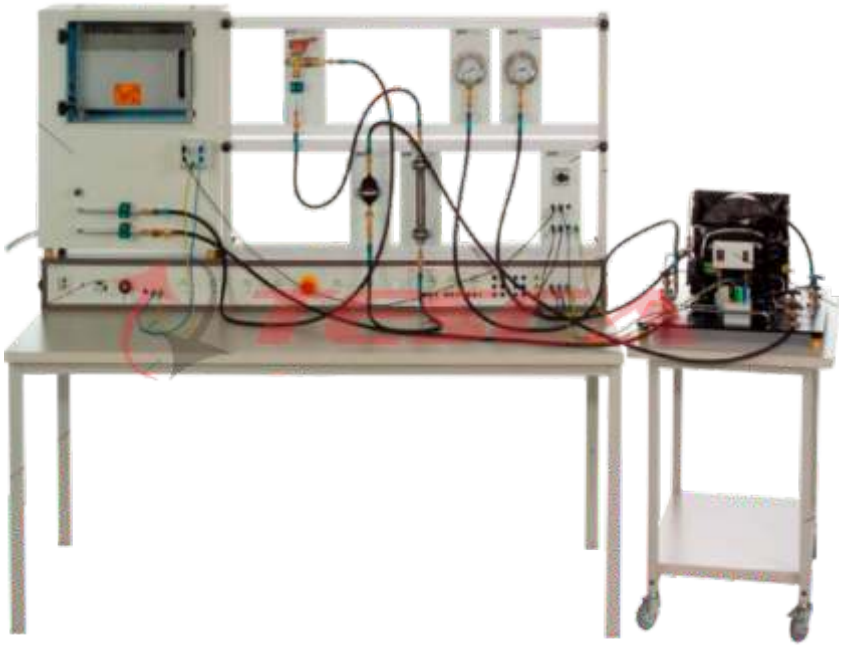

## Features

- Set-up of the most varied refrigeration circuits using modular component kits1
- Clear arrangement of components

Tesca Basic Refrigeration Trainer Bench 32420 practical experiments relating to the operation of a refrigeration system can be implemented by dealing with differently configured compression refrigeration circuits. The components used are common in refrigeration and therefore closely related to practice.

The base unit 32420 includes the main components of a refrigeration circuit: a condensing unit with compressor, condenser and receiver and a refrigeration chamber with integrated evaporator, fan for forced ventilation and an electric defrost heater. A pressure switch protects the compressor against excessive pressure. The refrigerant flow can be modified via shut-off valves.
Together with the components from e.g. heat exchanger, flow meter or manometer, simple refrigeration circuits are realised. For continued experiments additional refrigeration components are used, e.g. post-injection valve, capacity controller or defrost timer. All components of the training system have ball valves at the connections. Using the required accessory kit, the components are connected into a complete refrigeration system. For the complete experimental setup, laboratory workplace with frame for mounting the components and power supply, is required. The CFC-free refrigerant R134a serves as working medium.

With the service set additional exercises for the filling and evacuation of refrigeration systems are carried out.
The well-structured instructional material sets out the fundamentals and provides a step-by-step guide through the experiments.

## Specifications

- Base unit for the refrigeration training system
- Extension with components for basic experiments using simple refrigeration circuits
- Extension with components for advanced experiments in refrigeration systems
- Condensing unit, consisting of hermetic compressor, condenser, receiver, pressure switches and shut-off valves
- Insulated refrigeration chamber with integrated evaporator, electric defrost heater and condensate drip tray
- Refrigeration chamber, condensing unit and power supply equipped with shock-proof lab jacks
- Refrigerant R134a, CFC-free

## Technical Specifications

- Air-cooled condensing unit
  - Power consumption: 367W at -10/32°C
  - Refrigeration capacity: 731W at -10/32°C
  - Max. volumetric air flow rate: 850m³/h
  - Receiver: 1,4L
- Evaporator with fan
  - Capacity: 190W at t=2°C, ΔT=8K
  - Cooling surface: 1,81m²
  - Max. volumetric air flow rate: 140m³/h

Note: Specifications are subject to change.

