

**Lab-Volt®**



# Mining Industry Technology





# Mining Technology: Workforce-Ready, Hands-On Training

Mining is one of the oldest industries on Earth, and mining operations occur all around the world. Today's mining industry is particularly technologically advanced, and while the minerals mined all around the world vary, today's mining industry workers must all be well-trained in order to operate and maintain some of the largest and most complex machinery found in industry. Improved technical skills ensure improved performance, which in turn, ensures higher productivity.

To answer this need, Lab-Volt Systems, Inc. is proud to lead the way in offering hands-on training programs in Mining Technology. With over 50 years of dedicated industrial training systems development, Lab-Volt continues to be at the forefront of safe, highly-regarded learning environments and the first choice for businesses, teachers, and departments who want the best programs for their trainees and students.

## **REAL-WORLD COMPREHENSIVE TRAINING FOR MINING OPERATIONS**

The mining industry has seen increased efficiency in recent years due to new technologies. Most mining control rooms contain computer-controlled equipment and other advanced technologies, such as lasers and robotics; these new technologies require new skills. As the industry is expanding production, many experienced workers will soon become eligible for retirement, creating more employment opportunities for those with the necessary skills. These opportunities will be best for those with the required technical skills who can work with the new technologies. The work is demanding and requires a thorough knowledge of fluid power, industrial controls, instrumentation and process control, electrical power, and industrial maintenance technologies.

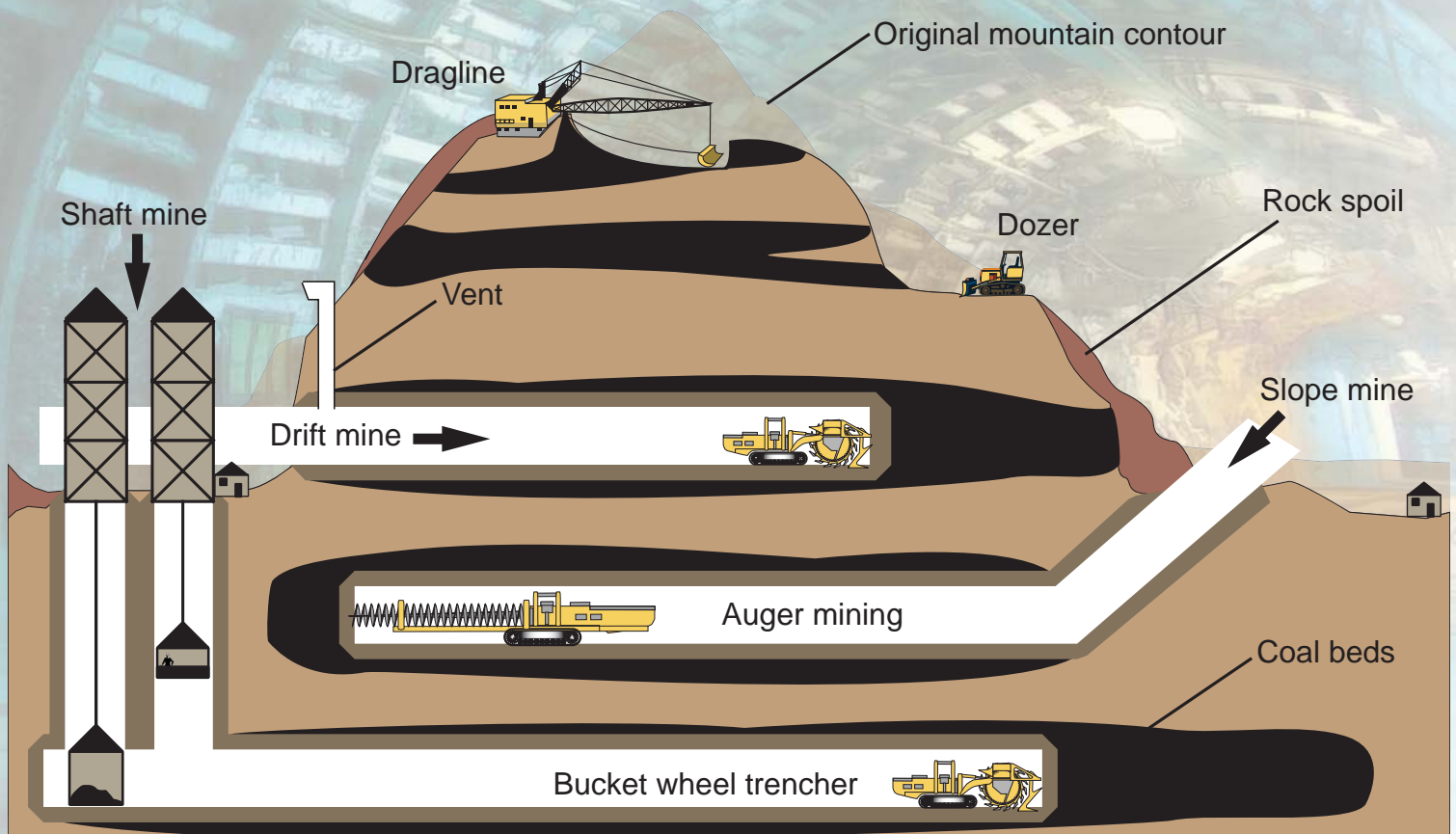
Lab-Volt's Mining Technology program offers comprehensive coverage in all of these areas, as well as cross-technology troubleshooting and problem-solving, preparing trainees for jobs in the mining industry. Lab-Volt's program also incorporates hands-on training using real-world equipment and comprehensive web-based training.



