

Water Sensor Manual

Model: NAS-WS09Z8U

(Z-Wave 700s S2 Version)

Version	Written By	Date	Change List
1.0	Yongqi	20191217	Initial
1.1	Yongqi	20201127	Modify Some Errors

The Water Leakage Detector is a Z-Wave™ enabled device and is fully compatible with any Z-Wave™ enabled network. Z-Wave™ enabled devices displaying the Z-Wave™ logo can also be used with it regardless of the manufacturer, and ours can also be used in other manufacturer's Z-Wave™ enable networks.

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.

Z-Wave™ Network Inclusion/Exclusion/Reset

Remove the sensor casing, there is one button on the top side of PCB board, it can be executed inclusion, exclusion and reset from Z-Wave™ network.

Add ¹	1、 Power up the device. 2、 Set Z-Wave™ Controller into inclusion mode 3、 Press and hold the button for 5s until white led lights is on, then release the button before led turn off.	Blue led will blink with 1s interval until inclusion successful.
Remove	1、 Power up the device. 2、 Set Z-Wave™ Controller into exclusion mode 3、 Press and hold the button for 5s until white led lights is on, then release the button before led turn off.	Blue led will blink with 0.5s interval until exclusion successful.
Factory Reset ²	1、 Power up the device. 2、 Press and hold the button for 10s until pink led lights is on, then release the button before led turn off.	
Product Test Mode	1、 Press and hold the button. 2、 Power on the device, device will enter into factory product test mode with white light blink one time.	
Send NIF ³	Press and hold the button for 5s until white led lights is on, then release the button before 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 implement step 3 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 2 association groups, and each 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.

Group 2 is controlling group, all nodes associated in this group will be controlled through BASIC_SET command by the device when device detects a water leakage event.

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

Group	Command Class	Event
1 (Lifeline)	COMMAND_CLASS_NOTIFICATION	NOTIFICATION_REPORT
	COMMAND_CLASS_SENSOR_BINARY	SENSOR_BINARY_REPORT
	COMMAND_CLASS_BATTERY	BATTERY_REPORT
	COMMAND_CLASS_INDICATOR	INDICATOR_REPORT
	COMMAND_CLASS_DEVICE_RESET_LOCALLY	DEVICE_RESET_LOCALLY_NOTIFICATION
2 (Control)	COMMAND_CLASS_BASIC	BASIC_SET

Z-Wave™ Message Report

Once the device detects a water leakage event, it will report the event to the controller.

In default, device will use COMMAND_CLASS_NOTIFICATION to represent the water leakage event.

User can also enable COMMAND_CLASS_SENSOR_BINARY report by setting the “Configuration No.9” to ‘1’.

Notice 1: If device is not added in any Z-Wave network, it will be beep alarm always until battery is running down, and the parameter settings (Configuration Parameter 1 to 4) are invalid.

Water Leakage Report

When device detects a water leakage event, it will automatically send the notification report to nodes associated in lifeline.

Command Class	COMMAND CLASS NOTIFICATION
Command	NOTIFICATION REPORT
Type	WATER_ALARM (0x05)
Event	WATER_LEAK_DETECTED_UNKNOWN_LOCATION (0x02) WATER_ALARM_NO_EVENT (0x00)
Command Class	COMMAND CLASS SENSOR BINARY
Command	SENSOR BINARY REPORT
Type	WATER
Event	DETECTED (0xFF) / NO-DETECTED (0x00)

Command Class Configuration

The device supports the controller to configure parameters of the device through Configuration Command Class, and the device has 9 parameters available for users to set according to their different needs:

Fig.1 Alarm Time Setting Figure

1) Alarm Duration Time

This configuration can be used to adjust the time for beep and LED turned on when water leakage is detected. If this configuration is set to '0', the beep and LED will be turn on always until water leakage is not detected. Prefer to Figure 1. Unit: min (Minute).

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

2) Alarm Interval Time

This configuration defines beep on /off interval time when water leakage is detected. Prefer to Figure 1. Unit: s (Second).

Parameter Number	Size (Byte)	Available Settings	Default value
2	1	5 ~ 120	60

3) First Alarm On Time Duration

This configuration defines beep on duration first time when water leakage is detected. Prefer to Figure 1. Unit: s (Second).

