



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[®]

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

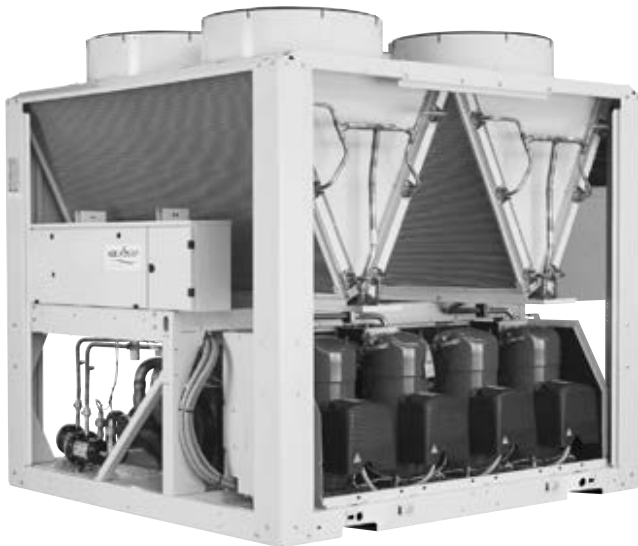


Remote management (standard)

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

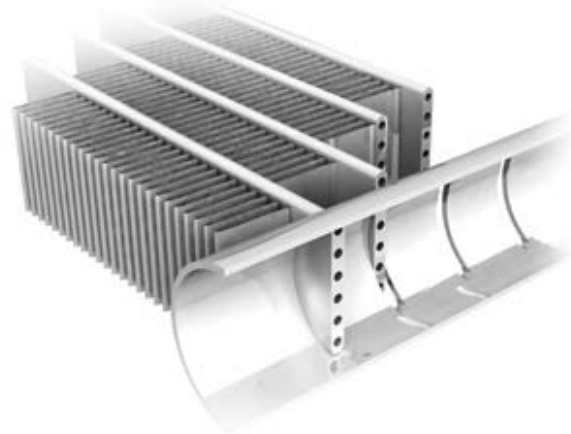
* contacts already supplied with the hydronic module option



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 |

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 | | | |
|---|-------|-------------|-------|-------|-------|-------|-------------|-------|-------|-------|-------|-------------|-------|-------|-------|-------------|-------|------|--|-------------|
| Air conditioning application as per EN14511-3:2011* | | | | | | | | | | | | | | | | | | | | |
| Nominal cooling capacity | 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 | | | |
| Air conditioning application** | | | | | | | | | | | | | | | | | | | | |
| Nominal cooling capacity | 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 | | | |
| Operating weight** | | | | | | | | | | | | | | | | | | | | |
| 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 | | | |
| Sound levels | | | | | | | | | | | | | | | | | | | | |
| Unit with option 15LS (very low noise level) | | | | | | | | | | | | | | | | | | | | |
| Sound power level 10 ⁻¹² 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 | | | |
| Unit with option 15 (low noise level) | | | | | | | | | | | | | | | | | | | | |
| Sound power level 10 ⁻¹² 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 | | | |
| Unit without option 15 and without hydronic module | | | | | | | | | | | | | | | | | | | | |
| Sound power level 10 ⁻¹² 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 | | | |
| Dimensions | | | | | | | | | | | | | | | | | | | | |
| 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 | | |
| Compressors | | | | | | | | | | | | | | | | | | | | |
| 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 | | | |
| Refrigerant | | | | | | | | | | | | | | | | | | | | |
| 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 | | | |
| Capacity control | | | | | | | | | | | | | | | | | | | | |
| Pro-Dialog Plus | | | | | | | | | | | | | | | | | | | | |
| Minimum capacity | % | 33 | 28 | 33 | 25 | 25 | 18 | 20 | 15 | 17 | 13 | 14 | 13 | 11 | 10 | 9 | 8 | | | |
| Condensers | | | | | | | | | | | | | | | | | | | | |
| All aluminium micro-channel heat exchanger (MCHE) | | | | | | | | | | | | | | | | | | | | |
| Fans | | | | | | | | | | | | | | | | | | | | |
| 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 | | | |
| Evaporator | | | | | | | | | | | | | | | | | | | | |
| 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 | | | |
| Hydronic module (option) | | | | | | | | | | | | | | | | | | | | |
| 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 | - | - | - | - | | | |
| Water connections without hydronic module | | | | | | | | | | | | | | | | | | | | |
| 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 | | | |
| Water connections with hydronic module | | | | | | | | | | | | | | | | | | | | |
| 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 | - | - | - | - | | | |
| Chassis paint colour | | | | | | | | | | | | | | | | | | | | |
| 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 m² 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 m² 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 | |
|--|---------|--------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|
| 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* | | | | | | | | | | | | | | | | | | |
| 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 | |
| Maximum unit power input** | | | | | | | | | | | | | | | | | | |
| 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 | |
| Cosine phi, unit at max. capacity** | | 0.84 | | | | | | | | | | | | | | | | |
| Maximum unit current draw (Un-10%)* | | | | | | | | | | | | | | | | | | |
| 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 | |
| Maximum unit current draw (Un)**** | | | | | | | | | | | | | | | | | | |
| 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 | |
| Maximum start-up current, standard unit (Un)† | | | | | | | | | | | | | | | | | | |
| 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 | |
| Max. start-up current, unit with soft starter (Un)† | | | | | | | | | | | | | | | | | | |
| 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 | |
|--|-------|------|------|---------|----------|----------|-------|-------|-------|---------|---------|---------|---------|---------|---------|---------|-----|
| Unit without main disconnect (except for units 30RB 162 to 262, that are supplied with the disconnect switch installed as standard) | | | | | | | | | | | | | | | | | |
| With fuses upstream - maximum fuse values assigned (gL/gG) | | | | | | | | | | | | | | | | | |
| 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 | |
| With fuses upstream - admissible rms current value (gL/gG) | | | | | | | | | | | | | | | | | |
| 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 | |
| Unit with optional main disconnect without fuse (standard for units 30RB 162 to 262, and option for units 30RB 302 to 802) | | | | | | | | | | | | | | | | | |
| Short-time assigned current I_{cw}** (1s) rms value/peak I_{pk}*** | | | | | | | | | | | | | | | | | |
| Circuits A and B | kA/kA | 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 | |
| With fuses upstream - maximum fuse values assigned (gL/gG) | | | | | | | | | | | | | | | | | |
| 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 | |
| With fuses upstream - conditional short-circuit assigned current I_{cc}/I_{cf}†† | | | | | | | | | | | | | | | | | |
| Circuits A and B | kA | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | |
| Circuit C | kA | - | - | - | - | - | - | - | - | - | - | - | 50 | 50 | 50 | 50 | |
| Unit with optional main disconnect with fuses (not available for units 30RB 162 to 262, and option for units 30RB 302 to 802) | | | | | | | | | | | | | | | | | |
| Short-circuit stability current I_{cc}/I_{cf}†† increased with fuses - maximum fuse values assigned (gL/gG) | | | | | | | | | | | | | | | | | |
| Circuits A and B | kA | - | - | - | - | 315 | 315 | 400 | 400 | 400 | 630 | 630 | 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 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | |
| Circuit C | kA | - | - | - | - | - | - | - | - | - | - | - | 50 | 50 | 50 | 50 | |

