



2012 Training Brochure

Technical Training Classes

For UPS Systems & Batteries

By AMETEK Solidstate Controls



TRAINING OBJECTIVE

More than ever, plant personnel are being challenged with the maintenance and repair of the Uninterruptible Power Supply (UPS) systems in their plants. In order to do this efficiently, without risking plant operations, personnel require hands on training for their UPS systems. The objective of our training seminars is to teach the basic information needed in order to keep these UPS systems and their associated Stationary Batteries in top condition to prevent catastrophic failures and downtime.

OUR TRAINING PHILOSOPHY

Our training philosophy is to provide qualified instructors to teach the basic technical knowledge needed at a level the students can understand. Thus, plant personnel can return to their jobs with the knowledge and confidence to work on their UPS equipment.

WHO SHOULD ATTEND?

Our seminars are intended for anyone involved with industrial grade critical power and battery systems, including maintenance technicians, planners, supervisors, plant engineers, operators and facility managers.

WHY SHOULD YOU ATTEND?

Our seminars are customized for the applications and equipment that you have on site. We understand your business and develop the curriculum accordingly.

WHO TEACHES THE SEMINAR?

Our instructors are seasoned technicians, engineers, and consultants with many years of field experience. They blend their knowledge of operating theory with their real world field experience to provide a learning environment that is ideal for plant personnel.

Don Imlay is the technical training manager at AMETEK Solidstate Controls and presents most of the electronics training seminars. Don has over 30 years of experience with critical power systems. He has served in several capacities including design, technical support, product acceptance, and management. He has traveled extensively to 100's of sites to service and maintain their critical power systems. Don has instructed over 100 training classes on critical power systems.

Marco Migliaro presents the stationary battery classes and has been employed in the electric utility industry for over 35 years. He provides a wide range of consulting services in the areas of DC power systems, Stationary Batteries and UPS systems to both end-users and battery manufacturers. He is a member of the IEEE Power Engineering and Industry Applications Societies and is the President and CEO of the IEEE-ISTO. He is a member of the IEEE PES committee on Stationary Batteries. He served as Chapter Chairman for the revision of Chapter 5 *Stored Energy Power Systems*, in the IEEE Standard 446-1995 (the Orange Book).

EXPECTED OUTCOMES

At the time of registration, we ask for the serial number(s) of the systems in your plant. We use this information to customize the seminars to match the needs of the persons attending. Upon completion of the seminar you will have the basic knowledge and skills to handle routine operation, maintenance, and troubleshooting of the system in your plant. ***Class sizes are limited so that individual attention can be given to address specific needs of each attendee and allow them to participate in discussions, demonstrations and hands on troubleshooting.***

COURSE OVERVIEW

1). Uninterruptible Power Supply (UPS)

The class is structured under the assumption that most plant personnel have some previous electronics training but may not have used it recently. Therefore, the class starts out by identifying components such as capacitors, diodes, IGBT's, etc. and their failure modes. Actual components are used for visual inspection. Students use a DVM to identify failed components.

One-line diagrams are used to describe the major modules (rectifier, inverter, static switch, etc.) of the system. With this knowledge the students are prepared to participate in the lab where we have fully functioning systems. The students identify the components they have discussed in the classroom. They review and use operating procedures and one-line diagrams to demonstrate safe operation of the systems in both normal and emergency conditions. Students take corrective actions for these conditions.

