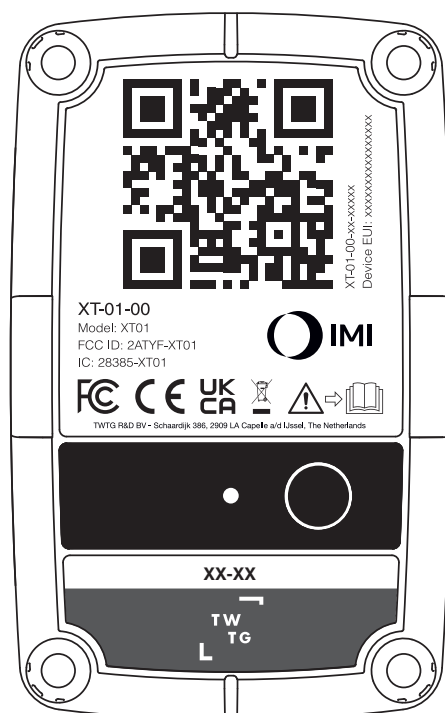


NEON XT

Product Manual

This document applies to version 1 of the NEON Blue (XT-01-XX)



Revision	A4
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1 TWTG NEON

1.1 NEON Product Introduction

NEON stands for a standardized approach to collecting data points from the operational environment and in doing so, creates a general approach to integrated data collection within existing IT ecosystems.

The TWTG NEON product range supports all industrial customers moving towards LoRaWAN as the Industrial IoT network of the future.

The LoRaWAN network gives industrial operations a secure solution, which scales-up to tens of thousands of sensors, covers complete sites with only a small amount of gateways and best of all, the low-power approach means that the lifetime of the NEON products is extended dramatically.

1.2 What you will need

In order to deploy the NEON product range, a compatible and operational LoRaWAN network architecture is required. This manual does not contain any instructions of how to setup and install LoRaWAN networks.

TWTG offers radio network planning and IT-architecture design services to fully integrate the products in the NEON product line. For more information go to; <https://www.twtg.io/products/solidred/>

1.3 Related Documents

All product documentation from the TWTG NEON product line can be found on;
<https://github.com/TWTG-R-D-B-V/neon-product-documentation/>

1.4 Service Desk for NEON products

In case you have any technical questions, or an issue to report please use the <https://twtg.io/servicedesk/>

2 Product Specifications

Product name

Product name NEON XT

2.1 Product Specifications Transmitter

Environmental Conditions

Operating temperature range -40 °C .. 80 °C (-40 °F .. 176 °F)

Operating humidity range 0% RH .. 100% RH

Storage temperature range 10 °C .. 30 °C (50 °F .. 86 °F)

Water and dust resistance IP66

Altitude Up to 2000 m (9842 ft)

Usage Indoor and outdoor

Mechanical

Enclosure material Molded plastic

Weight 250 g (8.8 oz)

Dimensions 110 mm × 72 mm × 54 mm (4.33" × 2.83" × 2.13")

Installation

Transmitter Band clamp or Bracket (not included)

Power supply

Battery rated voltage 3.6 V

Battery rated capacity 17 Ah

Battery

Battery type/size (replaceable) Type D + SPC0920A

Battery life 10 years, at 25 °C (77 °F)
(Battery lifetime depends on average ambient temperature, network quality and device configuration)

Conditions, at 25 °C (77 °F) Message interval: 1 message / hour
Measurement interval: 1 measurement / 5 min

Connectivity

Protocol LoRaWAN (private LoRaWAN)

