



# WATER LEAK DETECTOR    USER MANUAL

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## Presentation

The Water Leak sensor runs on a powerful micro-controller, the communication is handled by a top-of-the-line Radio module and all this is enclosed in a functional and elegant casing. It also has optional temperature and humidity sensors.

Several ways are available to deploy your device. It can be attached with double-sided tape or two screws whose primary function is to be electrodes. The sensor can be screwed directly in the object that has to be monitored for humidity. Another way to use it can be to put electrodes in a pot of potting soil or in the ground to know when the plan needs to be watered. So, a single device will send two separate data sets and two different alerts, one for the rope and one for the electrodes.

The opportunity to connect as many resistive rope sensors as it is needed makes it possible to monitor long distance water supply system in every building. Longer single ropes are also available on demand.

Conceived in the spirit of maximizing ease of use and efficiency, every part of the Water Leak Detector has a function.

- Functional and elegant white (Black optional) plastic casing blends into the background
- Long Battery life with a Lithium Thionyl Chloride battery (over 5 years)
- Battery replacement requires no tools and is done in seconds

- Connection of the water rope sensor by jack which can be extended by as many ropes as needed to cover the desired area
- Two additional electrodes can be used to secure the device

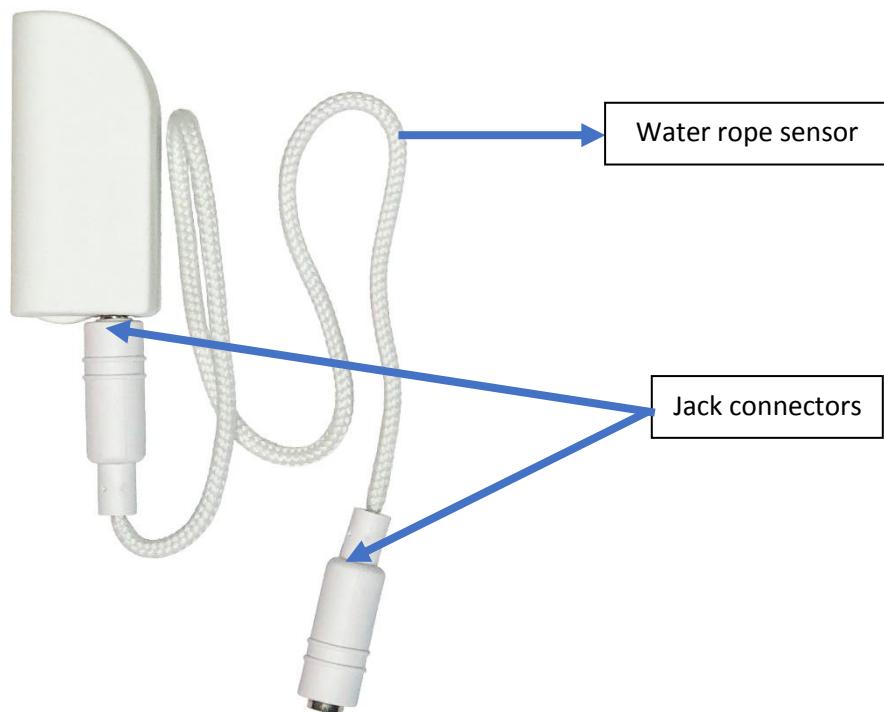


Figure 1 Water Leak Detector, Top View

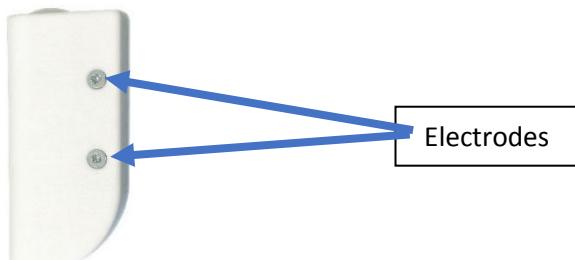
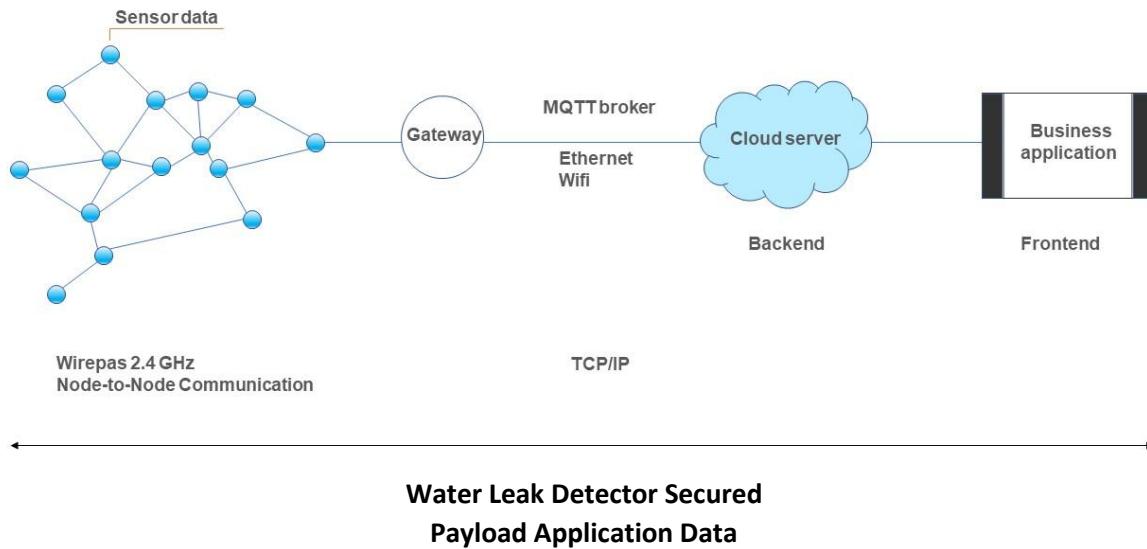


Figure 2 Water leak detector,  
Bottom View

## Wireless communication system

Measurement data is sent using the 2.4 GHz mesh network of the Wirepas system.

