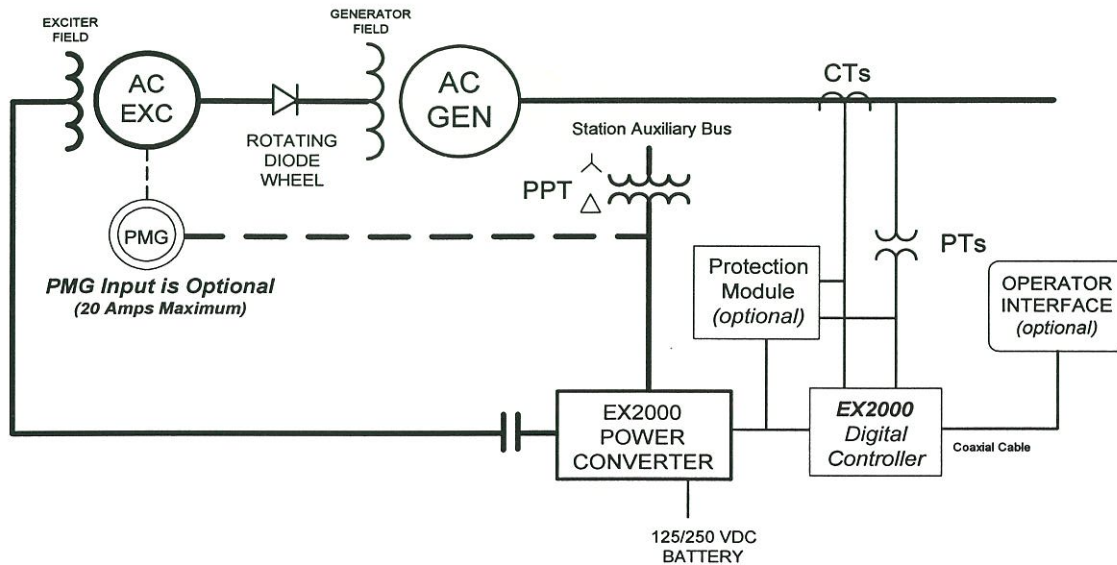




# EX2000BR BRUSHLESS EXCITER VOLTAGE REGULATOR

## Fact Sheet for Retrofit Applications



EX2000BR Simplified One-Line Diagram

The EX2000BR is a digital, static, voltage regulator for Brushless exciters, utilizing the latest hardware and software technology. To meet customer and operational requirements, a full range of control and protection functions are available for the product.

### Benefits of EX2000BR

- 99.98% Availability
- Replaces Old and Failing Components
- Full Digital Design
- Improved Performance
- Meets IEEE 421 Guidelines
- Sustained Fault Current Support
- Built-in Diagnostic System
- Built-in Control Simulator
- Faster System Checkout
- Reduced Maintenance
- High Degree of Accuracy,  $\pm 0.25\%$
- Configurable with a PC

The EX2000BR system comes equipped with either a full-wave, inverting, thyristor bridge or an IGBT based bridge which supplies excitation power to the field winding of the brushless exciter. In addition, all control and protective functions are implemented in the system software. There are no moving parts, such as motor operated setpoint adjusters, as are found in the older excitation systems. Digital technology coupled with over 35 years of GE static exciter design experience allows the EX2000BR to maintain 99.98% availability.

Redundancy is available with the Redundant Control Module option. With this option, control is transferred online to the spare or backup control module "on-the-fly" without a change in the generators' current operating point. Upon transfer the main controller is shutdown and can optionally be isolated to perform repairs, and then put back on-line.



## Standard Features & Functions

- IGBT based or SCR Power Conversion Module
- Power Converter circuit filtering
- Power Converter conduction monitor\*
- Diagnostic display panel
- Operator control simulator
- Surge Protection
- Over Excitation Limiter (OEL)
- Over Excitation Protection (OET)
- Under Excitation Limiter (UEL)
- Automatic Voltage Regulator (AVR)
- AVR Software Reference Adjusters
- Manual Field Current Regulator (FCR)
- FCR Software Reference Adjusters
- Bi-directional AutoTracking Function
- Volts per Hertz Limiter (V/Hz LIM)
- Volts per Hertz Protection (24G)
- Reactive Current Compensation (RCC/ARCC)
- Sensing PT Failure Detector (PTFD)
- Regulator Phase Unbalance Protection (EUT)
- Field Forcing Module
- Internal control power supply
- Three Phase Voltage Sensing
- Two Phase Current Sensing
- Output DC Field Contactor
- 100 millivolt shunt for exciter field
- 4-20 mA Programmable Analog Outputs
- Dry Contact I/O Cards
- Strip Heaters
- Input Power Potential Transformer (PPT), (*when fed from an auxiliary bus*)
- NEMA-I Enclosure

\* Conduction monitor is provided with a three-phase thyristor power conversion bridge.

## Optional Features & Functions

- PMG Power Input (20A Max)
- Power System Stabilizer (PSS)
- Redundant Control Module with On-Line Repair
- VAR/PF Controller
- Voltage Matching
- Data Link with GE's MARK V Turbine Control
- Digital Operator Interface
- Monitoring and Trending Software
- PLC-based Digital Interface
- Installation Design Engineering Package

### EX2000BR Retrofits

- Replaces Existing Regulators
- Eliminates 70P and 90P MOVAs
- Improved Protection Functions
- Black-Start Capability
- Soft-Start Capability

### EX2000BR Enclosure Information\*

Configuration	Width	Weight
Simplex	24"	1,500 lbs
with Redundant Control Module	48"	2,000 lbs

\* All enclosures are 90"H x 20"D

## Product History

The first EX2000 exciter was shipped in April 1993. Since that time an average of over 120 units per year have been shipped between retrofit and new unit applications. This unprecedented volume is a strong indicator of the products' market acceptance and dominance.

### Applications

- Steam Turbine Generators
- Gas Turbine Generators
- Hydro Turbine Generators
- Synchronous Condensers
- GE and Non-GE Units

