INVERTER AIR-COOLED LIQUID CHILLERS & REVERSIBLE AIR TO WATER HEAT PUMPS

- Easy and fast installation
- Hydraulic module available
- Inverter technology compressor and fans
- Superior reliability

30RQV

AQUASNAP greenspeed

Nominal heating capacity 17-21 kW
Nominal cooling capacity 15-18 kW

The AquaSnap Greenspeed® liquid chiller/heat pump range was designed for commercial applications such as the air conditioning of offices, hotels and large residential houses.

The units integrate the latest technological innovations: Non-ozone depleting refrigerant R410A, DC inverter twin-rotary compressors, low-noise variable speed fans and microprocessor control.

With exceptional energy efficiency values the inverter chillers qualify for local tax reductions and incentive plans in all EU countries.

For added flexibility the AquaSnap Greenspeed® units are available with or without hydraulic module integrated into the unit chassis, limiting the installation to straightforward operations like connection of the power supply and the water supply and return piping.

EUROVENT CERTIFIED PERFORMANCE
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CARRIER participates in the ECP programme for LCP/HP
Check ongoing validity of certificate:
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FEATURES AND BENEFITS

Features

The AquaSnap Greenspeed® heat pump systems can be used with a wide choice of Carrier terminal fan coil units - cassettes, low, medium and high-pressure satellite units, console units, underceiling units and high-wall units.

Ecodesign is the European Directive that sets mandatory requirements for Energy related Products (ErP) to improve their energy efficiency. Carrier supports initiatives to reduce the environmental impact of its products.

Quiet operation

- Compressors
  - Low-noise INVERTER Twin rotary compressor with low vibration levels
  - Advanced technology providing maximum energy-efficiency with high capacity available at peak conditions and optimised efficiency at low and mid compressor speeds. The AquaSnap Greenspeed® heat pump DC inverter uses Intelligent Power Drive Unit (IPDU) hybrid inverter technology. An electronic management logic is used to optimised compressor operation in all conditions, minimised temperature fluctuation to give a perfect individual comfort control with significant reduction of energy comsuption :
  - PWM: pulse width modulation of the direct current controls the compressor at partial load conditions, adjusting the frequency at fixed voltage. The compressor speed is fine-tuned and the system provides high-level comfort (no temperature fluctuations) at exceptionally efficient working conditions.

Compressor frequency is increased continuously up to the maximum level. This ensures that there are no current draw peaks in the start-up phase. Inverter ramp-up speed makes soft starts unnecessary and ensures immediate maximum power.

  - The two rotary compression cylinders, offset from each other by 180°, and the DC brushless motor with the shaft in perfect balance ensure reduced vibration and noise, even at very low operating speeds. This results in an extremely wide range between minimum and maximum capacity with continuous operation, guaranteeing that the system is always optimised and provides maximum comfort at exceptionally high efficiency levels.
  - Twin-rotary cylinders, low vibrations and low load to the shaft ensure highest compressor reliability and a long trouble-free operating life.
  - All DC brushless twin-rotary compressors are equipped with internal system to secure the motor against oil issues due to colder climate.
  - A double compressor shield for acoustic insulation further reduces noise levels.

- Air heat exchanger section
  - Vertical air heat exchanger coils
  - The latest-generation low-noise fans are now even quieter and do not generate intrusive low-frequency noise
  - Rigid fan installation for reduced start-up noise.

Easy and fast installation

- Integrated hydraulic module (option)
  - Fixed speed water pump or variable speed circulator
  - Water filter protecting the water pump against circulating debris
  - High-capacity membrane expansion tank ensures pressurisation of the water circuit (option)
  - Overpressure valve, set to 3 bar
  - Thermal insulation and frost protection down to -20°C, using an electric resistance heater and pump cycling.
  - Integrated water fill system to ensure correct water pressure (option)

No additional buffer tank required, simplyfing and speeding up the installation process (to be checked with the water volume of installation).

- Physical features
  - Advanced circuit design and component selection has resulted in a compact unit with an exceptionally small footprint that is easy to transport even through narrow doors.

Reduced operating weight and a handle on the unit panels to facilitate transport.

  - The unit is enclosed by easily removable panels, covering all components (except air heat exchanger and fans).
- A neutral color (RAL 7035) to facilitate the intregration in residential area
- Simplified electrical connections
  - Main disconnect switch with high trip capacity (option)
  - Transformer for safe 24 V control circuit supply included
- Fast commissioning
  - Systematic factory operation test before shipment
  - Quick-test function for step-by-step verification of the instruments, electrical components and motors.

