

# 30RQV 017-021 **NEW**

Nominal cooling capacity 15-18 kW

Nominal heating capacity 17-21 kW



HEATING

**AQUASNAP** greenspeed

**Easy and fast installation**

**Hydronic module available**

**Inverter technology compressor and fans**

**Superior reliability**

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.

# Physical data

30RQV				17	21
<b>Cooling</b>					
Standard unit	C1	Nominal capacity	kW	14,9	18,6
Full load performances*	C1	EER	kW/kW	3,0	3,1
	C1	Eurovent class cooling		B	A
	C2	Nominal capacity	kW	20,2	25,8
	C2	EER	kW/kW	3,8	3,8
	C2	Eurovent class cooling		A	A
<b>Seasonal efficiency</b>		ESEER	kW/kW	4,01	3,85
<b>Heating</b>					
Standard unit	H1	Nominal capacity	kW	17,1	21,1
Full load performances*	H1	COP	kW/kW	4,1	4,1
	H1	Eurovent class heating		A	A
	H2	Nominal capacity	kW	16,9	20,0
	H2	COP	kW/kW	3,3	3,3
	H2	Eurovent class heating		A	A
	H3	Nominal capacity	kW	15,2	21,1
	H3	COP	kW/kW	2,7	2,5
<b>Seasonal efficiency**</b>	H3	SCOP	kW/kW	3,1	2,9
	H3	$\eta_s$ heat	%	121	113
	H3	Prated	kW	9,5	15,43
	H3	Annual Energy consumption	KWh	6269	10980
	H3	Energy class		A+	A+
<b>Sound levels</b>					
<b>Standard unit</b>					
Sound power level <sup>(2)</sup>			dB(A)	71	74
Sound pressure level at 10 m <sup>(3)</sup>			dB(A)	40	43
<b>Dimensions - Standard unit</b>					
Length <sup>(5)</sup>			mm	1109	1109
Width			mm	584	584
Height			mm	1579	1579
<b>Operating Weight <sup>(1)</sup></b>					
Standard unit			kg	190,9	199,4
<b>Compressors</b>					
			Rotary compressor	1	1
<b>Refrigerant</b>					
			R410A		
Charge <sup>(1)</sup>			kg	8	8
<b>Capacity control</b>					
Minimum capacity <sup>(6)</sup>			%	33%	41%
<b>Air heat exchanger</b>					
				Grooved copper tubes, aluminium fins	
<b>Fans - Standard unit</b>					
				Axial type fan	
Quantity				2	2
Maximum total air flow			l/s	2000	2400
Maximum rotational speed			rps	14	16
<b>Water heat exchanger</b>					
				Brazed plate heat exchanger	
Water volume			l	1,52	1,9
Max water-side operating pressure without hydronic module			kPa	1000	1000
<b>Hydronic module (option)</b>					
				Pump, relief valve, paddle flow switch, expansion tank (option)	
Pump				Centrifugal pump (fixed speed or variable speed)	
Expansion tank volume			l	8	8
Max. water-side operating pressure with hydronic module <sup>(4)</sup>			kPa	300	300
<b>Water connections (Without Hydronic Module)</b>					
Inlet diameter (BSP GAS)			inch	1	1
Outlet diameter (BSP GAS)			inch	1	1
<b>Water connections (With Hydronic Module)</b>					
Inlet diameter (BSP GAS)			inch	1-1/4	1-1/4
Outlet diameter (BSP GAS)			inch	1	1
<b>Water Filling System (Option 287)</b>					
Diameter (BSP GAS)			inch	1/2	1/2
<b>Chassis paint colour</b>					
			Colour code:	RAL 7035	RAL 7035

\* In accordance with standard EN 14511-3:2013

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

C1 Cooling mode conditions : evaporator water entering/leaving temperature 12°C/7°C, outside air temperature 35°C, evaporator fouling factor 0m<sup>2</sup> K/W

