

AIR-COOLED LIQUID CHILLERS



High seasonal efficiency

Compact design

Alluminium micro-channel
heat exchanger technology

Partial heat reclaim

Low sound level

30RB 604-804



Nominal cooling capacity 607-774 kW

The Aquasnap liquid chiller range 604-804 features the latest technological innovations:

- ozone-friendly refrigerant R-410A
- scroll compressors
- low-noise fans made of a composite material
- auto-adaptive microprocessor control
- aluminium micro-channel heat exchangers (MCHE)

The AquaSnap (30RB604-804) version features a compact all-in-one package optimised for part-load applications where high SEER, SEPR, IPLV are required. The AquaSnap (30RB604-804), equipped with a variable speed fans and 0-10V signal for customer variable speed pump management, provides premium part-load efficiency to reduce maintenance costs over the lifespan of the chiller.

Additionally, the low sound levels achieved under part-load conditions can be very beneficial for sensitive acoustic applications. Besides operating efficiently and quietly, the AquaSnap operates from -20°C up to 48°C as standard.



CARRIER participates in the ECP programme for LCP/HP
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FEATURES

Quiet operation

- Compressors
 - Low-noise scroll compressors with low vibration level
 - The compressor assembly is installed on an independent chassis and supported by flexible anti-vibration mountings
 - Dynamic suction and discharge piping support, minimising vibration transmission (Carrier patent)
 - Acoustic compressor enclosure, reducing radiated noise emissions (option)
- Condenser with Greenspeed® variable-speed fans section
 - Condenser coils in V-shape with an open angle, allowing quieter air flow across the coil
 - Low-noise 4th generation Flying Bird 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 noise (Carrier patent)

Easy and fast installation

- High-capacity membrane expansion tank ensures pressurisation of the water circuit
- Thermal insulation and frost protection down to -20°C, using an electric resistance heater (see table of options)
- Pressure gauge to check filter pollution and measure the system water flow rate (option)
- Water flow control valve (option)
- Simplified electrical connections
 - Main disconnect switch with high trip capacity (see table of options)
 - 24 V control circuit without risk from a transformer 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 energy efficiency at part load
 - Unit meets the new Ecodesign regulation 2016/2281 for positive process and comfort applications.
 - 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 even more energy efficient, as they use the total condenser and evaporator capacity.
 - The electronic expansion device (EXV) allows operation at a lower condensing pressure (Energy efficiency optimisation).
 - Dynamic superheat management for better utilisation of the evaporator heat exchange surface
 - All-aluminium micro-channel condenser (MCHE), more efficient than a copper/aluminium coil
- Reduced maintenance costs
 - Maintenance-free scroll compressors
 - Fast diagnosis of possible incidents and their history via the Pro-Dialog Plus control
 - R-410A refrigerant is easier to use than other refrigerant blends

Environmental care

- Ozone-friendly R-410A refrigerant
 - Chlorine-free refrigerant of the HFC group with zero ozone depletion potential
 - Very efficient - gives an increased energy efficiency ratio in part load operation (IPLV, SEER, SEPR)
 - 40% reduction in the refrigerant charge through use of the micro-channel heat exchangers (MCHE)
- Leak-tight refrigerant circuit
 - Brazed refrigerant connections for increased leak-tightness
 - Reduction of leaks as no capillary tubes and flare connections are used
 - Verification of pressure transducers and temperature sensors without transferring refrigerant charge

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
 - Compressor control box installed on the cold side of the compressor (Carrier patent)
 - All-aluminium micro-channel heat exchanger (MCHE) offers 3.5 times higher corrosion resistance than a conventional coil. The all-aluminium construction eliminates the formation of galvanic currents between aluminium and copper that are responsible for the coil corrosion in saline or corrosive atmospheres.
- Auto-adaptive control
 - Control algorithm prevents excessive compressor cycling and permits reduction of the water quantity in the hydraulic circuit (Carrier patent).
 - Automatic compressor unloading in case of abnormally high condensing pressure. If an anomaly occurs (e.g. fouled condenser 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. The test is based on a military standard and equivalent to 4000 km by truck.

