



Ductable Air-to-Water Heat Pumps with Integrated Hydronic Module

AQUASNAP



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Quality Management System Approval

30RYH "B"

Nominal cooling capacity 18-76 kW

Nominal heating capacity 18-78 kW

The 30RYH Aquasnap air-to-water heat pumps are designed for indoor installation. A fan with available pressure permits connection of the suction and discharge lines to a duct system that can be equipped with sound attenuation. The 30RYH units incorporate the latest technological innovations: ecological refrigerant HFC-407C, scroll compressors and auto-adaptive microprocessor control. The refrigerant circuit with its patented receiver/heat exchanger, and the auto-adaptive Pro-Dialog control system guarantee reliable and economical operation in all climates from -10°C to 45°C. Aquasnap includes a complete hydronic module as standard, limiting the installation to straightforward operations like connection of the power supply and the water supply and return piping.

Features

- Quiet axial fan with available pressure. Unlike a centrifugal fan this type of fan does not require any adjustment at installation, as the flow rate only slightly depends on the pressure losses in the duct system. As the fan is directly mounted on the motor, there is no belt to adjust and replace. At part load or low outdoor temperatures the fan automatically switches to the low speed.
- Integrated hydronic module for fast installation, incorporating all components necessary for the operation of the system: removable screen filter, water pump with high available pressure, expansion tank, water flow switch, safety valve, pressure gauges, and purge valve. A throttle valve allows adjustment of the water flow in accordance with the characteristics of the installation. As an option Aquasnap is available without hydronic module.
- Low-volume water loop: an auto-adaptive algorithm controls the water temperature and eliminates any risk of excessive compressor cycling. In the majority of comfort air conditioning applications a buffer tank is unnecessary. The low water volume reduces the energy consumption during changeover from heating to cooling during in-between seasons.
- Ecological refrigerant HFC-407C: no effect on the ozone layer, replaces R-22 in air conditioning applications with small and medium capacities. Extensively tested by Carrier for several years, it offers the same performance and reliability guarantees as R-22.
- The receiver/heat exchanger (Carrier patent) enhances reliability and performance of the 30RYH heat pump. In the heating mode the refrigerant is condensed in the receiver at the plate heat exchanger outlet. This device compensates for large differences in volume between the coil and the water heat exchanger (plate heat exchanger). It ensures an ideal refrigerant charge in heating and cooling mode and perfect control of subcooling or superheating. Compressor life is increased (no risk of refrigerant migration into the

compressor), and the use of the heat exchangers is maximised.

- Defrost is optimised by the auto-adaptive algorithm. This and the new coil design reduce the defrost cycle duration by an average of 50%. For increased safety an electric heater prevents accumulation of ice on the air heat exchanger base.
- Quiet, vibration-free scroll compressors, durable and maintenance-free. The use of several compressors per circuit (from size 30RYH 050) reduces the start-up current and the power consumption at part load.
- The refrigerant circuit is completely leak-proof for life. All pipes and refrigeration components are welded. Pressure sensors, mounted directly on the pipes, take the place of the pressure switches and their capillary tubes, a source of leaks in the past.
- Electrical connections are simplified, and the standard Aquasnap equipment includes a main disconnect switch, and a single entry point of the three-phase without neutral power supply to the whole unit.
- Large removable panels and the hinged door of the control box ensure perfect accessibility and permit easy access to all components.
- The electric resistance heater control module (accessory) permits control of up to four stages of electric heat for supplementary heating at low outdoor temperatures.

PRO-DIALOG Plus control

PRO-DIALOG Plus is an advanced numeric control system that combines complex intelligence with great operating simplicity. PRO-DIALOG Plus constantly monitors all machine parameters, optimising the operation of compressors, fan, cycle reversing valve and water pump.

A powerful control system

- The auto-adaptive Pro-Dialog Plus control guarantees total protection of the compressors. The system permanently checks the operating parameters and responds to avoid excessive cycling and maintain the ideal operating range for the compressor (temperatures and pressures out of range etc.). By taking corrective action before the fault occurs, the auto-adaptive control frequently prevents a shutdown of the heat pump due to a fault condition.

- To reduce power consumption, PRO-DIALOG Plus automatically resets the leaving water temperature set point in accordance with the outdoor air temperature or uses a second set point (example: room unoccupied) and ensures automatic heating/cooling changeover.
- The system also controls the start-up of a boiler relay or manages a supplementary electric heater (accessory).

Clear and easy-to-use control system

- The operator interface is clear and user-friendly: LEDs and two numerical displays ensure immediate verification of all unit operating data.
- Buttons conveniently positioned on a synoptic heat pump diagram offer immediate display of the operating parameters: temperatures, pressures, set point, run times etc.
- 10 menus offer direct access to all machine controls, including a history of possible faults, for rapid and complete heat pump fault diagnosis.

Extended communications capabilities

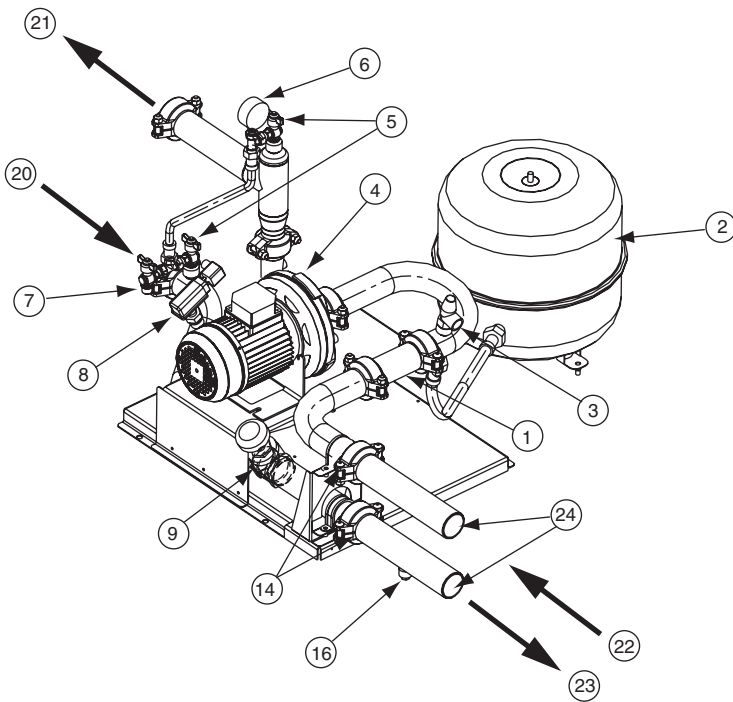
- PRO-DIALOG Plus allows remote control. Volt-free contacts regulate: start/stop, cooling/heating mode selection, power demand limit or selection of the second set point. The system permits remote signalling of any possible anomaly for each refrigerant circuit.
- The internal clock permits programming of:
 - heat pump start/stop
 - operation at the second set-point (e.g. unoccupied room)
 - operation of the heat pump with the fan at low speed to reduce the noise level.
- Master/slave control of two heat pumps operating in parallel with operating time equalisation.
- RS 485 serial port for remote heat pump control via communications bus.



PRO-DIALOG Plus operator interface

Options and accessories

	Option	Accessory
Air heat exchanger anti-corrosion pre-treatment for light marine applications	X	
Electronic compressor starter for reduction of start-up current (30RYH 040-080)	X	
Unit without hydronic module	X	
Hydronic module with dual pump (30RYH 040-080)	X	
Supplementary electric resistance heater control board (3 stages + 1 emergency stage)		X
Unit support with condensate recovery pan		X
Suction air filter, mounted on rails		X
Outside installation (30RYH 040-080)	X	
Communications board with open JBus protocol	X	X



Hydronic module (040 to 080)

