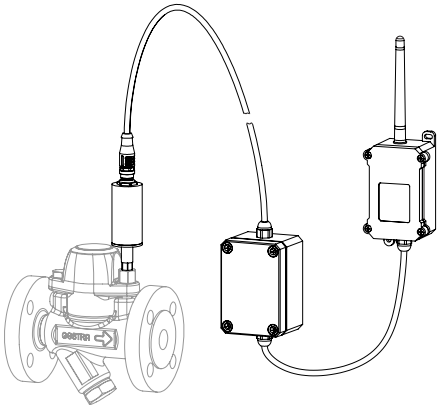
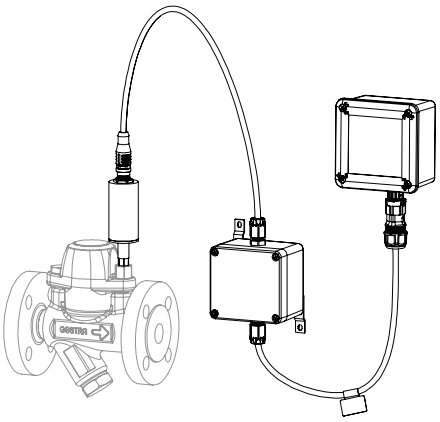
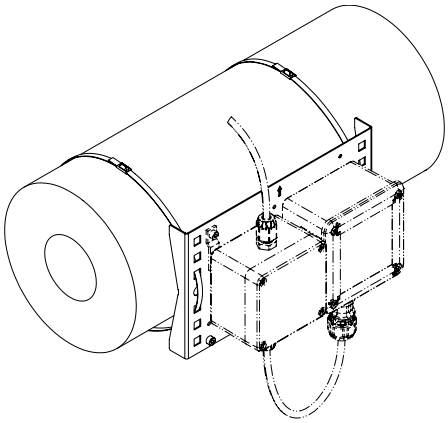


MSB-1, MSB-1.2



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

System 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 pressures or condensate flow rates.

The MSBS-2 Ex can be used for measuring points with higher temperatures and pressures.

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.

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, MSBS-2 Ex	Ex II 2G Ex ib IIC T4 Gb
Preamplifier	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 taken 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 for MSBS-1, MSBS-1 Ex, MSBA-1, MSBA-1.2, MSBA-1 Ex, MSBA-1.2 Ex, MSBN-1, MSBN-1 Ex	-20 — 50°C
Admissible ambient temperature for MSBS-2 Ex	-40 — 85°C

End 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
- In a sealing plug with sensor connection (STC, Smart Strainer Cap)
- Fastened to the pipe by a clip (RFC)

Available accessories

The following accessories are available for the equipment:

- Pressure-bearing screws (PBS) of steel or stainless steel
- 90° adapter (ADP)
- Sealing plug with sensor connection (STC)
- Clips (RFC) for mounting on pipes
- Mounting system for preamplifier and LoRa node
- LoRa gateway

Further accessories are available on request.

Materials

Component	Material
Housing of MSBS-1, MSBS-1 Ex sensor	1.4305
Housing of MSBS-2 Ex sensor	1.4404
Housing of MSBA-1, MSBA-1.2 preamplifier	Polycarbonate GF10
Housing of MSBA-1 Ex, MSBA-1.2 Ex preamplifier	Polyester
MSBN-1, MSBN-1 Ex LoRa node	See documentation on the LoRa node
Battery	Lithium metal battery ($Li\text{-}SOCl_2$)

The equipment and its components contain electronic parts.

Pressure and temperature ratings

Assembly	Storage/ operating temperature °C	Protection rating
MSBS-1, MSBS-1 Ex sensor [1])	–20 — 50	IP64
MSBS-2 Ex sensor [2])	–40 — 85	IP66 / IP67
MSBA-1, MSBA-1.2 preamplifier	–20 — 50	IP66
MSBA-1 Ex, MSBA-1.2 Ex preamplifier		IP66
MSBN-1 LoRa node [3])		IP68
MSBN-1 Ex LoRa node [3])		IP55

[1]) The temperature of the fluid in the steam trap must not exceed 240 °C.
[2]) The temperature of the fluid in the steam trap must not exceed 550 °C.
[3]) Battery life with one measurement per hour: approx. 10 years

MSBS-1 Ex temperature classes

Max. fluid temperature	Ambient temperature	Temperature class
240°C	50°C	T2
200°C	50°C	T3
135°	50°C	T4

