Carrier

PRODUCT SELECTION DATA

DUCTABLE AIR-COOLED LIQUID CHILLERS
DUCTABLE REVERSIBLE AIR-TO-WATER HEAT PUMPS

- Compact design
- High static available pressure
- Quiet operation
- Variable speed fans
- Variable water flow

30RBSY 039-160 C
30RQSY 039-160 B

AQUASNAP®

Nominal cooling capacity 30RBSY: 40-153 kW
Nominal cooling capacity 30RQSY: 37-147 kW
Nominal heating capacity 30RQSY: 42-151 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
- All-aluminium microchannel heat exchangers for the cooling only units (30RBSY)
- 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 hydraulic 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.

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Original document

FEATURES

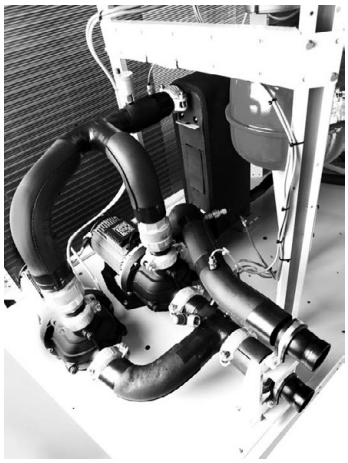
Quiet operation

- 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
  - Anti-vibration mountings and optional grilles to protect the heat exchanger against possible shocks.
  - 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 hydraulic module (option)
  - Centrifugal low or high-pressure water pump (as required), based on the pressure loss of the hydraulic installation.

Hydraulic 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 (option 70) 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 performances under any operating conditions.
- Increased energy efficiency at part load
  - 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 (SEER and SCOP seasonal performances 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 SmartVu™ control
  - R410A refrigerant is easier to use than other refrigerant blends

FEATURES

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
  - 50% reduction in the refrigerant charge through the use of micro-channel heat exchangers for the cooling only units (30RBSY)
- 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.
  - All aluminium micro-channel heat exchanger (MCHE) on cooling only units (30RBSY), offers increased corrosion resistance compared to traditional coils. The all-aluminium design eliminates the formation of galvanic currents between aluminium and copper that cause coil corrosion.
- Auto-adaptive control
  - Control algorithm prevents excessive compressor cycling and permits reduction of the water quantity in the hydraulic circuit (Carrier patent)
  - Hydraulic 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.
  - On Heat pump version 30RQSY specific Free Defrost algorithm to optimise performance and comfort even during defrost period.
- 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.

SmartVu™ control

The SmartVu ™ control combines intelligence with operating simplicity. The control constantly monitors all machine parameters and precisely manages the operation of compressors, expansion devices, fans and the evaporator water pump for optimum energy efficiency.

The SmartVu ™ control features advanced communication technology over Ethernet (IP) and a user-friendly and intuitive user interface with 4.3-inch colour touch screen.

- Energy management configuration
  - Internal timer: Controls chiller on/off times and operation at a second setpoint
  - Setpoint offset based on the outdoor air temperature
  - Master/slave control of two chillers operating in parallel with runtime balancing and automatic changeover in case of a unit fault.
  - For further energy savings, the AquaSnap® can be monitored remotely by Carrier experts for energy consumption diagnosis and optimisation.
- Integrated features
  - Night mode: Capacity and fan speed limitation for reduced noise level
  - With hydraulic module: Water pressure display and water flow rate calculation.
- Advanced communication features
  - Easy and high-speed communication technology over Ethernet (IP) to a centralised building management system
  - Access to multiple unit parameters.
- Maintenance functions
  - F-Gas regulation leak check reminder alert
  - Maintenance alert can be configured to days, months or hours of operation
  - Storage of maintenance manual, wiring diagram and spare parts list
  - Display of trend curves for the main values
  - Management of a fault memory allowing a log of the last 50 incidents to be accessed, with operating readings taken when the fault occurs
  - Blackbox memory

FEATURES

■ 4''3 SmartVu ™ user interface

- Intuitive and user-friendly 4''3 inch touch screen interface
- Concise and clear information is available in local languages
- Complete menu, customised for different users (end user, service personnel or Carrier engineers).

Remote management (standard)

Units with SmartVu™ control can be easily accessed from the internet, using a PC with an Ethernet connection. This makes remote control quick and easy and offers significant advantages for service operations.

The AquaSnap® is equipped with an RS485 serial port that 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.

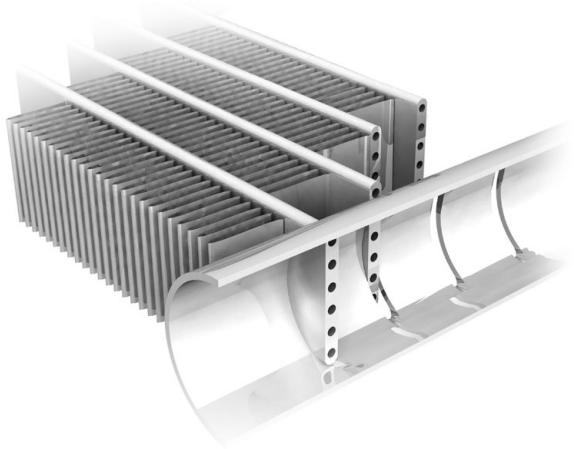
The AquaSnap® also communicates with other centralised building management systems via optional communication gateways.

A connection terminal allows the AquaSnap® unit to be remotely controlled by wire:

- Start/stop: Opening of this contact will shut down the unit
- Dual setpoint: Closing of this contact activates a second setpoint (e.g. unoccupied mode).
- Demand limit: Closing of this contact limits the maximum chiller capacity to a predefined value.
- Operation indication: This volt-free contact indicates that the chiller is operating (cooling load).
- Alarm indication: This volt-free contact indicates the presence of a major fault that has led to the shut-down of one or several refrigerant circuits.
- Setpoint adjustable via 4-20 mA signal

Variable fan speed controller*

All-aluminium micro-channel heat exchanger (MCHE)



Already utilised in the automobile and aeronautical industries for many years, the MCHE micro-channel heat exchanger is entirely made of aluminium. This one-piece concept significantly increases its corrosion resistance by eliminating the galvanic currents that are created when two different metals (copper and aluminium) come into contact in traditional heat exchangers.

As an option, the Enviro-Shield and Super Enviro-Shield anti-corrosion protections have been developed to increase the application range of the MCHE coil from medium to very corrosive environments. With Enviro-Shield protection, corrosion resistance of the MCHE coil is doubled without any impact on heat exchange.

With Super Enviro-Shield protection corrosion resistance of the MCHE coil is multiplied by four, and allows use in very corrosive industrial or marine environments

The MCHE heat exchanger allows a reduction in chiller refrigerant charge by up to 50%.

The low thickness of the MCHE reduces air pressure losses by 50% and makes it less susceptible to fouling (e.g. by sand) than a traditional coil. Cleaning of the MCHE heat exchanger is very fast using a dry air jet or a high-pressure washer, while observing the usage precautions.

