# Description

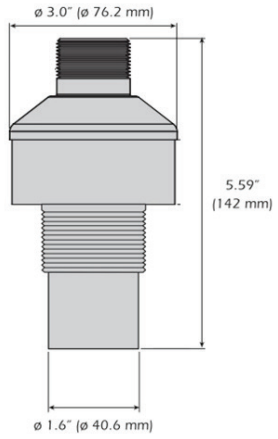
The **LT-US Data Logger** enables **level measurement using ultrasound** (or flow measurement via conversion tables).

The **LT-US ATEX FLEX** Data Logger may be installed in potentially explosive areas (see "ATEX installation precautions").

## 1.1 Presentation

LT-US: level measurement using ultrasound (0.17m - 3.00m)

## 1.2 Specifications




| | |
|---|---|
| **Angle of measurement** | 8 degrees |
| **Sealing** | IP68 (for 200 days in 2 metres of water) |
| **Resolution** | 1mm |
| **Measurement range** | 170 mm – 3,000 mm |
| **Accuracy** | ± 3 mm (over the entire measured range) |
| **Dead band** | 170 mm |
| **Cable length** | 5m or 10m |
| **Operating temperature** | -20°C to +50°C |
| **Temperature compensation** | Via an internal temperature sensor |
| **Dimensions** | 142mm overall height, Ø 80mm |
| **LT-US power supply** | 1 "high capacity" battery for the whole unit |
| **Configuration/Start-up** | Bluetooth® with SOFTOOLS Central Station |
| **Remote communication** | GPRS or 3G with SCADA Central Station and/or Web Server |
| **Maximum altitude** | 3,000 metres |
| **Degree of pollution** | 2 |
| **Indoor / outdoor use** | Outdoor use subject to certain conditions (protection from sunshine, protection from air currents, etc.) |

***LT-US / Standard EN61010-1:***
*Sound pressure risk > 110 dB ref. 20 µPa at less than one metre from the transducer.*

***LT-US ATEX FLEX / Standard EN 60079-0 (2012) +A11 (2013):***
- During installation or maintenance operations in a hazardous zone, there must be no friction against the product; it must only be cleaned with a damp cloth.
- *The product must not be configured in an ATEX zone: Bluetooth communication with SOFTOOLS must not be used in a hazardous area.*

## 1.3 LT-US data

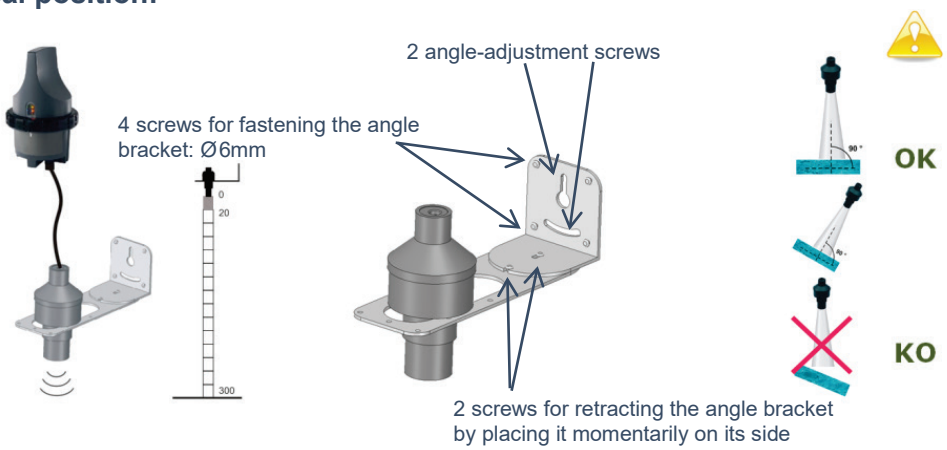
The data transmitted to the **Centralisation Systems** via LACBUS-RTU by the Data Logger are described in the "Configuration and Diagnostics" document; those listed below are **specific to the LT-US**:

| No. | Data label | No. | Data label |
|---|---|---|---|
| **45** | **EXT - Status** *numerical data specifying the nature of the fault (0 = operating correctly) ; the Data Logger archives changes in the value of this datum)* | **72** | **EXT - Fault** *logical datum (0 = OK, 1 = fault)* |
| | | **73** | **EXT – AI** *level measurement using ultrasound (0.17m - 3.00m)* |

