

SPINchiller³ FREE-COOLING

FREE-COOLING high efficiency air-cooled liquid chiller
for outdoor installation

WSAT-XSC3 FC 260.6 - 360.6 RANGE

Nominal cooling capacity from 711 kW to 985 kW

- ▶ FREE-COOLING mixing section on source exchanger
- ▶ R-410A multiscroll technology
- ▶ Two independent refrigeration circuits
- ▶ Diffusers for thermodynamic recovery fans

EXCELLENCE version

- ▶ Up to 50°C outdoor air temperature / Perfect for LEED



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

	Small and Medium Commercial			Large Commercial and Industry		
	ELFOEnergy Extended Inverter ELFOEnergy Edge ELFOEnergy Duct Inverter 4 ÷ 50 kW	ELFOEnergy Medium / Large ² ELFOEnergy Vulcan Medium ELFOEnergy Duct Medium 20 ÷ 216 kW	ELFOEnergy Magnum 50 ÷ 375 kW	Remotex Multi Scroll Technology 237 ÷ 2050 kW	SPINchiller ³ / SPINchiller ² Duct Multi Scroll Technology 115 ÷ 1350 kW	SCREWLine ³ 467 ÷ 1523 kW
Capacity (A35/W7)						
ErP compliance (heat pumps only)						
Products						
Chillers	WSAT-XIN EXC C PRM D	WSAT-XEE EXC A PRM C	WSAT-XIN EXC A PRM C WSAT-XEM EXC A PRM C	MSRT-XSC3 EXC A PRM C	WSAT-XSC3 SUP A EXC A PRM C	WDAT-SL3 EXC A PRM C
High Temperature Chillers External Air			WSAT-XEM EXC A	MSRT-XSC3 EXC A	WSAT-XSC3 SUP A EXC A	WDAT-SL3 EXC A
Free Cooling Chillers		WSAT-XEE (FC) A	WSAT-XEM FC EXC A		WSAT-XSC3 FC EXC A	WDAT-SL3 FC EXC A
Heat pumps	WSAN-XIN EXC A PRM B WSAN-XMI EXC A	WSAN-XEE A	WSAN-XIN EXC A WSAN-XEM EXC A	MSRN-XSC3 EXC A PRM C	WSAN-XSC3 EXC A	
High temperature water Heat pumps		WBAN A	WSAN-XEM HW EXC A			
Multi-Function Heat pumps			WSAN-XIN MF EXC A WSAN-XEM MF EXC A		WSAN-XSC3 MF EXC A	
Ducted units	WSA-XIN EXC A WSN-XIN EXC A	WSA-XEE EXC A WSN-XEE EXC A			WSA-XSC2 EXC A	

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 different types 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 compact PREMIUM
- 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)



WSAN-XSC3

Air cooled heat pump

- EXCELLENCE high efficiency version
- Eurovent certification



Dedicated series separately documented

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.



Perfect for LEED certification

The whole EXCELLENCE range satisfies both requirements 2 (Minimum Energy Performance) and 3 (Fundamental Refrigerant Management) of Energy and Atmosphere section. They also meet Credit 4 parameters (Enhanced Refrigerant Management) allowing 2 points acquisition.

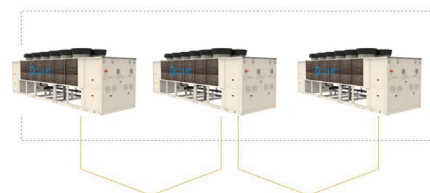
Clivet is committed in promoting the green building principles and has become a member of GBC Italia. This organization collaborates with USGBC, the U.S. nonprofit organization that promotes worldwide the LEED system of independent certification.



The advantages of the modular solution

In the event of particularly large buildings requiring high capacities, it is advisable to use several units. The ECOSHARE technology developed by Clivet allows to coordinate up to 3 units in local network, in parallel with modular logic, with the following advantages:

- greater efficiency, because the compressors are sequentially activated exploiting at most their point of operating with the lowest consumption, and the pumping units are activated only when necessary
- greater flexibility, thanks to capability of the automatic control to follow the load
- increased reliability, since the malfunction of one unit does not compromise the capacity supply of the other units.



ECOSHARE NETWORK

Remote system management

The unit is standard equipped with:

- potential-free contact for remote on/off control
- potential-free contacts for the compressor status display
- setting from user interface: Off / local On / serial On
- potential-free contact to remote a general alarm

Thanks to the different communication protocols available, the unit is able to exchange information with the main supervisory systems using serial connections.

Modbus®



FREE-COOLING always convenient

For industrial or civil applications where cooling capacity required is stable in any outdoor condition and it is not effected by outdoor temperature, using solutions that exploit low outdoor temperatures for supplying cooling capacity for free is strongly suggested.

The new SPINchiller³ FREE-COOLING series is the answer to that, and thanks to large exchanging surfaces with an antifreeze solution drives to notable annual energy consumption savings, up to 40% in harsh climate.

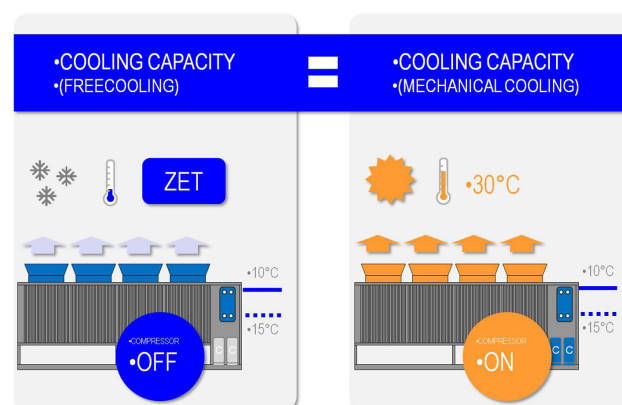
Not only great winter performances thanks to FREE-COOLING but also all SPINchiller³ benefits and especially very high efficiency at high outdoor temperature conditions.

During one operative year of FREE-COOLING units 70% of the time compressors are running and providing a quite important cooling capacity amount.

It is mandatory to provide a good efficiency even when FREE-COOLING is OFF, in these conditions SPINchiller³ drives to an high saving thanks to a full load efficiency up to 3,1.

Available with two configurations:

- Direct FREE-COOLING (FCD): for systems with glycol.
- Glycol free FREE-COOLING (FCI): for systems without glycol



10% of savings with an higher set point

For industrial applications, water supply could be different than 7°C. With FREE-COOLING units the advantages in terms of efficiency increasing water temperature set-point by few degrees is even more noticeable, driving to annual energy savings higher than 8% with a set point of 10°C for example, concrete economical value for this kind of applications.

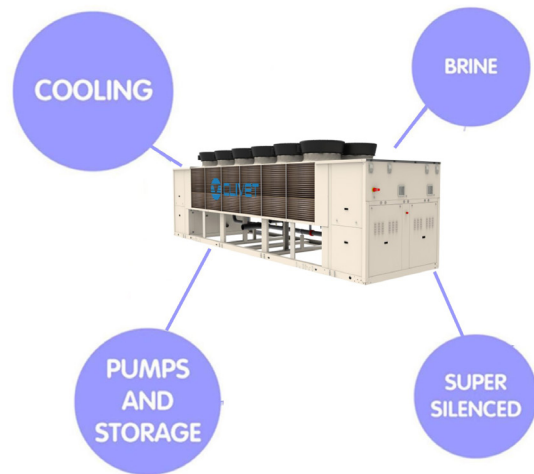
SPINchiller³

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 SPINchiller³, in a range of models that are ideal for high capacity air conditioning systems in commercial, residential and industrial buildings.

The EXCELLENCE version stands out for its extremely high energy efficiency under both part and full load conditions.

SPINchiller³ can also be supplied in many configurations equipped with the main components installed built-in.



Advantages

High efficiency all year round

SPINchiller³ 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 SPINchiller³ units operating on the same equipment, there is the innovative ECOSHARE feature, which automatically distributes the load and activates the necessary pumps.

4.5
ESEER
Seasonal
Efficiency

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, SPINchiller³ is also available in Super-silenced configuration. Energy recovery for producing hot water free of charge, FREE-COOLING.

Borderless multiscroll technology

With SPINchiller³ 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 SPINchiller³ in comparison to any other air cooled chiller technology. A comparison with three SPINchiller³ 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 SPINchiller³ 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 analysed technologies are always above acceptable values normally considered for system investment equal to 3 years.

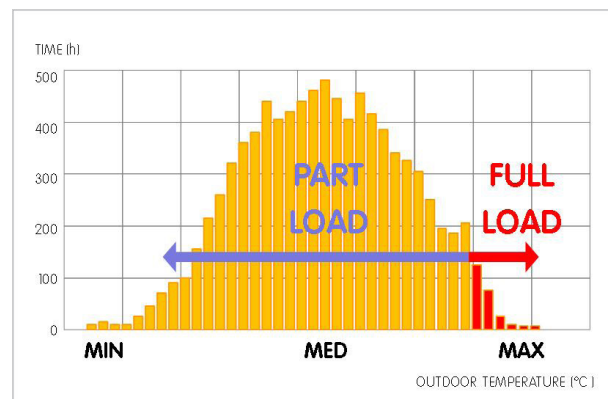
Comfort and energy saving in one solution

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.

CARICO IMPIANTO	PESO [ESEER] *	PESO [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

SPINchiller³ uses high efficiency Scroll compressors.

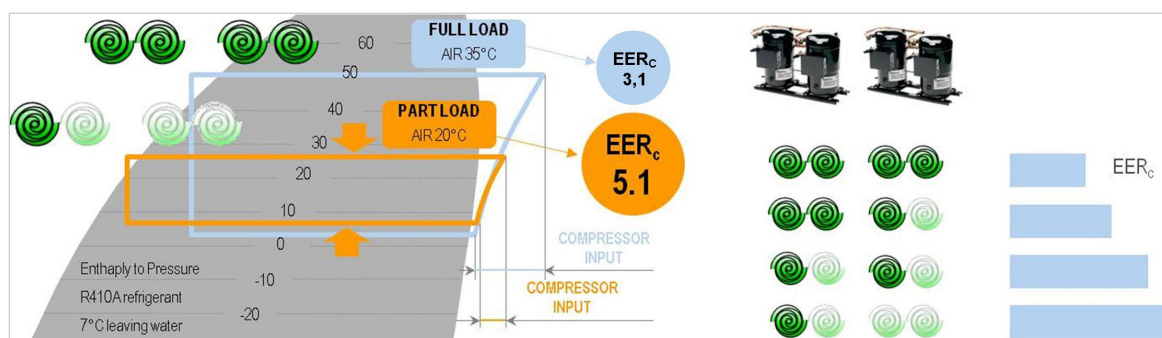
The advantages are:

- 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 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.

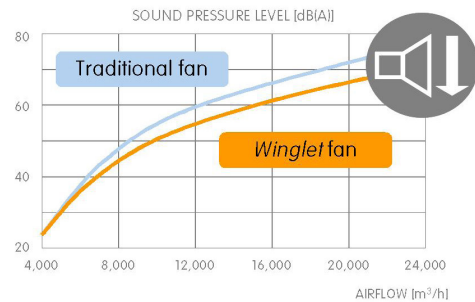
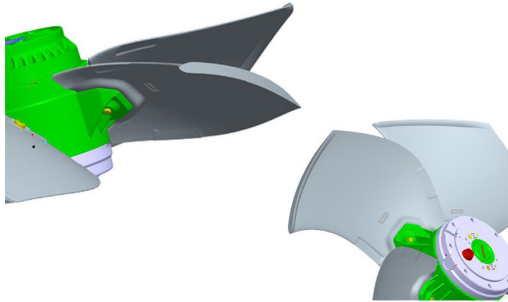


EERc = Energy efficiency referred to compressors

Efficient and silent ventilation technology

Advanced aerofoil fans

The external axial fans are equipped with the innovative Winglet air foil-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.

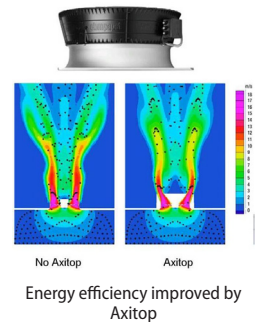


Diffusers for fans

Also the innovative air handling system on the external exchangers is the result of the Clivet design evolution.

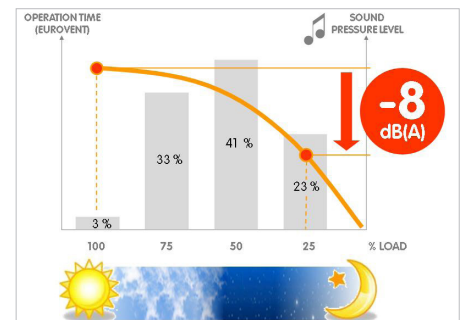
The new AxiTop diffuser creates an ideal air distribution: it aerodynamically decelerates the flow and transforms a big part of its dynamic energy in static pressure, obtaining:

- -3 dB of sound reduction
- reduction of 3% of the absorbed energy



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.



EXCELLENCE version: maximum efficiency

Apart from the high seasonal efficiency, the standard EXCELLENCE SC version stands out for its extremely high energy efficiency ratio (EER) during part-load cooling which reaches the value 3,1.

This is all possible thanks to Scroll modular technology, high efficiency heat exchangers, to the speed electronic control of the phase cutting fans and to AxiTop diffusers and to an electronic control device supplied as standard.

This allows for:

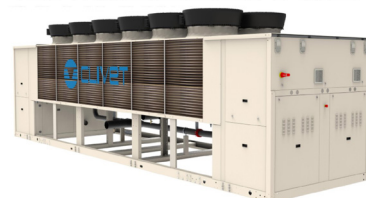
- energy efficiencies equal to or higher than most units on the market equipped with screw compressors, even when inverter driven
- efficient use even in a large number of industrial and process applications
- upgrade of the building's energy class and, therefore, increased value
- maximum savings on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

Available in two high efficiency acoustic configurations, it represents the optimum combination of efficiency and low noise:

- the EXCELLENCE SC version is standard and besides offering a high efficiency at full load and excellent performance in FREE-COOLING operation keeps reduced dimensions.
- the EXCELLENCE EN version not only confirms but also improves the SC performance and reduces noise emissions, thanks to the use of heat exchangers with generous dimensions and reduced fan rotation speed.

Both configurations offer soundproofed panels as standard, which constitute a heated compartment for the main component protection also from cold temperatures, including pumping units (if requested).

EXCELLENCE



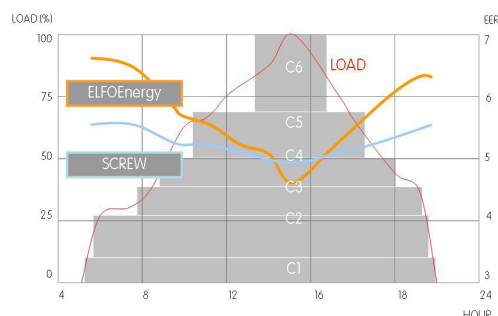
**EER
3,1**

Superior flexibility and reliability

Efficient precision

Sequential activation of SPINchiller³ 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.

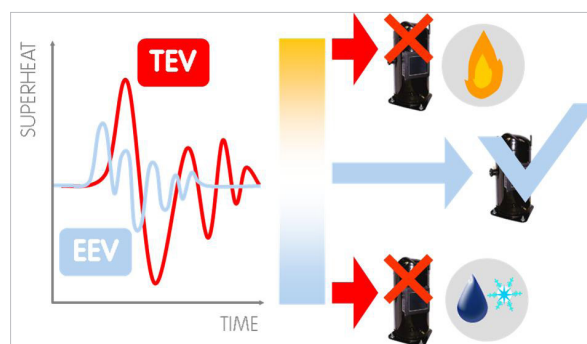


THE NUMBER OF START-UPS DECREASES THEREFORE THE LIFE CYCLE INCREASES

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, SPINchiller³ 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.



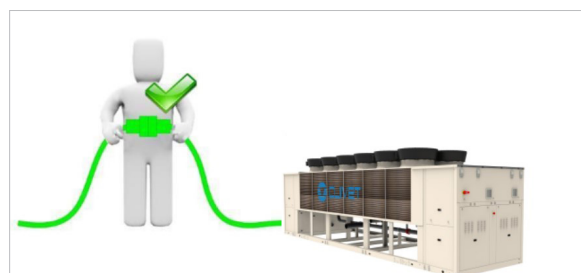
Controlled power supply

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.