OPTIONS

Options	No.	Description	Advantages	Use
Corrosion protection, traditional coils	3A	Fins made of pre-treated aluminum (polyurethane and epoxy)	Improved corrosion resistance, recommended for moderate marine and urban environments	30RQSY 039 -160
Medium-temperature brine solution	5B	Low temperature chilled water production down to 0°C with ethylene glycol and propylene glycol.	Covers specific applications such as ice storage and industrial processes	30RBSY / 30RQSY 039-160
Low-temperature brine solution	6B	Low temperature chilled water production down to -15°C with ethylene glycol and -12°C with propylene glycol.	Covers specific applications such as ice storage and industrial processes	30RBSY / 30RQSY 039-160
Very low noise level	15LS	Acoustic compressor enclosure	Compressor noise emission reduction	30RBSY / 30RQSY 039-160
Protection grilles	23	Metallic protection grilles	Coil protection against possible impact	30RBSY / 30RQSY 039-160
Suction filter	23B	Washable G2 efficiency filter in accordance with EN 779	Prevents pollution of the air-heat exchanger	30RBSY 039-80 30RQSY 039-78
Soft Starter	25	Electronic starter on each compressor	Reduced start-up current	30RBSY / 30RQSY 039-160
Hydraulic module frost protection	42	Electric heater on the hydraulic module	hydraulic module frost protection at low outside temperatures down to -20°C	30RBSY / 30RQSY 039-160
Partial heat recovery	49	Unit equipped with one desuperheater on each refrigerant circuit.	Production of free high-temperature hot-water simultaneously with chilled water production (or hot water for Heat pump)	30RBSY / 30RQSY 039-160
Master/slave operation	58	Unit equipped with supplementary water outlet temperature sensor kit (to be field installed) allowing master/slave operation of two units connected in parallel	Optimised operation of two units connected in parrallel operation with operating time equalisation	30RBSY / 30RQSY 039-160
Main disconnect switch without fuse	70	Factory-installed main electric disconnect switch in the control box	Ease-of-installation and compliance with local electrical regulations	30RBSY / 30RQSY 039-160
HP single-pump hydraulic module	116R	Single high-pressure water pump, water filter, electronic water flow control, pressure transducers. For more details, refer to the dedicated chapter (expansion tank not included.Option with built-in safety hydraulic components available.)	Easy and fast installation (plug & play)	30RBSY 039-160 Brine only 30RQSY 039-160
HP dual-pump hydraulic module	116S	Dual high-pressure water pump, water filter, electronic water flow control, pressure transducers. For more details, refer to the dedicated chapter(expansion tank not included) Option with built-in safety hydraulic components available)	Easy and fast installation (plug & play)	30RBSY 039-160 Brine only 30RQSY 039-160
HP evap. variable-speed single-pump	116V	Single high-pressure water pump with variable speed drive (VSD), water filter, electronic water flow control, pressure transducers. Multiple possibilities of water flow control. For more details, refer to the dedicated chapter(expansion tank not included Option with built-in safety hydraulic components available)	Easy and fast installation (plug & play), significant pumping energy cost savings (more than two-thirds), tighter water flow control, improved sytem reliability	30RBSY / 30RQSY 039-160
HP VSD dual-pump hydraulic mod.	116W	Dual high-pressure water pump with variable speed drive (VSD), pressure transducers. Multiple possibilities of water flow control. For more details, refer to the dedicated chapter (expansion tank not included Option with built-in safety hydraulic components available)	Easy and fast installation (plug & play), significant pumping energy cost savings (more than two-thirds), tighter water flow control, improved sytem reliability	30RBSY / 30RQSY 039-160
Lon gateway	148D	Bi-directional communication board complying with Lon Talk protocol	Connects the unit by communication bus to a building management system	30RBSY / 30RQSY 039-160

OPTIONS

Options	No.	Description	Advantages	Use
Bacnet over IP	149	Bi-directional high-speed communication using BACnet protocol over Ethernet network (IP)	Easy and high-speed connection by ethernet line to a building management system. Allows access to multiple unit parameters	30RBSY / 30RQSY 039-160
ModBus over IP and RS485 communication gateway	149B	Bi-directional high-speed communication using the ModBus over Ethernet network (IP) protocol	Easy, quick connection via Ethernet line to a building technical management system. Allows access to several unit parameters.	30RBSY / 30RQSY 039-160
Enviro-Shield anti-corrosion protection	262	Coating by conversion process which modifies the surface of the aluminum producing a coating that is integral to the coil. Complete immersion in a bath to ensure 100% coverage. No heat transfer variation, tested 4000 hours salt spray per ASTM B117	Improved corrosion resistance, recommended for use in moderately corrosive environments	30RBSY 039-160
Super Enviro-Shield anti-corrosion protection	263	Extremely durable and flexible epoxy polymer coating applied on micro channel heat exchangers by electro coating process, final UV protective topcoat. Minimal heat transfer variation, tested 6000 hours constant neutral salt spray per ASTM B117, superior impact resistance per ASTM D2794	Improved corrosion resistance, recommended for use in extremely corrosive environments	30RBSY 039-160
Evaporator screw connection sleeves (kit)	264	Evaporator inlet/outlet screw connection sleeves	Allows unit connection to a screw connector	30RBSY / 30RQSY 039-160
Welded evaporator connection kit	266	Victaulic piping connections with welded joints	Easy installation	30RBSY / 30RQSY 039-160
Reinforced ECM filtration for fan VFD	282A	Fan variable frequency drive compliance to IEC 61800-3 C1 class	Allows unit installation in domestic residential environment by reducing electromagnetic interferences	30RBSY / 30RQSY 039-160
Reinforced ECM filtration for pump VFD	282B	Pump variable frequency drive compliance to IEC 61800-3 C1 class	Allows unit installation in domestic residential environment by reducing electromagnetic interferences	30RBSY / 30RQSY 039-160 with option 116V or 116W
Expansion tank	293	6 bar expansion tank integrated in the hydraulic module (requires hydraulic module option)	Easy and fast installation (plug & play), & Protection of closed water systems from excessive pressure	30RBSY / 30RQSY 039-160
Set point adjustment by 4-20mA signal	311	Connections to allow a 4-20mA signal input	Easy energy managment, allow to adjust set point by a 4-20mA external signal	30RBSY / 30RQSY 039-160
Free Cooling dry cooler management	313	Control & connections to a Free Cooling Drycooler 09PE or 09VE fitted with option FC control box	Easy system managment, Extended control capabilities to a dryccoler used in Free Cooling mode	30RBSY 039-160
Plastic tarp	331	Plastic tarp covering the unit with straps and held down on a wooden pallet.	Prevents dust and external soiling on the machine during storage and transportation.	30RBSY / 30RQSY 039-160

PHYSICAL DATA, 30RBSY

30RBSY				39	45	50	60	70	80	90	100	120	140	160
Cooling														
Standard unit Full load performances*	CA1	Nominal capacity	kW	41	44	51	58	67	78	87	97	115	133	154
		EER	kW/kW	3,09	2,85	2,72	2,73	2,71	2,67	2,76	2,76	2,71	2,69	2,62
	CA2	Nominal capacity	kW	53	59	69	81	84	98	115	127	152	170	193
		EER	kW/kW	3,55	3,41	3,17	3,39	2,95	3,02	3,21	3,13	3,15	2,97	2,97
Standard unit Seasonal energy efficiency **		**SEER $_{12/7°C}$ Comfort low temp.**	**kWh/kWh**	**4,19**	**4,33**	**4,28**	**4,20**	4,04	4,05	**4,36**	**4,36**	**4,29**	**4,17**	**4,34**
		ηs cool $_{12/7°C}$	**%**	**165**	**170**	**168**	**165**	158	159	**171**	**171**	**169**	**164**	**170**
		SEPR $_{12/7°C}$ Process high temp.	**kWh/kWh**	**6,42**	**6,09**	**5,80**	**5,61**	**5,44**	**5,49**	**5,20**	**5,42**	**5,90**	**5,39**	**5,33**
Unit with option 6B Seasonal energy efficiency**		**SEPR $_{-2/-8°C}$ Process medium temp.**	**kWh/kWh**	**3,62**	**3,96**	**3,49**	**3,56**	**3,69**	**3,29**	**3,59**	**3,76**	**3,62**	**3,63**	**3,52**
Integrated Part Load Value		IPLV.SI	kW/kW	3,690	3,890	3,990	3,950	3,660	3,780	3,520	3,610	3,760	3,690	4,000
Sound levels														
Standard unit - for 160 Pa external static pressure														
Sound power level at discharge (1)			dB(A)	84	84	84	84	87	87	87	87	87	90	90
Sound power level radiated (1)				84	84	84	84	87	87	87	87	87	90	90
Sound pressure level at 10 m (2)			dB(A)	53	53	53	53	55	55	56	56	56	58	58
Dimensions				If two values are shown the first one is for standard units and the second one for units with option 23B										
Length			mm	2142/2307	2142/2307	2142/2307	2142/2307	2142/2307	2142/2307	2273	2273	2273	2273	2273
Width			mm	1132/1297	1132/1297	1132/1297	1132/1297	1132/1297	1132/1297	2122	2122	2122	2122	2122
Height			mm	1371	1371	1371	1371	1371	1371	1371	1371	1371	1371	1371
Operating weight with MCHE coil (3)														
Standard unit without hydraulic module			kg	436	443	449	464	461	480	771	780	793	901	932
Standard unit with hydraulic module														
Single high-pressure pump			kg	466	473	479	494	491	510	803	812	829	940	971
Dual high-pressure pump			kg	491	499	504	520	517	536	848	857	877	977	1008
Compressors				Hermetic scroll compressors, 48,3 r/s										
Circuit A				2	2	2	2	2	2	3	3	3	2	2
Circuit B				-	-	-	-	-	-	-	-	-	2	2
No of control stages				2	2	2	2	2	2	3	3	3	4	4
Refrigerant charge with MCHE coil (3)				R-410A, GWP=2088 following ARI4										
Circuit A			kg	4,7	5,3	5,9	6,7	6,2	7,3	10,7	10,8	11,4	6,5	7,4
			teqCO_2	9,8	11,1	12,3	14,0	12,9	15,2	22,3	22,6	23,8	13,6	15,5
Circuit B			kg	-	-	-	-	-	-	-	-	-	6,5	7,4
			teqCO_2	-	-	-	-	-	-	-	-	-	13,6	15,5

