

SMART CONTROL

24GHz Large-space presence & illuminance sensor



• Product features

MSA201 Z is a 24 GHz radar sensor equipped with a large-beam orthogonal antenna. Featuring high antenna gain and a wide sensing range, integrated with advanced software algorithms and automotive-grade FMCW radar modulation, it enables accurate detection of micromotions induced by human vital signs in indoor spaces, thereby providing fast and accurate front-end sensing input for current human presence-based scenarios including smart homes, smart hotels and smart offices.

MSA201 Z



• Product Feature

- FMCW modulation technology applied to detect micro movement brought by breathing
- Germany RF technology applied for 5-year guarantee assurance
- Accurate Presence/Absence Output
- Support Tuya ZIGBEE communication
- 24Ghz ISM Band Millimeter Wave Radar technology
- Major/Minor/Micro Motion detection diameter: 6-8m Max
- Major/Minor/Micro Motion detection range are highly coincide
- Round radiation. Effectively managing a whole space by a single sensor
- Absence switch to Presence within 0.5S
- Presence switch to Absence no less than 15S
- Flush mounting and Surface mounting installation available
- Sensor parameter adjustable by Tuya APP remote
- Sensing function based on millimeter wave radar technology
- Low RF power output. No harm to human health
- Not affected by temperature, humidity, noise, airflow, dust, light and other environments
- Supports bridging into the Matter ecosystem and enables real-time status synchronization



