



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

PRO-DIALOG

AQUASNAP™



www.eurovent-certification.com
www.certiflash.com



Quality
Management
Systems



30RB/RQ 017-033

Nominal cooling capacity 16-33 kW

Nominal heating capacity 16-33 kW

The Aquasnap liquid chiller/heat pump range was designed for commercial applications such as the air conditioning of offices and hotels etc.

The new Aquasnap units integrate the latest technological innovations:

- ozone-friendly refrigerant R410A
- scroll compressors
- low-noise fans
- auto-adaptive microprocessor control

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

Features

Quiet operation

- Compressors
 - Low-noise scroll compressors with low vibration levels
 - The compressor assembly is installed on an independent chassis and supported by anti-vibration mountings
- Air heat exchanger section
 - Vertical air heat exchanger coils
 - Anti-vibration protection grilles protect the heat exchanger against possible shocks.
 - The latest-generation low-noise fans are now even quieter and do not generate intrusive low-frequency noise
 - Rigid fan installation for reduced start-up noise

Easy and fast installation

- Integrated hydronic module
 - High-pressure centrifugal water pump

Access panels, sizes 017-021



- Water filter protecting the water pump against circulating debris
- High-capacity membrane expansion tank ensures pressurisation of the water circuit
- Overpressure valve, set to 4 bar
- Pressure gauge to measure the system pressure.
- Automatic purge valve positioned at the highest point of the hydronic module to remove air from the system.
- Thermal insulation and frost protection down to -10°C, using an electric resistance heater and pump cycling.
- Integrated water fill system to ensure correct water pressure (option/accessory)
- Physical features
 - With its small footprint the unit blends in with any architectural styles.
 - The unit is enclosed by easily removable panels, covering all components (except air heat exchanger and fans).
- Simplified electrical connections
 - A single power supply point (power supply without neutral available as an option)
 - 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

- Increased energy efficiency at part load
 - Eurovent energy efficiency class A and B (in accordance with EN14511-3:2011) in cooling and heating mode. The exceptionally high energy efficiency of the Aquasnap unit is the result of a long qualification and optimisation process.
- 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)
- Leak-tight refrigerant circuit
 - Brazed refrigerant connections for increased leak-tightness
 - Verification of pressure transducers and temperature sensors without transferring refrigerant charge

Hydronic module, sizes 026-033



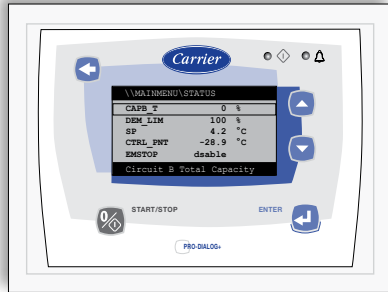
Superior reliability

- State-of-the-art concept
 - Cooperation with specialist laboratories and use of limit simulation tools (finite element calculations) for the design of the critical components, e.g. motor supports, suction/discharge piping etc.
- Auto-adaptive control
 - Control algorithm prevents excessive compressor cycling and permits reduction of the water quantity in the hydronic circuit (Carrier patent)
- 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.
 - Change-over based on the outside air temperature
- **Integrated features**
 - Night mode: capacity and fan speed limitation for reduced noise level
- **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)
- Alert indication: this volt-free contact indicates the presence of a minor fault
- Alarm indication: this volt-free contact indicates the presence of a major fault that has led to the shut-down of the unit
- 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
- Unit capacity: this analogue output (0-10 V) gives an immediate indication of the unit capacity
- Compressor operation: this contact signals that the compressor is in operation

Remote interface (accessory)

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

Interface access, sizes 026-033



Options and accessories

Options	Description	Advantages	Use
Unit without hydronic module	Unit without hydronic module	The pump can be remote from the unit	30RB/RQ 017-033
Integrated water fill system	Designed for units with hydronic module	Unit adds the water into the circuit	30RB/RQ 017-033
Power supply without neutral	The control box does not include the neutral connection (400 V- 3 ph - 50 Hz)	Used, if neutral is not required	30RB/RQ 017-033
Accessories	Description	Advantages	Use
JBus gateway	Two-directional communications board, complies with JBus protocol	Easy connection by communication bus to a building management system	30RB/RQ 017-033
BacNet gateway	Two-directional communications board, complies with BacNet protocol	Easy connection by communication bus to a building management system	30RB/RQ 017-033
LonTalk gateway	Two-directional communications board, complies with LonTalk protocol	Easy connection by communication bus to a building management system	30RB/RQ 017-033
Remote interface	Remotely installed user interface	Remote unit control up to 300 m	30RB/RQ 017-033
Integrated water fill system	Designed for units with hydronic module	Unit adds the water into the circuit	30RB/RQ 017-033

Hydronic module

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

The water heat exchanger and the hydronic module are protected against frost down to -10°C, using an electric resistance heater (standard) and pump cycling.

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

Physical and electrical data

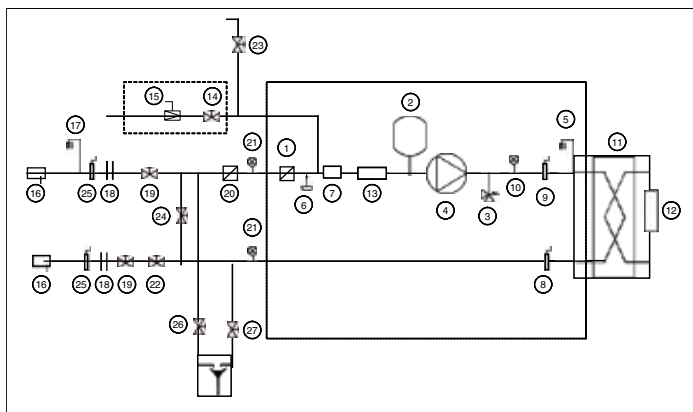
These are the same as for the standard unit except:

30RB/RQ - units with hydronic module		017	021	026	033
Hydronic module					
Expansion tank volume	l	5	5	8	8
Maximum water-side operating pressure	kPa	400	400	400	400
Pumps					
Water pump		Pump, screen filter, expansion tank, flow switch, pressure gauge, automatic purge valve, safety valve			
Power input*	kW	0.54	0.59	0.99	1.10
Nominal operating current draw*	A	1.30	1.40	2.40	2.60

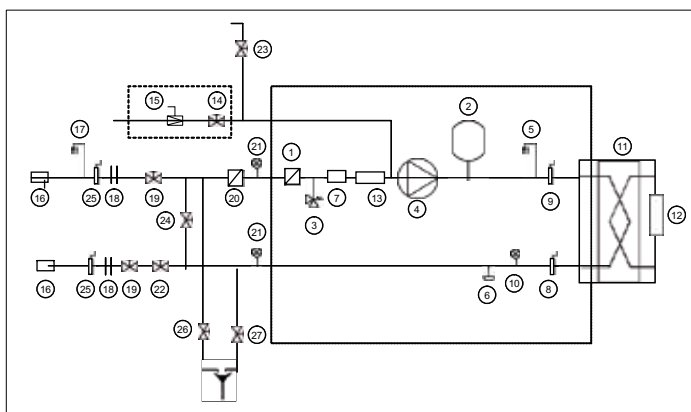
* Standard Eurovent conditions: water heat exchanger entering/leaving water temperature 12°C/7°C, outside air temperature 35°C.

