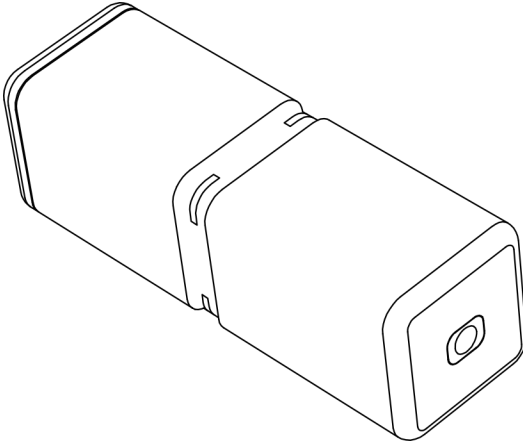


Custos Wireless Water Detector

Technology for Humanity



WWDZWU User Manual

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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 mesh network technology to ensure reliable two-way communication with each other.

This product can be operated in any Z-Wave network with other Z-Wave certified devices from other manufacturers. All mains operated nodes within the network will act as repeaters regardless of vendor to increase reliability of the network.

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. Custos WWD also supports SmartStart.

1.3 What's 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.

2 FEATURES & SPECIFICATIONS

2.1 Physical Specifications

Parameter	Value
Model No.	WWDZWU (US)
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, 912Mhz & 920Mhz FCC CFR47 Part 15.249
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-Axial Sensor
LED Indicator	3 colors LED. (Green, Yellow & Red)
Power Supply	ER14250 - Battery 3.6V 1200mAH
Battery Life	Standby: ~4.uA up to 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	v7.16.3
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
SmartStart	Support: After powering on, SmartStart will be activated automatically 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'S INSIDE IN THE BOX

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

3.1 Custos WWD Main Unit x 1 "Figure 3A"

3.2 Remote Water Detection Probe x 1 (Optional) "Figure 3B"

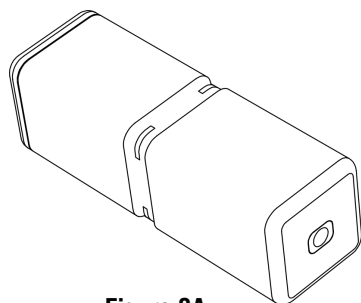


Figure 3A

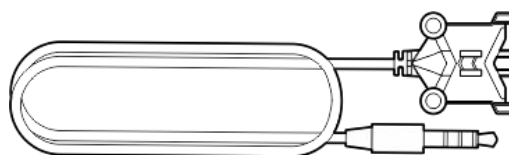
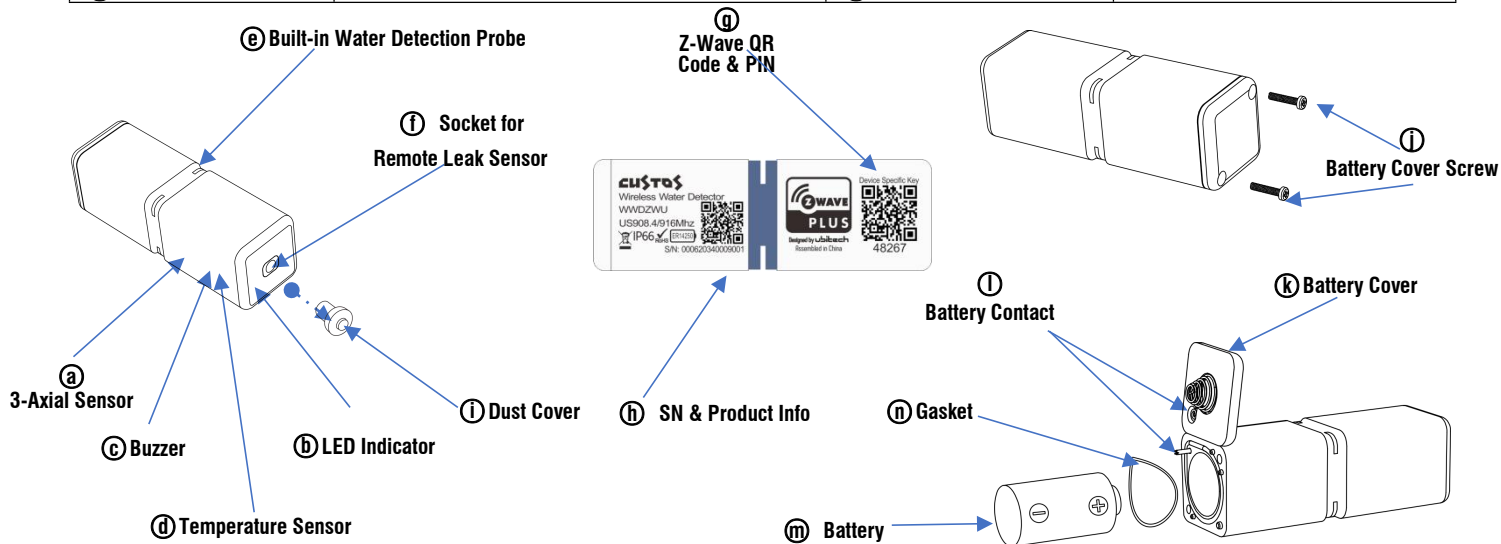


