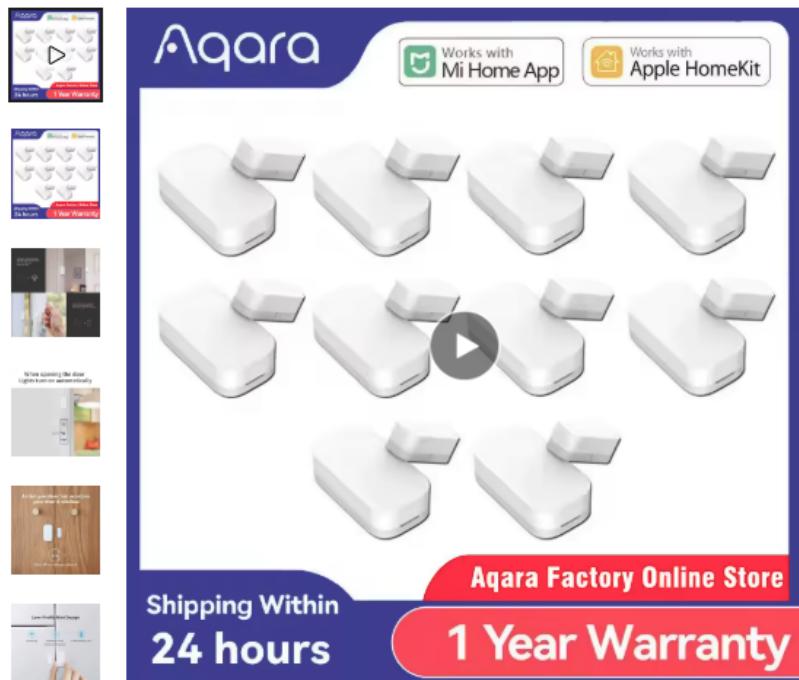# Door/Window Contact Sensor (Intrusion Sensor)

Smart Home Halacha Project - Hardware Documentation

Overview

This document provides technical specifications and Zigbee2MQTT (Z2M) configuration details for **Zigbee door/window contact sensors**, commonly used for intrusion detection in smart home setups. The examples shown include the popular **Aqara MCCGQ11LM** and similar **Tuya TS0203** models.

Product Images (AliExpress Samples)

Note: These images are representative examples from AliExpress listings. Actual products may vary by seller.

Aqara door/window sensors - works with Mi Home and Apple HomeKit

Low-Profile Mini Design: No Wiring, Installation Free, 2-Year Battery Life

Technical Specifications

Aqara MCCGQ11LM

Parameter	Value
Model	MCCGQ11LM
Battery	CR1632 (included)
Wireless Protocol	Zigbee
Dimensions	41 x 22 x 11 mm (1.61 x 0.87 x 0.43 in.)
Maximum Detection Distance	22 mm
Operating Temperature	-10C to +45C (14F to 113F)
Operating Humidity	0-95% RH, non-condensing
App Support	Apple Home (iOS 10.3+), Aqara Home, Mi Home

Tuya TS0203 (Alternative)

Parameter	Value
Zigbee Model	TS0203
Manufacturer	_TZ3000_oxslv1c9
Type	Door/window sensor
Protocol	Zigbee 3.0

Operating Principle

Door/window contact sensors use a **magnetic reed switch** mechanism:

- **Main Unit:** Contains the reed switch and Zigbee radio
- **Magnet:** Small magnetic piece attached to the moving part (door/window)
- **Detection:** When magnet is near (door closed), circuit is closed; when separated (door open), circuit opens
- **Detection Distance:** Typically 15-22mm maximum gap for reliable detection

Sensor States

Physical State	Sensor Reading	Contact Value
Door/Window Closed	Magnet Near	true (Closed)

| Door/Window Open | Magnet Far | false (Open) |

Zigbee2MQTT Integration

Device Identification (Tuya TS0203)

Field	Value
Zigbee Model	TS0203
Description	Door/window sensor
Manufacturer	Tuya
MQTT Topic	zigbee2mqtt/[device_name]
Support Status	Supported: native

Exposed Parameters

Parameter	Type	Description
Contact	Boolean	Indicates if contact is closed (true) or open (false)
Battery	Percentage	Remaining battery (may take up to 24 hours to report)
Voltage	Integer (mV)	Battery voltage in millivolts
Tamper	Boolean	Indicates if device has been tampered with
Link Quality	Integer (lqi)	Zigbee signal strength
Battery Low	Boolean	Low battery warning flag

Sample JSON State Payload

```json
{ "battery": 93, "battery_low": false, "contact": true, "linkquality": 131, "tamper": false, "voltage": 2600 }
```

Z2M Interface Screenshots

About Tab: Device identification (TS0203), battery status, MQTT topic

Exposes Tab: Contact state, battery %, voltage, tamper status, link quality

intrusion_1

ⓘ 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: Standard Zigbee device settings (debounce, disable, filter options)

intrusion_1

Empty exposes definition

Settings (Specific): Empty - no device-specific settings available

intrusion_1

```
{
    "battery": 93,
    "battery_low": false,
    "contact": true,
    "linkquality": 131,
    "tamper": false,
    "voltage": 2600
}
```

State Tab: Raw JSON payload showing current sensor state

Halachic Considerations

Key Differences from Presence Sensors

Unlike mmWave/PIR presence sensors, door/window contact sensors have significant differences relevant to halachic analysis:

- **Passive Detection:** The sensor doesn't actively scan - it only detects the magnetic field state
- **Binary State:** Simple open/closed, no complex processing
- **No Disable Option:** Cannot be 'disabled' via software - the reed switch always responds to the magnet
- **Direct Physical Causation:** Opening a door directly causes the sensor state change (not grama)

The Core Question

When a person opens a door on Shabbat, and a contact sensor detects this:
- Is the person considered to have 'done work' by changing an electrical state?
- Does it matter if the sensor change triggers an automation vs. simply being logged?
- Is the act of opening the door (permitted) separable from the sensor detection (potentially problematic)?

Possible Approaches

- **Disable Automations:** Keep sensor active but disable all Shabbat automations
- **Physical Removal:** Remove sensor batteries before Shabbat
- **Z2M Disable:** Use the 'disabled' setting to exclude from network
- **Accept Passive Monitoring:** If no actions are triggered, some may permit passive state logging

> **Important:** These are technical options only. Consult a qualified posek for halachic guidance.

Comparison: Door Sensor vs. Presence Sensor

Aspect	Door/Window Sensor	Presence Sensor
Detection Method	Magnetic reed switch	mmWave radar + PIR
Active/Passive	Passive	Active scanning
Configurable Sensitivity	No	Yes
Can Be "Disabled" via Software	Only via Z2M exclusion	Potentially via threshold settings
Detection Trigger	Physical movement of door	Human presence/motion
Causation Type	Direct	Potentially grama
Battery Life	2+ years	Variable