

Making Technology Visible

Electrical and Power Technology



LAB3 TECH Academy

labtech.org



labtech-academy.com

LABTECH – the International Technical Educational Company

LABTECH was formed over 30 years ago and is one of the largest Technical and Vocational educational systems designers and manufacturers in the world. Labtech's prime focus is to provide comprehensive 21st century skills infused technical and engineering learning solutions for Vocational Technical Schools, Polytechnics, Universities and Training Institutions. The development of LABTECH has been guided by professional educators from North America, Europe and Asia that have many years of experience in the field of international education.

Our Systems Approach design philosophy of "Making Technology Visible" is based on modular learning platforms and exposing key functional systems so as to clearly demonstrate the underlying technologies. We allow students to get close to technology by adopting a "hands-on" approach to training that combines theory as well as practical experiments. The result of this is that students have a clearer understanding of how technology works and its applications to industry and the work place. Many of our trainers have Fault Insertion systems that simulate common real-world faults with troubleshooting solutions facilitating real hands-on skills. Our Modular educational approach enables us to create systematic integrated solutions for varying syllabus levels, ranging from occupational skills standards and upwards to university degrees in engineering.

LABTECH has developed over 1.000 major training products which form a systematic educational program and we have exported these to over 80 countries worldwide. The technical training systems that LABTECH manufactures are made to International standards of quality and we are ISO 9001 certified in eight areas including educational research and development. LABTECH has a comprehensive R&D department and a sophisticated range of manufacturing equipment. LABTECH can assist training institution or projects by offering a complete service for equipping technology workshops or laboratories in our key technology areas including provision of training systems, educational aids, models, support tools and testing equipment.

Our training manuals are comprehensive teaching and learning guides which are student-centric and oriented for self-studies. The manuals include information on applied theory; related engineering information; set-up & operation; skills focused experiments; schematics & diagrams; along with troubleshooting solutions. We have active cooperative programs with leading educational and industrial institutions within our region who work together with us in our product research and development. Our trainers incorporate the latest technology so that education may keep pace with the changing economy.

Our manufacturing base is strategically located in a Free Trade Zone location on Batam Island nearby Singapore which allows us to easily ship all over the world. We also have marketing and distribution offices in Singapore, Malaysia, Jakarta and Jordan in order to facilitate communications, service support and financial transactions with our customer's world wide. We also have representatives in dozens of countries who act as our local partners on project implementation. Our unique international corporate structure allows us to globally market high quality products and services at reasonable costs.

Industry & Technology Partnerships and Memberships

Labtech has a network of industry and technology partners that enables us to widen our product offerings and better align our objectives with the end result of producing employable skills. Partnering with some of the most innovative technology companies in the world, including Microsoft and Intel. We are also members of ISTE (International Society of Technology in Education), CompTIA (Computing Technology Industry Association), IVETA (International Vocational Education & Training Association), World Didac, and we are the sole international distributor of the highly successful GenYES program for integrating technology in education. This global network makes us uniquely aligned to meet the needs of educational institutions around the globe.



Labtech Electrical And Power Technology

The generation, distribution, and use of electricity together form the basic foundation for the operation of our modern society. A complete knowledge in this area is required for those entering the installation, maintenance and repair fields for residential, commercial and industrial applications. Our training systems stress learning theory as well as the development of practical skills. This is accomplished with exercises being carried out on real industrial components.

Labtech has designed a series of training systems to address the training requirements for installation technicians and maintenance engineers. The training systems cover basic electricity, testing of electrical circuits, residential and industrial installation practices, electrical motor control, industrial automation, mechatronics, process control and Building Management Systems. Our systems use real industrial components, which have been specially modified for training.

Many our trainers are designed in a modular fashion with the components mounted on transparent DIN standard panels with the electrical connections brought out to 4mm electrical terminals. These terminals use 4mm stackable test leads to allow for quick connection between the various components and circuits to be tested. Different types of stands and testing racks are available onto which the students may mount the component panels so as to quickly form many types of configurations for experiment and testing purposes. All of these features plus fault insertion systems enable our training systems to be very flexible yet precise so as to prepare the student for real world industrial situations.

Labtech produces a comprehensive range of Electrical training systems that feature hundreds of trainers and modules which can be arranged in many formats to meet any curriculum. This catalog highlights some of our most popular training systems and platforms which are organized into the categories below.

World Class Technical Training Systems designed for education with quality built-in

- Comprehensive manuals feature graphic learning materials to aid in student comprehension and contain both theory and practical exercises.
- Electrical Trainers have graphic diagrams match the student understanding.
- Special Electronic fault insertion system with test points embedded into the circuit diagram for troubleshooting and fault finding.
- Modular design enables trainers to be expanded or inter-connected to other units to form larger complex systems for enhanced training.
- Labtech items use only high quality industrial components and materials from top brands.
- Ergonomic and attractive design for easy learning and operation.
- Built to last long in tropical and arid environments.
- All major metal parts are powder coated for corrosion protection and durability.
- High quality fiberglass circuit boards with socketed ICs for easy replacement.
- For maintenance purposes, a circuit diagram of the trainer is provided and internal system cables feature number tags.
- 4mm safety sockets for student protection and quick assembly of experiments

Digital TVET Content for Virtual Learning:

- Many items also have optional digital learning resources for computer aided instruction.
- Optional Data Acquisition Systems can facilitate higher level learning.
- 21st Century Learning Platform for blended learning.

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LFT - ELECTRICAL FUNDAMENTALS & INSTRUMENTATION



BASIC ELECTRICITY TRAINER PCB MODULAR

Model Number: EFT-ELC-2

Educational Objectives:

- Basic Electricity Trainer is a modular course covering the fundamentals, concepts, theory and applications of electricity.
- The trainer consists of a base station into which are inserted 6 modular boards that match the experiments.
- Fifty-seven experiments are provided which cover basic electrical theory, electric circuits and passive devices in both direct and alternating current.



BASIC ELECTRICAL MEASUREMENT TRAINER

Model Number:

LFT-BEM-B

1. Bench Top Fame Type

LFT-BEM-M

2. Mobile Fame Type

Educational Objectives:

- Study of Resistors in Series and Parallel Configurations.
- Understanding safety and operation of DC/AC Power Supply.
- Study of DC current and DC voltage measurements in power circuit.
- Designing Resistor Circuit based on given parameters.
- Measurement of Power in DC Circuits.
- Understanding Transmission Line Characteristics.
- Measurement of AC Voltage and AC Current.
- Understanding Phase angle, Real and Apparent Power.
- Understanding Capacitive and Inductive Reactance.
- Watt, Var, Volt-Ampere and Power Factor Measurements.
- Study of Vectors and Phasors in Series and Parallel Circuits.
- Understanding of Three-Phase Watts, Vars and Volt-Amperes.
- Measurement of power in a three phase circuit using two wattmeter methods (Aaron method).
- Determine the active and reactive power, and the power factor of three phase system.
- Three Phase Power Measurement Using One Wattmeter In Balanced Load.

TRANSFORMER EXPERIMENTAL TRAINER

Model Number: LFT-TET Series

1. Single Phase Transformer Trainer LFT-TET-P1

2. Three Phase Transformer Trainer LFT-TET-P3

Educational Objectives:

- Study of the polarity of windings.
- Study of series and parallel connection of secondary windings.
- Study of magnetic circuits, incorporating the concept of flux, flux density, field strength, magnetomotive force.
- Understanding of phasor diagram with transformer on no-load.
- Understanding of Transformation Ratio.
- Understanding of Single-phase transformer operation.
- Understanding of auto transformer operation.
- Familiarization of step-up and step-down transformer.
- Understanding of 3 phase transformer operation.
- Familiarization of equivalent circuit of power transformer.
- Transformer efficiency using open and short circuit test.
- Voltage regulation using open and short circuit tests.
- Full load test showing temperature rise and efficiency test.



FUNDEMENTAL OF APPLIANCE REPAIR TRAINER

Model Number: LFT-ART

Educational Objectives:

- Understanding using devices for troubleshooting.
- The importance of Power Factor. Basic AC circuits examples.
- Study of Electricity and Heat.
- Determining the length of Resistance Wire.
- Study of Incandescent Lamps.
- Study of Fluorescent Lamps.
- Study of Starting Methods.
- Study of Switches in Lamps.
- Study of Electricity and Power Transmission.
- Study of Transformers.
- Servicing by Substitution.
- Using Test Lamps.
- Servicing with Test Instruments.
- Voltage Tests.
- Open Circuits Test.
- Checking Line Voltages.
- Testing Special Circuits.



ELECTRICAL PROTECTION TRAINER

Model Number: LFT-EPT-1

Educational Objectives:

- The Electrical Protection Trainer is ideal for learning the technique in electrical protection as well as to know how electrical protection components function.
- The trainer provides a set of components modules which are specially designed for performing all experiments of electrical protection circuits.
- The experiments will guide the students in learning the theory and practical aspects of electrical protection measurements such as insulation, earth/ground and electrical protection devices testing as well as the use of various instrumentations.
- The component modules are made from clear material with components symbol on them for easy reference.
- The connections between components are made by the means of flexible color coded jumper leads.
- Socket and plugs are in 4mm system.

