USER MANUAL

Longo Bluetooth Products
LBT-1.B01
Bluetooth Mesh
window/door sensor

Version 1

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User Manual

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STANDARDS AND PROVISIONS: Standards, recommendations, regulations and provisions of the country in which the devices will operate, must be considered while planning and setting up electrical devices. Work on 100 .. 240 V AC network is allowed for authorized personnel only.

DANGER WARNINGS: Devices or modules must be protected from moisture, dirt and damage during transport, storing and operation.

WARRANTY CONDITIONS: For all modules LBT-1 – if no modifications are performed upon and are correctly connected by authorized personnel – in consideration of maximum allowed connecting power, warranty of 24 months is valid from the date of sale to the end buyer, but not more than 36 months after delivery from Smarteh. In case of claims within warranty time, which are based on material malfunctions the producer offers free replacement. The method of return of malfunctioned module, together with description, can be arranged with our authorized representative. Warranty does not include damage due to transport or because of unconsidered corresponding regulations of the country, where the module is installed.

This device must be connected properly by the provided connection scheme in this manual. Misconnections may result in device damage, fire or personal injury.
Hazardous voltage in the device can cause electric shock and may result in personal injury or death.
NEVER SERVICE THIS PRODUCT YOURSELF!

This device must not be installed in the systems critical for life (e.g. medical devices, aircrafts, etc.).

If the device is used in a manner not specified by the manufacturer, the degree of protection provided by the equipment may be impaired.

Waste electrical and electronic equipment (WEEE) must be collected separately!

LBT-1 devices are developed considering the following standards:

- EMC: EN 303 446-1
- LVD: EN 60669-2-1

Smarteh d.o.o. operates a policy of continuous development. Therefore we reserve the right to make changes and improvements to any of the products described in this manual without any prior notice.

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Longo Bluetooth Products LBT-1.B01

1. ABBREVIATIONS

LED	Light Emitted Diode
PLC	Programmable Logic Controller
PC	Personal Computer
OpCode	Message Option Code

2. DESCRIPTION

LBT-1.B01 Bluetooth Mesh window / door sensor is designed to work with any window or door while for detection of opening or closing is performed with an external magnet, which is delivered together with the sensor.

Window sensor and a magnet can primary be mounted with double sided glue tape or in addition with a screws provided.

LBT-1.B01 Bluetooth Mesh window sensor transmits the information regarding open/close status and battery voltage level. Window sensor can only operate with Smarteh LBT-1.GWx Modbus RTU Bluetooth Mesh gateway connected to the same Bluetooth Mesh network. LBT-1.GWx Modbus RTU gateway is connected to the main control device as Smarteh LPC-3.GOT.012 7" PLC based Touch panel, any other PLC or any PC with Modbus RTU communication . Beside Smarteh Bluetooth Mesh devices, other standard Bluetooth Mesh devices can be integrated into above mentioned Bluetooth Mesh network. More than a hundred Bluetooth Mesh devices can be provisioned and can operate in a single Bluetooth Mesh network.

NOTE: Alkaline AA type of batteries (LR6) are not supplied together with the product.

WARNINGS:

Explosion due to fire or short circuit, even with discharged batteries:

- Risk of injury due to flying parts.
- Prevent the batteries to be in contact with water.
- Do not damage the batteries.
- Do not heat batteries over 85°C.

Leakage of electrolyte:

- Handle damaged batteries only wearing suitable protective gloves.
  Otherwise severe burns are possible.
- In case of contact with electrolyte, rinse eyes immediately with a lot of water. Visit the doctor.

Falling objects:

- Overhead installation may result in injury from falling objects.

Observe also following:

- Pay attention on battery polarity (+/-).
- The batteries must be new and undamaged.
- Do not mix new and used batteries.
- Store, transport and dispose of the batteries in compliance with local requirements, regulations and laws. Also observe the instructions of the battery manufacturer.
- Dispose of empty batteries in designated collection points.

