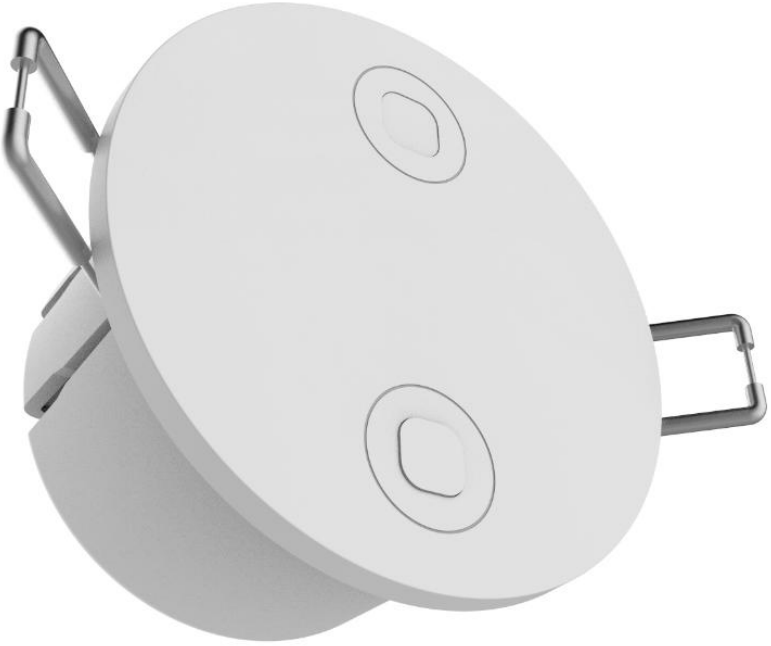
PEOPLE COUNTING (MMWAVE)

RS1Y-W—USER MANUAL



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1. Overview

This product adopts 60 GHz Frequency-Modulated Continuous Wave (FMCW) radar technology to detect human presence and activity by analyzing motion trajectories and micro-movements. It wirelessly communicates with a gateway via Wi-Fi to enable smart scene automation. The product is ideal for residential, hotel, office, and other indoor applications, offering privacy-preserving human sensing without the use of cameras.

2. Function Features

- Accurately detects both moving and stationary occupants (e.g., sitting or sleeping) simultaneously.
- Continuously detects stationary occupants to ensure stable and real-time presence reporting.
- Quickly outputs target movement trajectories and provides real-time 2D coordinate information for each position.
- Detects entries and exits in real time, providing accurate occupancy counting and real-time people count.
- Supports the configuration of irregular detection zone boundaries to suit different installation environments.
- The product does not collect or process any personal privacy-related information. All device data is securely reported to the backend server via a Wi-Fi network.

3. Technology Advantages:

- Strong Environmental Adaptability: Reliable performance under varying lighting conditions and is not affected by temperature, fog, haze, or other environmental factors.
- High Accuracy: Provides high-precision measurements of target speed, distance, and angle.
- Easy Integration: Directly outputs measurement data for fast and simple system integration.
- Privacy Protection: Ensures user privacy by operating without capturing images or collecting personally identifiable information.
- Safe Operation: Low RF transmission power with no harm to the human body under normal operating conditions.

Sensor Type	Presence Detection	Approach/Departure Detection	Vital Signs Detection	Comparison with Millimeter Wave Radar
PIR (Passive Infrared) Sensor	×	√	×	Cannot detect a stationary person. Highly affected by ambient temperature changes, resulting in high false alarm rate and uncontrollable detection distance.
Infrared Array Module	√	√	×	Easily affected by environmental heat sources, higher susceptibility to interference, and higher cost.
Ultrasonic Wave Sensor	×	√	×	Can only detect targets with large motion amplitude within a range of 3–5 m, and cannot achieve high-precision parameter measurement.
Heart Rate Sensor (Wearable Smart Band)	×	×	√	Requires direct contact with the skin; uncomfortable to wear.
Camera	√	√	×	Outputs unstructured data such as images and videos, has high post-processing requirements, and poses privacy risks.
Millimeter Wave Radar	√	√	√	-

