Making Technology Visible

# ECO-FRIENDLY AIR CONDITIONING & REFRIGERATION TECHNOLOGY

LAB TECH
Knowledge Engineering
ISO 9001


# LABTECH PROFILE

## 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 90 countries worldwide. The technical training systems that LABTECH manufactures are made to International standards of quality and we are ISO9001 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-study. 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, Australia, UK, and India 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 strategic network of industry and technology partners that enables us to expand our product offerings and better align our objectives with developing employable skills. We partner with innovative technology leaders including **Microsoft, Intel**, and **zSpace**. We are active members of **ISTE** (International Society of Technology in Education), **CompTIA** (Computing Technology Industry Association), **IVETA** (International Vocational Education & Training Association), and **Worlddidac**. Additionally, we collaborate with the IMI (**Institute of the Motor Industry**) and produce specialised training systems for **Toyota** and **Schneider Electric**. This comprehensive global network uniquely positions us to meet diverse educational institution needs worldwide.

# Introduction to Labtech's Environmentally Friendly HVAC Training Systems

Air conditioning and refrigeration systems play a crucial role in enhancing comfort at home and in the workplace, as well as safeguarding our food supply through effective preservation. The demand for these systems continues to rise, especially in warmer and tropical regions, making it essential to have skilled technicians who can expertly install, maintain, and repair this vital equipment.

The HVAC industry is experiencing a significant transformation, driven by the shift toward environmentally friendly technologies. As awareness grows about the environmental impact of traditional CFC refrigerants like R11 and R12, there is a pressing need for technicians to be trained in the latest sustainable solutions and in the safe handling and recovery of older refrigerants as well as replacing them with newer alternatives.

Labtech is at the forefront of this transition, offering training systems that align with the latest international standards set by the **Montreal and Kigali Protocols**. Our comprehensive range of trainers covers advanced refrigeration technologies, including systems **utilizing R-290, R-600, $CO_2$, ammonia, and other eco-friendly refrigerants**. Each Labtech training system is designed to equip technicians with the practical skills/knowledge required for today's industry challenges.

In addition to hands-on trainers, we provide interactive eLearning solutions covering a full spectrum of HVAC topics and refrigerant technologies. These resources are ideal for both instructors and students, supporting ongoing assessment, upskilling, and reskilling. Our eLearning programs are particularly effective for professionals seeking to stay current with the latest advancements in environmentally responsible HVAC technologies.

With Labtech's environmentally friendly training systems, you can be confident in preparing the next generation of HVAC technicians to deliver safe, efficient, and sustainable solutions.

**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.
- HVAC Trainers have color-coded piping and graphic diagrams that match the refrigeration cycle to aid in student understanding.
- Special Electronic fault insertion system with test points embedded into the circuit diagram for troubleshooting and fault finding. This provides an invaluable instruction device for troubleshooting & maintenance aspects of the equipment.
- Labtech items utilize 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.

**Digital TVET Content for Virtual Learning and Blended Learning:**

- Many items also have optional digital learning resources with realistic interactive simulations.
- Optional Data Acquisition Systems can facilitate higher level learning.
- 21st Century Learning Platform for blended learning.

# CONTENTS

# RDO - DOMESTIC REFRIGERATION AND AIR CONDITIONING

## R-600A PORTABLE REFRIGERATION TRAINER

### Model Number: RDO-PRT-A

**Educational Objectives:**

- Portable refrigeration system component and function familiarization
- Refrigerant temperature and pressure measurements.
- Plotting Refrigeration Cycle into P-H Diagram and observation of refrigerant thermodynamic properties.
- System Performance Analysis.
- System maintenance and refrigerant charging.

## R-290 SPLIT AIR CONDITIONER TRAINER SINGLE EVAPORATOR, APPROX. 18000 BTU COOLING CAPACITY

### Model Number: RDO-SAC-XP

**Educational Objectives:**

- Familiarization with split air conditioning components.
- To view the internal components of the air-conditioning system through a cut-out openings of the outdoor condensing unit.
- Familiarization with split air conditioning refrigeration cycle.
- To view the change of state of the refrigerant through sight glasses along the external pipe lines.
- To read the change in pressures of refrigerant along the pipelines through the pressure gauges.
- To view the power consumption on the volt and amp meters.
- Remote control functions.
- Representation of the refrigeration cycle into P-H Diagram.
- To view the digital temperature readings on indicator.
- Fault finding and troubleshooting.

