

# CLIVETPack<sup>2</sup>

Direct expansion high efficiency packaged rooftop  
air conditioner for medium attendance areas

**CSRN-XHE2 15.2-44.4 HSE RANGE**

**AIR-AIR HEAT PUMP R-410A**

Air flow-rate from 8500 to 25000 m<sup>3</sup>/h



- ▶ R-410A scroll compressors connected in tandem
- ▶ Two single refrigeration circuits
- ▶ High seasonal efficiency (HSE)
- ▶ Energy recovery of exhaust air
- ▶ Maximum compactness
- ▶ Variable airflow



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The products concerned appear in the certified products list of the EUROVENT  
[www.eurovent-certification.com](http://www.eurovent-certification.com) site.

## For many businesses, success depends on the right comfort of the users

Correct air conditioning is a fundamental component to manage various retail surfaces. Optimal temperature and humidity, air purification and proper ventilation are essential factors to ensure occupancy of these areas for both users and operators, regardless of external conditions. This is what happens in supermarkets and hypermarkets, shopping centres, stations, airports and industrial warehouses. Fresh air is even more for crucial for commercial catering to control odours and vapours. Finally, also in technical facilities ventilation and air-conditioning are often essential for the correct operation of the equipment they contain.



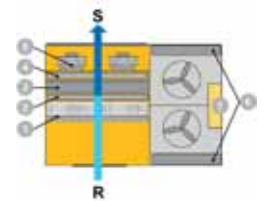
## CLIVETPack CSRN-XHE2 delivers all the technological evolution by Clivet to the applications for middle attendance

The specialised ranges for applications with medium to high occupancy are widely used in industrial and commercial buildings. Their success is based on high energy efficiency, compactness, versatility, maintenance and operation simplicity.

Four main configurations providing different air flow control. Each one can be integrated by a broad range of accessories that customise the product based on the application.

### CAK configuration: single fan section for full recirculation

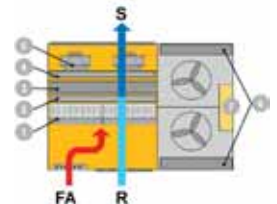
For air conditioning applications only, without the need for air renewal. The supply fan section provides the required supply and return available static pressure.



### CBK configuration: single fan section for recirculation and fresh air

For applications where you need to keep the room in over-pressure, with the option of controlling a particular fresh air flow.

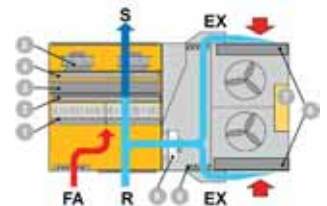
As for the CAK configuration, the supply fan section provides the supply and return available static pressure.



### CCK configuration: double fan section for recirculation, fresh air, exhaust, thermodynamic recovery

For applications with automatic air renewal and free-cooling function control. In addition to the parts contained in the CBK configuration, the unit is equipped with an exhaust section with thermodynamic energy recovery of the exhaust air.

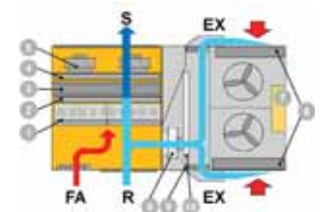
This air, which is still rich in energy, is mixed with the outdoor air, favouring the temperature conditions on the source side of the exchanger and improving the heating and cooling capacity.



### CCKP configuration: double fan section with fresh air and THOR thermodynamic recovery

For applications with automatic air renewal and free-cooling function control. In addition to the parts contained in the CCK configuration, the unit is equipped with an exhaust section with innovative thermodynamic energy recovery of the exhaust air through a dedicated THOR (Thermodynamic Overboost Recovery) exchanger.

The energy contained in the exhaust air is recovered and transferred to handling through the refrigeration circuit.



R. Return air  
S. Supply air  
FA. Fresh air  
EX. Exhaust air

1. G4 efficiency filters + H10 equivalent electronic filters  
2. Hot water exchanger or electric heaters

3. Handling exchanger  
4. Hot gas reheating exchanger  
5. Return + supply fan section  
6. Source side exchanger  
7. Electrical panel  
8. Exhaust fan  
9. Overpressure damper  
10. Thermodynamic recovery exchanger, THOR

## CLIVETPack series for medium attendance applications

### SMARTPACK2

CKN-XHE2i 7.1 - 14.2 reversible heat pump

Nominal airflow: 3200 - 10500 m<sup>3</sup>/h

Cooling capacity: 20 - 46 kW

Configurations:

CAK single fan section for full recirculation

CBK single fan section for recirculation and fresh air

CCK double fan section for recirculation, fresh air, exhaust, thermodynamic recovery



### CLIVETPack<sup>2</sup>

CSRN-XHE2 15.2 - 44.4 HSE reversible heat pump

Nominal airflow: 9000 - 25000 m<sup>3</sup>/h

Cooling capacity: 48 - 147 kW

Configurations:

CAK single fan section for full recirculation

CBK single fan section for recirculation and fresh air

CCK double fan section for recirculation, fresh air, exhaust, thermodynamic recovery

CCKP double fan section with fresh air and THOR thermodynamic recovery



Grandezze  
15.2 ÷ 30.4

### CLIVETPack<sup>2</sup>

CSRT/N-XHE2 49.4 - 110.4 solo freddo / pompa di calore reversibile

Portata aria nominale: 22000 - 60000 m<sup>3</sup>/h

Potenza frigorifera: 155 - 376 kW

Configurazioni:

CAK singola sezione ventilante per tutto ricircolo

CBK singola sezione ventilante per ricircolo ed aria di rinnovo

CCK doppia sezione ventilante per ricircolo, aria di rinnovo, espulsione, recupero termodinamico

CCKP doppia sezione ventilante con aria di rinnovo e recupero termodinamico THOR



### CLIVETPack<sup>2</sup>

CRH-XHE2 14.2 - 110.4 reversible heat pump

Nominal airflow: 8500 - 60000 m<sup>3</sup>/h

Cooling capacity: 52 - 392 kW

Configurations:

CAK single fan section for full recirculation

CBK single fan section for recirculation and fresh air

CCK double fan section for recirculation, fresh air, exhaust, thermodynamic recovery

CCKP double fan section with fresh air and THOR thermodynamic recovery



Grandezze  
14.2 ÷ 25.4

## Clivet series for high attendance applications

### CLIVETPack<sup>2</sup>

CSNX-XHE2 12.2 - 44.4 reversible heat pump

Nominal airflow: 4000 - 20000 m<sup>3</sup>/h

Fresh airflow up to 80%

Cooling capacity: 47 - 174 kW

Configurations:

CCK double fan section for recirculation, fresh air, exhaust, thermodynamic recovery

CCKP double fan section with fresh air and THOR thermodynamic recovery



Grandezze  
12.4 ÷ 24.4

## Clivet series for full fresh air application

### ClivetPACK<sup>2</sup> FFA

CSRT/N-XHE2 FFA 12.2-24.4 cooling only / reversible heat pump

Nominal airflow: 3000 - 9000 m<sup>3</sup>/h

Cooling capacity: 33 - 90 kW

Configurations:

CBFFA Configuration for fresh air inlet

CCFFA Configuration for fresh air inlet with outlet



## Complete and decentralised systems

The necessary heat or cooling energy is only produced where and when needed, for this they can be independently be installed next to the zone to be conditioned with a considerable system saving.

The packaged design of all of the plant engineering parts are contained inside the unit, already assembled and inspected.

The unit includes plug and play logic. Installation and later maintenance operations are easy and quick.

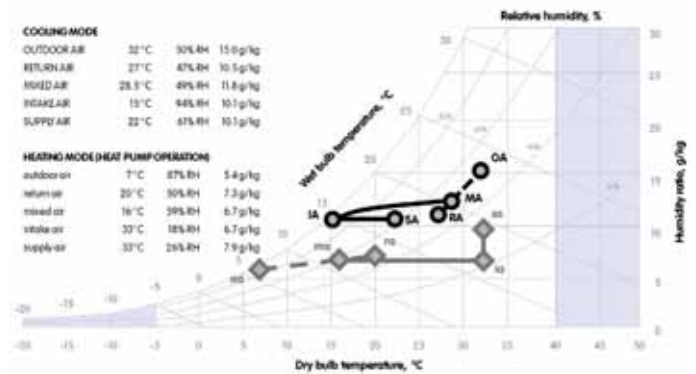
## Comfort and air quality in only one product

### Temperature and humidity control throughout the year

The unit acts on the overall heat load generated by the outdoor air and by the ambient loads.

The particular reversible heat pump technology is also suitable for applications in cold climates, and can be integrated where necessary to the other integrated heating options like electrical heaters, hot water coil, condensed gas with burner heating module with modulating control.

The unit can also automatically control the relative humidity in the served ambient. In cooling mode the dehumidification function can be completed by a post-heating device with hot gas recovery and on the FREE-COOLING enthalpy control. In heating mode, the steam humidifier or the evaporating heater increases the humidity introduced into the air to maintain the desired value in the ambient.



