



SIEMENS



Industry Services

Siemens Flender Condition Monitoring

Diagnostics and online monitoring technology
for maximum drive system availability



Technology-based services for a greater competitive edge

Minimum downtime and the optimum use of staff and resources are key to sustainable success in industry. Siemens provides the basis for greater productivity, flexibility, and efficiency with technology-based services throughout the lifecycle of an industrial plant – reliably, globally, and around the clock. In-depth technology and product knowledge as well as industry expertise within Siemens' global network of experts ensure a considerable competitive edge.

The challenge:

permanently safeguarding the efficiency and service life of drives
Safeguarding the availability of production plants on a permanent basis is a very high priority for every operator, since this is the only way to maintain the productivity of manufacturing, conveying and processing systems in both industry and primary production. To achieve this objective, condition-oriented maintenance of the drive trains is necessary. With the condition monitoring system, Siemens Field & Remote Services provide a diagnostics instrument that is optimally tailored to the individual requirements of plant operators.



www.siemens.com/flenderservice



Keeping an eye on everything: with ongoing and mobile condition monitoring based on our extensive engineering expertise

Perfect technologies for condition-oriented maintenance

The solution:

Siemens Flender Condition Monitoring from Siemens Industry Services

Siemens is a pioneer in the field of condition monitoring and has offered online condition monitoring systems (CMS) for the primary industry as part of its extended gear unit services for more than 15 years.

These are now widely used, for example in the cement and chemical sector, and in many other applications. Our constant monitoring system records all relevant parameters of your drive system in real time. This ensures that both long-term trends as well as any sudden changes of condition are detected and documented in full.

Condition monitoring and its disciplines

When it comes to availability, efficiency and safety, Siemens uses a combination of analyses, diagnoses and inspections to ensure that your plant operates productively. We utilize every conceivable method: from remote diagnostics, alignment checks and simulations to mobile vibration analyses, acceptance tests, load and torque measurements, as well as inspections, endoscopy and even thermography. In the case of complex systems this also means correctly evaluating and interpreting superimposed signals of different origins. Siemens reacts immediately if something is wrong – because above all, plant condition monitoring means having the right feel for drive systems.

Monitoring based on gear unit expertise

Siemens has a proven record of extreme reliability in the detection, diagnosis and location of anomalies and of pinpointing their cause. This requires determining the most meaningful condition variables, and our foundation for doing this is Siemens' extensive gear unit expertise, perfect sensor technology, data analysis and knowledge of specific plants. Condition monitoring maximizes plant availability and reduces lifecycle costs to the minimum by making the fullest possible use of the service life of critical machine components, while at the same time enabling necessary repair measures to be coordinated with the production plan.



Condition monitoring in an automation environment

SIPLUS CMS

The diagnostics expertise of a gear unit expert combined with Siemens automation technology takes condition monitoring to a whole new level. The measuring system based on SIPLUS CMS® components can be seamlessly integrated into the Siemens automation landscape, but at the same time it also has interfaces to other standardized bus systems.

Machine information

This enables the sensor signals and switching status of the machine control unit that have already been transmitted via Profibus to be incorporated into the diagnosis so that measured quantities and control data, for example from the frequency converter, are immediately available. This in turn substantially improves the quality of the condition diagnoses. It also allows Siemens to send the plant operator important warning and alarm signals from the easily condition monitoring system in an uncomplicated manner.

Automatic diagnosis

Siemens offers remote service and diagnostics so that plant operators do not need to employ their own specialist staff on site. CMS data is sent to Siemens via secure channels (e.g. Siemens common Remote Service Platform, cRSP) where a qualified diagnosis is performed.

Assembly service

If you choose this service solution, Siemens will take care of procuring spare parts and dispatching experienced master fitters.



Plant operators profit from the modular system construction with up to 14 installed nodes per component. The Siemens CMS delivers test signals synchronously with up to 192 k samples per second.

Gear unit monitoring hardware

Online measurement technology

- Sensors for measuring torque, vibration, temperature, pressure, rate of flow, water content in oil, speed (oil-resistant for fitting into the gear unit if applicable)
- SIPLUS CMS4000 analysis and diagnostic system; cost-effective, modular, scalable; for cross-device integration in existing and new plant components
- Modules for data recording:
 - Interface nodes:
 - IFN VIB-ACC (vibrations),
 - IFN AI (± 10 V voltages)
- Components for data transmission:
 - Media converter for fast, fault-free data transmission via fiber optic cable

In the cement industry, CMS can be seamlessly integrated into the Siemens master control system CEMAT®. The auto-diagnostics software OPENpredictor® transforms CMS into a smart system, allowing autonomous systems to be set up and assisting the diagnostic experts.

Mobile measurement technology

- VibControl® vibration severity meter, acceleration sensors, handheld measuring instruments and systems for vibration monitoring
- Mobile GearControl® – a data acquisition device configured for your specific application that is used for gear unit diagnosis
- Laser-optical alignment systems to check the accurate alignment of shafts
- Video endoscopes with high-resolution displays to detect the tiniest defects in bearings and gear teeth



From fault detection to repair and maintenance on site: Siemens offers field and remote services for maximum plant reliability.

Customer benefits

Customer benefits: minimum downtimes thanks to globally available service

With the condition monitoring technologies of the Siemens Flender service concept, operators profit from high drive unit availability and improved productivity.

