

Electricity and Electronics Training Systems 556-00

FESTO

LabVolt Series

Datasheet



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General Description

The Preparatory Electricity and Electronics Trainer (PEET) provides both entry-level job skill training and career awareness training in a complete program. It is ideally suited to training programs that focus on fundamental skills development. The PEET system offers eight different preparatory electricity and electronics trainers, which support a combination of instructional modules: Fundamentals of AC/DC, Basic Electronics, and Motors and Generators.

The PEET system is designed to accommodate a wide variety of training needs. Each module may be ordered by model number as part of a system. Each module comes with a student manual. An instructor's guide, a pretest, and a posttest are also available separately. The student laboratory manual, written at a basic level, states clear behavioral objectives and makes extensive use of two-color graphics. Student manuals provide laboratory exercises for in-depth application of theories learned. A short essay test follows each exercise, and an appendix allow students to check their answers to the questions. Each unit is followed by a multiple-choice test. Answers for unit tests are found in the optional instructor's guide, along with resource information and suggestions for lesson planning and program administration.

PEET hardware includes the unique Konnect-All student experimental board. Designed especially for training purposes, this bread-board allows students to build circuits easily. The Konnect-All board is molded from high-impact plastic and accepts lead sizes from 0.305 to 2.77 mm (0.012 to 0.109 in). Printed circuit assemblies are supplied with some modules to speed the breadboarding.

The Laboratory Instruments, Model 438, is an optional module that can be added to the PEET system. It contains equipment required to perform many laboratory procedures. Consisting of an ac/dc power supply, electronic VOM, sine/square-wave generator, and dc meter, this module is strongly recommended as an accompaniment to the PEET system. It fulfills all PEET instrumentation requirements and is available in a cabinet matching that of the Electricity and Electronics Training Systems. The Laboratory Instruments module is frequently referred to in the student manual, both in text and illustration.

Features & Benefits

- Konnect-All experiment board to facilitate circuit
- Printed circuit assemblies with some modules
- Flexible combination of modules

List of Available Training Systems

Qty	Description	Model number
1	Electricity and Electronics Training System - All Modules _____	585687 (556-10)

Optional Equipment

Qty	Description	Model number
1	Laboratory Instruments _____	585676 (438-00)
1	Locking Cover, 305 x 330 mm (12 x 13 in) _____	585698 (1204-00)
1	Electricity and Electronics Training System (Manuals on CD-ROM) _____	583785 (16604-A0)

Optional Manual(s)

Qty	Description	Model number
1	Basic Electronics (Workbook) _____	583816 (16814-00)
1	Motors and Generators (Workbook) _____	583818 (16815-00)
1	Fundamentals of AC/DC (Workbook) _____	583820 (16817-00)
1	Basic Electronics (Workbook) _____	583822 (16818-00)
1	Fundamentals of AC/DC (Workbook) _____	583826 (16821-00)
1	Basic Electronics (Workbook) _____	583828 (16822-00)
1	Motors and Generators (Workbook) _____	583830 (16823-00)

Equipment Description

Electricity and Electronics Training System - All Modules 585687 (556-10)



The Preparatory Electricity and Electronics Trainer (PEET) is a modularized approach to electricity and electronics training that uses interesting, comprehensive laboratory training manuals for three instructional modules:

- Module 1 - Fundamentals of AC/DC
- Module 2 - Basic Electronics
- Module 3 - Motors and Generators

List of Manuals

Description	Manual number
Fundamentals of AC/DC (Workbook) _____	583781 (16604-00)
Basic Electronics (Workbook) _____	583791 (16605-00)
Motors and Generators (Workbook) _____	583800 (16606-00)

Table of Contents of the Manual(s)

Fundamentals of AC/DC (Workbook) (583781 (16604-00))

- 1.1 Identify the Trainer Parts
- 1.2 Using the Trainer
- 2.1 Components and Symbols
- 2.2 Trainer Part Symbols
- 2.3 Using Schematics
- 3.1 General Safety Rules
- 3.2 Electrical Safety Rules
- 4.1 What is Matter

