Custos Wireless Water Detector

Technology for Humanity

WWDLWx User Manual
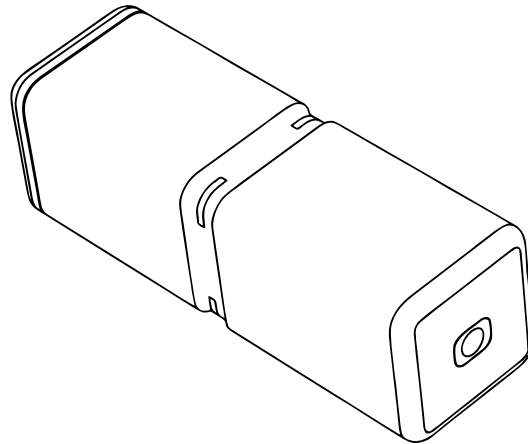
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1 INTRODUCTION

1.1 What's LoRa

LoRa (short for long range) is a spread spectrum modulation technique derived from chirp spread spectrum (CSS) technology. Semtech's LoRa devices and wireless radio frequency technology is a long range, low power wireless platform that has become the de facto technology for Internet of Things (IoT) networks worldwide.

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).

2 FEATURES & SPECIFICATIONS

2.1 Physical Specifications

Parameter	Value
Model No.	WWDLWU(US)/ WWDLWE(EU)
Dimensions	21.6*21.6*67.5mm
Weight	WWD Unit: 52g
Body Color	White
Water Detection Method	Conduction
Waterproof & Dustproof	IPX5
Operation Temperature	14~122°F (-10~+50℃)
Releative Humidity	8%~80%

2.2 Hardware Characteristic

Parameter	Value
CPU	Main: STM32 RF: Sx1261
RF Working Distance	40m (Indoor) / 120m (Outdoor) "Life of sight"
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 Specification

Parameter	Value
RF Wireless Protocol	LoRa
Protocol Version	
Device EUIDevEUI	"Unique Number that provided by Factory"
AppsKey	Can be provided by Factory" or requested by SI
AppsEUI	Can be provided by Factory" or requested by SI
Device Type	Sensor
Class Type	Class A
API Protocol Provide	Provided by Ubitech
Firmware Update	Yes (OTW with CommBox)
Alarm Report	Yes
Temperature Report	Yes
Uplink	
Downlink	
Configurable	Temperature Unit
Factory Default Reset	Yes, by "Gesture UI"

3 WHAT INSIDE IN THE BOX

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

3.1 Custos WWD Main Unit X1 (Figure 3A)

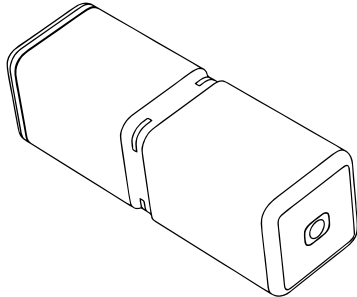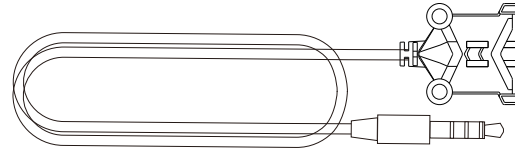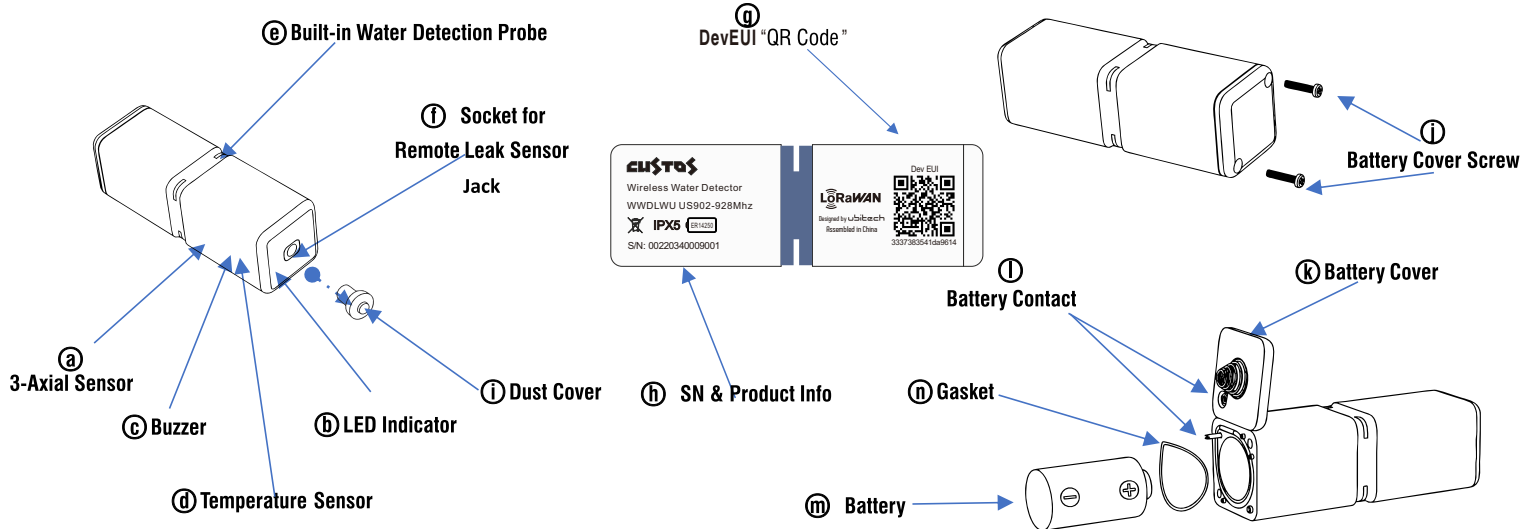## 3.2 Remote Water Detection Probe (Optional) X1 (Figure 3B)

