Carrier

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

PRO-DIALOG

AQUASNAP™

EUROVENT CERTIFIED PERFORMANCE
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ISO9001·ISO14001
Quality and Environment Management Systems Approval

30RB 039-160/30RQ 039-160

Nominal cooling capacity 30RB: 39-157 kW
Nominal cooling capacity 30RQ: 38-149 kW
Nominal heating capacity 30RQ: 42-158 kW

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

The Aquasnap 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 (30RB)/air evaporator/condenser (30RQ) section
  - Vertical condenser coils
  - Protection grilles on anti-vibration mountings 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
  - Rigid fan installation for reduced start-up noise (Carrier patent)

Easy and fast installation

- 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 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)
- Physical features
  - The unit has a small footprint and a low height (1330 mm) allowing it to blend in with any architectural styles.
  - The unit is enclosed by easily removable panels, covering all components (except air heat exchangers and fans).
- 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

  - Optional variable-speed pump for economical operation
  - The control algorithm adjusts the water flow rate based on the actual system requirements and obsoletes the need for the control valve at the unit outlet.
- Increased energy efficiency at part load
  - Eurovent energy efficiency class (in accordance with EN14511-3:2011) C and D in cooling mode and B and C in heating mode.
  - 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 (30RQ)
- 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

Partial view of the hydronic circuit

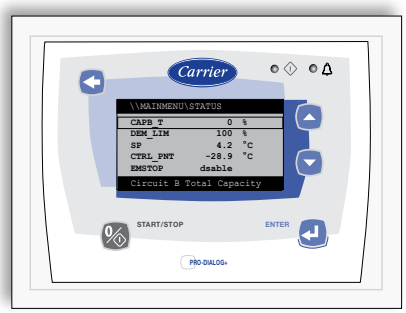
Superior reliability

- 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 backlighted 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 operat-ing parameters: number of compressors operating, suction/discharge pressure, compressor operating hours, set point, air temperature, entering/leaving water temperature

Remote operating mode with volt-free contacts (standard)

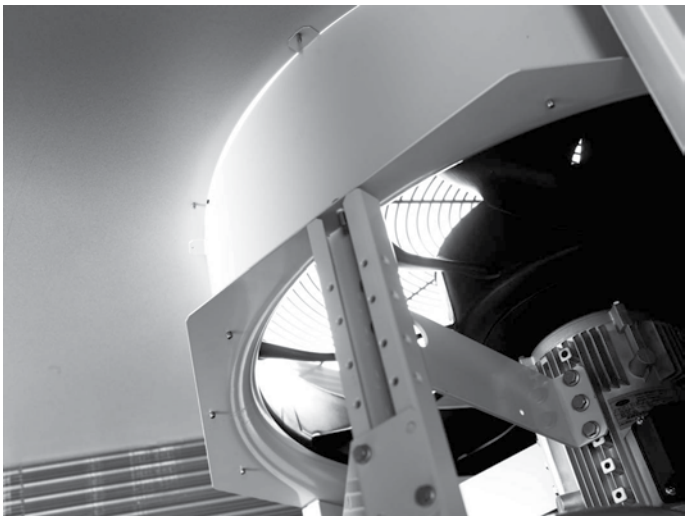
A simple two-wire communication bus between the RS485 port of the Aquasnap and the Carrier Comfort Network offers multiple remote control, monitoring and diagnostic possibilities. Carrier offers a vast choice of control products, specially designed to control, manage and supervise the operation of an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

- 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
- Out of service: this signal indicates that the unit is completely out of service

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.

Flying Bird IV fan



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	30RBS 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	30RBS/RQS 039-160
Very low noise level	15LS	Acoustic compressor enclosure and low-speed fans (12 r/s or 720 rpm)	Noise emission reduction	30RBS/RQS 039-160
Soft starter	25	Electronic compressor starter	Reduced compressor start-up current	30RBS/RQS 039-080
Winter operation	28	Fan speed control via frequency converter	Stable unit operation when the air temperature is between -10°C and -20°C	30RBS 039-160
Frost protection down to -20°C	42	Electric heater on the hydronic module	Hydronic module frost protection at low outside temperature	30RBS/RQS 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	30RBS/RQS 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	30RBS/RQS 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	30RBS/RQS 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	30RBS/RQS 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	30RBS/RQS 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	30RBS/RQS 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	30RBS/RQS 039-160
JBus gateway	148B	Two-directional communications board, complies with JBus protocol	Easy connection by communication bus to a building management system	30RBS/RQS 039-160
BacNet gateway	148C	Two-directional communications board, complies with BacNet protocol	Easy connection by communication bus to a building management system	30RBS/RQS 039-160
LonTalk gateway	148D	Two-directional communications board, complies with LonTalk protocol	Easy connection by communication bus to a building management system	30RBS/RQS 039-160
Water heat exchanger screw connection sleeves	264	Inlet/outlet screw connection sleeves	Permit connection of the unit to a screw connection	30RBS/RQS 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	30RBS/RQS 039-160
Remote interface	275	Remotely installed user interface (via communication bus).	Remote unit control up to 300 m	30RBS/RQS 039-160

* Winter operation option: This option allows operation of the unit down to -20°C outside temperature due to the optimised control of the condensing temperature. One fan is equipped with a frequency converter.

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.

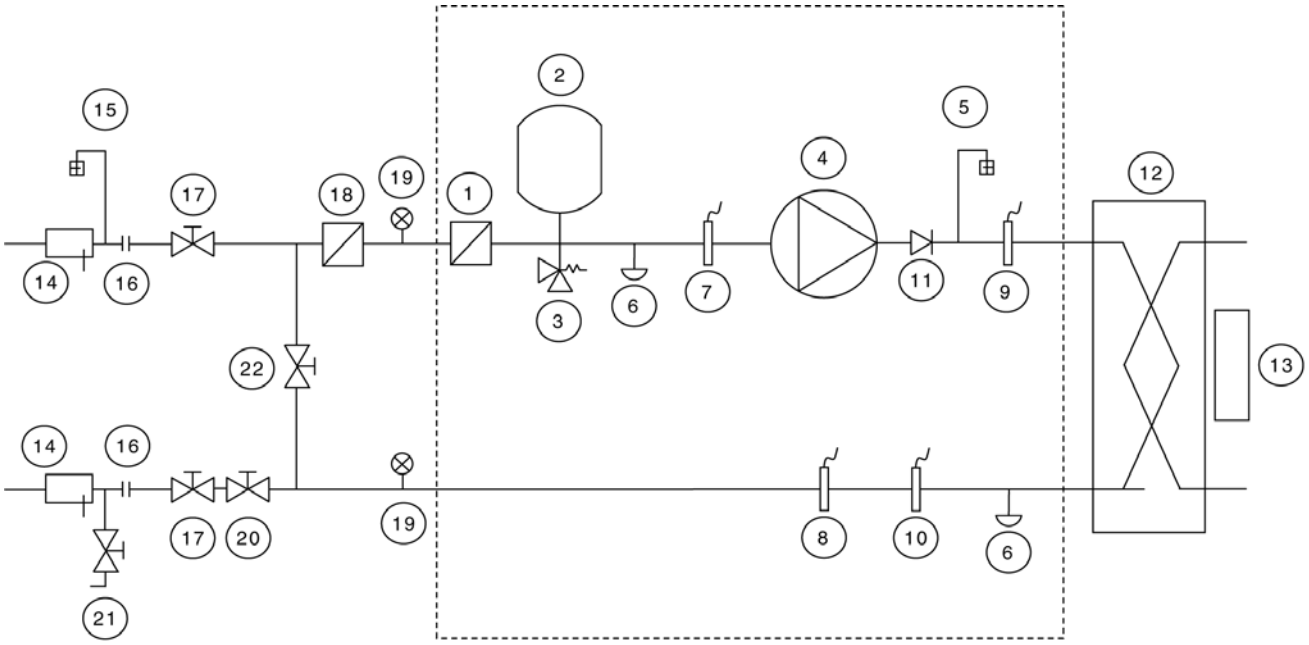
The pressure transducers allow the Pro-Dialog+ control to:
- display the available pressure at the unit outlet and the static system pressure
- calculate the instantaneous flow rate, using an algorithm that integrates the unit characteristics
- integrate the system and water pump protection devices (lack 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 probe
Note: Gives heat exchanger leaving temperature information (see installation manual)
9 Temperature probe
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)

--- **Hydronic module (unit with hydronic module)**

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.

Physical data, 30RBS

30RBS		039	045	050	060	070	080	090	100	120	140	160
Air conditioning application as per EN14511-3:2011*												
Condition 1												
Nominal cooling capacity	kW	39	44	52	58	66	78	89	100	117	134	157
EER	kW/kW	2.81	2.70	2.67	2.69	2.67	2.64	2.76	2.73	2.65	2.68	2.65
Eurovent class, cooling		C	C	D	D	D	D	C	C	D	D	D
ESEER	kW/kW	3.83	3.85	3.82	3.82	3.77	3.82	3.98	3.97	3.90	3.88	3.85
Condition 2												
Nominal cooling capacity	kW	52	59	72	80	91	109	120	133	154	183	204
EER	kW/kW	3.31	3.15	3.26	3.28	3.25	3.22	3.21	3.10	3.01	3.25	2.82
Air conditioning application**												
Condition 1												
Nominal cooling capacity	kW	39	45	52	59	67	79	90	100	118	135	158
EER	kW/kW	2.88	2.78	2.76	2.77	2.75	2.72	2.82	2.79	2.71	2.74	2.72
ESEER	kW/kW	4.05	4.09	4.08	4.08	4.00	4.07	4.23	4.22	4.15	4.15	4.13
Condition 2												
Nominal cooling capacity	kW	53	60	73	80	92	110	121	134	156	185	206
EER	kW/kW	3.44	3.28	3.43	3.43	3.40	3.38	3.32	3.20	3.11	3.37	2.92
Operating weight***												
Standard unit without hydronic module	kg	458	466	489	515	502	533	835	845	876	982	1046
Standard unit with hydronic module												
Single high-pressure pump	kg	488	496	519	545	531	562	867	877	912	1021	1085
Dual high-pressure pump	kg	514	522	545	571	557	588	912	922	960	1058	1122
Sound levels												
Standard unit												
Sound power level 10^{-12} W****	dB(A)	80	81	81	81	87	87	84	84	84	90	90
Sound pressure level at 10 m†	dB(A)	49	49	49	49	55	55	52	52	52	58	58
Unit with option 15LS (very low sound level)												
Sound power level 10^{-12} W****	dB(A)	79	80	80	80	80	80	83	83	83	83	83
Sound pressure level at 10 m†	dB(A)	48	48	48	48	48	48	51	51	51	51	51
Dimensions												
Length x depth x height	mm	1061 x 2050 x 1330						2258 x 2050 x 1330				
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
Number of capacity stages		2	2	2	2	2	2	3	3	3	4	4
Refrigerant		R-410A										
Circuit A	kg	8.5	9.0	12.5	15.0	12.5	15.5	19.0	20.0	25.0	12.5	16.0
Circuit B	kg	-	-	-	-	-	-	-	-	-	12.5	16.0
Capacity control		Pro-Dialog+										
Minimum capacity	%	50	50	50	50	50	50	33	33	33	25	25
Condensers		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
Total air flow (at high speed)	l/s	3800	3800	3800	3800	5300	5300	7600	7600	7600	10600	10600
Speed	r/s	12	12	12	12	12	16	12	12	12	16	16
Evaporator		Direct expansion. plate heat exchanger										
Water volume	l	2.6	3.0	3.3	4.0	4.8	5.6	8.7	9.9	11.3	12.4	14.7
Without hydronic module												
Max. water-side operating pressure	kPa	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
With hydronic module (option)												
Single or dual pump (as selected)		Pump, Victaulic screen filter, safety 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††	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 hydronic module		Victaulic										
Diameter	in	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
Chassis paint colour		Colour code: RAL7035										

* Eurovent-certified performances in accordance with standard EN14511-3:2011.
Condition 1: Cooling mode conditions: evaporator water entering/leaving temperature 12°C/7°C, outside air temperature 35°C, evaporator fouling factor 0 m^2 K/W
Condition 2: Cooling mode conditions: evaporator water entering/leaving temperature 23°C/18°C, outside air temperature 35°C, evaporator fouling factor 0 m^2 K/W

** Gross performances, not in accordance with EN14511-3:2011. These performances do not take into account the correction for the proportional heating capacity and power input generated by the water pump to overcome the internal pressure drop in the heat exchanger.
Condition 1: Cooling mode conditions: evaporator water entering/leaving temperature 12°C/7°C, outside air temperature 35°C, evaporator fouling factor 0 m^2 K/W
Condition 2: Cooling mode conditions: evaporator water entering/leaving temperature 23°C/18°C, outside air temperature 35°C, evaporator fouling factor 0 m^2 K/W

*** Weight shown is a guideline only. To find out the unit refrigerant charge, please refer to the unit nameplate.

**** In accordance with ISO 9614-1 and certified by Eurovent. The values have been rounded and are for information only and not contractually binding

† For information, calculated from the sound power level Lw(A)

†† 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.

Physical data, 30RQS

30RQS		039	045	050	060	070	078	080	090	100	120	140	160
Air conditioning application as per EN14511-3:2011*													
Condition 1													
Nominal cooling capacity	kW	38	43	50	59	64	74	78	86	96	113	132	149
EER	kW/kW	2.84	2.70	2.65	2.77	2.70	2.58	2.79	2.70	2.70	2.69	2.77	2.58
Eurovent class, cooling		C	C	D	C	C	D	C	C	C	D	C	D
ESEER	kW/kW	3.80	3.77	3.81	3.61	3.61	3.57	3.84	3.77	3.88	4.04	3.75	3.67
Condition 2													
Nominal cooling capacity	kW	48	54	63	71	79	93	97	108	118	143	163	187
EER	kW/kW	3.28	3.16	3.09	3.12	3.08	2.97	3.19	3.14	3.10	3.10	3.17	2.92
Air conditioning application**													
Condition 1													
Nominal cooling capacity	kW	38	44	50	59	64	74	78	86	96	114	132	150
EER	kW/kW	2.92	2.78	2.72	2.84	2.78	2.64	2.85	2.77	2.76	2.76	2.84	2.64
ESEER	kW/kW	4.00	4.00	4.03	3.80	3.81	3.75	4.00	4.00	4.12	4.30	4.00	3.92
Condition 2													
Nominal cooling capacity	kW	48	55	64	72	80	94	98	109	119	144	164	188
EER	kW/kW	3.40	3.28	3.20	3.23	3.20	3.07	3.28	3.24	3.20	3.20	3.28	3.02
Heating application as per EN14511-3:2011*													
Condition 1													
Nominal heating capacity	kW	42	47	53	61	70	78	80	93	101	117	138	158
COP	kW/kW	3.08	3.05	3.03	3.03	3.06	2.87	3.08	3.02	3.09	3.06	3.07	2.97
Eurovent class, heating		B	B	B	B	B	C	B	B	B	B	B	C
Condition 2													
Nominal heating capacity	kW	43	47	55	63	71	80	83	95	103	121	141	162
COP	kW/kW	3.72	3.72	3.76	3.73	3.72	3.47	3.74	3.74	3.77	3.73	3.73	3.59
Heating application**													
Condition 1													
Nominal heating capacity	kW	42	46	53	61	69	77	79	92	100	116	137	157
COP	kW/kW	3.12	3.09	3.07	3.08	3.11	2.91	3.11	3.06	3.12	3.10	3.10	3.01
Condition 1													
Nominal heating capacity	kW	42	47	54	63	71	79	82	94	102	120	140	161
COP	kW/kW	3.80	3.80	3.83	3.81	3.80	3.53	3.80	3.80	3.84	3.80	3.80	3.65
Operating weight***													
Standard unit without hydronic module	kg	506	513	539	552	553	560	748	895	903	959	1060	1078
Standard unit with hydronic module													
Single high-pressure pump	kg	535	543	569	582	582	590	778	927	935	995	1099	1117
Dual high-pressure pump	kg	561	569	594	608	608	616	804	972	980	1043	1136	1127
Sound levels													
Standard unit													
Sound power level 10^{-12} W****	dB(A)	80	81	81	86	87	87	84	84	84	84	90	90
Sound pressure level at 10 m†	dB(A)	49	49	49	55	55	55	52	52	52	52	58	58
Unit with option 15LS (very low sound level)													
Sound power level 10^{-12} W****	dB(A)	79	80	80	80	80	80	83	83	83	83	83	83
Sound pressure level at 10 m†	dB(A)	48	48	48	48	48	48	51	51	51	51	51	51
Dimensions													
Length x depth x height	mm	1090 x 2109 x 1330						2273 x 2136 x 1330					
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
Number of capacity stages		2	2	2	2	2	2	2	3	3	3	4	4
Refrigerant		R-410A											
Circuit A	kg	12.5	13.5	16.5	17.5	18.0	16.5	21.5	27.5	28.5	33.0	19.0	18.5
Circuit B	kg	-	-	-	-	-	-	-	-	-	-	19.0	18.5
Capacity control		Pro-Dialog+											
Minimum capacity	%	50	50	50	50	50	50	50	33	33	33	25	25

* Eurovent-certified performances in accordance with standard EN14511-3:2011.
Condition 1: Cooling mode conditions: evaporator water entering/leaving temperature 12°C/7°C, outside air temperature 35°C, evaporator fouling factor 0 m^2 K/W
Condition 2: Cooling mode conditions: evaporator water entering/leaving temperature 23°C/18°C, outside air temperature 35°C, evaporator fouling factor 0 m^2 K/W
Condition 1: Heating mode conditions: water heat exchanger water entering/leaving temperature 40°C/45°C, outside air temperature 7°C db/6°C wb, evaporator fouling factor 0 m^2 K/W.
Condition 2: Heating mode conditions: water heat exchanger water entering/leaving temperature 30°C/35°C, outside air temperature 7°C db/6°C wb, evaporator fouling factor 0 m^2 K/W.