Legend

Components of unit and hydronic module

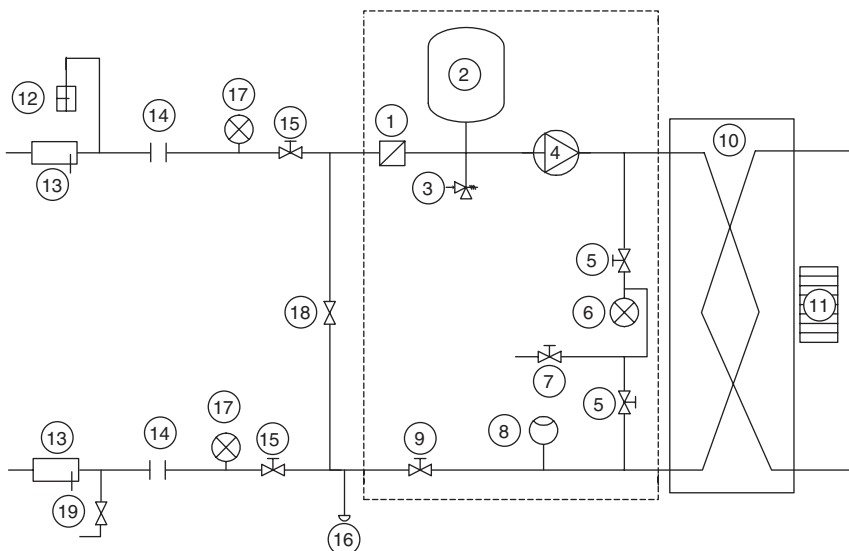
- 1 Victaulic screen filter
- 2 Expansion tank
- 3 Safety valve
- 4 Available pressure pump
- 5 Purge valve and pressure tap (see Installation Manuel)
- 6 Pressure gauges to measure the plate heat exchanger pressure drop (to be isolated with valve No. 5 if not used)
- 7 System air vent
- 8 Flow switch
- 9 Flow control valve
- 10 Plate heat exchanger
- 11 Evaporator defrost heater

Installation components

- 12 Air vent
- 13 Thermometer sleeve
- 14 Flexible connection
- 15 Check valve
- 16 System water drain plug (on connection pipe supplied in the unit)
- 17 Pressure gauge
- 18 Freeze-up protection bypass valve (when valves No. 15 are closed during winter)
- 19 Charge valve
- 20 Plate heat exchanger outlet
- 21 Plate heat exchanger inlet
- 22 Water inlet
- 23 Water outlet
- 24 Customer connection sleeves for welded or screw connection (supplied)

----- Hydronic module (units with hydronic module)

Note: Units without hydronic module (option) are equipped with a flow switch and an internal piping heater.



Typical hydronic circuit diagram

Physical data

30RYH		017	021	026	033	040	050	060	070	080
Nominal cooling capacity*	kW	17.8	22.4	24.1	31.3	37.8	44.7	56.0	65.0	76.0
Nominal heating capacity**	kW	18.3	22.1	25.6	34.5	37.0	48.3	55.0	62.0	78.0
Operating weight										
with hydronic module, single pump	kg	410	440	460	475	550	612	627	688	736
with hydronic module, dual pump	kg	-	-	-	-	630	692	707	768	813
without hydronic module	kg	385	415	435	450	526	588	603	664	710
Refrigerant charge R-407C	kg	6.4	6.6	7.4	8.6	10.3	11.4	12.5	13.3	17.3
Compressors		Hermetic scroll compressors, 48.3 r/s								
Quantity		1	1	1	1	1	2	2	2	2
No. of capacity steps		1	1	1	1	1	2	2	2	2
Minimum capacity	%	100	100	100	100	100	46	42	50	50
Control type		PRO-DIALOG Plus								
Air heat exchanger		Grooved copper tubes, aluminium fins								
Fan		Axial with available pressure								
Quantity		1	1	1	1	1	1	1	1	1
Available static pressure	Pa	100	100	100	100	150	150	150	150	150
Total air flow (high speed)	l/s	1940	1940	1940	2500	3890	3890	4720	5830	5830
Speed (high/low speed)	r/s	24/12	24/12	24/12	24/12	24/12	24/12	24/12	24/12	24/12
Water heat exchanger		Direct-expansion welded plate heat exchanger								
Water volume	l	1.6	2.0	2.3	3.0	3.6	4.6	5.9	6.5	7.6
Max. water-side operating pressure										
Option without hydronic module	kPa	1000	1000	1000	1000	1000	1000	1000	1000	1000
Unit with hydronic module	kPa	250	250	250	250	300	300	300	300	300
Hydronic module										
Pump (centrifugal)		Single multicell pump, 48.3 r/s				Single composite monocell pump, 48.3 r/s				
Quantity		1	1	1	1	1	1	1	1	1
Expansion tank volume	l	8	8	8	8	12	12	12	12	12
Expansion tank pressure	kPa	50	50	50	50	100	100	100	100	100
Water connections (with and without hydronic module)		Threaded male gas connections				Victaulic (sleeves for welding or screw connections supplied)				
Diameter	in	1-1/4	1-1/4	1-1/4	1-1/4	2	2	2	2	2
Outside tube diameter	in	1-1/4	1-1/4	1-1/4	1-1/4	2	2	2	2	2
	mm	42.4	42.4	42.4	42.4	60.3	60.3	60.3	60.3	60.3

* Nominal conditions: water heat exchanger entering/leaving temperature 12°C/7°C, outdoor air temperature 35°C.

** Nominal conditions: air heat exchanger entering/leaving temperature 40°C/45°C, outdoor air dry bulb temperature 7°C.

Sound levels

30RYH		017	021	026	033	040	050	060	070	080
Sound power, dB(A) 10⁻¹² W		82	83	83	85	91	91	89	91	91
Sound power, dB(A) 10⁻¹² W, low-speed fans		69	77	77	79	81	80	82	83	84

Note:

According to Eurovent 8/1 (derived from ISO standard 3744 or ISO 9614-1).

Electrical data

30RYH (without hydronic module)		017	021	026	033	040	050	060	070	080
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*	kW	9.8	12.1	13.8	18.0	21.0	25.3	32.3	38.2	42.9
Nominal unit current draw**	A	13.1	16.2	18.6	23.3	28.8	35.6	45.7	52.1	59.4
Maximum unit current draw at 360 V***	A	17.0	21.3	24.5	31.2	37.8	46.5	59.5	67.8	77.5
Maximum unit current draw at 400 V****	A	15.5	19.3	22.2	28.3	34.5	42.3	54.3	62.1	70.7
Maximum start-up current										
Standard unit†		87.8	131.8	131.8	147.4	159.3	151.8	173.5	181.2	195.5
With electronic starter option‡		-	-	-	-	97.3	96.7	111.9	118.2	127.9
Holding current for three-phase short circuits	kA	6	6	6	6	6	6	6	6	6

* Power input of the compressor(s) + fan at maximum unit operating conditions: entering/leaving water temperature = 15°C/10°C, maximum condensing temperature of 67.8°C and 400 V nominal voltage (values given on the unit name plate).

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

*** Maximum unit operating current at maximum unit power input and 360 V nominal voltage.

**** Maximum unit operating current at maximum unit power input and 400 V nominal voltage (values given on the unit name plate).

† 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) + fan current + 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) + fan current + reduced start-up current of the largest compressor).

Hydronic module		017	021	026	033	040	050	060	070	080
Single pump										
Shaft power	kW	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	1.1
Power input*	kW	0.75	0.75	0.75	0.75	1.1	1.1	1.1	1.1	1.4
Maximum current draw at 400 V**	A	2	2	2	2	2.1	2.1	2.1	2.1	3.1
Dual pump										
Shaft power	kW	-	-	-	-	2.2	2.2	2.2	2.2	2.2
Power input*	kW	-	-	-	-	2.7	2.7	2.7	2.7	2.7
Maximum current draw at 400 V**	A	-	-	-	-	4.7	4.7	4.7	4.7	4.7

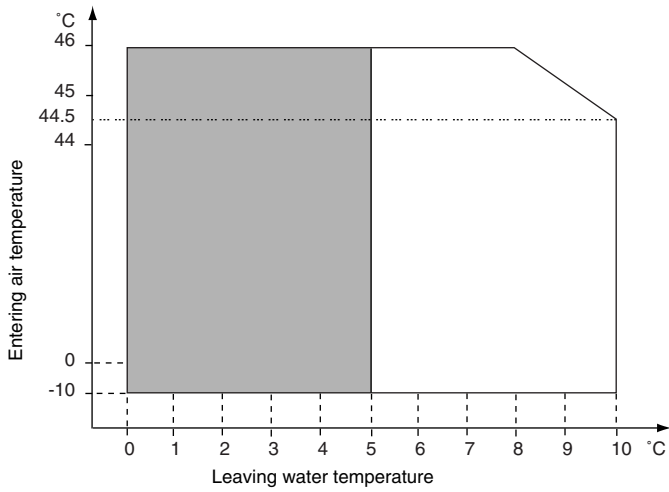
Note: The water pump power input values are given for guidance only.
 * To obtain the maximum power input for a unit with hydronic module add the maximum unit power input from the top table to the pump power input (*) from the table above.
 ** To obtain the maximum unit operating current draw for a unit with hydronic module add the maximum unit current draw from the top table to the pump current draw from the table above.