Frequency band (MHz) EU868
US915
AU915
AS923-1/2/3/4
IN865

Maximum RF output power (dbm) EU868 +14 dBm
US915 +22 dBm

Provisioning

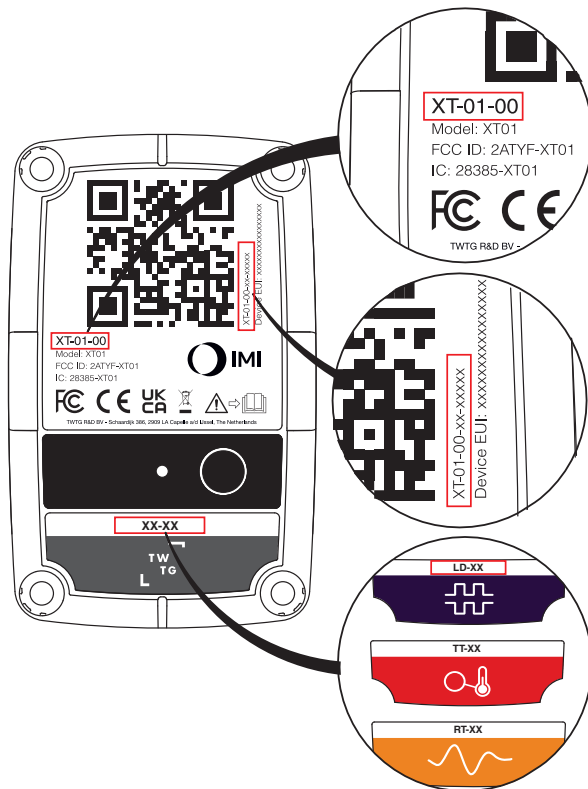
QR code/ Serial number Serial number (read only)

2.2 Certifications

Certifications	
CE	EN 300 220-1 V3.1.1
	EN 300 220-2 V3.2.1
	EN 303 446-1 V1.2.1
	EN 301 489-3 V2.3.2
	EN 301 489-1 V2.2.3
	IEC 62368-1:2018
	EN IEC 62311:2020
	EN IEC 61326-1:2021
	EN 60529:1911+A1:2000+A2:2013
UKCA	Radio Equipment Regulation 2017
FCC	FCC CFR 47, part 15, Subpart B, Subpart C
ISED	RSS-247, RSS-CAN ICES-003(B) / NMB-003(B) , RSS-General
WEEE	Directive 2033/108/EC
RoHS	2011/65/EU

3 Product Identification

3.1 Product Type Identification



AA-BB-CC

AA - Product Variant	XT = Transmitter
BB - Main Revision	E.g. 01
CC - Region	00 = Global

Product Nomenclature

AA-BB-CC-DD-EEEE

AA - Product Variant	XT = Transmitter
BB - Product Revision	E.g. 01
CC - Product Region	00 = Global
DD - Production Batch	E.g. AA
EEEE - Serial Number	E.g. 00001

Serial Number

AA-BB

AA - Connection type	E.g. LD
BB - Revision	E.g. 01

Connection Type

Figure 3.1: Product type identification

3.2 Product Dimensions Transmitter

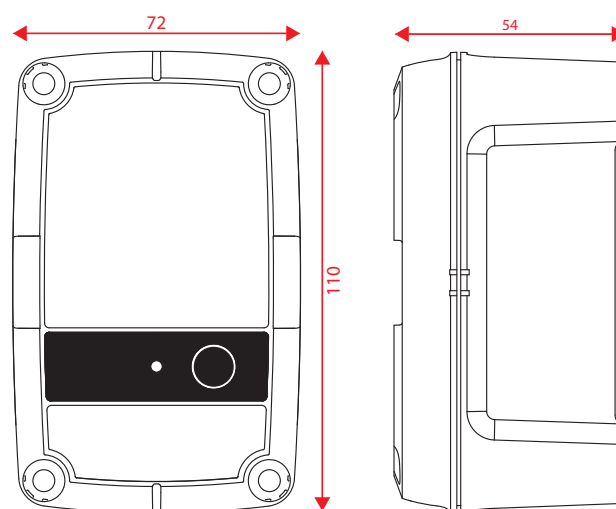


Figure 3.2: Transmitter dimensions (mm)

4 Provisioning

4.1 User Interface

In order to interact with the device the product contains one Light Emitting Diode (LED) and one Button.

