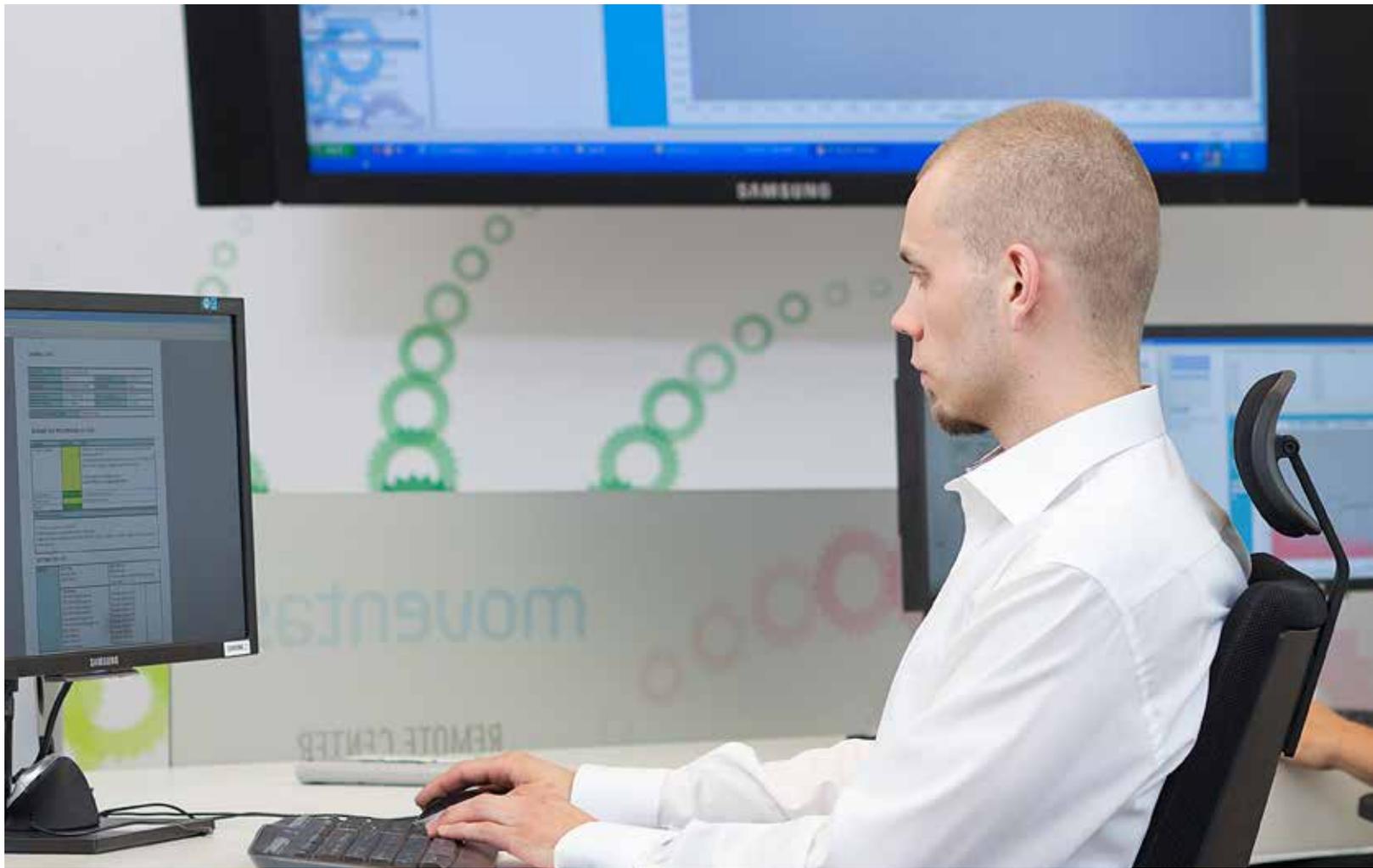


CMaS

Condition Management System





Everything under control

Out of the office? Relax; everything is under control no matter where you are, thanks to CMaS.



