



On-Load PFC Configuration Changer

Reconfiguration device for basic Power Flow Controllers to reach all operating areas

CONTEXT

The meshed Multi-Terminal HVDC system (MTDC) is a promising candidate for developing future transmission systems in regard to the high redundancy and reliability they offer for network operations. Since the power flow patterns are uncontrolled in a meshed network, new concepts of Power Electronics (PE) converter known as Power Flow Controllers (PFC) are proposed to improve the management of the power pattern distribution in a meshed MTDC network in order to enlarge the network operation.

The structure of Power Flow Controllers (PFC) may depend on the network operational needs and can be simple or more complex converters with a high number of PE switches. A PFC device fulfilling all possible network requirements is definitely a complex converter. Indeed, a PFC device is designed in regard to its abilities to operate in all network operational states where the PFC is needed. This entails a high requirement of reversibility in terms of current and voltage from the PFC device. A design of the PFC device with a high number of PE switches potentially leads to a converter with more losses and less reliability. Moreover, a PFC is not needed in any operation point. It is then necessary to provide solution to by-pass this device.

TECHNOLOGY DESCRIPTION

The On-Load Power Flow Controller Configuration Changer is a novel structure for PFC devices allowing on-load reconfiguration. It is designed for simple Power Electronics (PE) PFC device with low reversibility and relies on a structure of mechanical switches which implies less losses. This structure of mechanical switches allows to connect the PE PFC device in different ways/configurations. Each configuration consists of closing three mechanical switches in order to match the simple PE PFC device's ability to network requirements. The proposed mechanical structure can be associated with any simple PE PFC device inserting at least two voltage sources and designed to fit all network operational requirements.

A safe procedure allowing on-load reconfiguration between two configurations without any influence on the transmitted power of converter stations of the entire MTDC network because of null capacitor voltage

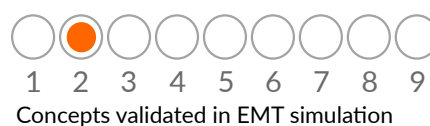
APPLICATION DOMAIN

Meshed Multi-Terminal HVDC grids

ADVANTAGES

Enlarge the MTDC network operation.
Reliable and robust Power Flow Controller
Less losses and less PE switches

TRL SCALE



DELIVERABLES

Patent application FR1873809
Technical reports

