



# Direct Current enhanced fuse Protection

*Low-cost reloadable switch for MVDC and HVDC systems*

## CONTEXT

In High Voltage direct current (HVDC) transmission network or Medium Voltage direct current (MVDC) distribution network protection is still a challenge. Most foreseen solutions today are highly reactive circuit breakers that are technically complex and therefore expensive. Circuit breakers are not the only protective technology to be considered in HVDC and MVDC.

Indeed in MVAC systems, fuses are often installed on non-critical feeders. In HVDC cable systems, the occurrence of a fault will cause a longlisting asset outage, allowing for a maintenance on the fuse protection without reducing the asset availability.

## APPLICATION DOMAIN

- MVDC network protection : distribution, industrial, railway
- HVDC cable network protection : transmission

## ADVANTAGES

- Low conduction losses in main branch
- Highly reactive
- Low cost (No moving parts in the main branch)
- Suitable for MVDC distribution market and HVDC cable systems.

## TECHNOLOGY DESCRIPTION

In case of a low impedance fault, the proposed technology operates independently as a fuse. If a high impedance fault is identified a triggerable overload circuit blows the fuse. Once the arc current within the fuse is cleared, the surge arrestor in parallel dissipates the magnetic energy.

The main advantage is to be able to react very fast while not having moving parts on the main branch. The overload circuit allows to always work in the range of the fuse even if the current amplitude is in the let through current range.

## TRL SCALE



Simulations and fuse preliminary tests were performed.

## DELIVERABLES

PATENT APPLICATION FR210202