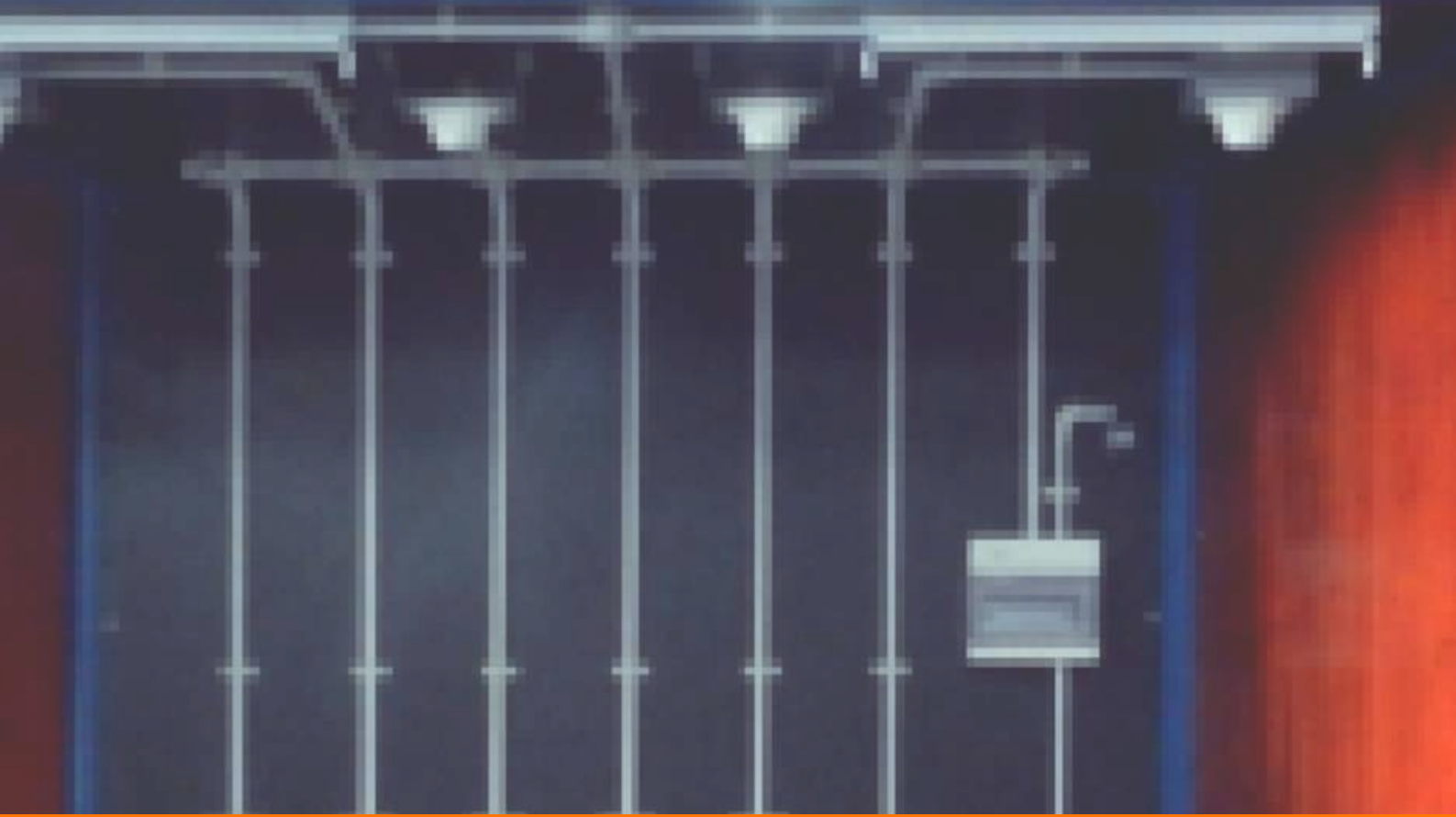
NEUTRAL CONDUCTOR TRAINER

Model Number: LFT-NCT-1X

Educational Objectives:

- Determining and comprehending the linkage of voltages and currents by measurement, calculation and drawing of line diagrams;
- Examining disturbances, e. g. deficiency of the neutral conductor, phase conductor or load resistor;
- Recognizing the function of the neutral conductor in a star circuit and determining its cross section;
- Structure and function of rectifier circuits; Proving by measurement the formation of harmonics caused by the electric circuits of e. g. PCs, motor control devices and energy saving lamps;
- Recognizing the overload of a neutral conductor by harmonics;
- Selection of protective measures for a consumer installation.





**LEW - WIRING, LIGHTING,
DISTRIBUTION AND PROTECTION**



BASIC ELECTRICAL TECHNOLOGY **TRAINER**

Model Number: LEW-BET-00

Basic Technology Trainer LEW-BET-A1

Educational Objectives:

- Single-Phase and Three-Phase circuit voltage measurement.
- Current measurement on Three Phase circuit.
- Controlling light circuit from different location.
- Build and use remote controlled load circuit.
- Controlling Single-Phase induction motor.
- Reversing Single-Phase induction motor rotation.
- Build Three-Phase induction motor control circuit.
- Reversing Single-Phase induction motor rotation.
- Starting of Three-Phase induction motor.
- Forwarding and reversing Three-Phase induction motor.
- Start-Stop-Jog control of Three -Phase induction motor.
- Installation of thermal overload in motor protection circuit.
- Build automatic star delta motor starting by using magnetic contactors and time delay relay.
- Build manual and automatic sequence motor control circuit.



ELECTRICAL INSTALLATION TRAINER

Model Number: LEW-EIT-X Series

- 1. Residential Wiring (1 phase) panel module set**
- 2. Commercial Wiring (1 phase and 3 Phase) panel module set**
- 3. Industrial Wiring (1 phase and 3 phase) panel module set**
- 4. Intercom and Signaling System panel module set**
- 5. Hospital Nurse Patient Communication Boards panel module set**
- 6. Fire Alarm System panel module set**
- 7. Security Alarm System panel module set**
- 8. Videophone Panel module set**
- 9. Complete set of modules to cover all categories**
- 10. Special order to customer specification category module set**

LEW-EIT-RW

LEW-EIT-CW

LEW-EIT-IW

LEW-EIT-IS

LEW-EIT-NP

LEW-EIT-FA

LEW-EIT-SA

LEW-EIT-VP

LEW-EIT-CS

LEW-EIT-SO

Educational Objectives:

- The "Electrical Installation Trainer" is designed to provide students with a good foundation in electrical installation technology.
- Study of electrical installation and troubleshooting in various areas such as lighting circuit, Signaling circuit, hotel/hospital, PABX telephone, Fire Alarm, Security Alarm, Videophone and Intercom.
- Each module contains real electrical components such as contactors, relays, switches, lamps, push buttons, timers, circuit breakers etc.
- The modules can be arranged on the panel frame stand in a variety of configurations to make many different and interesting installations.
- The trainer comes complete with laboratory manual which contains many experiments on electrical installation technology.



ELECTRICAL CONTROL CIRCUIT FAULT TRAINER

Model Number: LEW-ECF

Educational Objectives:

- Familiarization of circuit protection devices and working principles.
- Familiarization of earth leakage protection and over current protection installation.
- Install direct on line starter (DOL) circuit by using regulated cam switch.
- Explanation of working principle and troubleshooting of regulated cam switch.
- Install start-stop three phase induction motor circuit completed by control safety devices.
- Explanation of working principle of emergency switch and MCB.
- Install the thermal overload in power wiring and control wiring.
- Testing and setting a thermal overload.
- Explanation of the thermal overload working principle and troubleshooting.
- Install and check power lamp indicators and control lamp indicators.
- Install and operate the three phase induction motor control from two locations.
- Install and operate the forward and reverse of three phase induction motor circuit by using magnetic contactors.
- Explanation of the effect of mechanical interlocking failure of magnetic contactors.
- Install circuit of three phase induction motor by using time delay relay and magnetic contactors.
- Analyze and troubleshooting of starting failure by using time delay relay and magnetic contactors.
- Analyze and troubleshooting of automatic star delta motor starting failure.



ELECTRICAL WIRING INSTALLATION KIT

Model Number: LEW-EIK-Series

- | | |
|---|-------------------|
| 1. Domestic building mains feed and distribution wiring installation | LEW-EIK-D1 |
| 2. Residential wiring installation kit | LEW-EIK-D2 |
| 3. Commercial Building Mains Feed and Distribution Wiring Installation Kit | LEW-EIK-C1 |
| 4. Commercial Wiring Installation Kit | LEW-EIK-C2 |
| 5. Industrial Distribution Board and Surface Wiring Installation Kit | LEW-EIK-I1 |
| 6. Industrial Switching Control Installation Kit | LEW-EIK-I2 |
| 7. Manual Switching Control Installation Kit | LEW-EIK-I3 |
| 8. Contactor Control Circuit Installation Kit | LEW-EIK-I4 |

These installation kits are designed for use by the student in order to gain experience in typical electrical installation practices in various areas such as domestic and commercial building lighting and appliances, industrial switching and control systems, power distribution and main feeds, electrical safety system and installation protection. We offer a comprehensive series of kits as shown below that comes complete with job worksheets. Custom kits are available upon request.


RESIDENTIAL WIRING INSTALLATION KIT

Model Number: LEW-EIK-D2

Educational Objectives:

- Wire stripping and joints exercises.
- Installation of cables and conduits.
- Circuit-breakers installation.
- Wall switches installations.
- Installation of one-way switch with a control lamp and socket outlet.
- Installation of multi-switch with control lamps
- Installation of two-way switches and intermediate switch circuits with a control lamp and socket outlet.
- Installation of two-way switch, economy circuit with a control lamp.
- Installation of staircase switches
- Installation of current-surge circuit.
- Testing and commissioning of the circuits in accordance with installation and circuit diagrams
- Configuration of circuits in conduits or cable installations for fluorescent lamp circuits
- On/off circuit with a fluorescent lamp and socket
- Signaling circuit installation
- Low voltage control circuit installations



Watch the video 

RESIDENTIAL WIRING INSTALLATION SYSTEM

Model Number: LEW-EIK-D3

Educational Objectives:

- Circuit Protection Devices
 - a. Earth Leakage Circuit Breaker (ELCB) Installation and testing
 - b. Miniature Circuit Breaker (MCB) Installation
- Electrical Socket, Plug Familiarization
- Switches Familiarization and Installation
 - a. Switch Surface mount, 1 way, 2 terminal 1 gang
 - b. Switch Surface Mount, 2 Ways, 3 Terminal, 1 gang
- Lamp and Fitting Familiarization
- Signaling Circuit
- Staircase Timer Installation
- Controlling Single Lamp From Three Location
- Controlling Lamp From Different Location by Using Four Switch



POWER DISTRIBUTION BOARD

Model Number: LEW-PDB-Series

1. Power Distribution Board with MCCB

LEW-PDB-A


2. Power Distribution Board with ACB

LEW-PDB-B

Educational Objectives:

- Familiarization of Power Distribution systems design and operation.
- Design consolidates all the essential components into an easy to understand and operate system.
- System allows for extension boards to the bus bar if needed.
- Familiarization of number of circuit breakers, receptacles, bus bars (can be specially ordered for custom requirements).
- Understanding components such as transformers or additional electrical meters, such as frequency meters or power factor meters, can be added to the system.
- Measurement of Voltmeter and Ammeter to monitor the voltage and current in the lines.



