

KR-115B

Refrigeration Cycle and Heat Pump System with HMI



KR-115B is designed to learn the theory of Heat Transfer in refrigeration engineering. With proper setup, KR-115B can be emulated as a Refrigeration or Heat Pump system. All system components are mounted on the front panel so students can directly observe, touch the components, and hear the noise produced by the components while it is running under either Refrigeration or Heat Pump cycle.

KR-115B offers three expansion devices available for the refrigerant to pass through; they are pressure expansion valve, capillary tube, and thermal expansion valve. Students can use the control panel to switch the preferred expanding path from three expansion devices and compare the corresponding performance under Refrigeration or Heat Pump cycle.

The state of the refrigerant can be clearly observed through 6 sight glasses at different phases of the Refrigeration / Heat Pump cycle. Student must use the valves to lead the refrigerant to the appropriate flowing direction so that the system can operate in corresponding cooling/heating condition. If students mislead the refrigerant to wrong flowing direction, the pressure protection switches will detect the conflict and halt the compressor to prevent the system from being damaged.

Using HMI control system, touch panel can easy to control and check system's experiment status for students, the panel will display system working status, temperature and pressure numbers unit easy to choice and change.

● Features

1. All system components, including condenser, compressor, evaporator, capillary tube, filter, refrigerant receiver, accumulator, hand valves, pressure gauges, expansion devices, are mounted on the front panel for direct operation and observation
2. Provide three types of expansion devices, including capillary tube, pressure expansion valve, and thermal expansion valve for refrigerant to pass through.
3. Provide 6 sight glasses to observe the refrigerant status before and after passing evaporator, condenser, expansion devices, and compressor.
4. Provide high and low pressure protection switches to automatically halt the compressor when detecting wrong refrigerant flowing path.
5. The refrigerant path for high pressure tube is painted in red and low pressure tube in blue.
6. Use touch panel control and display data
7. Can use the VNC for wireless control.(Need use the WIFI AP)
8. High Pressure Gauge(0~500psig) and Low Pressure Gauge (0~200psig)
9. Capillary Tube
10. Pressure Expansion Valve
11. Thermal Expansion Valve (-40°C~+10°C Cap. Tube 1.5m)
12. 4-Way Valve 220VAC Max. 2.5Mpa Min. 0.25Mpa Discharge 3/8" Suction & Coils 5/16 "
13. High Pressure Switch 0.8MPa~3Mpa with Manual Reset
14. Low Pressure Switch -0.06MPa~0.6Mpa with Automatic Reset
15. Refrigerant Receiver
16. Refrigeration Accumulator
17. 6 Sight Glasses
18. 9 Solenoid Valves
19. Forced Fan : 220V AC, 50Hz /60Hz
20. Dimension : (1600(W) x 580(D) x 1890(H))mm ±10%
21. Condenser and evaporator fins are installed with the protective net, mesh 15 holes / in2 or more
22. The copper tubes are painted to prevent oxidation and corrosion.
23. Adopted 40x40mm aluminum extruded bracket and equipped with 4 brake wheels.

● Specifications

1. Compressor : 1HP 220V AC, 50Hz/60Hz
2. Refrigerants : R-134a

19. Panel and desktop are made of iron plates with coating
20. Under the positive cycle, the initial low pressure of three kinds of expansion valves should be between 25psig~35psig
21. Operation and teaching manual is supplied
22. Manual Includes:
 - (1) Detailed experiment procedures for all experiments
 - (2) Learning objectives of each experiment
 - (3) System principle and characteristics
 - (4) Principle of component operation
23. Operation instructions slides, which contain:
 - (1) Introduction to the structure of KR-115 and it's function
 - (2) Explanation of refrigeration circulation system
 - (3) Component description
 - (4) Operation procedures

● Human Machine Interface Control

1. Control mode: Programmable human-machine interface is selectable With 7" or above analogue resistive touchscreen
2. Memory: SRAM128 KB
3. Power consumption (maximum rating): 16W or less
4. Control screen content includes:
 - (1) Wind speed selection of condenser and evaporator: High speed and low wind speed. Forward and reverse.
 - (2) Compressor control: Start and stop.
 - (3) Selection of the cycle: positive cycle and reverse cycle (refrigeration cycle and heat pump cycle)
 - (4) Selection of the expansion valve
 - (5) Selection of the solenoid valve
 - (6) Cycle diagram of the system
 - (7) Numerical display:
 - high pressure and low pressure of the system.
 - 6 Temperature displays:
 - inlet and outlet of the compressor, inlet and outlet of the 2 coils
 - (8) Pressure page: bar, psi, kpa
 - (9) Temperature page: °C, °F, K

● Experiments

1. Refrigeration circulation system with capillary tube
2. Refrigeration circulation system with pressure expansion control valve
3. Refrigeration circulation system with thermal expansion control valve
4. Reverse cycle heat pump system
5. Reverse cycle heat pump system without refrigerant receiver
6. Drawing Mollier Chart
7. Calculating system performance
8. Comparison of system performance
9. Comparison of energy between cooling and heating experiments
10. Coefficient of performance (COP) and energy efficiency ratio (EER)



📞 22 736 3650 / 22 736 5827
22 736 4461 / 22 728 6162
✉ systelec@systelec.cl
🌐 ww.systelec.cl
📞 +56 9 34415419
📍 Av. Pedro Fontova 3954
Santiago de Chile