* Type of system earthing

** I_{cw}: assigned short-time current

*** I_{pk}: assigned current, admissible peak

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

†† I_{cc}/I_{cf}: 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.

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.

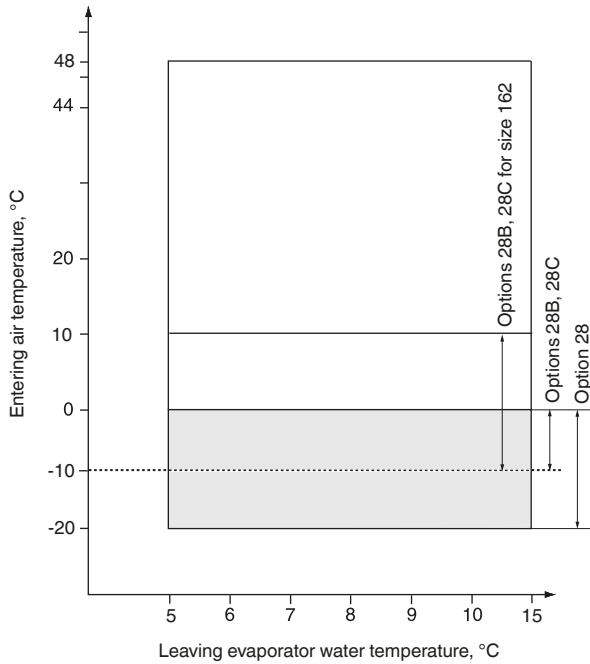
** For an application, requiring operation up to +15°C leaving water temperature, contact Carrier for the selection of the unit.

*** 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.

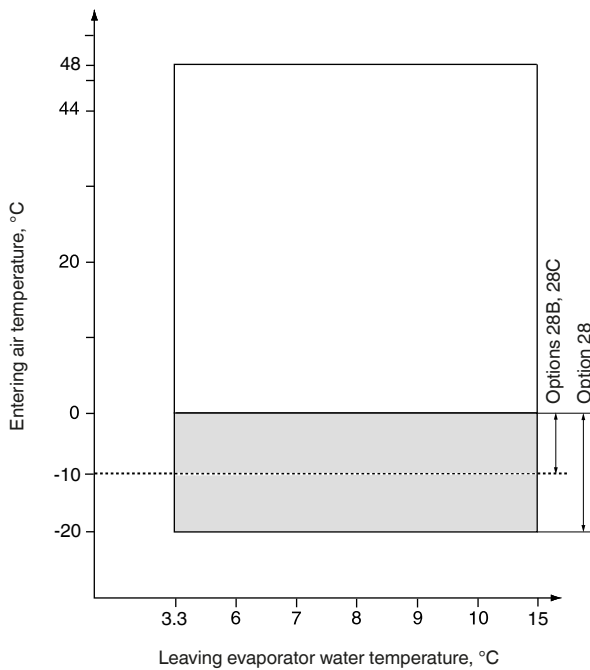
**** Unit with fans with available pressure up to 200 Pa.

† 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

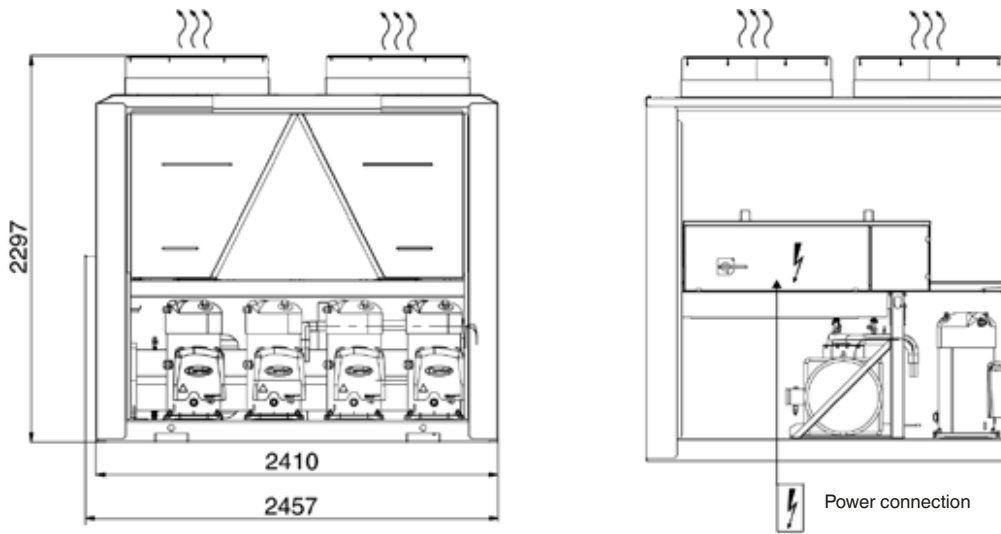
The evaporator is protected against frost down to -20°C.

