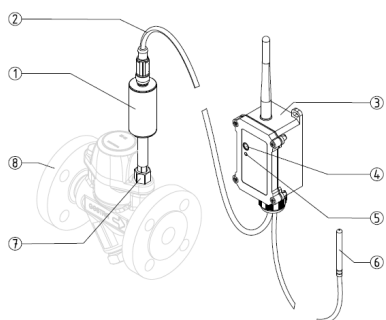


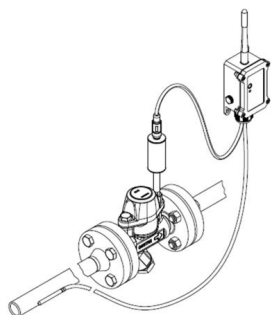
System Description



MSBN-2 LoRa Node with MSBS Sensor

The MSBN-2 LoRa Node with MSBS Sensor equipment is used to monitor steam traps for loss of steam and banking up of condensate at differential pressures. The measurement results are shown on the GESTRA dashboard. The monitoring enables the early detection of faulty steam traps, water hammer 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.

The equipment monitors steam traps using ultrasonic and temperature measurements taken by a piezo element. These measurements are performed automatically at regular intervals. The temperature sensor (external PT100) measures the temperature at the measuring point. The measured data is analysed in the MSBN ... LoRa node and transferred to the LoRa gateway (accessory). The data is transferred by LoRa wireless technology via network protocol. The temperature measurements taken by the external PT100 can also be transferred. The measurement results are analysed on the basis of the sound and temperature values and parameters of the steam trap under test. To use the equipment, a LoRa gateway and LoRa network server are required for displaying readings.



Continuous steam trap monitor for testing steam traps for loss of steam and banking up of condensate. The MSBN-2 LoRa Node with MSBS Sensor equipment is used for monitoring steam traps for loss of steam and banking up of condensate

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.

Function

Monitoring of a steam trap by the device is carried out using temperature measurements and ultrasonic measurements via a piezoelectric element. The measurements are performed automatically at regular intervals.

The temperature sensor (external PT100) measures the temperature at the measuring point.

The recorded data is analysed within the LoRa node and transmitted to the LoRa gateway (accessory). Data transmission takes place via a network protocol using LoRaWAN radio technology.

The temperature readings from the external PT100 sensor can also be transmitted.

The evaluation of the measurement results is based on sound values, temperature, and the parameters of the steam trap being tested.

Technical data

Ambient conditions

Area of application	Indoors and outdoors
Maximum altitude	2000 m (6562 ft)
Protection against ingress of foreign bodies	Suitable for industrial use
Pollution degree	4
Admissible ambient temperature	-40 – 85°C (-40 – 185°F)

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.
- Replace the standard strainer cap of the condensate drain with a specific type of strainer cap featuring an MSB connection.
- 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)
- Strainer cap with sensor interface (STC)
- Clips (RFC) for mounting on pipes
- LoRa gateway

Further accessories are available on request.

Materials

Komponente	Spezifikation
MSBS-2 Sensor Housing	1.4404 / 316L
LoRa Node MSBN-2 housing	Polycarbonate (PC)
Battery	Lithium-metal-battery (Li-SOCl ₂)

The equipment and its components contain electronic parts

Pressure and temperature ratings

Assembly	Storage/ operating temperature °C (°F)	IP rating
Sensor MSBS-2	-40 — 85 (-40 — 185)	IP66 / IP67
LoRa Node MSBN-2		

Permissible media temperature depending on ambient temperature at an installation angle of 45

Ambient temperature °C (°F)	Fluid temperature °C (°F)
-40 — 70 (-40 — 158)	550 (1.022)
>70 — 80 (>158 — 176)	450 (842)
>80 — 85 (>176 — 185)	350 (662)

