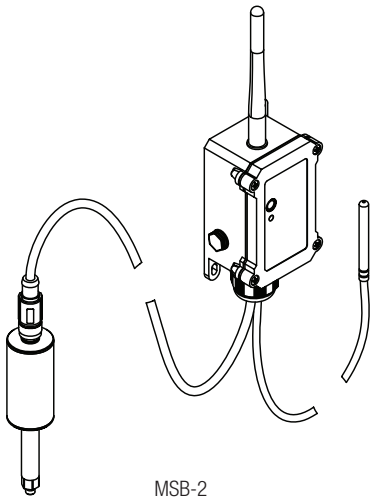
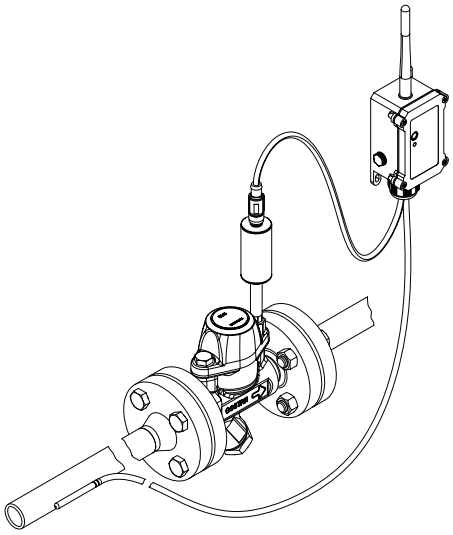


MSB-2



MSB-2
Illustration shows GESTRA BK 45 steam trap and pressure-bearing screw PBS

ecoBolt
Continuous Steam Trap Monitor
MSB-2

System description

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

The MSB-2 equipment is used for monitoring steam traps for loss of steam and banking up of condensate outside potentially explosive atmospheres. It must not be used in potentially explosive atmospheres.

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

Function

The equipment monitors steam traps using ultrasonic and temperature measurements taken by a piezo element. These measurements are performed automatically at regular intervals. In addition, the temperature can be output at an additional measuring point via an external temperature sensor.

The measured data is analysed in the LoRa node and transferred to the LoRa gateway (accessory). The data is transferred end-to-end (AES-128) encrypted using LoRaWAN wireless technology.

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

End connections

Sensor thread: M6

Options

- Connection to the GESTRA dashboard for viewing readings and the data derived from them, such as CO_2 emissions and costs due to loss of steam, for example.

Available accessories

The following accessories are available for the equipment:

- Pressure-bearing screw (PBS) of steel or stainless steel
- RHOMBUS*line* sealing plug with sensor connection (STC)
- Pressure-bearing screws (PBS) with 90° adapter
- 90° adapter (ADP)
- Clips (RFC) for mounting on pipes
- LoRa gateway

Further accessories are available on request.

Materials

Component	Material
Housing of MSBS-2 sensor	1.4404 / 316L
Housing of MSBN-2 LoRa node	Polycarbonate (PC)
Battery	Lithium metal battery (Li-$SOCl_2$)

The equipment and its components contain electronic parts.

Pressure and temperature ratings

Ambient conditions

Area of application	**Indoors and outdoors**
Maximum altitude	2,000 m (6,562 ft)
Protection against ingress of foreign bodies	Suitable for industrial use
Pollution degree	4
Admissible ambient temperature	-40 — 85 °C (-40 — 158 °F)

Assembly	**Storage/operating temperature °C (°F)**	**IP rating**
MSBS-2 sensor[1]	–40 — 85 (–40 — 185)	IP66 / IP67
MSBN-2 LoRa node[2]		IP66

[1] The temperature of the fluid in the steam trap must not exceed 550 °C.
[2] Battery life with one measurement per hour: approx. 10 years

Admissible fluid temperature when using the MSBS-2, depending on the ambient temperature, when installed at an angle > 45° from vertical

