

## Purpose

Hampden offers a variety of electricity and electronics training programs to suit virtually any course objective - industrial arts, pre-vocational, vocational, or technical.

Hampden supplies the total program, including kits of experimental components, breadboarding apparatus, interconnecting leads, power supplies, meters, laboratory benches, and student experimental manuals. Construction details of the kits are described in Bulletin 281.

Hampden training programs utilize one or more of the following student text/manuals:

### HEE-5A

- "Fundamentals of Electricity and Electronics" - Hampden Engineering

### HEE-2D

- "Basic Electricity" - Zbar, Rockmaker & Bates

## Topics Covered

1. Introduction to Laboratory Experimentation
2. Techniques of Preparing Laboratory Reports
3. Switching Devices and Circuits
4. Measuring Electrical Phenomena
5. Solid-State Volt-Ohm-Milliammeter
6. Creation of Electrical Energy
7. Practical Uses of Electricity
8. Voltage, Current, Resistance - Ohm's Law
9. Series Circuits
10. Parallel Circuits
11. Series-Parallel Circuits
12. Kirchhoff's Voltage Law
13. Kirchhoff's Current Law
14. Potentiometers and Rheostats
15. Voltage Divider Circuits
16. DC Ammeter Shunts
17. DC Voltmeter Multipliers
18. Ohmmeters
19. Balanced Bridge Circuits
20. Network Theorems
21. Power Transfer
22. Magnetism and Magnets
23. Electromagnetism and Electromagnets
24. Magnetomotive Force
25. Electromechanical Relays
26. Electromechanical Generation of Electricity
27. Introduction to the Oscilloscope
28. Comparison of Alternating and Direct Current
29. Inductors and Inductance
30. Transformers
31. Permanent Magnet DC Rotating Machine
32. Inductive Reactance and Impedance
33. Capacitors and Capacitance
34. Capacitive Reactance and Impedance
35. Time Constants - RC and RL
36. Measurement of RC Time Constants
37. Series Resonance
38. Parallel Resonance
39. Semiconductor Diodes
40. Full Wave and Half Wave Rectifiers
41. Filters and Voltage Doublers
42. Electron Tube Diodes
43. Zener Diodes
44. Neon Glow Lamps
45. Silicon Controlled Rectifiers
46. Three-Element Transistors
47. Triode Electron Tubes
48. Field Effect Transistors (FET)

### Appendices

- I. Symbols, Terms, Abbreviations
- II. Color Codes, Units and Equations
- III. Vectors, Phasor Diagrams, and Trig Tables
- IV. List of Components

## HEE-5A Fundamentals of Electricity/Electronics Kit



### MODEL HEE-5A-C Kit

Dimensions: 12"H x 17 $\frac{1}{4}$ "W x 8"D

Shipping Weight: 40 lbs.

Identical kit available without cabinet

for storing inside laboratory bench drawer, specify **MODEL HEE-5A-D**

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

**Hampden**<sup>®</sup>  
ENGINEERING CORPORATION

## HEE-2D Basic Electricity Kit

### Topics Covered

1. Introduction to Experiments
2. Resistor Color Code and Measurement of Resistance
3. Measurement of DC Voltage
4. Cells in Series and Parallel
5. Switches and Switching Circuits
6. Measurement of Direct Current
7. Ohm's Law
8. Series Circuits
9. Designing Series Circuits
10. Voltage-Divider Circuits (Unloaded)
11. Current in a Parallel Circuit
12. Resistance of a Parallel Circuit
13. Designing Parallel Circuits
14. Resistance of Series-Parallel Circuits
15. Direct Current Analog Meter Principles
16. Kirchhoff's Voltage Law (One Source)
17. Kirchhoff's Current Law
18. Voltage Divider Circuits (Loaded)
19. Designing Voltage- and Current-Divider Circuits
20. Troubleshooting Electric Circuits using Voltage, Current and Resistance Measurements
21. Maximum Power Transfer
22. Solving Circuits using Mesh Currents
23. Balanced-Bridge Circuit
24. Superposition Theorem
25. Thevenin's Theorem
26. Norton's Theorem
27. Millman's Theorem
28. Magnetic Field Associated with Current in a Wire
29. Inducing Voltage in a Coil
30. Applications of the DC Relay
31. Oscilloscope Operation
32. Signal-Generator Operation
33. Oscilloscope Voltage and Frequency Measurement
34. Peak, RMS, and Average Values of AC
35. Characteristics of Inductance
36. Transformer Characteristics
37. Inductances in Series and Parallel
38.  $RC$  Time Constants
39. Reactance of a Capacitor ( $X_c$ )
40. Capacitors in Series and Parallel
41. The Capacitive Voltage Divider
42. Impedance of a Series  $RL$  Circuit
43. Voltage Relationships in a Series  $RL$  Circuit
44. Impedance of a Series  $RC$  Circuit
45. Voltage Relationships in a Series  $RC$  Circuit
46. Power in AC Circuits
47. Frequency Response of a Reactive Circuit
48. Impedance of a Series RLC Circuit
49. Effects of Changes in Frequency on Impedance and Current in a Series RLC Circuit
50. Impedance of Parallel  $RL$  and  $RC$  Circuits
51. Impedance of a Parallel RLC Circuit
52. Resonant Frequency and Frequency Response of a Series RLC Circuit
53. Effect of  $Q$  on Frequency Response and Bandwidth of a Series Resonant Circuit
54. Characteristics of Parallel Resonant Circuits
55. Low-Pass and High-Pass Filters
56. Band-Pass and Band-Stop Filters
57. Nonlinear Resistors - Thermistors
58. Nonlinear Resistors - Varistors (VDRs)

### Appendices

- A. Capacitor/Inductor Coding
- B. Solder and the Soldering Process
- C. Electronics Careers

### Optional Drawer Storage

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. (Specify **-D** or **-C**)



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

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