Multifunction monitor, where limit values and the service schedule of Clivet's Technical Support can be modified.



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).



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.



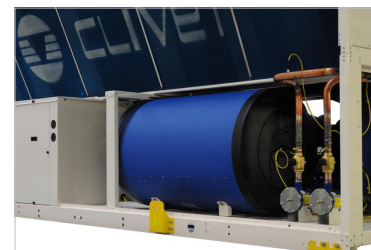
SPINchiller³ technology industrialised the system

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

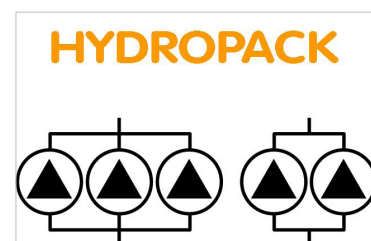
In most SPINchiller³ systems it can be installed without inertial accumulation on the system. In fact, the unit quickly adapts to the load due to modular compressors, electronic thermostatic valve and low water content plate heat exchangers. However, in the event of hydraulic distribution networks with 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



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 is 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.

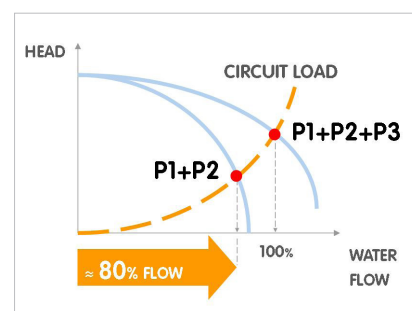
The possibility of independent pump management in case of failure is embedded in the unit keeping operative the system.

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.

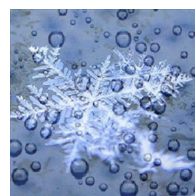
In fact, with a deactivated pump, the residual flow is:

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



Even 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

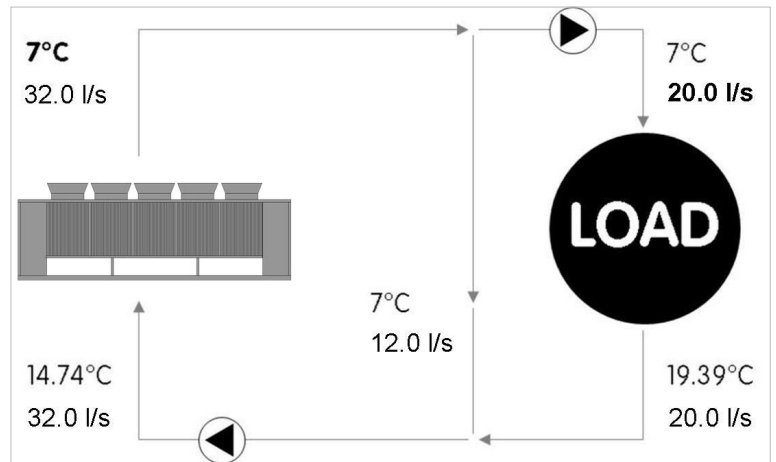
SPINchiller³ operates with constant water flow rate to the evaporator, between a minimum and maximum value indicated in the technical documents.

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 to WSAT-XSC3 FC 180.4 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.

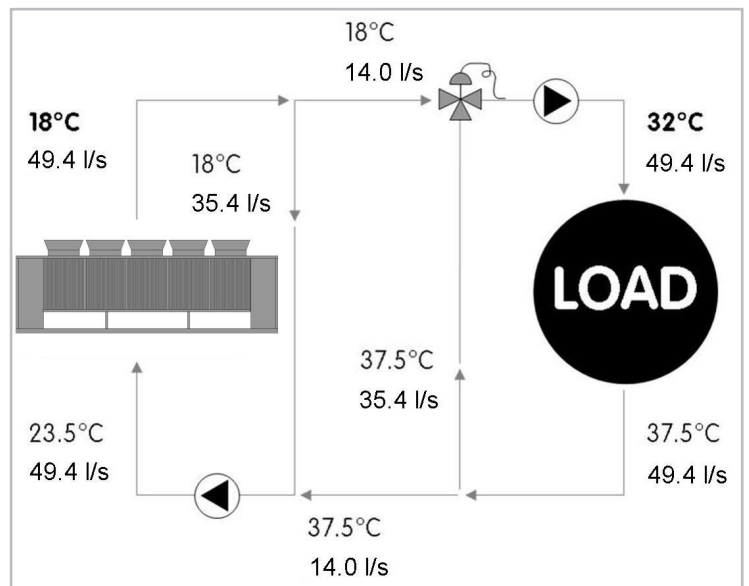
Temperature limits below the limit may cause unwanted formation of ice and the unit to stop following the intervention of built-in safety devices.

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 WSAT-XSC3 FC 180.4 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 - FCD configuration

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 TRIO 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 (evaporator)

Direct expansion heat exchanger, brazed 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 (condenser)

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 high performance and low-noise, balanced statically and dynamically, with blades in aluminum sheet coated in PP and sickle profile terminating with "Winglets", Wall ring in sheet steel pre-galvanised, directly coupled to the three-phase electric motor with external rotor and IP54 protection and class F insulation. Fans are located in aerodynamically shaped structures, equipped with accident prevention steel guards.

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.

Device for consumption reduction of the external section at variable speed (phase-cutting)

Automatic device for reducing of the outdoor section consumption with variable speed fans. The speed of the fan motors is continuously adjusted according to the condensing pressure to ensure the right working of the unit at low outside temperatures.

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;
- electronic expansion valve;
- high pressure safety pressure switch;
- high and low pressure safety valve;
- cutoff valve on liquid line;
- cutoff valve on compressor supply;

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

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

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;

- 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.

Hydraulic circuit

Exclusive FCD configuration components

- 3-way valve with on/off control

Accessories - Hydraulic circuit

- HYDROPACK
- Inverter driven HYDROPACK
- Storage tank (FCD configuration only)
- 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 grill
- Anti-hail protection grilles
- Copper / aluminium condenser coil with acrylic lining
- Copper / aluminium condenser coil with Aluminium Energy Guard DCC treatment
- High and low pressure gauges
- Cutoff valve on compressor supply and return
- Device for consumption reduction of the external section ECOBREEZE fans
- Device for fan consumption reduction of the external section at variable speed (phase-cutting) (optional in the EN config.)
- Power factor correction capacitors (cosφ > 0.9)
- ECOSHARE function for the automatic management of a group of units
- Serial communication module for Modbus supervisor
- Serial communication module for LonWorks supervisor
- Serial communication module for BACnet-IP supervisor
- Disposal for inrush current reduction (SOFT STARTER)
- Energy meter
- Set-point compensation with 0-10 V signal
- Set-point compensation with outdoor air temperature probe
- Variable flow-rate control
- Electrical panel antifreeze protection
- Remote control via microprocessor control (separately supplied accessory)
- Mains power supply (separately supplied accessory)
- Spring antivibration mounts (separately supplied accessory)
- Couple of manually operated shut-off valves (separately supplied accessory)

On request are available:

- Refrigerant leak detector

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 analysed, in order to ensure the respect of the limits set by the manufacturers of the different components.

Unit technical specifications - FCI configuration

Technical specifications as FCD configuration except for:

Device for consumption reduction of the external section ECOBREEZE fans

An option which regards the external helical fans, as an alternative to the phase-cut device.

Hydraulic circuit

- Pumping unit complete with non-return valves, safety valves, antifreeze heaters, shut-off valves and drainage and thermoformed insulated casing.

Intermediate exchanger

Brazed AISI 316 heat exchanger stainless steel plates for parts in contact with fluid (AISI 304 for the other parts), in pack without seals using copper as the brazing material, complete with:

- external thermal insulation no-condensation, thickness 9,5 mm, in extruded elastomer foam with closed cells;
- 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.

Unit equipment with outdoor air low temperatures

Minimum outdoor air temperature		Operating unit	Unit in stand-by (fed unit)	Unit in storage ⁽⁵⁾ (unit not fed)
+11°C	1	✓ standard unit ✓ electrical panel antifreeze protection ✓ glycol in an appropriate percentage	✓ standard unit	✓ standard unit
+2°C	2			
-7°C	3			
-10°C	4		✓ water empty unit or with an appropriate glycol percentage ✓ electrical panel anti-freeze protection	✓ standard unit ⁽⁶⁾ Not suitable: X electrical panel anti-freeze protection X energy meter (CONTA2) X high and low pressure gauges (MHP)
Between -10°C and -18°C				
Between -18°C and -25°C		✓ electrical panel antifreeze protection ✓ glycol in an appropriate percentage Not suitable: X high and low pressure gauges (MHP)		
Between -25°C and -39°C		✓ electrical panel antifreeze protection ✓ glycol in an appropriate percentage Not suitable: X ECOBREEZE fans (optional for SC conf., standard for EN conf.) X high and low pressure gauges (MHP)		NOT POSSIBLE

Data referred to the following conditions:

internal exchanger water = 12/7°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. Unit at full load and outdoor air temperature at rest.

⁽⁷⁾ 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.

Minimum system water content

For a proper functioning of the unit a minimum water content has to be provided to the system, using the formula:

Minimum water content [l] = 7 x kWf (air conditioning application)

= 14 x kWf (application with low outdoor temperature or low loads required))

kWf = Nominal cooling capacity unit



Volume calculated does not consider internal heat exchanger (evaporator) water content.

Unit configuration

<u>WSAT-XSC3 FC</u>	<u>260</u>	<u>.</u>	<u>6</u>	<u>FCD</u>	<u>EXC</u>	<u>SC</u>	<u>AXIX</u>	<u>-</u>	<u>-</u>
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	

(1) Range

WSAT = Air-cooled liquid chilled with scroll compressor
XSC3 FC = SPINchiller³ FREE-COOLING range

(2) Size

260 = Nominal compressor capacity (HP)

(3) Compressors

6 = Compressor quantity

(4) FREE-COOLING configuration

FCD = Direct FREE-COOLING (standard)
FCL = No-glycol FREE-COOLING

(5) Energy efficiency

EXC = EXCELLENCE version: high energy efficiency

(6) Acoustic configuration

SC = Acoustic configuration with compressor soundproofing
EN = Super-silenced acoustic configuration

(7) Fan diffusers

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

(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 (standard)
4PM - Hydropack user side with no. 4 of pumps
6PM - Hydropack user side with no. 6 of pumps
6PMV - Hydropack user side with no. 6 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

Accessories separately supplied		
<ul style="list-style-type: none"> • RCMRX - Remote control via microprocessor remote control 	<ul style="list-style-type: none"> • PSX - Mains power supply unit 	<ul style="list-style-type: none"> • AMMX - Spring antivibration mounts

FCD / FCI CONFIGURATION

Acoustic configuration: compressor soundproofing (SC)

General technical data - Performance

Size			260.6	280.6	300.6	320.6	340.6	360.6
Cooling								
Cooling capacity	1	[kW]	711	751	853	901	943	985
Compressor power input	1	[kW]	226	247	252	274	297	321
Total power input	2	[kW]	247	267	279	301	324	347
EER	1	-	2,88	2,81	3,06	2,99	2,91	2,83
Water flow-rate (User Side)	1	[l/s]	33,9	35,8	40,7	43,0	45,0	47,0
Total pressure drop user side - FCD	1	[kPa]	60,8	69,4	75,1	84,4	76,4	74,5
Total pressure drop user side - FCI	1	[kPa]	49,1	59,7	68,3	68,1	65,8	63,8
Cooling capacity (EN14511:2013)	3	[kW]	706	746	847	894	937	980
Total power input (EN14511:2013)	3	[kW]	250	271	284	306	329	352
EER (EN 14511:2013)	3	-	2,82	2,75	2,99	2,92	2,85	2,78
SEER	5	-	4,61	4,59	4,60	4,65	4,62	4,56
Cooling capacity (AHRI 550/590)	4	[kW]	708	748	849	896	938	980
Total power input (AHRI 550/590)	4	[kW]	226	247	251	273	296	320
COP _R	4	-	3,13	3,03	3,38	3,28	3,17	3,06
IPLV	4	-	4,94	4,96	4,89	4,92	5,00	4,97

The Product is compliant with the Erp (Energy Related Products) European Directive. It includes 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 = 0.44×10^{-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. 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
4. Data compliant to Standard AHRI 550/590 referred to the following conditions: internal exchanger water temperature = 6,7 °C. Water flow-rate 0,043 l/s per kW. Entering external exchanger air temperature 35°C. Evaporator fouling factor = 0.18×10^{-4} m² K/W
5. Data calculated according to the EN 14825:2016 Regulation

Acoustic configuration: super-silenced (EN)

General technical data - Performance

Size			260.6	280.6	300.6	320.6	340.6	360.6
Cooling								
Cooling capacity	1	[kW]	735	777	850	898	939	980
Compressor power input	1	[kW]	220	241	250	272	295	318
Total power input	2	[kW]	238	260	274	295	318	341
EER	1	-	3,08	2,98	3,10	3,04	2,95	2,87
Water flow-rate (User Side)	1	[l/s]	35,1	37,1	40,6	42,9	44,8	46,8
Total pressure drop user side - FCD	1	[kPa]	67,2	75,9	78,7	88,8	81,3	79,6
Total pressure drop user side - FCI	1	[kPa]	62,4	60,7	64,4	64,3	62,1	60,0
Cooling capacity (EN14511:2013)	3	[kW]	730	772	844	891	933	975
Total power input (EN14511:2013)	3	[kW]	243	265	279	301	323	345
EER (EN 14511:2013)	3	-	3,01	2,92	3,03	2,96	2,89	2,82
SEER	5	-	4,57	4,55	4,59	4,64	4,59	4,55
Cooling capacity (AHRI 550/590)	4	[kW]	731	773	846	893	934	974
Total power input (AHRI 550/590)	4	[kW]	219	241	250	271	294	318
COP _R	4	-	3,34	3,21	3,38	3,30	3,18	3,06
IPLV	4	-	5,04	5,02	5,00	5,00	5,04	5,07

The Product is compliant with the Erp (Energy Related Products) European Directive. It includes 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 = 0.44×10^{-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. 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
4. Data compliant to Standard AHRI 550/590 referred to the following conditions: internal exchanger water temperature = 6,7 °C. Water flow-rate 0,043 l/s per kW. Entering external exchanger air temperature 35°C. Evaporator fouling factor = 0.18×10^{-4} m² K/W
5. Data calculated according to the EN 14825:2016 Regulation

FCD / FCI CONFIGURATION

Acoustic configuration: compressor soundproofing (SC)

General technical data - Construction

Size			260.6	280.6	300.6	320.6	340.6	360.6
Compressor								
Type of compressors		-	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll
No. of compressors		Nr	6	6	6	6	6	6
Rated power (C1)		[HP]	120	140	140	160	160	180
Rated power (C2)		[HP]	140	140	160	160	180	180
Std Capacity control steps		-	11	12	13	14	11	6
Oil charge (C1)		[l]	19	19	19	19	19	19
Oil charge (C2)		[l]	19	19	19	19	19	19
Refrigerant charge (C1)	1	[kg]	68	70	88	90	90	90
Refrigerant charge (C2)	1	[kg]	70	70	90	90	90	90
Refrigeration circuits		-	2	2	2	2	2	2
Internal exchanger								
Type of internal exchanger	2	-	PHE	PHE	PHE	PHE	PHE	PHE
Water content		[l]	65,0	74,0	79,0	84,0	87,0	90,0
System water content	3	l	1824	1365	1766	2345	1990	1753
External Section Fans								
Type of fans	4	-	AX	AX	AX	AX	AX	AX
Number of fans		Nr	12	12	16	16	16	16
Type of motor	5	-	AC/P	AC/P	AC/P	AC/P	AC/P	AC/P
Standard airflow		[l/s]	65778	65778	87778	87778	87778	87778
Connections								
Water fittings		-	6"	6"	6"	6"	6"	6"
Power supply								
Standard power supply		V	400/3~/50	400/3~/50	400/3~/50	400/3~/50	400/3~/50	400/3~/50
Electrical data								
FLA Total		A	559,2	599,3	656,7	699,9	740,1	780,3
FLI Total		kW	340,8	364,2	395,6	421,0	444,4	467,8
M.I.C. - Value	6	A	828,9	869,0	976,6	1019,8	1009,8	1050,0
M.I.C. - with soft start accessory	6	A	838,9	879,0	966,6	1009,8	1009,8	1050,0

