

M o S e

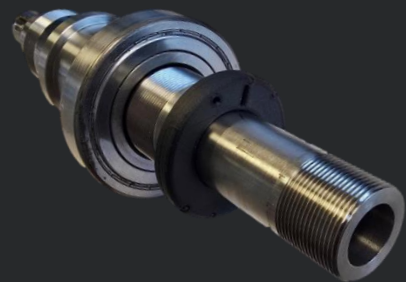
Concept Introduction

SMART MOTOR SENSOR SYSTEM



Wireless Temperature and Vibration Sensor

For Critical Parameter Monitoring and
Predictive Maintenance



MoSe Sensor

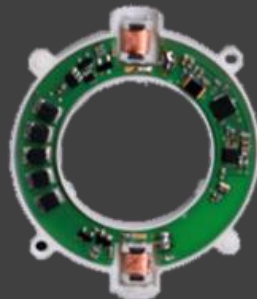
Wireless Monitoring of Critical Machine Parameters

Abstract

MoSe Sensors, unlike existing products or systems, monitor critical machine parameters such as temperature and vibration directly on the rotating motor shaft. A main development target is to protect electrical machines from thermal overload and atypical vibrations without delay.

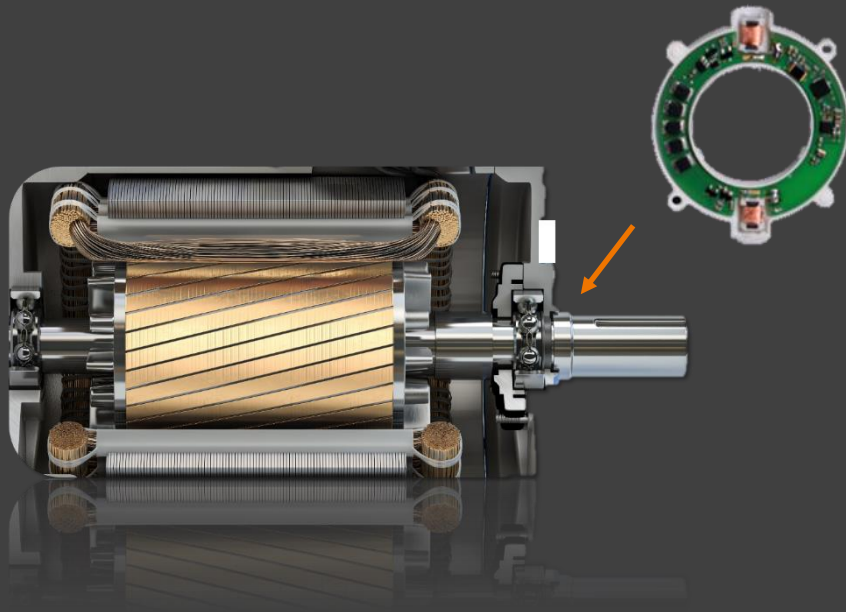
MoSe Sensor Systems compare real time measurements with reference data from the digital machine twin for fault prediction, maintenance planning and higher machine availability.

MoSe Sensors utilise energy harvesting, are powered by the machine`s stray fields and do not require external power supply. They are designed to protect rotor windings or rotor permanent magnets from synchronous machines from overheating and atypical vibrations resulting in machine malfunctions or lower efficiency.



MoSe

MoSe – The sensor for motor condition monitoring

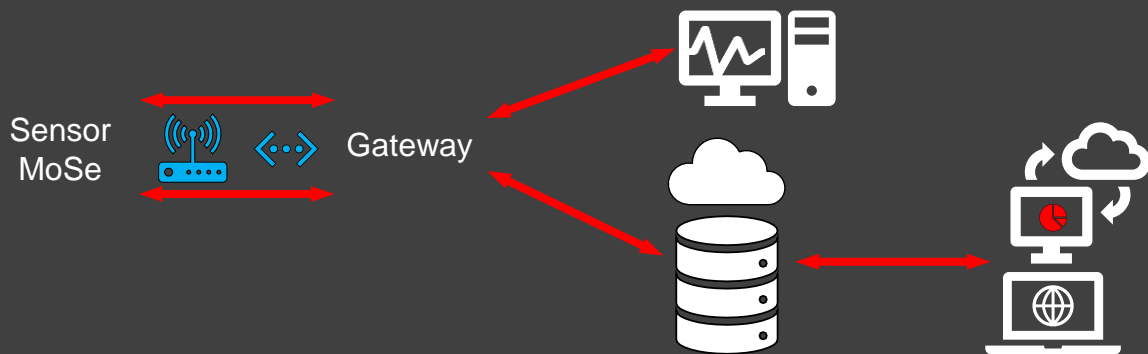


Advantages

- ✓ Monitors critical machine parameters on the motor shaft
- ✓ Senses temperature, vibration and motor speed
- ✓ Power supply through energy harvesting from stray fields
- ✓ Digital twin for error prediction and preventive maintenance
- ✓ Fault detection and fast response to atypical operating conditions through real - time data acquisition
- ✓ Reduced machine downtime and higher operational efficiency

