

# ELFOEnergy Magnum - Multifunction

Air-cooled heat pump with simultaneous production hot / cold for outdoor installation

## WSAN-XEM MF 50.4 - 120.4 RANGE

Nominal heating capacity **(A7/W45)** from 157 kW to 381 kW

Nominal cooling capacity **(A35/W7)** from 139 kW to 324 kW



- ▶ **R-410A MODULAR SCROLL TECHNOLOGY**
- ▶ **TWO INDEPENDENT REFRIGERATION CIRCUITS**
- ▶ **AXITOP FAN (optional for size 70.4 - 120.4)**  
Silent operation and reduced fan consumptions
- ▶ **ECOBREEZE FANS (optional for size 70.4 - 120.4)**  
For a further increase in efficiency
- ▶ **VARYFLOW + (optional)**  
Variable water flow-rate with inverter pumps



## Clivet hydronic system

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

### HYDRONIC System - Air Source

|                                        | Small and Medium Commercial                                                                              |                                                        |                                                          | Large Commercial and Industry                                                                   |                                      |                                                          |
|----------------------------------------|----------------------------------------------------------------------------------------------------------|--------------------------------------------------------|----------------------------------------------------------|-------------------------------------------------------------------------------------------------|--------------------------------------|----------------------------------------------------------|
|                                        |                                                                                                          |                                                        |                                                          |                                                                                                 |                                      |                                                          |
|                                        | <b>ELFOEnergy Extended Inverter</b><br><b>ELFOEnergy Duct Inverter/Horus</b><br><b>ELFOEnergy Vulcan</b> |                                                        |                                                          | <b>SPINchiller<sup>1</sup> / SPINchiller<sup>1</sup> Duct</b><br><b>Multi Scroll Technology</b> |                                      |                                                          |
| Capacity (kW/RT)                       | 5 ÷ 50 kW                                                                                                |                                                        |                                                          | 120 ÷ 680 kW                                                                                    |                                      |                                                          |
| ErP compliance (heat pumps only)       | ErP A                                                                                                    |                                                        |                                                          | ErP A                                                                                           |                                      |                                                          |
| Products                               |                                                                                                          |                                                        |                                                          |                                                                                                 |                                      |                                                          |
| Chillers                               | WSAT-XIN<br>EXC A<br>PRM D                                                                               | WSAT-XEE<br>EXC A<br>PRM D                             | WSAT-XIN<br>EXC A<br>PRM D<br>WSAT-XEM<br>EXC A<br>PRM D | WSAT-XSC3<br>SUP A<br>EXC A<br>PRM D                                                            | WSAT-XSC3<br>SUP A<br>EXC A<br>PRM D | WDAT-SL3<br>EXC A<br>PRM D<br>WDAT-4L3<br>EXC A<br>PRM D |
| High Temperature Chillers External Air |                                                                                                          |                                                        | WSAT-XEM<br>EXC A                                        |                                                                                                 |                                      | WDAT-SL3<br>EXC A                                        |
| Chillers Systems in two sections       |                                                                                                          |                                                        |                                                          | REMOTEX<br>EXC A<br>PRM D                                                                       | REMOTEX<br>EXC A<br>PRM D            |                                                          |
| Free Cooling Chillers                  |                                                                                                          | WSAT-XEE (FC)<br>A                                     | WSAT-XEM FC<br>EXC A                                     | WSAT-XSC3 FC<br>EXC A                                                                           | WSAT-XSC3 FC<br>EXC A                | WDAT-SL3 FC<br>EXC A                                     |
| Heat pumps                             | WSAN-XIN<br>EXC A<br>PRM D<br>HORUS<br>A                                                                 | WSAN-XEE<br>A<br>B                                     | WSAN-XIN<br>EXC A<br>PRM D<br>WSAN-XEM<br>EXC A          |                                                                                                 |                                      |                                                          |
| High temperature water Heat pumps      | WBAN<br>A                                                                                                | WBAN<br>A                                              | WSAN-XEM HW<br>EXC A                                     |                                                                                                 |                                      |                                                          |
| Multi-function Heat pumps              |                                                                                                          |                                                        | WSAN-XIN MF<br>EXC A<br>WSAN-XEM MF<br>EXC A             |                                                                                                 |                                      |                                                          |
| Ducted units                           | WSA-XIN<br>EXC A<br>PRM D<br>WSN-XIN<br>EXC A<br>PRM D                                                   | WSA-XEE<br>EXC A<br>PRM D<br>WSN-XEE<br>EXC A<br>PRM D |                                                          | WSA-XSC2<br>EXC A<br>PRM D                                                                      |                                      |                                                          |

### 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 the standard electronic filters
- Increases the energy efficiency and it also allows a savings of 40% on the running costs
- From -40°C to +50°C of outdoor air temperature

#### Terminal and AHU complete system

The hydronic terminal units are very diffused for their versatility and reliability. The Clivet range includes many versions that simplify the application in different 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

# ELFOEnergy Magnum: modular scroll technology for every application

## MAGNUM MULTIFUNCTION

### WSAN-XEM MF:

- Air cooled heat/cool heat pump with simultaneous operating
- EXCELLENCE high efficiency version
- 4-pipe system
- 2-pipe system and total condensing heat recovery



## MAGNUM HEAT PUMP

### WSAN-XEM:

- Air cooled heat pump
- EXCELLENCE high efficiency version



## MAGNUM COOL ONLY

### WSAT-XEM:

- Air cooled water chiller
- EXCELLENCE high efficiency version
- PREMIUM compact version
- Total/partial recovery of the condensing heat



## MAGNUM HEAT PUMP HIGH TEMPERATURE

### WSAN-XEM HW:

- Air cooled heat pump
- EXCELLENCE high efficiency version
- Production of hot water up to 65°C
- Extended operating range



## Many applications require heating and cooling simultaneous production

Simultaneous opposite loads is a very frequent situation in many applications.

Large size buildings, aspect, variable insulation and different purpose ambient make recurring the request of heating and cooling simultaneously.

Many different technical solutions could be used at this purpose. Clivet believes since ever that solution differentiation is the key for success and consequently present diversified solutions for answering to only apparently similar demands.



### Traditional way

The solution very common in the past is the independent production of heating and cooling thermal energy and transferring them to different ambient.

Thermal energy production thanks to one or many boilers and cooling power production with chillers is one possible solution.

Low efficiency of such kind system is well known, indeed during the periods where cooling and heating are simultaneously required, cooling energy production rejects a large quantity of thermal energy to a source and this is the working principle of a standard chiller, energy that could be used instead, supporting for example other thermal energy sources or as total replacement.



### Enhanced hydronic system

Clivet, since ever pioneer of innovative solutions proposes Enhanced hydronic system as optimal solution for 90% of applications where simultaneous opposite loads are present.

Building blocks are:

- Magnum or SPINChiller heat pump;
- Primary Energy decentralized system Zephir;
- ELFOspace fancoils



Thanks to a proper primary air design and using Clivet products around 30% annual energy saving is achievable and with a more competitive capital investment\*.

### MULTIFUNCTION Option

Hydronic multifunction units, able to produce hot water and chilled water simultaneously and independently is the optimal solution for some industrial applications or where the four pipe air conditioning system is required.

Heat pump product family called MULTIFUNCTION (MF) is the Clivet answer.

\*Dedicated documented.

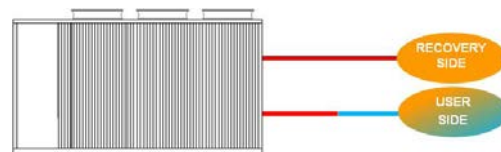
## MULTIFUNCTION by CLIVET

ELFOEnergy MAGNUM and SPINChiller<sup>3</sup> MF are the two air source heat pump families for simultaneous production of hot and chilled water.

Configuration available:

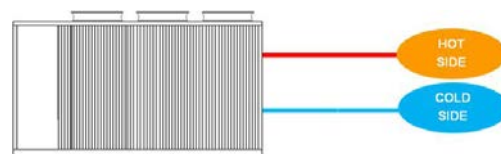
- **2T:** supply water for two pipe systems

- produce chilled water or hot water to the system;
- supply hot water using the total recovery device for domestic hot water tanks, pre or post heating simultaneously with chilled water production;



- **4T:** supply water for four pipe systems;

- produce chilled water and hot water to the system simultaneously and independently.



## 360° of efficiency

During a whole year and during the same day heating and cooling demand hugely vary with hot-cool combinations very unstable, function of many factors, among others: latitude and altitude of installation, building features and functionalities of different ambient.

Unit will mainly work in simultaneous heating-cooling mode with varying combinations over the time.

Clivet unit distinguishes for this working mode offering the best efficiency performance thanks to used solutions.

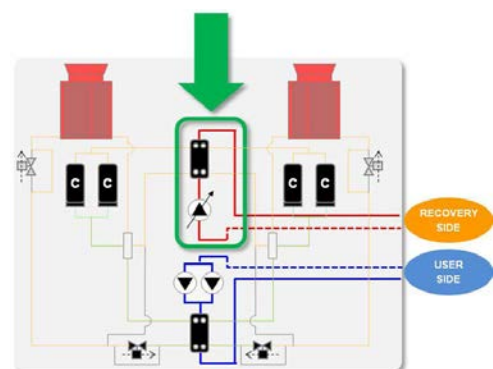
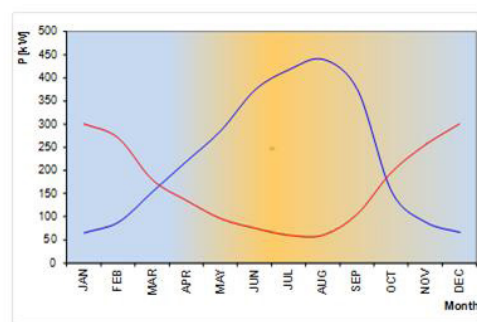
Refrigerant scheme allows both the partial and the total recovery mode for the MULTIFUNCTION heat exchanger according to thermal energy required.

Completely automatic set-up and system control logic adjusts the mode according the most efficient performance.

Completely automatic set-up and system control logic adjusts the mode according the most efficient performance. During a whole year more than half of energy provided is produced during unbalanced capacity demand where MULTIFUNCTION offer the best performances. Using the heat exchanger as a partial recovery device drives to an higher efficiency of 5% compared to solutions not using this working mode.

Real benefits in terms of efficiency and reliability:

- Few mode switches, reset where thermal capacity is less than 25% of cooling capacity;
- Improved reliability thanks to modulation and without on-off switches;
- Precise set-up thanks to modulation with less mode switches;
- Additional 3% savings on annual energy consumption comparing to standard multifunction units.



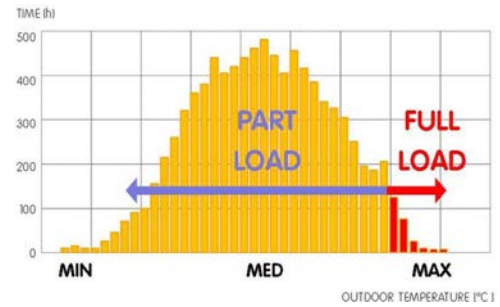


## Maximum efficiency is necessary with a part load

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.



## Magnum technology enhances part-load efficiency

Magnum uses high efficiency Scroll compressors.

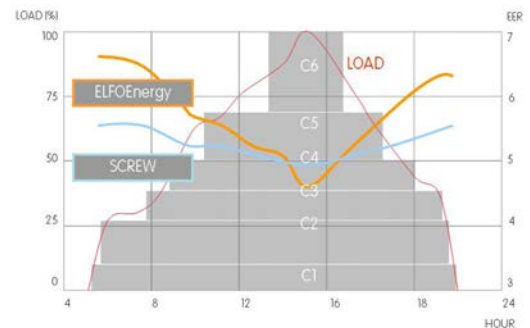
The advantages are:

- 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

## Efficient precision

Sequential activation of ELFOEnergy Magnum 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.



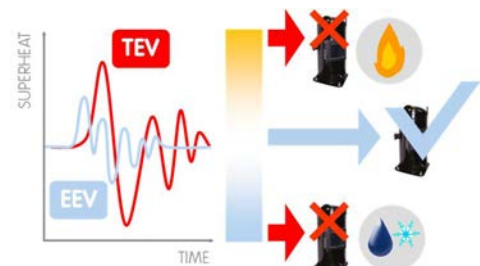
THE NUMBER OF START-UPS DECREASES THEREFORE THE LIFE CYCLE INCREASES

## Control of the refrigerant flow

The load variability involves the continuous variation of the refrigerant volume moved by compressors.

The electronic expansion valve (EEV), standard on Clivet units, adapts rapidly and precisely to the actual load required for usage, allowing stable and reliable control 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.



## Doubled efficiency

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

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



EERc = Energy efficiency referred to compressors

## Efficient and silent ventilation technology (optional)

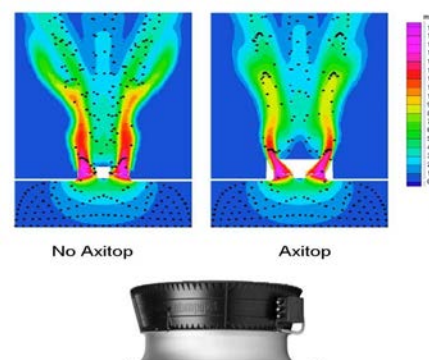
Available only for size 70.4 ÷ 120.4.

It is possible to further increase the seasonal efficiency with the innovative air handling system on the external exchangers.

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

All AXITOP components are aerodynamically optimized enhancing significantly the efficiency and reducing the impeller speed and consequently the noise. Obtaining:

- down to -3 dB of silence
- reduction of 3% of the absorbed energy



## ECOBREEZE fans, electronically controlled (optional)

Available only for size 70.4 ÷ 120.4.

With ECOBREEZE, the electric motor with an external rotor is driven by the continuous magnetic switching of the stator, deriving from the integrated electronic control.

The advantages are:

- **70% increase in efficiency** thanks to the brushless technology and the special electricity supply;
- **increase in the working life**, thanks to the elimination of the brush wear;
- **Reduction in the electrical consumption by the system**, thanks to a drastic reduction of the inrush current for the fans obtained using the integrated 'Soft starter' function.

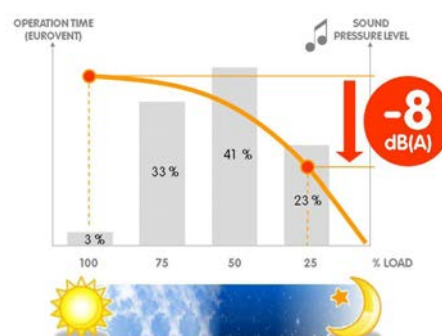


## Fans at variable speed for minimal noise emission

All units are supplied with a **condensation electronic control**. It automatically reduces the fan speed as the heat load drops.

Since the fans are the unit's main noise source, the benefits are evident especially during the night hours, when the load is reduced but sensitivity to noise is enhanced.

All this translates into a **sound pressure reduced down to 8 dB(A)** compared to full load operation in 90% of operating time of the unit.



## Water flow-rate continuous modulation (optional)

The energy used for the vector pumping is fundamental on the seasonal efficiency.

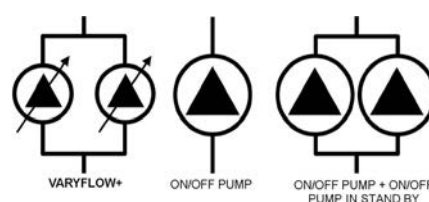
The **VARYFLOW + modulating pumping** unit made up of two pumps in parallel controlled by inverter, allows a precise water flow-rate modulation reducing notably the consumptions and at the same time it guarantees its functionality also in case of temporary unavailability of one of the two pumps, guaranteeing about the 80% of the nominal flow-rate.

The **water flow-rate** is modulated by keeping the supply/return water temperature differential constant

If the installation water temperature is in critical conditions, **VARYFLOW+** allows to extend the ELFOEnergy Magnum operating ranges guaranteeing the operating.

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 pump and in case of any failure it signals the damage and automatically activates the stand-by pump.



## Built-in inertial accumulation available (optional)

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

## 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).

It allows the management of several units in cascade up to 1 master and 6 slave (Ecoshare)

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



## Smart management of defrosts

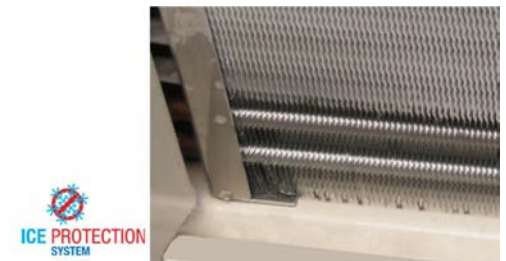
The automatic defrost cycles on the remaining external exchanger surface are managed in **ALTERNATED mode for each refrigeration circuit**, guaranteeing the 50% of the delivered capacity. The built-in electronic control analyzes not only the external conditions but also the evaporating pressure variations in the exchanger.



## Coils protected against the formation of ice

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

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





## Remote system management

Magnum 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.



## 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.



## Modularity

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

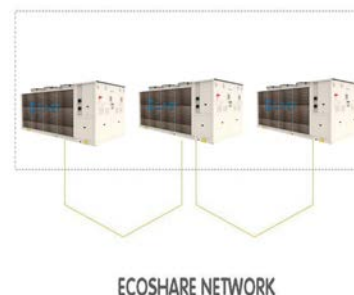
The Magnum units are designed to be connected in parallel in modular logic, thereby granting the following advantages:

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).



# Standard unit technical specifications

## Compressor

First circuit: Hermetic scroll compressors in tandem, equipped with a motor protection device for overheating, overcurrents and excessive temperatures of the supply gas. They are installed on anti-vibration mounts and equipped with oil charge. An oil heater, which starts automatically, keeps the oil from being diluted by the refrigerant when the compressor stops.

Second circuit: Hermetic scroll compressor in tandem equipped with a motor protection device for overheating, overcurrents and excessive temperatures of the supply gas. They are installed on anti-vibration mounts and equipped with oil charge. An oil heater, which starts automatically, keeps the oil from being diluted by the refrigerant when the compressor stops.

## Structure

Supporting structure realised with steel frame with zinc-magnesium superficial treatment painted with polyester powder RAL 9001, that ensures excellent mechanical features and high long-term resilience against corrosion.

## Panelling

External pre-painted zinc-magnesium panelling 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 with large exchange surface and complete with external heat and anti-condensate insulation.

The exchanger is complete with:

- differential pressure switch, water side
- antifreeze heater to protect the water side exchanger, preventing the formation of frost if the water temperature falls below a set value.

## Total recovery exchanger

Direct expansion heat exchanger, braze-welded AISI 316 stainless steel plates with large exchange surface and complete with external heat and anti-condensate insulation.

The exchanger comes complete with:

- differential pressure switch, water side
- antifreeze heater to protect the water side exchanger, preventing the formation of frost if the water temperature falls below a set value.

## External exchanger

Direct expansion finned exchanger, made from copper pipes in staggered rows and mechanically expanded to the fin collars. The fins are made from aluminium with a corrugated surface and adequately distanced to ensure the maximum heat exchange efficiency.

## Fan

Helical fans with shaped aluminium blades coupled directly to a three phase electric motor with thermal protection incorporated in version IP 54. Located in aerodynamically shaped nozzles to increase efficiency and minimise noise levels. They are fitted with protective safety guard grilles and supply with variable speed electronic control (phase cutting).

## Refrigeration circuit

Double refrigeration circuit complete, for each circuit, with:

- replaceable anti-acid solid cartridge dehydrator filter
- high pressure safety pressure switch
- high pressure transducer
- low pressure transducer
- liquid receiver
- liquid separator
- refrigerant temperature probe
- double electronic thermostatic expansion valve
- inversion valve of the 4-way cycle
- non-return valve
- high pressure safety valve
- low pressure safety valve
- cutoff valve on compressor supply
- cutoff valve on liquid line

## Electrical panel

The capacity section includes:

- main door lock isolator switch
- isolating transformer for auxiliary circuit power supply
- on-off "C1" and "C2" scroll compressor protection magnetothermic
- inverter scroll compressor protection fuses (size from 50.4 to 65.4)
- fan overload circuit breakers (size from 70.4 to 120.4)
- on-off "C1" and "C2" scroll compressor control contactor

**The control section includes:**

- interface terminal with graphic display
- display of the set values, the error codes and the parameter index
- keys for ON/OFF control, cool and heat operating modes, alarm reset
- proportional-integral water temperature control
- daily, weekly programmer of temperature set-point and unit on/off
- set point compensation in function of the outdoor air temperature
- set-point compensation with signal 0-10 V
- unit switching on management by local or remote (serial)
- antifreeze protection water side
- compressor overload protection and timer
- prealarm 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
- Input for remote ON/OFF control
- relay for remote cumulative fault signal
- inlet for demand limit (power input limitation according to a 0÷10V external signal)
- digital input for double set-point enabling
- potential-free contacts for compressor status
- phase monitor
- ECOSHARE function for the automatic management of a group of units
- 0÷10V signal output and potential-free contact for auxiliary heater
- enabling of DHW preparation in relation to remote consent
- numeration of electrical panel cables

**Unit equipment with low outdoor temperatures**

| Minimum outdoor air temperature | Operating unit  |                                           | Unit in stand-by ***<br>(fed unit)        | Unit in storage<br>(unit not fed)                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------|-----------------|-------------------------------------------|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                 | Freddo*         | Caldo**                                   |                                           |                                                                                                                                                                                                                                                                                                                                                                                                                     |
| +11°C                           | √ standard unit | √ standard unit                           | √ standard unit                           | √ standard unit<br><br>Unit without water or containing water with an appropriate quantity of glycol.<br><br>At the unit start-up the water temperature or water with glycol must be inside the operating range indicated in the "Operating range" graph.<br><br>To know the water freezing temperature at the glycol percentage changing refer to the specific 'Correction factor for antifreeze solutions' table. |
| +2°C                            |                 |                                           |                                           |                                                                                                                                                                                                                                                                                                                                                                                                                     |
| -5°C                            |                 |                                           |                                           |                                                                                                                                                                                                                                                                                                                                                                                                                     |
| -7°C                            |                 |                                           |                                           |                                                                                                                                                                                                                                                                                                                                                                                                                     |
| -10°C                           |                 |                                           |                                           |                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Tra -10°C e -18°C               | NOT POSSIBLE    | √ glycol in an appropriate percentage (1) | √ glycol in an appropriate percentage (1) |                                                                                                                                                                                                                                                                                                                                                                                                                     |

Data referred to the following conditions:

\* Production of chilled water:

internal exchanger water = 12/7°C

\*\* Production of hot water:

internal exchanger water = 30/35 °C

\*\*\* consider the unit powered electrically, with active control on pumping units. It is recommended to set a set-point value lower than standard (eco mode)

1. Operating range where the water pumping unit must be powered and always active, or with a periodical activation of the outdoor temperature operating pump to guarantee the correct unit operation

At the unit start-up the water temperature or water with glycol must be inside the operating range indicated in the "Operating range" graph.

To know the water freezing temperature at the glycol percentage changing refer to the specific 'Correction factor for antifreeze solutions' table.



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

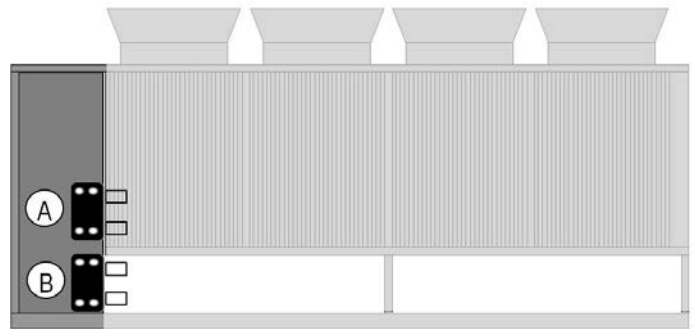
## 4T configuration - For 4-pipe systems

4T configuration supply air conditioning systems with 4 tubes and it is able to supply hot water and chilled water simultaneously and independently on season.

This configuration allows:

- Simultaneous hot water production to the hot user side with chilled water production to the cold user side;
- Hot water production to the hot user side with cooling capacity rejection to the external thermal source;
- Chilled water production to the cold user side with heating capacity rejection to the external thermal source.

Unit controller guarantees unit operation in mix mode conditions.



A: cold user side exchanger  
B: hot user side exchanger

## Considerations on the installation

### Desuperheater mode

The standard unit control at part load changes the water flow-rate, hot side, maintaining the supply temperature at the target value. Through the flow modulation the standard unit can produce hot water even over the set-point, up to a settable limit temperature (default 65°C). Thanks to this setting the exchanger operation time, hot user side, is extended in desuperheater mode, improving the unit efficiency of 5% compared to the desuperheater mode not active.



The logic of control above described drives to a proper design of hydraulic components and safety devices, considering the upper limit of hot water. It is possible to decrease this temperature down to the set point, not having the energy efficiency benefits that desuperheater solution leads.

### System water volume

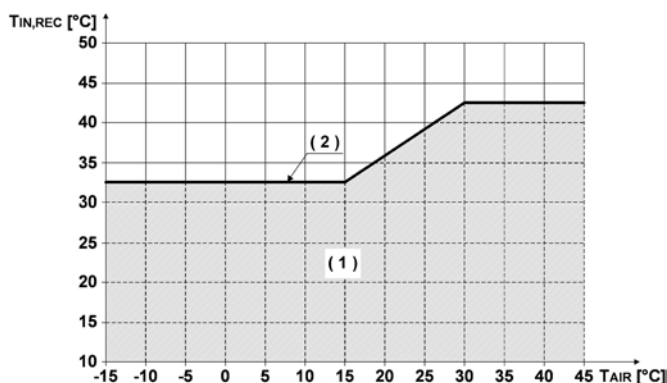
For a proper operation of MULTIFUNCTION 4T unit is necessary to contemplate a correct design of water tanks both on cold user side and hot user side.

Minimum system water volumes are described within 'General technical data' section and they have to be satisfied to avoid continuous compressor switching on and off.

We recommend to double minimum water volumes described for small deviations from set-point and a stable operation mode even in the most extreme conditions, such as simultaneously to an huge heating capacity demand there is a small cooling capacity demand.

### Operation with water low temperatures on the exchanger, recovery side

When the hot water production function is enabled to the recovery but the water temperature is too low, the water produced to the recovery will have a temperature higher than the minimum level indicated in the graph. If this unit operating requirement is not acceptable, it is recommended to provide on the recovery side a primary - secondary where the secondary is maintained at the desired operating temperature while the primary will have a consistent operating temperatures within the limits shown in the graph



$T_{IN,REC}$  [°C] = Entering water temperature to recovery  
 $T_{AIR}$  [°C] = entering external exchanger air temperature (D.B.)

1. Transient operating range where unit operates forcing on the recovery set-point (if the recovery function is enabled)
2. Minimum system water temperature level, recovery side

### Hot side water flow-rate

When pumps are not built-in it is necessary to contemplate hot user side water flow-rate modulation, managed by the unit with a 0-10V signal.

### Cold side water flow-rate

For a correct unit operation in all the possible circuit switching, it is necessary to ensure the water flow-rate, cold side, even when usually chilled water is not requested. This results in maintaining in stand-by and available the pump at the primary circuit start-up in the cold season. If the pumping unit may not be installed built-in, the external pumps start signal must be managed by the unit taking it from the specific potential-free contact in the electrical panel.

## 4-pipe unit operating range

The unit is capable of producing chilled or hot water at the same time throughout the year. Chilled water is only produced on the cold side. Hot water is only produced on the hot side.

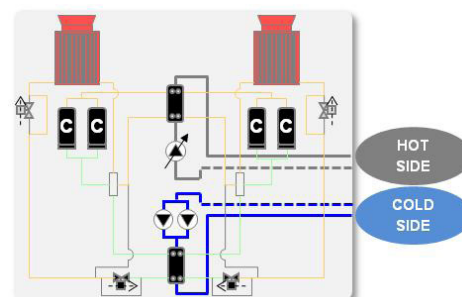
By providing the unit with an DHW switching valve (VACSRX) it is possible to prioritise domestic hot water production over system side heating requirements.

### Example of how the unit operates:

#### Cooling requirement 100%, Heating requirement 0%:

In this condition all the cooling capacity is released to the cold side of the heat exchanger and maintenance of the cold side set point is ensured through the modulation of the capacity steps.

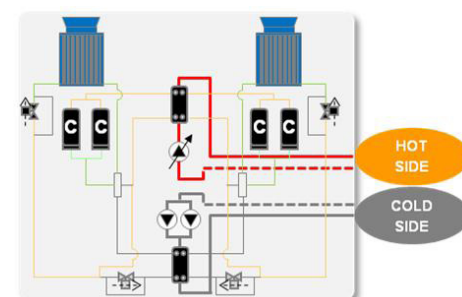
All the heating capacity is dispersed on the finned coil exchanger. The pump control on the hot side may be activated or deactivated based on a schedule to keep water temperature under control.



#### Cooling requirement 0%, Heating requirement 100%:

In this condition all the heating capacity is released to the hot side of the heat exchanger and maintenance of the hot side set point is ensured through the modulation of the capacity steps.

All the cooling capacity is dispersed on the finned coil exchanger. Cooling capacity is not released on the cold side: the cold side pump control may be kept activated at a minimum or it may be activated and deactivated based on a regular schedule to keep water temperature under control.

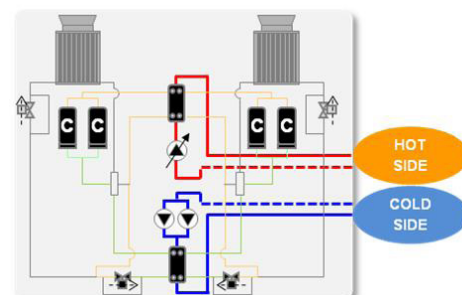


#### Cooling requirement 100%, Heating requirement 100%:

In this condition all the cooling capacity is released to the cold side of the heat exchanger while all the heating capacity is released to the hot side of the heat exchanger.

Maintenance of the hot side/cold side set point is ensured through the modulation of the capacity steps, according to the operation mode used (hot side in winter operation, cold side in summer operation).

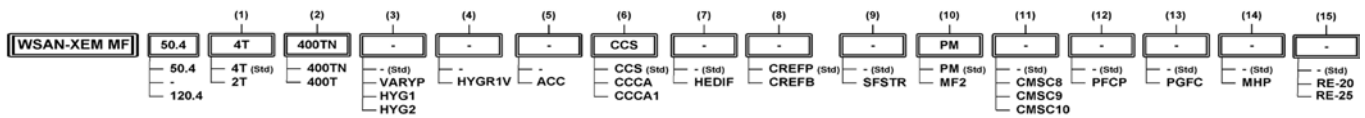
In this condition, the overall efficiency of the unit, defined as (cooling capacity for use + heating capacity for recovery)/(total power input) is very high.





