MerryIoT Open/Close

(Door Window Sensor)

Reference Manual

DW10-915

DW10-868

Model Name: DW10

BQW_02_0034.002

Table of Content

1. Description....1
2. Specifications....2
2.1 Mechanical....2
2.1.1 Sensor....2
2.2 Environmental....2
2.3 Power....2
2.4 Radio....2
2.5 User Interface....2
2.6 Certifications and Conformity....2
2.7 Additional Features....2
3. Operation....3
3.1 Installation Mode....3
3.2 Default Operation....3
4. Messages....4
4.1 Status....4
4.1.1 Triggers....4
4.1.2 Uplink Payload....5
5. Battery....6
5.1 Replacement....6
5.2 Cautions....6
6. Label format information....7
6.1 Device back label....7
6.1.1 All QR code....7
6.1.2 Serial Number....8
6.1.3 Model Name....8
6.1.4 FCC ID....8
6.1.5 IC ID....8
6.1.6 Caution!....8
6.2 Packaging label....8
7. Important Product & Safety Instructions....9
8. Warnings....10
9. Notices....10
10. Cautions....11
11. Regulatory....12
11.1 Federal Communication Commission Interference Statement....12
11.2 Industry Canada statement:....12
12. Configuration Downlink Command....14
12.1 Configuration Command....14
12.1.1 Payload....14
12.2 Response Content....15
12.3 Frame Count 1 Content....15
13. BLE FOTA Downlink Command....16
13.1 Payload....16

1. Description

The MerryIoT Open/Close 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 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.

There are also vibration and tilt detection in case of tampering.
Once the event is detected, the sensor will send an uplink and keep a buzzer alarm (Optional).

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2. Specifications

2.1 Mechanical

2.1.1 Sensor

Length x Width x Height	90mm x 28mm x 40mm
Weight	51g without battery 69g with battery
Sensor	• This sensor is designed for in-home and in-building usage for consumer or facility management applications. • Tamper detection (Vibration or tilt detection) • Temperature/Humidity

2.2 Environmental

Temperature	0°C to +50°C
IP Rating	IP 40 equivalent

2.3 Power

Source	3.6V ½ AA Li-SOCI2 1200 mAH battery x2
System Maximum Voltage	3.6V
System Minimum Voltage	2.5V
Current	135mA maximum

2.4 Radio

Frequency	Either 863-870 MHz for the EU model and 902-928 MHz for North America
Rx Sensitivity (Conducted)	-140dBm
Antenna Gain(Lora)	0.61dBi Peak, -5dBi Avg
Antenna Gain(BLE)	1.51dBi Peak

2.5 User Interface

LED	One blue LED
Hall Effect 14 Gauss trigger typical	1 CM
Button	Test Button
Buzzer	78 dB, 0 cm

2.6 Certifications and Conformity

FCC	On-going
CE	On-going
IC	On-going

2.7 Additional Features

Battery Monitoring
Vibration detection (Sensitivity Level: High/Mid/Low)
Tilt detection
Environment temperature

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3. Operation

3.1 Installation Mode

- Users need to press the button over 5 seconds to activate operation into installation mode. When the Sensor tries to join the network, it will keep blinking for 3 seconds.
- Once the sensor joins the network, the LED will keep on for 3 seconds and send an uplink
- Users can press the button for over 5 seconds to try to join the network again.
- The device will send uplink three times with FW version when the device joined successfully.

3.2 Default Operation

- While in default operation the device will immediately send a message any time there is a transition and buzzer alarm (Optional) in the below event
    - Open to Close (No buzzer alarm)
    - Close to Open (Buzzer alarm)
    - Tamper detected (Vibration or tilt detected) (Buzzer alarm)
    - Button pressed (No buzzer alarm)
    - Keepalive message (No buzzer alarm)
- Users can press the button to send a test message to the network
- The device will send a message saying it has been inactive for 6 hours.
- While in default mode the device will flash the LED 3 times within 100ms only when the user presses the test button

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4. Messages

LoRaWAN Packets for this device use port 120

4.1 Status

4.1.1 Triggers

Door Window Sensor Packet Triggers:

- 360-minute inactivity
- Switch Open
- Switch Close

Vibration Trigger:

Immediately send a message

Tilt Trigger:

Immediately send a message

Button Pressed Trigger:

Immediately send a message

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4.1.2 Uplink Payload

Port	120
Payload Length	9 bytes

Bytes	0	1	2	3	4	5	6	7	8
Field	Status	Battery	Temp.	RH	Time		Count		

Status	**Sensor's status** Bit [0] 1 - open, 0 - closed Bit [1] 1 - Button pressed, 0 - Button released Bit [2] 1 - Vibration detected, 0 - No Vibration detected Bit [3] 1 - Tilt detected, 0 - No Tilt detected Bits [7:4] RFU
Battery	**Battery level** Bits [3:0] unsigned value v, range 0 – 15. battery voltage in V = (21 + v) ÷ 10. Bits [7:4] RFU
Temp	**Environment Temperature** Bits [7:0] sign integer temperature in °C -20~50 °C
RH	**Relative humidity as measured by the digital sensor** Bits [6:0] unsigned value in %, range 0-100. 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.

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5. Battery

5.1 Replacement

Use ER14250 (3.6V 1/2 AA Li-SOCI2) only.
Remove the battery cover and replace the batteries.
(cross-slot screwdriver required)

5.2 Cautions

CAUTION: Disposal of a battery (or battery pack) into a fire or a hot oven, or mechanically crushing or cutting of a battery (or battery pack) can result in an EXPLOSION!

Leaving a battery (or battery pack) in an extremely high temperature surrounding environment can result in an EXPLOSION or leakage of flammable liquid or gas.

A battery (or battery pack) subjected to extremely low air pressure may also result in an EXPLOSION or leakage of flammable liquid or gas.

Discard used batteries according to the manufacturer's instructions.

CAUTION: The unit is provided with a battery-powered circuit.

There is a danger of explosion if the battery is incorrectly replaced.

Replace only with the same or equivalent type recommended by the manufacturer.

Discard used batteries according to the manufacturer’s instructions.

Risk of Explosion if Battery is replaced by an Incorrect Type. Dispose of Used Batteries according to the Instructions.

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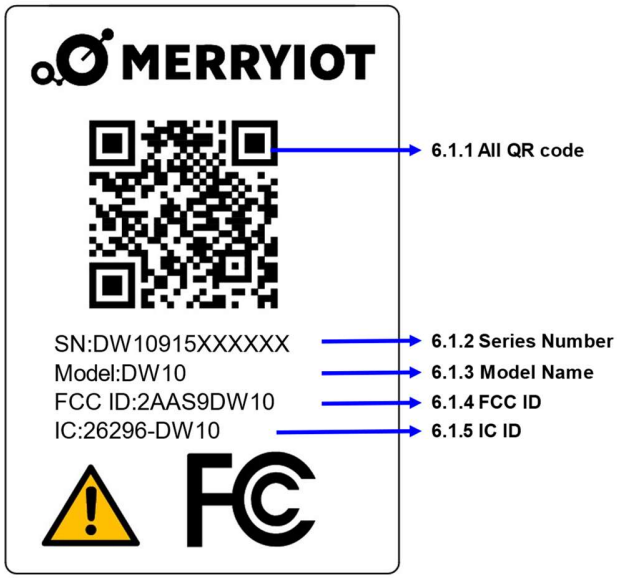
6. Label format information

6.1 Device back label



6.1.1 All QR code

URN:LW:D0: 0016160000000005:0016160000XXXXXX:01632003

The total maximum resulting character sentence is 48 alphanumeric characters long.

6.1.1.1 JoinEUI

900MHz: 0016160000000005. (US)

800MHz: 0016160000000006. (EU)

Uses a hexadecimal representation resulting in 16 characters.

6.1.1.2 DevEUI

0016160000XXXXXX.

Uses a hexadecimal representation resulting in 16 characters

6.1.1.3 ProfileID

The profile identifier encodes a Vendor Identifier and a Vendor Profile Identifier as a hexadecimal representation resulting in 8 characters.

6.1.1.3.1 VendorID

0163

VendorID is assigned by the LoRa Alliance.

6.1.1.3.2 VendorProfileID

900MHz: 2003 (US)

800MHz: 3003 (EU)

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6.1.2 Serial Number

SN: DW10915XXXXXX

Not including in QR code.

6.1.3 Model Name

MODEL: DW10.

Fixed code, not including in QR code.

