InduEye® LeakSense 2
Indueye® TempSense 2

User Manual

AEInnova
Alternative
Energy Innovations

Contents

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Safety Instructions for Ex Zones:

For Ex applications, it is essential to follow the specific Ex safety instructions provided. These instructions are included as documentation with each module carrying Ex certification and are an integral part of the user manual.

1 Introduction

1.1 Regarding this manual

This manual provides all the necessary information for assembly, connection, and configuration as well as important instructions for maintenance and user safety.

This manual should be provided to the end user.

Alternative Energy Innovations S.L. makes no warranty of any kind regarding this manual, including, but not limited to, implied warranty of merchantability and fitness for a particular purpose.

If any question arises, errors are found, or if any information is missing from this manual, please contact Alternative Energy Innovations S.L. for further information.

The specifications covered by this manual are limited to those for the standard type under the specified model number breakdown and do not cover custom-made instruments.

Please note that changes in the specifications, construction, or component parts of the module may not immediately be reflected in this manual at the time of change, given postponement of revisions will not cause difficulty to the user from a functional or performance standpoint.

1.2 Safety tips and warnings

1.2.1 Safety guidelines

This module conforms with all relevant regulations and norms. Ensure the module is in a perfect technical condition before its use. The operator is responsible for ensuring that module functions properly. When dealing with highly aggressive or corrosive substances that might cause a dangerous situation if the module fails, the operator must take adequate procedures to guarantee the unit is operational.

The user must follow the safety recommendations in these operating instructions manual, the national installation requirements and the applicable safety regulations and accident prevention rules.

For safety and warranty compliance, only authorized personnel are permitted to conduct intrusive maintenance on the module, as outlined in the operating manual. Unauthorized modifications or alterations are strictly prohibited. Additionally, only manufacturer-recommended accessories should be utilized for safety reasons.

To avoid any danger, the safety approval markings and safety tips on the module must also be observed.

1.2.2 Authorised personnel

All operations described in this documentation must be carried out only by qualified personnel authorised by the plant operator.

The required personal protective equipment must always be worn when working on and with the module.

1.2.3 Proper utilization

The InduEye® system is powered by renewable energy modules and utilizes the LoRaWan protocol for IIoT monitoring, transmitting data to a gateway. Detailed information on its application area can be found in the "Product overview" chapter. Operational reliability is contingent on adhering to specifications outlined in the operating manual and any supplementary instructions.

1.2.4 Warning about incorrect use

The supplier is not responsible for any damage caused by improper installation, incorrect technical conditions and improper use of equipment.

Do not attempt to disassemble or modify the equipment yourself. The equipment has no useful parts for the user.

Make sure that the temperatures do not exceed the recommended values.

1.3 Model overview

Reference	Model
NOD-0015	InduEye® LeakSense 2 LoRa
NOD-0016	InduEye® TempSense 2 LoRa
NOD-0017	InduEye® LeakSense 2 LoRa Ex ic
NOD-0018	InduEye® TempSense 2 LoRa Ex ic

1.4 Packing list

Before setting up the system, ensure that the following elements are present and in good condition. If an item does not match, please contact your dealer immediately.

- 1x InduEye® LeakSense 2/ TempSense 2
- 2x External Temperature Sensor (SEN-0003)
- 1x Ex-specific "Safety instructions" (with Ex versions)

2 Product overview

2.1 InduEye® LeakSense/TempSense module

InduEye® LeakSense/TempSense module is an efficient solution for assessing valves and steam traps in industrial settings. It employs non-intrusive installation technology and wireless communications to conduct regular evaluations that detect faulty steam traps/valves. This includes identifying traps that are left open, causing steam leaks, and those that are closed or blocked, leading to condensate build-up, which can result in plant damage, product deterioration, and safety hazards. This proactive monitoring enhances energy efficiency and safeguards the integrity of the system by preventing failures and reducing energy consumption. It is compatible with all types of steam traps and can be installed on most kinds of steam installations and surfaces.

Figure 1.- InduEye® LeakSense/TempSense module

It provides a variety of module configurations and features:

- Single temperature measurement
- Dual temperature measurement.
- Ultrasound measurement (Only for InduEye® LeakSense module).
- Combined Ultrasound and temperature measurement (Only for InduEye® LeakSense module).
- Wireless output data reliability, delivering rich LoRa data, protected by state of the art industrial-grade security (when operated as part of a well-formed network).
- Simple and easy installation.
- Power configurations include a renewable energy generator module power supply as standard and external DC power as an alternative option.

2.2 Module parts

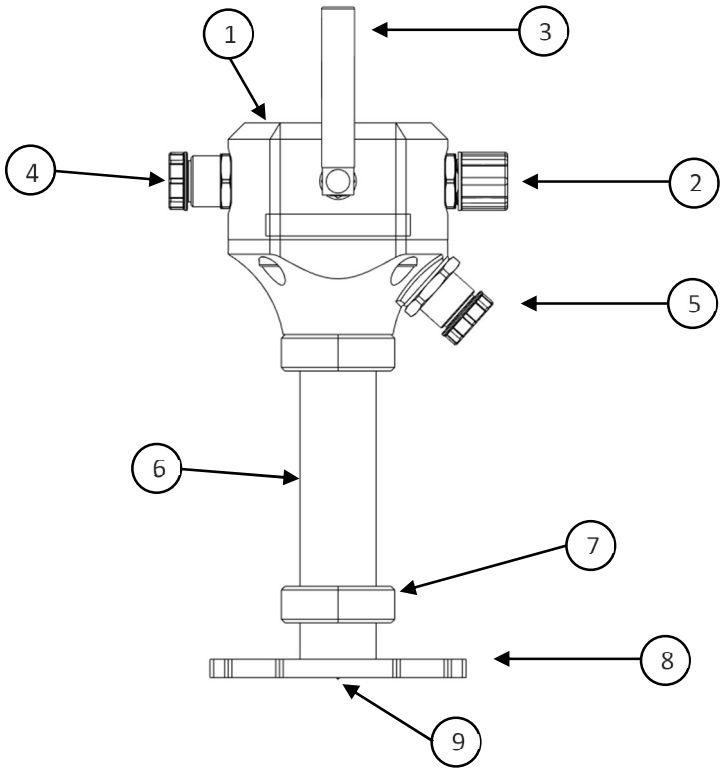
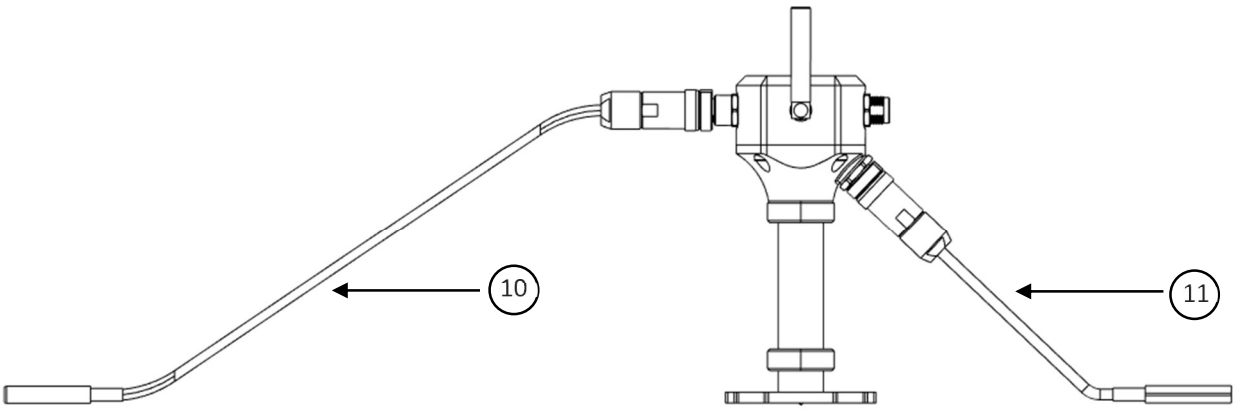


Figure 2 .- Components of InduEye® LeakSense/TempSense module

1. Electronics enclosure
2. Power supply connector
3. Antenna LoRa – Wireless communication
4. Temperature sensor connector 1
5. Temperature sensor connector 2
6. Anchoring support protector
7. Locknut
8. Mounting bracket
9. Wave guide (LeakSense module)



10. Temperature sensor 1 (SEN-0003)
11. Temperature sensor 2 (SEN-0003)

2.3 Functionality

2.3.1 Temperature measurement

Temperature measurement plays a vital role in industrial processes, as it directly affects product quality, operational safety, and overall efficiency. Temperature sensors measure only their own sensing element, so achieving optimal heat transfer between the process medium and the sensor is essential for obtaining fast and accurate readings.

