



# Nexus OnCore<sup>†</sup> Control System

## Gas turbine control retrofits

Nexus Controls, a Baker Hughes business is proud to provide controls you can trust from experts you can trust. Nexus Controls has supplied controls for heavy duty and aeroderivative gas turbines, steam turbines, hydro turbines, generators, compressors, turboexpanders, excitation and balance of plant equipment. Many legacy systems are limited by the technology of their era and require an upgrade to deliver asset performance, operability, and availability improvements.

Our Nexus **OnCore** Control System platform for gas turbines is applied across the complete spectrum of power generation, oil & gas and industrial applications. It is available for upgrades from legacy controls and supports the most advanced turbine technology.

### Benefits

Upgrading to a Nexus **OnCore** Control System brings you up-to-date with the latest technology, including:

- Improved performance, operability and availability
- Ease of operation with robust software tools that include process-oriented function blocks and built-in troubleshooting and maintenance tools
- Improved life cycle support with access to current Nexus Controls upgrade and maintenance programs for software and hardware

- Simplified maintenance and improved availability with the ability to integrate third party monitoring and control systems into the turbine control
- Simplified user interface that is designed to improve operator response and accuracy

### Flexible and scalable architecture

The Nexus **OnCore** Control System consists of a powerful controller using a high-speed processor and the QNX operating system, a standard dual I/O Network, and has built in MODBUS protocol support. This flexible and scalable architecture supports simplex or dual processors and the appropriate level of I/O redundancy for the application.

The Nexus **OnCore** Control System I/O modules are installed in the control cabinet but may also be distributed in the field to integrate auxiliary systems in adjacent cabinets or on turbine skids. Distributed solutions can offer reduced installation effort, improved signal quality, improved grounding and noise immunity. The wide range of available I/O types makes integration of auxiliary control and monitoring systems both feasible and cost effective.

Fiber optics can be used to extend location distance of cabinets and reduce lightning susceptibility.

The Nexus **OnCore** Control System can be configured in either a Simplex or a Redundant configuration. In a redundant system configuration each I/O module can be replaced while the control system is on-line while supporting dual communication networks and dual power feeds maximizing availability. Nexus **OnCore** Control System I/O modules include extensive diagnostic information to aid in troubleshooting. In addition, the I/O modules are compatible with most existing field devices. This reduces single point failures, simplifies ongoing maintenance, and enhances the diagnostics with a direct interface to the field devices.

**Some currently available I/O features include:**

- 1 millisecond SOE for all contact inputs (standard)
- Speed Measurement and Protection Module
- Triple Redundant LVDT Valve Position Control Module (also available in Redundant and Simplex)
- Integrated 2003 Emergency Trip System module with overspeed protection
- HART®, PROFIBUS, and MODBUS® I/O communications

**Nexus OnCore† OptimumC HMI Software with seamless integration**

The Nexus **OnCore** OptimumC HMI software suite provides an engineering development environment with tools that seamlessly integrate graphical application building with control logic application programming for efficient development and deployment of your control software, including:

- An advanced HMI with intuitive navigation and realistic process graphics
- Integrated Data Historian with precision data recording that includes flexible retrieval tools for a clear view of process trends and effective data analysis
- Alarm and event management with tools for determining when, where, and why alarms are occurring
- System-wide diagnostics for ease of maintenance and increased system availability
- Seamless integration of external systems with a single programming interface

**Operability, Availability, and Reliability**

Ultimately, your controls are the enabler for the performance, operability, and availability improvements to your equipment.

To complement Nexus **OnCore** OptimumC HMI software, Nexus Controls offers a suite of lifecycle software that enables plant owners to comply with the latest regulatory, safety and cybersecurity requirements—and to support operator productivity, plant reliability, and availability in the face of changing labor demographics and market demands.

**Typical Nexus OnCore Control System Cabinet (Front Side)**



**Generator Control Options**

As part of a complete turbine-island control solution, the Nexus **OnCore** Control System can be delivered with an integrated Automatic Voltage Regulator (AVR), providing modern generator control and protection functions across a wide variety of AVR applications and generator OEMs from a global leader in excitation retrofits. Nexus Controls can help to select the right AVR platform and features to support the unique performance and budgetary requirements associated with upgrading critical generating assets. Whether operating in an industrial setting or as a baseload utility unit, up-to-date generator controls can improve voltage stability, system protection and include the latest power system stabilizer software to serve critical loads and maximize revenue service. The new controls are delivered with a focus on cybersecurity and contemporary system models to support evolving operating threats and regulatory compliance requirements.

The Nexus Controls’ team can deliver pre-engineered AVR modernization solutions as one coordinated project, implemented by a team of turbine-generator control design, installation, and commissioning specialists. The upgrade package is available as an integrated unit control and AVR in a single cabinet, or with the AVR in a free-standing cabinet, or as panel inserts for installation in existing AVR cabinets or generator control panels (GCPs), all with an emphasis on flexible, cost effective upgrade options. Controls retrofit projects are delivered with a comprehensive documentation package to support maintenance, trouble-shooting and long-term support.

Innovative hardware and software packaging delivers an efficient system formfactor, optimized project work-scope and a unified operational experience through the Nexus **OnCore** Control System OptimumC HMI. The Nexus **OnCore** OptimumC HMI becomes the window into AVR management, consolidating operating controls, system status and time stamped alarm windows into our intuitive software interface.

For projects requiring a custom AVR solution or turn-key static excitation (up to 8,000Adc), the Nexus Controls' team can develop those options as well, supported by our in-house, multi-discipline, design engineering team.

### About Nexus Controls

Nexus Controls LLC (formerly GE Energy Controls Solutions) exists as the collective experience and history of multiple companies whose expertise, knowledge, and lineage spans over 150 years.

Our global team of domain experts are in 44 countries on all six continents and have successfully delivered over 11,000 successful projects in the power, oil & gas, and various industrial markets.

<sup>1</sup> Registered trademark of Baker Hughes in one or more countries.

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