3. FEATURES

Figure 1: LBT-1.B01

Table 1: Technical data
Communication standard: Bluetooth Mesh is a low power wireless mesh protocol and allows device to device communication and device to main control device communication.
Radio frequency: 2.4GHz
Radio range for direct connection: < 30m, depending on application and building. By using Bluetooth Mesh topology, much bigger distances can be achieved.
Power supply: 2 batteries 1.5V AA type commercially available, use alkaline batteries only (LR6). Do not use any type of rechargeable battery. Constructed for full year operation.
Protection degree: IP20
Working temperature: 0 .. 50 °C
Storage temperature: -20 .. 60 °C
Type of casing: ABS
Status indicator: red and green LED
Window/door position detection: Contact less, by using magnet

4. OPERATION

LBT-1.B01 Bluetooth Mesh window sensor can only operate with Smarteh LBT-1.GWx Modbus RTU Bluetooth Mesh gateway while provisioned to the same Bluetooth Mesh network.

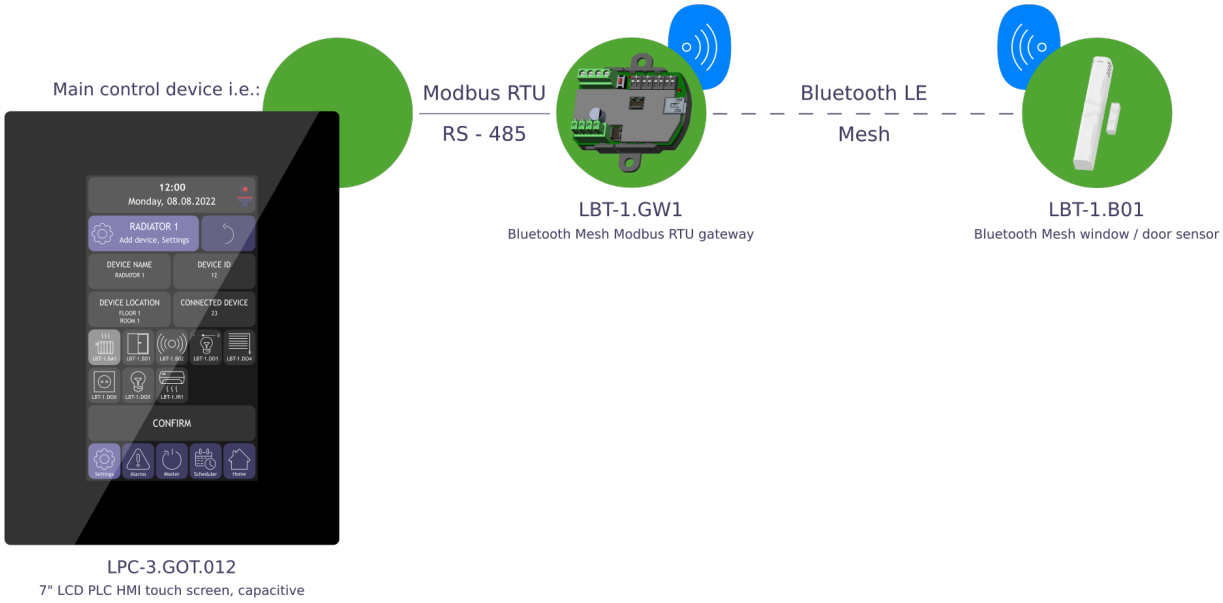


Figure 2: LBT-1.B01 device connection

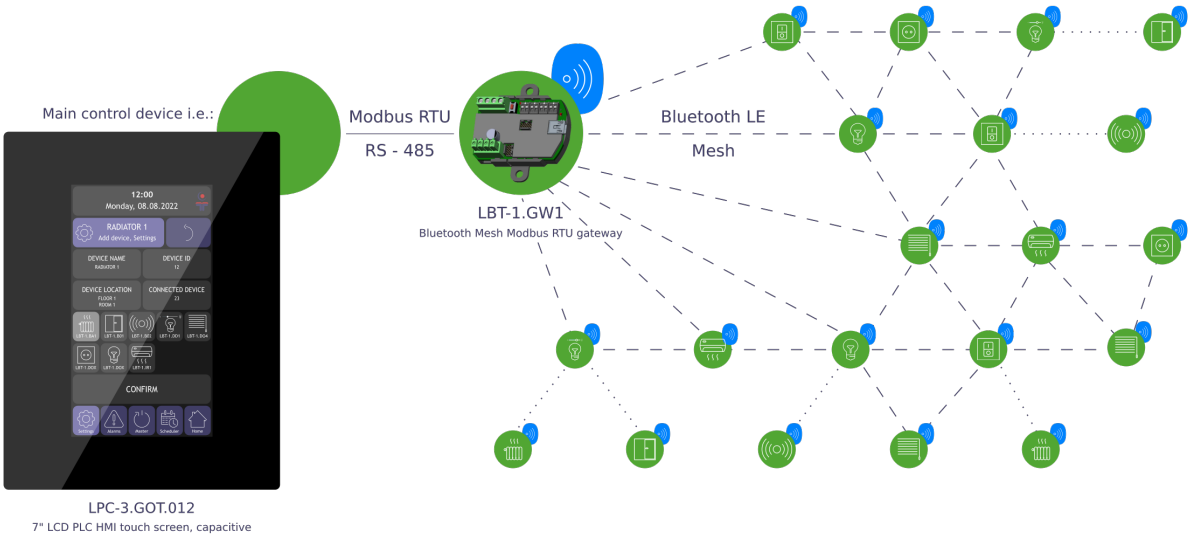


Figure 3: Bluetooth Mesh system topology

4.1. Other window / door sensor functions

- **Open window or balcony door:** Energy saving function can be implemented during window or balcony door open detection by using Smarteh LBT-1.B01 window / door sensor connected with main control device as LPC-3.GOT.012 7" PLC based Touch panel or similar.
- **Factory reset:** This function will delete all Bluetooth Mesh network parameters stored on LBT-1.B01 window / door sensor and will restore to the conditions of the initial programming, ready for provisioning. See Table 5 for more information.

NOTE: When voltage of two installed AA batteries in series is lower than 2.2V, LBT-1.B01 window / door sensor detects low battery condition. If batteries are not replaced soon, window sensor will switch off. Voltage level of the batteries can be monitored regularly i.e. on the Smarteh LPC-3.GOT.012 PLC based Touch panel or similar.