Figure 3B

4 UNDERSTANDING CUSTOS WWD

4.1 Connectors & Interfaces

Terminology	Description	Terminology	Description
(a) 3-Axial Sensor	3-Axial Action Sensor	(h) SN & Product Details	Z-Wave QR Code & PIN Code
(b) Display Indicators	3 Colors LED "Green, Yellow & Red"	(i) Dust Cover	Dust & Water prevention
(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	Connect main unit & Battery Cover
(f) Leak Sensor #2	Socket for Remote Water Detection Probe – 3.5mm jack	(m) Battery	ER14250 3.6V 1200mA
(g) Z-Wave QR Code	Z-Wave QR Code & PIN Code	(n) Gasket	Silicon Rubber For Waterproof



5 INSTALL & 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 (Figure 5A)
- Replace new ER14250 battery
- Make sure the Gasket is installed between the cover & body for waterproof (Figure 5B)
- Put the battery cover and align with two battery metal contacts then tighten the screws.

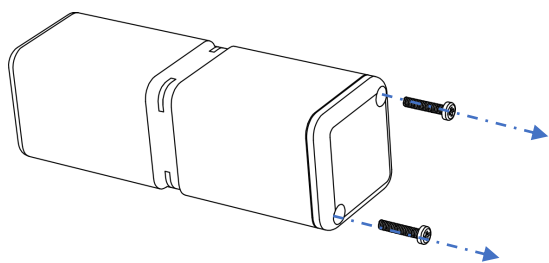


Figure 5A

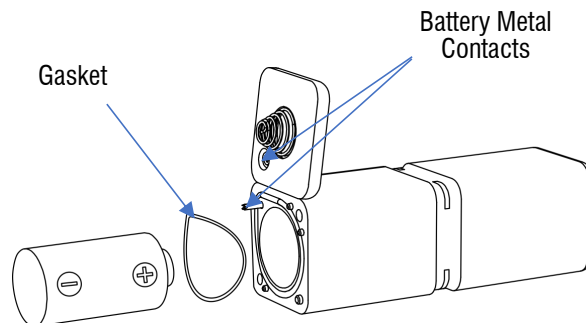


Figure 5B

6 ACTION SENSOR & INDICATORS BEHAVIOR

6.1 3-Axial Action Sensor

- Built-in 3-Axial Accelerometer Sensor for gesture recognition by detecting a series of movements, Once the 3-Axial Action Sensor is activated, you also can see below Visual and Sound Indicators response with the 3-Axial Action Sensor.

6.2 Visual Indicator

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

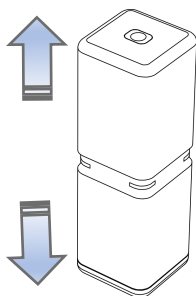
6.3 Sound Indicator

- Buzzer: Long & short beep sound.

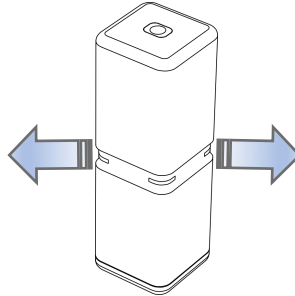
7 HOW 3-Axial ACTION SENSOR WORKS

7.1 3-Axial Action Sensor – Gesture Recognition Procedure

- End-user can use built-in 3-Axial Accelerometer to replace physical touchable key, Custos WWD can perform below actions after it woke up by shaking it. (*Please note that 3-Axial Action Sensor only activated while WWD included into Z-Wave Network.)
 - Send out Notification CC packet to Gateway, (Refer to item 13.1.1)
 - Perform Exclusion Gesture, (Refer to item 12.3)
 - Perform Factory Default Reset Gesture, (Refer to item 12.4)
- Custos WWD only supports below movement as wake up WWD from sleep mode, shake it vertically or horizontally as below,



Shaking in Vertical



Shaking in Horizontal

8 HOW WATER LEAK SENSOR WORKS

8.1 Water Detection Probes

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

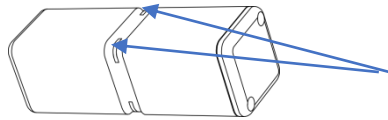


Figure 8A

Water will be induced to go thru this tiny groove to activate detection whenever water approach here.

