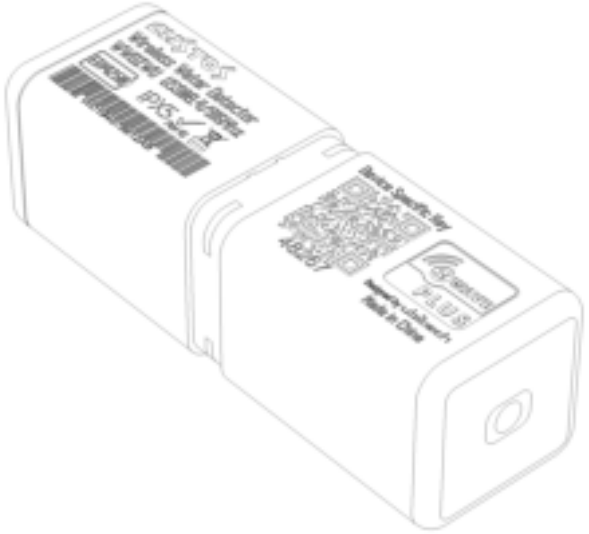
WWDZWU

Wireless Water Detector

Technology for Humanity



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1 INTRODUCTION

1.1 What's Z-Wave

Z-Wave is international wireless protocol used for Smart Home. It's a mash network technology to ensure reliable two-way communication with each other.

Z-Wave provides interoperability and security from multivendor to make sure Certificated products work within Z-Wave network. All mains operated nodes within the network will act as repeaters regardless of vendor to increase reliability of the communication.

1.2 About Custos WWD

Custos Wireless Water Detector "Custos WWD" detects Water Leakage with long battery operation lifespan, super tiny form factor detects water from either in body detection probe on 4 sides as well as optional remote wired water detection probe. It is a perfect companion for Custos BVS to work in concerto as a complete solution to close water valve once WWD detected water leak (need proper set up on App or gateway configuration).

It gets Z-Wave Plus Certification means it can be worked with other Z-Wave certified gateways or end-devices from other manufacturers.

2 FEATURES & SPECIFICATIONS

2.1 Physical Specifications

Parameter	Value
Model No.	WWDZWU (US) / WWDZWE (EU)
Dimensions	21.6 x 21.6 x 67.5mm
Weight	WWD Unit: 52g
Body Color	White
Water Detection method	Conduction
Waterproof and Dustproof	IPX5
Operation Temperature	14~122° F (-10 ~ +50°C)
Relative Humidity	8% ~ 80%

2.2 Hardware Characteristic

Parameter	Value
Z-Wave Module	ZGM130S037HGN1
Z-Wave RF Distance	40m (Indoor) / 120m (Outdoor)
Region Frequency	US: 908.4 & 916MHz, FCC CFR47 Part 15.249 EU: 868.42 & 869.85MHz
Water Leak Sensor	Dual Water Detection Probes “Built-in & Remote”
Temperature Sensor	Temperature Sensor Range from -40°C to +125°C / (-40°F to +257°F)
Action Sensor	3-Axis Accelerometer Sensor
LED Indicator	3 colors LED. (Green, Yellow & Red)
Power Supply	ER14250 - Battery 3.6V 1200mAH
Battery Life	Standby: ~3.uA over 10 Years

2.3 Software Specifications

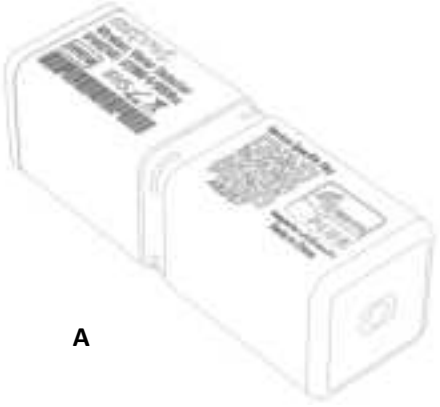
Parameter	Value
Wireless Technology	Z-Wave
Z-Wave Certification Type	Z-Wave Plus v2 Certification
Z-Wave SDK Version	v7.13.5
Z-Wave Library	0x04 (ROUTING_SLAVE)
Z-Wave Role Type	0x06 (ROLE_TYPE_SLAVE_SLEEPING_REPORTING)
Device Type	Notification
Generic Device Type	0x07 (GENERIC_TYPE_SENSOR_NOTIFICATION)
Specific Device Type	0x01 (SPECIFIC_TYPE_NOTIFICATION_SENSOR)
Security Class	Non-Security, S2 Unauthenticated and S2 Authenticated
Smart Start	Support: After powering on, Smart Start is auto activated if it's out of Z-Wave network
Firmware Update	Support: Firmware upgrade support via RF, "Over The Air (OTA)"
Association	Support 5 Groups. Lifeline, Built-in Water Leak Alarm, Remote Water Leak Alarm, Overheat & Underheat
Factory Default Reset	Support: Device Locally Reset

