



WIFI Water Pressure Sensor

SKU: PREWIE02

Version: 1.1.0



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1. Product Description

The Aqua-Scope pressure sensor detects water consumption, and leaks by analyzing pressure waves in the water supply. It continuously records the temperature, the water consumption, and water pressure. When leaks are detected or when pressure or temperature thresholds are exceeded or not reached, the user is alerted wirelessly. The device consists of two parts:

- The main housing for signal processing and wireless communication with a battery compartment.
- The external sensor head is connected to the water pipe. The stainless steel sensor head features a silicon sensor suspended in silicone oil for highly accurate and low-noise pressure measurements. The pressure measurement range is between 1 to 10 bar. The sensor head is installed somewhere in the building at a standardized 1/4-inch inspection opening or with a provided T-piece under any sink at the edge or corner valve.

The sensor can send an alarm message when predefined threshold values are exceeded or not reached. The polling frequency of the sensor is adjustable between 0.1 seconds and several minutes, defining the battery life. For a measurement interval of 1 second, a battery life of approximately 10 years is calculated.

Control of the system is centralized through a mobile phone app using WiFi communication. Furthermore, data can be transmitted to an MQTT server or an HTTP 'webhook,' facilitating integration with modern Smart Home systems.

The sensor is powered either by an external power supply with a USB-C power supply or by an optional internal ER26500 battery (Bobbin Cell C). Both the sensor head (IP67) and the main housing (IP65) are waterproof and can be used outdoors or in particularly humid and/or dirty environments.

2. Installation

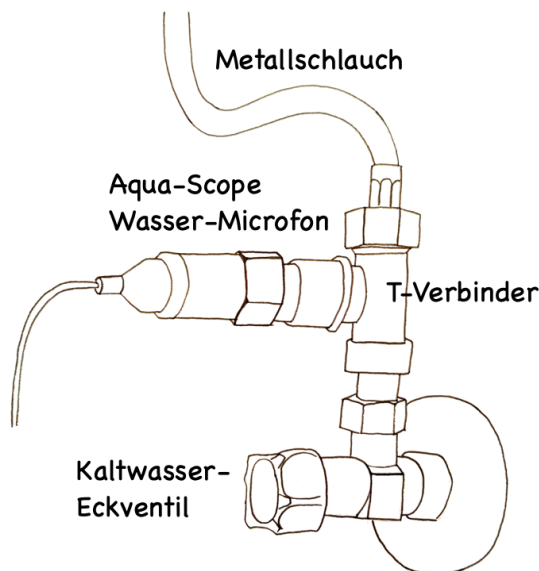


The Aqua-Scope sensor head must be connected to a single point in the house with the piping system. Ideal connection points are angle valves located under sinks or next to toilets. Other options include 1/4-inch access openings on the pressure reducer, shut-off valves, or other installation devices. It is recommended to choose a location as low as possible in the apartment



(ideally in the basement or on the first floor).

Attention! If a pressure reducing valve (PRV) is installed, the Aqua-Scope monitoring device must be installed between the pressure reducer and the individual outlets. If no PRV is present, the device can be installed anywhere, but the accuracy of the measurements will be lower. Details can be found in the "Effects of Pressure Reducer" section.



1. If two angle valves are present under the sink, please identify the cold water supply. Simply turn on the hot water and check which valve warms up.
2. Close the faucet and shut off the angle valve by turning it clockwise.
3. Remove the metal hose from the angle valve with the provided 19mm wrench. Have a towel ready to catch the water coming out of the end of the hose.
4. Mount the T-shaped connector on top of the angle valve and secure it with the 19mm wrench.
5. Connect the metal hose to the top of the connector and secure it with the 19mm wrench.
6. Screw the Aqua-Scope pressure sensor head into the side opening of the connector and secure it by hand. It is not necessary to tighten it too much.
7. Open the angle valve again by turning the knob counterclockwise.
8. Check all three connections for leaks for a few seconds.
9. Attach the Aqua-Scope to a suitable location with double-sided tape and connect the sensor head to the main device. If necessary, insert the flood sensor into the audio jack.
10. Turn on the device using the USB-C power plug. Please use the included power adapter. This power adapter has a very low harmonic distortion, which is necessary for precise measurements. Alternatively, insert a battery.



3. Connecting to wireless network

WiFi Connection

Select your Wifi-Network

CPAP

WIFI (WPA) Password

Your Account Email

cp@aqua-scope.com

[Advanced Settings](#)

Save

After inserting the two batteries or connecting the external power supply, the LED in the button blinks red/green, indicating the factory state.

