Aeon Labs Water Sensor 6

(Z-Wave Water Sensor)
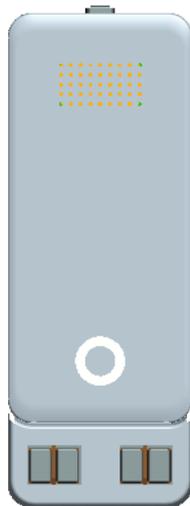
Change history

Revision	Date	Change Description
1	01/05/2017	Initial draft.
2	03/28/2017	Update
3	04/07/2017	Update
4	04/27/2017	Update

Aeon Labs Water Sensor 6

Engineering Specifications and Advanced Functions for Developers

Aeon Labs Water Sensor 6 is a binary sensor device based on Z-Wave enhanced 232 slave library of V6.51.09.

The Water Sensor 6 contains 2 Sensor ports, which allow you to connect 2 water probes on the Main Sensor unit to detect the presence and absence of water or detect whether there is the water leak in some places of your home.

It 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.

The Water Sensor 6 is a security Z-Wave plus device, so a security enabled controller is needed for take full advantage of all functionally for the Sensor. It also supports the Over The Air (OTA) feature for the product's firmware upgrade.

As soon as Water Sensor 6 is removed from a Z-Wave network, it will be restored into default factory setting.

1. Library and Command Classes:

1.1 SDK: 6.51.09

1.2 Library:

- Basic Device Class: BASIC_TYPE_ROUTING_SLAVE
- Generic Device class: GENERIC_TYPE_SENSOR_NOTIFICATION
- Specific Device Class: SPECIFIC_TYPE_NOTIFICATION_SENSOR

1.3 Commands:

|	Non-Security Inclusion	Security Inclusion
Node Info List	COMMAND_CLASS_ZWAVEPLUS_INFO_V2 COMMAND_CLASS_VERSION_V2 COMMAND_CLASS_MANUFACTURER_SPECIFIC_V2 COMMAND_CLASS_ASSOCIATION_GRP_INFO_V1 COMMAND_CLASS_ASSOCIATION_V2 COMMAND_CLASS_POWERLEVEL_V1 COMMAND_CLASS_NOTIFICATION_V7 COMMAND_CLASS_WAKE_UP_V2 COMMAND_CLASS_BATTERY_V1 COMMAND_CLASS_SENSOR_MULTILEVEL_V5 COMMAND_CLASS_CONFIGURATION_V1 COMMAND_CLASS_MULTI_CHANNEL_V4 COMMAND_CLASS_MULTI_CHANNEL_ASSOCIATION_V3 COMMAND_CLASS_FIRMWARE_UPDATE_MD_V2 COMMAND_CLASS_DEVICE_RESET_LOCALLY_V1 COMMAND_CLASS_MARK_V1	COMMAND_CLASS_ZWAVEPLUS_INFO_V2 COMMAND_CLASS_VERSION_V2 COMMAND_CLASS_MANUFACTURER_SPECIFIC_V2 COMMAND_CLASS_WAKE_UP_V2 COMMAND_CLASS_SECURITY_V1 COMMAND_CLASS_DEVICE_RESET_LOCALLY_V1 COMMAND_CLASS_MARK_V1

Security Supported Command Class List		COMMAND_CLASS_ASSOCIATION_GRP_INFO_V1 COMMAND_CLASS_ASSOCIATION_V2 COMMAND_CLASS_POWERLEVEL_V1 COMMAND_CLASS_NOTIFICATION_V7 COMMAND_CLASS_BATTERY_V1 COMMAND_CLASS_SENSOR_MULTILEVEL_V5 COMMAND_CLASS_CONFIGURATION_V1 COMMAND_CLASS_MULTI_CHANNEL_V4 COMMAND_CLASS_MULTI_CHANNEL_ASSOCIATION_V3 COMMAND_CLASS_FIRMWARE_UPDATE_MD_V2

2. Technical Specifications

Operating distance: Up to 492feet/150 meters outdoors.