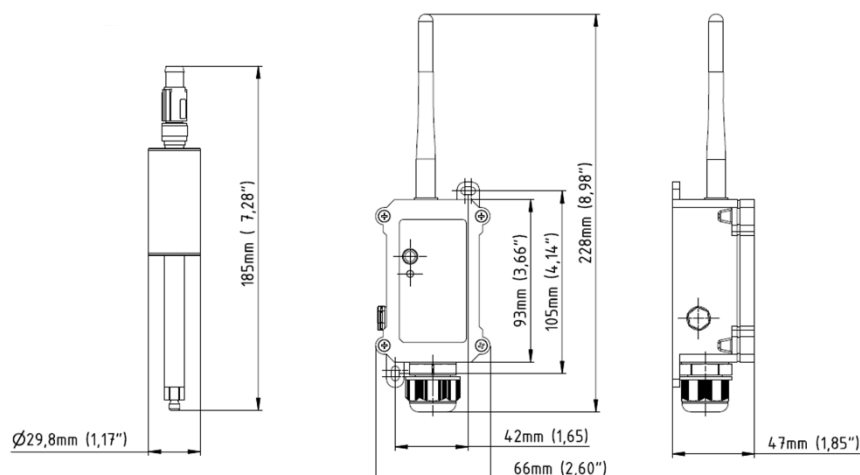
Measurement accuracy

Measuring point	Loss of steam	Temperature*
PBS	1 kg/h + 5% from final value	—
ADP	1 kg/h + 5% from final value	—
RFC	3 kg/h + 30% from final value	—
MSBS-2 (PT100)	—	+/- 1 K
External Temp. Element (PT100)	—	+/- 1 K

*Surface temperature can deviate from fluid temperature

MODEL	MSBN-2 MAX	MSBN-2
HVIN	MSBN-2 MAX	MSBN-2

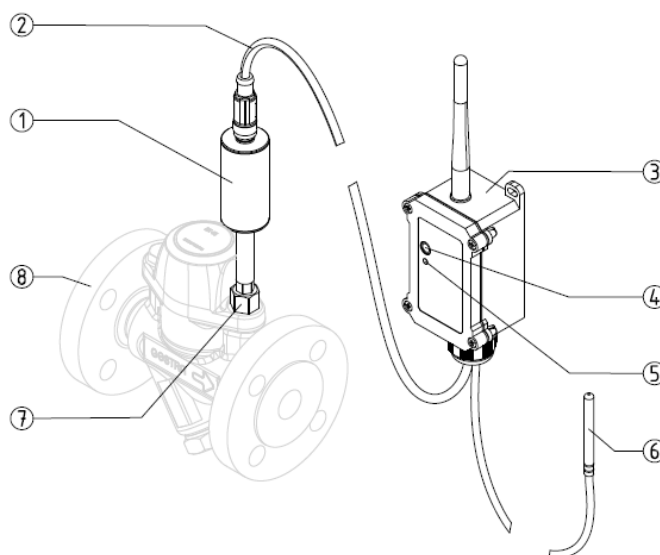
Bluetooth module with integrated microcontroller and accompanying components which are assembled on the model "MSBN-2 MAX" and not assembled on the model "MSBN-2".

Dimensions and weight


Assembly	Measures mm(in)			Weight g (lbs)
	Length/height	Wide/	Length/height	
Sensor MSBS-2 (incl. Connector)	185 (7,28")	29,8 (1,17")	–	160 (0,35)
Cable (MSBN-2 to MSBS) ¹	1.400 (55")	–	–	–
Cable length of temperature sensor PT100	3.000 (118")	–	–	–
LoRa Node MSBN-2	228 (9,0")	66 (2,6")	47 (1,85")	200 (0,44) ²

¹ Mounting dimension for cable fastening: 100 mm (3,94"), cable bending radius >25 mm (0,98")

² Including connection cable

MSB-2


Nr.	Designation
1	MSBS-2 sensor
2	Connecting cable
3	LoRa Node MSBN-2
4	Button
5	Status LED

Nr.	Designation
6	Temperature sensor (PT100)
7	Pressure-bearing screw PBS (accessory)
8	Steam trap (BK 45 shown here as an example)

How to order

MSBN-2 LoRa Node with MSBS Sensor

The continuous steam trap monitoring system MSB-2 consists of a sensor and a LoRa node for the automatic inspection of steam traps for steam losses and condensate backup.