You can connect the sensor to a **Wi-Fi network of your choice only in the factory state**. The factory state can be restored by waiting for the first beep sound when inserting the batteries or connecting the power supply, then pressing and holding the button for 4 seconds (counting four red blinks helps). If the LED lights up three short red flashes, please release the button.

In the factory state, when powered by batteries, you have exactly 120 seconds to connect the device to Wi-Fi. After that, the sensor goes into sleep mode to conserve battery life. You can wake up the device in this state by pressing the button, and the LEDs will blink red/green again for 120 seconds, indicating readiness to connect to Wi-Fi. In network operation, the factory state, indicated by red/green blinking, is continuously maintained.

For communication via Wi-Fi, three different methods are available:

1. **Conveniently through the Aqua-Scope App:** Please read the description of app installation and usage in the "Device Usage" section or directly in the app. There is no separate manual for the individual functions of the app.
2. **Through the built-in web server:** In the factory state, the device acts as an open Wi-Fi access point with the SSID 'Scope.' You need to connect your mobile device or PC to this SSID and open the page `http://192.168.4.1` in a web browser. Now, enter the SSID and WPA key of the home Wi-Fi. If you want to control your device later via the Aqua-Scope app, you need to have an Aqua-Scope account and provide this email address so that the device can be associated with your account. Under "Advanced Options," additional



settings for the device's communication options can be made (MQTT, JSON, Bluetooth, local web server). In the manual "Aqua-Scope Developers Manual", there is more information on this. The 'Save' button saves and activates the values. If they were correct, the red/green blinking stops. Otherwise, the process must be repeated with the correct SSID and WPA key.

3. **Through Bluetooth:**

(1) Connect with BLE Device

Connect

(2) Provide Wi-Fi Credentials
SSID of Wi-Fi-Network

WPA Password of Wi-Fi-Network

Aqua-Scope Account Email

(3) Write Data into Device

Submit

In the factory state, the Bluetooth interface on the device is active and can be used for initial configuration. This can be done through any Serial Bluetooth application. However, it is more convenient on a PC or an Android mobile phone with Bluetooth capabilities. Open the webpage <https://ble.aqua-scope.com> in the Chrome browser, connect to the Bluetooth device 'AQS-XXXXXX' (XX is the device ID), and enter the SSID and WPA key via the webpage form. More information is also available in the "Aqua-Scope Developers Manual".

