

PRODUCT SELECTION DATA

AIR-COOLED SCROLL CHILLERS WITH GREENSPEED® INTELLIGENCE



Unit with low noise level option

High full-load and part-load efficiency

Compact and simple to install

Low sound level

Low refrigerant charge

Superior reliability

30RBM/30RBP 160-520



Nominal cooling capacity 164-528 kW

AquaSnap liquid chillers are the best solution for commercial and industrial applications where installers, engineering and design departments and building owners require reduced installation costs, optimal performance and the highest quality.

The new generation of AquaSnap liquid chillers feature two new versions:

- The AquaSnap (30RBM) version features a compact all-in-one package optimised for full-load applications where reduced investment cost (low CapEx) is required. For cold or hot climates, the AquaSnap can be equipped with specific options to operate from -20°C up to +52°C.
- The AquaSnap Greenspeed® (30RBP) version is a compact all-in-one package optimised for part-load applications where high ESEER, SEPR and IPLV are required. The AquaSnap Greenspeed®, equipped with a variable speed pump and fans, provides premium part-load efficiency to reduce maintenance costs over the lifespan of the chiller. Additionally, the low sounds levels achieved at part load conditions can be very beneficial for sensitive acoustic applications. Besides operating efficiently and quietly, the AquaSnap Greenspeed® operates from -20°C up to +48°C as standard.

FEATURES AND BENEFITS

AquaSnap liquid chillers are designed to meet current and future Ecodesign and F-Gas European regulation requirements in terms of energy efficiency and reduced CO₂ emissions. They use the best technologies available today:

- Reduced refrigerant charge of ozone-friendly refrigerant R-410A
- Scroll compressors
- Greenspeed® variable-speed fans (30RBP models)
- Novation® micro-channel heat exchangers with a new aluminium alloy
- Brazed-plate heat exchangers with reduced pressure drops
- Auto-adaptive microprocessor control with Greenspeed® intelligence
- Colour touch screen with web connectivity options
- Extra energy savings through multiple options: direct-expansion free-cooling system on one or two circuits, partial heat recovery.

Both Aquasnap versions can be equipped with a built-in hydraulic module, limiting the installation to conventional operations such as connection of the power supply and the supply and return piping (plug & play), according to the dimensions of the standard unit.

Recommended by Carrier, Aquasnap can be equipped with one or two Greenspeed® variable-speed pumps to significantly reduce energy costs linked to pumping (reduction of more than two-thirds), ensure optimum water flow rate control, and improve overall system reliability.

For use in the harshest environments combining high temperatures, dust and sand, the AquaSnap (30RBM) can be equipped with an optional IP54 electrical box and cabinet fan enabling it to operate at outdoor air temperatures of up to 52°C.



Very economical operation

- High unit full- and part-load energy efficiency and efficient design of the water side:
 - Eurovent energy efficiency class A or B
 - SEER_{12/7°C} of up to 4.52 (30RBP version) in line with the new Ecodesign 2016/2281 regulations
 - Multiple scroll compressors equipped with a high-efficiency motor which can exactly match the cooling capacity to the load required
 - Electronic expansion valve permitting operation at a lower condensing pressure and improved utilisation of the evaporator heat exchange surface (superheat control)

- Condenser with high-efficiency Novation® aluminium micro-channel heat exchangers and Greenspeed® variable-speed fans (30RBP version)
- Low pressure drop brazed plate heat exchangers (< 45 kPa under Eurovent conditions).

- Specific control functions to reduce unit cooling energy use during occupied and unoccupied periods:
 - Internal timer: switches the chiller on/off and controls operation at a second setpoint
 - Setpoint automatically offset based on the outside air temperature or room air temperature (via an option)
 - Floating high pressure management
 - Variable-speed fan control
 - Cooling demand limitation.

Refer to control chapter for more information.

- Greenspeed® variable-speed pump to reduce pumping energy consumption by up to two-thirds (option recommended by Carrier):
 - Eliminate energy losses through the water flow control valve by electronically setting the nominal water flow
 - Save energy during stand-by periods or part-load operation by automatically reducing the water pump speed. The energy consumption of the pump motor varies according to the cube of the speed, so that a reduction in speed of just 40% can reduce energy consumption by 80%
 - Improved unit part-load performance (Increased SEER value with variable water flow according to EN14825 standard).

Refer to the hydraulic option chapter for more information.



- Extra energy savings through multiple options:
 - Direct expansion free-cooling without glycol (Carrier patented) on one or two refrigerating circuits
 - Partial heat recovery.
- Reduced maintenance costs:
 - Fast diagnosis of possible incidents and their history via the control
 - R-410A refrigerant is easier to use than other refrigerant blends.

HYDRAULIC MODULE (OPTION 116)

The new generation of Carrier hydraulic module minimises installation time. The heat pump is factory-equipped with the main components for the hydraulic system: Water pump, electronic flow switch, Victaulic screen filter, pressure sensors, water temperature sensors, pressures taps (2), relief valve, drain valve, air vent, water purge, optional hydraulic module heater and optional expansion tank.

The pressure transducers allow the 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.).

On units fitted with a Greenspeed® variable-speed pump, the display enables users to:

- Adjust the required pump speed
- Adjust the required available pressure at the unit outlet and the static system pressure to the actual needs of the customer; this saves energy and dispenses with the need for a water flow control valve (used to create artificial pressure drops that waste energy).

