# Rain Gauge with Wi-Fi

SKU: RANWIE01
Version: 1.1.0



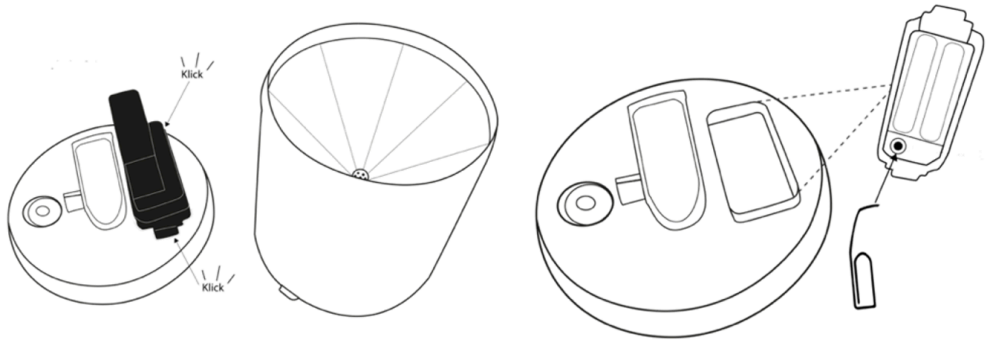
## 1. Product Description

This rain sensor measures the amount of rain at its location in milliliters using a tipping bucket mechanism and transmits the quantity within a 15-minute interval with an accuracy of 0.5 mm of water column, along with the temperature. In the case of heavy rain exceeding 20 l/h, a heavy rain alarm is triggered promptly. Both the heavy rain threshold and the measurement interval are configurable.

The device communicates via WLAN, either to the Aqua-Scope Cloud and thus to an app on your mobile phone or PC, or through MQTT to a server of your choice, or as a JSON object to a Smart Home Gateway.

The device is powered by two AAA batteries. The provided VARTA batteries allow for an approximate runtime of about 2 years. A low battery level is reported wirelessly, allowing for battery replacement before the device shuts down.

# 2. Installation and Mounting




Open the sensor by twisting the cover counterclockwise against the base of the sensor. Remove the electronic block, which is secured on both sides by a small clip (Figure 1 and 2). On the inside of the electronic block you find the battery compartment, the single button and the red/green LEDs right next to the button.

Choose a suitable location for the rain sensor that provides an unobstructed view of the sky, where no obstacles will affect the rainfall measurement and where there is sufficient Wi-Fi coverage. You can easily test the latter with your mobile phone. Securely mount the sensor on an elevated surface such as a mast or wall. Ensure that the sensor is level to ensure accurate measurements. The viewing glass at the bottom of the base will assist you with this.

# 3. Connecting to Wi-Fi

You can **only connect the sensor to a Wi-Fi network of your choice while it is in factory default mode**. You can always restore factory default mode by pressing and holding the button for 4 seconds while inserting the batteries. (Four red flashes help you count). When the LED flashes red three times, release the button.

Connecting the sensor to the Internet takes just 4 steps:

1. In factory default mode, the module creates its own Wi-Fi network with the name “Scope”. At the same time, after inserting the battery, the device