Electrical data notes:

- 30RYH units have a single power connection point.
 - The control box includes the following standard features:
 - starter and motor protection devices for each compressor, the fan, the optional pump
 - the control devices
 - Field connections:
 - All connections to the system and the electrical installations must be in full accordance with all applicable local codes.
 - The Carrier 30RYH units are designed and built to ensure conformance with these codes. The recommendations of European standard EN 60204-1 (corresponds to IEC 60204-1) (machine safety - electrical machine components - part 1: general regulations) are specifically taken into account, when designing the electrical equipment.
- NOTES:**
- Generally the recommendations of IEC 60364 are accepted as compliance with the requirements of the installation directives. Conformance with EN 60204 is the best means of ensuring compliance with the Machines Directive § 1.5.1.
 - Annex B of EN 60204-1 describes the electrical characteristics used for the operation of the machines.
- The operating environment for the 30RYH units is specified below:
 - 30RYH 017-080 – indoor installation
 - Environment* - Environment as classified in EN 60634 § 3:
 - ambient temperature range: +5°C to +40°C, class AA4
 - humidity range (non condensable*):
 - 50% rh at 40°C
 - 90% rh 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* (personnel trained according to IEC 60364)
 - 30RYH 040-080 – outdoor installation
 - Environment* - Environment as classified in EN 60721 (corresponds to IEC 60721):
 - outdoor installation*
 - ambient temperature range: -10°C to +46°C, class 4K3**
 - altitude: ≤ 2000 m
 - presence of hard solids, class 4S2** (no significant dust present)
 - presence of corrosive and polluting substances, class 4C2 (negligible)
 - vibration and shock, class 4M2
 - Competence of personnel, class BA4** (personnel trained according to IEC 60364)
- 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 required protection level for this class is IP21B (according to reference document IEC 60529). All 30RYH 017-080 units are protected to IP23C and fulfil this protection condition.
 - ** The required protection level for this class is IP43BW (according to reference document IEC 60529). All 30RYH 040-080 units are protected to IP45CW and fulfil this protection condition.

Operating limits

Operating range in cooling mode



Notes:

1. Water heat exchanger $\Delta t = 5 \text{ K}$
2. 30RYH 017-033: Install the unit in a location that is frost-free.
30RYH 040-080: The evaporator and the hydronic module are protected against frost down to -20°C .
3. Maximum air entering temperature at nominal static pressure of the fan.

Operating range with required anti-freeze solution and special Pro-Dialog control configuration

Fan data

30RYH	Min. available static pressure*		Nom. available static pressure		Max. available static pressure	
	Pressure	Flow	Pressure	Flow	Pressure	Flow
	Pa	l/s	Pa	l/s	Pa	l/s
017-026	0	2500	100	1940	150	1530
033	0	2920	100	2500	200	1940
040-050	0	4580	150	3890	230	3330
060	0	5560	150	4720	230	4030
070-080	0	6810	150	5830	230	5280

* Operation without duct system

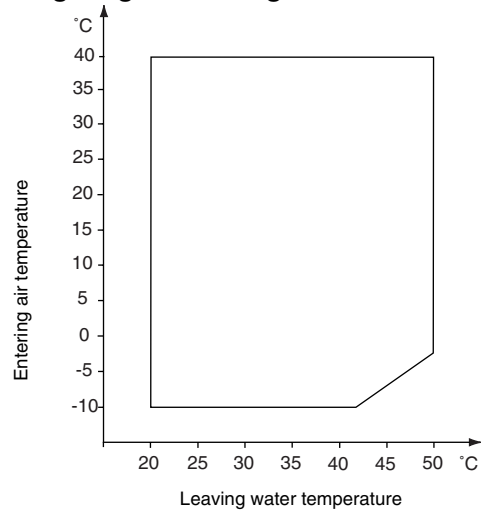
Heat exchanger water flow rate

30RY	Min. water flow l/s	Max. water flow*, l/s		Max. water flow** l/s
		Single pump	Dual pump	
017	0.58	1.7	0	1.7
021	0.70	1.8	0	1.9
026	0.81	1.9	0	2.2
033	1.10	2.0	0	3.0
040	1.20	3.5	4.4	3.7
050	1.19	4.0	5.2	4.6
060	1.46	4.4	6.0	5.8
070	1.66	4.6	6.4	6.4
080	1.92	5.5	6.8	7.3

* 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)

Operating range in heating mode



Maximum entering air temperature, °C (cooling mode)

30RYH	Air flow		
	Minimum	Nominal	Maximum
017-026	44	46	47.5
033	44	46	47
040-050	44.5	46	47
060	44.5	46	47
070-080	44.5	46	47

Performance correction factors

30RYH	Cooling capacity		Power input	
	Min. flow	Max. flow*	Min. flow	Max. flow*
017-026	0.98	1.01	1.03	0.97
033	0.98	1.005	1.03	0.98
040-050	0.985	1.005	1.02	0.98
060	0.985	1.005	1.02	0.98
070-080	0.985	1.005	1.01	0.98

* Operation without duct system

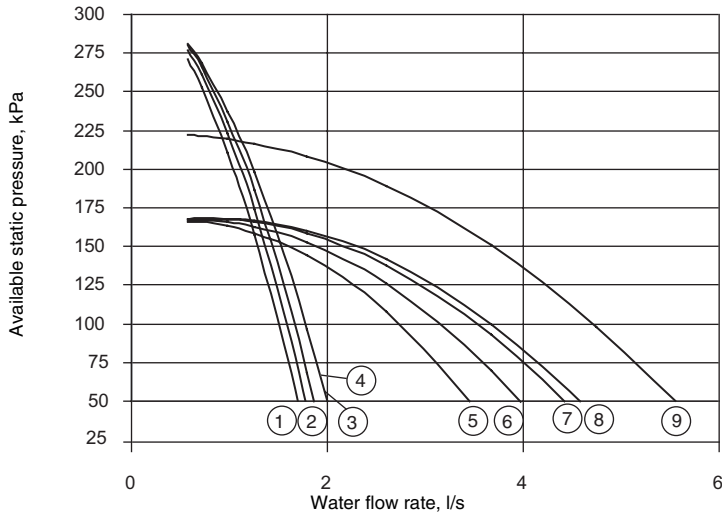
Correction factor to be added to the performances published for nominal air flow.

Heat exchanger entering water temperature

30RYH	Max. temperature, cooling (°C)		Min. temperature, heating (°C)		Max. temperature, heating (°C)	
	At start-up	At shut-down	At start-up	At shut-down	At start-up	At shut-down
017-080	35	60	10	3	50	60

Water pump: Available static pressure for water-side installation

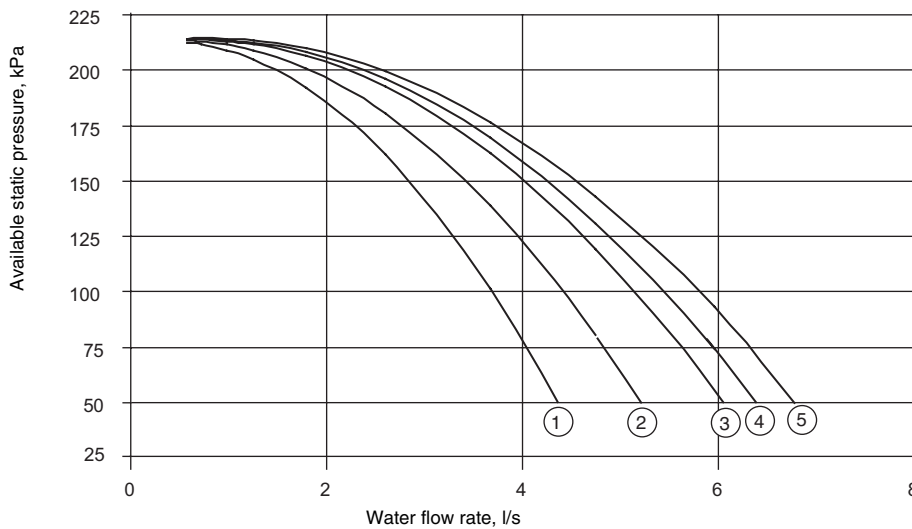
Single pump



Legend

1	30 RYH 017	6	30 RYH 050
2	30 RYH 021	7	30 RYH 060
3	30 RYH 026	8	30 RYH 070
4	30 RYH 033	9	30 RYH 080
5	30 RYH 040		

Dual pump



Legend

1	30 RYH 040
2	30 RYH 050
3	30 RYH 060
4	30 RYH 070
5	30 RYH 080

Water loop volume

Minimum water loop volume

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

Air conditioning application	N*
30RYH 017-040	3.5
30RYH 050-080	2.5
Industrial process cooling	
30RYH 017-080	See note

Note

For industrial process cooling applications, where high stability of the water temperature must be achieved, the values above must be increased.

