



## **DELTA X-P (enclosure)**

Groundwater level monitoring



**The DELTA X-P sensor is supplied with an immersed piezometric level probe designed to monitor groundwater level variations.**

**The piezometric probe features a reinforced cable with waterproof connectors, and includes an integrated atmospheric pressure compensation system.**



**Compact & Durable**



**Accurate**



**Plug & Play**



**Autonomous**



**Connected**

## Our Range of Connected Piezometers



### DELTA X-P

Groundwater monitoring without mounting support



### DELTA X-P Support 1

Groundwater monitoring with external mounting support



### DELTA X-P Support 2

Groundwater monitoring with secure mounting support



### DELTA P

Groundwater monitoring in confined or small-diameter wells

## Functionnality

<b>Battery</b> 3,6 V - 17 Ah - <b>Autonomy</b> 1 to 7 years*	<b>Enclosure protection</b> IP66	<b>Operating T°</b> -20 °C to +60 °C (liquid phase)
<b>Connectivity</b> Bluetooth & Radio LPWAN	<b>Integrated t° sensor</b> - Accuracy 1°C	<b>Probe accuracy</b> < ±0.3 % FS
<b>Measurement interval</b> 10 mins to 24 hours	<b>T° Drift</b> < ±0.02 % FS / °C (for pressure ranges > 4 m, drift between -20 °C and +60 °C ±0.03 % FS / °C)	<b>316L passivated stainless steel</b>
<b>Internal memory</b> 250,000 measurements	<b>Available probe lengths</b> 5 m, 10 m, 15 m, and 20 m	Ø 21.4 mm ± 0.1 mm; length 170 mm ± 0.2 mm

\*Depending on measurement frequency, sensor exposure, and data transfer mode (Bluetooth, LPWAN, etc.).

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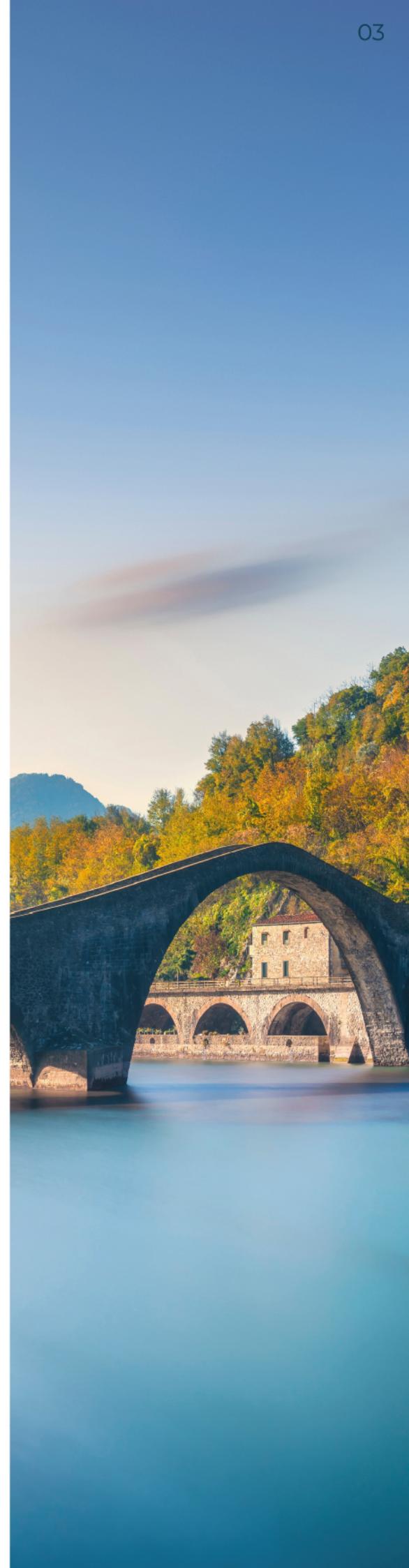
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## Useful Information