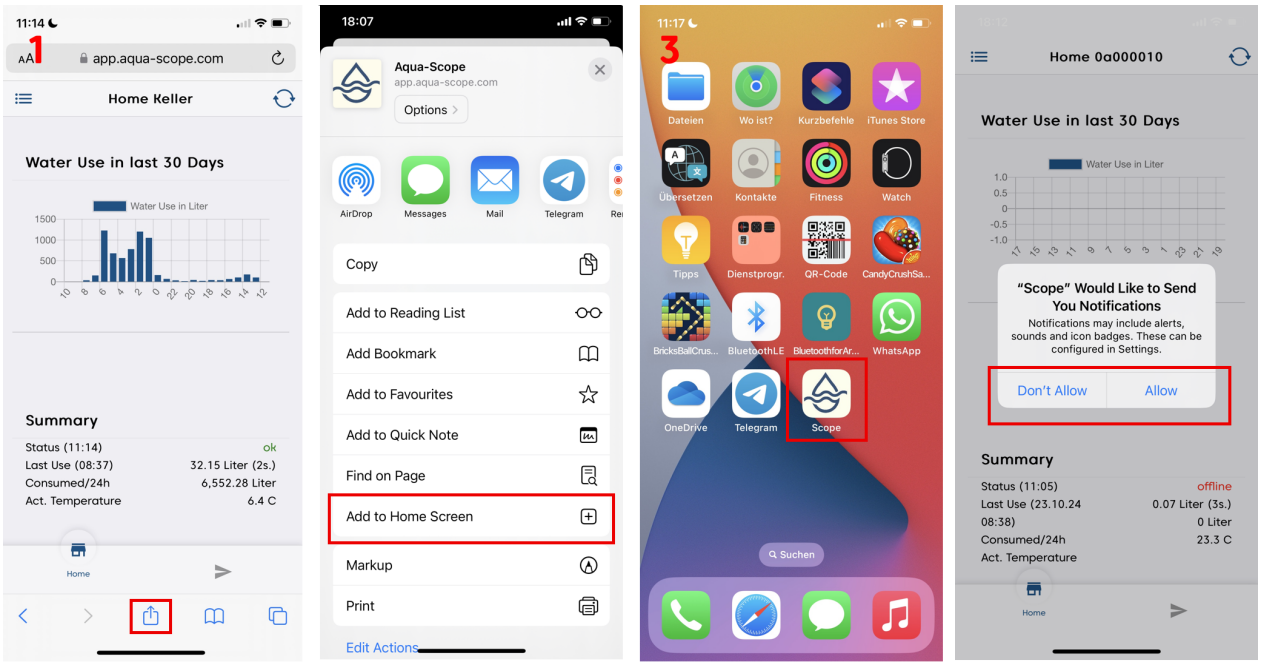
blinks red/green to indicate factory default mode.
2. On your smartphone or PC, connect to this Wi-Fi network (no password required).
3. Open a browser on your phone or PC and go to: http://scope.local or http://192.168.4.1. A page will appear showing a list of available Wi-Fi networks near the device, along with fields to enter the Wi-Fi password and your email address. The email address will later become your Aqua-Scope account name.
4. Select your Wi-Fi network from the list, enter the Wi-Fi password and your email address. (Advanced MQTT settings are also available – these can be configured later using the Aqua-Scope app). You will then be redirected to the Aqua-Scope app at https://app.aqua-scope.com, where you can either log in with an existing account or create a new one. In both cases, the app will then give you access to the motor with full control and configuration options.

# 4. Wireless Usage

## 4.1. Wireless Access

When the device is connected to the local Wi-Fi, its functions can be used through various communication methods (even parallel):

1. **Mobile Phone App**: You may not find the Aqua-Scope app in the app store of your mobile phone. We use what’s known as a PWA (Progressive Web App). For more information, see Progressive Web App on Wikipedia. To access it, open the system browser (Chrome on Android or Safari on iOS) and go to  https://app.aqua-scope.com. This will allow you to use almost all of the app's functions in your regular browser.
    - On Android, you will shortly be prompted to install the app as a native app on your device. Please confirm this prompt, and a native app will be installed on your screen.
    - On iOS, a shortcut to the website must be added to the home screen. To do this, select the icon marked in Image 1 in Safari to open the shortcut dialog. Then select the "Add to Home Screen" option (Image 2). A standard app icon will now appear on your home screen (Image 3). You may need to log out and log back in within the app so that iOS prompts you to allow push notifications (Image 4).




2. **MQTT Server**: If configured accordingly, the sensor's status information will be sent to the specified MQTT server. The MQTT service must be enabled, and your own MQTT server/port/login credentials must be entered into the device. Further details can be found in the Aqua-Scope Developers Manual.
3. **Own Web Service**: Most smart home gateways allow the receipt and display of sensor data through plugins. More information can be found in the Aqua-Scope Developers Manual.