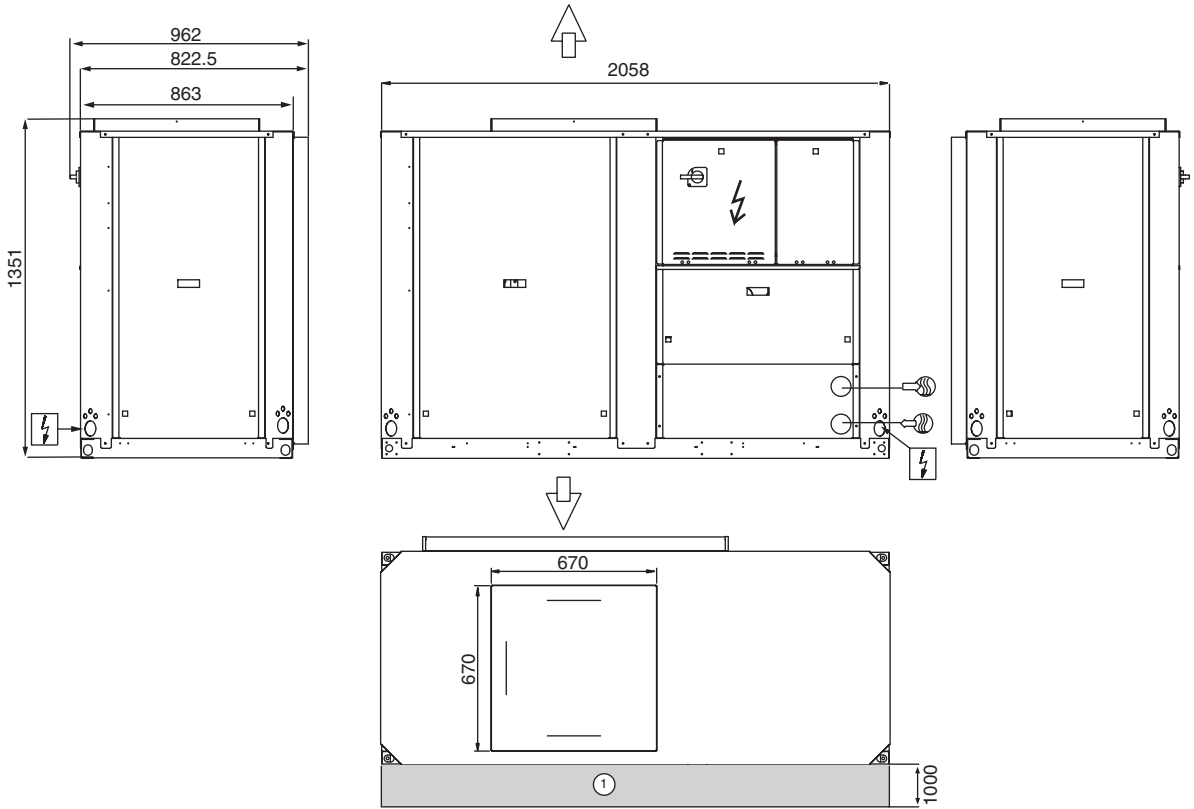
Maximum water loop volume

Units with hydronic module incorporate an expansion tank that limits the water loop volume. The table below gives the maximum loop volume for pure water or ethylene glycol with various concentrations.

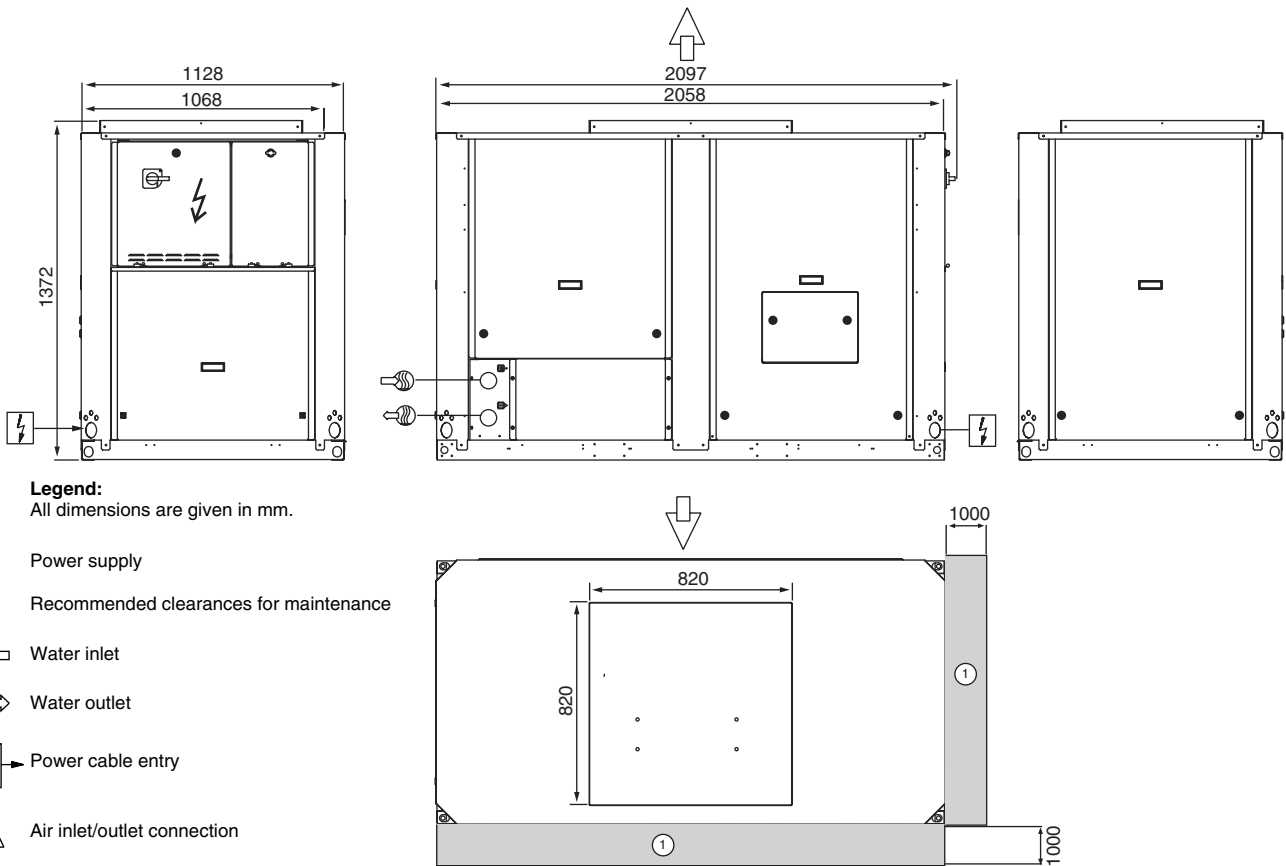
	30RYH 017-033 (in litres)	30RYH 040-80 (in litres)
Pure water	400	600
10% ethylene glycol	300	450
20% ethylene glycol	250	400
35% ethylene glycol	200	300

