# Product Description

## Rack mounted 19” Cooling Units

## Series RCL

version 12.2.2010

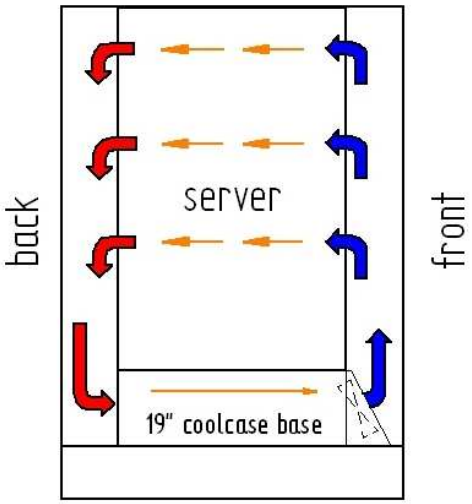
1. Application

- Automatic cooling of closed racks
- Self-contained control of the cooling power needed

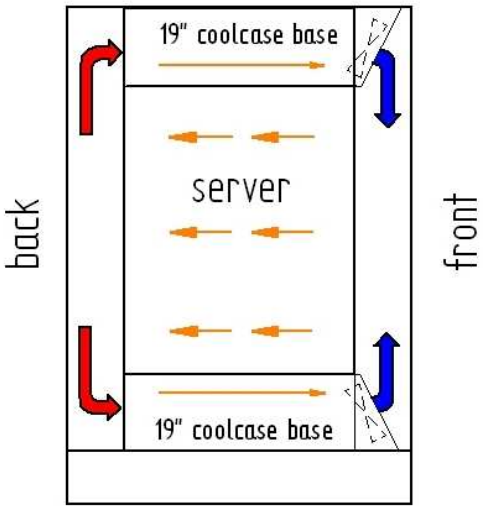
The Series RCL is offered in two performance classes:

- RCL sx with 4 kW cooling capacity
- RCL mx with 7 kW cooling capacity

The device is installed by default in the lowest part of the rack. It is also possible to mount the RCL at the top of the rack. The cooled air is carried upwards or downwards in the front of the rack. It is collected at the rear of the rack after being drawn through the electronic equipment. Thus, a closed air circulation is formed within the rack. The rack is cooled on the inside only, so environmental conditions at the location of the cabinet itself only have little influence on the internal temperature.




Series RCL at the lower position




Series RCL at the lower and upper position

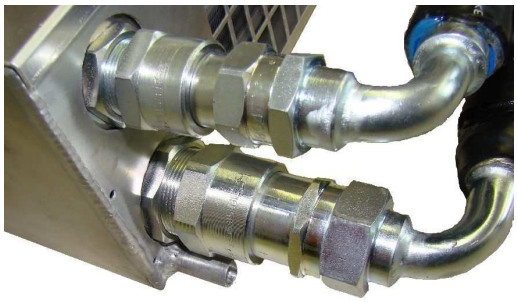
**The external dimensions of the Series RCL units are identical. The interchange between each power category is easily possible.**

## 2. Cooling Principle

The Series RCL involves the Heat exchanger (evaporator of the refrigerant), the fans to blow the cooled air into the front of the cabinet and the control electronics for control and monitoring of cooling and air circulation in the rack.

The RCL unit in the rack is connected to the compressor via special coolant hoses of 2m (about 6 feet) in length**.** They are fitted with screw-on coolant connectors. These hoses are brought out through the base of the rack and are then run to the compressor. The coolant circuit works with either R410A, R407C or R134A refrigerants.

On special order the length of the hoses can be extended up to 5m (about 15 feet). To bridge even longer distances there are adapters for fixed coolant pipes available. That way the comfort of easy exchange of the cooling unit is preserved.



Connected Screw-On Connectors

Rear View of the coolant connectors (left)

The cooling system works exclusively through evaporation of the refrigerant in the Series RCL units and its liquefaction in the compressor. Water is not needed for the operation of the cooling system. Therefore, support costs are minimized and there is no danger of freezing in the heat exchanger. Furthermore, there is no danger of water entering the rack due to leakages in the cooling system.

