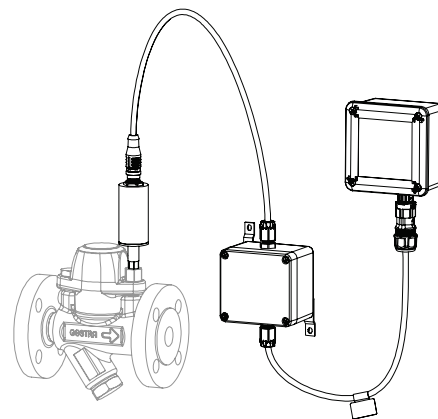
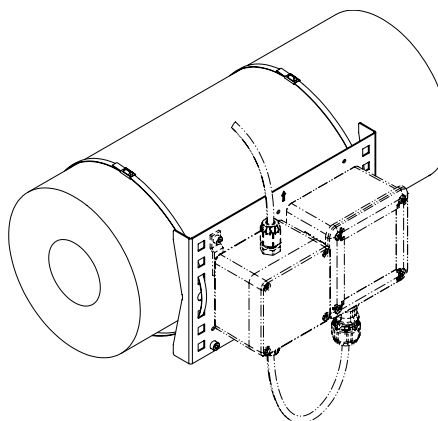


MSB-1, MSB-1.2



MSB-1 Ex, MSB-1.2 Ex



Example mounting system with MSB-1 Ex

## ecoBolt Continuous Steam Trap Monitor **MSB-1, MSB-1.2** **MSB-1 Ex, MSB-1.2 Ex**

### Description

Continuous steam trap monitor for testing steam traps for loss of steam and banking up of condensate.

The MSB-1 equipment is used for monitoring steam traps for loss of steam and banking up of condensate.

The MSB-1 Ex equipment is used for monitoring steam traps for loss of steam and banking up of condensate in potentially explosive atmospheres.

The MSB-1.2 and MSB-1.2 Ex units are intended for use at higher noise levels, e.g. at higher pressure or condensate flowrates.

Monitoring enables the early detection of faulty steam traps and banking up of condensate.

The early detection of faulty valves increases the efficiency of the plant as a whole and reduces its energy consumption.

The detection of banked up condensate prevents damage and malfunctions in the plant as a whole.

### Use in potentially explosive atmospheres

ATEX Directive

MSB-1 Ex and MSB-1.2 Ex units are approved for use in potentially explosive atmospheres.

Component	Type	ATEX classification
Sensor	MSBS-1 Ex	Ex II 2G Ex ib IIC T4 Gb
Pre-amplifier	MSBA-1 Ex, MSBA-1.2 Ex	Ex II 2G Ex ib IIC T4 Gb
LoRa node	MSBN-1 Ex	Ex II 2G Ex ib IIB, IIC T4 Gb

### Function

The equipment monitors steam traps using ultrasonic and temperature measurements by a piezo element. These measurements are performed automatically at regular intervals.

The measured data is analysed in the LoRa node and transferred to the LoRa gateway (accessory). The data is transferred by LoRa wireless technology via network protocol.

The measurement results are analysed on the basis of the sound and temperature values and parameters of the steam trap under test.

### Technical data

#### Ambient conditions

Area of application	Indoors and outdoors
Maximum altitude	2,000 m
Protection against ingress of foreign bodies	Suitable for industrial use
Pollution degree	4
Admissible ambient temperature	-20 — 50 °C

### Connections

Sensor thread: M6

The equipment sensor can be installed at the following measuring points:

- In a pressure-bearing screw (PBS), in place of a cover screw in the steam trap. With 90° adapter (ADP) if necessary.
- Fastened to the pipe by a clip (RFC)

### Available accessories

The following accessories are available for the equipment:

- Pressure-bearing screw (PBS) of steel or stainless steel
- 90° adapter (ADP)
- Clips (RFC) for mounting on pipes
- Mounting system for pre-amplifier and LoRa node
- LoRa gateway

Further accessories are available on request.