Typical hydronic circuit diagram

17-21 kW



26-33 kW



— Hydronic module (unit with hydronic module)
 - - - - - Automatic water fill system option

Legend

Components of the unit and hydronic module

- 1 Screen filter
- 2 Expansion tank
- 3 Safety valve
- 4 High-pressure pump
- 5 Air purge
- 6 Water drain valve
- 7 Flow sensor
- 8 Plate heat exchanger leaving temperature sensor
- 9 Plate heat exchanger entering temperature sensor
- 10 Pressure gauge
- 11 Plate heat exchanger
- 12 Heat exchanger frost protection heater
- 13 Pipe frost protection heater
- 14 Shut-off valve (automatic water fill option)
- 15 Pressure reducer (automatic water fill option)

System components

- 16 Temperature sensor well
- 17 Air purge
- 18 Flexible connections
- 19 Shut-off valve
- 20 Screen filter (obligatory for a unit without hydronic module)
- 21 Pressure gauge
- 22 Flow control valve (factory-supplied for field installation)
- 23 Charge valve
- 24 Frost protection bypass (when shut-off valves are closed in winter)
- 25 Pressure sensor
- 26 System drain valves
- 27 Plate heat exchanger drain valve

Physical data, 30RB units

30RB		017	021	026	033
 Air conditioning application as per EN14511-3:2011*					
Condition 1					
Nominal cooling capacity	kW	16.4	21.4	27.3	33.3
EER	kW/kW	3.04	3.11	3.08	3.28
Eurovent class, cooling		B	A	B	A
ESEER	kW/kW	3.46	3.47	3.44	3.62
Condition 2					
Nominal cooling capacity	kW	22.7	29.5	38.6	45.8
EER	kW/kW	3.80	3.86	4.01	4.11
ESEER	kW/kW	A	A	A	A
Air conditioning application					
Condition 1					
Nominal cooling capacity	kW	16.6	21.6	27.7	33.6
EER	kW/kW	3.15	3.25	3.24	3.45
ESEER	kW/kW	3.61	3.64	3.65	3.84
Condition 2					
Nominal cooling capacity	kW	22.9	29.9	39.2	46.5
EER	kW/kW	4.03	4.12	4.37	4.46
Operating weight**					
Standard unit, with/without hydronic module	kg	189/173	208/193	255/237	280/262
Sound power level***					
	dB(A)	72	74	78	78
Sound pressure level****					
	dB(A)	40	42	46	46
Dimensions					
Length x depth x height	mm	1136 x 584 x 1579		1002 x 824 x 1790	
Compressor					
One hermetic scroll compressor					
Refrigerant charge R-410A					
	kg	5.5	6.4	5.8	8.6
Control					
Pro-Dialog+					
Fans					
		Two twin-speed axial fans, 3 blades		One twin-speed axial fan, 7 blades	
Diameter	mm	495	495	710	710
Air flow	l/s	2212	2212	3530	3530
Speed	r/s	14.5	14.5	15	15
Water heat exchanger					
		Plate heat exchanger, maximum operating pressure 1000 kPa			
Water volume	l	1.52	1.9	2.28	2.85
Air heat exchanger					
		Copper tubes and aluminium fins			
Pipe diameter	in	3/8	3/8	3/8	3/8
Number of rows		2	2	2	3
Number of pipes per row		60	60	60	60
Fin spacing	mm	1.69	1.69	1.69	1.69
Standard unit					
Water connections (MPT gas)	in	1	1	1-1/4	1-1/4
Unit with hydronic module*					
		Pump, screen filter, expansion tank, flow switch, pressure gauge, automatic air purge valve, safety valve			
Pump		One single-speed pump, maximum water-side operating pressure 400 kPa			
Expansion tank capacity	l	5	5	8	8
Entering water connection	in	1-1/4	1-1/4	1-1/4	1-1/4
Leaving water connection	in	1	1	1-1/4	1-1/4
Power input*	kW	0.54	0.59	0.99	1.10
Nominal operating current*	A	1.30	1.40	2.40	2.60
Chassis paint colour					
Colour code: RAL 7035					

* 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 3741 (10⁻¹² W)

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

Physical data, 30RQ units

30RQ		017	021	026	033
 Air conditioning application as per EN14511-3:2011*					
Condition 1					
Nominal cooling capacity	kW	16,0	20,2	26,7	32,7
EER	kW/kW	3,17	3,11	3,01	3,21
Eurovent class, cooling		A	A	B	A
ESEER	kW/kW	3,61	3,44	3,36	3,58
Condition 2					
Nominal cooling capacity	kW	22,2	27,4	34,3	43,6
EER	kW/kW	4,02	3,76	3,62	3,96
ESEER	kW/kW	A	B	C	A
Air conditioning application**					
Condition 1					
Nominal cooling capacity	kW	16,2	20,4	27,0	33,1
EER	kW/kW	3,29	3,24	3,13	3,36
ESEER	kW/kW	3,77	3,60	3,51	3,77
Condition 2					
Nominal cooling capacity	kW	22,5	27,7	34,7	44,2
EER	kW/kW	4,27	4,00	3,84	4,25
 Heating application as per EN14511-3:2011*					
Condition 1					
Nominal heating capacity	kW	17,0	21,7	29,9	33,3
COP	kW/kW	3,18	3,28	3,20	3,19
Eurovent class, heating		B	A	A	B
Condition 2					
Nominal heating capacity	kW	17,6	22,2	31,0	34,7
COP	kW/kW	3,99	3,98	3,98	3,98
Heating application**					
Condition 1					
Nominal heating capacity	kW	16,8	21,4	29,6	33,0
COP	kW/kW	3,24	3,35	3,27	3,26
Condition 2					
Nominal heating capacity	kW	17,4	22,0	30,7	34,3
COP	kW/kW	4,10	4,10	4,10	4,10
Operating weight***					
Standard unit, with/without hydronic module	kg	206/191	223/208	280/262	295/277
Sound power level****					
Sound power level†	dB(A)	72	74	78	78
Sound pressure level†					
Sound pressure level†	dB(A)	40	42	46	46
Dimensions					
Length x depth x height	mm	1136 x 584 x 1579		1002 x 824 x 1790	
Compressor					
One hermetic scroll compressor					
Refrigerant charge R-410A					
	kg	6.4	7.7	7.6	9.5
Control					
Pro-Dialog+					
Fans					
Two twin-speed axial fans, 3 blades				One twin-speed axial fan, 7 blades	
Diameter	mm	495	495	710	710
Air flow	l/s	2217	1978	3530	3530
Speed	r/s	14.5	14.5	15	15
Water heat exchanger					
Plate heat exchanger, maximum operating pressure 1000 kPa					
Water volume	l	1.52	1.9	2.28	2.85
Air heat exchanger					
Copper tubes and aluminium fins					
Pipe diameter	in	3/8	3/8	3/8	3/8
Number of rows		2.5	3	2.5	3
Number of pipes per row		60	60	60	60
Fin spacing	mm	1.69	1.69	1.69	1.69
Standard unit					
Water connections (MPT gas)	in	1	1	1-1/4	1-1/4
Unit with hydronic module*					
Pump, screen filter, expansion tank, flow switch, pressure gauge, automatic air purge valve, safety valve					
One single-speed pump, maximum water-side operating pressure 400 kPa					
Expansion tank capacity	l	5	5	8	8
Entering water connection	in	1-1/4	1-1/4	1-1/4	1-1/4
Leaving water connection	in	1	1	1-1/4	1-1/4
Power input*	kW	0.54	0.59	0.99	1.10
Nominal operating current*	A	1.30	1.40	2.40	2.60
Chassis paint colour					
Colour code: RAL 7035					

* 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.