Legend:

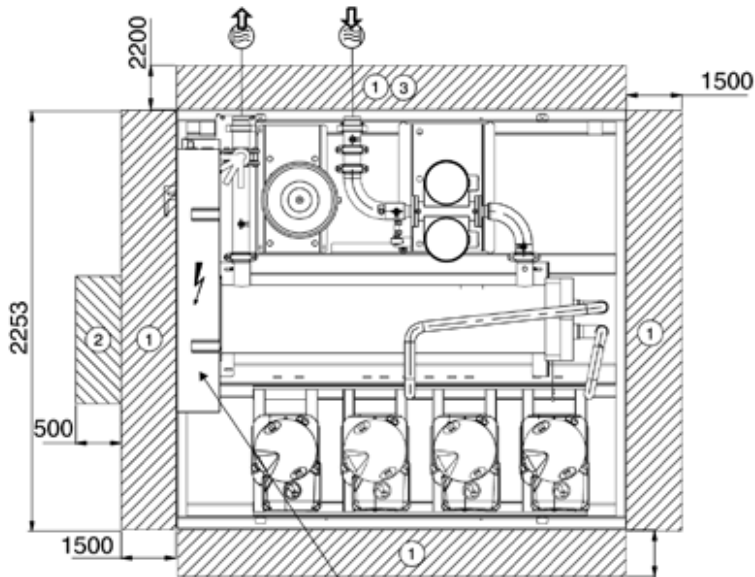
- Standard unit operating at full load.
- Operating range, units equipped with options 28, 28B, 28C "Winter operation".
- Option 28 (with variable-speed lead fan for each circuit) allows operation down to -20°C outside temperature.
- Options 28B, 28C (with two-speed lead fan for each circuit) allows 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.

Dimensions/clearances

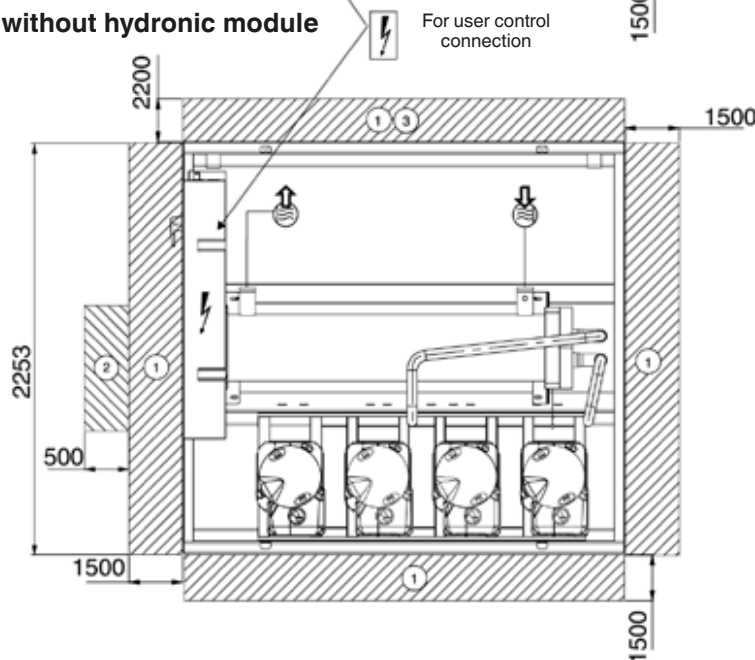
30RB 162-262 "B" with option 280 (shell-and-tube heat exchanger)






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.

