



# EX2100e Generator Controls

## 35A and 120A Automatic Voltage Regulators

The EX2100e 35A and 120A Automatic Voltage Regulators (AVR) are part of the growing family of generator controls for gas, steam, and hydro turbine-generators. They are built on GE's 50 years of excitation experience with over 6,000 excitation systems installed in 70 countries. These include new units and retrofits, installed on a variety of generators from various manufacturers.

Building upon decades of proven experience, the EX2100e incorporates the enhanced technology found in the Mark\* V1e control platform, making it a highly reliable and flexible solution.

The EX2100e 35A and 120A AVRs support several excitation system applications, including brushless and rotating DC exciters, as well as SCT/PPT regulator modernizations.

### Architecture

The heart of the EX2100e AVR is GE's patented UCSB controller. The UCSB controller incorporates modern system-on-chip (SOC) architecture. The controller uses secure Ethernet based communications to provide data to operator workstations (HMIs) or to other GE Mark V1e controllers. Other communication protocols such as Modbus (Serial or TCP/IP) can be used to communicate with non-GE DCS systems.

The 35A and 120A power converters utilize a DC link and insulated gate bipolar transistors (IGBTs) to modulate the AVR output for precise generator control from a wide variety of input sources. These sources include a single- or three-phase permanent magnet generator (PMG), a single- or three-phase AC source with power potential transformer or a 125 V DC or 250 V DC battery. The EX2100e AVR supports redundant AC and DC power input to maximize system reliability.

The EX2100e AVRs are available in simplex or fully redundant dual configurations to provide cost-effective solutions to meet the needs of any application. GE's advanced dual control technology combines redun-



35A AVR

120A AVR

dant controllers, power supplies, fans and power converters with a sophisticated virtual system model to provide unequalled selectivity and fault tolerance from a dual system (patent pending).

### Features and Benefits

- **Advanced Controls:** Provides industry-leading control, limiter, and protective functions to maximize generator performance and improve protection for a variety of applications.
- **Scalable:** Two available power converters (35A and 120A DC max) allow the EX2100e AVR hardware to be optimized for most applications and budgets.
- **Flexible Packaging:** Systems can be specified as a freestanding 800 mm x 800 mm (31 ½" x 31 ½") IP20 /NEMA 1 (optional IP54) panel configuration, as parts kits for custom installations or retrofits where space is a premium, saving time and money.

**HMI Options:** Systems can be configured to meet the needs of the site operational and engineering staff. Options for interfaces range from local desktop versions or remote touch screens. GE offers Windows 7 based systems that can be included in any cyber security environment.

**Software Tools:** GE's ControlST\* utilizing the CIMPLICITY\* Advanced Viewer provides operators and engineers a powerful set of tools for system configuration, maintenance tasks, and diagnostics a single interface. Advanced data visualization, alarm management, all in a sequence of events, integrated oscillography , guided help and more give engineers and operators more control and better system management tools.

**Secure:** Based on the Mark VIe control platform, the hardware and software architecture is designed and tested to meet today's rigorous cyber security standards and is Achilles certified.

**Connectivity:** The EX2100e AVR integrates seamlessly into almost any

plant environment, whether as part of an integrated GE Mark VIe or third-party control system utilizing OPC® Data Access (DA) or Modbus®.

**Design:** The EX2100e family of products is designed with the future in mind. The enhanced "e" architecture provides a flexible approach to life cycle management. The system is designed to allow incremental upgrades or modernization proving access to new features and protecting the investment from the rapid aging of digital component technology.

**Support:** GE has a portfolio of aftermarket products and services to maximize the life of the E2100e AVR and reduce its overall life cycle cost. GE's support combines new, repaired, remanufactured parts, global field services and the ControlsConnect web portal with parts and services agreement to provide a world-class experience for our customers.

**Expertise:** GE is a global leader in excitation technology for both new unit and retrofit applications. A worldwide network of dedicated retrofit specialist

support excitation modernization projects on all types and manufacturers of generator controls.

## The GE Advantage

The EX2100e is a highly reliable control, protection, and monitoring system. Its flexible architecture, modern networks, and versatile software suite simplify operations and integration with plant equipment. Advanced algorithms incorporate decades of fleet experience and the latest controls technology to deliver the performance needed in today's power generation industry.

Find out more about the GE 35A and 120A voltage regulators and the rest of the EX2100e family by contacting your GE representative or visiting [ge-mcs.com/control solutions](http://ge-mcs.com/control solutions).