# Lab-Volt®

## MINING INDUSTRY SKILLS COVERAGE

- Mechanical Systems/Industrial Mechanical Systems
- Hydraulics/Mobile Hydraulics
- Pneumatics
- Industrial Controls
- Instrumentation and Process Control
- Industrial Wiring
- Pumps
- PLCs
- Mobile Electrical
- Programmable Logic Controllers (PLC)
- AC/DC Motors and Drives
- Diesel Engines
- Electromechanical Systems





# Industrial Controls

## Industrial Controls Training System, Model 8036

The Lab-Volt Industrial Controls Training System has unique controls training capabilities, which are enhanced by its modularity and its instructor-inserted faults.

The system allows trainees to select and mount control devices to form typical control circuits, and to troubleshoot them once a fault is inserted.

### Topic Coverage

- Electric Motor Control
- Circuit Layout and Specifications
- Basic Control Circuit
- Jogging Control Circuits
- Reduced AC Voltage Starters
- Controls with Electronic Devices
- AC & DC Drive Controls
- PLCs
- Troubleshooting



## Mechanical Training System, Model 46101

The Lab-Volt Mechanical Training System, Model 46101, covers the installation, use, maintenance, and troubleshooting of mechanical drive components.

The list of industrial components includes pulleys, sprockets, gears, various types of belts, single- and multi-strand chains, several types of couplings, shafts, bearings, ball screws, clutches and brakes, and all the components required to assemble the proposed setups.



### Topic Coverage

- Belt Drives
- Chain Drives
- Gear Drives
- Lubrication
- Couplings
- Shaft Alignment
- Bearings
- Linear Bearings
- Ball Screws
- Gaskets and Seals
- Clutches and Brakes
- Laser Alignment
- Vibration Analysis





# Fluid Power Training Systems

## Hydraulics Training System, Model 6080

Lab-Volt offers the most comprehensive and flexible Hydraulics course available. Using the Hydraulics Training Systems, trainees gain a solid foundation in, and hands-on experience with, hydraulic components and circuits, the principles and concepts underlying hydraulic systems and applications, and methods of troubleshooting and testing hydraulic systems.

Each lesson builds upon previous lessons, making this an ideal job-training program.

### Topic Coverage

- Pressure and Force
- Flow Rate and Velocity
- Work and Power
- Cylinders
- Circuits and Valves
- Troubleshooting



## Pneumatics Training System, Model 6081

The Lab-Volt Pneumatics Training System is an innovative, modular system that uses state-of-the-art hardware and courseware to deliver comprehensive training in the principles of pneumatic energy and its control applications. The Pneumatics Training System uses the same workbench and many electrical components of the Hydraulics Training System, Model 6080, providing a convenient interconnection between both systems.



### Topic Coverage

- Basic Physical Concepts
- Basic Controls
- Electrical Concepts
- Functional Systems
- Industrial Applications
- Troubleshooting





# Industrial Technology

## Instrumentation and Process Control, Model 3531

The Lab-Volt Instrumentation and Process Control Training System introduces trainees to a wide range of industrial processes (temperature, pressure, flow, and level) as well as their instruments and control.

The use of modern equipment coupled with a complete training program helps trainees to get the theoretical and practical knowledge that is mandatory to work in the process control sector of the mining industry.

### Topic Coverage

- Temperature
- Pressure, Flow, and Level
- Air – Pressure and Flow
- Optional manuals on a wide range of additional topics are also available



## Pumps Training System, Model 46106

With Lab-Volt's Pumps Training System, trainees learn how to start up, operate, and troubleshoot industrial pumps in different configurations. Maintenance is an essential part of the mining process and requires specific skills. The Lab-Volt Pumps Training System familiarizes trainees with maintenance tasks, such as pump installation, lubrication, shaft alignment, inspection, and component replacement.



