

Media Release

Voith Group

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ELIN Motoren and Voith launch electric motors with integrated safety coupling for the reliable and maintenance-free operation of tunnel boring machines

- Combined expertise: electric motors from ELIN Motoren with integrated Voith SafeSet/SmartSet for the safe operation of the drive train of tunnel boring machines (TBMs).
- Weight reduction of more than 80% compared with previous safety couplings minimizes rotor inertia and bearing loads of drive train.
- Brief system-induced torque peaks are absorbed by means of “micro-slipping” and do not cause TBM downtime.

WEIZ, AUSTRIA/HEIDENHEIM, GERMANY. ELIN Motoren and Voith launch the first electric motor with integrated safety coupling for the main drive of tunnel boring machines. Water-cooled asynchronous motors from ELIN Motoren contain either the Voith SafeSet to safeguard the entire drive train or the Voith SmartSet for continuous operation, even with frequent torque peaks. Torque limitation increases the productivity of the TBM, protects the machine components, and avoids costly downtimes.

Depending on size and geology, the cutting head of a TBM is powered by between four and 24 drive units. These drive trains consist of a pinion, planetary gear unit, torsion shaft, safety coupling, and electric motor and represent the heart of a TBM that should be protected. Clogging in the cutting head causes a sudden torque much higher than the maximum permissible torque with which the drive train is rated. As it is activated at a predefined torque, the integrated safety coupling in the new MKH-SafeSet and MKH-SmartSet electric motors from ELIN Motoren accurately and reliably protects all the drive train components of tunnel boring machines. A triggered coupling can be re-activated within just a few minutes. If only a few couplings are released, the TBM can continue to tunnel until the next maintenance shift.

The weight of the new Voith SafeSet has been reduced by more than 80% and is only around 15% of that of conventional safety couplings. A lower mass minimizes rotor inertia and the bearing loads of the drive train, which

improves efficiency and achieves lower temperatures, thus extending the service life of the drive train.

The MKH-SmartSet is an optional add-on to the MKH-SafeSet and allows continuous tunneling despite any torque peaks that are non-critical for the drive train. Adding a SmartSet results in an automatic reset if the TBM slows down or comes to a stop which allows continuous operation, even if the frequency of high torque load peaks increases, which positively affects the productivity of the TBM.

“Partnering with ELIN Motoren, we have a powerful new to-the-market technical solution that will transform the tunneling boring market segment,” confirms Per-Olof Berg, Product Management Torque Limiting and Connection Couplings at Voith and adds: “The new MKH-SafeSet and MKH-SmartSet is a further development of the well-known SafeSet portfolio which is in operation on thousands of ELIN Motoren cutter head motors. The new MKH-SmartSet instantly shaves the torque peak and protects the drive without releasing. Furthermore, MKH-SafeSet, with the coupling integrated into the cutter head motors from ELIN Motoren, is the perfect lightweight and compact solution for tunnel boring machines that do not need peak shaving and automatic resetting.”

“The pooling of the expertise of ELIN Motoren and Voith offers manufacturers of tunnel boring machines a powerful yet safe technical solution from a single source,” says Markus Frickh, Key Account Manager at ELIN Motoren. “As a manufacturer of customized electric motors, we aim to offer products that meet the stringent individual requirements in the mechanized tunneling segment.”

Live demo at the World Tunnel Congress Athens, May 12-18, 2023

ELIN Motoren and Voith are appearing together at the WTC 2023. Our experts will conduct a live demonstration of the new solution at the venue:

Live product presentation

Booth Number E103

May 15 and 16, 2023 each day at 01:30 pm

About the Voith Group

The Voith Group is a global technology company. With its broad portfolio of systems, products, services and digital applications, Voith sets standards in the markets of energy, paper, raw materials and transport & automotive. Founded in 1867, the company today has around 21,000 employees, sales of € 4.9 billion and locations in over 60 countries worldwide and is thus one of the larger family-owned companies in Europe.

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The Group Division Voith Turbo is part of the Voith Group and a specialist for intelligent drive technology, systems as well as tailor-made services. With its innovative and smart products, Voith offers highest efficiency and reliability. Customers from highly diverse industries such as oil and gas, energy, mining and mechanical engineering, ship technology, rail and commercial vehicles rely on the advanced technologies and digital applications of Voith.

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Tunnel boring machine



MKH-SafeSet



MKH-SmartSet

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