User Manual

Product Name	**Millimeter Wave Radar Sensor**
Model	**MSR01-B**

Revision History

Revision	Description	Author	Revision date
V0.5	Document created	Andy Wang	2023-01-06
V1.0	Modify the technical parameters, Release version	Andy Wang	2023-06-05
V1.5	Modify the APP version	Tom	2025-03-13

Table of Contents

1. Product Overview

1.1 Introduction

MSR01 is a Bluetooth millimeter wave radar sensor designed and developed by Minew, It is used in application scenarios such as space management and personnel perception, It can detect the presence of human body, personnel flow statistics, and support functions such as counting the number of people and tracking the trajectory of people.It has the characteristics of sensitive sensing, excellent algorithm, and an accuracy rate of up to 99%. With a self-learning function, it can deeply learn the environment state, and identify and eliminate interference sources.At the same time, it also has a wealth of expandable functions, such as gesture recognition and posture judgment with a sense of technology.

1.2 Manual Introduction

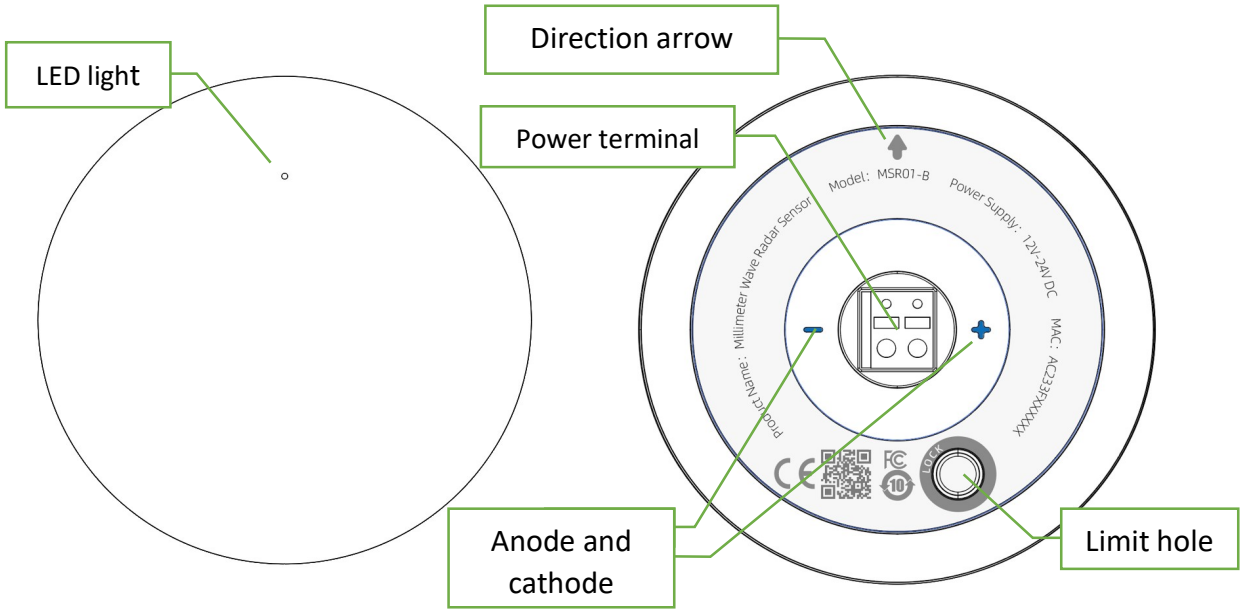
This product manual is the usage description of the MSR01-B personnel traffic detection version.

1.3 Product Specifications

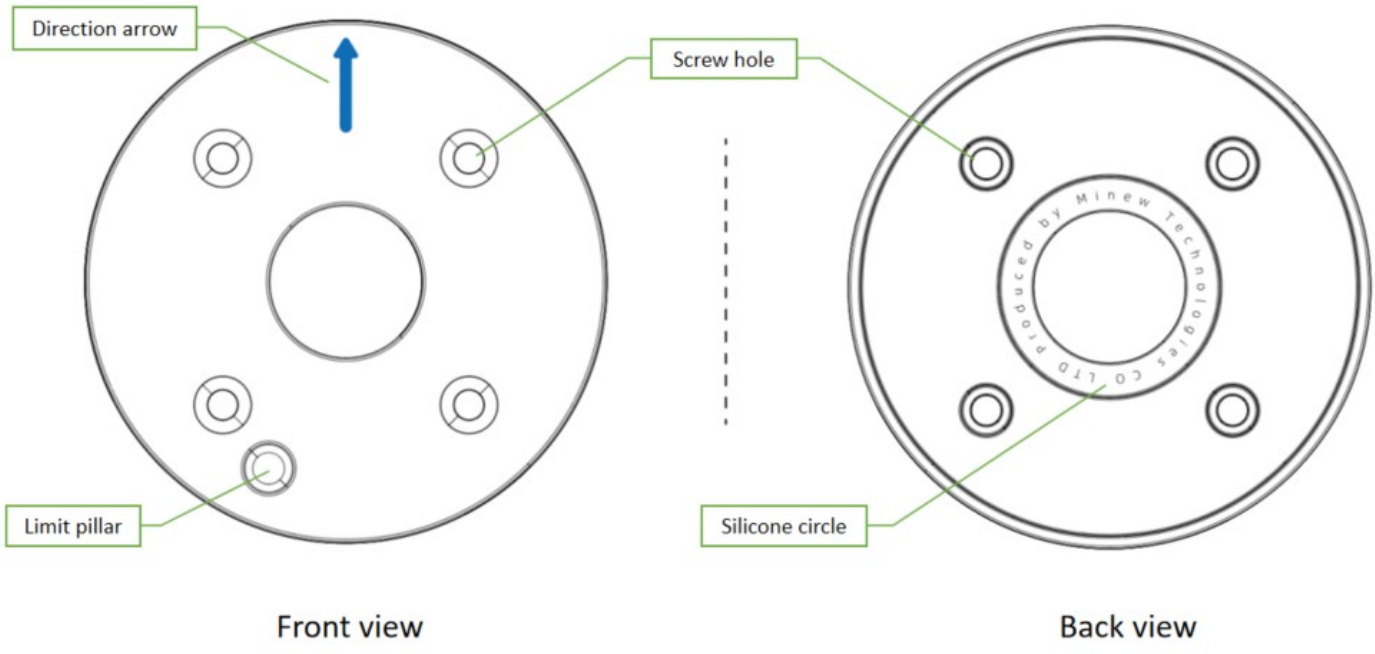
Wireless mode	Bluetooth® LE
Broadcast range	Up to 150 meters (open environment)
Radar frequency	60GHz
Installation height	2.5m~4.0m
Detection angle	120°
Detection range	Ceiling installation, projected ground radius 3 meters
Statistical period	10s~24h (settable), default 60s
Detection height	1.0m~4.0m (settable), default 2.7m
Counting area	Breadth：0.1m~1.0m (settable), default 0.4m Length：0.6~5.0m (settable), default 1.6m
Operating temperature	-10℃~+60℃
Operating humidity	≤95%RH, no condensation
Power supply	DC12V
Size	Φ83*21mm (main body) Φ66*6.1mm (mounting base)
Installation mode	Ceiling mounted, magnetic