This process helps eliminate the uncertainties of operating the system and assures the students that they can safely work on the systems when they return to the plant. Once the operation of the equipment is understood, drawings and schematics are used to discuss each block of the system. Theory of operation is discussed at a level so the student can read and interpret the schematics. The remainder of the presentation emphasizes troubleshooting techniques. With this knowledge the students return to the lab where they troubleshoot abnormal conditions that are induced into the system

Specific topics covered include:

RECTIFIER/CHARGER

- Input transformer & breaker
- Rectifier bridge
- Control circuits
- Adjustments
- Alarms

INVERTER/STATIC SWITCH

- Input filter
- DC switching circuits
- Current limit/protection circuits
- Synchronizing circuits
- Static switch transfers

TROUBLESHOOTING

- Component identification

Contact Information

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Online registration:

[www.solidstatecontrolsinc.com/
semnar.html](http://www.solidstatecontrolsinc.com/semnar.html)

- Component replacement techniques
- Real world examples

PREVENTIVE MAINTENANCE

- Annual 1-year, 5-year and 10-year maintenance
- Component replacement
- Readings and calibrations

2). Stationary Battery Many battery problems may go unrecognized for long periods of time before a failure occurs. This portion of the seminar will allow you to identify these problems in time to take corrective action before a catastrophic failure. Cell issues are defined and illustrated with pictures of cell failures. Both lead-acid and nickel cadmium stationary batteries are discussed in vented and valve regulated designs; however, emphasis is on lead-acid types. Practical exercises include preparation and installation of cells and data collection. The topics covered are:

INTRODUCTION & SAFETY

- Safety equipment and procedures
- Applicable industry safety codes and standards
- Protection of terminals and connections
- Spill containment systems and report ability

PARAMETERS

- Valve regulated and vented cell differences
- Basic chemistry and cell manufacturing
- Cell anatomy
- Charging
- Effects of temperature

INSTALLATION

- Considerations for location/mounting
- Receiving and storage
- Installation steps
- Acceptance and baseline testing
- Disposal of spent batteries

MAINTENANCE

- Inspection frequencies and types
- Applicability of industry standards, including NERC
- Visual checks
- Types of measurements
- Types of battery problems
- Corrective actions

DISCHARGE TESTING

- Types of discharge tests
- Recommendations for testing i.e. types/frequency
- Use of thermography
- Criteria for battery replacement

HANDS ON TROUBLESHOOTING

By far, the most common request is for real hands on troubleshooting with fully functional systems. With this in mind our seminars strive to provide as much hands on work as possible

TRAINING SEMINARS LOCATIONS:

HOUSTON, TX

Our regional field office in **Houston, TX** houses the official training center for AMETEK Solidstate Controls. At the training center we have new and

recycled UPS and battery systems dedicated for training. Many of the systems have been modified so that faults and malfunctions can be easily simulated. **The Houston Training Center provides the best opportunity for hands on training.**



GEORGIA POWER....

In cooperation with Georgia Power (the Atlanta area), we now have a complete Ferroresonant UPS training facility available. This location offers an attractive option for our Eastern clients who utilize Ferroresonant equipment.



ONSITE TRAINING

Training can also be provided at your facility. We will be happy to work with your training coordinator to meet your needs.

Rental equipment can be provided if suitable power is available. If power is not available, temporary power can be arranged. Training can be scheduled to coincide with start-up and commissioning of new installations.

NEW FOR 2012 BATTERY TEST EQUIPMENT TRAINING CLASSROOM

- Operation/features of test equipment – classroom
- Evaluation of measurements/data made with test equipment - classroom
- Review of safety and field use of test equipment - classroom
- Participant demonstration of equipment use (in field environment)
- Review of measurements/data taken (in field environment)
- Use of analysis software, if applicable - classroom



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Testimonials

Kevin W:

“The Instructors know the subject very well and were able to answer any question (we came up with). They were easy to listen to, engaged the class, and were open to any question- good class, I learned a lot.”

Thane T:

“The battery course with the battery instructor was very in-depth and the UPS course was outstanding.”

Wade W:

“The instructor was extremely knowledgeable and set the pace for learning.”

Joshua S:

“The hands on experience was great. Classroom information was very informative and accompanied with good handouts. The Instructor was very knowledgeable.”