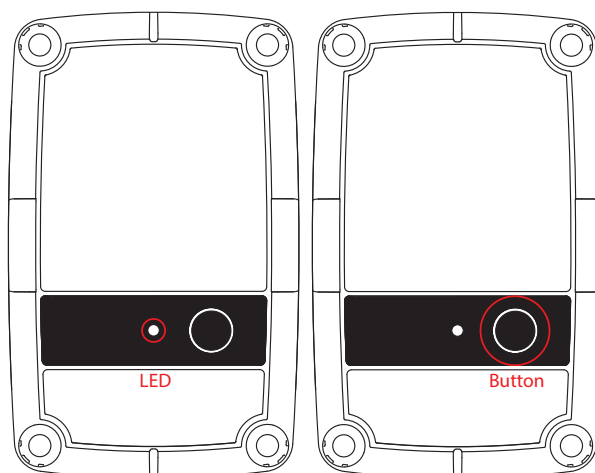


Figure 4.1: NEON Transmitter Interface

4.2 Operating the Device



Press and Release



Press and Hold



Release



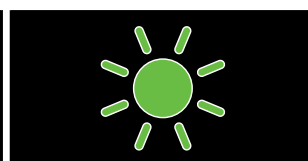
Red (Illuminated 2 s)
Deactivated



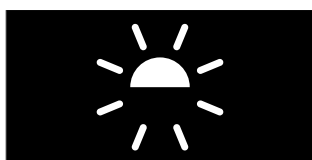
Red (Illuminated)
Failed



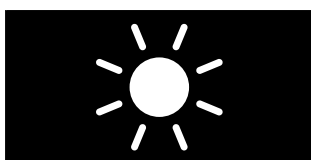
Green (Illuminated 2 s)
Activated



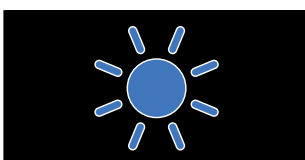
Green (Illuminated)
Passed



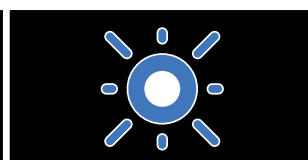
White (Blinking)
Connecting



White (Illuminated)
Calibrating



Blue (Illuminated)
Action / Handling Required



Blue (Flashing each second)
Button is being hold

4.2.1 Read device status

1. Press & release the button and the device will immediately show its status:

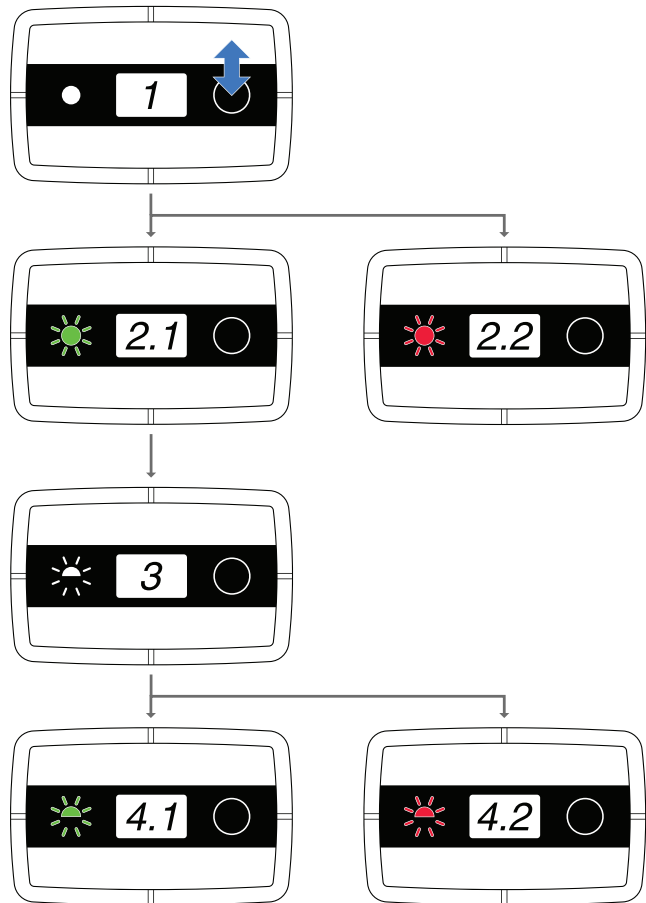
- **2.1 Green (Illuminated):** Device is activated
- **2.2 Red (Illuminated):** Device is deactivated