Watch the video 

ELECTRICAL INSTALLATION & MOTOR CONTROL **TRAINER**

Model Number: LEW-EIM-Series

1. Electrical Installation and Motor Control Module Set

LEW-EIM-01

2. Electrical Installation Parts for Switches and Socket module Set

LEW-EIM-02

3. Electrical Installation Parts for 3 Phase Voltage & Current

LEW-EIM-03

Measurement Module Set

Educational Objectives:

- Circuit Breaker Familiarization
- Electrical Socket and Plug Familiarization
- Switch Familiarization
- Lamp and Fitting Familiarization
- Three-Phase and Single Phase Voltage Measurement
- Single Phase and Three Phase Current Measurement
- Residential Electrical Installation
- Controlling Light Circuit from Two Locations
- Controlling a Light Circuit from Three Locations
- Controlling a Device from Different Location by Using Four Switches
- Remote-Controlled Load Circuit
- Controlling Single Phase Induction Motor by Using Magnetic Contactor and Push Button Switch
- Reversing Single Phase Induction Motor Rotation
- Three Phase Induction Motor Control
- Reversing Three Phase Induction Motor Rotation
- Starting of Three Phase Induction Motor by Using Time Delay (ON Delay Timer)
- Forwarding and Reversing Three Phase Induction Motor by Using Magnetic Contactor and Interlock Circuit
- Start-Stop-Jog Control of Three Phase Induction Motor
- Thermal Overload Circuit Application
- Automatic Star Delta Motor Starting by Using Magnetic Contactors and Time Delay Relay
- Manual Sequence Motor Control
- Automatic Sequence Motor Control



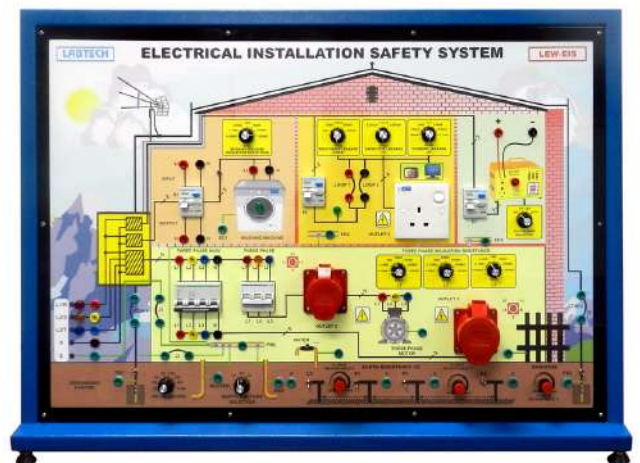
ELECTRICAL INSTALLATION SAFETY **SYSTEM**

Model Number: LEW-EIS-Series

1. For Residential LEW-EIS-1

Educational Objectives:

- Working Principle and Measurement of AC Voltage of Single Phase, Three Phase Three Wire and Three Phase Four Wire.
- Working Principle and Measurement of DC Voltage and Battery Voltage
- R.S.T Phase Rotation Test
- Live (HOT) Line
- Wiring continuity
- Four, Three and Two Earth Resistance Measurement
- Earth Voltage Measurement and Earth Voltage Effect when Measuring Earth Resistance
- Insulation Resistance Measurement
- Load current Measurement
- Earth leakage Circuit Breaker Test and Leakage Current Measurement
- Fault Simulation and Troubleshooting



ELECTRICAL INSTALLATION SAFETY SYSTEM

Model Number: LEW-EIS-Series

1. For Industrial LEW-EIS-2

Educational Objectives:

- Working Principle and Measurement of AC Voltage of Single Phase, Three Phase Three Wire and Three Phase Four Wire.
- Working Principle and Measurement of DC Voltage and Battery Voltage
- R.S.T Phase Rotation Test
- Live (HOT) Line
- Wiring continuity
- Four, Three and Two Earth Resistance Measurement
- Earth Voltage Measurement and Earth Voltage Effect when Measuring Earth Resistance
- Insulation Resistance Measurement
- Load current Measurement
- Earth leakage Circuit Breaker Test and Leakage Current Measurement
- Fault Simulation and Troubleshooting



ELECTRICAL INSTALLATION SAFETY SYSTEM

Model Number: LEW-EIS-Series

1. For Hospital LEW-EIS-3

Educational Objectives:

- Working Principle and Measurement of AC Voltage of Single Phase, Three Phase Three Wire and Three Phase Four Wire.
- Working Principle and Measurement of DC Voltage and Battery Voltage
- R.S.T Phase Rotation Test
- Live (HOT) Line
- Wiring continuity
- Four, Three and Two Earth Resistance Measurement
- Earth Voltage Measurement and Earth Voltage Effect when Measuring Earth Resistance
- Insulation Resistance Measurement
- Load current Measurement
- Earth leakage Circuit Breaker Test and Leakage Current Measurement
- Fault Simulation and Troubleshooting



ELECTRICAL INSTALLATION SAFETY SYSTEM

Model Number: LEW-EIS-Series

1. Home Renewable Energy Simulator LEW-EIS-4

Educational Objectives:

- A. Solar Cell Installation and Connection of:
 - AC Single phase System
- B. Wind Turbine Installation and Connection of:
 - AC Single phase System
- C. Measurement and Instrumentation:
 - Using Digital Clamp Meter.
 - AC Voltage (Single Phase)
 - DC Voltage
- D. Inverter Installation and Connection
- E. Solar Charge Controller Installation and Connection
- F. Battery Installation and Connection
- G. Fault Simulation



ELECTRICAL LIGHTING INSTALLATION TRAINER

Model Number:

1. Basic **LEW-EIT-LTC**

2. With Faults **LEW-EIT-LTF**

Educational Objectives:

- Familiarization Short-Circuit protection by circuit breaker
- Differential Circuit Breaker Familiarization
- Simple lighting Circuit Familiarization
- Double ignition circuit Familiarization
- Back and forth Circuit Familiarization
- Outlet Circuit Familiarization
- Kilowatt Hour Meter
- Short-Circuit protection by circuit breaker
- Earth leakage protection by residual current device.
- One way switch control 1 x Fluorescent lamp circuit.
- One way switch control 2 x Fluorescent lamp circuit,
- 1 x Ballast
- One way switch control 1 x Fluorescent lamp circuit with electronic ballast
- Two way switch control Mercury vapor lamp.
- Two way switch control Mercury vapor lamp with ballast.
- Intermediate switch control Incandescent lamp.
- Photo switch control lamp
- Current impulse circuit two push-buttons switch.
- Staircase circuit with time delay Relay
- Dimmer circuit control



HIGH ENERGY EFFICIENTLY LIGHTING TRAINER

Model Number: LEW-ELH-1

Educational Objectives:

- Familiarization of Electrical Energy Meter
- Familiarization with Power Control Using Power Electronic Component
- Familiarization with Staircase Timer Function
- Familiarization with Lighting Automation
- Familiarization with Smart Room Thermostat
- Load Shedding Application and its Contribution to Energy Saving

HOME AUTOMATION ELECTRICAL WIRING TRAINER

Model Number: LEW-HAE-1

Educational Objectives:

- Kilowatt Hour Meter
- Short-Circuit protection by circuit breaker.
- Earth leakage protection by residual current device.
- Outlet socket
- One way switch
- Two way switch
- Fluorescent lamp
- Mercury vapor lamp
- One way switch control Fluorescent lamp circuit.
- Two way switch control Mercury vapor lamp.
- Time delay relay
- Push button switch
- Latching switch
- Electric heater
- LDR
- Smoke detector
- Gas leak sensor
- Videophone and interphone



RESIDENTIAL ELECTRICAL TRAINER

Model Number: LEW-RET

Educational Objectives:

- The “Residential Electrical Trainer” is designed to provide students with a good foundation in residential electrical technology, and to prepare them for a career as an installation/service technician.
- The system consists of a number of components which are suitable for the study of residential electrical and troubleshooting in various areas such as lighting circuit and Signaling circuit.
- The unit contains real electrical components such as multifunction meter, switches, lamps, Socket, circuit breakers etc.
- Connections between the components are made by using stackable 4mm test leads which plug into 4mm color-coded heavy-duty captive-head binding posts.
- The trainer comes complete with laboratory manual which contains many experiments on residential electrical technology.



