Aeotec

BY AEON LABS

Door Window Sensor 7

(Z-Wave Door Window Sensor 7)

Change history

Revision	Date	Change Description
1	03/28/2019	Initial draft.
2		
3		
4		

Aeotec Door Window Sensor 7
Engineering Specifications and Advanced Functions for Developers

Aeotec Door Window Sensor 7 is a sensor binary device based on Z-wave enhanced 232 slave library of V6.81.01.

Aeotec Door/Window Sensor 7 provides your Z-Wave network with the intelligence required for a modern home automation and security system. And It does it all in a smaller, more elegant design crafted to suit any home's decor.

The Door Window Sensor is also a security Z-Wave device and supports the Over The Air (OTA) feature for the product's firmware upgrade.

Door Window Sensor 7 can be included and operated in any Z-Wave network with other Z-Wave certified devices from other manufacturers and/or other applications. All non-battery operated nodes within the network will act as repeaters regardless of vendor to increase reliability of the network.
It also supports Security Command Class and has the AES 128 bit security encryption built right in, so a security enabled controller is needed for fully to utilize its function.

1. Library and Command Classes:
1.1 SDK:6.81.01
1.2 Library:
- Basic Device Class: BASIC_TYPE_ROUTING_SLAVE
- Generic Device class: GENERIC_TYPE_SENSOR_NOTIFICATION
- Specific Device Class: SPECIFIC_TYPE_NOTIFICATION_SENSOR
1.3 Commands:
5E - COMMAND_CLASS_ZWAVEPLUS_INFO
85 - COMMAND_CLASS_ASSOCIATION
8E - COMMAND_CLASS_MULTI_CHANNEL_ASSOCIATION
59 - COMMAND_CLASS_ASSOCIATION_GRP_INFO
55 - COMMAND_CLASS_TRANSPORT_SERVICE
86 - COMMAND_CLASS_VERSION
72 - COMMAND_CLASS_MANUFACTURER_SPECIFIC
5A - COMMAND_CLASS_DEVICE_RESET_LOCALLY
73 - COMMAND_CLASS_POWERLEVEL
9F - COMMAND_CLASS_SECURITY_2
70 - COMMAND_CLASS_CONFIGURATION
84 - COMMAND_CLASS_WAKE_UP
80 - COMMAND_CLASS_BATTERY
5B - COMMAND_CLASS_CENTRAL_SCENE
30 - COMMAND_CLASS_SENSOR_BINARY
71 - COMMAND_CLASS_ALARM
6C - COMMAND_CLASS_SUPERVISION
7A - COMMAND_CLASS_FIRMWARE_UPDATE_MD

2. Technical Specifications

Model number: ZWA008
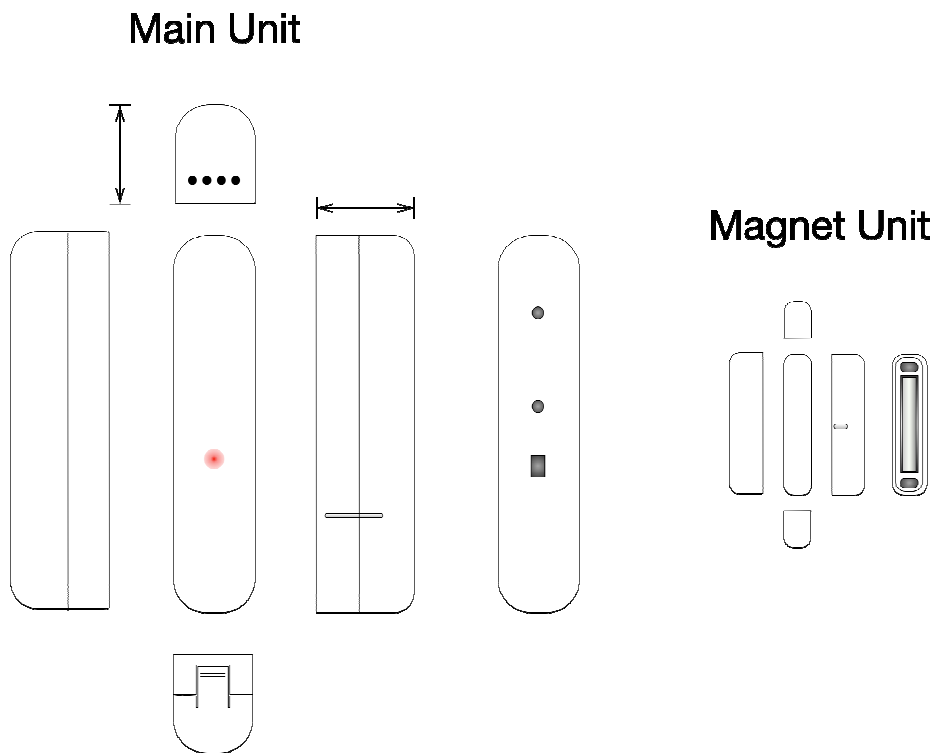
Operating distance: Up to 492 feet/150 meters outdoors.