* In accordance with standard EN14511-3:2013

** In accordance with standard EN14825:2016, average climate

CA1 Cooling mode conditions: Evaporator water entering/leaving temperature 12°C/7°C, outside air temperature 35°C, evaporator fooling factor 0 m².K/W

CA2 Cooling mode conditions: Evaporator water entering/leaving temperature 23°C/18°C, outside air temperature 35°C, evaporator fooling factor 0 m².K/W

ηs cool $_{12/7°C}$ & SEER $_{12/7°C}$ Bold Values compliant to Ecodesign regulation: (EU) No 2016/2281 for Comfort application

SEPR $_{12/7°C}$ **Bold values compliant to Ecodesign regulation: (EU) No 2016/2281 for Process application**

SEPR $_{-2/-8°C}$ **Bold values compliant to Ecodesign regulation: (EU) No 2015/1095 for Process application**

IPLV.SI Calculations according to standard performances AHRI 551-591 (SI).

(1) In dB ref=10^{-12} W, (A) weighting. Declared dualnumber noise emission values in accordance with ISO 4871 (with an associated uncertainty of +/-3dB(A)). Measured in accordance with ISO 9614-1 and certified by Eurovent.

(2) In dB ref 20µPa, (A) weighting. Declared dualnumber noise emission values in accordance with ISO 4871 (with an associated uncertainty of +/-3dB(A)). For information, calculated from the sound power level Lw(A).

(3) Values shown are a guideline only. Please refer to the unit nameplate

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Eurovent certified values

PHYSICAL DATA, 30RBSY

30RBSY		39	45	50	60	70	80	90	100	120	140	160
Capacity control		SmartVu™										
Minimum capacity	%	50	50	50	50	50	50	33	33	33	25	25
Condensers		All aluminium microchannel heat exchanger (MCHE)										
Fans		Axial Flying Bird IV with rotating shroud										
Quantity		1	1	1	1	1	1	2	2	2	2	2
Maximum total air flow	l/s	3885	3883	3687	3908	4982	5267	6940	6936	7370	9958	10534
Maximum rotation speed	r/s	16	16	16	16	18	18	16	16	16	18	18
Evaporator		Direct expansion, plate heat exchanger										
Water volume	l	2,6	3	3,3	4	4,8	5,6	8,7	9,9	11,3	12,4	14,7
Without hydraulic module (option)												
Max. water-side operating pressure	kPa	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
With hydraulic module (option)												
Single or dual pump (as selected)		Pump, Victaulic screen filter, relief valve, expansion tank, purge valves (water + air), pressure sensors										
Expansion tank volume	l	12	12	12	12	12	12	35	35	35	35	35
Expansion tank pressure(4)	bar	1	1	1	1	1	1	1,5	1,5	1,5	1,5	1,5
Max. water-side operating pressure	kPa	400	400	400	400	400	400	400	400	400	400	400
Water connections with/without hydraulic module		Victaulic										
Diameter	in	2	2	2	2	2	2	2	2	2	2	2
Outside tube diameter	mm	60,3	60,3	60,3	60,3	60,3	60,3	60,3	60,3	60,3	60,3	60,3
Chassis paint colour		Colour code: RAL7035										

(4) When delivered, the standard pre-inflation of the tank is not necessarily the optimal value for the system. To permit changing the water volume, change the inflation pressure to a pressure that is close to the static head of the system. Fill the system with water (purging the air) to a pressure value that is 10 to 20 kPa higher than the pressure in the tank

PHYSICAL DATA, 30RQSY

30RQSY				39	45	50	60	70	78	80	90	100	120	140	160
Heating															
Standard unit Full load performances*	HA1	Nominal capacity	kW	42,3	46,4	53,2	61,5	68,3	78,0	81,8	92,2	100	116	135	156
		COP	kW/kW	3,65	3,66	3,70	3,80	3,69	3,63	3,82	3,81	3,64	3,60	3,62	3,46
	HA2	Nominal capacity	kW	41,5	46,3	51,8	59,6	66,3	75,4	78,9	89,5	97,4	112	131	151
		COP	kW/kW	3,03	3,01	2,99	3,05	3,01	2,98	3,15	3,08	2,97	2,95	2,95	2,85
Standard unit Seasonal energy efficiency**	HA1	**SCOP $_{30/35°C}$**	**kWh/kWh**	**3,28**	**3,29**	**3,26**	**3,38**	**3,38**	**3,35**	**3,40**	**3,38**	**3,30**	**3,37**	**3,45**	**3,36**
		ηs heat $_{30/35°C}$	**%**	**128**	**129**	**127**	**132**	**132**	**131**	**133**	**132**	**129**	**132**	**135**	**131**
		P_{rated}	kW	36	32	36	44	50	56	57	82	73	84	100	112
		Energy labelling		A+	A+	A+	A+	A+	A+	A+	-	-	-	-	-
Cooling															
Standard unit Full load performances*	CA1	Nominal capacity	kW	36,9	43,1	49,4	57,1	62,1	69,1	77,0	84,9	95,1	112	129	146
		EER	kW/kW	2,80	2,72	2,66	2,71	2,65	2,41	2,73	2,66	2,66	2,67	2,70	2,50
	CA2	Nominal capacity	kW	46,1	53,9	62,7	69,5	76,8	87,0	96,5	107	117	142	159	182
		EER	kW/kW	3,23	3,18	3,09	3,06	3,03	2,77	3,13	3,10	3,06	3,07	3,08	2,83
Standard unit Seasonal energy efficiency**		SEER $_{12/7°C}$ Comfort low temp.	kWh/kWh	3,53	3,65	3,63	3,53	3,50	3,35	3,59	3,52	3,62	3,90	3,93	3,87
		SEPR $_{12/7°C}$ Process high temp.	kWh/kWh	5,00	5,41	4,84	4,90	4,77	4,88	5,08	4,62	4,60	5,23	4,81	5,31
Unit with option 6B Seasonal energy efficiency**		SEPR $_{-2/-8°C}$ Process medium temp.	kWh/kWh	3,08	3,08	2,61	2,96	2,97	2,86	2,70	2,86	3,04	2,94	2,80	2,58
Integrated Part Load Value		IPLV.SI	kW/kW	3,670	3,816	3,715	3,568	3,596	3,580	3,532	3,398	3,543	3,916	3,681	3,802
Sound levels															
Standard unit - for 160 Pa external static pressure															
Sound power level at discharge (1)			dB(A)	84	84	84	87	87	87	87	87	87	87	90	90
Sound power level radiated(1)				84	84	84	87	87	87	87	87	87	87	90	90
Sound pressure level at 10 m(2)			dB(A)	53	53	53	55	55	55	56	56	56	56	58	58
Dimensions				If two values are shown the first one is for standard units and the second one for units with option 23B											
Length			mm	2142/2307	2142/2307	2142/2307	2142/2307	2142/2307	2142/2307	2273	2273	2273	2273	2273	2273
Width			mm	1132/1297	1132/1297	1132/1297	1132/1297	1132/1297	1132/1297	2122	2122	2122	2122	2122	2122
Height			mm	1371	1371	1371	1371	1371	1371	1371	1371	1371	1371	1371	1371
Operating weight (3)															
Standard unit without hydraulic module			kg	512	519	553	567	567	574	753	921	930	988	1084	1101
Standard unit with hydraulic module															
Single high-pressure pump			kg	542	549	582	596	597	604	783	952	962	1024	1123	1140
Dual high-pressure pump			kg	568	575	608	622	623	630	809	997	1007	1072	1160	1177