- Indicative values for standard units with possible +/-10% variation. The actual data are indicated on the unit label
- PHE = plate exchanger
- Recommended system water content that does not consider the internal exchanger water content (evaporator). With outdoor air low temperature applications or low medium requested loads, the minimum installation water volume is obtained doubling the indicated value.
- AX = axial fan
- 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.
- 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 pressure level	Sound power level
	Octave band (Hz)									
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
260.6	101	98	92	90	90	87	73	64	73	94
280.6	101	98	93	91	91	88	74	65	73	95
300.6	108	105	98	92	87	82	84	80	74	96
320.6	109	106	99	93	87	82	84	80	74	96
340.6	109	106	99	93	88	82	85	81	74	97
360.6	110	106	100	93	88	83	85	81	75	97

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

FCD / FCI CONFIGURATION

Acoustic configuration: super-silenced (EN)

General technical data - Construction

Size			260.6	280.6	300.6	320.6	340.6	360.6
Compressor								
Type of compressors		-	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll
No. of compressors		Nr	6	6	6	6	6	6
Rated power (C1)		[HP]	120	140	140	160	160	180
Rated power (C2)		[HP]	140	140	160	160	180	180
Std Capacity control steps		-	11	12	13	14	11	6
Oil charge (C1)		[l]	19	19	19	19	19	19
Oil charge (C2)		[l]	19	19	19	19	19	19
Refrigerant charge (C1)	1	[kg]	86	88	110	111	111	112
Refrigerant charge (C2)	1	[kg]	88	88	111	111	112	112
Refrigeration circuits		-	2	2	2	2	2	2
Internal exchanger								
Type of internal exchanger	2	-	PHE	PHE	PHE	PHE	PHE	PHE
Water content		[l]	65,0	74,0	79,0	84,0	87,0	90,0
System water content	3	l	1824	1365	1766	2345	1990	1753
External Section Fans								
Type of fans	4	-	AX	AX	AX	AX	AX	AX
Number of fans		Nr	16	16	20	20	20	20
Type of motor	5	-	EC	EC	EC	EC	EC	EC
Standard airflow		[l/s]	68444	68444	85556	85556	85556	85556
Connections								
Water fittings		-	6"	6"	6"	6"	6"	6"
Power supply								
Standard power supply		V	400/3~/50	400/3~/50	400/3~/50	400/3~/50	400/3~/50	400/3~/50
Electrical data								
FLA Total		A	571,5	613,5	673,9	717,1	757,3	797,5
FLI Total		kW	345,3	370,2	403,6	429,0	452,4	475,8
M.I.C. - Value	6	A	841,2	883,2	993,8	1037,0	1027,0	1067,2
M.I.C. - with soft start accessory	6	A	841,2	883,2	993,8	1037,0	1027,0	1067,2

- Indicative values for standard units with possible +/-10% variation. The actual data are indicated on the unit label.
- PHE = plate exchanger.
- Recommended system water content that does not consider the internal exchanger water content (evaporator). With outdoor air low temperature applications or low medium requested loads, the minimum installation water volume is obtained doubling the indicated value.
- AX = axial fan.
- EC = electronic permanent-magnet switching motor without brushes with 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.
- 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 pressure level	Sound power level
	Octave band (Hz)									
	63	125	250	500	1000	2000	4000	8000	dB(A)	dB(A)
260.6	97	94	88	86	86	83	69	60	68	90
280.6	97	94	89	87	87	84	70	61	68	91
300.6	105	102	95	89	84	78	80	76	69	92
320.6	105	102	95	89	84	78	81	77	70	93
340.6	105	102	96	89	84	79	81	77	70	93
360.6	106	102	96	90	84	79	81	77	70	93

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.

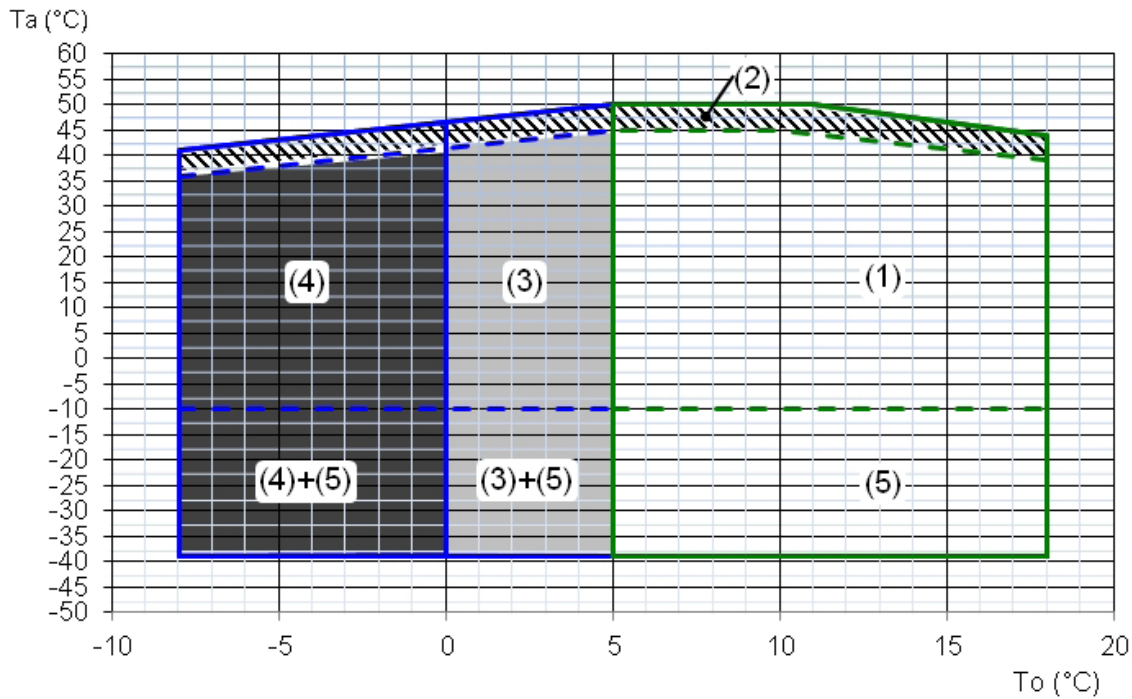
- internal exchanger water = 12/7 °C
- ambient temperature = 35 °C

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

FCD / FCI CONFIGURATION

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



Ta (°C) = entering external exchanger air temperature (D.B.)

To (°C) = leaving internal exchanger water temperature

1. Standard unit operating range
2. Unit operating range with automatic partialisation of the compressor capacity
3. Unit operating range in 'B - Low water temperature' configuration (40% ethylene glycol)
4. Extended operating range (extremely low water temperature option available on request)
5. Unit operating range as "Unit equipment with outdoor air low temperatures" table

Admissible water flow-rates

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

EXCELLENCE SC / EN		260.6	280.6	300.6	320.6	340.6	360.6
Qmin	[l/s]	19,9	21,8	22,4	23,0	24,4	25,8
Qmax	[l/s]	55,6	60,4	62,1	63,7	67,3	70,9

Correction factors for ethylene glycol use

% ethylene glycol by weight		5%	10%	15%	20%	25%	30%	35%	40%	50%	60%
Freezing temperature	°C	-2,0	-3,9	-6,5	-8,9	-11,8	-15,6	-19,0	-23,4	-33,0	-39,0
Safety temperature	°C	3,0	1,0	-1,0	-4,0	-6,0	-10,0	-14,0	-19,0	-30,0	-36,0
Cooling Capacity Factor	Nr	0,997	0,994	0,990	0,986	0,981	0,976	0,970	0,964	0,950	0,942
Compressor power input Factor	Nr	1,000	1,001	1,001	1,001	1,001	1,002	1,002	1,002	1,003	1,003
Internal exchanger glycol solution flow factor	Nr	1,003	1,010	1,020	1,033	1,050	1,072	1,095	1,124	1,184	1,221
Pressure drop Factor	Nr	0,989	0,983	0,979	0,980	0,984	0,993	1,004	1,020	1,049	1,073

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

Correction factors for propylene glycol use

% propylene glycol by weight		10%	20%	30%	40%	50%
Freezing temperature	°C	-1,3	-7,1	-12,7	-21,1	-33,5
Safety temperature	°C	3,7	-2,1	-7,7	-16,1	-28,5
Cooling Capacity Factor	Nr	0,985	0,964	0,932	0,889	0,846
Compressor power input Factor	Nr	0,993	0,983	0,969	0,948	0,929
Internal exchanger glycol solution flow factor	Nr	1,017	1,032	1,056	1,092	1,139
Pressure drop Factor	Nr	1,120	1,272	1,496	1,792	2,128

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



Available only on special request

Fouling Correction Factors

m2 K / W	Internal exchanger	
	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]	3	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	1000

DPr = Maximum operating pressure on refrigerant side in kPa

DPw = Maximum operating pressure on water side in kPa

FCD / FCI CONFIGURATION

Acoustic configuration: compressor soundproofing (SC)

Cooling performance

Size	To (°C)	Entering external exchanger air temperature (°C)											
		25		30		35		40		45		50	
		kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe
260.6	5	769	187	727	204	679	222	627	242	587	264	196	77,9
	6	792	190	746	206	697	225	644	244	604	266	203	78,1
	7	810	192	764	208	711	226	659	246	619	269	209	79,3
	10	869	198	819	215	765	233	709	253	673	276	234	79,6
	15	987	211	923	228	865	246	809	266	530	159	-	-
	18	1058	220	991	236	926	254	613	151	-	-	-	-
280.6	5	817	204	771	223	717	243	661	264	622	289	196	77,3
	6	838	207	790	225	737	246	679	267	640	292	203	77,6
	7	858	209	808	227	751	247	696	269	658	295	209	78,7
	10	920	216	866	234	806	254	749	276	714	303	234	79,1
	15	1044	230	972	248	910	269	856	291	530	158	-	-
	18	1113	239	1039	257	977	278	613	150	-	-	-	-
300.6	5	913	208	866	227	812	248	751	271	691	297	196	77,9
	6	937	210	892	229	835	250	773	273	713	300	203	78,2
	7	963	212	913	231	853	252	789	275	727	301	209	79,4
	10	1033	219	979	238	917	259	849	282	770	306	234	79,7
	15	1176	232	1113	252	1041	273	966	296	603	177	-	-
	18	1266	241	1195	260	1114	281	708	166	-	-	-	-
320.6	5	967	226	917	247	858	269	792	294	730	324	196	77,9
	6	992	228	941	249	880	272	813	297	750	326	203	78,2
	7	1022	231	964	252	901	274	833	299	765	328	209	79,4
	10	1092	237	1033	258	968	282	895	307	810	334	234	79,7
	15	1238	252	1170	273	1096	296	1018	322	658	200	-	-
	18	1336	262	1256	283	1173	305	771	187	-	-	-	-
340.6	5	1015	244	963	267	898	292	828	319	766	351	244	100,1
	6	1046	247	988	270	921	295	850	322	787	354	255	98,6
	7	1072	250	1011	272	943	297	870	324	806	356	261	100,0
	10	1150	258	1086	280	1012	305	935	333	860	363	284	100,1
	15	1304	274	1228	297	1146	322	1064	349	722	221	-	-
	18	1402	284	1315	307	1227	332	840	206	-	-	-	-
360.6	5	1064	263	1002	288	941	314	865	345	802	378	293	120,8
	6	1100	267	1036	291	962	318	886	348	822	383	301	120,7
	7	1124	269	1057	293	985	321	907	351	848	383	311	120,7
	10	1208	279	1141	302	1059	329	977	359	920	392	337	120,9
	15	1372	296	1290	320	1198	347	1108	377	774	246	-	-
	18	1463	308	1380	332	1281	359	899	229	-	-	-	-

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

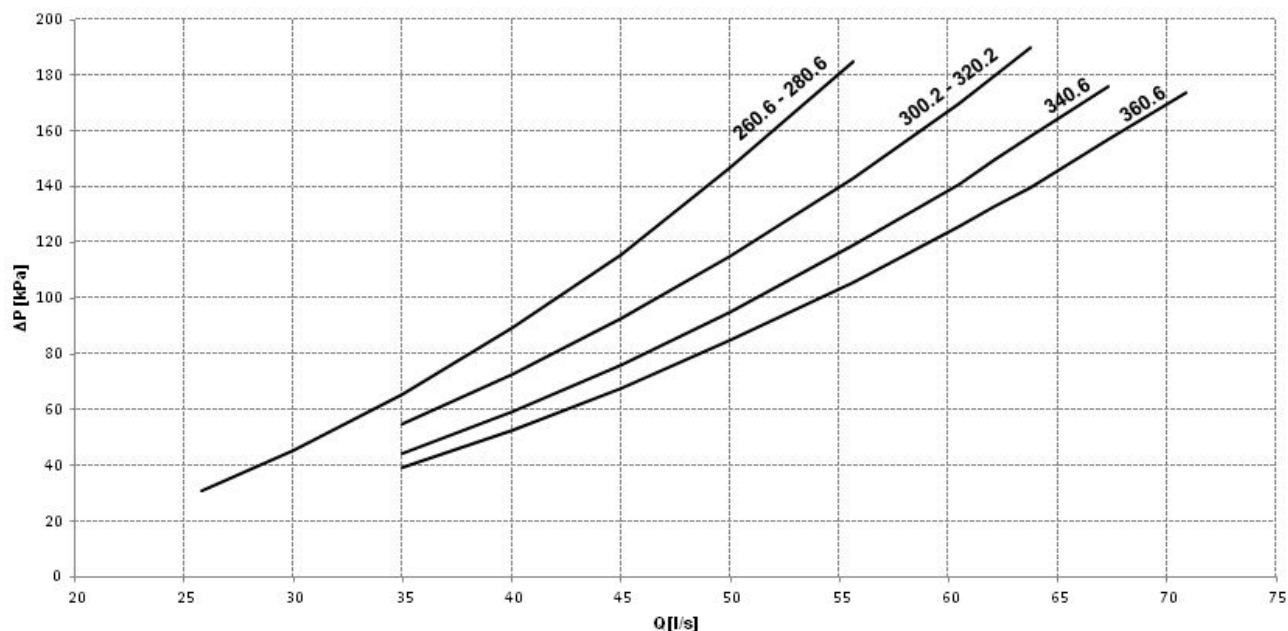
To (°C) = Leaving internal exchanger water temperature (°C) - Performances in function of the inlet/outlet water temperature differential = 5°C

FCD / FCI CONFIGURATION

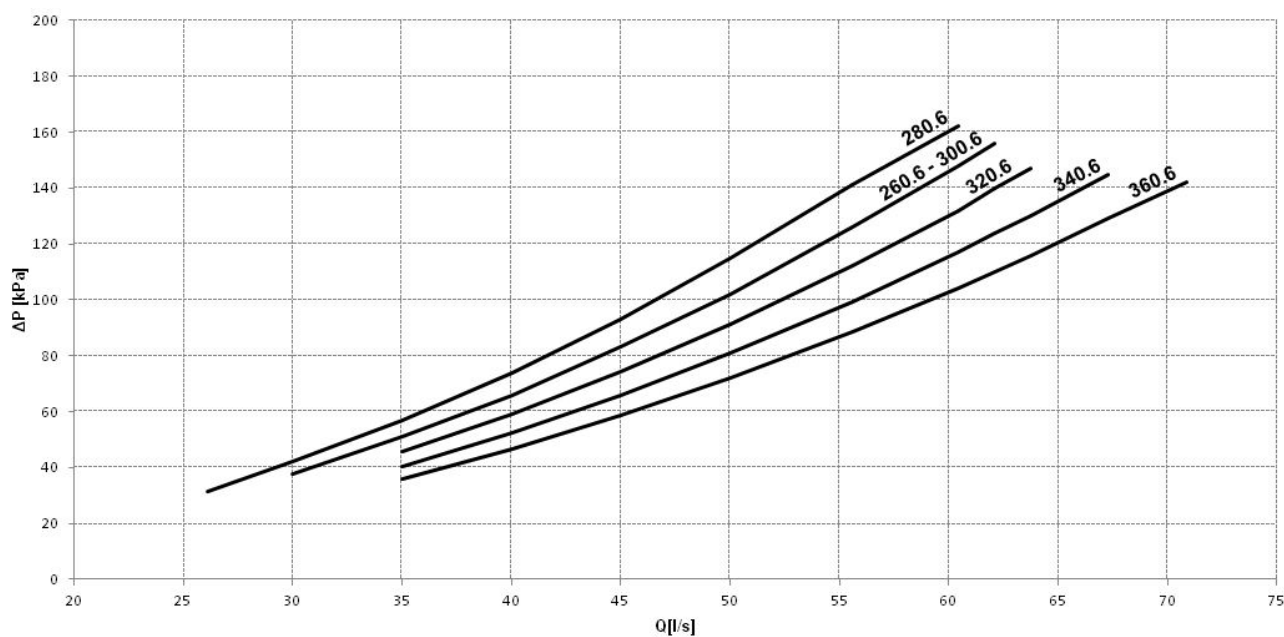
Acoustic configuration: compressor soundproofing (SC)

Pressure drop of the whole unit hydraulic circuit

FCD - Direct FREE-COOLING



FCI - No-glycol FREE-COOLING



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



To the overall (valves, pipes, internal exchangers) pressure drops must be added the pressure drops of the steel mesh mechanical filter (not supplied) that must be placed on the water input line. It is a device compulsory for the correct unit operation and it must be selected and installed by the Customer. It is forbidden the use of filters with the mesh pitch higher than 1,0 mm. Filters with higher mesh pitch can cause a bad unit operation and also its serious damaging.

