USER MANUAL

Longo Bluetooth Products
LBT-1.BA1
Bluetooth Valve Actuator

Version 3

User Manual

Document Version: 3
February 2025

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.BA1

1 ABBREVIATIONS

LED	Light Emitted Diode
PLC	Programmable Logic Controller
PC	Personal Computer
OpCode	Message Option Code
LPN	Low Power Node

2 TERMINOLOGY

- **Mesh Network** A network topology where devices communicate with one another to create a reliable and scalable system, enabling devices to forward messages within the network.

- **Provisioning** The process of adding a new device to a mesh network by assigning it a unique unicast address and network keys, ensuring secure communication with other devices.

- **Mesh Proxy** A device that allows non-mesh devices to interact with a mesh network by forwarding messages between the mesh network and other devices that do not support mesh functionality.

- **Unicast Address** A unique identifier assigned to each device in the network, ensuring that messages are sent to a specific device rather than broadcasted to all devices.

- **Group Address** An address that represents a group of devices within the mesh network. Messages sent to a group address are received by all devices in that group.

- **Network Key** A shared key used by all devices in the mesh network to secure communication. It is essentialfor ensuring the confidentiality and integrity of data in the network.

- **Application Key** A key used for securing application-specific communication within the mesh network. Each device in the network can have one or more application keys assigned to it.

- **Composition Data** Data that describes the features, models, and capabilities of a device in the mesh network. This information is used to inform other devices in the network about the device's capabilities.

- **Subscription Address** A group address to which devices can subscribe in order to receive specific messages. This allows devices to act as receivers for broadcasted data within the mesh.

- **Friendship** A feature in BLE Mesh where one device stores data on behalf of a low-power device, allowing the low-power device to conserve energy by sleeping and receiving messages later.

- **Provisioned Device** A device that has been successfully added to the mesh network and has received its unique address, keys, and other configuration settings.

- **Provisioning Tool** The tool used to configure and provision devices into a mesh network, including device setup, network key management, and application key assignment.

- **Provisioning Success** A status indicating that a device has been successfully added to the network, with its keys and settings properly configured. Smarteh BLE Mesh Provisioning tool

- **Device Binding** The process of associating a device with an application key, publication address, or subscription address to enable specific communication within the mesh network.

- **Publication Address** An address used by devices to broadcast information to other devices in the network. It is typically a group address that all devices in the group can receive.

- **Opcode** A specific operation code used to define actions or commands within the mesh network, allowing devices to execute predefined functions.

- **Key Index** A reference number used to distinguish different keys used in the mesh network. It helps to identify the specific key used for security purposes during communication.

- **Security Credentials** A set of keys and authentication mechanisms used to secure communication between devices in the mesh network.

- **Key Refresh** A process of changing the network or application key periodically to enhance security by preventing unauthorized access to the mesh network.

■ **Message Retransmit** A mechanism in the mesh network to retransmit messages to ensure reliability and prevent data loss, typically associated with network transmit settings like retransmit count.

■ **Node**: Provisioned Device connected and talking to Bluetooth mesh network. The device can be simple node in the network or it can have one or more network features (LPN, Friend, Relay, Proxy).

■ **Low-power node (LPN)** for nodes in the Bluetooth mesh network that are powered with battery and need to preserve power. They need friend node to receive massages when they are in low power mode.

■ **Friend node** friend node in the Bluetooth mesh network receives and stores massages for LPN and delivers them when LPN asks for them

■ **Relay node** relay nodes in the Bluetooth mesh network re-transmit massages of the same mesh network that are meant for other nodes so that massage can travel longer distances across mesh network.

■ **Proxy node**: proxy node in the Bluetooth mesh network act as bridge between Bluetooth mesh network and normal Bluetooth network. It is used to connect to Bluetooth mesh network.

3 DESCRIPTION

LBT-1.BA1 Bluetooth Mesh valve actuator is designed to work with various radiator and floor heating valves of different manufacturers. It opens and closes the radiator or floor heating valve to control the water flow and consequently control the temperature in the room. It's equipped with an M30 x 1.5 mm ring nut connection and it's also possible to get an adapter for other connection types of radiator or floor heating valves.

LBT-1.BA1 valve actuator 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. Besides 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.

However, the LBT-1.BA1 valve actuator can also work as stand alone in local operation mode. In addition, protection functions like anti-freeze can be set.

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

WARNINGS:

Burns from the hot surface:

• The screw nut with which the actuator is fastened to the radiator valve may become hot. When servicing the actuator, switch off the radiator and wait to cool off.

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 by wearing suitable protective gloves. Otherwise severe burns are possible.

