



Motion Sensor

Reference Manual

TBMS100-915
TBMS100-868

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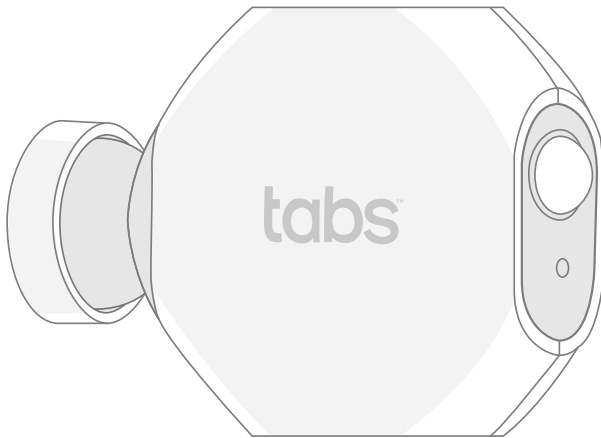
1. Description

The Tabs Motion Sensor utilizes LoRaWAN connectivity to communicate the presence or not of a person. The intended use is to place the sensor with a good view of a room to determine if there is motion in the room or not.

The sensor is composed of a Passive Infrared Detector and Fresnel Lens. The main body contains the active electronics to measure movement and transmit any changes to a LoRaWAN network.

2. Specifications

2.1 Mechanical



2.2 Environmental

Temperature	-20°C to +50°C
IP Rating	IP 50 equivalent

2.3 Radio

Frequency	Either 863–870MHz for Eu models and 902–928MHz for North America
Tx Power	+19dBm conducted
Rx Sensitivity (Conducted)	-140dBm
Antenna Gain	-2dBi Peak, -5dBi Avg

2.4 Certifications and Conformity

FCC ID: 2AMUGTBSP100
IC: 22980-TBSP100
CE
ROHS REACH

2.1.1 Sensor

Length x Width x Height	50mm x 20mm x 50mm without wall mount
Weight	30g without battery 40g with battery
Sensor	Dual Passive Infrared detectors and Fresnel Lens with 123° horizontal and 93° vertical view

2.5 Power

Source	3.6V ½ AA Li-SOCI2 1200mAh battery
Maximum Voltage	3.6V
Minimum Voltage	3.1V
Current	135mA maximum/5uA minimum

2.6 User Interface

LEDs	One blue LED
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2.7 Additional Features

PCB Temperature
Battery Monitoring

3. Operation

3.1 Power On Reset

Anytime the device power drops below 2.8V the device will enter a Power On Reset (POR) when greater than 2.8V is restored. Immediately after the POR the device will attempt to enter installation mode. After a 30 second duration the device will move to default operation.

3.2 Transport Mode

They are shipped with a plastic battery isolation tab that must be removed to enable operation.

3.3 Installation Mode

The device shall enter installation mode after being commanded by the network and remain in installation mode until commanded by the network. While in installation mode the device will turn on the LED whenever motion is detected.

3.4 Default Operation

While in default operation the device will immediately send a message any time there is a transition from vacant to occupied state or vice-versa. Additionally, the device will send a message every 10 minutes while in the occupied state and every 1 hour while in the vacant state.

4. Messages

LoRaWAN Packets for this device use port 102.

4.1 Status

4.1.1 Common Fields

Status[7:0]

{Fault3, Fault2, LED1, LED0, Fault1, Fault0, BTN1, BTN0}

- Nominally Fault0 indicates no network time available
- Nominally Fault1 indicates loss of primary sensor function
- Nominally Fault2 indicates loss of secondary sensor function
- Nominally Fault3 indicates loss of network connectivity

Battery[7:0]

LoRaWAN Decode

- 0 => Device is charging or line powered
- 1 to 254 => device level, 1 = minimum and 254 = fully charged
 - Further encode
 - [7:4] = predicted battery life percentage, 15 = New, 0 = Replace
 - [3:0] = BatteryVoltage — 2.5V, in 0.1V steps, So 3.1V = 6
- 255 => Device could not measure battery — possible Fault

Temperature[6:0]

Unsigned Integer (0 to 127) Temperature = value - 32, measurement range -32 to 95°C

4.1.2 Triggers

Packet Triggers: 60 minute inactivity, Occupancy Detection, Every 10 minute during occupancy, 20 minute of vacancy

4.1.3 Payload

Port	102
Payload Length	8 bytes

Byte	0	1	2	3	4	5	6	7
Field	Status	Battery	Temp	Time		Count		

4.1.3 Payload (cont.)

Status	Sensor status	
	Bit [0]	1 – occupied, 0 – free
	Bits [7:1]	RFU
Battery	Battery level	
	Bits [3:0]	unsigned value v , range 1 – 14; battery voltage in V = $(25 + v) \div 10$.
	Bits [7:4]	unsigned value κ , range 0 – 15; remaining battery capacity in % = $100 \times (\kappa \div 15)$.
Temp	Temperature as measured by on-board NTC	
	Bits [6:0]	unsigned value τ , range 0 – 127; temperature in °C = $\tau - 32$.
	Bit [7]	RFU
Time	Time elapsed since last event trigger	
	Bits [15:0]	unsigned value in minutes, range 0 – 65,535.
Count	Total count of event triggers	
	Bits [23:0]	unsigned value, range 0 – 16,777,215. Note: This value is not stored persistently on the device, and may reset whenever the device is power-cycled or rebooted.

4.2 Command

RESERVED.