# RDO - DOMESTIC REFRIGERATION AND AIR CONDITIONING


## R-32 AIR CONDITIONING TRAINER - INVERTER

### Model Number: RDO-SAC-XE

**Educational Objectives:**

- Design an operation of inverter split air conditioner unit.
- Familiarization with inverter split air conditioner components and functions.
- Operating modes of inverter split air conditioner.
- Remote control functions.
- System performance analysis.
- Effect of varying indoor fan speed.
- Plotting refrigeration cycle into P-H diagram
- Troubleshooting and maintenance of an inverter split air conditioning system.

## R-32 AIR CONDITIONING INSTALLATION TRAINER

### Model Number: RDO-SAP-1X

**Educational Objectives:**

- Familiarization with inverter split air conditioner components and functions.
- Install and uninstall a complete operational inverter split air conditioner unit.
- Cutting, bending, flaring, swaging and soldering.
- Piping installation.
- Wiring installation.
- Evacuating and charging the inverter split air conditioner.
- Troubleshooting and maintenance on inverter split air conditioner system.

# RDO - DOMESTIC REFRIGERATION AND AIR CONDITIONING

## R-600A DOUBLE DOOR DOMESTIC REFRIGERATOR AND FREEZER TRAINER

**Model Number: RDO-RRT-XF**

**Educational Objectives:**

- Understand operational principle of double door domestic refrigerator and freezer
- Measurement of refrigerant pressure and temperature on refrigeration system
- Plotting refrigeration cycle into P-H Diagram and observation of refrigerant thermodynamic properties.
- Defrosting controls
- System performance analysis.
- Troubleshooting exercises on system electrical components.
- System maintenance and refrigerant charging.

## R-600A DOMESTIC DEEP FREEZER (UPRIGHT FREEZER) TRAINER

**Model Number: RDO-DRT-XA**

**Educational Objectives:**

- Domestic Deep Freezer system components and function familiarization.
- Plotting refrigeration cycle into P-H diagram.
- System performance analysis.
- Evacuating and charging refrigeration system.
- Troubleshooting exercises on system electrical components : compressor motor, overload protector, pressure control, fuse, etc.

# RCO - COMMERCIAL REFRIGERATION AND AIR CONDITIONING

## CO2 COMMERCIAL REFRIGERATION SYSTEM TRAINER WITH 2 UNITS HERMETIC COMPRESSOR


### Model Number: RCO-CCR-XD

**Educational Objectives:**

- Familiarization and operational functions of CO2 commercial refrigeration components.
- Plotting refrigeration cycle into Pressure-Enthalpy (P-H) diagram.
- System performance analysis.
- Understand and be familiar with the function of the filter drier and moisture indicator.
- Understand and be familiar with the function of pressure control and be able to do the correct setting.
- Familiar with the characteristics of a heat exchanger and the effect of heat exchanger on the system performance.

## Digital learning Content for CO2 Refrigeration System

### Model Number: RCO-CCR-Series

- Digital learning simulation training unit.
- Digital learning material to teach students on operation and uses.
- Digital learning material to teach students how to do the required maintenance for most common errors and faults.

The Digital content shall be created in 3D using the latest digital creation technology to ensure photo realistic representations. It shall be animated into simulations using the lastest 3D gaming/ simulation technology.

## Digital learning Stage 2 - eLearning for TVET LMS-PC Based

### Model Number: RCO-CCR-EL2

Providing foundational knowledge so the student can familiarize themselves with the machine, its construction, its basic operations. To be installed on Item classroom Servers and access by calss PCs Glossary, Background Theory, Assembly / Disassembly, ID major components and Systems, Basic Operational Simulation and Assessments.





## Digital learning Stage 3 - AR- Augmented Reality - Tablet Based

### Model Number: RCO-CCR-AR3

- Students will be able to view the equipment in AR mode with the tablets, they will be able to launch additional content with the QR code markers embedded into the Classroom poster which shows a detailed view of the equipment.
- Software is to be loaded onto two tablets and also includes a special
- AR Classroom color poster showing the equipment
- AR applications show the simulations and at tributes of the equipment in moderate detail

## Digital learning Stage 4 - VR - Virtual Reality - VR Based

### Model Number: RCO-CCR-VR4

This content will create an immersive environment very much like the labs in the hospitals. The student can visualize and walk around the entire machine and open up key parts to explore the functions, constructions and operation of the units. Some Maintenance and Troubleshooting exercises are included. Software is to be loaded onto two units of VR headsets.