• In case of contact with an electrolyte, rinse your eyes immediately with lot of water. Visit the doctor.

Falling objects:

• Overhead installation may result in injury from falling objects.

Observe also the 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.

4 FEATURE

Figure 1: LBT-1.BA1

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.
Also external power supply 7..30V DC is possible. When an external power supply is used, two AA batteries must be removed. Only one source of power supply at a time is allowed.

Protection degree: IP20

Temperature control range: 6 .. 30˚C

Integrated ambient temperature sensor range: 0 .. 50˚C, ± 1˚C

Offset setting for the integrated ambient temperature sensor, see the operation parameters chapter.

Working temperature: 0 .. 50˚C

Storage temperature: -20 .. 60˚C

Type of casing: ABS

Valve thread connection: M30 x 1.5mm. Adapter is available for other types of radiator valves.

Actuator adaptation to the valve: Automatic

Status indicator: red and green LED

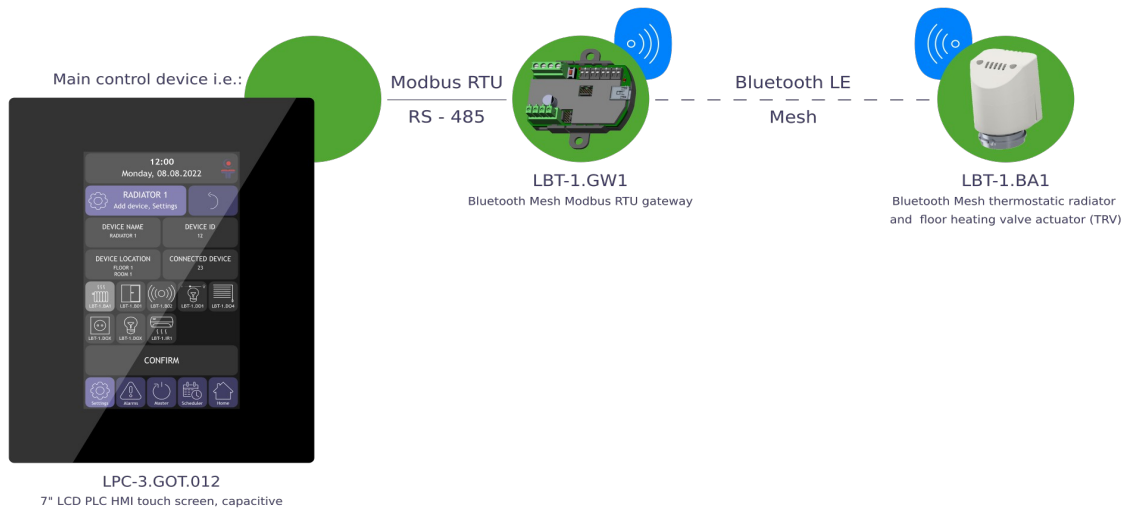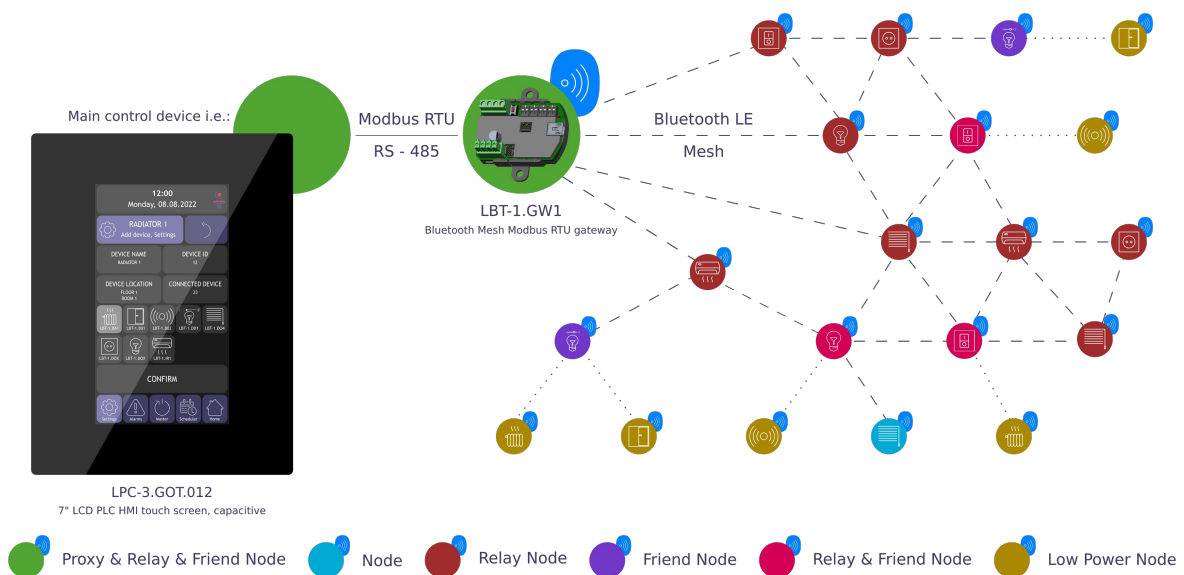Actuator mode set in local: Contact less, by using a magnet.

