



Ultra ToF People Counter

Featuring LoRaWAN®

VS135

User Guide



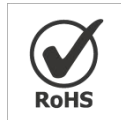
Safety Precautions

Milesight will not shoulder responsibility for any loss or damage resulting from not following the instructions of this operating guide.

- ❖ Though the device is compliant with Class 1 (IEC/EN 60825-1:2014), please **DO NOT** look at the ToF sensor too close and directly.
- ❖ The device must not be disassembled or remodeled in any way.
- ❖ To avoid risk of fire and electric shock, do keep the product away from rain and moisture before installation.
- ❖ Do not place the device where the temperature is below/above the operating range.
- ❖ **Do not touch the device directly to avoid the scalds when the device is running.**
- ❖ The device must never be subjected to shocks or impacts.
- ❖ Make sure the device is firmly fixed when installing.
- ❖ Do not expose the device to where laser beam equipment is used.
- ❖ Use a soft, dry cloth to clean the lens of the device.

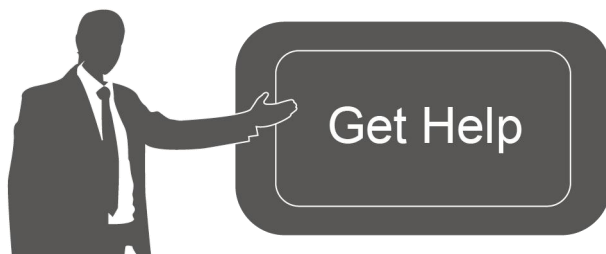
Declaration of Conformity

VS135 is in conformity with the essential requirements and other relevant provisions of the CE, FCC, and RoHS.



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Revision History

| Date | Doc Version | Description |
|---------------|-------------|---|
| Feb. 23, 2024 | V1.0 | Initial version |
| May 20, 2024 | V1.1 | <ol style="list-style-type: none">1. Support to configure WLAN IP address;2. Add ToF lighting mode and noise filtering;3. Add validation record task list;4. Add Enhanced Detection Mode;5. Update installation distance. |
| Jul.30, 2024 | V1.2 | <ol style="list-style-type: none">1. Add Multi-Device Stitching;2. Add detection line list;3. Add People Counting Trigger Report. |

Contents

| | |
|--------------------------------------|----|
| 1. Product Introduction | 5 |
| 1.1 Overview | 5 |
| 1.2 Key Features | 5 |
| 2. Hardware Introduction | 5 |
| 2.1 Packing List | 6 |
| 2.2 Hardware Overview | 6 |
| 2.3 Button and LED Indicators | 6 |
| 2.4 Dimensions (mm) | 7 |
| 3. Power Supply | 7 |
| 4. Access the Sensor | 7 |
| 5. Operation Guide | 8 |
| 5.1 Dashboard | 8 |
| 5.2 Rule | 9 |
| 5.2.1 Basic Counting Settings | 9 |
| 5.2.2 Multi-Device Stitching | 15 |
| 5.3 Communication | 22 |
| 5.3.1 WLAN | 22 |
| 5.3.2 LoRa | 23 |
| 5.4 Report | 25 |
| 5.5 Validation | 26 |
| 5.6 System | 29 |
| 5.6.1 Device Info | 29 |
| 5.6.2 User | 29 |
| 5.6.3 Time Configuration | 31 |
| 5.6.4 System Maintenance | 31 |
| 6. Installation Instruction | 34 |
| 6.1 Installation Height | 34 |
| 6.2 Covered Detection Area | 34 |
| 6.3 Environment Requirements | 36 |
| 6.4 Installation | 36 |
| 6.5 Factors Affecting Accuracy | 40 |
| 7. Communication Protocol | 40 |
| 7.1 Uplink Data | 40 |
| 7.2 Downlink Command | 42 |

1. Product Introduction

1.1 Overview

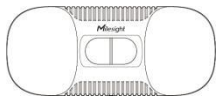
VS135 is a high-end people counting sensor that is based on deep learning AI and second-generation ToF technology. It is capable of adapting to various complex scenarios while ensuring excellent privacy protection. This sensor possesses an impressive accuracy of up to 99.8% in people counting, fully meeting your needs, and it delivers exceptional performance for both indoor and outdoor applications. With high ceiling mounting of up to 6.5m and an IP65 waterproof rating, it adapts seamlessly to any environment.

1.2 Key Features

- Up to 99.8% accuracy with the 2nd generation ToF technology and AI algorithm.
- Allow to collect more accurate people counting data by differentiating children / adults and detecting staffs via identification like staff lanyards for clearer people analysis.
- Smart U-turn detection to filter redundant counting of people wandering in the area.
- Support queuing management via dwell time detection and regional people counting.
- With radar sensor based ESG friendly working mode, it allows to experience full-speed operation when occupied while switching to a power-saving sleep mode when unoccupied.
- By incorporating 3-axis sensors for automatic height calibration, it ensures enhanced precision and guarantees accurate data analysis.
- Support automatic compensation of person height values when the device is mounted at a tilt.
- Working well even in low-light or completely dark environments with great lighting adaptability.
- Free from privacy concerns without image capturing.
- Store a million counting data locally and securely.
- Easy configuration via Wi-Fi for web GUI configuration.
- Function well with standard LoRaWAN® gateways and network servers.
- Quick and easy management with Milesight IoT Cloud.

2. Hardware Introduction

2.1 Packing List



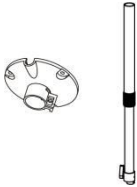
1 × VS135 Device



4 × Ceiling Mounting Kits



8 × Staff Tags



1 × VB01 Multifunctional Bracket Kit (Optional)



1 × Power Adapter



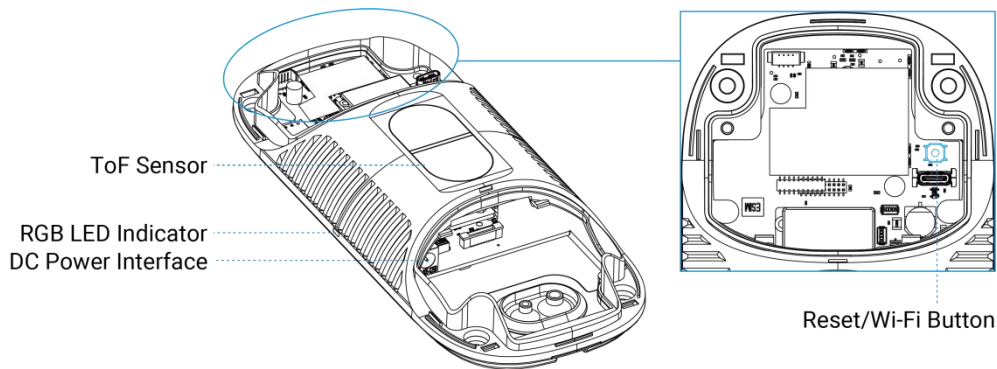
1 × Quick Guide



1 × Warranty Card

! If any of the above items is missing or damaged, please contact your sales representative.

2.2 Hardware Overview

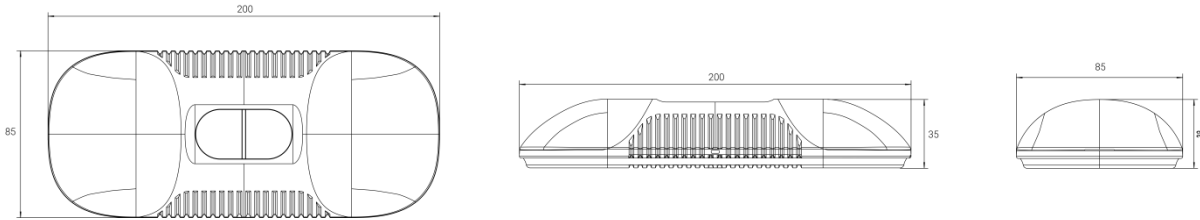


2.3 Button and LED Indicators

| Function | Action | LED Indication |
|--------------------------|--|---|
| Turn On/Off Wi-Fi | Press and hold the power button for more than 3 seconds. | Turn On/Off: Blue light blinks for 3 seconds. Wi-Fi On: Blue light on. Wi-Fi Off: Green light on. |
| Reset to Factory Default | Press and hold the reset button for more than 10 | Green light blinks until the reset process is completed. |

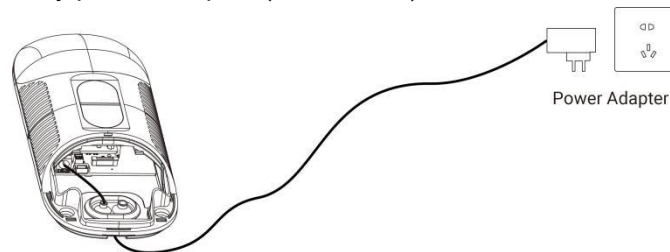
seconds.

2.4 Dimensions (mm)



3. Power Supply

VS135 can be powered by power adapter (12V DC, 2A).



4. Access the Sensor

VS135 provides user-friendly web GUI for configuration access via Wi-Fi. Users need to customize the password when using the device for the first time. The default settings are as below:

Wi-Fi SSID: People Counter_xxxxxx (can be found on the device label)

Wi-Fi IP: 192.168.1.1

Here are the wireless method way of accessing the web GUI:

Step 1: Enable the Wireless Network Connection on your computer, search for corresponding Wi-Fi SSID to connect it, then type 192.168.1.1 to access the web GUI.

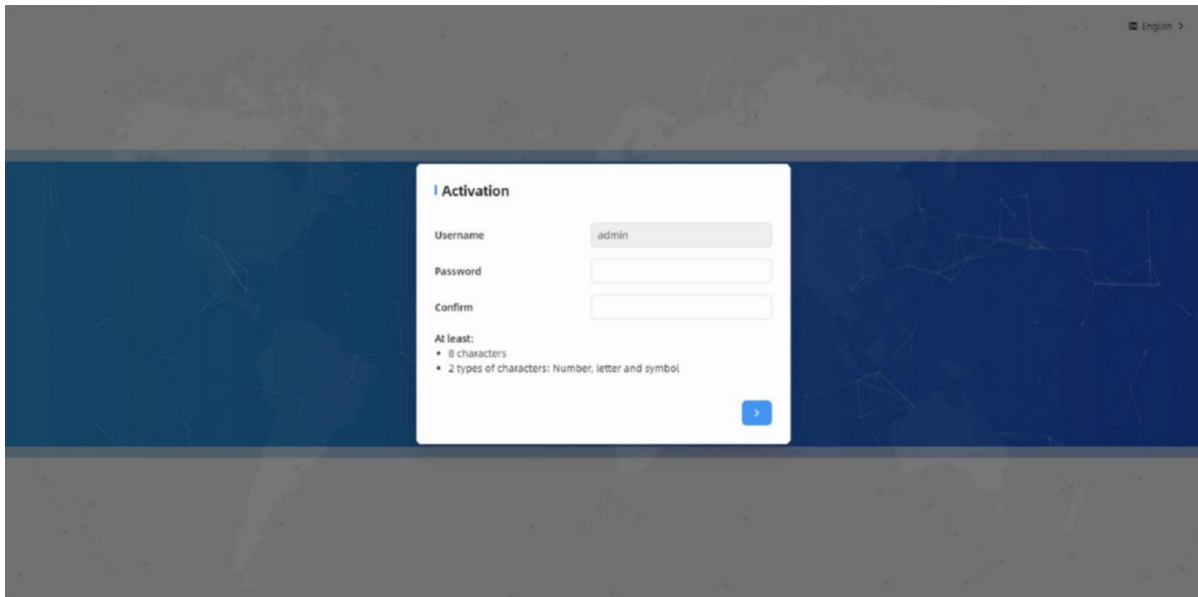
Step 2: Select the language.

Step 3: Users need to set the password and three security questions when using the sensor for the first time (three questions can be skipped by refreshing webpage). After configuration, log in with username (admin) and custom password.