Pro-Dialog Plus operator interface



FEATURES

Pro-Dialog Plus control

Pro-Dialog Plus combines intelligence with operating simplicity. The control constantly monitors all machine parameters and precisely manages the operation of compressors, expansion devices, fans and of the evaporator water pump for optimum energy efficiency.

■ Energy management

- Internal time schedule clock: permits chiller on/off control and operation at a second set point
- Set point reset based on the outside air temperature or the return water temperature
- Master/slave control of two chillers operating in parallel with operating time equalisation and automatic change-over in case of a unit fault.
- Start/stop control based on the air temperature
- 0-10V output for external variable speed pump control

■ Ease-of-use

- User interface with synoptic diagram for intuitive display of the principal operating parameters: number of compressors operating, suction/discharge pressure, compressor operating hours, set point, air temperature, entering/leaving water temperature
- Ten menus for direct access to all machine commands, including fault history, allowing fast and complete chiller diagnostics

Remote management (standard)

A simple two-wire communication bus between the RS485 port of the Aquasnap and the Carrier Comfort Network 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 on these products.

- 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 chiller capacity to a predefined value
- User safety: This contact is connected in series with the water flow switch and can be used for any customer safety loop
- Heat reclaim (option): Closing of this contact allows heat reclaim mode operation
- Water pump 1 and 2 control*: These outputs control the contactors of one or two evaporator water pumps
- Water pump on reversal*: These contacts are used to detect a water pump operation fault and automatically change over to the other pump
- Operation indication: This volt-free contact indicates that the chiller is operating (cooling load) or that it is ready to operate (no cooling load)
- Alert indication: This volt-free contact indicates the presence of a minor fault
- Alarm indication: This volt-free contact indicates the presence of a major fault that has led to the shut-down of one or two refrigerant circuits

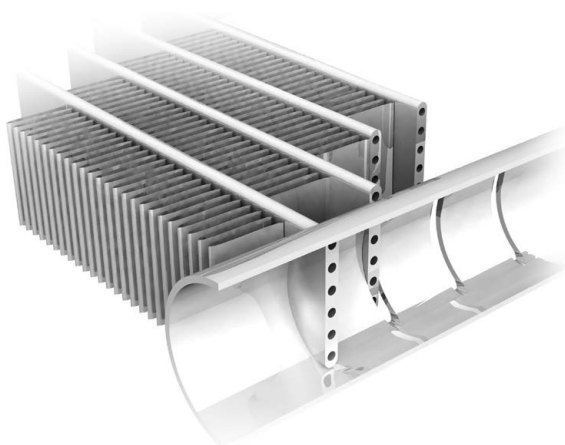


FEATURES

Remote management (EMM option)

- Room temperature: Permits set point reset based on the building indoor air temperature (with Carrier thermostat)
- Set point reset: Ensures reset of the cooling set point based on a 4-20 mA or 0-5 V signal
- Demand limit: Permits limitation of the maximum chiller demand based on a 4-20 mA or 0-5 V signal
- Demand limit 1 and 2: Closing of these contacts limits the maximum chiller capacity to three predefined values
- User safety: This contact can be used for any customer safety loop, closing of the contact generates a specific alarm
- Ice storage end: When ice storage has finished, this input permits return to the second set point (unoccupied mode)
- Time schedule override: Closing of this contact cancels the time schedule effects
- Out of service: This signal indicates that the chiller is completely out of service
- Chiller capacity: This analogue output (0-10 V) gives an immediate indication of the chiller capacity
- Compressor operation: This contact signals that one or several compressors are in operation

All aluminium micro-channel heat exchanger (MCHE)



Already utilised in the automobile and aeronautical industries for many years, the MCHE 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. Unlike traditional heat exchangers the MCHE heat exchanger can be used in moderate marine and urban environments.

From an energy efficiency point-of-view the MCHE heat exchanger is approximately 10% more efficient than a traditional coil and allows a 40% reduction in the amount of refrigerant used in the chiller. 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 high-pressure washer.

