



Water-Cooled/Condenserless Liquid Chillers with Integrated Hydronic Module

AQUASNAP™

PRO-DIALOG Plus



Quality Management System Approval

30RW/30RWA

Nominal cooling capacity 20-310 kW

- The new generation of 30RW/30RWA Aquasnap liquid chillers features the latest technological innovations: scroll compressors, digital auto-adaptive Pro-Dialog control and ozone-friendly refrigerant HFC-407C. Aquasnap can be supplied with hydronic evaporator and condenser modules as standard, limiting the installation to simple operations such as the entering and leaving water piping connection. An auto-adaptive control algorithm intelligently controls condenser water pump speed and the operation of the glycol cooler fans (30RW) or of the air-cooled condenser fans (30RWA) to ensure reliable and economical operation under any climate conditions.

"Plug and Play" installation

- Integrated hydronic modules: they minimise site installation complexity and reduce the required space for the chiller installation.

Evaporator hydronic module

This consists of a removable screen filter, single or twin-head water pump, expansion tank, water flow switch, safety valve, pressure gauge, and purge valve. A control valve permits adjustment of the flow rate to the water system characteristics. All components are isolated to prevent condensation.

Condenser hydronic module

This consists of a removable screen filter, single or twin-head (from size 060 upwards) variable-speed water pump, expansion tank, safety valve, pressure gauge, and purge valve. The variable-speed pump controls the chiller condensing pressure and makes the installation of a three-way mixing valve on the condenser water circuit unnecessary.

- Fan control: Pro-Dialog also controls the fans of the glycol cooler or remote air-cooled condenser. There are two methods: up to 8 stages maximum with balancing of fan operation times (30RW/RWA), or continuous speed variation (30RWA).
- Quick electrical connections: Aquasnap is equipped with a general disconnect switch and a 24 V control circuit supply transformer as standard. A single power supply entry (three-phase without neutral) supplies the chiller.

Economical operation

- The condensing pressure is optimised by a patented auto-adaptive algorithm. At part load or moderate outside temperature an algorithm intelligently controls the condenser water pump speed and the operation of the glycol cooler (30RW) or the condenser (30RWA) fans to maintain the condensing pressure at its lowest possible value. The standard 30RW chiller can operate down to -20°C outside temperature.

- The variable-speed condenser water pump automatically adjusts the water flow rate to maintain the ideal condensing conditions. At part load the power consumption of the pump is significantly reduced. A further advantage: as the three-way valve on the condenser circuit is not required, the hydronic circuit pressure drops are lower and the condenser water pump uses less energy.
- High-performance welded evaporator and condenser plate heat exchangers. With their counter-flow technology the heat exchangers maximise the thermodynamic properties of refrigerant HFC-407C. They are sized for very low water pressure drops. From size 30RW 160 upwards the evaporator and the condenser have two interlaced refrigerant circuits.

Finds space anywhere

- The Aquasnap chiller saves space, as it does not require additional space for the water pumps - everything is built into the unit. A further advantage: as routine unit maintenance operations are carried out via the front or side panels, the chiller can be installed against a wall.
- No plant room required. With its aesthetically pleasing casing design and the water connections at the top (30RW 020-150) the Aquasnap chiller can be installed in a place that is open to the public (garage, basement etc.), if local regulations permit.
- Low-noise operation. Aquasnap is equipped with quiet, vibration-free scroll compressors. These are well known for their durability and reliability, and they require no maintenance.

Reliability

- Refrigerant HFC-407C has no effect on the ozone layer, and is the replacement for R-22 in air conditioning applications with small and medium capacities. It has been extensively tested by Carrier for several years and offers the same reliability and even slightly superior performances to those of R-22.
- The refrigerant circuit is designed to be completely leak-proof. All pipes and the refrigeration components are welded, the capillaries, a source of leaks in the past, have been replaced. Pressure sensors, mounted directly on the pipes, take the place of the pressure switches. From size 30RW 160 upwards, two independent refrigerant circuits ensure partial cooling capacity in all circumstances.

PRO-DIALOG Plus control

- PRO-DIALOG Plus is an advanced numeric control system that combines intelligence with great operating simplicity. It controls the operation of compressors, evaporator and condenser water pumps and fans (glycol cooler or condenser).

Energy demand optimisation

- A patented auto-adaptive control algorithm optimises the condensing pressure at part load to reduce the compressor load, ensuring a perfect supply of the evaporator with liquid refrigerant. The algorithm controls the operation of the variable-speed condenser water pump and of the fans (glycol cooler or condenser).
- PRO-DIALOG Plus automatically resets the chilled-water temperature set point based on the outside air temperature or the return water temperature. The control can also operate on a second set point (example: unoccupied mode).

Total chiller protection

- A patented auto-adaptive algorithm controls the compressor operation and permanently adapts to the system characteristics (water loop inertia). Dangerous compressor cycling is prevented. The chiller can operate safely with a low water volume, and this frequently makes a buffer tank unnecessary (see minimum water volume later in this document).
- PRO-DIALOG permanently analyses the compressor suction and discharge pressures and temperatures. When an abnormal situation is detected, the control reacts e.g. by unloading one refrigerant circuit. As a result the compressors always operate in their ideal temperature range and many chiller fault shut-downs can be prevented.

Easy-to-use system

- The PRO-DIALOG operator interface is clear and user-friendly: LEDs and two numeric displays offer an immediate check of all unit operating data.
- By pushing the buttons conveniently positioned on a synoptic chiller diagram you have an immediate display of the following parameters: temperatures, pressures, set point, compressor run times etc.
- 10 menus offer direct access to all machine data, including a history of possible faults, for rapid and complete chiller fault diagnosis.

Easy remote control

- PRO-DIALOG Plus allows remote control and monitoring of the chiller through a wired connection: start/stop, cooling/heat reclaim mode selection, power demand limit or dual set point and customer safety lock. The system permits remote signalling of any possible anomaly for each refrigerant circuit.
- The optional "CCN Clock Board" offers other control possibilities. Three independent time schedules permit definition of:
 - chiller start/stop
 - operation at the second chilled-water set-point (e.g. unoccupied mode)
 - operation with a reduced number of fans (e.g. during the night).

This option also permits parallel operation of two units and remote control via communication bus (RS 485 serial port).



PRO-DIALOG Plus operator interface

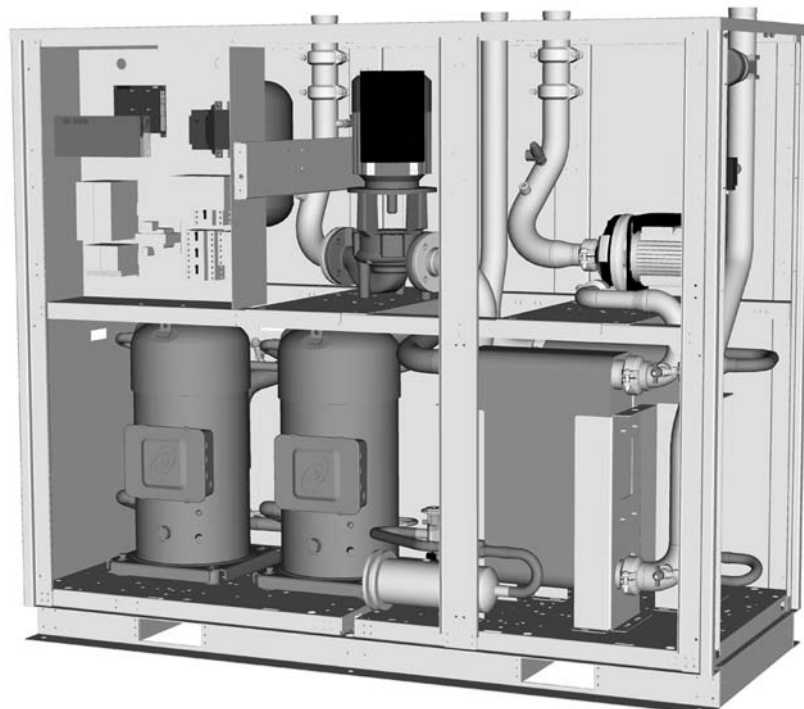
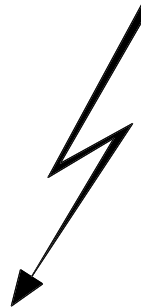
Options and accessories

	Option	Accessory
Chiller without condenser 30RWA	X	
Heat pump (hot or cold water control)	X	
Low leaving water temperature down to -10°C (30RW)	X	
Electronic starter for reduced start-up current	X	
CCN Clock Board RS485 communications and time schedule board	X	X
Communications board for the AQUASMART "hydronic solution" system	X	
Evaporator hydronic module with single pump	X	
Evaporator hydronic module with twin-head pump (sizes 060-300)	X	
Condenser hydronic module with variable-speed single pump	X	
Condenser hydronic module with variable-speed twin-head pump (sizes 060-300)	X	

The glycol coolers or air-cooled condensers of the Carrier 09 series are supplied ready for installation with a control box. A simple communication bus connects the liquid chiller to the heat rejection unit. As all control components are installed and tested in the factory, installation and start-up of the chiller and its associated glycol cooler are simplified.