POWER DISTRIBUTION & PROTECTION TRAINER

Model Number: LFT-PDP

Educational Objectives:

- Identify the challenges and solutions to power distribution protection problems
- Regulation of two transmission lines carrying AC or DC current
- Analyze the variations of distribution feeder systems (Radial and Ring System)
- Study how reactive power affects and regulates the voltage throughout the system.
- Analyze distribution losses and efficiency
- Voltage control by the distribution transformer tap changer
- Circuit Analysis of 3 Phase System in balanced and unbalanced condition
- Analyze the effect of improved power factor on line current
- Analyze the effect of an open-circuited neutral conductor on voltage that across 1 phase load
- Fault in a distribution system

POWER LINE TRANSMISSION TRAINER

Model Number: LFT-PTL-1

Educational Objectives:

- Vector representation of measured voltage in power transmission
- Voltage losses in transmission lines
- Measurements of real and reactive power in transmission line
- Demonstration of voltage variation in transmission line according to circuit integrity
- Voltage variation at the transmission line output according to resistive, inductive and/or capacitive load
- Voltage variation at the transmission line output according to inductive and/or capacitive source
- Voltage regulation in the transmission lines output
- Phase angle differences between measured input and output.
- Transmission lines operated at nominal or reduced voltage
- Two lines connected in parallel
- Regulation of two transmission lines carrying AC or DC current
- Power Generation (requires : LFT-PTL-G1, LFT-PTL-M1, LFT-PTL-P1, and LFT-PTL-P2)
- Load compensation for mechanical load (requires : LFT-PTL-P2 and LFT-PTL-M2)





LEM - ELECTRICAL MOTORS AND CONTROL TECHNOLOGY



ELECTRICAL MACHINE TRAINER

Model Number: LEM-EMT A-B

Electrical Machine Trainer, Electrical Machines Demonstration Set LEM-EMT

Educational Objectives:

- Prime Mover & Torque Measurement.
- DC Motor Construction.
- DC Generator Construction.
- DC Shunt Motor Characteristic (starting, running, under load).
- DC Series Motor Characteristic (starting, running, under load).
- DC Compound Motor Characteristic (starting, running, under load).
- DC Separately-Excited Shunt Generator Characteristic (running, under load).
- DC Self-Excited Shunt Generator Characteristic (running, under load).
- DC Compound Generator Characteristic (running, under load).
- DC Motor Starting Method
- Speed Control of DC Motor (requires optional power electronic module)
- Prime Mover & Torque Measurement
- Split-Phase Induction Motor Construction
- Split-Phase Induction Motor Characteristic (starting, running, under load).
- Capacitor-Start Motor Characteristic (starting, running, under load).
- Capacitor-Run Motor Characteristic (starting, running, under load).
- Universal Motor Construction
- Universal Motor Characteristic (starting, running, under load).
- Prime Mover & Torque Measurement
- Wound-Rotor Induction Motor Construction
- Wound-Rotor Induction Motor Characteristic (starting, running, under load).
- Squirrel-Cage Induction Motor Characteristic (starting, running, under load).
- Synchronous Motor Construction
- Synchronous Motor Characteristic (starting, running, under load).
- Three-Phase Alternator
- Alternator Under Load
- Alternator Synchronization
- Alternator Power
- The Three-Phase Induction Motor Starters
- Rotary Frequency Converter



Watch the video 

INDUSTRIAL MOTOR CONTROL CIRCUIT TRAINER

Model Number:

LEM-MCF-1 DC Motor Control

LEM-MCF-2 Basic AC motor Control

LEM-MCF-3 Advanced AC Motor Control

LEM-MCF-4 AC and DC Electrical Motor Control

LEM-MCF-5 Motor Protection Modules

Educational Objectives:

- Modular components mounted on to a rack system to facilitate the setting up of various types and configurations of circuits.
- Hands-on wiring with various contactor circuits.
- Familiarization and hands-on wiring with popular motor control circuits, such as a reversing circuit with various interlocking circuits, star-delta circuits, pole switching circuits for separate winding, Dahlander circuits for two speed rotation.
- Experimentation of jogging, plugging common circuits such as direct on/off switching.
- Experimentation of lamp operation, fault indication and switching from two locations via a sequential circuit.



MOTOR-GENERATOR SYSTEM

Model Number: LEM-MGS-Series

List of Generator

LEM-MGS-G1 DC Shunt Wound Generator, 350W

LEM-MGS-G2 DC Series Wound Generator, 350W

LEM-MGS-G3 DC Compound Wound Generator, 350W

LEM-MGS-G4 DC Multifunction Generator (Shunt, Series, Compound), 350W

List of Alternators

LEM-MGS-A1 1 Ph. Alternator with Cylindrical Rotor, Stator Wound Rotor excited, 300VA

LEM-MGS-A2 1 Ph. Alternator with Salient Pole Rotor, Rotor Wound Stator excited, 300VA

LEM-MGS-A3 3 Ph. Alternator with Cylindrical Rotor, Stator Wound Rotor excited, 300VA

LEM-MGS-A4 3 Ph. Alternator with Salient Pole Rotor, Rotor Wound Stator excited, 300VA

List of Motors

LEM-MGS-M1 DC Shunt Motor, 1 HP

LEM-MGS-M2 AC Single Phase Induction Motor, 1 HP

LEM-MGS-M3 AC Three Phase Induction Motor, 1 HP

Educational Objectives:

- Induction motor as prime mover principles
- Saturation Curve of Generator/Alternator
- Balance Load Effect of Generator/Alternator
- Unbalance Load Effect of Generator/Alternator
- Open circuit, Short Circuit characteristics
- Voltage regulation in Generator/Alternator
- Losses and Efficiency in Generator/Alternator
- Troubleshooting Generator/Alternator system



ELECTRICAL MOTOR SYSTEM

Model Number: LEM-EMS Series

- LEM-EMS-1 DC Shunt Wound Motor**
- LEM-EMS-2 DC Series Wound Motor**
- LEM-EMS-3 DC Compound Wound Motor**
- LEM-EMS-4 AC Single Phase Induction Motor**
- LEM-EMS-5 AC Single Phase Split-Pole Motor**
- LEM-EMS-6 AC Single Phase Repulsion Motor**
- LEM-EMS-7 AC Single Phase Universal Motor**
- LEM-EMS-8 AC Three Phase Asynchronous Induction Squirrel Cage Motor, 4 Pole**
- LEM-EMS-9 AC Three Phase Asynchronous Induction Pole Changing Motor**
- LEM-EMS-10 AC Three Phase Asynchronous Slip-Ring Motor**
- LEM-EMS-11 AC Three Phase Rotor Wound Motor**
- LEM-EMS-12 AC Single Phase Split-Phase Motor**
- LEM-EMS-13 AC Single Phase Capacitor Start/Run Induction Motor**
- LEM-EMS-14 AC Single Phase Reluctance Motor**
- LEM-EMS-15 AC Three Phase Synchronous Reluctance Motor**
- LEM-EMS-16 AC Three Phase Asynchronous Induction Squirrel Cage Motor, 2 Pole**
- LEM-EMS-17 AC Three Phase Synchronous Salient Pole Motor**

List of motor:

- Sectioned Universal motor for operation with 220 VAC or DC.
- Sectioned Single Phase Capacitor Start-Induction Run.
- Sectioned Single Phase Shaded Pole motor (for low torque applications).
- Sectioned Single Phase Split-Phase Start and Induction Run Motor.
- Sectioned Direct Current (DC) Motor normally used for variable speed applications.
- Sectioned Three Phase induction motor typically used for pumps, fans, blowers, machine tools, etc.
- Sectioned Three Phase Slip Ring Motor for use on pumping units and punch presses.
- Sectioned Three Phase Synchronous Motor for special applications.
- Sectioned Three Phase Induction Motor, Dahlander.
- AC Three Phase Asynchronous Slip-Ring Motor.
- AC Three Phase Rotor Wound Motor.
- AC Single Phase Split-Phase Motor.
- AC Single Phase Capacitor Start/Run Induction Motor.
- AC Single Phase Reluctance Motor.
- AC Three Phase Synchronous Reluctance Motor.
- AC Three Phase Asynchronous Induction Squirrel Cage Motor, 2 Pole.
- AC Three Phase Synchronous Salient Pole Motor.

Educational Objectives:

- Familiarization of a wide range of multifunctional motor types commonly used in industrial applications.
- Learn electrical motors specification for training applications in respect to the sizes and power output.
- Study of all wiring connections between the motor and motor controls.
- 4mm safety sockets for student protection and easy connections.



SECTIONED ELECTRICAL MOTOR

Model Number:

LEM-1UM Sectioned Universal motor for operation with 220 VAC or DC

LEM-1CS Sectioned Single Phase Capacitor Start-Induction Run

LEM-1SP Sectioned Single Phase Shaded Pole motor

LEM-1SB Sectioned Single Phase Split-Phase Start and Induction Run Motor

LEM-1DC Sectioned Direct Current (DC) Motor normally used for variable speed applications

LEM-3IM Sectioned Three Phase induction motor typically used for pumps, fans, blowers, machine tools, etc

LEM-3SR Sectioned Three Phase Slip Ring Motor for use on pumping units and punch presses

LEM-3SM Sectioned Three Phase Synchronous Motor for special applications

LEM-352 Sectioned Three Phase Induction Motor, Dahlander circuit used for applications that require 2 speeds

List of motor:

- Sectioned Universal motor for operation with 220 VAC or DC.
- Sectioned Single Phase Capacitor Start-Induction Run.
- Sectioned Single Phase Shaded Pole motor (for low torque applications).
- Sectioned Single Phase Split-Phase Start and Induction Run Motor.
- Sectioned Direct Current (DC) Motor normally used for variable speed applications.
- Sectioned Three Phase induction motor typically used for pumps, fans, blowers, machine tools, etc.
- Sectioned Three Phase Slip Ring Motor for use on pumping units and punch presses.
- Sectioned Three Phase Synchronous Motor for special applications.
- Sectioned Three Phase Induction Motor, Dahlander.

Educational Objectives:

- Familiarization of original electric motors, which have been carefully sectioned to expose all key operational parts.
- Ideal for demonstrating to students the function and operation of different types of electric motors.
- A variety of sectioned motors are available.



