



United Technologies

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

AQUASNAP™



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PRO-DIALOG



Quality and Environment
Management Systems
Approval

30RB 039-160 “A”/30RQ 039-160

Nominal cooling capacity 30RB: 40-156 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
- All-aluminium microchannel heat exchangers for the cooling only units (30RBS)
- 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)
 - 50% reduction in the refrigerant charge through the use of micro-channel heat exchangers for the cooling only units (30RBS)
- 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



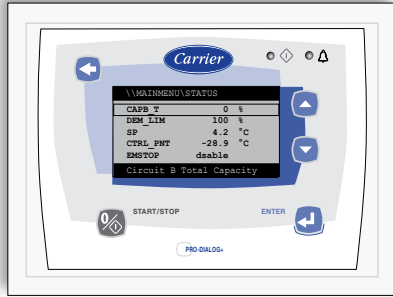
Superior reliability

- 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.
 - All aluminium micro-channel heat exchanger (MCHE) on cooling only units (30RBS), offers increased corrosion resistance compared to traditional coils. The all-aluminium design eliminates the formation of galvanic currents between aluminium and copper that cause coil corrosion.
- Auto-adaptive control
 - Control algorithm prevents excessive compressor cycling and permits reduction of the water quantity in the hydronic circuit (Carrier patent)
 - Hydronic module with integrated pressure transducers allowing measurement of the water pressure at two points, as well as measurement of the water flow rate and detection of lack of water and pressure. This considerably reduces the risk of problems such as frost accumulation on the water heat exchanger.
 - Automatic compressor unloading in case of abnormally high condensing pressure. If an anomaly occurs (e.g. fouled air heat exchanger coil, fan failure) Aquasnap continues to operate, but at reduced capacity.
- Exceptional endurance tests
 - Corrosion resistance tests in salt mist in the laboratory
 - Accelerated ageing test on components that are submitted to continuous operation: compressor piping, fan supports
 - Transport simulation test in the laboratory on a vibrating table.

Pro-Dialog+ control

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

Pro-Dialog+ interface



- Energy management
 - Seven-day internal time schedule clock: permits unit on/off control and operation at a second set point
 - Set point reset based on the outside air temperature or the return water temperature or on the water heat exchanger delta T
 - Master/slave control of two units operating in parallel with operating time equalisation and automatic change-over in case of a unit fault (accessory).
 - Change-over based on the outside air temperature
- Integrated features
 - Night mode: capacity and fan speed limitation for reduced noise level
 - With hydronic module: water pressure display and water flow rate calculation
- Ease-of-use
 - The new backlit LCD interface includes a manual control potentiometer to ensure legibility under any lighting conditions.
 - The information is displayed clearly in English, French, German, Italian and Spanish (for other languages please consult Carrier)
 - The Pro-Dialog+ navigation uses intuitive tree-structure menus, similar to the Internet navigators. They are user-friendly and permit quick access to the principal operating parameters: number of compressors operating, suction/discharge pressure, compressor operating hours, set point, air temperature, entering/leaving water temperature

Remote operating mode with volt-free contacts (standard)

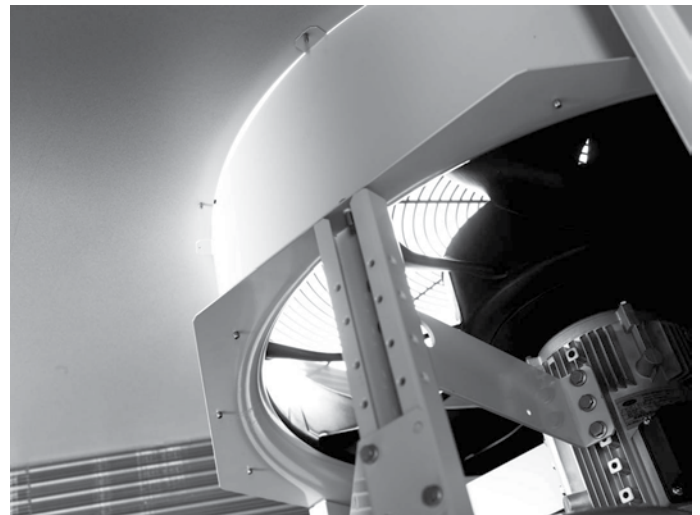
A simple two-wire communication bus between the RS485 port of the Aquasnap and the Carrier Comfort Network offers multiple remote control, monitoring and diagnostic possibilities. Carrier offers a vast choice of control products, specially designed to control, manage and supervise the operation of an 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

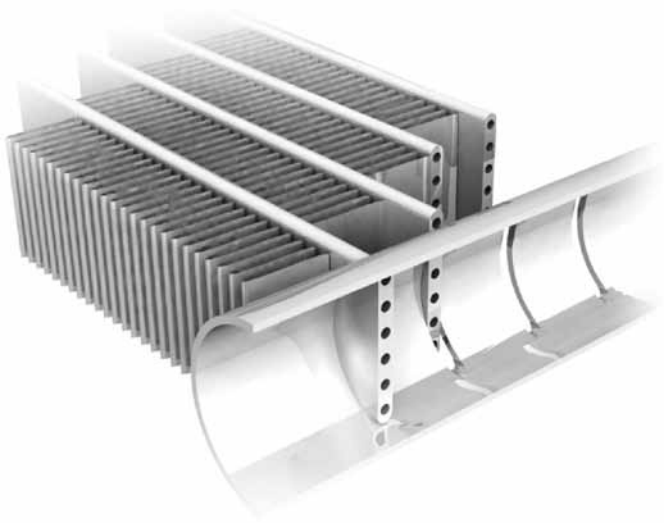
Remote interface (accessory)

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



All-aluminium micro-channel heat exchanger (MCHE)



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

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

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

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

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

Options

Options	No.	Description	Advantages	Use
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
Partial heat reclaim	49	Partial heat reclaim by desuperheating of the compressor discharge gas. Note: With option 49 the units are equipped with traditional coils (Cu/Al).	Free high-temperature hot-water production simultaneously with chilled and hot-water production	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, temperature and pressure sensors. 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, temperature and pressure sensors. 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, temperature and pressure sensors. 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, temperature and pressure sensors. 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, temperature and pressure sensors. 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, temperature and pressure sensors. See hydronic module option.	Easy and fast installation, operating safety, power consumption reduction of the water circulation pump	30RBS/RQS 039-160
High-pressure single-pump hydronic module without expansion tank	116R	Single high-pressure water pump, water filter, temperature and pressure sensors. See hydronic module option.	Easy and fast installation	30RBS/RQS 039-160
High-pressure dual-pump hydronic module without expansion tank	116S	Dual high-pressure water pump, water filter, temperature and pressure sensors. See hydronic module option.	Easy and fast installation, operating safety	30RBS/RQS 039-160
Low-pressure single-pump hydronic module without expansion tank	116T	Single low-pressure water pump, water filter, temperature and pressure sensors. See hydronic module option.	Easy and fast installation	30RBS/RQS 039-160
Low-pressure dual-pump hydronic module without expansion tank	116U	Dual low-pressure water pump, water filter, temperature and pressure sensors. See hydronic module option.	Easy and fast installation, operating safety	30RBS/RQS 039-160
High-pressure variable-speed single-pump hydronic module without expansion tank	116V	Single high-pressure water pump, water filter, temperature and pressure sensors. See hydronic module option.	Easy and fast installation, reduced power consumption of the water circulation pump	30RBS/RQS 039-160
High-pressure variable-speed dual-pump hydronic module without expansion tank	116W	Dual high-pressure water pump, water filter, temperature and pressure sensors. See hydronic module option.	Easy and fast installation, operating safety, reduced power consumption 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
Enviro-Shield anti-corrosion protection for microchannel heat exchangers (MCHE)	262	Carrier factory treatment of the MCHE heat exchanger for applications in standard and moderately corrosive environments	Improved corrosion resistance, recommended for moderately corrosive marine and industrial environments.	30RBS/039-160
Super Enviro-Shield anti-corrosion protection for microchannel heat exchangers (MCHE)	263	Carrier factory treatment of the MCHE heat exchanger for applications in corrosive environments	The Super Enviro-Shield option was developed to extend the application range of MCHE heat exchangers in very corrosive environmental conditions.	30RBS/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.

Partial heat reclaim using desuperheaters (option 49)

This option permits the production of free hot water using heat reclaim by desuperheating the compressor discharge gases. The option is available for the whole 30RBS/RQS range, that are equipped with traditional Cu/Al coils.

A plate heat exchanger is installed in series with the air condenser coils on the compressor discharge line of each circuit.

Physical data, 30RBS units with partial heat reclaim using desuperheaters (option 49)

30RBS partial heat reclaim mode		039	045	050	060	070	080	090	100	120	140	160	
Operating weight units with RTPF coils*													
Standard unit without hydronic module		kg	467	475	498	524	512	543	849	859	890	1010	1074
Standard unit with hydronic module option													
Single high-pressure pump		kg	497	505	528	554	541	572	881	891	926	1049	1113
Dual high-pressure pump		kg	523	531	554	580	567	598	926	936	974	1086	1150
Refrigerant charge, units with RTPF coils			R-410A										
Circuit A		kg	8.0	9.0	12.5	15.0	12.5	15.0	19.0	20.0	23.0	12.5	16.0
Circuit B		kg	-	-	-	-	-	-	-	-	-	12.5	16.0
Condensers			Grooved copper tubes, aluminium fins										
Desuperheaters on circuits A and B			Plate heat exchangers										
Water volume, circuit A		l	0.549	0.549	0.549	0.549	0.732	0.732	0.976	0.976	0.976	0.732	0.732
Water volume, circuit B		l	-	-	-	-	-	-	-	-	-	0.732	0.732
Max. water-side operating pressure without hydronic module		kPa	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Water connections			Cylindrical, male gas thread										
Connections		in	1	1	1	1	1	1	1	1	1	1	1
Outside diameter		mm	42	42	42	42	42	42	42	42	42	42	42

* Weights shown are a guideline only.

Physical data, 30RQS units with partial heat reclaim using desuperheaters (option 49)

30RQS partial heat reclaim mode		039	045	050	060	070	078	080	090	100	120	140	160	
Operating weight units with RTPF coils*														
Standard unit without hydronic module		kg	515	522	548	561	562	569	762	909	917	973	1088	1106
Standard unit with hydronic module option														
Single high-pressure pump		kg	544	552	578	591	591	599	792	941	949	1009	1127	1145
Dual high-pressure pump		kg	570	578	603	617	617	625	818	986	994	1057	1164	1155
Refrigerant charge, units with RTPF coils			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
Condensers			Grooved copper tubes, aluminium fins											
Desuperheaters on circuits A and B			Plate heat exchangers											
Water volume, circuit A		l	0.549	0.549	0.549	0.732	0.732	0.732	0.732	0.976	0.976	0.976	0.732	0.732
Water volume, circuit B		l	-	-	-	-	-	-	-	-	-	-	0.732	0.732
Max. water-side operating pressure without hydronic module		kPa	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Water connections			Cylindrical, male gas thread											
Connections		in	1	1	1	1	1	1	1	1	1	1	1	1
Outside diameter		mm	42	42	42	42	42	42	42	42	42	42	42	34

* Weights shown are a guideline only.