Application and advantages

Non-invasive temperature measurement is commonly applied to pipelines. In this approach, the sensor is installed externally and does not penetrate the pipe wall or come into direct contact with the process medium. This eliminates risks such as leakage, contamination, and process interruptions. Additionally, non-invasive solutions are simple to install, can be added to existing systems with minimal effort, and typically require very little maintenance.

Comparison with invasive measurement

For applications that demand high precision, invasive temperature measurement is often preferred. In this case, the sensor is inserted directly into the process medium or housed within a protective enclosure that is in contact with it.

By contrast, non-invasive sensors are attached to the outer surface of pipes or vessels using a coupling interface. They measure the surface temperature, which—under optimal conditions—closely reflects the actual temperature of the process medium.

Influence of environmental conditions

External factors can affect the accuracy of both invasive and non-invasive measurements. Key influences include:

- Ambient temperature
- Thermal mass of surrounding materials
- Presence of air gaps
- Surface characteristics

To minimize these effects, thermal insulation at the measurement point is typically required. When non-invasive measurement is combined with effective thermal coupling between the pipe and the sensor, it can achieve response times and accuracy levels comparable to those of invasive methods.

2.3.2 Ultrasound measurement

Ultrasound technology is also widely used as a complementary diagnostic tool in industrial environments. It enables the detection of faults in components such as steam traps and valves by identifying high-frequency sound emissions generated by leaks, blockages, or improper operation. This method allows for quick, non-invasive inspection without interrupting the process, helping to improve system reliability and energy efficiency.

2.3.3 Measured Variables

Temperature and **Ultrasound**.

2.3.4 Working areas

The InduEye® LeakSense/TempSense module is suitable for all industries.

The module is suitable for monitoring the condition of steam traps and valves across a wide range of industrial steam systems. It is designed for non-intrusive, surface-mounted installation on steam lines, enabling the detection of steam leaks, blockages and condensate build-up. The module is applicable to most types of steam traps and

installation surfaces and is intended for use in industrial environments where steam is used for energy transfer or process heating.

2.4 Network configuration

To configure LoRaWAN connectivity, integrate with compatible gateways, and link to the Daevis platform, please refer to the full technical manual at the following link: https://aeinnova.com/download-center.

3 Installation

Prior to the installation process it is recommended to follow these instructions:

- Install the Wireless Gateway and verify it is working correctly before you activate the InduEye®.
- Connect the power supply to the InduEye® LeakSense/TempSense module only when you are prepared to commission the module.

 CAUTION	• The InduEye® LeakSense/TempSense module protection may be compromised if not utilized in accordance with the manufacturer's guidelines. • The InduEye® LeakSense/TempSense module has heat-sensitive components inside. Exposure to ambient temperatures above those specified in the section "Technical data" may reduce the lifespan of the module. • Avoid dropping, hammering or impacting the module housing before, during, or after installation. Always keep in mind the following safety instructions: • All electrical connections must be made by skilled and authorised personnel. • Only connect or disconnect in de-energized state. • When installing the module in potentially hazardous locations, ensure that the module is grounded to the machine case. • Failure to follow these installation guidelines may result in injury. • Use appropriate tools for all operations.

! NOTES	• **Install the module where radio signals have no obstacles, avoiding walls, pipes or other emitters.** • **Do not install the product in a location with a corrosive atmosphere. If this cannot be avoided, ensure there is adequate ventilation.** • **FOR ULTRASONIC MONITORING, THIS MODULE MUST BE INSTALLED DOWNSTREAM OF THE STEAM TRAP/VALVE TO ENSURE OPTIMAL ACOUSTIC SIGNAL DETECTION (only for InduEye® LeakSense 2).**

! NOTES	• Vertical orientation is recommended, although both the module and the temperature sensors can be installed in any orientation on the pipe. • Avoid installing the module and its cables in areas where people and/or goods pass through to prevent accidents. • Ensure proper thermal contact to ensure an accurate temperature measurement. • Bear in mind that if the piping section varies drastically (Piping flanges, for example) or if installed on other steam system components (valves, pressure gauges or non-return valves, for instance) the measured temperature values by the external temperature sensors may not represent those of the steam trap.

3.1 Installing the module on piping with metallic clamps (standard)

The InduEye® LeakSense/TempSense module and its sensors can be non-invasively installed on piping downstream of the steam trap/vale by clamping them using metallic clamps or similar non-permanent high-tension fixation methods. This method is suitable for pipes of unknown size.

Procedure:

1. Identify an appropriate installation surface for the module, as can be shown in Figure 4. Bear in mind that exposure to high surface temperatures of or high ambient temperatures above those specified in the section "Technical data" may result in the degradation of the IIoT Wireless module. Installation on a pipe is recommended. At least 80 mm pipe segment is required, to properly install the module.

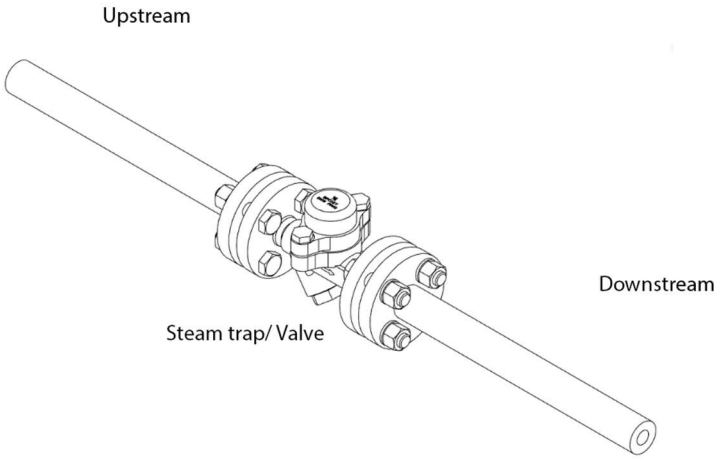


Figure 3.- Steam trap/valve: Installation place

2. Define the monitoring points to install the surface temperature sensors, as can be shown in Figure 4. 80mm pipe segment is the optimal installation surface, to ensure suitable thermal monitoring. Installation on irregular surfaces is not recommended, due to inaccuracies on the surface temperature measurement.