Ambient temperature °C (°F)	**Fluid temperature °C (°F)**	**Measuring range °C (°F)**
–40 — 70 (–40 — 158)	-40 — 550 (-40 — 1,022)	0 — 550 (32 — 1,022)
>70 — 80 (>158 — 176)	-40 — 450 (-40 — 842)	
>80 — 85 (>175 — 185)	-40 — 350 (-40 — 662)	

Admissible measuring point temperature for the external PT100

Ambient temperature °C (°F)	**Fluid temperature °C (°F)**	**Measuring range °C (°F)**
-40 — 85 (-40 — 158)	-40 — 600 (-40 — 1,112)	0 — 550 (32 — 1,022)

Evaluation accuracy

Measuring point	**Loss of steam[2]**	**Temperature**
PBS	1 kg/h + 5% of final value	—
ADP	1 kg/h + 5% of final value	—
RFC	3 kg/h + 30% of final value	
Temperature sensor MSBS-2 (PT100)	—	+/- 20 K[1]
Temperature sensor (external PT100)	—	+/- 1 K[1]

[1] Surface temperature of measuring point
[2] Ball-float steam trap: Accuracy of loss of steam rate depends on the cross-section cut of the orifice (AO). Loss of steam quoted by way of example for the mean value of all GESTRA UNA4 ball-float steam traps (AO 2-32).

Condensate flowrates

Steam trap Controller	**$\dot{m}_{max}$ Maximum condensate flowrate kg/h (lb/h)**	**p_{max} Maximum pressure barg (psig)**
Bimetal	1,000 (2,205)	140 (2,031)
Membrane	1,800 (3,968)	32 (464)
Ball float ≤ DN 65	6,000 (13,228)	140 (2,031)
Thermodynamic	2,000 (4,409)	140 (2,031)
Venturi	100 (220)	22 (319)
Inverted bucket	450 (992)	32 (464)

ecoBolt Continuous
Steam Trap Monitor
MSB-2

Electrical data

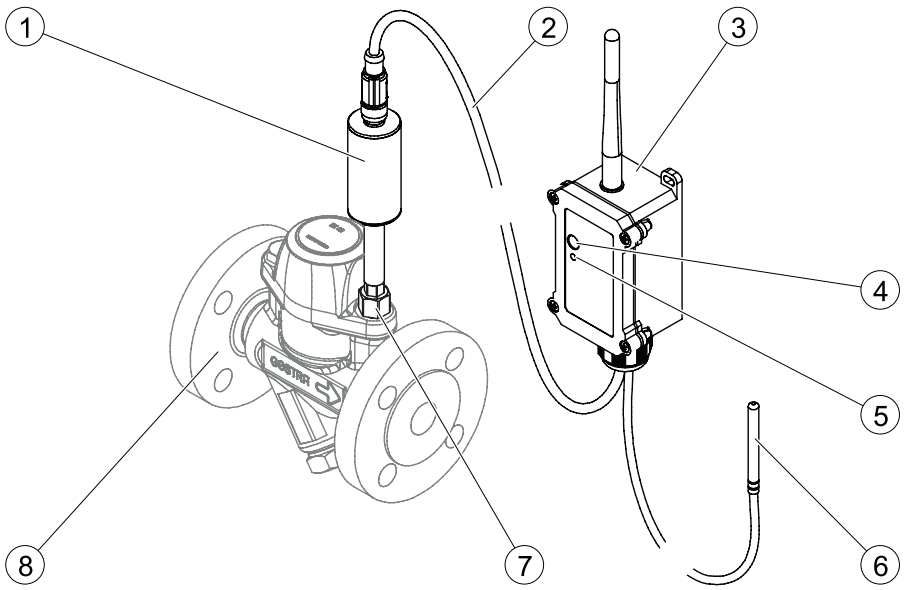
Assembly	Supply voltage	Protection class	Overvoltage category
MSBS-2 sensor	–	III (SELV)	I
MSBN-2 LoRa node	2.5 – 3.6 V		