Operating limits

Desuperheater		Minimum	Maximum
Entering water temperature at start-up	°C	25*	60
Leaving water temperature during operation	°C	30	65
Air condenser		Minimum	Maximum
Outside air temperature	°C	-10	46

* The entering water temperature at start-up must not be lower than 25°C. For installations with a lower temperature a three-way valve is necessary.

Reclaimed heating capacities using desuperheater(s)

30RBS 039-160

30RBS 039-160									
	Desuperheater entering water temperature, °C								
	45			50			55		
	Qhr kW	q l/s	Δp kPa	Qhr kW	q l/s	Δp kPa	Qc kW	q l/s	Δp kPa
039	12.9	0.31	6.1	10.9	0.26	4.4	9.0	0.21	3.1
045	16.5	0.40	9.5	14.3	0.34	7.4	12.0	0.29	5.2
050	18.1	0.43	11.7	15.4	0.37	8.5	12.8	0.31	6.1
060	19.3	0.46	12.9	16.6	0.40	9.8	13.7	0.33	6.9
070	24.3	0.58	11.8	21.0	0.50	9.2	17.5	0.42	6.5
080	28.6	0.68	16.3	24.4	0.58	12.1	20.6	0.49	8.8
090	30.5	0.73	11.4	25.8	0.62	8.2	21.5	0.51	5.8
100	36.4	0.87	16.0	31.9	0.76	12.4	27.0	0.64	8.9
120	43.1	1.03	22.6	37.4	0.89	17.2	31.6	0.75	12.3
140	47.1	1.12	11.3	39.7	0.95	8.3	33.0	0.79	5.9
160	54.0	1.29	15.0	45.6	1.09	10.7	38.3	0.92	7.8

Legend

Qhr Total heating capacity reclaimed at the desuperheater(s), kW
 q Total water flow rate in the desuperheater loop, l/s
 Δp Pressure drop per desuperheater, kPa

Application data

Evaporator entering/leaving water temperature 12/7°C
 Outside air temperature 35°C
 Desuperheater entering/leaving water temperature difference 10 K
 Evaporator fluid: chilled water
 Fouling factor 0.18 x 10⁻⁴ (m² K)/W

30RQS 039-160 cooling mode

30RQS 039-160									
	Desuperheater entering water temperature, °C								
	45			50			55		
	Qhr kW	q l/s	Δp kPa	Qhr kW	q l/s	Δp kPa	Qc kW	q l/s	Δp kPa
039	10.9	0.26	4.4	9.1	0.22	3.1	7.1	0.18	2.1
045	14.4	0.34	7.5	12.2	0.29	5.4	10.0	0.24	3.7
050	17.2	0.41	10.5	14.7	0.35	7.8	12.3	0.29	5.6
060	17.4	0.44	6.6	15.1	0.36	4.6	12.3	0.29	3.0
070	21.4	0.51	9.3	17.9	0.43	6.7	14.7	0.35	4.8
078	26.8	0.64	14.7	22.5	0.54	10.4	18.8	0.45	7.5
080	23.9	0.57	12.1	21.2	0.51	7.8	16.3	0.39	5.8
090	28.1	0.67	9.9	23.9	0.57	7.1	19.7	0.47	5.1
100	33.9	0.81	14.0	28.3	0.68	10.1	23.7	0.57	7.2
120	37.7	0.90	17.5	31.7	0.76	12.4	26.5	0.63	8.9
140	42.9	1.03	9.4	35.5	0.85	6.7	14.5	0.35	4.5
160	52.3	1.25	14.1	44.2	1.06	10.1	18.3	0.44	7.1

Legend

Qhr Total heating capacity reclaimed at the desuperheater(s), kW
 q Total water flow rate in the desuperheater loop, l/s
 Δp Pressure drop per desuperheater, kPa

Application data

Evaporator entering/leaving water temperature 12/7°C
 Outside air temperature 35°C
 Desuperheater entering/leaving water temperature difference 10 K
 Evaporator fluid: chilled water
 Fouling factor 0.18 x 10⁻⁴ (m² K)/W

30RQS 039-160 heating mode

30RQS 039-160									
	Desuperheater entering water temperature, °C								
	45			50			55		
	Qhr kW	q l/s	Δp kPa	Qhr kW	q l/s	Δp kPa	Qc kW	q l/s	Δp kPa
039	10.1	0.24	3.8	8.3	0.20	2.7	6.8	0.16	1.8
045	11.1	0.27	4.6	9.3	0.22	3.3	7.7	0.18	2.3
050	14.0	0.33	7.1	11.8	0.28	5.2	9.9	0.24	3.6
060	14.3	0.34	4.4	11.8	0.28	3.0	9.4	0.22	2.0
070	17.1	0.41	6.3	14.4	0.34	4.5	11.9	0.28	3.1
078	19.1	0.46	7.8	16.0	0.38	5.6	13.2	0.32	3.9
080	17.5	0.42	6.6	14.6	0.35	4.8	11.7	0.28	3.2
090	21.4	0.51	6.0	17.7	0.42	4.1	14.7	0.35	2.8
100	20.6	0.49	5.1	16.5	0.39	3.4	12.7	0.30	2.0
120	23.0	0.55	6.9	18.5	0.44	4.7	14.5	0.35	3.0
140	16.0	0.38	5.5	13.3	0.32	3.8	10.8	0.26	2.6
160	18.7	0.45	7.3	15.6	0.37	5.4	12.7	0.30	3.7

Legend

Qhr Total heating capacity reclaimed at the desuperheater(s), kW
 q Total water flow rate in the desuperheater loop, l/s
 Δp Pressure drop per desuperheater, kPa

Application data

Evaporator entering/leaving water temperature 40/45°C
 Outside air temperature 7°C
 Desuperheater entering/leaving water temperature difference 10 K
 Condenser fluid: water
 Fouling factor 0.18 x 10⁻⁴ (m² K)/W

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:

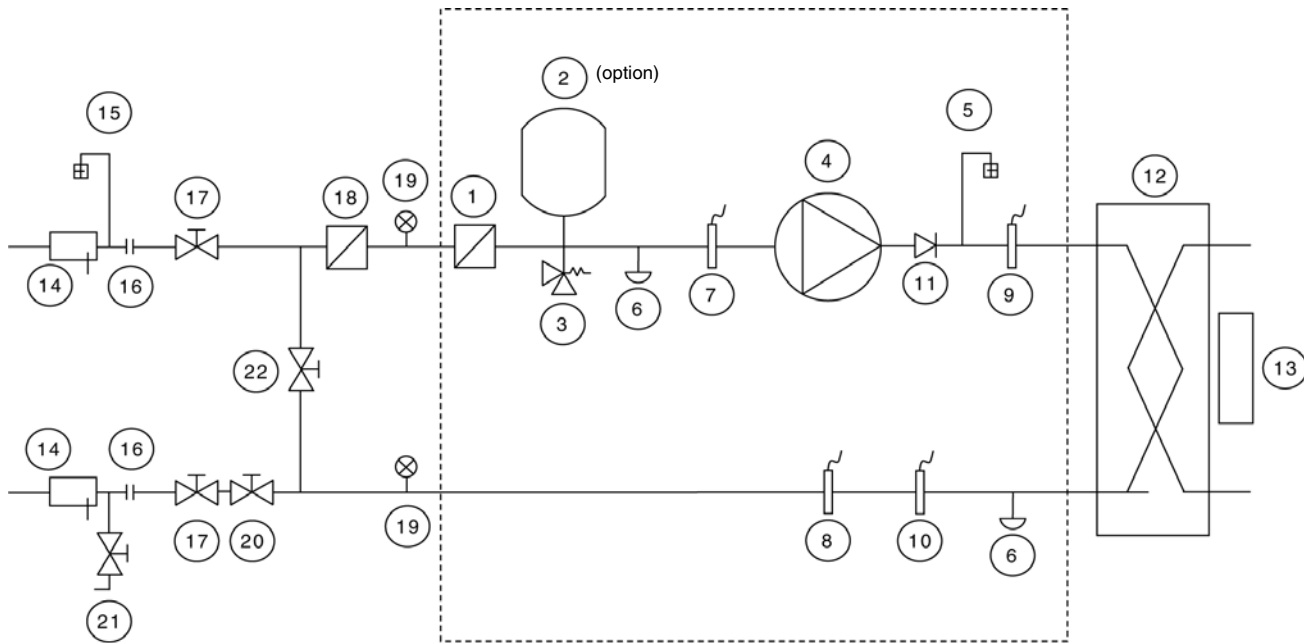
- display the available pressure at the unit outlet and the static system pressure
- calculate the instantaneous flow rate, using an algorithm that integrates the unit characteristics
- integrate the system and water pump protection devices (lack of water, water pressure, water flow rate etc.)