4.2. Operation parameters

LBT-1.B01 Bluetooth Mesh window / door sensor accepts a set of operation codes as specified in below tables 2 to 4.
LBT-1.B01 Bluetooth Mesh window / door sensor is communicating with main control device as Smarteh LPC-3.GOT.012 via Smarteh LBT-1.GWx Modbus RTU Bluetooth Mesh gateway.
All communication between main control device as LPC-3.GOT.012 or similar is performed by using Modbus RTU communication. Individual Bluetooth Mesh node configuration data should be observed by using network provisioning tool.

Table 2: 4xxxx, Holding registers, Modbus RTU to Bluetooth Mesh gateway

Reg.	Name	Description	Raw → Engineering data
10	Execute command	Execute command for Read and/or Write by toggling bit	Bit0 toggle → Write Bit1 toggle → Read
11	Destination address*	Destination node address. Can be unicast, group or virtual address	0 .. 65535 → 0 .. 65535
12	Element index*	Sending node model element index	0 .. 65535 → 0 .. 65535
13	Vendor ID*	Vendor ID of the sending node model	0 .. 65535 → 0 .. 65535
14	Model ID*	Model ID of the sending node model	0 .. 65535 → 0 .. 65535
16	Virtual address index*	Index of the destination Label UUID	0 .. 65535 → 0 .. 65535
17	Application key index*	The application key index used	0 .. 65535 → 0 .. 65535
18	Option code**	Refer to option code table	0 .. 63 → 0 .. 63
19	Payload byte length**	Refer to option code table	1 .. 10 → 1 .. 10 bytes
20	Payload word[0]**	Refer to option code table	0 .. 65535 → 0 .. 65535
21	Payload word[1]**	Refer to option code table	0 .. 65535 → 0 .. 65535
22	Payload word[2]**	Refer to option code table	0 .. 65535 → 0 .. 65535
23	Payload word[3]**	Refer to option code table	0 .. 65535 → 0 .. 65535
24	Payload word[4]**	Refer to option code table	0 .. 65535 → 0 .. 65535