• Product dimension

- Dimension: ϕ 65x49.5mm
- Connection: 2-pin terminal

•Parameter

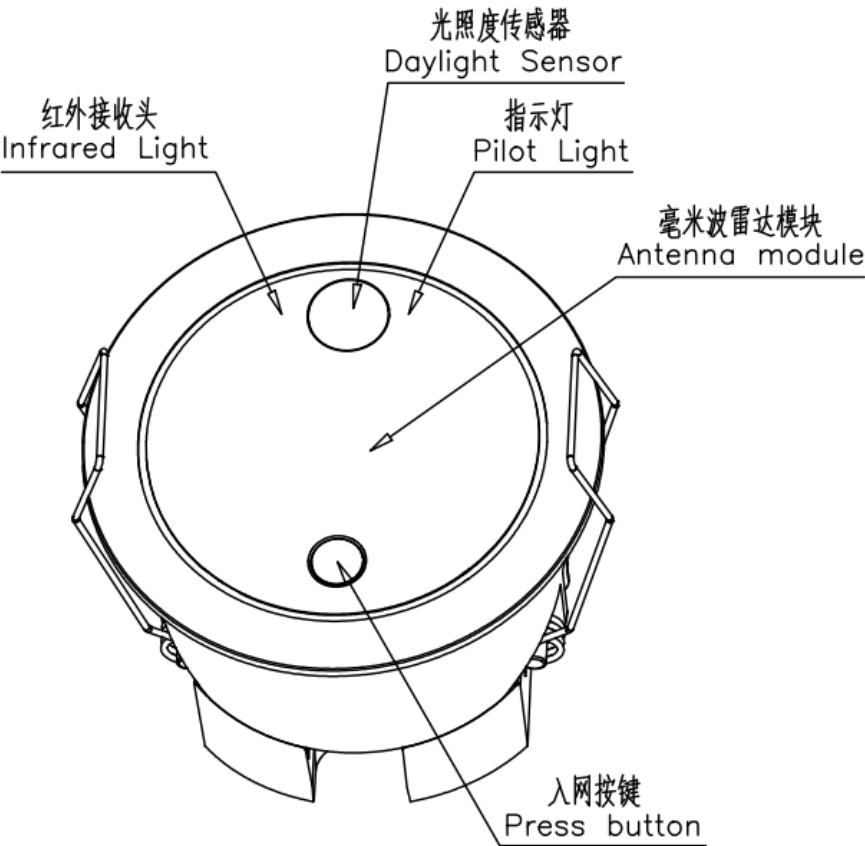
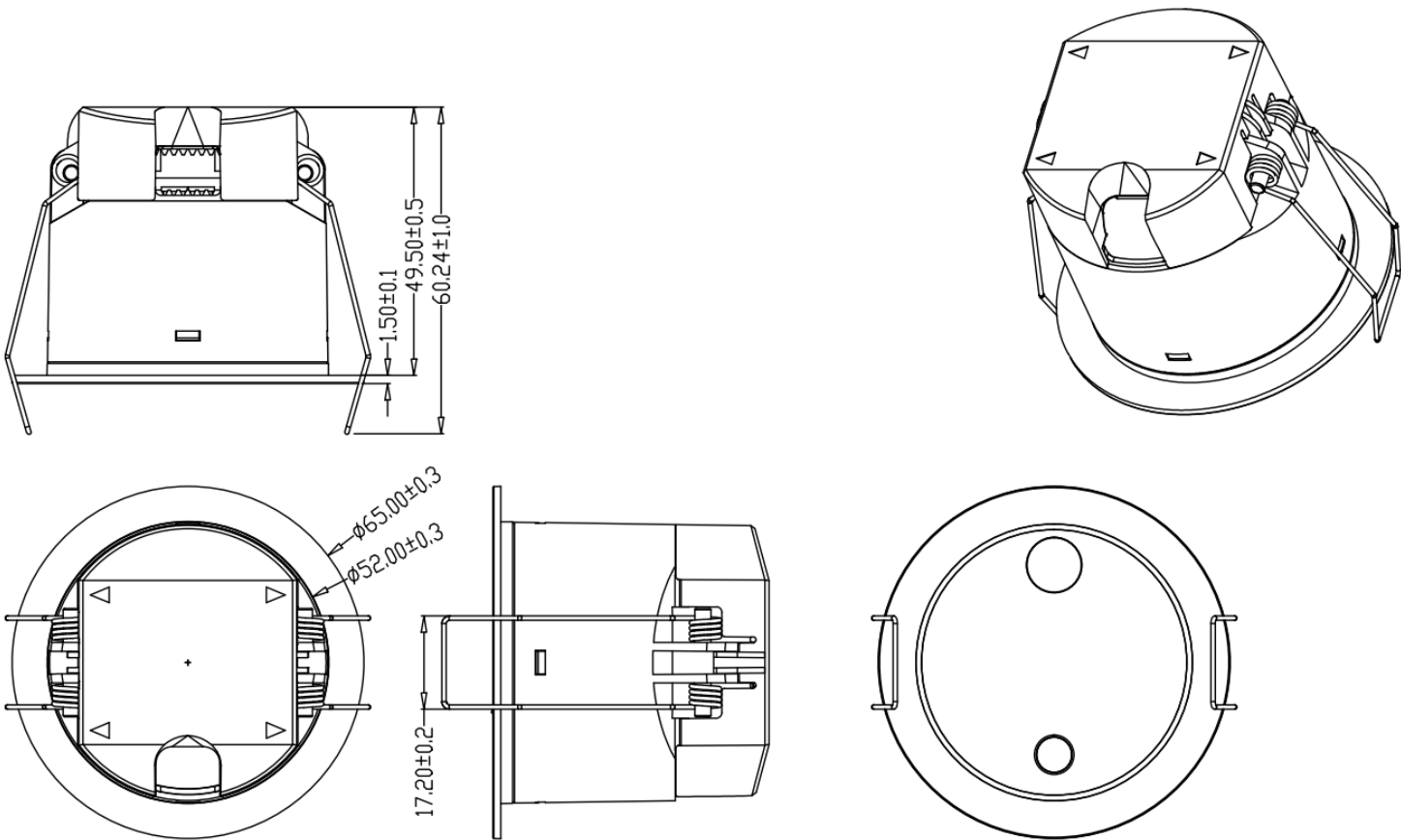
Input/Output	Input voltage	100-240Vac50Hz/60Hz
	Ratedvoltage	220VAC
	WorkingCurrent	50mAmax
	WorkingPower	≤1W230VAC
Wireless communication module	Zigbeefrequency	2.4GHz-2.484GHzZIGBEETransmittingFrequency:10dBReceiving Sensitivity:-101±2dBm
Sensor Parameter	Radarfrequency	24GHz-24.25GHzISMband
	TransmittingPower	5mWMax.
	DetectionArea	APPsetting:0-4m (0.5mpertapping)
	HoldTime	APPsetting:3-7200s
	Daylightsensorrangle	0-1200Lux
	QS1+100%detection rangeradius	major/minor/micro movement(3m height installation): 3.5±0.5m (based on 41m ² open area test and might change due to different space)
	Remotecontrol	Available
	Mountingheight	2.5-4.0mtypicalvalue:3m
	DetectingAngle	120°
Application Environment	Drillhole	Φ55mm
	WorkingTemperature	0°C...+50°C
	StorageTemperature	-25°C~+80°C Humidity:≤85%(non-condensation)
Certificate Standard	Certificate	FCC/RED
	EnvironmentalRequire ment	ComplianttoRoHS
	IPRating	IP20
	Gurantee	5year (onlyforproductqualityproblem)
Note:"N/A"meansnotavailable.		

•Common Function Invocation

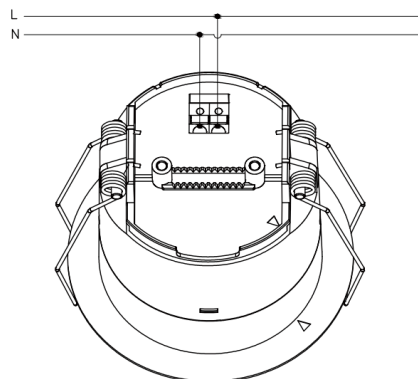
The recommended function points of this sensor for condition judgment are: Ambient Status (Person Present, Person Absent, Sensor Disabled) Person present Duration / Person absent Duration (less than, equal to, greater than a specified time length) Current Status (Person Approaching, Person Moving Away) Illuminance Value (less than, equal to, greater than the set illumnnance value).

