



United Technologies

## PRODUCT SELECTION DATA



- Compact design
- Alluminium micro-channel heat exchanger technology
- Fully equipped hydronic module
  - Partial heat reclaim
  - Total heat reclaim
- Direct expansion free-cooling

Air-Cooled Liquid Chillers with Integrated  
Hydronic Module

30RB 162-802

**AQUASNAP**<sup>®</sup>

# 30RB 162-802

## Nominal cooling capacity 162-774 kW

The Aquasnap liquid chiller range 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 can be equipped with an integrated hydronic module, limiting the installation to straight-forward 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 flexible anti-vibration mountings
  - Dynamic suction and discharge piping support, minimising vibration transmission (Carrier patent)
  - Acoustic compressor enclosure, reducing radiated noise emissions (option)
- Condenser 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

- Integrated hydronic module (option)
  - Centrifugal low or high-pressure water pump (as required), based on the pressure loss of the hydronic installation
  - Single or dual pump (as required) with operating time balancing and automatic changeover to the back-up pump if a fault develops
  - Water filter protecting the water pump against circulating debris
  - 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
  - A single power supply point without neutral (30RB 162-522)
  - 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
  - Eurovent energy efficiency class (in accordance with EN14511-3:2011) B to D
  - 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 (EER 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 (EER)
  - 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 hydronic 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 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
  - 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

## Pro-Dialog Plus operator interface

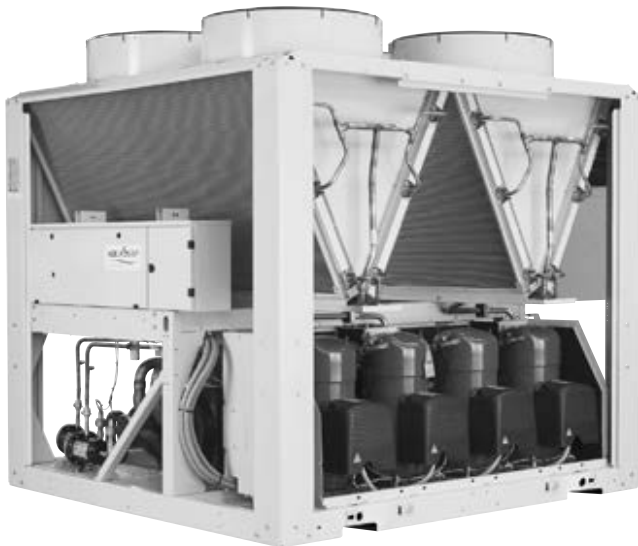


### Remote management (standard)

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

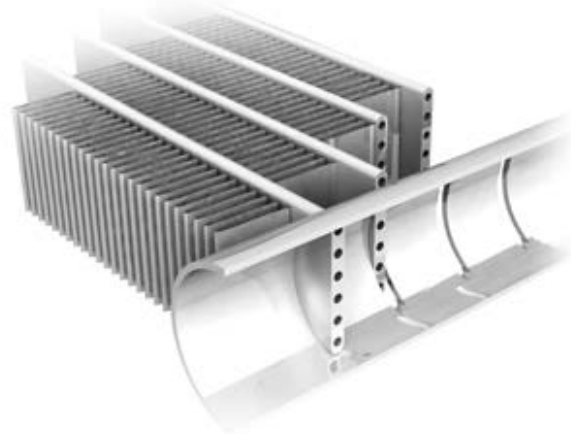
\* contacts already supplied with the hydronic module option



### 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	For 30RB
Unit for low leaving water temperature	6B	Leaving water temperature of +3°C to -10°C.	All low-temperature applications: ice storage, cold stores, process cooling etc.	162-402
Unit for indoor installation with discharge ducts	12	Fans with available pressure	Ducted condenser air discharge, optimised condensing temperature control, based on the operating conditions and system characteristics	162-802
Low noise level	15	Sound absorbing compressor enclosure	Noise emission reduction	162-802
Very low noise level	15LS	Sound absorbing compressor enclosure and low-speed fans	Noise emission reduction	162-802
Grilles	23	Metallic grilles on all four unit faces (this option includes the supply of enclosure panels)	Improved aesthetics	162-802
Enclosure panels	23A	Side panels on each end of the coils	Improved aesthetics	162-802
Electronic starter	25	Electronic starter on each compressor	Reduced start-up current	162-522
Winter operation down to -20°C	28	Fan speed control via frequency converter	Stable unit operation when the air temperature is between 0°C and -20°C	162-802
Winter operation down to -10°C	28B	Twin-speed lead fan for each circuit	Stable unit operation when the air temperature is between 0°C and -10°C	162-802
Winter operation down to -10°C and very low noise level (options 28B + 15LS)	28C	Sound absorbing compressor enclosure and low-speed fans + twin-speed lead fan for each circuit	Noise emission reduction and stable unit operation when the air temperature is between 0°C and -10°C	162-802
Evaporator and water piping frost protection	41	Electric heater on the evaporator and the water inlet/outlet piping	Evaporator frost protection for air temperatures between 0°C and -20°C	162-802
Evaporator, water piping and hydronic module frost protection	42A	Electric heaters on the evaporator, the water inlet/outlet piping and hydronic module	Evaporator and hydronic module frost protection for air temperatures between 0°C and -20°C	162-522
Partial heat reclaim	49	Partial heat reclaim by desuperheating of the compressor discharge gas	Free high-temperature hot-water production simultaneously with chilled water production	162-802
Total heat reclaim	50	See heat reclaim option.	Free hot water production simultaneously with chilled water production	262-522
Master/slave operation	58	Unit equipped with an additional field-installed leaving water temperature sensor, allowing master/slave operation of two chillers connected in parallel	Optimised operation of two chillers connected in parallel with operating time equalisation	162-802
Main disconnect switch without fuse (standard for sizes 162-262)	70	Factory-installed main electric disconnect switch in the control box	Ease-of-installation and compliance with local electrical regulations	302-802
Main disconnect switch with fuse	70D	Factory-installed main electric disconnect switch with fuse in the control box	Same advantage as main disconnect switch and reinforced anti-short circuit protection	302-802
Evaporator with aluminium jacket	88	Evaporator thermal insulation protection by aluminium sheets	Improved resistance to climatic aggression	162-802
Evaporator and hydronic module with aluminium jacket	88A	Evaporator and water piping thermal insulation protection by aluminium sheets	Improved resistance to climatic aggression	302-522
Suction valve	92	Shut-off valve on the compressor suction piping (discharge valve as standard)	Simplified maintenance	302-802
Compressor suction and discharge valves	92A	Shut-off valves on the common compressor suction and discharge piping	Simplified maintenance	162-262
High-pressure single-pump hydronic module	116B	Single high-pressure water pump, water filter, expansion tank, pressure gauge, water flow control valve. See hydronic module option.	Easy and fast installation	162-522
High-pressure dual-pump hydronic module	116C	Dual high-pressure water pump, water filter, expansion tank, pressure gauge, water flow control valve. See hydronic module option.	Easy and fast installation, operating safety	162-522
Low-pressure single-pump hydronic module	116F	Single low-pressure water pump, water filter, expansion tank, pressure gauge, water flow control valve. See hydronic module option.	Easy and fast installation	162-522
Low-pressure dual-pump hydronic module	116G	Dual low-pressure water pump, water filter, expansion tank, pressure gauge, water flow control valve. See hydronic module option.	Easy and fast installation, operating safety	162-522
High-pressure single-pump hydronic module	116M	Single high-pressure water pump, water filter, expansion tank, pressure ports. See hydronic module option.	Easy and fast installation	162-522
High-pressure dual-pump hydronic module	116N	Dual high-pressure water pump, water filter, expansion tank, pressure ports. See hydronic module option.	Easy and fast installation, operating safety	162-522
Low-pressure single-pump hydronic module	116P	Single low-pressure water pump, water filter, expansion tank, pressure ports. See hydronic module option.	Easy and fast installation	162-522
Low-pressure dual-pump hydronic module	116Q	Dual low-pressure water pump, water filter, expansion tank, pressure ports. See hydronic module option.	Easy and fast installation, operating safety	162-522
Direct-expansion free-cooling system	118A	See free-cooling option.	Economic chilled-water production at low outside temperature	232-522
JBus gateway	148B	Two-directional communications board, complies with JBus protocol	Easy connection by communication bus to a building management system	162-802
Bacnet gateway	148C	Two-directional communications board, complies with Bacnet protocol	Easy connection by communication bus to a building management system	162-802
LonTalk gateway	148D	Two-directional communications board, complies with LonTalk protocol	Easy connection by communication bus to a building management system	162-802
Energy Management Module EMM	156	See controls manual	Easy wired connection to a building management system	162-802
Safety valve with three-way valve fitted	194	Three-way valve upstream of the safety valves (not compatible with BPHE version)	Safety valve inspection and replacement facilitated without refrigerant loss	162-802
Conformance with Australian regulations	200	Heat exchanger approved to Australian code	-	162-802
Unit storage above 48°C	241	Refrigerant charge stored in the condenser. Option not compatible with MCHC coils; Cu/Al coils are required to store the charge.	Unit transport by container only possible with this option	162-802
Anti-corrosion protection Enviro-Shield for microchannel MCHC coils	262	Microchannel MCHC protection by the Carrier factory for applications in standard and moderate corrosive environments.	Better corrosion resistance, recommended for marine or moderately corrosive industrial environments	30RB 162-802
Anti-corrosion protection Super Enviro-Shield for microchannel MCHC coils	263	Microchannel MCHC protection by the Carrier factory for applications in corrosive and aggressive environments	The Super Enviro-Shield option was developed to increase the microchannel MCHC coil application range to extremely corrosive environmental conditions.	30RB 162-802
Connection sleeve	266	Piping to be welded with Victaulic connection	Ease-of-installation	162-802
Shell-and-tube evaporator	280	Different heat exchanger type	Ensures compatibility with other options than those available with the standard unit (see Electronic Catalogue)	162-262
Power cable connection side extension	283	Side extension on the power control to allow a reduced cable bend radius	Use of thicker power cables	302-802
230 V electrical plug	284	230 V power source with transformer (180 VA, 0.8 Amps)	Permit connection of a laptop or an electrical device during unit commissioning or servicing	30RB 162-802

# Units with fans with available pressure for indoor installation (option 12)

This option applies to 30RB units installed inside the building in a plant room. For this type of installation the hot air leaving the air-cooled condensers is discharged by the fans to the outside of the building, using a duct system.

30RB units equipped with fans with available pressure are designed to operate with air discharge ducts with maximum pressure drops of 200 Pa.