Early detection and reporting of defective steam traps is achieved through monitoring using temperature measurements and ultrasonic measurements via a piezoelectric element.

Measurements are carried out continuously and automatically at regular intervals.

The recorded data is analyzed within the LoRa node and transmitted to the LoRa gateway (accessory). Data transmission is carried out via LoRa radio technology.

Options

Connection to the GESTRA dashboard for visualizing the measured values and derived figures such as CO₂ emissions and costs due to steam losses.

Accessories

- Pressure bearing screw (PBS) made of steel or stainless steel for mounting on GESTRA steam traps
- 90° adapter (ADP)
- Strainer cap with sensor interface (STC)
- Clamps (RFC) for mounting on pipelines
- LoRa gateway

Further accessories are available on request.

Please not our general terms of business

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.

Performance profile

- Continuous steam trap monitoring for steam traps (e.g. GESTRA BK, MK and UNA)
- Measurement evaluation is carried out within the device.
- Measurement and evaluation results are included in the LoRa payload.
- Connection to LoRa network server via LoRaWAN radio technology (AES encryption).
- Optional: Display of measurement and evaluation results on the GESTRA Dashboard. For this, data from the LoRa network server is securely transmitted to the GESTRA Dashboard using TCP-IP with the latest TLS version.

CoMApp

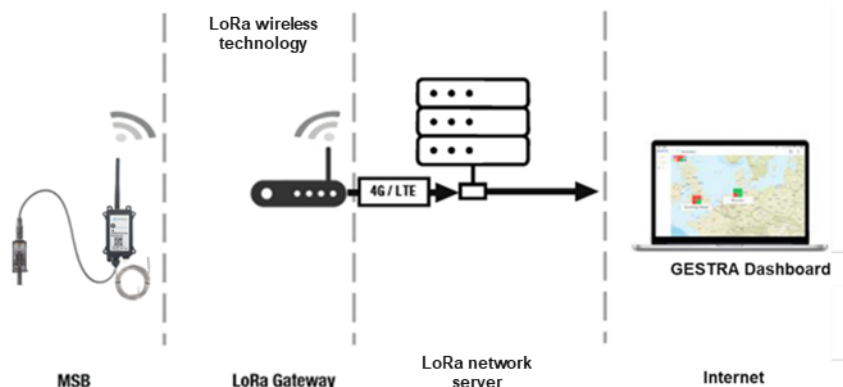
- Fast and efficient support during installation and maintenance of continuous steam trap monitoring
- Transmits metadata of installed devices and ensures unmistakable integration into the GESTRA IoT platform
- Requires a data connection (Wi-Fi or mobile data) to load the MSB app or transmit data. Use of the MSB app without an active data connection is also possible.

GESTRA Dashboard

The equipment can be connected to the GESTRA dashboard, which offers the following advantages::

- Access to the GESTRA dashboard via a web page (logins are provided by GESTRA)
- Real-time display of measured data via a web browser
- Display of measurement and analysis results in the dashboard
- Summary of results from all condensate drainers
- Clear overview of the connected condensate drainers
- Ability to correlate live data from the condensate drainers with live data from other devices (e.g., steam boilers, steam flow meters)

MSB Integration in Dashboard using LoRa wireless technology



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FCC Caution:

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

IMPORTANT NOTE:

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

IC Caution:

This device complies with Innovation, Science, and Economic Development Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

- (1) this device may not cause interference, and
- (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

- (1) l'appareil ne doit pas produire de brouillage, et

(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

FCC/IC Radiation Exposure Statement:

This equipment complies with FCC/ISED radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator& your body.

L'appareil est conforme aux limites d'exposition aux rayonnements spécifiées par la FCC/ISED pour les environnements non contrôlés. La distance entre le radiateur et le corps doit être d'au moins 20 cm lors de l'installation et du fonctionnement de l'appareil.