

IMS – Integrated Monitoring System

Condition Monitoring Box for Rotating Machinery using Vibration, Electrical and Temperature Data and Wireless Data Transfer

The highly modular and scalable monitoring and data logging solution enables plant operators to easily collect vibration, electrical and temperature data of motor-operated machines into the CADIS data analytics platform

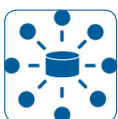
Challenge

Today energy utilities are part of a changing landscape. Customers expect delivery of safe, reliable, affordable and sustainable energy. Beside safety considerations driven by authorities, the optimization of the Overall Equipment Effectiveness (OEE) and the reduction of Operational Expenditure (OPEX) are becoming key objectives of all plant operators. The huge number of motor operated machines in power plants such as pumps, fans, compressors and valves requires high engineering and maintenance efforts to achieve optimum safety, reliability and availability, but it generates high operational costs in return.

Solution

The OPEX reduction by maximization of OEE is an objective which can be easily achieved nowadays with digital solutions for automated smart data collection. It can be performed using decentralized data loggers such as the Framatome IMS Box and automated data processing and insight derivation using centralized data analytics platform solutions such as Framatome CADIS.

The Framatome IMS Box – Integrated Monitoring System:



- connects vibration, electrical and process sensors
- allows time synchronous data acquisition and condition monitoring based on different standards (e.g. ISO 13373)



- stores measurement data event-based and/or cyclically with configurable pre-/post trigger time
- triggers the automated processing of created measurement files for diagnostic feature extraction, fault pattern recognition, fault prediction and/or remaining useful life estimation



- provides maximum scalability (e.g. extension of channels per asset), flexibility for several fields of applications and optional WiFi extension with its modular hardware platform design
- comes in a protective casing (IP66) with EMC certification



IMS – Integrated Monitoring Hardware Platform

Customer benefits

The Framatome IMS Box:

- enables automated condition monitoring and data collection of rotating machines
- allows automated transformation of data into actionable insights for faster and more reliable decisions
- performs automatically repetitive time consuming tasks and support engineering teams to focus on value adding tasks
- leads to reduction of engineering and maintenance effort
- is a customizable solution to integrate easily in existing platform architecture

Your performance
is **our** everyday **commitment**

Technical information

- Basic setup comprises galvanically isolated channels for one asset (1 speed sensor, 5 accelerometers, 3 current/ 3 voltage signals)
- Connector base plate and mounting plate are prepared for extensions of channel number and/or a large variety of sensor types to be connected
- Fully compatible analog interface to Framatome EPlug and SiPlug for electrical motor signals
- Available for standard industrial environment and to meet nuclear plant environmental requirements
- Wi-Fi Application Module
- Secured Wi-Fi setup for synchronous plant-wide communication with the centralized data server (CADIS)
- Cost optimized installation with minimal effort of cable routing or penetrations
- Integrated web-based dashboard for asset condition management enabling plant managers to learn from



IMS Hardware Platform

Instrumentation	Detectable fault	Possible detectable fault
Electrical Signals <ul style="list-style-type: none"> • 3x Motor voltage, $\pm 30V$, 12.8 kHz, 24 Bits • 3x Motor current, $\pm 30V$, 12.8 kHz, 24 Bits 	<ul style="list-style-type: none"> • Rotor bar health/Broken Bars • Stator health • Rotor/Stator air gap (eccentricity) • Motor efficiency/Load • Input Power, Output Power • Total Harmonic Distortion • Mechanical Power & Torque (Coupling Health) • Voltage supply problem (variation, unbalance, ...) • Current problems (variation, unbalance, ...) • Phase imbalance 	<ul style="list-style-type: none"> • Mechanical Unbalance • Misalignment/Coupling health • Rolling Bearing health • Gear box health • Belt health • Turbo machinery effects • Blade Vane effects • Torsional vibration
Vibration Signals <ul style="list-style-type: none"> • 5x accelerometers (IEPE), $\pm 30V$, 12.8 kHz, 24 Bits 	<ul style="list-style-type: none"> • Vibration/Resonance problems • Mechanical Unbalance • Thermal Unbalance • Fluid induced Unbalance • Misalignment/Coupling health • Rolling Bearing health • Rolling Bearing health • Gear box health • Belt health • Turbo machinery effects • Blade Vane effects • Casing/Foundation problems 	<ul style="list-style-type: none"> • Rotor health/Broken Bars • Stator health • Rotor/Stator air gap • Current problems (variation, unbalance, ...)
Tacho Signal <ul style="list-style-type: none"> • 1x Key Phasor, $\pm 30V$, 12.8 kHz, 24 Bits 	<ul style="list-style-type: none"> • Rotating Speed, Torque • Phases related faults (e.g. Imbalance) • Angular position 	
Temperature Signals <ul style="list-style-type: none"> • 16x Thermocouples, 68 S/s, 0.37°C • 8x PT1000 RTD, 400 Hz, 0.15°C 	<ul style="list-style-type: none"> • Journal bearings health • Rolling bearing health • Motor winding health 	
Static Data (Flows, Pressures, Temperatures, ...) <ul style="list-style-type: none"> • 16x Current, 0/4...20 mA, 500 Hz, 24 Bits • 16x Voltage, $\pm 10V$, 500 Hz, 24 Bits 	<ul style="list-style-type: none"> • Operational information • Process information • Performance information 	

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