



Ductable Air-Cooled Liquid Chillers Ductable Reversible Air-to-Water Heat Pumps

PRO-DIALOG

AQUASNAP™



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ISO9001 • ISO14001
Quality and Environment
Management Systems
Approval

30RBY 039-160/30RQY 039-160

Nominal cooling capacity 30RBY: 38-154 kW

Nominal cooling capacity 30RQY: 37-147 kW

Nominal heating capacity 30RQY: 42-159 kW

The Aquasnap liquid chiller/heat pump range was designed for commercial (air conditioning of offices, hotels etc.) or industrial (low-temperature process units etc.) applications.

It integrates the latest technological innovations:

- ozone-friendly refrigerant R410A
- scroll compressors
- low-noise fans made of a composite material
- auto-adaptive microprocessor control
- electronic expansion valve
- variable-speed pump (option)

The Aquasnap can be equipped with a hydronic module integrated into the unit chassis, limiting the installation to straightforward operations like connection of the power supply and the chilled water supply and return piping.

Features

Quiet operation

- Compressors
 - Low-noise scroll compressors with low vibration level
 - The compressor assembly is installed on an independent chassis and supported by anti-vibration mountings
 - Dynamic suction and discharge piping support, minimising vibration transmission (Carrier patent)
- Condenser (30RBSY)/air evaporator/condenser (30RQSY) section
 - Vertical condenser coils
 - Protection grilles on anti-vibration mountings to protect the heat exchanger against possible shocks (30RBSY 090-160 and 30RQSY 080-160 only).
 - Low-noise latest-generation Flying Bird IV fans, made of a composite material (Carrier patent) are now even quieter and do not generate intrusive low-frequency noise
 - Fan motor controlled by a variable-frequency controller, to allow adjustment of the fan speed in accordance with the ducting for optimised efficiency.
 - Rigid fan installation for reduced start-up noise (Carrier patent)

Easy and fast installation

■ Physical features

- Flying Bird IV fans controlled by a variable-frequency controller to provide up to 240 Pa available pressure (depending on the size) at nominal flow rate
- Flow control in accordance with the ducting for optimised efficiency with the possibility to program a maximum supply air flow.
- Supply air duct connection frame.
- Suction air connection frame standard for sizes 30RBSY 039-080 and 30RQSY 039-078
- Suction air filters optional (30RBSY 039-080 and 30RQSY 039-078 only)
- Small unit footprint with a low height (1371 mm) for easy installation in most buildings
- The unit is enclosed by easily removable panels, covering all components (except air heat exchanger and fans).

■ Integrated hydronic module (option)

- Centrifugal low or high-pressure water pump (as required), based on the pressure loss of the hydronic installation

Hydronic module



- Single or dual water pump (as required) with operating time balancing and automatic changeover to the back-up pump if a fault develops
- Water filter protects the water pump against circulating debris
- Pressure measurement, using two pressure transducers and allowing indication of water flow rate, water pressure and lack of water.
- High-capacity membrane expansion tank ensures pressurisation of the water circuit
- Overpressure valve, set to 4 bar
- Speed variator on the pumps (option) to ensure the correct flow rate, based on the system requirements
- Thermal insulation and frost protection down to -20°C, using an electric resistance heater (see table of options)
- Simplified electrical connections
 - A single power supply point without neutral
 - Main disconnect switch with high trip capacity
 - Transformer for safe 24 V control circuit supply included
- Fast commissioning
 - Systematic factory operation test before shipment
 - Quick-test function for step-by-step verification of the instruments, electrical components and motors

Economical operation

■ Variable-speed pump (option)

- The control algorithm adjusts the water flow rate in accordance with the actual system requirements. This saves energy and makes the flow control valve unnecessary.

■ Variable-speed fan

- Variable-speed ventilation permits adjustment to any duct type and variation of the air flow rate for maximised unit EERs and COPs under any operating conditions.

■ Increased energy efficiency at part load

- Eurovent energy efficiency class A and B in cooling mode and A in heating mode (in accordance with EN14511-3:2011)

- The refrigerant circuit includes several compressors connected in parallel. At part load, around 99% of the operating time, only the compressors that are absolutely necessary operate. At these conditions the compressors operating are more energy efficient, as they use the total condenser and evaporator capacity.

- The electronic expansion device (EXV) allows operation at a lower condensing pressure (EER, COP and ESEER optimisation).

- Dynamic superheat management for better utilisation of the water heat exchanger surface.

- Defrost cycle optimisation (30RQSY)

■ Reduced maintenance costs

- Maintenance-free scroll compressors

- Fast diagnosis of possible incidents and their history via the Pro-Dialog+ control

- R410A refrigerant is easier to use than other refrigerant blends

Environmental care

■ Ozone-friendly R410A refrigerant

- Chlorine-free refrigerant of the HFC group with zero ozone depletion potential
- Very efficient - gives an increased energy efficiency ratio (EER, COP and ESEER)

■ Leak-tight refrigerant circuit

- Brazed refrigerant connections for increased leak-tightness

- Reduction of leaks due to reduced vibration levels and elimination of capillary tubes (TXVs)

- Verification of pressure transducers and temperature sensors without transferring refrigerant charge

Supply air connection frame



Superior reliability

■ State-of-the-art concept

- Cooperation with specialist laboratories and use of limit simulation tools (finite element calculations) for the design of the critical components, e.g. motor supports, suction/discharge piping etc.

■ Auto-adaptive control

- Control algorithm prevents excessive compressor cycling and permits reduction of the water quantity in the hydronic circuit (Carrier patent)
- Hydronic module with integrated pressure transducers allowing measurement of the water pressure at two points, as well as measurement of the water flow rate and detection of lack of water and pressure. This considerably reduces the risk of problems such as frost accumulation on the water heat exchanger.
- Automatic compressor unloading in case of abnormally high condensing pressure. If an anomaly occurs (e.g. fouled air heat exchanger coil, fan failure) Aquasnap continues to operate, but at reduced capacity.

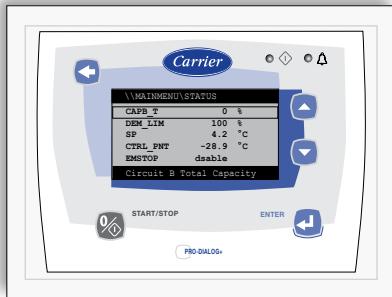
■ Exceptional endurance tests

- Corrosion resistance tests in salt mist in the laboratory
- Accelerated ageing test on components that are submitted to continuous operation: compressor piping, fan supports
- Transport simulation test in the laboratory on a vibrating table.

Pro-Dialog+ control

Pro-Dialog+ combines intelligence with operating simplicity. The control constantly monitors all machine parameters and precisely manages the operation of compressors, expansion devices, fans and of the water heat exchanger water pump for optimum energy efficiency.

Pro-Dialog+ interface



■ Energy management

- Seven-day internal time schedule clock: permits unit on/off control and operation at a second set point
- Set point reset based on the outside air temperature or the return water temperature or on the water heat exchanger delta T
- Master/slave control of two units operating in parallel with operating time equalisation and automatic change-over in case of a unit fault (accessory).
- Change-over based on the outside air temperature

■ Integrated features

- Night mode: capacity and fan speed limitation for reduced noise level
- With hydronic module: water pressure display and water flow rate calculation

■ Ease-of-use

- The new backlit LCD interface includes a manual control potentiometer to ensure legibility under any lighting conditions.
- The information is displayed clearly in English, French, German, Italian and Spanish (for other languages please consult Carrier)

- The Pro-Dialog+ navigation uses intuitive tree-structure menus, similar to the Internet navigators. They are user-friendly and permit quick access to the principal operating parameters: number of compressors operating, suction/discharge pressure, compressor operating hours, set point, air temperature, entering/leaving water temperature

Carrier Comfort Network (CCN) operating mode

A simple two-wire communication bus between the RS485 port of the Aquasnap and the Carrier Comfort Network offers multiple remote control, monitoring and diagnostic possibilities. Carrier offers a vast choice of control products, specially designed to control, manage and supervise the operation of an air conditioning system. Please consult your Carrier representative for more information on these products.

Remote operating mode with dry contacts (standard)

- Start/stop: opening of this contact will shut down the unit
- Dual set point: closing of this contact activates a second set point (example: unoccupied mode)
- Water pump 1 and 2 control (contacts supplied with the hydronic module option)*: these outputs control the contactors of one or two water heat exchanger water pumps
- Alarm indication: this volt-free contact indicates the presence of a major fault that has led to the shut-down of one or two refrigerant circuits
- Demand limit 1 and 2: closing of these contacts limits the maximum unit capacity to three predefined values
- User safety: this contact can be used for any customer safety loop, closing of the contact generates a specific alarm

Remote interface (accessory)

This interface allows access to the same menus as the unit interface and can be installed up to 300 m away. This accessory includes a box that can be mounted inside the building. The power supply is provided via a 220 V/24 V transformer supplied.

