REFRIGERATION SOLUTIONS

Ver: 02

ETEK Total equipment solution

The training program is built according to levels of knowledge and skill development from low to high

Basic refrigeration training system

- Learn basic refrigeration system theory and principles
- Learn the basic parameters of the refrigeration system
- Calculate the refrigeration system

Residential and commercial refrigeration training system

- Learn about equipment, refrigeration principles, and electrical principles of residential refrigeration
- Fix common errors
- Maintenance, matintenance equipment

Residential air conditioning training system

- Use tools
- Installation standards
- Installation process
- Post-installation inspection procedure

Industrial refrigeration training system

- Refrigeration equipment in industrial
- Device control diagram, refrigeration diagram
- Maintain refrigeration equipment

Central air conditioning training system

- Principle and application of central air conditioning system
- Calculation and selection of refrigeration systems and wind systems
- Control and monitoring system
- System maintenance

BASIC REFRIGERATION TRAINING ROOM

ROOM FUNCTION:
Basic cold practice

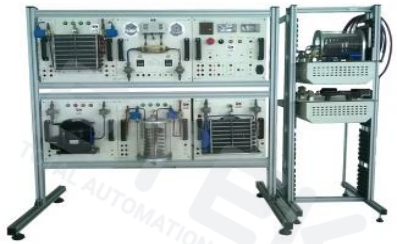
- Learn about the types of compressors used in practice
- Refrigeration principles, heat exchangers, equipment in refrigeration systems
- Basic calculation through software
- Practice theoretical testing, change different refrigeration components

=> Helps students understand basic refrigeration principles, basic refrigeration components, parameters to pay attention to in the refrigeration system and the effects of the system when parameters change

1. Electrical components of refrigeration system distributed layout model

2. Basic Refrigeration training system model

3. Compressor Cutaway



4. Refrigeration principles training set

5. Basic refrigeration model with water-cooled condenser

6. Basic Refrigeration training system model with tube heat exchanger

1. Electrical components of refrigeration system distributed layout model

TRAINING CONTENT:

- Practice identifying electrical and automation components in the refrigeration system, and understanding their functions and roles
- Practice understanding the principles of electrical wiring diagrams
- Practice operating the system
- Practice vacuuming and refrigerant charging
- Practice checking compressor operation
- Practice identifying and troubleshooting overcharging or undercharging of refrigerant using the training model
- Practice identifying and troubleshooting common system faults

2. Basic Refrigeration training system model in compact table version

TRAINING CONTENT:

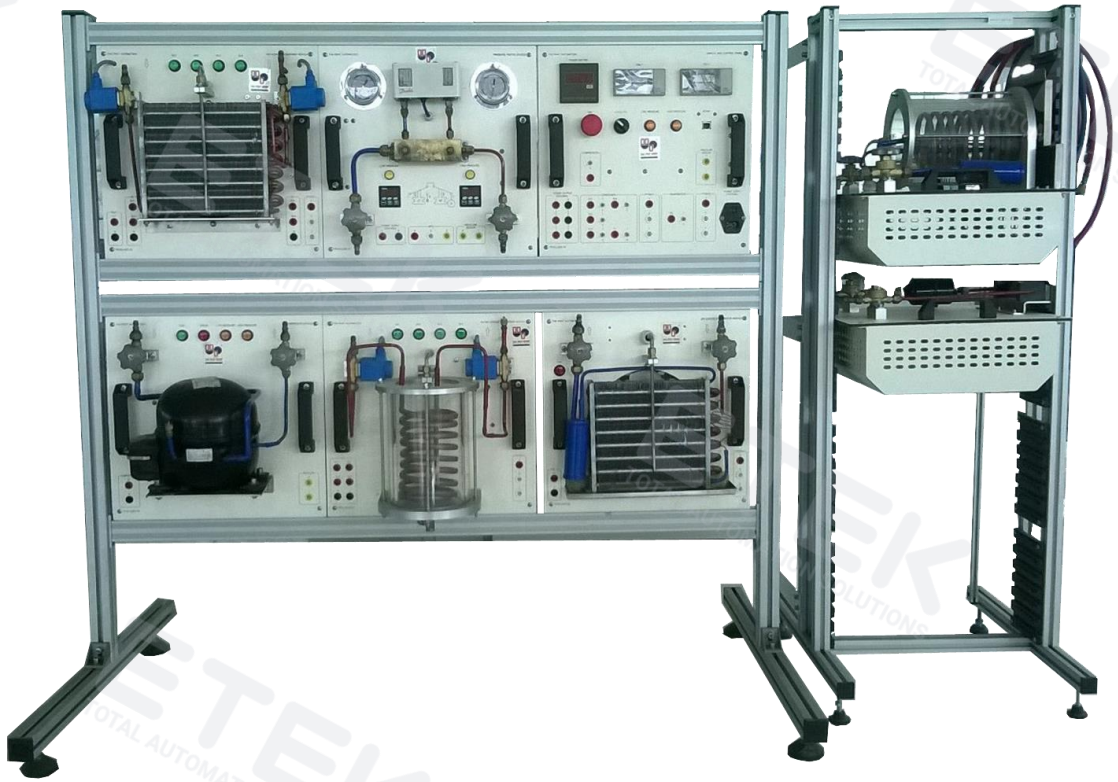
- Use tools for electrical and refrigeration installation and repair.
- Learn about the change in state of the refrigerant during the cycle
- Assemble and operate modules into a refrigeration system with forced condensation and evaporation by wind and water
- Fill oil, test tightness, test durability of refrigeration system piping system.
- Fill gas into the system

3. Compressor Cutaway

TRAINING CONTENT:

- Classify types of refrigeration compressors commonly used in refrigeration systems
- Observe the internal structure and learn the working principles of each type of compressor in the model
  + Hermetic Rotary Compressor
  + Semi-hermetic Compressor
  + Scroll Compressor
  + Reciprocating Hermetic Compressor

4. Refrigeration principles training set



TRAINING CONTENT:

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- Assemble and operate modules into a refrigeration system with forced condensation and evaporation by wind and water
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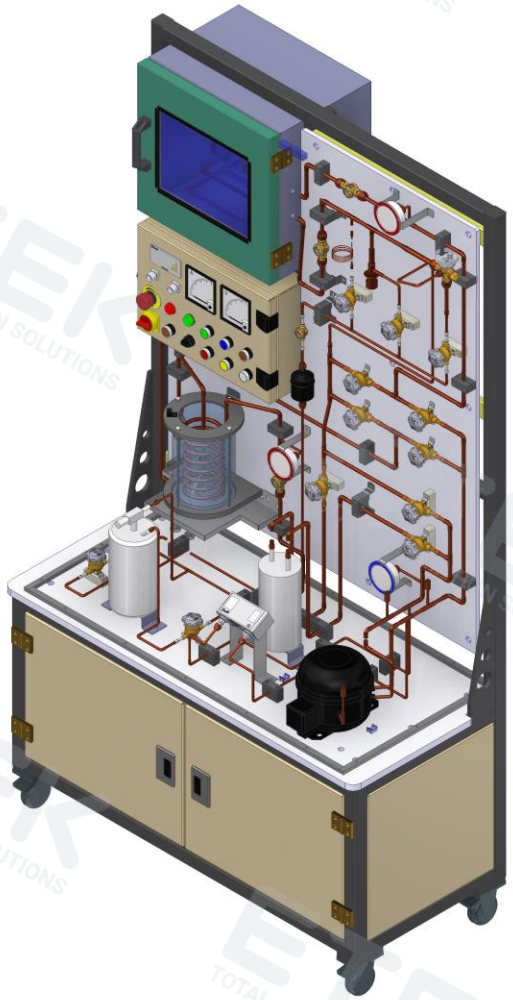
- Fill gas into the system

5. Basic refrigeration model with water-cooled condenser



TRAINING CONTENT:

- Learn the principles of refrigeration system with water-cooled condenser.
- Practice theory, change different refrigeration components
- Learn the main components of a refrigeration system, the change in state of refrigeration system refrigerant gas as it passes through the elements.
- Get familiar with pressure gauges, temperature gauges, and throttle elements

6. Basic Refrigeration training system model with tube heat exchanger

TRAINING CONTENT:

- Introduction to equipment, familiarization with components and the refrigeration cycle
- Drawing the P-H (Pressure-Enthalpy) diagram
- Energy balance at the evaporator and condenser
- Calculating the overall heat transfer coefficient for the evaporator and condenser
- Observing and evaluating the effects of load variation

RESIDENTIAL AND COMMERCIAL REFRIGERATION TRAINING ROOM

ROOM FUNCTION:

Practice residential and commercial refrigeration

- Training on electrical principles and refrigeration principles of residential refrigeration equipment
- Find errors, causes of equipment failure, and errors related to refrigeration
- Repair and maintenance of equipment
- Replace components and run tests

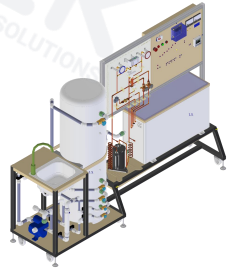
1. Residential freezer components' distributed layout model

2. Residential refrigerator components' distributed layout model

3. Direct Refrigerator components' distributed layout model

4. Inverter Refrigerator components' distributed layout model

5. Mini ice cubes maker components' distributed layout model



6. Heat pump system model for hot water production

1. Residential freezer components' distributed layout model

TRAINING CONTENT:

- Practice learning the operating principles and structure of the parts in the freezer
- Learn the control circuit of freezer functional blocks.
- Practice measuring and checking equipment to ensure safety before operating the model.
- Practice measuring and repairing common damages of equipment used in the model.
- Practice vacuuming and filling with gas.

2. Residential refrigerator components' distributed layout model

TRAINING CONTENT:

- Practice learning the operating principles and structure of the components in the refrigerator
- Learn the control circuit of the refrigerator function blocks
- Practice measuring and checking the equipment to ensure safety before operating the model.
- Practice measuring and repairing common damages of the equipment used in the model.
- Practice vacuuming and gas charging.

3. Direct Refrigerator components' distributed layout model

TRAINING CONTENT:

- Practice learning the principles of the components in a direct refrigerator
- Practice learning the principles of the direct refrigerator's operation
- Practice learning the electrical circuit of a direct refrigerator
- Practice vacuuming and charging the system with gas
- Practice balancing the capillary tubes for the refrigerator
- Practice running the refrigerator with 3 capillary tubes of different lengths
- Practice measuring and checking electrical equipment to ensure safety before operating the model
- Practice measuring and repairing common failures of equipment used in the model

4. Inverter Refrigerator components' distributed layout model

TRAINING CONTENT:

- Practice understanding the principles of structure of components in indirect refrigeration (inverter)

Practice learning the operating principles of indirect refrigeration (inverter)

- Practice electrical connection of equipment
- Practice measuring and checking electrical equipment to ensure safety before operating the model
- Practice filling gas
- Practice weighing cables for capillary tubes
- Practice learning how refrigerators operate when there is too much gas
- Practice learning how refrigerators work with capillaries of different lengths
- Practice measuring and repairing common failures of equipment used in the model: fan failures, sensors, clogged filters