8.2 Built-in Water Detection Probe

- WWD has special recess "Figure 8A" 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.

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 "Figure 8B" and there is no any gap allowed "Figure 8C" between 3.5mm jack and housing.

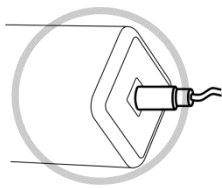


Figure 8B

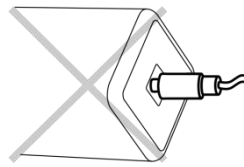


Figure 8C

9 WORKING MODE SUPPORT

9.1 Shipping Mode (unincluded)

- By default, Custos WWD does not belong to any Z-Wave Network, in this status, it only supports Classic Inclusion / SmartStart operations to join into Z-Wave Network.

9.2 Inclusion 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, SmartStart, Classic Inclusion, Exclusion & Factory Default Reset.

9.3 Association Mode – Only works in Mesh Network Mode

- Association Mode can only be configured after Custos WWD is included into Z-Wave Network
- Custos WWD also can associate with Custos Titan to shut off the Water Valve when detected Water Leak.

9.4 Water Leak Sensor & Alarm

- Water Leak Alarms refer to two Water Detection Probes "Built-in & Remote Figure 9A"
- Custos WWD also can send Battery Report and Temperature Report to Z-Wave Gateway.

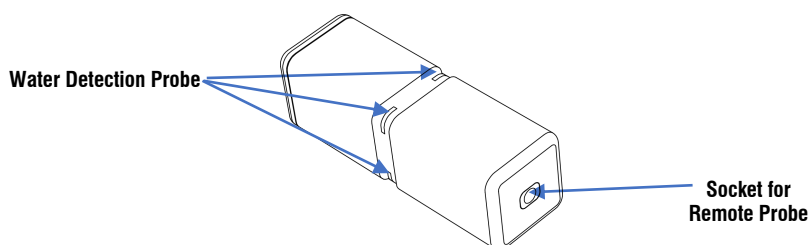


Figure 9A

10 PHYSICAL INSTALLATION

10.1 Connect the Remote Sensor Probe (Optional)

- i. Remove Dust Cover. *(Please do not remove Dust Cover if Remote Sensor Probe not installed)* “Figure 10A”
- ii. Insert the 3.5mm jack of Socket for Remote Water Detection Probe tightly. “Figure 10B”
- iii. Place the Custos WWD on the floor horizontally

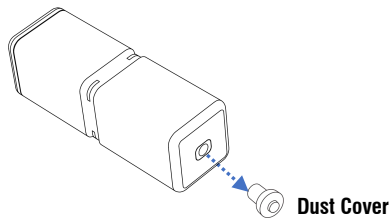


Figure 10A

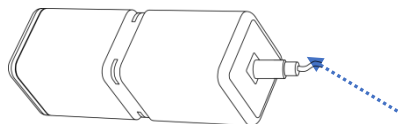


Figure 10B

11 USER INTERFACE BEHAVIORS

11.1 Event status

Below table shows simple UI Event status result,

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	Event failed and will stop to execute next step	
Timeout	n/a	Red flash x2	2 times	Event timeout and will stop to execute next step	
Waked up	Standalone	After triggered by 3-Axial sensor	Yellow ON x1	1 time	Waked up and 3-Axial sensor is ready. In Standalone mode.
	Network	3-Axial sensor	Green ON x1	1 time	Waked up and 3-Axial 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,
- To check the Network Status of Custos, just trigger Built-in Water Leak Sensor 2 seconds and result as below
 - i. In Standalone Mode: the YELLOW LED will be lighted ON;
 - ii. In Network Mode: the RED LED will be lighted ON “after included to any Z-Wave Network, Water Alarm will be enabled as normal function.

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 SmartStart and Classic Inclusion;
- For adding Custos WWD into Z-Wave Network, end-user can use SmartStart for Inclusion.

12.2.1 SmartStart:

- To enable SmartStart, below methods can be used, please also refer to Gateway’s user manual:
 - i. Scan the Z-Wave QR Code or entering PIN Code or DSK String into S2 Enabled Gateway, please refer to item 16.11 SmartStart Labeling, “The QR Code with Full SDK String is printed on packing box”;
 - ii. Re-install the battery then SmartStart will be enabled automatically.

