Technical Bulletin

BT16B015GB-04

SPINchiller[3]

High efficiency air cooled reversible heat pump for outdoor installation

WSAN-XSC3 90.4-240.4 RANGE

Nominal heating capacity from 283 kW to 692 kW
Nominal cooling capacity from 232 kW to 595 kW

- R-410A modular scroll technology
- Two independent refrigeration circuits
- Partial recovery of the condensing heat

EXCELLENCE version

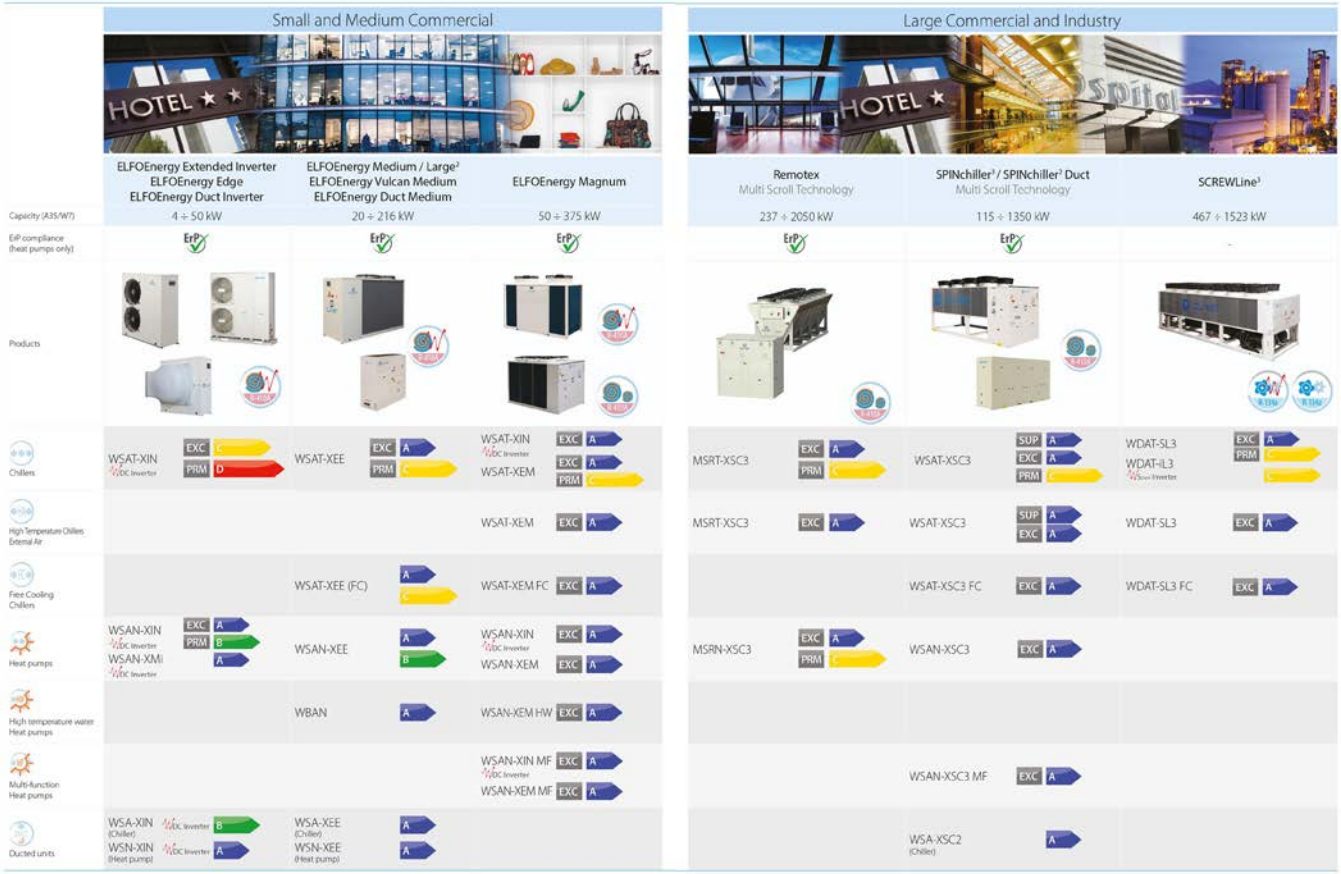
- Eurovent Class A / Up to 48°C outdoor air temperature

Clivet is taking part in the EUROVENT certification programme.
The products concerned appear in the certified products list of the EUROVENT www.eurovent-certification.com site.

Clivet hydronic system

Designed to provide high energy efficiency and sustainability of the investment, the wide range of Clivet liquid chillers and heat pumps for high efficiency air conditioning of Residential and Commercial spaces and for Industrial applications it is available with air or water source.

HYDRONIC System - Air Source



Specialization

Every intended use has specific requirements which determine the overall efficiency. For this, the Clivet hydronic system always offers the best solution in every project.

- Modular range with over 8000 kW of overall capacity
- Capacity control with Screw and modular Scroll technology
- Multifunction versions
- Outdoor or indoor (ductable type) installation

Centrality of the Air Renewal

From the Air Renewal depends the comfort in the spaces. Since it often represents the main building energetic load, it also determines the running costs of the entire system.

ZEPHIR3
Packaged Primary Air supply system with thermodynamic energy recovery.

- Simplifies the system, reduces the heating and cooling generators
- Purifies the air with standard electronic filters
- Increases the energy efficiency and it also allows a savings of 40% on the running costs
- From –40°C to +50°C of outdoor air temperature

Terminal and AHU complete system

The hydronic terminal units are very diffused for their versatility and reliability. The Clivet range includes many versions that simplify the application in differents type of installation and building.

ELFOSpace
High energy efficiency hydronic terminal units

AQX
Air-conditioning unit

- Cased and uncased terminal units, from 1 to 90 kW
- Horizontal and vertical installation
- Energy-saving DC fans
- Modular air conditioning units up to 160.000 m³/h
- EUROVENT certification

SPINchiller³: modular scroll technology for every application

SPINchiller³ is the new generation of Clivet liquid chillers and heat pump with modular scroll technology. Thanks to its high seasonal efficiency and range versatility, it represents the ideal solution for different types of installation.

WSAT-XSC3

Air cooled water chiller

- EXCELLENCE high efficiency version and PREMIUM compact version
- Operating with 52°C of outdoor air temperature
- Total / partial recovery of the condensing heat
- Eurovent certification

Dedicated series separately documented

WSAT-XSC3 FREE-COOLING

Air cooled water chiller with FREE-COOLING

- Direct FREE-COOLING
- Indirect FREE-COOLING (No-Glycol)

Dedicated series separately documented

WSAN-XSC3

Air cooled heat pump

- EXCELLENCE high efficiency version
- Eurovent certification

WSAN-XSC3 MULTIFUNCTION

Air cooled heat/cool heat pump with simultaneous operating

- EXCELLENCE high efficiency version
- 4-pipe system
- 2-pipe system and total condensing heat recovery

Dedicated series separately documented

Cost or reliability?

The dilemma of modern system engineering applications

Air-conditioning systems in trade centres influence both the starting investment and monthly management costs, for the whole of their working lives. This theme is even more relevant in residential applications with centralised systems. Furthermore, maximum working flexibility requirements should be added to that, in serving different users while avoiding wasting energy and thus, money. Finally, there are several industrial applications which require hot or chilled water as service fluid, process fluid or vector fluid for operator comfort and for conserving goods and enabling cycles to function correctly. Furthermore, in all these cases, the working reliability of the system is decisive.



High efficiency hydronic systems

The high efficiency hydronic systems are extremely versatile, reliable and widespread

Despite their apparently low costs, split, multi-split and VRF direct expansion systems have a lot of limits in these applications. For example, they require a separate system for primary air treatment. The pipes that contain the refrigerant cross the served rooms and therefore they are subject to restrictions and use limitations. They cannot operate in the FREE-COOLING mode, the high efficiency and convenient mode that allows energy savings.

The hydronic systems are certainly more complete and versatile. They make it possible to adopt various types of terminals in the served environment, from fan coil units exposed or integrated in the furnishings, up to radiant or induction systems. They are also irreplaceable in the service and process industrial applications.

The main component performances, like air-cooled liquid chillers and hydronic heat pumps, are checked and certificated by appropriate certification programs, as Eurovent.

Clivet technological evolution

Clivet chillers reduce consumption and are compact and reliable

With over twenty years of technological evolution, Clivet liquid chillers and heat pumps represent the state of the art in air-conditioning of residential, trade and industrial environments.

Their success is based on high energy efficiency, compactness and management maintenance simplicity, with wide versatility in the choice of the most suitable model for the specific use.

SPINchiller[3]

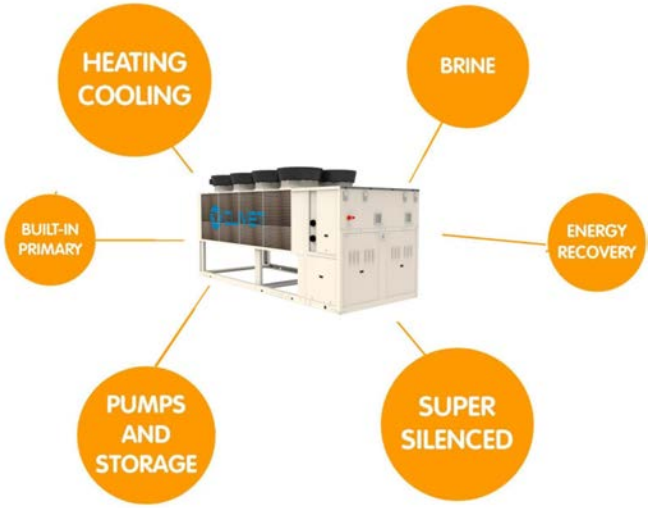
Provides all Clivet technological developments for their medium capacity hydronic systems

High efficiency Scroll compressors, high performance heat exchangers, electronic control fans, fully automatic operation: these are only some of the technologies available with SPINchiller[3], in a range of models that are ideal for high capacity air conditioning systems in commercial, residential and industrial buildings.

The best combination between the initial investment and the costs throughout the entire life cycle of the system.

- the EXCELLENCE SC version stands out for its extremely high energy efficiency under both part and full load conditions. (A- class Eurovent certification)

SPINchiller[3] can also be supplied in many configurations equipped with the main components installed built-in.



Advantages

High efficiency all year round

SPINchiller[3] reduces yearly energy consumption thanks to its high part-load efficiency i.e., by far the most frequent condition throughout the system's life-cycle. This way, even the value of the served building increases. The main components are manufactured on an industrial scale, with maximum manufacturing reliability and can be easily found as spare parts.

To further increase energy efficiency in a system with several SPINchiller[3] units operating on the same equipment, there is the innovative ECOSHARE feature, which automatically distributes the load and activates the necessary pumps.

System simplification

All of the features are provided by Clivet already assembled and tested built-in, differently then other manufacturers who make numerous additional components available to be installed on site.

Compact and versatile

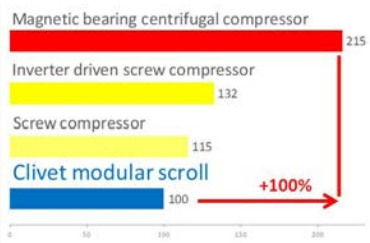
Suitable for any type of terminals, from fan coils to radiant systems and chilled beams, SPINchiller[3] heat pump is also available in Super-silenced configuration. Energy recovery for producing hot water free of charge, Master-Slave management devices.

Borderless multiscroll technology

With SPINchiller[3] the modular scroll compressor technology reaches the best levels of performance and versatility ever, guaranteeing competitiveness in more and more demanding applications. The top class seasonal efficiency rewards SPINchiller[3] in comparison to any other air cooled chiller technology. A comparison with three SPINchiller competitors such as:

- air cooled liquid chillers with magnetic bearing centrifugal compressors;
- air cooled liquid chillers with modulating capacity screw compressors;
- air cooled liquid chillers with inverter screw compressors

shows that SPINchiller[3] is the best solution, considering its seasonal efficiency similar to the inverter screw chillers and a capital cost lower than that of centrifugal compressor chillers, even considering the capital investment pay back, that for analized technologies are always above acceptable values normally considered for system investment equal to 3 years.



Average capital investment for 500 kW installation proportional with scroll technology

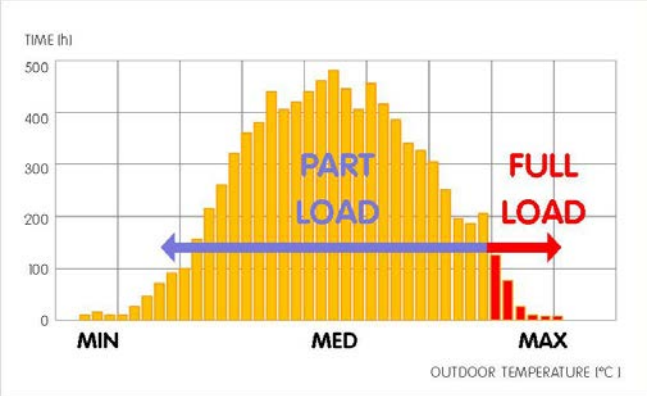
Comfort and energy saving in one solution

Maximum efficiency is necessary with a part load

The system is required to generate maximum capacity only for a short amount of time.

Therefore, it is essential to have the maximum efficiency under part-load conditions.

This is the only way to actually reduce overall yearly consumptions.



Part load efficiency determines the seasonal efficiency

Seasonal efficiency is conventionally represented by ESEER parameters according to Eurovent and IPLV parameters according to ARI. Both give great importance to part load operation, since it is the predominant condition.

SYSTEM LOAD	WEIGHT (ESEER) *	WEIGHT (IPLV) *
100%	3%	1%
75%	33%	42%
50%	41%	45%
25%	23%	12%

* EUROVENT (ESEER) supply times reference and ARI (IPLV) reference for seasonal efficiency calculations.

SPINchiller technology enhances part-load efficiency

SPINchiller[3] uses high efficiency Scroll compressors.

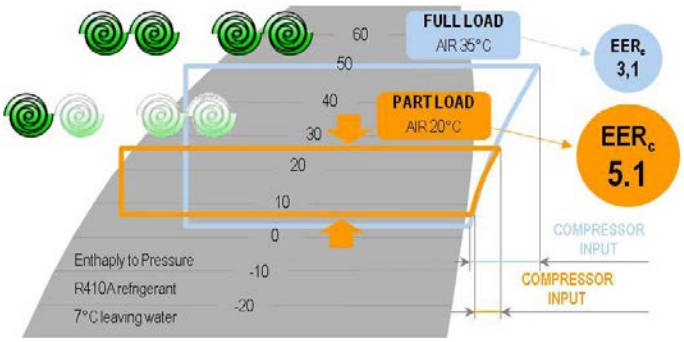
The advantages are:

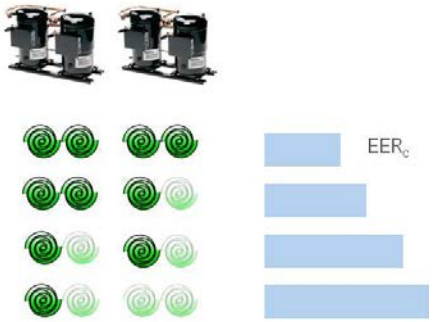
- compressors manufactured in large ranges on an industrial scale with strict quality control inspections and maximum manufacturing reliability thanks to the high production volumes;
- every refrigeration circuit uses two or three Scroll compressors, depending on the different sizes of the unit. When two compressors are used, their sizes are different in order to obtain more control steps. This way, only the necessary energy is supplied.

Doubled efficiency

The heat exchange surface is sized for full capacity operation. Under part load condition, some compressors are automatically deactivated. Under this condition, in fact, the compressors in operation make use of a much larger surface.

This entails a reduced condensation temperature and an increased evaporation temperature. This way, the compressor capacity consumption is reduced with respect to the yield thereby increasing the overall efficiency of the unit.





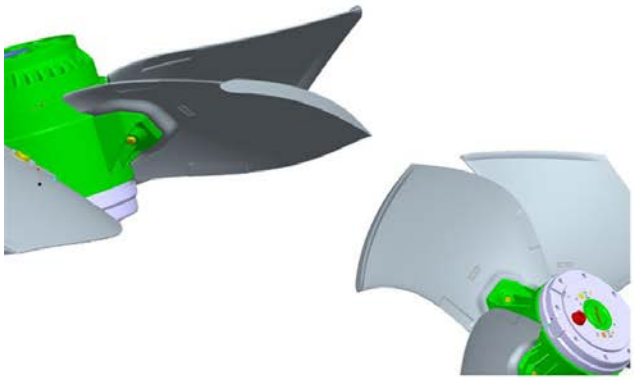
EERc = Energy effieciency referred to compressors

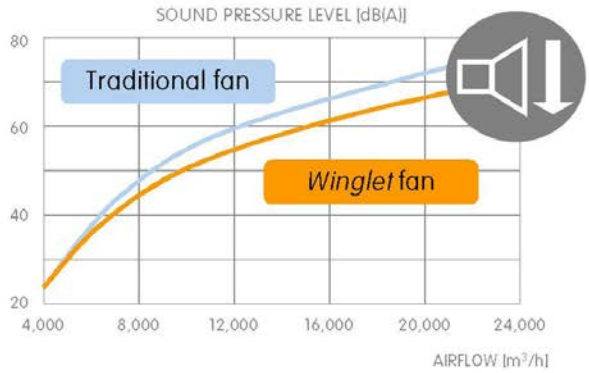
Efficient and silent ventilation technology

Advanced aerofoil fans

The external axial fans are equipped with the innovative Winglet airfoil-vane with integrated baffle, able to increase the aerodynamic efficiency.

It results in a consumption reduction of the 10% and a medium sound emission lower of 6 dB than the traditional fans.

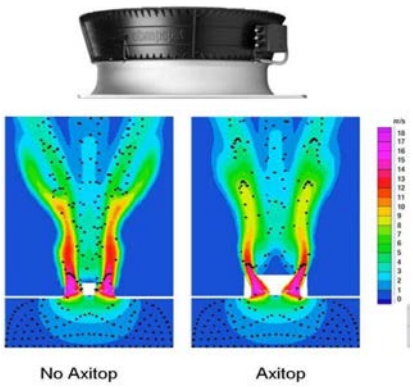




Diffusers for fans

Also the innovative air handling system on the external exchangers is the result of the Clivet design evolution. The new AxiTop diffuser creates an ideal air distribution: it aerodynamically decelerates the flow and transforms a big part of its dynamic energy in static pressure, obtaining:

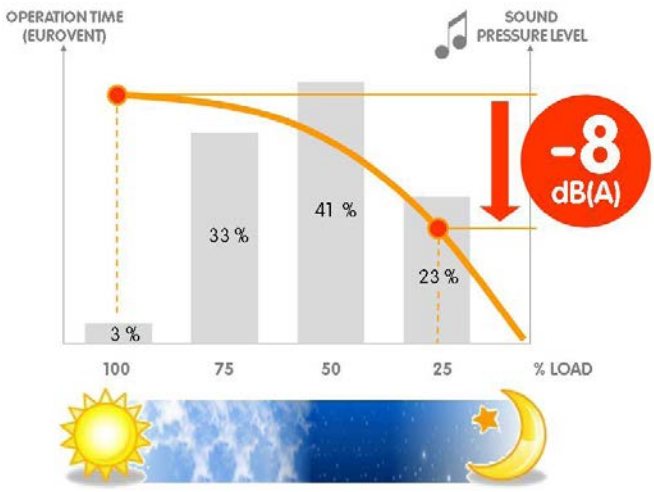
- –3 dB of sound reduction;
- reduction of 3% of the absorbed energy.



Energy efficiency improved by Axitop

Fans at variable speed for minimal noise emission

All SPINchiller³ units are equipped with electronic condensation control. It automatically reduces the fan speed when the heat load is reduced. Since the fans are the unit's main noise source, the benefits are evident especially during the night hours, when the load is reduced but sensitivity to noise is enhanced. All this translates into a sound pressure reduced down to 8 dB(A) compared to full load operation in 90% of operating time of the unit.



The best choice for every business

Excellence version: maximum efficiency

All SPINchiller[3] models feature high part-load energy efficiency, which means high ESEER seasonal efficiency.

EXCELLENCE version it's the best match between capital cost and total lifecycle cost.

Apart from the high seasonal efficiency, the standard EXCELLENCE SC version stands out for its extremely high energy efficiency ratio (COP) during full-load heating, which exceeds the value 3.2 and places it in Eurovent Energy Efficiency class A.

This is all possible thanks to Scroll modular technology, high efficiency heat exchangers and ECOBREEZE fans fitted with a permanent-magnet motor and an electronic control device supplied as standard.

This allows for:

- energy efficiencies equal to or higher than most units on the market equipped with screw compressors, even when inverter driven;
- efficient use even in a large number of industrial and process applications;
- upgrade of the building's energy class and, therefore, increased value;
- maximum savings on running and maintenance costs.

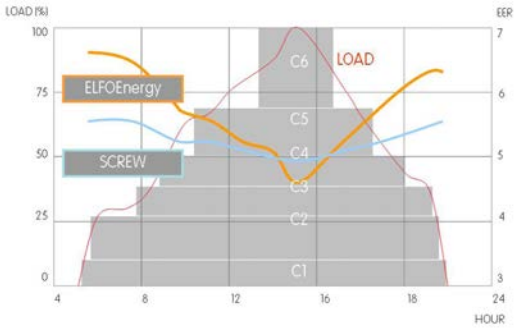
With Eurovent's implementation of the EN14511:2011 standard in 2012, reaching top energy efficiency levels at full load means calculating performance by also taking into account the energy consumption required to overcome pressure drops to allow for the circulation of the solution inside the exchangers.

Superior flexibility and reliability

Efficient precision

Sequential activation of SPINchiller[3] compressors allow:

- adapting to the load required for use, thereby ensuring added comfort;
- reducing the number of compressor start-ups, i.e., the main cause of wear;
- increasing the unit's useful life;
- reducing repair times and costs, thanks to the modular components, their reduced dimensions and reduced cost compared to semi-hermetic compressors.

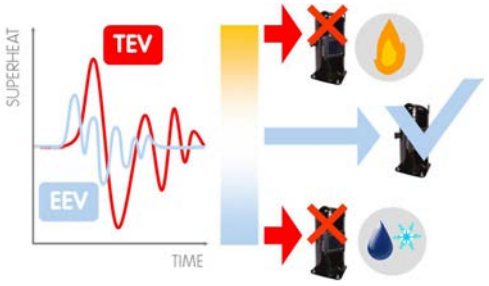


THE NUMBER OF START-UPS DECREASES THEREFORE THE LIFE CYCLE INCREASES

Stable and reliable operation

The electronic expansion valve (EEV) adapts rapidly and precisely to the actual load required for usage, allowing stable and reliable adjustment in comparison with mechanical thermostatic valves (TEV). This results also in a further increase in efficiency and longer compressor life.

The overheating control allows preventing phenomena that are hazardous to the compressors, such as overtemperature and return fluids, thereby increasing even more efficiency and durability.



Simplified maintenance

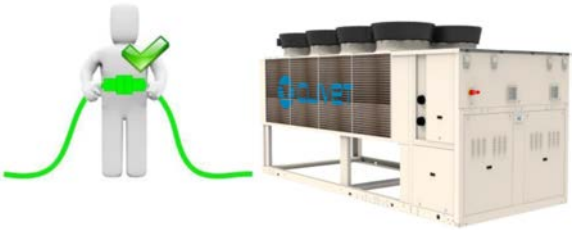
Besides being efficient, SPINchiller[3] improves the system maintenance. In fact, the malfunction of a compressor does not compromise overall operation. Furthermore, Scroll compressors are very compact, easy to find and easy to handle in case of replacement.

Controlled power supply

Proper power supply ensures optimal unit operation and protects its many electrical components.

The phase monitor, standard supplied.

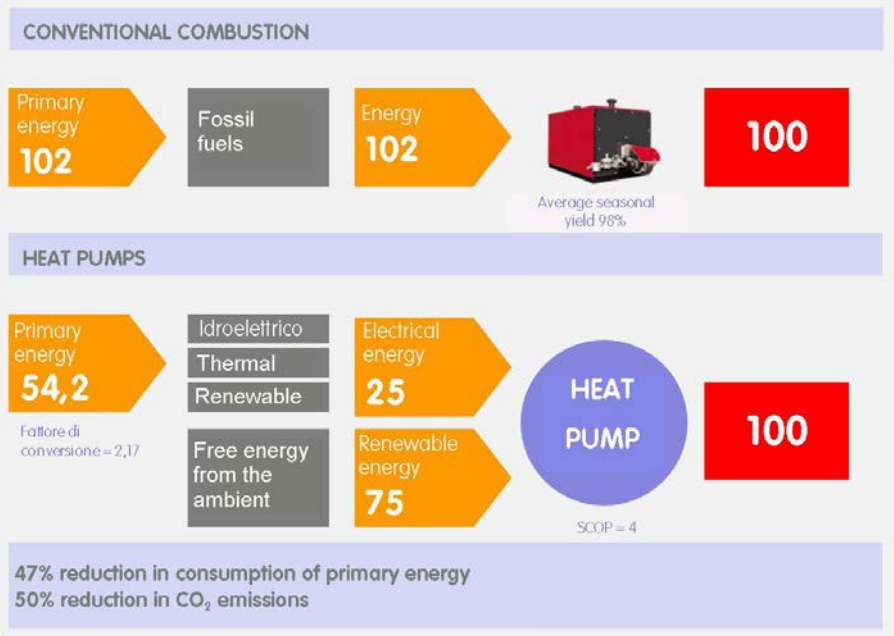
- controls the presence and the exact sequence of the phases;
- checks any voltage anomalies (-10%);
- automatically restarts the unit as soon as the proper power supply is restored.