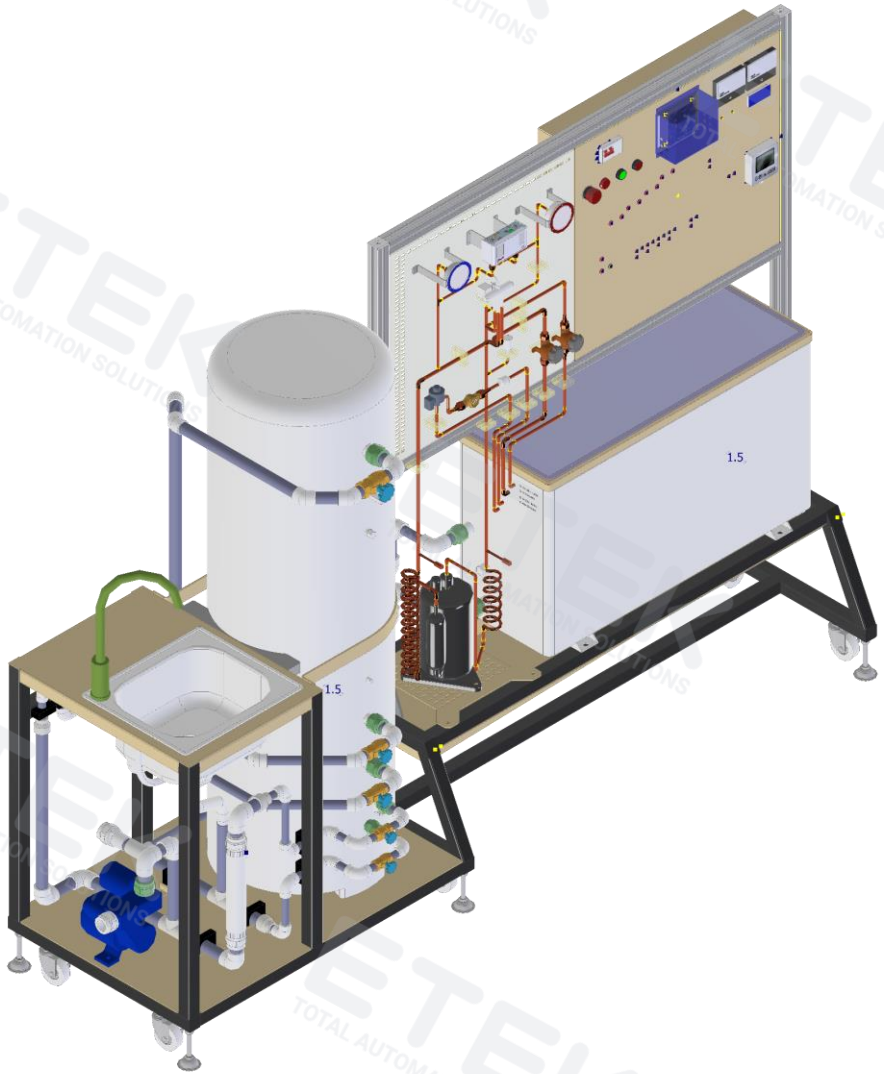
5. Mini ice cubes maker components' distributed layout model

TRAINING CONTENT:

- Practice understanding the structural principles of the parts in a mini ice machine
- Practice learning the principles of operation
- Practice measuring and checking electrical equipment to ensure safety before operating the model
- Practice filling gas
- Practice measuring and repairing common damages of equipment used in the model
- Accompanying technical documents:

+ Instructions for use and maintenance of equipment
+ Practical guidance documents

6. Heat pump system model for hot water production



TRAINING CONTENT:

- Practice identifying components of the refrigeration, electrical, and water systems in an industrial water heater-cooler
- Practice operating and adjusting devices on the training model
- Practice troubleshooting the refrigeration system
- Practice troubleshooting the electrical system
- Practice simulating faults, basic fault detection, and repair

RESIDENTIAL AIR CONDITIONING TRAINING ROOM

ROOM FUNCTION:

- Training on installation of all types of air conditioners
- Practice skills in using tools
- Training on installation standards and post-installation inspection standards

1. Air conditioner model (Cooling only Inverter air conditioner)

2. Air conditioner model (cooling/heating Inverter air conditioner)

3. Air conditioner model (standing cabinet air conditioner)

4. Air conditioner model (multi air conditioner)

5. Cabin for installs air conditioners

1. Air conditioner model (Cooling only Inverter air conditioner)

TRAINING CONTENT:

- Practice understanding the structural principles of components in an Inverter air conditioner - only cools
- Learn the operating cycle of Inverter air conditioner - only cools
- Learn about the control circuit and functional blocks to understand the common causes of air conditioner errors
- Learn the working conditions of local air conditioners
- Practice identifying functions and tasks of equipment for installation, operation, and repair of equipment
- Practice learning about inverter compressors, check the operation of the compressor
- Practice analyzing electrical circuits and electrical connections
- Practice vacuum filling gas
- Practice measuring and testing the running parameters of the model
- Practice common errors and how to fix them

+ Error of gas shortage or excess
+ Error of gas shortage or excess
+ Error of indoor unit sensor
+ Error of outdoor unit fan
+ Error of clogged capillary tube or broken throttle valve
+ How to look up error codes from the remote control, control modes

2. Air conditioner model (cooling/heating Inverter air conditioner)

TRAINING CONTENT:

- Practice understanding the structural principles of components in cooling/heating Inverter air conditioners
- Learn the operating cycle of a cooling/heating Inverter air conditioner
- Learn about the control circuit and functional blocks to understand the common causes of air conditioner errors
- Learn the working conditions of local air conditioners
- Practice identifying functions and tasks of equipment for installation, operation, and repair of equipment
- Practice learning about inverter compressors, check the operation of the compressor
- Practice analyzing electrical circuits and electrical connections
- Practice vacuum filling gas
- Practice measuring and testing the running parameters of the model
- Practice common errors and how to fix them