12.2.2 Classic Inclusion / Add Device:

- To enable Classic Inclusion:
 - i. Set your Z-Wave Gateway into Inclusion Mode / Add Device processing;
 - ii. Trigger Built-in Water Leak Sensor for 2 Seconds;
 - iii. 2 x Buzzer Sound and 2 GREEN LED ON UI to confirm enter into Inclusion Mode;
 - iv. YELLOW LED will be flashing when Inclusion is processing.

12.3 Remove Custos WWD from Z-Wave Network

- To Remove Custos WWD from Z-Wave Network, Use Gesture Recognition
 - i. Set your Z-Wave Gateway into Exclusion Mode / Remove Device processing;
 - ii. Shaking Custos WWD in Vertical / Horizontal to wake up it until get 1x Buzzer Sound & 1x GREEN LED ON;
 - iii. Then stop shaking it, leave WWD on the table in Horizontal position as Figure 12A;
 - iv. Wait for Position Recognition confirmation UI with Buzzer Sounds & GREEN LED flashing 2 times "Event success UI";
 - v. While GREEN & RED LED are flashing alternative for Gesture Recognition then turn Custos WWD from Horizontal to Vertical position "90°" and stick close to table surface as Figure 12B;
 - vi. Wait for Gesture Recognition configuration UI with Buzzer Sounds & GREEN LED flashing 2 times "Event success UI" for completion.

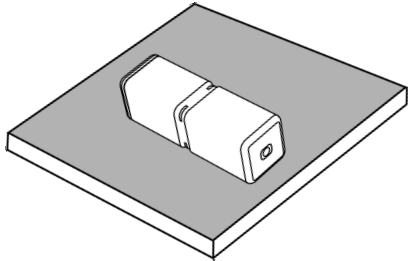


Figure 12A

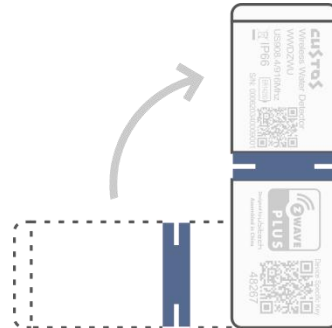


Figure 12B

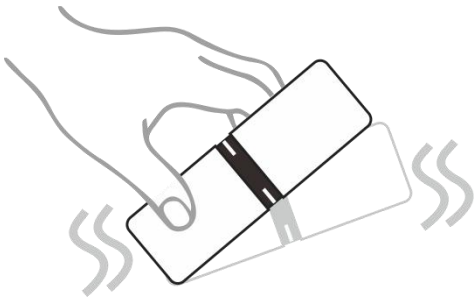
12.4 Factory Default Reset

Purpose: Remove all the registered setup information, exclude from Z-Wave network, return to factory state and go to hibernation mode for storage or shipping.

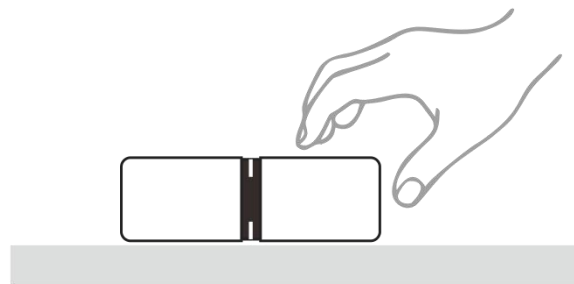
Step One: Trigger Active Standby State to get into Gesture Command mode

Action 1 : Shake the WWD, until you hear a beep sound and green light flashing, this will give you 10 seconds window of Active Standby Mode

Action 2: Within this 10 second Active Standby window, lay the WWD on level surface, WWD will engage in Gesture Command mode, this mode will give 10 seconds window to receive gesture command sequence.



