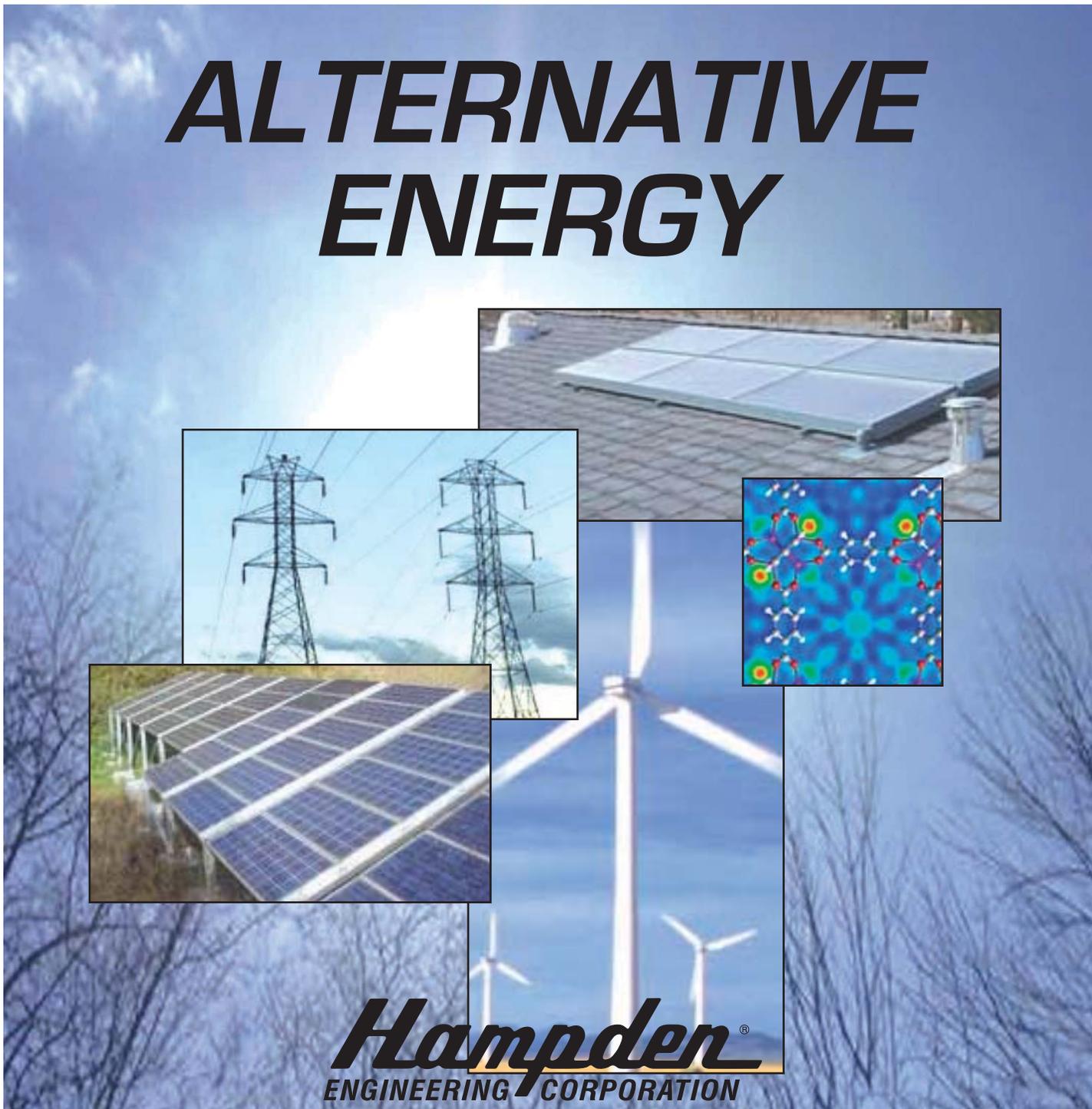


ALTERNATIVE ENERGY



Hampden[®]
ENGINEERING CORPORATION

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ALTERNATIVE ENERGY TRAINERS

H-SPT-AC-1A Solar Photovoltaic Trainer

The Hampden **Model H-SPT-AC-1A** is a control system trainer which lets the student technician examine the electrical layout and operational features normally associated with a photovoltaic power source. The trainer demonstrates the electrical characteristics of the solar array, storage battery, AC and DC distribution, and AC and DC loading. The complete charging sequence can be observed.



H-SST-1A Solar System Trainer

The Hampden **Model H-SST-1A** Solar System Trainer is an actual solar hot water heating system.

System components include:

- ◆ Solar collector
- ◆ Circulation pumps
- ◆ Storage tank
- ◆ Heat exchanger
- ◆ Air separator
- ◆ Air handler
- ◆ Solar heating coil
- ◆ Automatic air vents
- ◆ Thermostat
- ◆ Control panel with sensors

Gauges, thermometers, and flowmeters permit students to observe pressures, temperatures, and flow rate while the system is in operation. The trainer is mounted on a mobile frame and the collector panel is adjustable for easy positioning in direct sunlight.



Model H-SST-1A Shown with CDL Computer Data Logging Package and FP Fault Package Options

ALTERNATIVE ENERGY TRAINERS

H-FCTT-1 Fuel Cell Technology Trainer

The Hampden **Model H-FCTT-1** Fuel Cell Technology Trainer allows the student to create a grid independent power supply that uses only hydrogen as its fuel. The system familiarizes the student with fuel cell power supply technology.



The **Model H-FCTT-1** can also be connected to an external energy source, such as a solar panel or wind generator, for comparison between the different technologies. A switch located on the panel allows for switching between the fuel cell and external source.