If the device is activated it will try to send the Device Status message over LoRa (using default configuration):

- **3. White (Blinking):** Connecting to network

Within a typical maximum of 3 minutes*, the device will show:

- **4.1 Green (Blink 2x):** Message sent, or
- **4.2 Red (Blink 2x):** Failed to connect to send message / connect to network



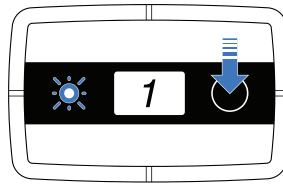
Notes:

- The NEON Transmitter can be configured to send a Sensor Data message upon a button press. In this configuration the Sensor Data message will be sent after the Sensor Event message;
- *All timeout and retry values are valid for the default configuration, the maximum timeout might be longer when process is performed repeatedly due to RF duty cycle limitations.

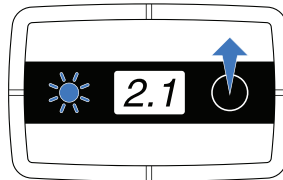
4.2.2 Device Activation

1. Press & hold the button for 5 seconds

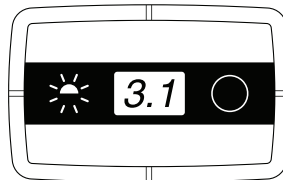
During the button hold the LED will blink Blue each second.



2. After holding the button for 5 seconds the device will first check the LoRa network:

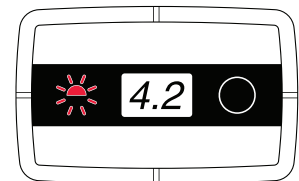
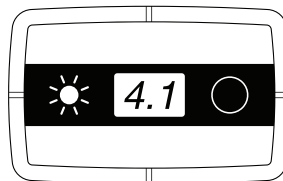


- 3.1 White (Blinking): Checking LoRa network



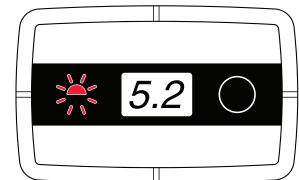
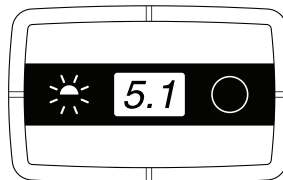
4. Within a typical maximum of 3 minutes* the device will show:

- 4.1 White (Illuminated): Checking sensor communication
- 4.2 Red (Blink 2x): Check network



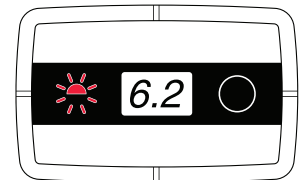
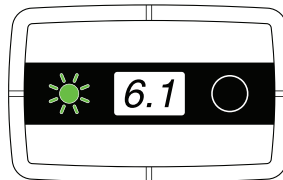
5. Within 30 seconds max. the device will show:

- 5.1 White (Blinking): Sending activation over LoRa
- 5.2 Red (Blink 2x): Check sensor



6. After communicating over LoRa, within a typical maximum of 3 minutes*, the device will show:

- 6.1 Green (Illuminated): Activated, or
- 6.2 Red (Blink 2x): Check network



Notes:

- *All time out and retry values are valid for the default configuration, the maximum time out might be longer when process is performed repeatedly due to RF duty cycle limitations.

4.2.3 Device Deactivation

1. Normal Configuration

During the button hold the LED will blink Blue each second.

