



NO INSTALLATION FEE

Our autonomous sensors can be easily mounted on hot or cold surfaces. The thermal losses from these surfaces power the sensors.

With MOÏZ, you no longer need kilometers of cables and overloaded cable trays!



NO MAINTENANCE

Our sensors are self-powered through a thermal energy harvesting solution and contain no batteries or wires. They are designed to operate maintenance-free throughout their lifetime.

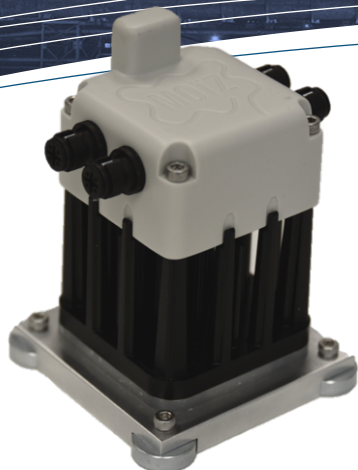


SUSTAINABLE APPROACH

Help conserve natural resources and reduce environmental impact by eliminating the need for lithium battery production, resulting in a more sustainable and eco-friendly solution

HARVESTREE

BATTERYLESS & WIRELESS DATA ACQUISITION NODE

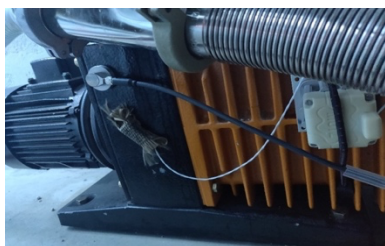


The Harvestree module is an innovative solution for wireless data acquisition for industrial sites. Its batteryless design and ability to convert heat into electricity make it a highly efficient and sustainable option. With compatibility with various LPWAN technologies and the ability to support multiple sensors, it's a versatile and flexible solution for a large range of applications.

The module's rugged construction and waterproof design ensure reliable operation in harsh environments, without the need for battery replacements or maintenance. All it requires is a temperature difference of around 10°C between the surface on which it's mounted and the ambient air.

MAIN APPLICATIONS TYPES

The Harvestree module addresses a wide range of industrial applications, demonstrating a particular suitability for industries such as steel, cement, glass, chemical, agri-food, and pharmaceutical production, as well as railway, smart grid, and rotating machine monitoring. Harvestree provides on-site data that are crucial for implementing process optimization and energy-saving strategies for industrial processes, as well as for equipment maintenance.



Monitoring pump health through real-time vibration analysis

Aluminum Electrolysis process monitoring



A few use cases illustrations



Railway tracks temperature monitoring

anomaly tracking in electrical transformer parameters



PRODUCT DESCRIPTION

- 1- Aluminum baseplate for waste heat recovery (includes a temperature sensor)
- 2- Aluminum heatsink
- 3- Magnetic mounting system
- 4- Fully potted electronics covered by glass fiber reinforced Polyamide cap
- 5- Waterproof industrial connectors for external sensors
- 6- Internal radio antenna



Rugged design for industrial environment

Dimensions	64mm x 64mm x 92 mm
Weight	280 g
Waterproof IP rating	IP 68
Impact protection rating	IK 7 (i.e the equivalent to the impact of a 0.5kg mass dropped from 400mm above the impacted surface)
Mounting options	Magnets (available for surfaces up to 450°C) Bonding, screws or pipe clamps with flanges
Intrinsic safety* (Compliance with hazardous locations)	
Tests	Salt spray test (ISO 9227) Vibrations Thermal cycling

*available Q4-2024 (as an option)

Wide temperature operating range

Baseplate operating temperature	From -80°C up to 180°C (standard reference) The baseplate can withstand and operate at temperatures exceeding 180°C when used with an additional insulating layer under the base
Electronics operating temperature	From -20°C up to 80°C For baseplate temperatures above 120°C, thermal protection is placed between the electronics and the heatsink
Recommended storage temperature	From -10°C up to 45°C

RADIO COMMUNICATION

Harvestree module uses LoRaWAN long-range and low-power wireless technology that offers extended connectivity and bidirectional communication, enabling real-time data transfer and remote device control. It's ready to be integrated with a LoRaWan private Lan or connected to a nation-wide operator network using 868Mhz European frequency, 915 Mhz (US, Canada) and AU 915 (Australia, NZ, Brazil, Argentina).



Within a LAN, LoRaWAN operates on a license-free frequency band, reducing deployment and operating costs. It supports connectivity for thousands of devices on a single gateway, enabling easy deployment of large-scale networks with enhanced security through end-to-end encryption and device authentication.

The Harvestree node operates efficiently even with minimal temperature differentials. It enables unparalleled data transmission frequencies, as demonstrated in the following table, which provides the radio transmission periods depending on the available temperature gradient:

Transmission period →		24h	12h	1h	30mn	10mn	5mn	3mn	1mn	30 s
Range + Transmission rate +	DR5-SF7	6° C	6° C	6° C	6° C	6° C	7° C	8° C	10° C	20° C
	DR4-SF8	6° C	6° C	6° C	6° C	6° C	7° C	8° C	12° C	25° C
	DR3-SF9	6° C	6° C	6° C	6° C	6° C	7° C	8° C	13° C	30° C
	DR2-SF10	7° C	7° C	7° C	7° C	8° C	9° C	14° C	17° C	
	DR0-SF12	9° C	9° C	9° C	9° C	12° C	18° C	22° C	Off Duty cycle (Europe)	

Information provided is for illustrative purposes and guidance only

The Harvestree node is engineered to seamlessly interface with up to 4 sensors, among a wide range of sensors type, providing flexibility to :

- integrate sensors already validated and utilized within your organization,
- select from the plug & play offerings of MOIZ catalog (please ask us), or
- procure sensors from the wider market.