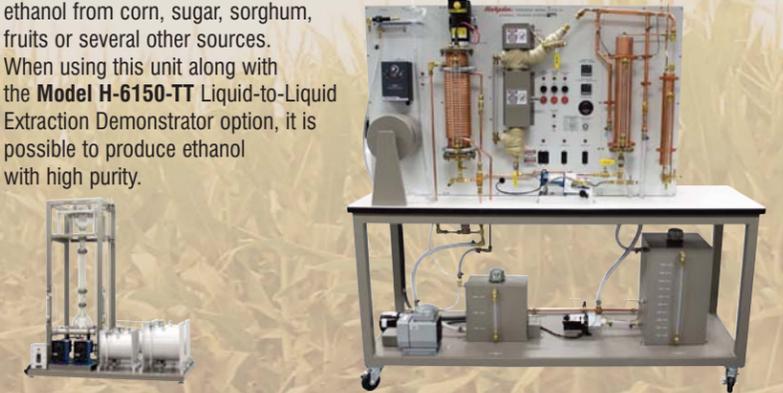


H-BIO-100 Bio-Diesel Demonstrator

The **Model H-BIO-100** Bio Diesel Demonstrator is built to withstand rigorous experiments. This unit is designed upon the same principals and protocols as large-scaled units. Key features include ease of use, no wash process and price/capacity ratio. Experiments entail a variety of variables such as pressure, temperature, time to temperature proportions, feedstock types, etc.

Bio-Fuel/Bio-Mass Training System

The Hampden **Model H-ETS-1A** Ethanol Production Process System is designed to facilitate the instruction of students on the process required to produce ethanol for experimental purposes. Ethanol is a very promising fuel alternative to oil since sources are widely available and ethanol is clean-burning. The student will be able to observe and control the process of producing ethanol from corn, sugar, sorghum, fruits or several other sources. When using this unit along with the **Model H-6150-TT** Liquid-to-Liquid Extraction Demonstrator option, it is possible to produce ethanol with high purity.



Model H-6150-TT Liquid-to-Liquid Extraction Demonstrator option

H-WPG-1B Wind Powered Generator

H-WPG-1B Wind Powered Generator

has been designed to provide the student with the basic understanding of how wind generators function as an alternate source of energy.

This system consists of a wind source, an DC generator, control panel and base assembly.



H-WPG-1B-CA Wind Powered Generator Cutaway

H-WPG-1B-CA Wind Powered Generator Cutaway

provides the student with the ability to understand the internal workings of an actual 400 watt wind generator.



Standard Products...Designed to Meet Your Growing Needs!

ALTERNATIVE ENERGY

Realistic problem solving in the classroom

MODEL H-WTS37 WIND TURBINE

is a powerful way to make use of the wind for energy.

- **Rated Capacity** 1.8 kW rated 2.4 kW peak
- **Weight** 170 lbs / 77 kg
- **Rotor Diameter** 12 feet / 3.72 meters
- **Swept Area** 115.7 ft² / 10.87 m²
- **Type** Downwind rotor w/ stall regulation control
- **Direction of Rotation** Clockwise looking upwind
- **Blades** 3 Fiberglass reinforced composite
- **Rated Speed** 50 – 330 rpm
- **Shutdown Speed** 370 rpm
- **Tip Speed** 66 – 213 f/s / 9.7 – 63 m/s
- **Alternator** Slotless permanent magnet brushless
- **Yaw Control** Passive
- **Grid Feeding** Interactive 120/240 VAC, 50-60 Hz and 120/208 VAC, 60 Hz, 3 Phase

- **Braking System** Electronic stall regulation w/ redundant relay switch control

- **Cut-in Wind Speed** 8 mph / 3.5 m/s
- **Rated Wind Speed** 20 mph / 9 m/s
- **User Control** Wireless 2-way interface remote system
- **Survival Wind Speed** 140 mph / 63 m/s
- **Total Harmonic Distortion** 2.7% at 2400W, meets UL 1741 and IEEE, 1547.1 requirements

- **Frequency Accuracy** ± 0.02 Hz
- **Voltage Accuracy** ± 2.0 V (line to neutral)
- **Surge Rating** IEEE 1547 Surge rating B

NOTE: Pole, wiring and installation to be provided by school / owner

MODEL H-DTT-26 Transformer Lab Kit

allows students to correctly make connections to power transformers located on utility poles. Following instruction, students will work in a lab using miniature hardware that mimics the appearance of real-world equipment. They will use an apparatus that looks like a short length of power line.



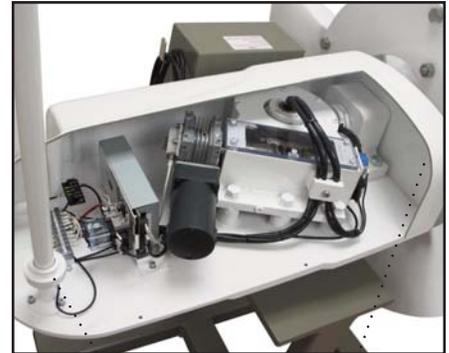
Model H-SHSP-1 Solar Heat and Solar Photovoltaic Trainer

is a fully mobile solar heat solar photovoltaic control system trainer which lets the student technician examine the hot water and electrical layouts and operational features normally associated with a solar heating system and photovoltaic power source.



MODEL H-WTS37-CA WIND TURBINE CUTAWAY

demonstrates the internal operation of a wind generator. The Wind Turbine is mounted on a mobile base with two locking castors. For safety reasons the turbine blades have been cut down to (1) foot diameter. The turbine is fully motorized, and is designed to rotate at approximately 3 rpm. The motor is connected to the blade via a slip clutch system that provides an added level of safety. The cutaway areas on the turbine allow full visual access to the internal workings of a wind turbine, such as the alternator, gears, inverter and isolator system.



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