Operating temperature: 0℃ to 40℃.

Relative humidity: 8%RH to 80%RH.

Frequency range: Z-Wave 868.4~868.42MHz (EU)

3. Familiarize yourself with your Door Window Sensor 7

3.1Interface

4. Functional Requirements

The product has the following functional requirements, listed in alphabetic order.

4.1 Associations

The product support Assigned Associations for direct control of other Z-Wave Devices within a Z-Wave Network.

The product supports up to 3 Association Groups:

1st Association Group – "Lifeline" reports the device status and allows for assigning single device only (main controller by default).

2nd Association Group – "Control" is assigned to the device status - reed sensor and External Sensor input (sends Basic Set Command frames). This group provides backward compatibility with controllers not supporting Z-Wave+.

3rd Association Group – "Alarm" is assigned to the device status - reed sensor and External Sensor input (sends Alarm Command frames). Its value may be modified via advanced parameters.

4th Association Group – "Tamper" is assigned to the Tamper Switches (sends Alarm Command frames). This group provides backward compatibility with controllers not supporting Z-Wave+.

All the groups allow to control 5 regular or 5 multichannel devices per an Association Group.

It is not recommended to Associate more than 10 devices in general, as the response time to control commands depends on the number of Associated devices. In extreme cases, system response may be delayed.

4.2 Automatic Network Management

The product must perform the following Automatic Network Management features:

Inform the Z-Wave Controller if it has been power cycled in order for the Server to determine if the device has been moved.

Device must ask for Network Topology updates

If the device cannot get in contact with the Z-Wave Controller it must initiate an "I'm Lost" process in order to be rediscovered by a Z-Wave Controller.

4.3 Configuration Mode

The product must support a Configuration Mode in which the device can be Z-Wave configured (Include, Exclude, Wake Up, Reset). Device enters Configuration Mode when TamperSwitch2 is short-pressed 3 times within 1.5 seconds.

Device exists Configuration Mode after a time out of 30 seconds.

Device transmits its Node Information Frame when entering Configuration Mode enabling to be Included/Excluded from Network.

4.4 Configuration/Status Parameters

The product has a range of configurable parameters.

(Param 1) Operation mode

Parameter defines device operation mode.

Available settings:	0 - Built-in hall sensor(external input disabled)		
	1 - External Input (hall sensor disabled)		
Default setting:	0	Parameter size:	1 [byte]

(Param 2) Door/Window or alarm status

Parameter defines state of the sensor when the magnet is close. If the alarm sensor is connected, it determines the output type.

Parameter inactive in external button mode (parameter "Operation Mode" set to 1).

Available settings:	0 - door/window closed		
	1 - door/window opened		
Default setting:	0	Parameter size:	1 [byte]

(Param 3) Visual LED indications

This parameter defines events indicated by the visual LED indicator. Disabling events might extend battery life.

Available settings:	0 - no indications		
	1 - indication of opening/closing status change (input In)		
	2 - indication of wake up (1 x click or periodical)		
	4- indication of device tampering		
Default setting:	7	Parameter size:	1 [byte]

Values of parameters may be combined, e.g. 1+2=3 means opening/closing and wake up will be indicated by the visual indicator.

(Param 4) Range test after double click

Allows to enable activation of Z-Wave range test with double click of a Tamper Switch 2.

Available settings:	0 - disabled		
	1 - enabled		
Default setting:	0	Parameter size:	1 [byte]

(Param 5) 2nd Association Group triggers

Parameter defines events which result in sending On/Off commands to devices added to the 2nd Association Group. These commands are sent alternately to switch the devices On and Off. Commands represent the values of BASIC SET command frames.

Parameter is inactive in external dry-contact mode (parameter "Operation Mode" set to 1).