### Topic Coverage

- Industrial Pumps
- Installation
- Performance
- Inspection
- Troubleshooting
- Maintenance





# Industrial Technology

## PLCs, Series 3240

The Lab-Volt Programmable Logic Controllers in the Series 3240 enable trainees to develop competence in operating, programming, and troubleshooting modern PLC-controlled systems. Once the training program is completed, trainees should be able to use their freshly acquired knowledge of PLC programming to achieve PLC control of various industrial applications.



## Industrial Wiring Training System, Model 46102



The Lab-Volt Industrial Wiring Training System faithfully reproduces an industrial environment where trainees can develop their skills in the installation and wiring of industrial electrical equipment, in compliance with the National Electrical Code® (NEC®). The system can also be used to teach trainees how to adjust and maintain industrial electrical equipment, as well as enforce the safety rules to be followed when working at industrial sites.

### Topic Coverage

- Enclosures and Conduits
- Electrical Wiring
- Electrical Power Distribution
- AC Motor Drive
- Three-Phase Motor Starters
- DC Motor Drive





# Industrial Technology

## Electromechanical Training System, Model 8010-9



**Computer-Assisted 0.2-kW  
Electromechanical Training System**

Lab-Volt's Electromechanical Training System was developed by educators to satisfy educational requirements for industrial applications of electric power technology. This system covers the fundamental subjects of Lab-Volt's 0.2 kW Electromechanical Training System and Computer-Assisted 0.2-kW Electromechanical Training System. This modern modular instructional program represents an approach to teaching electric power technology through laboratory observations and incorporates various techniques used in industry to generate and use electrical energy.

The system has been designed for low-power (0.2-kW or ¼-hp) educational equipment that enables students to understand and safely operate industrial-type equipment.

### Topic Coverage

- Investigations in Electric Power Technology
- DC Power Circuits
- Permanent Magnet DC Motors
- Single-Phase AC Power Circuits
- Three-Phase AC Power Circuits

- Three-Phase Rotating Machines
- Single-Phase Power Transformer
- Three-Phase Power Transformer Banks



**0.2-kW Electromechanical Training System**



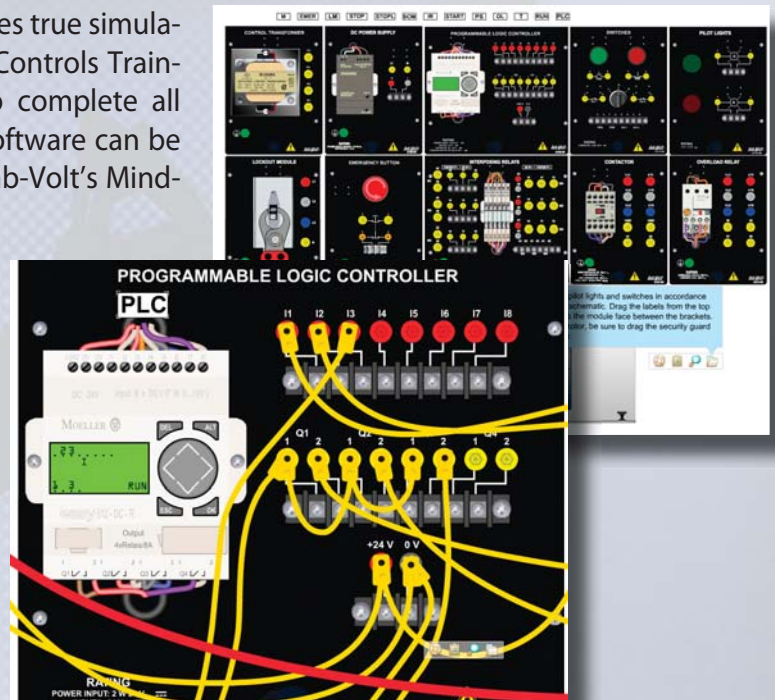
# Simulation Training

## Industrial Controls Simulation Software, Model 3161-H0

Lab-Volt's Industrial Controls Simulation Software features true simulations of the components of the Model 8036, Industrial Controls Training System. The precise simulations allow trainees to complete all exercises at their computers without equipment. The software can be used as a stand-alone product or in conjunction with Lab-Volt's Mind-Sight platform.