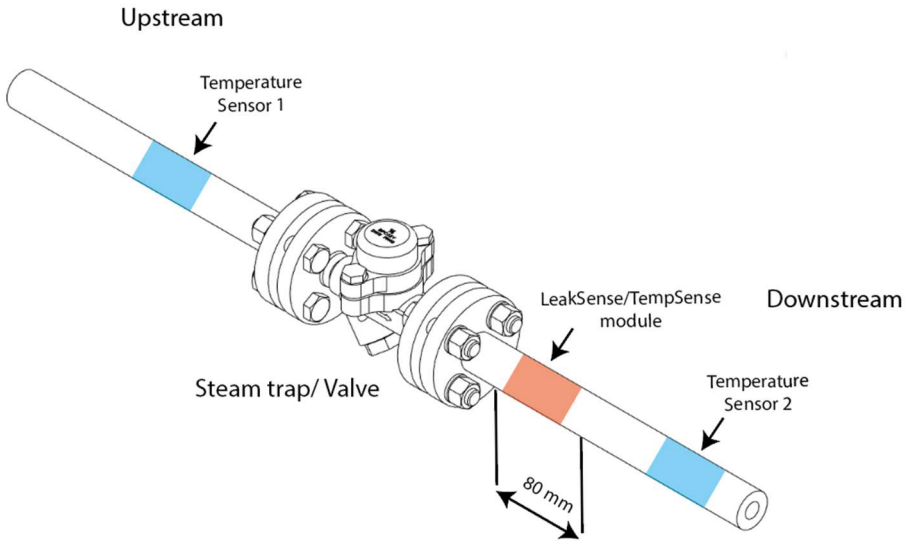


Figure 4.- Monitoring points selection

3. Once identified, clean the installation surfaces.

4. Place the metallic clamps on the piping and pre-tighten them, to facilitate following steps. Installation using two clamps for the module and one for each temperature sensor is recommended, as can be shown in Figure 5.

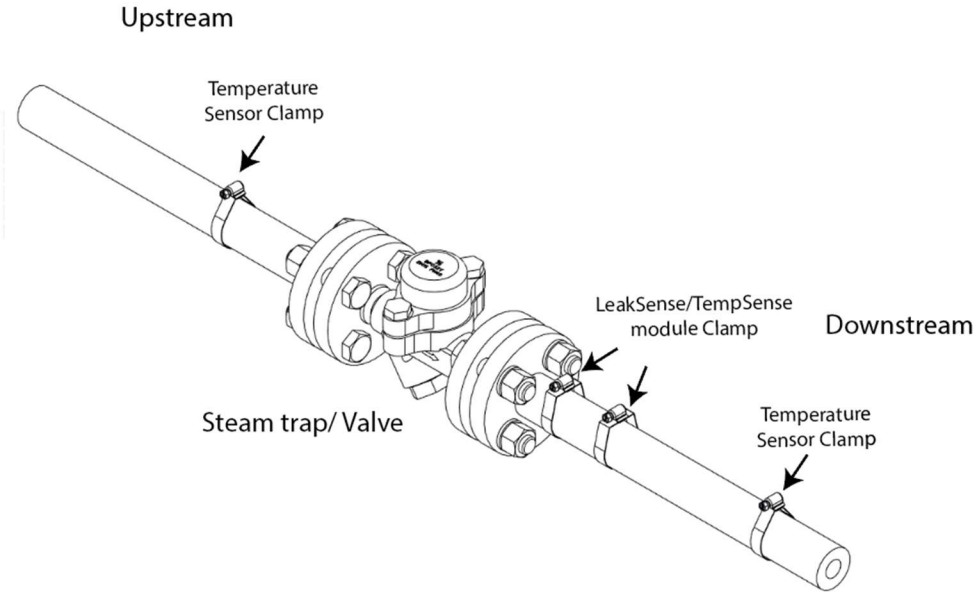


Figure 5.- Pre-clamping installation

5. Fix the module, with the metallic clamps placed on the standard mounting plate, by tightening the clamps. Ensure a firm and rigid union is achieved, as can be shown in Figure 6.

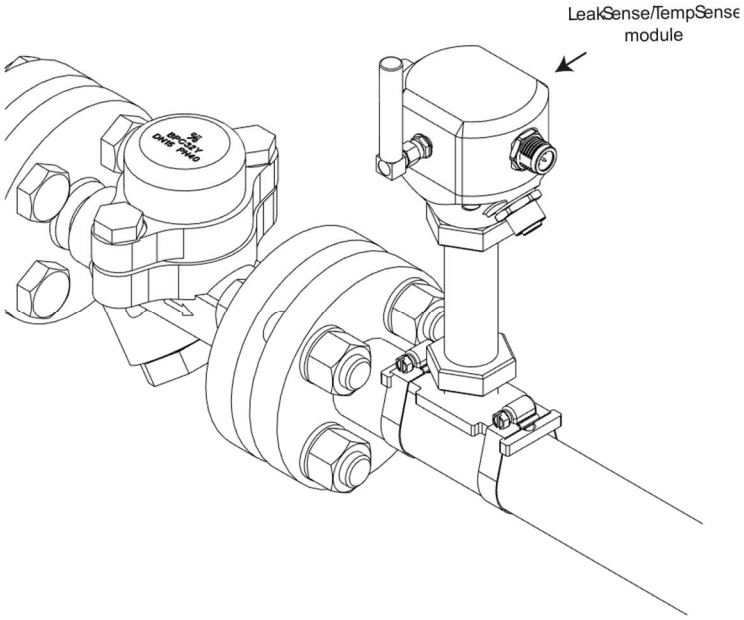


Figure 6.- LeakSense/TempSense module installation with standar method

6. For LeakSense module, it is essential to ensure that the waveguide is in firm and direct contact with the pipe surface, as proper acoustic coupling is critical for reliable measurement performance, as can be shown in Figure 7.

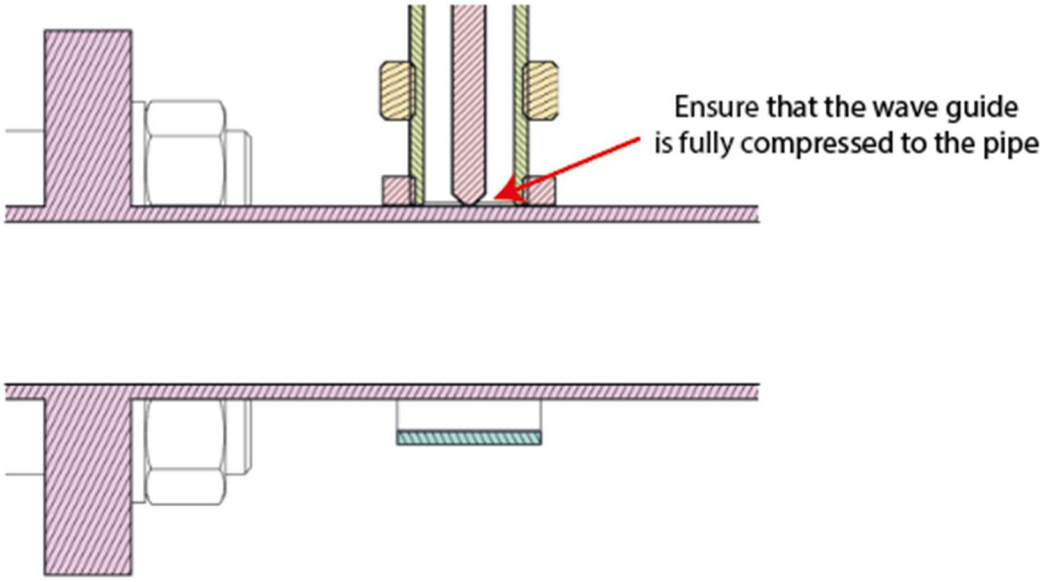


Figure 7.- Waveguide installation – Compression detail

3.2 Installing the module on piping with "rapid clamps" for pipes ½" to 1"

For faster and more repeatable installation, the module can also be mounted using the accessories supplied with the equipment. This configuration is specifically designed for steel pipes with diameters between 1/2" and 1".