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.

** 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.

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.

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

**** In accordance with ISO 3741 (10⁻¹² W)

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

Electrical data, 30RB/RQ units

30RB/RQ		017	021	026	033
Power circuit					
Nominal power supply	V-ph-Hz	400-3-50			
Voltage range	V	340-440			
Control circuit supply		24 V via internal transformer			
Maximum start-up current (Un)*	A	75	95	118	118
Unit power factor at nominal capacity**		0.84	0.79	0.77	0.81
Maximum operating power input**	kW	7.8	9.1	11	13.8
Nominal unit operating current draw***	A	8	12	16	17
Maximum operating current draw (Un)****	A	13	16	20	24
Maximum operating current draw (Un-15%)†	A	15	18	23	27

* Maximum instantaneous start-up current (locked rotor current of the 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 340-460 V.

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%			

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%			

Part load performances

30RB 017-033

30RB		017	021	026	033
IPLV	kW/kW	4.35	4.34	4.34	4.54
ESEER	kW/kW	3.46	3.47	3.44	3.62

30RQ 017-033

30RQ		017	021	026	033
IPLV	kW/kW	4.54	4.30	4.19	4.48
ESEER	kW/kW	3.61	3.44	3.36	3.58

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

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

Sound spectrum, 30RB/RQ units

30RB/RQ		Octave bands, Hz							Sound power levels	
		125	250	500	1000	2000	4000	8000		
017	dB	75	72	70	67	61	60	54	dB(A)	72
021	dB	80	75	70	69	63	60	56	dB(A)	74
026	dB	79	76	76	74	67	60	55	dB(A)	78
033	dB	79	76	76	74	67	60	55	dB(A)	78

Operating limits

Water heat exchanger water flow rate

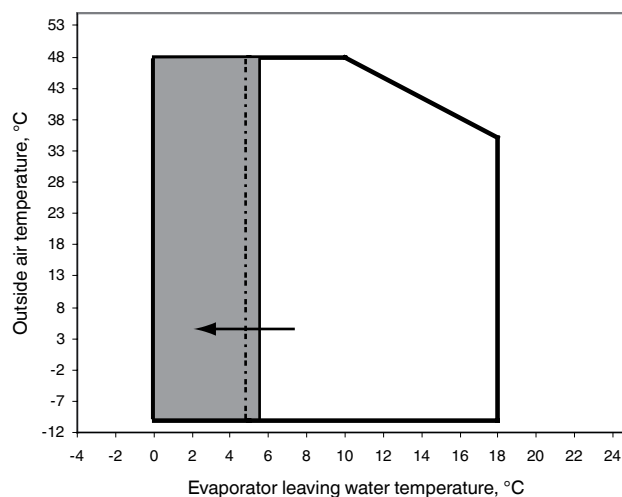
30RB	Flow rate, l/s		
	Minimum	Maximum*	Maximum**
017	0.45	1.39	1.26
021	0.57	1.52	1.42
026	0.67	1.96	1.43
033	0.87	2.18	1.72

30RQ	Flow rate, l/s		
	Minimum	Maximum*	Maximum**
017	0.45	1.39	1.26
021	0.57	1.52	1.42
026	0.67	2.18	1.72
033	0.87	2.29	1.85

* Maximum flow rate at an available pressure of 50 kPa (unit with hydronic module)

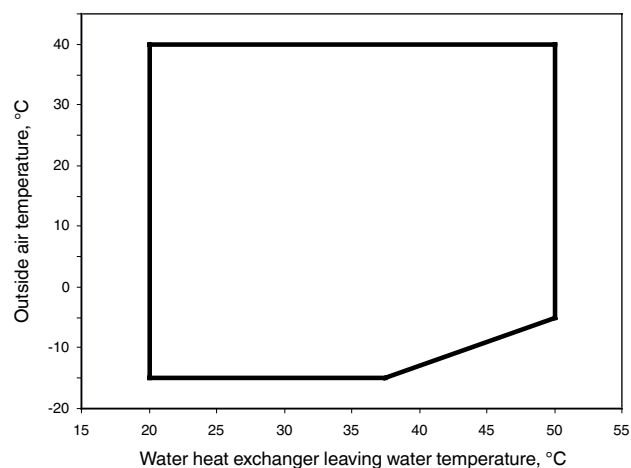
** Maximum flow rate at pressure drop of 100 kPa in the plate heat exchanger (unit without hydronic module).

30RB/RQ (cooling mode)



