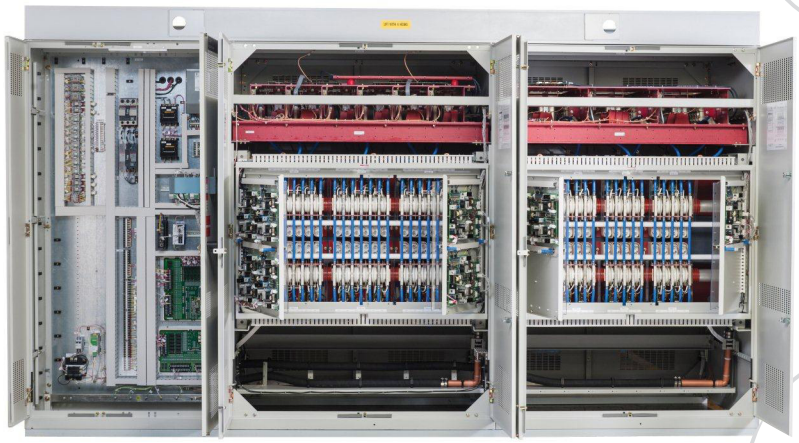

Modernizing gas turbine starting systems with the LS2100e

The LS2100e Static Starter is the latest evolution of the load-commutated inverter (LCI) drive technology specifically designed to start gas turbine-generators. The LS2100e is applied to both new-unit GE heavy-duty gas turbines and a variety of GE starter retrofit applications to modernize aging systems.

Today, many legacy systems are limited by the technology of their era and require an upgrade to deliver generator operability and availability improvements.

The Nexus Controls team are experts in generator control modernizations and the application of the LS2100e LCI in static starting systems. From "controls only" retrofits, to complete drive replacements, or the addition of new starters to create a redundant cross-over starting system, all engineered and installed by dedicated retrofit specialist helping owners improve the performance of the generating asset.

LS2100e Technology

Improved Reliability: Reduced card count, powerful diagnostics, modular construction and other design features help to drive maintenance and repair efficiency.

Improved Performance: High acceleration torque from turning gear speed, reducing unit starting times and improving starting performance.

Increased processing power allows integration of system cooling control, eliminating the need to manage the supplemental cooling control PLCs from prior designs.

Increased Staff Productivity: Turbine starting sequencing is coordinated between turbine controls, exciter, and the static starter controls via a high-speed unit data highway. System functions are monitored via the Mark controls Human Machine Interface (HMI).

System parameters, starting sequence summaries, thermal performance and extensive control and power converter diagnostics improve system management and decision support.

Events and alarms are time-stamped and integrated into the alarm management system in a common, time-coherent database.

System Approach: The LS2100e platform integrates seamlessly into the turbine island controls. Utilizing a single software tool-set, network architecture and common spare parts, simplifying life-cycle management of digital assets and reducing cyber-attack surface.

Designed to be part of the turbine-generator system, the LS2100e offers access to the advanced starting features such as FastStart and other OpFlex offerings[1].

[1] With compatible turbine-generator mechanical configurations

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Proven control and protection design

The LS2100e provides a comprehensive set of drive protective functions:

- Instantaneous overcurrent
- Bridge differential current
- Generator overvoltage
- Source bridge undervoltage and overvoltage
- Ground fault
- Bridge coolant over temperature, low resistivity, low pressure, high or low level
- Shorted thyristor
- No generator field at start

Member of the Mark VIe family

The LS2100e uses the same controller, communication architecture, operator interfaces and ControlST software suite as the Mark VIe family of turbine, generator and plant controls— simplifying plant operations and maintenance.

Comprehensive retrofit portfolio

Nexus Controls has developed a line of structured control migrations (digital front end (DFE)) solutions which enable customers with legacy GE Innovation Series or LS2100 static starters to upgrade to the LS2100e platform at a fraction of the cost of a full drive replacement. The LS2100e control migrations leverage the remaining useful life of the LCI power converters, while giving owners the peace of mind of a high performance, maintainable, secure control architecture with a better return on investment.

The LS2100e, coupled with our migration offerings for turbine and generator control, can provide access to performance software features and reset the life cycle clock on the existing hardware at a lower cost and shorter outage than conventional retrofits. New controls can be paired with cooling system refurbishments and spare parts programs as part of a comprehensive system management strategy.

Nexus Controls can design and install redundant, cross-over capability, enhancing sites where only a single static starter is currently installed, improving system reliability or to support getting more units on the grid faster. For sites with multiple existing starters in one-on-one configurations, cross-over capabilities can be added and for sites with aging cross-over control PLCs, the system can be simplified and integrated into the Mark VIe/LS2100e controls, eliminating PLC and associated support issues.

Dedicated retrofit experts

Nexus Controls provides a full range of services and support capabilities for the LS2100e starting systems:

- Hardware, software and integration engineering
- Application expertise to ensure starting system performance
- Installation design and documentation packages
- Single point responsibility across turbine-generator controls
- Integrated network, control and protection expertise
- Project management, installation and commissioning services

Cybersecurity

Upgrading to Nexus Controls' suite of security products allows you to take advantage of a suite of comprehensive cybersecurity solutions, helping reduce your risk and ensure maximum uptime. With over 10 years of industrial network protection experience and hundreds of installations worldwide, Nexus Controls' cybersecurity solutions provide defense-in-depth protection and have undergone strict cybersecurity best practices demonstrating to customers that systems are developed and implemented securely. The SecurityST platform and Cyber Asset Protection program are designed to support the plant operation's compliance to cybersecurity standards and guidelines including NERC CIP, NEI 08-09 and ISA99/IEC 62443.

Modernization benefits

- Flexible configuration software capable of supporting a widerange of starting profiles
- Enhanced operation and maintenance with a powerful suite of software tools
- Full system and controls only upgrade options to meet a wide range of technical and budgetary requirements
- Simplified hardware design reduces mean-time-to-repair and improves life cycle support options
- Improved start sequencing control in cross-over applications
- Enhanced cooling system and power converter monitoring and status reporting

We've been here all along

For decades, Nexus Controls, a Baker Hughes business, (formerly known as GE Energy Control Solutions) 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 outcomes to best meet your needs.

Baker Hughes

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