** Gross performances, not in accordance with EN14511-3:2011. These performances do not take into account the correction for the proportional heating capacity and power input generated by the water pump to overcome the internal pressure drop in the heat exchanger.
Condition 1: Cooling mode conditions: evaporator water entering/leaving temperature 12°C/7°C, outside air temperature 35°C, evaporator fouling factor 0 m^2 K/W
Condition 2: Cooling mode conditions: evaporator water entering/leaving temperature 23°C/18°C, outside air temperature 35°C, evaporator fouling factor 0 m^2 K/W
Condition 1: Heating mode conditions: water heat exchanger water entering/leaving temperature 40°C/45°C, outside air temperature 7°C db/6°C wb, evaporator fouling factor 0 m^2 K/W.
Condition 2: Heating mode conditions: water heat exchanger water entering/leaving temperature 30°C/35°C, outside air temperature 7°C db/6°C wb, evaporator fouling factor 0 m^2 K/W.

*** Weight shown is a guideline only. To find out the unit refrigerant charge, please refer to the unit nameplate.

**** In accordance with ISO 9614-1 and certified by Eurovent. The values have been rounded and are for information only and not contractually binding

† For information, calculated from the sound power level Lw(A)

Physical data, 30RQS (continued)

30RQS		039	045	050	060	070	078	080	090	100	120	140	160
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
Total air flow (at high speed)	l/s	3800	3800	3800	5300	5300	5300	7600	7600	7600	7600	10600	10600
Speed	r/s	12	12	12	12	12	16	12	12	12	16	16	960
Water heat exchanger		Direct expansion. plate heat exchanger											
Water volume	l	2.6	3.0	4.0	4.8	4.8	5.6	8.7	8.7	9.9	11.3	12.4	14.7
Without hydronic module													
Max. water-side operating pressure	kPa	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
With hydronic module (option)													
Single or dual pump (as selected)		Pump, Victaulic screen filter, safety 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††	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 hydronic module		Victaulic											
Diameter	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: RAL 7035											

†† 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.

Electrical data, 30RBS

30RBS without hydronic 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)*												
Standard unit	A	112.7	130.9	141.0	143.4	170.4	209.4	168.8	195.8	239.8	226.2	275.2
Unit with electronic starter option	A	74.7	86.5	93.8	96.2	114.4	139.8	-	-	-	-	-
Unit power factor at maximum capacity**		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**	kW	18.8	20.8	24.4	27.8	31.2	35.8	42.2	45.5	52.4	62.3	71.5
Nominal unit operating current draw***	A	25.7	30.6	34.9	38.3	45.6	55.8	57.8	67.1	82.7	91.2	112.2
Maximum operating current draw (Un)****	A	32.9	37.3	43.5	48.3	55.8	65.8	73.7	81.2	96.2	111.6	131.6
Maximum operating current draw (Un-10%)†	A	38.1	49.1	51.3	57.9	74.6	81.2	88.3	108.1	118.0	149.2	162.4
Customer-side unit power reserve		Customer reserve at the 24 V control power circuit										
Short-circuit stability and protection		See table “Short-circuit stability current” below										

* Maximum instantaneous start-up current at operating limit values (maximum operating current of the smallest compressor(s) + fan current + locked rotor current of the largest compressor).
** Power input, compressors and fans, at the unit operating limits (saturated suction temperature 10°C, saturated condensing temperature 65°C) and nominal voltage of 400 V (data given on the unit nameplate).
*** Standardised Eurovent conditions: evaporator entering/leaving water temperature 12°C/7°C, outside air temperature 35°C.
**** Maximum unit operating current at maximum unit power input and 400 V (values given on the unit nameplate).
† Maximum unit operating current at maximum unit power input and 360 V.

Short-circuit stability current (TN system*) - standard unit (with main disconnect without fuse)

30RBS	039	045	050	060	070	080	090	100	120	140	160
Value without upstream protection											
Short-term current at 1s - Icw – kA rms	3.36	3.36	3.36	3.36	3.36	3.36	5.62	5.62	5.62	5.62	5.62
Admissible peak current - Ipk - kA pk	20	20	20	20	20	15	20	20	15	20	15
Value with upstream protection by circuit breaker											
Conditional short-circuit current Icc - kA rms	40	40	40	40	40	40	40	40	40	30	30
Schneider circuit breaker - Compact series	NS100H	NS100H	NS100H	NS100H	NS100H	NS100H	NS100H	NS160H	NS160H	NS250H	NS250H
Reference No.**	29670	29670	29670	29670	29670	29670	29670	30670	30670	31671	31671

* Earthing system type
** 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. Contact your nearest Carrier office.
The short-circuit stability current values above are in accordance with the TN system.

Electrical data, 30RQS

30RQS without hydronic 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)*													
Standard unit	A	112.7	130.9	141.0	145.9	170.4	209.4	209.4	168.8	195.8	239.8	226.2	275.2
Unit with electronic starter option	A	74.7	86.5	93.8	98.7	114.4	139.8	-	-	-	-	-	-
Unit power factor at maximum capacity**		0.83	0.81	0.81	0.82	0.81	0.78	0.78	0.83	0.81	0.79	0.81	0.78
Maximum operating power input**	kW	18.8	20.8	24.4	29.0	31.2	35.8	35.5	42.2	45.5	52.4	62.3	71.5
Nominal unit operating current draw***	A	25.7	30.6	34.9	40.8	45.6	55.8	55.8	57.8	67.1	82.7	91.2	112.2
Maximum operating current draw (Un)****	A	32.9	37.3	43.5	50.8	55.8	65.8	65.8	73.7	81.2	96.2	111.6	131.6
Maximum operating current draw (Un-10%)†	A	38.1	49.1	51.3	61.4	74.6	81.2	80.6	88.3	108.1	118.0	149.2	162.4
Customer-side unit power reserve		Customer reserve at the 24 V control power circuit											
Short-circuit stability and protection		See table “Short-circuit stability current” below											

* Maximum instantaneous start-up current at operating limit values (maximum operating current of the smallest compressor(s) + fan current + locked rotor current of the largest compressor).
** Power input, compressors and fans, at the unit operating limits (saturated suction temperature 10°C, saturated condensing temperature 65°C) and nominal voltage of 400 V (data given on the unit nameplate).
*** Standardised Eurovent conditions: water heat exchanger entering/leaving water temperature 12°C/7°C, outside air temperature 35°C.
**** Maximum unit operating current at maximum unit power input and 400 V (values given on the unit nameplate).
† Maximum unit operating current at maximum unit power input and 360 V.

Short-circuit stability current (TN system*) - standard unit (with main disconnect without fuse)

30RQS	039	045	050	060	070	078	080	090	100	120	140	160
Value without upstream protection												
Short-term current at 1s - Icw – kA rms	3,36	3,36	3,36	3,36	3,36	3,36	3,36	5,62	5,62	5,62	5,62	5,62
Admissible peak current - Ipk - kA pk	20	20	20	20	20	15	15	20	20	15	20	15
Value with upstream protection by circuit breaker												
Conditional short-circuit current Icc - kA rms	40	40	40	40	40	40	40	40	40	40	30	30
Schneider circuit breaker - Compact series	NS100H	NS100H	NS100H	NS100H	NS100H	NS100H	NS100H	NS100H	NS160H	NS160H	NS250H	NS250H
Reference No.**	29670	29670	29670	29670	29670	29670	29670	29670	30670	30670	31671	31671

* Earthing system type
** 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. Contact your nearest Carrier office.
The short-circuit stability current values above are in accordance with the TN system.

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.

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.

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.

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.

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
ESEER = EER_1 x 1% + EER_2 x 42% + EER_3 x 45% + EER_4 x 12%			

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
ESEER = EER_1 x 3% + EER_2 x 33% + EER_3 x 41% + EER_4 x 23%			

Part load performances

30RBS 039-160

30RBS		039	045	050	060	070	080	090	100	120	140	160
IPLV	kW/kW	4.64	4.66	4.65	4.60	4.45	4.66	4.64	4.58	4.64	4.51	4.64
ESEER	kW/kW	3.83	3.85	3.82	3.82	3.77	3.82	3.98	3.97	3.90	3.88	3.85

30RQS 039-160

30RQS		039	045	050	060	070	078	080	090	100	120	140	160
IPLV	kW/kW	4.57	4.54	4.51	4.21	4.18	4.29	4.58	4.40	4.46	4.90	4.33	4.39
ESEER	kW/kW	3.80	3.77	3.81	3.61	3.61	3.57	3.84	3.77	3.88	4.04	3.75	3.67

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)

Sound spectrum, 30RBS

30RBS – Standard units

		Octave bands, Hz						Sound power levels	
		125	250	500	1k	2k	4k		
039	dB	77.0	78.9	78.5	75.1	71.9	67.2	dB(A)	80
045	dB	77.0	79.0	78.7	76.0	72.8	67.3	dB(A)	81
050	dB	77.0	79.0	78.9	76.0	72.4	67.8	dB(A)	81
060	dB	77.0	78.9	78.7	76.0	73.7	68.8	dB(A)	81
070	dB	81.3	83.5	84.4	82.9	76.9	72.6	dB(A)	87
080	dB	81.3	83.5	84.5	82.9	77.2	71.1	dB(A)	87
090	dB	80.0	81.9	81.6	78.7	75.9	70.7	dB(A)	84
100	dB	80.0	81.9	81.7	78.8	76.1	73.7	dB(A)	84
120	dB	80.0	81.9	81.8	78.9	76.8	71.4	dB(A)	84
140	dB	84.3	86.5	87.4	85.9	79.9	75.6	dB(A)	90
160	dB	84.3	86.5	87.5	85.9	80.2	74.1	dB(A)	90

30RBS - Units with option 15LS (very low sound levels)

		Octave bands, Hz						Sound power levels	
		125	250	500	1k	2k	4k		
039	dB	77.0	78.9	78.4	74.5	69.7	62.6	dB(A)	79
045	dB	77.0	78.9	78.5	74.6	70.0	62.7	dB(A)	80
050	dB	77.0	78.9	78.5	74.6	69.9	63.1	dB(A)	80
060	dB	77.0	78.9	78.4	74.7	70.4	63.8	dB(A)	80
070	dB	77.0	78.9	78.5	74.7	70.5	66.2	dB(A)	80
080	dB	77.0	78.9	78.5	74.7	70.9	64.3	dB(A)	80
090	dB	80.0	81.9	81.4	77.6	73.1	66.0	dB(A)	83
100	dB	80.0	81.9	81.5	77.6	73.2	68.3	dB(A)	83
120	dB	80.0	81.9	81.5	77.6	73.5	66.5	dB(A)	83
140	dB	80.0	81.9	81.5	77.7	73.5	69.2	dB(A)	83
160	dB	80.0	81.9	81.5	77.7	73.9	67.3	dB(A)	83

Sound spectrum, 30RQS

30RQS – Standard units

		Octave bands, Hz						Sound power levels	
		125	250	500	1k	2k	4k		
039	dB	77.0	78.9	78.6	75.4	72.6	66.9	dB(A)	80
045	dB	77.0	79.0	78.7	76.0	72.8	67.3	dB(A)	81
050	dB	77.0	79.0	78.9	76.0	72.4	67.8	dB(A)	81
060	dB	81.3	83.5	84.4	82.7	76.8	70.8	dB(A)	86
070	dB	81.3	83.5	84.4	82.8	76.9	72.6	dB(A)	87
078	dB	81.3	93.5	84.4	82.8	77.2	71.1	dB(A)	87
080	dB	80.0	81.9	81.6	78.4	75.6	69.9	dB(A)	84
090	dB	80.0	81.9	81.6	78.7	75.9	70.7	dB(A)	84
100	dB	80.0	81.9	81.7	78.8	76.1	73.7	dB(A)	84
120	dB	80.0	81.9	81.8	78.9	76.8	71.4	dB(A)	84
140	dB	84.3	86.5	87.4	85.8	79.9	75.6	dB(A)	90
160	dB	84.3	86.5	87.4	85.9	80.2	74.1	dB(A)	90

30RQS - Units with option 15LS (very low sound levels)

		Octave bands, Hz						Sound power levels	
		125	250	500	1k	2k	4k		
039	dB	77.0	78.9	78.4	74.5	69.7	62.6	dB(A)	79
045	dB	77.0	78.9	78.5	74.6	70.0	62.7	dB(A)	80
050	dB	77.0	78.9	78.5	74.6	69.9	63.1	dB(A)	80
060	dB	77.0	78.9	78.4	74.7	70.4	63.8	dB(A)	80
070	dB	77.0	78.9	78.5	74.7	70.5	66.2	dB(A)	80
078	dB	77.0	78.9	78.5	74.7	70.9	64.3	dB(A)	80
080	dB	80.0	81.9	81.5	77.5	73.0	65.4	dB(A)	83
090	dB	80.0	81.9	81.4	77.6	73.1	66.0	dB(A)	83
100	dB	80.0	81.9	81.5	77.6	73.2	68.3	dB(A)	83
120	dB	80.0	81.9	81.5	77.6	73.5	66.5	dB(A)	83
140	dB	80.0	81.9	81.5	77.7	73.5	69.2	dB(A)	83
160	dB	80.0	81.9	81.5	77.7	73.9	67.3	dB(A)	83

Electrical data and operating conditions notes:

- 30RB/RQ 039-160 units have a single power connection point located immediately upstream of the main disconnect switch.
- The control box includes the following standard features:
  - a main disconnect/isolator switch,
  - starter and motor protection devices for each compressor, the fans and the pump,
  - the control devices.
- Field connections:
  All connections to the system and the electrical installations must be in full accordance with all applicable local codes.
- The Carrier 30RB/RQ units are designed and built to ensure conformance with these codes. The recommendations of European standard EN 60204-1 (machine safety - electrical machine components - part 1: general regulations - corresponds to IEC 60204-1) are specifically taken into account, when designing the electrical equipment.

NOTES:

- Generally the recommendations of IEC 60364 are accepted as compliance with the requirements of the installation directives. Conformance with EN 60204-1 is the best means of ensuring compliance with the Machines Directive § 1.5.1.
- Annex B of EN 60204-1 describes the electrical characteristics used for the operation of the machines.
- The operating environment for the 30RB/RQ units is specified below:

1. Environment* - Environment as classified in EN 60721 (corresponds to IEC 60721):
   - outdoor installation*
   - ambient temperature range: -20°C to +48°C, class 4K4H
   - altitude: ≤ 2000 m (for hydronic kit see chapter 9.2 of the installation manual
   - presence of hard solids, class 4S2 (no significant dust present)
   - presence of corrosive and polluting substances, class 4C2 (negligible)
2. Power supply frequency variation: ± 2 Hz.
3. The neutral (N) conductor must not be connected directly to the unit (if necessary use a transformer).
4. Overcurrent protection of the power supply conductors is not provided with the unit.
5. The factory-installed disconnect switch is of a type suitable for power interruption in accordance with EN 60947.
6. The units are designed for connection to TN(S) networks (IEC 60364). For IT networks the earth connection must not be at the network earth. Provide a local earth, consult competent local organisations to complete the electrical installation.

Caution: If particular aspects of an actual installation do not conform to the conditions described above, or if there are other conditions which should be considered, always contact your local Carrier representative.

* The required protection level for this class is IP43BW (according to reference document IEC 60529). All 30RB/RQ units are protected to IP44CW and fulfil this protection condition.