FCD / FCI CONFIGURATION

Acoustic configuration: super-silenced (EN)

Cooling performance

Size	To (°C)	Entering external exchanger air temperature (°C)											
		25		30		35		40		45		50	
		kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe
260.6	5	786	182	744	198	698	216	648	235	599	256	193	77,7
	6	808	184	767	200	718	218	665	237	618	259	203	78,2
	7	830	186	785	202	735	220	680	239	631	260	211	78,5
	10	890	192	842	208	789	226	733	245	683	267	230	79,8
	15	1011	204	958	221	893	239	831	258	535	158	-	-
	18	1092	213	1026	229	958	246	632	148	-	-	-	-
280.6	5	835	199	791	217	740	237	684	258	631	282	193	77,7
	6	858	201	812	219	759	239	702	260	653	284	203	78,2
	7	880	204	830	221	777	241	719	263	667	286	211	78,4
	10	944	210	890	228	834	248	774	270	722	294	230	79,7
	15	1071	224	1010	242	940	261	875	283	535	158	-	-
	18	1151	233	1083	251	1009	270	631	292	-	-	-	-
300.6	5	908	205	864	225	807	246	747	272	687	298	196	77,9
	6	935	207	889	227	832	249	773	270	716	291	203	78,1
	7	958	209	911	229	850	250	788	276	725	302	209	79,3
	10	1030	215	980	235	914	256	849	286	784	309	234	79,6
	15	1175	227	1098	245	1022	264	951	282	603	177	-	-
	18	1264	235	1189	255	1111	278	708	166	-	-	-	-
320.6	5	965	223	915	244	854	268	790	293	726	325	196	77,9
	6	991	225	939	247	876	270	808	296	746	327	203	78,2
	7	1017	227	963	249	898	272	827	298	766	329	209	79,4
	10	1090	233	1036	255	965	279	891	305	829	337	234	79,7
	15	1242	247	1170	268	1075	288	1013	319	659	200	-	-
	18	1337	255	1251	276	1140	294	772	187	-	-	-	-
340.6	5	1012	242	960	265	894	290	825	317	763	348	244	99,3
	6	1042	245	984	268	917	292	847	319	784	351	254	97,8
	7	1068	248	1007	270	939	295	867	322	803	353	260	99,2
	10	1146	256	1081	278	1008	303	932	330	857	360	283	99,3
	15	1299	272	1223	295	1142	319	1060	346	719	219	-	-
	18	1397	282	1311	305	1222	329	837	205	-	-	-	-
360.6	5	1059	261	997	285	936	312	860	342	798	375	292	119,8
	6	1094	265	1030	289	956	316	881	345	817	380	300	119,8
	7	1118	266	1052	291	980	318	902	348	843	380	310	119,8
	10	1202	276	1135	300	1053	326	971	356	915	389	335	120,0
	15	1364	294	1282	318	1191	344	1102	374	770	244	-	-
	18	1455	306	1372	329	1274	356	894	227	-	-	-	-

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

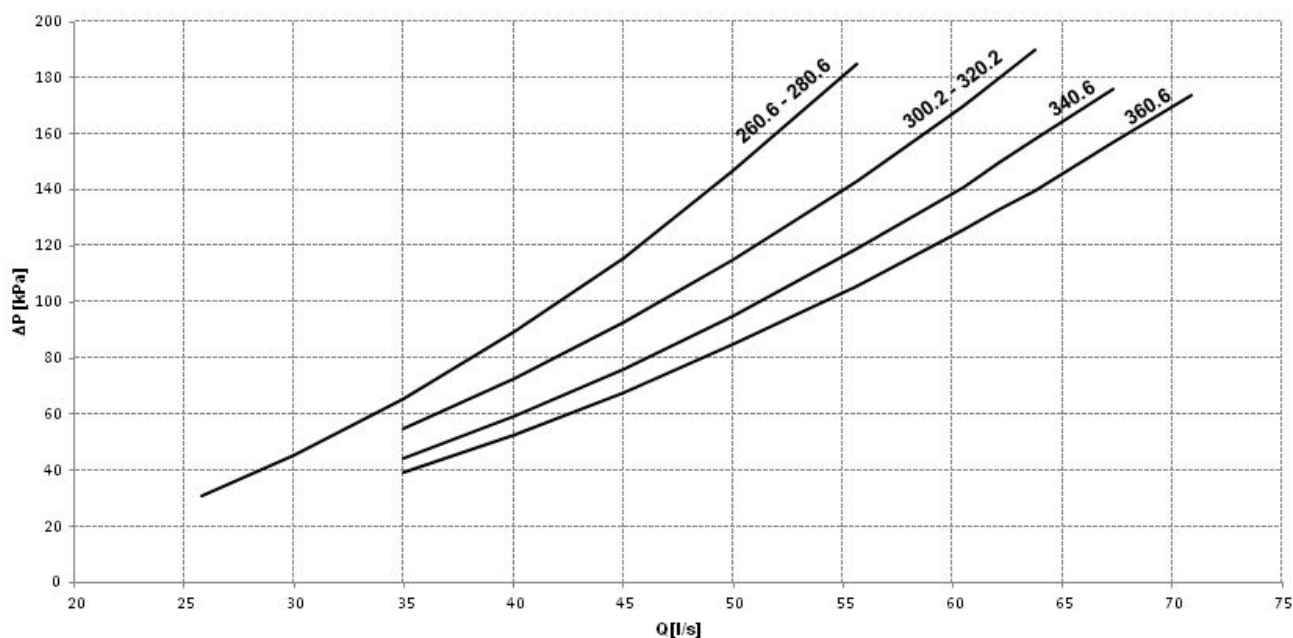
To (°C) = Leaving internal exchanger water temperature (°C) - Performances in function of the inlet/outlet water temperature differential = 5°C

FCD / FCI CONFIGURATION

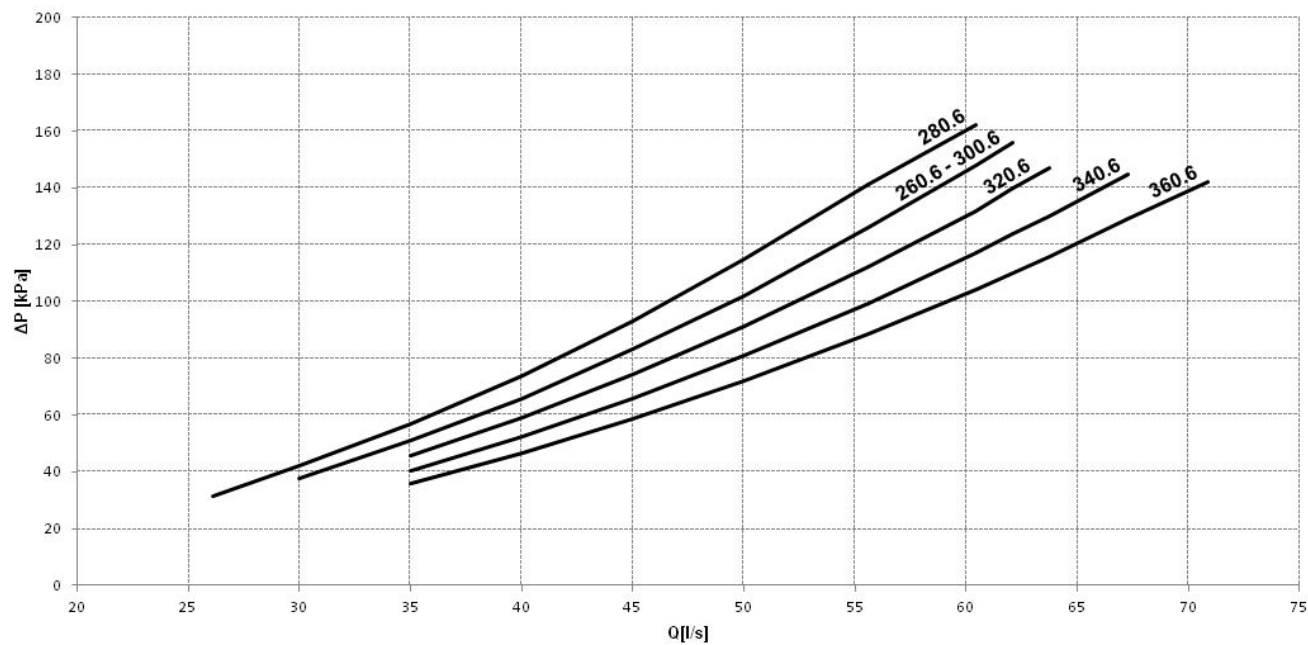
Acoustic configuration: super-silenced (EN)

Pressure drop of the whole unit hydraulic circuit

FCD - Direct FREE-COOLING



FCI - No-glycol FREE-COOLING



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



To the overall (valves, pipes, internal exchangers) pressure drops must be added the pressure drops of the steel mesh mechanical filter (not supplied) that must be placed on the water input line. It is a device compulsory for the correct unit operation and it must be selected and installed by the Customer. It is forbidden the use of filters with the mesh pitch higher than 1,0 mm. Filters with higher mesh pitch can cause a bad unit operation and also its serious damaging.

Configurations

Consult the "Option compatibility" section.

B - Low water temperature (Brine)

Configuration also known as "Brine". 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. 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.



In low temperature operation, some staging steps could not be available.



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".

FCD - Direct FREE-COOLING

Configuration that allows for considerable savings on the system's running costs in applications that require chilled water also during the cold season, such as industrial processes, data centres, telecommunications, technological applications and shopping centres. When the outdoor air temperature is lower than the temperature of the system's return water, the FREE-COOLING system recovers cold from the external environment and reduces the operation of the compressors until they stop completely. The higher the temperature of the chilled water in the system (e.g. 10-15°C instead of 7-12°C), the greater the operating range of the FREE-COOLING system and, therefore, the higher the energy savings.

Use of anti-freeze solutions

The FREE-COOLING configuration is particularly indicated in buildings where, at least in certain periods of the year, the temperature of the outdoor air also reaches very low values. For this reason the liquid must be protected from the risk of freezing, typically using the addition of a suitable anti-freeze substance such as ethylene glycol. The percentage of glycol in the solution depends on the minimum temperature value foreseen in the installation zone, and is in any case within the fundamental parameters of the plan for the system.

Management logic

There are three main operating modes, which basically differ in terms of position of the three-way switching valve and the number of active compressors.

(A) Summer

In the summer season, with outdoor air temperatures which are greater than the return temperature of the liquid in the system, the three-way valve is switched in such a way as to exclude the FREE-COOLING coils. The cooling of the liquid is referred to the direct expansion circuit, with the intervention of the compressors as in a traditional chiller.

(B) Intermediate season

In the winter season, or rather with the outdoor air temperature at a little below the return water temperature of the system, when the unit identifies that the temperature conditions are favourable:

- switches the position of the three-way valve, forcing the solution to transit through the FREE-COOLING coils before reaching the evaporator
- brings the fans to maximum speed to make the most of the cooling of the solution carried out by the outdoor air
- conducts a first cooling of the solution in a 'natural way and free of charge'
- provides any missing capacity via the cooling circuit using compressors with partial operation (power input proportional to the partialisation level)

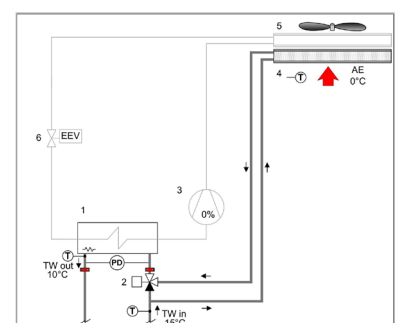
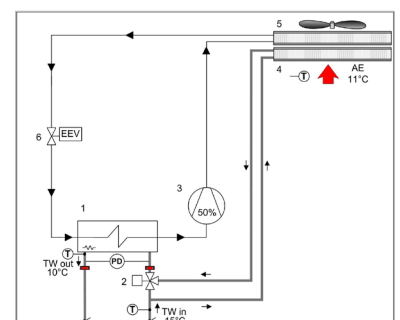
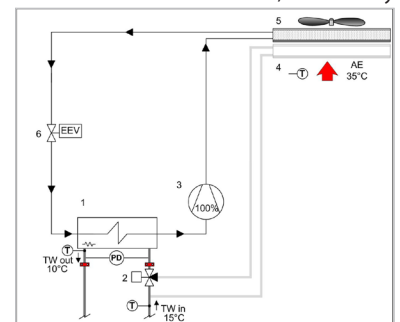
If the outdoor air temperature should increase, the microprocessor automatically converts the operating mode to the summer mode, guaranteeing the conditions requested by the user at all times.

(C) Winter

In the winter season, with the outdoor air temperature below the return water temperature of the system, the unit identifies that the temperature conditions are favourable for operating in FREE-COOLING mode:

- the 3-way valve is switched like in the previous case, forcing the solution to transit through the FREE-COOLING coils before reaching the evaporator.
- the outdoor air temperature brings the solution at the outlet of the FREE-COOLING coils already at the temperature required by the utility
- the microprocessor control completely deactivates all the compressors which supply all the requested cooling capacity at no cost, in contrast to traditional chillers

The difference between the outdoor air temperature and that requested for use could also be such as to lower the temperature of the solution at the output of the FREE-COOLING coils to below the set-point requested for use. This is a condition which does not prejudice the safety of the unit thanks to the presence of anti-freeze in the solution. The microprocessor modulates fan speed up to the point where they are switched off. If, with all the fans switched, off the temperature continues to decrease, the three-way valve positions itself automatically in the summer operational mode, thus enabling the requested set-point to be maintained.