* Observed from network provisioning tool

** User defined parameters, refer to option code table

Table 3: 3xxxx, Input registers, Modbus RTU to Bluetooth Mesh gateway			
Reg.	**Name**	**Description**	**Raw → Engineering data**
10	Messages pending	Number of messages pending in receiving buffer	1 .. 10 → 1 .. 10
11	Destination address	Destination node address. Can be unicast, group or virtual address	0 .. 65535 → 0 .. 65535
12	Element index	Sending node model element index	0 .. 65535 → 0 .. 65535
13	Vendor ID	Vendor ID of the sending node model	0 .. 65535 → 0 .. 65535
14	Model ID	Model ID of the sending node model	0 .. 65535 → 0 .. 65535
15	Source address	Unicast address of the node model which sent the message	0 .. 65535 → 0 .. 65535
16	Virtual address index	Index of the destination Label UUID	0 .. 65535 → 0 .. 65535
17	Application key index	The application key index used	0 .. 65535 → 0 .. 65535
18	Option code	Refer to option code table	0 .. 63 → 0 .. 63
19	Payload length	Refer to option code table	1 .. 10 → 1 .. 10 bytes
20	Payload word[0]	Refer to option code table	0 .. 65535 → 0 .. 65535
21	Payload word[1]	Refer to option code table	0 .. 65535 → 0 .. 65535
22	Payload word[2]	Refer to option code table	0 .. 65535 → 0 .. 65535
23	Payload word[3]	Refer to option code table	0 .. 65535 → 0 .. 65535
24	Payload word[4]	Refer to option code table	0 .. 65535 → 0 .. 65535

Table 4: Window sensor LBT-1.B01 option codes			
Option code	**Name**	**Description**	**Raw → Engineering data**
1	FW version status	Firmware version status	0 .. 65535 → 0 .. 65535
2	Operation mode set	Node operation mode selection	0 → Not used 1 → Not used 2 → Not used 3 → Not used 4 → Reset 5 → Factory reset
6	Vandal switch alarm status	Node vandal switch status	0 → Not active 1 → Active
7	Open / Closed status	Node status	0 → Closed 1 → Open
8	Battery voltage status	Battery voltage level	0 .. 330 → 0.00 .. 3.30 V
9	Wake up interval set	Node wake up from sleep mode interval	0 → Always on 1 .. 65535 → 1 .. 65535 sec
10	Wake up interval status	Node wake up from sleep mode interval status	0 → Always on 1 .. 65535 → 1 .. 65535 sec
11	Error codes status	Error codes status	0 .. 7 → Bit 0: Not used Bit 1: Not used Bit 2: Battery low

5. INSTALLATION

Table 5: LEDs & Inputs

LED1: red	Error	1x blink inside 5sec time period = empty battery 2x blink inside 5sec time period = network/friend lost 3x blink inside 5sec time period = unprovisioned node
LED2: green	Status	1x blink = normal operation. It's also feedback for S1 reed contact, when activated with magnet
S1	Reed contact	Mode setting contact Inside 5 sec time window, perform corresponding number of swipes in duration of not less than 200 ms with permanent magnet close to the window sensor S1 reed contact position. Following window sensor action or mode will be set: Number of swipes — Action 4 — Reset 5 — Factory reset A hardware reset is triggered if reed contact is continuously closed with a permanent magnet for more than 5 seconds.
S2	Switch	Vandal switch: close = not active, open = active
S3	Reed contact	For window/door magnet detection