*	In accordance with standard EN14511-3:2013
**	In accordance with standard EN14825:2016, average climate
HA1	Heating mode conditions: Water heat exchanger water entering/leaving temperature 30°C/35°C, outside air temperature tdb/twb = 7°C db/6°C wb, evaporator fooling factor 0 m².K/W
HA2	Heating mode conditions: Water heat exchanger water entering/leaving temperature 40°C/45°C, outside air temperature tdb/twb= 7°C db/6°C wb, evaporator fooling factor 0 m².K/W
CA1	Cooling mode conditions: Evaporator water entering/leaving temperature 12°C/7°C, outside air temperature 35°C, evaporator fooling factor 0 m².K/W
CA2	Cooling mode conditions: Evaporator water entering/leaving temperature 23°C/18°C, outside air temperature 35°C, evaporator fooling factor 0 m².K/W
ηs heat $_{30/35°C}$ & SCOP $_{30/35°C}$	**Bold values compliant to Ecodesign regulation: (EU) No 813/2013 for Heat Pump application**
SEER $_{12/7°C}$ & SEPR $_{12/7°C}$	Values calculated in accordance with EN14825:2016
SEPR $_{-2/-8°C}$	Values calculated in accordance with EN14825:2016
IPLV.SI	Calculations according to standard performances AHRI 551-591 (SI).
-	Not applicable
(1)	In dB ref=10-12 W, (A) weighting. Declared dualnumber noise emission values in accordance with ISO 4871 (with an associated uncertainty of +/-3dB(A)). Measured in accordance with ISO 9614-1 and certified by Eurovent.
(2)	In dB ref 20µPa, (A) weighting. Declared dualnumber noise emission values in accordance with ISO 4871 (with an associated uncertainty of +/-3dB(A)). For information, calculated from the sound power level Lw(A).
(3)	Values shown are a guideline only. Please refer to the unit nameplate

EUROVENT CERTIFIED PERFORMANCE www.eurovent-certification.com

Eurovent certified values

PHYSICAL DATA, 30RQSY

30RQSY		39	45	50	60	70	78	80	90	100	120	140	160
Compressors		Hermetic scroll compressors, 48,3 r/s											
Circuit A		2	2	2	2	2	2	2	3	3	3	2	2
Circuit B		-	-	-	-	-	-	-	-	-	-	2	2
No of control stages		2	2	2	2	2	2	2	3	3	3	4	4
Refrigerant charge (3)		R-410A, GWP=2088 following ARI4											
Circuit A	kg	12,5	13,5	16,5	17,5	18	16,5	21,5	27,5	28,5	33	19	18,5
	teqCO_2	26,1	28,2	34,5	36,5	37,6	34,5	44,9	57,4	59,5	68,9	39,7	38,6
Circuit B	kg	-	-	-	-	-	-	-	-	-	-	19	18,5
	teqCO_2	-	-	-	-	-	-	-	-	-	-	39,7	38,6
Oil charge (3)		POE SZ160 (EMKARATE RL-32-3MAF)											
Circuit A	l	5,8	7,2	7,2	7,2	7,0	7,0	7,2	7,0	7,0	7,0	7,0	7,0
Circuit B	l	-	-	-	-	-	-	-	-	-	-	7,0	7,0
Capacity control		SmartVu™											
Minimum capacity	%	50	50	50	50	50	50	50	33	33	33	25	25
Air heat exchangers		Grooved copper tubes and aluminium fins											
Fans		Axial Flying Bird IV with rotating shroud											
Quantity		1	1	1	1	1	1	2	2	2	2	2	2
Maximum total air flow	l/s	3692	3690	3910	5278	4982	5267	7770	7380	7376	7818	9964	10534
Maximum rotation speed	r/s	16	16	16	18	18	18	16	16	16	16	18	18
Water heat exchanger (direct-expansion type)		Plate heat exchanger, max, water-side operating pressure without hydraulic module 1000 kPa											
Water volume	l	2,6	3	4	4,8	4,8	5,6	8,7	8,7	9,9	11,3	12,4	14,7
With hydraulic module (option)													
Single or dual pump (as selected)		Pump, Victaulic screen filter, relief valve, expansion tank, purge valves (water + air), pressure sensors											
Expansion tank volume	l	12	12	12	12	12	12	35	35	35	35	35	35
Expansion tank pressure (4)	bar	1	1	1	1	1	1	1	1,5	1,5	1,5	1,5	1,5
Max. water-side operating pressure	kPa	400	400	400	400	400	400	400	400	400	400	400	400
Water connections with/without hydraulic module		Victaulic											
Connections	in	2	2	2	2	2	2	2	2	2	2	2	2
Outside diameter	mm	60,3	60,3	60,3	60,3	60,3	60,3	60,3	60,3	60,3	60,3	60,3	60,3
Chassis paint colour		Colour code: RAL7035											

(3) Values shown are a guideline only. Please refer to the unit nameplate

(4) When delivered, the standard pre-inflation of the tank is not necessarily the optimal value for the system. To permit changing the water volume, change the inflation pressure to a pressure that is close to the static head of the system. Fill the system with water (purging the air) to a pressure value that is 10 to 20 kPa higher than the pressure in the tank

ELECTRICAL DATA, 30RBSY

30RBSY without hydraulic module		039	045	050	060	070	080	090	100	120	140	160
Power/ circuit												
Nominal power supply	V-ph-Hz	400-3-50										
Voltage range	V	360-440										
Control circuit supply		24 V via internal transformer										
Maximum start-up current (Un)(1)												
Standard unit	A	116	137	145	148	176	213	179	213	253	244	287
Unit with electronic starter option	A	75	87	94	96	114	140	130	155	181	186	215
Unit power factor at maximum capacity(2)		0,83	0,81	0,81	0,83	0,81	0,78	0,83	0,81	0,79	0,81	0,78
Maximum operating power input(2)	kW	21	24	26	30	32	36	46	49	56	64	73
Nominal unit operating current draw(3)	A	28	32	36	39	43	53	61	67	83	86	106
Maximum operating current draw (Un)(4)	A	37	47	49	55	67	73	86	104	113	135	147
Maximum operating current draw (Un-10%)†	A	41	52	54	61	75	80	94	116	123	150	160
Customer-side unit power reserve		Customer reserve at the 24 V control power circuit										
Short-circuit stability and protection		See table 9,1										

(1) Maximum instantaneous start-up current at operating limit value (maximum operating current of the smallest compressor(s) + fan current + locked rotor current of the largest compressor).
(2) Power input, at the unit permanent maximum operating conditions (data given on the unit nameplate)
(3) Standardised Eurovent conditions: evaporator entering/leaving water temperature 12°C/7°C, outside air temperature 35°C.
(4) Maximum unit current at 400 V, non permanent operating conditions (values given on the unit nameplate).
† Maximum unit operating current at 360 V, non permanent operating conditions.