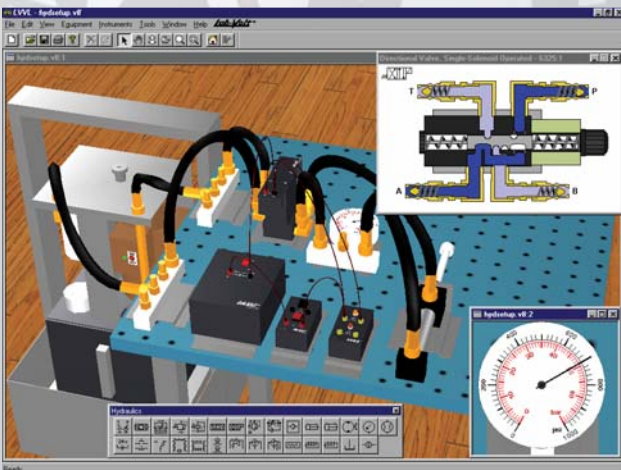
### Topic Coverage

- Basic Controls
- PLCs
- Sensors
- Motor Drives



## Hydraulics Simulation Software, (LVSIM<sup>®</sup>-HYD), Model 6385

LVSIM-HYD is a Windows™-based simulation program that covers the same courseware as the "Hydraulics Fundamentals" and "Electrical Control of Hydraulic Systems" subsystems of the Lab-Volt Hydraulics Training System, Model 6080. LVSIM-HYD enables trainees to install virtual hydraulic equipment in the laboratory, interconnect the equipment, and perform lab exercises. Sophisticated mathematical models fully simulate the mechanical, electrical, and physical characteristics of the actual Lab-Volt hydraulic equipment. This allows trainees working with LVSIM-HYD to obtain the same results as with the real Lab-Volt Hydraulics Training System.



### Topic Coverage

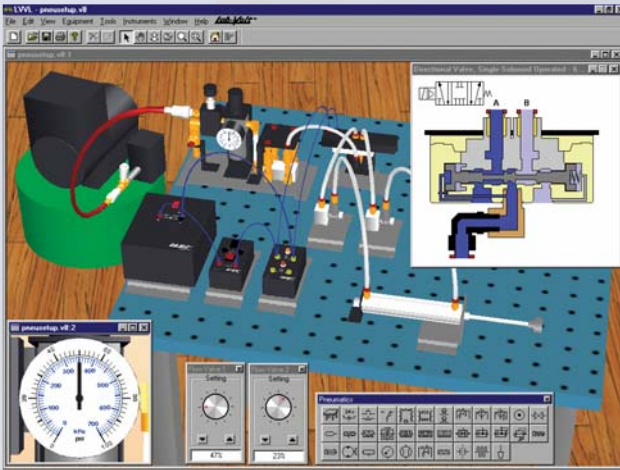
- Hydraulics Fundamentals
- Electrical Control of Hydraulic Systems





# Simulation Training

## Pneumatics Simulation Software, (LVSIM<sup>®</sup>-PNEU), Model 6485



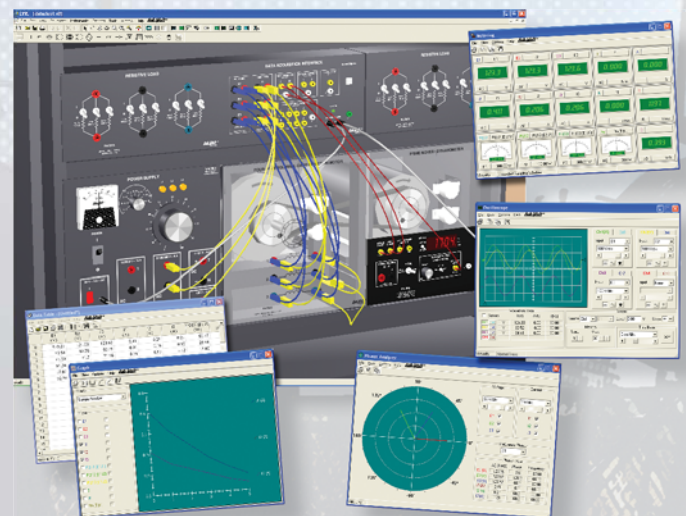
LVSIM-PNEU is a Windows™-based simulation software that covers the same courseware as the “Pneumatics Fundamentals” and “Electrical Control of Pneumatic Systems” subsystems of the Lab-Volt Pneumatics Training System, Model 6081. LVSIM-PNEU enables trainees to install virtual pneumatic equipment in the laboratory, interconnect the equipment, and perform lab exercises. Sophisticated mathematical models fully simulate the mechanical, electrical, and physical characteristics of the actual Lab-Volt pneumatic equipment. This allows trainees working with LVSIM-PNEU to obtain the same results as with the real Lab-Volt Pneumatics Training System.

### Topic Coverage

- Pneumatics Fundamentals
- Electrical Control of Pneumatic Systems

## Electromechanical Systems Simulation Software, (LVSIM<sup>®</sup>-EMS), Model 8970

The Lab-Volt Electromechanical Systems Simulation Software (LVSIM<sup>®</sup>-EMS), Model 8970, is a Windows™-based software that covers the same course work as the Computer-Assisted 0.2-kW Electromechanical Training System, Model 8006. Sophisticated mathematical models fully simulate the electrical and mechanical characteristics of all the actual EMS modules: power supply, motors, generators, transformers, and electrical and mechanical loads. Used either as a complement to the actual EMS laboratory equipment or as a stand-alone product, LVSIM-EMS is a cost-effective learning tool that enables trainees to perform the same exercises as in the Computer-Assisted 0.2-kW Electromechanical Training System, Model 8006, courseware.