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 (option)
- 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	40	44	51	58	67	79	87	97	114	135	156	
EER	kW/kW	2.87	2.76	2.67	2.66	2.72	2.70	2.73	2.73	2.67	2.70	2.65	
Eurovent class, cooling	C	C	D	D	C	C	C	C	C	D	C	D	
ESEER	kW/kW	3.75	3.88	3.95	3.80	3.62	3.67	3.91	3.94	3.83	3.68	3.87	
Condition 2													
Nominal cooling capacity	kW	53	59	69	81	85	98	114	126	151	171	194	
EER	kW/kW	3.44	3.32	3.12	3.31	2.97	3.06	3.18	3.09	3.10	2.99	3.01	
Air conditioning application**													
Condition 1													
Nominal cooling capacity	kW	40	44	52	59	68	80	87	98	115	136	157	
EER	kW/kW	2.95	2.84	2.75	2.74	2.80	2.78	2.79	2.79	2.73	2.77	2.72	
ESEER	kW/kW	3.97	4.14	4.22	4.06	3.84	3.90	4.16	4.18	4.08	3.94	4.16	
Condition 2													
Nominal cooling capacity	kW	54	59	69	82	86	99	115	127	152	173	196	
EER	kW/kW	3.59	3.47	3.26	3.47	3.08	3.19	3.28	3.19	3.21	3.09	3.12	
Operating weight with MCHE coil***													
Standard unit without hydronic module	kg	443	451	454	463	467	482	780	791	807	912	943	
Standard unit with hydronic module													
Single high-pressure pump	kg	473	481	484	493	496	511	812	823	843	951	982	
Dual high-pressure pump	kg	499	507	510	519	522	537	857	868	891	988	1019	
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 charge with MCHE coil****													
R-410A													
Circuit A	kg	4.0	4.5	6.3	6.7	6.2	7.3	9.5	10.8	11.4	6.3	8.0	
Circuit B	kg	-	-	-	-	-	-	-	-	-	6.3	8.0	
Capacity control													
Minimum capacity	%	Pro-Dialog+											
		50	50	50	50	50	50	33	33	33	25	25	
Condensers													
All-aluminium microchannel heat exchanger (MCHEx)													
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 m² 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 m² 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 m² 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 m² 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 charge****													
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 m² 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 m² 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 m² 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 m² 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 m² 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 m² 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 m² 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 m² 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	113.8	134.8	142.8	145.8	176.0	213.0	173.6	207.6	247.6	243.0	286.0	
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	19.5	22.3	24.5	27.9	31.2	35.8	42.3	45.6	52.5	62.4	71.6
Nominal unit operating current draw***													
		A	25.6	29.0	33.0	36.0	42.4	52.8	55.4	61.7	77.3	84.8	105.6
Maximum operating current draw (Un)****													
		A	34.8	44.8	46.8	52.8	67.0	73.0	80.6	98.6	107.6	134.0	146.0
Maximum operating current draw (Un-10%)†													
		A	38.0	49.2	51.4	58.4	74.8	79.6	89.0	110.3	117.5	149.6	159.2
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 - I _{cw} - 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 - I _{pk} - kA pk	20	20	20	20	20	15	20	20	15	20	15	
Value with upstream protection by circuit breaker												
Conditional short-circuit current I _{cc} - 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	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 (I²t) 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	113.8	134.8	142.8	145.8	176.0	213.0	213.6	173.6	207.6	247.6	243.0	286.0	
Unit with electronic starter option	A	74.7	86.5	93.8	96.2	114.4	139.8	139.8	-	-	-	-	-	
Unit power factor at maximum capacity**														
		0.83	0.81	0.81	0.83	0.81	0.78	0.78	0.83	0.81	0.79	0.81	0.78	
Maximum operating power input**														
		kW	19.5	22.3	24.5	27.9	31.2	35.8	35.6	42.3	45.6	52.5	62.4	71.6
Nominal unit operating current draw***														
		A	25.6	29.0	33.0	36.0	42.4	52.8	53.4	55.4	61.7	77.3	84.8	105.6
Maximum operating current draw (Un)****														
		A	34.8	44.8	46.8	52.8	67.0	73.0	73.6	80.6	98.6	107.6	134.0	146.0
Maximum operating current draw (Un-10%)†														
		A	38.0	49.2	51.4	58.4	74.8	79.6	80.2	89.0	110.3	117.5	149.6	159.2
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 - I _{cw} - 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 - I _{pk} - 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 I _{cc} - 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	NS100H	NS160H	NS160H	NS250H	NS250H
Reference No.**	29670	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 (I²t) 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.

IPLV (in accordance with AHRI 550/590)

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

IPLV (integrated part load value)

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

Note: Constant leaving water temperature 6.67°C.

Part load performances

30RBS 039-160

30RBS	039	045	050	060	070	080	090	100	120	140	160	
IPLV	kW/kW	4.54	4.71	4.81	4.58	4.26	4.39	4.55	4.53	4.55	4.29	4.64
ESEER	kW/kW	3.75	3.88	3.95	3.80	3.62	3.67	3.91	3.94	3.83	3.68	3.87

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)

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

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

ESEER (in accordance with EUROVENT)

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

ESEER (European seasonal energy efficiency ratio)

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

Note: Constant leaving water temperature 7°C.

Sound spectrum, 30RBS

30RBS – Standard units									
	dB	Octave bands, Hz						Sound power levels	
		125	250	500	1k	2k	4k		
039		77.0	78.9	78.5	75.1	71.9	67.2	dB(A)	80
045		77.0	79.0	78.7	76.0	72.8	67.3	dB(A)	81
050		77.0	79.0	78.9	76.0	72.4	67.8	dB(A)	81
060		77.0	78.9	78.7	76.0	73.7	68.8	dB(A)	81
070		81.3	83.5	84.4	82.9	76.9	72.6	dB(A)	87
080		81.3	83.5	84.5	82.9	77.2	71.1	dB(A)	87
090		80.0	81.9	81.6	78.7	75.9	70.7	dB(A)	84
100		80.0	81.9	81.7	78.8	76.1	73.7	dB(A)	84
120		80.0	81.9	81.8	78.9	76.8	71.4	dB(A)	84
140		84.3	86.5	87.4	85.9	79.9	75.6	dB(A)	90
160		84.3	86.5	87.5	85.9	80.2	74.1	dB(A)	90

30RBS - Units with option 15LS (very low sound levels)									
	dB	Octave bands, Hz						Sound power levels	
		125	250	500	1k	2k	4k		
039		77.0	78.9	78.4	74.5	69.7	62.6	dB(A)	79
045		77.0	78.9	78.5	74.6	70.0	62.7	dB(A)	80
050		77.0	78.9	78.5	74.6	69.9	63.1	dB(A)	80
060		77.0	78.9	78.4	74.7	70.4	63.8	dB(A)	80
070		77.0	78.9	78.5	74.7	70.5	66.2	dB(A)	80
080		77.0	78.9	78.5	74.7	70.9	64.3	dB(A)	80
090		80.0	81.9	81.4	77.6	73.1	66.0	dB(A)	83
100		80.0	81.9	81.5	77.6	73.2	68.3	dB(A)	83
120		80.0	81.9	81.5	77.6	73.5	66.5	dB(A)	83
140		80.0	81.9	81.5	77.7	73.5	69.2	dB(A)	83
160		80.0	81.9	81.5	77.7	73.9	67.3	dB(A)	83

Sound spectrum, 30RQS

30RQS – Standard units									
	dB	Octave bands, Hz						Sound power levels	
		125	250	500	1k	2k	4k		
039		77.0	78.9	78.6	75.4	72.6	66.9	dB(A)	80
045		77.0	79.0	78.7	76.0	72.8	67.3	dB(A)	81
050		77.0	79.0	78.9	76.0	72.4	67.8	dB(A)	81
060		81.3	83.5	84.4	82.7	76.8	70.8	dB(A)	86
070		81.3	83.5	84.4	82.8	76.9	72.6	dB(A)	87
078		81.3	93.5	84.4	82.8	77.2	71.1	dB(A)	87
080		80.0	81.9	81.6	78.4	75.6	69.9	dB(A)	84
090		80.0	81.9	81.6	78.7	75.9	70.7	dB(A)	84
100		80.0	81.9	81.7	78.8	76.1	73.7	dB(A)	84
120		80.0	81.9	81.8	78.9	76.8	71.4	dB(A)	84
140		84.3	86.5	87.4	85.8	79.9	75.6	dB(A)	90
160		84.3	86.5	87.4	85.9	80.2	74.1	dB(A)	90

30RQS - Units with option 15LS (very low sound levels)									
	dB	Octave bands, Hz						Sound power levels	
		125	250	500	1k	2k	4k		
039		77.0	78.9	78.4	74.5	69.7	62.6	dB(A)	79
045		77.0	78.9	78.5	74.6	70.0	62.7	dB(A)	80
050		77.0	78.9	78.5	74.6	69.9	63.1	dB(A)	80
060		77.0	78.9	78.4	74.7	70.4	63.8	dB(A)	80
070		77.0	78.9	78.5	74.7	70.5	66.2	dB(A)	80
078		77.0	78.9	78.5	74.7	70.9	64.3	dB(A)	80
080		80.0	81.9	81.5	77.5	73.0	65.4	dB(A)	83
090		80.0	81.9	81.4	77.6	73.1	66.0	dB(A)	83
100		80.0	81.9	81.5	77.6	73.2	68.3	dB(A)	83
120		80.0	81.9	81.5	77.6	73.5	66.5	dB(A)	83
140		80.0	81.9	81.5	77.7	73.5	69.2	dB(A)	83
160		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		Maximum dual pump**	
	Minimum	Maximum*	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, full load***	°C	-10	46
Entering air temperature, part load***	°C	-10	48
Hydronic module****			
Entering air temperature			
Kit without pump	°C	-20	-
Kit with pump (option 116x)	°C	-10	-
Kit with pump (option 116x) and frost protection option to -20°C (option 42)	°C	-20	-

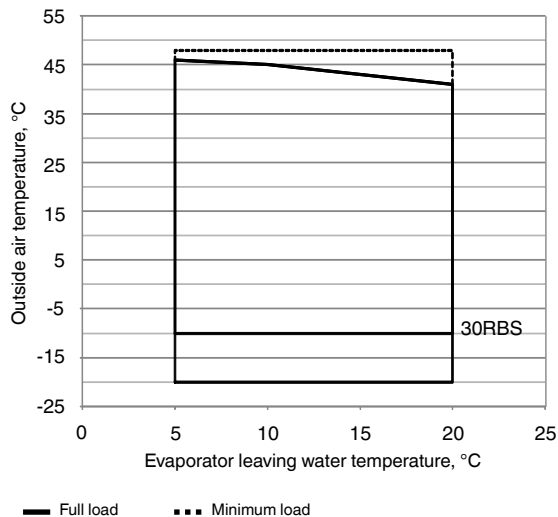
Note: Do not exceed the maximum operating temperature.

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

** For low-temperature applications, where the leaving water temperature is below 5°C, a frost protection solution must be used.

*** Ambient temperature: Please refer to option 20 for low-temperature applications (< -10°C). For transport and storage of the 30RBS 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.

**** Defines the frost-free temperature of the hydronic components for use without glycol.



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

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.

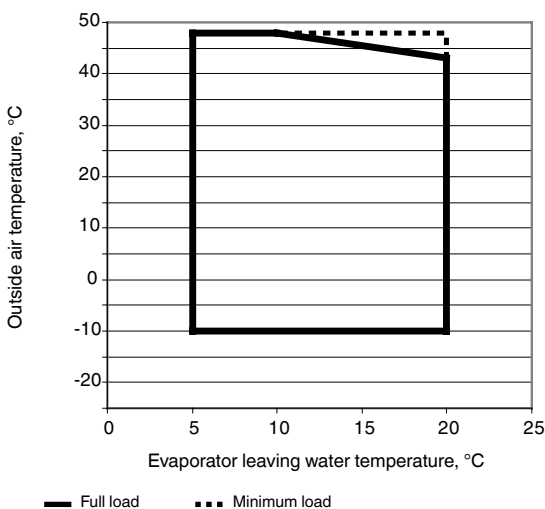
Operating range, standard unit, cooling mode

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
Hydronic module***		
Entering air temperature		
Kit without pump	°C -20	-
Kit with pump (option 116x)	°C 0	-
Kit with pump (option 116x) and frost protection option to -20°C (option 42)	°C -20	-

Note: Do not exceed the maximum operating temperature.