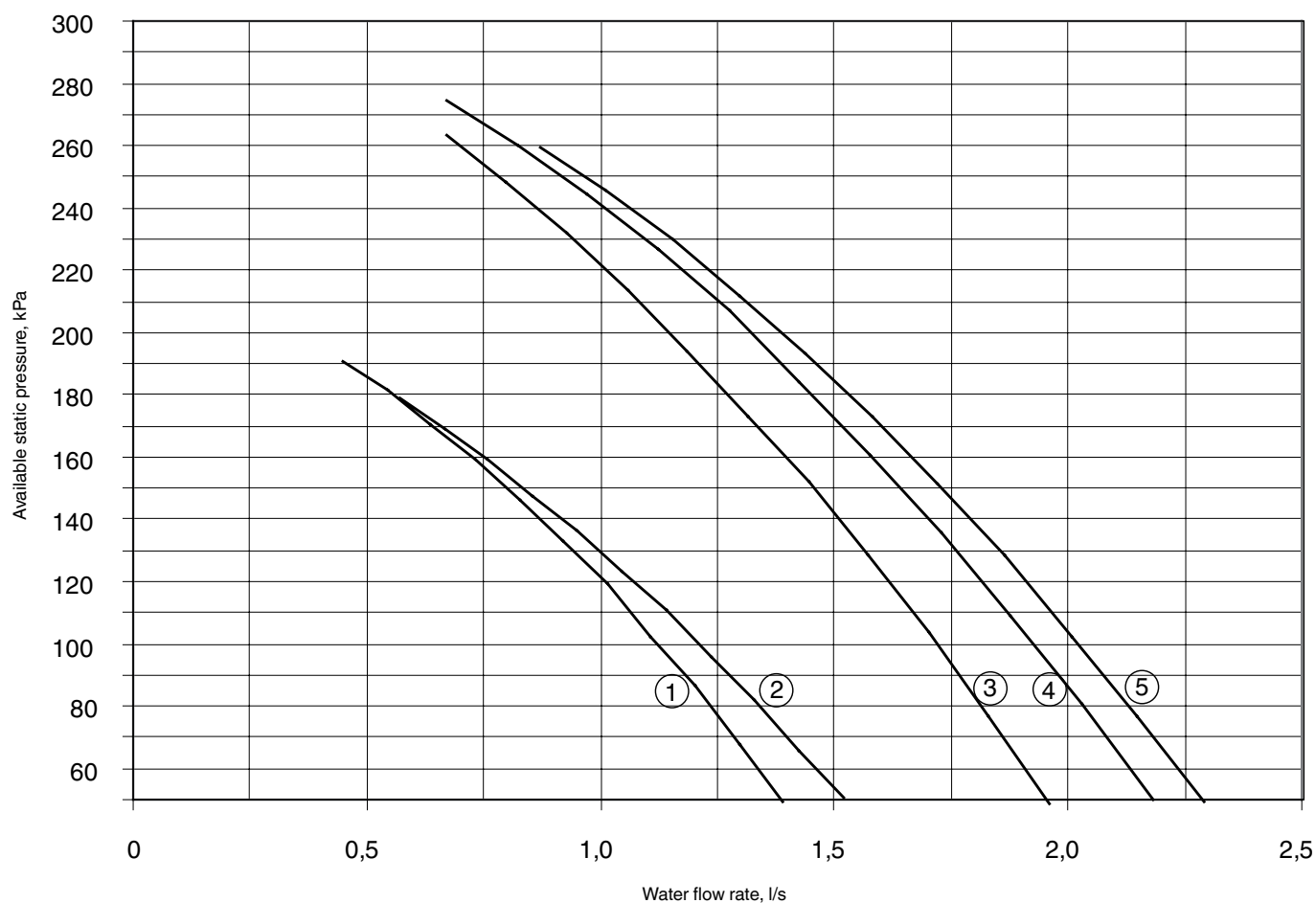
Operating range with anti-freeze solution and Pro-Dialog configuration-

30RQ (heating mode)



Available static system pressure

30RB/RQ 017-033

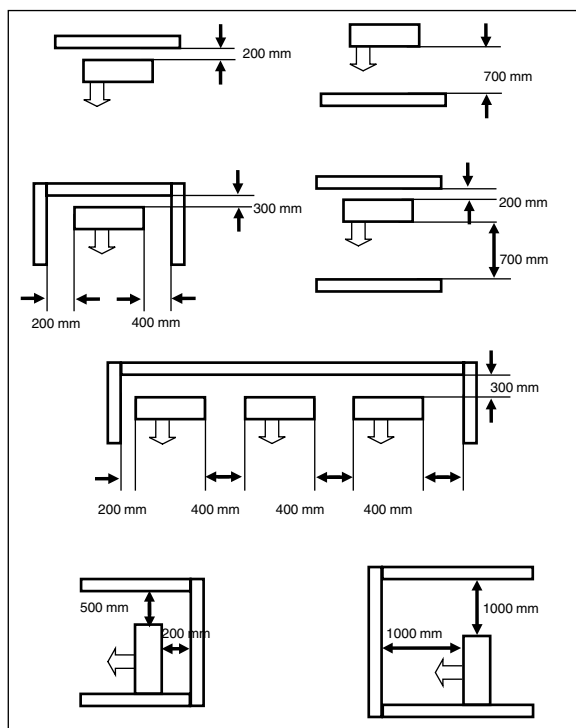
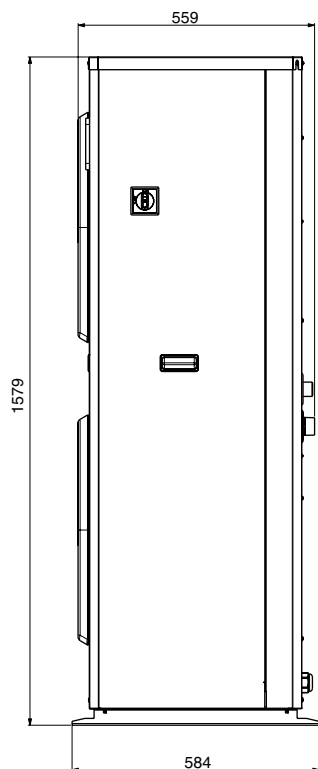
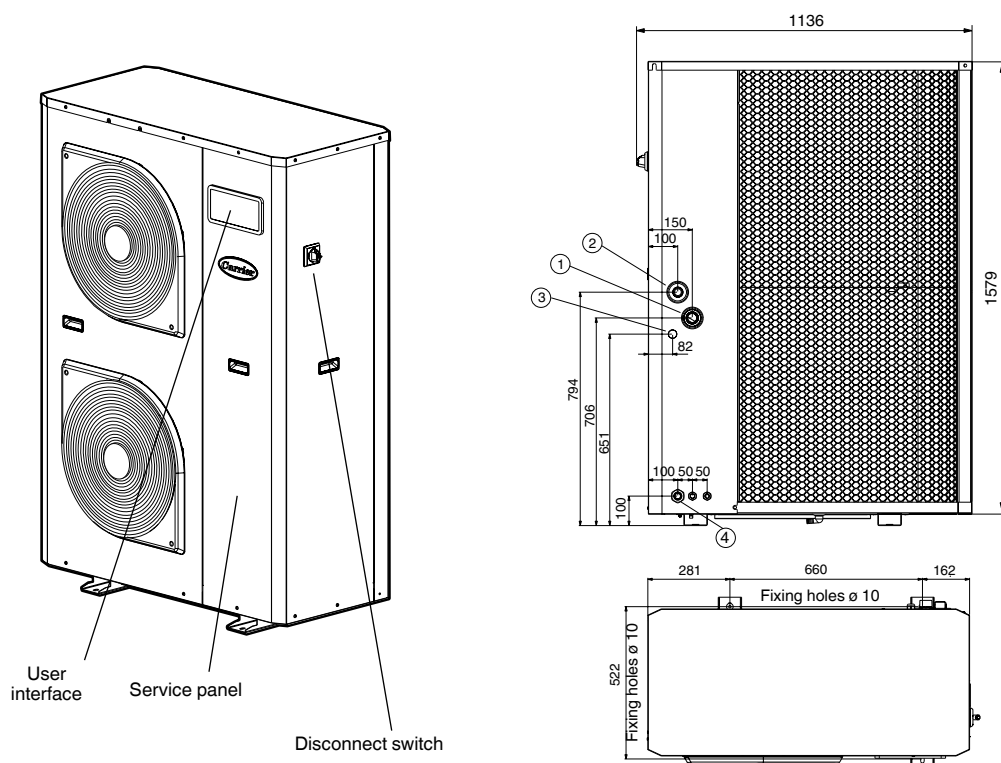