The EXCELLENCE version is fitted with a multifunction monitor, where limit values and the service schedule of Clivet's Technical Support can be modified.

Renewable energy heat pump technology

The electric Heat pump technology promotes and provides incentives by the European Union with specific standards, such as the EU Directive 2009/28/CE of April 23rd 2009 that recognises ambient heat as a renewable source.



Compared to a combustion system, the electric heat Pump allows:

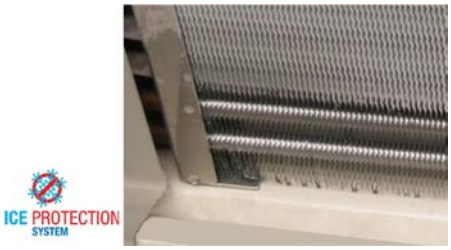
- energy saving and reduction of the CO2 emissions by an average of 50%;
- use of electric energy, increasingly produced through alternative and renewable sources;
- operation reliability and reduced maintenance;
- no fossil combustion and therefore absence of chimney, absence of periodical controls on the emissions in the ambient and no local production of fine dust;
- cost reduction of first investment with the reversible models that use a single system for both heating and cooling.

In heating mode, the reversible heat pump range by SPINchiller[3] offers high efficiency in both full load operation and Partial load. The energy saving cycle operation throughout the year is noteworthy. Thanks to the brilliant half-load performance even when in cooling mode. This result was aided with precise technological choices and a long history of specialised experience.

Coils protected against the formation of ice

The particular technology of the heat pump developed by Clivet guarantees its continued and reliable operation.

The ICE PROTECTION SYSTEM device prevents icing on the base of the external exchanger during winter operation, thanks to a special subcooling circuit. This prevents damages caused by freezing.



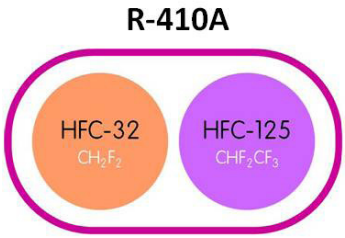
Smart management of defrosts

The automatic defrost cycles on the remaining external exchanger surface are managed in predictive mode, reducing both the frequency and the duration. The electronics on board analyse not only the external conditions, but also the evaporation pressure variation in the exchanger.

High efficient refrigerant

R410A is the mix of two refrigerants used in equal parts: R32 that supplies the heating capacity and R125 that controls the flammability. It is a chlorine free refrigerant (HFC) with numerous advantages:

- ODP (Ozone Depletion Potential) = 0;
- high volumetric effect thanks to the high coefficient global thermal exchange and to the pressure variation (glide) which is almost nil during the evaporation phase;
- elevated density and efficiency, with greater compactness of the refrigeration circuit and therefore the responsible use of materials and small refrigerant quantity, for a reduced environmental impact.

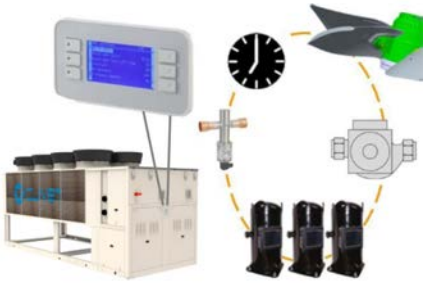


The automatic control device coordinates resources ensuring maximum efficiency

Operating completely automatic

The microprocessor control automatically manages operation according to the maximum efficiency criterion and includes many safety and alarm management functions.

It also includes advanced functions, such as daily and weekly programming and automatic maximum power consumption limitation (demand limit).



Modularity

In the event of particularly large buildings requiring high capacities, it is advisable to use several units.

The SPINchiller[3] units are designed to be connected in parallel in modular logic, thereby granting the following advantages:

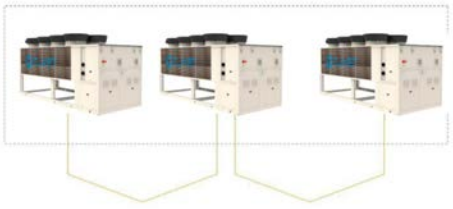
Increased flexibility, enhanced by the control that can adapt to the load.

Increased reliability, since the malfunction of one unit does not compromise the capacity supply of the other units.

Increased efficiency, since energy is produced where and when required, according to the served area.

The microprocessor control combined with ECOSHARE allows controlling up to 7 units in local network (1 Master unit and 6 Slave).

MODULAR SYSTEM THAT ENHANCES SPINchiller[2] TECHNOLOGY ADVANTAGES



ECOSHARE NETWORK

Remote system management

SPINchiller[3] is standard equipped with:

- potential-free contact for remote on/off control;
- potential-free contacts for remote display of the compressor status;
- setting from user interface: Off / local On / serial On;
- potential-free contact to remote any possible alarm.

The various communication protocols allow the unit to exchange information with the main supervision systems by means of serial connections.

Energy measuring

Monitoring energy consumption and instant power employed is the starting point to improve the system's energy management and efficiency. With the optional energy meter, the user displays all the information related to the unit's electrical parameters on the interface built-in the unit or via the serial connection.

Moreover, the integration with the Demand Limit function supplied as standard allows to act on consumption levels by limiting them if they exceed the expected limit.

Seasonal energy efficiency is further increased with the DST operating logic

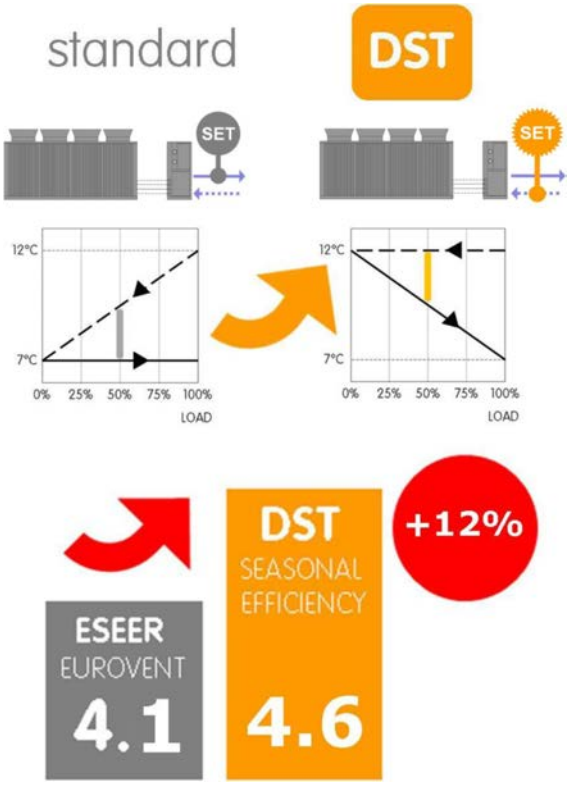
SPINchiller[3] is equipped with standard DST control (Dynamic Supply Temperature) control logic, which can be activated by the user.

Unlike the traditional control logic that aims at maintaining the water supply temperature constant, the DST logic aims at keeping constant the water return temperature, modifying the supply temperature dynamically according to the load. This way, evaporation temperature increases during part-load cooling, thereby increasing seasonal energy efficiency.

The DST control allows a considerable consumption and operation costs reduction, especially in civil applications, upon verification of the air treatment system's dehumidification capacity during cooling at part load.

The DST control allows considerable consumption and operation costs reduction, especially in civil applications, upon verification of the air treatment system's dehumidification capacity during part-load cooling. The DST control is particularly interesting when combined with active thermodynamic fresh air systems. The direct expansion circuit allows them to operate the outdoor air treatment independently from SPINchiller[3], which can vary the system water supply temperature, thereby optimising energy efficiency in the yearly cycle.

The DST control logic is as an alternative to the control logic at variable flow-rate.



Example

The following diagram represents the various operating temperatures in the production of chilled water under various load conditions for a typical civil system consisting of:

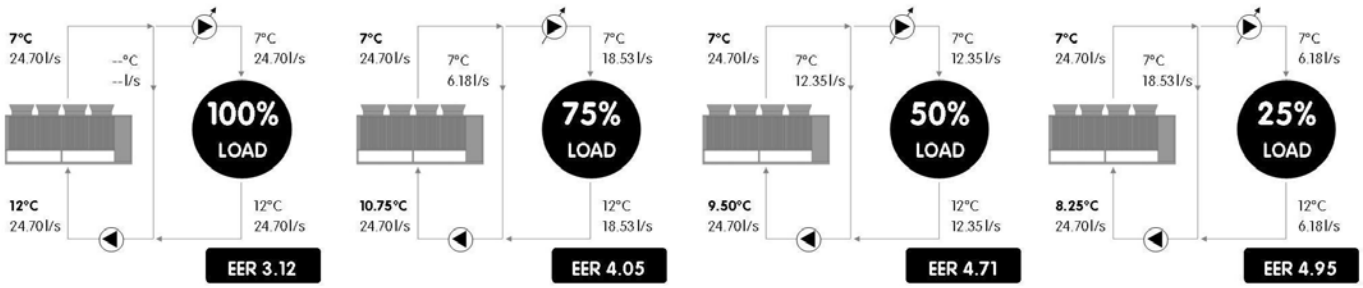
- primary circuit with constant water flow rate;
- secondary circuit with variable water flow-rate according to the load (linear variability for simplicity).

The traditional control logic keeps the water supply temperature to room terminals and outdoor air treatment units constant, in order for the latter to carry out the dehumidification.

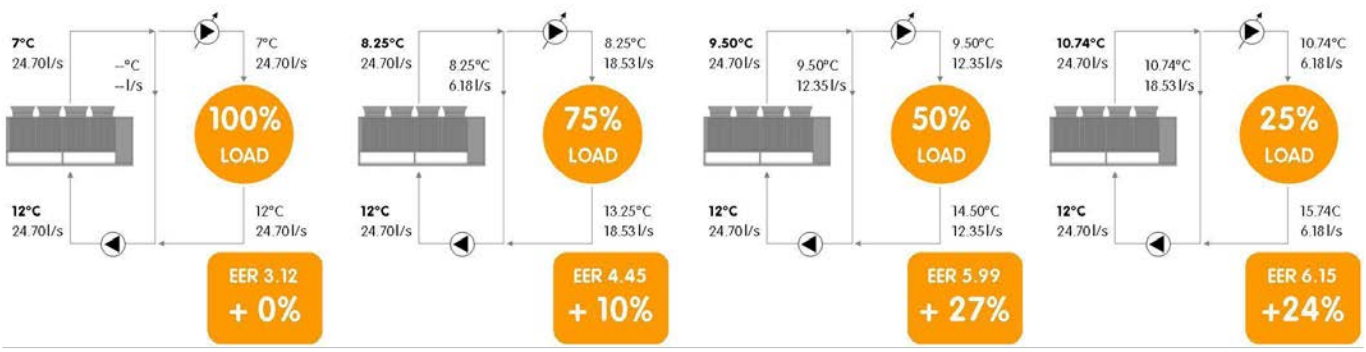
The DST control logic, on the other hand, allows increasing the system water supply temperature during part-load operation, thereby increasing seasonal energy efficiency for SPINchiller[3].

The DST application must be verified during the design stage according to specific system constraints.

Traditional control logic (system water flow rate temperature = constant)



DST control logic (system water return temperature = constant)



SPINchiller³ technology industrialised the system

SPINchiller³ can be supplied equipped with components that are often provided separately.

This allows reducing:

- design times: all accessories are made to ensure the best overall efficiency;
- installation costs: the accessories already mechanically connected, electrically wired and individually tested are ready to be put to operate immediately;
- overall dimensions: system components are integrated with the unit, thereby reducing the technical area and increasing the area available for other uses.

Built-in inertial accumulation available

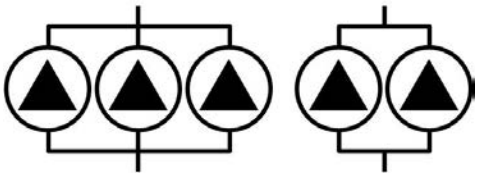
In most SPINchiller³ systems it can be installed without inertial accumulation on the system. In fact, the unit quickly adapts to the load due to modular compressors, electronic thermostatic valve and low water content plate heat exchangers. However, in the event of hydraulic distribution networks with reduced dimensions, it is important to provide the system with a hydraulic flywheel. In such cases, inertial accumulation is available built-in, equipped with insulating coating and all the necessary safety devices. This allows eliminating installation times and costs and freeing space inside the building.

The built-in pumps are versatile, ready-for-use and reliable

The various solutions available are:

- HYDROPACK, the modular solution with two or three parallel pumps. Automatically reduces the water flow rate when in critical conditions, thereby preventing jams due to overloading, requiring the subsequent intervention of specialised technical personnel;
- it is very useful during start-ups, when restarting after operating breaks (e.g. at the weekend) or after a long period of inactivity;
- Inverter driven HYDROPACK allows water flow-rate-head calibration.

HYDROPACK



Variable flow-rate advantages

Pumping energy for moving the water has an heavy impact on seasonal efficiency. The variable flow control is available for all units and drives to energy savings during partial load.

Pump energy consumption is proportional with cubic rotation speed. Evident the advantage when reducing flow-rate of 40% comparing to nominal conditions: energy saving is of 75% on pump energy consumption.

The control logic I based on keeping stable the water temperature entering and leaving difference, guaranteeing at the same time the best efficiency and a working envelope within an acceptable range for the heat exchanger (pressure losses).

The control logic applies to both flow-rate and compressor regulation thanks to steps. Proportional-Integral-Derivative guarantees a precise and stable operation.

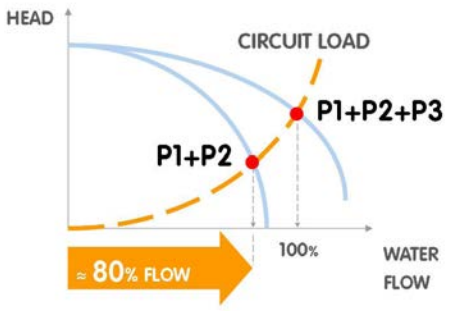
The possibility of independent pump management in case of failure is embedded in the unit keeping operative the system.

The exceptional HydroPack operation continuity

Due to its modularity, HYDROPACK maintains good water flow in the system even in the event of one of the pumps being temporarily unavailable.

In fact, with a deactivated pump, the residual flow is:

- about 80% of the rated flow (3 pump configuration);
- about 60% of the rated flow (2 pump configuration).



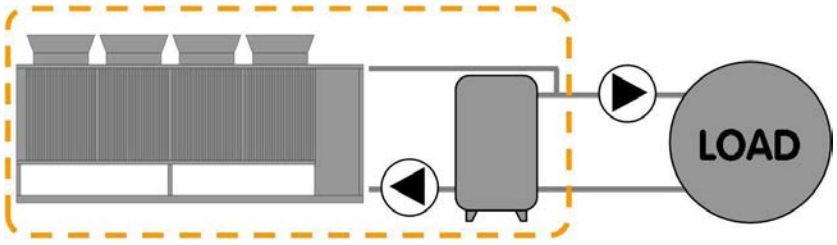
Even the primary circuit can be integrated built-in

A connection to the secondary use circuit is all that's needed. In this way, the system results even more simple and reliable.

The units are complete with quick connections on the hydraulic side, which further reduce start-up times by eliminating pipe threading operations.

Furthermore, other system components are also available as accessories, such as hydraulic connections reported on the external walls of the unit and the required water filter.

SPINchiller² CAN CONTAIN MOST OF THE SYSTEM COMPONENTS



THE QUICK CONNECTIONS ARE STANDARD SUPPLIED

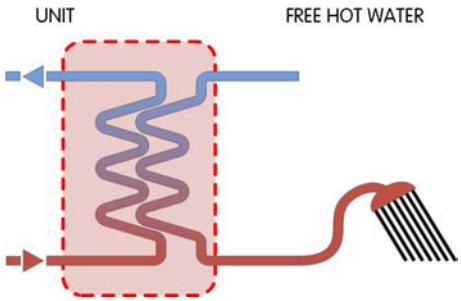
Produces hot water freely

Condensation heat recovery:

- partial: it recovers about the 20% of the available heat (desuperheater).

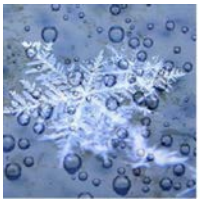
It allows the free DHW production for:

- hot water coil supply for reheat;
- domestic hot water production (with intermediate exchanger);
- other processes or operations.



Even for low water temperature

The unit is also perfectly adapted for use in process cooling where the low temperature version (Brine) together with the addition of glycol to the thermo-vector liquid produces chilled water down to –8 °C.



Further considerations on the installation

The vast operating field of SPINchiller³ allows it to adapt to most system applications. In some cases, special duty conditions may exceed the unit operating field. Simple devices on the system allow proper operation and meeting any requirement. Here are two examples.

Water flow rate values outside the limits

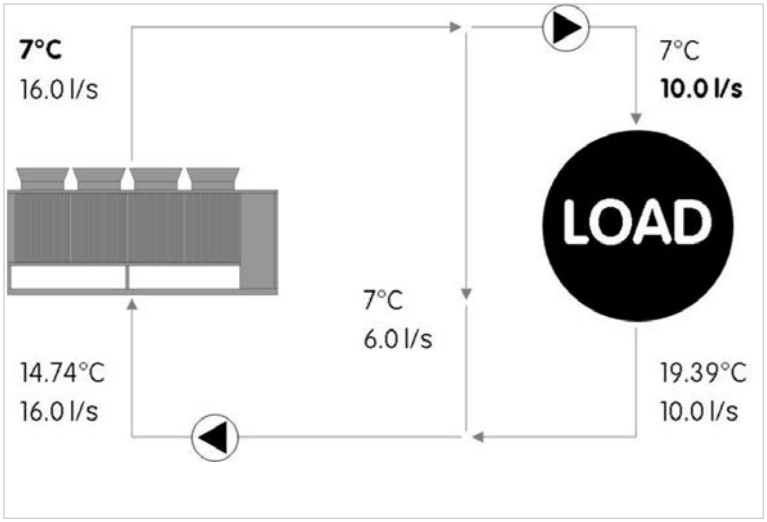
SPINchiller³ operates with constant water flow rate to the evaporator, between a minimum and maximum value indicated in the technical documents.

Flow rate values below the limit may cause unwanted formation of ice, incrustations, reduced control precision, and the unit to stop following the intervention of built-in safety devices.

Flow values above the limit may cause high pressure drops, high pumping costs, and reduced control precision, and erosion damages to the exchangers.

In this example, the required flow-rate is lower than the maximum value allowed to the evaporator, while the operating temperatures fall within the functional field of the unit.

A properly sized bypass piping resolves the problem.



Example referred toWSAN-XSC3 200.4 SC EXCELLENCE version.
Appropriate water flow rate for the correct unit operation.

Temperature values outside the limits

SPINchiller³ operates with the system supply temperatures indicated in the technical documentation.

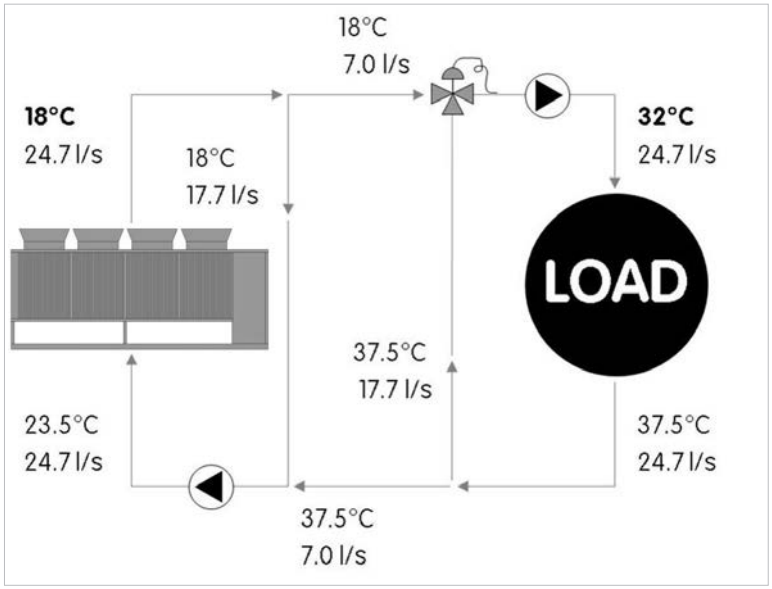
Temperature limits below the limit may cause unwanted formation of ice and the unit to stop following the intervention of built-in safety devices.

Temperature values under the limit may cause malfunctions and damages to the compressors, reduced control precision, and the unit to stop following the intervention of built-in safety devices.

In this example, the required temperature exceeds the maximum value allowed to the evaporator, while the water flow rate falls within the functional field of the unit.

A properly sized bypass piping and mixing system resolve the problem.

Should both the water flow rate and the operating temperature exceed the values intended for the chiller, all you have to do is combine the two cases described above.



Example referred to WSAN-XSC3 200.4 SC EXCELLENCE version.
Appropriate supply water temperature for the correct unit operation. Nominal water flow rate.

Evaporator thermal gradient

SPINchiller³ nominal capacities refer to an evaporator thermal gradient equal to 5 °C. A different thermal gradient may be used in full load operation, provided that both the operating flow and temperatures fall within the limits. As an indication, this corresponds to a minimum thermal gradient of approximately 3 °C and a maximum of 10 °C (the exact values must be determined based on the allowed flows and temperatures).

Standard unit technical specifications - EXCELLENCE Version

Compressor

High efficiency hermetic orbiting scroll compressor complete with oil charge, motor over-temperature and over-current devices and protection against excessive gas discharge temperature with oil heater, which starts automatically, keeps the oil from being diluted by the refrigerant when the compressor stops. Compressors, fitted on rubber antivibration mounts to prevent transmission of noise and vibration, are connected in TANDEM on a single refrigerating circuit with biphasic oil equalisation, it allows to reach high efficiency at partial load. Uniform compression process with reduced number of moving parts which ensure very low levels of noise and vibration.

Structure

Structure and base made entirely of sturdy sheet steel, thickness of 30/10 or 40/10, with the surface treatment in Zinc–Magnesium painted, for the parts in view, with polyester powder RAL 9001 that guarantees excellent mechanical characteristics and high corrosion strength over time.

Panelling

External pre-painted zinc-magnesium paneling, thickness 10/10, with the surface treatment in Zinc–Magnesium painted with polyester powder RAL 9001 that ensures superior resistance to corrosion for outdoor installation and eliminates the need for periodical painting. The panels can be easily removed to fully access internal components and are lined with sound-proof material on the inside to contain the unit's sound levels.

Internal exchanger

Direct expansion heat exchanger, braze-welded AISI 316 stainless steel plates, in pack without seals using copper as the brazing material, with low refrigerant charge and large exchange surface, complete with:

- external thermal insulation no-condensation, thickness 9,5 mm, in extruded elastomer foam with closed cells;
- differential pressure switch, water side;
- antifreeze heater to protect the water side exchanger, preventing the formation of frost if the water temperature falls below a set value.

Maximum operating pressure exchanger: 10 bar on the water side and 45 bar on the refrigerant side.

External exchanger

Finned exchanger, made from copper pipes arranged in staggered rows and mechanically expanded for better adherence to the collar of the fins. The exchangers are planned, designed and produced directly by CLIVET. The fins are made of aluminium with a special corrugated surface, set a suitable distance apart to ensure maximum heat exchange efficiency. A proper liquid supply of the expansion valve is ensured by the subcooling circuit. Each finned heat exchanger is directly cooled by the air flow of its specific fans.

Fan

Axial fans with sickle profile blades terminating with "Winglets", directly coupled to the three-phase electronic controlled motor with external rotor. Fans are housed in aerodynamically shaped structures, equipped with accident prevention guards and supplied with variable speed electronic control. Complete with Axitop diffusers to recover dynamic energy, resulting in increased efficiency and minimal sound emission; the Axitop difusser installation is provided by the Customer.

Diffusers for external section fans - Axitop

Axitop diffusers, to be installed on the outdoor section fans, to recover dynamic energy, resulting in increased efficiency and minimal sound emission. It creates an ideal air distribution: it aerodynamically decelerates the flow and transforms a big part of its dynamic energy in static pressure. The Axitop diffuser installation is provided by the Customer.

Refrigeration circuit

Two independent refrigeration circuits, copper made and factory-assembled, welded with continuity metallic solution, completed with:

- replaceable antiacid dehydrator filter with solid cartridge;
- liquid flow and moisture indicator;
- liquid receiver;
- electronic expansion valve;
- no-return valve;
- 4-way reversing valve;
- high pressure safety pressure switch;
- high pressure safety valve;
- low pressure safety valve;
- cutoff valve on liquid line;
- cutoff valve on compressor supply;
- suction liquid separator.

Thermal insulated of suction line with insulation material in highly flexible closed-cell elastomer based on EPDM rubber. Refrigeration circuit pressure tested to check leaks and supplied complete of refrigerant charge.

Configurations

D - Partial energy recovery

B - Low water temperature

SC - Acoustic configuration with compressor soundproofing

EN - Super-silenced acoustic configuration

Electrical panel

Fully constructed and wired in accordance with EN 60204. The capacity section includes:

- main door lock isolator switch;
- terminals main power (400V / 3Ph / 50Hz);
- isolating transformer for auxiliary circuit power supply (230V/24V);
- compressor circuit breaker;
- fan overload circuit breakers;
- compressor control contactor.