### Materials

Component	Material
MSBS-1 Ex sensor housing	1.4305
MSBA-1, MSBA-1.2 pre-amplifier housing	Polycarbonate GF10
MSBA-1 Ex, MSBA-1.2 Ex pre-amplifier housing	Polyester
MSBN-1, MSBN-1 Ex LoRa node	See documentation on the LoRa node
Battery	Lithium metal battery (Li-SOCl <sub>2</sub> )

The equipment and its components contain electronic parts.

ecoBolt Continuous  
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**MSB-1, MSB-1.2**  
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### Pressure and temperature ratings

Assembly	Storage/ operating temperature °C	IP rating
MSBS-1 Ex sensor <sup>1)</sup>	-20 — 50	IP64
MSBA-1, MSBA-1.2 pre-amplifier		IP66
MSBA-1 Ex, MSB-1.2 Ex pre-amplifier		IP66
MSBN-1 LoRa node		IP68
MSBN-1 Ex LoRa node		IP55

<sup>1)</sup> The temperature of the fluid in the steam trap must not exceed 240 °C.

### Electrical data

Assembly	Supply voltage	Protection class	Overvoltage category
MSBN-1 Ex sensor	–	III (SELV)	I
MSBN-1 LoRa node <sup>2)</sup>	3.6 V		
MSBN-1 Ex LoRa node <sup>2)</sup>	3.6 V		
MSBA-1, MSBA-1.2 pre-amplifier	5.0 V / 5 mA		
MSBA-1 Ex, MSBA-1.2 Ex pre-amplifier	5.0 V / 5 mA		

<sup>2)</sup> Battery life with one measurement per hour: approx. 10 years in ideal conditions (SF7, constant ambient temperature of 20 °C)

Assembly	Wireless device class	Maximum output power	Frequency range	Detection range
MSBN-1 EU/UK MSBN-1 Ex EU/UK	LoRaWAN Class A	+14 dBm / 25 mW	Network protocol LoRaWAN 863 — 870 MHz	Depending on installation location and gateway position. (Up to 3 km in urban areas, up to 10 km in rural areas)

### Equipment selection

Measuring point: pressure-bearing screws (PBS), 90° adapter (ADP), clips for pipes (RFC)

Steam trap regulator	$\dot{m}_{max}$ Maximum condensate flowrate kg/h	$P_{max}$ Maximum pressure barg	Measuring point	$\Delta p$ Area of application bar	ecoBolt
Bimetal	500	22	PBS <sup>1)</sup>	0 — 22	MSB-1 (Ex)
			ADP <sup>1)</sup>	0 — 22	
			RFC	0 — 22	
Membrane	1000	32	PBS <sup>1)</sup>	0 — 5	MSB-1 (Ex)
				5 — 32	MSB-1.2 (Ex)
			ADP <sup>1)</sup>	0 — 10	MSB-1 (Ex)
				10 — 32	MSB-1.2 (Ex)
			RFC	0 — 10	MSB-1 (Ex)
				10 — 32	MSB-1.2 (Ex)
Ball float ≤ DN 65	6000	32	PBS <sup>1)</sup>	0 — 5	MSB-1 (Ex)
				5 — 32	MSB-1.2 (Ex)
			ADP <sup>1)</sup>	0 — 5	MSB-1 (Ex)
				5 — 32	MSB-1.2 (Ex)
			RFC	0 — 32	MSB-1 (Ex)

