

## EUR24\_10 - 6MW, 10kV HIGH SPEED PMSM DIGITAL DRIVE SYSTEM FOR HIGHLY EFFICIENT COMPRESSORS

Author(s): Jörg Janning (Wolong GRC), Pengcheng Zhu (Wolong GRC), Chunzhi Deng (Wolong GRC)

### Abstract:

Modern gas compressor systems in the megawatt range strive for high reliability and efficiency. High speed motors with active magnetic bearings (AMB) can be directly coupled to the compressor without need of a gearbox. This technology has already been applied utilizing high speed induction motors.

The paper outlines a new digital drive solution utilizing a permanent magnet synchronous motor (PMSM) with a power of 6MW fed by a 10kV multilevel medium voltage inverter. Measurement and simulation results show a significant efficiency improvement. The inverter is designed for high reliability with built-in redundancy reaching MTBF values of more than 14 years. The inverter topology is compared with known solutions and the specific requirements of the PMSM motor are explained.

Digital drive train functionalities such as predictive maintenance and virtual commissioning are evaluated. Utilizing digital twins, the drive system can proactively anticipate anomalies and generate alerts.

The paper concludes with the feasible power range of this drive solution for compressor applications, indicating the potential energy savings and CO<sub>2</sub> reduction.