

# ELT-2-i

## LoRaWAN™ wireless Versatile sensor

*ELT-2-i by Elsys*

### Internal sensors

- 2-channel GPIO
- Internal Temperature
- Internal Humidity
- Internal Accelerometer
- Internal Atmospheric pressure

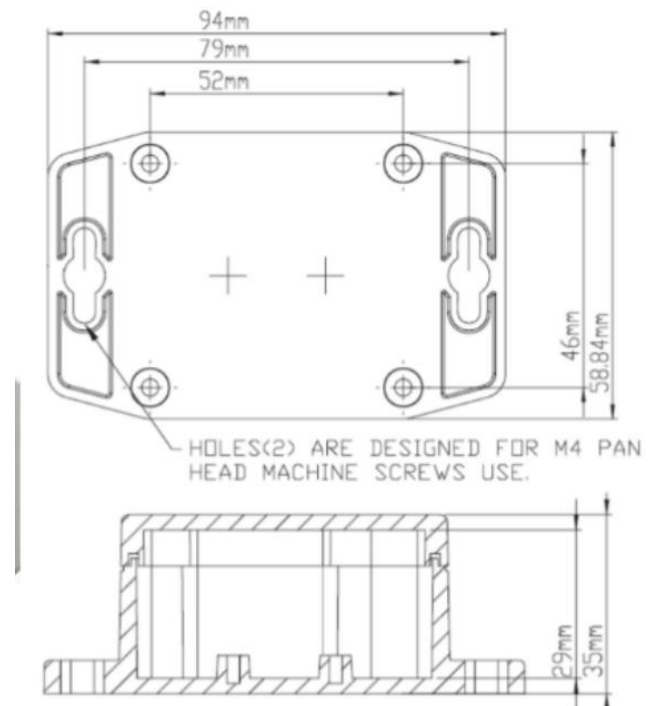


The ELT-2-HP LoRaWAN sensor is a fully self-contained IP67 rated and self-powered Versatile sensor. The ELT-2-HP can measure both analog or digital signals and can handle up to two external sensors simultaneously. It also has four internal sensors: temperature, humidity, accelerometer, and atmospheric pressure sensor. The ELT-2-HP has an external antenna for extended range (not as pictured). The ELT-2-I an internal aerial. (LoRaWAN Certified)

**Supported channel plans** - US902-928, EU863-870, AS923, AU915-928, KR920-923

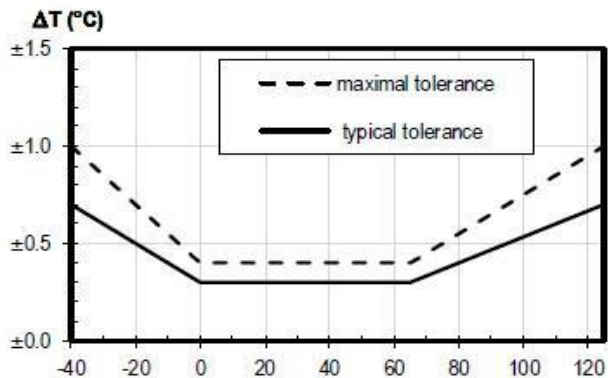
Supports Over-the-Air-Activation (**OTAA**) or Activation-by-Personalisation (**ABP**). Compatible with all LoRaWAN Network Servers including The Things Network, Orbiwise, Loriot, Wanasy, LoraServer and others. The Elsys sensors adhering to the latest recommendations of operation as promoted by the LoRaWAN alliance. The sensors supporting best practice of Join methods, Adaptive Data Rate, Link Check, retention of RF parameters during sleep and more.

All Elsys sensors are equipped with **NFC** for easy configuration by the Android app "Sensor Settings" available from the Google Play store. Sample rate, data rate, encryption keys, triggers, activation and other advanced features can be simply changed with a single tap of the sensor. Settings may also be updated remotely Over-The-Air from most LoRaWAN Network Servers or through cloud solutions using LNS API's.