Available settings:	0 - switch after opening and closing		
	1 - switch after opening		
	2 - switch after closing		
Default setting:	0	Parameter size:	1 [byte]

(Param 6) Commands sent to 2nd Association Group

Command frames sent to devices added to the 2nd association group.

Available settings:	0 – On		
	1 – OFF		
	2 - On & OFF		
Default setting:	2	Parameter size:	1 [byte]

(Param 7) Value of ON command frame sent to 2nd Association Group

The value of 0 turns OFF the device, 255 turns it On. In case of associating the Dimmer or Roller Shutter module, values 1-99 allow to set an Associated device to a specified level.

Available settings:	0-99 or 255		
Default setting:	255	Parameter size:	2 [byte]

(Param 8) Value of OFF command frame sent to 2nd Association Group

The value of 0 turns OFF the device, 255 turns it On. In case of associating the Dimmer or Roller Shutter module, values 1-99 allow to set an Associated device to a specified level.

Available settings:	0-99 or 255		
Default setting:	0	Parameter size:	2 [byte]

(Param 9) Time delay of ON command frame

Time period after which On command frame will be sent.

Available settings:	0-32400 - time in seconds		
Default setting:	0	Parameter size:	2 [byte]

(Param 10) Time delay of OFF command frame

Time period after which OFF command frame will be sent.

Available settings:	0-32400 - time in seconds		
Default setting:	0	Parameter size:	2 [byte]

(Param 11) Delay of tamper alarm cancellation

Time period after which a tamper alarm will be cancelled.

Available settings:	0-32400 - time in seconds		
Default setting:	5	Parameter size:	2 [byte]

(Param 12) Reporting tamper alarm cancellation

Reporting cancellation of tamper alarm to the controller and 5th Association Group.

Available settings:	0 - do not send tamper cancellation report 1 - send tamper cancellation report		
Default setting:	1	Parameter size:	1 [byte]

(Param 13) Scene activation functionality

The device can trigger scenes via Dry Input Terminal (external contact) using scene IDs assigned to different events.

To deactivate all scenes set the value to 0.

Available settings:	0- Contact Pressed scenes disabled 1- Contact Pressed scenes enabled		
Default setting:	0	Parameter size:	1 [byte]

(Param 14) Tilt Sensor functionality

The device can report Tilt Window events. This functionality can be disabled if the device is mounted on a door or windows without tilt functionality.

To disable tilt detection set the value to 0.

Available settings:	0–Tilt functionality is disabled 1– Tilt functionality is enabled		
Default setting:	1	Parameter size:	1 [byte]

4.5 External Sensor Interface

The product must support interconnection of external sensors as well as actuators and dry-contacts. Product allows interconnection with external sensors/actuators via 4-pin screw terminals with the following pinout:

#1: VCC (direct battery supply)
#2: Analogue Input (ADC)
#3: Digital Input
#4: Ground

As default the product is configured as Input for Pin #3.
The Digital Input can be used for external reed relays, dry-contact etc.
The Analogue Input is not used at the moment. Might be used in future.
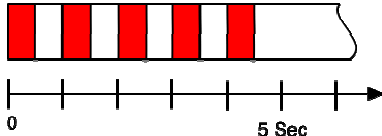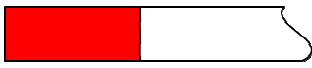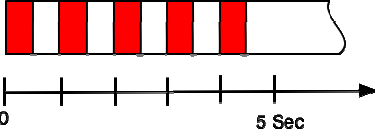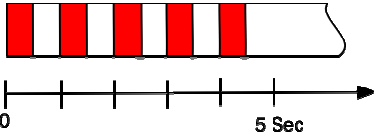
4.6 LED Indications

A single-colour LED indicator located on the front of the product must provide visual indication of device status.

The single-colour LED indicator must consist of green and res.

Product LED Indicator must be implemented in the following manner:

Open/Close Status: Blinks green for ½ second when open or close is detected.	
Battery Low Status: When open/close is detected LED blinks red for 3 seconds with 1 sec duty cycle.	