4. **Wireless Usage**

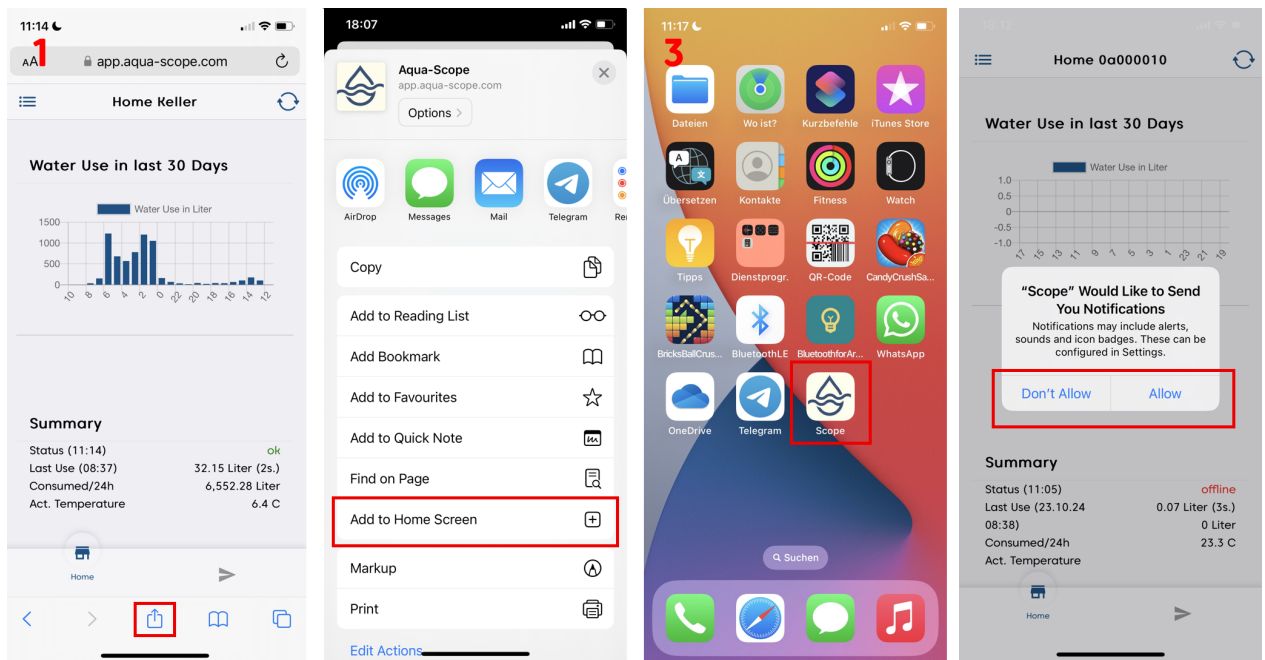
4.1. **Wireless Access**

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.

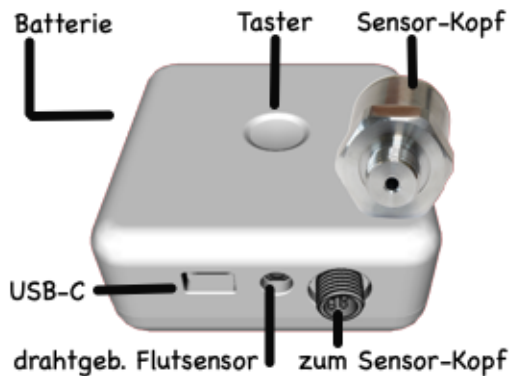


- On Android, you will shortly be prompted to install the app as a native app on your device. Please confirm this prompt, and a native app will be installed on your screen.
- On iOS, a shortcut to the website must be added to the home screen. To do this, select the icon marked in Image 1 in Safari to 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. Hardware



The above image shows the device with its connection options. The following connections or interfaces are present on the device:

- USB-C port: This port is only for power supply. The supplied USB-C power adapter is plugged in here. Please use the supplied power adapter from the manufacturer KTEC. Other cheaper power supplies may introduce noise to the device, negatively affecting sensor quality. The USB-C port is waterproof.
- The external sensor head is connected to the main device through a waterproof and screwable connection.
- Another external flood sensor head can be connected via the waterproof 3.5mm audio jack (included). This jack is also waterproof.
- On the back, there is the screwable battery compartment, also protected with a rubber seal against water ingress.
- In the center of the main device is the only button and thus the only local control of the device: It recognizes simple or multiple button press sequences:
 - **Press and hold the button immediately after the first beep** during startup for 5 seconds: The device will be reset to the factory state.
 - **Press once briefly:** A status message is sent to the network. If battery-powered, the device is awakened.
 - **Press twice:** Existing alarms (LED blinking red) will be ended.
 - **Press three times:** Currently not assigned.
- Directly below the button is the multi-color LED:
 - **Yellow glowing or blinking in various colors:** The device is booting.
 - **Red/green blinking:** The device is in the factory state and searching for a wireless connection. In this state, the internal web server and the Bluetooth interface are active.
 - **Slowly breathing blue or green:** The device is connected to the network and external power supply, in the rest or normal state.
 - **Red blinking:** Alarm active, and the device is connected to external power.
 - **No LED:** The device is either not powered or in battery-powered sleep mode.



4.3. Access to Sensor Data and Device Control

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

1. **Mobile Phone App:** You won't find the Aqua-Scope app in your phone's app store. We use a Progressive Web App (PWA, more at [wikipedia.org/wiki/Progressive_web_app](https://en.wikipedia.org/wiki/Progressive_web_app)). To use it, open the website in the system browser (Chrome@Android or Safari@IOS) at **<https://app.aqua-scope.com>**. You can use almost all app functions in the regular browser. Android will offer to install the app on the device after a short time. On IOS, a shortcut of the website must be added to the desktop to receive push notifications if allowed.
2. **MQTT Server:** When configured accordingly, the sensor's status information is sent to the configured MQTT server. The MQTT service must be active, and your own MQTT server/port/login must be set in the device. More information 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.

4.4. Measurement Values and Alarms

The device **measures the pressure and temperature of the water** in the pipe where the sensor is installed multiple times per second. On anomalies the user is alerted.

The following alarms are possible:

1. One of the wired or wireless flood sensors has detected water. This is typically triggered by a leak near the respective sensor.
2. The water pressure has risen above the threshold set in the app or through configuration parameter 6. The reason for this alarm could be malfunctions of a pressure reducer or backflow preventer to the hot water system.
3. The water pressure has fallen below the threshold set in the app or through configuration parameter 7. The reason for this could be a pipe break; however, the water may have simply been turned off.
4. The external sensor is not connected to the main device.
5. The external sensor is connected to the main device but not connected to a pressurized water line.
6. The water temperature has either fallen below the value set in the app or configuration parameter 11 or risen above the value in the app or configuration parameter 16.