Action 1: Shake it to Active Standby



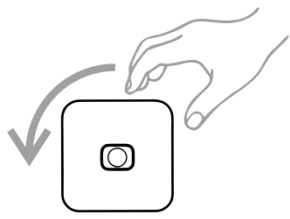
Action 2: Lay down horizontally for Gesture Command Mode

Remark: Double RED flash and beep indicates termination of this process due to time out or wrong gesture sequence

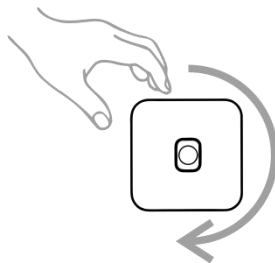
Step Two: Enter Gesture Command

Action: within 10 seconds Gesture Command Window

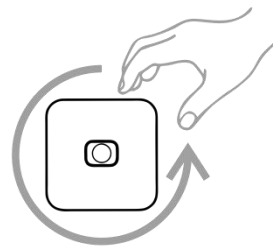
- (1) Rotate the WWD horizontally 90° to either direction, a double beep will be generated to indicate current gesture command is recognised and waiting next gesture within 10 seconds windows (all subsequent gestures are same)
- (2) Rotate the WWD toward counter direction for 180°,
- (3) Then rotate to counter direction again for 270°,
- (4) Put up WWD vertically



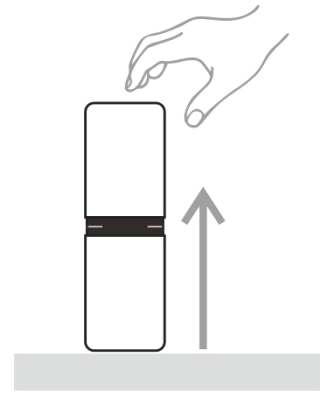
(1) Rotate 90° to either direction



(2) Rotate 180° to counter direction



(3) Rotate 270° to counter direction



(4) Put up vertically

Success: Green light will show up for about 10 seconds while it's cleaning up internal data and transmit unjoin request to gateway, then WWD will be hibernated

Fail: Double RED flash and beep then sleep

13 NOTIFICATION & BATTERY REPORT

13.1 Notification Report & Battery Report

13.1.1 The Notification report will be sent to Gateway after waked up every time, it can through Wake up CC setting "Refer to item 16.7" or through 3-Axial Action Sensor,

- To send out Notification by 3-Axial Action Sensor as following steps:
 - i. Shaking Custos WWD in Vertical / Horizontal to wake up it until get 1x Buzzer Sound & 1x GREEN LED ON;
 - ii. Then stop shaking WWD then wait for timeout in 10 seconds;
 - iii. After time out then WWD will send out Notification & Battery Report then it will go to sleep mode.

13.1.2 Battery will be sent to Gateway as following conditions,

- By default, the Battery report will be sent out when every 10% change, "Refer to Parameter #0x20 Battery Level Change Auto Report of item 16.10 Configuration CC" and it wake up every time "Refer to Wake up interval setting of item 16.7".

14 WATER LEAK DETECTION & 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 REPORT

15.1 Temperature Report

- By default setting of wake-up interval is 2 hours, Custos WWD will wake up every 2 hours "Please refer to item 16.7" and it sends temperature report to Gateway if the temperature is changed every 1°C or 4°F "Refer to item 16.10 – 0x31 Temperature Level Change to auto report",
- The Heat Alarm "Overheat and Underheat" also will send to Gateway at wake-up every time, once the Overheat or Underheat is detected, regarding the Overheat and Underheat setting with Configuration CC "Please refer to item 16.10"
- 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	0x10
Firmware 0 Version	0x03 – Z-Wave Chip Major Firmware Version
Firmware 0 Sub Version	0x00 – 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)
		0x02	No Location Support Event
Water Alarm		Overheat detected	No Location Support Event
		Underheat detected	No Location Support Event
	0x05	State idle	Notification value for the state variable going to idle (V5)
		Water leak detected	No Location Support Event

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	3600 Seconds
Max Wake Up Interval (Seconds)	0x015180	86400 Seconds (24 Hours)
Default Wake Up Interval (Seconds)	0x001C20	21600 Seconds (2 Hours)
Wake Up Interval Step (Seconds)	0x000014	3600 Seconds

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16.8 Association Group Info (AGI)