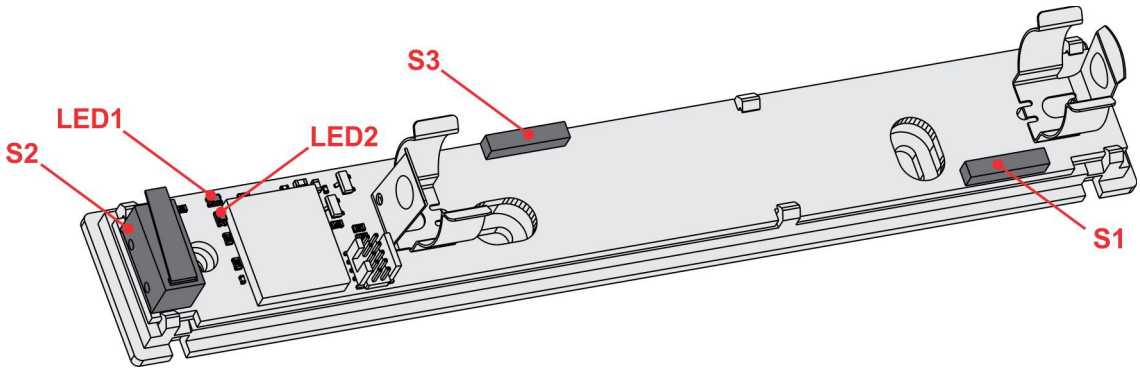


Figure 4: LBT-1.B01 LEDs and switches position

Table 6: Battery		
Bat.1	Battery	Alkaline AA/LR6 1.5 V high capacity battery, non rechargeable
Bat.2	Battery	Alkaline AA/LR6 1.5 V high capacity battery, non rechargeable

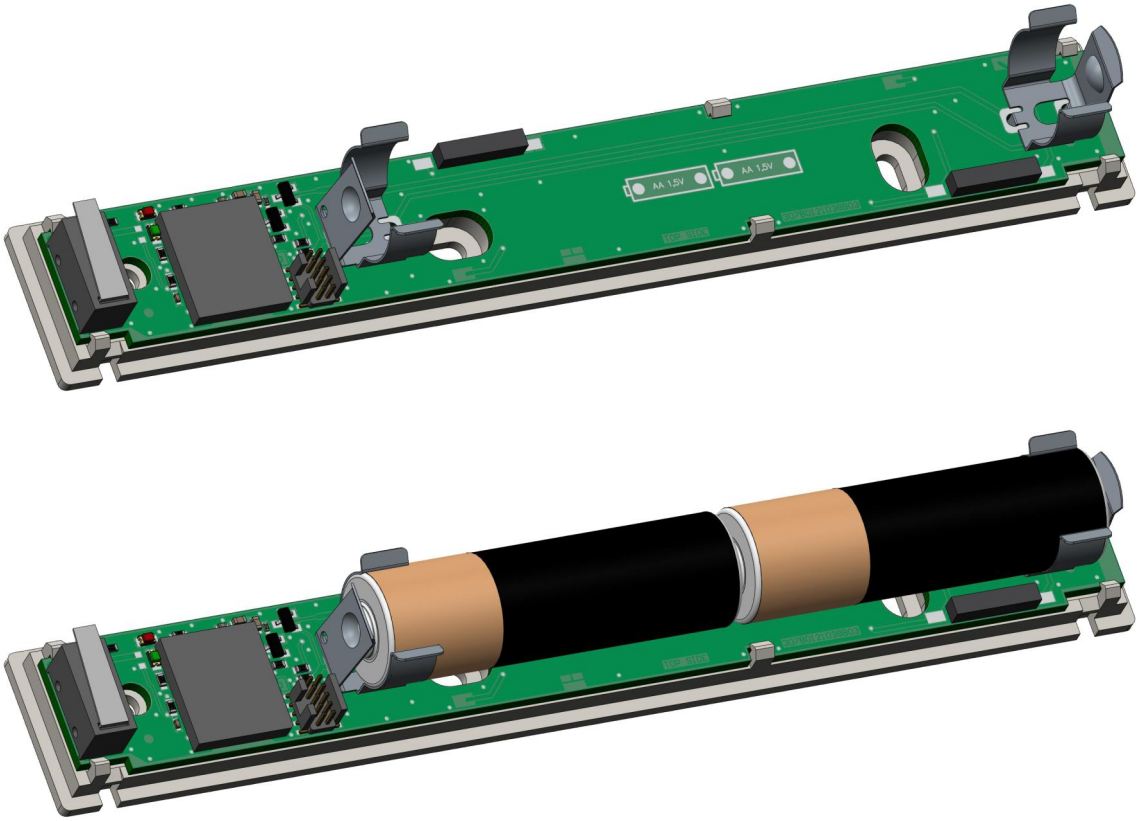
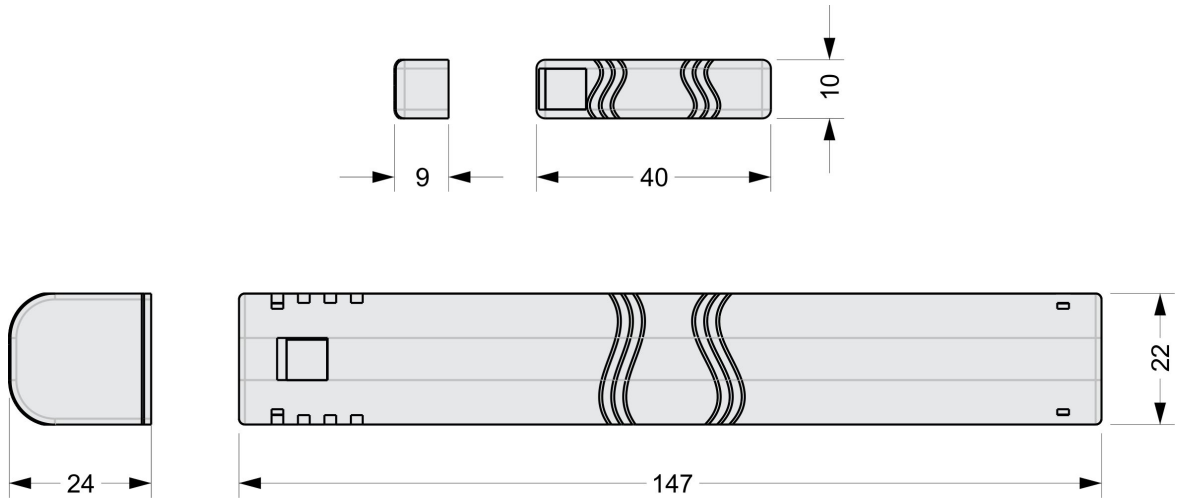