Operating limits, 30RBS

Evaporator water flow rate

30RBS	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

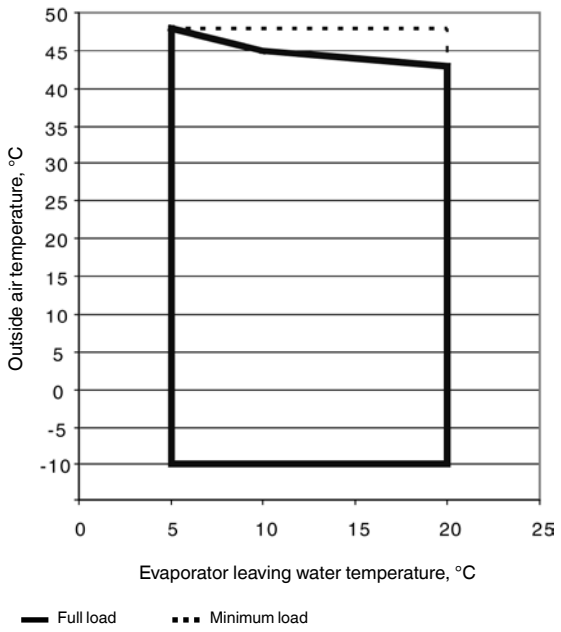
* Maximum flow rate at a pressure drop of 100 kPa in the plate heat exchanger (unit without hydronic module).
** Maximum flow rate at an available pressure of 20 kPa (unit with low-pressure hydronic module) or 50 kPa (high-pressure module).
*** Maximum flow rate with single pump is 2 to 4% higher, depending on the size.

Operating range

30RBS		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	-10	48

Note: Do not exceed the maximum operating temperature.

* For entering water temperatures below 7.5°C at start-up, contact Carrier. Please refer to options 28 and 42 for low-temperature applications (< -10°C).
** For low-temperature applications, where the leaving water temperature is below 5°C, a frost protection solution must be used.
*** Ambient temperature: For transport and storage of the 30RB 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.



Operating limits, 30RQS

Water heat exchanger water flow rate

30RQS	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.

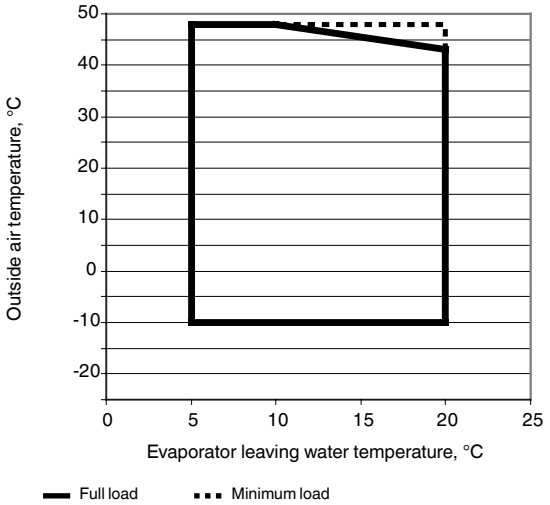
Operating range, standard unit, cooling mode

30RQS		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	-10	48

Note: Do not exceed the maximum operating temperature.

* If the leaving water temperature is below 5°C, a frost protection solution must be used.
** Ambient temperature: Please refer to option 42 for low-temperature applications (< -10°C). For transport and storage of the 30RQ 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.

30RQS (cooling mode)

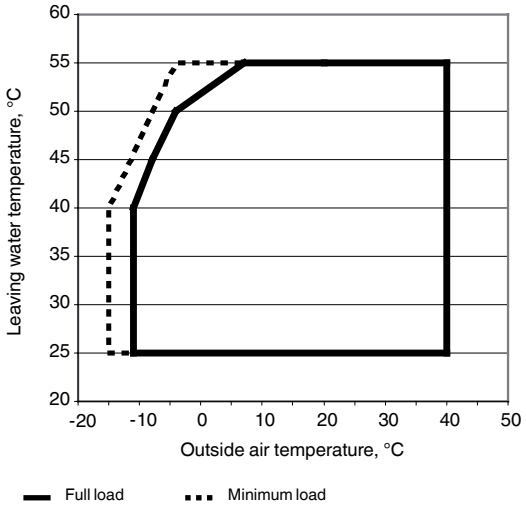


Operating range, standard unit, heating mode

30RQS		Minimum	Maximum
Condenser			
Entering water temperature at start-up	°C	8	45
Leaving water temperature during operation	°C	25	55
Entering/leaving water temperature difference	K	3	10
Evaporator			
Air temperature	°C	-15	40

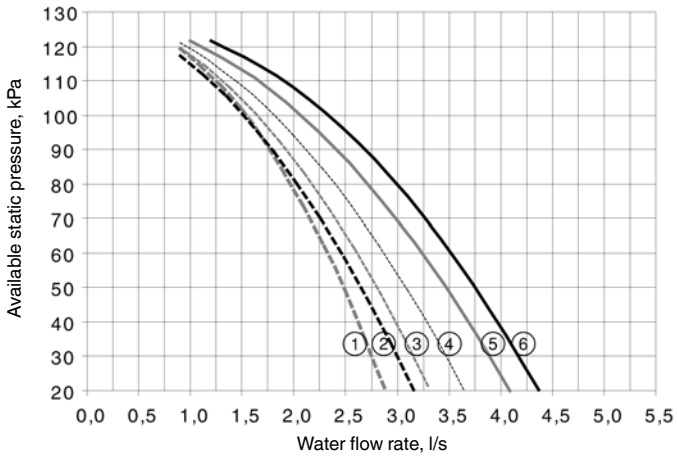
Note: Do not exceed the maximum operating temperature.

30RQS (heating mode)



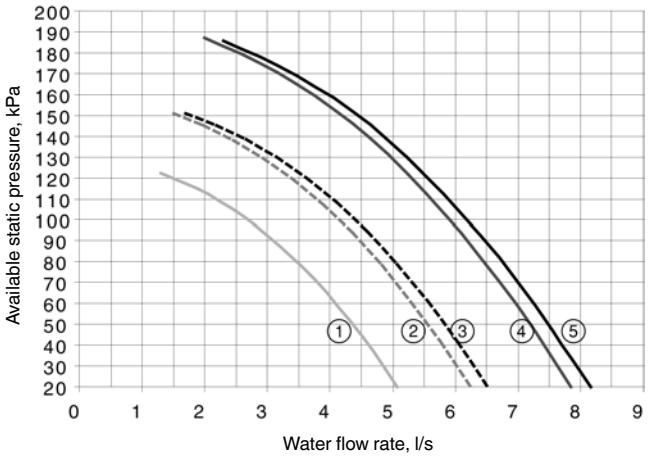
Available static system pressure, 30RBS

Low-pressure pump



Legend

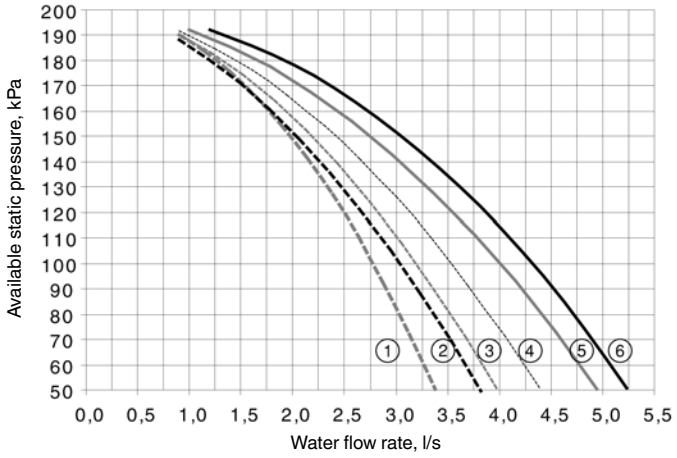
1. 30RBS 039
2. 30RBS 045
3. 30RBS 050
4. 30RBS 060
5. 30RBS 070
6. 30RBS 080



Legend

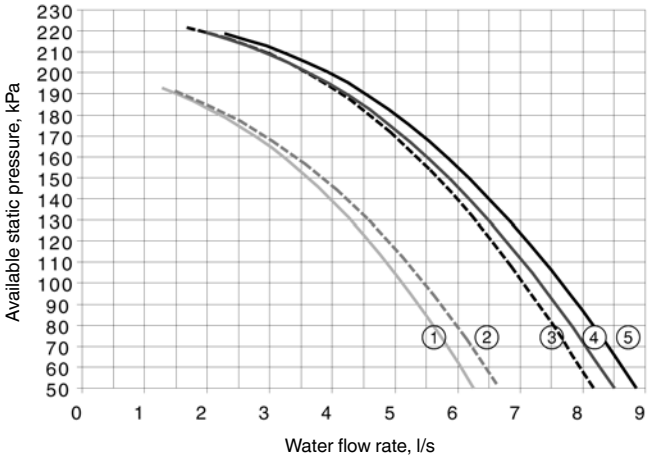
1. 30RBS 090
2. 30RBS 100
3. 30RBS 120
4. 30RBS 140
5. 30RBS 160

High-pressure pump



Legend

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

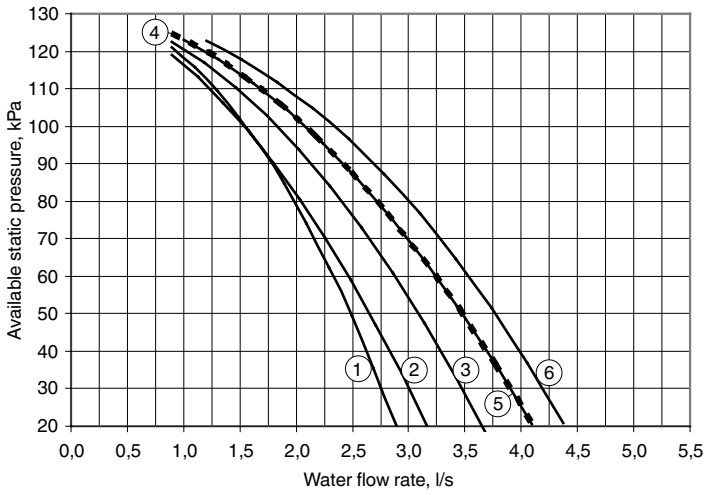


Legend

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

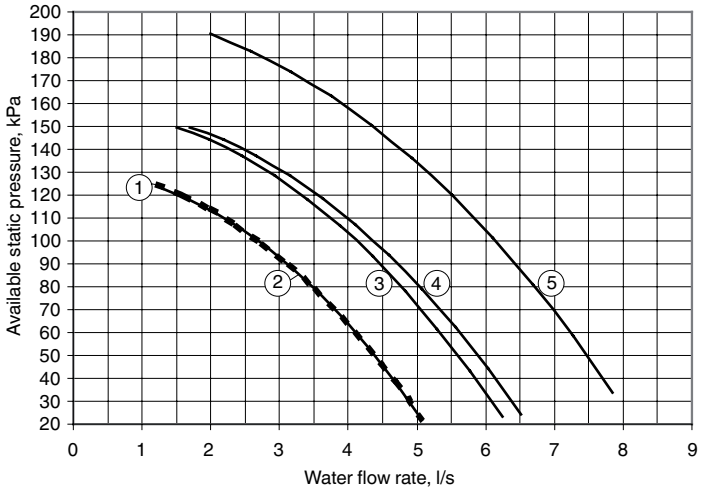
Available static system pressure, 30RQS

Low-pressure pump



Legend

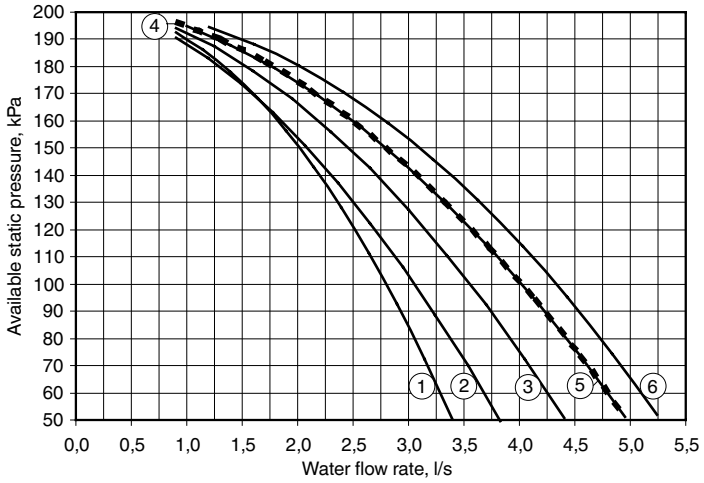
1. 30RQS 039
2. 30RQS 045
3. 30RQS 050
4. 30RQS 060
5. 30RQS 070
6. 30RQS 078



Legend

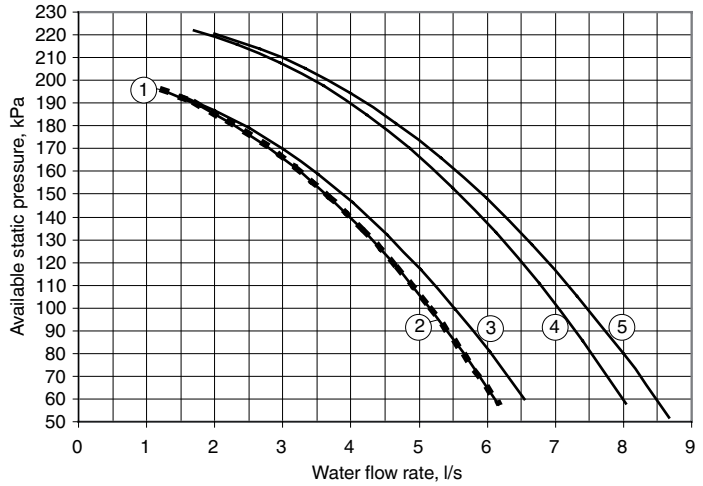
1. 30RQS 080
2. 30RQS 090
3. 30RQS 100
4. 30RQS 120
5. 30RQS 140

High-pressure pump



Legend

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

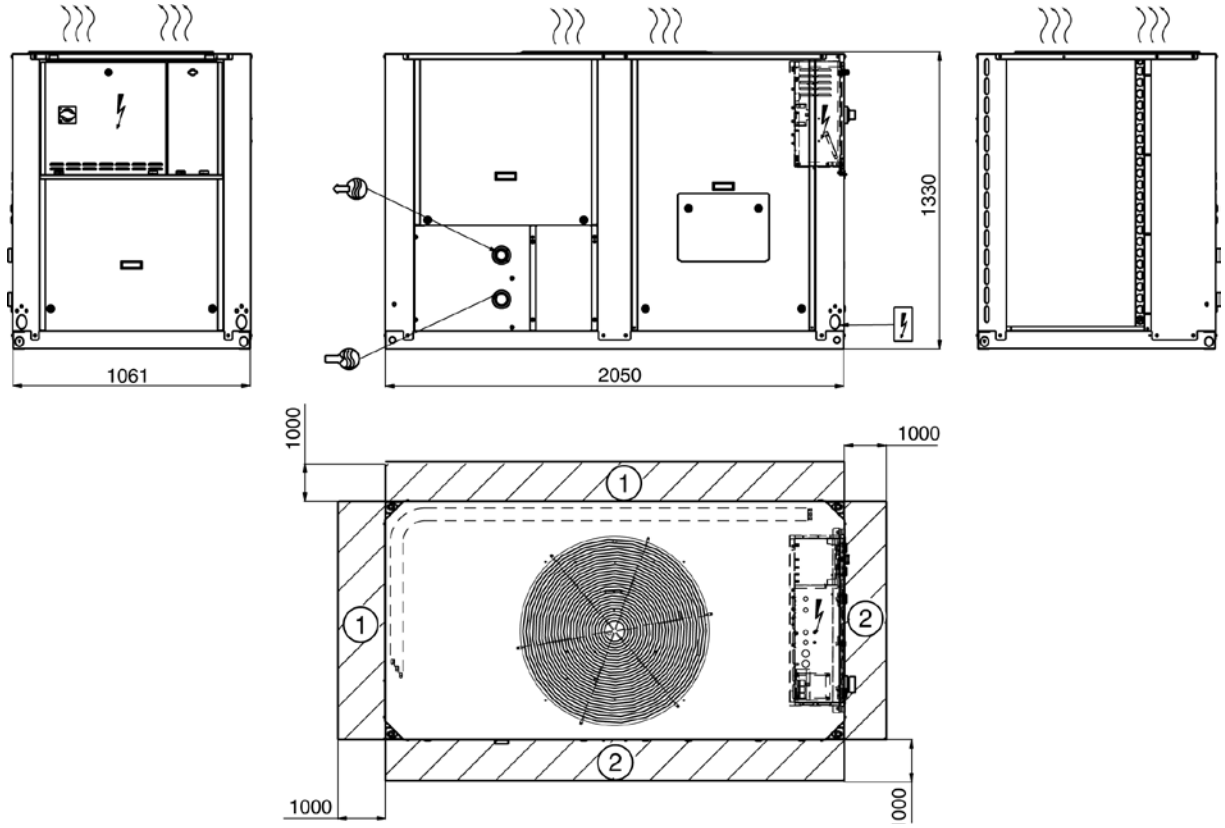


Legend

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

Dimensions/clearances, 30RBS

30RBS 039-080, 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

Notes:

A Non-certified drawings.
Refer to the certified dimensional drawings supplied with the unit or available on request, when designing an installation.