<sup>1)</sup> PBS and ADP accessories are only available for GESTRA steam traps

### Measurement accuracy

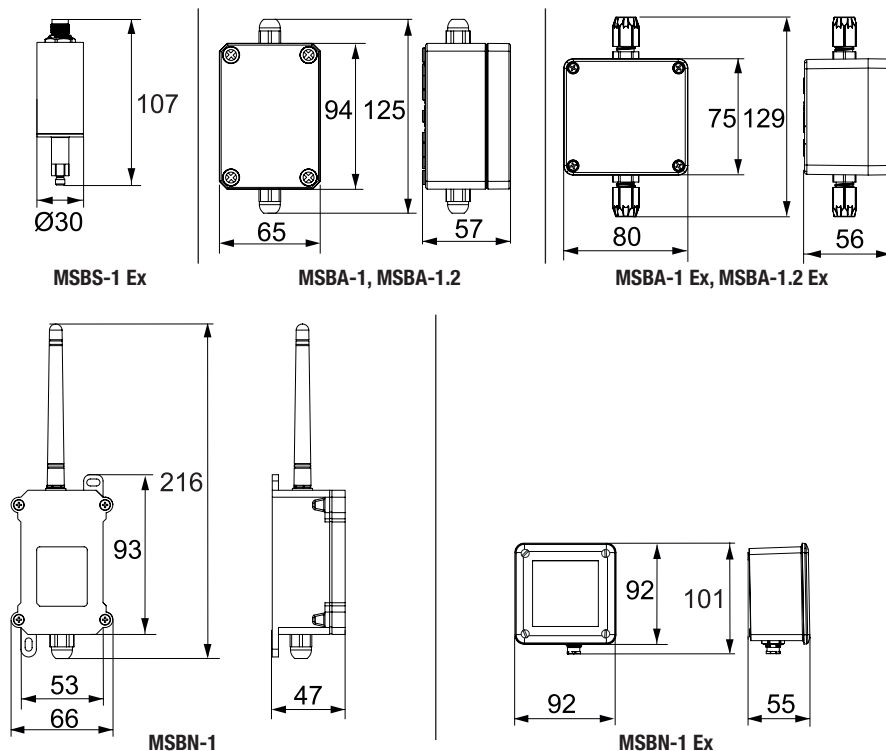
Measuring point	Loss of steam	Surface temperature of measuring point
PBS	1 kg/h + 5% of final value	0 — 40 K
ADP	1 kg/h + 5% of final value	-20 — 20 K
RFC	3 kg/h + 30% of final value	-20 — 20 K

ecoBolt Continuous  
Steam Trap Monitor  
**MSB-1, MSB-1.2**  
**MSB-1 Ex, MSB-1.2 Ex**

**Dimensions and weights**

Dimensions mm

Installation dimensions for securing 100 mm cable



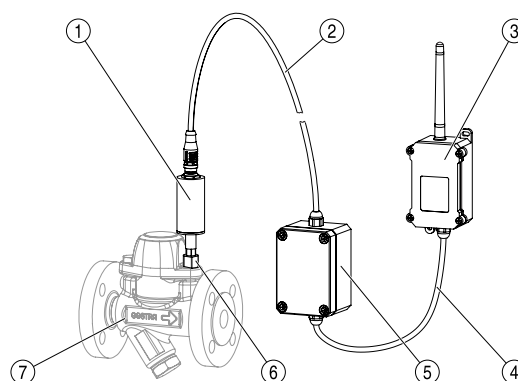
Assembly	Dimensions mm			Weight g
	Length/height	Width/diameter	Depth	
MSBS-1 Ex sensor	107	30	–	160
MSBA-1, MSBA-1.2 pre-amplifier	94	65	57	270 <sup>1)</sup>
MSBA-1 Ex, MSBA-1.2 Ex pre-amplifier	75	80	56	430 <sup>1)</sup>
Cable (sensor–pre-amplifier)	800	–	–	–
Cable (pre-amplifier–LoRa node)	200	–	–	–
MSBN-1 LoRa node	216	66	47	190
MSBN-1 Ex LoRa node	101	92	55	250

<sup>1)</sup> including cable

**MSB-1, MSB-1.2**

No.	Designation
1	MSBS-1 Ex sensor
2	Connecting cable
3	MSBN-1 LoRa node
4	Connecting cable
5	MSBA-1, MSBA-1.2 pre-amplifier
6	Pressure-bearing screw PBS (accessory)
7	Steam trap (BK 45 shown here as an example)

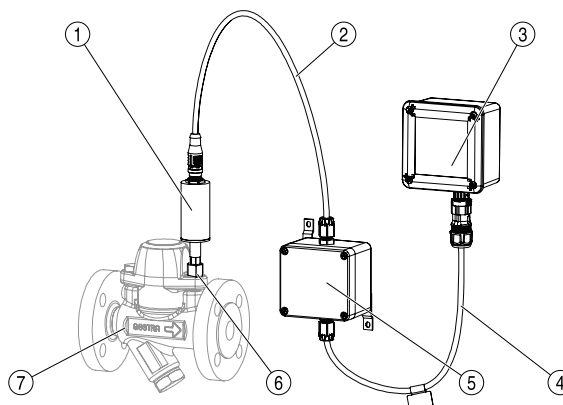
**MSB-1, MSB-1.2**



**MSB-1 Ex, MSB-1.2 Ex**

No.	Designation
1	MSBS-1 Ex sensor
2	Connecting cable
3	MSBN-1 Ex LoRa node
4	Connecting cable
5	MSBA-1 Ex, MSBA-1.2 Ex pre-amplifier
6	Pressure-bearing screw PBS (accessory)
7	Steam trap (BK 45 shown here as an example)

