

APPLICATION GUIDE

R@CKCOOLAIR

RHC - RNC - RNV

"In Row" close control unit for high density systems

3 > 51 kW



RACKCOOLAIR-AGU-1310-E

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R@CKCOOLAIR

APPLICATION GUIDE

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Product designed and manufactured under quality management systems certified ISO 9001 and ISO 14001.



Our company's products comply with European standards.

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RND	0260	
		026 = Capacity in kW
		RHC = Chilled water
		RND = Direct expansion with remote condenser
		RNV = Direct expansion with condensing unit

QUICK VIEW

RHC		0200	0250	0450	0510
Total cooling capacity	kW	22	28,6	42,9	58,2
Airflow rate	m ³ /h	4000	5300	9000	11000
Width	mm	300	300	600	600

RND		0100	0260	0400	0450
Total cooling capacity	kW	11,2	25,8	40,0	44,7
Airflow rate	m ³ /h	2700	5000	9000	9000
Width	mm	300	600	600	600

RNV		0140	0240	0330
Total cooling capacity	kW	12,8	24,2	33,5
Airflow rate	m ³ /h	3100	4400	4400
Width	mm	300	300	300

The self-contained **R@CKCOOLAIR** units are especially designed to be installed in technological environments where a spot cooling is needed.

As all LENNOX products, **R@CKCOOLAIR** represents the state of the art between technology and design : the low depth (1200 or 1000 mm) allows compatibility with standard server rack. Furthermore the innovative design and the **high tech selected colours** make this units complementary to the **last generation of IT devices**.

The internal design of the units has been focused on efficiency and reliability keeping easy accessibility: all components, including fans, valves, electrical components, etc. are accessible from front and back sides.

The exclusive use of primary brands components and a fully integrated development process (CAD + CAM, CAE) stands for highest possible quality level regarding efficiency, reliability, maintenance time, pre and after sales support.

VERSIONS

The R@CKCOOLAIR is available in three different versions :

RHC – Chilled water

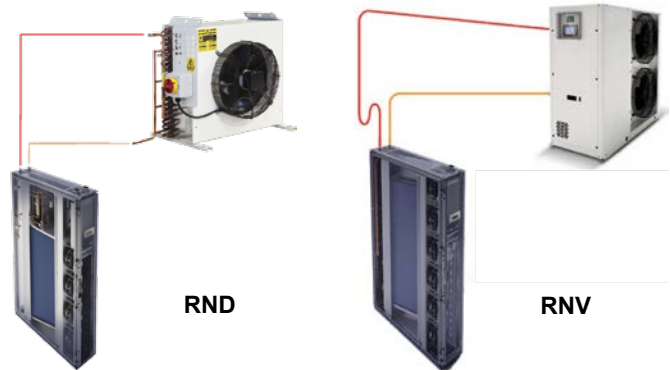
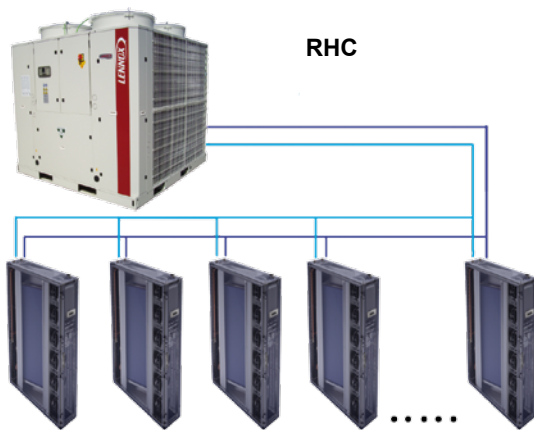
Chilled water unit with high performance coil and modulating water valve which distinguishes for:

- Highest specific cooling capacity (W/m²) due to the large heat exchanger surface;
- Precise temperature control (PID type regulation);
- The possibility to increase return air temperature, thus to rise – while keeping the cooling capacity stable – the medium chilled water temperature. This results in a maximized EER of the chiller and extends the Free-Cooling operation.

RND & RNV - Direct expansion

In the RND range, the compressor is located inside the unit and connected to a remote condenser.

The RNV range is a split unit connected to a condensing unit.



Both versions are equipped with variable speed EC motor compressors which guarantee:

- Precise temperature control (PID type regulation);
- Reduced power consumption at partial load;
- Avoiding of electrical peaks and the compressor's mechanical stress in ON/OFF cycles;
- Extension of the application field.

This is the solution for small and medium size installations where no chilled water system is available or where no chiller can be placed or where site specific constraints do not allow for water in the Datacenter.

Adjusting the facility configuration with the distance between indoor and outdoor unit allows a simple and economic installation.

APPLICATION

The R@CKCOOLAIR ranges can be used in In-Row application with cold or hot aisle or in In-Rack application.

The positioning of the R@CKCOOLAIR unit next to the Server itself minimizes the ventilation consumption needed to overcome pressure drops from ducting or raised floor systems.

Using plug fans with backward curved blades (in contrast to axial fans) guarantees a maximum stability in airflow even in most packed Server-racks whereas the optionally available EC fans allow an efficient modulation of the air volume.

The advanced control modulates the airflow in combination with either the chilled water valve (RHC) or the compressor speed (NRD / NRV) and thus significantly reduces the electrical consumption of the airflow.

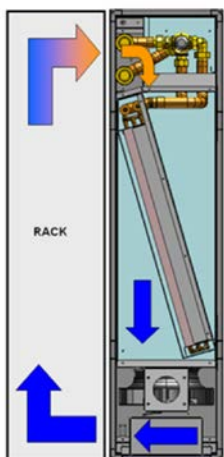
Keep in mind that :
 Fan consumption = $k \cdot [\text{Air Flow}]^3$

Alternatively and optionally available is the “automatic airflow control” which keeps the airflow constant in case of variable pressure drops of the system, or the “Delta P control” for a pressure control in the cold aisle.

The positioning of this type of product offer another big advantage, the cooled air does not go through the raised floor. Usually when the data center requirements change the raised floor becomes clogged with cables which then obstruct the airflow to the diffusion grid, degrading the quality of the cooling and increasing the pressure drop and then the energy consumption.



IN-RACK



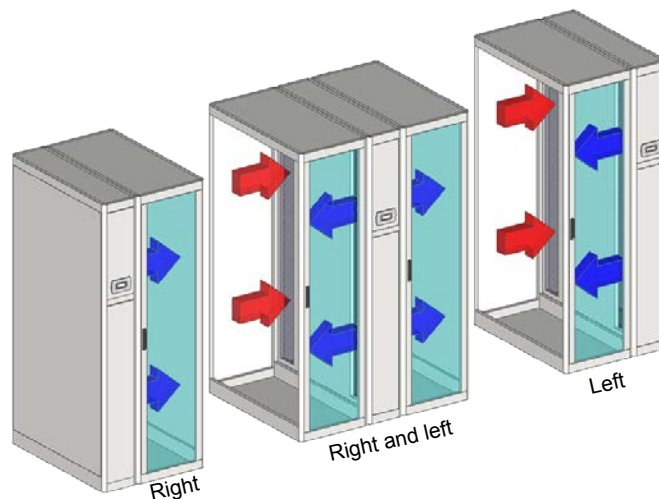
This airflow configuration is designed to cool down the server-rack only and not all the server-room. It is a really spot cooling solution : where and when you need it

Two temperature control zones

Our advanced control allow to manage two different zones, top and bottom, according to the distribution of appliances in the rack or the type of appliance for example one UPS* at the bottom and server bays on top.

The In-Rack configuration is only allowed for the units 300 mm wide and 1200 mm long, as well as server-rack 42U (2000mm) and 46U (2200 mm).

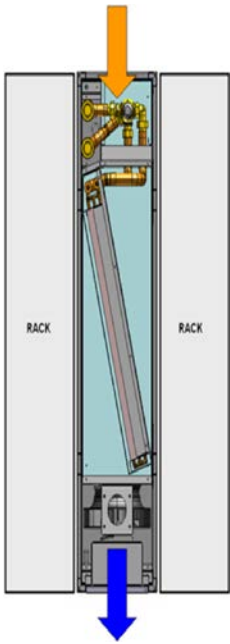
AIRFLOW CONFIGURATIONS



You can select left, right or left and right configuration. Obviously in this case the server-racks have to be equipped with doors and back with solid panels or glass-doors.

*Uninterruptible power supply

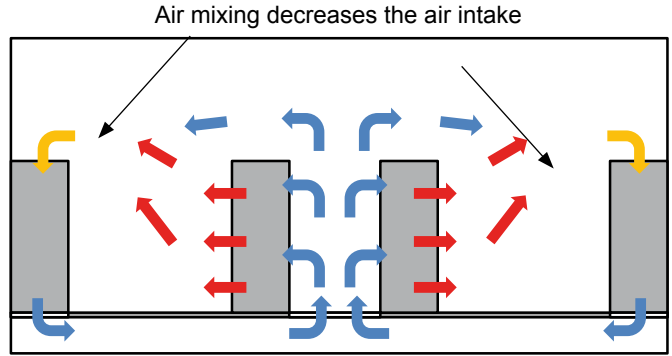
IN-ROW



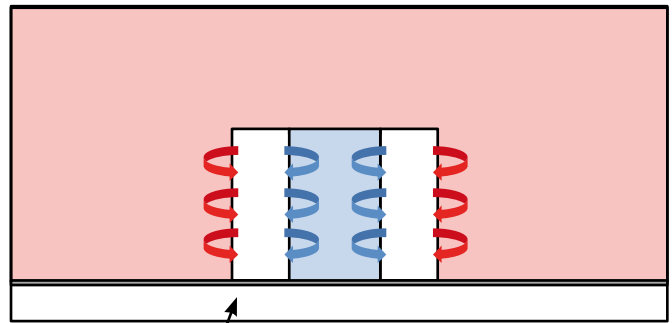
This airflow configuration is designed for hot or cold aisle. Both hot and cold air containment improve significantly the efficiency of data center cooling systems due to the fact that we eliminate the mixing of hot and cold air. In the traditional approach the cooled air floods the entire space and hot air is mixed with. **Separate the cooled and hot air the cooling system can be set to a higher temperature thereby increasing its efficiency and the energy saving.** By this way we also remove less humidity from the air and then reduce the humidification requirement.

Pressure control

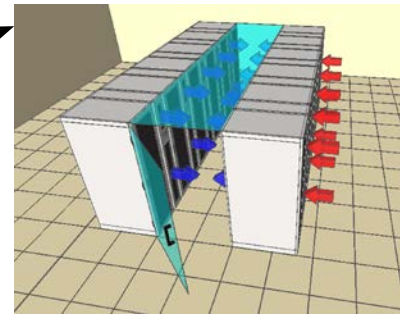
In this type of installation pressure control is required. First, an overpressure in the aisle could damage the server, secondly, in keeping the pressure at the same level than outside, air leakage and trouble with door opening is avoided. Our advanced control with the EC fans allow such precise control. In this case for better efficiency we recommend to draw the pressure sensor pipe in the aisle.



Traditional installation



Cold aisle installation

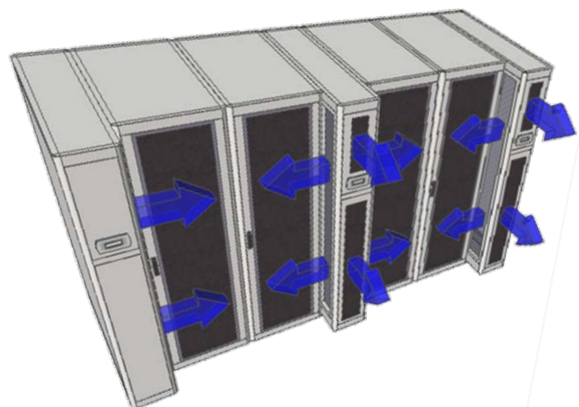
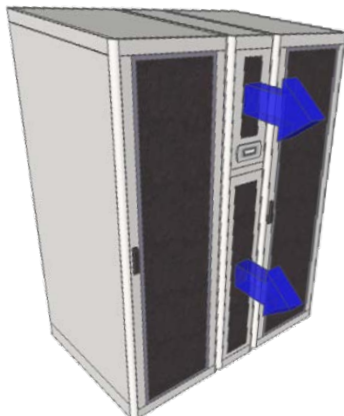


AIRFLOW CONFIGURATIONS

The different possibilities of airflow configurations allow many solutions :

- Below left illustration : traditional configuration with rack and unit of the same dimension 1000 mm or 1200 mm.

- Right illustration : other possibilities when we use units of 1200 mm with racks of 1000 mm. The discharge can be at the end or/and right, left you can imagine any combination.



STRUCTURE DESCRIPTION

R@CKCOOLAIR units are designed with a self-supporting frame and all components are produced using sophisticated computer driven machines and special tools.

All sheet metals are galvanized and all external panels are powder coated (RAL 7035) giving to the units the same image and quality as last generation of IT devices. The shape of the units is characterized with the curved edges with variable radius. All fixing elements are made in stainless steel or in non-corroding materials. The drain pan is made of stainless steel in order to ensure long time operation without damages.

All panels are thermally insulated with a polyurethane foam class 1 according UL 94 norms: this material, thanks to the open cells, gives good performances in sound absorption.

ELECTRICAL CONTROL BOARD

The electric control board is constructed and wired in accordance with Directives 73/23/EEC and 89/336/EEC and related standards. The board may be accessed through a door after the main switch has been turned off. All the remote controls use 24V signals powered by an insulating transformer situated on the electric control board.

- The mechanical safety devices such as the high pressure switched are of the kind that trigger directly; their efficiency will not be affected by any faults occurring in the microprocessor control circuit, in compliance with 97/23 PED.

