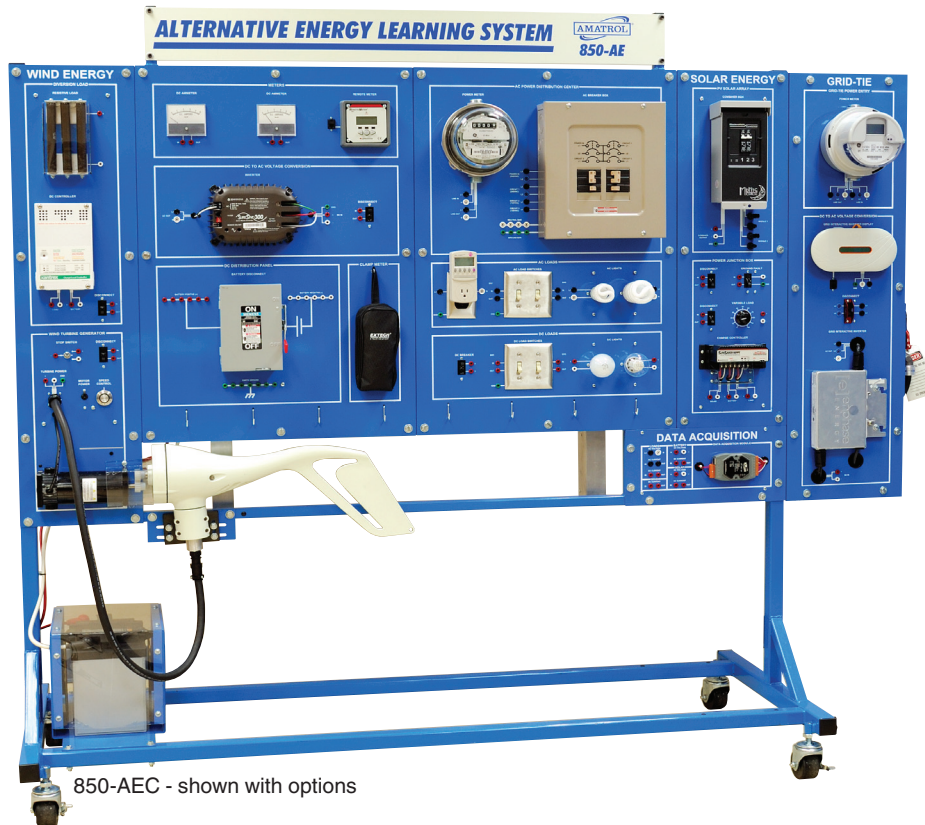


# ALTERNATIVE ENERGY LEARNING SYSTEM – WIND AND SOLAR

850-AEC



850-AEC - shown with options

The demand for qualified solar and small wind technicians is rising, as more consumers and businesses apply solar energy and small wind systems in their communities. Many employers prefer employment candidates who are certified. Amatrol's 850 series Alternative Energy Learning System supports the learning necessary to prepare for portions of the solar and small wind certifications offered by such certifying groups as NABCEP (North American Board of Certified Energy Practitioners), SWCC (Small Wind Certification Council), and ETA (Electronics Technicians Association).

**CURRICULUM IS THE KEY TO LEARNING**

## Learning Topics:

- Safety
- Solar Panel Operation
- Solar Panel Performance
- PV Array Connection
- Wind Turbine Operation
- Wind Turbine Performance
- Wind Turbine Connection
- Solar/Wind Batteries
- Charge Controllers
- Inverters
- Balance of System Components
- AC/DC Solar Systems
- AC/DC Wind Systems
- Energy Conservation and Demand
- System Performance

The 850-AEC Alternative Energy Learning System teaches students key skills needed for job success in small wind and solar. Students will learn hands-on skills they can use on the job. Critical skill areas covered are system connection, operation, and programming of solar PV (photovoltaic) and small wind systems in commercial and residential applications.

The Amatrol Alternative Energy Learning System - Wind and Solar includes a mobile workstation with solar PV components, small wind components, multimedia student curriculum, and teacher's assessment guide. The mobile workstation is equipped with pre-mounted components for easy inventory. Wind turbine and solar panels also allow for outside use with expansion capability for teaching grid-tie and data acquisition. Amatrol also offers alternate workstation configurations for either small wind or solar individually.



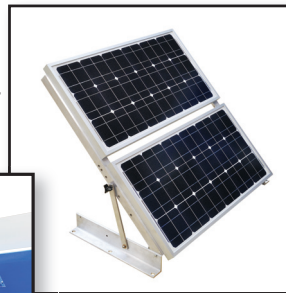
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www.amatrol.com

# DESIGNED FOR LEARNING

## Convenient Indoor / Outdoor Use

The Amatrol 850-AEC Learning System's wind and solar circuits can be used indoors with sun and wind simulators, or outdoors via the detachable solar panel array or client-supplied external wind and solar sources. The solar array easily disconnects from the workstation and sets up outdoors. The 850 Learning System can also be connected to client-supplied roof-top solar panels or wind turbines with the addition of optional interface connections.

