Gas-insulated switchgear
Pioneering innovation
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 140,000 people.

ABB offers a wide range of high-voltage products up to 1200 kV (kilovolt) that help enhance the reliability, efficiency and quality of power in transmission and distribution grids, power plants and industries while minimizing environmental impact.

In a power system, switchgear controls, protects and isolates electrical equipment to boost the reliability of power supply. With GIS technology, key components including breakers, switches, contacts and conductors are protected with insulating gas.

Many firsts from ABB in GIS

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1956</td>
<td>Research on SF₆</td>
</tr>
<tr>
<td>1967</td>
<td>170 kV GIS</td>
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<tr>
<td>1971</td>
<td>110 kV GIS</td>
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<tr>
<td>1976</td>
<td>550 kV GIS</td>
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<tr>
<td>1978</td>
<td>80 kA GIS for 245 kV and 550 kV</td>
</tr>
<tr>
<td>1987</td>
<td>145 kV GIS in a prefabricated housing</td>
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<tr>
<td>1992</td>
<td>800 kV GIS</td>
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<tr>
<td>1994</td>
<td>123 kV GIS</td>
</tr>
<tr>
<td>1997</td>
<td>Most compact 300 kV Auto-Puffer™ circuit-breaker</td>
</tr>
</tbody>
</table>
ABB has always been and continues to drive innovation in GIS technology in ratings, operations, switching technology, smart control and supervision, and compactness. Continuous research and development and advancements result in high performance GIS with outstanding reliability, operational safety.

GIS is a compact metal encapsulated switchgear consisting of high-voltage components such as circuit-breakers and disconnectors, which can be safely operated in confined spaces. GIS is used, where space is limited, such as extensions, in city buildings, on roofs, on offshore platforms, industrial plants and hydro power plants.

Our global network of state-of-the-art manufacturing facilities are located close to customers.
For all types of applications

Substation security
- Indoor application secures equipment and prevents vandalism

Extension or replacement
- Extension of existing air-insulated switchgear (AIS) or GIS with none or limited real estate purchase
- Enables extensions while AIS or GIS stays under operations

Modular with proven reliability
- Indoor or outdoor installation
- Design flexibility and adaptability according to needs

Advanced features for digital substation
- Incorporation of IEC 61850 standards
- One multi-purpose electronic current transformer (ECT) and electronic voltage transformer (EVT) for all applications
- Remote monitoring

Low environmental impact and life-cycle costs
- High energy efficiency
- Minimal maintenance
- Enables close installation to load center hence reducing energy losses of the grid
- Reduced amount of sealing, flange connections and support structures for efficient use of resources
Very large power plants | Industry applications | Long range power transmission

**High quality standards and safety**
- Extensive know-how and decades of proven experience
- Manufactured and fully tested in factory according to international standards
- High levels of safety as high-voltage components are enclosed in metal encapsulation

**Reduced installation and commissioning time**
- Factory assembled, fully tested and shipped as one bay up to 420 kV
- Less civil and on-site construction works

**Compact**
- Small footprint for installations in cities where land is limited or expensive
- Up to 90% volume reduction compared to AIS enabling land cost savings

**Aesthetics**
- Enables substation to be hidden in buildings or underground

**No environmental constraints**
- Withstands temperature range -55°C / +55°C
- Resists pollution, corrosions, earthquakes and high altitudes
New generation GIS

ELK-04 C, 145 kV – 3150 A, 40 kA
Reliable and compact solution
The ELK-04 C is the new generation for 145 kV designed to reduce complexity, life-cycle costs and environmental impact. Its design yields eco-efficient performance, simplifies planning and installation while improving serviceability.

ELK-14 C, 245 kV – 3150 A, 50 kA
Eco-efficient and compact solution
The ELK-14 C is the new generation for 245 kV designed to reduce complexity, life-cycle costs and environmental impact. The compact design fits any installation environment and offers convenient operation and serviceability.

ELK-3 C, 420 kV – 5000 A, 63 kA
High performance ratings in a compact design
The new generation ELK-3 C is designed to reduce complexity, its compact design fits any installation environment and features convenient operation and serviceability. A single interrupter circuit breaker enables manufacturing, testing and shipment of entire bays, which reduces installation and commissioning time.
Proven technology

ELK-04 up to 170 kV – 4000 A, 63 kA
Modular solution for reliable energy supply
Based on a few building blocks with standardized dimensions, the ELK-04 space saving and modular design offers a small footprint and easy operation at high performance ratings.

ELK-14 up to 300 kV / 362 kV – 4000 A, 63 kA / 80 kA
Modular GIS solution
The ELK-14 is a versatile solution for reliable energy supply. Based on a few building blocks, the modular design offers an outstanding level of flexibility for optimizing substation layouts, both in arrangement and technical features.

ELK-3 up to 550 kV – 6300 A, 80 kA
High performance ratings in a modular design
The ELK-3 requires less space than comparable GIS systems. Its modular architecture permits flexibility and adaptation to changing needs while providing short delivery and installation time. More than 1,500 installed circuit breaker bays demonstrate proven excellent performance of our product.

ELK-4 up to 800 kV – 6300 A, 63 kA
Extra high-voltage GIS
The ELK-4 offers maximum flexibility and customization in layout configuration. Optimized, compact and easily accessible layouts for the common one-and-a-half-breaker and two-breaker circuit schemes.

ELK-5 up to 1200 kV – 8000 A, 63 kA
Ultra high-voltage GIS
Ultra high-voltage (UHV) above 800 kV is the highest voltage level in use for bulk alternating current (AC) power transmission across long distances.
More than just products

Integrated GIS solutions up to 420 kV

Integrated gas-insulated switchgear is predesigned, standardized and fully integrated, ideal for customers in need of substations that can be quickly energized for grid expansions, backup or emergency power needs, and for short installation time requirements. With substantially reduced installation time compared to conventional substation, total system cost, project costs and on-site work are reduced.

