Technical Bulletin

BT16L145GB-00

SPINchiller³

Water-cooled reversible heat pump
for indoor installation

WSHN-XSC3 70.4-240.4 RANGE

Nominal cooling capacity from 212 kW to 720 kW
Nominal heating capacity from 243 kW to 831 kW

- R-410A modular scroll technology
- Two independent refrigeration circuits
- Partial recovery of the condensing heat
- Pre-assembled control unit
- Application versatility
- High efficiency at partial loads, ESEER up to 5,9

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

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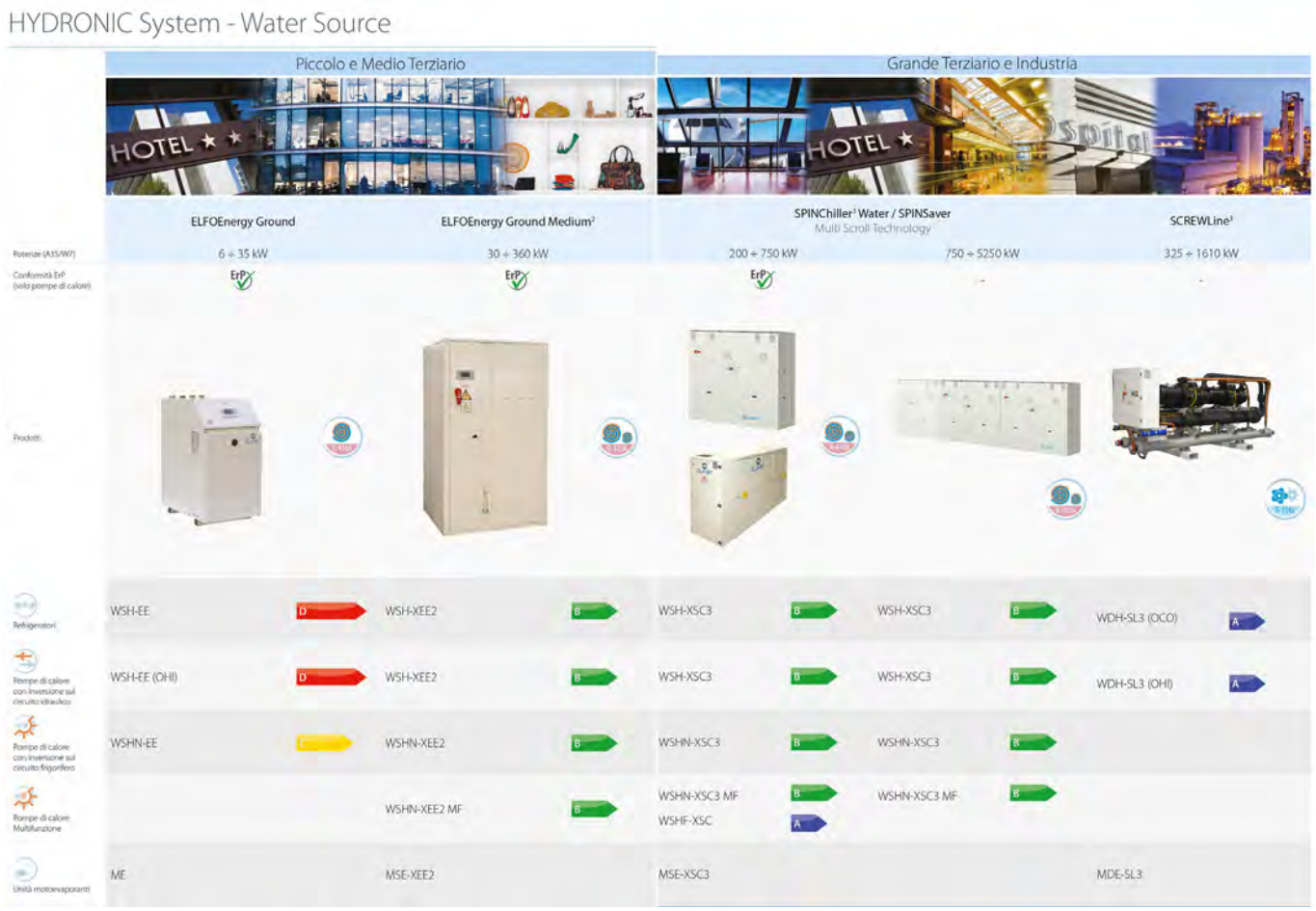
Clivet hydronic system

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



Specialization

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

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

Centrality of the Air Renewal

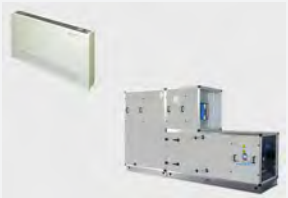
From the Air Renewal depends the comfort in the spaces. Since it often represents the main building energetic load, it also determines the running costs of the entire system.

ZEPHIR3
Packaged Primary Air supply system with thermodynamic energy recovery.

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

Terminal and AHU complete system

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



ELFOSpace
High energy efficiency hydronic terminal units

AQX
Air-conditioning unit

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

SPINchiller³: modular scroll technology for every application

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

WSHN-XSC3

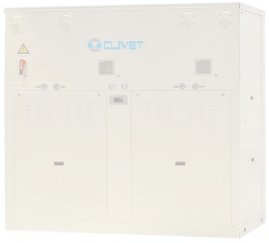
Water-cooled heat pump

- Partial recovery of the condensing heat
- Eurovent certification

WSH-XSC3

Water-cooled liquid chiller

- Available the reversible cooling and heating only version on the water circuit
- Partial recovery of the condensing heat
- Eurovent certification

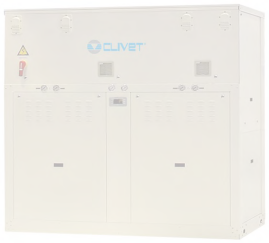


Dedicated series separately documented

WSHN-XSC3 Multifunction

Water-cooled heat/cool heat pump with simultaneous operating

- 4-pipe system
- 2-pipe system and total condensing heat recovery



Dedicated series separately documented

Cost or reliability?

The dilemma of modern system engineering applications

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



High efficiency hydronic systems

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

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

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

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

Clivet technological evolution

Clivet chillers reduce consumption and are compact and reliable

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

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

SPINchiller^3

Provides all Clivet technological developments for their medium capacity hydronic systems

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

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

- It stands out for its extremely high energy efficiency under part load conditions.

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

Advantages

High efficiency all year round

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

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

System simplification

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

Compact and versatile

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

5.9
ESEER
Seasonal
Efficiency

Borderless multiscroll technology

With SPINchiller^3 the modular scroll compressor technology reaches the best levels of performance and versatility ever, guaranteeing competitiveness in more and more demanding applications. The top class seasonal efficiency rewards SPINchiller^3 in comparison to several other water cooled chiller technologies. A comparison with one SPINchiller3 competitor as:

- water cooled liquid chillers with inverter screw compressors;

shows that SPINchiller^3 is the best solution, considering its seasonal efficiency comparable to the screw compressor chillers considering the capital investment pay back, that are always above acceptable values normally considered for system investment equal to 3 years.

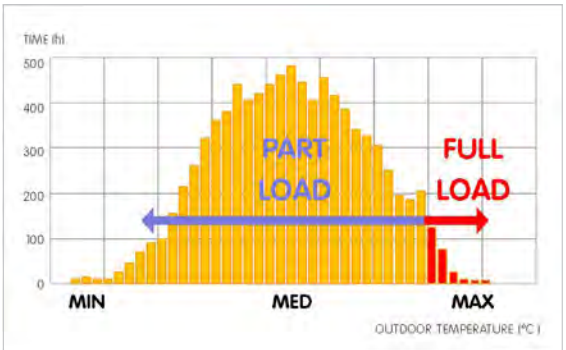
Comfort and energy saving in one solution

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.

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

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

SPINchiller[3] technology enhances part-load efficiency

SPINchiller[3] uses high efficiency Scroll compressors.

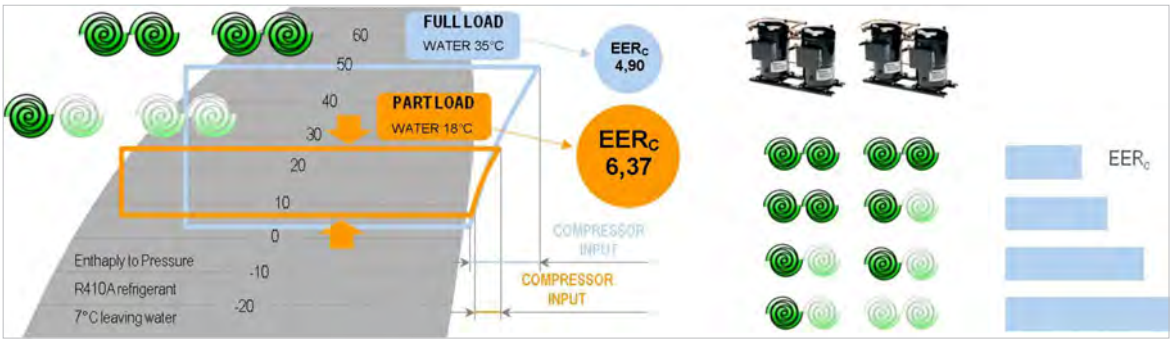
The advantages are:

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

Doubled efficiency

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

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



EERc = Energy effieciency referred to compressors

Two acoustic configurations available

Business oriented

All SPINchiller³ models feature high part-load energy efficiency, which means high ESEER seasonal efficiency.

The two configurations available allow choosing the best combination between the initial investment and the silence level.

Basic acoustic configuration

The Basic acoustic configuration (BN), thanks to the technological evolution of Clivet, is characterized by an extremely high seasonal efficiency. It, however, addresses to the most sensitive realizations to the initial investment, offering a simplified structure.

The structure is without panelling and the water connections must be carried out inside the unit (provided by the Customer).

Super-silenced acoustic configuration

The Super-silenced acoustic configuration (EN), in addition to the extremely high seasonal efficiency, stands out for a reduced sound pressure up to 8 dB(A).

The structure is equipped with soundproof panels and water connections only flush to the unit.

The dimensons are the same of the Basic version.

Perfect for LEED certification

All sizes from 70.4 to 160.4 fulfil both prerequisite 2 (Minimum Energy Performance) and 3 (Fundamental Refrigerant Management) of the Environment and Energy thematic area. They also fulfil the parameters of Credit 4 (Enhanced Refrigerant Management) which allows to get 1 point.

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

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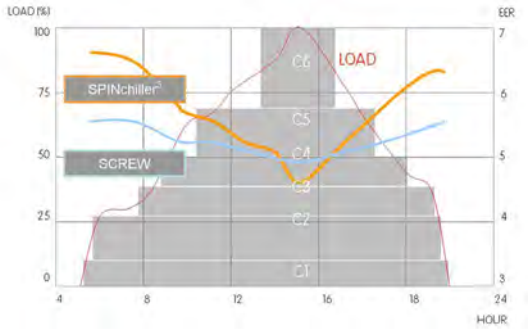
Superior flexibility and reliability

Efficient precision

Sequential activation of SPINchiller[3] compressors allow:

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

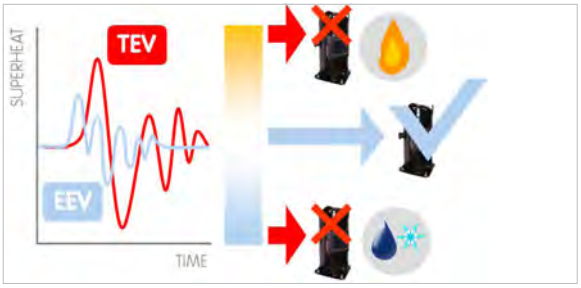


THE NUMBER OF START-UPS DECREASES THEREFORE THE LIFE CYCLE INCREASES

Stable and reliable operation

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

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



Simplified maintenance

Besides being efficient, SPINchiller[3] improves the system maintenance.

In fact, the malfunction of a compressor does not compromise overall operation.

Furthermore, Scroll compressors are very compact, easy to find and easy to handle in case of replacement.

Controlled power supply

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

The phase monitor, standard supplied.

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

The automatic control device coordinates resources ensuring maximum efficiency

Advanced control

The control system combines in a single solution the operating efficiency and the user-friendliness. Continuously monitoring all of the unit operating parameters, it ensures the maintenance of an optimal energy efficiency. The control includes many safety functions and a complete alarm management.

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

The interface terminal has a backlit graphic display and a multifunction access keypad. The multilevel menu is protected by different passwords according to the type of user.

Remote control (optional)

The remote control allows accessing to the same functions that are accessible by the built-in unit user interface, and can be installed at a maximum distance of 350 meters.

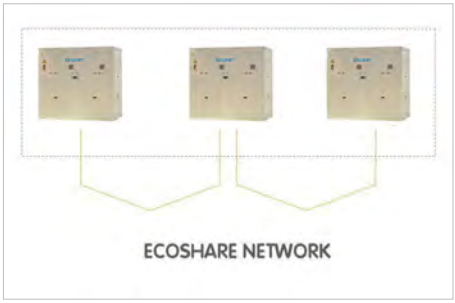
Modularity

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

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

- Increased flexibility, enhanced by the control that can adapt to the load
- Increased reliability, since the malfunction of one unit does not compromise the capacity supply of the other units.
- Increased efficiency, since energy is produced where and when required, according to the served area.
- The microprocessor control combined with ECOSHARE allows controlling up to 7 units in local network (1 Master unit and 6 Slave).

MODULAR SYSTEM THAT ENHANCES SPINchiller[2] TECHNOLOGY ADVANTAGES



Remote system management

SPINchiller[3] is standard equipped with:

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

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

Energy measuring

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

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

Seasonal energy efficiency is further increased with the DST operating logic

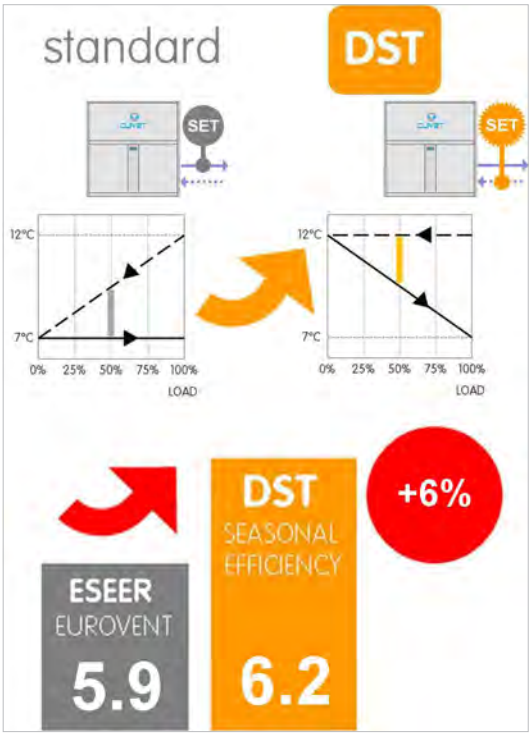
SPINchiller[3] is equipped with standard DST control (Dynamic Supply Temperature) control logic, which can be activated by the user.

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

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

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

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



Example

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

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

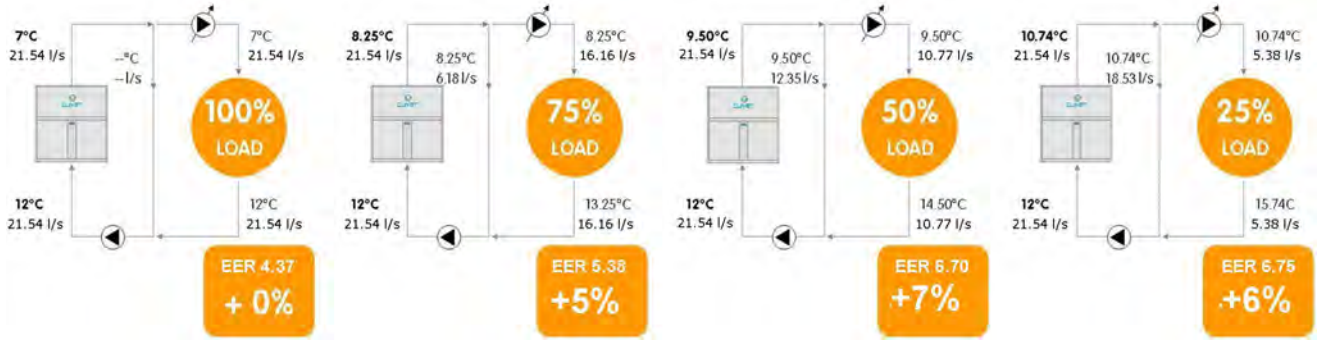
The traditional control logic keeps the water supply temperature to room terminals and outdoor air treatment units constant, in order for the latter to carry out the dehumidification.

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

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

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

DST control logic (system water return temperature = constant)



SPINchiller³ technology industrialised the system

Pre-assembled unit

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

- **Reduces design times:** all accessories have been selected to assure outstanding seasonal efficiency.
- **Reduces installation costs:** the accessories are already connected mechanically and electronically wired up, are controlled by a single controller and tested to be ready for immediate use.
- **Reduces overall dimensions:** when the heating or cooling capacity demand is very high, is possible to place side by side several units, considerably reducing the overall footprint and freeing up space for other equipment while facilitating maintenance.

Water flow-rate continuous modulation

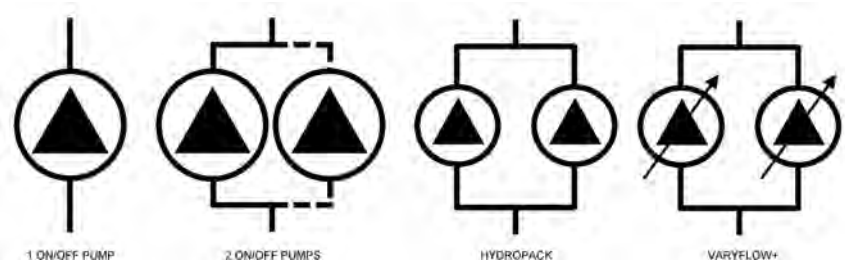
SPINchiller³ enables adoption of both **source and user side hydronic assemblies.**

- The **VARYFLOW+ modulating pumping unit** made up of two pumps in parallel **controlled by inverter**, allows a precise water flow-rate modulation reducing notably the consumptions. When the system water temperature is critical, the VARYFLOW+ controls the condensation/evaporation temperature by extending the operating range of SPINchiller³.
- The **HYDROPACK pumping unit**, made up of two pumps in parallel, reduces the water flow-rate under critical conditions, avoiding blocks for overload and consequent interventions of specialized technical personnel. It is very useful during start-ups, at restart after operating breaks (ex. weekend) or after a long period of inactivity.

Both the pumping units guarantee its functionality also in case of temporary unavailability of one of the two pumps, **guaranteeing about the 80% of the nominal flow-rate.** In this situation **the unit performance changes only of 2%.**

In case of particular installation needs, the hydronic assemblies are also available:

- **ON/OFF pump** the traditional solution with high available pressure.
- **ON/OFF pump + ON/OFF pump in stand-by** the solution that favours reliability. The built-in control balances the operating hours of the two pumps and in case of any failure it signals the damage and automatically activates the stand-by pump.
- **2-way or 3-way modulating valves source side** with electronic control, extend the unit's operating range by modulating the source water flow in relation to temperature.
- **2-way modulating valve source side for high DP** the solution that adapts itself to the requirements of systems with high pressures (from 2 up to 3,5 bar).



Variable flow-rate advantages

Pumping energy for moving the water has an heavy impact on seasonal efficiency. The variable flow control is available for all units and drives to energy savings during partial load. Pump energy consumption is proportional with cubic rotation speed. Evident the advantage when reducing flow-rate of 40% comparing to nominal conditions: energy saving is of 75% on pump energy consumption.