2.Product Diagram

2.1 Product Diagram

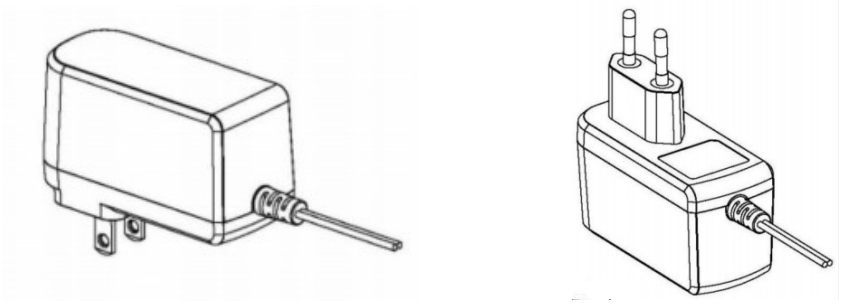


2.2 Mounting Base Diagram



2.3 Mounting Fittings（optional）

（1）DC adapter



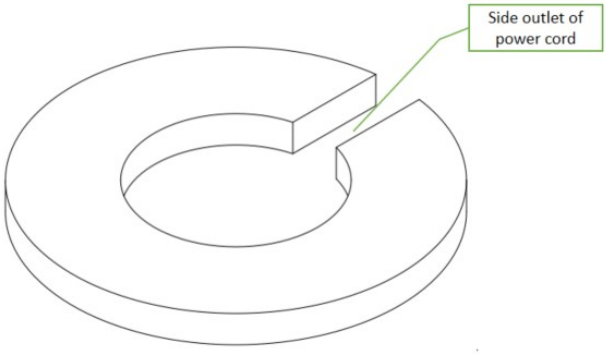
Adapter diagram, In kind prevail.

（2）DC adapter cable

①: Copper wire connects to the product power terminal. Red to the positive, black to the negative.

②: The DC female connector connects to the DC male connector of the power adapter.

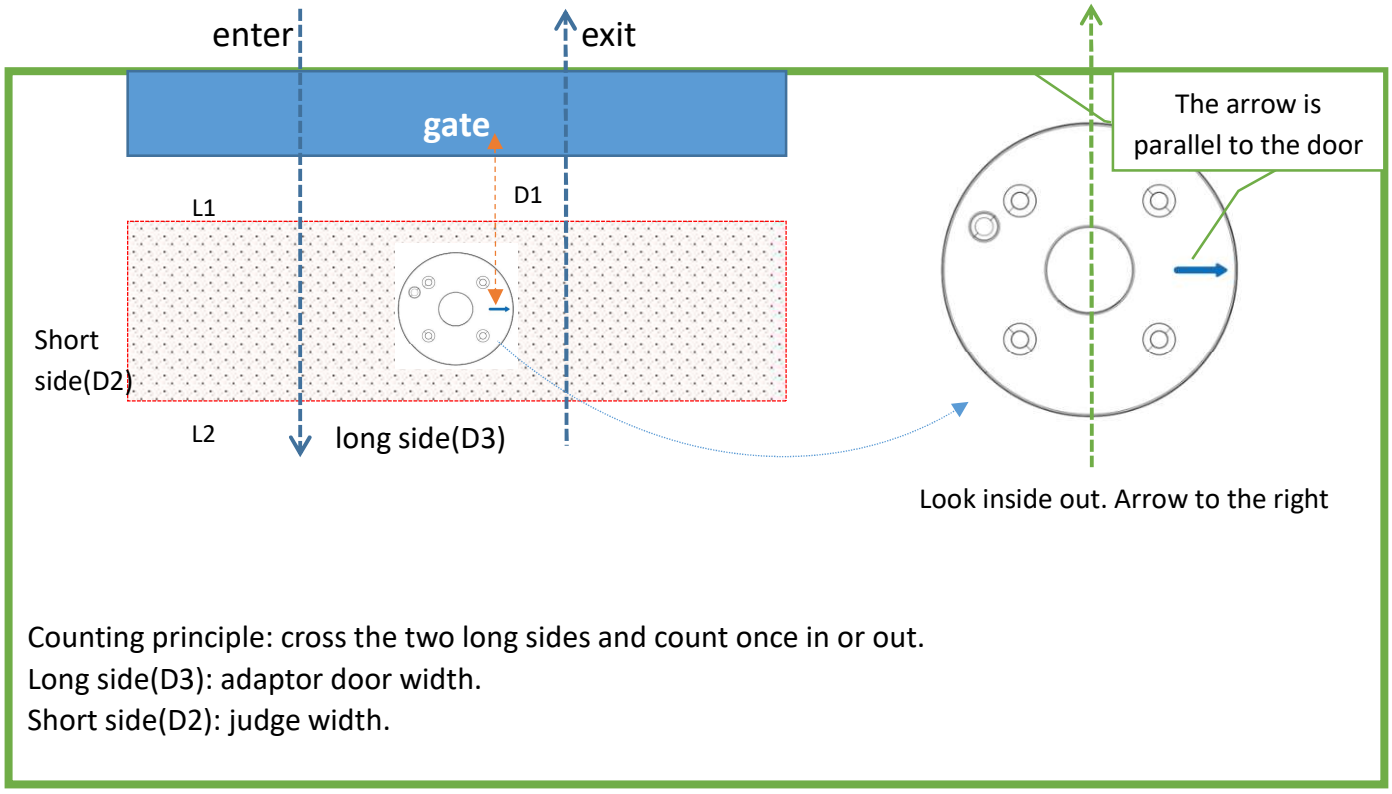
（3）Double-sided adhesive



Instruction: convenience-top installation allows the power cable to exit from the side, avoiding the protrusion of the power cable at the bottom and ensuring stable installation.