It is generally recommended that users combine one or more of the above function points, using trigger status, timer and ambient illuminance status as judgment conditions, to accurately and timely activate or deactivate a specific scene or electrical appliance.

• Dimension and Function diagram



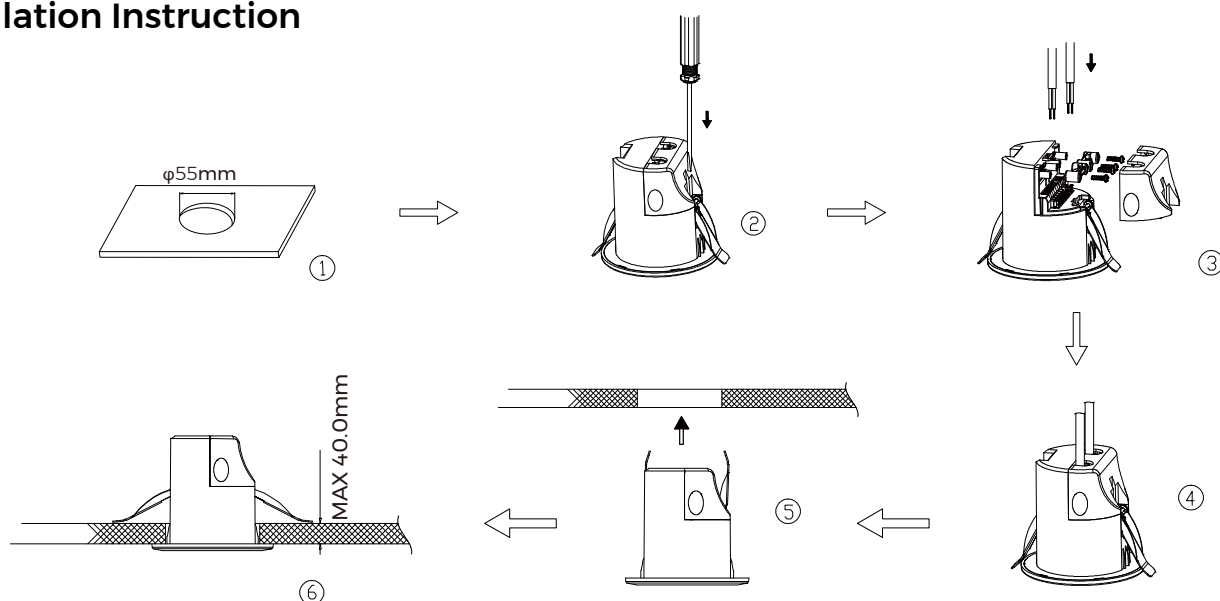
• Wiring instruction



Wiring layout suggestion:

1. Our sensor is recommended layout in UPS circle to guarantee instant smart scene execution or electrical appliance operation

• Installation Instruction



1. Cut a hole of 55mm on the ceiling.
2. Open cover by small straight screw.
3. Loosening clamp and wiring

4. Screw clamp and put the cover.
5. Open spring clip outward and install.
6. Adjust and make sensor flat with ceiling.

• Initialization

The indicator light flashes for 20 seconds and then turns off after the initial power-on. During the initialization process, no external movement sensing signals are detected. The indicator light can be turned off and on through the Tuya APP. The delay time and detection range (sensing distance) can be set through the Tuya APP.

[Reset]: Press and hold the network access button for more than 5 seconds. The reset is successful when the indicator light starts flashing.