Dimensions/clearances

30RYH 017-033



30RYH 040-080



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

Heating capacities, single and dual pumps

30RYH	Entering air temperature, °C																																			
	-10				-5				0				7				10																			
	CAP	COMP	UNIT	COND	PRES (1)	PRES (2)	CAP	COMP	UNIT	COND	PRES (1)	PRES (2)	CAP	COMP	UNIT	COND	PRES (1)	PRES (2)	CAP	COMP	UNIT	COND	PRES (1)	PRES (2)												
LMT	°C	kW	kW	l/s	kPa	kPa	kW	kW	l/s	kPa	kPa	kW	kW	l/s	kPa	kPa	kW	kW	l/s	kPa	kPa	kW	kW	l/s	kPa	kPa										
017	30	10.6	4.62	5.62	0.51	12	279	279	12.1	4.65	5.65	0.58	16	271	271	14.5	4.82	5.82	0.69	21	256	256	20.4	4.35	5.35	0.98	39	212	212	22.2	4.39	5.39	1.06	45	196	196
021		13	5.62	6.62	0.62	11	272	272	14.9	5.66	6.66	0.71	14	262	262	17.8	5.86	6.86	0.85	20	243	243	24.8	5.47	6.47	1.18	40	187	187	27	5.53	6.53	1.29	47	167	167
026		15	5.83	6.83	0.72	10	266	266	17.1	5.87	6.87	0.82	13	254	254	20.4	6.08	7.08	0.98	19	232	232	27.8	6.49	7.49	1.33	36	172	172	30.1	6.58	7.58	1.44	43	149	149
033		20.2	8.82	10.3	0.96	13	239	239	23	8.88	10.4	1.1	16	221	221	27.5	9.2	10.7	1.32	22	187	187	37.4	8.63	10.1	1.79	39	97	97	40.6	8.74	10.2	1.94	45	63	63
040		21.5	8.57	10.5	1.03	8	162	208	24.5	8.63	10.5	1.17	10	160	206	29.3	8.99	10.9	1.4	15	155	202	39.8	9.92	11.8	1.9	27	140	189	43.1	10.1	12	2.06	32	134	183
050		28.3	11.9	13.8	1.35	9	162	208	32.3	12	13.9	1.54	11	158	205	38.5	12.5	14.4	1.84	16	152	200	56	12.8	14.7	2.65	33	124	179	59	13	14.9	2.82	37	116	173
060		32.2	13.1	16.5	1.54	7	162	209	36.7	13.1	16.5	1.75	9	159	207	43.9	13.7	17.1	2.1	13	152	202	60	14.5	17.9	2.85	24	129	186	64	14.7	18.1	3.06	28	121	181
070		36.2	14.6	20.1	1.73	7	161	209	41.3	14.7	20.2	1.97	9	157	206	49.3	15.3	20.8	2.36	14	148	200	66	17	22.5	3.13	24	123	184	71	17.2	22.7	3.39	28	113	177
080		44.9	17.8	23.3	2.15	9	200	206	51	17.9	23.4	2.45	11	193	202	61	18.7	24.2	2.93	16	178	194	83	19.4	24.9	3.95	30	138	169	89	19.6	25.1	4.25	34	124	160
017	35	10.5	5.03	6.03	0.5	12	280	280	12	5.06	6.06	0.57	15	272	272	14.3	5.23	6.23	0.68	21	257	257	19.7	4.89	5.89	0.94	37	218	218	21.5	4.93	5.93	1.03	43	203	203
021		12.8	6.12	7.12	0.61	11	273	273	14.7	6.16	7.16	0.7	14	263	263	17.6	6.36	7.36	0.84	20	245	245	24	6.13	7.13	1.14	37	195	195	26.1	6.19	7.19	1.25	44	175	175
026		14.8	6.35	7.35	0.7	10	267	267	16.9	6.39	7.39	0.81	13	255	255	20.2	6.6	7.6	0.97	19	233	233	27.1	7.15	8.15	1.3	34	178	178	29.5	7.24	8.24	1.41	41	156	156
033		19.9	9.61	11.1	0.95	12	241	241	22.7	9.66	11.2	1.09	16	223	223	27.2	9.99	11.5	1.3	22	190	190	36.5	9.51	11	1.75	37	106	106	39.7	9.62	11.1	1.9	43	73	73
040		21.1	9.43	11.3	1.01	8	163	208	24.2	9.49	11.4	1.15	10	160	206	28.9	9.85	11.7	1.38	14	156	202	38.6	10.9	12.8	1.84	25	142	190	41.9	11.1	13	2	30	136	185
050		27.8	13.1	15	1.33	8	162	208	31.8	13.1	15	1.52	11	159	205	38.1	13.6	15.5	1.82	16	152	200	53	14.2	16.1	2.52	30	130	183	56	14.4	16.3	2.69	34	123	178
060		31.7	14.3	17.7	1.51	7	163	210	36.2	14.4	17.8	1.73	9	159	207	43.4	14.9	18.3	2.07	13	153	202	58	16.1	19.5	2.77	23	132	188	62	16.3	19.7	2.98	26	124	183
070		35.6	16.1	21.6	1.7	7	161	209	40.7	16.2	21.7	1.95	9	157	206	48.8	16.8	22.3	2.33	13	149	201	64	18.8	24.3	3.08	23	125	185	70	19	24.5	3.34	27	115	179
080		44.3	19.6	25.1	2.11	8	201	206	51	19.7	25.2	2.42	11	194	202	61	20.5	26	2.9	16	180	194	80	21.6	27.1	3.83	28	144	172	86	21.8	27.3	4.12	32	130	164
017	40	10.2	5.52	6.52	0.49	12	281	281	11.7	5.54	6.54	0.56	15	273	273	14	5.71	6.71	0.67	20	259	259	19	5.47	6.47	0.91	35	223	223	20.8	5.52	6.52	0.99	40	209	209
021		12.5	6.71	7.71	0.6	10	275	275	14.3	6.75	7.75	0.68	13	265	265	17.2	6.95	7.95	0.82	19	247	247	23.1	6.85	7.85	1.1	34	202	202	25.2	6.91	7.91	1.21	41	183	183
026		14.4	6.96	7.96	0.69	9	269	269	16.5	7	8	0.79	12	257	257	19.8	7.21	8.21	0.95	18	236	236	26.4	7.88	8.88	1.26	32	185	185	28.7	7.97	8.97	1.37	39	163	163
033		19.3	10.5	12	0.92	12	245	245	22.2	10.6	12.1	1.06	15	227	227	26.7	10.9	12.4	1.27	21	194	194	35.5	10.5	12	1.7	35	116	116	38.7	10.6	12.1	1.85	41	83	83
040		20.6	10.4	12.3	0.98	7	163	209	23.6	10.5	12.4	1.13	9	161	207	28.4	10.9	12.8	1.36	14	156	203	37.7	12.1	14	1.8	24	144	192	41	12.2	14.1	1.96	29	138	187
050		27.1	14.4	16.3	1.29	8	162	209	31.1	14.5	16.4	1.48	10	159	206	37.4	15	16.9	1.79	15	153	201	50	15.8	17.7	2.4	27	134	187	54	16	17.9	2.57	31	127	182
060		30.8	15.8	19.2	1.47	6	163	210	35.4	15.9	19.3	1.69	8	160	208	42.5	16.4	19.8	2.03	12	153	203	57	17.9	21.3	2.7	22	134	190	61	18.1	21.5	2.91	25	127	185
070		34.6	17.9	23.4	1.66	7	162	209	39.7	18	23.5	1.9	9	158	207	47.8	18.6	24.1	2.28	13	150	201	63	20.8	26.3	3.03	22	127	187	69	21.1	26.6	3.28	26	117	180
080		43.1	21.7	27.2	2.06	8	203	207	49.4	21.9	27.4	2.36	11	195	203	59	22.6	28.1	2.84	15	181	195	78	24.1	29.6	3.75	27	147	175	85	24.3	29.8	4.04	31	134	166

Legend:
LWT Leaving water temperature
CAP kW Instantaneous heating capacity
COMP kW Compressor power input
UNIT kW Unit power input, (compressors, fan, control circuit)
COND l/s Condenser water flow rate
COND kPa Condenser pressure drop
PRES kPa (1) Available pressure at the unit outlet (unit with single-pump hydronic module)
PRES kPa (2) Available pressure at the unit outlet (unit with dual-pump hydronic module)

Full load correction factors for Eurovent laboratory test:
Net heating capacity 1.000
Energy efficiency ratio 1.000
Evaporator pressure drop 1.000

Application data:
Standard units
Refrigerant: R-407C
Condenser temperature rise: 5 K
Condenser fluid: water
Fouling factor: 0.44×10^{-4} (m² K)/W

Note:
The Carrier electronic selection program permits calculating the integrated heating capacity as a function of the actual humidity conditions at the installation site. Contact Carrier for your personalised heat pump selection.

Heating capacity at low outdoor temperature
The published heating capacities are instantaneous capacities. They do not take account of the decrease of the heating capacity, resulting from the formation of frost on the coil and the effect of the defrost cycles.
The integrated heating capacity takes these effects into account. They depend on the temperature and the relative humidity (rh) of the outdoor air.

Correction factor to obtain integrated heating capacities
Leaving water temp. Outdoor temperature °C (87% rh)

-10	-5	0	7	10
0.88	0.85	0.87	1	1
0.87	0.85	0.87	1	1
0.88	0.85	0.87	1	1
0.89	0.86	0.88	1	1
0.91	0.89	0.91	1	1

Performances in accordance with EN 255.

Heating capacities, single and dual pumps (cont.)