C2 Cooling mode conditions : evaporator water entering/leaving temperature 23°C/18°C, outside air temperature 35°C, evaporator fouling factor 0m<sup>2</sup> K/W

H1 Heating mode conditions : Water heat exchanger water entering/leaving temperature 30°C/35°C, fouling factor 0m<sup>2</sup> K/W. Outside air temperature 7°C db / 6°C wb

H2 Heating mode conditions : Water heat exchanger water entering/leaving temperature 40°C/45°C, fouling factor 0m<sup>2</sup> K/W. Outside air temperature 7°C db / 6°C wb

H3 Heating mode conditions : Water heat exchanger water entering/leaving temperature 47°C/55°C, fouling factor 0m<sup>2</sup> K/W. Outside air temperature 7°C db / 6°C wb

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

(2) 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.

(3) In dB ref 20  $\mu$ Pa, (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).

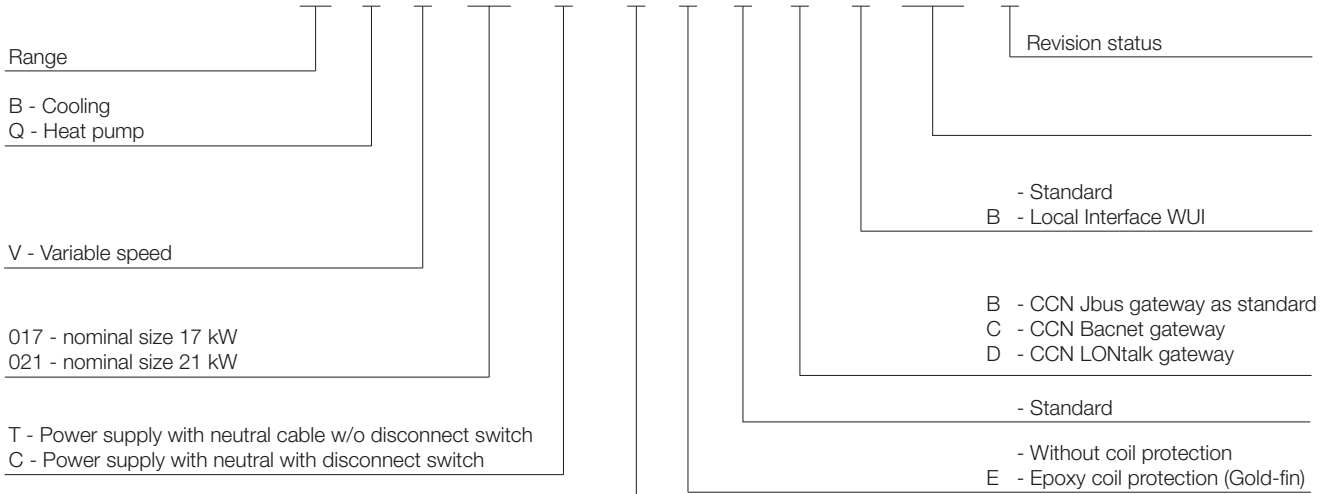
(4) Min. water-side operating pressure with fixed speed hydronic module is 50 kPa and with variable speed hydronic module is 40 kPa.

(5) Length = 1141 mm if main disconnect switch

(6) Cooling Eurovent condition

# Type key

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



## Accessories

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

# Hydronic module

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

The water heat exchanger and the hydronic module are protected against frost down to -20°C, using an electric resistance heater (standard) and pump cycling. However, the use of MPG (Mono Propylene Glycol) can effectively protect the installation even in case of power failure.