To compensate for these pressure drops 30RB units with option 12 are equipped with variable-speed fans with a maximum speed of 19 r/s, instead of 15.8 r/s and fixed-speed fans as for the standard units.

All fans in the same refrigerant circuit are controlled by a single-speed variator and therefore all run at the same speed.

The full-load or part-load speed is controlled by a patented algorithm that permanently optimises the condensing temperature to ensure the best unit energy efficiency (EER) whatever the operating conditions and pressure drops of the system ductwork.

Each refrigerant circuit (A, B and C) must have a separate ducting system to prevent any air recycling between the condensers of the different refrigerant circuits.

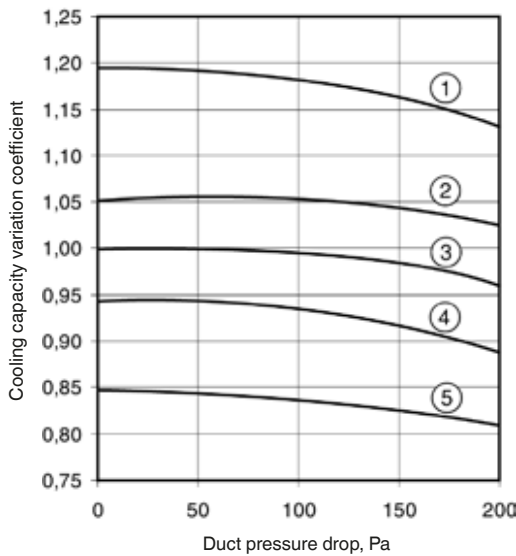
In 30RB units with option 12 each fan is equipped with a factory-installed connection interface, allowing the connection to the ducting system for the specific circuit (A, B and C) for each fan. Please refer to the unit dimensional drawings for the exact dimensions of the connection interface.

The unit cooling capacity and energy efficiency ratio (EER) vary depending on the duct pressure drops:

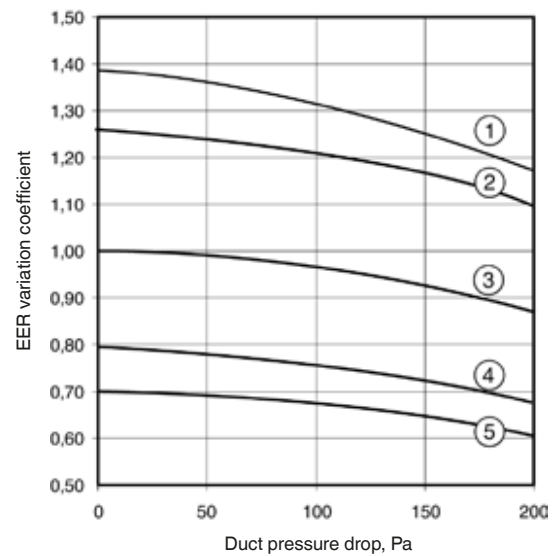
- between 0 and 100 Pa the unit cooling capacity is only slightly affected
- between 100 and 200 Pa the unit cooling capacity falls considerably depending on the operating conditions (outdoor air temperature and water conditions).

Please refer to the curves below to evaluate the impact of the estimated duct system pressure drop for the installation and the impact of different full load operating conditions on the 30RB unit cooling capacity and EER.

**Cooling capacity variations for operating conditions that differ from Eurovent conditions**



**EER variations for operating conditions that differ from Eurovent conditions**



**Operating conditions**

Curve No.	Outside temperature, °C	Entering water temperature, °C	Leaving water temperature, °C	Load %
1	25	15	10	100
2	25	10	5	100
3 Eurovent	35	12	7	100
4	45	15	10	100
5	45	10	5	100

**Nominal and maximum air flows per circuit**

30RB	Nominal/maximum air flow, l/s		
	Circuit A	Circuit B	Circuit C
162-262	9030/11110	9030/11110	-
302-342	13540/16670	9030/11110	-
372-402	13540/16670	13540/16670	-
432-462	18060/22220	13540/16670	-
522	18060/22220	18060/22220	-
602	13540/16670	13540/16670	13540/16670
672	13540/16670	13540/16670	18060/22220
732	18060/22220	18060/22220	13540/16670
802	18060/22220	18060/22220	18060/22220

**Sound power level at the discharge duct outlet for all circuits**

30RB	162	182	202	232	262	302	342	372	402	432	462	522	602	672	732	802
Sound power level 10 <sup>-12</sup> W	93	93	93	93	93	94	94	95	95	95.5	95.5	96	96.5	97	97.5	98
	dB(A)															

# 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		162	182	202	232	262	302	342	372	402	432	462	522	602	672	732	802
<b>Cooling capacity*</b>	kW	163	181	197	227	271	298	332	367	397	424	454	506	609	660	714	778
<b>Heating capacity*</b>	kW	42	44	61	57	90	103	110	113	129	126	152	159	197	206	243	241
Unit power input*	kW	54	60	71	74	100	106	122	130	150	154	173	192	222	243	272	297
Energy efficiency ratio*	kW/kW	3.01	3.01	2.77	3.07	2.72	2.81	2.72	2.83	2.64	2.75	2.62	2.63	3	3	3	2.62
<b>Operating weight**</b>																	
Standard unit***	kg	1882	1974	2074	2092	2260	2853	3049	3092	3218	3755	3895	4063	5285	5484	6145	6315
Unit with options****	kg	2052	2154	2244	2282	2450	3083	3279	3342	3478	4045	4185	4373	5645	5833	6555	6745
Unit with options†	kg	2302	2404	2484	2522	2690	3393	3589	3692	3818	4395	4585	4795	-	-	-	-
<b>Desuperheater in circuits A/B/C</b>		Plate heat exchanger															
Water volume circuit A	l	1.75	1.75	1.75	3.75	3.75	5.5	5.5	5.5	5.5	7.5	7.5	7.5	5.5	5.5	7.5	7.5
Water volume circuit B	l	3.5	3.5	3.5	3.75	3.75	3.75	3.75	5.5	5.5	5.5	5.5	7.5	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	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
<b>Water connections</b>		Cylindrical male gas thread															
Connection	in	2	2	2	2	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	60.3	60.3	60.3	60.3

\* 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.

\*\* Weights shown are a guideline only

\*\*\* Standard unit (with MCHE coils) and desuperheater option + option 280 (shell-and-tube heat exchanger)

\*\*\*\* Unit with option 15 (desuperheater)

† Unit with option 15 and desuperheater and hydronic module with high-pressure dual pump

## Operating limits

Desuperheater		Minimum	Maximum
Entering water temperature at start-up	°C	25*	75
Leaving water temperature during operation	°C	30	80
Air condenser		Minimum	Maximum
Outside operating temperature	°C	0**	46

\* 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.

\*\* The minimum outside temperature is 0°C. With the winter operation option it is -20°C.

# Total heat reclaim (option 50)

Suitable for heating, domestic hot water preparation, agriculture and food industry, industrial processes and other hot-water requirements.

With the total heat reclaim option it is possible to reduce the energy consumption bill considerably compared to conventional heating equipment such as fossil fuel boilers or electric water tanks.

## Operating principle

If hot water production is required, the compressor discharge gases are directed towards the heat reclaim condenser. The refrigerant releases its heat to the hot water that leaves the condenser at a temperature of up to 55°C. In this way 100% of the heat rejected by the liquid chiller can be used to produce hot water. When the demand for heat is satisfied, the hot gas is again directed towards the air condenser where the heat is rejected to the outside air by the fans. Hot water temperature control is ensured by the chiller Pro-Dialog control that independently controls the reclaim operation of each refrigerant circuit.

## Physical data, 30RB units with total heat reclaim

30RB – total heat reclaim mode		262	302	342	372	402	432	462	522
<b>Cooling capacity*</b>	kW	232	250	296	323	345	363	398	441
Heating capacity in heat reclaim mode*	kW	315	345	407	443	480	498	555	626
Total power input (unit)*	kW	87	99	117	125	142	142	164	194
Total energy efficiency ratio (EER/COP)*	kW/kW	2.66/3.61	2.52/3.47	2.54/3.49	2.58/3.53	2.43/3.38	2.57/3.52	2.43/3.38	2.27/3.22
<b>Cooling capacity**</b>	kW	233	251	297	324	346	364	400	443
Heating capacity in heat reclaim mode**	kW	315	345	407	443	480	498	555	626
Total power input (unit)**	kW	87	98	116	124	141	140	162	192
Total energy efficiency ratio (EER/COP)**	kW/kW	2.69/3.64	2.55/3.50	2.57/3.52	2.61/3.56	2.46/3.41	2.60/3.55	2.46/3.41	2.30/3.25
<b>Operating weight***</b>									
Unit with heat reclaim option	kg	2317	2772	2980	3080	3180	3651	3858	4027
Unit with option 15	kg	2507	3012	3220	3340	3440	3951	4158	4337
<b>Refrigerant charge</b>									
Circuit A	kg	14.8	20.4	21.7	21.7	21.2	27	27.2	27.2
Circuit B	kg	15.2	15.4	16.4	23.2	23.7	25.5	25.5	30.4
<b>Heat reclaim condenser</b>		Twin-circuit shell-and-tube condenser with finned copper tubes							
Water volume	l	22	22	22	22	22	46	46	46
Maximum water-side operating pressure	kPa	1000	1000	1000	1000	1000	1000	1000	1000
<b>Water connections</b>		Victaulic							
Diameter	in	3	3	3	3	3	4	4	4
Outside diameter	mm	88.9	88.9	88.9	88.9	88.9	114.3	114.3	114.3

\* Nominal conditions: Entering and leaving water temperature: Evaporator 12°C/7°C; heat reclaim condenser: 40°C/45°C.

Performances in accordance with EN14511-3:2011. These performances 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.

Evaporator and heat reclaim condenser fouling factor = 0 m<sup>2</sup>K/kW.

\*\* Nominal conditions: Entering and leaving water temperature: Evaporator 12°C/7°C; heat reclaim condenser: 40°C/45°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.

Evaporator and heat reclaim condenser fouling factor = 0 m<sup>2</sup>K/kW.

\*\*\* Weights are for guidance only.

## Operating limits

Heat reclaim condenser		Minimum	Maximum
Entering water temperature at start-up	°C	15*	55
Leaving water temperature during operation	°C	20	55
Condenser (air)		Minimum	Maximum
Outdoor ambient operating temperature	°C	0	46
Available static pressure	Pa	0	0

\* The water entering temperature at start-up must not fall below 15°C. For installations with a lower temperature an accessory 3-way valve must be installed.