The control section includes:

- interface terminal with graphic display;
- display of the set values, the error codes and the parameter index;
- ON/OFF and alarm reset buttons;
- remote HEAT/COOL control;
- Proportional-integral-derivative water temperature control;
- daily, weekly programmer of temperature set-point and unit on/off;
- unit switching on management by local or remote (serial);
- antifreeze protection water side;
- compressor overload protection and timer;
- pre-alarm function for water antifreeze and high refrigerant gas pressure; self-diagnosis system with immediate display of the fault code;
- automatic rotation control for compressor starts;
- compressor operating hour display;
- remote ON/OFF control;
- relay for remote cumulative fault signal;
- input for demand limit (absorbed power limit according to an external signal 0÷10V or 4÷20mA);
- potential-free contacts for compressor status;
- digital input for double set-point enabling;
- multifunction phase monitor;
- electrical panel ventilation.

All device functions can be repeated with a normal portable PC connected to the unit with an Ethernet cable and equipped with an internet navigation browser. All electrical cables are colored and numbered in accordance with the wiring diagram.

Accessories - Hydronic assembly

- HYDROPACK (n.b.: other types are available by head)
- Inverter driven HYDROPACK
- Storage tank
- Steel mesh mechanical strainer (accessory separately provided). Note: To be located at the exchanger inlet. We disclaim any liability and make the guarantee void, if an appropriate mechanical filter is not provided inside the system.

Accessories

- Finned coil protection grilles
- Anti-hail protection grilles
- Copper / aluminium condenser coil with acrylic lining
- Copper / aluminium condensing coils with Aluminium Energy Guard DCC treatment
- High and low pressure gauges
- Cutoff valve on compressor supply and return
- Couple of manual shut-off valves (accessory provided separately)
- Electrical panel ventilation
- Electrical panel antifreeze protection
- Power factor correction capacitors (cosfi > 0.9)
- ECOSHARE function for the automatic management of a group of units
- Disposal for inrush current reduction (SOFT STARTER)
- Serial communication module for BACnet-IP supervisor
- Serial communication module for Modbus supervisor
- Serial communication module for LonWorks supervisor
- Device for fan consumption reduction of the external section, ECOBREEZE type
- Remote control via microprocessor control (accessory separately supplied)
- Mains power supply (accessory separately supplied)
- Energy meter
- Set-point compensation with 0-10 V signal
- Set-point compensation with outdoor air temperature probe
- Limit extension kit in heating up to -10°C (W.B.)
- Spring antivibration mounts (supplied separately)
- Leak detector
- Variable flow-rate control

On special request are available:

- copper /copper condenser coil with brass shoulders
- storage tank with primary circuit with pump built-in the unit.

Test

Unit subjected to factory-tested in specific steps and test pressure of the piping of the refrigerant circuit (with nitrogen and hydrogen), before shipping them. After the approval, the moisture contents present in all circuits are analyzed, in order to ensure the respect of the limits set by the manufacturers of the different components.

Unit equipment with outdoor air low temperatures

<table>
<tr><th colspan="2" rowspan="2">Minimum outdoor air temperature</th><th colspan="2">Operating unit</th><th rowspan="2">Unit in stand-by (5)
(fed unit)</th><th rowspan="2">Unit in storage
(unit not fed)</th></tr>
<tr><th>Cool*</th><th>Heat**</th></tr>
<tr><td>+11°C</td><td>1</td><td rowspan="5">√ standard unit</td><td rowspan="4">√ standard unit</td><td rowspan="5">√ standard unit</td><td rowspan="4">√ standard unit)</td></tr>
<tr><td>+2°C</td><td>2</td></tr>
<tr><td>-5°C</td><td>4</td></tr>
<tr><td>-7°C</td><td>3</td></tr>
<tr><td>-10°C</td><td>4</td><td>√ device for extended operating range</td></tr>
<tr><td>Between –10°C and –15°C</td><td rowspan="4"></td><td rowspan="4">NOT POSSIBLE</td><td>√ electrical panel antifreeze protection
√ device for extended operating range
√ glycol in an appropriate percentage</td><td rowspan="4">√ water empty unit or with an appropriate glycol percentage
√ electrical panel anti-freeze protection</td><td rowspan="2">√ standard unit (6)
Not suitable:
X electrical panel anti-freeze protection
X energy meter (CONTA2)
X high and low pressure gauges (MHP)</td></tr>
<tr><td>Between –15°C and –18°C</td><td rowspan="2">NOT POSSIBLE</td></tr>
<tr><td>Between –18°C and –25°C</td><td rowspan="2">NOT POSSIBLE</td></tr>
<tr><td>Between –25°C and –39°C</td><td>NOT POSSIBLE</td></tr>
</table>

Data referred to the following conditions:
*chilled water production:
internal exchanger water = 12/7 °C
**hot water production:
internal exchanger water = 40/45 °C

1. Part load unit and air speed equal to 1 m/s.
2. Part load unit and air speed equal to 0.5 m/s.
3. Part load unit and outdoor air temperature at rest.
4. Full load unit and outdoor air temperature at rest.

(5) The water pumping unit must be fed and connected to the unit according to the manual.
(6) Unit without water or containing water with an appropriate quantity of glycol.
At the unit start-up the water temperature or water with glycol must be inside the operating range indicated in the "Operating range" graph.
To know the water freezing temperature on varying the glycol percentage refer to the specific 'Correction factors for glycol use' table.

Air conditions which are at rest are defined as the absence of air flowing towards the unit. Weak winds can induce air to flow through the exchanger and air-levels which can cause a reduction in the operating range. In the presence of predominant winds it is necessary to use suitable windbreak barriers.

The unit, with an outdoor air temperature on average lower than -10°C, can remain stored for a maximum of 1 month.

Unit configuration

WSAN-XSC3	200 . 4	EXC	SC	AXIX	-	-	-
(1)	(2) (3)	(4)	(5)	(6)	(7)	(8)	(9)

(1) Range
WSAN = Air cooled heat pump with scroll compressor
XSC3 = SPINchiller³ range

(2) Size
200 = Nominal compressor capacity (HP)

(3) Compressors
4 = Compressor quantity

(4) Energy efficiency
EXC = EXCELLENCE version: high energy efficiency

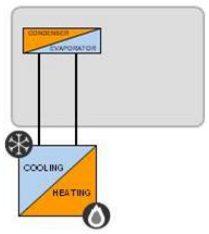
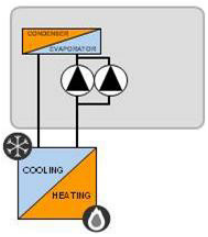
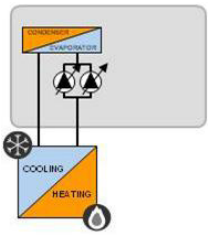
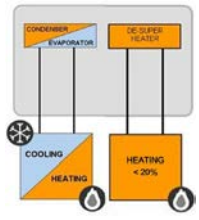
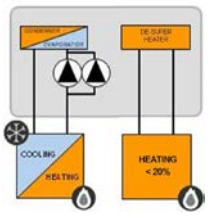
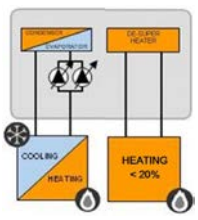
(5) Acoustic configuration
SC = Acoustic configuration with compressor soudproofing
EN = Super-silenced acoustic configuration

(6) Fan diffusers
AXIX - Diffuser for high efficiency fan (standard - separately supplied)
NAXI - Diffuser not required

(7) Condensation heat recovery
(-) Recovery not required (standard)
D - Partial energy recovery (15% of available heat)

(8) Low evaporator water temperature configuration
(-) Low water temperature: not required (standard)
B - Low water temperature, down to –8°C (Brine)

(9) Pumping unit user side
(-) Not required
2PM - Hydropack user side with no. 2 of pumps
3PM - Hydropack user side with no. 3 of pumps
2PMV- Hydropack user side with no. 2 of inverter pumps
3PMV - Hydropack user side with no. 3 of inverter pumps

Functionalities	Hydronic units		
2-PIPE SYSTEM Chilled water production for installation	**1.1** Standard unit 	**1.2** Standard unit with HYDROPACK 	**1.3** Standard unit with inverter driven HYDROPACK 
2-PIPE SYSTEM + PARTIAL RECOVERY Production of chilled water Free production of hot water from partial recovery	**2.1** Standard unit with partial recovery 	**2.2** Standard unit with partial recovery and HYDROPACK 	**2.3** Standard unit with partial recovery and inverter driven HYDROPACK 

Accessories separately supplied		
• **RCMRX** - Remote control via microprocessor remote control	• **PSX** - Mains power supply unit	• **AMMX** - Spring antivibration mounts

EXCELLENCE VERSION

Acoustic configuration: compressor soundproofing (SC)

General technical data - Performance

Size			90.4	100.4	110.4	120.4	140.4	160.4	180.4	200.4	220.4	240.4
Cooling												
Cooling capacity	1	[kW]	244	263	291	323	371	417	474	520	559	595
Compressor power input	1	[kW]	78,3	85,6	94,6	108	123	137	158	172	188	208
Total power input	2	[kW]	87,9	95,2	104	118	135	150	173	188	204	224
Partial recovery heating capacity	3	[kW]	64,5	69,8	77	86,3	98,7	110,8	126,4	138,3	149,5	160,7
EER	1	-	2,78	2,77	2,79	2,74	2,74	2,78	2,73	2,77	2,74	2,65
Water flow-rate (User Side)	1	[l/s]	11,7	12,6	13,9	15,4	17,7	19,9	22,7	24,8	26,7	28,4
Internal exchanger pressure drops	1	[kPa]	30,2	34,8	31,8	39,0	42,8	42,0	35,6	42,4	37,7	42,5
Cooling capacity (EN14511:2013)	4	[kW]	243	262	290	322	369	416	473	518	557	593
Total power input (EN14511:2013)	4	[kW]	88,7	96,1	105	119	137	151	175	189	206	226
EER (EN 14511:2013)	4	-	2,74	2,73	2,75	2,7	2,7	2,75	2,7	2,74	2,7	2,62
SEER	7	-	4,13	4,12	4,11	4,13	4,14	4,12	4,20	4,21	4,19	4,11
Heating												
Heating capacity	5	[kW]	282	311	338	376	424	469	541	598	643	693
Compressor power input	5	[kW]	77,8	86,0	94,0	104	116	130	151	166	184	198
Total power input	2	[kW]	87,3	95,6	104	114	129	143	167	182	199	214
COP	5	-	3,23	3,25	3,26	3,31	3,30	3,28	3,24	3,29	3,23	3,23
Heating capacity (EN14511:2013)	6	[kW]	283	312	340	378	426	471	543	600	646	696
Total power input (EN14511:2013)	6	[kW]	88,5	97,1	105	115	131	145	169	184	202	217
COP (EN 14511:2013)	6		3,20	3,22	3,22	3,28	3,26	3,25	3,22	3,25	3,20	3,20
SCOP - AVERAGE Climate - W35	7		3,80	3,81	3,82	3,72	3,85	3,71	-	-	-	-

The Product is compliant with the Erp (Energy Related Products) European Directive. It includes the Commission delegated Regulation (EU) No 811/2013 (rated heat output ≤70 kW at specified reference conditions), the Commission delegated Regulation (EU) No 813/2013 (rated heat output ≤400 kW at specified reference conditions) and the Commission delegated Regulation (EU) No 2016/2281, also known as Ecodesign Lot21.
'Contains fluorinated greenhouse gases'(GWP 2087,5)

1. Data referred to the following conditions: internal exchanger water = 12/7 °C. Entering external exchanger air temperature 35°C. Evaporator fouling factor = 0.44 x 10^(-4) m² K/W
2. The Total Power Input value does not take into account the part related to the pumps and required to overcome the pressure drops for the circulation of the solution inside the exchangers
3. Recovery exchanger water=40/45°C
4. Data compliant to Standard EN 14511:2013 referred to the following conditions: - Internal exchanger water temperature = 12/7°C - Entering external exchanger air temperature = 35°C
5. Data referred to the following conditions: internal exchanger water = 40/45 °C. Entering external exchanger air temperature = 7°C D.B./6°C W.B. Evaporator fouling factor = 0.44 x 10^(-4) m² K/W
6. Data compliant to Standard EN 14511:2013 referred to the following conditions: - Internal exchanger water temperature = 40/45 °C. Entering external exchanger air temperature = 7°C D.B./6°C W.B.
7. Data calculated according to the EN 14825:2016 Regulation

Acoustic configuration: super-silenced (EN)

General technical data - Performance

Size			90.4	100.4	110.4	120.4	140.4	160.4	180.4	200.4	220.4	240.4
Cooling												
Cooling capacity	1	[kW]	232	255	279	307	355	400	451	499	537	563
Compressor power input	1	[kW]	82,4	89,3	98,6	115	129	143	166	179	199	224
Total power input	2	[kW]	89,4	96,3	106	122	138	152	178	191	211	235
Partial recovery heating capacity	3	[kW]	62,9	68,8	75,5	84,4	96,8	108,6	123,5	135,7	147,3	157,4
EER	1	-	2,59	2,65	2,64	2,52	2,58	2,63	2,54	2,62	2,55	2,40
Water flow-rate (User Side)	1	[l/s]	11,1	12,2	13,3	14,7	17,0	19,1	21,5	23,9	25,7	26,9
Internal exchanger pressure drops	1	[kPa]	27,4	32,7	29,4	35,3	39,5	38,8	32,4	39,3	34,9	38,3
Cooling capacity (EN14511:2013)	4	[kW]	231	254	278	307	354	399	450	498	535	562
Total power input (EN14511:2013)	4	[kW]	90,2	97,2	107	123	139	153	179	192	212	237
EER (EN 14511:2013)	4	-	2,56	2,62	2,61	2,50	2,55	2,60	2,51	2,59	2,52	2,37
SEER	7	-	4,10	4,10	4,09	4,09	4,11	4,09	4,11	4,12	4,11	4,10
Heating												
Heating capacity	5	[kW]	282	311	338	376	424	469	541	598	643	693
Compressor power input	5	[kW]	77,8	86,0	94,0	104	116	130	151	166	184	198
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COP (EN 14511:2013)	6		3,20	3,22	3,22	3,28	3,26	3,25	3,22	3,25	3,20	3,20
SCOP - AVERAGE Climate - W35	7		3,80	3,81	3,82	3,72	3,85	3,71	-	-	-	-

The Product is compliant with the Erp (Energy Related Products) European Directive. It includes the Commission delegated Regulation (EU) No 811/2013 (rated heat output ≤70 kW at specified reference conditions), the Commission delegated Regulation (EU) No 813/2013 (rated heat output ≤400 kW at specified reference conditions) and the Commission delegated Regulation (EU) No 2016/2281, also known as Ecodesign Lot21.
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2. The Total Power Input value does not take into account the part related to the pumps and required to overcome the pressure drops for the circulation of the solution inside the exchangers
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4. Data compliant to Standard EN 14511:2013 referred to the following conditions: - Internal exchanger water temperature = 12/7°C - Entering external exchanger air temperature = 35°C
5. Data referred to the following conditions: internal exchanger water = 40/45 °C. Entering external exchanger air temperature = 7°C D.B./6°C W.B. Evaporator fouling factor = 0.44 x 10^(-4) m² K/W
6. Data compliant to Standard EN 14511:2013 referred to the following conditions: - Internal exchanger water temperature = 40/45 °C. Entering external exchanger air temperature = 7°C D.B./6°C W.B.
7. Data calculated according to the EN 14825:2016 Regulation

EXCELLENCE VERSION

Acoustic configuration: compressor soundproofing (SC)

General technical data - Construction

Size			90.4	100.4	110.4	120.4	140.4	160.4	180.4	200.4	220.4	240.4
Compressor												
Type of compressors		-	Scroll									
Refrigerante			R-410A									
No. of compressors		Nr	4	4	4	4	4	4	4	4	4	4
Rated power (C1)		[HP]	45	50	55	60	70	80	90	100	100	120
Rated power (C2)		[HP]	45	50	55	60	70	80	90	100	120	120
Std Capacity control steps		Nr	6	6	6	4	6	4	6	6	6	4
Oil charge (C1)		[l]	10	11	13	13	13	13	13	13	13	13
Oil charge (C2)		[l]	10	11	13	13	13	13	13	13	13	13
Refrigerant charge (C1)	1	[kg]	38	38	39	52	53	54	65	65	65	82
Refrigerant charge (C2)	1	[kg]	37	37	38	49	52	53	63	63	79	82
Refrigeration circuits		Nr	2	2	2	2	2	2	2	2	2	2
Internal exchanger												
Type of internal exchanger	2	-	PHE									
Water content		[l]	24	24	29	29	32	37	49	49	62	62
Minimum system water content	3	[l]	1284	1628	2072	2499	2526	3227	2494	3219	3288	4604
External Section Fans												
Type of fans	4	-	AX									
Number of fans		Nr	6	6	6	6	8	8	10	10	10	10
Type of motor	5	-	AC/P									
Standard airflow		[l/s]	37357	37357	36797	36365	49807	49063	62677	61219	60854	60489
Connections												
Water fittings		-	4"	4"	4"	4"	4"	4"	5"	5"	5"	5"
Power supply												
Standard power supply		V	400/3~/50									
Electrical data												
FLA Total		A	204,9	216,2	233,0	261,8	299,0	328,0	387,6	416,6	456,8	497,0
FLI Total		kW	117,7	128,6	138,2	155,8	180,7	201,9	231,2	252,4	275,8	299,2
M.I.C. - Value	6	A	455,6	466,9	483,7	512,5	619,2	648,2	657,6	686,6	726,8	767,0
M.I.C. - with soft start accessory	6	A	317,8	329,1	345,9	374,7	447,2	476,2	657,6	686,6	726,8	767,0

1. Indicative values for standard units with possible +/-10% variation. The actual data are indicated on the label of the unit.
2. PHE = Plate exchanger
3. The minimum system water content calculated value does not consider the internal exchanger water content. With outdoor air low temperature applications or low medium requested loads, the minimum installation water volume is obtained doubling the indicated value
4. AX = axial fan
5. AC/P = asynchronous three-phase external rotor motor with phase cutting speed automatic control
   Unbalance between phase max 2 % Voltage variation: max +/- 10% Electrical data refer to standard units; according to the installed accessories, the data can suffer some variations.
6. M.I.C.=Maximum unit starting current.
   The M.I.C. value is obtained adding the max. compressor starting current of the highest size to the power input at max. admissible conditions (F.L.A.) of the remaining electric components.

Sound levels

Size	Sound power level (dB)								Sound power level	Sound pressure level
	Octave band (Hz)									
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
90.4	93	90	90	88	88	85	71	62	92	72
100.4	93	90	90	88	88	85	71	62	92	72
110.4	93	90	90	88	88	85	71	62	92	72
120.4	93	90	90	88	88	85	71	62	92	72
140.4	94	91	91	89	89	86	72	63	92	72
160.4	95	92	92	90	90	87	73	64	93	73
180.4	101	97	96	93	89	84	78	72	95	74
200.4	101	97	96	93	89	84	78	72	95	74
220.4	102	98	97	94	90	85	79	73	95	74
240.4	102	98	97	94	90	85	79	73	95	75

The sound levels refer to standard unit with Axitop (no accessories) at full load, in test nominal conditions. The sound pressure level refers to 1 m. from the standard unit outer surface operating in open field.
Measures are according to UNI EN ISO 9614-2 regulations, with respect to the EUROVENT 8/1 certification, which provides for a tolerance of 3 dB(A) on the sound power level, which is the only acoustic data to be considered binding.
If unit is set without Axitop, the sound power level presents an increase up to 3 dB(A).

Data referred to the following conditions.
- internal exchanger water = 12/7 °C
- Ambient temperature = 35 °C

EXCELLENCE VERSION

Acoustic configuration: super-silenced (EN)

General technical data - Construction

Size			90.4	100.4	110.4	120.4	140.4	160.4	180.4	200.4	220.4	240.4
Compressor												
Type of compressors		-	Scroll									
Refrigerante			R-410A									
No. of compressors		Nr	4	4	4	4	4	4	4	4	4	4
Rated power (C1)		[HP]	45	50	55	60	70	80	90	100	100	120
Rated power (C2)		[HP]	45	50	55	60	70	80	90	100	120	120
Std Capacity control steps		Nr	6	6	6	4	6	4	6	6	6	4
Oil charge (C1)		[l]	10	11	13	13	13	13	13	13	13	13
Oil charge (C2)		[l]	10	11	13	13	13	13	13	13	13	13
Refrigerant charge (C1)	1	[kg]	38	38	39	52	53	54	65	65	65	82
Refrigerant charge (C2)	1	[kg]	37	37	38	49	52	53	63	63	79	82
Refrigeration circuits		Nr	2	2	2	2	2	2	2	2	2	2
Internal exchanger												
Type of internal exchanger	2	-	PHE									
Water content		[l]	22	22	24	29	32	37	49	49	62	62
Minimum system water content	3	[l]	1284	1628	2072	2499	2526	3227	2494	3219	3288	4604
External Section Fans												
Type of fans	4	-	AX									
Number of fans		Nr	6	6	6	6	8	8	10	10	10	10
Type of motor	5	-	AC/P									
Standard airflow		[l/s]	30588	30588	29943	29570	40784	39924	50870	49776	49467	49159
Connections												
Water fittings		-	4"	4"	4"	4"	4"	4"	5"	5"	5"	5"
Power supply												
Standard power supply		V	400/3~/50									
Electrical data												
FLA Total		A	204,9	216,2	233,0	261,8	299,0	328,0	387,6	416,6	456,8	497,0
FLI Total		kW	117,7	128,6	138,2	155,8	180,7	201,9	231,2	252,4	275,8	299,2
M.I.C. - Value	6	A	455,6	466,9	483,7	512,5	619,2	648,2	657,6	686,6	726,8	767,0
M.I.C. - with soft start accessory	6	A	317,8	329,1	345,9	374,7	447,2	476,2	657,6	686,6	726,8	767,0

1. Indicative values for standard units with possible +/-10% variation. The actual data are indicated on the label of the unit.
2. PHE = Plate exchanger
3. The minimum system water content calculated value does not consider the internal exchanger water content. With outdoor air low temperature applications or low medium requested loads, the minimum installation water volume is obtained doubling the indicated value
4. AX = axial fan
5. AC/P = asynchronous three-phase external rotor motor with phase cutting speed automatic control
   Unbalance between phase max 2 % Voltage variation: max +/- 10% Electrical data refer to standard units; according to the installed accessories, the data can suffer some variations.
6. M.I.C.=Maximum unit starting current.
   The M.I.C. value is obtained adding the max. compressor starting current of the highest size to the power input at max. admissible conditions (F.L.A.) of the remaining electric components.

Sound levels

Size	Sound power level (dB)								Sound power level	Sound pressure level
	Octave band (Hz)									
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
90.4	87	84	84	82	82	79	65	56	86	66
100.4	87	84	84	82	82	79	65	56	86	66
110.4	87	84	84	82	82	79	65	56	86	66
120.4	88	85	85	83	83	80	66	57	86	66
140.4	88	85	85	83	83	80	66	57	86	66
160.4	89	86	86	84	84	81	67	58	87	67
180.4	96	92	91	88	84	79	73	67	90	69
200.4	96	92	91	88	84	79	73	67	90	69
220.4	97	93	92	89	85	80	74	68	90	69
240.4	97	93	92	89	85	80	74	68	90	70

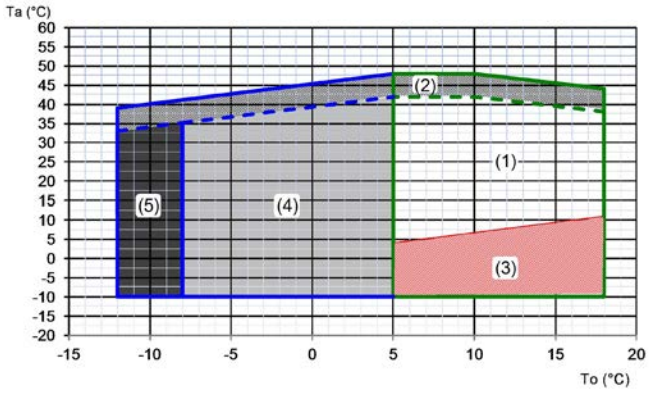
The sound levels refer to standard unit with Axitop (no accessories) at full load, in test nominal conditions. The sound pressure level refers to 1 m. from the standard unit outer surface operating in open field.
Measures are according to UNI EN ISO 9614-2 regulations, with respect to the EUROVENT 8/1 certification, which provides for a tolerance of 3 dB(A) on the sound power level, which is the only acoustic data to be considered binding.
If unit is set without Axitop, the sound power level presents an increase up to 3 dB(A).

Data referred to the following conditions.
- internal exchanger water = 12/7 °C
- Ambient temperature = 35 °C

The indicated sound levels are only valid within the operating field of the standard unit at full load as indicated in the 'Operating range - cooling' graph in the "Super-silenced EN" configuration. With outdoor air temperatures the unit operates at full load automatically increasing the airflow and taking the same sound levels of the "Soundproofed Compressors SC" configuration.