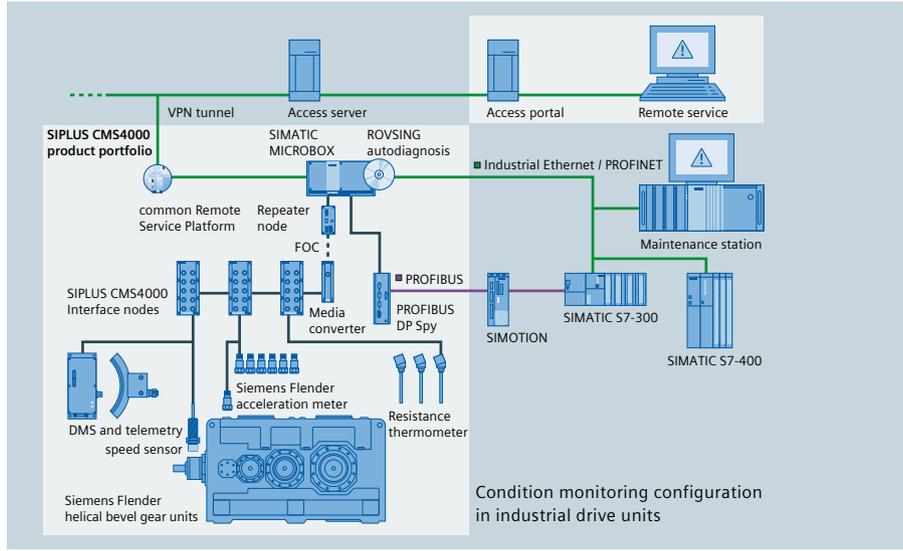
Diagnostics and service from a single supplier

As a manufacturer of industrial gear units, Siemens is a leading supplier in many sectors around the world and boasts decades of experience and extensive application expertise. We have developed drive solutions for a large number of applications. That's why our service always focuses on the respective application and provides comprehensive, wide-ranging support. We not only concentrate on ensuring the highest possible availability for your drives, but also safeguard the productivity of your entire plant. We provide service backed by the expertise of the largest gear unit manufacturer. Our maintenance management portfolio comprises everything from inspections and servicing to manufacturing and stocking spare parts to repairs and field services.

Gear unit manufacturing and sensors

Plant operators who choose Siemens as their condition monitoring partner automatically benefit from its gear unit expertise. Siemens configures and installs the online CMS, parameterizes it for your specific gear unit, and optimally positions the sensors. This is the only way to achieve the full benefit of ongoing monitoring.

The process and production environment is incorporated into the concept in order to minimize statistical deviations in the damage trends derived from the data. This paves the way for an optimum interpretation of the data, which means that even the tiniest changes in vibration behavior caused by damage can be diagnosed much sooner during a trend analysis. As well as automatically recording vibration signals, the diagnostic system analyzes and logs any changes.



Siemens Flender condition monitoring technologies guarantee highest possible availability of drive units.

Overview of the benefits

Plant availability

Alongside gear unit quality, condition monitoring and condition-oriented maintenance are the most important tools for prolonging and/or safeguarding your plant's service life.

Process optimization

Backed by an in-depth understanding of your plant and extensive industry expertise, Siemens condition monitoring will optimize your production processes.

Diagnostics and service from a single supplier

No need to worry about interface risks and who is responsible for what anymore. From now on, there is just one person to call. We ensure that information flows quickly.

Here to help, anytime and anywhere

We guarantee that your orders will be handled fast. You can contact us 24/7 via our hotline. And naturally Siemens provides service and condition monitoring for gear units all over the world.

Minimizing costs

CMS recognizes damage caused by wear and vibration reliably and – above all – promptly. Early detection and diagnosis reduce maintenance costs.

Support if damage occurs

As well as taking preventive action, we are also on hand to help if the worst comes to the worst. This means that maintenance can be planned more easily. We can also guarantee an optimum stock of spare parts.

Enhanced performance

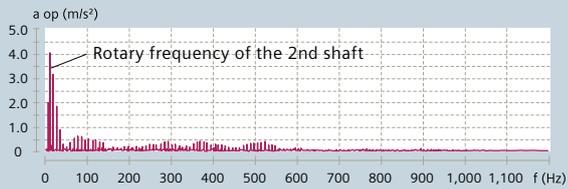
Torque measurements and optimization concepts enhance your gear units' performance and cost-effectiveness.

Fast expert support

Our remote diagnostics and service replace on-site experts and offer you both safety and convenience.

Certification

Our CMS and monitoring center are certified by both Allianz and Germanischer Lloyd.



Characteristic damage spectrum



Curve of a damage criterion

Example of measurement diagrams of a girth gear unit on a tube mill



Efficient drive units thanks to comprehensive monitoring

Far-sighted plant operators have long since discovered condition monitoring and already take advantage of it in the form of condition-oriented maintenance. The benefits are self-evident: Cost-intensive machines running at full load are perfectly monitored and fault-free operation of complex systems is assured to the greatest possible extent. The documented trend curves of unimpaired operating phases allow early detection of significant wear-related anomalies. This means that faults are identified and rectified before major gear damage, with cost-intensive consequential damage or total failures, can occur.

The economic benefits of using CMS can be immense. While the actual initial defect can be manageable and easy to rectify, later repair measures can push up the costs many times over. It is not just a matter of the repair costs incurred versus the high procurement costs for a new gear unit. The principal damage generally consists in the avoidable imputed costs arising from operational downtime lasting days if not weeks. If you include the delivery times for a new gear unit in the equation, and bearing in mind that complex plants frequently consist of multiple drive units, the need for a CMS for virtually every operator becomes quite clear.

Further information and support is available from your local Siemens partner:
www.siemens.com/siplus-cms

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