3. Familiarize yourself with your Water Sensor

3.1 Interface
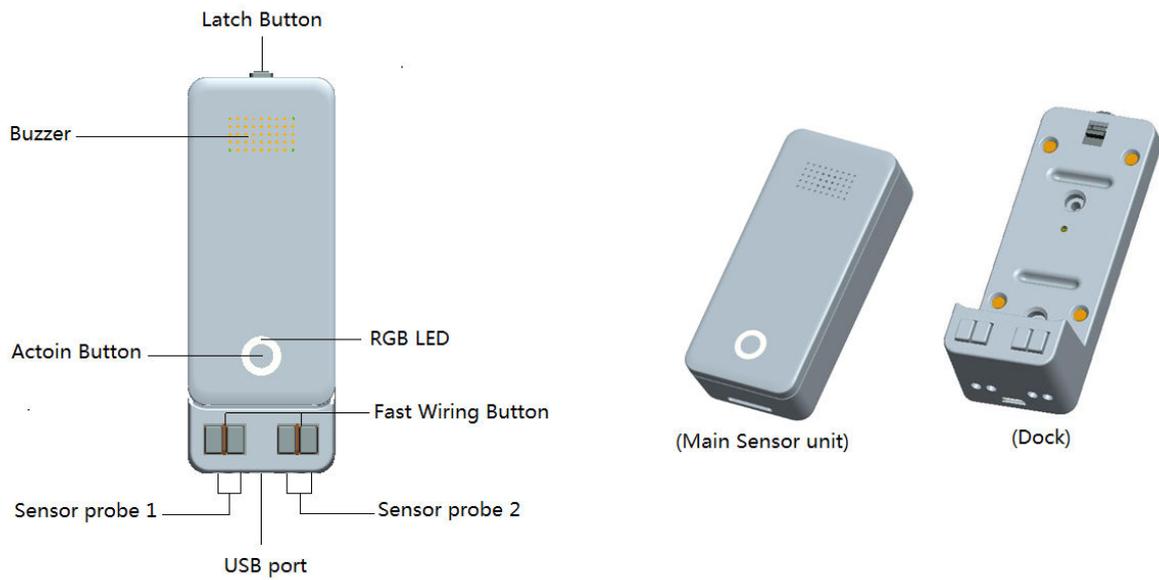
4. All Functions of Each Trigger

4.1 Function of Action Button

Trigger	Description
Click one time	1. Send non-security Node Info frame. 2. Add Water Sensor into Z-Wave network(non-security inclusion):

	1. Power on Water Sensor. The Water Sensor's LED will blink slowly when you short press the Action Button. 2. Let the primary controller into inclusion mode (If you don't know how to do this, refer to its manual). 3. Press the Action Button. 4. If the inclusion is success, Water Sensor's LED will be kept turning on for 8 seconds when you short press the Action Button. If the LED is still in slow blink, in which you need to repeat the process from step 2. **3. Remove Water Sensor from Z-wave network:** 1. Power on Water Sensor. The Water Sensor's LED will be kept turning on for 8 seconds when you short press the Action Button. 2. Let the primary controller into exclusion mode (If you don't know how to do this, refer to its manual). 3. Press the Action Button. 4. If the exclusion is success, Water Sensor's LED will blink slowly when you short press the Action Button. If Water Sensor's LED still keeps on status, in which you need to repeat the process from step 2.
Quick press 2 times within 1 second	**1. Send Security Node Info frame.** **2. Add Water Sensor into z-wave network(*Security inclusion*):** 1. Power on Water Sensor. The Water Sensor's LED will blink slowly when you short press the Action Button. 2. Let the primary controller into inclusion mode (If you don't know how to do this, refer to its manual). 3. Press the Action Button. 4. If the inclusion is success, Water Sensor's LED will be kept turning on for 8 seconds when you short press the Action Button. If the LED is still in slow blink, in which you need to repeat the process from step 2. **3. Remove Water Sensor from Z-wave network:** 1. Power on Water Sensor. The Water Sensor's LED will be kept turning on for 8 seconds when you short press the Action Button. 2. Let the primary controller into exclusion mode (If you don't know how to do this, refer to its manual). 3. Press the Action Button. 4. If the exclusion is success, Water Sensor's LED will blink slowly when you short press the Action Button. If Water Sensor's LED still keeps on status, in which you need to repeat the process from step 2.
Press and hold for 3 seconds	**Enable/disable wake up for 10 minutes.** (When it is enabled, the orange Led will fast blink)
Press and hold for 20 seconds	**Reset Water Sensor to factory default:** 1. Press and hold the Action Button for 20 seconds. 2. If holding time more than one second, the LED will blink faster and faster. If holding time more than 20 seconds, the LED will be on for 2 seconds, which indicates reset is success, otherwise please repeat step 2. *Note:*

	1, This procedure should only be used when the primary controller is inoperable.
	2, Reset Water Sensor to factory default settings, it will:
	a), let the Water Sensor to be excluded in Z-Wave network;
	b), delete the Association settings;
	c), restore the Configuration settings to the default.