MoSe - The motor sensor as a monitoring system

- The system consists of a sensor and a gateway
- Measured data are visualized and saved on PC / Cloud
- Data communication via bi-directional radio coupling to the gateway
- Transmission of the sensor operational status to the gateway for link stability and data integrity
- Shaft adapters - two versions covering standard industrial motors form shaft diameter classes 63 to 280M2



Methods for measuring and transferring critical parameters

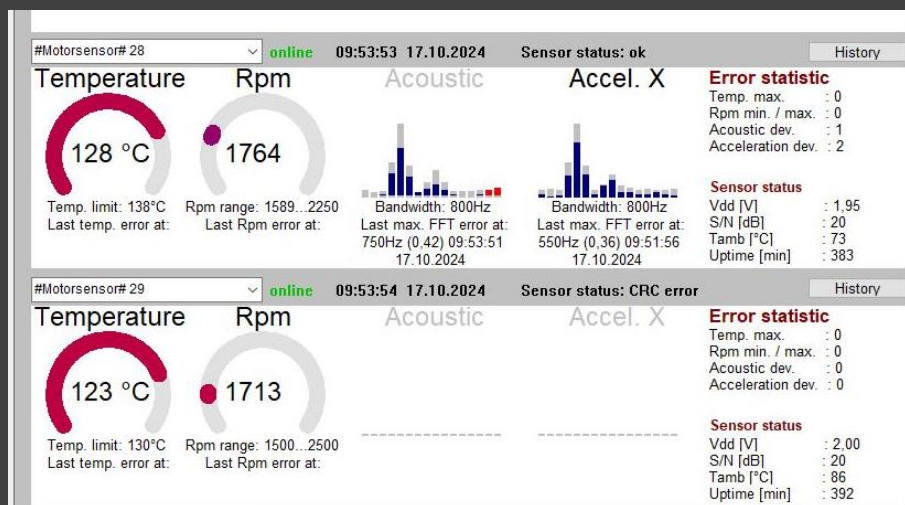
- ✓ Non-contact temperature measurement
- ✓ Detection of faulty bearing noises via audio spectrum
- ✓ Detection of vibrations via 3-D acceleration sensor
- ✓ RPM via rotation i.e. acceleration sensor
- ✓ Wireless data transmission
- ✓ Energy harvesting from stray fields



MoSe - Evaluation and Display of Sensor Data

Measurement data can be visualized on PC

- New sensors are registered automatically in a data base
- All results are archived in a ring buffer for two months
- Error states are recorded permanently with a time stamp
- Evaluation limits can be set individually
- A digital twin stores the reference patterns e.g. the fault-free state of the drive system.
- Atypical operating conditions can be detected and visualized



Parameters and data are shown in distinctive display areas:

- ✓ Temperature, RPM, Acoustic, Acceleration (X/Y/Z)
- ✓ Error statistic

MoSe - Analysis of sensor data

- Each sensor has its individual address. The mounting location can be described by the sensor name.
- The sensor status is highlighted in colour in the address area.
- An interrupted connection or machine fault is signalled via the sensor status with a time stamp.

Start sensor scan Configuration #Motorsensor# 29 online 10:52:55 29.10.2024 Sensor status: ok

Addr.	Sensor name
27	#Motorsensor# 27
28	#Motorsensor# 28
29	#Motorsensor# 29
30	#Motorsensor# 30

- Supplementary to the tabular overview detailed sensor data can be visualized in four display areas.
- Most recent error states are displayed below the selected parameter range.
- Sensor functions that are not activated are greyed out.

Temperature

128 °C

Temp. limit: 138°C
Last temp. error at:

Rpm

1698

Rpm range: 1589...2250
Last Rpm error at:

Acoustic

Bandwidth: 800Hz
Last max. FFT error at:
0Hz (0,40) 10:56:5178
29.10.2024

Accel. X

Bandwidth: 800Hz
Last max. FFT error at:
0Hz (0,33) 10:54:5517
29.10.2024

Error statistic

Temp. max. : 0
Rpm min. / max. : 0
Acoustic dev. : 887
Acceleration dev. : 315

Sensor status

Vdd [V] : 1,79
S/N [dB] : 24
Tamb [°C] : 71
Uptime [min] : 382

- The normal operational machine states can be used as a digital twin for the audio or acceleration / vibration spectrum as evaluation reference. Tolerances can be set.

Sensor Fingerprint Update sensor:

New address

RS232 Port

Samples

Tolerance %

AD Info

0%

Stop and Clear

MoSe

Concept Introduction

SMART MOTOR SENSOR SYSTEM

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