Comparison of Sensor Technologies

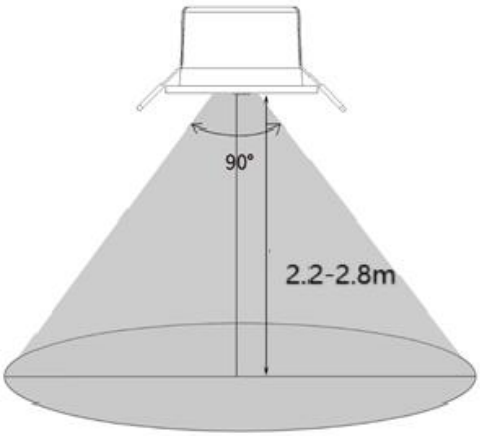
4. Technical Parameters

Parameter	Specification
Input Voltage	AC 110–220 V
Communication	Wi-Fi (Dual-Version)
Communication Range	Up to 80 m (line-of-sight)
Radar Frequency	60 GHz
Radar Transmit Power	≤ 8 dBm (8 mW)
Detection Angle	Wide-angle: 90°–100°; Narrow-angle: approximately 70°. When installed facing vertically downward, the detection area is elliptical.
Response Time	Occupancy detection: approximately 0.5 s; Vacancy report: within 1 minute after the person leaves.
Operating Temperature	–10°C to +55°C
Operating Humidity	≤ 95% RH (non-condensing)
Dimensions	Φ80 × 45.5 mm
Mounting Hole Diameter	65 mm
Installation Method	Ceiling-mounted

5. Installation Height

Default Installation Height: 2.2 m

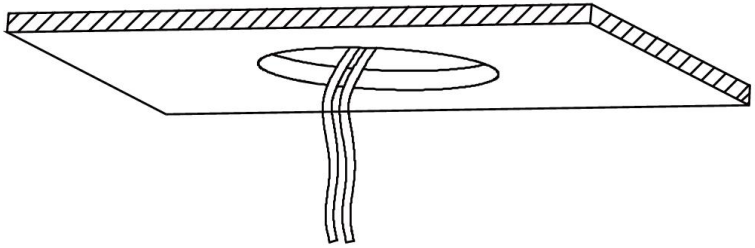
Recommended Installation Height: 2.2 – 2.8 m



6. Installation Instructions

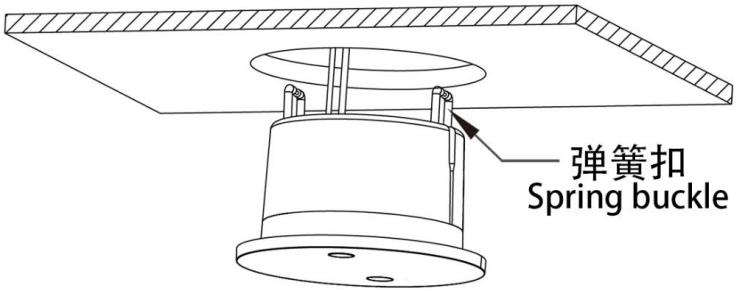
Choose an installation location according to the room layout to ensure effective coverage of the target detection area.

The product is designed for recessed ceiling installation with a mounting diameter of 65 mm. A standard ceiling cutout of 66 – 68 mm in diameter is recommended to facilitate installation.