## 4.2. Sensor Data


The sensor measures rainfall in millimeters of water **every 15 minutes**. When rain is detected, the rainfall amount is sent via Wi-Fi. If no rain falls, a status message with rain level = 0 and other data is sent **every 6 hours**. If the sensor detects heavy rain (precipitation > 20 liters/hour), an **alert message** is sent immediately. When rainfall drops below the heavy rain threshold, this is also reported.

Status messages are sent regularly via MQTT or JSON Web Hook (details on using these communication channels can be found in the developer manual) and include the following data (values shown are examples): *{"uptime":"1", "temperature":"20", "rainlevel":"0", "battery":"100", "raintotal":"5"}*. The scale for each value is as follows:

- **'uptime':** Time since the last battery change, in hours
- **'temperature':** Temperature in 1/10 degrees Celsius
- **'rainlevel':** Amount of rain measured in the last interval, in 0.5 mm of water
- **'battery':** Battery used since the last replacement, in mAs
- **'raintotal':** Total rainfall measured since the last battery replacement, in 0.5 mm of water

The frequency of rain reports is determined by two configuration parameters:

- **Parameter 29:** This sets the measurement interval in seconds. By default, it is 900 seconds (15 minutes). After this interval, a status message is sent via wireless, but only if at least 0.5 mm of rain was detected during that time.
- **Parameter 27:** If no rain has fallen, the sensor will still send a zero-report

after x * measurement interval to indicate that it is still active. The multiplier x is set by this parameter. By default, it is 24, meaning the sensor will wake up at least every 24 * 900 seconds = 6 hours.

# 5. Local Operation

The electronic capsule has two batteries and a small opening containing a button and two LEDs. The LEDs are located right next to the button, which can be pressed using a matchstick, needle, paperclip, or a small screwdriver.

Use the button for the following actions:

- **Reset the Device:**
    1. Insert the battery while pressing and holding the button for 5 seconds.
    2. The red LED will flash once per second while holding the button.
    3. After 5 seconds, the red LED will flash three times quickly.
    4. Release the button. The device is now reset to factory default settings, erasing Wi-Fi settings and restoring any changed configuration parameters.
- **Test Communication:**
    1. Press and hold the button for about 1 ... 2 seconds.
    2. The green LED will flash briefly to show the device has woken from deep sleep.
    3. If the device is connected to Wi-Fi, it will send a status message wirelessly.

# 6. Scope of Delivery

- Main Device
- Mounting Screws
- 2 * AAA Batteries

# 7. Technical Data

- Processor:
    - Main: ESP32-WROOM_32E (Xtensa Dual Core 32 Bit, 240 MHz, 520 KB RAM)
    - Sub: Xtensa 16 bit Ultra Low Power RISC
- Wireless Connection: WIFI ESP Built-in 2.4 GHz 802.11 b/g/n
- Measurements:
    - Rain:
        - Min amount of rainfall: 0.5 mm or 0.5 l/m3
        - Metering Interval: 15 minutes

    - Temperature:
        - Precision: +/- 3 Degree
        - Range: - 20 °C ... 50 °C
    - Heartbeat: every 6 hours unless there is rain
    - Threshold for Heavy Rain Alarm: ab 25 l/h
- User Interface: 3 colored LED, single button
- Power Supply:
    - 2 * AAA Battery
    - Voltage: 2.2 ... 3.6 V
- Environmental Conditions:
    - Shipment and Storage: -65 °C ... 125 °C
    - Operation: - 20 °C ... 50 °C
    - Rel. Humidity: 0...90 %
- Protection: IP 55
- Size of device: 132x132x139 mm
- Size of packaging: 140x140x150 mm
- Weight: 219 gr.

# 8. Support and Contact

Should you encounter any problem, please give us the opportunity to address it before returning this product. Please check our website www.aqua-scope.com and particularly the support section for answers and help. You can also send a message to info@aqua-scope.com.