# Configuration for 4-pipe system

## Unit configurations



### (1) Functionalities

4T - Unit for 4-pipe system (standard)  
2T - Unit for reversible 2-pipe system

### (2) Voltage

Supply voltage 400/3/50+N (only for size 50.4 ÷ 65.4)  
Supply voltage 400/3/50 (only for size 70.4 ÷ 120.4)

### (3) Cold side hydronic assemblies

Refer to the diagrams of the hydronic assembly reported

### (4) Hot side hydronic assemblies

Refer to the diagrams of the hydronic assembly reported

### (5) Storage tank

(-) Not required (standard)  
ACC - Storage tank

### (6) Condensing coil

CCS - Standard condenser coil (standard)  
CCCA - Copper / aluminium condenser coil with acrylic lining  
CCCA1 - Condenser coil with Energy Guard DCC Aluminum

### (7) Diffuser for fans

(-) Not required (standard)  
HEDIF - Diffuser for high efficiency axial fan (only for size 70.4 ÷ 120.4)

### (8) Type of fans

CREFP - Device for consumption reduction of the external section at variable speed (phase-cutting) (standard)  
CREFB - Device for consumption reduction of the external section ECOBREEZE fans (only for size 70.4 ÷ 120.4)

### (9) Soft starter

(-) Not required (standard)  
SFSTR - Disposal for inrush current reduction

### (10) Phase monitor

PM - Phase monitor (standard)  
MF2 - Multi-function phase monitor

### (11) Serial communication module

(-) Not required (standard)  
CMSC8 - Serial communication module to BACnet supervisor  
CMSC9 - Serial communication module to Modbus supervisor  
CMSC10 - Serial communication module to LonWorks supervisor

### (12) Power capacitors

(-) Not required (standard)  
PFCP - Power factor correction capacitors (cosφ>0.9)

### (13) Protection grill

(-) Not required (standard)  
PGFC - Finned coil protection grill

### (14) High and low pressure gauges

(-) Not required (standard)  
MHP - High and low pressure gauges

### (15) Electrical panel anti-freeze protection

(-) Not required (standard)  
RE-20 - Electric panel antifreeze protection for minimum ambient temperature up to -20 °C  
RE-25 - Electric panel antifreeze protection for minimum ambient temperature up to -25 °C

| Funzionalità                   | Schemi gruppi idronici |                                    |                                |                                 |
|--------------------------------|------------------------|------------------------------------|--------------------------------|---------------------------------|
| 4 PIPE SYSTEM<br><br>COLD SIDE | Standard unit (STD)    | Unit with VARYFLOW + (VARYP)       | Unit with 1 ON/OFF pump (HYG1) | Unit with 2 ON/OFF pumps (HYG2) |
|                                |                        |                                    |                                |                                 |
| 4 PIPE SYSTEM<br><br>HOT SIDE  | Standard unit (STD)    | Unit with 1 inverter pump (HYGR1V) |                                |                                 |
|                                |                        |                                    |                                |                                 |

The unit may be configured by choosing one of the 4 cold side hydronic assembly combinations with one of the 2 hot side combinations depending on system requirements.

| Accessories separately supplied |                                                            |                                                  |                                      |
|---------------------------------|------------------------------------------------------------|--------------------------------------------------|--------------------------------------|
| RCTX - Remote control           | BACX - BACnet serial communication module                  | PGFCX - Finned coil protection grill             | AVIBX - Anti-vibration mount support |
|                                 | CMMBX - Serial communication module to supervisor (MODBUS) | IFWX - Steel mesh strainer on the water side     | MHPX - High and low pressure gauges  |
|                                 | CMSLWX - LonWorks serial communication module              | VACSXR - Total recovery side DHW switching valve |                                      |

## Configuration for 4-pipe system

### General technical data - Performance

| Size                                     |   |     | 50.4 | 55.4 | 60.4 | 65.4 | 70.4 | 80.4 | 90.4 | 100.4 | 110.4 | 120.4 |
|------------------------------------------|---|-----|------|------|------|------|------|------|------|-------|-------|-------|
| <b>Cooling 100% - Heating 0%</b>         |   |     |      |      |      |      |      |      |      |       |       |       |
| Cooling capacity                         | 1 | kW  | 139  | 149  | 160  | 170  | 184  | 209  | 236  | 275   | 297   | 324   |
| Compressor power input                   | 1 | kW  | 43,3 | 48,2 | 52,8 | 58,2 | 60,4 | 69,4 | 85,2 | 86,7  | 98,3  | 114   |
| Total power input                        | 2 | kW  | 48,2 | 53,1 | 57,7 | 63,1 | 66,8 | 75,8 | 91,6 | 96,4  | 108   | 124   |
| EER                                      | 1 |     | 2,89 | 2,81 | 2,78 | 2,70 | 2,76 | 2,76 | 2,58 | 2,85  | 2,75  | 2,62  |
| Water flow-rate                          | 1 | l/s | 6,66 | 7,12 | 7,66 | 8,13 | 8,81 | 10,0 | 11,3 | 13,1  | 14,2  | 15,5  |
| Cold side exchanger pressure drop factor | 1 | kPa | 17,1 | 19,4 | 22,3 | 20,8 | 13,8 | 17,4 | 21,7 | 22,1  | 17,2  | 20,2  |
| Cooling capacity (EN14511:2013)          | 3 | kW  | 139  | 148  | 160  | 170  | 184  | 208  | 235  | 273   | 296   | 321   |
| Total power input (EN14511:2013)         | 3 | kW  | 48,7 | 53,6 | 58,4 | 63,7 | 67,6 | 77,0 | 92,7 | 98,1  | 110   | 126   |
| EER (EN14511:2013)                       | 3 |     | 2,85 | 2,76 | 2,73 | 2,66 | 2,72 | 2,70 | 2,54 | 2,79  | 2,69  | 2,55  |
| SEER                                     | 8 |     | 3,99 | 4,00 | 4,04 | 4,07 | 3,96 | 4,11 | 4,10 | 3,95  | 3,91  | 3,85  |
| <b>Cooling 0% - Heating 100%</b>         |   |     |      |      |      |      |      |      |      |       |       |       |
| Heating capacity                         | 4 | kW  | 157  | 169  | 185  | 197  | 213  | 243  | 278  | 318   | 345   | 381   |
| Compressor power input                   | 4 | kW  | 41,5 | 45,6 | 49,7 | 53,2 | 56,6 | 65,3 | 75,9 | 84,0  | 91,6  | 104   |
| Total power input                        | 2 | kW  | 46,4 | 50,5 | 54,6 | 58,1 | 63,0 | 71,7 | 82,1 | 93,7  | 101   | 113   |
| COP                                      | 4 |     | 3,39 | 3,35 | 3,38 | 3,39 | 3,38 | 3,39 | 3,39 | 3,40  | 3,41  | 3,38  |
| Water flow-rate                          | 4 | l/s | 7,50 | 8,08 | 8,86 | 9,35 | 10,1 | 11,6 | 13,2 | 15,2  | 16,5  | 18,3  |
| Hot side exchanger pressure drop factor  | 4 | kPa | 53,0 | 51,0 | 48,0 | 47,0 | 48,0 | 53,0 | 56,0 | 50,0  | 52,0  | 57,0  |
| Heating capacity (EN14511:2013)          | 5 | kW  | 157  | 170  | 186  | 196  | 213  | 243  | 278  | 321   | 346   | 387   |
| Total power input (EN14511:2013)         | 5 | kW  | 47,1 | 51,5 | 55,6 | 59,1 | 64,3 | 73,1 | 83,7 | 95,9  | 104   | 116   |
| COP (EN14511:2013)                       | 5 |     | 3,33 | 3,30 | 3,35 | 3,32 | 3,31 | 3,33 | 3,32 | 3,34  | 3,32  | 3,33  |
| SCOP - AVERAGE Climate - W35             | 8 |     | 3,85 | 3,81 | 3,86 | 3,87 | 3,78 | 3,79 | 3,91 | 3,36  | 3,85  | 3,95  |
| <b>Cooling 100% - Heating 100%</b>       |   |     |      |      |      |      |      |      |      |       |       |       |
| Cooling capacity                         | 6 | kW  | 140  | 151  | 162  | 172  | 187  | 212  | 239  | 278   | 300   | 328   |
| Heating capacity                         | 6 | kW  | 182  | 196  | 214  | 228  | 246  | 281  | 322  | 367   | 397   | 442   |
| Total power input                        | 6 | kW  | 40,3 | 44,3 | 48,1 | 52,5 | 54,8 | 63,2 | 76,0 | 80,3  | 89,2  | 102   |
| Overall efficiency                       | 7 |     | 7,99 | 7,84 | 7,81 | 7,62 | 7,89 | 7,80 | 7,39 | 8,04  | 7,81  | 7,53  |
| Cold side exchanger water flow rate      | 6 | l/s | 6,69 | 7,21 | 7,74 | 8,22 | 8,93 | 10,1 | 11,4 | 13,3  | 14,3  | 15,7  |
| Cold side exchanger pressure drop factor | 6 | kPa | 17,0 | 20,0 | 23,0 | 21,0 | 14,0 | 18,0 | 22,0 | 23,0  | 17,0  | 21,0  |
| Hot side exchanger water flow rate       | 6 | l/s | 8,70 | 9,36 | 10,2 | 10,9 | 11,8 | 13,4 | 15,4 | 17,5  | 19,0  | 21,1  |
| Hot side exchanger pressure drop factor  | 6 | kPa | 68,0 | 65,0 | 62,0 | 64,0 | 64,0 | 69,0 | 75,0 | 65,0  | 65,0  | 75,0  |

The Product is compliant with the Erp (Energy Related Products) European Directive. It includes the Commission delegated Regulation (EU) No 811/2013 (rate 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).  
 \*Contains fluorinated greenhouse gases (GWP 2087,5)

1. Data referred to the following conditions: cold side exchanger water = 12/7 °C. Entering external exchanger air temperature 35°C. Evaporator fouling factor =  $0.44 \times 10^{(-4)}$  m<sup>2</sup> K/W
2. The Total Power Input value does not take into account the part related to the pumps and required to overcome the pressure drops for the circulation of the solution inside the exchangers
3. Data compliant to Standard EN 14511:2013 referred to the following conditions: cold side exchanger water temperature = 12/7°C. Entering external exchanger air temperature 35°C
4. Data referred to the following conditions: hot side exchanger water = 40/45 °C. Entering external exchanger air temperature = 7°C D.B./6°C W.B.
5. Data compliant to Standard EN 14511:2013 referred to the following conditions: hot side exchanger water temperature = 40/45 °C. Entering external exchanger air temperature = 7°C D.B./6°C W.B.
6. Data referred to the following conditions: exchanger water cooling side = 12/7 °C. exchanger water heating side = 40/45°C
7. Global efficiency, calculated as (Cooling capacity + Heating capacity)/(Total power input).
8. Data calculated according to the EN 14825:2016 Regulation

## Configuration for 4-pipe system

### General technical data - Construction

| Size                                   |   |     | 50.4       | 55.4       | 60.4       | 65.4       | 70.4     | 80.4     | 90.4     | 100.4    | 110.4    | 120.4    |
|----------------------------------------|---|-----|------------|------------|------------|------------|----------|----------|----------|----------|----------|----------|
| <b>Compressor</b>                      |   |     |            |            |            |            |          |          |          |          |          |          |
| Type of compressors                    |   |     | SCROLL     |            |            |            |          |          |          |          |          |          |
| Refrigerant                            |   |     | R-410A     |            |            |            |          |          |          |          |          |          |
| No. of compressors                     |   | Nr  | 4          | 4          | 4          | 4          | 4        | 4        | 4        | 4        | 4        | 4        |
| Rated power (C1)                       |   | HP  | 25         | 25         | 30         | 30         | 35       | 40       | 45       | 50       | 55       | 60       |
| Rated power (C2)                       |   | HP  | 25         | 30         | 30         | 35         | 35       | 40       | 45       | 50       | 55       | 60       |
| Std Capacity control steps             |   | Nr  | 6          | 5          | 4          | 5          | 6        | 6        | 6        | 6        | 6        | 4        |
| Oil charge (C1)                        |   | l   | 7,00       | 7,00       | 7,00       | 7,00       | 8,00     | 10,0     | 10,0     | 11,0     | 13,0     | 13,0     |
| Oil charge (C2)                        |   | l   | 7,00       | 7,00       | 7,00       | 8,00       | 8,00     | 10,0     | 10,0     | 11,0     | 13,0     | 13,0     |
| Carica refrigerante (C1)               | 1 | kg  | 20,0       | 26,0       | 24,0       | 28,0       | 29,0     | 34,0     | 43,0     | 46,0     | 48,0     | 52,0     |
| Carica refrigerante (C2)               | 1 | kg  | 20,0       | 26,0       | 24,0       | 28,0       | 29,0     | 34,0     | 43,0     | 46,0     | 48,0     | 52,0     |
| Refrigeration circuits                 |   | Nr  | 2          | 2          | 2          | 2          | 2        | 2        | 2        | 2        | 2        | 2        |
| <b>Cold side exchanger</b>             |   |     |            |            |            |            |          |          |          |          |          |          |
| Type of exchanger                      | 2 |     | PHE        |            |            |            |          |          |          |          |          |          |
| No. of exchangers                      |   | Nr  | 1          | 1          | 1          | 1          | 1        | 1        | 1        | 1        | 1        | 1        |
| Water content                          |   | l   | 20         | 20         | 20         | 22         | 30       | 30       | 30       | 36       | 46       | 46       |
| Minimum system water content cold side | 3 |     | 1104       | 888        | 1240       | 1159       | 1314     | 1165     | 1503     | 1708     | 2562     | 2366     |
| <b>Hot side exchanger</b>              |   |     |            |            |            |            |          |          |          |          |          |          |
| Type of exchanger                      | 2 |     | PHE        |            |            |            |          |          |          |          |          |          |
| No. of exchangers                      |   | Nr  | 2          | 2          | 2          | 2          | 2        | 2        | 2        | 2        | 2        | 2        |
| Water content                          |   | l   | 54         | 55         | 56         | 57         | 58       | 60       | 62       | 108      | 110      | 111      |
| Minimum system water content hot side  | 3 |     | 1056       | 1104       | 1317       | 1440       | 1531     | 1776     | 1869     | 2078     | 2593     | 2784     |
| <b>External Section Fans</b>           |   |     |            |            |            |            |          |          |          |          |          |          |
| Type of fans                           | 4 |     | AX         |            |            |            |          |          |          |          |          |          |
| No. of fans                            |   | Nr  | 8          | 8          | 8          | 8          | 4        | 4        | 4        | 6        | 6        | 6        |
| Type of motor                          | 5 |     | AC/P       | AC/P       | AC/P       | AC/P       | AC/P     | AC/P     | AC/P     | AC/P     | AC/P     | AC/P     |
| Standard airflow                       |   | l/s | 20300      | 20300      | 20000      | 20000      | 25000    | 24200    | 24200    | 35000    | 35000    | 35000    |
| Installed unit power                   |   | kW  | 0,60       | 0,60       | 0,60       | 0,60       | 1,60     | 1,60     | 1,60     | 1,60     | 1,60     | 1,60     |
| <b>Connections</b>                     |   |     |            |            |            |            |          |          |          |          |          |          |
| Water fittings user side               |   |     | 3"         | 3"         | 3"         | 3"         | 3"       | 3"       | 3"       | 4"       | 4"       | 4"       |
| Water fittings recovery side           |   |     | 3"         | 3"         | 3"         | 3"         | 3"       | 3"       | 3"       | 4"       | 4"       | 4"       |
| <b>Water circuit</b>                   |   |     |            |            |            |            |          |          |          |          |          |          |
| Maximum water side pressure            |   | kPa | 1000       | 1000       | 1000       | 1000       | 1000     | 1000     | 1000     | 1000     | 1000     | 1000     |
| Safety valve calibration               |   | kPa | 600        | 600        | 600        | 600        | 600      | 600      | 600      | 600      | 600      | 600      |
| <b>Power supply</b>                    |   |     |            |            |            |            |          |          |          |          |          |          |
| Standard power supply                  |   |     | 400/3/50+N | 400/3/50+N | 400/3/50+N | 400/3/50+N | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 |

1. indicative values for standard units with possible +/-10% variation. The actual data are indicated on the label of the unit.
2. PHE = plate exchanger
3. The minimum system water content calculated value does not consider the internal exchanger water content. With outdoor air low temperature applications or low medium requested loads, the minimum installation water volume is obtained doubling the indicated value
4. AX = axial fan
5. AC/P = asynchronous three-phase external rotor motor with phase cutting speed automatic control

## Configuration for 4-pipe system

### Electrical data

#### Supply voltage 400/3/50+N

| Size                                                               |  |    | 50.4 | 55.4 | 60.4 | 65.4 |
|--------------------------------------------------------------------|--|----|------|------|------|------|
| <b>F.L.A. - Full load current at max admissible conditions</b>     |  |    |      |      |      |      |
| F.L.A. - Compressor 1                                              |  | A  | 19,7 | 19,7 | 30,5 | 30,5 |
| F.L.A. - Compressor 2                                              |  | A  | 30,5 | 30,5 | 30,5 | 30,5 |
| F.L.A. - Compressor 3                                              |  | A  | 19,7 | 30,5 | 30,5 | 30,5 |
| F.L.A. - Compressor 4                                              |  | A  | 30,5 | 30,5 | 30,5 | 36,5 |
| F.L.A. - Single External Fan                                       |  | A  | 2,60 | 2,60 | 2,60 | 2,60 |
| F.L.A. - Total                                                     |  | A  | 111  | 122  | 133  | 151  |
| <b>L.R.A. - Locked rotor amperes</b>                               |  |    |      |      |      |      |
| L.R.A. - Compressor 1                                              |  | A  | 118  | 118  | 174  | 174  |
| L.R.A. - Compressor 2                                              |  | A  | 174  | 174  | 174  | 174  |
| L.R.A. - Compressor 3                                              |  | A  | 118  | 174  | 174  | 174  |
| L.R.A. - Compressor 4                                              |  | A  | 174  | 174  | 174  | 225  |
| L.R.A. - Single External Fan                                       |  | A  | 14,0 | 14,0 | 14,0 | 14,0 |
| <b>F.L.I. - Full load power input at max admissible conditions</b> |  |    |      |      |      |      |
| F.L.I. - Compressor 1                                              |  | kW | 11,9 | 11,9 | 17,0 | 17,0 |
| F.L.I. - Compressor 2                                              |  | kW | 17,0 | 17,0 | 17,0 | 17,0 |
| F.L.I. - Compressor 3                                              |  | kW | 11,9 | 17,0 | 17,0 | 17,0 |
| F.L.I. - Compressor 4                                              |  | kW | 17,0 | 17,0 | 17,0 | 22,6 |
| F.L.I. - Single External Fan                                       |  | kW | 0,60 | 0,60 | 0,60 | 0,60 |
| F.L.I. - Total                                                     |  | kW | 60,4 | 65,6 | 70,7 | 76,3 |
| <b>M.I.C. Maximum inrush current</b>                               |  |    |      |      |      |      |
| M.I.C. - Value                                                     |  | A  | 254  | 265  | 276  | 327  |
| M.I.C. with soft start accessory                                   |  | A  | 192  | 203  | 214  | 230  |

Electrical data refer to standard units; according to the installed accessories, the data can suffer some variations.

Power supply: 400/3/50 Hz. Voltage variation: max. +/-10% Voltage unbalance between phases: max 2 %

For non standard voltage please contact Clivet technical office

The units are compliant with the provisions of European standards CEI EN 60204 and CEI EN 60335.

#### Supply voltage: 400/3/50

| Size                                                               |  |    | 70.4 | 80.4 | 90.4 | 100.4 | 110.4 | 120.4 |
|--------------------------------------------------------------------|--|----|------|------|------|-------|-------|-------|
| <b>F.L.A. - Full load current at max admissible conditions</b>     |  |    |      |      |      |       |       |       |
| F.L.A. - Compressor 1                                              |  | A  | 30,5 | 30,5 | 30,5 | 36,5  | 44,9  | 59,3  |
| F.L.A. - Compressor 2                                              |  | A  | 36,5 | 44,9 | 59,3 | 59,3  | 59,3  | 59,3  |
| F.L.A. - Compressor 3                                              |  | A  | 30,5 | 30,5 | 30,5 | 36,5  | 44,9  | 59,3  |
| F.L.A. - Compressor 4                                              |  | A  | 36,5 | 44,9 | 59,3 | 59,3  | 59,3  | 59,3  |
| F.L.A. - Single External Fan                                       |  | A  | 4,10 | 4,10 | 4,10 | 4,10  | 4,10  | 4,10  |
| F.L.A. - Total                                                     |  | A  | 151  | 168  | 196  | 217   | 234   | 262   |
| <b>L.R.A. - Locked rotor amperes</b>                               |  |    |      |      |      |       |       |       |
| L.R.A. - Compressor 1                                              |  | A  | 174  | 174  | 174  | 225   | 272   | 310   |
| L.R.A. - Compressor 2                                              |  | A  | 225  | 272  | 310  | 310   | 310   | 310   |
| L.R.A. - Compressor 3                                              |  | A  | 174  | 174  | 174  | 225   | 272   | 310   |
| L.R.A. - Compressor 4                                              |  | A  | 225  | 272  | 310  | 310   | 310   | 310   |
| L.R.A. - Single External Fan                                       |  | A  | 14,0 | 14,0 | 14,0 | 14,0  | 14,0  | 14,0  |
| <b>F.L.I. - Full load power input at max admissible conditions</b> |  |    |      |      |      |       |       |       |
| F.L.I. - Compressor 1                                              |  | kW | 17,0 | 17,0 | 17,0 | 22,6  | 27,6  | 36,1  |
| F.L.I. - Compressor 2                                              |  | kW | 22,6 | 27,6 | 36,1 | 36,1  | 36,1  | 36,1  |
| F.L.I. - Compressor 3                                              |  | kW | 17,0 | 17,0 | 17,0 | 22,6  | 27,6  | 36,1  |
| F.L.I. - Compressor 4                                              |  | kW | 22,6 | 27,6 | 36,1 | 36,1  | 36,1  | 36,1  |
| F.L.I. - Single External Fan                                       |  | kW | 1,90 | 1,90 | 1,90 | 1,90  | 1,90  | 1,90  |
| F.L.I. - Total                                                     |  | kW | 86,9 | 96,9 | 114  | 129   | 139   | 156   |
| <b>M.I.C. Maximum inrush current</b>                               |  |    |      |      |      |       |       |       |
| M.I.C. - Value                                                     |  | A  | 339  | 394  | 447  | 467   | 484   | 512   |
| M.I.C. with soft start accessory                                   |  | A  | 242  | 262  | 309  | 329   | 346   | 375   |

Electrical data refer to standard units; according to the installed accessories, the data can suffer some variations.

Power supply: 400/3/50 Hz. Voltage variation: max. +/-10% Voltage unbalance between phases: max 2 %

For non standard voltage please contact Clivet technical office

The units are compliant with the provisions of European standards CEI EN 60204 and CEI EN 60335..

## Configuration for 4-pipe system

### Sound levels

#### Standard unit

| Size  | Sound power level (dB) |     |     |     |      |      |      |      | Sound power level | Sound pressure level |
|-------|------------------------|-----|-----|-----|------|------|------|------|-------------------|----------------------|
|       | Octave band (Hz)       |     |     |     |      |      |      |      |                   |                      |
|       | 63                     | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | dB(A)             | dB(A)                |
| 50.4  | 88                     | 95  | 84  | 84  | 83   | 81   | 68   | 61   | 88                | 69                   |
| 55.4  | 88                     | 95  | 84  | 84  | 83   | 81   | 68   | 61   | 88                | 69                   |
| 60.4  | 88                     | 95  | 84  | 84  | 83   | 81   | 68   | 61   | 88                | 69                   |
| 65.4  | 88                     | 95  | 84  | 84  | 83   | 81   | 68   | 61   | 88                | 69                   |
| 70.4  | 91                     | 88  | 88  | 85  | 83   | 82   | 67   | 60   | 88                | 68                   |
| 80.4  | 91                     | 88  | 88  | 85  | 83   | 82   | 67   | 60   | 88                | 68                   |
| 90.4  | 91                     | 88  | 88  | 85  | 83   | 82   | 67   | 60   | 88                | 68                   |
| 100.4 | 93                     | 90  | 90  | 88  | 88   | 85   | 71   | 62   | 92                | 72                   |
| 110.4 | 93                     | 90  | 90  | 88  | 88   | 85   | 71   | 62   | 92                | 72                   |
| 120.4 | 93                     | 90  | 90  | 88  | 88   | 85   | 71   | 62   | 92                | 72                   |

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.

Measures are according to UNI EN ISO 9614-2 regulations, with respect to the EUROVENT 8/1 certification, which provides for a tolerance of 3 dB(A) on the sound power level, which is the only acoustic data to be considered binding.

Data referred to the following conditions:

- internal exchanger water = 12/7 °C

- ambient temperature = 35 °C

#### Unit with HEDIF - “Diffuser for high efficiency axial fan” option

| Size  | Sound power level | Sound pressure level |
|-------|-------------------|----------------------|
|       | dB(A)             | dB(A)                |
| 70.4  | 86                | 66                   |
| 80.4  | 86                | 66                   |
| 90.4  | 86                | 66                   |
| 100.4 | 90                | 70                   |
| 110.4 | 90                | 70                   |
| 120.4 | 90                | 70                   |

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.

Measures are according to UNI EN ISO 9614-2 regulations, with respect to the EUROVENT 8/1 certification, which provides for a tolerance of 3 dB(A) on the sound power level, which is the only acoustic data to be considered binding.

Data referred to the following conditions:

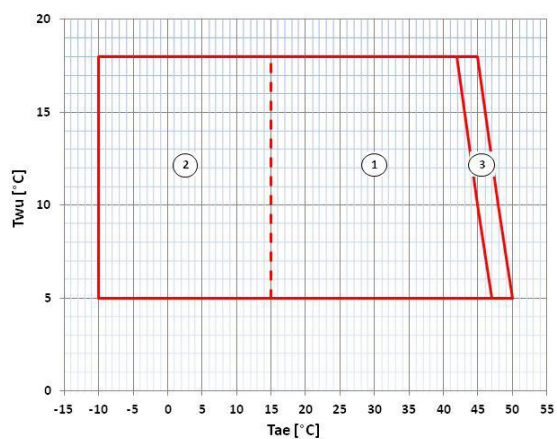
- internal exchanger water = 12/7 °C

- ambient temperature = 35 °C



## Configuration for 4-pipe system

### Operating range - Cooling

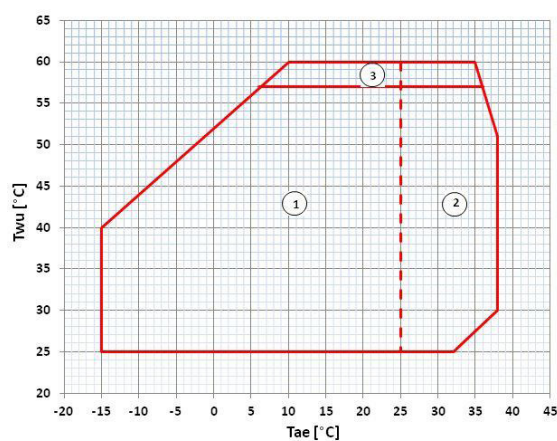


$T_{wu}$  [°C] = Internal exchanger outlet water temperature

$T_{ae}$  [°C] = External exchanger inlet air temperature

1. Standard unit operating range at full load
2. Standard unit operating range with air flow automatic modulation
3. Unit operating range with automatic staging of the compressor capacity

### Operating range - Heating

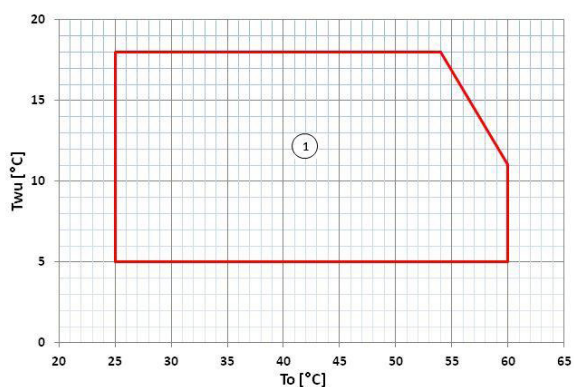


$T_{wu}$  [°C] = Internal exchanger outlet water temperature

$T_{ae}$  [°C] = External exchanger inlet air temperature

1. Standard unit operating range at full load
2. Standard unit operating range with air flow automatic modulation
3. Unit operating range with automatic staging of the compressor capacity

### Operating range - Cooling 100% - Heating 100%



$T_{wu}$  [°C] = Water outlet temperature from the user side of the heat exchanger (2-4 pipes)

$T_o$  [°C] = Outlet water temperature at the heat exchanger recovery side (2-4 pipes)

1. Normal operating range

## Configuration for 4-pipe system

### Cooling performance - Size 50.4 ÷ 90.4

| Size | To (°C) | Entering external exchanger air temperature (°C) |      |     |      |     |      |     |      |     |      |     |      |
|------|---------|--------------------------------------------------|------|-----|------|-----|------|-----|------|-----|------|-----|------|
|      |         | 20                                               |      | 25  |      | 30  |      | 35  |      | 40  |      | 45  |      |
|      |         | kWf                                              | kWe  | kWf | kWe  | kWf | kWe  | kWf | kWe  | kWf | kWe  | kWf | kWe  |
| 50.4 | 5       | 157                                              | 31,8 | 150 | 35,2 | 142 | 38,9 | 132 | 42,6 | 119 | 47,7 | 109 | 53,5 |
|      | 7       | 166                                              | 32,3 | 158 | 35,9 | 150 | 39,5 | 139 | 43,3 | 126 | 48,3 | 116 | 54,2 |
|      | 10      | 181                                              | 33,1 | 172 | 36,6 | 163 | 40,3 | 151 | 44,4 | 137 | 49,5 | 128 | 55,1 |
|      | 12      | 191                                              | 33,7 | 183 | 37,3 | 172 | 41,1 | 159 | 45,1 | 145 | 49,9 | -   | -    |
|      | 15      | 208                                              | 34,7 | 198 | 38,4 | 186 | 42,4 | 172 | 46,6 | 158 | 51,4 | -   | -    |
|      | 18      | 223                                              | 35,8 | 213 | 39,5 | 200 | 43,5 | 185 | 47,6 | 170 | 52,7 | -   | -    |
| 55.4 | 5       | 167                                              | 36,0 | 160 | 39,7 | 152 | 43,5 | 142 | 47,4 | 128 | 52,9 | 117 | 59,4 |
|      | 7       | 176                                              | 36,7 | 169 | 40,6 | 160 | 44,4 | 149 | 48,2 | 135 | 53,9 | 125 | 60,1 |
|      | 10      | 191                                              | 37,7 | 183 | 41,7 | 173 | 45,5 | 161 | 49,6 | 146 | 55,3 | 136 | 61,8 |
|      | 12      | 202                                              | 38,4 | 193 | 42,5 | 182 | 46,4 | 170 | 50,4 | 155 | 55,9 | -   | -    |
|      | 15      | 218                                              | 39,7 | 209 | 43,8 | 196 | 48,0 | 183 | 52,2 | 168 | 57,7 | -   | -    |
|      | 18      | 234                                              | 41,1 | 225 | 45,2 | 211 | 49,3 | 197 | 53,6 | 183 | 59,5 | -   | -    |
| 60.4 | 5       | 182                                              | 39,5 | 175 | 43,4 | 164 | 47,6 | 152 | 52,2 | 139 | 57,3 | 127 | 64,7 |
|      | 7       | 192                                              | 40,1 | 184 | 44,3 | 173 | 48,4 | 160 | 52,8 | 147 | 58,2 | 136 | 65,4 |
|      | 10      | 209                                              | 41,4 | 200 | 45,7 | 187 | 49,8 | 173 | 54,8 | 159 | 60,0 | 150 | 67,1 |
|      | 12      | 220                                              | 42,1 | 211 | 46,6 | 197 | 50,9 | 183 | 55,3 | 167 | 61,0 | -   | -    |
|      | 15      | 238                                              | 43,5 | 227 | 48,1 | 212 | 52,6 | 196 | 57,2 | 181 | 63,4 | -   | -    |
|      | 18      | 257                                              | 44,6 | 244 | 49,2 | 228 | 53,8 | 211 | 59,2 | 197 | 65,3 | -   | -    |
| 65.4 | 5       | 195                                              | 43,1 | 186 | 47,5 | 175 | 52,1 | 162 | 57,1 | 147 | 63,1 | 138 | 71,2 |
|      | 7       | 206                                              | 44,0 | 197 | 48,3 | 185 | 53,0 | 170 | 58,2 | 155 | 64,5 | 148 | 72,4 |
|      | 10      | 224                                              | 45,4 | 214 | 49,9 | 200 | 54,8 | 184 | 59,9 | 169 | 66,4 | 162 | 74,9 |
|      | 12      | 236                                              | 46,7 | 225 | 51,0 | 210 | 55,9 | 193 | 61,3 | 178 | 68,2 | -   | -    |
|      | 15      | 255                                              | 48,3 | 243 | 52,7 | 226 | 57,8 | 209 | 63,3 | 195 | 70,5 | -   | -    |
|      | 18      | 275                                              | 49,7 | 260 | 54,4 | 242 | 59,7 | 224 | 65,6 | 216 | 73,4 | -   | -    |
| 70.4 | 5       | 208                                              | 45,2 | 200 | 49,4 | 189 | 54,3 | 176 | 59,5 | 159 | 66,4 | 148 | 74,5 |
|      | 7       | 219                                              | 46,1 | 210 | 50,3 | 198 | 55,5 | 184 | 60,4 | 167 | 67,0 | 156 | 75,9 |
|      | 10      | 232                                              | 47,4 | 225 | 51,7 | 211 | 56,9 | 197 | 61,7 | 180 | 68,8 | 164 | 77,7 |
|      | 12      | 249                                              | 48,4 | 239 | 52,9 | 225 | 58,2 | 209 | 63,5 | 191 | 70,9 | -   | -    |
|      | 15      | 271                                              | 50,5 | 260 | 55,0 | 244 | 60,2 | 226 | 65,8 | 209 | 73,3 | -   | -    |
|      | 18      | 290                                              | 51,9 | 277 | 56,5 | 262 | 61,7 | 243 | 67,3 | 226 | 75,0 | -   | -    |
| 80.4 | 5       | 235                                              | 52,0 | 226 | 57,4 | 215 | 62,6 | 199 | 68,7 | 182 | 75,9 | 168 | 83,7 |
|      | 7       | 249                                              | 53,3 | 239 | 58,4 | 226 | 63,4 | 209 | 69,4 | 190 | 76,9 | 177 | 85,3 |
|      | 10      | 267                                              | 54,5 | 257 | 59,7 | 242 | 65,4 | 225 | 71,2 | 206 | 78,4 | 194 | 86,6 |
|      | 12      | 282                                              | 56,2 | 272 | 61,0 | 255 | 66,6 | 238 | 72,3 | 218 | 80,2 | -   | -    |
|      | 15      | 308                                              | 57,8 | 293 | 62,9 | 277 | 68,7 | 258 | 74,7 | 237 | 82,9 | -   | -    |
|      | 18      | 328                                              | 59,5 | 316 | 64,9 | 294 | 70,9 | 273 | 77,2 | 256 | 84,8 | -   | -    |
| 90.4 | 5       | 270                                              | 64,3 | 259 | 70,0 | 241 | 76,8 | 223 | 84,1 | 205 | 93,0 | 188 | 103  |
|      | 7       | 287                                              | 65,8 | 272 | 71,9 | 255 | 77,9 | 236 | 85,2 | 216 | 94,4 | 203 | 106  |
|      | 10      | 305                                              | 68,0 | 291 | 73,9 | 271 | 80,8 | 250 | 88,0 | 233 | 97,1 | 218 | 110  |
|      | 12      | 321                                              | 69,5 | 305 | 75,6 | 286 | 82,0 | 265 | 89,7 | 247 | 98,7 | -   | -    |
|      | 15      | 349                                              | 71,9 | 331 | 78,2 | 309 | 84,9 | 287 | 93,4 | 273 | 104  | -   | -    |
|      | 18      | 373                                              | 75,2 | 352 | 80,9 | 330 | 87,8 | 308 | 96,0 | 287 | 111  | -   | -    |

kWf = Cooling capacity at the heat exchanger user side (2 pipes) or cold side (4 pipes) (kW)

kWe = Electrical power absorbed by compressors (kW)