Treatment example at full load for CLIVETPack model CSRN-XHE2 25.4 in standard airflow. Outdoor airflow equal to 30% of that treated. Heating carried out with a heat pump. Unit complete with 'post-heating with hot gas' and 'vapour humidifier of 15 kg/h' options.

### Automatic management of the air renewal

The automatic logic of the air renewal:

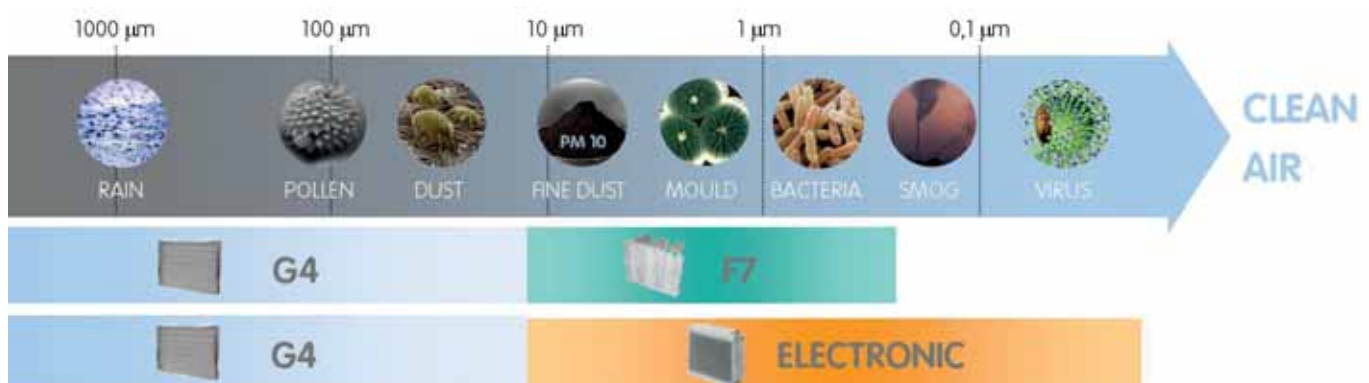
- Carries out the transient steady state in all recirculation mode, to reduce its duration and quickly reach comfort conditions
- Once these conditions have been reached, it operates with fixed open damper, based on the users preferred settings
- Carry out the FREE-COOLING as soon as the external conditions allow it
- In models fitted with air quality control, modulates the outdoor air renewal quantity, therefore guaranteeing the desired air quality with substantial energy and economic savings

### Air filtering

Air filtering is an essential function for ensure proper well-being and hygiene conditions are maintained in the areas served. This is why it is subject to special regulations based on specific applications. The units are fitted as standard with large G4 filters with low pressure drops on the treatment area.

### Very high filtration efficiency

As a second stage of filtration, there are F7 high efficiency filters or innovate electronic filters available. The efficiency of the fitted electronic filters is equivalent to the H10 classification used in traditional filters, or rather the class identification such as "absolute filter". They are efficient even on fumes, fine dust, particles PM10, PM2.5, PM1, bacteria, germs and virus.



## Automatic control of the air quality

When the area is occupied in partial mode, a minor air change is necessary. The air quality probe (which is sensitive to the CO<sub>2</sub> tracer) is positioned on the return of the served ambient and automatically determines the opening of the outdoor air damper to give the correct renewal and avoid waste.

Similarly, the probe is also sensitive to VOC (Volatile Organic Compounds) also acts in the presence of tobacco smoke, formaldehyde (for example from solvents, deodorants, glues, paint, detergents), cooked foods.

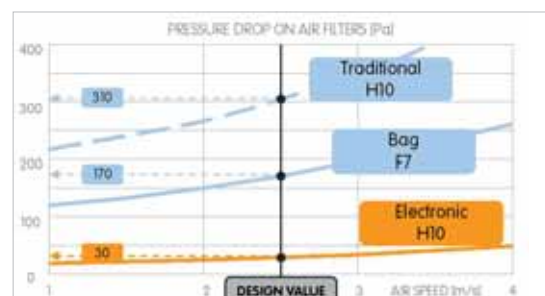
## The electronic filters reduce the energy necessary for ventilation

The highest filtration efficiency is obtained with practically no pressure drops.

This depends on the metal pre-filter that is found upstream of the plate and withholds the coarse particles. Moreover, the metal pre-filter homogeneously distributes the air flow and contributes to the containment of the magnetic field generated during operation.

The energy for the ventilation is thus reduced by more than 10%.

The pressure drops remain unchanged with the progressive fouling.



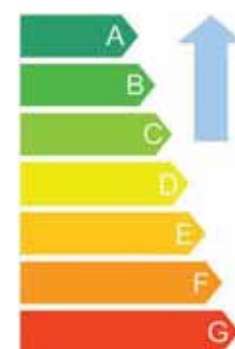
## High energy efficiency within the annual cycle

### Increases the building value

The high efficiency reduces the complex primary energy requirements and the CO<sub>2</sub> emissions compared to traditional solutions. It follows the improvement of the energy class of the building and therefore its value on the property market.

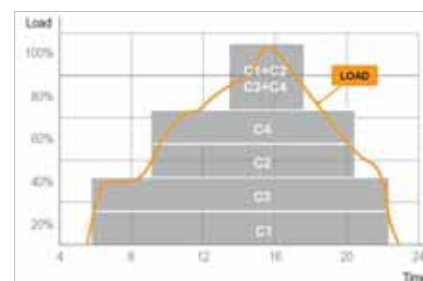
It is often possible to access the foreseen benefits to promote the use of the unit at low consumption.

The small consumptions also reduce the environmental impact of the system, further improving the public image on this sensitive issue.



### Part load efficiency determines the seasonal efficiency

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.



## Modular Scroll technology boosts performance at part load

Since the maximum capacity is requested only for short periods of time, it is fundamental to place the maximum efficiency in the partial load conditions. The unit uses high efficiency Scroll compressors. The advantages are:

- compressors manufactured in large ranges, with strict quality controls and maximum reliability thanks to the high production volumes
- the refrigerant circuit uses two compressors, almost always of different sizes in order to obtain more control steps. This way, only the necessary energy is supplied

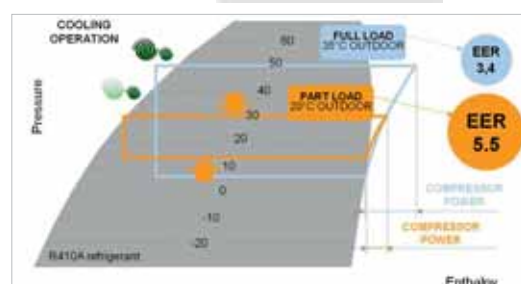
### THE SEQUENTIAL DEACTIVATION OF THE COMPRESSORS INCREASES EFFICIENCY



## 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.



Example referred to CSRN-XHE2 33.4 in the all recirculation operation, according to EN 14511



## Versatility of reversed blades rotor

This particular type of rotor offers a wider field of operation compared with a traditional forward curved blade fan. When necessary, this can supply high static pressures simply by varying the number of revolutions. The accurate balancing and the self-lubricating bearings ensure its rotating stability over time.



## Ventilation electronically controlled

An important expense entry in the systems management costs is represented by the energy consumption for ventilation, then the research for the correct operating conditions on the systems that forces them to carry out long and costly operations.

The ventilation technology makes it possible to cut back on both of these operational costs: it runs on fans that are coupled directly to electronic control brushless motors, and the control logic offers additional savings.

## The efficiency of the electronic controlled motor

The external rotor electric motor is driven by the continuous magnetic switching of the stator. The advantages are:

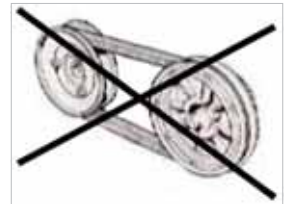
- The lack of brushes and the particular power supply increase efficiency by 70%;
- Even the life cycle increases, thanks to the elimination of the brushes' natural abrasive erosion effects;
- The electronic control allows a progressive start-up and also includes a "soft start" solution, which drastically reduces the starting current of the fan and limits even more the system's electrical commitment.



## Advantages of direct coupling (plug fan)

The motor's rotation is transmitted directly to the rotor, without the use of transmissions (belts and pulleys):

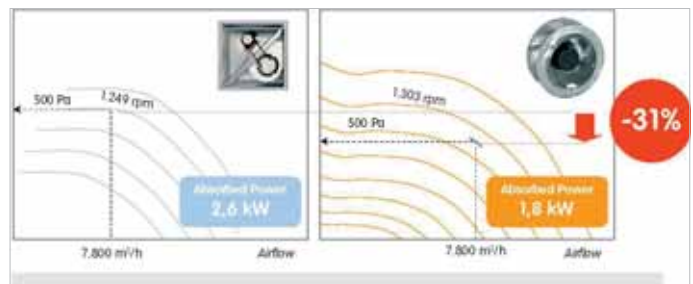
- the transmissions' inefficiencies are eliminated;
- the transmissions' wear and maintenance is eliminated.



