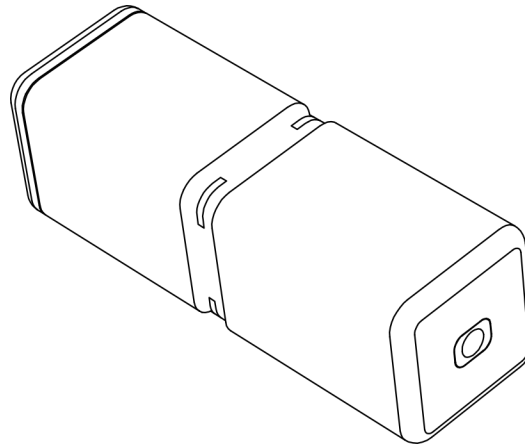


Custos Wireless Water Detector

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 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) / 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	IP66
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-Axial Sensor
LED Indicator	3 colors LED. (Green, Yellow & Red)
Power Supply	ER14250 - Battery 3.6V 1200mAH
Battery Life	Standby: ~4.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	v7.14.3
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”**

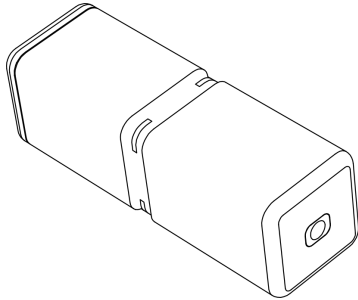


Figure 3A

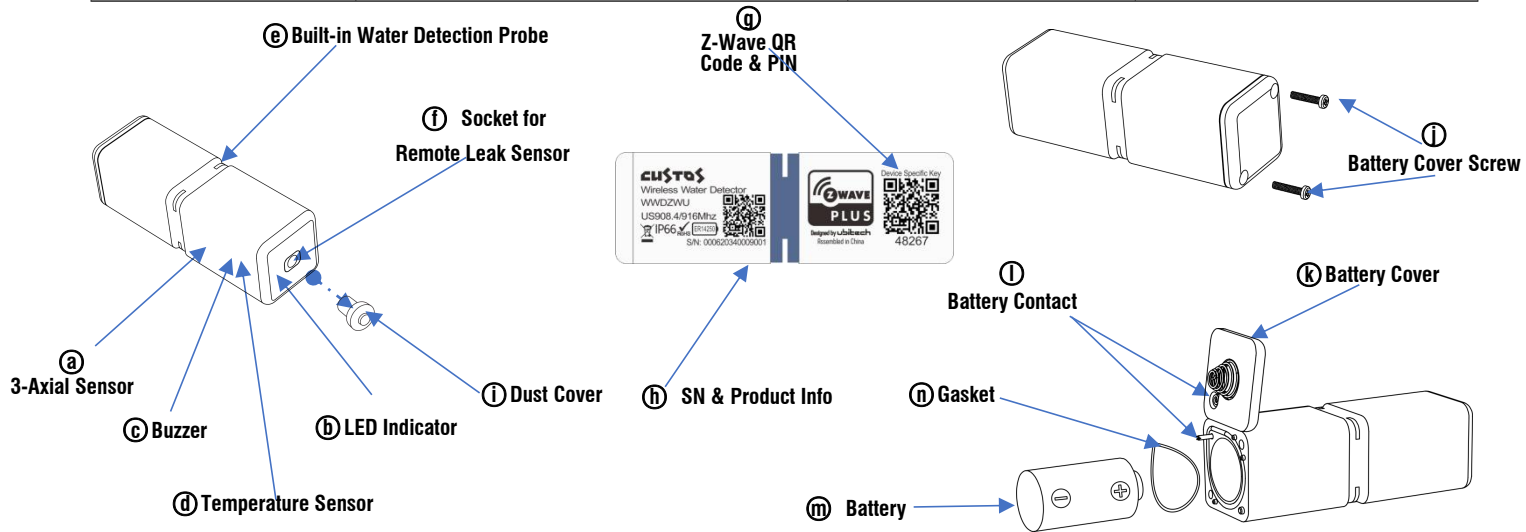


Figure 3B

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.