MSBS-2 Ex temperature classes

Max. fluid temperature	Ambient temperature	Temperature class
550°C	70°C	Not for use in potentially explosive atmospheres
450°C	80°C	T1
350°C	85°C	T1
300°C	85°C	T2
200°C	85°C	T3
135°C	85°C	T4

Electrical data

Assembly	Supply voltage	Protection class	Overvoltage category
MSBS-1, MSBS-1 Ex, MSBS-2 Ex sensor	–	III (SELV)	I
MSBN-1 LoRa node [1])	3.6 V		
MSBN-1 Ex LoRa node [1])	3.6 V		
MSBA-1, MSBA-1.2 preamplifier	5.0 V/5 mA		
MSBA-1 Ex, MSBA-1.2 Ex preamplifier	5.0 V/5 mA		

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

Assembly [1])	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)

[1]) Applies to the EU/UK; assemblies for other countries and frequency ranges available on request

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

Equipment selection

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

Steam trap regulator	$\dot{m}_{max}$ Maximum condensate flow rate kg/h	p_{max} Maximum pressure barg	Measuring point	Δp Area of application bar	ecoBolt
Bimetal	1000	32	PBS[1])	0 — 22	MSB-1 (Ex)
			ADP[1])	0 — 22	
			RFC	0 — 32	MSB-1 (Ex)
Membrane	1800	32	PBS[1])	0 — 5	MSB-1 (Ex)
				>5 — 32	MSB-1.2 (Ex)
			ADP[1])	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[1])	0 — 5	MSB-1 (Ex)
				>5 — 32	MSB-1.2 (Ex)
			ADP[1])	0 — 5	MSB-1 (Ex)
				>5 — 32	MSB-1.2 (Ex)
			RFC	0 — 32	MSB-1 (Ex)
Thermodynamic	2000	32	PBS[1])	0 — 20	MSB-1 (Ex)
			ADP[1])	0 — 32	MSB-1 (Ex)
			RFC	0 — 32	MSB-1 (Ex)
Venturi	100	22	RFC	0 — 22	MSB-1 (Ex)
Inverted bucket	450	32	RFC	0 — 32	MSB-1 (Ex)

[1]) PBS and ADP accessories are only available for GESTRA steam traps

Measurement accuracy

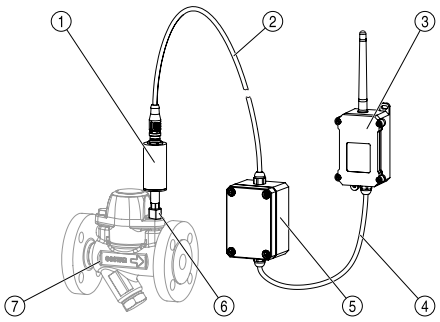
Measuring point	Loss of steam [1])	Surface temperature difference of measuring point
PBS	1 kg/h + 5% of final value	0 — 40 K
ADP	1 kg/h + 5% of final value	-20 — 20 K
RFC	3 kg/h + 30% of final value	-20 — 20 K
STC	1 kg/h + 5% of final value	-20 — 20 K

[1]) Ball-float steam trap: The accuracy of the steam loss rate depends on the cross-sectional area of the orifice. Steam losses are quoted by way of example for the mean value of all GESTRA UNA4 ball-float steam traps (orifice 2-32).

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

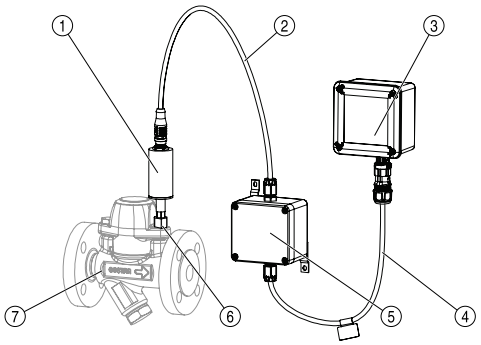
Equipment overview

MSB-1, MSB-1.2



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

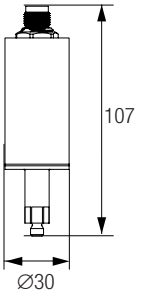
MSB-1 Ex, MSB-1.2 Ex



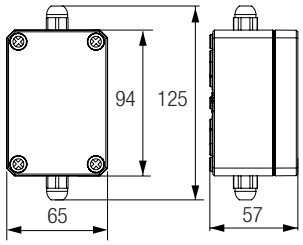
No.	Name
1	MSBS-1 Ex, MSBS-2 Ex sensor
2	Connecting cable
3	MSBN-1 Ex LoRa node
4	Connecting cable
5	MSBA-1 Ex, MSBA-1.2 Ex preamplifier
6	Pressure-bearing screw PBS (accessory)
7	Steam trap (BK 45 shown here as an example)