WARNING : For RNV range, the power supply of indoor and outdoor units are separated. Especially on sizes 0240 and 0330 where we have 230V/1/50Hz for indoor and 400V/3/50Hz for outdoor.

FILTRATION

The R@CKCOOLAIR is equipped as a standard with G3 filters, but in option G4 and M5 are available.

Our filter can be proposed with clogged-filter sensor. In this case you get an alarm when your filters are dirty.

HUMIDITY CONTROL

The advanced control manages the humidification and dehumidification. The unit provide 0-10V signal to drive an external humidifier but for the 600 mm width unit an internal 3kg/h steam humidifier can be proposed as an option.

DUAL POWER SUPPLY

Our unit can be equipped with optional DPSS, (Dual Power Supply System for automatic changeover from main line to UPS)

Features :

- Switching time = ~2 seconds (due to an electromechanical commutation)
- Unit stop time = ~30 seconds (due to the restart time of the microprocessor)

The DPSS is designed on specific unit around its maximum absorbed power and current. **We can provide different type of solutions, according to the size of the electrical panel.**

COOLING CAPACITY READING (RHC)

As an option on the RHC chilled water range, we can propose In/Out water temperature sensors, water flow meter or both, in this last case the **instantaneous capacity** of the unit can be read on the display or from the BMS.

WATER/REFRIGERANT CONNECTIONS

For chilled water and DX units you can chose connection to the top or to the bottom of the unit.

CONDENSATION PUMP

Our units are equipped with two drain pans (AISI 430 stainless steel EDX), one specific underneath the cooling coil and another one at the bottom of the unit. As an option, we can provide condensation pump on board.

LEVELLING FEET

For the Indoor unit we can provide 4 adjustable feet to align the unit with the server-rack. This option is not suitable for cold/hot aisle application (due to air bypass underneath the unit).

WATER LEAKAGE DETECTOR

Option specially required for chilled water unit, but keep in mind that our units are equipped with 2 drain pans.

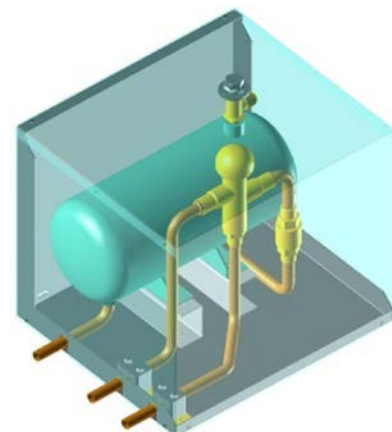
FIRE ALARM

We can also provide smoke detector and fire detector.

CONDENSING CONTROL

Our DX units are equipped as a standard with fan speed control to ensure enough pressure drops across the expansion device in operation with outside temperature below 20°C.

But below -15° and down to -30°C, we can propose as an option a flooding device in order to flood the condenser internal surface allowing the right condensing temperature even in case of strong and cold wind. This device is shipped as a kit consisting of a back pressure valve, a receiver, a safety valve and mounting instructions: the installation is very simple and has to be done just close to the condensing unit at bottom side.



ADVANCED CONTROL

The microprocessor built into the unit allows the different operating parameters to be controlled from a set of pushbuttons situated on the electric control board:

- Switching On/Off - Modulation of compressor to maintain the temperature set point T inside the shelter.
- Alarm management :
 - High / Low pressure;
 - Dirty filters alarm (optional);
 - Air flow alarm.
- Alarm signalling.
- Display of operating parameters.
- RS232, RS485 serial output management (optional).
- Phase sequence error (not displayed by the control, but prevents the compressor from starting up) (only for direct expansion units).
- As standard, LAN connection up to 8 units



OPTIONS :

- The units are equipped with their own display but you can add a remote one
- Air volume measurement - automatic constant airflow control and visualization
- Delta pressure control : required for cold/hot aisle application
- Many possibilities of communication through different protocols

See microprocessor control manual for further details, also in relation to particular customer specifications.

FEATURES SUMMARY

Standard

- Spot cooling: where and when you need it
- Airflow switch
- Full accessibility
- Display of 3-way water valve mixing percentage
- High pressure radial fans with backward curved blades : EC plug fans with continuous speed modulation
- Modulating airflow in accordance to the cooling capacity for a much higher energy saving
- High efficiency hydrophilic finned coil with aluminum structure
- Two drain pans made of AISI 430 stainless steel EDX
- Hydraulic connections from the top or from the bottom
- Powder-coated metal sheet structure
- Fully insulated panels
- 2 or 3 way water valve, modulating by means of a 0-10 V signal
- Several different airflow configurations
- Two separate zones control – At the top and the bottom of the unit
- Condensing controls: Built-in control for air-cooled units (modulating fan-speed control) with dedicated automatic breaker
- Lockable panels
- Programmable control with LCD display
- LAN connection up to 8 units

Options and accessories

- Clogged filter sensors
- Dehumidification/Humidification control with humidity sensor option (steam humidifier in 600 mm units)
- Additional temperature and humidity sensors
- Automatic airflow control with display visualization
- Fire and smoke sensors
- Water leakage detector
- Condensate water pump
- Water flow meter with current cooling capacity display
- Integrated IT Racks and Hotspot Cooling solutions – proposition des rack avec l'armoire
- Alarm option with extra potential free contacts
- Serial cards for protocols : Modbus / Lonworks / Bacnet / Trend
- pCOWEB Hardware: Ethernet card for protocols: Bacnet / SNMP
- DATAWEB Software: Ethernet card for Web connectivity
- Touch-Screen colour graphic display

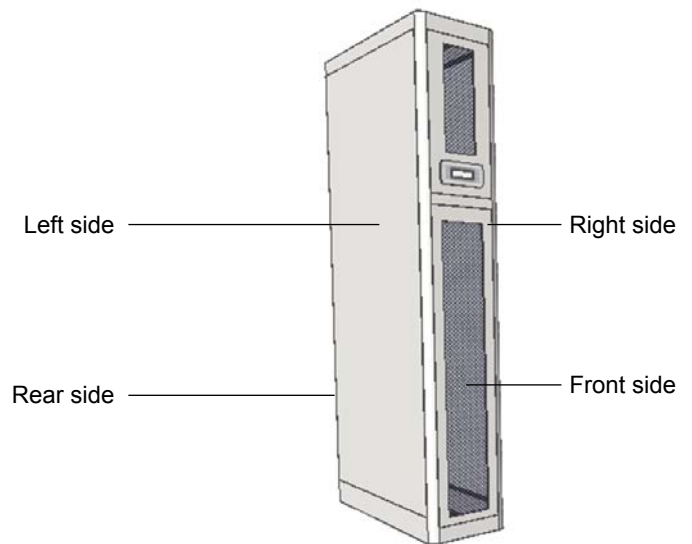
AIRFLOW CONFIGURATIONS OVERVIEW

Allowed airflow configurations according to dimensions.

1000x300x2000	■	■	■	■	■	■	■			
1000x300x2200	■	■	■	■	■	■	■			
1200x300x2000	■	■	■	■	■	■	■	■	■	■
1200x300x2200	■	■	■	■	■	■	■	■	■	■
1200x600x2000	■	■	■	■	■	■	■			
1200x600x2200	■	■	■	■	■	■	■			

SIDES IDENTIFICATION

Allowed airflow configurations according to dimensions.



CABINET DIMENSIONS OVERVIEW (indoor unit)

Dimensions allowed according to the type and size.

	RHC				RND				RNV		
	0200	0250	0450	0510	0100	0260	0400	0450	0140	0240	0330
1000x300x2000	■	■							■	■	■
1000x300x2200	■	■							■	■	■
1200x300x2000	■	■			■				■	■	■
1200x300x2200	■	■			■				■	■	■
1200x600x2000			■	■		■	■	■			
1200x600x2200			■	■		■	■	■			

R@CKCOOLAIR - RHC

Chilled water unit

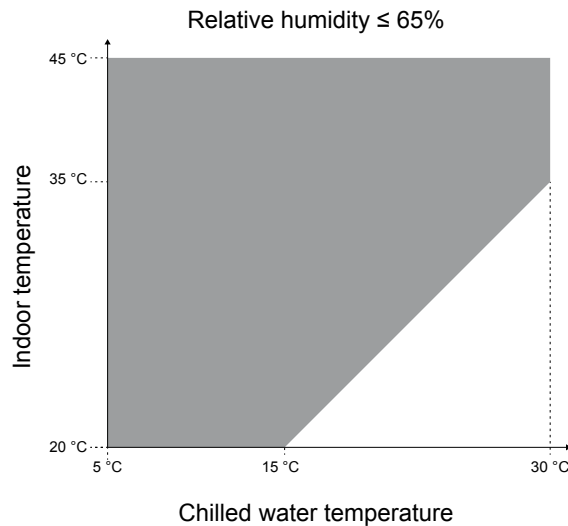
R@CKCOOLAIR		RHC 0200			RHC 0250			RHC 0450			RHC 0510		
Indoor operating conditions Temperature - Relative humidity		24°C 50%	30°C 35%	35°C 26%	24°C 50%	30°C 35%	35°C 26%	24°C 50%	30°C 35%	35°C 26%	24°C 50%	30°C 35%	35°C 26%
Total cooling capacity ⁽¹⁾	kW	13,0	20,5	26,2	18,1	28,3	36,1	30,4	46,2	59,1	36,1	57,0	74,2
Sensible cooling capacity		13,0	20,5	26,2	18,1	28,3	36,1	30,4	46,2	59,1	36,1	57,0	74,2
Fan absorbed power		0,6			0,8			2,1			2,5		
KVS valve		6,5						25					
Voltage		230 V/1 Ph/50 Hz						400 V/3 Ph/50 Hz					
Water flow rate	l/h	2395	3780	4840	3150	4919	6297	4805	7375	9429	6376	9997	12830
Water pressure drop	kPa	19,2	48,2	78,7	30,6	75,8	123,2	40	92,2	150,6	34,5	86,3	146,1
Airflow rate	m ³ /h	4000			5300			9000			11000		
Dimensions Length x Height x Depth	mm	300 x 2000 x 1200						600 x 2000 x 1200					
Weight	kg	130			135			250			280		

Water : 10-15 °C

Power supply / Storage conditions

Model	RHC	0200 0250	0450 0510
Power supply Indoor unit		230 Vac ± 10% 1/50Hz	400 Vac ± 10% 3+N/ 50Hz
Storage conditions		from -10 °C to +60 °C 90 % relative humidity	

Operating limits

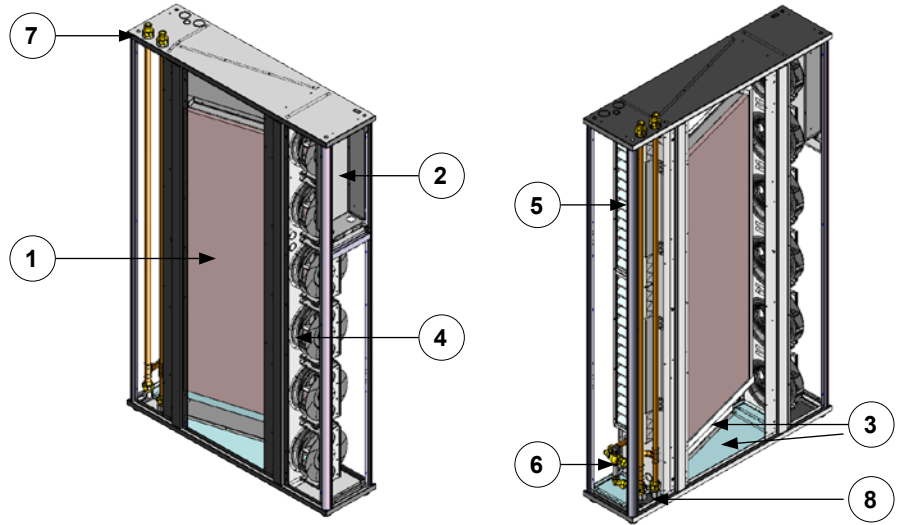


R@CKCOOLAIR - RHC

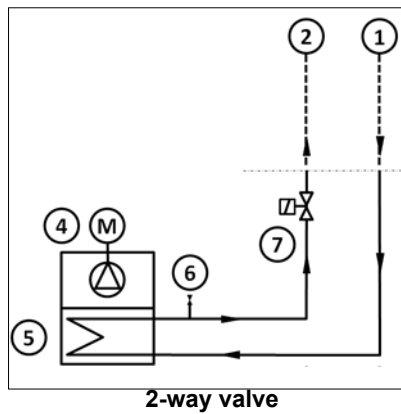
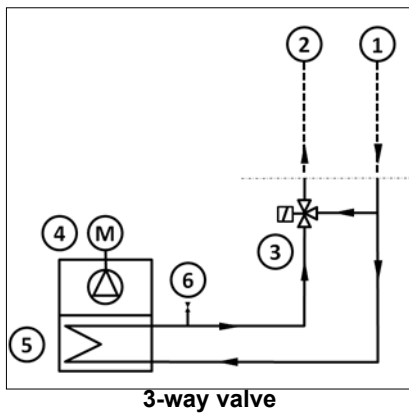
Chilled water unit

Legend

1	Chilled water coil
2	Electrical panel (removable for access to the fans)
3	Double stainless steel drain pan
4	Fan
5	Air filter
6	Water valve
7	Water connections from the top
8	Water connections from the bottom



BASIC COOLING CIRCUIT



Legend

1	Chilled water inlet
2	Chilled water outlet
3	3-way valve
4	Plug fan
5	Coil heat exchanger
6	Breather valve
7	Breather valve

WATER VALVE

Modulating valves allow high precision in controlling the rack temperature

- 3 way valve for constant flow systems
- 2 way valve for variable flow. In this case, free cooling application range will be extended thanks to the increase of return water temperature once the load decreases

Model	RHC 0200/RHC 0250	RHC 0450/RHC 0510
Brand / Type of valve	Controlli / VMXT2	Johnson / VG7802RT
PN valve	16	16
Dimension (inch)	3/4"	1" 1/2

All RHC units are supplied with 3- or 2-way valves with 0-10V signal regulation.

