

# PRODUCT SELECTION DATA



- Compact design
- High static available pressure
  - Quiet operation
  - Variable speed fans
- Variable water flow (optional)

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

# 30RBSY 039-160/30RQSY 039-160





# 30RBSY 039-160/30RQSY 039-160

Nominal cooling capacity 30RBSY: 40-153 kW Nominal cooling capacity 30RQSY: 37-147 kW Nominal heating capacity 30RQSY: 42-159 kW

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

It integrates the latest technological innovations:

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

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

#### **Features**

### **Quiet operation**

- Compressors
  - Low-noise scroll compressors with low vibration level
  - The compressor assembly is installed on an independent chassis and supported by anti-vibration mountings
  - Dynamic suction and discharge piping support, minimising vibration transmission (Carrier patent)
- Condenser (30RBSY)/air evaporator/condenser (30RQSY) section
  - Vertical condenser coils
  - Protection grilles on anti-vibration mountings to protect the heat exchanger against possible shocks (30RBSY 090-160 (optional) and 30RQSY 080-160 only). Low-noise latest-generation Flying Bird IV fans, made of
  - a composite material (Carrier patent) are now even quieter and do not generate intrusive low-frequency noise
  - Fan motor controlled by a variable-frequency controller, to allow adjustment of the fan speed in accordance with the ducting for optimised efficiency.
  - Rigid fan installation for reduced start-up noise (Carrier patent)

#### Easy and fast installation

- Physical features
  - Flying Bird IV fans controlled by a variable-frequency controller to provide up to 240 Pa available pressure (depending on the size) at nominal flow rate
  - Flow control in accordance with the ducting for optimised efficiency with the possibility to program a maximum supply air flow.
  - Supply air duct connection frame.
  - Suction air connection frame standard for sizes 30RBSY 039-080 and 30RQSY 039-078
  - Suction air filters optional (30RBSY 039-080 and 30RQSY 039-078 only)
  - Small unit footprint with a low height (1371 mm) for easy installation in most buildings
  - The unit is enclosed by easily removable panels, covering all components (except air heat exchanger and fans).

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

## Hydronic module



- Single or dual water pump (as required) with operating time balancing and automatic changeover to the back-up pump if a fault develops
- Water filter protects the water pump against circulating debris
- Pressure measurement, using two pressure transducers and allowing indication of water flow rate, water pressure and lack of water.
- High-capacity membrane expansion tank ensures pressurisation of the water circuit
- Overpressure valve, set to 4 bar
- Speed variator on the pumps (option) to ensure the correct flow rate, based on the system requirements
- Thermal insulation and frost protection down to -20°C, using an electric resistance heater (see table of options)
- Simplified electrical connections
  - A single power supply point without neutral
  - Main disconnect switch (option 70) with high trip capacity Transformer for safe 24 V control circuit supply included
- Fast commissioning
  - Systematic factory operation test before shipment
  - Quick-test function for step-by-step verification of the instruments, electrical components and motors

# **Economical operation**

- Variable-speed pump (option)
  - The control algorithm adjusts the water flow rate in accordance with the actual system requirements. This saves energy and makes the flow control valve unnecessary.
- Variable-speed fan
  - Variable-speed ventilation permits adjustment to any duct type and variation of the air flow rate for maximised unit ÉERs and COPs under any operating conditions.

- Increased energy efficiency at part load
  - Eurovent energy efficiency class A and B in cooling mode and A in heating mode (in accordance with EN14511-3:2013)
  - The refrigerant circuit includes several compressors connected in parallel. At part load, around 99% of the operating time, only the compressors that are absolutely necessary operate. At these conditions the compressors operating are more energy efficient, as they use the total condenser and evaporator capacity.
  - The electronic expansion device (ÉXV) allows operation at a lower condensing pressure (EER, COP and ESEER, SCOP optimisation).
  - Dynamic superheat management for better utilisation of the water heat exchanger surface.
  - Defrost cycle optimisation (30RQSY)
- Reduced maintenance costs
  - Maintenance-free scroll compressors
  - Fast diagnosis of possible incidents and their history via the Touch Pilot Junior control
  - R410A refrigerant is easier to use than other refrigerant blends

#### **Environmental care**

- Ozone-friendly R410A refrigerant
  - Chlorine-free refrigerant of the HFC group with zero ozone depletion potential
  - Very efficient gives an increased energy efficiency ratio (EER, COP and ESEER)
  - 50% reduction in the refrigerant charge through the use of micro-channel heat exchangers for the cooling only units (30RBSY)
- Leak-tight refrigerant circuit
  - Brazed refrigerant connections for increased leaktightness
  - Reduction of leaks due to reduced vibration levels and elimination of capillary tubes (TXVs)
  - Verification of pressure transducers and temperature sensors without transferring refrigerant charge

### Supply air connection frame



### **Superior reliability**

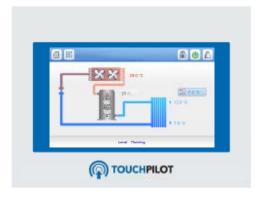
- State-of-the-art concept
  - Cooperation with specialist laboratories and use of limit simulation tools (finite element calculations) for the design of the critical components, e.g. motor supports, suction/ discharge piping etc.
  - All aluminium micro-channel heat exchanger (MCHE) on cooling only units (30RBSY), offers increased corrosion resistance compared to traditional coils. The all-aluminium design eliminates the formation of galvanic currents between aluminium and copper that cause coil corrosion.

- Auto-adaptive control
  - Control algorithm prevents excessive compressor cycling and permits reduction of the water quantity in the hydronic circuit (Carrier patent)
  - Hydronic module with integrated pressure transducers allowing measurement of the water pressure at two points, as well as measurement of the water flow rate and detection of lack of water and pressure. This considerably reduces the risk of problems such as frost accumulation on the water heat exchanger.
  - Automatic compressor unloading in case of abnormally high condensing pressure. If an anomaly occurs (e.g. fouled air heat exchanger coil, fan failure) Aquasnap continues to operate, but at reduced capacity.
- Exceptional endurance tests
  - Corrosion resistance tests in salt mist in the laboratory
  - Accelerated ageing test on components that are submitted to continuous operation: compressor piping, fan supports
  - Transport simulation test in the laboratory on a vibrating table.

#### **Touch Pilot Junior control**

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

- Energy management
  - Internal time schedule clock: Controls heat pump on/off times and operation at a second set-point
  - Set-point offset based on the outside air temperature
  - Master/slave control of two heat pumps operating in parallel with operating time equalisation and automatic changeover in case of a unit fault.
- Integrated advanced communication features
  - Night mode: Capacity and fan speed limitation for reduced noise level
  - With hydronic module: Water pressure display and water flow rate calculation
  - Easy and high-speed communication technology over Ethernet (IP) to a building management system
  - Access to multiple unit parameters.
- 4.3" Touch Pilot user interface



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

### Remote management (standard)

Units with Touch Pilot Junior control can be easily accessed from the internet, using a PC with an Ethernet connection. This makes remote control quick and easy and offers significant advantages for service operations.

The Aquasnap is equipped with an RS485 serial port that offers multiple remote control, monitoring and diagnostic possibilities. Carrier offers a vast choice of control products, specially designed to control, manage and supervise the operation of an air conditioning system. Please consult your Carrier representative for more information.

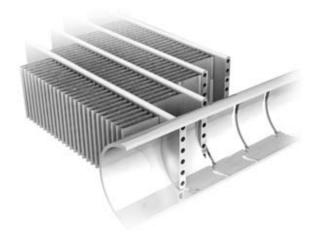
The Aquasnap also communicates with other building management systems via optional communication gateways.