OPTIONS

Options	No.	Description	Advantages	Use
Low noise level	15	Aesthetic and sound absorbing compressor enclosure	Noise level reduction	30RB 604-804
Very low noise level	15LS	Aesthetic and sound absorbing compressor enclosure associated with low-speed fans	Noise level reduction for sensible site	30RB 604-804
Grilles and enclosure panels	23	Metal grilles on the 4 unit sides, plus side enclosure panels at each end of each coil	Improves aesthetics, protection against intrusion to the unit interior, coil and piping protection against impacts.	30RB 604-804
Enclosure panels	23A	Side enclosure panels at each end of each coil	Improves aesthetics, coil and piping protection against impacts.	30RB 604-804
Water exchange frost protection	41	Electric heater on the water exchanger and the water piping	Water exchanger module frost protection between 0°C and -20°C outside air temperature	30RB 604-804
Partial heat recovery	49	Unit equipped with one desuperheater on each refrigerant circuit	Production of free high-temperature hot-water simultaneously with chilled water production (or hot water for Heat pump)	30RB 604-804
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 parallel operation with operating time equalisation	30RB 604-804
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	30RB 604-804
Fuses on main disconnect switch	70D	Factory installed additional fuses, one per each phase, to protect main switch and associated cables from over-current flow (Note: frequency drives and electronic boards are protected as standard by dedicated fuses. Option 70D recommended when compliant protection devices on field not present)	No need for separate fuse box. Save time and money on site installation and avoid additional space requirement	30RB 604-804
Shell and tubes evaporator with aluminum jacket	88	Evaporator covered with an aluminum sheet for thermal insulation protection	Improved resistance to aggressive climate conditions	30RB 604-804
Compressor suction valve	92	Valve set for the compressor suction side to isolate it in the refrigerant circuit	Simplified service and maintenance	30RB 604-804
J-Bus gateway	148B	Bi-directional communication board complying with JBus protocol	Connects the unit by communication bus to a building management system	30RB 604-804
BacNet gateway	148C	Bi-directional communication board complying with BacNet protocol	Easy connection by communication bus to a building management system	30RB 604-804
Lon gateway	148D	Bi-directional communication board complying with Lon Talk protocol	Connects the unit by communication bus to a building management system	30RB 604-804
Energy Management Module	156	EMM Control board with additional inputs/outputs. See Energy Management Module option chapter	Extended remote control capabilities (Set-point reset, ice storage end, demand limits, boiler on/off command...)	30RB 604-804
Dual relief valves on 3-way valve	194	Three-way valve upstream of dual relief valves on the shell and tubes evaporator	Valve replacement and inspection facilitated without refrigerant loss. Comforms to European standard EN378/BGVD4	30RB 604-804
Compliance with Australian regulations	200	Unit approved to Australian code	Conformance with Australian regulations	30RB 604-804
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	30RB 604-804
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	30RB 604-804
Welded evaporator connection kit	266	Victaulic piping connections with welded joints	Easy installation	30RB 604-804
230V electrical plug	284	230V AC power supply source provided with plug socket and transformer (180 VA, 0,8 Amps)	Permits connection of a laptop or an electrical device during unit commissioning or servicing	30RB 604-804

PARTIAL HEAT RECLAIM USING DESUPERHEATERS (OPTION 49)

This option permits the production of free hot water using heat reclaim by desuperheating the compressor discharge gases. The option is available for the whole 30RB range.

A plate heat exchanger is installed in series with the air condenser coils on the compressor discharge line of each circuit.

Physical data, 30RB units with partial heat reclaim

30RB - partial heat reclaim mode		604	674	732	802
Cooling capacity ⁽¹⁾	kW	609	660	714	778
Heating capacity ⁽¹⁾	kW	197	206	243	241
Unit power input ⁽¹⁾	kW	222	243	272	297
Energy efficiency ratio ⁽¹⁾	kW/kW	3	3	3	2,62
Operating weight⁽²⁾					
Standard unit ⁽³⁾	kg	4544	4769	5234	5461
Unit with options ⁽⁴⁾	kg	4760	5003	5486	5731
Desuperheater in circuits A/B/C		Plate heat exchanger			
Water volume circuit A	l	5,5	5,5	7,5	7,5
Water volume circuit B	l	5,5	5,5	7,5	7,5
Water volume circuit C	l	5,5	5,7	5,5	7,5
Max. water-side operating pressure	kPa	1000	1000	1000	1000
Water connections		Cylindrical male gas thread			
Connection	in	2	2	2	2
Outside diameter	mm	60,3	60,3	60,3	60,3

(1) Nominal conditions: Evaporator entering and leaving water temperature = 12°C/7°C, desuperheater entering and leaving water temperature = 50°C/60°C, outside air temperature = 35°C.