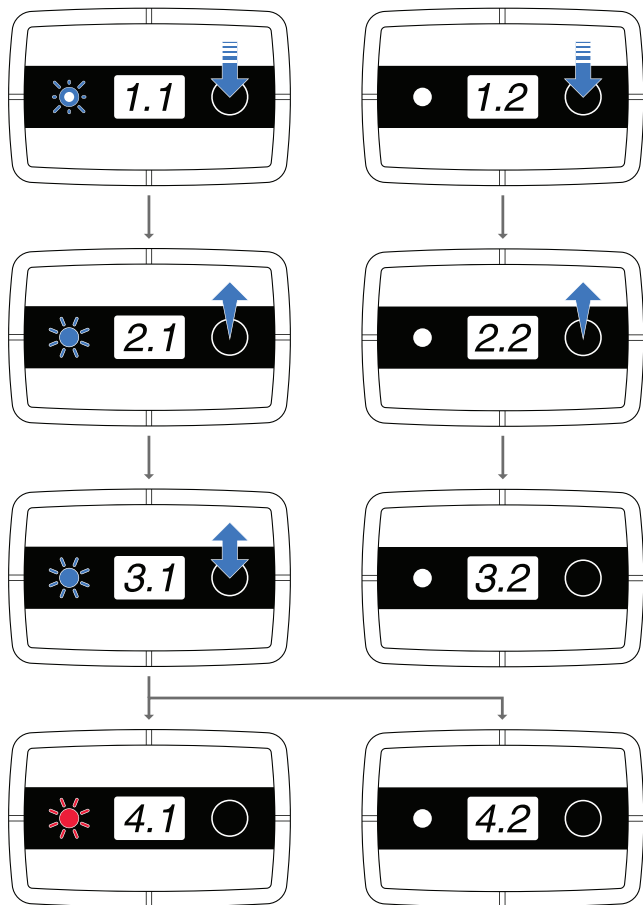
2. After holding the button for 5 seconds the device will show:

- 2.1 Blue (Illuminated): Action required

3. The user can now release the button and press and release within 5 seconds:

4. If the button isn't pressed & released within these 5 seconds:

- Red (Illuminated): Deactivated
- No LED: Deactivation canceled



Notes:

- Secured Configuration
 - If the device is in Secured Configuration it is not possible to deactivate the device using the button. The device will not react to a press and hold of the button and the LED will stay off. See Diagram 1.2, 2.2 and 3.2 and Communication Protocol.

5 Installation Transmitter

5.1 General Installation Requirements

For optimal operation the Transmitter needs to be mounted in the correct orientation.

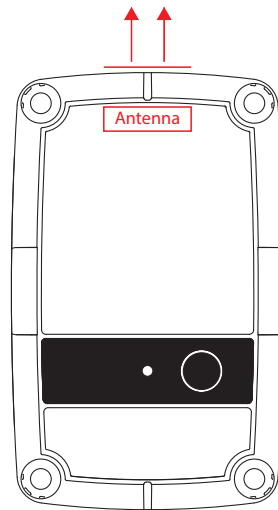


Figure 5.1: Mounting Orientation

The Transmitter may be installed using the threaded M4 inserts, or by using a bandclamp in the designated area.

