24G MmWave Radar Human Presence Sensor

Smart Home Halacha Project - Hardware Documentation

Overview

This document provides technical specifications and Zigbee2MQTT (Z2M) configuration details for the **Tuya ZG-204ZM** 24G MmWave Radar Human Presence Sensor, commonly available on AliExpress and similar platforms.

Product Images (AliExpress Samples)

Note: These images are representative examples from AliExpress listings. Actual products may vary by seller.
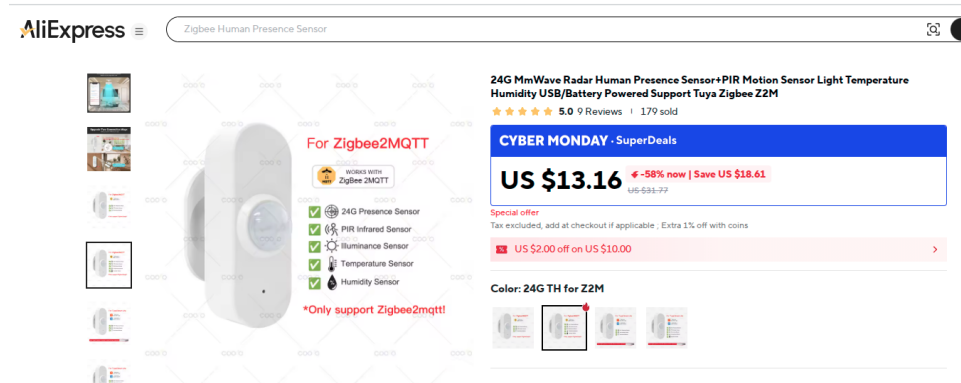
AliExpress listing showing 24G MmWave sensor with features

Product features: 24G Radar, PIR, Luminance, Temperature, Humidity

Technical Specifications

Parameter	Value
Sensor Type A	24G Radar + PIR + Luminance + Temperature + Humidity
Sensor Type B	24G Radar + PIR + Luminance
Working Voltage	DC 3V
Power Adapter	USB DC 5V
Quiescent Current	< 65uA
Wireless Protocol	Zigbee 3.0 (requires Zigbee gateway)
App Support	Smart Life / Tuya
Illuminance Range	0-3500 Lux
Battery Type	2x LR03 AAA (not included)
Working Temperature	-10C to 55C
Working Humidity	max 95% RH

Detection Capabilities

Detection Type	Range	Notes
Static Detection (Radar)	Max 3.5 meters	Sensitivity adjustable
Motion Detection (PIR)	Max 5 meters	Fixed sensitivity
Light Value Updates	Every 1 minute	On change only
Temp/Humidity Updates	Every 15 seconds	0.3C or 3% RH threshold

Important Operating Notes

1. Zigbee devices must be connected to a Zigbee gateway to function
2. After installation, align the sensing surface with the detection area
3. For frequent false negatives, set 'Presence Keep Time' to 60+ seconds and sensitivity to 8x
4. Low-power device - settings update only when device uploads data or is triggered
5. When no presence detected, PIR activates first, then triggers mmWave radar for static detection

Zigbee2MQTT Integration

Device Identification

Field	Value
Zigbee Model	ZG-204ZM
Manufacturer	HOBEIAN (PIR 24Ghz human presence sensor)
Model	ZG-204ZM (Tuya)
MQTT Topic	zigbee2mqtt/[device_name]

Z2M Interface Screenshots

About Tab: Device identification and MQTT topic

living_room_presence

Presence
Indicates whether the device detected presence

True

Motion state
Motion state

large

Illuminance
Measured illuminance

1526 lx

Battery
Remaining battery in %, can take up to 24 hours before reported

100 %

Fading time
Presence keep time

0   28800   s

Static detection distance
Static detection distance

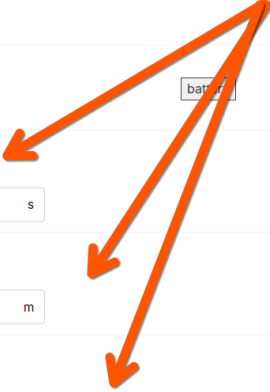0   6   m

Static detection sensitivity
Static detection sensitivity

0   10   x

Exposes Tab: Presence, motion state, illuminance, and configurable parameters

Fading time
Presence keep time

0   28800   s

Static detection distance
Static detection distance

0   6   m

Static detection sensitivity
Static detection sensitivity

0   10   x

Indicator
LED indicator mode

OFF ◯ ON

Motion detection mode
Motion detection mode (Firmware version>=0122052017)

