PCS-8100

VSC-HVDC Converter Valve

The PCS-8100 converter valve is comprised of sub-modules, converter valve tower and valve control units. It is one of the core equipment of HVDC SuperCon™ which is used to achieve mutual conversion between DC and AC. NR Electric HVDC SuperConTM system is based on a modular multi-level voltage sourced converter technology. Its innovative design offers technical and economic advantages. The capacitor and IGBT-based switching devices are key components of a submodule. The valve in each phase is composed of several submodules and a series of connected reactors. By triggering different quantity of sub-modules, the converter's output voltage and power levels are flexible to control. The MMC technology is easy to extend the output levels with low harmonic distortion and low switching frequency, so as to reduce operational losses and improve system efficiency.

Features

NR Electric PCS-8100 converter valve is featured by low running loss, high margin of safety, easy operation and maintenance.

- Modularized, layered and staged, compact vertical structure
  - The converter valve, based on modular and standardized design concept, can reduce delivery period, save time of erection and commissioning on site.
  - Based on the on-site situations, it flexibly selects layout type, such as "-" and "[]", characterized by flexible manner and free combination, meeting the requirements of different voltage levels and capacities.
  - Design philosophy of converter valve is taken into account of overall transport, testing and installation

Figure 1 ±160kV/100M VSC-HVDC Converter Valve

- Optimally-designed and well-controlled sub-modules
  - Based on high performance digital driving, the module perfectly match power equipment, in addition, loss reducing components is applied, so high efficiency converter valve is achieved..
  - Based on power module frequency optimized control technology, it reduces switching losses and improves the efficiency of the transmission system.
  - The power module circuits, based on centralized layout and covering design, compact structure, additional shielding design in terms of functional partitions, and high anti-interference ability, ensure high reliability of the converter valve.
  - Based on the building block concept and modularized design, the power module circuit is easy for maintenance and repair.
  - The power module over-voltage protection strategy, based on hardware circuit and real-time sampling software, is combined both advantages: high speed of hardware and flexibility of software. It effectively solves the problem of over-voltage of series modules, achieving reliable overvoltage protection.
  - Self-diagnosis technology of hardware and driving grading current protection make excellent fault ride-through capability.
  - Based on patented heating radiating technology, current capability of IGBT is enhanced.

Figure 2 ±535kV/3000M VSC-HVDC Converter Valve

  - The reliably designed water cooling system ensures the safe operation of the converter valve.

- High integration and high performance valve control unit
  - Multi-channel high-speed parallel bus and delay-free extension technology helps achieve high integration
  - High-precision balancing algorithm helps achieve excellent voltage balanced control
  - The optimized circulation control strategy effectively suppresses system current circulation.

Figure 3 ±800kV/5000M VSC-HVDC Converter Valve