Carrier

United Technologies

PRODUCT SELECTION DATA

- Commercial and industrial applications
- Compact design
- Quiet operation
- Variable water flow (optional)
- Partial heat reclaim

Air-Cooled Liquid Chillers, Reversible Air-to-Water Heat Pumps

30RBS 039-160/30RQS 039-160

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AQUASNAP®

Original document

30RBS 039-160/30RQS 039-160

Nominal cooling capacity 30RBS: 40-156 kW
Nominal cooling capacity 30RQS: 38-149 kW
Nominal heating capacity 30RQS: 42-158 kW

The Aquasnap range of liquid chillers/air-to-water heat pumps was designed for commercial (air conditioning of offices, hotels etc.) or industrial (low-temperature process units etc.) applications.

The Aquasnap integrates the latest technological innovations:
- Ozone-friendly refrigerant R410A
- All-aluminium microchannel heat exchangers for the cooling only units (30RBS)
- Scroll compressors
- Low-noise fans made of a composite material
- Auto-adaptive microprocessor control
- Electronic expansion valve
- Variable-speed pump (option)

The Aquasnap can be equipped with a hydronic module integrated into the unit chassis, limiting the installation to straightforward operations like connection of the power supply and the chilled water supply and return piping.

Features

Quiet operation

- Compressors
  - Low-noise scroll compressors with low vibration level
  - The compressor assembly is installed on an independent chassis and supported by anti-vibration mountings
  - Dynamic suction and discharge piping support, minimising vibration transmission (Carrier patent).
- Condenser (30RB)/air evaporator/condenser (30RQ) section
  - Vertical condenser coils
  - Protection grilles on anti-vibration mountings to protect the heat exchanger against possible shocks (optional on 30RB 039-160).
  - Low-noise latest-generation Flying Bird IV fans, made of a composite material (Carrier patent) are now even quieter and do not generate intrusive low-frequency noise
  - Rigid fan installation for reduced start-up noise (Carrier patent).

Easy and fast installation

- Integrated hydronic module (option)
  - Centrifugal low or high-pressure water pump (as required), based on the pressure loss of the hydronic installation

Hydronic module

  - Single or dual water pump (as required) with operating time balancing and automatic changeover to the back-up pump if a fault develops
  - Water filter protects the pump against circulating debris
  - Pressure measurement, using two pressure transducers and allowing indication of water flow rate, water pressure and lack of water.
  - High-capacity membrane expansion tank ensures pressurisation of the water circuit
  - Overpressure valve, set to 4 bar
  - Speed variator on the pumps (option) to ensure the correct flow rate, based on the system requirements
  - Thermal insulation and frost protection down to -20°C, using an electric resistance heater (see table of options)
- Physical features
  - The unit has a small footprint and a low height (1330 mm) allowing it to blend in with any architectural styles.
  - The unit is enclosed by easily removable panels, covering all components (except air heat exchangers and fans).
- Simplified electrical connections
  - A single power supply point without neutral
  - Main disconnect switch (option 70) with high trip capacity
  - 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

- Optional variable-speed pump for economical operation
- The control algorithm adjusts the water flow rate based on the actual system requirements and obsoletes the need for the control valve at the unit outlet.

■ Increased energy efficiency at part load
- Eurovent energy efficiency class (in accordance with EN14511-3:2013) C and D in cooling mode and B and C in heating mode.
- The refrigerant circuit includes several compressors connected in parallel. At part load, around 99% of the operating time, only the compressors that are absolutely necessary operate. At these conditions the compressors operating are more energy efficient, as they use the total condenser and evaporator capacity.
- The electronic expansion device (EXV) allows operation at a lower condensing pressure (EER, COP and ESEER, SCOP optimisation).
- Dynamic superheat management for better utilisation of the water heat exchanger surface.
- Defrost cycle optimisation (30RQ).

■ Reduced maintenance costs
- Maintenance-free scroll compressors
- Fast diagnosis of possible incidents and their history via the Touch Pilot Junior control
- R410A refrigerant is easier to use than other refrigerant blends.