30RYH	Entering air temperature, °C																																	
	-10				-5				0				7				10																	
	LWT °C	CAP kW	COMP kW	UNIT i/s	COND kPa	PRES (1) kPa	PRES (2) kPa	CAP kW	COMP kW	UNIT i/s	COND kPa	PRES (1) kPa	PRES (2) kPa	CAP kW	COMP kW	UNIT i/s	COND kPa	PRES (1) kPa	PRES (2) kPa	CAP kW	COMP kW	UNIT i/s	COND kPa	PRES (1) kPa	PRES (2) kPa									
017	45	-	-	-	-	-	11.3	6.1	7.1	0.54	14	276	276	13.6	6.27	7.27	0.65	19	262	262	18.3	6.11	7.11	0.88	32	229	229	20.1	6.15	7.15	0.96	38	215	215
021		-	-	-	-	-	13.8	7.42	8.42	0.66	12	268	268	16.7	7.63	8.63	0.8	18	250	250	22.1	7.63	8.63	1.06	32	210	210	24.3	7.69	8.69	1.16	38	192	192
026		-	-	-	-	-	15.9	7.7	8.7	0.76	11	261	261	19.2	7.91	8.91	0.92	17	240	240	25.6	8.69	9.69	1.22	30	192	192	27.9	8.77	9.77	1.33	36	170	170
033		-	-	-	-	-	21.4	11.6	13.1	1.02	14	232	232	25.9	12	13.5	1.24	20	200	200	34.5	11.5	13	1.65	33	126	126	37.6	11.7	13.2	1.8	39	95	95
040		-	-	-	-	-	22.8	11.7	13.6	1.09	9	162	207	27.6	12	13.9	1.32	13	157	203	37	13.4	15.3	1.77	23	145	193	40.4	13.5	15.4	1.93	28	139	188
050		-	-	-	-	-	30	16.1	18	1.43	10	160	207	36.3	16.6	18.5	1.73	14	154	202	48.3	17.5	19.4	2.31	25	137	189	52	17.7	19.6	2.48	29	131	184
060		-	-	-	-	-	34.2	17.6	21	1.63	8	161	208	41.3	18.1	21.5	1.97	12	155	204	55	19.9	23.3	2.64	21	136	191	60	20.1	23.5	2.85	24	129	186
070		-	-	-	-	-	38.4	20	25.5	1.83	8	159	208	51	22.4	27.9	2.44	14	146	199	62	23	28.5	2.97	21	129	188	68	23.3	28.8	3.23	25	119	182
080		-	-	-	-	-	47.7	24.3	29.8	2.28	10	197	204	58	25.1	30.6	2.76	14	184	197	78	26.8	32.3	3.7	26	149	176	84	27.1	32.6	4	30	136	168
017	50	-	-	-	-	-	-	-	-	-	-	-	-	13.1	6.9	7.9	0.63	18	265	265	17.6	6.78	7.78	0.84	30	234	234	19.4	6.83	7.83	0.93	36	221	221
021		-	-	-	-	-	-	-	-	-	-	-	-	16.1	8.39	9.39	0.77	17	255	255	21.1	8.46	9.46	1.01	29	218	218	23.3	8.52	9.52	1.11	35	200	200
026		-	-	-	-	-	-	-	-	-	-	-	-	18.5	8.71	9.71	0.88	15	245	245	24.8	9.56	10.6	1.18	28	199	199	27.1	9.64	10.6	1.29	34	178	178
033		-	-	-	-	-	-	-	-	-	-	-	-	24.9	13.2	14.7	1.19	18	208	208	33.3	12.7	14.2	1.59	23	147	137	36.5	12.8	14.3	1.74	37	106	106
040		-	-	-	-	-	-	-	-	-	-	-	-	26.5	13.4	15.3	1.27	12	158	204	36.7	14.8	16.7	1.75	23	145	193	40	15	16.9	1.91	27	140	188
050		-	-	-	-	-	-	-	-	-	-	-	-	34.9	18.4	20.3	1.67	13	156	203	46.8	19.2	21.1	2.23	23	140	191	50	19.5	21.4	2.41	27	134	186
060		-	-	-	-	-	-	-	-	-	-	-	-	39.7	20	23.4	1.9	11	156	205	54	22	25.4	2.6	20	138	192	59	22.3	25.7	2.81	23	131	187
070		-	-	-	-	-	-	-	-	-	-	-	-	49.8	24.8	30.3	2.38	14	148	200	61	25.5	31	2.91	21	131	189	66	25.7	31.2	3.17	24	122	183
080		-	-	-	-	-	-	-	-	-	-	-	-	55	27.8	33.3	2.65	13	187	199	77	29.9	35.4	3.7	26	149	176	84	30.2	35.7	3.99	30	136	168

Legend:

- LWT Leaving water temperature
- CAP kW Instantaneous heating capacity
- COMP kW Compressor power input
- UNIT kW Unit power input, (compressors, fan, control circuit)
- COND i/s Condenser water flow rate
- COND kPa Condenser pressure drop
- PRES kPa (1) Available pressure at the unit outlet (unit with single-pump hydronic module)
- PRES kPa (2) Available pressure at the unit outlet (unit with dual-pump hydronic module)

Full load correction factors for Eurovent laboratory test:

Net heating capacity	1.000
Energy efficiency ratio	1.000
Evaporator pressure drop	1.000

Application data:

- Standard units
- Refrigerant: R-407C
- Condenser temperature rise: 5 K
- Condenser fluid: water
- Fouling factor: 0.44×10^{-4} (m²·K)/W

Performances in accordance with EN 255.

Heating capacity at low outdoor temperature

The published heating capacities are instantaneous capacities. They do not take account of the decrease of the heating capacity, resulting from the formation of frost on the coil and the effect of the defrost cycles. The integrated heating capacity takes these effects into account. They depend on the temperature and the relative humidity (rh) of the outdoor air.

Correction factor to obtain integrated heating capacities

Leaving water temp. °C	Outdoor temperature °C (87% rh)			
	-10	-5	0	7
30	0.88	0.85	0.87	1
35	0.87	0.85	0.87	1
40	0.88	0.85	0.87	1
45	0.89	0.86	0.88	1
50	0.91	0.89	0.91	1

Note:

The Carrier electronic selection program permits calculating the integrated heating capacity as a function of the actual humidity conditions at the installation site. Contact Carrier for your personalised heat pump selection.