SPEED CONTROL FOR INDUCTION MOTOR

Model Number:

LEM-IMC-1 Speed Control For 1PH Motor

LEM-IMC-3 Speed Control For 3PH Motor

Educational Objectives:

- Study of speed transducer
- Study of calibration and signal conditioning of speed transducer
- Study of speed controller
- Study of open-loop and close-loop control
- Study the function of error amplifier, set point, controlled variable and controlled output in speed controller
- Study the function of the circuits in three phase frequency inverter (rectifiers, filters, PWM modulation, three phase MOSFET inverter)
- Study of motor protection



PWM SPEED CONTROL FOR PERMANENT MAGNET DC MOTOR

Model Number: LEM-DMC-1

Educational Objectives:

- Study of speed transducer
- Study of calibration and signal conditioning of speed transducer
- Study of PWM speed controller
- Study of open-loop and close-loop control
- Study the function of error amplifier, set point, controlled variable and controlled output in speed controller
- Study the function of the circuits in PWM speed controller (rectifiers, filters, PWM modulation, three phase MOSFET inverter)
- Study of motor protection



SERVOMECHANISM FOR BRUSHLESS SYNCHRONOUS AC MOTOR

Model Number: LEM-SMC-1

LEM-SMC-2 Servomechanism For Stepper Motor

LEM-SMC-3 Servomechanism For DC Shunt Motor

LEM-SMC-4 Servomechanism For Permanent Magnet DC Motor

LEM-SMC-5 Servomechanism For 3PH Induction Motor Wit Scalar Type PWM Inverter

LEM-SMC-6 Servomechanism For 3PH Induction Motor Wit Vector Type PWM Inverter

Educational Objectives:

- Study of Brushless Synchronous AC Motor characteristic
- Study of calibration and signal conditioning of speed transducer
- Study of servomechanism structure for synchronous motor
- Study of open-loop control on synchronous motor
- Study the function of 3 phase frequency inverter using IGBT at power stage.
- Study the dynamic response of the system
- Study of motor protection



ELECTRIC MOTOR TROUBLESHOOTING TRAINER

Model Number: LEM-ELM

Educational Objectives:

- Power Wiring Circuit Protection Devices and Troubleshooting
- Control Wiring Safety Device and Troubleshooting
- Familiarization, Measurement and Troubleshooting of Single Phase Induction Motor.
- Familiarization, Measurement and Troubleshooting of Direct Current (DC) Motor.
- Familiarization, Measurement and Troubleshooting of Three Phase Induction Motor.
- Familiarization, Measurement and Troubleshooting of Three Phase Transformer.
- Measurement and Troubleshooting of Reversing Starter AC
- Measurement and Troubleshooting of Reversing Starter DC
- Star Delta Connection





GENERATOR SYNCHRONOUS TRAINER

Model Number: LEM-GST-1

Educational Objectives:

- Understand how to synchronize of two three phase generator by using synchroscope method.
- Understand how to synchronize of two three phase generator by using three dark lamp method.
- Understand how to synchronize of two three phase generator by using two bright one dark lamp method.
- Understand the regulation of three phase generator by using open circuit test.
- Understand the regulation of three phase generator by using short circuit test.
- Analyze V-Curve & Inverse V-Curve of Synchronous generator.

ELECTRIC MOTOR CONTROL WITH FAULT INSERTION

Model Number: LEM-MCF-XF

Educational Objectives:

- Forward and Reverse Three Phase Induction Motor Using Reversing Starter
- Forward and reverse three phase induction motor using magnetic contactor
- Starting Of Three Phase Induction Motor Using Time Delay
- Control Of Three Phase Induction Motor Using Limit Switch and Push Button
- Three Phase Induction Motor Control From Two location Using Push Button and Magnetic Contactor
- Start-Stop-Jog Control of Three Phase Induction Motor
- Sequence Motor Control
- Three phase induction motor control using control relay that controlled by photo electric sensor
- Three Phase Induction Motor Control Using Inductive Proximity Switch
- Starting Star-Delta Motor With Star Delta Switch
- Starting Motor With Manual Star Delta Starter



MOTOR CONTROL AND PROTECTION TRAINER WITH PLC

Model Number: LEM-MCP-01

Educational Objectives:

- Basic training in motor controls.
- Programmable Logic Controller (PLC) for motor operation control.
- Introduces dc drive and ac drives.
- Introduces photoelectric and proximity switches.

INDUSTRIAL MOTOR WIRING CONTROL TRAINER

Model Number: LEW-IMC-A

Educational Objectives:

- Industrial Motor Control Wiring Board designed to study the wiring of electrical components in motor control circuits as well as their function that are used in industrial system.
- This system allows the students to select the module and design their own wiring on various circuits.
- Many industrial motor control circuits such start stop control circuit, 1-ph induction motor control circuit, 2 speed motor control for 3-Ph induction motor, star-delta starting circuit, reverse control of 3-Ph induction motor, motor protection circuit etc.
- Wiring from the component to the terminals is also color-coded so as to enhance the student learning experience.





LMX - MECHATRONICS AND
AUTOMATION



PROGRAMMABLE LOGIC CONTROLLER TRAINERS

The LABTECH Programmable Logic Controller Trainers use OMRON PLC products which are powerful and flexible and ideally suited to your specialized needs. OMRON is a leader in industrial automation and many factories commonly use their products. The systems in our trainers are compatible with a variety of accessories and peripherals, thus allowing them to be easily expanded into larger systems. These trainers are suitable for the students to develop competence in operating, programming, and trouble shooting modern PLC control circuits. Several models of trainers are available in different sizes. Other brand PLCs can be ordered for the training systems.

Model Number:

- LDA-PLC-01 Basic Training Package (20 I/O points)**
- LDA-PLC-02 Intermediate Training Package (30 I/O points)**
- LDA-PLC-03 Advanced Training Package 1 (40 I/O points)**
- LDA-PLC-04 Advanced Training Package 2 (60 I/O points)**

Educational Objectives:

- Basic PLC Trainer Familiarization.
- Human Machine Interface console (optional).
- Basic Ladder programming & Instruction.
- Inputting the program.
- Terminology and Mnemonic code.
- Logical continuity.
- I/O Devices.
- Equivalent user programs.
- Branch instructions. Latching instructions.
- Delete, copy, move, modify.
- The search and force function.
- Counters, Sequencers, Shift registers.
- Comparison instructions.
- Monitoring data files.



INDUSTRIAL PLC SYSTEM

Model Number: LDA-PCU

Educational Objectives:

- These systems are based upon Omron PLCs which are commonly used by industry through out the world.
- These have special features such as advanced high-speed CPUs, compact size, high speed counter, RS-232C interface, High I/O capacities, easy to maintain, built-in clock, multi lingual displays.



PROGRAMMER LOGIC CONTROLLER TRAINER MODULE APPLICATION

Model Number: LDA-PAP

Educational Objectives:

- Traffic Light Module.
- Vehicle Parking Module.
- Elevator Lift Module.
- Laundry Module.
- Bottling Plant Module.
- Product Line Inspection Module.
- Packing Module.
- Tank Level and Pump Control Module.
- Alarm System Module.
- Safety Door Module.
- Fan Control Device Module.
- Seven Segment Display.
- Tank Filling Draining Control Module.
- Measuring The Life of a Cutting Knife/Punch Module.
- Two Door Auto Access Warehouse Module.
- Game Show Contest Buzzer System Module.

INDUSTRIAL SENSOR TRAINER

Model Number: LDA-IST-1

Educational Objectives:

- Photoelectric Sensor Direct Reflector Type Characteristic
- Photoelectric Sensor Transmission Type Characteristic
- Photoelectric Sensor Miller Reflector Type Characteristic
- Photoelectric Sensor Infra Red Ray Type Characteristic
- Photoelectric Sensor Distance Measurement Type Characteristic
- Photoelectric Sensor Color Mark Sensing Style Characteristic
- Photo Fiber Sensor Direct Reflector Type Characteristic
- Photo Interrupter Transmission Type Characteristic
- Rotary Encoder Characteristic
- Temperature Sensor, Resistance Temperature Detector (RTD) Characteristic
- Temperature Sensor, Thermocouple (TC) Characteristic
- Digital Counter Characteristic
- Tachometer Characteristic
- Line Speed Meter Characteristic



CONVEYOR SYSTEM TRAINER

Model Number: LDA-CVR-1

Educational Objectives:

- Industrial quality hardware designed to accommodate a wide variety of configurations
- Introductory level to PLC or PC control programming
- Fundamentals of sensors actuators and motors
- Four different types of industrial sensors
- Component detection rejection and acceptance
- Connection through 'D' type, IDC and 4mm connectors
- Industry standard 24V system.
- Can be controlled from a Labtech LDA-PLC trainer



ROBOTIC ARM TRAINER, 6 AXIS

Model Number: LMX-IRT-1

Educational Objectives:

- Familiarization of Industrial Robot Trainer
- Familiarization of Arbotix-m Board
- Familiarization of Arduino Software
- Installing The Arbotix Driver and Library
- The first Servo motor (360 degree base motor) Programming
- The second servo motor (Shoulder) Programming
- The third servo motor (Elbow) Programming
- The fourth servo motor (Wrist) Programming
- The Fifth servo motor (Wrist Rotate) Programming
- The Sixth servo motor (Gripper) Programming
- Robot Movement Programming
- Industrial Robot PC Controlling and Programming
- Industrial Robot Wireless Controlling & Programming
- Lifting The Load Simulator Application Programming



ELECTROMECHANICAL CONTROL TRAINER

Model Number: LMX-ECT-1

Educational Objectives:

- DC Stepper Motor Static Running Test
- DC Stepper Motor Open Loop Control Operation
- DC Stepper Motor Close Control with Loop Photoelectric Feedback
- DC Stepper Motor Close Loop Control with Potentiometer Feedback
- DC Stepper Motor Speed Control (Encoder Feedback)
- DC Stepper Motor Load Running Test
- DC Motor Static Running Test
- DC Motor Drive Principle Characteristic
- DC Motor Open Loop Control Operation
- DC Motor Speed Close Loop Control Feedback Operation
- DC Motor Loading Test
- DC Servo Motor Connection and Operation
- DC Servo Motor Static Function Test and Parameters Measurement
- DC Servo Motor Drive Principle and Characteristic
- DC Servo Motor Open Loop Control Operation Characteristic
- DC Servo Motor Speed Close Loop Control Operation Characteristic
- DC Servo Motor Loading Test
- Auto Synchro Motor Characteristic
- Auto Synchro Motor Angle Change Test



