



Pipe Clip LoRaWAN

SKU: CLPLWE01

Version: 1.1



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1. Pipe-Clip

The Smart-Pipe-Clip is a compact, clip-like clamp that can be easily attached to any



water pipe with a diameter between 15 and 32 mm. The device offers three functions:

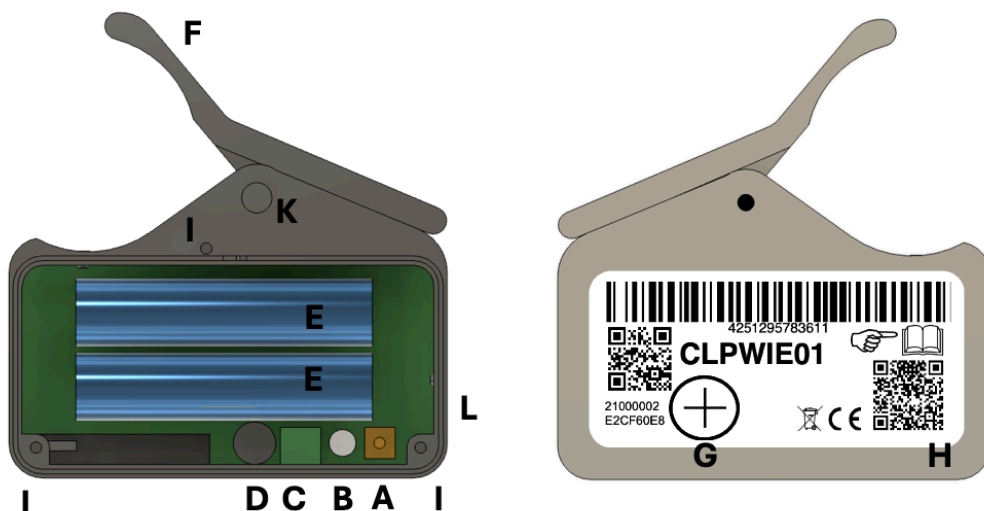
- Detection and warning of frost risk
- Estimation and display of water consumption
- Detection of water leaks

The device is powered by two AAA batteries and transmits the collected data and any alarms via Wi-Fi to the preferred app or smart home platform. Alternatively, it can be operated with an external 3V power supply.

In addition to Wi-Fi, the claw can also communicate via LoRa or LoRaWAN. Normally, communication with the user takes place via Wi-Fi. In case of an alarm, a previously paired Aqua-Scope shut-off motor (for ball valves or angle seat valves) can be directly controlled by the device via LoRa. This allows a response to water leaks even if the communication network is unavailable. Since the monitoring of the water pipe, as well as the pairing and control of the motor, occurs without the need for a wireless connection, such a system can also function completely offline without an internet connection.

With a special button sequence, the sensor can be switched to LoRaWAN mode, allowing it to transmit data over the standardized LoRaWAN wide-area network as a Class A device. This mode requires LoRaWAN network coverage at the installation site.

2. Sensor Structure



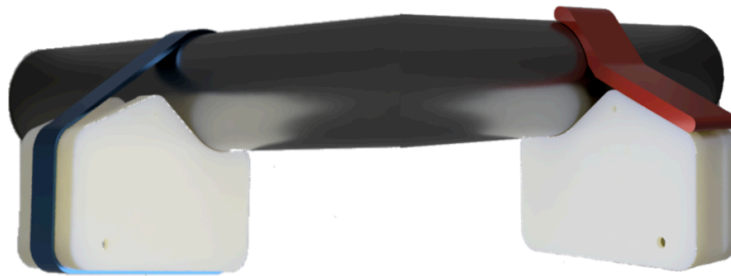
The image above shows the sensor:

- **A:** Button for pairing and testing



- **B:** LED for initial network connection / pairing menu
- **C:** Screw terminal for connecting external power supply
- **D:** Buzzer
- **E:** 2 * AAA batteries
- **F:** Movable clamp for mounting on the water pipe
- **G:** Transport lock magnet
- **H:** Red LED for alarm and active network communication
- **I:** Screws for closing the battery compartment
- **K:** Clamp axis, removable when mounting with cable tie
- **L:** Air temperature sensor

3. Installation and Commissioning



The sensor can be mounted in two different ways:

- Using the clamp (F), the sensor can simply be attached to a water pipe. It can be just as quickly removed or mounted at another location.
- Alternatively, the sensor can be securely and tamper-proof mounted to the water pipe using the included cable tie. To do this, the pin (K) on the device, which serves as the clamp axis, must be removed. It can be easily pulled out by hand or with pliers, after the battery cover is removed by loosening the three screws (I). The clamp and spring are then removed. A recess is built into the housing to hold the cable tie in place.

For both mounting methods, the sensor should be placed on the main water supply line approximately 20–40 cm away from the point where the water first enters the house. The clamp should be installed so that the air temperature sensor (L) points toward the center of the room.

On the outside of the housing, there is a round magnet. As long as this magnet is placed on the housing at the position marked with a large plus sign (G), the sensor remains in sleep mode without draining the battery. To activate the sensor, simply remove the magnet. It may take up to one minute for the sensor to become active,



indicated by the red LED inside the housing blinking.

It is always possible to deactivate the sensor again by reattaching the magnet to the marked position.

4. Establishing a Wireless Connection

4.1. Communication via WLAN

After the device is powered on, the LED should slowly blink red/green, indicating the factory default state. The device can only connect to a selected WLAN while in its factory default state. There is a button sequence for resetting to factory settings, which is described in the section "Button Operation".

To communicate via WLAN, the device needs the following information:

- The name of the WLAN (technically, the SSID) to which it should connect.
- The network key (technically, WPA2 key), which secures communication over WLAN. You can usually find this key—an alphanumeric code of at least 8 characters—on the bottom of your WLAN router.
- Your email address as the Aqua-Scope user ID. This ensures that you can access the device's data via the server—e.g., using the free Aqua-Scope app.

In the factory default state, the sensor creates its own WLAN with the identifier "Scope".

1. Connect your smartphone or PC (no password required!) to this WLAN network.
2. Open a browser on your PC or phone and go to the webpage: **<http://scope.local>**. A webpage will appear showing a list of available WLAN networks at the device's location and input fields for the WLAN password and your email address, which will also become your Aqua-Scope account name.
3. Select the desired WLAN from the list, enter the corresponding WLAN key and your email address into the form. (Advanced MQTT connection settings can also be configured here—these can be adjusted later via the Aqua-Scope app.)
4. You will then be redirected to the Aqua-Scope app **<https://app.aqua-scope.com>** where you can either log in with an existing account or create a new Aqua-Scope account. In both cases, the app will provide access to the motor, including control and configuration options.

Only after successfully connecting should you install the device at its final location, and then check whether it reconnects to the WLAN. If it does not, there is likely insufficient WLAN coverage at the installation site, and you will need to install a WLAN repeater. Please note that in a WLAN network with multiple repeaters (WLAN



meshing), it may take a while for the device to connect to the optimal repeater.

4.2. Communication via LoRaWAN

If LoRaWAN communication is activated, the sensor attempts to join a LoRaWAN network. By default, the sensor operates in WLAN mode and must first be switched to LoRaWAN mode. To do this, remove the battery cover by loosening the three screws (I). Underneath is the menu button (A) and the associated two-color LED (B). The section Button Operation and LED Signals describes how to switch between LoRaWAN and WLAN mode.

The device must be registered with a LoRaWAN network operator that provides radio coverage at the device's location, using its three keys (Dev EUI, Join EUI, Join Key). This could be, for example, the community network 'The Things Network (TTN)' or any other commercially operated LoRaWAN network.