Cooling capacities, single and dual pumps

30RYH	Condenser entering air temperature, °C																																			
	25				30				35				40				45																			
	LWT	CAP	COMP	UNIT	COOL	COOL	PRES	PRES	CAP	COMP	UNIT	COOL	COOL	PRES	PRES	CAP	COMP	UNIT	COOL	COOL	PRES	PRES														
°C	kW	kW	kW	l/s	kPa	(1)	(2)	kW	kW	l/s	kPa	(1)	(2)	kW	kW	l/s	kPa	(1)	(2)	kW	kW	l/s	(1)	(2)												
017	5	18.4	4.67	5.67	0.88	33	228	228	17.5	5.19	6.19	0.84	30	235	235	16.6	5.75	6.75	0.79	27	242	242	15.7	6.35	7.35	0.75	25	248	248	14.7	6.99	7.99	0.7	22	255	255
021		23.3	6.32	7.32	1.11	35	200	200	22.1	6.96	7.96	1.06	32	210	210	20.9	7.66	8.66	1	28	220	220	19.7	8.41	9.41	0.94	25	229	229	18.5	9.21	10.2	0.88	22	238	238
026		24.9	7.06	8.06	1.19	29	197	197	23.7	7.77	8.77	1.13	26	207	207	22.5	8.55	9.55	1.08	23	216	216	21.3	9.39	10.4	1.02	21	226	226	20	10.3	11.3	0.96	18	235	235
033		32.3	9.66	11.2	1.54	30	146	146	30.8	10.6	12.1	1.47	27	160	160	29.2	11.7	13.2	1.39	25	174	174	27.5	12.8	14.3	1.32	22	187	187	25.9	14	15.5	1.24	20	200	200
040		39.5	11.1	13	1.89	27	140	189	37.4	12.2	14.1	1.79	24	144	192	35.3	13.5	15.4	1.68	21	147	195	33.2	14.8	16.7	1.59	19	150	197	31.2	16.2	18.1	1.49	17	153	200
050		47	13.7	15.6	2.25	24	140	191	44.5	15.3	17.2	2.12	21	144	194	41.9	16.9	18.8	2	19	147	197	39.3	18.7	20.6	1.88	16	151	199	36.6	20.5	22.4	1.75	14	154	202
060		59	16.2	19.6	2.83	24	130	187	56	17.9	21.3	2.68	21	135	191	53	19.7	23.1	2.52	19	140	194	49.7	21.6	25	2.37	17	145	197	46.5	23.7	27.1	2.22	15	149	200
070		68	19.3	24.8	3.23	25	119	182	64	21.2	26.7	3.06	23	126	186	61	23.3	28.8	2.9	20	132	190	57	25.5	31	2.73	18	137	193	54	27.9	33.4	2.56	16	143	197
080		80	22.4	27.9	3.84	28	143	172	76	24.8	30.3	3.63	25	152	178	72	27.3	32.8	3.42	22	161	183	67	30	35.5	3.21	20	169	188	63	32.8	38.3	2.99	17	176	192
017	6	19.1	4.71	5.71	0.91	35	223	223	18.2	5.23	6.23	0.87	32	230	230	17.2	5.8	6.8	0.82	29	237	237	16.2	6.4	7.4	0.78	26	244	244	15.2	7.04	8.04	0.73	23	251	251
021		24.1	6.39	7.39	1.15	37	193	193	22.9	7.03	8.03	1.09	34	204	204	21.7	7.73	8.73	1.04	30	214	214	20.5	8.48	9.48	0.98	27	224	224	19.2	9.28	10.3	0.92	24	233	233
026		25.8	7.14	8.14	1.23	31	190	190	24.6	7.85	8.85	1.17	28	200	200	23.3	8.63	9.63	1.11	25	210	210	22.1	9.47	10.5	1.05	22	220	220	20.8	10.4	11.4	0.99	20	229	229
033		33.5	9.77	11.3	1.6	31	136	136	31.9	10.7	12.2	1.52	29	151	151	30.2	11.8	13.3	1.44	26	165	165	28.6	12.9	14.4	1.36	24	179	179	26.9	14.1	15.6	1.28	21	193	193
040		40.9	11.2	13.1	1.96	29	138	187	38.7	12.4	14.3	1.85	26	142	190	36.5	13.6	15.5	1.75	23	145	193	34.4	15	16.9	1.64	20	149	196	32.3	16.4	18.3	1.54	18	152	199
050		48.5	13.9	15.8	2.32	25	137	189	45.9	15.5	17.4	2.19	22	141	192	43.3	17.1	19	2.07	20	145	195	40.7	18.9	20.8	1.94	18	149	198	38	20.7	22.6	1.82	15	152	200
060		61	16.4	19.8	2.92	25	127	185	58	18.1	21.5	2.77	23	132	189	55	19.9	23.3	2.61	20	138	192	51	21.9	25.3	2.46	18	142	195	48.2	23.9	27.3	2.3	16	147	198
070		70	19.5	25	3.34	27	115	179	66	21.5	27	3.17	24	122	183	63	23.6	29.1	3	22	128	187	59	25.8	31.3	2.83	19	134	191	55	28.2	33.7	2.65	17	140	195
080		83	22.7	28.2	3.96	30	138	169	78	25.1	30.6	3.75	27	147	175	74	27.6	33.1	3.53	24	156	180	69	30.3	35.8	3.32	21	165	185	65	33.2	38.7	3.1	18	173	190
017	7	19.8	4.75	5.75	0.94	37	217	217	18.8	5.28	6.28	0.9	34	225	225	17.8	5.85	6.85	0.85	31	233	233	16.8	6.45	7.45	0.8	28	240	240	15.8	7.09	8.09	0.76	25	247	247
021		24.9	6.46	7.46	1.19	40	186	186	23.7	7.1	8.1	1.13	36	197	197	22.4	7.8	8.8	1.07	32	208	208	21.2	8.55	9.55	1.01	29	218	218	19.9	9.36	10.4	0.95	25	228	228
026		26.7	7.21	8.21	1.27	33	182	182	25.4	7.93	8.93	1.21	30	193	193	24.1	8.71	9.71	1.15	27	204	204	22.8	9.55	10.5	1.09	24	214	214	21.5	10.4	11.4	1.03	21	224	224
033		34.6	9.87	11.4	1.65	33	125	125	33	10.8	12.3	1.57	31	141	141	31.3	11.9	13.4	1.49	28	156	156	29.6	13	14.5	1.41	25	171	171	27.8	14.2	15.7	1.33	23	185	185
040		42.3	11.3	13.2	2.02	31	135	185	40	12.5	14.4	1.91	27	140	188	37.8	13.8	15.7	1.81	24	143	192	35.6	15.1	17	1.7	22	147	194	33.4	16.6	18.5	1.6	19	150	197
050		50	14.1	16	2.39	27	134	187	47.4	15.7	17.6	2.26	24	139	190	44.7	17.3	19.2	2.14	21	143	193	42.1	19.1	21	2.01	19	147	196	39.4	20.9	22.8	1.88	17	151	199
060		63	16.6	20	3.01	27	123	182	60	18.3	21.7	2.85	24	129	186	56	20.2	23.6	2.7	21	135	190	53	22.1	25.5	2.54	19	140	194	49.8	24.2	27.6	2.38	17	145	197
070		72	19.8	25.3	3.44	29	110	176	68	21.7	27.2	3.27	26	118	181	65	23.8	29.3	3.1	23	125	185	61	26.1	31.6	2.92	21	131	189	57	28.5	34	2.74	18	137	193
080		86	23	28.5	4.09	32	132	165	81	25.4	30.9	3.87	28	142	171	76	27.9	33.4	3.64	25	152	177	72	30.7	36.2	3.42	22	161	183	67	33.6	39.1	3.2	19	169	188

Full load correction factors for Eurovent laboratory test:

Net cooling capacity 1.000
 Energy efficiency ratio 1.000
 Evaporator pressure drop 1.000

Application data:

Standard units
 Refrigerant: R-407C
 Evaporator temperature rise: 5 K
 Evaporator fluid: chilled water
 Fouling factor: 0.44×10^{-4} (m² K)/W

Performances in accordance with EN 255.

Legend:

LWT Leaving water temperature
 CAP kW Cooling capacity
 COMP kW Compressor power input
 UNIT kW Unit power input (compressors, fan, control circuit)
 COOL l/s Evaporator water flow rate
 COOL kPa Evaporator pressure drop
 PRES kPa (1) Available pressure at the unit outlet (unit with single-pump hydronic module)
 PRES kPa (2) Available pressure at the unit outlet (unit with dual-pump hydronic module)

Cooling capacities, single and dual pumps (cont.)

30RYH	Condenser entering air temperature, °C																																			
	25				30				35				40				45																			
	LWT	CAP	COMP	UNIT	COOL	COOL	PRES	PRES	CAP	COMP	UNIT	COOL	COOL	PRES	PRES	CAP	COMP	UNIT	COOL	COOL	PRES	PRES														
°C	kW	kW	kW	l/s	kPa	kPa	kPa	kW	kW	kW	l/s	kPa	kPa	kPa	kW	kW	kW	l/s	kPa	kPa	kPa	kPa														
017	8	20.4	4.79	5.79	0.98	39	212	212	19.5	5.32	6.32	0.93	36	220	220	18.5	5.89	6.89	0.88	33	228	228	17.4	6.5	7.5	0.83	30	236	236	16.4	7.15	8.15	0.78	27	243	243
017		25.8	6.52	7.52	1.23	43	178	178	24.5	7.17	8.17	1.17	39	190	190	23.2	7.87	8.87	1.11	35	201	201	21.9	8.62	9.62	1.05	31	212	212	20.6	9.43	10.4	0.98	27	223	223
021		27.6	7.28	8.28	1.32	35	174	174	26.3	8	9	1.25	32	186	186	24.9	8.79	9.79	1.19	29	197	197	23.6	9.63	10.6	1.13	26	208	208	22.3	10.5	11.5	1.06	23	218	218
026		35.7	9.97	11.5	1.71	35	114	114	34.1	10.9	12.4	1.63	32	130	130	32.3	12	13.5	1.55	30	146	146	30.6	13.1	14.6	1.46	27	162	162	28.8	14.3	15.8	1.38	24	177	177
033		43.7	11.5	13.4	2.09	33	133	133	41.4	12.7	14.6	1.98	29	137	137	39.1	13.9	15.8	1.87	26	141	141	36.8	15.3	17.2	1.76	23	145	145	34.6	16.7	18.6	1.65	20	148	148
040		52	14.3	16.2	2.46	28	132	132	48.8	15.9	17.8	2.33	25	137	137	46.2	17.5	19.4	2.2	23	141	141	43.5	19.2	21.1	2.08	20	145	145	40.7	21.1	23	1.95	18	149	149
050		65	16.8	20.2	3.11	28	119	180	62	18.5	21.9	2.94	26	126	184	58	20.4	23.8	2.78	23	132	188	55	22.4	25.8	2.62	20	137	192	51	24.4	27.8	2.46	18	142	195
060		74	20	25.5	3.55	31	105	173	71	21.9	27.4	3.38	28	113	178	67	24.1	29.6	3.2	25	121	183	63	26.3	31.8	3.01	22	128	187	59	28.8	34.3	2.83	19	134	191
070		88	23.3	28.8	4.21	34	126	161	83	25.7	31.2	3.98	30	137	168	79	28.3	33.8	3.76	27	147	174	74	31	36.5	3.53	24	156	180	69	33.9	39.4	3.3	21	165	186
017	10	21.8	4.88	5.88	1.04	44	200	200	20.7	5.41	6.41	0.99	40	209	209	19.7	5.99	6.99	0.94	37	218	218	18.6	6.6	7.6	0.89	33	227	227	17.5	7.25	8.25	0.83	30	235	235
021		27.4	6.66	7.66	1.31	48	162	162	26	7.31	8.31	1.24	44	175	175	24.7	8.01	9.01	1.18	39	188	188	23.3	8.77	9.77	1.12	35	200	200	21.9	9.58	10.6	1.05	31	212	212
026		29.3	7.43	8.43	1.4	40	158	158	27.9	8.16	9.16	1.33	36	170	170	26.6	8.94	9.94	1.27	33	183	183	25.2	9.79	10.8	1.2	29	195	195	23.8	10.7	11.7	1.14	26	207	207
033		38	10.2	11.7	1.82	40	91	91	36.3	11.1	12.6	1.73	36	109	109	34.5	12.2	13.7	1.65	33	126	126	32.6	13.3	14.8	1.56	30	144	144	30.7	14.5	16	1.47	27	161	161
040		46.5	11.8	13.7	2.22	37	127	178	44	12.9	14.8	2.1	33	132	182	41.6	14.2	16.1	1.99	29	137	186	39.2	15.6	17.5	1.87	26	141	189	36.8	17	18.9	1.76	23	145	193
050		54	14.7	16.6	2.6	32	126	181	52	16.3	18.2	2.47	29	131	184	49	17.9	19.8	2.34	26	136	188	46.2	19.6	21.5	2.21	23	141	192	43.5	21.4	23.3	2.08	20	145	195
060		69	17.2	20.6	3.29	32	111	174	65	18.9	22.3	3.12	29	119	179	62	20.8	24.2	2.95	26	125	184	58	22.8	26.2	2.78	23	132	188	55	24.9	28.3	2.61	20	137	192
070		79	20.4	25.9	3.77	35	95	166	75	22.4	27.9	3.58	31	104	172	71	24.6	30.1	3.39	28	112	177	67	26.9	32.4	3.2	25	120	182	63	29.3	34.8	3.01	22	128	187
080		93	23.9	29.4	4.45	38	114	153	88	26.3	31.8	4.22	34	126	161	83	28.9	34.4	3.98	30	137	168	78	31.7	37.2	3.75	27	147	175	73	34.6	40.1	3.51	23	157	181