Figure 3A   Figure 3B

4 UNDERSTANDING CUSTOS WWD

4.1 Connectors & Interfaces

Terminology	Description	Terminology	Description
ⓐ 3-Axial Sensor	3-Axial Action Sensor	ⓗ SN & Product Details	SN & Product Details
ⓑ Display Indicators	3 Colors LED "Green, Yellow & Red"	ⓘ Dust Cover	Dust & Water prevention
ⓒ Sound Indicator	Buzzer	ⓙ Battery Cover Screw	
ⓓ Temperature Sensor	Built-in Temperature Sensor	ⓚ Battery Cover	
ⓔ Leak Sensor #1	Built-in Water Detection Probe	ⓛ Battery Contact	Connect main unit & Battery Cover
ⓕ Leak Sensor #2	Socket for Remote Water Detection Probe – 3.5mm jack	ⓜ Battery	ER14250 3.6V 1200mA
ⓖ Device EUI	DevEUI "QR Code"	ⓝ Gasket	Silicon Rubber For Waterproof

ⓔ Built-in Water Detection Probe

ⓖ
DevEUI "QR Code"

ⓕ Socket for Remote Leak Sensor Jack

Battery Cover Screw ⓘ

CUSTOS
Wireless Water Detector
WWDLWU US902-928Mhz
IPX5 ER14250
S/N: 00220340009001
LoRaWAN
Dev EUI
Designed by ubitech
Assembled in China
3337383541da9614

ⓐ 3-Axial Sensor

ⓘ Dust Cover

ⓗ SN & Product Info

ⓒ Buzzer

ⓑ LED Indicator

ⓛ Battery Contact

ⓚ Battery Cover

ⓝ Gasket

ⓓ Temperature Sensor

ⓜ Battery

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 (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.
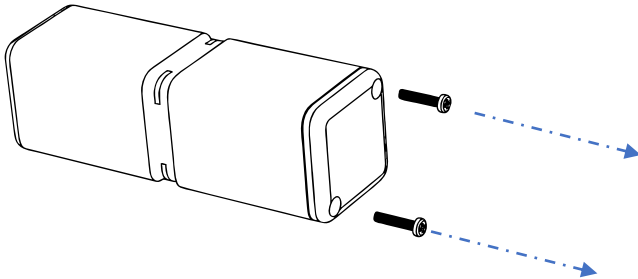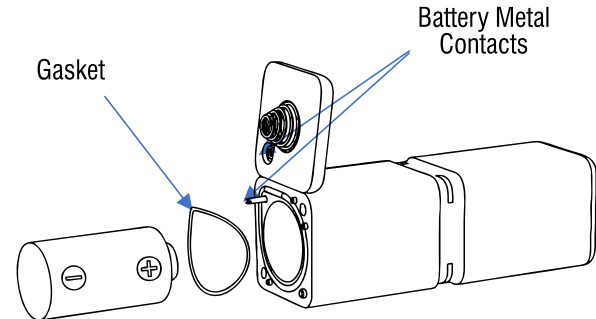

Figure 5A

Battery Metal
Contacts

Gasket

Figure 5B

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, Once the 3-Axis Action Sensor is activated, you also can see below Visual and Sound Indicators response with the 3-Axis Action Sensor.