The integrated GIS package comes with all primary and secondary equipment including control, protection, monitoring and communication completely installed in the prefabricated housing. Due to its prefabricated design and short deployment time, it is ideal for applications in the oil, gas and mining industries where it can be easily transported to the sites.

Hybrid switchgear solutions up to 550 kV

The simplified ELK hybrid switchgear 550 kV combines the advantage of encapsulated technology with the simplicity of air-insulated switchgear (AIS), offering up to 70 percent space reduction compared to AIS.

PASS (Plug and Switch System) from 72 kV up to 420 kV encloses all functions of a complete switchgear bay in a single module. The hybrid design makes use of traditional air-insulated busbars to connect with other equipment in the substation while enclosing the following bay functions in a single-phase gas-insulated housing.
Enabling digital substations

ABB’s GIS can be equipped with monitoring, measurement, control, protection and communication features for smooth integration into substation automation system using IEC 61850.

Benefits:
- Integration into substation automation systems, using IEC 61850 interface to non-conventional instrument transformers (NCIT) via IEC 61850-9-2LE process bus
- All monitoring features are integrated into local control cubicle to provide guided local control of all motorized switching objects via HMI of ABB’s Relion® series bay control IED, or via conventional control mimic. ABB’s Relion® series of protection and control IEDs allows flexible combination of control and protection functionality in one device
- Modular Switchgear Monitoring (MSM) supervise SF₆ density within the GIS
- Primary and secondary system status supervision and alarm visualization
- Station wide interlocking and double-operation interlocking is implemented via fail-safe IEC 61850 GOOSE, or via parallel wiring

Service for GIS

ABB’s service portfolio offers comprehensive solutions that extend the operating asset life while reducing maintenance costs. Our service departments are positioned locally to ensure that your entire installed base is taken care in the fastest possible time. With technology development at the forefront of everything we do, upgrade and retrofitting are just two of our many offerings which can help you modernize and extend the life of your existing equipment.

Benefits:
- 24/7 hotline ensures quick reaction time
- Diverse training courses for your personnel
- Customized maintenance and retrofit solutions to extend your GIS lifetime and to increase the reliability of your equipment to its maximum level
- Capability of bay extensions for any GIS, including non-ABB switchgears
- Options to adapt your GIS to future requirements including rating upgrades and layout modifications
- Service agreements to match your needs, including: risk assessments, warranty extensions, diagnostics, consulting and much more

Enabling digital substations

Station level
Substation automation solutions with IEC 61850 station bus

Bay level
Relion® series protection and control system, PWC600 point-of-wave controllers and MSM using IEC 61850

Process level
ELK-CP14 and ELK-CP3 NCITs for GIS with merging units or SAM600 stand-alone merging units to conventional current or voltage transformers connected to IEC 61850-9-2 process bus
### Comprehensive portfolio and proven technology

<table>
<thead>
<tr>
<th>Product name</th>
<th>ELK-04</th>
<th>ELK-14</th>
<th>ELK-3</th>
<th>ELK-4</th>
<th>ELK-5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage</td>
<td>kV</td>
<td>145</td>
<td>245/253</td>
<td>420</td>
<td></td>
</tr>
<tr>
<td>Rated power-frequency withstand voltage</td>
<td>kV</td>
<td>275</td>
<td>460</td>
<td>650</td>
<td></td>
</tr>
<tr>
<td>Rated lightning impulse withstand voltage</td>
<td>kV</td>
<td>850</td>
<td>1050</td>
<td>1425</td>
<td></td>
</tr>
<tr>
<td>Rated normal current</td>
<td>A</td>
<td>3150</td>
<td>3150</td>
<td>5000</td>
<td></td>
</tr>
<tr>
<td>Rated short-circuit breaking current, 3s</td>
<td>kA</td>
<td>40</td>
<td>50</td>
<td>63</td>
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<tbody>
<tr>
<td>Rated voltage</td>
<td>kV</td>
<td>145/170</td>
<td>300/362</td>
<td>420/550</td>
<td>800</td>
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<tr>
<td>Rated power-frequency withstand voltage</td>
<td>kV</td>
<td>275/325</td>
<td>460</td>
<td>650/740</td>
<td>960</td>
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<tr>
<td>Rated lightning impulse withstand voltage</td>
<td>kV</td>
<td>650/750</td>
<td>1050</td>
<td>1425/1675</td>
<td>2100</td>
</tr>
<tr>
<td>Rated normal current</td>
<td>A</td>
<td>3150/4000</td>
<td>4000</td>
<td>5000/6300</td>
<td>5000/6300</td>
</tr>
<tr>
<td>Rated short-circuit breaking current, 3s</td>
<td>kA</td>
<td>40/63</td>
<td>63/80</td>
<td>63/80</td>
<td>63</td>
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Quality assurance

We are committed to providing the best products and services. Our products comply with or exceed the latest international standards. In addition to type tests in independent laboratories, our certified design and manufacturing process guarantee the highest quality.

Our products are type tested according to international standards:
– IEC
– ANSI/IEEE
– GOST

Our products are certified by third-party organizations:
– LAPEM
– PEHLA

Sustainability

For ABB, sustainability is about balancing economic success, environmental stewardship and social progress to benefit all our stakeholders.

Sustainability considerations cover how we design and manufacture products, what we offer customers, how we engage suppliers, how we assess risks and opportunities, and how we behave in the communities where we operate and towards one another, while striving to ensure the health, safety and security of our employees, contractors and others affected by our activities. In line with our business practices, we publish environmental product declarations for each product we manufacture.
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