- * If the leaving water temperature is below 5°C, a frost protection solution must be used.
- ** For transport and storage of the 30RQS 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.
- *** Defines the frost-free temperature of the hydronic components for use without glycol.

30RQS (cooling mode)



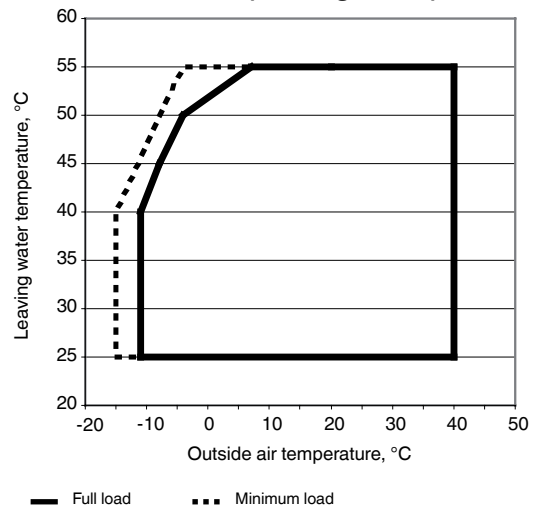
Operating range, standard unit, heating mode

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
Hydronic module*		
Entering air temperature		
Kit without pump	°C -20	-
Kit with pump (option 116x)	°C 0	-
Kit with pump (option 116x) and frost protection option to -20°C (option 42)	°C -20	-

Note: Do not exceed the maximum operating temperature.

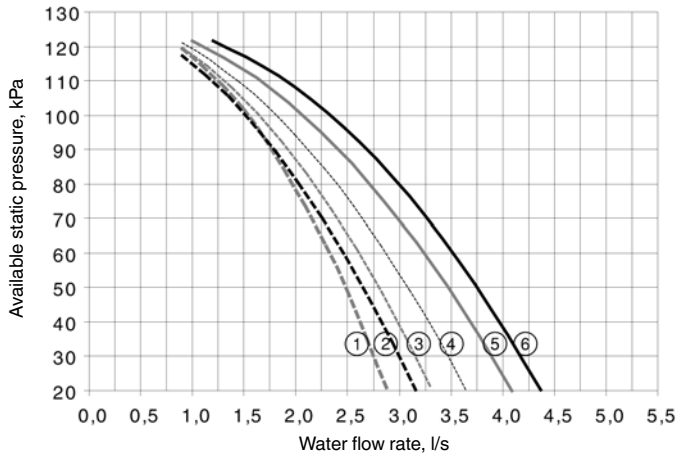
- * Defines the frost-free temperature of the hydronic components for use without glycol.

30RQS (heating mode)



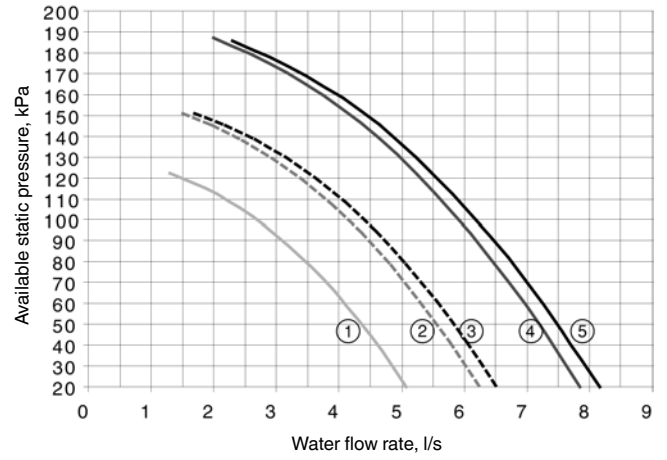
Available static system pressure, 30RBS

Low-pressure pump



Legend

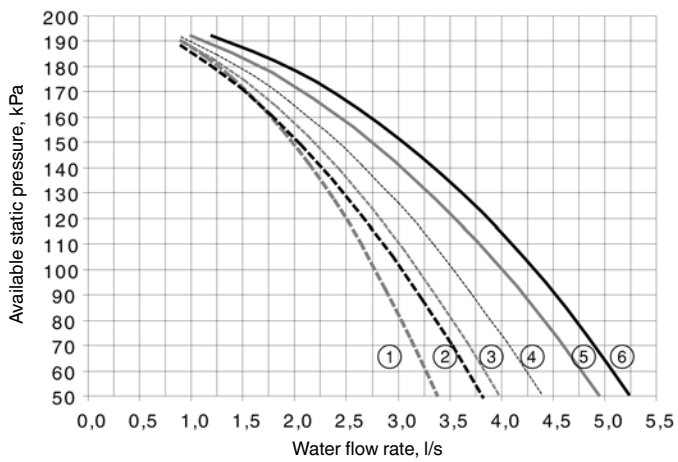
- 1. 30RBS 039
- 2. 30RBS 045
- 3. 30RBS 050
- 4. 30RBS 060
- 5. 30RBS 070
- 6. 30RBS 080



Legend

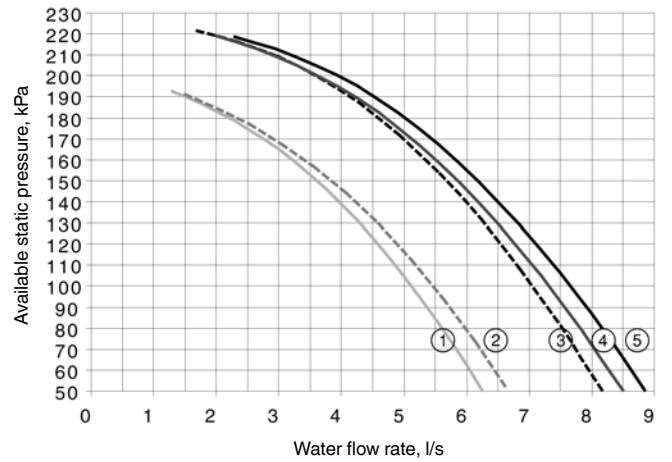
- 1. 30RBS 090
- 2. 30RBS 100
- 3. 30RBS 120
- 4. 30RBS 140
- 5. 30RBS 160

High-pressure pump



Legend

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

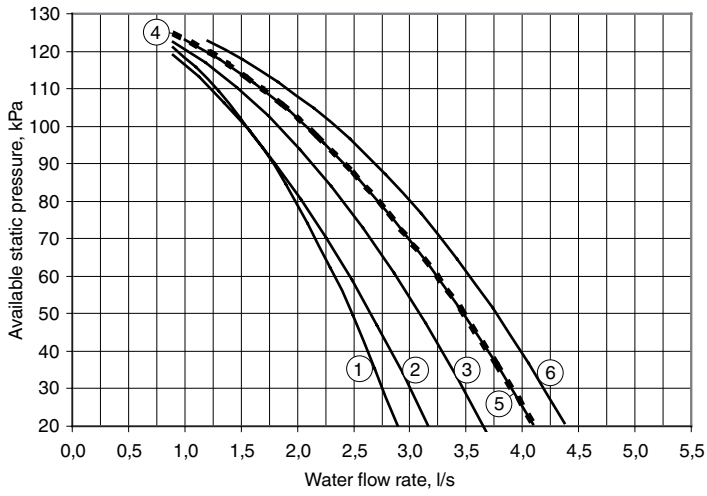


Legend

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

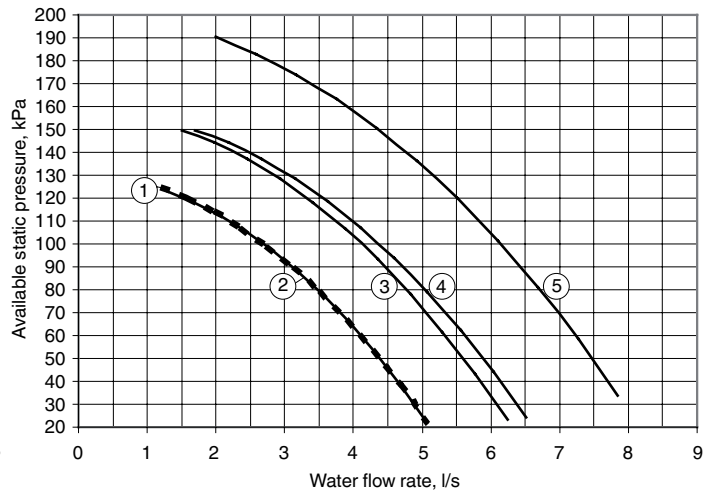
Available static system pressure, 30RQS

Low-pressure pump



Legend

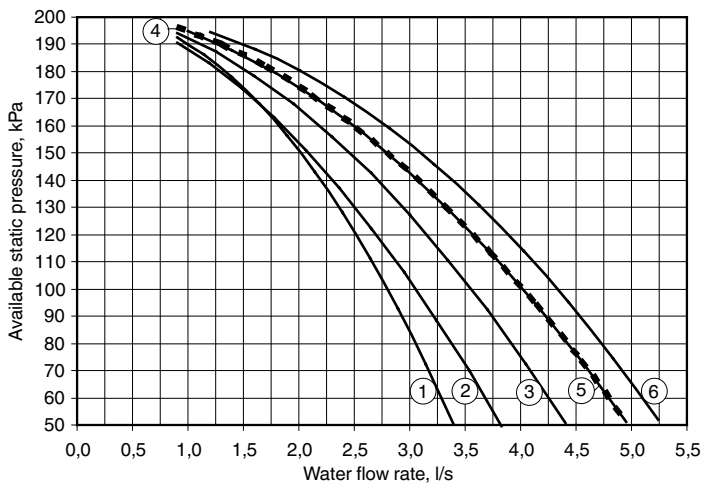
1. 30RQS 039
2. 30RQS 045
3. 30RQS 050
4. 30RQS 060
5. 30RQS 070
6. 30RQS 078