Economical operation

- Increased saesonal efficiency
  - In accordance with EN 14825:2013, Average Climate, energy label reach A+ (see Physical data RQV units). The exceptionally high energy efficiency of the AquaSnap Greenspeed® unit is the result of a long qualification and optimisation process.
- Reduced maintenance costs
  - Maintenance-free twin rotary compressors
  - Fast diagnosis of possible incidents and their history via the user interface WUI
  - R410A refrigerant is easier to use than other refrigerant blends

Environmental care

- Non-ozone depleting R410A refrigerant
  - Chlorine-free refrigerant of the HFC group with zero ozone depletion potential
  - Very efficient - gives an increased energy efficiency ratio (EER)
- Leak-tight refrigerant circuit
  - Brazed refrigerant connections for increased leak-tightness
  - Verification of pressure transducers and temperature sensors without transferring refrigerant charge

FEATURES AND BENEFITS

Superior reliability

■ State-of-the-art concept
- Cooperation with specialist laboratories and use of limit simulation tools (finite element calculations) for the design of the critical components, e.g. motor supports, suction/ discharge piping etc.

■ Auto-adaptive control
- Control algorithm prevents excessive compressor cycling and permits reduction of the water quantity in the hydraulic circuit (Carrier patent)

■ Exceptional endurance tests
- Corrosion resistance tests in salt mist in the laboratory
- Accelerated ageing test on components that are submitted to continuous operation: compressor piping, fan supports
- Transport simulation test in the laboratory on a vibrating table.

NHC Control

NHC control associate with compressor and fan variable frequency driver combines intelligence with operating simplicity. The control constantly monitors all machine parameters and precisely manages the operation of compressor, expansion devices, fans and of the water heat exchanger water pump for optimum energy efficiency.

■ Ease-of-use
- NHC control can be associated with a new User interface (WUI) which allow an easy access to the configuration parameters (frequency compressor, refrigerant circuit temperature, sets points, air temp, entering water temp, alarm report…).
- This user interface is also very intuitive in its use. It allows reading and easy selection of the operating mode. The functions are represented by icons on the LCD backlit screen.
- To facilitate the use of this interface, 3 levels of access are available: end user, installer and factory.

■ Key features
- Heating and cooling mode
- Domestic hot water
- Master/slave control of 4 units operating in parallel with operating time equalisation and automatic changeover in case of a unit fault (need Master slave sensor in accessory).
- Scheduling period

■ Choice of control product
- 3 options are available to drive the 30RQV 17-21:
  • Dry contact
  • User interface WUI
  • ModBus protocol

User Interface WUI

- This interface can be installed up to 50 m away. It is connected to the NHC board with a 4 wires cable.
- 2 installation possibilities:
  • Inside the room (with remote interface accessory) : IAT sensor is an accessory, it is not mandatory to operate in remote user interface, because WUI has an internal sensor to measure the room temperature take with the internal sensor, set-point selected is air temperature.
  • On the HP/chiller (with local user interface option) : set-point is on water temperature are water temperature

Local User Interface configuration

■ ModBus

Direct access with Modbus connection to set, configure and monitor the 30RQV

■ Input remote contact :
- Remote On/Off Contact
- Remote Heat/Cool Contact: This switch is used to select the Cooling Mode (contact opened) or the Heating Mode (contact closed).
- Remote Economic Contact: This switch is used to select the regular Home Mode when contact is opened or the Economic Away Mode when contact is closed.
- Safety Input Contact: This switch is normally closed type, according to configuration it is used either to stop the unit, to ban the Heating Mode or to ban the Cooling Mode when contact is opened.

FEATURES AND BENEFITS

■ Large choice of Input Contacts

Several functions can be configured by the installer. They allow to adapt to the environment of the machine:

- Power Limitation / Night Mode: This switch is used to reduce the compressor maximum frequency to avoid noise.
- Off Peak: If the General Purpose Contact, configured to "Off Peak", is closed then the Electric Heat Stages are not allowed.
- Loadshed Request: If the General Purpose Contact, configured to "Loadshed Request", is closed then unit shall be stopped as soon as possible.
- Solar Input: If the General Purpose Contact, configured to "Solar Input", is closed then the unit is not allowed to run in Heating or DHW Mode because hot water is produced from a solar source.
- DHW Request Switch from tank : When this input is closed, the Domestic Hot Water production is requested (need DHW sensor delivered in accessory).
- DHW Priority : When this input is closed, the unit is switching to Domestic Hot Water production regardless of the Space Heating demand and the current DHW schedule (need DHW sensor delivered in accessory).
- Anti-Legionella Cycle Request : When this input is closed, the Domestic Hot Water production is requested with the Anti-Legionella set-point.
- Summer Switch : This switch is used to select the Winter (contact opened) or the Summer Mode (contact closed).
- Energy Meter Input : This input is used to count the number of pulses received from an external energy meter (not supplied)
- External Alarm Indication Input : When this input is opened, alarm is tripped. This alarm is for information only, it does not affect the unit operation.