3. Installation and Deployment Instructions

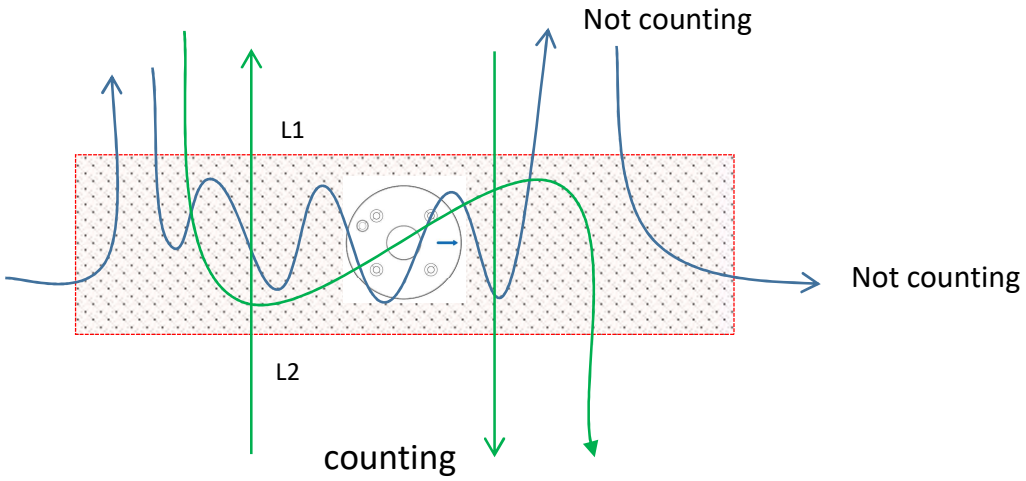
3.1 Deployment Diagram



Counting principle: cross the two long sides and count once in or out.
Long side(D3): adaptor door width.
Short side(D2): judge width.

Top view

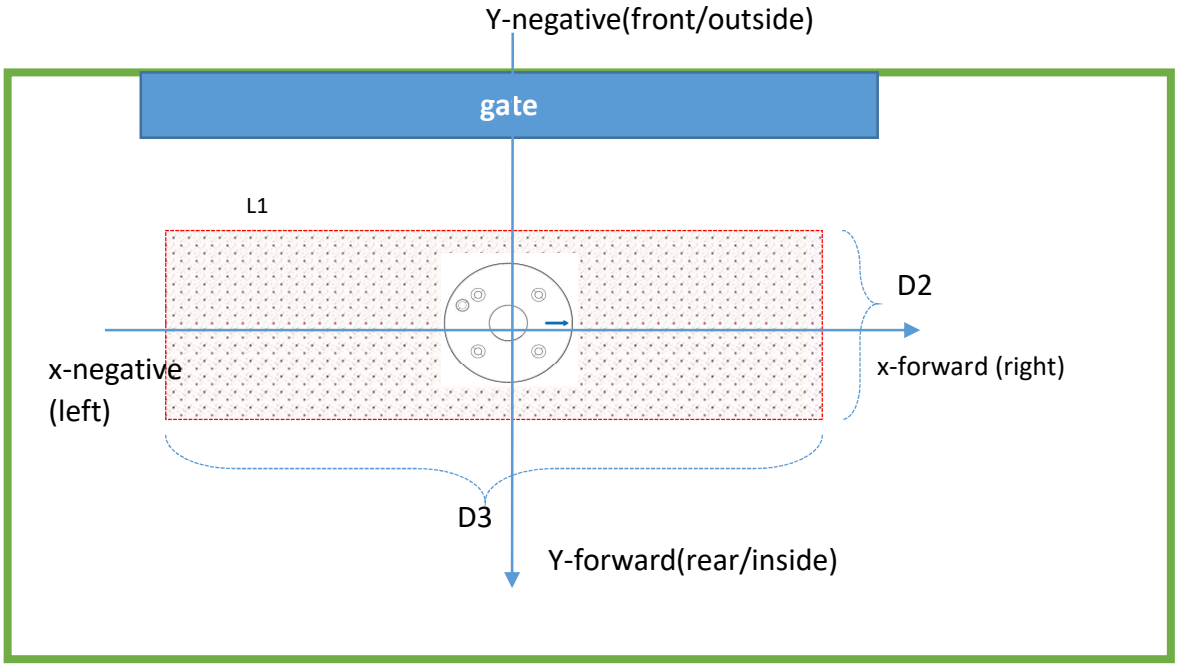
3.1.1 Counting principle description



Green line direction: counting.
Blue line direction: not counting.
Counting principle: cross the two long sides(L1,L2) and count once in or out.

3.1.2 Set the width of the count judgment area

- Coordinate system: X and Y axis directions



Top view

x-forward: The direction of the base arrow/indicator light is in the positive direction of the X-axis. When viewed from the inside towards the outside of the door, it is on the right side of the base.

x-negative: In contrast to the positive direction of the X-axis, when viewed from the inside towards the outside of the door, it is on the left side of the base.