5 OPERATION

LBT-1.BA1 Bluetooth Mesh valve actuator can operate over Bluetooth mesh network with Smarteh LBT-1.GWx Modbus RTU Bluetooth Mesh gateway, while provisioned to the same Bluetooth Mesh network. LBT-1.BA1 acts as **LPN**(low power node) in Bluetooth mesh network.

Figure 2: LBT-1.BA1 device connection

Main control device i.e.:

Modbus RTU
RS - 485

Bluetooth LE
Mesh

LBT-1.GW1
Bluetooth Mesh Modbus RTU gateway

LBT-1.BA1
Bluetooth Mesh thermostatic radiator
and floor heating valve actuator (TRV)

LPC-3.GOT.012
7" LCD PLC HMI touch screen, capacitive

Figure 3: LBT-1.BA1 device connection

Main control device i.e.:

Modbus RTU
RS - 485

Bluetooth LE
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LBT-1.GW1
Bluetooth Mesh Modbus RTU gateway

LPC-3.GOT.012
7" LCD PLC HMI touch screen, capacitive

Proxy & Relay & Friend Node   Node   Relay Node   Friend Node   Relay & Friend Node   Low Power Node

5.1   Other valve actuator functions:

- **Anti freeze:** if the room temperature measured by the valve actuator falls below 6°C, the valve actuator will open until the temperature rises above 8°C. This will prevent the water in the pipes from freezing. Anti freeze function works only in automatic mode.

- **Anti calcification:** Anti calcification function can be implemented together with Smarteh main control device like LPC-3.GOT.012. When activating anti calcification function, the valve performs the opening/closing cycle to prevent the valve from calcifying. It's recommended to execute this command if the valve is not working for a longer period, for example, few weeks.

- **Open window or balcony door:** Energy saving function during window or balcony door opening can be implemented by using Smarteh LBT-1.B01 window sensor and main control device LPC-3.GOT.012 for example.

- **Holiday function:** Holiday function can be implemented together with Smarteh main control device like LPC-3.GOT.012. When activating the holiday function, all valve actuators connected to the Bluetooth Mesh network will close. The holiday function can always and only be deactivated by the main control device.

- **Factory reset:** This function will delete all Bluetooth Mesh network parameters stored on LBT-1.BA1 valve actuator and will restore to the conditions of the initial programming, ready for provisioning. Also plunger moves to fully open position, so it's retracted. See Table 6 for more information.

- **Safe operation:** If LBT-1.BA1 valve actuator loses communication with the main control device like LPC-3.GOT.012 or a similar, communication warning status should be implemented on the control device like LPC-3.GOT.012 or similar.

- **Low battery:** When the voltage of two installed AA batteries in series is lower than 2.2V, LBT-1.BA1 valve actuator detects low battery condition, valve actuator red LED will indicate this. The voltage level of the batteries is monitored and shown regularly on the Smarteh LPC-3.GOT.012 7" PLC based Touch panel. In case the batteries are not replaced soon, the valve actuator will switch off.

- **Summer mode:** The summer mode function can be implemented together with Smarteh main control device like LPC-3.GOT.012 or similar. When activating the summer mode function, the communication interval will be extended to extend the battery life cycle. The summer mode function can always and only be deactivated by the main control device.

NOTE: When the voltage of two installed AA batteries in series is lower than 2.2 V, LBT-1.B01 window/door sensor detects low battery condition. If the batteries are not replaced soon, the 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.