## Efficiency of the ventilation system increases by 30%

The comprehensive ventilation system, made up of rotor and motor, is therefore very versatile and efficient.

Consumption is 30% lower than a ventilation system of the same capacity used by traditional units available on the market.



Electrical power absorbed by electric motor, data constructor - Example, referred to flow of 7.800 m³/h with 500 Pa external static pressure.

## Applications with textile channels

The fans with electronic control allow choosing the preferred ramp for fan start-up.

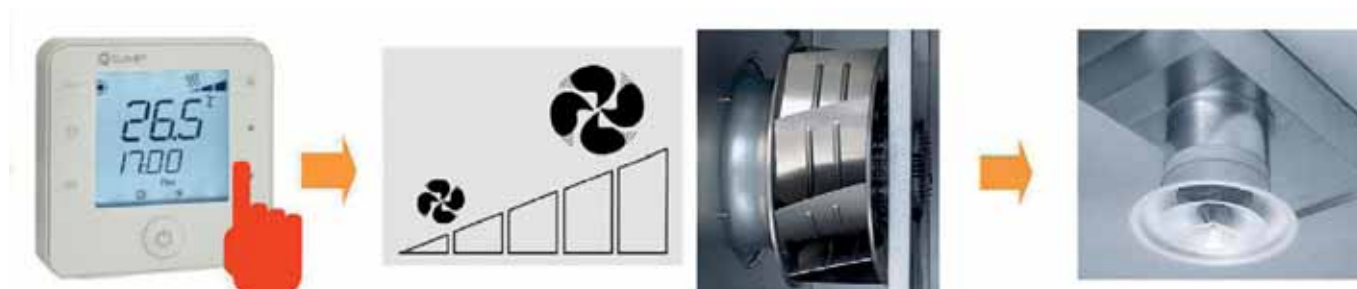
The units are therefore suitable for majority of the applications with textile channels for the air distribution.

This versatility remains valid in each management mode of the flow (standard, ECO, Variable flow).



## The right air flow for every type of system

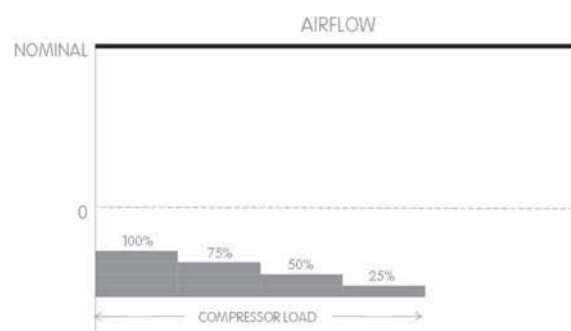
By controlling the fan speed, the airflow can be varied and the static pressure capacity can be adapted to the system pressure drop, making the unit start-up particularly simple. The adjustment or modification of the transmission is no longer required as the ventilation system will adapt itself to the system. The possibility to modify the fan start-up ramp makes this unit suitable for most applications with textile air distribution ducting.



## Automatic management of the air flow

### Standard mode

The air flow supply remains constant in all heat load conditions and operation modes.



### ECO mode

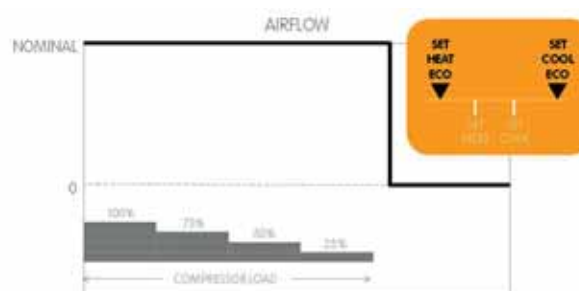
The air flow supply remains constant at varied heat loads and is shutdown when the load is fulfilled (dead zone).

To further increase the energy savings in this condition, it is also possible to set less demanding operation setpoints for the unit in respect to the standard mode.

This function is indicated for the thermal maintenance of the served area in case it is temporarily not used, which can for example occur at night.

The ECO mode can be activated:

- Manually
- Automatically by means of the Clivet supervision System



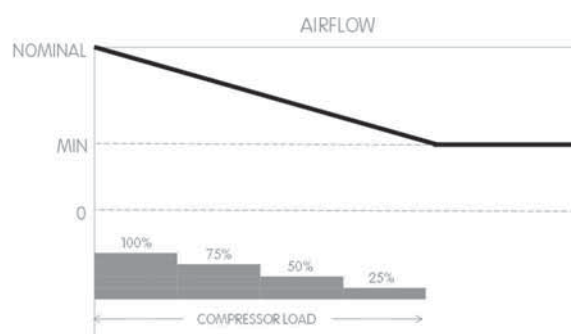
### Variable airflow

The air flow supply varies depending on the heat load, up to a minimum value compatible with the distribution system and the chosen air diffusion.

The ventilation remains active even when the load is fulfilled (dead zone).

This option allows a further energy savings

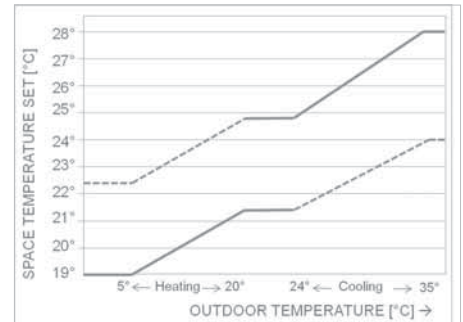
- The movement of the air is always active during the operation of the rooftop unit
- It determines an annual energy consumption comparable or even greater than the compressors.
- The reduction of 20% of the flow generates a saving of 50% on energy absorbed by the ventilators
- With a reduction of the flow equal to 40%, the saving for ventilation exceeds 70%
- The variable airflow can therefore lead to a saving of 30% on an overall electrical consumption of the unit



## Set-point automatic compensation

With this function as standard, the temperature set-point can automatically vary in view of the outdoor temperature and of the User settings:

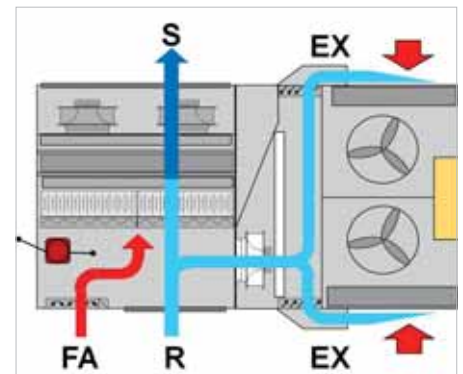
- Further increases the energy saving
- Reduces the temperature difference between the outside and the served area, increasing the user comfort.



## Ambient pressure control

The ambient pressure control device compares the return pressure with the external pressure and compensates any variations by acting on the outdoor air damper.

This way, the unit maintains the relevant ambient pressure desired by the user, who can choose between the overpressure, depression or equal-pressure.



The room pressure control device is fitted as standard in the units with extraction and exhaust (Clivet reference code CCK and CCKP)

## FREE-COOLING

As soon as the external conditions allow it, the unit is capable of automatically activating the FREE-COOLING mode, which, keeping the compressors off and drawing in suitably filtered outdoor air allows to cool the served room. This operating mode is especially useful in spring and autumn or in case of high ambient loads. It allows substantial reduction of the unit energy consumption and compressors.

To obtain the maximum energy saving, the FREE-COOLING model is activated even when it is not sufficient to supply all the capacity requested. In this case the integration cooling capacity is supplied from cooling by means of compressors.

At reduced load, or even with rigid outdoor air temperatures, the cooling capacity in FREE-COOLING mode is controlled by means of a modulation of the outdoor air damper.



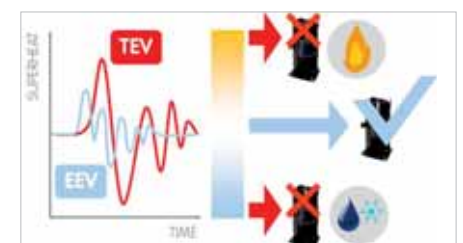
## Stable and reliable operation

The electronic expansion valve (EEV) adapts rapidly and precisely to the actual load required for usage, allowing stable and reliable adjustment in comparison with mechanical thermostatic valves (TEV). This results also in a further increase in efficiency and longer compressor life. Through control of overheating, it also prevents hazardous phenomena for the compressors, such as overtemperature and return of fluids, thereby further increasing efficiency and durability.

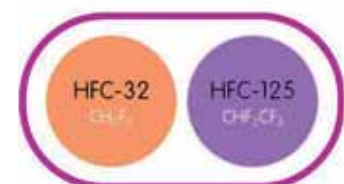
## High efficient refrigerant

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

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



### R-410A





## Energy recovery on the exhaust air

The air renewal in buildings is indispensable for checking the air quality and comfort. The movement and the treatment of the outdoor air generate added costs in the realisation of the system and energy consumption in its service life. For this reason the energy recovery devices on ejected air are widely used. Local standards and provisions regulate the application.