Environmental care

■ Ozone-friendly R410A refrigerant
- Chlorine-free refrigerant of the HFC group with zero ozone depletion potential
- Very efficient - gives an increased energy efficiency ratio (EER, COP and ESEER)
- 50% reduction in the refrigerant charge through the use of micro-channel heat exchangers for the cooling only units (30RBS)

■ Leak-tight refrigerant circuit
- Brazed refrigerant connections for increased leak-tightness
- Reduction of leaks due to reduced vibration levels and elimination of capillary tubes (TXVs)
- Verification of pressure transducers and temperature sensors without transferring refrigerant charge.

Partial view of the hydronic circuit

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.
- All aluminium micro-channel heat exchanger (MCHE) on cooling only units (30RBS), offers increased corrosion resistance compared to traditional coils. The all-aluminium design eliminates the formation of galvanic currents between aluminium and copper that cause coil corrosion.

■ Auto-adaptive control
- Control algorithm prevents excessive compressor cycling and permits reduction of the water quantity in the hydronic circuit (Carrier patent)
- Hydronic module with integrated pressure transducers allowing measurement of the water pressure at two points, as well as measurement of the water flow rate and detection of lack of water and pressure. This considerably reduces the risk of problems such as frost accumulation on the water heat exchanger.
- Automatic compressor unloading in case of abnormally high condensing pressure. If an anomaly occurs (e.g. fouled air heat exchanger coil, fan failure) Aquasnap continues to operate, but at reduced capacity.

■ 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.

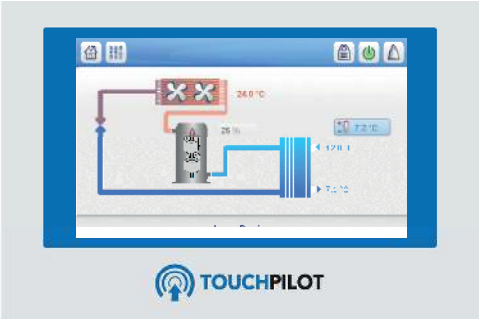
Touch Pilot Junior control

The Touch Pilot Junior features a control with advanced communication technology over Ethernet (IP), user-friendly and intuitive user interface with 4.3” colour touch screen.

■ Energy management
- Internal time schedule clock: Controls heat pump on/off times and operation at a second set-point
- Set-point offset based on the outside air temperature
- Master/slave control of two heat pumps operating in parallel with operating time equalisation and automatic change-over in case of a unit fault.

■ Integrated advanced communication features
- Night mode: Capacity and fan speed limitation for reduced noise level
- With hydronic module: Water pressure display and water flow rate calculation
- Easy and high-speed communication technology over Ethernet (IP) to a building management system
- Access to multiple unit parameters.

■ 4.3" Touch Pilot Junior user interface



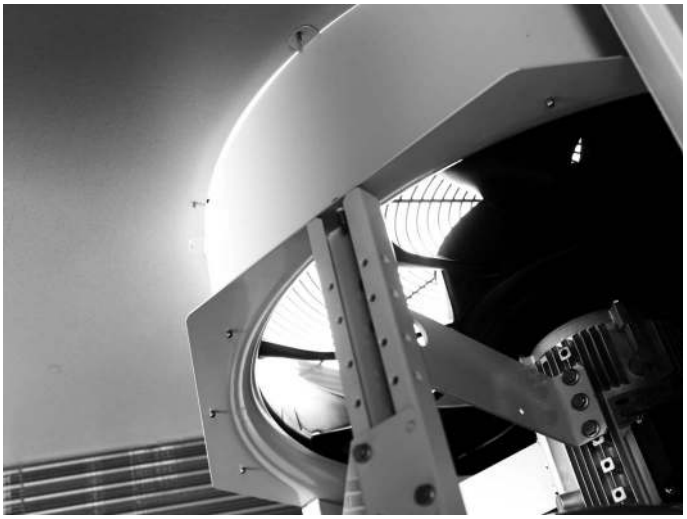
- Intuitive and user-friendly 4.3 inch touch screen interface
- Concise and clear information is available in local languages
- Complete menu, customised for different users (end user, service personnel or Carrier engineers).