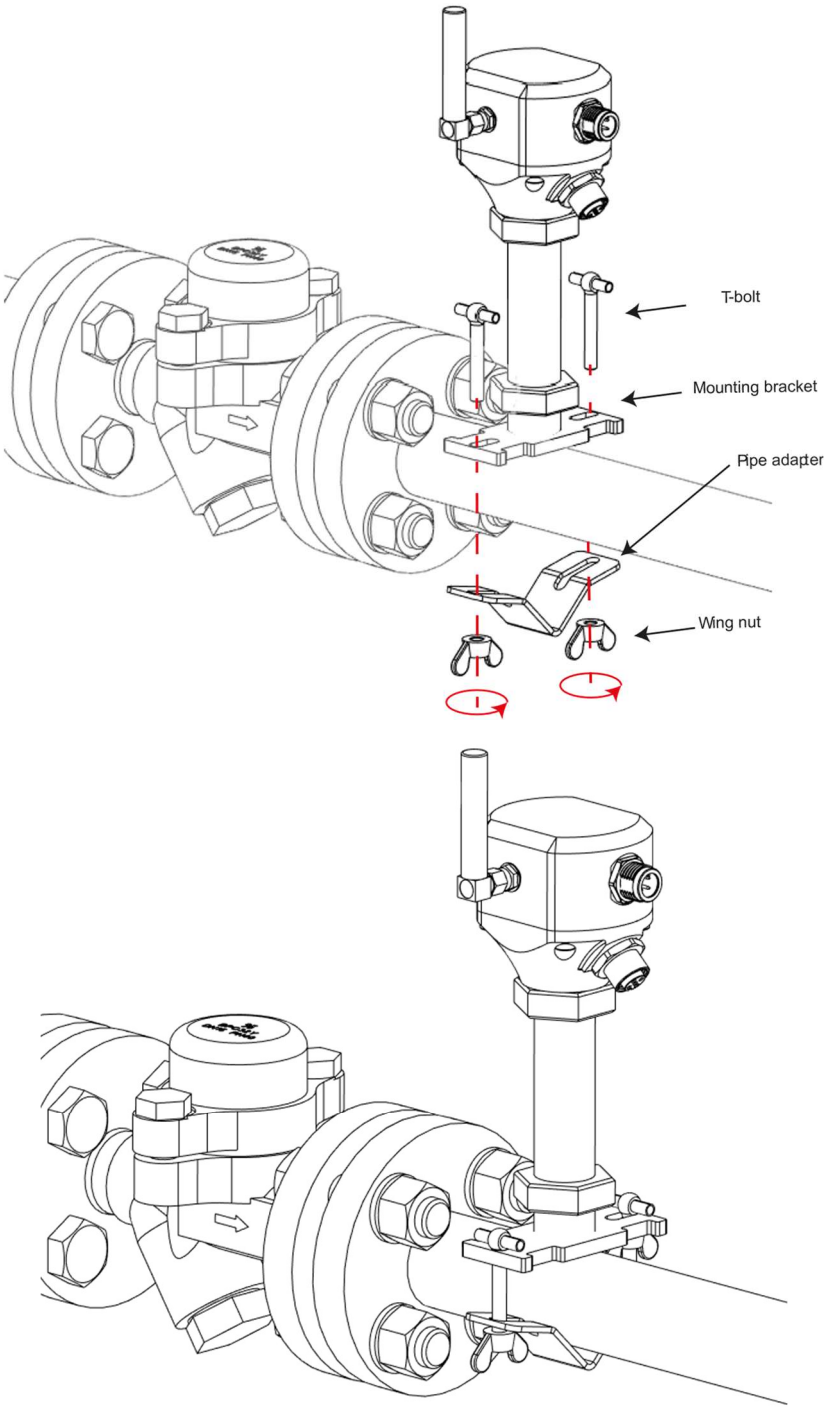


Figure 8.- LeakSense/TempSense module installation with "quick mounting" method

Procedure:

1. Identify an appropriate installation surface for the module as can be shown in Figure 4. Bear in mind that exposure to high surface temperatures of or high ambient temperatures above those specified in the section "Technical data" may result in the degradation of the IIoT Wireless module. Installation on a pipe is recommended. At least 80 mm pipe segment is required, to properly install the module.
2. Define the monitoring points to install the surface temperature sensors, as can be shown in Figure 4. 80mm pipe segment is the optimal installation surface, to ensure suitable thermal monitoring. Installation on irregular surfaces is not recommended, due to inaccuracies on the surface temperature measurement.
3. Once identified, clean the installation surfaces.
4. Insert the "T" bolt through the slots of the mounting bracket. Position the pipe adapter (MEP-0049) onto the bolts and secure it by tightening the wing nuts, as can be shown in Figure 8.
5. For LeakSense module, it is essential to ensure that the waveguide is in firm and direct contact with the pipe surface, as proper acoustic coupling is critical for reliable measurement performance, as can be shown in Figure 7.

3.3 Connecting the temperature sensors

Install the temperature sensors as close as possible to the stream trap/valve, in order to properly monitor the process temperature. The further away the temperature probes are installed, the greater the variation will be measured with respect to the actual temperature of the steam trap/valve.

Temperature sensor connector has a poka-yoke so that it cannot be inserted incorrectly into the InduEye® LeakSense/TempSense module. If the connector does not fit properly, please, verify the orientation to ensure the terminal is no harmed and proceed to introduce it effortlessly.

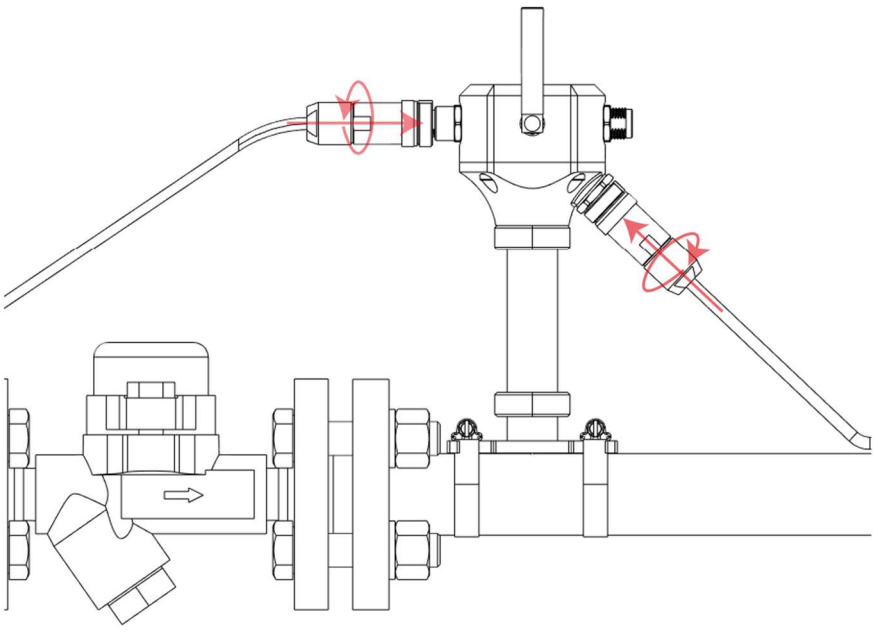


Figure 9.- Temperature sensor connection to the LeakSense/TempSense module

Procedure:

1. Inspect the input temperature sensor connector (4)(5) and the temperature sensor cable (10)(11) to be inserted for any obvious signs of damage or deterioration.

