Door & Window Sensor

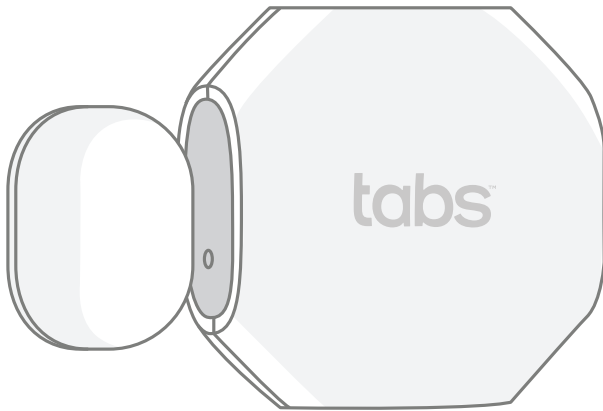Reference Manual

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1. Description

The Tabs Door & Window sensor utilizes LoRaWAN connectivity to communicate the proximity or not of a magnet. The intended use is to place the sensor and magnet on separate elements of a door or window to determine if the door or window is open or closed.

The sensor is composed of two parts. The main body contains the active electronics to measure magnetic fields and transmit any changes to a LoRaWAN network. The second part is a permanent magnet of sufficient field strength to be detected by the Hall Effect sensor on the main body.

2. Specifications

2.1 Mechanical

2.1.1 Sensor

Length x Width x Height	50mm x 20mm x 50mm
Weight	30g without battery 40g with battery

2.1.2 Magnet

Length x Width x Height	31mm x 20mm x 20mm
Weight	12g

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

2.5 Power

Source	3.6V ½ AA Li-SOCl2 1200mAh battery
Maximum Voltage	3.6V
Minimum Voltage	3.1V
Current	135mA maximum/5uA minimum

2.6 User Interface

LEDs	One blue LED
Sensor	Hall Effect 14 Gauss trigger typical

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. After a POR the device will wait up to 30 seconds before entering 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 for 3 minutes. While in installation mode the device will flash the LED 3 times within 500ms for every transition between sensing states, i.e. whenever the device detects changes between open and closed.

3.4 Default Operation

While in default operation the device will immediately send a message any time there is a transition from Open to Close or vice-versa. Additionally, the device will send a message anytime it has been inactive for 6 hours.

4. Messages

LoRaWAN Packets for this device use port 100.

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
    - Futher 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: 360 minute inactivity, Switch Open, Switch Close

4.1.3 Payload

Port	100
Payload Length	8 bytes

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

Status	**Sensor status**	
	Bit [0]	1 – open, 0 – closed
	Bits [7:1]	RFU

Battery	**Battery level**	
	Bits [3:0]	unsigned value ν, range 1 – 14; battery voltage in V = $(25 + \nu) \div 10$.
	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 = τ - 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.