CMaS has been developed to monitor how the gearbox and other drive train components in a wind turbine are performing, 24/7. It also anticipates possible upcoming failures, responding by providing you with timely updates and alerting maintenance crews.

What is even better, CMaS can do all this for thousands of units spread over a wide geographical area. Think what that could mean in terms of your cost efficiency.

For end-users, it guarantees the continuity of their energy yield. For energy utilities, it transforms conventional maintenance into smart, proactive maintenance and longer, more trouble-free operations. For turbine and system suppliers, it provides a new, value-added dimension to their product offering.



Remote Center

Moventas also provides proactive gear expertise on more than just a system level. Watching over thousands of wind gears around the globe, the Moventas Remote Center has experienced, field-proven gear specialists available for all customers on-call – 24 hours a day, seven days a week.

cmas.support@moventas.com

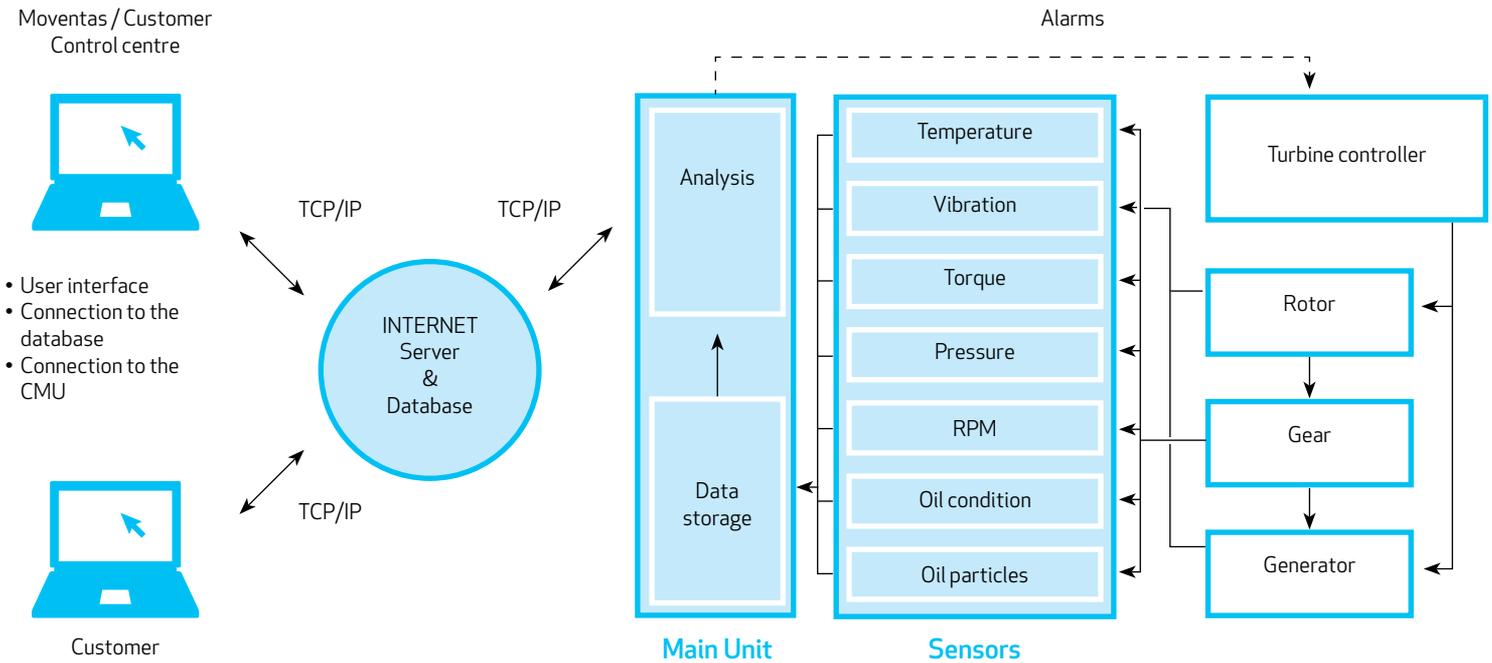
*Why not
think ahead?*

CMaS condition management system has been designed as a smart, compact, value-added package that monitors a range of performance parameters, stores and analyzes this data, and reports it to a remote server over the internet using a standard TCP/IP protocol (Ethernet and/or GPRS).

