

ELT wM-Bus Series

Wireless M-Bus sensor



Important Safety Information



Read this manual before attempting to install the device.

Failure to observe the recommendations included in this manual may be dangerous or cause a violation of the law. The manufacturer, ElektronikSystem i Umeå AB, will not be held responsible for any loss or damage resulting from not following the instructions of this operating manual.

- The device must not be dismantled or modified in any way.
- The device is only intended for indoor use. Do not expose it to moisture.
- The device is not intended to be used as a reference sensor, and ElektronikSystem i Umeå AB will not be held liable for any damage which may result from inaccurate readings.
- The battery should be removed from the device if it is not to be used for an extended period. Otherwise, the battery might leak and damage the device. Never leave a discharged battery in the battery compartment.
- The device must never be subjected to shocks or impacts.
- To clean the device, wipe with a soft moistened cloth. Use another soft, dry cloth to wipe dry. Do not use any detergent or alcohol to clean the device.
- CAUTION – Risk of explosion if the battery is replaced by an incorrect type



Disposal note in accordance with Waste from Electrical and Electronic Equipment (WEEE) Directive 2012/19/EU

The device, as well as all the individual parts, must not be disposed of with household waste or industrial waste. You are obliged to dispose of the device at the end of its service life in accordance with the requirements of Directive 2012/19/EU to protect the environment and to reduce waste through recycling. For additional information and how to carry out disposal, please contact the certified disposal service providers. The sensors contain a lithium battery, which must be disposed of separately.

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1. Product information

1.1 Description

The ELT Series wM-Bus Series are universal industrial sensors for both in- and outdoor use. The internal sensors measure temperature, humidity, atmospheric pressure, and acceleration. The ELT wM-Bus Series are also equipped with multi-purpose IN for connection to external sensors and equipment. The sensor is equipped with NFC (Near Field Communication) for easy configuration with an NFC-enabled smartphone.

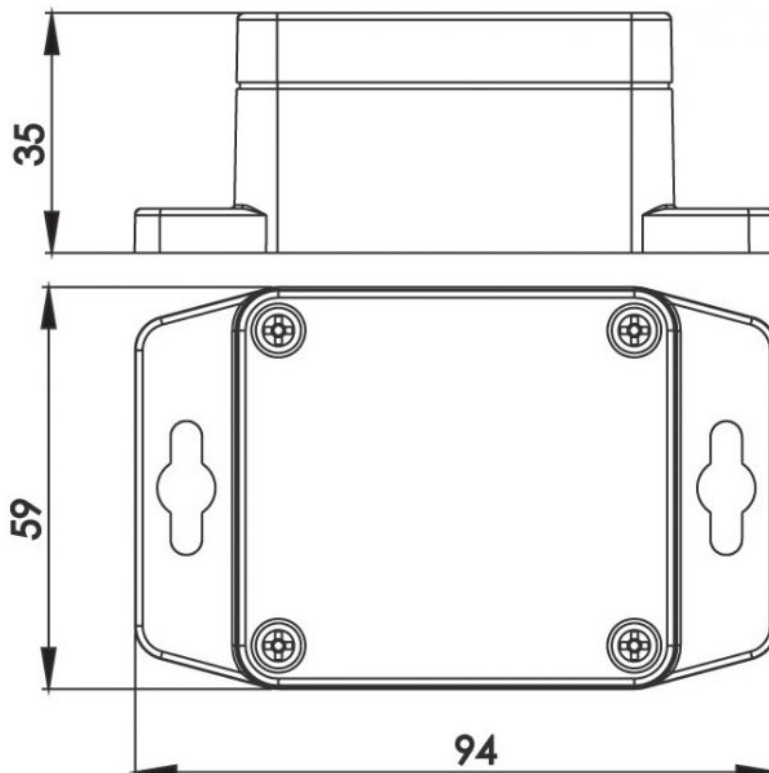
1.2 ELT wM-Bus Series attributes

- Temperature
- Humidity
- Atmospheric pressure
- Accelerometer
- Multi-purpose IN1
- Multi-purpose IN2
- External antenna

1.3 Label

At the back of your device there is a label with an Aztec barcode containing Serial and sensor type.