1 - Internal exchanger

2 - Three-way valve for FREE-COOLING

3 - Compressors

4 - External exchanger

5 - External fan

6 - Expansion electronic valve

T - Temperature probe

TW in chilled water inlet

TW out chilled water outlet

AE Outdoor air

PD - Differential pressure switch



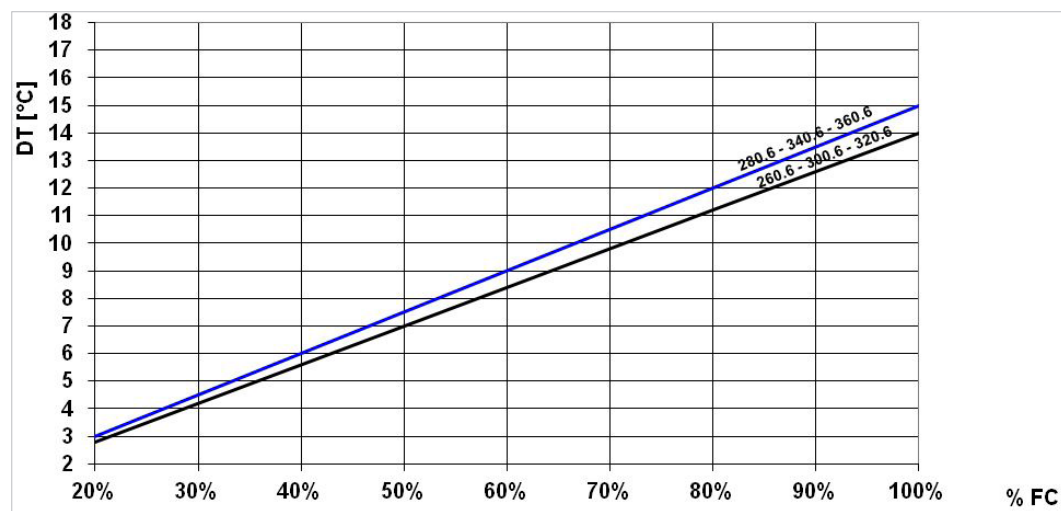
Check availability and compatibility of 'FCD - Direct FREE-COOLING' with the other accessories in the "Option compatibility" table

Determination of chiller performance with direct FREE-COOLING in conditions of FC = ON

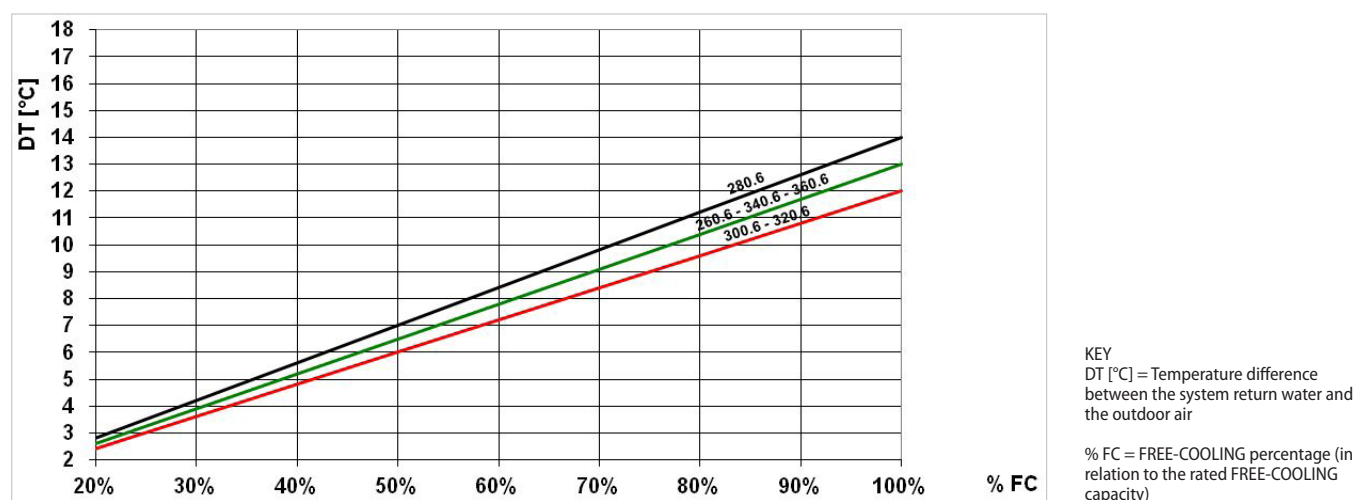
Size			260.6	280.6	300.6	320.6	340.6	360.6
SC	FREE-COOLING (1) nominal capacity	kW	799	845	955	1008	1059	1114
	Air temperature with FREE-COOLING at 100% (1)	°C	1,0	0,4	1,1	0,6	0,2	-0,1
EN	FREE-COOLING (1) nominal capacity	kW	821	869	956	1011	1056	1108
	Air temperature with FREE-COOLING at 100% (1)	°C	1,8	1,5	3,3	2,8	2,4	2,1

(1) Data refer to the following conditions:
- water temperature: 15°C inlet / 10°C outlet

Determination of the direct FREE-COOLING percentage - SC configuration



Determination of the direct FREE-COOLING percentage - EN configuration



Example: Determine the performances with outdoor air = +2°C for the following unit: WSAT-XSC3 260.6 FCD EXC SC (EXCELLENCE version, direct FREE-COOLING configuration), with water 15/10 °C / 30% glycol.

Reference: WSAT-XSC3 260.6 FCD EXC SC: FREE-COOLING nominal capacity = 799 kW (from table with water 15/10 °C / 30% glycol/ outdoor air temperature 1°C).

Calculation: Difference between the installation return water and the outdoor air = 15°C - 2°C = 13°C

The graph shows that: FREE-COOLING percentage = 93%: direct FREE-COOLING capacity at +2°C outdoors = 799 x 92% = 734 kW

FCI - No-glycol FREE-COOLING

Configuration that allows for considerable savings on the system's running costs in applications that require chilled water also during the cold season, such as industrial processes, data centres, telecommunications, technological applications and shopping centres. Does not require the addition of an antifreeze substance in the hydraulic circuit used. Therefore, it is particularly suitable for large-sized systems and wherever laws and regulations limit the use of antifreeze substances inside buildings. Moreover, it does not affect the performance of terminal units and the system's pumping units. When the outdoor air temperature is lower than the temperature of the system's return water, the FREE-COOLING system recovers cold from the external environment and reduces the operation of the compressors until they stop completely. The higher the temperature of the chilled water in the system (e.g. 10-15°C instead of 7-12°C), the greater the operating range of the FREE-COOLING system and, therefore, the higher the energy savings.

Management logic

There are three main operating modes, which basically differ in terms of activation of the FREE-COOLING circuit electric pump and the number of active compressors:

(A) Summer

In the summer season, with outdoor air temperatures which are greater than the return temperature of the liquid in the system, the electric pump is off and the fluid circulation by the FREE-COOLING coils is not present. The cooling of the liquid is referred to the direct expansion circuit, with the intervention of the compressors as in a traditional chiller.

(B) Intermediate season

In the winter season, or rather with the outdoor air temperature at a little below the return water temperature of the system, when the unit identifies that the temperature conditions are favourable:

- activates the electric pump of the FREE-COOLING circuit by creating an exchange of energy between the liquid in the system and the FREE-COOLING circuit before reaching the evaporator
- brings the fans to maximum speed to make the most of the cooling of the solution carried out by the outdoor air
- conducts a first cooling of the solution in a 'natural way and free of charge'
- provides any missing capacity via the cooling circuit using compressors with partial operation (power input proportional to the partialisation level)

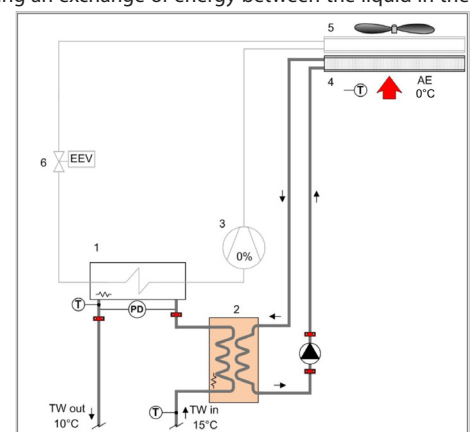
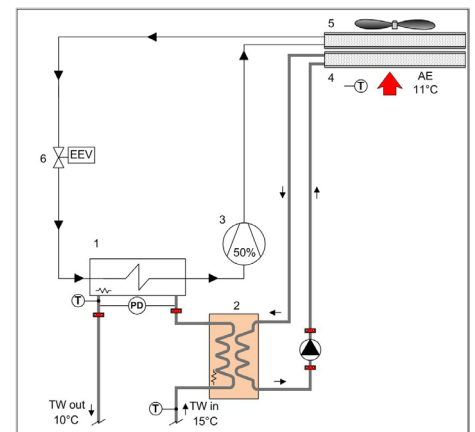
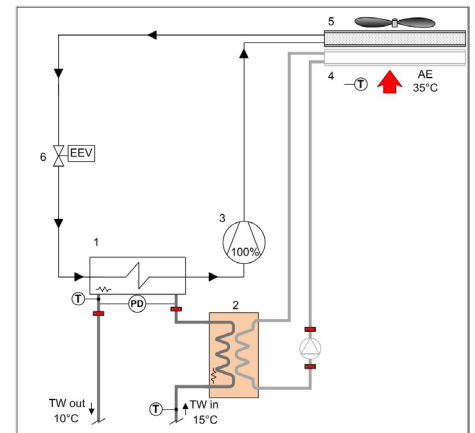
If the outdoor air temperature should increase, the microprocessor automatically converts the operating mode to the summer mode, guaranteeing the conditions requested by the user at all times.

(C) Winter

In the winter season, with the outdoor air temperature below the return water temperature of the system, the unit identifies that the temperature conditions are favourable for operating in FREE-COOLING mode:

- as in the previous scenario, it activates the electric pump on the FREE-COOLING circuit by creating an exchange of energy between the liquid in the system and the FREE-COOLING circuit before reaching the evaporator
- acts on the speed of the fans until it turns them off in order to reach the temperature required on the system's supply line
- the microprocessor control turns off all the compressors by releasing all the desired cooling capacity AT ZERO COST, unlike traditional chillers

If the temperature keeps dropping with all the fans off, the electric pump turns off, which allows the desired set point value to be maintained.



- 1 - Internal exchanger
- 2 - Water-water intermediate exchanger
- 3 - Compressors
- 4 - External exchanger

- 5 - External fan
- 6 - Expansion electronic valve
- T - Temperature probe
- PD - Differential pressure switch

- TW in chilled water inlet
- TW out chilled water outlet
- AE Outdoor air
- PD - Differential pressure switch



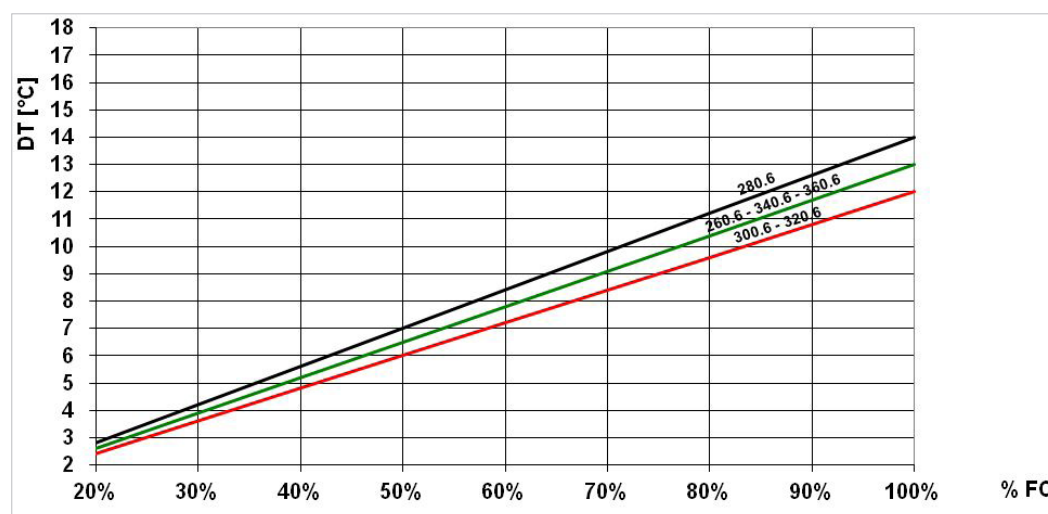
Check availability and compatibility of 'FCI - No-glycol FREE-COOLING' with the other accessories in the "Option compatibility" table

Determination of chiller performance with no-glycol FREE-COOLING in conditions of FC = ON

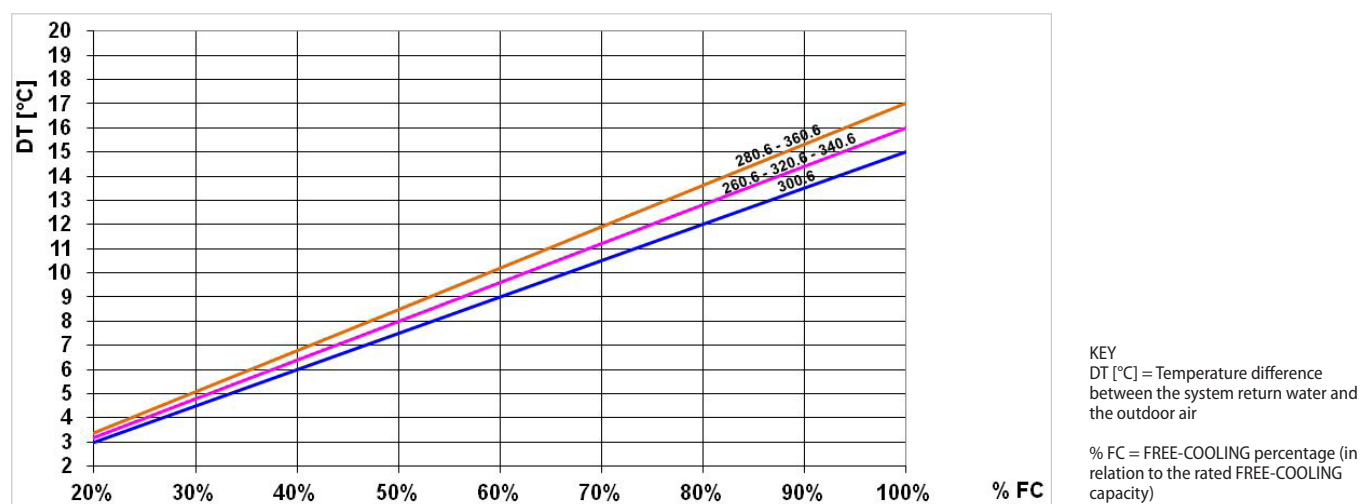
Size			260.6	280.6	300.6	320.6	340.6	360.6
SC	FREE-COOLING (1) nominal capacity	kW	819	866	979	1033	1086	1141
	Air temperature with FREE-COOLING at 100% (1)	°C	-1,2	-1,8	-0,4	-1,0	-1,4	-1,8
EN	FREE-COOLING (1) nominal capacity	kW	842	890	980	1036	1081	1135
	Air temperature with FREE-COOLING at 100% (1)	°C	0,5	0,1	1,5	1,1	0,6	0,2

(1) Data refer to the following conditions:
- water temperature: 15°C inlet / 10°C outlet

Determination of the no-glycol FREE-COOLING percentage - SC configuration



Determination of the no-glycol FREE-COOLING percentage - EN configuration



Example: Determine the performances with outdoor air = +3°C for the following unit: WSAT-XSC3 260.6 FCI EXC SC (EXCELLENCE version, No-glycol FREE-COOLING configuration), with water at 15/10 °C.

Reference: WSAT-XSC3 260.6 FCI EXC SC: FREE-COOLING nominal capacity = 842 kW (from table with water 15/10 °C / outdoor air temperature 0,5°C).

Calculation: Difference between the installation return water and the outdoor air = 15°C - 3°C = 12°C

The graph shows that: FREE-COOLING percentage = 75% : FREE-COOLING capacity at +3°C outdoors = 842 x 75% = 631 kW

WOGLY - Unit supplied without glycol solution

The standard unit is supplied with antifreeze solution in the FREE-COOLING separated circuit. With WOGLY option the unit is supplied without antifreeze solution with the advantage of a reduction of shipping weight of 10% as well as a saving on the initial investment.



The antifreeze solution supply and charge are provided by the Customer. Refer to the Installation and Operating manual for the charging procedures.



For the water + glycol solution content, refer to the 'Quantity of glycol in the no-glycol FREE-COOLING' table.

Option valid in combination with 'FCI - no-glycol FREE-COOLING'.

Quantity of glycol in the no-glycol FREE-COOLING

Size			260.6	280.6	300.6	320.6	340.6	360.6
SC	Water solution total volume + glycol	l	455	462	677	683	689	695
	30% ethylene glycol							
	Freezing temperature	°C	-15,4					
	Ethylene glycol volume	l	137	139	203	205	207	209
	Glycol solution total weight	kg	471	479	702	708	714	720
	40% ethylene glycol							
	Freezing temperature	°C	-23,4					
	Ethylene glycol volume	l	182	185	271	273	276	278
	Glycol solution total weight	kg	477	484	710	716	722	729
	50% ethylene glycol							
	Freezing temperature	°C	-33,0					
	Ethylene glycol volume	l	228	231	339	342	345	348
	Glycol solution total weight	kg	482	490	718	724	731	737
	60% ethylene glycol							
	Freezing temperature	°C	-39,0					
	Ethylene glycol volume	l	273	277	406	410	413	417
	Glycol solution total weight	kg	488	495	726	732	739	745

Size			260.6	280.6	300.6	320.6	340.6	360.6
EN	Water solution total volume + glycol	l	688	695	796	802	808	814
	30% ethylene glycol							
	Freezing temperature	°C	-15,4					
	Ethylene glycol volume	l	206	209	239	241	242	244
	Glycol solution total weight	kg	713	720	825	831	837	843
	40% ethylene glycol							
	Freezing temperature	°C	-23,4					
	Ethylene glycol volume	l	275	278	318	321	323	326
	Glycol solution total weight	kg	721	729	834	841	847	853
	50% ethylene glycol							
	Freezing temperature	°C	-33,0					
	Ethylene glycol volume	l	344	348	398	401	404	407
	Glycol solution total weight	kg	730	737	844	850	857	863
	60% ethylene glycol							
	Freezing temperature	°C	-39,0					
	Ethylene glycol volume	l	413	417	478	481	485	488
	Glycol solution total weight	kg	738	745	854	860	867	873

HydroPack

4PM/6PM - Hydronic assembly user side with 4/6 ON/OFF pumps

Option supplied on the unit. Pumping unit consisting of electric pumps with a self-adaptive modular activation logic.

