Wireless Safety Door Sensor V2

User Manual

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CONVENTIONS USED THROUGHOUT THIS MANUAL

|	
WARNING	Items with this label must be carefully considered to avoid any damage to system components.
NOTE	Items with this label should be considered for best results.

1 Device Overview

The BTR Wireless Safety Door Sensor system is designed to work with industrial door controllers, external hosts and remote hosts for trouble free activation and safety. It is based on our proven SeyWave® Technology for low power consumption and reliable two-way RF communication. This product is an FCC and IC licensed product operating in the 2.4 GHz spectrum for global compliance.

The Door Sensor can connect to any Remote Host, External Host or door controller enabled with the SeyWave® system. If the door sensor is connected to a host, the information is passed on to the controller through the host. The sensor passes the status signal of the wired reversing safety edge and auxiliary input (i.e. breakaway switch) to the paired controller or host.

- Battery powered with low power consumption
- Replaceable 3.6V AA lithium battery
- Adjustable impact sensitivity via DIP switches
- 150ft line of sight capability
- IP65 water and dust tight housing
- Built for harsh inside and outside environments found in industrial facilities
- Terminal blocks provided for easy connection
- Easy one button pairing
- Activity and Fault LED indication

1.1 Basic Interface Diagram
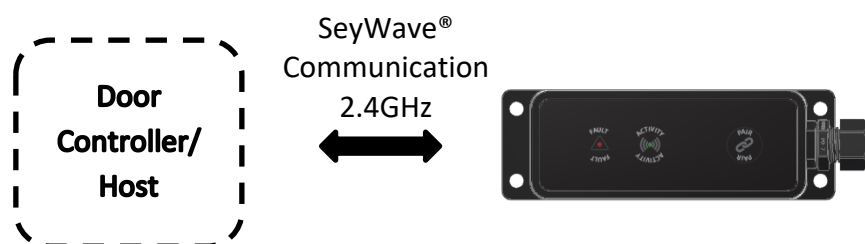
1.2 Product and Operating Characteristics

Standard Operating Conditions (unless otherwise stated)				
Characteristic	**Min**	**Typical**	**Max**	**Units**
Supply Voltage	3.0	3.6	3.6	VDC
Operating Current		20		mA
RF Frequency		2.4		GHz
Range			150[1] (45)	Ft (meters)
Weight		3.23 (91.5)		Ounces (Grams)

[1] Range between the controller/host and the sensor is assumed as Line of Sight. Any objects within the direct path between the two devices will/can diminish the range and may cause potential connection issues.

Input Specifications		
	Type	Monitored
Safety Edge	N.O. Secure (8.2kΩ resistor)	Yes
Auxiliary	N.O.	No

Environmental Specifications	
Operating Temperature	-13°F to 140°F (-25°C to 60°C)
Ingress Protection	IP65

NOTE	This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

WARNING	Input connections must be of the dry (non-powered) type. The common for each switch is taken from the Sensor Module.