Short-circuit stability current (TN system(1))

30RBSY	039	045	050	060	070	080
Value with unspecified upstream protection						
Short-term current at 1s - Icw – kA rms	3,36	3,36	3,36	3,36	3,36	3,36
Admissible peak current - Ipk - kA pk	20	20	20	20	20	15
Max. value with upstream protection by circuit breaker						
Conditional short-circuit current Icc - kA rms	40	40	40	40	40	40
Schneider circuit breaker - Compact series	NS100H	NS100H	NS100H	NS100H	NS100H	NS100H
Reference No.(2)	29670	29670	29670	29670	29670	29670

30RBSY	090	100	120	140	160
Value with unspecified upstream protection					
Short-term current at 1s - Icw – kA rms	5,62	5,62	5,62	5,62	5,62
Admissible peak current - Ipk - kA pk	20	20	15	20	15
Max. value with upstream protection by circuit breaker					
Conditional short-circuit current Icc - kA rms	40	40	40	30	30
Schneider circuit breaker - Compact series	NS100H	NS160H	NS160H	NS250H	NS250H
Reference No.(2)	29670	30670	30670	31671	31671

(1) Earthing system type
(2) If another current limitation protection system is used, its time-current and thermal constraint (I^2t) trip characteristics must be at least equivalent to those of the recommended Schneider circuit breaker.
The short-circuit stability current values above are suitable with the TN system.

ELECTRICAL DATA, 30RQSY

30RQSY without hydraulic module		039	045	050	060	070	078	080	090	100	120	140	160
Power circuit													
Nominal power supply	V-ph-Hz	400-3-50											
Voltage range	V	360-440											
Control circuit supply		24 V via internal transformer											
Maximum start-up current (Un)(1)													
Standard unit	A	116	137	145	148	176	213	219	179	213	253	244	287
Unit with electronic starter option	A	75	87	94	96	114	143	149	130	155	181	186	215
Unit power factor at maximum capacity(2)		0,83	0,81	0,81	0,83	0,81	0,83	0,83	0,83	0,81	0,79	0,81	0,78
Maximum operating power input(2)	kW	21	24	26	30	32	36	39	46	49	56	64	73
Nominal unit operating current draw(3)	A	28	32	36	39	43	53	59	61	67	83	86	106
Maximum operating current draw (Un)(4)	A	37	47	49	55	67	73	79	86	104	113	135	147
Maximum operating current draw (Un-10%)†	A	41	52	54	61	75	80	85	94	116	123	150	160
Customer-side unit power reserve		Customer reserve at the 24 V control power circuit											
Short-circuit stability and protection		See table 9,1											

(1) Maximum instantaneous start-up current at operating limit value (maximum operating current of the smallest compressor(s) + fan current + locked rotor current of the largest compressor).
(2) Power input, at the unit permanent maximum operating conditions (data given on the unit nameplate)
(3) Standardised Eurovent conditions: evaporator entering/leaving water temperature 12°C/7°C, outside air temperature 35°C.
(4) Maximum unit current at 400 V, non permanent operating conditions (values given on the unit nameplate).
† Maximum unit operating current at 360 V, non permanent operating conditions.

Short-circuit stability current (TN system(1))

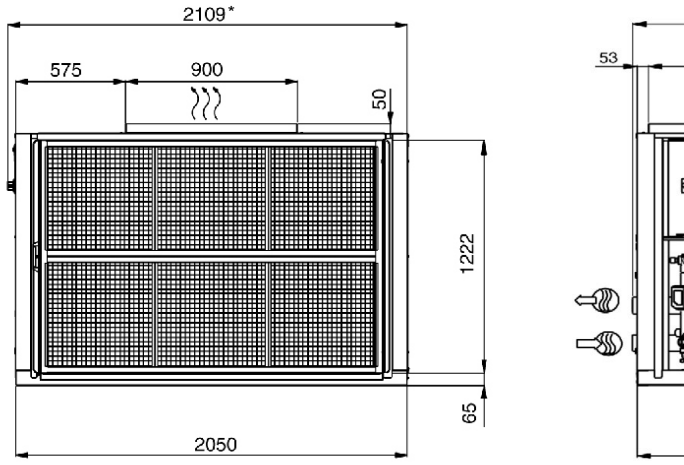
30RQSY	039	045	050	060	070	078
Value with unspecified upstream protection						
Short-term current at 1s - Icw – kA rms	3,36	3,36	3,36	3,36	3,36	3,36
Admissible peak current - Ipk - kA pk	20	20	20	20	20	15
Max. value with upstream protection by circuit breaker						
Conditional short-circuit current Icc - kA rms	40	40	40	40	40	40
Schneider circuit breaker - Compact series	NS100H	NS100H	NS100H	NS100H	NS100H	NS100H
Reference No.(2)	29670	29670	29670	29670	29670	29670

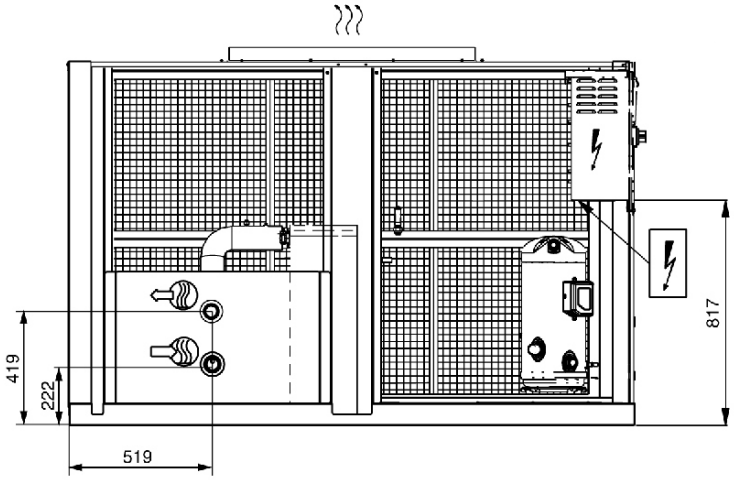
30RQSY	080	090	100	120	140	160
Value with unspecified upstream protection						
Short-term current at 1s - Icw – kA rms	3,36	5,62	5,62	5,62	5,62	5,62
Admissible peak current - Ipk - kA pk	15	20	20	15	20	15
Max. value with upstream protection by circuit breaker						
Conditional short-circuit current Icc - kA rms	40	40	40	40	40	40
Schneider circuit breaker - Compact series	NS100H	NS100H	NS160H	NS160H	NS250H	NS250H
Reference No.(2)	29670	29670	30670	30670	31671	31671

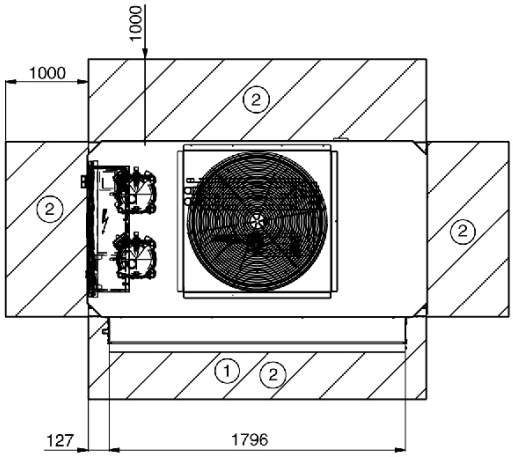
(1) Earthing system type
(2) If another current limitation protection system is used, its time-current and thermal constraint (I^2t) trip characteristics must be at least equivalent to those of the recommended Schneider circuit breaker.
The short-circuit stability current values above are suitable with the TN system.

DIMENSIONS/CLEARANCES, 30RBSY/30RQSY

30RBSY 039-050 and 070 and 30RQSY 039-045, units with and without hydraulic 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.

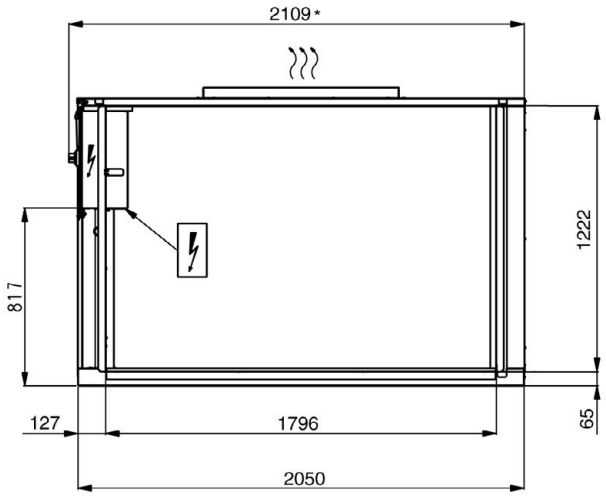
B Provide a gutter around the unit to collect the condensate water or install the accessory condensate collection pan (30RBSY 039-080/30RQSY 039-078).