- 4.2 Atoms and Molecules
- 4.3 Electric Charges
- 4.4 Laws of Electric Charges
- 5.1 What is Voltage
- 5.2 What is Current
- 5.3 What is Resistance
- 6.1 Producing Electricity by Chemicals
- 6.2 Making Electricity From Magnetism
- 6.3 Using Heat to Produce Electricity
- 6.4 Electricity From Solar Cells
- 6.5 Power Supplies as a Source of Electricity
- 7.1 Conductors
- 7.2 Insulators
- 8.1 The Closed Circuit
- 8.2 The Open Circuit
- 8.3 Switch Controlled Circuits
- 9.1 Voltage in Series Circuits
- 9.2 Voltage in Parallel Circuits
- 9.3 Voltage in Series-Parallel Circuits
- 10.1 Current in Series Circuits
- 10.2 Current in a Parallel Circuit
- 10.3 Current in a Series-Parallel Circuit
- 11.1 Ohm's Law and Resistance
- 11.2 Ohm's Law and Current
- 11.3 Ohm's Law and Voltage
- 11.4 Ohm's Law and Power
- 12.1 Types of Resistors
- 12.2 Variable Resistors
- 12.3 Resistor Color Code
- 12.4 Resistor Dissipation
- 13.1 Resistance in a Series Resistor Circuit
- 13.2 Current in a Series Resistor Circuit
- 13.3 Voltage in a Series Resistor Circuit
- 13.4 Power in a Series Resistor Circuit
- 14.1 Resistance in a Parallel Resistor Circuit
- 14.2 Voltages in a Parallel Resistor Circuit
- 14.3 Current in a Parallel Resistor Circuit
- 14.4 Power in a Parallel Resistor Circuit
- 15.1 Resistance in a Series-Parallel Resistor Circuit
- 15.2 Voltage in a Series-Parallel Resistor Circuit
- 15.3 Current in a Series-Parallel Resistor Circuit
- 15.4 Power in a Series-Parallel Resistor Circuit
- 16.1 What is Magnetism
- 16.2 Fields around a Magnet
- 16.3 Making a Magnet
- 17.1 What is an Electromagnet
- 17.2 The Circuit Breaker
- 17.3 The Solenoid/Door Chime

- 17.4 The Relay
- 17.5 The Buzzer
- 18.1 What is AC
- 18.2 Generating AC
- 18.3 Define and Measure Peak AC
- 18.4 Define and Measure Effective AC
- 19.1 What the Capacitor Is
- 19.2 Capacitors in a Series Circuit
- 19.3 Capacitors in a Parallel Circuit
- 19.4 Capacitors and Frequency Change
- 20.1 The Inductor
- 20.2 Inductors in a Series Circuit
- 20.3 Inductors in a Parallel Circuit
- 20.4 Inductors and Changing Frequency
- 21.1 Making and Reading Graphs
- 21.2 Inductors and Capacitors in a Series AC Circuit
- 21.3 Inductors and Capacitors in a Parallel AC Circuit
- 22.1 Transformer Action
- 22.2 Step-Up or Step-Down Transformer
- 22.3 Transformer Types

Basic Electronics (Workbook) (583791 (16605-00))

- 1.1 Biasing the P-N Junction
- 1.2 Diode Types
- 1.3 Light Emitting Diodes
- 2.1 The Half-Wave Rectifier
- 2.2 The Full-Wave Rectifier
- 2.3 The Bridge Rectifier
- 3.1 Filters and How They Work
- 3.2 Improving Filter Action
- 4.1 The Voltage Divider Circuit
- 4.2 Divider Circuits In Power Supplies
- 5.1 Zener Diode Characteristics
- 5.2 Zener Diode Regulation
- 6.1 Basic Circuits
- 6.2 The Negative Voltage Supply
- 6.3 Multi-Voltage Supplies
- 7.1 The Basic Transistor-NPN
- 7.2 The PNP Transistor
- 7.3 Transistor Biasing
- 8.1 The Common-Base Circuit
- 8.2 Common-Base Bias
- 8.3 Common-Base Working Circuit
- 9.1 Common-Emitter Configuration
- 9.2 Common-Emitter Control
- 9.3 Common-Emitter Characteristics
- 10.1 Common-Collector Configuration
- 10.2 Common-Collector Characteristics

- 11.1 Amplifier Basics
- 11.2 Classes of Amplification
- 11.3 The Two-Transistor Amplifier
- 11.4 The Push-Pull Amplifier
- 12.1 Oscillator Basics
- 12.2 Tuned Circuit Review
- 12.3 The LC Oscillator
- 13.1 JFET Basics
- 13.2 JFET Amplifier
- 13.3 MOSFET Basics
- 13.4 MOSFET Amplifier
- 14.1 SCR Basics
- 14.2 An SCR Switch
- 14.3 An SCR Control
- 15.1 The Op-Amp
- 15.2 Feedback
- 15.3 Summing Amplifier
- 15.4 Voltage Comparator
- 15.5 Alternating Current and Operational Amplifiers
- 16.1 Binary-Decimal Conversion
- 16.2 Binary Numbers as Electrical Signals
- 17.1 Symbol and Truth Table
- 17.2 Inverter Operation
- 18.1 The Basic OR Circuit
- 18.2 The Diode OR Circuit
- 18.3 The NOR Circuit
- 19.1 The Basic AND Circuit
- 19.2 The Diode AND Circuit
- 19.3 The NAND Circuit
- 19.4 The IC NAND
- 20.1 The RS Flip Flop
- 20.2 The Toggle Flip Flop
- 20.3 One-Shot Basics
- 20.4 The Integrated Circuit One Shot
- 21.1 The Decimal-to-Binary Converter
- 21.2 The Binary-to-Decimal Converter
- 21.3 A Real-Time Converter

Motors and Generators (Workbook) (583800 (16606-00))