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

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

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

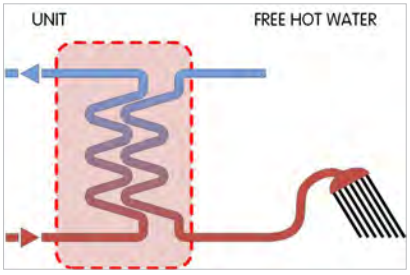
Produces hot water freely

Condensation heat recovery:

- partial: it recovers about the 25% of the available heat (desuperheater)

It allows the free DHW production for:

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



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

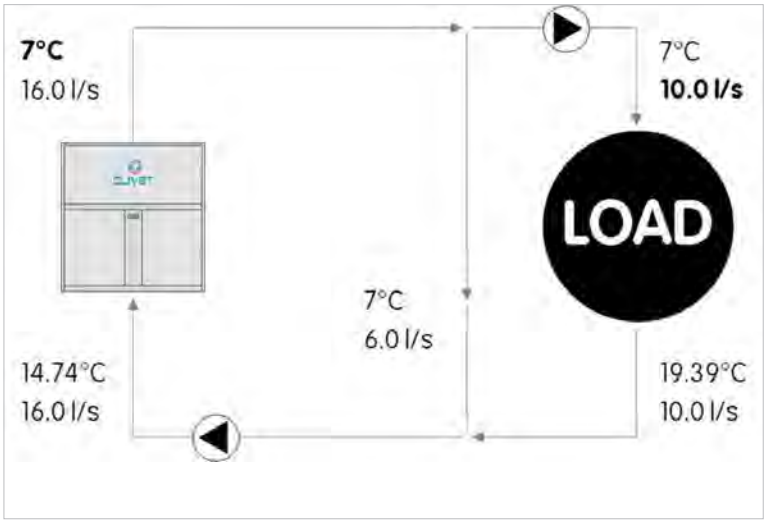
SPINchiller³ operates with constant water flow rate to the evaporator, between a minimum and maximum value indicated in the technical documents.

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 minimum 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 WSHN-XSC3 160.4.
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.

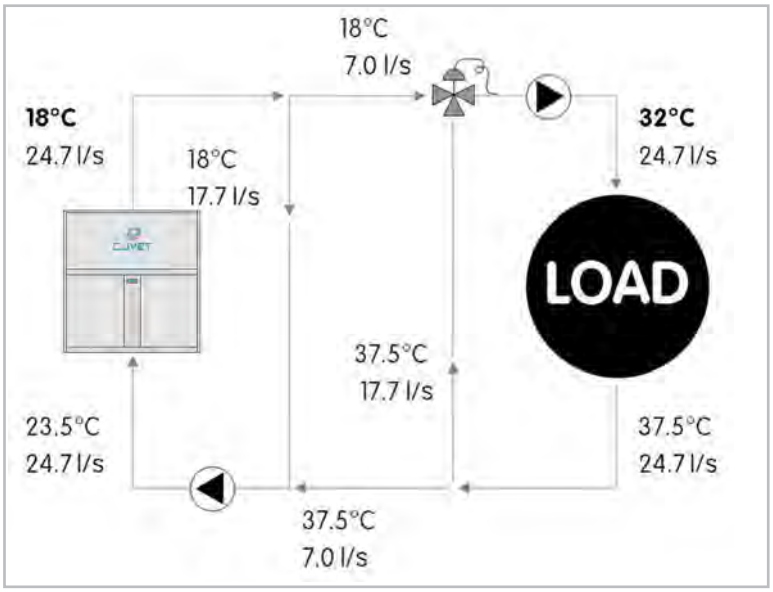
Temperature limits below the limit may cause unwanted formation of ice and the unit to stop following the intervention of built-in safety devices.

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 WSHN-XSC3 160.4.
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

Compressor

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

Structure

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

Panelling

External pre-painted zinc-magnesium paneling, thickness 20/10, with the surface treatment in Zinc–Magnesium painted with polyester powder RAL 9001 that ensures superior resistance to corrosion for outdoor installation and eliminates the need for periodical painting. The panels can be easily removed to fully access internal components and are lined with sound-proof material on the inside to contain the unit's sound levels.

Internal exchanger

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

- external thermal insulation no-condensation, thickness 9,5 mm, in extruded elastomer foam with closed cells;
- differential pressure switch, water side;
- water temperature probes.

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

External exchanger

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

- external thermal insulation no-condensation, thickness 9,5 mm, in extruded elastomer foam with closed cells;
- differential pressure switch, water side;
- water temperature probes.

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

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;
- 4-way reversing valve;
- high pressure safety pressure switch;
- low pressure transducer;
- high pressure transducer;
- low pressure safety valve;
- high pressure safety valve;
- cutoff valve on liquid line;
- refrigerant temperature probes

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

Configurations

D - Partial energy recovery

BN - Basic acoustic configuration

EN - Super-silenced acoustic configuration

Electrical panel

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

- main door lock isolator switch;
- terminals main power (400V / 3Ph / 50Hz);
- isolating transformer for auxiliary circuit power supply (230V/24V);
- compressor circuit breaker;
- compressor control contactor;
- double winding on compressor for reduction of inrush current (in the range between 180.4 and 240.4).

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;
- 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 input;
- input for HEAT/COOL remote control;
- relay for remote cumulative fault signal;
- input for demand limit (absorbed power limit according to an external signal 0÷10V);
- potential-free contacts for compressor status;
- digital input for double set-point enabling;
- phase monitor;
- electrical panel ventilation;
- 0÷10V signal output and potential free contact for auxiliary heater;
- numbering of electrical panel cables;
- set-up for natural cooling management (provided by the Customer);
- set-up for one ON/OFF or modulanting pump control user and source side.

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

Accessories - Hydronic assembly

- VARYFLOW + (2 inverter pumps)
- Hydronic assembly with 1 ON/OFF pump
- Hydronic assembly with 2 ON/OFF pumps
- HYDROPACK with 2 pumps
- 2-way modulating valve
- 2-way modulating valve for high DP
- 3-way modulating valve (accessory separately provided)
- Steel mesh strainer on the water side (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

- High and low pressure gauges
- Antifreeze heater for internal exchanger protection
- Source side antifreeze electric heaters
- Cutoff valves on compressor supply and return
- Couple of manually operated shut-off valves (accessory separately supplied)
- Power factor correction capacitors (cosfi > 0.9)
- ECOSHARE function for the automatic management of a group of units
- Disposal for inrush current reduction
- Serial communication module for BACnet-IP supervisor
- Serial communication module for Modbus supervisor
- Serial communication module for LonWorks supervisor
- Remote control via microprocessor control (accessory separately supplied)
- Mains power supply (accessory separately supplied)
- Energy meter
- Set-point compensation with 0-10 V signal
- Set-point compensation with outdoor air temperature probe
- Antivibration mount support (accessory separately supplied)
- Refrigerant leak detector with pump down function in the casing
- Inverter driven variable flow-rate user side control depending on the temperature differential
- Multifunction phase monitor
- Rear water fittings (only for basic acoustic congifuration)
- DHW switching valve (accessory separately supplied)

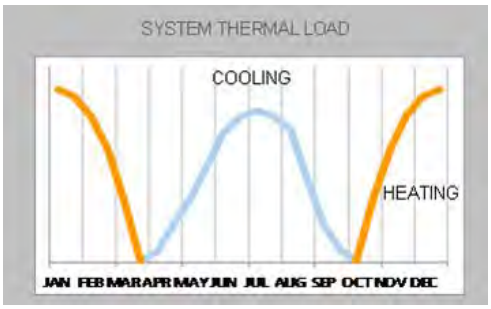
Test

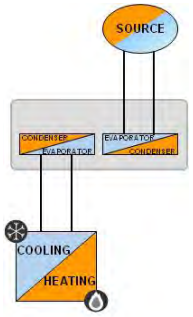
Unit subjected to factory-tested in specific steps and test pressure of the piping of the refrigerant circuit (with nitrogen and hydrogen), before shipping them. After the approval, the moisture contents present in all circuits are analyzed, in order to ensure the respect of the limits set by the manufacturers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

System solutions

Standard unit:

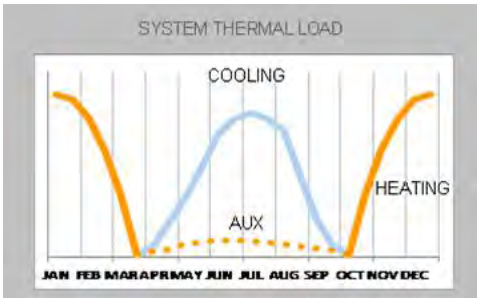
- **Production of chilled or hot water**

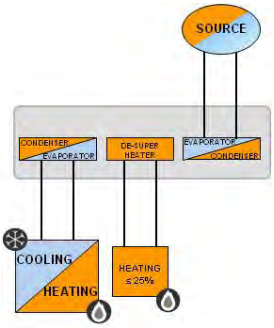




Unit with Partial energy recovery option:

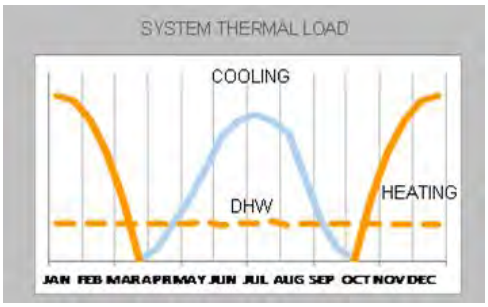
- **Production of chilled or hot water**
- **Free production of hot water from partial energy recovery**

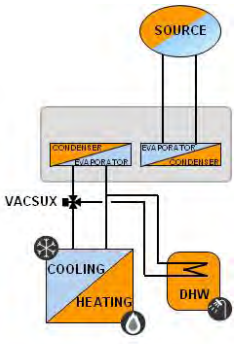




Unit with accessory User side DHW switching valve:

- **Production of chilled or hot water**
- **Priority hot water production with 3-way valve**





Unit configuration

WSHN-XSC3 70.4 EN - - -

(1) (2) (3) (4) (5) (6) (7)

(1) Range
WSHN - Water cooled chiller with scroll compressor
XSC3 - SPINchiller3 range

(2) Size
70 - Nominal compressor capacity in HP

(3) Compressors
4 - Compressor quantity

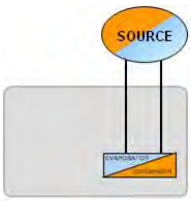
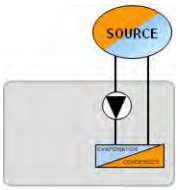
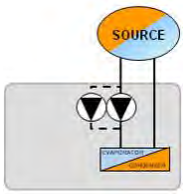
(4) Acoustic configuration
EN -Super-silenced acoustic configuration (standard)
BN - Basic acoustic configuration

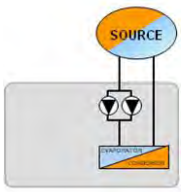
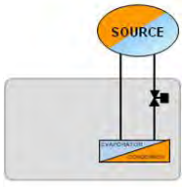
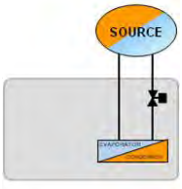
(5) Condensation heat recovery
(-) not required (standard)
D - Partial energy recovery (25% of available heat)

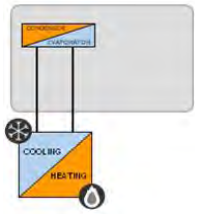
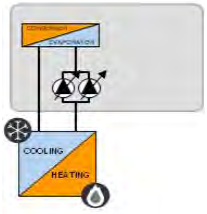
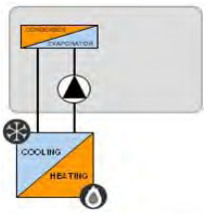
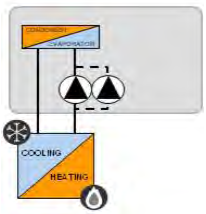
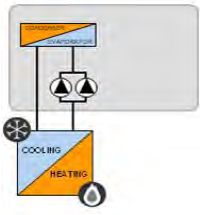
(6) Hydronic assembly user side
(-) not required (standard)
VARYU - Varyflow + (user side 2 inverter pumps)
HYGU1 - User side hydronic assembly with 1 ON/OFF pump
HYGU2 - User side hydronic assembly with 2 ON/OFF pumps
HYP2U - Hydropack user side with 2 pumps

(7) Hydronic assembly source side
(-) not required (standard)
VARYS - Varyflow + (source side 2 inverter pumps)
HYGS1 - Source side hydronic assembly with 1ON/OFF pump
HYGS2 - Source side hydronic assembly with 2 ON/OFF pumps
VS2M - Source side 2-way modulating valve
V2MSP - Source side 2-way modulating valve for high DP

N.B: For a correct unit operation is necessary that the leaving water temperatures, source and user side, are within the indicated operanting range.
If at the variation of the operation conditions is necessary to significantly vary the water flow-rate or if the design water flow-rate is close to the minimum limit indicated in the "Admissible water flow-rate" table, is mandatory to equip the unit with a flow rate modulation, source side.
The modulation can be supplied by Clivet or will be provided by the Customer which should also arrange the connection to the unit.

Functionalities	Diagram hydronic assemblies			
SOURCE SIDE	Standard unit (Std) 	Unit with VARYFLOW + (VARYS) 	Unit with 1 ON/OFF pump (HYGS1) 	Unit with 2 ON/OFF pumps (HYGS2) 

SOURCE SIDE	Unit with Hydropack (HYP2S) 	Unit with 2-way modulating valve (VS2M) 	Unit with 2-way modulating valve for high DP (V2MSP) 

USER SIDE	Standard unit (Std) 	Unit with VARYFLOW + (VARYU) 	Unit with 1 ON/OFF pump (HYGU1) 	Unit with 2 ON/OFF pumps (HYGU2) 	Unit with Hydropack (HYP2U) 

General technical data - Performance

Size			70.4	75.4	80.4	85.4	90.4	100.4	110.4	120.4	140.4	160.4	180.4	200.4	220.4	240.4
Cooling																
Cooling capacity	1	[kW]	212	226	243	262	285	313	342	391	445	498	557	612	669	720
Compressor power input	1	[kW]	47,2	51,1	54,0	59,2	63,6	69,4	76,6	85,2	97,4	110	124	136	149	164
Total power input	2	[kW]	47,3	51,2	54,1	59,3	63,7	69,5	76,7	85,3	97,5	110	124	136	149	164
Partial recovery heating capacity	3	[kW]	41,5	44,3	47,4	51,4	55,7	61,2	67,0	76,1	86,7	97,2	109	120	131	141
EER	1	-	4,50	4,41	4,49	4,43	4,47	4,51	4,47	4,59	4,56	4,54	4,48	4,50	4,48	4,40
Water flow-rate user side	1	[l/s]	10,1	10,8	11,6	12,5	13,6	15,0	16,4	18,7	21,2	23,8	26,6	29,3	31,9	34,4
Pressure drop user side	1	[kPa]	21	24	23	26	26	28	33	31	31	38	39	38	37	38
Water flow-rate source side	1	[l/s]	12,4	13,2	14,2	15,4	16,6	18,3	20.0	22,7	25,9	29,0	32,5	35,7	39,1	42,2
Pressure drop source side	1	[kPa]	31	35	34	39	37	40	48	45	46	55	56	54	54	53
Cooling capacity (EN14511:2013)	4	[kW]	211	225	242	261	283	313	341	389	443	496	555	610	666	717
Total power input (EN14511:2013)	4	[kW]	48,5	52,6	55,4	60,9	65,6	70,7	78,1	87,3	99,8	112	127	139	153	168
EER (EN 14511:2013)	4	-	4,36	4,28	4,36	4,29	4,32	4,42	4,37	4,46	4,44	4,42	4,36	4,38	4,36	4,27
ESEER	4	-	5,85	5,78	5,83	5,80	5,78	5,76	5,69	5,71	5,76	5,56	5,70	5,61	5,55	5,46
Cooling capacity (AHRI 550/590)	5	[kW]	213	227	243	263	286	314	344	392	446	500	559	614	671	723
Total power input (AHRI 550/590)	5	[kW]	46,2	50,2	52,9	58,1	62,4	68,1	75,2	83,6	95,6	108	122	133	146	160
COP_R	5		4,61	4,52	4,59	4,53	4,58	4,61	4,57	4,69	4,67	4,63	4,58	4,62	4,60	4,52
IPLV	5		6,51	6,50	6,51	6,52	6,47	6,46	6,35	6,42	6,45	6,21	6,35	6,30	6,18	6,08
Heating																
Heating capacity	6	[kW]	243	259	278	301	326	357	393	445	507	568	639	702	769	831
Compressor power input	6	[kW]	57,3	62,0	65,6	72,0	77,4	84,8	92,8	104	118	132	151	165	181	200
Total power input	2	[kW]	57,4	62,1	65,7	72,1	77,5	84,9	92,9	104	118	132	151	165	182	200
COP	6	-	4,24	4,18	4,24	4,18	4,21	4,22	4,23	4,29	4,31	4,32	4,22	4,26	4,24	4,16
Water flow-rate user side	6	[l/s]	11,6	12,4	13,3	14,4	15,6	17,1	18,8	21,3	24,2	27,1	30,5	33,5	36,7	39,7
Pressure drop user side	6	[kPa]	27,8	31,3	29,6	34,3	33,2	35,4	38,4	39,2	40,5	48,6	50,0	48,4	47,9	47,3
Water flow-rate source side	6	[l/s]	8,88	9,42	10,2	10,9	11,9	13,0	14,3	16,3	18,6	20,9	23,3	25,7	28,1	30,1
Pressure drop source side	6	[kPa]	16,8	18,8	17,7	20,4	19,8	21,1	23,0	23,7	24,5	29,8	30,2	29,4	28,9	28,2
Heating capacity (EN14511:2013)	7	[kW]	244	260	279	302	327	358	393	446	508	570	641	704	771	833
Total power input (EN14511:2013)	7	[kW]	59,0	64,0	67,6	74,3	80,3	86,5	94,9	107	121	135	156	170	187	206
COP (EN 14511:2013)	7	-	4,13	4,06	4,13	4,06	4,08	4,14	4,15	4,18	4,19	4,20	4,11	4,15	4,13	4,04

The Product is compliant with the ErP (Energy Related Products) European Directive. It includes the Commission delegated Regulation (EU) No 811/2013 (rated heat output ≤ 70 kW at specified reference conditions) and the Commission delegated Regulation (EU) No 813/2013 (rated heat output ≤ 400 kW at specified reference conditions)

1. Data referred to the following conditions: Internal exchanger water temperature = 12/7 °C. External exchanger water temperature = 30/35°C. Evaporator fouling factor = 0.44 x 10^(-4) m^2 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. Option. Source exchanger water=30/35°C - Recovery exchanger water = 40/45°C - - User side exchanger = 7°C
4. Data compliant to Standard EN 14511:2013 referred to the following conditions: Internal exchanger water temperature = 12/7°C. External exchanger water temperature = 30/35°C
5. 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 x 10^(-4) m2 K/W
6. Data referred to the following conditions: Internal exchanger water temperature = 40/45 °C. External exchanger water temperature = 10/7°C. Evaporator fouling factor = 0.44 x 10^(-4) m^2 K/W
7. Data compliant to Standard EN 14511:2013 referred to the following conditions: Internal exchanger water temperature = 40/45 °C. External exchanger water temperature = 10/7°C.

