

Variable Shunt Reactors for Reactive Power Compensation of HV Subsea Cables

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Abstract : This paper presents an application of 230 kV Variable Shunt Reactors (VSR) used to compensate reactive power of dual 90 KM subsea cables. VSR integrates an on-load tap changer (OLTC) that adjusts reactive power compensation to maintain acceptable bus voltages under variable load profile and network configuration. An automatic voltage regulator (AVR) or a power management system (PMS) that allows VSR rating to be changed in discrete steps typically controls the OLTC. Typical regulation range start as minimum as 20% up to 100% and are available for systems up to 550kV. The regulation speed is normally in the order of seconds per step and approximately a minute from maximum to minimum rating. VSR can be bus or line connected depending on line/cable length and compensation requirements. The flexible reactive compensation ranges achieved by recent VSR technologies have enabled newer facilities design to deploy line connected VSR through either disconnect switches, which saves space and cost, or through circuit breakers. Lines with VSR are typically energized with lower taps (reduced reactive compensation) to minimize or remove the presence of delayed zero crossing.

Keywords : power management, reactive power, subsea cables, variable shunt reactors

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