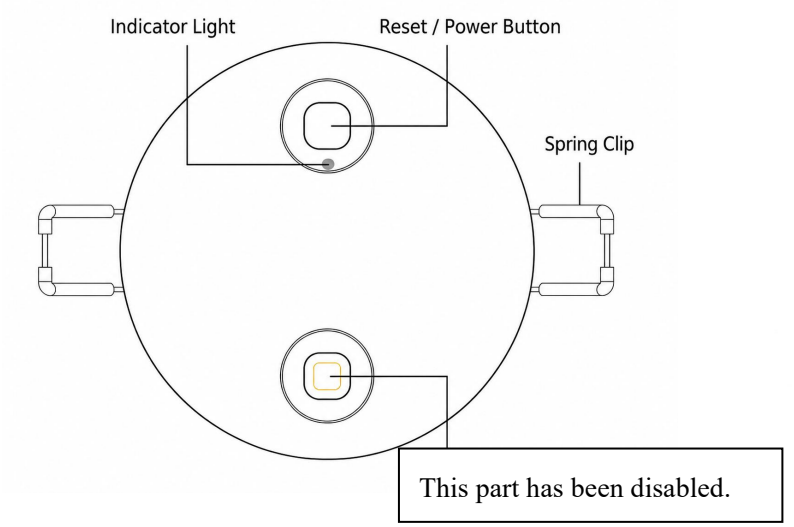


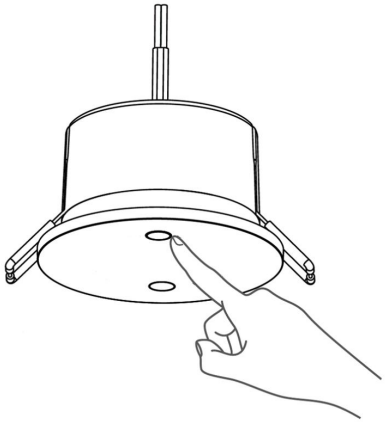
Route the power cable through the ceiling opening, strip the wire insulation, and connect it to the product's power leads. It is recommended to use the building's permanent AC power supply. The two power wires are non-polarized and can be connected in either orientation.

Secure the product in the ceiling using the spring clips, as shown in the illustration.



7. Appearance





8. Network Configuration

After the device is powered on, it starts automatically. Press and hold the button for 10 seconds to enter Server Configuration mode. For detailed instructions, refer to *the Quick Start Guide for the Ceiling-Mounted Recessed People Counting Sensor*.

Open the Wi-Fi settings on your smartphone, search for the device hotspot, and connect to the hotspot with the "RadarConfig" prefix.

Once connected, the browser will automatically open the Server Configuration web page, where you can configure the server parameters.

Wi-Fi Configuration

To connect the device to a Wi-Fi network, press and hold the button for 5 seconds until the red LED indicator starts flashing. Then use the Android configuration application Network Test (Android demo source code is available) to complete the network setup.

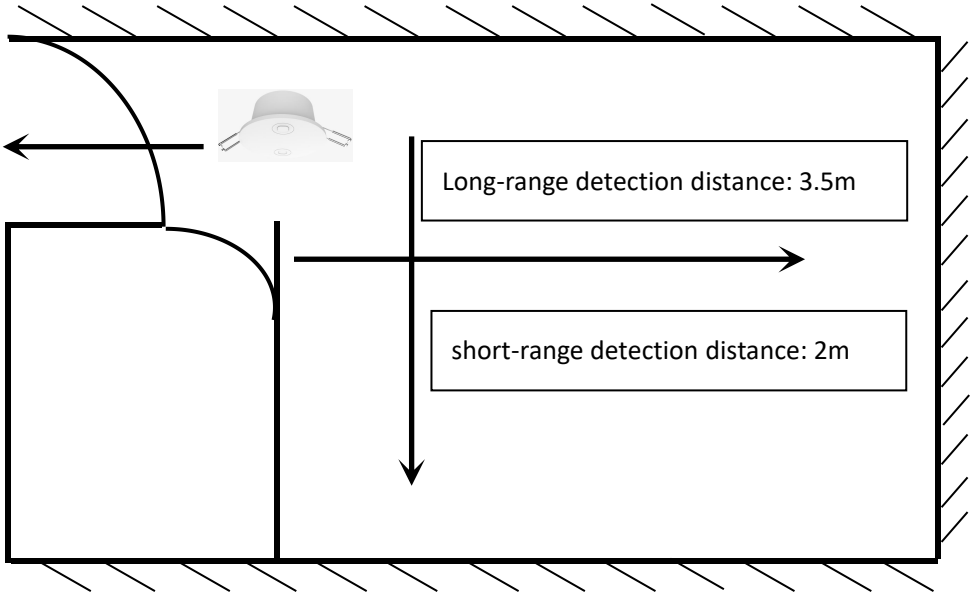
Tap CHOOSE BLUETOOTH to scan for nearby Bluetooth devices, then select Radar_BLE.

Tap CHOOSE SSID to select a Wi-Fi network. Only 2.4 GHz Wi-Fi networks are supported.

Tap START CONFIGURING NETWORK to begin the Wi-Fi configuration process.

9. Detection Range

The radar has different detection sensitivities for stationary and moving occupants. When installed at a height of approximately 2.4 m with the radar facing vertically downward, the typical detection coverage is shown in the figure below.