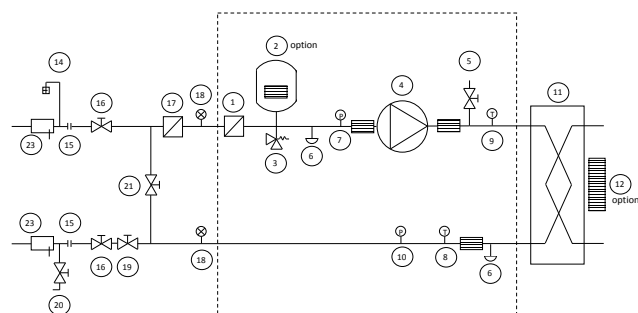
Several water pump types are available to suit any application:

- Single or dual low-pressure pump or single or dual high-pressure pump
- Greenspeed variable-speed single or dual high-pressure pump.

If necessary, increased frost protection down to -20 °C is possible by adding the heater option to the hydraulic module piping (see options 42A).

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

Typical hydraulic circuit diagram



Electrical data, units with hydraulic modules

The pumps that are factory-installed in these units have motors with efficiency class IE3. The additional electrical data required by regulation 640/2009 is given in the installation, operation and maintenance manual.

Hydraulic module



Key

Components of the unit and hydronic module:

1. Screen filter (mesh opening 1.2 mm)
2. Expansion tank (option)
3. Relief valve
4. Available pressure pump (single pump or dual pump)
5. Air purge
6. Water drain valve
7. Pressure sensor
Note: provides suction pump pressure data
8. Temperature probe -
Note: provides heat exchanger leaving temperature data
9. Temperature probe -
Note: provides heat exchanger inlet temperature data
10. Pressure sensor
Note: provides unit leaving pressure data
11. Plate heat exchanger
12. Evaporator frost protection heater (option)

System components

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

Notes:

- The system must be protected against frost.
- The hydraulic module and unit evaporator are protected (option 42A, factory-installed) against frost with electric heaters (item 12 + .
- The pressure sensors are installed at connections without Schraeder valves. Depressurise and drain the system before any intervention.

This regulation concerns the application of directive 2009/125/EC on the eco-design requirements for electric motors.

DX FREE COOLING SYSTEM (OPTION 118A-118B)

Physical properties of 30RB units with Free Cooling system

30RBM/30RBP option 118A (Free Cooling on 2 circuits)		220	260	300	330	360	400	430	470	520
30RBM - Operating weight⁽¹⁾										
Standard unit + option 118A	kg	1462	1483	1958	1994	2170	2226	2646	2664	2864
Unit with option 15 and option 118A	kg	1570	1591	2084	2120	2313	2370	2808	2827	3044
Unit with option 15 and option 116S + 118A	kg	1709	1745	2244	2324	2517	2573	3051	3068	3324
30RBP - Operating weight⁽¹⁾										
Standard unit + option 118A	kg	1498	1520	1994	2030	2206	2263	2704	2722	2930
Unit with option 15 and option 118A	kg	1606	1628	2120	2156	2350	2407	2866	2884	3110
Unit with option 15 and option 116S + 118A	kg	1745	1782	2280	2360	2553	2610	3108	3125	3390
30RBM/30RBP - Refrigerant		R410A								
Circuit A ⁽¹⁾	kg	13,9	14,6	16,7	17,6	24,8	24,3	27,5	25,5	31,6
	tCO ₂ e	29,0	30,5	34,9	36,7	51,8	50,7	57,4	53,2	65,9
Circuit B ⁽¹⁾	kg	14,0	14,6	25,0	24,7	25,4	25,4	29,5	30,3	31,8
	tCO ₂ e	29,2	30,5	52,2	51,6	53,0	53,0	61,6	63,3	66,3

30RBM/30RBP option 118B (Free Cooling on 1 circuit)		160	180	200	220	260	300	330	360	400	430	470	520
30RBM - Operating weight⁽¹⁾													
Standard unit + option 118A	kg	1260	1301	1301	1431	1472	1929	1965	2133	2189	2608	2626	2824
Unit with option 15 and option 118A	kg	1343	1383	1384	1539	1580	2055	2091	2276	2333	2770	2789	3004
Unit with option 15 and option 116S + 118A	kg	1482	1523	1523	1678	1734	2215	2295	2480	2536	3013	3030	3284
30RBP - Operating Weight⁽¹⁾													
Standard unit + option 118A	kg	1296	1337	1337	1467	1489	1965	2001	2169	2226	2666	2684	2890
Unit with option 15 and option 118A	kg	1378	1420	1420	1575	1597	2091	2127	2313	2370	2828	2846	3070
Unit with option 15 and option 116S + 118A	kg	1517	1559	1560	1714	1751	2251	2331	2516	2573	3070	3087	3350
30RBM/30RBP - Refrigerant		R410A											
Circuit A ⁽¹⁾	kg	8,4	10,9	10,9	12,6	13,1	14,7	15,4	20,3	21,1	23,5	23,5	26,8
	tCO ₂ e	17,5	22,8	22,8	26,3	27,4	30,7	32,2	42,4	44,1	49,1	49,1	55,9
Circuit B ⁽¹⁾	kg	14,0	14,1	13,7	14,0	14,6	25,0	24,7	25,4	25,4	29,5	30,3	31,8
	tCO ₂ e	29,1	29,4	28,6	29,2	30,5	52,2	51,6	53,0	53,0	61,6	63,3	66,3

(1) Weights are guidelines only. Refer to the unit name plate.