## R-290 MONO BLOCK HEAT PUMP CHILLER TRAINER

### Model Number: RCO-MHC-XA

**Educational Objectives:**

- Familiarization with monoblock heat pump chiller components.
- To view the internal components of the refrigeration system through a cut-out openings of the outdoor condensing unit.
- Familiarization with monoblock heat pump chiller cycle.
- To read the change in pressures of refrigerant along the pipelines through the pressure gauges.
- To view the power consumption on the volt and amp meters.
- Remote control functions.
- Representation of the refrigeration cycle into P-H Diagram.
- System performances analysis.


## R-290 MONO BLOCK VRV/VRF AIR CONDITIONER TRAINER WITH 2 INDOOR UNITS

### Model Number: RCO-SAC-XR

**Educational Objectives:**

- Familiarization with Monobloc VRV/VRF Air Con (Heat Pump) components.
- Familiarization with Monobloc VRV/VRF Air Con (Heat Pump) cycle.
- Plotting refrigeration cycle into Pressure-Enthalpy (P-H) diagram.
- System performances analysis.
- Troubleshooting exercises on system electrical circuit and components: Outdoor fan motor, Thermistor, High Pressure Switch, Low Pressure Switch, Indoor Water Pump, Indoor Fan Motor, Indoor Fuse, etc.

## R-600A COMMERCIAL REFRIGERATION TRAINER

### Model Number: RCO-CRT-XK

**Educational Objectives:**

- Understand operational principle of commercial refrigeration system.
- Measurement of refrigerant pressure and temperature on refrigeration system.
- Understanding and plotting thermodynamic cycle in pressure-enthalpy diagram.
- Calculate the refrigeration capacity from the p-h diagram.
- System performance analysis.
- Troubleshooting exercises on system electrical components.
- System maintenance and refrigerant charging procedure.

## R-290 ICE MAKER TRAINER

### Model Number: RCO-ICM-XA

**Educational Objectives:**

- Demonstrate ice making process and refrigeration cycle of the Ice Maker.
- Familiarization and operational function of each components in the system.
- Able to understand of the function of timer in the Ice Maker unit to control the size of ice cubes.
- Able to understand and be familiar with the function of filter drier and moisture indicator.
- Plotting the refrigeration cycle into Pressure – Enthalpy (P-H) Diagram.
- System performances analysis.

# RCO - COMMERCIAL REFRIGERATION AND AIR CONDITIONING

## R-290 COLD ROOM TRAINER

### Model Number: RCO-SRT-XA

**Educational Objectives:**

- Understand the operational functions of refrigeration and electrical circuits in commercial cold rooms.
- Observe refrigerant state changes in condenser and evaporator.
- Perform evacuation and charging of refrigeration systems.
- Measure refrigerant pressures and temperatures accurately.
- Analyze thermostatic expansion valve performance.
- High pressure control (HPC) and low pressure control (LPC) setting.
- Plotting refrigeration cycle into Pressure – Enthalpy (P-H) diagram.
- System performances analysis.
- Effect of varying load to system performance.
- Electric heater defrosting system.

## R-290 COMMERCIAL SHOWCASE REFRIGERATOR TRAINER

### Model Number: RCO-SCR-XC

**Educational Objectives:**

- Familiarization and operational functions of show case refrigeration circuit components.
- Evacuating and charging show case refrigeration system.
- Measurement of refrigerant pressures and temperature.
- Observation of expansion device performance.
- Understanding and plotting thermodynamic cycle in pressure-enthalpy diagram.
- Calculate the refrigeration capacity from the p-h diagram.
- Calculate the coefficient of performance.