Glycol cooler 09



Chiller 30RW

Physical data

30RW/RWA		020	025	030	040	045	060	070	080	090	110	120	135	150	160	185	210	245	275	300	
Nominal cooling capacity 30RW*	kW	20.2	25.9	29.9	39.7	45.3	56	70	80	91	108	123	139	149	162	183	216	247	284	310	
Nominal cooling capacity 30RWA**	kW	19	24.4	28.2	37.8	43.5	54	67	76	87	102	117	134	143	148	170	198	226	264	291	
Operating weight																					
30RW without hydronic module	kg	316	335	338	367	387	683	713	755	781	864	937	956	977	1079	1144	1357	1471	1421	1491	
30RWA without hydronic module	kg	325	339	339	361	375	627	648	682	703	777	840	849	859	953	1000	1318	1318	1361	1371	
Extra weight																					
Evaporator with single-pump hydronic kit	kg	25	25	25	27	27	14	14	14	14	15	15	15	15	75	75	75	75	60	63	
Condenser with single-pump hydronic kit	kg	35	35	35	37	37	20	20	20	20	80	80	80	80	80	80	95	95	97	101	
Evaporator with twin-head pump hydronic kit	kg	-	-	-	-	-	104	104	104	104	130	130	130	130	130	130	188	188	-	-	
Condenser with twin-head pump hydronic kit	kg	-	-	-	-	-	114	114	114	114	140	140	140	140	140	140	198	198	-	-	
Casing, if hydronic option is used	kg	-	-	-	-	-	-	-	-	-	-	-	-	-	170	170	170	170	-	-	
Refrigerant 30RW***		R-407C																			
Circuit A	kg	3.2	3.3	3.3	4.2	6.2	7.5	9.6	11	12.4	14	16.4	18.5	19.3	15	17	19	19	24	24	
Circuit B	kg	-	-	-	-	-	-	-	-	-	-	-	-	-	15	17	19	19	24	24	
Compressors 30RW/30RWA		Hermetic scroll, 48.3 r/s																			
Circuit A		1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
Circuit B		-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	2	2	2	2	
Number of capacity steps		1	1	1	1	1	2	2	2	2	2	2	2	2	4	4	4	4	4	4	
Minimum capacity	%	100	100	100	100	100	46	43	50	50	42	50	46	50	25	25	21	25	23	25	
Control		PRO-DIALOG Plus																			
Condensers (30RW)		Welded plate heat exchangers																			
Water volume	l	2	2.91	2.91	3.8	4.8	6.1	7.8	9	9.7	12.2	13.7	15.8	17.9	26.5	26.5	34.9	34.9	46.6	46.6	
Max. water-side operating pressure, without hydronic module	kPa	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	
Max. water-side operating pressure, with hydronic module	kPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	
Condenser hydronic module (30RW)		Single or twin-head composite centrifugal pump, as per option used, variable speed by frequency converter (48.3 r/s)																			
Condenser pump																					
Expansion tank volume, condenser loop	l	8	8	8	8	8	12	12	12	25	25	25	25	25	35	35	35	50	50	50	
Evaporator (30RW/30RWA)		Welded direct-expansion plate heat exchanger																			
Water volume	l	2	2.91	2.91	3.8	4.8	6.1	7.8	9	9.7	12.2	13.7	15.8	17.9	26.5	26.5	34.9	34.9	46.6	46.6	
Max. water-side operating pressure, without hydronic module	kPa	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	
Max. water-side operating pressure, with hydronic module	kPa	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	
Evaporator hydronic module (30RW/30RWA)		Single or twin-head composite centrifugal pump, as per option used (48.3 r/s)																			
Evaporator pump																					
Expansion tank volume, evaporator loop	l	8	8	8	8	8	12	12	12	25	25	25	25	25	35	35	35	50	50	50	
Water connections (30RW/30RWA)		Victaulic† (30RW 020-045 without hydronic module: threaded gas connections)																			
Standard field connection diameter, Victaulic	inch	2	2	2	2	2	2	2	2	2	3 OD	3 OD	3 OD	3 OD	3	3	3	3	3	3	
Welded field connection diameter	mm	60.3	60.3	60.3	60.3	60.3	60.3	60.3	60.3	60.3	76.1	76.1	76.1	76.1	88.9	88.9	88.9	88.9	88.9	88.9	
Field refrigerant connections (30RWA)		Welded copper tube																			
Outside discharge piping diameter	inch																				
Circuit A		7/8	7/8	7/8	7/8	1-1/8	1-1/8	1-1/8	1-1/8	1-3/8	1-3/8	1-3/8	1-3/8	1-3/8	1-1/8	1-3/8	1-3/8	1-3/8	1-3/8	1-3/8	
Circuit B		-	-	-	-	-	-	-	-	-	-	-	-	-	1-1/8	1-3/8	1-3/8	1-3/8	1-3/8	1-3/8	
Outside liquid refrigerant return piping diameter	inch																				
Circuit A		7/8	7/8	7/8	7/8	7/8	7/8	7/8	7/8	7/8	1-1/8	1-1/8	1-1/8	1-1/8	7/8	7/8	7/8	1-1/8	1-1/8	1-1/8	
Circuit B		-	-	-	-	-	-	-	-	-	-	-	-	-	7/8	7/8	7/8	1-1/8	1-1/8	1-1/8	

* Standard EUROVENT conditions: evaporator entering/leaving water temperature = 12°C/7°C, condenser entering/leaving water temperature = 30°C/35°C.

** Standard EUROVENT conditions: evaporator entering/leaving water temperature = 12°C/7°C, saturated bubble point condensing temperature = 45°C, subcooling = 5 K.

*** The RWA units only have a nitrogen holding charge

† With tubular sleeve, supplied with the unit, consisting of a Victaulic connection at one end and a plain section at the other end.

Electrical data

30RW/RWA (without hydronic module)		020	025	030	040	045	060	070	080	090	110	120	135	150	160	185	210	245	275	300	
Power circuit																					
Nominal power supply	V-ph-Hz	400-3-50																			
Voltage range	V	360-440																			
Control circuit supply																					
The control circuit is supplied via the unit-mounted transformer																					
Maximum unit power input 30RW/RWA*																					
	kW	8.1	10.3	12.0	15.8	18.0	22.3	27.8	31.6	36.1	42.4	48.8	54.0	59.1	63.2	72.2	84.9	97.6	107.9	118.2	
Nominal unit current draw 30RW**																					
	A	9.9	12.6	14.6	17.9	21.1	27.2	32.5	35.8	42.1	48.1	54.0	61.0	68.0	71.7	84.2	96.1	108.0	122.0	136.0	
Nominal unit current draw 30RWA***																					
	A	10.4	13.3	15.5	19.1	22.4	28.8	34.5	38.1	44.8	51.4	58.0	64.7	71.4	76.3	89.6	102.8	116.0	129.4	142.8	
Maximum unit current draw 30RW/RWA†																					
	A	13.7	17.6	20.5	25.9	30.2	38.0	46.3	51.8	60.5	69.2	78.0	99.9	96.0	120.1	120.9	138.5	156.0	174.0	192.0	
Maximum start-up current (standard unit without electronic starter) 30RW/30RWA††																					
	A	86.0	130.0	130.0	135.0	155.0	147.6	155.5	160.9	185.2	245.2	254.0	309.0	318.0	212.6	245.7	314.5	332.0	396.0	414.0	
Maximum start-up current (electronic-starter option) 30RW/30RWA‡																					
	A	51.6	78.0	78.0	81.0	93.0	95.6	101.5	106.9	123.2	159.2	168.0	201.0	210.0	158.6	183.7	228.5	246.0	288.0	306.0	
Three-phase short-circuit holding current 30RW/RWA																					
	kA	7.5	7.5	7.5	7.5	7.5	10	10	10	10	10	10	10	10	18	18	18	18	18	18	

* Power input of the compressor(s) at maximum unit operating conditions: entering/leaving evaporator water temperature = 15°C/10°C, maximum condensing temperature of 65°C, and 400 V nominal voltage.

** Nominal unit current draw at standard conditions: evaporator entering/leaving water temperature 12°C/7°C, condenser entering/leaving water temperature 30°C/35°C. The current values are given at 400 V nominal voltage.

*** Nominal unit current draw at standard conditions: evaporator entering/leaving water temperature 12°C/7°C, saturated condensing temperature (dew point) 45°C, subcooling 5 K The current values are given at 400 V nominal voltage.

† Maximum unit operating current at maximum unit power input and 400 V.

†† Maximum instantaneous starting current at 400 V nominal voltage and with compressor in across-the-line start (maximum operating current of the smallest compressor(s) + locked rotor current of the largest compressor).

‡ Maximum instantaneous starting current at 400 V nominal voltage and with compressor with electronic starter (maximum operating current of the smallest compressor(s) + reduced start-up current of the largest compressor).

Evaporator hydronic module

30RW/RWA		020	025	030	040	045	060	070	080	090	110	120	135	150	160	185	210	245	275	300	
Single pump																					
Shaft power rating	kW	0.75	0.75	0.75	0.75	0.75	1.5	1.5	1.5	1.5	1.85	1.85	1.85	1.85	4	4	4	4	4	4	
Power input*	kW	1.0	1.0	1.0	1.0	1.0	2.1	2.1	2.1	2.1	2.5	2.5	2.5	2.5	5	5	5	5	5	5	
Maximum current draw**	A	1.9	1.9	1.9	1.9	1.9	3.9	3.9	3.9	3.9	4.6	4.6	4.6	4.6	8.3	8.3	8.3	8.3	8.3	8.3	
Dual pump																					
Shaft power rating	kW	-	-	-	-	-	2.2	2.2	2.2	2.2	4	4	4	4	4	4	5.5	5.5	5.5	5.5	
Power input	kW	-	-	-	-	-	2.8	2.8	2.8	2.8	5.3	5.3	5.3	5.3	5.3	5.3	6.8	6.8	6.8	6.8	
Maximum current draw	A	-	-	-	-	-	4.7	4.7	4.7	4.7	8.7	8.7	8.7	8.7	8.7	8.7	11.6	11.6	11.6	11.6	

Condenser hydronic module

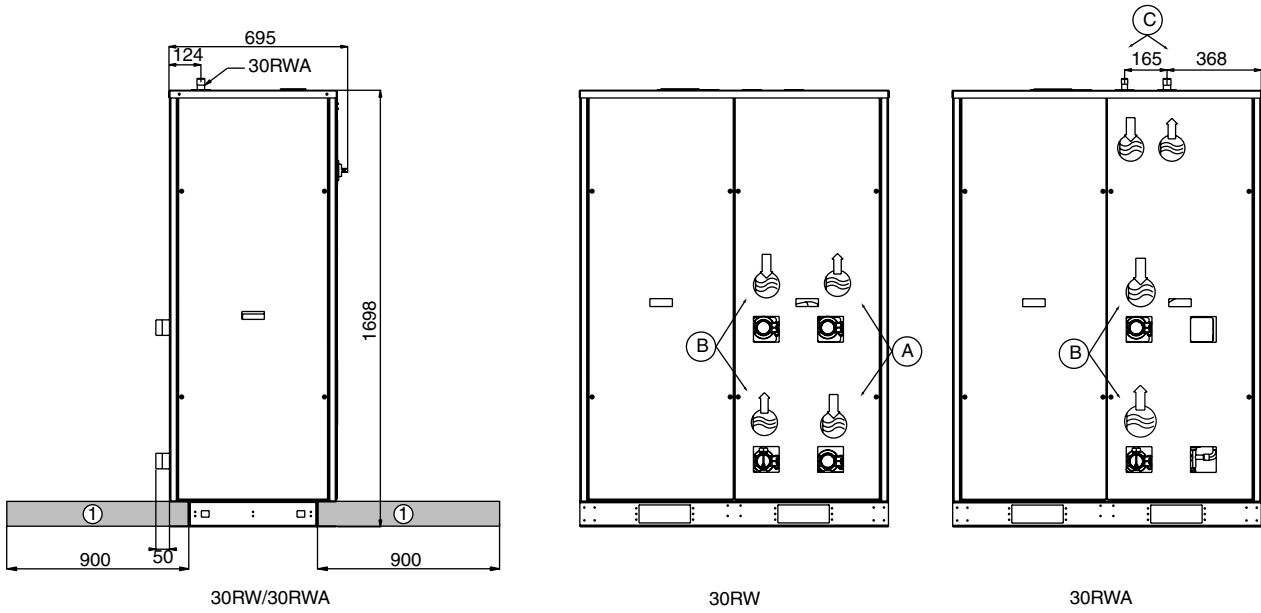
30RW/RWA		020	025	030	040	045	060	070	080	090	110	120	135	150	160	185	210	245	275	300	
Variable-speed single pump																					
Shaft power rating	kW	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	1.85	4	4	4	4	4	4	5.5	5.5	5.5	5.5	
Power input***	kW	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	5	5	5	5	5	5	6.7	6.7	6.7	6.7	
Maximum current draw†	A	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	4.6	8.3	8.3	8.3	8.3	8.3	8.3	11.5	11.5	11.5	11.5	
Pompe double à vitesse variable																					
Shaft power rating	kW	-	-	-	-	-	2.2	2.2	2.2	2.2	4	4	4	4	4	4	5.5	5.5	5.5	5.5	
Power input	kW	-	-	-	-	-	2.8	2.8	2.8	2.8	5.3	5.3	5.3	5.3	5.3	5.3	6.8	6.8	6.8	6.8	
Maximum current draw	A	-	-	-	-	-	4.7	4.7	4.7	4.7	8.7	8.7	8.7	8.7	8.7	8.7	11.6	11.6	11.6	11.6	

Notes:

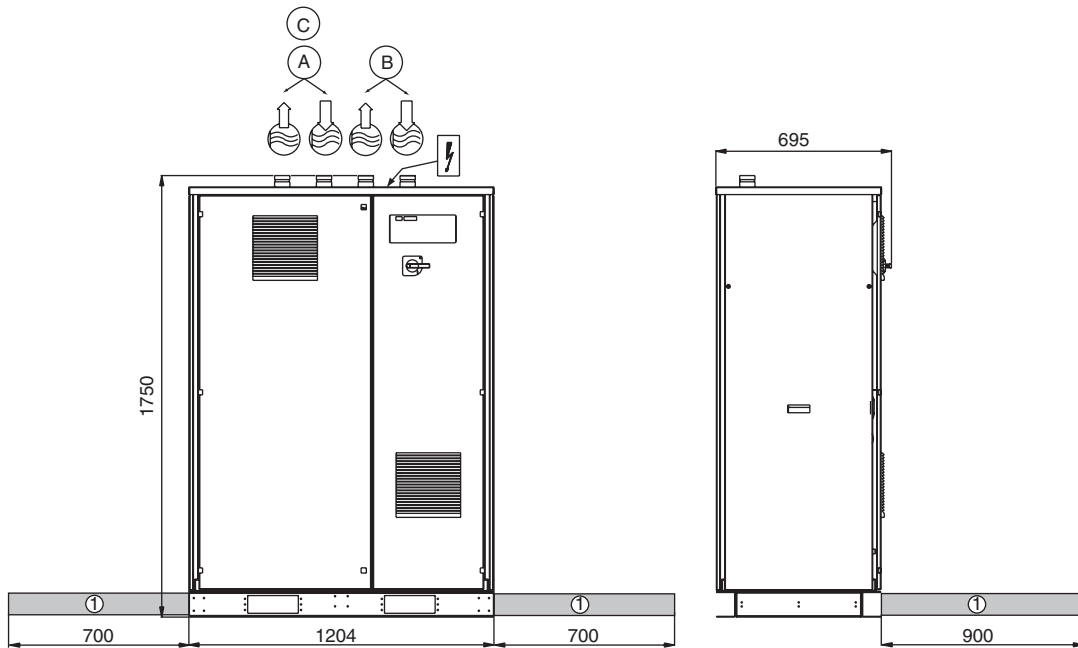
- The water pump power input values given are for guidance only.
- 30RW units have an evaporator and a condenser pump.
- 30RWA only have an evaporator pump.
- To obtain the maximum unit power input for a unit with hydronic kit add the evaporator (*) and condenser pump (***) power input to the maximum power input of the unit without hydronic module, given in the top table.
- To obtain the maximum unit current draw for a unit with hydronic kit add the evaporator (**) and condenser pump current (†) draw to the maximum current draw of the unit without hydronic module, given in the top table.

Dimensions/clearances

30RW/30RWA 020-045 - unit without hydronic module (standard)



30RW/30RWA 020-045 - unit with hydronic module (option) and/or unit with option 116E (Victaulic water connection at the top)



	30RW 020-030	30RW 040-045
A	1-1/4" gas	2" gas
B	1-1/4" gas	2" gas

Legend

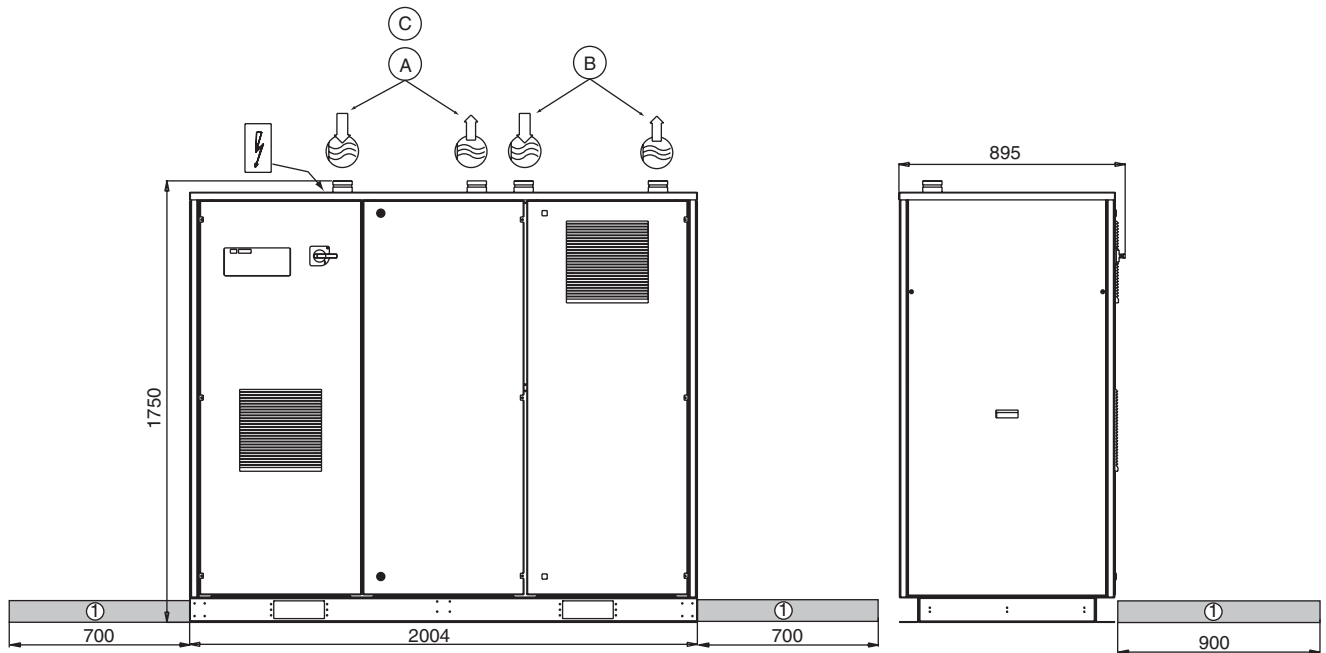
All dimensions are given in mm.

- Water inlet
- Water outlet
- A Condenser (water inlet/outlet for 30RW unit)
- B Evaporator
- C Refrigerant inlet/outlet (30RWA units only)
- Required clearances for maintenance
- Power supply

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





Dimensions/clearances

30RW/30RWA 060-150 - unit with or without hydronic module



Legend

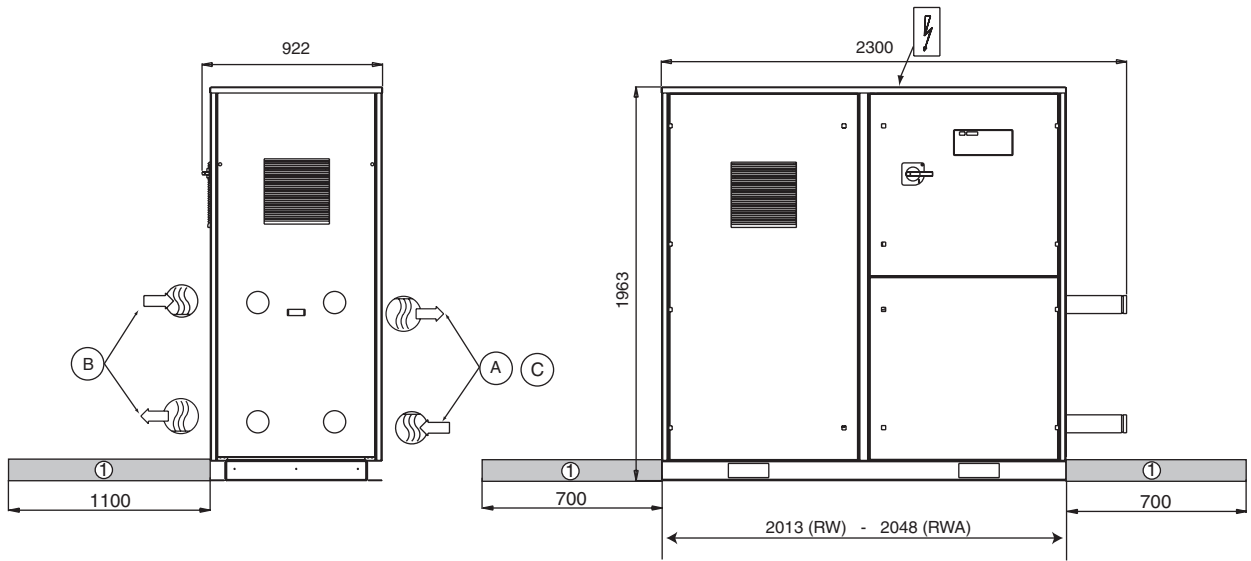
All dimensions are given in mm.

-  Water inlet
-  Water outlet
- A Condenser (water inlet/outlet for 30RW unit)
- B Evaporator
- C Refrigerant inlet/outlet (30RWA units only)
-  Required clearances for maintenance
-  Power supply

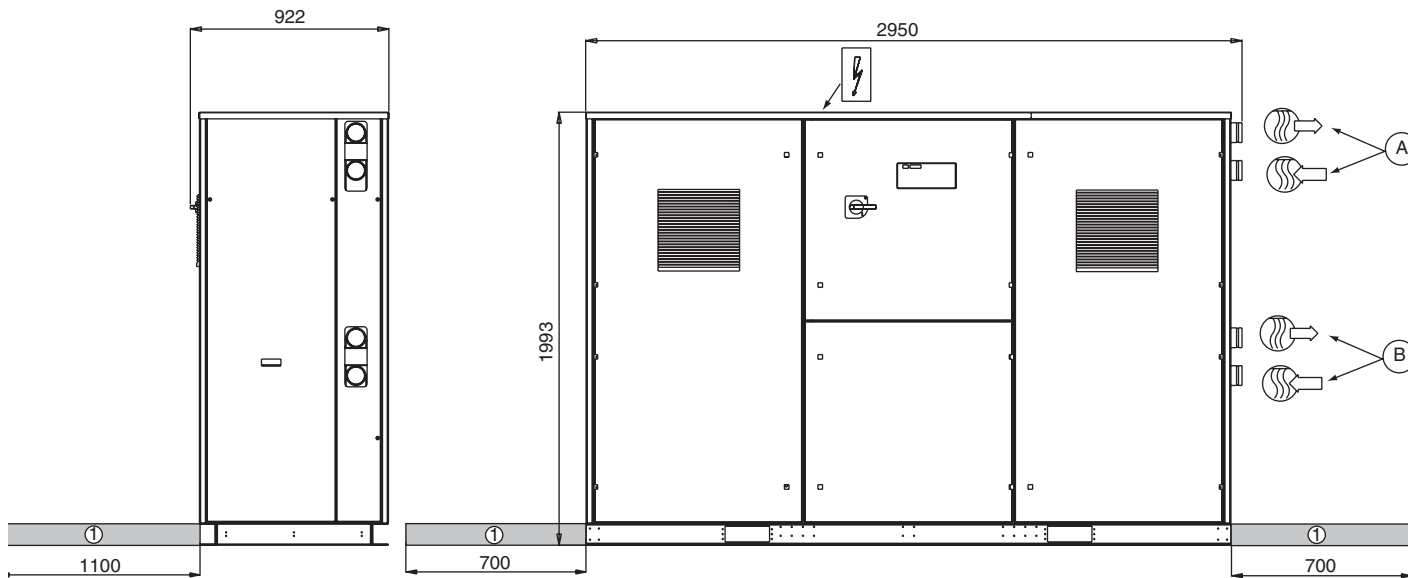
NOTE: Drawings are not contractually binding. Before designing an installation, consult the certified dimensional drawings, available on request.