R@CKCOOLAIR - RND

Direct expansion unit with remote condenser

COOLING CIRCUIT

The entire refrigerating circuit is assembled in our production line including all pipe work and using only primary brand components. The workers involved in the welding and pipe work process are qualified by a third part according to CEE 97/23. The units are precharged with dry nitrogen.

COMPRESSORS

On RND units, only primary brand of scroll compressors is used, BLDC scroll for inverter application are installed.

On close control units, BLDC scroll compressor is the best solution in terms of efficiency and reliability. The compression ratio is very close to the typical operating condition of these units, giving the maximum in terms of COPs. The perfect balanced pressures at start-up gives high reliability to the EC motor, especially in this application **with** frequent start-ups.

All motors are thermally protected with an internal sensors chain: in case of overload, this sensor opens without giving contacts to the connection box.

ELECTRONIC EXPANSION VALVE

Standard feature on our DX range, the expansion valve is a mass flow regulator ensuring the right refrigerant flow according to the superheating after the evaporator. The mass flow depends mainly from the % of opening and from the delta pressure available across the valve. Mechanical valves have a very little modulating capacity and, to ensure the mass flow, require a significant pressure difference over it.

The R@CKCOOLAIR uses an electronic driven valve that ensures a high modulation capacity thanks to the large shutter stroke : this solution allows to decrease the minimum differential pressure over the valve, thus reducing the condensing temperature in middle and winter seasons. In this periods the reduction of energy consumption reaches 51 % guaranteeing significant money savings and CO2 emission reduction.

SETTING OF CONTROL AND SAFETY DEVICES

Control device		Activation	Differential	Resetting
Maximum pressure switch	Bar-g	38	4	Manual
Minimum pressure switch	Bar-g	2.0	1.5	Automatic
Condensation modulating control devices (DX versions)	Bar-g	18	10	-
Time laps between two compressor starts	s	480	-	-

COOLING COMPONENTS

- Molecular mesh activated-alumina filter dryer.
- Flow indicator with humidity indicator (indications are provided directly on the sight glass).
- High and low pressure switches.
- Schraeder valves for checks and/or maintenance.

MAXIMUM PRESSURE SWITCH

The high pressure switch stops the compressor when the outlet pressure exceeds the set value.

Warning: do not attempt to change the setting of the maximum pressure switch: Should the latter fail to trip in the event of a pressure increase, the pressure relief valve will open.

The high pressure switch must be manually reset; this is possible only when the pressure falls below the differential set (see above).

MINIMUM PRESSURE SWITCH

The low pressure switch stops the compressor when the inlet pressure falls below the set value for more than 1 second. The switch is automatically reset when the pressure rises above the set differential (see above).

RND : DX unit with remote condenser

R@CKCOOLAIR		RND 0100			RND 0260		
Compressor frequency	Hz	30	70	120	30	70	120
Total cooling capacity	kW	3,1	7,6	11,2	7,6	16,6	25,8
Sensible heat ratio		1					
Compressor absorbed power	kW	0,7	1,5	2,7	1,2	3,2	6,9
Compressor absorbed current	A	3,1	7,2	13,0	1,9	4,8	10,5
Evaporator airflow rate	m ³ /h	700	1600	2700	1500	3000	5000
Fan absorbed power	kW	0,05	0,12	0,40	0,11	0,21	0,50
Voltage		230 V/1 Ph/50 Hz			400 V/3 Ph/50 Hz		
Compressor type		1 x EC motor compressor - Twin Rotary			1 x EC motor compressor - Scroll		
Dimensions Length x Height x Depth	mm	300 x 2000 x 1200			600 x 2000 x 1200		
Weight	kg	135			365		

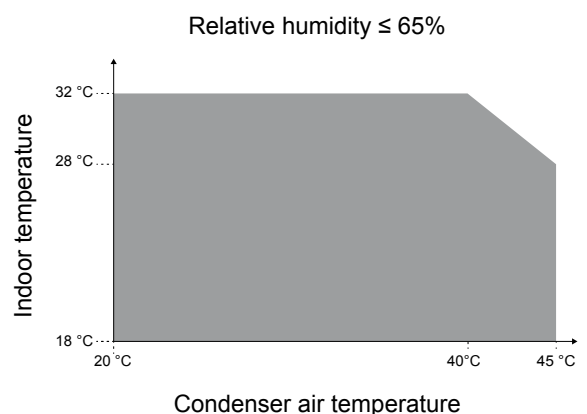
R@CKCOOLAIR		RND 0400			RND 0450		
Compressor frequency	Hz	30	70	120	30	70	120
Total cooling capacity	kW	12,9	26,5	40,0	14,9	30,9	44,7
Sensible heat ratio		1					
Compressor absorbed power	kW	1,9	5,4	11,3	2,4	6,5	14,4
Compressor absorbed current	A	2,9	8,2	17,2	3,6	9,9	21,9
Evaporator airflow rate	m ³ /h	2700	5500	9000	2700	5500	9000
Fan absorbed power	kW	0,20	0,65	2,10	0,20	0,65	2,10
Voltage		400 V/3 Ph/50 Hz					
Compressor type		1 x EC motor compressor - Scroll					
Dimensions Length x Height x Depth	mm	600 x 2000 x 1200					
Weight	kg	368			375		

Operating conditions :
Indoor : 30°C/35% - Outdoor : 35°C

Power supply / Storage conditions

RND	0100	0260 0400 0450
Power supply	230 Vac ± 10% 1/50Hz	400 Vac ± 10% 3+N/ 50Hz
Storage conditions	from -10 °C to +60 °C 90 % relative humidity	

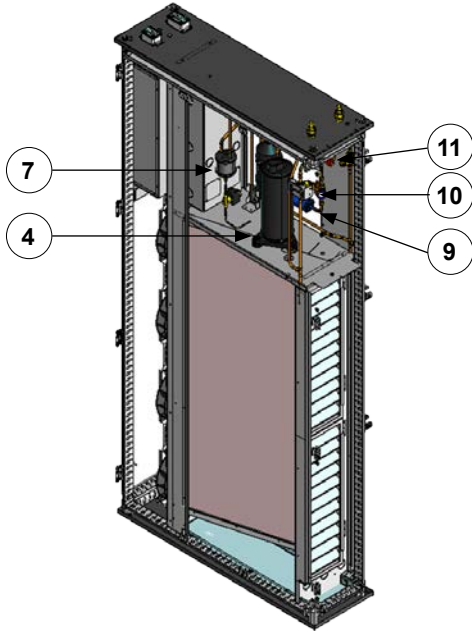
Operating limits



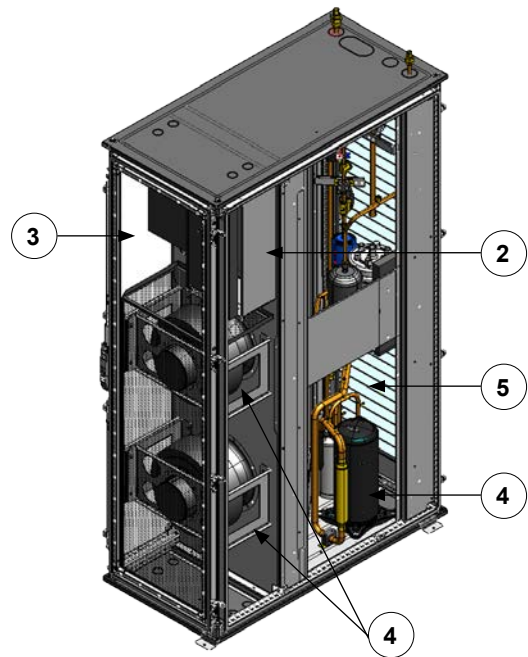
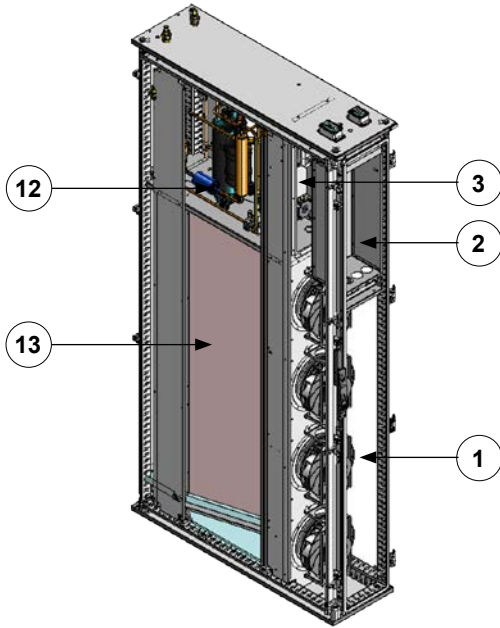
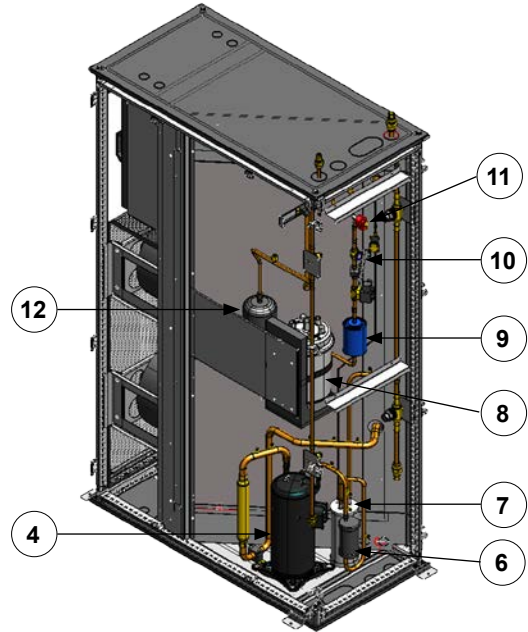
R@CKCOOLAIR - RND

Direct expansion unit with remote condenser

RND 0100



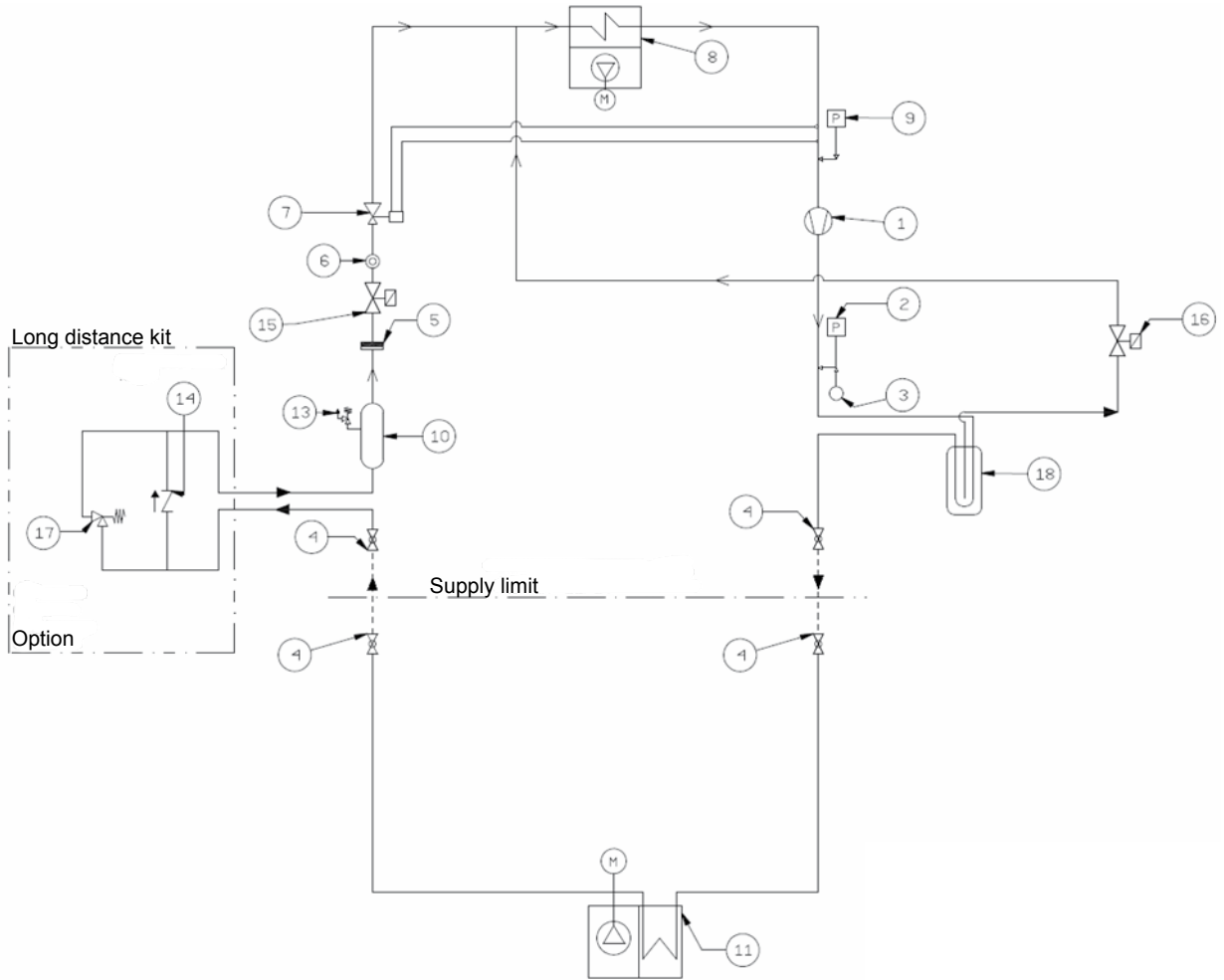
RND 0260/0400/0560



Legend

1	Radial fan	8	Humidifier
2	Electrical panel	9	Dry filter
3	Inverter	10	Sight glass
4	EC motor compressor	11	Expansion valve
5	Air filter	12	Liquid receiver
6	Silencer	13	Evaporator
7	Oil separator		

R@CKCOOLAIR - RND
BASIC COOLING CIRCUIT



Legend

1	Inverter driven compressor	10	Liquid receiver
2	HP Pressure switch	11	Condenser
3	Pressure probe (opt.)	13	Safety valve
4	Ball valve	14	Check valve
5	Refrigerant filter	15	Solenoid valve
6	Sight glass	16	Oil solenoid valve
7	Thermostatic valve	17	Bypass valve - Long distance kit
8	Evaporator	18	Oil separator
9	LP pressure switch		

R@CKCOOLAIR - RNV

Direct expansion unit condensing unit

COOLING CIRCUIT

The entire refrigerating circuit is assembled in our production line including all pipe work and using only primary brand components. The workers involved in the welding and pipe work process are qualified by a third part according CEE 97/23. The units are precharged with dry nitrogen.