Also, with the absence of water the whole system works more. An additional refrigerant/water heat exchanger and associated water pumps are obsolete.

3. Applications and Possible Modes of Operation

The following compressors are suitable for use with the Series RCL:

1. Professional compressor-systems with the appropriate spare power of 4kW or 7kW that are certified for the refrigerants R134A, R407C and R410A respectively.

2. Modified split compressors certified for the refrigerants R134A, R407C or R410A respectively without external injection, a coolant low-pressure switch and cycle protection for the compressor. Before modification of a commercial spilt compressor you are urgently asked to consult with us.

3. Compressors offered by us together with the Series RCL units. Compressors offered by us are unconditionally usable with the Series RCL.

The outdoor compressor is mounted like the outdoor unit of a traditional compressor of split air conditioner.

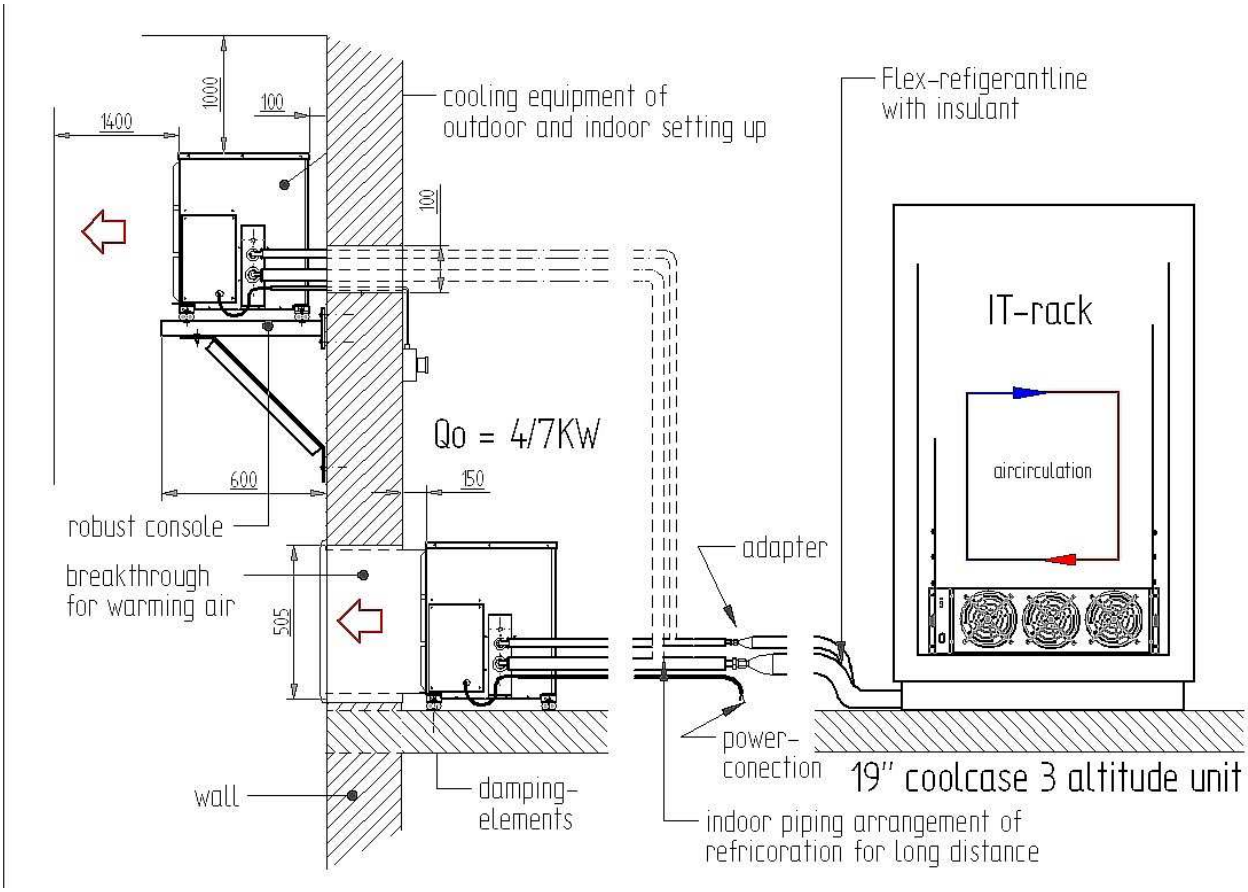
Series RCL with movable

Air conduct

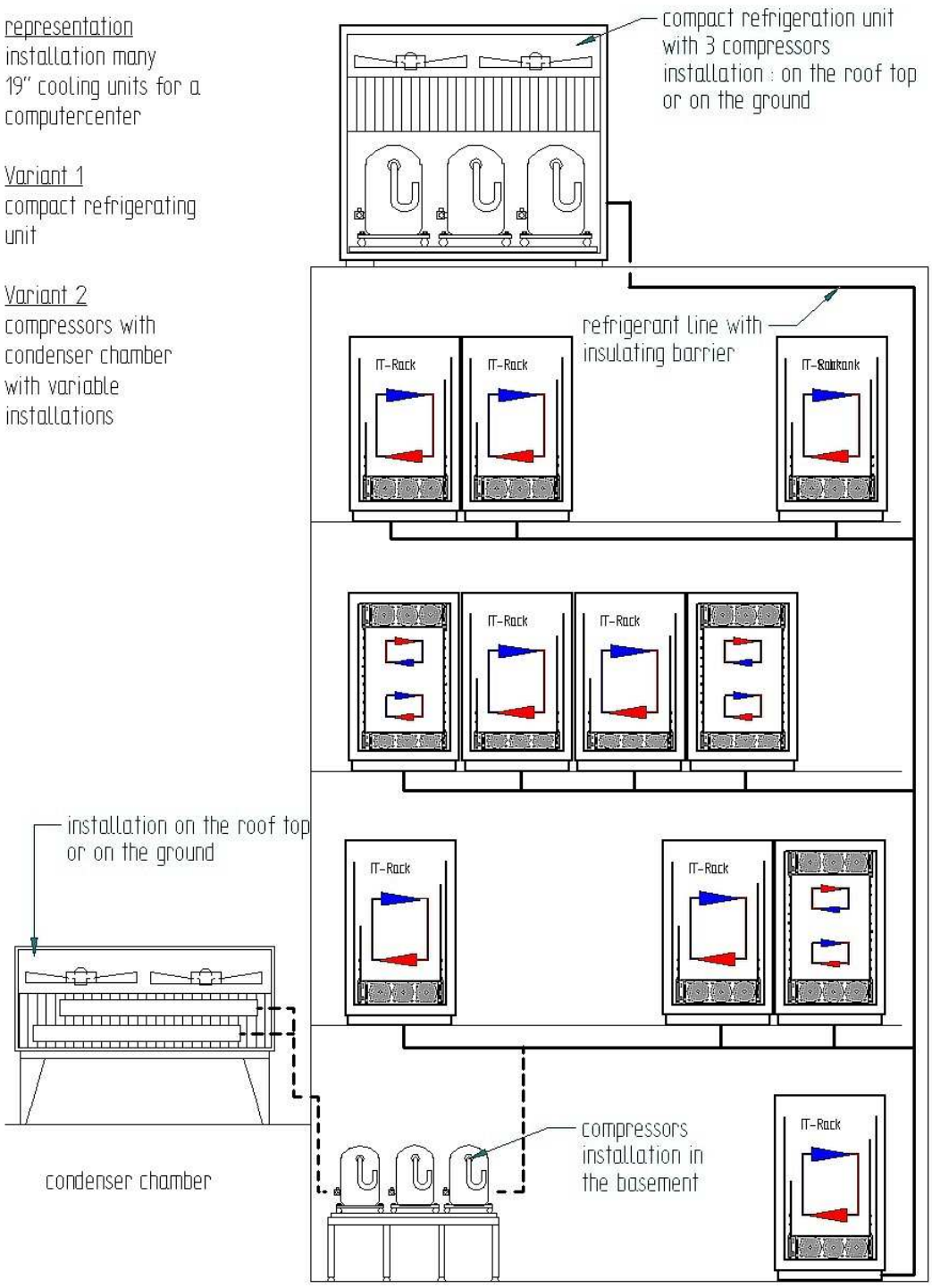
Compressor made by “Klima-Kaelte-Umwelt”