Operating range - Cooling

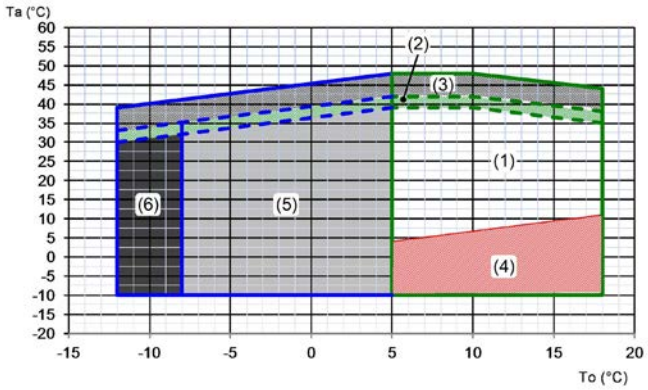
Compressor soundproofing (SC)



Ta (°C)= external exchanger inlet air temperature (D.B.)
To (°C)= internal exchanger outlet water temperature

1. Standard unit operating range at full load
2. Unit operating range with automatic staging of the compressor capacity
3. Standard unit operating range with air flow automatic modulation
4. Unit operating range in 'B - Low water temperature' configuration (40% ethylene glycol)
5. Extended of operating range (extremely low water temperature option available on request)

Super-silenced (EN)

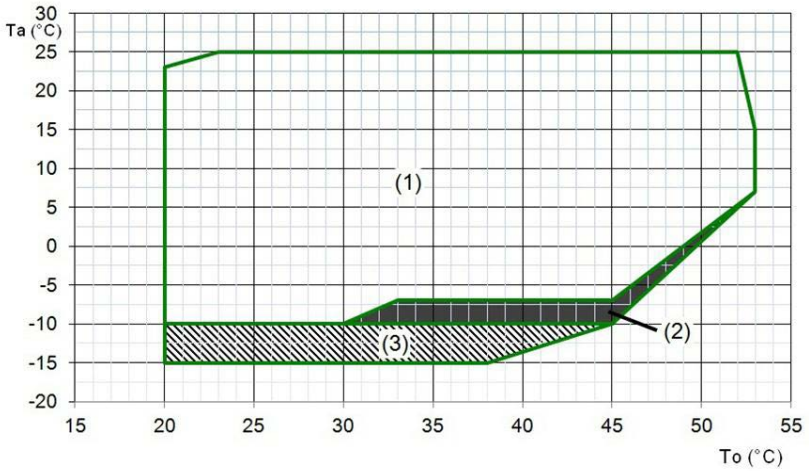


Ta (°C)= external exchanger inlet air temperature (D.B.)
To (°C)= internal exchanger outlet water temperature

1. Standard unit operating range at full load
2. Extended operating range with air flow-rate automatic increasing. Inside this field the sound levels are the same of the 'compressor soundproofing (SC)' acoustic configuration
3. Unit operating range with automatic staging of the compressor capacity
4. Standard unit operating range with air flow automatic modulation
5. Unit operating range in 'B - Low water temperature' configuration (40% ethylene glycol)
6. Extended of operating range (extremely low water temperature option available on request)

Operating range - Heating

Compressor soundproofing (SC) / super-silenced (EN)



Ta (°C)= external exchanger inlet air temperature (D.B.)
To (°C)= internal exchanger outlet water temperature

1. Standard unit operating range at full load
2. Unti operating range with 'OHE - operating range extension kit up to -10°C (W.B.)
3. Range in which the unit operation is allowed only for a limited period (max 1 hour).

Admissible water flow-rates

Minimum (Qmin) and maximum (Qmax) admissible water flow for the unit to operate correctly.

EXCELLENCE SC/EN		90.4	100.4	110.4	120.4	140.4	160.4	180.4	200.4	220.4	240.4
Qmin	[l/s]	8,0	8,0	9,3	9,3	10,1	11,5	14,3	14,3	16,4	16,4
Qmax	[l/s]	21,8	21,8	25,1	25,1	27,5	31,2	38,6	38,6	44,0	44,0

Correction factors for glycol use

% ethylene glycol by weight		5%	10%	15%	20%	25%	30%	35%	40%
Freezing temperature	°C	-2,0	-3,9	-6,5	-8,9	-11,8	-15,6	-19,0	-23,4
Safety temperature	°C	3,0	1,0	-1,0	-4,0	-6,0	-10,0	-14,0	-19,0
Cooling Capacity Factor	Nr	0,997	0,994	0,99	0,986	0,981	0,976	0,970	0,964
Compressor power input Factor	Nr	1,000	1,001	1,001	1,001	1,001	1,002	1,002	1,002
Internal exchanger glycol solution flow factor	Nr	1,003	1,010	1,020	1,033	1,05	1,072	1,095	1,124
Pressure drop Factor	Nr	0,989	0,983	0,979	0,980	0,984	0,993	1,004	1,020

The correction factors shown refer to water and glycol ethylene mixes used to prevent the formation of frost on the exchangers in the water circuit during inactivity in winter.

Fouling Correction Factors

	Internal exchanger	
m^2 K / W	F1	FK1
0.44 x 10 (-4)	1,0	1,0
0.88 x 10 (-4)	0,97	0,99
1.76 x 10 (-4)	0,94	0,98

F1 = Cooling capacity correction factors

FK1 = Compressor power input correction factor

Overload and control device calibrations

			open	closed	value
High pressure safety pressure switch		[kPa]	4050	3300	-
Antifreeze protection		[°C]	4	5.5	-
High pressure safety valve		[kPa]	-	-	4500
Low pressure safety valve		[kPa]	-	-	2950
Max no. of compressor starts per hour		[n°]	-	-	10
High compressor discharge temperature safety thermostat		[°C]	-	-	140

Exchanger operating range

	Internal exchanger		
	DPr		DPw
PED (CE)	4500	4500	1000

DPr = Maximum operating pressure on refrigerant side in kPa

DPw = Maximum operating pressure on water side in kPa

EXCELLENCE VERSION

Acoustic configuration: compressor soundproofing (SC)

Cooling performance (continued)

Size	To (°C)	ENTERING EXTERNAL EXCHANGER AIR TEMPERATURE (°C)											
		25		30		35		40		42		48	
		kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe
90.4	5	263	64	247	70	229	77	209	86	201	91	70	28
	6	270	64	255	71	238	78	215	88	208	91	73	28
	7	279	65	263	71	244	78	221	88	214	91	75	29
	10	298	66	280	73	258	80	235	89	229	93	80	29
	15	346	69	323	75	300	83	277	92	170	49	-	-
	18	381	71	356	78	331	85	305	96	192	50	-	-
100.4	5	282	70	267	76	249	85	227	95	218	98	92	36
	6	294	70	277	77	255	86	234	96	226	100	95	37
	7	302	71	284	78	263	86	237	97	234	101	98	37
	10	323	72	304	79	279	88	255	99	249	105	105	39
	15	371	76	349	83	324	91	302	102	201	61	-	-
	18	412	78	388	85	357	94	336	107	227	63	-	-
110.4	5	316	76	296	84	276	93	251	105	242	111	142	62
	6	327	77	307	85	283	94	258	106	250	111	148	62
	7	335	78	314	86	291	95	265	106	258	112	152	62
	10	359	80	336	88	310	96	281	109	269	116	159	65
	15	411	83	383	91	355	100	333	115	199	61	-	-
	18	451	85	422	93	388	103	370	119	223	62	-	-
120.4	5	350	88	331	96	305	106	280	118	270	124	142	61
	6	360	88	339	97	316	107	290	119	280	126	147	62
	7	373	89	351	98	323	108	296	121	285	128	150	63
	10	399	91	372	100	342	110	313	123	301	131	159	64
	15	463	95	432	104	399	115	373	128	208	59	-	-
	18	508	98	479	107	443	118	416	134	231	60	-	-
140.4	5	401	100	377	110	349	121	322	134	308	142	148	60
	6	412	101	388	111	359	121	332	134	321	143	154	60
	7	426	102	401	112	371	123	341	136	329	144	158	61
	10	454	105	425	114	391	125	361	138	349	149	168	63
	15	518	109	486	119	450	130	428	148	260	78	-	-
	18	575	113	534	123	498	134	475	154	292	80	-	-
160.4	5	453	112	428	122	395	134	359	150	346	160	183	80
	6	465	113	439	123	407	135	370	151	358	160	190	80
	7	480	115	453	125	417	137	381	152	370	162	196	81
	10	506	118	476	127	440	139	402	154	397	165	211	82
	15	587	123	547	133	508	146	470	160	275	74	-	-
	18	645	127	607	137	562	151	519	163	305	75	-	-
180.4	5	522	127	489	141	452	155	413	175	401	182	151	61
	6	541	129	505	142	467	157	423	176	411	184	155	61
	7	551	130	515	143	474	158	431	176	419	185	158	62
	10	578	133	539	145	497	160	464	181	439	190	165	63
	15	671	139	625	152	578	166	538	189	368	117	-	-
	18	744	143	690	156	640	171	593	194	416	119	-	-

kWf = Cooling capacity in kW. The data do not consider the part related to the pumps, required to overcome the pressure drop for the solution circulation inside the exchangers.
kWe = Compressor power input in kW.
To (°C) = Leaving internal exchanger water temperature (°C) - Performances in function of the inlet/outlet water temperature differential = 5°C.

EXCELLENCE VERSION

Acoustic configuration: compressor soundproofing (SC)

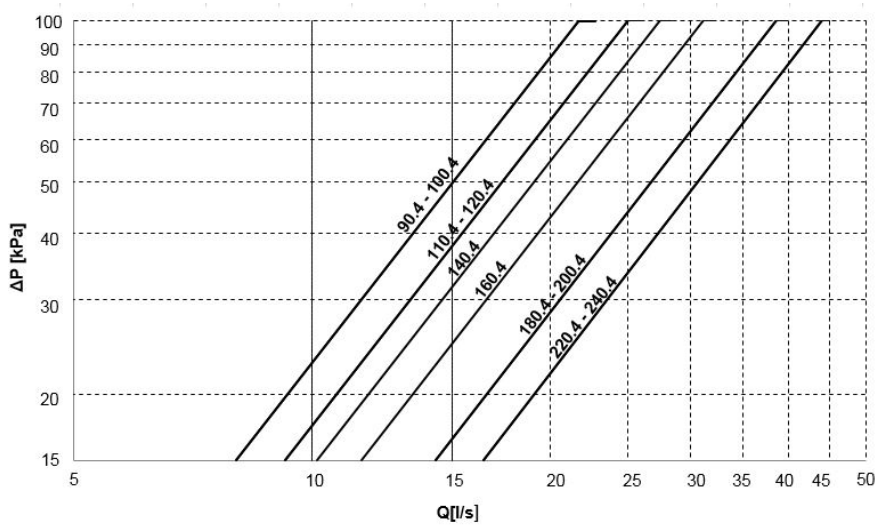
Cooling performance

Size	To (°C)	ENTERING EXTERNAL EXCHANGER AIR TEMPERATURE (°C)											
		25		30		35		40		42		48	
		kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe
200.4	5	569	141	533	154	496	169	458	185	448	192	274	119
	6	583	143	547	156	511	170	473	187	460	193	282	119
	7	599	145	561	157	520	172	482	188	471	194	288	120
	10	626	148	588	160	543	175	505	190	493	198	302	122
	15	713	155	675	169	630	183	592	199	394	112	-	-
	18	793	160	744	174	695	188	656	205	441	114	-	-
220.4	5	617	155	581	170	534	187	486	209	471	219	265	119
	6	633	157	596	171	547	188	499	209	480	222	271	121
	7	645	158	607	171	559	188	506	211	490	226	276	123
	10	675	160	631	174	581	192	525	218	519	233	292	127
	15	789	168	737	182	682	201	635	231	390	122	-	-
	18	878	173	819	188	760	206	722	235	444	125	-	-
240.4	5	656	171	617	187	570	207	514	227	502	242	262	118
	6	672	173	635	188	583	208	529	229	513	246	268	120
	7	685	175	647	188	595	208	543	232	524	249	273	122
	10	718	176	672	192	619	212	561	240	555	259	290	127
	15	836	184	779	200	726	220	676	255	388	116	-	-
	18	929	190	866	208	808	227	768	258	434	118	-	-

kWf = Cooling capacity in kW. The data do not consider the part related to the pumps, required to overcome the pressure drop for the solution circulation inside the exchangers.
kWe = Compressor power input in kW.
To (°C) = Leaving internal exchanger water temperature (°C) - Performances in function of the inlet/outlet water temperature differential = 5°C.

Internal exchanger pressure drop

Acoustic configuration: compressor soundproofing (SC)



The pressure drops are calculated considering a water temperature of 7°C

Q = water flow-rate[l/s]
DP = water side pressure drops (kPa)

The water flow-rate must be calculated with the following formula

Q [l/s] = kWf / (4,186 x DT)

kWf = Cooling capacity in kW
DT = Different between entering/leaving water temperature

To the internal exchanger pressure drops must be added the pressure drops of the steel mesh mechanical strainer that must be placed on the water input line. It is a device compulsory for the correct unit operation, and it is available as Clivet option (see the HYDRONIC ASSEMBLY ACCESSORIES). If the mechanical filter is selected and installed by the Customer, it is forbidden the use of filters with the mesh pitch higher than 1,6 mm, because they can cause a bad unit operation and also its serious damaging.

EXCELLENCE VERSION

Acoustic configuration: compressor soundproofing (SC) / Acoustic configuration: super-silenced (EN)

Heating performance (continued)

Size	Ta (°C) D.B./W.B.	LEAVING INTERNAL EXCHANGER WATER TEMPERATURE (°C)									
		35		40		45		50		53	
		kWt	kWe	kWt	kWe	kWt	kWe	kWt	kWe	kWt	kWe
90.4	-7 / -8	205	60.8	203	67.8	201	75.4	-	-	-	-
	-5 / -6	216	61.2	214	68.0	211	75.6	-	-	-	-
	0 / -1	245	62.4	243	68.9	238	76.2	-	-	-	-
	2 / 1	260	62.8	256	69.4	250	76.7	244	85.5	-	-
	7 / 6	297	64.1	290	70.7	282	77.8	273	86.6	272	91.7
	12 / 11	344	65.7	336	72.1	326	79.7	313	88.4	312	93.5
100.4	-7 / -8	225	67.4	223	75.0	219	83.2	-	-	-	-
	-5 / -6	236	67.8	235	75.2	231	83.5	-	-	-	-
	0 / -1	270	68.9	268	76.3	262	84.4	-	-	-	-
	2 / 1	285	69.3	282	76.8	276	84.9	270	95.0	-	-
	7 / 6	325	70.6	319	78.1	311	86.0	303	96.4	302	102
	12 / 11	378	72.4	367	79.9	357	87.8	347	98.4	346	104
110.4	-7 / -8	246	73.8	244	81.8	240	90.7	-	-	-	-
	-5 / -6	258	74.3	256	82.2	252	91.1	-	-	-	-
	0 / -1	295	75.5	291	83.4	286	92.2	-	-	-	-
	2 / 1	311	76.0	307	84.0	300	92.7	292	103	-	-
	7 / 6	354	77.4	346	85.5	338	94.0	330	105	327	111
	12 / 11	410	79.3	399	87.4	388	95.8	377	107	375	113
120.4	-7 / -8	273	82.2	271	91.3	269	101	-	-	-	-
	-5 / -6	287	82.6	284	91.5	282	102	-	-	-	-
	0 / -1	329	83.7	323	92.6	317	102	-	-	-	-
	2 / 1	347	84.2	340	93.1	334	103	327	115	-	-
	7 / 6	394	85.7	386	94.7	376	104	365	116	365	123
	12 / 11	457	87.9	445	96.9	432	106	418	119	419	126
140.4	-7 / -8	310	90.8	309	100	305	111	-	-	-	-
	-5 / -6	325	91.5	324	101	319	112	-	-	-	-
	0 / -1	371	93.3	367	103	362	114	-	-	-	-
	2 / 1	391	94.1	386	104	379	114	370	127	-	-
	7 / 6	445	96.3	435	106	424	116	416	130	414	137
	12 / 11	515	99.2	502	109	487	119	476	133	474	140
160.4	-7 / -8	342	99.4	339	110	335	121	-	-	-	-
	-5 / -6	360	101	356	111	350	122	-	-	-	-
	0 / -1	410	103	403	114	395	125	-	-	-	-
	2 / 1	432	105	425	115	415	127	407	140	-	-
	7 / 6	490	107	480	118	469	130	457	143	455	151
	12 / 11	569	111	554	122	539	133	524	147	520	155
180.4	-7 / -8	398	117	395	131	389	147	-	-	-	-
	-5 / -6	417	118	415	132	409	147	-	-	-	-
	0 / -1	471	120	470	134	460	149	-	-	-	-
	2 / 1	497	121	492	134	483	149	473	167	-	-
	7 / 6	563	123	554	136	541	151	529	169	526	180
	12 / 11	651	126	637	139	618	153	603	171	598	182

kWt = Internal exchanger heating capacity (kW). The data do not consider the part related to the pumps, required to overcome the pressure drop for the solution circulation inside the exchangers.
The kWt heating capacity does not consider any defrosting cycles. For the real heating capacity calculation, including defrosting cycles, please refer to "Integrated heating capacities" table.
kWe = Compressor power input in kW
Ta = Entering external exchanger air temperature
D.B. = Dry bulb
W.B. = Wet bulb
With Ta below -5°C 'OHE - Limit extension kit in heating' accessory included.

EXCELLENCE VERSION

Acoustic configuration: compressor soundproofing (SC) /

Acoustic configuration: super-silenced (EN)

Heating performance

Size	Ta (°C) D.B./W.B.	LEAVING INTERNAL EXCHANGER WATER TEMPERATURE (°C)									
		35		40		45		50		53	
		kWt	kWe	kWt	kWe	kWt	kWe	kWt	kWe	kWt	kWe
200.4	-7 / -8	439	128	436	142	427	158	-	-	-	-
	-5 / -6	460	129	457	144	449	159	-	-	-	-
	0 / -1	522	132	517	146	506	162	-	-	-	-
	2 / 1	551	133	543	147	533	163	521	182	-	-
	7 / 6	620	136	611	150	598	166	581	185	578	196
	12 / 11	717	139	701	154	684	169	662	188	657	199
220.4	-7 / -8	473	142	470	158	460	177	-	-	-	-
	-5 / -6	495	143	494	159	484	178	-	-	-	-
	0 / -1	563	146	555	162	545	180	-	-	-	-
	2 / 1	593	147	584	163	573	181	558	203	-	-
	7 / 6	667	150	658	166	643	184	627	206	622	219
	12 / 11	769	154	754	170	733	187	713	209	706	222
240.4	-7 / -8	510	153	506	171	494	191	-	-	-	-
	-5 / -6	534	154	530	172	520	192	-	-	-	-
	0 / -1	602	157	600	175	585	194	-	-	-	-
	2 / 1	636	158	629	176	615	196	602	220	-	-
	7 / 6	716	161	705	179	693	198	672	222	669	237
	12 / 11	823	164	807	182	787	201	765	225	759	239

kWt = Internal exchanger heating capacity (kW). The data do not consider the part related to the pumps, required to overcome the pressure drop for the solution circulation inside the exchangers.
The kWt heating capacity does not consider any defrosting cycles. For the real heating capacity calculation, including defrosting cycles, please refer to "Integrated heating capacities" table.
kWe = Compressor power input in kW.
Ta = Entering external exchanger air temperature.
D.B. = Dry bulb
W.B. = Wet bulb
With Ta below -5°C 'OHE - Limit extension kit in heating' accessory included.

Integrated heating capacities

Entering external exchanger air temperature °C (D.B. / W.B.)	-7 / -8	-5 / -6	0 / -1	2 / 1	Other
Heating capacity multiplication coefficient	0,90	0,89	0,88	0,90	1,00

The integrated heating capacity represents the real heating capacity considering the defrost cycles too.
To obtain the integrated heating capacity multiply the heating performance value in kWt (shown in the heating performance tables) by the coefficients indicated in the table.
DB = dry bulb
WB = wet bulb
In case of below zero outdoor air temperature with a long period of heat pump operating mode it is necessary to help the evacuation of the water produced during the defrost cycle; this to avoid the formation of ice in the unit basement. Pay attention that the evacuation will not create inconveniences to things or persons.

EXCELLENCE VERSION

Acoustic configuration: super-silenced (EN)

Cooling performance (continued)

Size	To (°C)	ENTERING EXTERNAL EXCHANGER AIR TEMPERATURE (°C)											
		25		30		35		39		42		48	
		kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe
90.4	5	253	67	237	73	221	81	204	89	201	91	70	28
	6	262	67	246	74	226	82	210	90	208	91	73	28
	7	269	68	251	75	232	82	215	90	214	91	75	29
	10	288	70	268	76	247	84	230	91	229	93	80	29
	15	332	73	308	80	288	88	267	94	170	49	-	-
	18	366	75	343	82	316	91	294	96	192	50	-	-
100.4	5	279	72	261	80	242	88	222	97	218	98	92	36
	6	287	73	268	80	249	88	231	97	226	100	95	37
	7	297	74	277	81	255	89	236	98	234	101	98	37
	10	315	76	295	83	271	91	253	100	249	105	105	39
	15	360	79	337	86	313	95	289	104	201	61	-	-
	18	395	81	367	89	342	99	314	106	227	63	-	-
110.4	5	305	80	287	88	263	97	244	108	242	111	142	62
	6	315	81	294	89	271	98	253	108	250	111	148	62
	7	326	82	303	90	279	99	256	109	258	112	152	62
	10	346	83	322	91	295	101	274	111	269	116	159	65
	15	396	87	369	96	340	107	317	115	198	61	-	-
	18	433	89	404	98	374	109	349	117	224	62	-	-
120.4	5	337	93	315	102	290	113	273	123	270	124	142	61
	6	348	94	326	103	301	114	281	124	280	126	147	62
	7	357	95	334	104	307	115	287	126	285	128	150	63
	10	379	98	354	107	325	117	306	129	301	131	159	64
	15	437	102	409	111	379	124	355	134	209	59	-	-
	18	488	105	451	115	420	126	390	137	230	60	-	-
140.4	5	389	104	367	115	339	126	316	137	308	142	148	60
	6	404	106	377	116	347	127	327	139	321	143	154	60
	7	413	107	386	117	355	129	332	141	329	144	158	61
	10	437	110	409	120	376	131	350	147	349	149	168	63
	15	503	116	468	126	437	139	412	154	260	78	-	-
	18	551	119	516	130	482	143	454	158	292	80	-	-
160.4	5	442	116	412	127	380	140	357	153	346	160	183	80
	6	453	117	426	129	391	141	368	154	358	160	190	80
	7	468	119	436	130	400	143	373	156	370	162	196	81
	10	493	122	458	133	421	146	388	160	397	165	211	82
	15	559	128	520	140	482	155	452	166	275	74	-	-
	18	608	133	567	144	524	159	494	170	306	75	-	-
180.4	5	503	136	469	149	434	163	400	182	401	182	151	61
	6	518	137	481	151	444	165	409	183	411	184	155	61
	7	530	138	491	152	451	166	417	184	419	185	158	62
	10	556	141	514	154	474	169	443	186	439	190	165	63
	15	640	148	596	162	553	178	504	191	369	117	-	-
	18	704	152	656	166	610	184	550	196	413	119	-	-

kWf = Cooling capacity in kW. The data do not consider the part related to the pumps, required to overcome the pressure drop for the solution circulation inside the exchangers.
kWe = Compressor power input in kW.
To (°C) = Leaving internal exchanger water temperature (°C) - Performances in function of the inlet/outlet water temperature differential = 5°C

EXCELLENCE VERSION

Acoustic configuration: super-silenced (EN)

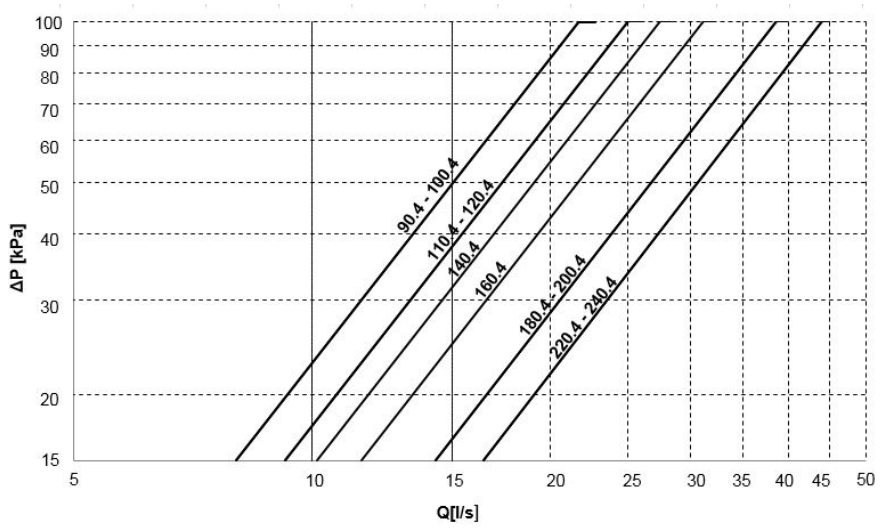
Cooling performance

Size	To (°C)	ENTERING EXTERNAL EXCHANGER AIR TEMPERATURE (°C)											
		25		30		35		39		42		48	
		kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe
200.4	5	549	148	514	161	476	176	450	189	448	192	274	119
	6	563	150	526	163	488	177	463	191	460	193	282	119
	7	572	151	537	165	499	179	472	192	471	194	288	120
	10	601	155	561	168	522	183	494	195	493	198	302	122
	15	686	163	645	177	606	192	582	206	394	112	-	-
	18	754	168	705	182	667	198	636	210	441	114	-	-
220.4	5	605	161	563	177	516	196	477	218	471	219	265	119
	6	620	163	576	179	528	198	487	221	481	222	271	121
	7	632	164	587	180	537	199	497	220	490	226	276	123
	10	660	167	611	183	557	203	525	227	519	233	292	127
	15	765	176	710	192	655	215	599	237	389	122	-	-
	18	847	181	789	198	729	223	656	242	444	125	-	-
240.4	5	634	181	589	198	541	219	501	245	502	242	262	118
	6	648	183	603	200	554	221	512	249	513	246	268	120
	7	663	184	616	202	563	224	523	249	524	249	273	122
	10	691	187	640	205	584	227	549	254	555	259	290	127
	15	809	196	750	214	694	240	638	264	387	116	-	-
	18	906	202	846	222	787	246	710	270	435	118	-	-

kWf = Cooling capacity in kW. The data do not consider the part related to the pumps, required to overcome the pressure drop for the solution circulation inside the exchangers
kWe = Compressor power input in kW
To (°C) = Leaving internal exchanger water temperature (°C) - Performances in function of the inlet/outlet water temperature differential = 5°C

Internal exchanger pressure drop

Acoustic configuration: super-silenced (EN)



The pressure drops are calculated considering a water temperature of 7°C

Q = water flow-rate[l/s]
DP = water side pressure drops (kPa)

The water flow-rate must be calculated with the following formula

Q [l/s] = kWf / (4,186 x DT)

kWf = Cooling capacity in kW
DT = Different between entering/leaving water temperature

To the internal exchanger pressure drops must be added the pressure drops of the steel mesh mechanical strainer that must be placed on the water input line. It is a device compulsory for the correct unit operation, and it is available as Clivet option (see the HYDRONIC ASSEMBLY ACCESSORIES). If the mechanical filter is selected and installed by the Customer, it is forbidden the use of filters with the mesh pitch higher than 1,6 mm, because they can cause a bad unit operation and also its serious damaging.