Cooling capacities in accordance with EN14511-3 : 2011



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

| LWT °C | | Condenser entering air temperature, °C | | | | | | | | | | | | | | | | | | | | | | | |
|-----------|----|--|--------------|----------|-----------|----------|--------------|----------|-----------|----------|--------------|----------|-----------|----------|--------------|----------|-----------|----------|--------------|----------|-----------|----------|--------------|----------|-----------|
| | | 20 | | | | 25 | | | | 30 | | | | 35 | | | | 40 | | | | 46 | | | |
| | | Qc kW | EER kW/kW | q l/s | Δp kPa | Qc kW | EER kW/kW | q l/s | Δp kPa | Qc kW | EER kW/kW | q l/s | Δp kPa | Qc kW | EER kW/kW | q l/s | Δp kPa | Qc kW | EER kW/kW | q l/s | Δp kPa | Qc kW | EER kW/kW | q l/s | Δp kPa |
| 162 | 5 | 176 | 4.31 | 8.3 | 21 | 168 | 3.76 | 7.9 | 19 | 160 | 3.25 | 7.5 | 18 | 150 | 2.78 | 7.0 | 17 | 139 | 2.34 | 6.5 | 15 | 125 | 1.87 | 5.8 | 13 |
| 182 | | 193 | 4.18 | 9.0 | 23 | 184 | 3.67 | 8.6 | 22 | 174 | 3.20 | 8.1 | 20 | 164 | 2.76 | 7.7 | 19 | 152 | 2.34 | 7.1 | 17 | 137 | 1.89 | 6.4 | 15 |
| 202 | | 213 | 3.89 | 10.1 | 28 | 203 | 3.42 | 9.7 | 26 | 193 | 2.99 | 9.2 | 24 | 182 | 2.59 | 8.7 | 22 | 170 | 2.22 | 8.1 | 20 | 154 | 1.82 | 7.3 | 18 |
| 232 | | 251 | 4.44 | 11.8 | 34 | 240 | 3.90 | 11.2 | 32 | 228 | 3.39 | 10.7 | 30 | 215 | 2.92 | 10.1 | 27 | 199 | 2.47 | 9.3 | 25 | 179 | 1.98 | 8.4 | 21 |
| 262 | | 296 | 3.88 | 13.7 | 42 | 282 | 3.41 | 13.1 | 40 | 268 | 2.97 | 12.4 | 37 | 252 | 2.57 | 11.6 | 34 | 234 | 2.20 | 10.8 | 30 | 213 | 1.81 | 9.8 | 27 |
| 302 | | 324 | 4.00 | 15.2 | 49 | 309 | 3.51 | 14.5 | 46 | 293 | 3.06 | 13.7 | 43 | 276 | 2.64 | 12.9 | 39 | 256 | 2.25 | 12.0 | 35 | 232 | 1.83 | 10.9 | 31 |
| 342 | | 361 | 3.88 | 16.9 | 42 | 344 | 3.41 | 16.1 | 39 | 327 | 2.97 | 15.3 | 35 | 307 | 2.57 | 14.4 | 32 | 286 | 2.20 | 13.4 | 28 | 259 | 1.80 | 12.1 | 24 |
| 372 | | 397 | 4.02 | 18.4 | 48 | 379 | 3.53 | 17.6 | 45 | 360 | 3.08 | 16.7 | 41 | 338 | 2.66 | 15.7 | 37 | 314 | 2.27 | 14.6 | 33 | 283 | 1.84 | 13.2 | 27 |
| 402 | | 430 | 3.75 | 20.2 | 56 | 411 | 3.30 | 19.3 | 52 | 390 | 2.87 | 18.3 | 48 | 367 | 2.49 | 17.2 | 43 | 342 | 2.13 | 16.0 | 38 | 311 | 1.74 | 14.6 | 32 |
| 432 | | 459 | 3.89 | 21.5 | 54 | 439 | 3.43 | 20.6 | 50 | 417 | 2.99 | 19.6 | 45 | 394 | 2.59 | 18.4 | 41 | 367 | 2.22 | 17.2 | 36 | 334 | 1.81 | 15.6 | 30 |
| 462 | | 489 | 3.71 | 22.9 | 61 | 467 | 3.26 | 21.9 | 56 | 445 | 2.85 | 20.8 | 51 | 419 | 2.48 | 19.6 | 46 | 390 | 2.13 | 18.3 | 40 | 355 | 1.74 | 16.6 | 33 |
| 522 | | 546 | 3.69 | 26.1 | 77 | 522 | 3.26 | 24.9 | 71 | 497 | 2.85 | 23.7 | 65 | 468 | 2.48 | 22.3 | 58 | 437 | 2.13 | 20.8 | 51 | 398 | 1.75 | 19.0 | 43 |
| 602 | | 665 | 3.93 | 30.9 | 45 | 635 | 3.45 | 29.5 | 41 | 603 | 3.02 | 28.0 | 38 | 568 | 2.61 | 26.4 | 34 | 529 | 2.24 | 24.6 | 30 | 481 | 1.84 | 22.4 | 25 |
| 672 | | 719 | 3.87 | 33.7 | 53 | 686 | 3.40 | 32.2 | 48 | 652 | 2.97 | 30.5 | 44 | 614 | 2.57 | 28.8 | 39 | 573 | 2.21 | 26.8 | 35 | 522 | 1.82 | 24.4 | 29 |
| 732 | | 778 | 3.73 | 36.5 | 61 | 743 | 3.29 | 34.8 | 56 | 706 | 2.88 | 33.1 | 51 | 664 | 2.50 | 31.1 | 46 | 620 | 2.15 | 29.0 | 40 | 564 | 1.77 | 26.4 | 34 |
| 802 | | 846 | 3.70 | 39.2 | 70 | 807 | 3.27 | 37.4 | 64 | 767 | 2.86 | 35.6 | 58 | 722 | 2.48 | 33.5 | 52 | 673 | 2.13 | 31.2 | 46 | 613 | 1.75 | 28.4 | 38 |
| 162 | 7 | 189 | 4.57 | 8.9 | 23 | 180 | 3.98 | 8.5 | 21 | 171 | 3.45 | 8.0 | 20 | 161 | 2.96 | 7.6 | 18 | 149 | 2.50 | 7.0 | 16 | 134 | 2.00 | 6.3 | 14 |
| 182 | | 210 | 4.44 | 9.8 | 26 | 200 | 3.91 | 9.4 | 24 | 190 | 3.42 | 8.9 | 23 | 179 | 2.96 | 8.4 | 21 | 166 | 2.51 | 7.8 | 19 | 149 | 2.03 | 7.0 | 16 |
| 202 | | 228 | 4.05 | 10.8 | 30 | 217 | 3.58 | 10.4 | 28 | 207 | 3.13 | 9.8 | 26 | 195 | 2.72 | 9.3 | 24 | 181 | 2.33 | 8.6 | 22 | 165 | 1.91 | 7.8 | 19 |
| 232 | | 262 | 4.56 | 12.3 | 36 | 251 | 4.01 | 11.8 | 34 | 238 | 3.50 | 11.2 | 31 | 225 | 3.02 | 10.6 | 29 | 210 | 2.58 | 9.9 | 26 | 190 | 2.08 | 8.9 | 23 |
| 262 | | 314 | 4.00 | 14.5 | 45 | 299 | 3.52 | 13.8 | 42 | 284 | 3.08 | 13.1 | 39 | 267 | 2.67 | 12.4 | 36 | 249 | 2.29 | 11.5 | 33 | 227 | 1.88 | 10.5 | 29 |
| 302 | | 342 | 4.12 | 16.0 | 52 | 327 | 3.62 | 15.3 | 49 | 311 | 3.17 | 14.6 | 46 | 293 | 2.75 | 13.7 | 42 | 273 | 2.36 | 12.8 | 38 | 248 | 1.92 | 11.6 | 33 |
