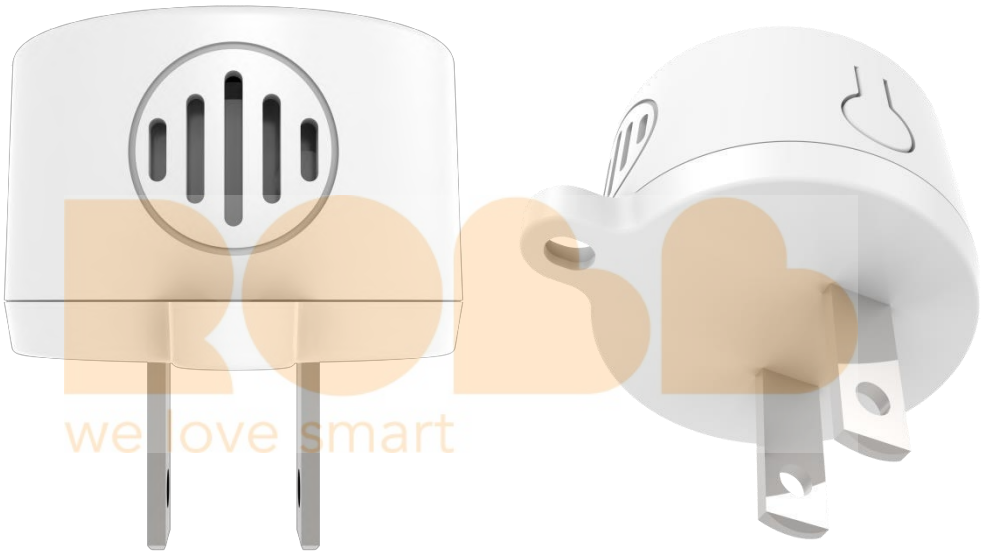
Repeater User Manual

(S2 Version)

Thank you for your support

- Please read the instruction manual carefully before operating
- Please keep the instruction manual for further reference



This product 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.

NOTE: 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 or more 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

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the 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.

Operation configuration

Specifications

Power Supply	85 – 240V AC, 50/60Hz
Power Consumption	Up to 0.8W
Operational Temperature	0 - 40℃
Communication frequency	908.40MHz, 916.00MHz(US)
Range	Up to 80m indoors (depending on the building structure) Up to 100m outdoors.
Detect temperature range	-20~80℃

- **Compatible with any Z-Wave main controller.**
- **The use distance of the equipment can be increased by repeater, and the distance can be increased by up to 100 m.**
- **With a temperature probe, the temperature can be detected, the detection range is -20 ~ 80 ℃**
- **Use of flame retardant materials**

Z-Wave™ Network Inclusion/Exclusion/Reset

There is one button on the side of the device, it can be executed inclusion, exclusion and reset from Z-Wave™ network.

Add[1]	1、 Power up the device. Set Z-Wave™ Controller into inclusion mode Press and hold the button for 5s until green led lights is on, then release the button before green led turn off.	Blue led will blink with 1s interval until inclusion successful.

Remove	1、 Power up the device. Set Z-Wave™ Controller into exclusion mode Press and hold the button for 5s until Green led lights is on, then release the button before green led turn off.	Blue led will blink with 1s interval until exclusion successful.
Factory Reset[2]	1、 Power up the device. Press and hold the button for 10s until Red led lights is on, then release the button before red led turn off.	
Product Test Mode	1、 Press and hold the button. Power on the device, device will enter factory product test mode	
Send NIF[3]	Press and hold the button for 5s until Green led lights is on, then release the button before green led turn off.	

Notice 1: When device enters into inclusion mode, the device all functionality will be useless. The inclusion mode will be timeout after 30s, user can press and hold the button for 5s to terminate inclusion mode.

Notice 2: Factory Reset will clear the device all Z-Wave™ Network data (include home id, node id, etc…) saved in memory, and restore all configuration parameters to factory default. Please use this procedure only when the network primary controller is missing or otherwise inoperable.

Notice 3: NIF – Node Information

Association

The device supports 5 association groups, and each group supports max 5 associated nodes.

Group 1, Lifeline – All nodes which associated in group 1(lifeline group) will receive the messages that send by device through lifeline.

Group 2, all nodes which associated in group 2 will be controlled by device through BASIC_SET command. When ambient temperature value is less than the setting value in "**Configuration: No.6**", device will trigger a low temperature Alarm and send a BASIC_SET = 0xFF to the nodes that associated in group 2. And BASIC_SET = 0x00 will be sent when temperature value is large than the setting value in "**Configuration: No.6**".

Group 3, all nodes which associated in group 3 will be controlled by device through BASIC_SET command. When ambient temperature value is less than the setting value in "**Configuration: No.7**", device will trigger a low temperature Alarm and send a BASIC_SET = 0xFF to the nodes that associated in group 3. And BASIC_SET = 0x00 will be sent when temperature value is large than the setting value in "**Configuration: No.7**".