### Topic Coverage

- Power Circuits and Transformers
- AC/DC Motors and Generators

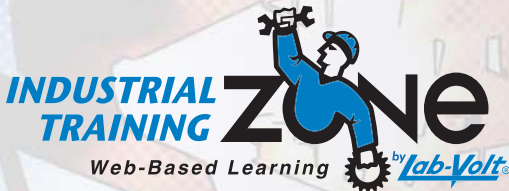
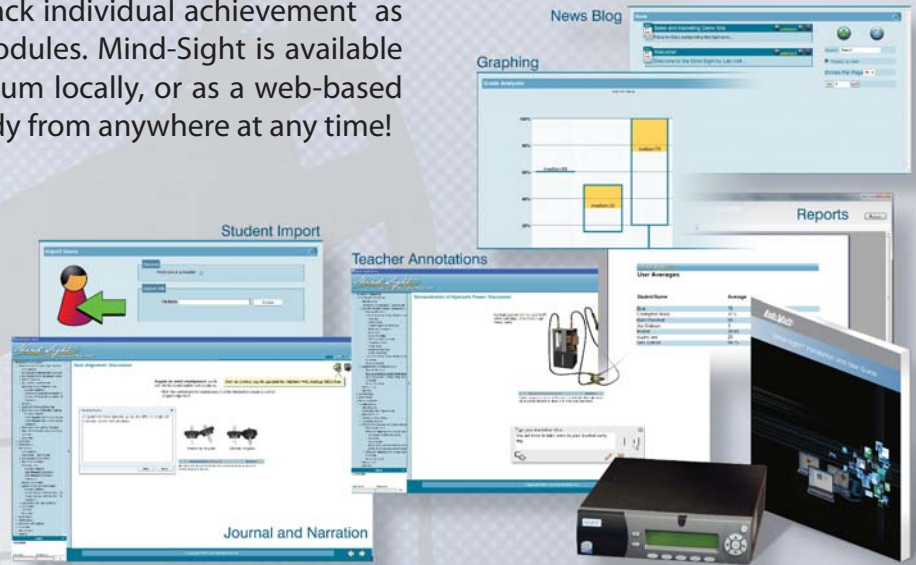


# Online Industrial Training

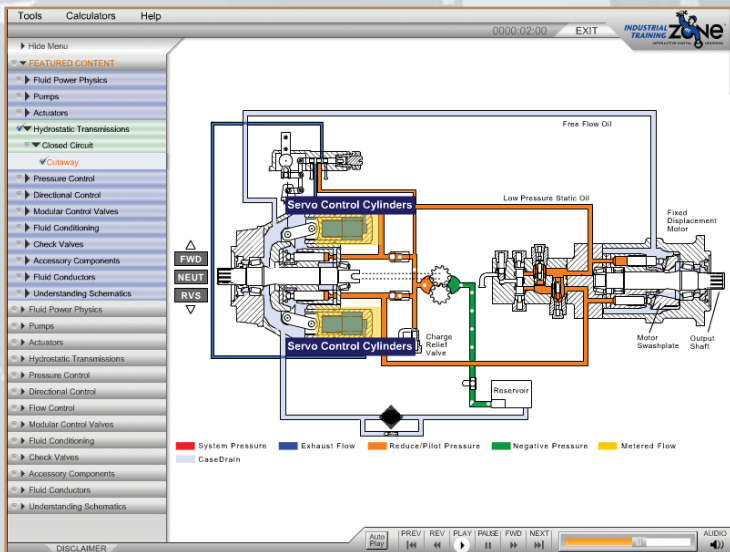


Tracking and management are key to providing an effective and successful learning environment. Lab-Volt's Mind-Sight Learning Management System is a seamless integration of course delivery and classroom management. Designed around the most up-to-date programming standards, Mind-Sight facilitates Lab-Volt's Mining Technology curriculum. Instructors can use Mind-Sight to manage enrollment, schedule learning activities, customize courseware and track individual achievement as students and trainees work through the modules. Mind-Sight is available as a LAN-based solution to deliver curriculum locally, or as a web-based solution so that trainees can log on and study from anywhere at any time!

- SCORM-Compliant Courseware
- Flexible Scheduling Options
- Easy Grade Viewing
- Real-Time Data Collection
- Simple Report Generation
- Competency Testing
- Manual Skill Assessment



Industrial Training Zone by Lab-Volt delivers a broad range of online industrial training courses designed to help you build a more competent, qualified, and efficient workforce. Imagine an industrial training program that delivers powerful training right to your computer – the right content in the right context, comprehensive assessments, and the latest tools to measure performance. Our interface gives you more ways than ever to meet your industrial training needs. ITZ courses are SCORM-Compliant and run in a standards-based Learning Management System (LMS).