COMPRESSORS

On RNV units, only primary brand of scroll compressors is used, BLDC scroll for inverter application are installed.

On close control units, BLDC scroll compressor is the best solution in terms of efficiency and reliability. The compression ratio is very close to the typical operating condition of these units, giving the maximum in terms of COPs. The perfect balanced pressures at start-up gives high reliability to the EC motor, especially in this application with frequent start-ups.

All motors are thermally protected with an internal sensors chain: in case of overload, this sensor opens without giving contacts to the connection box.

ELECTRONIC EXPANSION VALVE



Standard feature on our DX range, the expansion valve is a mass flow regulator ensuring the right refrigerant flow checking the superheating at the evaporator outlet. The mass flow depends mainly from the % of opening and from the delta pressure available across the valve. Mechanical valves have a very little modulating capacity and, to ensure the mass flow, a significant Delta P across it has to be maintained.

The R@CKCOOLAIR uses an electronic driven valve that ensures a high modulation capacity thanks to the large shutter stroke : this solution allows to decrease the

minimum differential pressure over the valve, thus reducing the condensing temperature in middle and winter seasons. In this periods the reduction of energy consumption reaches 51 % guaranteeing significant money savings and CO2 emission reduction

COOLING COMPONENTS

- Molecular mesh activated-alumina filter dryer.
- Flow indicator with humidity indicator (indications are provided directly on the sight glass).
- High and low pressure switches.
- Schraeder valves for checks and/or maintenance.

MAXIMUM PRESSURE SWITCH

The high pressure switch stops the compressor when the outlet pressure exceeds the set value.

Warning: do not attempt to change the setting of the maximum pressure switch: should the latter fail to trip in the event of a pressure increase, the pressure relief valve will open.

The high pressure switch must be manually reset; this is possible only when the pressure falls below the differential set (see above).

MINIMUM PRESSURE SWITCH

The low pressure switch stops the compressor when the inlet pressure falls below the set value for more than 1 second. The switch is automatically reset when the pressure rises above the set differential (see above).

SETTING OF CONTROL AND SAFETY DEVICES

Control device		Activation	Differential	Resetting
Maximum pressure switch	Bar-g	38	4	Manual
Minimum pressure switch	Bar-g	2.0	1.5	Automatic
Condensation modulating control devices (DX versions)	Bar-g	18	10	-
Time lapse between two compressor starts	s	480	-	-

R@CKCOOLAIR - RNV

Direct expansion unit condensing unit

R@CKCOOLAIR		RNV 0140			RNV 0240			RNV 0330		
Indoor unit										
Compressor frequency	Hz	30	70	120	30	70	120	30	70	120
Total cooling capacity	kW	3,9	8,1	12,8	7,8	16	24,2	12,8	23	33,5
Sensible heat ratio		1	1	1	1	1	1	1	0,9	0,83
Evaporator airflow rate	kW	900	1800	3100	1650	2900	4400	2900	3600	4400
Fan absorbed power		0,08	0,17	0,38	0,14	0,35	0,99	0,3	0,56	0,99
Voltage		230 V/1 Ph/50 Hz								
Dimensions Length x Height x Depth	mm	300 x 2000 x 1200								
Outdoor condensing unit										
Compressor frequency	Hz	30	70	120	30	70	120	30	70	120
Compressor absorbed power	kW	0,6	1,7	4,3	1,2	3,2	7	2	5,2	10,7
Compressor absorbed current	A	2,9	8,2	20,8	1,8	4,9	10,6	3,1	7,9	16,2
Number of scroll compressors		1								
Condenser airflow rate	m³/h	3500			9300			16280		
Soud power level	dB(A)	62			72			73		
Sound pressure level (10 m free field)		34			44			45		
Voltage		230 V/1 Ph/50 Hz			400 V/3 Ph/50 Hz					
Dimensions Length x Height x Depth	mm	1270 x 880 x 500			1565 x 1300 x 600			1990 x 1485 x 950		
Weight	kg	100			332			162		

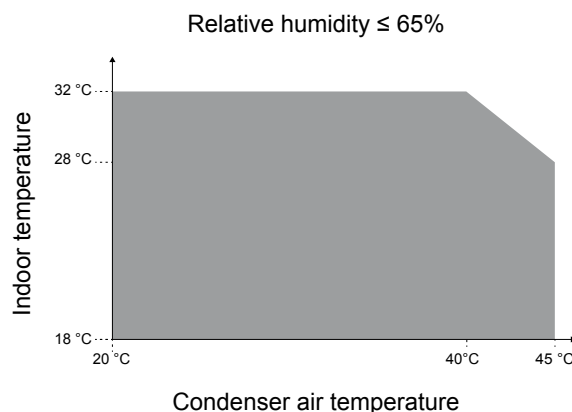
Operating conditions :

Indoor : 30°C/35% - Outdoor : 35°C

Power supply / Storage conditions

RNV			
Power supply	Indoor unit		
	Outdoor unit		
Storage conditions		from -10 °C to +60 °C 90 % relative humidity	

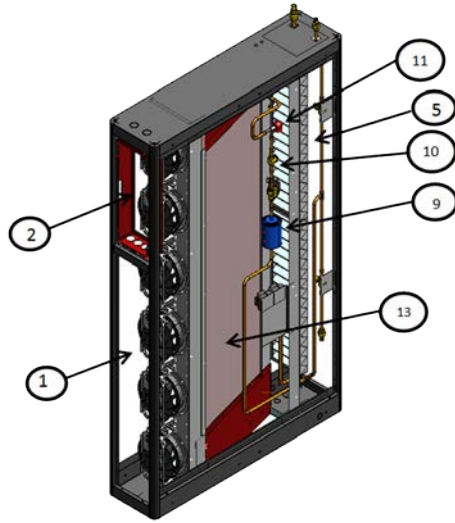
Operating limits



R@CKCOOLAIR - RNV

Direct expansion unit condensing unit

Indoor unit

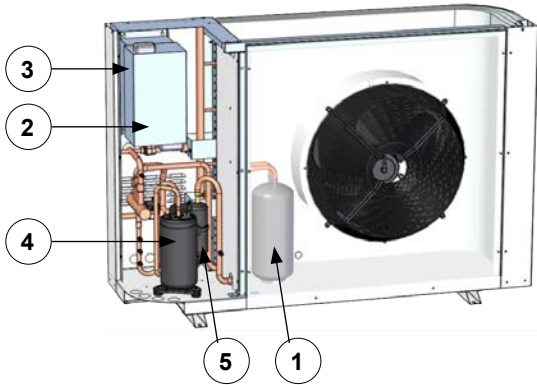


Legend

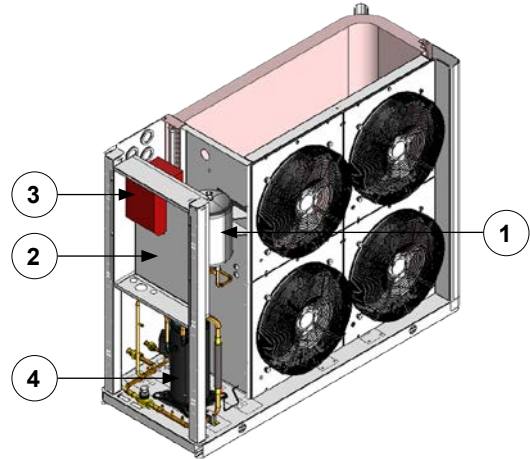
1	Radial fan
2	Electrical panel
5	Air filter
9	Dry filter
10	Sight glass
11	Expansion valve
13	Evaporator

Outdoor units

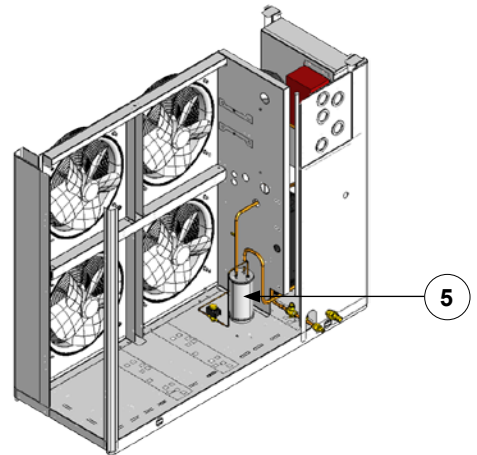
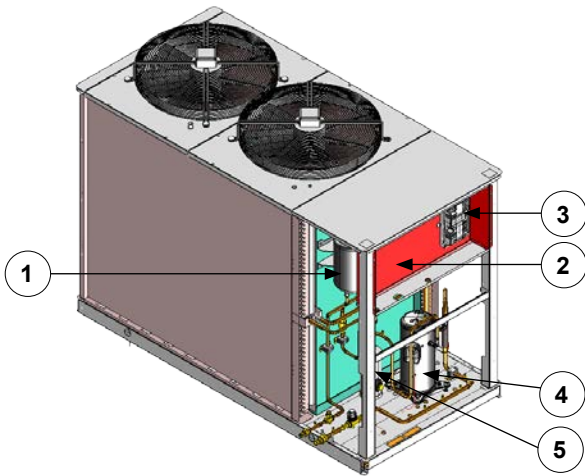
RNV 0140



RNV 0240



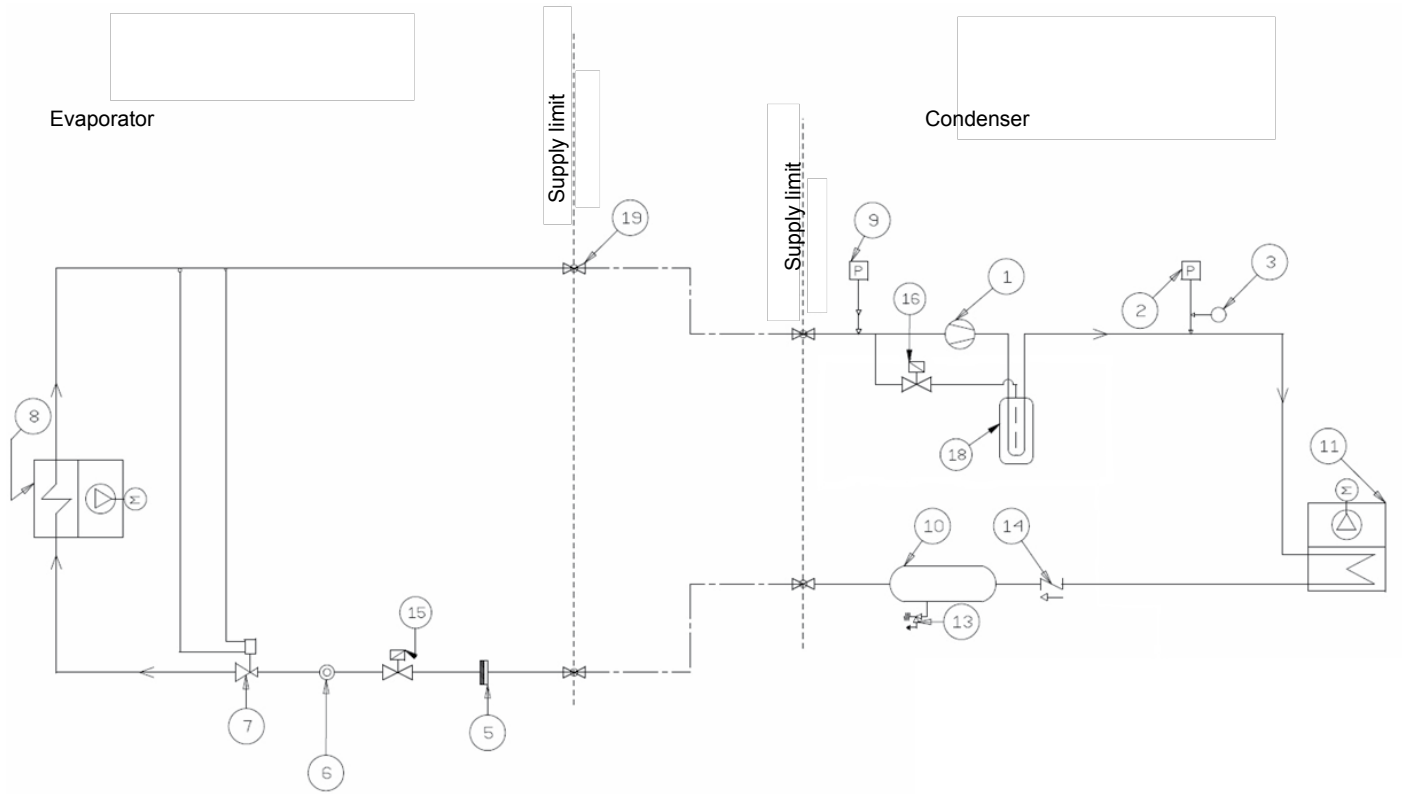
RNV 0300



Legend

1	Liquid receiver	4	EC motor compressor
2	Electrical panel	5	Oil separator
3	Inverter		

R@CKCOOLAIR - RNV
BASIC COOLING CIRCUIT



Legend

1	Inverter driven compressor	10	Liquid receiver
2	HP Pressure switch	11	Condenser coil
3	Pressure probe (opt.)	13	Safety valve
5	Refrigerant filter	14	Check valve
6	Sight glass	15	Solenoid valve
7	Thermostatic valve	16	Oil solenoid valve
8	Evaporator	18	Oil separator
9	LP pressure switch	19	Shout off valve

LIFTING AND TRANSPORT

While the unit is being unloaded and positioned, utmost care must be taken to avoid abrupt or violent movements. The unit must be handled carefully and gently; avoid using machine components as anchorages or holds and always keep it in an upright position. The unit should be lifted using the pallet it is packed on; a transpallet or similar conveyance means should be used.