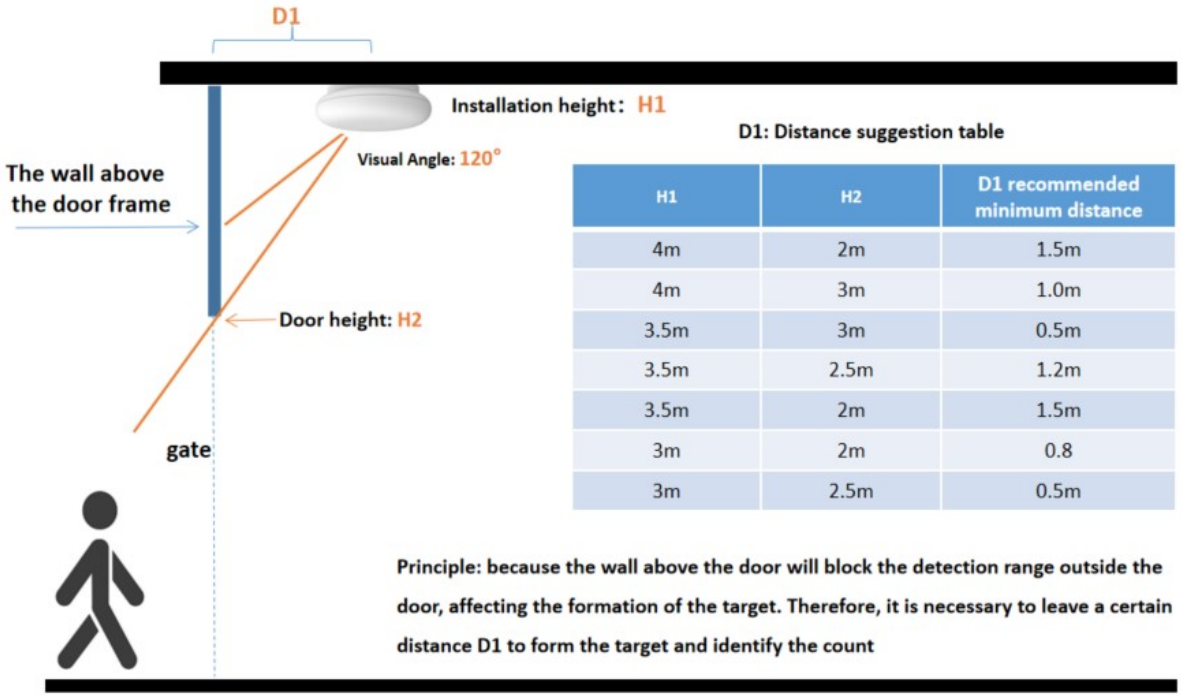
Y-forward: When viewed from the inside towards the outside of the door, it is behind the base.

Y-negative: In contrast to the positive direction of the Y-axis, when viewed from the inside towards the outside of the door, it is in front of the base.

- Long side(D3)、Short side(D2)

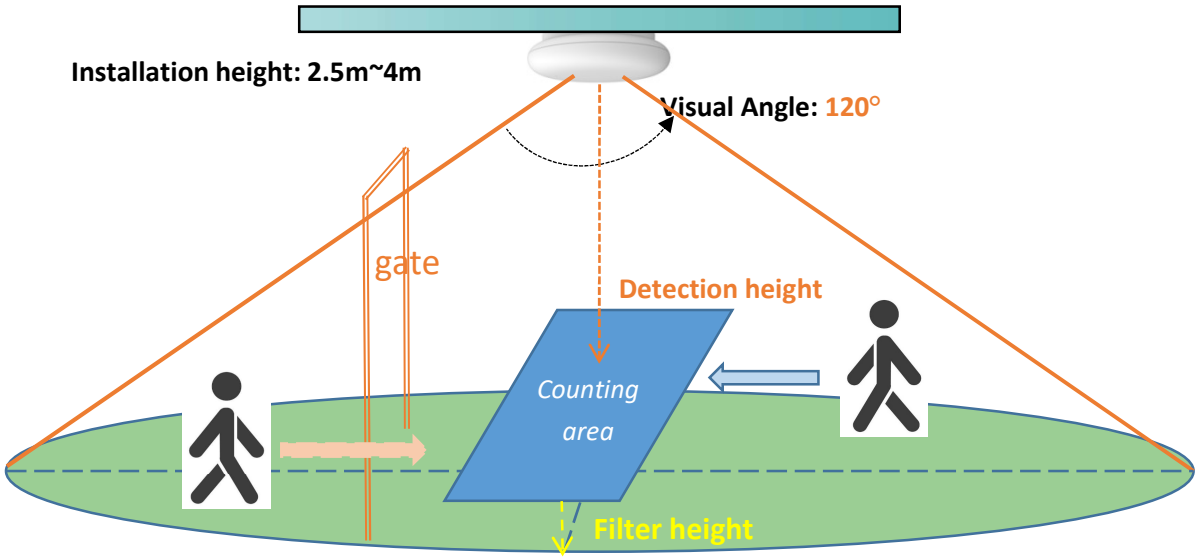
Width	Default value	Parameter setting description
D2	0.4m	D2=Y-forward plus Y-negative For example: Y-forward set as：20cm Y-negative set as：-20cm So D2=20+|-20|=40cm
D3	1.6m	D3=X-forward plus x-negative For example: X-forward set as：80cm X-negative set as：-80cm so D3=80+|-80|=160cm

- D1: Distance between base and door



H1	H2	D1 recommended minimum distance
4m	2m	1.5m
4m	3m	1.0m
3.5m	3m	0.5m
3.5m	2.5m	1.2m
3.5m	2m	1.5m
3m	2m	0.8
3m	2.5m	0.5m

3.2 Detection Range Diagram



Detection height: can be settable (use APP).

Filter height: the filter height can be set according to the height of the pet so that invalid counts can be filtered out.
Calculation method: installation height subtract detection height.
for example:
Installation height: 3.0m
Detection height: 2.0m
So filter height=3 - 2=1m

4. Installation Instructions

4.1 Accessories Introduction

Four self-tapping screws are standard. The installation is supported by drilling holes and an expansion rubber plug is required.

DC adapter cable, DC adapter, Double-sided adhesive accessories can also be selected.

4.2 Installation Steps

Step 1: Select installation location

(1) Select a base installation position according to deployment instructions. It is recommended to install the center line above the door.