6.1.4 FCC ID

2AAS9DW10

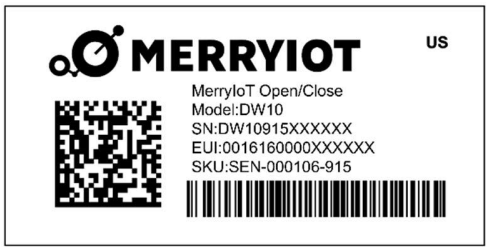
6.1.5 IC ID

26296-DW10

6.1.6 Caution!

For more information, please refer to chapter 5.2. and 10.

6.2 Packaging label



GS1 DataMatrix

- The GS1 Application Identifier (21) indicates that the GS1 Application Identifier data field contains a serial number.
- The GS1 Application Identifier (92) assigned to the company's internal information is DevEUI.

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7. Important Product & Safety Instructions

For the most current and more detailed information about Browan features and settings as well as safety instructions, please download the user manual for the products online at www.browan.com before the use of any Browan products or services.

Certain sensors contain magnets. **Keep away from ALL Children!** Do not put it in your nose or mouth. Swallowed magnets can stick to intestines causing serious injury or death. Seek immediate medical attention if magnets are swallowed.

These products are not toys and contain small parts that can be dangerous to children under 3 years old. Do not allow children or pets to play with products.

Observe proper precautions when handling batteries. Batteries may leak or explode if improperly handled.

Observe the following precautions to avoid a sensor explosion or fire:

- Do not drop, disassemble, open, crush, bend, deform, puncture, shred, microwave, incinerate, or paint the sensors, Hub, or other hardware.
- Do not insert foreign objects into any opening on the sensors or Hub, such as the USB port.
- Do not use the hardware if it has been damaged—for example, if cracked, punctured, or harmed by water.
- Disassembling or puncturing the battery (whether integrated or removable) can cause an explosion or fire.
- Do not dry the sensors or battery with an external heat source such as a microwave oven or hairdryer.

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8. Warnings

- Do not place naked flame sources, such as lighted candles, on or near the equipment.
- The battery shall not be exposed to excessive heat such as sunshine, fire, or the like.
- Do not dismantle, open or shred battery packs or cells.
- Do not expose batteries to heat or fire. Avoid storage in direct sunlight.
- Do not short-circuit the battery. Do not store batteries in a box or drawer where they may short-circuit each other or be short-circuited by other metal objects.
- Do not remove a battery from its original packaging until required for use.
- Do not subject batteries to mechanical shock.
- In the event of a battery leaking, do not allow the liquid to come in contact with the skin or eyes. If a contact has been made, wash the affected area with copious amounts of water, and seek medical advice.
- Do not use any charger other than that specifically provided for use with the equipment.
- Observe the plus (+) and minus (-) marks on the battery and equipment and ensure correct use.
- Do not use any which is not designed for use with the product.
- Do not mix cells of different manufacture, capacity, size, or type within a device.
- Keep batteries out of the reach of children.
- Seek medical advice immediately if a battery has been swallowed.
- Always purchase the correct battery for the equipment.
- Keep batteries clean and dry.
- Wipe the battery terminals with a clean dry cloth if they become dirty.

9. Notices

- Avoid exposing your sensors or batteries to very cold or very hot temperatures. Low or high-temperature conditions may temporarily shorten the battery life or cause the sensors to temporarily stop working.
- Take care in setting up the Hub Gateway and other hardware. Follow all installation instructions in the User Guide. Failure to do so may result in injury.
- Do not install hardware equipment while standing in water or with wet hands. Failure to do so can result in electric shock or death. Use caution when setting up all electronic equipment.
- When charging the sensors, do not handle the sensors with wet hands. Failure to observe this precaution could result in electric shock.
- PROP 65 WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm
- Cleaning Browan Products: Use a clean dry cloth or wipe to clean Browan products. Do not use detergent or abrasive materials to clean the Browan products, as this may damage the sensors.

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10. Cautions

CAUTION: Disposal of a battery (or battery pack) into a fire or a hot oven, or mechanically crushing or cutting of a battery (or battery pack) can result in an **EXPLOSION!**

Leaving a battery (or battery pack) in an extremely high temperature surrounding environment can result in an **EXPLOSION** or leakage of flammable liquid or gas.

A battery (or battery pack) subjected to extremely low air pressure may also result in an **EXPLOSION** or leakage of flammable liquid or gas.