# Online Industrial Training

## Mobile Electrical, Model 47907

Mobile Electrical is designed to help trainees understand the fundamental concepts of electrical systems of mobile equipment, including the basic electrical system common to almost all combustion engine vehicles, and how the battery, charging, and starting systems function and interact with each other.

### Topic Coverage

- Electrical Fundamentals
- Circuit Fundamentals
- Circuit Analysis
- Basic Magnetism
- Circuit Components
- Electrical Testers
- Charging and Starting Systems

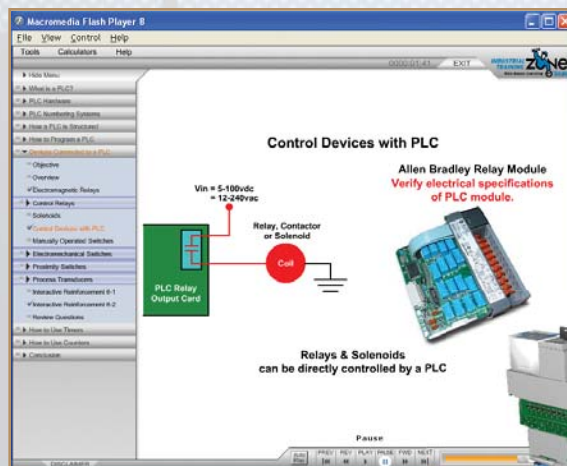
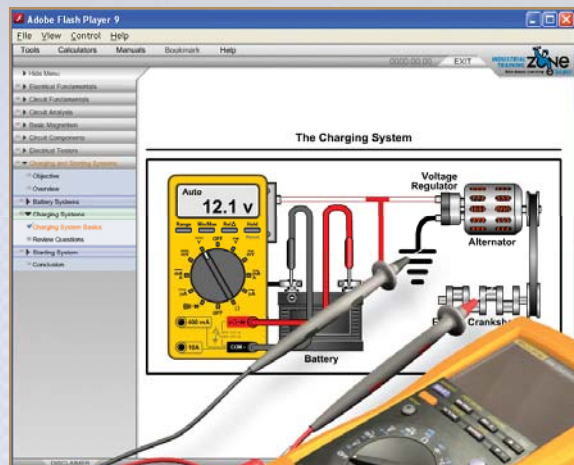
**Course Length:** 15 hours

## PLC Fundamentals, Model 47910

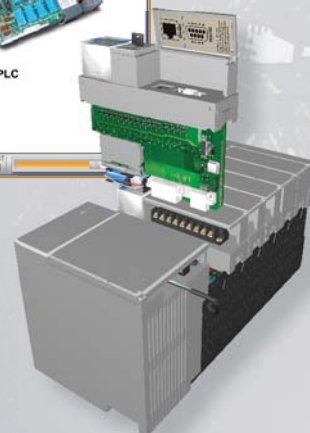
The Programmable Logic Controller (PLC) course explores the hardware, firmware, and software that make a PLC function. The course also examines appropriate PLCs to use for specific purposes, how to connect devices to a PLC, and how to read and write basic PLC ladder-logic software programs.

### Topic Coverage

- What is a PLC?
- PLC Hardware
- How a PLC is Structured
- How to Program a PLC
- Devices Connected to a PLC
- How to Use Timers
- How to Use Counters



**Course Length:** 15 hours





# Online Industrial Training

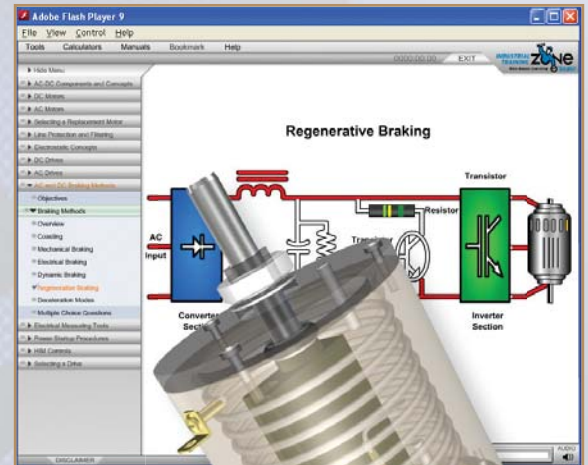
## AC/DC Motors and Drives, Model 47908

AC/DC Motors and Drives is designed to help trainees understand how electrical motors and drives work with each other and other systems. Trainees also learn how to identify and calculate the speed, torque, and horsepower of a motor, how motors and drives operate, how to identify the hardware and firmware involved in motor operation, and safety considerations associated with operating electromechanical systems.