Association Group	Name	Node Count	Function
1	Lifeline	5	<ul style="list-style-type: none"> - Device Reset Locally Notification - Sensor Binary Report - Indicator Report - Sensor Multilevel Report – Temperature “Temperature level change auto report will be sent after wake up every time based on Configuration Parameter 0x31 Setting.” - Battery Report - Heat Alarm Notification Report (0x04) <ul style="list-style-type: none"> - 0x00 = State idle - 0x02 = Overheat – no location support - - 0x06 = Underheat – no location support - Water Alarm Notification Report (0x05) <ul style="list-style-type: none"> - 0x00 = State idle - 0x02 = Water leak detected – no location support
2	Built-in Leak Sensor Probe	5	<ul style="list-style-type: none"> - Basic Set <ul style="list-style-type: none"> - 0x00 = IDEL / CANCEL (Based on Configuration Parameter 0x41 Setting) - 0xFF = TRIGGERED (Based on Configuration Parameter 0x40 Setting)
3	Remote Water Detection Probe	5	<ul style="list-style-type: none"> - Basic Set <ul style="list-style-type: none"> - 0x00 = IDEL / CANCEL (Based on Configuration Parameter 0x43 Setting) - 0xFF = TRIGGERED (Based on Configuration Parameter 0x42 Setting)
4	Overheat Alarm	5	<ul style="list-style-type: none"> - Basic Set <ul style="list-style-type: none"> - 0x00 = IDEL / CANCEL (Based on Configuration Parameter 0x45 Setting) - 0xFF = TRIGGERED (Based on Configuration Parameter 0x44 Setting)
5	Underheat Alarm (Freeze)	5	<ul style="list-style-type: none"> - Basic Set <ul style="list-style-type: none"> - 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

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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 - 1				
Parameter No.	0x10 (16)			
Name	Local Water Leak Sensor Enable			
Info	Local Water Leak Sensor Enable / Disable			
Properties	Size	1 Byte	Min Value	0x00 (0)
	Format	Enumerated	Max Value	0x01 (1)
	Read only	FALSE	Default Value	0x01 (1)
	Altering	FALSE	Advanced	FALSE
Description	Local Water Leak Sensor Enable / Disable *(Default enabled)			
	Value	Function		
	0x00(0)	Disable Local Water Leak Detection Probe		
	0x01(1)	Enable Local Water Detection Probe *(Default)		
Parameter No.	0x11 (17)			
Name	Remote Water Leak Sensor Enable			
Info	Remote Water Leak Sensor Enable / Disable			
Properties	Size	1 Byte	Min Value	0x00 (0)
	Format	Enumerated	Max Value	0x01 (1)
	Read only	FALSE	Default Value	0x01 (1)
	Altering	FALSE	Advanced	FALSE
Description	Remote Water Leak Sensor Enable / Disable *(Default enable)			
	Value	Function		
	0x00(0)	Disable Remote Water Leak Detection Probe		
	0x01(1)	Enable Remote Water Detection Probe *(Default)		
Parameter No.	0x12 (18)			
Name	Overheat Sensor Enable			
Info	Overheat Sensor Enable / Disable			
Properties	Size	1 Byte	Min Value	0x00 (0)
	Format	Enumerated	Max Value	0x01 (1)
	Read only	FALSE	Default Value	0x01 (1)
	Altering	FALSE	Advanced	FALSE
Description	Overheat Sensor Enable / Disable *(Default enable)			
	Value	Function		
	0x00(0)	Disable Overheat Detection		
	0x01(1)	Enable Overheat Detection *(Default)		
Parameter No.	0x13 (19)			
Name	Freeze Sensor Enable			
Info	Freeze Sensor Enable / Disable			
Properties	Size	1 Byte	Min Value	0x00 (0)
	Format	Enumerated	Max Value	0x01 (1)
	Read only	FALSE	Default Value	0x01 (1)
	Altering	FALSE	Advanced	FALSE
Description	Freeze Sensor Enable / Disable *(Default enable)			
	Value	Function		
	0x00(0)	Disable Freeze Detection		
	0x01(1)	Enable Freeze Detection *(Default)		