Figure 5: LBT-1.B01 battery position

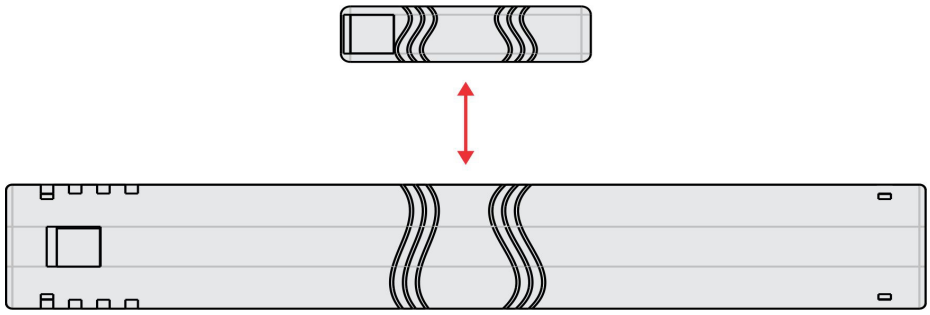
5.1. Mounting instructions

Figure 6: Housing dimensions



Dimensions in millimeters.

Figure 7: Mounting positions



Before mounting the sensor and magnet to provided place, it's necessary to check, that mounting position will give best sensing performance between sensor and magnet, see pictures above. Pay attention that the gap between magnet and sensor is not more than 5 mm, that the bottom of the magnet and sensor are in the same plane and that stripe lines of the magnet and sensor are aligned.