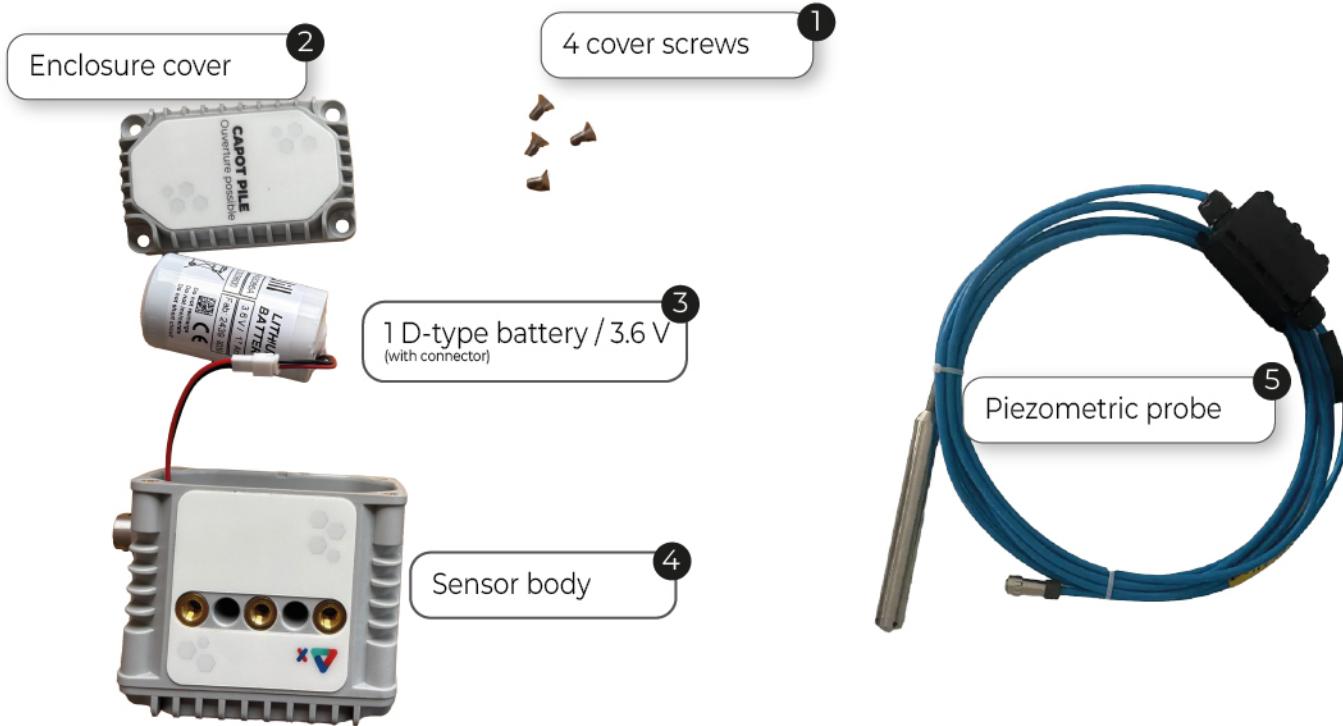
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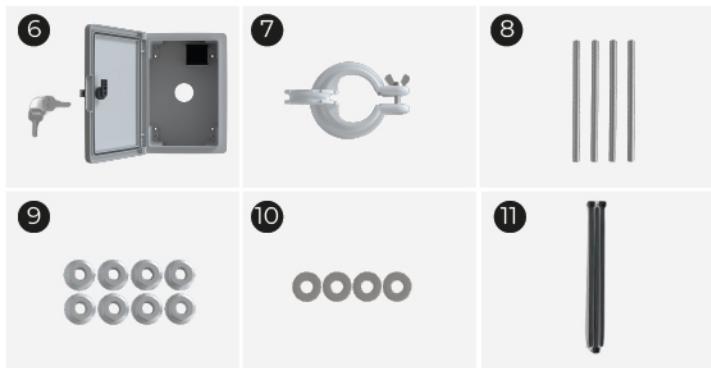


# 01 Packing List



## Mounting Components

(for concrete, solid brick, stone, etc.)



6 ABS enclosure with integrated DELTA X mounting bracket, door with key lock

7 Cable guide (compatible with diameters 52/60 mm and 69/75 mm)

8 4 threaded rods M6, length 100 mm

9 8 M6 flange nuts

10 4 washers

11 3 plastic cable ties

This manual is specific to the mounting enclosure.

You must therefore have a **DELTA X** and a **piezometric probe** before installation.

## 02 Advice



**This installation guide is also available in video format.**

[Watch the DELTA X-P installation video](#)

### **Mounting Recommendations**

#### **The DELTA X-P sensor is not included**

- 10 mm socket wrench for nuts
- It is recommended to install the sensor on a small concrete slab for better stability
- Manual groundwater level measuring tape
- T20 screwdriver



## 03 Sensor Start-up



We strongly recommend connecting and configuring your sensor via Bluetooth before going to the installation site.  
It is essential to prepare your equipment 48 to 72 hours prior to deployment and to test the Bluetooth connectivity in advance.