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

### Variable fan speed controller



### All-aluminium micro-channel heat exchanger (MCHE)



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

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

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

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

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

# **Options**

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Multiple possibilities of vater flow control. For more details, refer to the dedicated chapter (expansion tank not included Option with builth as afterly hydraulic components available)  HP variable-speed dual-pump hydronic mod.  16W Dual high-pressure water pump with variable speed drive (VSD), water filter, electronic flow switch, pressure transducers, Multiple possibilities of vater flow control. For more details, refer to the dedicated chapter (expansion tank not included Option with builth as afterly hydraulic components available)  J-Bus gateway  18B Two-directional communication board complying with Lbu abulth as afterly hydraulic components available)  Lon gateway  18D Two-directional communication board complying with Lbu Taik builth as afterly hydraulic components available)  Bacnet over IP  19D Two-directional high-speed communication using BACnet protocol over Ethernet network (IP)  External boiler management  156B Control board factory-installed on the unit to control a boiler  Electric heaters management  156C Control board factory-installed on the unit with additional inputs of electrical heaters.  156D Control board factory-installed on the unit with additional inputs of electrics heaters. Which modifies the surface of the alumnum producing a coating that is integral to the coil. Complete management and to ensure 100% coverage. No heat transfer variation, tested 4000 hours constant neutral sail spray per ASTM B117, superior impact resistance, recommended for unput variation, tested 4000 hours constant neutral sail spray per ASTM B117, superior impact resistance per ASTM D2794  Evaporator cornection 2828 Pump variable frequency drive compliance to IEC 61800-3. C1 class  Reinforced ECM filtration for face 2828 Pump variable frequency drive compliance to IEC 61800-3. C1 class  Super Enviro-Shield  2828 Pump variable frequency drive compliance to IEC 61800-3. C1 class  Reinforced ECM filtration for face 2828 Pump variable frequency drive compliance to IEC 61800-3. C1 class  Super Enviro-Shield Struc					0011D0170011DQ01000100
the dedicated chapter (expansion tank not included Option with builth is affectly hydraulic components available) hydronic mod.  116W Jula high-pressure water pump with variable speed drive (VSD), water filter, electronic flow switch, pressure transducers. Multiple possibilities of water flow control. For more details, refer to the dedicated chapter (expansion tank not included Option with dedicated option with under other objects)  J-Bus gateway  148D Two-directional communication board complying with Lon Talk  Lon gateway  148D Two-directional communication board complying with Lon Talk  159 Two-directional ingh-speed communication using BACnet protocol over Etherente network (if)  150 Control board factory-installed on the unit to control a boiler protocol over Etherente network (if)  150 Control board factory-installed on the unit to control a boiler or outputs in order to manage up to 4 externals heating stage (electrical heaters.)  150 Control board factory-installed on the unit with additional input electrics heaters. Permits easy control of a basic heating system outputs in order to manage up to 4 externals heating stage (electrical heaters.)  150 Control board factory-installed on the unit with additional input electrics heaters. Permits easy control of a basic heating system of the protocol outputs in order to manage up to 4 externals heating stage (electrical heaters.)  150 Control board factory-installed on the unit with additional input electrics heaters. Permits easy control of a basic heating system outputs in order to manage up to 4 externals heating stage proper ASTM B117. Superior imersion in a bath to ensure 100% coverage. No heat transfer varia	nyaronio moa.				
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possibilities of water flow control. For more details, refer to the dedicated chapter (expansion tank not included Option with built-in safety hydraulic components available)  J-Bus gateway 1488 Two-directional communication board complying with JBus protocol  Lon gateway 1480 Two-directional communication board complying with JBus protocol  Lon gateway 1480 Two-directional communication board complying with JBus protocol  Bacnet over IP 149 Two-directional high-speed communication using BACnet protocol over Ethernet network (IP)  External boiler management 1560 Control board factory-installed on the unit unit ocortol a boiler commander laystem outputs in order to manage up to 4 externals beating stage electrical heaters)  Evering Shield anti-corrosion protection  Enviro-Shield anti-corrosion protection  Expansion reversible of a sub-feeding by conversion process which modifies the surface of the aluminum producing a coating that is integral to the coil. Complete immersion in a bath to ensure 100% coverage. No heat transfer variation, tested 4000 hours onatsant neutral satt syray per ASTM B117.  Expansion reversible (a reprince ECM filtration for an VFD  Reinforced ECM filtration for pump VFD  Expansion tank  282 Pump variable frequency drive compliance to IEC 61800-3 C1 allows unit installation in domestic residential environment by reducing electromagnetic interferences. Solos water systems. Allows unit installation in domestic residential environment by reducing electromagnetic interferences. Solos BSSV /30RBQSV 039-160 with environment by reducing electromagnetic interferences. Solos Basin stagilation in domestic residential environment by reducing electromagnetic interferences. Solos Basin stallation in domestic residential environment by reducing electromagnetic interferences. Solos Basin stallation in domestic residential environment by reducing electromagnetic interferences. Solos Basin stallation in domestic residential environment by reducing electromagnetic interferences. Solos Basin stallation in	HP variable-speed dual-pump	116W		Easy and fast installation (plug & play), significant	30RBSY / 30RBQSY 039-160
dedicated chapter (expansion tank not included Option with bulli-in safety hydraulic components available)  J-Bus gateway 1488 Two-directional communication board complying with JBus protocol  Lon gateway 1480 Two-directional communication board complying with Lon Talk protocol  Bacnet over IP 149 Two-directional communication board complying with Lon Talk protocol  External boiler management system  1564 Control board factory-installed on the unit to control a boiler control as being related to the unit by communication bus to a building management system  1564 Control board factory-installed on the unit to control a boiler control as being related to the unit by communication bus to a building management system  1564 Control board factory-installed on the unit to control a boiler control as being related to the unit by communication bus to a building management system  1565 Control board factory-installed on the unit to control a boiler control as being related to the unit by communication bus to a building management system  1564 Control board factory-installed on the unit to control a boiler control as being related to the unit by communication bus to a building management system.  1565 Control board factory-installed on the unit to control a boiler control as being related to the unit by communication bus to a building management system.  1566 Control board factory-installed on the unit to control a boiler control as being related to the con	hydronic mod.		water filter, electronic flow switch, pressure transducers. Multiple	pumping energy cost savings (more than two-thirds),	
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J-Bus gateway					
building management system  congateway  148B Two-directional communication board complying with Lon Talk protocol  Bacnet over IP  149 Two-directional high-speed communication using BACnet protocol over Ethernet network (IP)  External boiler management protocol over Ethernet network (IP)  156a Control board factory-installed on the unit to control a boiler outputs in order to manage up to 4 externals heating stage (electrical heaters.) Extended remote control capabilities to a boiler on/off command/Pemble sets youthol of a basic heating system  157b Control board factory-installed on the unit with additional inputs outputs in order to manage up to 4 externals heating stage (electrical heaters.) Extended remote control capabilities to up to 4 electrics heaters. Permits easy control of a basic heating system  157b Control board factory-installed on the unit with additional inputs outputs in order to manage up to 4 externals heating stage (electrical heaters.) Extended remote control capabilities to up to 4 electrics heaters. Permits easy control of a basic heating system  157b Control board factory-installed on the unit with additional inputs outputs in order to manage up to 4 externals heating stage (electrical heaters.) Extended remote control capabilities to up to 4 electrics heaters. Permits easy control of a basic heating system  157b Control board factory-installed on the unit with additional inputs outputs in order to manage up to 4 externals heating stage (electrical heaters.) Extended remote control capabilities to up to 4 electrics heaters. Permits easy control of a basic heating system  157b Control board factory-installed on the unit with additional inputs glave from the unit with additional inputs glave f					
Lab   Two-directional communication board complying with Lon Talk   Connects the unit by communication bus to a   SQRBSY/30RBQSY 039-160   building management system   Square   Connects the unit by communication bus to a   SQRBSY/30RBQSY 039-160   building management system   Square   Connects the unit by communication bus to a   SQRBSY/30RBQSY 039-160   Square   Squa	J-Bus gateway	148B			30RBSY / 30RBQSY 039-160
Bacnet over IP   149   Two-directional high-speed communication using BACnet protocol over Ethernet network (IP)   External boiler management   156a   Control board factory-installed on the unit to control a boiler management   156b   Control board factory-installed on the unit with additional inputs outputs in order to manage up to 4 externals heating stage (electrical heaters					
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Super Enviro-Shield anti-corrosion protection anti-corrosion protection anti-corrosion protection anti-corrosion protection  Evaporator screw connection sleeves  Welded evaporator connection kit  Reinforced ECM filtration for pump VFD  Reinforced ECM filtration for pump VFD  Expansion tank 2828  Pump variable frequency drive compliance to IEC 61800-3 C1 pump VFD  Set point adjustment by edit or option 116)  Set point adjustment by 4-20mA signal Free Cooling dry cooler  328 Extremely durable and flexible epoxy polymer coating applied on improved corrosion resistance, recommended for use in extremely corrosive environments use in extremely corrosive environments  30RBSY / 30RBQSY 039-160  Allows unit connection to a screw connector  30RBSY / 30RBQSY 039-160  Allows unit installation in domestic residential environment by reducing electromagnetic interferences  Allows unit installation in domestic residential environment by reducing electromagnetic interferences  Expansion tank  293 6 bar expansion tank integrated in the hydraulic module (require option 116)  Set point adjustment by 4-20mA signal  Free Cooling dry cooler  313 Control & connections to a Free Cooling Drycooler 09PE or  Allows unit installation (program pump VFD Easy system managment, Extended control  30RBSY / 30RBQSY 039-160  Allows unit installation in domestic residential environment by reducing electromagnetic interferences  30RBSY / 30RBQSY 039-160 with option 116V or 116W  30RBSY / 30RBQSY 039-160 with option 116V or 116W  30RBSY / 30RBQSY 039-160					
Super Enviro-Shield anti-corrosion protection  263 Extremely durable and flexible epoxy polymer coating applied on anti-corrosion protection protection anti-corrosion protection  264 Evaporator screw connection sleeves  265 Evaporator screw connection sleeves  266 Evaporator inlet/outlet screw connection sleeves  267 Evaporator connection sleeves  268 Evaporator inlet/outlet screw connection sleeves  269 Victaulic piping connections with welded joints  260 Victaulic piping connections with welded joints  260 Easy installation  261 Allows unit installation in domestic residential environment by reducing electromagnetic interferences  262 Fan variable frequency drive compliance to IEC 61800-3 C1 class  263 Extremely durable and flexible epoxy polymer coating applied on micro channel heat transfer variation, tested 6000 hours constant neutral salt spray per ASTM B117, superior impact resistance per ASTM D2794  264 Evaporator inlet/outlet screw connection sleeves  265 Victaulic piping connections with welded joints  266 Victaulic piping connections with welded joints  267 Easy installation  2882 Fan variable frequency drive compliance to IEC 61800-3 C1 environment by reducing electromagnetic interferences  2882 Pump variable frequency drive compliance to IEC 61800-3 C1 Allows unit installation in domestic residential environment by reducing electromagnetic interferences  2882 Expansion tank integrated in the hydraulic module (require option 116)  2883 G bar expansion tank integrated in the hydraulic module (require option 116)  2894 G bar expansion tank integrated in the hydraulic module (require option 116)  2895 G bar expansion to allow a 4-20mA signal input  2896 Easy energy managment, allow to adjust set point by a 4-20mA external signal  2897 (30RBSY) 30RBQSY 039-160  30RBSY) 30RBSY) 039-160  30RBSY) 30RBSY) 039-160  30RBSY) 30RBSY) 039-160				•	
anti-corrosion protection  micro channel heat exchangers by electro coating process, final UV protective topcoat. Minimal heat transfer variation, tested 6000 hours constant neutral salt spray per ASTM B117, superior impact resistance per ASTM D2794  Evaporator screw connection sleeves  Evaporator connection with testination for fan VFD  264 Evaporator inlet/outlet screw connection sleeves  Welded evaporator connection kit  Reinforced ECM filtration for fan VFD  282A Fan variable frequency drive compliance to IEC 61800-3 C1 class  Reinforced ECM filtration for pump VFD  282B Pump variable frequency drive compliance to IEC 61800-3 C1 class  282B Pump variable frequency drive compliance to IEC 61800-3 C1 class  282B Pump variable frequency drive compliance to IEC 61800-3 C1 class  282B Pump variable frequency drive compliance to IEC 61800-3 C1 class  282B Pump variable frequency drive compliance to IEC 61800-3 C1 class  282B Pump variable frequency drive compliance to IEC 61800-3 C1 class  282B Pump variable frequency drive compliance to IEC 61800-3 C1 class  282B Pump variable frequency drive compliance to IEC 61800-3 C1 class  282B Pump variable frequency drive compliance to IEC 61800-3 C1 class  282B Pump variable frequency drive compliance to IEC 61800-3 C1 class  282B Pump variable frequency drive compliance to IEC 61800-3 C1 class  282B Pump variable frequency drive compliance to IEC 61800-3 C1 class  282B Pump variable frequency drive compliance to IEC 61800-3 C1 class  282B Pump variable frequency drive compliance to IEC 61800-3 C1 class  282B Pump variable frequency drive compliance to IEC 61800-3 C1 class  282B Pump variable frequency drive compliance to IEC 61800-3 C1 class  282B Pump variable frequency drive compliance to IEC 61800-3 C1 class environment by reducing electromagnetic interferences environment by reducing electromagnetic interfe					
UV protective topcoat. Minimal heat transfer variation, tested 6000 hours constant neutral salt spray per ASTM B117, superior impact resistance per ASTM D2794  Evaporator screw connection sleeves  Evaporator connection sleeves  Welded evaporator connection kit  Reinforced ECM filtration for fan VFD  Reinforced ECM filtration for pump VFD  Reinforced ECM filtration for pump VFD  Reinforced ECM filtration for pump VFD  Sexpansion tank  282B Pump variable frequency drive compliance to IEC 61800-3 C1 class  Expansion tank  282B Pump variable frequency drive compliance to IEC 61800-3 C1 class  Reinforced ECM filtration for pump VFD  Sexpansion tank  282B Pump variable frequency drive compliance to IEC 61800-3 C1 class  Reinforced ECM filtration for pump VFD  Sexpansion tank  282B Control & Connections to allow a 4-20mA signal input  Expansion tank  283B Control & Connections to a Free Cooling Drycooler 09PE or  Easy system managment, Extended control  30RBSY/30RBQSY 039-160  Allows unit installation in domestic residential environment by reducing electromagnetic interferences option 116V or 116W or	Super Enviro-Shield	263	Extremely durable and flexible epoxy polymer coating applied on	Improved corrosion resistance, recommended for	30RBSY 039-160
Evaporator screw connection sleeves  Welded evaporator connection kit  Reinforced ECM filtration for fan VFD  Evaporator Serew connection for selection for class  Expension tank  Easy Days and Say	anti-corrosion protection			use in extremely corrosive environments	
Evaporator screw connection sleeves Seleeves Welded evaporator connection kit Reinforced ECM filtration for fan VFD  Reinforced ECM filtration for pump VFD Expansion tank 2828 Pump variable frequency drive compliance to IEC 61800-3 C1 class  Reinforced ECM filtration for pump VFD  Expansion tank 293 6 bar expansion tank integrated in the hydraulic module (require option 116)  Set point adjustment by 4-20mA signal Free Cooling dry cooler 308BSY/30RBQSY 039-160  Allows unit installation in domestic residential environment by reducing electromagnetic interferences Allows unit installation in domestic residential environment by reducing electromagnetic interferences  30RBSY/30RBQSY 039-160  30RBSY/30RBQSY 039-160  30RBSY/30RBQSY 039-160 with option 116V or 116W Easy and fast installation (plug & play), & Protection of closed water systems from excessive pressure  Easy energy managment, allow to adjust set point by a 4-20mA external signal Free Cooling dry cooler 313 Control & connections to a Free Cooling Drycooler 09PE or  Easy system managment, Extended control 30RBSY/30RBQSY 039-160					
Evaporator screw connection sleeves  Welded evaporator connection kit  Reinforced ECM filtration for fan VFD  Reinforced ECM filtration for pump VFD  Expansion tank  2828  Reynancion tank  2828  2828  Reynancion tank  2828  Reyna					
Sleeves  Welded evaporator connection kit  Reinforced ECM filtration for fan VFD  Reinforced ECM filtration for class  Reinforced ECM filtration for pump VFD  Reinforced				All S S S S	coppoy/coppos/
Welded evaporator connection kit Reinforced ECM filtration for fan VFD Reinforced ECM filtration for Class Reinforced ECM filtration for pump VFD Class Expansion tank PFD Reinforced ECM filtration for pump VFD Reinforced ECM filtration in domestic residential environment by reducing electromagnetic interferences Pasy and fast installation (plug & play), & Protection of closed water systems from excessive pressure Resy energy managment, allow to adjust set point by a 4-20mA external signal Reinforced ECM filtration for pump VFD Reinforced ECM filtration in domestic residential environment by reducing electromagnetic interferences Pasy and fast installation in domestic residential environment by reducing electromagnetic interferences Pasy and fast installation in domestic residential environment by reducing electromagnetic interferences Easy and fast installation in domestic residential environment by reducing electromagnetic interferences Easy and fast installation in domestic residential environment by reducing electromagnetic interferences Easy and fast installation in domestic residential environment by reducing electromagnetic interferences Easy and fast installation in domestic residential environment by reducing electromagnetic interferences Easy and fast installation in domestic resi		264	Evaporator inlet/outlet screw connection sleeves	Allows unit connection to a screw connector	30HBSY / 30HBQSY 039-160
kit Reinforced ECM filtration for fan VFD  282A Fan variable frequency drive compliance to IEC 61800-3 C1 class  Reinforced ECM filtration for pump VFD  Reinforced ECM filtration for pump VFD  282B Pump variable frequency drive compliance to IEC 61800-3 C1 and interferences  Reinforced ECM filtration for pump VFD  282B Pump variable frequency drive compliance to IEC 61800-3 C1 Allows unit installation in domestic residential environment by reducing electromagnetic interferences  class  282B Pump variable frequency drive compliance to IEC 61800-3 C1 Allows unit installation in domestic residential option of class  282B Pump variable frequency drive compliance to IEC 61800-3 C1 Allows unit installation in domestic residential option interferences  282B Pump variable frequency drive compliance to IEC 61800-3 C1 Allows unit installation in domestic residential option interferences  282B Pump variable frequency drive compliance to IEC 61800-3 C1 Allows unit installation in domestic residential option interferences  282B Pump variable frequency drive compliance to IEC 61800-3 C1 Allows unit installation in domestic residential option interferences  282B Pump variable frequency drive compliance to IEC 61800-3 C1 Allows unit installation in domestic residential option interferences  282B Pump variable frequency drive compliance to IEC 61800-3 C1 Allows unit installation in domestic residential option interferences  282B Pump variable frequency drive compliance to IEC 61800-3 C1 Allows unit installation in domestic residential option interferences  282B Pump variable frequency drive compliance to IEC 61800-3 C1 Allows unit installation in domestic residential option interferences  282B Pump variable frequency drive compliance to IEC 61800-3 C1 Allows unit installation in domestic residential option interferences  282B Pump variable frequency drive compliance to IEC 61800-3 C1 Allows unit installation in domestic residential option interferences environment to provide the privation option interferences and providence fre		266	Victorille piping connections with wolded isinte	Facy installation	30DBSV / 30DBOSV 030 160
Reinforced ECM filtration for fan VFD  282A Fan variable frequency drive compliance to IEC 61800-3 C1 Allows unit installation in domestic residential environment by reducing electromagnetic interferences  Reinforced ECM filtration for pump VFD  282B Pump variable frequency drive compliance to IEC 61800-3 C1 Allows unit installation in domestic residential environment by reducing electromagnetic interferences  Expansion tank  282B Pump variable frequency drive compliance to IEC 61800-3 C1 Allows unit installation in domestic residential environment by reducing electromagnetic interferences  Expansion tank  282B Pump variable frequency drive compliance to IEC 61800-3 C1 Allows unit installation in domestic residential environment by reducing electromagnetic interferences  Expansion tank  282B Pump variable frequency drive compliance to IEC 61800-3 C1 Allows unit installation in domestic residential environment by reducing electromagnetic interferences  Expansion tank  282B Pump variable frequency drive compliance to IEC 61800-3 C1 Allows unit installation in domestic residential environment by reducing electromagnetic interferences  Expansion tank  282B Pump variable frequency drive compliance to IEC 61800-3 C1 Allows unit installation in domestic residential environment by reducing electromagnetic interferences  Expansion tank  282B Pump variable frequency drive compliance to IEC 61800-3 C1 Allows unit installation in domestic residential environment by reducing electromagnetic interferences  Expansion tank  282B Pump variable frequency drive compliance to IEC 61800-3 C1 Allows unit installation in domestic residential environment by reducing electromagnetic interferences  Expansion tank  282B Pump variable frequency drive compliance to IEC 61800-3 C1 Allows unit installation in domestic residential environment by reducing electromagnetic interferences  282B Pump variable frequency diversed to IEC 61800-3 C1 Allows unit installation in domestic residential environment by reducing electromagnetic interferences		∠00	violaulic piping connections with weided joints	Lasy ilistaliation	001-601 100auno / 10auno
VFD  Class  class  environment by reducing electromagnetic interferences  Reinforced ECM filtration for pump VFD  Class  class  Expansion tank  282B  Expansion tank  293  6 bar expansion tank integrated in the hydraulic module (require option 116)  Set point adjustment by adjustment by 4-20mA signal  Free Cooling dry cooler  313  Control & connections to a Free Cooling Drycooler 09PE or  environment by reducing electromagnetic interferences option 116W and sometiment installation (plug & play), & Protection of closed water systems from excessive pressure  Easy energy managment, allow to adjust set point by a 4-20mA external signal  Free Cooling dry cooler  313  Control & connections to a Free Cooling Drycooler 09PE or  Easy system managment, Extended control  30RBSY 039-160		2824	Fan variable frequency drive compliance to IEC 61800-3 C1	Allows unit installation in domestic residential	30RBSY / 30RBOSY 030-160
Reinforced ECM filtration for pump VFD 282B Pump variable frequency drive compliance to IEC 61800-3 C1 Allows unit installation in domestic residential environment by reducing electromagnetic interferences option 116V or 116W option 116V or 116W environment by reducing electromagnetic interferences option 116V or 116W environment by reducing electromagnetic interferences option 116V or 116W environment by reducing electromagnetic interferences option 116V or 116W environment by reducing electromagnetic interferences option 116V or 116W environment by reducing electromagnetic interferences option 116V or 116W environment by reducing electromagnetic interferences option 116V or 116W environment by reducing electromagnetic interferences option 116V or 116W environment by reducing electromagnetic interferences option 116V or 116W environment by reducing electromagnetic interferences option 116V or 116W environment by reducing electromagnetic interferences option 116V or 116W environment by reducing electromagnetic interferences option 116V or 116W environment by reducing electromagnetic interferences option 116V or 116W environment by reducing electromagnetic interferences option 116V or 116W environment by reducing electromagnetic interferences option 116V or 116W environment by reducing electromagnetic interferences option 116V or 116W environment by reducing electromagnetic interferences option 116V or 116W environment by reducing electromagnetic interferences option 116V or 116W environment by reducing electromagnetic interferences option 116V or 116W environment by reducing electromagnetic interferences option 116V or 116W environment by reducing electromagnetic interferences option 116V or 116W environment by reducing electromagnetic interferences option 116V or 116W environment by reducing electromagnetic interferences option 116V or 116W environment by reducing electromagnetic interferences option 116V or 116W or		_U2A			55. (BC) / 66((BQO) 665-100
Reinforced ECM filtration for pump VFD class class  Expansion tank 293 6 bar expansion tank integrated in the hydraulic module (require option 116)  Set point adjustment by 4-20mA signal  Free Cooling dry cooler  313 Control & connections to a Free Cooling Drycooler 09PE or  Allows unit installation in domestic residential environment by reducing electromagnetic interferences option 116V or 116W  Easy and fast installation (plug & play), & Protection of closed water systems from excessive pressure  Easy energy managment, allow to adjust set point by a 4-20mA external signal  Free Cooling dry cooler  313 Control & connections to a Free Cooling Drycooler 09PE or  Allows unit installation in domestic residential environment by reducing electromagnetic interferences option 116V or 116W  Easy and fast installation (plug & play), & Protection of closed water systems from excessive pressure  Easy energy managment, allow to adjust set point by a 4-20mA external signal  Free Cooling dry cooler  30RBSY/30RBQSY 039-160					
pump VFD         class         environment by reducing electromagnetic interferences         option 116V or 116W           Expansion tank         293         6 bar expansion tank integrated in the hydraulic module (require option 116)         Easy and fast installation (plug & play), & Protection of closed water systems from excessive pressure           Set point adjustment by 4-20mA signal         31         Connections to allow a 4-20mA signal input 4-20mA external signal         Easy energy managment, allow to adjust set point by a 4-20mA external signal         30RBSY/30RBQSY 039-160           Free Cooling dry cooler         313         Control & connections to a Free Cooling Drycooler 09PE or         Easy system managment, Extended control         30RBSY 039-160	Reinforced ECM filtration for	282B	Pump variable frequency drive compliance to IEC 61800-3 C1		30RBSY / 30RBQSY 039-160 with
Expansion tank  293 6 bar expansion tank integrated in the hydraulic module (require option 116)  Easy and fast installation (plug & play), & Protection of closed water systems from excessive pressure  Set point adjustment by  4-20mA signal  Free Cooling dry cooler  313 Control & connections to a Free Cooling Drycooler 09PE or  Easy and fast installation (plug & play), & Protection of closed water systems from excessive pressure  Easy energy managment, allow to adjust set point by a 30RBSY/30RBQSY 039-160  4-20mA external signal  Free Cooling dry cooler  313 Control & connections to a Free Cooling Drycooler 09PE or  Easy system managment, Extended control  30RBSY 039-160			· · · · · · ·		
closed water systems from excessive pressure  Set point adjustment by 311 Connections to allow a 4-20mA signal input Easy energy management, allow to adjust set point by a 4-20mA signal  Free Cooling dry cooler 313 Control & connections to a Free Cooling Drycooler 09PE or Easy system management, Extended control 30RBSY 039-160	.1 1	293			
Set point adjustment by 4-20mA signal Free Cooling dry cooler 313 Connections to allow a 4-20mA signal input Easy energy managment, allow to adjust set point by a 30RBSY / 30RBQSY 039-160 4-20mA external signal 4-20mA external signal Easy system managment, Extended control 30RBSY 039-160	•				
4-20mA signal     4-20mA external signal       Free Cooling dry cooler     313     Control & connections to a Free Cooling Drycooler 09PE or     Easy system management, Extended control     30RBSY 039-160	Set point adjustment by	311			30RBSY / 30RBQSY 039-160
Free Cooling dry cooler 313 Control & connections to a Free Cooling Drycooler 09PE or Easy system management, Extended control 30RBSY 039-160					
management 09VE fitted with option FC control box capabilities to a dryccoler used in Free Cooling mode	Free Cooling dry cooler	313			30RBSY 039-160
	management		09VE fitted with option FC control box	capabilities to a dryccoler used in Free Cooling mode	