To (°C) = Outlet water temperature at the heat exchanger user side (2 pipes) or cold side (4 pipes) (°C)

Performances in function of the inlet/outlet water temperature differential = 5°C

## Configuration for 4-pipe system

### Cooling performance - Size 100.4 ÷ 120.4

| Size  | To (°C) | Entering external exchanger air temperature (°C) |      |     |      |     |      |     |      |     |      |     |     |
|-------|---------|--------------------------------------------------|------|-----|------|-----|------|-----|------|-----|------|-----|-----|
|       |         | 20                                               |      | 25  |      | 30  |      | 35  |      | 40  |      | 45  |     |
|       |         | kWf                                              | kWe  | kWf | kWe  | kWf | kWe  | kWf | kWe  | kWf | kWe  | kWf | kWe |
| 100.4 | 5       | 311                                              | 65,6 | 297 | 71,6 | 281 | 78,1 | 263 | 85,5 | 239 | 95,2 | 218 | 107 |
|       | 7       | 325                                              | 66,8 | 310 | 73,0 | 292 | 80,0 | 275 | 86,7 | 248 | 96,5 | 229 | 108 |
|       | 10      | 344                                              | 67,9 | 326 | 74,6 | 310 | 80,6 | 290 | 88,4 | 265 | 97,9 | 246 | 110 |
|       | 12      | 364                                              | 70,0 | 349 | 76,3 | 331 | 82,7 | 309 | 90,8 | 281 | 102  | -   | -   |
|       | 15      | 399                                              | 72,1 | 380 | 78,7 | 359 | 85,6 | 333 | 93,5 | 307 | 104  | -   | -   |
|       | 18      | 423                                              | 75,2 | 404 | 81,4 | 380 | 87,8 | 352 | 96,6 | 328 | 106  | -   | -   |
| 110.4 | 5       | 342                                              | 74,8 | 328 | 81,0 | 309 | 88,3 | 287 | 96,7 | 261 | 108  | 242 | 120 |
|       | 7       | 357                                              | 75,6 | 340 | 82,6 | 321 | 89,8 | 297 | 98,3 | 272 | 109  | 253 | 121 |
|       | 10      | 376                                              | 77,0 | 361 | 83,6 | 338 | 91,8 | 315 | 99,8 | 289 | 111  | 272 | 123 |
|       | 12      | 400                                              | 79,5 | 383 | 85,8 | 358 | 93,9 | 334 | 102  | 307 | 114  | -   | -   |
|       | 15      | 437                                              | 82,1 | 415 | 89,2 | 388 | 97,1 | 362 | 105  | 336 | 116  | -   | -   |
|       | 18      | 464                                              | 85,1 | 441 | 91,8 | 415 | 99,4 | 381 | 109  | 359 | 121  | -   | -   |
| 120.4 | 5       | 375                                              | 86,2 | 357 | 94,6 | 338 | 102  | 313 | 112  | 286 | 125  | 271 | 141 |
|       | 7       | 389                                              | 88,0 | 373 | 95,2 | 350 | 104  | 324 | 114  | 295 | 128  | 278 | 141 |
|       | 10      | 411                                              | 89,6 | 390 | 97,5 | 368 | 106  | 343 | 116  | 315 | 128  | 298 | 143 |
|       | 12      | 435                                              | 92,2 | 414 | 99,9 | 386 | 110  | 362 | 119  | 335 | 132  | -   | -   |
|       | 15      | 470                                              | 96,4 | 450 | 104  | 419 | 114  | 391 | 124  | 369 | 137  | -   | -   |
|       | 18      | 502                                              | 99,1 | 475 | 108  | 447 | 117  | 417 | 127  | 395 | 142  | -   | -   |

kWf = Cooling capacity at the heat exchanger user side (2 pipes) or cold side (4 pipes) (kW)

kWe = Electrical power absorbed by compressors (kW)

To (°C) = Outlet water temperature at the heat exchanger user side (2 pipes) or cold side (4 pipes) (°C)

Performances in function of the inlet/outlet water temperature differential = 5°C

## Configuration for 4-pipe system

### Heating performance - Size 50.4 ÷ 90.4

| Size | Tae (°C)<br>DB/WB | Hot side heat exchanger outlet water temperature (°C) |      |      |      |      |      |     |      |     |      |     |      |
|------|-------------------|-------------------------------------------------------|------|------|------|------|------|-----|------|-----|------|-----|------|
|      |                   | 25                                                    |      | 35   |      | 40   |      | 45  |      | 55  |      | 60  |      |
|      |                   | kWt                                                   | kWe  | kWt  | kWe  | kWt  | kWe  | kWt | kWe  | kWt | kWe  | kWt | kWe  |
| 50.4 | -15 / -15.4       | 91,8                                                  | 25,6 | 90,8 | 32,0 | 90,6 | 36,1 | -   | -    | -   | -    | -   | -    |
|      | 10 / -10.5        | 106                                                   | 26,0 | 104  | 32,3 | 104  | 36,3 | -   | -    | -   | -    | -   | -    |
|      | -7 / -8           | 113                                                   | 26,2 | 112  | 32,5 | 111  | 36,4 | 110 | 40,8 | -   | -    | -   | -    |
|      | 0 / -0.6          | 140                                                   | 26,7 | 137  | 33,0 | 136  | 36,8 | 134 | 41,1 | -   | -    | -   | -    |
|      | 7 / 6             | 166                                                   | 27,0 | 163  | 33,6 | 160  | 37,2 | 157 | 41,5 | 149 | 52,1 | 144 | 61,0 |
|      | 15 / 13           | 201                                                   | 27,0 | 196  | 34,1 | 194  | 37,9 | 189 | 42,0 | 176 | 52,5 | 162 | 61,2 |
| 55.4 | -15 / -15.4       | 97,6                                                  | 28,1 | 96,8 | 34,9 | 98,1 | 39,4 | -   | -    | -   | -    | -   | -    |
|      | 10 / -10.5        | 112                                                   | 28,6 | 111  | 35,3 | 112  | 39,5 | -   | -    | -   | -    | -   | -    |
|      | -7 / -8           | 119                                                   | 28,9 | 120  | 35,5 | 120  | 39,7 | 119 | 44,4 | -   | -    | -   | -    |
|      | 0 / -0.6          | 147                                                   | 29,6 | 147  | 36,2 | 146  | 40,3 | 145 | 44,9 | -   | -    | -   | -    |
|      | 7 / 6             | 175                                                   | 30,0 | 174  | 37,0 | 172  | 41,1 | 169 | 45,6 | 160 | 56,8 | 149 | 66,4 |
|      | 15 / 13           | 211                                                   | 30,1 | 210  | 37,8 | 207  | 41,9 | 204 | 46,5 | 190 | 57,5 | 172 | 66,9 |
| 60.4 | -15 / -15.4       | 106                                                   | 30,7 | 107  | 37,8 | 107  | 42,6 | -   | -    | -   | -    | -   | -    |
|      | 10 / -10.5        | 122                                                   | 31,4 | 122  | 38,3 | 123  | 41,9 | -   | -    | -   | -    | -   | -    |
|      | -7 / -8           | 131                                                   | 31,8 | 131  | 38,6 | 132  | 43,0 | 131 | 48,1 | -   | -    | -   | -    |
|      | 0 / -0.6          | 160                                                   | 32,6 | 160  | 39,7 | 159  | 43,9 | 157 | 48,7 | -   | -    | -   | -    |
|      | 7 / 6             | 192                                                   | 33,1 | 190  | 40,7 | 189  | 45,0 | 185 | 49,7 | 174 | 61,8 | 167 | 72,0 |
|      | 15 / 13           | 233                                                   | 33,0 | 230  | 41,7 | 227  | 46,3 | 185 | 51,0 | 207 | 62,9 | 190 | 72,5 |
| 65.4 | -15 / -15.4       | 112                                                   | 32,6 | 112  | 39,0 | 113  | 45,6 | -   | -    | -   | -    | -   | -    |
|      | 10 / -10.5        | 129                                                   | 33,2 | 129  | 40,9 | 130  | 45,8 | -   | -    | -   | -    | -   | -    |
|      | -7 / -8           | 138                                                   | 33,5 | 138  | 41,2 | 138  | 46,0 | 138 | 51,7 | -   | -    | -   | -    |
|      | 0 / -0.6          | 169                                                   | 34,4 | 168  | 42,0 | 168  | 46,7 | 166 | 52,3 | -   | -    | -   | -    |
|      | 7 / 6             | 202                                                   | 34,9 | 200  | 43,1 | 199  | 47,7 | 197 | 53,2 | 184 | 65,7 | 169 | 74,5 |
|      | 15 / 13           | 245                                                   | 35,1 | 243  | 44,1 | 240  | 48,9 | 235 | 54,4 | 218 | 66,6 | 198 | 74,5 |
| 70.4 | -15 / -15.4       | 123                                                   | 34,4 | 122  | 43,8 | 122  | 48,7 | -   | -    | -   | -    | -   | -    |
|      | 10 / -10.5        | 142                                                   | 35,0 | 141  | 44,3 | 141  | 49,1 | -   | -    | -   | -    | -   | -    |
|      | -7 / -8           | 152                                                   | 35,3 | 150  | 44,6 | 150  | 49,2 | 149 | 55,0 | -   | -    | -   | -    |
|      | 0 / -0.6          | 189                                                   | 36,3 | 185  | 45,4 | 183  | 50,1 | 181 | 55,7 | -   | -    | -   | -    |
|      | 7 / 6             | 224                                                   | 36,8 | 219  | 46,6 | 217  | 51,1 | 213 | 56,6 | 203 | 71,1 | 194 | 84,2 |
|      | 15 / 13           | 273                                                   | 37,4 | 266  | 47,7 | 262  | 52,3 | 258 | 57,0 | 241 | 72,1 | 220 | 83,6 |
| 80.4 | -15 / -15.4       | 143                                                   | 40,6 | 143  | 50,3 | 142  | 56,1 | -   | -    | -   | -    | -   | -    |
|      | 10 / -10.5        | 163                                                   | 41,4 | 163  | 50,9 | 163  | 56,5 | -   | -    | -   | -    | -   | -    |
|      | -7 / -8           | 174                                                   | 41,7 | 174  | 51,3 | 173  | 56,8 | 171 | 63,3 | -   | -    | -   | -    |
|      | 0 / -0.6          | 213                                                   | 42,8 | 212  | 52,4 | 210  | 57,9 | 207 | 64,2 | -   | -    | -   | -    |
|      | 7 / 6             | 256                                                   | 43,6 | 253  | 53,5 | 249  | 59,0 | 243 | 65,3 | 231 | 80,9 | 217 | 95,0 |
|      | 15 / 13           | 310                                                   | 44,4 | 303  | 54,7 | 298  | 60,4 | 290 | 66,5 | 274 | 82,2 | 261 | 96,2 |
| 90.4 | -15 / -15.4       | 161                                                   | 47,2 | 164  | 59,6 | 165  | 66,9 | -   | -    | -   | -    | -   | -    |
|      | 10 / -10.5        | 186                                                   | 47,9 | 186  | 59,9 | 187  | 66,9 | -   | -    | -   | -    | -   | -    |
|      | -7 / -8           | 198                                                   | 48,3 | 198  | 60,0 | 198  | 66,8 | 198 | 74,6 | -   | -    | -   | -    |
|      | 0 / -0.6          | 242                                                   | 49,6 | 241  | 61,1 | 239  | 67,5 | 238 | 75,0 | -   | -    | -   | -    |
|      | 7 / 6             | 290                                                   | 50,8 | 287  | 62,2 | 282  | 68,5 | 278 | 75,9 | 266 | 95,1 | 235 | 110  |
|      | 15 / 13           | 354                                                   | 52,0 | 342  | 63,7 | 340  | 70,2 | 332 | 77,4 | 315 | 96,5 | 290 | 112  |

kWt = Heating capacity to the hot side exchanger (kW)

kWe = Electrical power absorbed by compressors (kW)

Tae [°C] = External exchanger inlet air temperature

Performances in function of the inlet/outlet water temperature differential = 5°C

## Configuration for 4-pipe system

### Heating performance - Size 100.4 ÷ 120.4

| Size  | T <sub>ae</sub> (°C)<br>DB/WB | Hot side heat exchanger outlet water temperature (°C) |      |     |      |     |      |     |      |     |     |     |     |
|-------|-------------------------------|-------------------------------------------------------|------|-----|------|-----|------|-----|------|-----|-----|-----|-----|
|       |                               | 25                                                    |      | 35  |      | 40  |      | 45  |      | 55  |     | 60  |     |
|       |                               | kWt                                                   | kWe  | kWt | kWe  | kWt | kWe  | kWt | kWe  | kWt | kWe | kWt | kWe |
| 100.4 | -15 / -15.4                   | 183                                                   | 52,0 | 184 | 64,8 | 186 | 72,7 | -   | -    | -   | -   | -   | -   |
|       | -10 / -10.5                   | 210                                                   | 52,7 | 210 | 65,2 | 211 | 72,9 | -   | -    | -   | -   | -   | -   |
|       | -7 / -8                       | 225                                                   | 53,1 | 225 | 65,5 | 224 | 73,1 | 225 | 81,8 | -   | -   | -   | -   |
|       | 0 / -0.6                      | 277                                                   | 54,5 | 274 | 66,6 | 272 | 73,9 | 269 | 82,5 | -   | -   | -   | -   |
|       | 7 / 6                         | 334                                                   | 56,1 | 327 | 68,0 | 323 | 75,4 | 318 | 84,0 | 305 | 106 | 280 | 122 |
|       | 15 / 13                       | 406                                                   | 58,2 | 398 | 70,1 | 388 | 77,3 | 380 | 86,1 | 360 | 108 | 338 | 124 |
| 110.4 | -15 / -15.4                   | 199                                                   | 56,8 | 201 | 70,7 | 203 | 79,0 | -   | -    | -   | -   | -   | -   |
|       | -10 / -10.5                   | 228                                                   | 57,9 | 230 | 71,8 | 231 | 79,7 | -   | -    | -   | -   | -   | -   |
|       | -7 / -8                       | 244                                                   | 58,5 | 245 | 71,9 | 246 | 80,2 | 244 | 88,7 | -   | -   | -   | -   |
|       | 0 / -0.6                      | 301                                                   | 60,5 | 298 | 73,8 | 297 | 81,4 | 292 | 90,0 | -   | -   | -   | -   |
|       | 7 / 6                         | 360                                                   | 62,3 | 354 | 75,5 | 351 | 83,2 | 345 | 91,6 | 326 | 114 | 326 | 132 |
|       | 15 / 13                       | 438                                                   | 64,8 | 424 | 77,7 | 418 | 85,6 | 411 | 93,7 | 385 | 116 | 368 | 135 |
| 120.4 | -15 / -15.4                   | 224                                                   | 64,2 | 227 | 80,8 | 227 | 90,7 | -   | -    | -   | -   | -   | -   |
|       | -10 / -10.5                   | 253                                                   | 65,3 | 257 | 81,2 | 258 | 90,9 | -   | -    | -   | -   | -   | -   |
|       | -7 / -8                       | 268                                                   | 65,9 | 272 | 81,5 | 273 | 90,8 | 273 | 101  | -   | -   | -   | -   |
|       | 0 / -0.6                      | 329                                                   | 67,9 | 332 | 83,4 | 329 | 91,9 | 326 | 102  | -   | -   | -   | -   |
|       | 7 / 6                         | 396                                                   | 70,3 | 393 | 85,3 | 389 | 93,8 | 381 | 104  | 366 | 129 | 335 | 146 |
|       | 15 / 13                       | 480                                                   | 73,1 | 474 | 88,0 | 465 | 96,3 | 453 | 106  | 429 | 131 | 409 | 153 |

kWt = Heating capacity to the hot side exchanger (kW)

kWe = Electrical power absorbed by compressors (kW)

T<sub>ae</sub> [°C] = External exchanger inlet air temperature

Performances in function of the inlet/outlet water temperature differential = 5°C

## Configuration for 4-pipe system

### Cooling 100% - Heating 100% performance - Size 50.4 ÷ 90.4

| Size | Tw<br>(°C) | Recovery side (hot side) outlet water temperature |      |     |      |       |      |     |      |       |      |     |      |       |      |     |      |       |      |     |      |       |      |     |      |
|------|------------|---------------------------------------------------|------|-----|------|-------|------|-----|------|-------|------|-----|------|-------|------|-----|------|-------|------|-----|------|-------|------|-----|------|
|      |            | 20/25                                             |      |     |      | 30/35 |      |     |      | 35/40 |      |     |      | 40/45 |      |     |      | 45/50 |      |     |      | 50/55 |      |     |      |
|      |            | kWf                                               | kWe  | kWt | GLE  | kWf   | kWe  | kWt | GLE  | kWf   | kWe  | kWt | GLE  | kWf   | kWe  | kWt | GLE  | kWf   | kWe  | kWt | GLE  | kWf   | kWe  | kWt | GLE  |
| 50.4 | 5          | 163                                               | 26,8 | 190 | 13,2 | 150   | 32,7 | 183 | 10,2 | 141   | 36,1 | 178 | 8,85 | 130   | 40,0 | 172 | 7,55 | 120   | 44,6 | 166 | 6,42 | 111   | 49,9 | 163 | 5,49 |
|      | 6          | 168                                               | 26,9 | 195 | 13,5 | 155   | 32,8 | 188 | 10,4 | 146   | 36,3 | 183 | 9,07 | 136   | 40,2 | 178 | 7,80 | 124   | 44,8 | 171 | 6,58 | 115   | 50,0 | 167 | 5,63 |
|      | 7          | 173                                               | 26,9 | 201 | 13,9 | 160   | 33,0 | 194 | 10,7 | 151   | 36,4 | 189 | 9,35 | 140   | 40,3 | 182 | 7,99 | 128   | 44,9 | 174 | 6,73 | 118   | 50,1 | 170 | 5,74 |
|      | 10         | 188                                               | 27,2 | 216 | 14,9 | 173   | 33,3 | 207 | 11,4 | 163   | 36,7 | 201 | 9,93 | 150   | 40,7 | 193 | 8,43 | 137   | 45,3 | 184 | 7,08 | 127   | 50,5 | 179 | 6,05 |
|      | 15         | 210                                               | 27,5 | 238 | 16,3 | 194   | 33,9 | 228 | 12,4 | 185   | 37,4 | 223 | 10,9 | 172   | 41,4 | 215 | 9,34 | 157   | 46,1 | 205 | 7,86 | -     | -    | -   | -    |
|      | 18         | 228                                               | 27,7 | 256 | 17,5 | 211   | 34,3 | 246 | 13,3 | 199   | 37,7 | 238 | 11,6 | 186   | 42,0 | 229 | 9,89 | 169   | 46,6 | 218 | 8,30 | -     | -    | -   | -    |
| 55.4 | 5          | 174                                               | 29,5 | 204 | 12,8 | 160   | 35,9 | 196 | 9,94 | 152   | 39,6 | 192 | 8,68 | 141   | 44,1 | 186 | 7,44 | 129   | 49,2 | 179 | 6,25 | 119   | 55,3 | 176 | 5,34 |
|      | 6          | 181                                               | 29,8 | 211 | 13,2 | 167   | 36,0 | 203 | 10,3 | 157   | 39,7 | 198 | 8,94 | 146   | 44,2 | 191 | 7,65 | 133   | 49,5 | 184 | 6,40 | 124   | 55,4 | 180 | 5,49 |
|      | 7          | 186                                               | 29,9 | 216 | 13,5 | 172   | 36,2 | 208 | 10,5 | 162   | 39,9 | 202 | 9,14 | 151   | 44,3 | 196 | 7,84 | 138   | 49,6 | 188 | 6,56 | 128   | 55,6 | 185 | 5,62 |
|      | 10         | 204                                               | 30,3 | 234 | 14,4 | 186   | 36,6 | 223 | 11,2 | 176   | 40,3 | 217 | 9,75 | 163   | 44,7 | 208 | 8,30 | 147   | 50,0 | 199 | 6,92 | 138   | 55,9 | 195 | 5,94 |
|      | 15         | 228                                               | 31,1 | 259 | 15,7 | 210   | 37,4 | 248 | 12,2 | 199   | 41,0 | 240 | 10,7 | 184   | 45,5 | 230 | 9,11 | 169   | 50,9 | 221 | 7,68 | -     | -    | -   | -    |
|      | 18         | 246                                               | 31,5 | 277 | 16,6 | 227   | 37,9 | 264 | 13,0 | 216   | 41,5 | 257 | 11,4 | 201   | 46,2 | 248 | 9,71 | 183   | 51,5 | 235 | 8,13 | -     | -    | -   | -    |
| 60.4 | 5          | 187                                               | 32,2 | 222 | 12,7 | 172   | 39,0 | 215 | 9,94 | 164   | 43,0 | 211 | 8,70 | 151   | 47,7 | 203 | 7,40 | 139   | 53,2 | 196 | 6,29 | 128   | 59,6 | 191 | 5,35 |
|      | 6          | 192                                               | 32,3 | 228 | 13,0 | 178   | 39,1 | 221 | 10,2 | 169   | 43,2 | 216 | 8,91 | 157   | 47,9 | 209 | 7,65 | 144   | 53,4 | 201 | 6,46 | 132   | 59,8 | 196 | 5,49 |
|      | 7          | 199                                               | 32,5 | 235 | 13,4 | 184   | 39,2 | 227 | 10,5 | 174   | 43,4 | 222 | 9,14 | 162   | 48,1 | 214 | 7,81 | 148   | 53,5 | 206 | 6,61 | 137   | 59,9 | 200 | 5,62 |
|      | 10         | 216                                               | 32,9 | 252 | 14,2 | 200   | 39,6 | 244 | 11,2 | 188   | 43,7 | 235 | 9,68 | 174   | 48,4 | 226 | 8,27 | 158   | 53,9 | 217 | 6,96 | 146   | 60,2 | 211 | 5,94 |
|      | 15         | 242                                               | 33,6 | 280 | 15,5 | 225   | 40,4 | 269 | 12,2 | 212   | 44,4 | 261 | 10,6 | 198   | 49,2 | 252 | 9,13 | 182   | 54,7 | 241 | 7,75 | -     | -    | -   | -    |
|      | 18         | 261                                               | 34,1 | 300 | 16,4 | 242   | 40,9 | 288 | 13,0 | 231   | 45,0 | 280 | 11,4 | 214   | 49,7 | 268 | 9,69 | 197   | 55,3 | 257 | 8,22 | -     | -    | -   | -    |
| 65.4 | 5          | 199                                               | 35,0 | 237 | 12,5 | 184   | 42,5 | 230 | 9,75 | 174   | 46,9 | 224 | 8,48 | 161   | 52,1 | 216 | 7,23 | 148   | 58,2 | 209 | 6,14 | 137   | 65,3 | 206 | 5,25 |
|      | 6          | 206                                               | 35,2 | 244 | 12,8 | 191   | 42,6 | 237 | 10,0 | 179   | 47,1 | 230 | 8,68 | 167   | 52,3 | 222 | 7,44 | 153   | 58,4 | 215 | 6,30 | 142   | 65,4 | 210 | 5,37 |
|      | 7          | 214                                               | 35,5 | 253 | 13,2 | 198   | 42,8 | 244 | 10,3 | 186   | 47,3 | 237 | 8,94 | 172   | 52,5 | 228 | 7,62 | 158   | 58,6 | 220 | 6,44 | 146   | 65,6 | 215 | 5,50 |
|      | 10         | 231                                               | 36,0 | 271 | 14,0 | 212   | 43,2 | 259 | 10,9 | 200   | 47,7 | 251 | 9,47 | 185   | 52,9 | 242 | 8,06 | 171   | 59,4 | 233 | 6,79 | 156   | 65,9 | 225 | 5,77 |
|      | 15         | 257                                               | 36,7 | 298 | 15,1 | 239   | 44,2 | 287 | 11,9 | 225   | 48,6 | 277 | 10,3 | 211   | 53,9 | 268 | 8,88 | 193   | 60,0 | 256 | 7,48 | -     | -    | -   | -    |
|      | 18         | 278                                               | 37,2 | 320 | 16,1 | 258   | 44,7 | 307 | 12,6 | 245   | 49,2 | 298 | 11,0 | 228   | 54,6 | 287 | 9,42 | 208   | 60,7 | 272 | 7,90 | -     | -    | -   | -    |
| 70.4 | 5          | 213                                               | 36,9 | 255 | 12,7 | 197   | 44,6 | 247 | 10,0 | 188   | 49,1 | 242 | 8,74 | 175   | 54,4 | 234 | 7,52 | 161   | 60,5 | 227 | 6,41 | 147   | 67,3 | 219 | 5,43 |
|      | 6          | 220                                               | 37,2 | 262 | 13,0 | 204   | 44,8 | 254 | 10,2 | 194   | 49,4 | 248 | 8,95 | 181   | 54,6 | 240 | 7,72 | 166   | 60,8 | 232 | 6,55 | 153   | 67,6 | 225 | 5,59 |
|      | 7          | 228                                               | 37,6 | 271 | 13,3 | 212   | 45,1 | 262 | 10,5 | 200   | 49,6 | 255 | 9,18 | 187   | 54,8 | 246 | 7,89 | 170   | 60,9 | 236 | 6,67 | 157   | 67,8 | 229 | 5,70 |
|      | 10         | 246                                               | 38,2 | 290 | 14,0 | 228   | 45,7 | 279 | 11,1 | 215   | 50,1 | 271 | 9,69 | 200   | 55,4 | 261 | 8,33 | 182   | 61,5 | 249 | 7,02 | 168   | 68,3 | 241 | 5,99 |
|      | 15         | 274                                               | 39,2 | 319 | 15,1 | 255   | 46,8 | 307 | 12,0 | 242   | 51,0 | 299 | 10,6 | 227   | 56,5 | 289 | 9,13 | 209   | 62,7 | 277 | 7,77 | -     | -    | -   | -    |
|      | 18         | 298                                               | 40,1 | 344 | 16,0 | 275   | 47,5 | 329 | 12,7 | 263   | 51,9 | 321 | 11,2 | 245   | 57,3 | 308 | 9,64 | 226   | 63,5 | 296 | 8,22 | -     | -    | -   | -    |
| 80.4 | 5          | 241                                               | 42,8 | 289 | 12,4 | 225   | 51,4 | 282 | 9,9  | 213   | 56,5 | 275 | 8,64 | 198   | 62,5 | 267 | 7,43 | 181   | 69,3 | 255 | 6,30 | 168   | 76,8 | 250 | 5,44 |
|      | 6          | 251                                               | 43,2 | 300 | 12,8 | 232   | 51,8 | 290 | 10,1 | 221   | 56,9 | 284 | 8,86 | 205   | 62,8 | 273 | 7,61 | 187   | 69,6 | 262 | 6,44 | 174   | 77,2 | 256 | 5,57 |
|      | 7          | 259                                               | 43,6 | 309 | 13,0 | 239   | 52,1 | 297 | 10,3 | 228   | 57,3 | 291 | 9,06 | 212   | 63,2 | 281 | 7,80 | 193   | 69,9 | 268 | 6,60 | 178   | 77,4 | 261 | 5,67 |
|      | 10         | 278                                               | 44,4 | 329 | 13,7 | 257   | 52,9 | 317 | 10,8 | 243   | 57,9 | 307 | 9,49 | 225   | 63,8 | 295 | 8,15 | 207   | 70,9 | 284 | 6,93 | 190   | 78,0 | 273 | 5,93 |
|      | 15         | 311                                               | 46,0 | 364 | 14,7 | 288   | 54,4 | 349 | 11,7 | 273   | 59,2 | 339 | 10,3 | 255   | 65,4 | 327 | 8,91 | 234   | 72,1 | 313 | 7,59 | -     | -    | -   | -    |
|      | 18         | 333                                               | 47,2 | 388 | 15,3 | 312   | 55,5 | 376 | 12,4 | 296   | 60,4 | 364 | 10,9 | 276   | 66,5 | 350 | 9,42 | 253   | 73,1 | 333 | 8,01 | -     | -    | -   | -    |
| 90.4 | 5          | 274                                               | 50,8 | 336 | 12,0 | 256   | 61,6 | 326 | 9,45 | 243   | 68,0 | 319 | 8,25 | 226   | 75,7 | 308 | 7,05 | 206   | 84,7 | 296 | 5,93 | 188   | 95,2 | 288 | 5,00 |
|      | 6          | 283                                               | 51,1 | 345 | 12,3 | 264   | 61,8 | 334 | 9,68 | 250   | 68,2 | 326 | 8,45 | 233   | 75,9 | 316 | 7,22 | 213   | 84,9 | 303 | 6,08 | 194   | 95,3 | 293 | 5,10 |
|      | 7          | 292                                               | 51,3 | 354 | 12,6 | 272   | 62,0 | 343 | 9,93 | 257   | 68,4 | 334 | 8,64 | 239   | 76,0 | 322 | 7,39 | 218   | 85,0 | 308 | 6,19 | 198   | 95,4 | 298 | 5,20 |
|      | 10         | 312                                               | 51,7 | 375 | 13,3 | 288   | 62,4 | 361 | 10,4 | 273   | 68,9 | 351 | 9,06 | 253   | 76,4 | 337 | 7,72 | 230   | 85,3 | 321 | 6,46 | 210   | 95,6 | 310 | 5,44 |
|      | 15         | 347                                               | 52,6 | 413 | 14,5 | 326   | 63,5 | 401 | 11,4 | 309   | 69,9 | 390 | 10,0 | 288   | 77,5 | 375 | 8,55 | 267   | 86,4 | 362 | 7,28 | -     | -    | -   | -    |
|      | 18         | 376                                               | 53,3 | 444 | 15,4 | 351   | 64,3 | 428 | 12,1 | 334   | 70,7 | 416 | 10,6 | 313   | 78,2 | 402 | 9,14 | 286   | 87,1 | 382 | 7,67 | -     | -    | -   | -    |

kWf = Cooling capacity (kW)

kWe = Total power input (kW)

kWt = Heating capacity (kW)