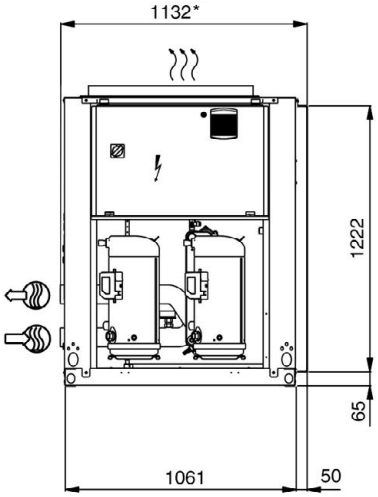
C The unit must be installed level (less than 2 mm per metre deviation in both axes).

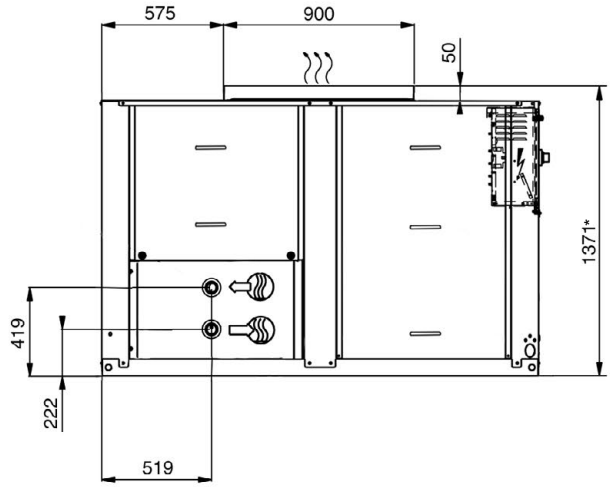
D Units 30RBSY 039-080 and 30RQSY 039-078 are equipped with a sleeve on the air heat exchanger side to allow connection of a suction air frame.

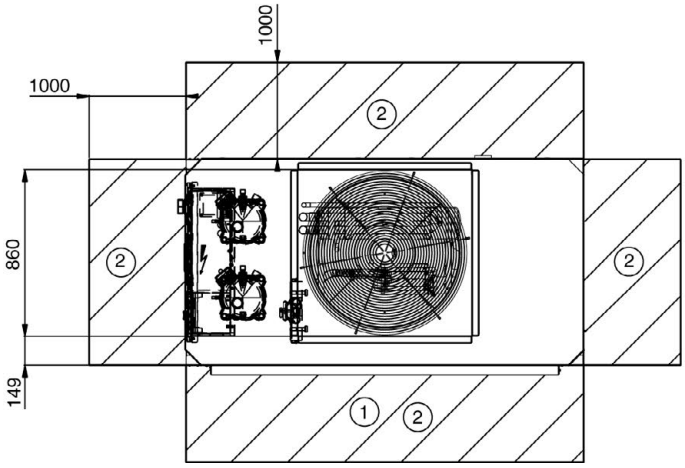
DIMENSIONS/CLEARANCES, 30RBSY/30RQSY

30RBSY 039-050 and 070 and 30RQSY 039-045, option 23B, units with and without hydraulic module, with 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.

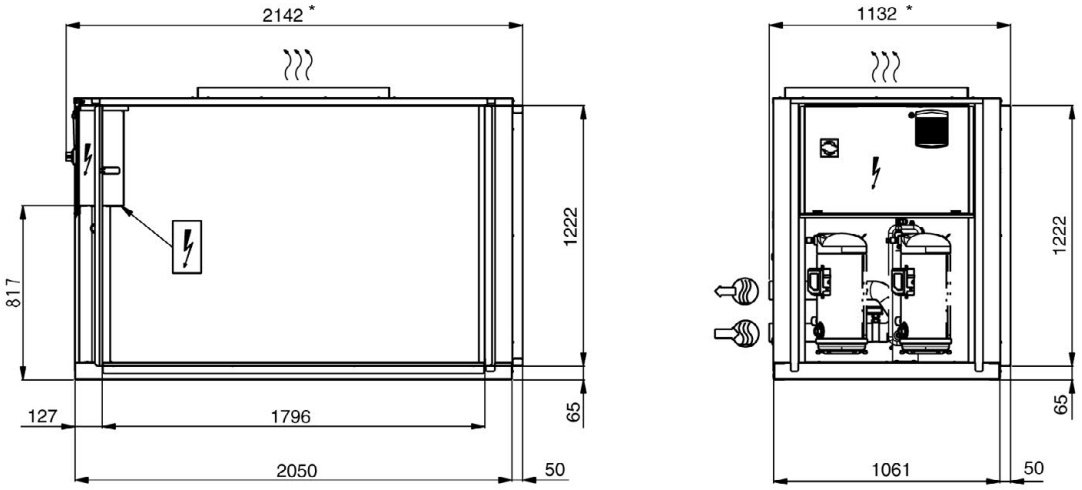
B Provide a gutter around the unit to collect the condensate water or install the accessory condensate collection pan (30RBSY 039-080/30RQSY 039-078).

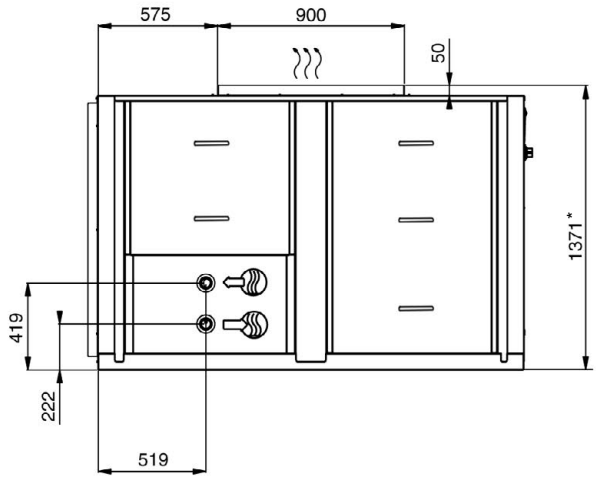
C The unit must be installed level (less than 2 mm per metre deviation in both axes).

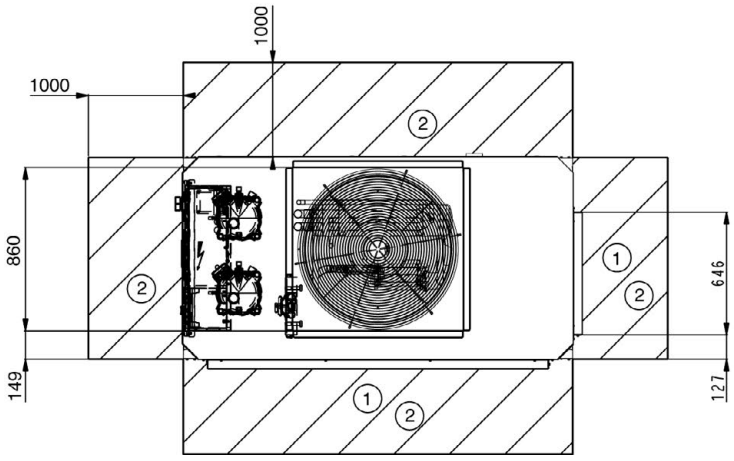
D Units 30RBSY 039-080 and 30RQSY 039-078 are equipped with a sleeve on the air heat exchanger side to allow connection of a suction air frame.

DIMENSIONS/CLEARANCES, 30RBSY/30RQSY

30RBSY 060 and 080 and 30RQSY 050-078, units with and without hydraulic 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.