General technical data - Construction

Size			70.4	75.4	80.4	85.4	90.4	100.4	110.4	120.4	140.4	160.4	180.4	200.4	220.4	240.4
Compressor																
Type of compressors		-	SCROLL													
Refrigerant		-	R-410A													
No. of compressors		Nr	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Rated power (C1)		[HP]	35	35	40	40	45	50	55	60	70	80	90	100	100	120
Rated power (C2)		[HP]	35	40	40	45	45	50	55	60	70	80	90	100	120	120
Std Capacity control steps		Nr	6	6	6	6	6	6	6	4	6	4	6	6	6	4
Oil charge (C1)		[l]	8	8	10	12	11	11	13	13	13	13	13	13	13	13
Oil charge (C2)		[l]	8	10	10	12	11	11	13	13	13	13	13	13	13	13
Refrigerant charge (C1)	1	[kg]	14,0	14,0	16,5	17,5	18,0	20,0	20,0	21,0	24,0	26,0	27,0	38,0	38,0	38,0
Refrigerant charge (C2)	1	[kg]	14,0	16,5	16,5	17,5	18,0	20,0	20,0	21,0	24,0	26,0	27,0	38,0	38,0	38,0
Refrigeration circuits		Nr	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Internal exchanger / cooling side																
No. of internal exchangers		Nr	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Type of internal exchanger	2	-	PHE													
Water content		[l]	19,4	19,4	22,2	22,2	26,7	29,5	31,2	44,2	49,4	48,1	55,5	62,9	67,3	74,7
Minimum system water content	3	[l]	1170	1140	1120	1120	1130	1570	1990	2550	2430	3250	2280	3090	2930	4770
External exchanger / heating side																
No. of internal exchangers		Nr	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Type of internal exchanger	2	-	PHE													
Water content		[l]	19,4	19,4	22,2	22,2	26,7	29,5	31,2	44,2	49,4	48,1	55,5	62,9	67,3	74,7
Connections																
Water fittings		-	4''	4''	4''	4''	4''	4''	4''	5''	5''	5''	5''	5''	5''	5''
Power supply																
Standard power supply		V	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Electrical data																
FLA Total		A	135,0	143,4	151,8	166,2	180,6	191,9	208,7	237,5	266,5	295,5	346,9	375,9	416,1	456,3
FLI Total		kW	79,3	84,1	88,9	97,7	106,5	117,4	127,0	144,6	165,8	187,0	212,6	233,8	257,2	280,6
M.I.C. - Value	4	A	323,2	370,2	378,6	416,6	431,0	442,3	459,1	487,9	586,4	615,4	616,6	645,6	685,8	726,0
M.I.C. - with soft start accessory	4	A	226,0	237,4	245,8	278,8	293,2	304,5	321,3	350,1	414,4	443,4	-	-	-	-

1. Indicative values for standard units with possible +/-10% variation. The actual data are indicated on the label of the unit.
2. PHE = Plate exchanger
3. The minimum system water content calculated value does not consider the internal exchanger water content. With outdoor air low temperature applications or low medium requested loads, the minimum installation water volume is obtained doubling the indicated value
4. 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 level

Super-silenced acoustic configuration EN (standard)

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)
70.4	57	70	75	76	75	76	67	66	**63**	**81**
75.4	57	68	75	76	77	77	69	68	**64**	**82**
80.4	57	66	75	76	78	78	70	70	**65**	**83**
85.4	57	66	75	77	79	78	70	69	**65**	**83**
90.4	57	66	75	78	79	77	70	69	**65**	**83**
100.4	57	70	78	79	80	79	70	67	**66**	**84**
110.4	57	67	78	79	81	80	72	71	**68**	**85**
120.4	57	67	78	80	82	80	72	70	**68**	**86**
140.4	57	66	79	81	85	83	73	71	**70**	**88**
160.4	57	66	80	81	86	84	74	71	**72**	**90**
180.4	57	76	94	80	82	81	76	74	**71**	**89**
200.4	57	76	94	81	85	83	76	74	**72**	**90**
220.4	57	78	95	81	83	83	77	75	**72**	**90**
240.4	57	79	97	81	82	82	78	76	**73**	**91**

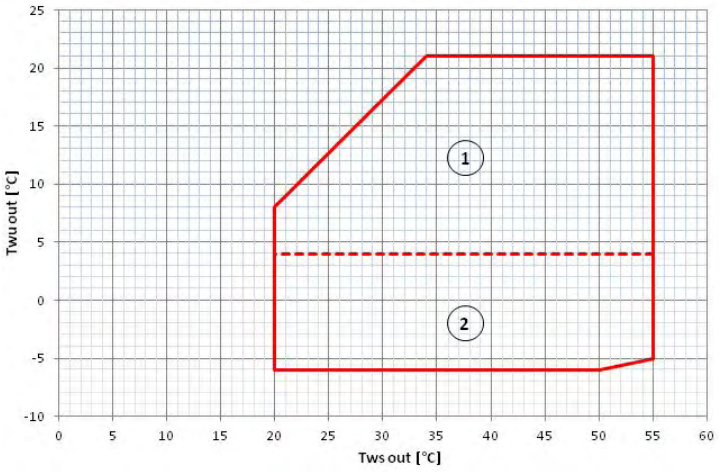
Sound levels refer to units with full load under nominal test conditions.
The sound pressure level refers to a distance of 1 meter from the outer surface of the unit operating in open field.
Noise levels are determined using the tensiometric method (UNI EN ISO 9614-2)
Data referred to the following conditions:
entering / leaving exchanger water temperature user side 12/7°C
entering / leaving exchanger water temperature source side 30/35°C

Basic unit configuration BN

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)
70.4	48	69	79	81	82	85	78	71	**71**	**89**
75.4	48	67	79	81	84	86	80	73	**72**	**90**
80.4	48	65	79	81	85	87	81	75	**73**	**91**
85.4	48	65	79	82	86	87	81	74	**73**	**91**
90.4	48	65	79	83	86	86	81	74	**73**	**91**
100.4	48	69	82	84	87	88	81	72	**74**	**92**
110.4	48	66	82	84	88	89	83	76	**76**	**93**
120.4	48	66	82	85	89	89	83	75	**76**	**94**
140.4	48	65	83	86	92	92	84	76	**78**	**96**
160.4	48	65	84	86	93	93	85	76	**79**	**97**
180.4	49	76	99	86	90	91	88	80	**79**	**97**
200.4	49	76	99	87	93	93	88	80	**80**	**98**
220.4	49	78	100	87	91	93	89	81	**80**	**98**
240.4	49	79	102	87	90	92	90	82	**80**	**98**

Sound levels refer to units with full load under nominal test conditions.
The sound pressure level refers to a distance of 1 meter from the outer surface of the unit operating in open field.
Noise levels are determined using the tensiometric method (UNI EN ISO 9614-2)
Data referred to the following conditions:
entering / leaving exchanger water temperature user side 12/7°C
entering / leaving exchanger water temperature source side 30/35°C

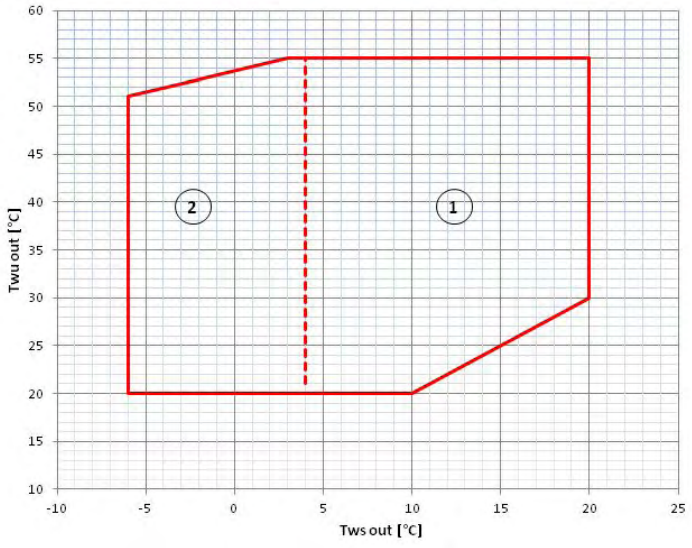
Operating range - Cooling



Twu out [°C] = Leaving water temperature user side
Tws out [°C] = Leaving water temperature source side
The limits refer to DT=5 °C on both the user and source sides

1. Normal operating range
2. Operating range where is mandatory the use of a mixture of water and glycol in relation to the leaving exchanger water temperature, cooling side

Operating range - Heating



Twu out [°C] = Leaving water temperature user side
Tws out [°C] = Leaving water temperature source side
The limits refer to DT=5 °C on both the user and source sides

1. Normal operating range
2. Operating range where is mandatory the use of a mixture of water and glycol in relation to the leaving exchanger water temperature, cooling side

Admissible water flow-rates

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

Size			70.4	75.4	80.4	85.4	90.4	100.4	110.4	120.4	140.4	160.4	180.4	200.4	220.4	240.4
Source side	Qmin	[l/s]	6	6	7	7	8	9	9	10	11	12	13	14	16	17
	Qmax	[l/s]	21	21	23	23	26	28	29	33	35	37	39	45	49	53
User side	Qmin	[l/s]	6	6	7	7	8	9	9	10	11	12	13	14	16	17
	Qmax	[l/s]	21	21	23	23	26	28	29	33	35	37	39	45	49	53

Correction factors for glycol use

% ethylene glycol by weight		5%	10%	15%	20%	25%	30%	35%	40%	45%	50%
Freezing temperature	°C	-2,0	-3,9	-6,5	-8,9	-11,8	-15,6	-19,0	-23,4	-27,8	-32,7
Safety temperature	°C	3	1	-1	-4	-6	-10	-14	-19	-24	-30
Internal exchanger cooling Capacity Factor	-	0,995	0,990	0,985	0,981	0,977	0,974	0,971	0,968	0,966	0,964
Internal exchanger compressor power input Factor	-	0,997	0,993	0,990	0,988	0,986	0,984	0,982	0,981	0,980	0,979
Internal exchanger glycol solution flow factor	-	1,003	1,010	1,020	1,033	1,050	1,072	1,095	1,124	1,156	1,192
Internal exchanger pressure drop Factor	-	1,029	1,060	1,090	1,118	1,149	1,182	1,211	1,243	1,272	1,302
External exchanger cooling Capacity Factor	-	0,999	0,997	0,995	0,992	0,989	0,986	0,983	0,979	0,975	0,971
External exchanger compressor power input Factor	-	1,003	1,006	1,009	1,012	1,016	1,021	1,026	1,031	1,038	1,044
External exchanger glycol solution flow factor	-	1,004	1,011	1,020	1,031	1,043	1,056	1,071	1,088	1,107	1,128
External exchanger pressure drop Factor	-	1,027	1,062	1,103	1,149	1,200	1,256	1,318	1,387	1,466	1,550

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

Fouling Correction Factors

	Internal exchanger		External exchanger	
m2 °C / W	F1	FK1	F2	FK2
0.44 x 10 (-4)	1,0	1,0	1,0	1,0
0.88 x 10 (-4)	0,97	0,99	0,97	1,08
1.76 x 10 (-4)	0,94	0,98	0,92	1,05

F1 = Cooling capacity correction factors

FK1 = Compressor power input correction factor

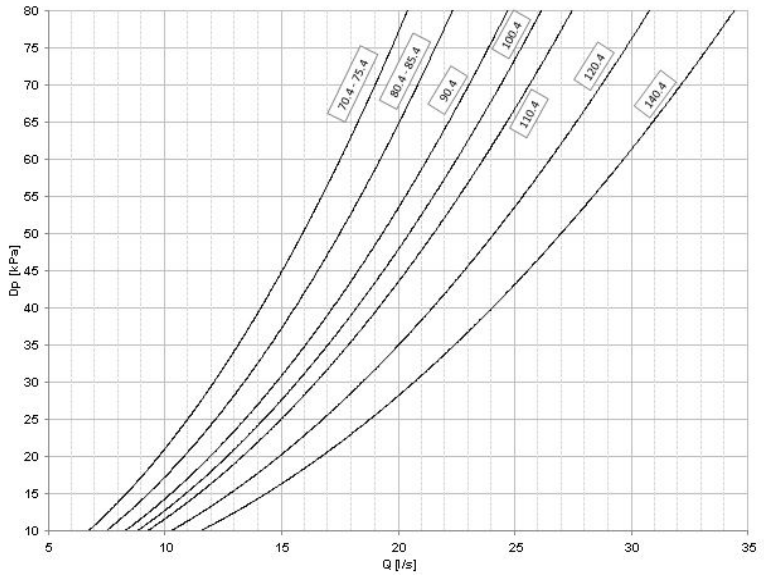
Overload and control device calibrations

		Intervention	Reset	Value
High pressure safety pressure switch (gas side)	[kPa]	4050	3300	-
Low pressure alarm (gas side)	[kPa]	450	600	-
Antifreeze protection	[°C]	4	6	-
High pressure safety valve (gas side)	[kPa]	-	-	4500
Low pressure safety valve (gas side)	[kPa]	-	-	3000
Max no. of compressor starts per hour (gas side)	[n°]	-	-	10
Differential pressure switch (water side)	[kPa]	8	10,5	-
Max pressure without hydronic assembly (water side)	[kPa]	-	-	1000
Max pressure with hydronic assembly (water side)	[kPa]	-	-	600
Safet valve setting (water side) (1)	[kPa]	-	-	600

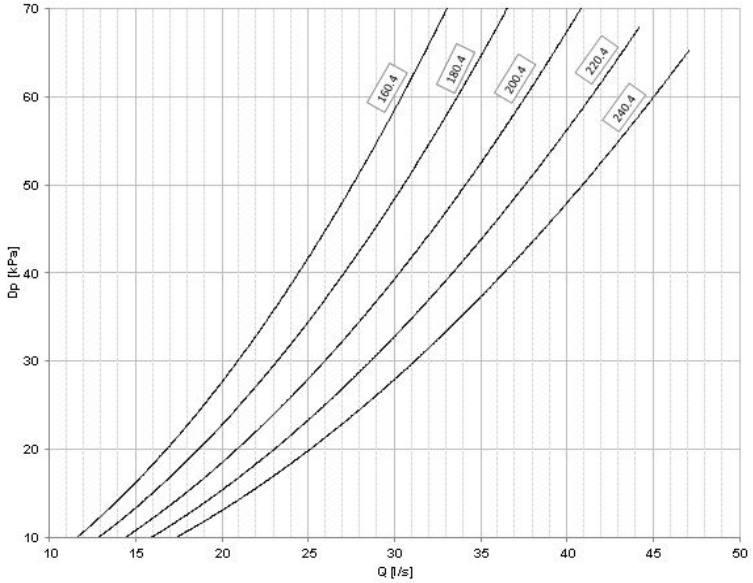
(1) Available only with hydronic assembly option

User and source side pressure drop

Size 70.4 - 140.4



Size 160.4 - 240.4



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

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

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

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

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

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

Cooling performance

Size	To (°C)	Entering water temperature source side / hot (°C)											
		25		30		35		40		45		50	
		kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe
70.4	5	209	42.4	200	46.7	189	51.5	174	57.3	159	63.0	151	70.8
	7	222	42.8	212	47.2	200	52.0	184	57.7	169	63.5	161	71.2
	10	244	43.5	234	48.0	220	52.8	203	58.7	186	64.5	179	72.1
	12	259	43.9	248	48.5	234	53.4	216	59.3	198	65.1	191	72.7
	15	283	44.5	270	49.3	255	54.3	236	60.3	216	66.2	211	73.7
	18	-	-	294	50.0	277	55.3	257	61.3	236	67.3	232	74.7
75.4	5	222	45.9	212	50.6	200	55.8	185	61.9	169	68.1	161	76.2
	7	236	46.4	226	51.1	212	56.3	196	62.5	179	68.6	171	76.6
	10	259	47.1	248	52.0	233	57.2	215	63.4	197	69.6	191	77.6
	12	274	47.6	262	52.5	247	57.9	228	64.1	209	70.3	203	78.2
	15	299	48.3	286	53.4	270	58.8	249	65.1	229	71.4	223	79.4
	18	-	-	311	54.2	293	59.8	271	66.2	249	72.6	243	80.7
80.4	5	238	48.5	228	53.5	215	59.0	199	65.5	182	71.9	172	80.2
	7	254	49.0	243	54.0	228	59.6	211	66.0	193	72.5	183	80.7
	10	279	49.6	266	54.8	251	60.5	232	66.9	213	73.4	203	81.5
	12	295	50.1	282	55.3	266	61.0	246	67.5	226	74.0	217	82.1
	15	322	50.7	308	56.1	291	61.9	269	68.5	247	75.1	239	83.1
	18	-	-	336	56.9	317	62.8	293	69.5	269	76.3	263	84.2
85.4	5	258	53.2	247	58.6	232	64.7	214	71.8	196	78.9	187	88.1
	7	274	53.7	262	59.2	247	65.3	227	72.4	208	79.6	199	88.7
	10	301	54.6	288	60.2	271	66.4	250	73.5	229	80.7	221	89.7
	12	319	55.2	304	60.9	287	67.1	265	74.3	243	81.4	235	90.4
	15	348	56.1	332	61.9	313	68.2	289	75.5	265	82.8	258	91.5
	18	-	-	362	62.9	341	69.4	315	76.8	289	84.3	284	92.8
90.4	5	280	57.2	267	63.0	252	69.5	232	77.2	213	85.0	202	95.0
	7	298	57.8	285	63.6	268	70.1	247	77.9	226	85.7	215	95.6
	10	327	58.8	313	64.8	295	71.4	272	79.1	249	86.9	239	96.8
	12	346	59.5	331	65.5	312	72.2	288	80.0	264	87.7	255	97.6
	15	377	60.4	361	66.7	341	73.5	314	81.3	288	89.2	281	99.1
	18	-	-	394	67.8	371	74.8	342	82.8	314	90.8	309	101
100.4	5	307	62.6	294	68.8	277	75.9	256	84.9	235	93.8	227	107
	7	327	63.2	313	69.4	296	76.5	273	85.4	250	94.4	243	107
	10	361	64.3	344	70.6	324	77.4	300	86.4	275	95.3	269	108
	12	384	65.1	366	71.3	346	78.2	320	87.1	294	96.1	288	109
	15	421	66.2	401	72.4	379	79.5	351	88.4	322	97.4	318	110
	18	-	-	438	73.6	413	80.8	382	89.7	351	98.7	349	111
110.4	5	341	69.2	326	76.1	308	83.8	285	92.8	262	102	249	114
	7	359	69.7	342	76.6	323	84.2	299	93.3	275	102	262	115
	10	379	70.4	362	77.2	341	84.8	317	93.9	292	103	280	115
	12	400	71.1	385	78.0	363	85.5	339	94.5	314	104	302	116
	15	437	72.2	421	79.2	398	86.6	372	95.6	345	105	333	117
	18	-	-	455	80.2	431	87.7	402	96.7	373	106	361	118
120.4	5	382	76.7	365	84.3	343	93.2	316	104	289	115	274	128
	7	410	77.7	391	85.2	367	94.1	338	105	309	116	295	129
	10	451	79.4	430	87.0	405	95.5	373	106	341	117	327	131
	12	481	80.7	459	88.2	432	96.7	398	107	364	118	351	132
	15	528	82.6	504	90.2	474	98.8	437	110	399	120	389	134
	18	-	-	548	92.2	515	101	475	112	434	123	426	136
140.4	5	436	87.7	416	96.1	392	106	361	118	331	129	314	144
	7	466	89.1	445	97.4	419	107	386	119	353	131	336	145
	10	511	91.5	488	99.8	460	109	424	121	388	133	372	147
	12	544	93.3	520	101	491	111	452	122	414	134	399	149
	15	597	96.1	570	104	537	113	496	125	454	137	440	151
	18	-	-	619	107	584	116	539	128	494	139	480	154

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 = Leaving water temperature user side / cold (°C)
Performance refer to DT = 5°C both user and source side.