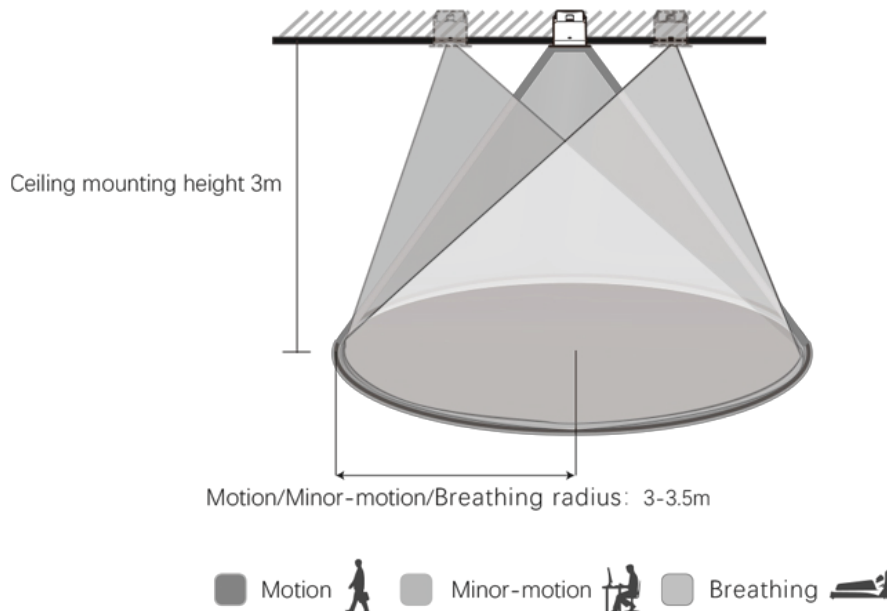
• Factory setting

Detection Area: 4m
Indicator light: Open

Hold Time: 30s
Sensitivity: Major sensitivity

• Detection radiation

MSA201 Z is highly recommended ceiling flush mounting and its detection radiation is as below shows:



• Detection Signal

The product detects human moving, minor moving, and presence signals, and realizes the detection of human-existing/no-human in non-sleep state. The following is a description of the moving, minor moving and presence signals:

- Major movement:** detect the human significant moving (walking) in the detection area.
- Minor movement:** detect the human slight moving in the detection area, such as leaning forward, leaning forwarder and back, swinging limbs, shaking head, operate a computer and so on.
- Micro movement:** detect human abdominal and thoracic expansion behaviors caused by breathing, but not detect moving signal and minor moving signal.



•Signal Detection and Product Function Description

- **Person status:** Detects significant movement signals of the human body within the detection area (such as walking), minor signals (such as body leaning forward or backward, limb swinging, head shaking, operating a computer, etc. - some minor behavioral actions), and detects breathing vital signs caused by the body's expansion movements (such as abdominal and thoracic expansion actions).
- **Unoccupied state:** No signal was detected in the detection area.
- **Someone is approaching:** Someone is moving closer towards the sensor.
- **Some people are moving away:** Some people are walking away from the sensor.
- **Light sensor reporting:** When the change in external light exceeds the set light sensitivity difference, the light sensor value command is reported.
- This sensor can be configured for sensitivity, indicator light, and delay function parameters through the Tuya APP.
- When the trigger distance of this sensor is set to the 0m position, the sensor's sensing function will be disabled and it will lose its sensing capability.
- This sensor supports human body sensing detection function and light intensity detection function. It can also be linked with other devices for automatic control.
- This sensor supports display of trigger status (presence/absence, proximity/distance, duration of presence/absence, light intensity).
- This sensor supports accessing the Matter ecosystem through a Multi-Protocol Matter Bridge Gateway, and its status is updated in real time.

• APP User Guide

- 1. Download and install the [Smart Life] App
- 2.Search for [Smart Life]in Apple App Store or Android App Store, or scan the QR code below to down-load and install the application. For first time use, tap the "Register" button to create an account; log in directly if you already have an account.



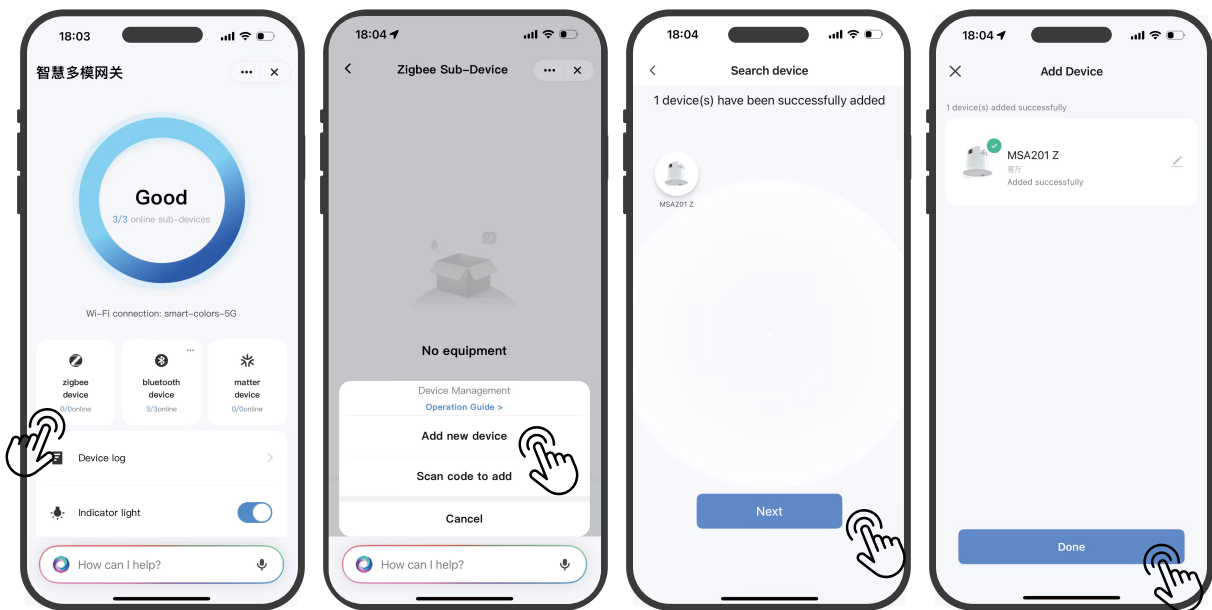
3.Connect to smartphone

- (1).Pre-connect the Multi-Protocol Matter Bridge Gateway.
- (2).Power the sensor. When the indicator light turns on, press and hold the device pairing button on the product for 5 seconds. The product indicator light flashes to enter the network pairing state. After successful network access, the LED indicator stays solid on for 10 seconds.