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.

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. Complete with thermoformed insulated casing, quick connections with insulated casing, non return valve, safety valve, 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.



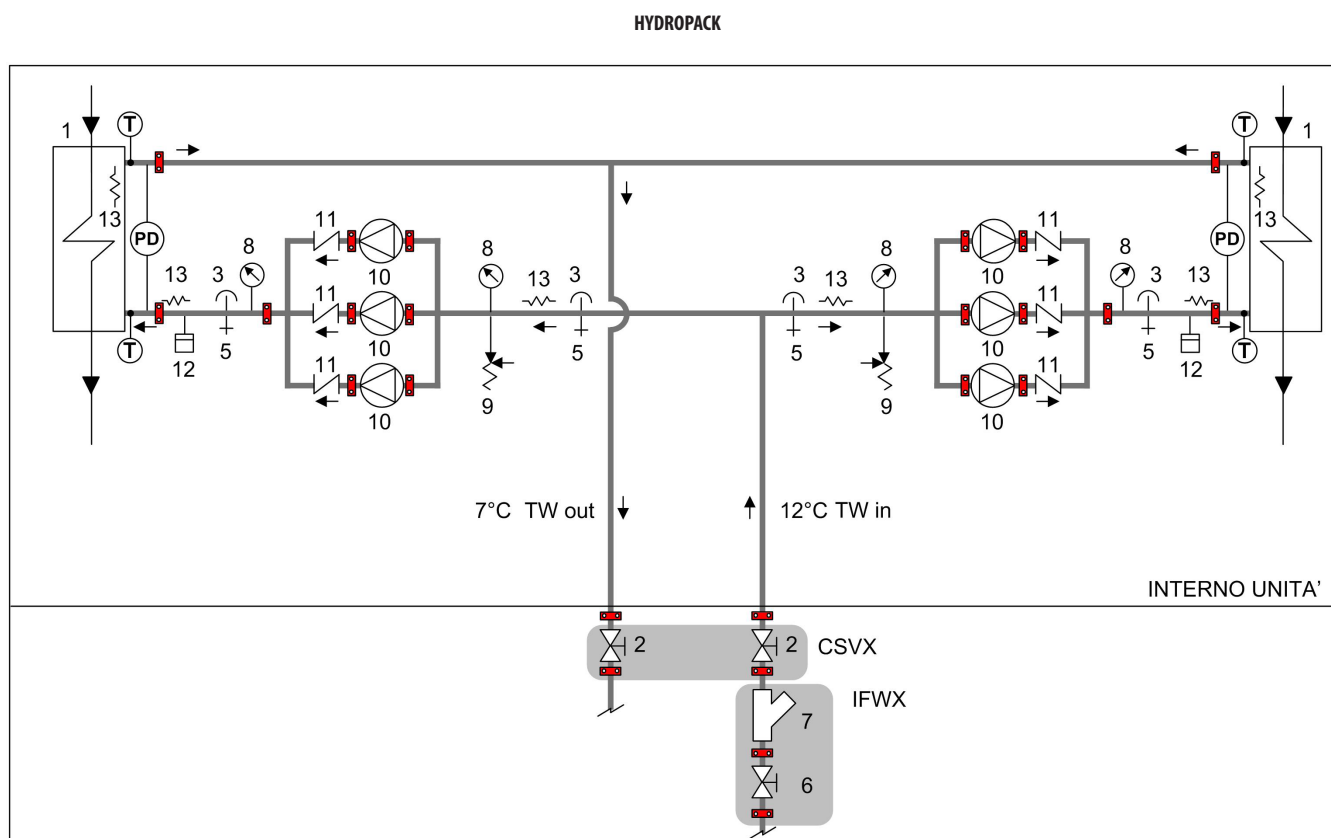
The 4PM / 6PM option is supplied with a kit made up of 2 quick blind connections, for the removal of one pump in case of maintenance.



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



Illustrative diagram referred to unit size 320.6 with Hydropack with no. 6 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

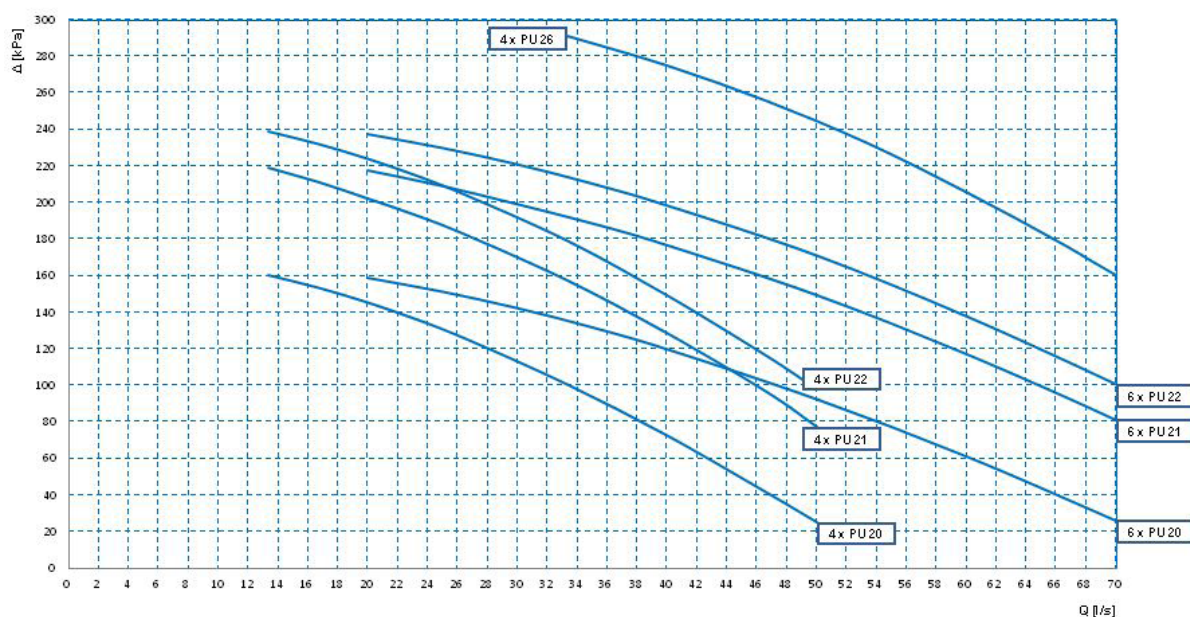
IFWX = Steel mesh strainer water side

CSVX - Couple of manual shut-off valves

The grey area indicates further optional components.

4PM/6PM 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:

- Pressure drop of the whole unit internal hydraulic circuit
- IFWX accessory –Steel mesh filter on the water side (where applicable)

Hydropack electrical data

PUMP	Rated power [kW]	Nominal power [A]
4 x PU20	4 x 1.8	4 x 3.4
4 x PU21	4 x 2.9	4 x 4.8
4 x PU22	4 x 3.3	4 x 5.6
4 x PU26	4 x 5.5	4 x 10.4

PUMP	Rated power [kW]	Nominal power [A]
6 x PU20	6 x 1.8	6 x 3.4
6 x PU21	6 x 2.9	6 x 4.8
6 x PU22	6 x 3.3	6 x 5.6

6PMV - Hydronic assembly user side with 6 inverter pumps

Option supplied on the unit. Pumping unit consisting of parallel electric pumps and controlled by inverter to adapt to the different application conditions. 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. Complete with thermoformed insulated casing, quick connections with insulated casing, non return valve, safety valve, 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.



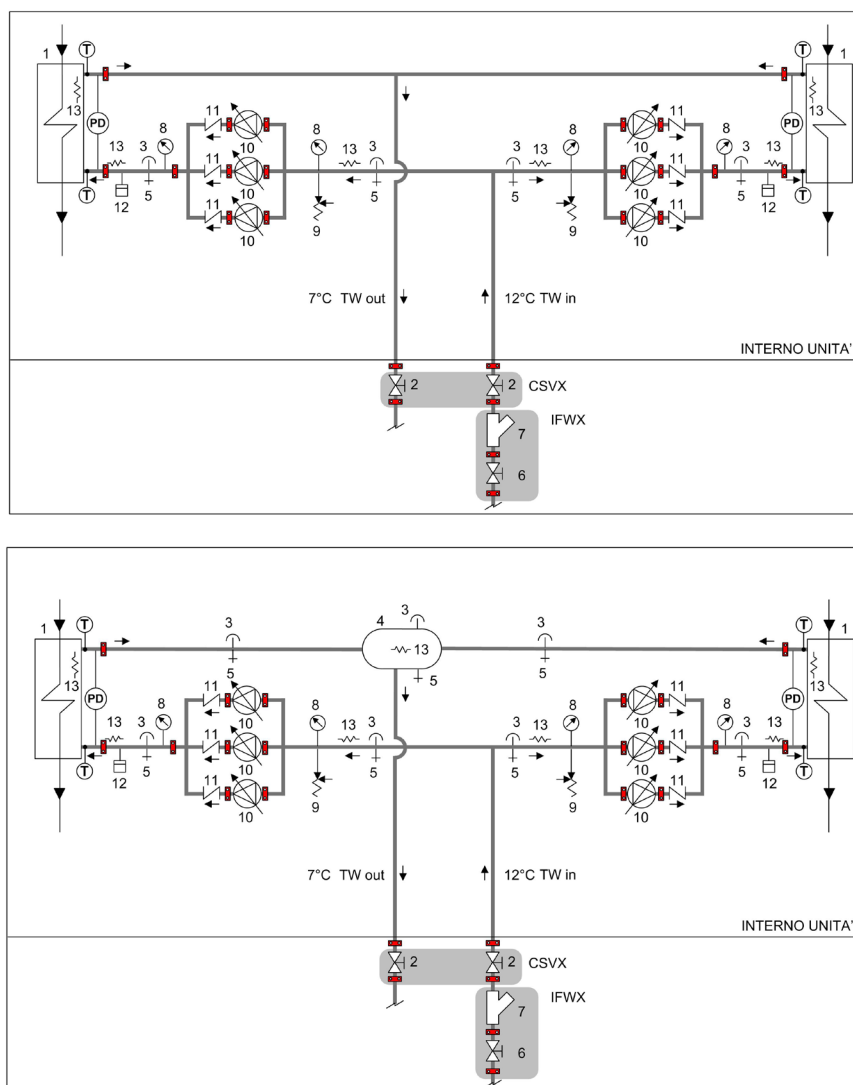
The 6PMV option is supplied with a kit made up of 2 quick blind connections, for the removal of one pump in case of maintenance.



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

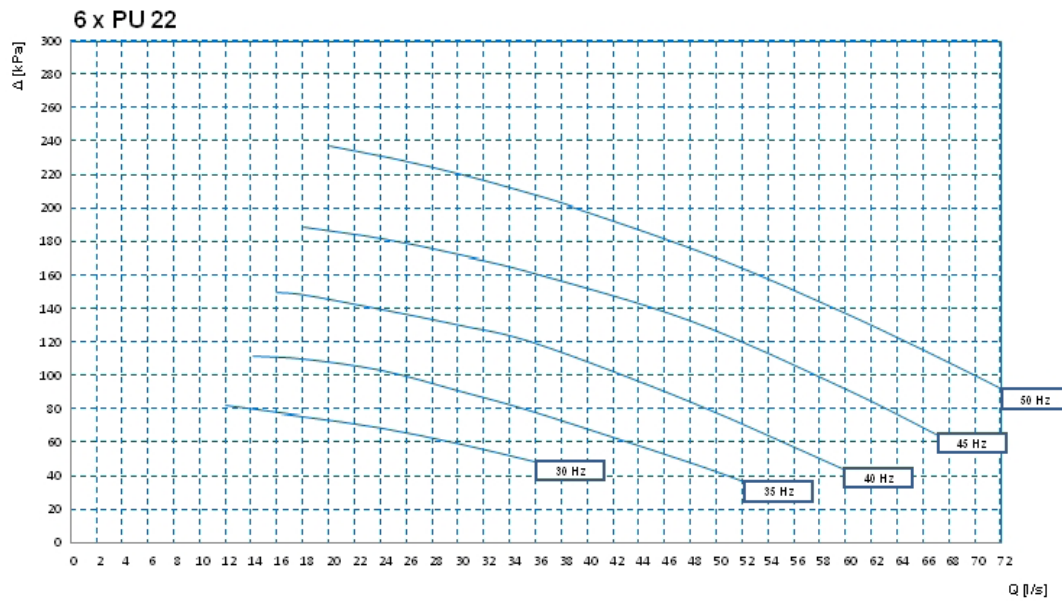
IFWX = Steel mesh strainer water side

CSVX - Couple of manual shut-off valves

The grey area indicates further optional components.

6PMV option performances

Head



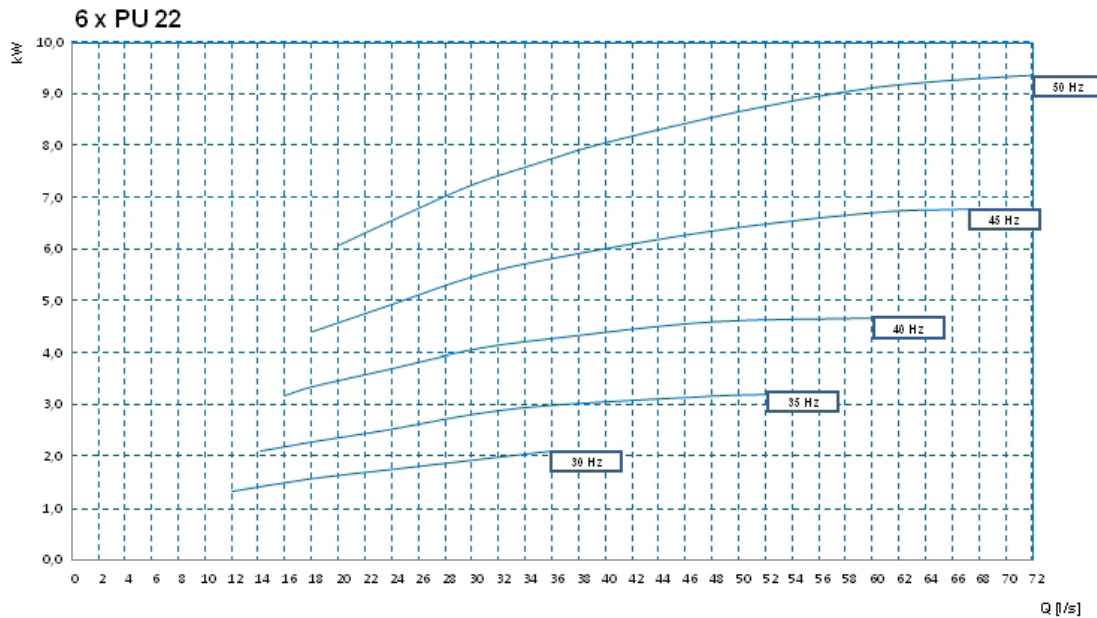
Q [l/s] = water flow rate
 Δ [kPa] = pump head



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

- Pressure drop of the whole unit internal hydraulic circuit
- IFWX accessory –Steel mesh filter on the water side (where applicable)

Power input



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

Accessories - Hydronic assembly

A900 - 900 l. storage tank

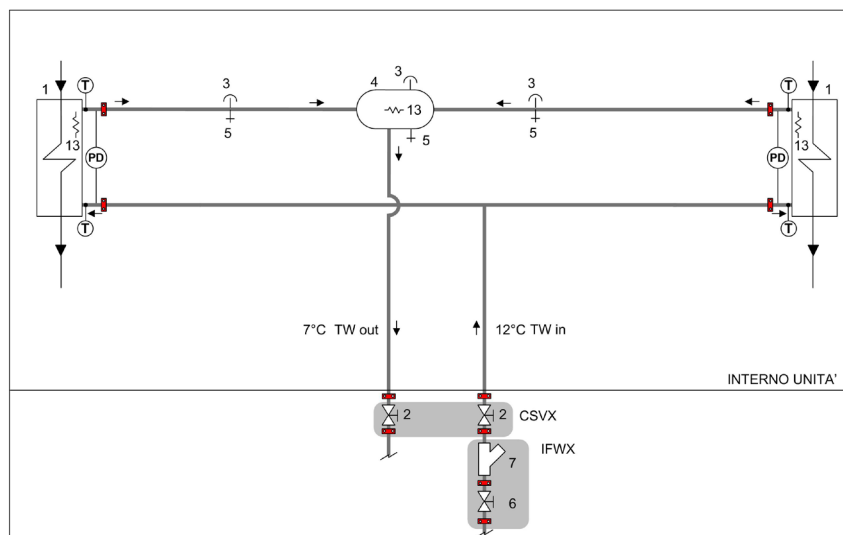
Option supplied built-in the unit. Steel storage tank complete with double layer covering with closed-cell insulation, stainless steel anti-freeze immersion resistance, bleed valve, draw off cock, quick connections with insulated casing. The various available models can be differentiated by capacity.