5. Special rule of each command

5.1 Basic Command Class

When the water sensor is triggered, it will send the Basic Set 0x00/0xFF (configured by parameter 0x58 and 0x59) to the associated nodes in association group 3 or 4.

Basic Report = 0x00, Water Leak Cleared.

Basic Report = 0xFF, Water Leak Detected

5.2 Z-Wave Plus Info Report Command Class

Parameter	Value
Z-Wave Plus Version	1
Role Type	6 (ZWAVEPLUS_INFO_REPORT_ROLE_TYPE_SLAVE_ALWAYS_ON)
Node Type	0 (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)

5.3 Manufacturer Specific Report

Parameter	Value
Manufacturer ID 1	AEON LABS=0x00
Manufacturer ID 2	AEON LABS=0x86
Product Type ID 1	EU=0x00, US=0x01, AU=0x02 CN=0x1D (29)
Product Type ID 2	0x02
Product ID 1	0x00
Product ID 2	0x7A (122)

5.4 Association Command Class

Water Sensor 6 supports 4 association groups and can add max 5 nodes for every group.

Association Group	Nodes	Send Mode	Send commands
Group 1 (Lifeline)	[1,5]	Single Cast	1. Send Battery Report or Multilevel Sensor Report (configured by parameter 0x65 and 0x6F). 2. Send Notification Report when water leak is detected. *Note: When having a classic Node ID association on this group, the Water Sensor will send the "Water leak detected" notification if any of the probes detect water and "event cleared" notification if none of the probe longer detects a*

			water leak. 3. Send Device Reset Locally when it is reset.
Group 2	[1,5]	Single Cast	Send configuration 0x88 report:
Group 3	[1,5]	Single Cast	Send Basic Set (configured by parameter 0x58) to the associated nodes in Group 3 when the Sensor probe 1 is triggered.
Group 4	[1,5]	Single Cast	Send Basic Set (configured by parameter 0x59) to the associated nodes in Group 4 when the Sensor probe 2 is triggered.

5.5 Association Group Info Command Class

5.5.1 Association Group Name Report

Group	Name	ASSIC Code
Group 1	Lifeline	4C 69 66 65 6C 69 6E 65
Group 2	Retransmit	52 65 74 72 61 6E 73 6D 69 74
Group 3	ON/OFF Control(Sensor Probe 1)	4F 4E 2F 4F 46 46 20 43 6F 6E 74 72 6F 6C 28 4C 65 61 6B 20 50 72 6F 62 65 20 31 29
Group 4	ON/OFF Control(Sensor Probe 2)	4F 4E 2F 4F 46 46 20 43 6F 6E 74 72 6F 6C 28 4C 65 61 6B 20 50 72 6F 62 65 20 32 29

5.5.2 Association Group Info Report

Group	Profile	Vg1
Group 1	General:Lifeline	01 01 00 00 01 00 00 00
Group 2	General:NA	01 02 00 00 00 00 00 00
Group 3	Notification:WaterAlarm01	01 03 00 71 05 00 00 00
Group 4	Notification:WaterAlarm02	01 04 00 71 05 00 00 00

5.5.3 Association Group Command List Report

Group	Command Class	Command	Code
Group 1	COMMAND_CLASS_CONFIGURATION	CONFIGURATION_REPORT	70 06
	COMMAND_CLASS_BATTERY	BATTERY_REPORT	80 03
	COMMAND_CLASS_SENSOR_MULTILEVEL	SENSOR_MULTILEVEL_REPORT	31 05
	COMMAND_CLASS_NOTIFICATION	NOTIFICATION_REPORT	71 05
	COMMAND_CLASS_DEVICE_RESET_LOCALLY	DEVICE_RESET_LOCALLY_NOTIFICATION	5A 01
Group 2	COMMAND_CLASS_CONFIGURATION	CONFIGURATION_REPORT	70 06
Group 3	COMMAND_CLASS_BASIC	BASIC_SET	20 01
Group 4	COMMAND_CLASS_BASIC	BASIC_SET	20 01

5.6 Notification Command Class

Notification Type		Notification Events	
Heat Alarm	0x04	Previous Events cleared	0x00
		Overheat detected, unknown Location	0x02

		Under heat detected, Unknown Location	0x06
Water Alarm	0x05	Previous Events cleared	0x00
		Water Leak detected, Unknown Location	0x02
Home Security	0x07	Previous Events cleared	0x00
		Tampering Product covering removed	0x03

5.7 Multichannel Command Class

It supports 2 Multi Channel Endpoints.