EXCELLENCE VERSION

Acoustic configuration: compressor soundproofing (SC)

Cooling performance at part load

Size	STEP	External exchanger entering air temperature (°C)											
		35			30			25			20		
		kWf	kWe_tot	EER	kWf	kWe_tot	EER	kWf	kWe_tot	EER	kWf	kWe_tot	EER
90.4	6	244	88	2,78	263	81	3,25	279	74	3,75	291	68	4,27
	5	212	73	2,90	229	67	3,39	243	62	3,91	253	57	4,45
	4	177	58	3,07	191	53	3,60	202	49	4,15	211	45	4,73
	3	136	43	3,13	146	40	3,66	155	37	4,23	162	34	4,81
	2	92	29	3,16	99	27	3,70	105	25	4,27	110	23	4,86
	1	45	15	3,01	48	14	3,53	51	13	4,07	53	11	4,63
100.4	6	263	95	2,77	284	88	3,24	302	80	3,77	315	74	4,29
	5	224	77	2,92	241	70	3,42	256	65	3,97	268	59	4,52
	4	179	57	3,17	193	52	3,71	206	48	4,31	215	44	4,91
	3	150	46	3,24	161	43	3,80	172	39	4,41	179	36	5,02
	2	118	36	3,30	128	33	3,87	136	30	4,50	142	28	5,12
	1	57	18	3,13	61	17	3,67	65	15	4,26	68	14	4,85
110.4	6	291	104	2,79	314	96	3,28	335	88	3,82	349	80	4,34
	5	241	81	2,97	260	74	3,50	277	68	4,07	289	62	4,64
	4	183	57	3,23	198	52	3,80	211	48	4,42	220	44	5,04
	3	166	50	3,29	180	46	3,88	192	42	4,51	200	39	5,14
	2	149	44	3,37	161	41	3,97	172	37	4,62	179	34	5,25
	1	71	22	3,20	77	20	3,77	82	19	4,38	86	17	4,99
120.4	4	323	118	2,74	351	108	3,26	373	99	3,78	390	91	4,30
	3	255	87	2,92	276	80	3,47	294	73	4,03	307	67	4,59
	2	183	55	3,30	198	50	3,93	211	46	4,56	220	42	5,19
	1	90	28	3,22	97	25	3,83	104	23	4,45	108	21	5,07
140.4	6	371	135	2,74	401	125	3,22	426	115	3,71	445	105	4,22
	5	305	104	2,92	330	96	3,44	351	89	3,96	366	81	4,50
	4	235	72	3,25	254	66	3,83	270	61	4,41	282	56	5,02
	3	214	64	3,32	231	59	3,90	246	55	4,49	256	50	5,11
	2	194	57	3,41	209	52	4,02	223	48	4,62	232	44	5,26
	1	93	29	3,25	100	26	3,82	107	24	4,40	111	22	5,00
160.4	4	417	150	2,78	453	137	3,30	480	128	3,76	501	117	4,28
	3	328	111	2,97	356	101	3,51	377	94	4,01	394	86	4,56
	2	234	71	3,28	254	65	3,89	269	61	4,44	281	56	5,05
	1	115	36	3,21	125	33	3,81	132	30	4,34	138	28	4,94
180.4	6	474	173	2,73	515	159	3,25	551	146	3,78	575	134	4,30
	5	410	141	2,90	445	129	3,45	476	119	4,01	497	109	4,57
	4	350	109	3,20	380	100	3,80	407	92	4,43	425	84	5,04
	3	251	83	3,04	273	75	3,61	292	69	4,21	304	64	4,79
	2	199	58	3,45	217	53	4,09	232	49	4,77	242	45	5,43
	1	90	29	3,14	98	26	3,73	105	24	4,34	109	22	4,94
200.4	6	520	188	2,77	561	173	3,24	599	160	3,74	625	147	4,24
	5	437	147	2,97	472	136	3,47	504	126	4,00	526	116	4,55
	4	354	107	3,30	381	99	3,84	407	92	4,44	425	84	5,04
	3	295	88	3,36	318	81	3,92	340	75	4,52	354	69	5,14
	2	246	70	3,53	265	64	4,12	283	60	4,76	295	55	5,40
	1	123	35	3,50	132	32	4,08	141	30	4,71	147	28	5,35
220.4	6	559	204	2,73	607	187	3,24	645	174	3,72	673	159	4,23
	5	473	165	2,86	513	151	3,40	546	140	3,89	570	129	4,43
	4	347	106	3,26	376	97	3,87	400	90	4,44	417	83	5,05
	3	291	86	3,36	315	79	3,99	336	73	4,57	350	67	5,20
	2	172	51	3,34	186	47	3,96	198	44	4,54	207	40	5,16
	1	117	35	3,30	127	32	3,92	135	30	4,49	141	28	5,11
240.4	4	595	224	2,65	647	204	3,17	685	191	3,59	715	175	4,08
	3	471	164	2,87	512	150	3,42	542	140	3,88	566	128	4,41
	2	354	104	3,39	384	95	4,04	407	89	4,59	425	81	5,21
	1	176	52	3,36	191	48	4,01	203	45	4,55	212	41	5,17

kWf = Cooling capacity in kW kWe_tot = Unit total power input in kW

STEP = Active capacity steps (the maximum number indicates full capacity / the minimum number indicates the smallest partialization step)

Internal exchanger water = output temperature 7°C/ input * (variable) / constant flow equal to the nominal value.

EXCELLENCE VERSION

Acoustic configuration: super-silenced (EN)

Cooling performance at part load

Size	STEP	External exchanger entering air temperature (°C)											
		35			30			25			20		
		kWf	kWe_tot	EER	kWf	kWe_tot	EER	kWf	kWe_tot	EER	kWf	kWe_tot	EER
90.4	6	232	89	2,59	251	82	3,07	269	75	3,58	280	69	4,07
	5	204	74	2,77	221	67	3,28	236	62	3,82	247	57	4,35
	4	175	58	3,03	190	53	3,58	203	49	4,18	212	45	4,76
	3	135	44	3,08	146	40	3,65	156	37	4,25	163	34	4,84
	2	92	29	3,11	99	27	3,69	106	25	4,30	111	23	4,89
	1	44	15	2,97	48	14	3,52	51	13	4,10	53	11	4,67
100.4	6	255	96	2,65	277	88	3,14	297	81	3,68	310	74	4,18
	5	218	76	2,85	237	70	3,39	254	64	3,96	264	59	4,51
	4	182	56	3,24	197	51	3,85	211	47	4,50	220	43	5,12
	3	152	46	3,31	165	42	3,93	177	38	4,60	184	35	5,24
	2	120	36	3,38	130	32	4,01	140	30	4,69	146	27	5,34
	1	58	18	3,20	62	16	3,80	67	15	4,44	70	14	5,06
110.4	6	279	106	2,64	303	97	3,12	326	89	3,67	339	81	4,18
	5	231	81	2,84	250	74	3,36	269	68	3,95	280	62	4,50
	4	182	57	3,22	198	52	3,82	213	47	4,48	222	43	5,10
	3	166	50	3,29	180	46	3,89	193	42	4,57	201	39	5,20
	2	148	44	3,36	161	40	3,98	173	37	4,67	181	34	5,32
	1	71	22	3,19	77	20	3,78	83	19	4,44	87	17	5,05
120.4	4	307	122	2,52	334	111	3,01	357	102	3,49	372	94	3,97
	3	246	89	2,75	267	81	3,29	285	75	3,82	297	68	4,34
	2	183	56	3,24	199	51	3,86	212	47	4,48	221	43	5,10
	1	90	28	3,16	98	26	3,77	104	24	4,37	109	22	4,97
140.4	6	355	138	2,58	386	126	3,06	413	116	3,55	430	107	4,04
	5	296	105	2,81	321	96	3,33	343	89	3,87	358	81	4,40
	4	235	72	3,25	255	66	3,85	273	61	4,47	285	56	5,08
	3	214	65	3,31	232	59	3,92	248	55	4,55	259	50	5,17
	2	194	57	3,40	210	52	4,04	225	48	4,68	234	44	5,33
	1	93	29	3,24	101	26	3,84	108	24	4,46	112	22	5,07
160.4	4	400	152	2,63	436	139	3,13	468	128	3,65	488	118	4,15
	3	318	111	2,86	346	102	3,40	371	94	3,96	387	86	4,51
	2	236	71	3,32	257	65	3,96	276	60	4,61	287	55	5,25
	1	116	36	3,25	126	33	3,87	136	30	4,51	141	28	5,13
180.4	6	451	178	2,54	491	163	3,01	530	149	3,55	553	137	4,03
	5	392	144	2,73	427	132	3,23	460	121	3,82	480	111	4,34
	4	333	109	3,06	363	100	3,62	391	91	4,27	408	84	4,86
	3	238	82	2,90	260	75	3,44	280	69	4,06	292	63	4,62
	2	189	58	3,29	206	53	3,90	223	48	4,60	232	44	5,23
	1	86	29	2,99	93	26	3,55	101	24	4,18	105	22	4,76
200.4	6	499	191	2,62	537	176	3,04	572	162	3,52	597	149	4,01
	5	422	148	2,86	453	137	3,32	483	126	3,84	504	115	4,37
	4	345	105	3,27	370	97	3,80	395	90	4,40	412	82	5,00
	3	295	87	3,37	317	81	3,92	338	74	4,53	352	68	5,15
	2	246	69	3,54	264	64	4,11	281	59	4,76	294	54	5,41
	1	122	35	3,51	132	32	4,08	140	30	4,72	146	27	5,36
220.4	6	537	211	2,55	587	192	3,06	632	176	3,60	659	161	4,09
	5	458	168	2,72	501	153	3,27	540	140	3,85	563	129	4,38
	4	343	104	3,30	375	94	3,97	404	87	4,66	421	79	5,30
	3	293	86	3,40	321	78	4,09	345	72	4,80	360	66	5,46
	2	173	51	3,37	189	47	4,06	204	43	4,77	213	39	5,42
	1	118	35	3,33	129	32	4,01	139	29	4,71	145	27	5,36
240.4	4	563	235	2,40	616	213	2,88	663	196	3,38	691	179	3,85
	3	451	169	2,67	493	153	3,21	530	141	3,77	553	129	4,29
	2	339	104	3,27	370	94	3,93	398	86	4,62	415	79	5,25
	1	169	52	3,24	184	47	3,90	198	43	4,58	207	40	5,21

kWf = Cooling capacity in kW kWe_tot = Unit total power input in kW

STEP = Active capacity steps (the maximum number indicates full capacity / the minimum number indicates the smallest partialization step)

Internal exchanger water = output temperature 7°C/ input * (variable) / constant flow equal to the nominal value.

EXCELLENCE VERSION

Acoustic configuration: compressor soundproofing (SC)

Acoustic configuration: super-silenced (EN)

Heating performance at part load

Size	STEP	Entering external exchanger air temperature (°C)																		
		-7/-8			-5/-6			-0/-1			2/1			7/6			12/11		
		kWt	kWe_tot	COP	kWt	kWe_tot	COP	kWt	kWe_tot	COP	kWt	kWe_tot	COP	kWt	kWe_tot	COP	kWt	kWe_tot	COP
90.4	6	205	70	2,91	216	71	3,05	245	72	3,40	260	72	3,59	297	74	4,03	344	75	4,57
	5	180	58	3,10	189	58	3,24	214	59	3,61	226	60	3,79	255	61	4,21	291	62	4,72
	4	150	45	3,30	157	46	3,44	179	46	3,85	189	47	4,03	214	48	4,50	244	48	5,03
	3	115	35	3,27	121	35	3,43	139	36	3,87	147	36	4,06	167	37	4,56	192	37	5,12
	2	80	25	3,23	85	25	3,41	99	25	3,91	105	26	4,11	121	26	4,67	140	26	5,29
	1	40	13	3,16	43	13	3,34	49	13	3,82	52	13	4,03	60	13	4,57	70	13	5,18
100.4	6	225	77	2,92	236	77	3,05	270	79	3,44	285	79	3,61	325	80	4,05	378	82	4,61
	5	197	63	3,12	207	63	3,26	234	64	3,63	248	65	3,81	280	66	4,24	319	67	4,75
	4	164	49	3,31	172	50	3,46	196	51	3,87	207	51	4,06	234	52	4,53	267	53	5,06
	3	126	38	3,29	133	38	3,45	152	39	3,89	161	39	4,08	183	40	4,59	210	41	5,15
	2	88	27	3,24	93	27	3,43	108	28	3,93	115	28	4,13	132	28	4,69	153	29	5,32
	1	44	14	3,17	47	14	3,36	54	14	3,84	57	14	4,05	66	14	4,60	76	15	5,21
110.4	6	246	84	2,94	258	84	3,07	295	85	3,46	311	86	3,63	354	87	4,06	410	89	4,60
	5	214	68	3,13	225	69	3,27	255	70	3,64	270	71	3,82	305	72	4,25	347	73	4,76
	4	178	54	3,32	187	54	3,47	213	55	3,88	225	55	4,07	255	56	4,54	290	57	5,07
	3	137	42	3,30	144	42	3,46	165	42	3,90	175	43	4,10	200	43	4,60	228	44	5,16
	2	96	29	3,25	102	30	3,44	118	30	3,94	125	30	4,15	144	31	4,71	166	31	5,33
	1	48	15	3,18	51	15	3,37	59	15	3,86	62	15	4,06	72	16	4,61	83	16	5,22
120.4	4	273	92	2,97	287	92	3,11	329	94	3,52	347	94	3,69	394	96	4,12	457	98	4,68
	3	208	69	3,02	220	69	3,18	253	70	3,61	266	70	3,78	306	72	4,26	349	73	4,77
	2	145	46	3,17	154	46	3,35	178	47	3,81	189	47	4,02	217	48	4,54	249	49	5,10
	1	73	23	3,11	77	23	3,28	89	24	3,74	94	24	3,94	109	24	4,45	124	25	5,00
140.4	6	310	103	3,00	325	104	3,12	371	106	3,50	391	107	3,66	445	109	4,08	515	112	4,60
	5	270	86	3,15	283	86	3,29	320	88	3,66	339	88	3,84	383	90	4,27	437	91	4,79
	4	224	67	3,34	235	68	3,48	268	69	3,90	283	69	4,09	321	70	4,56	365	72	5,10
	3	172	52	3,32	181	52	3,48	208	53	3,92	220	53	4,12	251	54	4,62	287	55	5,19
	2	120	37	3,27	128	37	3,46	148	37	3,96	157	38	4,17	181	38	4,73	209	39	5,36
	1	60	19	3,20	64	19	3,38	74	19	3,88	79	19	4,08	91	20	4,63	105	20	5,25
160.4	4	342	112	3,05	360	114	3,16	410	116	3,54	432	118	3,67	490	120	4,08	569	124	4,60
	3	259	87	2,99	274	87	3,14	314	88	3,56	331	89	3,74	380	90	4,21	434	92	4,72
	2	181	58	3,14	192	58	3,31	222	59	3,77	235	59	3,97	270	60	4,49	310	61	5,04
	1	90	29	3,07	96	30	3,24	111	30	3,69	117	30	3,89	135	31	4,40	155	31	4,94
180.4	6	398	133	3,00	417	134	3,12	471	136	3,47	497	137	3,63	563	139	4,05	651	142	4,59
	5	341	109	3,12	358	110	3,26	405	112	3,63	429	113	3,81	484	114	4,24	553	116	4,75
	4	284	86	3,31	298	86	3,45	339	88	3,87	358	88	4,05	406	90	4,52	462	91	5,05
	3	218	66	3,29	230	67	3,45	263	68	3,89	278	68	4,08	317	69	4,58	363	71	5,15
	2	152	47	3,24	161	47	3,43	188	48	3,93	199	48	4,13	229	49	4,69	265	50	5,31
	1	76	24	3,17	81	24	3,36	94	24	3,84	99	25	4,05	115	25	4,59	132	25	5,20
200.4	6	439	144	3,05	460	145	3,17	522	148	3,53	551	149	3,70	620	152	4,08	717	155	4,63
	5	376	119	3,15	395	120	3,28	446	122	3,66	473	123	3,84	533	125	4,27	608	127	4,78
	4	313	94	3,34	328	94	3,48	373	96	3,90	394	96	4,09	447	98	4,56	509	100	5,09
	3	240	72	3,31	253	73	3,47	290	74	3,92	306	74	4,12	350	76	4,62	400	77	5,19
	2	167	51	3,27	178	51	3,46	206	52	3,96	219	53	4,17	252	53	4,73	291	54	5,35
	1	84	26	3,20	89	26	3,38	103	27	3,87	109	27	4,08	126	27	4,63	146	28	5,25
220.4	6	473	158	2,99	495	159	3,11	563	162	3,48	593	163	3,64	667	166	4,01	769	170	4,52
	5	404	131	3,09	424	131	3,23	480	134	3,59	508	135	3,78	574	137	4,20	655	139	4,70
	4	336	102	3,28	353	103	3,42	402	105	3,83	424	106	4,02	481	107	4,48	547	109	5,01
	3	258	79	3,26	272	80	3,41	312	81	3,85	330	82	4,04	376	83	4,54	430	84	5,10
	2	180	56	3,21	191	56	3,40	222	57	3,89	236	58	4,09	272	58	4,65	314	60	5,26
	1	90	29	3,14	96	29	3,32	111	29	3,81	118	29	4,01	136	30	4,55	157	30	5,16
240.4	4	510	169	3,02	534	170	3,14	602	173	3,48	636	174	3,65	716	177	4,04	823	180	4,57
	3	378	128	2,96	400	128	3,12	459	130	3,53	484	131	3,70	556	133	4,18	634	136	4,68
	2	264	85	3,11	280	85	3,28	324	87	3,74	343	87	3,94	395	89	4,45	452	91	5,00
	1	132	43	3,05	140	44	3,21	162	44	3,66	172	45	3,86	198	45	4,36	226	46	4,90

kWt = Heating capacity in kW kWe_tot = Unit total power input in kW
STEP = Active capacity steps (the maximum number indicates full capacity / the minimum number indicates the smallest partialization step)
Internal exchanger water = output temperature 35°C/ input * (variable) / constant flow equal to the nominal value.

Configurations

Consult the special prospective reported in the final section to check for compatibility between different options.

B - Low water temperature (Brine)

Composed of suitable brazed plate heat exchanger closed-cell insulation 13mm thick, electronic expansion valve, functional calibration and safety devices suitable for particular uses. Enables an "unfreezable" solution to be cooled (for example, water and ethylene glycol in suitable quantities) up to a temperature of between +4°C and –8°C. Configuration also known as "Brine". In low temperature operation, some staging steps could not be available. It includes:

- suitable exchangers with extra-thick closed-cell insulation
- electronic expansion valve, functional calibration and safety devices suitable for particular uses.

During the selection phase it is necessary to indicate the required operating type, the unit will be optimised on the basis of this: - Unit with single operating set-point (only at low temperature) - Unit with double operating set-point.

The unit in this configuration has a different operation range, indicated in the operating range section.

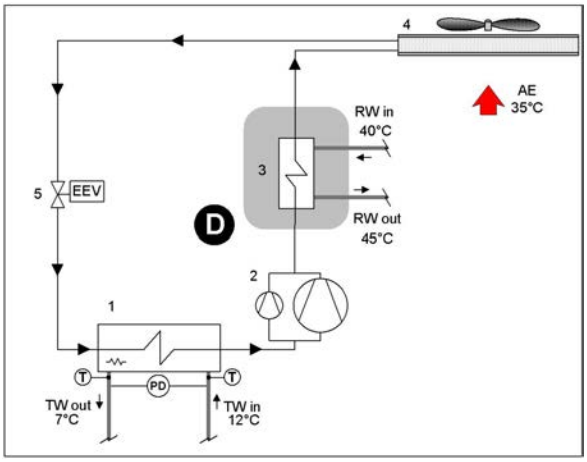
The glycol concentration must be chosen based on the minimum temperature the water can reach. The presence of glycol influences pressure drops on the water side and the unit's output as indicated in the table reporting the "correction factors for use with glycol".

The "Extremely low water temperature" option for the chilled wter production down to -12°C is available on request.

D - Partial energy recovery

Consisting of heat exchanger of a brazed plate heat exchanger made of 316 stainless steel, suitable for recovering a part of the capacity dispersed by the unit. Maximum operating pressure exchanger: 10 bar on the water side and 45 bar on the refrigerant side. A configuration which enables the production of hot water free-of-charge while operating in the cooling mode, thanks to the total recovery of condensation heat that would otherwise be disposed of into the external heat source. This option is also known as "desuperheater". The partial recovery device is considered to be operating when it is powered by the water flow which is to be heated. This condition improves the unit performance. When the temperature of the water to be heated is particularly low, it is necessary to insert a flow regulation valve in the hydraulic circuit (user side), to maintain the recovery output temperature at higher than 35°C and thus avoid refrigerant condensation in the plate exchanger.

The power delivered by the partial recovery is 20% of the thermal power dissipation (cooling + electrical power absorbed by the compressors).



D - Partial recovery device

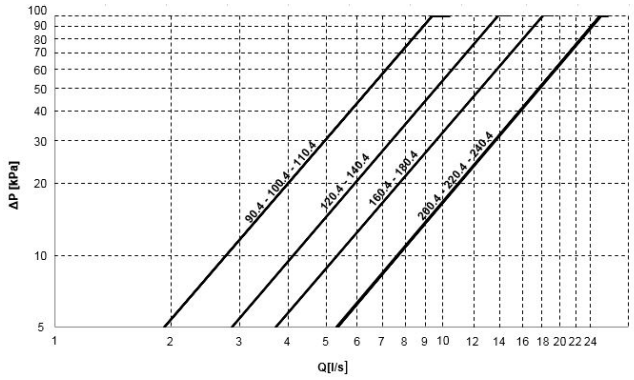
1 - Internal exchanger
2 - Compressors
3 - Recovery exchanger
4 - External exchanger
5 - Expansion electronic valve

TW in chilled water inlet
TW out chilled water outlet

RW in - Recovery water input
RW out - Recovery water output

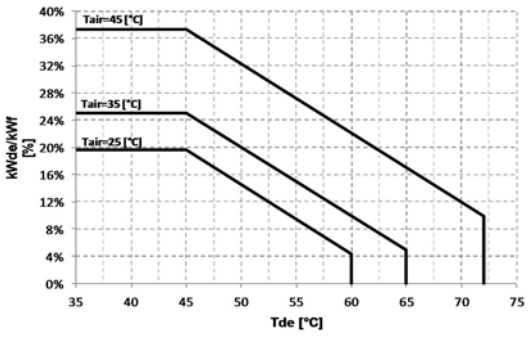
T - Temperature probe
PD - Differential pressure switch
AE - Outdoor air

Pressure drops of partial energy recovery exchanger



Q = water flow-rate [l/s]
DP = pressure drop water side (kPa)

Partial recovery heating capacity



kWde/kWf = Heating capacity/cooling capacity [%]
Tde = Leaving recovery exchanger water temperature [°C]

Values with a tolerance of ± 2%

Example: Requested cooling capacity: 520 kW with chilled water at 12/7°C and 35°C outdoor air.
Size purpose of the study: WSAN-XSC3 EXC SC 200.4
Hot water required temperature: +45°C
Recovery capacity: 26% di 520 kW = 135 kW
Design flow-rate: 6,4 l/s
Recovery pressure drop: 7 kPa

Efficient use of energy with heat recovery

In almost all systems fitted with a chiller used to produce chilled water there is also the need to have hot water. The recovery of condensation heat is an efficient way of producing hot water while the chiller is in operation. It has the double benefit of both reducing the heat load to the condenser, thereby eliminating dissipation costs and generating free hot water, thereby reducing the costs of the auxiliary heater.