Watch the video 



DYNAMIC CONTROL TRAINER

Model Number: LDA-DCT-1

Educational Objectives:

- AC Servo Motor Principle and Static Function Test
- AC Servo Motor Linear Displacement Position Control
- AC Servo Motor Angular Displacement
- AC Servo Motor Slow Down Positioning Control
- AC Servo Loading Experiment
- Application of Gear Reducer (40:1) On AC Servo Motor Control System
- DC Servo Motor Principle and Static Function Test
- DC Servo Motor Linear Displacement Position Control
- DC Servo Motor Angular Displacement
- DC Servo Motor Slow Down Positioning Control
- DC Servo Loading Experiment
- Application of Gear Reducer (40:1) On DC Servo Motor Control System
- Stepper Motor Principle and Static Function Test
- Stepper Motor Open Loop Operation Control
- Stepper Motor Close Loop Operation Control
- Stepper Motor Linear Displacement Position Control
- Stepper Motor Angular Displacement
- Stepper Motor Slow Down Positioning Control
- Stepper Loading Experiment
- Stepper Motor Control By Using 40 : 1 Reducer

INDUSTRIAL PLC TRAINER

Model Number: LDA-PLC-11

Educational Objectives:

- Basic PLC Trainer Familiarization.
- Human Machine Interface console
- Basic ladder programming & Instruction.
- Inputting the program.
- Terminology and Mnemonic code.
- Logical continuity.
- I/O Devices.
- Equivalent user programs.
- Branch instructions.
- Latching instructions.
- Delete, copy, move, modify.
- The search and force function.
- Counters, Sequencers, Shift registers.
- Comparison instructions.
- Monitoring data files.
- Photoelectric Sensor Direct Reflector Type Characteristic
- Photoelectric Sensor Transmission Type Characteristic
- Photoelectric Sensor Miller Reflector Type Characteristic
- Photoelectric Sensor Infra Red Ray Type Characteristic
- Photoelectric Sensor Distance Measurement Type Characteristic
- Photoelectric Sensor Color Mark Sensing Style Characteristic
- Photo Fiber Sensor Direct Reflector Type Characteristic
- Photo Interrupter Transmission Type Characteristic
- Rotary Encoder Characteristic
- Temperature Sensor, Resistance Temperature Detector (RTD) Characteristic
- Temperature Sensor, Thermocouple (TC) Characteristic
- Digital Counter Characteristic
- Tachometer Characteristic
- Line Speed Meter Characteristic



STEPPER MOTOR TRAINER

Model Number: LDA-SMT-1

Educational Objectives:

- Stepper Motor Principle and Static Function Test
- Stepper Motor Open Loop Operation Control
- Stepper Motor Close Loop Operation Control
- Stepper Motor Linear Displacement Position Control
- Stepper Motor Angular Displacement
- Stepper Motor Slow Down Positioning Control
- Stepper Motor Loading Experiment
- Stepper Motor Control By Using 40:1 Reducer



LPC - FLUID AND PROCESS CONTROL




TEMPERATURE PROCESS CONTROL TRAINER

Model Number: LDA-PCT-A

Educational Objectives:

- Introduction to the fundamentals of process control (open loop, close loop, control response).
- Familiarization with industrial process control components (controllers, transducers, actuators).
- Implementation of controlled variable in a open loop and feed forward control system.
- Implementation of controlled variable in a closed loop control system.
- Application of On/Off controller in single loop controlled system.
- Investigation of disturbance and control response.
- Application P, PI and PID control in single loop controlled system.
- Influence of different control parameters (P, I and D) on stability and control quality.
- Tuning of PID controller.
- Application of cascade control (Only for LDA-LCP-C : Level & Flow control system).
- Processing of process variables using data acquisition (DAQ).
- Using computer for process control monitoring and analysis (SCADA).



Watch the video 

LEVEL PROCESS CONTROL TRAINER

Model Number: LDA-PCL-A

Educational Objectives:

- Introduction to the fundamentals of process control (open loop, close loop, control response).
- Familiarization with industrial process control components (controllers, transducers, actuators).
- Implementation of controlled variable in a open loop and feed forward control system.
- Implementation of controlled variable in a closed loop control system.
- Application of On/Off controller in single loop controlled system.
- Investigation of disturbance and control response.
- Application P, PI and PID control in single loop controlled system.
- Influence of different control parameters (P, I and D) on stability and control quality.
- Tuning of PID controller.
- Application of cascade control (Only for LDA-LCP-C : Level & Flow control system).
- Processing of process variables using data acquisition (DAQ).
- Using computer for process control monitoring and analysis (SCADA).



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FLOW PROCESS CONTROL TRAINER

Model Number: LDA-PCF-A

Educational Objectives:

- Introduction to the fundamentals of process control (open loop, close loop, control response).
- Familiarization with industrial process control components (controllers, transducers, actuators).
- Implementation of controlled variable in a open loop and feed forward control system.
- Implementation of controlled variable in a closed loop control system.
- Application of On/Off controller in single loop controlled system.
- Investigation of disturbance and control response.
- Application P, PI and PID control in single loop controlled system.
- Influence of different control parameters (P, I and D) on stability and control quality.
- Tuning of PID controller.
- Application of cascade control (Only for LDA-LCP-C : Level & Flow control system).
- Processing of process variables using data acquisition (DAQ).
- Using computer for process control monitoring and analysis (SCADA).



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PRESSURE PROCESS CONTROL TRAINER

Model Number: LDA-PCP-A

Educational Objectives:

- Calibration of Process Control Elements
- Setting Up and Demonstrating Open Loop Control (Manual)
 1. Investigation of Relationship between Manipulated Variable and Dependent Variable
 2. Investigation of Relationship between Disturbance and Manipulated Variable
 3. Open Loop of Control Process
- Setting up and Demonstrating Closed Loop Control (Automatic)
 1. ON/OFF Control of Air Pressure and Air Flow
 2. PID Control of Air Pressure and Flow
- Tuning of P, I and D Controller
- Dynamic Operation of Level Control System



PROCESS CONTROL TRAINER, PH

Model Number: LDA-PHC-A

Educational Objectives:

1. Calibration of process control elements
2. Setting up and demonstrating open loop control (manual mode)
 - Investigation of correlation between manipulated variable and dependent variable on pH process control
 - Investigation of correlation between disturbance and manipulated variable on pH process control
 - Open loop system of pH process control
3. Setting up and demonstrating closed loop control (automatic mode)
 - ON/OFF Control
 - PID Control
4. Tuning of P, I and D controller
5. Dynamic process of pH control system

PROCESS CONTROL TRAINER: LEVEL AND FLOW

Model Number: LDA-PC1-A

Educational Objectives:

- Introduction to the fundamentals of process control (open loop, close loop, control response).
- Familiarization with industrial process control components (controllers, transducers, actuators).
- Implementation of controlled variable in a open loop and feed forward control system.
- Implementation of controlled variable in a closed loop control system.
- Application of On/Off controller in single loop controlled system.
- Investigation of disturbance and control response.
- Application P, PI and PID control in single loop controlled system.
- Influence of different control parameters (P, I and D) on stability and control quality.
- Tuning of PID controller.
- Application of cascade control (Only for LDA-LCP-C : Level & Flow control system).
- Processing of process variables using data acquisition (DAQ).
- Using computer for process control monitoring and analysis (SCADA).



PROCESS CONTROL TRAINER: LEVEL, FLOW AND TEMPERATURE

Model Number: LDA-PP2-A

Educational Objectives:

- Introduction to the fundamentals of process control (open loop, close loop, control response).
- Familiarization with industrial process control components (controllers, transducers, actuators).
- Implementation of controlled variable in an open loop and feed forward control system.
- Implementation of controlled variable in a closed loop control system.
- Application of On/Off controller in a single loop controlled system.
- Investigation of disturbance and control response.
- Application of P, PI and PID control in a single loop controlled system.
- Influence of different control parameters (P, I and D) on stability and control quality.
- Tuning of a PID controller.
- Application of cascade control (Only for LDA-LCP-C : Level & Flow control system).
- Processing of process variables using data acquisition (DAQ).
- Using a computer for process control monitoring and analysis (SCADA).



MULTI PROCESS CONTROL TRAINER: LEVEL, FLOW, TEMPERATURE AND PRESSURE

Model Number: LDA-PCT SERIES

Educational Objectives:

1. Calibration of Level Sensor Elements
2. Calibration of Temperature Sensor Elements
3. Calibration of Flow Sensor Elements
4. Setting up and Demonstrating Open Loop Control (Manual Mode)
 - Investigation of Relationship between Manipulated Variable and Dependent Variable on Level Control Elements
 - Investigation of Relationship between Manipulated Variable and Dependent Variable on Temperature Control Elements
 - Investigation of Relationship between Manipulated Variable and Dependent Variable on Flow Control Elements
 - Investigation of Correlation between Disturbance and Manipulated Variable on Level Process Control
 - Investigation of Radiator / Heat Exchanger
 - Open Loop of Level Control Process
 - Open Loop of Temperature Control Process
 - Open Loop of Flow Control Process
5. Setting Up and Demonstrating Closed Loop Control (Automatic Mode)
 - ON/OFF Level Control
 - ON/OFF Temperature Control
 - ON/OFF Flow Control
 - PID Level Control
 - PID Flow Control
 - Batch Control
6. Troubleshooting
 - Water Float Switch Troubleshooting
 - Heater Troubleshooting
 - Water Flow Sensor 1 Troubleshooting
 - Water Flow Sensor 2 Troubleshooting
 - Process Tank Water temperature Troubleshooting
 - Motorized Proportioning Valve Troubleshooting
 - Radiator Inlet Temperature Troubleshooting
 - Water Fan Cooling Radiator Troubleshooting
 - Radiator Outlet Temperature Troubleshooting
 - Water Pump Troubleshooting



SERIES AND PARALLEL PUMP SET

Model Number: TDS-RPP-Series


LPC-RPP-1 Standard Trainer

LPC-RPP-2 With Data Acquisition System

Educational Objectives:

- This is a self contained unit consisting of two independent sets of centrifugal pumps and a sump tank for water supply.
- Sturdy polypropylene piping with pressure gauges and flow meters at strategic points.
- By manipulating flow control valves, each pump can be operated individually or both pumps connected in series or parallel for measurement of flow rate, head, power input and efficiency at various speeds.
- Plotting of flow rate vs head at various constant speeds for individual pump, and two pumps connected in series or parallel.
- Calculation of power input, output and efficiency at various constant of speeds for individual pump and two pumps connected in series or parallel.