1. Multi Channel endpoint 1 capability:
   71 - COMMAND_CLASS_NOTIFICATION
   5E - COMMAND_CLASS_ZWAVEPLUS_INFO
   59 - COMMAND_CLASS_ASSOCIATION_GRP_INFO
   98 - COMMAND_CLASS_SECURITY

If there is the multi channel endpoint association, the Multi Channel Endpoint 1 can be used to send the encapsulated report to the associated nodes in association Group 3 when the sensor probe 1 is triggered.

2. Multi Channel endpoint 2 capability:
   71 - COMMAND_CLASS_NOTIFICATION
   5E - COMMAND_CLASS_ZWAVEPLUS_INFO
   59 - COMMAND_CLASS_ASSOCIATION_GRP_INFO
   98 - COMMAND_CLASS_SECURITY

If there is the multi channel endpoint association, the Multi Channel Endpoint 2 can be used to send the encapsulated report to the associated nodes in association Group 4 when the sensor probe 2 is triggered.

5.8 Multilevel Sensor Command Class

Sensor Type		Scale	
Air Temperature	0x01	Celsius (℃)	0x00
		Fahrenheit (℉)	0x01

5.9 Configuration Command Class

7	6	5	4	3	2	1	0
Command Class = COMMAND_CLASS_CONFIGURATION							
Command = CONFIGURATION_SET							
Parameter Number							
Default	Reserved				Size		
Configuration Value 1(MSB)							
Configuration Value 2							
………							

Configuration Value n(LSB)

Parameter Number Definitions (8 bit):

Parameter Number Hex/ Decimal	Description	Default Value	Size
0x02 (2)	Enable/disable wake up for 10 minutes state when re-power on the Sensor 0 = Disable, 1 = Enable.	0	1
0x08 (8)	Set the timeout to go into the sleep state after the Wake Up Notification was sent out. [15, 255]	30	1
0x09 (9)	Get the current power mode Value 1: 0 = USB power, 1 = Battery power. Value 2: 0 = Sleeping mode after re-power on, 1 = keep awake for 10 minutes after re-power on, 2 = always awake state. Note: This parameter is a Get-only parameter.	-	2
0x0A (10)	Set the alarm time for the Buzzer when the sensor is triggered. Value 1: the time of Buzzer keeping OFF state (MSB) Value 2: the time of Buzzer keeping OFF state (LSB) Value 3: the time of Buzzer keeping ON state (MSB) Value 4: repeated cycle of Buzzer alarm. Note: one cycle is equal to the Buzzer from ON state to OFF state.	0x001E0A0A	4
0x27 (39)	Set the low battery value. Range: 10% to 50%.	20	1
0x30 (48)	Enable/disable the sensor report Bit =0, the corresponding sensor report is disabled. Bit =1, the corresponding sensor report is enabled.	1	1
0x31 (49)	Set the upper limit value (overheat). Value 1: temperature value (MSB) Value 2: temperature value (LSB) Value 2: 0 = Celsius unit, 1 = Fahrenheit unit. Value 4: reserved.	US version: 0x04100100 (104℉). Other versions: 0x01900000 (40℃).	4
0x32 (50)	Set the lower limit value (under heat). Value 1: temperature value (MSB) Value 2: temperature value (LSB) Value 2: 0 = Celsius unit, 1 = Fahrenheit unit. Value 4: reserved.	US version: 0x01400100 (32℉). Other versions: 0x00000000 (0℃).	4
0x39 (57)	Set the recover limit value of temperature sensor. Note: 1. When the current measurement <= (Upper limit – Recover limit), the upper limit report is enabled and then it would send out a sensor report when the next measurement is more than the upper limit. After that the upper limit report would be disabled again until the measurement <= (Upper limit – Recover limit).	US version: 0x1401(2.0℉) Other version: 0x1400 (2.0℃)	2