2. Insert and screw the temperature sensor cable (10)(11) connection male to the temperature sensor connector (4)(5) available in the IIoT Wireless module (Figure 2), as can be shown in Figure 9.
3. Tighten the sheathed from the temperature sensor (10)(11) with the metal clamp pre-installed. Ensure sufficient thermal contact for an accurate temperature measurement as can be shown in Figure 10.

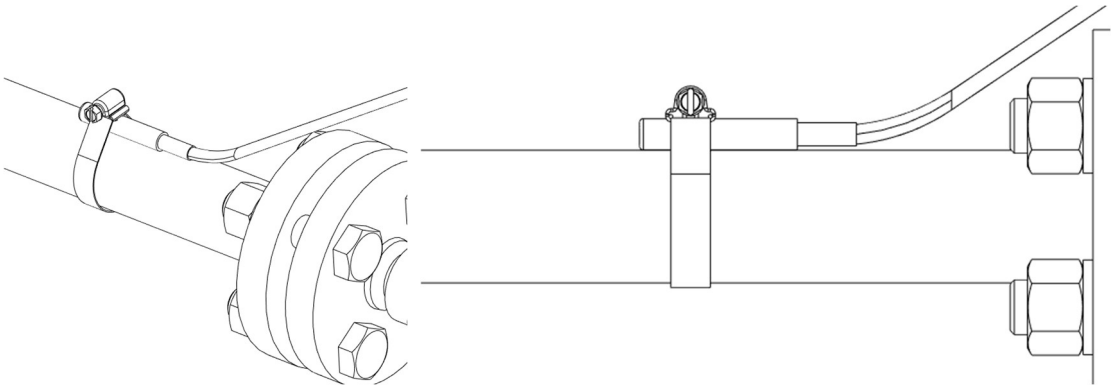


Figure 10.- Temperature sensor fixing on a pipe

4. Once installed, power the module by connecting it to the desired power supply.

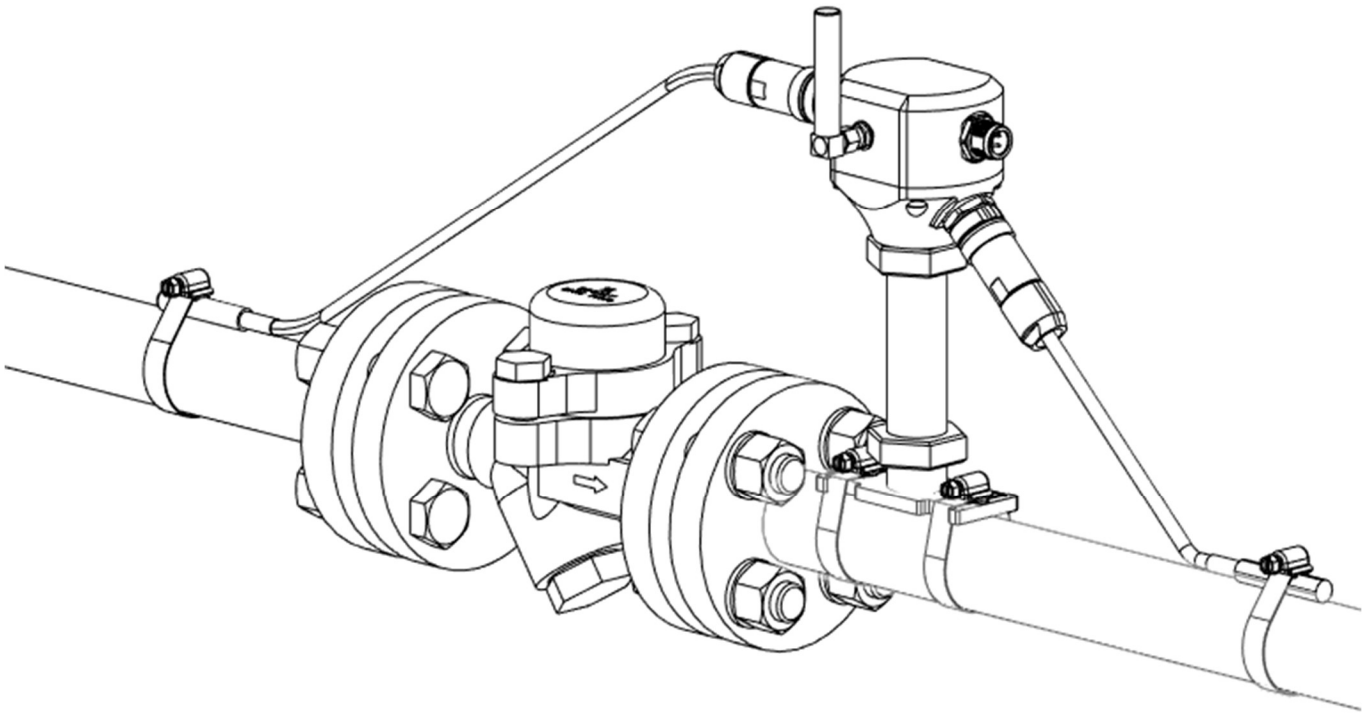


Figure 11.- LeakSense/TempSense installation overview

3.4 Powering the IIoT Wireless module with an energy generation module

For typical applications, Alternative Energy Innovations' IIoT modules use renewable energy sources such as heat, air or sunlight. In this section, we use the Thermoelectric generator, a module developed by Alternative Energy Innovations S.L. to transform heat into electrical energy, as an example.

For additional information, please refer to the Thermoelectric generator module User Manual.

The InduEye® LeakSense/TempSense module also has the possibility to be powered externally via a DC power supply. See section 0.

3.4.1 Preparing the connection

Warning	Always keep in mind the following safety instructions: • All electrical connections must be made by skilled and authorised personnel • Only connect or disconnect the module in de-energized state.

NOTES	• Refer to the chapter "Technical data" to know power supply input parameters. • Use cable with a circular cross-section. To guarantee a secure cable gland, choose the appropriate outside diameter based on the plug connection type. • Depending on the kind of power supply or signal input connection (for example, temperature), always use a cable assembly with a shielded cable and connector. • The power supply cable must only be connected to the module once it has been properly anchored.

3.4.2 Physical connectivity

The InduEye® LeakSense/TempSense module has been designed with safety in mind. The power supply connector is a poka-yoke so that it cannot be inserted incorrectly. If the connector does not fit properly, verify its orientation to ensure the terminal is not harmed and proceed to introduce it effortlessly.

The InduEye® LeakSense/TempSense module power supply connector is a M12x1 male plug, A-Code 4P circular connector, as seen in Figure 12.

Warning	All wiring should be done by a skilled electrician. Wiring must comply with all local norms and regulations. Follow local norms and regulations for wire type, size, colour, insulation voltage rating, and other parameters.

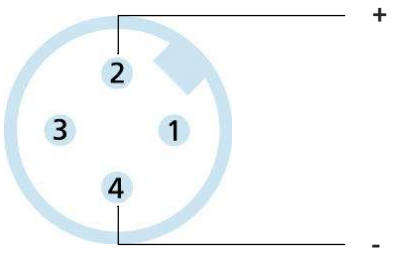


Figure 12.- InduEye® LeakSense/TempSense module Power supply connector M12x1, A-Code 4P – Pin configuration

Table 1.- Power supply connector pins configurations

Pin	Function
1	Not connected
2	**Power supply (+)**
3	Not connected
4	**Power supply (-)**

To supply power from the renewable power generator used such as a Thermoelectric generator (Figure 14) to the InduEye® LeakSense/TempSense module (Figure 13), the connection must be done via the power supply cable (CAB-0001) M12x1 A Code 4P Female connector.