Registration Information

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2012 Seminar Schedule

DATES	LOCATIONS	COURSE TYPE	COMMENTS
Feb.27- Mar.1	Houston, TX	Digital Process Power UPS & Stationary Batteries	Seminar begins on Monday at 8:00 AM and concludes Thursday at 4:00 PM
Feb.27- Mar.2	Houston, TX	Stationary Batteries & Ferroresonant UPS	Seminar begins on Monday at 8:00 AM and concludes Friday at noon.
Apr.23-27	Atlanta, GA	Stationary Batteries & Ferroresonant UPS	Seminar begins on Monday at 12:00 PM and concludes Friday at noon.
May 21-24	Houston, TX	Digital Process Power UPS & Stationary Batteries	Seminar begins on Monday at 8:00 AM and concludes Thursday at 4:00 PM.
May 21-25	Houston, TX	Stationary Batteries & Ferroresonant UPS	Seminar begins Monday at 12:00 PM and concludes Friday at noon
Aug. 13 – 16	Houston, TX	Digital Process Power UPS & Stationary Batteries	Seminar begins on Monday at 8:00 AM and concludes Thursday at 4:00PM.
Aug. 13 – 17	Houston, TX	Stationary Batteries & Ferroresonant UPS	Seminar begins on Monday at 8:00 AM and concludes Friday at noon.
Oct. 22 - 25	Houston, TX	Digital Process Power UPS & Stationary Batteries	Seminar begins on Monday at 8:00 AM and concludes Thursday at 4:00 PM
Oct. 22 - 26	Houston, TX	Stationary Batteries & Ferroresonant UPS	Seminar begins on Monday at 8:00 AM and concludes Friday at noon.
Nov. 5- 9	Atlanta, GA	Ferroresonant UPS & Stationary Batteries	Seminar begins Monday at 12:00 PM and concludes Friday at noon
Dec. 10- 14	Houston, TX	Digital Process Power UPS & Stationary Batteries	Seminar begins on Monday at 8:00 AM and concludes Thursday at noon.
Dec. 10- 14	Houston, TX	Stationary Batteries & Ferroresonant UPS	Seminar begins on Monday at 8:00 AM and concludes Friday at noon.

All seminars are constantly updated to include hardware and software upgrades as well as changes to industry standards. Students are asked to evaluate their training experience at the conclusion of each program. Their comments are immediately reviewed and acted on as needed.

*Any person who has previously attended one of our seminars may register for a refresher course and take advantage of a 25% discount as shown below.

Seminar Location	Cost Per Student	Refresher Cost*
Houston	\$2395	\$1795
Atlanta	\$2495	\$1875

When you register for a seminar we ask for serial numbers of your systems. We use this to verify you attend the proper seminar for the equipment at your plant. We also review your drawings for unique configurations. Therefore it is important to include a valid phone number and E-mail address so we can contact you.

To help you decide what is best for you, please note that with few exceptions, all systems built by AMETEK Solidstate Controls prior to 2003 are of the Ferroresonant type. Since 2003 both Ferroresonant and Digital Process Power (DPP) equipment have been built. Ferroresonant systems are characterized by panel meters on the front door. DPP systems are characterized by a touch screen on the front door.

Please consider registering as soon as possible. We adhere to class size limitations for safety and to provide the best learning environment for each individual. Unfortunately, in 2011 we were forced to deny seats to some people because of this.

Fees include registration, course materials, continental breakfast, catered lunch, snacks and individual consulting time with the instructor. On Thursday night students and their guest have the option of attending an informal dinner which is also included with the registration fee.

Fees **do not** include travel and living expenses for the attendees. However, contact AMETEK Solidstate Controls for details regarding hotel accommodations before booking a room, in order to take advantage of recommended hotels and special rates.

AGENDA	
7:30 AM	Continental Breakfast, Introductions
8:00 AM	Seminar begins
12 – 1:00 PM	Lunch (catered)
4:30 PM	Seminar concludes

There will be breaks in the morning and afternoon approximately every 50 minutes. Refreshments and snacks will be provided throughout each day.

DEADLINE for enrollment is 15 days prior to seminar date.