Legend

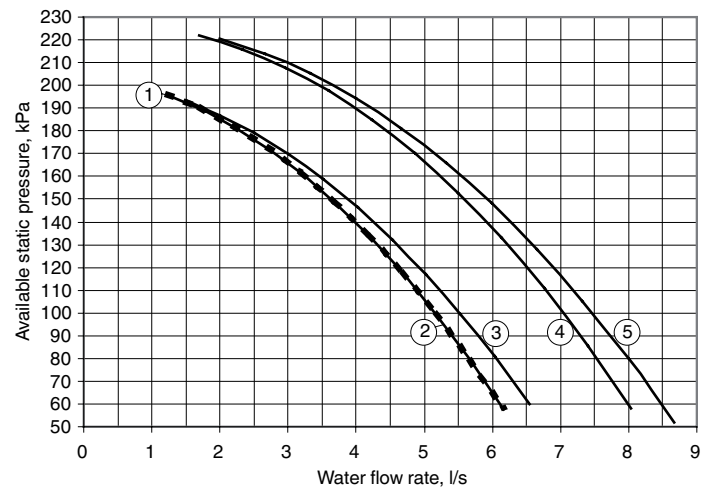
1. 30RQS 080
2. 30RQS 090
3. 30RQS 100
4. 30RQS 120
5. 30RQS 140

High-pressure pump



Legend

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

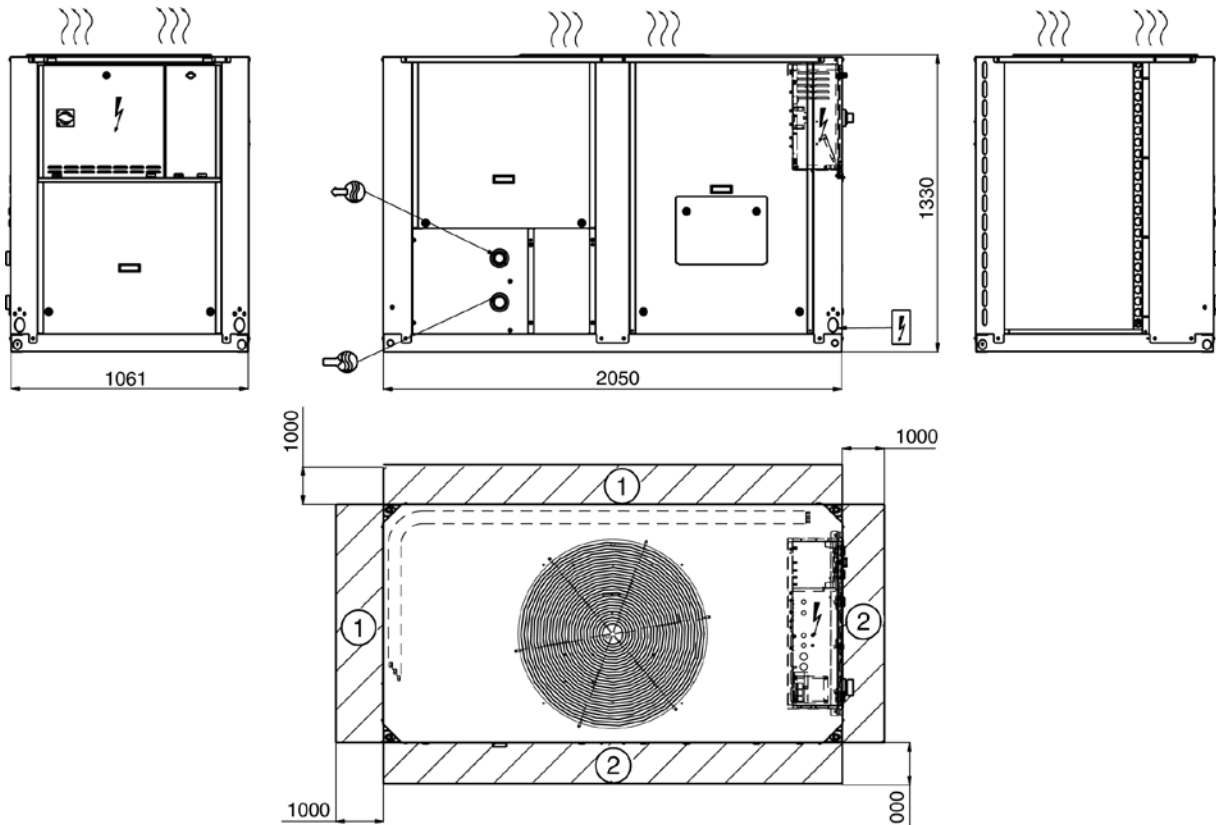


Legend

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

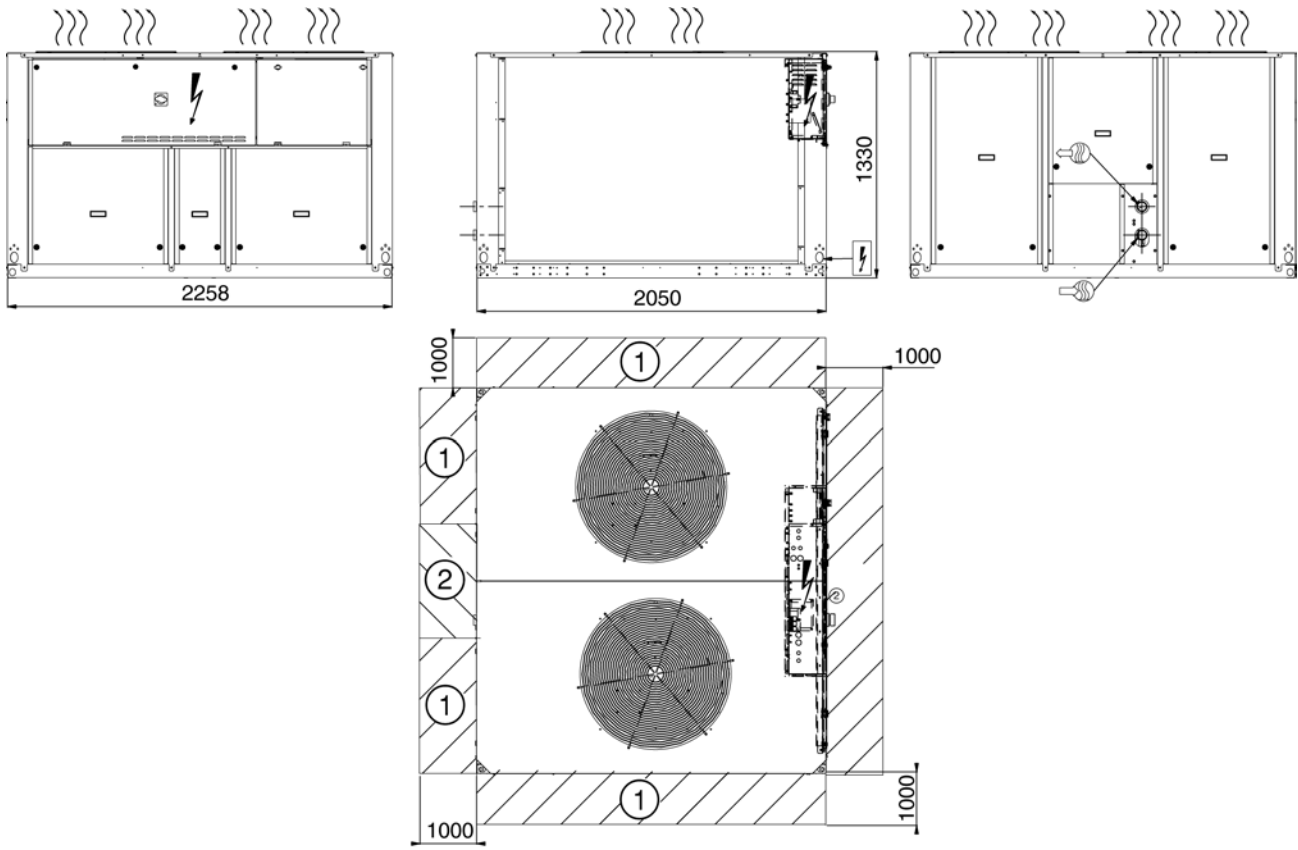
-  Control box
-  Water inlet
-  Water outlet
- ① Required clearances for air entry
- ② Recommended space for maintenance
-  Air outlet, do not obstruct
-  Power supply inlet

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

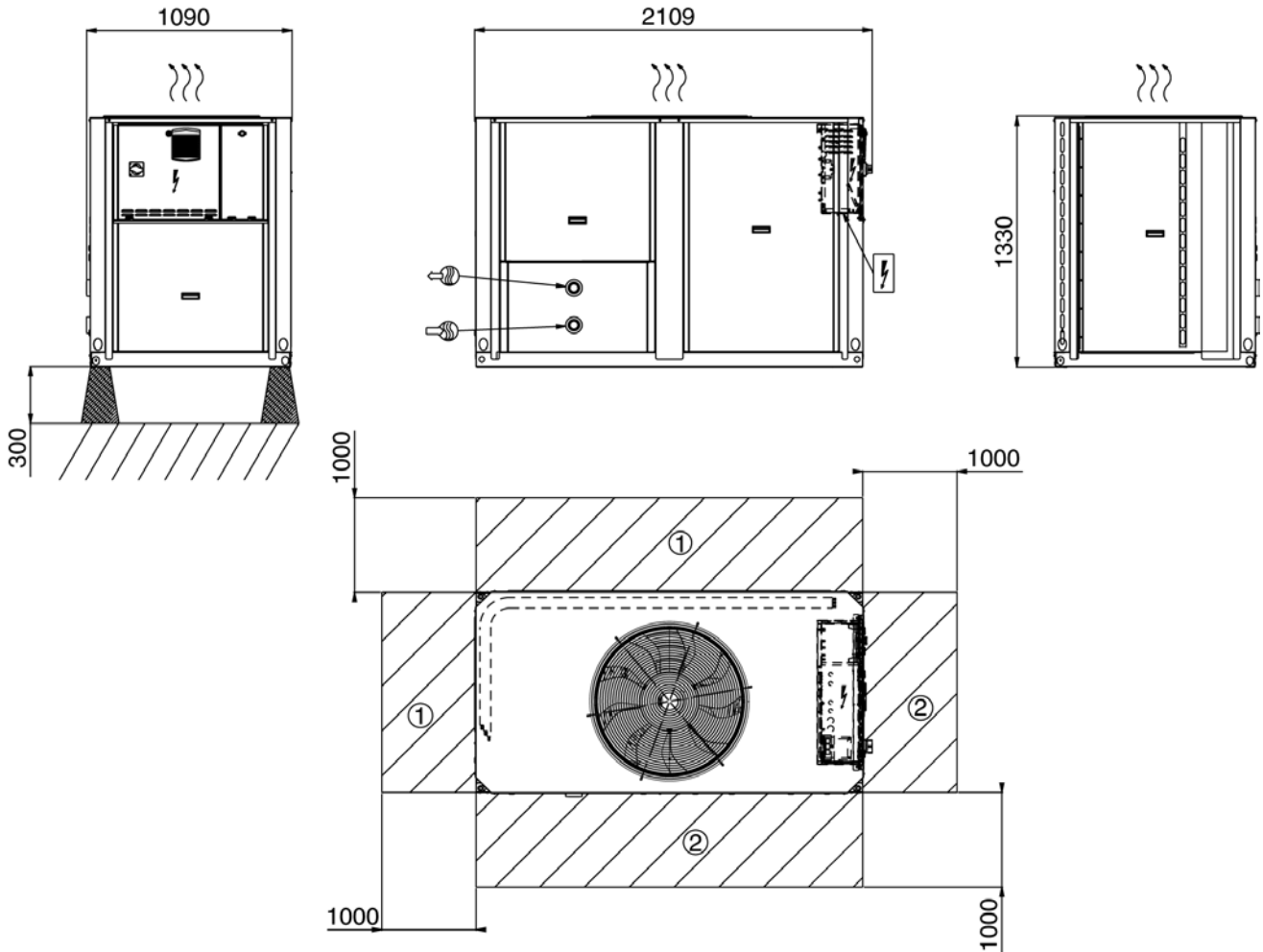
-  Control box
-  Water inlet
-  Water outlet
- ① Required clearances for air entry
- ② Recommended space for maintenance
-  Air outlet, do not obstruct
-  Power supply inlet