Parameter Number	Size (Byte)	Available Settings	Default value
3	1	10 ~ 120	60

4) Alarm on Time Duration

This configuration defines beep on duration after fist beep on when water leakage is detected. Prefer to Figure 1. Unit: s (Second).

Parameter Number	Size (Byte)	Available Settings	Default value
4	1	5 ~ 120	5

5) Water Leakage Detected Disable

This configuration sets to '0' will disable the water leakage detected function.

Parameter Number	Size (Byte)	Available Settings	Default value
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5

1

0, 1

1

6) Beep Alarm Disable

This configuration sets to '0' will disable the beep alarm on when device detects water leakage event.

Parameter Number	Size (Byte)	Available Settings	Default value
6	1	0, 1	1

7) Led Light Alarm Disable

This configuration sets to '0' will disable the Led indicating when device detects a water leakage event.

Parameter Number	Size (Byte)	Available Settings	Default value
7	1	0, 1	1

8) Basic Set Level

This configuration sets the level for device sending BASIC_SET to nodes that associated in group 2 when device detects a water leakage event.

[0] – Off, BASIC_SET = 0x00, all nodes associated in group 2 will be off.

[1 ... 99] – On, BASIC_SET = [Setting Value].

[100] – On, BASIC_SET = 0xFF.

Parameter Number	Size (Byte)	Available Settings	Default value
8	1	0 ~ 100	100

9) Sensor Binary Report Enable

This parameter sets to '1' will enable SENSOR_BINARY_REPORT when device detects a water leakage event. This is for Z-Wave protocol backward compatibility.

Parameter Number	Size (Byte)	Available Settings	Default value
9	1	0, 1	0

Wakeup Command Class

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

The minimum wakeup interval is 20s

The maximum wakeup interval is 86400s (24 Hours)

Allowable min step among each wakeup interval is 60 seconds, such as 1860s, 1870s, 1880s...

Note: The default value is 12 hours with factory default. This value is greater, the battery life is longer.

Battery Command Class

The users can also enquire the battery status of the device by sending BATTERY_GET command.

Once the device receives the command, it will return BATTERY_REPORT command.

The device will send BATTERY_REPORT = 0xFF command to the Z-Wave™ Controller to inform that

the device is in dead battery status, otherwise BATTERY_REPORT value range is from 0% to 100%.

Command Class Basic

The COMMAND_CLASS_BASIC is realized to control the devices associated in group 2 in this water detector.

When water detector detects a water leakage event occurred, it will send a “BASIC_SET = [Value]” command to control the devices in group 2.

And it will send a “BASIC_SET = 0x00” command to control the devices in group 2 after the water leakage event is cleared.

The [Value] is set by configuration No.8.

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 printed by laser can be found 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 if device is not included successfully during 10 second, it will enter sleep mode. 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 or battery run down.

Led Action Indicator

Led Color	Action	Description
Red	Light On 1s When Power On	Not Add in Z-Wave Network
	Light On Always	Water Leakage is Detected
Pink	Light On 2s	Press And Hold Button 10s, Off at 12 th Second
Green	Light On 1s When Power On	Add in Z-Wave in Network Already
White	Light On 2s	Press And Hold Button 5s, Off at 7 th Second
Blue	Blink with 1s Interval	Add to Z-Wave Network
	Blink with 500ms Interval	Remove from Z-Wave Network
Yellow	Blink with 500ms Interval	OTA is Running
	Light On Always	Button Pressed and Held Time Large Than 12s.

Security Network

The device supports the security function with S2 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 and 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

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_BATTERY	1	•	•		•		•
COMMAND_CLASS_WAKEUP	2	•	•		•		•
COMMAND_CLASS_NOTIFICATION	8	•	•		•		•
COMMAND_CLASS_SENSOR_BINARY	2	•	•		•		•
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

Specifications

Power Supply	CR14250 × 1
Standby Current	2uA
Work Current(RF Tx)	Up to 16mA
Operational Temperature	0 - 70°C
Communication frequency	868.40MHz, 869.85MHz (EU) 908.40MHz, 916.00MHz(US)
Range	Up to 45m indoors (depending on the building structure), and 80m for outdoor open fields. Up to 60m outdoors.

FCC Warning

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.

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

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.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.