Cooling performance

Size	To (°C)	Entering water temperature source side / hot (°C)											
		25		30		35		40		45		50	
		kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe	kWf	kWe
160.4	5	488	98.7	467	108	440	119	406	131	372	144	352	159
	7	521	101	498	110	469	120	433	133	397	145	377	161
	10	573	104	549	113	517	123	478	136	438	148	420	164
	12	609	106	583	115	550	125	507	137	465	150	449	166
	15	666	110	637	118	601	128	555	141	509	153	496	168
	18	-	-	692	122	653	132	603	144	553	156	542	171
180.4	5	546	111	522	123	494	135	454	151	415	167	390	188
	7	583	113	557	124	527	137	485	153	442	169	417	189
	10	641	115	613	126	580	139	533	155	487	171	463	190
	12	680	117	651	128	615	140	566	156	517	172	493	191
	15	744	119	711	131	671	143	618	159	565	174	544	194
	18	-	-	772	133	728	146	670	161	613	177	597	196
200.4	5	600	122	574	134	544	148	501	164	458	181	429	202
	7	640	124	612	136	579	149	534	166	488	183	459	204
	10	704	127	674	139	637	152	587	169	538	185	510	206
	12	747	129	715	141	676	154	623	171	571	187	543	207
	15	816	132	781	144	738	157	681	174	623	190	599	210
	18	-	-	847	147	800	160	738	177	676	193	656	213
220.4	5	656	134	627	148	595	162	547	181	500	200	468	225
	7	699	136	669	149	634	164	583	183	533	202	500	226
	10	768	138	736	152	696	167	641	186	586	204	555	228
	12	815	140	780	154	738	169	680	187	622	206	591	229
	15	890	143	852	157	805	172	742	190	679	209	651	232
	18	-	-	924	160	873	175	805	193	736	212	712	234
240.4	5	707	147	676	162	640	179	588	200	536	221	503	249
	7	753	148	720	164	682	180	626	202	571	223	538	250
	10	827	151	792	166	748	183	688	204	627	226	596	252
	12	877	153	840	168	793	185	729	206	665	227	636	254
	15	957	156	916	172	864	188	795	209	726	230	700	256
	18	-	-	992	175	936	191	861	212	786	233	767	259

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 = Leaving water temperature user side / cold (°C)
Performance refer to DT = 5°C both user and source side.

Heating performance

Size	To (°C)	Entering water temperature source side / cold (°C)											
		10		12		15		17		20		22	
		kWt	kWe	kWt	kWe	kWt	kWe	kWt	kWe	kWt	kWe	kWt	kWe
70.4	30	252	42.6	265	43.0	288	43.6	303	44.0	327	44.6	343	45.0
	35	247	46.7	260	47.2	282	48.0	297	48.5	320	49.3	336	49.8
	40	239	51.8	251	52.3	272	53.1	286	53.7	309	54.6	324	55.2
	45	232	56.9	243	57.3	263	58.3	276	58.9	297	59.9	312	60.7
	55	224	63.5	234	64.0	253	64.9	266	65.6	286	66.6	300	67.4
75.4	30	268	46.1	283	46.6	306	47.3	322	47.7	347	48.4	364	48.8
	35	264	50.6	277	51.1	300	52.0	316	52.5	340	53.4	357	53.9
	40	255	56.1	268	56.6	290	57.5	304	58.1	327	59.1	343	59.7
	45	247	61.5	259	62.0	280	63.1	293	63.8	315	64.8	330	65.5
	55	239	68.6	250	69.1	270	70.1	283	70.8	304	71.9	319	72.6
80.4	30	287	48.7	302	49.1	328	49.8	345	50.2	372	50.9	391	51.3
	35	282	53.5	297	54.0	322	54.8	338	55.3	365	56.1	383	56.6
	40	274	59.3	288	59.8	311	60.7	327	61.3	352	62.1	369	62.7
	45	265	65.1	278	65.6	300	66.6	315	67.2	339	68.2	355	68.8
	55	256	72.4	268	72.9	289	73.8	303	74.5	326	75.4	341	76.1
85.4	30	311	53.4	328	54.0	355	54.8	374	55.4	403	56.2	423	56.8
	35	306	58.6	322	59.2	348	60.2	366	60.9	394	61.9	414	62.6
	40	296	65.0	311	65.6	336	66.7	353	67.4	380	68.5	399	69.3
	45	287	71.3	301	72.0	325	73.1	340	73.9	366	75.1	383	76.0
	55	277	79.5	290	80.1	313	81.2	328	82.0	353	83.2	370	84.1
90.4	30	337	57.5	355	58.1	386	59.0	406	59.7	438	60.6	460	61.2
	35	331	63.0	349	63.6	378	64.8	398	65.5	429	66.7	450	67.4
	40	321	69.9	338	70.5	365	71.7	384	72.5	413	73.8	433	74.7
	45	311	76.7	326	77.4	352	78.7	370	79.6	397	81.0	416	81.9
	55	300	85.6	314	86.3	339	87.5	356	88.3	382	89.8	401	90.9
100.4	30	368	62.9	389	63.6	422	64.6	445	65.3	483	66.4	509	67.1
	35	361	68.8	381	69.4	412	70.5	435	71.2	472	72.3	497	73.1
	40	350	76.5	369	77.1	398	78.1	420	78.9	455	80.1	479	80.9
	45	340	84.1	357	84.8	385	85.8	405	86.6	438	87.8	461	88.7
	55	330	94.5	346	95.1	372	96.1	392	96.9	423	98.1	444	99.0
110.4	30	407	70.2	425	70.8	446	71.5	467	72.2	504	73.4	530	74.2
	35	400	76.1	418	76.6	437	77.2	459	77.9	496	79.0	521	79.8
	40	388	84.2	405	84.7	423	85.2	444	85.9	480	87.0	504	87.8
	45	377	92.4	393	92.8	409	93.3	429	94.0	464	95.1	488	95.8
	55	365	103	379	103	395	104	416	105	448	106	470	106
120.4	30	459	77.2	487	78.2	530	79.9	561	81.1	610	83.0	643	84.3
	35	449	84.3	476	85.2	517	87.0	547	88.2	594	90.2	626	91.5
	40	435	93.5	460	94.5	499	96.2	527	97.5	570	99.5	600	101
	45	422	103	445	104	480	105	506	107	547	109	575	110
	55	407	115	428	116	462	118	487	119	525	121	552	123
140.4	30	523	88.3	554	89.7	602	92.0	637	93.8	692	96.6	730	98.6
	35	513	96.1	543	97.4	588	99.7	621	101	675	104	711	106
	40	497	106	525	108	567	110	599	111	648	114	682	116
	45	481	116	507	118	547	120	576	122	622	124	654	126
	55	463	130	488	131	525	133	553	135	597	137	627	139

kWt = Internal exchanger heating capacity (kW). The data do not consider the part related to the pumps, required to overcome the pressure drop for the solution circulation inside the exchangers.
The kWt heating capacity does not consider any defrosting cycles. For the real heating capacity calculation, including defrosting cycles, please refer to "Integrated heating capacities" table.
kWe = Compressor power input in kW
To = Leaving water temperature user side / hot (°C)
Performance refer to DT = 5°C both user and source side.

Heating performance

Size	To (°C)	Entering water temperature source side / cold (°C)											
		10		12		15		17		20		22	
		kWt	kWe	kWt	kWe	kWt	kWe	kWt	kWe	kWt	kWe	kWt	kWe
160.4	30	586	99.4	621	101	677	104	714	107	775	110	817	113
	35	575	108	608	110	661	113	697	115	755	118	795	121
	40	557	119	588	121	638	124	672	126	726	129	764	131
	45	540	130	568	132	615	135	647	137	698	140	733	142
	55	519	144	546	146	591	149	621	150	669	154	703	156
180.4	30	656	112	693	114	755	116	795	117	861	120	906	122
	35	645	123	680	124	740	126	779	128	842	130	886	132
	40	626	136	660	138	715	140	752	142	811	144	851	146
	45	608	150	639	151	690	154	724	155	779	158	817	159
	55	586	168	615	169	664	172	696	173	748	175	784	177
200.4	30	720	123	761	125	825	128	872	130	945	133	995	135
	35	709	134	748	136	809	139	854	141	924	144	972	146
	40	688	149	725	150	782	153	824	155	890	158	934	160
	45	668	163	702	165	755	167	795	169	856	172	897	174
	55	643	182	675	184	725	186	763	188	821	191	861	193
220.4	30	788	135	833	137	905	139	953	141	1031	144	1084	147
	35	776	148	818	149	888	152	935	154	1009	157	1061	159
	40	753	164	793	165	859	168	902	170	972	173	1021	175
	45	731	180	769	181	830	184	870	186	935	189	980	191
	55	704	202	739	203	797	205	835	207	897	210	940	212
240.4	30	852	148	900	150	972	152	1026	154	1110	157	1167	159
	35	839	162	884	164	955	166	1007	168	1088	171	1142	174
	40	815	180	857	182	922	184	971	186	1047	189	1098	192
	45	791	198	831	200	890	202	936	204	1007	207	1054	209
	55	762	223	800	224	856	226	900	228	967	231	1013	233

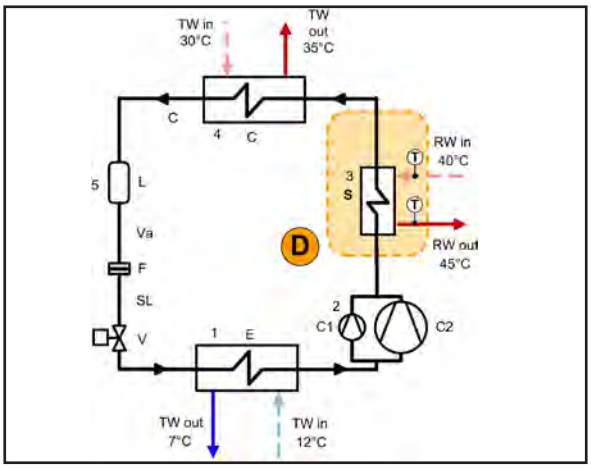
kWt = Internal exchanger heating capacity (kW). The data do not consider the part related to the pumps, required to overcome the pressure drop for the solution circulation inside the exchangers.
The kWt heating capacity does not consider any defrosting cycles. For the real heating capacity calculation, including defrosting cycles, please refer to "Integrated heating capacities" table.
kWe = Compressor power input in kW
To = Leaving water temperature user side / hot (°C)
Performance refer to DT = 5°C both user and source side.

Configurations

D - Partial energy recovery

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

The power delivered by the partial recovery is 25% of the thermal power dissipation (cooling + electrical power absorbed by the compressors)



D - Partial recovery device

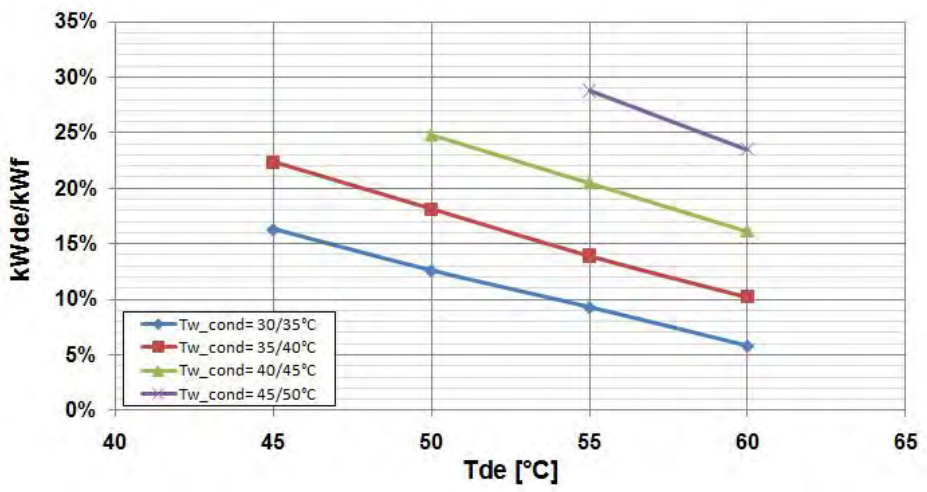
1 - Internal exchanger
2 - Compressors
3 - Recovery exchanger (D)
4 - External exchanger
5 - Expansion electronic valve

TW in chilled water inlet
TW out chilled water outlet

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

T - Temperature probe

Partial recovery heating capacity



kWde/kWf = Heating capacity/cooling capacity [%]
Tde = Leaving recovery exchanger water temperature [°C]
Leaving exchanger water temperature user side = 7°C [°C]

Efficient use of energy with heat recovery

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

Application versatility of recovery devices

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

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

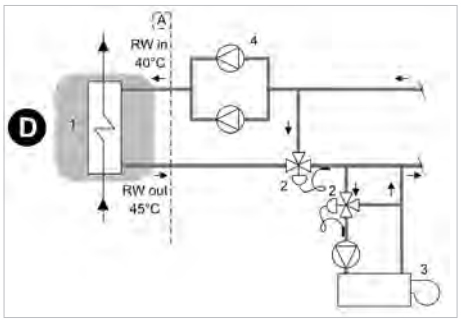
Preheating of hot water for domestic use or for industrial process

Heating of water in swimming pools, showers and SPAS

Preheating of hot water for laundries and industrial kitchens

Air heating

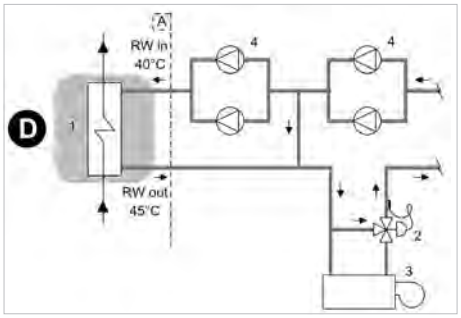
The heat recovery device can be used to cover the entire heat load required. The hot water supply temperature is controlled via a modulating control valve that needs to be fitted on the system at the outlet of the recovery unit. The auxiliary heating device is recommended to cover the thermal energy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



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

Water preheating

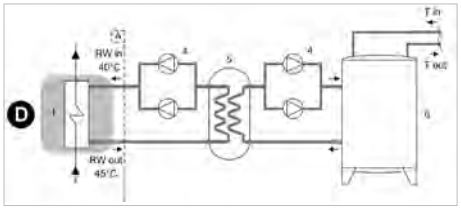
The heat recovery device can be used to preheat water at the inlet of the main heating device (e.g. boiler). In this case, the demand for hot water is greater than the amount of heat recovered by condensation and the recovery device only covers part of the required heat load. By preheating the water,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



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

Domestic hot water production

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



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

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

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

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

Hydronic assemblies - source side

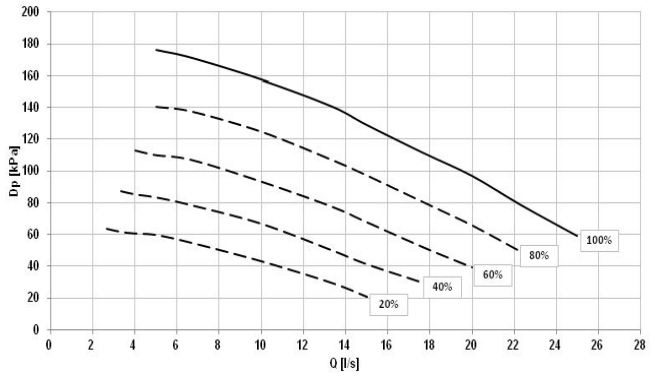
VARYS - VARYFLOW+ (source side 2 inverter pumps)

Configuration with 2 centrifugal electric pumps arranged in parallel and controlled by inverter, with housing and impeller made with AISI 304 stainless steel, and components as described on the water diagram key. All water fittings are Victaulic type.

The electric pumps are equipped with three-phase electric motor with IP55-protection and complete with thermoformed insulated casing.

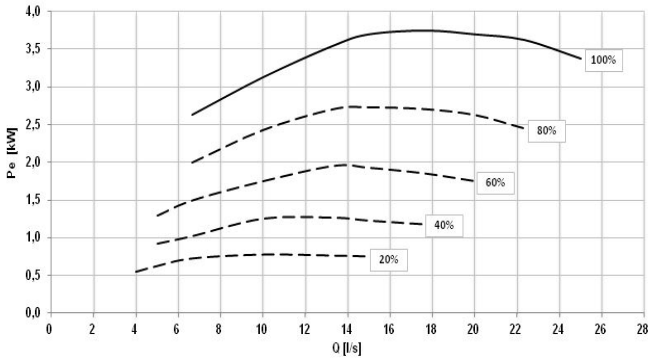
The control, modulates the water flow-rate keeping constant the delta T. If the water temperature is in critical conditions, it allows to extend the unit operating ranges guaranteeing its operating, automatically reducing the water flow-rate. In the event of one of the two pumps is temporarily unavailable, it guarantees about the 80% of the nominal flow-rate.

Head (Size 70.4 ÷ 85.4)



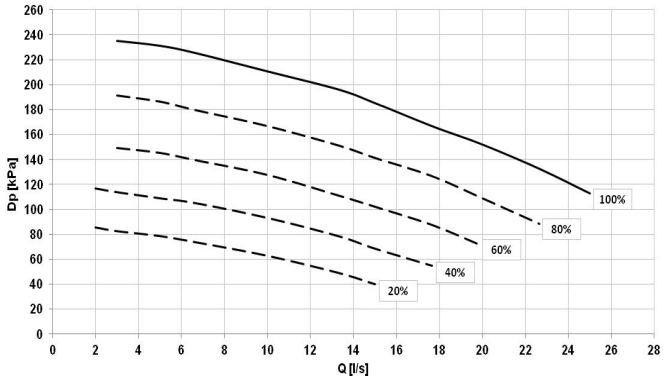
Q = Water flow rate [l/s] Dp = Head [kPa]

Absorption curves (Size 70.4 ÷ 85.4)



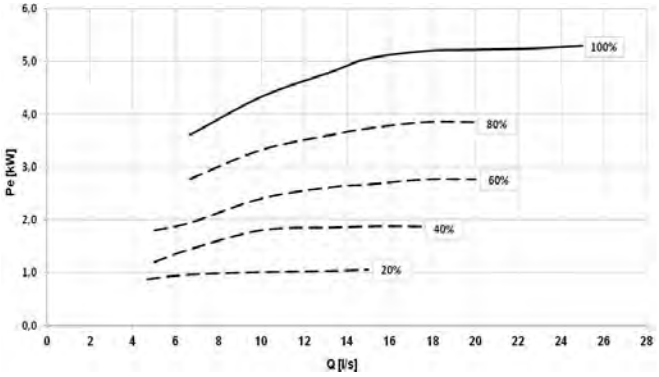
Q = Water flow rate [l/s] Pe = Electrical power draw [kW]

Head (Size 90.4 ÷ 110.4)



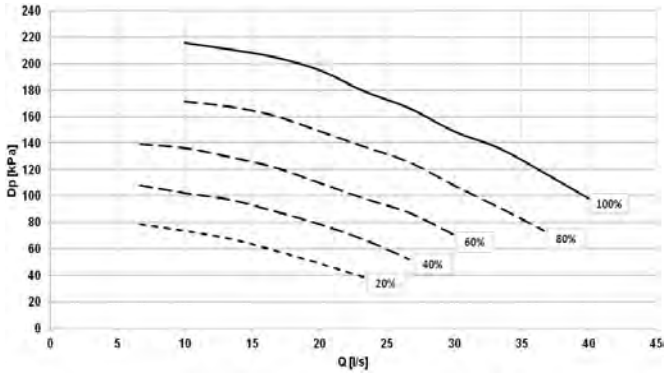
Q = Water flow rate [l/s] Dp = Head [kPa]

Absorption curves (Size 90.4 ÷ 110.4)



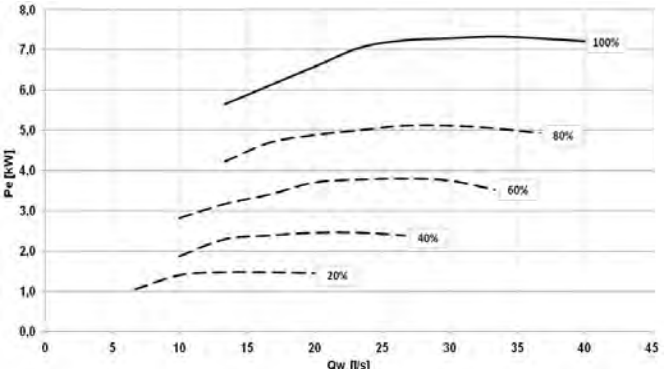
Q = Water flow rate [l/s] Pe = Electrical power draw [kW]

Head (Size 120.4 ÷ 160.4)



Q = Water flow rate [l/s] Dp = Head [kPa]

Absorption curves (Size 120.4 ÷ 160.4)



Q = Water flow rate [l/s] Pe = Electrical power draw [kW]