Notes:

- A Non-certified drawings.
Refer to the certified dimensional drawings supplied with the unit or available on request, when designing an installation.
- B For the location of fixing points, weight distribution and coordinates of the centre of gravity refer to the certified dimensional drawings.
- C In multiple-chiller installations (maximum four units), the side clearance between the units should be increased from 1000 to 2000 mm.
- D 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.

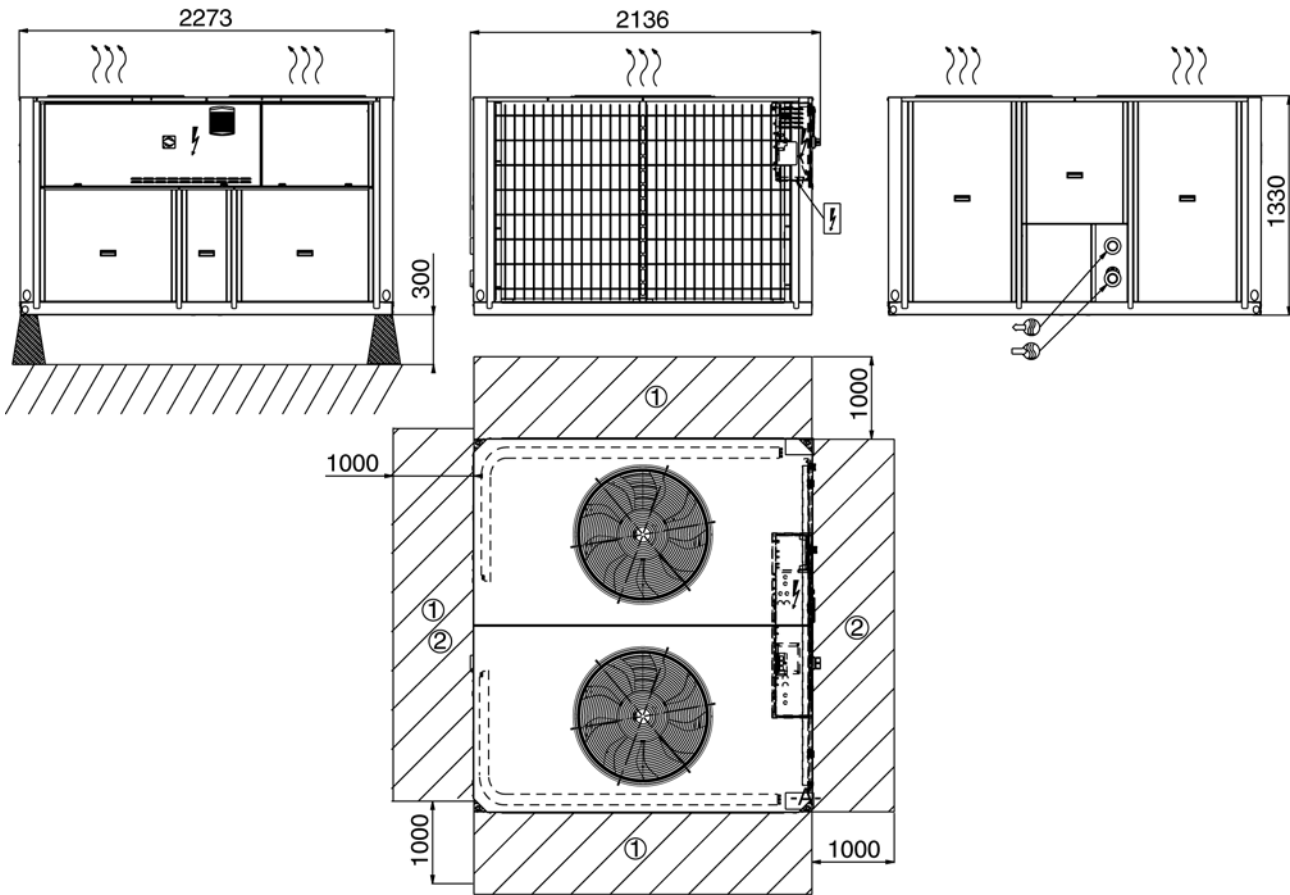
For the location of fixing points, weight distribution and coordinates of the centre of gravity refer to the certified dimensional drawings.

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

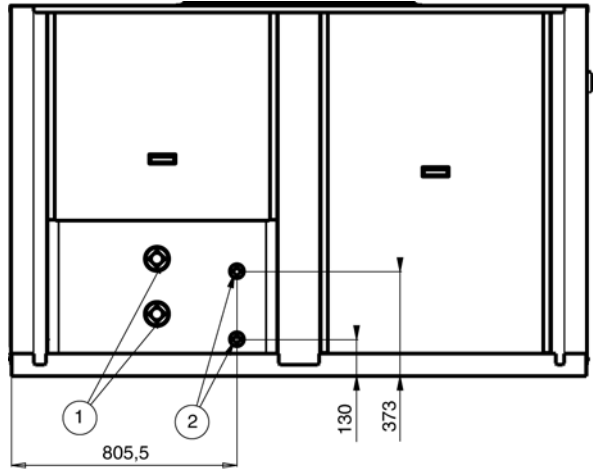
Notes:

- A Non-certified drawings.
Refer to the certified dimensional drawings supplied with the unit or available on request, when designing an installation.
- B For the location of fixing points, weight distribution and coordinates of the centre of gravity refer to the certified dimensional drawings.
- C In multiple-unit installations (maximum four units), the side clearance between the units should be increased from 1000 to 2000 mm.
- D The height of the solid surface must not exceed 2 m.

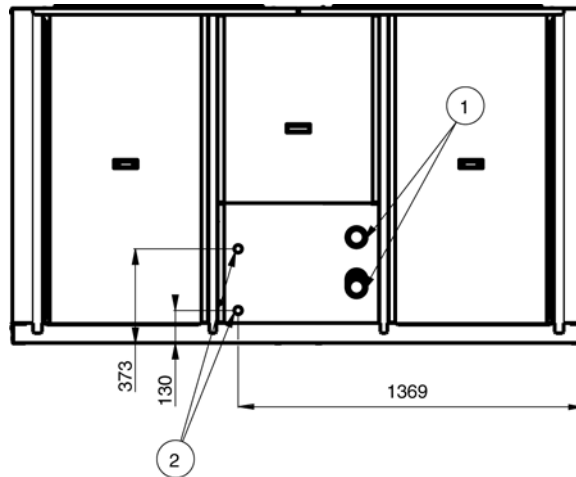
Dimensions/clearances for 30RBS/RQS units with option 49