Collected data is sent automatically through the gateway according to your specifications. All the configuration is done remotely.



*Schematic Wirepas diagram*

The Custom Wirepas firmware designed by Promistel, PWS for Promistel Wirepas System, is supplied with all our sensors. Data packets are configurable: frequencies, alert threshold. Sensor data can be polled, collected at a given interval, or triggered by events you will have defined.

## Data Format

The data sent by water leak detectors are from Source End Point 111 and with destination End Point according to the data type. The software is based on PWS, for a full list of PWS commands, please reference to the PWS documentation. Here is a short brief of the messages that the device will send.

### Descriptor (EP 0)

This descriptor is a set of data describing the hardware and the configuration of the device.

Param 1 (4 bytes) : the PWS version (A.B.C.D)

Param 2 (16 byte) : a string, the name of the board hardware

Param 3 (4 x 4 bytes) : the values of the « sensorPeriod » registers.

Param 4 (8 x 1 byte) : list of the supported application commands.

8x

Param 5.1 (1 byte) : supported sensor (End point)

Param 5.2 (1 byte) : sensor option flags

The possible sensor option flags are :

0x01 : an offset is set for this sensor

0x02 : an alarm is set for this sensor

### Alarm message (EP 6)

These messages are the result of the alarms configuration (see command 21)

Param 1 (1 byte) : Destination EP of the sensor that has generated the alarm

Param 2 (1 byte) : The alarm status.

The possible alarm status are :

0 : ALARM OFF

1 : ALARM HIGH

2 : ALARM LOW

### Temperature (EP 112)

Signed short: Integer representing the temperature in 100th of degree.

### Humidity (EP 114)

Unsigned short: Relative humidity in 100th of %.

### Shock detection Extended (EP 127)

Param 1 (unsigned byte): the state:

\* 0: sensor was stationary, and it is still stationary.

\* 1: sensor was stationary, and it is moving now.

\* 2: sensor was moving, and it is stationary now.

\* 3: sensor was moving, and it is still moving.

Param 2 (unsigned short): move duration in seconds. (Meaningful for state 2 & 3)

Param 3 (unsigned byte): number of moves. (Meaningful for state 2 & 3)

Param 4 (3 signed bytes): acceleration state (One byte per axis X/Y/Z - Meaningful for state 0 & 2)

Acceleration value is the MSB of a 12 bits value. And the result is in mG.

**Water Leak Terminal (EP 136)**

This value is for the pads in the casing

Param 1 (signed int): The ADC value measured between the pads

**Water Leak Rope (EP 137)**

Param 1 (signed int): the ADC value measured within the structure of the rope

## Starting your product

To start using your device, you only need to plug the Battery in the holder.

Open the casing and push the battery in, like in the picture and close the casing again. Connect the Water Rope.

The device will connect automatically to the network and send



## Using the product

Place the device with its electrodes on the ground where a water leak may occur, attach the water rope to cover additional area. Both will alert separately. Once an alert occurs, a notification also will be sent once the water rope is dry or that the

## Technical Specifications

### RADIO INTERFACE

Frequency	ISM (Non licensed) 2,4 GHz Wirepas Mesh Network (2.36 – 2.48GHz)
Transmission power	10dBm
Application data protocol	PWS (see corresponding documentation)
Hardware security	128 bits AES ECB/CCM/AAR symmetric data encryption
Range	From 20 to 40 meters (depending environment)

### SENSORS

Water leak sensor	Detection of humidity from terminal resistive humidity contactors and from water leak rope with Jack connectors Accuracy: $\pm 2\%$ RH Resolution: typically, 0.01 %RH
Values send from the Water leak sensor via PWS	Water leak terminal: the ADC value measured between the pads Water leak rope: the ADC value measured within the structure of the rope
3D Accelerometer	Detection of inertial events $\pm 2g/\pm 4g/\pm 8g/\pm 16g$ (1Hz to 5.3kHz)
Values sent from the 3D Accelerometer via PWS	The state: Sensor was stationary, and it is still stationary. Sensor was stationary, and it is moving now. Sensor was moving, and it is stationary now. Sensor was moving, and it is still moving. Move duration in seconds Number of moves Acceleration state One byte per axis X/Y/Z Acceleration value in mG.
Temperature and humidity sensor (optional)	Detection of its environment temperature and humidity level Temperature range: from $-40$ to $125^\circ\text{C}$ Temperature accuracy tolerance: typ. from 0 to $65^\circ\text{C}$ : $\pm 0.2^\circ\text{C}$ Humidity range: from 0 to 100 %RH Humidity accuracy tolerance: typ. $\pm 2\%$ RH
Values sent from the temperature and humidity sensor via PWS (optional)	Integer representing the temperature in 100th of degree Relative humidity in 100th of %
Overall current consumption	Average: 20 $\mu\text{A}$

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**POWER SUPPLY**

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Battery AA Lithium 2.4 Ah, 3.6 VDC

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**CERTIFICATIONS**

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Europe CE

USA FCC

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**HOUSING**

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Dimensions 89.5mm x 83.5mm x 26mm

Weight 40g

Material PC/ABS

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**ACCESSORIES**

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Water leak rope Connection type: Jack plug

Water leak rope length available: 0.2 – 1m

Provided stainless steel contacts sensor (X2) Nominal diameter: 2.5mm

## Legal Mentions

### FCC STATEMENT :

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

**Warning:** Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

### FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.