Vibration Sensor

Advanced Information Product Manual

Engineering Specification

Vibration Sensor Advanced Information Product Manual

Document No.	Engineering Specification – Z-Wave® Product Line ZW866
Version	1.0
Description	This document mainly introduces the new generation **Vibration Sensor**. The content mainly includes its interfaces, accessories, features, specifications, quick start, and software function definition. Vibration Sensor is a Z-Wave Plus v2 device with many advantages. ● Used to send out notification via Group 1 (Lifeline) when vibration triggered. ● Used to control other Z-Wave device directly via Group 2. ● Support SmartStart, which makes inclusion more convenient. ● Support S2, which makes it more secure and reliable. ● Support Long Range, extended communication range is more than 500 meters. ● Used 800 chip, it has lower power consumption and longer life.
Written By	
Date	
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Date	
Approved By	
Date	

Version	Date	Brief description of changes
1.0	2024.11.28	First revision.

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1 OVERVIEW

Please read this Engineering Specification carefully for correct and effective use.

Failure to follow the recommendations set forth by **Zvidar** Limited may be dangerous or cause a violation of the law. The manufacturer, importer, distributor, and/or reseller will not be held responsible for any loss or damage resulting from not following any instruction in this guide or in other materials.

The product is intended for indoor use in dry locations only. Do not use in damp, moist, and /or wet locations.

Contains small parts, keep away from children.

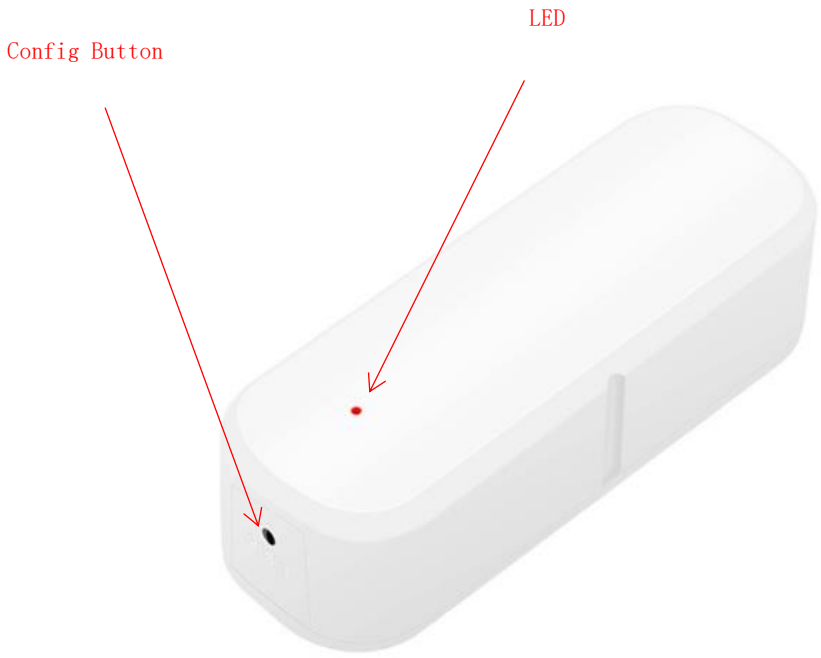
Z-Wave® is the international wireless protocol for communication in the Smart Home.

This device is a security enabled Z-Wave Plus® v2 product that is able to use encrypted Z-Wave Plus v2 messages to communicate to other security S2 enabled Z-Wave Plus v2 products. This device must be used in conjunction with a S2 security enabled Z-Wave controller in order to fully utilize all implemented functions. Otherwise it will automatically turn into a lower level of security to maintain backward compatibility. This product can be operated in any Z-Wave network with other Z-Wave certified devices from other manufacturers. All mains operated nodes within the network will act as repeaters regardless of vendor to increase reliability of the network.

SmartStart enabled products can be added into a Z-Wave network by scanning the Z-Wave QR Code present on the product with a controller providing SmartStart inclusion. No further action is required and the SmartStart product will be added automatically within 10 minutes of being switched on in the network vicinity.