| 342 | | 383 | 3.99 | 18.0 | 46 | 366 | 3.52 | 17.2 | 42 | 348 | 3.08 | 16.3 | 39 | 327 | 2.67 | 15.3 | 35 | 304 | 2.29 | 14.3 | 31 | 276 | 1.88 | 13.0 | 26 |
| 372 | | 424 | 4.19 | 19.7 | 53 | 405 | 3.68 | 18.8 | 49 | 384 | 3.21 | 17.8 | 45 | 361 | 2.78 | 16.8 | 41 | 336 | 2.37 | 15.6 | 36 | 304 | 1.93 | 14.1 | 30 |
| 402 | | 457 | 3.88 | 21.5 | 62 | 437 | 3.42 | 20.5 | 57 | 415 | 2.98 | 19.5 | 52 | 390 | 2.58 | 18.3 | 47 | 364 | 2.22 | 17.1 | 42 | 331 | 1.82 | 15.5 | 36 |
| 432 | | 482 | 4.00 | 22.6 | 59 | 462 | 3.53 | 21.7 | 54 | 441 | 3.10 | 20.7 | 50 | 417 | 2.69 | 19.6 | 45 | 390 | 2.31 | 18.3 | 40 | 356 | 1.90 | 16.7 | 33 |
| 462 | | 521 | 3.83 | 24.5 | 68 | 498 | 3.38 | 23.4 | 62 | 474 | 2.96 | 22.2 | 57 | 446 | 2.57 | 21.0 | 51 | 417 | 2.21 | 19.5 | 45 | 380 | 1.82 | 17.8 | 38 |
| 522 | | 579 | 3.81 | 27.7 | 85 | 553 | 3.36 | 26.4 | 78 | 527 | 2.95 | 25.2 | 72 | 497 | 2.57 | 23.7 | 64 | 465 | 2.21 | 22.2 | 57 | 424 | 1.83 | 20.3 | 48 |
| 602 | | 708 | 4.05 | 33.0 | 50 | 676 | 3.57 | 31.5 | 46 | 641 | 3.12 | 29.8 | 42 | 602 | 2.70 | 28.0 | 37 | 562 | 2.32 | 26.1 | 33 | 511 | 1.91 | 23.8 | 27 |
| 672 | | 760 | 3.98 | 35.7 | 58 | 727 | 3.51 | 34.1 | 53 | 691 | 3.07 | 32.4 | 48 | 651 | 2.67 | 30.5 | 43 | 608 | 2.29 | 28.5 | 38 | 555 | 1.89 | 26.0 | 32 |
| 732 | | 828 | 3.86 | 38.9 | 68 | 790 | 3.40 | 37.1 | 62 | 749 | 2.97 | 35.2 | 56 | 705 | 2.58 | 33.1 | 50 | 657 | 2.22 | 30.8 | 44 | 599 | 1.83 | 28.1 | 37 |
| 802 | | 900 | 3.83 | 41.8 | 77 | 859 | 3.37 | 39.9 | 71 | 814 | 2.95 | 37.8 | 64 | 766 | 2.56 | 35.6 | 57 | 715 | 2.21 | 33.2 | 51 | 651 | 1.82 | 30.2 | 43 |
| 162 | 10 | 206 | 4.86 | 9.7 | 25 | 196 | 4.27 | 9.2 | 23 | 186 | 3.70 | 8.7 | 22 | 175 | 3.18 | 8.2 | 20 | 163 | 2.69 | 7.6 | 18 | 147 | 2.17 | 6.9 | 16 |
| 182 | | 231 | 4.74 | 10.9 | 30 | 221 | 4.19 | 10.4 | 28 | 211 | 3.67 | 9.9 | 26 | 199 | 3.18 | 9.3 | 24 | 185 | 2.73 | 8.7 | 22 | 168 | 2.24 | 7.9 | 19 |
| 202 | | 250 | 4.29 | 11.9 | 34 | 239 | 3.79 | 11.4 | 32 | 227 | 3.32 | 10.8 | 29 | 215 | 2.90 | 10.2 | 27 | 201 | 2.50 | 9.6 | 25 | 182 | 2.05 | 8.7 | 22 |
| 232 | | 282 | 4.77 | 13.3 | 39 | 270 | 4.19 | 12.7 | 37 | 256 | 3.66 | 12.1 | 34 | 242 | 3.17 | 11.4 | 32 | 225 | 2.71 | 10.6 | 29 | 204 | 2.21 | 9.6 | 25 |
| 262 | | 341 | 4.17 | 15.8 | 50 | 326 | 3.67 | 15.1 | 47 | 309 | 3.21 | 14.3 | 44 | 291 | 2.79 | 13.5 | 40 | 271 | 2.40 | 12.6 | 36 | 247 | 1.98 | 11.4 | 32 |
| 302 | | 377 | 4.35 | 17.7 | 59 | 360 | 3.83 | 16.9 | 55 | 342 | 3.35 | 16.1 | 51 | 322 | 2.90 | 15.1 | 47 | 300 | 2.49 | 14.1 | 43 | 273 | 2.05 | 12.8 | 37 |
| 342 | | 421 | 4.16 | 19.8 | 53 | 402 | 3.67 | 18.9 | 49 | 381 | 3.22 | 17.9 | 45 | 358 | 2.80 | 16.8 | 40 | 333 | 2.41 | 15.7 | 36 | 303 | 1.99 | 14.2 | 30 |
| 372 | | 467 | 4.42 | 21.8 | 62 | 446 | 3.89 | 20.8 | 57 | 423 | 3.40 | 19.7 | 52 | 398 | 2.95 | 18.5 | 47 | 370 | 2.52 | 17.2 | 42 | 334 | 2.06 | 15.6 | 35 |
| 402 | | 500 | 4.05 | 23.5 | 71 | 478 | 3.57 | 22.5 | 65 | 454 | 3.13 | 21.4 | 60 | 427 | 2.72 | 20.1 | 54 | 398 | 2.34 | 18.7 | 48 | 362 | 1.93 | 17.0 | 41 |
| 432 | | 526 | 4.19 | 24.7 | 68 | 505 | 3.71 | 23.7 | 63 | 482 | 3.25 | 22.7 | 58 | 455 | 2.83 | 21.4 | 52 | 426 | 2.44 | 20.0 | 46 | 389 | 2.01 | 18.3 | 39 |
| 462 | | 571 | 4.00 | 26.9 | 79 | 547 | 3.54 | 25.7 | 73 | 520 | 3.10 | 24.5 | 67 | 489 | 2.70 | 23.0 | 59 | 455 | 2.32 | 21.4 | 52 | 415 | 1.92 | 19.5 | 44 |
| 522 | | 632 | 3.97 | 30.3 | 99 | 605 | 3.51 | 29.0 | 91 | 575 | 3.08 | 27.6 | 83 | 541 | 2.69 | 25.9 | 74 | 504 | 2.31 | 24.1 | 65 | 460 | 1.92 | 22.0 | 55 |
| 602 | | 776 | 4.23 | 36.2 | 58 | 740 | 3.73 | 34.5 | 53 | 703 | 3.26 | 32.7 | 48 | 659 | 2.84 | 30.7 | 43 | 613 | 2.44 | 28.6 | 38 | 557 | 2.01 | 25.9 | 32 |
| 672 | | 826 | 4.15 | 38.8 | 66 | 790 | 3.66 | 37.1 | 61 | 751 | 3.21 | 35.3 | 56 | 708 | 2.79 | 33.2 | 50 | 661 | 2.41 | 31.1 | 44 | 604 | 1.99 | 28.4 | 37 |
| 732 | | 909 | 4.04 | 42.8 | 79 | 868 | 3.57 | 40.8 | 73 | 824 | 3.12 | 38.7 | 66 | 773 | 2.71 | 36.3 | 59 | 719 | 2.33 | 33.8 | 51 | 654 | 1.92 | 30.7 | 43 |
| 802 | | 989 | 4.01 | 46.1 | 91 | 944 | 3.54 | 44.0 | 83 | 896 | 3.10 | 41.7 | 76 | 841 | 2.70 | 39.1 | 67 | 782 | 2.32 | 36.3 | 59 | 711 | 1.91 | 33.0 | 49 |