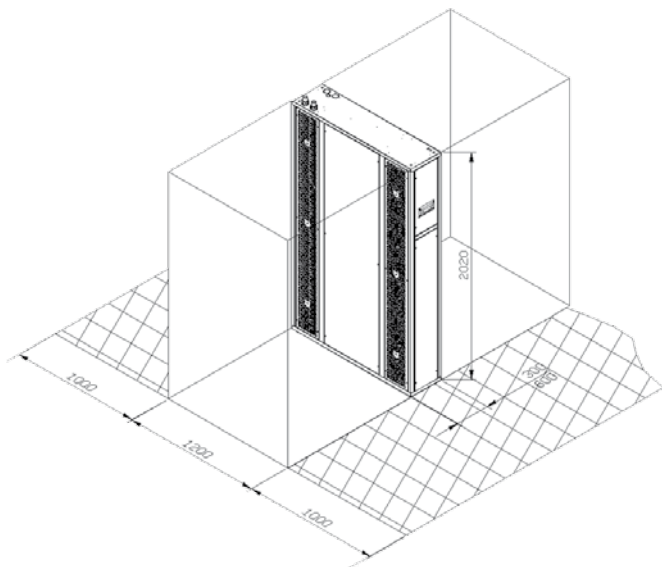
Warning: In all lifting operations make sure that the unit is securely anchored in order to prevent accidental falling or overturning.

CLEARANCES

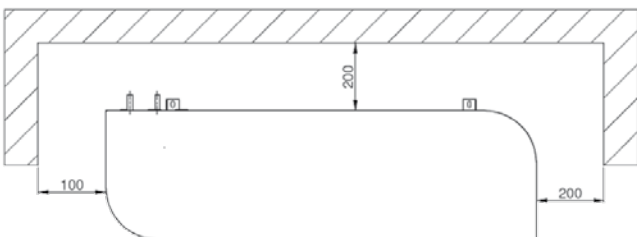
The RHC air-conditioning unit is suitable for all environments except aggressive ones. Do not place any obstacles near the units and make sure that the air flow is not impeded by obstacles and/or situations causing back suction.

The following steps should be carried out to ensure proper installation:

- Apply a anti-vibration rubber lining between the unit and the bottom.
- Position the unit on the floor



RNV 0140
Outdoor unit - Top view



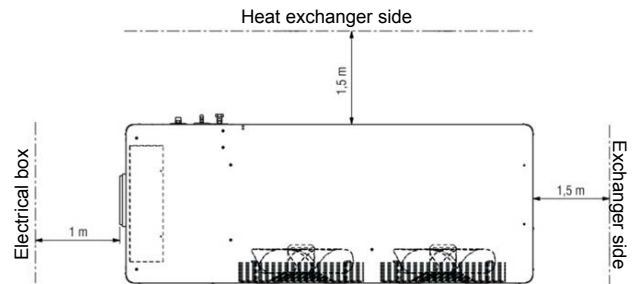
POSITIONING

Keep in mind the following aspects when choosing the best site for installing the unit and the relative connections:

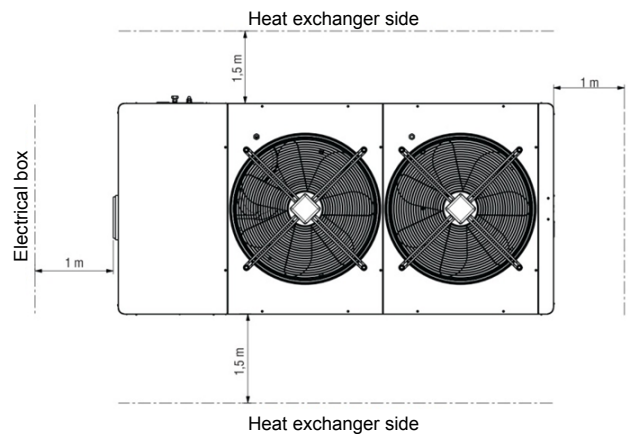
- positioning and dimensions of the coupling flanges;
- location of power supply;
- solidity of the supporting floor.

It is recommended to first prepare holes in the floor/wall for passing through the power cables and for the air outlet (downflow units). The dimensions of the air outlet and the positions of the holes for the screw anchors and power cables are shown in the dimensional drawing (see the documentations delivered together with the unit)

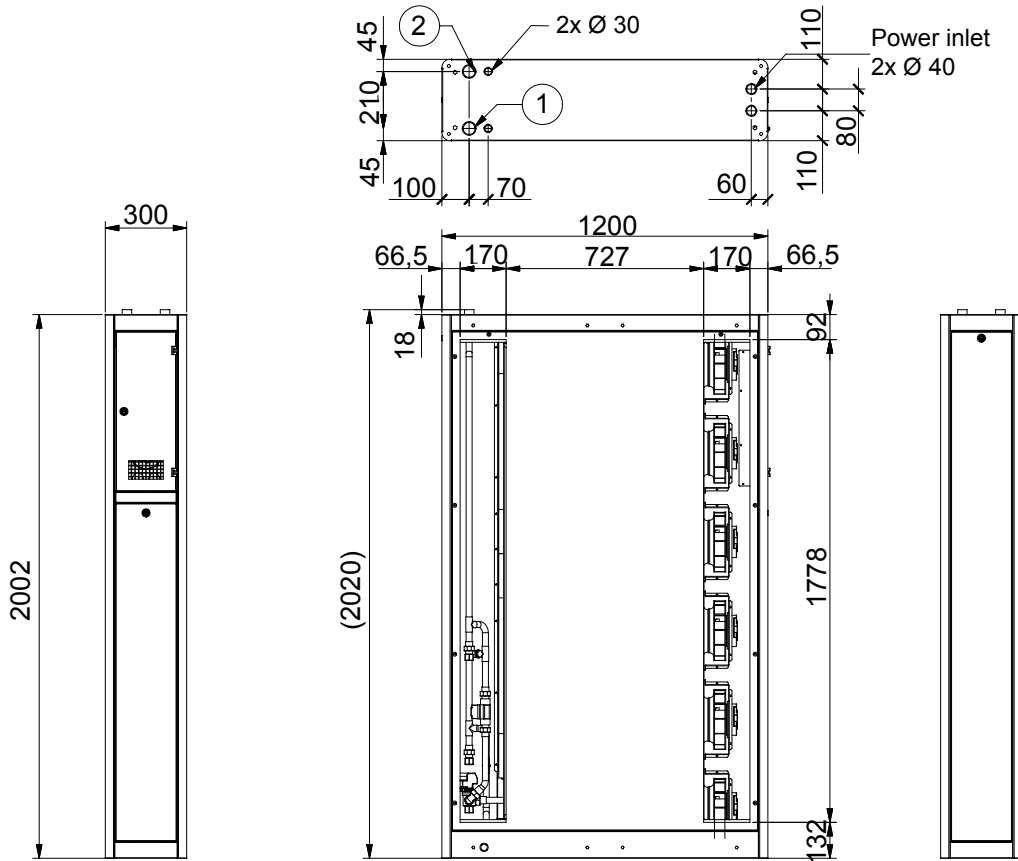
RNV 0240
Outdoor unit - Top view



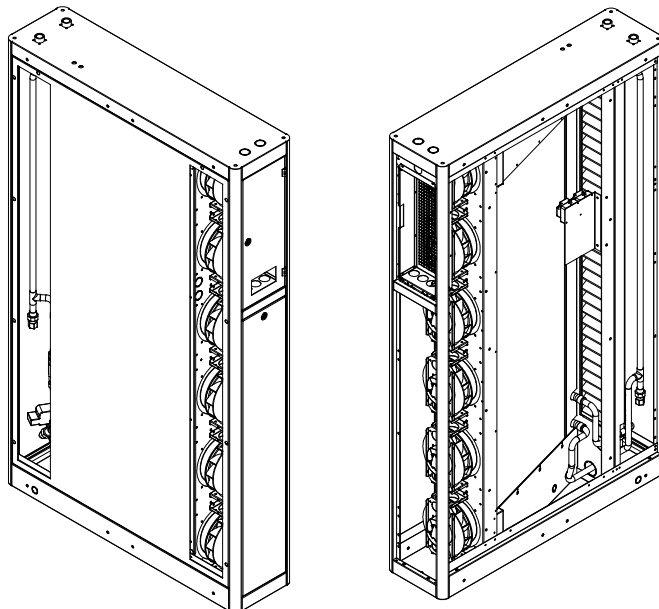
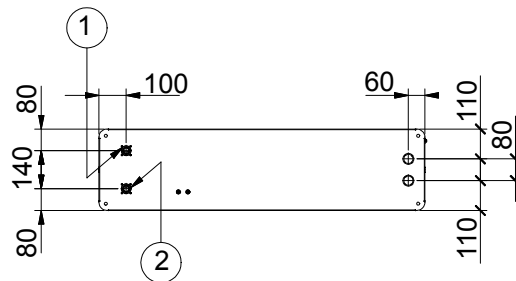
RNV 0300
Outdoor unit - Top view



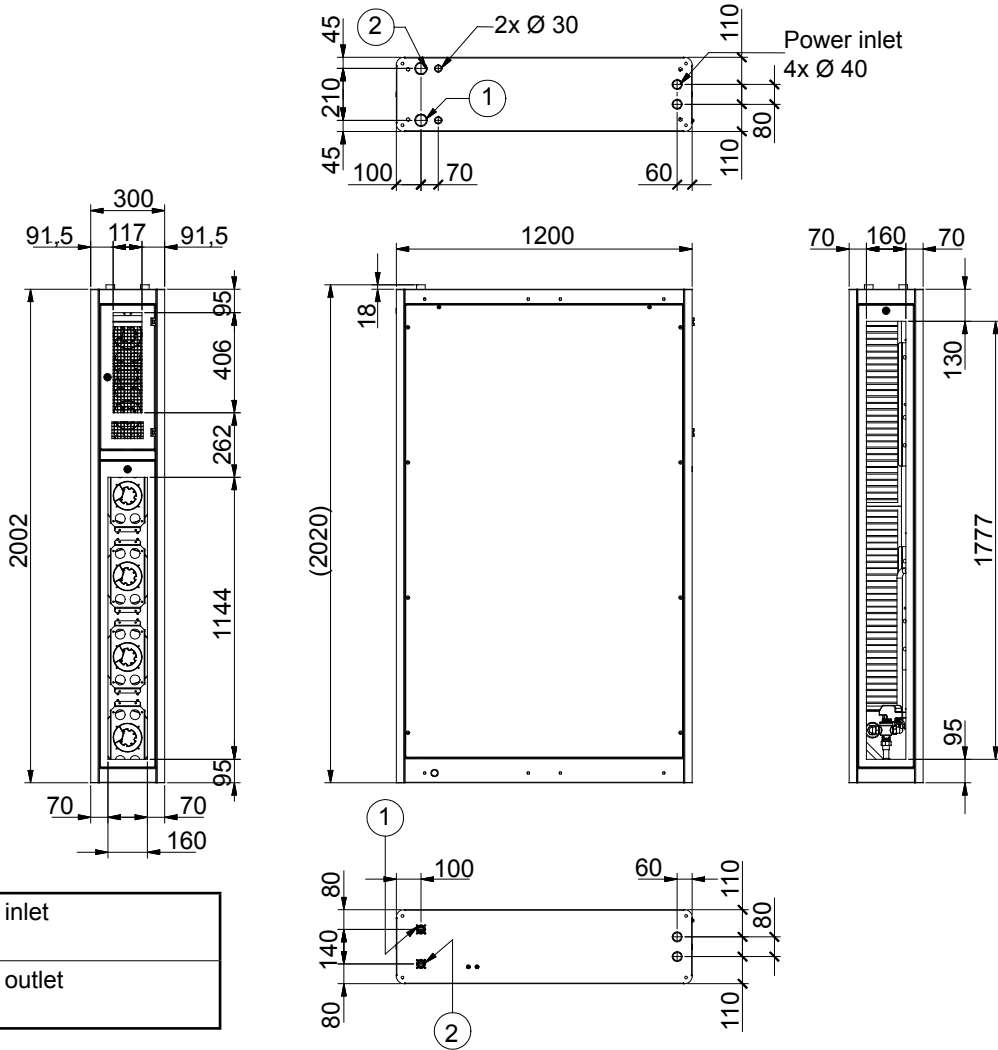
**RHC 0200 - RHC 0250
IN RACK (1200 mm)**