Gross performances, not in accordance with EN14511-3:2011. 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.

(2) Weights shown are a guideline only

(3) Standard unit (with MCHC coils) and desuperheater option

(4) Unit with options 15 and 49

Operating limits

Desuperheater		Minimum	Maximum
Entering water temperature at start-up	°C	25 ⁽¹⁾	75
Leaving water temperature during operation	°C	30	80
Air condenser		Minimum	Maximum
Outside operating temperature	°C	-20	46

(1) The entering water temperature at start-up must not be lower than 25°C. For installations with a lower temperature a three-way valve is necessary.

PHYSICAL DATA

30RB604-804 units

30RB		604	674	734	804			
Cooling								
Standard unit Full load performances *	CA1	Nominal capacity	kW		607	657	712	774
		EER	kW/kW		2,72	2,68	2,59	2,58
		Eurovent class			C	D	D	D
Seasonal energy efficiency		SEER_{12/7°C} Comfort low temp.	kWh/kWh		4,32	4,16	4,14	4,19
		η_{s cool}_{12/7°C}	%		170	163	162	164
		SEPR_{12/7°C} Process high temp.	kWh/kWh		5,21	5,07	5,07	5,03
Integrated Part Load Value		IPLV.SI	kW/kW		4.48	4.32	4.36	4.42
Operating weight⁽¹⁾								
Unit with option 15			kg		4626	4864	5342	5583
Standard unit ⁽²⁾			kg		4410	4630	5090	5313
Sound levels								
Unit with option 15LS (very low noise level)								
Sound power level 10 ⁻¹² W ⁽³⁾			dB(A)		89	89	89	90
Sound pressure level at 10 m ⁽⁴⁾			dB(A)		57	57	56	57
Unit with option 15 (low noise level)								
Sound power level 10 ⁻¹² W ⁽³⁾			dB(A)		93	94	94	94
Sound pressure level at 10 m ⁽⁴⁾			dB(A)		61	62	61	61
Unit without option 15								
Sound power level 10 ⁻¹² W ⁽³⁾			dB(A)		95	95	96	96
Sound pressure level at 10 m ⁽⁴⁾			dB(A)		63	63	63	63
Dimensions								
Length			mm		5992		7186	
Depth			mm		2253		2253	
Height			mm		2297	2297	2297	2297
Compressors								
Hermetic scroll, 48.3 r/s								
Circuit A					3	3	4	4
Circuit B					3	3	4	4
Circuit C					3	4	3	4
No. of control stages					9	10	11	12
Refrigerant								
R-410A								
Circuit A			kg		22	22	26	26
			teqCO ₂		45	45	54	54
Circuit B			kg		22	22	28	28
			teqCO ₂		46	45	58	58
Circuit C			kg		24	28	24	31
			teqCO ₂		49	58	50	65
Capacity control								
Pro-Dialog Plus								
Minimum capacity			%		11	10	9	8
Condensers								
All aluminum micro-channel heat exchanger (MCHE)								
Fans								
Axial Flying Bird 4 with rotating shroud								
Quantity					9	10	11	12
Total air flow			l/s		40623	45139	49653	54167
Speed			r/s		16	16	16	16
Evaporator								
Direct-expansion, dual-circuit shell-and-tube								
Water volume			l		284	284	284	284
Max. water-side operating pressure without hydraulic module			kPa		1000	1000	1000	1000
Water connections without hydraulic module								
Victaulic								
Diameter			inch		6	6	6	6
Outside tube diameter			mm		168,3	168,3	168,3	168,3
Chassis paint colour								
Colour code: RAL7035								

* In accordance with standard EN14511-3:2013.
 CA1 Cooling mode conditions: Evaporator water entering/leaving temperature 12°C/7°C, outside air temperature 35°C, evaporator frosting factor 0 m².K/W
η_{s cool}_{12/7°C} & SEER_{12/7°C} **Applicable Ecodesign regulation: (EU) No 2016/2281**
SEPR_{12/7°C} **Applicable Ecodesign regulation: (EU) No 2016/2281**
 IPLV.SI Calculations according to standard performances AHRI 551-591.
 (1) Weight shown is a guideline only. To find out the unit refrigerant charge, please refer to the unit nameplate.
 (2) Standard unit: base unit without option 15.
 (3) In accordance with ISO 9614-1 and certified by Eurovent.
 (4) Average sound pressure level, unit in a free field on a reflective surface.