1.4 Dimensions (mm)



1.5 Main features of the ELT wM-Bus Series

- Wireless M-Bus mode T1/C1a/C1B
- Wireless M-Bus mode standard EN13757:2018
- IP67-rated
- Measures ambient temperature
- Measures ambient humidity
- Measures atmospheric pressure
- Measures acceleration
- Two multi-purpose IN ports
- Modular build with expandable functionality
- Can be connected to external sensors and meters
- Easy installation
- Easy configuration
- Battery-powered
- Long-range communication
- Configurable over NFC
- Configurable over the air
- Ten years of battery life*
- Supported wM-Bus modes: T1, C1a, C1b
- CE Approved and RoHS compliant

* Depending on settings and environmental factors



ELT-W



ELT-ETH-W

2. Mounting guidelines

Common mounting guidelines for the ELT wM-Bus Series lines of sensor:

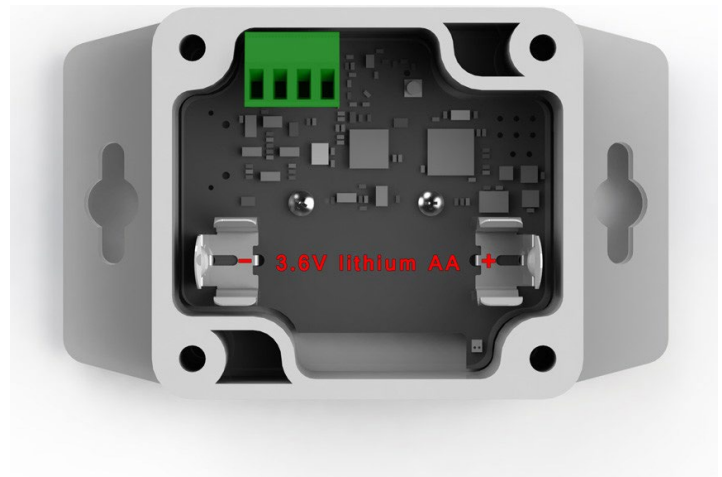
- For best RF and measurement performance, make sure you mount the sensor with the antenna vertically.
- If external wiring is to be connected to the sensor and the sensor is to be placed in environments where it may get wet, consider water runoff, and place the sensor with the cable gland placed vertically.
- If the external SHT4x is mounted with the filter cup (ELT-ETH-W) and the sensor is to be placed in environments where it may get wet, consider water runoff, and place the sensor with the filter cup pointing downwards.
- Make sure that the sensor is not placed in direct sunlight, as the temperature reading from within the sensor case may be affected.

3. Installation

3.1 Installation

1. Remove the front lid.
2. Install the battery. The ELT wM-Bus Series requires one AA battery. The battery type is 3.6V Lithium Battery (ER14505).

Caution: Using batteries other than the ones provided may result in loss of performance, battery life, and damage to the device. Dispose of properly, observing environmental protection rules.



3. Screw the lid in place with the four provided screws.

3.2 Service and Maintenance

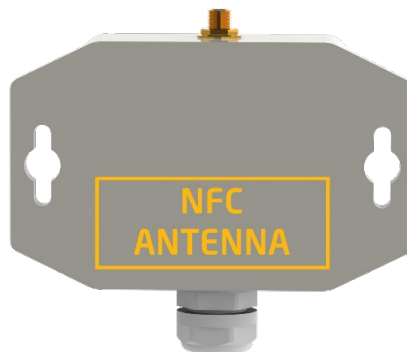
No serviceable parts inside. If service is needed other than battery replacement, please contact your distributor.

4. Sensor Configuration

All sensor settings can be configured via a smartphone application with NFC (Near Field Communication). The timebase, wM-Bus mode, can be changed. All modifications of the settings via NFC can be locked to prevent unwanted changes.

