



Nexus Control System*

A steam turbine control system to increase your competitive advantage

Overview

In today's competitive production environment, process industries demand control systems that increase productivity, reliability and quality while lowering cost. GE's Nexus Control System is an advanced, fully configurable solution that improves overall unit reliability and availability, provides simplified expansion capabilities and reduces overall installation and training costs.

Designed and built using industry-proven control system expertise, Nexus Control System provides seamless integration of advanced control and optimization solutions to further improve communication speed and reliability, reduce forced and unplanned outages, extend maintenance cycle, and decrease operation costs.

Benefits

- Logic configuration is completed online to avoid excess system outage or shutdown.
- Redundant I/O communication and power enables independent replacement of modules without a complete system shutdown.
- Three-level system network provides real-time performance with high-speed data exchange where needed the most—between the controller and HMI. Non-critical information, such as data backups, is handled on a separate data highway.
- Integrated HMI software package includes embedded historian and engineering tools. Historian can be expanded without additional equipment, saving cost and allowing for more analytical capability.
- Easily configured software allows for customization of HMI screens, reducing training time while improving the user experience.
- The redundant architecture provides enhanced control reliability and uninterrupted system access.
- Consistent turbine control approach, independent of manufacturer.

System Architecture

Nexus Control System has been engineered with special attention to diagnostic and redundancy features. Its distributed architecture reduces impact from loss of system components and provides production continuity. The component and network redundancy guarantees the operability of critical system and control functions. It also allows for optimization of available space by distributing control, I/O and HMI functions to different areas of a plant, eliminating the need to allocate a large, central area for installation.

System Software

Nexus Control System provides an integrated, easy-to-use and configure comprehensive software package that allows for integration of displays, logs, graphics and alarms to give operators a clearer picture for data analytics and troubleshooting. This provides a clearer picture for data analytics and troubleshooting.



System Hardware

Controllers

Central to the Nexus Control System is the iDPU controller. The iDPU is an integrated, stand-alone computer that runs the application code for industrial process control and data communication. It interfaces with process I/O modules and can be implemented in either a simplex or redundant configuration, depending on user requirements.

The control software supports powerful control applications through straightforward configuration of function blocks. A wide range of process control capabilities include:

- Data Acquisition
- Continuous Control
- Logic Control

Both online and off-line configuration is supported.

Speed Measurement and Protection Module

Nexus Control System has a dedicated speed measurement and overspeed protection module (MSP) for use in steam turbine control, compressor control, hydro turbine, and other large rotary machine speed detection and protection applications. This module can be configured as Triple Module Redundant (TMR) mode which provides high-reliability and availability. The embedded overspeed control logic inside the MSP module enables fast response to emergency situations even if the controller (iDPU) fails. In addition to the MSP module, an MLP module, with two out of three relay voting, is provided for turbine emergency protection. Embedded Sequence of Event (SOE) also helps to identify the root cause of a trip with 1 ms resolution.

Valve Position Control Module

This dedicated valve positioning module with on-board PID servo control can be used in steam or hydro turbine control, boiler bypass valve control, and other servo valve control applications. Valve Position control module provides fast close-loop for servo control with smart selection of redundant LVDTs. With the use of the software tool included in an engineering work station, the user can easily calibrate the position feedback (LVDT). Module configurations can be saved off-line without the need for re-tuning in the unlikely event a module needs replacement.

For more information please contact:

GE Oil & Gas

Digital Solutions

North America: 1-888-943-2272; 1-540-387-8726

Latin America (Brazil): +55-11-3958-0098

Europe (France): +33-2-72-249901

Asia/China (Singapore): +65-6622 1623

Africa/India/Middle East (U.A.E.): +971-2-699 7119

Email: ControlsConnect@ge.com

Customer Portal: ge-controlsconnect.com

1800 Nelson Road

Longmont, CO, USA 80501

<http://www.gemeasurement.com>



Operator Station and HMI

Each operator station supports control, monitoring, and configuration of the entire system. Features of the operator station and HMI include:

- Administrative control of user access levels.
- Single-point display for monitoring and control.
- Flexible alarm-monitoring capability (available in alarm list or embedded in operator graphics).
- Real-time and historical trend reports; both time-based and event-based options.
- Configurable and redundant system historical data collection and storage.
- Fault detection-based historical data and SOE event records allow operators to pinpoint cause and determine response.

A library of standard display elements is supplied with the option of creating custom-built dynamic displays based on user standards and requirements.

Turbine Function Options

Nexus Control System provides a suite of standard function that can be adapted to fit the individual needs of your unit.

- Off-line Primary and Backup Overspeed Testing
- Overspeed Trip Manifold Assembly Ready
- Auto startup using SALI curve data
- Power Load Unbalance

Mechanical Solutions

GE's electromechanical solutions are a critical piece of a control system migration or full panel retrofit. Integration considerations need to be made based on the age of the control system and the interface with the software and electromechanical components. GE has the expertise and OEM knowledge to evaluate these needs to ensure assets remain reliable. Our solutions have the potential to improve performance, online capability, provide redundancy and fit within the current operations envelope.

Critical components that need to be evaluated include transducers and transmitters, fuel valves and fuel skids, and speed sensing. GE also provides solutions for Trip Manifold Assemblies (TMAs), Hydraulic Power Units (HPUs), and other assets that are important to operations. Our experience includes steam, hydro, and gas turbines as well as balance of plant. We have the application knowledge to make sure that your assets are upgraded correctly.