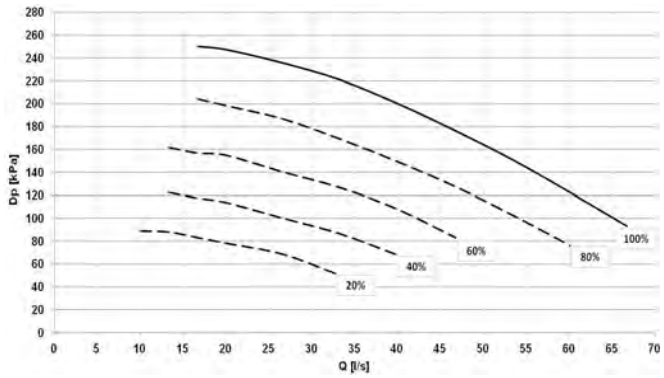
Caution: to obtain the available pressure values, you need to subtract the following from the head values represented in these diagrams:

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

Hydronic assemblies - source side

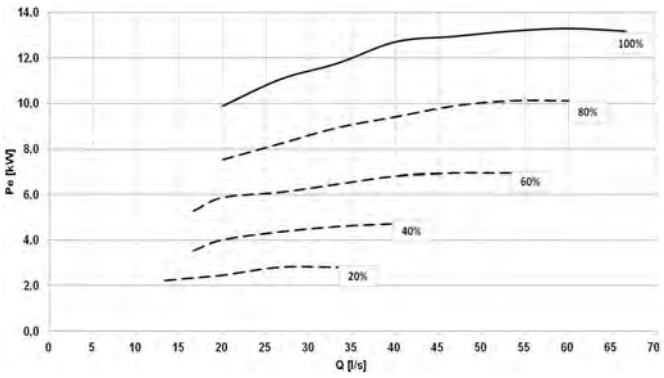
VARYS - VARYFLOW+ (source side 2 inverter pumps)

Head (Size 180.4 ÷ 240.4)



Q = Water flow rate [l/s] Dp = Head [kPa]

Absorption curves (Size 180.4 ÷ 240.4)

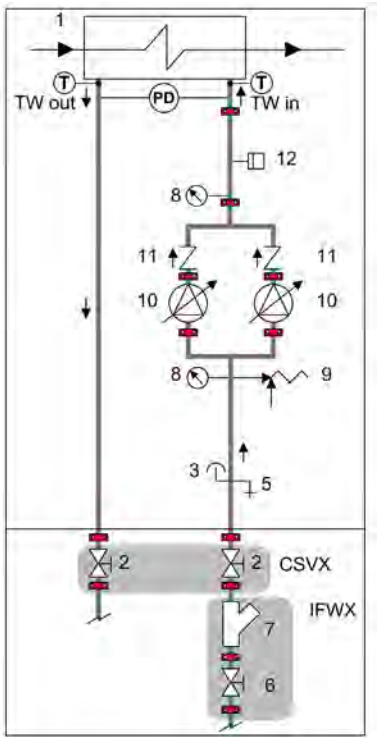


Q = Water flow rate [l/s] Pe = Electrical power draw [kW]

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

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

Water diagram



1 - Internal exchanger
2 - Cutoff valve
3 - Purge valve
5 - Drain valve
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)

T - Temperature probe
PD - Differential pressure switch

TW in chilled water inlet
TW out chilled water outlet

IFWX = Steel mesh strainer on the water side
CSVX = Couple of manually operated shut-off valves

The grey area indicates further optional components.

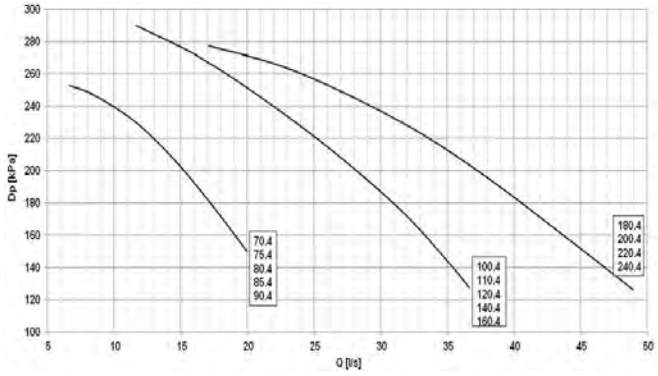
Hydronic assemblies - source side

HYGS1 - Source side hydronic assembly with 1 ON/OFF pump

Configuration with 1 centrifugal electric pump, with housing and impeller made with AISI 304 stainless steel, and components as described on the water diagram key. All water fittings are Victaulic type.

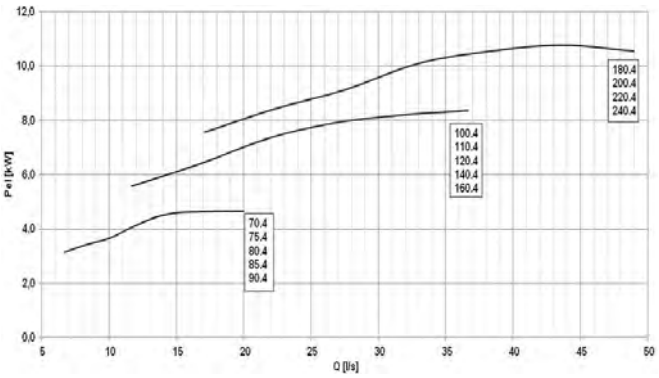
The electric pump is equipped with three-phase electric motor with IP55-protection and complete with thermoformed insulated casing.

Head (Size 70.4 ÷ 120.4)



Q = Water flow rate [l/s] Dp = Head [kPa]

Absorption curves (Size 70.4 ÷ 120.4)

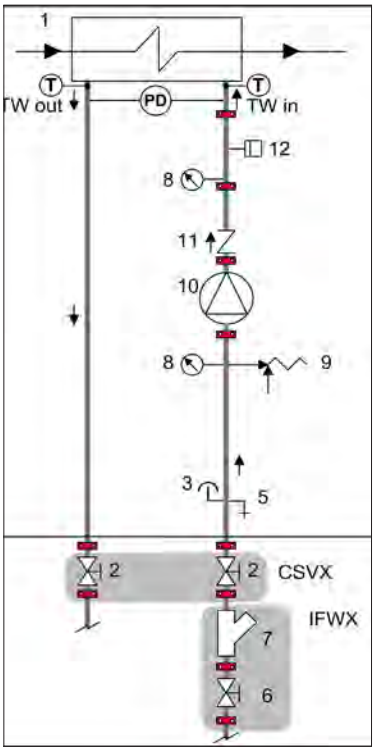


Q = Water flow rate [l/s] Pe = Electrical power draw [kW]

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

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

Water diagram



1 - Internal exchanger
2 - Cutoff valve
3 - Purge valve
5 - Drain valve
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)

T - Temperature probe
PD - Differential pressure switch

TW in chilled water inlet
TW out chilled water outlet

IFWX = Steel mesh strainer on the water side
CSVX = Couple of manually operated shut-off valves

The grey area indicates further optional components.

Hydronic assemblies - source side

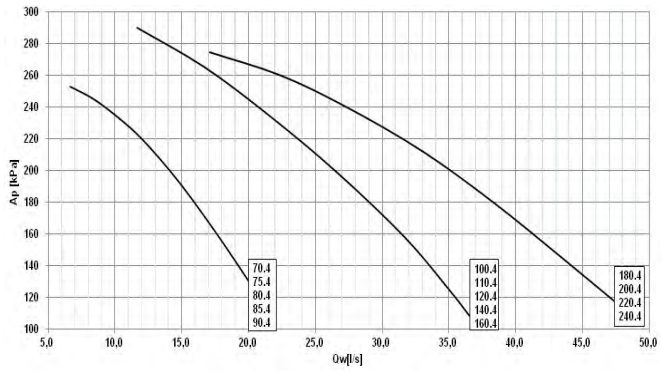
HYGS2 - Source side hydronic assembly with 2 ON/OFF pumps

Configuration with 2 centrifugal electric pumps, 1 stand-by, with housing and impeller made with AISI 304 stainless steel, and components as described on the water diagram key. All water fittings are Victaulic type.

The electric pumps are equipped with three-phase electric motor with IP55-protection and complete with thermoformed insulated casing.

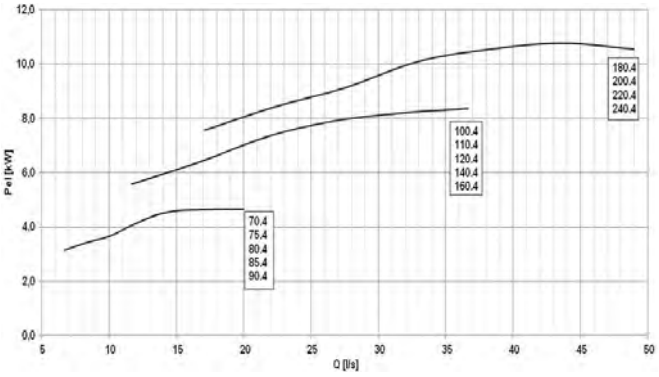
The control balances the operating hours and in case of failure it is signaled and the stand-by pump is automatically activated.

Head (Size 70.4 ÷ 120.4)



Q = Water flow rate [l/s] Dp = Pressure head, available to the unit fittings [kPa]

Absorption curves (Size 70.4 ÷ 120.4)

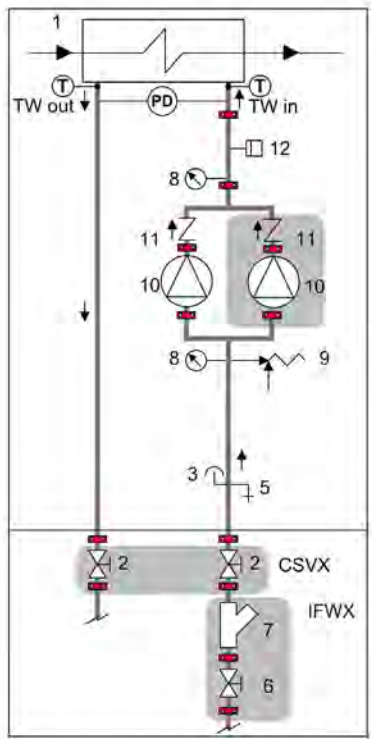


Q = Water flow rate [l/s] Pe = Electrical power draw [kW]

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

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

Water diagram



1 - Internal exchanger
2 - Cutoff valve
3 - Purge valve
5 - Drain valve
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)

T - Temperature probe
PD - Differential pressure switch

TW in chilled water inlet
TW out chilled water outlet

IFWX = Steel mesh strainer on the water side
CSVX = Couple of manually operated shut-off valves

The grey area indicates further optional components.

Hydronic assemblies - source side

HYP2S - Hydropack source side wiyh 2 pumps

Pumping unit supplied on the unit consisting of 2 parallel electric pumps (all in duty) with a self-adaptive modular activation logic.

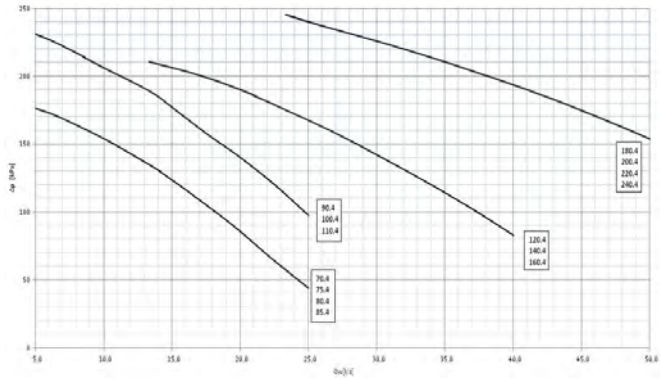
Centrifugal electric pump with impeller made with AISI 304 steel and AISI 304 stainless steel body or grey cast iron (depending on models). Mechanical seal using ceramic, carbon and EPDM elastomer components.

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

The HYP2S option is supplied with a kit made up of 2 quick blind connections, for the removal of one pump in case of maintenance.

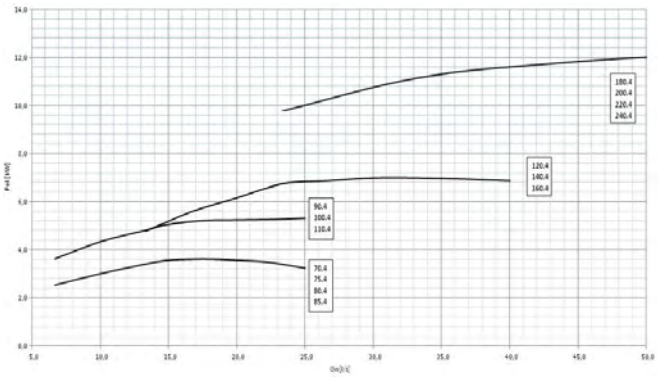
Provided with hydraulic interceptions to the outside of the unit (option 'CSVX - A pair of manually operated shut-off valves') to facilitate any major maintenance

Head (Size 70.4 ÷ 120.4)



Qw= Water flow rate [l/s] Dp = Head [kPa]

Absorption curves (Size 70.4 ÷ 120.4)

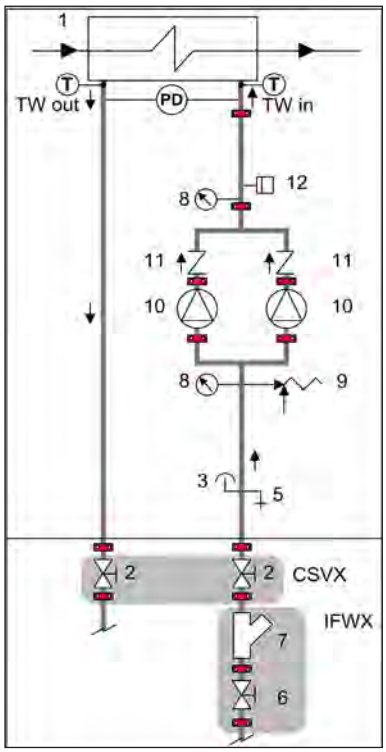


Q = Water flow rate [l/s] Pe = Electrical power draw [kW]

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

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

Water diagram



1 - Internal exchanger
2 - Cutoff valve
3 - Purge valve
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)

T - Temperature probe
PD - Differential pressure switch

TW in chilled water inlet
TW out chilled water outlet

IFWX = Steel mesh strainer on the water side
CSVX = Couple of manually operated shut-off valves

The grey area indicates further optional components.

Hydronic assemblies - source side

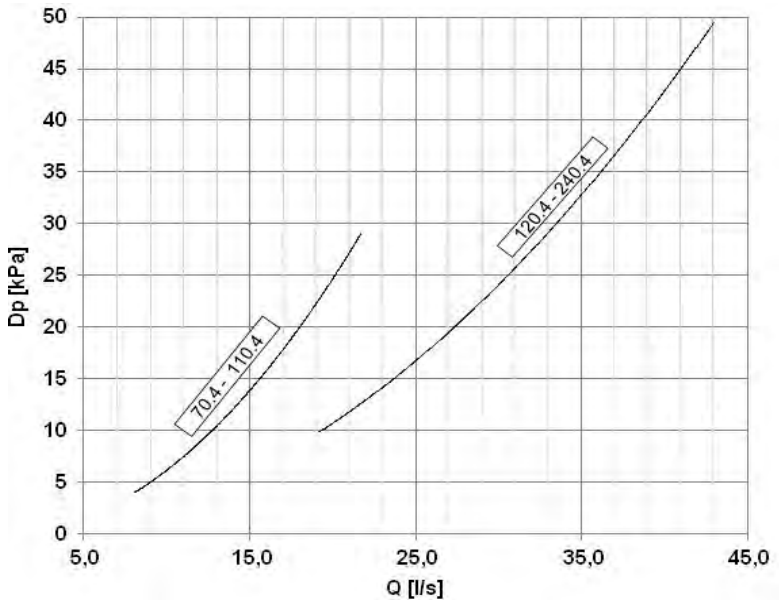
VS2M - Source side 2-way modulating valve

Configuration with 1 globe modulating 2-way valve, equal-percentage source side and components according to the key indicated on the water diagram. All water fittings are Victaulic type.

The valve is suitable for pressure difference up to 2 bar for size from 70.4 to 110.4 and up to 1,5 bar for size from 120.4 to 240.4.

The 2-way source side modulating valve, installed on the source side exchanger inlet, modulates the flow of water in response to a 0-10 V signal from the unit's controller.

Source side 2-way modulating valve pressure drops

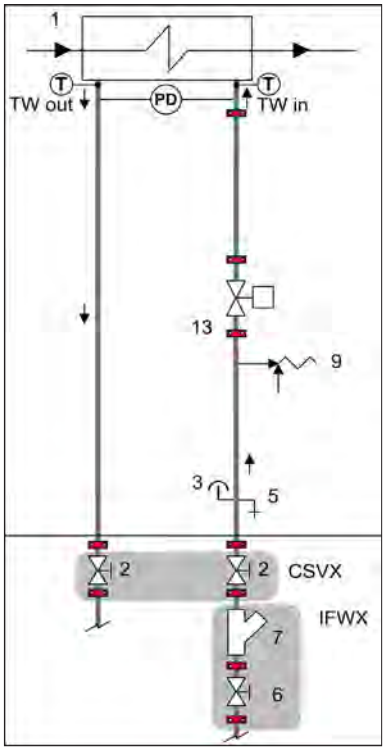


The pressure drops, water side, are calculated considering an average water temperature of 7°C.

Q = Water flow rate [l/s]
DP = Pressure drops [kPa]

Size		70.4	75.4	80.4	85.4	90.4	100.4	110.4	120.4	140.4	160.4	180.4	200.4	220.4	240.4
Max opening DP	[bar]	2	2	2	2	2	2	2	1,5	1,5	1,5	1,5	1,5	1,5	1,5
Max. seeping	[l/min]	2,4	2,4	2,4	2,4	2,4	2,4	2,4	3,7	3,7	3,7	3,7	3,7	3,7	3,7
Diameter		4"	4"	4"	4"	4"	4"	4"	5"	5"	5"	5"	5"	5"	5"

Water diagram



1 - Internal exchanger
2 - Cutoff valve
3 - Purge valve
5 - Draw off cock
6 - Cutoff valve with quick joints
7 - Steel mesh strainer water side
9 - Safety valve (6 Bar)
13 - 2-way modulating valve

T - Temperature probe
PD - Differential pressure switch

TW in chilled water inlet
TW out chilled water outlet

IFWX = Steel mesh strainer on the water side
CSVX = Couple of manually operated shut-off valves

The grey area indicates further optional components.

Hydronic assemblies - source side

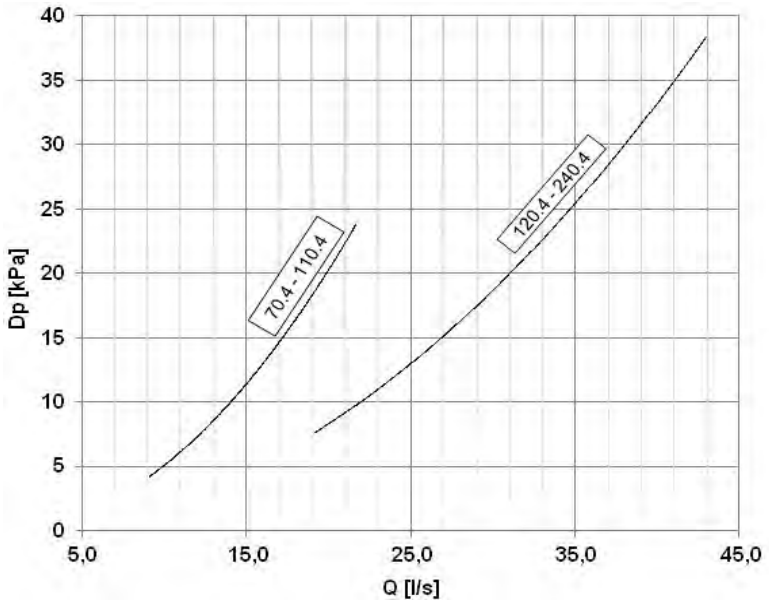
V2MSP - Source side 2-way modulating valve for high DP

Configuration with 1 ball modulating 2-way valve, equal-percentage source side and components according to the key indicated on the water diagram. All water fittings are Victaulic type.