# RCO - COMMERCIAL REFRIGERATION AND AIR CONDITIONING

## R-600 BASIC COMMERCIAL REFRIGERATION DISPLAY TRAINER

**Model Number: RCO-CRD-XA**

**Educational Objectives:**

- Identify and explain the components and their functions in a commercial refrigeration system.
- Understand and demonstrate the refrigeration cycle operation.
- Measurement of refrigerant pressures and temperatures.
- Observation of thermostatic expansion valve and capillary tube expansion device performance.
- Understanding and plotting thermodynamic cycle in pressure-enthalpy diagram.
- Calculate the refrigeration capacity from the p-h diagram.
- System performance analysis.

# RAC - AIR & CONDITIONING REFRIGERATION CONTROL

## R-290 REFRIGERATION ELECTRICAL CONNECTION TRAINER

**Model Number: RAC-ECC-XP**

**Educational Objectives:**

- Familiarization with electrical components for compressor starting.
- Read, understand, wire and test electric circuit diagrams for refrigerant compressors.
- Understand function and behaviour of electrical components.
- Design and operation of electrical components of refrigerant compressors (start-up capacitor, start-up relay, overheat protection, automatic fuse, pressure switch, thermostat).
- Design and testing of a safety chain.
- Representation methods in electrical engineering (symbols, circuit diagrams).
- Safety aspects when handling mains voltage.

# RBA - BASIC REFRIGERATION AND AIR CONDITIONING

## ABSORPTION REFRIGERATION TRAINER MOBILE TYPE - AMMONIA REFRIGERANT

### Model Number: RBA-ART-A

**Educational Objectives:**

- Familiarization of absorption refrigeration system and its main components.
- Demonstrate the working principle of absorption refrigeration system.
- Absorption refrigeration system operation with electric heater.
- Absorption refrigeration system operation with gas flame.


## Digital learning Content for NH3 Ammonia Refrigeration System

### Model Number: RBA-ART-Series

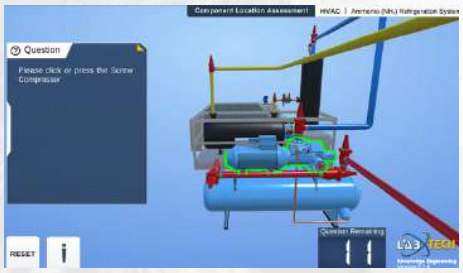
- Digital learning simulation training unit.
- Digital learning material to teach students on operation and uses.
- Digital learning material to teach students how to do the required maintenance for most common errors and faults.

The Digital content shall be created in 3D using the latest digital creation technology to ensure photo realistic representations. It shall be animated into simulations using the lastest 3D gaming/ simulation technology.

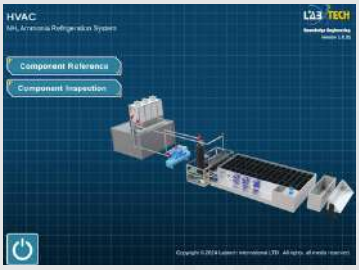
## Digital learning Stage 2 - eLearning for TVET LMS-PC Based

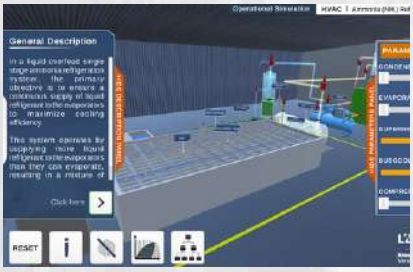
### Model Number: RBA-ART-EL2

Providing foundational knowledge so the student can familiarize themselves with the machine, its construction, its basic operations. To be installed on Item classroom Servers and access by calss PCs Glossary, Background Theory, Assembly / Disassembly, ID major components and Systems, Basic Operational Simulation and Assessments.








## Digital learning Stage 3 - AR- Augmented Reality - Tablet Based

### Model Number: RBA-ART-AR3

- Students will be able to view the equipment in AR mode with the tablets, they will be able to launch additional content with the QR code markers embedded into the Classroom poster which shows a detailed view of the equipment.
- Software is to be loaded onto two tablets and also includes a special
- AR Classroom color poster showing the equipment
- AR applications show the simulations and at tributes of the equipment in moderate detail

## Digital learning Stage 4 - VR - Virtual Reality - VR Based

### Model Number: RBA-ART-VR4

This content will create an immersive environment very much like the labs in the hospitals. The student can visualize and walk around the entire machine and open up key parts to explore the functions, constructions and operation of the units. Some Maintenance and Troubleshooting exercises are included. Software is to be loaded onto two units of VR headsets.