Legend

1. 30RB/RQ 017
2. 30RB/RQ 021
3. 30RB 026
4. 30RB 033 - 30RQ 026
5. 30RQ 033

Dimensions/clearances

30RB/RQ 017-021



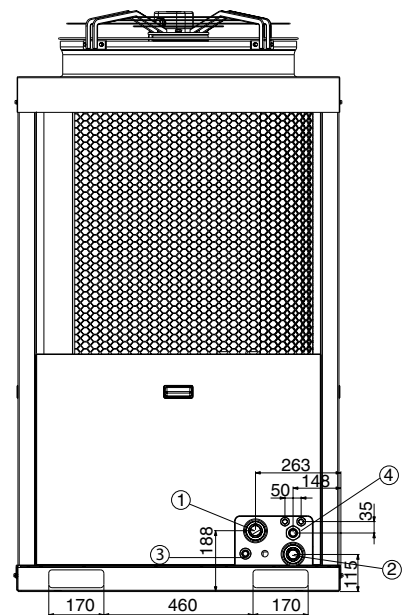
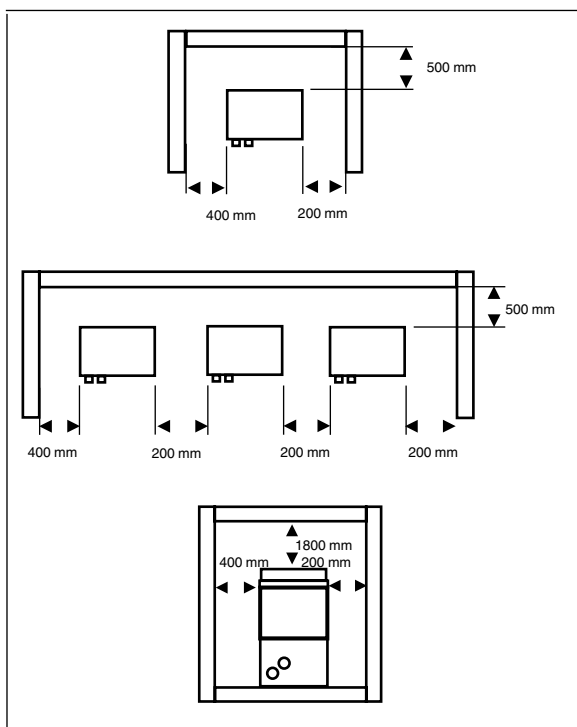
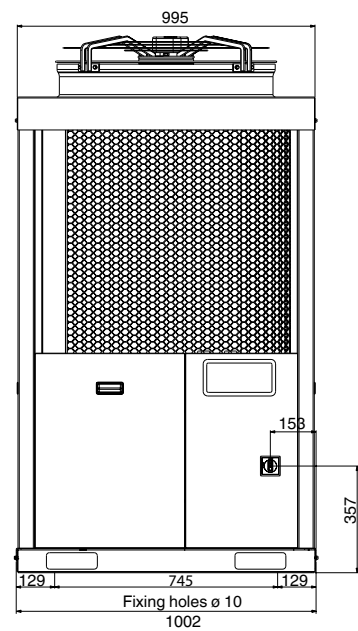
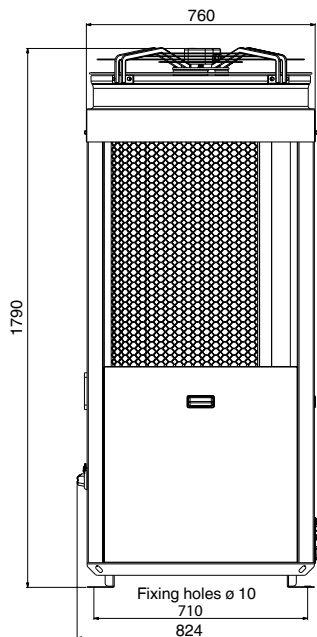
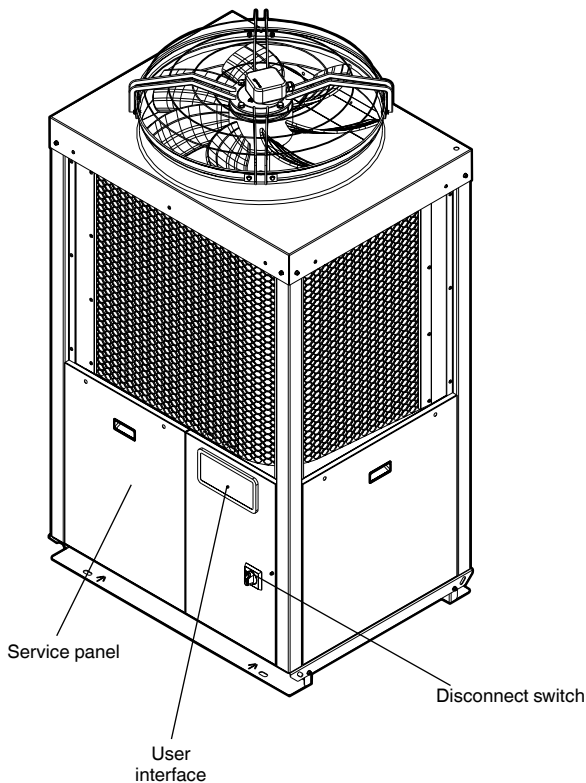
Legend

All dimensions are in mm

- 1 Water inlet
- 2 Water outlet
- 3 Water fill kit connection (option)
- 4 Power connections

Dimensions/clearances

30RB/RQ 026-033



Legend

All dimensions are in mm

- 1 Water inlet
- 2 Water outlet
- 3 Water fill kit connection (option)
- 4 Power connections