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

2 Hydronics modules are available in option :

- With fixed speed pump
- With Variable speed circulator

## Physical and electrical data

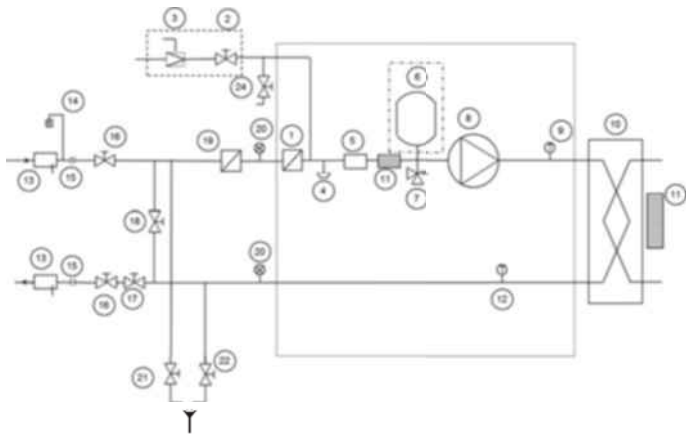
These are the same as for the standard unit except:

30 RQV - units with hydronic module	017/021 Fixed Speed		017/021 Variable Speed
<b>Hydronic module</b>			
Expansion tank volume	l	8	8
Maximum water-side operating pressure	kPa	300	300
<b>Pumps</b>			
Water pump	Pump, screen filter, expansion tank, flow switch, relief valve		
Power input*	kW	0.82	0.31
Nominal operating current draw*	A	1.60	1.57

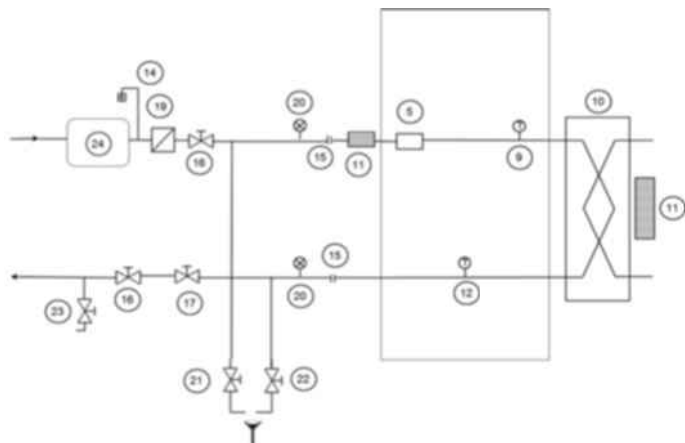
\* Nominal conditions: evaporator entering/leaving water temperature 12°C/7°C, outside air temperature 35°C, evaporator fouling factor = 0 m² K/kW. Gross performances, not in accordance with EN14511-3:2013. These performances do not take into account the correction for the proportional heating capacity and power input generated by the water pump to overcome the internal pressure drop in the heat exchanger.

## Typical hydronic circuit diagram

With the hydronic module 17-21 kW



Without the hydronic module 17-21 kW



- Components provided with unit
- - - Water filling system (option)
- · - · Expansion tank (option)

### Legend

#### Hydronic components

1. Mesh filter
2. On/off valve (water filling - optional)
3. Pressure reducer (water filling - optional)
4. Water drain valve
5. Paddle flow switch
6. Expansion tank
7. Safety valve
8. Pump
9. Temperature sensor
10. Brazed Plate Heat Exchanger
11. Anti-freeze electric heater
12. Temperature sensor

#### System components

13. Pocket for temperature sensor
14. Air purge
15. Flexible connections
16. On/off valve
17. Water flow control valve (factory supplied only with hydronic module option but to be installed on site)
18. Bypass valve for anti-freeze protection (when, in winter, on/off valve are closed)
19. Mesh filter (mandatory for a unit without hydronic kit)
20. Pressure gauge
21. Water drain valve from the plant
22. Water drain valve from refrigerant – water exchanger
23. Charge valve
24. Buffer tank (if required)

# Features and advantages

## Features

The AquaSnap Greenspeed 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 consumption :
    - 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 hydronic 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, simplifying 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 integration 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 seasonal efficiency
  - Increased seasonal 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 leaktightness
  - Verification of pressure transducers and temperature sensors without transferring refrigerant charge