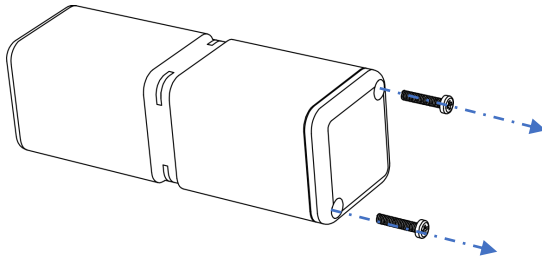


Figure 5A

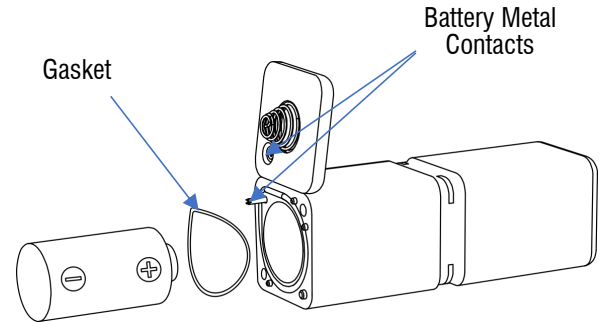


Figure 5B

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

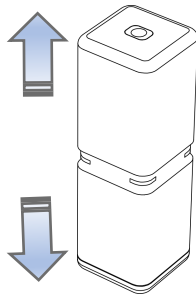
6.3 Sound Indicator

- Buzzer: Long & short beep sound.

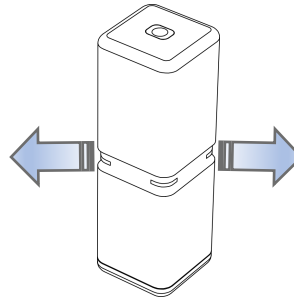
7 HOW 3-Axial ACTION SENSOR WORKS

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.)
 - i. Send out Notification CC packet to Gateway, (Refer to item 13.1.1)
 - ii. Perform Exclusion Gesture, (Refer to item 12.3)
 - iii. 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”,

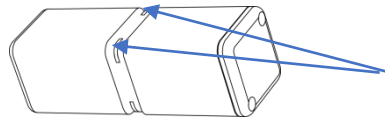


Figure 8A

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.

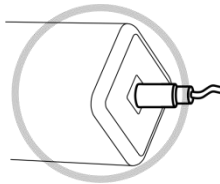


Figure 8B

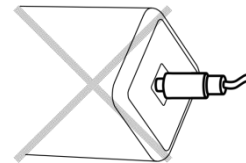


Figure 8C

9 WORKING MODE SUPPORT

9.1 Standalone Mode

- 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 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, SmartStart, Classic Inclusion, Exclusion & Factory Default Reset.
- Custos WWD also can associate with Custos BVS to shut off the Water Valve when detected Water Leak.

9.3 Factory Default Reset Mode – Only works in Mesh Network Mode

- Factory Mode only can be executed after Custos WWD is included into Z-Wave Network (in Mesh Network Mode)

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.

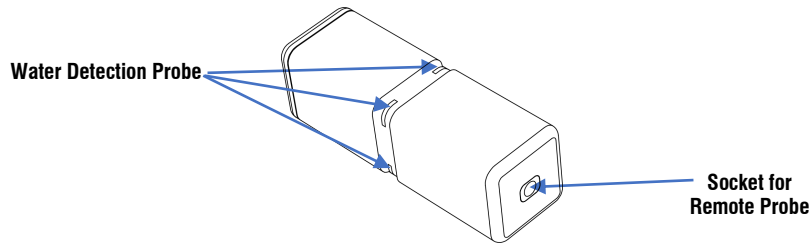


Figure 9A

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

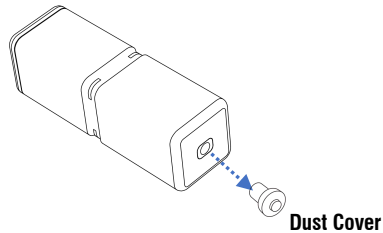


Figure 10A

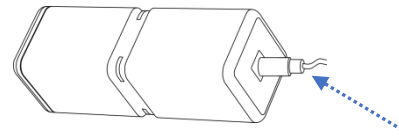


Figure 10B

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		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.