Procedure

1. Inspect the power supply connector from the module and the cable to be inserted for any obvious signs of damage or deterioration.
2. Insert and screw the cable connection from the power generation module, in this case a Thermoelectric generator (male connector) to the InduEye® LeakSense/TempSense module power supply connector (female connector), as shown in Figure 13.
3. On the other side, from the power generation module, in this case a Thermoelectric generator, make sure the connection between modules is properly done (Figure 15).
4. Wait until the InduEye® LeakSense/TempSense module is charged, and the Gateway should start receiving data.
5. Secure the cable connection between modules to the machine 120-150mm away from the mounting location using an appropriately sized cable clamp. Do not coil the cable with a bending radius of less than 100mm (Figure 16).

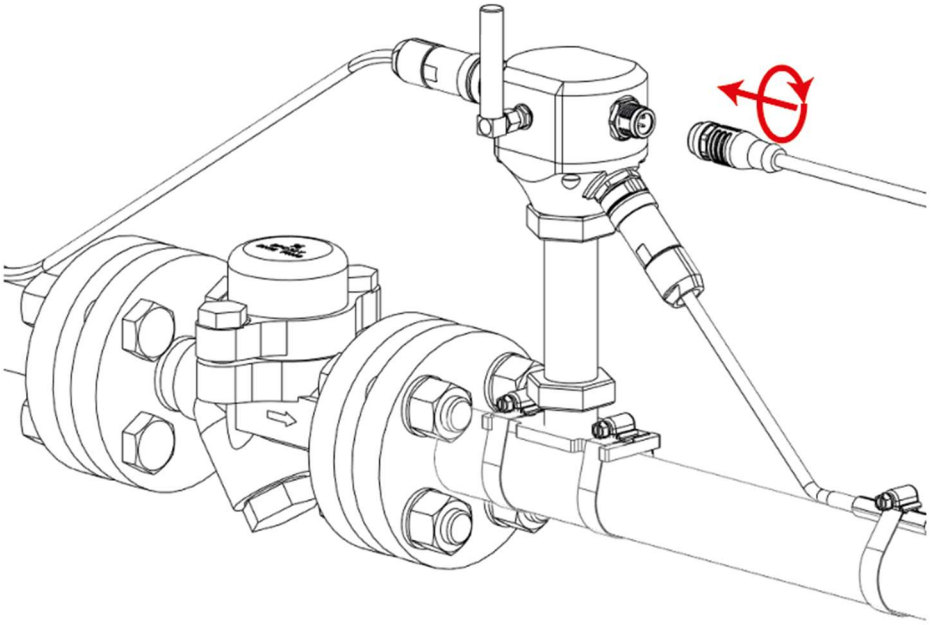


Figure 13.- Connecting the power supply to the InduEye®

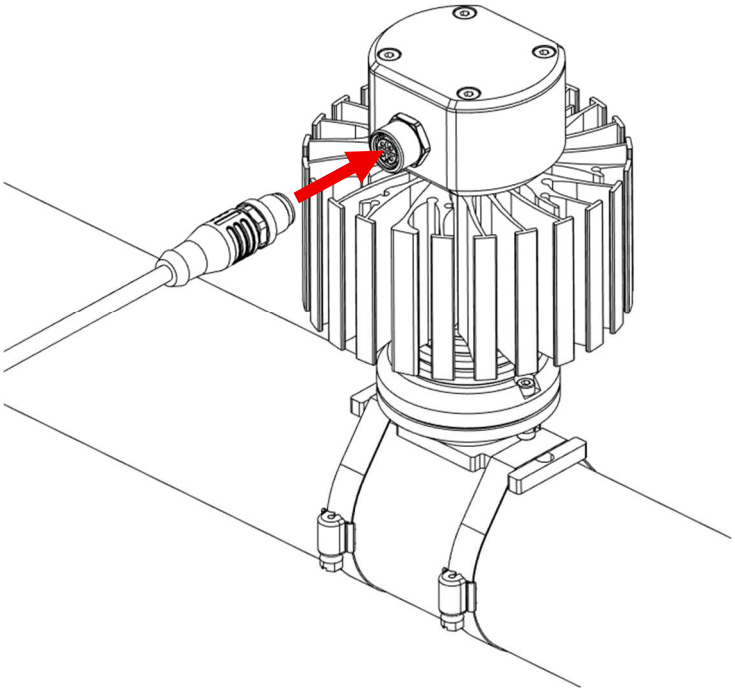


Figure 14.- Power supply (Thermoelectric generator module – Tube mounting) connection

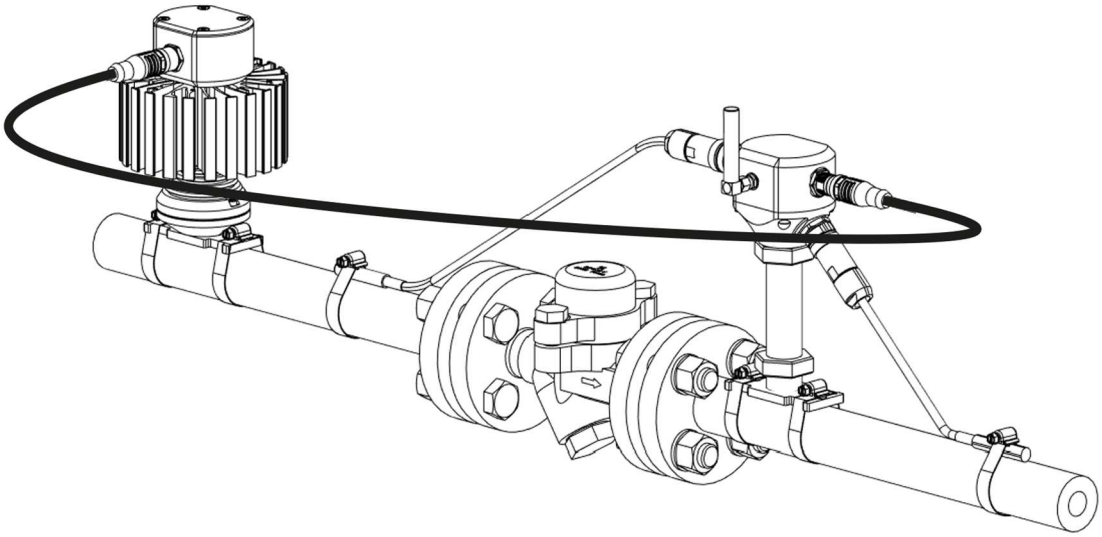


Figure 15.- Example of connection between the IIoT Wireless module (InduEye® LeakSense/TempSense) and the Generator module (InduEye® TG One module)