Remote management (standard)

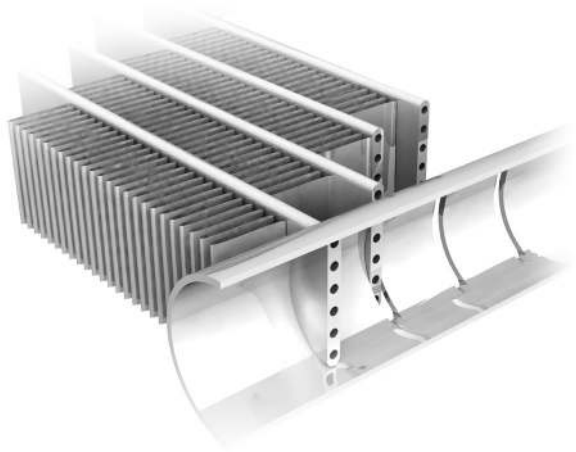
Units with Touch Pilot Junior control can be easily accessed from the internet, using a PC with an Ethernet connection. This makes remote control quick and easy and offers significant advantages for service operations.
The Aquasnap is equipped with an RS485 serial port that offers multiple remote control, monitoring and diagnostic possibilities. Carrier offers a vast choice of control products, specially designed to control, manage and supervise the operation of an air conditioning system. Please consult your Carrier representative for more information.

The Aquasnap also communicates with other building management systems via optional communication gateways.
- A connection terminal allows remote control of the Aquasnap by wired cable:
- Start/stop: Opening of this contact will shut down the unit
- Dual set-point: Closing of this contact activates a second set-point (example: unoccupied mode).
- Demand limit: Closing of this contact limits the maximum heat pump capacity to a predefined value.
- Operation indication: This volt-free contact indicates that the heat pump is operating (cooling load).
- Alarm indication: This volt-free contact indicates the presence of a major fault that has led to the shut-down of one or several refrigerant circuits.

Flying Bird IV fan



All-aluminium micro-channel heat exchanger (MCHE)



Already utilised in the automobile and aeronautical industries for many years, the MCHE micro-channel heat exchanger is entirely made of aluminium. This one-piece concept significantly increases its corrosion resistance by eliminating the galvanic currents that are created when two different metals (copper and aluminium) come into contact in traditional heat exchangers.

As an option, the Enviro-Shield and Super Enviro-Shield anti-corrosion protections have been developed to increase the application range of the MCHE coil from medium to very corrosive environments. With Enviro-Shield protection, corrosion resistance of the MCHE coil is doubled without any impact on heat exchange.

With Super Enviro-Shield protection corrosion resistance of the MCHE coil is multiplied by four, and allows use in very corrosive industrial or marine environments

The MCHE heat exchanger allows a reduction in chiller refrigerant charge by up to 50%.

The low thickness of the MCHE reduces air pressure losses by 50% and makes it less susceptible to fouling (e.g. by sand) than a traditional coil. Cleaning of the MCHE heat exchanger is very fast using a dry air jet or a high-pressure washer, while observing the usage precautions.