DX FREE COOLING SYSTEM (OPTION 118A-118B)

Cooling capacities (Option 118A)

30RBM/30RBP 160-520 Free Cooling mode

LWT (°C)		Condenser entering air temperature, °C								
		-10			-5			0		
		Qc	Unit	EER	Qc	Unit	EER	Qc	Unit	EER
		kW	kW	kW/kW	kW	kW	kW/kW	kW	kW	kW/kW
220	10	128	7,6	17,0	129	7,5	17,3	110	7,4	14,7
260		128	7,6	16,8	129	7,6	17,1	110	7,5	14,6
300		212	9,8	21,7	198	9,7	20,5	168	9,6	17,5
330		210	9,7	21,6	196	9,6	20,4	166	9,6	17,4
360		296	12,2	24,3	272	12,1	22,5	229	12,0	19,2
400		296	12,1	24,4	272	12,0	22,6	229	11,9	19,2
430		308	13,7	22,5	295	13,6	21,7	242	13,5	17,9
470		308	13,8	22,3	295	13,7	21,5	241	13,6	17,8
520		320	15,6	20,6	319	15,4	20,7	253	15,3	16,6

LWT Water outlet temperature
Qc Cooling capacity
Unit Unit power input (pumps, fans, control)
EER Energy efficiency

Cooling capacity (Option 118B)

30RBM/30RBP 160-520 Free Cooling mode

LWT (°C)		Condenser inlet air temperature (°C)								
		-10			-5			0		
		Qc	Unit	EER	Qc	Unit	EER	Qc	Unit	EER
		kW	kW	kW/kW	kW	kW	kW/kW	kW	kW	kW/kW
160	10	64	3,9	16,6	65	3,8	16,8	55	3,8	14,4
180		64	3,9	16,2	65	3,9	16,5	55	3,9	14,1
200		64	4,1	15,7	64	4,0	15,9	55	4,0	13,6
220		64	4,2	15,3	64	4,2	15,2	54	4,1	13,2
260		64	4,3	14,9	64	4,2	15,2	54	4,2	12,9
300		148	6,4	23,1	135	6,3	21,2	112	6,3	17,9
330		146	6,4	23,0	134	6,3	21,2	111	6,3	17,8
360 ⁽¹⁾		147	8,0	18,4	135	7,9	17,0	114	7,9	14,5
400 ⁽¹⁾		147	8,0	18,4	135	7,9	17,0	114	7,9	14,5
430		160	8,1	19,7	159	8,0	19,8	126	8,0	15,8
470		159	8,2	19,3	159	8,2	19,5	126	8,1	15,6
520		159	8,5	18,7	159	8,5	18,8	126	8,4	15,0

LWT Water outlet temperature
Qc Cooling capacity
Unit Unit power input (pumps, fans, control)
EER Energy efficiency
(1) Not available on 30RBP units

Operating limits

Cooling mode	Minimum	Maximum
Evaporator (water)		
Entering water temperature at start-up °C	8	40
Leaving water temperature during operation °C	5	20
Condenser (air)		
Ambient temperature (outdoors) 30RBM ⁽¹⁾ °C	-10	45
30RBP outside ambient temperature °C	-20	45
Available static pressure Pa	0	0

(1) The unit must be equipped with option 28B.

Free Cooling mode	Minimum	Maximum
Evaporator (water)		
Entering water temperature at start-up °C	8	40
Leaving water temperature during operation °C	5	26
Condenser (air)		
Ambient temperature (outdoors) 30RBM ⁽¹⁾ °C	-10	20
30RBP outside ambient temperature °C	-20	20
Available static pressure Pa	0	0

PHYSICAL DATA, SIZES 160 TO 520

30RBP				160	180	200	220	260	300	330	360	400	430	470	520
Cooling															
Standard unit Full load performances*	CA1	Nominal capacity	kW	168	180	197	216	261	300	331	365	397	430	464	523
		EER	kW/kW	3,04	3,12	2,98	2,97	2,90	2,97	2,92	2,95	2,90	2,94	2,90	2,90
		Eurovent class		B	A	B	B	B	B	B	B	B	B	B	B
	CA2	Nominal capacity	kW	216	247	263	297	336	393	428	475	510	556	593	676
		EER	kW/kW	3,6	3,89	3,59	3,7	3,37	3,53	3,4	3,47	3,37	3,45	3,34	3,38
		Eurovent class		C	A	C	B	D	C	D	D	D	D	E	D
Standard unit Seasonal energy efficiency**	SEER _{12/7°C} Comfort low temp.		kWh/kWh	4,32	4,29	4,18	4,25	4,20	4,52	4,40	4,52	4,37	4,45	4,53	4,40
	ηs cool _{12/7°C}		%	170	169	164	167	165	178	173	178	172	175	178	173
	SEPR _{12/7°C} Process high temp.		kWh/kWh	5,43	5,61	5,32	5,56	5,16	5,60	5,24	5,62	5,32	5,50	5,38	5,26
Unit + option 6 Seasonal energy efficiency**	SEPR _{-2/-8°C} Process medium temp. ***		kWh/kWh	3,03	3,40	3,38	3,33	3,22	3,40	3,06	3,47	3,42	NA	NA	NA
Part Load integrated values	IPLV.SI	kW/kW	4,758	4,855	4,733	4,849	4,749	4,999	4,833	5,004	4,815	4,925	4,999	4,839	
Sound levels															
Standard unit															
Sound power ⁽³⁾		dB(A)	91	92	92	92	92	93	93	93	93	93	94	94	94
Sound pressure level at 10 m ⁽⁴⁾		dB(A)	59	60	60	60	60	60	60	61	61	61	62	62	62
Standard unit + option 15 ⁽¹⁾															
Sound power ⁽³⁾		dB(A)	89	90	90	90	90	91	91	92	92	92	93	93	93
Sound pressure at 10 m ⁽⁴⁾		dB(A)	57	58	58	58	58	59	59	60	60	60	61	61	61
Standard unit + option 15LS ⁽¹⁾															
Sound power ⁽³⁾		dB(A)	85	85	85	86	86	86	86	87	87	87	88	88	88
Sound pressure at 10 m ⁽⁴⁾		dB(A)	53	53	53	54	54	54	54	55	55	55	55	55	56
Dimensions - standard unit															
Length		mm	2410						3604			4797			
Width		mm	2253						2253			2253			
Height		mm	2297						2297			2297			
Operating weight ⁽²⁾															
Standard unit		kg	1252	1293	1293	1423	1445	1901	1937	2105	2162	2603	2621	2827	
Standard unit + option 15 ⁽¹⁾		kg	1334	1376	1376	1531	1553	2027	2063	2249	2306	2765	2783	3007	
Standard unit + option 15 + option 116S ⁽¹⁾		kg	1473	1515	1516	1670	1707	2187	2267	2452	2509	3007	3024	3287	