### Step 1

Before installing your sensor, connect the battery.

Make sure to follow the numbers indicated in *green*, which correspond to the items listed in the packing list.



01

Remove the DELTA X cover (2) by unscrewing the 4 screws (1) using a T20 TORX wrench.

**⚠ Warning:** Do not remove the cover labeled "Radio Wave" – do not open it.



02

Remove the battery and then connect it (3).

**⚠** Use the keyed connector; do not pay attention to wire colors.



03

Carefully note the serial number (located behind the battery). You will need it to connect the sensor to the app.



04

**Replace the cover** (2) ensuring the O-ring is properly positioned before closing.

**⚠** Pay attention to sensor positioning; a keyed guide (orange arrow) is provided to assist.



05

Press the cover (2) and reinsert the screws (1).



06

Tighten gently – do not force.

**⚠** Use silicone grease (not supplied) to lubricate the O-ring during reassembly. The screws are only meant to hold the cover in place, not to compress it.



07

Your sensor is now almost ready for on-site installation

**Your sensor is now**

- ✓ **connected**
- ✓ **prépared**

## 04 Downloading the App

To connect your sensor, install the FEELBAT mobile app:



**Download the FEELBAT app from your smartphone's app store.**



**Allow all access requests to fully use the app.**



**Sign up; a confirmation email will be sent to you.**

If you encounter any issues, contact us at: (check your spam folder if you don't see it)  
**SAV@feelbat.fr**



## 04 Connecting Your Sensor

After signing up, open the FEELBAT app. You will be guided step by step to add and configure your first sensor.



### Stay nearby!

When connecting your sensor, it must be close to you to receive the Bluetooth signal.

Position yourself at a maximum distance of 30–40 meters from the sensor in open space (without obstacles between you and the sensor).

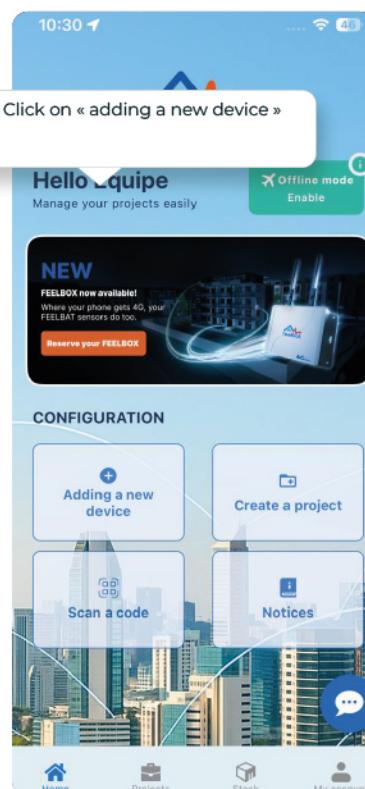
**Without a LINKFEEL token, you cannot receive data remotely, meaning synchronization will be Bluetooth only.**

To enable remote connection, you must have at least 10 credits. Contact your advisor or write to us to obtain them.

**You must be connected via Bluetooth to the sensor in order to activate the token.**



Don't forget to turn on Bluetooth on your phone.



## 05 Installing Your Sensor

The probe cable length (LC) must be adapted to the installed tube length (borehole depth). The measurement range (MR) must be equal to or greater than the maximum water height under which the probe can be submerged.