Legend

LWT Leaving water temperature, °C
 Qc Cooling capacity, kW
 EER Energy efficiency ratio, kW/kW
 q Evaporator water flow rate, l/s
 Δp Evaporator pressure drop, kPa

Application data

Standard units, refrigerant: R-410A
 Evaporator entering/leaving water temperature difference: 5 K
 Evaporator fluid: chilled water
 Fouling factor: 0.18 x 10⁻⁴ (m² K)/W

Performances in accordance with EN14511-3:2011.

Cooling capacities

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

| LWT °C | | Condenser entering air temperature, °C | | | | | | | | | | | | | | | | | | | | | | | |
|-----------|----|--|--------------|----------|-----------|----------|--------------|----------|-----------|----------|--------------|----------|-----------|----------|--------------|----------|-----------|----------|--------------|----------|-----------|----------|--------------|----------|-----------|
| | | 20 | | | | 25 | | | | 30 | | | | 35 | | | | 40 | | | | 46 | | | |
| | | Qc kW | EER kW/kW | q l/s | Δp kPa | Qc kW | EER kW/kW | q l/s | Δp kPa | Qc kW | EER kW/kW | q l/s | Δp kPa | Qc kW | EER kW/kW | q l/s | Δp kPa | Qc kW | EER kW/kW | q l/s | Δp kPa | Qc kW | EER kW/kW | q l/s | Δp kPa |
| 162 | 5 | 177 | 4.37 | 8.3 | 21 | 169 | 3.81 | 7.9 | 19 | 160 | 3.29 | 7.5 | 18 | 150 | 2.81 | 7.0 | 17 | 139 | 2.36 | 6.5 | 15 | 125 | 1.88 | 5.8 | 13 |
| 182 | | 193 | 4.24 | 9.0 | 23 | 184 | 3.72 | 8.6 | 22 | 175 | 3.23 | 8.1 | 20 | 164 | 2.78 | 7.7 | 19 | 153 | 2.36 | 7.1 | 17 | 137 | 1.91 | 6.4 | 15 |
| 202 | | 214 | 3.95 | 10.1 | 28 | 204 | 3.47 | 9.7 | 26 | 194 | 3.02 | 9.2 | 24 | 182 | 2.62 | 8.7 | 22 | 170 | 2.24 | 8.1 | 20 | 155 | 1.84 | 7.3 | 18 |
| 232 | | 252 | 4.52 | 11.8 | 34 | 241 | 3.96 | 11.2 | 32 | 229 | 3.44 | 10.7 | 30 | 215 | 2.95 | 10.1 | 27 | 200 | 2.50 | 9.3 | 25 | 179 | 2.00 | 8.4 | 21 |
| 262 | | 297 | 3.95 | 13.7 | 42 | 283 | 3.46 | 13.1 | 40 | 269 | 3.01 | 12.4 | 37 | 253 | 2.60 | 11.6 | 34 | 235 | 2.23 | 10.8 | 30 | 214 | 1.82 | 9.8 | 27 |
| 302 | | 325 | 4.08 | 15.2 | 49 | 310 | 3.58 | 14.5 | 46 | 294 | 3.11 | 13.7 | 43 | 277 | 2.68 | 12.9 | 39 | 257 | 2.28 | 12.0 | 35 | 233 | 1.85 | 10.9 | 31 |
| 342 | | 362 | 3.94 | 16.9 | 42 | 345 | 3.46 | 16.1 | 39 | 328 | 3.01 | 15.3 | 35 | 308 | 2.60 | 14.4 | 32 | 287 | 2.22 | 13.4 | 28 | 260 | 1.81 | 12.1 | 24 |
| 372 | | 398 | 4.10 | 18.4 | 48 | 380 | 3.59 | 17.6 | 45 | 361 | 3.12 | 16.7 | 41 | 339 | 2.69 | 15.7 | 37 | 315 | 2.29 | 14.6 | 33 | 284 | 1.86 | 13.2 | 27 |
| 402 | | 432 | 3.83 | 20.2 | 56 | 413 | 3.36 | 19.3 | 52 | 392 | 2.92 | 18.3 | 48 | 369 | 2.52 | 17.2 | 43 | 343 | 2.15 | 16.0 | 38 | 312 | 1.76 | 14.6 | 32 |
| 432 | | 461 | 3.97 | 21.5 | 54 | 441 | 3.49 | 20.6 | 50 | 419 | 3.04 | 19.6 | 45 | 395 | 2.62 | 18.4 | 41 | 369 | 2.25 | 17.2 | 36 | 335 | 1.83 | 15.6 | 30 |
| 462 | | 491 | 3.79 | 22.9 | 61 | 469 | 3.32 | 21.9 | 56 | 446 | 2.90 | 20.8 | 51 | 420 | 2.51 | 19.6 | 46 | 392 | 2.15 | 18.3 | 40 | 356 | 1.76 | 16.6 | 33 |
| 522 | | 549 | 3.79 | 26.1 | 77 | 525 | 3.33 | 24.9 | 71 | 499 | 2.91 | 23.7 | 65 | 471 | 2.52 | 22.3 | 58 | 439 | 2.16 | 20.8 | 51 | 400 | 1.77 | 19.0 | 43 |