The alarm is transmitted to the app and forwarded there via push notification and (configurable in the app) as an email or voice message. If the condition that



triggered the alarm has been resolved, the alarm will be automatically cleared. It is also possible to clear the alarm by double-clicking on the monitor's button, even if the alarm condition has not been resolved. The alarm will then remain locked until the next power-on.

4.5. Sensor Data

The sensor measures water pressure and water temperature, and sends the values every 15 minutes, along with operating time, battery consumption, and battery voltage, via Wi-Fi.

5. Battery Operation

The sensor can be operated with an external power supply, a battery, or both simultaneously. The status at the moment of powering on defines the device's operating mode. If mains voltage is present at the moment of powering on, the device will remain in power mode until the next status report (default every 15 minutes), even if mains voltage fails and a battery is inserted. The battery then operates as a backup.

If the sensor is started by inserting a battery, it will switch to battery mode. This means that some sensor functions are shut down to save power:

- The status LED remains dark.
- A local alarm is neither indicated acoustically nor by a red LED.
- The device responds only slowly to incoming commands (on average, about 10 seconds in power mode, up to one hour in battery mode).
- The device can no longer receive alarms from external wireless flood sensors.
- The sensor data is sent only hourly instead of every 15 minutes.
- If the device has LoRaWAN communication capability, it will attempt to join the LoRaWAN network only once (JOIN).

An estimate of battery life can be found in the app under "Devices". With a pressure reducer, the battery lasts about 8 to 10 years, without a pressure reducer in the water pipe, the lifespan is about 4 years.

6. Device Specific Alarms and Parameters

If you want to use the device within a machine-2-machine environment (MQTT, JSON Web Services) the Aqua-Scope Developers Manual will provide you with all the required information that apply to all Aqua_Scope devices. Here you find the missing device-specific information complementing the description within the Aqua-Scope Developers Manual.

6.1. Configuration Parameters



The device has a set of configuration parameters that can be changed using downstream commands. Details on the format are available in the 'Aqua-Scope Developer Manual'. Beside the general configuration commands mentioned in the developer manual (1,3,11,16,19,27,28,29,30,31) the following device-specific configuration parameters are available:

- Parameter 6: **Pressure Alarm Upper Threshold**, set in mBar, Default is 8000 mBar
- Parameter 7: **Pressure Alarm Lower Threshold**, set in mBar, Default is 1 mBar
- Parameter 18: **Temperature Sensor Offset** (allows adding a positive or negative linear offset to the temperature sensor value to compensate for misalignments), value in 1/10 degree Celsius, default is 0.

6.2. Alarm Types

The following device-specific alarm types are supported by this device (For the general format of alarm message and general alarm types please refer to the 'Aqua-Scope Developer manual'):

- **Type = 1** (mask = 0x001): The external water sensor head has tripped, indicated water nearby the device.
- **Type = 4** (mask = 0x008): The measures water pressure exceeded the lower pressure threshold defined in configuration parameter 7. The value provided with the alarm message contains the actual pressure sensor value.
- **Type = 6** (mask = 0x020): The measures water pressure exceeded the higher-pressure threshold defined in configuration parameter 6. The value provided with the alarm message contains the actual pressure sensor value.
- **Type = 14** (mask = 0x2000): The Sensor Head is not connected to main device. The value is not set.
- **Type = 15** (mask = 0x4000): The Sensor Head is connected to the main device but not in contact with water. The value is not set.

7. Scope of Delivery

- Water Monitor main device (without battery)
- Pressure sensor head with 80 cm cable
- 3/8 Inch water pipe connector (T-shaped)
- One external flood sensor with cable
- USB-C power cable and power supply
- 19 mm wrench to unfasten and fasten the 3/8 Inch connections of the pipe connector

8. Information related to Drinking Water Directive EU



98/83/EC

The t-shaped part of the device is exposed to drinking water and therefore subject to the European Drinking Water Directive. The certified used material is called CW509L, which is in the list of approved of materials of the German Environment Agency (UBA) in the version from May 14th, 2020 under section 2.1.3.1.