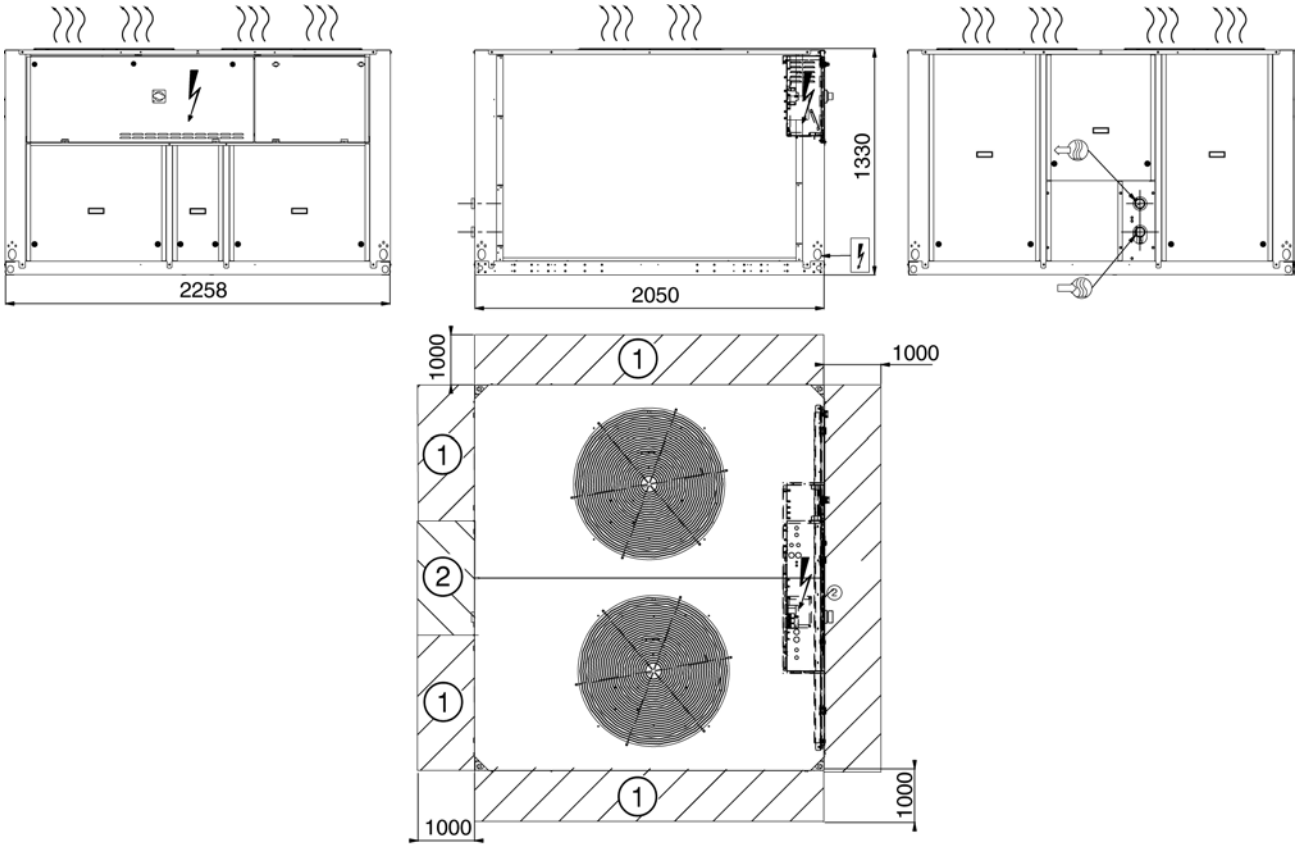
For the location of fixing points, weight distribution and coordinates of the centre of gravity refer to the certified dimensional drawings.

B In multiple-chiller installations (maximum four units), the side clearance between the units should be increased from 1000 to 2000 mm.

C The height of the solid surface must not exceed 2 m.

Dimensions/clearances, 30RBS

30RBS 090-160, 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

Notes:

A Non-certified drawings.
Refer to the certified dimensional drawings supplied with the unit or available on request, when designing an installation.

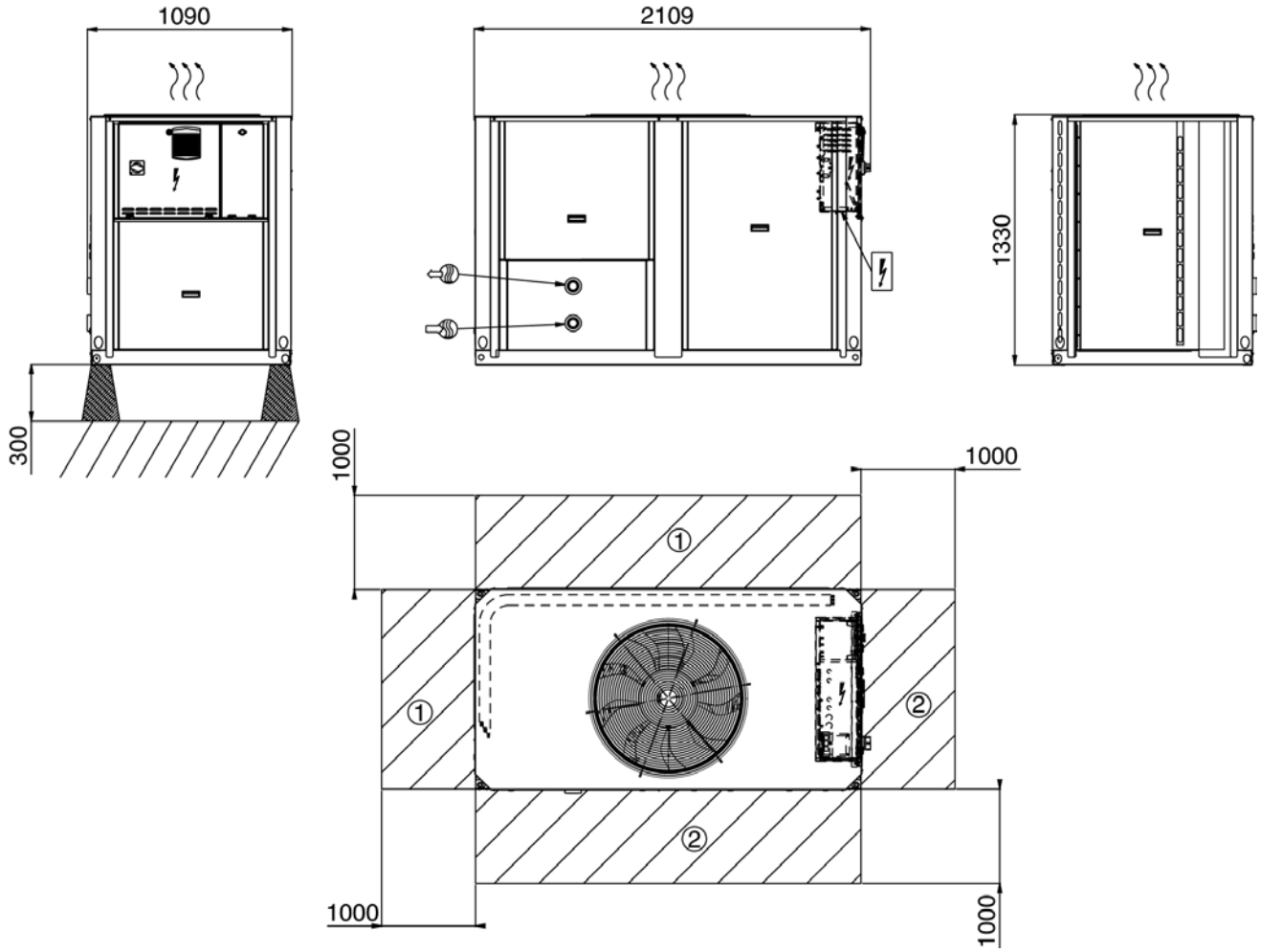
For the location of fixing points, weight distribution and coordinates of the centre of gravity refer to the certified dimensional drawings.

B In multiple-chiller installations (maximum four units), the side clearance between the units should be increased from 1000 to 2000 mm.

C The height of the solid surface must not exceed 2 m.

Dimensions/clearances, 30RQS

30RQS 039-078, 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

Notes:

A Non-certified drawings.
Refer to the certified dimensional drawings supplied with the unit or available on request, when designing an installation.

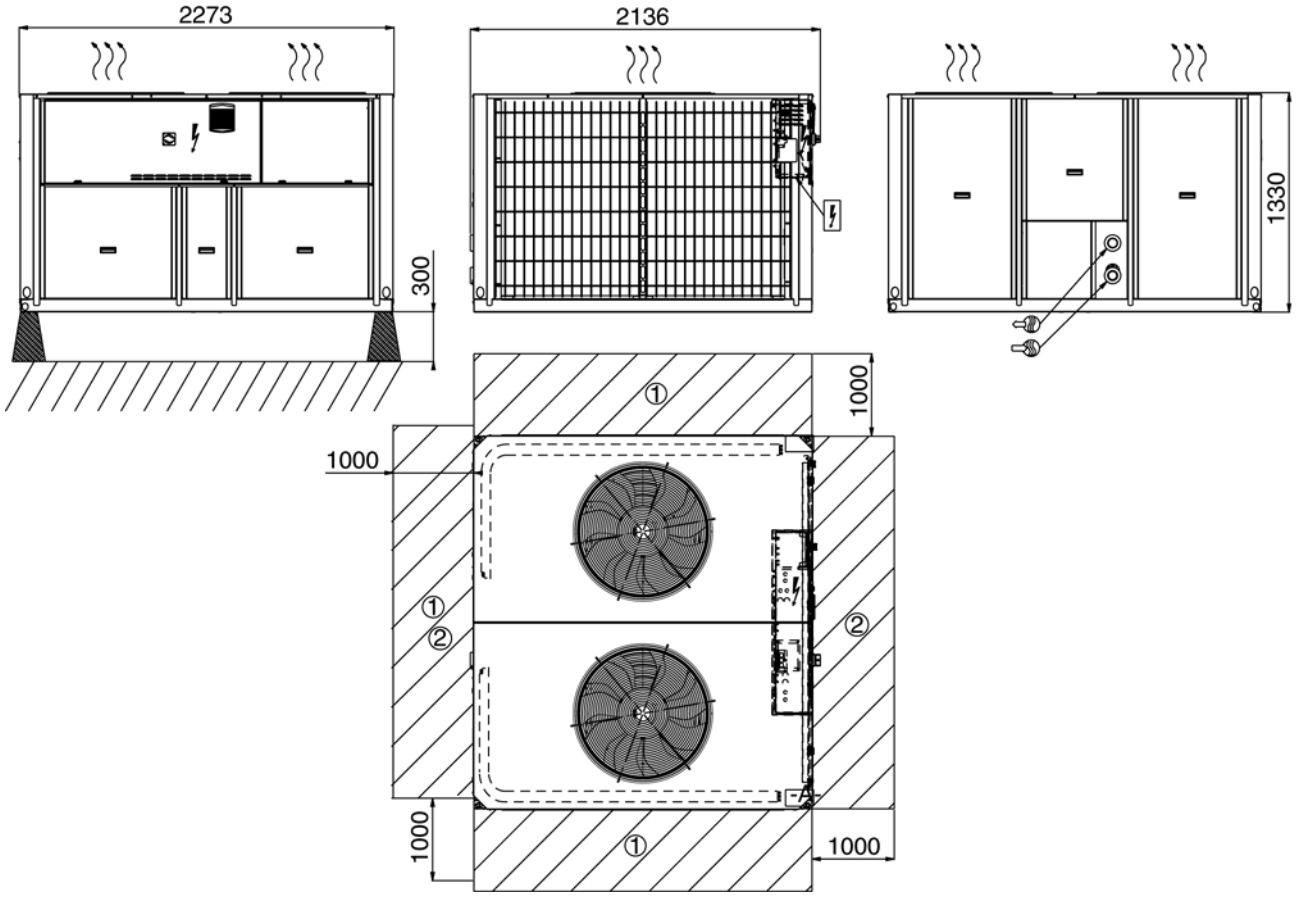
For the location of fixing points, weight distribution and coordinates of the centre of gravity refer to the certified dimensional drawings.

B In multiple-unit installations (maximum four units), the side clearance between the units should be increased from 1000 to 2000 mm.

C The height of the solid surface must not exceed 2 m.

Dimensions/clearances, 30RQS

30RQS 080-160, 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

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 In multiple-unit installations (maximum four units), the side clearance between the units should be increased from 1000 to 2000 mm.

C The height of the solid surface must not exceed 2 m.