* In accordance with standard EN14511-3:2013.

** In accordance with standard EN14825:2016

*** With EG 30%

CA1 Cooling mode conditions: evaporator water inlet/outlet temperature 12 °C/7 °C, outdoor air temperature 35 °C, evaporator fouling factor 0 m². k/W

CA2 Cooling mode conditions: evaporator water inlet/outlet temperature 23 °C/18 °C, outdoor air temperature 35 °C, evaporator fouling factor 0 m². k/W

ηs cool_{12/7°C} & SEER_{12/7°C} Bold values compliant to Ecodesign regulation: (EU) No 2016/2281 for Comfort application
SEPR_{12/7°C} Bold values compliant to Ecodesign regulation: (EU) No 2016/2281 for Process application
SEPR_{-2/-8°C} Bold values compliant to Ecodesign regulation: (EU) No 2015/1095 for Process application

NA Not Authorised for the specific application for the CEE market

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

(1) Options: 15 = Low noise level, 15LS = Very Low Noise level, 116S = High pressure dual-pump hydraulic module

(2) Weights are guidelines only. Refer to the unit name plate.

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

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



Valeurs certifiées Eurovent

PHYSICAL DATA, SIZES 160 TO 520

30RBP	160	180	200	220	260	300	330	360	400	430	470	520
Compressors	Hermetic scroll 48,3 tr/s											
Circuit A	1	1	1	2	2	2	2	3	3	3	3	4
Circuit B	2	2	2	2	2	3	3	3	3	4	4	4
No. of control stages	3	3	3	4	4	5	5	6	6	7	7	8
Refrigerant⁽²⁾ - Standard unit	R410A											
Circuit A	kg	8,40	10,90	10,90	12,60	13,10	14,70	15,40	20,30	21,10	23,50	26,75
	tCO ₂ e	17,5	22,8	22,8	26,3	27,4	30,7	32,2	42,4	44,1	49,1	55,9
Circuit B	kg	12,25	12,60	12,60	12,70	13,10	20,20	20,20	20,40	22,20	26,70	26,95
	tCO ₂ e	25,6	26,3	26,3	26,5	27,4	42,2	42,2	42,6	46,4	55,7	56,3
Capacity control	Pro-Dialog+ Control											
Minimum capacity	%	33	33	33	25	25	20	20	17	17	14	13
Condensers	Aluminium micro-channel coils (MCHE)											
Fans - Standard unit	FLYING BIRD 4 axial fans with rotating impeller											
Quantity		3	4	4	4	4	5	5	6	6	7	8
Maximum total air flow	l/s	13542	18056	18056	18056	18056	22569	22569	27083	27083	31597	36111
Maximum rotation speed	rps	16	16	16	16	16	16	16	16	16	16	16
Evaporator	Dual-circuit plate heat exchanger											
Water volume	l	15	15	15	15	19	27	35	33	42	44	53
Max. water-side operating pressure without hydronic module	kPa	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Hydraulic module (option)	Pump, Victaulic screen filter, relief valve, water and air drain valve, pressure sensors, expansion tank (option)											
Pump	Centrifugal pump, monocoil, 48,3 r/s, low- or high-pressure (as required), single or dual (as required)											
Expansion tank volume	l	50	50	50	50	50	80	80	80	80	80	80
Max. water-side operating pressure with hydraulic module	kPa	400	400	400	400	400	400	400	400	400	400	400
Water connections with/without hydraulic module	Victaulic type											
Diameter	inch	3	3	3	3	3	4	4	4	4	4	4
External diameter	mm	88,9	88,9	88,9	88,9	88,9	114,3	114,3	114,3	114,3	114,3	114,3
Casing paintwork	Colour code RAL 7035											

(2) Weights are guidelines only. Refer to the unit name plate.