Cooling capacities in accordance with EN14511-3 : 2011



30RB units

LWT °C		Condenser entering air temperature, °C															
		20				25				30				35			
		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
017	5	17.7	4.32	0.85	48	17.0	3.84	0.81	44	16.3	3.36	0.78	41	15.5	2.91	0.74	37
021		22.8	4.27	1.10	66	22.1	3.84	1.06	62	21.2	3.41	1.02	58	20.2	2.99	0.97	54
026		28.5	4.18	1.37	95	27.6	3.72	1.33	90	26.5	3.30	1.28	84	25.3	2.88	1.21	77
033		34.5	4.41	1.65	93	33.7	3.96	1.61	89	32.6	3.55	1.55	84	31.2	3.12	1.49	77
017	7	18.7	4.50	0.90	53	18.0	4.00	0.86	49	17.2	3.50	0.83	45	16.4	3.03	0.78	41
021		24.2	4.43	1.17	72	23.4	3.99	1.13	68	22.5	3.55	1.09	64	21.4	3.11	1.03	59
026		30.6	4.41	1.47	106	29.7	3.94	1.43	101	28.6	3.50	1.38	94	27.3	3.07	1.31	87
033		36.8	4.62	1.76	105	35.9	4.14	1.71	100	34.7	3.72	1.65	93	33.2	3.28	1.58	86
017	10	20.4	4.75	0.98	61	19.6	4.25	0.94	57	18.8	3.72	0.90	52	17.9	3.23	0.86	47
021		26.4	4.68	1.28	82	25.6	4.22	1.24	78	24.6	3.77	1.19	73	23.4	3.31	1.13	67
026		33.8	4.73	1.63	124	32.9	4.24	1.59	118	31.6	3.79	1.53	110	30.2	3.34	1.46	102
033		40.2	4.89	1.93	122	39.2	4.40	1.88	116	37.9	3.96	1.81	109	36.4	3.51	1.74	100
017	15	23.7	5.20	1.14	78	22.8	4.68	1.10	73	21.8	4.12	1.05	67	20.8	3.59	1.00	61
021		30.6	5.09	1.49	103	29.6	4.60	1.44	97	28.5	4.14	1.38	91	27.1	3.66	1.32	84
026		39.6	5.23	1.92	159	38.5	4.73	1.87	152	37.2	4.25	1.80	142	35.5	3.78	1.72	132
033		46.6	5.33	2.24	157	45.3	4.83	2.18	149	43.8	4.36	2.11	140	42.1	3.89	2.02	129
017	18	25.9	5.47	1.25	91	24.9	4.92	1.20	85	23.8	4.35	1.15	78	22.7	3.80	1.09	71
021		33.3	5.31	1.62	117	32.2	4.81	1.57	111	31.0	4.34	1.51	104	29.5	3.86	1.44	95
026		43.0	5.48	2.09	181	41.8	4.97	2.03	172	40.3	4.48	1.96	161	38.5	4.00	1.87	149
033		50.5	5.56	2.43	180	49.2	5.06	2.37	171	47.6	4.58	2.29	161	45.7	4.11	2.20	149

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: $0.18 \times 10^{-4} \text{ (m}^2 \text{ K)/W}$

Performances in accordance with EN14511-3:2011.

Cooling capacities

30RB units

LWT °C		Condenser entering air temperature, °C															
		20				25				30				35			
		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
017	5	17.8	4.56	0.85	48	17.2	4.03	0.81	44	16.4	3.49	0.78	41	15.6	3.01	0.74	37
021		23.1	4.53	1.10	66	22.3	4.05	1.06	62	21.4	3.58	1.02	58	20.4	3.11	0.97	54
026		28.9	4.49	1.37	95	28.0	3.97	1.33	90	26.9	3.49	1.28	84	25.6	3.03	1.21	77
033		35.0	4.73	1.65	93	34.1	4.21	1.61	89	33.0	3.75	1.55	84	31.6	3.27	1.49	77
017	7	18.9	4.76	0.90	53	18.2	4.21	0.86	49	17.4	3.65	0.83	45	16.5	3.15	0.78	41
021		24.5	4.73	1.17	72	23.7	4.23	1.13	68	22.7	3.73	1.09	64	21.6	3.25	1.03	59
026		31.0	4.77	1.47	106	30.1	4.22	1.43	101	28.9	3.72	1.38	94	27.6	3.24	1.31	87
033		37.3	4.98	1.76	105	36.4	4.43	1.71	100	35.1	3.94	1.65	93	33.6	3.45	1.58	86
017	10	20.6	5.07	0.98	61	19.9	4.50	0.94	57	19.0	3.91	0.90	52	18.1	3.37	0.86	47
021		26.8	5.04	1.28	82	25.9	4.50	1.24	78	24.8	3.99	1.19	73	23.6	3.48	1.13	67
026		34.3	5.18	1.63	124	33.3	4.60	1.59	118	32.1	4.07	1.53	110	30.6	3.55	1.46	102
033		40.8	5.33	1.93	122	39.8	4.76	1.88	116	38.4	4.24	1.81	109	36.8	3.72	1.74	100
017	15	24.0	5.64	1.14	78	23.1	5.02	1.10	73	22.1	4.37	1.05	67	21.0	3.78	1.00	61
021		31.1	5.56	1.49	103	30.0	4.98	1.44	97	28.8	4.43	1.38	91	27.4	3.88	1.32	84
026		40.2	5.85	1.92	159	39.2	5.22	1.87	152	37.8	4.65	1.80	142	36.1	4.08	1.72	132
033		47.3	5.93	2.24	157	46.0	5.31	2.18	149	44.5	4.74	2.11	140	42.7	4.19	2.02	129
017	18	26.2	5.99	1.25	91	25.2	5.33	1.20	85	24.1	4.66	1.15	78	22.9	4.03	1.09	71
021		33.8	5.85	1.62	117	32.7	5.25	1.57	111	31.4	4.69	1.51	104	29.9	4.12	1.44	95
026		43.7	6.21	2.09	181	42.5	5.55	2.03	172	41.0	4.95	1.96	161	39.2	4.36	1.87	149
033		51.4	6.26	2.43	180	50.0	5.63	2.37	171	48.4	5.03	2.29	161	46.4	4.46	2.20	149

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: $0.18 \times 10^{-4} \text{ (m}^2 \text{ K)/W}$

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



30RQ units

LWT °C		Condenser entering air temperature, °C															
		20				25				30				35			
		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
017	5	17.3	4.49	0.84	47	16.6	4.00	0.80	43	15.9	3.49	0.77	40	15.1	3.02	0.73	36
021		21.5	4.24	1.05	61	20.8	3.79	1.01	57	20.0	3.39	0.97	53	19.1	2.98	0.92	49
026		28.2	4.14	1.38	67	27.3	3.68	1.34	63	26.3	3.26	1.28	58	25.1	2.86	1.22	54
033		34.8	4.41	1.69	84	33.8	3.95	1.63	79	32.5	3.52	1.57	73	31.1	3.08	1.50	67
017	7	18.3	4.68	0.89	52	17.6	4.17	0.85	48	16.9	3.65	0.82	44	16.0	3.16	0.77	40
021		22.8	4.41	1.11	66	22.1	3.94	1.07	62	21.2	3.52	1.03	58	20.2	3.10	0.98	54
026		29.9	4.32	1.47	74	29.1	3.85	1.42	70	27.9	3.42	1.37	65	26.7	3.00	1.30	60
033		36.7	4.58	1.78	92	35.5	4.10	1.72	86	34.2	3.66	1.65	80	32.7	3.21	1.58	73
017	10	20.0	4.96	0.97	60	19.2	4.42	0.93	56	18.4	3.89	0.89	51	17.5	3.38	0.85	46
021		24.8	4.64	1.21	75	24.0	4.16	1.17	71	23.1	3.73	1.12	66	22.0	3.29	1.07	61
026		32.6	4.58	1.60	86	31.7	4.09	1.55	81	30.5	3.65	1.50	76	29.2	3.22	1.43	69
033		39.4	4.80	1.91	103	38.2	4.31	1.85	98	36.8	3.87	1.78	91	35.2	3.40	1.71	83
017	15	23.2	5.45	1.13	77	22.4	4.87	1.09	72	21.4	4.33	1.04	66	20.4	3.78	0.99	60
021		28.6	5.00	1.40	93	27.6	4.49	1.35	87	26.5	4.05	1.29	81	25.3	3.60	1.23	75
026		36.5	4.90	1.80	104	35.3	4.40	1.74	97	34.0	3.94	1.67	90	32.5	3.48	1.60	83
033		44.6	5.20	2.17	129	43.4	4.69	2.11	122	41.9	4.23	2.04	114	40.2	3.75	1.96	105
017	18	25.4	5.74	1.24	90	24.4	5.14	1.19	84	23.4	4.59	1.14	77	22.2	4.01	1.08	70
021		31.0	5.18	1.52	105	29.9	4.67	1.47	99	28.7	4.22	1.40	92	27.3	3.76	1.34	85
026		38.5	5.06	1.90	113	37.3	4.55	1.84	106	35.9	4.08	1.77	99	34.3	3.62	1.69	90
033		48.2	5.43	2.35	148	46.9	4.92	2.29	140	45.3	4.45	2.21	131	43.5	3.96	2.12	121