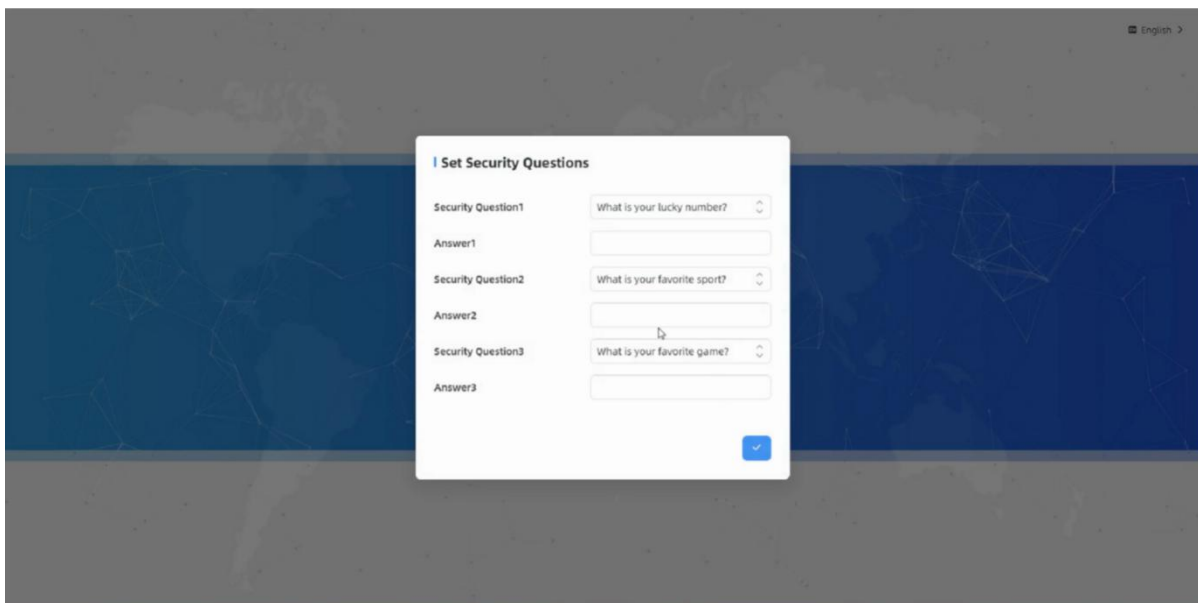
Note:

- 1) Password must be 8 to 16 characters long, which contains at least two kinds or more in combination with numbers, lowercase letters, uppercase letters and special characters .
- 2) You can click the "forgot password" in login page to reset the password by answering three

security questions when you forget the password if you set the security questions in advance.



The screenshot shows a web interface with a dark blue background and a grey header. In the top right corner, there is a language selector labeled "English" with a right-pointing arrow. The main content area features a white modal box titled "Activation". Inside this box, there are three input fields: "Username" with the value "admin", "Password", and "Confirm". Below these fields, there is a section titled "At least:" followed by two bullet points: "8 characters" and "2 types of characters: Number, letter and symbol". A blue button with a white right-pointing arrow is located at the bottom right of the modal box.

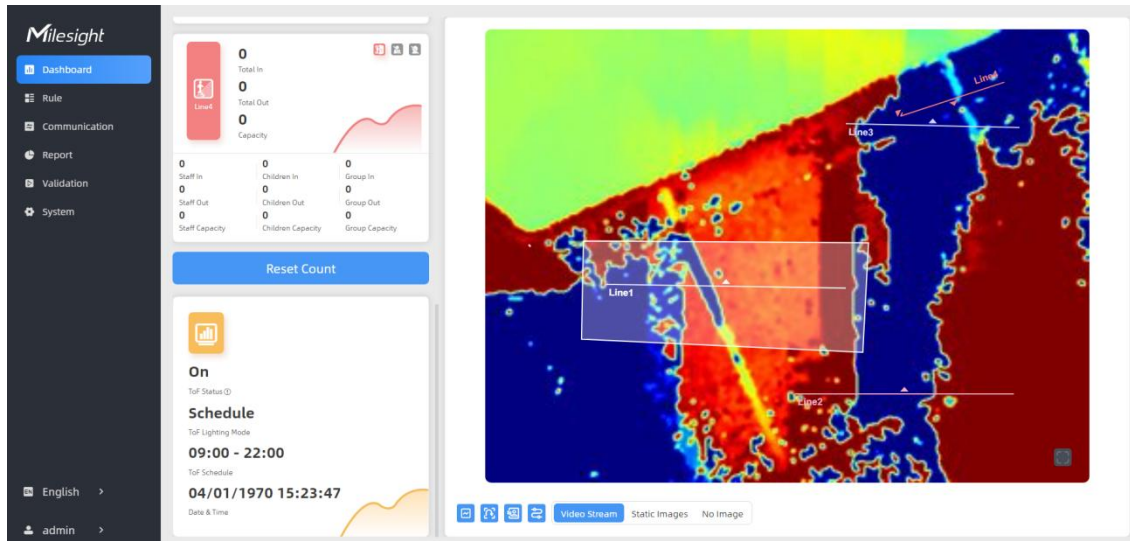


The screenshot shows a web interface with a dark blue background and a grey header. In the top right corner, there is a language selector labeled "English" with a right-pointing arrow. The main content area features a white modal box titled "Set Security Questions". Inside this box, there are three sets of input fields. Each set consists of a "Security Question" dropdown menu and an "Answer" text input field. The first set has the question "What is your lucky number?". The second set has the question "What is your favorite sport?". The third set has the question "What is your favorite game?". A blue button with a white checkmark is located at the bottom right of the modal box.

5. Operation Guide

5.1 Dashboard

After logging on to the device web GUI successfully, user is allowed to view live video as following.




| Parameters | Description |
|----------------|---|
| | <p>Hide Capacity: Hide the total count data capacity;</p> <p>Staff Excluded: Exclude staff data from statistical data;</p> <p>Children Excluded: Exclude children data from statistical data.</p> |
| Reset Count | Clear all accumulated entrance and exit people counting values. |
| | <p>Click to show detection lines, U-turn areas, detection regions, tracking lines as needed.</p> <p>Note: These functions will not be shown here when they are disabled in Rule Configuration.</p> |
| Scence Preview | Select video stream preview, static image preview or no image preview as needed. |

5.2 Rule

5.2.1 Basic Counting Settings

Draw Detection Lines

Users can draw detection lines to record the people count values which indicate the number of people enter or exit.

Step 1: Find the list of detection lines. Click **+Add** to draw a new detection line or click  to edit existed detection line on the live view.

Line Cross Counting

U-turn Filtering

| Line No. | Line Name | Operation |
|----------|-----------|-----------|
| No.2 | Line2 | |
| No.3 | Line3 | |
| No.4 | Line4 | |
| +Add | | |

Step 2: Left-click to start drawing and drag the mouse to draw a line, left-click again to continue drawing a different direction edge, and right-click the mouse to complete the drawing. The line can be dragged to adjust the location and length. One device supports at most 4 broken lines with maximum 4 segments each.

Step 3: If users want to redraw this line, click **Clear This Line** or drag the vertices of the broken line to adjust. The arrow direction of the detection line depends on your drawing direction. If

users need to flip the line, click **Flip Arrow Direction**. Then click to finish drawing.

The screenshot shows the Milesight web interface. On the left is a navigation menu with options: Dashboard, Rule (selected), Communication, Report, Validation, and System. Below the menu are language and user settings: English and admin. The main area displays a camera feed with several red lines drawn across it, labeled Line1, Line2, Line3, and Line4. Below the camera feed are two buttons: 'Clear This Line' and 'Flip Arrow Direction', both highlighted with a red box. To the right is a configuration panel with various detection settings: Staff Detection (checked), Shopping Cart Fill Level Detection (unchecked), Heat Map (unchecked), Line Cross Counting (checked), U-turn Filtering (unchecked), Group Counting (checked), Region Monitoring (unchecked), and Reset Cumulative Count on Schedule (checked). Below these settings is a table with the same structure as the one in the previous image, but with 'Line2' highlighted in blue. At the bottom of the configuration panel, there is a 'Multi-Device List' section with a table containing device information.

| Device | IP Address | SN | Device Name | Operation |
|--------|----------------|--------------|-----------------|-----------|
| Master | 192.168.60.... | 6757D1617... | P35555555555... | |
| Node1 | | | | |

Note:

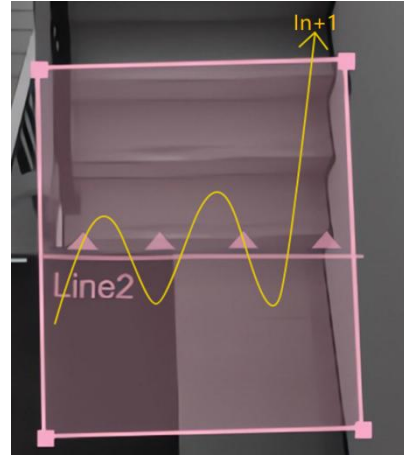
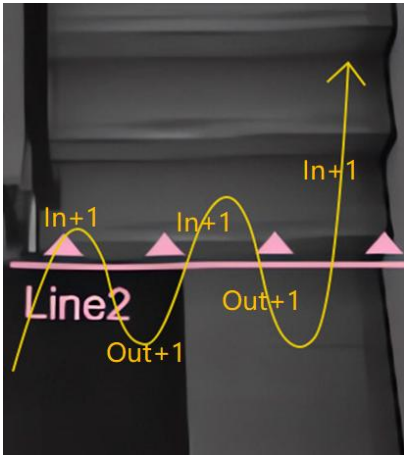
- 1) Ensure that the detected target can pass through the detection line completely. It's recommended that the detection line is perpendicular to the In/Out direction and on the center of the detection area without other objects around.
- 2) Redundant identification spaces are needed on both sides of the detection line for the target detection. It ensures the stable recognition and tracking of the target before passing the detection line, which will make the detection and count more accurate.


Draw U-turn Area

VS135 supports the U-turn filtering function, filtering out the people who are actually not in / out of the entrance, to avoid repeated counting. Users can draw an area for every line and the device will count the In and Out values only when people pass this area.

Disable U-turn filtering:

Enable U-turn filtering:







Step 1: Enable U-turn Filtering. Users can click  to edit U-turn areas for existed detection line on the live view.

The configuration panel on the right shows the following settings:

- Enhanced Detection Mode:
- Children Distinction:
- Staff Detection:
- Shopping Cart Fill Level Detection:
- Heat Map:
- Line Cross Counting:
- U-turn Filtering: (highlighted with a red box)
- Group Counting:
- Region Monitoring:


The U-turn Filtering section contains a table with the following data:

| Line No. | Line Name | Operation |
|----------|-----------|---|
| No.1 | Line1 | Edit Uturn Area  |
| No.2 | line 2 |    |

Below the table is a '+ Add' button.

Step 2: Left-click to start drawing and drag the mouse to draw an edge. Then left-click again to continue drawing a different direction edge. Right-click the mouse to complete the drawing. The area can be dragged to adjust the location and length. One device supports up to 4 broken lines with maximum 10 segments each.

Step3: If users want to redraw the line, click **Clear This Area** or drag the vertices of the area to adjust. Then click  to finish drawing.

Step 4: If users need to delete a certain U-turn area, click , then click **Clear This Area**.

The screenshot displays the Milesight web interface. On the left, a dark sidebar contains navigation links: Dashboard, Rule, Communication, Report, Validation, and System. The main content area is split into three sections. The top section shows a live camera feed with a red polygonal region drawn over it, labeled 'Master'. Below the feed is a 'Clear This Area' button and a 'Multi-Device List' table. The bottom section is a settings panel with various detection features. The 'Region Monitoring' toggle is highlighted with a red box.

| Device | IP Address | SN | Device Name | Operation |
|--------|---------------|--------------|-----------------|-----------|
| Master | 192.168.60... | 6757D1617... | P35555555555... | |
| Node1 | | | | |

Draw Monitoring Region

VS135 supports monitoring the number and the dwell time of people in the region, providing more valuable analysis data.

Step 1: Enable Region Monitoring. Click **+Add** to add the region monitoring on the live view. Up to 4 regions are supported with maximum 10 segments each.

The screenshot displays the Milesight web interface. On the left, a dark sidebar contains navigation links: Dashboard, Rule, Communication, Report, Validation, and System. The main content area is split into three sections. The top section shows a live camera feed with a red rectangular region drawn over it, labeled 'line 2'. Below the feed is a 'Clear This Area' button and a 'Multi-Device List' table. The bottom section is a settings panel. The 'Region Monitoring' toggle is highlighted with a red box. Below it is a table for region configuration and an '+Add' button.

| Region No. | Region Name | Advanced Pro... | Operation |
|------------|-------------|-----------------|-----------|
| No.1 | Region1 | Region Peopl... | |

Step 2: Customize the zone name and enable Region People Counting or Dwell Time Detection as needed.

