High Voltage GIS
Life Cycle Services
**Complete service portfolio from start-up to decommissioning**

Expand crowded conventional substations with GIS bay(s)

Upgrade HV cables & cable end units

Strategic spare parts supply

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**GIS Life Cycle Services**

**Installation & Commissioning**

Installation & commissioning services range from technical assistance to full turnkey project execution. ABB is able to handle all GIS I&C projects - expansions, retrofits, upgrades, and new construction.

**Repair & Maintenance**

ABB is able to handle all types of repair and maintenance projects (planned, unplanned, emergency) with scheduled or rapid response action plans by factory trained & certified OEM service engineers.

**Retrofit & Upgrade**

Easily extend legacy GIS or another OEM's GIS with ABB's highly reliable GIS. Retrofits and upgrades cost-effectively life extend existing equipment.

**Fleet Assessment & System Engineering**

ABB maintains an extensive library of records dating back 40 years. Engineering services range from conditional assessments to fleet assessments, up-rates, life extension programs, and more.

**OEM Parts**

OEM parts increase GIS reliability. Replacement parts are specific to the GIS serial number. Spare part kits and cost-saving exchange components are also available.

**Diagnostic & Testing Services**

ABB’s full range of diagnostic services maximize maintenance effectiveness. Options include: radiography, acoustic scanning, PD testing, SF₆ gas testing, and IR Imaging.

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**The ABB difference:** With strategically placed global production, service, and training centers, ABB is ready to respond to our customers’ needs at a moment’s notice.

Our GIS experts focus on reliability and service excellence.
GIS Product Portfolio and Service Capabilities

There is a legacy of product leadership and many firsts in ABB’s GIS history. ABB High Voltage Service proudly supports the following brands with complete life cycle support services:

In addition to product leadership, ABB has a dedicated team of GIS service experts for all your aftermarket needs.

Service Capabilities

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One location for all aftermarket support
ABB’s Mt. Pleasant Service operation handles all aftermarket support for the convenience of our customers. Whether it is spare parts, preventive maintenance, an emergency repair, or warranty support, ABB has centralized GIS customer support to one location.
ABB’s GIS Expertise

Operating mechanisms
ABB offers several options to maintain mechanism energy and switching operations: parts, rebuild, retrofit, & conversion programs, training, or expert maintenance.

OEM parts
OEM parts increase GIS reliability. ABB maintains a large inventory of parts & kits. All parts meet stringent OEM form, fit, & function requirements.

Life extension
Receive another 25 - 30 years of reliable operation from existing equipment with component improvements & enhancements (interrupter, mechanism, etc), includes possible up-rate.

Training
Equipment training is available on-site or at ABB’s dedicated HV training center.

Maintenance recommendations
Service experts will review your equipment & determine maintenance priorities to maximize the equipment life.

Remote or condition monitoring device
Predictive condition based maintenance keeps you one step ahead of problems. ABB’s sophisticated condition monitoring services collect data from your equipment and analyze key parameters to optimize the maintenance schedule.

Retrofit new technology or component improvements
Retrofit equipment with new technology or component improvements to maximize asset value.

Bay extensions
Extend legacy GIS bays and other OEM GIS with ABB GIS bays.

Cable connections
ABB engineers are factory trained & certified to terminate, upgrade, & install GIS cables.

Radiography
Diagnostic X-ray inspection of critical, internal components. Maintenance is performed without opening internal chambers or busbar.

SF₆ gas testing, analysis & leak remediation
ABB will analyze SF₆ gas on site, find & remediate SF₆ leaks; saving you money, while improving equipment longevity.
Installation & Commissioning

ABB’s Service operation, based in Mount Pleasant, PA, can assist with everything from post-installation commissioning tests to complete turnkey project execution, up to and including disposal of the original equipment being replaced. ABB’s experience includes the installation of GIS, cable termination, testing, technical assistance, expansions of vintage and other OEM equipment bays, greenfield and brownfield expansions, and AIS to GIS installations/retrofits.

ABB Advantages

ABB is the only service provider able to offer factory certified field service engineers for ABB’s GIS equipment and cables. This certification is the customer’s guarantee that the engineer is fully qualified and trained in commissioning and installing the equipment in a correct and safe manner, and according to the manufacturer’s instructions.

Using factory certified engineers lays the ground work for long-term reliability and efficiency.