GLE = Overall efficiency

Tw [°C] = User side (cold side) outlet water temperature



## Configuration for 4-pipe system

### Cooling 100% - Heating 100% performance - Size 100.4 ÷ 120.4

| Size  | Tw<br>(°C) | Recovery side (hot side) outlet water temperature |      |     |      |       |      |     |      |       |      |     |      |       |      |     |      |       |      |     |      |       |      |     |      |
|-------|------------|---------------------------------------------------|------|-----|------|-------|------|-----|------|-------|------|-----|------|-------|------|-----|------|-------|------|-----|------|-------|------|-----|------|
|       |            | 20/25                                             |      |     |      | 30/35 |      |     |      | 35/40 |      |     |      | 40/45 |      |     |      | 45/50 |      |     |      | 50/55 |      |     |      |
|       |            | kWf                                               | kWe  | kWt | GLE  | kWf   | kWe  | kWt | GLE  | kWf   | kWe  | kWt | GLE  | kWf   | kWe  | kWt | GLE  | kWf   | kWe  | kWt | GLE  | kWf   | kWe  | kWt | GLE  |
| 100.4 | 5          | 318                                               | 54,0 | 380 | 12,9 | 296   | 65,1 | 370 | 10,2 | 281   | 71,9 | 362 | 8,94 | 261   | 79,8 | 349 | 7,65 | 239   | 89,0 | 336 | 6,46 | 219   | 99,7 | 326 | 5,47 |
|       | 6          | 328                                               | 54,3 | 391 | 13,3 | 306   | 65,4 | 379 | 10,5 | 290   | 72,2 | 371 | 9,16 | 270   | 80,0 | 358 | 7,84 | 247   | 89,3 | 344 | 6,62 | 226   | 99,9 | 334 | 5,61 |
|       | 7          | 338                                               | 54,6 | 402 | 13,6 | 315   | 65,7 | 390 | 10,7 | 299   | 72,5 | 381 | 9,38 | 278   | 80,3 | 367 | 8,04 | 253   | 89,4 | 350 | 6,74 | 232   | 100  | 340 | 5,71 |
|       | 10         | 362                                               | 55,3 | 427 | 14,3 | 335   | 66,3 | 411 | 11,2 | 317   | 73,0 | 400 | 9,82 | 294   | 80,8 | 384 | 8,38 | 267   | 89,9 | 366 | 7,04 | 245   | 100  | 353 | 5,95 |
|       | 15         | 402                                               | 56,5 | 469 | 15,4 | 373   | 67,6 | 451 | 12,2 | 354   | 74,2 | 438 | 10,7 | 331   | 82,1 | 423 | 9,18 | 308   | 91,3 | 409 | 7,84 | -     | -    | -   | -    |
|       | 18         | 436                                               | 57,6 | 504 | 16,3 | 407   | 68,7 | 487 | 13,0 | 387   | 75,3 | 473 | 11,4 | 359   | 83,0 | 452 | 9,77 | 331   | 92,2 | 434 | 8,28 | -     | -    | -   | -    |
| 110.4 | 5          | 348                                               | 59,7 | 417 | 12,8 | 324   | 72,2 | 405 | 10,1 | 307   | 79,8 | 395 | 8,80 | 285   | 88,8 | 381 | 7,50 | 259   | 99,3 | 365 | 6,28 | 237   | 112  | 355 | 5,31 |
|       | 6          | 359                                               | 60,0 | 428 | 13,1 | 334   | 72,5 | 415 | 10,3 | 317   | 80,1 | 405 | 9,01 | 294   | 89,0 | 390 | 7,68 | 266   | 99,5 | 372 | 6,41 | 243   | 112  | 361 | 5,4  |
|       | 7          | 370                                               | 60,2 | 439 | 13,4 | 343   | 72,8 | 424 | 10,5 | 325   | 80,3 | 414 | 9,19 | 300   | 89,2 | 397 | 7,81 | 272   | 99,7 | 379 | 6,53 | 248   | 112  | 367 | 5,5  |
|       | 10         | 389                                               | 60,7 | 459 | 14,0 | 360   | 73,4 | 442 | 10,9 | 341   | 80,8 | 431 | 9,55 | 315   | 89,6 | 412 | 8,11 | 286   | 100  | 393 | 6,78 | 262   | 112  | 381 | 5,72 |
|       | 15         | 435                                               | 62,0 | 508 | 15,2 | 405   | 74,7 | 490 | 12,0 | 386   | 82,2 | 478 | 10,5 | 359   | 91,0 | 460 | 8,99 | 331   | 102  | 441 | 7,59 | -     | -    | -   | -    |
|       | 18         | 471                                               | 63,0 | 545 | 16,1 | 440   | 75,8 | 527 | 12,7 | 417   | 83,1 | 510 | 11,1 | 388   | 91,9 | 490 | 9,56 | 356   | 103  | 468 | 8,03 | -     | -    | -   | -    |
| 120.4 | 5          | 376                                               | 68,1 | 458 | 12,3 | 353   | 82,7 | 449 | 9,69 | 335   | 91,5 | 439 | 8,46 | 311   | 102  | 423 | 7,20 | 283   | 114  | 406 | 6,03 | 258   | 129  | 394 | 5,07 |
|       | 6          | 388                                               | 68,3 | 471 | 12,6 | 364   | 83,0 | 461 | 9,94 | 343   | 91,7 | 447 | 8,63 | 320   | 102  | 434 | 7,39 | 292   | 114  | 415 | 6,18 | 265   | 129  | 401 | 5,17 |
|       | 7          | 400                                               | 68,5 | 484 | 12,9 | 373   | 83,3 | 471 | 10,1 | 354   | 92,0 | 459 | 8,84 | 328   | 102  | 442 | 7,53 | 298   | 115  | 422 | 6,29 | 271   | 129  | 408 | 5,27 |
|       | 10         | 423                                               | 69,0 | 508 | 13,5 | 392   | 83,8 | 491 | 10,5 | 373   | 92,5 | 479 | 9,21 | 345   | 103  | 460 | 7,83 | 314   | 115  | 439 | 6,55 | 286   | 129  | 424 | 5,50 |
|       | 15         | 468                                               | 70,0 | 557 | 14,7 | 438   | 84,9 | 539 | 11,5 | 415   | 93,5 | 523 | 10,0 | 387   | 104  | 505 | 8,59 | 360   | 116  | 488 | 7,31 | -     | -    | -   | -    |
|       | 18         | 508                                               | 70,9 | 599 | 15,6 | 476   | 85,9 | 580 | 12,3 | 452   | 94,6 | 564 | 10,7 | 422   | 105  | 542 | 9,20 | 389   | 117  | 520 | 7,77 | -     | -    | -   | -    |

kWf = Cooling capacity (kW)

kWe = Total power input (kW)

kWt = Heating capacity (kW)

GLE = Overall efficiency

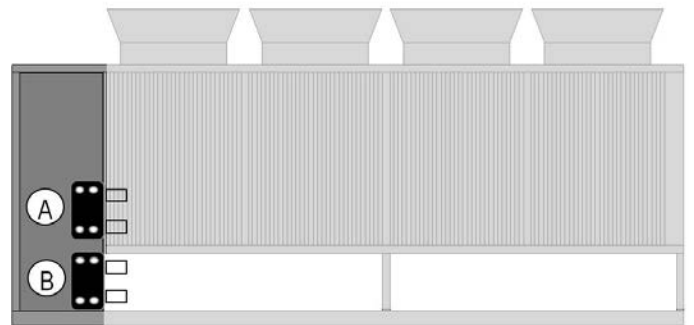
Tw [°C] = User side (cold side) outlet water temperature

## 2T configuration - For 2-pipe systems

2T configuration supply air conditioning systems with 2 tubes and it is able to supply hot water or chilled water dependently on season, with the total condensation heat recovery possibility. 2T configuration is designed for air conditioning systems, chilling and heating mode are not allowed.

This configuration allows:

- Simultaneous free hot water production to the recovery side with chilled water production to the user side.
- Hot water production to the recovery side with cooling capacity rejection to the external thermal source.
- Chilled water production to the user side with heating capacity rejection to the external thermal source.
- Hot water production to the user side with cooling capacity rejection to the external thermal source.
- Simultaneous hot water production to the user side and to the recovery side (total heating capacity is the heating capacity declared within 'General technical data' section).



A: user side exchanger  
B: recovery exchanger

Unit controller guarantees unit operation in mix mode conditions.

It is possible a priority set on request of recovery hot water (priority DHW). The hot water unit production request can be performed by a proper potential-free contact.

## Considerations on the installation

### Desuperheater mode

The standard unit control at part load changes the water flow-rate, hot side, maintaining the supply temperature at the target value. Through the flow modulation the standard unit can produce hot water even over the set-point, up to a settable limit temperature (default 65°C). Thanks to this setting the exchanger operation time, hot user side, is extended in desuperheater mode, improving the unit efficiency of 5% compared to the desuperheater mode not active.



The logic of control above described drives to a proper design of hydraulic components and safety devices, considering the upper limit of hot water. It is possible to decrease this temperature down to the set point, not having the energy efficiency benefits that desuperheater solution leads.

The energy dimensioning from recovery has to consider that:

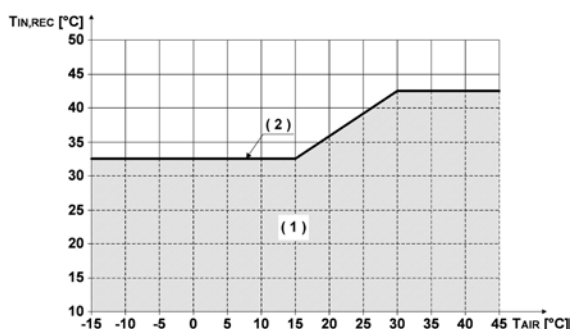
- in middle seasons the recovery heat production can be exclusive dissipating the cooling capacity on the external thermal source;
- in winter, the recovery heat production is obtained taking heat from the system use.

### System water volume

For a proper operation of MULTIFUNCTION 2T unit is necessary to contemplate a correct design of water tanks both on user side and recovery side. Minimum system water volumes are described within 'General technical data' section and they have to be satisfied to avoid continuous compressor switching on and off. We recommend to increase minimum water volumes described to reduce compressor switching on and off in an hour and to limit drifting of water temperature during defrosting cycles.

### Operation with water low temperatures on the exchanger, recovery side

When the hot water production function is enabled to the recovery but the water temperature is too low, the water produced to the recovery will have a temperature higher than the minimum level indicated in the graph. If this unit operating requirement is not acceptable, it is recommended to provide on the recovery side a primary - secondary where the secondary is maintained at the desired operating temperature while the primary will have a consistent operating temperatures within the limits shown in the graph



$T_{IN,REC}$  [°C] = Entering water temperature to recovery  
 $T_{AIR}$  [°C] = entering external exchanger air temperature (D.B.)

1. Transient operating range where unit operates forcing on the recovery set-point (if the recovery function is enabled)
2. Minimum system water temperature level, recovery side

### Recovery side water flow-rate

When pumps are not built-in it is necessary to contemplate recovery side water flow-rate modulation, managed by the unit with a 0-10V signal.

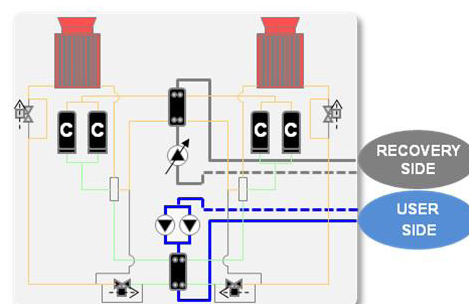
## 2-pipe unit operating range

The unit is capable of producing chilled water or domestic hot water on the user side. The total recovery heat exchanger allows for free domestic hot water production in summer operation mode and for the simultaneous production of chilled water and domestic hot water in winter operation mode.

### Example of how the unit operates:

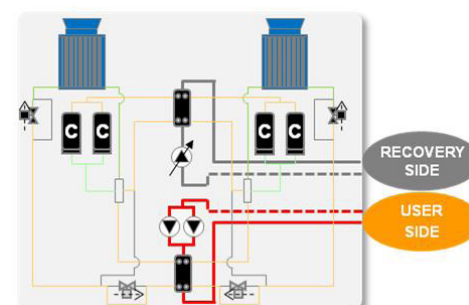
#### System cooling only:

In this condition all the cooling capacity is released to the user side of the heat exchanger and maintenance of the user side set point is ensured through the modulation of the capacity steps. All the heating capacity is dispersed on the finned coil exchanger.



#### System heating only:

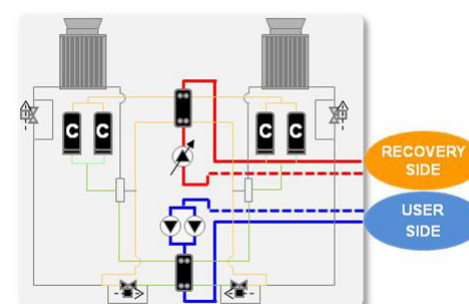
In this condition all the heating capacity is released to the recovery side of the heat exchanger and the load requirements are met through the modulation of the capacity steps. All the cooling capacity is dispersed on the finned coil exchanger.



#### System cooling requirements and free production of domestic hot water:

In this condition, all the cooling capacity is released to the user side of the heat exchanger while all the heating capacity is released to the recovery side of the heat exchanger.

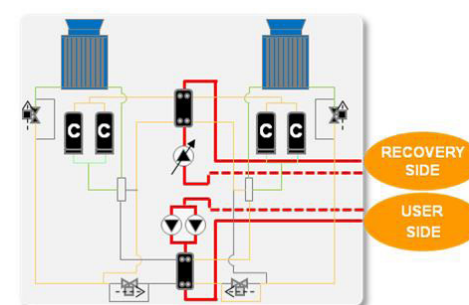
Maintenance of the user side set point is ensured through the modulation of the capacity steps. In this condition, the overall efficiency of the unit, defined as (chiller power for cold operation + heating capacity for recovery)/(total power input) is very high.



#### System heating requirements and production of domestic hot water:

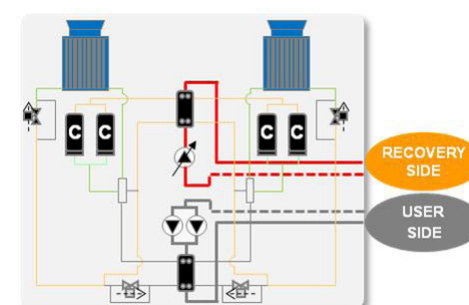
In this condition, the heat is released at the same time to the user side and the recovery side of the heat exchanger. The total heating capacity that can be provided to the two points of use cannot exceed 100% of the unit's nominal heating capacity.

The total heating capacity that can be provided to the two points of use cannot exceed 100% of the unit's nominal heating capacity. The unit will manage the capacity steps considering both loads, and through modulation of the flow it will initially serve the primary point of use, reserving the residual capacity for the secondary point of use. All the cooling capacity is dispersed on the finned coil exchanger.

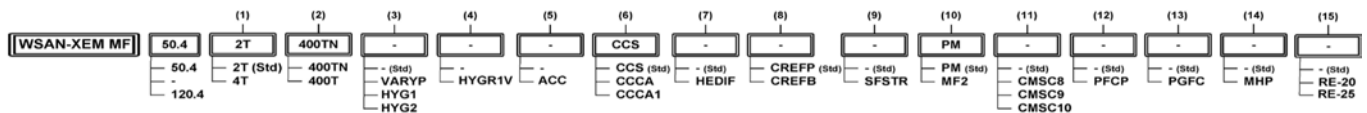


#### Requirement for the production of domestic hot water only:

In this condition all the heating capacity is released to the recovery side of the heat exchanger and the load requirements are met through the modulation of the capacity steps. All the cooling capacity is dispersed on the finned coil exchanger.



## Unit configurations - 2-pipe system



### (1) Functionalities

2T - Unit for reversible 2-pipe system (standard)  
4T - Unit for 4-pipe system

### (2) Voltage

Supply voltage 400/3/50+N (only for size 50.4 ÷ 65.4)  
Supply voltage 400/3/50 (only for size 70.4 ÷ 120.4)

### (3) User side hydronic assemblies

Refer to the diagrams of the hydronic assembly reported

### (4) Recovery side hydronic assemblies

Refer to the diagrams of the hydronic assembly reported

### (5) Storage tank

(-) Not required (standard)  
ACC - Storage tank

### (6) Condensing coil

CCS - Standard condenser coil (standard)  
CCA - Copper / aluminium condenser coil with acrylic lining  
CCA1 - Condenser coil with Energy Guard DCC Aluminum

### (7) Diffuser for fans

(-) Not required (standard)  
HEDIF - Diffuser for high efficiency axial fan (only for size 70.4 ÷ 120.4)

### (8) Type of fans

CREFP - Device for consumption reduction of the external section at variable speed (phase-cutting) (standard)  
CREFB - Device for consumption reduction of the external section ECOBREEZE fans (only for size 70.4 ÷ 120.4)

### (9) Soft starter

(-) Not required (standard)  
SFSTR - Disposal for inrush current reduction

### (10) Phase monitor

PM - Phase monitor (standard)  
MF2 - Multi-function phase monitor

### (11) Serial communication module

(-) Not required (standard)  
CMSC8 - Serial communication module to BACnet supervisor  
CMSC9 - Serial communication module to Modbus supervisor  
CMSC10 - Serial communication module to LonWorks supervisor

### (12) Power capacitors

(-) Not required (standard)  
PFCP - Power factor correction capacitors (cosfi>0.9)

### (13) Protection grill

(-) Not required (standard)  
PGFC - Finned coil protection grill

### (14) High and low pressure gauges

(-) Not required (standard)  
MHP - High and low pressure gauges

### (15) Electrical panel anti-freeze protection

(-) Not required (standard)  
RE-20 - Electric panel antifreeze protection for minimum ambient temperature up to -20 °C  
RE-25 - Electric panel antifreeze protection for minimum ambient temperature up to -25 °C

| Functionalities                                           | Diagram hydronic assemblies |                              |                                    |                                 |
|-----------------------------------------------------------|-----------------------------|------------------------------|------------------------------------|---------------------------------|
| 2 PIPE SYSTEM<br>+<br>TOTAL RECOVERY<br><br>USER SIDE     | Standard unit (STD)         | Unit with VARYFLOW + (VARYP) | Unit with 1 ON/OFF pump (HYG1)     | Unit with 2 ON/OFF pumps (HYG2) |
|                                                           |                             |                              |                                    |                                 |
| 2 PIPE SYSTEM<br>+<br>TOTAL RECOVERY<br><br>RECOVERY SIDE | Standard unit (STD)         |                              | Unit with 1 inverter pump (HYGR1V) |                                 |
|                                                           |                             |                              |                                    |                                 |

The unit may be configured by choosing one of the 4 user side hydronic assembly combinations with one of the 2 recovery side combinations depending on system requirements.

| Accessories separately supplied |                                                            |                                                 |                                      |
|---------------------------------|------------------------------------------------------------|-------------------------------------------------|--------------------------------------|
| RCTX - Remote control           | BACX - BACnet serial communication module                  | PGFCX - Finned coil protection grill            | AVIBX - Anti-vibration mount support |
|                                 | CMMBX - Serial communication module to supervisor (MODBUS) | IFWX - Steel mesh strainer on the water side    | MHPX - High and low pressure gauges  |
|                                 | CMSLWX - LonWorks serial communication module              | VACSX - Total recovery side DHW switching valve |                                      |

## Configuration for 2-pipe system

### General technical data - Performance

| Size                                    |   |     | 50.4 | 55.4 | 60.4 | 65.4 | 70.4 | 80.4 | 90.4 | 100.4 | 110.4 | 120.4 |
|-----------------------------------------|---|-----|------|------|------|------|------|------|------|-------|-------|-------|
| <b>Cooling 100% - Heating 0%</b>        |   |     |      |      |      |      |      |      |      |       |       |       |
| Cooling capacity                        | 1 | kW  | 139  | 149  | 160  | 170  | 184  | 209  | 236  | 275   | 297   | 324   |
| Compressor power input                  | 1 | kW  | 43,3 | 48,2 | 52,8 | 58,2 | 60,4 | 69,4 | 85,2 | 86,7  | 98,3  | 114   |
| Total power input                       | 2 | kW  | 48,2 | 53,1 | 57,7 | 63,1 | 66,8 | 75,8 | 91,6 | 96,4  | 108   | 124   |
| EER                                     | 1 |     | 2,89 | 2,81 | 2,78 | 2,70 | 2,76 | 2,76 | 2,58 | 2,85  | 2,75  | 2,62  |
| Water flow-rate                         | 1 | l/s | 6,66 | 7,12 | 7,66 | 8,13 | 8,81 | 10,0 | 11,3 | 13,1  | 14,2  | 15,5  |
| User side exchanger pressure drop       | 1 | kPa | 17,1 | 19,4 | 22,3 | 20,8 | 13,8 | 17,4 | 21,7 | 22,1  | 17,2  | 20,2  |
| Cooling capacity (EN14511:2013)         | 3 | kW  | 139  | 148  | 160  | 170  | 184  | 208  | 235  | 273   | 296   | 321   |
| Total power input (EN14511:2013)        | 3 | kW  | 48,7 | 53,6 | 58,4 | 63,7 | 67,6 | 77,0 | 92,7 | 98,1  | 110   | 126   |
| EER (EN14511:2013)                      | 3 |     | 2,85 | 2,76 | 2,73 | 2,66 | 2,72 | 2,70 | 2,54 | 2,79  | 2,69  | 2,55  |
| SEER                                    | 8 |     | 3,99 | 4,00 | 4,04 | 4,07 | 3,96 | 4,11 | 4,10 | 3,95  | 3,91  | 3,85  |
| <b>Cooling 0% - Heating 100%</b>        |   |     |      |      |      |      |      |      |      |       |       |       |
| Heating capacity                        | 4 | kW  | 154  | 166  | 181  | 193  | 209  | 238  | 273  | 312   | 338   | 374   |
| Compressor power input                  | 4 | kW  | 42,3 | 46,5 | 50,7 | 54,3 | 57,8 | 66,6 | 77,4 | 85,7  | 93,5  | 106   |
| Total power input                       | 2 | kW  | 47,2 | 51,4 | 55,6 | 59,2 | 64,2 | 73,0 | 83,6 | 95,4  | 103   | 115   |
| COP                                     | 4 |     | 3,26 | 3,23 | 3,26 | 3,26 | 3,26 | 3,26 | 3,27 | 3,27  | 3,28  | 3,24  |
| Water flow-rate                         | 4 | l/s | 7,36 | 7,93 | 8,65 | 9,22 | 9,99 | 11,4 | 13,0 | 14,9  | 16,1  | 17,9  |
| User side exchanger pressure drops      | 4 | kPa | 20,6 | 23,9 | 28,4 | 26,1 | 17,3 | 22,2 | 28,3 | 28,2  | 21,8  | 26,8  |
| Heating capacity (EN14511:2013)         | 5 | kW  | 155  | 167  | 183  | 194  | 210  | 239  | 274  | 313   | 340   | 378   |
| Total power input (EN14511:2013)        | 5 | kW  | 47,9 | 52,3 | 56,5 | 60,1 | 65,3 | 74,3 | 85,1 | 97,5  | 106   | 118   |
| COP (EN14511:2013)                      | 5 |     | 3,24 | 3,20 | 3,24 | 3,23 | 3,22 | 3,22 | 3,22 | 3,21  | 3,21  | 3,20  |
| SCOP - AVERAGE Climte - W35             | 8 |     | 3,70 | 3,66 | 3,72 | 3,72 | 3,64 | 3,64 | 3,76 | 3,25  | 3,70  | 3,80  |
| <b>Cooling 100% - Heating 100%</b>      |   |     |      |      |      |      |      |      |      |       |       |       |
| Cooling capacity                        | 6 | kW  | 140  | 151  | 162  | 172  | 187  | 212  | 239  | 278   | 300   | 328   |
| Heating capacity                        | 6 | kW  | 182  | 196  | 214  | 228  | 246  | 281  | 322  | 367   | 397   | 442   |
| Total power input                       | 6 | kW  | 40,3 | 44,3 | 48,1 | 52,5 | 54,8 | 63,2 | 76,0 | 80,3  | 89,2  | 102   |
| Overall efficiency                      | 7 |     | 7,99 | 7,84 | 7,81 | 7,62 | 7,89 | 7,80 | 7,39 | 8,04  | 7,81  | 7,53  |
| Exchanger water flow rate utility side  | 6 | l/s | 6,69 | 7,21 | 7,74 | 8,22 | 8,93 | 10,1 | 11,4 | 13,3  | 14,3  | 15,7  |
| User side exchanger pressure drops      | 6 | kPa | 17,0 | 20,0 | 23,0 | 21,0 | 14,0 | 18,0 | 22,0 | 23,0  | 17,0  | 21,0  |
| Recovery side exchanger water flow-rate | 6 | l/s | 8,70 | 9,36 | 10,2 | 10,9 | 11,8 | 13,4 | 15,4 | 17,5  | 19,0  | 21,1  |
| Recovery side exchanger pressure drop   | 6 | kPa | 68,0 | 65,0 | 62,0 | 64,0 | 64,0 | 69,0 | 75,0 | 65,0  | 65,0  | 75,0  |

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

\*Contains fluorinated greenhouse gases (GWP 2087,5)

1. Data referred to the following conditions: User side exchanger water = 12/7 °C. Entering external exchanger air temperature 35°C.

2. The Total Power Input value does not take into account the part related to the pumps and required to overcome the pressure drops for the circulation of the solution inside the exchangers

3. Data compliant to Standard EN 14511:2013 referred to the following conditions: User side exchanger water = 12/7 °C. Entering external exchanger air temperature 35°C

4. Data referred to the following conditions: User side Exchanger water temperature = 40/45 °C. Entering external exchanger air temperature = 7°C D.B./6°C W.B.

5. Data compliant to Standard EN 14511:2013 referred to the following conditions: User side Exchanger water temperature = 40/45 °C. Entering external exchanger air temperature = 7°C D.B./6°C W.B.

6. Data referred to the following conditions: user side exchanger water 12/7 °C. Source side exchanger water 40/45 °C.

7. Global efficiency, calculated as (Cooling capacity + Heating capacity)/(Total power input).

8. Data calculated according to the EN 14825:2016 Regulation

## Configuration for 2-pipe system

### General technical data - Construction

| Size                                       |   |     | 50.4       | 55.4       | 60.4       | 65.4       | 70.4     | 80.4     | 90.4     | 100.4    | 110.4    | 120.4    |
|--------------------------------------------|---|-----|------------|------------|------------|------------|----------|----------|----------|----------|----------|----------|
| <b>Compressor</b>                          |   |     |            |            |            |            |          |          |          |          |          |          |
| Type of compressors                        |   |     | SCROLL     |            |            |            |          |          |          |          |          |          |
| Refrigerant                                |   |     | R-410A     |            |            |            |          |          |          |          |          |          |
| No. of compressors                         |   | Nr  | 4          | 4          | 4          | 4          | 4        | 4        | 4        | 4        | 4        | 4        |
| Rated power (C1)                           |   | HP  | 25         | 25         | 30         | 30         | 35       | 40       | 45       | 50       | 55       | 60       |
| Rated power (C2)                           |   | HP  | 25         | 30         | 30         | 35         | 35       | 40       | 45       | 50       | 55       | 60       |
| Std Capacity control steps                 |   | Nr  | 6          | 5          | 4          | 5          | 6        | 6        | 6        | 6        | 6        | 4        |
| Oil charge (C1)                            |   | l   | 7,00       | 7,00       | 7,00       | 7,00       | 8,00     | 10,0     | 10,0     | 11,0     | 13,0     | 13,0     |
| Oil charge (C2)                            |   | l   | 7,00       | 7,00       | 7,00       | 8,00       | 8,00     | 10,0     | 10,0     | 11,0     | 13,0     | 13,0     |
| Carica refrigerante (C1)                   | 1 | kg  | 20,0       | 26,0       | 24,0       | 28,0       | 29,0     | 34,0     | 43,0     | 46,0     | 48,0     | 52,0     |
| Carica refrigerante (C2)                   | 1 | kg  | 20,0       | 26,0       | 24,0       | 28,0       | 29,0     | 34,0     | 43,0     | 46,0     | 48,0     | 52,0     |
| Refrigeration circuits                     |   | Nr  | 2          | 2          | 2          | 2          | 2        | 2        | 2        | 2        | 2        | 2        |
| <b>User side exchanger</b>                 |   |     |            |            |            |            |          |          |          |          |          |          |
| Type of exchanger                          | 2 |     | PHE        |            |            |            |          |          |          |          |          |          |
| No. of exchangers                          |   | Nr  | 1          | 1          | 1          | 1          | 1        | 1        | 1        | 1        | 1        | 1        |
| Water content                              |   | l   | 20         | 20         | 20         | 22         | 30       | 30       | 30       | 36       | 46       | 46       |
| Minimum system water content user side     | 3 |     | 1104       | 888        | 1240       | 1159       | 1314     | 1165     | 1503     | 1708     | 2562     | 2366     |
| <b>Recovery side exchanger</b>             |   |     |            |            |            |            |          |          |          |          |          |          |
| Type of exchanger                          | 2 |     | PHE        |            |            |            |          |          |          |          |          |          |
| No. of exchangers                          |   | Nr  | 2          | 2          | 2          | 2          | 2        | 2        | 2        | 2        | 2        | 2        |
| Water content                              |   | l   | 54         | 55         | 56         | 57         | 58       | 60       | 62       | 108      | 110      | 111      |
| Minimum system water content recovery side | 3 |     | 1056       | 1104       | 1317       | 1440       | 1531     | 1776     | 1869     | 2078     | 2593     | 2784     |
| <b>External Section Fans</b>               |   |     |            |            |            |            |          |          |          |          |          |          |
| Type of fans                               | 4 |     | AX         |            |            |            |          |          |          |          |          |          |
| No. of fans                                |   | Nr  | 8          | 8          | 8          | 8          | 4        | 4        | 4        | 6        | 6        | 6        |
| Type of motor                              | 5 |     | AC/P       | AC/P       | AC/P       | AC/P       | AC/P     | AC/P     | AC/P     | AC/P     | AC/P     | AC/P     |
| Standard airflow                           |   | l/s | 20300      | 20300      | 20000      | 20000      | 25000    | 24200    | 24200    | 35000    | 35000    | 35000    |
| Installed unit power                       |   | kW  | 0,60       | 0,60       | 0,60       | 0,60       | 1,60     | 1,60     | 1,60     | 1,60     | 1,60     | 1,60     |
| <b>Connections</b>                         |   |     |            |            |            |            |          |          |          |          |          |          |
| Water fittings user side                   |   |     | 3"         | 3"         | 3"         | 3"         | 3"       | 3"       | 3"       | 4"       | 4"       | 4"       |
| Water fittings recovery side               |   |     | 3"         | 3"         | 3"         | 3"         | 3"       | 3"       | 3"       | 4"       | 4"       | 4"       |
| <b>Water circuit</b>                       |   |     |            |            |            |            |          |          |          |          |          |          |
| Maximum water side pressure                |   | kPa | 1000       | 1000       | 1000       | 1000       | 1000     | 1000     | 1000     | 1000     | 1000     | 1000     |
| Safety valve calibration                   |   | kPa | 600        | 600        | 600        | 600        | 600      | 600      | 600      | 600      | 600      | 600      |
| <b>Power supply</b>                        |   |     |            |            |            |            |          |          |          |          |          |          |
| Standard power supply                      |   |     | 400/3/50+N | 400/3/50+N | 400/3/50+N | 400/3/50+N | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 |

1. indicative values for standard units with possible +/-10% variation. The actual data are indicated on the label of the unit.
2. PHE = plate exchanger
3. The minimum system water content calculated value does not consider the internal exchanger water content. With outdoor air low temperature applications or low medium requested loads, the minimum installation water volume is obtained doubling the indicated value
4. AX = axial fan
5. AC/P = asynchronous three-phase external rotor motor with phase cutting speed automatic control

## Configuration for 2-pipe system

### Electrical data

#### Supply voltage 400/3/50+N

| Size                                                               |  |    | 50.4 | 55.4 | 60.4 | 65.4 |
|--------------------------------------------------------------------|--|----|------|------|------|------|
| <b>F.L.A. - Full load current at max admissible conditions</b>     |  |    |      |      |      |      |
| F.L.A. - Compressor 1                                              |  | A  | 19,7 | 19,7 | 30,5 | 30,5 |
| F.L.A. - Compressor 2                                              |  | A  | 30,5 | 30,5 | 30,5 | 30,5 |
| F.L.A. - Compressor 3                                              |  | A  | 19,7 | 30,5 | 30,5 | 30,5 |
| F.L.A. - Compressor 4                                              |  | A  | 30,5 | 30,5 | 30,5 | 36,5 |
| F.L.A. - Single External Fan                                       |  | A  | 2,60 | 2,60 | 2,60 | 2,60 |
| F.L.A. - Total                                                     |  | A  | 111  | 122  | 133  | 151  |
| <b>L.R.A. - Locked rotor amperes</b>                               |  |    |      |      |      |      |
| L.R.A. - Compressor 1                                              |  | A  | 118  | 118  | 174  | 174  |
| L.R.A. - Compressor 2                                              |  | A  | 174  | 174  | 174  | 174  |
| L.R.A. - Compressor 3                                              |  | A  | 118  | 174  | 174  | 174  |
| L.R.A. - Compressor 4                                              |  | A  | 174  | 174  | 174  | 225  |
| L.R.A. - Single External Fan                                       |  | A  | 14,0 | 14,0 | 14,0 | 14,0 |
| <b>F.L.I. - Full load power input at max admissible conditions</b> |  |    |      |      |      |      |
| F.L.I. - Compressor 1                                              |  | kW | 11,9 | 11,9 | 17,0 | 17,0 |
| F.L.I. - Compressor 2                                              |  | kW | 17,0 | 17,0 | 17,0 | 17,0 |
| F.L.I. - Compressor 3                                              |  | kW | 11,9 | 17,0 | 17,0 | 17,0 |
| F.L.I. - Compressor 4                                              |  | kW | 17,0 | 17,0 | 17,0 | 22,6 |
| F.L.I. - Single External Fan                                       |  | kW | 0,60 | 0,60 | 0,60 | 0,60 |
| F.L.I. - Total                                                     |  | kW | 60,4 | 65,6 | 70,7 | 76,3 |
| <b>M.I.C. Maximum inrush current</b>                               |  |    |      |      |      |      |
| M.I.C. - Value                                                     |  | A  | 254  | 265  | 276  | 327  |
| M.I.C. with soft start accessory                                   |  | A  | 192  | 203  | 214  | 230  |

Electrical data refer to standard units; according to the installed accessories, the data can suffer some variations.