Cooling capacities in accordance with EN14511-3 : 2011

30RBS units

		Condenser entering air temperature, °C																							
		20				25				30				35				40				46			
	LWT	Qc	EER	q	Δp	Qc	EER	q	Δp	Qc	EER	q	Δp	Qc	EER	q	Δp	Qc	EER	q	Δp	Qc	EER	q	Δp
	°C	kW	kW/kW	l/s	kPa	kW	kW/kW	l/s	kPa	kW	kW/kW	l/s	kPa	kW	kW/kW	l/s	kPa	kW	kW/kW	l/s	kPa	kW	kW/kW	l/s	kPa
039	5	42	3.87	1.96	50	40	3.46	1.89	46	39	3.09	1.81	42	37	2.71	1.73	38	35	2.33	1.62	33	31	1.88	1.48	27
045		47	3.89	2.26	60	46	3.44	2.18	57	44	3.02	2.10	53	42	2.59	1.98	48	39	2.19	1.83	42	34	1.76	1.63	34
050		56	3.89	2.71	74	54	3.44	2.60	69	51	3.00	2.47	63	48	2.59	2.32	56	45	2.17	2.14	48	40	1.72	1.90	39
060		63	3.89	3.01	74	61	3.45	2.90	69	58	2.99	2.77	64	54	2.54	2.58	56	50	2.13	2.37	48	44	1.68	2.09	38
070		74	3.84	3.58	79	71	3.42	3.42	73	67	3.01	3.24	66	63	2.60	3.02	58	58	2.23	2.79	50	51	1.80	2.47	40
080		87	3.72	4.16	89	83	3.32	3.96	80	79	2.94	3.74	72	74	2.57	3.51	63	68	2.22	3.25	54	61	1.82	2.92	43
090		97	3.96	4.56	62	93	3.53	4.39	58	89	3.09	4.19	53	84	2.65	3.93	47	77	2.25	3.64	41	69	1.80	3.25	33
100		110	3.94	5.16	66	105	3.49	4.95	61	100	3.06	4.70	55	94	2.64	4.40	49	87	2.25	4.08	43	78	1.82	3.64	35
120		130	3.75	6.09	76	124	3.35	5.80	70	117	2.98	5.50	63	110	2.62	5.17	56	103	2.28	4.82	48	92	1.85	4.32	39
140		149	3.86	6.94	83	142	3.43	6.63	76	135	3.01	6.28	68	126	2.60	5.87	60	116	2.22	5.42	51	103	1.78	4.79	41
160		174	3.74	8.13	92	165	3.33	7.74	84	156	2.94	7.32	75	147	2.56	6.86	66	136	2.20	6.36	57	122	1.80	5.71	46
039	7	44	3.99	2.08	55	43	3.57	2.00	51	41	3.19	1.92	47	39	2.80	1.83	42	37	2.41	1.72	37	33	1.96	1.56	31
045		50	4.02	2.39	66	49	3.56	2.31	62	47	3.13	2.23	58	44	2.69	2.10	53	41	2.29	1.94	46	36	1.84	1.73	37
050		60	3.99	2.90	83	58	3.54	2.78	77	55	3.10	2.64	70	51	2.67	2.48	62	48	2.27	2.29	54	42	1.82	2.04	43
060		68	4.07	3.23	83	65	3.62	3.11	78	62	3.15	2.97	71	58	2.68	2.77	63	53	2.25	2.55	54	47	1.78	2.25	43
070		79	3.93	3.79	87	75	3.50	3.62	80	71	3.08	3.42	72	66	2.67	3.19	63	61	2.28	2.94	54	54	1.86	2.61	43
080		93	3.82	4.42	99	88	3.40	4.21	90	83	3.01	3.98	80	78	2.64	3.73	70	73	2.28	3.47	61	65	1.88	3.11	49
090		103	4.09	4.83	69	99	3.65	4.66	64	95	3.19	4.45	59	89	2.75	4.18	52	82	2.34	3.87	45	74	1.88	3.46	37
100		116	4.05	5.48	73	112	3.60	5.26	67	106	3.15	4.98	61	99	2.72	4.67	54	92	2.32	4.33	47	82	1.88	3.86	38
120		137	3.83	6.45	84	131	3.39	6.14	77	124	3.01	5.81	69	116	2.65	5.46	61	108	2.31	5.08	53	98	1.92	4.59	43
140		158	3.95	7.38	92	151	3.52	7.05	84	143	3.09	6.67	76	133	2.67	6.22	66	123	2.28	5.74	57	109	1.85	5.09	45
160		185	3.85	8.66	103	176	3.43	8.25	94	166	3.03	7.79	84	156	2.65	7.31	74	145	2.28	6.79	64	130	1.87	6.09	52
039	10	48	4.15	2.26	64	46	3.73	2.18	60	44	3.33	2.09	55	42	2.94	1.99	50	40	2.53	1.87	43	36	2.06	1.70	36
045		54	4.20	2.60	75	53	3.73	2.51	71	51	3.28	2.42	66	48	2.83	2.29	60	44	2.42	2.11	52	40	1.97	1.89	43
050		66	4.17	3.21	99	64	3.67	3.07	91	60	3.22	2.91	82	57	2.78	2.73	73	52	2.37	2.53	63	47	1.93	2.25	51
060		74	4.32	3.57	98	72	3.86	3.43	91	68	3.37	3.28	84	64	2.88	3.06	74	59	2.43	2.83	64	52	1.93	2.51	51
070		86	4.16	4.15	101	82	3.69	3.96	92	77	3.21	3.73	83	72	2.76	3.47	72	66	2.37	3.20	62	59	1.94	2.83	49
080		101	4.06	4.85	118	96	3.60	4.62	106	91	3.16	4.36	95	85	2.74	4.08	83	79	2.38	3.79	71	42	2.85	2.02	20
090		112	4.27	5.28	80	108	3.82	5.08	74	103	3.35	4.86	68	97	2.89	4.56	60	90	2.46	4.22	52	80	1.99	3.79	43
100		127	4.21	5.98	84	121	3.74	5.73	77	115	3.28	5.42	70	108	2.84	5.08	62	100	2.42	4.70	54	89	1.97	4.20	43
120		149	3.99	7.01	97	142	3.54	6.67	89	134	3.12	6.31	79	126	2.71	5.91	70	117	2.33	5.49	60	80	2.49	3.77	29
140		173	4.16	8.09	107	165	3.69	7.71	98	156	3.21	7.27	87	145	2.78	6.78	77	134	2.38	6.25	65	119	1.94	5.53	52
160		199	3.91	9.36	118	190	3.51	8.95	108	181	3.13	8.51	98	171	2.76	8.02	87	159	2.39	7.46	76	85	2.68	3.99	22
039	15	55	4.43	2.58	83	53	3.99	2.49	77	51	3.58	2.39	70	48	3.17	2.28	64	45	2.74	2.14	56	41	2.23	1.94	45
045		62	4.48	2.97	92	60	3.98	2.87	87	58	3.50	2.77	81	55	3.03	2.61	73	50	2.61	2.41	64	45	2.14	2.16	53
050		77	4.60	3.75	128	74	4.08	3.59	118	70	3.57	3.41	107	66	3.06	3.19	95	61	2.58	2.94	82	32	2.94	1.55	25
060		85	4.62	4.10	123	82	4.14	3.94	114	78	3.64	3.77	105	73	3.14	3.54	94	68	2.68	3.28	82	61	2.17	2.93	67
070		99	4.54	4.82	130	95	4.06	4.59	119	89	3.56	4.34	106	83	3.06	4.03	93	76	2.58	3.69	79	42	3.03	2.04	26
080		117	4.44	5.65	155	112	3.95	5.38	141	106	3.48	5.08	126	99	3.04	4.76	110	92	2.62	4.43	95	50	3.21	2.39	27
090		128	4.54	6.06	101	123	4.06	5.84	94	118	3.57	5.57	86	110	3.09	5.22	76	103	2.65	4.84	66	70	2.79	3.32	32
100		145	4.41	6.87	105	139	3.94	6.56	96	131	3.47	6.19	87	123	3.01	5.80	77	113	2.58	5.36	66	80	2.83	3.75	34
120		169	4.22	7.99	122	161	3.75	7.61	111	152	3.32	7.19	99	143	2.90	6.73	87	132	2.50	6.24	75	93	2.77	4.38	38
140		200	4.54	9.37	138	191	4.05	8.94	126	180	3.55	8.45	113	168	3.05	7.86	99	154	2.58	7.20	83	85	3.02	3.98	27
160		223	3.93	10.54	145	213	3.54	10.06	132	202	3.17	9.55	119	191	2.81	9.01	106	179	2.48	8.44	93	99	2.99	4.65	29
039	18	59	4.58	2.79	96	57	4.14	2.70	89	55	3.72	2.59	82	52	3.30	2.46	74	49	2.86	2.31	65	44	2.35	2.10	53
045		67	4.62	3.20	103	65	4.11	3.10	97	62	3.62	2.99	91	59	3.15	2.81	82	54	2.72	2.60	71	31	3.27	1.48	27
050		84	4.81	4.08	147	81	4.31	3.91	136	77	3.78	3.73	124	72	3.26	3.49	110	66	2.76	3.22	95	35	3.16	1.69	29
060		92	4.77	4.44	140	89	4.29	4.27	130	85	3.78	4.08	120	79	3.27	3.83	107	74	2.80	3.55	93	39	3.06	1.85	28
070		108	4.74	5.25	150	103	4.26	5.01	137	97	3.76	4.73	123	91	3.24	4.40	108	83	2.75	4.03	91	46	3.23	2.23	30
080		128	4.65	6.17	183	122	4.15	5.87	166	115	3.67	5.56	148	108	3.22	5.22	130	101	2.79	4.84	112	55	3.43	2.64	33
090		138	4.67	6.57	115	133	4.18	6.32	107	127	3.68	6.02	98	119	3.20	5.64	87	111	2.75	5.24	75	77	2.96	3.62	37
100		157	4.50	7.42	119	149	4.03	7.08	109	141	3.55	6.68	98	132	3.10	6.26	87	95	3.59	4.48	47	86	2.98	4.08	39
120		182	4.34	8.62	139	173	3.86	8.20	126	164	3.42	7.74	113	153	3.00	7.25	99	111	3.54	5.25	53	101	2.94	4.76	44
140		217	4.74	10.22	160	207	4.26	9.75	146	196	3.75	9.21	131	183	3.24	8.58	114	168	2.74	7.87	97	93	3.23	4.35	31
160		238	3.92	11.27	162	227	3.54	10.74	147	215	3.17	10.18	133	203	2.82	9.59	118	118	3.78	5.54	40	108	3.19	5.08	34

Legend
LWT Leaving water temperature, °C
Qc Cooling capacity, kW
EER Energy efficiency ratio, kW/kW
q Evaporator water flow rate, l/s
Δp Evaporator pressure drop, kPa

Application data

Standard units, refrigerant: R-410A
Evaporator entering/leaving water temperature difference: 5 K
Evaporator fluid: chilled water
Fouling factor: 0.18 x 10^{-4} (m^2 K)/W

Performances in accordance with EN14511-3:2011.

Cooling capacities

30RBS units

		Condenser entering air temperature, °C																							
		20				25				30				35				40				46			
	LWT	Qc	EER	q	Δp	Qc	EER	q	Δp	Qc	EER	q	Δp	Qc	EER	q	Δp	Qc	EER	q	Δp	Qc	EER	q	Δp
	°C	kW	kW/kW	l/s	kPa	kW	kW/kW	l/s	kPa	kW	kW/kW	l/s	kPa	kW	kW/kW	l/s	kPa	kW	kW/kW	l/s	kPa	kW	kW/kW	l/s	kPa
039	5	42	4.02	1.96	50	41	3.57	1.89	46	39	3.17	1.81	42	37	2.78	1.73	38	35	2.38	1.62	33	32	1.91	1.48	27
045		48	4.05	2.26	60	46	3.57	2.18	57	45	3.11	2.10	53	42	2.66	1.98	48	39	2.24	1.83	42	34	1.79	1.63	34
050		57	4.07	2.71	74	54	3.57	2.60	69	52	3.10	2.47	63	49	2.66	2.32	56	45	2.22	2.14	48	40	1.75	1.90	39
060		64	4.06	3.01	74	61	3.58	2.90	69	59	3.09	2.77	64	54	2.61	2.58	56	50	2.18	2.37	48	44	1.70	2.09	38
070		75	4.01	3.58	79	72	3.55	3.42	73	68	3.10	3.24	66	63	2.67	3.02	58	58	2.28	2.79	50	52	1.83	2.47	40
080		88	3.89	4.16	89	84	3.45	3.96	80	79	3.03	3.74	72	74	2.64	3.51	63	69	2.27	3.25	54	62	1.85	2.92	43
090		98	4.10	4.56	62	94	3.64	4.39	58	90	3.17	4.19	53	84	2.71	3.93	47	78	2.28	3.64	41	70	1.83	3.25	33
100		111	4.07	5.16	66	106	3.60	4.95	61	101	3.14	4.70	55	94	2.69	4.40	49	87	2.29	4.08	43	78	1.84	3.64	35
120		131	3.88	6.09	76	125	3.45	5.80	70	118	3.06	5.50	63	111	2.68	5.17	56	103	2.32	4.82	48	93	1.88	4.32	39
140		150	3.99	6.94	83	143	3.53	6.63	76	136	3.09	6.28	68	127	2.66	5.87	60	117	2.26	5.42	51	104	1.81	4.79	41
160		175	3.88	8.13	92	166	3.44	7.74	84	157	3.02	7.32	75	148	2.62	6.86	66	137	2.24	6.36	57	123	1.82	5.71	46
039	7	44	4.15	2.08	55	43	3.70	2.00	51	41	3.29	1.92	47	39	2.88	1.83	42	37	2.47	1.72	37	34	1.99	1.56	31
045		51	4.20	2.39	66	49	3.70	2.31	62	47	3.24	2.23	58	45	2.77	2.10	53	41	2.34	1.94	46	37	1.88	1.73	37
050		61	4.20	2.90	83	58	3.69	2.78	77	55	3.21	2.64	70	52	2.75	2.48	62	48	2.33	2.29	54	43	1.85	2.04	43
060		68	4.27	3.23	83	66	3.78	3.11	78	63	3.27	2.97	71	58	2.76	2.77	63	54	2.30	2.55	54	47	1.81	2.25	43
070		79	4.11	3.79	87	76	3.64	3.62	80	72	3.19	3.42	72	67	2.75	3.19	63	62	2.34	2.94	54	55	1.89	2.61	43
080		93	4.01	4.42	99	89	3.54	4.21	90	84	3.12	3.98	80	79	2.72	3.73	70	73	2.34	3.47	61	66	1.92	3.11	49
090		103	4.24	4.83	69	100	3.77	4.66	64	95	3.28	4.45	59	89	2.81	4.18	52	83	2.38	3.87	45	74	1.91	3.46	37
100		117	4.20	5.48	73	112	3.71	5.26	67	107	3.24	4.98	61	100	2.78	4.67	54	93	2.36	4.33	47	83	1.91	3.86	38
120		138	3.97	6.45	84	132	3.50	6.14	77	125	3.09	5.81	69	117	2.71	5.46	61	109	2.35	5.08	53	98	1.95	4.59	43
140		159	4.11	7.38	92	152	3.64	7.05	84	144	3.18	6.67	76	134	2.74	6.22	66	124	2.33	5.74	57	110	1.88	5.09	45
160		186	4.01	8.66	103	177	3.55	8.25	94	168	3.12	7.79	84	157	2.71	7.31	74	146	2.33	6.79	64	131	1.90	6.09	52
039	10	48	4.35	2.26	64	47	3.88	2.18	60	45	3.45	2.09	55	43	3.03	1.99	50	40	2.60	1.87	43	36	2.10	1.70	36
045		55	4.41	2.60	75	53	3.89	2.51	71	51	3.40	2.42	66	48	2.92	2.29	60	45	2.48	2.11	52	40	2.01	1.89	43
050		67	4.41	3.21	99	64	3.86	3.07	91	61	3.36	2.91	82	57	2.88	2.73	73	53	2.44	2.53	63	47	1.97	2.25	51
060		75	4.57	3.57	98	72	4.06	3.43	91	69	3.51	3.28	84	65	2.98	3.06	74	59	2.50	2.83	64	53	1.97	2.51	51
070		87	4.38	4.15	101	83	3.86	3.96	92	78	3.34	3.73	83	72	2.85	3.47	72	67	2.43	3.20	62	59	1.97	2.83	49
080		102	4.28	4.85	118	97	3.76	4.62	106	92	3.28	4.36	95	86	2.83	4.08	83	80	2.44	3.79	71	43	2.90	2.02	20
090		113	4.45	5.28	80	109	3.96	5.08	74	104	3.45	4.86	68	97	2.96	4.56	60	90	2.51	4.22	52	81	2.03	3.79	43
100		128	4.38	5.98	84	122	3.87	5.73	77	116	3.38	5.42	70	109	2.91	5.08	62	100	2.47	4.70	54	90	2.00	4.20	43
120		150	4.16	7.01	97	143	3.66	6.67	89	135	3.21	6.31	79	127	2.77	5.91	70	117	2.38	5.49	60	81	2.53	3.77	29
140		174	4.35	8.09	107	166	3.83	7.71	98	157	3.31	7.27	87	146	2.85	6.78	77	135	2.43	6.25	65	119	1.97	5.53	52
160		201	4.09	9.36	118	192	3.65	8.95	108	183	3.24	8.51	98	172	2.84	8.02	87	160	2.44	7.46	76	86	2.72	3.99	22
039	15	55	4.68	2.58	83	53	4.19	2.49	77	51	3.74	2.39	70	49	3.28	2.28	64	46	2.82	2.14	56	41	2.29	1.94	45
045		63	4.74	2.97	92	61	4.19	2.87	87	59	3.66	2.77	81	55	3.15	2.61	73	51	2.69	2.41	64	46	2.20	2.16	53
050		78	4.92	3.75	128	75	4.33	3.59	118	71	3.76	3.41	107	67	3.19	3.19	95	61	2.67	2.94	82	32	3.01	1.55	25
060		86	4.93	4.10	123	83	4.39	3.94	114	79	3.82	3.77	105	74	3.28	3.54	94	69	2.78	3.28	82	62	2.23	2.93	67
070		100	4.84	4.82	130	96	4.29	4.59	119	90	3.73	4.34	106	84	3.18	4.03	93	77	2.66	3.69	79	43	3.09	2.04	26
080		119	4.76	5.65	155	113	4.19	5.38	141	107	3.66	5.08	126	100	3.17	4.76	110	93	2.71	4.43	95	50	3.28	2.39	27
090		129	4.77	6.06	101	124	4.24	5.84	94	119	3.70	5.57	86	111	3.19	5.22	76	103	2.72	4.84	66	71	2.84	3.32	32
100		146	4.63	6.87	105	140	4.10	6.56	96	132	3.59	6.19	87	124	3.10	5.80	77	114	2.64	5.36	66	80	2.88	3.75	34
120		171	4.44	7.99	122	162	3.92	7.61	111	153	3.44	7.19	99	144	2.98	6.73	87	133	2.56	6.24	75	93	2.83	4.38	38
140		202	4.81	9.37	138	192	4.26	8.94	126	182	3.70	8.45	113	169	3.15	7.86	99	155	2.64	7.20	83	86	3.07	3.98	27
160		226	4.15	10.54	145	215	3.71	10.06	132	204	3.29	9.55	119	193	2.91	9.01	106	181	2.54	8.44	93	99	3.04	4.65	29
039	18	60	4.87	2.79	96	58	4.37	2.70	89	55	3.90	2.59	82	53	3.43	2.46	74	49	2.96	2.31	65	45	2.41	2.10	53
045		67	4.92	3.20	103	65	4.35	3.10	97	63	3.80	2.99	91	59	3.27	2.81	82	55	2.81	2.60	71	31	3.35	1.48	27
050		85	5.20	4.08	147	82	4.60	3.91	136	78	4.01	3.73	124	73	3.42	3.49	110	67	2.87	3.22	95	35	3.24	1.69	29
060		93	5.12	4.44	140	90	4.57	4.27	130	86	3.99	4.08	120	80	3.42	3.83	107	74	2.91	3.55	93	39	3.12	1.85	28
070		109	5.11	5.25	150	104	4.54	5.01	137	98	3.97	4.73	123	92	3.39	4.40	108	84	2.85	4.03	91	46	3.30	2.23	30
080		130	5.06	6.17	183	123	4.45	5.87	166	117	3.89	5.56	148	110	3.37	5.22	130	102	2.89	4.84	112	55	3.51	2.64	33
090		140	4.93	6.57	115	135	4.39	6.32	107	128	3.83	6.02	98	120	3.31	5.64	87	111	2.83	5.24	75	77	3.02	3.62	37
100		158	4.75	7.42	119	151	4.22	7.08	109	142	3.69	6.68	98	133	3.19	6.26	87	95	3.69	4.48	47	87	3.04	4.08	39
120		184	4.60	8.62	139	175	4.06	8.20	126	165	3.56	7.74	113	155	3.10	7.25	99	112	3.64	5.25	53	102	3.01	4.76	44
140		219	5.08	10.22	160	209	4.51	9.75	146	198	3.94	9.21	131	184	3.36	8.58	114	169	2.83	7.87	97	93	3.29	4.35	31
160		241	4.16	11.27	162	230	3.72	10.74	147	218	3.31	10.18	133	205	2.92	9.59	118	118	3.86	5.54	40	109	3.25	5.08	34

Legend
LWT Leaving water temperature, °C
Qc Cooling capacity, kW
EER Energy efficiency ratio, kW/kW
q Evaporator water flow rate, l/s
Δp Evaporator pressure drop, kPa

Application data

Standard units, refrigerant: R-410A
Evaporator entering/leaving water temperature difference: 5 K
Evaporator fluid: chilled water
Fouling factor: 0.18 x 10^{-4} (m^2 K)/W

Gross performances, not in accordance with EN14511-3:2011. These performances do not take into account the correction for the proportional heating capacity and power input generated by the water pump to overcome the internal pressure drop in the heat exchanger.