Advanced Properties

Zone Name

Region People Counting

Pass-by Filtering
s(0~3600)

Dwell Time Detection

Min. Dwell Time
s(0~3600)

Step 3: The configuration is displayed in the list after the configuration is complete. You can redraw the areas by clicking the redraw button in the list. Click the edit button to modify the advanced settings of the areas or click delete button to delete the areas separately.

Region Monitoring

| No. | Region Name | Advanced Properties | Operation |
|-------|-------------|----------------------------|---|
| No.1 | Region1 | Region People Counting(5s) | <input type="button" value="✎"/> <input type="button" value="✖"/> |
| + Add | | | |

Rule Configuration

Users can set the rules to ensure accurate counting.

| Parameters | Description |
|---------------------|--|
| Installation Height | Set the device installation height. Click Detect to detect the current installation height automatically. Note: 1) Ensure that there is no object directly below the device avoiding |

| | |
|------------------------------------|--|
| | interfering the height detection. 2) The automatic detection of the installation height is not supported with dark floor/carpet (black, grey, etc.) |
| Max. Target Height | Set the maximum target height, then the device will ignore the objects higher than this setting value. |
| Min. Target Height | Set the minimum target height, then the device will ignore the object shorter than this setting value. |
| Tracking Mode | Select the tracking mode of counting, including Heads Tracking and Feet Tracking. Note: It is recommended to use heads tracking mode when the installation height is low in standalone working mode. |
| Enhanced Detection Mode | Turn on when any one of the following situations occurs, it will ensure normal counting and detecting: <ul style="list-style-type: none"> • The depth image is abnormal; • There is obstacle in the live view; • Installation conditions are not met. |
| U-turn Filtering | Enable or disable U-turn Filtering. |
| Children Distinction | The device will detect the people shorter than child filter height as children. |
| Staff Detection | The device will detect the people who wear reflective stripes as staff tags on the visible parts (neck, shoulders, etc.) as staffs. Reflective stripe requirements: width > 2cm, 500 cd/lux.m ² |
| Group Counting | Click to enable the group counting function that based on the distance, moving direction and speed difference to gain deeper insights into customer' behaviors. Note: 1) This function is only applicable for line cross people counting. 2) LoRa reporting only transmit group counting data when group counting function is enabled. |
| Region Monitoring | Enable or disable Region Monitoring. |
| Reset Cumulative Count on Schedule | Enable to periodically reset cumulative count on schedule. Cumulative Count includes: Total In/Out counting of each detection line. Max./Avg. Dwell Time of each detection region. |
| Periodic Report | Report the people counting data periodically. |
| Period | Set the period of reporting periodic report. Range: 1-1080 mins, default: 10 mins |
| Trigger Report | Report immediately when there is a change of the line crossing people counting number or region people counting number. |

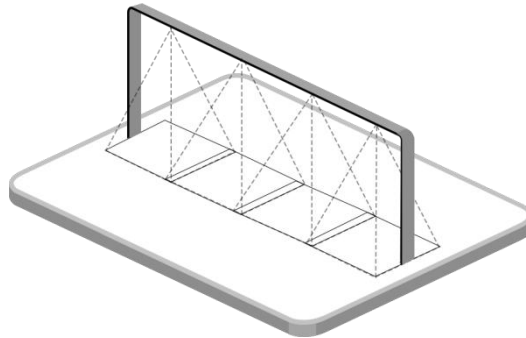
Note:

Due to the error in ToF distance measurement (0.035 m), the Max. Target Height should be set as maximum pedestrian height plus 0.035 m and the Min. Target Height as minimal pedestrian

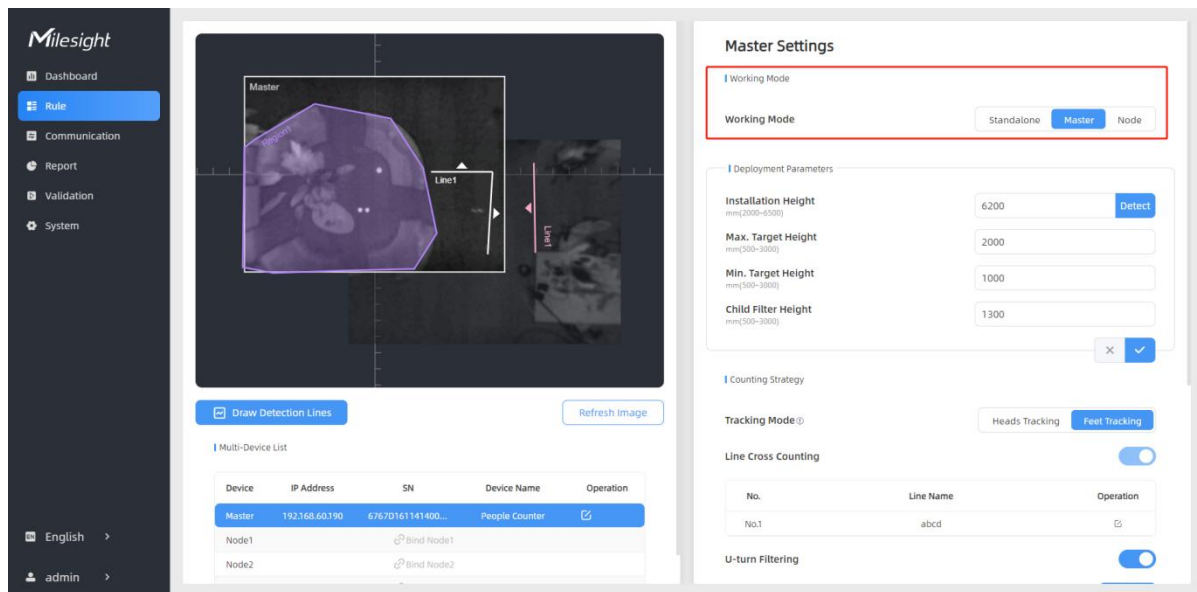
height minus 0.035 m in the actual applications. For example, if the pedestrian height is 1.6 m to 1.8 m, the Max. and Min. Target Height should be configured as 1.835 m and 1.565 m respectively.

5.2.2 Multi-Device Stitching

Multi-device stitching is mainly used to monitor a larger detection area than just the area covered by a single device. When using this feature, devices should be installed next to each other and ensure the **detection areas** are tangent or overlapping.



Before using this feature, set one device as **Master Mode** and other devices as **Node Mode**.



- **Master Mode:** Receive target tracks and view from the device, responsible for all counts, rule setting, data push and other functions. Report by wireless communication mode.
- **Node Mode:** Only extends the view of the master device.

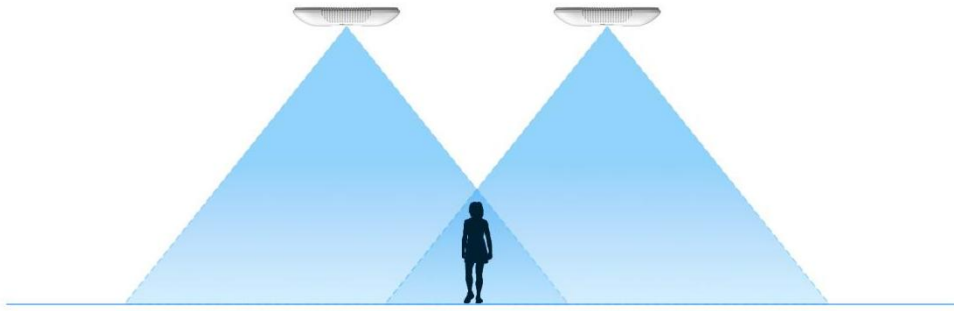
Here is the device multi-stitching compatible list of VS13x series:

| Stitching | Master Device | Node Devices | Stitching Number |
|-----------|---------------|-----------------------|------------------|
| Support | VS135-P | VS135-P | 8 |
| | VS135-P-High | VS135-P-High | |
| | VS135-L08EU | VS135-P, VS135-HL, | 4 |

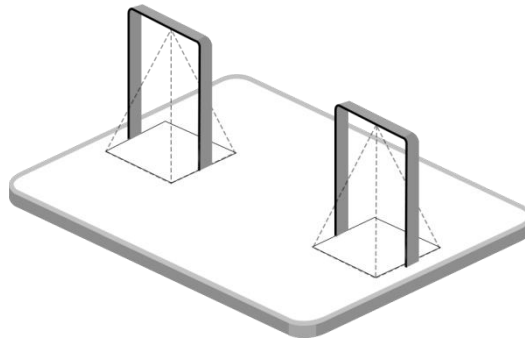
| | | | |
|-------------|-----------------------------------|---|---|
| | | VS135-LoRa, VS135-L08EU | |
| | VS135-L08EU-High | VS135-P-High, VS135-HL-High, VS135-LoRa-High, VS135-L08EU-High | |
| | VS135-HL | VS135-P, VS135-L08EU, VS135-LoRa, VS135-HL | |
| | VS135-HL-High | VS135-P-High, VS135-L08EU-High, VS135-LoRa-High, VS135-HL-High | |
| | VS135-LoRa | VS135-P, VS135-L08EU, VS135-HL, VS135-LoRa | |
| | VS135-LoRa-High | VS135-P-High, VS135-L08EU-High, VS135-HL-High, VS135-LoRa-High | |
| Not Support | VS135-P | VS135-LoRa, VS135-L08EU, VS135-HL | - |
| | VS135-P-High | VS135-LoRa-High, VS135-L08EU-High, VS135-HL-High | |
| | VS135 standard versions | VS135 high ceiling mount versions | |
| | VS135 high ceiling mount versions | VS135 standard versions | |
| | VS133-P | VS135-P | |
| | VS135-P | VS133-P | |

Note:

- 1) Ensure the head of one person can be seen on both live views at the same time.

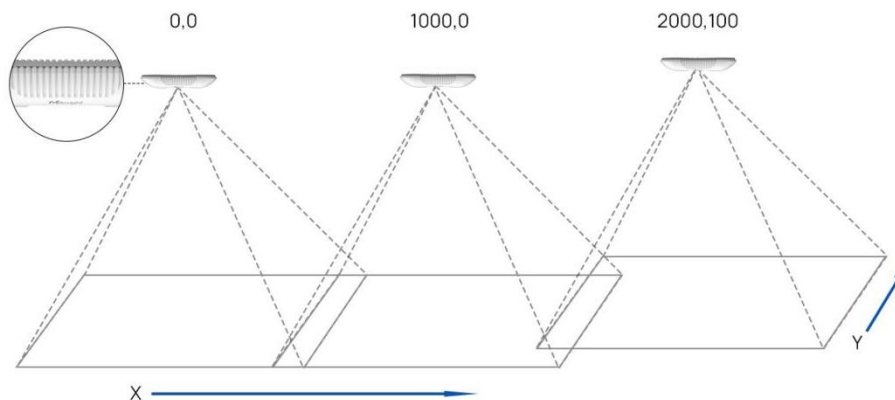


2) The devices can also be installed without overlapping as required.