(2) Ensure that the power cable can pass through the center hole of the base from top to bottom.

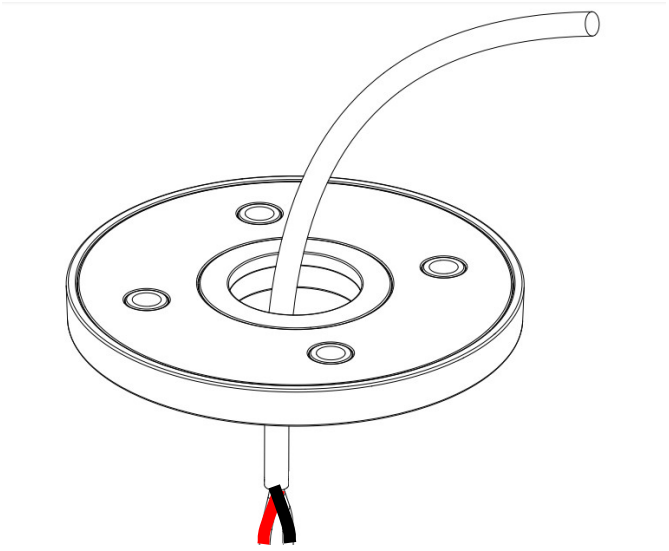
(3) When installing the base, the indicator arrow on the base is parallel to the wall where the door is located. When viewed from the inside towards the outside of the door, the arrow points to the right.

Step 2: Mounting base

Method 1: Screw installation (Suitable for power supply directly from the ceiling)

Fist: Thread the power cable through the central hole of the base.

Second: Select the base installation position and ensure that the arrow direction is correct, Fasten the base with screws to the position where the holes have been drilled.

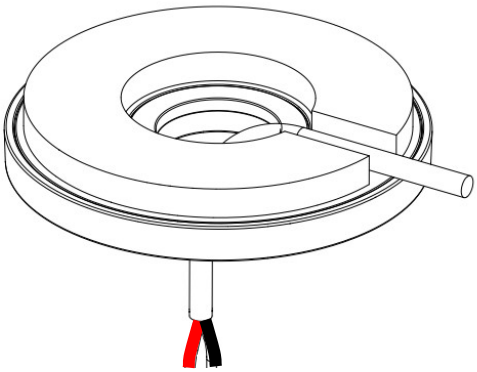


Method 2: Use the installation kit (Applicable to side outlet of power cable)

First: Peel off the double-sided adhesive side and attach it to the back of the base, Thread the DC adapter cable through the central hole of the base.

Second: After confirming the installation position and orientation of the base, tear off the other side of the double-sided tape, paste it on the clean ceiling, and press it slightly for 5~10s.

Note: During installation, thread the DC adapter cable through the double-sided adhesive groove.

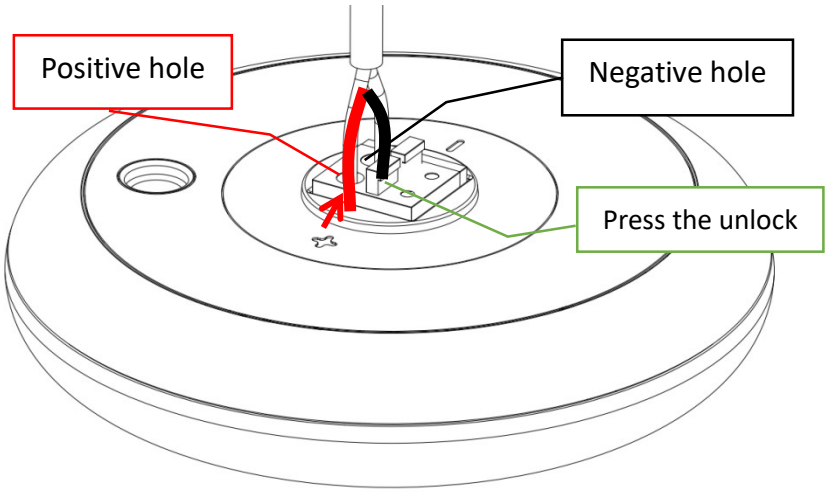


Step 3: Connect the power cable

Insert the positive and negative terminals of the DC power cable correctly into the power terminal holes of the device.

Note: Pay attention to the positive and negative polarity markings ("+" and "-") on the shell, correspondingly connect the wires, and do not reverse the connection.

Power terminal operation instructions:



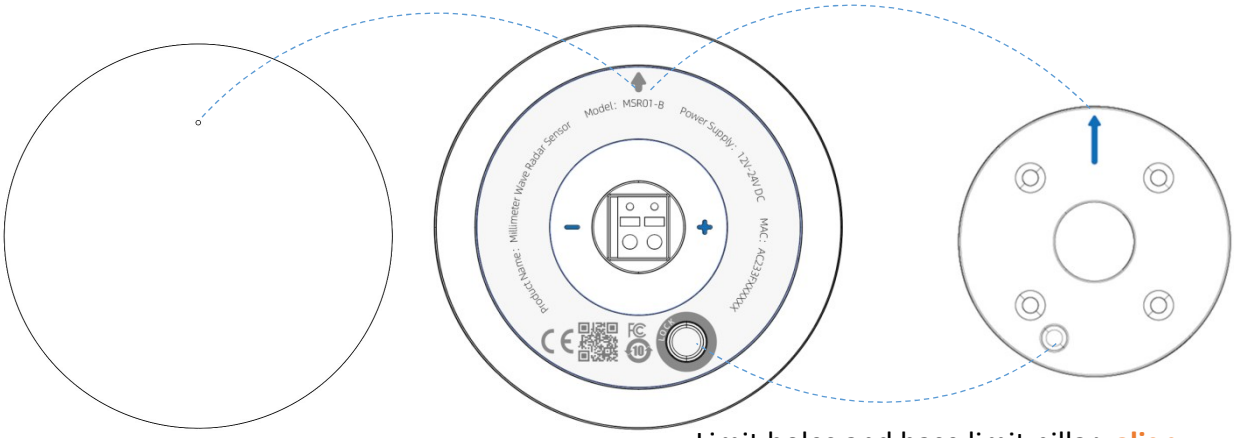
Wiring: Insert the exposed terminals of the power cable directly into the corresponding positive and negative wire holes. Pay attention to the positive and negative polarity markings ("+" and "-") on the shell, You can gently pull it to check, if it cannot be pulled out, it means the installation is correct.

