FOCS is a Fibre Optic Current Sensor that replaces the conventional current transformer for current measurement. A smart grid ready solution for use with IEC 61850-9-2-LE standard digital outputs.

User benefits

Enhancing eco-efficiency
The FOCS integrated to a 420 or 550 kV DCB needs no additional insulation medium and uses less material in production compared to conventional current transformers.

When integrated to a 420 or 550 kV DCB, FOCS provides a reduction in footprint of over 50% compared to conventional solution of live tank breakers with disconnectors and current transformers.

Simpler and safer wiring
Standard ethernet cable connections make the construction and commissioning work much easier. It also makes it easier to change setup and there are no secondary circuit flashover risks.

Smart grid ready
The system is designed for IEC 61850-9-2-LE which makes flexible intelligent data access through IEC standard digital signal.

Using standard ethernet cables makes it easy and fast to install into the control and relay part of the substation. Plug and play.

Simpler protection and control
One FOCS replaces many CT cores which equals simpler design and engineering of the substation.
System setup

Redundant system setup
The FOCS system comprises of redundant three-phase light source and signal processing, redundant fiber optics integrated to the DCB pole, and a primary sensor head with redundant fiber optic coils per phase of DCB.

Measuring the phase shift
The source light is emitted through the fiber optic cable through the breaker, through the sensor head and reflected back to the secondary signal processing unit.

The light wave of the source light is compared to the light wave of the reflected light. The phase shift between the waves is measured and the phase shift is proportional to any shifts in the primary current. Since there is no iron core, there is no saturation effect.

Disconnecting Circuit Breaker

The disconnecting circuit breaker (DCB) combines the switching and disconnecting functions into one device.

The breaking function is identical to that of a conventional circuit breaker. It uses the same breaking chamber and operating mechanism.

The disconnection function for a DCB is obtained between the circuit breaker contact set.

Substations equipped with disconnecting circuit breakers have higher availability in supplying power, they require less maintenance and space, and CO₂ emissions are greatly reduced in comparison to conventional substations.

It also improves the eco-efficiency of the equipment throughout the life cycle by using fewer primary apparatus and, consequently, fewer raw materials.

DCBs also create lower electrical losses during the use phase due to lower electrothermal losses.

ABB has a comprehensive portfolio of disconnecting circuit breakers, from 72.5 kV to 550 kV, and the portfolio is continuously being further improved.