3 WHAT INSIDE IN THE BOX

Standard Custos Wireless Water Detector (WWD) package comes with below items

3.1 Custos WWD Main Unit x 1 "A"

3.2 Remote Water Detection Probe x 1 (Optional) "B"



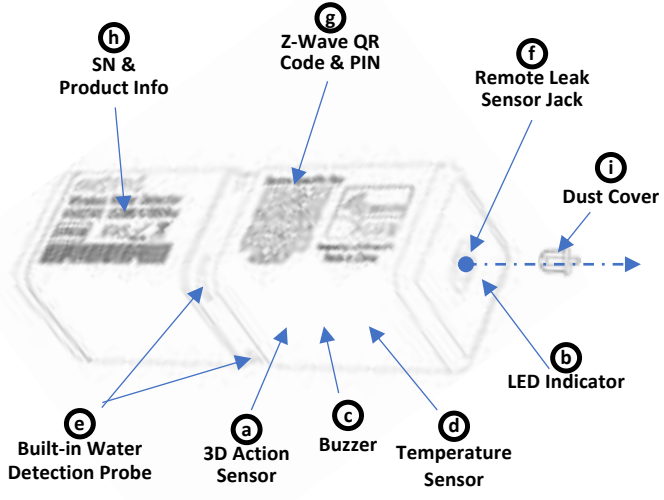
A

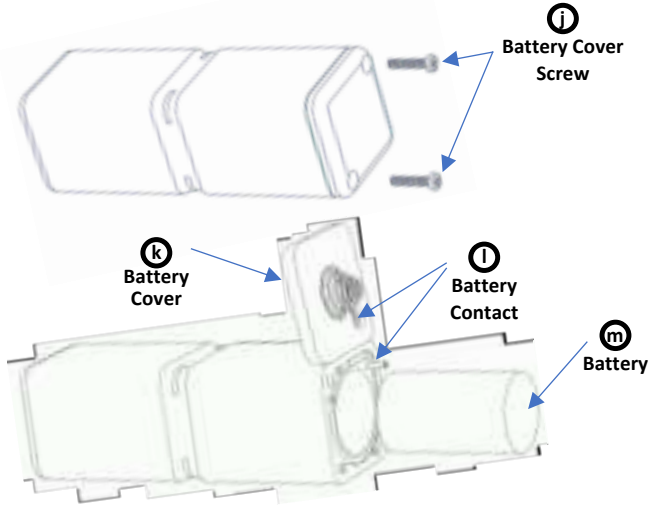
B

4 UNDERSTANDING CUSTOS WWD

4.1 Connectors & Interfaces

Terminology	Description	Terminology	Description
a 3D Action Sensor	3-axis Action Sensor	h SN & Product Details	Z-Wave QR Code & PIN Code
b Display Indicators	3 Colors LED “Green, Yellow & Red”	i Dust Cover	
c Sound Indicator	Buzzer	j Battery Cover Screw	
d Temperature Sensor	Built-in Temperature Sensor	k Battery Cover	
e Leak Sensor #1	Built-in Water Detection Probe	l Battery Contact	3.6V
f Leak Sensor #2	Remote Water Detection Probe – 3.5mm jack	m Battery	
g Z-Wave QR Code	Z-Wave QR Code & PIN Code		





5 CHANGE THE BATTERY

5.1 Battery Support

- Model: ER14250
- Voltage: 3.6V
- Type: Lithium 1200mAh

5.2 How to change battery

- Remove the screws of battery cover and batter cover, (Figure A)
- Replace new ER14250 battery
- Put the rubber waterproof rubber o-range (Figure B)
- Put the battery cover and align with two battery metal contacts then tighten the screws.

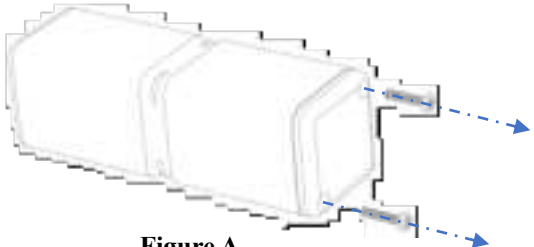


Figure A

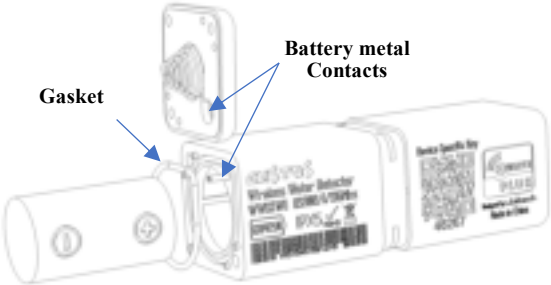


Figure B

6 ACTION SENSOR & INDICATORS BEHAVIOR

6.1 3-axis Action Sensor

- Built-in 3-Axis Accelerometer for gesture recognition by detecting a series of movements,
- 3-axis movement supports detection (X, Y & Z axis).

6.2 Visual Indicator

- 3 Colors LED: GREEN, YELLOW & RED
- ON Event: ON, quick blinking and slow blinking

6.3 Sound Indicator

- Buzzer: Long & short beep sound.

7 HOW 3-AIXS ACTION SENSOR WORKS

7.1 3-axis Actions Sensor – Gesture Recognition Procedure

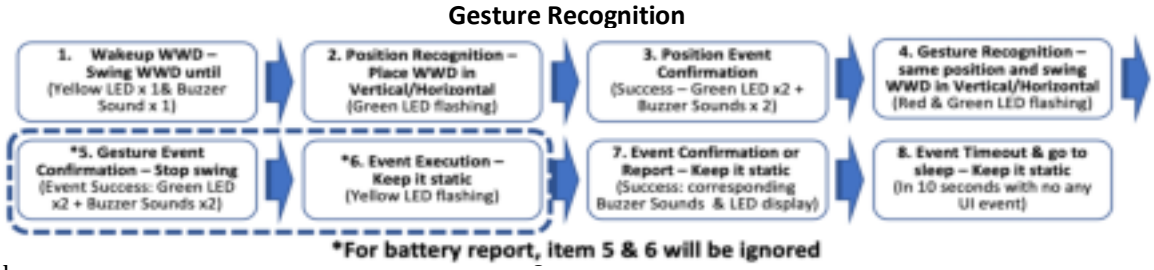
- End-user can use built-in 3-axis Accelerometer to replace physical touchable key, it can detect any movement very sensitive, end-user use a series of action to enable some defined function, such as below functions
  - i. To wake up from Custos WWD from sleep mode,
  - ii. Inclusion & Exclusion,
  - iii. Factory Default Reset,
  - iv. Send out Battery Report,
- WWD supports three types of gesture movements, with "Position-Movements" as below,

ⓐ Vertical-Vertical

ⓑ Vertical-Horizontal

ⓒ Horizontal-Horizontal

- To enable Gesture Recognition, please following below procedure,



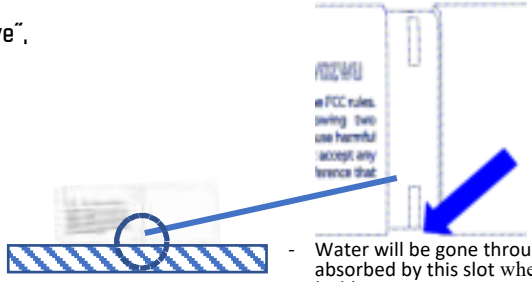
8 HOW WATER LEAK SENSOR WORKS

8.1 Water Detection Probes

- Custos WWD supports two Water Detection Probes "Built-in & Remove",

8.2 Built-in Water Detection Probe

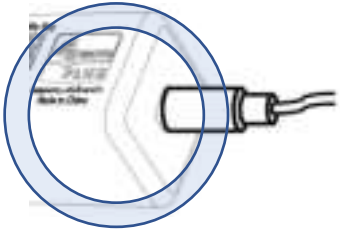
- WWD has special recess which helps induce Water run through it, to create effective detection by probes from both end
- To achieve better result, please put the WWD on the floor flatly

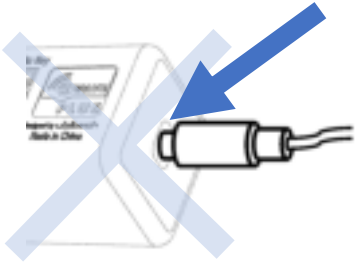


- Water will be gone through and absorbed by this slot when water is leaking

8.3 Remote Water Detection Probe

- To make sure Sensor Probe works properly show as below pictures, please make sure insert the Remove Sensor Probe tightly and there is no any gap allowed between 3.5mm jack and housing.