While the information in this manual has been compiled with great care, it may not be deemed an assurance of product characteristics. Aqua-Scope shall be liable only to the degree specified in the terms of sale and delivery. The reproduction and distribution of the documentation and software supplied with this product and the use of its contents is subject to written authorization from Aqua-Scope. We reserve the right to make any alterations that arise as the result of technical development.

- Phone: +372 (0) 6248002
- eMail: info@aqua-scope.com
- Web: www.aqua-scope.com

# 9. Declaration of Conformity

CE Aqua-Scope Technology OÜ, Sakala 7-2, 10141 Tallinn, Republic of Estonia, declares that this radio emitting device works on the following frequences:

**Български** С настоящото Aqua-Scope Technology OÜ декларира, че този тип радиосъоръжение

RANWIE01 е в съответств ие с Директива 2014/53/ЕС. Цялостният текст на ЕС декларацията за съответствие може да се намери н а следния интернет адрес: www.aqua-scope.com/ce.

**Čeština** Tímto Aqua-Scope Technology OÜ prohlašuje, že typ rádiového zařízení RANWIE01 je v souladu se směrnicí 2014/53/EU. Úplné znění EU prohlášení o shodě je k dispozici na této internetové adrese: www.aqua-scope.com/ce.

**Dansk** Hermed erklærer Aqua-Scope Technology OÜ, at radioudstyrstypen RANWIE01 er i overensstemmelse med direktiv 2014/53/EU. EUoverensstemmelseserklæringens fulde tekst kan findes p følgende internetadresse: www.aqua-scope.com/ce.

**Deutsch** Hiermit erklärt Aqua-Scope Technology OÜ, dass der Funkanlagentyp RANWIE01 der Richtlinie 2014/53/EU entspricht. Der vollständige Text der EU-Konformitätserklärung ist unter der folgenden Internetadresse verfügbar: www.aqua-scope.com/ce.

**Eesti** Käesolevaga deklareerib Aqua-Scope Technology OÜ, et kesolev raadioseadme tp RANWIE01 vastab direktiivi 2014/53/EL nuetele. ELi vastavusdeklaratsiooni tielik tekst on kttesaadav jrgmisel internetiaadressil: www.aqua-scope.com/ce

**English** Hereby, Aqua-Scope Technology OÜ declares that the radio equipment type RANWIE01 is in compliance with Directive 2014/53/EU. The full text of the EU declaration of conformity is available at the following internet address: www.aqua-scope.com/ce

**Español** Por la presente, Aqua-Scope Technology OÜ declara que el tipo de equipo radioeléctrico RANWIE01 es conforme con la Directiva 2014/53/UE. El texto completo de la declaracin UE de conformidad está disponible en la direccin Internet siguiente: www.aqua-scope.com/ce

**Ελληνικά** Με την παρούσα ο/η Aqua-Scope Technology OÜ, δηλώνει ότι ο ραδιοεξοπλισμός RANWIE01 πληροί την οδηγία 2014/53/ΕΕ. Το πλήρες κείμενο της δήλωσης συμμόρ φωσης ΕΕ διατίθεται στην ακόλουθη ιστοσελίδα στο διαδίκτυο: www.aqua-scope.com/ce

**Français** Le soussigné, Aqua-Scope Technology OÜ, déclare que l'équipement radioélectrique du type RANWIE01 est conforme la directive 2014/53/UE. Le texte complet de la déclaration UE de conformité est disponible l'adresse internet suivante: www.aqua-scope.com/ce

**Hrvatski** Aqua-Scope Technology OÜ ovime izjavljuje da je radijska oprema tipa RANWIE01 u skladu s Direktivom 2014/53/EU. Cjeloviti tekst EU izjave o sukladnosti dostupan je na sljedećoj internetskoj adresi: www.aqua-scope.com/ce

**Italiano** Il fabbricante, Aqua-Scope Technology OÜ, dichiara che il tipo di apparecchiatura radio RANWIE01 conforme alla direttiva 2014/53/UE. Il testo completo della dichiarazione di conformit UE disponibile al seguente indirizzo Internet: www.aqua-scope.com/ce