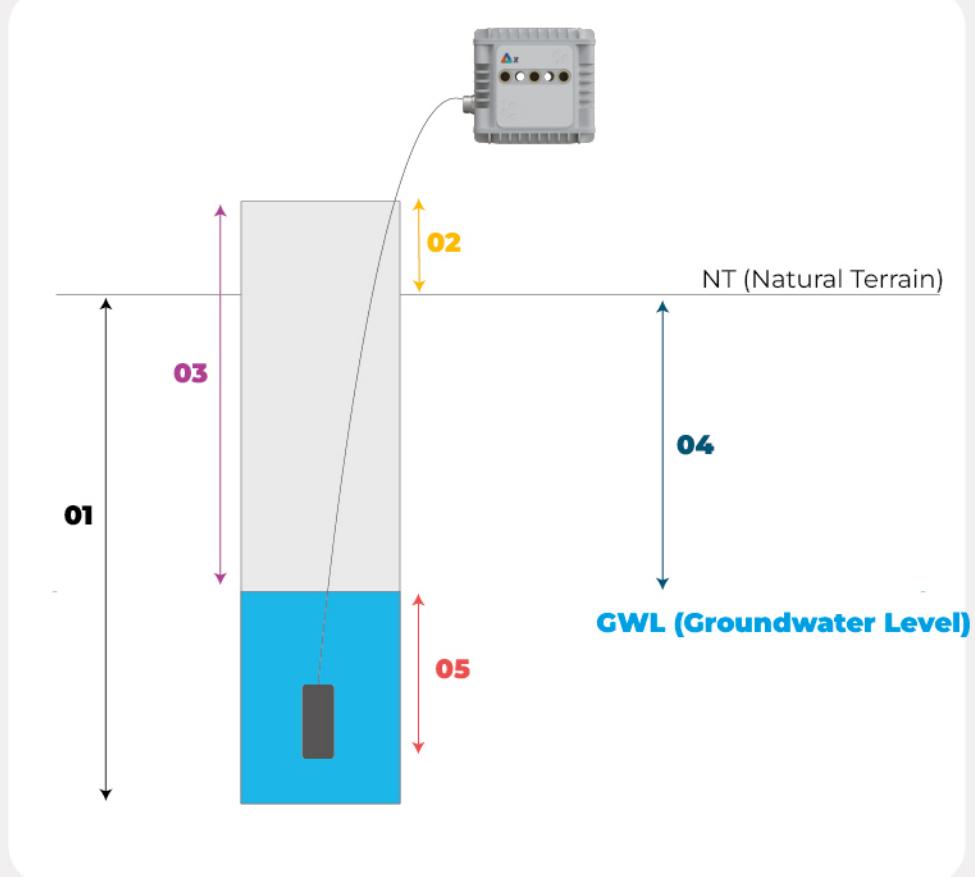
Before installation, make sure to note only the MR value corresponding to the depth to be instrumented.



**LC :** must allow the probe to reach the bottom of the borehole (BH)

**RM :** must be greater than the maximum estimated water level above the probe

- 01** Total borehole depth
- 02** Height of the piezometer above ground (relative to natural terrain)
- 03** Water level measured with a tape at the piezometer
- 04** Groundwater level relative to natural terrain
- 05** Water height above the probe (MR: maximum measurement range of the probe)





01

Excavate around the tube to a depth of 10-15 cm.

**Cut the tube to 5 cm above ground level.**



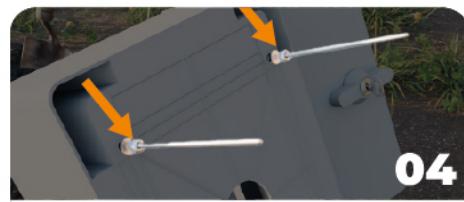
02

**Take an initial manual ground-water measurement.**

This will serve as a reference point (1) for DELTA X-P measurements.



Prepare a mortar base around the tube, dimensions 40 x 30 x 10 cm.



04

**Insert the 4 threaded rods (8)** provided in the kit.

Place the 4 washers (10) and 4 nuts (9) **on the outside**, leaving each rod protruding approximately 5 cm.



05

**Place 4 additional nuts (9) inside the enclosure** and tighten with a 10 mm socket wrench.

**⚠️** Set the threaded rods into the fresh mortar to hold them in place, then tighten once the mortar has set.



06

Position the enclosure on the mortar base.

**⚠️** Do not block the vent – it allows the sealed enclosure to maintain atmospheric pressure, which is required as the piezometric probe measures a pressure difference.



07

**Place the cable guide (7)** on your plastic tube.



08

Tighten the wing nut by hand.



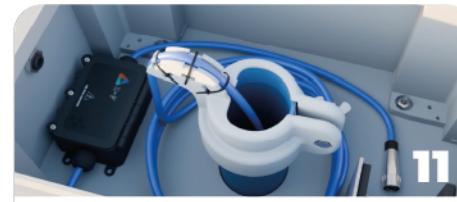
09

**Slide the piezometric probe (5) into the tube.**



10

Arrange the various components inside the enclosure, ensuring the atmospheric pressure compensation system aligns with the cable guide.



11

**Use the cable ties (17) to properly secure the cable.**



12

**Connect the probe to the DELTA X sensor.** Turn clockwise until the connector locks with a click.



Place the DELTA X in the designated slot.



Lock the enclosure with the key.



You can attach the label on top of the box, next to the lock, to discourage tampering.