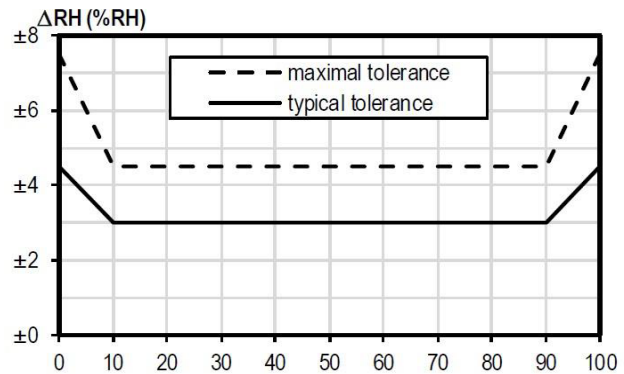


# ELT-2-i

**Internal Temperature:** Resolution 0.1°C



**Internal Humidity:** Resolution 0.1% RH



**Connectivity:**

- Analog input 0 – 3 or 0 – 10 Voltage
- Powered analog input 0 – 10V
- Pulse count (Pull up)
- Pulse count (Pull down)
- Pulse count (Pull down) – External pulse
- Pulse count (Pull up) – S0 input
- 4 – 20 mA input
- Pulse count (Pull up) – 2 channels
- Pulse count (Pull down) – 2 channels
- Switch input + Temperature sensor

**Accelerometer:**

- Range: ± 2.0 g
- Sensitivity: 16 mg/digit
- Data rate: 10 Hz

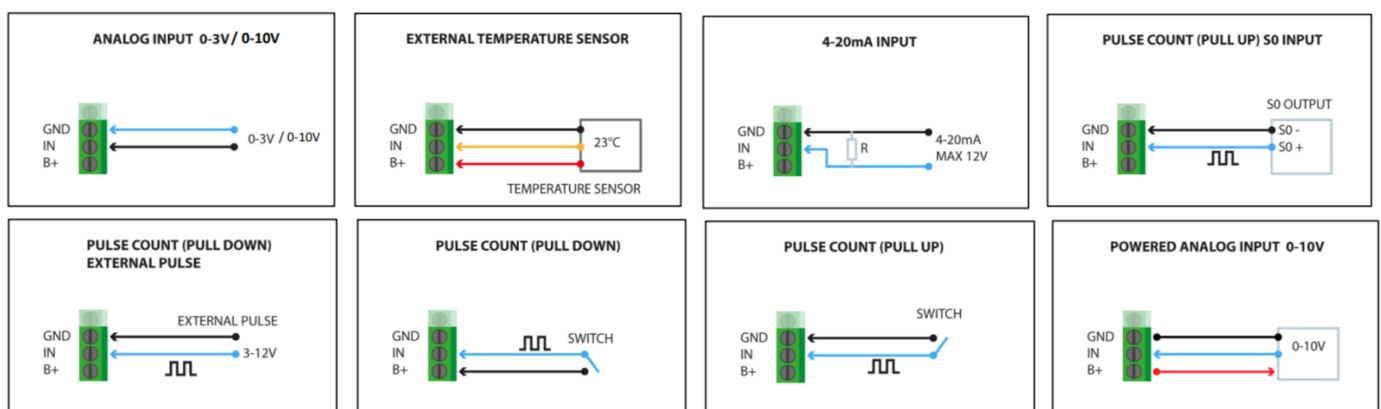
**Atmospheric pressure:**

- Range: 260 – 1260 hPa
- Accuracy: ± 1 hPa



**Pre-defined Sensors:**

- External temperature sensor
- Water leak input
- Maxbotix distance sensor input
- Meter (Decagon) sensor input



\* The above is a sample and subset of the possible connections and sensors available.

# ELT-2-i

## Device Specifications

Mechanical specifications	
Weight	60 g excluding batteries / 100 g including batteries
Dimensions	94 x 59 x 35 mm
Enclosure	IP67
Direct connection to:	1-wire temperature sensor, Decagon moisture sensor, SO output, Matabotix ultrasonic
Operating conditions	
Temperature	-40 to 60 °C (85 °C with external power supply)
Humidity	0 to 100% RH
Device Power Supply	
Battery Type	1 x 3.6V AA Lithium Batteries
Expected Battery Life	<10 years (Depending on configurations and environment)
Device Logging Function	
Sampling Interval	Configurable via NFC and downlink configuration
Data Upload Interval	Configurable via NFC and downlink configuration

## Radio / Wireless

LoRaWAN parameters	
Wireless Technology	LoRaWAN® 1.0.3
Wireless Security	LoRaWAN® End-to-End encryption (AES-CTR), Data Integrity Protection (AES-CMAC)
LoRaWAN Device Type	Class A/C (configurable) End-device
Supported LoRaWAN® features	OTAA, ABP, ADR, Adaptive Channel Setup
Supported LoRaWAN® regions	US902 – 928, EU863 – 870, AS923, AU915 – 928, KR920 – 923, RU864, IN865
Link Budget	137 dB (SF7) to 151 dB (SF12)
RF Transmit Power	14 dB / 20 dB (Region specific)