Legend:

- LWT Leaving water temperature
- CAP kW Cooling capacity
- COMP kW Compressor power input
- UNIT kW Unit power input (compressors, fan, control circuit)
- COOL l/s Evaporator water flow rate
- COOL kPa Evaporator pressure drop
- PRES kPa (1) Available pressure at the unit outlet (unit with single-pump hydronic module)
- PRES kPa (2) Available pressure at the unit outlet (unit with dual-pump hydronic module)

Full load correction factors for Eurovent laboratory test:

- Net cooling capacity 1.000
- Energy efficiency ratio 1.000
- Evaporator pressure drop 1.000

Application data:

- Standard units
- Refrigerant: R-407C
- Evaporator temperature rise: 5 K
- Evaporator fluid: chilled water
- Fouling factor: 0.44×10^{-4} (m² K)/W

Performances in accordance with EN 255.

Guide specifications

Carrier model number: 30RYH
Nominal cooling capacity 17-76 kW
Nominal heating capacity 18-78 kW

Part 1 - General

System description

- Air-to-water reversible heat pumps for indoor installation, equipped with scroll compressors, a fan with available pressure, auto-adaptive microprocessor control and operating with HFC-407C refrigerant which has no effect on the ozone layer.

Quality assurance

- 30RYH units comply with requirements of European directives:
 - pressurised equipment directive (PED) 97/23/EC
 - machinery directive 98/37/EC, modified,
 - low voltage directive 73/23/EEC, modified.
 - electromagnetic compatibility directive 89/336/EEC, modifiedand 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.

30RYH units have been designed and tested in a facility with a quality assurance system certified ISO 9001. 30RYH units have been assembled in a facility with an environment management system certified ISO 14001. The published performances have been certified by Eurovent and verified by independent laboratories. All units undergo a run test before shipment.

Part 2 - Products

Equipment

Compressor

- Hermetic scroll compressor with only three moving parts, 2-pole electric motor, cooled by suction gas with overload protection through an internal thermostat and/or thermal relay. Oil level sight glass and polyolester synthetic oil charge.

Water heat exchanger

- Stainless steel plate heat exchanger with welded copper connections. Closed-cell thermal foam insulation, anti-freeze protection during operation by flow switch (standard on all versions).
- 30RYH 017-033: the water heat exchanger and the hydronic module are located in a technical compartment, isolated from the outside air. 30RYH 040-080: the water heat exchanger and the hydronic modules are protected against frost at shutdown down to -20°C by electric resistance heater.

Air heat exchanger/fan

- One vertical coil with slotted aluminium fins expanded into grooved copper tubes. Protection against ice build-up by electric resistance heater on the coil support.
- Axial fan with available pressure and profiled airfoil blades for quiet operation. Three-phase, two-speed motor (24/12 r/s), insulation class F, protection category IP 55, overload protection by internal motor sensors. Vertical air flow with rigid connection collar for the air outlet duct.

Refrigerant circuit

- The circuit includes: a four-way cycle reversing valve, liquid line valve, moisture sight glass, two-way expansion device, receiver/heat exchanger, protecting the compressor against refrigerant migration, removable suction line screen filter, high-pressure safety valve (30RYH 040-080), pressure and temperature sensors, manually reset high pressure switch, and a refrigerant charge of HFC-407C. All components of the refrigerant circuit are welded for total and lasting leak-tightness.

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, fan and water pump contactors, thermal relays and fan sensor relays, low-voltage control circuit transformer (24 V control circuit) and the Pro-Dialog control system.

The whole unit is supplied by a single power connection point (three-phase supply without neutral).

Chassis/cabinet

- Chassis and cabinet made of galvanised sheet steel. Painted in oven-baked polyester powder paint in light grey colour (RAL 7035). Removable panels with 1/4 turn locks. Compressor, water heat exchanger and hydronic module of sizes 30RYH 017-033 are located in a technical compartment, isolated from the air flow.

Hydronic module

- Hydronic module, integrated into the heat pump, including: removable screen filter, expansion tank, single centrifugal water pump (dual water pump optional for sizes 30RYH 040-080) with three-phase motor, water flow switch, safety valve, set to 3 bar, flow control valve, pressure gauge and purges. Internal piping made of galvanised steel. Customer-side Victaulic connections with welding or screw connection sleeves. Protection against ice build-up down to -20°C by thermal insulation and water pump cycling.

Note: Units without hydronic module (option): internal water piping protected against frost down to -10°C by electric resistance heater.

Carrier Pro-Dialog Plus control system

Pro-Dialog Plus ensures the following functions:

Control

- Water temperature control by PID loop with compressor run time equalising. The system permanently adjusts the system inertia and ensures complete prevention of excessive compressor cycling. The heat pump can safely operate with a low system water volume which often makes the use of a buffer tank unnecessary (see minimum water volume in this document).
- Head pressure control by auto-adaptive algorithm (fan speed).
- Water pump control (optional dual pump with automatic change-over).
- Control at the second set point (example: unoccupied room). Set point reset as a function of the air temperature or the difference between entering/leaving water temperature.
- Automatic change-over of heating/cooling, as a function of the outdoor temperature with adjustable dead band. Optional control module with a relay for the control of supplementary electric resistance heaters. Four stages maximum, with start-up of the last stage in case of a heat pump shutdown as a result of a fault condition.

Safety

- The system checks the evolution of the parameters: temperatures, pressures ... 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
 - Low water entering temperature in heating mode
 - 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 water and ambient air temperatures, compressor suction/discharge pressures and temperatures, set point, operating time and number of compressor start-ups.
- Diagnosis and complete parameter set by selection of one of the following menus: information, temperatures, pressures, set points, input values, test, configuration, alarms, alarm history and operating log.

Remote management of the heat pump

Volt-free contact inputs permit:

- Start/stop control
- Selection of heating or cooling mode
- Integration of a customer safety device
- Operation at the second set point* (example room unoccupied)
- Maximum demand limit* (30RYH 050-080)
- * One or the other
- Outputs are available for:
 - Start-up of a boiler relay (shutdown of the heat pump below a minimum outdoor temperature)
 - Signalling of a fault condition for each circuit.
- The internal clock permits programming of the following operations:
 - heat pump start/stop
 - control at the second set point (e.g. unoccupied room)
 - fan at low speed to reduce the noise level (e.g. during the night)
- Master/slave control of two heat pumps operating in parallel with operating time equalisation.
- RS 485 serial port for remote heat pump control via communications bus.



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Environmental Management System Approval

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