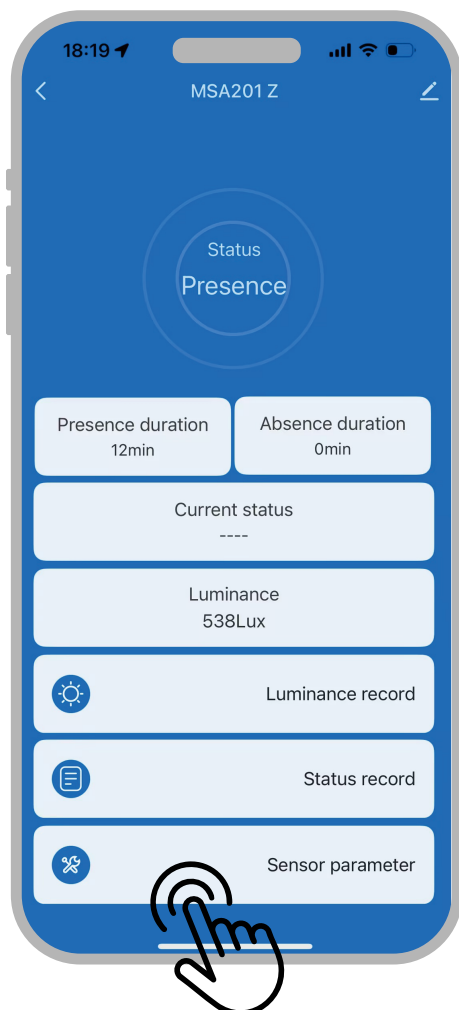
Press and hold the 【Network pairing Button】
for 5 s; the device indicator flashes rapidly
to enter network pairing mode.

- (3).Tap "Smart M Gateway" in the APP, then select Add New Device under Zigbee devices. The gateway will search for and add the sensor device. Once the device is detected, tap Next, select the placement room and edit the device name. The device will then be successfully added to the site.



(4).Upon successful device addition, navigate to the parameter configuration interface. You may configure parameters such as indicator light, application scenario, sensitivity, illuminance difference, illuminance compensation value and hold off time. Please refer to the APP on screen description for detailed functions.

• APP On screen Interface



Detection Status:

- 1.No presence tatus: No person within the detection range
- 2.Presence tatus: uman movement or human presence is detected within the detection range

- 1.Immediate report when switching from no presence status to presence status
- 2.The presence status will switch to no presence status only after the hold off time elapses upon human leaving the detection range

1.Presence Duration:
Duration of human presence within the detection range.

2.Nopresence Duration:
Duration of nohuman presence within the detection range.

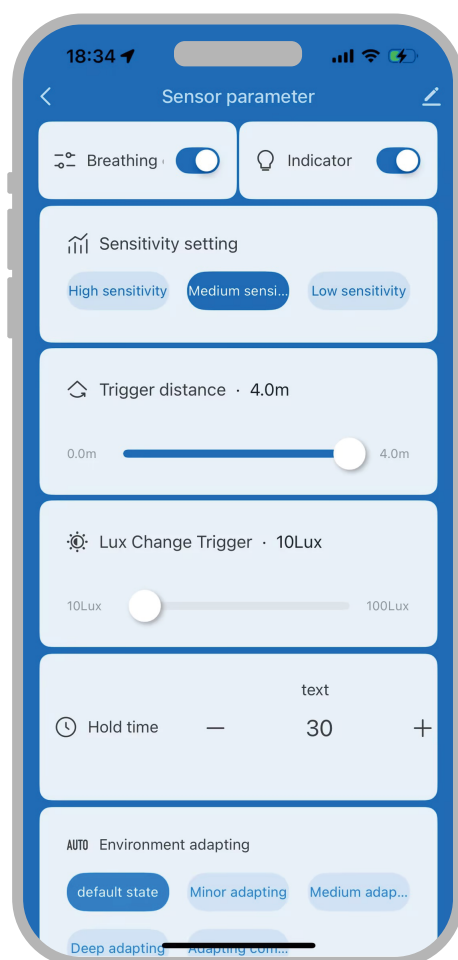
Current Status:
Status reporting for human approaching / human departing.

