Wireless Dry Contact Sensor

User Guide

TABLE OF CONTENTS

1. QUICK START 2
2. OVERVIEW 2
2.1. Sensor Overview 2
2.2. Revision History 3
2.3. Document Conventions 3
2.4. Part Numbers 3
3. TECHNICAL SPECIFICATIONS 4
3.1. Absolute Maximum Ratings 4
4. BATTERY LIFE 4
5. TEST MESSAGES 5
6. MESSAGE PROTOCOL 5
6.1. Common Messages 6
6.2. Uplink Messages 6
6.3. Downlink Messages

1. QUICK START

To start using your sensor, simply go to web interface of the sensor unit:

The sensor configuration, message monitoring, and setting up alerts is usually self-explanatory through the user interface. For further explanations of any sensor features, you may refer to this user guide.

2. OVERVIEW

2.1. Sensor Overview

The wireless sensors designed and manufactured and provide full sensor to cloud solutions for Internet of Things (IoT) applications. The wireless dry contact sensor detects a connection between two wires. When the wires are either shorted or opened, an alert is sent over the wireless network. Versions of the sensor support the major LPWAN standards such as Sigfox, LoRa/LoRaWAN, and NBIoT.

Features include:

- Built-in radio that talks directly with the wireless network. Standards include:
  - Sigfox
  - LoRa/LoRaWAN
  - NBIoT
- Two types of tamper detection: enclosure tamper and wall mount tamper
  - Enclosure tamper detects if the packaging of the sensor itself is opened or broken
  - Wall mount tamper detects if the sensor has been removed from the wall or mounting point
- 20,000-200,000+ transmissions on a single battery and a 5-10 year battery life depending on usage (see Battery section)
- Fully integrated internal antenna
- Over the air sensor configuration in the field
- Automatic low battery reporting and supervisory messages

2.2. Revision History

2.3. Document Conventions

Table 2 Document Conventions

Font / Icon	Meaning
	Important notes
	Warnings and cautions

3. TECHNICAL SPECIFICATIONS

3.1. Absolute Maximum Ratings

Table 4 Absolute Maximum Ratings

Parameter	Rating	Units
Operating ambient temperature (indoor version)	-30 to +70	°C
Operating ambient temperature (outdoor version)	-40 to +70	°C
Storage ambient temperature	-40 to +100	°C

4. BATTERY LIFE

The sensor uses a lithium non-rechargeable battery and is capable of 20,000 to 200,000+ total messages depending on the wireless standard and usage. For an accurate estimate of battery life, please refer to the "Sensor Battery Estimator.xlsx" spreadsheet on the Controlledcare website. This spreadsheet combines usage information such as average number of messages per day and estimates the battery life for a particular sensor.

Refer to the spreadsheet "Sensor Battery Estimator.xlsx" on our website for specific battery life estimates.

The power required for a message transmission is much greater than the "sleep current" (the power consumed when the sensor is inactive) for high power radio technologies such as Sigfox and LoRaWAN. This means that the battery life for most sensors is primarily dependent on the number of transmissions per day.

Different battery types will deplete over time with different voltage profiles. For instance, a lithium battery will maintain a relatively high voltage for the life of the battery and then experience a rapid drop near the end, whereas an alkaline battery will experience a more gradual

reduction in voltage over time. sensors are shipped with lithium batteries, and these are recommended when the battery needs to be eventually replaced.

Temperature also plays a role in battery life. The battery life estimates in the online spreadsheet assume room temperature, but temperatures close to the maximum and minimum ratings will have a negative impact on battery life. For example, battery voltage tends to be lower in cold temperatures and the internal circuitry needs a certain minimum voltage to operate properly before it will shut down. Thus, battery life will tend to be shorter when running the sensor in cold environments.

Battery voltage will be lower in cold temperatures and thus battery life will be reduced in cold environments.

The battery voltage is reported by the supervisory messages as well as a low battery indicator. See the section on Message Protocol for more detail.

5. TEST MESSAGES

The sensor can be triggered to send test messages by placing a magnet next to the triangular notch on the side of the sensor. There is a small magnetic Hall effect sensor that will detect the presence of a magnet and send a message. This can be used for diagnostic purposes to ensure the sensor is within range and connected to the network.

6. MESSAGE PROTOCOL

This section defines the protocol and message definitions for the sensor.

Through web-based console go to configure and monitor sensors. Usage of this console is highly recommended for most customers rather than implementing the protocols defined in this section.

6.1. Common Messages

There are common messages across all wireless sensors that are defined in the document "Common Sensor Messages"

Refer to the document "Common Sensor Messages" for definitions of all common messages. Common messages are not defined in this document.

Common messages include basic error messages, tamper, supervisory, and downlink ack. It is important to refer to that document prior to decoding the messages defined in this section.

6.2. Uplink Messages

The uplink message (sensor to web application) specific to the sensor is defined in following table. The common uplink messages are not included in this section (see common messages document).

Table 5 Uplink Message 0x07: Contact Event

Event Payload	Description
0x00	Contacts shorted (connected)
0x01	Contacts opened (disconnected)

6.3. Downlink Messages

The downlink message (web application to sensor) specific to the sensor configuration is defined in following table. The common downlink messages are not included in this section (see common messages document).

Table 6 Downlink Configuration Message 0x07

Bytes	Description
0	Disable events (see the table Disable Events Bit Definitions)
1-2	Contacts shorted (connected) hold time
3-4	Contacts opened (disconnected) hold time

The hold times are 16-bit values that represent the amount of time the sensor must be held in a particular position (connected or disconnected) before a message is sent.

The hold time values range from 1-65535 and are represented in 250ms increments. This gives the hold times a range of 250 milliseconds – 4.5 hours. If the hold time is 0, the feature is disabled and an alert will be sent any time the input changes.

The table below describes the disable bit definitions which can selectively disable alerts for one position or another.

Table 7 Disable Events Bit Definitions

Bits	Description
7:2	Not used
1	Disable contact open (disconnected) events only
0	Disable reporting for contact short (connected) events only

7. MECHANICAL DRAWINGS

The mechanical drawings provided in this section are for the main body of the sensor. All dimensions are inches unless otherwise noted.

7.1. INDOOR SENSORS