Harvestree fitted with a vibration sensor and an external Pt1000 probe

To guarantee compatibility, chosen sensors should align with the specifications detailed in the following table:

Internal sensor	Pt1000 sensor embedded within the aluminum base (<i>B class with +/- 1°C accuracy</i>)
External sensors	4 inputs equipped with waterproof 4-wire connectors
Sensors power	In its standard configuration, the Harvestree node can power the 4 sensors up to a voltage of 3.3V (<i>For voltages exceeding 3.3V, please reach out to us directly</i>)
Sensor compatibility	- Any Pt1000 probe or K-type thermocouple (<i>temperature</i>) - Any analog signal ranging from -500 mV/+500 mV or positive only from 0 to 3V - Any I²C sensor (<i>temperature, humidity, pressure, moisture, hall-effect, gas sensor, light sensor, distance, and many more</i>) - Any dry contact input (<i>control of openings, status of equipment or power supply,...</i>) - And much more (<i>strain gauge, displacement gauge,...</i>)

The table below lists some typical external sensors employed for specific use cases:

Use cases examples	External sensors																		
Surface temperature of industrial pipes	Contact Thermocouple or Pt1000 probe with fastening																		
Temperature of flat surfaces of machinery, industrial process tanks, transformers busbars,...	Contact Thermocouple or Pt1000 probe																		
Non-contact measure of ultra-high temperature of surfaces (like molten metal)	Infrared temperature sensor (3V - I²C) Example of a contact-less Infrared Sensor - MLX90614 3V integrated within a custom casing (-70°C to +380°C for object temperature with a accuracy of 0.5°C)																		
Temperature of an industrial fluid inside a pipe	Thermocouple or Pt1000 probe within a thermowell																		
Rotating machine vibration monitoring	Vibration sensor (3.2 V power supply) Example of compliant sensor (Kemet VS-JV10A) <table border="1"> <thead> <tr> <th colspan="2">Kemet VS-JV10A</th> </tr> </thead> <tbody> <tr> <td>Specifications</td> <td></td> </tr> <tr> <td>Temperature Range</td> <td>-25/+85°C</td> </tr> <tr> <td>Power Supply Voltage</td> <td>3.2 - 5.5 VDC</td> </tr> <tr> <td>Protection</td> <td>IP67 and oil-resistant</td> </tr> <tr> <td>Sensitivity</td> <td>10 mV/m/s²</td> </tr> <tr> <td>Frequency Range</td> <td>10 - 15,000 Hz</td> </tr> <tr> <td>Measuring Range</td> <td>+/-100 m/s²</td> </tr> </tbody> </table>	Kemet VS-JV10A		Specifications		Temperature Range	-25/+85°C	Power Supply Voltage	3.2 - 5.5 VDC	Protection	IP67 and oil-resistant	Sensitivity	10 mV/m/s ²	Frequency Range	10 - 15,000 Hz	Measuring Range	+/-100 m/s ²		
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Moisture level in Oil monitoring: Insulation (power transformer), lubrication (Gearbox), transmission and hydraulic oils (hydraulic machinery and equipment)	Temperature/Humidity sensor (3V - I²C) Example of compliant sensor (IST HPM.HYT.271.M.0.SK.SA.S) <table border="1"> <tbody> <tr> <td>Operating voltage:</td> <td>2.7 V to 5.5 V</td> </tr> <tr> <td>Current consumption (nominal):</td> <td><22 µA at 1 Hz measuring rate; 85 µA max.</td> </tr> <tr> <td>Current consumption (sleep):</td> <td><1 µA</td> </tr> <tr> <td>Digital interface:</td> <td>I²C, default address 0x28</td> </tr> <tr> <td>Operating voltage (limits):</td> <td>-0.3 V to 6 V</td> </tr> <tr> <td>Storage conditions:</td> <td>-10 to +90 °C Please refer to I²C application note for packaging recommendations</td> </tr> <tr> <td>Housing material:</td> <td>Stainless steel 1.4571</td> </tr> <tr> <td>Process connector:</td> <td>M8x1.5 mm</td> </tr> <tr> <td>Cable:</td> <td>4x AWG 24, 300mm, open ends</td> </tr> </tbody> </table>	Operating voltage:	2.7 V to 5.5 V	Current consumption (nominal):	<22 µA at 1 Hz measuring rate; 85 µA max.	Current consumption (sleep):	<1 µA	Digital interface:	I ² C, default address 0x28	Operating voltage (limits):	-0.3 V to 6 V	Storage conditions:	-10 to +90 °C Please refer to I ² C application note for packaging recommendations	Housing material:	Stainless steel 1.4571	Process connector:	M8x1.5 mm	Cable:	4x AWG 24, 300mm, open ends
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Your specific use case	To ensure you the seamless integration of sensors into your specific use-case environment, MOIZ will assist you in selecting the most suitable sensors and provides expertise in crafting tailored solutions. This includes designing mounting fixtures for sensors or integrating them as electronic components within specialized casings, all made possible by our CAD design proficiency and rapid prototyping capabilities.																		