Battery life with one measurement per hour: approx. 10 years in ideal conditions (SF7, constant ambient temperature of 68 °F (20 °C))

Assembly	Wireless device class	Maximum output power	Network protocol/ Frequency range
MSBN-2 EU868	LoRaWAN Class A	+14 dBm / 25 mW	LoRaWAN / 863–870 MHz
MSBN-2 US915	LoRaWAN Class A	+20 dBm / 100 mW	LoRaWAN / 902–928 MHz
MSBN-2 CN470	LoRaWAN Class A	+14 dBm / 25 mW	LoRaWAN / 470–510 MHz
MSBN-2 KR920	LoRaWAN Class A	+14 dBm / 25 mW	LoRaWAN / 920.9–923.3 MHz
MSBN-2 AU915	LoRaWAN Class A	+20 dBm / 100 mW	LoRaWAN / 915–928 MHz
MSBN-2 AS923-1	LoRaWAN Class A	+14 dBm / 25 mW	LoRaWAN / 915–928 MHz
MSBN-2 AS923-2	LoRaWAN Class A	+14 dBm / 25 mW	LoRaWAN / 915–928 MHz

Detection range: depends on the installation position and the position of the gateway: up to 3 km (1.86 mi) in cities, up to 10 km (6.21 mi) in rural areas

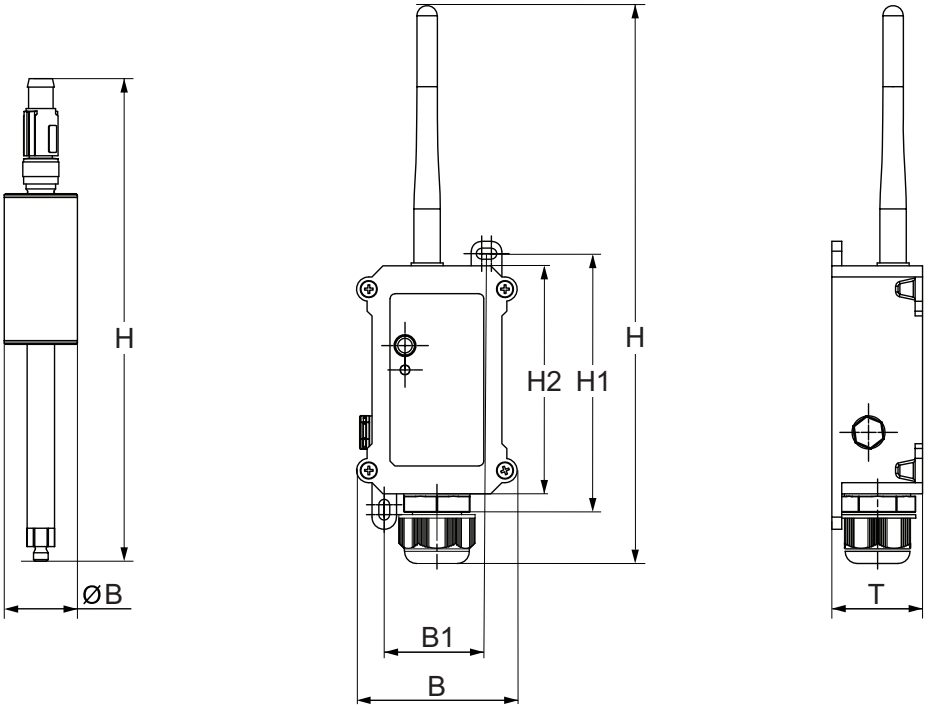
Equipment overview



No.	Designation
1	MSBS-2 sensor
2	Connecting cable
3	MSBN-2 LoRa node
4	Button
5	Status LED