Cooling capacities in accordance with EN14511-3 : 2011

30RQS units

		Condenser entering air temperature, °C																							
		20				25				30				35				40				46			
	LWT	Qc	EER	q	Δp	Qc	EER	q	Δp	Qc	EER	q	Δp	Qc	EER	q	Δp	Qc	EER	q	Δp	Qc	EER	q	Δp
	°C	kW	kW/kW	l/s	kPa	kW	kW/kW	l/s	kPa	kW	kW/kW	l/s	kPa	kW	kW/kW	l/s	kPa	kW	kW/kW	l/s	kPa	kW	kW/kW	l/s	kPa
039	5	41	3.91	1.91	47	39	3.50	1.84	44	38	3.11	1.76	40	36	2.72	1.68	36	33	2.32	1.57	31	30	1.86	1.41	25
045		46	3.86	2.16	56	45	3.42	2.09	53	43	3.00	2.01	49	41	2.57	1.90	45	37	2.16	1.75	38	33	1.73	1.55	31
050		54	3.86	2.56	55	52	3.40	2.45	51	50	2.96	2.34	47	47	2.54	2.20	42	43	2.14	2.04	36	39	1.70	1.82	30
060		63	3.89	2.98	56	61	3.47	2.87	53	58	3.06	2.75	48	55	2.65	2.60	43	51	2.25	2.40	38	45	1.80	2.14	30
070		69	3.78	3.33	69	66	3.38	3.21	64	63	2.98	3.06	59	60	2.58	2.88	53	55	2.20	2.67	46	49	1.77	2.38	37
078		81	3.61	3.72	71	77	3.22	3.56	65	73	2.83	3.37	58	69	2.47	3.17	51	64	2.11	2.95	44	58	1.72	2.65	36
080		85	3.90	3.93	47	81	3.49	3.76	43	77	3.07	3.58	40	73	2.68	3.37	35	68	2.31	3.15	31	62	1.88	2.85	26
090		92	3.87	4.38	58	89	3.44	4.22	54	85	3.01	4.04	50	80	2.57	3.79	44	74	2.17	3.50	38	66	1.73	3.11	30
100		105	3.86	5.13	65	101	3.43	4.92	60	96	3.01	4.68	55	90	2.59	4.38	49	83	2.19	4.05	42	74	1.75	3.60	34
120		124	3.81	5.90	72	119	3.39	5.63	66	113	2.98	5.34	59	106	2.59	5.02	52	99	2.21	4.67	46	89	1.80	4.21	37
140		143	3.90	6.74	78	137	3.48	6.48	73	131	3.06	6.18	66	123	2.65	5.81	59	115	2.25	5.39	51	102	1.81	4.82	41
160		165	3.63	7.82	86	157	3.23	7.46	78	149	2.84	7.07	70	140	2.48	6.64	62	130	2.12	6.17	54	117	1.72	5.56	44
039	7	43	4.06	2.03	53	42	3.64	1.96	49	40	3.24	1.88	45	38	2.84	1.78	40	35	2.43	1.67	35	32	1.95	1.50	28
045		49	4.03	2.30	62	47	3.57	2.23	58	46	3.14	2.15	54	43	2.69	2.03	49	40	2.28	1.87	43	36	1.83	1.66	35
050		57	3.99	2.71	60	55	3.52	2.60	56	53	3.07	2.48	51	50	2.64	2.34	46	46	2.23	2.17	40	41	1.79	1.95	33
060		67	4.04	3.17	62	64	3.61	3.06	58	62	3.19	2.93	54	58	2.76	2.77	48	54	2.35	2.56	42	48	1.89	2.29	34
070		73	3.92	3.55	77	71	3.51	3.41	71	67	3.10	3.26	65	63	2.69	3.06	58	59	2.29	2.84	51	53	1.85	2.54	41
078		86	3.74	3.96	80	82	3.34	3.79	73	78	2.94	3.60	65	73	2.57	3.38	58	68	2.21	3.15	50	61	1.80	2.83	40
080		90	4.05	4.18	52	86	3.61	4.00	48	82	3.19	3.81	44	77	2.79	3.59	39	72	2.40	3.35	34	65	1.97	3.04	29
090		98	4.03	4.68	65	95	3.59	4.51	60	91	3.14	4.31	55	85	2.70	4.05	49	79	2.28	3.74	42	70	1.82	3.33	34
100		112	4.00	5.48	72	107	3.56	5.25	67	102	3.12	4.99	61	96	2.69	4.67	54	88	2.28	4.32	47	79	1.83	3.84	38
120		132	3.95	6.27	80	126	3.51	5.99	73	120	3.08	5.68	66	113	2.69	5.34	58	105	2.30	4.97	51	95	1.88	4.49	42
140		152	4.04	7.18	87	146	3.62	6.90	81	139	3.19	6.58	74	131	2.76	6.19	65	122	2.35	5.74	57	109	1.90	5.13	46
160		175	3.76	8.32	96	167	3.35	7.94	87	158	2.95	7.52	78	149	2.57	7.07	69	138	2.21	6.57	60	125	1.80	5.92	49
039	10	47	4.28	2.23	63	45	3.84	2.15	58	44	3.43	2.05	53	41	3.01	1.95	47	39	2.58	1.82	41	35	2.09	1.65	33
045		54	4.28	2.52	71	52	3.80	2.44	67	50	3.34	2.36	63	48	2.88	2.23	57	44	2.44	2.06	50	39	1.97	1.83	40
050		62	4.18	2.95	69	60	3.71	2.83	64	57	3.24	2.71	59	54	2.80	2.55	53	50	2.37	2.38	47	45	1.91	2.13	38
060		73	4.24	3.47	72	70	3.81	3.35	68	68	3.37	3.21	62	64	2.93	3.03	56	59	2.50	2.81	49	53	2.02	2.51	40
070		80	4.12	3.89	90	77	3.71	3.74	83	74	3.28	3.57	76	69	2.86	3.36	68	64	2.44	3.12	59	58	1.98	2.79	48
078		94	3.95	4.35	94	90	3.53	4.16	86	85	3.11	3.95	77	80	2.72	3.71	68	75	2.34	3.46	59	67	1.92	3.11	48
080		98	4.26	4.58	61	94	3.81	4.38	56	90	3.36	4.17	51	85	2.94	3.93	46	79	2.54	3.67	40	72	2.10	3.33	33
090		108	4.26	5.13	76	104	3.81	4.94	71	99	3.34	4.73	65	94	2.87	4.45	58	87	2.43	4.12	50	77	1.95	3.68	40
100		123	4.26	6.03	85	118	3.79	5.78	78	112	3.32	5.49	71	105	2.85	5.12	63	97	2.42	4.74	54	86	1.95	4.21	44
120		144	4.15	6.87	94	138	3.69	6.56	86	131	3.25	6.22	77	123	2.83	5.85	69	115	2.44	5.45	60	104	2.00	4.92	49
140		166	4.24	7.86	102	160	3.81	7.56	94	152	3.37	7.21	86	143	2.93	6.78	76	133	2.50	6.29	66	119	2.03	5.63	54
160		191	3.94	9.10	112	182	3.51	8.69	102	173	3.10	8.24	92	163	2.71	7.75	81	151	2.34	7.20	71	137	1.91	6.49	58
039	15	54	4.63	2.58	82	52	4.17	2.49	76	50	3.74	2.38	70	47	3.28	2.25	62	44	2.82	2.08	53	39	2.27	1.85	41
045		62	4.68	2.91	89	60	4.17	2.82	84	58	3.67	2.72	79	54	3.16	2.56	71	50	2.68	2.34	61	44	2.16	2.07	48
050		71	4.49	3.38	86	69	4.01	3.25	80	66	3.52	3.12	74	62	3.05	2.94	67	58	2.60	2.75	59	52	2.10	2.45	48
060		83	4.52	3.95	89	80	4.07	3.79	83	76	3.60	3.62	76	71	3.13	3.40	67	66	2.67	3.13	58	58	2.16	2.78	46
070		93	4.43	4.52	115	89	3.99	4.33	106	84	3.54	4.10	96	79	3.09	3.83	84	73	2.63	3.52	72	64	2.13	3.12	57
078		109	4.29	5.04	123	104	3.83	4.82	113	99	3.39	4.58	102	93	2.97	4.31	90	86	2.56	3.98	76	77	2.09	3.54	60
080		113	4.61	5.28	78	108	4.11	5.06	72	103	3.63	4.82	65	97	3.19	4.54	58	90	2.76	4.21	51	81	2.27	3.78	41
090		124	4.59	5.94	97	120	4.13	5.73	91	115	3.64	5.49	84	108	3.14	5.15	74	99	2.67	4.74	63	88	2.14	4.20	50
100		140	4.59	6.87	105	133	4.11	6.56	96	126	3.61	6.21	87	118	3.10	5.78	76	108	2.61	5.30	65	95	2.07	4.65	51
120		166	4.48	7.94	121	159	3.99	7.58	110	151	3.52	7.19	99	142	3.08	6.77	88	132	2.66	6.30	77	119	2.18	5.64	62
140		191	4.56	9.11	130	184	4.12	8.73	120	174	3.65	8.28	109	163	3.17	7.73	95	150	2.71	7.14	82	133	2.19	6.31	65
160		219	4.21	10.52	144	210	3.76	10.03	131	199	3.33	9.51	118	187	2.92	8.93	104	173	2.52	8.25	89	155	2.07	7.37	72
039	18	55	4.65	2.60	83	53	4.18	2.50	76	50	3.73	2.38	69	47	3.28	2.25	61	44	2.82	2.09	52	39	2.27	1.86	41
045		62	4.69	2.93	88	60	4.16	2.82	83	58	3.67	2.72	78	54	3.16	2.56	70	50	2.68	2.35	60	44	2.16	2.07	48
050		74	4.59	3.53	92	71	4.08	3.38	85	68	3.58	3.21	77	63	3.09	3.00	68	58	2.62	2.77	59	52	2.10	2.46	47
060		83	4.52	3.95	88	79	4.06	3.79	82	76	3.60	3.62	75	71	3.13	3.40	67	66	2.67	3.14	57	59	2.16	2.79	46
070		93	4.43	4.53	113	89	3.99	4.33	104	84	3.54	4.10	94	79	3.08	3.83	83	73	2.63	3.53	71	64	2.13	3.13	57
078		111	4.34	5.16	127	106	3.86	4.90	115	100	3.40	4.62	102	93	2.97	4.32	89	86	2.56	3.99	75	77	2.09	3.56	60
080		115	4.65	5.40	80	110	4.14	5.13	72	104	3.64	4.85	65	97	3.19	4.54	57	-	-	-	-	81	2.27	3.79	41
090		126	4.62	6.03	98	121	4.15	5.79	91	115	3.64	5.52	83	108	3.14	5.16	73	99	2.67	4.75	62	88	2.14	4.21	50
100		139	4.59	6.88	103	133	4.11	6.57	95	126	3.61	6.22	86	118	3.10	5.79	75	108	2.61	5.32	64	95	2.07	4.67	50
120		170	4.53	8.14	125	162	4.03	7.74	113	153	3.55	7.31	101	143	3.10	6.83	88	133	2.66	6.33	76	119	2.18	5.67	61
140		192	4.56	9.13	129	183	4.11	8.72	118	174	3.65	8.28	107	163	3.17	7.74	94	151	2.71	7.15	81	134	2.19	6.34	64
160		223	4.24	10.68	146	212	3.77	10.15	132	200	3.33	9.56	117	187	2.92	8.94	103	173	2.52	8.28	88	155	2.07	7.40	71

Legend
LWT Leaving water temperature, °C
Qc Cooling capacity, kW
EER Energy efficiency ratio, kW/kW
q Evaporator water flow rate, l/s
Δp Evaporator pressure drop, kPa

Application data

Standard units, refrigerant: R-410A
Evaporator entering/leaving water temperature difference: 5 K
Evaporator fluid: chilled water
Fouling factor: 0.18 x 10^{-4} (m^2 K)/W

Performances in accordance with EN14511-3:2011.