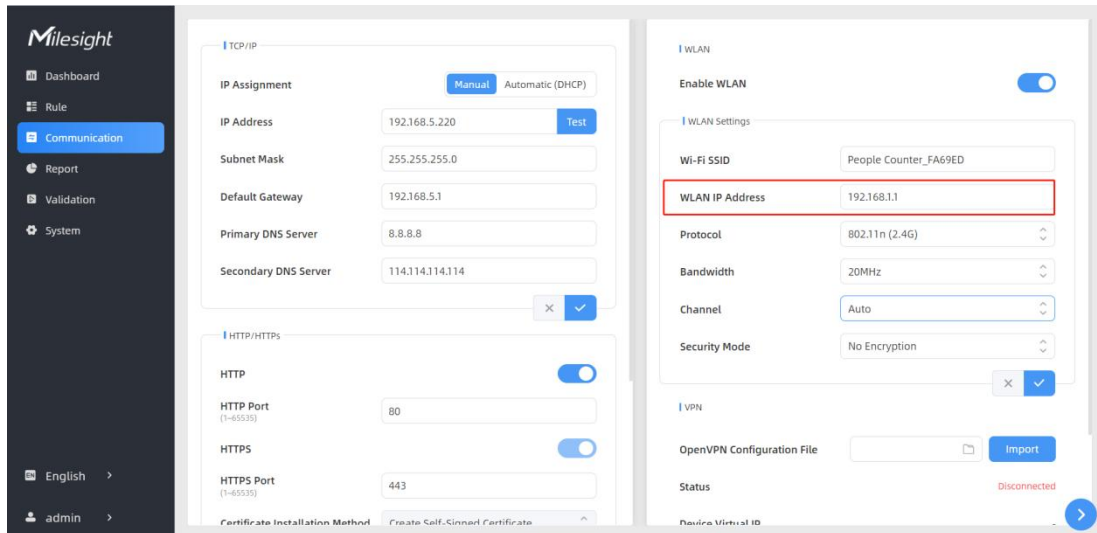
Device Positioning

Device positioning is done via X&Y coordinates. For example, the installation direction of the master device is shown as below, the logo needs to be facing the front. When the master device's coordinate is (0, 0), the coordinates of the node devices are all positive values.

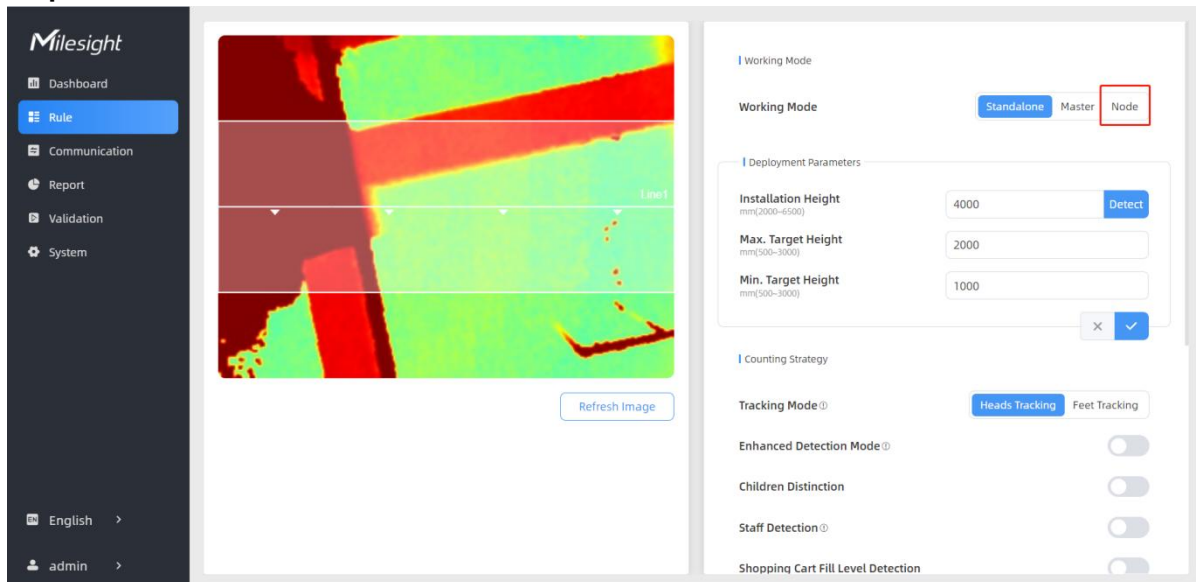


Node Device Setting

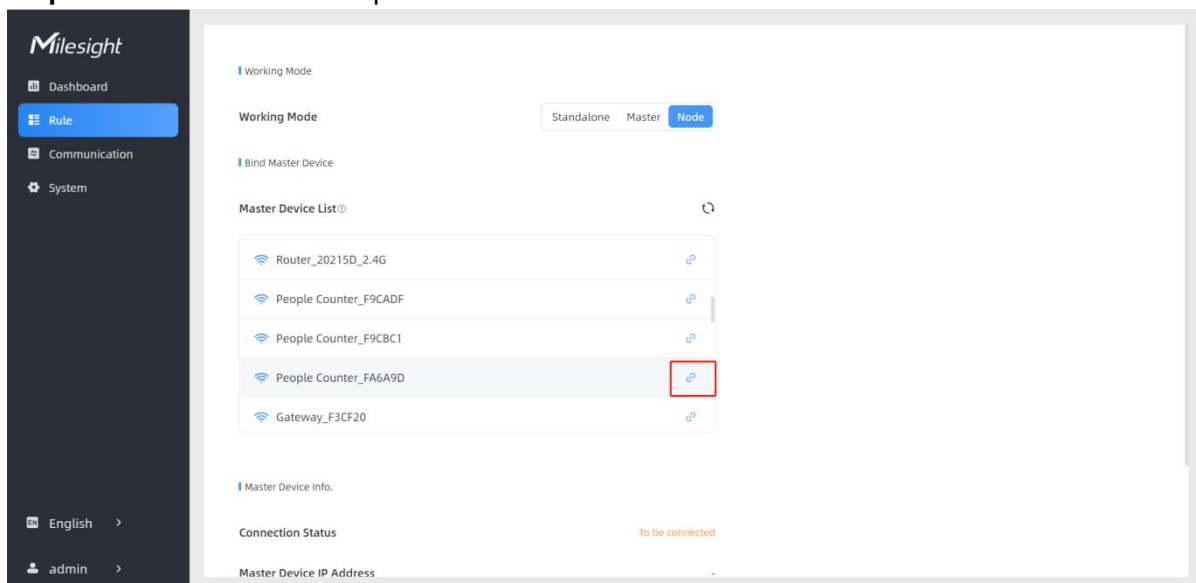
Step 1: change the WLAN IP Address of node devices to different subnets from master device's WLAN IP address.



Step 2: Select work mode as Node and wait for the device to reboot.



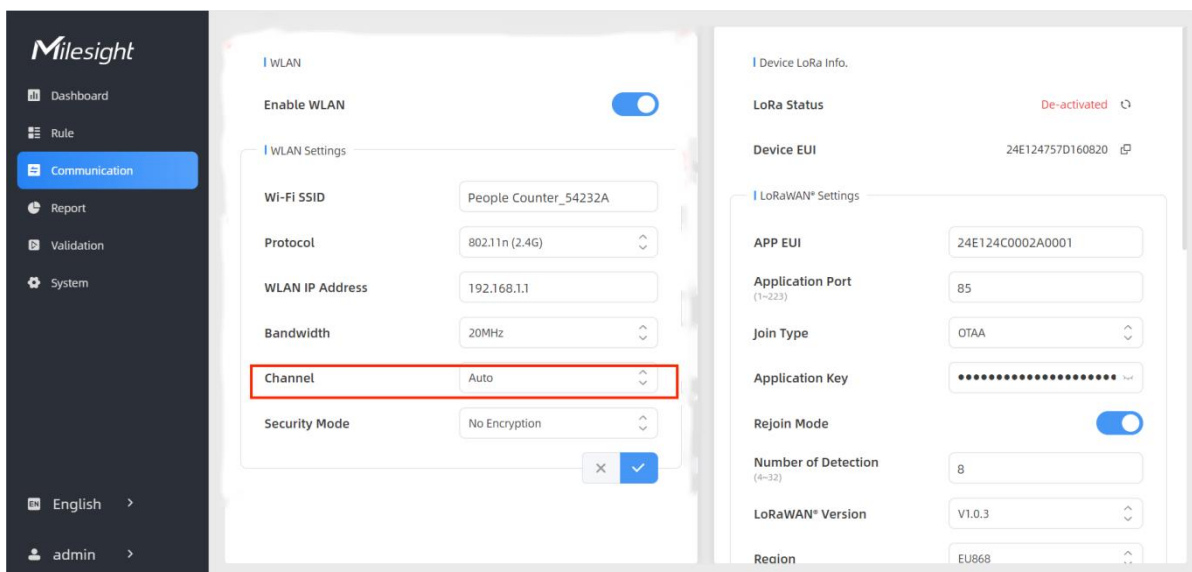
Step 3: Find the Wi-Fi access point of master device and connect.



| Parameters | Description |
|--------------------------|--|
| Connection Status | Show the connection status between the node device and master device. |
| Master Device IP Address | Show master device's IP address. When this IP address is under the same network with node device, the node device can bind to the master device. |
| Master Device SN | Show the master device's serial number. |
| Master Device Name | Show master device name. |
| Unbind Master Device | Click Unbind to release the connection status, this device will be deleted from the list of the master device. |

Master Device Setting

Step 1: When work mode is on Standalone or Node mode, select the WLAN channel to an idle channel. Users can use test App (like Wi-Fi Analyzer) to check ideal WLAN channels to reduce interference.

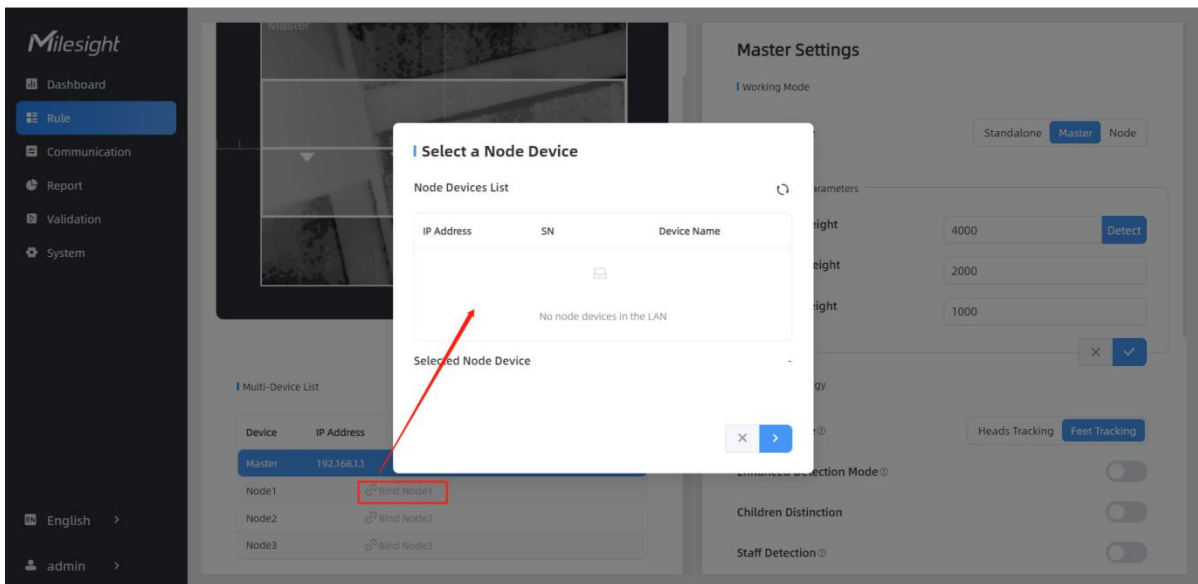


Note: the scene preview and people counting results are dependent on the WLAN channel selection, also the distance between node devices and master device. Please adjust the distance to ensure accurate scene preview or counting results.

| WLAN Channel | Video Stream | Static Image/No Image | Counting Inaccuracy |
|------------------|--------------|-----------------------|---------------------|
| Occupied Channel | Not Support | ≤ 6.5m | > 6.5m |
| Idle Channel | ≤8m | ≤10m | >10m |

Step 2: Select **Master** as the working mode and wait for the device to reboot.

Step 3: Go to the master device web GUI, then click **Bind Node** in the Multi-Device List. The device will use multicast protocol to search for the unbound node devices under the same local network.



Step 4: Select the node device and type the login password of the node device.

Step 5: Fill in the installation height of a node device and relative position information if these parameters are already measured. If not, save default settings and skip to Step 6.