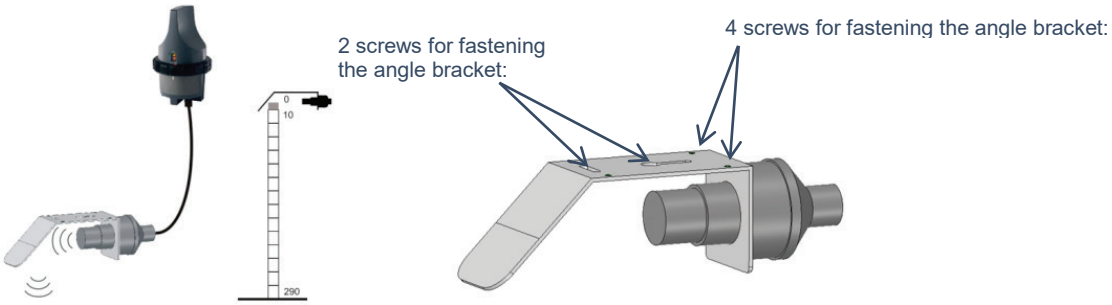
# Installation

## 2.1 Fitting the ultrasound transducer

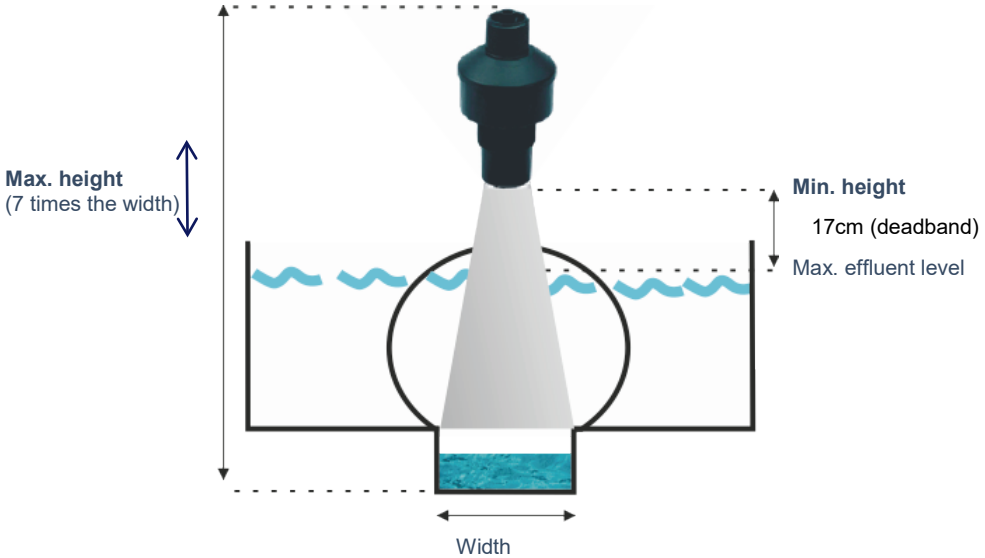
☑ **Vertical position:**




☑ **Horizontal position** (with deflector):




- To ensure measurement quality, the transducer must be placed **in line with the flow** above a zone where there is not too much backwash:
  **maximum measurement distance = 3 meters.**
- After fixing the device in a vertical or horizontal position, the angle of the device must be adjusted to ensure it is positioned **parallel to the surface of the water.**
- **Min. and max. heights are indicated** below:

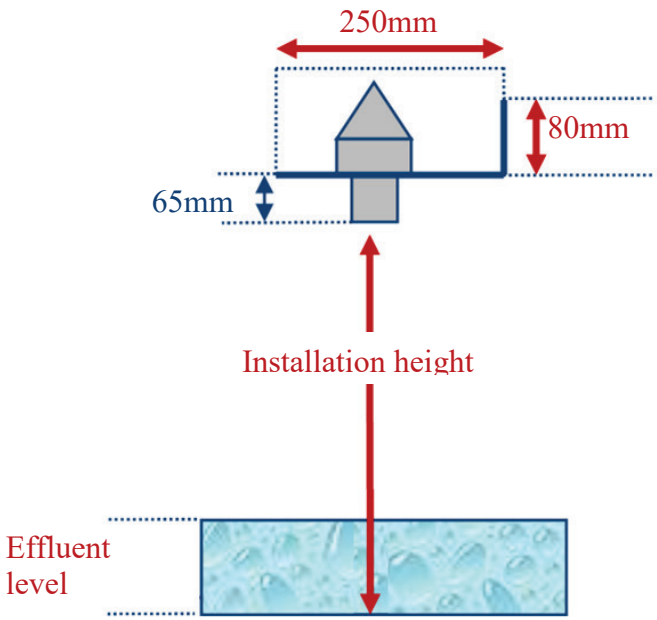



*The **cable** between the transducer and the LT-US **must not be changed**; it is 5 or 10 meters long. It may be necessary to **protect the cable** with an outer sheath (due to the presence of rodents, for example).*

## 2.2 Measuring the installation height accurately

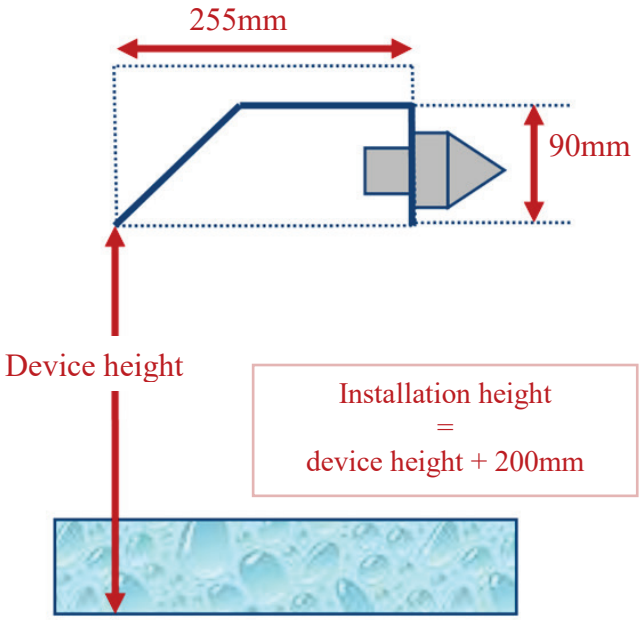
### Vertical position

**Wall bracket**: the height of the installation is measured between the bottom of the apron and the bottom of the transducer.




### Horizontal position

**Deflector**: the distance is measured between the bottom of the apron and the bottom of the deflector.
Add 200mm to this distance when recording the height in SOFTOOLS.

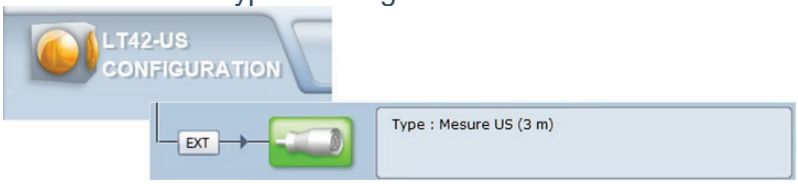



*The wall bracket and deflector are available as optional extras.*

# SOFTOOLS Configuration

## 3.1 Configuring the US case and third-party transducers

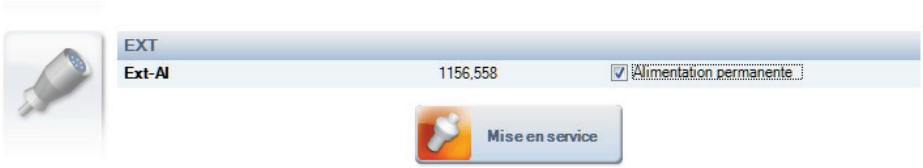
☑ The “ultrasound measurement” type is configured via the “EXT” extension section.




☑ The 4-20 mA transducers (CPR, CNP) are configured via the AIs, and the CSV transducer via the DIs.