ELECTRICAL SPECIFICATIONS

30RBM		160	180	200	220	260	300	330	360	400	430	470	520
Power circuit													
Nominal voltage	V-ph-Hz	400 - 3 - 50											
Voltage range	V	360 - 440											
Control circuit supply		24 V via internal transformer											
Nominal unit current draw⁽¹⁾													
Circuit A&B	A	100	110	124	133	161	180	201	221	242	261	282	322
Max. operating input power⁽²⁾													
Circuit A&B	kW	80	88	99	107	129	145	161	177	194	210	226	258
Cosine Phi unit at maximum power⁽²⁾		0,88	0,87	0,87	0,88	0,88	0,88	0,88	0,88	0,88	0,88	0,88	0,88
Maximum unit current draw (Un-10%)⁽³⁾													
Circuit A&B	A	144	158	176	192	230	259	288	317	345	374	403	460
Maximum unit current draw (Un)⁽⁴⁾													
Circuit A&B - Standard Unit	A	133	146	163	177	212	239	266	292	319	345	372	425
Circuit A&B - Unit with option 231	A	100	110	125	133	163	181	204	222	244	262	285	326
Maximum start-up current, standard unit (Un)†													
Circuit A&B	A	307	356	374	352	423	450	476	503	529	556	583	636
Max. start-up current, unit with soft starter (Un)†													
Circuit A&B	A	261	283	300	305	349	376	403	429	456	482	509	562

- (1) Conditions equivalent to the standardised Eurovent conditions (evaporator water input-output temperature = 12 °C/7 °C, outside air temperature = 35 °C)
- (2) Power input, compressors and fans, at the unit operating limits (saturated suction temperature 15°C, saturated condensing temperature 68.3°C) and nominal voltage of 400 V (data given on the unit nameplate).
- (3) Maximum unit operating current at maximum unit input power and 360 V.
- (4) Maximum unit operating current at maximum unit input power and 400 V (values given on the unit's nameplate).
- † Maximum instantaneous start-up current at operating limits (maximum operating current of the smallest compressor(s) + current of the fan(s) + locked rotor current of the largest compressor).
- Fan motor electrical data reported upstream the variable speed drive at Eurovent equivalent conditions and motor ambient air temperature of 50°C at 400 V: Current 3.8 A; In-rush current 20 A; Power input: 1.75 kW.

30RBP		160	180	200	220	260	300	330	360	400	430	470	520
Power circuit													
Nominal voltage	V-ph-Hz	400 - 3 - 50											
Voltage range	V	360 - 440											
Control circuit supply		24 V via internal transformer											
Nominal unit current draw⁽¹⁾													
Circuit A&B	A	97	107	121	130	158	176	197	216	237	255	276	316
Cosine Phi unit at maximum power⁽²⁾													
Circuit A&B	kW	81	88	99	108	129	145	162	178	194	210	226	259
Cosine Phi unit at maximum power⁽²⁾		0,88	0,88	0,88	0,88	0,88	0,88	0,88	0,88	0,88	0,88	0,88	0,88
Maximum unit current draw (Un-10%)⁽³⁾													
Circuit A&B	A	142	154	173	189	227	255	284	312	340	369	397	454
Maximum unit current draw (Un)⁽⁴⁾													
Circuit A&B - Standard Unit	A	131	142	160	174	209	235	262	287	314	340	366	419
Circuit A&B - Unit with option 231	A	98	108	123	131	161	178	201	219	241	259	281	321
Maximum start-up current, standard unit (Un)†													
Circuit A&B	A	305	353	371	349	420	446	472	498	525	550	577	629
Max. start-up current, unit with soft starter (Un)†													
Circuit A&B	A	259	279	297	302	346	372	399	424	451	477	503	556

- (1) Conditions equivalent to the standardised Eurovent conditions (evaporator water input-output temperature = 12 °C/7 °C, outside air temperature = 35 °C)
- (2) Input power, compressors + fans, at the unit operating limits (saturated suction temperature: 15°C, saturated condensing temperature: 68.3°C) and nominal voltage of 400 V (data given on the unit nameplate).
- (3) Maximum unit operating current at maximum unit input power and 360 V.
- (4) Maximum unit operating current at maximum unit input power and 400 V (values given on the unit's nameplate).
- † Maximum instantaneous start-up current at operating limits (maximum operating current of the smallest compressor(s) + current of the fan(s) + locked rotor current of the largest compressor).
- Fan motor electrical data reported upstream of the variable drive at Eurovent equivalent conditions and motor ambient air temperature of 50°C at 400 V: Current 3.0 A; Start-up current 20 A; Power input: 1.75 kW.

OPERATING LIMITS

Evaporator water flow rate

30RBM/30RBP 160-520 without hydronic module

	Minimum flow rate (l/s) ⁽¹⁾	Maximum flow rate (l/s) ⁽²⁾
160	2.9	17.5
180	3.2	17.5
200	3.6	17.5
220	3.8	17.5
260	4.6	21.8
300	5.2	29.8
330	5.9	35.2
360	6.3	33.8
400	7.1	38.9
430	7.6	40.4
470	8.2	41.6
520	9.4	43.4

- (1) Minimum flow rate for the maximum permitted water temperature difference conditions (10 K) at the minimum water outlet temperature value (5°C)
(2) Maximum flow rate for a pressure drop of 100 kPa in the plate heat exchanger

30RBM/30RBP 160-520 with low pressure hydronic module

	Minimum flow rate (l/s) ⁽¹⁾		Maximum flow rate (l/s)	
	Single	Dual	Single	Dual
160	2.8	3.2	12.2	10.3
180	2.8	3.2	12.2	10.3
200	2.8	2.5	12.2	12.2
220	2.8	2.5	12.2	12.2
260	4	2.7	14.3	15
300	3.1	3.7	20.2	20.2
330	3.4	3.7	20.2	20.2
360	3.7	3.8	20.2	20.2
400	9.5	4.1	25	22.9
430	9.5	8	25	25
470	9.5	8	25	25
520	5.4	5.4	26.6	26.5

