity , select "Basic Module- > Entity Management- > Add Entity"

- ⚠ **Email:** used to push abnormal status of the device
- ⚠ **Organizational structure:** Select the default structure
- ⚠ **Business hours:** Business hours are based on the settings on the device configuration page and are not processed by the platform.
- ⚠ **Time zone:** used to convert the time when the device uploads data. The default domestic time zone is UTC/GMT+08:00, and the default overseas time zone is selected according to the local time zone.

FOORIR

Home

Quick Query

Analysis Report

Basic Module

- Organizational Structure
- Entity Management
- Entrance& and Exit Mana...
- Device Management
- Role Management
- Employee Management
- Basic Information
- Log Management

Basic Module / Entity Management

English foorir

Organizational Granada shopping ce... Name Input Query Reset

+ Add

Name

Abnormal push

Daylight savin...

Operation

TD

Shopping malls in Hong Kong

Peking University

Guangdong exhibition

Shanghai Park

Chengdu Office

10/page

1

Go to 1

Total 6

Entity access

Name Input Query Reset

+ Add

Delete

Name

Entity

Remarks

Creation time

Operation

No Data

Add

*

Name

Wanda Plaza 2nd Floor

*

Contact number

1820220000

*

E-mail

123@qq.com

*

Organization

Granada shopping center

*

Business hours

⌚

07:00 ~ 21:59

Select

City

New York

Address

New York

Time zone

UTC/GMT-05:00

Remarks

Input

Cancel

Confirm

Step 4.1: Create an entity entrance and exit. On the entity management page, select the entity and create a new entrance and exit directly on the right.

! Physical entrance and exit: Select "Yes"

FOORIR

Basic Module / Entity Management

English

foorir

Home

Quick Query

Analysis Report

Basic Module

Organizational Structure

Entity Management

Entrance& and Exit Mana...

Device Management

Role Management

Employee Management

Basic Information

Log Management

Organizational

Granada shopping ce...

Name

Input

Query

Reset

+ Add

Name	Abnormal push	Daylight savin...	Operation
Wanda Plaza 2nd Floor	☒	☐	👁️🗑️🔧➡️
TD	☐	☐	👁️🗑️🔧➡️
Shopping malls in Hong Kong	☐	☐	👁️🗑️🔧➡️
Peking University	☐	☐	👁️🗑️🔧➡️
Guangdong exhibition	☐	☐	👁️🗑️🔧➡️
Shanghai Park	☐	☐	👁️🗑️🔧➡️
Chengdu Office	☐	☐	👁️🗑️🔧➡️

10/page < 1 > Go to 1 Total 7

Wanda Plaza 2nd Floor-Entity access

Name

Input

Query

Reset

+ Add

Delete

Name	Entity	Remarks	Creation time	Operati...
No Data				

10/page < 1 > Go to 1 Total 7

Add

* Name

1. Store front door

* Entity access

☐ No ☒ Yes

Remarks

Input

Cancel

Confirm

Step 4.2: Bind the device , select the entrance and exit to be bound, click the binding icon at the back, enter the binding page, check the device to be bound, and click " Confirm " ; the web networking configuration is completed.

⚠ After completing this step, the data pushed by the device can be queried from the cloud platform

Wanda Plaza 2nd Floor-Entity access

Name

Input

Query

Reset

+ Add

Delete

☐	Name	Entity	Remarks	Creation time	Operation
☐	1. Store front d...	Wanda Pla...		2024-11-13 16:09:55	⛶ 👁 ✎ 🗑

10/page

< 1 >

Go to

1

Total 1

Binding device

SN

Input

Device name

Input

Query

Reset

☒	SN	Device name	Device firmware version number
☒	22124410001	Shop 1, second floor	