# 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 30RBSY/RQSY range, that are equipped with traditional Cu/Al coils.

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

# Physical data, 30RBSY units with partial heat reclaim using desuperheaters (option 49)

30RBSY partial heat reclaim mode		039	045	050	060	070	080	090	100	120	140	160
Operating weight units with RTPF coils*												
Standard unit without hydronic module	kg	466	474	497	529	509	546	845	854	885	1005	1071
Standard unit with hydronic module option												
Single high-pressure pump	kg	496	504	527	559	539	576	877	886	921	1044	1110
Dual high-pressure pump	kg	522	529	552	584	565	602	922	931	970	1081	1147
Refrigerant charge, units with RTPF coils		R-410A	1									
Circuit A	kg	8.0	9.0	12.5	15.0	12.5	15.0	19.0	20.0	23.0	12.5	16.0
Circuit B	kg	-	-	-	-	-	-	-	-	-	12.5	16.0
Condensers		Groove	d copper t	ubes. alur	minium fin:	S						
Desuperheaters on circuits A and B		Plate he	eat exchar	ngers								
Water volume, circuit A	1	0.549	0.549	0.549	0.549	0.732	0.732	0.976	0.976	0.976	0.732	0.732
Water volume, circuit B	1	-	-	-	-	-	-	-	-	-	0,732	0,732
Max. water-side operating pressure without hydronic module	kPa	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Water connections		Cylindri	cal, male	gas thread	d							
Connections	in	1	1	1	1	1	1	1	1	1	1	1
Outside diameter	mm	42	42	42	42	42	42	42	42	42	42	42

Weights shown are a guideline only.

### Physical data, 30RQSY units with partial heat reclaim using desuperheaters (option 49)

30RQSY partial heat reclaim mode		039	045	050	060	070	078	080	090	100	120	140	160
Operating weight units with RTPF coils													
Standard unit without hydronic module	kg	519	526	560	574	574	581	763	931	940	998	1103	1120
Standard unit with hydronic module option													
Single high-pressure pump	kg	549	556	589	603	604	611	793	962	972	1034	1142	1159
Dual high-pressure pump	kg	575	582	615	629	630	637	918	1007	1017	1082	1179	1196
Refrigerant charge, units with RTPF coils*		R-410A	١										
Circuit A	kg	12.5	13.5	16.5	17.5	18.0	16.5	21.5	27.5	28.5	33.0	19.0	18.5
Circuit B	kg	-	-	-	-	-	-	-	-	-	-	19.0	18.5
Condensers		Groove	d copper	tubes. alı	uminium f	ins							
Desuperheaters on circuits A and B		Plate h	eat excha	ngers									
Water volume, circuit A	1	0.549	0.549	0.549	0.732	0.732	0.732	0.732	0.976	0.976	0.976	0.732	0.732
Water volume, circuit B	I	-	-	-	-	-	-	-	-	-	-	0.732	0.732
Max. water-side operating pressure without hydronic module	kPa	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Water connections		Cylindr	ical, male	gas threa	ad								
Connections	in	1	1	1	1	1	1	1	1	1	1	1	1
Outside diameter	mm	42	42	42	42	42	42	42	42	42	42	42	42

Weights shown are a guideline only.

# **Operating imits**

°C	25*	00
	20	60
°C	30	65
	Minimum	Maximum
	-10	46
	$\sim$	C -10

<sup>\*</sup> 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.

# Reclaimed heating capacities using desuperheater(s)

### 30RBSY 039-160

30RBS	Y 039-	160							
	Desu	perheat	er ente	ring wa	ter tem	peratur	e, °C		
	45			50			55		
	Qhr	q	Δр	Qhr	q	Δр	Qc	q	Δр
	kW	l/s	kPa	kW	l/s	kPa	kW	l/s	kPa
039	12.9	0.31	6.1	10.9	0.26	4.4	9.0	0.21	3.1
045	16.5	0.40	9.5	14.3	0.34	7.4	12.0	0.29	5.2
050	18.1	0.43	11.7	15.4	0.37	8.5	12.8	0.31	6.1
060	19.3	0.46	12.9	16.6	0.40	9.8	13.7	0.33	6.9
070	24.3	0.58	11.8	21.0	0.50	9.2	17.5	0.42	6.5
080	28.6	0.68	16.3	24.4	0.58	12.1	20.6	0.49	8.8
090	30.5	0.73	11.4	25.8	0.62	8.2	21.5	0.51	5.8
100	36.4	0.87	16.0	31.9	0.76	12.4	27.0	0.64	8.9
120	43.1	1.03	22.6	37.4	0.89	17.2	31.6	0.75	12.3
140 (1)	47.1	1.12	11.3	39.7	0.95	8.3	33.0	0.79	5.9
160 <sup>(1)</sup>	54.0	1.29	15.0	45.6	1.09	10.7	38.3	0.92	7.8

Legend

Ohr Total heating capacity reclaimed at the desuperheater(s), kW

" ' is the desuperheater loop, l/s

Fouling factor  $0.18 \times 10^{-4} \, (m^2 \, K)/W$ 

Δp Pressure drop per desuperheater, kPa
Sizes 140 and 160 are fitted with 2 desuperheaters, one per circuit.

#### Application data

Evaporator entering/leaving water temperature 12/7°C Outside air temperature 35°C Desuperheater entering/leaving water temperature difference 10 K Evaporator fluid: chilled water

# 30RQSY 039-160 cooling mode

30RQS	Y 039-	160							
	Desu	perheat	er ente	ring wa	ter tem	peratur	e, °C		
	45			50			55		
	Qhr	q	Δр	Qhr	q	Δр	Qc	q	Δр
	kW	l/s	kPa	kW	l/s	kPa	kW	l/s	kPa
039	10.9	0.26	4.4	9.1	0.22	3.1	7.1	0.18	2.1
045	14.4	0.34	7.5	12.2	0.29	5.4	10.0	0.24	3.7
050	17.2	0.41	10.5	14.7	0.35	7.8	12.3	0.29	5.6
060	17.4	0.44	6.6	15.1	0.36	4.6	12.3	0.29	3.0
070	21.4	0.51	9.3	17.9	0.43	6.7	14.7	0.35	4.8
078	26.8	0.64	14.7	22.5	0.54	10.4	18.8	0.45	7.5
080	23.9	0.57	12.1	21.2	0.51	7.8	16.3	0.39	5.8
090	28.1	0.67	9.9	23.9	0.57	7.1	19.7	0.47	5.1
100	33.9	0.81	14.0	28.3	0.68	10.1	23.7	0.57	7.2
120	37.7	0.90	17.5	31.7	0.76	12.4	26.5	0.63	8.9
140 (1)	42.9	1.03	9.4	35.5	0.85	6.7	14.5	0.35	4.5
160 <sup>(1)</sup>	52.3	1.25	14.1	44.2	1.06	10.1	18.3	0.44	7.1

#### Legend

Othr Total heating capacity reclaimed at the desuperheater(s), kW qTotal water flow rate in the desuperheater loop, l/s

Ap Pressure drop per desuperheater, kPa

Sizes 140 and 160 are fitted with 2 desuperheaters, one per circuit.

#### Application data

Evaporator entering/leaving water temperature 12/7°C

Outside air temperature 35°C

Desuperheater entering/leaving water temperature difference 10 K Evaporator fluid: chilled water Fouling factor 0.18 x 10-4 (m $^2$  K)/W

## 30RQSY 039-160 heating mode

30RQS		160 perheat	or onto	rina wa	tor tom	norotur	- °C		
	45	perneal	er ente	50	ter tem	peratur	55		
	Qhr	q	Δр	Qhr	q	Δр	Qc	q	Δр
	kW	l/s	kPa	kW	l/s	kPa	kW	l/s	kPa
039	10.1	0.24	3.8	8.3	0.20	2.7	6.8	0.16	1.8
045	11.1	0.27	4.6	9.3	0.22	3.3	7.7	0.18	2.3
050	14.0	0.33	7.1	11.8	0.28	5.2	9.9	0.24	3.6
060	14.3	0.34	4.4	11.8	0.28	3.0	9.4	0.22	2.0
070	17.1	0.41	6.3	14.4	0.34	4.5	11.9	0.28	3.1
078	19.1	0.46	7.8	16.0	0.38	5.6	13.2	0.32	3.9
080	17.5	0.42	6.6	14.6	0.35	4.8	11.7	0.28	3.2
090	21.4	0.51	6.0	17.7	0.42	4.1	14.7	0.35	2.8
100	20.6	0.49	5.1	16.5	0.39	3.4	12.7	0.30	2.0
120	23.0	0.55	6.9	18.5	0.44	4.7	14.5	0.35	3.0
140 (1)	32.0	0.77	5.5	26.7	0.64	3.8	21.6	0.52	2.6
160 <sup>(1)</sup>	37.5	0.90	7.3	31.2	0.75	5.4	25.4	0.61	3.7

Ohr Total heating capacity reclaimed at the desuperheater(s), kW qTotal water flow rate in the desuperheater loop, l/s

Ap Pressure drop per desuperheater, kPa

(1) Sizes 140 and 160 are fitted with 2 desuperheaters, one per circuit.

Evaporator entering/leaving water temperature 40/45°C

Outside air temperature  $7^{\circ}\text{C}$  Desuperheater entering/leaving water temperature difference 10 K

Condenser fluid: water Fouling factor 0.18 x 10<sup>-4</sup> (m<sup>2</sup> K)/W

# Hydronic module (option 116)

This module is equipped with pressure transducers to optimise unit operation at the hydronic level.

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

The pressure transducers allow the Touch Pilot Junior control to:

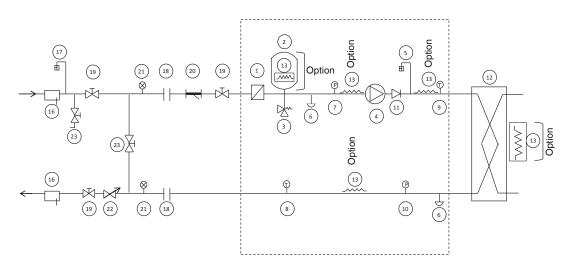
- Display the available pressure at the unit outlet and the static system pressure
- Calculate the instantaneous flow rate, using an algorithm that integrates the unit characteristics
- Integrate the system and water pump protection devices (lack of water, water pressure, water flow rate etc.)

Several water pump types are available: Primary single or dual low-pressure pump or single or dual high-pressure

An automatic pump start-up algorithm protects the heat exchanger and the hydronic module piping against frost down to -10°C(30RBSY)/0°C(30RQSY) outside temperature, if the water heat exchanger frost protection option is installed. If necessary increased frost protection down to -20°C is possible by adding heaters to the hydronic module piping (see option 42).

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

## Typical hydronic circuit diagram



#### Legend

#### Components of the unit and hydronic module

- Screen filter (Mesh1.2 mm)
- Expansion tank (option)
- Discharge valve
- Available pressure pump (single pump, or dual pump)
- Air purge
- Water drain valve
- Pressure sensor
  - Note: Gives pump suction pressure information (see regulation manual)
- - Note: Gives heat exchanger leaving temperature information (see regulation manual)
- g
  - Note: Gives heat exchanger entering temperature information (see regulation manual)
- Note: Gives heat exchanger leaving pressure information (see regulation manual) Check valve (If dual pump)
- Plate heat exchanger
- Heater or tracer for frost protection (Option) 13
- Flow sensor for water heat exchange

#### Installation components

- Thermowell 16
- Air purge
- Flexible connexion
- Shut-off valve
- Screen filter (obligatory for a unit without hydronic module)
- Pressure gauge
- Water flow control valve
  - Note: Not necessary for a hydronic module with a variable-speed pump
- Frost protection bypass valve (when shut-off valves (19) are closed during winter)
- Buffer tank (if necessary)
- Hydronic module (unit with hydronic module)

- The system must be protected against frost.
- The hydronic module of the unit and the exchanger can be protected (option factory installed) against frost with electric heaters and tracers (13).
- The pressure sensors are installed at connections without Schraeder valves. Depressurise and drain the system before any intervention

### Electrical data, units with hydronic modules

The pumps that are factory-installed in these units have motors with efficiency class IE2. 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 2005/32/ EC on the eco-design requirements for electric motors.