**Latviešu** Ar šo Aqua-Scope Technology OÜ deklarē, ka radioiekārta RANWIE01 atbilst Direktīvai 2014/53/ES. Pilns ES atbilstības deklarācijas teksts ir pieejams šādā interneta v ietnē: www.aqua-scope.com/ce Lietuvių Aš, Aqua-Scope Technology OÜ, patvirtinu, kad radijo įrenginių tipas RANWIE01 atitinka Direktyvą 2014/53/ES. Visas ES atitikties deklaracijos tekstas prieinamas šiuo internet adresu: www.aqua-scope.com/ce

**Magyar** Aqua-Scope Technology OÜ igazolja, hogy a RANWIE01 típus rádiberendezés megfelel a 2014/53/EU irányelvnek. Az EUmegfelelőségi nyilatkozat teljes szövege elérhető a következő internetes címen: www.aqua-scope.com/ce

**Malti** B'dan, Aqua-Scope Technology OÜ, niddikjara li dan it-tip ta' tagħmir tar-radju RANWIE01 huwa konformi madDirettiva 2014/53/UE. It-test kollu tad-dikjarazzjoni ta' konformit tal-UE huwa disponibbli f'dan l-indirizz talInternet li ġej: www.aqua-scope.com/ce

**Nederlands** Hierbij verklaar ik, Aqua-Scope Technology OÜ, dat het type radioapparatuur RANWIE01 conform is met Richtlijn 2014/53/EU. De volledige tekst van de EUconformiteitsverklaring kan worden geraadpleegd op het volgende internetadres: www.aqua-scope.com/ce

**Polski** Aqua-Scope Technology OÜ niniejszym oświadcza, że typ urządzenia radiowego RANWIE01 jest zgodny z dyrektywą 2014/53/UE. Pełny tekst deklaracji zgodnośc I UE jest dostępny pod następującym adre sem internetowym: www.aqua-scope.com/ce

**Português** O(a) abaixo assinado(a) Aqua-Scope Technology OÜ declara que o presente tipo de equipamento de rádio RANWIE01 está em conformidade com a Diretiva 2014/53/UE. O texto integral da declarao de conformidade está disponível no seguinte endereo de Internet: www.aqua-scope.com/ce

**Română** Prin prezenta Aqua-Scope Technology OÜ declară că tipul de echipamente RANWIE01 este în conformitate cu Directiva 2014/53/UE. Textul integral al declarației UE de conformitate este disponibil la următoarea adresă internet: www.aqua-scope.com/ce

**Slovensko** Aqua-Scope Technology OÜ potrjuje, da je tip radijske opreme RANWIE01 skladen z irektivo 2014/53/EU. Celotno besedilo izjave EU o skladnosti je na voljo na naslednjem spletnem naslovu: www.aqua-scope.com/ce

**Slovensky** Aqua-Scope Technology OÜ týmto vyhlasuje, že rádiové zariadenie typu RANWIE01 je v slade so smernicou 2014/53/EÚ. Úplné EÚ vyhlásenie o zhode je k dispozícii na tejto internetovej adrese: www.aqua-scope.com/ce

**Soumi** Aqua-Scope Technology OÜ vakuuttaa, että radiolaitetyyppi RANWIE01 on direktiivin 2014/53/EU mukainen. EUvaatimustenmukaisuusvakuutuksen täysimittainen teksti on saatavilla seuraavassa internetosoitteessa: www.aqua-scope.com/ce

**Svenska** Härmed försäkrar Aqua-Scope Technology OÜ att denna typ av radioutrustning RANWIE01 verensstmmer med direktiv 2014/53/EU. Den fullständiga texten till EUförsäkran om verensstämmelse finns på följande webbadress: www.aqua-scope.com/ce

# 10. Disposal Guidelines

Do not dispose of electrical appliances as unsorted municipal waste, use separate collection facilities. Contact your local government for information regarding the collection systems available. If electrical appliances are disposed of in landfills or dumps, hazardous substances can leak into the groundwater and get into the food chain, damaging health and well-being.