The public device ID (Dev EUI) can be found on the inside of the battery cover and also on the packaging as a 16-digit number and as a QR code for scanning. The also public Join ID (Join EUI) is the same for all Aqua-Scope devices: 49 43 48 54 48 59 20 21.

The **required secret key (Join Key) is sent by email** when requested via the website <https://aqua-scope.com/lora> by entering a valid email address and the public key. Note that this web form request can only be made once to prevent misuse. The email received, which contains all three necessary LoRaWAN keys, should therefore be stored securely. If lost, assistance can be provided by contacting Aqua-Scope support.

Immediately after inserting the batteries or connecting a power supply, the device will attempt to connect to the LoRaWAN network using the stored keys. During this process, the LEDs will blink. After about 25 seconds, this process, known as 'JOIN', either succeeds or is aborted. In the latter case, the device immediately enters sleep mode.

If the sensor later loses connection to the server for any reason, it will automatically restart the connection. This process is called 'Rejoin' and is repeated whenever the device attempts to send a message via the LoRaWAN network.

Pressing the button on the device always triggers a LoRaWAN communication, which may also lead to a 'Rejoin' as described above. Note the duty-cycle regulation in LoRaWAN: sending messages or rejoining too frequently may be ignored by the LoRaWAN network.

Further information about the sensor's behavior in the LoRaWAN network and the payload format can be found in the 'Aqua-Scope Developers Manual'. For general information on LoRaWAN and LoRa, we recommend Wikipedia.

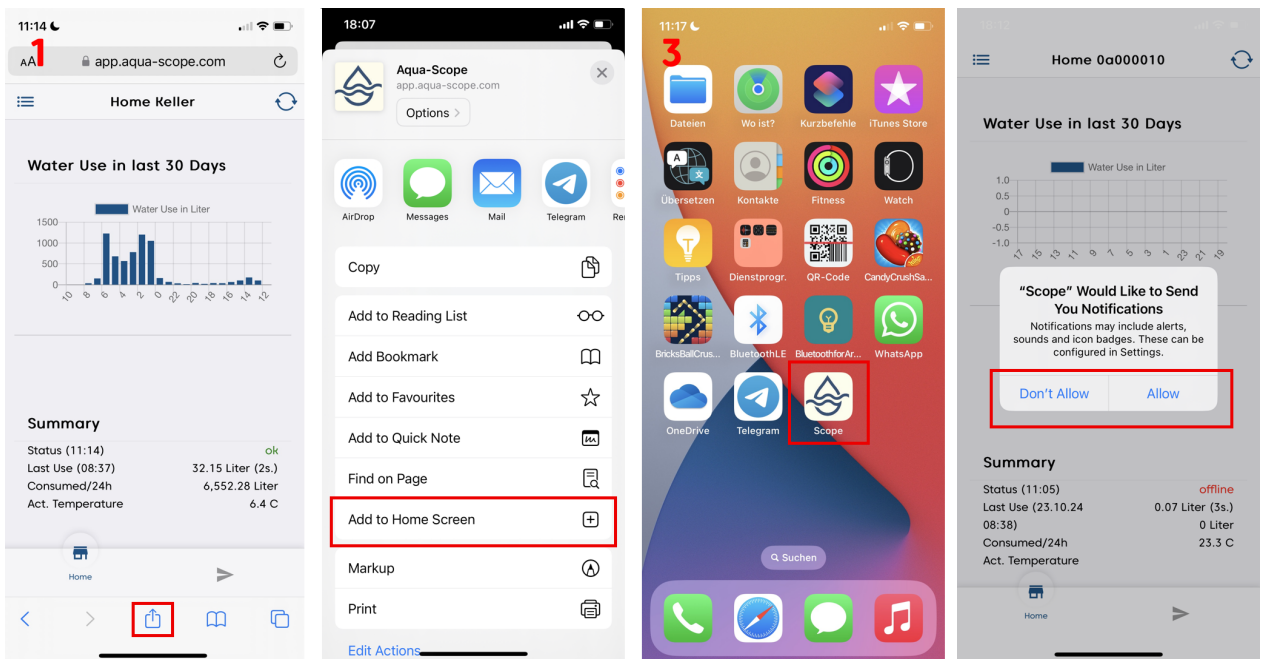


5. Wireless Usage

5.1. 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.