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Sensor Function - 2

Sensor Function - 2				
Parameter No.	0x14 (20)			
Name	Local Water Leak Sensor Detection Time			
Info	Minimum Leak Trigger Detection Time			
Properties	Size	1 Byte	Min Value	0x00 (0)
	Format	Unsigned Integer	Max Value	0x3C (60)
	Read only	FALSE	Default Value	0x05 (5)
	Altering	FALSE	Advanced	FALSE
Description	Minimum Leak Trigger Detection Time (seconds) *(Default 5 seconds)			
	Value	Function		
	0x00 ~ 0x3C	From 0 second to 60 seconds (Default 5 seconds)		
Parameter No.	0x15 (21)			
Name	Remote Water Leak Sensor Detection Time			
Info	Minimum Leak Trigger Detection Time			
Properties	Size	1 Byte	Min Value	0x00 (0)
	Format	Unsigned Integer	Max Value	0x3C (60)
	Read only	FALSE	Default Value	0x05 (5)
	Altering	FALSE	Advanced	FALSE
Description	Minimum Leak Trigger Detection Time (seconds) *(Default 5 seconds)			
	Value	Function		
	0x00 ~ 0x3C	From 0 second to 60 seconds (Default 5 seconds)		
Parameter No.	0x16 (22)			
Name	Temperature Overheat Alarm Value			
Info	Temperature Overheat Alarm Value			
Properties	Size	1 Byte	Min Value	0x00 (0)
	Format	Unsigned Integer	Max Value	0xFF (255)
	Read only	FALSE	Default Value	0x68 (104)
	Altering	FALSE	Advanced	FALSE
Description	Temperature Overheat Alarm Value in °F *(Default 104°F)			
	Value	Function		
	0x00 ~ 0xFF	From 0 °F to 255 °F (Default 104°F)		
Parameter No.	0x17 (23)			
Name	Temperature Overheat Recover Value			
Info	Temperature Overheat Recover Value			
Properties	Size	1 Byte	Min Value	0x00 (0)
	Format	Unsigned Integer	Max Value	0xFF (255)
	Read only	FALSE	Default Value	0x56 (86)
	Altering	FALSE	Advanced	FALSE
Description	Temperature Overheat Recover Value in °F *(Default 86°F)			
	Value	Function		
	0x00 ~ 0xFF	From 0 °F to 255 °F (Default 86°F)		
Parameter No.	0x18 (24)			
Name	Temperature Freeze Alarm Value			
Info	Temperature Freeze Alarm Value			
Properties	Size	1 Byte	Min Value	0x00 (0)
	Format	Unsigned Integer	Max Value	0xFF (255)
	Read only	FALSE	Default Value	0x20 (32)
	Altering	FALSE	Advanced	FALSE
Description	Temperature Freeze Alarm Value in °F *(Default 32°F)			
	Value	Function		
	0x00 ~ 0xFF	From 0 °F to 255 °F (Default 32°F)		
Parameter No.	0x19 (25)			
Name	Temperature Freeze Recover Value			
Info	Temperature Freeze Recover Value			
Properties	Size	1 Byte	Min Value	0x00 (0)
	Format	Unsigned Integer	Max Value	0xFF (255)
	Read only	FALSE	Default Value	0x24 (36)
	Altering	FALSE	Advanced	FALSE
Description	Temperature Freeze Recover Value in °F *(Default 36°F)			
	Value	Function		
	0x00 ~ 0xFF	From 0 °F to 255 °F (Default 36°F)		

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Sensor Function - 3				
Parameter No.	0x1A (26)			
Name	Water Leak Report Resend Time Interval			
Info	Resend time for water leak alarm			
Properties	Size	1 Byte	Min Value	0x00 (0)
	Format	Unsigned Integer	Max Value	0x3C (60)
	Read only	FALSE	Default Value	0x05 (5)
	Altering	FALSE	Advanced	FALSE
Description	Resend Water leak report every X minute when water leak detected *(Default 5 minutes)			
	Value	Function		
	0x00 ~ 0x3C	From 0 minutes to 60 minutes (Default 5 minutes)		
Parameter No.	0x1B (27)			
Name	Water Leak Report Resend Count			
Info	Resend count for water leak alarm			
Properties	Size	1 Byte	Min Value	0x00 (0)
	Format	Unsigned Integer	Max Value	0x0A (10)
	Read only	FALSE	Default Value	0x03 (3)
	Altering	FALSE	Advanced	FALSE
Description	Maximum retry time to resend water leak report.			
	Value	Function		
	0x00 ~ 0x0A	From 0 time to 10 times (Default 3 times)		

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Battery				
Parameter No.	0x20 (32)			
Name	Battery Low Level			
Info	Battery Low Level Trigger value			
Properties	Size	1 Bytes	Min Value	0x01 (1)
	Format	Unsigned Integer	Max Value	0x64 (100)
	Read only	FALSE	Default Value	0x0A (10)
	Altering	FALSE	Advanced	FALSE
Description	Configure Battery Lower Threshold Level Report *(Default 10%)			
	Value	Function		
	0x01 ~ 0x63	From 1% to 100% of battery level *(Default 10%)		

Temperature Sensor				
Parameter No.	0x30 (48)			
Name	Temperature Report Change Interval			
Info	Temperature Report Change Interval			
Properties	Size	1 Bytes	Min Value	0x00 (0°F)
	Format	Signed Integer	Max Value	0xFF (255°F)
	Read only	FALSE	Default Value	0x04 (4 °F)
	Altering	FALSE	Advanced	FALSE
Description	Configure Temperature Level Change to auto report			
	Value	Function		
	0x0100 ~	From 0°F to 255°F		
Parameter No.	0x31 (49)			
Name	Temperature Offset			
Info	Temperature Offset			
Properties	Size	1 Bytes	Min Value	0x00 (0°F)
	Format	Signed Integer	Max Value	0xFF (255°F)
	Read only	FALSE	Default Value	0x00 (0 °F)
	Altering	FALSE	Advanced	FALSE
Description	Configure Temperature Value Offset			
	Value	Function		
	0x0100 ~	From 0°F to 255°F		