It is up to you whether you want us to handle the data analysis and provide you with peace-of-mind reporting, or whether you prefer to take care of the analysis yourself, calling on Moventas for expert assistance when required.

The system operates as a fully customizable portal that can handle a very large number of parameters, including those from other systems, providing access to the “one-stop” analytical toolbox needed.

How does it work?



CMaS sensors monitor seven key parameters:

- **Temperature**
- **Vibration**
- **Load**
- **Torque**
- **RPM**
- **Oil condition**
- **Oil particles**

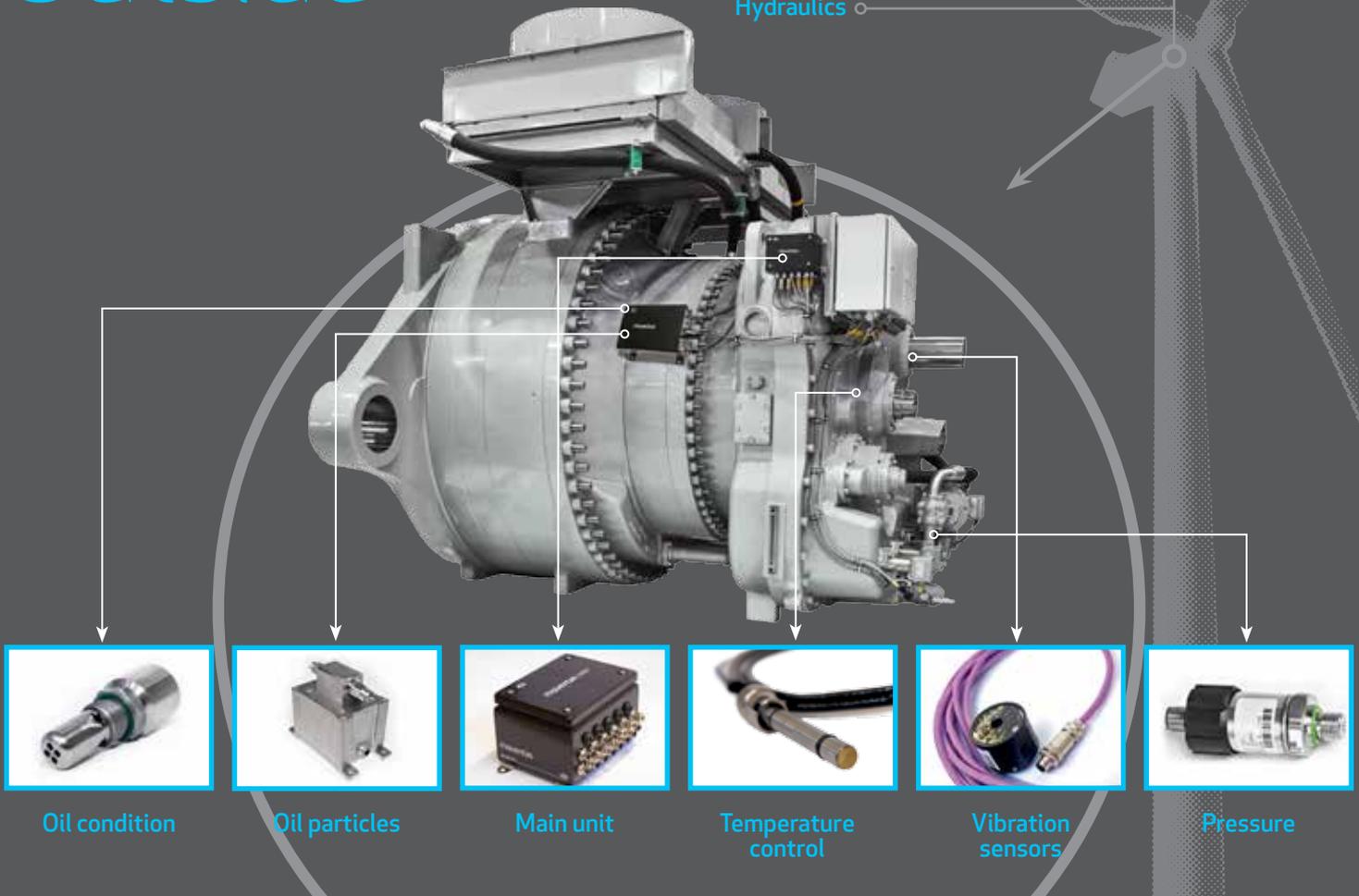
In addition to these parameters, others can be added in line with your needs, covering even phenomena such as wind speed. The more data that can be analyzed, the more valuable the results will be. This kind of flexibility comes as standard with Moventas solutions.