# Variable water flow system (VWF)

Variable water flow is a hydronic control function package that permits control of the water flow rate.

The VWF not only ensures control at full load, a specific Carrier algorithm linked to an electronic frequency converter also continuously modulates the flow rate to minimise pump consumption at full load as well as part load.

The hydronic module includes pressure transducers that permit intelligent measurement of the water flow rate and real-time display on the Touch Pilot Junior interface. All adjust-ments can be made directly on the interface, speeding up start-up and maintenance.

As VWF acts directly on the pump, the system no longer requires the control valve at the unit outlet. However, for applications with two-way valves a bypass system must be kept to guarantee the minimum flow rate.

## **Operating logic**

■ Full-load set point

The flow rate control at full load uses the Touch Pilot Junior interface, reducing the pump speed. This first control saves energy that would normally be dissipated in the control valve. For example, if the pressure supplied by the pump is reduced by 20% the power consumption of the pump is reduced by the same ratio, compared to a traditional installation.

- Operating mode at part load
   Touch Pilot Junior includes two part-load operating modes:
  - Constant outlet pressure controlConstant delta T control.

# 1 - Constant unit outlet pressure control

The control continuously acts on the pump speed to ensure a constant outlet pressure.

This solution is suitable for installations with two-way valves. When these close, the water speed will accelerate in the system branches that are still open. For a fixed-speed pump this results in an unnecessary increase of the pressure at the pump outlet.

The outlet pressure control mode ensures that each circuit branch always has a uniform supply, without unnecessary energy waste.

In industrial processes such as plastic injection moulding, this solution ensures that each terminal unit has the correct pressure supply.

### 2 - Constant delta T control

The VWF algorithm maintains a constant delta T no matter what the unit load, reducing the flow rate to the minimum.

This solution can be used for systems with two-way or threeway valves and achieves higher energy savings than the "Constant unit outlet pressure control" mode. It is suitable for the majority of comfort applications.

# Physical data, 30RBSY

30RBSY				039	045	050	060	070	080	090	100	120	140	160
Cooling														
Standard unit	C1	Nominal capacity	kW	39.6	44.0	51.2	58.1	66.2	77.7	86.7	97.1	114.4	132.8	153
		EER	kW/kW		2.78	2.66	2.68	2.66	2.63	2.69	2.70	2.66	2.64	2.5
		Eurovent class cooling		A	A	В	В	В	В	В	Α	В	В	В
		Nominal capacity	kW	53.0	58.9	68.5	80.8	83.6	97.0	114.3	126.5	150.8		19
		EER	kW/kW		3.35	3.11	3.33	2.89	2.97	3.13	3.06	3.09	2.91	2.9
Full load performances**		Gross nominal	kW	39.9	44.4	51.6	58.6	66.8	78.4	87.2	97.7	115.1		15
-uii ioau periormances		capacity												
		Gross EER	kW/kW		2.63	2.56	2.59	2.55	2.54	2.55	2.58	2.56	2.52	2.4
		Gross nominal capacity	kW	53.5	59.4	69.3	81.7	84.3	97.9	115.3	127.4	152.1	170.3	19
		Gross EER	kW/kW		3.23	3.06	3.29	2.82	2.92	3.02	2.97	3.03	2.83	2.8
Seasonal efficiency*		ESEER	kW/kW		3.95	3.9	3.85	3.65	3.68	3.74	3.8	3.79	3.99	4.
Seasonal efficiency**	C1	Gross ESEER	kW/kW	3.28	3.46	3.56	3.54	3.31	3.39	3.26	3.35	3.41	3.40	3.6
PLV			kW/kW	3.69	3.89	3.99	3.95	3.66	3.78	3.52	3.61	3.76	3.69	4.0
Sound levels														
Standard unit - for 160 F	a ex	ternal static pressure												
Sound power level at dis	char	ge <sup>(1)</sup>	dB(A)	84	84	84	84	87	87	87	87	87	90	90
Sound power level radia		•		84	84	84	84	87	87	87	87	87	90	90
Sound pressure level at	10 m	(2)	dB(A)	53	53	53	53	55	55	56	56	56	58	58
Dimensions				If two value	es are show	n the first o	ne is for sta	ndard units	and the se	cond on	e for uni	ts with o	ption 23	BB
_ength			mm		2142/2307						2273	2273	2273	22
Width			mm	1132/1297	1132/1297	1132/1297	1132/1297	1132/1297	1132/1297	2122	2122	2122	2122	21
Height			mm	1371	1371	1371	1371	1371	1371	1371	1371	1371	1371	13
Operating weight with	MCF	HE coil (3)												
Standard unit without			kg	436	443	449	464	461	480	771	780	793	901	93
	-		ĸy	430	443	443	404	401	400	// 1	700	195	901	90
Standard unit with hyd		c illouule	l.m	466	473	479	494	491	510	803	812	829	940	97
Single high-pressure pur	-		kg											
Dual high-pressure pum	p		kg	491	499	504	520	517	536	848	857	877	977	10
Compressors					scroll comp			_			_	_		_
Circuit A				2	2	2	2	2	2	3	3	3	2	2
Circuit B				-	-	-	-	-	-	-	-	-	2	2
No of control stages				2	2	2	2	2	2	3	3	3	4	4
Refrigerant charge wit	h MC	CHE coil <sup>(3)</sup>		R-410A										
Circuit A			kg	4.7	5.3	5.9	6.7	6.2	7.3	10.7	10.8	11.4	6.5	7.4
			$teqCO_{\!\scriptscriptstyle 2}$	9.8	11.1	12.3	14.0	12.9	15.2	22.3	22.6	23.8	13.6	15
Circuit B			kg	-	-	-	-	-	-	-	-	-	6.5	7.4
			teqCO <sub>2</sub>										13.6	15
Capacity control				Touch Pilo	t Junior									
Minimum capacity			%	50	50	50	50	50	50	33	33	33	25	25
Condensers				All alumini	um microch	nannel heat	exchanger	(MCHE)						
Fans					ng Bird IV w			. ,						
Quantity				1	1	1	1	1	1	2	2	2	2	2
Maximum total air flow			l/s	3885	3883	3687	3908	4982	5267	6940	6936	7370	9958	10
Maximum rotation speed	1		r/s	16	16	16	16	18	18	16	16	16	18	18
Evaporator			.,0		ansion, plat									- 10
Water volume			1	2.6	3	3.3	4	4.8	5.6	8.7	9.9	11.3	12.4	14
	ule '	ontion)	1	2.0	J	0.0	7	4.0	5.0	0.7	5.5	11.3	14.4	14
Without hydronic mod	•	• •	l <sub>2</sub> Do	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	4.
Max. water-side operatin	• .		kPa	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	10
With hydronic module	٠.	•				en		, .				,		
Single or dual pump (as	seled	cted)		-	taulic scree		-							
			I	12	12	12	12	12	12	35	35	35	35	35
	(4)		bar	1	1	1	1	1	1	1.5	1.5	1.5	1.5	1.
		essure	kPa	400	400	400	400	400	400	400	400	400	400	40
Expansion tank pressure	ig pre													
Expansion tank volume Expansion tank pressure Max. water-side operatin Water connections wit	<u> </u>	thout hydronic		Victaulic										
Expansion tank pressure Max. water-side operatin	<u> </u>	thout hydronic		Victaulic										
Expansion tank pressure Max. water-side operatin Water connections wit module	<u> </u>	thout hydronic	in		2	2	2	2	2	2	2	2	2	2
Expansion tank pressure Max. water-side operatin Water connections wit	<u> </u>	thout hydronic	in mm	Victaulic 2 60.3	2 60.3	2 60.3	2 60.3	2 60.3	2 60.3	2 60.3	2 60.3	2 60.3	2 60.3	2

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



Eurovent certified values

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

Cooling mode conditions: evaporator water entering/leaving temperature 2°C/7°C, outside air temperature 35°C, evaporator fooling factor 0 m².K/W
Cooling mode conditions: evaporator water entering/leaving temperature 23°C/18°C, outside air temperature 35°C, evaporator fooling factor 0 m².K/W
IPLV Calculations according to standard performances (in accordance with AHRI 550-590)
In dB ref=10¹² W, (A) weighting. Declared dualnumber noise emission values in accordance with ISO 4871 (with an associated uncertainty of +/-3dB(A)). Measured in accordance with ISO 9614-1 and certified by Eurovent.

<sup>(2)</sup> In dB ref 20µPa, (A) weighting. Declared dualnumber noise emission values in accordance with ISO 4871 (with an associated uncertainty of +/-3dB(A)). For information, calculated from the sound power level Lw(A).

