

## DIROM

### Monitoring, Diagnostics and Asset Management for Rotating Machinery

Optimization of asset availability and condition-based maintenance through the early detection of changes in measurement signals, identification of potential failures and their severity using diagnostic feature analysis

#### Challenge

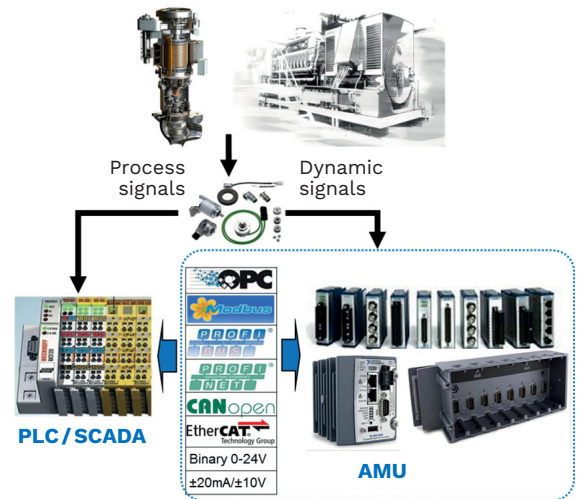
Rotating machineries in power and process plants, like pumps, turbines, etc., are vital for unimpeded operation and production. Component faults, such as bearing and gearbox failures, electrical faults in drives, imbalance of rotating parts, misalignment or high vibration amplitudes due to resonances, influence the vibration behavior of rotating machines. If this remains undetected, costly machine damage and unplanned outages can lead to limited availability and profitability of the plant.

#### Solution

DIROM allows the operator to increase the availability, reliability and maintainability of rotating machinery by performing optimal monitoring, diagnostics and asset management. DIROM is designed with smart algorithms as well as modular, reliable and robust hardware consisting of different kinds of sensors. Including the monitoring of asset failure modes, one or several distributed data acquisition and monitoring units (AMU), analog and/or digital communication interfaces to transfer collected data and related features to third-party systems if demanded and one data server for centralized archiving of all important asset data.

The DIROM AMU continuously and synchronously acquires, processes, monitors and stores sensor data pre- and post-trigger after recognized events, periodically or on user request. After data is stored in the AMU, the DIROM data server collects the measurement files, automatically extracts and analyzes the user-defined diagnostic features from the raw signals to identify impending component faults and the related severity.

Through the DIROM database software condition-based maintenance and asset management are enhanced. The measurement data, diagnostic results and reports are archived together with the maintenance reports and the machine construction information. Therefore, a complete machine lifetime log is centralized and accessible at any time.



PLC: programmable logic controller  
SCADA: supervisory control and data acquisition

DIROM data acquisition and monitoring unit

#### Customer benefits

- Protects assets and revenue through real-time monitoring, early anomaly detection and severity prediction
- Improves reliability of assets
- Reduces operational and investment costs by optimizing maintenance intervals and duration, repairs, replacements and spare parts management
- Improves situational awareness and supports decision making with the online view of asset data like health and performance indicators, event logs and notifications

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is **our** everyday **commitment**

## Technical information

- Modular architecture for connection, conditioning and processing different sensor signals
- Scalability and time synchronization (e.g. easy expansion of number of channels)
- Synchronous acquisition of static data (<100 Hz) and dynamic data (>1,000 Hz)
- Deterministic and adaptive monitoring (according to the operating and load states) for early detection of relative and absolute changes in measurement signals
- Continuous logging of all system statuses and monitoring information in a ring buffer for efficient event analysis
- Intelligent data collection through manually, periodic and event based (load condition change or monitoring status change) data storage with configurable pre-trigger
- Analog and digital communication interfaces with third-party systems
- Integrated data storage, self-start after power failure and watchdog hardware and software
- Online / remote configuration and visualization tool, diagnostic and maintenance support
- Event detection, logging, notification and tracking
- Certified by the Germanischer Lloyd and compliant with ISO 7919, ISO 10816, ISO 13373, ISO 13374, ISO 13379, ISO 17359 and ISO 13381

### Asset design data

What are the asset functions and components?

### Cost benefit analysis

Is the asset critical or important to be monitored?

### Failure mode effects analysis

Which components faults should be monitored and how?

### Asset monitoring strategy

Selection of hardware, sensor, locations and indicators

### DIROM erection and commissioning

Learning phase and baseline measurements after commissioning

### Fault detection and diagnostic

Monitoring for event detection and identification of impending component faults

DIROM monitoring and diagnosis concept

## Key figures

More than **25** systems in **4** plants in operation

Over **15** years of operational experience

## References

### Western Europe

- Germany
- France
- Finland

### Asia

- China

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