Group 4, all nodes which associated in group 4 will be controlled by device through BASIC_SET command. When ambient humidity value is less than the setting value in "**Configuration: No.8**", device will trigger a low humidity Alarm and send a BASIC_SET = 0xFF to the nodes that associated in group 4. And BASIC_SET = 0x00 will be sent when humidity value is large than the setting value in "**Configuration: No.8**".

Group 5, all nodes which associated in group 5 will be controlled by device through BASIC_SET

command. When ambient humidity value is less than the setting value in "**Configuration: No.9**", device will trigger a low humidity alarm and send a BASIC_SET = 0xFF to the nodes that associated in group 5. And BASIC_SET = 0x00 will be sent when humidity value is large than the setting value in "**Configuration: No.9**".

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

Group	Command Class	Command
1 (Lifeline)	COMMAND_CLASS_SENSOR_MULTILEVEL COMMAND_CLASS_INDICATOR COMMAND_CLASS_DEVICE_RESET_LOCALLY	SENSOR_MULTILEVEL_REPORT INDICATOR_REPORT DEVICE_RESET_LOCALLY_NOTIFICATION
2 (Control)	COMMAND_CLASS_BASIC	BASIC_SET
3 (Control)	COMMAND_CLASS_BASIC	BASIC_SET
4 (Control)	COMMAND_CLASS_BASIC	BASIC_SET
5 (Control)	COMMAND_CLASS_BASIC	BASIC_SET

Device Functionality and Z-Wave™ Message Report

This device has two main functions: repeater and ambient temperature and humidity measured.

Repeater

This device is a z-wave repeater device. In the z-wave network, it can be as a router to extend the communication distance.

Temperature and humidity monitor

The device have embeds a temperature and humidity sensor to monitor ambient temperature and humidity variation and report to z-wave hubs.

Command Class Sensor Multilevel

Temperature Sensor

When the ambient temperature differential over 1.0℃ or 1.0 degree F(in default, and decides by "Configuration No. 4"), the device will unsolicited to send a "SENSOR_MULTILEVEL_REPORT" to nodes which associated in lifeline.

Command Class	COMMAND_CLASS_SENSOR_MULTILEVEL
Command	SENSOR_MULTILEVEL_REPORT
Type	Air Temperature
Scale	0.1 Degree Celsius / Fahrenheit(US)

Humidity Sensor

When the relative humidity differential over 1.0%RH (in default, and decides by "Configuration No.

5"), the device will unsolicited to send a "SENSOR_MULTILEVEL_REPORT" to nodes which associated in lifeline.

Command Class	COMMAND_CLASS_SENSOR_MULTILEVEL
Command	SENSOR_MULTILEVEL_REPORT
Type	Humidity
Scale	0.1% RH

Command Class Configuration

The device supports the controller to configure parameters of the device through Configuration Command Class, and the device has 11 parameters available for users to set according to their different needs:

Sensor Running Indicator Enable

1） When sensor enters to measure mode, this setting decides the Led indicated or not. '0' – No led blinks. '1' – led blinks with red.

Parameter Number	Size (Byte)	Available Settings	Default value
1	1	0, 1	1

2) OTA Led Disable

When OTA is running, this setting decides the Led blinking or not.

'0' – No Led blinks.

'1' – Led blinks with yellow.

Parameter Number	Size (Byte)	Available Settings	Default value
2	1	0, 1	1

3) Temperature Offset Value

The current measuring temperature value can be add and minus a value by this setting.

Temperature Offset Value = [Value] × 0.1 Degree Celsius / Fahrenheit (US).

Parameter Number	Size (Byte)	Available Settings	Default value
3	1	-120 ~ 120	0

4) Humidity Offset Value

The current measuring humidity value can be add and minus a value by this setting.

Humidity Offset Value = [Value] × 0.1 RH%.

Parameter Number	Size (Byte)	Available Settings	Default value
4	1	-120 ~ 120	0

5) Temperature D-Value Setting

This configuration sets the changed value of the temperature. When the difference from the last report exceeds this setting value, the device will report current temperature value to Z-Wave Hubs.

The D- Value = [Value] × 0.1 Degree Celsius / Fahrenheit (US).

Parameter Number	Size (Byte)	Available Settings	Default value
5	1	0 ~ 100	10

6) Humidity D-Value Setting

This configuration sets the changed value of the humidity. When the difference from the last report exceeds this setting value, the device will report current humidity value to Z-Wave Hubs.

The D- Value = [Value] × 0.1 RH%.

Parameter Number	Size (Byte)	Available Settings	Default value (min)
6	1	0 ~ 100	20

7) Low Temperature Alarm Value

This parameter is configured the threshold value that alarm level for low temperature. When the current ambient temperature value is less than this configuration value, device will trigger an alarm through the device associated in group 2.

The Alarm Value = [Value] × 0.1 Degree Celsius / Fahrenheit (US).

Parameter Number	Size (Byte)	Available Settings	Default value
7	2	-200 ~ 600	180

8) High Temperature Alarm Value

This parameter is configured the threshold value that alarm level for High temperature. When the current ambient temperature value is large than this configuration value, device will trigger an alarm through the device associated in group 3.