Power supply: 400/3/50 Hz. Voltage variation: max. +/-10% Voltage unbalance between phases: max 2 %

For non standard voltage please contact Clivet technical office

The units are compliant with the provisions of European standards CEI EN 60204 and CEI EN 60335.

#### Supply voltage: 400/3/50

| Size                                                               |  |    | 70.4 | 80.4 | 90.4 | 100.4 | 110.4 | 120.4 |
|--------------------------------------------------------------------|--|----|------|------|------|-------|-------|-------|
| <b>F.L.A. - Full load current at max admissible conditions</b>     |  |    |      |      |      |       |       |       |
| F.L.A. - Compressor 1                                              |  | A  | 30,5 | 30,5 | 30,5 | 36,5  | 44,9  | 59,3  |
| F.L.A. - Compressor 2                                              |  | A  | 36,5 | 44,9 | 59,3 | 59,3  | 59,3  | 59,3  |
| F.L.A. - Compressor 3                                              |  | A  | 30,5 | 30,5 | 30,5 | 36,5  | 44,9  | 59,3  |
| F.L.A. - Compressor 4                                              |  | A  | 36,5 | 44,9 | 59,3 | 59,3  | 59,3  | 59,3  |
| F.L.A. - Single External Fan                                       |  | A  | 4,10 | 4,10 | 4,10 | 4,10  | 4,10  | 4,10  |
| F.L.A. - Total                                                     |  | A  | 151  | 168  | 196  | 217   | 234   | 262   |
| <b>L.R.A. - Locked rotor amperes</b>                               |  |    |      |      |      |       |       |       |
| L.R.A. - Compressor 1                                              |  | A  | 174  | 174  | 174  | 225   | 272   | 310   |
| L.R.A. - Compressor 2                                              |  | A  | 225  | 272  | 310  | 310   | 310   | 310   |
| L.R.A. - Compressor 3                                              |  | A  | 174  | 174  | 174  | 225   | 272   | 310   |
| L.R.A. - Compressor 4                                              |  | A  | 225  | 272  | 310  | 310   | 310   | 310   |
| L.R.A. - Single External Fan                                       |  | A  | 14,0 | 14,0 | 14,0 | 14,0  | 14,0  | 14,0  |
| <b>F.L.I. - Full load power input at max admissible conditions</b> |  |    |      |      |      |       |       |       |
| F.L.I. - Compressor 1                                              |  | kW | 17,0 | 17,0 | 17,0 | 22,6  | 27,6  | 36,1  |
| F.L.I. - Compressor 2                                              |  | kW | 22,6 | 27,6 | 36,1 | 36,1  | 36,1  | 36,1  |
| F.L.I. - Compressor 3                                              |  | kW | 17,0 | 17,0 | 17,0 | 22,6  | 27,6  | 36,1  |
| F.L.I. - Compressor 4                                              |  | kW | 22,6 | 27,6 | 36,1 | 36,1  | 36,1  | 36,1  |
| F.L.I. - Single External Fan                                       |  | kW | 1,90 | 1,90 | 1,90 | 1,90  | 1,90  | 1,90  |
| F.L.I. - Total                                                     |  | kW | 86,9 | 96,9 | 114  | 129   | 139   | 156   |
| <b>M.I.C. Maximum inrush current</b>                               |  |    |      |      |      |       |       |       |
| M.I.C. - Value                                                     |  | A  | 339  | 394  | 447  | 467   | 484   | 512   |
| M.I.C. with soft start accessory                                   |  | A  | 242  | 262  | 309  | 329   | 346   | 375   |

Electrical data refer to standard units; according to the installed accessories, the data can suffer some variations.

Power supply: 400/3/50 Hz. Voltage variation: max. +/-10% Voltage unbalance between phases: max 2 %

For non standard voltage please contact Clivet technical office

The units are compliant with the provisions of European standards CEI EN 60204 and CEI EN 60335..



## Configuration for 2-pipe system

### Sound levels

#### Standard unit

| Size  | Sound power level (dB) |     |     |     |      |      |      |      | Sound power level | Sound pressure level |
|-------|------------------------|-----|-----|-----|------|------|------|------|-------------------|----------------------|
|       | Octave band (Hz)       |     |     |     |      |      |      |      |                   |                      |
|       | 63                     | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | dB(A)             | dB(A)                |
| 50.4  | 88                     | 95  | 84  | 84  | 83   | 81   | 68   | 61   | 88                | 69                   |
| 55.4  | 88                     | 95  | 84  | 84  | 83   | 81   | 68   | 61   | 88                | 69                   |
| 60.4  | 88                     | 95  | 84  | 84  | 83   | 81   | 68   | 61   | 88                | 69                   |
| 65.4  | 88                     | 95  | 84  | 84  | 83   | 81   | 68   | 61   | 88                | 69                   |
| 70.4  | 91                     | 88  | 88  | 85  | 83   | 82   | 67   | 60   | 88                | 68                   |
| 80.4  | 91                     | 88  | 88  | 85  | 83   | 82   | 67   | 60   | 88                | 68                   |
| 90.4  | 91                     | 88  | 88  | 85  | 83   | 82   | 67   | 60   | 88                | 68                   |
| 100.4 | 93                     | 90  | 90  | 88  | 88   | 85   | 71   | 62   | 92                | 72                   |
| 110.4 | 93                     | 90  | 90  | 88  | 88   | 85   | 71   | 62   | 92                | 72                   |
| 120.4 | 93                     | 90  | 90  | 88  | 88   | 85   | 71   | 62   | 92                | 72                   |

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.

Measures are according to UNI EN ISO 9614-2 regulations, with respect to the EUROVENT 8/1 certification, which provides for a tolerance of 3 dB(A) on the sound power level, which is the only acoustic data to be considered binding.

Data referred to the following conditions:

- internal exchanger water = 12/7 °C

- ambient temperature = 35 °C

#### Unit with HEDIF - “Diffuser for high efficiency axial fan” option

| Size  | Sound power level | Sound pressure level |
|-------|-------------------|----------------------|
|       | dB(A)             | dB(A)                |
| 70.4  | 86                | 66                   |
| 80.4  | 86                | 66                   |
| 90.4  | 86                | 66                   |
| 100.4 | 90                | 70                   |
| 110.4 | 90                | 70                   |
| 120.4 | 90                | 70                   |

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.

Measures are according to UNI EN ISO 9614-2 regulations, with respect to the EUROVENT 8/1 certification, which provides for a tolerance of 3 dB(A) on the sound power level, which is the only acoustic data to be considered binding.

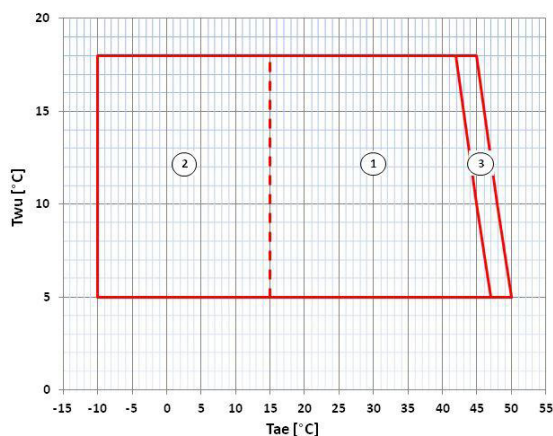
Data referred to the following conditions:

- internal exchanger water = 12/7 °C

- ambient temperature = 35 °C

## Configuration for 2-pipe system

### Operating range - Cooling



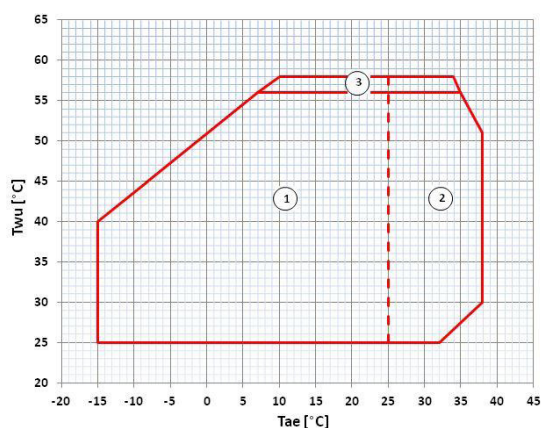
$T_{wu}$  [°C] = Internal exchanger outlet water temperature

$T_{ae}$  [°C] = External exchanger inlet air temperature

1. Standard unit operating range at full load
2. Standard unit operating range with air flow automatic modulation
3. Unit operating range with automatic staging of the compressor capacity

### Operating range - Heating

#### User side

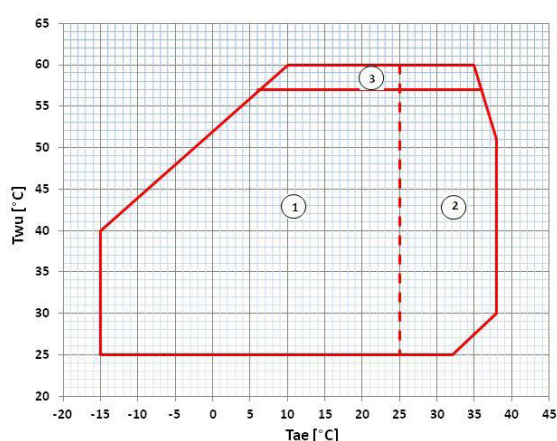


$T_{wu}$  [°C] = Internal exchanger outlet water temperature

$T_{ae}$  [°C] = External exchanger inlet air temperature

1. Standard unit operating range at full load
2. Standard unit operating range with air flow automatic modulation
3. Unit operating range with automatic staging of the compressor capacity

#### Recovery side (for production of DWH)

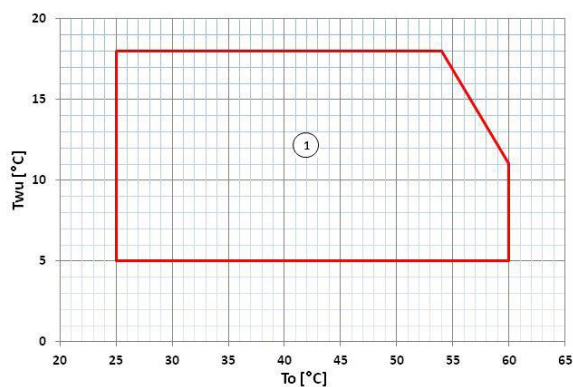


$T_{wu}$  [°C] = Internal exchanger outlet water temperature

$T_{ae}$  [°C] = External exchanger inlet air temperature

1. Standard unit operating range at full load
2. Standard unit operating range with air flow automatic modulation
3. Unit operating range with automatic staging of the compressor capacity

### Operating range - Cooling 100% - Heating 100%



$T_{wu}$  [°C] = Water outlet temperature from the user side of the heat exchanger (2-4 pipes)

$T_o$  [°C] = Outlet water temperature at the heat exchanger recovery side (2-4 pipes)

1. Normal operating range

## Configuration for 2-pipe system

### Cooling performance - Size 50.4 ÷ 90.4

| Size | To (°C) | Entering external exchanger air temperature (°C) |      |     |      |     |      |     |      |     |      |     |      |
|------|---------|--------------------------------------------------|------|-----|------|-----|------|-----|------|-----|------|-----|------|
|      |         | 20                                               |      | 25  |      | 30  |      | 35  |      | 40  |      | 45  |      |
|      |         | kWf                                              | kWe  | kWf | kWe  | kWf | kWe  | kWf | kWe  | kWf | kWe  | kWf | kWe  |
| 50.4 | 5       | 157                                              | 31,8 | 150 | 35,2 | 142 | 38,9 | 132 | 42,6 | 119 | 47,7 | 109 | 53,5 |
|      | 7       | 166                                              | 32,3 | 158 | 35,9 | 150 | 39,5 | 139 | 43,3 | 126 | 48,3 | 116 | 54,2 |
|      | 10      | 181                                              | 33,1 | 172 | 36,6 | 163 | 40,3 | 151 | 44,4 | 137 | 49,5 | 128 | 55,1 |
|      | 12      | 191                                              | 33,7 | 183 | 37,3 | 172 | 41,1 | 159 | 45,1 | 145 | 49,9 | -   | -    |
|      | 15      | 208                                              | 34,7 | 198 | 38,4 | 186 | 42,4 | 172 | 46,6 | 158 | 51,4 | -   | -    |
|      | 18      | 223                                              | 35,8 | 213 | 39,5 | 200 | 43,5 | 185 | 47,6 | 170 | 52,7 | -   | -    |
| 55.4 | 5       | 167                                              | 36,0 | 160 | 39,7 | 152 | 43,5 | 142 | 47,4 | 128 | 52,9 | 117 | 59,4 |
|      | 7       | 176                                              | 36,7 | 169 | 40,6 | 160 | 44,4 | 149 | 48,2 | 135 | 53,9 | 125 | 60,1 |
|      | 10      | 191                                              | 37,7 | 183 | 41,7 | 173 | 45,5 | 161 | 49,6 | 146 | 55,3 | 136 | 61,8 |
|      | 12      | 202                                              | 38,4 | 193 | 42,5 | 182 | 46,4 | 170 | 50,4 | 155 | 55,9 | -   | -    |
|      | 15      | 218                                              | 39,7 | 209 | 43,8 | 196 | 48,0 | 183 | 52,2 | 168 | 57,7 | -   | -    |
|      | 18      | 234                                              | 41,1 | 225 | 45,2 | 211 | 49,3 | 197 | 53,6 | 183 | 59,5 | -   | -    |
| 60.4 | 5       | 182                                              | 39,5 | 175 | 43,4 | 164 | 47,6 | 152 | 52,2 | 139 | 57,3 | 127 | 64,7 |
|      | 7       | 192                                              | 40,1 | 184 | 44,3 | 173 | 48,4 | 160 | 52,8 | 147 | 58,2 | 136 | 65,4 |
|      | 10      | 209                                              | 41,4 | 200 | 45,7 | 187 | 49,8 | 173 | 54,8 | 159 | 60,0 | 150 | 67,1 |
|      | 12      | 220                                              | 42,1 | 211 | 46,6 | 197 | 50,9 | 183 | 55,3 | 167 | 61,0 | -   | -    |
|      | 15      | 238                                              | 43,5 | 227 | 48,1 | 212 | 52,6 | 196 | 57,2 | 181 | 63,4 | -   | -    |
|      | 18      | 257                                              | 44,6 | 244 | 49,2 | 228 | 53,8 | 211 | 59,2 | 197 | 65,3 | -   | -    |
| 65.4 | 5       | 195                                              | 43,1 | 186 | 47,5 | 175 | 52,1 | 162 | 57,1 | 147 | 63,1 | 138 | 71,2 |
|      | 7       | 206                                              | 44,0 | 197 | 48,3 | 185 | 53,0 | 170 | 58,2 | 155 | 64,5 | 148 | 72,4 |
|      | 10      | 224                                              | 45,4 | 214 | 49,9 | 200 | 54,8 | 184 | 59,9 | 169 | 66,4 | 162 | 74,9 |
|      | 12      | 236                                              | 46,7 | 225 | 51,0 | 210 | 55,9 | 193 | 61,3 | 178 | 68,2 | -   | -    |
|      | 15      | 255                                              | 48,3 | 243 | 52,7 | 226 | 57,8 | 209 | 63,3 | 195 | 70,5 | -   | -    |
|      | 18      | 275                                              | 49,7 | 260 | 54,4 | 242 | 59,7 | 224 | 65,6 | 216 | 73,4 | -   | -    |
| 70.4 | 5       | 208                                              | 45,2 | 200 | 49,4 | 189 | 54,3 | 176 | 59,5 | 159 | 66,4 | 148 | 74,5 |
|      | 7       | 219                                              | 46,1 | 210 | 50,3 | 198 | 55,5 | 184 | 60,4 | 167 | 67,0 | 156 | 75,9 |
|      | 10      | 232                                              | 47,4 | 225 | 51,7 | 211 | 56,9 | 197 | 61,7 | 180 | 68,8 | 164 | 77,7 |
|      | 12      | 249                                              | 48,4 | 239 | 52,9 | 225 | 58,2 | 209 | 63,5 | 191 | 70,9 | -   | -    |
|      | 15      | 271                                              | 50,5 | 260 | 55,0 | 244 | 60,2 | 226 | 65,8 | 209 | 73,3 | -   | -    |
|      | 18      | 290                                              | 51,9 | 277 | 56,5 | 262 | 61,7 | 243 | 67,3 | 226 | 75,0 | -   | -    |
| 80.4 | 5       | 235                                              | 52,0 | 226 | 57,4 | 215 | 62,6 | 199 | 68,7 | 182 | 75,9 | 168 | 83,7 |
|      | 7       | 249                                              | 53,3 | 239 | 58,4 | 226 | 63,4 | 209 | 69,4 | 190 | 76,9 | 177 | 85,3 |
|      | 10      | 267                                              | 54,5 | 257 | 59,7 | 242 | 65,4 | 225 | 71,2 | 206 | 78,4 | 194 | 86,6 |
|      | 12      | 282                                              | 56,2 | 272 | 61,0 | 255 | 66,6 | 238 | 72,3 | 218 | 80,2 | -   | -    |
|      | 15      | 308                                              | 57,8 | 293 | 62,9 | 277 | 68,7 | 258 | 74,7 | 237 | 82,9 | -   | -    |
|      | 18      | 328                                              | 59,5 | 316 | 64,9 | 294 | 70,9 | 273 | 77,2 | 256 | 84,8 | -   | -    |
| 90.4 | 5       | 270                                              | 64,3 | 259 | 70,0 | 241 | 76,8 | 223 | 84,1 | 205 | 93,0 | 188 | 103  |
|      | 7       | 287                                              | 65,8 | 272 | 71,9 | 255 | 77,9 | 236 | 85,2 | 216 | 94,4 | 203 | 106  |
|      | 10      | 305                                              | 68,0 | 291 | 73,9 | 271 | 80,8 | 250 | 88,0 | 233 | 97,1 | 218 | 110  |
|      | 12      | 321                                              | 69,5 | 305 | 75,6 | 286 | 82,0 | 265 | 89,7 | 247 | 98,7 | -   | -    |
|      | 15      | 349                                              | 71,9 | 331 | 78,2 | 309 | 84,9 | 287 | 93,4 | 273 | 104  | -   | -    |
|      | 18      | 373                                              | 75,2 | 352 | 80,9 | 330 | 87,8 | 308 | 96,0 | 287 | 111  | -   | -    |

kWf = Cooling capacity at the heat exchanger user side (2 pipes) or cold side (4 pipes) (kW)

kWe = Electrical power absorbed by compressors (kW)

To (°C) = Outlet water temperature at the heat exchanger user side (2 pipes) or cold side (4 pipes) (°C)

Performances in function of the inlet/outlet water temperature differential = 5°C

## Configuration for 2-pipe system

### Cooling performance - Size 100.4 ÷ 120.4

| Size  | To (°C) | Entering external exchanger air temperature (°C) |      |     |      |     |      |     |      |     |      |     |     |
|-------|---------|--------------------------------------------------|------|-----|------|-----|------|-----|------|-----|------|-----|-----|
|       |         | 20                                               |      | 25  |      | 30  |      | 35  |      | 40  |      | 45  |     |
|       |         | kWf                                              | kWe  | kWf | kWe  | kWf | kWe  | kWf | kWe  | kWf | kWe  | kWf | kWe |
| 100.4 | 5       | 311                                              | 65,6 | 297 | 71,6 | 281 | 78,1 | 263 | 85,5 | 239 | 95,2 | 218 | 107 |
|       | 7       | 325                                              | 66,8 | 310 | 73,0 | 292 | 80,0 | 275 | 86,7 | 248 | 96,5 | 229 | 108 |
|       | 10      | 344                                              | 67,9 | 326 | 74,6 | 310 | 80,6 | 290 | 88,4 | 265 | 97,9 | 246 | 110 |
|       | 12      | 364                                              | 70,0 | 349 | 76,3 | 331 | 82,7 | 309 | 90,8 | 281 | 102  | -   | -   |
|       | 15      | 399                                              | 72,1 | 380 | 78,7 | 359 | 85,6 | 333 | 93,5 | 307 | 104  | -   | -   |
|       | 18      | 423                                              | 75,2 | 404 | 81,4 | 380 | 87,8 | 352 | 96,6 | 328 | 106  | -   | -   |
| 110.4 | 5       | 342                                              | 74,8 | 328 | 81,0 | 309 | 88,3 | 287 | 96,7 | 261 | 108  | 242 | 120 |
|       | 7       | 357                                              | 75,6 | 340 | 82,6 | 321 | 89,8 | 297 | 98,3 | 272 | 109  | 253 | 121 |
|       | 10      | 376                                              | 77,0 | 361 | 83,6 | 338 | 91,8 | 315 | 99,8 | 289 | 111  | 272 | 123 |
|       | 12      | 400                                              | 79,5 | 383 | 85,8 | 358 | 93,9 | 334 | 102  | 307 | 114  | -   | -   |
|       | 15      | 437                                              | 82,1 | 415 | 89,2 | 388 | 97,1 | 362 | 105  | 336 | 116  | -   | -   |
|       | 18      | 464                                              | 85,1 | 441 | 91,8 | 415 | 99,4 | 381 | 109  | 359 | 121  | -   | -   |
| 120.4 | 5       | 375                                              | 86,2 | 357 | 94,6 | 338 | 102  | 313 | 112  | 286 | 125  | 271 | 141 |
|       | 7       | 389                                              | 88,0 | 373 | 95,2 | 350 | 104  | 324 | 114  | 295 | 128  | 278 | 141 |
|       | 10      | 411                                              | 89,6 | 390 | 97,5 | 368 | 106  | 343 | 116  | 315 | 128  | 298 | 143 |
|       | 12      | 435                                              | 92,2 | 414 | 99,9 | 386 | 110  | 362 | 119  | 335 | 132  | -   | -   |
|       | 15      | 470                                              | 96,4 | 450 | 104  | 419 | 114  | 391 | 124  | 369 | 137  | -   | -   |
|       | 18      | 502                                              | 99,1 | 475 | 108  | 447 | 117  | 417 | 127  | 395 | 142  | -   | -   |

kWf = Cooling capacity at the heat exchanger user side (2 pipes) or cold side (4 pipes) (kW)

kWe = Electrical power absorbed by compressors (kW)

To (°C) = Outlet water temperature at the heat exchanger user side (2 pipes) or cold side (4 pipes) (°C)

Performances in function of the inlet/outlet water temperature differential = 5°C

## Configuration for 2-pipe system

### Heating performance - Size 50.4 ÷ 90.4

| Size | T <sub>ae</sub> (°C)<br>DB/WB | User side heat exchanger outlet water temperature (°C) |      |      |      |      |      |     |      |     |      |     |      |
|------|-------------------------------|--------------------------------------------------------|------|------|------|------|------|-----|------|-----|------|-----|------|
|      |                               | 25                                                     |      | 35   |      | 40   |      | 45  |      | 55  |      | 58  |      |
|      |                               | kWt                                                    | kWe  | kWt  | kWe  | kWt  | kWe  | kWt | kWe  | kWt | kWe  | kWt | kWe  |
| 50.4 | -15 / -15.4                   | 90                                                     | 26,1 | 89   | 32,7 | 88,8 | 36,8 | -   | -    | -   | -    | -   | -    |
|      | -10 / -10.5                   | 104                                                    | 26,5 | 102  | 33   | 102  | 37   | -   | -    | -   | -    | -   | -    |
|      | -7 / -8                       | 111                                                    | 26,7 | 110  | 33,2 | 109  | 37,1 | 108 | 41,6 | -   | -    | -   | -    |
|      | 0 / -0.6                      | 137                                                    | 27,2 | 134  | 33,7 | 133  | 37,5 | 131 | 41,9 | -   | -    | -   | -    |
|      | 7 / 6                         | 163                                                    | 27,5 | 160  | 34,3 | 157  | 38   | 154 | 42,3 | 146 | 53,2 | 142 | 59,8 |
|      | 15 / 13                       | 197                                                    | 27,6 | 192  | 34,8 | 190  | 38,7 | 185 | 42,9 | 173 | 53,6 | 160 | 60   |
| 55.4 | -15 / -15.4                   | 95,7                                                   | 28,7 | 94,9 | 35,6 | 96,2 | 40,2 | -   | -    | -   | -    | -   | -    |
|      | -10 / -10.5                   | 110                                                    | 29,2 | 109  | 36   | 110  | 40,3 | -   | -    | -   | -    | -   | -    |
|      | -7 / -8                       | 117                                                    | 29,5 | 118  | 36,2 | 118  | 40,5 | 117 | 45,3 | -   | -    | -   | -    |
|      | 0 / -0.6                      | 144                                                    | 30,2 | 144  | 36,9 | 143  | 41,1 | 142 | 45,8 | -   | -    | -   | -    |
|      | 7 / 6                         | 172                                                    | 30,6 | 171  | 37,8 | 169  | 41,9 | 166 | 46,5 | 157 | 58   | 147 | 65,1 |
|      | 15 / 13                       | 207                                                    | 30,7 | 206  | 38,6 | 203  | 42,8 | 200 | 47,4 | 186 | 58,7 | 170 | 65,6 |
| 60.4 | -15 / -15.4                   | 104                                                    | 31,3 | 105  | 38,6 | 105  | 43,5 | -   | -    | -   | -    | -   | -    |
|      | -10 / -10.5                   | 120                                                    | 32   | 120  | 39,1 | 121  | 42,8 | -   | -    | -   | -    | -   | -    |
|      | -7 / -8                       | 128                                                    | 32,4 | 128  | 39,4 | 129  | 43,9 | 128 | 49,1 | -   | -    | -   | -    |
|      | 0 / -0.6                      | 157                                                    | 33,3 | 157  | 40,5 | 156  | 44,8 | 154 | 49,7 | -   | -    | -   | -    |
|      | 7 / 6                         | 188                                                    | 33,8 | 186  | 41,5 | 185  | 45,9 | 181 | 50,7 | 171 | 63,1 | 165 | 70,6 |
|      | 15 / 13                       | 228                                                    | 33,7 | 225  | 42,5 | 223  | 47,2 | 218 | 52   | 203 | 64,2 | 188 | 71,1 |
| 65.4 | -15 / -15.4                   | 110                                                    | 33,3 | 110  | 39,8 | 111  | 46,5 | -   | -    | -   | -    | -   | -    |
|      | -10 / -10.5                   | 126                                                    | 33,9 | 126  | 41,7 | 127  | 46,7 | -   | -    | -   | -    | -   | -    |
|      | -7 / -8                       | 135                                                    | 34,2 | 135  | 42   | 135  | 46,9 | 135 | 52,8 | -   | -    | -   | -    |
|      | 0 / -0.6                      | 166                                                    | 35,1 | 165  | 42,9 | 165  | 47,7 | 163 | 53,4 | -   | -    | -   | -    |
|      | 7 / 6                         | 198                                                    | 35,6 | 196  | 44   | 195  | 48,7 | 193 | 54,3 | 180 | 67   | 167 | 73   |
|      | 15 / 13                       | 240                                                    | 35,8 | 238  | 45   | 235  | 49,9 | 230 | 55,5 | 214 | 68   | 196 | 73   |
| 70.4 | -15 / -15.4                   | 121                                                    | 35,1 | 120  | 44,7 | 120  | 49,7 | -   | -    | -   | -    | -   | -    |
|      | -10 / -10.5                   | 139                                                    | 35,7 | 138  | 45,2 | 138  | 50,1 | -   | -    | -   | -    | -   | -    |
|      | -7 / -8                       | 149                                                    | 36   | 147  | 45,5 | 147  | 50,2 | 146 | 56,1 | -   | -    | -   | -    |
|      | 0 / -0.6                      | 185                                                    | 37   | 181  | 46,3 | 179  | 51,1 | 177 | 56,8 | -   | -    | -   | -    |
|      | 7 / 6                         | 220                                                    | 37,6 | 215  | 47,5 | 213  | 52,1 | 209 | 57,8 | 199 | 72,5 | 192 | 82,5 |
|      | 15 / 13                       | 268                                                    | 38,2 | 261  | 48,7 | 257  | 53,4 | 253 | 58,2 | 236 | 73,6 | 217 | 82   |
| 80.4 | -15 / -15.4                   | 140                                                    | 41,4 | 140  | 51,3 | 139  | 57,2 | -   | -    | -   | -    | -   | -    |
|      | -10 / -10.5                   | 160                                                    | 42,2 | 160  | 51,9 | 160  | 57,7 | -   | -    | -   | -    | -   | -    |
|      | -7 / -8                       | 171                                                    | 42,6 | 171  | 52,3 | 170  | 58   | 168 | 64,6 | -   | -    | -   | -    |
|      | 0 / -0.6                      | 209                                                    | 43,7 | 208  | 53,5 | 206  | 59,1 | 203 | 65,5 | -   | -    | -   | -    |
|      | 7 / 6                         | 251                                                    | 44,5 | 248  | 54,6 | 244  | 60,2 | 238 | 66,6 | 226 | 82,6 | 214 | 93,1 |
|      | 15 / 13                       | 304                                                    | 45,3 | 297  | 55,8 | 292  | 61,6 | 284 | 67,9 | 269 | 83,9 | 258 | 94,3 |
| 90.4 | -15 / -15.4                   | 158                                                    | 48,2 | 161  | 60,8 | 162  | 68,3 | -   | -    | -   | -    | -   | -    |
|      | -10 / -10.5                   | 182                                                    | 48,9 | 182  | 61,1 | 183  | 68,3 | -   | -    | -   | -    | -   | -    |
|      | -7 / -8                       | 194                                                    | 49,3 | 194  | 61,2 | 194  | 68,2 | 194 | 76,1 | -   | -    | -   | -    |
|      | 0 / -0.6                      | 237                                                    | 50,6 | 236  | 62,3 | 234  | 68,9 | 233 | 76,5 | -   | -    | -   | -    |
|      | 7 / 6                         | 284                                                    | 51,8 | 281  | 63,5 | 276  | 69,9 | 273 | 77,4 | 261 | 97   | 232 | 108  |
|      | 15 / 13                       | 347                                                    | 53,1 | 335  | 65   | 333  | 71,6 | 325 | 79   | 309 | 98,5 | 287 | 110  |

kWt = Heating capacity to the user side exchanger (kW)

kWe = Electrical power absorbed by compressors (kW)