## R-290 GENERAL CYCLE REFRIGERATION AND AIR CONDITIONING TRAINER

### Model Number: RBA-GCR-XA

**Educational Objectives:**

- Familiarization and operational functions of refrigeration circuit components.
- Evacuating and charging refrigeration system.
- Measurement of refrigerant pressures and temperatures.
- Observation of thermostatic expansion valve and capillary tubes performance.
- Understanding and plotting thermodynamic cycle in pressure-enthalpy diagram.
- Calculate the refrigeration capacity from the p-h diagram.
- Calculate the coefficient of performance.
- Calculate the efficiency of the compressor.
- Thermostatic valve superheat.


## R-290 AUTOMATED SINGLE-STAGE REFRIGERATION TRAINER

### Model Number: RBA-STR-XA

**Educational Objectives:**

- The operation principles of main components of the refrigeration unit.
- Practical skills in the operation and maintenance of automated small refrigeration systems.
- Handling equipment during repair and commissioning.
- Procedure of pressure testing, vacuuming and charging the refrigerant.
- Performing analysis.
- Identification of operating modes.
- Simulation and identification of emergency situations.

# HC - AUTOMOTIVE AIR CONDITIONING

## AUTO AIR CONDITIONER TRAINER WITH R-1234YF (AFTER MARKET TYPE)

**Model Number: HC-AC1-TX**

**Educational Objectives:**

- Automotive air-conditioning components function and operation.
- Testing air-conditioning system performance using temperature and pressure measurement.
- Introduction to automotive air-conditioning servicing.
- Leak testing an air conditioning system.
- Air conditioning components servicing.
- Inspect air-conditioning condenser for air flow restriction.
- Electrical compressor controls.
- Removing A/C compressor belts and pump.
- Evacuate and charge A/C system.
- Diagnose A/C system conditions faults and determine necessary action.

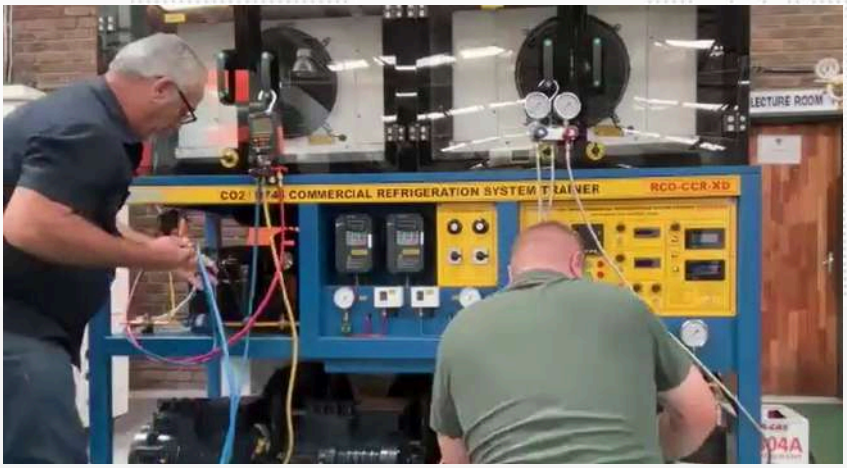
## AUTOMOTIVE ELECTRICAL DRIVE AIR CONDITIONING TRAINER WITH R-1234YF

**Model Number:**
**HC-AC4-TF Trainer With PTC HEATER TYPE**
**HC-AC4-TG Trainer With HEAT PUMP TYPE**

**Educational Objectives:**

- Familiarization and operational functions of automotive A/C system.
- Measurement of refrigerant pressures and evaporating temperatures.
- Climate control operation in automotive A/C system.
- Cabin air distribution.
- Observation of thermostatic expansion valve performance.
- Understanding and plotting thermodynamic cycle in pressure-enthalpy diagram
- Calculate the refrigeration capacity from the p-h diagram
- Calculate the coefficient of performance
- Calculate the efficiency of the compressor
- Leak testing an air conditioning system.
- Evacuating and charging automotive A/C system.
- Diagnose A/C system conditions that cause faults/problems and determine necessary action.
- Troubleshoot A/C system components (condenser fan motor, blower fan motor, electronic circuit, sensors etc) that cause faults/problems and determine necessary action (Optional Item).