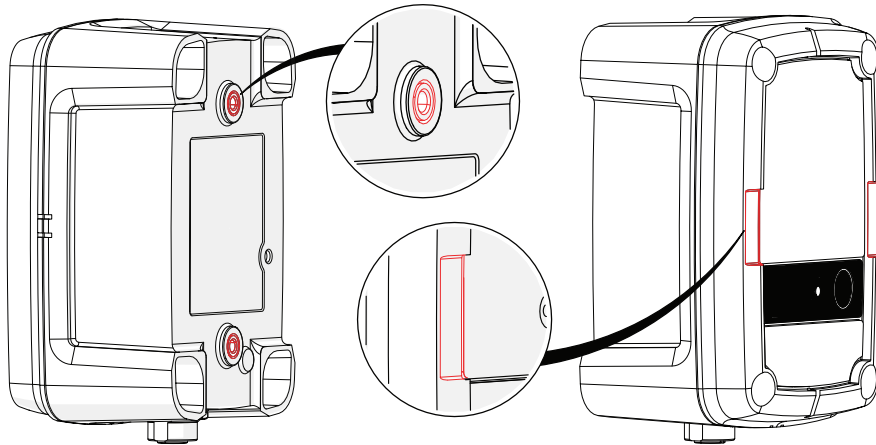


Figure 5.2: Mounting options



IMPORTANT

- This product may be safely mounted using the designated mounting holes at heights up to 2 meters. If installed at a greater height, additional mechanical safeguards must be implemented to prevent injury or damage in the event of accidental detachment or fall.

6 Maintenance

6.1 Battery Replacement

The battery can be replaced using the battery replacement kit. See Section 7.1.

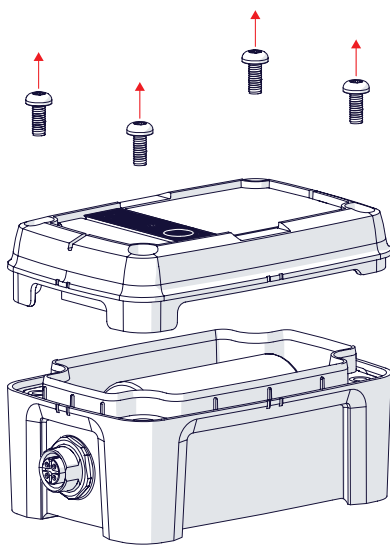
6.1.1 Required tools

- Torque screwdriver with TX20 bit;

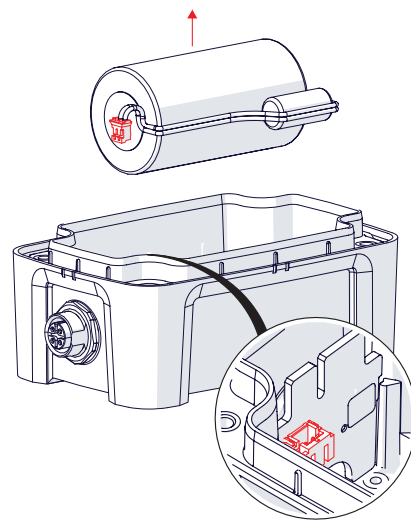


IMPORTANT: ESD Sensitive Electronics

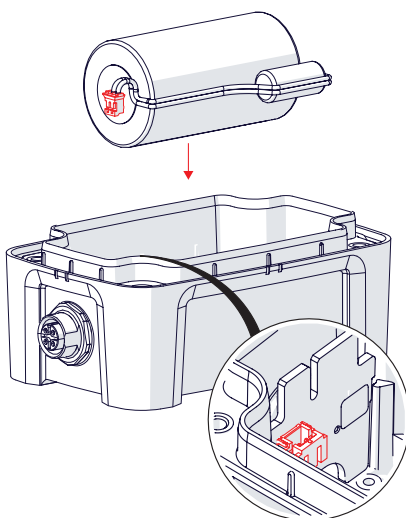
- Take proper precaution such as a grounded wrist strap and avoid touching the electronics board.



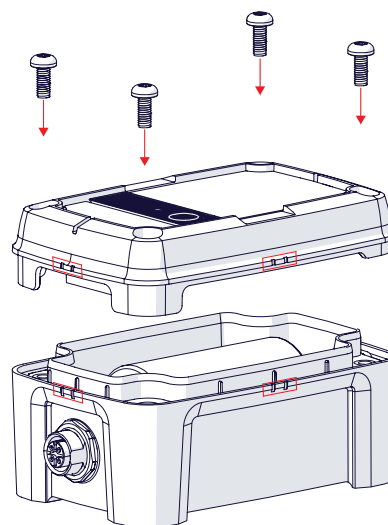
Step 1: Remove the four M4 screws and the top housing



Step 2: Disconnect the battery connector (marked in red) and remove the battery assembly



Step 3: Place the new battery assembly in the top housing and connect the battery connector (marked in red)



Step 4: Place the Top housing back onto the bottom housing. For the correct orientation; use alignment ribs (marked in red). Use a torque screwdriver TX20 to set the max. torque to 1Nm

6.1.2 Built-In Self-Test Procedure

When the device is deactivated a built-in self-test is performed upon insertion of the battery. This test is not executed when the device is already activated. Use the deactivation sequence as described in Section 4.2.3 and reinsert the batteries if a self-test is needed.

