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High Power Medium Voltage Applications With CSI-FED Induction Motor Drive

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Abstract: *This review introduces a new topology for Silicon Controlled Rectifier (SCR) -based current source inverter powered induction motor drives (CSIs) suitable for medium voltage (MV) drive applications. The requirement for forced commutation circuits was a major drawback of SCR-based CSI powered induction motor drives. The proposed drive uses an induction motor with an auxiliary low voltage winding isolated on the stator. The SCR converter is connected to the main winding of a medium voltage level motor. A small rated voltage source inverter (VSI) connected to the auxiliary winding injects the voltage required to ensure safe commutation of the SCR inverter. This allows the drive to operate over the full speed range without the need for additional external rectifier circuits. VSI also compensates for low frequency torque harmonics due to quasi-square wave CSI currents, ensuring a low ripple torque profile. The proposed drive has been experimentally validated using a 37.5kW, 1.65kV laboratory prototype with 400V auxiliary windings. In this highly active area, different converter topologies are being developed for different drive applications in the industry. This topic is extensively covered and is therefore divided into two parts. Multi-level voltage source and current source converter topology. This white paper focuses on Part 2 and describes current source inverter technologies such as pulse width modulated current source inverters (CSIs) and load commutation inverters. In addition, this article describes the current status of cycloconverters, also known as cycloconverters (CCVs). This white paper focuses on the latest CSI and CCV technologies and provides an overview of commonly used modulation schemes. It also introduces the latest technological advances and future trends for large drives with CSI and CCV.*

Keywords: (CSI) Current Source Inverter, VSI (Voltage Source Inverter), SCR (Silicon Controlled Rectifier) etc..

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