# INSTALLATION & TRAINING





# LABTECH DIGITAL CONTENT FOR TVET

## 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 with the software preloaded onto the system. This can solution can turn any classroom into a e-learning or blended learning environment.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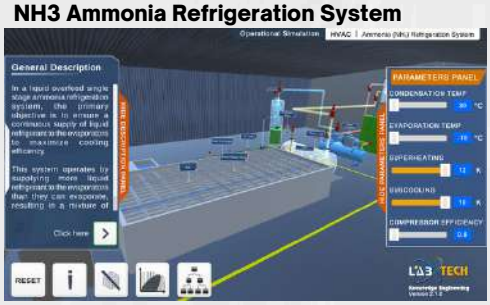
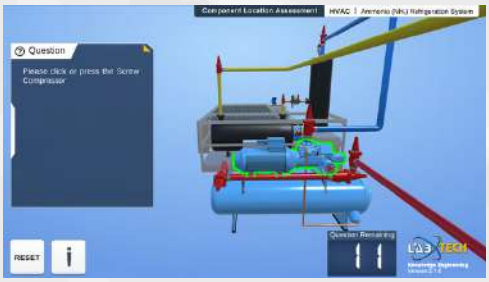
**CO2 Refrigeration System**




**NH3 Ammonia Refrigeration System**




## SMART CLASSROOM FOR INTERACTIVE DIGITAL LEARNING

## SMART TECH LAB

## VR Learning Systems – A Prime tool for Industry 4.0

Virtual Reality has been a hit with the gaming community, but it is also a serious tool for learning as well. It is perfect for immersive learning situations such as realistic simulators for teaching operational skills on large and expensive equipment such as aircraft, marine vessels and heavy equipment. At Labtech we are using this tool to create new types of learning experiences that will enhance the learning process by using the unique characteristics of VR for immersive learning.




Labtech has become a leading developer of Virtual Reality VR and Mixed Reality MR learning applications. We have ensured that all of our 3D Learning Modules and Knowledge Objects are able to be imported and programmed within the virtual reality environment. As such, we can quickly reformat the content and transfer it over into VR/MR systems as demand increases. This will be a program that will be of increasing importance to education over the next few years as more VR/MR learning centers are set up.

These would all be good candidates. Also, it is a good use of VR/MR when the safety of the learner is at issue. VR/MR is a great way to learn and to make mistakes without getting hurt and for experiencing larger industrial installations.

# AR and MR Learning Systems – A Prime tool for Industry 4.0

AR and MR allows us to introduce digital learning and mix it with our physical and real surroundings. It has great potential for training and is already being used by industry particularly in the service sector and for guidance of various activities. Industry is using it to project expert real time assistance to remote technicians, to provide guidance on servicing tasks and to monitor complex processes and systems. Labtech is working hard on bringing thistechnology to the TVET classrooms so that we can learn in the same way that we will work for Industry 4.0.


Labtech is able to develop Virtual Reality learning applications and is currently working on creating new learning strategies that are complementary to this technology. We have ensured that all of our 3D Learning Modules and Knowledge Objects are able to be imported and programmed within the augmented reality environment. As such we can quickly reformat the content and transfer it over into AR and MR systems as demand increases.

AR and MR technology, we believe, is going to be very useful in the classroom and in the workplace. It will become anincreasingly more powerful tool that allows students to transform their learning experience in several ways.

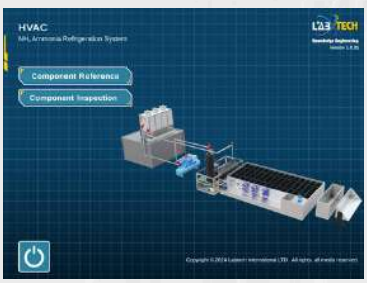
- Interaction with real training systems
- Guidance in tasks
- Building Real Skills