2 INTERFACES & INSTALLATION

2.1 Interfaces



Terminology	Description
LED	Used for indicating the current state of the product.
Config Button	Inside the Config Button Hole. Used for networking and resetting.
QR Code	2D barcode format that can contain large amounts of information in a small square of encoded blocks resembling a random checkerboard pattern. In Z-Wave, it is used to represent the S2 public part of the DSK on a device, as well as additional information needed for the inclusion process

3 FEATURES & SPECIFICATIONS

3.1 Structural Characteristics

Parameter	Value
Product Identifier	ZW866
Dimensions	Main:70*24.5*20mm
Weight	
Color	White
Shell Material	ABS
Shell Fire-proof Level	UL94 V-0
Waterproof and Dustproof	Rated IP20 under IEC 60529
Usage	For indoor use.
Operating Temperature	14-122° F (-10-50° C)
Relative Humidity	Up to 90%

3.2 Hardware Characteristics

Parameter	Value
Z-Wave Module	EFR32ZG23A010F512GM40
Z-Wave TX Power	Max: 14dBm
Z-Wave Antenna Distance	100m(Indoor) /200m(Outdoor) />400m (US-LR)
Indicator Light Color	red and green
Buttons and Connectors	Config Button(x1), Magnet(x1)
Power	3V, AAA*2
Wakeup current	~5mA
Standby current	~6uA
Battery Life	>2 years

3.3 Software Characteristics

Parameter	Value
Wireless Technology	Z-Wave
Certification Type	Z-Wave Plus v2
Z-Wave SDK Version	7.22.02
Z-Wave Library Type	Enhanced 232 Slave
Z-Wave Role Type	ZWAVEPLUS_INFO_REPORT_ROLE_TYPE_SLAVE_SLEEPING_REPORTING (0x06)
Generic Device Type	GENERIC_TYPE_SENSOR_NOTIFICATION (0x07)
Specific Device Type	SPECIFIC_TYPE_NOTIFICATION_SENSOR (0x01)
Security Class	Non-Security, S2-UNAUTHENTICATED, S2-AUTHENTICATED
SmartStart	Support. After powering on, SmartStart is auto active if it' s out of the Z-Wave network.
Over The Air （OTA）	Support. Firmware can be updated via RF.

Multichannel Device	No.
Association	Support. Refer to Section 5.6 Association Group Info.
Factory Reset	Support. Refer to Section 4.5 How to factory reset.
Power-down Memory	Support. All command settings will stay unchanged even power down.
Sensor Status Report	Support. When vibration triggered, send out notification via Group 1.
Control Other Device	Support. When vibration triggered, control other Z-Wave device directly via Group 2.
Low Battery Alarm	Support. Refer to Configuration Parameter 1.
Signal Repeater	No.
Z-Wave Long Range	Support.

4 PRODUCT QUICK START

4.1 Z-Wave DSK Location

You can find the QR CODE on the side of this **Vibration Sensor** body.

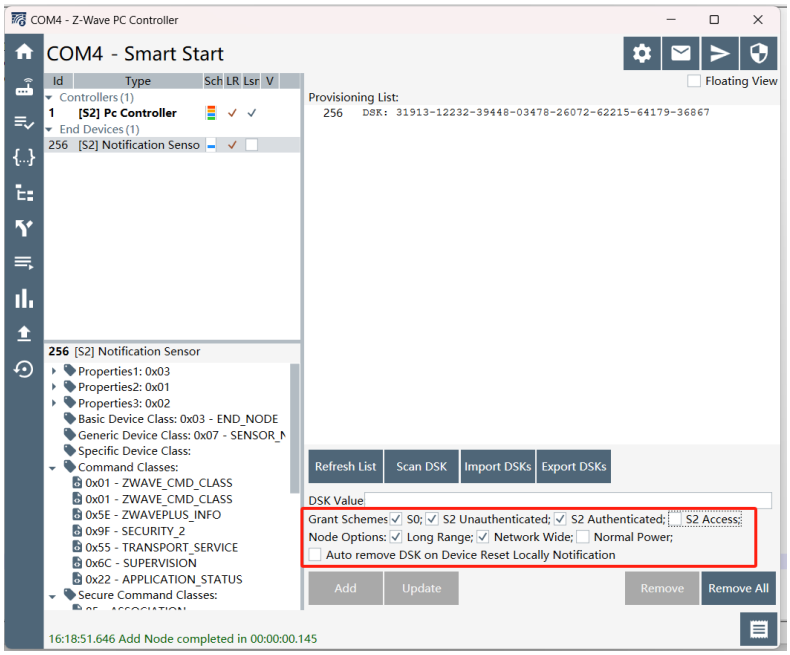
You may also find the QR Code and DSK card in the individual package of each product.

Please do not remove or damage them.

4.2 How to add the product into Z-Wave Long Range network

Z-Wave Long Range device can only support be included via SmartStart.

Extract the DSK from end device and paste it into the DSK Value in PC Controller, make sure the 'Long Range' option is ticked.



In the scanning process when using US_LR frequency, the end device will switch between 2 PHY setups, the classic US PHY and the LR PHY with both LR channels active. When the inclusion of end device starts, it will settle on using the PHY that was used by the controller for inclusion. In other words, during learn mode, a end node that support LR will send SmartStart Prime on both classic Z-Wave and Z-Wave LR PHY, both request are send up to the host on the controller and it is the host's responsibility to determine which PHY is used for inclusion.

