ABB generation protection and control systems
Simplicity, savings and asset reliability

The technology behind generation protection and control is evolving rapidly, delivering advanced capabilities with greater efficiency and creating new opportunities. Built on a foundation of experience, service and support, ABB generation solutions leverage the latest innovations to deliver advanced protection at a lower cost, increased reliability, and greater flexibility, to safeguard your generation assets.

Challenges
Your unit was delivered more than 10 years ago and is approaching its first, or perhaps second, protection upgrade. Regulatory requirements, grid modernization phenomena such as subsynchronous oscillations, operational and footprint challenges are all driving the requirements for your next upgrade decision. Your current system has served you well, but aspects of its design will become increasingly problematic:

- It is based on electromechanical or first generation microprocessor generator protection relays deploying antiquated protection philosophies, exposing generation assets to greater risk.
- It shuts down when the frequency is less than 55 Hz, leaving your unit unprotected.
- It does not offer protection against stator or rotor winding earth faults.
- NERC/PRC regulations have significantly increased your disturbance reporting obligations and maintenance efforts.
- It cannot detect and respond to subsynchronous oscillations and subsynchronous resonance coming from your grid connection.
- It is not compatible with the latest protection and control technologies available in the digital world.

Situational analysis/background
To meet the challenges of today, and tomorrow, aging generation assets must continue to operate efficiently, and with minimal downtime, under increasing regulatory reliability pressure. Unfortunately, many generation owners deploy systems operating on outdated protection technologies, with limited communications or none at all, exposing the generator asset to risk of damage due to legacy protection philosophies, operational inefficiencies, and problematic plant integration.

The advanced applications necessary to improve reliability and system performance are essential in ensuring the ongoing dependability and security of the asset. ABB offers the power of one solution for protection and control, based on a foundation built on the latest innovations and open standards, increasing operational efficiencies, optimizing system performance, and enabling operators to minimize downtime in the event of a failure.

The need for real-time information to support regulatory and operational reporting will continue to increase. Relion generator protection and control solutions are the keystone in meeting these critical demands to safeguard assets and maintain operational reporting.
Points to consider

- What components of your generator protection and control system are original equipment?
- Which components have previously been upgraded? When were the upgrades performed?
- When is your next planned generator outage? Upgrade outage?
- Do you operate as a base load unit or as a peaking unit? If peaking, roughly how many starts per year?
- Do your existing generation assets utilize advanced protection solutions capable of protecting 100% of the stator and rotor windings from earth faults?
- Have you been impacted by subsynchronous oscillations or subsynchronous resonance?
- Are you in proximity to:
  - HVDC devices
  - Series capacitance, STATCOM, SVC or other active devices
  - Wind farms
- Are you able to comply with all the requirements of NERC/PRC as it pertains to generators?

The solution

ABB protection and control solutions allow for increased capability at a significantly smaller footprint, while providing self-supervision, measurements, metering and integration to the electrical SCADA and DCS. Technology advances address operational problems during startup and shutdown providing the maximum protection and safeguarding generator assets.

Advanced applications

- Generator and unit transformer protection in one protection device
- ABB’s patented turn-to-turn winding detection for ultrafast fault detection and clearance
- ABB’s patented frequency tracking algorithm to protect the asset during generator startup and shutdown
- Smaller footprint, reduced control system wiring and integrated control for flexible automation
- NERC/PRC compliant trending, reporting and display
- Synchronizing and excitation systems for automatic voltage regulations for synchronous generators

Next steps

Arrange a visit from our technical team to discuss:

- The latest technological advances in generator protection and control.
- The impact of antiquated technology on your system.
- Requirements for your next generator protection and control upgrade and a budgetary estimate for ABB solutions.

### Solutions summary

<table>
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<tr>
<th>Original OEM upgrade SAS-001-01</th>
<th>NERC/PRC reporting SAS-001-02</th>
<th>100% earth fault detection SAS-001-03</th>
<th>Subsynchronous oscillations SAS-001-04</th>
<th>Frequency tracking SAS-001-05</th>
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<tr>
<td>As the original provider of your protection &amp; control equipment, an ABB upgrade solution optimizes existing panel/rack layouts and offers the opportunity for footprint reduction if desired.</td>
<td>The REG670 is the core of the protection upgrade. Coupled with MicroScada, an ABB upgrade provides full data acquisition, display, and analysis for logging required in support of NERC/PRC compliance.</td>
<td>The REG670 is the most advanced generator protection device. Enabling 100% stator and rotor earth fault detection through high frequency injection, creating a cost effective solution that is easily installed.</td>
<td>The REG670 is the only generator protection device with advanced capability to monitor and detect SSO from HVDC series capacitors and other active devices in proximity to the generation plant.</td>
<td>The REG670 is the only generator protection device designed to monitor and protect through a full range of frequencies during startups and shut down. (10 Hz-90 Hz).</td>
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ABB Inc.
Power Grids Grid Automation
901 Main Campus Dr.
Raleigh, NC 27606, USA
us-info.pgac@abb.com
abb.com/distribution-automation-systems

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