5.2. Basic Functions

The sensor regularly reports via radio and transmits:

- the device uptime in hours,
- the room temperature in degrees Celsius,
- the battery status (voltage and used battery capacity), and
- an estimate of the water consumption in liters.

If a leak, unusually long water usage, or another alarm condition is detected, it is immediately reported via radio. The following alarms are distinguished:

- **Temperature too low:** The sensor contains a lower temperature threshold that can be configured via radio. If the measured temperature drops below this threshold, the alarm is triggered. When the temperature rises above the threshold again, the alarm is also cleared via radio.
- **Temperature too high:** The sensor contains an upper temperature threshold that can be configured via radio. If the measured temperature exceeds this threshold, the alarm is triggered. When the temperature falls back below the threshold, the alarm is also cleared via radio.
- **Leakage or drip alarm:** This alarm is triggered by a detected dripping faucet. However, it could also indicate a small water leak. If the water flow stops, the alarm is automatically cleared.
- **Water usage too long:** This alarm is triggered by excessively long water usage. It may also indicate a larger water leak. If the water flow stops, the alarm is automatically cleared.
- **Battery empty:** The sensor uses two AAA batteries. When more than 80% of their capacity has been used, this alarm is sent via radio.

5.3. Button Operation and LED Signals

When the battery cover is removed by loosening the three screws (I), the control button (A) and its associated two-color LED (B) become accessible. The button has three functions:

1. In factory state (red/green blinking), a single click (short press) switches to WPS mode and back. More on this in the section *Wireless Network*.
2. In normal operating mode, a short click sends a status message via radio for testing. The button press is acknowledged with the green LED.
3. Pressing and holding for more than 5 seconds activates the sensor's single-button menu. In this menu, the red or green LED blinks multiple times.



The single-button menu works as follows: The menu allows execution of a small number of commands indicated by a sequence of beeps and LED blinks. At the start, the active command is '1', i.e., one beep and one LED blink. A short click on the button switches to the next command, indicated by the corresponding number of beeps and LED blinks (after 1 comes 2, so double beep and double blink). Once the maximum command number is reached, the next click cycles back to command 1.

Each command toggles a parameter's status between active and inactive. The color of the blinking LED shows the current status (red = inactive, green = active). A long press activates the currently selected menu command, confirmed with a triple blink in red+green = yellow LED color. If no action is taken, the menu automatically exits after a few seconds without executing any command.

The following commands are supported:

- **1: Reset to factory settings:** This command is always shown in "red" and, when executed, resets all modified parameters to factory defaults. WAN SSID and WLAN key are also deleted.
- **2: LoRaWAN versus WLAN:** Switches between LoRaWAN and WLAN mode. If LoRaWAN is enabled, the sensor cannot directly control an Aqua-Scope motor via radio. Direct motor control and LoRaWAN operation are mutually exclusive. In the factory state, LoRaWAN is disabled, WLAN is active, and direct control is enabled.
- **3: ESP always active:** This is for testing purposes and is disabled by default. The battery will drain quickly if this option is active.
- **4: Vibration sensor:** Activates or deactivates the vibration sensor (only for hardware versions with a vibration sensor).
- **5: Calibration:** Repeats the initial calibration. Do not use while the sensor is mounted on the water pipe.

6. Battery Replacement and External Power Supply

The device contains two AAA batteries. Removing the transport protection magnet (G) activates the device. Empty batteries must be replaced. To do so, loosen the three screws (I) and remove the battery cover. The two batteries (E) are located underneath.