Application versatility of recovery devices

The hot water produced by heat recovery can be used in a number of ways: to reheat air in handling units, to preheat hot water for domestic use or industrial processes, to heat up water in swimming pools, showers and spas, to preheat hot water for laundries or industrial kitchens.

Post-heating in air handling units to control humidity levels in hospitals and labs

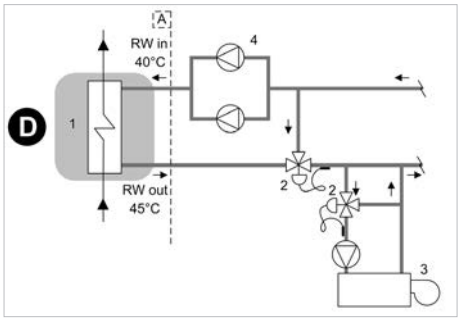
Preheating of hot water for domestic use or for industrial process

Heating of water in swimming pools, showers and SPAS

Preheating of hot water for laundries and industrial kitchens

Air heating

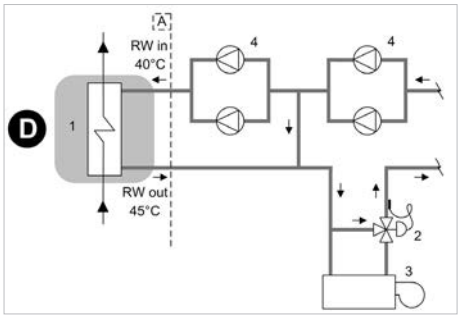
The heat recovery device can be used to cover the entire heat load required. The hot water supply temperature is controlled via a modulating control valve that needs to be fitted on the system at the outlet of the recovery unit. The auxiliary heating device is recommended to cover the thermal energy demand when the chiller is not in operation or is operating at part load.



Example of how heat recovery is used to cover the entire heat demand and control the operating temperature

Water preheating

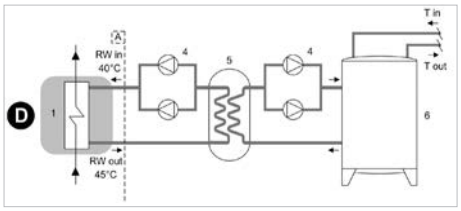
The heat recovery device can be used to preheat water at the inlet of the main heating device (e.g. boiler). In this case, the demand for hot water is greater than the amount of heat recovered by condensation and the recovery device only covers part of the required heat load. By preheating the water, heating consumption levels are therefore reduced and the main heating device has a lower installed power requirement.



Example of how heat recovery is used to preheat hot water in the system

Domestic hot water production

The heat recovery device can be used to produce water for domestic use. In order to prevent contamination of domestic water with the chiller's process fluid, it is necessary to insert an intermediate heat exchanger. Using an inertial heat storage tank allows to have a reserve of preheated water and enables the intermediate exchanger to operate more efficiently.



Example of how heat recovery is used to preheat hot water for domestic use

A - Unit supply limit
1 - Recovery exchanger
3 - Auxiliary heating device (ex.boiler)
5 - Intermediate heat exchanger
RW in - Recovery water input
T in - Drinkable water inlet

D - Partial energy recovery
2 - Control modulating valve
4 - Electric pump with standby pump
6 - Inertial heat storage
RW out - Recovery water output
T out - Drinkable water outlet to the auxiliary heater

The diagrams refer to partial energy recovery, though they also apply to total energy recovery (Clivet R). Please note that the diagrams are only meant as a guide.

HydroPack

2PM/PM - Hydronic assembly user side with 2/3 ON/OFF pumps

Pumping unit supplied on the unit consisting of parallel electric pumps (all in duty) with a self-adaptive modular activation logic.

Centrifugal electric pump with impeller made with AISI 304 steel and AISI 304 stainless steel body or grey cast iron (depending on models).

Mechanical seal using ceramic, carbon and EPDM elastomer components.

Three-phase electric motor with IP55 protection and class F insulation. Complete with thermoformed insulated casing, Victaulic type quick connections with insulated casing, non return valve, safety valve (6 bar), pressure gauges, system load safety pressure switch, stainless steel antifreeze immersion heaters located at the return and supply point.

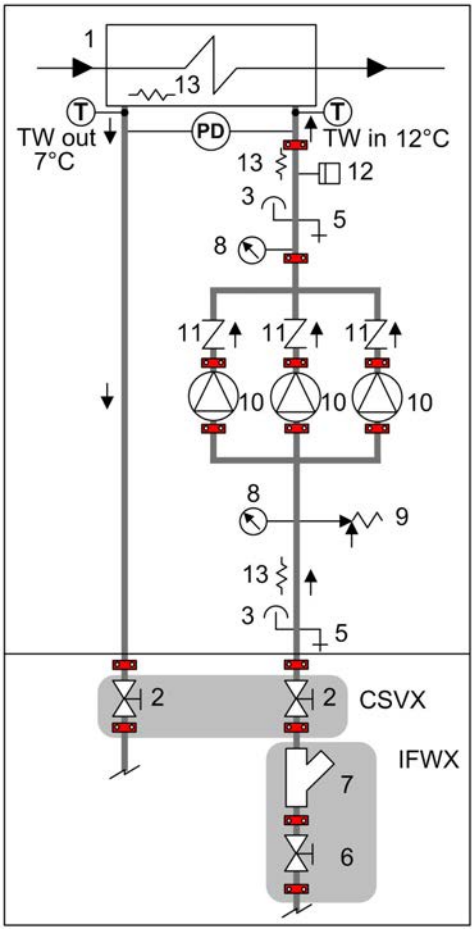
The various models which are available can be differentiated by the system available pressure.

The 2PM / 3PM option is supplied with a kit made up of 2 quick blind connections, for the removal of one pump in case of maintenance.

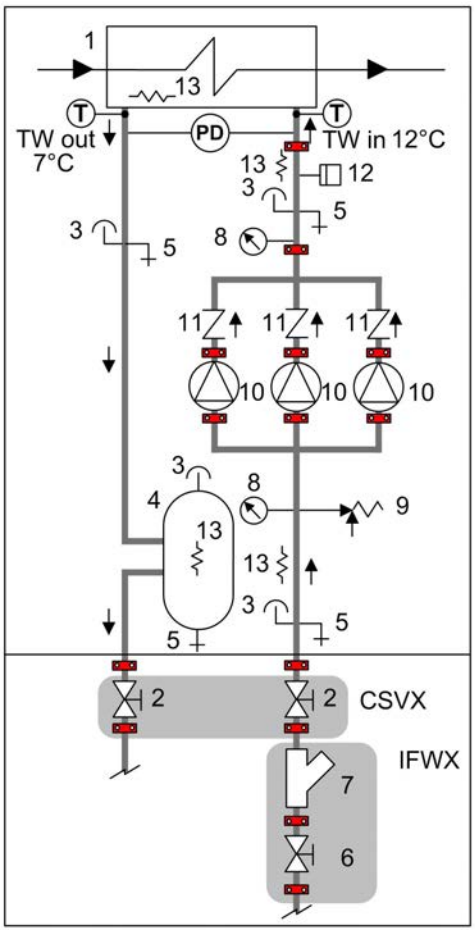
Check the option compatibility table for combinations with storage tank.

Provided with hydraulic interceptions to the outside of the unit (option 'CSVX - A pair of manually operated shut-off valves') to facilitate any major maintenance operations.

HYDROPACK



HYDROPACK WITH STORAGE TANK

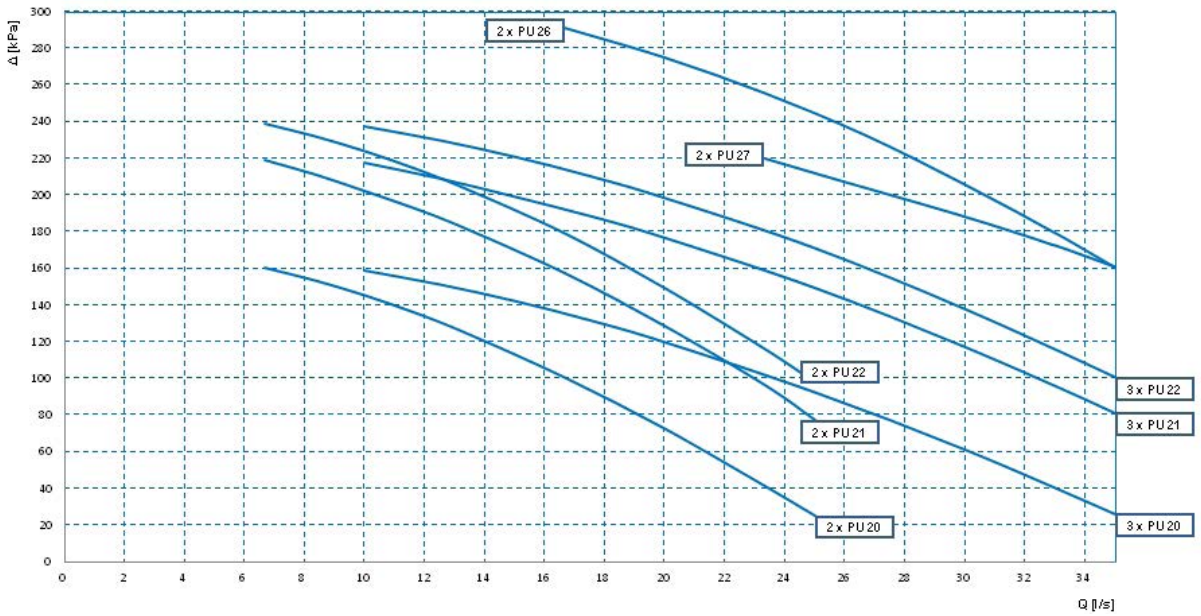


Illustrative diagram referred to unit size 240.4 with Hydropack with no. 3 of pumps

1 - Internal exchanger
2 - Cutoff valve
3 - Purge valve
4 - Storage tank with antifreeze heater
5 - Draw off cock
6 - Cutoff valve with quick joints
7 - Steel mesh strainer water side
8 - Manometer
9 - Safety valve (6 Bar)
10 - Packaged electric pump with high efficiency impeller
11 - Non return valve
12 - System safety pressure switch (prevents the pumps from operating if no water is present)
13 - Antifreeze heater
T - Temperature probe
PD - Differential pressure switch
TW in chilled water inlet
TW out chilled water outlet
IFWX - Steel mesh strainer water side
CSVX - Couple of manual shut-off valves
The grey area indicates further optional components.

2PM/3PM option performances (HydroPack)

Head



Q[l/s]= water flow rate
Δ [kPa] = pump head
PU2* = 2-pole pump

Caution: to obtain the available pressure values, you need to subtract the following from the head values represented in these diagrams:

- User side exchanger pressure drops
- IFVX accessory –Steel mesh filter on the water side (where applicable)

Hydropack electrical data

PUMP	Rated power [kW]	Nominal power [A]
2×PU20	2×1.8	2×3.4
2×PU21	2×2.9	2×4.8
2×PU22	2×3.3	2×5.6
2×PU26	2×5.5	2×10.4

PUMP	Rated power [kW]	Nominal power [A]
2×PU27	2×5.5	2×10.4
3×PU20	3×1.8	3×3.4
3×PU21	3×2.9	3×4.8
3×PU22	3×3.3	3×5.6

2PMV/3PMV - Hydronic assembly user side with 2/3 inverter pumps

Pumping unit supplied on the unit consisting of parallel electric pumps (all in duty) and controlled by inverter to adapt to the different conditions of the load system.

It enables the automatic reduction of the liquid flow rate in critical conditions, avoiding blocks due to overloading and consequential intervention work by specialised technical personnel.

Through the inverter calibration, standard supplied, it is possible to adapt the pump flow-rate/head to the installation feature.

Centrifugal electric pump with impeller made with AISI 304 steel and AISI 304 stainless steel body or grey cast iron (depending on models).

Mechanical seal using ceramic, carbon and EPDM elastomer components.

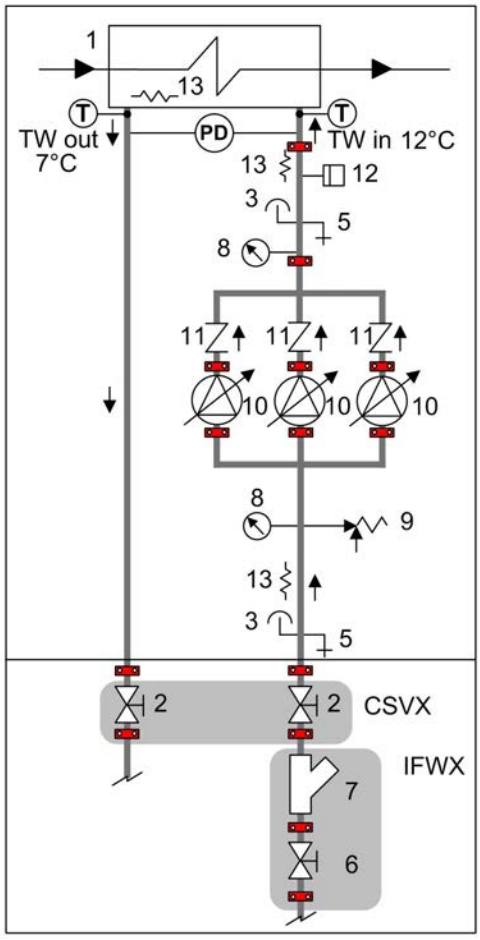
Three-phase electric motor with IP55 protection and class F insulation. Complete with thermoformed insulated casing, Victaulic type quick connections with insulated casing, non return valve, safety valve (6 bar), pressure gauges, system load safety pressure switch, stainless steel antifreeze immersion heaters located at the return and supply point.

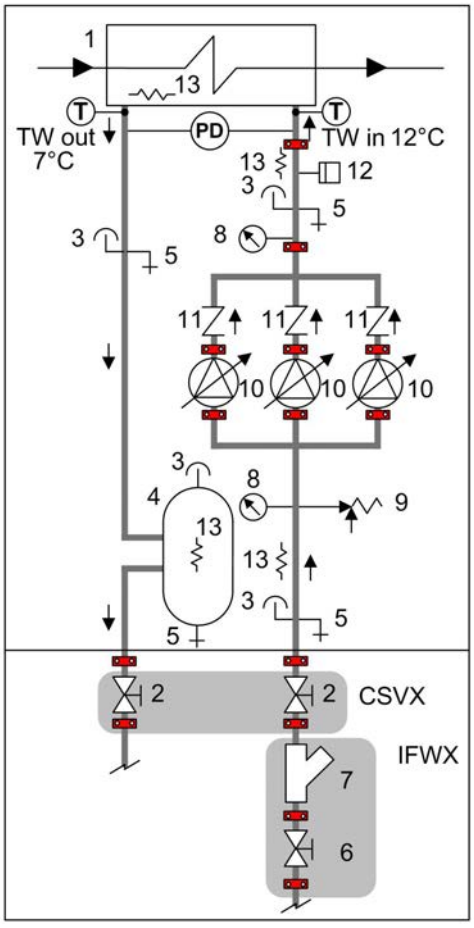
In combination with the "IVFDT" - Variable flow-rate control option, it allows the water flow rate variation to the installation in part load operation to obtain the maximum unit efficiency and lower pumping unit consumption.

The 2PMV / 3PMV option is supplied with a kit made up of 2 quick blind connections, for the removal of one pump in case of maintenance.

Check the option compatibility table for combinations with storage tank.

Provided with hydraulic interceptions to the outside of the unit (option 'CSVX - A pair of manually operated shut-off valves') to facilitate any major maintenance operations.

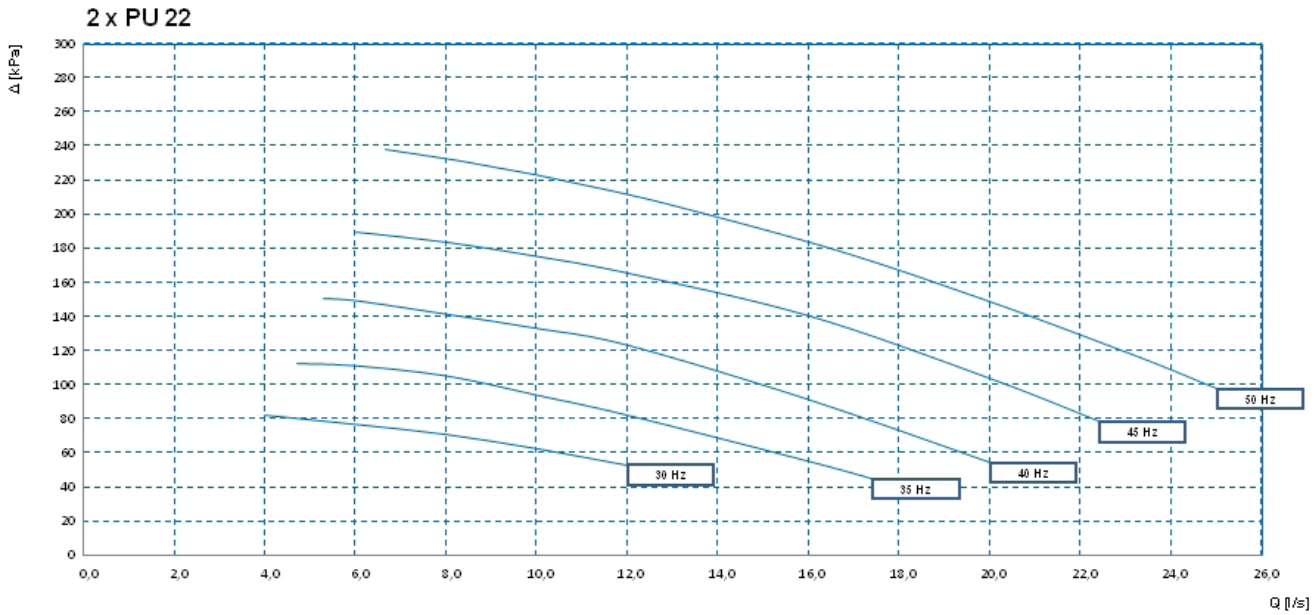




1 - Internal exchanger
2 - Cutoff valve
3 - Purge valve
4- Storage tank
5 - Draw off cock
6 - Cutoff valve with quick joints
7 - Steel mesh strainer water side
8 - Manometer
9 - Safety valve (6 Bar)
10 - Packaged electric pump with high efficiency impeller activated by inverter
11 - Non return valve
12 - System safety pressure switch (prevents the pumps from operating if no water is present)
13 - Antifreeze heater
T - Temperature probe
PD - Differential pressure switch
TW in chilled water inlet
TW out chilled water outlet
IFWX - Steel mesh strainer water side
CSVX - Couple of manual shut-off valves
The grey area indicates further optional components.

2PMV option performances

Head

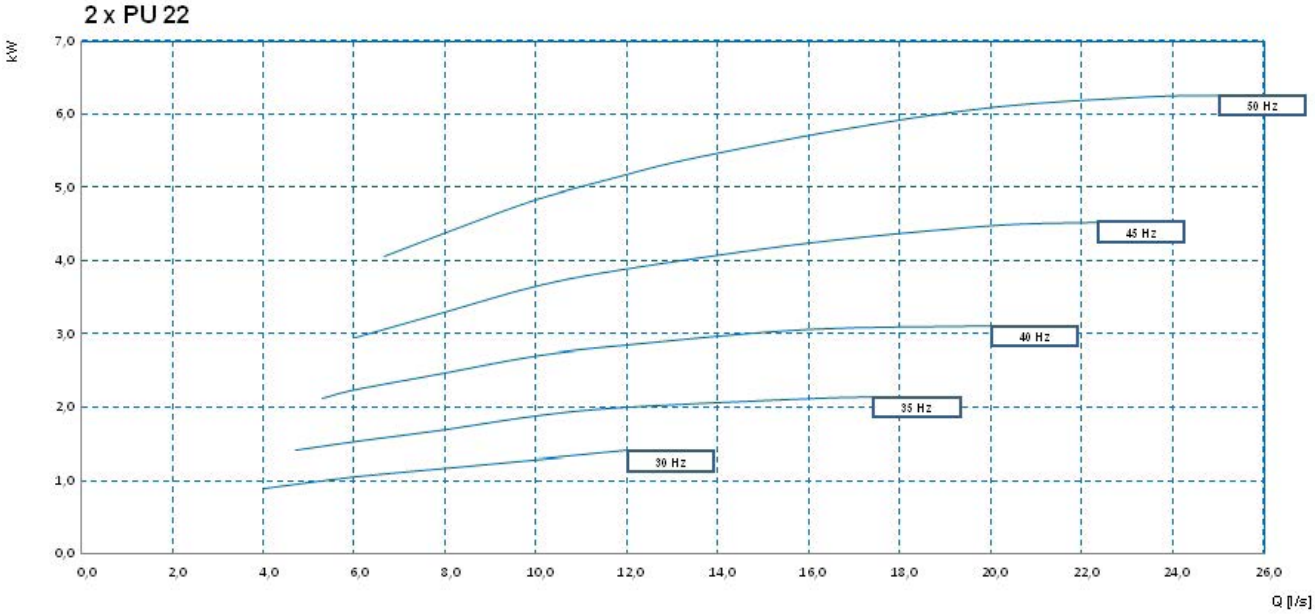


Q[l/s]= water flow rate
Δ [kPa] = pump head

Caution: to obtain the available pressure values, you need to subtract the following from the head values represented in these diagrams:

- internal exchanger pressure drops
- IFVX accessory –Steel mesh filter on the water side (where applicable)

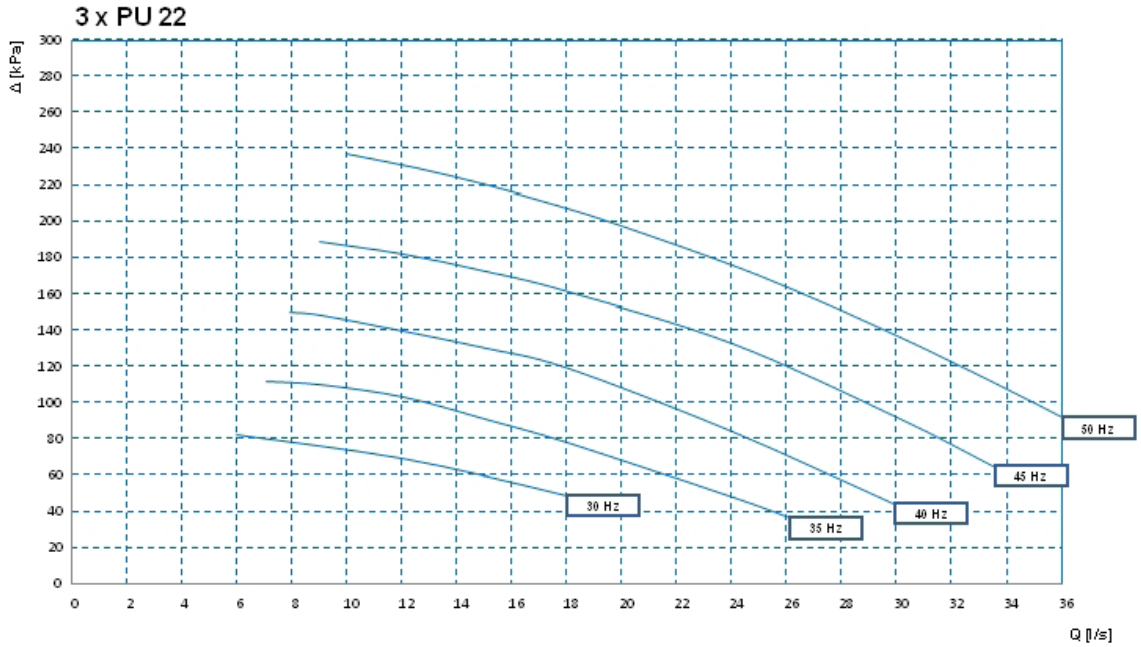
Power input



Q[l/s]= water flow rate
kW = power input

3PMV option performances

Head

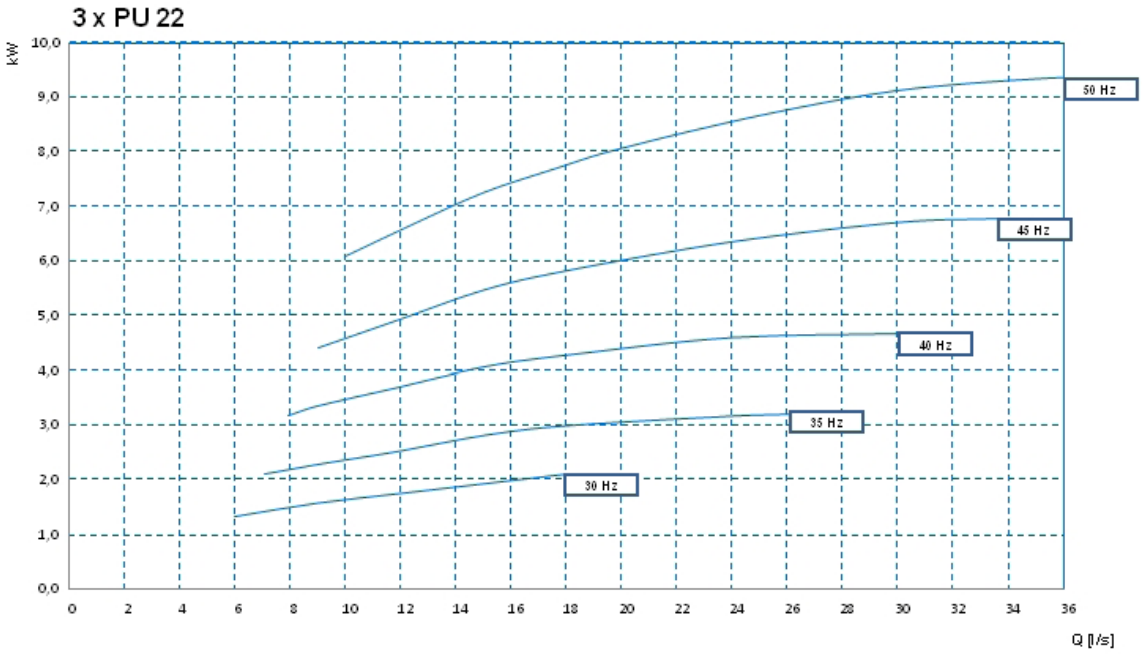


Q[l/s]= water flow rate
Δ [kPa] = pump head

Caution: to obtain the available pressure values, you need to subtract the following from the head values represented in these diagrams:

- internal exchanger pressure drops
- IFVX accessory –Steel mesh filter on the water side (where applicable)

Power input

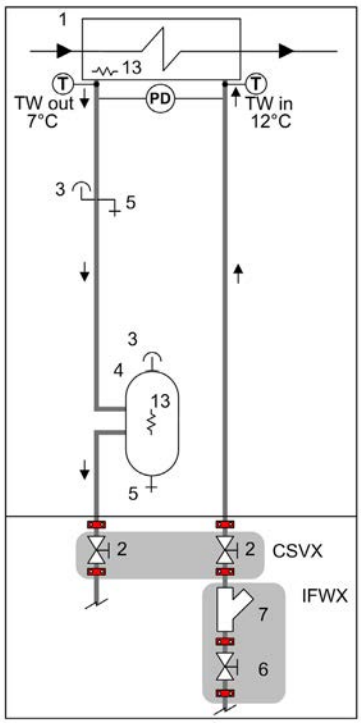


Q[l/s]= water flow rate
kW = power input

Accessories - Hydronic assembly

A550/A700/A900 - 550 / 700 / 900 l. storage tank

Steel storage tank supplied on the unit, complete with double layer covering with closed-cell insulation 30mm thick, stainless steel anti-freeze immersion resistance, bleed valve, drain cock, Victaulic type quick connections with insulated casing. Maximum operating pressure of 10 bar. Suitable for operation with mixtures of glycol-water.