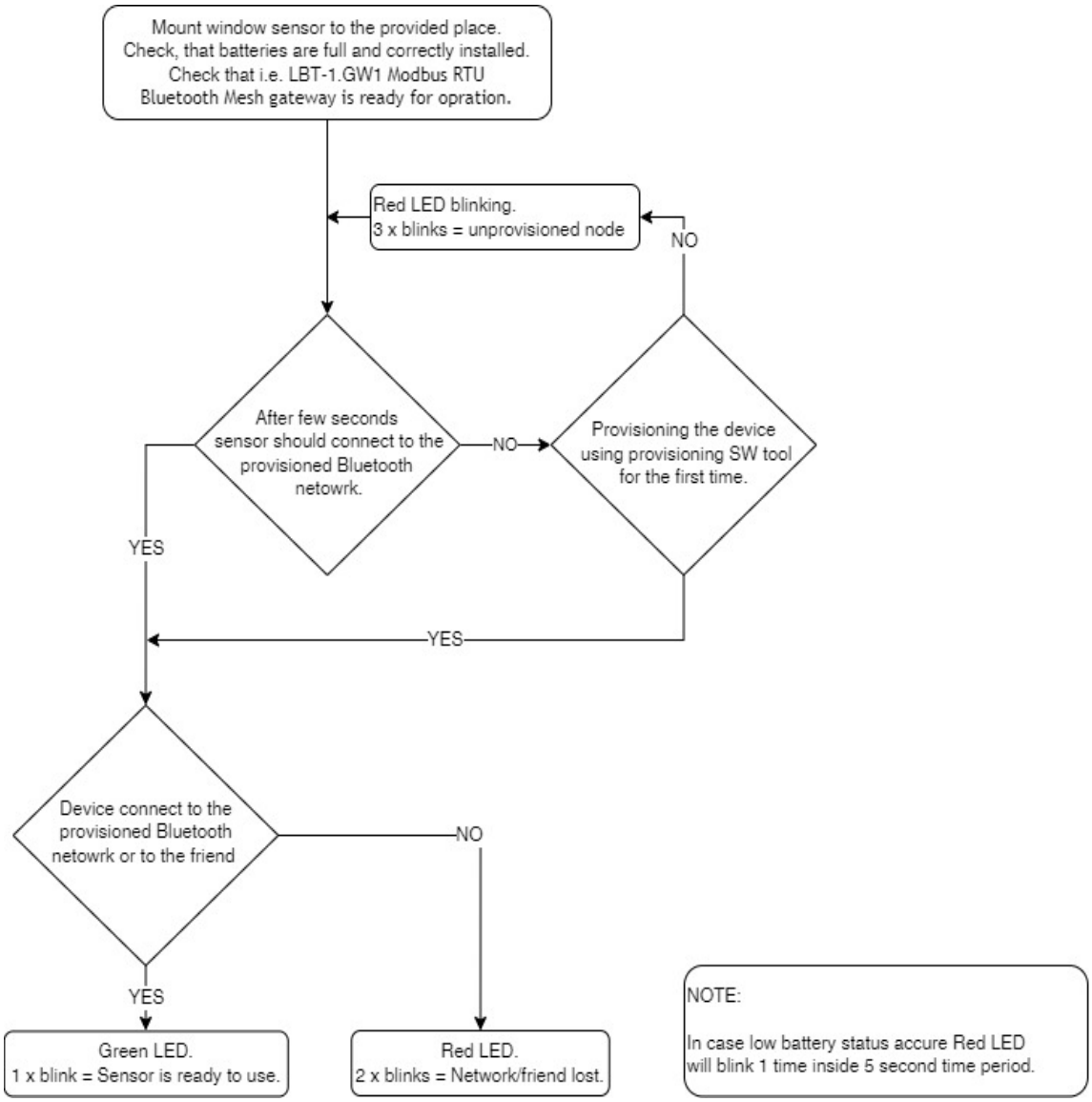


Figure 8: Installation flowchart

1. Check if sensor will be fixed with double sided glue tape or with screws. It can also be fixed both ways.
2. Once sensor is mounted to provided place, insert two AA batteries and firmly close the cover. In addition, also cover can be fixed with a screw and hidden by small plastic cap, delivered together.
3. Mount the magnet in a way to get best sensing performance.
4. After few seconds Green or Red LED starts to blink, please see flowchart above for details.
5. If sensor is not provisioned Red LED will blink 3x, the provisioning procedure has to be started. Contact producer for more details*.
6. Once provisioning is finished, sensor will continue with normal mode of operation and this will be indicated as Green LED blinking once per 10 sec.

***NOTE:** Smarteh Bluetooth Mesh products are added and connected to a Bluetooth Mesh network by using standard provisioning and configuration mobile apps tool such as nRF Mesh or similar.

For further information, please contact producer for more details.

5.2. Maintenance

The LBT-1.B01 window / door sensor is maintenance free. Only two AA batteries require replacement with new one when empty. On main control device i.e. LPC-3.GOT.012, the indication for replacing the batteries will become active. If batteries will not be replaced approximately in two months after battery warning appear for the first time, window / door sensor will switch off.