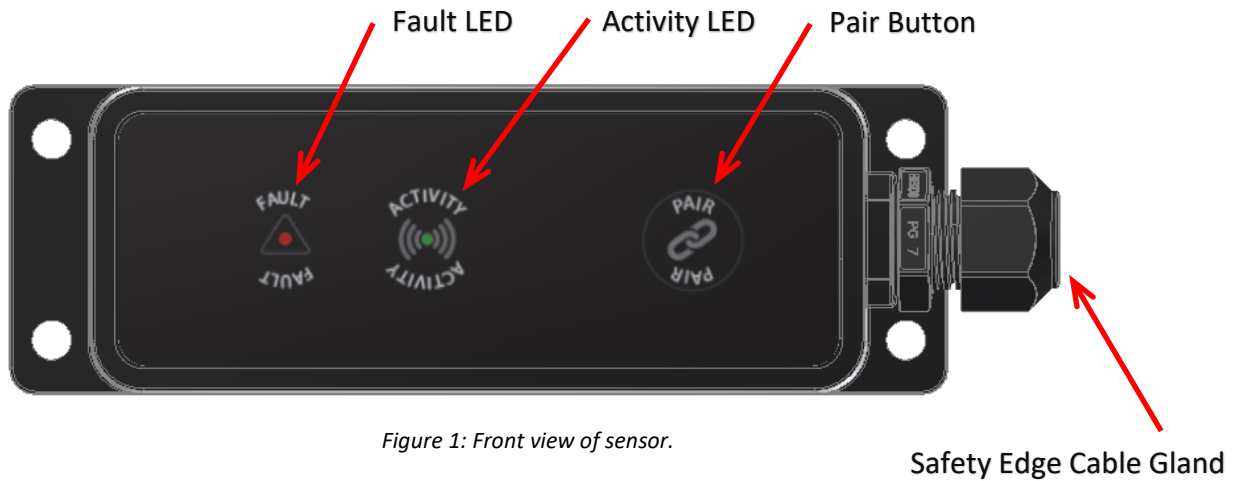| WARNING	Operating the Door Sensor outside of these specified limits may cause damage and will VOID the Warranty.

1.3 Device Functions

Fault LED   Activity LED   Pair Button

Figure 1: Front view of sensor.

Safety Edge Cable Gland

Battery

Figure 2: Back view of sensor.

Safety Edge Input

Auxiliary Input

DIP Switches

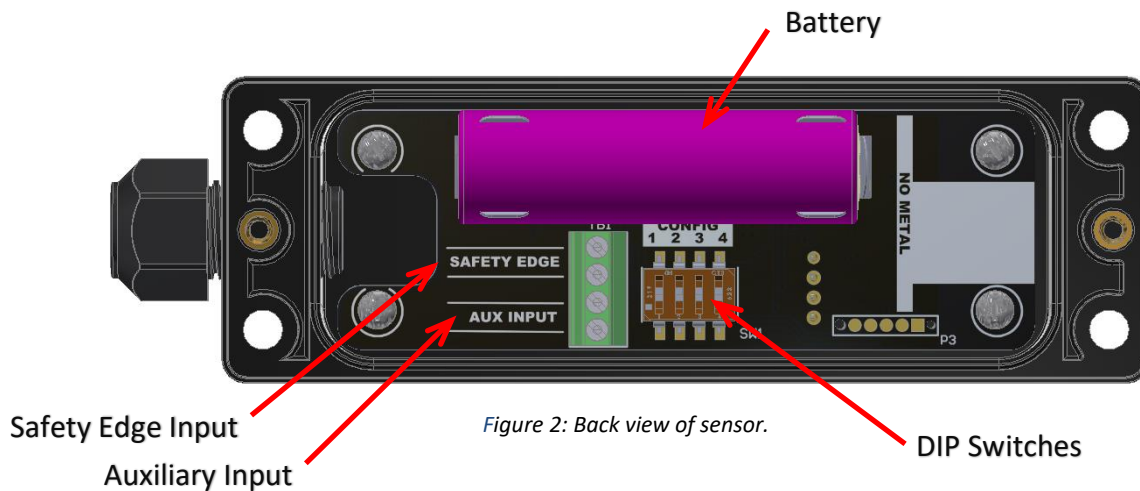|	
Fault LED	Indicates a fault in the door sensor or safety edge system. The type of fault is indicated by the number of flashes. See Faults section for explanation of specific faults.
Activity LED	Indicates the current communication status of the door sensor with the controller/host.
Pair Button	A button used to connect the door sensor with the controller/host.
Safety Edge Cable Gland	The safety edge cable is fed through the gland for a seal tight connection with the sensor.
Battery	3.6V AA Lithium battery powering the sensor.
Safety Edge Input	Input used to connect the safety edge to the sensor.
Auxiliary Input	Input used to connect an auxiliary safety device. Most commonly a breakaway switch.
DIP Switches	Switches used to configure settings of the sensor.

2 Installation

This section covers the Wireless Safety Sensor installation.

