



Course Information Letter ---- G532

(GE) ALTERREX™ EXCITATION SYSTEMS G532

This is one of those systems that can run for seemingly, forever. Then there is that “**one-day**”. We all remember that one-day. That is the day you may wish you (or one of your plant’s technicians/engineers) had attended this course. If something has gone wrong then attention is going to be completely focused on you, assuming you are responsible for your Alterrex™ system. Equipment-experienced engineers present the course. Simply put, the overall objective of this (GE) Alterrex™ This Excitation System Training Program is to develop the individuals responsible for plant operations, testing, calibration and maintenance of this system. To accomplish we have a need to understand the “big-picture”, to understand the OEM print systems, to understand how to read those prints and maintenance instructions, and finally, we need to understand how to apply this knowledge toward the solution of operating problems.

A **topical outline** for this course will include: Generator Characteristics and Design Features, Operation of an Automatic Voltage Regulator, Excitation System Components, Alternator Field Control, AC Regulator, Protective Features, Station One Line Diagram, Print Interpretation and Drawing Practices, Excitation System Alignment Procedures, Troubleshooting Tips, Techniques and Industry Examples

This course is designed for Engineers, Technicians, and Electricians who have a need to maintain this system.

OBJECTIVES: Upon completion of this course, participants will be able to:

1. Learn how the Alterrex™ Excitation System works.
2. Learn the location and purpose of the major components that make up the Alterrex™ Excitation System.
3. Learn to interpret alarms and know what corrective action is needed to take in the event of an alarm.
4. Learn to perform recommended operational tests.
5. Learn to perform periodical maintenance on the Alterrex™ Excitation System.
6. Learn to accurately calibrate the Alterrex™ Excitation System utilizing the necessary OEM drawings.
7. Learn to quickly and safely troubleshoot the Alterrex™ Excitation System if a problem should occur or a component fail within the system.

COURSE DATES/LOCATION/FEE

For current dates / locations / prices, please see HPC’s website, www.hpcnet.com.

WHAT YOU WILL RECEIVE:

1. 1 copy of HPC Technical Services' textbook, Alterrex™ Excitation Systems
2. A "Certificate of Completion" with 2.9 CEUs, authorized for issue by the International Associate of Continuing Education/Training.

RECENTLY SATISFIED CLIENTS:

American Electric Power, Arizona Public Service, Austin (TX) Electric Department, Carolina Power & Light, Commonwealth Edison, Entergy Operations, Houston Industries, Illinois Power, Kansas City Power & Light, Lower Colorado River Authority, MidAmerican Energy, Minnesota Power, New York Power Authority, Niagara Mohawk Power Corporation, Northern States Power, Oklahoma Gas & Electric, Orange & Rockland, Progress Energy, Reliant Energy, Salt River Project, South Carolina Electric & Gas, TECO Power Services, Texas Municipal Power Agency, Union Electric, Wisconsin Power & Light

COURSE OUTLINE

1. **Generator Characteristics and Design Features**
 - a. Mechanical Descriptions
 - b. Electrical Descriptions
 - c. Operation Parameters
2. **Operation of an Automatic Voltage Regulator**
3. **Excitation System Components**
 - a. Alternating Exciter Description
 - b. Power Rectifiers
 - c. Voltage Regulator
4. **Alternator Field Control**
 - a. DC Regulator
 - b. Regulator Front End
 - c. Basic Amplifier Stage
 - d. AC Regulator
 - e. Transient Operation
 - f. Power Rectifier and SCR Firing Circuits
 - g. Diode Rectifier Circuits
5. **AC Regulator**
 - a. Exciter Stabilization Circuit
 - b. Reactive Current Compensator
 - c. Active Reactive Current Compensator
6. **Protective Features**
 - a. Under excited Reactive-Ampere Limit
 - b. Generator Field Current Limiter
 - c. Exciter Minimum Voltage Limit
 - d. Phase Back Limit
 - e. Exciter Field Current Limiter
 - f. Overcurrent Relays
 - g. Volts-per-Hertz Regulator
 - h. Maximum Excitation Limit
 - i. Automatic Tracking
7. **Station One Line Diagram**
8. **Print Interpretation and Drawing Practices (Note: This topic is included in all discussions above)**
9. **Excitation System Alignment Procedures (Note: This topic is addressed above as well)**
10. **Troubleshooting Tips, Techniques and Industry Examples**