1 - Internal exchanger
2 - Cutoff valve
3 - Purge valve
4 - Storage tank with antifreeze heater
5 - Draw off cock
6 - Cutoff valve with quick joints
7 - Steel mesh strainer water side
13 - Antifreeze heater

T - Temperature probe
PD - Differential pressure switch

TW in chilled water inlet
TW out chilled water outlet

IFWX - Steel mesh strainer water side
CSVX - Couple of manual shut-off valves

The grey area indicates further optional components.

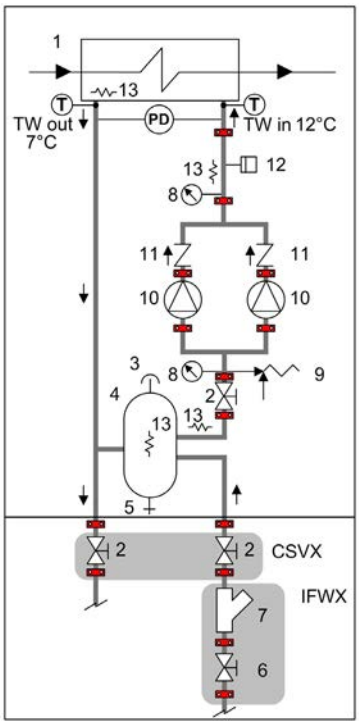
Provided with hydraulic interceptions to the outside of the unit (option 'CSVX - A pair of manually operated shut-off valves') to facilitate any major maintenance operations.

The water outlet user side with "Storage tank" option is positioned in correspondence of the storage tank itself. The outlet position will be defined when ordering. The water inlet user side remains in the same position of the standard unit.

A550PPS/A700PPS/A900PPS - 550/700/900 l. storage tank with primary circuit with pump built-in

Option supplied built-in and availale only in case of special request. Simplifies system design and manufacture. This accessory includes the components provided for the A550 / A700 / A900 options, as well as:

- primary circuit, already set up and tested inside the unit;
- cast-iron butterfly shut-off valve, with quick connections and activating handle and mechanical calibration lock on the pump supply;
- 2PM - HYDROPACK with no. 2 of pumps or 3PM - HYDROPACK with no. 3 of pumps according to the size.



1 - Internal exchanger
2 - Cutoff valve
3 - Purge valve
4 - Storage tank with antifreeze heater
5 - Draw off cock
6 - Cutoff valve with quick joints
7 - Steel mesh strainer water side
8 - Manometer
9 - Safety valve (6 Bar)
10 - Packaged electric pump with high efficiency impeller
11 - Non return valve
12 - System safety pressure switch (prevents the pumps from operating if no water is present)
13 - Antifreeze heater

T - Temperature probe
PD - Differential pressure switch

TW in chilled water inlet
TW out chilled water outlet

IFWX - Steel mesh strainer water side
CSVX - Couple of manual shut-off valves

The grey area indicates further optional components.

Option available only in case of special request.

The water inlet user side with "Storage tank with primary circuit with pump built-in" option is positioned in correspondence of the storage tank. The water outlet user side remains in the same position of the standard unit. The outlet position will be defined when ordering.

Attention: option not compatible with DST control logic (Dynamic Supply Temperature) activable by the User.

If the water flow rate on the primary circuit is greater than the one on the secondary circuit, this allows to directly control the supply temperature to the secondary one. Vice versa, if the water flow rate on the primary circuit is lower than the one on the secondary circuit, this means the supply water is mixed with the system's return water and therefore there is no direct control over the temperature of the chilled water produced.

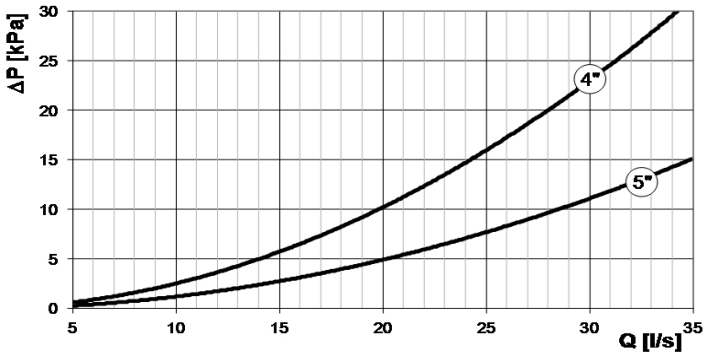
Built-in pump electrical data

Size		90.4	100.4	110.4	120.4	140.4	160.4	180.4	200.4	220.4	240.4
EXCELLENCE SC / EN											
		2 x PU20	2 x PU20	2 x PU20	2 x PU20	2 x PU20	2 x PU20	2 x PU20	3 x PU20	3 x PU20	3 x PU20
FLI	[kW]	3,6	3,6	3,6	3,6	3,6	3,6	3,6	5,4	5,4	5,4
FLA	[A]	6,8	6,8	6,8	6,8	6,8	6,8	6,8	10,2	10,2	10,2

IFWX - Steel mesh strainer water side

Mechanical steel mesh strainer to place on the water input line to avoid fouling of the exchanger from being clogged by any impurities which are in the hydraulic circuit, easily dismantled for periodical maintenance and cleaning. It also includes: cast-iron shut-off butterfly valve with quick connections and activation lever with a mechanical calibration lock, Victaulic type quick connections with insulated casing.

STEEL MESH FILTER PRESSURE DROP



Q = water flow rate (l/s) DP = water side pressure drop (kPa)

STEEL MESH FILTER FEATURES

EXCELLENCE		
Diameter	4"	5"
Degree of filtration	1,6 mm	

Pressure drop referred to a clean filter.

IInstallation is the responsibility of the Client, externally to the unit

Check for the presence of the required hydraulic shut-off valves in the system, in order to undertake periodical maintenance.

Separately supplied accessory

Accessories

PGFC- Finned coil protection grilles

Grilles made in drawn of electro-welded steel and coated to protect the external coil from accidental contact with people and things.

The protection grill has a height equal to the whole unit. Therefore, all areas under the coils are protected.

This accessory also protects the rear area of the unit opposite to the electric panel.

Ideal for installation in places where persons can pass from, such as car parks, terraces, etc.

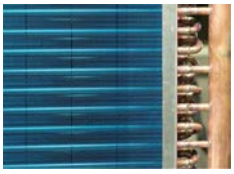
Accessories supplied and installed built-in the unit.

PGCCH - Anti-hail protection grilles

Grilles made in drawn of electro-welded steel and coated suitable to protect the external coil from hail damage.

Accessories supplied and installed on the machine.

CCCA - Copper / aluminium condenser coil with acrylic lining



Condensing coils with copper pipes and aluminum fins with acrylic lacquering. Can be used in settings with moderately aggressive low saline concentrations and other chemical agents. The acrylic coating is used as the most economical and effective method particularly in protecting aluminum surfaces exposed to the corrosive influence of the humid and salty air in regions with marine climates.

Attention!

- Cooling capacity variation -2.7%

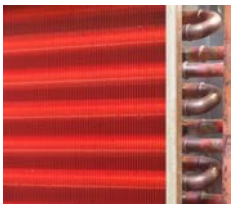
- Variation in compressor power input +4.2%

- Operating range reduction -2.1°C

CCCA1 - Copper / aluminium condensing coils with Aluminium Energy Guard DCC treatment

Condensing coils with copper pipes and aluminum fins with Aluminium Energy Guard DCC treatment. Complete treatment which offers an optimal thermal exchange and guarantees and protects the finned coil exchangers from corrosion over time and UV rays. Can be used in settings with very aggressive saline concentrations and other chemical agents in the air thus maintaining the performance of the coils over time and with negligible pressure drop.

CCCC - Copper / copper condensing coil



Condensing coils with copper pipes, copper fins and brass structure. Can be used in settings with moderately aggressive saline concentrations and other chemical agents.

This option is not suitable for application in sulphuric environments

Option available only on special request

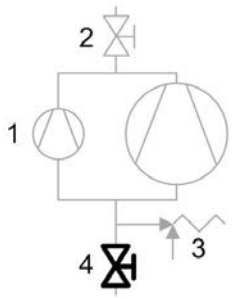
MHP - High and low pressure gauges

It includes two liquid pressure gauges for the analog measurement of refrigerant pressures on suction and discharge lines of the compressors with pressure sockets installed in the unit in an easily accessible location.

SDV - Cutoff valve on compressor supply and return

An option which integrates the supply cutoff valve, which is supplied as standard. The presence of the cock at the intake as well enables the compressors to be isolated and substituted without discharging the refrigerant from within the refrigeration circuit. This means that the extraordinary maintenance activities are facilitated.

The device is installed built-in the unit.



1. Compressors
2. Cutoff valve
3. Safety valve
4. SDV option

RE-20 / RE-25 / RE-30 / RE-35 / RE-39 - Electrical panel anti-freeze protection

It includes self-regulating electric heaters with thermost which are able to protect the electrical panel against condensation and frost guaranteeing its correctly functions down to -39°C. This accessory operates even when the unit is switched off provided that the power supply is maintained active and the unit continues to be electrically connected.

Device installed and wired built-in the unit.

This accessory operates even when the unit is switched off provided that the power supply is maintained active and the unit continues to be connected.

This accessory does not lead to substantial variations in the electrical data for the unit which has been declared in the Electrical Data section.

PFCP - Power factor correction capacitors (cosfi > 0.9)

The component is necessary to lower the phase difference between current and voltage in the electromagnetic components of the unit (e.g. asynchronous motors). The component allows to put the cosfi power factor to values on average higher than 0.9, reducing the network reactive power. This often leads to an economic benefit which the energy provider grants to the final user.

The device is installed and wired built-in the unit.

ECS - ECOSHARE function for the automatic management of a group of units

Device allows automatic management of units that operate on the same hydraulic circuit, by creating a local communication network. There are three control modes that can be set via a parameter during the units stat-up. Two control modes distribute the heat load on the available units by following the distribution logic to benefit of efficiency levels at part load and one shift the supply water set-point temperature on the group of units.

Moreover:

Mode 1 - distribute the heat load and keeps all the pumps active;

Mode 2 - distribute the heat load and activates only the pumps of the unit required to operate.

The device allows for rotation based on the criterion of minimum wear and management of units in stand-by. In case of failure of one unit the load is distributed in the other units.

The units can be of various sizes but of the same type: all reversible heat pumps, or all air-cooled liquid chiller.The set of units is controlled by a Master unit. The local network can be extended up to 7 units (1 Master and 6 Slave).

The unit supplied with this device can also be equipped at the same time with the RCMRX option and one of the CMSC11 / CMSC9 / CMSC10 options.

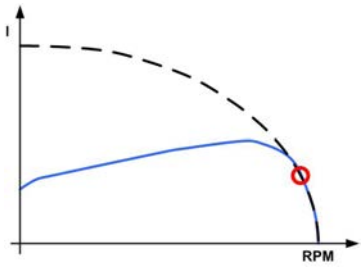
SFSTR – Disposal for inrush current reduction (SOFT STARTER)

Electronic device which automatically starts up the compressors gradually, reducing the starting current for the unit by around 40% in comparison with the nominal value. This results in the reduction of the starting torque of the ON/OFF compressor, it is more protected from mechanical stresses leading to an increased life of the component. The noise is also reduced.

Device installed and wired built-in the unit.

In sizes 180.4, 200.4, 220.4 and 240.4 the larger size compressor is standard equipped with device for progressive start-up, defined part-winding. For these units the soft-starter bene fits are guaranteed on lower size compressors, maintaining unchanged the M.I.C. (max. inrush current) of the standard unit.

The compressors with 60 HP of nominal capacity need the standard device for the progressive start-up defined part-winding.



–– Absorbed current without SFSTR option
– Absorbed current without SFSTR option

CMSC11 - Serial communication module for BACnet-IP supervisor

Module allows the serial connection of the supervision system, using BACnet/IP as the communication protocol. It enables access to the complete list of operational variables, commands and alarms. Using this accessory every unit can dialogue with the main supervision systems.

Device installed and wired built-in the unit.

The configuration and management activities for the BACnet networks are the responsibility of the client.

The total length of each serial line do not exceed 1000 meters and the line must be connected in bus typology (in/out).

CMSC9 - Serial communication module for Modbus supervisor

Module allows the serial connection of the supervision system, using Modbus as the communication protocol. It enables access to the complete list of operational variables, commands and alarms. Using this accessory every unit can dialogue with the main supervision systems.

Device installed and wired built-in the unit.

The total length of each serial line do not exceed 1000 meters and the line must be connected in bus typology (in/out).

CMSC10 - Serial communication module for LonWorks supervisor

Module allows the serial connection of the supervision system which uses the LonWorks communication protocol. It enables access to a list of operating variables, commands and alarms which comply with the Echelon® standard.

Device installed and wired built-in the unit.

The configuration and management activities for the LonWorks networks are the responsibility of the client.

LonWorks technology uses the LonTalk® protocol for communicating between the network nodes. Contact the service supplier for further information.

The total length of each serial line do not exceed 1000 meters and the line must be connected in bus typology (in/out).

CREFB - Device for fan consumption reduction of the external section, ECOBREEZE type

An option which regards the external helical fans, as an alternative to the phase-cut device. It provides for an IP54 brushless electronically commutated electrical motor and incorporated thermal protection. Supplied with variable speed control.

IVFDT - Inverter driven variable flow-rate user side control depending on the temperature differential

Option allows water flow-rate modulation to the unit during partial load conditions, maintaining stable the temperature difference between inlet and outlet to the heat exchanger.

The option is available only when the unit thermoregulation is set on the return temperature.

Flow-rate modulation is managed by embedded logic thanks to built-in flow-rate control device and temperature probes. Designed for systems with primary circuit variable flow-rate systems decoupled from secondary circuit. With no building load the unit switches off the compressors while concerning pumps is possible to select:

- Active pumps with minimum flow-rate, monitoring secondary circuit temperature variations
- Pump switching off, periodically activating them (settable time) leading secondary circuit temperatures on primary circuit
- Pump switching off and waiting for the user signal for activation (free potential).

Device installed and wired built-in the unit, available only with inverter driven HYDROPACK selected.

This option is available only with inverter driven HYDROPACK selected (2PMV / 3PMV)

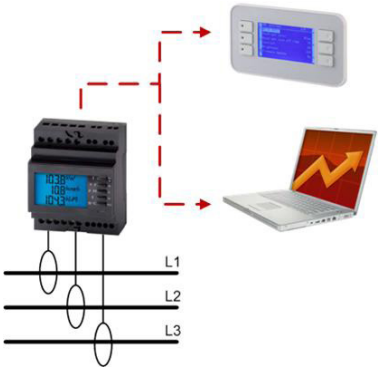
The water flow control is active only with thermoregulation on the return temperature.

CONTA2 - Energy meter

Allows to display and record the unit's main electrical parameters. The data can be displayed on the device display or via the supervisor through the specific protocol variables.

It is possible to control:
- voltage (V),
- absorbed current (A),
- frequency (Hz),
- cosfi,
- power input (KW),
- absorbed energy (KWh),
- harmonic components (%).

The device is installed and wired built-in the unit.



On the device is present a serial port with Modbus protocol for the connection to the supervision system.

SCP4 - Set-point compensation with 0-10 V signal

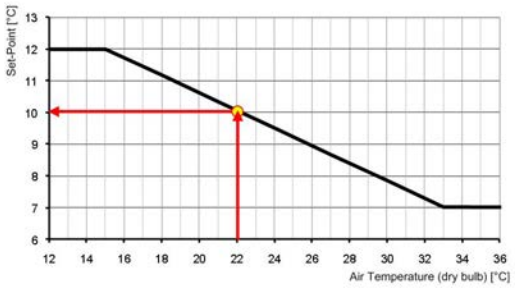
Device allows the changing of the preset set point by means to an external 0÷10 V signal. The interruption of the signal the set-point is at the nominal set value. The limit values can be changed within wide values.

Device installed and wired built-in the unit.

SPC2 - Set-point compensation with outdoor temperature probe

Device allows the automatic regulation of the preset set-point depending of the outside temperature air measured by the unit probe. This device allows to get the sliding supply water temperature, which varies depending on external conditions, enabling energy savings throughout the entire system.

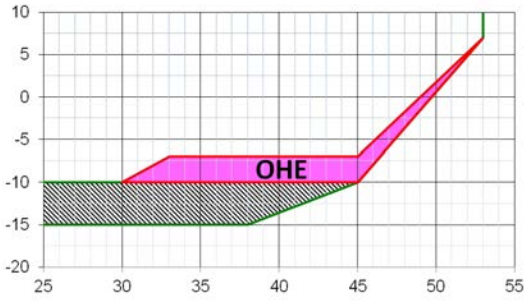
Device installed and wired built-in the unit.



OHE - Limit extension kit in heating up to -10°C (W.B.)

Device allows to extend heating unit operation fields up to -10°C wet bulb outdoor temperature. Clivet automatic control ensures the ongoing operation at the unit full capacity.

Device installed and wired built-in the unit.



RPRPDI - Refrigerant leak detector with pump down function in the casing

Leak detector device built-in installed and placed inside the compressor box, It detects leaks of the internal refrigeration circuit and automatically enables the "pump-down" function, storing the refrigerant inside the finned coil exchanger. During pump-down, cooling capacity is not produced by the unit. At the end of the operation the unit is switched off and a dedicated alarm signal is available directly inside the electrical panel.

The device respects BREEAM regulations.

Accessories separately supplied

CSVX - Couple of manual shut-off valves

Kit composed of:

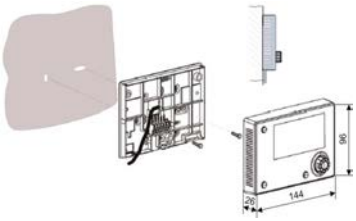
- no. 2 cast-iron shut-off butterfly valves, it includes: fast fittings and activation lever with a mechanical calibration lock
- no. 2 of Victaulic type quick connection with insulated casing to isolate the hydraulic circuit at the inlet and outlet.

Installation is the responsibility of the Client, externally to the unit.

RCMRX - Remote control via microprocessor control

This option allows to have full control over all the unit functions from a remote position.

It can be easily installed on the wall and has the same aspect and functions of the user interface on the unit.



All device functions can be repeated with a normal portable PC connected to the unit with an Ethernet cable and equipped with an internet navigation browser.

The device must be installed on the wall with suitable plugs and connected to the unit (installation and wiring to be conducted by the Customer). Maximum remote control distance 350 m without auxiliary power supply. For distances greater than 350 m and in any case less than 700 m it is necessary to install the 'PSX - Mains power unit' accessory.

Data and power supply serial connection cable n.1 twisted and shielded pair. Diameter of the individual conductor 0.8 mm.

Installation provided by Customer.

PSX - Mains power supply

The device allows the unit and the remote control to communicate with the user interface even when the serial line is longer than 350m.

It must be connected to the serial line at a distance of 350m from the unit and allows to extend the length to 700m maximum in total. The device requires an external power supply at 230V AC.

Power supply at 230V AC provided by Customer.

AMMX - Spring antivibration mounts

The spring antivibration mounts are attached in special housing on the support frame and serve to smooth the vibrations produced by the unit thus reducing the noise transmitted to the support structure.

Installation provided by Customer.

Option compatiblity - EXCELLENCE version

Acoustic configuration: compressor soundproofing (SC)

REFERENCE	DESCRIPTION	90.4	100.4	110.4	120.4	140.4	160.4	180.4	200.4	220.4	240.4
CONFIGURATIONS AND MAIN ACCESSORIES											
B	Water low temperature	0	0	0	0	0	0	0	0	0	0
D	Partial energy recovery	0	0	0	0	0	0	0	0	0	0
B + D	Water low temperature + Partial energy recovery	0	0	0	0	0	0	0	0	0	0
A550	550 l. storage tank	0	0	0	0	-	-	-	-	-	-
A700	700 l. storage tank	-	-	-	-	0	0	-	-	-	-
A900	900 l. storage tank	-	-	-	-	-	-	0	0	0	0
STORAGE TANK AND PUMP WITH PRIMARY CIRCUIT BUILT-IN											
A550PPS	550 l. storage tank with primary circuit with pump built-in	◊	◊	◊	◊	-	-	-	-	-	-
A700PPS	700 l. storage tank with primary circuit with pump built-in	-	-	-	-	◊	◊	-	-	-	-
A900PPS	900 l. storage tank with primary circuit with pump built-in	-	-	-	-	-	-	◊	◊	◊	◊
2PM - HYDROPACK USER SIDE WITH 2 PUMPS											
(PU20)	Pump 20	0	0	0	0	0	-	-	-	-	-
(PU21) / (PU22)	Pump 21 / Pump 22	0	0	0	0	0	0	0	-	-	-
(PU26)	Pump 26	-	-	-	-	-	-	-	0	0	0
+ A550PPS	+ 550 l. storage tank with primary circuit with pump built-in	-	-	-	-	-	-	-	-	-	-
+ A700PPS	+ 700 l. storage tank with primary circuit with pump built-in	-	-	-	-	-	-	-	-	-	-
+ A900PPS	+ 900 l. storage tank with primary circuit with pump built-in	-	-	-	-	-	-	-	-	-	-
+ A550	+ 550 l. storage tank	0	0	0	0	-	-	-	-	-	-
+ A700	+ 700 l. storage tank	-	-	-	-	0	0	-	-	-	-
+ A900	+ 900 l. storage tank	-	-	-	-	-	-	0	0	0	0
3PM - HYDROPACK USER SIDE WITH 3 PUMPS											
(PU20)	Pump 20	-	-	-	-	-	-	-	0	0	-
(PU21)	Pump 21	-	-	-	-	0	0	0	0	0	0
(PU22)	Pump 22	0	0	0	0	0	0	0	0	0	0
+ A550PPS	+ 550 l. storage tank with primary circuit with pump built-in	-	-	-	-	-	-	-	-	-	-
+ A700PPS	+ 700 l. storage tank with primary circuit with pump built-in	-	-	-	-	-	-	-	-	-	-
+ A900PPS	+ 900 l. storage tank with primary circuit with pump built-in	-	-	-	-	-	-	-	-	-	-
+ A550	+ 550 l. storage tank	0	0	0	0	-	-	-	-	-	-
+ A700	+ 700 l. storage tank	-	-	-	-	0	0	-	-	-	-
+ A900	+ 900 l. storage tank	-	-	-	-	-	-	0	0	0	0
2PMV - HYDROPACK USER SIDE WITH NO.2 OF INVERTER PUMPS											
(PU22)	Pump 22	0	0	0	0	-	-	-	-	-	-
3PMV - HYDROPACK USER SIDE WITH NO.3 OF INVERTER PUMPS											
(PU22)	Pump 22	0	0	0	0	0	0	0	0	0	0
IVFDT - INVERTER DRIVEN VARIABLE FLOW-RATE USER SIDE CONTROL DEPENDING ON THE TEMPERATURE DIFFERENTIAL											
(2PM) / (3PM)	Hydropack user side with no. 2 of pumps / Hydropack user side with no. 3 of pumps	-	-	-	-	-	-	-	-	-	-
(2PMV) / (3PMV)	Hydropack user side with no.2 of inverter pumps / Hydropack user side with no.3 of inverter pumps	0*	0*	0*	0*	0*	0*	0*	0*	0*	0*
OTHER ACCESSORIES											
CREFB	Device for fan consumption reduction of the external section, ECOBREEZE type	0	0	0	0	0	0	0	0	0	0
CREFP	Device for consumption reduction of the external section at variable speed (phase-cutting)	•	•	•	•	•	•	•	•	•	•

• Standard

0 Option

- Not available

0* Necessary matching: variable flow-rate control and built-in inverter pumps

◊ Option available only on special request.