## Controls

### 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

## Superior reliability

- State-of-the-art concept
  - Cooperation with specialist laboratories and use of limit simulation tools (finite element calculations) for the design of the critical components, e.g. motor supports, suction/discharge piping etc.
- Auto-adaptive control
  - Control algorithm prevents excessive compressor cycling and permits reduction of the water quantity in the hydronic circuit (Carrier patent)
- Exceptional endurance tests
  - Corrosion resistance tests in salt mist in the laboratory
  - Accelerated ageing test on components that are submitted to continuous operation: compressor piping, fan supports
  - Transport simulation test in the laboratory on a vibrating table.
- 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, setpoint selected is air temperature.
  - On the HP/chiller (with local user interface option): setpoint is on water temperature are water temperature

- ModBus
  - Direct acces 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.

#### ■ 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 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

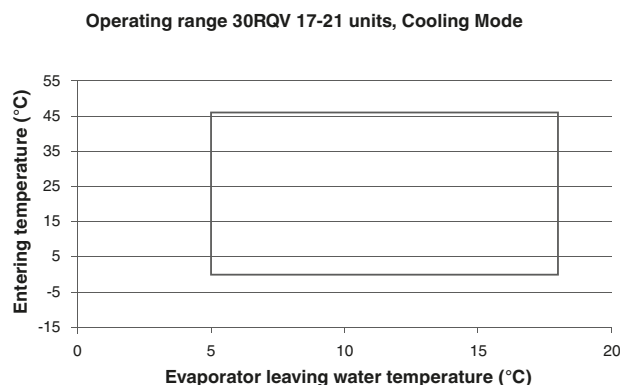
## Operating limits

Cooling Cycle			
Evaporator Water Temperature	°C	Minimum	Maximum
Entering water temperature at start-up		6	30
Leaving water temperature during operation		5	18
Condenser Air Temperature			
	°C	Minimum	Maximum
Standard unit		0	46
Heating Cycle			
Condenser Water Temperature	°C	Minimum	Maximum
Entering water temperature at start-up		10	45
Leaving water temperature during operation		20	60/57*
Evaporator Air Temperature	°C	Minimum	Maximum
Standard unit		-20 **	30

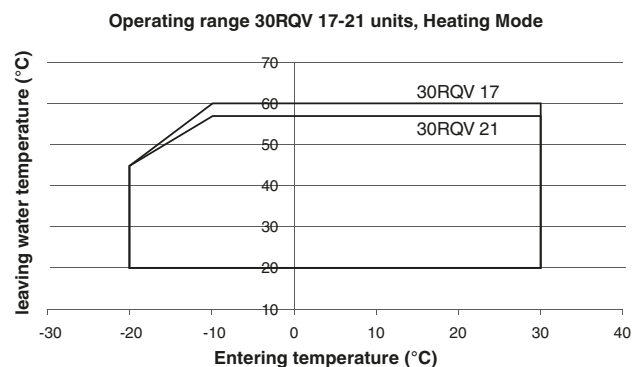
\* 60°C for 30RQV 17 and 57°C for 30RQV 21

\*\* For operation at an outdoor ambient temperature below 0°C (cooling mode and heating mode), the water freeze protection should be available and / or the water loop can be protected against frost by the installer, using an anti-freeze solution.