While replacing the batteries, it's recommended that LBT-1.B01 window / door sensor and the magnet remain mounted. However, replacing of batteries is also possible if/when sensor is dismounted. In this case please follow instructions from *capture 5 – INSTALLATION*. For optimal performance, the usage of alkaline AA batteries (LR6) with high capacity is recommended.

Figure 9: Screw position

1. Remove a screw (if fasten) by using Torx T10 screw driver and than open the cover. **NOTE**: screw may be hidden under small plastic cap.
2. Take both batteries out of the battery holder.
3. Insert two new high capacity batteries alkaline AA/LR6, PAY ATTENTION ON POLARITY!
4. Close the cover and, if necessary, also fasten the screw by using Torx T10 screw driver. Insert also small plastic cap, if it was removed before.
5. The window sensor will automatically start to re-establish the connection, if Bluetooth Mesh network is available.

Unsuccessful connecting to the Bluetooth Mesh network will be shown on the device itself and also on main control device i.e. LPC-3.GOT.012 or similar. Please refer to Mounting instructions chapter for more information.

6. SYSTEM OPERATION

LBT-1.B01 window / door sensor detects magnet position movement and according to presence of the sensor, sends to main control device LPC-3.GOT.012 status Open/Close in approx. 1 sec delay. Beside Open/Close status, LBT-1.B01 window / door sensor also sends battery voltage and S2 vandal switch alarm status.

6.1. Interference warning

Common sources of unwanted interference are devices that generate high frequency signals. These are typically computers, audio and video systems, electronics transformers, power supplies and various ballasts. The distance of the LBT-1.B01 window / door sensor to the above mentioned devices should be at least 0.5m or greater.

WARNING:

- In order to protect plants, systems, machines and network against cyber threats, necessary to implement and continuously maintain up to date security concept.
- You are responsible for preventing unauthorized access to your plants, systems, machines and networks and they are allowed to be connected to Internet only, when security measures like firewalls, network segmentation, … are in place.
- We strongly recommend the updates and usage of latest version. Usage of version that are not longer supported may increase the possibility of cyber threats.

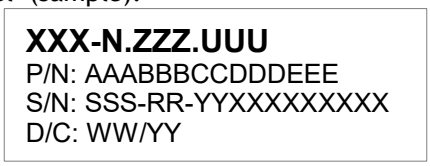
7. TECHNICAL SPECIFICATIONS

Table 7: Technical specifications	
Power supply	2 high capacity batteries alkaline AA type (LR6)
Battery life	> 1 years
RF communication interval	When magnet position to the window sensor is changed or typically every 10min
Life cycle status and monitor capabilities	Yes
Max. power consumption	0.01 W
Mounting fixation	double sided glue tape and/or with a screw
Dimensions (L x W x H)	147 x 22 x 24 mm
Weight (with two AA batteries)	100 g
Ambient temperature	0 to 50 °C
Ambient humidity	max. 95 %, no condensation
Maximum altitude	2000 m
Mounting position	Any
Transport and storage temperature	-20 to 60 °C
Pollution degree	2
Over voltage category	II
Electrical equipment	Class II (double insulation)
Protection class	IP 20

8. MODULE LABELING

Figure 10: Label

Label (sample):



Label description:

1. **XXX-N.ZZZ** - full product name,
   - **XXX-N** - product family,
   - **ZZZ.UUU** – product,
2. **P/N: AAABBBCCDDDEEE -** part number,
   - **AAA** - general code for product family,
   - **BBB** - short product name,
   - **CCDDD** - sequence code,
     - **CC** - year of code opening,
     - **DDD** - derivation code,
   - **EEE** – version code (reserved for future HW and/or SW firmware upgrades),
3. **S/N: SSS-RR-YYXXXXXXXXX -** serial number,
   - **SSS** – short product name,
   - **RR** – user code (test procedure, e.g. Smarteh person xxx),
   - **YY** – year,
   - **XXXXXXXXX** – current stack number,
4. **D/C: WW/YY -** date code,
5. **WW** – week and,
6. **YY** – year of production.

Optional:

- *MAC,*
- *Symbols,*
- *WAMP,*
- *Other.*

9. CHANGES

The following table describes all the changes to the document.

Date	V.	Description
10.02.23	1	The initial version, issued as *LBT-1.B01 window / door sensor UserManual*.

10. NOTES