

Refrigeration and Air-conditioning Technology

Climate change, the greenhouse effect and global warming – in the 21st Century there is scarcely any other subject that is more ubiquitous or “hotly” debated. Global environmental accords like the international Kyoto protocol or specifically the European directive on fluorinated gases are devoted to the problems associated with greenhouse relevant agents and the search for solutions on a political level. Refrigeration and air-conditioning applications amplify the effects of global warming.

In the first place they contribute directly and in a big way to the greenhouse effect through the emission of coolants containing fluorine like partially or wholly fluorinated hydrocarbons. One example of how these emissions are caused is because of leaks in refrigeration systems which allow coolants to escape into the atmosphere. Secondly, the operation of refrigeration systems also causes additional, indirect CO₂ emissions due to the not inconsiderable amount of energy required for their operation. This problem is compounded by the fact that demand for refrigeration systems is constantly increasing.

Lucas-Nülle has committed itself to this subject and developed a concept to integrate easily serviceable and effective training systems devoted to this growing sector. Refrigeration and air-conditioning technology is a professional area that builds entirely the latest educational and technical know-how. It is the many years of experience that Lucas-Nülle has accumulated combining theoretical know-how with practical applications which empowers course participants to boost their skills and competence in this area.

Modular R134a refrigeration training system



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This modular refrigeration training system allows trainees to gain extensive experience of the materials used in refrigeration systems. The training focus of this module is to observe the refrigeration circuit itself. Rather than teaching professional skills as such, its objective is more to gain an understanding for the technology and the function of the components. Various applications, valves and other components of a refrigeration circuit are investigated by means of an authentic cold storage cell under a variety of conditions. The key aspects include how the quantity of refrigerant, the ambient temperature or faults with certain components affect the system. In addition, training is provided in the environmentally conscious handling of refrigerant when filling or emptying the system.

Important!

Some of the supplies employed with this equipment set are governed by regulations on hazardous goods and therefore require special handling. We recommend procuring these supplies in the respective country of use to avoid a transport of hazardous goods. The relevant supplies are summarized in the associated section.

RCC23 Supplementary set – capillary tube system R134a



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The capillary tube system supplementary set demonstrates the design and function of a system used in the majority of household fridges.

The following training contents are covered:

- Design and function
- Filling, emptying, leak testing
- Start-up
- Effect of capillary tubes of different lengths
- Shut-down

Equipment set comprising the following:

Compressor kit without accumulator, 230V/50Hz

CO3207-1C

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The compressor is designed for small refrigeration systems and consists of the following components:

- Compressor
- Condenser
- 2x corner stop valves, connector at suction end 5/8" UNF connection at pressure end 7/16" UNF
- T-piece in hot gas piping with 7/16" UNF thread



Technical data

- Refrigerant: R134a
- Power rating: >500W at +15°C/+32°C // >170W at 15°C/+32°C
- Filling capacity: Max. 0.4l
- Operating voltage: 230V/50Hz
- Nominal current: 0.2 A
- Dimensions: 200mm x 290mm x 430mm
- Weight: 14kg

Wound spirl-shaped capillary tubes, 1,5m

CO3207-1N

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Capillary tube for regulating refrigeration systems.

Technical data:

- Material: Copper
- Length: 1.5 m
- Diameter: 0.8 mm
- Connections: 7/16" UNF flare connector with spigot nut
- Weight: 0.8 kg



Wound spirl-shaped capillary tubes, 2,0m

CO3207-1P

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Capillary tube for regulating refrigeration systems.

Technical data:

- Material: Copper
- Length: 2.0 m
- Diameter: 0.8 mm
- Connections: 7/16" screw connection
- Weight: 0.8 kg



Media:

Interactive Lab Assistant: R134a capillary tube system

SO2801-1F

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Multimedia experiment software with virtual instruments, instructions and documentation of set-up and measurement results for a capillary tube system in a refrigeration circuit.

Features:

- Detailed set-up animations
- Questions with feedback and evaluation logic for checking student progress
- Printable document for easy printing of instructions and solutions
- CD-ROM with Labsoft browser, course software and virtual instruments

Training contents:

- Measurement of pressure using a pressure gauge
- Measurement of temperature differences
- Checking for leaks with a leakage tester
- Starting up a refrigeration system with capillary tube