Cooling capacities

30RQS units

		Condenser entering air temperature, °C																							
		20				25				30				35				40				46			
	LWT	Qc	EER	q	Δp	Qc	EER	q	Δp	Qc	EER	q	Δp	Qc	EER	q	Δp	Qc	EER	q	Δp	Qc	EER	q	Δp
	°C	kW	kW/kW	l/s	kPa	kW	kW/kW	l/s	kPa	kW	kW/kW	l/s	kPa	kW	kW/kW	l/s	kPa	kW	kW/kW	l/s	kPa	kW	kW/kW	l/s	kPa
039	5	41	4.06	1.91	47	39	3.61	1.84	44	38	3.20	1.76	40	36	2.79	1.68	36	34	2.37	1.57	31	30	1.89	1.41	25
045		47	4.02	2.16	56	45	3.54	2.09	53	43	3.09	2.01	49	41	2.63	1.90	45	38	2.21	1.75	38	33	1.76	1.55	31
050		55	4.00	2.56	55	52	3.51	2.45	51	50	3.04	2.34	47	47	2.60	2.20	42	44	2.18	2.04	36	39	1.72	1.82	30
060		63	4.03	2.98	56	61	3.58	2.87	53	58	3.15	2.75	48	55	2.71	2.60	43	51	2.29	2.40	38	45	1.83	2.14	30
070		70	3.93	3.33	69	67	3.50	3.21	64	64	3.07	3.06	59	60	2.65	2.88	53	56	2.24	2.67	46	50	1.80	2.38	37
078		81	3.74	3.72	71	78	3.32	3.56	65	74	2.91	3.37	58	69	2.52	3.17	51	65	2.15	2.95	44	58	1.74	2.65	36
080		85	4.02	3.93	47	82	3.57	3.76	43	78	3.14	3.58	40	73	2.73	3.37	35	68	2.34	3.15	31	62	1.91	2.85	26
090		93	4.00	4.38	58	90	3.54	4.22	54	86	3.08	4.04	50	80	2.63	3.79	44	74	2.21	3.50	38	66	1.75	3.11	30
100		106	4.00	5.13	65	101	3.54	4.92	60	96	3.08	4.68	55	90	2.64	4.38	49	84	2.23	4.05	42	74	1.78	3.60	34
120		125	3.94	5.90	72	120	3.49	5.63	66	113	3.05	5.34	59	107	2.64	5.02	52	99	2.25	4.67	46	89	1.82	4.21	37
140		144	4.03	6.74	78	138	3.59	6.48	73	132	3.14	6.18	66	124	2.71	5.81	59	115	2.29	5.39	51	103	1.84	4.82	41
160		166	3.76	7.82	86	158	3.33	7.46	78	150	2.92	7.07	70	141	2.53	6.64	62	131	2.16	6.17	54	118	1.75	5.56	44
039	7	44	4.23	2.03	53	42	3.77	1.96	49	40	3.34	1.88	45	38	2.91	1.78	40	36	2.48	1.67	35	32	1.98	1.50	28
045		49	4.21	2.30	62	48	3.71	2.23	58	46	3.24	2.15	54	44	2.77	2.03	49	40	2.33	1.87	43	36	1.86	1.66	35
050		58	4.15	2.71	60	56	3.65	2.60	56	53	3.17	2.48	51	50	2.71	2.34	46	46	2.28	2.17	40	42	1.81	1.95	33
060		67	4.19	3.17	62	65	3.73	3.06	58	62	3.28	2.93	54	59	2.83	2.77	48	54	2.40	2.56	42	49	1.92	2.29	34
070		74	4.09	3.55	77	71	3.65	3.41	71	68	3.20	3.26	65	64	2.77	3.06	58	59	2.35	2.84	51	53	1.88	2.54	41
078		87	3.89	3.96	80	83	3.46	3.79	73	79	3.03	3.60	65	74	2.63	3.38	58	69	2.25	3.15	50	62	1.83	2.83	40
080		91	4.17	4.18	52	87	3.71	4.00	48	82	3.26	3.81	44	78	2.84	3.59	39	73	2.44	3.35	34	66	2.00	3.04	29
090		99	4.18	4.68	65	95	3.71	4.51	60	91	3.23	4.31	55	86	2.76	4.05	49	79	2.32	3.74	42	71	1.84	3.33	34
100		113	4.15	5.48	72	108	3.68	5.25	67	103	3.21	4.99	61	96	2.76	4.67	54	89	2.33	4.32	47	79	1.86	3.84	38
120		133	4.09	6.27	80	127	3.62	5.99	73	121	3.17	5.68	66	113	2.75	5.34	58	106	2.35	4.97	51	95	1.91	4.49	42
140		153	4.19	7.18	87	147	3.74	6.90	81	140	3.28	6.58	74	132	2.83	6.19	65	122	2.40	5.74	57	109	1.93	5.13	46
160		176	3.90	8.32	96	168	3.46	7.94	87	159	3.03	7.52	78	150	2.63	7.07	69	139	2.25	6.57	60	125	1.83	5.92	49
039	10	48	4.48	2.23	63	46	4.00	2.15	58	44	3.55	2.05	53	42	3.10	1.95	47	39	2.65	1.82	41	35	2.13	1.65	33
045		54	4.49	2.52	71	52	3.96	2.44	67	51	3.47	2.36	63	48	2.97	2.23	57	44	2.51	2.06	50	39	2.01	1.83	40
050		63	4.37	2.95	69	60	3.85	2.83	64	58	3.35	2.71	59	54	2.88	2.55	53	51	2.43	2.38	47	46	1.94	2.13	38
060		74	4.43	3.47	72	71	3.96	3.35	68	68	3.49	3.21	62	64	3.01	3.03	56	60	2.56	2.81	49	53	2.06	2.51	40
070		81	4.32	3.89	90	78	3.87	3.74	83	74	3.40	3.57	76	70	2.95	3.36	68	65	2.51	3.12	59	58	2.02	2.79	48
078		95	4.13	4.35	94	91	3.67	4.16	86	86	3.22	3.95	77	81	2.80	3.71	68	75	2.40	3.46	59	68	1.96	3.11	48
080		99	4.41	4.58	61	95	3.92	4.38	56	90	3.45	4.17	51	85	3.01	3.93	46	79	2.59	3.67	40	72	2.13	3.33	33
090		108	4.43	5.13	76	105	3.95	4.94	71	100	3.44	4.73	65	94	2.95	4.45	58	87	2.49	4.12	50	78	1.99	3.68	40
100		124	4.44	6.03	85	119	3.93	5.78	78	113	3.43	5.49	71	105	2.92	5.12	63	97	2.47	4.74	54	87	1.98	4.21	44
120		146	4.33	6.87	94	139	3.83	6.56	86	132	3.35	6.22	77	124	2.91	5.85	69	115	2.49	5.45	60	104	2.03	4.92	49
140		167	4.44	7.86	102	161	3.96	7.56	94	153	3.48	7.21	86	144	3.01	6.78	76	134	2.56	6.29	66	120	2.06	5.63	54
160		192	4.12	9.10	112	184	3.64	8.69	102	174	3.20	8.24	92	164	2.78	7.75	81	152	2.39	7.20	71	137	1.95	6.49	58
039	15	55	4.89	2.58	82	53	4.38	2.49	76	51	3.90	2.38	70	48	3.41	2.25	62	44	2.90	2.08	53	40	2.32	1.85	41
045		62	4.96	2.91	89	60	4.38	2.82	84	58	3.83	2.72	79	55	3.28	2.56	71	50	2.76	2.34	61	44	2.21	2.07	48
050		72	4.73	3.38	86	69	4.19	3.25	80	66	3.67	3.12	74	63	3.16	2.94	67	58	2.68	2.75	59	52	2.14	2.45	48
060		84	4.76	3.95	89	80	4.26	3.79	83	77	3.75	3.62	76	72	3.23	3.40	67	66	2.74	3.13	58	59	2.20	2.78	46
070		94	4.69	4.52	115	90	4.20	4.33	106	85	3.70	4.10	96	80	3.20	3.83	84	73	2.72	3.52	72	65	2.18	3.12	57
078		110	4.54	5.04	123	105	4.02	4.82	113	100	3.53	4.58	102	94	3.08	4.31	90	87	2.63	3.98	76	77	2.14	3.54	60
080		114	4.80	5.28	78	109	4.26	5.06	72	104	3.75	4.82	65	98	3.28	4.54	58	91	2.82	4.21	51	82	2.31	3.78	41
090		125	4.82	5.94	97	121	4.31	5.73	91	116	3.77	5.49	84	109	3.24	5.15	74	100	2.73	4.74	63	89	2.18	4.20	50
100		141	4.84	6.87	105	135	4.30	6.56	96	127	3.75	6.21	87	118	3.20	5.78	76	109	2.68	5.30	65	95	2.11	4.65	51
120		168	4.73	7.94	121	160	4.18	7.58	110	152	3.66	7.19	99	143	3.18	6.77	88	133	2.73	6.30	77	119	2.22	5.64	62
140		193	4.83	9.11	130	185	4.33	8.73	120	176	3.80	8.28	109	164	3.28	7.73	95	152	2.78	7.14	82	134	2.23	6.31	65
160		222	4.46	10.52	144	212	3.95	10.03	131	201	3.47	9.51	118	188	3.02	8.93	104	174	2.59	8.25	89	156	2.12	7.37	72
039	18	55	4.92	2.60	83	53	4.39	2.50	76	51	3.90	2.38	69	48	3.40	2.25	61	44	2.90	2.09	52	40	2.32	1.86	41
045		63	4.97	2.93	88	60	4.38	2.82	83	58	3.83	2.72	78	55	3.28	2.56	70	50	2.76	2.35	60	44	2.21	2.07	48
050		75	4.84	3.53	92	72	4.28	3.38	85	68	3.73	3.21	77	64	3.20	3.00	68	59	2.69	2.77	59	52	2.14	2.46	47
060		83	4.75	3.95	88	80	4.25	3.79	82	76	3.74	3.62	75	72	3.23	3.40	67	66	2.74	3.14	57	59	2.20	2.79	46
070		94	4.69	4.53	113	90	4.20	4.33	104	85	3.70	4.10	94	80	3.20	3.83	83	73	2.72	3.53	71	65	2.18	3.13	57
078		112	4.60	5.16	127	107	4.06	4.90	115	100	3.54	4.62	102	94	3.07	4.32	89	87	2.63	3.99	75	77	2.14	3.56	60
080		116	4.86	5.40	80	111	4.29	5.13	72	105	3.76	4.85	65	98	3.28	4.54	57	-	-	-	-	82	2.31	3.79	41
090		127	4.85	6.03	98	122	4.33	5.79	91	116	3.77	5.52	83	109	3.24	5.16	73	100	2.73	4.75	62	89	2.18	4.21	50
100		141	4.83	6.88	103	134	4.29	6.57	95	127	3.75	6.22	86	119	3.20	5.79	75	109	2.68	5.32	64	96	2.11	4.67	50
120		172	4.80	8.14	125	163	4.22	7.74	113	154	3.69	7.31	101	144	3.20	6.83	88	134	2.73	6.33	76	120	2.23	5.67	61
140		194	4.83	9.13	129	185	4.32	8.72	118	176	3.80	8.28	107	164	3.28	7.74	94	152	2.78	7.15	81	135	2.23	6.34	64
160		225	4.50	10.68	146	214	3.96	10.15	132	201	3.47	9.56	117	188	3.02	8.94	103	174	2.59	8.28	88	156	2.12	7.40	71

Legend
LWT Leaving water temperature, °C
Qc Cooling capacity, kW
EER Energy efficiency ratio, kW/kW
q Evaporator water flow rate, l/s
Δp Evaporator pressure drop, kPa

Application data

Standard units, refrigerant: R-410A
Evaporator entering/leaving water temperature difference: 5 K
Evaporator fluid: chilled water
Fouling factor: 0.18 x 10^{-4} (m^2 K)/W

Gross performances, not in accordance with EN14511-3:2011. These performances do not take into account the correction for the proportional heating capacity and power input generated by the water pump to overcome the internal pressure drop in the heat exchanger.

Heating capacities in accordance with EN14511-3 : 2011

30RQS units

		Outside air dry-bulb (wet-bulb) temperature, °C																							
		-15 (-16)				-10 (-11)				-7 (-8)				2 (1)				7 (6)				12 (11)			
	LWT	Qh	COP	q	Δp	Qh	COP	q	Δp	Qh	COP	q	Δp	Qh	COP	q	Δp	Qh	COP	q	Δp	Qh	COP	q	Δp
	°C	kW	kW/kW	l/s	kPa	kW	kW/kW	l/s	kPa	kW	kW/kW	l/s	kPa	kW	kW/kW	l/s	kPa	kW	kW/kW	l/s	kPa	kW	kW/kW	l/s	kPa
039	30	22	2.21	1.19	15	24	2.34	1.33	19	25	2.45	1.43	22	31	2.98	1.81	36	43	4.03	2.05	47	49	4.47	2.34	62
045		24	2.17	1.29	20	26	2.33	1.46	24	27	2.45	1.57	28	34	2.99	1.98	41	47	4.06	2.24	51	54	4.57	2.56	65
050		28	2.18	1.47	18	30	2.35	1.68	22	32	2.47	1.82	26	40	3.04	2.31	40	55	4.13	2.62	51	63	4.62	2.99	64
060		32	2.15	1.69	18	34	2.31	1.93	23	37	2.43	2.10	27	46	2.98	2.66	42	64	4.05	3.03	53	72	4.53	3.45	68
070		36	2.24	1.94	21	39	2.38	2.20	27	41	2.48	2.38	31	52	2.99	3.01	49	72	4.03	3.43	62	82	4.45	3.92	80
078		40	2.10	2.16	20	44	2.24	2.46	26	46	2.33	2.67	31	58	2.79	3.39	50	81	3.76	3.85	65	92	4.17	4.40	85
080		41	2.25	2.22	14	45	2.39	2.53	18	48	2.49	2.75	21	60	3.01	3.51	34	84	4.07	4.00	44	96	4.55	4.58	57
090		48	2.18	2.57	18	52	2.34	2.93	23	55	2.46	3.17	26	69	3.01	4.02	41	96	4.09	4.57	52	109	4.58	5.21	67
100		37	2.31	1.98	10	57	2.40	3.20	23	60	2.50	3.46	27	75	3.04	4.36	41	104	4.12	4.95	52	118	4.59	5.65	67
120		61	2.29	3.26	21	66	2.43	3.71	26	70	2.53	4.03	31	88	3.02	5.14	50	123	4.07	5.85	64	140	4.52	6.69	83
140		72	2.25	3.86	23	78	2.37	4.36	29	82	2.48	4.71	34	103	3.00	5.97	53	142	4.05	6.80	68	163	4.52	7.77	88
160		-	-	-	-	89	2.32	5.01	31	94	2.42	5.42	36	119	2.89	6.89	58	164	3.89	7.84	74	188	4.31	8.96	97
039	35	22	2.01	1.20	15	24	2.14	1.34	19	25	2.24	1.44	22	31	2.71	1.80	35	43	3.70	2.04	45	49	4.10	2.32	59
045		24	1.94	1.32	20	26	2.10	1.48	24	27	2.21	1.59	27	34	2.70	1.98	40	47	3.70	2.24	50	53	4.15	2.54	63
050		27	1.96	1.48	17	30	2.10	1.68	22	31	2.20	1.82	25	39	2.71	2.30	39	54	3.74	2.60	49	62	4.19	2.97	62
060		31	1.95	1.69	17	34	2.09	1.93	22	36	2.20	2.09	26	45	2.70	2.65	40	63	3.72	3.01	51	72	4.15	3.43	65
070		36	2.06	1.95	21	39	2.17	2.20	26	41	2.26	2.38	31	51	2.72	3.00	47	71	3.70	3.41	60	82	4.09	3.89	76
078		40	1.91	2.18	20	43	2.03	2.46	25	46	2.12	2.66	30	57	2.55	3.35	48	80	3.45	3.80	62	91	3.83	4.35	81
080		41	2.04	2.22	14	44	2.16	2.51	18	47	2.26	2.72	21	59	2.73	3.46	33	82	3.73	3.95	42	94	4.16	4.51	54
090		47	1.97	2.56	17	51	2.11	2.92	22	54	2.21	3.16	25	68	2.71	4.00	40	95	3.73	4.54	50	108	4.17	5.18	65
100		37	2.11	1.99	9	57	2.18	3.22	23	60	2.27	3.47	26	74	2.75	4.35	40	103	3.76	4.93	50	118	4.21	5.62	64
120		60	2.07	3.26	20	65	2.19	3.70	26	69	2.29	4.00	30	86	2.73	5.07	47	121	3.72	5.77	61	138	4.13	6.60	79
140		72	2.06	3.89	23	77	2.16	4.38	29	81	2.25	4.73	33	101	2.72	5.95	51	141	3.72	6.75	66	161	4.16	7.71	85
160		82	1.98	4.42	24	88	2.11	5.01	30	93	2.20	5.41	35	116	2.63	6.83	55	162	3.58	7.75	71	186	3.96	8.86	92
039	40	22	1.75	1.23	15	23	1.91	1.35	19	24	1.99	1.45	22	30	2.41	1.79	34	42	3.38	2.02	44	48	3.76	2.29	57
045		24	1.65	1.33	20	26	1.84	1.49	24	27	1.95	1.60	27	33	2.39	2.00	40	47	3.37	2.25	49	53	3.77	2.53	61
050		27	1.72	1.49	17	29	1.84	1.68	21	30	1.93	1.82	25	38	2.38	2.29	37	54	3.37	2.58	47	61	3.79	2.94	59
060		30	1.71	1.67	17	33	1.84	1.91	21	35	1.94	2.08	25	44	2.39	2.64	39	62	3.37	2.98	49	71	3.78	3.39	62
070		35	1.85	1.96	21	38	1.94	2.21	26	40	2.02	2.38	30	50	2.41	2.99	45	71	3.37	3.38	57	80	3.74	3.84	73
078		40	1.70	2.20	20	42	1.80	2.47	25	45	1.88	2.66	29	55	2.27	3.33	46	79	3.15	3.76	59	90	3.49	4.28	76
080		40	1.80	2.23	14	43	1.92	2.51	17	45	2.01	2.71	20	57	2.42	3.42	31	81	3.40	3.89	39	93	3.79	4.44	51
090		46	1.73	2.54	16	50	1.86	2.90	21	53	1.95	3.15	25	66	2.39	3.98	38	94	3.37	4.50	49	107	3.79	5.12	62
100		52	1.86	2.85	18	55	1.95	3.22	22	58	2.02	3.47	26	72	2.43	4.33	39	102	3.42	4.89	49	116	3.83	5.56	62
120		59	1.82	3.29	20	63	1.94	3.70	25	67	2.02	3.99	29	83	2.42	5.02	45	119	3.38	5.69	58	136	3.75	6.49	75
140		71	1.85	3.90	22	75	1.94	4.39	28	79	2.01	4.73	32	98	2.41	5.92	50	140	3.39	6.69	63	159	3.80	7.62	81
160		81	1.75	4.48	24	86	1.87	5.03	30	91	1.95	5.41	34	112	2.34	6.77	53	160	3.27	7.67	68	183	3.62	8.74	88
039	45	-	-	-	-	23	1.66	1.37	19	24	1.74	1.46	21	29	2.12	1.78	33	42	3.06	2.00	42	47	3.41	2.26	54
045		-	-	-	-	25	1.58	1.49	23	26	1.69	1.60	26	32	2.09	1.99	39	47	3.03	2.24	48	53	3.41	2.53	59
050		14	1.54	0.79	5	28	1.61	1.69	21	30	1.69	1.82	24	37	2.07	2.27	36	53	3.01	2.56	45	61	3.39	2.90	57
060		15	1.44	0.86	5	32	1.61	1.89	20	-	-	-	-	42	2.08	2.59	37	61	3.02	2.94	47	70	3.39	3.34	59
070		35	1.66	1.96	20	-	-	-	-	39	1.79	2.37	29	48	2.13	2.95	44	70	3.04	3.33	55	79	3.38	3.78	69
078		21	1.51	1.17	5	42	1.59	2.49	25	43	1.66	2.66	28	53	2.00	3.29	44	77	2.86	3.71	56	88	3.17	4.22	72
080		40	1.59	2.26	14	42	1.69	2.52	17	44	1.76	2.70	19	54	2.13	3.37	30	80	3.07	3.82	37	91	3.42	4.35	48
090		44	1.52	2.51	16	48	1.62	2.86	20	51	1.70	3.11	23	63	2.08	3.93	37	93	3.01	4.45	46	106	3.39	5.06	59
100		35	1.69	1.99	9	54	1.73	3.22	22	56	1.79	3.46	25	69	2.14	4.30	37	101	3.08	4.84	47	115	3.45	5.49	59
120		40	1.65	2.29	10	62	1.70	3.71	25	65	1.77	3.98	28	80	2.13	4.95	43	117	3.05	5.60	55	133	3.38	6.37	71
140		36	1.60	2.04	6	73	1.72	4.39	28	-	-	-	-	94	2.12	5.86	48	138	3.06	6.61	60	157	3.43	7.50	77
160		-	-	-	-	85	1.65	5.07	29	88	1.72	5.43	34	108	2.07	6.72	51	158	2.96	7.57	65	180	3.29	8.61	83
039	50	-	-	-	-	-	-	-	-	24	1.52	1.47	21	28	1.87	1.78	32	41	2.73	1.98	40	46	3.04	2.23	51
045		-	-	-	-	-	-	-	-	26	1.46	1.59	25	31	1.84	1.95	37	46	2.69	2.20	45	52	3.02	2.48	56
050		-	-	-	-	15	1.50	0.89	6	29	1.50	1.83	24	36	1.82	2.25	35	53	2.67	2.53	43	59	3.01	2.85	54
060		-	-	-	-	16	1.41	0.98	6	32	1.50	2.01	23	40	1.83	2.54	35	60	2.68	2.87	44	68	3.00	3.25	55
070		-	-	-	-	36	1.56	2.20	25	38	1.60	2.36	28	46	1.89	2.92	42	68	2.72	3.28	52	77	3.01	3.70	65
078		-	-	-	-	22	1.45	1.32	7	43	1.48	2.68	28	52	1.79	3.27	42	76	2.58	3.66	53	86	2.86	4.14	68
080		-	-	-	-	42	1.50	2.54	17	44	1.57	2.70	19	53	1.90	3.33	28	78	2.76	3.75	35	88	3.08	4.25	45
090		-	-	-	-	47	1.43	2.83	19	49	1.50	3.06	22	61	1.82	3.85	35	91	2.67	4.35	43	103	2.99	4.93	55
100		-	-	-	-	37	1.58	2.23	11	56	1.60	3.45	24	68	1.89	4.25	36	99	2.74	4.77	44	112	3.07	5.39	56
120		-	-	-	-	43	1.56	2.58	12	64	1.57	3.99	28	78	1.89	4.90	41	115	2.74	5.51	52	130	3.03	6.23	66
140		-	-	-	-	38	1.53	2.29	8	76	1.59	4.70	31	92	1.88	5.79	46	135	2.73	6.50	57	153	3.06	7.34	72
160		-	-	-	-	45	1.51	2.70	8	88	1.53	5.48	34	106	1.84	6.68	49	156	2.67	7.48	62	176	2.97	8.46	79