+ Error of gas shortage or excess
+ Error of gas shortage or excess
+ Error of indoor unit sensor
+ Error of outdoor unit fan
+ Error of clogged capillary tube or broken throttle valve
+ Error of reversing valve

How to look up error codes from the remote control, control modes

3. Air conditioner model (standing cabinet air conditioner)

TRAINING CONTENT:

- Practice understanding the structural principles of components in 2-way cabinet-style air conditioners
- Learn the operating cycle of air conditioning
- Learn about the control circuit and functional blocks to understand the common causes of air conditioner errors
- Understand the phenomenon, judge and correct errors arising in the model
- Practice measuring and repairing common damages of equipment used in the model
- Practice filling gas
- Accompanying technical documents:

+ Instructions for use and maintenance of equipment
+ Practical guidance documents

4. Air conditioner model (multi air conditioner)

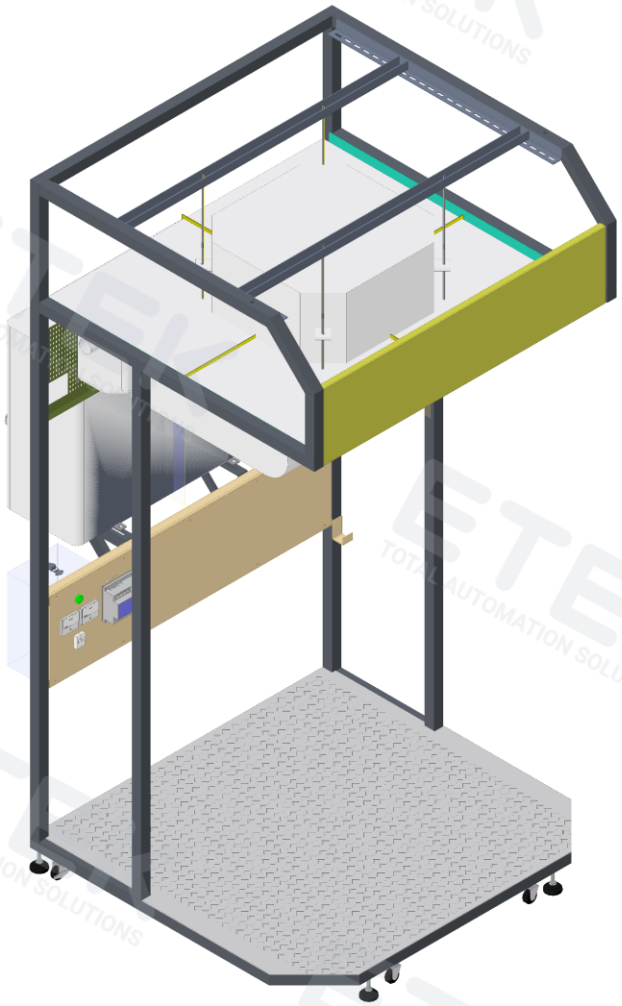
TRAINING CONTENT:

- Practice understanding the structural principles of components in multi 1-way air conditioners
- Practice learning the principles of operation

Practice learning the working conditions of the air conditioning system

- Practice learning the electrical diagram and refrigeration diagram of the system
- Practice checking the system before operating
- Practice identifying main devices in the model
- Practice applications of various types of refrigeration units
- Practice installation instructions for various types of indoor units
- Learn about inverter technology compressors and control circuits
- Practice sealed and vacuum testing
- Practice refilling gas
- Practice measuring and checking electrical equipment to ensure safety before operating the model
- Practice running the system according to the indoor unit modes
- Practice measuring and repairing common damages of equipment used in the model

5. Air conditioning and refrigeration installation practice cabin



SPECIFICATIONS:

Designed and manufactured in compliance with the following standards:

- ISO 9001:2015 – Quality Management
- ISO 14001:2015 – Environmental Management
- ISO 45001:2018 – Occupational Health and Safety
- ISO/IEC 27001:2013 – Information Security Management
- ISO 50001:2011 – Energy Management

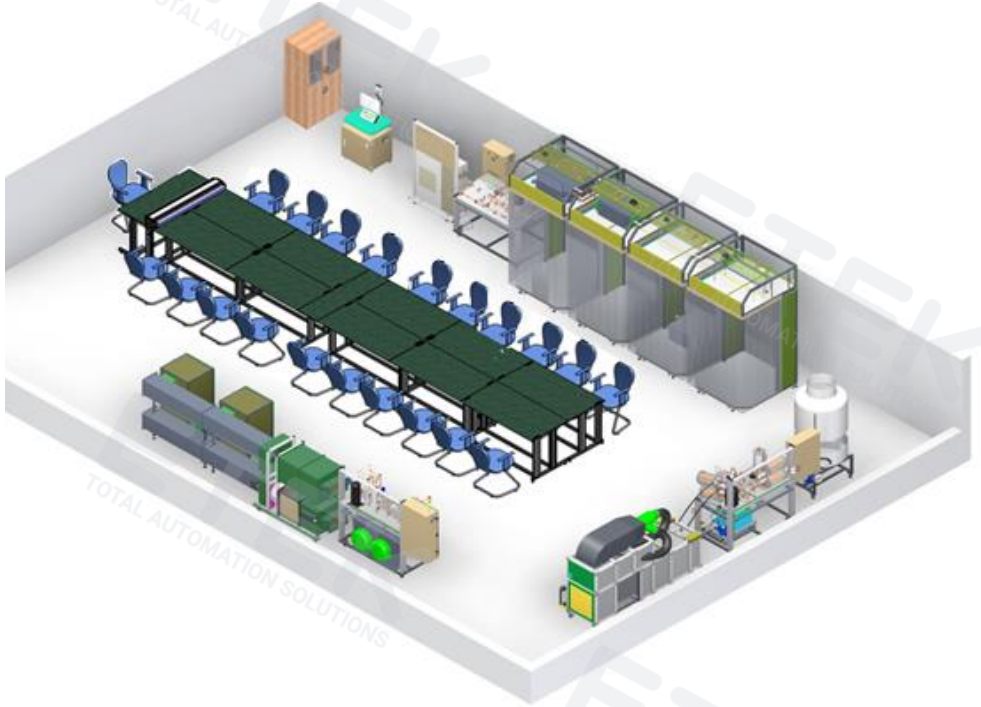
Cabinet frame:

- Welded steel box frame with electrostatic coating
- Size: 2500 x 1306 x 1230 mm (H x W x D)
- Includes perforated panels for mounting components and piping
- Four caster wheels with adjustable leveling feet
- Anti-slip checkered steel floor
- Supports multiple types of air conditioners for flexible training use

Electrical control cabinet: Complies with TCVN 5699-1:2010 and IEC 60335-1:2010 on power, current, leakage, and insulation strength

CENTRAL RESIDENTIAL AIR CONDITIONING TRAINING ROOM

ROOM FUNCTION:
Practice central air conditioning
- Training on central air conditioning system applied in buildings and factories
- Calculate equipment, refrigeration system, water system, ventilation system
- System control and monitoring



1. AHU air conditioning components' distributed layout model

2. VRV central air conditioning components' distributed layout model

3. VRV central control practice cabinet with computer monitoring

4. Water-chiller central air conditioning components' distributed layout model

CENTRAL RESIDENTIAL AIR CONDITIONING TRAINING ROOM

1. AHU air conditioning components' distributed layout model

TRAINING CONTENT:

- Practice understanding the structural principles of the components of a gas AHU central air conditioner
- Practice separate temperature control for each room
- Practice controlling the wind system
- Practice vacuuming and filling with gas
- Practice installing and operating the system
- Practice measuring and repairing common damages of equipment used in the model

CENTRAL RESIDENTIAL AIR CONDITIONING TRAINING ROOM

2. VRV central air conditioning components' distributed layout model

TRAINING CONTENT:

- Learn the principles of the refrigeration system and electrical control system of VRV central air conditioning
- Practice understanding the structure and application of different types of refrigeration units in VRV air conditioners
- Practice installing various types of indoor units
- Practice using electricity and water lines
- Practice installing and operating the system
- Practice maintenance, retrieve error codes and fix errors

3. Water-chiller central air conditioning components' distributed layout model

TRAINING CONTENT:

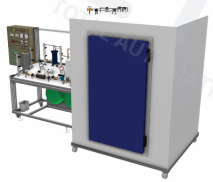
- Practice understanding the structural principles of AHU central air conditioning components
- Practice learning the operating principles of AHU central air conditioning
- Practice measuring and checking electrical equipment to ensure safety before operation
- model practice
- Practice filling gas
- Practice replacing damaged equipment
- Practice connecting devices and test running devices
- Practice measuring and repairing common damages of equipment used in the model

INDUSTRIAL RESIDENTIAL AIR CONDITIONING TRAINING ROOM

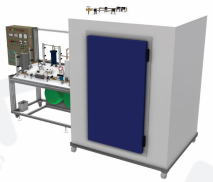
ROOM FUNCTION:
Practice industrial air conditioning

- Training on components of industrial refrigeration systems such as in industrial cold storage and processing plants
  - + Cool storage device
  - + Freezing equipment
  - + Freezing storage device
  - + Reserve ice making equipment

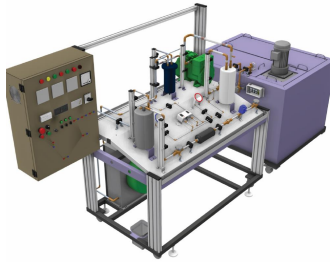
=> Helps students become familiar with, operate and maintain industrial refrigeration equipment