Disconnecting the power cable: Press the latch above the power terminal slightly to pull out the power cable.

Step 4: Installation Product

- Screw Fixation: Insert the self-tapping screws through the screw installation holes on the base. The screws can penetrate the double-sided adhesive and should be tightened onto the mounting surface.
- **Align the device body with the base:** Align the arrow on the product nameplate with the arrow on the base. In addition, the LED indicator can help confirm the direction, and the LED indicator is consistent with the direction indicated by the arrow.
- After visual alignment, magnetic the product to the mounting base. You can turn the product slightly to check whether the installation is successful. If it cannot be rotated, it means that the installation is in place. If it can be rotated, it needs to be adjusted: turn slightly to the left or right until the limit column of the bottom shell is stuck into the limit hole and cannot be rotated (with a "click" sound).

LED indicator light, arrow above the nameplate, arrow on the base:**In the same direction**



Limit holes and base limit pillar: **align**

- **Complete the installation and power-on test**

The installation is complete. You can power on the device to test it. The red light turns on once during power-on.

5. PRECAUTIONS

- The device must be used with a gateway. You are advised to use our gateway.
- The Bluetooth communication distance is affected by the environment. Pay attention to the installation distance between the sensor and the gateway to ensure normal communication.
- Pay attention to the positive and negative polarity markings ("+" and "-") on the shell, correspondingly connect the wires, and do not reverse the connection.
- Keep a clear space under the sensor detection area to avoid metal or other objects blocking the detection area.
- Please use the device on the suggested working temperature for safety.

- Please do not disassemble the main shell without permission, our company will not be responsible for any damage caused.

6. Firmware information

Device broadcast information consists of two frames: monitoring data frame, device information frame.

- **monitoring data frame：Personnel traffic detection**

Offset	Length	Type	Data	Details
0	1	Data Length	0x02	Data length of the AD structure
1	1	Flag Data Type	0x01	The AD type is Flags
2	1	Flag Data	0x06	The flags are "LE (Low Energy) Regular Discoverable Mode" and "BR/EDR not supported
3	1	Data Length	/	Data length of the AD structure
4	1	AD Type	0xFF	The AD type is vendor - defined data
5	2	CompanyID	0x3906	LE,Manufacturer ID,Ox0639 = Minew Technologies Co., Ltd
7	1	Frame Type	0xCA	Minew Connect V3
8	1	Frame Version	0x18	Broadcast frame type, radar monitor frame
9	1	Usage	0x00	Indicating that this is a human traffic monitoring data frame
10	1	Serial number	-	Each time the sensor outputs monitoring data, the serial numbe r automatically adds 1, up to 255 jump to 0, cycle
11	2	Number of entries	-	The number of entry times detected by radar. LE (Little Endian) model. The high and low bits need to be converted and then resolved.
13	2	Number of exits	-	The number of entry times detected by radar. LE (Little Endian) model. The high and low bits need to be converted and then resolved
15	12	TBD	-	Not yet defined
27	2	Salt	-	BE，Random number
29	2	Digital Signature	-	Digital signature

Tips: An example of parsing is attached below.

Parsing example:

Broadcast packets: 0201061BFF3906CA18001A040104030000000000000000000000020ADD2D6

Explanation:

0201061BFF3906: Front part, as described above.

CA: indicates the Minew Connect V3 protocol

18: Radar monitoring frame

00: human flow monitoring data frame

1A: serial number

0401: When parsing, the high and low bits are converted to 0104, which represents the entry times 260 times

0403: When parsing, the high and low bits are converted to 0304, which represents 772 times of going out when converted to decimal

000000000000000000000000: undefined data

20AD: indicates a random number

D2D6: indicates a digital signature

- **Device information frame**

Offset	Length	Type	Data	Details
0	1	Data Length	0x02	Data length of the AD structure
1	1	Flag Data Type	0x01	The AD type is Flags
2	1	Flag Data	0x06	The flags are "LE (Low Energy) Regular Discoverable Mode" and "BR/EDR not supported
3	1	Data Length	/	Data length of the AD structure
4	1	AD Type	0xFF	The AD type is vendor - defined data
5	2	CompanyID	0x3906	LE,Manufacturer ID,Ox0639 = Minew Technologies Co., Ltd
7	1	Frame Type	0xCA	Minew Connect V3
8	1	Frame Version	0x00	@ref [ESL device type](ESL Branch Vers.md)
9	6	Mac Address	-	LE,0x0165332211AC = AC:11:22:33:65:01
15	1	Battery Level	-	Percentage of battery capacity. 0x64 = 100%
16	2	Firmware Version	-	BE, Ox2187 = 1.3.7 (16 bites: 3b maior 6b minor 7b build
18	8	Peripheral Support	-	@ref peripherals support description
26	1	TBD	-	Not yet defined
27	2	Salt	-	BE，Random number
29	2	Digital Signature	-	Digital signature