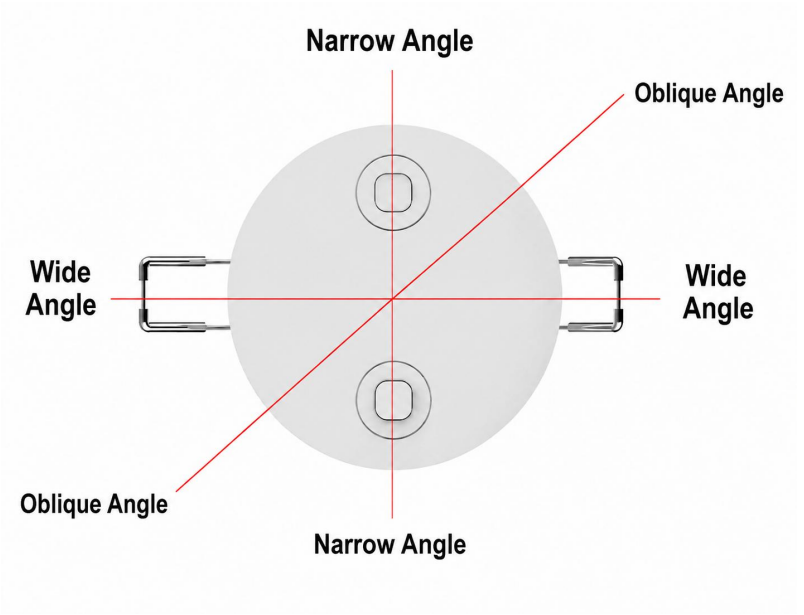


10. Installation Requirements

- Install the radar vertically with a horizontal tilt of no more than ±3°.
- Ensure that the radar's main beam fully covers the intended detection area.
- The recommended installation height is 2.8 m or lower.

  Default Installation Height setting in device: 2.2 m

  Recommended Installation Height: 2.2 – 2.8 m
- Ensure there are no significant obstructions or coverings in front of the radar.



Radar Detection Range Diagram

11. Functional Description

- Motion Detection

  Detection Sensitivity: ⩽ 0.2 m/s

  Response Time: ⩽ 100 ms

- Micro-Motion Detection

  Response Time: ⩽ 1 s

- Occupancy Status Switching

  When switching from the Occupied state to the Unoccupied state, the radar algorithm performs multiple confirmation checks to prevent false reports. The switching time is ⩽ 1 minute.

- Startup Time

  After power-on, the product requires a complete reset of the internal circuitry and sufficient evaluation of the ambient noise environment before normal operation can begin.

  To ensure accurate and reliable output data, allow the device to stabilize for at least 30 seconds after power-on before using the reported detection results.

12. Applications and Precautions

- No Significant Impact: The radar can penetrate cotton fabrics and clothing and is not affected by lighting conditions or dense fog.
- Limited Impact: The radar can penetrate materials such as wood, glass, gypsum board, and plastic. However, the penetration capability is limited by material thickness. Typical residential materials do not affect normal operation.

- Significant Impact: The radar cannot penetrate metal. Do not install the device where the radar beam is blocked by metal objects.
- If a single radar cannot fully cover the target area, additional radars may be installed. Up to three radars can be deployed within the same area without causing mutual interference.
- After a person leaves the detection area, the radar typically requires more than 60 seconds to confirm the Unoccupied state before reporting it. In some complex environments, this confirmation time may be up to 180 seconds.
- When installing multiple radars, it is recommended that they all face the same direction to minimize mutual interference.
- The radar must be securely mounted. Vibration or movement of the device may result in false detections.
- Continuous power supply is recommended to ensure stable operation.

13. Troubleshooting

- False Occupancy Detection (No Person Present, but Occupied Reported)

Possible causes include:

1) The wall is too thin, allowing the radar to detect people in an adjacent room.
2) An unstable power supply may cause false occupancy detection.
3) Moving objects within the detection area may cause false detections, such as server cooling fans, computer fans, plants or metallic objects moved by airflow, large pets, electric motors, electric fans, washing machines, or other moving equipment.

- False Vacancy Detection (Person Present, but Unoccupied Reported)

Possible causes include:

1) The person is outside the radar's detection area.
2) The person is blocked by metal objects or large, thick furniture (such as desks or cabinets), preventing the radar from detecting them.