Variable fan speed controller



Options

Options	No.	Description	Advantages	Use
Air heat exchanger with anti-corrosion post-treatment	2B	Coils with factory-applied Blygold Polual treatment	Improved corrosion resistance, recommended for urban, industrial and rural environments	30RBSY 039-160
Air heat exchanger with pre-treated fins	3A	Fins made of pre-treated aluminium (polyurethane or epoxy)	Improved corrosion resistance, recommended for marine environments	30RBSY/RQSY 039-160
Very low noise level	15LS	Acoustic compressor enclosure and low-speed fans	Noise emission reduction at reduced fan speed	30RBSY/RQSY 039-160
Suction filter	23B	Washable G2 efficiency filter in accordance with EN 779	Prevents pollution of the air heat exchanger	30RBSY 039-080/30RQSY 039-078
Soft starter	25	Electronic compressor starter	Reduced compressor start-up current	30RBSY/RQSY 039-080
Frost protection down to -20°C	42	Electric heater on the hydronic module	Hydronic module frost protection at low outside temperature	30RBSY/RQSY 039-160
Master/slave operation	58	Unit equipped with an additional field-installed leaving water temperature sensor, allowing master/slave operation of two units connected in parallel	Operation of two units connected in parallel with operating time equalisation	30RBSY/RQSY 039-160
High-pressure single-pump hydronic module	116B	Single high-pressure water pump, water filter, expansion tank, pressure gauge, water flow control valve. See hydronic module option.	Easy and fast installation	30RBSY/RQSY 039-160
High-pressure dual-pump hydronic module	116C	Dual high-pressure water pump, water filter, expansion tank, pressure gauge, water flow control valve. See hydronic module option.	Easy and fast installation, operating safety	30RBSY/RQSY 039-160
Low-pressure single-pump hydronic module	116F	Single low-pressure water pump, water filter, expansion tank, pressure gauge, water flow control valve. See hydronic module option.	Easy and fast installation	30RBSY/RQSY 039-160
Low-pressure dual-pump hydronic module	116G	Dual low-pressure water pump, water filter, expansion tank, pressure gauge, water flow control valve. See hydronic module option.	Easy and fast installation, operating safety	30RBSY/RQSY 039-160
High-pressure variable-speed single-pump hydronic module	116J	Single high-pressure water pump, water filter, expansion tank, pressure gauge, water flow control valve. See hydronic module option.	Easy and fast installation, power consumption reduction of the water circulation pump	30RBSY/RQSY 039-160
High-pressure variable-speed dual-pump hydronic module	116K	Dual high-pressure water pump, water filter, expansion tank, pressure gauge, water flow control valve. See hydronic module option.	Easy and fast installation, operating safety, power consumption reduction of the water circulation pump	30RBSY/RQSY 039-160
JBus gateway	148B	Two-directional communications board, complies with JBus protocol	Easy connection by communication bus to a building management system	30RBSY/RQSY 039-160
BacNet gateway	148C	Two-directional communications board, complies with BacNet protocol	Easy connection by communication bus to a building management system	30RBSY/RQSY 039-160
LonTalk gateway	148D	Two-directional communications board, complies with LonTalk protocol	Easy connection by communication bus to a building management system	30RBSY/RQSY 039-160
Water heat exchanger screw connection sleeves	264	Inlet/outlet screw connection sleeves	Permit connection of the unit to a screw connection	30RBSY/RQSY 039-160
Welded water heat exchanger connection sleeves	266	Welded inlet/outlet connection sleeves	Permit connection of the unit to a connection other than a Victaulic connection	30RBSY/RQSY 039-160
Remote interface	275	Remotely installed user interface (via communication bus).	Remote unit control up to 300 m	30RBSY/RQSY 039-160

Hydronic module (option 116)

This module is equipped with pressure transducers to optimise unit operation at the hydronic level.

The hydronic module option reduces the installation time. The unit is factory-equipped with the main hydronic components required for the system: screen filter, water pump, expansion tank, safety valve and water pressure transducers.

The pressure transducers allow the Pro-Dialog+ control to:

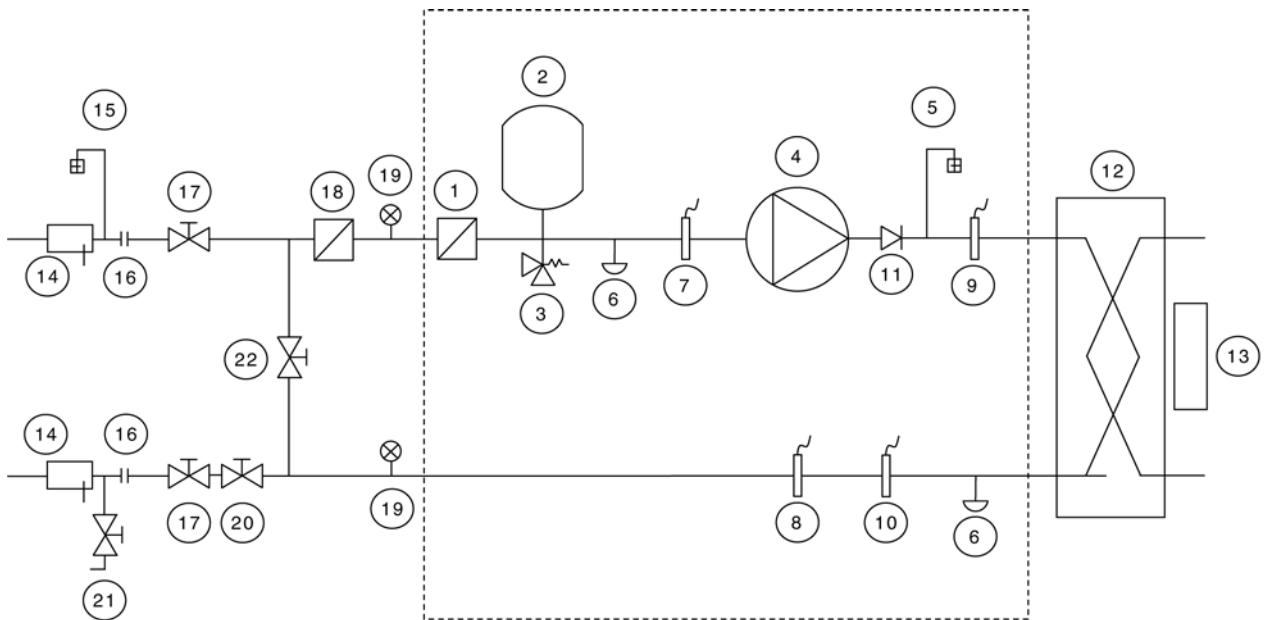
- display the available pressure at the unit outlet and the static system pressure
- calculate the instantaneous flow rate, using an algorithm that integrates the unit characteristics
- integrate the system and water pump protection devices (lack of water, water pressure, water flow rate etc.)

Several water pump types are available: primary single or dual low-pressure pump or single or dual high-pressure pump.

An automatic pump start-up algorithm protects the heat exchanger and the hydronic module piping against frost down to -10°C outside temperature, if the water heat exchanger frost protection option is installed. If necessary increased frost protection down to -20°C is possible by adding heaters to the hydronic module piping (see option 42).

The hydronic module option is integrated into the unit without increasing its dimensions and saves the space normally used for the water pump.

Typical hydronic circuit diagram



Legend

Components of the unit and hydronic module

- 1 Victaulic screen filter
- 2 Expansion tank
- 3 Safety valve
- 4 Available pressure pump
Note: x 1 for a single pump, x 2 for a dual pump
- 5 Air purge
- 6 Water drain valve
Note: A second valve is located on the heat exchanger leaving piping
- 7 Pressure sensor
Note: Gives pump suction pressure information (see installation manual)
- 8 Temperature sensor
Note: Gives heat exchanger leaving temperature information (see installation manual)
- 9 Temperature sensor
Note: Gives heat exchanger entering temperature information (see installation manual)
- 10 Pressure sensor
Note: Gives unit leaving pressure information (see installation manual)
- 11 Check valve
Note: x 2 for a dual pump, not provided for a single pump
- 12 Plate heat exchanger
- 13 Water heat exchanger frost protection heater

Installation components

- 14 Temperature probe well
- 15 Air vent
- 16 Flexible connection
- 17 Shut-off valve
- 18 Screen filter (obligatory for a unit without hydronic module)
- 19 Pressure gauge
- 20 Water flow control valve
Note: Not necessary for a hydronic module with a variable-speed pump
- 21 Charge valve
- 22 Frost protection bypass valve (when shut-off valves [17] are closed during winter)

Notes:

- Units without hydronic module are equipped with a flow switch and two temperature sensors (8 and 9).
- The pressure sensors are installed on connections without Schrader valve.
- Depressurise and empty the system before any intervention.