5.2 Operation parameters

LBT-1.BA1 Bluetooth Mesh valve actuator accepts a set of operation codes as specified in below tables 2 to 4. LBT-1.BA1 Bluetooth Mesh valve actuator is communicating with the main control device as Smarteh LPC-3.GOT.012 or similar via Smarteh LBT-1.GWx Modbus RTU Bluetooth Mesh gateway. All communication between the main control device is performed by using Modbus RTU communication. Individual Bluetooth Mesh node configuration data should be observed by using a 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 a 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 the option code table	0 .. 63 → 0 .. 63
19	Payload byte length**	Refer to the option code table	1 .. 10 → 1 .. 10 bytes
20	Payload word[0]**	Refer to the option code table	0 .. 65535 → 0 .. 65535
21	Payload word[1]**	Refer to the option code table	0 .. 65535 → 0 .. 65535
22	Payload word[2]**	Refer to the option code table	0 .. 65535 → 0 .. 65535
23	Payload word[3]**	Refer to the option code table	0 .. 65535 → 0 .. 65535
24	Payload word[4]**	Refer to the option code table	0 .. 65535 → 0 .. 65535

* Observed from network provisioning tool

** User defined parameters, refer to the 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 a 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 status	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 the option code table	0 .. 63 → 0 .. 63
19	Payload length	Refer to the option code table	1 .. 10 → 1 .. 10 bytes
20	Payload word[0]	Refer to the option code table	0 .. 65535 → 0 .. 65535
21	Payload word[1]	Refer to the option code table	0 .. 65535 → 0 .. 65535
22	Payload word[2]	Refer to the option code table	0 .. 65535 → 0 .. 65535
23	Payload word[3]	Refer to the option code table	0 .. 65535 → 0 .. 65535
24	Payload word[4]	Refer to the option code table	0 .. 65535 → 0 .. 65535

Table 4: Valve actuator LBT-1.BA1 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 → Remote operation 2 → Local operation 3 → Recalibration 4 → Reset 5 → Factory reset
3	Operation mode status	Node remote operation mode selection status	1 → Remote operation 2 → Local operation
6	Vandal switch alarm status	Node vandal switch status	0 → Not active 1 → Active
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 .. 15 → Bit0: Not used Bit1: Not used Bit2: Battery low Bit3: Anti freeze activated
20	Temperature status	Node temperature sensor status	0 .. 5000 → 0 .. 50.00°C
30	Position set	Valve position set	0 .. 100 → 0..100%
31	Position status	Valve position set status	0 .. 100 → 0..100%
32	Temp SP set	Setpoint set	0 .. 5000 → 0 .. 50.00°C
33	Temp SP status	Setpoint status	0 .. 5000 → 0 .. 50.00°C
36	Remote probe temperature set	Actual temperature set	0 .. 500 → 0 .. 50.0°C
37	Remote probe temperature status	Actual temperature status	0 .. 500 → 0 .. 50.0°C
45	P parameter set	Temperature regulation proportional par. set	0 .. 100 → 0 .. 100
46	P parameter status	Temperature regulation proportional par. status	0 .. 100 → 0 .. 100
53	Temperature offset	Temperature offset setting	-100 .. 100 → -10.0 .. 10.0°C
54	Temperature offset status	Temperature offset status	-100 .. 100 → -10.0 .. 10.0°C