Option compatiblity - EXCELLENCE version

Acoustic configuration: super-silenced (EN)

REFERENCE	DESCRIPTION	90.4	100.4	110.4	120.4	140.4	160.4	180.4	200.4	220.4	240.4
CONFIGURATIONS AND MAIN ACCESSORIES											
B	Water low temperature	0	0	0	0	0	0	0	0	0	0
D	Partial energy recovery	0	0	0	0	0	0	0	0	0	0
B + D	Water low temperature + Partial energy recovery	0	0	0	0	0	0	0	0	0	0
A550	550 l. storage tank	0	0	0	0	-	-	-	-	-	-
A700	700 l. storage tank	-	-	-	-	0	0	-	-	-	-
A900	900 l. storage tank	-	-	-	-	-	-	0	0	0	0
STORAGE TANK AND PUMP WITH PRIMARY CIRCUIT BUILT-IN											
A550PPS	550 l. storage tank with primary circuitwith pump built-in	◊	◊	◊	◊	-	-	-	-	-	-
A700PPS	700 l. storage tank with primary circuitwith pump built-in	-	-	-	-	◊	◊	-	-	-	-
A900PPS	900 l. storage tank with primary circuitwith pump built-in	-	-	-	-	-	-	◊	◊	◊	◊
2PM - HYDROPACK WITH 2 PUMPS											
(PU20)	Pump 20	0	0	0	0	0	0	0	0	-	-
(PU21) / (PU22)	Pump 21 / Pump 22	0	0	0	0	0	0	0	0	-	-
(PU27)	Pump 27	-	-	-	-	-	-	-	-	0	0
+ A550PPS	+ 550 l. storage tank with primary circuitwith pump built-in	-	-	-	-	-	-	-	-	-	-
+ A700PPS	+ 700 l. storage tank with primary circuitwith pump built-in	-	-	-	-	-	-	-	-	-	-
+ A900PPS	+ 900 l. storage tank with primary circuitwith pump built-in	-	-	-	-	-	-	-	-	-	-
+ A550	+ 550 l. storage tank	0	0	0	0	-	-	-	-	-	-
+ A700	+ 700 l. storage tank	-	-	-	-	0	0	-	-	-	-
+ A900	+ 900 l. storage tank	-	-	-	-	-	-	0	0	0	0
3PM - HYDROPACK WITH 3 PUMPS											
(PU20)	Pump 20	-	-	-	-	-	-	-	-	0	0
(PU21)	Pump 21	-	-	-	-	0	0	0	0	0	0
(PU22)	Pump 22	0	0	0	0	0	0	0	0	0	0
+ A550PPS	+ 550 l. storage tank with primary circuitwith pump built-in	-	-	-	-	-	-	-	-	-	-
+ A700PPS	+ 700 l. storage tank with primary circuitwith pump built-in	-	-	-	-	-	-	-	-	-	-
+ A900PPS	+ 900 l. storage tank with primary circuitwith pump built-in	-	-	-	-	-	-	-	-	-	-
+ A550	+ 550 l. storage tank	0	0	0	0	-	-	-	-	-	-
+ A700	+ 700 l. storage tank	-	-	-	-	0	0	-	-	-	-
+ A900	+ 900 l. storage tank	-	-	-	-	-	-	0	0	0	0
2PMV - HYDROPACK USER SIDE WITH NO.2 OF INVERTER PUMPS											
(PU22)	Pump 22	0	0	0	0	-	-	-	-	-	-
3PMV - HYDROPACK USER SIDE WITH NO.3 OF INVERTER PUMPS											
(PU22)	Pump 22	0	0	0	0	0	0	0	0	0	0
IVFDT - INVERTER DRIVEN VARIABLE FLOW-RATE USER SIDE CONTROL DEPENDING ON THE TEMPERATURE DIFFERENTIAL											
(2PM) / (3PM)	Hydropack user side with no. 2 of pumps / Hydropack user side with no. 3 of pumps	-	-	-	-	-	-	-	-	-	-
(2PMV) / (3PMV)	Hydropack user side with no.2 of inverter pumps / Hydropack user side with no.3 of inverter pumps	0*	0*	0*	0*	0*	0*	0*	0*	0*	0*
OTHER ACCESSORIES											
CREFB	Device for fan consumption reduction of the external section, ECOBREEZE type	0	0	0	0	0	0	0	0	0	0
CREFP	Device for consumption reduction of the external section at variable speed (phase-cutting)	•	•	•	•	•	•	•	•	•	•

• Standard

0 Option

- Not available

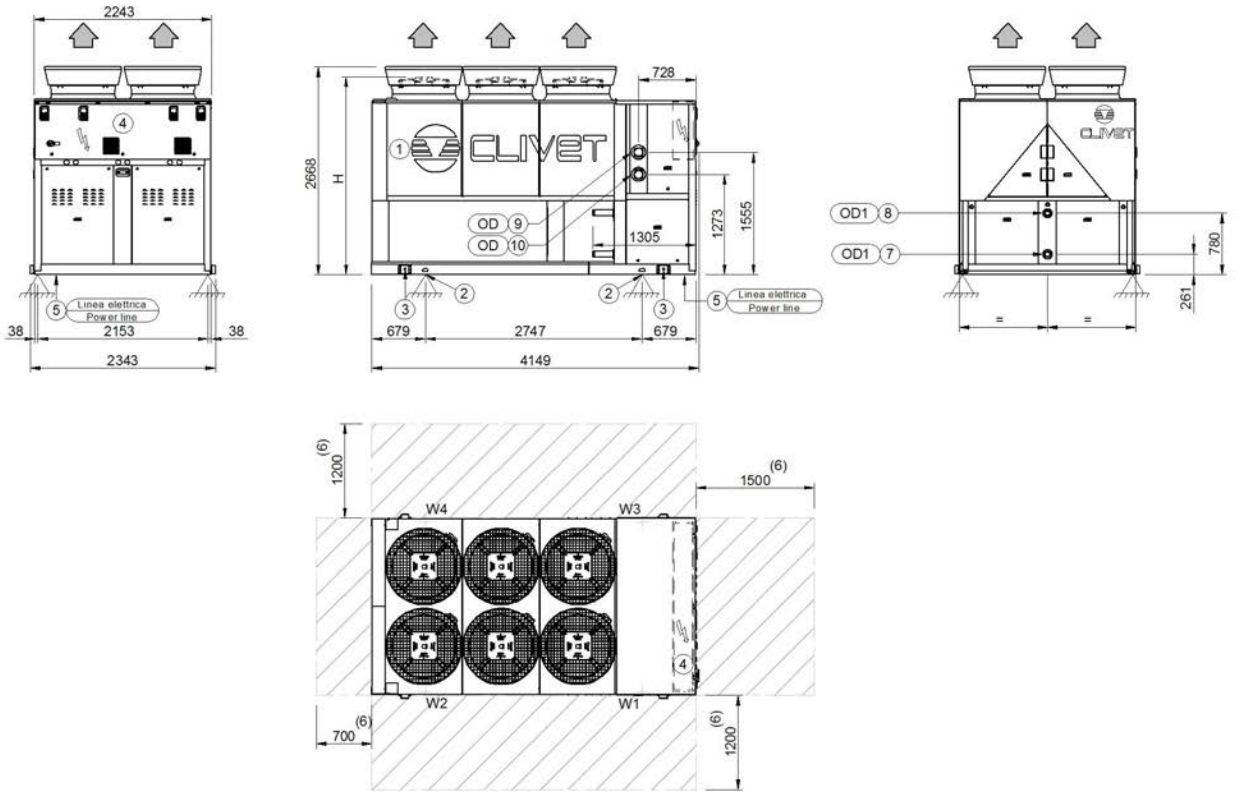
0* Necessary matching: variable flow-rate control and built-in inverter pumps

◊ Option available only on special request.

Dimensional drawings

Size 90.4-120.4 - Acoustic configuration : Compressor soundproofing (SC) / Super-silenced (EN)

DAB8N90 4_120 4_EXC_SC_EN_1
Date: 06/09/2016



1. External exchanger
2. Antivibration fixing holes Ø 25mm
3. Lifting brackets (removable, if required, after unit positioning)
4. Main electrical panel
5. Power input supply
6. Recommended functional clearances
7. Entering exchanger water recovery side (optional)
8. Leaving exchanger water recovery side (optional)
9. Water inlet user side of no pumps unit / Water outlet user side of unit with pumps (optional)
10. Water outlet user side of no pumps unit / Water inlet user side of unit with pumps (optional)

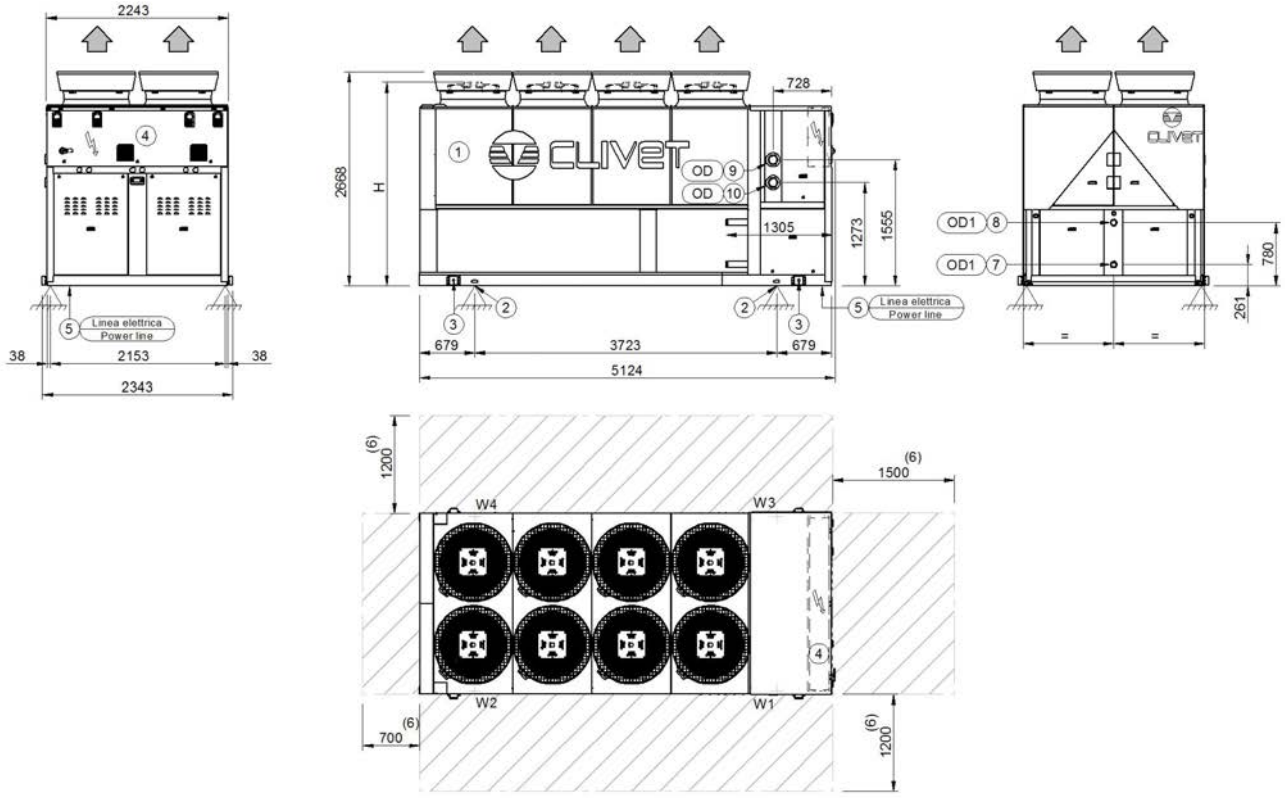
Size		SC-EXC				EN-EXC			
		90.4	100.4	110.4	120.4	90.4	100.4	110.4	120.4
H (without Axitop)	mm	2484	2484	2484	2484	2484	2484	2484	2484
H (without Axitop with ECOBREEZE - optional)	mm	2510	2510	2510	2510	2510	2510	2510	2510
OD (internal exchanger)	mm	114,3	114,3	114,3	114,3	114,3	114,3	114,3	114,3
OD1 (partial recovery)	mm	76,1	76,1	76,1	76,1	76,1	76,1	76,1	76,1
A - Length	mm	4149	4149	4149	4149	4149	4149	4149	4149
B - Depth	mm	2243	2243	2243	2243	2243	2243	2243	2243
C - Height	mm	2668	2668	2668	2668	2668	2668	2668	2668
W1 Supporting point	kg	902	918	937	977	902	918	937	977
W2 Supporting point	kg	571	574	585	610	571	574	585	610
W3 Supporting point	kg	893	910	929	971	893	910	929	971
W4 Supporting point	kg	562	566	577	604	562	566	577	604
Shipping weight	kg	2815	2855	2913	3042	2815	2855	2913	3042
Operating weight	kg	2928	2968	3028	3162	2928	2968	3028	3162

Size		SC-EXC				EN-EXC			
		90.4	100.4	110.4	120.4	90.4	100.4	110.4	120.4
Container shipping length	mm	4300	4300	4300	4300	4300	4300	4300	4300
Container shipping depth	mm	2315	2315	2315	2315	2315	2315	2315	2315

The presence of optional accessories may result in a substantial variation of the weights shown in the table. Fan diffusers are separately supplied.

Size 140.4-160.4 - Acoustic configuration : Compressor soundproofing (SC) / Super-silenced (EN)

DAB8N140 4_160 4_EXC_SC_EN_1
Date: 08/09/2016



1. External exchanger
2. Antivibration fixing holes Ø 25mm
3. Lifting brackets (removable, if required, after unit positioning)
4. Main electrical panel
5. Power input supply
6. Recommended functional clearances
7. Entering exchanger water recovery side (optional)
8. Leaving exchanger water recovery side (optional)
9. Water inlet user side of no pumps unit / Water outlet user side of unit with pumps (optional)
10. Water outlet user side of no pumps unit / Water inlet user side of unit with pumps (optional)

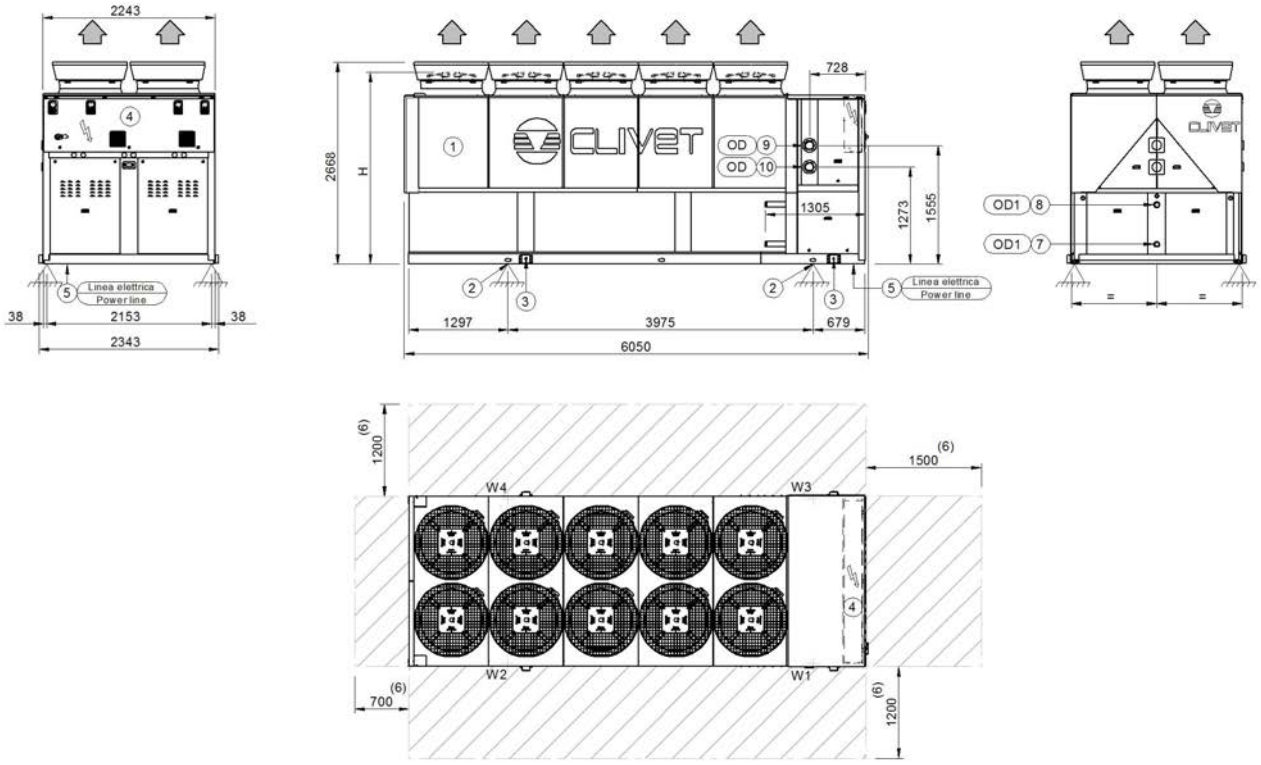
Size		SC-EXC		EN-EXC	
		140.4	160.4	140.4	160.4
H (without Axitop)	mm	2484	2484	2484	2484
H (without Axitop with ECOBREEZE - optional)	mm	2510	2510	2510	2510
OD (internal exchanger)	mm	114,3	114,3	114,3	114,3
OD1 (partial recovery)	mm	76,1	76,1	76,1	76,1
A - Length	mm	5124	5124	5124	5124
B - Depth	mm	2243	2243	2243	2243
C - Height	mm	2668	2668	2668	2668
W1 Supporting point	kg	1104	1108	1104	1108
W2 Supporting point	kg	699	701	699	701
W3 Supporting point	kg	1094	1099	1094	1099
W4 Supporting point	kg	689	693	689	693
Shipping weight	kg	3431	3445	3431	3445
Operating weight	kg	3588	3602	3588	3602

Size		SC-EXC		EN-EXC	
		140.4	160.4	140.4	160.4
Container shipping length	mm	5275	5275	5275	5275
Container shipping depth	mm	2315	2315	2315	2315

The presence of optional accessories may result in a substantial variation of the weights shown in the table. Fan diffusers are separately supplied.

Size 180.4-200.4 - Acoustic configuration : Compressor soundproofing (SC) / Super-silenced (EN)

DAB8N180 4_200 4_EXC_SC_EN_1
Data/Date 09/09/2016



1. External exchanger
2. Antivibration fixing holes Ø 25mm
3. Lifting brackets (removable, if required, after unit positioning)
4. Main electrical panel
5. Power input supply
6. Recommended functional clearances
7. Entering exchanger water recovery side (optional)
8. Leaving exchanger water recovery side (optional)
9. Water inlet user side of no pumps unit / Water outlet user side of unit with pumps (optional)
10. Water outlet user side of no pumps unit / Water inlet user side of unit with pumps (optional)

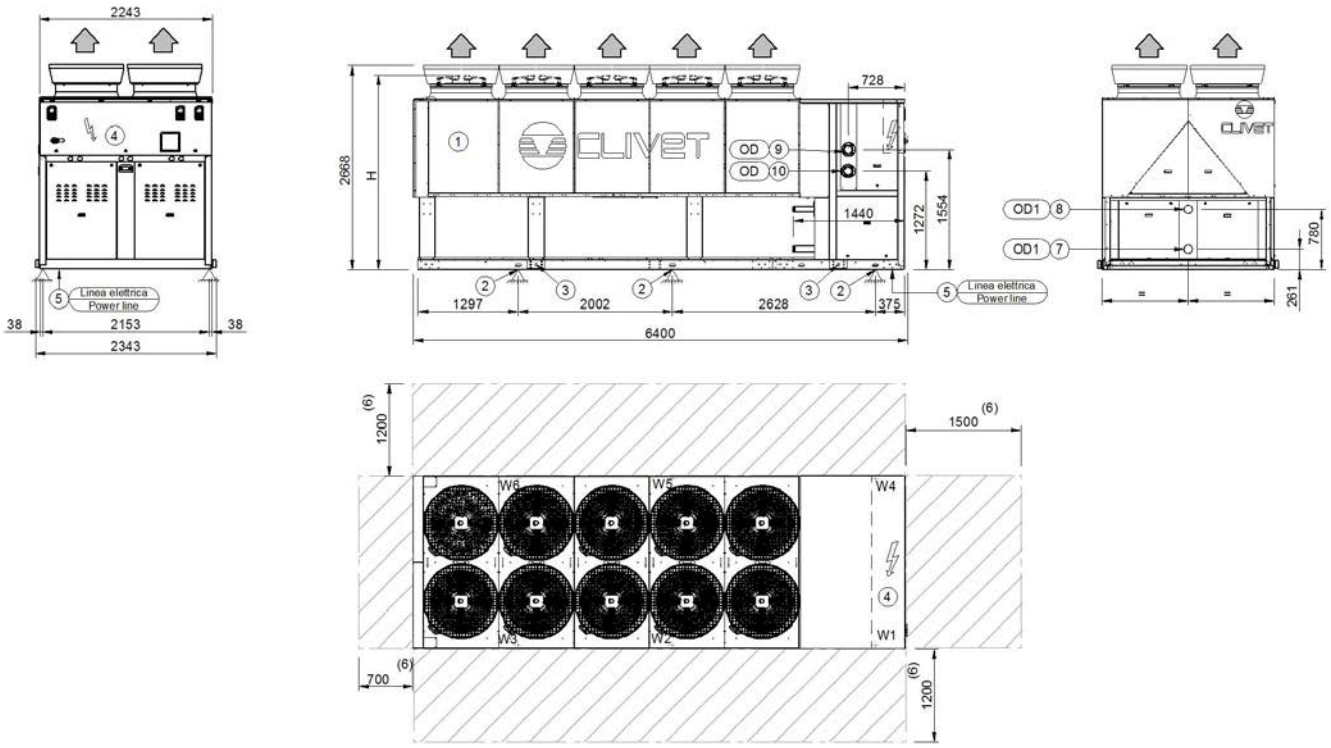
Size		SC-EXC		EN-EXC	
		180.4	200.4	180.4	200.4
H (without Axitop)	mm	2484	2484	2484	2484
H (without Axitop with ECOBREEZE - optional)	mm	2510	2510	2510	2510
OD (internal exchanger)	mm	139,7	139,7	139,7	139,7
OD1 (partial recovery)	mm	76,1	76,1	76,1	76,1
A - Length	mm	6050	6050	6050	6050
B - Depth	mm	2243	2243	2243	2243
C - Height	mm	2668	2668	2668	2668
W1 Supporting point	kg	1322	1337	1322	1337
W2 Supporting point	kg	862	873	862	873
W3 Supporting point	kg	1312	1327	1312	1327
W4 Supporting point	kg	851	862	851	862
Shipping weight	kg	4148	4200	4148	4200
Operating weight	kg	4347	4399	4347	4399

Size		SC-EXC		EN-EXC	
		180.4	200.4	180.4	200.4
Container shipping length	mm	6157	6157	6157	6157
Container shipping depth	mm	2315	2315	2315	2315

The presence of optional accessories may result in a substantial variation of the weights shown in the table. Fan diffusers are separately supplied.

Size 220.4-240.4 - Acoustic configuration : Compressor soundproofing (SC) / Super-silenced (EN)

DAB8N220 4_240 4_EXC_1
Date: 12/09/2016



1. External exchanger
2. Antivibration fixing holes Ø 25mm
3. Lifting brackets (removable, if required, after unit positioning)
4. Main electrical panel
5. Power input supply
6. Recommended functional clearances
7. Entering exchanger water recovery side (optional)
8. Leaving exchanger water recovery side (optional)
9. Water inlet user side of no pumps unit / Water outlet user side of unit with pumps (optional)
10. Water outlet user side of no pumps unit / Water inlet user side of unit with pumps (optional)

Size		SC-EXC		EN-EXC	
		220.4	240.4	220.4	240.4
H (without Axitop)	mm	2484	2484	2484	2484
H (without Axitop with ECOBREEZE - optional)	mm	2510	2510	2510	2510
OD (internal exchanger)	mm	139,7	139,7	139,7	139,7
OD1 (partial recovery)	mm	76,1	76,1	76,1	76,1
A - Length	mm	6400	6400	6400	6400
B - Depth	mm	2243	2243	2243	2243
C - Height	mm	2668	2668	2668	2668
W1 Supporting point	kg	1402	1424	1402	1424
W2 Supporting point	kg	518	533	518	533
W3 Supporting point	kg	506	523	506	523
W4 Supporting point	kg	1375	1431	1375	1431
W5 Supporting point		507	521	507	521
W6 Supporting point		508	525	508	525
Shipping weight	kg	4561	4701	4561	4701
Operating weight	kg	4816	4956	4816	4956

Size		SC-EXC		EN-EXC	
		220.4	240.4	220.4	240.4
Container shipping length	mm	6507	6507	6507	6507
Container shipping depth	mm	2315	2315	2315	2315

The presence of optional accessories may result in a substantial variation of the weights shown in the table. Fan diffusers are separately supplied.

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