Electrical data, units with hydronic modules

The pumps that are factory-installed in these units have motors with efficiency class IE2. The additional electrical data required by regulation 640/2009 is given in the installation, operation and maintenance manual.

This regulation concerns the application of directive 2005/32/EC on the eco-design requirements for electric motors.

Part load performances

With the rapid increase in energy costs and the care about environmental impacts of electricity production, the power consumption of air conditioning equipment has become an important topic. The energy efficiency of a unit at full load is rarely representative of the actual performance of the units, as on average a unit works less than 5% of the time at full load.

IPLV (in accordance with AHRI 550/590)

The IPLV (integrated part load value) allows evaluation of the average energy efficiency based on four operating conditions defined by the AHRI (Air Conditioning, Heating and Refrigeration Institute). The IPLV is the average weighted value of the energy efficiency ratios (EER) at different operating conditions, weighted by the operating time.

IPLV (integrated part load value)

Load %	Air temperature °C	Energy efficiency	Operating time %
100	35	EER ₁	1
75	26.7	EER ₂	42
50	18.3	EER ₃	45
25	12.8	EER ₄	12

$$\text{ESEER} = \text{EER}_1 \times 1\% + \text{EER}_2 \times 42\% + \text{EER}_3 \times 45\% + \text{EER}_4 \times 12\%$$

The heat load of a building depends on many factors, such as the outside air temperature, the exposure to the sun and the building occupancy.

Consequently it is preferable to use the average energy efficiency, calculated at several operating points that are representative for the unit utilisation.

ESEER (in accordance with EUROVENT)

The ESEER (European seasonal energy efficiency ratio) permits evaluation of the average energy efficiency at part load, based on four operating conditions defined by Eurovent. The ESEER is the average value of energy efficiency ratios (EER) at different operating conditions, weighted by the operating time.

ESEER (European seasonal energy efficiency ratio)

Load %	Air temperature °C	Energy efficiency	Operating time %
100	35	EER ₁	3
75	30	EER ₂	33
50	25	EER ₃	41
25	20	EER ₄	23

$$\text{ESEER} = \text{EER}_1 \times 3\% + \text{EER}_2 \times 33\% + \text{EER}_3 \times 41\% + \text{EER}_4 \times 23\%$$

Part load performances

30RBSY 039-160

30RBSY	039	045	050	060	070	080	090	100	120	140	160
IPLV	kW/kW	3.79	3.84	3.89	4.03	3.79	4.01	3.61	3.68	3.90	3.89
ESEER	kW/kW	4.39	4.32	4.10	4.25	4.12	4.20	4.22	4.22	4.28	4.88

30RQSY 039-160

30RQSY	039	045	050	060	070	078	080	090	100	120	140	160
IPLV	kW/kW	3.74	3.89	3.76	3.63	3.63	3.81	3.59	3.42	3.60	3.99	3.74
ESEER	kW/kW	4.36	4.36	4.25	4.25	4.09	3.95	3.78	4.11	4.21	4.46	4.72

ESEER Calculations according to standard performances (in accordance with EN14511-3:2011) and certified by Eurovent.

IPLV Calculations according to standard performances (in accordance with AHRI 550-590)

Operating limits, 30RBSY

Evaporator water flow rate

30RBSY	Flow rate, l/s			
	Minimum	Maximum*	Maximum dual pump**	
			Low pressure***	High pressure***
039	0.9	3.0	2.9	3.4
045	0.9	3.4	3.2	3.8
050	0.9	3.7	3.3	4.0
060	0.9	4.2	3.7	4.4
070	1.0	5.0	4.1	5.0
080	1.2	5.5	4.4	5.2
090	1.3	6.8	5.1	6.2
100	1.5	7.7	6.3	6.5
120	1.7	8.5	6.5	8.0
140	2.0	10.6	7.9	8.7
160	2.3	11.2	8.2	8.9

* Maximum flow rate at a pressure drop of 100 kPa in the plate heat exchanger (unit without hydronic module).

** Maximum flow rate at an available pressure of 20 kPa (unit with low-pressure hydronic module) or 50 kPa (high-pressure module).

*** Maximum flow rate with single pump is 2 to 4% higher, depending on the size.

Operating range

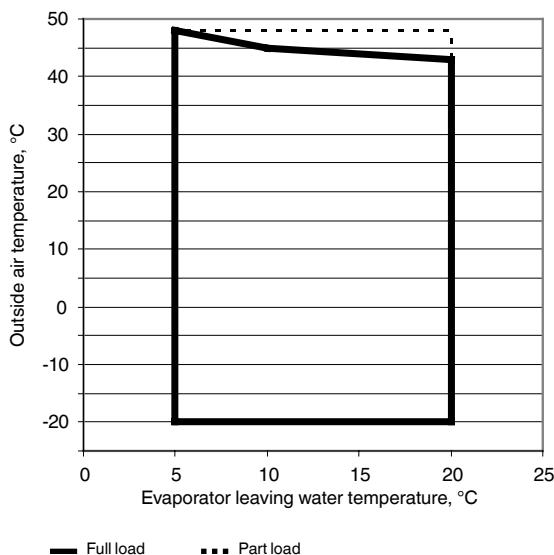
30RBSY		Minimum	Maximum
Evaporator			
Entering water temperature at start-up	°C	7.5*	30
Leaving water temperature during operation	°C	5**	20
Entering/leaving water temperature difference	K	3	10
Condenser			
Entering air temperature***	°C	-20	48

Note: Do not exceed the maximum operating temperature.

* For entering water temperatures below 7.5°C at start-up, contact Carrier.

** For low-temperature applications, where the leaving water temperature is below 5°C, a frost protection solution must be used. Please refer to option 6 for applications with a low evaporator leaving water temperature (< 5°C).

*** Ambient temperature: Please refer to option 42 for low air temperature applications (< -10°C). For transport and storage of the 30RBSY units the minimum and maximum allowable temperatures are -20°C and +48°C. It is recommended that these temperatures are used for transport by container.



Note: This operating range applies up to 130 Pa static pressure without suction air duct for sizes 070-080 and 140-160, and up to 240 Pa for all other sizes.

Operating limits, 30RQSY

Water heat exchanger water flow rate

30RQSY	Flow rate, l/s			
	Minimum	Maximum*	Maximum dual pump**	
	Low pressure***	High pressure***		
039	0.9	3.0	2.9	3.4
045	0.9	3.4	3.2	3.8
050	0.9	4.2	3.7	4.4
060	0.9	5.0	4.1	5.0
070	1.0	5.0	4.1	5.0
078	1.2	5.5	4.4	5.2
080	1.2	6.8	5.1	6.2
090	1.3	6.8	5.1	6.2
100	1.5	7.7	6.3	6.5
120	1.7	8.5	6.5	8.0
140	2.0	10.6	7.9	8.7
160	2.3	11.2	8.2	8.9

* Maximum flow rate at a pressure drop of 100 kPa in the plate heat exchanger (unit without hydronic module).

** Maximum flow rate at an available pressure of 20 kPa (unit with low-pressure hydronic module) or 50 kPa (high-pressure module).

*** Maximum flow rate with single pump is 2 to 4% higher, depending on the size.

Operating range, standard unit, cooling mode

30RQSY		Minimum	Maximum
		Evaporator	
	Entering water temperature at start-up °C	7,5*	30
	Leaving water temperature during operation °C	5**	20
	Entering/leaving water temperature difference K	3	10
	Condenser		
	Entering air temperature*** °C	-20	48

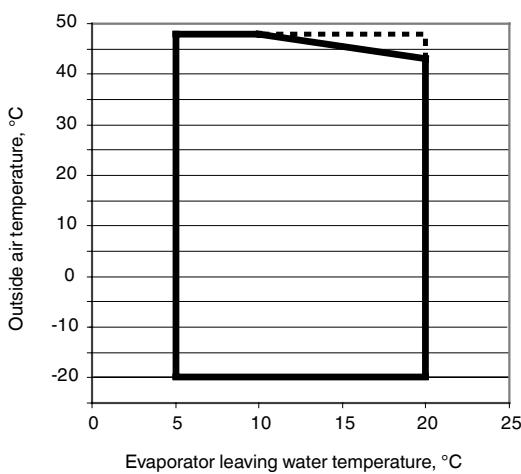
Note: Do not exceed the maximum operating temperature.

* For entering water temperatures below 7.5°C at start-up, contact Carrier.

** For low-temperature applications, where the leaving water temperature is below 5°C, a frost protection solution must be used. Please refer to option 6 for applications with a low evaporator leaving water temperature (< 5°C).

*** Ambient temperature: Please refer to option 42 for low air temperature applications (< -10°C). For transport and storage of the 30RQSY units the minimum and maximum allowable temperatures are -20°C and +48°C. It is recommended that these temperatures are used for transport by container.