Dimensions/clearances

30RW/30RWA 160-300 - unit without hydronic module (standard)







30RW/30RWA 160-300 - unit with hydronic module (option)



Legend

All dimensions are given in mm.

-  Water inlet
-  Water outlet
- A Condenser (water inlet/outlet for 30RW unit)
- B Evaporator
- C Refrigerant inlet/outlet (30RWA units only)
-  Required clearances for maintenance
-  Power supply

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

Cooling capacities 30RW

30RW	Condenser entering water temperature °C																															
	30				35				40				45																			
	CAP kW	COMP i/s	COOL kPa	COOL PRES kPa	COND i/s	COND kPa	COND PRES kPa	COND PRES kPa	CAP kW	COMP i/s	COOL kPa	COOL PRES kPa	COND i/s	COND kPa	COND PRES kPa	COND PRES kPa	CAP kW	COMP i/s	COOL kPa	COOL PRES kPa	COND i/s	COND kPa	COND PRES kPa	COND PRES kPa								
020	18.8	4.99	0.9	34	137	1.13	50	188	17.6	5.59	0.84	30	142	1.11	48	190	16.4	6.25	0.78	26	146	1.08	46	192	15	7	0.72	23	150	1.05	44	195
025	24.2	6.25	1.16	18	149	1.45	26	206	22.7	7.03	1.08	16	153	1.41	25	208	21.3	7.92	1.01	14	156	1.38	24	209	19.4	8.92	0.93	12	159	1.34	23	211
030	27.9	7.25	1.33	23	141	1.67	34	193	26.2	8.18	1.25	20	145	1.63	32	195	24.3	9.23	1.16	18	149	1.59	31	198	22.4	10.4	1.07	15	153	1.55	29	200
040	37	9.69	1.77	23	147	2.22	36	204	34.8	10.9	1.66	21	151	2.17	35	206	32.6	12.3	1.56	18	154	2.12	33	208	30.2	13.9	1.44	15	158	2.08	32	209
045	42.2	11.4	2.02	19	148	2.54	30	207	39.6	12.8	1.89	17	152	2.48	29	209	36.7	14.3	1.76	14	156	2.42	27	211	33.7	16.1	1.61	12	160	2.35	26	213
060	52	14	2.49	18	189	3.13	29	201	48.8	15.7	2.33	16	193	3.06	27	203	45.3	17.8	2.16	14	196	2.98	26	205	41.4	20	1.98	12	199	2.9	25	208
070	65	17.1	3.13	19	182	3.91	29	186	62	19.2	2.94	16	187	3.82	28	190	57	21.7	2.74	14	191	3.74	26	192	53	24.5	2.53	12	195	3.65	25	195
080	74	19.4	3.55	22	173	4.45	33	170	70	21.9	3.35	20	178	4.35	32	173	66	24.6	3.13	17	184	4.26	31	177	61	27.8	2.91	15	189	4.18	30	180
090	84	22.7	4.03	25	161	5.08	39	148	79	25.5	3.78	22	169	4.95	37	153	73	28.7	3.51	19	176	4.82	35	159	67	32.2	3.22	16	183	4.69	33	164
100	101	26.1	4.8	23	186	6	36	209	95	29.2	4.52	21	193	5.86	34	211	88	32.7	4.22	18	200	5.71	33	213	82	36.6	3.9	16	207	5.58	31	215
120	114	30.7	5.47	25	171	6.87	39	200	108	34.2	5.14	22	193	6.71	37	203	101	38.2	4.81	20	189	6.55	35	206	93	42.7	4.46	17	198	6.41	34	208
135	130	34.1	6.22	25	154	7.78	38	193	123	38.1	5.87	22	165	7.61	37	196	115	42.5	5.5	20	176	7.44	35	199	107	47.4	5.1	17	187	7.26	34	202
150	139	37.4	6.66	23	145	8.37	36	190	132	41.8	6.3	21	157	8.21	35	193	124	46.7	5.9	18	169	8.03	33	196	115	52	5.48	16	180	7.85	32	199
160	151	35.6	7.23	24	212	8.84	34	186	143	40	6.84	21	218	8.65	33	190	135	45	6.43	19	223	8.47	32	193	126	51	6	17	228	8.3	30	196
185	171	42.7	8.15	26	202	10.1	39	166	161	47.9	7.68	23	209	9.85	37	171	150	54	7.17	21	216	9.61	35	176	138	60	6.61	18	223	9.36	34	181
210	201	49.4	9.6	18	209	11.8	27	208	190	55	9.06	16	216	11.6	26	210	178	62	8.5	15	222	11.3	25	213	165	69	7.89	13	228	11	24	216
245	230	57	11	23	189	13.6	35	188	217	64	10.4	21	198	13.3	33	192	204	71	9.74	19	207	13	32	196	190	79	9.07	16	215	12.7	31	199
275	265	65	12.6	20	171	15.6	30	177	251	72	12	18	182	15.3	29	181	236	81	11.3	16	193	14.9	27	185	220	90	10.5	14	204	14.6	26	189
300	290	71	13.8	24	149	17.1	36	157	275	80	13.2	21	162	16.8	34	161	259	89	12.4	19	176	16.4	33	166	242	99	11.6	17	189	16	32	171
020	19.5	5	0.93	36	135	1.17	53	184	18.3	5.59	0.87	32	139	1.14	50	187	17	6.26	0.81	28	144	1.11	48	190	15.6	7.01	0.75	25	148	1.07	45	193
025	25.1	6.26	1.2	19	147	1.49	27	203	23.5	7.04	1.12	17	151	1.45	26	206	21.9	7.92	1.05	15	154	1.42	25	207	20.1	8.93	0.96	13	158	1.38	24	209
030	28.9	7.25	1.38	24	138	1.72	36	190	27.1	8.18	1.32	22	142	1.68	34	192	25.2	9.23	1.21	19	147	1.63	32	195	23.2	10.4	1.11	16	152	1.59	31	198
040	38.3	9.7	1.83	25	145	2.28	38	201	36.1	10.9	1.72	22	149	2.23	37	203	33.8	12.3	1.61	19	153	2.18	35	205	31.3	13.9	1.5	17	156	2.14	34	207
045	43.7	11.4	2.09	20	146	2.62	32	204	41	12.8	1.96	18	150	2.55	30	207	38.1	14.4	1.82	15	154	2.48	29	209	34.9	16.1	1.67	13	158	2.41	27	212
060	54	14	2.58	20	187	3.22	30	197	51	15.7	2.42	17	191	3.14	29	200	46.9	17.8	2.24	15	195	3.06	27	203	43	20	2.05	12	198	2.97	26	206
070	68	17.1	3.24	20	182	4.02	31	184	64	19.3	3.04	18	184	3.93	29	186	59	21.7	2.84	15	189	3.84	28	189	55	24.5	2.62	13	193	3.75	27	192
080	77	19.5	3.68	23	169	4.57	35	165	73	21.9	3.47	21	175	4.47	34	169	68	24.7	3.24	18	181	4.37	32	173	63	27.8	3.01	16	186	4.28	31	176
090	87	22.8	4.18	27	156	5.22	41	141	82	25.6	3.92	24	165	5.09	39	147	76	28.7	3.64	21	173	4.95	37	153	70	32.3	3.34	17	181	4.81	35	159
110	104	26.2	4.98	25	181	6.18	38	205	98	29.3	4.69	22	189	6.02	36	202	92	32.8	4.38	20	197	5.87	34	211	85	36.7	4.05	17	204	5.72	33	213
120	119	30.8	5.66	27	166	7.07	41	197	112	34.3	5.33	24	175	6.9	39	200	104	38.3	4.98	21	185	6.73	37	203	97	42.9	4.62	18	194	6.58	36	205
135	135	34.3	6.44	27	147	8	41	189	127	38.2	6.08	24	159	7.82	39	192	119	42.7	5.69	21	171	7.64	37	195	111	47.6	5.29	18	182	7.46	35	199
150	144	37.6	6.89	25	137	8.61	38	185	136	42	6.52	22	149	8.44	36	188	128	46.9	6.11	20	162	8.25	35	192	119	52	5.67	17	175	8.05	33	195
160	157	35.6	7.48	25	209	9.1	36	181	148	40	7.08	23	214	8.9	35	185	139	45.1	6.66	20	220	8.71	33	189	130	51	6.22	18	225	8.52	32	192
185	177	42.8	8.44	28	197	10.4	41	160	166	48	7.95	25	205	10.1	39	165	155	54	7.43	22	212	9.87	37	171	143	61	6.85	19	220	9.6	35	176
210	208	49.5	9.94	19	204	12.2	28	204	197	55	9.39	18	212	11.9	27	207	184	62	8.81	16	219	11.6	26	210	171	69	8.19	14	225	11.3	25	213
245	238	57	11.4	25	183	14	37	183	225	64	10.8	23	193	13.6	35	187	211	71	10.1	20	202	13.3	34	191	197	79	9.41	18	211	13	32	195
275	274	65	13.1	21	163	16	32	171	260	73	12.4	19	175	15.7	30	175	244	81	11.7	17	187	15.3	29	180	228	90	10.9	15	199	15	28	184
300	300	71	14.3	25	139	17.6	38	150	285	80	13.6	23	154	17.2	36	155	268	89	12.8	20	168	16.9	35	160	250	99	12	18	183	16.5	33	165
020	20.2	5	0.96	38	132	1.2	55	181	19	5.6	0.91	35	136	1.17	53	184	17.6	6.27	0.84	30	142	1.14	50	187	16.2	7.02	0.77	26	147	1.1	47	191
025	25.9	6.26	1.24	20	145	1.53	29	201	24.4	7.04	1.17	18	149	1.49	27	203	22.7	7.93	1.08	16	153	1.45	26	206	20.9	8.93	1	13	156	1.41	25	208
030	29.7	7.25	1.43	26	135	1.77	37	186	28.1	8.18	1.34	23	140	1.72	36	190	26.1	9.23	1.25	20	145	1.68	34	192	24	10.4	1.15	17	150	1.63	32	195
040	39.7	9.72	1.9	27	142	2.35	41	198	37.4	10.9	1.79	24	146	2.29	39	201	35	12.3	1.67	21	151	2.24	37	203	32.5	13.9	1.55	18	155	2.19	35	205
045	45.3	11.4	2.16	22	143	2.69	34	202	42.5	12.8	2.03	19	148	2.62	32	204	39.5	14.4	1.88	17	152	2.55	30	207	36.2	16.2	1.73	14	157	2.47	28	210
060	56	14	2.67	21	185	3.31	32	194	52	15.7	2.5	18	189	3.23	31	197	48.6	17.8	2.32	16	193	3.14	29	200	44.6	20	2.13	13	197	3.05	27	203
070	70	17.1	3.35	21	177	4.14	32	178	66	19.3	3.15	19																				

Cooling capacities 30RW (cont.)

