



Solar/Wind Energy Training System

Model 46120-00



Lab-Volt Systems, Inc. is proud to lead the way in offering new hands-on training systems in Alternative, Renewable, and Sustainable Energy Technology.

The Solar/Wind Energy Training System is our initial offering in this series and includes state-of-the-art components and curriculum. Lab-Volt's Alternative Energy training programs are not only for those who can make a difference today, but also for those who will shape the future of these technologies.

Renewable energy is derived from regenerative resources that are naturally replenished, such as sunlight and wind. The prime source of renewable energy comes from the sun via solar radiation. Solar energy can generate electricity in many ways, including using photovoltaic (PV) cells and concentrated solar engines. Wind energy can generate electricity using turbines and generators.

The Solar/Wind Energy Training System forms a complete hybrid energy training system. This program demonstrates how wind turbines and solar cells are being used in the consumer and industrial markets to supplement the world's power needs. The program explores solar and wind as energy sources that can be used to help reduce dependence on non-renewable fuel sources. Students gain a global perspective when they understand the economics, efficiency, and low environmental impact of producing energy from non-polluting, renewable sources.

Solar/Wind Energy Training System includes:

- 85W Photovoltaic Solar Module
- 400W Wind Turbine Generator
- 50A Stop Switch
- 30A PWM Solar Charge Controller
- 35A Diversion Load Controller
- 600W Resistive Dump Load
- Digital Multimeter (DMM)
- Power/Usage Monitor
- Three Analog 30A DC Ammeters
- Two 120V AC Watt-Hour (kWh) Meters
- Battery: 12V DC, 110Ah Sealed Lead-Acid AGM Storage Battery
- 1kW DC-to-AC Sinusoidal Power Inverter
- Four Battery Disconnect Switches with Keys
- Lockout/Tagout Module with Hasp
- 120V AC Circuit Breaker Box with Two 30A and Two 15A Resettable Circuit Breakers
- Three 12V DC, 50A Circuit Breakers
- Three 120V AC/12V DC, 15A Duplex Outlets
- 120V AC, 15A Duplex Outlet
- Four 120V AC/12V DC, 15A Wall Switches
- Four Light Socket Adapters
- 120V AC Incandescent, Fluorescent, and LED Lamps
- 12V DC Incandescent, Fluorescent, and LED Lamps
- 12V DC Power Bus Bar
- 12V DC Power Distribution Panel
- 90V DC Motor and Controller (Wind Simulator)
- 120V AC Flood Lamp (Sun Simulator)

The Solar/Wind Energy Training System includes everything required to function as a stand-alone, hands-on learning workstation: Instructor Guide, Student Guide, training modules with fault insertion, and power-generating equipment. The trainer is made with real-world components that are used in industry; the same components that students will see in their own homes, schools, or workplace. Lab-Volt training systems are engineered for extreme ease of use and durability, and are manufactured to the highest quality standards.

In the Solar/Wind Energy curriculum, students will learn about how solar and wind energies are converted, transmitted, and stored. The lesson plan includes an Instructor Guide that provides information for the installation, configuration, and operation of the trainer. It also includes learning outcomes, testing and evaluation procedures, answer keys, student skills response, inventory list, and print CD.



Wind turbine generator powered by DC motor drive without turbine blades, for classroom safety. Blades are included for display purposes only.



System shown with AC Flood Lamp (Sun Simulator)

Topic Coverage

Energy Fundamentals

- Sources of Energy
- Power and Work
- Measurements and Units

Trainer Familiarization and Safety

- Trainer Components
- Safety Practices
- Lockout/Tagout Procedure
- Proper Grounding
- Equipment Protection

Solar Module

- Siting
- Photovoltaic Module
- Charge Controller
- Loading
- Battery Bank

Wind Turbine

- Siting

- Turbine Generator
- Stop Switch
- Loading
- Battery Bank

Solar/Wind Systems

- Diversion Load and Controller
- DC to AC Inverter
- Power Consumption
- Power Efficiency
- Power Transmission and Distribution
- On/Off Grid Operation
- Hybrid Generator
- Troubleshooting

Going Green

- Solar Energy History
- Wind Energy History
- Solar/Wind Industry Careers

Trainer Components



AC Circuit Breaker Box



AC Duplex Outlet



AC Flood Lamp (Sun Simulator)



AC/DC Duplex Outlet



AC/DC Wall Switch

Trainer Components



Ammeter



Battery Bank Fuse



DC Circuit Breaker



DC Power Distribution Panel



Digital Multimeter

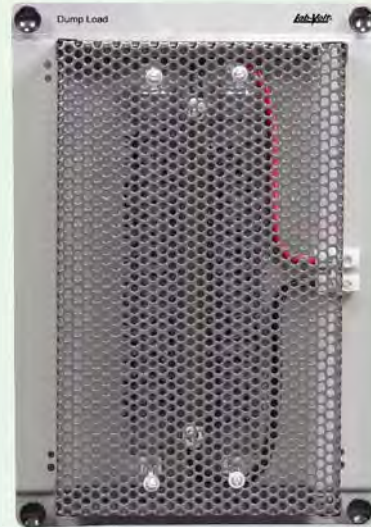


Disconnect Switch

Trainer Components



Diversion Load Controller



Dump Load



kWh Meters



Lockout/Tagout Module



Power Bus Bar



Power/Usage Monitor

Trainer Components



Power Inverter



Solar Charge Controller



Stop Switch



Wind Turbine Generator with DC Motor/
Controller (Wind Simulator)



Wind Turbine Generator
with Blades (for display
purposes only)



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