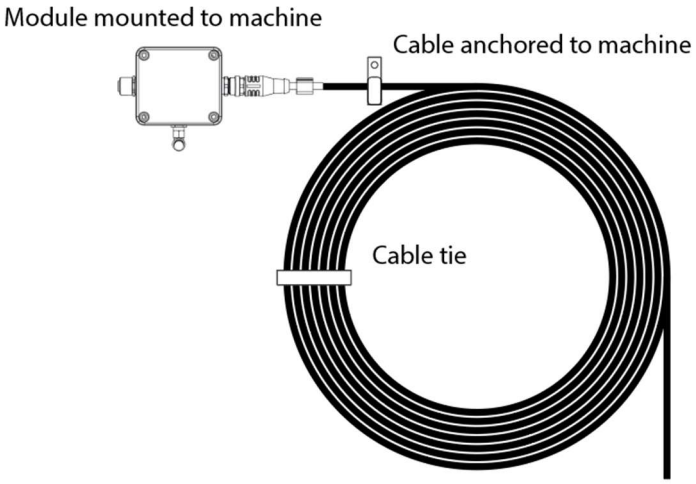


Figure 16.- Cable connection securing process

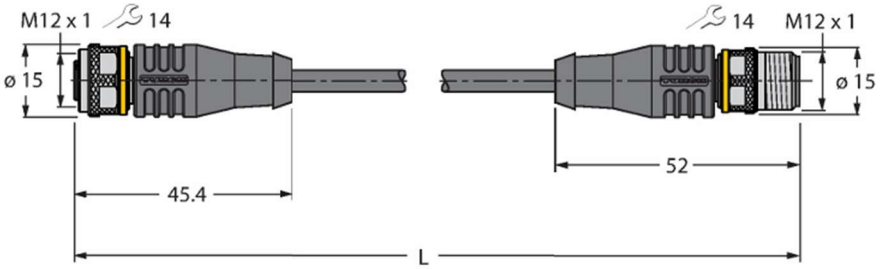


Figure 17.- Standard Male-Female cable M12x1 4P A-Code (CAB-0001) – Dimensions in mm

3.4.3 InduEye® LeakSense/TempSense module Start-up

Once the modules have been properly installed, the start-up should begin. The process unfolds as follows:

1. The Heat-intensive process starts.
2. The hot surface in contact with the Thermoelectric generator module heats up.
3. Once the hot surface reaches a temperature differential of approximately 30 ºC from the ambient temperature, the Thermoelectric generator module powers the InduEye® LeakSense/TempSense module and starts the charging cycle.
4. After the InduEye® LeakSense/TempSense module is fully charged, it proceeds to transmit data to the platform.

Figure 18.- Commissioning diagram (Temperature variation of the hot Surface in contact with the Thermoelectric generator module- blue line; InduEye® LeakSense/TempSense module charging process-orange line).

3.5 Powering the module with external DC power supply

The InduEye® LeakSense/TempSense module also has the possibility to be powered externally via a DC power supply. Refer to the chapter "Technical data" to know power supply input parameters and cable features.

The module must be supplied with external DC power via a cable with a M12x1 A-Code 4P female connection (Figure 20). If you decide to mount your own cable with an external connector (Figure 19), you must follow the pin configuration (Figure 20 and Table 1) and the mounting process described in Figure 21.

! NOTES	You must follow the instructions and procedures described in sections 3.4.1 and 3.4.2 to power the InduEye® LeakSense/TempSense module. **The external power supply used must comply with the safety requirements specified in the latest edition of the standard IEC 61010-1** **Output: 5 V DC ±10 %, 1 A** Use only a **CE-marked SELV power supply**. Ensure **correct polarity** when connecting the power supply. Incorrect polarity may damage the instrument. The instrument is designed for 5 V DC operation only. Higher voltages or AC voltages must not be applied.

Figure 19.- Field-Wireable female connector for externally powered modules M12x1 4P, A-Code

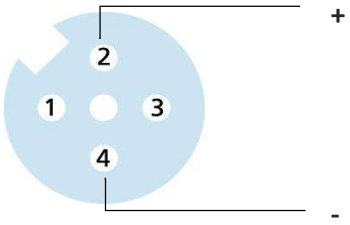


Figure 20.- Cable power supply M12x1 4P, A-Code female connector – Pin configuration

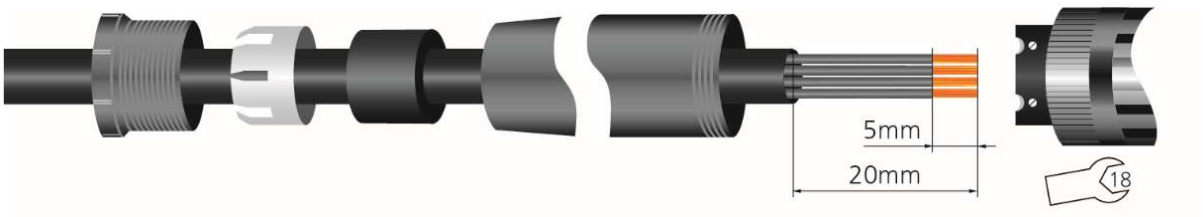


Figure 21.- Connection between cable and field-wireable connector

Warning	Even if the equipment is protected, none of its connectors should be left open and unconnected. This instrument **does not contain internal mains isolation**. **Do not connect the instrument directly to mains voltage**.

3.6 External temperature sensor connection (optional)

The InduEye® LeakSense/TempSense module can collect temperature measurements. This is achievable as the module temperature sensor connection already has an analogue input.

The temperature sensor to be connected can be a 2, 3, or 4-wire PT100 with shielded cable and installed on a M12x1 5P A-code male Field-Wireable connector with protective shielding.

To assure stable and reliable data transmission, attach the cable shield to the connector housing.

Depending on the number of wires of the temperature sensor, the following connection of the wires must be made on the Field-Wireable connector, as shown in Figure 22. If the temperature sensor has two wires, pins 3-4 and 1-5 of the Field-Wireable connector must be connected. If the temperature sensor has 3 wires, pins 3-4 must be connected, as shown in Figure 22 with red lines.

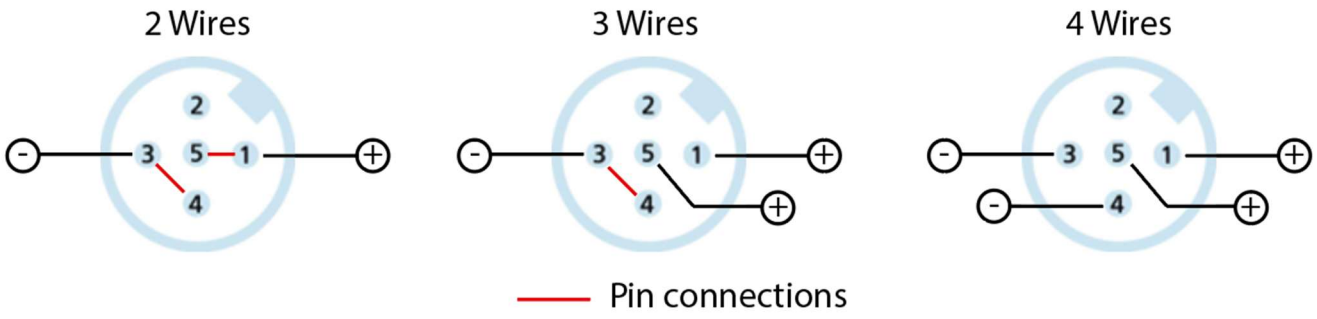


Figure 22.- Cable temperature sensor PT100 and Field-Wireable male connector M12x1 5P A-Code – Pin configuration

***Contact the supplier to obtain the appropriate sensor or to receive guidance on installing a custom sensor if required. ***

4 Servicing, diagnostics, and maintenance

4.1 Maintenance

- The responsibility for the safe use of this equipment lies with the user in accordance with the provisions of these instructions for use, as well as the technical documentation of each module supplied. Proper usage of the module eliminates the need for additional maintenance during regular operation.
- It is the user's responsibility to establish an Inspection and Maintenance plan for this equipment to guarantee its proper and safe use.
- Check the module's installation and stain condition. If any module becomes dirty or dusty, wipe with a soft cloth moistened with water or mild soap. Avoid using alcohol or acetone-based solvents to clean the module. The use of abrasive materials for cleansing purposes is strongly discouraged.

4.2 Troubleshooting

The system operator is responsible for taking appropriate measures to correct errors.