The valve is suitable for pressure difference up to 4 bar and guarantees a seeping equal to 0.

The 2-way source side modulating valve, installed on the source side exchanger inlet, modulates the flow of water in response to a 0-10 V signal from the unit's controller.

Source side 2-way modulating valve pressure drops for high DP

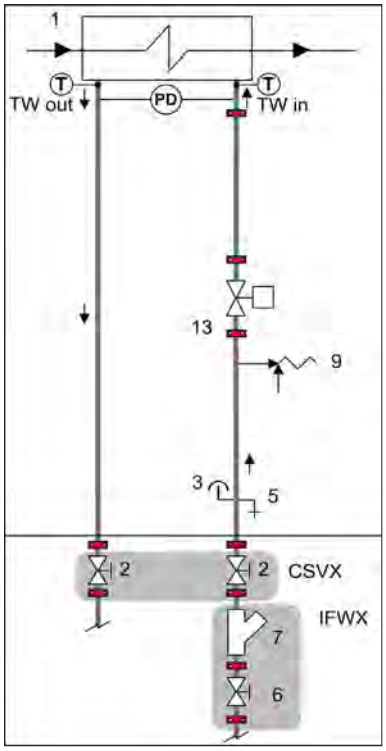


The pressure drops, water side, are calculated considering an average water temperature of 7°C.

Q = Water flow rate [l/s]
DP = Pressure drops [kPa]

Size		70.4	75.4	80.4	85.4	90.4	100.4	110.4	120.4	140.4	160.4	180.4	200.4	220.4	240.4
Max opening DP	[bar]	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Max. seeping	[l/min]	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diameter		4"	4"	4"	4"	4"	4"	4"	5"	5"	5"	5"	5"	5"	5"

Water diagram



1 - Internal exchanger
2 - Cutoff valve
3 - Purge valve
5 - Draw off cock
6 - Cutoff valve with quick joints
7 - Steel mesh strainer water side
9 - Safety valve (6 Bar)
13 - 2-way modulating valve for high DP

T - Temperature probe
PD - Differential pressure switch

TW in chilled water inlet
TW out chilled water outlet

IFWX = Steel mesh strainer on the water side
CSVX = Couple of manually operated shut-off valves

The grey area indicates further optional components.

Hydronic assemblies - User side

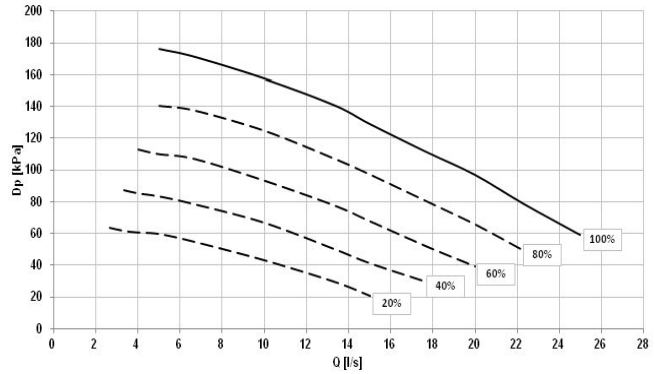
VARYU - VARYFLOW+ (user side 2 inverter pumps)

Configuration with 2 centrifugal electric pumps arranged in parallel and controlled by inverter, with housing and impeller made with AISI 304 stainless steel, and components as described on the water diagram key. All water fittings are Victaulic type.

The electric pumps are equipped with three-phase electric motor with IP55-protection and complete with thermoformed insulated casing.

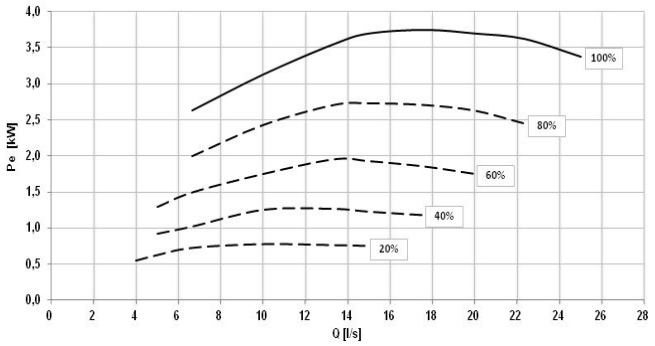
The control, modulates the water flow-rate keeping constant the delta T. If the water temperature is in critical conditions, it allows to extend the unit operating ranges guaranteeing its operating, automatically reducing the water flow-rate. In the event of one of the two pumps is temporarily unavailable, it guarantees about the 80% of the nominal flow-rate.

Head (Size 70.4 ÷ 85.4)



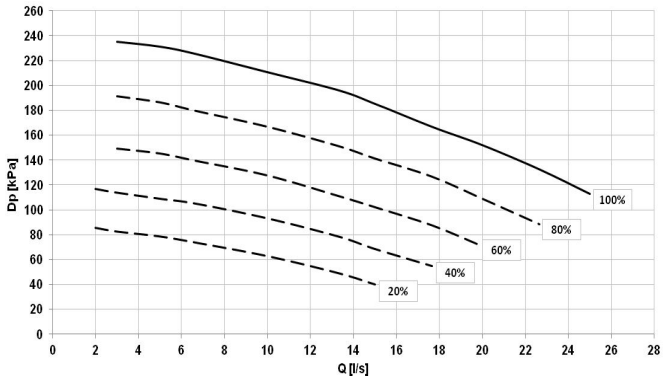
Q = Water flow rate [l/s] Dp = Head kPa]

Absorption curves (Size 70.4 ÷ 85.4)



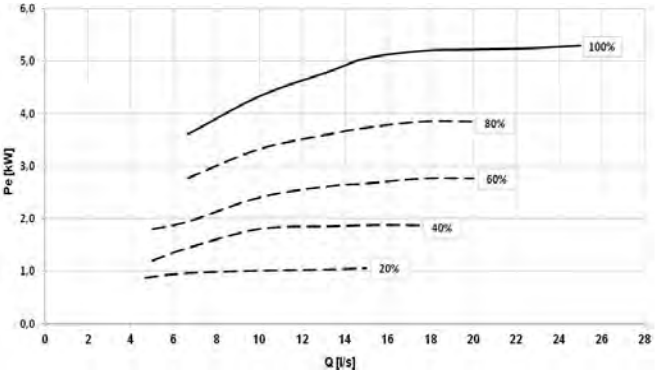
Q = Water flow rate [l/s] Pe = Electrical power draw [kW]

Head (Size 90.4 ÷ 110.4)



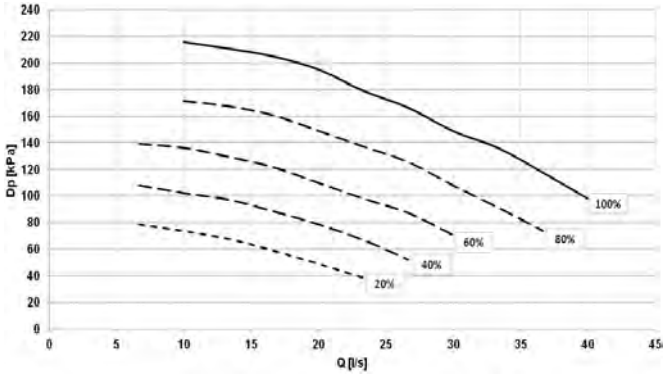
Q = Water flow rate [l/s] Dp = Head [kPa]

Absorption curves (Size 90.4 ÷ 110.4)



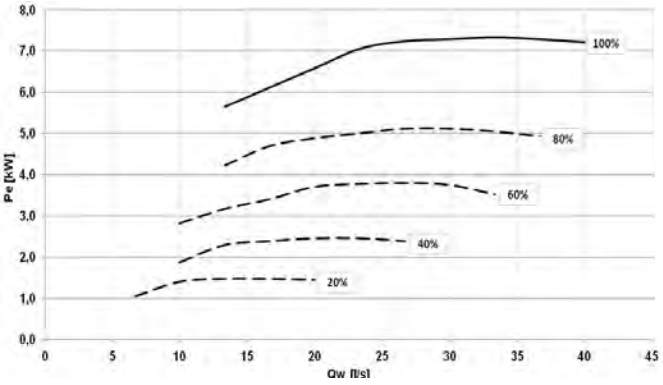
Q = Water flow rate [l/s] Pe = Electrical power draw [kW]

Head (Size 120.4 ÷ 160.4)



Q = Water flow rate [l/s] Dp = Head [kPa]

Absorption curves (Size 120.4 ÷ 160.4)



Q = Water flow rate [l/s] Pe = Electrical power draw [kW]

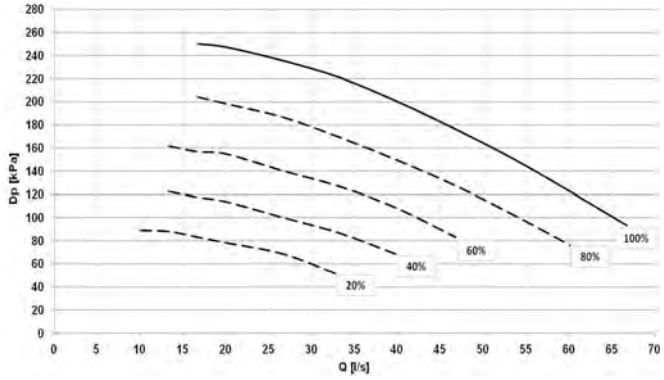
Caution: to obtain the available pressure values, you need to subtract the following from the head values represented in these diagrams:

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

Hydronic assemblies - User side

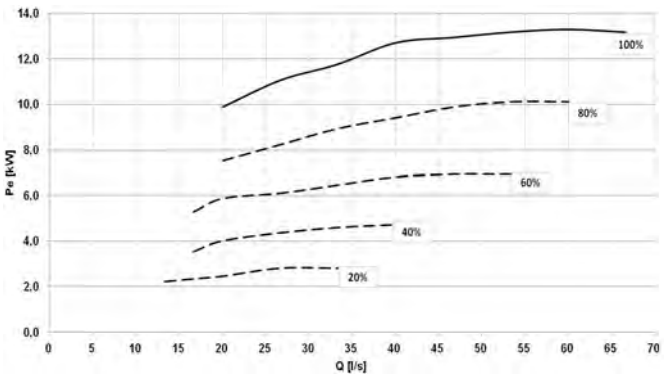
VARYU - VARYFLOW+ (user side 2 inverter pumps)

Head (Size 180.4 ÷ 240.4)



Q = Water flow rate [l/s] Dp = Head [kPa]

Absorption curves (Size 180.4 ÷ 240.4)

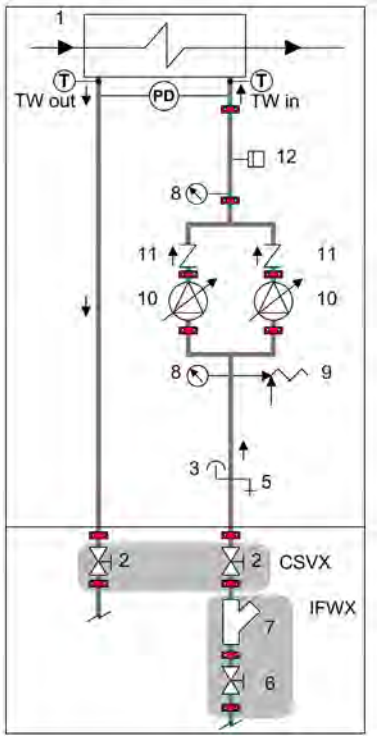


Q = Water flow rate [l/s] Pe = Electrical power draw [kW]

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

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

Water diagram



1 - Internal exchanger
2 - Cutoff valve
3 - Purge valve
5 - Drain valve
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)

T - Temperature probe
PD - Differential pressure switch

TW in chilled water inlet
TW out chilled water outlet

IFWX = Steel mesh strainer on the water side
CSVX = Couple of manually operated shut-off valves

The grey area indicates further optional components.

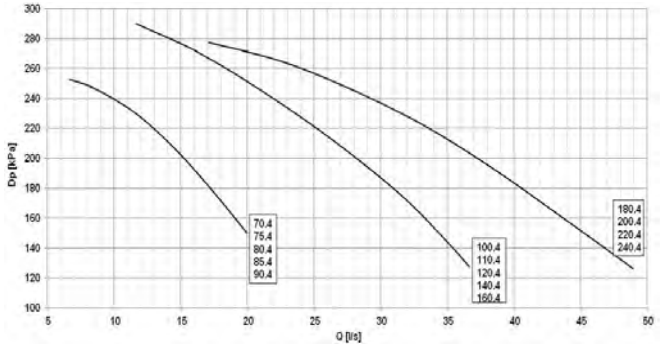
Hydronic assemblies - User side

HYGU1 - User side hydronic assembly with 1 ON/OFF pump

Configuration with 1 centrifugal electric pump, with housing and impeller made with AISI 304 stainless steel, and components as described on the water diagram key. All water fittings are Victaulic type.

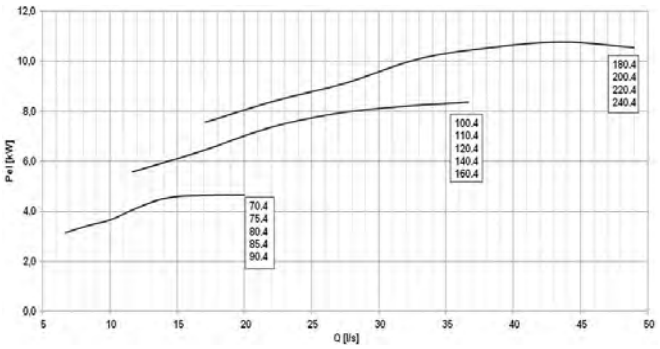
The electric pump is equipped with three-phase electric motor with IP55-protection and complete with thermoformed insulated casing.

Head (Size 70.4 ÷ 240.4)



Q = Water flow rate [l/s] Dp = Head [kPa]

Absorption curves (Size 70.4 ÷ 240.4)

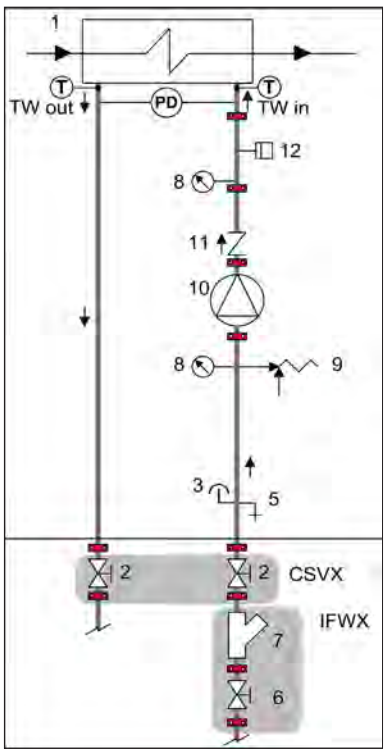


Q = Water flow rate [l/s] Pe = Electrical power draw [kW]

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

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

Water diagram



1 - Internal exchanger
2 - Cutoff valve
3 - Purge valve
5 - Drain valve
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)

T - Temperature probe
PD - Differential pressure switch

TW in chilled water inlet
TW out chilled water outlet

IFWX = Steel mesh strainer on the water side
CSVX = Couple of manually operated shut-off valves

The grey area indicates further optional components.

Hydronic assemblies - User side

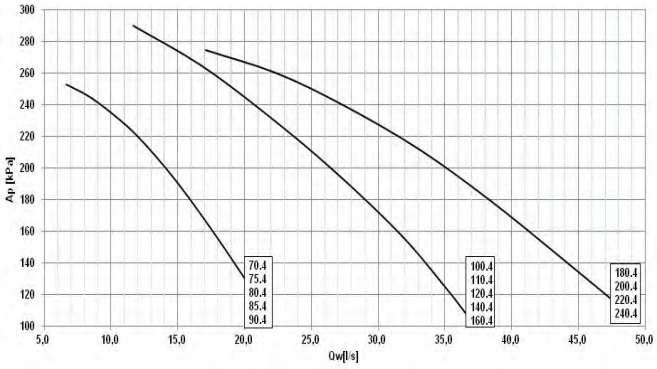
HYGU2 - User side hydronic assembly with 2 ON/OFF pumps

Configuration with 2 centrifugal electric pumps, 1 stand-by, with housing and impeller made with AISI 304 stainless steel, and components as described on the water diagram key. All water fittings are Victaulic type.

The electric pumps are equipped with three-phase electric motor with IP55-protection and complete with thermoformed insulated casing.

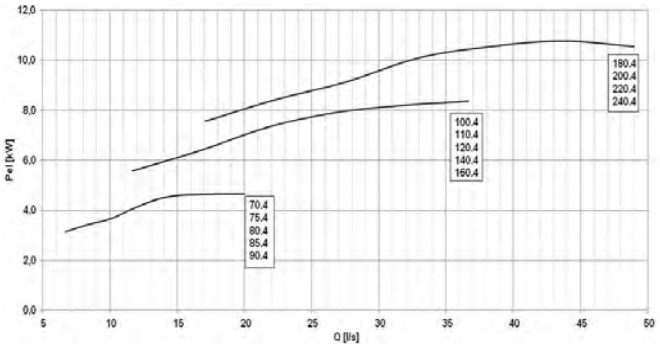
The control balances the operating hours and in case of failure it is signaled and the stand-by pump is automatically activated.

Head (Size 70.4 ÷ 240.4)



Q = Water flow rate [l/s] Dp = Head [kPa]

Absorption curves (Size 70.4 ÷ 240.4)

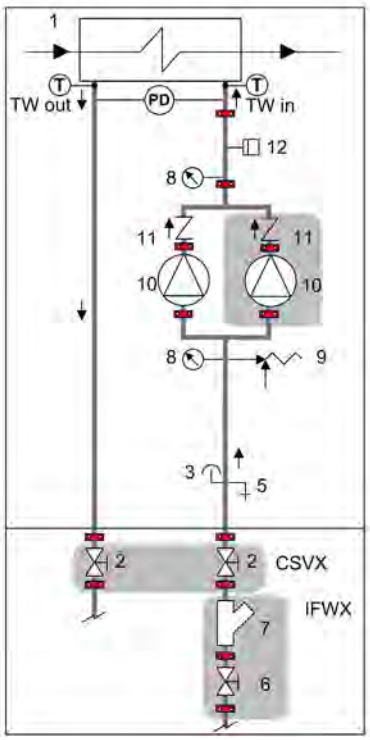


Q = Water flow rate [l/s] Pe = Electrical power draw [kW]

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

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

Water diagram



1 - Internal exchanger
2 - Cutoff valve
3 - Purge valve
5 - Drain valve
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)

T - Temperature probe
PD - Differential pressure switch

TW in chilled water inlet
TW out chilled water outlet

IFWX = Steel mesh strainer on the water side
CSVX = Couple of manually operated shut-off valves

The grey area indicates further optional components.

Hydronic assemblies - User side

HYP2U - Hydropack user side with 2 pumps

Pumping unit supplied on the unit consisting of 2 parallel electric pumps (all in duty) with a self-adaptive modular activation logic.

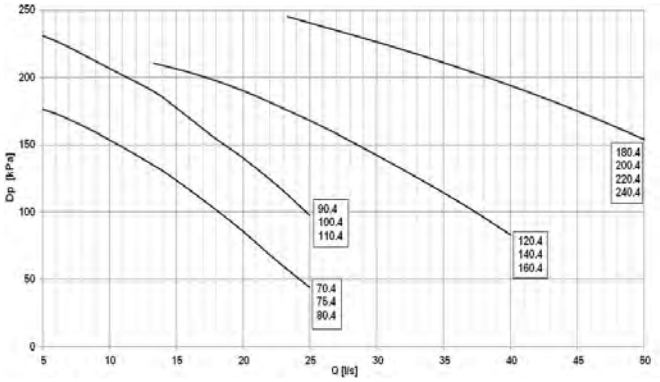
Centrifugal electric pump with impeller made with AISI 304 steel and AISI 304 stainless steel body or grey cast iron (depending on models). Mechanical seal using ceramic, carbon and EPDM elastomer components.