### 30RQV (cooling mode)

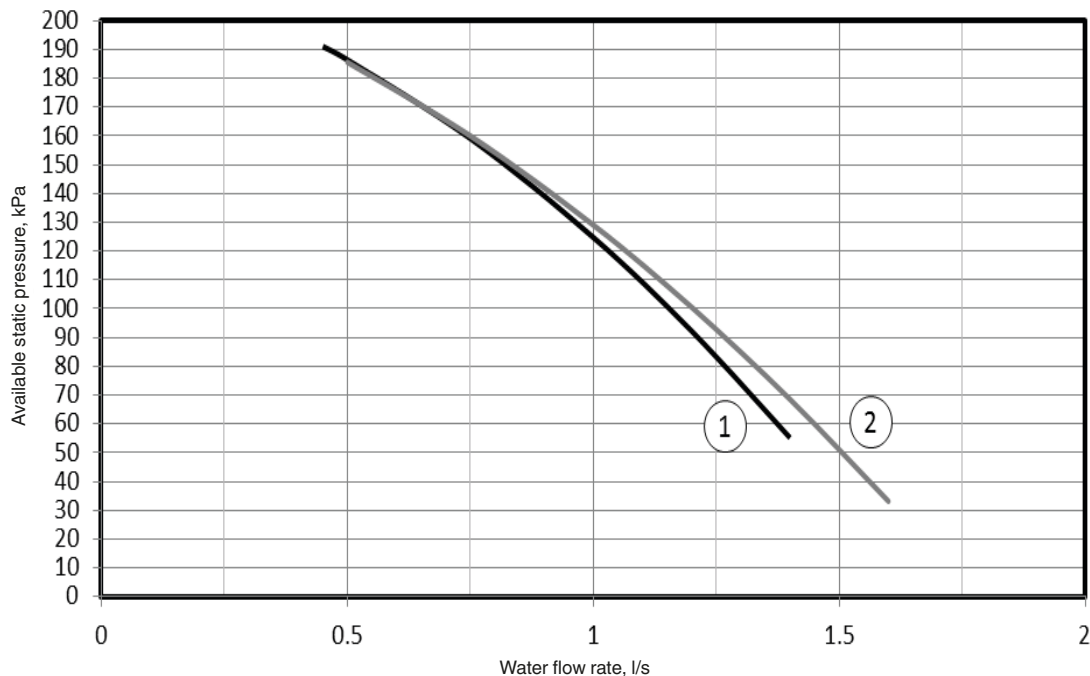


### 30RQV (heating mode)



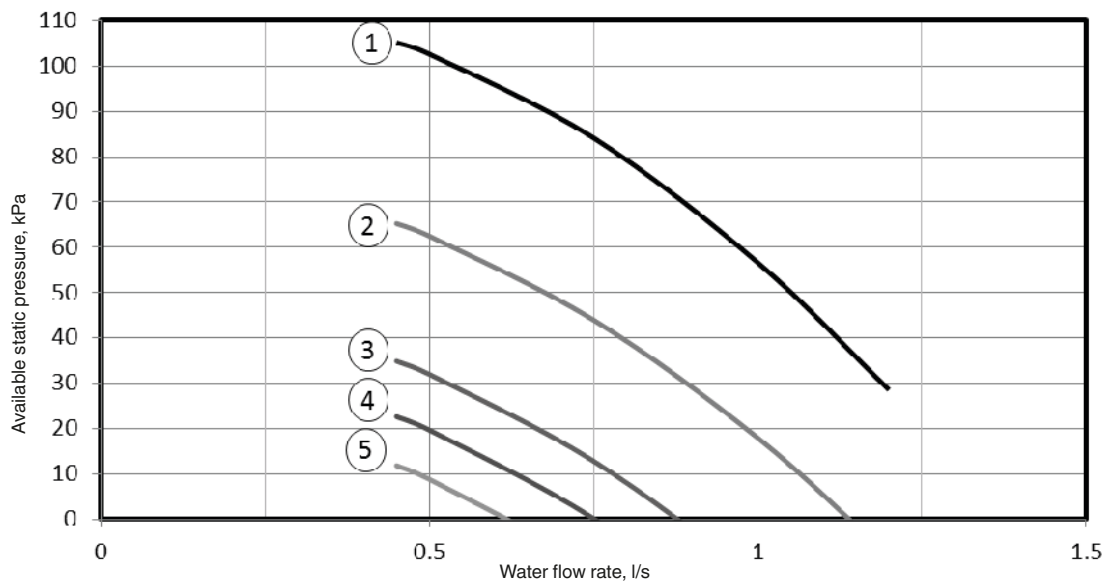
# Available static system pressure

Available external static pressure for unit with fixed speed hydronic module 17 and 21kW



