

Smart Vibration & Condition Monitoring Sensor

Permanently installed multi-channel sensor with on-board analysis, TFT status display and single-cable PoE Ethernet in a stainless steel IP69 housing



This smart sensor is designed for the permanent condition monitoring of rotating machinery. It combines triaxial vibration, ultrasonic acoustic emission, magnetic field, a phase marker input and non-contact infrared surface temperature in one compact housing, and evaluates all signals directly at the measuring point.

The sensor works as a stand-alone measurement server. One PoE Ethernet cable supplies power and data. Configuration, live values and analysis results are available through a built-in web interface in any standard browser, with no additional software to install. The full-colour TFT display shows the machine condition directly at the sensor: green for OK, red/orange for alarm.

Measured parameters and alarms are available via Modbus TCP for automation, alarm and monitoring systems. Data can also be sent to a cloud platform for remote monitoring and detailed diagnostics.

Typical machinery

Pumps, fans, compressors, separators, electric motors, generators, gearboxes and other rotating equipment, on board and ashore.



Key Features

Multi-channel measurement

Triaxial vibration, high-frequency Z-axis, ultrasound, magnetic field, phase marker and IR temperature

Status at a glance

Full-colour TFT display with measuring point name, standard, current value and alarm status

Web-based configuration

Built-in web interface, password and PIN protection, no software installation required

8 GB on-board memory

Trend values and full time waveforms stored locally in a circular buffer

On-board analysis

Up to 32 analysis functions with 3 independent alarm levels each, organised in 4 analysis groups

Single-cable installation

PoE IEEE 802.3af/at for power and data, M12 industrial connectors

System integration

Modbus TCP (2 ports), solid-state alarm relay, cloud connection, SNTP time sync

Extremely rugged

Stainless steel housing, IP69, resistant to high-pressure water jets and steam cleaning

Analysis Functions and Detectable Faults

Available analysis types

- Spectral RMS (e.g. vibration velocity 10–1000 Hz per ISO 20816)
- Peak-peak, crest factor and average values
- Envelope peak-peak for rolling bearing diagnostics
- Sound pressure level (dB SPL)
- 1X phase, 1X frequency and frequency magnitude
- IR object temperature

Typical faults

- Unbalance, misalignment and looseness
- Rolling bearing damage and lubrication deficits
- Gear damage
- Electrical faults in motors and generators
- Resonances and critical speeds
- Overheating of bearings and housings

Analysis groups can be switched via Modbus TCP, for example to adapt thresholds to different operating states of the machine.

Technical Specifications

Vibration (CH1 / CH2 / CH3)	
Triaxial MEMS accelerometer	X, Y, Z: $\pm 156 \text{ m/s}^2$ ($\pm 16 \text{ g}$), 0 to 6.4 kHz (-3 dB) Selectable ranges: ± 78 / ± 39 / $\pm 19 \text{ m/s}^2$
Precise Z-axis accelerometer (CH1)	$\pm 490 \text{ m/s}^2$ ($\pm 50 \text{ g}$), 0 to 15 kHz (-3 dB) Fixed range, for high-frequency bearing diagnostics
High-pass filter	1 Hz (-3 dB), selectable (CH1, CH4, CH5)
Acoustic (CH4)	
MEMS ultrasonic microphone	$\pm 140 \text{ Pa}$, max. 120 dB SPL 15 Hz to 51.2 kHz (-3 dB), Z-axis
Magnetic field (CH5) and phase marker (CH6)	
Hall-effect sensor	$\pm 3 \text{ T}$, 0 to 15 kHz (-3 dB), X-axis
Phase marker input	Digital, rising edge $\geq 3 \text{ V}$, max. 30 V DC
Temperature	
IR object temperature	Non-contact, -40 to +130 °C, Z-axis Emissivity 0.01 to 1.00 (default 0.95)
Sensor temperature	-30 to +110 °C (device health monitoring)
Data acquisition and storage	
Sampling frequency	4096 / 8192 / 16384 / 32768 / 65536 Hz
Time waveform length	1 to 16 s
Analysis functions	Up to 32, 3 alarm levels each with delay, 4 analysis groups
On-board memory	8 GB flash, circular buffer Up to 499,999 trend records Up to 4,287 time waveforms

Network and communication	
Ethernet	10/100Base-TX, M12 D-coded 4-pin Max. cable length 100 m (CAT5e or better)
Protocols	Modbus TCP (ports 502 and 503) HTTP web interface (port 80) Cloud connection (TCP port 5000) SNTP time synchronisation
Firmware update	OTA (over the air) via network
Security	Password and PIN protected configuration
Power supply	
PoE	IEEE 802.3af (Class 3, 15.4 W) IEEE 802.3at (Class 4, 30 W)
Relay output and I/O (M12 A-coded 5-pin)	
Relay output	Isolated solid-state relay, max. 30 V DC NO / NC configurable, trigger: alarm 1 / 2 / 3
Auxiliary supply output	12 V DC for external low-current devices
Digital input	Phase marker / external trigger
Display	
TFT status display	Full colour: measuring point, standard, current value, time stamp, OK / ALARM
Environment and mechanical	
Operating temperature	-20 to +70 °C
Storage temperature	-40 to +85 °C
Protection	IP69, high-pressure water jet and steam cleaning resistant
Housing	Stainless steel
Mounting	Stud mounting via thread or magnetic mounting
Conformity	
Certification	CE, RoHS, WEEE 2012/19/EU

Installation Notes

- Mount on a clean, flat and rigid surface, ideally on or near the bearing housing (ISO 13373-1)
- Recommended surface roughness $R_a \leq 3.2 \mu\text{m}$
- Z-axis perpendicular to the mounting surface, which is also the IR measuring direction
- Use only certified PoE switches or injectors, no passive PoE
- Cables, PoE switch/injector, mounting hardware and M12 mating connectors are not included as standard
- No user-serviceable parts, do not open the housing

Due to continuous product development, specifications are subject to change without notice.