Confirm Authorization

Selected Node Device: 192.168.46.80

Node Device Username:

Node Device Password:

Bind the Node Device

Selected Node Device: 192.168.46.80

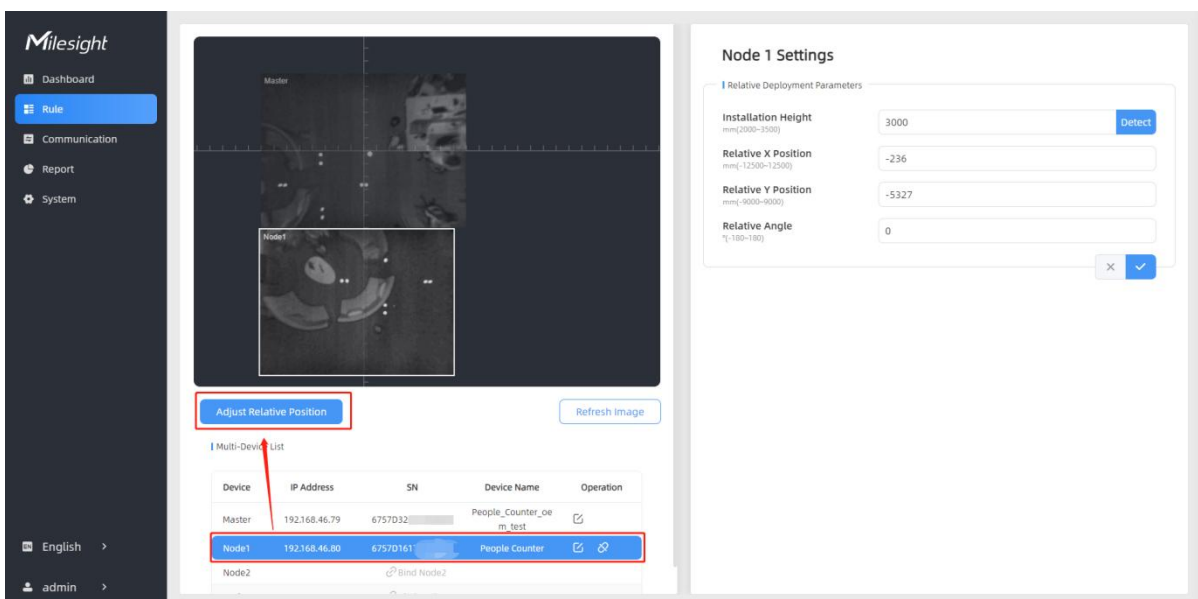
Installation Height:

Relative X Position:

Relative Y Position:

Relative Angle:

Step 6: Select the node device on the Multi-Device List, click **Adjust Relative Position**.



Drag the live view of node device to adjust the location and angle, and the relative position

parameters will change automatically as your operations. Besides, users can also adjust the size of this live view.

The screenshot shows the Milesight dashboard interface. On the left is a navigation menu with options: Dashboard, Rule (selected), Communication, Report, and System. The main area is split into two panels. The left panel displays a live view of a node device, showing a camera feed with a white bounding box around a person. Below the live view is a 'Set & Testing Track' button and a 'Multi-Device List' table. The right panel shows 'Node 1 Settings' with a 'Relative Deployment Parameters' section containing input fields for Installation Height, Relative X Position, Relative Y Position, and Relative Angle, along with a 'Detect' button and a close button.

| Device | IP Address | SN | Device Name | Operation |
|--------|---------------|------------------|-----------------------------|-----------|
| Master | 192.168.46.79 | 6757D32675210018 | People_Counter_oe m_test | |
| Node1 | 192.168.46.80 | 6757D16179950018 | People Counter | |
| Node2 | | | Bind Node2 | |

Tips: cut the staff tags or other reflective stripes into pieces and stick them to the ground of overlapping areas, then drag the live view of node devices to make highlight markers in the two live views overlap. This allows equipment splicing configuration **without measurement**.

Step 7: Click **Set & Testing Track**, then check if the tracking lines are connected and smooth when people pass on the live views of multiple devices. If not, click **Stop Testing** to adjust the node device's live view location slightly.

The screenshot shows the Milesight dashboard interface. On the left is a navigation menu with options: Dashboard, Rule (selected), Communication, Report, and System. The main area is split into two panels. The left panel displays a live view of a node device, showing a camera feed with a blue bounding box around a person. Below the live view is a 'Stop Testing' button and a 'Multi-Device List' table. The right panel shows 'Node 3 Settings' with a 'Relative Deployment Parameters' section containing input fields for Installation Height, Relative X Position, Relative Y Position, and Relative Angle, along with a 'Detect' button and a close button.

| Device | IP Address | SN | Device Name | Operation |
|--------|---------------|----------|-----------------------------|-----------|
| Master | 192.168.46.79 | 6757D326 | People_Counter_oe m_test | |
| Node1 | 192.168.46.80 | 6757D161 | People Counter | |
| Node2 | 192.168.46.83 | 6757D161 | People Counter | |
| Node3 | 192.168.46.90 | 6757D16 | People Counter | |

Step 8: When all settings are completed, users can draw detection lines and even U-turn areas on the new stitching live view the same as standalone mode devices.

Step 9: Click **Unbind** to disconnect the node device if necessary.

The screenshot shows the Milesight web interface. On the left is a navigation menu with options: Dashboard, Rule, Communication, Report, and System. The main area is divided into two panels. The top panel shows a map with nodes labeled Master, Node2, and Node3. Below the map is a 'Stop Testing' button and a 'Multi-Device List' table. The table has columns for Device, IP Address, SN, Device Name, and Operation. The 'Operation' column for Node3 has an 'Unbind' button highlighted with a red box and a red arrow. The right panel shows 'Node 3 Settings' with fields for Installation Height (3000), Relative X Position (231), Relative Y Position (-2452), and Relative Angle (0).

| Device | IP Address | SN | Device Name | Operation |
|--------|---------------|---------|--------------------------|-----------|
| Master | 192.168.46.79 | 6757D32 | People_Counter_oe_m_test | |
| Node1 | 192.168.46.80 | 6757D16 | People Counter | |
| Node2 | 192.168.46.83 | 6757D16 | People Counter | |
| Node3 | 192.168.46.90 | 6757D16 | People Counter | Unbind |

5.3 Communication

5.3.1 WLAN

VS135 supports wlan feature to work as AP mode to configure device and it can not connect to other access point.

The screenshot shows the Milesight web interface. On the left is a navigation menu with options: Dashboard, Rule, Communication, Report, Validation, and System. The main area is divided into two panels. The left panel shows 'WLAN' settings with a toggle for 'Enable WLAN' (checked) and fields for 'Wi-Fi SSID' (People Counter_54232A), 'Protocol' (802.11n (2.4G)), 'WLAN IP Address' (192.168.3.3), 'Bandwidth' (20MHz), 'Channel' (Auto), and 'Security Mode' (No Encryption). The right panel shows 'Device LoRa Info' with 'LoRa Status' (De-activated), 'Device EUI' (24E124757D160820), and 'LoRaWAN® Settings' with fields for 'APP EUI' (24E124C0002A0001), 'Application Port' (85), 'Join Type' (OTAA), 'Application Key' (masked), 'Rejoin Mode' (checked), 'Number of Detection' (8), 'LoRaWAN® Version' (V1.0.3), and 'Region' (EU868).

| Parameters | Description |
|-------------|---|
| Enable WLAN | Enable or disable Wi-Fi feature. If disabled, users can use button or LoRaWAN® downlink command to enable it. |
| Wi-Fi SSID | The unique name for this device Wi-Fi access point. |
| Protocol | 802.11b (2.4 GHz), 802.11g (2.4 GHz), 802.11n (2.4 GHz) are optional. |
| WLAN IP | Configure WLAN IP address for web access, the default IP address is |

| | |
|----------------|---|
| Address | 192.168.1.1. |
| Bandwidth | 20 MHz or 40 MHz are optional. |
| Channel | Select the wireless channel. Auto, 1,...11 are optional. |
| Security Mode | No Encryption, WPA-PSK, WPA2-PSK and WPA-PSK/WPA2-PSK are optional. |
| Cipher | AES, TKIP, AES/TKIP are optional. |
| Wi-Fi Password | Customize the password when security mode is not No Encryption. |

5.3.2 LoRa

LoRa settings are used for configuring the transmission parameters in LoRaWAN® network.

Device LoRa Info.

LoRa Status Activated

Device EUI 24E124767D511657

LoRaWAN® Settings

APP EUI

Application Port
(1~223)

Join Type

Application Key

Rejoin Mode

Number of Detection
(4~32)

LoRaWAN® Version

Region

RX2 Data Rate

RX2 Frequency
MHz(863~870)

Spreading Factor

Channel List

| Enable | Frequency <small>MHz(863~870)</small> |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | 868.1 |
| <input checked="" type="checkbox"/> | 868.3 |
| <input checked="" type="checkbox"/> | 868.5 |
| <input type="checkbox"/> | <input type="text" value="867.1"/> |
| <input type="checkbox"/> | <input type="text" value="867.3"/> |
| <input type="checkbox"/> | <input type="text" value="867.5"/> |
| <input type="checkbox"/> | <input type="text" value="867.7"/> |
| <input type="checkbox"/> | <input type="text" value="867.9"/> |

×
✓

LoRa Working Mode

Confirm Mode

ADR

| Parameters | Description |
|-------------------------|---|
| LoRa Status | LoRaWAN® network joining status of this device. |
| Device EUI | Unique ID of the device, which can also be found on the label. |
| App EUI | The Default App EUI is 24E124C0002A0001. |
| Application Port | The port used for sending and receiving data, default port is 85. |
| Join Type | OTAA and ABP mode are available. |
| Application Key | Appkey for OTAA mode, the default key is 5572404C696E6B4C6F52613230313823. |
| Device Address | DevAddr for ABP mode, the default address is the 5 th to 12 th digits of SN. |
| Network Session Key | Nwkskey for ABP mode, the default key is 5572404C696E6B4C6F52613230313823. |
| Application Session Key | Appskey for ABP mode, the default key is 5572404C696E6B4C6F52613230313823. |
| Rejoin Mode | Reporting interval ≤ 35 mins: the device will send a specific number of LinkCheckReq MAC packets to the network server every reporting interval or every double reporting interval to validate connectivity; If there is no |

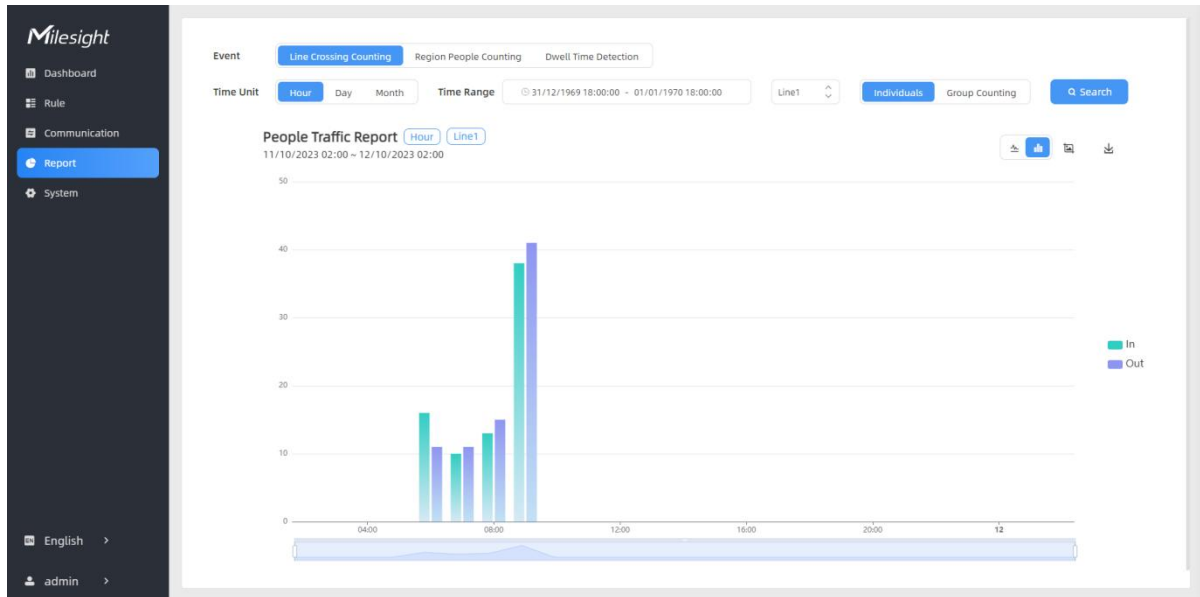
| | |
|---------------------|--|
| | <p>response, the device will re-join the network.</p> <p>Reporting interval > 35 mins: the device will send a specific number of LinkCheckReq MAC packets to the network server every reporting interval to validate connectivity; If there is no response, the device will re-join the network.</p> |
| Number of Detection | <p>When rejoin mode is enabled, set the number of detection.</p> <p>Note: the actual sending number is Number of Detection + 1.</p> |
| LoRaWAN® Version | V1.0.2, V1.0.3 are available. |
| Region | Frequency plan of this device. |
| RX2 Data Rate | RX2 data rate to receive downlinks. |
| RX2 Frequency | RX2 frequency to receive downlinks. |
| Spreading Factor | If ADR is disabled, the device will send data via this spreading factor. |
| Channel | <p>Select the channel from channel list or enter the index to select the frequency channel.</p> <p>Index examples:</p> <p>1, 40: Enabling Channel 1 and Channel 40</p> <p>1-40: Enabling Channel 1 to Channel 40</p> <p>1-40, 60: Enabling Channel 1 to Channel 40 and Channel 60</p> <p>All: Enabling all channels</p> <p>Null: Indicates that all channels are disabled</p> |
| Confirm Mode | If the device does not receive ACK packet from network server, it will resend data once. |
| ADR | Allow network server to adjust data rate of the device. |

Note:

- 1) Please contact sales for device EUI list if there are many units.
- 2) Please contact sales if you need random App keys before purchase.
- 3) Only OTAA mode supports rejoin mode.
- 4) Select OTAA mode when you connect device to Milesight IoT Cloud.