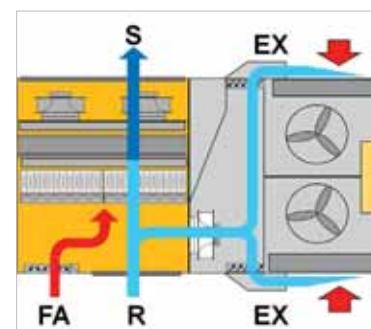
## Rooftop in CCK and CCKP configuration are equipped with the energy recovery on the exhaust air

### CCK - Thermodynamic energy recovery

Thermodynamic recovery is also included in the CCK configuration and uses the technology of refrigeration circuit with direct expansion.

The unit is equipped with an electronically controlled exhaust fan section that automatically controls the amount of air to reject.

The exhaust air flow is, in fact, directed onto the external finned coil exchanger which is accordingly thermally favoured in its operation cycle. The recovered energy is transferred by the handling exchanger and therefore transferred directly to the supply air.



### CCKP - THOR thermodynamic energy recovery (Thermodynamic Overboost Recovery)

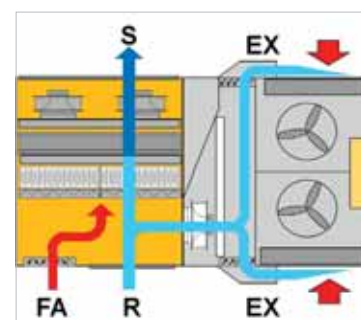
The innovative THOR recovery (Thermodynamic Overboost Recovery) is always included in the CCKP configuration and uses direct expansion refrigeration circuit technology.

The unit is equipped with an electronically controlled exhaust fan section that automatically adjusts the amount of air to reject. The exhaust air flow is directed by the exchanger dedicated to recovery, which is an integral part of the refrigeration circuit. The amount of recovered energy is easily measurable like the static heat recovery.

Winter and summer energy recovery provides a dual positive effect: it increases the capacity and offers a significant energy savings.

The main benefits of the energy recovery:

- it increases the total unit efficiency
- it eliminates the greater part of electrical power consumption for the ventilation of passive recovery devices, which also significantly reduce the effective amount of recovered energy
- in terms of heat pump operation, it reduces the formation of ice on the exchanger and therefore the number of defrost cycles. Thereby increasing operation continuity and overall system efficiency.
- it is also effective for cooling operations, especially in continental and temperate climates where passive recovery device output is essentially negligible due to a low outdoor and indoor temperature difference and enthalpy
- it keeps the unit compact and simplifies its positioning.



## Energy considerations

The physical principle of thermodynamic energy recovery differs from the principle that manages passive recuperators. Therefore, efficiency indicators differ as well:

- the performance of passive recovery devices, which are air-air heat exchangers, are measured by the heat exchange efficiency. These values must be combined with the performance of the refrigeration circuit to obtain the overall performance of the unit
- the performance of the heat pumps is measured with the coefficient of performance (COP). The contribution of the thermodynamic energy recovery is in this case already included in the overall performance of the unit that can thus be inserted in the calculations of the different procedures of energy certification, both compulsory and voluntary
- THOR energy recovery is based on the heat pump technology, making it possible to determine the recovered heating capacity on the dedicated exchanger, and therefore an efficiency value. It can accordingly be included in the calculations required by the various compulsory and voluntary energy certification procedures.

## Energy recovery from food refrigeration

Modern supermarkets and hypermarkets consume massive amounts of energy every year on food storage. With most of these systems, the heat that they produce is released outdoors through air-cooled condensers.

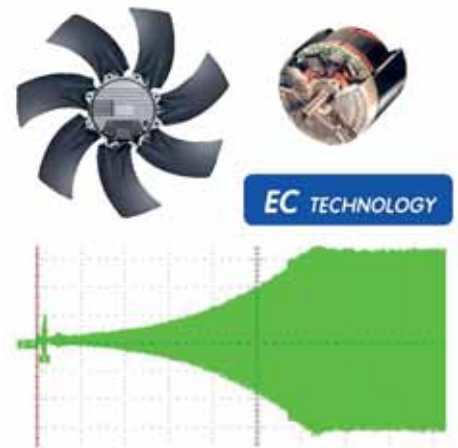
In winter, energy recovery from cold storage offers new possibilities for energy savings, as it increases the efficiency of the entire air conditioning and food storage system.

## Electronic control ECOBREEZE technology

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.

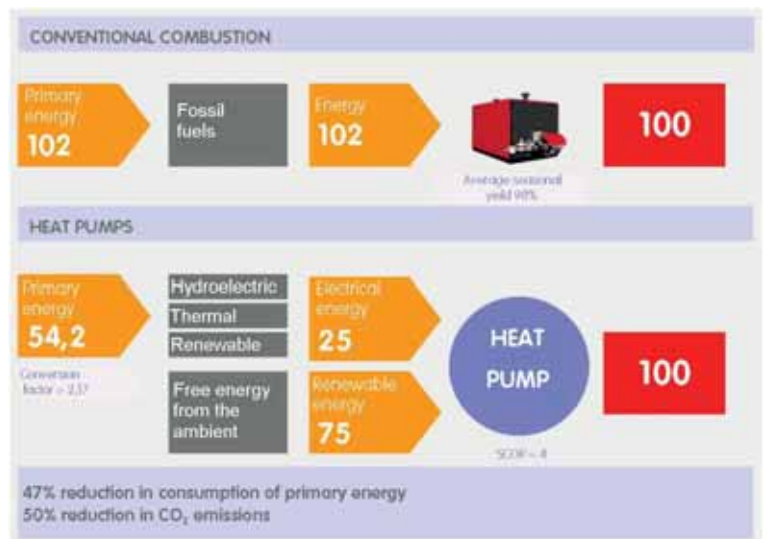


## Renewable energy heat pump technology

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

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

- Energy saving and reduction of the CO<sub>2</sub> emissions by an average of 50%
- Use of electric energy, increasingly produced through alternative and renewable sources
- Operation and reduced maintenance reliability
- No fossil combustion and therefore absence of chimney, absence of periodical controls on the emissions in the ambient and no local production of fine dust
- Cost reduction of first investment with the reversible models that use a single system for both heating and cooling.



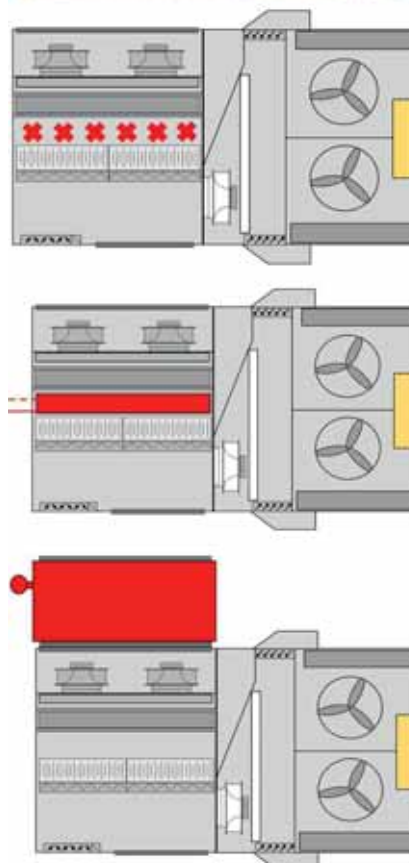
## High efficiency heating solutions

The reversible heat pump model is able to also operate with particularly rigid external temperatures. In many locations this condition is determined only for short periods during the effective use of the system. The use of the electric resistance (I) allows to maintain the advantages of the single block solution, in terms of design simplicity and system rational. The electric resistances can in fact intervene automatically like any thermal integration, or with the outdoor air pre-heating operation, before heating from the heat pump.

Alternately, the hot water coil (II) option extends the operating field of the unit to even colder climates. When necessary, it can also heat-up the external air before the treatment or integrate the capacity delivery from the heat pump. It can also fully substitute it in automatic mode, below an outside temperature value chosen by the user. For example, after having estimated the different supply costs of the energy sources in the individual application situations. In the event the heat pump is damaged, the hot water coil is automatically activated in emergency mode.

Another available solution is the heating module with combustion burner (III). It is the solution frequently used in very cold climates. As the hot water coil performs the task of heat integration needed in the operation range of the heat pump, it can automatically become the only heat source with an outdoor temperature below the value chosen by the user and is automatically activated in emergency mode. Unlike systems powered by a thermal power station it does not require the distribution of hot water outside of the building: this simplifies the system, eliminates pumping consumption and avoids the use of devices and controls against the risk of freezing.

In very cold climates it is also necessary to foresee the 'Application for low outdoor temperature' option. The operation fields of the different heating options are shown separately.