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HYDRAULICS TRAINERS

Model Number: MFT-HDS-1

Educational Objectives:

- Study of fluid power physics.
- Study of flow Controls, directional controls and pressure controls.
- Understanding of basic system design and schematics.
- Familiarization of pumps, check valves, actuators, connectors and conditioning.

PNEUMATICS TRAINERS

Model Number: MFT-PMS-1

Educational Objectives:

- Study of basic physics of pneumatic systems.
- Study of flow controls and directional controls.
- Understanding of basic design and schematics.
- Understanding of air preparation and distribution.
- Familiarization of valves, vacuum, compressors, air dryers, actuators, connectors and conductors.



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LBM - BUILDING MANAGEMENT
AND CONTROL SYSTEMS



FIRE ALARM INSTALLATION KITS

Model Number: LEW-EIK-F

LEW-EIK-F1 Conventional Fire Alarm installation Kit

LEW-EIK-F2 Addressable Fire Alarm installation Kit

Educational Objectives:

- Understanding Conventional Fire Alarm System Components
- Sketching, Wiring And Programming Fire Alarm In Zone 1
- Sketching, Wiring And Programming Fire Alarm In Zone 2
- Sketching, Wiring And Programming Fire Alarm In Zone 3
- Sketching, Wiring And Programming Fire Alarm In Zone 4
- Sketching, Wiring And Programming Fire Alarm For Two Protected Zone Type I
- Sketching, Wiring And Programming Fire Alarm For Two Protected Zone Type II
- Sketching, Wiring And Programming Fire Alarm For Three Protected Zone Type I
- Sketching, Wiring And Programming Fire Alarm For Three Protected Zone Type II
- Sketching, Wiring And Programming Fire Alarm For Three Protected Zone Type III
- Maintenance Testing Procedure Of Three Zone Fire Alarm System
- Follow An Alarm Wiring Type I (Incomplete Wiring)
- Follow An Alarm Wiring Type II (Wrong Connection)
- Follow An Alarm Wiring Type III (Fault Switch)



FIRE ALARM INSTALLATION SYSTEM KIT

Model Number: LEW-EIK-FA

Educational Objectives:

- Introducing and working with fire alarm and Security system
- Understanding technical wiring diagram
- Build alarm and security system according to Wiring diagram
- Testing heat detector circuit and operation
- Testing smoke detector circuit and operation
- Testing sounder circuit and operation
- Testing security circuit including break glass
- Switch, window sensor and motion detector
- Programming alarm control unit
- Commissioning a complete fire alarm and Security system installation



FIRE ALARM TRAINER

Model Number: LLC-FAT-Series

LLC-FAT-1 Conventional

Educational Objectives:

- Familiarization of conventional fire alarm system components
- Basic wiring of the control panel
- Optical smoke detector with siren
- Ionization smoke detector and strobe light
- Heat detector and alarm bell
- Panic button, glass break and alarm buzzer

Watch the video 



FIRE ALARM TRAINER

Model Number: LLC-FAT-Series

LLC-FAT-2 Addressable

Educational Objectives:

- Familiarization of addressable fire alarm system components
- Basic wiring of the control panel
- Optical smoke detector with siren
- Ionization smoke detector and strobe light
- Heat detector and alarm bell
- Panic button, glass break and alarm buzzer



SECURITY ALARM TRAINER

Model Number: LLC-SAT

Educational Objectives:

- Familiarization of Security Alarm System Components.
- Learn Control Panel wiring.
- Programming for Control Panel.
- Familiarization of sensors and signaling installation.
- Familiarization of Window and Door Sensor installation.
- Familiarization of Photo Electric Sensor and smoke detector.
- Optional video phone integration.
- Optional PC interface.



ELECTRONIC CONTROL TRAINER

Model Number: LLC-ECT

Educational Objectives:

- Voltages Measurement
- Operating Transistor As Switch
- Operating IC Im555 as one-shot multivibrator
- Using IC 7473 As Latching Unit
- Condenser Microphone Characteristic
- Pre-Amplifier With One Transistor
- Capacitor As Coupling And Dc Filter
- Operating Sound Controlled Circuit
- Applying IC Lm 555 As Actable Multivibrator
- Comparing dc and pulse signals
- Led As A Transmitter And Photo Transistor As A Receiver
- Analyzing Cascaded Transistor Switch As Pulse To Dc Converter
- Operating Light Controlled Circuit
- SCR As A Solid State Relay
- TRIAC As A Solid State Relay
- Ac Motor As Load On The Trainer
- Comparing Solid State Relay Using SCR and TRIAC



TRAINING SYSTEM FOR DIRECT DIGITAL CONTROL WITH BMS SYSTEM

Model Number: LLC-TPC-1

Educational Objectives:

- Hands-on applications & practice various types of configurations & learn work on programming set up of the units using Honeywell software.
- Understanding the basic operation of Direct Digital Control (DDC) systems for the control of building systems & also in industry for process and plant systems.
- The system comes with the following Application Modules:
 1. Analog Input Module.
 2. Digital Input Module.
 3. Damper/Ventilation Control actuator module.
 4. Thermostat and Temperature Control Module.
 5. Analog Input Simulator Module.
 6. Digital Input Simulator Module.
 7. Analog Output Module.
 8. Digital Output Module.
 9. Monitoring Indicator Light Module.
 10. Fan Control Module.
 11. PIR Detector Module.
 12. Fire alarm module.
 13. Lighting Control Module.



BUILDING MANAGEMENT AND CONTROL SYSTEM

Model Number:

LLC-CBC-1 Commercial Building BMS System Trainer

Educational Objectives:

- Featuring multiple modules that can be stand alone or integrated into one BMS system to simulate total building control.
- Understanding of BEMS software system (Theory and BEMS Supervisor Software).
- Creating a controlled Plant with BEMS Software (Theory and Dashboard Monitoring Software Designing).
- Integration of BEMS system and DDC Controller connected to controlled plants (Data Points Integration to Dashboard Monitoring Software).
- Familiarization of Commercial Building BMS System.
- Familiarization of Addressable Fire Alarm System.
- Familiarization of Video Phone, IP Phone and CCTV Systems.
- Familiarization of Water, Gas, Electricity and HVAC System control and monitoring.
- Familiarization of Residence Lighting and Security System control and monitoring
- Working with Simulation of Energy Metering System
- Creating graphics on energy usage and report.
- Working with graphics and animations on GUI of a Dashboard monitoring screen.
- Understanding the logic programming for various points, data manipulations and control (creating readings for dashboard monitoring).



BUILDING MANAGEMENT AND CONTROL SYSTEM

Model Number:

LLC-AFA-1 Addressable Fire Alarm System Trainer

Educational Objectives:

- Featuring multiple modules that can be stand alone or integrated into one BMS system to simulate total building control.
- Understanding of BEMS software system (Theory and BEMS Supervisor Software).
- Creating a controlled Plant with BEMS Software (Theory and Dashboard Monitoring Software Designing).
- Integration of BEMS system and DDC Controller connected to controlled plants (Data Points Integration to Dashboard Monitoring Software).
- Familiarization of Commercial Building BMS System.
- Familiarization of Addressable Fire Alarm System.
- Familiarization of Video Phone, IP Phone and CCTV Systems.
- Familiarization of Water, Gas, Electricity and HVAC System control and monitoring.
- Familiarization of Residence Lighting and Security System control and monitoring
- Working with Simulation of Energy Metering System
- Creating graphics on energy usage and report.
- Working with graphics and animations on GUI of a Dashboard monitoring screen.
- Understanding the logic programming for various points, data manipulations and control (creating readings for dashboard monitoring).



BUILDING MANAGEMENT AND CONTROL SYSTEM

Model Number:

LLC-CCT-1 Video Phone, IP Phone & CCTV

Educational Objectives:

- Featuring multiple modules that can be stand alone or integrated into one BMS system to simulate total building control.
- Understanding of BEMS software system (Theory and BEMS Supervisor Software).
- Creating a controlled Plant with BEMS Software (Theory and Dashboard Monitoring Software Designing).
- Integration of BEMS system and DDC Controller connected to controlled plants (Data Points Integration to Dashboard Monitoring Software).
- Familiarization of Commercial Building BMS System.
- Familiarization of Addressable Fire Alarm System.
- Familiarization of Video Phone, IP Phone and CCTV Systems.
- Familiarization of Water, Gas, Electricity and HVAC System control and monitoring.
- Familiarization of Residence Lighting and Security System control and monitoring
- Working with Simulation of Energy Metering System
- Creating graphics on energy usage and report.
- Working with graphics and animations on GUI of a Dashboard monitoring screen.
- Understanding the logic programming for various points, data manipulations and control (creating readings for dashboard monitoring).