- (1) Minimum water flow rate, factory-set according to pump type

30RBM/30RBP 160-520 with high pressure hydronic module

	Minimum flow rate (l/s) ⁽¹⁾		Maximum flow rate (l/s)	
	Single	Dual	Single	Dual
160	2.5	2.6	11.7	11.7
180	2.5	2.6	11.7	11.7
200	2.5	2.6	11.7	11.7
220	2.5	2.6	11.7	11.7
260	5.2	2.9	16.1	15.5
300	6.4	3.5	16.1	15.5
330	3.6	3.4	26.5	26.5
360	3.7	3.7	26.5	26.5
400	4.1	4.1	26.5	26.5
430	4.4	4.4	26.7	29.2
470	4.8	4.8	26.7	29.2
520	5.4	5.4	26.7	35

- (1) Minimum water flow rate, factory-set according to pump type

Unit operating limits

30RBM 160-520 units

Water-cooled heat exchanger	Minimum	Maximum
Entering water temperature at start-up	8 ⁽¹⁾	40
Leaving water temperature during operation option 5B	0 ⁽²⁾	20 ⁽³⁾
Leaving water temperature during operation option 6B	-15 ⁽⁶⁾	20 ⁽³⁾
Air-cooled exchanger	Minimum	Maximum
Outdoor ambient operating temperature		
Standard units	0 ⁽⁴⁾ /10	48 ⁽⁵⁾
Units with options 28B-28C (winter operation)	-10	48 ⁽⁵⁾
Units with option 28 (winter operation)	-20	48 ⁽⁵⁾
Units with option 16 (high ambience operation)	0/10	52
Available static pressure		
Standard units (outdoor installation)	Pa	0

30RBP 160-520 units

Water-cooled heat exchanger	Minimum	Maximum
Entering water temperature at start-up	8 ⁽¹⁾	40
Leaving water temperature during operation option 5B	0 ⁽²⁾	20 ⁽³⁾
Leaving water temperature during operation option 6B	-15 ⁽⁶⁾	20 ⁽³⁾
Condenser	Minimum	Maximum
Outdoor ambient operating temperature		
Standard unit	-20	48
Available static pressure		
Standard unit (outdoor installation)	Pa	0

- (1) For applications requiring operation at less than 8°C, contact Carrier to select a unit using the Carrier electronic catalogue.
(2) Use of antifreeze is obligatory if the water outlet temperature is below 5°C.
(3) For applications requiring operation at a water outlet temperature exceeding 20°C, contact Carrier to select a unit using the Carrier electronic catalogue.
(4) "For applications requiring operation from 0°C to -10°C, the unit must be equipped with options 28B-28C "Winter operation"". For operation from 0°C to -20°C, the unit must be equipped with option 28 "Winter operation".
For both options, the unit must either be equipped with the evaporator frost protection option (for units without hydraulic module option), or the evaporator and hydraulic module frost protection option (for units with hydraulic module option), or the water loop must be protected against frost by the installer, using an antifreeze solution.
(5) The maximum ambient temperature allowed for machines equipped with option 231 is +40°C.
Maximum ambient temperature: if storing and transporting 30RBM/30RBP units, the minimum and maximum ambient temperatures to be respected are -20°C and +52°C. These temperature limits shall be considered in case of container shipment and temperatures over 52°C.
(6) If using ethylene glycol and for RBM 160-400 or RBP 160-400.

AVAILABLE STATIC SYSTEM PRESSURE

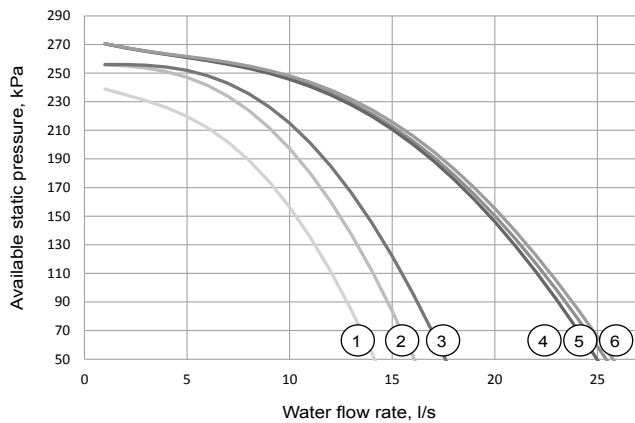
Data applicable for:

- Pure water at 20°C.
- Refer to the chapter “Evaporator flow rate” for the maximum water flow values.
- If glycol is used, the maximum water flow is reduced.