30RQSY (cooling mode)



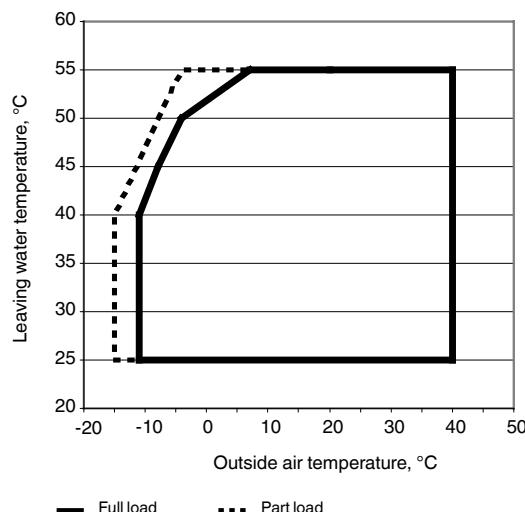
Note: This operating range applies up to 130 Pa static pressure without suction air duct for sizes 060, 070 and 078 and 140-160, and up to 240 Pa for all other sizes.

Operating range, standard unit, heating mode

30RQSY	Minimum	Maximum
Condenser		
Entering water temperature at start-up °C		
Leaving water temperature during operation °C	25	55
Entering/leaving water temperature difference K	3	10
Evaporator		
Air temperature °C	-15	40

Note: Do not exceed the maximum operating temperature.

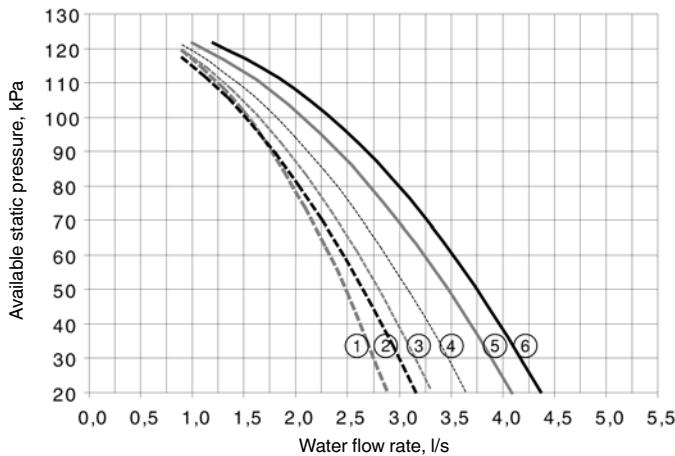
30RQSY (heating mode)



— Full load - - - Part load

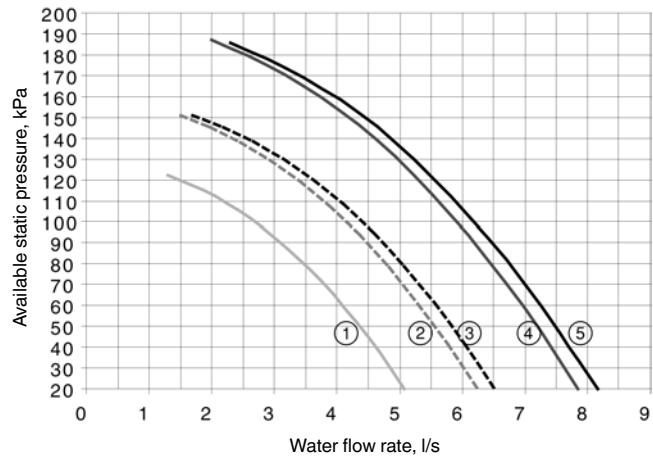
Available static system pressure, 30RBSY

Low-pressure pump



Legend

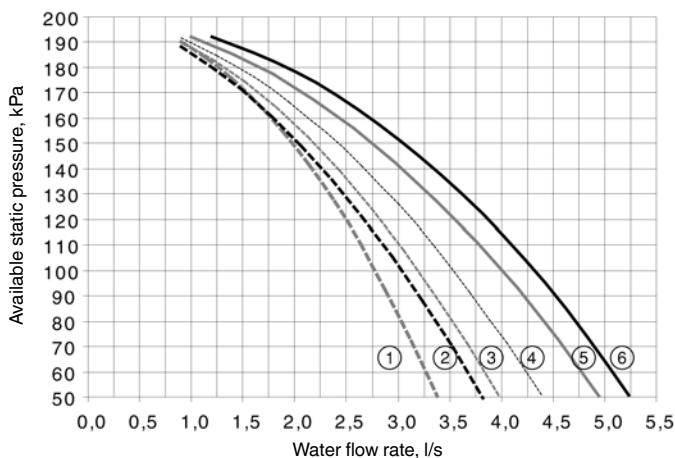
1. 30RBSY 039
2. 30RBSY 045
3. 30RBSY 050
4. 30RBSY 060
5. 30RBSY 070
6. 30RBSY 080



Legend

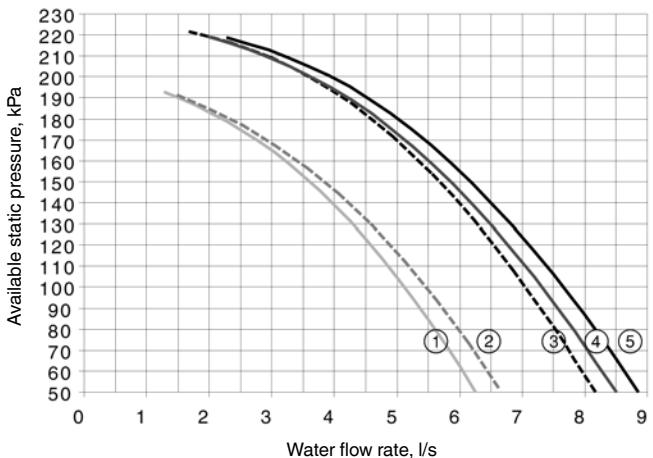
1. 30RBSY 090
2. 30RBSY 100
3. 30RBSY 120
4. 30RBSY 140
5. 30RBSY 160

High-pressure pump



Legend

1. 30RBSY 039
2. 30RBSY 045
3. 30RBSY 050
4. 30RBSY 060
5. 30RBSY 070
6. 30RBSY 080

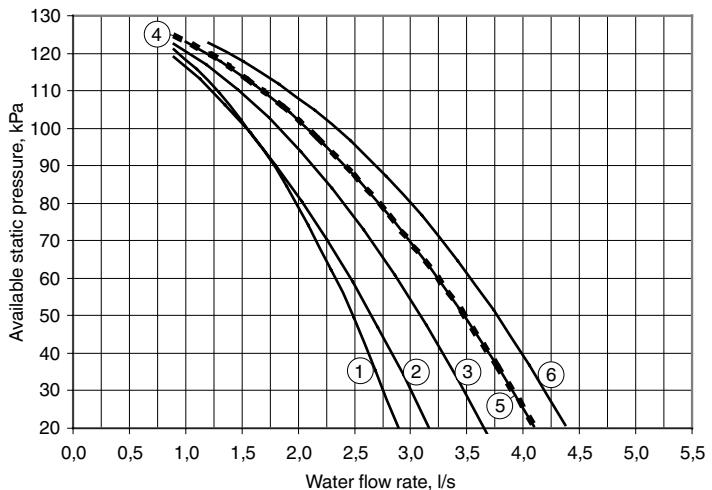


Legend

1. 30RBSY 090
2. 30RBSY 100
3. 30RBSY 120
4. 30RBSY 140
5. 30RBSY 160

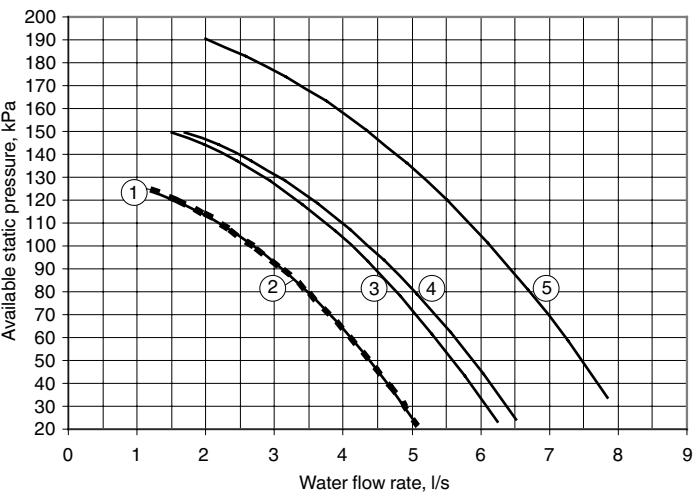
Available static system pressure, 30RQSY