All Series RCL units can run in interconnected groups. The number of connected units is only limited by the capacity of compressor which has to deliver the aggregate cooling power needed by the application. It must be noted, that larger systems require thorough planning. **It is strongly recommended to consult us before realization.**

A small group of up to four Series RCL units is easily possible. Contact us for any questions regarding Series RCL grouping.




Installation examples of the Series RCL made by „Klima-Kaelte-Umwelt”




Installation examples of the Series RCL

# 4. Safety and comfort

**The Series RCL has a host of safety measures and automatic controls. They assure reliable and comfortable operation without user intervention.**

There are no adjustments at the Series RCL necessary. The unit operates fully self-contained with its built-in dew point sensor, humidity sensor and temperature sensors.

In case of a hardware malfunction there is an appropriate display and measures are automatically taken by the Series RCL to keep the cooling operation up and running as long as possible.

In case of a software malfunction an automated reset will be executed after which the system runs normally again.

With the help of the software of the Series RCL and the automatic and exact measurement of the dew point the formation of condensate in the Series RCL is vastly reduced or even fully suppressed.

Control of the fan speed combined with control of the cooling power let the Series RCL automatically adapt to the cooling currently needed in the rack.

## 5. Condesate drainage

The Series RCL is designed in a way that under normal operating conditions (humidity less than or equal to 12g/kg air) no condensate will build up in the cooling unit.

As an additional safety feature the Series RCL has a port at rear side of the case where a hose for leading out condensate can be connected. This way the condensate can be drained e.g to a small container in the bottom the rack or a fixed drainage line.

**Please note that the drainage port is a preventive measure for extreme climate conditions**.

Drainage Port (lower left)

6. Reference Information

The cooling power of the Series RCL is based on the use of R407C refrigerant. The refrigerants R410A and R134A are used under special environmental conditions. So is the refrigerant R134 intended for use in desert-like conditions.

Separate removable electronics

Front with status indicators and com-interface

6.1. Elements on the front panel of the Series RCL

| | | |
|---|---|---|
| LED gn: | On | Normal operation |
| LED ye: | | Startup phase |
| rd: | On | |
| LED rd: | On | Malfunction / Emergency operation |
| LED gn: | ( | |
| ye: | ( flashing | dew point sensor not connected |
| | simultaneously | |
| rd: | ( | |

com-interface: 9600 Baud 8N1

6.2. Elements on the rear side

Power line receptacle (IEC 320) 1: Line voltage 115 to 230 VAC

Power line receptacle (IEC 320) 2: Line voltage 115 to 230 VAC

(Stand by with the redundancy option

| | |
|---|---|
| Phoenix Connector 6 poles: | 1/2/3 |
| | Floating DPST switch „ Operation“ |
| | 4/5/6 |
| | Floating DPST „ Malfunction“ |

6.3. Dimensions:

| | |
|---|---|
| | Height: 3U |
| | Width: 19“ |
| | Depth: 29“ |
| Standard Temperature Range: | + 5 °C . . . + 45 °C |
| Absolute Humidity Range: | 5,5 g/kg . . . 12 g/kg |
| Cooling Power: | max. 4,4 kW (RCL sx) |
| Average Evaporation Temperature : | + 6 °C . . . + 10 °C |
| Average Temperature At The Air Outlet: | + 20 °C . . . + 26 °C |

Contact : Klima Kaelte Umwelt Lukas

Nickerner Weg 8

01257 Dresden

Tel.: 0351 2840150

Fax.: 0351 2840190

e- mail : KKU-Lukas@gmx.de

Internet : www.kku-lukas.de