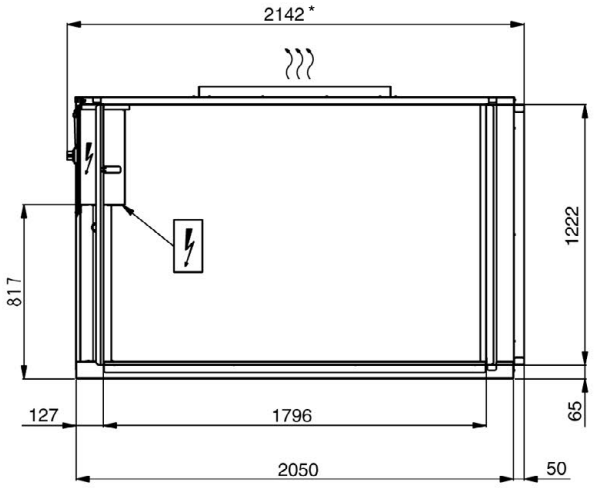
B Provide a gutter around the unit to collect the condensate water or install the accessory condensate collection pan (30RBSY 039-080/30RQSY 039-078).

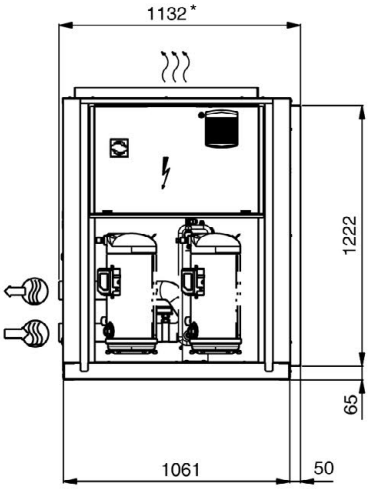
C The unit must be installed level (less than 2 mm per metre deviation in both axes).

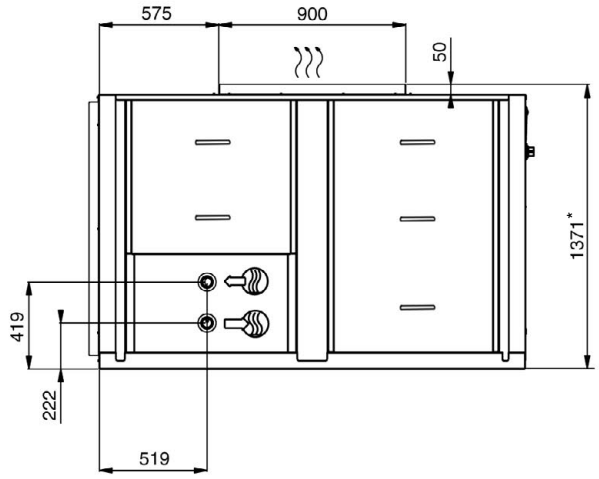
D Units 30RBSY 039-080 and 30RQSY 039-078 are equipped with a sleeve on the air heat exchanger side to allow connection of a suction air frame.

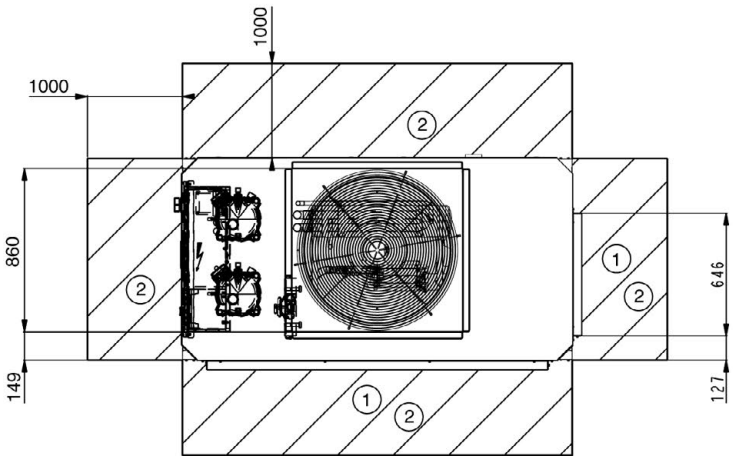
DIMENSIONS/CLEARANCES, 30RBSY/30RQSY

30RBSY 060 and 080 and 30RQSY 050-078, option 23B, units with and without hydraulic module, with 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.

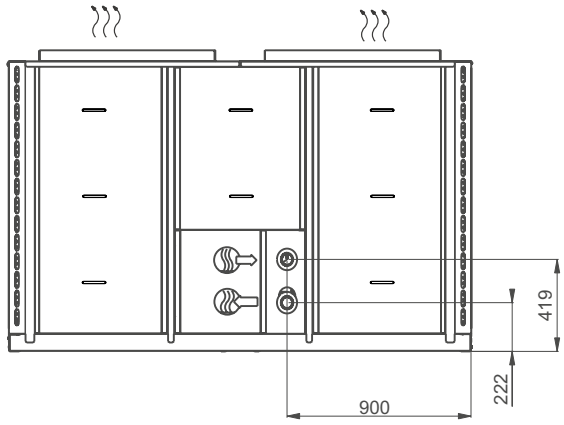
B Provide a gutter around the unit to collect the condensate water or install the accessory condensate collection pan (30RBSY 039-080/30RQSY 039-078).

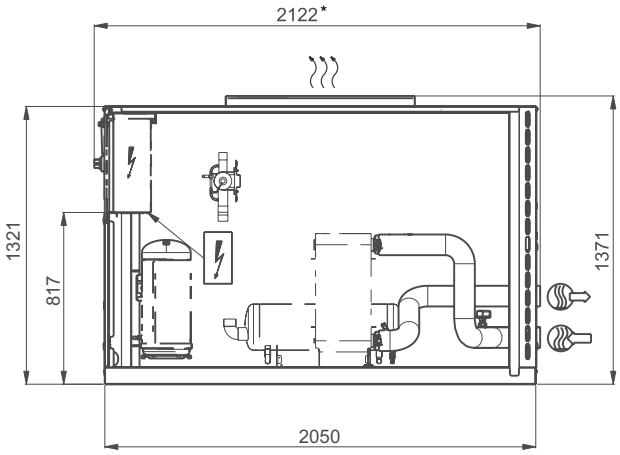
C The unit must be installed level (less than 2 mm per metre deviation in both axes).

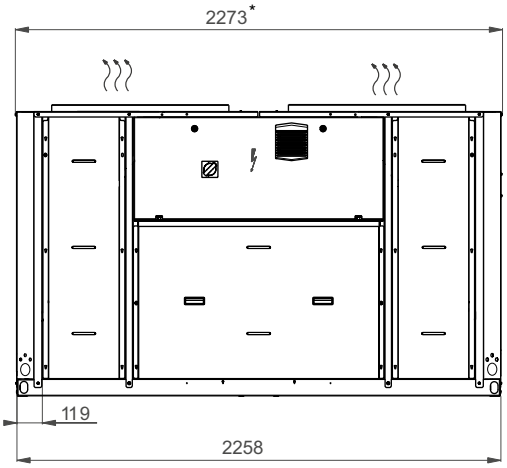
D Units 30RBSY 039-080 and 30RQSY 039-078 are equipped with a sleeve on the air heat exchanger side to allow connection of a suction air frame.