1. Frozen Cold Storage Model

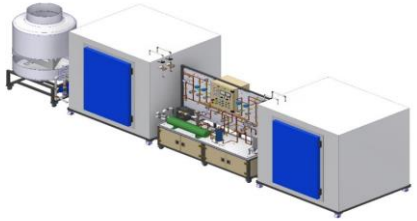


2. Positive temperature cold storage model



3. Structure of the Ice block maker model

4. Ice cube machine model

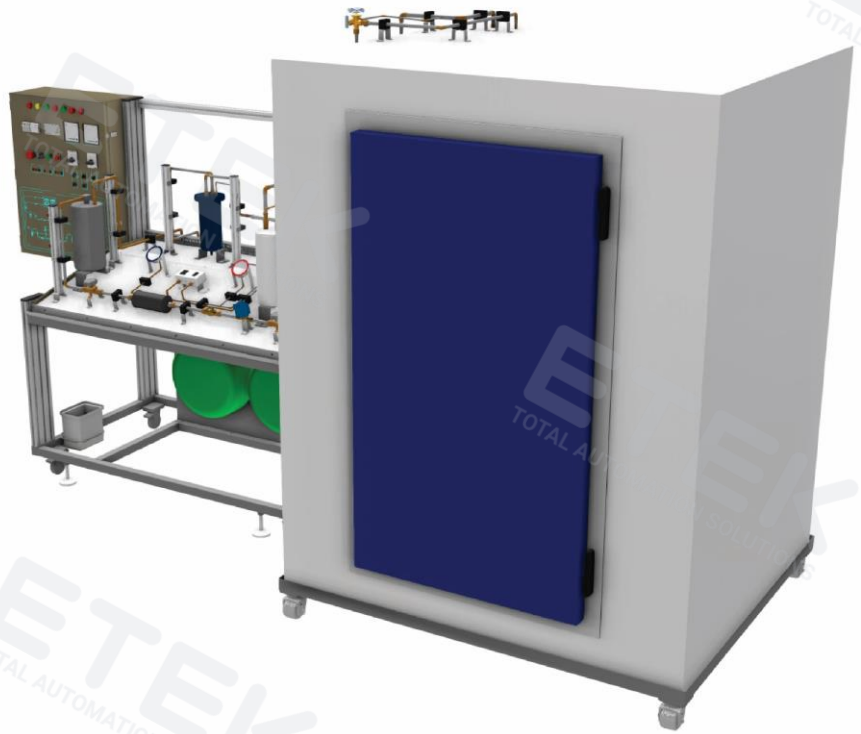


5. Structure of the Industrial refrigeration practice set

6. Structure of the Dual application commercial refrigeration practice set

INDUSTRIAL RESIDENTIAL AIR CONDITIONING TRAINING ROOM

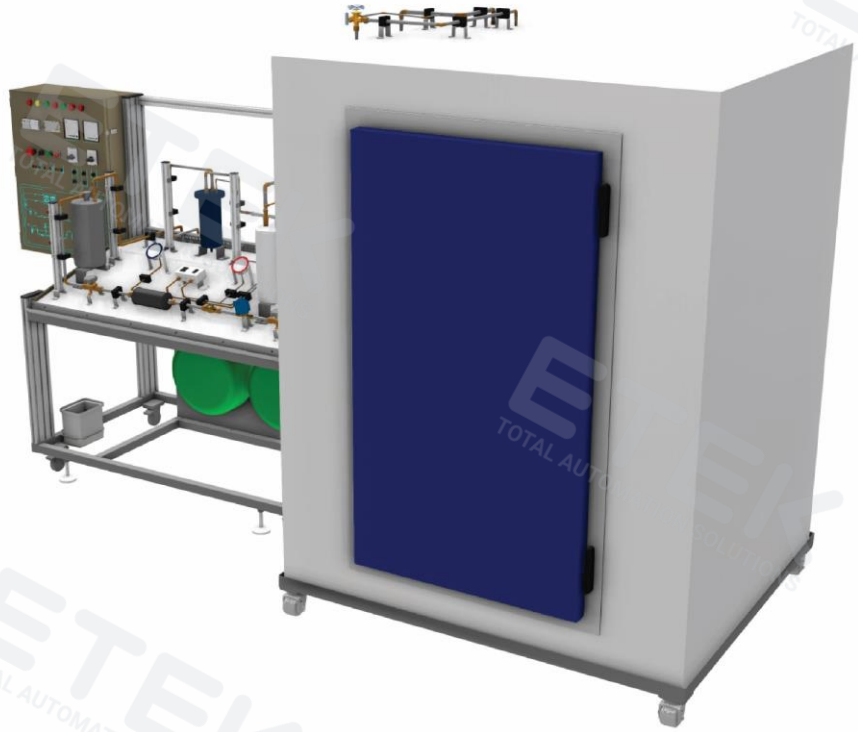
1. Frozen Cold Storage Model



TRAINING CONTENT:

- Practice understanding the schematic diagram of the refrigeration system
- Practice identifying components and their functions in the cold storage system
- Practice understanding the structure of industrial cold storage
- Practice calculating and selecting equipment
- Practice understanding the electrical control circuit of the cold storage system
- Practice inspecting and understanding compressor operation
- Practice vacuuming and charging refrigerant into the refrigeration system
- Practice setting up the temperature controller
- Inspect the system before operation
- Practice operating the system and troubleshooting common faults

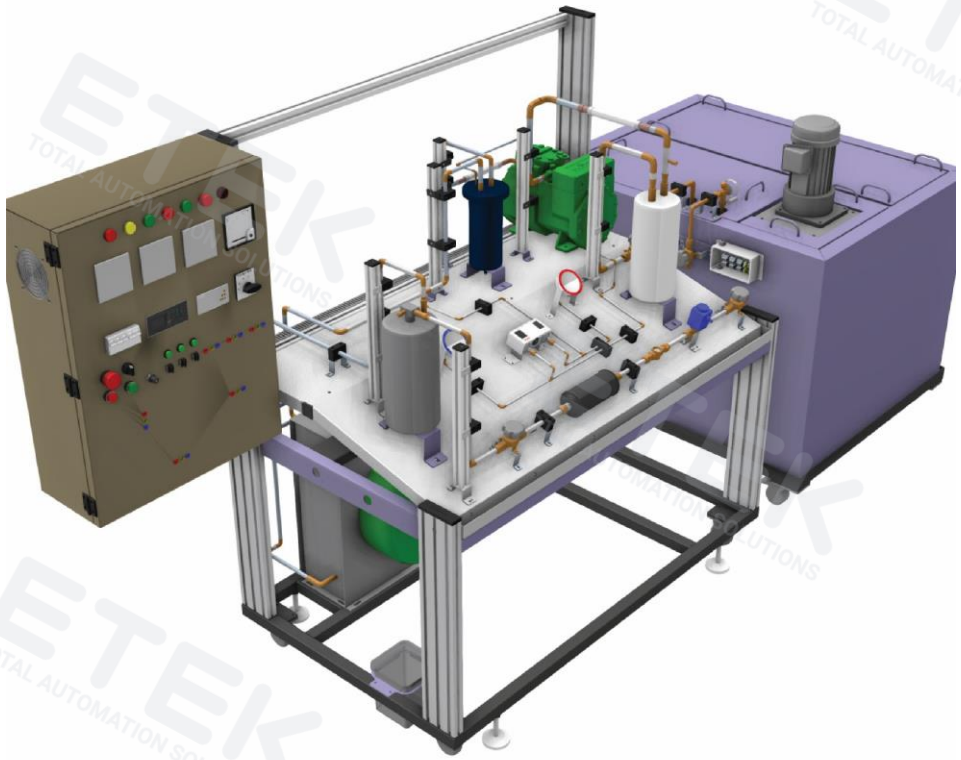
2. Positive temperature cold storage model



