Generator circuit-breakers
Enhancing power plant availability
ABB is a leader in power and automation technologies that enable utility and industry customers to improve their performance while lowering environmental impact. The ABB Group of companies operates in around 100 countries and employs about 145,000 people.

ABB is a leader in the design and manufacturing of generator circuit-breakers (GCBs) since 1954 with more than 8,000 deliveries in over 100 countries. We offer the widest and most modern portfolio of GCBs in SF₆ and vacuum technology with a range of short-circuit ratings from 50 kA to 300 kA and nominal currents from 3,000 A to over 50,000 A to meet the demand of all types of power plants around the globe.

Continuous research and development has assured the most modern and largest portfolio with the highest value for customers.
GCB increases protection and flexibility in power plants

GCB plays an important role in switching the circuit between generator and transformer in a power plant.

It protects important assets in power plants by clearing potential harmful short-circuit faults in tens of milliseconds, preventing severe damages.

ABB’s GCBs serve all types of power plants around the globe to increase both safety and flexibility. With world-leading technology, they meet customers’ needs, to achieve the highest possible plant availability at the lowest possible cost.
Wide range of technological and economic benefits

Simplified operational procedures

- Clear and logical plant arrangement
- Clearly defined responsibilities for the operation of the plant. GCB is operated by the power plant owner while high-voltage breaker is controlled by the grid operator
- No auxiliary supply changeover necessary. Only one circuit-breaker has to be operated during the starting-up or shutting-down of the generator

Economic advantages

- Disconnectors, earthing switches, instrument transformers, surge arresters etc. can be integrated into the GCB enclosure
- Station transformers and relevant high-voltage and medium-voltage connection equipment can be omitted
- Increased power plant availability means higher profits for the operator

Improved protection

- The differential protection zones of the generator and the transformers can be arranged to achieve the maximum selectivity
- More protection for transformers as generator-fed short-circuit faults are interrupted within a maximum of four cycles whereas the de-excitation equipment requires several seconds

Higher power plant availability

- Reduced possible costly damages of primary and secondary equipment in case of failure
- More reliable synchronization of the generator with the high-voltage transmission network
- Unit auxiliaries’ supplies can be drawn directly from the high-voltage transmission network
ABB GCBs offer the best value in products and services

As a global leader for GCB, ABB strives for excellence in technology and processes, never compromising in quality.

**State-of-the-art technology**
- Continuous research and development ensures the most modern and functional portfolio for customers
- Lowest lifecycle cost and lowest maintenance requirement

**Widest portfolio based in SF₆ technology**
- Reliability proven by the largest installed base of more than 8,000 GCBs worldwide
- Widest ratings for short-circuit current ranging from 63 kA to 300 kA, and rated continuous currents from 6,300 A to more than 50,000 A
- Leading performance in switching currents exhibiting delayed zero crossing, for example in case of generator-fed or out-of-phase faults

**Award-winning production facility in Zurich, Switzerland**
- Based on ‘lean enterprise’ principle, ABB GCB factory is able to achieve a production time reduced to 16 hours and assure stable ex-works delivery in only three months for standard GCBs
- Speed and performance assures a quick resolution of trouble-shooting in urgent cases

**Sustainability**
- Contribution to environmental protection by recycling of SF₆
- Involvement in renewable energy such as solar and pumped storage power plants
Complete offering of GCBs and monitoring system

Based on standardized platforms

**VD4G-50 up to 50 kA – 4,000 A**
Cost-optimized solutions for generators up to 70 MW
ABB is the only manufacturer to offer GCBs with both vacuum and SF6 switching technologies. Based on the well-proven and highly reliable VD4 platform, VD4G-50 is tested to meet the most stringent IEEE and IEC requirements for generator applications. VD4G-50 supports generators up to 70 MW and is able to clear generator-fed faults up to 50 kA.

**HVR-63 up to 63 kA – 8,000 A**
The first built-in mechanical erosion indicator for arcing contact
The innovative built-in direct contact erosion indicator offers a clear visualization of the remaining length of the arcing contact for the highest degree of safety and reliability. HVR-63 is especially suitable for power plants with frequent switching operations and unit power of up to 180 MW such as hydro power plants. It is highly reliable in case of seismic events, such as earthquakes, as tested according to IEC/TR 62271-300 standard.
GMS600 monitoring system
State-of-the-art monitoring for GCB
Enhanced GCB monitoring GMS600 offers unique features such as remaining time before service is needed, SF₆ gas monitoring and trending (GMS600-G) and temperature monitoring of primary conductors (GMS600-GT). GMS600 enables ABB to support power plant operators and maintenance engineers for the most cost-effective management of the equipment and the entire lifecycle.

HVS-63S up to 63 kA - 7,150 A
The most reliable system solution with the contact erosion indicator
The newly developed HVS-63S is a complete 3-phase system type, which is based on the highly reliable technology of HVR-63. HVS-63S offers a clear visualization of the remaining length of the arcing contacts for the highest degree of safety and reliability. It is best suited for retrofits and replacements in power plants with frequent switching operations and unit power of up to 200 MW.

HEC 7/8 up to 210 kA – 28,000 A
One step ahead in SF₆ technology
HEC 7/8 is suitable for power plants up to 1,600 MW. Naturally cooled up to 25,000 A, its arc interrupting technology allows to clear fault currents exhibiting very high degree of asymmetry up to 130 percent. It is also recommended for retrofits or replacements of old generator circuit-breakers based on air-blast technology.