## Combustion heating modules

The following module type is available with different heating capacities:

- gas-operated condensation module with modulating control: extremely efficient solution that, thanks to the condensation and accurate control, always allows for top comfort levels. It is the best choice for the overall cost reduction throughout the lifespan of the system

## Criteria to determine the size of the combustion heat generator

The heating capacity that needs to be installed is determined based on the conditions the unit will work under, such as the outdoor air temperature, internal loads and energy losses of the building.

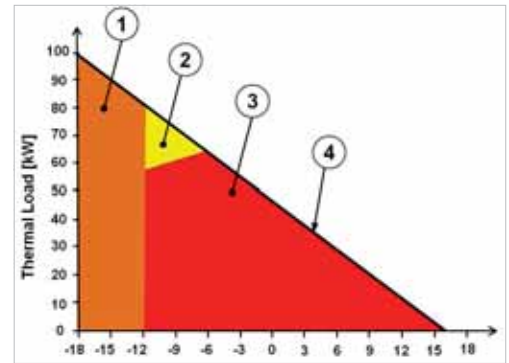
The size of the heat generator is based on one of the modes below:

- hybrid, as an integration for the heat pump to maintain the heating capacity supplied as the outdoor temperature drops.
- bivalent, to fully replace the heat pump when the outdoor temperature drops below the operating limits or the latter is not available.

In hybrid mode, the heating capacity required is met by the heat pump and the additional resource, whose capacity may be smaller than the capacity provided by the heat pump.

In bivalent mode, as well as serving as an additional resource, the thermal resource must fully replace the heat pump. Therefore, the chosen heating capacity must be higher or identical to the one provided by the heat pump.

The unit control manages the operation of the thermal resource by giving priority to the heat pump, which also carries out the exhaust air thermodynamic recovery whenever required (configuration with exhaust air energy recovery).



The load that needs to be met increases as the outdoor temperature drops.

Ex: CSRN-XHE2 25.4 CAK configuration.

Condensing gas module with modulating control 65kW (Hybrid function)

Condensing gas module with modulating control 100kW (bivalent function)

1. Bivalent function
2. Hybrid function
3. Heat pump
4. Thermal load line

## Winter thermodynamic energy recovery for unit with hot water coil or gas module

The refrigerating circuit of this unit is of reversible type. Carries out the thermodynamic energy recovery, automatically activating only one compressor that, thanks to the high exchange surface available, operates with highly efficient energy. In respect to the passive recuperators:

- Delivers a notably superior thermal and stable capacity in time. This reduces the capacity requested from the hot water coil or gas module
- Eliminates most of the consumption for ventilation caused by the high pressure drops of the passive exchangers. Therefore, further increases the overall efficiency.

## Operating completely automatic

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

It also includes advanced functions, such as daily and weekly programming.

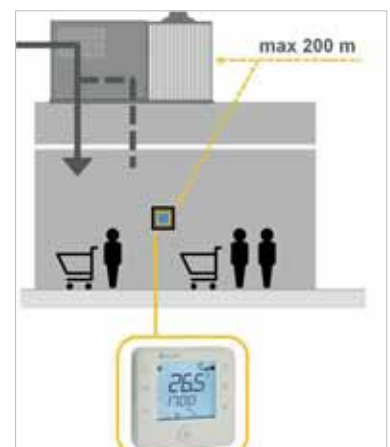


## Simple and intuitive user interface

An innovative graphic interface prepared for wall-installation (with 230V power supply and wiring at the customer's care) is supplied as standard, with the option to be removed from the support and connected on-board for maintenance operations.

Among the main functions it allows to:

- the temperature and humidity measurement is made by probes into the unit;
- daily/weekly start-up or power-off programming of the unit;
- operating mode (heat or cool) and/or set-point manual change ;
- alarm and unit status display;
- operating parameter management



## Remote system management

The unit can be remotely managed by:

- Remote control user interface, supplied standard
- Clivet Master System, device to manage a group made of max 8 units
- Clivet P-Matic, supervision system able to be interfaced to other users
- Potential-free contacts supplied as standard, to remotely control the main functions and to display alarms and operating data
- Different communication protocols to exchange information with the main supervision systems by serial line.



## Heat exchangers protected against the formation of ice

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

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



## Smart management of defrosts

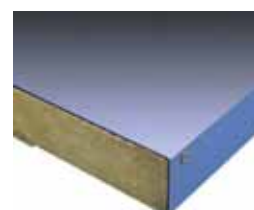
The automatic defrost cycles on the remaining external exchanger surface are managed in predictive mode, reducing both the frequency and the duration. The built-in electronics analyses not only the external conditions, but also the evaporation pressure variation in the exchanger.



## Composite panels with sandwich structure

The "sandwich" type panelling is lighter and sturdy. They reduce the thermal dispersions and therefore the energetic consumptions.

They are composed of a double steel wall that contains the insulating material, made of injected polyurethane. They are equipped with seal gasket for the whole length of the perimeter.



## Easy access for maintenance

The internal components are positioned based on type, in an homogeneous area with easy and safe access, thanks to the hinges that support the larger sized doors to their adjustable hinges and to the device that blocks the access panel to the electrical control board in open position and helps protect the maintenance operator from the rain.





## Clivet rooftop are Eurovent certified products

Clivet is associated to the Eurovent Certification Programme, a recognized European authority that tests and certifies the performance of the air-conditioning systems.

An additional guarantee for the Customer, the Eurovent tests in fact confirm the product performance and allow for a thorough analysis of the management costs: "Total Life Cycle Cost".

Eurovent tests are made in certified test Laboratories and follow the European Standards for each type of product. For the rooftop performance are applied the following regulations:

EN 14511: "Air conditioners, liquid chilling packages and heat pumps with electrically driven compressors for space heating and cooling".

EN 12102: "Air conditioners, liquid chilling packages, heat pumps and dehumidifiers with electrically driven compressors for space heating and cooling - Measurement of airborne noise - Determination of the sound power level".



<http://www.eurovent-certification.com/>

### Eurovent performance (EN 14511-2018)

| Size                             | 15.2  | 18.2  | 20.4  | 25.4  | 30.4  |
|----------------------------------|-------|-------|-------|-------|-------|
| Total cooling capacity [kW]      | 44,66 | 52,8  | 68,33 | 77,11 | 85,11 |
| Total power input [kW]           | 14,9  | 18,7  | 24,27 | 27,48 | 30    |
| EER                              | 3,00  | 2,83  | 2,82  | 2,81  | 2,84  |
| Energy class                     | A     | B     | B     | B     | B     |
| Total heating capacity [kW]      | 43,8  | 56,13 | 66,06 | 79,95 | 86,7  |
| Total power input [kW]           | 12,32 | 15,79 | 21,18 | 23,89 | 27,36 |
| COP                              | 3,56  | 3,55  | 3,12  | 3,35  | 3,17  |
| Energy class                     | A     | A     | C     | B     | C     |
| Sound power envelope [dB(A)]     | 84    | 86    | 87    | 88    | 89    |
| Sound power duct [dB(A)]         | 78    | 82    | 79    | 81    | 84    |
| Airflow rate [m <sup>3</sup> /h] | 9000  | 11500 | 13500 | 15000 | 17000 |
| Test static pressure             | 200   | 200   | 200   | 250   | 250   |

Notes: Performance referred to the following conditions:

- Cooling: internal temperature 27°C D.B./19°C W.B., outdoor temperature 35°C.

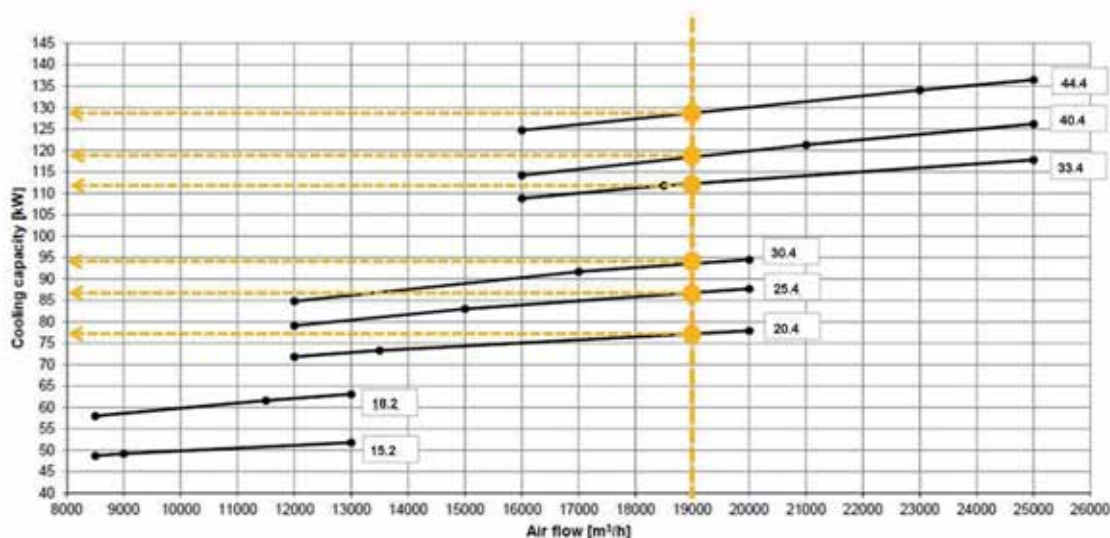
- Heating: internal temperature 20°C, outdoor temperature 7°C D.B./6°C W.B.