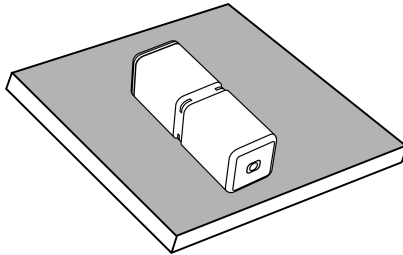


Figure 12A

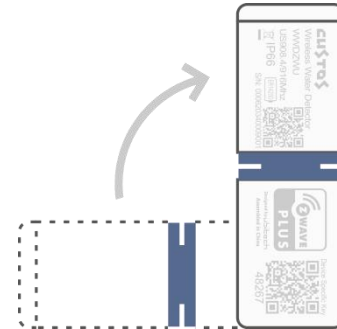


Figure 12B

12.4 Factory Default Reset

- **End-user can perform Factory Default Reset when you met below things and it will involve gateway in Exclusion / Remove device operation,**
 - i. The WWD lost connection permanent or no longer be paired with Z-Wave Network or controller;
 - ii. Re-include WWD with other Z-Wave Network without perform exclusion with previous Z-Wave Network;
 - iii. To exclude the WWD from Z-Wave Network and then re-include into Z-Wave Network.
- **Please note that once WWD performed Factory Default Reset, all setting will be restored to Factory Default as below.**
 - i. Remove the WWD from Z-Wave Network and reset the node ID,
 - ii. Restore Association Group to default,
 - iii. Restore the configuration settings to the default.
- **To perform Factory Default Reset as following steps – Only works in Mesh Network Mode**
 - i. Shaking Custos WWD in Vertical / Horizontal to wake up it until get 1x Buzzer Sound & 1x GREEN LED ON;
 - ii. Then stop shaking it, leave WWD on the table in Horizontal position as Figure 12C;
 - iii. Wait for Position Recognition confirmation UI with Buzzer Sounds & GREEN LED flashing 2 times “Event success UI”;
 - iv. While GREEN & RED LED are flashing alternative for Gesture Recognition then roll Custos WWD in one complete turn “360°” and stick close to table surface as Figure 12D;
 - v. Wait for Gesture Recognition configuration UI with Buzzer Sounds & GREEN LED flashing 2 times “Event success UI”;
 - vi. Then WWD will perform soft reset after GREEN LED is flashing for 2 seconds;
 - vii. After soft reset with RED LED & Buzzer Sound x1 to finished Factory Default Reset action then SmartStart also will be activated.

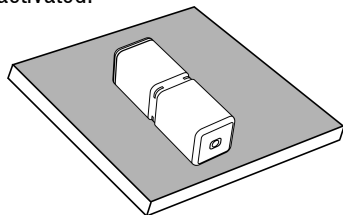


Figure 12C

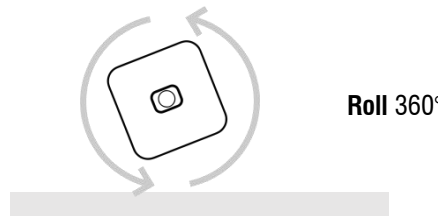


Figure 12D

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	0x0E
Firmware 0 Version	0x02 – 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)
		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	<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 - Power Management Notification (0x08) <ul style="list-style-type: none"> - 0x00 = State Idle - 0x11 = Battery Fluid is low
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)

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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			

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Battery Function				
Parameter No.	0x20 (32)			
Name	Battery Level Change 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 report *(Default 10% change to report)			
	Value	Function		
	0x00 (0)	Disable Battery Level Change Auto Report		
	0x01 (1) – 0x63 (99)	Auto report when wake up every time. *(Default 0x0A = 10%)		
	0x063 (99)	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 Temperature Report		
	0x01 (1)	Report Celsius °C unit		
	0x02 (2)	Report Fahrenheit °F unit		

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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, 0x 01 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		

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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		

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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)		

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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 alarm cancelled			
	Value	Function		
	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)		

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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		
	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	0x02 (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)		

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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 = Enabled)		
	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=Enable)			
	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 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	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-Axial sensor	Yellow ON x1	1 time	Waked up and 3-Axial sensor is ready. In Standalone mode.
	Network		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
Factory Default Reset	1 st phase	Built-in Leak sensor	Red flashing	1 time	Waked up and 3-Axial sensor is ready. In Standalone mode.
	2 nd phase	3-Axial sensor	Green ON x1	1 time	Waked up and 3-Axial 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.

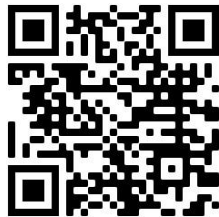
17.6 Water Leak Alarm Status

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.

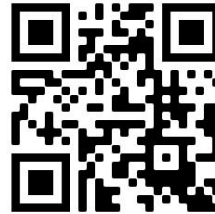
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