Eurovent certified values

ELECTRICAL DATA

30RB 604-804 units

30RB		604	674	734	804
Power circuit					
Nominal power supply	V-ph-Hz	400-3-50			
Voltage range	V	360-440			
Control circuit supply					
24 V, via internal transformer					
Nominal unit current draw⁽¹⁾					
Circuits A + B (one supply)	A	237	237	316	316
Circuit C (separate supply)	A	118	158	118	158
Maximum unit power input⁽²⁾					
Circuits A + B (one supply)	kW	194	194	259	259
Circuit C (separate supply)	kW	97	129	97	129
Cosine phi, unit at max. capacity⁽²⁾					
0,88					
Maximum unit current draw (Un-10%)⁽³⁾					
Circuits A + B (one supply)	A	340	340	454	454
Circuit C (separate supply)	A	170	227	170	227
Maximum unit current draw⁽⁴⁾					
Circuits A + B (one supply)	A	314	314	419	419
Circuit C (separate supply)	A	157	209	157	209
Maximum start-up current, standard unit (Un)⁽⁵⁾					
Circuits A + B	A	525	525	629	629
Circuit C	A	368	420	368	420

(1) Standardised Eurovent conditions: evaporator entering/leaving water temperature 12°C/7°C, outside air temperature 35°C, evaporator fouling factor 0.18 x 10⁻⁴ (m²K)/W.

(2) Power input, compressors and fans, at the unit operating limits (saturated suction temperature 10°C, saturated condensing temperature 65°C) and nominal voltage of 400 V (data given on the unit nameplate).

(3) Maximum unit operating current at maximum unit power input and 360 V.

(4) Maximum unit operating current at maximum unit power input and 400 V (values given on the unit nameplate).

(5) Maximum instantaneous start-up current at operating limit values (maximum operating current of the smallest compressor(s) + fan current + locked rotor current of the largest compressor).

Short-circuit stability current (TN system)*

30RB		604	674	734	804
Unit without main disconnect					
With fuses upstream - maximum fuse values assigned (gL/gG)					
Circuits A and B	A	630/500	630/500	630/500	630/500
Circuit C	A	400	400	400	400
With fuses upstream - admissible rms current value (gL/gG)					
Circuits A and B	kA	70	70	60/70	60/70
Circuit C	kA	60	60	60	60
Unit with optional main disconnect without fuse					
Short-time assigned current I_{cw}⁽²⁾ (1s) rms value/peak I_{pk}⁽⁶⁾					
Circuits A and B	kA/kA	13/26	13/26	15/30	15/30
Circuit C	kA/kA	13/26	13/26	13/26	13/26
With fuses upstream - maximum fuse values assigned (gL/gG)					
Circuits A and B	A	400	400	630	630
Circuit C	A	400	400	400	400
With fuses upstream - conditional short-circuit assigned current I_{cc}/I_{cf}[†]					
Circuits A and B	kA	50	50	50	50
Circuit C	kA	50	50	50	50
Unit with optional main disconnect with fuses					
Short-circuit stability current I_{cc}/I_{cf}⁽⁴⁾ increased with fuses - maximum fuse values assigned (gL/gG)					
Circuits A and B	kA	400	400	630	630
Circuit C	kA	250	250	250	250
Short-circuit stability current I_{cc}/I_{cf}[†] increased with fuses - admissible rms current value (gL/gG)					
Circuits A and B	kA	50	50	50	50
Circuit C	kA	50	50	50	50

(1) Type of system earthing

(2) I_{cw}: assigned short-time current

(3) I_{pk}: assigned current, admissible peak

(4) I_{cc}/I_{cf}: assigned conditional short-circuit current

IT system: The short-circuit holding current values given above for the TN system are not valid for IT; modifications are required.