4.1 NFC Configuration

1. Download ELSYS "Sensor Settings" application from Google Play or App store and install it on a smartphone or tablet. The device must support NFC.
2. Enable NFC on the device and start the application.
3. Place your device on top of the NFC antenna on the sensor. Keep the two devices close to each other and don't move them to get as good connectivity as possible.
4. Remove the device. Current settings will be displayed in the application.
5. Use the application to change any settings if needed.
6. Tap the device on top of the NFC antenna to transfer the new settings to the sensor. Make sure that the application confirms your new settings.
7. Wait for the sensor to reboot (1 sec), indicated by the LED flashing. Sensor settings have been updated. Always validate your settings by reading the NFC data after the sensor has restarted.



4.2 Application parameters

All parameters for the "Sensor settings" application can be found in our settings document. Please visit the support section on our webpage for more information.

5. Sensor behavior

5.1 Sensor startup

1. When the sensor starts up, it loads any configuration parameters written to the NFC chip. The sensor will then write all configuration parameters back to the NFC chip.
2. When the configuration is done, the sensor enters sampling mode and will start sending telegrams at the specified timebase. Make sure that the sensor credentials (Serial, Encryption key) match the keys added to the server for activation of the device.

5.2 Scheduled transmission

The sensor makes periodic measurements and transmits data according to the user's configuration.

5.3 LED indication

The LED, located in the bottom right corner of the PCB, indicates different actions when the sensor is active.

LED indication	Action
Long red blink, long green blink	Sensor is starting up
Short green blink	wM-Bus uplink transmission

6. Internal sensors

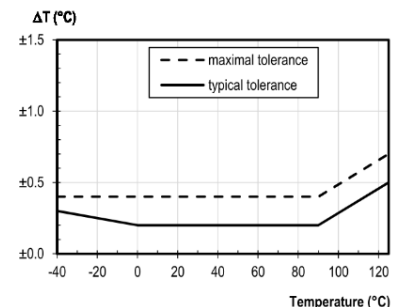
The ELT wM-Bus Series contain the following internal sensors.

- Temperature
- Humidity
- Atmospheric pressure
- Accelerometer
- Multi-purpose IN1
- Multi-purpose IN2

6.1 Temperature

Resolution: 0.1 °C

Accuracy: 0.2 °C typical, see figure



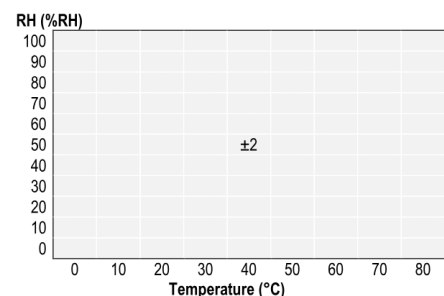
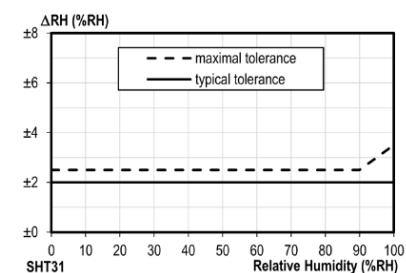
6.2 Humidity

Note that the internal sensor will react very slowly to external changes in humidity. The humidity sensor can be somewhat helped by equipping the ELT wM-Bus Series with a membrane if cable gland is not needed, but the response time will not be comparable to a sensor exposed to open air.

Resolution: 1 % RH

Accuracy at 25 °C: % RH, See figure

Accuracy of RH over temp.: See figure



6.3 Atmospheric Pressure

Note that the ELT Series wM-Bus is equipped with a cable gland with a pressure membrane, which allows for atmospheric pressure reading while keeping its IP 67 rating. If the ELT is equipped with the filter cup instead of the cable gland, it's rated IP 54.

Atmospheric pressure

Range: 260 – 1260 hPa

Accuracy: ± 1 hPa.