The controller doesn't do channel scanning the same way as in end device. The controller will scan 4 channels, including 3 classic Z-Wave channels 9.6/40/100 kbps and 1 LR channel, using US_LR frequency will scan at 912 MHz while using US_LR_BACKUP will scan at 920 MHz during startup. The active LR channel can be switch at runtime.

4.3 How to add the product into Z-Wave network

1. Follow the user guide of hub to enter inclusion mode.

2. Click the Config button 3 times quickly, enter "Include mode"

3. LED will fast blink green during the inclusion, and then solid green for 3 seconds to indicate the inclusion is successful, otherwise the LED will solid red for 3 seconds in which you need to repeat the process form step 1

4.4 How to remove the product from Z-Wave network

1. Follow the user guide of hub to enter exclusion mode.

2. Click the Config Button 3 times quickly, enter "Exclusion mode"

3. LED will fast blink green during the exclusion, and then solid green for 3 seconds to indicate that the exclusion is successful, otherwise the LED will solid red for 3 seconds in which you need to repeat the process form step 1

4.5 How to factory reset

Click Z-Wave button 2 times quickly, and hold for at least 10 seconds > LED start red led blinking quickly once tapped twice, then after 10s confirmed reset. The T/H Sensor will reset itself to factory default by sending a "Device Reset Locally Notification" to gateway when the button is released.

Note:

1. This procedure should only be used when the primary controller is missing or otherwise inoperable.
2. Factory Reset will:
   - Remove the product from Z-Wave network;
   - Delete the Association setting;
   - Restore the configuration settings to the default.

5 SOFTWARE FUNCTION DEFINITION

5.1 User Behavior Interaction

User behavior	Out of the Z-Wave network	In the Z-Wave network
Power on	LED blink red 3 times and start Smart Start	Send Battery report and Wake up notification, LED keeps green on 1 second.
Click Config Button once	LED will flash red once.	Send Wake up notification, LED will flash green once.
Vibration triggered		LED will flash green once.
Click Config Button 3 times quickly	**Click the Z-Wave button 3 times quickly, enter "Include mode"** LED will fast blink green during the inclusion, and then solid green for 3 seconds to indicate the inclusion is successful, otherwise the LED will solid red for 3 seconds.	**Click the Z-Wave button 3 times quickly, enter "Exclusion mode"** LED will fast blink green during the exclusion, and then solid green for 3 seconds to indicate that the exclusion is successful, otherwise the LED will solid red for 3 seconds.
Click Config Button 2 times quickly, and hold for at least 10 seconds.	**Factory Reset.** Click Z-Wave button 2 times quickly, and hold for at least 10 seconds > LED start red led blinking quickly, then after 10s red solid confirmed reset. The Vibration Sensor will reset itself to factory default by sending a "Device Reset Locally Notification" to gateway when the button is released.	**Factory Reset.** Click Z-Wave button 2 times quickly, and hold for at least 10 seconds > LED start red led blinking quickly, then after 10s red solid confirmed reset. The Vibration Sensor will reset itself to factory default by sending a "Device Reset Locally Notification" to gateway when the button is released.

5.2 Supported Command Classes

Command	Version	Required Security Class
COMMAND_CLASS_ZWAVEPLUS_INFO_V2	2	None
COMMAND_CLASS_TRANSPORT_SERVICE_V2	2	None
COMMAND_CLASS_SECURITY_2_V1	1	None
COMMAND_CLASS_SUPERVISION_V1	1	None
COMMAND_CLASS_APPLICATION_STATUS_V1	1	None
COMMAND_CLASS_NOTIFICATION_V8	8	Highest granted Security Class
COMMAND_CLASS_BATTERY_V1	1	Highest granted Security Class
COMMAND_CLASS_WAKE_UP_V2	2	Highest granted Security Class
COMMAND_CLASS_CONFIGURATION_V4	4	Highest granted Security Class
COMMAND_CLASS_ASSOCIATION_V2	2	Highest granted Security Class
COMMAND_CLASS_ASSOCIATION_GRP_INFO_V3	3	Highest granted Security Class
COMMAND_CLASS_MULTI_CHANNEL_ASSOCIATION_V3	3	Highest granted Security Class
COMMAND_CLASS_VERSION_V3	3	Highest granted Security Class
COMMAND_CLASS_MANUFACTURER_SPECIFIC_V2	2	Highest granted Security Class
COMMAND_CLASS_DEVICE_RESET_LOCALLY_V1	1	Highest granted Security Class
COMMAND_CLASS_POWERLEVEL_V1	1	Highest granted Security Class
COMMAND_CLASS_FIRMWARE_UPDATE_MD_V5	5	Highest granted Security Class
COMMAND_CLASS_INDICATOR_V3	3	Highest granted Security Class

5.3 ZWAVEPLUS_INFO

The Command is used to differentiate between Z-Wave Plus v2, Z-Wave for IP and Z-Wave devices. This command provides additional information about the Z-Wave Plus v2 device in question.