only_pir pir_and_radar only_radar

Can toggle between PIR and radar but not disable detection

Motion detection sensitivity
Motion detection sensitivity (Firmware version>=0122052017)

0   10   x

Linkquality
Link quality (signal strength)

87 lqi

Exposes Tab (continued): Detection mode options - can toggle PIR/radar but not disable

Fading time
Presence keep time

0   28800   s

Static detection distance
Static detection distance

0   6   m

Static detection sensitivity
Static detection sensitivity

0   10   x

Indicator
LED indicator mode

OFF ◯ ON

Motion detection mode
Motion detection mode (Firmware version>=0122052017)

only_pir pir_and_radar only_radar

Motion detection sensitivity
Motion detection sensitivity (Firmware version>=0122052017)

0   10   x

Full parameters view showing all configurable settings

living_room_presence

ℹ Read about this in the documentation...

debounce

Debounces messages of this device

debounce_ignore

[+] [✓] Protects unique payload values of specified payload properties from overriding within debounce time

disabled

☐ Disables the device (excludes device from network scans, availability and group state updates)

filtered_attributes

[+] [✓] Filter attributes with regex from published payload.

filtered_cache

[+] [✓] Filter attributes with regex from being added to the cache, this prevents the attribute from being in the published payload when the value didn't change.

filtered_optimistic

[+] [✓] Filter attributes with regex from optimistic publish payload when calling /set. (This has no effect if optimistic is set to false).

Settings Tab: Device-level settings including disable option

living_room_presence

```
{
    "battery": 100,
    "illuminance": 1528,
    "indicator": "OFF",
    "linkquality": 94,
    "motion_detection_mode": "only_pir",
    "motion_state": "small",
    "presence": true,
    "fading_time": null,
    "motion_detection_sensitivity": null,
    "static_detection_distance": null,
    "static_detection_sensitivity": null
}
```

State Tab: JSON payload showing sensor state and parameters

Configurable Parameters

Parameter	Range	Unit	Description
Fading Time	0-28800	seconds	Presence keep time
Static Detection Distance	0-6	meters	Radar detection range
Static Detection Sensitivity	0-10	x	Radar sensitivity multiplier
Indicator	OFF/ON	-	LED indicator mode
Motion Detection Mode	only_pir / pir_and_radar / only_radar		Detection method
Motion Detection Sensitivity	0-10	x	PIR/motion sensitivity