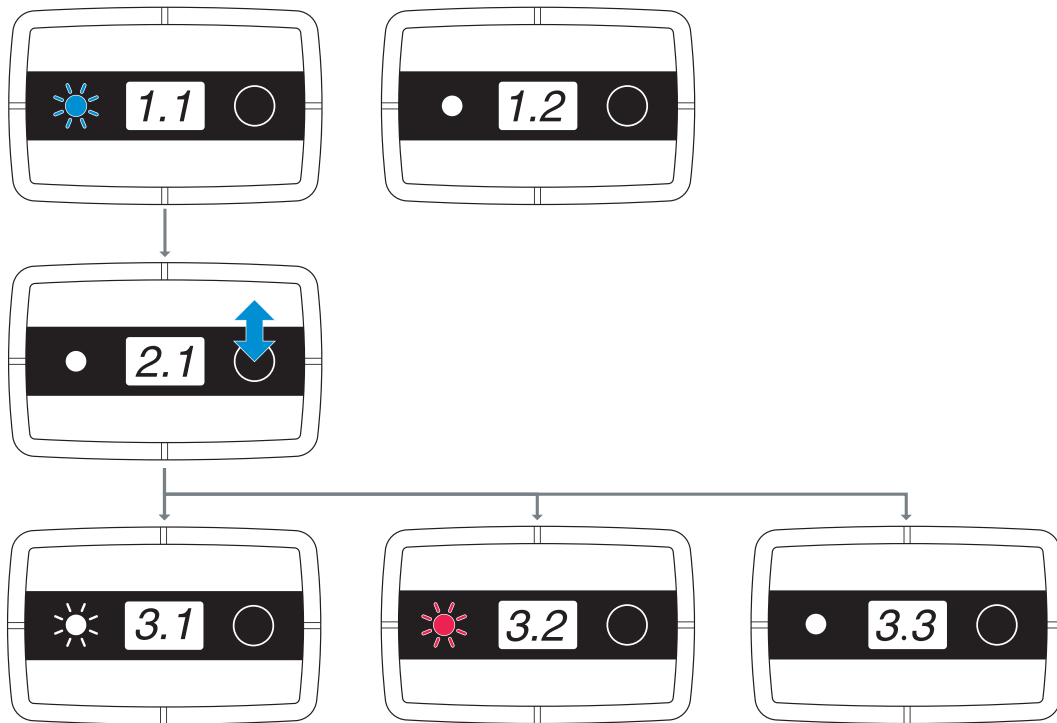


Figure 6.1: Built-in self-test

1: After successful replacement of the battery the device will go into self-test mode. This mode is activated for 30 seconds;

1.1: A BLUE LED will show after inserting the battery;

1.2: If no LED is shown, check the battery and / or device;

2: Start the test;

2.1: Press and Release the button;

3: Test Results;

3.1: LED turns bright WHITE for 5 seconds. Self test passed;

3.2: LED turns RED, self test failed. Check device;

3.3: No LED, no response from device. Check device.

After pressing the button once and passing the self-test the device will exit the self-test mode. Pressing the button again will show the device status, as explained in Read device status.