Options

Options	No.	Description	Advantages	Use
Condenser with anti6corrosion post treatment	2B	Factory application of Blygold Polual treatment on the copper/aluminium coils	Improved corrosion resistance, recommended for industrial, rural and marine environments	30RBS 039-160 with option 49, 5 or 6
Corrosion protection, traditional coils	3A	Fins made of pre-treated aluminium (polyurethane and epoxy)	Improved corrosion resistance, recommended for moderate marine and urban environments	30RBS 039-160 with option 49, 5 or 6 30RQS 039-160
Medium-temperature brine solution	5B	Low temperature chilled water production down to 0°C with ethylene glycol and propylene glycol.	Covers specific applications such as ice storage and industrial processes	30RBS/ 30RQS 039-160
Low-temperature brine solution	6B	Low temperature chilled water production down to -15°C with ethylene glycol and -12°C with propylene glycol.	Covers specific applications such as ice storage and industrial processes	30RBS/ 30RQS 039-160
Very low noise level	15LS	Acoustic compressor enclosure and low-speed fans	Noise emission reduction at reduces fan speed	30RBS/ 30RQS 039-160
Protection grilles	23	Metallic protection grilles	Coil protection against possible impact	30RBS 039-160
Soft Starter	25	Electronic starter on each compressor	Reduced start-up current	30RBS/ 30RQS 039-160
Winter operation down to -20°C	28	Fan speed control via frequency converter	Stable unit operation when the air temperature is between -10°C and -20°C.	30RBS/ 30RQS 039-160
Frost protection down to -20°C	42	Electric heater on the hydronic module	Hydronic module frost protection at low outside temperatures	30RBS/ 30RQS 039-160
Partial heat recovery	49	Unit equipped with one desuperheater on each refrigerant circuit. Note: In this configuration the units are equipped with traditional coils (Cu/Al).	Production of free high-temperature hot-water simultaneously with chilled water production (or hot water for Heat pump)	30RBS/ 30RQS 039-160
Master/slave operation	58	Unit equipped with supplementary water outlet temperature sensor kit to be field-installed allowing master/slave operation of two units connected in parallel	Optimised operation of two units connected in parrallele operation with operating time equalisation	30RBS/ 30RQS 039-160
Main disconnect switch without fuse	70	Factory-installed main electric disconnect switch in the control box	Ease-of-installation and compliance with local electrical regulations	30RBS/ 30RQS 039-160
HP single-pump hydronic module	116R	Single high-pressure water pump, water filter, electronic water flow control, pressure transducers. For more details, refer to the dedicated chapter (expansion tank not included.Option with built-in safety hydraulic components available.)	Easy and fast installation (plug & play)	30RBS/ 30RQS 039-160
HP dual-pump hydronic module	116S	Dual high-pressure water pump, water filter, electronic water flow control, pressure transducers. For more details, refer to the dedicated chapter (expansion tank not included) Option with built-in safety hydraulic components available)	Easy and fast installation (plug & play)	30RBS/ 30RQS 039-160
LP single-pump hydronic module	116T	Single low-pressure water pump, water filter, electronic water flow control, pressure transducers. For more details, refer to the dedicated chapter (expansion tank not included Option with built-in safety hydraulic components available)	Easy and fast installation (plug & play)	30RBS/ 30RQS 039-160
LP dual-pump hydronic module	116U	Dual low-pressure water pump, water filter, electronic water flow control, pressure transducers. For more details, refer to the dedicated chapter (expansion tank not included Option with built-in safety hydraulic components available)	Easy and fast installation (plug & play)	30RBS/ 30RQS 039-160
HP variable-speed single-pump hydronic mod.	116V	Single high-pressure water pump with variable speed drive (VSD), water filter, electronic water flow control, pressure transducers. Multiple possibilities of water flow control. For more details, refer to the dedicated chapter (expansion tank not included Option with built-in safety hydraulic components available)	Easy and fast installation (plug & play), significant pumping energy cost savings (more than two-thirds), tighter water flow control, improved sytem reliability	30RBS/ 30RQS 039-160
HP variable-speed dual-pump hydronic mod.	116W	Dual high-pressure water pump with variable speed drive (VSD), water filter, electronic flow switch, pressure transducers. Multiple possibilities of water flow control. For more details, refer to the dedicated chapter (expansion tank not included Option with built-in safety hydraulic components available)	Easy and fast installation (plug & play), significant pumping energy cost savings (more than two-thirds), tighter water flow control, improved sytem reliability	30RBS/ 30RQS 039-160
J-Bus gateway	148B	Two-directional communication board complying with JBus protocol	Connects the unit by communication bus to a building management system	30RBS/ 30RQS 039-160
Lon gateway	148D	Two-directional communication board complying with Lon Talk protocol	Connects the unit by communication bus to a building management system	30RBS/ 30RQS 039-160
Bacnet over IP	149	Two-directional high-speed communication using BACnet protocol over Ethernet network (IP)	Easy and high-speed connection by ethernet line to a building management system. Allows access to multiple unit parameters	30RBS/ 30RQS 039-160
External boiler management	156a	Control board factory-installed on the unit to control a boiler	Extended remote control capabilities to a boiler on/off command.Permits easy control of a basic heating system	30RQS 039-160
Electric heaters management	156b	Control board factory-installed on the unit with additional inputs/outputs in order to manage up to 4 externals heating stage (electrical heaters…)	Extended remote control capabilities to up to 4 electrics heaters. Permits easy control of a basic heating system	30RQS 039-160
Compliance with Russian regulations	199	EAC certification	Conformance with Russian regulations	30RBS/ 30RQS 039-160
Enviro-Shield anti-corrosion protection	262	Coating by conversion process which modifies the surface of the aluminum producing a coating that is integral to the coil. Complete immersion in a bath to ensure 100% coverage. No heat transfer variation, tested 4000 hours salt spray per ASTM B117	Improved corrosion resistance, recommended for use in moderately corrosive environments	30RBS 039-160
Super Enviro-Shield anti-corrosion protection	263	Extremely durable and flexible epoxy polymer coating applied on micro channel heat exchangers by electro coating process, final UV protective topcoat. Minimal heat transfer variation, tested 6000 hours constant neutral salt spray per ASTM B117, superior impact resistance per ASTM D2794	Improved corrosion resistance, recommended for use in extremely corrosive environments	30RBS 039-160