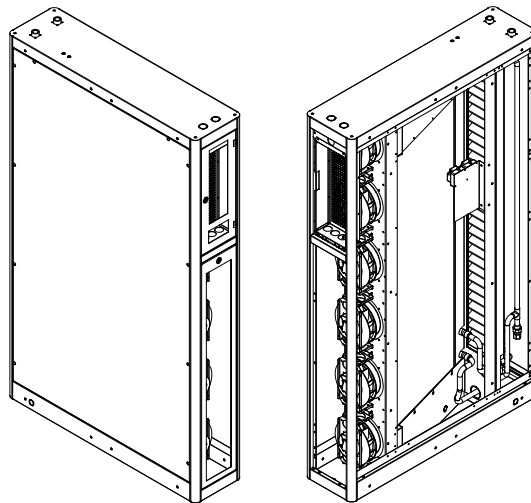
1	Cooling water inlet 3/4" gas
2	Cooling water outlet 3/4" gas



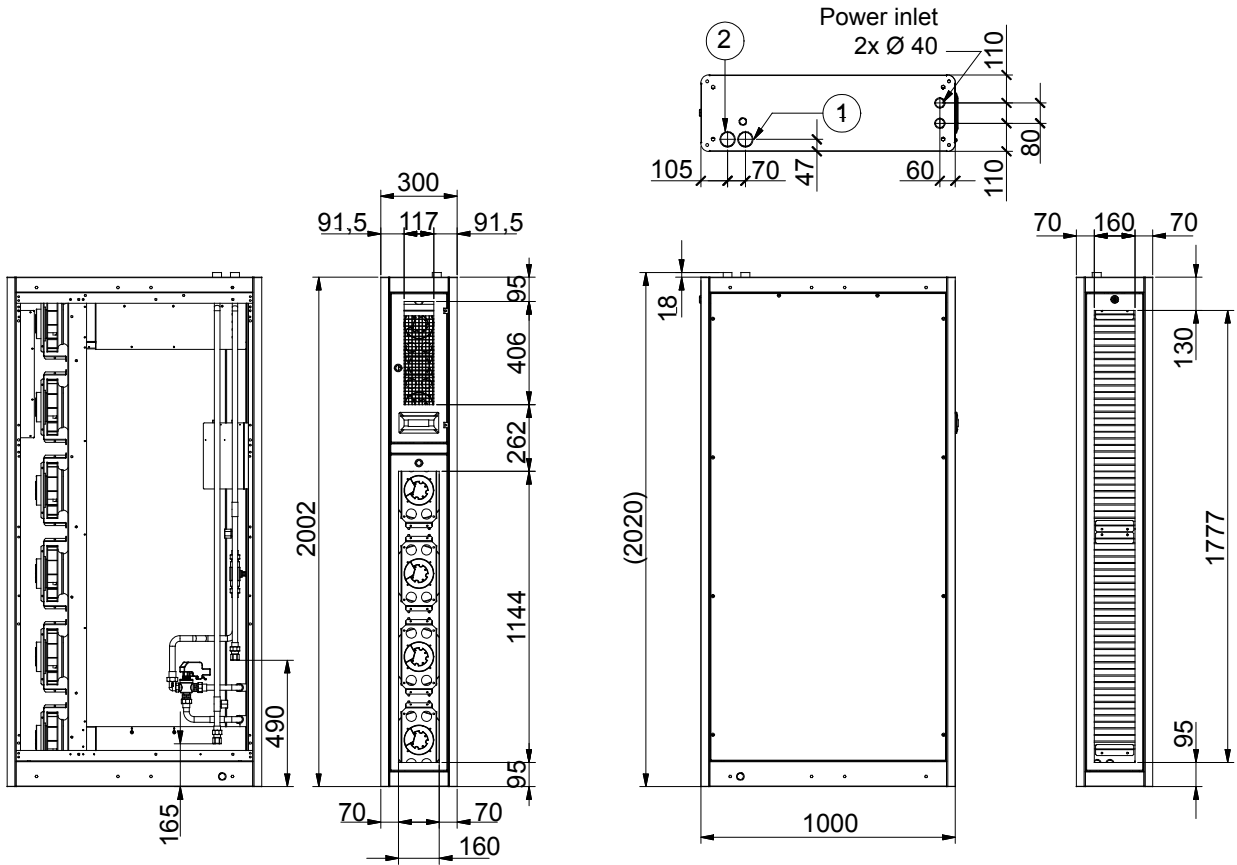
RHC 0200 - RHC 0250
IN ROW (1200 mm)



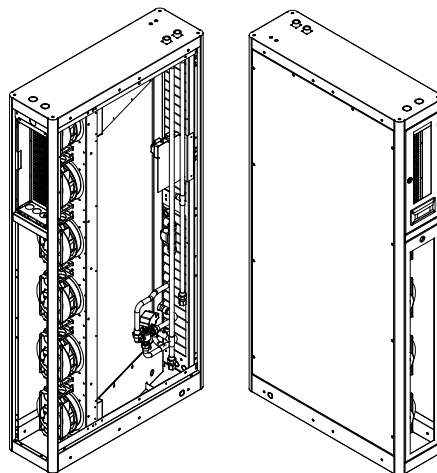
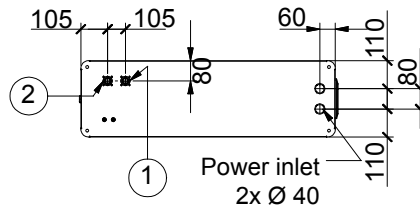
1	Cooling water inlet 3/4" gas
2	Cooling water outlet 3/4" gas



**RHC 0200 - RHC 0250
IN ROW (1000 mm)**

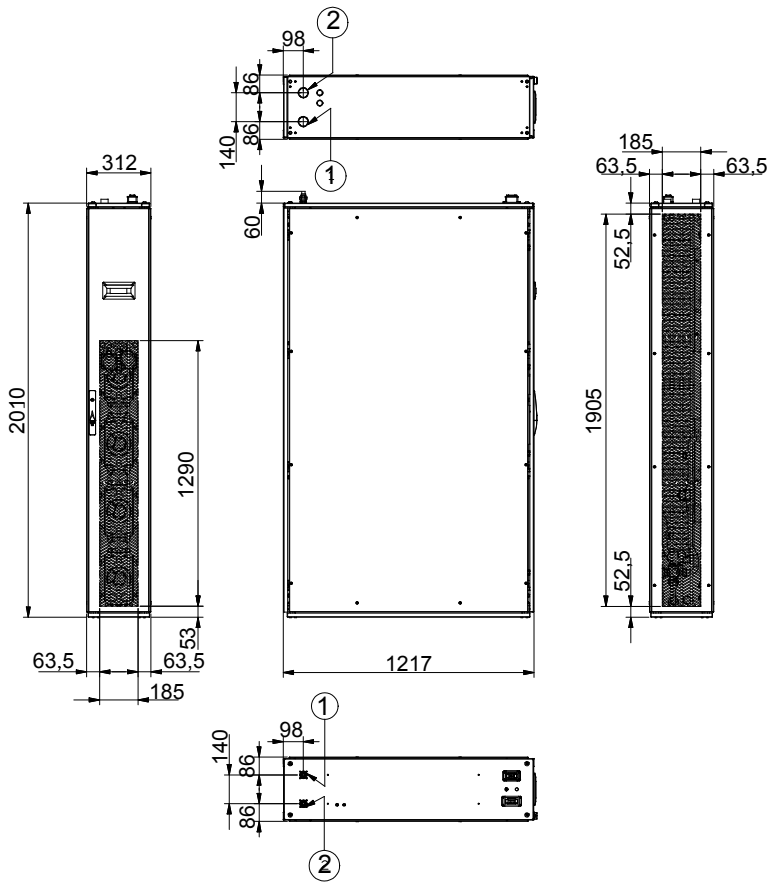


1	Cooling water inlet 3/4" gas
2	Cooling water outlet 3/4" gas

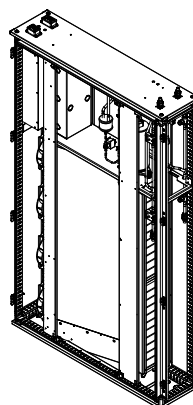
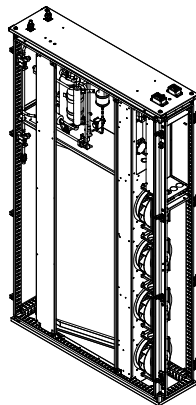
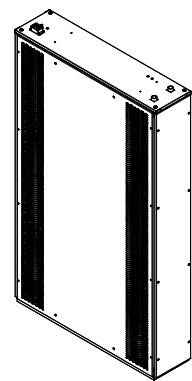
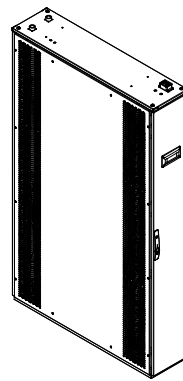
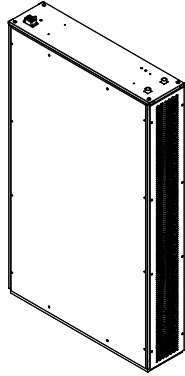
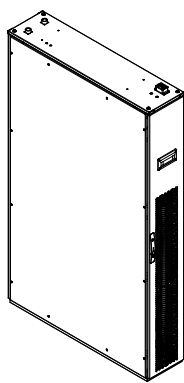
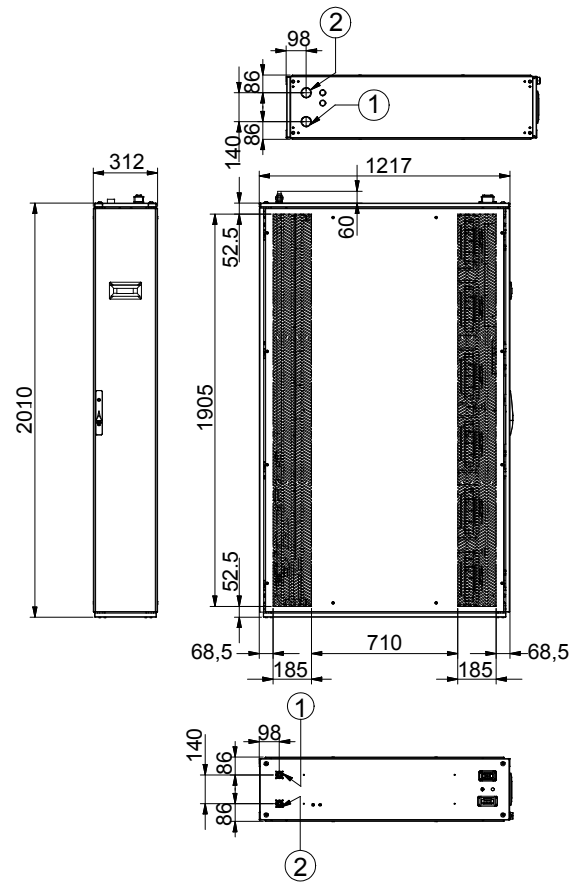


RND 0100

Horizontal air flow (rear-front)

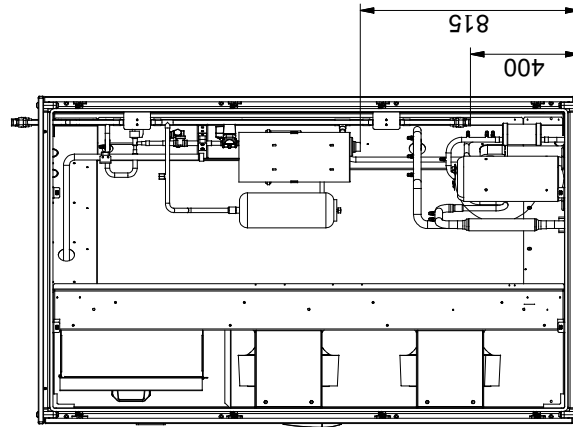


Side air flow (left and right)

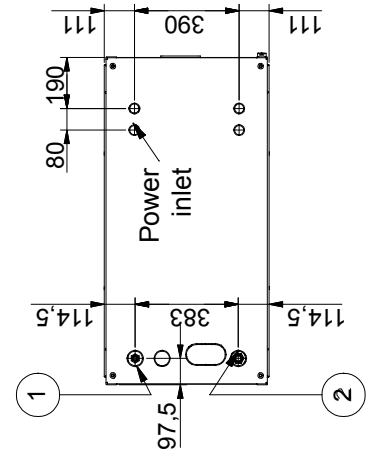
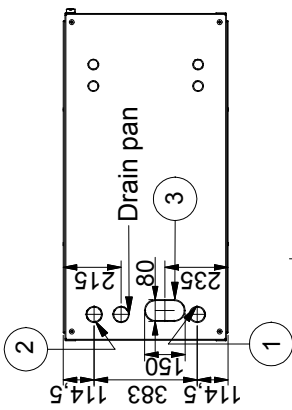
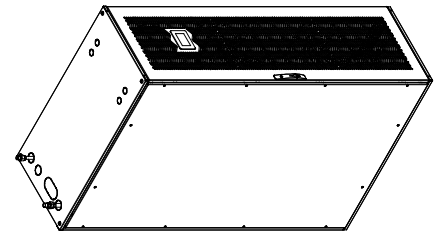
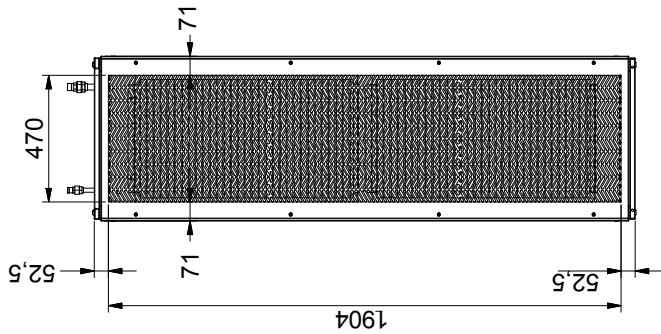