°C	Condenser leaving water temperature °C																															
	30			35			40			45																						
30RW	CAP kW	COMP kW	COOL kPa	COOL I/s	COND kPa	COND I/s	COND kPa	COND I/s	COND kPa	COND I/s	COND kPa	COND I/s	CAP kW	COMP kW	COOL kPa	COOL I/s	COND kPa	COND I/s	COND kPa	COND I/s	CAP kW	COMP kW	COOL kPa	COOL I/s	COND kPa	COND I/s	COND kPa	COND I/s				
8	20.9	5.01	1	41	129	1.24	58	177	19.6	5.61	0.94	37	134	1.2	55	181	18.3	6.28	0.87	32	139	1.17	53	184	16.8	7.04	0.8	28	145	1.13	50	188
020	26.9	6.26	1.28	21	143	1.58	30	198	25.3	7.04	1.21	19	147	1.54	29	201	23.5	7.93	1.12	17	151	1.49	27	203	21.7	8.94	1.03	14	155	1.45	26	206
030	30.9	7.25	1.48	27	132	1.82	39	183	29.1	8.17	1.39	24	138	1.77	37	186	27.1	9.23	1.29	21	143	1.72	36	190	24.9	10.4	1.19	18	148	1.67	34	193
040	41.1	9.73	1.96	29	139	2.41	43	195	38.7	10.9	1.85	26	144	2.36	41	198	36.2	12.3	1.73	22	149	2.3	39	200	33.7	13.9	1.61	19	153	2.25	37	203
050	46.8	11.4	2.24	23	140	2.77	36	199	44	12.8	2.1	21	145	2.69	34	202	40.9	14.4	1.95	18	150	2.62	32	204	37.5	16.2	1.79	15	155	2.54	30	207
060	58	14	2.76	23	183	3.41	34	191	54	15.7	2.59	20	187	3.32	32	194	50	17.8	2.41	17	191	3.22	30	197	46.2	20	2.21	14	195	3.13	29	201
070	73	17.1	3.47	27	173	4.26	34	173	68	19.3	3.26	20	179	4.15	33	178	64	21.7	3.05	18	184	4.04	31	182	59	24.5	2.82	15	189	3.94	29	185
080	83	19.5	3.94	27	161	4.84	39	154	78	21.9	3.72	24	168	4.72	37	159	73	24.7	3.48	21	175	4.61	36	163	68	27.9	3.23	18	181	4.51	34	167
090	94	22.8	4.48	30	146	5.52	45	128	88	25.6	4.2	27	156	5.37	43	135	82	28.8	3.9	23	165	5.22	41	141	75	32.4	3.58	20	174	5.06	38	148
100	112	26.4	5.33	29	171	6.54	42	199	105	29.4	5.02	26	180	6.37	40	202	98	32.9	4.7	22	189	6.2	38	205	91	36.9	4.35	19	197	6.03	36	208
120	127	31.1	6.07	31	152	7.49	45	188	120	34.6	5.72	27	164	7.3	43	192	112	38.6	5.35	24	175	7.11	41	196	104	43.2	4.97	21	185	6.94	39	199
135	144	34.5	6.89	30	131	8.47	45	179	136	38.5	6.51	27	145	8.27	43	183	128	43	6.1	24	158	8.06	41	188	119	48	5.67	21	171	7.86	39	191
150	154	37.9	7.37	28	119	9.1	42	175	146	42.4	6.98	25	134	8.91	40	179	137	47.2	6.55	22	148	8.7	39	183	127	53	6.08	19	163	8.48	37	188
160	168	35.8	8.02	28	200	9.64	40	171	159	40.2	7.59	26	207	9.42	38	175	150	45.2	7.15	23	214	9.2	37	180	140	51	6.67	20	220	8.99	35	184
185	189	42.9	9.04	32	187	11	45	147	178	48.1	8.53	28	195	10.7	43	153	167	54	7.97	25	204	10.4	41	159	154	61	7.36	22	213	10.1	39	166
210	223	49.8	10.7	22	194	12.9	32	196	211	56	10.1	20	202	12.6	30	200	198	62	9.45	18	211	12.3	29	203	184	70	8.79	16	219	12	27	207
245	255	58	12.2	29	169	14.8	41	172	241	64	11.5	26	180	14.5	39	177	227	72	10.8	23	191	14.1	37	182	212	80	10.1	20	202	13.7	36	186
275	293	66	14	24	146	17	35	158	278	73	13.3	22	160	16.6	34	163	262	82	12.5	19	174	16.2	32	169	244	91	11.7	17	187	15.8	31	174
300	321	72	15.3	29	118	18.6	42	135	305	81	14.6	26	135	18.2	40	140	287	90	13.7	23	151	17.8	39	146	268	100	12.8	20	168	17.4	37	153
10	22.4	5.01	1.07	46	123	1.31	64	170	21.1	5.62	1.01	41	128	1.27	61	174	19.6	6.3	0.94	37	134	1.23	58	178	18.1	7.06	0.86	31	140	1.19	54	182
025	28.8	6.26	1.37	24	139	1.67	34	193	27.1	7.04	1.29	21	143	1.62	32	196	25.2	7.93	1.21	19	147	1.58	30	198	23.3	8.94	1.11	16	152	1.53	29	201
030	33.1	7.24	1.58	31	126	1.92	43	176	31.2	8.17	1.49	28	132	1.87	41	180	29	9.22	1.39	24	138	1.82	29	193	26.8	10.4	1.28	21	143	1.76	37	187
040	43.9	9.76	2.1	33	133	2.55	48	189	41.4	11.1	1.98	29	138	2.49	46	192	38.8	12.4	1.85	26	144	2.43	44	195	36.1	13.9	1.72	22	149	2.37	42	197
045	50	11.4	2.39	27	134	2.92	40	193	47.1	12.9	2.25	24	140	2.84	37	196	43.8	14.4	2.09	20	146	2.76	35	199	40.2	16.2	1.92	17	151	2.67	33	202
060	62	14	2.96	26	177	3.6	38	183	58	15.7	2.78	23	182	3.5	36	187	54	17.7	2.58	20	187	3.4	34	191	49.6	20	2.37	17	192	3.29	32	195
070	78	17.1	3.71	26	166	4.5	38	164	73	19.3	3.5	23	172	4.38	36	168	68	21.8	3.27	20	179	4.26	34	173	63	24.6	3.02	17	185	4.15	33	178
080	88	19.6	4.22	30	152	5.12	44	141	83	22	3.98	27	160	4.99	42	147	78	24.8	3.73	24	168	4.86	40	153	73	27.9	3.47	21	175	4.74	38	158
090	100	22.9	4.79	35	135	5.84	50	112	94	25.7	4.5	31	145	5.67	47	120	88	28.9	4.18	27	156	5.5	45	129	80	32.5	3.84	23	167	5.33	42	136
110	119	26.5	5.71	33	159	6.92	47	191	113	29.6	5.38	29	169	6.73	45	195	105	33.1	5.03	26	180	6.55	42	199	98	37.1	4.66	22	190	6.36	40	202
120	136	31.3	6.51	35	137	7.93	51	179	128	34.8	6.13	31	150	7.72	48	184	120	38.9	5.74	28	163	7.51	46	188	112	43.5	5.33	24	175	7.32	44	192
135	154	34.8	7.37	35	113	8.96	50	169	146	38.8	6.97	31	128	8.74	48	174	137	43.3	6.53	28	144	8.51	46	178	127	48.3	6.07	24	159	8.28	43	183
150	165	38.2	7.88	32	99	9.63	47	164	156	42.7	7.47	29	115	9.41	45	169	147	47.6	7.01	26	133	9.18	43	174	136	53	6.52	22	149	8.93	41	179
160	180	35.9	8.58	32	191	10.2	44	159	170	40.3	8.13	29	199	9.96	42	164	160	45.3	7.66	26	206	9.71	41	169	150	51	7.16	23	213	9.47	39	174
185	202	43	9.67	36	175	11.6	50	132	191	48.3	9.13	32	185	11.3	48	139	179	54	8.53	28	195	11	45	147	165	61	7.89	25	206	10.7	43	154
210	239	50	11.4	25	182	13.7	35	187	226	56	10.8	23	192	13.3	34	191	212	62	10.1	20	202	13	32	195	197	70	9.43	18	211	12.6	30	199
245	274	58	13.1	32	152	15.7	46	160	259	65	12.4	29	166	15.3	43	166	243	72	11.6	26	179	14.9	41	171	227	80	10.9	23	191	14.5	39	177
275	314	66	15	28	125	18	39	144	298	74	14.2	25	142	17.6	38	150	280	82	13.4	22	158	17.1	36	156	262	92	12.5	19	174	16.7	34	163
300	343	73	16.4	33	94	19.7	47	117	326	81	15.6	30	112	19.3	45	124	307	91	14.7	27	132	18.8	43	131	287	101	13.7	23	152	18.3	41	139

Application data:
 Standard units:
 Refrigerant: R407C
 Condenser and evaporator entering/leaving water temperature difference: 5 K
 Evaporator fluid: Chilled water
 Fouling factor: 0.44 x 10⁻⁴ (m²K)/W

Legend:
 CAP kW
 COMP kW
 COOL I/s
 COOL kPa
 COND I/s
 COND kPa
 COND PRES kPa

- Leaving water temperature °C
 - Cooling capacity
 - Compressor power input
 - Evaporator water flow rate
 - Evaporator water pressure drop
 - Available pressure at the unit evaporator outlet (unit with hydronic module)
 - Condenser water flow rate
 - Condenser water pressure drop
 - Available pressure at the unit condenser outlet (unit with hydronic module)

Note: For the water pump power input (30RW with hydronic module) please refer to the electrical data table.