Position of the desuperheater inlets and outlets

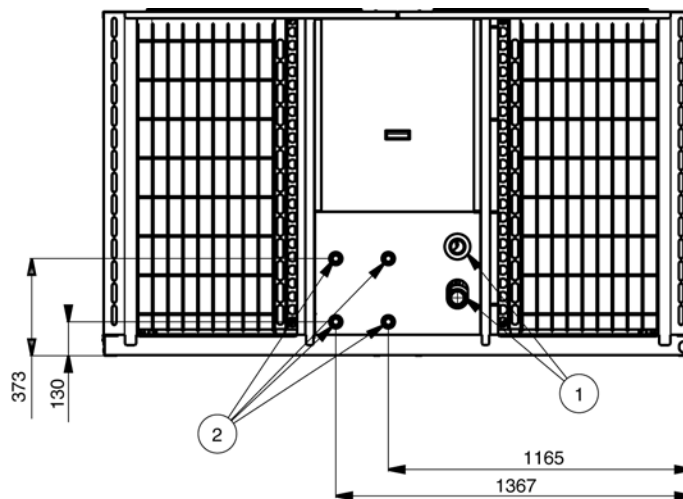
30RBS/RQS 039-080



30RBS/RQS 090-120



30RBS/RQS 140-160



① Unit water inlet and outlet

② Water inlet and outlet, unit with option 49

Cooling capacities in accordance with EN14511-3 : 2011

30RBS units

		Condenser entering air temperature, °C																							
		20				25				30				35				40				46			
		LWT °C	Qc kW	EER kW/kW	q l/s	Δp kPa	Qc kW	EER kW/kW	q l/s	Δp kPa	Qc kW	EER kW/kW	q l/s	Δp kPa	Qc kW	EER kW/kW	q l/s	Δp kPa	Qc kW	EER kW/kW	q l/s	Δp kPa	Qc kW	EER kW/kW	q l/s
039	5	42	3.92	1.99	51	41	3.49	1.92	48	39	3.12	1.85	44	37	2.74	1.76	40	35	2.35	1.66	35	32	1.90	1.51	29
045		47	3.96	2.26	60	45	3.50	2.18	57	44	3.07	2.10	53	41	2.65	1.99	48	38	2.24	1.84	42	34	1.80	1.64	34
050		56	3.89	2.68	73	54	3.43	2.57	68	51	2.99	2.45	62	48	2.57	2.30	55	45	2.16	2.13	48	40	1.73	1.90	38
060		63	3.87	3.02	75	61	3.43	2.91	70	58	2.98	2.77	64	54	2.54	2.58	56	50	2.13	2.37	48	44	1.68	2.10	38
070		75	3.91	3.59	80	72	3.47	3.44	74	68	3.04	3.27	67	64	2.61	3.06	59	59	2.21	2.83	51	53	1.77	2.52	41
080		87	3.79	4.15	89	83	3.39	3.98	81	80	2.99	3.79	74	75	2.62	3.59	66	71	2.26	3.37	58	65	1.86	3.08	48
090		94	3.90	4.50	61	90	3.47	4.34	57	87	3.04	4.15	52	81	2.61	3.90	47	75	2.21	3.61	40	67	1.76	3.22	32
100		107	3.91	5.08	64	102	3.48	4.87	59	98	3.06	4.64	54	92	2.64	4.35	48	85	2.25	4.04	42	76	1.81	3.60	34
120		127	3.79	6.05	76	121	3.37	5.77	69	115	2.96	5.47	62	108	2.57	5.13	55	100	2.20	4.76	47	90	1.74	4.27	38
140		149	3.88	6.98	84	143	3.45	6.68	77	136	3.01	6.35	70	127	2.58	5.94	61	118	2.18	5.49	53	105	1.78	4.89	42
160		171	3.72	8.15	93	164	3.32	7.82	86	157	2.94	7.45	78	148	2.57	7.06	70	139	2.21	6.63	62	128	1.82	6.07	52
039	7	45	4.07	2.11	57	43	3.63	2.04	53	41	3.25	1.96	49	40	2.86	1.88	45	37	2.47	1.76	39	34	2.00	1.61	32
045		50	4.10	2.39	66	48	3.63	2.31	62	46	3.19	2.22	58	44	2.76	2.11	53	41	2.34	1.95	46	36	1.89	1.74	38
050		60	4.02	2.86	81	57	3.56	2.74	75	54	3.10	2.61	69	51	2.67	2.45	61	47	2.26	2.27	53	42	1.80	2.02	43
060		68	4.04	3.24	84	65	3.59	3.12	78	62	3.12	2.97	72	58	2.66	2.77	63	53	2.24	2.54	54	47	1.77	2.25	43
070		79	4.04	3.79	87	75	3.60	3.63	80	72	3.16	3.45	73	67	2.72	3.23	64	62	2.30	2.99	56	55	1.84	2.66	45
080		91	3.89	4.35	96	87	3.48	4.17	88	83	3.08	3.97	80	79	2.70	3.76	72	74	2.34	3.53	63	68	1.93	3.23	53
090		99	4.03	4.77	67	96	3.61	4.60	63	92	3.16	4.40	58	86	2.72	4.14	51	80	2.30	3.83	44	72	1.85	3.43	36
100		113	4.02	5.38	70	108	3.58	5.15	65	103	3.15	4.90	59	97	2.72	4.60	52	90	2.32	4.27	46	80	1.88	3.82	37
120		134	3.91	6.42	84	128	3.47	6.11	76	121	3.05	5.79	68	114	2.66	5.43	60	106	2.28	5.04	52	95	1.85	4.52	42
140		158	4.03	7.39	92	151	3.59	7.08	85	144	3.14	6.73	77	134	2.70	6.30	68	124	2.28	5.82	58	111	1.82	5.18	47
160		179	3.82	8.56	101	172	3.41	8.21	93	164	3.02	7.82	85	155	2.65	7.41	76	146	2.29	6.96	67	134	1.89	6.37	57
039	10	48	4.27	2.29	67	47	3.82	2.22	62	45	3.43	2.14	57	43	3.03	2.04	52	41	2.63	1.93	46	37	2.14	1.77	39
045		54	4.32	2.60	75	52	3.83	2.51	70	50	3.37	2.42	66	48	2.92	2.30	60	44	2.48	2.13	53	40	2.02	1.90	43
050		65	4.20	3.14	95	63	3.73	3.01	88	60	3.26	2.86	80	56	2.81	2.68	71	52	2.39	2.48	61	46	1.92	2.21	49
060		75	4.28	3.58	99	72	3.81	3.44	92	68	3.32	3.28	84	64	2.84	3.06	74	59	2.40	2.82	64	52	1.91	2.50	51
070		85	4.14	4.08	98	81	3.75	3.92	91	78	3.34	3.74	83	73	2.89	3.50	74	67	2.45	3.24	64	60	1.97	2.88	51
080		97	4.04	4.66	108	93	3.61	4.46	99	89	3.19	4.25	90	84	2.81	4.02	80	79	2.43	3.77	71	43	2.67	2.04	20
090		108	4.21	5.18	77	104	3.77	4.99	72	99	3.32	4.78	66	94	2.87	4.50	59	87	2.45	4.18	51	78	1.97	3.75	42
100		122	4.16	5.83	80	117	3.72	5.59	74	111	3.27	5.31	67	104	2.84	4.98	59	97	2.42	4.62	52	87	1.97	4.13	42
120		145	4.08	6.97	96	139	3.63	6.64	88	131	3.20	6.28	79	123	2.79	5.90	70	114	2.40	5.47	60	103	1.95	4.91	49
140		170	4.18	7.99	105	164	3.78	7.69	97	156	3.33	7.31	88	146	2.87	6.84	78	135	2.43	6.33	67	120	1.95	5.63	54
160		192	3.97	9.18	114	184	3.54	8.79	104	175	3.14	8.38	95	166	2.75	7.93	85	156	2.39	7.45	75	116	2.21	5.52	42
039	15	55	4.57	2.61	85	53	4.10	2.54	80	51	3.70	2.44	73	49	3.29	2.33	67	46	2.87	2.20	59	42	2.36	2.02	50
045		61	4.66	2.97	92	59	4.14	2.86	86	57	3.65	2.76	81	54	3.17	2.62	74	50	2.71	2.44	65	45	2.22	2.18	53
050		75	4.44	3.60	119	72	3.96	3.45	110	68	3.48	3.28	100	64	3.02	3.07	88	59	2.58	2.85	77	33	3.09	1.57	26
060		86	4.67	4.15	126	83	4.16	3.99	117	79	3.62	3.80	107	74	3.10	3.54	94	68	2.64	3.27	81	36	2.89	1.70	24
070		94	4.15	4.53	116	90	3.74	4.34	107	85	3.36	4.13	97	81	2.98	3.89	87	75	2.62	3.64	77	40	2.78	1.91	23
080		108	4.27	5.18	131	103	3.81	4.97	120	98	3.38	4.72	108	93	2.97	4.46	96	87	2.58	4.18	85	51	3.06	2.46	29
090		122	4.46	5.91	96	118	4.01	5.69	89	113	3.53	5.44	82	106	3.06	5.12	73	99	2.63	4.75	63	89	2.14	4.27	52
100		138	4.37	6.62	98	132	3.91	6.34	90	125	3.45	6.00	82	118	3.00	5.62	72	109	2.58	5.21	63	78	2.79	3.72	34
120		165	4.33	7.93	120	157	3.86	7.56	110	149	3.41	7.15	98	140	2.99	6.70	87	130	2.58	6.21	75	91	2.71	4.38	38
140		189	4.18	8.89	125	181	3.78	8.53	115	172	3.39	8.11	105	163	3.00	7.66	94	152	2.64	7.17	83	108	2.34	5.06	42
160		213	4.19	10.21	136	204	3.74	9.78	125	194	3.31	9.31	113	183	2.92	8.80	102	172	2.54	8.25	89	105	3.08	5.01	34
039	18	59	4.73	2.82	98	57	4.26	2.74	92	55	3.85	2.64	85	53	3.43	2.52	77	50	3.00	2.38	69	46	2.49	2.19	57
045		66	4.85	3.21	104	64	4.32	3.09	97	62	3.81	2.99	91	59	3.32	2.84	83	54	2.85	2.63	73	49	2.34	2.36	60
050		80	4.62	3.89	134	77	4.10	3.73	124	73	3.59	3.53	112	68	3.12	3.31	100	63	2.67	3.06	86	36	3.30	1.72	30
060		94	4.91	4.53	145	90	4.41	4.36	135	86	3.87	4.16	124	81	3.31	3.88	109	74	2.79	3.57	94	39	3.10	1.85	28
070		99	4.11	4.81	127	95	3.72	4.59	117	90	3.34	4.35	105	85	2.97	4.10	94	79	2.62	3.82	83	44	2.96	2.11	27
080		114	4.39	5.51	146	109	3.92	5.27	133	104	3.47	5.01	120	98	3.06	4.72	106	92	2.66	4.42	93	57	3.30	2.73	35
090		131	4.58	6.36	108	127	4.13	6.12	101	121	3.64	5.85	93	114	3.17	5.49	82	106	2.72	5.10	71	95	2.23	4.58	58
100		148	4.46	7.12	110	142	4.00	6.81	101	134	3.54	6.44	91	126	3.09	6.02	81	116	2.65	5.57	70	84	2.95	4.03	38
120		177	4.45	8.51	136	169	3.98	8.13	124	160	3.52	7.69	111	150	3.09	7.20	98	139	2.68	6.67	84	99	2.85	4.74	43
140		199	4.15	9.43	137	191	3.76	9.02	126	181	3.37	8.56	114	171	2.99	8.06	102	160	2.63	7.53	89	88	2.95	4.11	28
160		225	4.31	10.85	151	216	3.85	10.38	138	205	3.41	9.87	125	194	3.00	9.31	112	182	2.61	8.72	98	115	3.29	5.52	40