### Topic Coverage

- System Components
- AC/DC Motors
- Replacement Motors or Drives
- Line Protection and Filtering
- Electrostatic Concepts
- AC/DC Drives Hardware
- AC and DC Braking
- Testing the System
- Checking the System
- Using the HIM with the Drive
- Selecting a Drive

**Course Length:** 15 hours



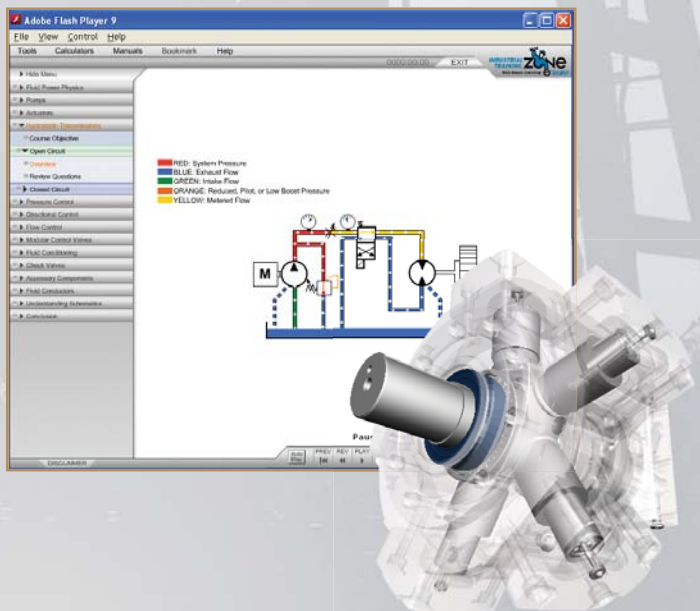
## Mobile Hydraulics, Model 47906

Mobile Hydraulics covers the fundamental concepts of hydraulic systems of mobile equipment as well as the hydraulic components and circuits associated with these systems. Trainees study the basics of hydrostatic transmissions, valves, and maintenance systems common to most combustion engine vehicles.

### Topic Coverage

- Fluid Power Physics
- Pumps
- Actuators
- Hydrostatic Transmissions
- Pressure Control
- Directional Control Valves
- Flow Control Valves
- Modular Control Valves
- Fluid Conditioning
- Check Valves
- Accessory Components
- Fluid Conductors
- Schematics

**Course Length:** 15 hours





# Online Industrial Training

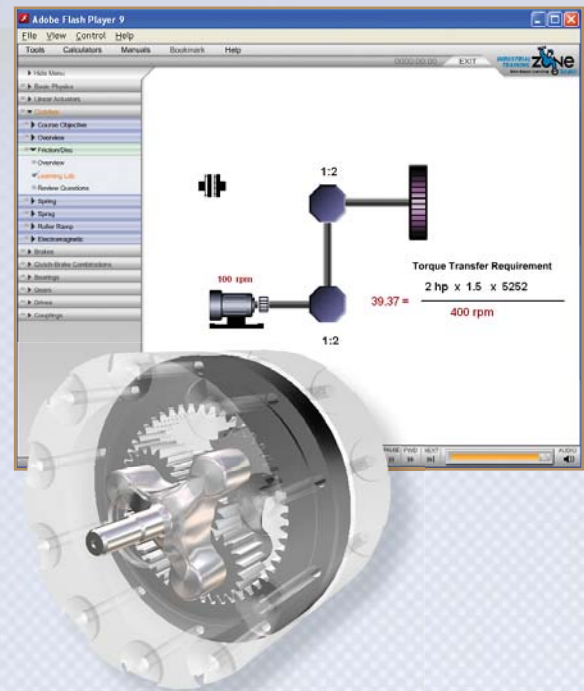
## Industrial Mechanical, Model 47904

This course gives trainees an overview of the basic physics laws, schematics, and systems design associated with mechanical power transmissions. Trainees learn about the various components found in a typical mechanical system, and how these components function and interact with each other.