9 SETUP & PHICAL INSTALLATION

9.1 Activate WWD from Shipping Mode (For Brand New WWD only)

i. To trigger Built-in Water Detection Probe for 10 seconds with YELLOW LED flash 10 times, "Figure A"
ii. Until the success UI signal show up, "Green LED & Buzzer sound 1 time"

Figure A

9.2 Connect the Remote Sensor Probe (Optional)

i. Remove Dust Cover. (*Please do not remove Dust Cover if Remote Sensor Probe not installed*) "Figure B"
ii. Insert the 3.5mm jack of Remote Water Detection Probe tightly. "Figure C"
iii. Place the Custos WWD on the floor horizontally

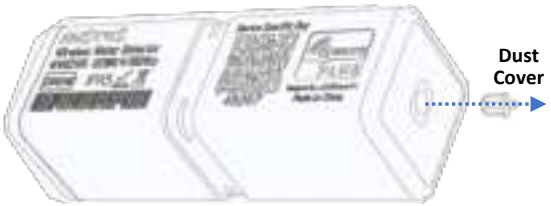


Figure B

Figure C

10 WORKING MODE SUPPORT

10.1 Shipping Mode (Deep Sleep Mode)

- By default, Custos WWD is set in Shipping Mode to keep it in deep sleep to conserve battery for transportation & warehousing, in this time all functions will be disabled until unlocked it from Shipping Mode. End-customer must activate the device from Shipping Mode before set up.

10.2 Standalone Mode

- If Custos WWD is not belongs to any Z-Wave Network and it unlocked from Shipping Mode. It supports Classic Inclusion / Smart Start to add into Z-Wave Network.

10.3 Mesh Network Mode

- Custos WWD is added into a Z-Wave Network and it can join full benefits of Z-Wave technology.
- Supported function as Water Leak Detection, Temperature Report, Smart Start, Classic Inclusion, Exclusion & Factory Default Reset.
- Custos WWD also can associate with Custos BVS to shut off the Water Valve when detected Water Leak.

10.4 Water Leak Sensor & Alarm

- Water Leak Alarms refer to two Water Detection Probes "Built-in & Remote"

11 USER INTERFACE BEHAVIORS

LI Event status

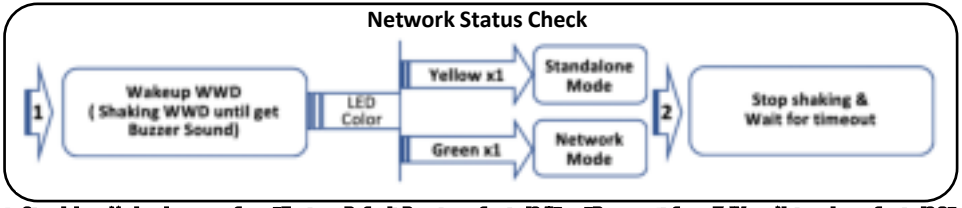
Below table shows simple UI Event status result, for more detail please refer to item 17.2 – 17.7,

Event		Action	LED	Buzzer Sound	Remark
Completed / Okay		n/a	Green flash x2	2 times	Event executed without problem / will go to next step
Fail		n/a	Red flash x3	3 times	Even failed and will stop to execute next step
Timeout		n/a	Red flash x2	2 times	Even timeout and will stop to execute next step
Waked up	Standalone	After triggered by 3-axis sensor	Yellow ON x1	1 time	Waked up and 3-axis sensor is ready. In Standalone mode.
	Network		Green ON x1	1 time	Waked up and 3-axis sensor is ready. In Mesh Network Mode
Device Mode	Shipping	Triggering Built-in Sensor Probe	Yellow x1 @ Sec	n/a	Device is in Shipping Mode; all functions are disabled
	Normal		Red x1 @ Sec	1 time @ second	Device is in Normal Mode; all functions are enabled

12 SETUP Z-WAVE NETWORK

12.1 Check Network Status:

- By default, Custos WWD does not belong to any Z-Wave Network, before adding WWD into Z-Wave Network, you have to make sure Custos WWD is in Standalone Mode, otherwise you have to perform Factory Default Reset refer to 12.4,



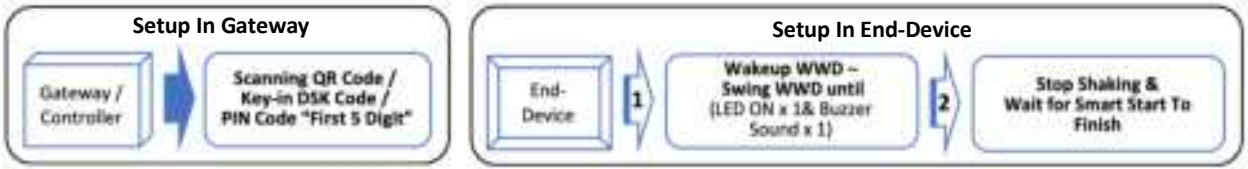
➢ **If it's not in Standalone Mode, please perform "Factory Default Reset – refer to 12.4" or "Remove it from Z-Wave Network – refer to 12.3"**

12.2 Add Custos WWD into Z-Wave Network:

- Custos WWD supports Security 2 Command Class while a Security S2 enabled controller is needed. It supports Smart Start and Classic Inclusion,
- For adding Custos WWD into Z-Wave Network, end-user can use Smart Start for Classic Inclusion,

12.2.1 Smart Start:

- To enable Smart Start, below methods can be used
  i. Scan the Z-Wave QR Code or entering PIN Code or DSK String into S2 Enabled Gateway, please refer to item 16.11 Smart Start Labeling,
  ii. Wakeup Custos WWD by shaking it until the Yellow LED ON and Buzzer Sound x1,



➢ To enable Security S2 in Z-Wave Gateway, please refer to Gateway's user manual.