7. App Operation Instructions

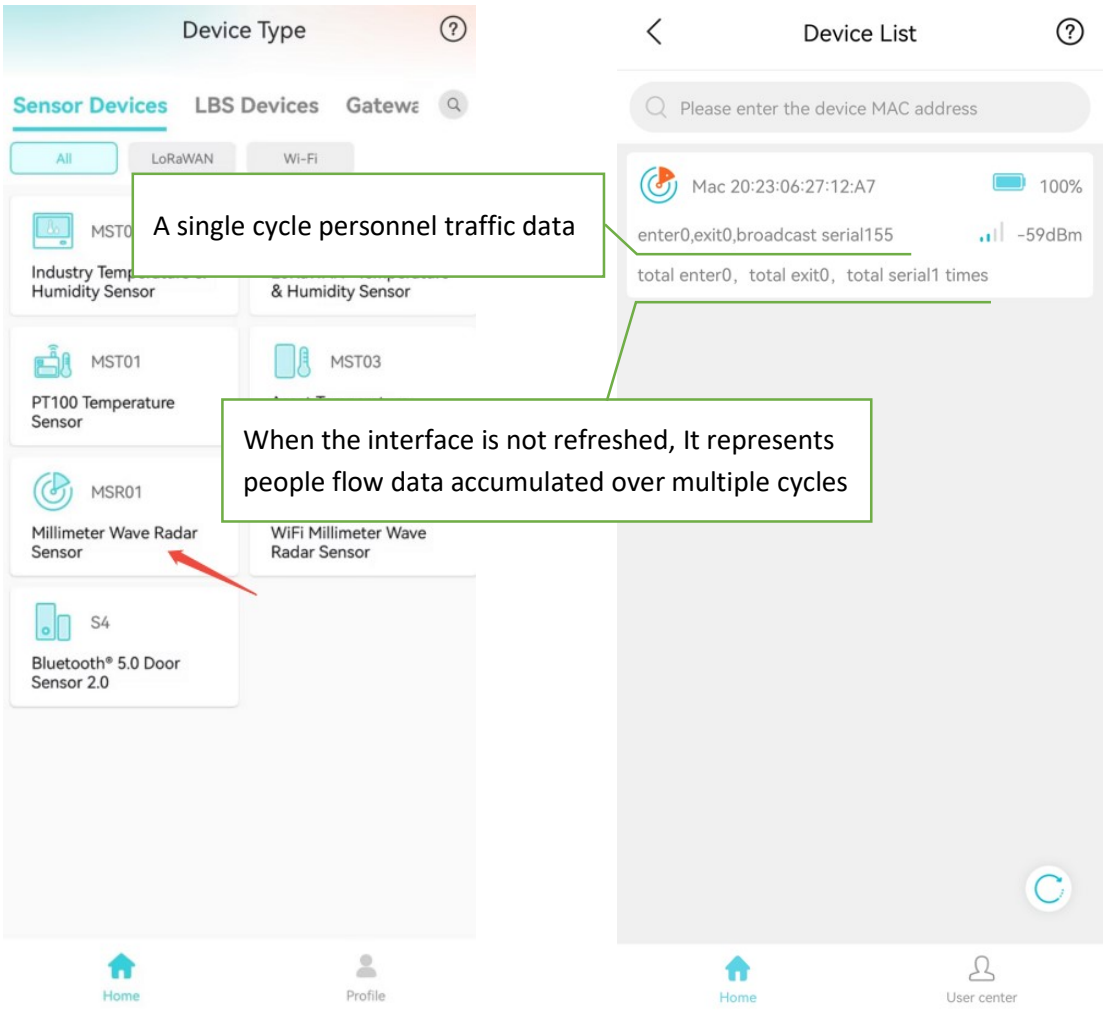
7.1 Download and Install App

- Android system
  a. You can download MinewLink App from Google Play.
  b. You can also contact our sales or FAE to provide a download link or installation package.
- IOS system: Please download MinewLink App from the App Store.

7.2 App Function Description

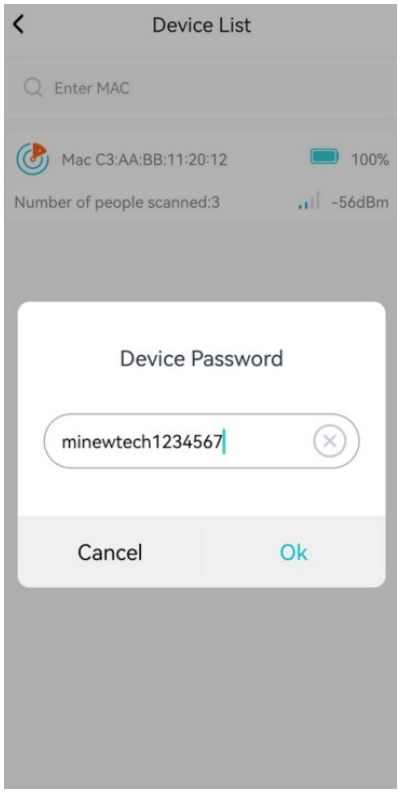
- Scanning interface

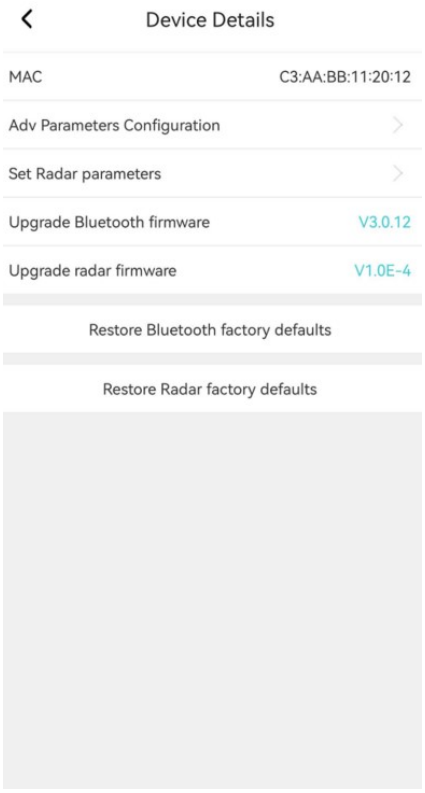
Open the APP and tap to enter Radar Sensor interface.