■ Output remote contact available

2 Output contacts could be chosen on the NHC board, upon configuration for the following purposes:

alert, alarm , Standby, running (Cool, Heat, DHW or Defrost Modes), IAT Reached, electrical Heat Stage 2, electrical Heat Stage 3

TYPE KEY

30R Q V 021 C H E - B B - - -

Range

B - Cooling
Q - Heat pump

V - Variable speed

017 - nominal size 17 kW
021 - nominal size 21 kW

T - Power supply with neutral cable w/o disconnect switch
C - Power supply with neutral with disconnect switch

X - Without hydraulic module
H - With hydraulic module with expansion tank
F - With hydraulic module with expansion tank and water filling system
R - With hydraulic and without expansion tank*
Z - With hydraulic, w/o expansion tank and with water filling system
M - With variable speed circulator with expansion tank
N - With variable speed circulator with expansion tank and water filling system
P - With variable speed circulator without expansion tank
Q - With variable speed circulator, w/o expansion tank and with water filling system

- Without coil protection
E - Epoxy coil protection (Gold-fin)

- Standard

B -CCN Jbus gateway as standard
C - CCN Bacnet gateway
D -CCN LONtalk gateway

- Standard
B - Local Interface WUI

Revision status

Accessories
- Remote User Interface (00PSG002521900A)
- DHW sensor (00PSG002501300A)
- Master /slave sensor (00PSG000596400A)
- Additional OAT sensor (00PSG002522000A)

PHYSICAL DATA, 30RQV UNITS

30RQV				17	21
Heating					
Standard unit Full load performances*	HA1	Nominal capacity	kW	17,1	21,1
		COP	kW/kW	4,1	4,1
	HA2	Nominal capacity	kW	16,2	20,0
		COP	kW/kW	3,4	3,3
	HA3	Nominal capacity	kW	15,3	19,1
		COP	kW/kW	2,7	2,7
Seasonal energy efficiency**	HA1	$SCOP_{30/35°C}$	kWh/kWh	3,68	3,56
		$\eta s\ heat_{30/35°C}$	%	144	139
	HA3	**$SCOP_{47/55°C}$**	**kWh/kWh**	**3,1**	**2,9**
		$\eta s\ heat_{47/55°C}$	**%**	**121**	**113**
		P_{rated}	kW	9,5	15,43
		Energy labelling		A+	A+
Cooling					
Standard unit Full load performances*	CA1	Nominal capacity	kW	14,9	18,6
		EER	kW/kW	3,0	3,1
		Eurovent class		B	A
	CA2	Nominal capacity	kW	19,8	25,8
		EER	kW/kW	3,9	3,8
		Eurovent class		A	A
Seasonal energy efficiency		SEER $_{12/7°C}$ Comfort low temp.	kWh/kWh	151	149
Sound levels					
Standard unit					
Sound power level(1)			dB(A)	71	74
Sound pressure level at 10 m(2)			dB(A)	40	43
Dimensions - Standard unit					
Length(3)			mm	1109	1109
Width			mm	584	584
Height			mm	1579	1579
Operating Weight(4)					
Standard unit			kg	190,9	199,4
Compressors			Rotary compressor	1	1
Refrigerant			R410A		
Charge (4)			kg	8	8
Capacity control					
Minimum capacity(5)			%	33 %	41 %
Air heat exchanger				Grooved copper tubes, aluminium fins	
Fans - Standard unit				Axial type fan	
Quantity				2	2
Maximum total air flow			l/s	2000	2400
Maximum rotational speed			rps	14	16
Water heat exchanger				Brazed plate heat exchanger	
Water volume			l	1,52	1,9
Max water-side operating pressure without hydraulic module			kPa	1000	1000

* In accordance with standard EN 14511-3:2013

** In accordance with standard EN 14825:2013, Average climate

HA1 Heating mode conditions: Water heat exchanger water entering/leaving temperature 30°C/35°C, outside air temperature tdb/twb = 7°C db/6°C wb, evaporator fouling factor 0 m².K/W