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Association Group				
Parameter No.	0x40 (64)			
Name	Local Water Leak Sensor Alarm Basic SET			
Info	Local Water Leak Sensor Alarm For AG2			
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) *(Default)		
	0x02 (2)	Basic Set OFF (0x00)		
Parameter No.	0x41 (65)			
Name	Local Water Leak Sensor Disarm Basic SET			
Info	Local Water Leak Sensor Disarm For AG2			
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) *(Default)		
	0x01 (1)	Basic Set ON (0xFF)		
	0x02 (2)	Basic Set OFF (0x00)		
Parameter No.	0x42 (66)			
Name	Remote Water Leak Sensor Alarm Basic SET			
Info	Remote Water Leak Sensor Alarm For AG3			
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) *(Default)		
	0x02 (2)	Basic OFF (0x00)		
Parameter No.	0x43 (67)			
Name	Remote Water Leak Sensor Disarm Basic SET			
Info	Remote Water Leak Sensor Disarm For AG3			
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 alarm cancelled			
	Value	Function		
	0x00 (0)	Disable Basic Set (Send nothing) *(Default)		
	0x01 (1)	Basic ON (0xFF)		
	0x02 (2)	Basic OFF (0x00)		
Parameter No.	0x44 (68)			
Name	Overheat Alarm Basic SET			
Info	Overheat Alarm Basic For AG4			
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) *(Default)		
	0x01 (1)	Basic ON (0xFF)		
	0x02 (2)	Basic OFF (0x00)		
Parameter No.	0x45 (69)			
Name	Overheat Disarm Basic SET			
Info	Overheat Disarm Basic For AG4			
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) *(Default)		
	0x01 (1)	Basic ON (0xFF)		
	0x02 (2)	Basic OFF (0x00)		

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Parameter No.	0x46 (70)			
Name	Freeze Alarm Basic SET			
Info	Freeze Alarm Basic For AG5			
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) *(Default)		
	0x01 (1)	Basic ON (0xFF)		
	0x02 (2)	Basic OFF (0x00)		
Parameter No.	0x47 (71)			
Name	Freeze Disarm Basic SET			
Info	Freeze Disarm Basic For AG5			
Properties	Size	1 Byte	Min Value	0x00 (0)
	Format	Enumerated	Max Value	0x02 ()
	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) *(Default)		
	0x01 (1)	Basic ON (0xFF)		
	0x02 (2)	Basic OFF (0x00)		

Notification				
Parameter No.	0x50 (80)			
Name	Water Leak Notification Enable			
Info	Water Leak Notification Enable / Disable			
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 Notification Enable / Disable			
	Value	Function		
	0x00 (0)	Disable		
	0x01 (1)	Enable *(Default)		
Parameter No.	0x51 (81)			
Name	Temperature Overheat Notification Enable			
Info	Temperature Overheat Notification Enable / Disable			
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 Temperature Overheat Notification Enable / Disable			
	Value	Function		
	0x00 (0)	Disable		
	0x01 (1)	Enable *(Default)		
Parameter No.	0x52 (82)			
Name	Temperature Freeze Notification Enable			
Info	Temperature Freeze Notification Enable / Disable			
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 Freeze Notification Enable / Disable			
	Value	Function		
	0x00 (0)	Disable		
	0x01 (1)	Enable *(Default)		

16.11 SmartStart Labeling

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

-PIN code with QR Code on WWD housing "Refer to item 4.1"



PIN Code: 12345

-QR Code with full DSK string printed on outside of Packing Box, the first 5 digits are PIN code for SmartStart use



12345-xxxxx-xxxxx-xxxxx
-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	R→Y→G x1	1 time	System Power On Okay after battery installed	
Waked up	Network	After triggered by 3-Axial sensor	Green ON x1	1 time	Waked up and 3-Axial sensor is ready. In Mesh Network Mode

17.4 3-Axial Sensor 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	
OTA FW Upgrade	Starting	OTA upgrade	Green flash x2	2 times	Being to start OTA firmware upgrade
	Processing	procedure	G→Y→R flashing	n/a	OTA is in progressing, LED keep flashing until OTA finished.

17.6 Water Leak Alarm Status

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

17.7 Patents

CN Patent: ZL 2019 2 1399174

US Patent: US D950,407 S