- Section 2.1 Mounting

NOTE	The sensor should always be mounted to a solid surface, with the pair button and LEDs away from the mounting surface. Mounting the sensor in any other orientation then intended will diminish the signal range and may cause loss of communication.

- Section 2.2 Input Wiring
- Section 2.3 Power Up

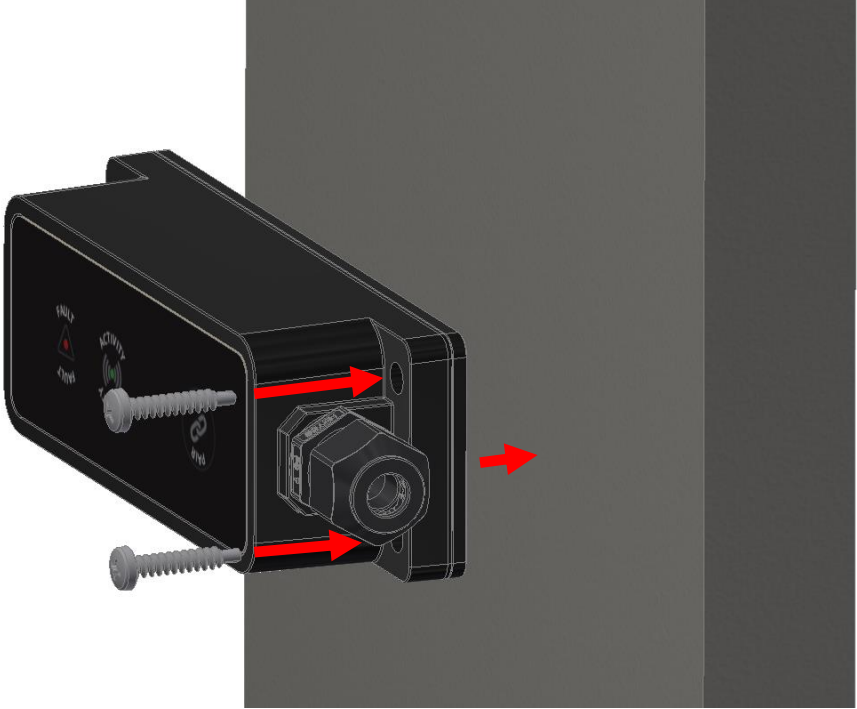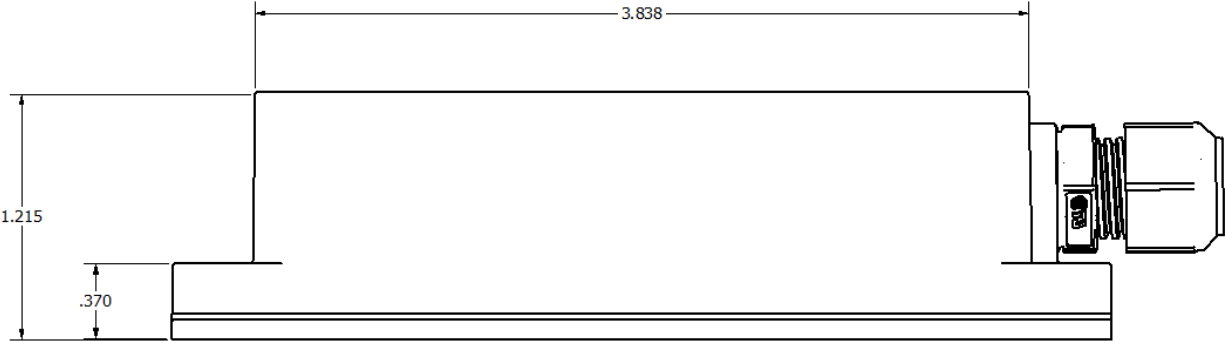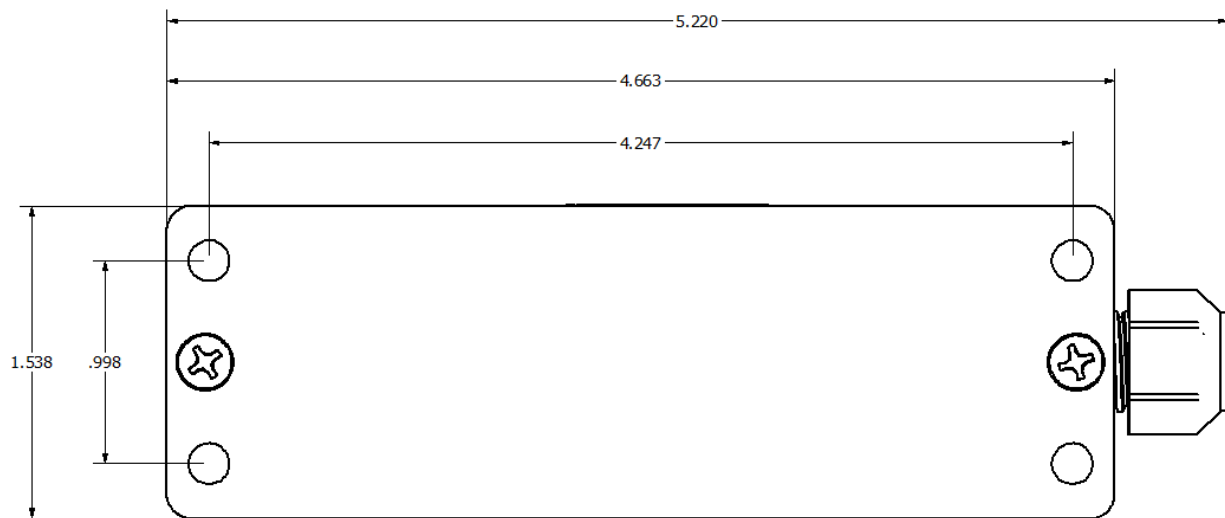| WARNING	• Remove the battery before making any connections to the sensor. • Stay within specified operating conditions as shown in section 1.2 on page 5. • Failure to follow the above may cause damage to the Door Sensor.