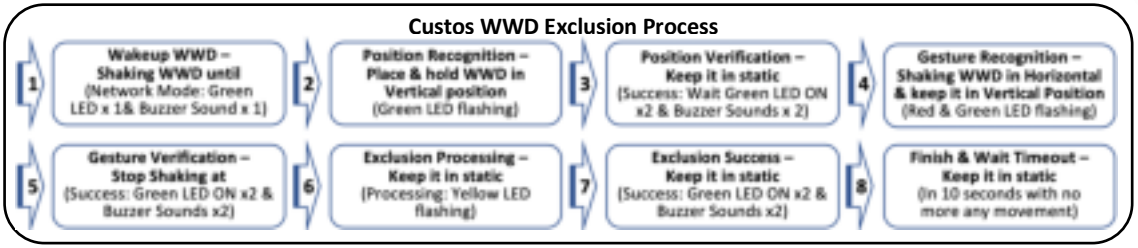
2.2.2 Classic Inclusion / Add Device:

- Custos WWD also support Classic Inclusion,
  - i. Set your Z-Wave Gateway into Inclusion Mode / Add Device processing.
  - ii. Use Vertical-Horizontal movement in WWD to activate Classic Inclusion Mode,
  - iii. Follow below procedure to start Classic Inclusion procedure in Custos WWD

- Please process the Inclusion Procedure again if WWD shows any error #3 / #5 /#7 with RED LED ON & Buzzer Sound.

2.3 Remove Custos WWD from Z-Wave Network:

- Custos WWD also support Classic Inclusion, set your Z-Wave Gateway into Add device.
  - i. Set your Z-Wave Gateway into Exclusion Mode / Remove Device processing,
  - ii. Use Vertical-Horizontal movement in WWD to activate Exclusion Mode,
  - iii. Follow below procedure to start Exclusion procedure in Custos WWD,



- Please process the Exclusion Procedure again if WWD shows any error #3 / #5 /#7 with RED LED ON & Buzzer Sound.

12.4 Factory Default Reset: (Horizontal/Horizontal Movement + Trigger Leak Sensor 10s)

12.4.1 To remove Custos WWD without involve gateway in Exclusion / Remove device operation and WWD will reset all setting to Factory Default Setting as below.

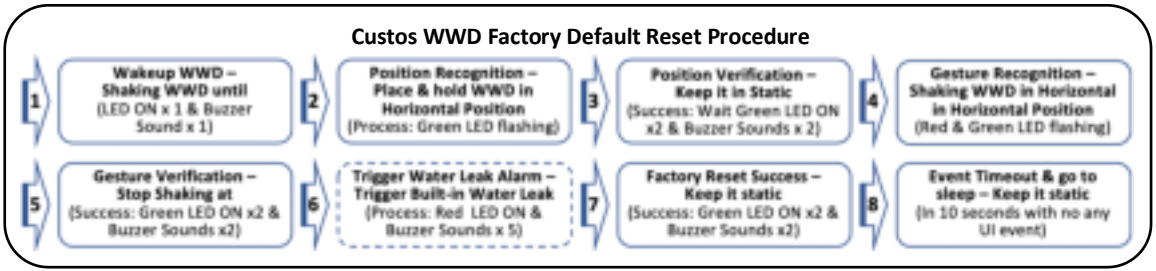
a. Remove the WWD from Z-Wave Network;
b. Delete the association setting;
c. Restore the configuration settings to the default.

12.4.2 To perform Factory Default Reset

i. Use Horizontal-Horizontal movement in WWD to activate Factory Default Reset processing,
ii. Trigger Built-in Water Leak Sensor for 10 seconds "Buzzer Sounds & LED flashing 5 times"
iii. Following below procedure to start Factory Default Reset function in Custos WWD

➢ **Horizontal-Horizontal Movement**

➢ **Trigger Built-in Leak Sensor**



➢ Please process the Factory Default Reset Procedure again if WWD shows any error #3 / #5 /#7 with RED LED ON & Buzzer Sound.

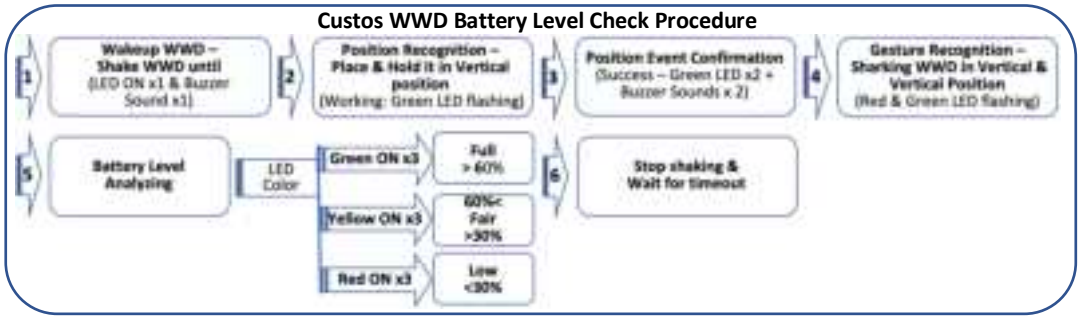
13 Battery Level

13.1 Battery Level Report

- The Battery Level Report can be show on Custos WWD and report to Gateway after waked up every time.

13.2 Battery Level Check

- User Vertical-Vertical movement in WWD to activate Battery Level Check processing,
- Following below procedure to start Battery Level Check,
- There're three result of Battery Level UIs,
  i. Battery Full = 61 – 100%
  ii. Battery Fair = 31 – 60%
  iii. Battery Low < 30%



14 Water Leak Sensor & Alarm

14.1 Water Leak Detection & Alarm

- **Custos WWD can report Water Leak by Built-in & Remote Water Detection Probe through Notification CC,**
- **Built-in Water Leak Alarm Sends to Association Group 2,**
- **Remote Water Leak Alarm Sends to Association Group 3**

14.2 Water Leak Alarm Cancellation

- **Water Leak Alarm Cancellation action sets Basic SET to Associated Group and it can be configured with Configuration CC,**
  i. Built-in Water Detection Probe sends Basic SET to Association Group 2,
  ii. Remote Water Detection Probe sends Basic SET to Association Group 3

15 Temperature Sensor

15.1 Temperature Report (waked up by 3-axis accelerometer or auto wake up interval)

- By default, Custos WWD will send report to Gateway after waked up every time.
- Custos WWD reports to gateway the temperature unit °F in US version and °C for other frequency versions.