# Physical data, 30RQSY

30RQSY				39	45	50	60	70	78	80	90	100	120	140	16
Cooling															
Standard unit	C1	Nominal capacity	kW	37	43	50	58	63	73	78	86	96	113	130	14
Full load	C1	EER	kW/kW	2.88	2.79	2.70	2.79	2.70	2.56	2.80	2.71	2.72	2.74	2.76	2
performances*	C1	Eurovent class cooling		Α	Α	Α	Α	Α	В	Α	Α	Α	Α	Α	Е
	C2	Nominal capacity	kW	47	54	63	70	78	91	97	108	118	143	160	1
	C2		kW/kW	3.32	3.26	3.15	3.14	3.08	2.94	3.20	3.15	3.14	3.14	3.15	2
Full load	C1			37	44	50	58	63	73	78	86	96	114	130	1
performances**	C1		kW/kW		2.64	2.57	2.61	2.56	2.46	2.60	2.56	2.59	2.62	2.62	2
p		Gross nominal capacity		47	55	64	71	78	92	98	109	119	144	162	1
		Gross EER	kW/kW		3.13	3.04	2.98	2.96	2.87	3.02	3.01	3.02	3.05	3.03	2
Casasas afficianau*	C1		kW/kW		3.94	3.86	3.82	3.74	3.66		3.67	3.81		4.10	2
Seasonal efficiency*										3.73			4.04		
Seasonal efficiency**	C1	Gross ESEER	kW/kW	3.34	3.47	3.42	3.30	3.33	3.35	3.22	3.15	3.34	3.58	3.48	3
Heating															
Standard unit	H1	' '	kW	42	47	53	62	70	78	80	93	101	117	139	1
Full load	H1	COP	kW/kW		3.13	3.03	3.16	3.17	3.02	3.21	3.08	3.05	3.07	3.14	2
performances*	H1			Α	Α	Α	Α	Α	Α	Α	Α	Α	Α	Α	E
	H2	Nominal capacity	kW	43	47	55	63	72	80	83	95	103	121	142	1
	H2	COP	kW/kW	3.83	3.83	3.75	3.93	3.88	3.66	3.90	3.81	3.74	3.75	3.85	3
Full load	H1	Gross nominal	kW	42	46	53	61	70	77	79	92	100	116	138	1
performances**		capacity													
	H1	Gross COP	kW/kW	2.86	2.86	2.80	2.87	2.92	2.81	2.87	2.81	2.81	2.85	2.89	2
	H2	Gross nominal capacity	kW	42	47	54	63	71	80	82	94	102	120	141	1
	H2	Gross COP	kW/kW	3.41	3.45	3.41	3.51	3.53	3.38	3.44	3.42	3.39	3.45	3.49	3
Seasonal efficiency***	H1	SCOP	kW/kW	2.98	3.01	2.98	3.10	3.12	3.07	3.05	3	2.99	3.05	3.17	3
	H1	ηs heat	%	116	117	116	121	122	120	119	117	117	119	124	1
	H1	Prated	kW	33	37	42	51	58	65	66	77	84	96	114	1
IDIA			kW/kW	3.7/	3.89	3.76	3.63	3.63	3.81	3.59	3.42	3.60	3.99	0.74	
IPLV			KVV/KVV		3.09	3.70	5.05	3.03	J.01	3.33		3.00	ა.ყყ	3.74	- 0
			KVV/KVV	3.74	3.09	3.70	3.03	3.03	3.01	3.33	0.42	3.00	3.99	3.74	3
Sound levels	en D	a avtarnal static nrass		5.74	3.09	3.70	3.03	3.03	3.01	3.39	0.42	3.00	3.99	3.74	
Sound levels Standard unit - for 16		a external static press	ure												
Sound levels Standard unit - for 16 Sound power level at d	disch	narge (1)		84	84	84	87	87	87	87	87	87	87	90	9
Sound levels Standard unit - for 16 Sound power level at d Sound power level radii	disch iatec	parge (1)	ure dB(A)	84 84	84 84	84 84	87 87	87 87	87 87	87 87	87 87	87 87	87 87	90 90	9
Sound levels Standard unit - for 16 Sound power level at d Sound power level radii Sound pressure level a	disch iatec	parge (1)	ure	84 84 53	84 84 53	84 84 53	87 87 55	87 87 55	87 87 55	87 87 56	87 87 56	87 87 56	87 87 56	90 90 58	9
Sound levels Standard unit - for 16 Sound power level at d Sound power level radii	disch iatec	parge (1)	ure dB(A)	84 84 53 If two valu	84 84 53 les are sho	84 84 53 wn the first	87 87 55 t one is for	87 87 55 standard u	87 87 55 nits and the	87 87 56 e secor	87 87 56 nd one f	87 87 56 or units	87 87 56 with op	90 90 58 tion 23	5 B
Sound levels Standard unit - for 16 Sound power level at d Sound power level radi Sound pressure level a Dimensions Length	disch iatec	parge (1)	ure dB(A)	84 84 53 If two valu 2142/2307	84 84 53 les are sho 2142/2307	84 84 53 wn the first 2142/2307	87 87 55 t one is for 2142/2307	87 87 55 standard u 2142/2307	87 87 55 nits and the 2142/2307	87 87 56 e secor 2273	87 87 56 nd one f	87 87 56 or units 2273	87 87 56 with op	90 90 58 tion 23l 2273	5 B
Sound levels Standard unit - for 16 Sound power level at d Sound power level radi Sound pressure level a Dimensions	disch iatec	parge (1)	dB(A)	84 84 53 If two valu 2142/2307	84 84 53 les are sho 2142/2307	84 84 53 wn the first 2142/2307	87 87 55 t one is for 2142/2307	87 87 55 standard u	87 87 55 nits and the 2142/2307	87 87 56 e secor 2273	87 87 56 nd one f	87 87 56 or units	87 87 56 with op	90 90 58 tion 23	5 B
Sound levels Standard unit - for 16 Sound power level at d Sound power level radi Sound pressure level a Dimensions Length Width Height	disch iatec	parge (1)	dB(A) dB(A)	84 84 53 If two valu 2142/2307	84 84 53 les are sho 2142/2307	84 84 53 wn the first 2142/2307	87 87 55 t one is for 2142/2307	87 87 55 standard u 2142/2307	87 87 55 nits and the 2142/2307	87 87 56 e secor 2273	87 87 56 nd one f	87 87 56 or units 2273	87 87 56 with op	90 90 58 tion 23l 2273	9 9 5 B
Sound levels Standard unit - for 16 Sound power level at d Sound power level radi Sound pressure level a Dimensions Length Width	disch iatec	parge (1)	dB(A)  dB(A)  mm  mm	84 84 53 If two valu 2142/2307 1132/1297	84 84 53 les are sho 2142/2307 1132/1297	84 84 53 wn the first 2142/2307 1132/1297	87 87 55 t one is for 2142/2307 1132/1297	87 87 55 standard ur 2142/2307 1132/1297	87 87 55 nits and the 2142/2307 1132/1297	87 87 56 e secor 2273 2122	87 87 56 nd one f 2273 2122	87 87 56 for units 2273 2122	87 87 56 with op 2273 2122	90 90 58 ition 23 2273 2122	9 9 5 B
Sound levels Standard unit - for 16 Sound power level at d Sound power level radi Sound pressure level a Dimensions Length Width Height	disch iated at 10	inarge <sup>(1)</sup> (1) (1) (1) (2)	dB(A)  dB(A)  mm  mm	84 84 53 If two valu 2142/2307 1132/1297	84 84 53 les are sho 2142/2307 1132/1297	84 84 53 wn the first 2142/2307 1132/1297	87 87 55 t one is for 2142/2307 1132/1297	87 87 55 standard ur 2142/2307 1132/1297	87 87 55 nits and the 2142/2307 1132/1297	87 87 56 e secor 2273 2122	87 87 56 nd one f 2273 2122	87 87 56 for units 2273 2122	87 87 56 with op 2273 2122	90 90 58 ition 23 2273 2122	9 9 8 8 2 2
Sound levels Standard unit - for 16 Sound power level at d Sound power level radi Sound pressure level a Dimensions Length Width Height Operating weight (3)	dischiated at 10	dronic module	dB(A)  dB(A)  mm  mm	84 84 53 If two valu 2142/2307 1132/1297 1371	84 84 53 les are sho 2142/2307 1132/1297 1371	84 84 53 wn the first 2142/2307 1132/1297 1371	87 87 55 t one is for 2142/2307 1132/1297 1371	87 87 55 standard u 2142/2307 1132/1297 1371	87 87 55 nits and the 2142/2307 1132/1297 1371	87 87 56 e secor 2273 2122 1371	87 87 56 and one f 2273 2122 1371	87 87 56 for units 2273 2122 1371	87 87 56 with op 2273 2122 1371	90 90 58 tion 23 2273 2122 1371	9 9 8 8 2 2
Sound levels Standard unit - for 16 Sound power level at d Sound power level at d Sound pressure level a Dimensions Length Width Height Operating weight (3) Standard unit withou Standard unit with hy	disch iated at 10	dronic module	dB(A)  mm mm mm	84 84 53 If two valu 2142/2307 1132/1297 1371	84 84 53 les are sho 2142/2307 1132/1297 1371	84 84 53 wn the first 2142/2307 1132/1297 1371	87 87 55 t one is for 2142/2307 1132/1297 1371	87 87 55 standard u 2142/2307 1132/1297 1371	87 87 55 nits and the 2142/2307 1132/1297 1371	87 87 56 e secor 2273 2122 1371	87 87 56 and one f 2273 2122 1371	87 87 56 for units 2273 2122 1371	87 87 56 with op 2273 2122 1371	90 90 58 tion 23 2273 2122 1371	9 9 8 8 2 2 1
Sound levels Standard unit - for 16 Sound power level at d Sound power level at d Sound pressure level at Dimensions Length Width Height Operating weight (3) Standard unit withou Standard unit with h Single high-pressure p	isch iateo at 10 ut hy ydro	dronic module	dB(A)  mm mm kg	84 84 53 If two valu 2142/2307 1132/1297 1371 512	84 84 53 les are sho 2142/2307 1132/1297 1371 519	84 84 53 wn the first 2142/2307 1132/1297 1371 553	87 87 55 t one is for 2142/2307 1132/1297 1371	87 87 55 standard ui 2142/2307 1132/1297 1371 567	87 87 55 nits and the 2142/2307 1132/1297 1371	87 87 56 e secor 2273 2122 1371 753	87 87 56 nd one f 2273 2122 1371 921	87 87 56 for units 2273 2122 1371 930	87 87 56 with op 2273 2122 1371 988	90 90 58 tion 23 2273 2122 1371 1084	9 5 B 2 1
Sound levels Standard unit - for 16 Sound power level at d Sound power level radi Sound pressure level a Dimensions Length Width Height Operating weight (3) Standard unit withou Standard unit with hy Single high-pressure p Dual high-pressure pun	isch iateo at 10 ut hy ydro	dronic module	dB(A)  mm mm mm	84 84 53 If two valu 2142/2307 1132/1297 1371 512 542 568	84 84 53 les are sho 2142/2307 1132/1297 1371 519 549 575	84 84 53 wn the first 2142/2307 1132/1297 1371 553 582 608	87 87 55 t one is for 2142/2307 1132/1297 1371 567 596 622	87 87 55 standard ui 2142/2307 1132/1297 1371 567	87 87 55 nits and the 2142/2307 1132/1297 1371 574 604	87 87 56 e secor 2273 2122 1371	87 87 56 nd one f 2273 2122 1371	87 87 56 for units 2273 2122 1371	87 87 56 with op 2273 2122 1371	90 90 58 tion 23 2273 2122 1371	9 5 B 2 1
Sound levels Standard unit - for 16 Sound power level at d Sound power level at d Sound pressure level at Dimensions Length Width Height Operating weight (3) Standard unit withou Standard unit with hy Single high-pressure p Dual high-pressure pur Compressors	isch iateo at 10 ut hy ydro	dronic module	dB(A)  mm mm kg	84 84 53 If two valu 2142/2307 1132/1297 1371 512 542 568 Hermetic	84 84 53 les are sho 2142/2307 1132/1297 1371 519 549 575 scroll com	84 84 53 wn the first 2142/2307 1132/1297 1371 553 582 608 pressors, 4	87 87 55 cone is for 2142/2307 1132/1297 1371 567 596 622 8.3 r/s	87 87 55 standard ui 2142/2307 1132/1297 1371 567 597 623	87 87 55 nits and the 2142/2307 1132/1297 1371 574 604 630	87 87 56 e secor 2273 2122 1371 753 783 809	87 87 56 and one f 2273 2122 1371 921 952 997	87 87 56 for units 2273 2122 1371 930 962 1007	87 87 56 with op 2273 2122 1371 988 1024 1072	90 90 58 tion 23 2273 2122 1371 1084 1123 1160	9 5 8 2 1 1
Sound levels Standard unit - for 16 Sound power level at d Sound power level at d Sound pressure level at Dimensions Length Width Height Operating weight (3) Standard unit withou Standard unit with hy Single high-pressure p Dual high-pressure pur Compressors Circuit A	isch iateo at 10 ut hy ydro	dronic module	dB(A)  mm mm kg	84 84 53 If two valu 2142/2307 1132/1297 1371 512 542 568	84 84 53 les are sho 2142/2307 1132/1297 1371 519 549 575	84 84 53 wn the first 2142/2307 1132/1297 1371 553 582 608	87 87 55 t one is for 2142/2307 1132/1297 1371 567 596 622	87 87 55 standard ui 2142/2307 1132/1297 1371 567	87 87 55 nits and the 2142/2307 1132/1297 1371 574 604 630	87 87 56 e secon 2273 2122 1371 753 783 809	87 87 56 nd one f 2273 2122 1371 921	87 87 56 or units 2273 2122 1371 930 962 1007	87 87 56 with op 2273 2122 1371 988	90 90 58 tition 23l 2273 2122 1371 1084 1123 1160	9 9 9 5 B 2 2 1 1 1 1 1 1 1 2
Sound levels Standard unit - for 16 Sound power level at d Sound power level at d Sound pressure level at Dimensions Length Width Height Operating weight (3) Standard unit withou Standard unit with hy Single high-pressure pur Compressors Circuit A Circuit B	isch iateo at 10 ut hy ydro	dronic module	dB(A)  mm mm kg	84 84 53 If two valu 2142/2307 1132/1297 1371 512 542 568 Hermetic 2	84 84 53 les are sho 2142/2307 1132/1297 1371 519 549 575 scroll com 2	84 84 53 wn the first 2142/2307 1132/1297 1371 553 582 608 pressors, 4 2	87 87 55 t one is for 2142/2307 1132/1297 1371 567 596 622 8.3 r/s 2	87 87 55 standard u 2142/2307 1132/1297 1371 567 597 623	87 87 55 nits and the 2142/2307 1132/1297 1371 574 604 630	87 87 56 e secor 2273 2122 1371 753 783 809	87 87 56 nd one f 2273 2122 1371 921 952 997	87 87 56 for units 2273 2122 1371 930 962 1007	87 87 56 with op 2273 2122 1371 988 1024 1072	90 90 58 Ition 23 2273 2122 1371 1084 1123 1160	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9
Sound levels Standard unit - for 16 Sound power level at d Sound power level at d Sound pressure level at Dimensions Length Width Height Operating weight (3) Standard unit withou Standard unit with hy Single high-pressure put Compressors Circuit A Circuit B No of control stages	iated iated at 10	dronic module	dB(A)  mm mm kg	84 84 53 If two valu 2142/2307 1132/1297 1371 512 542 568 Hermetic 2	84 84 53 les are sho 2142/2307 1132/1297 1371 519 549 575 scroll com	84 84 53 wn the first 2142/2307 1132/1297 1371 553 582 608 pressors, 4	87 87 55 cone is for 2142/2307 1132/1297 1371 567 596 622 8.3 r/s	87 87 55 standard ui 2142/2307 1132/1297 1371 567 597 623	87 87 55 nits and the 2142/2307 1132/1297 1371 574 604 630	87 87 56 e secon 2273 2122 1371 753 783 809	87 87 56 and one f 2273 2122 1371 921 952 997	87 87 56 or units 2273 2122 1371 930 962 1007	87 87 56 with op 2273 2122 1371 988 1024 1072	90 90 58 tition 23l 2273 2122 1371 1084 1123 1160	9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9
Sound levels Standard unit - for 16 Sound power level at d Sound power level at d Sound pressure level at Dimensions Length Width Height Operating weight (3) Standard unit withous Standard unit with by Single high-pressure put Compressors Circuit A Circuit B No of control stages Refrigerant charge (3)	iated iated at 10	dronic module	dB(A)  dB(A)  mm  mm  kg  kg  kg	84 84 53 If two value 2142/2307 1132/1297 1371 512 542 568 Hermetic 2 - 2 R-410A	84 84 53 les are sho 2142/2307 1132/1297 1371 519 549 575 scroll comp 2	84 84 53 wn the first 2142/2307 1132/1297 1371 553 582 608 pressors, 4 2	87 87 55 t one is for 2142/2307 1132/1297 1371 567 596 622 8.3 r/s 2	87 87 55 standard u 2142/2307 1132/1297 1371 567 597 623 2	87 87 55 nits and the 2142/2307 1132/1297 1371 574 604 630	87 87 56 e secor 2273 2122 1371 753 783 809	87 87 56 nd one f 2273 2122 1371 921 952 997 3 - 3	87 87 56 or units 2273 2122 1371 930 962 1007	87 87 56 with op 2273 2122 1371 988 1024 1072 3	90 90 58 tion 23 2273 2122 1371 1084 1123 1160 2	9 9 5 5 E 2 2 1 1 1 1 1 2 2 4
Sound levels Standard unit - for 16 Sound power level at d Sound power level at d Sound pressure level at Dimensions Length Width Height Operating weight (3) Standard unit withou Standard unit with hy Single high-pressure put Compressors Circuit A Circuit B No of control stages	iated iated at 10	dronic module	dB(A)  dB(A)  mm mm kg kg kg kg	84 84 53 If two valu 2142/2307 1132/1297 1371 512 542 568 Hermetic 2 - 2 R-410A 12.5	84 84 53 les are sho 2142/2307 1132/1297 1371 519 549 575 scroll comp 2 - 2	84 84 53 wn the first 2142/2307 1132/1297 1371 553 582 608 pressors, 4 2 - 2	87 87 55 t one is for 2142/2307 1132/1297 1371 567 596 622 8.3 r/s 2	87 87 55 standard u 2142/2307 1132/1297 1371 567 597 623 2	87 87 55 nits and the 2142/2307 1132/1297 1371 574 604 630 2	87 87 56 e secon 2273 2122 1371 753 783 809 2 - 2	87 87 56 nd one f 2273 2122 1371 921 952 997 3 - 3	87 87 56 For units 2273 2122 1371 930 962 1007 3 - 3	87 87 56 with op 2273 2122 1371 988 1024 1072 3 - 3	90 90 58 tition 23 2273 2122 1371 1084 1123 1160 2 2 4	9 9 9 5 5 8 2 2 1 1 1 1 1 2 2 4 1
Sound levels Standard unit - for 16 Sound power level at d Sound power level at d Sound pressure level at Dimensions Length Width Height Operating weight (3) Standard unit withou Standard unit with h Single high-pressure put Compressors Circuit A Circuit B No of control stages Refrigerant charge (3) Circuit A	iated iated at 10	dronic module	dB(A)  dB(A)  mm mm kg kg kg kg teqCO <sub>2</sub>	84 84 53 If two valu 2142/2307 1132/1297 1371 512 542 568 Hermetic 2 - 2 R-410A 12.5	84 84 53 les are sho 2142/2307 1132/1297 1371 519 549 575 scroll comp 2 - 2	84 84 53 wn the first 2142/2307 1132/1297 1371 553 582 608 pressors, 4 2	87 87 55 t one is for 2142/2307 1132/1297 1371 567 596 622 8.3 r/s 2 - 2	87 87 55 standard u 2142/2307 1132/1297 1371 567 597 623 2	87 87 55 nits and the 2142/2307 1132/1297 1371 574 604 630	87 87 56 e secor 2273 2122 1371 753 783 809	87 87 56 nd one f 2273 2122 1371 921 952 997 3 - 3	87 87 56 or units 2273 2122 1371 930 962 1007	87 87 56 with op 2273 2122 1371 988 1024 1072 3 - 3	90 90 58 2273 2122 1371 1084 1123 1160 2 2 4	9 9 9 5 5 8 2 2 1 1 1 1 1 1 2 2 4 4 1 3
Sound levels Standard unit - for 16 Sound power level at d Sound power level at d Sound pressure level at Dimensions Length Width Height Operating weight (3) Standard unit withous Standard unit with by Single high-pressure put Compressors Circuit A Circuit B No of control stages Refrigerant charge (3)	iated iated at 10	dronic module	dB(A)  dB(A)  mm mm kg kg kg kg	84 84 53 If two valu 2142/2307 1132/1297 1371 512 542 568 Hermetic 2 - 2 R-410A 12.5	84 84 53 les are sho 2142/2307 1132/1297 1371 519 549 575 scroll comp 2 - 2	84 84 53 wn the first 2142/2307 1132/1297 1371 553 582 608 pressors, 4 2 - 2	87 87 55 t one is for 2142/2307 1132/1297 1371 567 596 622 8.3 r/s 2	87 87 55 standard u 2142/2307 1132/1297 1371 567 597 623 2	87 87 55 nits and the 2142/2307 1132/1297 1371 574 604 630 2	87 87 56 e secon 2273 2122 1371 753 783 809 2 - 2	87 87 56 nd one f 2273 2122 1371 921 952 997 3 - 3	87 87 56 For units 2273 2122 1371 930 962 1007 3 - 3	87 87 56 with op 2273 2122 1371 988 1024 1072 3 - 3	90 90 58 tition 23 2273 2122 1371 1084 1123 1160 2 2 4	9 9 9 9 8 8 2 2 1 1 1 1 1 1 2 2 4 4 1 3 3
Sound levels Standard unit - for 16 Sound power level at d Sound power level at d Sound pressure level a Dimensions Length Width Height Operating weight (3) Standard unit withou Standard unit with h Single high-pressure p Dual high-pressure pur Compressors Circuit A Circuit B No of control stages Refrigerant charge (3) Circuit A Circuit B	iated iated at 10	dronic module	dB(A)  dB(A)  mm mm kg kg kg kg teqCO <sub>2</sub>	84 84 53 If two valu 2142/2307 1132/1297 1371 512 542 568 Hermetic 2 - 2 R-410A 12.5	84 84 53 les are sho 2142/2307 1132/1297 1371 519 549 575 scroll comp 2 - 2	84 84 53 wn the first 2142/2307 1132/1297 1371 553 582 608 pressors, 4 2 - 2	87 87 55 t one is for 2142/2307 1132/1297 1371 567 596 622 8.3 r/s 2 - 2	87 87 55 standard u 2142/2307 1132/1297 1371 567 597 623 2 - 2	87 87 55 nits and the 2142/2307 1132/1297 1371 574 604 630 2 - 2	87 87 56 e secor 2273 2122 1371 753 783 809 2 - 2 21.5 44.9	87 87 56 nd one f 2273 2122 1371 921 952 997 3 - 3	87 87 56 For units 2273 2122 1371 930 962 1007 3 - 3	87 87 56 with op 2273 2122 1371 988 1024 1072 3 - 3	90 90 58 2273 2122 1371 1084 1123 1160 2 2 4	9 9 9 5 5 5 5 6 5 6 5 6 6 6 6 6 6 6 6 6
Sound levels Standard unit - for 16 Sound power level at d Sound power level at d Sound pressure level at Dimensions Length Width Height Operating weight (3) Standard unit withou Standard unit with h Single high-pressure put Compressors Circuit A Circuit B No of control stages Refrigerant charge (3) Circuit A	iated iated at 10	dronic module	dB(A)  dB(A)  mm  mm  kg  kg  kg  teqCO <sub>2</sub> kg	84 84 53 If two valu 2142/2307 1132/1297 1371 512 542 568 Hermetic 2 - 2 R-410A 12.5	84 84 53 les are sho 2142/2307 1132/1297 1371 519 549 575 scroll comp 2 - 2	84 84 53 wn the first 2142/2307 1132/1297 1371 553 582 608 pressors, 4 2 - 2	87 87 55 t one is for 2142/2307 1132/1297 1371 567 596 622 8.3 r/s 2 - 2	87 87 55 standard u 2142/2307 1132/1297 1371 567 597 623 2 - 2	87 87 55 nits and the 2142/2307 1132/1297 1371 574 604 630 2 - 2	87 87 56 e secor 2273 2122 1371 753 783 809 2 - 2 21.5 44.9	87 87 56 nd one f 2273 2122 1371 921 952 997 3 - 3	87 87 56 For units 2273 2122 1371 930 962 1007 3 - 3	87 87 56 with op 2273 2122 1371 988 1024 1072 3 - 3	90 90 58 2273 2122 1371 1084 1123 1160 2 2 4	9 9 9 5 5 8 2 2 1 1 1 1 1 2 2 4 1
Sound levels Standard unit - for 16 Sound power level at d Sound power level at d Sound pressure level a Dimensions Length Width Height Operating weight (3) Standard unit withou Standard unit with h Single high-pressure p Dual high-pressure pur Compressors Circuit A Circuit B No of control stages Refrigerant charge (3) Circuit A Circuit B	iated iated at 10	dronic module	dB(A)  dB(A)  mm  mm  kg  kg  kg  teqCO <sub>2</sub> kg	84 84 53 If two valu 2142/2307 1132/1297 1371 512 542 568 Hermetic 2 - 2 R-410A 12.5 26.1	84 84 53 les are sho 2142/2307 1132/1297 1371 519 549 575 scroll comp 2 - 2	84 84 53 wn the first 2142/2307 1132/1297 1371 553 582 608 pressors, 4 2 - 2	87 87 55 t one is for 2142/2307 1132/1297 1371 567 596 622 8.3 r/s 2 - 2	87 87 55 standard u 2142/2307 1132/1297 1371 567 597 623 2 - 2	87 87 55 nits and the 2142/2307 1132/1297 1371 574 604 630 2 - 2	87 87 56 e secor 2273 2122 1371 753 783 809 2 - 2 21.5 44.9	87 87 56 nd one f 2273 2122 1371 921 952 997 3 - 3	87 87 56 For units 2273 2122 1371 930 962 1007 3 - 3	87 87 56 with op 2273 2122 1371 988 1024 1072 3 - 3	90 90 58 2273 2122 1371 1084 1123 1160 2 2 4	9 9 5 5 B 2 2 1 1 1 1 1 2 2 2 4 1 3 1 1
Sound levels Standard unit - for 16 Sound power level at d Sound power level at d Sound power level at d Sound pressure level a Dimensions Length Width Height Operating weight (3) Standard unit withou Standard unit with h Single high-pressure p Dual high-pressure pure Compressors Circuit A Circuit B No of control stages Refrigerant charge (3) Circuit B Oil charge (3) Circuit A	ut hy wat hy mp	dronic module	dB(A)  dB(A)  mm  mm  kg  kg  kg  teqCO <sub>2</sub> kg  teqCO <sub>2</sub>	84 84 53 If two valu 2142/2307 1132/1297 1371 512 542 568 Hermetic 2 - 2 R-410A 12.5 26.1	84 84 53 les are sho 2142/2307 1132/1297 1371 519 549 575 scroll comp 2 - 2 13.5 28.2	84 84 53 wn the first 2142/2307 1132/1297 1371 553 582 608 pressors, 4 2 - 2 16.5 34.5	87 87 55 one is for 2142/2307 1132/1297 1371 567 596 622 8.3 r/s 2 - 2 17.5 36.5	87 87 55 standard ur 2142/2307 1132/1297 1371 567 597 623 2 - 2 18 37.6 -	87 87 55 nits and the 2142/2307 1132/1297 1371 574 604 630 2 - 2 16.5 34.5	87 87 56 e secor 2273 2122 1371 753 783 809 2 - 2 21.5 44.9	87 87 56 nd one f 2273 2122 1371 921 952 997 3 - 3 27.5 57.4	87 87 56 for units 2273 2122 1371 930 962 1007 3 - 3	87 87 56 with op 2273 2122 1371 988 1024 1072 3 - 3 3 68.9	90 90 58 tion 23 2273 2122 1371 1084 1123 1160 2 2 4 19 39.7 19 39.7 7.0	9 9 9 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
Sound levels Standard unit - for 16 Sound power level at d Sound power level at d Sound power level at d Sound pressure level a Dimensions Length Width Height Operating weight (3) Standard unit withou Standard unit with h Single high-pressure p Dual high-pressure pure Compressors Circuit A Circuit B No of control stages Refrigerant charge (3) Circuit B Circuit B	ut hy wat hy mp	dronic module	wre dB(A) dB(A) mm mm kg kg kg teqCO <sub>2</sub> kg teqCO <sub>2</sub>	84 84 53 If two valu 2142/2307 1132/1297 1371 512 542 568 Hermetic 2 - 2 R-410A 12.5 26.1	84 84 84 53 les are sho 2142/2307 1132/1297 1371 519 549 575 scroll comp 2 - 2 13.5 28.2 -	84 84 53 wn the first 2142/2307 1132/1297 1371 553 582 608 pressors, 4 2 - 2 16.5 34.5 -	87 87 55 one is for 2142/2307 1132/1297 1371 567 596 622 8.3 r/s 2 - 2	87 87 55 standard ur 2142/2307 1132/1297 1371 567 597 623 2 - 2	87 87 55 nits and the 2142/2307 1132/1297 1371 574 604 630 2 - 2	87 87 56 e secor 2273 2122 1371 753 783 809 2 - 2 21.5 44.9 -	87 87 56 nd one f 2273 2122 1371 921 952 997 3 - 3 27.5 57.4 -	87 87 56 for units 2273 2122 1371 930 962 1007 3 - 3 28.5 59.5	87 87 56 with op 2273 2122 1371 988 1024 1072 3 - 3 368.9	90 90 58 tion 23 2273 2122 1371 1084 1123 1160 2 2 4 19 39.7 19 39.7	9 9 5 5 B 2 2 1 1 1 1 1 2 2 4 1 3 3 1 3 3