2.1 Mounting

Figure 3: Correct mounting orientation

Mounting Hole	
Mounting Hole Size	0.20 in (0.5 cm)
Maximum Screw Size	#10
Max Screw Shaft Diameter	0.19 in (0.48 cm)

| Cover Screws	
Torque Rating	5 lb-in (0.56 Nm)

NOTE	The sensors longest edge should be mounted horizontally, if possible. If mounting vertically the cable gland should be pointing down to avoid any accumulation of water on the cable gland and causing any seepage into the sensor.

NOTE	• Do not mount the Wireless Safety Sensor in close proximity to other 2.4 GHz devices such as Wi-Fi routers or cordless telephones. • Contact BTR Controls if you are unsure of your installation environment.

| NOTE	The sensor should always be mounted to a solid surface, with the pair button and LEDs away from the mounting surface (see Figure 3). Mounting the sensor in any other orientation then intended will diminish the signal range and may cause loss of communication.

2.2 Input Wiring

Ø.240
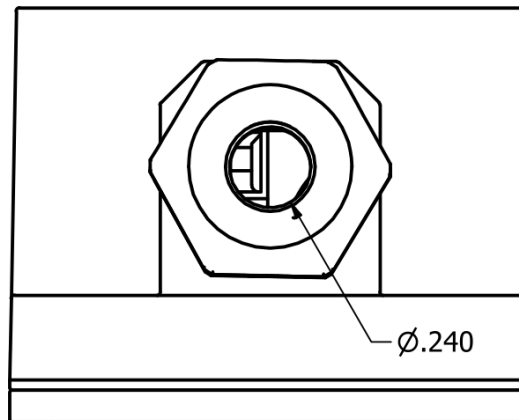
Wiring	
Cable Gland Hole Size	0.240 in (0.61 cm)
Cable Size	0.12 in - 0.24 in (0.29 cm – 0.61 cm)
Minimum Cable Clearance	1 in (2.5 cm)
Terminal Block Screw Torque	1.9 – 2.2 lb-in (0.22 Nm - 0.25 Nm)

Wire the safety edge to the terminal block labeled "SAFETY EDGE", the safety edge must have a built-in safety 8.2kΩ resistor.