15

**Reset your data before leaving the site:**  
Go to Connection > Configuration > Action > Reset Data.

### Your sensor is now

- ✓ connected,
- ✓ configured,
- ✓ prepared,
- ✓ installed.



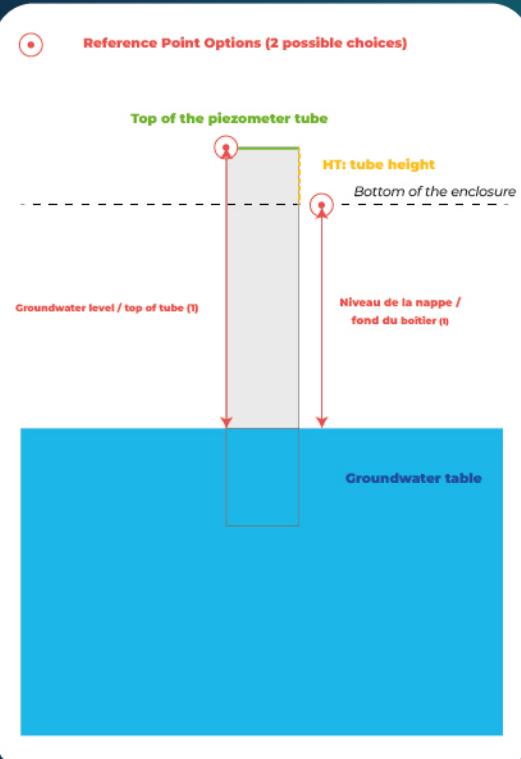
**If you haven't activated your LINKFEEL token yet, it's not too late!**

Go to Connection > Activate LINKFEEL and perform a network test.

You must be connected via Bluetooth to activate the token. Once activated, the sensor will start communicating within seconds to 4 hours, depending on site exposure.

**It is recommended to activate the token 24 hours before the mission.**

[Watch the video](#)



## Technical Details

**(i)** This value will be referred to as the "initial value". It corresponds to the measurement shown in red.

**The initial value is taken during the manual measurement (see Step 10).**

The initial value must be set by the user and defined according to your choice:

- Top of the tube
- Bottom of the piezometer tube (at the bottom of the enclosure)

We recommend using the bottom of the enclosure as the reference point to measure the height between the enclosure and the groundwater table, in case the piezometer tube is accidentally displaced.



**Caution: When handling the sensor, do not pierce, bend, or damage the cable.**

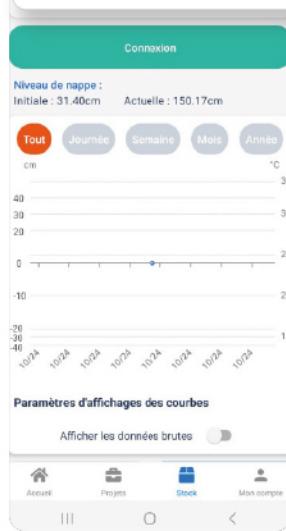
Note: The installation method presented here is an example suitable in most cases. You are free to adapt it according to your needs or the specific characteristics of the site.

## 06 App Display

The graph shown represents the groundwater variation profile relative to the initial value.

**01**

At **T0**, the sensor was installed and configured with its **initial value**.



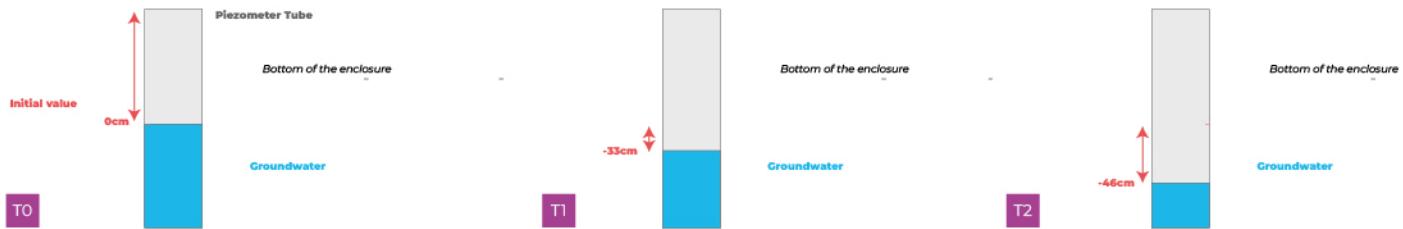
**02**

At **T1**, the groundwater level decreased – this is the first recorded measurement.



**03**

At **T2**, the level of the water has decreased and the sensor has synchronized a new data.



