

H-CAI Electricity and Electronic Kits

Educational Training Equipment for the 21st Century

Bulletin 286-3B

Electricity Program Model H-CAI-EE

The Hampden H-CAI-EE Kit assumes no previous training in electricity. A unified presentation of subjects enables students to develop a thorough understanding of electricity and its applications. Complete resources for the quick assembly and disassembly of simple breadboard experiments included. (No Soldering Required)

A Student Workbook guides students in the connection of circuits, making measurements and observations, and arriving at conclusions. All experiments are performed at low voltage levels. Each concept is presented simply with easy-to-follow circuit diagrams.

Description

This kit provides all necessary components and breadboarding apparatus required to complete the topics covered in **Fowler's Electricity: Principles & Applications**.

The *Activities Manual for Electricity* provides the basis of coverage for basic circuits and components, complex circuit analysis, magnetism, AC voltage, Capacitance, Inductance, transformers, RCL circuits, electric motors and instrumentation.

Each component is permanently secured to its own sturdy plastic base—Velcro® backed for fast and easy assembly of circuits on the supplied Velcro work board. This “Velcro” attachment system has become the preferred method for laboratory circuit assembly due to its simplicity, ease of use and durability.

All components are secured to Velcro-covered sliding trays. All kits can be ordered as drawer storage kits using the supplied glue-on tray support panels (two per drawer) or with heavy-duty lockable cabinets.

Hardware Features

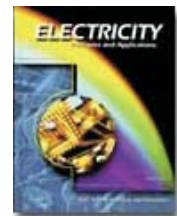
- Lockable Storage & Carrying Case
- Neat Work Areas
- Ease of Circuit Assembly & Disassembly
- Individually Mounted Components
- Low Voltage

Courseware Features

- Background Theory
- Easy to Follow Sequence
- Experiments and Tests



Optional Drawer Storage Available



All the necessary components & breadboarding apparatus required to complete ►

Fowler's Electricity: Principles & Applications



All Hampden units are available for operation at any voltage or frequency

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■ Topics

Basic Concepts

Electrical Quantities and Units

Charge & Unit of Charge
Current and Current Carriers
Current in Solids and Liquids and Gases
Unit of Current - The Ampere
Unit of Voltage - The Volt
Semiconductors
Unit of Resistance - The Ohm
Temperature Coefficient
Resistivity & Resistors
Power and Energy
Unit of Power & Efficiency
Multiple and Submultiple Units

Basic Circuits, Laws, and Measurements

Circuit Essentials
Circuit Symbols and Diagrams
Calculating & Measuring Electrical Quantities

Circuit Components

Batteries and Cells
Lead-Acid & Nickel-Cadmium Cells
Carbon-Zinc and Zinc Chloride Cells
Alkaline-Manganese Dioxide Cells
Mercuric Oxide & Silver Oxide Cells

Lithium Cells
Miniature Lamps
Resistors & Switches
Wires and Cables
Fuses and Circuit Breakers

Multiple-load Circuits

Subscripts
Power in Multiple-Load Circuits
Series Circuits and Parallel Circuits
Maximum Power Transfer
Conductance & Series-Parallel Circuits

Complex-circuit Analysis

Simultaneous Equations
Loop-Equations Technique
Superposition Theorem
Thevenin's Theorem
Current Source
Norton's Theorem
Comparison of Techniques

Magnetism and Electromagnetism

Magnetism and Magnets
Magnetic Fields, Flux, and Poles
Electromagnetism & Magnetic Materials
Magnetizing Magnetic Materials
Magnetomotive Force
Residual Magnetism & Demagnetizing

Reluctance & Induced Voltage
Magnetic Quantities and Units
Electromagnets & DC Motors
Solenoids & Relays

Alternating Current And Voltage

Types of AC Waveforms
The Sine Wave & AC Generator
Three-Phase Alternating Current

Power In AC Circuits

Power in Resistive AC Circuits
Power in Out-of-Phase Circuits
True Power, Apparent Power, & Power Factor

Capacitance

Basic Capacitor Action & Voltage Rating
Unit of Capacitance - The Farad
Determining Capacitance
Types of Capacitors
Capacitors in DC Circuits & AC Circuits
Capacitors in Series & Parallel
Detecting Faulty Capacitors
Undesired, or Stray, Capacitance
Uses of Capacitors

Inductance

Characteristics of Inductance
Unit of Inductance - The Henry
Factors Determining Inductance
Types & Ratings of Inductors

Inductors in DC Circuits
Ideal Inductors in AC Circuits
Real Inductors in AC Circuits
Inductors in Parallel & in Series
Time Constants of Inductors
Preventing Mutual & Undesired Inductance

Transformers

Transformer Fundamentals
Efficiency of Transformers
Loaded and Unloaded Transformers
Transformer Cores
Types of Transformers
Transformer Ratings
Series and Parallel Windings
Three-Phase Transformers

R, C, and L Circuits

Impedance & Adding Phasors
Solving RC, RL, & RCL Circuits
Resonance & Filters

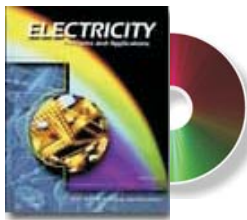
Electric Motors

Instruments and Measurements

■ Courseware

1. Text: *Electricity: Principles & Applications*, Richard Fowler
2. Manual: *Activity Manual for Electricity*, Richard Fowler
3. Manual: *Activity Manual for Electricity, Instructor's Guide*
4. Software: Instructor's Productivity Center (Optional—Specify Model H-CAI-SL-EE)

Instructor's Productivity Center from Glencoe McGraw-Hill



Revolutionize Your Classroom with Instructor's Productivity Center Software

Consists of a complete set of powerful teaching and testing software tools. All programs are designed specifically to match and enhance this curriculum. Highly recommended as a comprehensive, multi-level, instructional tool. Helps students to work independently and at their own speed, while also freeing the instructor to provide specific guidance wherever needed.

All tutorial and lab units are coordinated directly to actual student texts & workbooks and provides students with directly related on-screen questions and diagrams to solve. **Order Model H-CAI-SL-EE**

▼ Includes the Following Tools

Glencoe Student Assessment System: Test generator software, computerized testing & classroom administration package

Instrumentation: Realistic software simulations of Hewlett Packard instruments & electronics Workbench® files for projects

Math Tutorials Program: Strengthens students' knowledge of electronics related math.

Circuit Database: Contains all essential circuits from this curricula for use or editing in the Electronics Workbench® program

PowerPoint Plus: Animated PowerPoint slides covering all related text

Circuit Viewer: Selected circuits from curriculum prepared for use directly to computer screen and/or projection device.

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