T<sub>ae</sub> [°C] = External exchanger inlet air temperature

Performances in function of the inlet/outlet water temperature differential = 5°C

## Configuration for 2-pipe system

### Heating performance - Size100.4 ÷ 120.4

| Size  | T <sub>ae</sub> (°C)<br>DB/WB | User side heat exchanger outlet water temperature (°C) |      |     |      |     |      |     |      |     |     |     |     |
|-------|-------------------------------|--------------------------------------------------------|------|-----|------|-----|------|-----|------|-----|-----|-----|-----|
|       |                               | 25                                                     |      | 35  |      | 40  |      | 45  |      | 55  |     | 58  |     |
|       |                               | kWt                                                    | kWe  | kWt | kWe  | kWt | kWe  | kWt | kWe  | kWt | kWe | kWt | kWe |
| 100.4 | -15 / -15.4                   | 179                                                    | 53,1 | 180 | 66,1 | 182 | 74,2 | -   | -    | -   | -   | -   | -   |
|       | -10 / -10.5                   | 206                                                    | 53,8 | 206 | 66,5 | 207 | 74,4 | -   | -    | -   | -   | -   | -   |
|       | -7 / -8                       | 221                                                    | 54,2 | 221 | 66,8 | 220 | 74,6 | 221 | 83,5 | -   | -   | -   | -   |
|       | 0 / -0.6                      | 272                                                    | 55,6 | 269 | 68,0 | 267 | 75,4 | 264 | 84,2 | -   | -   | -   | -   |
|       | 7 / 6                         | 327                                                    | 57,2 | 321 | 69,4 | 317 | 76,9 | 312 | 85,7 | 299 | 108 | 277 | 120 |
|       | 15 / 13                       | 398                                                    | 59,4 | 390 | 71,5 | 380 | 78,9 | 373 | 87,9 | 353 | 110 | 334 | 122 |
| 110.4 | -15 / -15.4                   | 195                                                    | 58,0 | 197 | 72,1 | 199 | 80,6 | -   | -    | -   | -   | -   | -   |
|       | -10 / -10.5                   | 224                                                    | 59,1 | 225 | 73,3 | 226 | 81,3 | -   | -    | -   | -   | -   | -   |
|       | -7 / -8                       | 239                                                    | 59,7 | 240 | 73,4 | 241 | 81,8 | 239 | 90,5 | -   | -   | -   | -   |
|       | 0 / -0.6                      | 295                                                    | 61,7 | 292 | 75,3 | 291 | 83,1 | 286 | 91,8 | -   | -   | -   | -   |
|       | 7 / 6                         | 353                                                    | 63,6 | 347 | 77,0 | 344 | 84,9 | 338 | 93,5 | 320 | 116 | 322 | 129 |
|       | 15 / 13                       | 429                                                    | 66,1 | 416 | 79,3 | 410 | 87,3 | 403 | 95,6 | 377 | 118 | 364 | 132 |
| 120.4 | -15 / -15.4                   | 220                                                    | 65,5 | 223 | 82,4 | 223 | 92,5 | -   | -    | -   | -   | -   | -   |
|       | -10 / -10.5                   | 248                                                    | 66,6 | 252 | 82,9 | 253 | 92,8 | -   | -    | -   | -   | -   | -   |
|       | -7 / -8                       | 263                                                    | 67,2 | 267 | 83,2 | 268 | 92,7 | 268 | 103  | -   | -   | -   | -   |
|       | 0 / -0.6                      | 323                                                    | 69,3 | 325 | 85,1 | 323 | 93,8 | 320 | 104  | -   | -   | -   | -   |
|       | 7 / 6                         | 388                                                    | 71,7 | 385 | 87,0 | 381 | 95,7 | 374 | 106  | 359 | 132 | 331 | 143 |
|       | 15 / 13                       | 471                                                    | 74,6 | 465 | 89,8 | 456 | 98,3 | 444 | 108  | 421 | 134 | 404 | 150 |

kWt = Heating capacity to the user side exchanger (kW)

kWe = Electrical power absorbed by compressors (kW)

T<sub>ae</sub> [°C] = External exchanger inlet air temperature

Performances in function of the inlet/outlet water temperature differential = 5°C

## Configuration for 2-pipe system

### Cooling 100% - Heating 100% performance - Size 50.4 ÷ 90.4

| Size | Tw<br>(°C) | Recovery side (hot side) outlet water temperature |      |     |      |       |      |     |      |       |      |     |      |       |      |     |      |       |      |     |      |       |      |     |      |
|------|------------|---------------------------------------------------|------|-----|------|-------|------|-----|------|-------|------|-----|------|-------|------|-----|------|-------|------|-----|------|-------|------|-----|------|
|      |            | 20/25                                             |      |     |      | 30/35 |      |     |      | 35/40 |      |     |      | 40/45 |      |     |      | 45/50 |      |     |      | 50/55 |      |     |      |
|      |            | kWf                                               | kWe  | kWt | GLE  | kWf   | kWe  | kWt | GLE  | kWf   | kWe  | kWt | GLE  | kWf   | kWe  | kWt | GLE  | kWf   | kWe  | kWt | GLE  | kWf   | kWe  | kWt | GLE  |
| 50.4 | 5          | 163                                               | 26,8 | 190 | 13,2 | 150   | 32,7 | 183 | 10,2 | 141   | 36,1 | 178 | 8,85 | 130   | 40,0 | 172 | 7,55 | 120   | 44,6 | 166 | 6,42 | 111   | 49,9 | 163 | 5,49 |
|      | 6          | 168                                               | 26,9 | 195 | 13,5 | 155   | 32,8 | 188 | 10,4 | 146   | 36,3 | 183 | 9,07 | 136   | 40,2 | 178 | 7,80 | 124   | 44,8 | 171 | 6,58 | 115   | 50,0 | 167 | 5,63 |
|      | 7          | 173                                               | 26,9 | 201 | 13,9 | 160   | 33,0 | 194 | 10,7 | 151   | 36,4 | 189 | 9,35 | 140   | 40,3 | 182 | 7,99 | 128   | 44,9 | 174 | 6,73 | 118   | 50,1 | 170 | 5,74 |
|      | 10         | 188                                               | 27,2 | 216 | 14,9 | 173   | 33,3 | 207 | 11,4 | 163   | 36,7 | 201 | 9,93 | 150   | 40,7 | 193 | 8,43 | 137   | 45,3 | 184 | 7,08 | 127   | 50,5 | 179 | 6,05 |
|      | 15         | 210                                               | 27,5 | 238 | 16,3 | 194   | 33,9 | 228 | 12,4 | 185   | 37,4 | 223 | 10,9 | 172   | 41,4 | 215 | 9,34 | 157   | 46,1 | 205 | 7,86 | -     | -    | -   | -    |
|      | 18         | 228                                               | 27,7 | 256 | 17,5 | 211   | 34,3 | 246 | 13,3 | 199   | 37,7 | 238 | 11,6 | 186   | 42,0 | 229 | 9,89 | 169   | 46,6 | 218 | 8,30 | -     | -    | -   | -    |
| 55.4 | 5          | 174                                               | 29,5 | 204 | 12,8 | 160   | 35,9 | 196 | 9,94 | 152   | 39,6 | 192 | 8,68 | 141   | 44,1 | 186 | 7,44 | 129   | 49,2 | 179 | 6,25 | 119   | 55,3 | 176 | 5,34 |
|      | 6          | 181                                               | 29,8 | 211 | 13,2 | 167   | 36,0 | 203 | 10,3 | 157   | 39,7 | 198 | 8,94 | 146   | 44,2 | 191 | 7,65 | 133   | 49,5 | 184 | 6,40 | 124   | 55,4 | 180 | 5,49 |
|      | 7          | 186                                               | 29,9 | 216 | 13,5 | 172   | 36,2 | 208 | 10,5 | 162   | 39,9 | 202 | 9,14 | 151   | 44,3 | 196 | 7,84 | 138   | 49,6 | 188 | 6,56 | 128   | 55,6 | 185 | 5,62 |
|      | 10         | 204                                               | 30,3 | 234 | 14,4 | 186   | 36,6 | 223 | 11,2 | 176   | 40,3 | 217 | 9,75 | 163   | 44,7 | 208 | 8,30 | 147   | 50,0 | 199 | 6,92 | 138   | 55,9 | 195 | 5,94 |
|      | 15         | 228                                               | 31,1 | 259 | 15,7 | 210   | 37,4 | 248 | 12,2 | 199   | 41,0 | 240 | 10,7 | 184   | 45,5 | 230 | 9,11 | 169   | 50,9 | 221 | 7,68 | -     | -    | -   | -    |
|      | 18         | 246                                               | 31,5 | 277 | 16,6 | 227   | 37,9 | 264 | 13,0 | 216   | 41,5 | 257 | 11,4 | 201   | 46,2 | 248 | 9,71 | 183   | 51,5 | 235 | 8,13 | -     | -    | -   | -    |
| 60.4 | 5          | 187                                               | 32,2 | 222 | 12,7 | 172   | 39,0 | 215 | 9,94 | 164   | 43,0 | 211 | 8,70 | 151   | 47,7 | 203 | 7,40 | 139   | 53,2 | 196 | 6,29 | 128   | 59,6 | 191 | 5,35 |
|      | 6          | 192                                               | 32,3 | 228 | 13,0 | 178   | 39,1 | 221 | 10,2 | 169   | 43,2 | 216 | 8,91 | 157   | 47,9 | 209 | 7,65 | 144   | 53,4 | 201 | 6,46 | 132   | 59,8 | 196 | 5,49 |
|      | 7          | 199                                               | 32,5 | 235 | 13,4 | 184   | 39,2 | 227 | 10,5 | 174   | 43,4 | 222 | 9,14 | 162   | 48,1 | 214 | 7,81 | 148   | 53,5 | 206 | 6,61 | 137   | 59,9 | 200 | 5,62 |
|      | 10         | 216                                               | 32,9 | 252 | 14,2 | 200   | 39,6 | 244 | 11,2 | 188   | 43,7 | 235 | 9,68 | 174   | 48,4 | 226 | 8,27 | 158   | 53,9 | 217 | 6,96 | 146   | 60,2 | 211 | 5,94 |
|      | 15         | 242                                               | 33,6 | 280 | 15,5 | 225   | 40,4 | 269 | 12,2 | 212   | 44,4 | 261 | 10,6 | 198   | 49,2 | 252 | 9,13 | 182   | 54,7 | 241 | 7,75 | -     | -    | -   | -    |
|      | 18         | 261                                               | 34,1 | 300 | 16,4 | 242   | 40,9 | 288 | 13,0 | 231   | 45,0 | 280 | 11,4 | 214   | 49,7 | 268 | 9,69 | 197   | 55,3 | 257 | 8,22 | -     | -    | -   | -    |
| 65.4 | 5          | 199                                               | 35,0 | 237 | 12,5 | 184   | 42,5 | 230 | 9,75 | 174   | 46,9 | 224 | 8,48 | 161   | 52,1 | 216 | 7,23 | 148   | 58,2 | 209 | 6,14 | 137   | 65,3 | 206 | 5,25 |
|      | 6          | 206                                               | 35,2 | 244 | 12,8 | 191   | 42,6 | 237 | 10,0 | 179   | 47,1 | 230 | 8,68 | 167   | 52,3 | 222 | 7,44 | 153   | 58,4 | 215 | 6,30 | 142   | 65,4 | 210 | 5,37 |
|      | 7          | 214                                               | 35,5 | 253 | 13,2 | 198   | 42,8 | 244 | 10,3 | 186   | 47,3 | 237 | 8,94 | 172   | 52,5 | 228 | 7,62 | 158   | 58,6 | 220 | 6,44 | 146   | 65,6 | 215 | 5,50 |
|      | 10         | 231                                               | 36,0 | 271 | 14,0 | 212   | 43,2 | 259 | 10,9 | 200   | 47,7 | 251 | 9,47 | 185   | 52,9 | 242 | 8,06 | 171   | 59,4 | 233 | 6,79 | 156   | 65,9 | 225 | 5,77 |
|      | 15         | 257                                               | 36,7 | 298 | 15,1 | 239   | 44,2 | 287 | 11,9 | 225   | 48,6 | 277 | 10,3 | 211   | 53,9 | 268 | 8,88 | 193   | 60,0 | 256 | 7,48 | -     | -    | -   | -    |
|      | 18         | 278                                               | 37,2 | 320 | 16,1 | 258   | 44,7 | 307 | 12,6 | 245   | 49,2 | 298 | 11,0 | 228   | 54,6 | 287 | 9,42 | 208   | 60,7 | 272 | 7,90 | -     | -    | -   | -    |
| 70.4 | 5          | 213                                               | 36,9 | 255 | 12,7 | 197   | 44,6 | 247 | 10,0 | 188   | 49,1 | 242 | 8,74 | 175   | 54,4 | 234 | 7,52 | 161   | 60,5 | 227 | 6,41 | 147   | 67,3 | 219 | 5,43 |
|      | 6          | 220                                               | 37,2 | 262 | 13,0 | 204   | 44,8 | 254 | 10,2 | 194   | 49,4 | 248 | 8,95 | 181   | 54,6 | 240 | 7,72 | 166   | 60,8 | 232 | 6,55 | 153   | 67,6 | 225 | 5,59 |
|      | 7          | 228                                               | 37,6 | 271 | 13,3 | 212   | 45,1 | 262 | 10,5 | 200   | 49,6 | 255 | 9,18 | 187   | 54,8 | 246 | 7,89 | 170   | 60,9 | 236 | 6,67 | 157   | 67,8 | 229 | 5,70 |
|      | 10         | 246                                               | 38,2 | 290 | 14,0 | 228   | 45,7 | 279 | 11,1 | 215   | 50,1 | 271 | 9,69 | 200   | 55,4 | 261 | 8,33 | 182   | 61,5 | 249 | 7,02 | 168   | 68,3 | 241 | 5,99 |
|      | 15         | 274                                               | 39,2 | 319 | 15,1 | 255   | 46,8 | 307 | 12,0 | 242   | 51,0 | 299 | 10,6 | 227   | 56,5 | 289 | 9,13 | 209   | 62,7 | 277 | 7,77 | -     | -    | -   | -    |
|      | 18         | 298                                               | 40,1 | 344 | 16,0 | 275   | 47,5 | 329 | 12,7 | 263   | 51,9 | 321 | 11,2 | 245   | 57,3 | 308 | 9,64 | 226   | 63,5 | 296 | 8,22 | -     | -    | -   | -    |
| 80.4 | 5          | 241                                               | 42,8 | 289 | 12,4 | 225   | 51,4 | 282 | 9,9  | 213   | 56,5 | 275 | 8,64 | 198   | 62,5 | 267 | 7,43 | 181   | 69,3 | 255 | 6,30 | 168   | 76,8 | 250 | 5,44 |
|      | 6          | 251                                               | 43,2 | 300 | 12,8 | 232   | 51,8 | 290 | 10,1 | 221   | 56,9 | 284 | 8,86 | 205   | 62,8 | 273 | 7,61 | 187   | 69,6 | 262 | 6,44 | 174   | 77,2 | 256 | 5,57 |
|      | 7          | 259                                               | 43,6 | 309 | 13,0 | 239   | 52,1 | 297 | 10,3 | 228   | 57,3 | 291 | 9,06 | 212   | 63,2 | 281 | 7,80 | 193   | 69,9 | 268 | 6,60 | 178   | 77,4 | 261 | 5,67 |
|      | 10         | 278                                               | 44,4 | 329 | 13,7 | 257   | 52,9 | 317 | 10,8 | 243   | 57,9 | 307 | 9,49 | 225   | 63,8 | 295 | 8,15 | 207   | 70,9 | 284 | 6,93 | 190   | 78,0 | 273 | 5,93 |
|      | 15         | 311                                               | 46,0 | 364 | 14,7 | 288   | 54,4 | 349 | 11,7 | 273   | 59,2 | 339 | 10,3 | 255   | 65,4 | 327 | 8,91 | 234   | 72,1 | 313 | 7,59 | -     | -    | -   | -    |
|      | 18         | 333                                               | 47,2 | 388 | 15,3 | 312   | 55,5 | 376 | 12,4 | 296   | 60,4 | 364 | 10,9 | 276   | 66,5 | 350 | 9,42 | 253   | 73,1 | 333 | 8,01 | -     | -    | -   | -    |
| 90.4 | 5          | 274                                               | 50,8 | 336 | 12,0 | 256   | 61,6 | 326 | 9,45 | 243   | 68,0 | 319 | 8,25 | 226   | 75,7 | 308 | 7,05 | 206   | 84,7 | 296 | 5,93 | 188   | 95,2 | 288 | 5,00 |
|      | 6          | 283                                               | 51,1 | 345 | 12,3 | 264   | 61,8 | 334 | 9,68 | 250   | 68,2 | 326 | 8,45 | 233   | 75,9 | 316 | 7,22 | 213   | 84,9 | 303 | 6,08 | 194   | 95,3 | 293 | 5,10 |
|      | 7          | 292                                               | 51,3 | 354 | 12,6 | 272   | 62,0 | 343 | 9,93 | 257   | 68,4 | 334 | 8,64 | 239   | 76,0 | 322 | 7,39 | 218   | 85,0 | 308 | 6,19 | 198   | 95,4 | 298 | 5,20 |
|      | 10         | 312                                               | 51,7 | 375 | 13,3 | 288   | 62,4 | 361 | 10,4 | 273   | 68,9 | 351 | 9,06 | 253   | 76,4 | 337 | 7,72 | 230   | 85,3 | 321 | 6,46 | 210   | 95,6 | 310 | 5,44 |
|      | 15         | 347                                               | 52,6 | 413 | 14,5 | 326   | 63,5 | 401 | 11,4 | 309   | 69,9 | 390 | 10,0 | 288   | 77,5 | 375 | 8,55 | 267   | 86,4 | 362 | 7,28 | -     | -    | -   | -    |
|      | 18         | 376                                               | 53,3 | 444 | 15,4 | 351   | 64,3 | 428 | 12,1 | 334   | 70,7 | 416 | 10,6 | 313   | 78,2 | 402 | 9,14 | 286   | 87,1 | 382 | 7,67 | -     | -    | -   | -    |

kWf = Cooling capacity (kW)

kWe = Total power input (kW)

kWt = Heating capacity (kW)

GLE = Overall efficiency

Tw [°C] = User side (cold side) outlet water temperature



## Configuration for 2-pipe system

### Cooling 100% - Heating 100% performance - Size 100.4 ÷ 120.4

| Size  | Tw<br>(°C) | Recovery side (hot side) outlet water temperature |      |     |      |       |      |     |      |       |      |     |      |       |      |     |      |       |      |     |      |       |      |     |      |
|-------|------------|---------------------------------------------------|------|-----|------|-------|------|-----|------|-------|------|-----|------|-------|------|-----|------|-------|------|-----|------|-------|------|-----|------|
|       |            | 20/25                                             |      |     |      | 30/35 |      |     |      | 35/40 |      |     |      | 40/45 |      |     |      | 45/50 |      |     |      | 50/55 |      |     |      |
|       |            | kWf                                               | kWe  | kWt | GLE  | kWf   | kWe  | kWt | GLE  | kWf   | kWe  | kWt | GLE  | kWf   | kWe  | kWt | GLE  | kWf   | kWe  | kWt | GLE  | kWf   | kWe  | kWt | GLE  |
| 100.4 | 5          | 318                                               | 54,0 | 380 | 12,9 | 296   | 65,1 | 370 | 10,2 | 281   | 71,9 | 362 | 8,94 | 261   | 79,8 | 349 | 7,65 | 239   | 89,0 | 336 | 6,46 | 219   | 99,7 | 326 | 5,47 |
|       | 6          | 328                                               | 54,3 | 391 | 13,3 | 306   | 65,4 | 379 | 10,5 | 290   | 72,2 | 371 | 9,16 | 270   | 80,0 | 358 | 7,84 | 247   | 89,3 | 344 | 6,62 | 226   | 99,9 | 334 | 5,61 |
|       | 7          | 338                                               | 54,6 | 402 | 13,6 | 315   | 65,7 | 390 | 10,7 | 299   | 72,5 | 381 | 9,38 | 278   | 80,3 | 367 | 8,04 | 253   | 89,4 | 350 | 6,74 | 232   | 100  | 340 | 5,71 |
|       | 10         | 362                                               | 55,3 | 427 | 14,3 | 335   | 66,3 | 411 | 11,2 | 317   | 73,0 | 400 | 9,82 | 294   | 80,8 | 384 | 8,38 | 267   | 89,9 | 366 | 7,04 | 245   | 100  | 353 | 5,95 |
|       | 15         | 402                                               | 56,5 | 469 | 15,4 | 373   | 67,6 | 451 | 12,2 | 354   | 74,2 | 438 | 10,7 | 331   | 82,1 | 423 | 9,18 | 308   | 91,3 | 409 | 7,84 | -     | -    | -   | -    |
|       | 18         | 436                                               | 57,6 | 504 | 16,3 | 407   | 68,7 | 487 | 13,0 | 387   | 75,3 | 473 | 11,4 | 359   | 83,0 | 452 | 9,77 | 331   | 92,2 | 434 | 8,28 | -     | -    | -   | -    |
| 110.4 | 5          | 348                                               | 59,7 | 417 | 12,8 | 324   | 72,2 | 405 | 10,1 | 307   | 79,8 | 395 | 8,80 | 285   | 88,8 | 381 | 7,50 | 259   | 99,3 | 365 | 6,28 | 237   | 112  | 355 | 5,31 |
|       | 6          | 359                                               | 60,0 | 428 | 13,1 | 334   | 72,5 | 415 | 10,3 | 317   | 80,1 | 405 | 9,01 | 294   | 89,0 | 390 | 7,68 | 266   | 99,5 | 372 | 6,41 | 243   | 112  | 361 | 5,4  |
|       | 7          | 370                                               | 60,2 | 439 | 13,4 | 343   | 72,8 | 424 | 10,5 | 325   | 80,3 | 414 | 9,19 | 300   | 89,2 | 397 | 7,81 | 272   | 99,7 | 379 | 6,53 | 248   | 112  | 367 | 5,5  |
|       | 10         | 389                                               | 60,7 | 459 | 14,0 | 360   | 73,4 | 442 | 10,9 | 341   | 80,8 | 431 | 9,55 | 315   | 89,6 | 412 | 8,11 | 286   | 100  | 393 | 6,78 | 262   | 112  | 381 | 5,72 |
|       | 15         | 435                                               | 62,0 | 508 | 15,2 | 405   | 74,7 | 490 | 12,0 | 386   | 82,2 | 478 | 10,5 | 359   | 91,0 | 460 | 8,99 | 331   | 102  | 441 | 7,59 | -     | -    | -   | -    |
|       | 18         | 471                                               | 63,0 | 545 | 16,1 | 440   | 75,8 | 527 | 12,7 | 417   | 83,1 | 510 | 11,1 | 388   | 91,9 | 490 | 9,56 | 356   | 103  | 468 | 8,03 | -     | -    | -   | -    |
| 120.4 | 5          | 376                                               | 68,1 | 458 | 12,3 | 353   | 82,7 | 449 | 9,69 | 335   | 91,5 | 439 | 8,46 | 311   | 102  | 423 | 7,20 | 283   | 114  | 406 | 6,03 | 258   | 129  | 394 | 5,07 |
|       | 6          | 388                                               | 68,3 | 471 | 12,6 | 364   | 83,0 | 461 | 9,94 | 343   | 91,7 | 447 | 8,63 | 320   | 102  | 434 | 7,39 | 292   | 114  | 415 | 6,18 | 265   | 129  | 401 | 5,17 |
|       | 7          | 400                                               | 68,5 | 484 | 12,9 | 373   | 83,3 | 471 | 10,1 | 354   | 92,0 | 459 | 8,84 | 328   | 102  | 442 | 7,53 | 298   | 115  | 422 | 6,29 | 271   | 129  | 408 | 5,27 |
|       | 10         | 423                                               | 69,0 | 508 | 13,5 | 392   | 83,8 | 491 | 10,5 | 373   | 92,5 | 479 | 9,21 | 345   | 103  | 460 | 7,83 | 314   | 115  | 439 | 6,55 | 286   | 129  | 424 | 5,50 |
|       | 15         | 468                                               | 70,0 | 557 | 14,7 | 438   | 84,9 | 539 | 11,5 | 415   | 93,5 | 523 | 10,0 | 387   | 104  | 505 | 8,59 | 360   | 116  | 488 | 7,31 | -     | -    | -   | -    |
|       | 18         | 508                                               | 70,9 | 599 | 15,6 | 476   | 85,9 | 580 | 12,3 | 452   | 94,6 | 564 | 10,7 | 422   | 105  | 542 | 9,20 | 389   | 117  | 520 | 7,77 | -     | -    | -   | -    |

kWf = Cooling capacity (kW)

kWe = Total power input (kW)

kWt = Heating capacity (kW)

GLE = Overall efficiency

Tw [°C] = User side (cold side) outlet water temperature

## Correction factors for glycol use

| % ethylene glycol by weight                    |    | 5%    | 10%   | 15%   | 20%   | 25%   | 30%   | 35%   | 40%   |
|------------------------------------------------|----|-------|-------|-------|-------|-------|-------|-------|-------|
| Freezing temperature                           | °C | -2,0  | -3,9  | -6,5  | -8,9  | -11,8 | -15,6 | -19,0 | -23,4 |
| Safety temperature                             | °C | 3     | 1     | -1    | -4    | -6    | -10   | -14   | -19   |
| Cooling Capacity Factor                        | Nr | 0,995 | 0,990 | 0,985 | 0,981 | 0,977 | 0,974 | 0,971 | 0,968 |
| Compressor power input Factor                  | Nr | 0,997 | 0,993 | 0,990 | 0,988 | 0,986 | 0,984 | 0,982 | 0,981 |
| Internal exchanger glycol solution flow factor | Nr | 1,003 | 1,010 | 1,020 | 1,033 | 1,050 | 1,072 | 1,095 | 1,124 |
| Pressure drop Factor                           | Nr | 1,029 | 1,060 | 1,090 | 1,118 | 1,149 | 1,182 | 1,211 | 1,243 |

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

| m2 °C / W             | Internal exchanger |      |
|-----------------------|--------------------|------|
|                       | F1                 | FK1  |
| <b>0.44 x 10 (-4)</b> | 1,0                | 1,0  |
| <b>0.88 x 10 (-4)</b> | 0,97               | 0,99 |
| <b>1.76 x 10 (-4)</b> | 0,94               | 0,98 |

The cooling performance values provided in the tables are based on the external exchanger having clean plates (fouling factor 1). For different fouling factor values, multiply the performance by the coefficients shown in the table.

F1 = Cooling capacity correction factors

FK1 = Compressor power input correction factor

## Overload and control device calibrations

|                                                      |       | open | closed | Value |
|------------------------------------------------------|-------|------|--------|-------|
| High pressure switch (gas side)                      | [kPa] | 4050 | 3300   | -     |
| Low pressure alarm (gas side)                        | [kPa] | 450  | 600    | -     |
| Antifreeze protection                                | [°C]  | 4,0  | 6,0    | -     |
| 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] | 3    | 5      | -     |
| Max. pressure without hydronic assembly (water side) | [kPa] | -    | -      | 1000  |
| Max. pressure with hydronic assembly (water side)    | [kPa] | -    | -      | 600   |
| Safety valve calibration (water side) (1)            | [kPa] | -    | -      | 600   |

(1) Available only with hydronic assembly option

## Integrated heating capacities

| Air temperature external exchanger inlet °C (B.S. / B.U) | -10 / -10,5 | -5 / -5,4 | 0 / 0,6 | 5 / 3,9 | Altri |
|----------------------------------------------------------|-------------|-----------|---------|---------|-------|
| Heating capacity multiplication coefficient              | 0,90        | 0,89      | 0,88    | 0,91    | 1     |

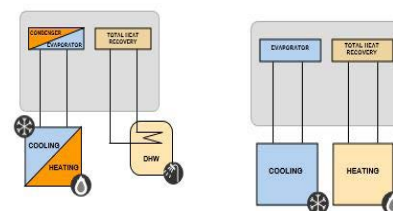
To obtain the integrated heating capacities (the real heating capacity considering the defrost cycles too), multiply the kWt value in the heating performance tables by the following coefficient.

## User side (2/4 - pipes)

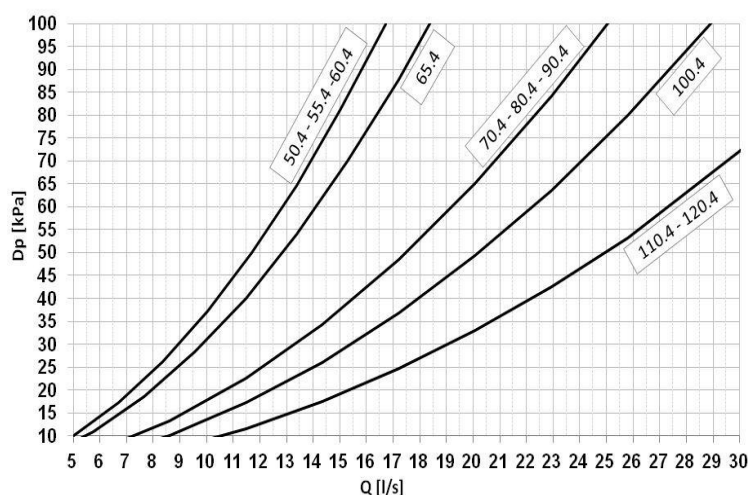
### Standard unit (STD)

Configuration without hydronic assembly, equipped with components as described on the water diagram key.