16 Z-WAVE SOFTWARE DEFINITIONS

16.1 Z-Wave Plus Info

Parameter	Value
Z-Wave Plus Version	2
Role Type	0x06 (ZWAVEPLUS_INFO_REPORT_ROLE_TYPE_SLAVE_SLEEP_REPORTING)
Node Type	0x00 (ZWAVEPLUS_INFO_REPORT_NODE_TYPE_ZWAVEPLUS_NODE)
Installer Icon Type	0x0C05 (ICON_TYPE_SPECIFIC_SENSOR_NOTIFICATION_WATER_ALARM)
User Icon Type	0x0C05 (ICON_TYPE_SPECIFIC_SENSOR_NOTIFICATION_WATER_ALARM)

16.2 Version CC

Parameter	Value
Z-Wave Protocol Library Type	0x03
Z-Wave Protocol Version	0x07
Z-Wave Protocol Sub Version	0x0D
Firmware 0 Version	0x01 – Z-Wave Chip Major Firmware Version
Firmware 0 Sub Version	0x0C – Z-Wave Chip Minor Firmware Version
Hardware Version	0x01
Number of firmware targets	0x00

16.3 Manufacturer Specific

Parameter	Value
Manufacturer ID 1	0x02
Manufacturer ID 2	0x70
Product Type ID 1	0x02
Product Type ID 2	0x01
Product ID 1	0x01
Product ID 2	0x0B

16.4 Notification CC

Notification Type		Notification Events / State		Description
Heat Alarm	0x04	State idle	0x00	Notification value for the state variable going to idle (V5)
		Overheat detected	0x02	No Location Support Event
		Underheat detected	0x06	No Location Support Event
Water Alarm	0x05	State idle	0x00	Notification value for the state variable going to idle (V5)
		Water leak detected	0x02	No Location Support Event
Power Management	0x08	State idle	0x00	Notification value for the state variable going to idle (V5)
		Battery fluid is low	0x11	

16.5 Indicator CC

Parameter	Value
Indicator ID	0x50 = (Node Identify)
Property ID	0x03 = (On/Off Periods) 0x04 = (On/Off Cycles) 0x05 = (On time within an On/Off period)

16.6 Basic CC Mapping of Water WWD

Basic Command Class does not map to any Command Class

16.7 Wake Up CC

Wake Up Interval Capabilities Report

Parameter	Value	Time
Min Wake Up Interval (Seconds)	0x000014	20 Seconds
Max Wake Up Interval (Seconds)	0x015180	86400 Seconds (24 Hours)
Default Wake Up Interval (Seconds)	0x001C20	7200 Seconds (2 Hours)
Wake Up Interval Step (Seconds)	0x000014	20 Seconds

16.8 Association Group Info (AGI)

Association Group	Name	Node Count	Function

1	Lifeline	5	- Device Reset Locally Notification
			- Sensor Binary Report
			- Indicator Report
			- Sensor Multilevel Report – Temperature “Auto report based on Configuration Parameter 0x22 Setting.”
			- Battery Report
			- Heat Alarm Notification Report (0x04)
			  - 0x00 = State idle
			  - 0x02 = Overheat – no location support -
			  - 0x06 = Underheat – no location support
			- Water Alarm Notification Report (0x05)
			  - 0x00 = State idle
			  - 0x02 = Water leak detected – no location support
			- Power Management Notification (0x08)
			  - 0x00 = State Idle
			  - 0x11 = Battery Fluid is low

2	Built-in Leak Sensor Probe	5	- Basic Set
			  - 0x00 = IDEL / CANCEL (Based on Configuration Parameter 0x41 Setting)
			  - 0xFF = TRIGGERED (Based on Configuration Parameter 0x40 Setting)

3	Remote Water Detection Probe	5	- Basic Set
			  - 0x00 = IDEL / CANCEL (Based on Configuration Parameter 0x43 Setting)
			  - 0xFF = TRIGGERED (Based on Configuration Parameter 0x42 Setting)

4	Overheat Alarm	5	- Basic Set
			  - 0x00 = IDEL / CANCEL (Based on Configuration Parameter 0x45 Setting)
			  - 0xFF = TRIGGERED (Based on Configuration Parameter 0x44 Setting)

5	Underheat Alarm (Freeze)	5	- Basic Set
			  - 0x00 = IDEL / CANCEL (Based on Configuration Parameter 0x47 Setting)
			  - 0xFF = TRIGGERED (Based on Configuration Parameter 0x46 Setting)

16.9 Supported Command Classes In NIF

Command Class	Version	Not added	Non-secure added	Security 2 added	
				Non-Secure	Secure
ZWAVEPLUS_INFO	2	Support	Support	Support	----
SENSOR_BINARY	2	Support	Support	---	Support
ASSOCIATION	3	Support	Support	---	Support
MULTI_CHANNEL_ASSOCIATION	4	Support	Support	---	Support
ASSOCIATION_GRP_INFO	3	Support	Support	---	Support
NOTIFICATION	8	Support	Support	---	Support
TRANSPORT_SERVICE	2	Support	Support	Support	---
VERSION	3	Support	Support	---	Support
MANUFACTURER_SPECIFIC	2	Support	Support	---	Support
DEVICE_RESET_LOCALLY	1	Support	Support	---	Support
INDICATOR	3	Support	Support	---	Support
POWERLEVEL	1	Support	Support	---	Support
SECURITY	1	Support	Support	Support	---
SECURITY_2	1	Support	Support	Support	---
SUPERVISION	1	Support	Support	Support	---
FIRMWARE_UPDATE_MD	5	Support	Support	---	Support
SENSOR_MULTILEVEL - Temperature	11	Support	Support	---	Support
CONFIGURATION	4	Support	Support	---	Support
APPLICATION STATUS	1	Support	Support	---	Support
WAKE_UP	2	Support	Support		Support
BATTERY	1	Support	Support	---	Support