### Topic Coverage

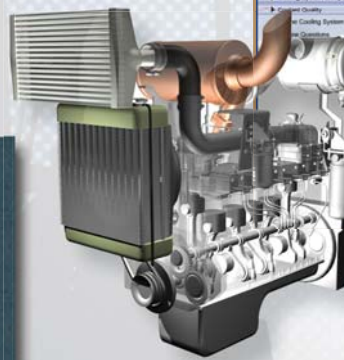
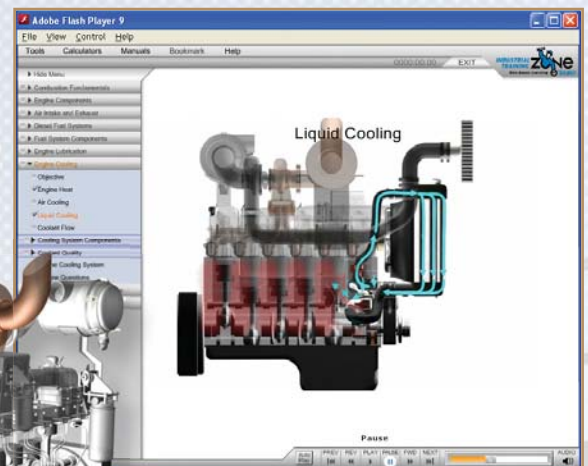
- Basic Physics
- Linear Actuators
- Clutches
- Brakes
- Clutch/Brake Combinations
- Bearings
- Gears
- Drives
- Couplings

**Course Length:** 15 hours



## Diesel Engines, Model 47913

This course begins with combustion fundamentals and a brief history of diesel engines. Trainees then explore the various components of a typical diesel engine and how these components function and interact with each other. The Diesel Engines course also covers fuel pumps, fuel injectors, intake and exhaust systems, engine lubrication and engine cooling systems.



### Topic Coverage

- Combustion Fundamentals
- Engine Components
- Air Intake and Exhaust
- Diesel Fuel Systems
- Fuel System Components
- Engine Lubrication
- Engine Cooling
- Electrical System

**Course Length:** 15 hours





# Custom Solutions

## Turnkey Solutions and Support

No matter where you are located worldwide, Lab-Volt will collaborate with you to determine the best equipment and training programs suitable for your needs, your budget, and your available space. Lab-Volt will then design the lab, install and test the equipment, and train your local instructors



## Training, Testing, Tracking, and Troubleshooting

Ultimately, the Return on Investment for any training in the mining industry comes when technicians are able to apply the skills they have learned to reduce downtime and keep the operation running smoothly.

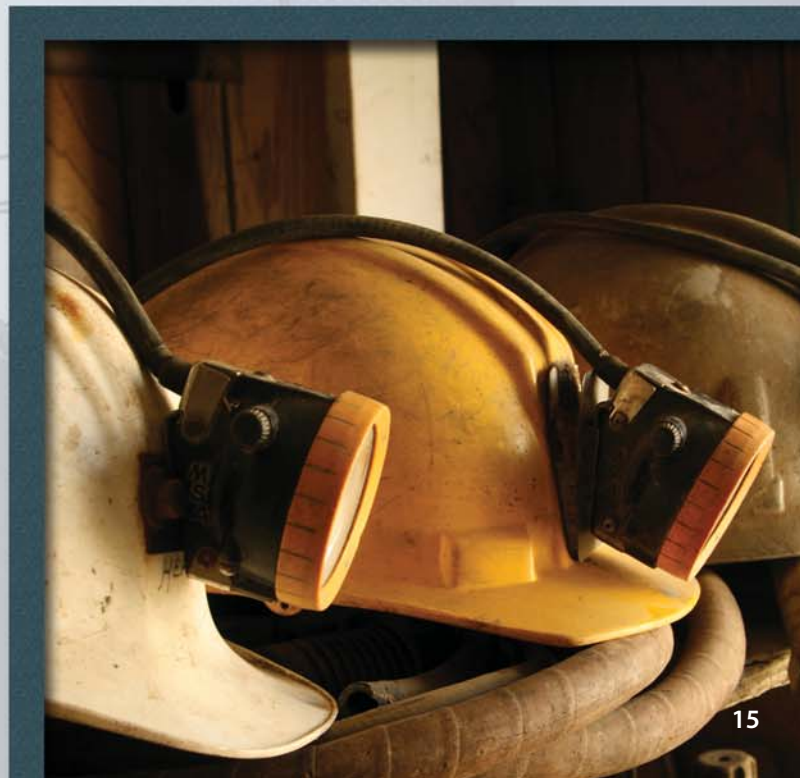
Lab-Volt's blended learning model helps trainees progress from a basic understanding of fundamental principles all the way through advanced troubleshooting. Drawing on Lab-Volt's extensive library of printed and digital curriculum and wide variety of hands-on, faultable training simulators, technicians will be well-prepared for the next, most crucial step... machine-specific troubleshooting!



## Customization and Content

Ask us about our customized, industry and machine-specific learning solutions that help your technicians put this valuable content into real-world context.

Lab-Volt's capabilities include virtual video tours, actual component and system photographs, animated schematics, training and troubleshooting videos, 3-D modeling, industry-specific safety tips, and turnkey mobile training labs. Visit our website at [www.labvolt.com](http://www.labvolt.com) to find your local Lab-Volt Dealer.







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