

Media Release

Voith GmbH
Group Communication
St. Pöltener Str. 43
89522 Heidenheim, Germany
Tel. +49 7321 37-3456
Fax +49 7321 37-7107
www.voith.com

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Voith solution helps energy suppliers to comply with grid regulations

2017-06-26

- **SmartSet limits torque peaks and protects the driveline**
- **Generator sets can be retro-fitted without the need of any redesigning and upscaling of the existing components**
- **A tried-and-tested solution for users, packagers and OEMs**

Hudiksvall, Sweden: The European energy market has been facing new challenges since the release of the new EU regulation 2016/631. To stabilize the grid, and yet help power providers avoid oversize drivetrains, Voith offers an upgraded version of the SmartSet torque limiting coupling.

A lot has changed since the European Union adopted the new grid code EU 2016/631. It obliges power providers to remain on the grid for 0,150 to 0,300 seconds to stabilize it during a fault ride-through (FRT). Gas and steam turbine generator set owners need to prove that they meet the new grid code regulation.

They have to certify their ability to withstand grid faults to avoid cascading failure in the region. The new code provided by the European Network of Transmission System Operators for Electricity (ENTSO-E) reflects on that situation. The transition from centralized to decentralized power generation has caused that preventive reaction.

Limiting torque peaks

In other words, the more small-scale producers - like solar power companies or windmills - join the grid, the weaker and more unstable it gets. Interconnected microgrids are the result.

So if an FRT occurred, the generator set's driveline would be exposed to large torque peaks. These can damage or even destroy the complete set, and in consequence affect the overall grid situation negatively. To avoid



worst-case scenarios like the European blackout in the year 2006 and be compliant with ENTSO-E's new grid code, generator set owners have two options: They could either scale up their drivelines which is costly and increases the size of the set, or implement a non-releasing torque limiting coupling like Voith's SmartSet.

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Stay connected to the grid

The latter solution enables the power generator to stay connected to the grid in case of a failure, both during and after its occurrence. "SmartSet protects small- and medium-size generator set's drivelines from overloads created by an FRT," says Håkan Westberg, Head of Product Management for Torque Limiting and Connecting Couplings at Voith in Sweden. "Not many conventional gas turbines with shear elements supporting the grid may be able to remain on it for 150 milliseconds during an FRT without a reliable upgrade. SmartSet eliminates not only the risk of gas turbine failures but also grid perturbations, and consequently increases productivity. At the same time, the user complies with the EU's requirements and reduces their total cost of investment."

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SmartSet is based on the same technology as Voith's SafeSet coupling; however, it is smartly developed, using a mechanical logic, in a way that gives the coupling an additional ability to slip during FRT and only to release in rare case of major failure. SmartSet, like SafeSet couplings, is not affected by fatigue or wear, giving a stable torque setting over its lifetime. Together with Voith's Coupling Monitoring System (CMS), it is further possible to supervise and monitor the torque limiting coupling. The CMS control unit continuously calculates the slip angle and sends a signal into a monitored supervising system indicating how much the coupling has slipped.

New limiters for shaft lines

Dr.-Ing. Oliver Drubel is an expert when it comes to energy conversion. He habilitated on "Converter Applications and their Influence on Large Electrical Machines". In his current work, Dr.-Ing. Drubel analyzes transient torques of turbine shaft lines with torque limiting couplings. Shaft lines of generator sets in power plants need to meet the requirements of the new ENTSO-E network code. He says: "The shaft line must be designed under the consideration that an FRT is possible. Sustainable shaft lines already fulfill the requirements. Designs with SmartSet couplings need an individual shaft line calculation to determine values for the initiation of the limiters."



This must be investigated by a process which takes into account all elements along the shaft line. Those being designed with a SmartSet coupling do not need to scale up the drive line. If this particular coupling slips during the FRT, the shaft line is available for normal operation as soon as the grid recovers. "More challenging disturbances can be handled simpler with SmartSet." Dr.-Ing. Drubel adds.

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A tried-and-tested solution

In conclusion, non-releasing torque limiting couplings such as SmartSet are of benefit for end users, packagers and OEMs alike. Especially end users benefit from SmartSet in many ways: By installing the coupling, they do not have to scale up their equipment, yet increase their productivity and be grid code compliant at the same time. Further generator sets can be retro-fitted with SmartSet without the need of any redesigning and upscaling the existing drive line components.

This application adds new features to the already existing solution. Power providers get a well-trusted mechanical device stabilizing the grid and overcoming potential instability drawbacks.

Voith Turbo

Voith Turbo, a Group Division of Voith GmbH, is a specialist for intelligent drive solutions, systems and comprehensive services. Customers from highly diverse industries such as oil and gas, energy, rail and commercial vehicles, ship technology, mining and mechanical engineering rely on the advanced technologies and solutions-driven expertise of Voith Turbo.

About Voith

For 150 years, Voith's technologies have been inspiring customers, business partners and employees around the world. Founded in 1867, Voith today has around 19,000 employees, sales of €4.3 billion and locations in more than 60 countries worldwide and is thus one of the largest family-owned companies in Europe. Being a technology leader, Voith sets standards in the markets of energy, oil & gas, paper, raw materials and transport & automotive.





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Caption: Voith's SmartSet coupling uses mechanical logic to slip during a fault ride-through, protecting the driveline from serious harm.

Contact:
Robin Wankerl
Global Market Communication Manager
Tel. +49 7321 37-8303
robin.wankerl@voith.com
www.voith.com

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