16.10 Configuration CC

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

Sensor Function				
Parameter No.	**0x10 (16)**			
Name	Sensors Function Set			
Info	Sensors Function Enable / Disable			
Properties	**Size**	1 Byte	**Min Value**	0x00 (0)
	Format	Bit Field	**Max Value**	0x0F (15)
	Read only	False	**Default Value**	0x0F (15)
	Altering capabilities	False	**Advanced**	False
Description	Water Leak Probes & Temperature Function Set Disable / Enable *(Default all enabled)			
	Value	**Function**		
	Bit 0	Built-in Water Detection Probe *(Default Enabled)		
	Bit 1	Remote Water Detection Probe *(Default Enabled)		
	Bit 2	Overheat Detection *(Default Enabled)		
	Bit 3	Freeze Detection *(Default Enabled)		
Parameter No.	**0x11 (17)**			
Name	Water Leak Cancellation Basic SET			
Info	Water Leak Probes Cancellation for AG2 AG3			
Properties	**Size**	1 Byte	**Min Value**	0x00 (0)
	Format	Enumerated	**Max Value**	0x01 (1)
	Read only	False	**Default Value**	0x01 (1)
	Altering capabilities	False	**Advanced**	False
Description	Configure Water Leak Cancellation Basic SET for Built-in (AG2) / Remote Sensor (AG3) Probes, related parameters 0x41 & 0x43			
	Value	**Function**		
	0x00 (0)	Send Basic SET when Water Alarm Cancelled “**Either**” Built-in “**or**” Remote Water Detection Probe		
	0x01 (1)	Send Basic SET when Water Alarm Cancelled Built-in “**And**” Remote Water Detection Probe		

Battery Function				
Parameter No.	**0x20 (32)**			
Name	Battery Level Change Auto Report			
Info	Battery Level Change Value to auto report			
Properties	**Size**	1 Byte	**Min Value**	0x00 (0)
	Format	Unsigned Integer	**Max Value**	0x63 (99)
	Read only	False	**Default Value**	0x0A (10)
	Altering capabilities	False	**Advanced**	False
Description	Configure Battery Level Change Value to auto report *(Default 10% change to auto report)			
	Value	**Function**		
	0x00 (0)	Disable Auto Temperature Report		
	0x01 (1)	Report Celsius °C unit		
	0x02 (2)	Report Fahrenheit °F unit		
Parameter No.	**0x21 (33)**			
Name	Battery Threshold Level Report			
Info	Battery Lower Threshold Level Report			
Properties	**Size**	1 Bytes	**Min Value**	0x01 (1)
	Format	Unsigned Integer	**Max Value**	0x63 (99)
	Read only	False	**Default Value**	0x1E (30)
	Altering capabilities	False	**Advanced**	False
Description	Configure Battery Lower Threshold Level Report *(Default 30%, the buzzer also will be disabled at the same time)			
	Value	**Function**		
	0x01 (1) – 0x63 (99)	Battery Lower Threshold Valve Report *(Default 30%)		

Temperature Sensor – 1/3				
Parameter No.	**0x30 (48)**			
Name	Temperature Report Unit			
Info	Configure Temperature Report Unit			
Properties	**Size**	1 Bytes	**Min Value**	0x00 (0)
	Format	Enumerated	**Max Value**	0x02 (2)
	Read only	False	**Default Value**	0x02 (2)
	Altering capabilities	False	**Advanced**	False
Description	Configure Temperature Unit report. The default unit is depended on Regional Frequency Setting. *(By default, US=°F and EU=°C)			
	Value	**Function**		
	0x00 (0)	Disable Auto Temperature Report		
	0x01 (1)	Report Celsius °C unit		
	0x02 (2)	Report Fahrenheit °F unit		

Temperature Sensor – 2/3				
Parameter No.	**0x31 (49)**			
Name	Temperature Level Change Report			
Info	Temperature Level Change to auto report			
Properties	**Size**	2 Bytes	**Min Value**	0x0000 (0) = 0°C / 0x0100 (0) = 0°F
	Format	Unsigned Integer	**Max Value**	0x00FF (255) = 255°C) / 0x01FF (511) = 255°F
	Read only	False	**Default Value**	0x0004 (4) = 4°C / 0x0104 (260) = 4 °F
	Altering capabilities	False	**Advanced**	False
Description	Configure Temperature Level Change to auto report. “Higher byte 0x00 represents Celsius °C unit, 0x01 represents Fahrenheit °F unit”			
	Value	**Function**		
	0x0000 ~ 0x00FF	From 0°C to 255°C		
	0x0100 ~ 0x01FF	From 0°F to 255°F		
Parameter No.	**0x32 (50)**			
Name	Temperature Value Offset Report			
Info	Temperature Value Offset Report Set			
Properties	**Size**	2 Bytes	**Min Value**	0x0000 (0) = 0°C / 0x0100 (0) for 0°F
	Format	Unsigned Integer	**Max Value**	0x10FF (255) = -255°C / 0x11FF (4607) = -255°F
	Read only	False	**Default Value**	0x0000 (0) = 0°C / 0x0100 (256) for 0°F
	Altering capabilities	False	**Advanced**	False
Description	Configure Temperature Value Offset (Bytes 0xxx = Positive Value; 1xxx = Negative Value & x0xx = °C; x1xx = °F)			
	Value	**Function**		
	0x0000 ~ 0x00FF	From 0°C to 255°C		
	0x1001 ~ 0x10FF	From -1°C to -255°C		
	0x0100 ~ 0x01FF	From 0°F to 255°F		
	0x1101 ~ 0x11FF	From -1°F to -255°F		
Parameter No.	**0x33 (51)**			
Name	Overheat Trigger Value			
Info	Overheat Trigger Value SET			
Properties	**Size**	2 Byte	**Min Value**	0x0000 (0) = 0°C / 0x0100 (0) = 0°F
	Format	Unsigned Integer	**Max Value**	0x00FF (255) = 255°C / 0x01FF (511) = 255°F
	Read only	False	**Default Value**	0x0028 (40) = 40°C / 0x0168 (360) = 104°F
	Altering capabilities	False	**Advanced**	False
Description	Configure Overheat Trigger Value. (Higher byte 0x00 represents Celsius °C unit, 0x01 represents Fahrenheit °F unit)			
	Value	**Function**		
	0x0000 ~ 0x00FF	From 0°C to 255°C		
	0x0100 ~ 0x01FF	From 0°F to 255°F		