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

The HYP2S option is supplied with a kit made up of 2 quick blind connections, for the removal of one pump in case of maintenance.

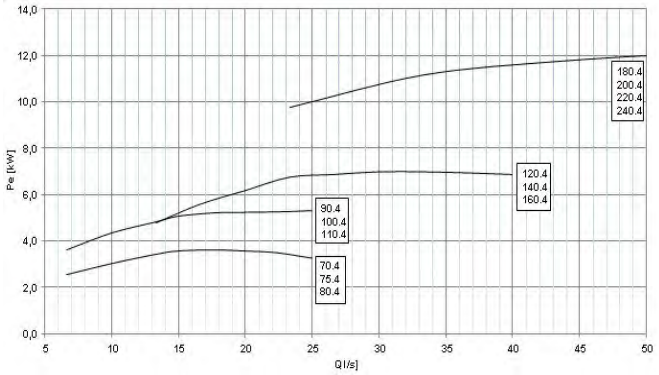
Provided with hydraulic interceptions to the outside of the unit (option 'CSVX - A pair of manually operated shut-off valves') to facilitate any major maintenance

Head (Size 70.4 ÷ 240.4)



Q = Water flow rate [l/s] Dp = Head [kPa]

Absorption curves (Size 70.4 ÷ 240.4)

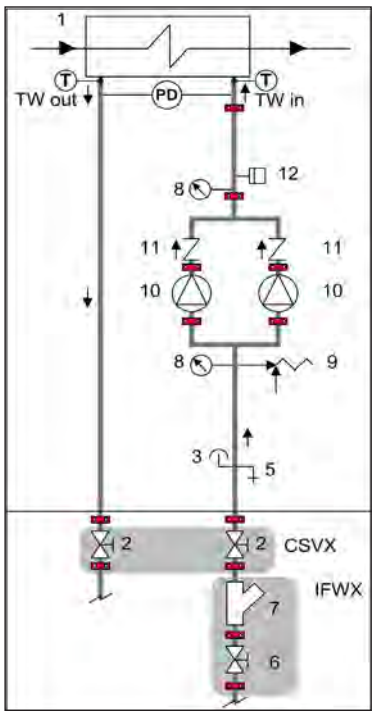


Q = Water flow rate [l/s] Pe = Electrical power draw [kW]

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

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

Water diagram



1 - Internal exchanger
2 - Cutoff valve
3 - Purge valve
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)

T - Temperature probe
PD - Differential pressure switch

TW in chilled water inlet
TW out chilled water outlet

IFWX = Steel mesh strainer on the water side
CSVX = Couple of manually operated shut-off valves

The grey area indicates further optional components.

Accessories

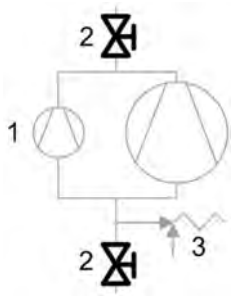
MHP - High and low pressure gauges

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

SDV - Cutoff valve on compressor supply and return

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

The device is installed built-in the unit.



1. Compressors
2. SDV option
3. Safety valve

PFCP - Power factor correction capacitors (cosfi > 0.9)

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

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

MF2 - Multi-function phase monitor

The multifunction phase monitor controls all phases and their sequence, checks for voltage anomalies (+/–10%), and automatically restores operation of the unit as soon as the power supply returns to normal.

This control allows to:

- salvaguardare i componenti interni dell'unità, che essendo alimentati da una tensione anomala potrebbero funzionare in modo non corretto o rompersi;
- quickly identify, among the alarms of the unit's components, the real cause of the malfunction due to the sudden change in voltage.

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

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

Moreover:

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

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

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

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

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

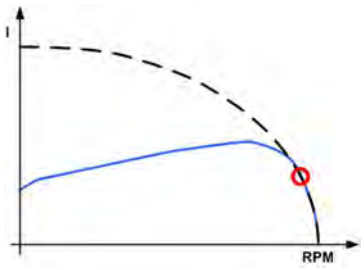
SFSTR – Disposal for inrush current reduction

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

Device installed and wired built-in the unit.

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

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



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

CMSC8 - Serial communication module for BACnet supervisor

Module allows the serial connection of the supervision system, using BACnet 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)

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. Flow-rate modulation is managed by embedded logic thanks to built-in flow-rate control device and temperature probes.

Designed for systems with primary circuit variable flow-rate systems decoupled from secondary circuit. With no building load the unit switches off the compressors while concerning pumps is possible to select:

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

Device installed and wired built-in the unit, available only with VARYFLOW+ option.

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

CONTA2 - Energy meter

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

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

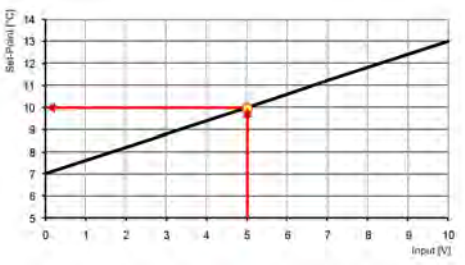
The device is installed and wired built-in the unit.

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

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

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

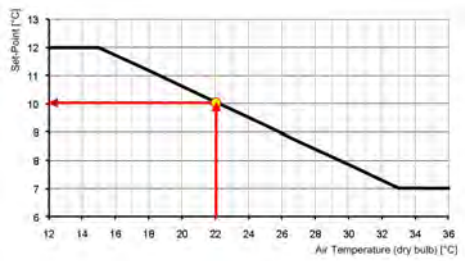
Device installed and wired built-in the unit.



SPC2 - Set-point compensation with outdoor temperature probe

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

Device installed and wired built-in the unit.



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.

ACIE - Antifreeze heater for internal exchanger protection

The option makes it possible to avoid the formation of ice in the plate exchanger and to preserve its correct operation.

This is an electric heating element fastened to the outside of the exchanger. It activates if the water temperature drops below a set limit.

The device is recommended during the winter when the unit is in stand-by or if the system is not in use for long periods of time.

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

When the unit is electrically disconnected, the device is not in operation.

The device only protects the water side exchanger. Anti-freeze protection of the plumbing connections is the responsibility of the client.

EHCS - Souce side antifreeze electric heaters

The option makes it possible to avoid the formation of ice in the plate exchanger and to preserve its correct operation.

This is an electric heating element fastened to the outside of the exchanger. It activates if the water temperature drops below a set limit.

The device is recommended during the winter when the unit is in stand-by or if the system is not in use for long periods of time.

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

When the unit is electrically disconnected, the device is not in operation.

The device only protects the water side exchanger. Anti-freeze protection of the plumbing connections is the responsibility of the client.

AP - Rear water fittings

The basic acoustic configuration (BN) is without water fittings both on source side and the user side. The water connection is made inside the unit (provided by the Customer).

This option semplifies the water connection placing the fittings flush to the unit both on source side and on user side.

It includes 4 internal pipes up to the unit external panel, 8 Victaulic fittings, 4 pieces "to be brazed" for the connection of the installation.

The rear water fittings are an option automatically selected matched to any hydronic assembly built-in to the unit (user side and source side).

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
- 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.

PSX - Mains power supply

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

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

Power supply at 230V AC provided by Customer

RCMRX - Remote control via microprocessor control

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

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

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

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

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

Installation provided by Customer

AVIBX - Anti-vibration mount support

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

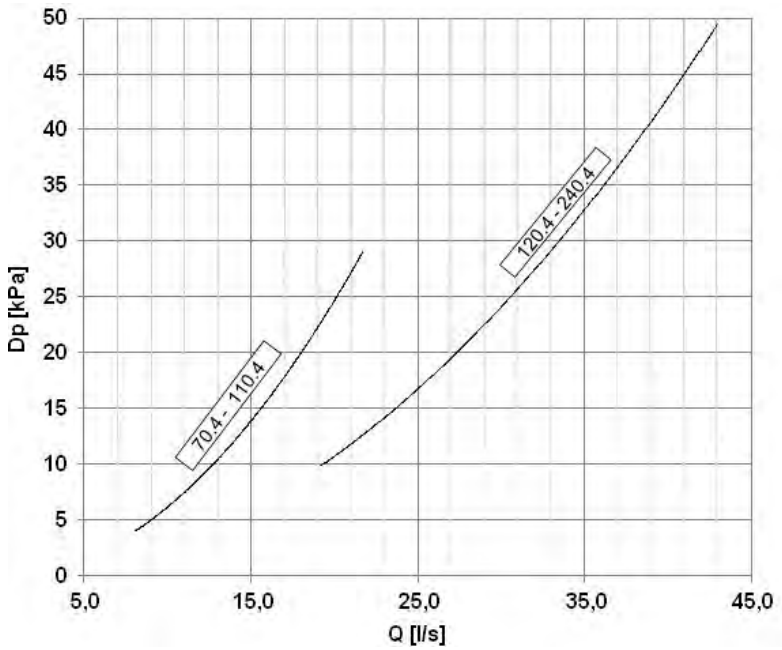
Installation provided by Customer

VS2MX- Source side 2-way modulating valve

Accessory with 1 globe modulating 2-way valve, equal-percentage.
The valve is suitable for pressure difference up to 2 bar for size from 70.4 to 110.4 and up to 1,5 bar for size from 120.4 to 240.4.
The 2-way modulating valve, modulates the flow of water in response to a 0-10 V signal from the unit's controller.
IInstallation is the responsibility of the Client.

Water fittings are flanged

2-way modulating valve pressure drops



SIZE		70.4 - 110.4	120.4-240.4
Max opening DP	[bar]	2	1,5
Max. seeping	[l/min]	2,4	3,7
Diameter		4"	5"

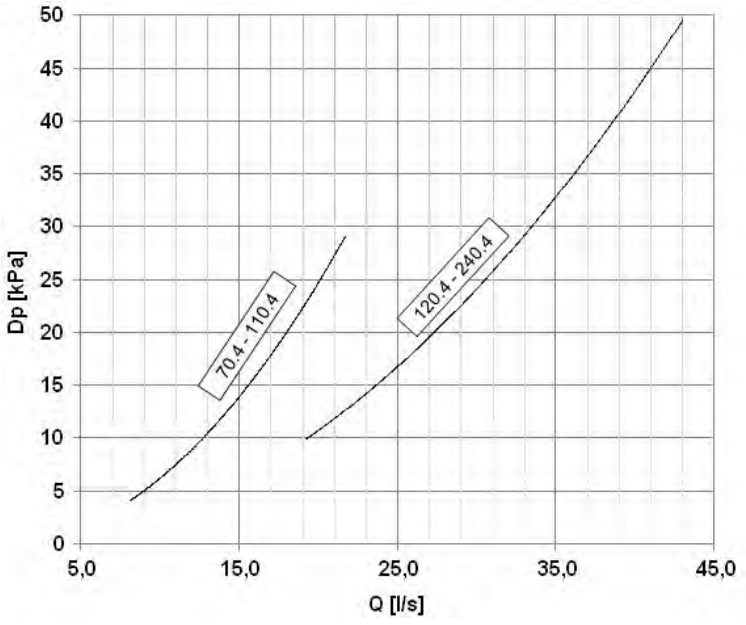
Q = Water flow rate [l/s]
DP = Pressure drop [kPa]

VS3MX - Source side 3-way modulating valve

Accessory with 1 globe modulating 3-way valve, equal-percentage.
The valve is suitable for pressure difference up to 2 bar for size from 70.4 to 110.4 and up to 1,5 bar for size from 120.4 to 240.4.
The 3-way modulating valve connects the source side exchanger intake and output, thus bypassing the exchanger and reducing the flow of water inside it, while keeping the machine's delivery flow constant.
The valve modulation is managed by a 0-10V signal generated by the unit electronic control.
IInstallation is the responsibility of the Client.

Water fittings are flanged

3-way modulating valve pressure drops



GRANDEZZE		70.4 - 110.4	120.4-240.4
Max opening DP	[bar]	2	1,5
Max. seeping	[l/min]	2,4	3,7
Diametro		4"	5"

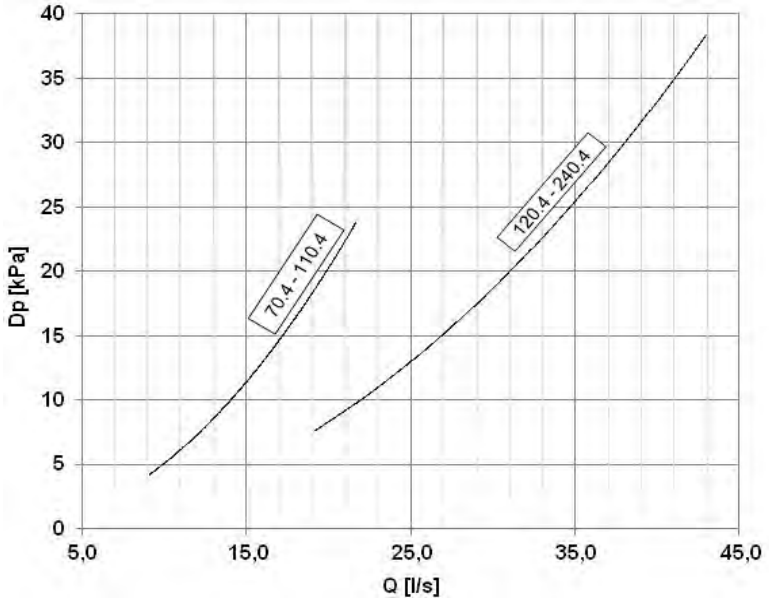
Q = Water flow rate [l/s]
DP = Pressure drop [kPa]

V2MSPX - Source side 2-way modulating valve for high DP

Accessory with 1 ball modulating 2-way valve, equal-percentage.
The valve is suitable for pressure difference up to 4 bar and guarantees a seeping equal to 0.
The 2-way modulating valve, modulates the flow of water in response to a 0-10 V signal from the unit's controller.
IInstallation is the responsibility of the Client.

Water fittings are flanged

2-way modulating valve for high DP pressure drops



SIZE		70.4 - 110.4	120.4-240.4
Max opening DP	[bar]	4	4
Max. seeping	[l/min]	0	0
Diameter		4"	5"

Q = Water flow rate [l/s]
DP = Pressure drop [kPa]

VACSUX - User side DHW switching valve

The utility side DHW switching valve is also supplied as a separate accessory.
The DHW is called by the closure of the potential-free contact present in the unit electric panel.In heating, the control regulates the 3-way valve commutation because it deviates the flow-rate from installation to DHW storage tank, changes the installation set into the DHW one, thermoregulates and activates or deactivates the compressors depending on the distance from the DHW set. In cooling, the control switches off the compressors due to the mode changing, regulates the 3-way valve commutation and starts the compressors after the safety time owed to on/off.

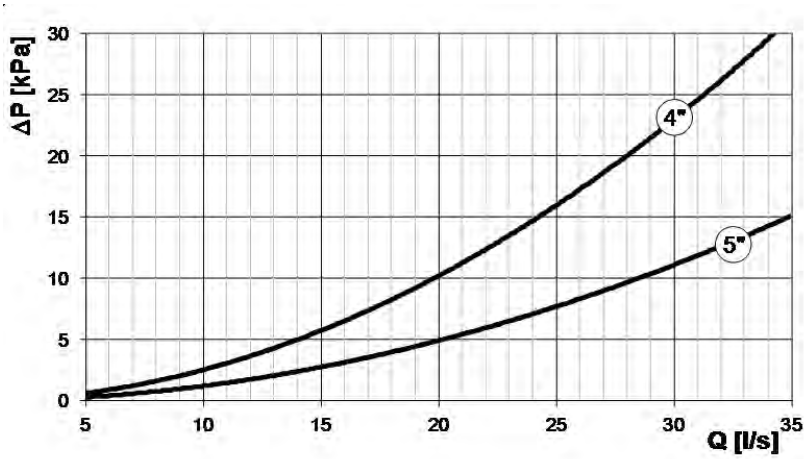
The DHW switching valve is made up of 2 throttle valve with no seeping.
The maximum pressure drops are lower than 5 kPa at at nominal flow rate conditions.

The DHW switching valve has a IP 40 protection degree.
It is therefore compulsory that client provides a protection for the external liquid valve.

IFWX - Steel mesh strainer on the 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 KNIT FILTER PRESSURE DROP



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

STEEL MESH FILTER FEATURES

SIZE	70.4 - 110.4	120.4-240.4
Diameter	4"	5"
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 and available both for user side and recovery side exchanger.

Option compatibility

REFERENCE	DESCRIPTION	70.4	75.4	80.4	85.4	90.4	100.4	110.4	120.4	140.4	160.4	180.4	200.4	220.4	240.4
CONFIGURATIONS AND MAIN ACCESSORIES															
(SFSTR)	Soft Start	0	0	0	0	0	0	0	0	0	0	-	-	-	-
EN - SUPER-SILENCED ACOUSTIC CONFIGURATION															
(ACL)	Internal water fittings provided by the Customer	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(AP)	Water connections at the rear	•	•	•	•	•	•	•	•	•	•	•	•	•	•
BN - BASIC ACOUSTIC CONFIGURATION															
(ACL)	Internal water fittings by the Customer	•	•	•	•	•	•	•	•	•	•	•	•	•	•
(AP)	Water fittings at the rear	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ACL - INTERNAL WATER FITTINGS PROVIDED BY THE CUSTOMER															
(HYGU2)	User side hydronic assembly with 2 ON/OFF pumps	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(HYGU1)	User side hydronic assembly with 1 ON/OFF pump	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(VARYU)	Varyflow + (user side 2 inverter pumps)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(HYP2U)	Hydropack user side with 2 pumps	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(VARYS)	Varyflow + (source side 2 inverter pumps)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(HYP2S)	Hydropack source side with 2 pumps	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(HYGS1)	Source side hydronic assembly with 1 ON/OFF pump	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(HYGS2)	Source side hydronic assembly with 2 ON/OFF pumps	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(V2MSP)	Source side 2-way modulating valve for high DP	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(V2MSPX)	Source side 2-way modulating valve for high DP (separately supplied)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(VS2M)	Source side 2-way modulating valve	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(VS2MX)	Source side 2-way modulating valve (separately supplied)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(VS3MX)	Source side 3-way modulating valve (separately supplied)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IVFDT - INVERTER DRIVEN VARIABLE FLOW-RATE USER SIDE CONTROL DEPENDING ON THE TEMPERATURE DIFFERENTIAL															
(HYGU2)	User side hydronic assembly with 2 ON/OFF pumps	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(HYGU1)	User side hydronic assembly with 1 ON/OFF pump	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(VARYU)	Varyflow + (user side 2 inverter pumps)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
(HYP2U)	Hydropack user side with 2 pumps	-	-	-	-	-	-	-	-	-	-	-	-	-	-