TRAINING CONTENT:

- Practice understanding the schematic diagram of the refrigeration system
- Practice identifying components and their functions in a cold storage system
- Practice studying the structure of an industrial cold storage room
- Practice calculating and selecting suitable equipment
- Practice studying the electrical control circuit of the cold storage system
- Practice examining and testing the operation of the compressor
- Practice vacuuming and charging refrigerant into the system
- Practice setting the temperature controller
- Check the system before operation
- Practice operating the system and troubleshooting common faults

3. Structure of the Ice block maker model



TRAINING CONTENT:

- Perform the operation procedures of the block ice machine according to technical requirements.
- Carry out safe and technically correct maintenance procedures for the block ice machine.
- Inspect and evaluate the quality of equipment in the system.
- Repair electrical and refrigeration faults in the system.
- Effectively use tools and machinery in the profession

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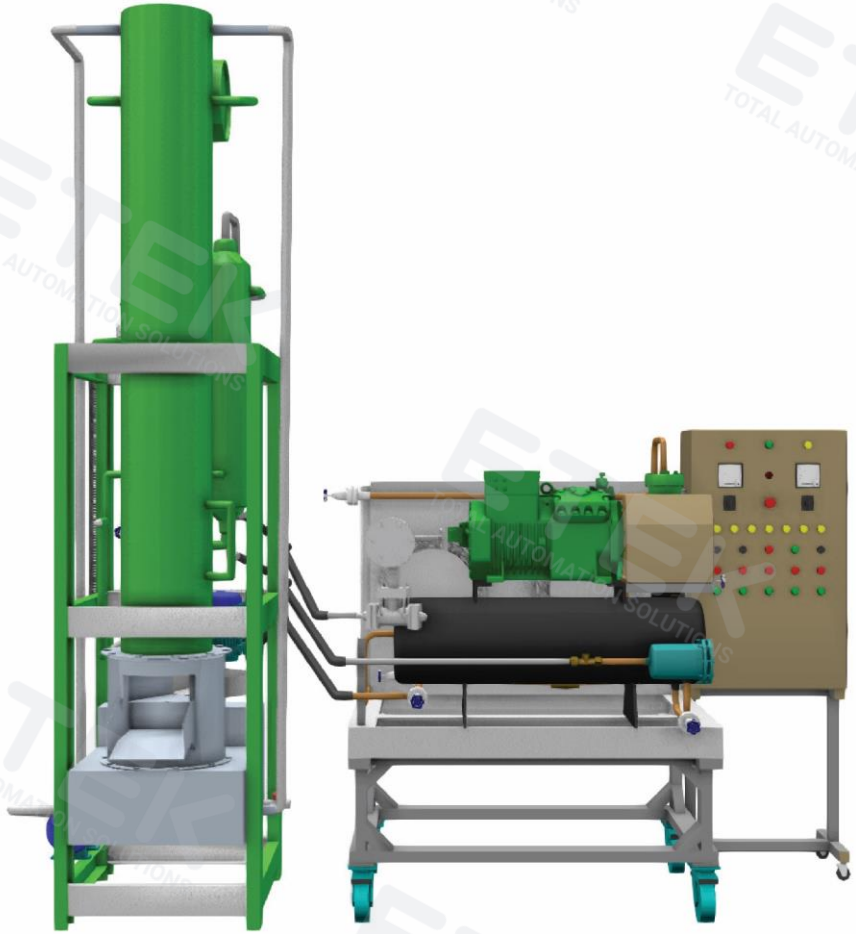
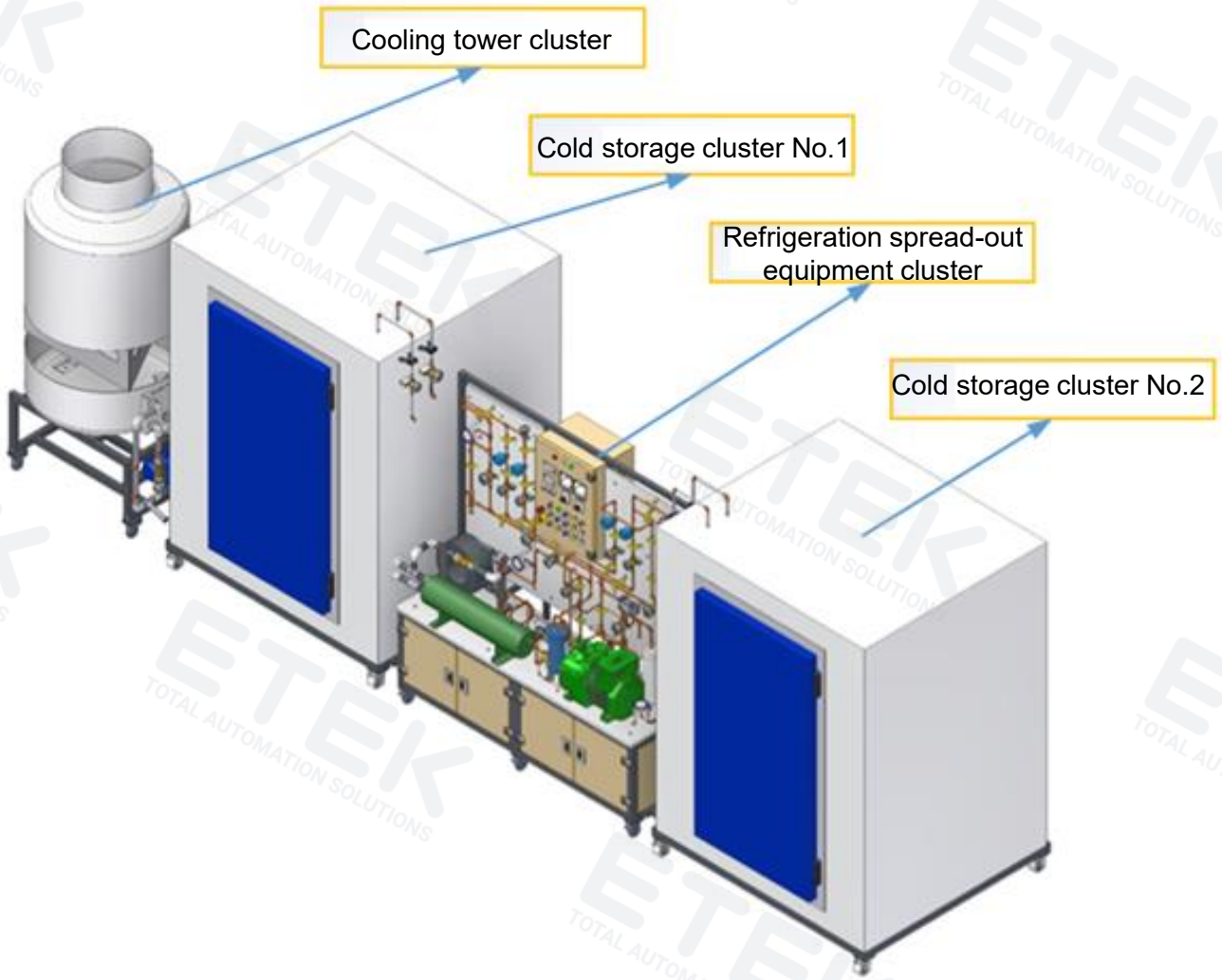
4. Ice cube machine model