	2. When the current measurement >= (Lower limit + Recover limit), the lower limit report is enabled and then it would send out a sensor report when the next measurement is less than the lower limit. After that the lower limit report would be disabled again until the measurement >= (Lower limit + Recover limit). 3. High byte is the recover limit value. Low byte is the unit (0x00=Celsius, 0x01=Fahrenheit). 4. Recover limit range: 1.0 to 25.5 ℃/℉ (0x0100 to 0xFF00 or 0x0101 to 0xFF01). E.g. The default recover limit value is 2.0 ℃/℉ (0x1400/0x1401), when the measurement is less than (Upper limit – 2), the upper limit report would be enabled one time or when the measurement is more than (Lower limit + 2), the lower limit report would be enabled one time.		
0x40 (64)	Set the default temperature unit. 0 = Celsius unit. 1 = Fahrenheit unit.	US version: 0x01 Other versions: 0x00	1
0x54 (84)	The state of tilt sensor 0 = the Water Sensor main unit is in horizontal direction. 1 = the Water Sensor main unit is in vertical direction. Note: this parameter is a Get-only parameter.	-	1
0x56 (86)	Enable/ disable the buzzer. 0 = disable. 1 = enable.	1	1
0x57 (87)	To set which sensor is triggered the buzzer will alarm. 1 = If the Water leak is triggered, the buzzer will alarm. 2 = If the vibration is triggered, the buzzer will alarm. 4 = If the tilt sensor is triggered, the buzzer will alarm. 16 = If the under heat is triggered, the buzzer will alarm. 32 = If the overheat is triggered, the buzzer will alarm. Note: if the value = 1+2+4+16+32=55, which means if any sensor is triggered, the buzzer will alarm.	55	1
0x58 (88)	To set which value of the Basic Set will be sent to the associated nodes in association Group 3 when the Sensor probe 1 is triggered. 0 = Send nothing. 1 = Presence of water, send Basic Set 0xFF, absence of water, send Basic Set 0x00. 2 = Presence of water, send Basic Set 0x00, absence of water, send Basic Set 0xFF.	0	1
0x59 (89)	To set which value of the Basic Set will be sent to the associated nodes in association Group 4 when the Sensor probe 2 is triggered. 0 = Send nothing. 1 = Presence of water, send Basic Set 0xFF, absence of water, send Basic Set = 0x00. 2 = Presence of water, send Basic Set 0x00, absence of water, send Basic Set 0xFF.	0	1
0x5E (94)	To set which power source level is reported via the Battery CC. 0 = report the USB power level.	0	1

	1 = report the CR123A battery level.		
0x65 (101)	To set what unsolicited report would be sent to the Lifeline group. 0 = Send Nothing. 1 = Battery Report. 2 = Multilevel sensor report for temperature. 3 = Battery Report and Multilevel sensor report for temperature.	3	1
0x6F (111)	Set the interval time for sending the unsolicited report that configured by parameter 0x65. (Valid values 0x05-0x28DE80) Note: 1. The unit of interval time is second if USB power. 2. If battery power, the minimum interval time is equal to Wake Up interval set by the Wake Up CC.	3600	4
0x87 (135)	To set which sensor report can be sent when the water leak event is triggered and if the receiving device is a non-multichannel device. 0 = Send nothing. 1 = Send notification report to association group 1. 2 = Send configuration 0x88 report to association group 2. 3 = Send notification report to association group 1 and Send configuration 0x88 report to association group 2.	1	1
0x88 (136)	When the parameter 0x87 is set to 2 or 3, it can get the sensor probes' status through this configuration value. If Bit 0 = 0, which means absence of water is triggered by probe 1. If Bit 0 = 1, which means presence of water is triggered by probe 1. If Bit 1 = 0, which means absence of water is triggered by probe 2. If Bit 1 = 1, which means presence of water is triggered by probe 2. Bit 2-7 = reserved. *Note:* This parameter is a Get- only parameter.	_	1
0xC9 (201)	Temperature calibration (the available value range is [-128,127] or [-12.8℃, 12.7℃]). *Note:* 1. High byte is the calibration value. Low byte is the unit (0x00=Celsius, 0x01=Fahrenheit) 2. The calibration value (high byte) contains one decimal point. E.g. if the value is set to 20 (0x1400), the calibration value is 2.0 ℃ (EU/AU version) or if the value is set to 20 (0x1401), the calibration value is 2.0 ℉ (US version) 3. The calibration value (high byte) = standard value - measure value. E.g. If measure value =25.3℃ and the standard value = 23.2℃, so the calibration value= 23.2℃ - 25.3℃ = -2.1℃ (0xEB). If the measure value =30.1℃ and the standard value = 33.2℃, so the calibration value= 33.2℃ - 30.1℃=3.1℃ (0x1F).	US version: 0x0001. Other versions: 0x0000.	2
0xFC (252)	Enable/disable Configuration Locked. 0 = Disable. 1 = Enable.	0	1
0xFF (255)	Value=0x55555555、Default=1、Size=4	N/A	4

	Reset to factory default setting and removed from the z-wave network		
	Reset to factory default setting	N/A	1

Parameter number equals 0x30:

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
—	—	Notification Report for Overheat alarm	Notification Report for Under heat alarm	—	Configuration Report for Tilt sensor	Notification Report for Vibration event	Notification Report for Water Leak event