| 602 | | 667 | 3.99 | 30.9 | 45 | 637 | 3.50 | 29.5 | 41 | 605 | 3.05 | 28.0 | 38 | 570 | 2.64 | 26.4 | 34 | 531 | 2.26 | 24.6 | 30 | 483 | 1.85 | 22.4 | 25 |
| 672 | | 722 | 3.94 | 33.7 | 53 | 689 | 3.46 | 32.2 | 48 | 654 | 3.01 | 30.5 | 44 | 616 | 2.60 | 28.8 | 39 | 575 | 2.23 | 26.8 | 35 | 523 | 1.83 | 24.4 | 29 |
| 732 | | 781 | 3.81 | 36.5 | 61 | 746 | 3.35 | 34.8 | 56 | 708 | 2.92 | 33.1 | 51 | 666 | 2.53 | 31.1 | 46 | 621 | 2.17 | 29.0 | 40 | 566 | 1.78 | 26.4 | 34 |
| 802 | | 850 | 3.79 | 39.2 | 70 | 811 | 3.33 | 37.4 | 64 | 770 | 2.90 | 35.6 | 58 | 725 | 2.51 | 33.5 | 52 | 675 | 2.15 | 31.2 | 46 | 614 | 1.77 | 28.4 | 38 |
| 162 | 7 | 190 | 4.64 | 8.9 | 23 | 181 | 4.04 | 8.5 | 21 | 172 | 3.49 | 8.0 | 20 | 162 | 2.99 | 7.6 | 18 | 150 | 2.52 | 7.0 | 16 | 134 | 2.01 | 6.3 | 14 |
| 182 | | 210 | 4.51 | 9.8 | 26 | 201 | 3.96 | 9.4 | 24 | 190 | 3.46 | 8.9 | 23 | 179 | 2.99 | 8.4 | 21 | 166 | 2.54 | 7.8 | 19 | 150 | 2.05 | 7.0 | 16 |
| 202 | | 228 | 4.12 | 10.8 | 30 | 218 | 3.63 | 10.4 | 28 | 207 | 3.17 | 9.8 | 26 | 195 | 2.75 | 9.3 | 24 | 182 | 2.35 | 8.6 | 22 | 165 | 1.93 | 7.8 | 19 |
| 232 | | 263 | 4.65 | 12.3 | 36 | 251 | 4.07 | 11.8 | 34 | 239 | 3.55 | 11.2 | 31 | 226 | 3.06 | 10.6 | 29 | 211 | 2.61 | 9.9 | 26 | 190 | 2.10 | 8.9 | 23 |
| 262 | | 315 | 4.08 | 14.5 | 45 | 300 | 3.58 | 13.8 | 42 | 285 | 3.12 | 13.1 | 39 | 268 | 2.70 | 12.4 | 36 | 250 | 2.31 | 11.5 | 33 | 227 | 1.90 | 10.5 | 29 |
| 302 | | 343 | 4.21 | 16.0 | 52 | 328 | 3.69 | 15.3 | 49 | 312 | 3.22 | 14.6 | 46 | 294 | 2.78 | 13.7 | 42 | 274 | 2.38 | 12.8 | 38 | 249 | 1.94 | 11.6 | 33 |
| 342 | | 385 | 4.07 | 18.0 | 46 | 367 | 3.57 | 17.2 | 42 | 349 | 3.12 | 16.3 | 39 | 328 | 2.70 | 15.3 | 35 | 305 | 2.31 | 14.3 | 31 | 277 | 1.89 | 13.0 | 26 |
| 372 | | 426 | 4.28 | 19.7 | 53 | 406 | 3.75 | 18.8 | 49 | 386 | 3.26 | 17.8 | 45 | 362 | 2.81 | 16.8 | 41 | 337 | 2.40 | 15.6 | 36 | 305 | 1.95 | 14.1 | 30 |
| 402 | | 460 | 3.97 | 21.5 | 62 | 439 | 3.49 | 20.5 | 57 | 417 | 3.03 | 19.5 | 52 | 392 | 2.62 | 18.3 | 47 | 365 | 2.24 | 17.1 | 42 | 332 | 1.84 | 15.5 | 36 |
| 432 | | 484 | 4.09 | 22.6 | 59 | 464 | 3.60 | 21.7 | 54 | 443 | 3.15 | 20.7 | 50 | 419 | 2.73 | 19.6 | 45 | 392 | 2.34 | 18.3 | 40 | 357 | 1.92 | 16.7 | 33 |
| 462 | | 523 | 3.92 | 24.5 | 68 | 500 | 3.45 | 23.4 | 62 | 476 | 3.01 | 22.2 | 57 | 448 | 2.61 | 21.0 | 51 | 418 | 2.24 | 19.5 | 45 | 381 | 1.84 | 17.8 | 38 |
| 522 | | 582 | 3.92 | 27.7 | 85 | 556 | 3.45 | 26.4 | 78 | 529 | 3.01 | 25.2 | 72 | 499 | 2.61 | 23.7 | 64 | 467 | 2.24 | 22.2 | 57 | 426 | 1.85 | 20.3 | 48 |
| 602 | | 711 | 4.13 | 33.0 | 50 | 678 | 3.62 | 31.5 | 46 | 643 | 3.16 | 29.8 | 42 | 604 | 2.73 | 28.0 | 37 | 563 | 2.34 | 26.1 | 33 | 512 | 1.93 | 23.8 | 27 |
| 672 | | 763 | 4.07 | 35.7 | 58 | 730 | 3.57 | 34.1 | 53 | 694 | 3.12 | 32.4 | 48 | 653 | 2.70 | 30.5 | 43 | 610 | 2.32 | 28.5 | 38 | 556 | 1.90 | 26.0 | 32 |
| 732 | | 832 | 3.95 | 38.9 | 68 | 793 | 3.47 | 37.1 | 62 | 752 | 3.02 | 35.2 | 56 | 707 | 2.61 | 33.1 | 50 | 660 | 2.24 | 30.8 | 44 | 601 | 1.85 | 28.1 | 37 |
| 802 | | 905 | 3.92 | 41.8 | 77 | 863 | 3.44 | 39.9 | 71 | 818 | 3.00 | 37.8 | 64 | 769 | 2.60 | 35.6 | 57 | 717 | 2.23 | 33.2 | 51 | 653 | 1.84 | 30.2 | 43 |