FREQUENTLY ASKED QUESTIONS

- Will HPC Technical Services bring this course to our location for our personnel only? YES, call or email Stephen Parker, stparker@hpcnet.com for a price quotation.
- Will HPC Technical Services customize the presentation at our site to suit our particular needs? Yes.
- Is HPC Technical Services' textbook available for purchase as a reference document? Yes. \$195 + S&H.
- What is the cost for HPC Technical Service to deliver this course at our location? Well, of course that can vary, but generally speaking, if you're planning on having 6+ attend, when considering your T&L, it is to your advantage to perform the course at your plant (office). You gain from the customization and price.
- Can HPC Technical Services provide "Technical Assistance" in the maintenance troubleshooting of your excitation system? Yes we can. Call or contact Harold Parker, hparker@hpcnet.com for our rate sheets and any further information required.

GENERATOR I&C CERTIFICATION:

Those who attend this course are automatically qualified to take HPC Technical Services' Certification Examination. This examination is offered at no additional expense to the participant. An 80% passing grade is required. The examination length will not exceed 2-hours. Those who complete this examination will receive a revised "certificate of completion" that recognizes this accomplishment along with two-copies of a "To Whom It May Concern" letter that states their accomplishment. (Two copies are provided, one for the participants' employer and one for the participants' personal file.)

Consult HPC's website, www.hpcnet.com, for detail on this certification program.

HPC INSTRUCTOR / CONSULTANT (S):



John Marshall. Mr. Marshall, worked for GE 35 years in the power system service and installation business. 25 years of this time was in the international service business. During his career, Mr. Marshall's positions included Field Engineer, Service Supervisor, Technical Training Instructor and Senior Application Engineer. Mr. Marshall's work covered electrical power distribution and control of power generation equipment. His expertise is GE manufactured excitation systems for large and medium size generators used on gas and steam powered turbines. As a Technical Training Instructor for over 20 years, Mr. Marshall developed and presented training programs for GE manufactured excitation systems. As a Senior Application Engineer, Mr. Marshall's work included the upgrading/replacement of older excitation systems with GE's digital excitation system. His Field Service work was worldwide. BSEE degree from Virginia Polytechnic Institute and State University in Blacksburg, Virginia.



Tom McKinney. Mr. McKinney is an electrical engineer with over 25 years of experience in utility and industrial power systems. He earned his B.S.E.E. from the Virginia Military Institute. His experience includes the design, installation, and start-up of a wide variety power equipment, including turbine and diesel-generators, excitation systems, protective relaying, transformers and circuit breakers. Tom worked in the corporate engineering offices of American Electric Power supporting plant operation and maintenance needs. Most recently, before joining HPC Technical Services as a consultant, he worked for First Energy at the Bayshore Plant. Mr. McKinney has a unique ability to present technically complex subjects in an understandable and simple manner. Tom resides in Ohio.

Stuart Fasser. Mr. Fasser earned his BSEE from Union College, Schenectady, NY, in 1967. He retired in 2002 after 37 years of service with GE, including an early career in factory and field testing of power generation equipment and concluded with 10 years of field engineering in the installation and service of excitation systems. As a field engineer assigned to GE International he installed new GE excitation systems on generators as well as trouble shooting and maintaining existing installations. His most recent installations included 21 EX2000 exciters on units in Egypt, Thailand, Korea and the United States. In these assignments he was responsible for installation of the exciters as well as their checkout and start-up. These activities included component checks, initial calibration, pre-roll simulation of operation and both off-line and on-line alignment and checkout. Stuart is associated with HPC Technical Services in the areas of generator maintenance, testing, excitation systems and instruction.

HPC TECHNICAL SERVICES
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Telephone: 941-747-7733 FAX: 941-746-5374
Website: www.hpcnet.com

REGISTRATION FORM

Company: _____

Plant: _____

Address: _____

City/State/Zip: _____

Telephone: _____ FAX: _____

Course Number/Title: _____

Course Dates: ____/____/____ Thru ____/____/____

Course Location: _____ Course Fee: _____

Please enroll the following individual(s) listed below:

Student #1: _____

Student #2: _____

Taking advantage of HPC's 3-4-2 Policy: Send 3, Pay for 2 when paying in advance.

Student #3: _____

Enrolled by: _____ **Date:** _____

METHOD OF PAYMENT

Check to Follow: _____

Check Enclosed #: _____

MC/Visa/AMEX #: _____

Expiration Date: _____ CV Code: _____

Purchase Order #: _____

HOW DID YOU LEARN OF THIS TRAINING?

Attended HPC classes in the past

Received a fax

Received an email

Internet search

Other: _____