Illuminance Value:
The current illuminance value will be reported immediately once the change of ambient illuminance exceeds the illuminance difference.

luminance Record:
The current illuminance value shall be reported immediately when the variation of ambient illuminance exceeds the illuminance difference.

Status Record:
Log records for presence and nopresence status reports.

Sensor Parameter Settings:
Radar detection parameter configuration. See next page for details.



Breathing:

- Presence Enable ON: The sensor can detect movement, micro-motion and stationary-presence signals within the detection range.
- Presence Enable OFF: The sensor can only detect movement signals within the detection range.

Sensitivity Setting:

Select High, Medium or Low sensitivity. The detection sensitivity for stationary presence and micro motion signals within the detection range decreases sequentially, while movement detection sensitivity remains unaffected.

Trigger Distance :

The detection range is linearly adjustable in 8 gears from 0-4m with a step of 0.5m. Setting the detection range to 0 disables the sensor detection function. A larger distance setting corresponds to a wider detection coverage.

Lux Change Trigger:

When deviation exists between the illuminance value detected by the sensor and the actual ambient illuminance value, correction can be performed by adjusting the illuminance compensation value.

Holdoff Time:

Time interval for the sensor to switch from presence status to no presence status after human leaves the detection area. Adjustable from 3s to 7200s. For optimal human presence detection performance, it is recommended to set the hold off time above 30s (factory default: 30s).

AUTO Environment adapting:

After configuring the detection range and hold off time, users can activate the Environment Learning function if sensor self excitation occurs during testing. This enables the sensor to adapt to ambient conditions and adjust its parameters rapidly.

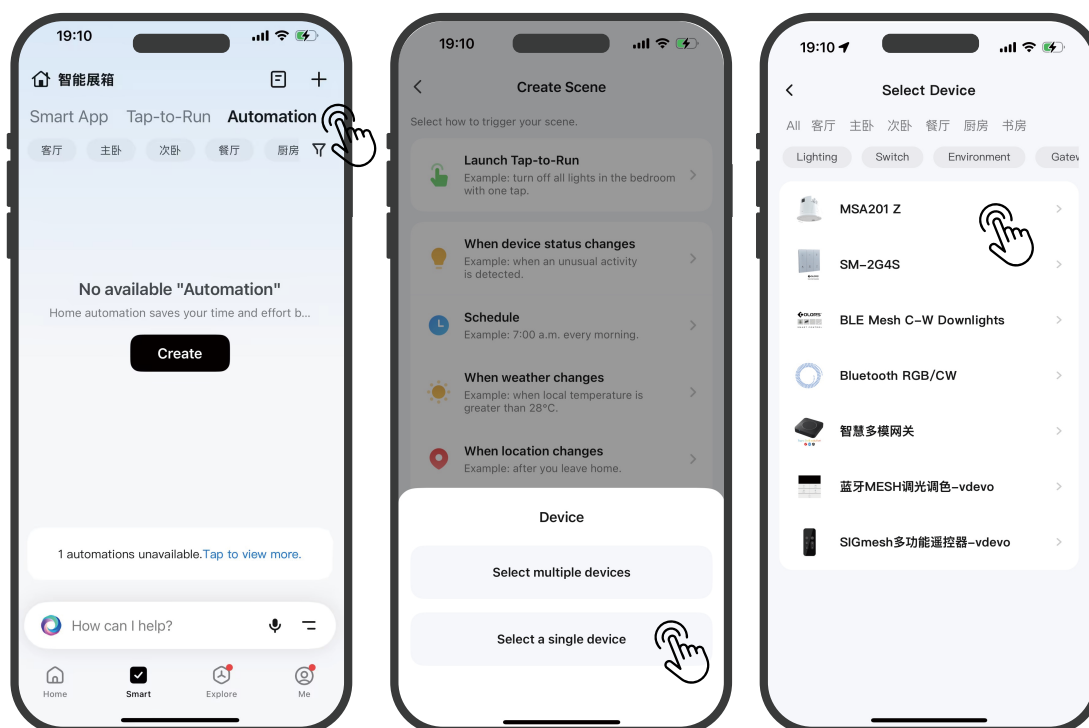
[Minor]: When this mode is selected, the sensor achieves a good balance between maintaining stationary human detection and filtering interfering micro motion signals.

[Medium]: When this mode is selected, the sensor can effectively filter interfering micro motion signals, yet partial stationary presence signals may fail to be detected. It is recommended to compensate by increasing the hold off time (hold off time > 180s is suggested).