All water fittings are Victaulic type. It is possible to control an external pump by an on/off or 0-10V signal.



### Exchanger pressure drop curves



The pressure drops on the water side are calculated by considering an average water temperature at 7°C.

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

The water flow rate must be calculated with the following formula

$$Q \text{ [l/s]} = \text{kWf} / (4,186 \times \text{DT})$$

kWf = Cooling capacity in kW  
DT = Temperature difference between entering / leaving water

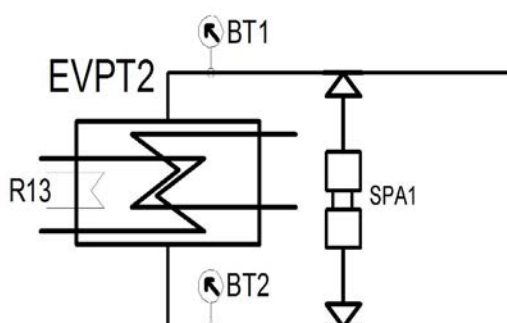
To the cold side exchanger pressure drops must be added the pressure drops of the steel mesh mechanical filter that must be placed on the water input line. It is a device compulsory for the correct unit operation, and it is available as accessory IFWX.

### Admissible water flow rates

Min. (Qmin) and max. (Qmax) water flow-rates admissibles for the correct unit operation.

| Size |       | 50.4 | 55.4 | 60.4 | 65.4 | 70.4 | 80.4 | 90.4 | 100.4 | 110.4 | 120.4 |
|------|-------|------|------|------|------|------|------|------|-------|-------|-------|
| Qmin | [l/s] | 5,0  | 5,0  | 5,0  | 5,5  | 7,4  | 7,4  | 7,4  | 8,6   | 10,7  | 10,7  |
| Qmax | [l/s] | 16,7 | 16,7 | 16,7 | 18,4 | 25,1 | 25,1 | 25,1 | 29,0  | 35,8  | 35,8  |

### Water diagram



EVPT2 = Plate evaporator 2 circuits

R13 = Evaporator group heater

BT1 = Probes of entering water temperature

BT2 = Probes of leaving water temperature

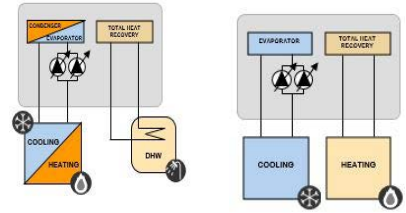
SPA1 = Differential pressure switch water

## User side (2/4 - pipes) Unit with VARYFLOW+ (VARYP)

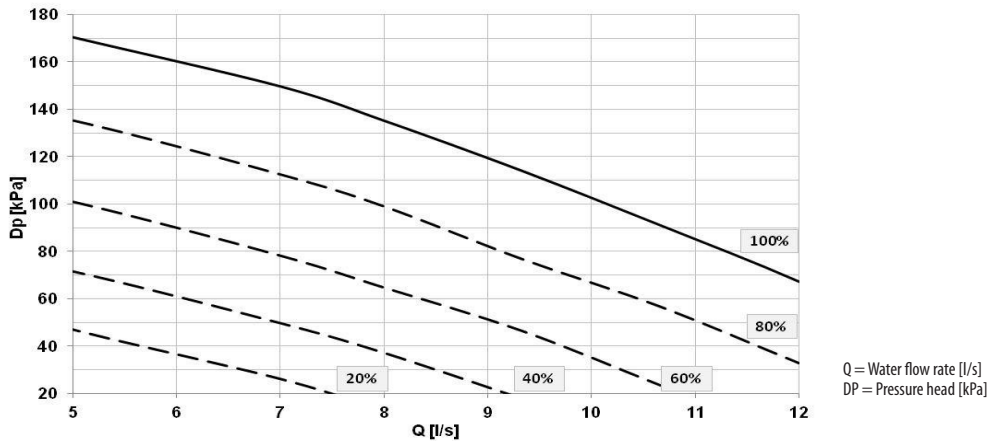
Configuration with 2 centrifugal electric pumps arranged in parallel and controlled by inverter, with housing and impeller made with AISI 304 stainless steel, and components as described on the water diagram key. All water fittings are Victaulic type.

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.



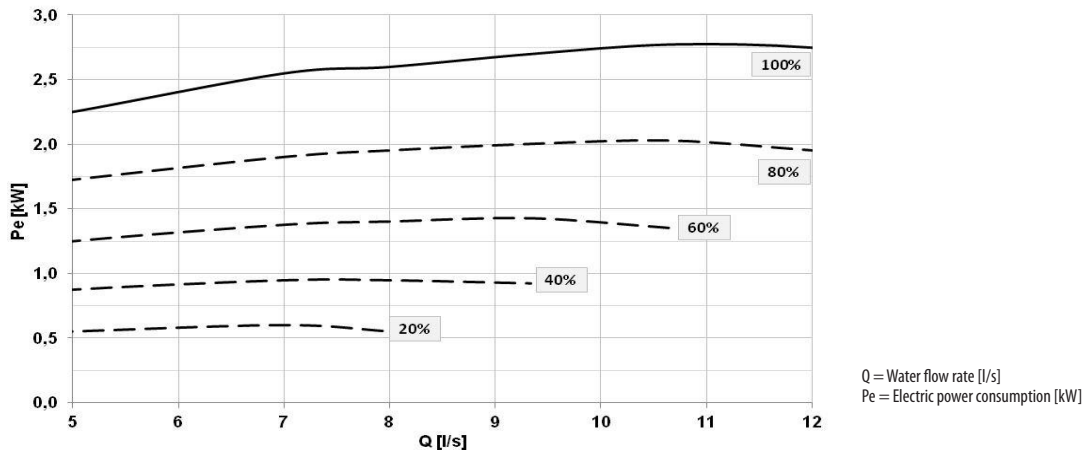
### Pressure head VARYFLOW + (Size 50.4 - 65.4)



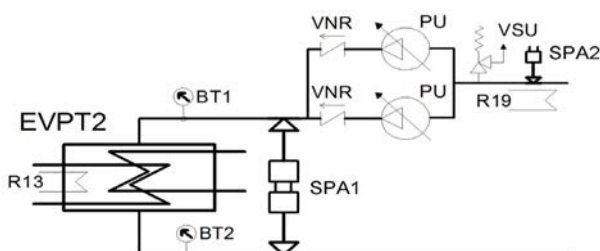
Caution: to obtain the available pressure values, you need to subtract the following from the head values represented in these diagrams:

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

### Absorption curves VARYFLOW + (Size 50.4 - 65.4)

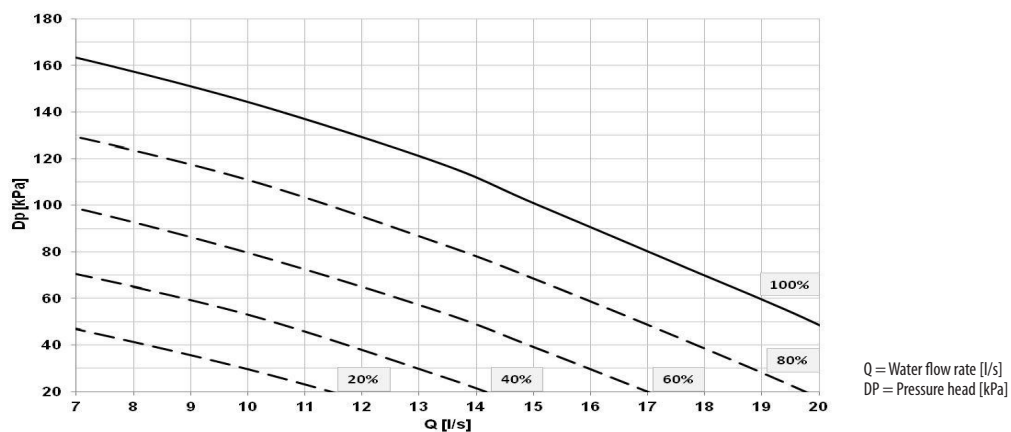


### Water diagram

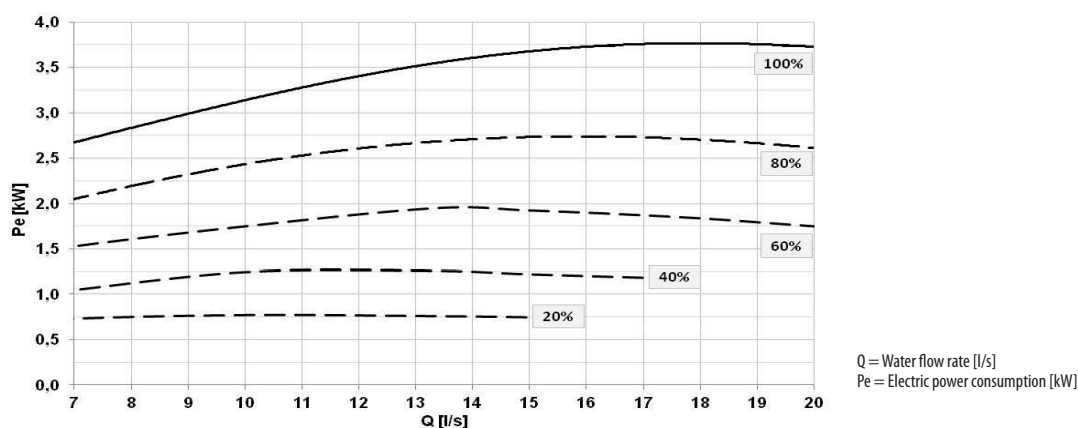


- EVPT2 = Plate evaporator 2 circuits
- R13 = Evaporator group heater
- BT1 = Probes of entering water temperature
- BT2 = Probes of leaving water temperature
- VNR = Non return valves
- SPA1 = Differential pressure switch water
- PU = Hydronic assembly VARYFLOW +
- VSU = Water safety valve
- R19 = Hydronic assembly heaters
- SPA2 = Installation load pressure switch

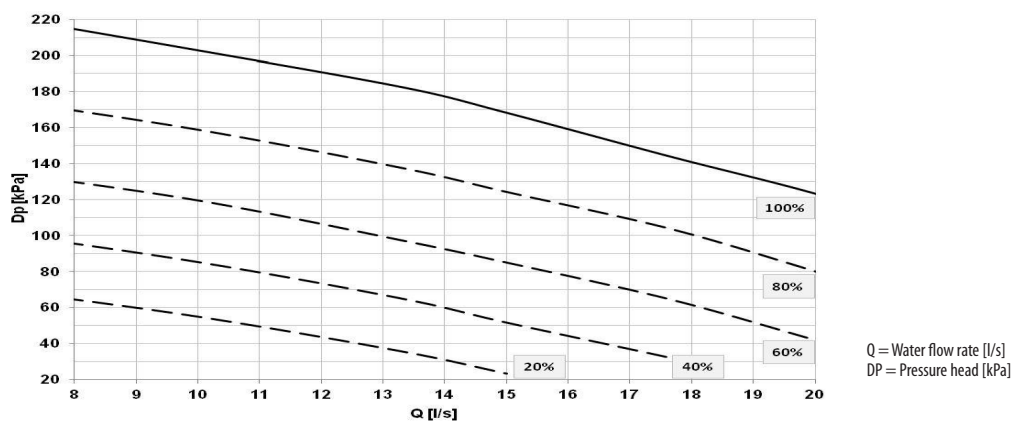
### Pressure head VARYFLOW + (Size 70.4 - 90.4)



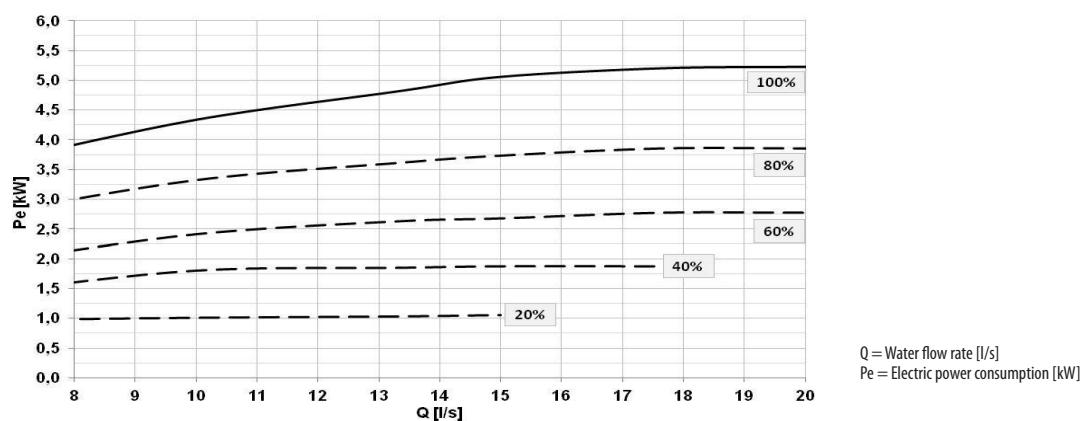
### Absorption curves VARYFLOW + (Size 70.4 - 90.4)



### Pressure head VARYFLOW + (Size 100.4 - 120.4)



### Absorption curves VARYFLOW + (Size 100.4 - 120.4)

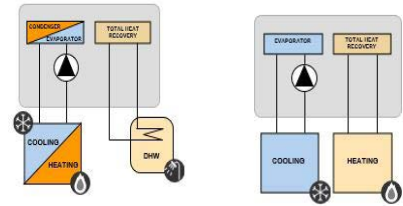


## User side (2/4 - pipes)

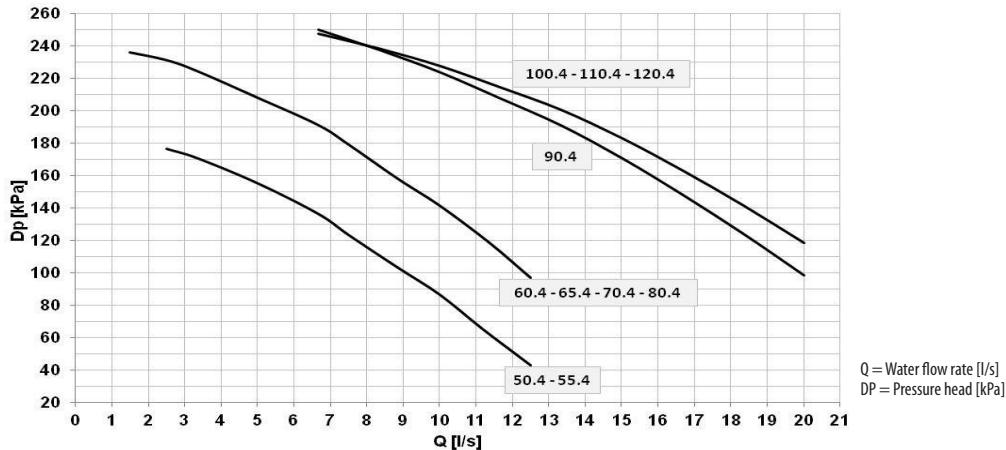
### Unit with 1 ON/OFF pump (HYG1)

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.



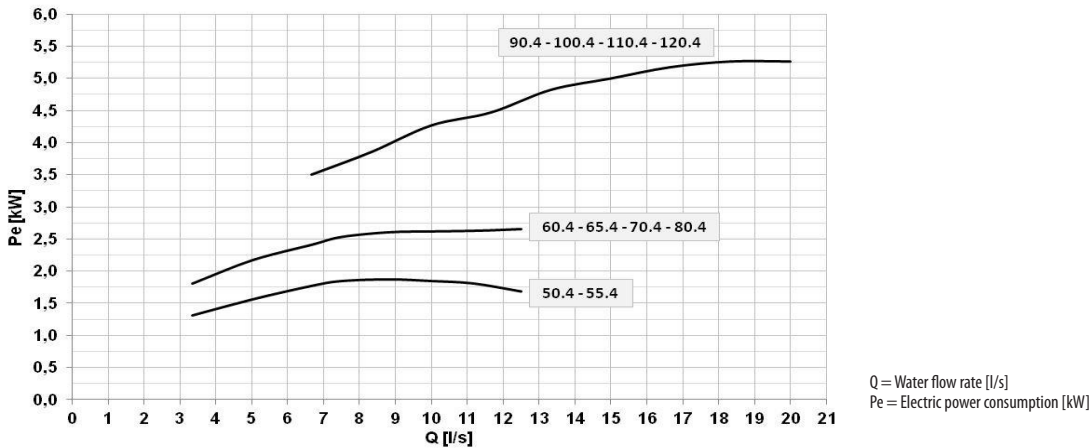
#### ON/OFF pump pressure head (Size 50.4 - 120.4)



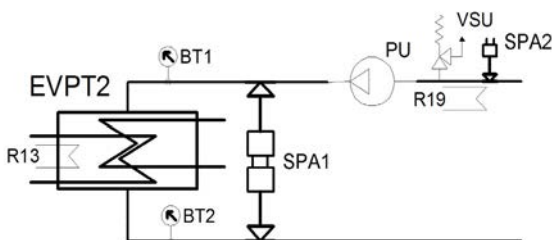
Caution: to obtain the available pressure values, you need to subtract the following from the head values represented in these diagrams:

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

#### ON/OFF pump absorption curves (Size 50.4 - 120.4)



#### Water diagram



- EVPT2 = Plate evaporator 2 circuits
- R13 = Evaporator group heater
- BT1 = Probes of entering water temperature
- BT2 = Probes of leaving water temperature
- SPA1 = Differential pressure switch water
- PU = Hydronic assembly 1 ON/OFF pump
- VSU = Water safety valve
- R19 = Hydronic assembly heaters
- SPA2 = Installation load pressure switch

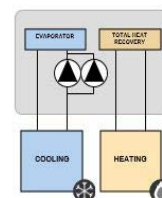
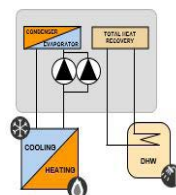
## User side (2/4 - pipes)

### Unit with 2 ON/OFF pumps (HYG2)

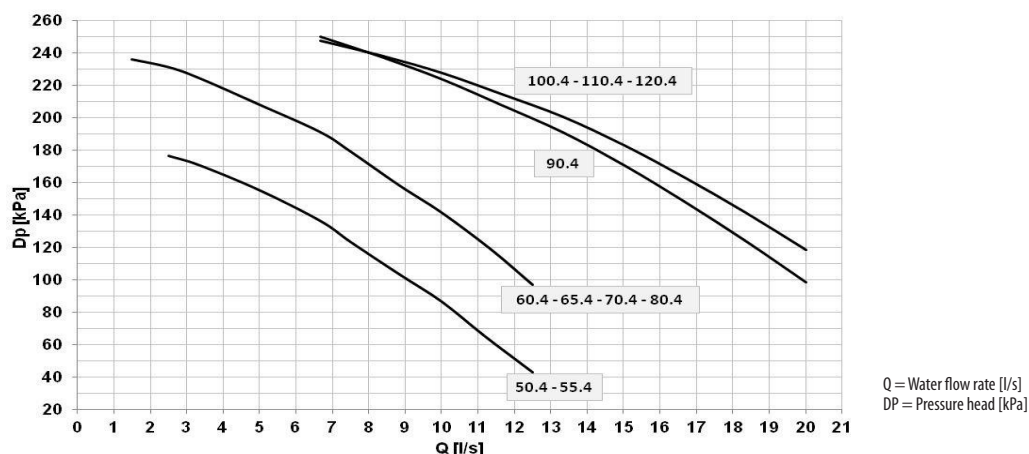
Configuration with 2 centrifugal electric pumps, 1 stand-by, with housing and impeller made with AISI 304 stainless steel, and components as described on the water diagram key. All water fittings are Victaulic type.

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.



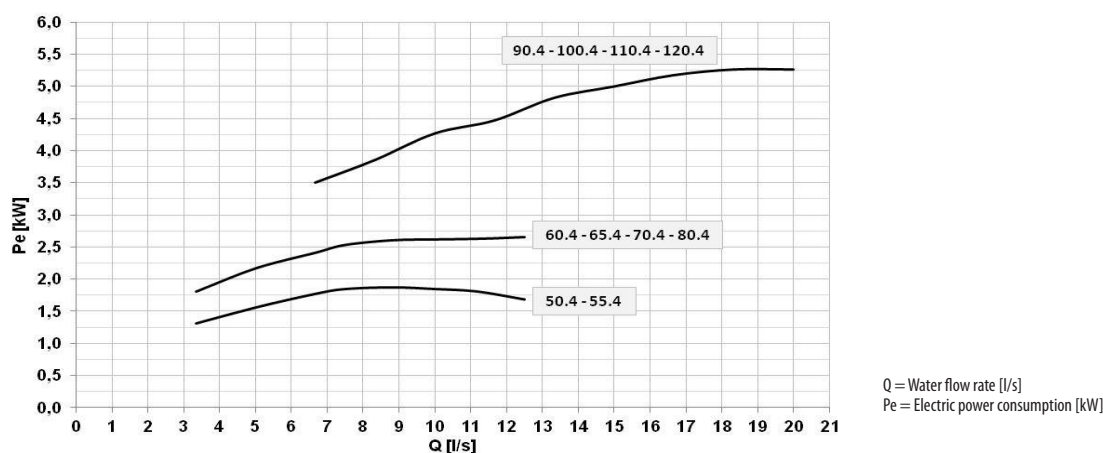
### ON/OFF pump pressure head (Size 50.4 - 120.4)



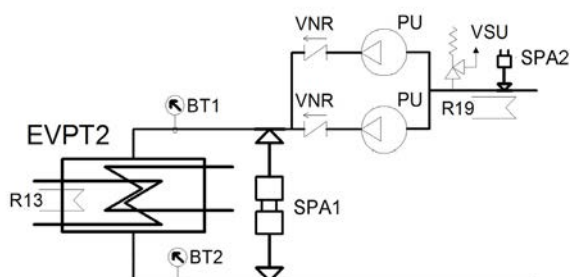
Caution: to obtain the available pressure values, you need to subtract the following from the head values represented in these diagrams:

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

### ON/OFF pump absorption curves (Size 50.4 - 120.4)



### Water diagram



- EVPT2 = Plate evaporator 2 circuits
- R13 = Evaporator group heater
- BT1 = Probes of entering water temperature
- BT2 = Probes of leaving water temperature
- VNR = Non return valves
- SPA1 = Differential pressure switch water
- PU = Hydronic assembly 2 ON/OFF pumps
- VSU = Water safety valve
- R19 = Hydronic assembly heaters
- SPA2 = Installation load pressure switch

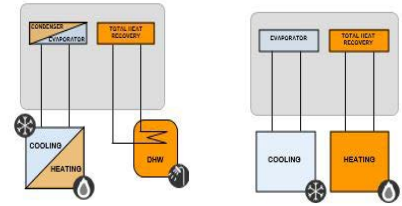


## Recovery side (2/4 - pipes)

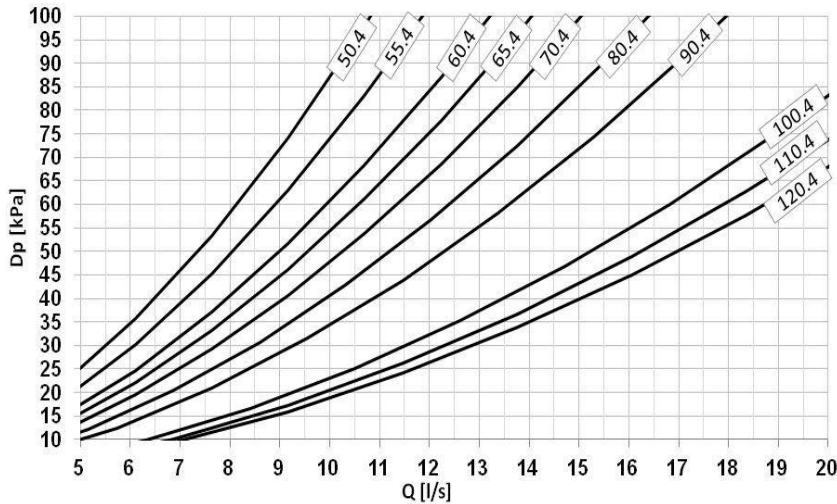
### Standard unit (STD)

Configuration without hydronic assembly, equipped with components as described on the water diagram key.

All water fittings are Victaulic type. It is possible to control an external pump by an on/off or 0-10V signal.



### Exchanger pressure drop curves

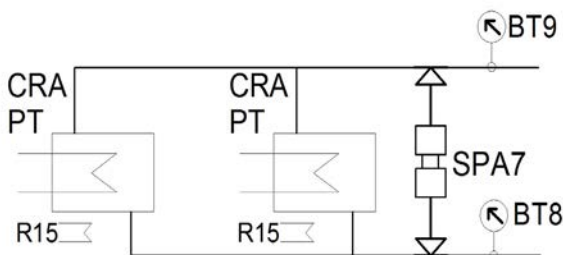


The pressure drops on the water side are calculated by considering an average water temperature at 7°C.

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

To the pressure drop at the heat exchanger recovery side (2 pipes) and hot side (4 pipes) we must also add the pressure drop at the steel mesh filter installed on the water intake line. This device is essential to the unit's proper operation, and is available as accessory IFWX.

### Water diagram



CRA PT = Water cooled plate condenser  
R15 = Condenser unit heaters  
BT9 = Water outlet temperature probes  
SPA7 = Water differential pressure switch  
BT8 = Water inlet temperature probes

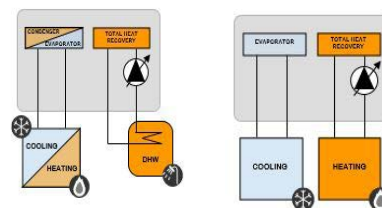
## Recovery side (2/4 - pipes)

### Configuration: Unit with 1 inverter pump (HYGR1V)

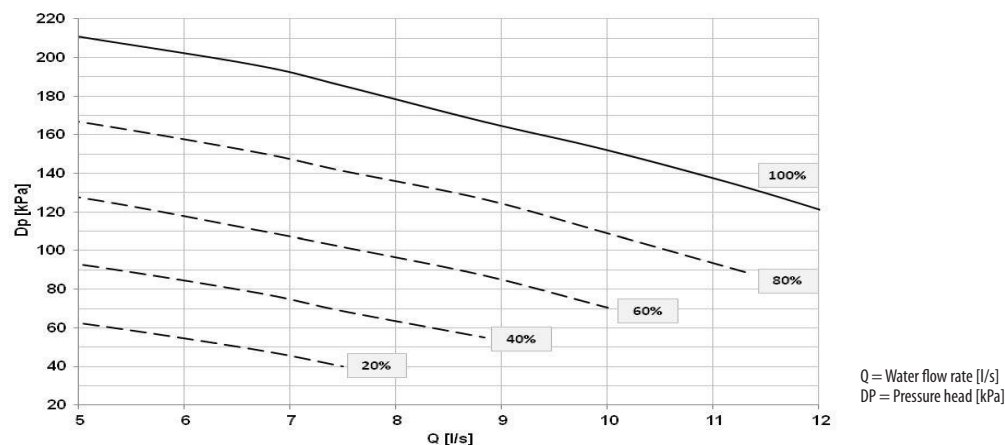
This configuration provides for one inverter-controlled electric centrifugal pump with body and impeller in AISI 304 steel and components listed in the key of the included water diagram. All water fittings are Victaulic.

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

Adjustment enables the optimised load distribution according to the system requirements.