< 1 >

Go to

1

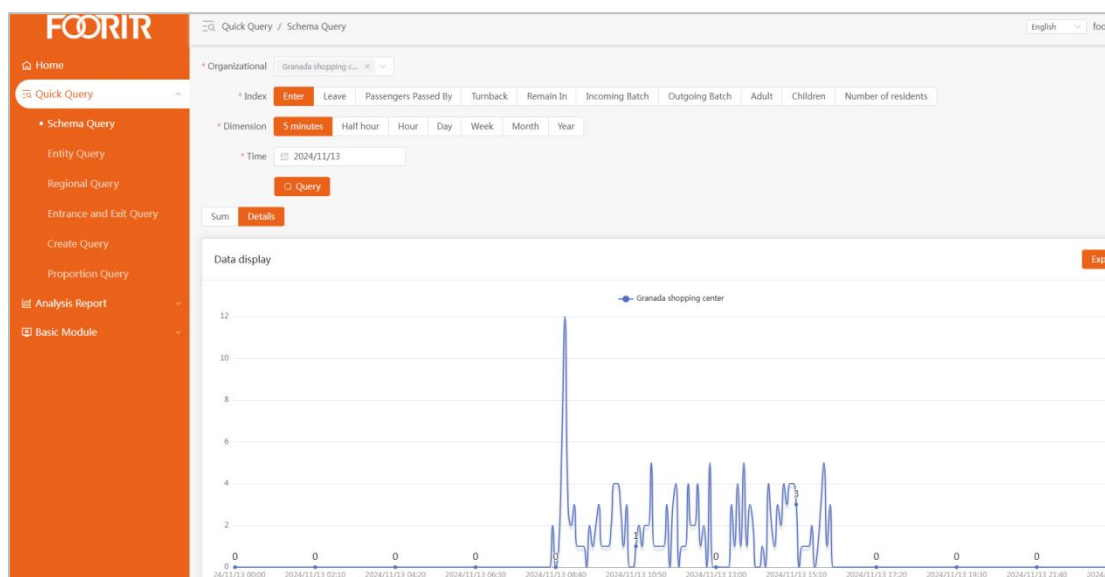
Total 1

Cancel

Confirm

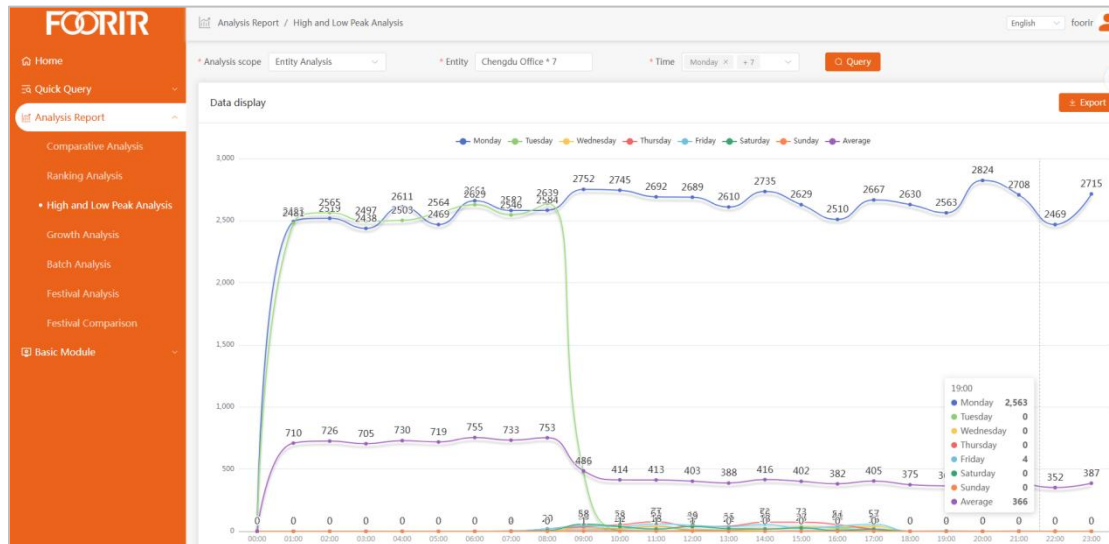
5.2 Quick Query of People Counting

The cloud platform provides a multi-dimensional passenger flow quick query function, including architecture query, entity query , area query , entrance and exit query , and can also create custom queries. Users can query data according to their needs to help you quickly obtain passenger flow information.



5.3 Analysis Report

The cloud platform provides a wealth of analysis reports, including comparative analysis, ranking analysis, peak and low peak analysis, growth analysis, batch analysis, holiday analysis, and holiday comparative analysis. Users can choose different time dimensions to customize queries.



Statement

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Notice

- The parameters used in the screenshots shown in this manual are only used as setting examples for reference and may not be completely consistent with the actual situation. Please set the parameters according to your actual needs.
- The housing is prohibited from being disassembled during operation. Anti-disassembly reminder: Be careful when manually disassembling the housing of the device to avoid damage to the device. This is a Class A product. In a living environment, this product may cause radio interference. In this case, the user may need to take practical measures to deal with the interference.
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