BUILDING MANAGEMENT AND CONTROL SYSTEM

Model Number:

LLC-SBA-1 Water, Gas, Electricity and HVAC

Educational Objectives:

- Featuring multiple modules that can be stand alone or integrated into one BMS system to simulate total building control.
- Understanding of BEMS software system (Theory and BEMS Supervisor Software).
- Creating a controlled Plant with BEMS Software (Theory and Dashboard Monitoring Software Designing).
- Integration of BEMS system and DDC Controller connected to controlled plants (Data Points Integration to Dashboard Monitoring Software).
- Familiarization of Commercial Building BMS System.
- Familiarization of Addressable Fire Alarm System.
- Familiarization of Video Phone, IP Phone and CCTV Systems.
- Familiarization of Water, Gas, Electricity and HVAC System control and monitoring.
- Familiarization of Residence Lighting and Security System control and monitoring
- Working with Simulation of Energy Metering System
- Creating graphics on energy usage and report.
- Working with graphics and animations on GUI of a Dashboard monitoring screen.
- Understanding the logic programming for various points, data manipulations and control (creating readings for dashboard monitoring).



BUILDING MANAGEMENT AND CONTROL SYSTEM

Model Number:

LLC-SBA-2 Residence Lighting and Security

Educational Objectives:

- Featuring multiple modules that can be stand alone or integrated into one BMS system to simulate total building control.
- Understanding of BEMS software system (Theory and BEMS Supervisor Software).
- Creating a controlled Plant with BEMS Software (Theory and Dashboard Monitoring Software Designing).
- Integration of BEMS system and DDC Controller connected to controlled plants (Data Points Integration to Dashboard Monitoring Software).
- Familiarization of Commercial Building BMS System.
- Familiarization of Addressable Fire Alarm System.
- Familiarization of Video Phone, IP Phone and CCTV Systems.
- Familiarization of Water, Gas, Electricity and HVAC System control and monitoring.
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Watch the video 



KNX-EIB TRAINER

Model Number: LLC-KNX-1

Educational Objectives:

- Wall-embedded sub-distribution box
- Lead-through terminals wired to 4mm safety sockets
- EIB power supply with choke
- EIB-USB interface
- Block of EIB switch actuators
- Block of EIB blind actuators
- EIB lightning conductor terminals
- EIB-bus interfaces
- Block of EIB button/wall switch
- EIB Heating/cooling control
- EIB Information display
- Block of EIB binary inputs

VARIABLE AC/DC POWER SUPPLY



LPS - POWER SUPPLIES AND BENCHESFRAMES





VARIABLE POWER SUPPLIES

Model Number: LPS-VPS

LPS-VPS-5B Variable AC/DC Power Supply

Educational Objectives:

- The variable AC supplies have basic motor control facilities and start/stop controls.
- The three phase supplies have useful output configurations for star and delta connections.
- The power supplies are available either as a basic autotransformer type for general use, Variable AC, Variable DC, Variable AC and DC combined power supplies with outputs ranging from 500 watts to 2000 watts.

PANEL MOUNTING FRAMES AND STORAGE CABINETS FOR ELECTRICAL PANEL TRAINERS

Model Number: LPS-TPF-1

Educational Objectives:

- The mobile frames are mounted onto castor wheels and include a working surface, which is handy for placing test equipment or special modules during experimentation.
- The units have a shelf for storage of panels not in use.
- The bench top frames have strong steel legs for support and stability.



Blending Virtual Learning with the Practical World

Labtech has two main Digital learning Systems which are available for use in the classroom and workshop. Both are designed to enhance the students learning experience and keep track of their progress and assessments. They can be used to extend the learning space into virtual learning for either the Labtech training systems or even generic subject content.

1. Computer Aided Instructional Modules (CAI) Labtech Training Systems - CAI modules are available for all major Automotive training systems. They present all the elements of the student manuals into a media rich e-learning format which incorporates many color photos, illustrations, videos and simulations. The student is led through the courseware on the training system, is given assessments of the theory then proceeds onto the experiments which detail the steps often including videos showing key procedures being performed. It also facilitates the student to enter in his results for review by the teacher. The CAI offers a comprehensive step-by-step program to guide the student through the use of the training system.

2. Flexible Micro Learning Modules to match all curriculums - Labtech's digital micro learning modules are designed as generic topical learning elements which are modular so as to integrate with most school or national curriculums. Each module deals with a distinct single learning topic which is common to most curriculums and provides enhanced learning materials for the student to explore and learn about these topics. They are provided in such a way that they can be used as supplemental learning materials to enhance the learning process or they can be incorporated into the main classroom activities. The content is organized in a systematic way and is easily accessed by the teacher and the students. Each module can be utilized according to the presentation schedule of the teacher so the materials are available when and where they need them.

Contents of the Modules: The modules contain realistic graphic animations and simulations of the topic selected for study. They also have information about the associated theory and science of about the topic, construction of the component, identification exercise for constituent components, illustrations of the operational processes, examples of real industry parts and videos of real systems. An assessment quiz is included which challenges the student about what he has learned. The assessment can guide the student to reflect further on parts of the topic which he may not have mastered. Students can work at their own pace and complete each module in about 20 to 45 minutes.

Subjects Listing:

Packages are available for Basic Automotive, Advanced Automotive, Basic Electronics, Basic Electrical, Electrical Motors, Basic Refrigeration and Air Conditioning, Computer Technology, Network Technology, Basic Mechanical Mechanisms, Renewable Energy (Green Tech) and Biomedical.

Classroom Deployment:

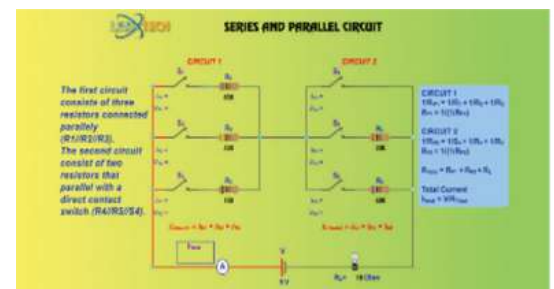
Networked PC Multimedia Lab: It is deployed on a classroom or school server and can be accessed by any PC. The modules are able to be accessed with the Labtech LMS system. The Labtech LMS is designed especially for Vocational and Technical Schools. The LMS content is displayed in a browser and the students and the teachers can log in. Licenses are provided for the whole school for access for the learning materials. The system also works best when the Classroom 21 CMS system is used which helps the teacher to monitor the students and to interact with them during learning.

Tablet Cart Deployment: The system is able to be deployed in a classroom cart configuration. This is a mobile tablet cart equipped with either 20 or 40 Android or Windows tablets, a server, a teacher laptop, the LMS, the CMS and the software preloaded onto the system. This can solution can turn any classroom into e-learning or blended learning environment.

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LLabtech's Virtual TVET interactive digital learning content are designed as self-learning topics that can be used by the teacher or student for self-learning (minimal teacher involvement). The content can now be used online in the Labtech Academy (www.labtech-academy.com). The learning materials or topics are designed to cover from the introduction to electrical fundamentals, instruments and meters, electrical components, power supplies, etc. It also goes onto developing the students' knowledge and skills leading to more advanced or practical studies such as residential and commercial wiring systems, electrical machines and their controls, electrical protection systems, etc.

The virtual learning courses feature interactive animated 3D models of the technical item under study. This can be done in a realistic manner and featuring all the major system and subsystem components. The 3D models are realistic in detail, constructed layer by layer, and "assembled" in its animated format. All the 3D Models can be rotated to view from all sides.

There are over 1000 Knowledge Objects consisting of Background Theory, Component Identification & Descriptions, Assembly & Disassembly, Component Animations, Functional Animations, Assessments - Reference, Identification, and Location, designed to match the different learning styles based on visual and kinaesthetic principles. Electrical Fundamentals provides learners with a thorough understanding of the principles of Electrical components and the technologies behind those components. The content has been designed to meet international training standards (IEEE USA, Malaysian NOSS, and Philippines TESDA etc.) and covers all the requirements that students need to be able to meet those standards.

The learning modules contain numerous activities to allow users to practice their understanding of the principles of the learning modules. This is supported by numerous assessment activities in a number of formats. Designed to work on individually, in teams or as part of classroom exercises or presentations.

For Institutions, Labtech can set up a customized TVET Learning Management System (LMS), which runs on any PC/Laptop/Tablet. Our TVET LMS Institutional system is ideal for running our interactive new generation learning content either on campus or off campus. This version of our system provides more interactions with the teachers and the school can monitor the class and students' progress.

Contact us for a FREE Demo:
info@labtech-academy.com



Watch the video 



Labtech Training Systems are used in over 75 countries world wide and indicated in blue on this map.
We also have 6 regional operational locations marked with a flag .

Labtech Product Areas :

- Air Conditioning and Refrigeration Technology
- Automotive and Transportation Technology
- Biomedical Technology
- Computer & Networks Technology
- Digital TVET Content for Virtual Learning
- Electrical Technology
- Electronics Technology
- Learning Management Systems / Classroom21 CMS
- Renewable Energy and Green Tech
- TVET Learning Management System

Labtech has obtained major Quality Certifications from TÜV Rheinland, Germany:
ISO 9001:2015 Quality Management System



Management System
ISO 9001:2015
www.tuv.com
ID 9105033389



9001 Certification Categories: Research, Assessment, Design and Development of Educational Training Systems, Programs and Products. Manufacturing of Educational Training Systems and Products to International Standards which includes the processes of: Production, Manufacturing Resource Planning (MRP), Quality Control and Assurance (QC/QA), International Sales & Marketing, Project Implementation and Consulting Services, Training Programs and Customer Services.

Batam Office (Main Factory):

PT. LABTECH PENTA INTERNATIONAL
Kawasan Industri Sekupang Kav. 34, Sekupang,
P.O. box 120 Sekupang, Batam - Indonesia 29428
Tel: (62-778) 327781, 327782, 321057, 321330
Fax: (62-778) 321414 E-mail: batam@labtech.org

Singapore (Finance/ Logistics)

E-mail: singapore@labtech.org

Indonesia (Marketing Office)

E-mail: jakarta@labtech.org

Malaysia (Regional Marketing Center)

E-mail: malaysia@labtech.org

Jordan (Middle East Regional Support Center)

E-mail: jordan@labtech.org

India Office

E-mail: india@labtech.org

USA Office

E-mail: usa@labtech.org

UK Office

E-mail: Arnaud@labtech.org