Temperature Sensor – 3/3				
Parameter No.	**0x34 (52)**			
Name	Overheat Cancellation Value			
Info	Overheat Cancellation Value auto report			
Properties	**Size**	2 Byte	**Min Value**	0x0000 (0) = 0°C / 0x0100 (0) = 0°F
	Format	Unsigned Integer	**Max Value**	0x00FF (255) = 255°C / 0x01FF (511) = 255°F
	Read only	False	**Default Value**	0x001E (30) = °C / 0x0156(342) = 86 °F
	Altering capabilities	False	**Advanced**	False
Description	Configure Overheat Cancellation Value Set. (Higher byte 0x00 represents Celsius °C unit, 0x01 represents Fahrenheit °F unit)			
	Value	**Function**		
	0x0000 ~ 0x00FF	From 0°C to 255°C		
	0x0100 ~ 0x01FF	From 0°F to 255°F		
Parameter No.	**0x35 (53)**			
Name	Freeze Trigger Value			
Info	Configure Freeze Trigger Report value			
Properties	**Size**	2 Bytes	**Min Value**	0x0000 (0) = 0°C / 0x0100 (0) = 0°F
	Format	Unsigned Integer	**Max Value**	0x00FF (255) = 255°C / 0x01FF (511) = 255°F
	Read only	False	**Default Value**	0x0000 (0) = 0°C / 0x0168 (360) = 104°F
	Altering capabilities	False	**Advanced**	False
Description	Configure Freeze Trigger Report Value. (Higher byte 0x00 represents Celsius °C unit, 0x01 represents Fahrenheit °F unit)			
	Value	**Function**		
	0x0000 ~ 0x00FF	From 0°C to 255°C		
	0x0100 ~ 0x01FF	From 0°F to 255°F		
Parameter No.	**0x36 (54)**			
Name	Freeze Recover Value			
Info	Configure Freeze Recover Report Value			
Properties	**Size**	2 Bytes	**Min Value**	0x0000 for °C / 0x0100 for °F
	Format	Unsigned Integer	**Max Value**	0x00FF (255) =255°C / 0x01FF (511) = 255°F
	Read only	False	**Default Value**	0x0002 (2) =2°C / 0x0156(342) = 86 °F
	Altering capabilities	False	**Advanced**	False
Description	Configure Freeze Recover Report Value. (Higher byte 0x00 represents Celsius °C unit, 0x01 represents Fahrenheit °F unit)			
	Value	**Function**		
	0x0000 ~ 0x00FF	From 0°C to 255°C		
	0x0100 ~ 0x01FF	From 0°F to 255°F		

Association Group – 1/3				
Parameter No.	**0x40 (64)**			
Name	AG2 - Built-in Water Leak Trigger			
Info	Built-in Water Leak Trigger Basic SET			
Properties	**Size**	1 Byte	**Min Value**	0x00 (0)
	Format	Enumerated	**Max Value**	0x02 (2)
	Read only	False	**Default Value**	0x01 (1)
	Altering capabilities	False	**Advanced**	False
Description	Configure Association Group 2 Basic Set value when Built-in Water Leak triggered			
	Value	**Function**		
	0x00 (0)	Disable Basic Set (Send nothing)		
	0x01 (1)	Basic Set ON (0xFF)		
	0x02 (2)	Basic Set OFF (0x00)		
Parameter No.	**0x41 (65)**			
Name	AG2 - Built-in Water Leak Cancellation			
Info	Built-in Water Leak Cancellation Basic SET			
Properties	**Size**	1 Byte	**Min Value**	0x00 (0)
	Format	Enumerated	**Max Value**	0x02 (2)
	Read only	False	**Default Value**	0x00 (0)
	Altering capabilities	False	**Advanced**	False
Description	Configure Association Group 2 Basic Set value when Built-in Water Leak Cancelled			
	Value	**Function**		
	0x00 (0)	Disable Basic Set (Send nothing)		
	0x01 (1)	Basic Set ON (0xFF)		
	0x02 (2)	Basic Set OFF (0x00)		
Parameter No.	**0x42 (66)**			
Name	AG3 - Remote Water Leak Trigger			
Info	Remote Water Leak Trigger Basic SET			
Properties	**Size**	1 Byte	**Min Value**	0x00 (0)
	Format	Enumerated	**Max Value**	0x02 (2)
	Read only	False	**Default Value**	0x01 (1)
	Altering capabilities	False	**Advanced**	False
Description	Configure Association Group 3 Basic Set value when Remote Water Leak triggered			
	Value	**Function**		
	0x00 (0)	Disable Basic Set (Send nothing)		
	0x01 (1)	Basic ON (0xFF)		
	0x02 (2)	Basic OFF (0x00)		

Association Group – 2/3				
Parameter No.	**0x43 (67)**			
Name	AG3 - Remote Water Leak Cancellation			
Info	Remote Water Leak Cancellation Basic SET			
Properties	**Size**	1 Byte	**Min Value**	0x00 (0)
	Format	Enumerated	**Max Value**	0x02 (2)
	Read only	False	**Default Value**	0x00 (0)
	Altering capabilities	False	**Advanced**	False
Description	Configure Association Group 3 Basic Set value when Remote Water Leak cancelled			
	Value	**Function**		
	0x00 (0)	Disable Basic Set (Send nothing)		
	0x01 (1)	Basic ON (0xFF)		
	0x02 (2)	Basic OFF (0x00)		
Parameter No.	**0x44 (68)**			
Name	AG4 - Overheat Trigger Value			
Info	Overheat Trigger Value Basic SET			
Properties	**Size**	1 Byte	**Min Value**	0x00 (0)
	Format	Enumerated	**Max Value**	0x02 (2)
	Read only	False	**Default Value**	0x00 (0)
	Altering capabilities	False	**Advanced**	False
Description	Configure Association Group 4 Basic Set value when Overheat Triggered			
	Value	**Function**		
	0x00 (0)	Disable Basic Set (Send nothing)		
	0x01 (1)	Basic ON (0xFF)		
	0x02 (2)	Basic OFF (0x00)		
Parameter No.	**0x45 (69)**			
Name	AG4 - Overheat Recover Value			
Info	Overheat Recover Value Basic SET			
Properties	**Size**	1 Byte	**Min Value**	0x00 (0)
	Format	Enumerated	**Max Value**	0x02 (2)
	Read only	False	**Default Value**	0x00 (0)
	Altering capabilities	False	**Advanced**	False
Description	Configure Association Group 4 Basic Set value when Overheat Recovered			
	Value	**Function**		
	0x00 (0)	Disable Basic Set (Send nothing)		
	0x01 (1)	Basic ON (0xFF)		
	0x02 (2)	Basic OFF (0x00)		