Optionally, wire the auxiliary input into the terminal block labeled "AUX INPUT". This input is commonly used for door breakaway switch.

- Safety Edge – used to connect a monitored safety edge. Only a normally open safety edge with a built in 8.2kΩ resistor can be used. In the event that a safety edge is not connected or becomes damaged, the sensors fault light will flash. See the Faults section for details on faults.
  If the safety edge is activated, the sensor sends a message to the host immediately.

- Aux Input – the auxiliary input, when active, relays a message to the host immediately that the input is ON. This input will stop the operation of the door. The input can be used to stop the door for a variety of purposes such as a door breakaway.
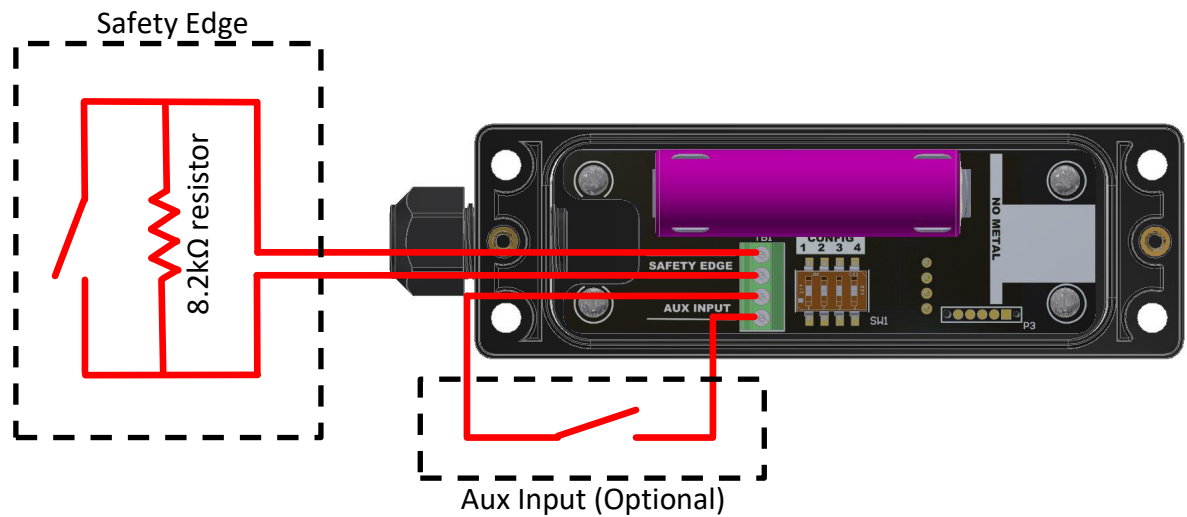
2.3 Power Up

WARNING	Ensure that all connections have been made according to section 2.2 before inserting the battery.
NOTE	The Door Sensor has been shipped from the factory without being paired to any controllers/hosts.

1) Check all connections to the door sensor.
2) Insert the battery or remove battery tab, if installed.
3) Both the fault and activity LED should flash briefly to indicate that the sensor has powered on.
4) The sensors activity LED should flash rapidly 3 times every 10 seconds to indicate that it is not communicating with a controller/host. If the sensor is moved, it will also flash 3 times to indicate it has not communicated successfully.
5) The sensor is ready to be paired with a controller/host.

3 Pairing

This section provides information on pairing the sensor with a controller or host.

3.1 Pairing

The sensor is equipped with a pair button on the front face of the sensor. The pair button is used to pair the sensor with a controller or host to establish a bond for communication.