5.4 Report

VS135 supports visual line chart or bar chart generation to display people traffic and supports report exporting. Before using this feature, do ensure that the device time is correct on **System** page.



| Parameters | Description |
|-------------------------|--|
| Event | Select the event which you want to query the report. Line crossing counting, region people counting and dwell time detection are optional. |
| Time Unit | Select the unit to generate the graph or export the data. |
| Time Range | Select the time range to generate the graph. |
| Line1 | Select the line to display the graph. |
| Individuals Groups | Select the individuals counting reports or groups counting reports. |
| Region1 | Select the region to display the graph. |
| Search | Click to generate the graph according to the time range and line option. |
| Export | Export the historical traffic data as CSV file according to the selected time unit. The device can store up to one million data records to CSV file. |
| Staff Included/Excluded | Select whether to contain staff counting values on the graph. |
| Line/Bar | Select the display type as line or bar. |
| Download | Download the graph screenshot. |

5.5 Validation

Video validation function can assist users in verifying the accuracy of people counting by setting up a video task of recording.

| Parameters | Description |
|----------------|--|
| Task Name | Show the task name. |
| Start/End Time | Show the start time and end time of this video. |
| Duration | Show the length of the video. |
| Task Status | Show the video task status. |
| Operation | Click to check the video details, stop recording or delete the task. |
| +Add | Click to add a video task. One device can add up to 24 tasks. |

Set a Task of Recording

Task Name

Recording Mode Record Now Setting Time

Start Time

Duration min(1~240)

Video Quality Standard Low Quality

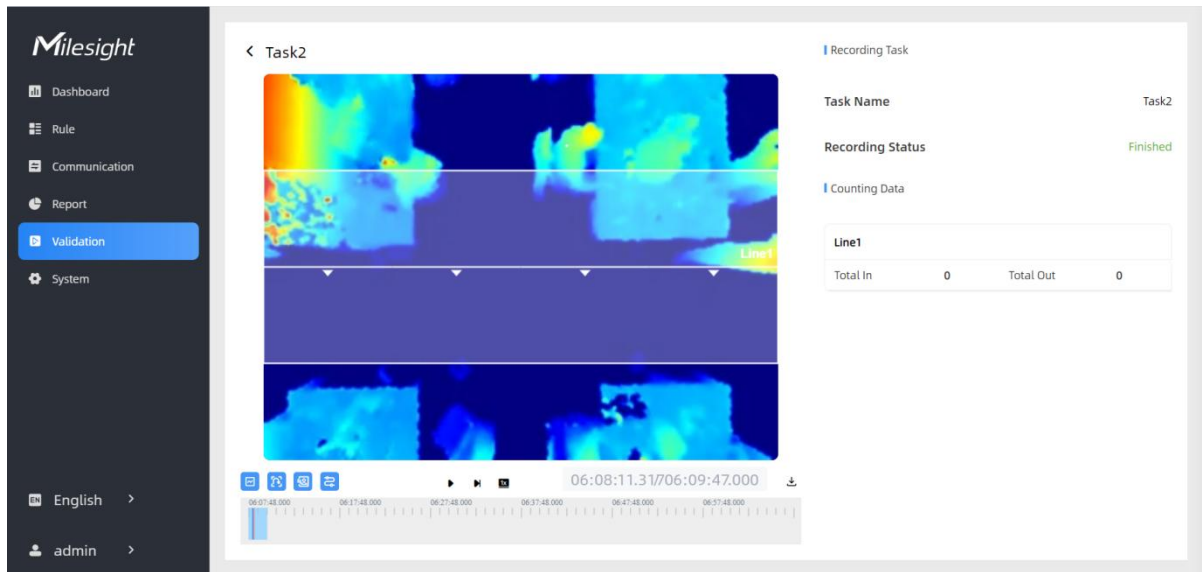
✕ ✓

| Parameters | Description |
|----------------|--|
| Task Name | Customize a name for this task. |
| Recording Mode | Record Now or Setting Time is optional. |
| Start Time | Set the start recording time. |
| Duration | Set the duration of the recording, the duration of all tasks should not be |

| | |
|---------------|--|
| | more than 240 minutes. |
| Video Quality | When video quality is low, the video size will be smaller and quicker to download. |

Note:

- The setting time range of different tasks can not be overlap.
- Detection rules and ToF frequency parameters cannot be modified during the recording process.
- If the validation videos need to be played locally, please contact Milesight IoT support for a specialized player.



| | Parameters | Description |
|-----------------|------------|--|
| Playback Button | | Enable/Disable detection lines in the recording footage. |
| | | Enable/Disable u-turn area in the recording footage. |
| | | Enable/Disable detection region in the recording footage. |
| | | Enable/Disable tracking line in the recording footage. |
| | | Rewind/Pause/Play/Forward(supports switching between 0.5x, 1x, 2x, and 4x playback speed). |
| | | Start time and end time of the recording. |
| | | Download video stream footage. |

Note: The playback progress bar of video stream footage highlights the video frame where the data changes.

5.6 System

5.6.1 Device Info

All information about the hardware and software can be checked on this page.

The screenshot displays the Milesight System configuration interface. On the left is a dark sidebar with navigation options: Dashboard, Rule, Communication, Report, Validation, and System (highlighted in blue). Below the sidebar are language and user selection options: English and admin. The main content area is divided into two panels. The left panel, titled 'Device Info.', contains a form with the following fields: Device Name (People Counter), Product Model (VS135-868M), SN (6767D51165730004), Hardware Version (V1.2), Software Version (V_135.1.0.5-r1-b), and WLAN MAC Address (24:E1:24:36:37:38). Below this is a 'Users' section with a table:

| Username | User Level | Operation |
|------------|---------------|-----------|
| admin | Administrator | |
| + Add User | | |

The right panel, titled 'Current System Time', shows the current date (01/02/2024) and time (12:43:52). It includes a 'Set the System Time' section with a Time Zone dropdown (UTC-0:00 Western European Time (WET), Greenwich Mean Ti) and a Daylight Saving Time toggle. Below is a 'Synchronize Time' section with a 'Setting Time' field (01/02/2024 12:43:50) and a 'Synchronize' button.

5.6.2 User

This screenshot is identical to the previous one, but with a red box highlighting the 'Users' table in the 'Device Info.' panel. The table content is as follows:

| Username | User Level | Operation |
|------------|---------------|-----------|
| admin | Administrator | |
| + Add User | | |

Parameters

Description



You can change the login password of this device.

Users modify

| | |
|------------------------|--|
| Username | <input type="text" value="admin"/> |
| User Level | <input type="text" value="Administrator"/> |
| Administrator Password | <input type="password"/> |
| New Password | <input type="password"/> |
| Confirm | <input type="password"/> |

At least:

- 8 characters
- 2 types of characters: Number, letter and symbol



Click to set three security questions for your device. In case that you forget the password, you can click **Forget Password** button on login page to reset the password by answering three security questions correctly.

Secure Question Settings Already Set

| | |
|--------------------|---|
| Password | <input type="password"/> |
| Security Question1 | <input type="text" value="What is your lucky number?"/> |
| Answer1 | <input type="text"/> |
| Security Question2 | <input type="text" value="What is your favorite sport?"/> |
| Answer2 | <input type="text"/> |
| Security Question3 | <input type="text" value="What is your favorite game?"/> |
| Answer3 | <input type="text"/> |



Click to add a viewer, who will only have access to the "Dashboard" and "Report" interfaces.

Add User

| | |
|------------|-------------------------------------|
| Username | <input type="text" value="viewer"/> |
| User Level | <input type="text" value="Viewer"/> |
| Password | <input type="password"/> |
| Confirm | <input type="password"/> |

At least:

- 8 characters
- 2 types of characters: Number, letter and symbol



+ Add User

5.6.3 Time Configuration

| Parameters | Description |
|--------------------------------|---|
| Time Zone | Choose the time zone for your location. |
| Daylight Saving Time | Enable or disable Daylight Saving Time (DST). Start Time: the start time of DST time range. End Time: the end time of DST time range. DST Bias: the DST time will be faster according to this bias setting. |
| Setting Time | Set the device time manually. |
| Synchronize with computer time | Synchronize the time with your computer. |

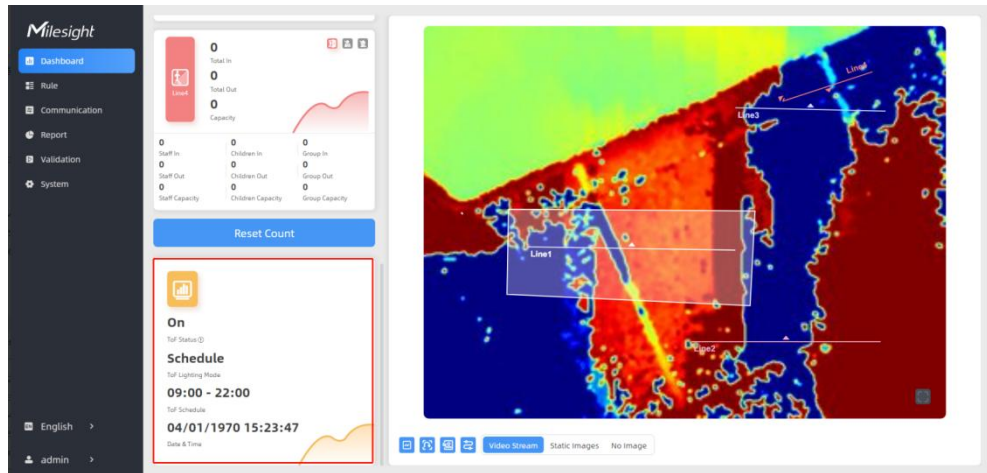
5.6.4 System Maintenance

The screenshot displays the Milesight IoT management interface. The left sidebar contains navigation options: Dashboard, Rule, Communication, Report, Validation, System (highlighted), English, and admin. The main content area is divided into two sections:

- Time of Flight Advanced Settings:**
 - Frequency Adjustment: Modulation Mode A (dropdown)
 - ToF Lighting Mode: Always On, Auto (selected), Schedule (radio buttons)
 - ToF Noise Filtering:
 - Noise Filtering Level: Slider control
 - Tilt Correction:
 - Reset:
 - Recovery device basic configuration: Basic Recovery
 - Recovery device to factory settings: All Recovery
 - Reboot
- Reboot:**
 - Reboot the Device: Reboot
 - Upgrade:
 - Software Version: V_135.1.0.6-r1-a2
 - Upgrade Image: [File Selection] Upgrade
 - Explanation: The upgrade process takes 1-10 minutes, do not turn off the power. The automatic reboot will happen once the upgrade complete.
 - Backup and Restore:
 - Export Config File: Export
 - Import Config File: [File Selection] Import

| Parameters | Description |
|----------------------|--|
| Frequency Adjustment | Adjust the ToF frequency modulation mode to avoid the interference of surrounding IR devices. Please avoid using the same mode if there are multiple VS135 devices around. Note: If there is only one option, please contact Milesight IoT support: iot.support@milesight.com |
| ToF Lighting Mode | Adjust the ToF light mode as Always On, Auto or Schedule. When using Auto mode, the device will turn off the ToF light when radar detects no person for some times to save the power. Note: |