6 INSTALLATION

6.1 Connection scheme
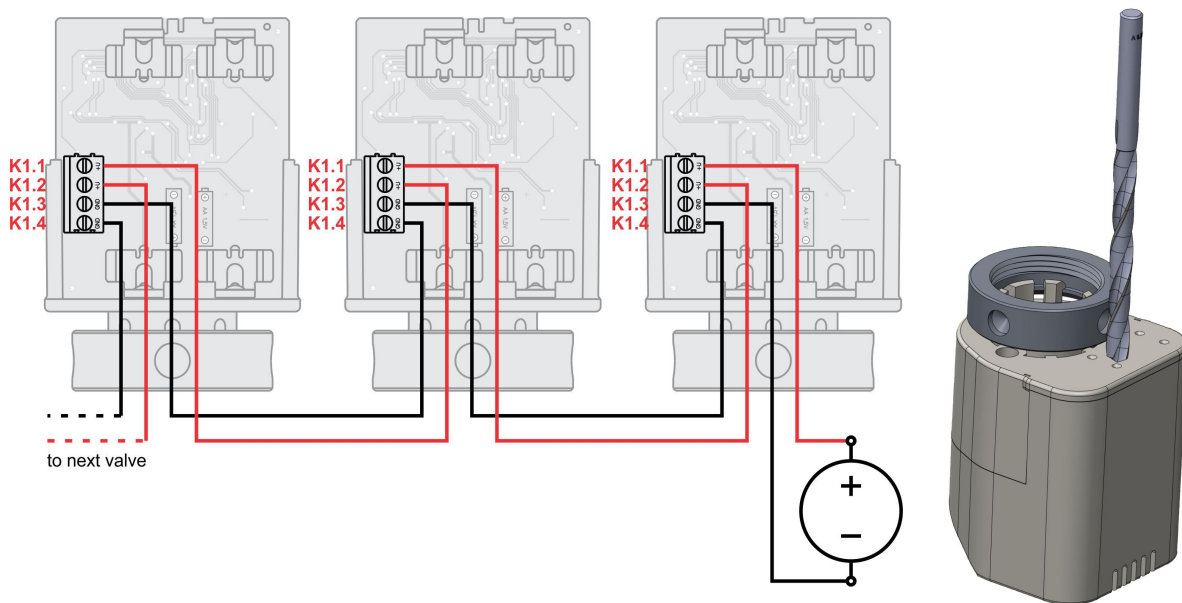
Figure 4: Connection scheme

Table 5: K1

K1.1	+	Power supply input, 7 .. 30 V DC
K1.2	+	Power supply input, 7 .. 30 V DC
K1.3	- / ⊥	GND
K1.4	- / ⊥	GND

WARNING: When an external power supply is used, two AA batteries must be removed. Only one source of power supply at a time is allowed.

NOTE: There are a few perforated holes in the plastic enclosure already, which can be drilled with 6 mm diameter.
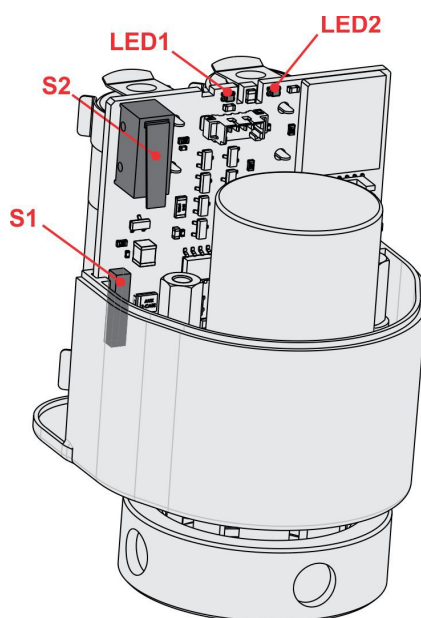
LBT-1.BA1 valve actuator should be powered separately from other electrical appliances. Wires must be installed separately from high power and high voltage wires in accordance with general industry electrical installation standards.

Table 6: LEDs & Inputs

LED1: red	Error	1x blink inside 5sec time period = empty battery 2x blinks inside 5sec time period = network/friend lost 3x blinks inside 5sec time period = unprovisioned node
LED2: green	Status	1x blink inside 10sec time period = normal operation. It is also feedback for S1 reed contact when activated with a magnet.

S1	Reed contact	Inside 5 sec time window, perform the corresponding number of swipes in a duration of not less than 200 ms with a permanent magnet close to the valve actuator reed contact position.
		Following valve actuator action or mode will be set:
		
		Number of swipes Action
		_____
		     3 Recalibration
		     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

Figure 5: Description of LBT-1.BA1

Table 7: Battery

Bat.1	Battery	Alkaline AA 1.5 V high capacity battery, non rechargeable
Bat.2	Battery	Alkaline AA 1.5 V high capacity battery, non rechargeable

Figure 6: Battery instalation
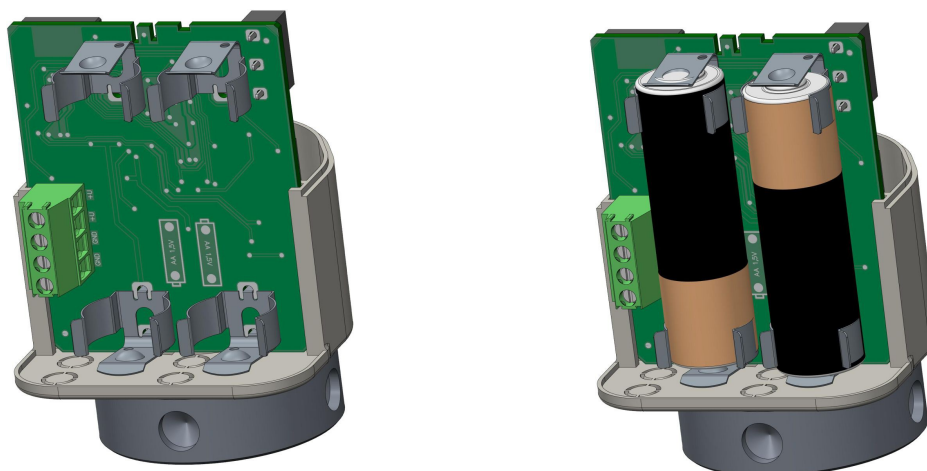
WARNING: When batteries are used, external power supply 7 .. 30 V DC must be removed. Only one source of power supply at a time is allowed.