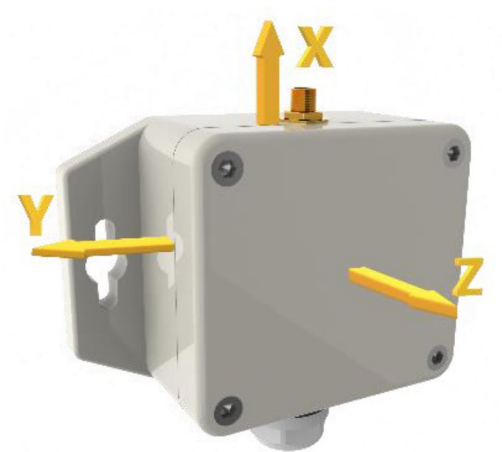
6.4 Accelerometer

The accelerometer sensor reports values of X, Y and Z direction, depending on the sensor orientation. In the picture, the Z reference value is around 64 and the value for X, Y is 0.

Range: ± 2.0 g

Sensitivity: 16 mg/digit

Data rate: 10 Hz



7 External Sensors

The ELT wM-Bus Series sensor can be connected to a wide array of external sensors, equipment, and modules. All connections to external gear are made available through the terminal block located on the top left of the circuit board inside the ELT wM-Bus. Available connections on the terminal block are power, ground, and two multi-purpose IN-ports. For a detailed description see the Application Note: ELSYS ELT wM-Bus external configurations guide

8 Device specifications

Mechanical specifications	
Dimensions	94 x 59 x 35 mm
Weight	60g / 97g (with battery inserted)
Enclosure	Polycarbonate
IP rating (ELT-W)	IP67
IP rating (ELT-ETH-W)	IP54
Mounting	Screws / Adhesive tape
Operating conditions	
Usage environment	Indoor, Outdoor
Temperature	−40 to 60 °C (85 °C with external power supply)
Humidity	0 to 100% RH
Power supply	
Operating voltage	3.6V DC
Battery type	AA 14505 (3.6V Li-SOCl ₂)
Battery life	Up to 10 years (Depending on settings and environmental factors).
Radio / wireless	
Wireless technology	Wireless M-Bus
Wireless security	wM-Bus End-to-End encryption (AES-CBC)
WM-Bus mode	Can be configured as T1, C1a, C1b
Supported wM-Bus regions	EU868
RF Transmit Power	Max 14 dBm EIRP

9 Sensor payload format

The device uses the standard Open Metering System payload format. Each telegram consists of a header plus different types of payloads depending on how the device is configured. All external sensors have a DIF extension bit with subunit 1.

Header	Always present
Device battery	Always present
Internal SHT3x (temp and humidity)	Present if enabled
Internal LPS25H (atmospheric pressure)	Present if enabled
Internal LIS2DH (accelerometer)	Present if enabled
External sensor	Present if configured

Below are examples of the telegram formats for the header, internal and external sensors, and an example of a full telegram.

9.1 Header + Device Battery

Byte index	Data	Description
0	0xnn	L-Field
1	0x44	C-Field: SND-NR
2..3	0x1599	Manufacturer "ELY"
4..7	0xnnnnnnnn	Identification number
8	0xnn	Version
9	0x1F	Device type = Sensor device
10	0x7A	0x7A = Short application header
11	0xnn	Access number, increases after each transmission (0..255)
12	0xnn	Status, No Error: 0x00, Any Error: 0x10
13..14	0xnnnn	CONFIG: Bit 3..0 = 0 Bit 7..4 = 1 to 15, number of encrypted 16-byte block, 0 if encryption = OFF Bit 12..8 = encryption mode, 5 with encryption, 0 without encryption Bit 13 = 1 (Synchronized) Bit 15..14 = 0
15..16	0x2F2F	AES check (idle filler) only if encrypted
17	0x02 (0x32 in case of error)	DIF, instantaneous (2-byte data)
18	0xFD	VIF, extension table FD
19	0x46	VIFE, voltage
20..21	0xnnnn	Battery voltage in mV In case of error, this value will be set to 0x0000