- 1) ToF light off will not affect the periodic report.
- 2) During validation, the ToF lighting will be fixed as On irregardless of its lighting mode configuration.
- 3) When using ToF Lighting Mode, the Dashboard will display relevant information.



| | |
|-----------------------|---|
| ToF Noise Filtering | Filter the noisy point on the screen when working with dark floor or carpet. |
| Noise Filtering Level | <p>Standard Version: When installing in a spacious environment with black carpet, it is recommended to set the strength to 2; when installing in a narrow environment with black carpet, it is recommended to set the strength to 10.</p> <p>High Ceiling Mount Version: When installing in a spacious environment with black carpet: it is recommended to set the strength to 18; when installing in a narrow environment with black carpet, it is recommended to set the strength to 9.</p> |
| Tilt Correction | Enable to automatic compensation of person height values when the device is mounted at a tilt. |
| Reset | <p>Recovery device basic configuration: keep the IP settings and user information when resetting.</p> <p>Recovery device to factory settings: reset device to factory default, which needs to verify admin password.</p> |
| Reboot | Restart the device immediately. |
| Upgrade | <p>Click the folder icon and select the upgrading file, then click the Upgrade button to upgrade. The update will be done when the system reboots successfully.</p> <p>Note: The upgrade process takes about 1-10 minutes. Do not turn off the power and complete automatic restart after the upgrade.</p> |
| Backup and Restore | <p>Export Config File: Export configuration file.</p> <p>Import Config File: Click the file icon and select the configuration file, click Import button to import configuration file.</p> |

6. Installation Instruction

Parameter definition:

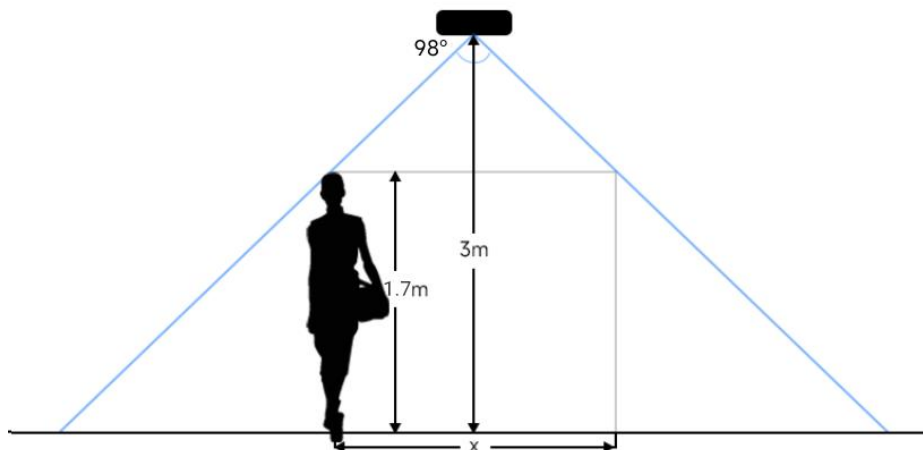
| Parameters | Explanation | Value |
|------------|-------------------------------------|--|
| H | Installation height | Standard Version: ≤ 3.5 m High Ceiling Mount: ≤ 6.5 m |
| d | Minimum detection distance of VS135 | Standard Version: 0.5 m High Ceiling Mount: 2 m |
| Δd | Distance measurement error of VS135 | 0.035 m |
| h_{\max} | Maximum pedestrian height | Example 1.8 m |
| h_{\min} | Minimum pedestrian height | Example 1.7 m |
| α | ToF horizontal field of view angle | Standard Version: 98° High Ceiling Mount: 60° |
| β | ToF vertical field of view angle | Standard Version: 80° High Ceiling Mount: 45° |
| x | Length of detection range | |
| y | Width of detection range | |

6.1 Installation Height

- The maximum installation height is 3.5 m and the minimum installation height is $h_{\max}+d+\Delta d$. For example, when the maximum pedestrian height is 1.8 m, then the minimum installation height is $1.8+0.5+0.035=2.335$ m.
- The maximum installation height is 6.5 m and the minimum installation height is $h_{\max}+d+\Delta d$. For example, when the maximum pedestrian height is 1.8 m, then the minimum installation height is $1.8+2+0.035=3.835$ m.

6.2 Covered Detection Area

The detection area covered by the device is related to the field of view angle of the device, the installation height and the target height. The length of the detection area is approximately $x=1.155 \times (H-h_{\min})$ and the width of the detection area is approximately $y=0.828x$ ($H-h_{\min}$).



For example, if the Minimum height of pedestrians is 1.7 m, the detection area corresponding to each installation height is as follows:

Standard Version:

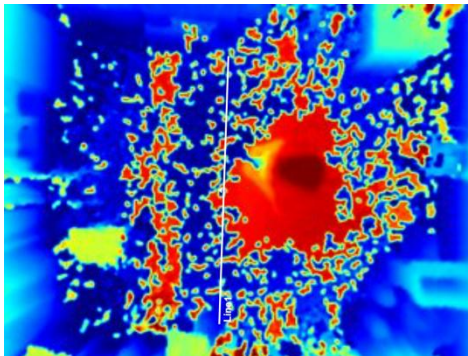
| Installation Height (m) | Monitored Area (m) | Detection Area(m) |
|-------------------------|--------------------|-------------------|
| 2.5 | 5.75 × 4.20 | 1.84 × 1.34 |
| 2.6 | 5.98 × 4.36 | 2.07 × 1.51 |
| 2.7 | 6.21 × 4.53 | 2.30 × 1.68 |
| 2.8 | 6.44 × 4.70 | 2.53 × 1.85 |
| 2.9 | 6.67 × 4.87 | 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 | 7.59 × 5.54 | 3.68 × 2.69 |
| 3.4 | 7.82 × 5.71 | 3.91 × 2.85 |
| 3.5 | 8.05 × 5.87 | 4.14 × 3.02 |

High Ceiling Mount Version:

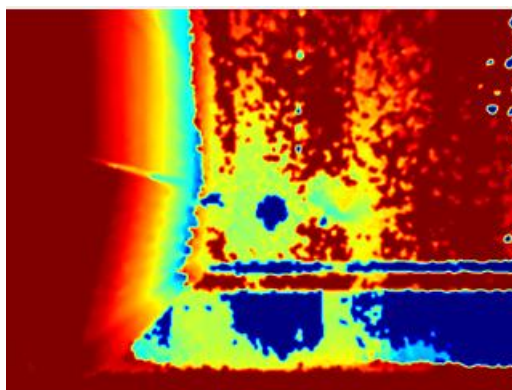
| Installation Height (m) | Monitored Area (m) | Detection Area(m) |
|-------------------------|--------------------|-------------------|
| 3.5 | 4.04 × 2.90 | 2.08 × 1.49 |
| 3.7 | 4.27 × 3.07 | 2.31 × 1.66 |
| 3.9 | 4.50 × 3.23 | 2.54 × 1.82 |
| 4.1 | 4.73 × 3.40 | 2.77 × 1.99 |
| 4.3 | 4.97 × 3.56 | 3.00 × 2.15 |
| 4.5 | 5.20 × 3.73 | 3.23 × 2.32 |
| 4.7 | 5.43 × 3.89 | 3.46 × 2.49 |
| 4.9 | 5.66 × 4.06 | 3.70 × 2.65 |
| 5.1 | 5.89 × 4.22 | 3.93 × 2.82 |
| 5.3 | 6.12 × 4.39 | 4.16 × 2.98 |
| 5.5 | 6.35 × 4.56 | 4.39 × 3.15 |
| 5.7 | 6.35 × 4.72 | 4.62 × 3.31 |
| 5.9 | 6.81 × 4.89 | 4.85 × 3.48 |
| 6.1 | 7.04 × 5.05 | 5.08 × 3.65 |
| 6.3 | 7.27 × 5.22 | 5.31 × 3.81 |
| 6.5 | 7.51 × 5.38 | 5.54 × 3.98 |

6.3 Environment Requirements

- Dark floor/carpet (black, grey, etc.) will affect the device to count staffs when Staff Detection is enabled.



- Avoid 940nm light which may result in incorrect counting.
- Outdoor sunlight shining on the over channel will not have any effect, but the mirrored reflections that allow sunlight to shine on the ToF Sensor should be avoided.
- **Make sure there are no obstacles within the live view of device. Otherwise, the device imaging may appear abnormally red or it will affect people counting. When the carpet/floor is black, make sure to adjust Noise Filtering Level to max value.**

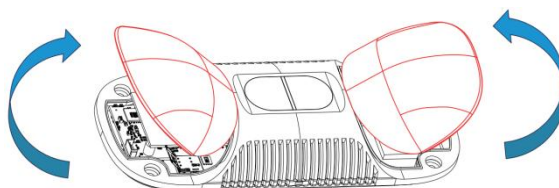


6.4 Installation

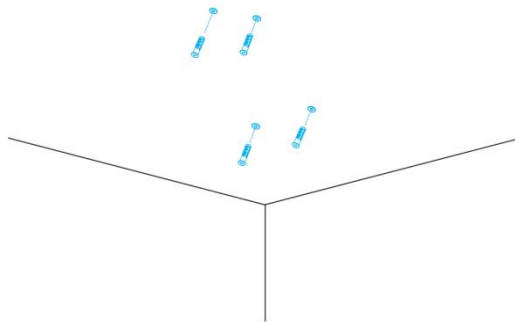
Ceiling Mount

Installation condition: ceiling thickness > 30mm.

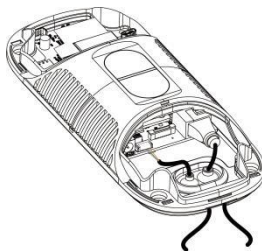
Step 1: Take down the side covers.



Step 2: Fix wall plugs into ceiling holes.



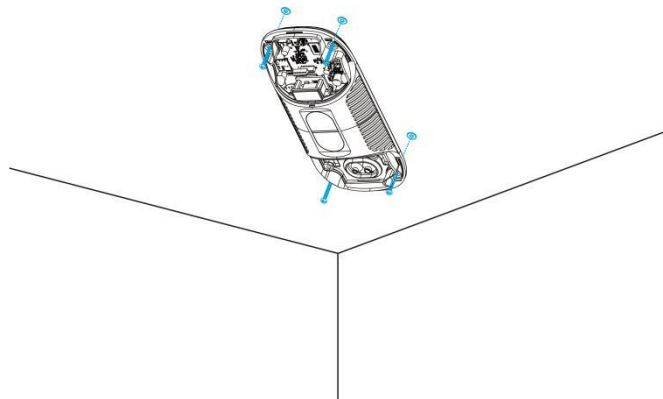
Step 3: Remove rubber plugs on the rubber sleeve, connect all required wires.



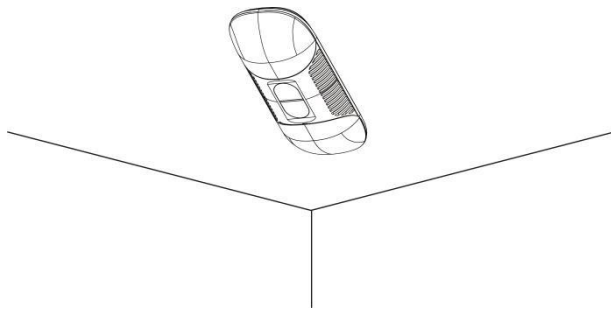
Note:

- Remove the rubber sleeve if waterproof is not required for easy installation.
- Use round wires.
- Ensure the rubber sleeve and the bottom cover are tightly connected without a gap if waterproof is required; if necessary, wrap the waterproof tapes around the wires to avoid any gap.
- Tighten the wires to avoid contact with internal modules.

Step 4: Fix the device to ceiling with mounting screws.



Step 5: Restore side covers.



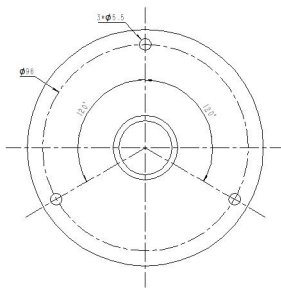
Ceiling/Lintel Mount (with Optional VB01 Multifunctional Bracket)

Step 1: Fix the pole to the device with the hole on the device.