Cooling capacities 30RWA

30RWA	Compressor discharge pressure, kPa																													
	1243 (35°C/29,58°C**)				1433 (40°C/34,76°C**)				1643 (45°C/39,95°C**)				1873 (50°C/45,16°C**)				2126 (55°C/50,38°C**)													
	CAP kW	COMP kW	COOL l/s	COOL kPa	COOL PRES kPa	THR kW	CAP kW	COMP kW	COOL l/s	COOL kPa	COOL PRES kPa	THR kW	CAP kW	COMP kW	COOL l/s	COOL kPa	COOL PRES kPa	THR kW	CAP kW	COMP kW	COOL l/s	COOL kPa	COOL PRES kPa	THR kW						
020	20.7	4.01	0.99	40	130	24.5	19.8	4.47	0.95	37	133	24	18.8	4.99	0.9	34	137	23.5	17.7	5.56	0.84	30	141	22.9	16.5	6.21	0.79	27	145	22.4
025	26.6	5.03	1.27	21	144	31.4	25.4	5.61	1.21	19	147	30.8	24.1	6.28	1.15	17	150	30.1	22.7	7.04	1.08	16	153	29.4	21.2	7.9	1.01	14	156	28.7
030	30.8	5.79	1.47	27	133	36.3	29.4	6.47	1.4	25	137	35.5	27.9	7.25	1.33	23	141	34.8	26.2	8.14	1.25	20	145	34	24.5	9.16	1.17	18	149	33.2
040	41	7.64	1.96	29	139	48.3	39.2	8.53	1.87	26	143	47.3	37.3	9.54	1.78	24	147	46.4	35.2	10.7	1.68	21	150	45.4	33.1	12	1.58	19	154	44.5
045	47.3	8.84	2.26	24	139	56	45.2	9.86	2.16	22	143	55	42.9	11.1	2.05	20	147	55	40.5	12.3	1.93	17	151	52	37.8	13.8	1.8	15	155	51
060	58	10.8	2.79	23	182	69	56	12.1	2.67	21	185	67	53	13.5	2.53	19	188	66	49.9	15.2	2.38	17	192	64	46.5	17	2.22	15	195	63
070	73	13.4	3.48	23	173	86	70	15	3.32	21	177	84	66	16.8	3.15	19	182	82	62	18.8	2.98	17	186	80	58	21.1	2.79	15	190	78
080	83	15.3	3.95	27	161	97	79	17.1	3.77	25	166	95	75	19.1	3.59	22	172	93	71	21.4	3.39	20	177	91	67	24	3.18	18	182	89
090	95	17.7	4.52	31	145	111	90	19.7	4.32	28	152	109	86	22	4.1	26	159	107	81	24.6	3.87	23	164	104	76	27.6	3.61	20	174	102
110	111	21.2	5.3	28	172	131	106	23.5	5.06	26	179	128	101	26.1	4.81	23	186	125	95	29.1	4.53	21	193	123	89	32.4	4.25	18	200	120
120	127	24.7	6.09	31	152	151	122	27.3	5.81	28	161	148	116	30.2	5.52	26	170	144	109	33.5	5.21	23	179	141	102	37.2	4.89	20	187	138
135	143	27	6.85	30	132	169	138	30.1	6.58	28	142	166	131	33.5	6.28	25	153	163	124	37.3	5.94	23	163	160	117	41.4	5.59	20	174	156
150	152	29.2	7.28	28	123	180	147	32.9	7.02	26	132	178	141	36.7	6.72	24	143	176	134	40.9	6.38	21	154	172	126	45.5	6.01	19	166	169
160	161	30.5	7.69	26	206	190	154	34.1	7.34	24	211	186	146	38.2	6.98	22	216	182	158	42.8	6.59	20	221	179	140	48	6.19	18	226	175
185	185	35.4	8.83	30	190	218	177	39.4	8.44	28	197	214	168	44	8.02	25	204	210	158	49.3	7.55	23	211	205	148	55	7.05	20	217	200
210	215	42.3	10.3	21	200	255	205	46.9	9.81	19	206	250	195	52	9.32	17	213	245	184	58	8.79	16	219	239	172	65	8.22	14	225	234
245	246	49.3	11.8	27	177	293	235	54	11.2	24	185	287	223	60	10.7	22	194	280	210	67	10.1	20	203	274	197	74	9.43	18	211	268
275	284	54	13.6	23	154	335	273	60	13	21	164	330	260	67	12.4	19	175	324	246	75	11.8	17	186	317	232	83	11.1	15	196	310
300	309	59	14.8	27	130	365	298	66	14.2	25	141	361	285	74	13.6	23	153	355	271	82	12.9	21	166	349	255	91	12.2	19	179	342
020	21.5	4.01	1.03	43	127	25.3	20.5	4.47	0.98	39	131	24.8	19.5	4.99	0.93	36	135	24.2	18.3	5.56	0.88	32	139	23.6	17.1	6.21	0.82	29	143	23
025	27.6	5.02	1.32	22	141	32.4	26.4	5.61	1.26	20	145	31.7	25	6.28	1.19	19	148	31	23.5	7.03	1.12	17	151	30.2	22	7.89	1.05	15	154	29.5
030	31.9	5.78	1.52	29	130	37.4	30.5	6.46	1.46	27	134	36.6	28.9	7.24	1.38	24	138	35.8	27.2	8.13	1.3	22	142	34.9	25.4	9.15	1.21	19	147	34.1
040	42.5	7.65	2.03	31	136	49.8	40.6	8.54	1.94	28	140	48.7	38.6	9.54	1.85	25	144	47.7	36.5	10.7	1.74	23	148	46.7	34.3	12	1.64	20	152	45.7
045	49	8.85	2.34	26	136	57	46.8	9.86	2.24	23	140	56	44.5	11	2.13	21	144	55	41.9	12.3	2	19	148	54	39.2	13.8	1.87	16	153	52
060	61	10.8	2.89	25	179	71	58	12.1	2.77	23	182	69	55	13.5	2.62	20	176	68	52	15.2	2.47	18	190	66	48.3	17	2.31	16	193	64
070	75	13.4	3.6	25	169	88	72	15.1	3.44	22	174	86	68	16.8	3.27	20	179	84	65	18.8	3.09	18	183	82	60	21.1	2.89	16	188	81
080	86	15.3	4.09	29	156	100	82	17.1	3.91	26	162	98	78	19.1	3.72	24	168	96	74	21.4	3.51	21	174	94	69	24	3.3	19	180	92
090	98	17.7	4.68	33	139	115	94	19.7	4.47	30	146	112	89	22	4.25	28	154	110	84	24.6	4.01	25	162	107	78	27.6	3.74	22	170	105
110	115	21.2	5.49	30	166	135	110	23.5	5.24	28	173	132	104	26.2	4.98	25	181	129	98	29.1	4.7	22	188	126	92	32.5	4.4	20	196	123
120	132	24.7	6.31	33	144	156	126	27.4	6.02	30	154	152	120	30.3	5.72	27	164	149	113	33.6	5.41	25	173	145	106	37.3	5.07	22	182	142
135	148	27.1	7.09	32	124	174	143	30.2	6.81	30	134	171	136	33.6	6.5	27	145	168	129	37.4	6.16	25	156	164	121	41.6	5.79	22	168	161
150	158	29.3	7.54	29	113	186	152	33	7.27	27	123	183	146	36.8	6.96	25	134	181	138	41	6.61	23	147	177	130	45.6	6.22	20	147	174
160	167	30.6	7.96	28	201	196	159	34.1	7.61	26	207	192	151	38.2	7.23	24	212	188	143	42.8	6.84	21	218	184	134	48	6.42	19	223	180
185	191	35.4	9.15	32	185	225	183	39.4	8.75	30	192	221	174	44.1	8.31	27	199	216	164	49.3	7.83	24	207	211	153	55	7.31	21	214	205
210	223	42.4	10.6	22	194	263	213	47	10.2	20	201	258	202	52	9.66	18	208	252	191	58	9.11	17	215	246	179	65	8.53	15	222	240
245	255	49.4	12.2	28	169	302	243	55	11.6	26	179	295	231	60	11	24	188	289	218	67	10.4	21	198	282	205	74	9.79	19	206	276
275	294	54	14.1	24	145	346	282	60	13.5	23	156	340	269	67	12.9	21	167	333	255	75	12.2	19	179	326	240	83	11.5	16	190	319
300	320	59	15.3	29	119	376	309	66	14.7	27	131	371	295	74	14.1	25	144	366	281	82	13.4	22	157	359	264	91	12.6	20	171	351
020	22.3	4.01	1.06	45	123	26.1	21.3	4.47	1.02	42	127	25.5	20.2	4.99	0.97	38	132	24.9	19	5.57	0.91	34	136	24.3	17.8	6.21	0.85	31	141	23.7
025	28.6	5.02	1.37	24	139	33.3	27.3	5.61	1.3	22	142	32.6	25.9	6.27	1.24	20	146	31.9	24.4	7.03	1.17	18	149	31.1	22.8	7.89	1.09	16	153	30.3
030	33	5.77	1.58	31	126	38.5	31.5	6.45	1.51	28	131	37.7	29.9	7.23	1.43	26	135	36.8	28.2	8.12	1.35	23	140	35.9	26.3	9.13	1.26	20	145	35
040	44	7.65	2.1	33	133	51	42.1	8.54	2.01	30	137	50	40	9.55	1.91	27	141	49.1	37.8	10.7	1.81	24	146	48	35.5	12	1.7	22	150	46.9
045	51	8.85	2.42	27	133	59	48.5	9.87	2.32	25	137	58	46.1	11	2.2	23	141	57	43.5	12.3	2.08	20	146	55	40.6	13.8	1.94	18	151	54
060	63	10.8	3	27	176	73	60	12.1	2.86	24	180	71	57	13.5	2.72	22	184	70	54	15.1	2.56	19	188	68	50	17	2.39	17	191	66
070	78	13.4	3.73	26	165	91	75	15	3.56	24	170	89	71	16.8	3.39	22	176	87	67	18.8	3.2	19	185	63	21.1	3	17	186	83	
080	89	15.3	4.23	31	152	103	85	17.1	4.05	28	158	101	81	19.1	3.85	26	164	99	76	21.4	3.64	23	170	96	72	24	3.42	20	176	94
090	101	17.7	4.84	35	132	118	97	19.7	4.63	32	141	116	92	22	4.4	29														

Operating limits

Operating limits 30RW/RWA

30RW/30RWA	At start-up		At shut-down
	Minimum, °C	Maximum, °C	Maximum, °C
Evaporator			
Entering water temperature	7.5	30	50
During operation			
	Minimum, °C	Maximum, °C	Maximum, °C
Leaving water temperature	5 (note 1)	15	50

30RW - With hydronic module and variable-speed pump

	At start-up and during operation		During operation
	Minimum	Maximum	Maximum
Condenser			
Entering water temperature	-15	47 (note 3)	
Leaving water temperature	-	52	

Dry-cooler		
Entering air temperature	-20	(note 4)

30RW - Without hydronic module

	At start-up and during operation		During operation
	Minimum	Maximum	Maximum
Condenser			
Entering water temperature	20 (note 2)	47 (note 3)	
Leaving water temperature	25	52	

Dry-cooler		
Entering air temperature	(note 5)	(note 4)

30RWA - With variable-speed fan

	At start-up and during operation	
	Minimum	Maximum
Air-cooled condenser		
Entering air temperature	-10	(note 6)

30RWA - With fixed-speed fan

	At start-up and during operation	
	Minimum	Maximum
Air-cooled condenser		
Entering air temperature	0	(note 6)

Notes:

- 30RW/30RWA units can operate from 4°C to 0°C without modification. In all cases the units must be configured for low leaving-water temperature, and use of antifreeze is required.
- 30RW units without hydronic module operating below 20°C entering condenser water temperature require the use of a three-way valve controlled from the 0-10 V analogue output of the PRO-DIALOG control.
- For a flow rate corresponding to a condenser Δt of 5 K.
- The maximum entering air temperature is based on the drycooler selection.
- The minimum entering air temperature range is between 15 and 20°C (without the use of three-way valves)
Operation at -15°C ambient temperature is possible with the use of a three-way valve to maintain the required minimum condensing temperature (see note 2).
- The maximum entering air temperature is based on the remote condenser selection.

IMPORTANT: Maximum ambient temperatures. For storage and transport of 30RW units the minimum and maximum temperatures must not go beyond -20°C and 50°C. It is recommended that these temperatures are used for transport by container.

Evaporator water flow rate

30RW 30RWA	Minimum flow rate, l/s	Maximum flow rate*, l/s		Maximum flow rate**, l/s
		Single pump	Dual pump	
020	0.3	1.7	-	1.7
025	0.4	2.5	-	3.1
030	0.5	2.5	-	3.1
040	0.7	3.4	-	3.7
045	0.8	3.8	-	4.7
060	0.9	5.7	5.6	5.9
070	1.2	6.2	6.1	7.3
080	1.4	6.4	6.2	8.0
090	1.5	6.6	6.3	8.4
110	1.8	8.3	11.7	10.3
120	2.2	8.5	12.4	11.4
135	2.4	8.8	13.1	12.8
150	2.7	9.0	13.7	14.3
160	2.7	14.2	14.2	15.9
185	3.1	14.5	14.5	17.0
210	3.8	17.4	22.0	24.0
245	4.4	17.4	22.0	24.0
275	5.0	18.1	23.3	29.1
300	5.5	18.1	23.3	29.1

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

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

Condenser water flow rate

30RW	Minimum flow rate* (l/s) at min. condenser capacity, $\Delta t = 10$ K	Nominal condenser flow rate at Eurovent conditions, l/s	Maximum flow rate** (l/s) at max. condenser capacity, $\Delta t = 5$ K
	020	0.5	1.2
025	0.7	1.5	1.8
030	0.8	1.7	2
040	1.0	2.3	2.7
045	1.2	2.7	3.1
060	1.4	3.3	3.8
070	1.8	4.1	4.8
080	2.1	4.7	5.5
090	2.3	5.4	6.2
110	2.8	6.4	7.4
120	3.3	7.3	8.5
135	3.6	8.3	9.5
150	4.0	9.1	10.3
160	4.2	9.4	10.9
185	4.7	10.8	12.5
210	5.7	12.7	14.6
245	6.5	14.5	16.8
275	7.3	16.6	19
300	8.0	18.2	20.5

* The minimum flow rate given is for units without hydronic module that have a fixed condenser flow rate.

