DC Circuit Breaker for HVDC & MVDC networks

Protecting meshed multi-terminal DC networks

Our DC Circuit Breaker is a key technology for the protection of multi-terminal HVDC & MVDC networks, providing internal commutation in 2 to 4 milliseconds. Its modular and scalable design is suitable for network voltages up to 525 kVDC.

OVERVIEW

To reach the European Union's climate targets and reduce CO_2 emissions, more than 300 GW of electricity is expected to be produced by offshore wind farms in Europe by 2050. A significant part of this energy is expected to be transmitted via a High Voltage Direct Current (HVDC) network. To increase the reliability and resilience of this meshed electrical network, extremely rapid electrical protection solutions will be required.

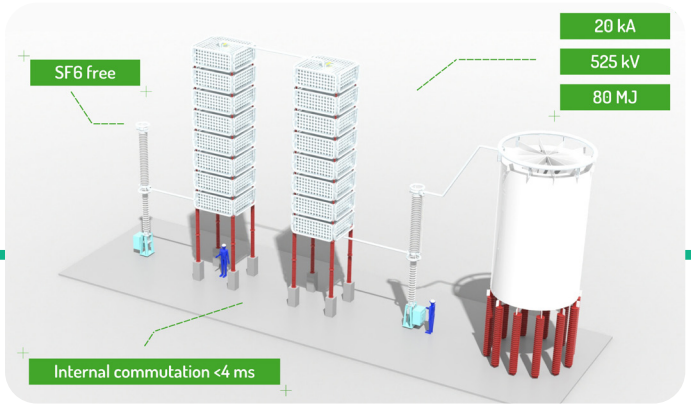
SuperGrid Institute is developing new Direct Current Circuit Breaker (DCCB) technologies to guarantee the protection of these electrical systems.

WORK WITH US

Our research team has developed a mechanical DC CB. This design and knowledge are now available for further development by equipment manufacturers.

- Collaborate with our experts to design and test your industrial circuit breaker equipment.
- Access our intellectual property and technology transfer services to reduce your time-to-market.

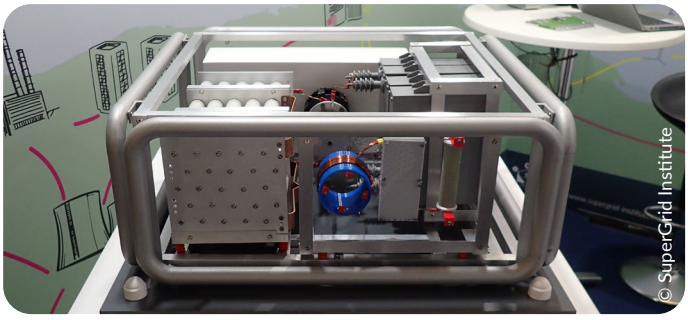
DC CIRCUIT BREAKER



525 kV Direct Current Circuit Breaker © SuperGrid Institute

BENEFITS

- Low conduction losses
- Fast internal commutation time
- Cost effective solution
- Reduced footprint



OUR ADDED VALUE

Diverse services, all in one place.

- Specifications, simulations & design
- Prototyping
- Validation testing
- Efficient support for your industrialisation cycle

HVDC CIRCUIT BREAKER DEVELOPMENT TIMELINE

NOW	2023 (TRL 6)	2024	2025 (TRL 7)	2026 (TRL 8)	2027 (TRL 9)
Get ahead of the game! Join us and become a leader of the HVDC CB market.	• Ratings: 35 kVDC & 2 kA • Breaking: 20 kA bi-directions, O-CO • Operation time: as low as 2 ms • Energy absorption: up to 8 MJ	Double module demonstration		Final breaker configuration	

Shaping power transmission

SuperGrid Institute
Shaping power transmission

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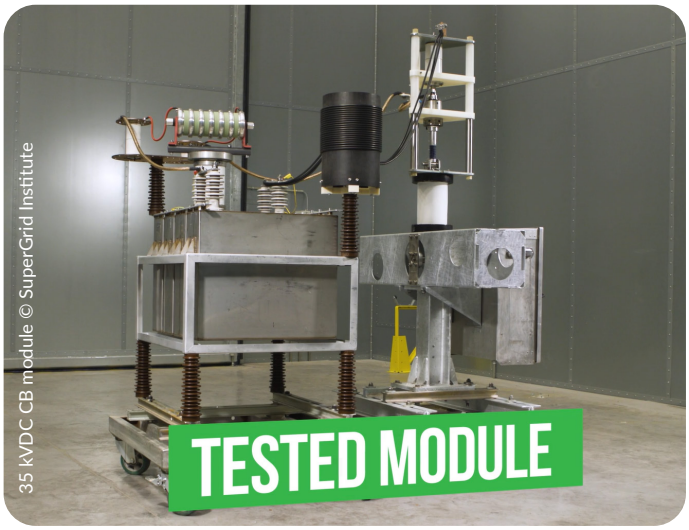
SCALABLE MODULE UP TO 525 kVDC

Based on a scalable design, we have developed patented technologies in order to achieve cutting-edge performances in our DCCB.



35 kVDC CB module © SuperGrid Institute

A time-controlled resistor module is included in the auxiliary circuit to adjust injected current to clear the fault. It contributes to a compact and cost-efficient DC circuit breaker with high breaking current.

AVAILABLE SERVICES

- Perform techno-economic analyses of grid protection strategies at the system level or circuit breaker level
- Provide technical support for the definition of DC CB specifications based on different protection strategies
- Design and build DC CBs from components to complete devices
- Establish test procedures & prepare testing circuits
- Perform investigation and qualification tests

This list is not exhaustive. Please contact us to express your needs so we can offer you a personalised service.

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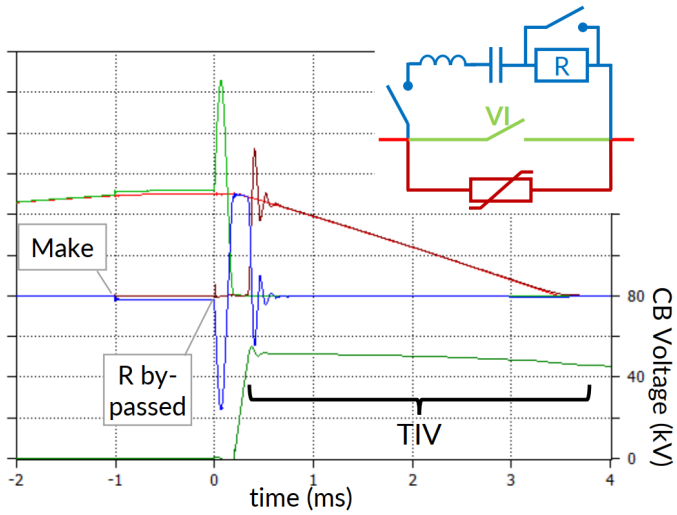
TEST RESULTS ON A 35 kVDC MODULE

Our DCCB is a device with a bidirectional current interrupting capacity up to 20 kA; a reasonable size at an optimised cost.



Power test oscillogram showing successful current breaking © SuperGrid Institute

PROTOTYPE TESTING FACILITIES

The first direct current high power testing facility in Europe with an HVDC source!

- 3000 MVA Generator
- 200kV diode Rectifier
- Testing hall: 26 x 26 x 26 m
- Ability to test O-CO breaking cycles

Explore our unique testing facility in this video:

SuperGrid Institute's High Power Source test platform © Lotfi Dakhli Photographe

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Shaping power transmission
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