# Hydronic module (option 116)

The hydronic module option saves a lot of installation time. The chiller is factory-equipped with the main components for the hydronic system: Screen filter, water pump, expansion tank, safety valve and water flow control valve (option).

Several water pump types are available to suit any application: Primary single or dual low-pressure pump or single or dual high-pressure pump (30RB 162-522).

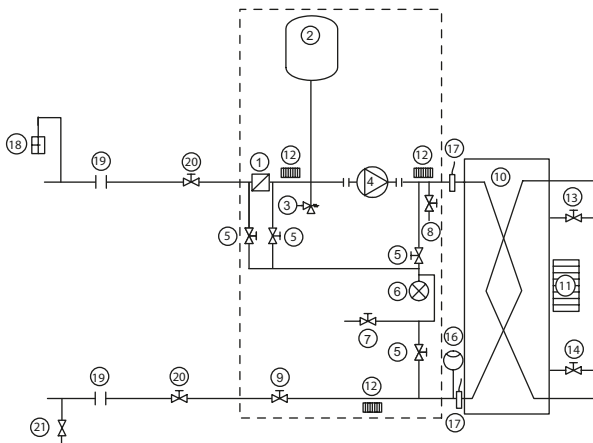
An automatic pump start-up algorithm protects the heat exchanger and the hydronic module piping against frost down to -10°C outside temperature, if the evaporator frost protection option is installed. If necessary increased frost protection down to -20°C is possible by adding the heater option to the hydronic module piping (see options 41 and 42A).

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

## Hydronic module



### Typical hydronic circuit diagram



#### Legend

##### Components of unit and hydronic module

- 1 Victaulic screen filter
- 2 Expansion tank
- 3 Safety valve
- 4 Available pressure pump
- 5 Pressure tap valve
- 6 Pressure gauge to measure the component pressure loss (option)
- 7 System vent valve, pressure gauge
- 8 Drain valve
- 9 Water flow control valve (option)
- 10 Heat exchanger
- 11 Evaporator heater (option)
- 12 Hydronic module heater (option)
- 13 Air vent (evaporator)
- 14 Water purge (evaporator)
- 16 Flow switch
- 17 Water temperature sensor

##### System components

- 18 Air vent
- 19 Flexible connection
- 20 Shut-down valves
- 21 Charge valve

--- Hydronic module (units with hydronic module)

##### Notes:

With option 42A the unit hydronic module is protected against frost by electric heaters. The unit evaporator must be protected against frost (anti-freeze solution or optional electric heater)

### Electrical data, units with hydronic modules

The pumps that are factory-installed in these units comply with the European Ecodesign directive ErP. The additional electrical data required by regulation 640/2009 is given in the installation, operation and maintenance manual.

This regulation concerns the application of directive 2009/125/EC on the eco-design requirements for electric motors.

# DX free-cooling system (option 118A)

The DX free-cooling option permits significant energy savings for all applications that require cooling in winter. In the free-cooling mode the compressors are stopped and only the fan and cooling micro-pump are running. The changeover from compressor cooling mode to free-cooling mode is automatically controlled by the Pro-Dialog control, based on the chiller heat load and the temperature difference between chilled water and ambient air.

**Important:** In order to optimise chiller performances, it is recommended to use the leaving water set point reset function.

## Operating principle

When the chilled water-air temperature difference exceeds a threshold value, the Pro-Dialog control carries out a comparison between the instantaneous chiller cooling capacity and the available free-cooling capacity. If the operating conditions allow free-cooling operation, the compressors are stopped, a three-way valve on the suction piping connects the evaporator with the condenser, allowing the migration of the refrigerant vapours to the condenser. The refrigerant condenses in the condenser coils, and the cooling micro-pump transports the liquid to the evaporator. The cooling capacity in free-cooling mode is controlled by the opening of the electronic expansion valve (EXV).

## Advantages of the DX free-cooling system

- Operation without glycol
  - Unlike traditional hydronic free-cooling systems that require the use of a glycol solution, the Aquasnap DX free-cooling chiller works with pure water. The evaporator is protected against frost down to -20°C by an electric resistance heater (option).
- Low water pressure losses
  - The Aquasnap DX free-cooling chiller does not include a three-way valve nor free-cooling coils connected in series with the evaporator. The Aquasnap free-cooling chiller has the same water pressure losses as a standard chiller.
- Weight and dimensions gain
  - The DX free-cooling option has little impact on the weight of the liquid chiller.
  - The Aquasnap free-cooling chiller has the same dimensions as a standard chiller.
- Increased energy efficiency
  - In free-cooling mode only the fans and the cooling micro-pump run. At an air-water temperature difference of 10 K for example the average chiller energy efficiency (EER) is 15 (kW/kW).
  - In the mechanical cooling mode chiller thermal and energy performances are not reduced by the use of a water-glycol solution.
  - As the pressure losses of the water circuit are low, the water pumps use less energy.

## Physical data, 30RB units free-cooling system

30RB (compressor cooling mode)		232	262	302	342	372	402	432	462	522	
<b>Nominal cooling capacity*</b>		kW	227	271	298	332	367	397	424	506	
Unit power input*		kW	74	100	106	122	130	150	154	192	
<b>Operating weight**</b>											
Unit with option 15		kg	1997	2171	2680	2871	2993	3093	3458	3850	
Unit with option 15 + dual pump hydronic module		kg	2181	2355	2985	3176	3338	3438	3803	4265	
Standard unit		kg	1902	2076	2563	2754	2859	2959	3307	3682	
<b>Refrigerant charge</b>			R410A								
Circuit A		kg	16.3	16.3	22.4	23.4	23.4	22.9	29.3	29.5	
Circuit B		kg	15	15	15.6	16.6	23.2	23.7	25.2	30.3	

\* Nominal conditions: evaporator 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 EN14511-3:2011. 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.

\*\* Weights are for guidance only

## Cooling capacities

30RB 232-522 (free-cooling mode)		Condenser entering air temperature, °C								
30RB	LWT °C	0			-5			-10		
		Qc kW	Unit kW	EER kW/kW	Qc kW	Unit kW	EER kW/kW	Qc kW	Unit kW	EER kW/kW
232	10	118	8	14.7	122	8	15	122	4	29.9
262		120	8	14.8	124	8	15.2	124	4	30.2
302		146	10	14.8	164	10	16.4	188	8	23.4
342		146	10	15	164	10	16.6	188	8	23.7
372		176	12	15.2	207	12	17.7	255	12	21.5
402		174	12	14.9	205	12	17.4	252	12	21.1
432		213	14	15.7	248	14	18.1	280	14	20.2
462		213	14	15.7	248	14	18.1	280	14	20.2
522		246	15	16.4	273	15	18	291	15	19

LWT - Leaving water temperature, °C  
 Qc - Cooling capacity, kW  
 Unit kW - Unit power input (compressors, fans, control)  
 EER - Energy efficiency, kW/kW

## Operating limits

30RB - compressor cooling mode			
Evaporator water temperature	°C	Minimum	Maximum
Entering water at start-up		6.8	40
Entering water during operation		8.5	25
Leaving water during operation		5	15
Condenser air temperature	°C	Minimum	Maximum
Standard free-cooling unit		0	48
With winter operation option (No. 28)		-20	48
30RB - free-cooling mode			
Evaporator water temperature	°C	Minimum	Maximum
Entering water at start-up		6.8	40
Leaving water during operation		5	26
Condenser air temperature	°C	Minimum	Maximum
		-25	20

# Physical data

## 30RB 162-262 "B" standard units (with plate heat exchanger)

30RB		162	182	202	232	262
<b>Air conditioning application as per EN14511-3:2011*</b>						
Nominal cooling capacity	kW	170	184	208	222	265
EER	kW/kW	2.95	2.96	2.86	3.00	2.67
Eurovent class, cooling		B	B	C	B	D
ESEER	kW/kW	3.71	3.53	3.82	3.87	3.69
<b>Air conditioning application**</b>						
Nominal cooling capacity	kW	171	185	209	223	266
EER	kW/kW	3.00	3.02	2.92	3.05	2.71
ESEER	kW/kW	3.87	3.70	4.00	4.06	3.90
<b>Operating weight***</b>						
Standard unit with option 15 and high-pressure dual-pump hydronic module option	kg	1561	1671	1770	1818	1993
Unit with option 15	kg	1385	1495	1594	1634	1809
Standard unit****	kg	1310	1420	1519	1539	1714
<b>Sound levels</b>						
<b>Unit with option 15LS (very low noise level)</b>						
Sound power level 10 <sup>-12</sup> W†	dB(A)	84	84	84	85	85
Sound pressure level at 10 m‡	dB(A)	52	52	52	53	53
<b>Unit with option 15 (low noise level)</b>						
Sound power level 10 <sup>-12</sup> W†	dB(A)	89	89	89	89	89
Sound pressure level at 10 m‡	dB(A)	57	57	57	57	57
<b>Unit without option 15 and without hydronic module</b>						
Sound power level 10 <sup>-12</sup> W†	dB(A)	91	91	91	91	91
Sound pressure level at 10 m‡	dB(A)	59	59	59	59	59
<b>Dimensions</b>						
Length x depth x height	mm	2457 x 2253 x 2297	2457 x 2253 x 2297	2457 x 2253 x 2297	2457 x 2253 x 2297	2457 x 2253 x 2297
<b>Compressors</b>						
Hermetic scroll, 48.3 r/s						
Circuit A		1	1	1	2	2
Circuit B		2	2	2	2	2
No. of control stages		-	-	-	-	4
<b>Refrigerant</b>						
R-410A						
Circuit A	kg	8.8	11.6	11.6	14	13.2
Circuit B	kg	13	13	12.9	13.5	12.9
<b>Capacity control</b>						
Pro-Dialog Plus						
Minimum capacity	%	33	28	33	25	25
<b>Condensers</b>						
All aluminium micro-channel heat exchanger (MCHEx)						
<b>Fans</b>						
Axial Flying Bird 4 with rotating shroud						
Quantity		3	4	4	4	4
Total air flow	l/s	13542	18056	18056	18056	18056
Speed	r/s	16	16	16	16	16
<b>Evaporator</b>						
Twin-circuit plate heat exchanger						
Water volume	l	10.76	10.76	12.64	16.38	16.69
Max. water-side operating pressure without hydronic module	kPa	1000	1000	1000	1000	1000
<b>Hydronic module (option)</b>						
Pump, Victaulic screen filter, safety valve, expansion tank, pressure gauge, water + air purge valves, flow control valve						
Pump		Centrifugal, monocell, low or high pressure (as required), 48.3 r/s, single or twinned dual pump (as required)				
Quantity		1	1	1	1	1
Expansion tank volume	l	50	50	50	50	50
Max. water-side operating pressure with hydronic module	kPa	400	400	400	400	400
<b>Water connections without hydronic module</b>						
Victaulic						
Diameter	inch	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2
Outside tube diameter	mm	76	76	76	76	76
<b>Water connections with hydronic module</b>						
Victaulic						
Diameter	inch	3	3	3	3	3
Outside tube diameter	mm	88.9	88.9	88.9	88.9	88.9
<b>Chassis paint colour</b>						
Colour code: RAL7035						

\* Eurovent-certified performances in accordance with standard EN14511-3:2011.