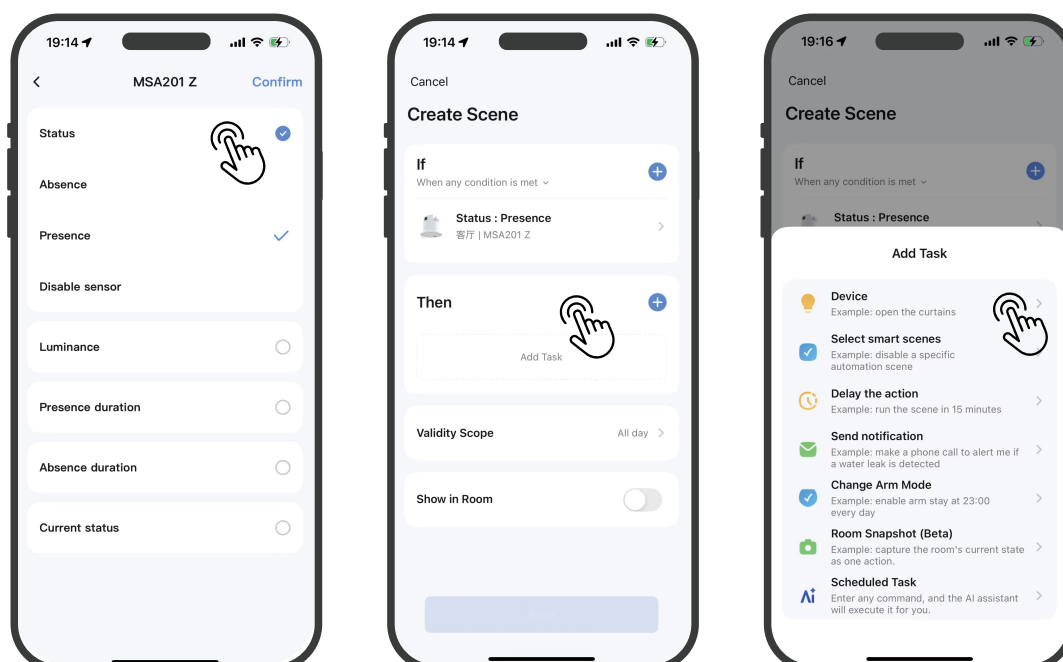
[Deep]: When this mode is selected, the sensor can fully filter interfering micro motion signals; however, partial stationary presence signals may go undetected. Compensation is recommended by increasing the hold off time (hold off time > 600s is suggested).

• Scene Creation

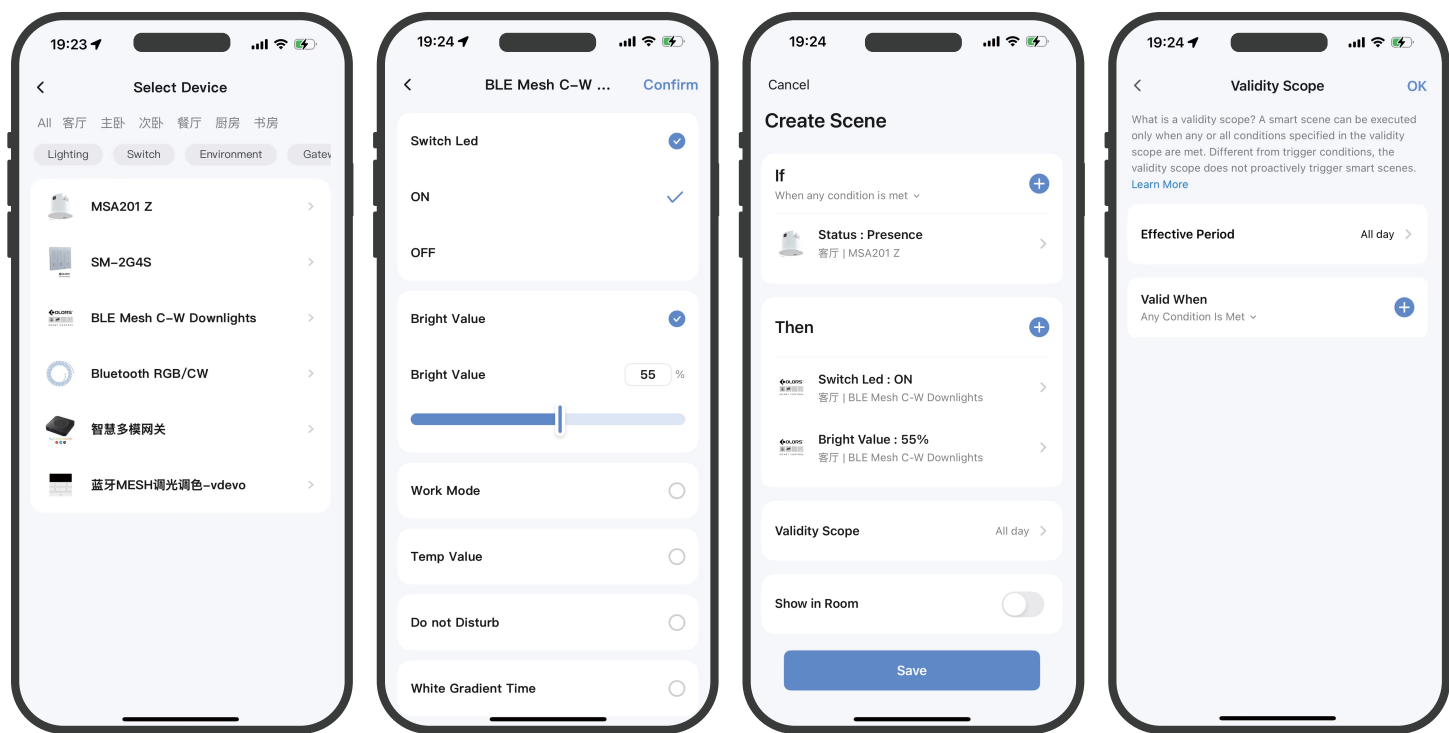
(1). Tap the **【Smart】** button in the APP, tap the “+” icon at the topright corner, select Create Scene → On Device Status Change, then choose a single device and select the target sensor for configuration.