The module provides great reliability. However, problems may develop during operation. These can be caused by the following, e.g.:

- Process
- Signal processing
- Voltage supply
- Sensor

First fault rectification measures:

- Evaluation of fault messages
- Checking the output signal
- Treatment of measurement errors

5 Warranty

- The warranty shall cover the period noted on the quotation presented to the purchaser or the purchase agreement.
- If any problems are experienced with this product, the customer should contact the Alternative Energy Innovations' representative from which this product was purchased.
- If a problem arises with this product, please inform Alternative Energy Innovations of the nature of the problem and the circumstances under which it developed, including the model specification and serial number. Any diagrams, data and other information you can include in your communication will also be helpful.
- The party responsible for the cost of fixing the problem shall be determined by Alternative Energy Innovations following an investigation conducted by Alternative Energy Innovations.

The purchaser shall bear the responsibility for repair costs, even during the warranty period, if the malfunction is due to:

- Improper and/or inadequate maintenance by the purchaser or user.
- Malfunction or damage due to a failure to handle, use, or store this product in accordance with the design specifications.
- Use of this product in a location not conforming to the standards specified by Alternative Energy Innovations, or due to improper maintenance of the installation location.
- Failure or damage due to modification or repair by any party except Alternative Energy Innovations or an approved representative of Alternative Energy Innovations.
- Malfunction or damage from improper relocation of this product after delivery.
- Reason of force majeure such as fires, earthquakes, storms/floods, thunder/lightning, or other natural disasters, or disturbances, riots, warfare, or radioactive contamination.
- Not following any of the instructions indicated in this manual, especially those mentioned in section 3.

6 Technical data

! NOTES	The safety instructions included with the delivery apply to authorized modules (e.g., with Ex approval). These instructions may differ from those provided below, such as process conditions or voltage supply. All authorized documentation is available upon request and is supplied with the module.

6.1 Functional features

Model	NOD-0015, NOD-0016, NOD-0017, NOD-0018.
Input	DC input power supply
Output	• Temperature • LoRa Wireless enabled • Ultrasound

6.2 Physical features

Materials	Stainless Steel AISI316 (Enclosure, mounting bracket, waveguide), CuZn – Niquel plated (Connectors), (Antenna).
Weight	800 g
Enclosure rating	IP67
Impact protection	IK08
Pollution degree	3
Intended Use	Indoor and outdoor, on altitudes under 2000 m
Mounting	Mounting bracket (MEP-0016) (standard – For more information see section 3.1). ½" to 1" pipe adapter (MEP-0049) (Optional – For more information see section 3.2).
Input connections	1 x Input IP67 Power supply connector M12x1 4p A-Code Male (Power). 2 x Input IP67 temperature sensor connector M12x1 5P A-Code Female (Temperature sensor).
Output connections	---
Power Cable length	2 m (standard) to 10 m (on demand).

6.3 Working conditions

Ambient temperature	-20 °C to 50 °C (-4 °F to 122 F)
Ambient humidity	0 to 95 % RH
Maximum surface temperature in contact with the module	0 °C to 70 °C with 25 °C ambient temperature.

6.4 Electrical Features

Voltage supply	5 V DC
Current supply	1 A DC
Renewable Energy generator power supply	Yes (standard).
External DC power supply	Yes (optional).

6.5 Ultrasound sensor features

	NOD-0015, NOD-0017
Measured parameters	• RMS • Peak to Peak (g) • 0 to Peak (g) • Kurtosis • Crest Factor • Open-Close counter per minute
Frequency range	20 kHz to 50 kHz

6.6 Temperature sensor features

Measured parameter	Temperature in °C
Measurement range	-20 °C to 400 °C (-4 °F to 752 °F) (Depends on the temperature probe used)
Resolution	0.1 °C
Measurement element	External PT100 Probe
Temperature sensor cable length	500 mm (Standard) Other length (On demand)

6.7 Wireless features

Communication Protocol	LoRaWAN Class A EU868, AS923, AU915, US915
Data rate	5,5 kbit/s
Data Sending Frequency	Up to 6 transmission/h (configurable)
Coverage Range	Up to 2 km
Frequency	EU868: 863–870 MHz AS923: 923–925 MHz AU915: 915–928 MHz US915: 902–928 MHz
Radio Security	AES128-bit encryption
RF transmission power	EU868: max. 14 dBm AS923: max. 16 dBm AU915: max. 23 dBm US915: max. 23 dBm
Antenna	External omnidirectional antenna (2 dBi max)

* The antenna of the radio equipment must be a monopole antenna of 2dBi peak gain as supplied with the equipment (ref ANT-0001, please contact Alternative Energy Innovations in case you need replacement). If the above guidelines are not met, compliance with the EN 300 220-2 v3.1.1 standard is not guaranteed.

** The antenna of the radio equipment is a monopole antenna of 2dBi peak gain as supplied with the equipment (ref ANT-0001, please contact Alternative Energy Innovations in case you need replacement).

6.8 Regulatory compliance declarations

Ingress protection rating	IP67
Explosion-proof	ATEX Zone 2 and Zone 22 (NOD-0017/NOD-0018)
Certifications	• CE • FCC • ANATEL (Pending)

6.9 Dimensions

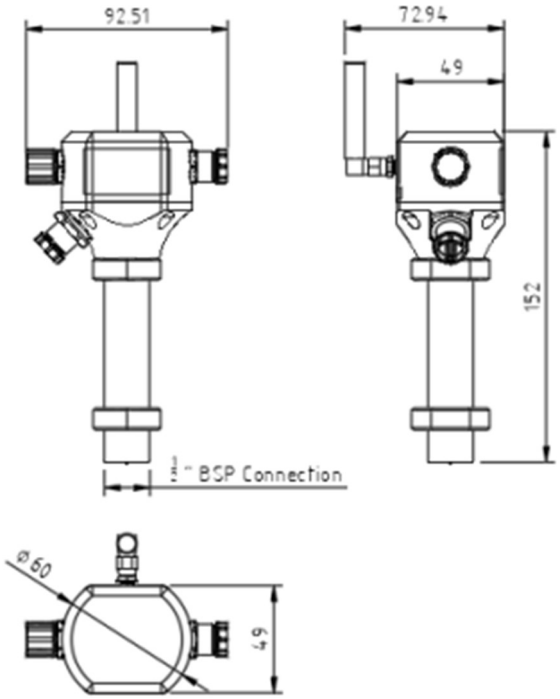


Figure 23.- InduEye® LeakSense/TempSense module - Dimensions in mm

7 Regulatory compliance statements and marking

Equipment with CE mark:

The equipment has been tested and complies with all relevant directives required for CE marking:

- Directive 2014/53/EU (RED) on Radio Equipment
- Directive 2014/30/UE (EMC) on Electromagnetic Compatibility
- Directive 2011/65/EU (RoHS) on Restriction of Hazardous Substances

Additionally, the InduEye® LeakSense LoRa Ex and InduEye® TempSense LoRa Ex modules comply with the following:

- Directive 2014/34/EU (ATEX) on equipment and protective systems intended for use in potentially explosive atmospheres.

The corresponding declaration of conformity is supplied with the product.

Equipment with FCC mark:

The equipment 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.

Contains FCC ID: XMR2024KG200Z.
The antenna used with this transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

This equipment complies with FCC radiation exposure limits set for an uncontrolled environment. To maintain compliance with FCC RF exposure guidelines, a minimum separation distance of 20 cm (8 inches) must be maintained between the antenna and all people during operation.

The equipment should be installed and operated in accordance with the instructions provided by the manufacturer. Failure to follow these instructions may result in exposure levels in excess of FCC limits.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