1	Liquid line inlet Rotalock 1" - Ø 12
2	Gas line outlet Rotalock 1" - Ø 12

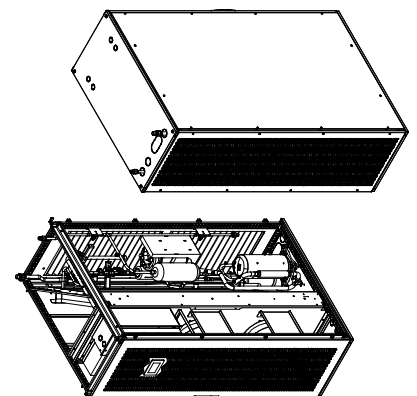
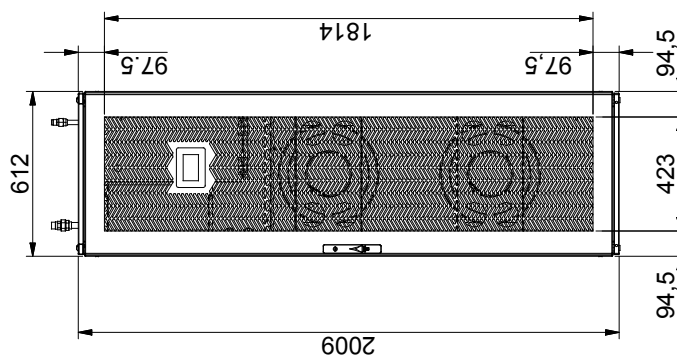
RND 0260 - 0400 - 0450 (1200 mm)



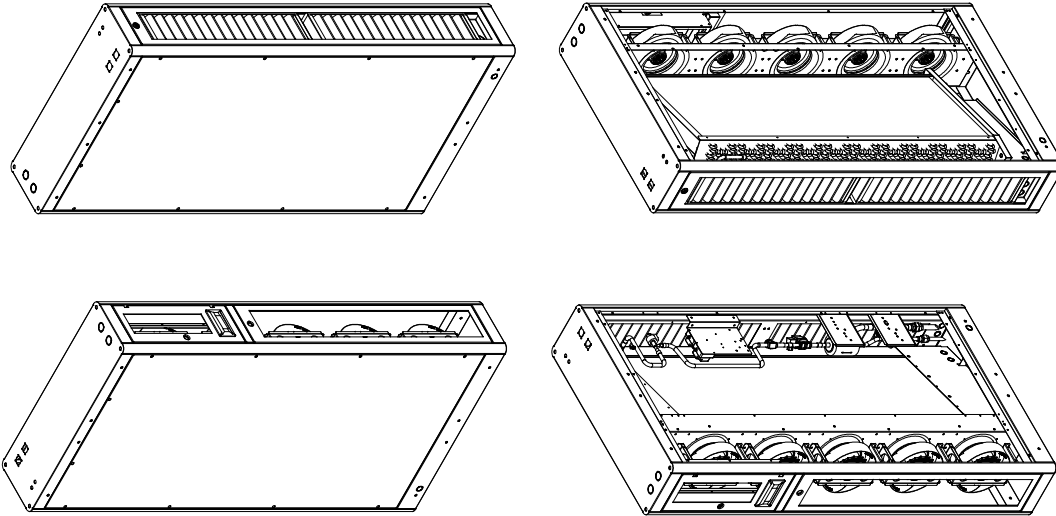
1	Liquid line inlet Rotalock 1" - Ø 16
2	Gas line outlet Rotalock 1" 1/4 - Ø 22
3	Humidifier water supply 3/4" gas male Humidifier water drain Ø 32



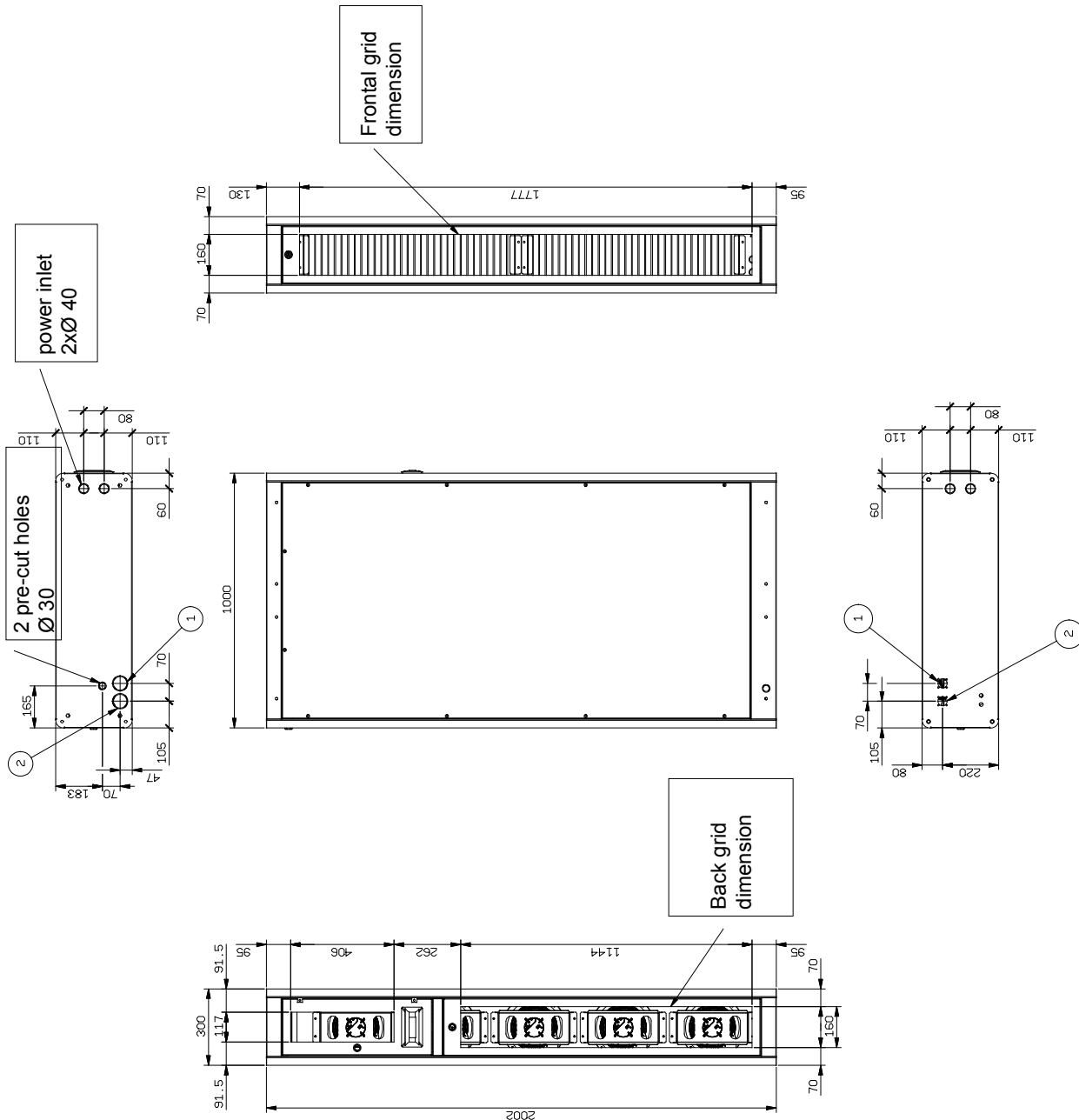
Horizontal air flow (rear-front)



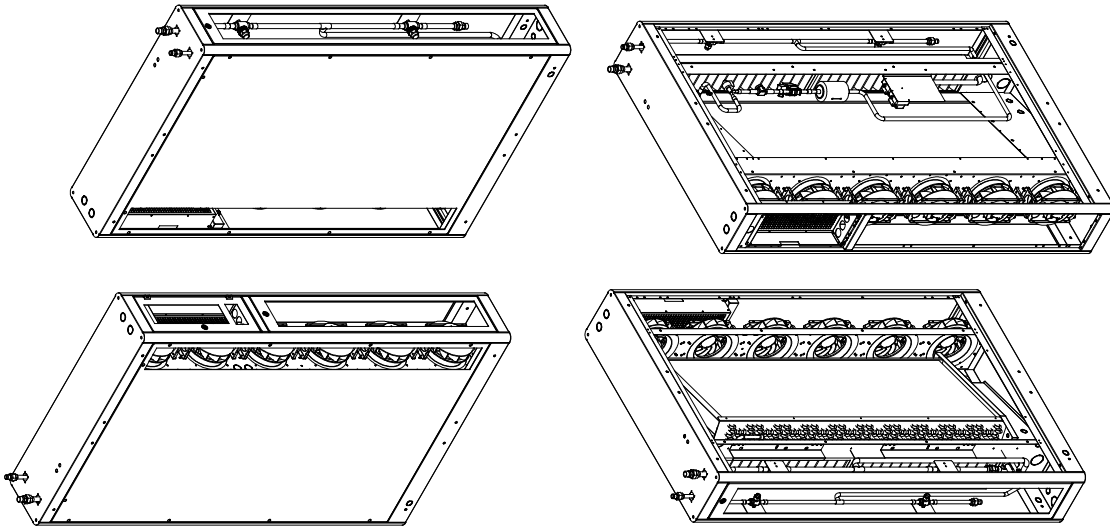
RNV 0140 - 0240 - 0330 (1000 mm)



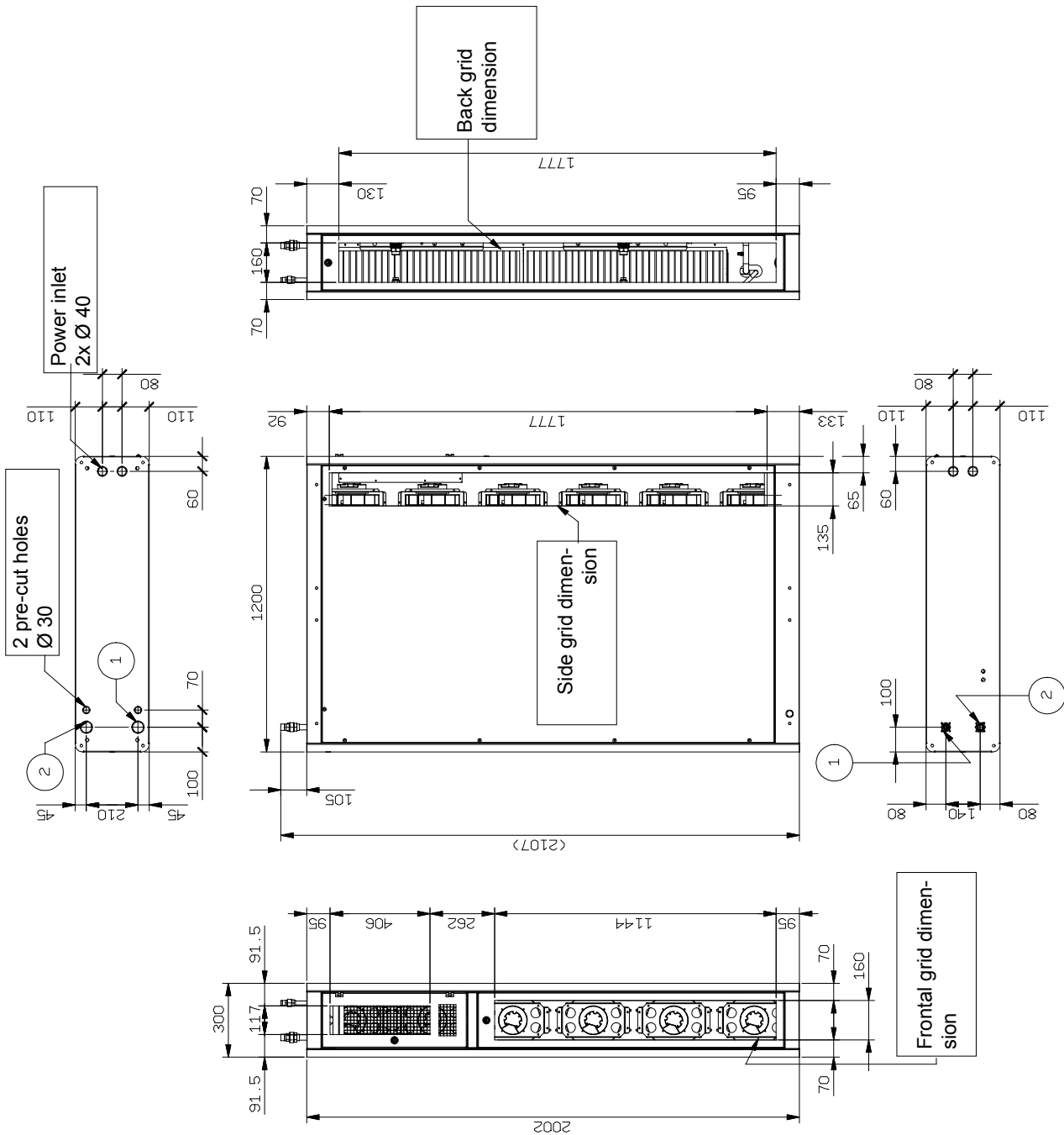
1	Refrigerant inlet Rotalock ODS - Ø 16
2	Refrigerant outlet Rotalock ODS - Ø 22