Sample JSON State Payload

```
{ "battery": 100, "illuminance": 1528, "indicator": "OFF", "linkquality": 94, "motion_detection_mode":
"only_pir", "motion_state": "small", "presence": true, "fading_time": null,
"motion_detection_sensitivity": null, "static_detection_distance": null,
"static_detection_sensitivity": null }
```
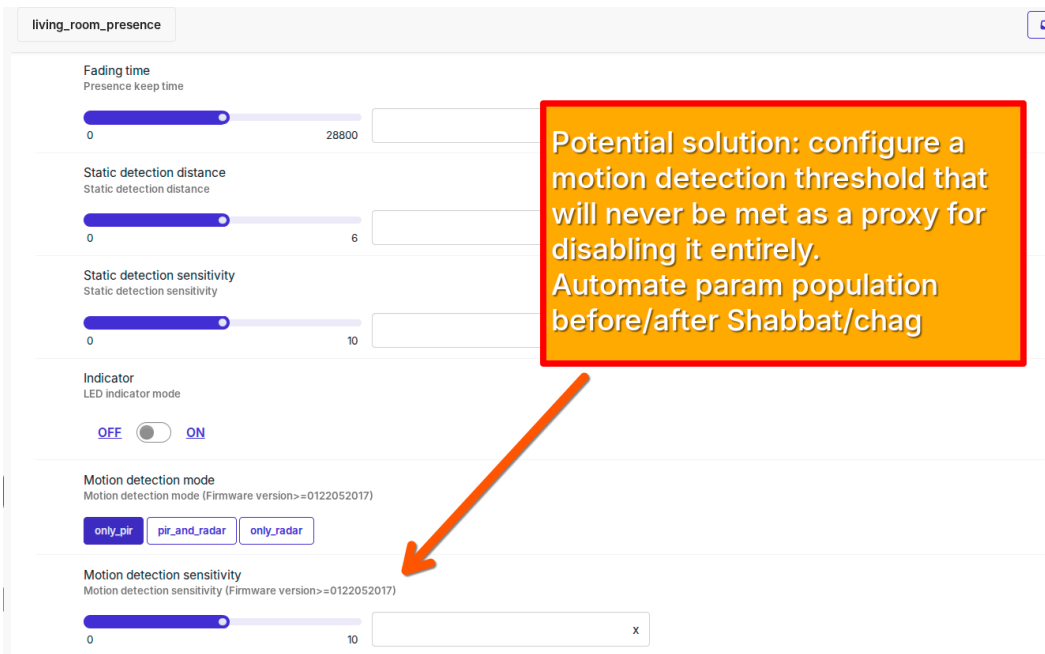
Potential Shabbat Solution: Sensitivity Threshold Workaround

> **Disclaimer:** This is a theoretical technical approach only. It has NOT been tested to confirm effectiveness, and no halachic determination has been made regarding whether this approach is permissible or advisable. Consult with a qualified posek before implementing any Shabbat automation strategy.

The Concept

Since this sensor does not have a true 'disable' option, one potential workaround is to set the detection thresholds to values that would effectively prevent any detection from occurring.

Key Observation: The Z2M interface allows toggling between PIR and radar modes, but does NOT provide an option to disable detection entirely.

Annotated screenshot showing potential Shabbat solution: configure thresholds that won't be met

Proposed Settings (Pre-Shabbat)

Parameter	Normal Value	Shabbat Value	Effect
Static Detection Distance	3-6 m	0 m	Radar won't detect at any distance
Static Detection Sensitivity	5-8x	0x	Radar sensitivity at minimum
Motion Detection Sensitivity	5-8x	0x	PIR sensitivity at minimum

Sample Home Assistant Automation

UNTESTED - Conceptual only

```
automation: - alias: "Presence Sensor - Pre-Shabbat Disable" trigger: - platform: state entity_id:
binary_sensor.shabbat to: 'on' action: - service: mqtt.publish data: topic: "zigbee2mqtt/living_room_presence/set"
```

payload: | {"static_detection_distance": 0, "static_detection_sensitivity": 0, "motion_detection_sensitivity": 0} -
alias: "Presence Sensor - Post-Shabbat Enable" trigger: - platform: state entity_id: binary_sensor.shabbat to: 'off'
action: - service: mqtt.publish data: topic: "zigbee2mqtt/living_room_presence/set" payload: |
{"static_detection_distance": 4, "static_detection_sensitivity": 6, "motion_detection_sensitivity": 6}

Critical Unknowns

Technical Questions (Require Testing)

- Does sensitivity=0 actually prevent detection?
- Does distance=0 work as expected?
- What about the PIR sensor at minimum sensitivity?
- Do settings persist across power cycles?
- Is there latency in applying settings?

Halachic Questions (Require Rabbinic Consultation)

- Is 'effectively disabled' sufficient?
- What if the settings don't fully prevent detection?
- Is pre-Shabbat automation problematic?
- Grama considerations if sensor is 'armed' at 0 sensitivity

Alternative Approaches

- **Physical switch:** Install on USB power supply for manual disconnect before Shabbat
- **Removable batteries:** Remove before Shabbat (impractical for multiple sensors)
- **Disable automations only:** If sensor state changes without resulting actions are permissible