6.2 Mounting instructions
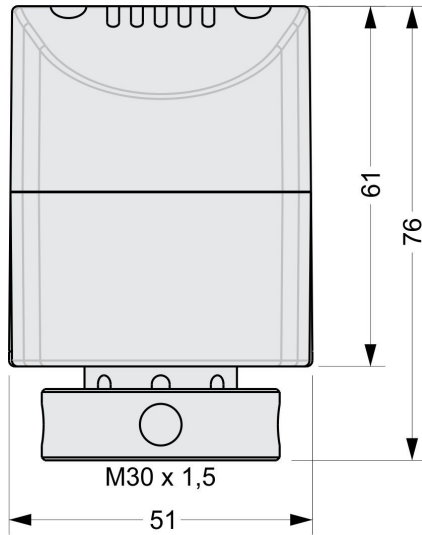
Figure 7: Housing dimensions
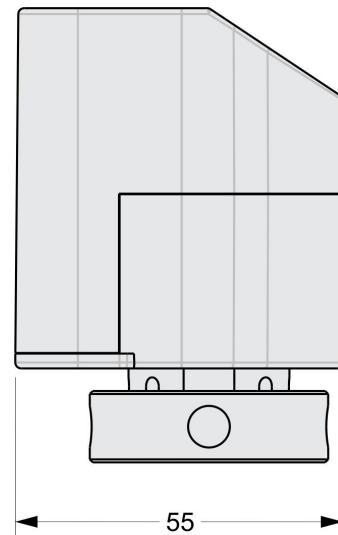

Figure 6: Front dimensions

Figure 7: Side dimensions

Dimensions in millimeters.

Valve actuator mounting to the valve must be done while batteries are not installed and the valve actuator is not connected to the external power supply source.
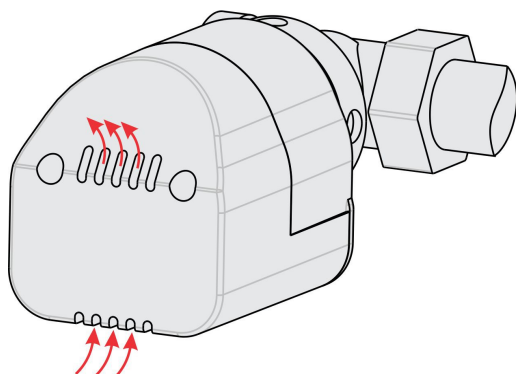
Figure 8: Mounting positions
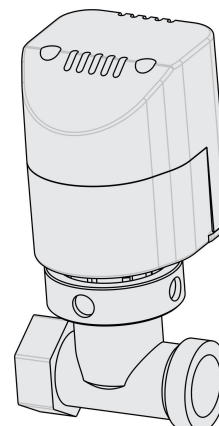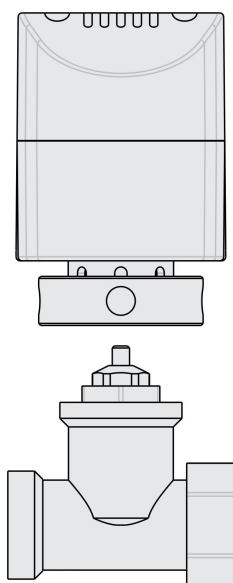

Figure 9: Recommended position

Figure 10: Not recommended position

Any mounting position, when flow pipe temperature <= 40˚C. The vertical position is not recommended due to the influence of the radiator temperature when the flow pipe temperature > 40˚C.

Before mounting the corresponding radiator or floor heating valve, it is necessary to check, if the mounting adapter will be needed to attach LBT-1.BA1 valve actuator to the radiator or floor heating valve. The adapter is usually needed when the radiator valve is not equipped with M30 x 1.5 mm thread.

Figure 9: Mounting without adapter	Figure 10: Mounting with adapter
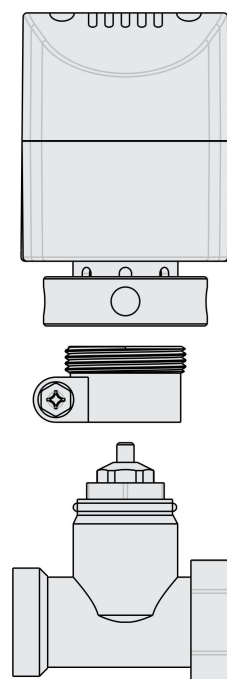
Before removing the actuator from the radiator valve it's recommended to set the temperature set point to the maximum in order to move the plunger to a fully open position (retracted), to make installation easier.

Unscrew the actuator valve nut from the radiator valve. The anti theft protection nut and screws prevent the actuator to be unscrewed from the radiator valve and the batteries to be removed by an unauthorized person. Use a Torx T10 screw driver to unscrew and screw the actuator valve battery cover screws. Use a hook wrench 34-36mm to screw and unscrew the valve actuator nut (see picture below).