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- Electric defrost heater: 50W/m

## Experiments

- Design of compression refrigeration circuit
- Draining and filling of refrigeration systems
- Operation of refrigeration components
- Cyclic process of cold production
- Fault finding
- Different operating modes of the receiver
  * With and without receiver
  * Pump-down
  * Filling the refrigeration circuit
- compare different expansion elements

## Requirements

- 220 – 240V, 50Hz, AC Power Supply

## Laboratory Bench - Order Code - 32421

Tesca Laboratory Bench 32421 is designed for Refrigeration Experiments with the set-up of a complete trainer. The laboratory workplace consists of a table with supply strip, a frame to arrange the components, a mobile cabinet and a movable base frame for the condensing unit.

## Specifications

- Laboratory workplace for the modular training system refrigeration
- Table with supply strip
- Mobile cabinet with drawers
- Movable base frame with 4 steerable castors, breakable

## Technical Specifications

Supply strip

- Fault current protection switch: 25A
- Motor protection switch: 10...16A
- Key switch, sockets, lab jacks, emergency off switch, main switch

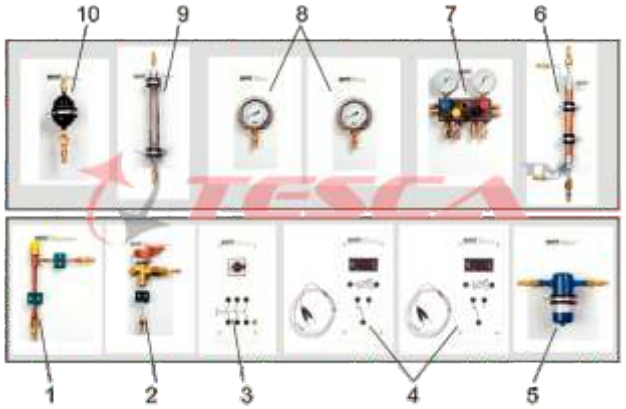
**Dimensions:**

- l x w x h: 1800 x 900 x 785 mm (table)
- l x w x h: 1800 x 320 x 155 mm (supply strip)
- l x w x h: 1200 x 250 x 685 mm (frame)
- l x w x h: 420 x 600 x 625 mm (mobile cabinet)
- l x w x h: 600 x 900 x 780 mm (base frame)

## Requirements:

220 – 240V, 50Hz Power Supply

## Basic Refrigeration Components - Order Code - 32422




1. Pressure-controlled expansion valve,
2. Thermostatic expansion valve,
3. Circuit breaker,
4. Electric thermostat,
5. Suction line receiver,
6. Heat exchanger as super-heater,
7. Assembly aid,
8. Manometer delivery side/intake side,
9. Flow meter,
10. Sight glass with filter/drier

## Feature

Practice-oriented basic experiments using real components from within the industry

Tesca Basic Refrigeration Components 32422 enables in conjunction the design and performance of various basic experiments related to refrigeration.
Commercial components are used in practical experiments. These components are mounted on plates ready to be connected and are arranged clearly in the frame.
The set includes simple refrigeration components, such as expansion elements and filters, as well as electrical components, e.g. switches and thermostat. The super-heater included in the set is a heat exchanger ensuring the complete evaporation of the refrigerant before entering the compressor whilst the liquid refrigerant is super-cooled upstream of the expansion element. The control behavior of the expansion element is monitored at the flow meter.
Manometers provide an insight to the pressure ratios in the refrigeration circuit. Via pressure and temperature measurements the change of state of the refrigerant can be tracked and entered into the log p-h diagram. The temperature is measured by inter-laboratory thermometers.
The well-structured instructional material sets out the fundamentals and provides a step-by-step guide through the experiments.

Note: Specifications are subject to change.

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## Specifications

- Components for the set-up of simple refrigeration circuits in conjunction with Bench
- Heat exchanger as super-heater
- 3-pin circuit breaker
- Assembly aid: 4-port directional valve with sight glass
- Sight glass with humidity indicator
- Pressure-controlled expansion valve
- Thermostatic expansion valve
- 2 thermostats with different temperature ranges
- Components mounted on plates ready to connect
- Abrasion-proof symbols and labels on plates

## Technical Specifications

- Pressure-controlled expansion valve
  - Pressure range: 1...7bar
- Thermostatic expansion valve
  - Evaporation temperature: -45°...20°C
  - Valve insert rated capacity: 0,3kW
- Circuit breaker, 3-pin: 3kW
- 2 electric thermostats
  - -5...25°C
  - -25...5°C
- Heat exchanger
  - Capacity: approx. 2.5kW at -10°C evaporatio ntemperature
- Measuring ranges
  - Pressure, high pressure side: -1...24bar
  - Pressure, low pressure side: -1...9bar
  - Flow rate: 3...41kg/h