CMaS gives you a heads up

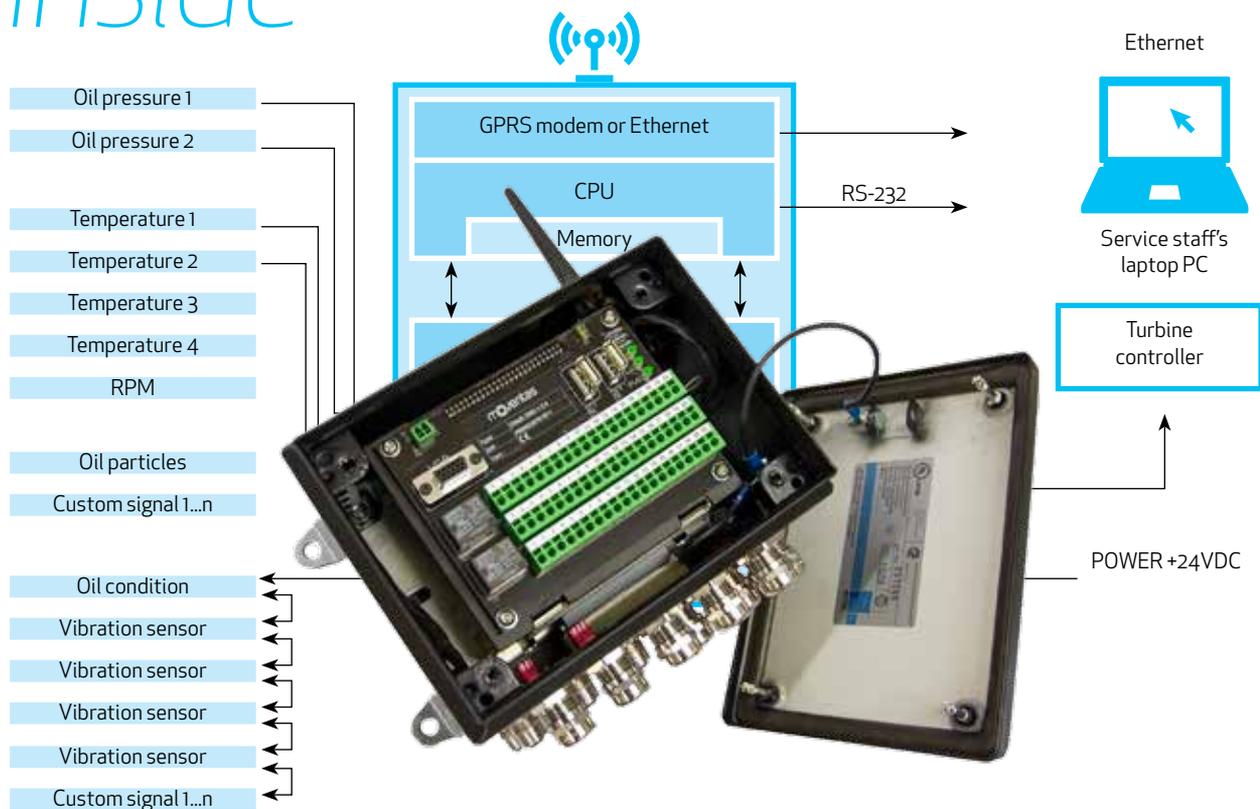
- **Measuring a turbine's bearing and oil temperature profiles provides excellent advance indication of possible malfunctions in cooling systems or problems with a turbine's lubrication.**
- **Excessive vibration is an early signal of bearing misalignment and friction issues.**
- **Torque and RPM data gives you up-to-the-minute information on actual load conditions and prior warning of out-of-spec operations.**
- **Oil condition and particles content provide advance warning of wear-related problems -everyone knows that the cleaner your lubricant, the better it performs to maximize the lifetime of bearings and gears.**