Dimensions and weights

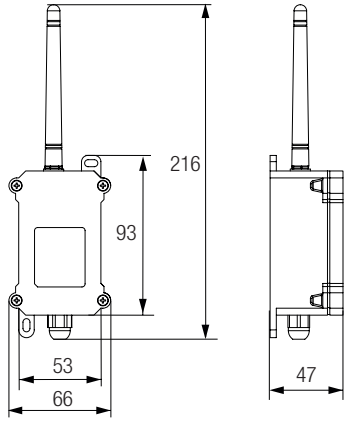
Dimensions mm
Installation dimensions for
securing the 100 mm cable, bending radius >25 mm



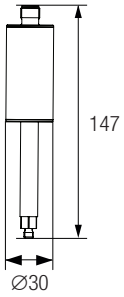
MSBS-1 (Ex)



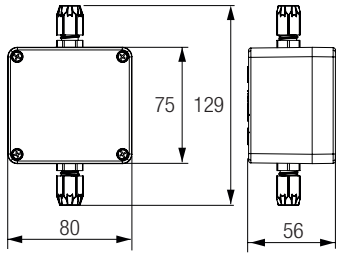
MSBA-1, MSBA-1.2



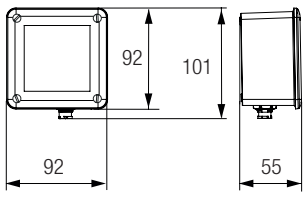
MSBN-1



MSBS-2 Ex



MSBA-1 Ex, MSBA-1.2 Ex



MSBN-1 Ex

Assembly	Dimensions mm			Weight g
	Length/height	Width/ diameter	Depth	
MSBS-1, MSBS-1 Ex sensor	107	30	–	160
MSBS-2 Ex sensor	147	30	–	190
MSBA-1, MSBA-1.2 preamplifier	94	65	57	270[1])
MSBA-1 Ex, MSBA-1.2 Ex preamplifier	75	80	56	430[1])
Cable (sensor-preamplifier)	800	–	–	–
Cable (preamplifier-LoRa node)	200	–	–	–
MSBN-1 LoRa node	216	66	47	190
MSBN-1 Ex LoRa node	101	92	55	250

[1]) including cable

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 taken by 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_2 emissions and costs due to loss of steam, 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 preamplifier and LoRa node
- LoRa gateway

Directives and standards

For details on the conformity of equipment and applicable standards and directives, please see our Declaration of Conformity and associated certificates and 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 LoRaWAN 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 the 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 GESTRA IoT platform
- A data connection (Wi-Fi or SIM card) is required for loading the CoMApp and for transferring data. The CoMApp can be used without a data connection.

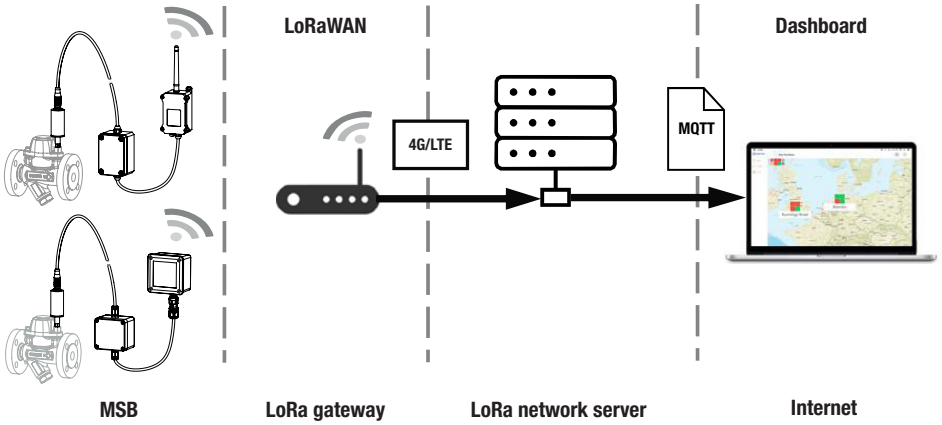
GESTRA IoT platform

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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