Device Not in Network Blinks red for 5 seconds(1 sec duty cycle) when battery is inserted and devices is not in network	 **Device Not in Network**
Include/Exclude/Configuration Illuminate red for 2,5 seconds when Inclusion/Exclusion/Configuration is successful. Blinks red for 5 seconds (1 sec duty cycle) when Inclusion/Exclusion/Configuration is unsuccessful (upon a timeout of 30 seconds).	**Successful** **Unsuccessful**
Local Reset When devices is locally reset to Factory Default LED blinks red (1 second duty cycle) for 5 seconds.	
Tampering If either Tamper Switch is activated the device blinks redone time with ½ second duty cycle if within range of Controller. The device blinks red three times with ½ second duty cycle if out of range of Controller	**Within range of Controller** **Out of range of Controller**

4.7 Local Reset (Z-Wave)

Product must support local manual reset to factory default. Factory Reset is performed by:
- Open front cover
- Press-and-hold Tamper Switch 2 for 5 seconds
- LED indicator illuminates red for 1 seconds
- Release Tamper Switch 2
- Press Tamper Switch 2 for 5 seconds
- LED blinks red 5 times
- Release Tamper Switch 2 when LED stops blink

4.8 Operation Button
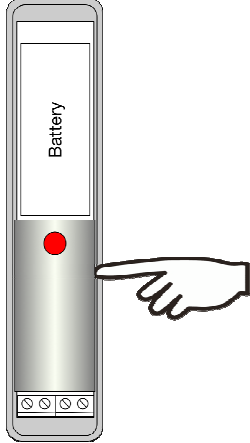## 4.8.1   Push Types

Device must support Short-press and Long-press of Operation Button.

Short press: <500mSec
Long press: >500mSec

4.8.2 Button Functions

The Product must support the following button functions.

Push Type	Function	Description
Short-Press-Release	Configuration	Product enters Configuration Mode
Long Press	Tamper	Product mounted and Tamper function working

Configuration Mode (Include/Exclude) Short press 3 times within 1.5 seconds puts the device in Configuration Mode (it transmits its Node Info Frame for network inclusion/ exclusion).	

4.9 Over the Air Firmware Update (OTA)

The product must support Over-the-Wire firmware upgrade of the Z-Wave firmware. OTA is entirely handled by the Z-Wave protocol.

4.10 S2 Security

Product must support S2 Security as according to the Z-Wave Protocol certification requirements. Product must request S2 Unauthenticated security level.

4.11 Smart Start

The product supports Z-Wave Smart Start.

This is ensured by using SDK6.81 for firmware development, as this SDK has built in Smart Start features.

4.12 Tamper Protection

The product has two tamper detection switches. Tamper Switch 1 is on the back side of the base enclosure of the Main Unit to detect if the devices is removed from its installed location. Tamper Switch is located inside the Main Unit to detect if the front enclosure of the Main Units is removed. Tamper Switch is also used as Z-Wave Configuration Initiator.
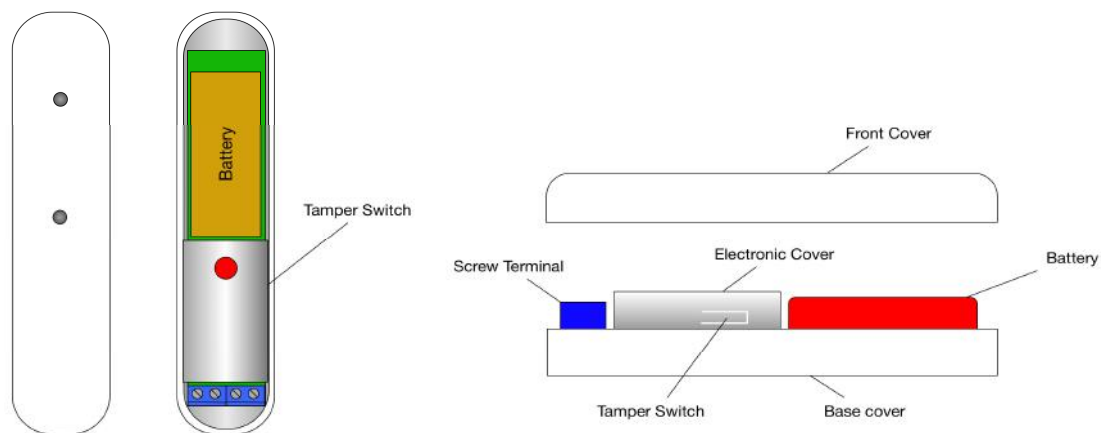
Figure 1 Tamper Switch Location

Tamper Switch must be implemented on PCB and activated by a mechanical "finger" in the Electronic Cover when the Front Cover is mounted.

4.13   Tilt detection

The product must be able to detect if a window is tilted (air ventilation) by the use of an integrated Gyro sensor.