- 1-1 What Is Magnetism?
- 1-2 Magnetic Fields
- 1-3 What Is An Electromagnet?
- 2-1 Motor Basics
- 2-2 The Permanent Magnet Motor
- 2-3 Series DC (Universal) Motor
- 2-4 The Compound Motor
- 2-5 Generator Action
- 3-1 The Universal Motor

- 3-2 The Synchronous Motor
- 4-1 DC Motor Control

Specifications

Parameter	Value
Physical Characteristics	
Dimensions (H x W x D)	311 x 330 x 305 mm (12.25 x 13 x 12 in)
Shipping Dimensions (H x W x D)	482.6 x 482.6 x 482.6 mm (19 x 19 x 19 in)
Net Weight	6.15 kg (16.5 lb)
Shipping Weight	13.15 kg (29 lb)

Optional Equipment Description

Laboratory Instruments (Optional) 585676 (438-00)



The Laboratory Instruments module provides a compact combination of equipment which is invaluable for troubleshooting, experimentation, education and training. Utilizing semiconductor circuitry, it is highly reliable and accurate. The module's design protects the instruments from inadvertent short circuits and overloads, a feature which is essential in school laboratory situations.

The Laboratory Instruments module consists of the following devices:

- DC meter
- Electronic volt-ohm-millimeter (VOM)
- Sine/square wave generator
- AC/DC power supply

These instruments are housed in an enclosure that complements the Electricity and Electronics Training Systems, Series 556. The module may be permanently attached to a bench. An optional Locking Cover, Model 1204, is available for added security. A lead set and an instruction manual are provided with the module.

Manual

Description

Laboratory Instrument System (User Guide) _____ 583834 (16982-00)

**Manual
number**

Table of Contents of the Manual(s)

Laboratory Instrument System (User Guide) (583834 (16982-00))

- 1 General Description
- 2 Safety
- 3 Specifications
- 4 Operating Instructions

Features & Benefits

- Practical and versatile
 - Two meters for concurrent voltage and current measurements
 - Several voltage and current ranges can be measured

- All test jacks are color-coded for easy identification
- Convenient carrying handles make permanent attachment possible and protect the instrumentation on the front panel
- Safe and durable
 - All components, switches and terminals are mounted to resist tampering
 - Protection mechanisms, such as internal semiconductor devices, are included against overvoltage and improper current connections

Optional Equipment

Qty	Description	Model number
1	Locking Cover, 305 x 330 mm (12 x 13 in)	585698 (1204-00)

Locking Cover, 305 x 330 mm (12 x 13 in) (Optional) 585698 (1204-00)

The Locking Cover consists of a 305 x 330 mm (12 x 13 in) cover that can be affixed to certain training modules. It completely covers the module front panel, making it inaccessible to students, and prevents damage to the module components during storage periods. The Locking Cover can be locked in place using a lock-and-key mechanism.

Specifications

Parameter	Value
Physical Characteristics	
Intended Location	Affixed to the front panel of a training module
Dimensions (H x W)	305 x 330 mm (12 x 13 in)
Net Weight	TBE

Electricity and Electronics Training System (Manuals on CD-ROM) (Optional) 583785 (16604-A0)

List of Manuals

Description	Manual number
Fundamentals of AC/DC (Workbook) _____	590217 (16604-00)
Fundamentals of AC/DC (Workbook (Instructor)) _____	590218 (16604-01)
Basic Electronics (Workbook) _____	590226 (16605-00)
Basic Electronics (Workbook (Instructor)) _____	590227 (16605-01)
Motors and Generators (Workbook) _____	590235 (16606-00)
Motors and Generators (Workbook (Instructor)) _____	590236 (16606-01)
Fundamentals of AC/DC (Workbook) _____	590248 (16813-00)
Fundamentals of AC/DC (Workbook (Instructor)) _____	590249 (16813-01)
Basic Electronics (Workbook) _____	590250 (16814-00)
Basic Electronics (Workbook (Instructor)) _____	590251 (16814-01)
Motors and Generators (Workbook) _____	590252 (16815-00)
Motors and Generators (Workbook (Instructor)) _____	590253 (16815-01)
Fundamentals of AC/DC (Workbook) _____	590254 (16817-00)
Fundamentals of AC/DC (Workbook (Instructor)) _____	590255 (16817-01)
Basic Electronics (Workbook) _____	590256 (16818-00)
Basic Electronics (Workbook (Instructor)) _____	590257 (16818-01)
Motors and Generators (Workbook) _____	590258 (16819-00)
Motors and Generators (Workbook (Instructor)) _____	590259 (16819-01)
Fundamentals of AC/DC (Workbook) _____	590260 (16821-00)
Fundamentals of AC/DC (Workbook (Instructor)) _____	590261 (16821-01)
Basic Electronics (Workbook) _____	590262 (16822-00)
Basic Electronics (Workbook (Instructor)) _____	590263 (16822-01)
Motors and Generators (Workbook) _____	590264 (16823-00)
Motors and Generators (Workbook (Instructor)) _____	590265 (16823-01)

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