• Standard

0 Option

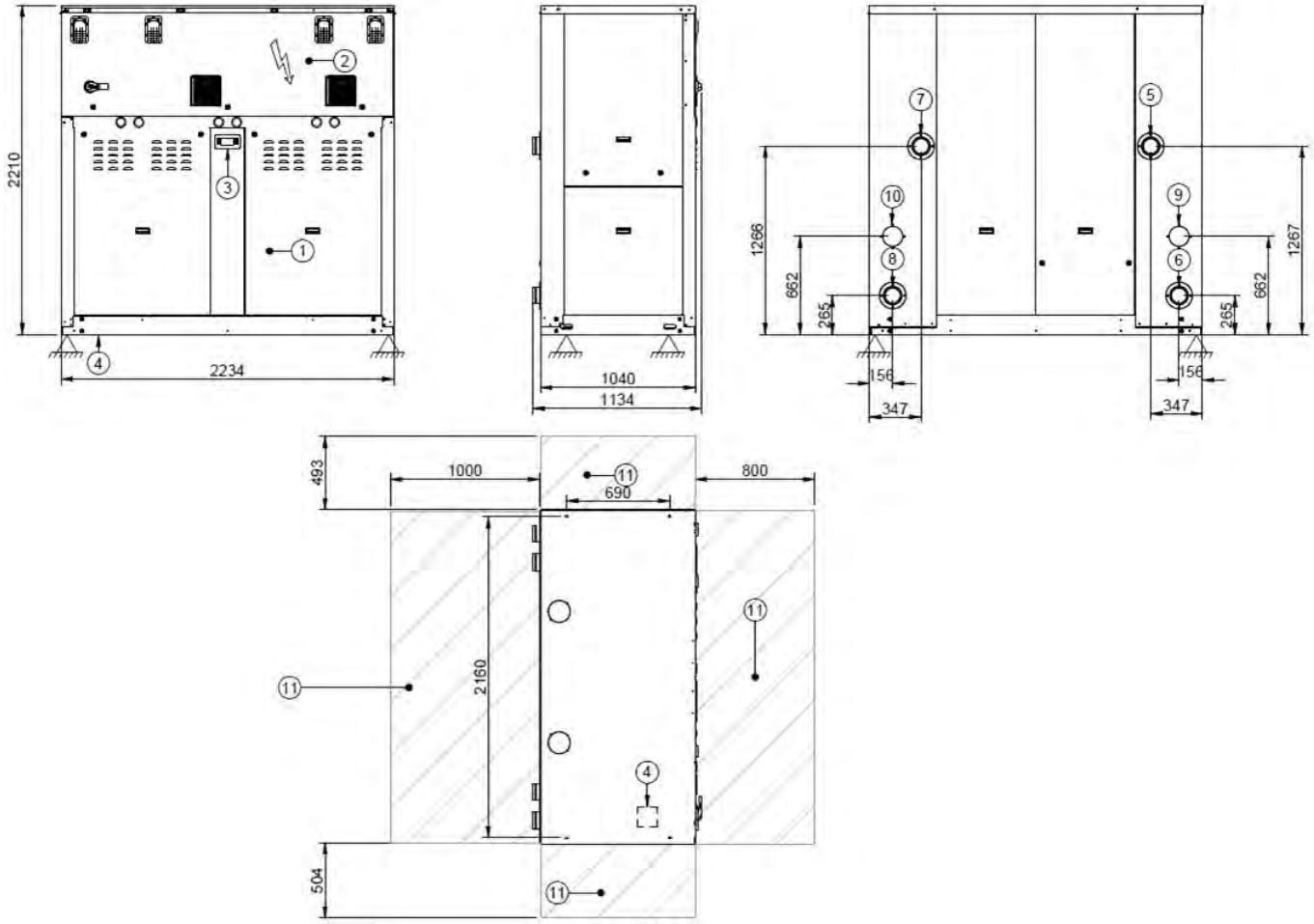
- Not available

Dimensional drawings

Acoustic configuration: Super-silenced (EN)

DAA8M70.4_110.4_EN REV00
Data/Date 03/10/2016

Size 70.4-110.4



1. Compressor compartment
2. Electrical panel
3. Unit control keypad
4. Power input
5. H2O return from the system source side
6. H2O supply to the system source side
7. H2O return from the system user side
8. H2O supply to the system user side
9. H2O return from the system source side without pumps
10. H2O return from the system user side without pumps
11. Functional clearances

Size		70.4	75.4	80.4	85.4	90.4	100.4	110.4
A - Length	mm	2234	2234	2234	2234	2234	2234	2234
B - Depth	mm	1460	1460	1460	1460	1460	1460	1460
C - Height	mm	2210	2210	2210	2210	2210	2210	2210
Shipping weight	Kg	1188	1210	1263	1284	1338	1509	1574
Operating weight	Kg	1242	1264	1322	1343	1406	1583	1651

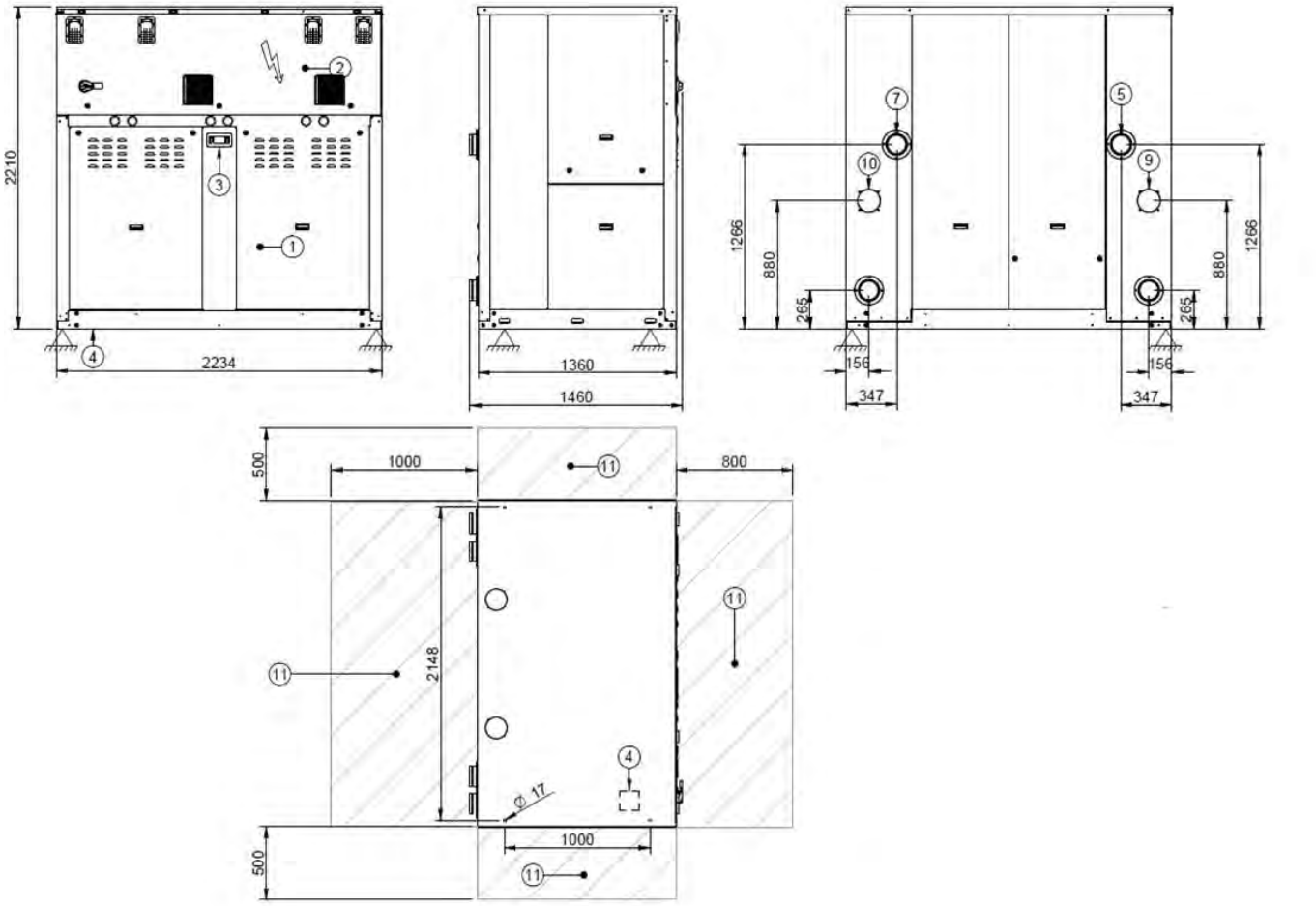
The presence of optional accessories may result in a substantial variation of the weights shown in the table.

Dimensional drawings

Acoustic configuration: Super-silenced (EN)

DAA8M120.4_240.4_EN REV00
Data/Date 03/10/2016

Size 120.4-240.4



1. Compressor compartment
2. Electrical panel
3. Unit control keypad
4. Power input
5. H2O return from the system source side
6. H2O supply to the system source side
7. H2O return from the system user side
8. H2O supply to the system user side
9. H2O return from the system source side without pumps
10. H2O return from the system user side without pumps
11. Functional clearances

Size		120.4	140.4	160.4	180.4	200.4	220.4	240.4
A - Length	mm	2234	2234	2234	2234	2234	2234	2234
B - Depth	mm	1460	1460	1460	1460	1460	1460	1460
C - Height	mm	2210	2210	2210	2210	2210	2210	2210
Shipping weight	Kg	1820	1894	2002	2163	2265	2382	2499
Operating weight	Kg	1924	2013	2121	2291	2411	2537	2668

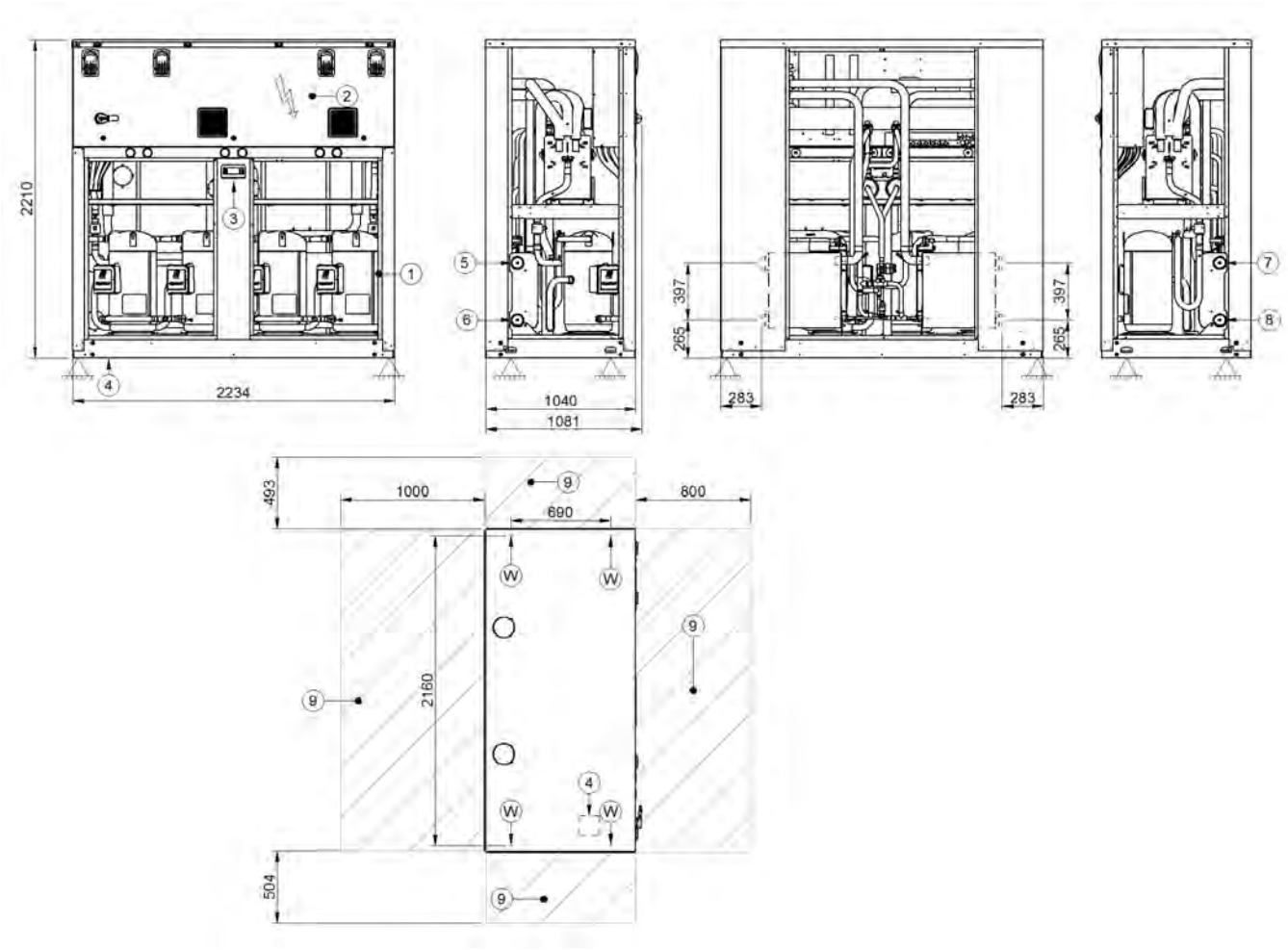
The presence of optional accessories may result in a substantial variation of the weights shown in the table.

Dimensional drawings

Acoustic configuration: base (BN)

DAA8M70.4_110.4_BN REV00
Data/Date 03/10/2016

Size 70.4-110.4



1. Compressor compartment
2. Electrical panel
3. Unit control keypad
4. Power input
5. H2O return from the system source side
6. H2O supply to the system source side
7. H2O return from the system user side
8. H2O supply to the system user sid
9. Functional clearances

Size		70.4	75.4	80.4	85.4	90.4	100.4	110.4
A - Length	mm	2234	2234	2234	2234	2234	2234	2234
B - Depth	mm	1040	1040	1040	1040	1040	1040	1040
C - Height	mm	2210	2210	2210	2210	2210	2210	2210
Shipping weight	Kg	1058	1080	1133	1154	1208	1379	1444
Operating weight	Kg	1111	1133	1192	1213	1276	1453	1521

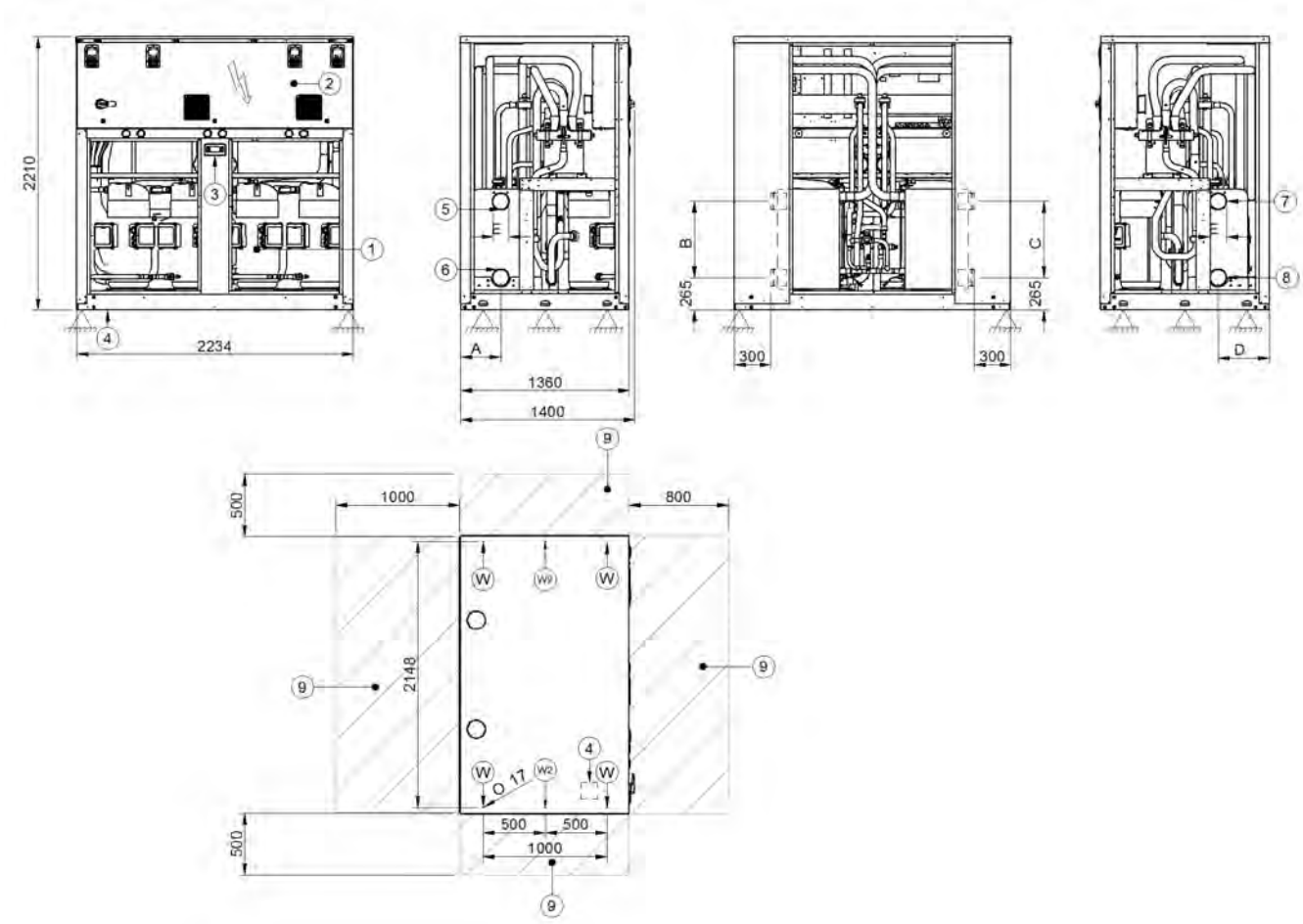
The presence of optional accessories may result in a substantial variation of the weights shown in the table.

Dimensional drawings

Acoustic configuration: base (BN)

Size 120.4-240.4

DAA8M120.4_240.4_BN REV00
Data/Date 03/10/2016



1. Compressor compartment
2. Electrical panel
3. Unit control keypad
4. Power input
5. H2O return from the system source side
6. H2O supply to the system source side
7. H2O return from the system user side
8. H2O supply to the system user sid
9. Functional clearances

Size		120.4	140.4	160.4	180.4	200.4	220.4	240.4
A - Length	mm	2234	2234	2234	2234	2234	2234	2234
B - Depth	mm	1360	1360	1360	1360	1360	1360	1360
C - Height	mm	2210	2210	2210	2210	2210	2210	2210
Shipping weight	Kg	1662	1736	1845	2005	2107	2225	2340
Operating weight	Kg	1766	1855	1963	2132	2253	2378	2510

The presence of optional accessories may result in a substantial variation of the weights shown in the table.

CLIVET SPA
Via Camp Lonc 25, Z.I. Villapaiera - 32032 Feltre (BL) - Italy
Tel. + 39 0439 3131 - Fax + 39 0439 313300 - info@clivet.it

CLIVET UK LTD (Sales)
4 Kingdom Close, Segensworth East - Fareham, Hampshire - PO15 5TJ - United Kingdom
Tel. + 44 (0) 1489 572238 - Fax + 44 (0) 1489 573033 - info@clivet-uk.co.uk

CLIVET AIRCON LTD (Service and Maintenance Division)
Units F5&F6 Railway Triangle Ind EST, Walton Road - Portsmouth, Hampshire - PO6 1 TG - United Kingdom
Tel. + 44 (0) 2392 381235 - Fax + 44 (0) 2392 381243 - info@clivetaircon.co.uk

CLIVET ESPAÑA COMERCIAL S.L. (Sales)
Calle Gurb, 17 1° 1ª - 08500 Vic, Barcelona - España
Tel. + 34 93 8606248 - Fax + 34 93 8855392 - info@clivetcomercial.es

CLIVET ESPAÑA S.A.U. (Service and Maintenance Division)
Calle Real de Burgos n°12 - 28860, Paracuellos del Jarama, Madrid - España
Tel. + 34 91 6658280 - Fax + 34 91 6657806 - info@clivet.es

CLIVET GmbH
Hummelsbütteler Steindamm 84, 22851 Norderstedt - Germany
Tel. + 49 (0) 40 32 59 57-0 - Fax + 49 (0) 40 32 59 57-194 - info.de@clivet.com

CLIVET RUSSIA
Elektrozavodskaya st. 24, office 509 - 107023, Moscow, Russia
Tel. + 74956462009 - Fax + 74956462009 - info.ru@clivet.com

CLIVET MIDEAST FZCO
Dubai Silicon Oasis (DSO), High Bay Complex, Ind Unit No. 3 - PO Box 342009 - DUBAI, UAE
Tel. + 97 14 3208499 - Fax + 97 14 3208216 - info@clivet.ae

CLIVET AIRCONDITIONING SYSTEMS PRIVATE LTD
3C3, Gundecha Onclave - Kherani Road, Saki Naka, Andheri (East), Mumbai 400 072 (INDIA)
Tel. + 91 - 22 - 6193 7000 - Fax + 91 - 22 - 6193 7001 - sales.india@clivet.com