Legend
LWT Leaving water temperature, °C
Qh Heating capacity, kW
COP Coefficient of performance, kW/kW
q Condenser water flow rate, l/s
Δp Condenser pressure drop, kPa

Application data

Standard units, refrigerant: R-410A
Condenser entering/leaving water temperature difference: 5 K for LWT values <50°C
Condenser fluid: water
Fouling factor: 0.18 x 10^{-4} (m^2 K)/W

Performances in accordance with EN14511-3:2011.

Heating capacities

30RQS units

		Outside air dry-bulb (wet-bulb) temperature, °C																							
		-15 (-16)				-10 (-11)				-7 (-8)				2 (1)				7 (6)				12 (11)			
	LWT	Qh	COP	q	Δp	Qh	COP	q	Δp	Qh	COP	q	Δp	Qh	COP	q	Δp	Qh	COP	q	Δp	Qh	COP	q	Δp
	°C	kW	kW/kW	l/s	kPa	kW	kW/kW	l/s	kPa	kW	kW/kW	l/s	kPa	kW	kW/kW	l/s	kPa	kW	kW/kW	l/s	kPa	kW	kW/kW	l/s	kPa
039	30	25	2.48	1.19	15	28	2.77	1.33	19	30	2.97	1.43	22	38	3.68	1.81	36	43	4.12	2.05	47	49	4.61	2.34	62
045		27	2.44	1.29	20	30	2.76	1.46	24	33	2.97	1.57	28	41	3.69	1.98	41	47	4.16	2.24	51	53	4.71	2.56	65
050		31	2.46	1.47	18	35	2.78	1.68	22	38	3.00	1.82	26	48	3.75	2.31	40	55	4.23	2.62	51	62	4.76	2.99	64
060		35	2.42	1.69	18	40	2.74	1.93	23	44	2.95	2.10	27	55	3.69	2.66	42	63	4.14	3.03	53	72	4.66	3.45	68
070		40	2.53	1.94	21	46	2.82	2.20	27	49	3.02	2.38	31	63	3.70	3.01	49	71	4.12	3.43	62	82	4.59	3.92	80
078		45	2.36	2.16	20	51	2.64	2.46	26	55	2.83	2.67	31	70	3.45	3.39	50	80	3.83	3.85	65	92	4.28	4.40	85
080		46	2.53	2.22	14	53	2.82	2.53	18	57	3.02	2.75	21	73	3.70	3.51	34	83	4.14	4.00	44	95	4.66	4.58	57
090		53	2.45	2.57	18	61	2.76	2.93	23	66	2.98	3.17	26	84	3.71	4.02	41	95	4.17	4.57	52	108	4.70	5.21	67
100		41	2.60	1.98	10	67	2.84	3.20	23	72	3.04	3.46	27	91	3.74	4.36	41	103	4.19	4.95	52	118	4.71	5.65	67
120		68	2.57	3.26	21	77	2.87	3.71	26	84	3.06	4.03	31	107	3.73	5.14	50	122	4.15	5.85	64	139	4.64	6.69	83
140		80	2.53	3.86	23	91	2.81	4.36	29	98	3.01	4.71	34	124	3.70	5.97	53	141	4.13	6.80	68	162	4.64	7.77	88
160		-	-	-	-	104	2.75	5.01	31	113	2.93	5.42	36	143	3.56	6.89	58	163	3.96	7.84	74	187	4.43	8.96	97
039	35	25	2.28	1.20	15	28	2.56	1.34	19	30	2.74	1.44	22	37	3.38	1.80	35	42	3.78	2.04	45	48	4.21	2.32	59
045		27	2.20	1.32	20	31	2.51	1.48	24	33	2.71	1.59	27	41	3.37	1.98	40	47	3.78	2.24	50	53	4.26	2.54	63
050		31	2.22	1.48	17	35	2.50	1.68	22	38	2.70	1.82	25	48	3.38	2.30	39	54	3.81	2.60	49	62	4.30	2.97	62
060		35	2.20	1.69	17	40	2.49	1.93	22	43	2.69	2.09	26	55	3.37	2.65	40	62	3.79	3.01	51	71	4.25	3.43	65
070		41	2.33	1.95	21	46	2.59	2.20	26	49	2.77	2.38	31	62	3.39	3.00	47	71	3.77	3.41	60	81	4.20	3.89	76
078		45	2.16	2.18	20	51	2.42	2.46	25	55	2.59	2.66	30	70	3.17	3.35	48	79	3.51	3.80	62	90	3.92	4.35	81
080		46	2.30	2.22	14	52	2.58	2.51	18	57	2.77	2.72	21	72	3.39	3.46	33	82	3.78	3.95	42	94	4.25	4.51	54
090		53	2.22	2.56	17	61	2.51	2.92	22	66	2.71	3.16	25	83	3.37	4.00	40	94	3.79	4.54	50	108	4.26	5.18	65
100		41	2.39	1.99	9	67	2.60	3.22	23	72	2.78	3.47	26	90	3.41	4.35	40	102	3.82	4.93	50	117	4.30	5.62	64
120		68	2.34	3.26	20	77	2.61	3.70	26	83	2.80	4.00	30	105	3.41	5.07	47	120	3.78	5.77	61	137	4.22	6.60	79
140		81	2.33	3.89	23	91	2.58	4.38	29	98	2.76	4.73	33	124	3.38	5.95	51	140	3.78	6.75	66	160	4.25	7.71	85
160		92	2.24	4.42	24	104	2.51	5.01	30	112	2.69	5.41	35	142	3.27	6.83	55	161	3.64	7.75	71	184	4.06	8.86	92
039	40	25	2.03	1.23	15	28	2.32	1.35	19	30	2.50	1.45	22	37	3.08	1.79	34	42	3.44	2.02	44	48	3.84	2.29	57
045		28	1.91	1.33	20	31	2.25	1.49	24	33	2.44	1.60	27	41	3.06	2.00	40	47	3.43	2.25	49	53	3.86	2.53	61
050		31	2.00	1.49	17	35	2.25	1.68	21	38	2.42	1.82	25	47	3.03	2.29	37	54	3.42	2.58	47	61	3.87	2.94	59
060		35	1.98	1.67	17	40	2.25	1.91	21	43	2.43	2.08	25	55	3.04	2.64	39	62	3.43	2.98	49	70	3.86	3.39	62
070		41	2.15	1.96	21	46	2.37	2.21	26	49	2.53	2.38	30	62	3.08	2.99	45	70	3.42	3.38	57	80	3.82	3.84	73
078		46	1.96	2.20	20	51	2.20	2.47	25	55	2.36	2.66	29	69	2.89	3.33	46	78	3.20	3.76	59	89	3.56	4.28	76
080		46	2.09	2.23	14	52	2.34	2.51	17	56	2.51	2.71	20	71	3.08	3.42	31	81	3.44	3.89	39	92	3.86	4.44	51
090		53	2.00	2.54	16	60	2.26	2.90	21	65	2.44	3.15	25	83	3.04	3.98	38	93	3.42	4.50	49	106	3.85	5.12	62
100		59	2.15	2.85	18	67	2.37	3.22	22	72	2.53	3.47	26	90	3.09	4.33	39	102	3.46	4.89	49	115	3.90	5.56	62
120		68	2.11	3.29	20	77	2.36	3.70	25	83	2.53	3.99	29	104	3.08	5.02	45	118	3.43	5.69	58	135	3.82	6.49	75
140		81	2.14	3.90	22	91	2.36	4.39	28	98	2.52	4.73	32	123	3.07	5.92	50	139	3.44	6.69	63	158	3.87	7.62	81
160		93	2.03	4.48	24	104	2.28	5.03	30	112	2.44	5.41	34	141	2.98	6.77	53	159	3.31	7.67	68	181	3.69	8.74	88
039	45	-	-	-	-	28	2.08	1.37	19	30	2.24	1.46	21	37	2.77	1.78	33	42	3.10	2.00	42	47	3.47	2.26	54
045		-	-	-	-	31	1.97	1.49	23	33	2.16	1.60	26	41	2.73	1.99	39	46	3.08	2.24	48	52	3.47	2.53	59
050		16	1.83	0.79	5	35	2.02	1.69	21	38	2.17	1.82	24	47	2.70	2.27	36	53	3.05	2.56	45	60	3.46	2.90	57
060		18	1.70	0.86	5	39	2.01	1.89	20	-	-	-	-	54	2.71	2.59	37	61	3.06	2.94	47	69	3.45	3.34	59
070		41	1.97	1.96	20	-	-	-	-	49	2.29	2.37	29	61	2.78	2.95	44	69	3.09	3.33	55	78	3.44	3.78	69
078		24	1.79	1.17	5	52	1.99	2.49	25	55	2.13	2.66	28	68	2.61	3.29	44	77	2.90	3.71	56	87	3.22	4.22	72
080		47	1.88	2.26	14	52	2.11	2.52	17	56	2.26	2.70	19	70	2.78	3.37	30	79	3.10	3.82	37	90	3.47	4.35	48
090		52	1.79	2.51	16	59	2.02	2.86	20	64	2.17	3.11	23	81	2.71	3.93	37	92	3.05	4.45	46	105	3.44	5.06	59
100		41	2.00	1.99	9	67	2.16	3.22	22	72	2.29	3.46	25	89	2.78	4.30	37	100	3.11	4.84	47	114	3.50	5.49	59
120		47	1.96	2.29	10	77	2.12	3.71	25	82	2.27	3.98	28	103	2.78	4.95	43	116	3.09	5.60	55	132	3.44	6.37	71
140		42	1.89	2.04	6	91	2.15	4.39	28	-	-	-	-	121	2.77	5.86	48	137	3.09	6.61	60	156	3.49	7.50	77
160		-	-	-	-	105	2.06	5.07	29	112	2.21	5.43	34	139	2.70	6.72	51	157	3.00	7.57	65	178	3.34	8.61	83
039	50	-	-	-	-	-	-	-	-	30	1.97	1.47	21	37	2.46	1.78	32	41	2.76	1.98	40	46	3.09	2.23	51
045		-	-	-	-	-	-	-	-	33	1.89	1.59	25	40	2.42	1.95	37	45	2.72	2.20	45	51	3.07	2.48	56
050		-	-	-	-	19	1.88	0.89	6	38	1.94	1.83	24	47	2.40	2.25	35	52	2.70	2.53	43	59	3.05	2.85	54
060		-	-	-	-	20	1.77	0.98	6	42	1.94	2.01	23	53	2.41	2.54	35	59	2.71	2.87	44	67	3.05	3.25	55
070		-	-	-	-	45	1.96	2.20	25	49	2.08	2.36	28	60	2.49	2.92	42	68	2.75	3.28	52	76	3.06	3.70	65
078		-	-	-	-	27	1.82	1.32	7	56	1.92	2.68	28	68	2.35	3.27	42	76	2.61	3.66	53	86	2.90	4.14	68
080		-	-	-	-	53	1.89	2.54	17	56	2.03	2.70	19	69	2.49	3.33	28	78	2.78	3.75	35	88	3.11	4.25	45
090		-	-	-	-	58	1.80	2.83	19	63	1.94	3.06	22	80	2.40	3.85	35	90	2.69	4.35	43	102	3.03	4.93	55
100		-	-	-	-	46	2.00	2.23	11	71	2.07	3.45	24	88	2.49	4.25	36	99	2.77	4.77	44	111	3.11	5.39	56
120		-	-	-	-	53	1.97	2.58	12	83	2.03	3.99	28	101	2.48	4.90	41	114	2.76	5.51	52	129	3.08	6.23	66
140		-	-	-	-	47	1.93	2.29	8	97	2.06	4.70	31	120	2.47	5.79	46	134	2.75	6.50	57	152	3.10	7.34	72
160		-	-	-	-	56	1.90	2.70	8	113	1.98	5.48	34	138	2.43	6.68	49	155	2.70	7.48	62	175	3.01	8.46	79

Legend
LWT Leaving water temperature, °C
Qh Heating capacity, kW
COP Coefficient of performance, kW/kW
q Condenser water flow rate, l/s
Δp Condenser pressure drop, kPa

Application data

Standard units, refrigerant: R-410A
Condenser entering/leaving water temperature difference: 5 K for LWT values <50°C
Condenser fluid: water
Fouling factor: 0.18 x 10^{-4} (m^2 K)/W

Gross performances, not in accordance with EN14511-3:2011. These performances do not take into account the correction for the proportional heating capacity and power input generated by the water pump to overcome the internal pressure drop in the heat exchanger.

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.

Order No.: 13461-20.10.2012. Supersedes order No.: 13461-20.12.2009.
Manufacturer reserves the right to change any product specifications without notice.

Manufactured by: Carrier SCS, Montluel, France.
Printed in the European Union.