Units with a hydronic module have a variable flow rate and no minimum fixed flow rate. The minimum flow rate is optimised by unit control in parallel with the drycooler fan stages for all operating conditions, especially at low outdoor temperature and low load conditions.

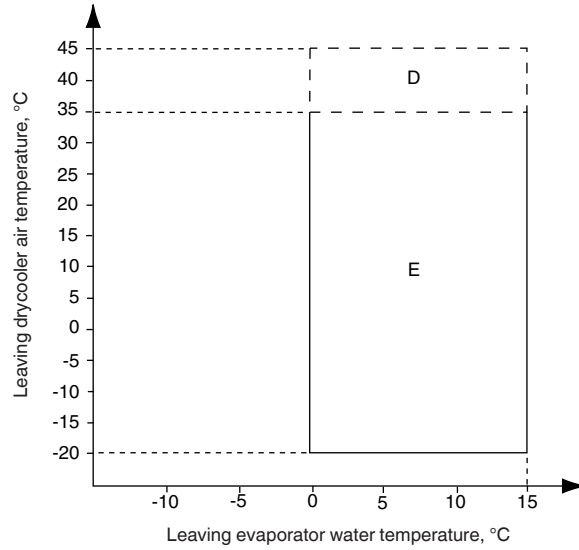
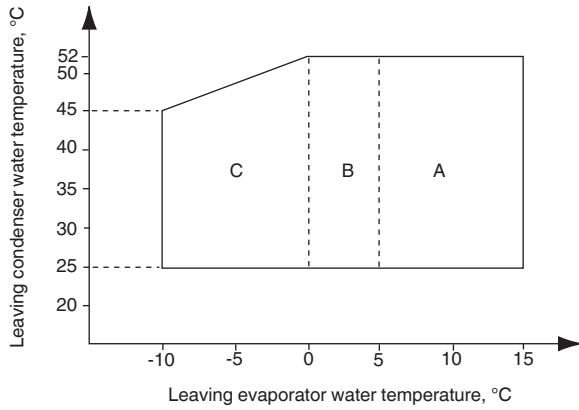
** The maximum flow rate given is for units without hydronic module that have a fixed condenser flow rate.

Units with a hydronic module have a variable flow rate.

The maximum flow rate is optimised by unit control at all operating conditions, based on pump capacity, system pressure losses and outdoor temperature.

Operating range

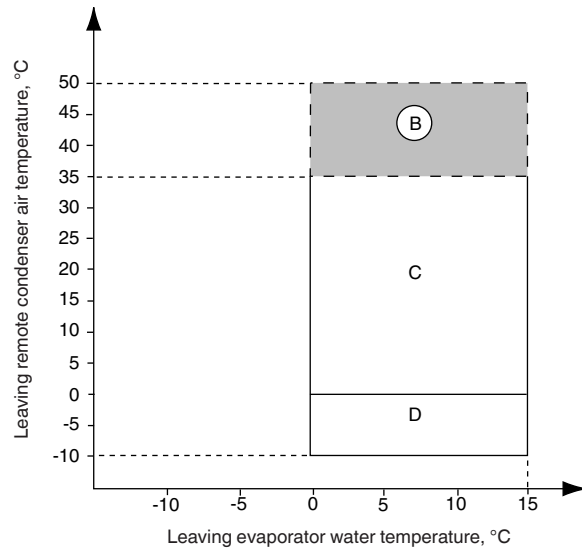
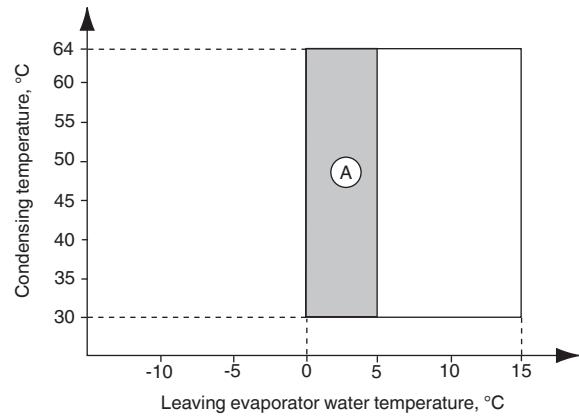
30RW



Notes 30RW

- Evaporator and condenser $\Delta T = 5\text{ K}$
 - For 30RW units without hydronic module with an entering condenser water temperature below 20°C a three-way valve is required to allow operation, while maintaining the correct condensing temperature.
 - For 30RW units equipped with a hydronic module the minimum entering water temperature is -15°C .
 - Maximum leaving condenser water temperature is 52°C (at full load)
- A Standard unit with without antifreeze solution
 B Standard unit operation with the anti-freeze solution required and control configuration for a leaving water temperature down to 0°C .
 C Standard unit operation with the anti-freeze solution required and control configuration for a leaving water temperature down to -10°C .
 D Operation at high air temperature is based on the drycooler selected.
 E Operation at low air temperature is possible down to -20°C with a drycooler.

30RWA



Notes 30RWA

- Evaporator $\Delta T = 5\text{ K}$
 - Unit operation is limited by the maximum compressor condensing temperature of 64°C .
- A Standard unit operation with the anti-freeze solution required and special control configuration.
 B Operation at high air temperature is based on the condenser selected.
 C Operating range down to 0°C , if the air-cooled condenser is not equipped with a variable-speed head fan.
 D Extended operating range with variable-speed fan.

Water loop volume

Evaporator

1. Minimum volume

A minimum water volume is required for correct chiller operation. The minimum water loop volume can be calculated in accordance with the following formula:

Volume = CAP(kW) x N* = litres, where CAP is the cooling capacity at nominal operating conditions.

Air conditioning application	N*
30RW 020-045	3.5
30RW 060-300	2.5

Industrial process cooling

Certain industrial process applications may require high stability of the leaving water temperature levels. In this case the values above must be increased.

2. Maximum volume

Units with hydronic module incorporate an expansion tank sized for the maximum water loop volume.

The table below gives the maximum water loop volume (in litres) for pure water or ethylene glycol with various concentrations.

30RW/30RWA	020-045	060-080	090-150	160-210	245-300
Pure water	673	1000	2080	2900	4162
10% ethylene glycol	487	730	1525	2135	3053
20% ethylene glycol	358	540	1120	1570	2236
35% ethylene glycol	290	430	910	1260	1800

Condenser

1. Minimum volume

The condenser water loop volume has no impact on the chiller operation.

Note: For heat pump operation (unit control based on the hot-water temperature) the minimum condenser water loop volume must be calculated in accordance with the method used for the evaporator loop, replacing the cooling capacity with the heating capacity.

2. Maximum volume

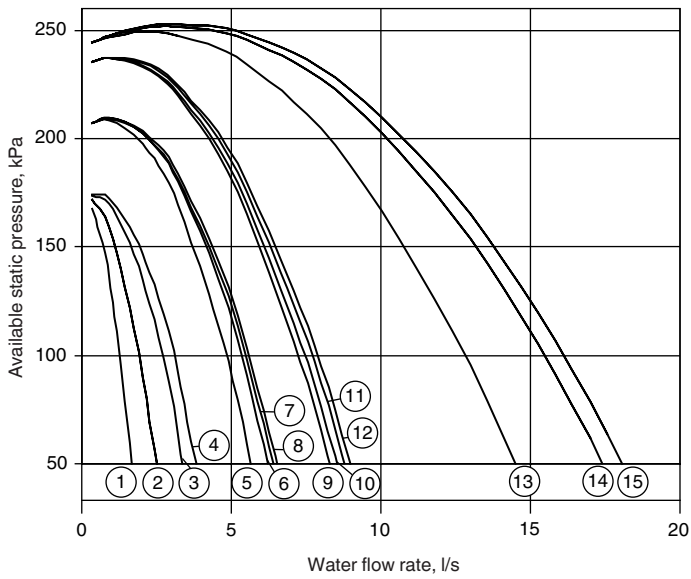
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The table below gives the maximum water loop volume (in litres) for pure water or ethylene glycol with various concentrations.

30RW	020-045	060-080	090-150	160-210	245-300
Pure water	673	1000	2080	2900	4162
10% ethylene glycol	487	730	1525	2135	3053
20% ethylene glycol	358	540	1120	1570	2236
35% ethylene glycol	290	430	910	1260	1800

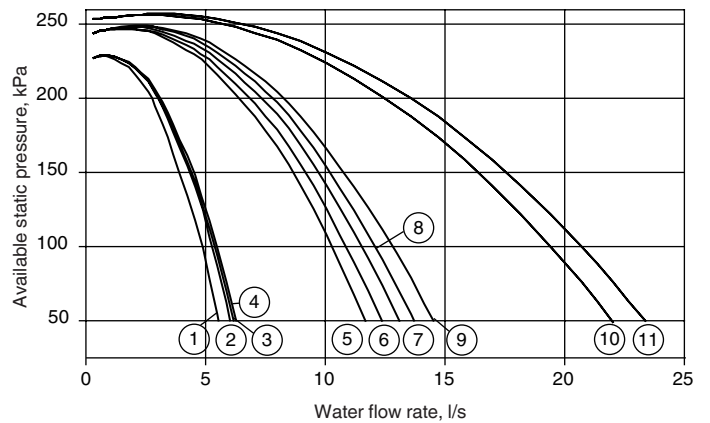
Available static pressure, evaporator side 30RW/30RWA

Single pump



- Legend**
- | | |
|--------------------|---------------------|
| 1 30RW/RWA 020 | 9 30RW/RWA 110 |
| 2 30RW/RWA 025-030 | 10 30RW/RWA 120 |
| 3 30RW/RWA 040 | 11 30RW/RWA 135 |
| 4 30RW/RWA 045 | 12 30RW/RWA 150 |
| 5 30RW/RWA 060 | 13 30RW/RWA 160-185 |
| 6 30RW/RWA 070 | 14 30RW/RWA 210-245 |
| 7 30RW/RWA 080 | 15 30RW/RWA 275-300 |
| 8 30RW/RWA 090 | |