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: $0.18 \times 10^{-4} \text{ (m}^2 \text{ K)/W}$

Performances in accordance with EN14511-3:2011.

Cooling capacities

30RQ units

LWT °C		Condenser entering air temperature, °C															
		20				25				30				35			
		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
017	5	17.5	4.74	0.84	47	16.8	4.20	0.80	43	16.0	3.64	0.77	40	15.2	3.13	0.73	36
021		21.8	4.50	1.05	61	21.0	4.00	1.01	57	20.2	3.54	0.97	53	19.2	3.10	0.92	49
026		28.5	4.38	1.38	67	27.6	3.87	1.34	63	26.5	3.41	1.28	58	25.3	2.97	1.22	54
033		35.2	4.71	1.69	84	34.2	4.18	1.63	79	32.9	3.70	1.57	73	31.4	3.21	1.50	67
017	7	18.5	4.96	0.89	52	17.8	4.40	0.85	48	17.0	3.82	0.82	44	16.1	3.28	0.77	40
021		23.1	4.69	1.11	66	22.3	4.17	1.07	62	21.4	3.70	1.03	58	20.4	3.24	0.98	54
026		30.3	4.59	1.47	74	29.4	4.06	1.42	70	28.2	3.59	1.37	65	27.0	3.13	1.30	60
033		37.1	4.91	1.78	92	36.0	4.36	1.72	86	34.6	3.86	1.65	80	33.0	3.36	1.58	73
017	10	20.2	5.30	0.97	60	19.5	4.69	0.93	56	18.6	4.09	0.89	51	17.7	3.53	0.85	46
021		25.1	4.97	1.21	75	24.3	4.42	1.17	71	23.3	3.94	1.12	66	22.2	3.45	1.07	61
026		33.0	4.90	1.60	86	32.1	4.35	1.55	81	30.9	3.85	1.50	76	29.5	3.37	1.43	69
033		39.9	5.19	1.91	103	38.7	4.61	1.85	98	37.2	4.10	1.78	91	35.6	3.57	1.71	83
017	15	23.5	5.93	1.13	77	22.7	5.24	1.09	72	21.7	4.61	1.04	66	20.6	3.99	0.99	60
021		29.0	5.43	1.40	93	28.0	4.83	1.35	87	26.8	4.32	1.29	81	25.6	3.80	1.23	75
026		37.0	5.32	1.80	104	35.8	4.72	1.74	97	34.4	4.19	1.67	90	32.8	3.68	1.60	83
033		45.2	5.70	2.17	129	44.0	5.09	2.11	122	42.5	4.55	2.04	114	40.7	3.99	1.96	105
017	18	25.7	6.31	1.24	90	24.7	5.59	1.19	84	23.7	4.93	1.14	77	22.5	4.27	1.08	70
021		31.4	5.67	1.52	105	30.3	5.06	1.47	99	29.1	4.53	1.40	92	27.7	4.00	1.34	85
026		39.1	5.52	1.90	113	37.8	4.91	1.84	106	36.3	4.36	1.77	99	34.7	3.84	1.69	90
033		48.9	6.02	2.35	148	47.6	5.39	2.29	140	46.0	4.82	2.21	131	44.1	4.25	2.12	121

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: $0.18 \times 10^{-4} \text{ (m}^2 \text{ K)/W}$

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

Heating capacities in accordance with EN14511-3 : 2011



30RQ 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
017	30	8.9	2.40	0.47	15	9.6	2.58	0.54	19	10.2	2.69	0.58	22	12.8	3.27	0.74	35	17.8	4.41	0.85	44	20.4	4.88	0.97	57
021		11.3	2.36	0.61	22	12.2	2.51	0.68	26	12.9	2.63	0.74	30	16.2	3.21	0.94	45	22.4	4.34	1.06	55	25.6	4.81	1.22	69
026		15.3	2.31	0.82	22	16.7	2.50	0.94	28	17.8	2.63	1.02	33	22.7	3.23	1.31	52	31.4	4.36	1.49	67	35.8	4.83	1.70	86
033		-	-	-	-	18.9	2.53	1.06	29	20.0	2.64	1.15	34	25.3	3.22	1.46	55	35.1	4.35	1.67	71	40.1	4.82	1.90	91
017	35	8.8	2.15	0.47	15	9.5	2.31	0.54	19	10.0	2.41	0.58	21	12.5	2.90	0.73	33	17.6	3.97	0.84	42	20.0	4.42	0.95	54
021		11.3	2.15	0.61	21	12.1	2.28	0.68	26	12.7	2.39	0.74	29	15.9	2.91	0.93	43	22.2	3.96	1.06	53	25.3	4.38	1.21	66
026		15.1	2.07	0.81	21	16.4	2.23	0.93	27	17.4	2.35	1.01	31	22.1	2.88	1.29	50	31.0	3.95	1.48	64	35.4	4.39	1.69	82
033		17.1	2.13	0.92	22	18.6	2.28	1.06	29	19.7	2.39	1.14	33	24.7	2.90	1.45	52	34.6	3.96	1.65	67	39.6	4.39	1.88	87
017	40	8.6	1.91	0.48	14	9.3	2.03	0.54	18	9.8	2.11	0.58	21	12.1	2.53	0.73	32	17.3	3.55	0.82	40	19.7	3.95	0.94	51
021		11.1	1.91	0.61	21	11.8	2.03	0.68	25	12.4	2.12	0.74	29	-	-	-	-	21.9	3.62	1.05	51	24.9	4.00	1.19	63
026		14.6	1.82	0.81	20	15.9	1.96	0.92	26	16.8	2.06	1.00	30	21.2	2.53	1.28	47	30.5	3.56	1.45	61	34.8	3.98	1.66	78
033		16.4	1.87	0.91	21	18.0	2.01	1.04	27	19.0	2.10	1.13	32	23.8	2.54	1.43	50	34.1	3.57	1.63	64	38.8	3.98	1.85	82
017	45	8.4	1.70	0.48	14	9.0	1.79	0.54	18	9.5	1.86	0.58	20	11.6	2.21	0.72	30	17.0	3.17	0.81	38	19.2	3.52	0.92	48
021		10.9	1.68	0.62	21	11.5	1.78	0.69	25	12.0	1.86	0.74	28	14.8	2.27	0.92	40	21.6	3.26	1.03	49	24.5	3.62	1.17	60
026		14.2	1.60	0.80	20	15.4	1.71	0.92	25	-	-	-	-	20.3	2.20	1.25	45	29.8	3.18	1.43	57	34.0	3.57	1.63	73
033		15.6	1.62	0.89	19	17.2	1.75	1.02	26	18.1	1.82	1.11	30	22.7	2.21	1.40	47	33.2	3.18	1.59	60	37.9	3.55	1.81	77
017	50	-	-	-	-	8.9	1.60	0.54	17	9.3	1.66	0.58	20	11.4	1.96	0.71	29	16.7	2.82	0.80	36	18.8	3.12	0.90	45
021		-	-	-	-	11.5	1.57	0.69	25	11.9	1.63	0.74	27	14.5	1.99	0.91	39	21.3	2.90	1.02	47	24.0	3.23	1.15	57
026		-	-	-	-	15.1	1.52	0.91	24	15.9	1.58	0.98	28	19.7	1.93	1.23	43	29.1	2.82	1.39	54	33.0	3.15	1.58	68
033		-	-	-	-	16.6	1.54	1.00	24	17.5	1.60	1.08	28	21.9	1.94	1.37	44	32.2	2.80	1.54	55	36.5	3.12	1.75	70