Low-pressure pump



Legend

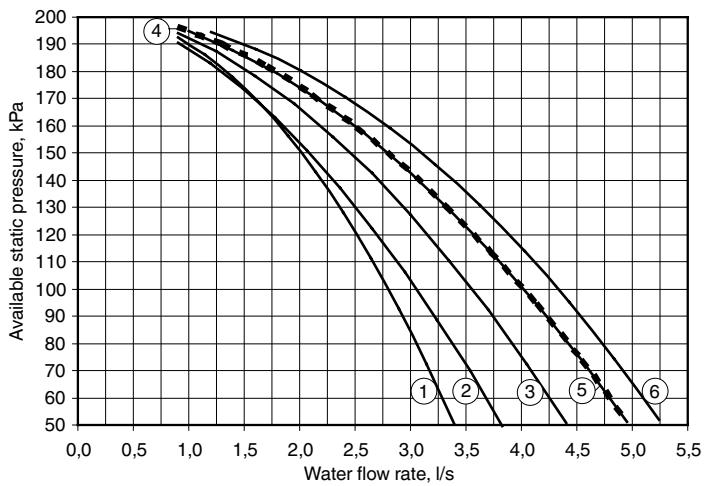
1. 30RQSY 039
2. 30RQSY 045
3. 30RQSY 050
4. 30RQSY 060
5. 30RQSY 070
6. 30RQSY 078



Legend

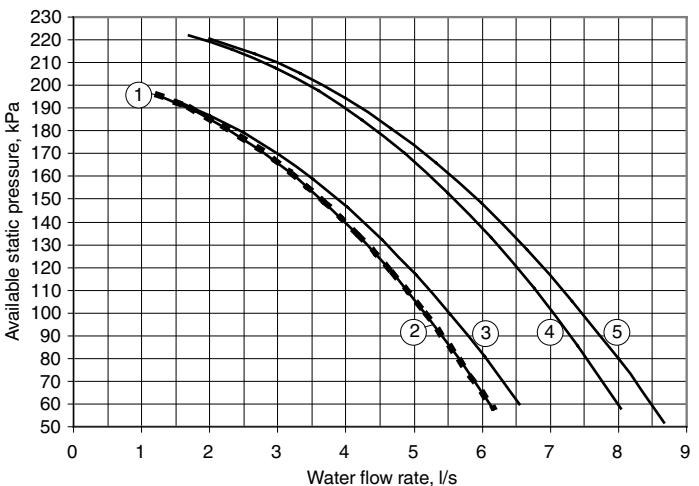
1. 30RQSY 080
2. 30RQSY 090
3. 30RQSY 100
4. 30RQSY 120
5. 30RQSY 140

High-pressure pump



Legend

1. 30RQSY 039
2. 30RQSY 045
3. 30RQSY 050
4. 30RQSY 060
5. 30RQSY 070
6. 30RQSY 078



Legend

1. 30RQSY 080
2. 30RQSY 090
3. 30RQSY 100
4. 30RQSY 120
5. 30RQSY 140

Air pressure drop

Selection of a ductable unit

The 30RBSY and 30RQSY ranges are designed for indoor installation in a plant room. For this type of installation the cold or hot air leaving the air-cooled air heat exchangers is discharged by the fans to the outside of the building, using a duct system.

The units are equipped with fans with available pressure, designed to operate with air discharge ducts with maximum pressure drops of 180 Pa or 240 Pa on certain sizes.

To compensate for these pressure drops this range of ductable units equipped with variable-speed fans with a maximum speed of 19 r/s.

In the cooling mode, the full-load or part-load speed is controlled by a patented algorithm that permanently optimises the condensing temperature to ensure the best unit energy efficiency (EER) whatever the operating conditions and pressure drops of the system ductwork.

In the heating mode, the full-load or part-load speed of each circuit is fixed and at the configured maximum (range configurable from 12 r/s to 19 r/s) based on the constraints and characteristics of the installation site. The maximum configured speed applies to both the heating and cooling mode.

Each refrigerant circuit (A and B) must have a separate ducting system to prevent any air recycling between the air heat exchangers of the different refrigerant circuits.

To collect the defrost water from the coils in the heating mode, 30RQSY units must be installed on an appropriate surface to permit efficient condensate drainage and evacuation and to prevent any risk of flooding at the site. A condensate collection pan is available for 30RBSY 039-080 and 30RQSY 039-078 units.

Selection based on the pressure drop

The cooling and heating capacities are given for an available pressure of 160 Pa and for a unit without filter.

To calculate the performances at other pressure drops please use the correction factors below.

Cooling mode

30RBSY 039-060/30RBSY 090-120 and 30RQSY 039-050/30RQSY 080-120

Duct pressure drop	Fan speed, r/s	Power input coefficient	Cooling capacity coefficient
0	12.00	0.943	1.019
50	13.33	0.962	1.012
100	14.66	0.980	1.006
130	15.46	0.990	1.003
160	16.26	1.000	1.000
200	17.31	1.012	0.998
240	18.36	1.023	0.996

30RBSY 070-080/30RBSY 140-160 and 30RQSY 060-078/30RQSY 140-160

Duct pressure drop	Fan speed, r/s	Power input coefficient	Cooling capacity coefficient
0	15.83	0.929	1.018
50	16.81	0.944	1.016
100	17.78	0.964	1.014
130	18.36	0.978	1.011
160	18.36	1.000	1.000
180	18.36	1.019	0.991

Heating mode

30RQSY 039-050/30RQSY 080-120

Duct pressure drop	Fan speed, r/s	Power input coefficient	Heating capacity coefficient
0	18.36	0.990	1.016
50	18.36	0.990	1.012
100	18.36	0.990	1.009
130	18.36	1.000	1.005
160	18.36	1.000	1.000
200	18.36	1.000	0.994
240	18.36	1.010	0.981

30RQSY 060-078/30RQSY 140-160

Duct pressure drop	Fan speed, r/s	Power input coefficient	Heating capacity coefficient
0	18.36	1.000	1.026
50	18.36	1.000	1.020
100	18.36	1.000	1.011
130	18.36	1.000	1.007
160	18.36	1.000	1.000
180	18.36	1.001	0.993

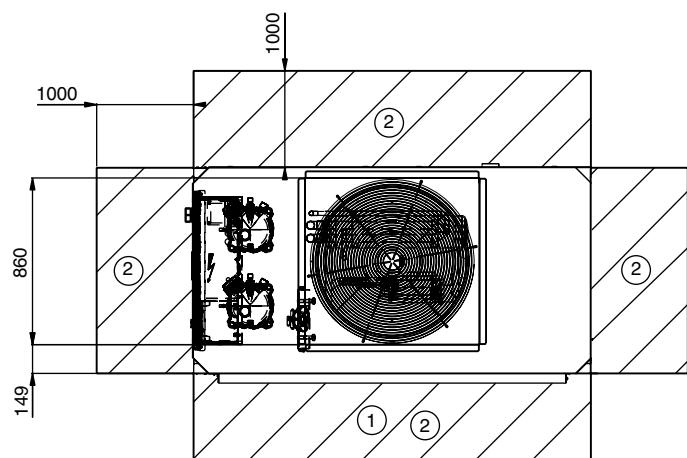
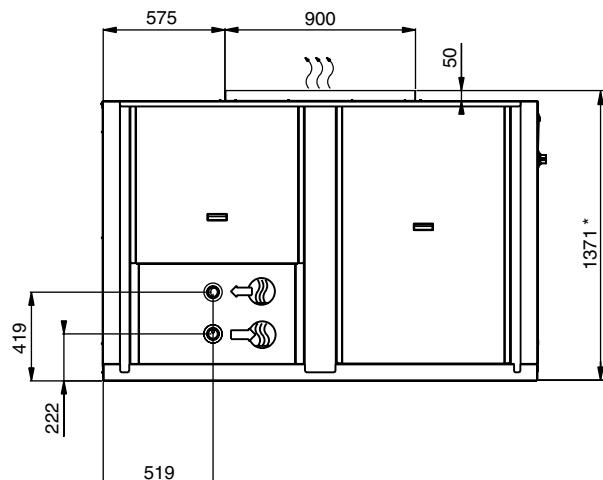
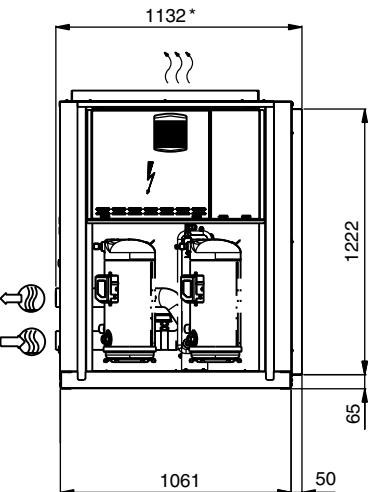
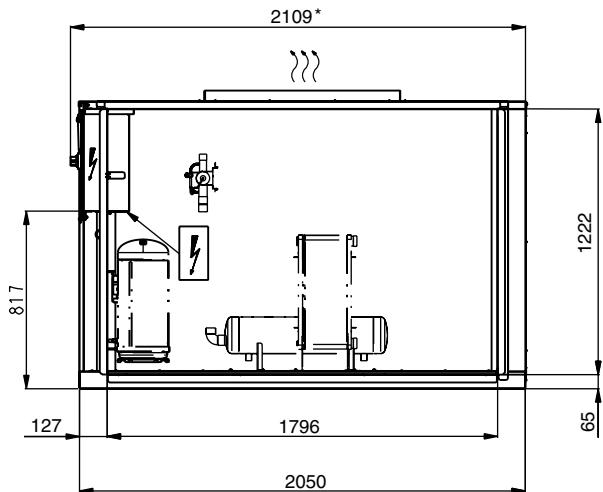
Note:

Pressure drop, clean filter = 6 Pa

Pressure drop, dirty filter = 12 Pa

Dimensions/clearances, 30RBSY/30RQSY

30RBSY 039-050 and 070 and 30RQSY 039-045, units with and without hydronic module, without filter frame

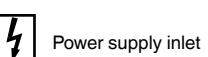


Legend:
All dimensions are given in mm



(1) Required clearances for air entry

(2) Recommended space for maintenance



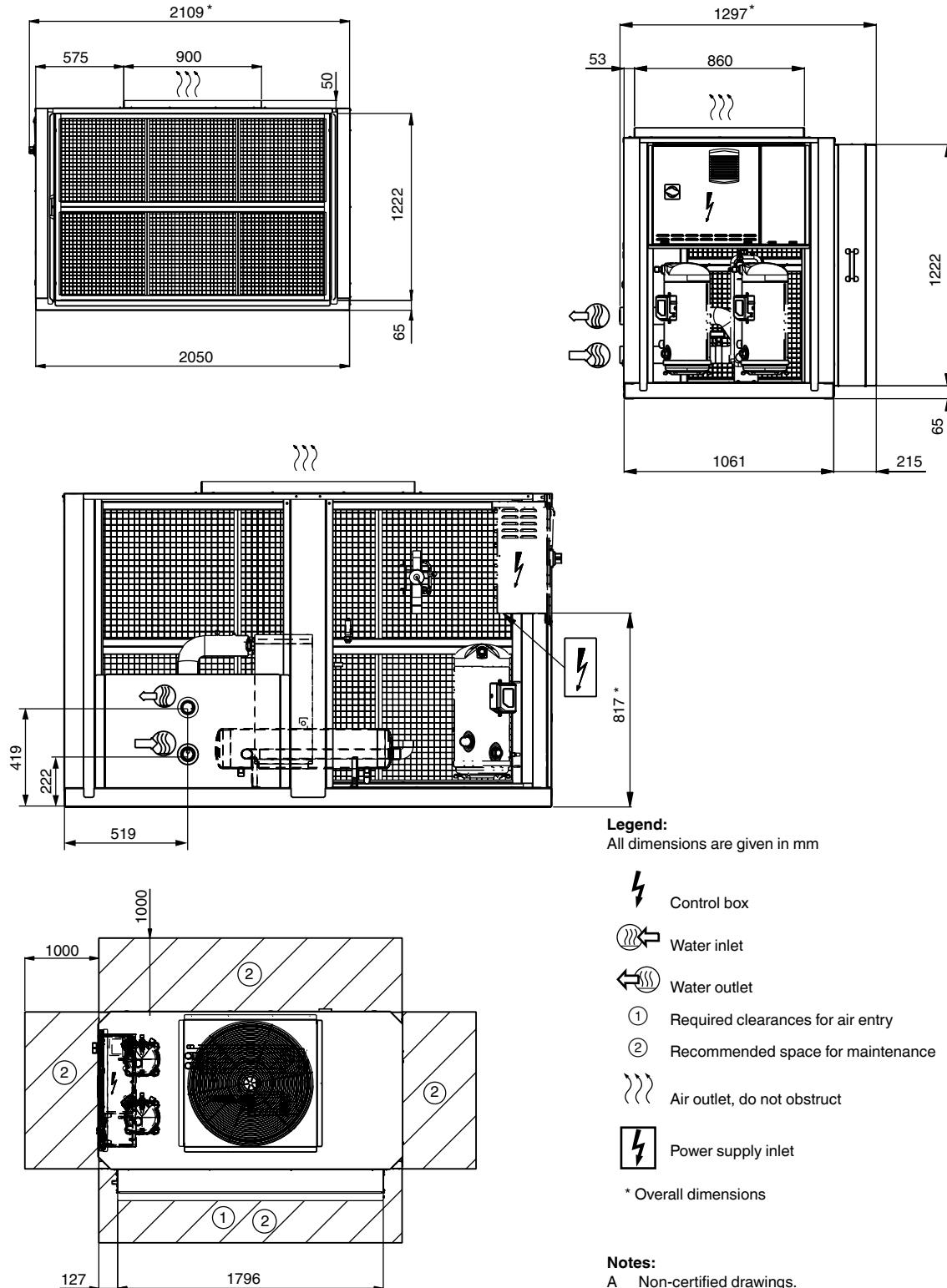
* Overall dimensions

Notes:

- A Non-certified drawings.
Refer to the certified dimensional drawings supplied with the unit or available on request, when designing an installation. For the location of fixing points, weight distribution and coordinates of the centre of gravity refer to the certified dimensional drawings.
- B Provide a gutter around the unit to collect the condensate water or install the accessory condensate collection pan (30RBSY 039-080/30RQSY 039-078).
- C The unit must be installed level (less than 2 mm per metre deviation in both axes).
- D Units 30RBSY 039-080 and 30RQSY 039-078 are equipped with a sleeve on the air heat exchanger side to allow connection of a suction air frame.

Dimensions/clearances, 30RBSY/30RQSY

30RBSY 039-050 and 070 and 30RQSY 039-045, option 23B, units with and without hydronic module, with filter frame

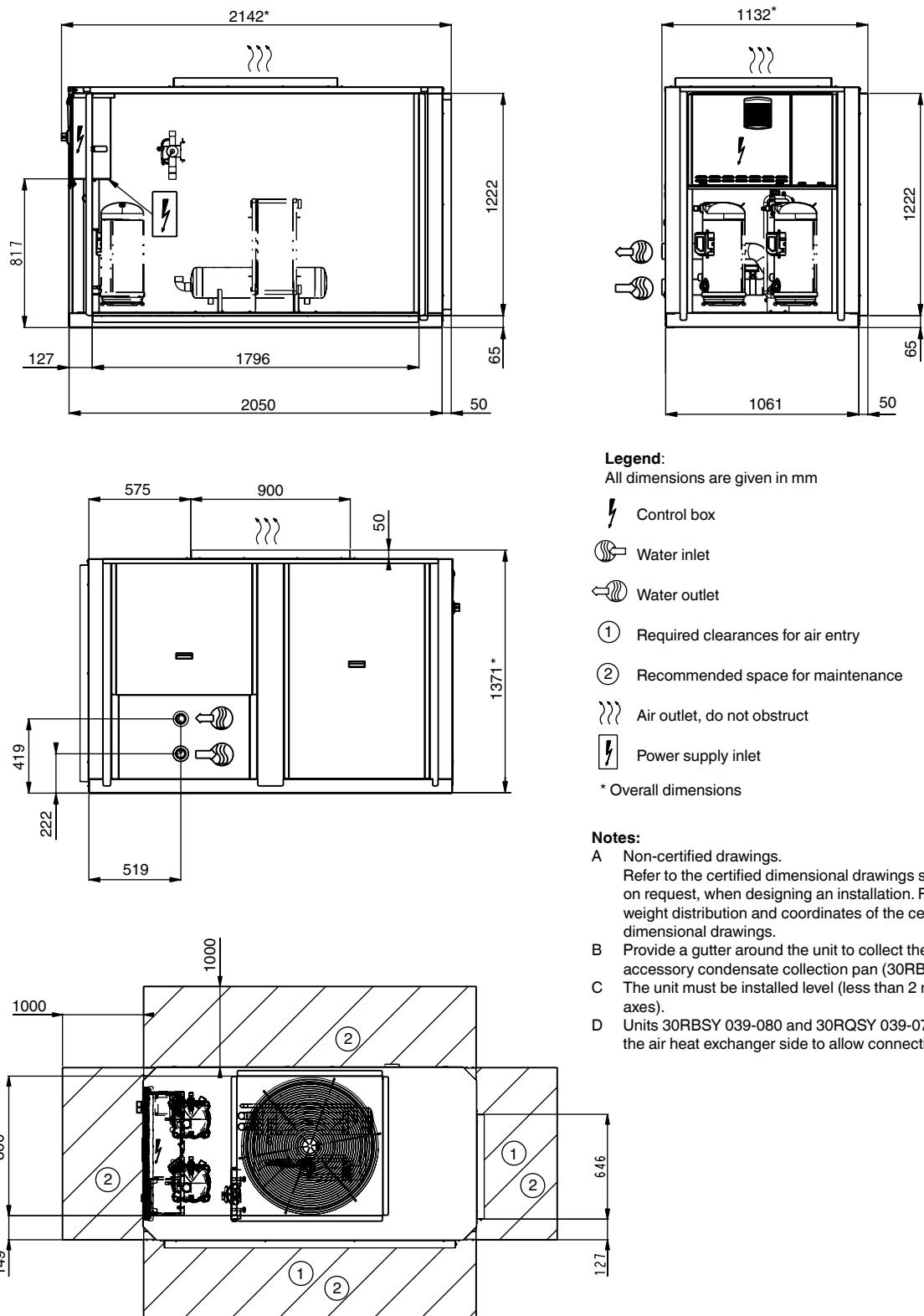


Notes:

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- B Provide a gutter around the unit to collect the condensate water or install the accessory condensate collection pan (30RBSY 039-080/30RQSY 039-078).
- C The unit must be installed level (less than 2 mm per metre deviation in both axes).
- D Units 30RBSY 039-080 and 30RQSY 039-078 are equipped with a sleeve on the air heat exchanger side to allow connection of a suction air frame.

Dimensions/clearances, 30RBSY/30RQSY

30RBSY 060-080 and 30RQSY 050-078, units with and without hydronic module, without filter frame



Legend:

All dimensions are given in mm



Control box



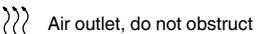
Water inlet



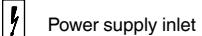
Water outlet

① Required clearances for air entry

② Recommended space for maintenance



Air outlet, do not obstruct



Power supply inlet

* Overall dimensions

Notes:

A Non-certified drawings.

Refer to the certified dimensional drawings supplied with the unit or available on request, when designing an installation. For the location of fixing points, weight distribution and coordinates of the centre of gravity refer to the certified dimensional drawings.

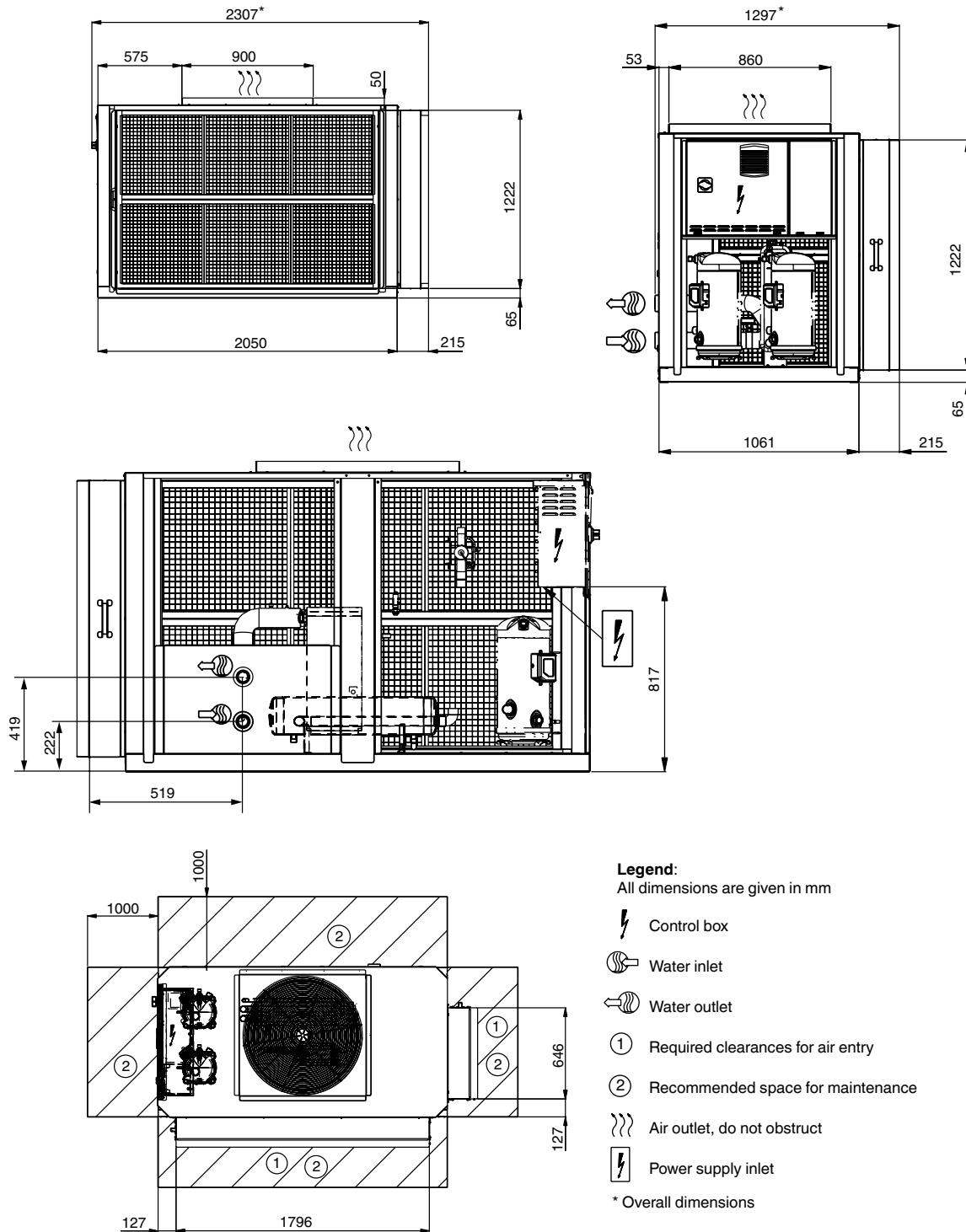
B Provide a gutter around the unit to collect the condensate water or install the accessory condensate collection pan (30RBSY 039-080/30RQSY 039-078).

C The unit must be installed level (less than 2 mm per metre deviation in both axes).

D Units 30RBSY 039-080 and 30RQSY 039-078 are equipped with a sleeve on the air heat exchanger side to allow connection of a suction air frame.

Dimensions/clearances, 30RBSY/30RQSY

30RBSY 060-080 and 30RQSY 050-078, option 23B, units with and without hydronic module, with filter frame

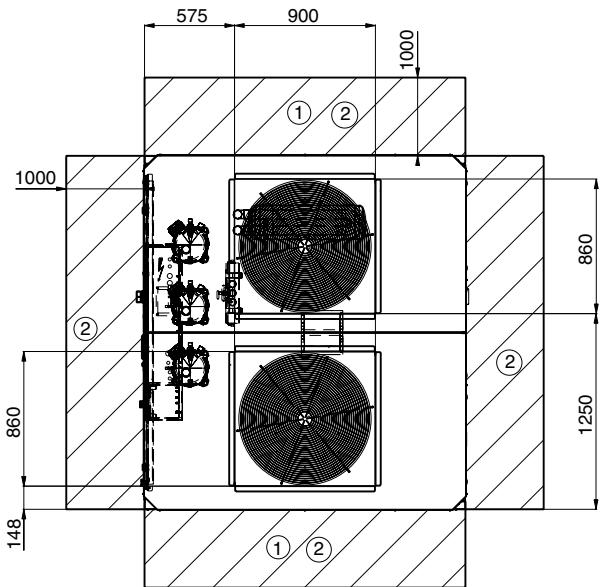
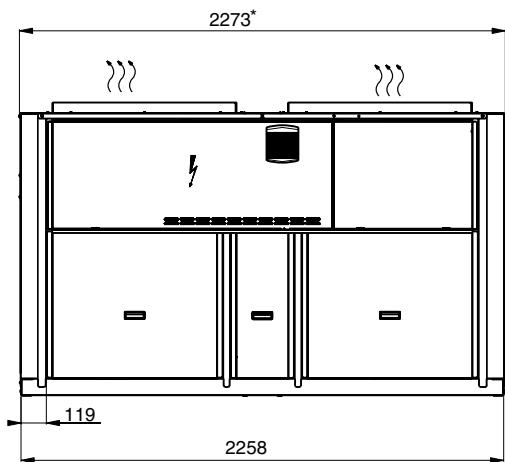
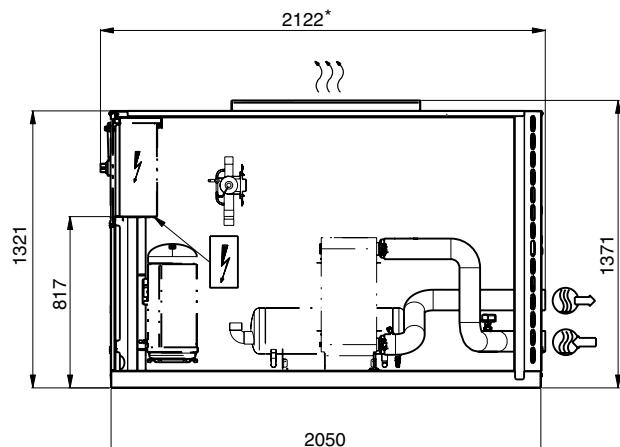
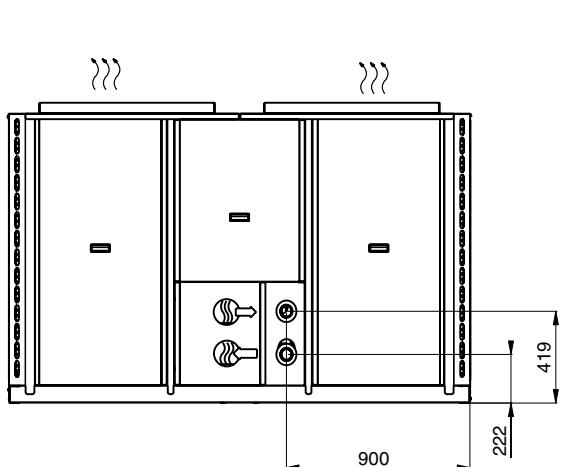