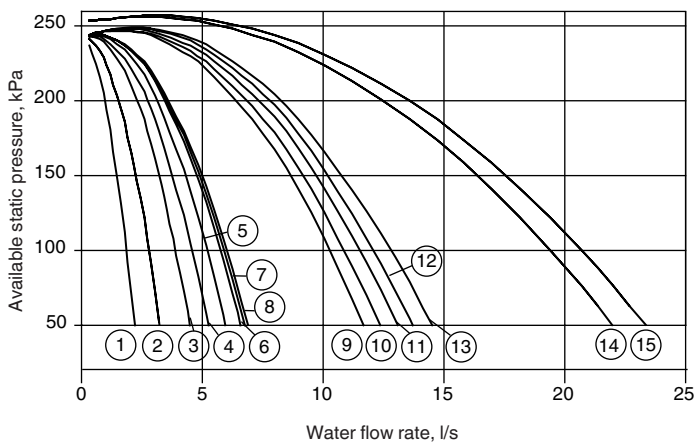
Dual pump



- Legend**
- | | |
|----------------|---------------------|
| 1 30RW/RWA 060 | 7 30RW/RWA 135 |
| 2 30RW/RWA 070 | 8 30RW/RWA 150 |
| 3 30RW/RWA 080 | 9 30RW/RWA 160-185 |
| 4 30RW/RWA 090 | 10 30RW/RWA 210-245 |
| 5 30RW/RWA 110 | 11 30RW/RWA 275-300 |
| 6 30RW/RWA 120 | |

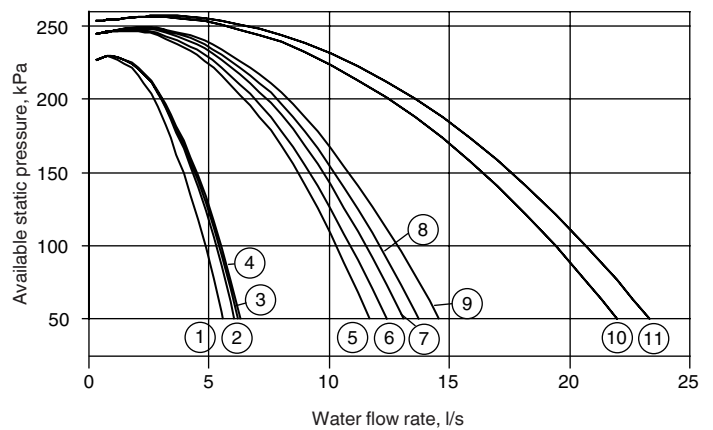
Available static pressure, condenser side 30RW

Single pump



- Legend**
- | | |
|----------------|-----------------|
| 1 30RW 020 | 9 30RW 110 |
| 2 30RW 025-030 | 10 30RW 120 |
| 3 30RW 040 | 11 30RW 135 |
| 4 30RW 045 | 12 30RW 150 |
| 5 30RW 060 | 13 30RW 160-185 |
| 6 30RW 070 | 14 30RW 210-245 |
| 7 30RW 080 | 15 30RW 275-300 |
| 8 30RW 090 | |

Dual pump



- Legend**
- | | |
|------------|-----------------|
| 1 30RW 060 | 7 30RW 135 |
| 2 30RW 070 | 8 30RW 150 |
| 3 30RW 080 | 9 30RW 160-185 |
| 4 30RW 090 | 10 30RW 210-245 |
| 5 30RW 110 | 11 30RW 275-300 |
| 6 30RW 120 | |

Technical description

Guide specifications

Liquid chillers
Nominal cooling capacity range: 20 to 310 kW
Carrier model:
30RW water-cooled
30RWA condenserless

Part 1 - General

System description

- Water-cooled (30RW) or condenserless (30RWA) liquid chiller for indoor installation, equipped with scroll compressors, auto-adaptive microprocessor control and operating with HFC-407C refrigerant which has no effect on the ozone layer.

Quality assurance

- 30RW units comply with requirements of European directives:
 - machinery directive 98/37/CE, modified,
 - low voltage directive 73/23/EEC, modified,
 - electromagnetic compatibility directive 89/336/EEC, modified and with the applicable recommendations of European standards:
 - machine safety, electrical equipment in machines, general regulations: EN 60204-1,
 - radiated electromagnetic emissions: EN 50081-1,
 - conducted electromagnetic emissions: EN 50081-2,
 - electromagnetic immunity EN 50082-2. 30RW and 30RWA units have been designed and tested in a facility with a quality assurance system certified ISO 9001.
 - 30RW and 30RWA units have been assembled in a facility with an environment management system certified ISO 14001. All units undergo a run test before shipment (electrical test only for 30RWA units).

Part 2 - Product equipment

Compressors

- Hermetic scroll compressor with only three moving parts, 2-pole electric motor, cooled by suction gas. Overload protection through an internal thermostat. Polyolester synthetic oil charge, and oil level sight glass.

Evaporator

- Stainless steel plate heat exchanger with welded copper connections. From size 30RW 160 upwards the evaporator has two interlaced independent refrigerant circuits. Closed-cell thermal foam insulation.

Condenser (30RW only)

- Stainless steel plate heat exchanger with welded copper connections. From size 30RW 160 upwards the condenser has two interlaced independent refrigerant circuits.

Refrigerant circuit

- Each circuit includes: one or two compressors, liquid line valve, moisture sight glass, filter drier, thermostatic expansion device, high and low pressure transducers, manually reset high pressure switch, high and low-pressure safety valve (except sizes 30RW 020-045) and HFC-407C refrigerant charge. The main components of the refrigerant circuit are welded.

Note: On 30RWA units the refrigerant circuit also includes a check valve on the discharge piping, a solenoid valve on the liquid piping, refrigerant piping and a nitrogen holding charge.

Control and power circuit control box

- The control box is accessible via a hinged door. It includes a main disconnect switch, fuses and circuit breakers, compressor and evaporator water pump contactors, thermal relays, low-voltage control circuit transformer (24 V control circuit) and the Pro-Dialog control system. The whole unit is supplied via a single power connection point (three-phase supply without neutral).
- Extraction fans protecting the electrical components against overheating.

Chassis/cabinet

- Chassis and cabinet made of galvanised sheet steel. Painted in oven-baked polyester powder paint in light grey colour (RAL 7035). Removable side and rear panels. Front access via hinged doors.

Evaporator hydronic module

- Integrated hydronic module, including: removable screen filter, expansion tank, single monocell centrifugal water pump (dual water pump optional from sizes 30RW 060 upwards) - three-phase motor with internal thermal protection, water flow switch, safety valve set to 4 bar, flow control valve, pressure gauge and purge valves. Internal piping made of galvanised steel. Thermal piping and water pump insulation to prevent condensation. Victaulic water connections at the top (30RW 020-150) or on the right-hand side (30RW 160-300) with welded connection sleeve.

Note: Units without hydronic module (standard): water flow switch installed as standard and water piping protected against condensation. 30RW 020-045 threaded gas water connections at the rear of the unit.

Condenser hydronic module

- Integrated hydronic module, including: removable screen filter, expansion tank, single monocell centrifugal water pump (dual water pump optional from sizes 30RW 060 upwards) - three-phase motor with integrated frequency converter, safety valve set to 4 bar, pressure gauge and purge valves. Internal piping made of galvanised steel with thermal insulation. Victaulic water connections at the top (30RW 020-150) or on the right-hand side (30RW 160-300) with welded connection sleeve.

Note: Units without hydronic module (standard). 30RW 020-045 threaded gas water connections at the rear of the unit.

Carrier Pro-Dialog Plus control system

Pro-Dialog Plus ensures the following functions:

Control

- Entering or leaving chilled or hot water (heat pump option) temperature control by PID loop with compressor run time and start-up equalising. The system permanently adjusts the system inertia and ensures complete protection against excessive compressor cycling.
- Head pressure control by auto-adaptive algorithm:
 - Control of the frequency converter, integrated into the condenser water pump
 - Activating a maximum of 8 fan stages with operating time equalising or fan speed control (with Carrier glycol cooler or air-cooled condenser)
 - Fan rotation speed control (with Carrier air-cooled condenser)
- Evaporator and condenser water pump control (optional dual pump with automatic change-over in case of a fault from size 30RW 060 upwards).
- Control at the second set point (example: unoccupied room).
- Leaving water temperature reset, based on the air temperature (with Carrier glycol cooler or air-cooled condenser) or the difference between entering/leaving water temperature.

Safety

- The system checks the evolution of the parameters (temperatures, pressures etc.), and responds to maintain the compressor within the operating range. If despite this one parameter exceeds its limit, an alert message is generated or the unit is shut down. The following faults cause the refrigerant circuit or the unit to be shut down:
 - Low suction pressure
 - High discharge pressure
 - Low suction temperature
 - Compressor, water pump overload
 - Reverse compressor rotation
 - Temperature sensor and pressure transducer fault
 - Board and loss of communication fault
 - Customer safety device tripping
 - Water heat exchanger anti-freeze protection
 - More than 50 alert or fault codes to facilitate fault detection.

Operator interface

Includes status or fault LEDs, two numerical displays, a refrigerant system synoptic diagram and a command keyboard.

- Immediate display of parameters: entering/leaving chilled water temperature, compressor suction/discharge pressures and temperatures, set point, run times and number of compressor start-ups.
- Diagnosis and complete parameter set by selection of one of the following ten menus: information, temperatures, pressures, set points, input values, test, configuration, alarms, alarm history and run times.

Remote chiller management

- Volt-free contact inputs permit:
 - Start/stop control
 - Selection of cooling or heat reclaim mode (override mode at high condensing temperature)
 - Integration of a customer safety device
 - Operation at the second set point* (example: room unoccupied)
 - Maximum demand limit* (three limit levels from size 30RW 160 upwards)

* One or the other for 30RWA 020-160

- Outputs are available for:
 - Start-up of a boiler
 - Signalling of a general fault condition for each circuit.

Note: For units without hydronic module (standard) a 0-10 V output is available to control a three-way valve or a variable-speed condenser water pump.

- The optional/accessory CCN Clock Board permits:
 - Control in master/slave configuration of two chillers operating in parallel
 - Programming of operating time schedules (up to 8 periods per week)
 - Programming of operating time schedules for the second set point (up to 8 periods per week)
 - Definition of an operating time period with a reduced number of fans (for example during the night)
 - Definition of an operating time period with demand limitation
 - Integration of the chiller into a building monitoring system (BMS): serial port RS 485.

Electrical data notes:

- 30RW and 30RWA 020-300 units have a single power connection point.
- The control box includes the following standard features:
 - the starter and motor protection devices for each compressor and the pumps
 - 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 30RW and 30RWA 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 unit 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.
1. The operating environment for the 30RW and 30RWA chillers is specified below:
 - Environment* - Environment as classified in IEC 60364 § 3:
 - ambient temperature range: +5°C to +40°C, class AA4
 - humidity range (non-condensing)*:
 - 50% relative humidity at 40°C
 - 90% relative humidity at 20°C

- altitude: ≥ 2000 m
 - indoor installation*
 - presence of water: class AD2* (possibility of water droplets)
 - presence of hard solids, class AE2* (no significant dust present)
 - presence of corrosive and polluting substances, class AF1 (negligible)
 - vibration and shock, class AG2, AH2
 - competence of personnel, class BA4* (trained personnel - IEC 60364)
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. Over-current protection of the power supply conductors is not provided with the unit.
 5. The factory-installed disconnect switch(es)/circuit breaker(s) is (are) of a type suitable for power interruption in accordance with EN 60947.
 6. The units are designed for connection to TN 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.

NOTE: 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 protection level of the control boxes required to conform to this class is IP21B (according to reference document IEC 60529). All 30RW and 30RWA units with correctly installed casing panels fulfil this protection condition.

Carrier is participating in the Eurovent Certification Programme for liquid chilling packages. Certified data of certified models are as listed in the Eurovent Directory of Certified Products or on the Internet site www.eurovent-certification.com.



This programme covers air-cooled chillers up to 600 kW and water-cooled chillers up to 1500 kW.



Environmental Management System Approval



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Manufacturer reserves the right to change any product specifications without notice.
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