

Engineering Specifications

Temperature and Humidity Sensor



This product can be included and operated in any Z-Wave™ network with other Z-Wave or Z-Wave Plus™ 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.

1 Library and Command Classes

1.1 Embedded SDK

Version 7.18.3.0

1.2 Device Type

Generic Device Class: GENERIC_TYPE_SENSOR_MULTILEVEL (0x21)

Specific Device Class: SPECIFIC_TYPE_ROUTING_SENSOR_MULTILEVEL (0x01)

1.3 Role Type

Reporting Sleeping Slave (RSS): ROLE_TYPE_SLAVE_SLEEPING_REPORTING (0x06)

1.4 Command Class

Command Class	Version	Not added	Non-secure added	Securely added	
				Non-secure CC	Secure CC
Z-Wave Plus Info	2	Support	Support	Support	
Association	2	Support	Support		Support
Association Group Information	3	Support	Support		Support
Multi-Channel Association	3	Support	Support		Support
Battery	1	Support	Support		Support
Multilevel Sensor	11	Support	Support		Support
Notification	8	Support	Support		Support
Configuration	4	Support	Support		Support
Transport Service	2	Support	Support	Support	
Version	3	Support	Support		Support
Wakeup	2	Support	Support		Support
Manufacturer Specific	2	Support	Support		Support
Device Reset Locally	1	Support	Support		Support
Indicator	3	Support	Support		Support
Power Level	1	Support	Support		Support
Security 0/2	1	Support	Support	Support	
Supervision	1	Support	Support	Support	
Firmware Update Meta Data	5	Support	Support		Support

2 Association Groups

The device supports 3 association groups and every group supports max 5 associated nodes.

Group 1 is Lifeline group, all nodes which associated in this group will receive the messages sent by device through Lifeline.

The Command Class supported by each association group is shown in the table below:

Root Device

ID	Name	Nodes	Profile	Description
1	Lifeline	5	General: Lifeline	<p><u>Device Reset Locally:</u> When factory reset.</p> <p><u>Notification Report:</u> See Notification Chapter for more information.</p> <p><u>Sensor Multilevel Report:</u> sensor timing report.</p> <p><u>Battery Report:</u> Power on OR when the battery quantity changes.</p> <p><u>Indicator Report:</u> When the Indicator set command is received.</p>

2	Temperature	5	Sensor: Temperature	Associated device receive Temperature reports from Multi sensor
3	Humidity	5	Sensor: Humidity	Associated device receive Humidity reports from Multi sensor

3 Wakeup

The device stays in sleep status for the majority of time in order to conserve battery life.

The minimum wakeup interval is 1800 seconds (30 minutes)

The maximum wakeup interval is 86400 seconds (24 hours)

The default wakeup interval is 28800 seconds (8 hours) The value is greater, the battery life is longer.

Allowable min step among each wakeup interval is 60 seconds.

4 Function

4.1 SmartStart

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.

Add the T/H Sensor into the Z-Wave network via Smart Start (SmartStart Inclusion):

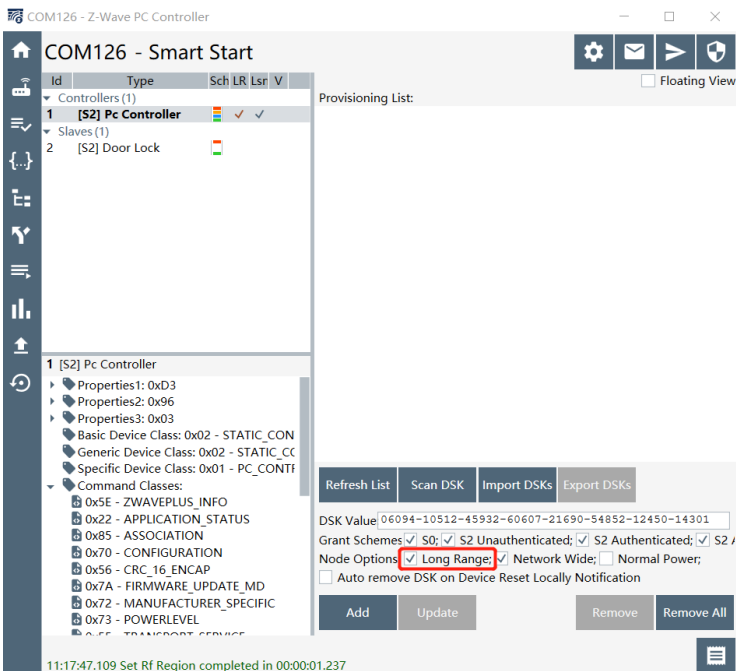
- a. Add T/H Sensor DSK into the primary controller Smart Start Provisioning List (If you don't know how to do this, refer to its manual, DSK usually print on the main body).