Options

Options	No.	Description	Advantages	Use
Evaporator screw connection sleeves	264	Evaporator inlet/outlet screw connection sleeves	Allows unit connection to a screw connector	30RBS/ 30RQS 039-160
Welded evaporator connection kit	266	Victaulic piping connections with welded joints	Easy installation	30RBS/ 30RQS 039-160
Reinforced ECM filtration for fan VFD	282A	Fan variable frequency drive compliance to IEC 61800-3 C1 class	Allows unit installation in domestic residential environment by reducing electromagnetic interferences	30RBS/ 30RQS 039-160 with option 5B, 6B or 28
Reinforced ECM filtration for pump VFD	282B	Pump variable frequency drive compliance to IEC 61800-3 C1 class	Allows unit installation in domestic residential environment by reducing electromagnetic interferences	30RBS/ 30RQS 039-160 with option 116V or 116W
Expansion tank	293	6 bar expansion tank integrated in the hydraulic module (require option 116)	Easy and fast installation (plug & play), & Protection of closed water systems from excessive pressure	30RBS/ 30RQS 039-160
Set point adjustment by 4-20mA signal	311	Connections to allow a 4-20mA signal input	Easy energy managment, allow to adjust set point by a 4-20mA external signal	30RBS/ 30RQS 039-160
Free Cooling dry cooler management	313	Control & connections to a Free Cooling Drycooler 09PE or 09VE fitted with option FC control box	Easy system managment, Extended control capabilities to a dryccoler used in Free Cooling mode	30RBS 039-160

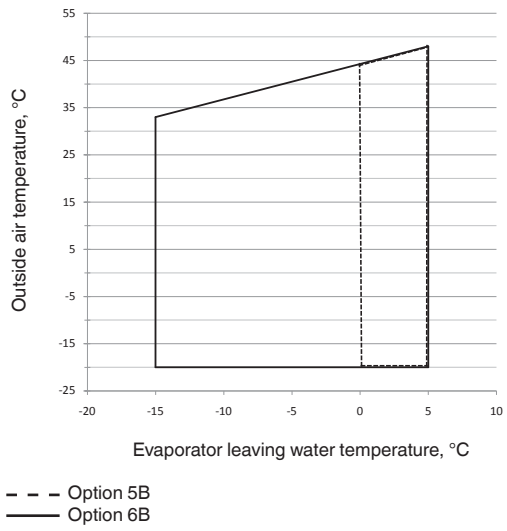
Brine Options (option 5B & option 6B)

This option allows production of brine down to 0°C (option 5B) / -15°C (option 6B). The unit is equipped with suction pipe insulation (option 6B only) and a fan frequency converter.

Note: With options 5B & 6B the units are equipped with traditional coils (Cu/Al).

The operating range is a function of the suction pressure, which in turn is a function of:
- The brine type
- The brine concentration
- The flow rate
- The brine temperature
- The condensing pressure (ambient temperature).