4.14   Electrical Requirements
4.14.1 Battery

The product must use a ER14250 ½ AA Lithium Battery and must with standard use have a battery lifetime of min. 3 years with 5 open/close events per day.

4.15   Hall Sensor

Products shall use a Hall effect sensor instead of Reed Relay.

4.16   LED Indicator

The LED indicator must be visible in a distance up to 5m, an angle of ±30°, with an ambient luminance of >200 LUX.

4.17   Push Buttons (Tamper Switches)

The Tamper Switch Buttons shall have a glitch immunity/protection of 20mSec.

5.   Special rule of each command
5.1 Basic Command Class

Basic CC does not have any mapping.
The device shall as mandatory Support the Basic Commands Class.

        Commands Class Version   : 1
        Basic Set   : Supported/Controlled

Basic Get   : Supported/Controlled
Basic Report   : Supported/Controlled

The Basic Set Command Classes must be ignored.
The Basis Get Command must be responded with Basic Report, which contains current humidity value.

5.2 Manufacturer Specific Report

Parameter	Value
Manufacturer ID 1	0x03
Manufacturer ID 2	0x71
Product Type ID 1	EU=0x00, US=0x01, AU=0x02
Product Type ID 2	0x02
Product ID 1	0x00
Product ID 2	0x07

5.3 Association Command Class

The product must be able to be Associated with a Z-Wave Controller in order to get Network updates etc.

The Product has 4 association groups, max nodes 5.

Commands Class Version	: 2
Association Set	: Supported
Association Get	: Supported
Association Report	: Supported
Association Remove	: Supported
Association Supported Groupings Get	: Supported
Association Supported Groupings Report	: Supported

5.4 Association Group Info Command Class

Group 1：Lifeline
The product must provide all required information about existing association groups, using this CC.

Commands Class Version   : 1
Association Group Name Get   : Supported
Association Group Name Report   : Supported
Association Group Info Get   : Supported
Association Group Info Report   : Supported
Association Command List Get   : Supported
Association Command List Report   : Supported

Group Information:
- Lifeline: All of the device status reports are sent to this group:
  BATTERY_REPORT

NOTIFICATION_REPORT
CENTRAL_SCENE_NOTIFICATION
DEVICE_RESET_LOCALLY_NOTIFICATION
SENSOR_MULTILEVEL_REPORT

- Control: is assigned to the device status - reed sensor and External Sensor input (sends Basic Set Command frames).
  BASIC_SET
- Alarm sensor: is assigned to the device status - reed sensor and External Sensor input (sends Alarm Command frames). Its value may be modified via advanced parameters.
  NOTIFICATION_REPORT
- Alarm tamper: is assigned to the device status –tamper state (sends Alarm Command frames). Its value may be modified via advanced parameters.
  NOTIFICATION_REPORT

5.5 Binary Sensor Command Class

The device must be able to respond to Binary Sensor Commands.

Commands Class Version	: 2
Binary Sensor Get Supported Sensor	: Supported
Binary Sensor Supported Sensor Report	: Supported
Binary Sensor Get	: Supported
Binary Sensor Report	: Supported

The product must support the following sensors:
-Type Tilt (0x0B)
The product must use this Type to indicate If window is tilted
- ON: window is tilted
- OFF: window is closed

5.6 Central Scene Command Class:

The device must be able to respond to Central Scene Commands.

Commands Class Version	: 3
Central Scene Supported Get	: Supported
Central Scene Supported Report	: Supported
Central Scene Configuration Set	: Supported
Central Scene Configuration Get	: Supported
Central Scene Configuration Report	: Supported
Central Scene Notification	: Supported

Max supported Scenes: 7
1 - Contact Pressed 1 time
2 - Contact Pressed 2 time
3 - Contact Pressed 3 time
4 - Contact Pressed 4 time
5 - Contact Pressed 5 time

6 – Contact held down
7 – Contact released

5.7 Notification Command Class

The device can be respond to Notification Command Class commands.

Commands Class Version	: 8
Notification Set	: Supported
Notification Get	: Supported
Notification Report	: Supported
Notification Supported Get	: Supported
Notification Supported Report	: Supported
Events Supported Get	: Supported
Events Supported Report	: Supported

The product must support the following Notifications:
- Home Security:

Tampering, product covering removed
- Access Control:

Door/window opened
Door/window closed
- Power Management:

Replace battery now