Step 2: Adjust the length of the pole, then adjust the direction of 3-axis ball and tighten it with the handle.

Step 3: Determine the mounting location and drill 3 holes, fix the wall plugs into the mounting holes, then fix the bracket base to the wall plugs via mounting screws.

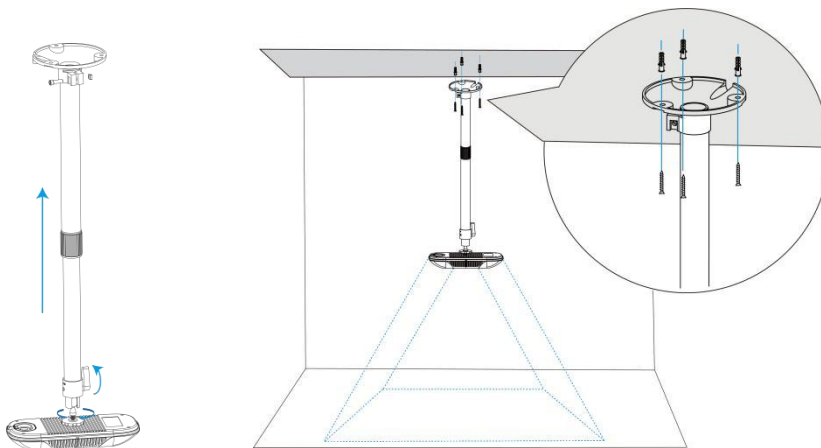
(Note: If the wire needs to be extended to the interior of the ceiling or wall, a wire hole with a suitable size is also required to be drilled.)



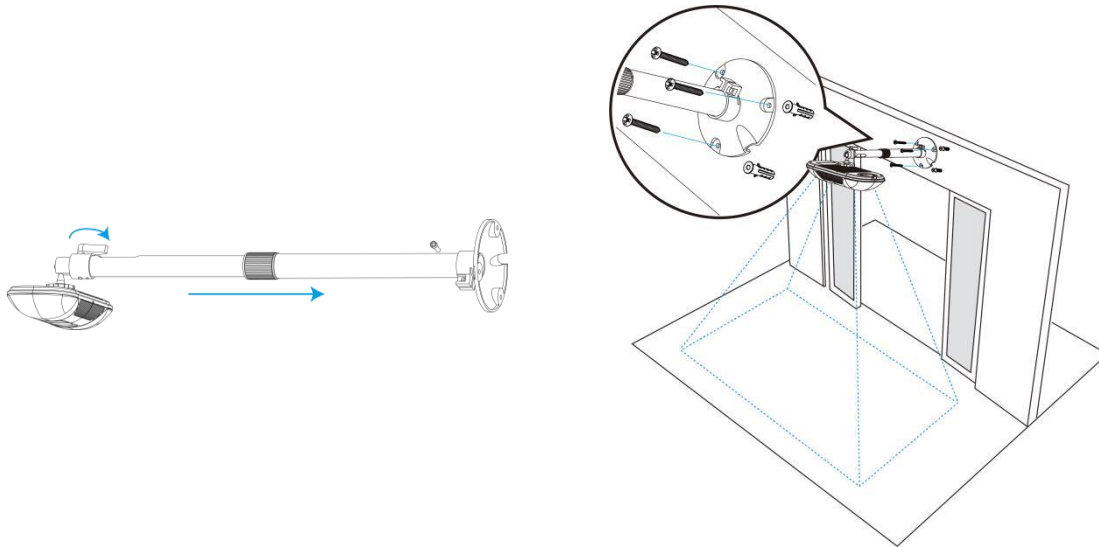
Step 4: Remove the cover on the device, and then connect all required wires and pass them through the inside of pole.

Step 5: Fix the pole to bracket base with screws and nuts.

Ceiling Mount

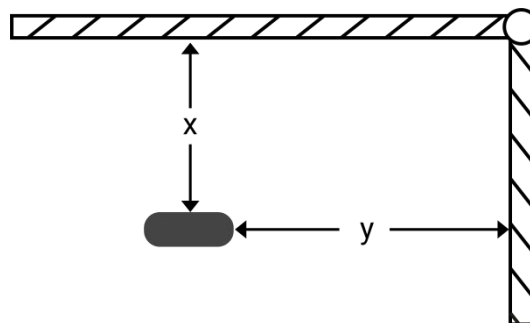


Lintel Mount



Installation Note:

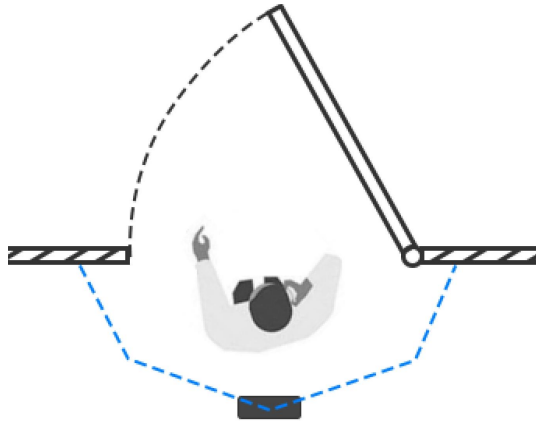
- Ensure that the ToF sensor is facing down and the tilt angle from the ground is no greater than 15° for the standard version, and no greater than 10° for the high ceiling mount version.
- Avoid direct Infrared LED light in the detection area.
- Not suggested to install the sensor close to glass or mirror.
- Ensure that there are no other objects blocking the ToF light within a 50cm radius of the device's field of view.
- Avoid installing the device against the wall and ensure the distance between the device and the wall as follows:



| Condition | Standard Environment | The carpet/floor is Dark (need to set max noise filtering level) |
|-----------------|---------------------------------------|--|
| Normal imaging | $x > 50\text{cm}$, $y > 60\text{cm}$ | $x > 50\text{cm}$, $y > 75\text{cm}$ |
| Normal counting | $x > 50\text{cm}$, $y > 50\text{cm}$ | $x > 50\text{cm}$, $y > 50\text{cm}$ |

- When you install devices on the top of swinging doors, it is suggested to keep the door normally open. If the door must be normally closed, please install the device on the other side of the door to keep away from the door's movement. And it is suggested to keep away

from the door with a distance of at least 40cm.



6.5 Factors Affecting Accuracy

- Wearing a fisherman's hat or carrying a cardboard box on the shoulder: The target will not be recognized because it will become unlike a human in depth map.
- Handheld or cart-carrying a humanoid doll with sufficient height to pass by: The doll will be mistakenly detected as people because it is human-like in depth map.

7. Communication Protocol

7.1 Uplink Data

VS135 reports basic information of sensor once joining the network and the number of people periodically. For decoder examples please find files on

<https://github.com/Milesight-IoT/SensorDecoders>.

| Channel | Type | Description |
|---------|--------------------------|---|
| ff | 01 (Protocol Version) | 01=> V1 |
| | 09 (Hardware Version) | 01 04 => V1.4 |
| | 16 (Device SN) | 16 digits |
| | 1f (Software Version) | 85 01 00 05 => 133.1.0.5 |
| 03 | d2 (Accumulated counter) | Line 1 accumulated in counter, 4 bytes |
| 04 | d2 (Accumulated counter) | Line 1 accumulated out counter, 4 bytes |
| 05 | cc (Periodic counter) | Line 1: Byte 1-2: in counter during the report interval Byte 3-4: out counter during the report interval |
| 06 | d2 (Accumulated counter) | Line 2 accumulated in counter, 4 bytes |

| | | |
|----|--------------------------|--|
| 07 | d2 (Accumulated counter) | Line 2 accumulated out counter, 4 bytes |
| 08 | cc (Periodic counter) | Line 2: Byte 1-2: in counter during the report interval Byte 3-4: out counter during the report interval |
| 09 | d2 (Accumulated counter) | Line 3 accumulated in counter, 4 bytes |
| 0a | d2 (Accumulated counter) | Line 3 accumulated out counter, 4 bytes |
| 0b | cc (Periodic Counter) | Line 3: Byte 1-2: in counter during the report interval Byte 3-4: out counter during the report interval |
| 0c | d2 (Accumulated counter) | Line 4 accumulated in counter, 4 bytes |
| 0d | d2 (Accumulated counter) | Line 4 accumulated out counter, 4 bytes |
| 0e | cc (Periodic Counter) | Line 4: Byte 1-2: in counter during the report interval Byte 3-4: out counter during the report interval |
| 0f | e3 (Region Monitoring) | Byte 1: number of people in region 1 Byte 2: number of people in region 2 Byte 3: number of people in region 3 Byte 4: number of people in region 4 |
| 10 | e4 (Region Monitoring) | Byte 1: region ID Byte 2-3: avg. dwell time Byte 4-5: max. dwell time |

Note: If children distinction feature or staff detection feature is enabled, the counter uplinks will minus children and staff. For example, if children distinction is enabled, the accumulated in counter=total in counter-children in, the accumulated out counter=total out counter-children out.

Example:

1. Device information

| ff0101 ff166600b09409760000 ff090102 ff1f85010001 | | | | | |
|---|--------------------------|-------------|---------|-----------------------|-----------------------------|
| Channel | Type | Value | Channel | Type | Value |
| ff | 01 (Protocol Version) | 01 (V1) | ff | 16(Device SN) | 66 00 b0 94 09 76 00 00 |
| Channel | Type | Value | Channel | Type | Value |
| ff | 09 (Hardware version) | 0102 (V1.2) | ff | 1f (Software version) | 85 01 00 01 (V133.1.0.1) |

2. Line 1 People counter

| 03d205000000 04d203000000 05cc02000100 | | | | | |
|--|-----------------------------------|--|---------|------------------------------------|------------------------------------|
| Channel | Type | Value | Channel | Type | Value |
| 03 | d2 (accumulated in counter) | 05 00 00 00 => 00 00 00 05=5 | 04 | d2 (accumulated out counter) | 03 00 00 00 => 00 00 00 03=3 |
| Channel | Type | Value | | | |
| 05 | cc (Periodic Counter) | In: 02 00 => 00 02 = 2 Out: 01 00 => 00 01 =1 | | | |

7.2 Downlink Command

VS135 supports to configure the device via downlink commands. Application port is 85 by default.

| Channel | Type | Description |
|---------|--------------------------------------|---|
| | 10 (Reboot) | ff (Reserved) |
| | 03 (Reporting Interval) | 2 Bytes, unit: s |
| | 04 (Confirm Mode) | 00: disable, 01: enable |
| ff | 05 (LoRaWAN® Channel Mask) | Byte 1: Channel index range 01: 0-15 02: 16-31 03: 32-47 04: 48-63 05: 64-79 06: 80-95 Byte 2-3: indicate disable or enable via every bit, 0=disable, 1=enable |
| | 40 (ADR) | 00: disable, 01: enable |
| | 41 (Application Port) | 1 Byte, default is 85 |
| | 42 (Wi-Fi) | 00: disable, 01: enable |
| | 43 (People Counting Periodic Report) | 00: disable, 01: enable |
| | 44 (People Counting Trigger Report) | 00: disable, 01: enable |
| | 51 (Clear the accumulated counting) | ff (Reserved) |

Note: After changing any parameter of LoRaWAN® settings, the device will re-join the network.

Example:

1. Disable Wi-Fi.

| ff4200 | | |
|---------|------------|-------------|
| Channel | Type | Value |
| ff | 42 (Wi-Fi) | 00: disable |

2. Set AU915 or US915 channel mask as 8-15.

| ff0501ff00 ff05020000 ff05030000 ff05040000 ff05050000 | | |
|--|--------------------------|---|
| Channel | Type | Value |
| ff | 05 (Set Channel Mask) | 01: Channel index 0-15, ff00 => 8-15 is enabled 02-05: Channel index 16-79, 0000 => all disabled |

3. Reboot the device.

| ff10ff | | |
|---------|-------------|---------------|
| Channel | Type | Value |
| ff | 10 (Reboot) | ff (Reserved) |

4. Set reporting interval as 20 minutes.

| ff03b004 | | |
|----------|----------------------------|---------------------------------------|
| Channel | Type | Value |
| ff | 03(Set Reporting Interval) | b0 04 => 04 b0 = 1200s =20 minutes |

-END-