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

\*\* 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.

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

\*\*\* Weight shown is a guideline only. To find out the unit refrigerant charge, please refer to the unit nameplate.

\*\*\*\* Standard unit: base unit without option 15 and hydronic module.

† In accordance with ISO 9614-1 and certified by Eurovent.

‡ For information, calculated from the sound power level Lw(A).

# Physical data (continued)

## 30RB 162-262 “B” units with option 280 (shell-and-tube heat exchanger) and 30RB 302-802 units

30RB		162	182	202	232	262	302	342	372	402	432	462	522	602	672	732	802			
<b>Air conditioning application as per EN14511-3:2011*</b>																				
<b>Nominal cooling capacity</b>	kW	162	181	197	227	270	297	331	366	395	422	452	503	607	657	712	774			
EER	kW/kW	2.98	2.98	2.74	3.04	2.68	2.77	2.69	2.80	2.60	2.71	2.59	2.58	2.72	2.68	2.59	2.58			
Eurovent class, cooling		B	B	C	B	D	C	D	C	D	C	D	D	C	D	D	D			
ESEER	kW/kW	3.89	3.81	3.64	4.07	3.74	3.80	3.81	3.95	3.72	3.71	3.65	3.56	3.97	3.88	3.75	3.71			
<b>Air conditioning application**</b>																				
<b>Nominal cooling capacity</b>	kW	163	181	197	227	271	298	332	367	397	424	454	506	609	660	714	778			
EER	kW/kW	3.01	3.01	2.77	3.07	2.72	2.81	2.72	2.83	2.64	2.75	2.62	2.63	2.75	2.72	2.63	2.62			
ESEER	kW/kW	3.99	3.91	3.74	4.22	3.87	3.96	3.95	4.11	3.89	3.86	3.81	3.74	4.11	4.03	3.91	3.88			
<b>Operating weight**</b>																				
Standard unit with option 15 and high-pressure dual-pump hydronic module option	kg	1896	2006	2093	2118	2292	2911	3102	3258	3358	3720	3977	4183	-	-	-	-			
Unit with option 15	kg	1720	1830	1917	1934	2108	2606	2797	2913	3013	3375	3582	3768	4828	5091	5597	5861			
Standard unit***	kg	1645	1755	1842	1839	2013	2489	2680	2779	2879	3224	3431	3600	4627	4873	5362	5609			
<b>Sound levels</b>																				
<b>Unit with option 15LS (very low noise level)</b>																				
Sound power level 10 <sup>-12</sup> W†	dB(A)	84	84	84	85	85	86	86	87	87	88	88	88	89	89	89	90			
Sound pressure level at 10 m‡	dB(A)	52	52	52	53	53	54	54	55	55	55	55	56	56	57	57	57			
<b>Unit with option 15 (low noise level)</b>																				
Sound power level 10 <sup>-12</sup> W†	dB(A)	89	89	89	89	89	90	90	91	91	92	92	92	93	93	94	94			
Sound pressure level at 10 m‡	dB(A)	57	57	57	57	57	58	58	59	59	60	60	60	61	61	61	62			
<b>Unit without option 15 and without hydronic module</b>																				
Sound power level 10 <sup>-12</sup> W†	dB(A)	91	91	91	91	91	92	92	93	93	94	94	94	95	95	96	96			
Sound pressure level at 10 m‡	dB(A)	59	59	59	59	59	60	60	61	61	62	62	62	62	63	63	64			
<b>Dimensions</b>																				
Length x depth	mm	2457 x 2253					3604 x 3353					4798 x 2253				5992 x 2253				7186 x 2253
Height	mm	2297	2297	2297	2297	2297	2297	2297	2297	2297	2297	2297	2297	2297	2297	2297	2297	2297		
<b>Compressors</b>																				
Hermetic scroll, 48.3 r/s																				
Circuit A		1	1	1	2	2	3	3	3	3	4	4	4	3	3	4	4			
Circuit B		2	2	2	2	2	2	2	3	3	3	3	4	3	3	4	4			
Circuit C		-	-	-	-	-	-	-	-	-	-	-	-	3	4	3	4			
No. of control stages		-	-	-	-	4	5	5	6	6	7	7	8	9	10	11	12			
<b>Refrigerant</b>																				
R-410A																				
Circuit A	kg	9.2	11	11	13.5	13.5	18.5	19.5	19.5	19	24.3	24.5	24.5	21.5	21.5	26	26			
Circuit B	kg	12.8	12.8	12.8	13	13	13	14	19.5	20	21.5	21.5	25.5	22	21.5	28	28			
Circuit C	kg	-	-	-	-	-	-	-	-	-	-	-	-	23.5	28	24	31			
<b>Capacity control</b>																				
Pro-Dialog Plus																				
Minimum capacity	%	33	28	33	25	25	18	20	15	17	13	14	13	11	10	9	8			
<b>Condensers</b>																				
All aluminium micro-channel heat exchanger (MCHE)																				
<b>Fans</b>																				
Axial Flying Bird 4 with rotating shroud																				
Quantity		3	4	4	4	4	5	5	6	6	7	7	8	9	10	11	12			
Total air flow	l/s	13542	18056	18056	18056	18056	22569	22569	27083	27083	31597	31597	36111	40623	45139	49653	54167			
Speed	r/s	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16			
<b>Evaporator</b>																				
Direct-expansion, dual-circuit shell-and-tube																				
Water volume	l	110	110	110	110	110	110	125	125	125	113	113	113	284	284	284	284			
Max. water-side operating pressure without hydronic module	kPa	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000			
<b>Hydronic module (option)</b>																				
Pump, Victaulic screen filter, safety valve, expansion tank, pressure gauge, water + air purge valves, flow control valve																				
Centrifugal, monocell, low or high pressure (as required), 48.3 r/s, single or twinned dual pump (as required)																				
Quantity		1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-			
Expansion tank volume	l	50	50	50	50	50	80	80	80	80	80	80	80	-	-	-	-			
Max. water-side operating pressure with hydronic module	kPa	400	400	400	400	400	400	400	400	400	400	400	400	-	-	-	-			
<b>Water connections without hydronic module</b>																				
Victaulic																				
Diameter	inch	3	3	3	3	3	4	4	4	4	6	6	6	6	6	6	6			
Outside tube diameter	mm	88.9	88.9	88.9	88.9	88.9	114.3	114.3	114.3	114.3	168.3	168.3	168.3	168.3	168.3	168.3	168.3			
<b>Water connections with hydronic module</b>																				
Victaulic																				
Diameter	inch	3	3	3	3	3	4	4	4	4	5	5	5	-	-	-	-			
Outside tube diameter	mm	88.9	88.9	88.9	88.9	88.9	114.3	114.3	114.3	114.3	139.7	139.7	139.7	-	-	-	-			
<b>Chassis paint colour</b>																				
Colour code: RAL7035																				

\* Eurovent-certified performances in accordance with standard EN14511-3:2011.

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

\*\* 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.

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

\*\*\* Weight shown is a guideline only. To find out the unit refrigerant charge, please refer to the unit nameplate.

\*\*\*\* Standard unit: base unit without option 15 and hydronic module.

† In accordance with ISO 9614-1 and certified by Eurovent.

‡ For information, calculated from the sound power level Lw(A).

# Electrical data

## 30RB 162-262 "B" standard units and units with option 280 and 30RB 302-802 units

30RB (without hydronic module)		162	182	202	232	262	302	342	372	402	432	462	522	602	672	732	802	
<b>Power circuit</b>																		
Nominal power supply	V-ph-Hz	400-3-50																
Voltage range	V	360-440																
<b>Control circuit supply</b>		24 V, via internal transformer																
<b>Nominal unit current draw*</b>																		
Circuits A + B (one supply)	A	101	113	129	135	167	185	209	227	251	269	293	334	251	251	334	334	
Circuit C (separate supply)	A	-	-	-	-	-	-	-	-	-	-	-	-	125	167	125	167	
<b>Maximum unit power input**</b>																		
Circuits A + B (one supply)	kW	76	85	98	102	127	140	159	172	191	204	223	255	191	191	255	255	
Circuit C (separate supply)	kW	-	-	-	-	-	-	-	-	-	-	-	-	96	127	96	127	
<b>Cosine phi, unit at max. capacity**</b>		0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	
<b>Maximum unit current draw (Un-10%)*</b>																		
Circuits A + B (one supply)	A	143	159	183	191	239	263	299	323	359	383	419	478	359	359	478	478	
Circuit C (separate supply)	A	-	-	-	-	-	-	-	-	-	-	-	-	179	239	179	239	
<b>Maximum unit current draw (Un)****</b>																		
Circuits A + B (one supply)	A	131	146	168	175	219	241	274	296	329	351	384	438	329	329	439	438	
Circuit C (separate supply)	A	-	-	-	-	-	-	-	-	-	-	-	-	164	219	164	219	
<b>Maximum start-up current, standard unit (Un)†</b>																		
Circuits A + B	A	304	353	375	348	426	448	481	502	535	557	590	645	535	535	645	645	
Circuit C	A	-	-	-	-	-	-	-	-	-	-	-	-	371	426	371	426	
<b>Max. start-up current, unit with soft starter (Un)†</b>																		
Circuits A + B	A	259	283	305	323	356	378	411	433	466	489	521	575	-	-	-	-	
Circuit C	A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

\* Standardised Eurovent conditions: evaporator entering/leaving water temperature 12°C/7°C, outside air temperature 35°C.

\*\* 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).

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

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

† 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).

Fan motor electrical data: current used in the tables below: Units at Eurovent 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. These values are those given on the motor nameplate.