No.	Designation
6	Temperature sensor (external PT100)
7	Pressure-bearing screw (accessory)
8	Steam trap (BK 45 shown here as an example)

Dimensions and weights



Assembly	Dimensions mm (in")			Weight g (lb)
	Height / length H	Width / diameter W / ∅	Depth D	
MSBS-2 sensor (incl. connector)	185 (7.28")	29.8 (1.17")	–	160 (0.35)
Connecting cable[1]	1,400 (55")	–	–	–
Cable length PT100 temperature sensor	3,000 (118.1")	–	–	–
MSBN-2 LoRa node	228 (9.0")	66 (2.6")	47 (1.85")	200 (0.44)[2]

[1] Installation dimension for securing cable 100 mm (3.94"), cable bending radius > 25 mm (0.98")
[2] incl. connecting cable

MSBN-2 LoRa node

H1	mm (in")	105 (4.14)
H2	mm (in")	93 (3.66)
B1	mm (in")	42 (1.65)

ecoBolt Continuous
Steam Trap Monitor
MSB-2

How to order

ecoBolt Continuous Steam Trap Monitor

MSB-2

The MSB-2 continuous steam trap monitor consists of a sensor 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 taken by a piezo element. In addition, the temperature can be output at an additional measuring point via an external temperature sensor.

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). Data is transferred via LoRaWAN wireless technology.

Options

- Connection to an IoT (internet of things) platform for viewing readings and the data derived from them, such as CO_2 emissions and costs due to loss of steam, for example.

Accessories

- Pressure-bearing screw (PBS) of steel or stainless steel
- RHOMBUSline sealing plug with sensor connection (STC)
- Pressure-bearing screws (PBS) with 90° adapter
- 90° adapter (ADP)
- Clips (RFC) for mounting on pipes (including clip adapters)
- LoRa gateway

Further accessories are available on request.

Directives and standards

You can find details on the conformity of the equipment and the relevant standards and directives, where applicable, in the Declaration of Conformity and associated certificates or approvals.

Please note our general terms of business.

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 dashboard. Data from the LoRa network server is encrypted and sent to the GESTRA dashboard for this purpose (TCP-IP with latest TLS version).

CoMApp

- 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 IoT platform.
- A data connection (Wi-Fi or SIM card) is required for loading the CoMApp or for transferring data.

The CoMApp can be used without an active data connection.

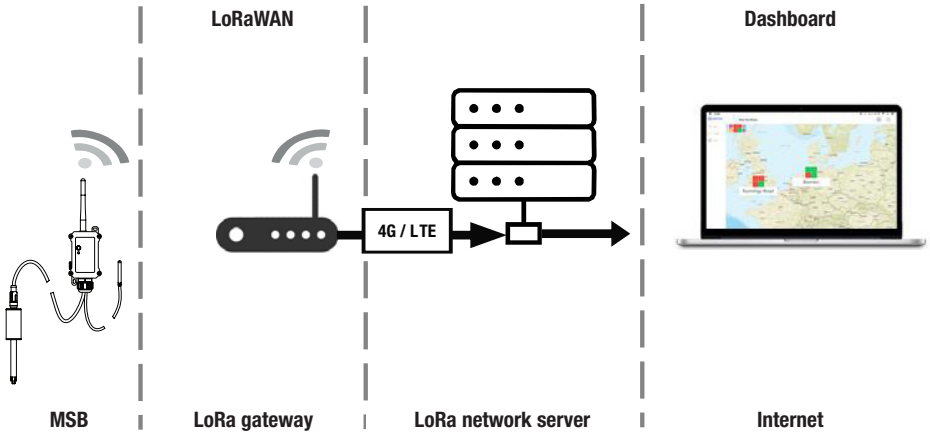
GESTRA dashboard

The readings from the equipment can be viewed on the GESTRA dashboard.

Advantages:

- Access to the GESTRA dashboard 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 the GESTRA dashboard
- 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)

System overview



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