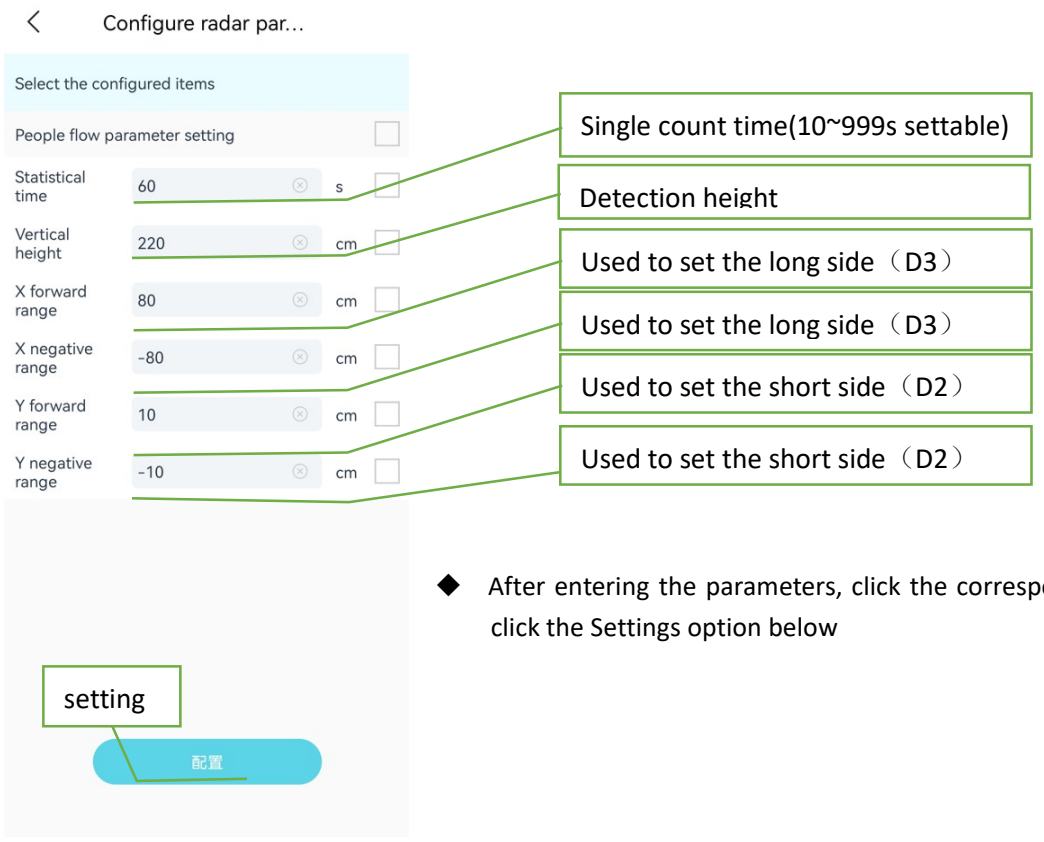
- Enter the connected state

Click the selected MAC, enter the password（minewtech1234567）, and enter the connection status.



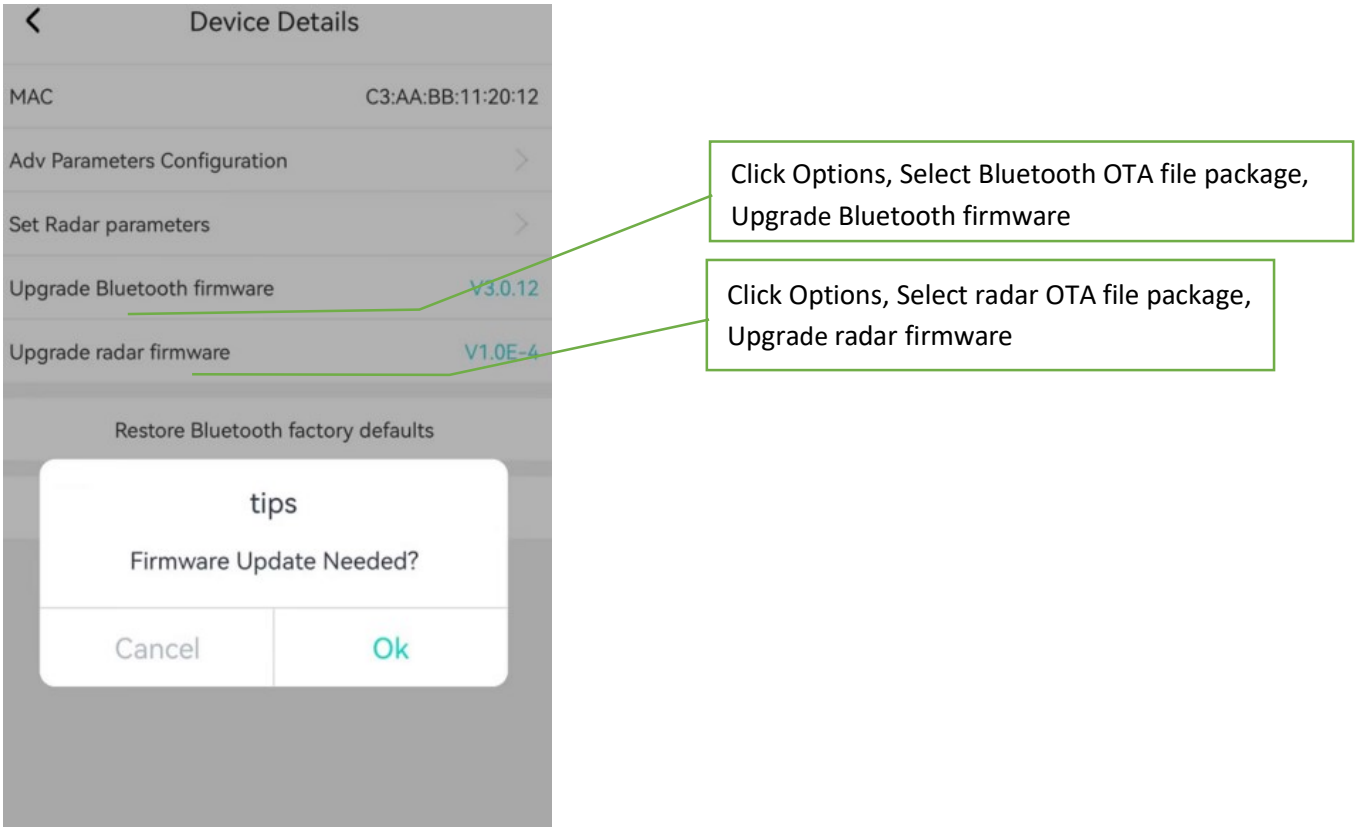


- Set Radar parameters



◆ After entering the parameters, click the corresponding box and then click the Settings option below

- OTA radar firmware/Bluetooth firmware



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