## Short-circuit stability current (TN system)\*

30RB		162	182	202	232	262	302	342	372	402	432	462	522	602	672	732	802	
<b>Unit without main disconnect (except for units 30RB 162 to 262, that are supplied with the disconnect switch installed as standard)</b>																		
<b>With fuses upstream - maximum fuse values assigned (gL/gG)</b>																		
Circuits A and B	A	-	-	-	-	-	500	500	500	500	630/500	630/500	630/500	630/500	630/500	630/500	630/500	
Circuit C	A	-	-	-	-	-	-	-	-	-	-	-	-	400	400	400	400	
<b>With fuses upstream - admissible rms current value (gL/gG)</b>																		
Circuits A and B	kA	-	-	-	-	-	70	70	70	70	60/70	60/70	60/70	70	70	60/70	60/70	
Circuit C	kA	-	-	-	-	-	-	-	-	-	-	-	-	60	60	60	60	
<b>Unit with optional main disconnect without fuse (standard for units 30RB 162 to 262, and option for units 30RB 302 to 802)</b>																		
<b>Short-time assigned current I<sub>cw</sub>** (1s) rms value/peak I<sub>pk</sub>***</b>																		
Circuits A and B	kA/kA	9/26	9/26	9/26	9/26	9/26	13/26	13/26	13/26	13/26	15/30	15/30	15/30	13/26	13/26	15/30	15/30	
Circuit C	kA/kA	-	-	-	-	-	-	-	-	-	-	-	-	13/26	13/26	13/26	13/26	
<b>With fuses upstream - maximum fuse values assigned (gL/gG)</b>																		
Circuits A and B	A	200	200	200/250	250/315†	250/315†	400	400	400	400	500	630	630	400	400	630	630	
Circuit C	A	-	-	-	-	-	-	-	-	-	-	-	-	400	400	400	400	
<b>With fuses upstream - conditional short-circuit assigned current I<sub>cc</sub>/I<sub>cf</sub>††</b>																		
Circuits A and B	kA	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	
Circuit C	kA	-	-	-	-	-	-	-	-	-	-	-	-	50	50	50	50	
<b>Unit with optional main disconnect with fuses (not available for units 30RB 162 to 262, and option for units 30RB 302 to 802)</b>																		
<b>Short-circuit stability current I<sub>cc</sub>/I<sub>cf</sub>†† increased with fuses - maximum fuse values assigned (gL/gG)</b>																		
Circuits A and B	kA	-	-	-	-	-	315	315	400	400	400	630	630	400	400	630	630	
Circuit C	kA	-	-	-	-	-	-	-	-	-	-	-	-	250	250	250	250	
<b>Short-circuit stability current I<sub>cc</sub>/I<sub>cf</sub>†† increased with fuses - admissible rms current value (gL/gG)</b>																		
Circuits A and B	kA	-	-	-	-	-	50	50	50	50	50	50	50	50	50	50	50	
Circuit C	kA	-	-	-	-	-	-	-	-	-	-	-	-	50	50	50	50	

\* Type of system earthing

\*\* I<sub>cw</sub>: assigned short-time current

\*\*\* I<sub>pk</sub>: assigned current, admissible peak

† For units with options 12 and 116 use the higher value.

†† I<sub>cc</sub>/I<sub>cf</sub>: assigned conditional short-circuit current

IT system: The short circuit current stability values given above for the TN system are also valid for IT for units 30RB 302 to 522. For units 30RB 162 to 262 and 30RB 602 to 802 modifications are required.

## Electrical data notes for 30RB units:

- 30RB 162-522 units have a single power connection point at the main disconnect switch; 30RB 602-802 units have two connection points at the main disconnect switch.
- The control box includes the following standard features:
  - one main disconnect switch
  - Starter and motor protection devices for each compressor and the fan(s)
  - 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 60204-1 (corresponds to IEC 60204-1) (machine safety - electrical machine components - part 1: general regulations) are specifically taken into account, when designing the electrical equipment.
- **Electrical reserves:**  
Circuit A has disconnect switches and branch sections, designed to supply the evaporator pump power input.

### IMPORTANT:

- Generally the recommendations of IEC 60364 are accepted as compliance with the requirements of the installation directives. Conformance with EN 60204 is the best means of ensuring compliance with the Machines Directive § 1.5.1.
- Annex B of EN 60204-1 describes the electrical characteristics used for the operation of the machines.

#### 1. The operating environment for the 30RB units is specified below:

- a. Environment\* - Environment as classified in EN 60721 (corresponds to IEC 60721):
  - outdoor installation\*
  - ambient temperature range: -20°C to +48°C ± 1 K, class 4K3\*
  - altitude: ≤ 2000 m (for hydronic kit see chapter 5.3 of the installation manual)
  - presence of hard solids, class 4S2 (no significant dust present)
  - presence of corrosive and polluting substances, class 4C2 (negligible)
  - vibration and shock, class 4M2
- b. Competence of personnel, class BA4\* (trained personnel - IEC 60364)

2. Power supply frequency variation: ± 2 Hz.
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 simplified connection on TN(s) networks (IEC 60364). For IT networks derived currents may interfere with network monitoring elements, and it is recommended to create an IT type divider for the system units that require this and/or a TN type divider for Carrier units. Please consult the appropriate local organisations to define the monitoring and protection elements and carry out the electrical installation. Units delivered with speed drive (options 12 and 28) are not compatible with IT network.

If short circuit currents above those given in the electrical data table are likely, modifications are required. Please contact your local Carrier representative.

**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 IP43B (according to reference document IEC 60529). All 30RB units are protected to IP44CW and fulfil this protection condition.

# 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 energy efficiency ratios (EER) at different operating conditions, weighted by the operating time.

### IPLV (integrated part load value)

Load %	Air temperature °C	Energy efficiency	Operating time %
100	35	EER <sub>1</sub>	1
75	26.7	EER <sub>2</sub>	42
50	18.3	EER <sub>3</sub>	45
25	12.8	EER <sub>4</sub>	12

ESEER = EER<sub>1</sub> x 1% + EER<sub>2</sub> x 42% + EER<sub>3</sub> x 45% + EER<sub>4</sub> x 12%

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.

## ESEER (in accordance with EUROVENT)

The ESEER (European seasonal energy efficiency ratio) permits evaluation of the average energy efficiency at part load, based on four operating conditions defined by Eurovent. The ESEER is the average value of energy efficiency ratios (EER) at different operating conditions, weighted by the operating time.

### ESEER (European seasonal energy efficiency ratio)

Load %	Air temperature °C	Energy efficiency	Operating time %
100	35	EER <sub>1</sub>	3
75	30	EER <sub>2</sub>	33
50	25	EER <sub>3</sub>	41
25	20	EER <sub>4</sub>	23

ESEER = EER<sub>1</sub> x 3% + EER<sub>2</sub> x 33% + EER<sub>3</sub> x 41% + EER<sub>4</sub> x 23%

## Part load performances

30RB 162-262 "B" standard units (with plate heat exchanger)						
30RB		162	182	202	232	262
IPLV	kW/kW	4.33	4.16	4.50	4.47	4.27
ESEER	kW/kW	3.71	3.53	3.82	3.87	3.69

30RB 162-262 "B" units with option 280 (shell-and-tube heat exchanger) and 30RB 302-802 units																	
30RB		162	182	202	232	262	302	342	372	402	432	462	522	602	672	732	802
IPLV	kW/kW	4.42	4.31	4.13	4.69	4.26	4.40	4.25	4.63	4.32	4.33	4.27	4.19	4.56	4.49	4.39	4.34
ESEER	kW/kW	3.89	3.81	3.64	4.07	3.74	3.80	3.81	3.95	3.72	3.71	3.65	3.56	3.97	3.88	3.75	3.71

ESEER Calculations according to standard performances (in accordance with EN14511-3:2011) and certified by Eurovent.

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

# Sound spectrum

30RB 162-262 "B" standard units									
		Octave bands, Hz						Sound power levels	
		125	250	500	1k	2k	4k		
162	dB	92	90	89	86	81	75	dB(A)	91
182	dB	92	90	89	86	81	75	dB(A)	91
202	dB	92	90	89	86	81	75	dB(A)	91
232	dB	93	90	90	86	82	75	dB(A)	91
262	dB	93	90	90	86	82	75	dB(A)	91

30RB 162-262 "B" units with option 280 and 30RB 302-802 units									
		Octave bands, Hz						Sound power levels	
		125	250	500	1k	2k	4k		
162	dB	92	90	89	86	81	75	dB(A)	91
182	dB	92	90	89	86	81	75	dB(A)	91
202	dB	92	90	89	86	81	75	dB(A)	91
232	dB	93	90	90	86	82	75	dB(A)	91
262	dB	93	90	90	86	82	75	dB(A)	91
302	dB	94	91	91	87	83	76	dB(A)	92
342	dB	94	91	91	87	83	76	dB(A)	92
372	dB	94	92	92	88	83	77	dB(A)	93
402	dB	94	92	92	88	83	77	dB(A)	93
432	dB	95	92	93	88	84	78	dB(A)	94
462	dB	96	93	93	89	85	78	dB(A)	94
522	dB	96	93	93	89	85	78	dB(A)	94
602	dB	96	94	94	90	85	79	dB(A)	95
672	dB	97	94	94	90	86	79	dB(A)	95
732	dB	97	94	95	90	86	80	dB(A)	96
802	dB	97	95	95	91	86	80	dB(A)	96

# Operating limits

## Evaporator water flow rate

30RB 162-262 "B" standard units (with plate heat exchanger)		
30RB	Minimum flow rate, l/s	Maximum flow rate, l/s*
162	2.8	13.9
182	2.8	13.9
202	2.8	14.3
232	3.0	14.3
262	3.5	14.3

30RB 162-262 "B" with option 280 (shell-and-tube heat exchanger) and 30RB 302-802		
30RB	Minimum flow rate, l/s	Maximum flow rate, l/s*
162	2.8	28.1
182	2.8	28.1
202	2.8	28.1
232	3.0	26.7
262	3.5	26.7
302	3.9	26.7
342	4.4	29.4
372	4.9	29.4
402	5.2	29.4
432	5.8	31.1
462	6.1	31.1
522	6.9	31.1
602	7.9	50.6
672	8.7	50.6
732	9.6	50.6
802	10.3	50.6

\* The maximum flow rate corresponds to a pressure loss of 100 kPa (heat exchanger without hydronic module).