TRAINING CONTENT:

- Training on ice making machine system principles
- Learn the structure of devices and identify devices in the system
- Practice vacuuming and filling with gas
- Measure and test the running parameters of the model
- Practice installing and operating the system
- Align equipment so it runs efficiently
- Calculate system productivity

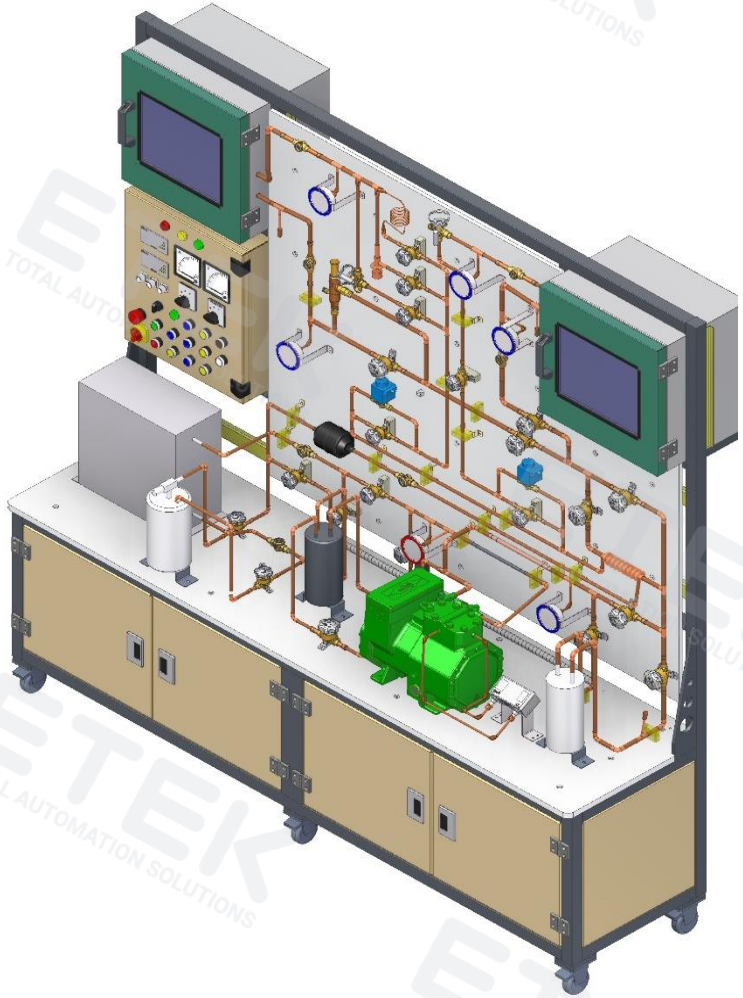
5. Structure of the Industrial refrigeration practice set



TRAINING CONTENT:

- -Practice operating the model with a shell-tube condenser
- Practice defrosting with hot gas
- Practice adjusting the evaporator temperature with the KVP valve
- Practice adjusting the expansion valve
- Practice recognizing a gas shortage problem
- Practice recognizing a gas surplus problem
- Practice adjusting the compressor suction pressure with the KVL valve

6. Structure of the Dual application commercial refrigeration practice set



TRAINING CONTENT:

- Practice operating the model with 2 evaporators at different temperatures, running with the expansion valve
- Practice defrosting mode with the resistor
- Practice running the system with the KVP pressure regulator
- Survey the phenomenon of poor cooling of the condenser.
- Practice identifying a system lacking gas
- Practice identifying a system with excess gas
- Practice adjusting the temperature of the evaporator with the KVP valve
- Practice checking and replacing the filter
- Practice adjusting the expansion valve

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