In accordance with standard EN14511-3:2013

<sup>(3)</sup> 



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

In accordance with standard EN14825:2013, average climate
Cooling mode conditions: evaporator water entering/leaving temperature 12°C/7°C, outside air temperature 35°C, evaporator fooling factor 0 m².K/W

Cooling mode conditions: evaporator water entering/leaving temperature 23°C/18°C, outside air temperature 35°C, evaporator fooling factor 0 m².K/W
Heating mode conditions: water heat exchanger water entering/leaving temperature 40°C/45°C, outside air temperature 7°C db/6°C wb, evaporator fooling factor 0 m².K/W
Heating mode conditions: water heat exchanger water entering/leaving temperature 30°C/35°C, outside air temperature 7°C db/6°C wb, evaporator fooling factor 0 m².K/W

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

(1) In dB ref=10<sup>-12</sup> W, (A) weighting. Declared dualnumber noise emission values in accordance with ISO 9614-1 and certified by Eurovent.

 $In \ dB \ ref \ 20 \mu Pa, \ (A) \ weighting. \ Declared \ dual number \ noise \ emission \ values \ in \ accordance \ with \ ISO \ 4871 \ (with \ an \ associated \ uncertainty \ of \ +/-3dB(A)). \ For \ information, \ calculated \ from \ the \ sound \ accordance \ with \ ISO \ 4871 \ (with \ an \ associated \ uncertainty \ of \ +/-3dB(A)). \ For \ information, \ calculated \ from \ the \ sound \ accordance \ with \ ISO \ 4871 \ (with \ an \ associated \ uncertainty \ of \ +/-3dB(A)). \ For \ information, \ calculated \ from \ the \ sound \ accordance \ with \ information \ accordance \ information \ accordance \ with \ information \ accordance \ information \ accordance \ a$ (2) power level Lw(A).

Values shown are a guideline only. Please refer to the unit nameplate

# Physical data, 30RQSY (continued)

30RQSY		39	45	50	60	70	78	80	90	100	120	140	160
Air heat exchangers		Groov	ed coppe	er tubes	and alun	ninium fi	ns						
Fans		Axial F	lying Bir	d IV with	rotating	shroud							
Quantity		1	1	1	1	1	1	2	2	2	2	2	2
Maximum total air flow	l/s	3692	3690	3910	5278	4982	5267	7770	7380	7376	7818	9964	10534
Maximum rotation speed	r/s	16	16	16	18	18	18	16	16	16	16	18	18
Water heat exchanger (direct-expansion type)		Plate h	eat exch	anger, m	ax. wate	r-side op	erating p	ressure v	vithout hy	/dronic m	odule 10	000 kPa	
Water volume	1	2.6	3	4	4.8	4.8	5.6	8.7	8.7	9.9	11.3	12.4	14.7
With hydronic module (option)													
Single or dual pump (as selected)		Pump,	Victaulic	screen f	ilter, relie	f valve, e	xpansion	ı tank, pu	ırge valve	es (water	+ air), pr	essure s	ensors
Expansion tank volume	1	12	12	12	12	12	12	35	35	35	35	35	35
Expansion tank pressure (4)	bar	1	1	1	1	1	1	1	1.5	1.5	1.5	1.5	1.5
Max. water-side operating pressure	kPa	400	400	400	400	400	400	400	400	400	400	400	400
Water connections with/without hydronic module		Victau	lic										
Connections	in	2	2	2	2	2	2	2	2	2	2	2	2
Outside diameter	mm	60.3	60.3	60.3	60.3	60.3	60.3	60.3	60.3	60.3	60.3	60.3	60.3
Chassis paint colour		Colou	r code: F	RAL7035									

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

# Electrical data, 30RBSY

30RBSY without hydronic module		039	045	050	060	070	080	090	100	120	140	160
Power circuit												
Nominal power supply	V-ph-Hz	400-3-	50									
Voltage range	V	360-44	0									
Control circuit supply		24 V vi	a internal	transform	er							
Maximum start-up current (Un)*												
Standard unit	Α	116	137	145	148	176	213	179	213	253	244	287
Unit with electronic starter option	Α	75	87	94	96	114	140	130	155	181	186	215
Unit power factor at maximum capacity**		0.83	0.81	0.81	0.83	0.81	0.78	0.83	0.81	0.79	0.81	0.78
Maximum operating power input**	kW	21	24	26	30	32	36	46	49	56	64	73
Nominal unit operating current draw***	Α	28	32	36	39	43	53	61	67	83	86	106
Maximum operating current draw (Un)****	Α	37	47	49	55	67	73	86	104	113	135	147
Maximum operating current draw (Un-10%)†	Α	41	52	54	61	75	80	94	116	123	150	160
Customer-side unit power reserve		Custon	ner reserv	e at the 2	4 V contro	l power ci	rcuit					
Short-circuit stability and protection		See tal	ole 9.1									

- Maximum instantaneous start-up current at operating limit value (maximum operating current of the smallest compressor(s) + fan current + locked rotor current of the largest compressor).
- Power input, at the unit permanent maximum operating conditions (data given on the unit nameplate)

  Standardised Eurovent conditions: evaporator entering/leaving water temperature 12°C/7°C, outside air temperature 35°C.
- Maximum unit current at 400 V, non permanent operating conditions (values given on the unit nameplate).
- Maximum unit operating current at 360 V, non permanent operating conditions

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

30RBSY	039	045	050	060	070	080	090	100	120	140	160
Value with unspecified upstream protection											
Short-term current at 1s - Icw - kA rms	3.36	3.36	3.36	3.36	3.36	3.36	5.62	5.62	5.62	5.62	5.62
Admissible peak current - lpk - kA pk	20	20	20	20	20	15	20	20	15	20	15
Max. value with upstream protection by circuit I	reaker										
Conditional short-circuit current lcc - kA rms	40	40	40	40	40	40	40	40	40	30	30
Schneider circuit breaker - Compact series	NS100H	NS160H	NS160H	NS250H	NS250H						
Reference No.**	29670	29670	29670	29670	29670	29670	29670	30670	30670	31671	31671

Earthing system type

The short-circuit stability current values above are in accordance with the TN system.