## Unit operating limits

30RB 162-262 "B" standard units and units with option 280			
Evaporator		Minimum	Maximum
Entering water temperature at start-up	°C	8*	40
Leaving water temperature during operation	°C	5	15**
Condenser		Minimum	Maximum
Outdoor ambient operating temperature			
Standard unit	°C	0***/10†	48
Unit with options 28B, 28C (winter operation)	°C	-10	48
Unit with option 28 (winter operation)	°C	-20	48
Available static pressure			
Standard unit (outdoor installation)	Pa	0	0
Unit with option 12 (indoor installation)	Pa	0****	200

30RB 302-802 units			
Evaporator		Minimum	Maximum
Entering water temperature at start-up	°C	6,8*	40
Leaving water temperature during operation	°C	3,3	15**
Condenser		Minimum	Maximum
Outdoor ambient operating temperature			
Standard unit	°C	0***	48
Unit with options 28B, 28C (winter operation)	°C	-10	48
Unit with option 28 (winter operation)	°C	-20	48
Available static pressure			
Standard unit (outdoor installation)	Pa	0	0
Unit with option 12 (indoor installation)	Pa	0****	200

\* For application requiring operation at less than 8 or 6.8°C respectively, contact Carrier for unit selection using the Carrier electronic catalog.

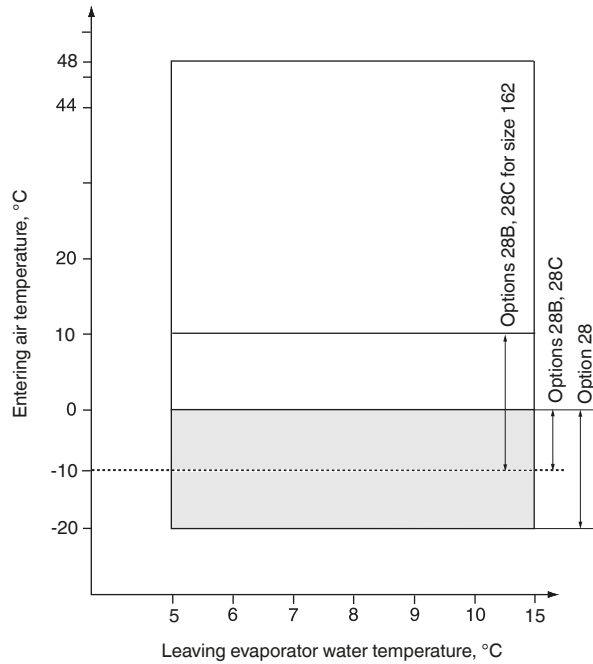
\*\* For an application, requiring operation up to +15°C leaving water temperature, contact Carrier for the selection of the unit.

\*\*\* For operation from 0°C to -10°C the units must be equipped with options 28B, 28C "Winter operation". For operation from 0°C to -20°C the units must be equipped with option 28 "Winter operation". For both options the unit must either be equipped with the evaporator frost protection option (for units without hydronic module option) or the evaporator and hydronic module frost protection option (for units with hydronic module option) or the water loop must be protected against frost by the installer, using an anti-freeze solution. Maximum outside temperature: For transport and storage of the 30RB units the minimum and maximum allowable temperatures are -20°C and +48°C. It is recommended that these temperatures are used for transport by container.

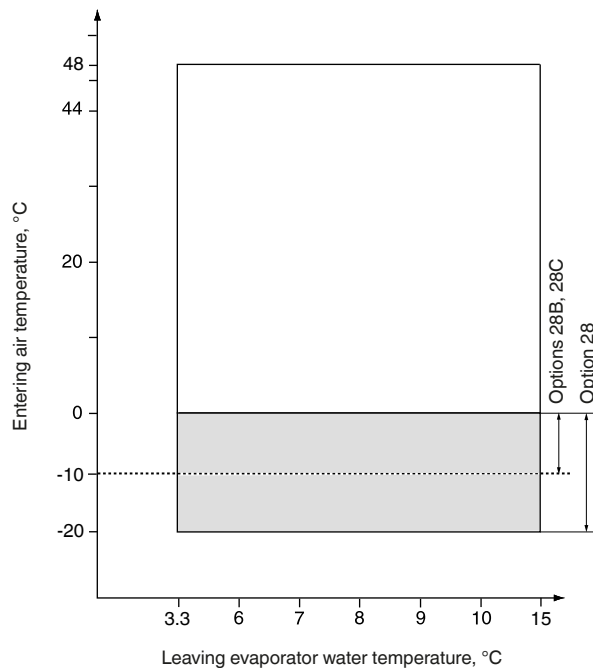
\*\*\*\* Unit with fans with available pressure up to 200 Pa.

† 30RB 162 units use options 28B, 28C for outside temperatures below 10°C.

## Operating range - 30RB 162-262 "B" standard units and units with option 280



## Operating range - 30RB 302-802



### Notes:

Evaporator  $\Delta T = 5$  K

The evaporator is protected against frost down to -20°C.

### Legend:

- Standard unit operating at full load.
- Operating range, units equipped with options 28, 28B, 28C "Winter operation".
- Option 28 (with variable-speed lead fan for each circuit) allows operation down to -20°C outside temperature.
- Options 28B, 28C (with two-speed lead fan for each circuit) allows operation down to -10°C outside temperature. In addition to options 28, 28B, 28C the unit must either be equipped with the evaporator frost protection option (for units without hydronic module option) or the evaporator and hydronic module frost protection option (for units with hydronic module option) or the water loop must be protected by the installer by adding a frost protection solution.



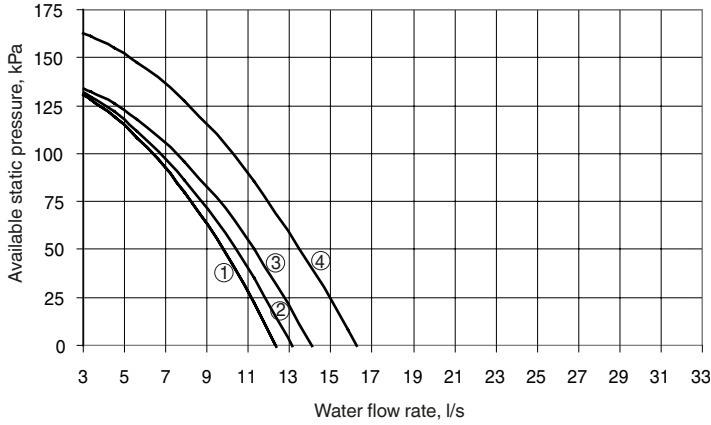
# Available static system pressure

Data applicable for:

- Fresh water 20°C
- In case of use of the glycol, the maximum water flow is reduced.

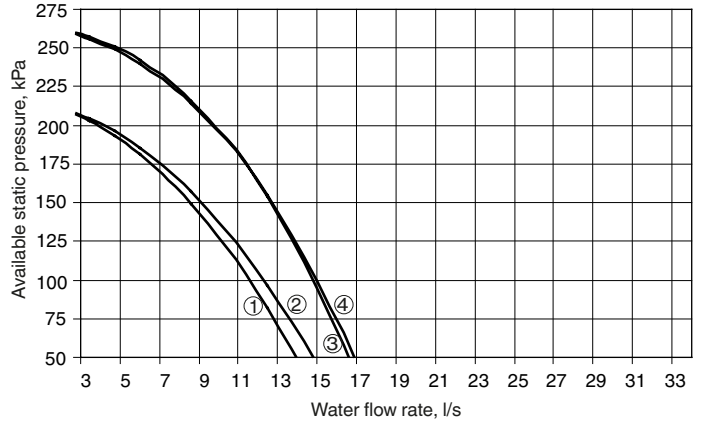
## 30RB 162-262 "B" standard units (with plate heat exchanger)

### Low-pressure pump (hydraulic module option)



- Legend**
- 1 30RB 162-182 "B"
  - 2 30RB 202 "B"
  - 3 30RB 232 "B"
  - 4 30RB 262 "B"

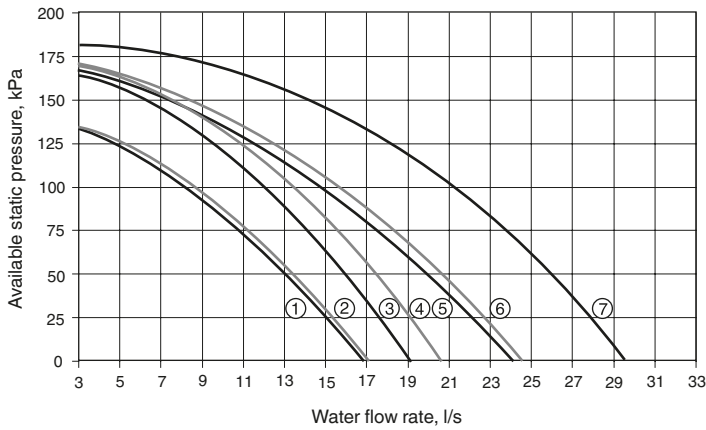
### High-pressure pump (hydraulic module option)



- Legend**
- 1 30RB 162-182 "B"
  - 2 30RB 202 "B"
  - 3 30RB 232 "B"
  - 4 30RB 262 "B"

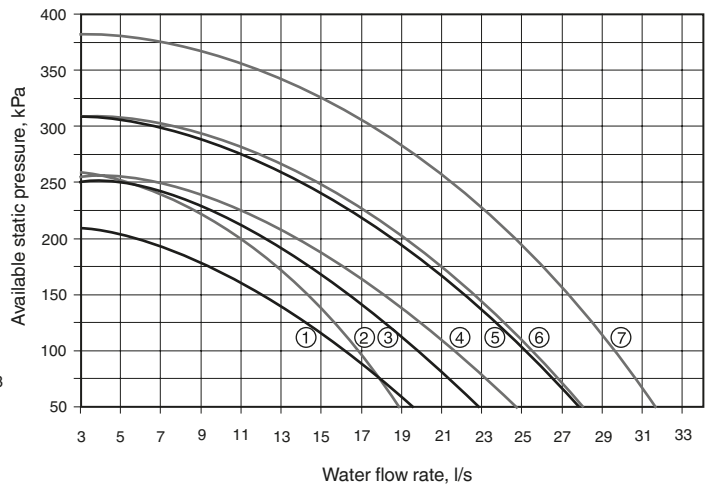
## 30RB 162-262 "B" units with option 280 (shell-and-tube heat exchanger) and 30RB 302-522 units

### Low-pressure pump (hydraulic module option)



- Legend**
- 1 30RB 162-202 "B"
  - 2 30RB 232-262 "B"
  - 3 30RB 302
  - 4 30RB 342
  - 5 30RB 372-402
  - 6 30RB 432
  - 7 30RB 462-522