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-AXIAL ACTION SENSOR WORKS

7.1 3-axis Action 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
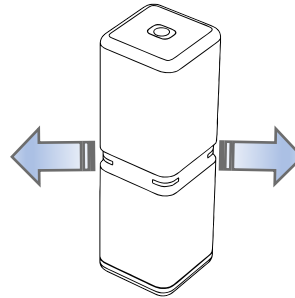i.To wake up Gustos WWD from sleep mode and send out uplink packet to Gateway / LoRa Server,
ii.Factory Default Reset,
-Custos WWD only support below gesture movement, shake it vertically or horizontally as below
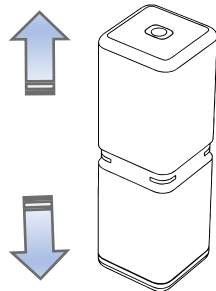
Shaking in Vertical

Shaking in Horizontal

8 HOW WATER LEAK SENSOR WORKS

8.1 Water Detection Probes

Custos WWD supports two water detection probe: "Build-in" & "Remote"

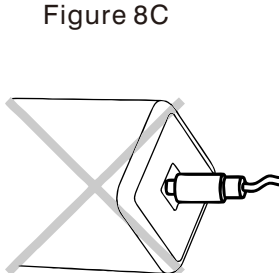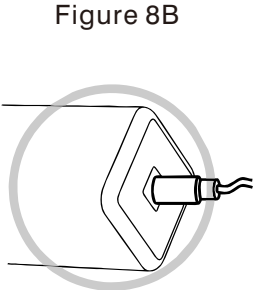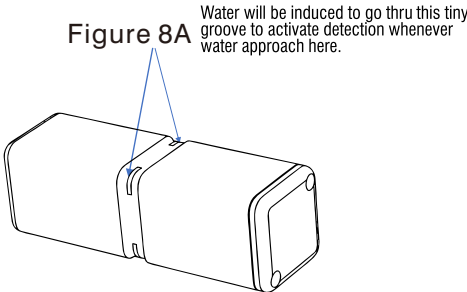## 8.2 Built-in Water Detection Probes

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 ends.
To achieve better result, please lay the WWD flat on the floor.

8.3 Removable Water Detection Probe

To ensure the sensor probe works properly, as shown in the picture below (Figure 8B) , please ensure that the removed sensor probe is inserted tightly and no gap is allowed (Figure 8C) between the 3.5mm jack and housing.

Figure 8A — Water will be induced to go thru this tiny groove to activate detection whenever water approach here.

Figure 8B

Figure 8C

9 WORKING MODE SUPPORT

9.1 Shipping Mode (Deep Sleep Mode)

-By default, Custos WWD is set in Shipping Mode to keep it in deep sleep to save power during transport & storage, in this time all functions will be disabled until unlocked it from Shipping Mode. End-user must activate the device from Shipping Mode before joined to any LoRaWAN Network.
-To exit Shipping mode, the user needs to trigger the device's water leak sensor and holds it for at least 2 seconds.

9.2 Standalone Mode

-If Custos WWD is not paired to any LoRa Network and it unlocked from Shipping Mode.

9.3 Network Mode

-Custos WWD is paired with a LoRaWAN Network.
-Supported function as Water Leak Report, Temperature Report, and downlink configuration.
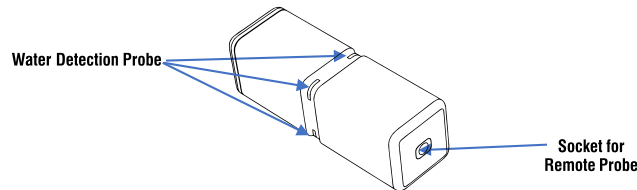Leak Alarm
-Water Leak sensor has been triggered.