# Electrical data, 30RQSY

30RQSY without hydronic module		039	045	050	060	070	078	080	090	100	120	140	160
Power circuit													
Nominal power supply	V-ph-Hz	400-3-	-50										
Voltage range	V	360-44	40										
Control circuit supply		24 V v	ia interna	al transfor	mer								
Maximum start-up current (Un)*													
Standard unit	Α	116	137	145	148	176	213	219	179	213	253	244	287
Unit with electronic starter option	Α	75	87	94	96	114	143	149	130	155	181	186	215
Unit power factor at maximum capacity**		0.83	0.81	0.81	0.83	0.81	0.83	0.83	0.83	0.81	0.79	0.81	0.78
Maximum operating power input**	kW	21	24	26	30	32	36	39	46	49	56	64	73
Nominal unit operating current draw***	Α	28	32	36	39	43	53	59	61	67	83	86	106
Maximum operating current draw (Un)****	Α	37	47	49	55	67	73	79	86	104	113	135	147
Maximum operating current draw (Un-10%)†	Α	41	52	54	61	75	80	85	94	116	123	150	160
Customer-side unit power reserve		Customer reserve at the 24 V control power circuit											
Short-circuit stability and protection		See ta	ble 9.1										

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

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

30RQSY	039	045	050	060	070	078	080	090	100	120	140	160
Value with unspecified upstream protection												
Short-term current at 1s - lcw - kA rms	3.36	3.36	3.36	3.36	3.36	3.36	3.36	5.62	5.62	5.62	5.62	5.62
Admissible peak current - lpk - kA pk	20	20	20	20	20	15	15	20	20	15	20	15
Max. value with upstream protection by circu	it breakei	•										
Conditional short-circuit current lcc - kA rms	40	40	40	40	40	40	40	40	40	40	30	30
Schneider circuit breaker - Compact series	NS100H	NS100H	NS100H	NS100H	NS100H	NS100H	NS100H	NS100H	NS160H	NS160H	NS250H	NS250H
Reference No.**	29670	29670	29670	29670	29670	29670	29670	29670	30670	30670	31671	31671

The short-circuit stability current values above are in accordance with the TN system.

If another current limitation protection system is used, its time-current and thermal constraint (I2t) trip characteristics must be at least equivalent to those of the recommended Schneider circuit breaker. Contact your nearest Carrier office.

If another current limitation protection system is used, its time-current and thermal constraint (I<sup>2</sup>t) trip characteristics must be at least equivalent to those of the recommended Schneider circuit breaker. Contact your nearest Carrier office.

# 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 unit at full load is rarely representative of the actual performance of the units, as on average a unit 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,	1				
75	26.7	EER,	42				
50	18.3	EER <sub>3</sub>	45				
25	12.8	EER4	12				
ESEER =	ESEER = EER, x 1% + EER, x 42% + EER, x 45% + EER, x 12%						

Note: Constant leaving water temperature 6.67°C.

# SCOP (In accordance with standard EN14825:2013, average climate)

The SCOP (Seasonal Coefficient of Performance) permit evaluation of the average energy efficienty at part load, based on multipoint conditions (16°C to -10°C for average climate) and number of hours occurring at each air temperature (Bin hours). To be able to compare the energy efficiency of boilers using a primary energy source (gas or fuel) with heat pumps using a final energy source (electricity), the seasonal efficiency criteria used by the Ecodesign regulations is known as s it is based on the use of primary energy sources and expressed in %

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,	3				
75	30	EER,	33				
50	25	EER <sub>3</sub>	41				
25	20	EER4	23				
ESEER =	ESEER = EER, x 3% + EER, x 33% + EER, x 41% + EER, x 23%						

Note: Constant leaving water temperature 7°C.

#### Electrical data and operating conditions notes:

- 30RBSY/RQSY 039-160 units have a single power connection point located immediately upstream of the field power connections.
- The control box includes the following standard features:
  - Starter and motor protection devices for each compressor, the fans and the pump
  - The control devices
- A main disconnect switch can be installed within the box with the option 70.
   Field connections:
- All connections to the system and the electrical installations must be in full accordance with all applicable local codes.
- The Carrier 30RBSY/RQSY units are designed and built to ensure conformance with these codes. The recommendations of European standard EN 60204-1 (machine safety - electrical machine components part 1: general regulations - corresponds to IEC 60204-1) are specifically taken into account, when designing the electrical equipment\*.
- An auxiliary contactor is available with the QF breaker allowing a safety channel installation to ensure a feedback output about heater and board power supply status and then prevent evaporator from frosting when heaters and boards are off.

### NOTES:

- Generally the recommendations of IEC 60364 are accepted as compliance with the requirements of the installation directives. Conformance with EN 60204-1 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.
- The operating environment for the 30RBSY/RQSY units is specified below:

- Environment\*\* Environment as classified in EN 60721 (corresponds to IEC 60721):
  - Outdoor installation\*\*
  - Ambient temperature range: -20°C to +48°C, class 4K4H
  - Altitude: ≤ 2000 m (for hydronic kit see chapter 9.2 of the installation manual)
  - Presence of hard solids, class 4S2 (no significant dust present)
  - Presence of corrosive and polluting substances, class 4C2 (negligible)
- Power supply frequency variation: ± 2 Hz.
- The neutral (N) conductor must not be connected directly to the unit (if necessary use a transformer).
- Overcurrent protection of the power supply conductors is not provided with the unit.
- The factory-installed disconnect switch (option 70) is of a type suitable for power interruption in accordance with EN 60947.
- The units are designed for connection to TN(S) networks (IEC 60364). For IT networks the earth connection must not be at the network earth. Provide a local earth, consult competent local organisations to complete the electrical installation. Units delivered with speed drive (options 116J/K/V/W) are not compatible with IT network.

Caution: 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 absence of main power disconnect switch on standard machines is an exception that must be taken in account at field installation level.
- \*\* The required protection level for this class is IP43BW (according to reference document IEC 60529). All 30RBSY/RQSY units fulfil this protection condition.
  - Closed electrical box is IP44CW
  - Open electrical box (when accessing to interface) is IPxxB

# Operating limits, 30RBSY

# **Evaporator water flow rate**

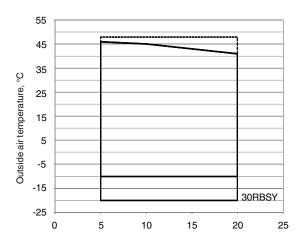
30RBSY	Flow rate, I/s	S			
	Minimum	Maximum*	Maximum dual pump**		
			Low pressure***	High pressure***	
039	0.9	3.0	2.9	3.4	
045	0.9	3.4	3.2	3.8	
050	0.9	3.7	3.3	4.0	
060	0.9	4.2	3.7	4.4	
070	1.0	5.0	4.1	5.0	
080	1.2	5.5	4.4	5.2	
090	1.3	6.8	5.1	6.2	
100	1.5	7.7	6.3	6.5	
120	1.7	8.5	6.5	8.0	
140	2.0	10.6	7.9	8.7	
160	2.3	11.2	8.2	8.9	

Maximum flow rate at a pressure drop of 100 kPa in the plate heat exchanger (unit

# **Operating range**

30RBSY		Minimum	Maximum
Evaporator			
Entering water temperature at start-up	°C	7.5*	30
Leaving water temperature during operation	°C	5**	20
Entering/leaving water temperature difference	K	3	10
Condenser			
Entering air temperature, full load***	°C	-20	46
Entering air temperature, part load***	°C	-20	48
Hydronic module****			
Entering air temperature			
Kit without pump	°C	-20	-
Kit with pump (option 116x)	°C	-10	-
Kit with pump (option 116x) and frost protection option to -20°C (option 42)	°C	-20	-

Note: Do not exceed the maximum operating temperature.



Evaporator leaving water temperature, °C

Full load ■■■ Minimum load

Note: This operating range applies up top 130 Pa static pressure without suction air

duct for sizes 070-080 and 140-160, and up to 240 Pa for all other sizes.

<sup>\*\*</sup> Maximum flow rate at an available pressure of 20 kPa (unit with low-pressure hydronic module) or 50 kPa (high-pressure module).

\*\* Maximum flow rate at an available pressure of 20 kPa (unit with low-pressure hydronic module).

Maximum flow rate with single pump is 2 to 4% higher, depending on the size.

<sup>\*\*</sup> For low-temperature applications, where the leaving water temperature is below 5°C, a frost protection solution must be used.

\*\*\* For transport and attended to the second second temperature is below 5°C, as frost protection solution must be used.

<sup>\*\*\*</sup> For transport and storage of the 30RBSY units the minimum and maximum allowable temperatures are -20°C and +48°C. It is recommended that these temperatures are used for

Defines the frost-free temperature of the hydronic components for use without glycol.

# Operating limits, 30RQSY

# Water heat exchanger water flow rate

30RQSY	Flow rate, I/s	Flow rate, I/s							
	Minimum	Maximum*	Maximum dual pump**						
			Low pressure***	High pressure***					
039	0.9	3.0	2.9	3.4					
045	0.9	3.4	3.2	3.8					
050	0.9	4.2	3.7	4.4					
060	0.9	5.0	4.1	5.0					
070	1.0	5.0	4.1	5.0					
078	1.2	5.5	4.4	5.2					
080	1.2	6.8	5.1	6.2					
090	1.3	6.8	5.1	6.2					
100	1.5	7.7	6.3	6.5					
120	1.7	8.5	6.5	8.0					
140	2.0	10.6	7.9	8.7					
160	2.3	11.2	8.2	8.9					

Maximum flow rate at a pressure drop of 100 kPa in the plate heat exchanger (unit without hydronic module).

# Operating range, standard unit, cooling mode

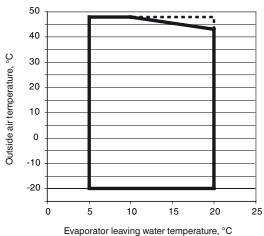
30RQSY		Minimum	Maximum
Evaporator			
Entering water temperature at start-up	°C	7,5*	30
Leaving water temperature during operation	°C	5**	20
Entering/leaving water temperature difference	K	3	10
Condenser			
Entering air temperature***	°C	-20	46

Note: Do not exceed the maximum operating temperature.

- For entering water temperatures below 7.5°C at start-up, contact Carrier.
- For low-temperature applications, where the leaving water temperature is below  $5^{\circ}\text{C}$ ,
- a frost protection solution must be used.

  \*\*\* For transport and storage of the 30RQSY 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.

# 30RQSY (cooling mode)



Full load ... Minimum load

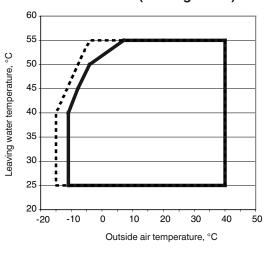
Note: This operating range applies up top 130 Pa static pressure without suction air duct for sizes 060, 070 and 078 and 140-160, and up to 240 Pa for all other sizes.

### Operating range, standard unit, heating mode

30RQSY		Minimum	Maximum
Condenser			
Entering water temperature at start-up	°C	8	45
Leaving water temperature during operation	°C	25	55
Entering/leaving water temperature difference	K	3	10
Evaporator			
Air temperature	°C	-15	40

Note: Do not exceed the maximum operating temperature.

# 30RQSY (heating mode)



Full load ... Minimum load

Maximum flow rate at an available pressure of 20 kPa (unit with low-pressure hydronic module) or 50 kPa (high-pressure module).

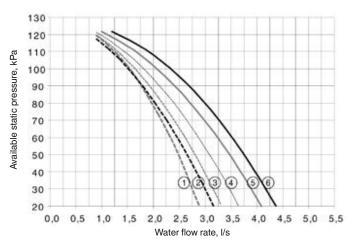
Maximum flow rate with single pump is 2 to 4% higher, depending on the size.

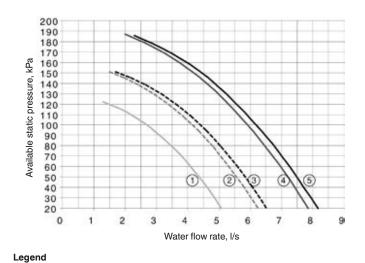
# Available external static pressure, 30RBSY

Data applicable for:

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

### Low-pressure pump



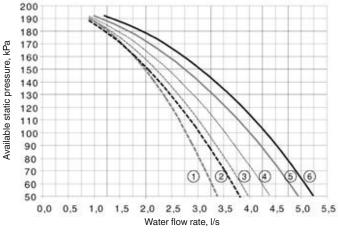


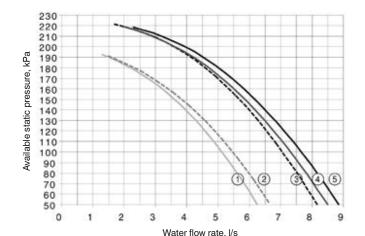
#### Legend

- 30RBSY 039 30RBSY 045

- 30RBSY 070 30RBSY 080
- 30RBSY 050 30RBSY 060

# **High-pressure pump**





#### Legend

- 30RBSY 039 30RBSY 045
- 30RBSY 050 30RBSY 060
- 30RBSY 070
- 30RBSY 080

#### Legend

30RBSY 090 30RBSY 100

30RBSY 090

30RBSY 100

30RBSY 120 30RBSY 140

30RBSY 160

3. 4. 5.

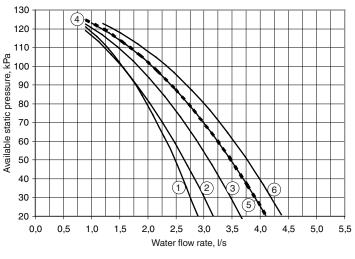
- 30RBSY 120 30RBSY 140
- 2. 3. 4. 5. 30RBSY 160

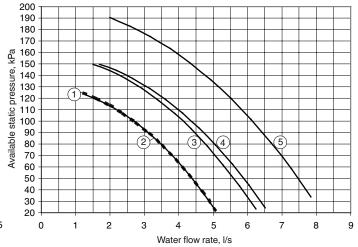
# Available external static pressure, 30RQSY

## Data applicable for:

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

## Low-pressure pump





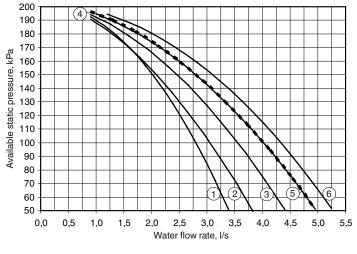
#### Legend

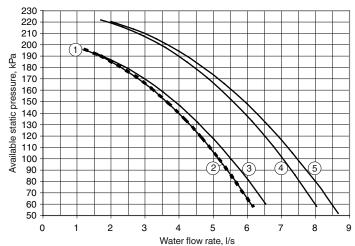
- 30RQSY 039
   30RQSY 045
   30RQSY 050
   30RQSY 060
- 30RQSY 060
   30RQSY 070
   30RQSY 078

### Legend

1. 30RQSY 080 2. 30RQSY 090 3. 30RQSY 100 4. 30RQSY 120 5. 30RQSY 140

## **High-pressure pump**





#### Legend

1. 30RQSY 039 2. 30RQSY 045 3. 30RQSY 050 4. 30RQSY 060 5. 30RQSY 070 6. 30RQSY 078

#### Legend

1. 30RQSY 080 2. 30RQSY 090 3. 30RQSY 100 4. 30RQSY 120 5. 30RQSY 140

# Air pressure drop

#### Selection of a ductable unit

The 30RBSY and 30RQSY ranges are designed for indoor installation in a plant room. For this type of installation the cold or hot air leaving the air-cooled air heat exchangers is discharged by the fans to the outside of the building, using a duct system.

The units are equipped with fans with available pressure, designed to operate with air discharge ducts with maximum pressure drops of 180 Pa or 240 Pa on certain sizes.

To compensate for these pressure drops this range of ductable units equipped with variable-speed fans with a maximum speed of 19 r/s.

In the cooling mode, 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.

In the heating mode, the full-load or part-load speed of each circuit is fixed and at the configured maximum (range configurable from 12 r/s to 19 r/s) based on the constraints and characteristics of the installation site. The maximum configured speed applies to both the heating and cooling mode.