- Legend**
- 1. 30RQV 17
  - 2. 30RQV 21

Available external static pressure for 17kW unit with variable speed hydronic module

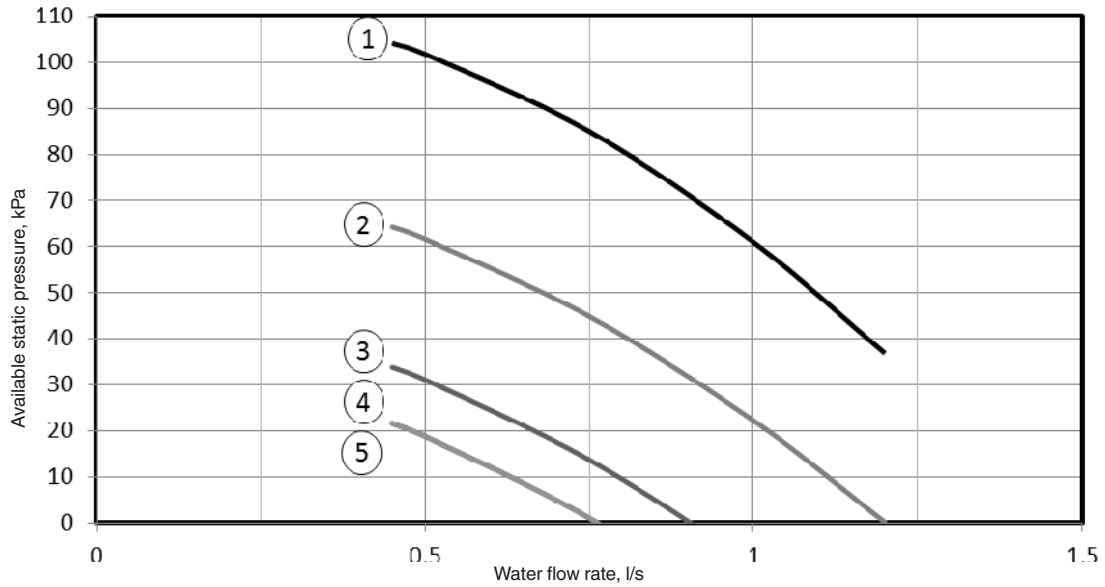


- Legend**
- 1. Pump Speed = 100%
  - 2. Pump Speed = 75%
  - 3. Pump Speed = 50%
  - 4. Pump Speed = 38%
  - 5. Pump Speed = 25%



# Available static system pressure

Available external static pressure for 21kW unit with variable speed hydronic module



## Legend

1. Pump Speed = 100%
2. Pump Speed = 75%
3. Pump Speed = 50%
4. Pump Speed = 38%
5. Pump Speed = 25%

## BPHE water flow rate

### 30RQV units without hydronic module

	Minimum water flow rate, l/s	Maximum water flow rate, l/s
17	0,45	1,3
21	0,57	1,5