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

Cooling capacities

30RBS units

LWT °C	Condenser entering air temperature, °C																							
	20				25				30				35				40				46			
	Qc kW	EER kW/kW	q l/s	Δp kPa	Qc kW	EER kW/kW	q l/s	Δp kPa	Qc kW	EER kW/kW	q l/s	Δp kPa	Qc kW	EER kW/kW	q l/s	Δp kPa	Qc kW	EER kW/kW	q l/s	Δp kPa	Qc kW	EER kW/kW	q l/s	Δp kPa
039 5	42	4.07	1.99	51	41	3.61	1.92	48	39	3.21	1.85	44	37	2.81	1.76	40	35	2.40	1.66	35	32	1.93	1.51	29
045	47	4.13	2.26	60	46	3.63	2.18	57	44	3.17	2.10	53	42	2.72	1.99	48	39	2.29	1.84	42	34	1.84	1.64	34
050	57	4.07	2.68	73	54	3.57	2.57	68	52	3.09	2.45	62	48	2.64	2.30	55	45	2.21	2.13	48	40	1.76	1.90	38
060	64	4.04	3.02	75	61	3.57	2.91	70	59	3.08	2.77	64	55	2.60	2.58	56	50	2.17	2.37	48	44	1.71	2.10	38
070	75	4.08	3.59	80	72	3.61	3.44	74	69	3.14	3.27	67	64	2.68	3.06	59	59	2.26	2.83	51	53	1.80	2.52	41
080	88	3.96	4.15	89	84	3.52	3.98	81	80	3.09	3.79	74	76	2.70	3.59	66	71	2.32	3.37	58	65	1.90	3.08	48
090	95	4.03	4.50	61	91	3.58	4.34	57	87	3.12	4.15	52	82	2.67	3.90	47	76	2.25	3.61	40	68	1.79	3.22	32
100	107	4.04	5.08	64	103	3.58	4.87	59	98	3.14	4.64	54	92	2.70	4.35	48	86	2.29	4.04	42	76	1.83	3.60	34
120	128	3.92	6.05	76	122	3.47	5.77	69	115	3.03	5.47	62	108	2.62	5.13	55	100	2.24	4.76	47	90	1.80	4.27	38
140	150	4.02	6.98	84	144	3.55	6.68	77	137	3.09	6.35	70	128	2.64	5.94	61	118	2.22	5.49	53	105	1.77	4.89	42
160	172	3.86	8.15	93	165	3.43	7.82	86	158	3.02	7.45	78	149	2.63	7.06	70	140	2.26	6.63	62	128	1.85	6.07	52
039 7	45	4.24	2.11	57	43	3.77	2.04	53	42	3.36	1.96	49	40	2.94	1.88	45	37	2.52	1.76	39	34	2.03	1.61	32
045	50	4.29	2.39	66	48	3.78	2.31	62	47	3.31	2.22	58	44	2.84	2.11	53	41	2.40	1.95	46	37	1.93	1.74	38
050	60	4.22	2.86	81	58	3.71	2.74	75	55	3.22	2.61	69	51	2.75	2.45	61	48	2.31	2.27	53	42	1.84	2.02	43
060	68	4.24	3.24	84	66	3.74	3.12	78	63	3.23	2.97	72	58	2.74	2.77	63	54	2.29	2.54	54	48	1.81	2.25	43
070	79	4.24	3.79	87	76	3.75	3.63	80	72	3.27	3.45	73	68	2.80	3.23	64	63	2.36	2.99	56	56	1.88	2.66	45
080	92	4.08	4.35	96	88	3.62	4.17	88	84	3.18	3.97	80	79	2.78	3.76	72	75	2.39	3.53	63	68	1.97	3.23	53
090	100	4.18	4.77	67	96	3.73	4.60	63	92	3.25	4.40	58	87	2.79	4.14	51	80	2.35	3.83	44	72	1.88	3.43	36
100	114	4.16	5.38	70	109	3.69	5.15	65	104	3.23	4.90	59	97	2.79	4.60	52	90	2.37	4.27	46	81	1.91	3.82	37
120	135	4.06	6.42	84	129	3.59	6.11	76	122	3.14	5.79	68	114	2.72	5.43	60	106	2.32	5.04	52	95	1.88	4.52	42
140	159	4.19	7.39	92	152	3.71	7.08	85	144	3.23	6.73	77	135	2.76	6.30	68	125	2.32	5.82	58	111	1.85	5.18	47
160	181	3.98	8.56	101	173	3.53	8.21	93	165	3.11	7.82	85	156	2.71	7.41	76	147	2.33	6.96	67	134	1.92	6.37	57
039 10	49	4.47	2.29	67	47	3.98	2.22	62	45	3.56	2.14	57	43	3.13	2.04	52	41	2.70	1.93	46	37	2.19	1.77	39
045	54	4.54	2.60	75	53	4.00	2.51	70	51	3.50	2.42	66	48	3.01	2.30	60	45	2.55	2.13	53	40	2.06	1.90	43
050	66	4.43	3.14	95	63	3.91	3.01	88	60	3.40	2.86	80	56	2.91	2.68	71	52	2.45	2.48	61	46	1.96	2.21	49
060	75	4.52	3.58	99	72	3.99	3.44	92	69	3.45	3.28	84	64	2.94	3.06	74	59	2.46	2.82	64	53	1.95	2.50	51
070	85	4.36	4.08	98	82	3.92	3.92	91	78	3.48	3.74	83	73	2.98	3.50	74	68	2.52	3.24	64	60	2.01	2.88	51
080	98	4.25	4.66	108	94	3.77	4.46	99	90	3.32	4.25	90	85	2.90	4.02	80	80	2.50	3.77	71	43	2.72	2.04	20
090	109	4.38	5.18	77	105	3.91	4.99	72	100	3.42	4.78	66	94	2.94	4.50	59	88	2.50	4.18	51	78	2.00	3.75	42
100	123	4.33	5.83	80	118	3.85	5.59	74	112	3.37	5.31	67	105	2.91	4.98	59	97	2.47	4.62	52	87	2.00	4.13	42
120	147	4.25	6.97	96	140	3.76	6.64	88	132	3.30	6.28	79	124	2.86	5.90	70	115	2.45	5.47	60	103	1.99	4.91	49
140	171	4.37	7.99	105	165	3.93	7.69	97	157	3.44	7.31	88	147	2.95	6.84	78	136	2.49	6.33	67	121	1.98	5.63	54
160	193	4.15	9.18	114	185	3.68	8.79	104	177	3.24	8.38	95	167	2.83	7.93	85	157	2.44	7.45	75	116	2.25	5.52	42
039 15	55	4.83	2.61	85	54	4.31	2.54	80	52	3.87	2.44	73	49	3.42	2.33	67	47	2.96	2.20	59	43	2.42	2.02	50
045	62	4.95	2.97	92	60	4.36	2.86	86	58	3.82	2.76	81	55	3.29	2.62	74	51	2.80	2.44	65	46	2.28	2.18	53
050	76	4.73	3.60	119	72	4.19	3.45	110	69	3.66	3.28	100	64	3.14	3.07	88	60	2.66	2.85	77	33	3.15	1.57	26
060	87	4.98	4.15	126	84	4.41	3.99	117	80	3.81	3.80	107	74	3.23	3.54	94	69	2.73	3.27	81	36	2.95	1.70	24
070	95	4.38	4.53	116	91	3.93	4.34	107	86	3.51	4.13	97	81	3.09	3.89	87	76	2.70	3.64	77	40	2.83	1.91	23
080	109	4.53	5.18	131	104	4.01	4.97	120	99	3.53	4.72	108	94	3.08	4.46	96	88	2.67	4.18	85	52	3.13	2.46	29
090	123	4.67	5.91	96	119	4.18	5.69	89	114	3.66	5.44	82	107	3.16	5.12	73	99	2.69	4.75	63	89	2.18	4.27	52
100	140	4.57	6.62	98	133	4.07	6.34	90	126	3.57	6.00	82	118	3.09	5.62	72	110	2.64	5.21	63	78	2.84	3.72	34
120	167	4.57	7.93	120	159	4.03	7.56	110	150	3.54	7.15	98	141	3.08	6.70	87	130	2.64	6.21	75	92	2.76	4.38	38
140	190	4.40	8.89	125	182	3.95	8.53	115	174	3.52	8.11	105	164	3.10	7.66	94	153	2.71	7.17	83	108	2.38	5.06	42
160	215	4.43	10.21	136	206	3.92	9.78	125	196	3.45	9.31	113	185	3.01	8.80	102	173	2.61	8.25	89	105	3.13	5.01	34
039 18	60	5.04	2.82	98	58	4.50	2.74	92	56	4.04	2.64	85	53	3.58	2.52	77	50	3.11	2.38	69	46	2.56	2.19	57
045	67	5.18	3.21	104	65	4.57	3.09	97	62	4.01	2.99	91	59	3.46	2.84	83	55	2.95	2.63	73	49	2.40	2.36	60
050	81	4.95	3.89	134	78	4.36	3.73	124	74	3.79	3.53	112	69	3.26	3.31	100	64	2.77	3.06	86	36	3.38	1.72	30
060	95	5.30	4.53	145	92	4.71	4.36	135	87	4.09	4.16	124	82	3.47	3.88	109	75	2.90	3.57	94	39	3.17	1.85	28
070	100	4.35	4.81	127	96	3.91	4.59	117	91	3.49	4.35	105	85	3.08	4.10	94	80	2.70	3.82	83	44	3.02	2.11	27
080	116	4.69	5.51	146	111	4.15	5.27	133	105	3.64	5.01	120	99	3.18	4.72	106	93	2.75	4.42	93	57	3.38	2.73	35
090	133	4.82	6.36	108	128	4.32	6.12	101	122	3.79	5.85	93	115	3.27	5.49	82	106	2.80	5.10	71	96	2.27	4.58	58
100	150	4.69	7.12	110	143	4.18	6.81	101	135	3.68	6.44	91	127	3.18	6.02	81	117	2.72	5.57	70	85	3.01	4.03	38
120	179	4.72	8.51	136	171	4.19	8.13	124	161	3.68	7.69	111	151	3.20	7.20	98	140	2.75	6.67	84	99	2.91	4.74	43
140	202	4.38	9.43	137	193	3.94	9.02	126	183	3.51	8.56	114	172	3.09	8.06	102	161	2.71	7.53	89	88	3.00	4.11	28
160	228	4.59	10.85	151	218	4.06	10.38	138	207	3.56	9.87	125	196	3.11	9.31	112	183	2.69	8.72	98	116	3.36	5.52	40

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 (m² 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

LWT °C		Condenser entering air temperature, °C																							
		20				25				30				35				40				46			
		Qc	EER	q	Δp	Qc	EER	q	Δp	Qc	EER	q	Δp	Qc	EER	q	Δp	Qc	EER	q	Δp	Qc	EER	q	Δp
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	2.93	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							

Cooling capacities

30RQS units

LWT °C		Condenser entering air temperature, °C																							
		20				25				30				35				40				46			
		Qc kW	EER kW/kW	q l/s	Δp kPa	Qc kW	EER kW/kW	q l/s	Δp kPa	Qc kW	EER kW/kW	q l/s	Δp kPa	Qc kW	EER kW/kW	q l/s	Δp kPa	Qc kW	EER kW/kW	q l/s	Δp kPa	Qc kW	EER kW/kW	q l/s	Δp 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	51
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																									

Heating capacities in accordance with EN14511-3 : 2011

30RQS units

LWT °C		Outside air dry-bulb (wet-bulb) temperature, °C																							
		-15 (-16)				-10 (-11)				-7 (-8)				2 (1)				7 (6)				12 (11)			
		Qh	COP	q	Δp	Qh	COP	q	Δp	Qh	COP	q	Δp	Qh	COP	q	Δp	Qh	COP	q	Δp	Qh	COP	q	Δp
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
1																									

Heating capacities

30RQS units

LWT °C		Outside air dry-bulb (wet-bulb) temperature, °C																							
		-15 (-16)				-10 (-11)				-7 (-8)				2 (1)				7 (6)				12 (11)			
		Qh	COP	q	Δp	Qh	COP	q	Δp	Qh	COP	q	Δp	Qh	COP	q	Δp	Qh	COP	q	Δp	Qh	COP	q	Δp
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
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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.



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