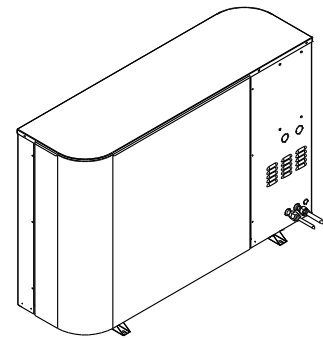
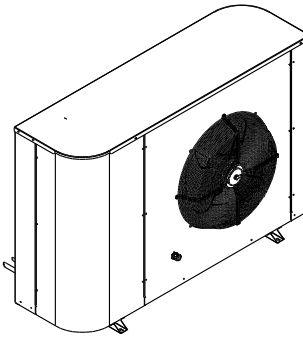
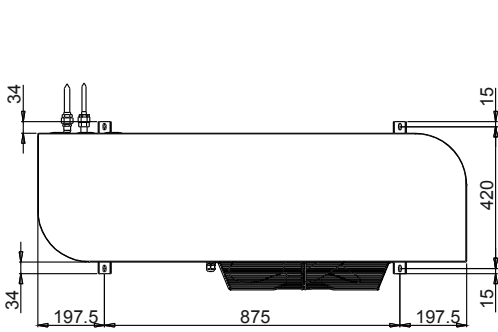
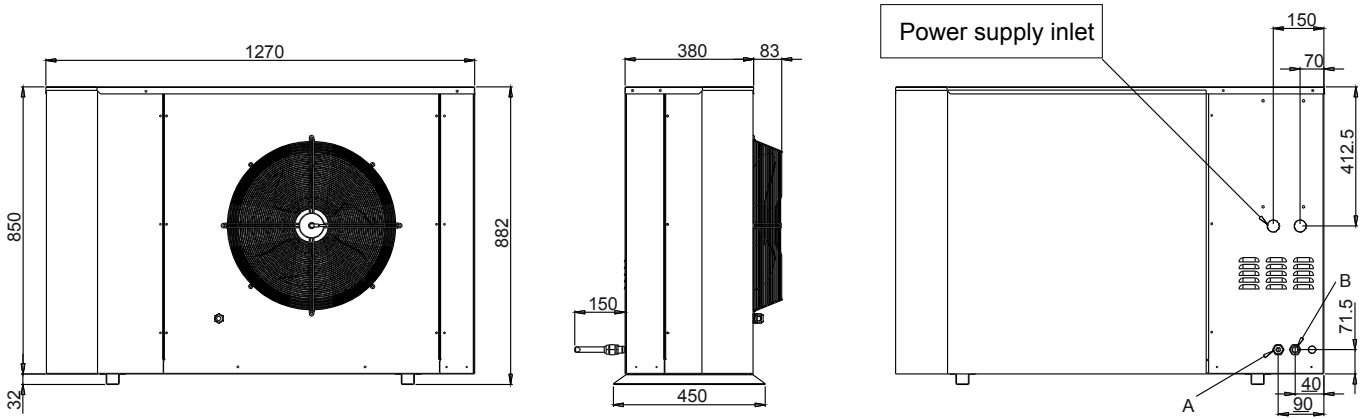
RNV 0140 - 0240 - 0330 (1200 mm)



1	Refrigerant inlet Rotalock ODS - Ø 16
2	Refrigerant outlet Rotalock ODS - Ø 22

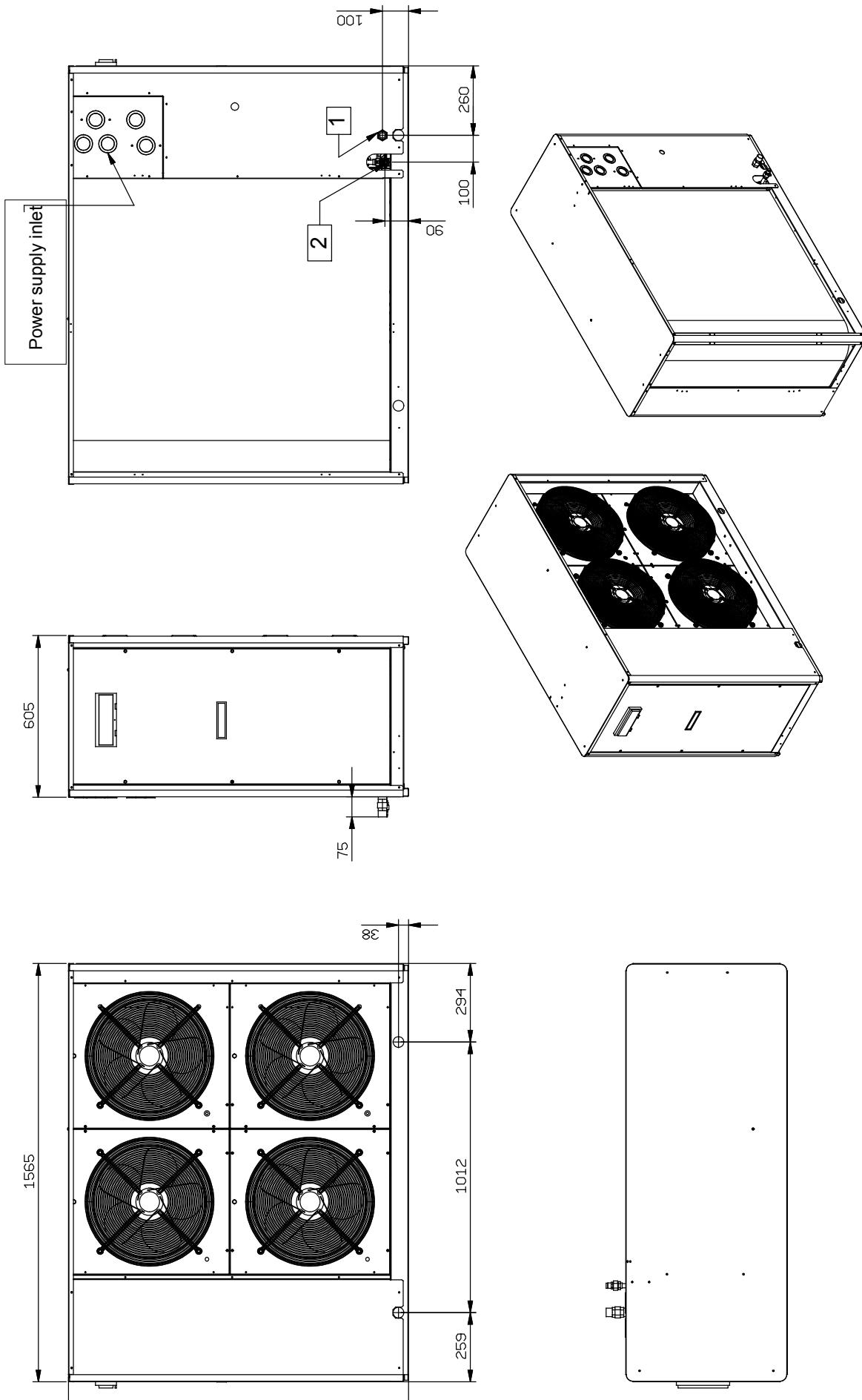


RNV 0140
Outdoor units



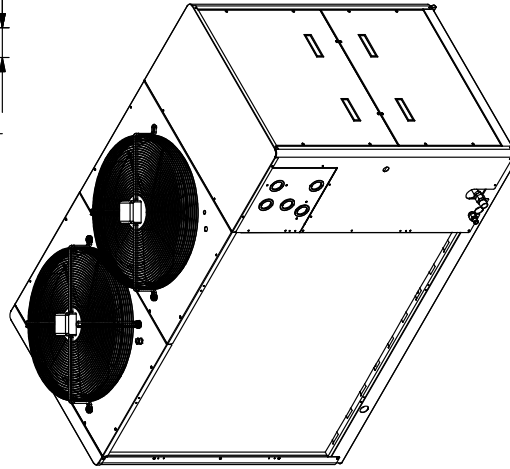
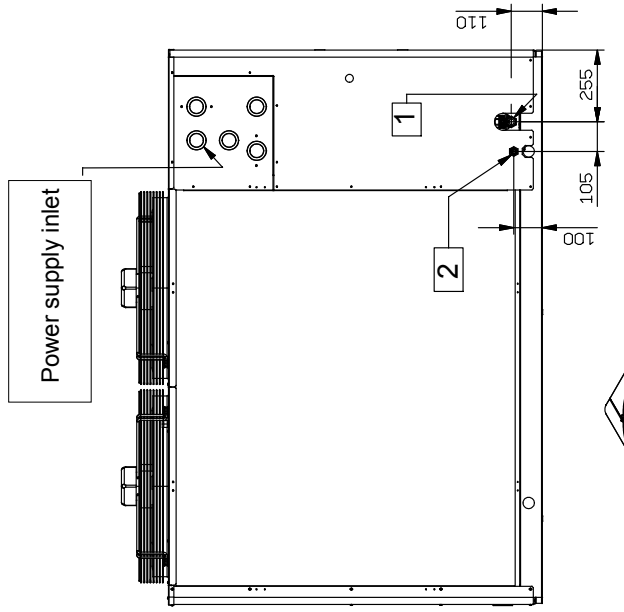
A	Refrigerant inlet Rotalock ODS - Ø 12
B	Refrigerant outlet Rotalock ODS - Ø 16

RNV 0240
Outdoor units

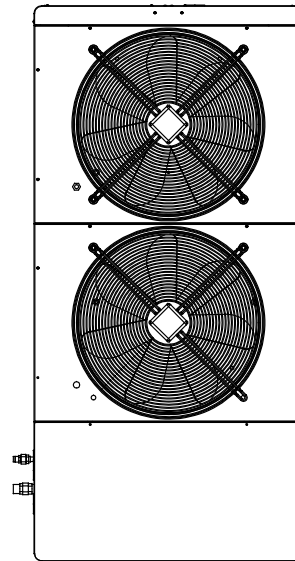
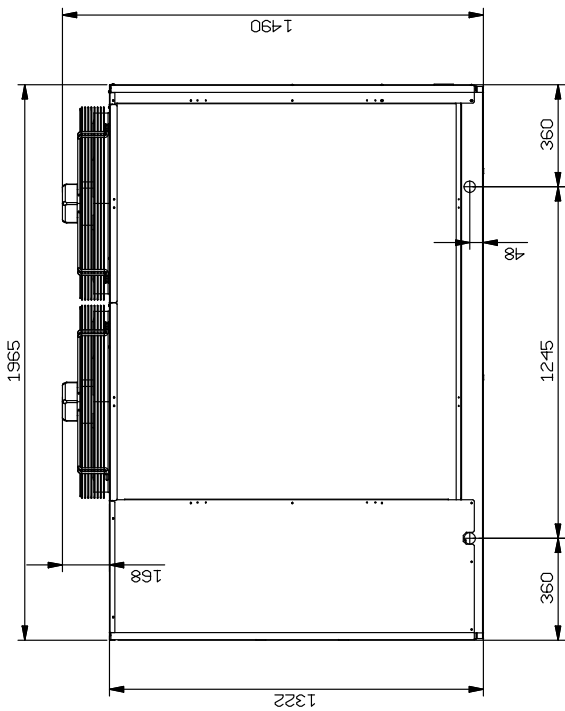
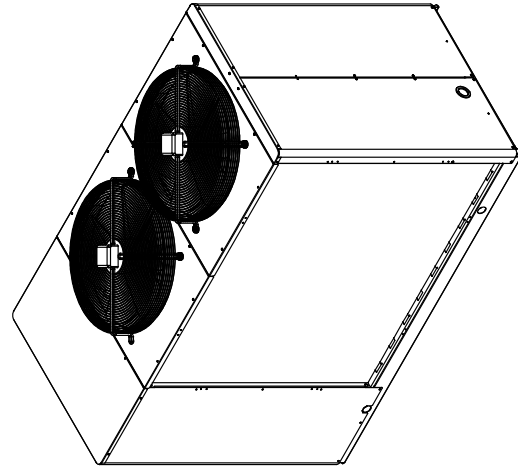
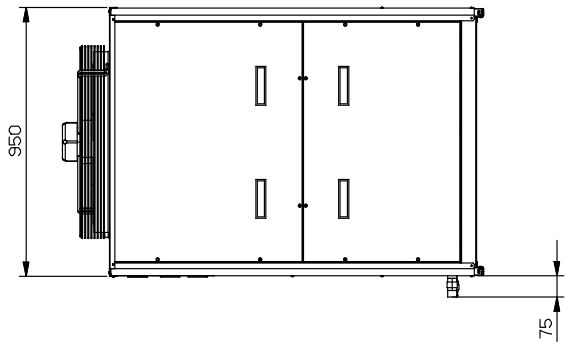


Inlet	Rotalock ODS - Ø 22
1	Refrigerant outlet
2	Rotalock ODS - Ø 16

RNV 0330
Outdoor units



1	Inlet Rotalock ODS - Ø 22
2	Refrigerant outlet Rotalock ODS - Ø 16





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