The Alarm Value = [Value] × 0.1 Degree Celsius / Fahrenheit (US).

Parameter Number	Size (Byte)	Available Settings	Default value
8	2	-200 ~ 600	300

9) Low Humidity Alarm Value

This parameter is configured the threshold value that alarm level for low humidity. When the current ambient humidity value is less than this configuration value, device will trigger an alarm through the device associated in group 4.

The Alarm Value = [Value] × 0.1 RH%.

Parameter Number	Size (Byte)	Available Settings	Default value
9	2	200 ~ 850	400

10) High Humidity Alarm Value

This parameter is configured the threshold value that alarm level for high humidity. When the current ambient humidity value is large than this configuration value, device will trigger an alarm through the device associated in group 5.

The Alarm Value = [Value] × 0.1 RH%.

Parameter Number	Size (Byte)	Available Settings	Default value
10	2	200 ~ 850	700

11) Sensor Measuring Interval

This parameter is configured the time interval for sensor measuring interval time. This value is larger, the sensor values updates slowly. '0' – Sensor Measuring Disable.

Unit: Second.

Parameter Number	Size (Byte)	Available Settings	Default value
11	2	0 ~ 30000	10

12) Heartbeat Time

This parameter is configured the time interval for sensor values report to Z-Wave Hubs and ignore the sensor D-Values. '0' – Heartbeat Time Disable, None Data Report to Hubs.

Unit: Second.

Parameter Number	Size (Byte)	Available Settings	Default value
12	2	0 ~ 30000	3600

Command Class Basic

This device support COMMAND_CLASS_BASIC to control other devices associated in group 2, 3, 4, 5. The devices associated in group 2, 3 , 4, 5 must be the AOS device or FLiRS Device.

The BASIC_SET value can refer to "**Association Group 2, 3, 4, 5**"

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.

This device supports SmartStart function. QR code is printed on the label that pasted on on surface of product and the outside of packing box. And the full DSK code is printed can be found on the packing box.

The device will enter SmartStart if the device is not included in network after power up. And then
2nd SmartStart time delay approximately 16s
3rd SmartStart time delay approximately 32s
4th SmartStart time delay approximately 64s
5th SmartStart time delay approximately 128s
6th SmartStart time delay approximately 256s
7th SmartStart time delay approximately 512s

Afterwards, the Smartstart mode will be auto running with 512 second interval until device is included successfully.

Security Network

The device supports the security function with and S2 + SmartStart encrypted communication. The device will auto switch to the security mode when the device included with a security controller. In the security mode, the follow commands must use security or security_2 command class wrapped to communicate, otherwise the device will not response any commands.

Security Keys

This device supports security levels are listed in below table:

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

All Supports Command Class in Each NIF Lists

Command Class	Version	Not Included	Non-secure Included	S0 Included		S2 Included	
				Non-Secure	Secure	Non-Secure	Secure
COMMAND_CLASS_ZWAVEPLUS_INFO	2	●	●	●		●	
COMMAND_CLASS_SECURITY	1	●	●	●		●	
COMMAND_CLASS_SECURITY_2	1	●	●	●		●	
COMMAND_CLASS_TRANSPORT_SERVICE	2	●	●	●		●	
COMMAND_CLASS_VERSION	3	●	●		●		●
COMMAND_CLASS_POWERLEVEL	1	●	●		●		●
COMMAND_CLASS_ASSOCIATION	2	●	●		●		●
COMMAND_CLASS_MULTI_CHANNEL_ASSOCIATION	3	●	●		●		●
COMMAND_CLASS_ASSOCIATION_GRP_INFO	1	●	●		●		●
COMMAND_CLASS_MANUFACTURER_SPECIFIC	2	●	●	●			●
COMMAND_CLASS_DEVICE_RESET_LOCALLY	1	●	●		●		●
COMMAND_CLASS_SENSOR_MULTILEVEL	11	●	●		●		●
COMMAND_CLASS_INDICATOR	3	●	●		●		●
COMMAND_CLASS_CONFIGURATION	4	●	●		●		●
COMMAND_CLASS_SUPERVISION	1	●	●	●		●	
COMMAND_CLASS_FIRMWARE_UPDATE_MD	5	●	●		●		●

Notice 1: When device is included with S0 level, COMMAND_CLASS_MANUFACTURER_SPECIFIC is supported non-securely. And when device is included with S2 level, COMMAND_CLASS_MANUFACTURER_SPECIFIC is supported securely only.

Notice 2: "●" – Indicates the corresponding command class is supported in NIF, Blank means the command class is not supported.

Led Color Indicator

Led Color	Action	Description
Red	Light On 1s When Power On	Not Add in Z-Wave Network
	Blink One Time	Sensor Measuring Time
	Light On 1s	Press And Hold Button 10s, Off at 11th Second
Green	Light On 1s When Power On	Add in Z-Wave in Network Already
	Light On 1s	Press And Hold Button 5s, Off at 6th Second
Blue	Blink with 1s Interval	Z-Wave Indicator
Yellow	Blink with 500ms Interval	OTA is Running

we love smart