Operating range with 45% ethylene glycol



Physical data, 30RQS

30RQS				39	45	50	60	70	78	80	90	100	120	140	160
Cooling															
Standard unit	C1	Nominal capacity	kW	38	43	50	59	64	74	78	86	96	113	132	149
Full load performances*	C1	EER	kW/kW	2.84	2.7	2.65	2.77	2.7	2.58	2.79	2.7	2.7	2.69	2.77	2.58
	C1	Eurovent class cooling		C	C	D	C	C	D	C	C	C	D	C	D
	C2	Nominal capacity	kW	48	54	63	71	79	93	97	108	118	143	163	187
	C2	EER	kW/kW	3.28	3.16	3.09	3.12	3.08	2.97	3.19	3.14	3.1	3.1	3.17	2.92
Full load performances**	C1	Gross nominal capacity	kW	38	44	50	59	64	74	78	86	96	114	132	150
	C1	Gross EER	kW/kW	2.92	2.78	2.72	2.84	2.78	2.64	2.85	2.77	2.76	2.76	2.84	2.64
	C2	Gross nominal capacity	kW	48	55	64	72	80	94	98	109	119	144	164	188
	C2	Gross EER	kW/kW	3.4	3.28	3.2	3.23	3.2	3.07	3.28	3.24	3.2	3.2	3.28	3.02
Seasonal efficiency*	C1	ESEER	kW/kW	3.8	3.77	3.81	3.61	3.61	3.57	3.84	3.77	3.88	4.04	3.75	3.67
Seasonal efficiency**	C1	Gross ESEER	kW/kW	4	4	4.03	3.8	3.81	3.75	4	4	4.12	4.3	4	3.92
Heating															
Standard unit	H1	Nominal capacity	kW	42	47	53	61	70	78	80	93	101	117	138	158
Full load performances*	H1	COP	kW/kW	3.08	3.05	3.03	3.03	3.06	2.87	3.08	3.02	3.09	3.06	3.07	2.97
	H1	Eurovent class heating		B	B	B	B	B	C	B	B	B	B	B	C
	H2	Nominal capacity	kW	43	47	55	63	71	80	83	95	103	121	141	162
	H2	COP	kW/kW	3.72	3.72	3.76	3.73	3.72	3.47	3.74	3.74	3.77	3.73	3.73	3.59
Full load performances**	H1	Gross nominal capacity	kW	42	46	53	61	69	77	79	92	100	116	137	157
	H1	Gross COP	kW/kW	3.12	3.09	3.07	3.08	3.11	2.91	3.11	3.06	3.12	3.1	3.1	3.01
	H2	Gross nominal capacity	kW	42	47	54	63	71	79	82	94	102	120	140	161
	H2	Gross COP	kW/kW	3.8	3.8	3.83	3.81	3.8	3.53	3.8	3.8	3.84	3.8	3.8	3.65
Seasonal efficiency***	H1	SCOP	kW/kW	3.07	3.10	3.21	3.07	3.10	2.96	3.14	3.17	3.23	3.23	3.14	3.13
	H1	ηs heat	%	120	121	125	120	121	115	123	124	126	126	123	122
	H1	Prated	kW	33	37	42	51	57	65	66	76	83	97	113	131
IPLV			kW/kW	4.57	4.54	4.51	4.21	4.18	4.29	4.58	4.40	4.46	4.90	4.33	4.39
Sound levels															
Standard unit															
Sound power level(1)			dB(A)	80	81	81	86	87	87	84	84	84	84	90	90
Sound pressure level at 10 m(2)			dB(A)	49	49	49	55	55	55	52	52	52	52	58	58
Unit with option 15LS															
Sound power level(1)			dB(A)	79	80	80	80	80	80	83	83	83	83	83	83
Sound pressure level at 10 m(2)			dB(A)	48	48	48	48	48	48	51	51	51	51	51	51
Dimensions															
Length			mm	1090	1090	1090	1090	1090	1090	2273	2273	2273	2273	2273	2273
Width			mm	2109	2109	2109	2109	2109	2109	2136	2136	2136	2136	2136	2136
Height			mm	1330	1330	1330	1330	1330	1330	1330	1330	1330	1330	1330	1330
Operating weight (3)															
Standard unit without hydronic module			kg	497	504	533	546	547	554	739	886	894	953	1054	1072
Standard unit with hydronic module															
Single high-pressure pump			kg	529	537	563	576	576	584	769	918	926	989	1093	1111
Dual high-pressure pump			kg	555	563	588	602	602	610	795	963	971	1037	1130	1148
Compressors				Hermetic scroll compressors, 48.3 r/s											
Circuit A				2	2	2	2	2	2	2	3	3	3	2	2
Circuit B				-	-	-	-	-	-	-	-	-	-	2	2
No of control stages				2	2	2	2	2	2	2	3	3	3	4	4
Refrigerant charge (3)				R-410A											
Circuit A			kg	12.5	13.5	16.5	17.5	18	16.5	21.5	27.5	28.5	33	19	18.5
			teqCO_2	26.1	28.2	34.5	36.5	37.6	34.5	44.9	57.4	59.5	68.9	39.7	38.6
Circuit B			kg	-	-	-	-	-	-	-	-	-	-	19	18.5
			teqCO_2	-	-	-	-	-	-	-	-	-	-	39.7	38.6
Capacity control				Touch Pilot Junior											
Minimum capacity			%	50	50	50	50	50	50	50	33	33	33	25	25

* In accordance with standard EN14511-3:2013

** Not in accordance with standard EN14511-3:2013.These performances do not take into account the correction for the proportionnal heating capacity and power input generated by the water pump to overcome the internal pressure drop in the heat exchanger.