Discard used batteries according to the manufacturer's instructions.

CAUTION: The unit is provided with a battery-powered circuit.

There is a danger of **EXPLOSION** if the battery is incorrectly replaced.

Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer’s instructions.

Risk of **EXPLOSION** if Battery is replaced by an Incorrect Type. Dispose of Used Batteries According to the Instructions.

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11. Regulatory

Hereby, Browan Communications Inc. declares that the radio equipment for Browan products complies with Directive 2014/53/EU.

This device complies with Part 15 of the FCC Rules and RSS Standards of Industry Canada.

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.

This symbol means that according to local laws and regulations your product should be disposed of separately from household waste. When this product reaches its end of life, take it to a collection point designated by local authorities. Some collection points accept products for free. The separate collection and recycling of your product at the time of disposal will help conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment.

11.1 Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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.

IMPORTANT NOTE:

Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

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This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Country Code selection feature to be disabled for products marketed to the US/CANADA.

Operation of this device is restricted to indoor use only.

11.2 Industry Canada statement:

This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science, and Economic Development Canada's license-exempt RSS(s). Operation is subject to the following two conditions :

(1) This device may not cause interference

(2) This device must accept any interference, including interference that may cause undesired operation of the device

Cet appareil contient des émetteurs / récepteurs exempts de licence qui sont conformes au (x) RSS (s) exemptés de licence d'Innovation, Sciences et Développement économique Canada. L'opération est soumise aux deux conditions suivantes :

(1) Cet appareil ne doit pas causer d'interférences

(2) Cet appareil doit accepter toute interférence, y compris les interférences pouvant provoquer un fonctionnement indésirable de l'appareil

Radiation Exposure Statement:

This equipment complies with Canada radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Déclaration d'exposition aux radiations:

Cet équipement est conforme Canada limites d'exposition aux radiations dans un environnement non contrôlé. Cet équipement doit être installé et utilisé à distance minimum de 20cm entre le radiateur et votre corps.

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12. Configuration Downlink Command

12.1 Configuration Command

12.1.1 Payload

Port	204

Bytes	0	1	2
Field	Cmd	Config	

Cmd	**Command**	1 byte
	Bit [7:0]	**0x00 – Set keepalive interval.** default: 21600 sec. (Min: 15 sec) **0x01 – Set sensor vibration detection on/off and set tilt detection on/off** default: enable vibration low sensitivity, disable tilt detection **0x02 – Set buzzer alarm period(seconds)** default: 0
Config	**Configuration**	1 or 2 bytes

See the table as follows:

Command	Command Description	Data Length
0x00	Get Sensor Configuration **(Only for unconfirmed downlink)** *Note: little-endian format.	0 bytes
0x00	Set keepalive interval. *Note: little-endian format.	2 bytes
0x01	Bit[1:0] = 00: Disable vibration detection 01: Enable vibration detection in low sensitivity 10: Enable vibration detection in medium sensitivity, 11: Enable vibration detection in high sensitivity Bit[3:2] = RFU Bit[5:4] = 00: Disable tilt detection 01: Enable tilt detection in high sensitivity (15) Bit[7:6] = RFU	1 byte
0x02	Buzzer alarm period in seconds	1 byte

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Payload Content	**Command content** Ex: **00100E || 0100 ||0200** 00 100E => Set keepalive interval: 0x0E10 -> 3600 (sec) 01 00 => Disable vibration detection and tilt detection: 0x00 02 00 => Buzzer alarm period in 0 seconds: 0x00

12.2 Response Content

(Only for unconfirmed downlink)

Port	204
Payload Length	7 bytes
Payload Content	Response content Example: **00100e 0100 0200** 00 100e => Keepalive interval: 0x0E10 -> 3600 (sec) 01 00 => Disable vibration detection and tilt detection 02 00 => Buzzer alarm period in 0 seconds

12.3 Frame Count 1 Content

Payload Length	9 bytes
Payload Content	Frame count 1 content Ex: **01 03200000 7ff1f102** **01** => command ID **03200000** => HW ID: 0x00002003 (little-endian format) **7ff1f102** => FW Version: 0x02f1f17f (little-endian format)

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13. BLE FOTA Downlink Command

Port	206
Payload Length	3 bytes

13.1 Payload

Bytes	0~2
Payload	0x444655

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