### 30RQV units with fixed speed hydronic module

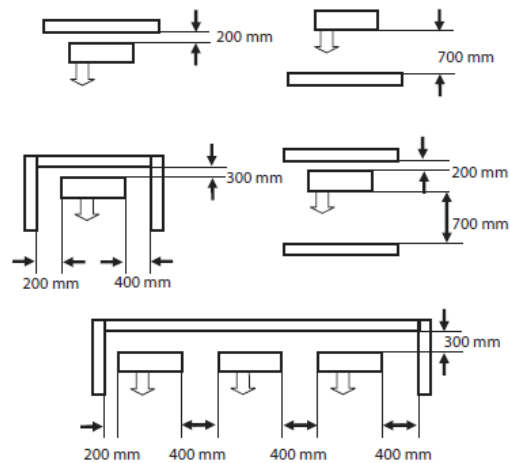
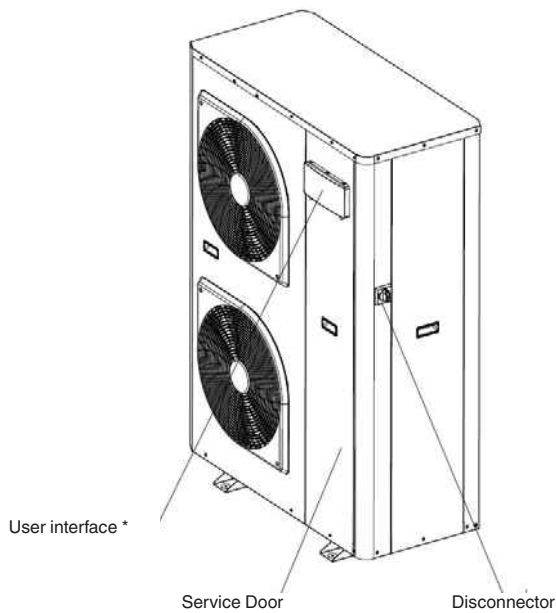
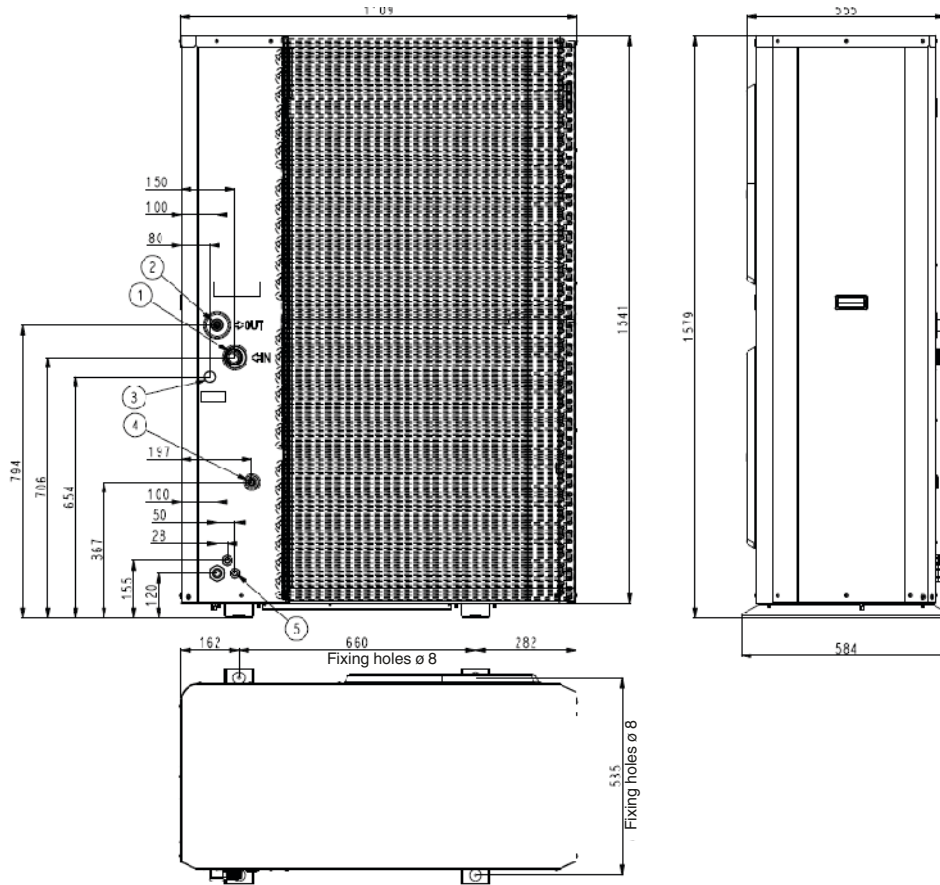
	Minimum water flow rate, l/s	Maximum water flow rate, l/s
17	0,45	1,4
21	0,57	1,6

### 30RQV units with variable speed hydronic module

	Minimum water flow rate, l/s	Maximum water flow rate, l/s
17	0,45	1,2
21	0,57	1,2

# 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