*** In accordance with standard EN14825:2013, average climate

C1 Cooling mode conditions: evaporator water entering/leaving temperature 12°C/7°C, outside air temperature 35°C, evaporator fooling factor 0 m^2.K/W

C2 Cooling mode conditions: evaporator water entering/leaving temperature 23°C/18°C, outside air temperature 35°C, evaporator fooling factor 0 m^2.K/W

H1 Heating mode conditions: water heat exchanger water entering/leaving temperature 40°C/45°C, outside air temperature 7°C db/6°C wb, evaporator fooling factor 0 m^2.K/W

H2 Heating mode conditions: water heat exchanger water entering/leaving temperature 30°C/35°C, outside air temperature 7°C db/6°C wb, evaporator fooling factor 0 m^2.K/W

IPLV Calculations according to standard performances (in accordance with AHRI 550-590)

(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 20µPa, (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) Values shown are a guideline only. Please refer to the unit nameplate

EUROVENT CERTIFIED PERFORMANCE

Eurovent certified values

Physical data, 30RQS (continued)

30RQS		39	45	50	60	70	78	80	90	100	120	140	160
Air heat exchangers		Grooved copper tubes and aluminium fins											
Fans		Axial Flying Bird IV with rotating shroud											
Quantity		1	1	1	1	1	1	2	2	2	2	2	2
Maximum total air flow	l/s	3692	3690	3910	5285	5284	5282	7770	7380	7376	7818	10568	10568
Maximum rotation speed	r/s	12	12	12	16	16	16	12	12	12	12	16	16
Water heat exchanger		Direct expansion. plate heat exchanger											
Water volume	l	2.6	3	4	4.8	4.8	5.6	8.7	8.7	9.9	11.3	12.4	14.7
Without hydronic module													
Max. water-side operating pressure	kPa	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
With hydronic module (option)													
Single or dual pump (as selected)		Pump, Victaulic screen filter, relief valve, expansion tank, purge valves (water + air), pressure sensors											
Expansion tank volume	l	12	12	12	12	12	12	35	35	35	35	35	35
Expansion tank pressure (4)	bar	1	1	1	1	1	1	1	1.5	1.5	1.5	1.5	1.5
Max. water-side operating pressure	kPa	400	400	400	400	400	400	400	400	400	400	400	400
Water connections with/without hydronic module		Victaulic											
Connections	in	2	2	2	2	2	2	2	2	2	2	2	2
Outside diameter	mm	60.3	60.3	60.3	60.3	60.3	60.3	60.3	60.3	60.3	60.3	60.3	60.3
Chassis paint colour		Colour code: RAL7035											

(4) When delivered, the standard pre-inflation of the tank is not necessarily the optimal value for the system. To permit changing the water volume, change the inflation pressure to a pressure that is close to the static head of the system. Fill the system with water (purging the air) to a pressure value that is 10 to 20 kPa higher than the pressure in the tank

Electrical data, 30RBS

30RBS without hydronic module		039	045	050	060	070	080	090	100	120	140	160
Power circuit												
Nominal power supply	V-ph-Hz	400-3-50										
Voltage range	V	360-440										
Control circuit supply		24 V via internal transformer										
Maximum start-up current (Un)*												
Standard unit	A	114	135	143	146	176	213	174	208	248	243	286
Unit with electronic starter option	A	75	87	94	96	114	140	125	150	176	186	215
Unit power factor at maximum capacity**		0.83	0.81	0.81	0.83	0.81	0.78	0.83	0.81	0.79	0.81	0.78
Maximum operating power input**	kW	20	22	25	28	31	36	42	46	53	62	72
Nominal unit operating current draw***	A	26	29	33	36	42	53	55	62	77	85	106
Maximum operating current draw (Un)****	A	35	45	47	53	67	73	81	99	108	134	146
Maximum operating current draw (Un-10%)†	A	38	49	51	58	75	80	89	110	118	150	159
Customer-side unit power reserve		Customer reserve at the 24 V control power circuit										
Short-circuit stability and protection		See table 9.1										

* Maximum instantaneous start-up current at operating limit value (maximum operating current of the smallest compressor(s) + fan current + locked rotor current of the largest compressor).
** Power input, at the unit permanent maximum operating conditions (data given on the unit nameplate)
*** Standardised Eurovent conditions: evaporator entering/leaving water temperature 12°C/7°C, outside air temperature 35°C.
**** Maximum unit current at 400 V, non permanent operating conditions (values given on the unit nameplate).
† Maximum unit operating current at 360 V, non permanent operating conditions.