1. With the sensor mounted and wired. Place the controller or host into pairing mode. See their respective manuals for instructions on how to go into pairing mode.
2. Momentarily press the **Pair** button on the Wireless Safety Door Sensor.
3. The controller or host will indicate if the pairing was successful. The Activity LED on the sensor should also flash once when paired with the controller/host to indicate successful connection.
4. If the pairing process is not successful, the Fault LED will flash 5 times.

4   Settings

The sensor is equipped with four DIP switches used to change settings of the sensor.

DIP Switch	Function
1	Sensor Sensitivity
2	Sensor Sensitivity
3	Communication Rate
4	Not Used
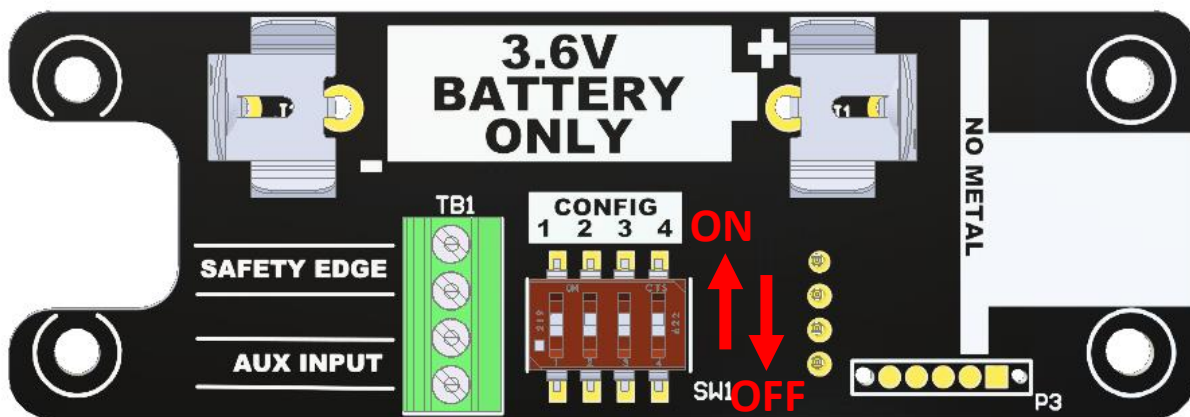
Device Sensitivity

The DIP switches are used to set the sensitivity of the sensor, they may be changed at any time. By changing the sensitivity settings, the sensors impact sensing will be affected in the horizontal orientation. This direction typically, when mounted correctly, is straight into the door. The sensitivity refers to the impact level of the device at which it will activate. (ex. at High sensitivity, the sensor will activate easily and will send notification to the host more often than when set to Low)

Sensitivity	Dip Switch 1	Dip Switch 2
Off	OFF	OFF
Low	ON	ON
Medium	OFF	ON
High	ON	OFF

Communication Rate

The Communication Rate DIP switch is used to toggle between two modes; Motion and Beacon. When the DIP switch is turned ON, the sensor goes into Beacon mode. In this mode, the sensor turns off the motion detection and communicates constantly with the host. Approximately every 0.4 seconds. This feature, for example, can be used in heavy style doors where the motion is not easily detectable by the sensor. The Activity LED does not flash when in Beacon mode.

When the DIP switch is set to the OFF position, the sensor will be in Motion mode. It will communicate with the host every time motion or impact is detected. The Activity LED will flash normally with each communication.

Mode	Dip Switch 3
Motion	OFF
Beacon	ON*

*this option available with software version 1.2.0 or higher.

5   LEDs

The sensor is equipped with two LED lights on the front face of the sensor. A green activity and red fault LED will illuminate displaying the sensors status.

- Activity LED – the activity LED will flash each time that a message is sent out to the receiver such as controller or host. It will flash once if the message has been successfully received. It will flash rapidly three times if the host did not receive the message. When the sensor is in Beacon mode (DIP Switch 3 is ON), the Activity LED will not illuminate at all.
- Fault LED – the fault LED will flash to indicate that the sensor is encountering an error. It will flash rapidly in succession and then pause for 3 seconds before flashing again. The number of flashes will indicate what type of error is being encountered. See the Faults section for details on faults.