9.2 Internal SHT3x

Byte index	Data	Description
n + 1	0x02 (0x32 in case of error)	DIF, instantaneous (2-byte data)
n + 2	0x65	VIF, external temperature
n + 3..4	0xnnnn	Temperature in °C In case of error, this value will be set to 0x0000
n + 5	0x02 (0x32 in case of error)	DIF, instantaneous
n + 6	0xFB	VIF, extension table FB
n + 7	0x1A	VIFE, relative humidity
n + 8..9	0xnnnn	Humidity in d% In case of error, this value will be set to 0x0000

9.3 Internal LPS25H

Byte index	Data	Description
n + 1	0x02 (0x32 in case of error)	DIF, instantaneous (2-byte data)
n + 2	0x68	VIF, pressure
n + 3..4	0xnnnn	Pressure in mbar In case of error, this value will be set to 0x0000

9.4 Internal LIS2DH

Byte index	Data	Description
n + 1	0x03 (0x33 in case of error)	DIF, instantaneous (3-byte data)
n + 2	0x7C	VIF, Plain text
n + 3	0x03	Text length (3)
n + 4	0x43	'C'
n + 5	0x43	'C'
n + 6	0x41	'A'
n + 7..9	0xnnnnnn	Acceleration in Z, Y, X In case of error, this value will be set to 0x000000
n + 10	0x02 (0x33 in case of error)	DIF, instantaneous
n + 11	0x7C	VIF, Plain text
n + 12	0x03	Text length (3)
n + 13	0x54	'T'
n + 14	0x4F	'O'
n + 15	0x4D	'M'
n + 16..17	0xnnnn	Motion count

9.5 External Temperature

For example, 1-Wire temp probe (DS12B20), PT100, PT1000:

Byte index	Data	Description
n + 1	0x82 (0x32 in case of error)	DIF, instantaneous (2-byte data) + DIFE
n + 2	0x40	DIFE, subunit 1
n + 3	0x65	VIF, external temperature
n + 4..5	0xnnnn	Temperature in °C In case of error, this value will be set to 0x0000

9.6 External SHT4x

Byte index	Data	Description
n + 1	0x82 (0xB2 in case of error)	DIF, instantaneous (2-byte data) + DIFE
n + 2	0x40	DIFE, subunit 1
n + 3	0x65	VIF, external temperature
n + 4..5	0xnxxx	Temperature in °C In case of error, this value will be set to 0x0000
n + 6	0x82 (0xB2 in case of error)	DIF, instantaneous (2-byte data) + DIFE
n + 7	0x40	DIFE, subunit 1
n + 8	0xFB	VIF, extension table FB
n + 9	0x1A	VIFE, relative humidity
n + 10..11	0xnxxx	Humidity in d% In case of error, this value will be set to 0x0000

9.7 External Pulse

Byte index	Data	Description
n + 1	0x82 (0xB2 in case of error)	DIF, instantaneous (2-byte data) + DIFE
n + 2	0x40	DIFE, subunit 1
n + 3	0xnn	VIF, selectable in app (default 0xFD)
n + 4	0xnn	VIFE, selectable in app (default 0x3A dimensionless)
n + 5..6	0xnxxx	Number of pulses since the last telegram In case of error, this value will be set to 0x0000

9.8 External Analog 0-3V and 0-10V

Byte index	Data	Description
n + 1	0x82 (0xB2 in case of error)	DIF, instantaneous (2-byte data) + DIFE
n + 2	0x40	DIFE, subunit 1
n + 3	0xFD	VIF, extension table FD
n + 4	0x46	VIFE, voltage
n + 5..6	0xnxxx	Analog voltage in mV In case of error, this value will be set to 0x0000

9.9 External Water leak cable

Byte index	Data	Description
n + 1	0x81 (0xB1 in case of error)	DIF, instantaneous (1-byte data) + DIFE
n + 2	0x40	DIFE, subunit 1
n + 3	0x7C	VIF, Plain text
n + 4	0x03	Text length (3)
n + 5	0x52	'R'
n + 6	0x54	'T'
n + 7	0x57	'W'
n + 8	0xnn	Water detection (0x00..0xFF)

9.10 Full Telegram Format Example

Example of a full telegram where all internal sensor data and an external SHT4x are reported.