Under the battery cover, there is also a two-wire screw terminal (C) marked for '+' and '-' input. Here, an external power supply (not included) with a voltage of 3V DC can be connected. To do this, the small 3 x 5 mm opening at the bottom of the sensor must be broken open. If using external power, the batteries can remain in the device as a backup. Breaking open the slot to insert the wires results in the loss of the IP rating, i.e., the device is no longer waterproof.



7. Package Contents

The package includes:

- Main device
- 2× AAA batteries (pre-installed)
- User manual
- Cable tie

8. Technical Specifications

- Supported Water Pipes
 - Compatible with all material types (copper, steel, PEX, PE, etc.)
 - Pipe outer diameter: 15 - 32 mm
- Communication:
 - Wi-Fi 2.4 GHz, 802.11 b/g
 - Bluetooth Low Energy
 - LoRaWAN
 - LoRa point-to-point for controlling Aqua-Scope actuators
- Sensors
 - 6-Axis Gyro Sensor (if available)
 - 3 * Temperature Sensors
 - Voltage Sensor
 - Reed Contact Sensor
 - Ruthenium Oxide Heating Element
- Power Supply:
 - 2× AAA standard alkaline or lithium batteries
 - External power supply: 3 V DC, minimum 500 mA
 - Power consumption:
 - Standby power: 0.4 mAh/day
 - LoRaWAN communication: 8 mAs per transmission
 - Wi-Fi communication: 300 mAs per transmission
 - Estimations:
 - LoRaWAN (4 transmissions/day, 1000 mAh effective capacity): 75 months
 - Wi-Fi (4 transmissions/day, 1000 mAh effective capacity): 45 months
 - Wi-Fi (24 transmissions/day, 1000 mAh effective capacity): 12 months
- Protection Rating: IP44
- IP Rights: DE 402025200873-0001
- Dimensions: 65 × 20 × 45 mm
- Weight: 57 g (including batteries)

9. 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

10. 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 CLPLWE01 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 CLPLWE01 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 CLPLWE01 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 CLPLWE01 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 CLPLWE01 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 CLPLWE01 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 CLPLWE01 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 ΟÜ, δηλώνει ότι ο ραδιοεξοπλισμός CLPLWE01 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 ΟÜ, déclare que l'équipement radioélectrique du type CLPLWE01 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 ΟÜ ovime izjavljuje da je radijska oprema tipa CLPLWE01 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 ΟÜ, dichiara che il tipo di apparecchiatura radio CLPLWE01 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 ΟÜ deklarē, ka radioiekārta CLPLWE01 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 ΟÜ, patvirtinu, kad radijo įrenginių tipas CLPLWE01 atitinka Direktyvą 2014/53/ES. Visas ES atitikties deklaracijos tekstas prieinamas šiuo internet adresu: www.aqua-scope.com/ce

Magyar Aqua-Scope Technology ΟÜ igazolja, hogy a CLPLWE01 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 ΟÜ, niddikjara li dan it-tip ta' tagħmir tar-radju CLPLWE01 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 ΟÜ, dat het type radioapparaat CLPLWE01 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 ΟÜ niniejszym oświadczam, że typ urządzenia radiowego CLPLWE01 jest zgodny z dyrektywą 2014/53/UE. Pełny tekst deklaracji zgodności z UE jest dostępny pod następującym adresem internetowym: www.aqua-scope.com/ce

Português O(a) abaixo assinado(a) Aqua-Scope Technology ΟÜ declara que o presente tipo de equipamento de rádio CLPLWE01 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 ΟÜ declară că tipul de echipamente CLPLWE01 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 ΟÜ potrjuje, da je tip radijske opreme CLPLWE01 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 ΟÜ týmto vyhlasuje, že rádiové zariadenie typu CLPLWE01 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 ΟÜ vakuuttaa, että radiolaitetyyppi CLPLWE01 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 CLPLWE01 verensstämmer med direktiv 2014/53/EU. Den fullständiga texten till EUförsäkringen om verensstämmelse finns på följande webbadress: www.aqua-scope.com/ce

11. 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.