ELECTRICAL DATA

Electrical data notes for 30RB units:

- 30RB 604-804 units have two connection points upstream of the main disconnect switches.
- The control box includes:
 - One main disconnect switch
 - Starter and motor protection devices for each compressor, the fans and the pump
 - 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 30RB units are designed and built to ensure conformance with these codes. The recommendations of European standard EN 60 204-1 (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 International Electrotechnical Commission document 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.

- Operating conditions of 30RB units are described below:

1. Physical environment*

The classification of environment is specified in standard EN 60364:

- Outdoor installation*,
- Ambient temperature range: minimum temperature -20°C to +48°C**,
- Altitude: AC1 of 2000 m or less,
- Presence of hard solid: Class AE3 (no significant dust present)*,
- Presence of corrosive and polluting substances, class AF1 (negligible),
- Competence of persons: BA4 (Persons wise).

2. Compatibility for low-frequency conducted disturbances according to class 2 levels per IEC61000-2-4 standard:

- Power supply frequency variation: +- 2Hz
- Phase imbalance : 2%
- Total Voltage Harmonic Distortion (THDV): 8%

3. The neutral (N) line must not be connected directly to the unit (if necessary use a transformer).

- 4. Overcurrent protection of the power supply conductors is not provided with the unit.

- 5. The factory-installed disconnect switch(es)/circuit breaker(s) is (are) of a type suitable for power interruption in accordance with EN 60947-3 (corresponds to IEC 60947-3).

- 6. The units are designed for connection to TN networks (IEC 60364). In IT networks, if noise filters are integrated into the variable frequency drive(s), this will render the units unsuitable for their intended purpose. In addition, the equipment characteristics in case of insulation failure are modified. Provide a local earth; consult competent local organisations to complete the electrical installation.

30RB units are designed to use for domestic / residential and industrial environments in accordance with standard EN61800-3 electric power variable speed drives:

- part 3: EMC requirements and specific test methods for the following classifications:

Use in the first and second environments**.

- Category C2 applicable in the first environment, to stationary devices designed to be installed and commissioned by a professional.

Warning: In a residential environment, this product may cause radio interference in which case additional mitigation measures could be required.

Leakage currents: If protection by monitoring the leakage currents is necessary to ensure the safety of the installation, the presence of additional leakage currents introduced by the use of variable frequency drive(s) in the unit must be considered.

In particular, the reinforced immunity protection types and a control value not lower than 150 mA are recommended when selecting differential protective devices.

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 IP43BW (according to reference document IEC 60529). All 30RB units are protected to IP44CW and fulfil this protection condition.

- ** - Example of installations of the first environment: Commercial and residential buildings.

- Example of installations of the second environment: industrial zones, technical rooms powered from a dedicated transformer.

PART LOAD PERFORMANCES

With the rapid increase in energy costs and the care about environmental impacts of electricity production, the power consumption of air conditioning equipment has become an important topic. The energy efficiency of a liquid chiller at full load is rarely representative of the actual performance of the units, as on average a chiller works less than 5% of the time at full load.

IPLV (in accordance with AHRI 550/590)

The IPLV (integrated part load value) allows evaluation of the average energy efficiency based on four operating conditions defined by the AHRI (Air Conditioning, Heating and Refrigeration Institute). The IPLV is the average weighted value of the cooling coefficient of performance (COP_R) at different operating conditions, weighted by the operating time.

IPLV (integrated part load value)

Load %	Air temperature °C	Energy efficiency	Operating time %
100	35	COP_1	1
75	26.7	COP_2	42
50	18.3	COP_3	45
25	12.8	COP_4	12

$$IPLV = COP_1 \times 1\% + COP_2 \times 42\% + COP_3 \times 45\% + COP_4 \times 12\%$$

SEER for comfort chillers (in accordance with EU ECODSIGN)

The **SEER** (Seasonal Energy Efficiency Ratio) measures the seasonal energy efficiency of comfort **chillers** by calculating the ratio between annual cooling demand of the building and annual energy demand of the chiller. It takes into account the energy efficiency achieved for each outdoor temperature weighted by the number of hours observed for each of these temperatures, using actual climate data.

SEER is a new way of measuring the true energy efficiency of chillers for **comfort cooling** over an entire year.