HA2 Heating mode conditions: Water heat exchanger water entering/leaving temperature 40°C/45°C, outside air temperature tdb/twb= 7°C db/6°C wb, evaporator fouling factor 0 m².K/W

HA3 Heating mode conditions: Water heat exchanger water entering/leaving temperature 47°C/55°C, outside air temperature tdb/twb= 7°C db/6°C wb, evaporator fouling factor 0 m².K/W

CA1 Cooling mode conditions: Evaporator water entering/leaving temperature 12°C/7°C, outside air temperature 35°C, evaporator fouling factor 0 m².K/W

CA2 Cooling mode conditions: Evaporator water entering/leaving temperature 23°C/18°C, outside air temperature 35°C, evaporator fouling factor 0 m².K/W

$\eta s\ heat_{30/35°C}$ & $SCOP_{30/35°C}$ Applicable Ecodesign regulation: (EU) No 813/2013

$\eta s\ heat_{47/55°C}$ & $SCOP_{47/55°C}$ Applicable Ecodesign regulation: (EU) No 813/2013

SEER 12/7°C Applicable Ecodesign regulation: (EU) No 2016/2281

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

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

(3) Length = 1141 mm if main disconnect switch

(4) Values are guidelines only. Refer to the unit nameplate.

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Eurovent certified values

PHYSICAL DATA, 30RQV UNITS

30RQV		17	21
Hydraulic module (option)		Pump, relief valve, paddle flow switch, expansion tank (option)	
Pump		Centrifugal pump	
Expansion tank volume	l	8	8
Max. water-side operating pressure with hydraulic module(6)	kPa	300	300
Water connections (Without Hydraulic Module)			
Inlet diameter (MPT GAS)	inch	1	1
Outlet diameter (MPT GAS)	inch	1	1
Water connections (With Hydraulic Module)			
Inlet diameter (MPT GAS)	inch	1-1/4	1-1/4
Outlet diameter (MPT GAS)	inch	1	1
Water Filling System (Option)			
Diameter (MPT GAS)	inch	1/2	1/2
Chassis paint colour	Colour code:	RAL 7035	RAL 7035

(6) Min. water-side operating pressure with fixed speed hydraulic module is 50 kPa and with variable speed hydraulic module is 40 kPa.

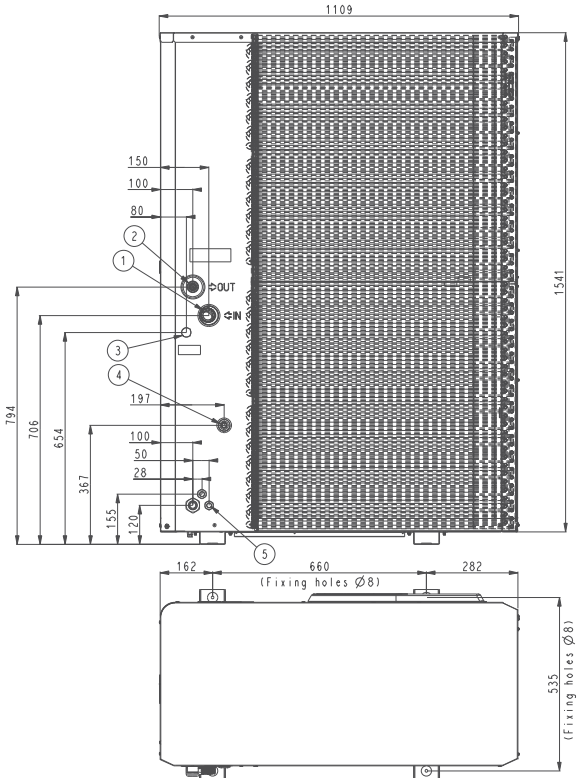
ELECTRICAL DATA, 30RQV UNITS

30RQV (full options)		17	21
Power circuit			
Nominal power supply	V-ph-Hz	400-3+N-50	400-3+N-50
Voltage range	V	360-440	360-440
Control circuit supply		24V AC via internal transformer	
Nominal unit current drawn (Un) *	A	12,5	14,3
Maximum unit power input (Un) **	kW	10,8	12,4
Cos Phi unit at maximum power **		0,93	0,93
Maximum unit current drawn (Un-10%)***	A	18,5	21,2
Maximum unit current drawn (Un) ****	A	16,7	19,2
Maximum Start-up current, standard unit †	A	Not Applicable (less than the operating current)	

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

DIMENSIONS/CLEARANCES

30RQV 017-021



Legend
All dimensions are in mm

1. Water inlet
2. Water outlet
3. Fill kit connection
4. Safety valve outlet
5. Electrical connections