- b. Remove the battery from the T/H Sensor. A few seconds later, reinsert battery in the DUT.
- c. The T/H Sensor will send “Z-Wave protocol Command Class” frame to start Smart Start Inclusion.

Note:

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.

4.2 Power on

In the network:

Send Battery report and Wake up notification, LED keeps **green** on 1 second.

Not in the network:

LED blink **red** 3 times and start Smart Start.

4.3 Short press Config Button 1 time

In the network:

Send Wake up notification, and LED will fast blink **red** during sending data.

4.4 Short press Config Button 3 times

Add the T/H Sensor into the Z-Wave network (**Manual Inclusion**):

- a. Power on your T/H Sensor, set your Z-Wave controller into add/inclusion mode.
- b. Short press Config Button 3 times.
- c. 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 a

Remove T/H Sensor from a Z-Wave network (Manual Exclusion):

- a. Power on your T/H Sensor, and let the Z-Wave primary controller into remove/exclusion mode.
- b. Short press Config Button 3 times.
- c. 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 from step a.

4.5 Press and hold Config Button 10 seconds

Reset T/H Sensor to factory default:

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: Please use this procedure only when the network primary controller is missing or otherwise inoperable.

5 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

6 Notification

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.

7 Manufacturer Information

Parameter	Value
Manufacturer ID 1	0x045A
Product ID 1	0x0113

8 Configuration

User can change the default settings by the below configuration parameters. After device reset, all these parameters will be set to their default values.

Properties:

R=Readable, W=Writable, S=Signed Integer, U=Unsigned Integer, E=Enumerated, B=Bit field

(Param 1) Low Battery Threshold

Configure low battery report threshold, sends low battery report via notification and battery report when battery level drops under setting. Unit %.

Parameter Number	Size (Byte)	Available Settings	Default value	Property
0x01	1	5-50	10	R/W/U

(Param 2) Temperature Unit

Set the unit for temperature when reports.

Parameter Number	Size (Byte)	Available Settings	Default value	Property
0x02	1	0/1	0 (EU/AU) 1 (US)	R/W/E

0 - Celsius

1 – Fahrenheit

(Param 3) Minimum Temperature Change To Report

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

0 = disable.

Parameter Number	Size (Byte)	Available Settings	Default value	Property
0x03	1	0-255	10	R/W/U

(Param 4) Minimum Humidity Change To Report

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.

Humidity rang = 1%to50%

0 = disable.

Parameter Number	Size (Byte)	Available Settings	Default value	Property
0x04	1	0-50	5	R/W/U

(Param 5) Sensor Minimum Change Check Time

Check time in seconds.

Parameter Number	Size (Byte)	Available Settings	Default value	Property
0x05	2	60-65535	900	R/W/U

(Param 6) Sensor Periodic Reports

This parameter defines the time interval to send an unsolicited report.

Parameter Number	Size (Byte)	Available Settings	Default value	Property
0x06	2	60~65535	3600	R/W/U

9 Security Network

This device is a security enabled Z-Wave Plus product that is able to use encrypted Z-Wave Plus messages to communicate to other security enabled Z-Wave Plus products.

The device supports the security function with S2 encrypted communication. The device will auto switch to thesecurity mode when the device included with a security controller. In the security mode, the commands will use security and security2 command class wrapped to communicate with others, otherwise the device will not response any commands.

This device supports security levels are listed in belowtable:

Security Levels	Support (Yes/No)
SECURITY_KEY_S0	No
SECURITY_KEY_S2_UNAUTHENTICATED	Yes
SECURITY_KEY_S2_AUTHENTICATED	Yes
SECURITY_KEY_S2_ACCESS	No