This new indicator gives a more realistic indication of the real energy efficiency and environmental impact of a cooling system (Ecodesign Regulation 2016/2281).

The heat load of a building depends on many factors, such as the outside air temperature, the exposure to the sun and the building occupancy.

Consequently it is preferable to use the average energy efficiency, calculated at several operating points that are representative for the unit utilisation.

SEPR for process chillers (in accordance with EU ECODSIGN)

The **SEPR** (Seasonal Energy Performance Ratio) measures the seasonal energy efficiency of **process chillers** by calculating the ratio between annual cooling demand of the process and annual energy demand of the chiller. It takes into account the energy efficiency achieved at each outdoor temperature of an average climate weighted by the number of hours observed for each of these temperatures.

SEPR is a new way of measuring the true energy efficiency of chillers for **process cooling** over an entire year. This new indicator gives a more realistic indication of the real energy efficiency and environmental impact of the cooling system (Ecodesign Regulation 2015/1095).

SOUND SPECTRUM

30RB 604-804 units		Octave bands, Hz						Sound power levels	
		125	250	500	1k	2k	4k		
604	dB	96	94	94	90	85	79	dB(A)	95
674	dB	97	94	94	90	86	79	dB(A)	95
734	dB	97	94	95	90	86	80	dB(A)	96
804	dB	97	95	95	91	86	80	dB(A)	96

OPERATING LIMITS

Evaporator water flow rate

30RB 604-804

30RB	Minimum flow rate, l/s	Maximum flow rate, l/s ⁽¹⁾
604	7,9	50,6
674	8,7	50,6
734	9,6	50,6
804	10,3	50,6

(1) The maximum flow rate corresponds to a pressure loss of 100 kPa (heat exchanger without hydraulic module).

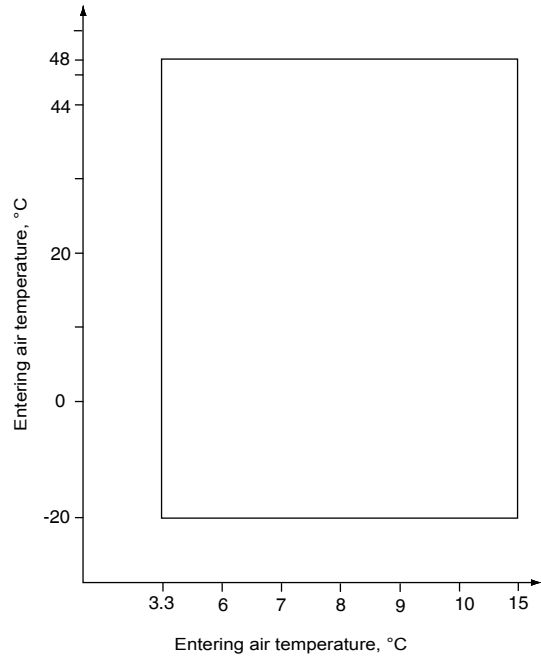
Unit operating limits

30RB 604-804 units

Evaporator	Minimum	Maximum
Entering water temperature at start-up °C	6,8 ⁽¹⁾	40
Leaving water temperature during operation °C	3,3	15 ⁽²⁾
Condenser	Minimum	Maximum
Outdoor ambient operating temperature		
Standard unit °C	-20	48
Available static pressure		
Standard unit (outdoor installation) Pa	0	0

- (1) For application requiring operation at less than 8 or 6.8°C respectively, contact Carrier for unit selection using the Carrier electronic catalog.
- (2) For an application, requiring operation up to +15°C leaving water temperature, contact Carrier for the selection of the unit.