| 162 | 10 | 206 | 4.94 | 9.7 | 25 | 197 | 4.34 | 9.2 | 23 | 187 | 3.75 | 8.7 | 22 | 176 | 3.22 | 8.2 | 20 | 163 | 2.72 | 7.6 | 18 | 147 | 2.18 | 6.9 | 16 |
| 182 | | 232 | 4.82 | 10.9 | 30 | 222 | 4.25 | 10.4 | 28 | 211 | 3.72 | 9.9 | 26 | 199 | 3.22 | 9.3 | 24 | 186 | 2.76 | 8.7 | 22 | 168 | 2.26 | 7.9 | 19 |
| 202 | | 250 | 4.36 | 11.9 | 34 | 239 | 3.85 | 11.4 | 32 | 228 | 3.37 | 10.8 | 29 | 215 | 2.93 | 10.2 | 27 | 201 | 2.52 | 9.6 | 25 | 183 | 2.07 | 8.7 | 22 |
| 232 | | 283 | 4.86 | 13.3 | 39 | 270 | 4.27 | 12.7 | 37 | 257 | 3.72 | 12.1 | 34 | 243 | 3.21 | 11.4 | 32 | 226 | 2.74 | 10.6 | 29 | 205 | 2.23 | 9.6 | 25 |
| 262 | | 343 | 4.25 | 15.8 | 50 | 327 | 3.74 | 15.1 | 47 | 310 | 3.26 | 14.3 | 44 | 292 | 2.83 | 13.5 | 40 | 272 | 2.43 | 12.6 | 36 | 248 | 2.00 | 11.4 | 32 |
| 302 | | 379 | 4.46 | 17.7 | 59 | 362 | 3.91 | 16.9 | 55 | 344 | 3.41 | 16.1 | 51 | 323 | 2.94 | 15.1 | 47 | 302 | 2.53 | 14.1 | 43 | 274 | 2.07 | 12.8 | 37 |
| 342 | | 423 | 4.25 | 19.8 | 53 | 403 | 3.74 | 18.9 | 49 | 383 | 3.27 | 17.9 | 45 | 359 | 2.83 | 16.8 | 40 | 334 | 2.43 | 15.7 | 36 | 304 | 2.01 | 14.2 | 30 |
| 372 | | 470 | 4.53 | 21.8 | 62 | 448 | 3.98 | 20.8 | 57 | 425 | 3.46 | 19.7 | 52 | 399 | 2.99 | 18.5 | 47 | 371 | 2.56 | 17.2 | 42 | 335 | 2.08 | 15.6 | 35 |
| 402 | | 503 | 4.15 | 23.5 | 71 | 480 | 3.65 | 22.5 | 65 | 456 | 3.19 | 21.4 | 60 | 429 | 2.76 | 20.1 | 54 | 399 | 2.37 | 18.7 | 48 | 364 | 1.95 | 17.0 | 41 |
| 432 | | 529 | 4.30 | 24.7 | 68 | 507 | 3.79 | 23.7 | 63 | 484 | 3.31 | 22.7 | 58 | 457 | 2.88 | 21.4 | 52 | 428 | 2.47 | 20.0 | 46 | 390 | 2.03 | 18.3 | 39 |
| 462 | | 575 | 4.12 | 26.9 | 79 | 550 | 3.62 | 25.7 | 73 | 523 | 3.16 | 24.5 | 67 | 491 | 2.74 | 23.0 | 59 | 457 | 2.35 | 21.4 | 52 | 416 | 1.94 | 19.5 | 44 |
| 522 | | 636 | 4.11 | 30.3 | 99 | 609 | 3.62 | 29.0 | 91 | 579 | 3.16 | 27.6 | 83 | 544 | 2.74 | 25.9 | 74 | 506 | 2.35 | 24.1 | 65 | 462 | 1.94 | 22.0 | 55 |
| 602 | | 779 | 4.32 | 36.2 | 58 | 743 | 3.80 | 34.5 | 53 | 705 | 3.31 | 32.7 | 48 | 661 | 2.87 | 30.7 | 43 | 615 | 2.47 | 28.6 | 38 | 559 | 2.03 | 25.9 | 32 |
| 672 | | 830 | 4.25 | 38.8 | 66 | 793 | 3.74 | 37.1 | 61 | 754 | 3.26 | 35.3 | 56 | 710 | 2.83 | 33.2 | 50 | 663 | 2.44 | 31.1 | 44 | 606 | 2.01 | 28.4 | 37 |
| 732 | | 914 | 4.15 | 42.8 | 79 | 872 | 3.65 | 40.8 | 73 | 827 | 3.18 | 38.7 | 66 | 776 | 2.76 | 36.3 | 59 | 721 | 2.36 | 33.8 | 51 | 656 | 1.94 | 30.7 | 43 |
| 802 | | 995 | 4.13 | 46.1 | 91 | 950 | 3.63 | 44.0 | 83 | 901 | 3.17 | 41.7 | 76 | 845 | 2.74 | 39.1 | 67 | 785 | 2.35 | 36.3 | 59 | 714 | 1.93 | 33.0 | 49 |

Legend

LWT Leaving water temperature, °C
 Qc Cooling capacity, kW
 EER Energy efficiency ratio, kW/kW
 q Evaporator water flow rate, l/s
 Δp Evaporator pressure drop, kPa

Application data

Standard units, refrigerant: R-410A
 Evaporator entering/leaving water temperature difference: 5 K
 Evaporator fluid: chilled water
 Fouling factor: 0.18 x 10⁻⁴ (m² 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.



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.