- **Expert Service Personnel**
  - Factory trained & certified engineers
  - ABB GIS engineers have the necessary certification to validate the factory warranty
  - Using ABB ensures the work is done correctly, safely, and efficiently

- **Commissioning**
  - ABB will perform recommended commissioning tests including: timing/travel tests, verification of control and alarm set points, SF₆ analysis tests, micro Ohm testing, and mechanical operation tests

- **High Voltage Expertise**
  - Engineers are trained on the full product portfolio
  - Quick access to engineers with specialized skills to expand the resource base as needed
  - Creates a safer jobsite utilizing ABB engineers thoroughly trained in SF₆ handling practices

- **Technical Assistance**
  - ABB will provide a certified engineer to oversee installation & commissioning, & assist with testing
  - Oversight procedures include: filling with SF₆ gas
  - Timing/travel tests
  - Verification of control & set points
  - Micro Ohm & mechanical tests

- **In-house project management**
  - One point of contact for customers
  - Specialized knowledge in GIS installations
  - Dedicated resources to ensure project success

- **Full Turnkey Installation, Replacement, or Expansion**
  - ABB will handle the end-to-end installation of new equipment, replacements, retrofits, expansions, & upgrades
  - Worry-free GIS project execution is our specialty

- **Resources**
  - All insurance, safety certifications, & jobsite training requirements are already in place
  - Immediate access to all necessary equipment and associated resources

- **Cable termination, testing**
  - Factory certified supervisors for HV & MV cables: Südkabel, Pfisterer, Kabeldon (ABB)
  - Factory certification is necessary to validate warranty
  - Experienced, terminating, moving, & upgrading cables
Service Recommendations

According to CIGRE studies*, GIS is very highly reliable equipment. Though GIS requires less maintenance than AIS equipment, it still requires maintenance to maximize its reliability and availability.

Recommendations:
- Preventive maintenance every five years for outdoor installations
- Preventive maintenance every seven years for indoor installations
- Major maintenance to follow condition and application based guidelines

Upgrade & Retrofit Recommendations for Improved Reliability

Mechanisms
- Complete mechanism or specific component upgrades/retrofits available
- Parts kits available
- On-site service or cost-saving rebuilt units available

CT’s/PT’s/CCVT’s
- Upgrade to the latest technology
- Improved safety & performance
- On-site installation & testing available

Surge Arresters
- Upgrade obsolete silicon carbide (SiC) surge arresters with gapless solid-state metal-oxide surge arrester (MOSA)
- Improved performance
- On-site installation & testing available

Density Monitor
- Upgrade to the latest technology
- Improved safety & performance
- On-site installation & testing available

SF₆ plumbing
- Update valves, fittings, & tubing
- Reduce/eliminate/prevent SF₆ leaks
- Advanced leak detection & remediation methods utilized

Retrofit condition monitoring device
- Install condition monitoring devices to maximize equipment reliability & availability
- Quickly solve problems or performance issues via root cause analysis

Animal control
- Components damaged by the natural environment are upgraded for protection
- Long-term equipment availability is increased with appropriate upgrades

Weather upgrade
- Component upgrades protect outdoor equipment from UV light, precipitation, & condensation

Rupture disk
- Upgrade graphite disks to safer (modern) metal disks
- Metals disks also include an SF₆ moisture filter
- Improved safety & performance

Interrupter Upgrade
- Upgrade GIS interrupters with the latest technology & operational enhancements
- Up-rate the continuous & interrupting current
- Cost-effectively life extend the equipment with rebuilt exchange components

Custom or specialty upgrades or retrofits
- ABB regularly performs many custom life-extending upgrades & retrofits
- Engineered solutions are available for complex, recurring, or systemic problems

Contact ABB for upgrade and retrofit eligibility and options.

* CIGRE Evaluation of different switchgear technologies (AIS, MTS, GIS) for rated voltages of 52 V and above
August 2009
The financial implications of corrective versus preventive maintenance strategies can be substantial.

Diagnostic Testing

- **Acoustic Scanning**: Electrical scan of GIS to check for loose hardware, floating potential, and partial discharge
- **Radiography**: X-ray inspection of internal components to verify switchgear integrity & reliability
- **SF₆ Gas Testing**: Analysis of SF₆ gas for decomposition, moisture, & purity with highly accurate measurement equipment
- **IR Imaging**: External infrared inspection of GIS for SF₆ leaks or hot spots

Field Service Expertise

- ABB has the experience to handle all types of field service work from minor repairs to major overhauls on everything from current production to legacy equipment.
- ABB’s expertise includes factory trained & certified OEM field service engineers & supervisors.
- ABB field service engineers have a superior level of knowledge which enables them to finish work quickly and precisely.

Service Highlight

Radiography

- Preventive maintenance typically only inspects the interrupter and mechanism. With radiography, the entire GIS is easily & cost-effectively inspected.
- Maintenance via radiographic inspection saves significant amounts of time & money due to shorter outages schedules.
- Radiography eliminates the risk of SF₆ gas emissions or environmental contaminants entering the equipment.
- Radiography may be done beginning with the first maintenance cycle.