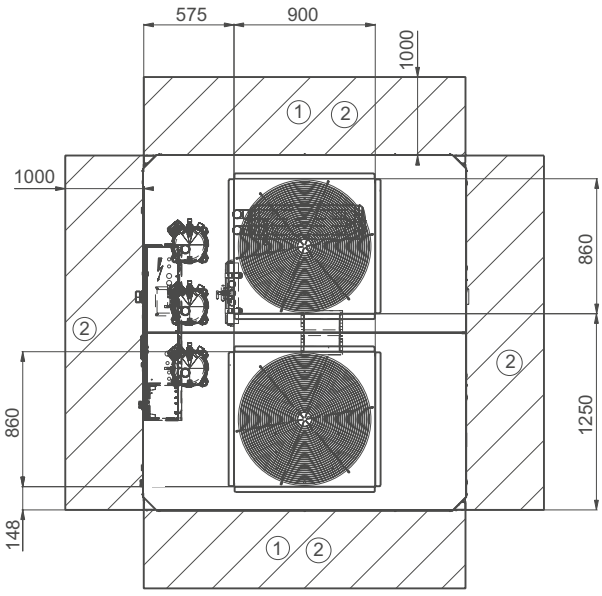
DIMENSIONS/CLEARANCES, 30RBSY/30RQSY

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

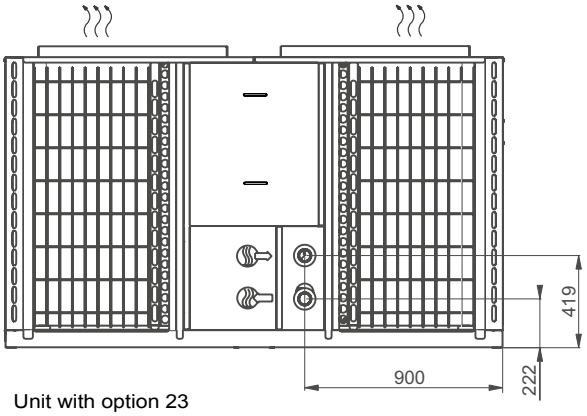
NOTES:

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.

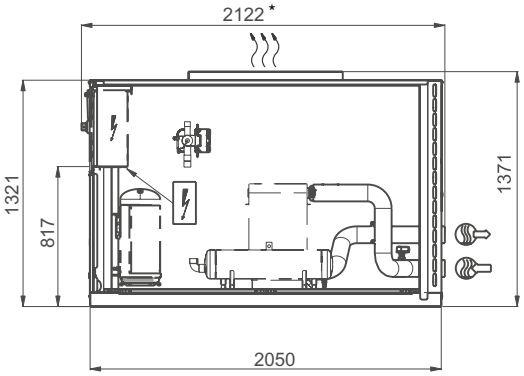
B The unit must be installed level (less than 2 mm per metre deviation in both axes).

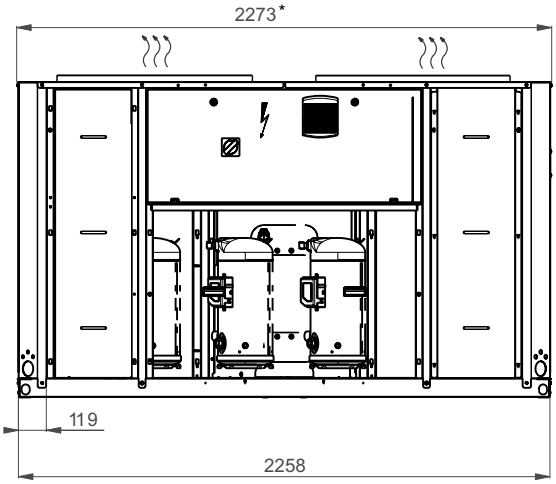
DIMENSIONS/CLEARANCES, 30RBSY/30RQSY

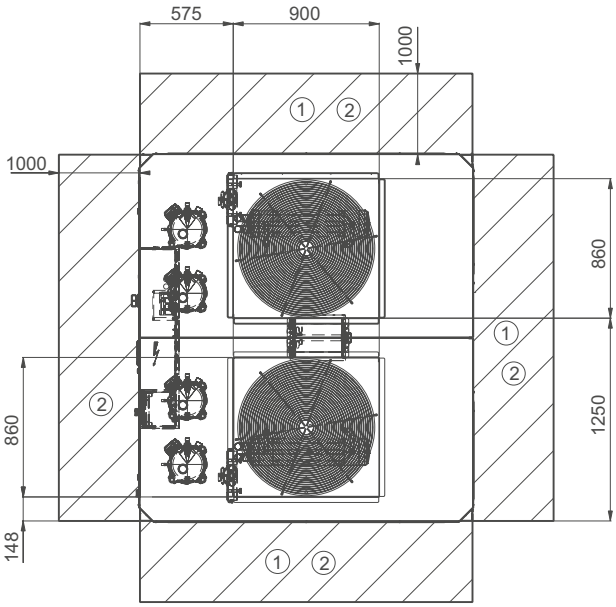
30RBSY 140-160 and 30RQSY 140-160, units with and without hydraulic module



Unit with option 23







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:

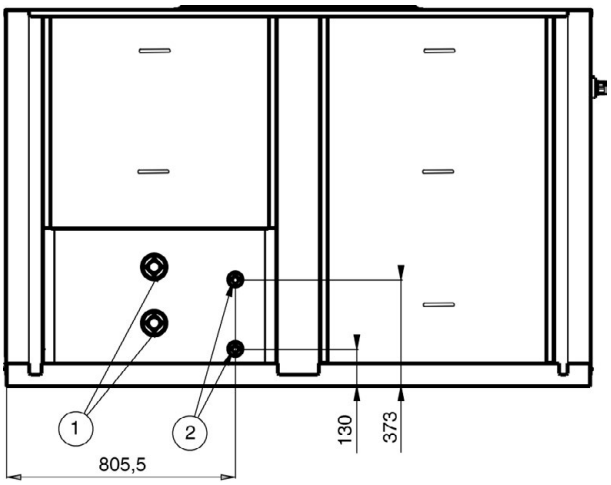
A Non-certified drawings.
Refer to the certified dimensional drawings supplied with the unit or available on request, when designing an installation. For the location of fixing points, weight distribution and coordinates of the centre of gravity refer to the certified dimensional drawings.

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

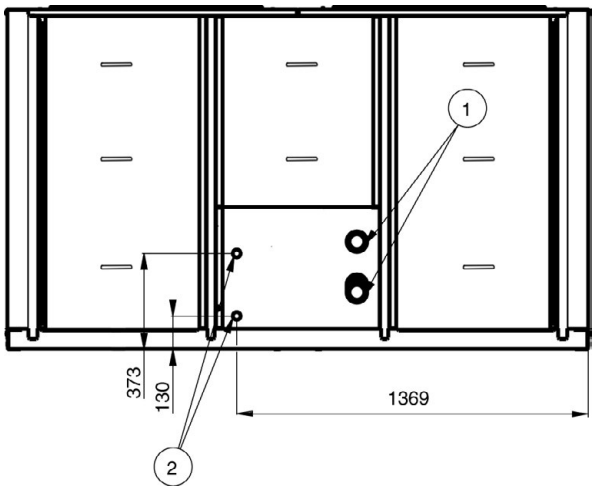
DIMENSIONS/CLEARANCES FOR 30RBSY/RQSY UNITS WITH OPTION 49

Position of the desuperheater inlets and outlets

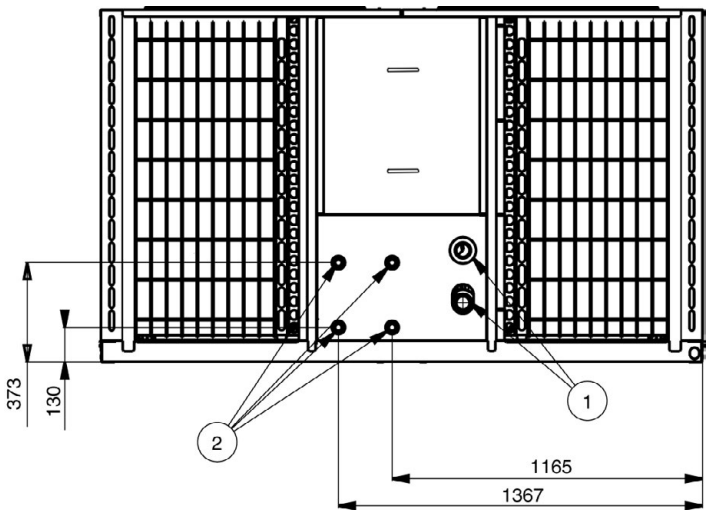
30RBSY/RQSY 039-080



30RBSY/RQSY 090-120



30RBSY/RQSY 140-160



Unit with option 23

① Unit water inlet and outlet
② Water inlet and outlet, unit with option 49