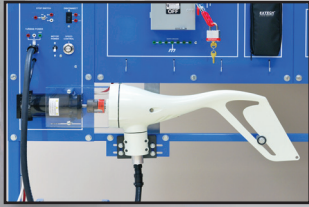


85-SPA1 - Solar PV Array Station

85-SPS1 - Solar PV Sun Simulator

## Real World Components: Multiple Panel Array and Modern Communications

Real world components commonly found in commercial and residential environments to help make learners job ready are showcased in the 850-AEC. For example, the 850 is equipped with a combiner box and a multiple panel solar array, allowing learners to connect panels in series and parallel. The MPPT charge controller, which is the most common controller used today, allows programming and communications from an LCD panel that are typical of current practices. The 400W wind turbine and diversion load controller are commonly found in small wind applications.



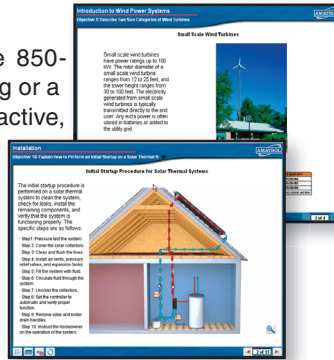
850-AEC Turbine



850-AEC Combiner Box

## Interactive Multimedia Curriculum

Interactive, multimedia curriculum is included with the 850-AEC that enables it to support self-paced student learning or a traditional class setting as a presentation tool. The interactive, multimedia curriculum uses a competency-based instructional design that teaches industry standard skills. Eye popping graphics, 3D animations, video, audio and complete text explanations combine with strong interactivity to engage students and appeal to a variety of learning styles.



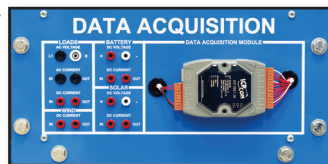
## Grid Interactive and Data Acquisition Options

Amatrol's 850-AEC Learning System for wind and solar offers a number of options that can greatly expand the capability of the system. The 85-GT1 Grid-Tie Learning System - Solar features a single phase inverter that enables the system to connect to the classroom grid, typical of PV systems being installed today.

The 85-ADA1 Data Acquisition Learning System - Wind and Solar features a multi-point data acquisition module, PC software, and sensors that monitor voltage and current in various parts of both wind and solar circuits, enabling students to study operation via data analysis. Both options are panel-mounted units that easily add to the 850 workstation.



85-GT1 Grid-Tie Learning System



85-ADA1 Data Acquisition Learning System

## TECHNICAL DATA

### System Configurations

- Solar DC charge-controlled
- Solar AC stand-alone
- Wind DC charge-controlled
- Wind AC stand-alone
- Hybrid wind and solar

### Workstation

- Welded and braced steel tube frame
- Dimensions: 72in (183 cm) L x 72in (183 cm) H x 28in (71 cm) W
- Swivel casters (4) with (2) locking
- Wind component circuit panel
- Solar component circuit panel
- Central component circuit panel
- Solar/wind battery, AGM type, 120 Ah, 12 volt
- Connector lead set
- Lockout/tagout set

### Wind Component Circuit Panel

- Wind turbine, 400W horizontal
- Wind turbine simulator drive
- Simulator drive speed control
- Simulator drive power switch
- Diversion load controller
- Resistive load
- Stop switch
- Disconnect switches with circuit breakers (2)

### Solar Component Circuit Panel

- Charge controller, MPPT type
- Combiner box
- Ground fault protector
- Disconnect switch with circuit breaker (2)
- Variable load control for solar array

### Central Component Circuit Panel

- Inverter, single phase
- Utility power meter, analog
- AC load center with circuit breakers
- DC distribution section
- Battery disconnect switch
- Clamp-on multimeter
- Wattmeter
- DC ammeter, analog (2)
- Remote monitor LCD display, ethernet connection
- AC lamps (3)
- DC lamp holders (2)
- DC lamps (3)
- DC lamp holders (2)
- DC load switches (2)
- AC load switches (2)
- AC receptacle, dual
- AC disconnect switch
- DC disconnect switch

## Instructor's Assessment Guide, C20103 Installation Guide, D20103 Multimedia, PC-Based Student Curriculum, M20103

### Requires:

- 85-SPA1 - Solar PV Array Station
- 85-SPS1 - Solar PV Sun Simulator
- PC - Windows XP or higher, see <http://www.amatrol.com/support/computer-requirements>

### Options:

- 85-GT1 - Grid-Tie Learning System - Solar
- 85-ADA1 - Data Acquisition Learning System - Solar / Wind
- 950-SC1 - Solar Concepts Learning System (multimedia)
- 950-WC1 - Wind Concepts Learning System (multimedia)

- 20097 - Solar PV Interface (connect existing PV array)
- 20098 - Solar PV Extension Cable (for external array use)
- 20099 - Wind Turbine Interface (connect existing wind turbine)

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