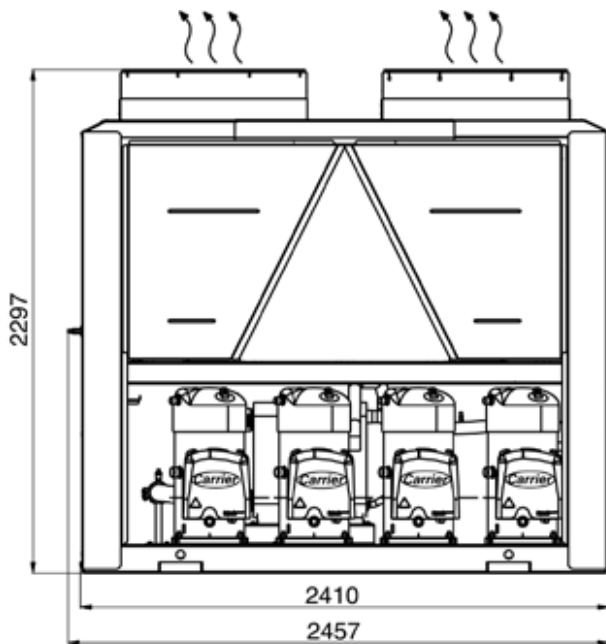
### High-pressure pump (hydraulic module option)



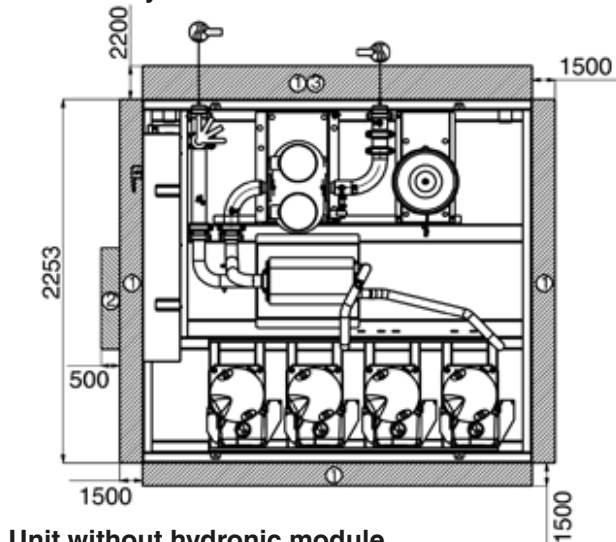
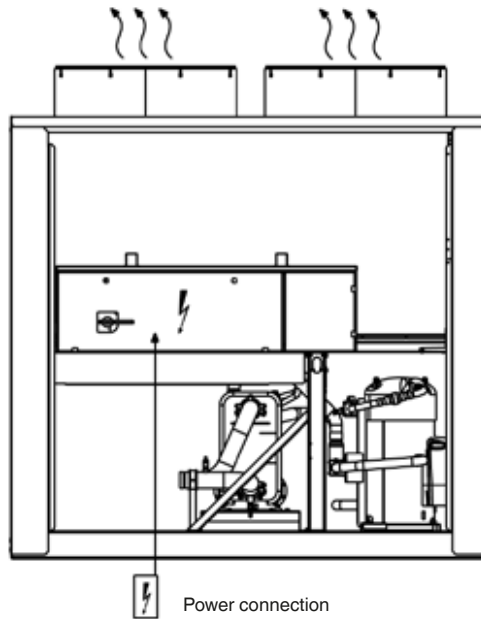
- Legend**
- 1 30RB 162-202 "B"
  - 2 30RB 202-232 "B"
  - 3 30RB 302
  - 4 30RB 342
  - 5 30RB 372-402
  - 6 30RB 432
  - 7 30RB 462-522

# Dimensions/clearances

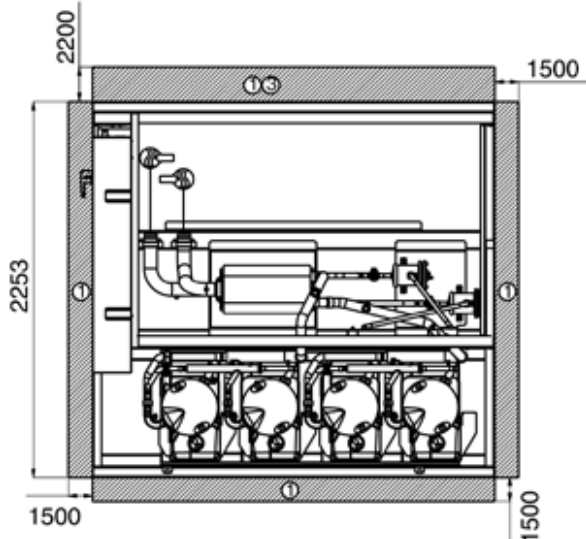
30RB 162-262 "B", standard units (with plate heat exchanger)



Unit with hydronic module






Unit without hydronic module



**Legend:**  
All dimensions are in mm.

- 1 Clearances required for maintenance and air flow
- 2 Clearances recommended for evaporator tube removal
- 3 Clearances recommended for heat exchanger removal

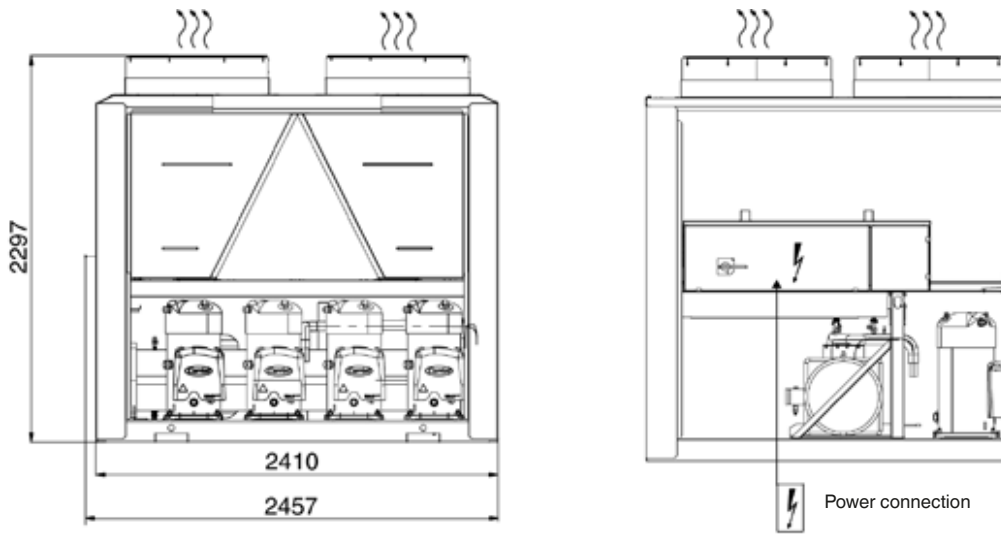
-  Water inlet
-  Water outlet
-  Air outlet, do not obstruct

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

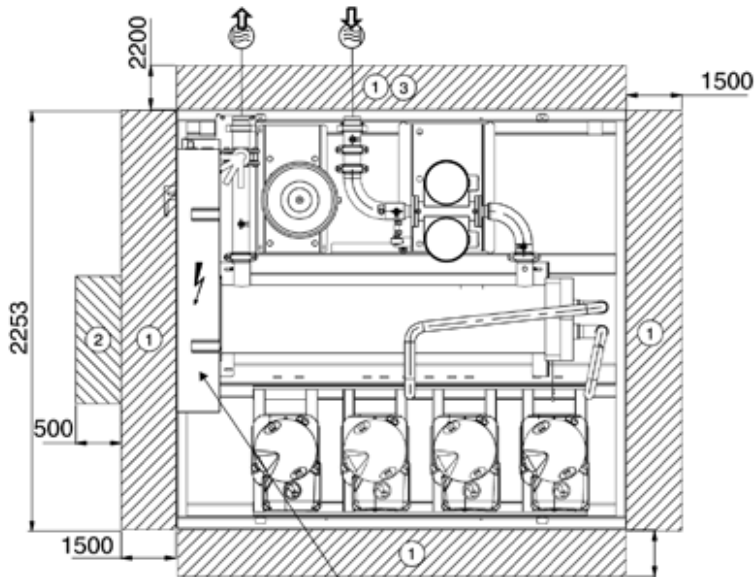
For the positioning of the fixing points, weight distribution points and centre of gravity coordinates please refer to the dimensional drawings.

# Dimensions/clearances

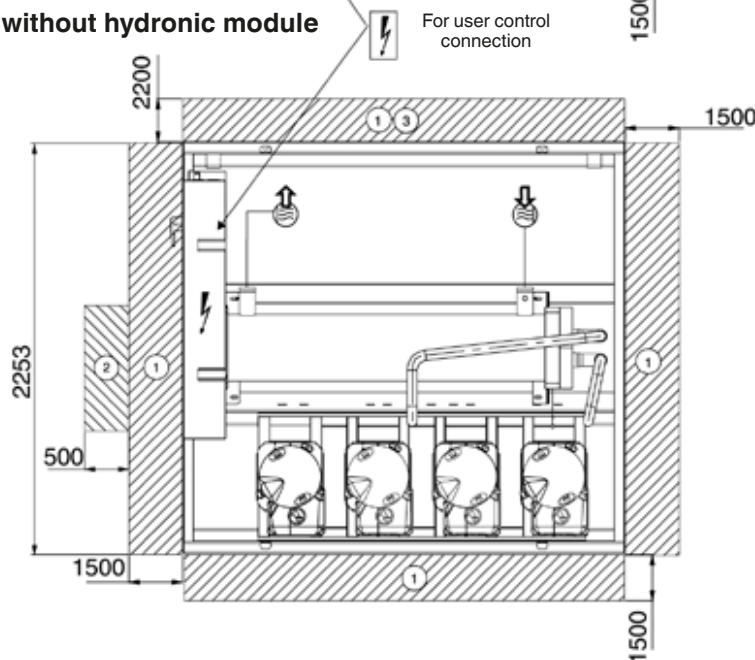
30RB 162-262 "B" with option 280 (shell-and-tube heat exchanger)






Unit with hydronic module



Unit without hydronic module



**Legend:**  
All dimensions are 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

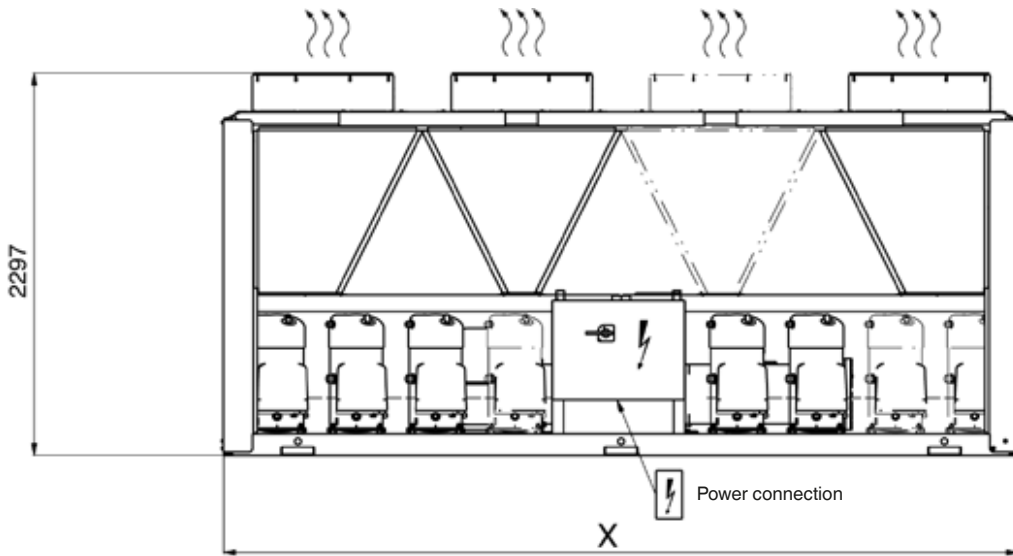
**NOTE:** Drawings are not contractually binding. Before designing an installation, consult the certified dimensional drawings, available on request.