Figure 9A

10 SETUP WITH LORAWAN NETWORK

10.1 Check Network Status

-By brand new default, Custos WWD does not belong to any LoRaWAN Network, and it is under shipping mode;
-To check Custos WWD Network status, trigger the Built-in Leak Sensor;
-Yellow LED flashing means Custos WWD is in Standalone mode, not joined in LoRa network.

10.2 OTAA Activation

-Custos LoRa WWD can support two methods to activate OTAA (time limit mode and forever mode)
i.Periodically activate OTAA for 2 minutes only.
ii.Activate OTAA forever.

10.2.1 Time Limits Activate OTAA

-OTAA will be activate only 3 minutes, after that if Custos WWD is not joined to any LoRa Network then it will return to shipping mode, this keeps lowers power consumption.
i.Trigger Built-in Water Leak Sensor for 2 seconds comes with Yellow LED Lights on per second.
ii.OTAA will be started per 30 seconds automatically if it's remained in standalone mode.
iii.OTAA success with LoRa Server, 2 Buzzer Sounds and Green LED on when OTAA success,
iv.After 3 minutes time-out without OTAA success then it will be back to shipping mode.

10.2.2 Activate OTAA &Exits Shipping Mode Permanently (Not Recommended)

-OTAA will be activated forever until it joined into a LoRaWAN Network, and it will not return to shipping mode anymore,

i.Trigger Built-in Water Leak Sensor for 5 seconds and comes with Yellow LED Lights on per seconds.

ii.OTAA will be started per 30 seconds automatically if it's remained in standalone mode.

iii.Yellow LED will keep flashing when OTAA is process with LoRa Server and 2 Buzzer Sounds and Green LEED on when OTAA success

10.3 Remove Custos WWD from LoRa Network

- If you need to remove the Custos from a LoRaWAN Network and possibly move it to another LoRaWAN Network.

i.Remove Device information form LoRa Server, "Please refer to related LoRa Server user manual".

ii.Perform Factory Default Reset as item 10.4.

iii.Follow below procedure to start Exclusion procedure in Custos WWD.

10.4 Factory Default Reset

- To remove all Custos WWD settings without involve LoRa Gateway or LoRa Server.
i.Pick up the Custos WWD;
ii.Shaking it as picture below (10A), you will get "beep" sound and Green LED blinking,
iii.Lay WWD flat and wait for 2 sec, then You'll get 2 Buzzer Sounds with Green LED Lights 2 times.
iv.Roll the WWD as shown in (10B) so that all 4 sides of the WWD are facing down once.
v.You'll get 2 Buzzer Sounds with Green LED Lights 2 times.
vi.Once success. Green LED Lights up while it*s resting itself to factory state;
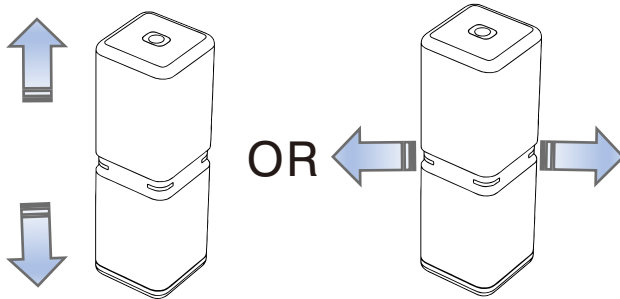vii.Then WWD goes into hibernation (Shipping Mode).
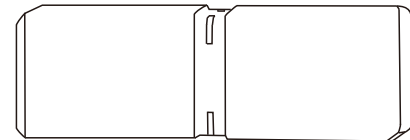
OR

Figure 10A   Figure 10B

11 BATTERY LEVEL

11.1 Battery Level Report

-The Battery Level Report will be sent through Uplink packet when triggered 3-Axis Action Sensor or Water Leak Sensor

11.2 Low Battery Alarm

-Low Battery Alarm UI will be enabled when battery level less than 15% once triggered the 3D-Axis Action Sensor (Red LED flashing 2 time and buzzer sounds 2 times.)

12 WATER LEAK DETECTION & ALARM

12.1 Water Leak Detection & Alarm

-Once the Water Leak Sensor Probe is triggered, the Custos WWD sends Uplink packet with Water Leak Detected to LoRa Server automatically.

Contact us if you have any questions

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https://www.ubitech.com