Decommissioning

- ABB will remove your equipment in a safe & environmentally friendly manner
- ABB is one of the few companies with an effective use for decommissioned equipment components, further lowering your carbon footprint. ABB both recycles and purifies used SF₆ gas, and refurbishes exchange components (interrupters, mechanisms).
OEM Parts Increase GIS Reliability

ABB Advantages

- Original manufacturer tested
- Every kit ABB builds is individually tailored to the shop order and GIS serial number for precise fit and application
- Over $20 million of parts on stock
- In-house expertise to remanufacture and life extend current production and legacy GIS and components
- Over 60 marketing, engineering, project management, production, and field service engineers available to respond to customer needs
- Over 1,000,000 design records on-site in print and microfilm
- Expertise to develop strategic and critical parts programs with customers
- Ability to support US as well as global customers
- Same day shipping on many parts
- Twelve month warranty included with ABB's OEM parts

ABB will help you maximize reliability and availability with an inventory assessment

All of ABB’s OEM parts are made to the highest quality standards. All tolerances and materials must fall within stringent manufacturing specifications. This and only this guarantees your equipment will continue operating with maximum reliability. Contact ABB today for a review of your system and spare parts stock. We will analyze your needs, equipment criticality, component lead times, and other relevant factors unique to each customer. With this information, we will help you determine cost saving inventory levels as well as strategic and critical parts to optimize a high level of equipment reliability and availability.

Benefits of stocking spare parts on site

The delivery time for some spare parts may be several weeks or even months. Spare parts represent a small investment that can have a significant effect on availability.

Keeping essential spare parts on site is a good investment with a number of benefits:
- Improved availability of the GIS
- Effective preparation for unexpected situations
- Minimized downtime in case of a failure
- Minimized revenue loss in case of a failure

Benefits of sourcing OEM parts

Only the OEM can guarantee that parts are based on the original documentation and are 100% correct.

Constant design improvements mean that the original manufacturer can supply spare parts that are superior to the existing components in terms of design and functionality.

OEM parts ensure form, fit, and function.
Technical Expertise

Life Extensions
ABB has the capability to maximize your asset value by life extending your installed equipment. After an assessment and overhaul with the latest product enhancements, your existing equipment will provide you with another 25 to 30 years of reliable operation. Installed equipment is upgraded with the latest components and technology to provide better than original operating performance.

ABB upgrades many or sometimes all of the following components for improved performance:
- Mechanism
- Interrupter
- Surge Arrester
- PT/CCVT
- Control Cabinet
- Monitoring Device

Life Extension Advantages
Benefit from the reliability and improvements of the latest technology without changing your equipment:
- Average savings of 30-40% over new equipment
- Opportunity to apply capital expenditure funding to equipment maintenance
- Shorter lead time than new equipment
- System re-engineering not required
- Original busbar and foundations are re-used
- No retraining of employees on new equipment necessary
- No associated procurement, product switching, or decommissioning costs

Cable Upgrades / Terminations

Services include:
- Oil to solid dielectric upgrade
- Move / reroute cables
- HV & MV cable termination

High Voltage Testing / PD Detection
ABB is able to perform the following tests on GIS:
- PD test in conjunction with HV withstand test
- PD test while in service

ABB also offers partial discharge monitoring. A permanent sensor is installed to continuously monitor for localized partial dielectric breakdown. In GIS PD faults can occur as a result of cavity, cracks, particles, or embedded particles resulting in unexpected outages.

ITE 550 kV legacy GIS 30 year life extension

On-site HV testing, ITE GIS after installation

High Voltage Service | GIS Service
A Tailored Level of Support

Customer Support Agreements

ABB is committed to maximizing the availability and reliability of your equipment. Through a Customer Support Agreement (CSA) we will determine the level of support you need to reach this goal. Some CSA’s are pre-defined based on industry best practices, while many are customized per each customer’s unique needs, equipment criticality, and fleet life cycle phase.

Popular CSA’s include:
- Spare parts, tools, & inventory analysis
- Inspection & Diagnosis
- Conditional Assessment
- Fleet Assessment
- Failure Mitigation Planning
- Training

A global service organization with local, 24/7 support

As a globally operating technology corporation and a manufacturer of products and systems, we complement these offerings with a comprehensive spectrum of round-the-clock support service capabilities.

Our approach to aftermarket support is to offer services that improve reliability and extend the operating life of a customer’s high voltage switchgear, while reducing operation and maintenance costs at each life cycle phase. We offer the most comprehensive and cost effective alternatives to the purchase of new power equipment.

By combining our high level of quality service and industry expertise, we provide our customers with options for every situation encountered. To meet the challenges of the changing high voltage service market we continue to develop our portfolio, increase customer intimacy, and improve our operations.