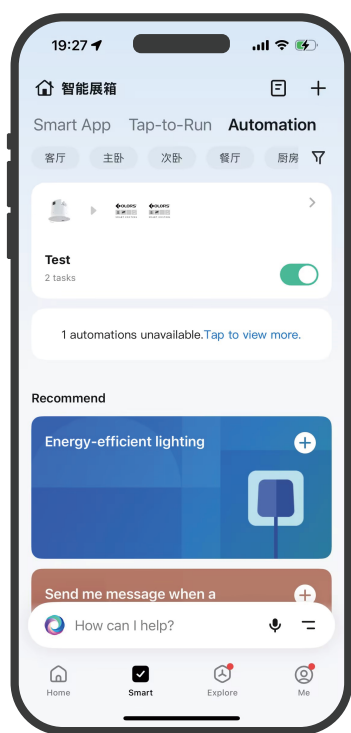
(2). At this point, you may set conditions based on the required sensor status. Taking Ambient Status Person Present as an example, select the devices to perform actions (e.g., luminaires), and complete the configuration according to the logic of what effect the luminaire shall execute when the sensor detects a person.



(3).After selecting the effect for the response device (e.g., luminaire), set the effective scope for this automation, such as enabling automation for all day time periods. Finally, enter the scene name and tap Save to complete.



(4)If you need to temporarily enable or disable automation triggering, locate this automation task under 【Automation】 , then toggle the slider to turn it on or off. When disabled, this configured automation will no longer respond even if the sensor detects status changes.



• Troubleshooting

Symptom	Possible Causes and Solutions
Failed to Join the Network	Verify that your phone and gateway device are connected to the same local area network and have been updated to the latest system. Press and hold the button again for 3 seconds to enter network pairing mode and retry.
No device status displayed in App	Confirm that pairing is completed and check whether the device is powered on.
Poor detection sensitivity or short detection range	Adjust the radar sensitivity level. Avoid metal obstructions or placement near air conditioner vents.
Frequent false alarms	Microwave radar can penetrate glass, wood and other non-metallic materials. Reduce radar sensitivity and increase the unoccupied delay. Meanwhile, check whether the installation location is close to vibration sources.

• Disclaimer

Due to the complexity of product technology and differences in application environment, it is difficult to guarantee a completely accurate or complete description, so this specification is only for user reference.

We will reserve the right to make changes to the product specifications without notifying the user, and do not make any commitments and guarantees in the legal sense.

At the same time, our company encourages users to supplement or modify the contents of our specifications after using our products.

• Notes:

- This product shall be installed and commissioned by qualified professionals.
- Do not connect wires while power is applied. Turn on the power only after wires are correctly connected with no short circuit conditions.
- This device (except for special models) is not waterproof or lightning proof. Avoid direct sunlight and rain exposure. If installed outdoors, a waterproof enclosure and lightning protection device shall be adopted.
- Good heat dissipation conditions can extend product service life. Install the product in a well ventilated environment;
- Do not operate the controller in areas with large scale metal surfaces or nearby strong electromagnetic waves; otherwise, communication stability will be severely impaired.
- Do not attempt unauthorized repair in case of malfunction. Contact your supplier for any inquiries.
- When multiple radar sensors are deployed at the same site, too short installation distance may cause false alarms on individual radar sensors. It is recommended that the installation spacing between products be greater than 2.5 m
- When the sensor is used together with wireless communication modules (NB, Bluetooth, Wi Fi modules), adequate separation shall be maintained. It is recommended to keep a distance of more than 1 m from high-power wireless communication devices such as routers and wireless hotspots during installation.

• Warranty Terms

- The warranty period is 5 years from the date of manufacture.。
- Within the warranty period, our company will provide free repair or replacement for product quality defects.

Non Warranty Provisions:
The following situations are excluded from free repair or replacement services:

- Warranty period has expired ;
- Damage caused by human factors such as excessive voltage, overload and improper operation; severe physical damage or deformation of the product;
- Damage caused by natural disasters and force majeure events。