Outside

Generator bearings
Main bearing(s)
Hydraulics



Inside



Wide range of digital and analog sensors can be connected to the system's central processor.



We help you succeed

Easy access

Thanks to its use of the CMaS MySQL based server, the system can be easily integrated into corporate intranets or extranets, matching other web-based solutions and minimizing people's learning curve.

It also means that you can log on via your mobile phone. The mobile interface is as flexible as the PC one, so you have a mobile access to even the most detailed information, such as data from individual sensors.

Scalability built in

CMaS is highly scalable to all onshore and offshore wind turbines and components. It even has the potential to monitor much more than just your gearbox.

With such a flexible interface and in-built scalability, CMaS is ideal for a wide range of installations, ranging from a couple of units to a major offshore wind park featuring tens or hundreds of units, or installations across an entire region. Plus, CMaS can grow with you as your needs change.

You reap the benefits

The system provides round-the-clock monitoring to provide you with early warning of potential problems. Using this data, you can limit loads, for example, giving you time to fix a minor problem before a major failure occurs.

The combination of CMaS and Moventas remote diagnostics services provides you with quick response time on field service repairs and the shortest lead-time of factory services. This will also optimize your spare part inventories to minimum.

The system also provides crucial input for designing your maintenance program to prevent failure situations developing in the first place, and eliminate the costs these involve. This translates into higher availability, lower overall costs as well as longer unit lifetimes.

If you take a typical five years old, onshore wind farm of 50 x 2MW turbines, the value of the Moventas CMaS system and analysis service contracts can be calculated at a minimum of €5,5M in saved O&M costs and downtime over the remaining life time (15 years) of the wind farm. Return on initial investment is seen within the first one to two years.

The condition analysis data provided by the system gives you the potential to develop and adopt optimum operating models for your installations.

Several options to choose from

Scope of CMaS Installation

- Gear Unit
- Entire Drivetrain (Main Bearing, Gear Unit, Generator)

Desired CMaS Hardware

- CMaS Vibration
- CMaS Vibration & Particle Counter
- CMaS Vibration & Oil Analyzing Unit
- CMaS Pro

Other options are also available

Desired reporting service

- CMaS 24/7 All-Inclusive Monitoring Service by Moventas Drivetrain Experts
- Includes alarm monitoring, analysis, reporting, recommendations and full customer access to data on the secure Moventas CMaS server
- CMaS 24/7 Data Access Service
- Includes full customer access to data on the secure Moventas CMaS server



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moventas | GEARED FOR
NEW ENERGY

Moventas is a new energy technology expert and service provider. Moventas' technology strives to lower the cost of energy across the lifecycle of renewable energy generation, from superior gearbox design and manufacture to extensive after sales service for most gearbox brands. Moventas is owned by the global engineering group Clyde Blowers.

Read more at

www.moventas.com

*All the people in the pictures of this
brochure are authentic Moventas employees.*