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

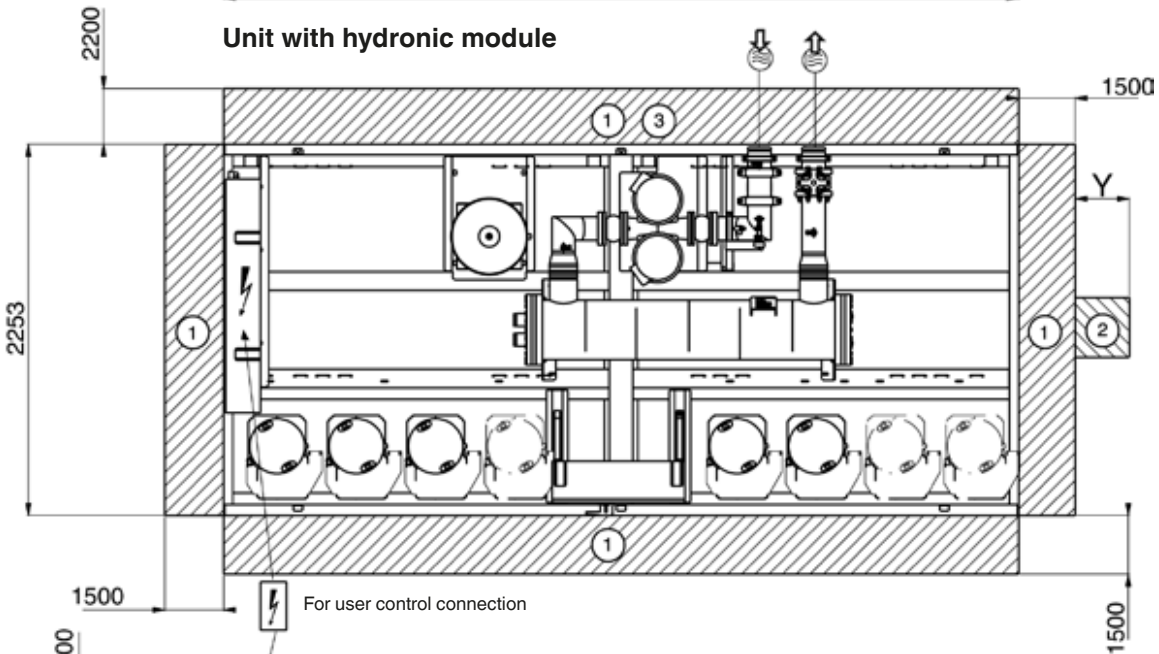
# Dimensions/clearances

30RB 302-522

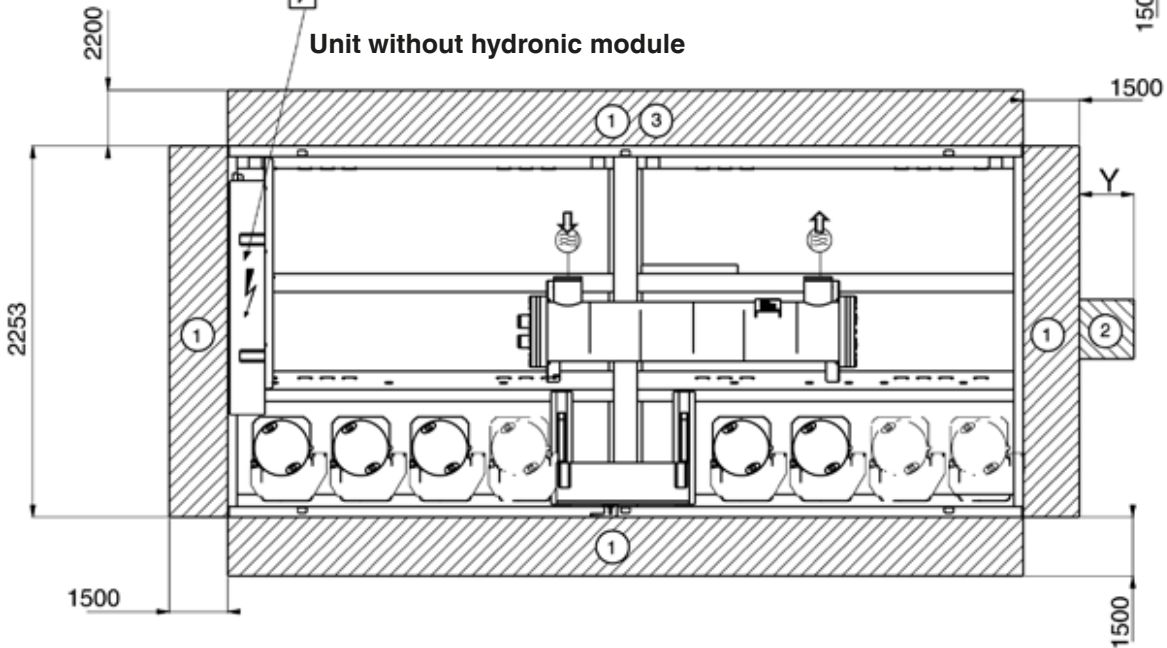
30RB	X	Y
302-402	3604	200
432-522	4798	0



Unit with hydronic module

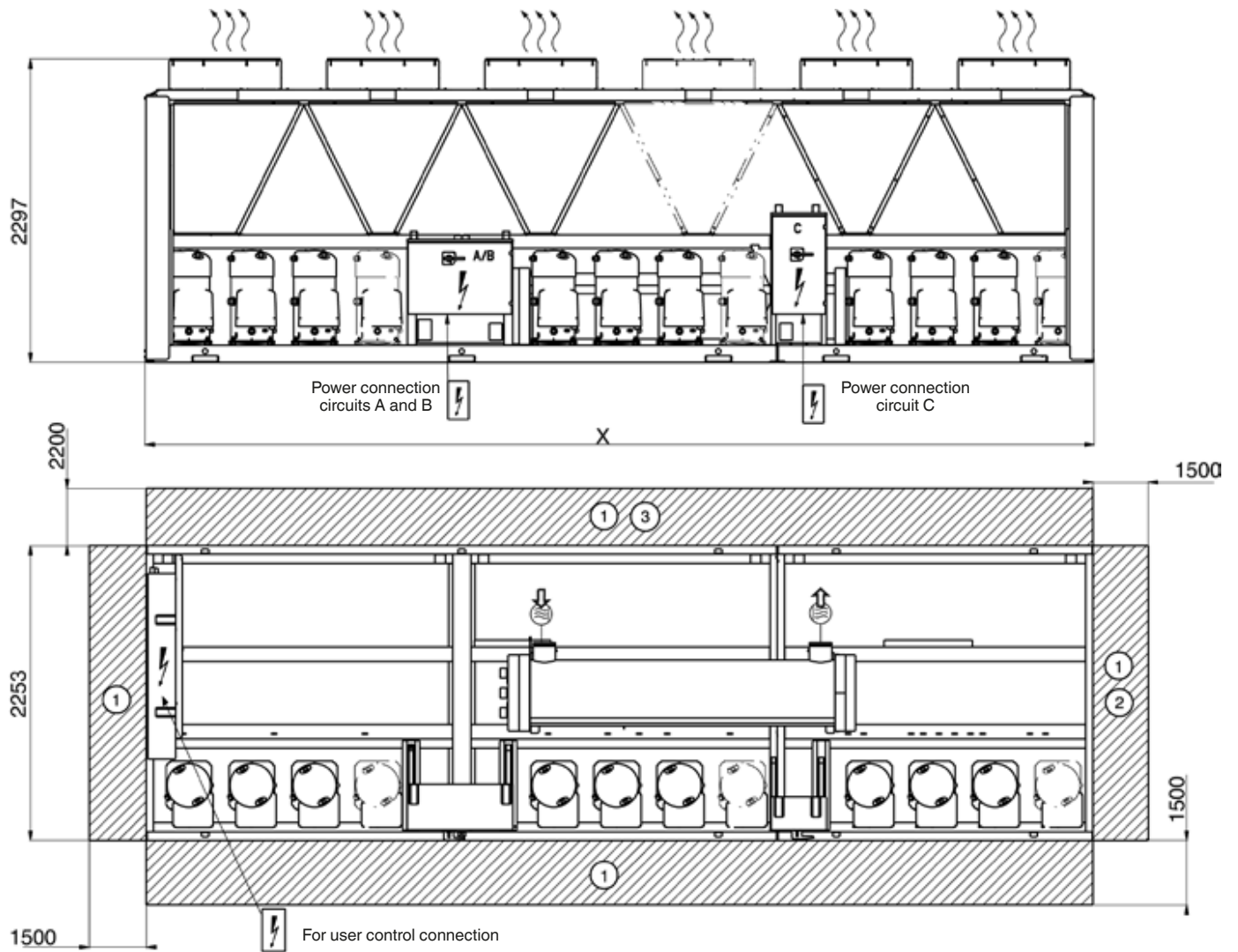


Unit without hydronic module



# Dimensions/clearances




30RB 602-802



30RB	X
602-672	5992
732-802	7186

### Legend:

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

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













Order No.13438, 12.2016. Supersedes order No. 13438, 02.2014.  
The manufacturer reserves the right to make any changes, without notice.



Quality and Environment  
Management Systems  
Approval

Manufacturer: Carrier SCS, Montluel, France.  
Printed in the European Union.