Notes:

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- B Provide a gutter around the unit to collect the condensate water or install the accessory condensate collection pan (30RBSY 039-080/30RQSY 039-078).
- C The unit must be installed level (less than 2 mm per metre deviation in both axes).
- D Units 30RBSY 039-080 and 30RQSY 039-078 are equipped with a sleeve on the air heat exchanger side to allow connection of a suction air frame.

Dimensions/clearances, 30RBSY/30RQSY

30RBSY 090-120 and 30RQSY 080-120, units with and without hydronic module



Legend:
All dimensions are given in mm

- ⚡ Control box
- ↙ Water inlet
- ↗ Water outlet
- ① Required clearances for air entry
- ② Recommended space for maintenance
- ↔ Air outlet, do not obstruct
- ⚡ Power supply inlet

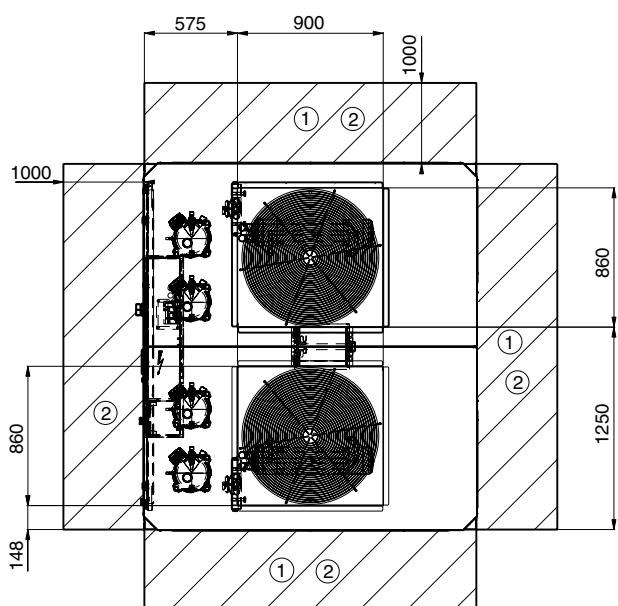
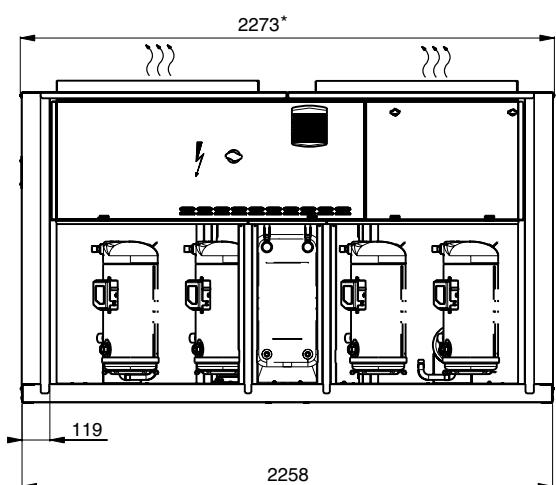
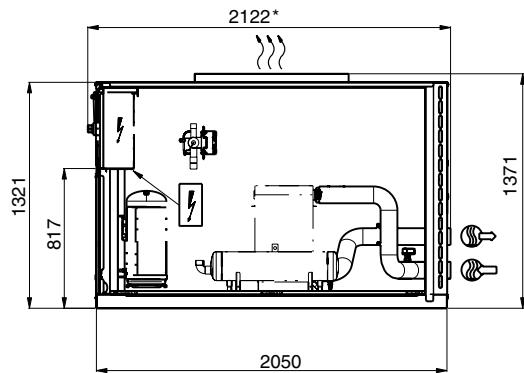
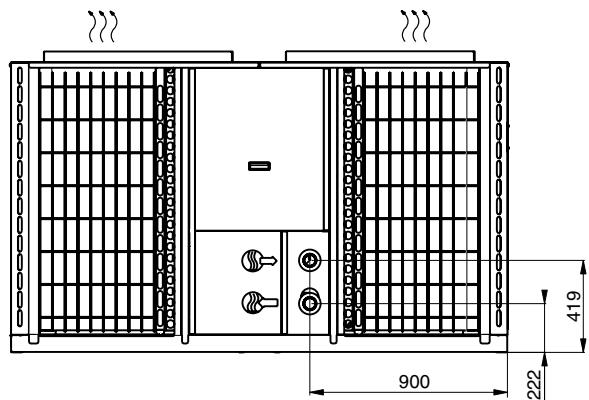
* Overall dimensions

Notes:

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Refer to the certified dimensional drawings supplied with the unit or available on request, when designing an installation. For the location of fixing points, weight distribution and coordinates of the centre of gravity refer to the certified dimensional drawings.
- B The unit must be installed level (less than 2 mm per metre deviation in both axes).

Dimensions/clearances, 30RBSY/30RQSY

30RBSY 140-160 and 30RQSY 140-160, units with and without hydronic module



Legend:
All dimensions are given in mm



Control box



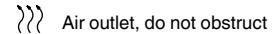
Water inlet



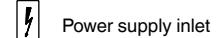
Water outlet

(1) Required clearances for air entry

(2) Recommended space for maintenance



Air outlet, do not obstruct



Power supply inlet

* Overall dimensions

Notes:

A Non-certified drawings.

Refer to the certified dimensional drawings supplied with the unit or available on request, when designing an installation. For the location of fixing points, weight distribution and coordinates of the centre of gravity refer to the certified dimensional drawings.

B The unit must be installed level (less than 2 mm per metre deviation in both axes).

Variable water flow system (VWF)

Variable water flow is a hydronic control function package that permits control of the water flow rate.

The VWF not only ensures control at full load, a specific Carrier algorithm linked to an electronic frequency converter also continuously modulates the flow rate to minimise pump consumption at full load as well as part load.

The hydronic module includes pressure transducers that permit intelligent measurement of the water flow rate and real-time display on the Pro-Dialog+ interface. All adjustments can be made directly on the interface, speeding up start-up and maintenance.

As VWF acts directly on the pump, the system no longer requires the control valve at the unit outlet. However, for applications with two-way valves a bypass system must be kept to guarantee the minimum flow rate.

Operating logic

■ Full-load set point

The flow rate control at full load uses the Pro-Dialog+ interface, reducing the pump speed. This first control saves energy that would normally be dissipated in the control valve. For example, if the pressure supplied by the pump is reduced by 20% the power consumption of the pump is reduced by the same ratio, compared to a traditional installation.

■ Operating mode at part load

Pro-Dialog+ includes two part-load operating modes:

- Constant outlet pressure control
- Constant delta T control.

1 – Constant unit outlet pressure control

The control continuously acts on the pump speed to ensure a constant outlet pressure.

This solution is suitable for installations with two-way valves. When these close, the water speed will accelerate in the system branches that are still open. For a fixed-speed pump this results in an unnecessary increase of the pressure at the pump outlet.

The outlet pressure control mode ensures that each circuit branch always has a uniform supply, without unnecessary energy waste.

In industrial processes such as plastic injection moulding, this solution ensures that each terminal unit has the correct pressure supply.

2 – Constant delta T control

The VWF algorithm maintains a constant delta T no matter what the unit load, reducing the flow rate to the minimum.

This solution can be used for systems with two-way or three-way valves and achieves higher energy savings than the "Constant unit outlet pressure control" mode. It is suitable for the majority of comfort applications.

