



Analog Busfed Exciter Life Extension

Overview

Designed in the late 1970s and built into the early 1990s, more than 500 GE Analog Busfed (ABF) excitation systems were applied to gas and steam turbine generators over its production life. The analog controls and robust power conversion bridges were delivered in freestanding cabinets and installed as modules and assemblies into a variety of metal control room designs and shipped around the globe. After almost four decades, many of those original systems are still in service today. Parts availability issues, increased regulatory modeling and testing requirements and declining access to qualified support personnel have driven many customers to look for upgrade options for these venerable systems.

Extending ABF Systems Useful Life

Over the last 15 years, Nexus Controls, a Baker Hughes business (formerly GE Energy Control Solutions), has developed an expanding portfolio of products designed to help owners of legacy GE excitation and static starter products, as well as those from other manufacturers, address aging systems. Our approach allows operators to manage obsolescence and operational risk over time and as budget allows.

Controls Modernizations

We pioneered Digital Front End (DFE) controls upgrades, offering a cost-effective way to reduce both risk and performance limitations of aging analog and early generations of digital control hardware.

Updated digital controls provide a host of benefits:

- Improved system response
- Current IEEE, limiter and PSS models and documentation packages
- Increase system reliability with redundant control options
- Access to parts and product support
- Improved operational and diagnostic data

Nexus Controls tailors Digital Front End (DFE) control upgrades for the analog busfed exciters, structured to minimize system disruption and reduce both outage duration and installation costs versus full system replacements. The EX2100e control components are consolidated into modules, fully factory tested and packaged, ready for mounting in existing cabinets and interconnected with predefined harnesses.

DFEs are integrated into the existing site infrastructure, usually with no change to the system footprint and no disruption of the AC or DC power connections.

EX2100e Redundant Controls



New EX2100e components include:

- Simplex or redundant controllers, I/O modules and current feedback.
- AC line filter module and shaft voltage suppressor
- Optional field flashing module
- A variety of operator interface options

Power Converter Replacements

While power electronics and system electrical auxiliaries have a long operational life, thermal cycling, environmental conditions and age eventually impact the reliability of the power train.

Nexus Controls has introduced a line of modular power converter replacements for ABF excitation systems operating with EX2100e controls.

New, three phase, full SCR power converters can reset the clock on the heart of the system power electronics. Installed in the existing enclosures, the Nexus Controls team will design mounting and power connections to seamlessly integrate modern power conversion hardware to the EX2100e controls. The new power converter(s) can be installed in conjunction with the EX2100e digital front end or during a later outage.



Systems include AC input fuses, snubber circuits, conduction sensing, new gate firing interfaces, and power cable terminations. Power auxiliaries like input/output breakers or contactors can be replaced as extended scope options. Where an added level of reliability is required, the new power converters can be supplied with redundant cooling fans or simplex systems may be upgraded to fully redundant power converters where space allows.

Controls and power converter modernizations projects include design support to keep the project running smoothly. Demolition, wire transition, signal level separation and device layouts help to ensure a safe and reliable installation.

Dedicated Excitation Retrofit Experts

Nexus Controls provides a full range of services and support capabilities for the EX2100e excitation systems:

- Hardware, software and integration engineering
- Application expertise to support custom solutions
- Installation design and documentation packages
- Single point system responsibility – PPT, cable, bus, networks, enclosures
- Comprehensive PSS and Modeling services and documentation
- Project management, installation and commissioning services

We've been here all along

For decades, Nexus Controls, a Baker Hughes business, has successfully delivered turbine and generator control system solutions for power generation customers around the globe. Our team of experienced domain experts leverage a comprehensive portfolio of reliable control platforms to tailor the outcomes to best meet your needs.