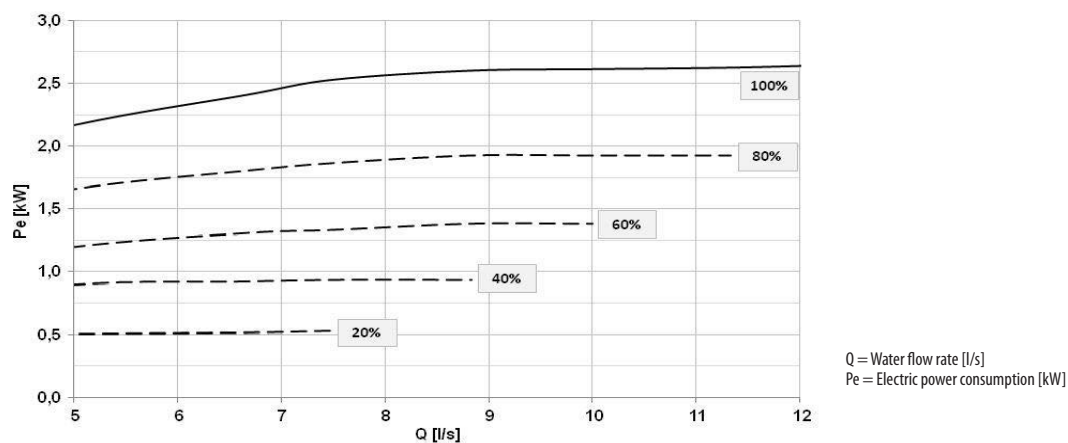
### Inverter pump pressure head (Size 50.4 - 60.4)



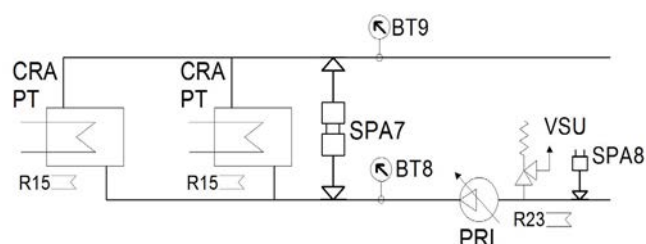
Caution: to obtain the available pressure values, you need to subtract the following from the head values represented in these diagrams:

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

### Inverter pump absorption curves (Size 50.4 - 60.4)

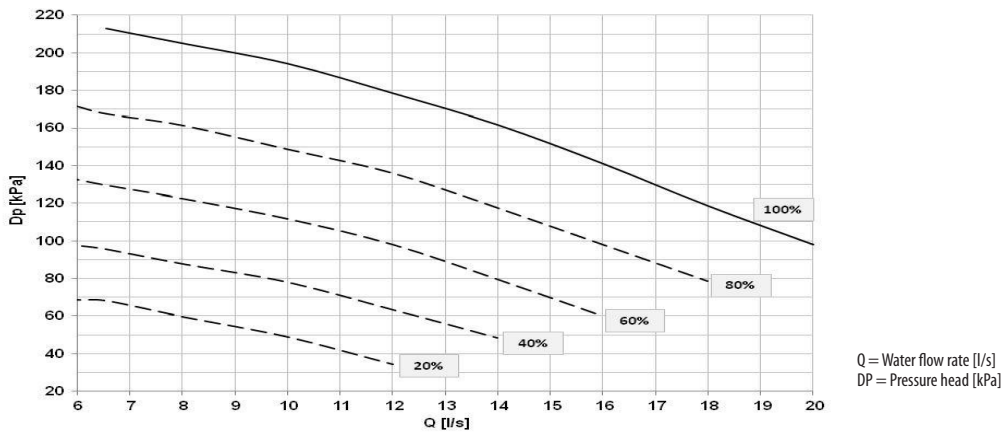


### Water diagram

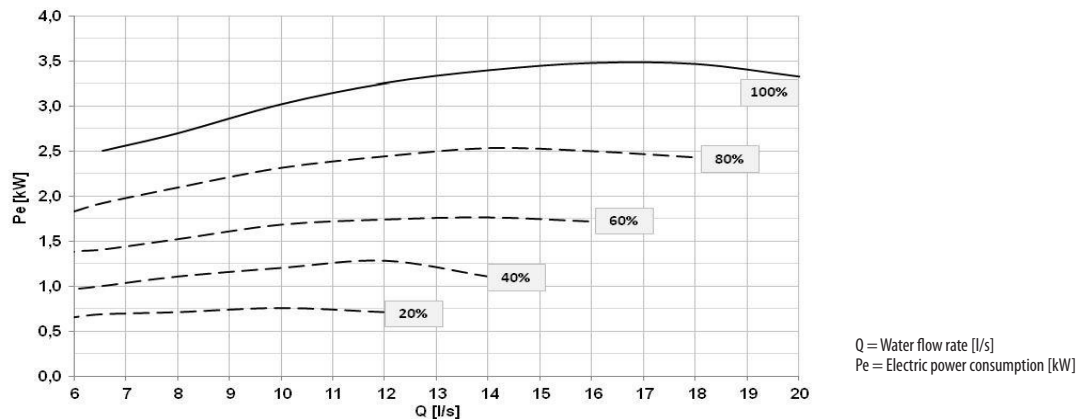


CRA PT = Water cooled plate condenser  
R15 = Condenser unit heaters  
BT9 = Temperature probes water outlet  
SPA7 = Water differential pressure switch  
BT8 = Water inlet temperature probes  
PRI = Hydronic assembly 1 inverter pump  
VSU = Water safety valve  
R19 = Hydronic assembly heaters  
SPA8 = Pressostato di carico impianto

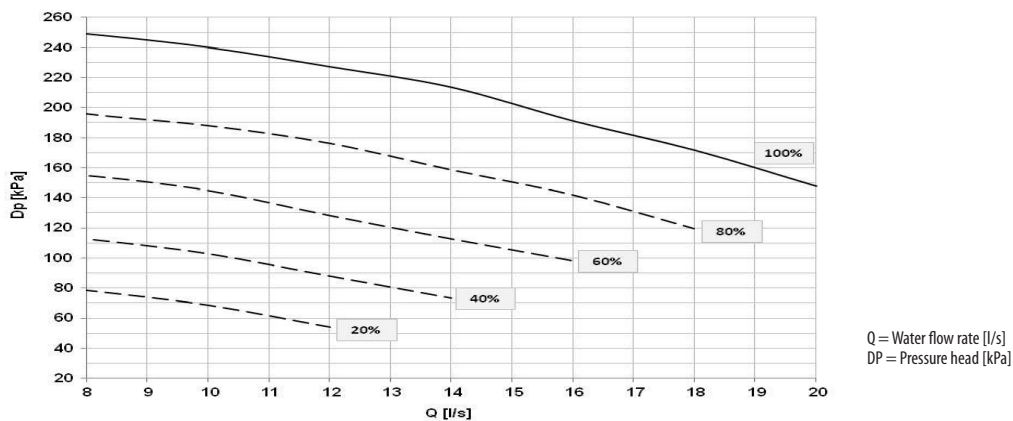
### Inverter pump pressure head (Size 65.4 - 80.4)



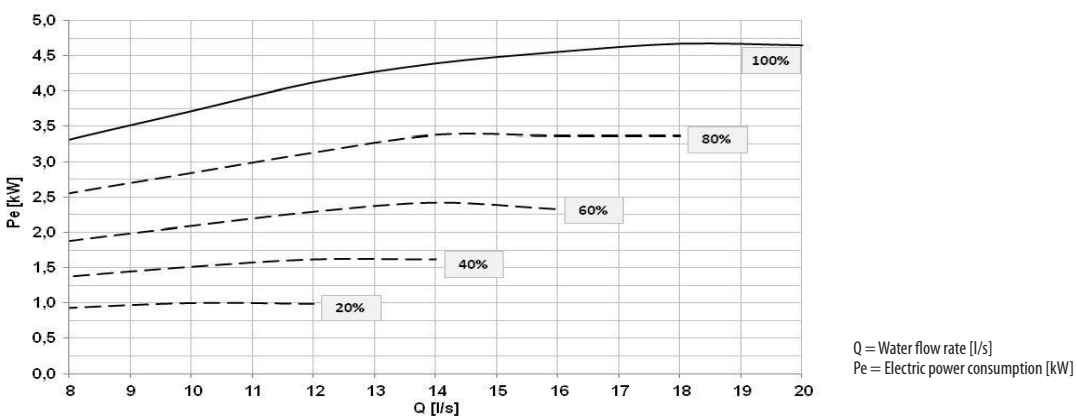
### Inverter pump absorption curves (Size 65.4 - 80.4)



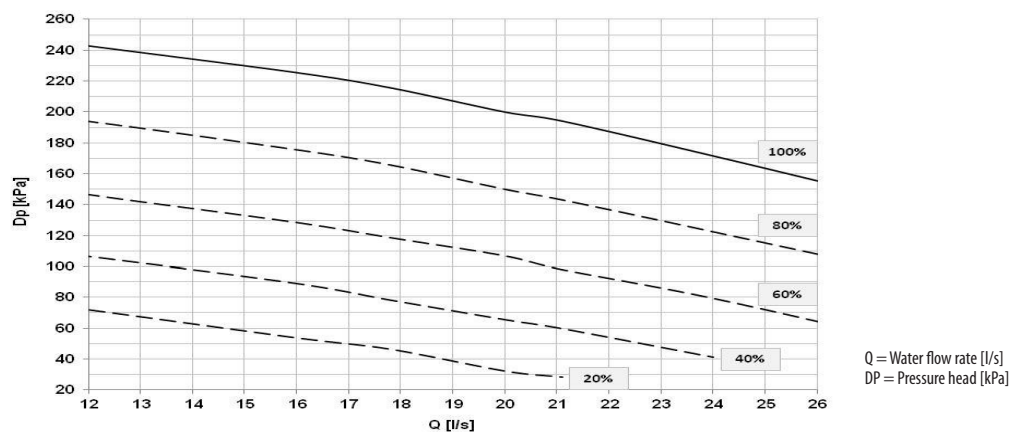
### Inverter pump pressure head (Size 90.4 - 100.4)



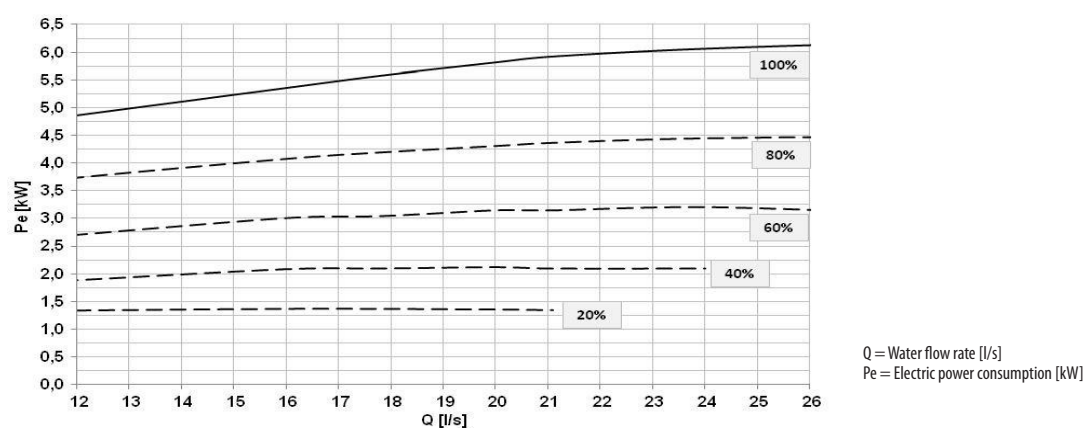
### Inverter pump absorption curves (Size 90.4 - 100.4)



### Inverter pump pressure head (Gr.110.4 - 120.4)



### Inverter pump absorption curves (Gr. 110.4 - 120.4)



## Built-in configuration options

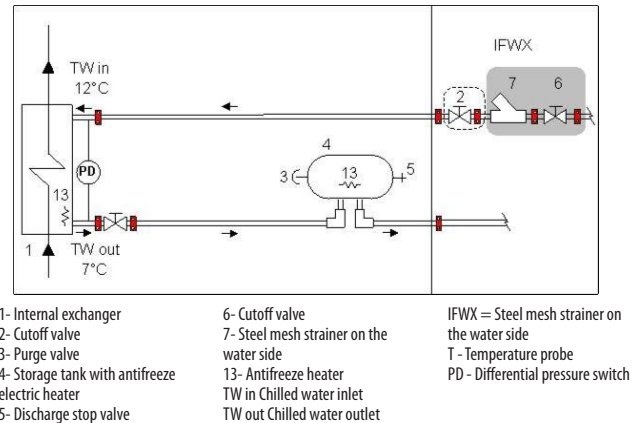
### ACC - Storage tank

Option supplied built-in the unit. Steel storage tank complete with double layer covering with closed-cell insulation, stainless steel anti-freeze immersion resistance, bleed valve, draw off cock, cast-iron shut-off butterfly valve with quick connections and activation lever with a mechanical calibration lock at the evaporator output, quick connections with insulated casing.

The storage tank is installed on user side in the 2-pipe configuration (2T), and on cold side in the 4-pipe configuration (4T).

For sizes 50.4 ÷ 65.4 the storage tank capacity is 300L.

For sizes 70.4 ÷ 120.4 the storage tank capacity is 500L.



### CCCA - Copper / aluminium condenser coil with acrylic lining

Coils with copper pipes and aluminium fins with acrylic lacquering. Can be used in settings with moderately aggressive saline concentrations and other chemical agents.

Attention!

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

### CCCA1 - Condenser coil with Energy Guard DCC Aluminum

A treatment which offers an optimal thermal exchange and guarantees and protects the finned coil exchangers from corrosion over time. Can be used in settings with very aggressive saline concentrations and other chemical agents in the air thus maintaining the performance of the coils over time.

### HEDIF - Diffuser for high efficiency axial fan

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

- down to -3 dB of silence
- reduction of 3% of the absorbed energy.

Since the fans are the unit's main noise source, the benefits are evident especially during the night hours, when the load is reduced but sensitivity to noise is enhanced.

Available only for size 70.4 ÷ 120.4.

### CREFB - Device for consumption reduction of the external section ECOBREEZE fans

Axial fans with sickle profile blades terminating with "Winglets", directly coupled to the electronic controlled motor (IP54), driven by the magnetic switching of the stator. The brushless technology and the special supply increase both the life expectancy and the efficiency. As a result the electric consumption is reduced up to 50%. Fans are located in aerodynamically shaped structures to increase efficiency and reduce noise level.

The assembly is protected by accident prevention guards.

Available only for size 70.4 ÷ 120.4.

### SFSTR - Disposal for inrush current reduction

Electronic device that automatically and gradually starts the compressors, thereby reducing the current peak generated in star-triangle start-ups and therefore reduces the mechanical stress on the motor and the electrodynamic stress on the power cables and on the mains.

### 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:

- protect the internal components of the unit, which are powered by an abnormal voltage, may operate incorrectly or break;
- quickly identify, among the alarms of the unit's components, the real cause of the malfunction due to the sudden change in voltage.

## CMSC8 - Serial communication module to BACnet supervisor

This enables 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.

The device is 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 to Modbus supervisor

This enables 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.

The device is 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 to LonWorks supervisor

This enables 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.

The device is 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.

## 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.

## PGFC - Finned coil protection grill

This accessory is used to protect the external coil from the accidental contact with external things or people. Ideal for installation in places where persons can pass from, such as car parks, terraces, etc.

## MHP - High and low pressure gauges

Despite the unit already enabling a series of digital displays on the operating pressure of the refrigeration circuit, this option enables analogical measuring of refrigerant pressures at compressor intake and supply thus easing the checking of these parameters for the technicians who are managing the unit. The two liquid pressure gauges and related pressure sensors are attached built-in in easily accessible positions.

## RE-20 / RE-25 - Electrical panel anti-freeze protection

It includes self-regulating electric heaters with thermostat which are able to protect the electrical panel against condensation and frost guaranteeing its correct functions down to -25°C. This accessory operates even when the unit is switched off provided that the power supply is maintained active and the unit continues to be electrically connected.

Device installed and wired built-in the unit.



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



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



## Accessories separately supplied

### RCTX - Remote 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.



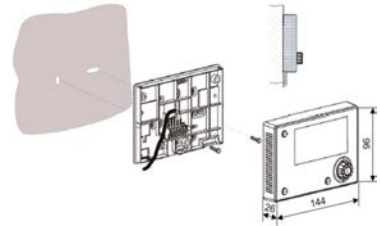
All device functions can be repeated with a normal portable PC connected to the unit with an Ethernet cable and equipped with an internet navigation browser



The device should be installed on the wall using suitable plugs, electrically hooked up and connected to the unit (installation and wiring are the responsibility of the Customer). Max. remote distance 350 m without auxiliary supply.



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



### BACX - BACnet serial communication module

Allows the serial connection to supervision systems by using BACnet-IP as a communication protocol. It allows the access to the entire list of operating variables, controls and alarms. With this accessory every unit can communicate with the main supervision systems.



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)

### CMMBX - Serial communication module to supervisor (Modbus)

This enables 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.



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

### CMSLWX - LonWorks serial communication module

This enables 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.



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.

### PGFCX - Finned coil protection grill

This accessory is used to protect the external coil from the accidental contact with external things or people.

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



This option is not suitable for application in sulphuric environments

### MHPX - High and low pressure gauges

Despite the unit already enabling a series of digital displays on the operating pressure of the refrigeration circuit, this option enables analogical measuring of refrigerant pressures at compressor intake and supply thus easing the checking of these parameters for the technicians who are managing the unit. The two liquid pressure gauges and related pressure sensors are attached built-in in easily accessible positions.





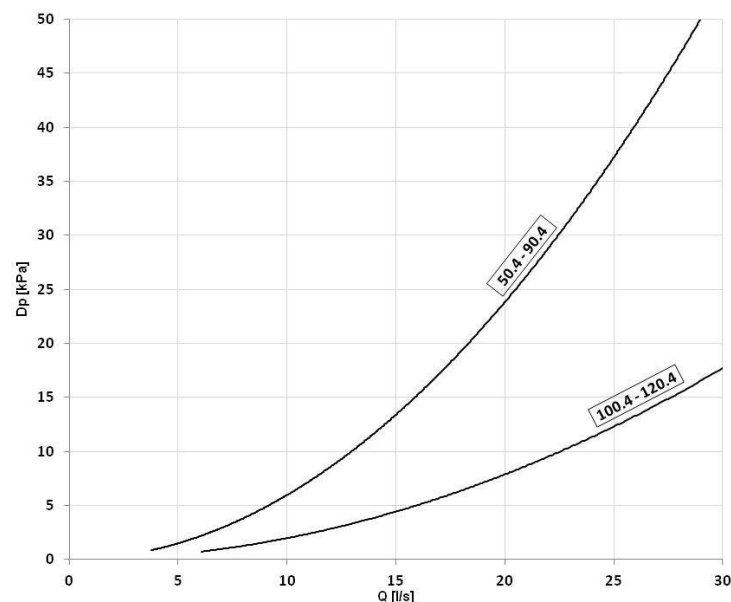
## IFWX - Steel mesh strainer on the water side

The device prevents any impurity in the hydraulic circuit from soiling the exchanger. The stainless steel mesh mechanical filter must be placed on the water inlet line. It needs to be easy to remove for periodical maintenance and cleaning operations.

Moreover, it consists of:

- cast-iron shut-off butterfly valve with quick coupling and throttle drive and mechanical calibration stop
- quick couplings with an insulated casing

### Steel mesh strainer pressure drops



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

## AVIBX - Anti-vibration mount supports

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

## VACSRX - Total recovery side DHW switching valve

The utility side DHW switching valve is also supplied as a separate accessory.

The unit controller closes a digital output to control the DHW switching valve from the installation to the storage tank up to the DHW set point reaching.

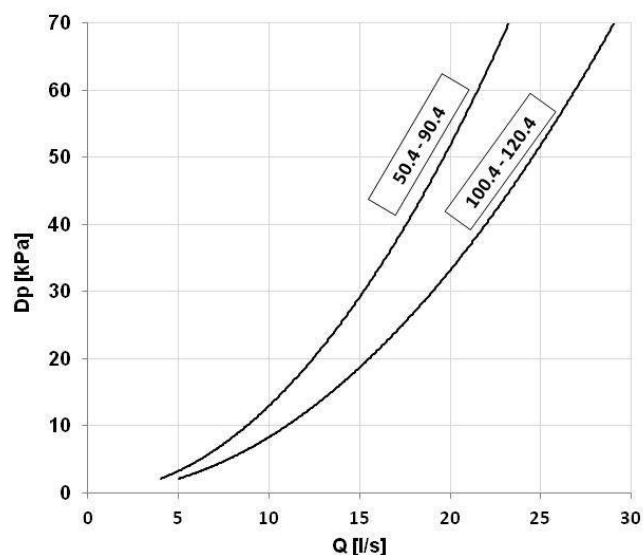
For sizes from 50.4 to 90.4 the DHW switching valve is 3".

For sizes from 100.4 to 120.4 the DHW switching valve is 4".

The DHW switching valve has a IP 40 protection degree.

**It is therefore compulsory that client provides a protection for the external liquid valve.**

### DHW switching valve pressure drops

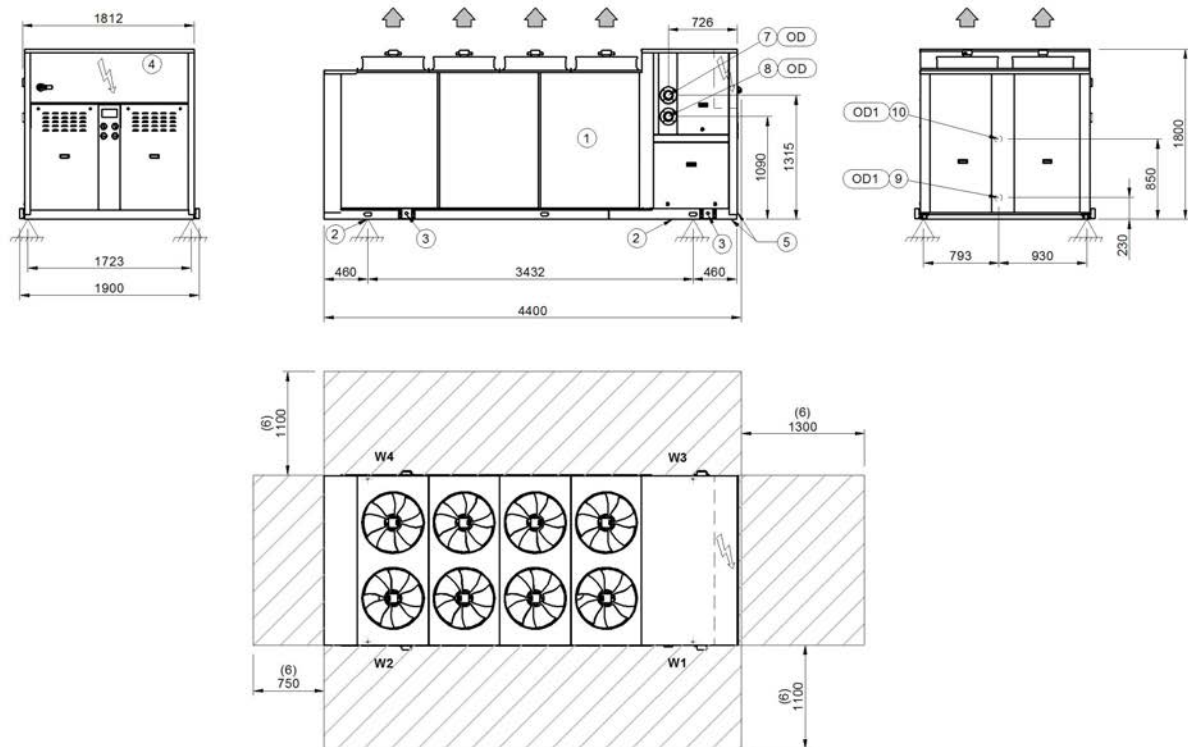


Q = Water flow rate [l/s]  
DP = Water side pressure drops [kPa]

## Dimensional

### Size 50.4 - 55.4 - 60.4 - 65.4

DAAL 450.4\_65.4 EXC\_0 REV01  
Data/Date 23/07/2015



- 1) External exchanger
- 2) Unit fixing holes Ø 25
- 3) Lifting brackets (Removable)
- 4) Electrical panel
- 5) Power input
- 6) Clearance access recommended
- 7) Water inlet user side of no pumps unit / Water outlet user side of unit with pumps (optional)
- 8) Water outlet user side of no pumps unit / Water inlet user side of unit with pumps (optional)
- 9) Recovery side exchanger water inlet (optional)
- 10) Recovery side exchanger water outlet (optional)

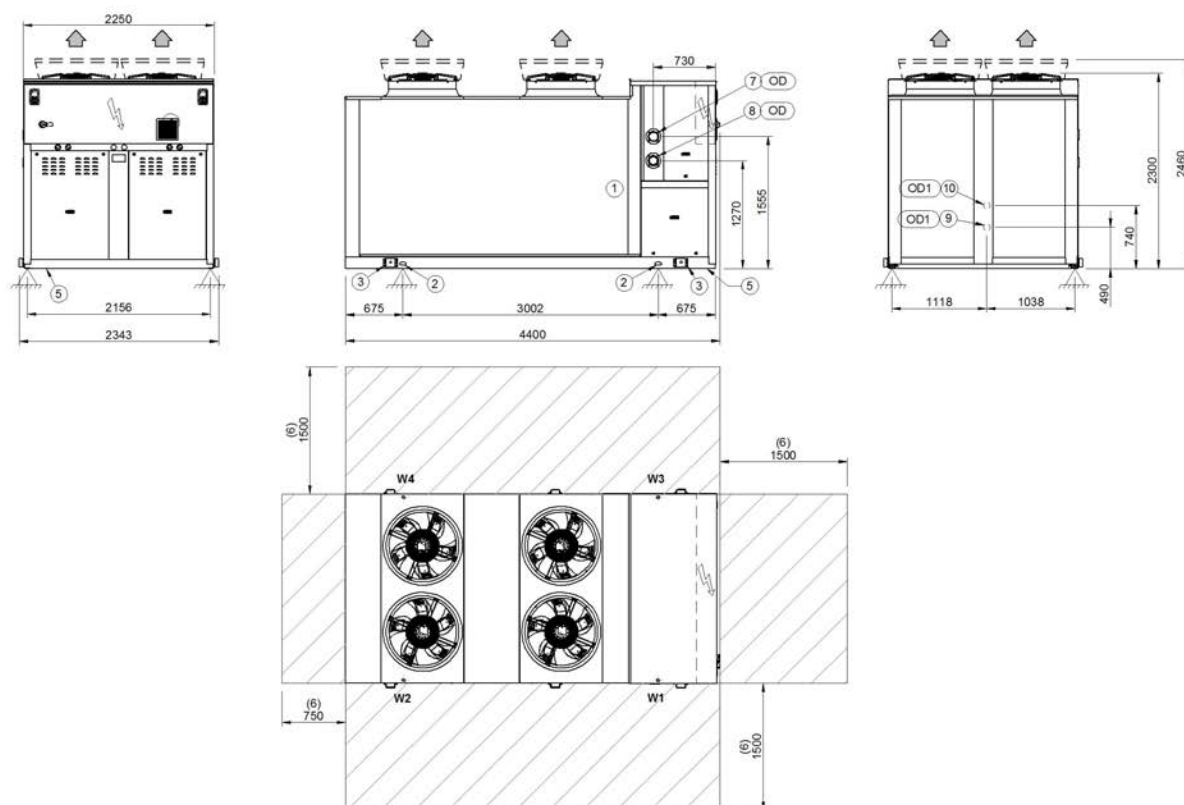
| Size             |    | 50.4 | 55.4 | 60.4 | 65.4 |
|------------------|----|------|------|------|------|
| Length           | mm | 4450 | 4450 | 4450 | 4450 |
| Height           | mm | 1800 | 1800 | 1800 | 1800 |
| Depth            | mm | 1812 | 1812 | 1812 | 1812 |
| W1 Support point | kg | 540  | 545  | 567  | 614  |
| W2 Support point | kg | 352  | 352  | 373  | 392  |
| W3 Support point | kg | 550  | 550  | 581  | 645  |
| W4 Support point | kg | 361  | 367  | 687  | 423  |
| Operation weight | kg | 1803 | 1825 | 1908 | 2073 |
| Shipping weight  | kg | 1710 | 1730 | 1810 | 1970 |

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

## Dimensional

### Size 70.4 - 80.4 - 90.4

DAAL 470.4\_90.4 EXC\_0 REV01  
Data/Date 23/07/2015



- 1) External exchanger
- 2) Unit fixing holes Ø 25
- 3) Lifting brackets (Removable)
- 4) Electrical panel
- 5) Power input
- 6) Clearance access recommended
- 7) Water inlet user side of no pumps unit / Water outlet user side of unit with pumps (optional)
- 8) Water outlet user side of no pumps unit / Water inlet user side of unit with pumps (optional)
- 9) Recovery side exchanger water inlet (optional)
- 10) Recovery side exchanger water outlet (optional)

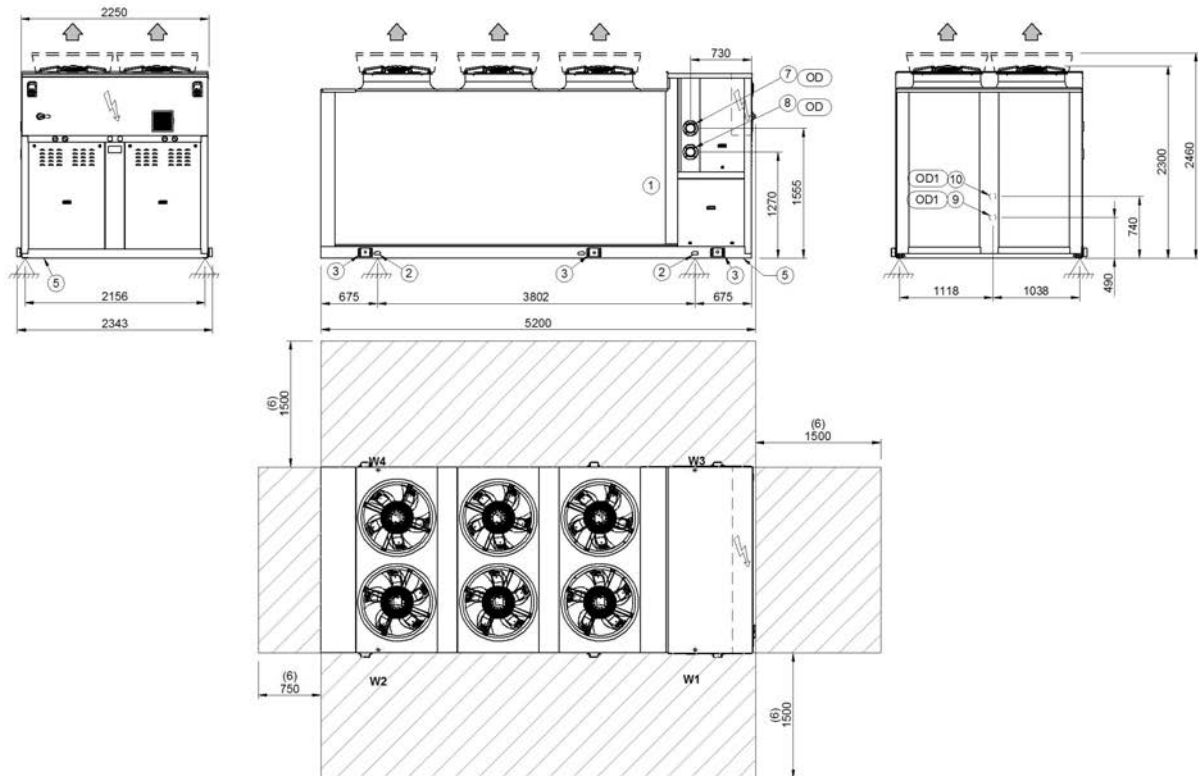
| Size                 |    | 70.4 | 80.4 | 90.4 |
|----------------------|----|------|------|------|
| Length               | mm | 4450 | 4450 | 4450 |
| Height standard unit | mm | 2300 | 2300 | 2300 |
| Height with AXITOP   | mm | 2460 | 2460 | 2460 |
| Depth                | mm | 2250 | 2250 | 2250 |
| W1 Support point     | kg | 803  | 838  | 885  |
| W2 Support point     | kg | 484  | 507  | 535  |
| W3 Support point     | kg | 831  | 868  | 919  |
| W4 Support point     | kg | 512  | 537  | 570  |
| Operation weight     | kg | 2630 | 2750 | 2908 |
| Shipping weight      | kg | 2520 | 2640 | 2800 |

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

## Dimensional

### Size 100.4 - 110.4 - 120.4

DAAL 4100.4\_120.4 EXC\_0 REV00  
Data/Date 23/07/2015



- 1) External exchanger
- 2) Unit fixing holes Ø 25
- 3) Lifting brackets (Removable)
- 4) Electrical panel
- 5) Power input
- 6) Clearance access recommended
- 7) Water inlet user side of no pumps unit / Water outlet user side of unit with pumps (optional)
- 8) Water outlet user side of no pumps unit / Water inlet user side of unit with pumps (optional)
- 9) Recovery side exchanger water inlet (optional)
- 10) Recovery side exchanger water outlet (optional)

| Size                 |    | 100.4 | 110.4 | 120.4 |
|----------------------|----|-------|-------|-------|
| Length               | mm | 5250  | 5250  | 5250  |
| Height standard unit | mm | 2300  | 2300  | 2300  |
| Height with AXITOP   | mm | 2460  | 2460  | 2460  |
| Depth                | mm | 2250  | 2250  | 2250  |
| W1 Support point     | kg | 1060  | 1092  | 1136  |
| W2 Support point     | kg | 648   | 657   | 687   |
| W3 Support point     | kg | 1086  | 1119  | 1160  |
| W4 Support point     | kg | 674   | 684   | 711   |
| Operation weight     | kg | 3467  | 3553  | 3694  |
| Shipping weight      | kg | 3320  | 3400  | 3540  |

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

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**CLIVET SPA**

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

**CLIVET GROUP UK Limited**

4 Kingdom Close, Segensworth East - Fareham, Hampshire - PO15 5TJ - United Kingdom  
Tel. + 44 (0) 1489 572238 - Fax + 44 (0) 1489 573033 - [enquiries@clivetgroup.co.uk](mailto:enquiries@clivetgroup.co.uk)

**CLIVET GROUP UK Limited (Operations)**

Units F5&F6 Railway Triangle Ind Est, Walton Road - Portsmouth, Hampshire - PO6 1TG - United Kingdom  
Tel. +44 (0) 2392 381235 - Fax. +44 (0) 2392 381243 - [service@clivetgroup.co.uk](mailto:service@clivetgroup.co.uk)

**CLIVET ESPAÑA S.A.U.**

C/ Bac de Roda, 36 - 08019 Barcelona - España  
Tel: +34 93 8606248 - Fax +34 93 8855392 - [info@clivet.es](mailto:info@clivet.es)

Av.Manoteras Nº 38, Oficina C303 - 28050 Madrid - España  
Tel. +34 91 6658280 - Fax +34 91 6657806 - [info@clivet.es](mailto: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](mailto:info.de@clivet.com)

**CLIVET RUSSIA**

Elektrozavodskaya st. 24, office 509 - 107023, Moscow, Russia  
Tel. + 74956462009 - Fax + 74956462009 - [info.ru@clivet.com](mailto:info.ru@clivet.com)

**CLIVET MIDEAST FZCO**

Dubai Silicon Oasis (DSO), High Bay Complex, Office N. 20, PO BOX 342009, Dubai, UAE  
Tel. + 9714 3208499 - Fax + 9714 3208216 - [info@clivet.ae](mailto:info@clivet.ae)

**CLIVET AIRCONDITIONING SYSTEMS PRIVATE LIMITED**

501/502, Commercial-1, Kohinoor City, Old Premier Compound, Kirol Road, Off L B S Marg, Kurla West - Mumbai 400 070 - India  
[info.in@clivet.com](mailto:info.in@clivet.com)

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[www.clivet.com](http://www.clivet.com)  
[www.clivetlive.com](http://www.clivetlive.com)

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