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.



- 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

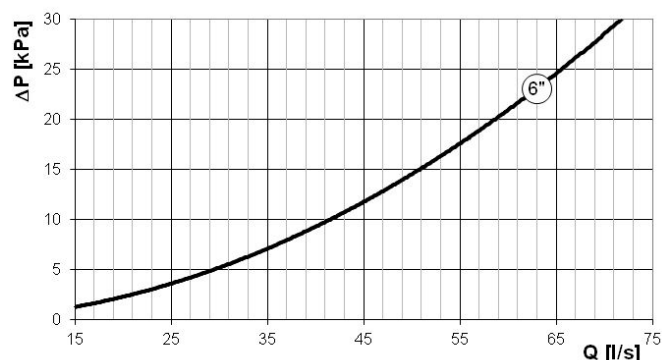
The grey area indicates further optional components.

IFWX - Steel mesh strainer water side

The device stops the exchanger from being clogged by any impurities which are in the hydraulic circuit. The mechanical steel mesh strainer must be placed on the water input line. It can be 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;
- 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

Diameter	6"
Degree of filtration	1,6 mm



Pressure drop referred to a clean filter



Installation 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 grill

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.

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 built-in the unit.

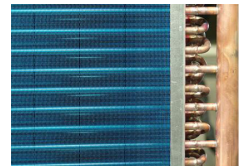


CCCA - Copper / aluminium condenser coil with acrylic lining

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!

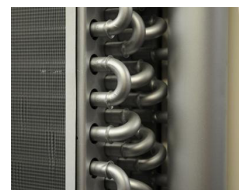
- Cooling capacity variation -2.7%
- Variation in compressor power input +4.2%
- Operating range reduction -2.1°C



Option available only on special request

CCCA1 - Copper / aluminium condenser coil 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.



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.

Device supplied and installed built-in the unit.

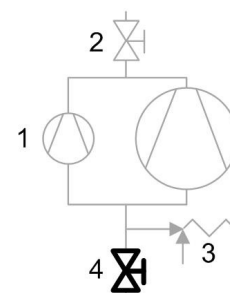


SDV - Cutoff valve on compressor supply and return

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 thermostat which are able to protect the electrical panel against condensation and frost guaranteeing its correct 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 ($\cos\phi > 0.9$)

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 $\cos\phi$ power factor to values on average higher than 0.9, reducing the network reactive power.

Device installed and wired built-in the unit.



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.



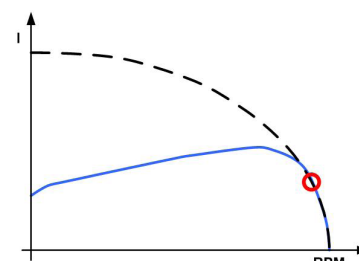
In sizes 260.6, 280.6, 300.6, 320.6 e 340.6 the larger size compressor is standard equipped with device for progressive start-up, defined part-winding. For these units the soft-starter benefits are guaranteed on lower size compressors, maintaining unchanged the M.I.C. (max. inrush current) of the standard unit.



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



Option not available for size 360.6, because it is equipped with all compressors with 60 HP of nominal capacity.



— Absorbed current without SFSTR option
— Absorbed current without SFSTR option

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 start-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 0 - shift the water set-point temperature and keeps all the pumps active;

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 CMSC8 / CMSC9 / CMSC10 options.

CMSC11 - Serial communication module for BACnet 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 consumption reduction of the external section ECOBREEZE fans

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.



Standard in EN version.

CREFP - Device for fan consumption reduction of the external section at variable speed (phase-cutting)

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

Device installed and wired built-in the unit.



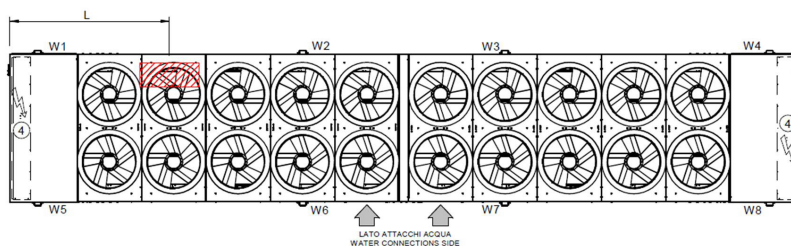
Standard in the SC acoustic version.



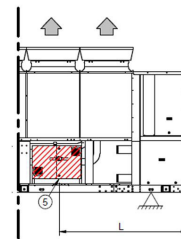
Available in the EN acoustic version only on size 260.6 and 280.6.

PSPS - Set up for single power supply

Option that allows the electric power supply to the unit by a single power line, facilitating the installation operations and making them faster. The units can be supplied as standard with double power line.



L = 2200 mm +/- 150 mm



CONTA2 - Energy meter

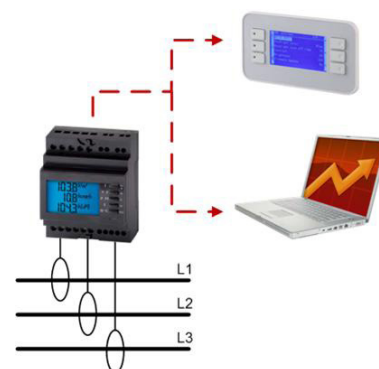
Allows to display and record the unit's main electrical parameters. The data can be displayed on the device display or via the supervisor through the specific protocol variables. The device has a serial port with Modbus protocol for connection to the supervisory system. It is possible to control:

- voltage (V),
- absorbed current (A),
- frequency (Hz), - cosφ,
- power input (KW),
- absorbed energy (KWh),
- harmonic components (%).

Device installed and wired built-in the unit.



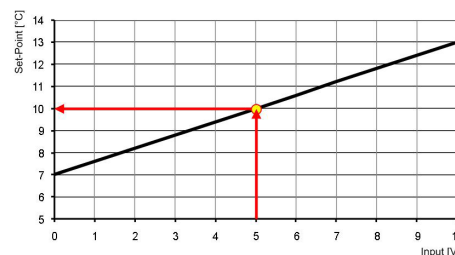
On the device is present a serial port with Modbus protocol for the connection to the supervision system.



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 air 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.

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



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. 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 pumps..



This option is available only with inverter driven HYDROPACK selected (6PMV)



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

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 manually operated 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 and no. 2 of Victaulic type quick connection with insulated casing to isolate the hydraulic circuit at the inlet and outlet.

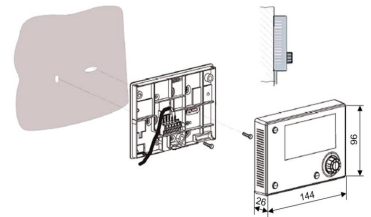


Installation is the responsibility of the Client, externally to the unit.

RCMRX - Remote control via microprocessor control

Option allows to have full control over all the unit functions from a remote position by serial line.

It can be easily installed on the wall and has the same functions of the user interface built-in 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 the Customer.

PSX - Mains power supply

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

Spring antivibration mounts to be fixed 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 the Customer.



Option compatibility

REFERENCE	DESCRIPTION	260.6	280.6	300.6	320.6	340.6	360.6
CONFIGURATIONS AND MAIN ACCESSORIES							
B + FCD	Water low temperature + Direct FREE-COOLING	0	0	0	0	0	0
B + FCI	Water low temperature + Indirect FREE-COOLING	-	-	-	-	-	-
A900 + FCD + SC	900 l. storage tank + Direct FREE-COOLING + Acoustic configuration with compressor soundproofing	0	0	0	0	0	0
A900 + FCD + EN	900 l. storage tank + Direct FREE-COOLING + Extremely low noise acoustic configuration	0	0	0	0	0	0
A900 + FCI	900 l. storage tank + Indirect FREE-COOLING	-	-	-	-	-	-
4PM - HYDROPACK USER SIDE WITH 4 PUMPS							
(PU20)	Pump 20	0	0	-	-	-	-
(PU21) / (PU22)	Pump 21 / Pump 22	0	0	0	0	0	0
(PU26)	Pump 26	-	-	0	0	0	0
+ A900	+ 900 l. storage tank	0	0	0	0	0	0
6PM - HYDROPACK USER SIDE WITH 6 PUMPS							
(PU20)	Pump 20	0	0	-	-	-	-
(PU21) / (PU22)	Pump 21 / Pump 22	0	0	0	0	0	0
+ A900	+ 900 l. storage tank	0	0	0	0	0	0
6PMV - HYDROPACK USER SIDE WITH NO.6 OF INVERTER PUMPS							
(PU22)	Pump 22	0	0	0	0	0	0
IVFDT - INVERTER DRIVEN VARIABLE FLOW-RATE USER SIDE CONTROL DEPENDING ON THE TEMPERATURE DIFFERENTIAL							
(6PM)	Hydropack user side with n°6 of pumps	-	-	-	-	-	-
(6PMV)	Hydropack user side with n°6 of inverter pumps	0*	0*	0*	0*	0*	0*
OTHER ACCESSORIES							
CREFP + SC	Device for the reduction of the ext. Section fan consumptions at variable speed (phase-cutting) + Acoustic configuration with compressor soundproofing	•	•	•	•	•	•
CREFB + SC	Device for the reduction of the Eco Breeze ext. section fan consumptions + Acoustic configuration with compressor soundproofing	0	0	0	0	0	0
CREFP + EN	Device for the reduction of the ext. Section fan consumptions at variable speed (phase-cutting) + Extremely low noise acoustic configuration	0	0	-	-	-	-
CREFB + EN	Device for the reduction of the Eco Breeze ext. section fan consumptions + Extremely low noise acoustic configuration	•	•	•	•	•	•

• Standard

0 Option

- Not available

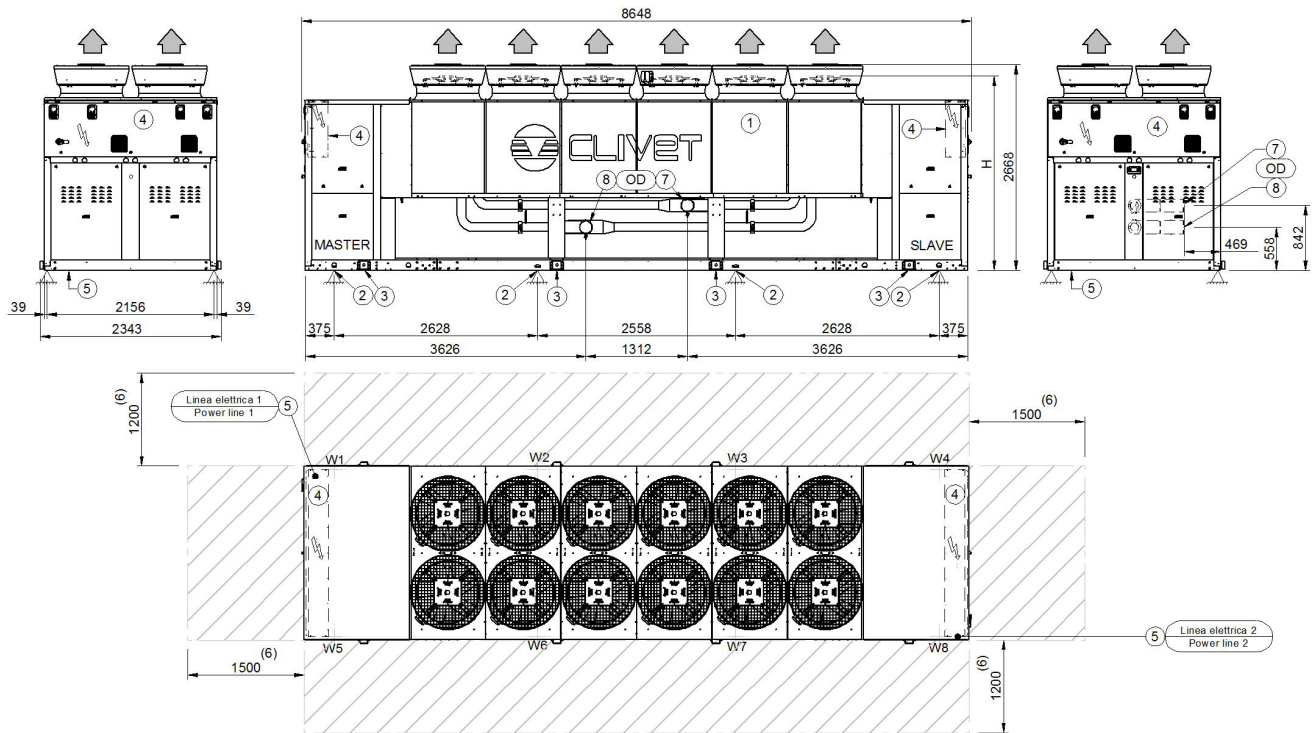
0* Necessary matching: variable flow-rate control and built-in inverter pumps

Dimensional drawings - FCD and FCI configuration

Size 260.6-280.6 - Acoustic configuration : Compressor soundproofing (SC)

1_DAB8Z0001_260.6_280.6_FCD_FCI_SC_0

Data/Date 17/05/2017



- | | |
|--|---------------------------|
| 1. External exchanger (condenser) | 5. Power input |
| 2. Antivibration fixing holes \varnothing 25mm | 6. Suggested clearance |
| 3. Lifting brackets (removable) | 7. Water inlet user side |
| 4. General electrical panel | 8. Water outlet user side |

Size		SC-FCD		SC-FCI	
		260.6	280.6	260.6	280.6
H (without Axitop)	mm	2484	2484	2484	2484
H (without Axitop with ECOBREEZE - optional)	mm	2510	2510	2510	2510
OD (water connection diameter)	mm	168,3	168,3	168,3	168,3
A - Length	mm	8648	8648	8648	8648
B - Depth	mm	2243	2243	2243	2243
C - Height	mm	2668	2668	2668	2668
W1 Supporting point	kg	967	1003	1062	1107
W2 Supporting point	kg	755	755	810	815
W3 Supporting point	kg	752	752	829	828
W4 Supporting point	kg	1114	1114	1229	1229
W5 Supporting point	kg	1076	1129	1187	1255
W6 Supporting point	kg	748	749	815	825
W7 Supporting point	kg	756	756	825	823
W8 Supporting point	kg	1016	1016	1125	1125
Shipping weight	kg	7184	7274	7882	8007
Operating weight	kg	6398	6478	7341	7449

Size		SC-FCD		SC-FCI	
		260.6	280.6	260.6	280.6
Container shipping length	mm	8648	8648	8648	8648
Container shipping depth	mm	2343	2343	2343	2343