Parameter	Value
Z-Wave Plus Version	0x02
Role Type	0x06 (ZWAVEPLUS_INFO_REPORT_ROLE_TYPE_SLAVE_SLEEPING_REPOR TING)
Node Type	0x00 (ZWAVEPLUS_INFO_REPORT_NODE_TYPE_ZWAVEPLUS_NODE)
Installer Icon Type	0x0C07 (ICON_TYPE_SPECIFIC_SENSOR_NOTIFICATION_HOME_SECURITY)
User Icon Type	0x0C07 (ICON_TYPE_SPECIFIC_SENSOR_NOTIFICATION_HOME_SECURITY)

5.4 Manufacturer Specific

The Command is used to advertise manufacturer specific information.

Parameter	Value
Manufacturer ID 1	**0x04**
Manufacturer ID 2	**0x5A**
Product Type ID 1	0x00
Product Type ID 2	0x04
Product ID 1	0x03
Product ID 2	0x62

5.5 Version

The Command may be used to obtain the Z-Wave library type, the Z-Wave protocol version used by the application, the individual command class versions used by the application.

Parameter	Value
Z-Wave Protocol Library Type	0x03
Z-Wave Protocol Version	0x07
Z-Wave Protocol Sub Version	0x16
Firmware 0 Version	Z-Wave Chip Firmware Version Major
Firmware 0 Sub Version	Z-Wave Chip Firmware Version Minor
Hardware Version	0x01
Number of firmware targets	0x01

5.6 Association Group Info

The Command is used to manage associations to Node ID destinations.

ID	Name	Count	Profile	Function
1	Lifeline	5	General: Lifeline (0x0001)	**Device Reset Locally Notification (0x5A01):** Issued when Factory Reset is performed. **Battery Report(0x8003):** Power on OR when the battery quantity changes. **Notification Report(0x7105):** See Notification Chapter for more information. **Indicator Report(0x8703):** Issued when indicator set received
2	Basic Set	5	General: Control (0x2001)	**Basic Set (0x2001) :** Issued when vibration triggered.

5.7 Notification

The Command is used to advertise events or states, such.

Notification Type	Notification Event/State	Description
Home Security(0x07)	Impact detected (0x0A)	When vibration triggered.

Notification Type	Notification Event/State	Description
Power Management (0x08)	Replace battery soon (0x0A)	When battery level below the param1 value.
	Replace battery now (0x0B)	When battery level below 2.2V.

5.8 Wake Up

The Wake Up used to configure the Wake Up interval and destination.

1. When the product has been online, short press the Config Button to report the product has been awakened.
2. Wake up interval set command can be used to configure the product to automatically wakeup time.

3. Wake up Interval Capabilities

Minimum Wake up Interval Seconds = 1800 seconds

Maximum Wake up Interval Seconds = 86400 seconds

Default Wake up Interval Seconds = 28800 seconds

Wake up Interval Step Seconds = 60 seconds

5.9 Indicator

The Command is used to help end users to monitor the operation or condition of the application provided by a supporting node.

Indicator ID		Property ID	
Node Identify	0x50	On Off Period	0x03
		On Off Cycles	0x04
		On time within an On/Off period	0x05

5.10 Configuration

The Command allows product specific configuration parameters to be changed.

Note: No Bulk Support equals to True. ***It will return an Application Rejected Request Command when receiving Configuration Bulk Set or Get (if received without Supervision encapsulation).*** It will reset all its configuration parameters if either manually reset to factory default or receives a Configuration Default Reset Command. It will NOT modify or reset any configuration parameter when being included or excluded of a Z-Wave network.

Parameter 1:

Parameter	0x01 (1)			
Name	Low Battery Threshold			
Info	Low Battery Threshold			
Properties	Size	1	Min Value	5
	Format	Unsigned Integer	Max Value	50
	Read-only	False	Default Value	10
	Altering capabilities	False	Advanced	False
Description	Configure low battery report threshold, sends low battery report via notification and battery report when battery level drops under setting. Unit %.			

Parameter 2:

Parameter	0x02 (2)			
Name	Vibration Sensitivity			
Info	Vibration Sensitivity			
Properties	Size	2	Min Value	1
	Format	Enumerated	Max Value	3
	Read-only	False	Default Value	2

	Altering capabilities	False	Advanced	False
Description	Set the triggering sensitivity of the vibration sensor. 1: high sensitive; 2: medium sensitive; 3: low sensitive.			