Legend

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

Application data

Standard units, refrigerant: R-410A
 Condenser entering/leaving water temperature difference: 5 K for LWT values <50°C
 Condenser fluid: water
 Fouling factor: 0.18 x 10⁻⁴ (m² K)/W

Performances in accordance with EN14511-3:2011.

Heating capacities

30RQ units

LWT °C		Outside air dry-bulb (wet-bulb) temperature, °C																							
		-15 (-16)				-10 (-11)				-7 (-8)				2 (1)				7 (6)				12 (11)			
		Qh kW	COP kW/kW	q l/s	Δp kPa	Qh kW	COP kW/kW	q l/s	Δp kPa	Qh kW	COP kW/kW	q l/s	Δp kPa	Qh kW	COP kW/kW	q l/s	Δp kPa	Qh kW	COP kW/kW	q l/s	Δp kPa	Qh kW	COP kW/kW	q l/s	Δp kPa
017	30	9.9	2.71	0.47	15	11.2	3.06	0.54	19	12.1	3.29	0.58	22	15.5	4.08	0.74	35	17.7	4.56	0.85	44	20.2	5.10	0.97	57
021		12.6	2.66	0.61	22	14.2	2.99	0.68	26	15.4	3.22	0.74	30	19.5	4.00	0.94	45	22.2	4.49	1.06	55	25.3	5.02	1.22	69
026		17.0	2.61	0.82	22	19.5	2.97	0.94	28	21.2	3.20	1.02	33	27.3	4.03	1.31	52	31.1	4.52	1.49	67	35.4	5.06	1.70	86
033		-	-	-	-	22.0	3.00	1.06	29	23.8	3.22	1.15	34	30.5	4.01	1.46	55	34.7	4.50	1.67	71	39.6	5.05	1.90	91
017	35	9.9	2.45	0.47	15	11.2	2.76	0.54	19	12.1	2.96	0.58	21	15.3	3.64	0.73	33	17.4	4.08	0.84	42	19.8	4.58	0.95	54
021		12.6	2.44	0.61	21	14.2	2.74	0.68	26	15.3	2.95	0.74	29	19.3	3.66	0.93	43	21.9	4.08	1.06	53	25.1	4.55	1.21	66
026		16.9	2.35	0.81	21	19.3	2.67	0.93	27	21.0	2.88	1.01	31	26.9	3.62	1.29	50	30.7	4.07	1.48	64	35.0	4.57	1.69	82
033		19.1	2.41	0.92	22	21.9	2.73	1.06	29	23.7	2.93	1.14	33	30.1	3.64	1.45	52	34.3	4.08	1.65	67	39.1	4.57	1.88	87
017	40	9.9	2.21	0.48	14	11.2	2.48	0.54	18	12.0	2.66	0.58	21	15.1	3.25	0.73	32	17.1	3.63	0.82	40	19.5	4.07	0.94	51
021		12.7	2.22	0.61	21	14.2	2.48	0.68	25	15.3	2.67	0.74	29	-	-	-	-	21.7	3.71	1.05	51	24.7	4.13	1.19	63
026		16.8	2.11	0.81	20	19.2	2.40	0.92	26	20.8	2.59	1.00	30	26.5	3.24	1.28	47	30.2	3.65	1.45	61	34.4	4.12	1.66	78
033		18.8	2.16	0.91	21	21.7	2.45	1.04	27	23.5	2.64	1.13	32	29.7	3.26	1.43	50	33.7	3.66	1.63	64	38.4	4.11	1.85	82
017	45	9.9	2.01	0.48	14	11.2	2.24	0.54	18	12.0	2.39	0.58	20	14.9	2.90	0.72	30	16.8	3.23	0.81	38	19.1	3.60	0.92	48
021		12.8	1.99	0.62	21	14.2	2.23	0.69	25	15.2	2.39	0.74	28	19.0	2.98	0.92	40	21.4	3.34	1.03	49	24.3	3.72	1.17	60
026		16.7	1.89	0.80	20	19.0	2.14	0.92	25	-	-	-	-	26.0	2.89	1.25	45	29.5	3.25	1.43	57	33.7	3.67	1.63	73
033		18.3	1.92	0.89	19	21.2	2.18	1.02	26	22.9	2.34	1.11	30	29.1	2.90	1.40	47	32.9	3.24	1.59	60	37.5	3.65	1.81	77
017	50	-	-	-	-	11.1	2.02	0.54	17	11.9	2.15	0.58	20	14.7	2.59	0.71	29	16.5	2.87	0.80	36	18.6	3.19	0.90	45
021		-	-	-	-	14.3	1.98	0.69	25	15.2	2.12	0.74	27	18.8	2.63	0.91	39	21.1	2.95	1.02	47	23.8	3.30	1.15	57
026		-	-	-	-	18.9	1.91	0.91	24	20.3	2.05	0.98	28	25.5	2.55	1.23	43	28.8	2.86	1.39	54	32.7	3.22	1.58	68
033		-	-	-	-	20.7	1.94	1.00	24	22.4	2.08	1.08	28	28.4	2.56	1.37	44	31.9	2.85	1.54	55	36.1	3.19	1.75	70

Legend

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

Variable water flow system (VWF)

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

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

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

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

Operating logic

■ Full-load set point

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

■ Operating mode at part load

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

- Constant outlet pressure control
- Constant delta T control.

1 – Constant unit outlet pressure control

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

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

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

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

2 – Constant delta T control

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

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



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Environmental
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Systems