Figure 11: 13: Hook wrench 34 - 36mm
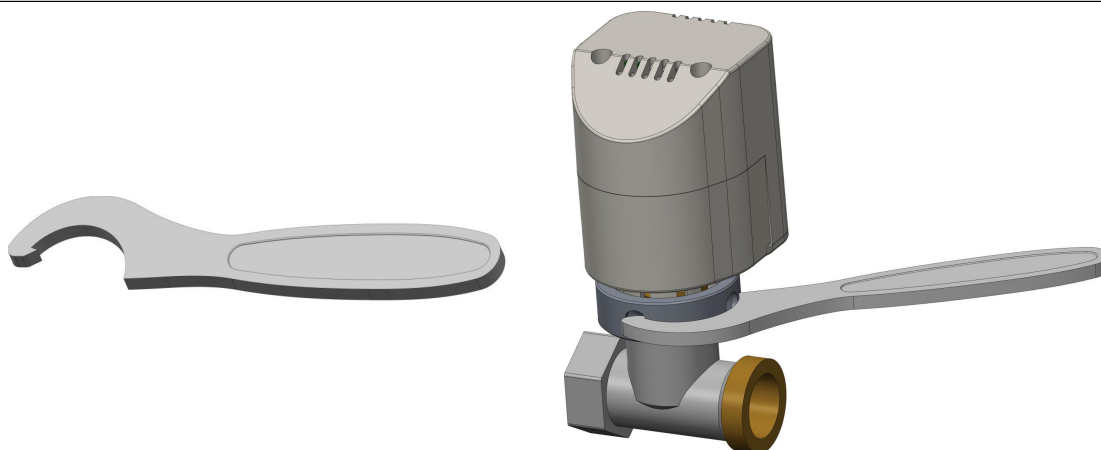
At first start-up, LBT-1.BA1 valve actuator automatically detects the end positions of the valve and calculates the needed stroke. The actuator uses this information for positioning between 0 % - close and 100 % - open position. It also detects, if the actuator is not connected to the radiator or floor heating valve or if valve is blocked. The expected stroke is between 1.5 mm to 4.5 mm.

Figure 12: Installation flowchart

Mount the valve actuator to the valve body and tighten the ring nut of the valve. For easier installation the product is delivered with the valve plunger fully open/retracted. Check that i.e. LBT-1.GW1 Modbus RTU Bluetooth Mesh gateway is ready for operation.

Check that bateries are full and install them correctly. Wait 10 sec. for valve actuator to perform initial run.

Red LED.
3 x blinks = unprovisioned node.

NO

After few seconds actuator should connect to the provisioned Bluetooth netowrk.

NO

Provisioning the device using provisioning SW tool for the first time.

YES

YES

Device connect to the provisioned Bluetooth netowrk or to the friend.

NO

YES

Green LED.
1 x blink = Sensor is ready to use.

Red LED.
2 x blinks = Network/friend lost.

NOTE:

In case low battery status accure Red LED will blink 1 time inside 5 second time period.

In case the initial run is not completed successfully valve actuator is not mounted correctly and Red LED will blink 4 times inside 5 second time period.

Please mount the valve actuator correctly and perform a reset of the valve actuator by using a permanent magnet or by re-installing batteries.

1. Mount the valve actuator to the radiator or floor heating valve body. The product is delivered with the valve plunger in a fully open position (retracted) to make installation easier. Firmly tighten the valve actuator screw nut by hand. In case the valve actuator should be protected from easy dismounting, use a hook wrench for nut diameters 34 to 36mm, tight the nut with care and not more than 10 Nm of force.

2. Insert two AA batteries and wait 10 sec for the valve actuator to perform the initial run.

3. After a few seconds green or red LED starts to blink, please see the above flowchart for details

4. Once adaptation is finished and if the valve actuator is already provisioned, then the valve actuator will continue to work in the normal mode of operation. Before the valve actuator can operate in the normal mode of operation, it's mandatory to mount and adapt the valve actuator to the radiator valve or floor heating valve correctly.

5. If the valve actuator is not provisioned Red LED will blink 3x, the provisioning procedure has to be started. Contact the producer for more details*.

6. Once provisioning is finished, the sensor will continue with the normal mode of operation and this will be indicated as a 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 the producer for more details.

6.3 Maintenance

The LBT-1.BA1 valve actuator is maintenance free. Only two AA batteries, when the valve actuator is powered from internal batteries, require replacement with new ones when empty. On the main control device i.e. LPC-3.GOT.012, the indication for replacing the batteries will become active. In case the batteries are not replaced soon, the valve actuator will switch off.