## How choosing the unit

The selection of the most appropriate size for an installation can be performed starting from the supply airflow value, established this value it is possible to choose among different available thermo-refrigerant treatments.

It is well-known that buildings built with modern technologies, that improve efficiency, have different needs than the previous buildings. In this case, the designer has to design systems with different potentialities.

Example: with airflow at 19000 m<sup>3</sup>/h, 6 possible cooling capacities are highlighted to do a different treatment, allowing to the designer to have a wide choice.



With same airflow is available a different thermo-refrigerant treatment depending on the selected size.

## Unit configuration

|                  |             |            |           |           |              |             |             |              |
|------------------|-------------|------------|-----------|-----------|--------------|-------------|-------------|--------------|
| <u>CSRN-XHE2</u> | <u>30.4</u> | <u>CBK</u> | <u>M0</u> | <u>R3</u> | <u>SERMD</u> | <u>CHW2</u> | <u>PCOS</u> | <u>CREFO</u> |
|                  |             | (1)        | (2)       | (3)       | (4)          | (5)         | (6)         | (7)          |

### 1. Configuration

CAK configuration: single fan section for full recirculation

CBK configuration: single fan section for recirculation and fresh air

CCK double fan section for recirculation, fresh air, exhaust, thermodynamic recovery

CCKP double fan section with fresh air and THOR thermodynamic recovery

### 2. Air supply

M0 Horizontal supply

M3 Downflow supply

M5 Upflow supply

ML Lateral supply

### 3. Air return

R0 Horizontal return

R3 Downflow return

### 4. Outdoor air damper

- Standard

SERM - Outdoor air on/off motorized damper

SERMD - Modulating motorized fresh air shutter

### 5. Auxiliary heating

- Standard

EH - Electric elements

CHW2 - 2row hot water coil

GC - Gas heating module

CHWER - Energy recovery from the food refrigeration

### 6. Airflow

- Standard

PCOSM - Supply constant airflow

PVAR - Variable airflow

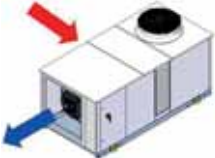
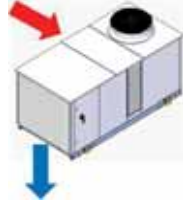
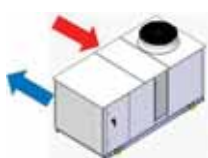
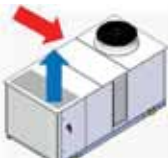
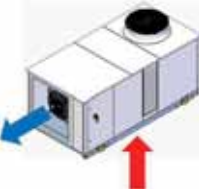
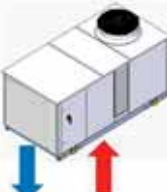
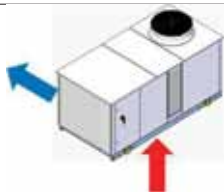
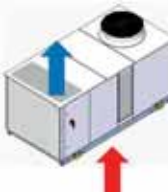
### 7. External section fan

CREFO - Device to reduce the consumption levels of on/off fans on the external section

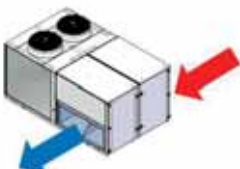
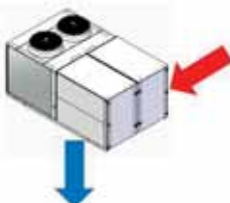
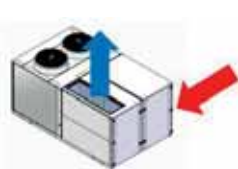
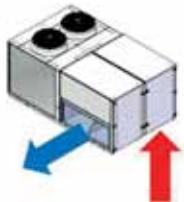
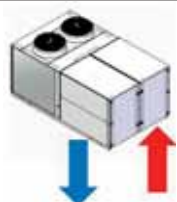
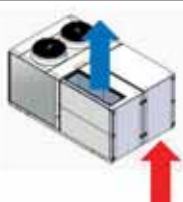
CREFB - ECOBREEZE external section fans consumption reduction device

## Supply and return configurations

### Air supply and return - Size 15.2 - 18.2

| Functionalities       |                                                                                   |                                                                                   |                                                                                    |                                                                                     |
|-----------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Air supply and return | <b>M0 - R0</b>                                                                    | <b>M3 - R0</b>                                                                    | <b>ML - R0</b>                                                                     | <b>M5 - R0</b>                                                                      |
|                       | Standard unit                                                                     | Option                                                                            | Option                                                                             | Option                                                                              |
|                       |  |  |  |  |
|                       | <b>M0 - R3</b>                                                                    | <b>M3 - R3</b>                                                                    | <b>ML-R3</b>                                                                       | <b>M5 - R3</b>                                                                      |
|                       | Option                                                                            | Option                                                                            | Option                                                                             | Option                                                                              |
|                       |  |  |  |  |

### Air supply and return - Size 20.4 - 44.4

| Functionalities          |                                                                                     |                                                                                      |                                                                                       |
|--------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Air supply and return    | <b>M0 - R0</b>                                                                      | <b>M3 - R0</b>                                                                       | <b>M5 - R0</b>                                                                        |
|                          | Standard unit                                                                       | Option                                                                               | Option                                                                                |
|                          |  |  |  |
|                          | <b>M0 - R3</b>                                                                      | <b>M3 - R3</b>                                                                       | <b>M5-R3</b>                                                                          |
|                          | Option                                                                              | Option                                                                               | Option                                                                                |
|                          |  |   |  |
| <b>Filtration</b>        | <b>G4</b>                                                                           | <b>G4+F7</b>                                                                         | <b>G4+FES H10</b>                                                                     |
| <b>Auxiliary heating</b> | Heat pump standard unit and electric heaters                                        | Heat pump and hot water coil or energy recovery from the food refrigeration option   | Gas heating module                                                                    |

### Accessories separately supplied

|                                    |                                           |                        |
|------------------------------------|-------------------------------------------|------------------------|
| <b>CLMX</b> - Clivet Master System | <b>AMRX</b> - Rubber antivibration mounts | <b>RCX</b> - Roof curb |
|------------------------------------|-------------------------------------------|------------------------|

# Standard unit technical features - Configuration with single fan section for full recirculation (CAK) and for recirculation and fresh air (CBK)

## Compressor

Hermetic orbiting scroll compressor complete with motor over-temperature and over-current devices and protection against excessive gas discharge temperature. Fitted on rubber antivibration mounts and complete with oil charge. The oil heater is automatically activated to prevent the oil from being diluted by the refrigerant when the compressor stops. The compressors are connected in TANDEM on a single refrigeration circuit and have a biphasic oil equalisation.

## Structure

The support base is assembled with a painted galvanized steel frame. The internal structure is made of zinc - magnesium bent galvanized steel. The alloy Zn - Mg allows an excellent corrosion proofing thanks to the galvanic protection typical of the combination zinc - magnesium.

## Panelling

Sandwich panels in the air treatment section with dual walls in steel sheet metal with polyurethane insulation (40 kg/m<sup>3</sup>), thickness of outer sheet metal 6/10 mm galvanized and painted using polyester powders colour RAL 9001, polyurethane thickness 30 mm with thermal conductivity coefficient 0.022W/mK, thickness of internal sheet metal 5/10 mm hot galvanized. The access door panels for the routine maintenance are provided with a PVC profile for thermal insulation and a EPDM rubber gasket that ensures the hermetic seal.

All panelling can easily be removed to allow complete accessibility to internal components.

## Internal exchanger

Direct expansion finned coil exchanger made with copper pipes placed on staggered rows mechanically expanded to better adhere to the fin collar. The fins are made from aluminium with a corrugated surface and adequately distanced to ensure the maximum heat exchange efficiency.

## External exchanger

Direct expansion finned coil exchanger made with copper pipes placed on staggered rows mechanically expanded to better adhere to the fin collar. The fins are made from aluminium with a corrugated surface and adequately distanced to ensure the maximum heat exchange efficiency.

A correct power supply to the expansion valve is ensured by the subcooling circuit; this circuit also prevents the formation of ice at the base of the heat exchanger during winter operation.

## Fan

### Internal section

Plug fans without scroll with reverse blades driven by electronically-controlled "brushless" dc motors with direct coupling. No transmission sizing is needed. The motor is in compliance with ErP 2015 according to Regulation UE 640/2009. Class IE4.