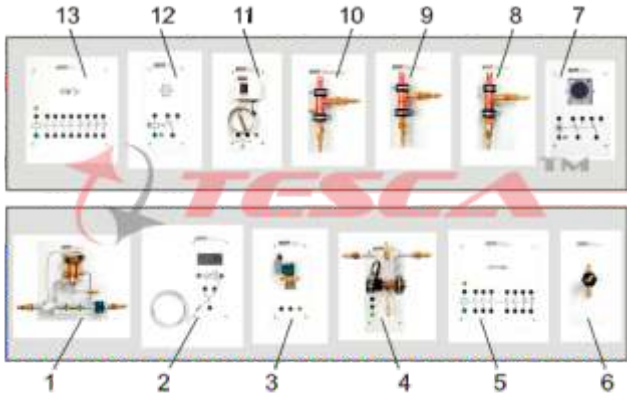
## Experiments

- Design of different simple refrigeration circuits
- Design, operation and adjustment of components
  - Sight glass with filter/drier
  - Flow meter
  - Delivery and intake manometer
  - Assembly aid
  - Super-heater
  - Pressure-controlled expansion valve
  - Thermostatic expansion valve
  - 3-pin circuit breaker
  - Electric two-point thermostat with switch hysteresis
  - Suction line receiver
- Read and understand technical drawings and operating instructions
- Fault finding

## Requirements

- 220 – 240V, 50Hz, AC Power Supply

## Advanced Refrigeration Components - Order Code - 32423




01. Post-injection valve,
02. Refrigeration controller,
03. Solenoid valve,
04. 4/2-way reversing valve,
05. Main contactor, 6 valve,
07. Defrost timer,
08. Capacity controller,
09. Start-up controller,
10. Evaporation pressure controller,
11. Temperature controller,
12. Time relay,
13. Auxiliary contactor

## Features

- Set-up of more complex refrigeration circuits1
- Sophisticated components for advanced experiments

Tesca Advanced Refrigeration Components 32423 enables in conjunction the design and performance of various advanced experiments related to refrigeration.
Commercial components are used in practical experiments. These components are mounted on plates ready to be connected and are arranged clearly in the frame of 32420. The set includes complex refrigeration components, such as capacity controller, start-up controller, defrost timer, 4/2- way reversing valve and refrigeration controller. The 4/2-way reversing valve, for example, is used to reverse the circuit.
This allows for the defrosting of an iced-up evaporator by operating it temporarily as condenser. Manometers provide an insight to the pressure ratios in the refrigeration circuit.
Via pressure and temperature measurements the changes of state of the refrigerant can be tracked and entered into the log p-h diagram. The temperature is measured by inter-laboratory thermometers.
The well-structured instructional material sets out the

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fundamentals and provides a step-by-step guide through the experiments

## Specifications

- Components for the set-up of complex refrigeration circuits in conjunction with RAC 076
- Post-injection valve
- Refrigeration controller with PTC sensor
- Defrost timer, timing interval 30min
- Time relay
- 4/2-way reversing valve, solenoid valves
- Electric thermostat as temperature controller
- Power and auxiliary contactor

## Technical Specifications

- Rated controller capacity at t0=-10°C, tc=25°C
  - Evaporation pressure: 2,8kW at Δp=0,2bar
  - Start-up: 5,3kW at Δp=0,2bar
  - Capacity: 4,8 kW at offset=0,7bar
- Suction line receiver: 0,3L, max. 28bar
- Temperature controller: -5...35°C
- Refrigeration controller: -40...110°C
- Post-injection valve: -45...35°C
- Time relay: response delay: 0,05s...100h
- Measuring ranges
  - Pressure, evaporation: 0...5,5bar
  - Intake pressure: 0,2...6bar
  - Pressure, capacity controller: 0,2...6bar

## Experiments

- Set-up of different refrigeration circuits
- Design, operation and adjustment of components
  - Evaporation pressure, start-up, capacity and refrigeration controllers
  - Electric thermostat
  - Manual valve as expansion element
  - Post-injection valve
  - Solenoid valve with coil
  - 4/2-way reversing valve
  - Power and auxiliary contactor
  - Time relay
  - Defrost timer
  - Hot gas defrosting
- Read and understand technical drawings and operating instructions
- Fault finding

## Requirements

- 220 – 240V, 50Hz, AC Power Supply

## Set of Accessories - Order Code - 32424

## Maintenance Set - Order Code - 32425

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