Header	Byte 0 to 16
Device battery	Byte 17 to 21
Internal SHT3x	Byte 22 to 29
Internal LPS25H	Byte 30 to 33
Internal LIS2DH	Byte 34 to 50
External SHT4x	Byte 51 to 61

Byte index	Data	Description
0	0xnn	L-Field
1	0x44	C-Field: SND-NR
2..3	0x1599	Manufacturer "ELY"
4..7	0xnnnnnnnn	Identification number
8	0xnn	Version
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15..16	0x2F2F	AES check (idle filler) only if encrypted
17	0x02 (0x32 in case of error)	DIF, instantaneous (2-byte data)
18	0xFD	VIF, extension table FD

19	0x46	VIFE, voltage
20..21	0xn timer	Battery voltage in mV In case of error, this value will be set to 0x0000
22	0x02 (0x32 in case of error)	DIF, instantaneous (2-byte data)
23	0x65	VIF, external temperature
24..25	0xn timer	Temperature in °C In case of error, this value will be set to 0x0000
26	0x02 (0x32 in case of error)	DIF, instantaneous
27	0xFB	VIF, extension table FB
28	0x1A	VIFE, relative humidity
29	0xn timer	Humidity in d% In case of error, this value will be set to 0x0000
30	0x02 (0x32 in case of error)	DIF, instantaneous (2-byte data)
31	0x68	VIF, pressure
32..33	0xn timer	Pressure in mbar In case of error, this value will be set to 0x0000
34	0x03 (0x33 in case of error)	DIF, instantaneous (3-byte data)
35	0x7C	VIF, Plain text
36	0x03	Text length (3)
37	0x43	'C'
38	0x43	'C'
39	0x41	'A'
40..42	0xn timer	Acceleration in Z, Y, X In case of error, this value will be set to 0x000000
43	0x02 (0x33 in case of error)	DIF, instantaneous
44	0x7C	VIF, Plain text
45	0x03	Text length (3)
46	0x54	'T'
47	0x4F	'O'
48	0x4D	'M'
49..50	0xn timer	Motion count
51	0x82 (0xB2 in case of error)	DIF, instantaneous (2-byte data) + DIFE
52	0x40	DIFE, subunit 1
53	0x65	VIF, external temperature
54..55	0xn timer	Temperature in °C In case of error, this value will be set to 0x0000
56	0x82 (0xB2 in case of error)	DIF, instantaneous (2-byte data) + DIFE
57	0x40	DIFE, subunit 1
58	0xFB	VIF, extension table FB
59	0x1A	VIFE, relative humidity
60..61	0xn timer	Humidity in d% In case of error, this value will be set to 0x0000

10 Regulations

a. Legal Notices

All information, including, but not limited to, information regarding the features, functionality, and/or other product specification, are subject to change without notice. ELSYS reserves all rights to revise or update its products, software, or documentation without any obligation to notify any individual or entity. ELSYS and ELSYS logo are trademarks of ElektronikSystem i Umeå AB. All other brands and product names referred to herein are trademarks of their respective holders.

b. Declaration of conformity

Hereby, ElektronikSystem i Umeå AB declares that the radio equipment type Radio communication devices for low-speed data R&TTE Class 1 is in compliance with Directive 2014/53/EU, Directive 2011/65/EU and Directive 2012/19/EU.

The full text of the EU declaration of conformity is available at: <https://www.elsys.se/link/eu-doc>

11 Revision History

Revision	Description	Date
1.0	First version	2025-12-08
1.1	ELT wM-Bus -> ELT Series wM-Bus	2025-12-08