### External section

Helical fans with die-cast aluminium blades, directly coupled to a three-phase electric motor with external rotor, with built-in thermal overload protection, IP 54 index of protection. Housed inside an aerodynamically shaped nozzles to increase efficiency and minimise noise levels; fitted with safety grills. The motor is in compliance with ErP 2015 according to Regulation UE 640/2009.

## Refrigeration circuit

Refrigeration circuit with:

- refrigerant charge
- liquid flow and moisture indicator
- safety high pressure switch
- filter dryer
- electronic expansion valve
- non-return valve
- 4-way reverse cycle valve
- liquid receiver
- liquid separator
- high pressure safety valve
- low pressure safety valve

## Filtration

Outdoor air inlet side and environment return side

Pleated filter for greater filtering surface, made of a galvanized sheet frame with a galvanized and electric-welded protective mesh, and regenerable filtering media made from polyester fibre sized with synthetic resins. G4 efficiency according to CEN-EN 779 standard (Eurovent classification EU4/5 - separation average 90.1% ASHRAE 52-76 Atm). Self-extinguishing type (flame resistant class 1 - DIN 53438).

## Drain pan

### Internal section

Inox steel AISI 304 condensate collection tray with anti-condensate insulation, welded, fitted with sleeve for the drain pipe.

## Electrical panel

The electrical panel is situated inside the units and is accessed through a hinged door that is opened by a special key.

The capacity section includes:

- main door lock isolator switch
- compressor circuit breaker
- compressor power supply remote control switch
- fan motor thermal protections of internal and external section
- circuit breaker to protect auxiliary circuit

The microprocessor control section includes:

- compressor overload protection and timer
- potential-free contacts for remote ON-OFF, cumulative alarm, fire alarm inlet, fan status, compressor status, summer/winter mode

Remote control with user interface:

- intuitive graphical interface retro lighted
- daily/weekly start-up or power-off programming of the unit
- modification of the temperature and humidity set point
- unit On/Off and overload reset
- heating/cooling operating mode manual change
- display of operating state
- display of alarms and failure code
- display and modification of the operating parameters

## Accessories

- Downward air supply
- Downward air return
- Upflow air supply
- Sideward air supply (size 15.2 - 18.2)
- Two-rows hot water coil
- Energy recovery from the food refrigeration
- Modulating 3-way valve
- Modulating 2-way valve
- Modulating 3-way valve for energy recovery from food refrigeration
- Electric heaters
- Hot gas re-heating coil
- Gas heating module
- Immersed electrode humidifier
- Water to waste evaporating wet-deck humidifier
- Ambient humidity temperature control with built-in probes
- Ambient humidity temperature control with remote thermostat
- Air quality probe for CO<sub>2</sub> rate check
- Air quality sensor for CO<sub>2</sub> and VOC rate check
- Outdoor air motorized ON/OFF damper (only for CBK configuration)
- Modulating motorized outdoor air damper (only for CBK configuration)
- Enthalpy FREE-COOLING (only for CCK and CCKP configuration)
- High static pressure fans
- High efficiency F7 air filter
- High efficiency H10 electronic filters
- Differential pressure switch for dirty air filters
- Serial communication module to Modbus supervisor
- Serial communication module to LonWorks supervisor
- Serial communication module for BACnet-IP supervisor
- Phase monitor
- Power factor correction capacitors (cosφ > 0.9)
- Constant supply airflow
- Variable airflow
- Device for consumption reduction of the external section ECOBREEZE fans
- High and low pressure gauges
- Smoke detector
- Demand Limit
- Application for low outdoor temperature
- Rubber antivibration mounts (accessory separately supplied)
- Rubber antivibration mounts for unit and gas module. (accessory separately supplied)
- Clivet Master System (accessory separately supplied)
- Sandwich panels of the handling zone in M0 fire reaction class
- Set up for shipping via container
- Roof curb (accessory separately supplied)

All the handling coils can be covered with aluminium - Fin Guard - copper/copper

## Test

Unit manufactured to ISO 9001 standard and commissioned upon production completion.



## Configuration with double fan section for recirculation, fresh air, exhaust, thermodynamic recovery (CCK)

Technical features as the configuration with single fan section for full recirculation (CAK) and single fan section for recirculation and fresh air (CBK) and moreover:

- **Modulating motorized outdoor air damper for renewal and e FREE-COOLING**

- **Exhaust fan**

Plug fans without scroll with reverse blades driven by electronically-controlled "brushless" DC motors with direct coupling. No drive sizing is required.

- **Thermodynamic recovery on the exhaust air**

The energy content of the exhaust air is recovered by the external exchanger, through a dedicated fan section. The favourable air temperature on the source side increases unit capacity.

## Configuration with double fan section for recirculation, fresh air, exhaust, THOR thermodynamic recovery (CCKP)

Technical features like the configuration with recirculation, renewal, exhaust air and thermodynamic recovery (CCK) and also:

- **Modulating motorized outdoor air damper for renewal and e FREE-COOLING**

- **Exchanger for thermodynamic recovery - THOR**

The energy content of the exhaust air is recovered by a dedicated exchanger, as integral part of the refrigeration circuit. It is a direct expansion finned coil exchanger made with copper pipes placed on staggered rows mechanically expanded to better adhere to the fin collar. The fins are made from aluminium with a corrugated surface and adequately distanced to ensure the maximum heat exchange efficiency.