## Payload Format

Data types			
Type value	Type	Data size	Comment
0x01	Temperature	2	-3276.5 °C – 3276.5 °C (Value of: 100 → 10.0 °C)
0x02	Humidity	1	0 – 100%
0x07	VDD (Battery voltage)	2	0 – 65535 mV
0x08	Analog1	2	0 – 65535 mV
0x0A	Pulse count	2	0 – 65535 (Between two send intervals)
0x0B	Pulse count ABS	4	Absolute value 0 – 4294967295
0x0C	External temp1	2	-3276.5 °C – 3276.5 °C
0x0D	External digital/button	1	0 / 1 (On / Off, Down / Upp)
0x0E	External distance	2	0 – 65535 mm
0x...	.....		{Further additional payloads available depending on settings}

This datasheet is compiled from original publications by Elsys available from the manufacturer's website:

- [https://elsys.se/public/datasheets/ELT-2\\_datasheet.pdf](https://elsys.se/public/datasheets/ELT-2_datasheet.pdf)
- <https://elsys.se/public/documents/Declaration-of-conformity-Elsys-LoRa.pdf>

## Battery life predictions

# ELT-2-i

The nature of Radio Frequency (RF) technology including LoRaWAN is that the distances achieved are subject to the configuration, environmental conditions, possible obstacles, topography of the surrounding area and the risk of interference by other devices on the same frequency. LoRaWAN allows for a variance in the transmission speed known as Spread Factor (or Data Rates) which can be dynamically adjusted to achieve the best range while optimising battery use. Over greater distances or through obstacles, a higher Spread Factor may be used which will consume more time on air and therefore greater power. This along with frequency of samples, reducing battery life.

The following guides are provided by the manufacturer as a realistic expectation of battery life performance.

## Sample time of 300 seconds (5minutes) with Spread Factor 7

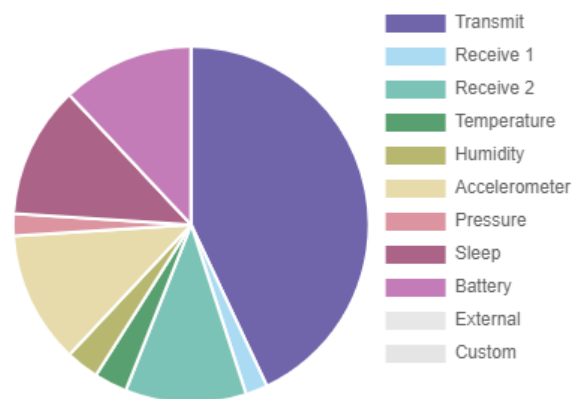
Sample time <input type="text" value="300"/> Seconds	Sensor ELT2 HP Select Elsys sensor	Battery capacity <input type="text" value="2700"/> Capacity(mAh)	Battery performance <input type="text" value="80"/> Performance(%)
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Spreading factor  
 SF7  
  SF8  
  SF9  
  SF10  
  SF11  
  SF12

### Result:

The battery will last for **7.6** years\*. The sensor will draw **33uA** and **285mAh** in one year.

Details



## Sample time of 300 seconds (5minutes) with Spread Factor 12

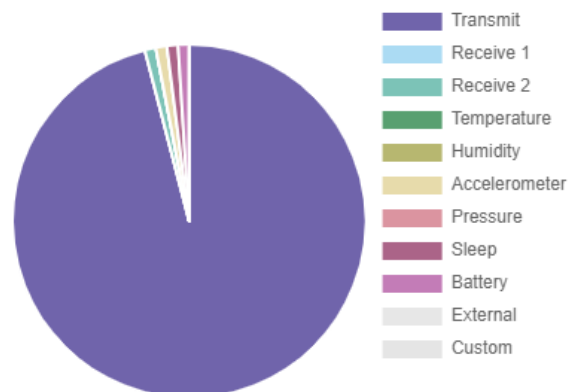
Sample time <input type="text" value="300"/> Seconds	Sensor ELT2 HP Select Elsys sensor	Battery capacity <input type="text" value="2700"/> Capacity(mAh)	Battery performance <input type="text" value="80"/> Performance(%)
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Spreading factor  
 SF7  
  SF8  
  SF9  
  SF10  
  SF11  
  SF12

### Result:

The battery will last for **0.7** years\*. The sensor will draw **349uA** and **3053mAh** in one year.

Details



\* The ELT-2 is a versatile sensor allowing a range of external sensing equipment to be connected. Any draw on power by such sensors is in addition to that calculated in these examples. It is important to ensure that the power draw of the sensor itself and the amount of start-up time required is used in any battery life calculation.