Operating range - 30RB 604-804

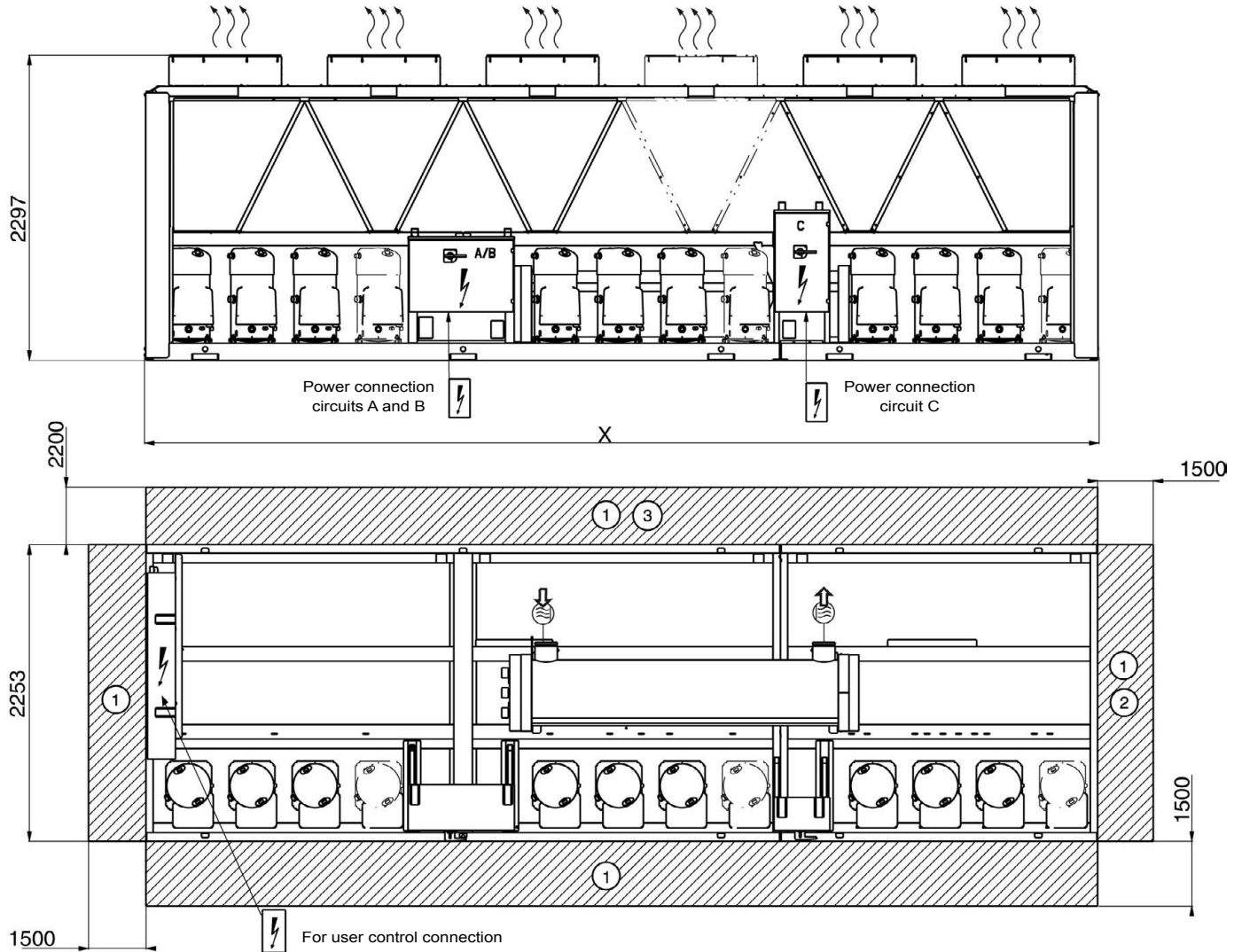


Notes

- 1. Evaporator $\Delta T = 5$ K
- 2. The evaporator is protected against frost down to -20°C.

DIMENSIONS/CLEARANCES

30RB 604-804



30RB	X
604-674	5992
734-804	7186

Legend

All dimensions are given in mm.

- ① Clearances required for maintenance and air flow
- ② Clearances recommended for evaporator tube removal
- ③ Clearances recommended for heat exchanger removal
- ⬇️ Water inlet
- ⬆️ Water outlet
- ⋈ Air outlet, do not obstruct

NOTE: Non-contractual drawings.

When designing an installation, refer to the certified dimensional drawings, available on request.

For the positioning of the fixing points and centre of gravity coordinates please refer to the dimensional drawings.



Order No.: 10233, 03.2018. Supersedes order No.: 10233, 12.2017.

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

Manufactured by: Carrier SCS, Montluel, France.

Printed in the European Union.



Quality and Environment
Management Systems
Approval