9. Technical Data

- Power Supply: External USB Power Plug 5 V/ 1A
- Battery: Bobbin Cell C ER26500, Lithium-Thionyl Chloride
- Processor: ESP32-WROOM_32E (Xtensa Dual Core 32 Bit, 240 MHz, 520 KB RAM)
- Wireless Connection:
 - WLAN IEEE 802.11b/g/n (2.4 GHz WIFI)
 - Aqua-Scope Cloud Protokoll
 - MQTT Client
 - JSON Webservice Client
 - Bluetooth 5 (LE)
 - UART Profile
- Pressure Sensor Head:
 - Range : 0 ... 1000 kPa (10 bar)
 - Overload: 150 Percent of maximum pressure
 - Connection: G 1/4 " female
 - Communication: I2C
 - Precision: < 1 Percent dynamically
 - Built-in High-Precision Temperature Sensor
- Dimensions (Main): 91 mm x 91 mm x 30 mm
- Weight (Main Device): 105 gr
- Weight (Sensor Head): 140 gr
- Protection: Main Device: IP 65, Sensor Head: IP 67
- User Interface: 4 colored LED, single touchless button
- Environmental Conditions:
 - Shipment and Storage: -65 °C ... 125 °C
 - Operation: - 20 °C ... 50 °C
 - Rel. Humidity: 0...90 %

10. 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

11. Declaration of Conformity



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

Български С настоящото Aqua-Scope Technology OÜ декларира, че този тип радиосъоръжение PREWIE02 е в съответствие с Директива 2014/53/ЕС. Цялостният текст на ЕС декларацията за съответствие може да се намери на следния интернет адрес: www.aqua-scope.com/ce.

Čeština Tímto Aqua-Scope Technology OÜ prohlašuje, že typ rádiového zařízení PREWIE02 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 PREWIE02 er i overensstemmelse med direktiv 2014/53/EU. EUoverensstemmelseserklæringens fulde tekst kan findes på følgende internetadresse: www.aqua-scope.com/ce.

Deutsch Hiermit erklärt Aqua-Scope Technology OÜ, dass der Funkanlagentyp PREWIE02 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 tüüp PREWIE02 vastab direktiivi 2014/53/EL nõuetele. ELi vastavusdeklaratsiooni terviklik tekst on kättesaadav järgmisel internetiaadressil: www.aqua-scope.com/ce

English Hereby, Aqua-Scope Technology OÜ declares that the radio equipment type PREWIE02 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 PREWIE02 es conforme con la Directiva 2014/53/UE. El texto completo de la declaración UE de conformidad está disponible en la dirección Internet siguiente: www.aqua-scope.com/ce

Ελληνικά Με την παρούσα ο/η Aqua-Scope Technology OÜ, δηλώνει ότι ο ραδιοεξοπλισμός PREWIE02 πληροί την οδηγία 2014/53/ΕΕ. Το πλήρες κείμενο της δήλωσης συμμόρφωσης 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 PREWIE02 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 PREWIE02 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 PREWIE02 conforme alla direttiva 2014/53/UE. Il testo completo della dichiarazione di conformità UE disponibile al seguente indirizzo Internet: www.aqua-scope.com/ce

Latviešu Ar šo Aqua-Scope Technology OÜ deklarē, ka radioiekārta PREWIE02 atbilst Direktīvai 2014/53/ES. Pilns ES atbilstības deklarācijas teksts ir pieejams šādā interneta vietnē: www.aqua-scope.com/ce Lietuvių Aš, Aqua-Scope Technology OÜ, patvirtinu, kad radijo įrenginių tipas PREWIE02 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 PREWIE02 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 PREWIE02 huwa konformi mad-Direttiva 2014/53/UE. It-test kollu tad-dikjarazzjoni ta' konformit tal-UE huwa disponibbli f'dan l-indirizz tal-Internet li ġej: www.aqua-scope.com/ce

Nederlands Hierbij verklaar ik, Aqua-Scope Technology OÜ, dat het type radioapparatuur PREWIE02 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 oświadczam, że typ urządzenia radiowego PREWIE02 jest zgodny z dyrektywą 2014/53/UE. Pełny tekst deklaracji zgodności I UE jest dostępny pod następującym adresem 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 PREWIE02 está em conformidade com a Diretiva 2014/53/UE. O texto integral da declaração de conformidade está disponível no seguinte endereço de Internet: www.aqua-scope.com/ce

Română Prin prezenta Aqua-Scope Technology OÜ declară că tipul de echipamente PREWIE02 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 PREWIE02 skladen z irektivom 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 PREWIE02 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 radiolaitetyypin PREWIE02 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 PREWIE02 verensstämmer med direktiv 2014/53/EU. Den fullständiga texten till EUförsäkran om verensstämmelse finns på följande webbadress: www.aqua-scope.com/ce

12. 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.