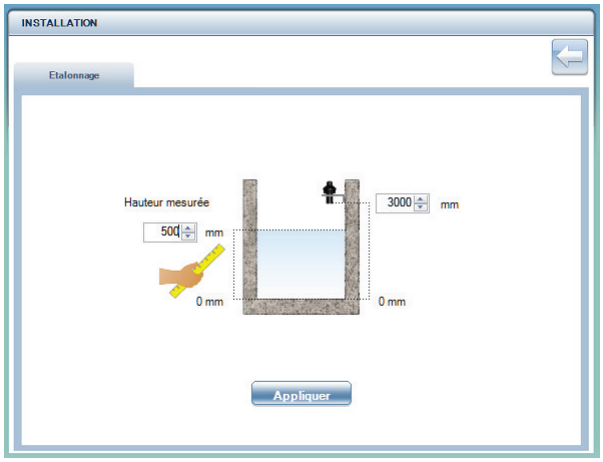
## 3.2 Connection – Start-up

SOFTOOLS connected by Bluetooth lets you access the **"EXT"** section to start up the transducer:



## 3.3 Measurement calibration

The user calibrates measurement by specifying the installation height of the transducer and the actual effluent level.

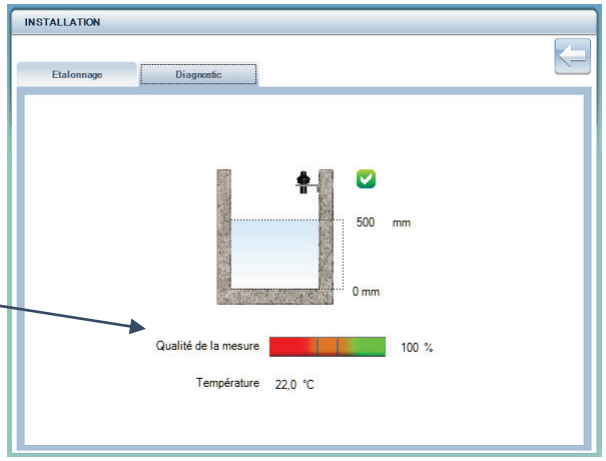



*The **ambient temperature** is an important parameter; for precise calibration, it is important to ensure that the ambient temperature is that of the place of installation.*

Use **diagnostics** to check **measurements** are **correct** (value and quality). If the quality is incorrect (red or orange bar graph), check and adjust the angle of the transducer in relation to effluent level.

Measurement quality:

poor average good




## 3.4 US sensor diagnostics results

SOFTOOLS allows you to run the diagnostics to get the value for **data point 45:**

| "Ext-Status" Value | Diagnostics |
|---|---|
| 0 | Measurement OK |
| 1 | No extension card |
| 2 | Failed communication with extension card |
| 16 | Map not initialised |
| 17 | Unknown request |
| 18 | Error in format of data exchanged |
| 19 | No data block number |
| 32 | US sensor not connected |
| 33 | US measurement not stable |
| 34 | Sampling time error |
| 35 | Incorrect US sensor supply voltage |
| 36 | Measurement acquisition timed out |
| 37 | No echo |
| 38 | Distance too short |
| 39 | KO measurement |

# Battery life

"**Combined sewer overflow**" application (average daily overflow duration = 20 minutes).

The Data Logger can be powered by a "High capacity" battery (ref. 933). Data point no.44 makes it possible to assess the **remaining battery life**, in days. In order to limit power consumption, the Data Logger **only activates its GSM modem during communication phases**. Only batteries specified by the manufacturer can guarantee its safety and performance.

The autonomy evaluated below takes into account the following conditions of use:

- Full measuring scale: 3 meters,
- Ambient temperature between 5°C and 25°C,
- Average GSM reception level (≥ 7).

| **Conditions for use of LT-US Data Logger** | | | **Battery life** with **Pack 933** *("High Capacity" battery)* |
|---|---|---|---|
| **LT-US** :<br>(with only US sensor) | Measurement archiving period:<br>15 minutes | **1 call per day** | **9 years** |
| | Measurement archiving period:<br>5 minutes | **1 call per day** | **5 years** |
| **LT-US** :<br>(with US sensor<br>+ CSV overflow sensor) | Measurement archiving period:<br>• Outside overflow: 30 minutes<br>• During overflow: 1 minute | **1 call per day** | **10 years** |

To preserve the autonomy of the Data Logger, it is important to limit the archiving period and the number of daily emissions.