



EX2100e* Digital Front-End Migrations

GE is proud to provide controls you can trust from experts you can trust. For four decades, GE has continually supplied controls for heavy duty and aeroderivative gas turbines as well as steam turbines, generators, and excitation. Today, many of these legacy systems are limited by the technology of their era and require an upgrade to deliver turbine performance, operability, and availability improvements.

GE's latest generator control platform is the EX2100e, which supports the most advanced generator technology enabled by modern model-based control. The EX2100e DFE is designed to meet generation control challenges in gas, steam and hydro generating applications.

The EX2100e DFE Migration enables customers with legacy GE excitation systems as well as non-GE systems to upgrade to the fully digital EX2100e platform. A migration significantly reduces installation cost and required outage length through retention of field devices, field wiring, and cabinet terminations.

Benefits of e-technology

- **Improved performance** – through precise control and protection system that maintains unit stability and enhances operational flexibility.
- **Increased operational productivity** – user-friendly HMI graphics, alarm/event management, and trending leading to improved operator recognition and resolution of system faults. Enhanced data capture and analysis tools support regulatory requirements.
- **Improved flexibility** – wide range of configurations for mixed generator fleets with redundancy options to fit application and budget demands.
- **Improved reliability** – TMR controller redundancy provides 2-out-of-3 voting to improve reliability and eliminate single-point communication failures within the control.
- **Intuitive features** – GE's powerful Toolbox* software, with modern drag-and-drop type editors, industry leading trender with video type forward-reverse-freeze capability, and code-compare tools.
- **Latest GE software libraries** – draws upon years of GE OEM experience to ensure safety-related software updates are delivered as well as built-in generator simulator for training.

- **Maintenance efficiency improvements** – a simplified architecture that shares technology with turbine and plant controls for improved lifecycle management support and reduced obsolescence.
- **I/O expandability** – flexible and modular architecture allows for future growth of capabilities and applications.

Additional capabilities available

Additional options are available with the EX2100e DFE migration, including a power system stabilizer to meet system grid connect requirements. Other added features and protective functions include:

- Autotracking regulators
- PT failure throw-over
- Temperature biasing
- Volts per hertz limit
- Over excitation limit
- Under reactive ampere limit
- Under excitation limit



Software packages

The ControlST* software suite comprises several high performance tools for ease of use by operators and maintenance personnel. These include the WorkstationST* software for management of HMI and Historian functions, the ToolboxST application for configuration and diagnostics, and a CIMPLICITY graphics user interface. Seamless integration provides direct connectivity from parameters on operator screens to their corresponding alarm history, trends, logic diagrams, watch windows, and browsers.

Software tools include system diagrams with signal flow, sequencing, and regulator control in the excitation control. The diagrams display variables and their values in real time. Parameters shown in the diagrams can be modified.

The flexible communication architecture enables connectivity to other GE and non-GE plant control systems through standard protocols and processes.

Cyber Security:

Upgrading to GE's e-technology suite of products allows you to take advantage of GE's cyber security solutions, helping reduce your risk. Our cyber security solution provides defense-in-depth protection. Our solutions have undergone strict cyber security best practices demonstrating to customers that systems are developed and implemented securely. The SecurityST appliance and Cyber Asset Protection Subscription are designed to support the plant operation's compliance to cyber security standards and guidelines including NERC CIP, NEI 08-09 and ISA99/IEC 62443.

Controls LifeCare* Partnership

This comprehensive subscription helps to maintain the health of turbine and plant control, generator control and static starter systems. Subscribers benefit from GE expertise and a true partnership in the maintenance and servicing of control systems with a simple, packaged approach. Controls LifeCare is available in one-, five- and ten-year agreements and is applicable for both new and existing units.

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Dedicated Excitation Retrofit Experts

GE 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
- Nuclear grade retrofit packages and DCN support

