ABB’s High Voltage Products
Business overview - Legacy of over 100 years
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ABB High Voltage Products
Key Facts

- No.1 player in global market of High Voltage Products
- 44 factories around the world
- Approximately 7,000 employees
- Sales support in over 100 countries
- Installations all over the world and in all types of harsh environment
ABB’s High Voltage Products
At the forefront of innovation

A continuous journey of innovation, some examples

- ABB built the world’s first gas insulated switchgear in 1967
- Offers High Voltage Products up to 1100 kV DC and 1200 kV AC
- In partnership with XD Group, China ABB installed the first 1100kV GIS worldwide in 2008
- ABB’s generator circuit breakers offer the highest short circuit breaking capacity in the world of 300 kA
- ABB introduced the world’s 1st high voltage breaker on CO₂ platform as an alternative to SF₆ gas – LTA for 72.5 kV
- ABB’s patented cryogenic SF₆ gas recycling technology purifies SF₆ gas up to 99.9 %
ABB’s high voltage products offering
One stop shop across the value chain

1. Gas Insulated Switchgear
2. Air insulated switchgear
3. Multifunction modules including hybrid switchgear
4. Generator Circuit Breakers, Cooling systems
5. Instrument transformers, disconnectors
6. Capacitors and filters, surge arresters, cable accessories
7. Power quality
ABB’s High Voltage Products
Range of applications

Widest range of products enabling
- Transmission and distribution of electricity
- Protection in power generation plants
- Improving power quality
- Enhancing energy efficiency
- Integrating renewable sources of energy
ABB’s high voltage products
Complete service portfolio

1. Engineering and consulting
2. Repairs
3. Customer Service Agreements
4. Maintenance
5. Training
6. Extensions, upgrades and retrofits
7. Replacements
8. Installation and commissioning
9. End of life services
10. Spares and consumables
11. Advanced services
ABB’s high voltage products – global footprint
Factories and service centers

Factories - 44
Service Centers - 26
ABB’s High Voltage Products
Innovation is key differentiator

Examples

- Cost optimization
- Smaller product footprint
- Green portfolio
- Intelligent products
- Higher voltages

- 1200 kV hybrid GIS
- DCB for Smart Grid application
- Dry Capacitor technology
Quality and operational excellence
We share our global experience with you

We prove our reliability

- With successful product installations in all kind of harsh environments from -55 °C to +55 °C
- With product certifications according to a wide range of international standards like IEC, ANSI/IEEE, GOST, DL or GB
- With experience showing that many of our installations exceed the designed service life of 30 years
- For any issues claim through Customer Complaint Resolution Process (CCRP) available on [www.abb.com](http://www.abb.com)
Gas Insulated Switchgear

3-ph Design up to 245 kV, 1-ph Design up to 1100 kV; up to 80kA breaking capacity

**Applications**
Protection and switching in HV substations with:

- Low space requirements e.g. inner-city substations and power plants
- Heavily polluted areas e.g. coastal regions and industrial substations
- High safety and power availability requirements

**Special features**

- Compact footprint
- Easy access to drives
- Shipment of full factory assembled and tested bays
Hybrid modules – PASS (Plug and Switch System)

Hybrid technology of air and gas
Available up to 420 kV

Applications
Protection and switching in HV outdoor substations
- Remote substations
- Industrial substations
- Substation retrofits
- Railway
- Wind

Special features
- Plug And Switch System (PASS)
- Pre-assembled and factory-tested
- MotorDrive
Multi Functional Modules – MFM

Mobile substation based on PASS up to 252 kV

Applications
- Protection and switching in HV outdoor substations
  - Periodical peak load coverage
  - Industrial substations (e.g. mining etc.)
  - Supply recovery in short time in case of emergency
  - Power supply in remote areas

Special features
- Fully pre-assembled and factory-tested
- Available on one trailer
Dead Tank Breakers

Available up to 1200 kV AC, and up to 90 kA breaking capacity

Applications
Protection and switching in HV outdoor substations

Special features
- Polymer insulators available
- Circuit Breaker Sentinel monitors breaker conditions, supports “Smart Grid” initiative
- Switching Control Sentinel mitigates switching transients
COMPASS

Hybrid technology of air and gas
Available up to 170 kV and up to 40 kA breaking current

Applications
Protection and switching in HV outdoor and indoor substations
- Industrial substations
- Remote substations
- Substation retrofits

Special features
- Pre-assembled and factory-tested
- Possibility of maintenance on circuit breaker with live busbars
Live Tank Circuit Breakers

Available up to 1200 kV AC and 1100 kV DC, up to 80 kA breaking current

Applications
Protection and switching in HV outdoor and indoor substations

Special features
- Excellent performance and high reliability in all climate conditions
- Highly reliable operating mechanisms
- Polymeric insulators available
- Controlled switching with Switchsync™
Disconnecting Circuit Breaker - DCB

Available up to 550 kV and up to 63 kA breaking current

Applications
Protection and switching in HV outdoor and indoor substations with
- Minimized maintenance and less space
- Low failure rate, increased safety and low Life Cycle Cost (LCC)

Special features
- Polymeric insulators
- No conventional disconnectors needed
ABB developing alternative gas platform