Short-circuit stability current (TN system*)

30RBS	039	045	050	060	070	080	090	100	120	140	160
Value without upstream protection											
Short-term current at 1s - Icw – kA rms	3.36	3.36	3.36	3.36	3.36	3.36	5.62	5.62	5.62	5.62	5.62
Admissible peak current - Ipk - kA pk	20	20	20	20	20	15	20	20	15	20	15
Value with upstream protection by circuit breaker											
Conditional short-circuit current Icc - kA rms	40	40	40	40	40	40	40	40	40	30	30
Schneider circuit breaker - Compact series	NS100H	NS100H	NS100H	NS100H	NS100H	NS100H	NS100H	NS160H	NS160H	NS250H	NS250H
Reference No.**	29670	29670	29670	29670	29670	29670	29670	30670	30670	31671	31671

* Earthing system type
** If another current limitation protection system is used, its time-current and thermal constraint (I^2t) trip characteristics must be at least equivalent to those of the recommended Schneider circuit breaker. Contact your nearest Carrier office.
The short-circuit stability current values above are in accordance with the TN system.

Electrical data, 30RQS

30RQS without hydronic module		039	045	050	060	070	078	080	090	100	120	140	160
Power circuit													
Nominal power supply	V-ph-Hz	400-3-50											
Voltage range	V	360-440											
Control circuit supply		24 V via internal transformer											
Maximum start-up current (Un)*													
Standard unit	A	114	135	143	146	176	213	214	174	208	248	243	286
Unit with electronic starter option	A	75	87	94	96	114	140	140	125	150	176	186	215
Unit power factor at maximum capacity**		0.83	0.81	0.81	0.83	0.81	0.78	0.78	0.83	0.81	0.79	0.81	0.78
Maximum operating power input**	kW	20	22	25	28	31	36	36	42	46	53	62	72
Nominal unit operating current draw***	A	26	29	33	36	42	53	53	55	62	77	85	106
Maximum operating current draw (Un)****	A	35	45	47	53	67	73	74	81	99	108	134	146
Maximum operating current draw (Un-10%)†	A	38	49	51	58	75	80	80	89	110	118	150	159
Customer-side unit power reserve		Customer reserve at the 24 V control power circuit											
Short-circuit stability and protection		See table 9.1											

* Maximum instantaneous start-up current at operating limit value (maximum operating current of the smallest compressor(s) + fan current + locked rotor current of the largest compressor).
** Power input, at the unit permanent maximum operating conditions (data given on the unit nameplate)
*** Standardised Eurovent conditions: evaporator entering/leaving water temperature 12°C/7°C, outside air temperature 35°C.
**** Maximum unit current at 400 V, non permanent operating conditions (values given on the unit nameplate).
† Maximum unit operating current at 360 V, non permanent operating conditions.

Short-circuit stability current (TN system*)

30RQS	039	045	050	060	070	078	080	090	100	120	140	160
Value without upstream protection												
Short-term current at 1s - Icw – kA rms	3.36	3.36	3.36	3.36	3.36	3.36	3.36	5.62	5.62	5.62	5.62	5.62
Admissible peak current - Ipk - kA pk	20	20	20	20	20	15	15	20	20	15	20	15
Value with upstream protection by circuit breaker												
Conditional short-circuit current Icc - kA rms	40	40	40	40	40	40	40	40	40	40	30	30
Schneider circuit breaker - Compact series	NS100H	NS100H	NS100H	NS100H	NS100H	NS100H	NS100H	NS100H	NS160H	NS160H	NS250H	NS250H
Reference No.**	29670	29670	29670	29670	29670	29670	29670	29670	30670	30670	31671	31671

* Earthing system type
** If another current limitation protection system is used, its time-current and thermal constraint (I^2t) trip characteristics must be at least equivalent to those of the recommended Schneider circuit breaker. Contact your nearest Carrier office.
The short-circuit stability current values above are in accordance with the TN system.