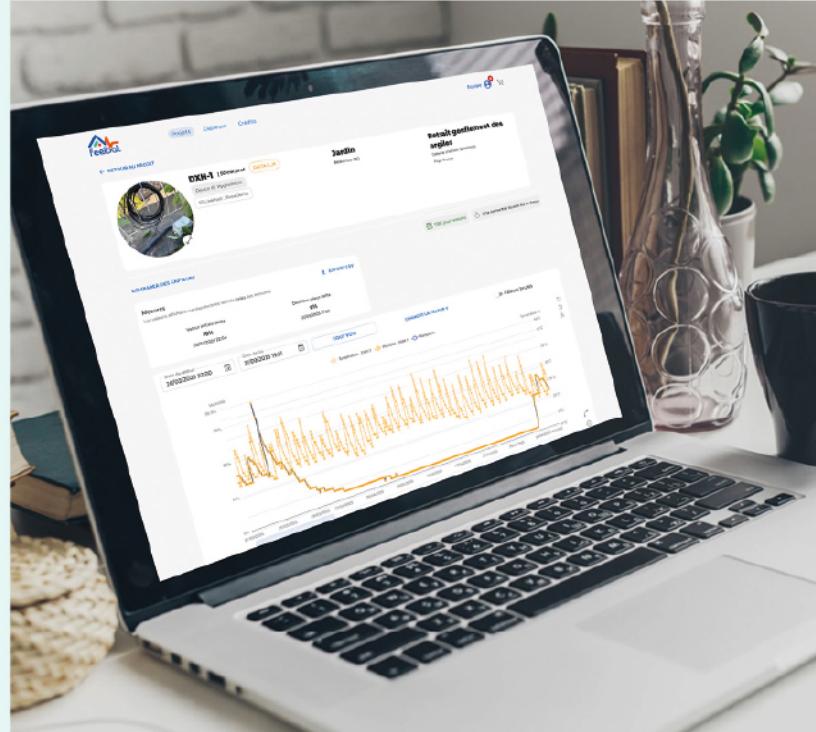
## 07 Webmonitoring

### Go further!

All features available on the mobile application are also accessible via the web, making it easier to analyze and compare graphs.

- ✓ **SIMPLIFIED PROJECT MANAGEMENT**
- ✓ **ZONE VISUALIZATION**
- ✓ **CURVE ANALYSIS**
- ✓ **PDF REPORT GENERATION**

[Access the Web application](#)



#### Test Button

The test button allows you to **check the Sigfox coverage** when the address or the exact placement of the sensors has not yet been determined, thus ensuring proper device operation.

### Solutions to extend your network and ensure data retrieval from your sensors



#### FEELBOX

The **FEELBOX** is a 4G gateway that ensures the transmission of data from your **FEELBAT** sensors when SIGFOX coverage is insufficient. Wherever a 4G connection is available, your sensors can send their measurements.



#### Repeater

The repeater extends the range of sensors located in areas with low Sigfox coverage. It can relay up to 13 sensors (140 messages/day) and works on battery power, with a lifespan of 1 to 7 years depending on use. A one-year subscription is included and can be renewed with a LINKFEEL token.



#### SIGFOX Microstation

The Sigfox microstation extends Sigfox coverage indoors or in poorly covered areas. It runs on 220 V with Ethernet or 3G/4G connection (optional). Its IP65 enclosure is suitable for outdoor use. 3G/4G keys are available as an option (SIM card not included).

If you have any questions, contact us:  
**SAV@feelbat.fr**

## 08 Cas d'usage



DELTA X-P (enclosure)



DELTA P (valve box)



## 09 Useful Information

### FEELBAT products are covered by the legal warranty of conformity.

This warranty covers conformity defects with the sales contract that appear within two years following the delivery of the product. They are also covered by the warranty for hidden defects, which applies to non-apparent defects at the time of sale that render the product unsuitable for its intended use or significantly reduce its usability.

### In this regard, the warranty does not apply in the following cases:

-  The sensor has been dropped
-  The casing is damaged (shocks, cracks, marks)
-  The sensor is used for a purpose other than its intended use
-  The sensor has been submerged in water
-  The sensor is stored or used outside its temperature range (-25 °C to +70 °C)
-  The mountings restrict the linear operation of the sensor
-  The sensor is stressed beyond its measurement range
-  The sensor was purchased more than two years ago



### Any questions?

Visit our FAQ: it brings together answers to the most frequently asked questions and guides you step by step in using our solutions.

[Access the FAQ](#)



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