- LTB & DCB using CO₂
  - Developed from ABB’s highly efficient SF₆ interrupter technology with low loss copper contacts
  - Similar ratings as a conventional SF₆ breakers

- Common components with SF₆ platform
  - MSD1 mechanical spring drive
  - Insulators, linkages, structure and castings
Generator Circuit-Breakers

Generator Circuit-Breakers with rated short-circuit current up to 250 kA for application in the largest power plants

**Applications**
Protection of generator and step-up transformers in:
- New Power Plants
- Existing Power Plants

**Special features**
- Special solution also for Pumped Storage Power Plants
- Up to 20’000 mechanical close-open operations without overhaul
- Contact ablation display provides visual indication aiding power plant operators in their maintenance planning
Outdoor Instrument Transformers

Current and voltage transformers available up to 800 kV

Oil insulated, SF$_6$ gas insulated and optical solutions

**Applications**
- Voltage, current or combined measurement in HV outdoor substations

**Special features**
- Polymeric insulators available
SSVT Instrument Transformers
For Station Service Voltage Transformers

For 46kV to 500kV systems

- Reliable, redundant station control power up to 333kVA
- Self reliant - Reduce or eliminate the need to purchase control power from outside source.
- High availability from HV transmission line connection transformed directly to LV/MV.
SSVT Instrument Transformers
For Community Electrification

Full Distribution Infrastructure Supply

Expensive - Long Lead Times
Oversized for Existing Loads

Station Service VT Derived LV Supply

Cost and Lead Time Effective
Right Sized
High voltage capacitors and filters

Capacitor and harmonic filtering solutions up to 800 kV to improve the efficiency and reliability of utility and industrial networks.

Applications
- Reactive power compensation
- Improvement of asset utilization
- Reduction of network losses
- Compliance with grid regulations
- FACTS/HVDC

Special features
- Quality and technology leadership
- Products supported by application know-how
- Extensive portfolio coverage
Low voltage capacitors and filters

Capacitor units, banks and harmonic filters up to 1000 V to improve the efficiency and reliability of industrial and commercial networks.

Applications
- Automatic Power factor correction
- Harmonic filtering
- Load balancing
- Reactive power compensation
- Dynamic voltage support

Special features
- ‘Best in class’ functionality
- High level of reliability and safety
- Compliance with Power Quality regulations
Surge Arresters

Available up to 800 kV for surge protection in LV, MV and HV networks
All voltage classes and surge ratings

Applications

- Indoor and outdoor substations and transmission lines
- High energy applications

Special features

- Polymeric housing for improved performance
Disconnectors

Available up to 550 kV

Applications
Isolating function in HV outdoor and indoor substations

Special features
- Various types of disconnector are available
- Excellent performance and high reliability in all climate conditions
Operating mechanisms

- Spring operating mechanisms
- Hydraulic-spring drive
- Electronic motor drive
Cable accessories 52 – 420 kV

- Outdoor cable terminations
  - Conventionally oil-filled with composite insulators
  - NEW! Dry type, pre-assembled (170 kV)
- Dry flexible cable terminations
- Cable connectors/terminations for GIS and transformer
  - Conventionally oil-filled
  - NEW! Dry plug-in termination (170 kV)
- Premolded cable joints
- Tools and accessories

Extensive training courses – world renowned
Cable accessories 12 – 42 kV

- Cable terminations for indoor and outdoor applications - for XLPE and oil-paper insulated cables
- Cable connectors
  - Insulated
  - Screened separable
  - Surge arresters
- Cable joints - for XLPE and oil-paper insulated cables
- Cable distribution cabinets
- Tools and accessories

Extensive training courses – world renowned
High voltage products service portfolio

**Diagnosis**
- On-site diagnostics, on-line monitoring

**Environmental services**
- SF$_6$ gas management and SF$_6$ recovery training and certification

**Installation and commissioning**
- Certified staff and on-site testing

**Spare parts**
- Current and legacy products

**Support and remote service**
- Telephone support, remote monitoring

**Maintenance and field services**
- Asset updates and remote service
Our Service Centers Network
26 Service Centers, 1000 Service Experts

Moorebank, Australia
Guarulhos, Brazil
Montreal, Canada
Santiago, Chile
Beijing, China
Bogota, Colombia
Helsinki, Finland
Paris, France
Mannheim, Germany
Vadodara, India
Lodi, Italy
Kuala Lumpur, Malaysia
San Luis Potosi, Mexico
Bergen, Norway
Lima, Peru
Cheboksary, Russia
Al-Khobar, Saudi Arabia
Gauteng, South Africa
Madrid, Spain
Ludvika, Sweden
Zurich, Switzerland
Kaohsiung, Taiwan
Bangkok, Thailand
Abu Dhabi, UAE
Stone, UK
Mount Pleasant, USA
High Voltage Service
Extending the life of your asset

The high voltage service market is continually expanding and changing. By combining a high level of quality service and industry expertise, High Voltage Service offer solutions for every day situations. To meet these challenges we continue to develop our portfolio, increase customer intimacy and improve our operations.

As a compliment, we offer services that extend the operating asset life while reducing maintenance costs. As high voltage equipment ages, various maintenance procedures can be performed to keep the equipment operating in new or better than new condition. These procedures can be time based or condition based depending on the need.