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

To collect the defrost water from the coils in the heating mode, 30RQSY units must be installed on an appropriate surface to permit efficient condensate drainage and evacuation and to prevent any risk of flooding at the site. A condensate collection pan is available for 30RBSY 039-080 and 30RQSY 039-078 units.

### Selection based on the pressure drop

The cooling and heating capacities are given for an available pressure of 160 Pa and for a unit without filter.

To calculate the performances at other pressure drops please use the correction factors below.

### **Cooling mode**

#### 30RBSY 039-060/30RBSY 090-120 and 30RQSY 039-050/30RQSY 080-120

Duct pressure drop	Fan speed, r/s	Power input coefficient	Cooling capacity coefficient
0	12.00	0.943	1.019
50	13.33	0.962	1.012
100	14.66	0.980	1.006
130	15.46	0.990	1.003
160	16.26	1.000	1.000
200	17.31	1.012	0.998
240	18.36	1.023	0.996

#### 30RBSY 070-080/30RBSY 140-160 and 30RQSY 060-078/30RQSY 140-160

Duct pressure drop	Fan speed, r/s	Power input coefficient	Cooling capacity coefficient
0	15.83	0.929	1.018
50	16.81	0.944	1.016
100	17.78	0.964	1.014
130	18.36	0.978	1.011
160	18.36	1.000	1.000
180	18.36	1.019	0.991

#### Heating mode

#### 30RQSY 039-050/30RQSY 080-120

Duct pressure drop	Fan speed, r/s	Power input coefficient	Heating capacity coefficient
0	18.36	0.990	1.016
50	18.36	0.990	1.012
100	18.36	0.990	1.009
130	18.36	1.000	1.005
160	18.36	1.000	1.000
200	18.36	1.000	0.994
240	18.36	1.010	0.981

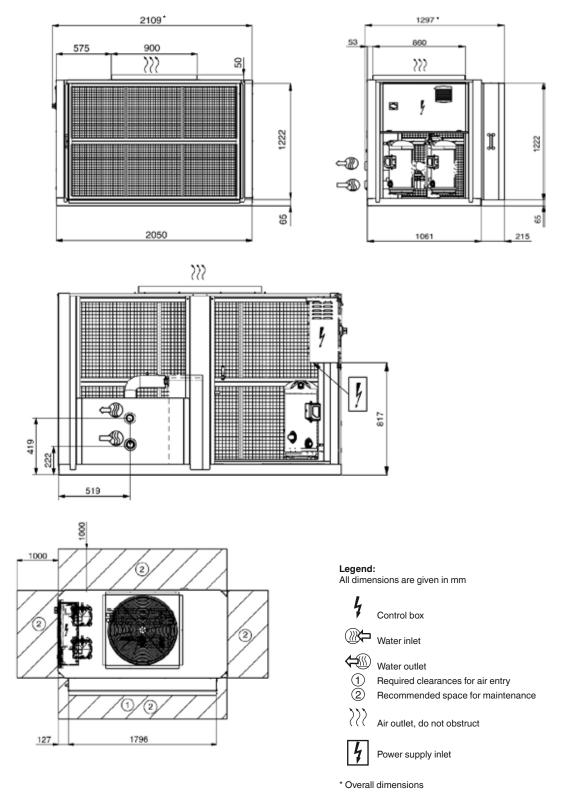
### 30RQSY 060-078/30RQSY 140-160

Duct pressure drop	Fan speed, r/s	Power input coefficient	Heating capacity coefficient
0	18.36	1.000	1.026
50	18.36	1.000	1.020
100	18.36	1.000	1.011
130	18.36	1.000	1.007
160	18.36	1.000	1.000
180	18.36	1.001	0.993

## Note:

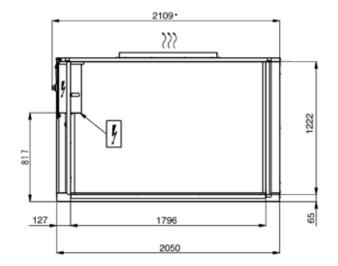
Pressure drop, clean filter = 6 Pa Pressure drop, dirty filter = 12 Pa

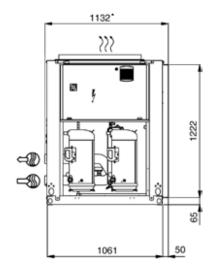
30RBSY 039-050 and 070 and 30RQSY 039-045, units with and without hydronic module, without filter frame

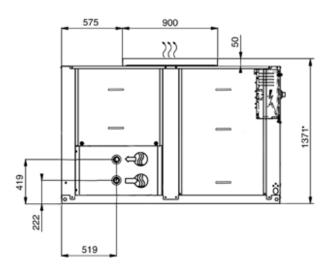


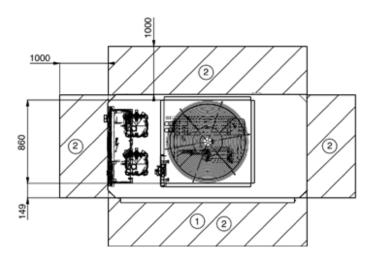
- Notes:
  A Non-certified drawings.
  - Refer to the certified dimensional drawings supplied with the unit or available on request, when designing an installation. For the location of fixing points, weight distribution and coordinates of the centre of gravity refer to the certified dimensional drawings.
- B Provide a gutter around the unit to collect the condensate water or install the accessory condensate collection pan (30RBSY 039-080/30RQSY 039-078).
- C The unit must be installed level (less than 2 mm per metre deviation in both
- D Units 30RBSY 039-080 and 30RQSY 039-078 are equipped with a sleeve on the air heat exchanger side to allow connection of a suction air frame.

30RBSY 039-050 and 070 and 30RQSY 039-045, option 23B, units with and without hydronic module, with filter frame









#### Legend:

All dimensions are given in mm



Control box



Water inlet



Water outlet



Required clearances for air entry



Recommended space for maintenance



Air outlet, do not obstruct



Power supply inlet

### Notes:

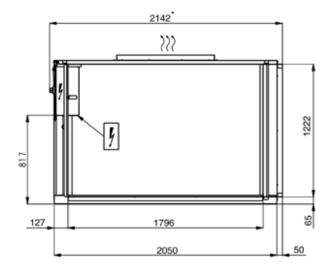
A Non-certified drawings.

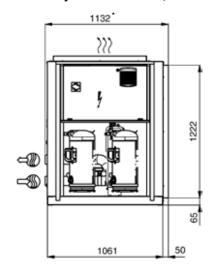
Refer to the certified dimensional drawings supplied with the unit or available on request, when designing an installation. For the location of fixing points, weight distribution and coordinates of the centre of gravity refer to the certified dimensional drawings.

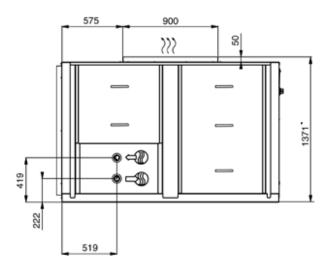
- B Provide a gutter around the unit to collect the condensate water or install the accessory condensate collection pan (30RBSY 039-080/30RQSY 039-078).
- C The unit must be installed level (less than 2 mm per metre deviation in both
- D Units 30RBSY 039-080 and 30RQSY 039-078 are equipped with a sleeve on the air heat exchanger side to allow connection of a suction air frame.

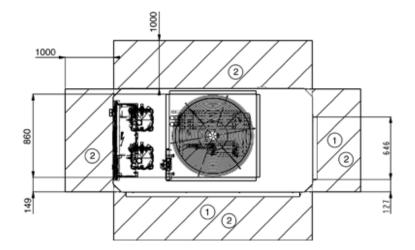
<sup>\*</sup> Overall dimensions

30RBSY 060 and 080 and 30RQSY 050-078, units with and without hydronic module, without filter frame









### Legend:

All dimensions are given in mm



Control box



Water inlet



Water outlet

Required clearances for air entry Recommended space for maintenance

Air outlet, do not obstruct



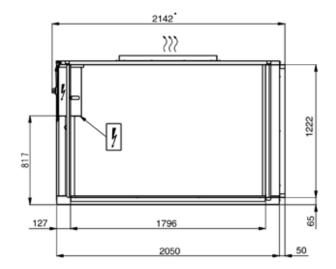
Power supply inlet

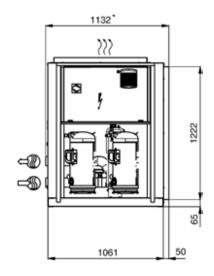
\* Overall dimensions

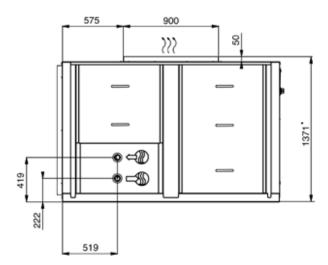
#### Notes:

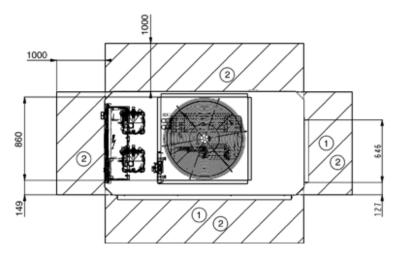
- Non-certified drawings.
  - Refer to the certified dimensional drawings supplied with the unit or available on request, when designing an installation. For the location of fixing points, weight distribution and coordinates of the centre of gravity refer to the certified dimensional drawings.
- Provide a gutter around the unit to collect the condensate water or install the accessory condensate collection pan (30RBSY 039-080/30RQSY 039-078).
- The unit must be installed level (less than 2 mm per metre deviation in both
- Units 30RBSY 039-080 and 30RQSY 039-078 are equipped with a sleeve on the air heat exchanger side to allow connection of a suction air frame.

30RBSY 060 and 080 and 30RQSY 050-078, option 23B, units with and without hydronic module, with filter frame









### Legend:

All dimensions are given in mm



Control box



Water inlet



Water outlet



Required clearances for air entry



Recommended space for maintenance



Air outlet, do not obstruct



Power supply inlet

\* Overall dimensions

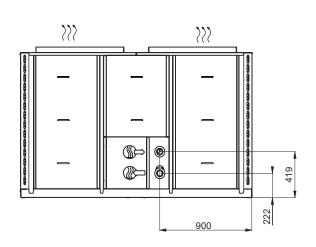
#### Notes:

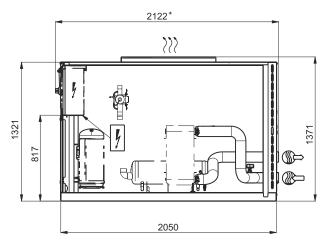
A Non-certified drawings.

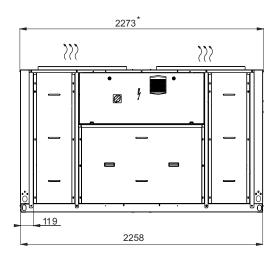
Refer to the certified dimensional drawings supplied with the unit or available on request, when designing an installation. For the location of fixing points, weight distribution and coordinates of the centre of gravity refer to the certified dimensional drawings.

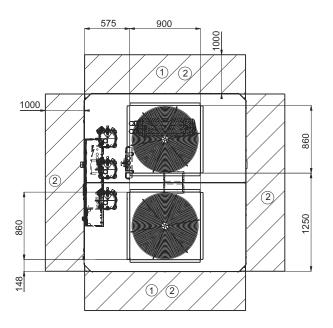
- B Provide a gutter around the unit to collect the condensate water or install the accessory condensate collection pan (30RBSY 039-080/30RQSY 039-078).
- C The unit must be installed level (less than 2 mm per metre deviation in both axes).
- D Units 30RBSY 039-080 and 30RQSY 039-078 are equipped with a sleeve on the air heat exchanger side to allow connection of a suction air frame.

# 30RBSY 090-120 and 30RQSY 080-120, units with and without hydronic module









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



Control box



Water inlet



Water outlet

Required clearances for air entry

Recommended space for maintenance



Air outlet, do not obstruct



Power supply inlet

\* Overall dimensions

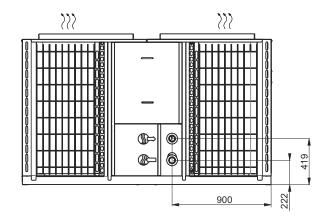
### Notes:

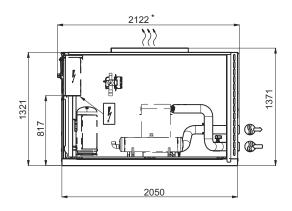
Non-certified drawings.

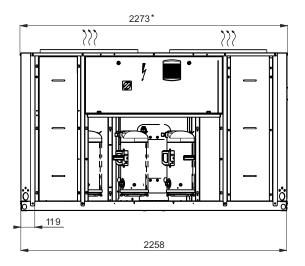
Refer to the certified dimensional drawings supplied with the unit or available on request, when designing an installation. For the location of fixing points, weight distribution and coordinates of the centre of gravity refer to the certified dimensional drawings.

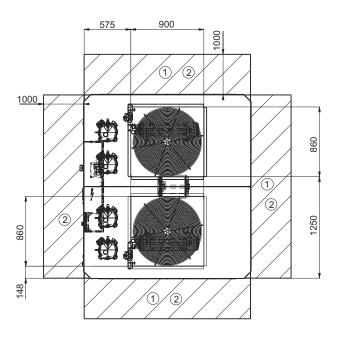
The unit must be installed level (less than 2 mm per metre deviation in both

# 30RBSY 140-160 and 30RQSY 140-160, units with and without hydronic module









### Legend:

All dimensions are given in mm



Control box



Water inlet



Water outlet

1) R

Required clearances for air entry
Recommended space for maintenance



Air outlet, do not obstruct



Power supply inlet

\* Overall dimensions

### Notes:

A Non-certified drawings.

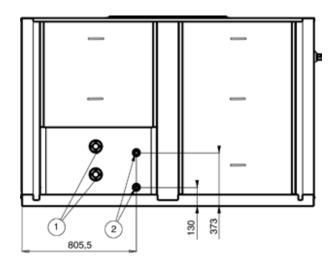
Refer to the certified dimensional drawings supplied with the unit or available on request, when designing an installation. For the location of fixing points, weight distribution and coordinates of the centre of gravity refer to the certified dimensional drawings.

B The unit must be installed level (less than 2 mm per metre deviation in both axes).

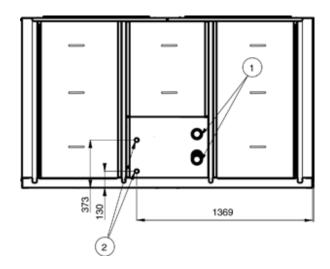
# Dimensions/clearances for 30RBSY/RQSY units with option 49

# Position of the desuperheater inlets and outlets

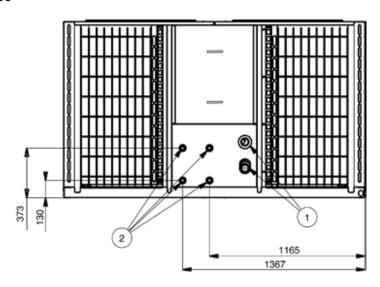
# 30RBSY/RQSY 039-080



# 30RBSY/RQSY 090-120



# 30RBSY/RQSY 140-160



<sup>1</sup> Unit water inlet and outlet

Water inlet and outlet, unit with option 49



Quality and Environment Management Systems Approval