HEC 9 up to 300 kA – 33,500 A
The most powerful GCB in the world
HEC 9 has been developed for large sized power plants up to 2,000 MW such as nuclear and coal fired. It has the world’s highest performance with short-circuit currents up to 300 kA and is also highly suitable for retrofits or replacements of old GCBs based on air-blast technology. It is highly reliable in case of seismic events, such as earthquakes, as tested according to IEC/TR 62271-300 standard.

HECS up to 130 kA – 23,000 A
Highest installed base worldwide
The wide range of ratings with short-circuit currents from 80 to 130 kA makes HECS the most used GCB in the world for power plants with a unit power of up to 800 MW. With small and standardized dimensions HECS is easy to install and highly suitable for replacements and retrofits in existing power plants. HECS has very low lifecycle cost with up to 20,000 close-open (CO) no-load operations or 20 years between main overhauls.
We offer full consultancy, services and trainings to support our customers

Application study team
A highly competent team of GCB experts is available to support customers in the proper selection of GCB during all phases of power plant design. Competence is available to find the best solution for each customer, from the simplest question to the most complex analysis.

Service
We help customers to ensure the reliability and safety of their operations at optimized cost. ABBs service supports our customers over the entire lifetime of equipment covering all essential parts to give the GCB a longer life. A team of experts is available to deliver the following benefits:
- 24/7 hotline
- Certified GCB field service engineers located in our local service organizations around the globe
- Service agreements can be customized and can include risk assessments, warranty extensions, diagnostics, consulting, and more
- Customized maintenance and retrofit solutions to extend the lifetime of GCBs
- Options to adapt your GCB to future requirements including rating upgrades and modernizations

Trainings
Fully-equipped training centers are available to all customers located in strategic areas. GCB training programs are available in the training centers or at the power plants covering a range of topics to enable customers to:
- Ensure safe operation of the investment
- Allow a cost-efficient performance of the breaker
- Guarantee a risk-free utilization
- Reduce risk of unexpected downtimes
- Minimize lifetime cost of the breaker
Setting the benchmark with lean enterprise
Our GCB factory has been awarded best factory of the year in Europe in 2010 for setting a benchmark on how the factory of the future should operate – with improved processes, enhanced products and best-in-class customer service.

The entire production process at the GCB factory is based on the ‘lean enterprise’ concept, where products and processes are continuously optimized to reduce key input requirements like time, space and capital. Flow production principles help optimize the use of space and time, and process efficiencies are built into the entire production and logistics chain, from suppliers to end users.

This approach leads to significantly shorter lead times, shorter cycle times and stock reduction, all contributing to improved efficiency and productivity. Since opening the factory ABB has cut the average production time for GCBs from 20 days to two days. The entire delivery time including engineering, manufacturing, testing and quality control takes just three months.

For the customer
Our short delivery time means longer time availability for the engineering of the power plant, with more flexibility of design changes to the requested GCB until the design freeze of up to two months before the estimated delivery. Since our GCBs are produced just-in-time, this improves project cash flow for our customers.

Understanding customers’ needs
In addition to having efficient production process, our GCB factory also won the Manufacturing Excellence Award in the category of Customer Orientation in 2014. It highlights our ability to understand our customers’ needs and to cater to them with on-time and on-quality solutions.
In our award-winning factory in Zurich, Switzerland, we have an open-door policy, where anyone can visit our facilities. We take pride in our relationships with our customers and provide full transparency in their projects. Customers are more than welcomed to attend the Factory Acceptance Test (FAT) at our factory. A quiet and comfortable room is made available to host our guests in the most efficient way to complete the test procedures and issue the relevant test protocols in the shortest possible time.

Making life easier for our customers with Remote Factory Acceptance Test (RFAT)

If customers are not able to join us in the factory, we bring the FAT to them. With only an internet connection, customers can witness the testing of their GCB in our factory without actually leaving their office premises. Using our unique RFAT tool enables us to virtually invite our customers into the GCB factory and provide them a real time customer event experience.

The test area is equipped with live cameras and computerized measuring system; therefore, streaming of test performance with measured test data is collected by web client application and made available on any internet browser.

The RFAT serves our customer better while saving time and resources. Overcoming geographical limitations and not restricting a number of attendees allow participation of as many relevant people as necessary. For orders with multiple deliveries the remote method brings about effective cost optimization and individual benefits to each customer.
Value Based Customer Care (VBCC)

**ABB experts at your fingertips**
The innovative concept of VBCC enables ABB to support power plant operators and maintenance engineers to facilitate the highest operational availability of their GCB’s over the entire lifecycle. ABB experts will provide valuable service recommendations according to customers’ requirements based on data retrieved from the GCB monitoring system, GMS600. Through this, customized reports consist of overall condition of the breaker, time to service, prognostics of operational parameters trending and drive results.

Forecasts and recommendations are then generated to help customers better plan their maintenance activities, decrease maintenance costs and prolong the lifetime of the GCBs. VBCC supports power plant operators and maintenance engineers through a proactive and cost-efficient maintenance program. With improved diagnostic capacity, the reliability of a power plant is further increased.