# Temperature And Humidity Sensor

# Advanced Information Product Manual

## Engineering Specification

## Temperature And Humidity Sensor Advanced Information Product Manual

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|---|---|
| Document No. | Engineering Specification – Z-Wave® Product Line<br><br>ZW8631 |
| Version | 1.0 |
| Description | This document mainly introduces the new generation **Temperature And Humidity Sensor**. The content mainly includes its interfaces, accessories, features, specifications, quick start, and software function definition.<br><br>Temperature And Humidity Sensor is a Z-Wave Plus v2 device with many advantages.<br>● Support SmartStart, which makes inclusion more convenient.<br>● Support S2, which makes it more secure and reliable.<br>● Support Long Range, extended communication range is more than 500 meters.<br>● Used 800 chip, it has lower power consumption and longer life. |
| Written By | |
| Date | |
| Reviewed By | |
| Date | |
| Approved By | |
| Date | |

| Version | Date | Brief description of changes |
|---------|------|------------------------------|
| 1.0 | 2024.10.05 | First revision. |
| | | |
| | | |

# Table of Content

# 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.

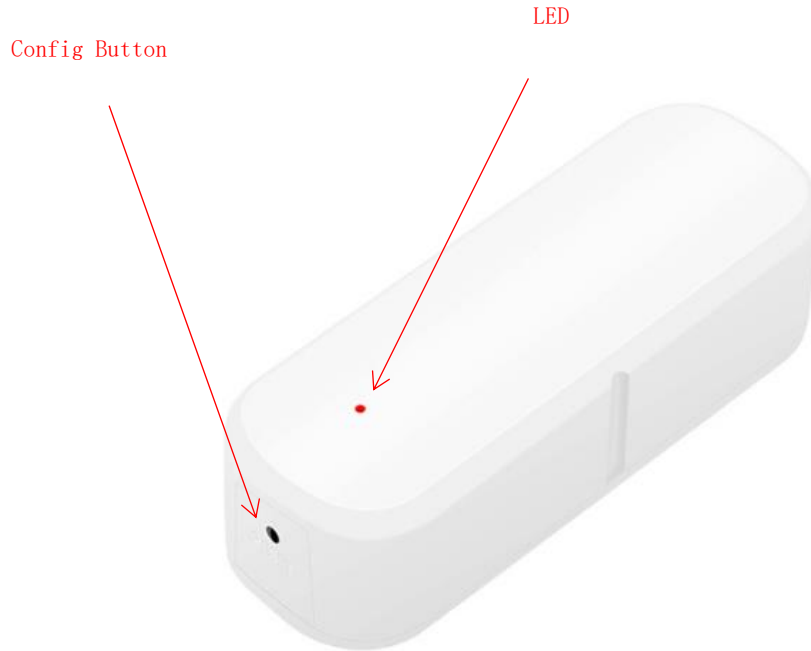Contains small parts, keep away from children.

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

LED

Config Button

| 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 | ZW8631 |
| Dimensions | Main:70*24.5*20mm |
| Weight | |
| Color | White |
| Shell Material | ABS |
| Shell Fire-proof Level | UL94 V-0 |
| Waterproof and Dustproof | Rated 1P20 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 | ~3uA |
| Battery Life | >5 years |

## 3.3  Software Characteristics

| Parameter | Value |
|---|---|
| Wireless Technology | Z-Wave |
| Certification Type | Z-Wave Plus v2 |
| Z-Wave SDK Version | 7.18.03 |
| 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_MULTILEVEL (0x21) |
| Specific Device Type | SPECIFIC_TYPE_ROUTING_SENSOR_MULTILEVEL (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 Magnet is away or near, send out Sensor Multilevel via Group 1. |
| 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 **Temperature And Humidity Sensor** body.

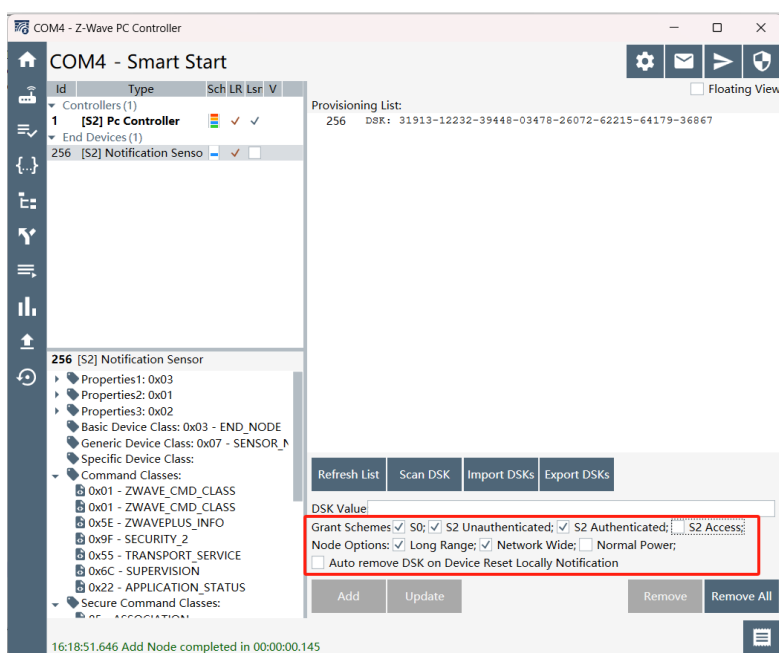You may also find the QR Code and DSK card in the individual package of each product.