**MSB-1 Ex, MSB-1.2 Ex**



# ecoBolt Continuous Steam Trap Monitor MSB-1, MSB-1.2 MSB-1 Ex, MSB-1.2 Ex

## How to order

ecoBolt Continuous Steam Trap Monitor

### MSB-1, MSB-1.2

### MSB-1 Ex, MSB-1.2 Ex

for potentially explosive atmospheres

The MSB-1, MSB-1.2, MSB-1 Ex or MSB-1.2 Ex continuous steam trap monitor consists of a sensor, an amplifier and a LoRa node for automatically testing all makes of steam trap for loss of steam and banking up of condensate.

Faulty steam traps are detected and reported at an early stage by means of temperature measurements with a piezo element. These measurements are performed continuously and automatically at regular intervals.

The measured data is analysed in the LoRa node and transferred to the LoRa gateway (accessory). The data is transferred using LoRa wireless technology.

### Options

- Connection to the GESTRA IoT (internet of things) platform for viewing readings and the data derived from them, such as CO<sub>2</sub> emissions and costs, for example.

### Accessories

- Pressure-bearing screws (PBS) of steel or stainless steel for installing on GESTRA steam traps
- 90° adapter (ADP)
- Clips (RFC) for mounting on pipes
- Mounting system for pre-amplifier and LoRa node
- LoRa gateway

## Performance profile

- Continuous steam trap monitor for steam traps (e.g. GESTRA BK, MK and UNA)
- Readings are analysed inside the equipment
- The LoRa payload includes test and analysis results
- Connection to the LoRa network server via LoRa wireless technology
- Option: Presentation of test and analysis results on the GESTRA IoT platform. To do this, the LoRa network server is connected to the GESTRA IoT platform via MQTT protocol.

## MSB app

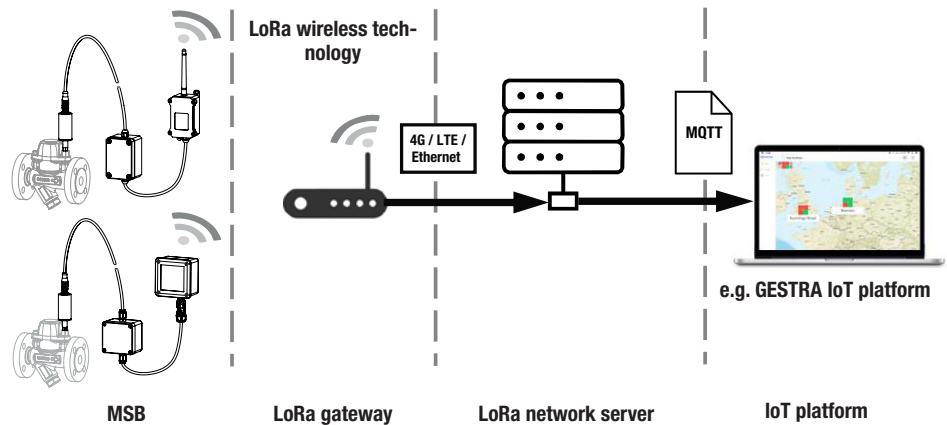
- Fast and efficient support during installation and maintenance of the continuous steam trap monitor
- Transfers metadata to the installed equipment and guarantees confusion-proof integration in the GESTRA IoT platform
- A data connection is required for loading the MSB app and for transferring data (Wi-Fi or SIM card). The MSB app cannot be used without a data connection.

## GESTRA IoT platform

The equipment can be connected to the GESTRA IoT (internet of things) platform, which offers the following advantages:

- Access to the GESTRA IoT platform via a website (login credentials are provided by GESTRA)
- Online presentation of readings in real time on a website via your browser
- Presentation of test and analysis results on dashboards
- Summary of results from all steam traps
- Clear information about connected steam traps
- Live steam trap data can be compared with live data from other units (e.g. steam boilers, steam flowmeters)

## MSB integration in IoT platform using LoRa wireless technology



Please note our general terms of business.

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