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

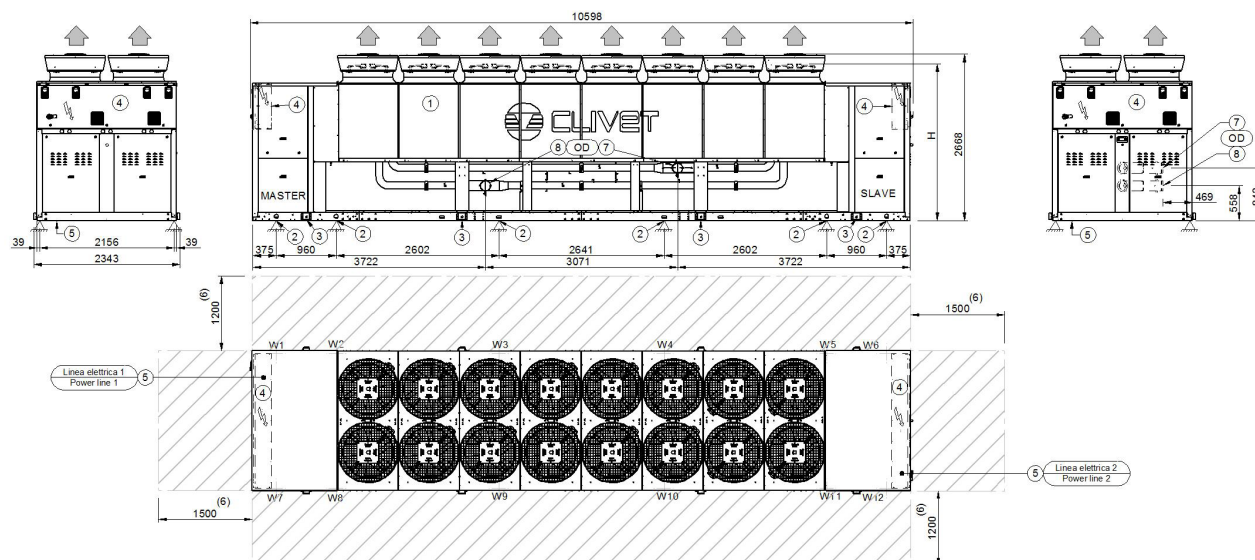
FCD configuration

Size 300.6-360.6 - Acoustic configuration : Compressor soundproofing (SC)

Size 260.6-280.6 - Acoustic configuration : Super-silenced (EN)

2_DAB8Z0002_260.6_280.6_FCD_EN
_300.6_360.6_FCD_SC_0

Data/Date 17/05/2017



1. External exchanger (condenser)
2. Antivibration fixing holes \varnothing 25mm
3. Lifting brackets (removable)
4. General electrical panel
5. Power input
6. Suggested clearance
7. Water inlet user side
8. Water outlet user side

Size		SC-FCD				EN-FCD	
		300.6	320.6	340.6	360.6	260.6	280.6
H (without Axitop)	mm	2484	2484	2484	2484	2484	2484
H (without Axitop with ECOBREEZE - optional)	mm	2510	2510	2510	2510	2510	2510
OD (water connection diameter)	mm	168,3	168,3	168,3	168,3	168,3	168,3
A - Length	mm	10598	10598	10598	10598	10598	10598
B - Depth	mm	2243	2243	2243	2243	2243	2243
C - Height	mm	2668	2668	2668	2668	2668	2668
W1 Supporting point	kg	588	621	621	659	549	588
W2 Supporting point	kg	646	646	646	654	641	646
W3 Supporting point	kg	847	847	847	847	847	847
W4 Supporting point	kg	847	848	847	847	847	847
W5 Supporting point	kg	636	636	643	643	634	635
W6 Supporting point	kg	770	770	822	822	723	723
W7 Supporting point	kg	718	765	765	816	664	718
W8 Supporting point	kg	629	630	630	636	624	629
W9 Supporting point	kg	848	848	848	848	848	848
W10 Supporting point	kg	847	847	847	847	846	847
W11 Supporting point	kg	645	645	653	653	645	645
W12 Supporting point	kg	611	611	648	648	578	578
Shipping weight	kg	8632	8714	8817	8920	8446	8551
Operating weight	kg	7682	7761	7859	7957	7511	7603

Size		SC-FCD				EN-FCD	
		300.6	320.6	340.6	360.6	260.6	280.6
Container shipping length	mm	10703	10703	10703	10703	10703	10703
Container shipping depth	mm	2315	2315	2315	2315	2315	2315

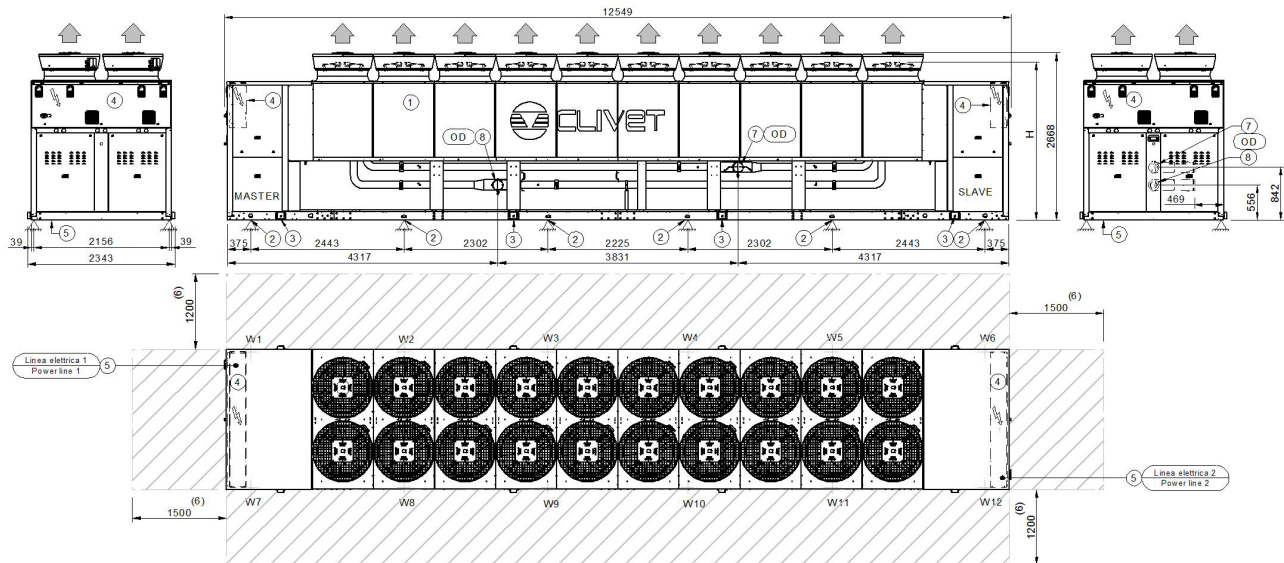
The presence of optional accessories may result in a substantial variation of the weights shown in the table. Fan diffusers are separately supplied.

FCD configuration

Size 300.6-360.6 - Acoustic configuration : Super-silenced (EN)

3_DAB8Z0004_300.6_360.6_FCD_EN_0

Data/Date 17/05/2017



1. External exchanger (condenser)
2. Antivibration fixing holes \varnothing 25mm
3. Lifting brackets (removable)
4. General electrical panel
5. Power input
6. Suggested clearance
7. Water inlet user side
8. Water outlet user side

Size		EN-FCD			
		300.6	320.6	340.6	360.6
H (without Axitop)	mm	2484	2484	2484	2484
H (without Axitop with ECOBREEZE - optional)	mm	2510	2510	2510	2510
OD (water connection diameter)	mm	168,3	168,3	168,3	168,3
A - Length	mm	12549	12549	12549	12549
B - Depth	mm	2243	2243	2243	2243
C - Height	mm	2668	2668	2668	2668
W1 Supporting point	kg	1041	1074	1074	1108
W2 Supporting point	kg	752	752	752	752
W3 Supporting point	kg	602	602	602	602
W4 Supporting point	kg	604	604	604	604
W5 Supporting point	kg	744	744	745	745
W6 Supporting point	kg	1214	1214	1265	1265
W7 Supporting point	kg	1159	1205	1205	1255
W8 Supporting point	kg	741	741	741	742
W9 Supporting point	kg	605	605	605	605
W10 Supporting point	kg	602	602	602	602
W11 Supporting point	kg	751	751	751	751
W12 Supporting point	kg	1063	1063	1096	1096
Shipping weight	kg	9878	9957	10042	10127
Operating weight	kg	8770	8844	8925	9006

Size		EN-FCD			
		300.6	320.6	340.6	360.6
Container shipping length	mm	12654	12654	12654	12654
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.

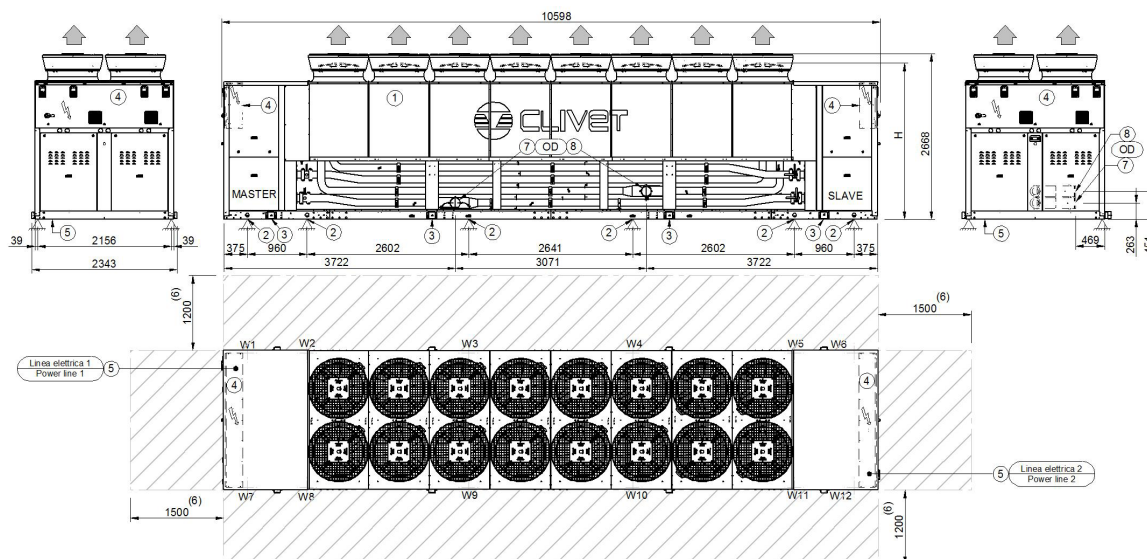
FCI configuration

Size 300.6-360.6 - Acoustic configuration : Compressor soundproofing (SC)

Size 260.6-280.6 - Acoustic configuration : Super-silenced (EN)

4_DAB8Z0003_260.6_280.6_FCI_EN_
300.6_360.6_FCI_SC_0

Data/Date 17/05/2017



1. External exchanger (condenser)
2. Antivibration fixing holes \varnothing 25mm
3. Lifting brackets (removable)
4. General electrical panel
5. Power input
6. Suggested clearance
7. Water inlet user side
8. Water outlet user side

Size		SC-FCI				EN-FCI	
		300.6	320.6	340.6	360.6	260.6	280.6
H (without Axitop)	mm	2484	2484	2484	2484	2484	2484
H (without Axitop with ECOBREEZE - optional)	mm	2510	2510	2510	2510	2510	2510
OD (water connection diameter)	mm	168,3	168,3	168,3	168,3	168,3	168,3
A - Length	mm	10598	10598	10598	10598	10598	10598
B - Depth	mm	2243	2243	2243	2243	2243	2243
C - Height	mm	2668	2668	2668	2668	2668	2668
W1 Supporting point	kg	685	725	726	771	639	685
W2 Supporting point	kg	721	724	725	729	714	721
W3 Supporting point	kg	910	911	912	912	908	909
W4 Supporting point	kg	907	908	908	909	906	907
W5 Supporting point	kg	771	771	788	788	759	759
W6 Supporting point	kg	829	829	885	885	776	776
W7 Supporting point	kg	828	885	886	950	763	828
W8 Supporting point	kg	699	703	704	711	690	698
W9 Supporting point	kg	-	-	-	-	909	910
W10 Supporting point	kg	-	-	-	-	905	906
W11 Supporting point	kg	770	771	781	782	762	763
W12 Supporting point	kg	672	672	710	710	636	636
Shipping weight	kg	9610	9719	9846	9969	9367	9498
Operating weight	kg	9017	9119	9233	9347	8803	8915

Size		SC-FCI				EN-FCI	
		300.6	320.6	340.6	360.6	260.6	280.6
Container shipping length	mm	10703	10703	10703	10703	10703	10703
Container shipping depth	mm	2315	2315	2315	2315	2315	2315

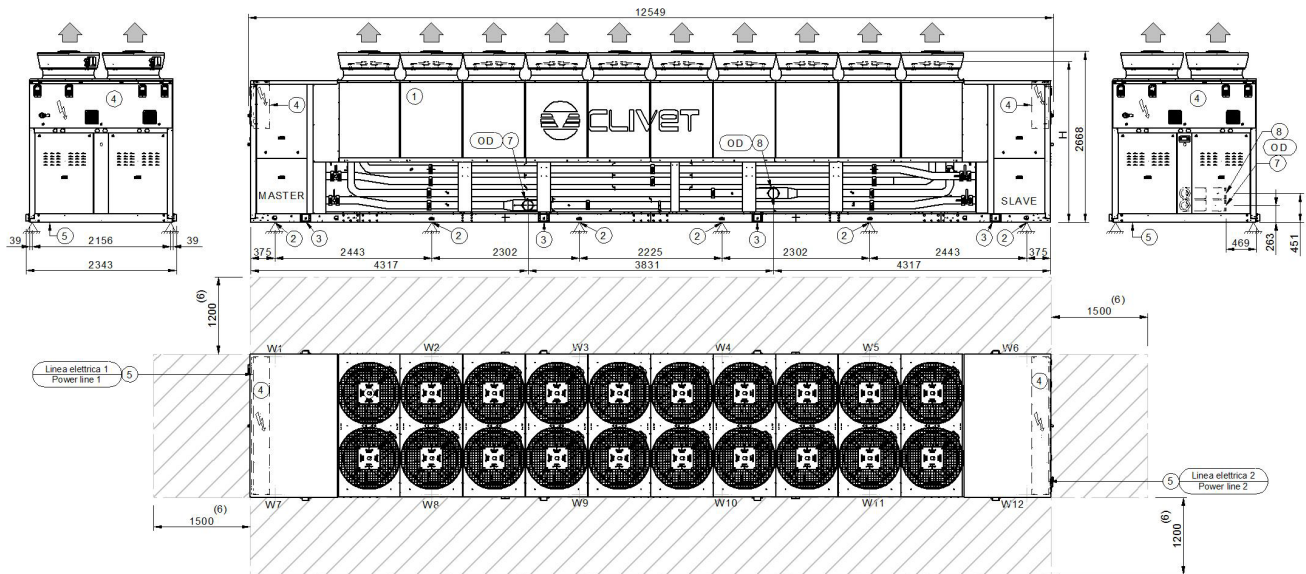
The presence of optional accessories may result in a substantial variation of the weights shown in the table. Fan diffusers are separately supplied.

FCI configuration

Size 300.6-360.6 - Acoustic configuration : Super-silenced (EN)

5_DAB8Z0005_300.6_360.6_FCI_EN_0

Data/Date 17/05/2017



- | | |
|--|---------------------------|
| 1. External exchanger (condenser) | 5. Power input |
| 2. Antivibration fixing holes \varnothing 25mm | 6. Suggested clearance |
| 3. Lifting brackets (removable) | 7. Water inlet user side |
| 4. General electrical panel | 8. Water outlet user side |

Size		EN-FCI			
		300.6	320.6	340.6	360.6
H (without Axitop)	mm	2484	2484	2484	2484
H (without Axitop with ECOBREEZE - optional)	mm	2510	2510	2510	2510
OD (water connection diameter)	mm	168,3	168,3	168,3	168,3
A - Length	mm	12549	12549	12549	12549
B - Depth	mm	2243	2243	2243	2243
C - Height	mm	2668	2668	2668	2668
W1 Supporting point	kg	1240	1283	1283	1331
W2 Supporting point	kg	861	863	864	867
W3 Supporting point	kg	644	645	646	646
W4 Supporting point	kg	641	642	640	640
W5 Supporting point	kg	872	873	883	883
W6 Supporting point	kg	1385	1385	1450	1451
W7 Supporting point	kg	1341	1402	1402	1470
W8 Supporting point	kg	834	837	837	841
W9 Supporting point	kg	653	653	654	653
W10 Supporting point	kg	636	637	636	637
W11 Supporting point	kg	882	883	889	889
W12 Supporting point	kg	1255	1256	1300	1300
Shipping weight	kg	11244	11359	11484	11608
Operating weight	kg	10579	10684	10798	10912

Size		EN-FCI			
		300.6	320.6	340.6	360.6
Container shipping length	mm	12654	12654	12654	12654
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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