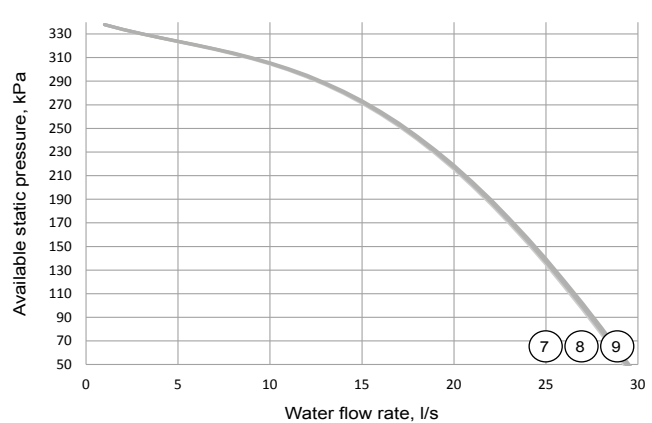
High-pressure pumps (fixed speed or variable speed at 50 Hz) on 30RBM/30RBP units

Single pumps

Sizes 160-400

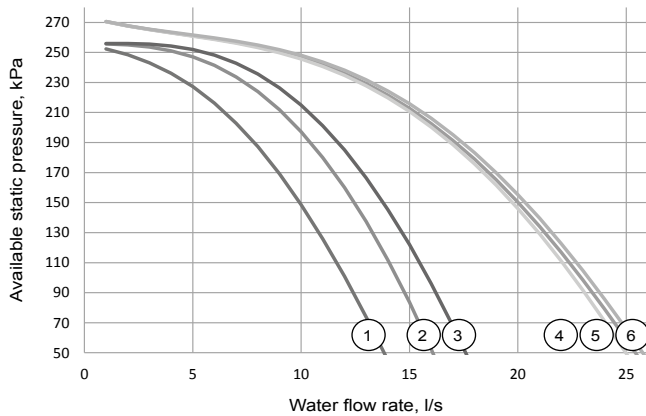


Sizes 430-520

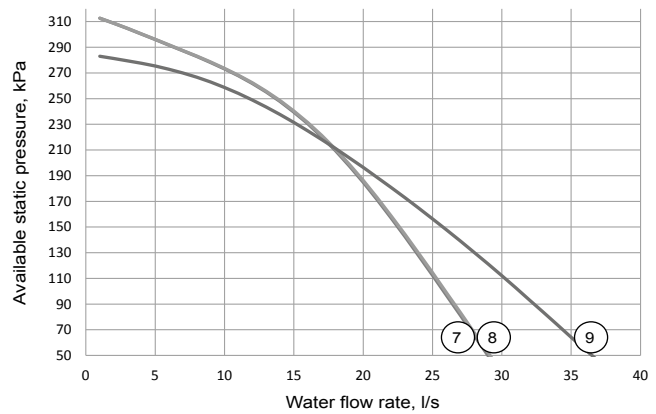


Dual pumps

Sizes 160-400



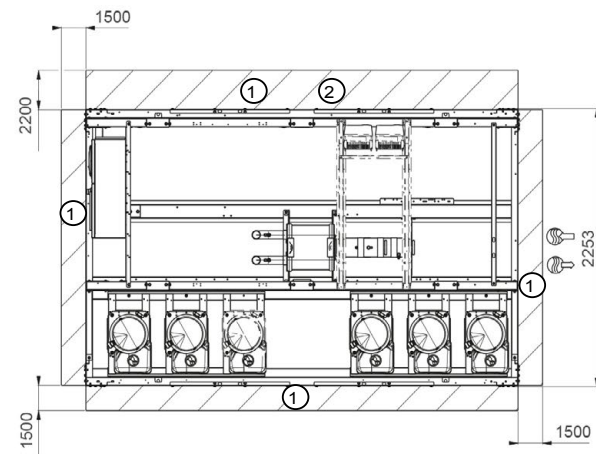
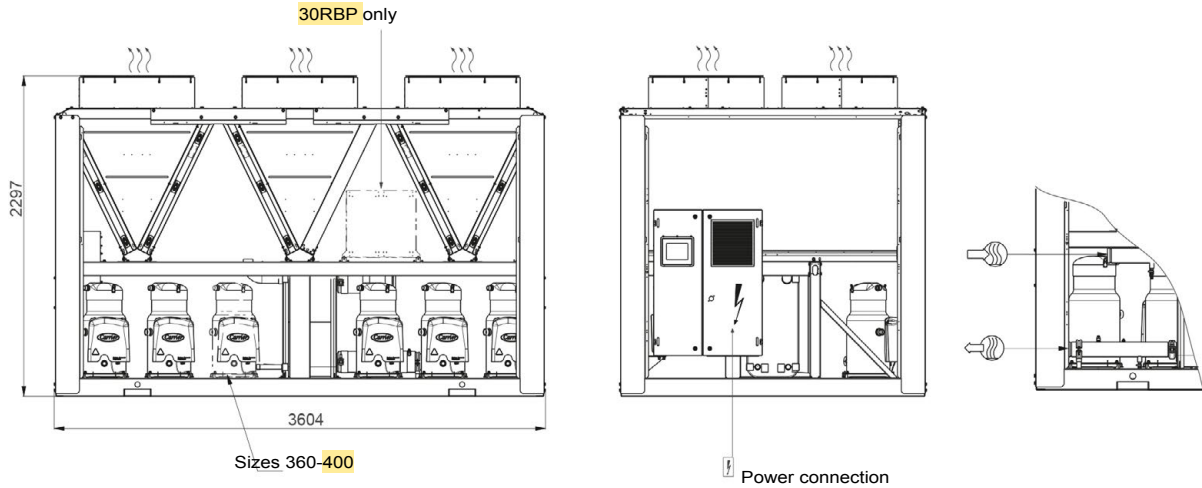
Sizes 430-520



DIMENSIONS/CLEARANCES

30RBM/30RBP 300-400 (with and without hydraulic module)

Without hydraulic module



Key:

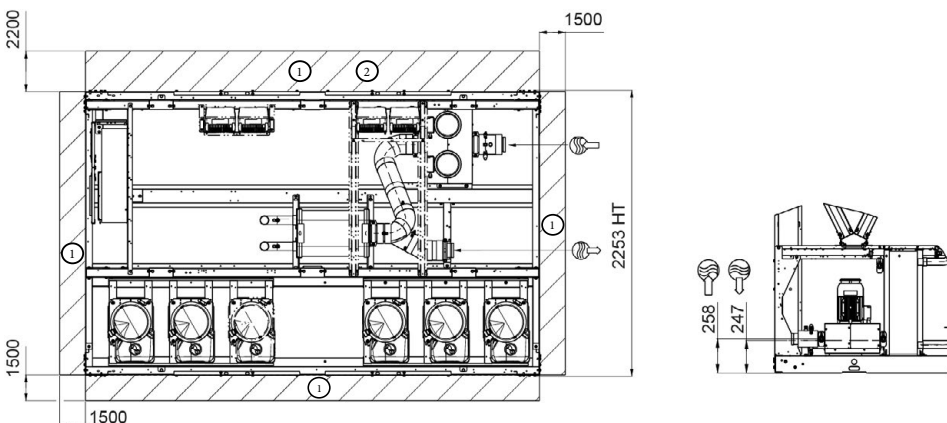
All dimensions are in mm.

- ① Clearances required for maintenance and air flow
- ② Clearance recommended for coil removal
-  Water inlet
-  Water outlet
-  Air outlet, do not obstruct
-  Electrical cabinet

Note: Drawings are not contractually binding. Before designing an installation, consult the certified dimensional drawings, available on request.

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

With hydraulic module



SPECIFICATION GUIDE - 30RBP

Condenser

- Coil shall be air-cooled Novation® micro channel heat exchanger (MCHE).
- The coil construction shall consist of a highly resistant aluminium alloy combined with an optional corrosion-resistant coating.
- The coil shall have a series of flat tubes containing a series of multiple, parallel flow micro-channels layered between the refrigerant manifolds.
- The coils shall consist of a two pass arrangement.
- Coil design shall adopt a V-shape for coil protection against hail damage. Vertical coils shall be excluded.
- The assembled condenser coils shall be 100% leak tested and pressure tested at 45 bar.

Fans

- All fans on the unit shall be equipped with variable-speed drive (with Greenspeed® intelligence) to provide higher part-load efficiency and reduced acoustic levels.
- All fans shall be automatically controlled (via Greenspeed® intelligence) to achieve higher part-load efficiency; winter operation at outside air temperatures as low as -20°C (as standard); automatic fan speed adjustment in case of coil fouling; floating condensing pressure; smooth fan start to increase unit lifetime and eliminate start/stop noise for sensitive acoustic applications.
- Each refrigerant circuit shall have a factory-installed, independent variable speed drive. Variable speed drives shall be rated IP 55 enclosures and CE compliant.
- The condenser fans shall have a minimum overall efficiency higher than the minimum efficiency target to comply with (EU) regulation No. 327/2011 implementing Directive 2009/125/EC with regard to Ecodesign requirements for industrial fans.
- The fans shall be direct-drive, 9-blade airfoil cross-section, reinforced polymer construction with inherent corrosion resistance, axial type, statically and dynamically balanced.
- Air shall be discharged vertically upward.
- The fans shall be protected by polyethylene-coated steel wire safety guards.
- Winter operation at outside air temperatures as low as -20°C as standard.

Refrigerant

- HFC R410-A refrigerant.
- The total unit refrigerant charge shall not exceed 0.14 kg/kW of the cooling capacity under Eurovent conditions. Units with higher refrigerant charge shall be excluded.

Refrigerant circuit components

The refrigerant circuit components shall include:

- Replaceable-core filter drier
- Moisture indicating sight glass
- Electronic expansion device
- Liquid line service valves
- Complete operating charge of refrigerant R-410A and compressor oil.

Electrical specifications

- Unit shall operate on 400 V, 3-phase, 50 Hz +/-10% power supply without neutral.
- Control voltage shall be supplied by a factory-installed transformer.
- Unit shall be supplied with factory-installed main circuit breaker, also acting as electrical disconnect/isolator.

Checks, safety and diagnostics

The unit controls shall include the following components as a minimum:

- Microprocessor with non-volatile memory
- Power transformer to serve all controllers, relays, and control components
- LCD user display
- Remote control by contact or CCN
- Replaceable controller boards
- Pressure sensors to measure suction and discharge pressure
- Thermistors to measure cooler entering and leaving fluid temperatures, outside air temperature and refrigerant suction temperature
- Programmable flow switch or water pressure transducers to protect against low water flow situation.

Controls features

- Automatic management of master/slave circuits (lead/lag).
- Control of the refrigerant parameters (suction superheating, condensing pressure control).
- Capacity control based on chilled water inlet (or outlet) temperature and compensated by the return temperature rate of exchange.
- Temperature setpoint shift according to the outside air temperature, or differential water inlet/outlet temperature or via a 0-10 V signal.
- Provision of a dual setpoint for the chilled water outlet temperature activated by a remote dry contact type signal or by the built-in timer program.
- Chilled water temperature pull-down rate at start-up in a range which can be adjusted from 0.11°C to 1.1°C per minute to prevent excessive demand spikes on start-up.
- Programmable seven-day time schedule. Up to 14 holiday period definitions
- *Night-time sound control* through demand limit and fan speed control to reduce the sound of the machine. Can be configured via a