## Operational Simulation

### AR - CO2 Refrigeration System



### AR - NH3 Ammonia Refrigeration System





# LABTECH ACADEMY - HVAC COURSES

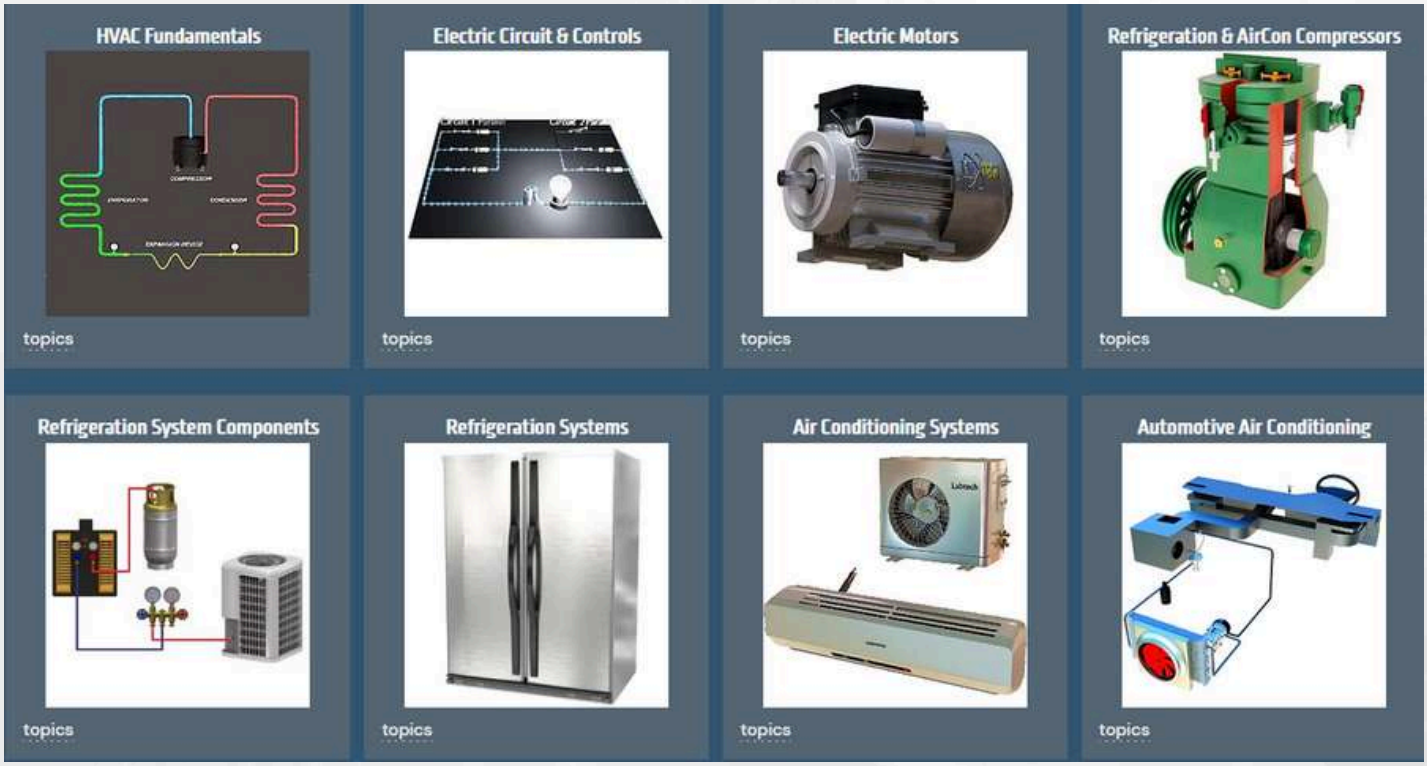
Labtech's Virtual TVET interactive digital learning content are designed as self- paced topics that can be used by the teacher or student for independent learning (minimal teacher involvement). The content can now be used online in the Labtech Academy (**www.labtech-academy.com**). The learning materials or topics are designed to cover from the introduction to HVAC fundamentals, electrical controls and components, instruments and meters, electric motors, HVAC components, etc. It also goes onto developing the students' knowledge and skills leading to more advanced or practical studies such as residential and commercial air conditioning and refrigeration systems, automotive air conditioning, 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 (ASHRAE 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

LABTECH Academy

Watch the video


Labtech Training Systems are used in 100 countries worldwide through our 6 regional offices 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 TUV Rheinland, Germany:
ISO 9001:2015 Quality Management System

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

**ISO09001 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.

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