Association Group – 3/3				
Parameter No.	**0x46 (70)**			
Name	AG5 - Freeze Trigger Value			
Info	Freeze Trigger Value Basic SET			
Properties	**Size**	1 Byte	**Min Value**	0x00 (0)
	Format	Enumerated	**Max Value**	0x02 (2)
	Read only	False	**Default Value**	0x00 (0)
	Altering capabilities	False	**Advanced**	False
Description	Configure Association Group 5 Basic Set value when Freeze Triggered			
	Value	**Function**		
	0x00 (0)	Disable Basic Set (Send nothing)		
	0x01 (1)	Basic ON (0xFF)		
	0x02 (2)	Basic OFF (0x00)		
Parameter No.	**0x47 (71)**			
Name	AG5 - Freeze Recover Value			
Info	Freeze Recover Value Basic SET			
Properties	**Size**	1 Byte	**Min Value**	0x00 (0)
	Format	Enumerated	**Max Value**	0x01 (1)
	Read only	False	**Default Value**	0x00 (0)
	Altering capabilities	False	**Advanced**	False
Description	Configure Association Group 5 Basic Set value when Freeze Recovered			
	Value	**Function**		
	0x00 (0)	Disable Basic Set (Send nothing)		
	0x01 (1)	Basic ON (0xFF)		
	0x02 (2)	Basic OFF (0x00)		

Notification Report				
Parameter No.	**0x50 (80)**			
Name	Resend Water Leak Notification Time			
Info	Resend Water Leak Notification Time Set			
Properties	**Size**	1 Byte	**Min Value**	0x00 (0)
	Format	Unsigned Integer	**Max Value**	0x1E (30)
	Read only	False	**Default Value**	0x00 (0)
	Altering capabilities	False	**Advanced**	False
Description	Configure Resend Water Leak Notification time in minutes during Water Leak is triggered *(Default 0x00 = not resend)			
	Value	**Function**		
	0x00	Do not resend		
	0x01 ~ 0x1E	1 - 30 Minutes		

User Interface				
Parameter No.	**0x60 (96)**			
Name	Buzzer Related Function Actions			
Info	Buzzer Related Function Actions Set			
Properties	**Size**	1 Byte	**Min Value**	0x00 (0)
	Format	Bit Field	**Max Value**	0x03 (3)
	Read only	False	**Default Value**	0x03 (3)
	Altering capabilities	False	**Advanced**	False
Description	Configure Buzzer Function Disable / Enable with device action. *(Default 0x03, 0=Disable; 1=Enable)			
	Value	**Function**		
	Bit 0	Buzzer Enable responds with GSensor in action *(Default 1 = Eanbled)		
	Bit 1	Buzzer Enable responds with Water Leak Detection *(Default 1 = Enabled)		
Parameter No.	**0x61 (97)**			
Name	Buzzer Sound Saving Mode			
Info	Sound works first 3'S Water Leak Detected			
Properties	**Size**	1 Byte	**Min Value**	0x00 (0)
	Format	Bit Field	**Max Value**	0x01 (1)
	Read only	False	**Default Value**	0x01 (1)
	Altering capabilities	False	**Advanced**	False
Description	Configure Buzzer Sound works for first 3 Seconds only when Water Leak is detected if Saving Mode enabled *(Default 0x01=Eanble)			
	Value	**Function**		
	0x00	Disable Saving mode (Buzzer sound works during whole Water Leak is detected)		
	0x01	Enable Saving mode (Buzzer function only works 3's when Water Leak is detected)		

16.11 Smart Start Labeling

Custos WWD comes with QR Code including PIN Code and Full DSK string for Smart Start and they´re located as below locations,

- PIN Code with QR Code on WWD housing

PIN Code: 12345

- QR Code with full DSK string printed on Packing Box, the first 5 digits is PIN code for Smart Start use.

12345-xxxxx-xxxxx-xxxxx-x
xxxx-xxxxx-xxxxx-xxxxx

17 APPENDIX

Terminology, all events and operations details including action key event, LED and Buzzer status.

17.1 Z-Wave Terminology

Z-Wave Functionality	Documentation Terminology	Description
Inclusion	Add	The process of adding a node to Z-Wave Network
Exclusion	Remove	The process of removing a node from Z-Wave Network

17.2 Event Status

Event	Action	LED	Buzzer Sound	Remark
Event Okay	n/a	Green flash x2	2 times	Event executed without problem / will go to next step
Fail	n/a	Red flash x3	3 times	Even failed and will stop to execute next step
Timeout	n/a	Red flash x2	2 times	Even timeout and will stop to execute next step

17.3 System Event

Event		Action	LED	Buzzer Sound	Remark
Power On Okay		Power Up	Y→G x1	1 time	System Power On Okay after battery installed
Device Mode	Shipping	Triggering Built-in Sensor Probe	Yellow x1 @ Sec	n/a	Device is in Shipping Mode, all functions are disabled
	Normal		Red x1 @ Sec	1 time @ second	Device is in Normal Mode, all functions are enabled
Waked up	Standalone	After triggered by 3-axis sensor	Yellow ON x1	1 time	Waked up and 3-axis sensor is ready. In Standalone mode.
	Network		Green ON x1	1 time	Waked up and 3-axis sensor is ready. In Mesh Network Mode

17.4 3-Axis Accelerometer Processing

Event	Action	LED	Buzzer Sound	Remark
Position Recognizing	n/a	Green flashing	n/a	Position is under recognizing; timeout is 5 seconds
Gesture Recognizing	n/a	G & R flashing	n/a	Gesture is under recognizing; timeout is 10 seconds

17.5 Network Event

Event		Action	LED	Buzzer Sound	Remark
Inclusion / Exclusion		Processing	Yellow flashing	n/a	In processing, LED keep flashing until event finished
Factory Default Reset	1st phase	Built-in Leak sensor	Red flashing	1 time	Waked up and 3-axis sensor is ready. In Standalone mode.
	2nd phase	3-axis sensor	Green ON x1	1 time	Waked up and 3-axis sensor is ready. In Mesh Network Mode
OTA FW Upgrade	Starting	OTA upgrade procedure	Green flash x2	2 times	Being to start OTA firmware upgrade
	Processing		G→Y→R flashing	n/a	OTA is in progressing, LED keep flashing until OTA finished.

17.6 Battery Status

Event		Action	LED	Buzzer Sound	Remark
Battery Level	Full	Battery Level check by 3-axis sensor procedure	Green flash x3	3 times	Battery level is full. “over 60%”
	Fair		Yellow flash x3	3 times	Battery level is fair. “between 30% to 60%”
	Low		Red flash x3	3 times	Battery level is low “under 30%”

17.7 Water Leak Alarm Status

Event		Action	LED	Buzzer Sound	Remark
Water Leak Alarm	Normal	Trigger Water Detection Probe	Yellow x1 @ sec	1 time @ second	Buzzer keeps beep sound continually at 1 sound per second.
	Saving mode		Green x1 @ sec	3 times only	Only 3 beep sounds in first 3 seconds at 1 sound per second.

FCC Statement

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.
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 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.

Radiation Exposure Statement
This device complies with RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.