While replacing the batteries, it's recommended that LBT-1.BA1 valve actuator remains mounted on the radiator or floor heating valve. However, replacing of batteries is also possible if/when the actuator is dismounted from the valve. In this case please follow instructions from Capture 5 – INSTALLATION. Replacing the batteries requires a screw driver Torx T10 to prevent batteries to be removed by an unauthorized persons. For optimal performance, the usage of alkaline AA batteries with high capacity is recommended.

Figure 13: Open cover for battery replacement
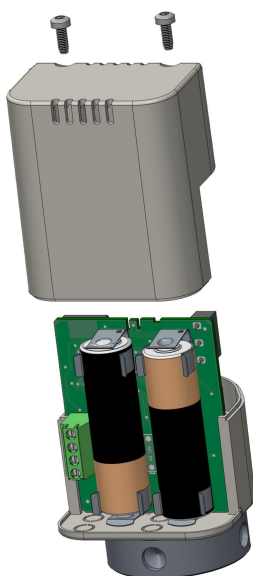
- remove two screws by using a Torx T10 screw driver and then open the cover
- take both batteries out of the battery holder
- insert two new high capacity batteries LR6 alkaline AA, PAY ATTENTION ON POLARITY!
- close the cover and fasten both screws by using a Torx T10 screw driver
- the valve actuator will automatically start the new calibration and try to re-establish the connection if the Bluetooth Mesh network is available

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

7 SYSTEM OPERATION

7.1 Interference warning

Common sources of unwanted interference are devices that generate high frequency signals. These are typically computers, audio and video systems, electronic transformers, power supplies and various ballasts. The distance of the LBT-1.BA1 valve actuator to the above mentioned devices should be at least 0.5m or greater.

WARNING:

- To protect plants, systems, machines and network against cyber threats, it's necessary to implement and continuously implemented state of the art security concept.

- You are responsible for preventing unauthorized access to your plants, systems, machines and networks and they are allowed to be connected to the internet only, when security measures like firewalls, network segmentations, … are in place

- We strongly recommend the updates and usage of latest version. Usage of version that are no longer supported may increase the possibility of cyber threats.

8 TECHNICAL SPECIFICATIONS

Table 8: Technical specifications

Power supply	2 high capacity batteries alkaline AA type (LR6) or external power supply 5 .. 30 V DC. Can not be connected in parallel, only a separate connection is allowed.
Battery life	> 1 year
Valve thread connection	M 30 x 1.5 Contact the producer regarding adapters for other types of valve connections.
Flow pipe temperature	75°C max
Maximum valve pin/plunger stroke calibration range	< 5 mm
Operating pin/plunger stroke	Typically 3 mm, minimum 1.5 mm
Valve position adjustment speed	Typically 1 mm/s
Pin stroke resolution	Step of 1%
Stall force or valve positioning force	60 N
Noise level	< 30 dB
RF communication interval	Typically 10min
Life cycle status and monitor capabilities	Yes
Max. power consumption	0.5 W
Connection type	screw type connector for stranded wire 0.75 to 2.5 mm^2
Dimensions (L x W x H)	55 x 51 x 76 mm
Weight (with two AA batteries)	150 g
Ambient temperature	0 to 50°C
Ambient humidity	max. 95 %, no condensation
Maximum altitude	2000 m
Mounting position	Any, when flow pipe temperature <= 40°C Horizontal, when flow pipe temperature > 40°C
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

9 MODULE LABELING

Figure 14: Label

Label (sample):

```
XXX-N.ZZZ
P/N: AAABBBCCDDDEEE
S/N: SSS-RR-YYXXXXXXXXX
D/C: WW/YY
```

Label description:

1. **XXX-N.ZZZ** - full product name.

   • **XXX-N** - Product family

   • **ZZZ** - product

2. **P/N: AAABBBCCDDDEEE -** part number.

   • **AAA** - general code for a product family,

   • **BBB** - short product name,

   • **CCDDD** - sequence code,

     ◦ **CC** – the 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,

   • **XXXXXXXX**– current stack number.

4. **D/C: WW/YY -** date code.

   • **WW** – week and

   • **YY** – the year of production.

Optional

1. *MAC*
2. *Symbols*
3. *WAMP*
4. *Other*

10 CHANGES

The following table describes all the changes to the document.

Date	V.	Description
21.02.2025	3	Added terminology chapter, more descriptive image of mesh network and node functions description.
27.3.2023	2	Update.
10.02.23	1	The initial version, issued as *LBT-1.BA1 valve actuator User Manual*.

11 NOTES