When power is first supplied to the sensor, both the activity and fault LEDs will turn on briefly at the same time and then turn off. This indicates power is provided to the sensors electronics and the sensor was able to start successfully.

If both LEDs turn on and continue to illuminate and do not go off within a second, then an internal error has occurred during startup, see Faults section for possible solutions.

6   Operation

While the sensor is sitting idle, it will continuously monitor the movement, impact, safety edge and auxiliary input. If a change in state arises in any of the features, the sensor will communicate them immediately to the controller or host. If the sensor is set to Beacon mode, it will communicate with the controller/host continuously. Motion and Impact detection is turned off at this point and the Activity LED does not flash. If a fault occurs in the sensor or the safety edge, a message is sent to the controller/host immediately as well.

If no change in state is found and no faults occur, the sensor will send a heartbeat message every 10 seconds to update the status and notify the controller/host that it is still functioning properly.

7   Battery

The sensor is powered by a replaceable, 3.6 Volt, AA size lithium battery. In the event that the battery voltage drops below 3 Volts, the sensors fault light will flash once, indicating that the battery requires replacement.

To replace the battery, remove the sensor from its mounting surface. Remove the 2 screws on the back holding the cover and lift up the cover. Replace the battery with a new 3.6V AA Lithium battery, install the cover and mount the sensor back on the mounting surface. Make sure the gasket in the cover is present in the channel correctly.

NOTE	Use **ONLY 3.6V Lithium** battery, using a conventional 1.5V AA battery will not operate the sensor.

8   Faults

The fault LED on the front of the sensor will flash in quick succession and then pause for 3 seconds. It will repeat this process for as long as the fault is present. The LED will stop flashing if the fault has been corrected. See table below for details on the type of fault for each set of flashes.

Flash Rate	Description
1 flash	Low Battery
2 flashes	Safety Edge Fault
5 flashes	Failed pair attempt with controller/host
Activity and Fault on constantly	Internal Error

9   Possible Troubleshooting

Symptom	Diagnosis	Solution
No Communication	Sensor is not paired	Pair the sensor to the host.
	Sensor too far away from host	Mount the sensor closer to the host or use an external host to increase range.
	Mounted orientation is incorrect	Mount the sensor correctly, the sensor should always be mounted with the Pair button and LEDs away from its mounting surface.
LEDs do not light up	Sensor battery is dead	Replace the battery.
	(Activity LED only) The sensor is set to Beacon mode (DIP switch 3), the LED does not flash when in this mode. (this mode available with software version 1.2.0 or higher)	Sensor is functioning correctly.
Fault LED flashes once	The sensors battery is low	Replace sensor battery.
Fault LED flashes twice (safety edge error)	The safety edge is not connected to the sensor	Connect a safety edge to the safety edge terminals.
	The safety edge wiring is damaged	Replace the safety edge.
	Wrong safety edge installed	Connect correct safety edge (must be a normally open with built in 8.2kΩ safety resistor)
Both Activity and Fault LED are constantly ON	An internal error has occurred	Remove battery, wait 30 seconds, re-install battery, if LEDs continue to illuminate for longer than 1 second, replace sensor.
Activity LED flashes three times	Host not within range	Mount sensor closer to the host.

(no communication with host)	Sensor not paired	Pair the sensor.
	Host is not ON	Turn on the host.
Sensor will not pair	Sensor not within range	Bring sensor closet to host and try pairing again.
	Host not in pairing mode	The host must be placed in pairing mode first, make sure the host is broadcasting a pairing signal before pressing the pair button.
	Too close to other 2.4GHz devices	Move sensor away from other 2.4GHz frequency devices.

9.1 Technical Assistance

Contact:

BTR Controls, Inc.

1570 Todd Farm Dr.

Elgin, IL 60123

(847)608-9500

"This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation."*