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. |
| Click Config Button 3 times quickly | **Click the Z-Wave button 3 times quickly, enter "Include mode"**<br><br>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"**<br><br>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.**<br>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 T/H Sensor will reset itself to factory default by sending a "Device Reset Locally Notification" to gateway when the button is released. | **Factory Reset.**<br>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 T/H 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 |
| COMMAND_CLASS_MULTILEVEL_SENSOR_V11 | 11 | 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 | 0x21 |

| Product ID 2 | 0xB7 |
|---|---|

## 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 | 0x12 |
| 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 **Sensor Multileve Report(0x3103):** sensor timing report |
| 2 | Temperature | 5 | Sensor: Temperature (0x3101) | Associated device receive Temperature reports from Multi sensor |
| 3 | Humidity | 5 | Sensor: Humidity (0x3105) | Associated device receive Humidity reports from Multi sensor |

## 5.7 Notification

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

| 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 Multilevel Sensor

The device has a temperature/ humidity sensor. The ambient temperature  and humidity will be checked period..

| Command Class | COMMAND_CLASS_SENSOR_MULTILEVEL |
|---|---|

| Command | SENSOR_MULTILEVEL_REPORT |
|---------|--------------------------|
| Type | Air Temperature |
| Scale | Celsius (EU) / Fahrenheit (US) |

| Command Class | COMMAND_CLASS_SENSOR_MULTILEVEL |
|---------------|--------------------------------|
| Command | SENSOR_MULTILEVEL_REPORT |
| Type | Humidity |
| Scale | Percentage value |

## 5.9 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

## 5.10 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 |

## 5.11 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 | Temperature Unit | | | |
| Info | Temperature Unit | | | |
| Properties | Size | 2 | Min Value | 0 |
| | Format | Enumerated | Max Value | 1 |
| | Read-only | False | Default Value | 0(EU/AU) 1(US) |
| | Altering capabilities | False | Advanced | False |
| Description | Set the unit for temperature when reports. | | | |

| Value | Function |
|---|---|
| 0 | Celsius t. |
| 1 | Fahrenheit |

Parameter 3:

| Parameter | 0x03 (3) | | | |
|---|---|---|---|---|
| Name | Minimum Temperature Change To Report | | | |
| Info | Minimum Temperature Change To Report | | | |
| Properties | Size | 1 | Min Value | 0 |
| | Format | Unsigned Integer | Max Value | 255 |
| | Read-only | False | Default Value | 10 |
| | Altering capabilities | False | Advanced | False |
| Description | This value defines the minimum change of temperature to cause an unsolicited report of temperature to the central controller using Lifeline. If the value is set to 0, there will be no reports sent to the controller, when the temperature changes.  temperature = (Value * 0.1), Scale is determined by Param2. | | | |

Parameter 4:

| Parameter | 0x04 (4) | | | |
|---|---|---|---|---|
| Name | Minimum Humidity Change To Report | | | |
| Info | Minimum Humidity Change To Report | | | |
| Properties | Size | 1 | Min Value | 0 |

| | Format | Unsigned Integer | Max Value | 50 |
|---|---|---|---|---|
| | Read-only | False | Default Value | 5 |
| | Altering capabilities | False | Advanced | False |
| Description | This value defines the minimum change of humidity to cause an unsolicited report of humidity to the central controller using Lifeline. If the value is set to 0, there will be no reports sent to the controller, when the humidity changes.<br><br>Humidity rang = 1%to50%. | | | |

Parameter 5:

| Parameter | 0x05 (5) | | | |
|---|---|---|---|---|
| Name | Sensor Minimum Change Check Time | | | |
| Info | Sensor Minimum Change Check Time | | | |
| Properties | Size | 2 | Min Value | 60 |
| | Format | Unsigned Integer | Max Value | 65535 |
| | Read-only | False | Default Value | 900 |
| | Altering capabilities | False | Advanced | False |
| Description | Check time in seconds. | | | |

Parameter 6:

| Parameter | 0x06 (6) | | | |
|---|---|---|---|---|
| Name | Sensor Periodic Reports | | | |
| Info | Sensor Periodic Reports | | | |
| Properties | Size | 2 | Min Value | 60 |
| | Format | Unsigned Integer | Max Value | 65535 |
| | Read-only | False | Default Value | 3600 |
| | Altering capabilities | False | Advanced | False |
| Description | This parameter defines the time interval to send an unsolicited report. | | | |