7 Accessories and Spare Parts

7.1 Accessories

Description	Order code
Magnet kit temp. installation (for Transmitter) - including 2 magnets, 4 washers, 4 screws	MKT-DS-XX
Bracket set installation (for Transmitter) - including 1 bracket, 2 washers, 2 screws	BRK-XT-01
Thermocouple connector - straight (f)	TCC-F02
Magnet installation (for Sensor) - curved surfaces (38mm)	MAG-VB-01-38
Magnet installation (for Sensor) - flat surfaces (38mm)	MAG-VB-02-38
Magnet installation (for Sensor) - curved surfaces (38mm) metric thread	MAG-VB-03-38
Magnet installation (for Sensor) - flat surfaces (38mm) metric thread	MAG-VB-04-38
Adapter installation (for Sensor) - chemical bonding	ADA-VB-01

Table 7.1: Accessories

7.2 Spare Parts

Description	Order code
Battery replacement kit - including 1 battery assembly	BATT-XT-01
Gasket	GSK-XT-01
RT Sensor cable	DS-EC-02-AB03

Table 7.2: Spare Parts

8 Legal

8.1 Declaration of Conformity EU

Hereby, TWTG R&D B.V., declares that this equipment is in compliance with;

- Radio Equipment Directive - 2014/53/EU;
- WEEE Directive - 2003/108/EC;
- RoHS - 2011/65/EU.

The full text of the EU Declaration of Conformity is available at <https://www.twtg.io/legal/>

8.2 Declaration of conformity UK

Hereby, TWTG R&D B.V., declares that this equipment is in compliance with;

- Radio Equipment Regulation - 2017;
- WEEE Directive - 2003/108/EC;
- RoHS - 2012/19/EU.

The full text of the UK Declaration of Conformity is available at <https://www.twtg.io/legal/>

8.3 FCC and ISSED Declarations

FCCID: 2ATYF-XT01 This device complies with part 15 of the FCC Rules and to RSS of Industry Canada. 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.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1. l'appareil ne doit pas produire de brouillage, et
2. l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users and installers must be provide with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

La puissance de sortie émise par l'appareil de sans fil est inférieure à la limite d'exposition aux fréquences radio d' ISSED. Utilisez l'appareil de sans fil de façon à minimiser les contacts humains lors du fonctionnement normal. Ce périphérique a également été évalué et démontré conforme aux limites d'exposition aux RF d' ISSED des conditions d'exposition à des appareils mobiles (antennes sont supérieures à 20 cm à partir du corps d'une personne).

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.

Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment.

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de Classe B est conforme à la norme Canadienne ICES-003.

CAN ICES-003(B) / NMB-003(B).

The full text of the FCC and ISED Declarations are available at <https://www.twtg.io/legal/>

8.4 Manufacturer information

Table 8.1: Manufacturer information

Manufacturer information	
Name	TWTG R&D BV
Address	Schaardijk 386 2909 LA Capelle a/d IJssel The Netherlands

For more information please visit <https://www.twtg.io/>

8.5 Disclaimers

Customer is responsible for selecting appropriate Products for desired application, testing and validating such application and ensuring that implementation is in compliance with rules and (safety) requirements as listed in the data sheet, instruction manual or equivalent. Supplier allows use of Products only for the primary purpose of each device. If Customer adapts or processes or makes changes to any Product delivered without prior written authorisation from the Supplier or does not use the Products in accordance with the instructions for use as listed in the respective Data Sheet, instruction manual or equivalent and to be found within the TWTG github or allows these to be used improperly, any warranty, if applicable, lapses. The Customer is not permitted to remove/hide any trademark/logo/warning /information applied by the Supplier from / to the Product. Supplier disclaims responsibility for, and Customer will fully indemnify Supplier and its representatives against, any claims, damages, costs, losses, and liabilities arising out of wrongful or intentionally wrong use of the Products. Supplier disclaims responsibility for any actions taken by Customer staff or third parties as a result of the data provided by Products. The Customer indemnifies the Supplier from any claims for damages and claims by third parties resulting from non-compliance on the part of the Customer of the obligations stipulated in this manual.

Revision History

Revision	Date	Description
A1	27-01-2025	Concept version
A2	24-04-2025	Concept version after first review
A3	18-06-2025	Release
A4	16-07-2025	Extension of installation instructions

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