## STANDARD AIRFLOW

## General technical data

| Size                               |      |    |      | 15.2   | 18.2   | 20.4   | 25.4   | 30.4   | 33.4   | 40.4   | 44.4   |
|------------------------------------|------|----|------|--------|--------|--------|--------|--------|--------|--------|--------|
| Cooling                            |      |    |      |        |        |        |        |        |        |        |        |
| Cooling capacity                   | CAK  | 1  | kW   | 46,6   | 54,5   | 69,8   | 79,8   | 88,2   | 105,1  | 122,2  | 130,2  |
| Sensible capacity                  |      | 1  | kW   | 36,6   | 42,4   | 52,8   | 59,9   | 67,2   | 78,6   | 89,6   | 94,2   |
| Compressor power input             |      | 1  | kW   | 12,9   | 16,4   | 20,2   | 22,6   | 25,5   | 28,0   | 34,8   | 38,6   |
| EER                                |      | 1  |      | 3,61   | 3,32   | 3,46   | 3,53   | 3,46   | 3,75   | 3,51   | 3,37   |
| SEER                               |      | 11 |      | 3,98   | 3,75   | 3,56   | 3,65   | 3,61   | 3,99   | 4,25   | 3,77   |
| ηsc                                |      | 11 | %    | 156,1  | 146,8  | 139,2  | 143,2  | 141,4  | 156,8  | 166,9  | 147,7  |
| Cooling capacity                   | CBK  | 2  | kW   | 50,3   | 59,8   | 75,4   | 86,6   | 94,3   | 109,3  | 126,7  | 134,8  |
| Sensible capacity                  |      | 2  | kW   | 39,2   | 46,7   | 57,5   | 64,4   | 70,7   | 81,5   | 91,8   | 97,1   |
| Compressor power input             |      | 2  | kW   | 12,9   | 16,7   | 20,3   | 22,2   | 25,4   | 28,3   | 35,3   | 39,1   |
| EER                                |      | 2  |      | 3,90   | 3,58   | 3,71   | 3,90   | 3,71   | 3,86   | 3,59   | 3,45   |
| Cooling capacity                   | CCK  | 3  | kW   | 51,3   | 61,5   | 76,7   | 88,0   | 95,9   | 111,0  | 129,2  | 137,3  |
| Sensible capacity                  |      | 3  | kW   | 39,7   | 47,5   | 58,2   | 65,2   | 71,7   | 82,3   | 92,9   | 98,5   |
| Compressor power input             |      | 3  | kW   | 12,5   | 16,1   | 19,9   | 21,6   | 24,8   | 27,5   | 34,2   | 37,8   |
| EER                                |      | 3  |      | 4,10   | 3,82   | 3,85   | 4,07   | 3,87   | 4,04   | 3,78   | 3,63   |
| Cooling capacity                   | CCKP | 3  | kW   | 55,0   | 65,7   | 82,6   | 94,7   | 103,0  | 118,6  | 137,5  | 146,2  |
| Sensible capacity                  |      | 3  | kW   | 42,7   | 51,0   | 63,2   | 70,6   | 72,8   | 87,8   | 99,0   | 104,6  |
| Compressor power input             |      | 3  | kW   | 12,7   | 16,5   | 20,1   | 21,8   | 25,1   | 28,0   | 35,0   | 38,7   |
| EER                                |      | 3  |      | 4,33   | 3,98   | 4,11   | 4,34   | 4,10   | 4,24   | 3,93   | 3,78   |
| Heating                            |      |    |      |        |        |        |        |        |        |        |        |
| Heating capacity                   | CAK  | 1  | kW   | 43,8   | 55,8   | 66,0   | 79,9   | 86,1   | 108,4  | 133,3  | 141,1  |
| Compressor power input             |      | 1  | kW   | 10,0   | 13,0   | 16,6   | 19,0   | 22,2   | 24,8   | 30,5   | 34,6   |
| COP                                |      | 1  |      | 4,38   | 4,29   | 3,98   | 4,21   | 3,88   | 4,37   | 4,37   | 4,08   |
| SCOP                               |      | 11 |      | 3,20   | 3,43   | 3,26   | 3,49   | 3,32   | 3,50   | 3,81   | 3,64   |
| ηsh                                |      | 11 | %    | 125    | 134    | 127    | 137    | 130    | 137    | 149    | 143    |
| Heating capacity                   | CBK  | 2  | kW   | 44,2   | 56,6   | 67,0   | 80,8   | 87,2   | 110,0  | 135,4  | 143,6  |
| Compressor power input             |      | 2  | kW   | 9,23   | 11,8   | 15,0   | 17,4   | 20,3   | 22,7   | 28,0   | 31,9   |
| COP                                |      | 2  |      | 4,79   | 4,80   | 4,47   | 4,64   | 4,30   | 4,85   | 4,84   | 4,50   |
| Heating capacity                   | CCK  | 3  | kW   | 45,6   | 58,8   | 68,6   | 82,8   | 89,5   | 113,2  | 139,8  | 148,4  |
| Compressor power input             |      | 3  | kW   | 9,34   | 12,0   | 15,2   | 17,6   | 20,5   | 23,0   | 28,5   | 32,6   |
| COP                                |      | 3  |      | 4,88   | 4,90   | 4,51   | 4,70   | 4,37   | 4,92   | 4,91   | 4,55   |
| Heating capacity                   | CCKP | 3  | kW   | 49,8   | 63,4   | 74,4   | 90,4   | 98,3   | 118,0  | 145,3  | 154,0  |
| ompressor power input              |      | 3  | kW   | 9,35   | 11,9   | 15,2   | 17,5   | 20,4   | 23,4   | 28,9   | 32,9   |
| COP                                |      | 3  | kW   | 5,33   | 5,33   | 4,89   | 5,17   | 4,82   | 5,04   | 5,03   | 4,68   |
| THOR recovery efficiency           |      | 4  | %    | 83     | 81     | 84     | 83     | 81     | 85     | 82     | 81     |
| Compressor                         |      |    |      |        |        |        |        |        |        |        |        |
| Type of compressors                |      | 5  |      | Scroll | Scroll | Scroll | Scroll | Scroll | Scroll | Scroll | Scroll |
| No. of compressors                 |      |    | Nr   | 2      | 2      | 4      | 4      | 4      | 4      | 4      | 4      |
| Std Capacity control steps         |      |    | Nr   | 2      | 3      | 4      | 4      | 4      | 4      | 4      | 4      |
| Refrigerant charge (C1)            | CAK  | 6  | kg   | 13.0   | 17.5   | 8.5    | 13.0   | 15.0   | 18.0   | 21.5   | 22.5   |
| Refrigerant charge (C2)            |      | 6  | kg   | -      | -      | 8.5    | 15.0   | 15.0   | 21.5   | 21.5   | 22.5   |
| Refrigerant charge (C1)            | CBK  | 6  | kg   | 13.0   | 17.5   | 8.5    | 13.0   | 15.0   | 18.0   | 21.5   | 22.5   |
| Refrigerant charge (C2)            |      | 6  | kg   | -      | -      | 8.5    | 15.0   | 15.0   | 21.5   | 21.5   | 22.5   |
| Refrigerant charge (C1)            | CCK  | 6  | kg   | 13.0   | 17.5   | 8.5    | 13.0   | 15.0   | 18.0   | 21.5   | 22.5   |
| Refrigerant charge (C2)            |      | 6  | kg   | -      | -      | 8.5    | 15.0   | 15.0   | 21.5   | 21.5   | 22.5   |
| Refrigerant charge (C1)            | CCKP | 6  | kg   | 17.0   | 22.0   | 15.0   | 17.0   | 20.0   | 24.5   | 26.5   | 29.0   |
| Refrigerant charge (C2)            |      | 6  | kg   | -      | -      | 15.0   | 19.0   | 20.0   | 29.5   | 26.5   | 29.0   |
| Refrigeration circuits             |      |    | Nr   | 1      | 1      | 2      | 2      | 2      | 2      | 2      | 2      |
| Air Handling Section Fans (Supply) |      |    |      |        |        |        |        |        |        |        |        |
| Type of supply fan                 |      | 7  |      | RAD    | RAD    | RAD    | RAD    | RAD    | RAD    | RAD    | RAD    |
| No. of supply fans                 |      |    | Nr   | 1      | 1      | 2      | 2      | 2      | 2      | 2      | 2      |
| Fan diameter                       |      |    | mm   | 630    | 630    | 560    | 560    | 560    | 630    | 630    | 630    |
| Supply airflow                     |      |    | m³/h | 2500   | 3194   | 3750   | 4167   | 4722   | 5139   | 5833   | 6389   |

| Size                                                             |  |    |      | 15.2     | 18.2     | 20.4     | 25.4     | 30.4     | 33.4     | 40.4     | 44.4     |
|------------------------------------------------------------------|--|----|------|----------|----------|----------|----------|----------|----------|----------|----------|
| Supply airflow                                                   |  |    | l/s  | 9000     | 11500    | 13500    | 15000    | 17000    | 18500    | 21000    | 23000    |
| Installed unit power                                             |  |    | kW   | 2.75     | 2.75     | 2.90     | 2.90     | 2.90     | 2.75     | 2.75     | 2.75     |
| Max. static pressure supply fan                                  |  | 8  | Pa   | 510      | 390      | 510      | 510      | 510      | 510      | 440      | 380      |
| <b>High static pressure air handling section fans (OPTIONAL)</b> |  |    |      |          |          |          |          |          |          |          |          |
| Type of supply fan                                               |  |    |      | RAD      | RAD      | RAD      | RAD      | RAD      | RAD      | RAD      | RAD      |
| Number of supply fans                                            |  |    | Nr   | 1        | 1        | 2        | 2        | 2        | 2        | 2        | 2        |
| Fan diameter                                                     |  |    | mm   | 500      | 500      | 500      | 500      | 500      | 500      | 500      | 500      |
| Supply airflow                                                   |  |    | l/s  | 2500     | 3194     | 3750     | 4167     | 4722     | 5139     | 5833     | 6389     |
| Supply airflow                                                   |  |    | m³/h | 9000     | 11500    | 13500    | 15000    | 17000    | 18500    | 21000    | 23000    |
| Installed unit power                                             |  |    | kW   | 5.5      | 5.5      | 5.5      | 5.5      | 5.5      | 5.5      | 5.5      | 5.5      |
| Max. static pressure supply fan                                  |  |    | Pa   | 1020     | 825      | 1020     | 1020     | 1020     | 1020     | 1000     | 830      |
| <b>Fans (Exhaust) (only CCK, CCKP-THOR configuration)</b>        |  |    |      |          |          |          |          |          |          |          |          |
| Type of fans                                                     |  | 7  |      | RAD      | RAD      | RAD      | RAD      | RAD      | RAD      | RAD      | RAD      |
| No. of fans                                                      |  | 9  |      | 1        | 1        | 2        | 2        | 2        | 2        | 2        | 2        |
| Installed unit power                                             |  | 9  | kW   | 2,7      | 2,7      | 1,3      | 1,3      | 1,3      | 2,7      | 2,7      | 2,7      |
| <b>External Section Fans</b>                                     |  |    |      |          |          |          |          |          |          |          |          |
| Type of fans                                                     |  | 10 |      | AX       | AX       | AX       | AX       | AX       | AX       | AX       | AX       |
| No. of fans                                                      |  |    | Nr   | 1        | 1        | 2        | 2        | 2        | 2        | 2        | 2        |
| Fan diameter                                                     |  |    | mm   | 800      | 800      | 800      | 800      | 800      | 800      | 800      | 800      |
| Standard airflow                                                 |  |    | l/s  | 5835     | 5835     | 11670    | 11670    | 11670    | 11670    | 11670    | 11670    |
| Single power input                                               |  |    | kW   | 1.50     | 1.50     | 1.50     | 1.50     | 1.50     | 1.50     | 1.50     | 1.50     |
| <b>Connections</b>                                               |  |    |      |          |          |          |          |          |          |          |          |
| Condensate drain                                                 |  |    | mm   | 20       | 20       | 20       | 20       | 20       | 20       | 20       | 20       |
| <b>Power supply</b>                                              |  |    |      |          |          |          |          |          |          |          |          |
| Standard power supply                                            |  |    | V    | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 |

Contains fluorinated greenhouse gases (GWP 2087,5)

Performances in cooling: Indoor air temp. 27°C/19°C W.B. Entering external exchanger air temperature 35°C D.B./24°C W.B. EER referred only to compressors

Performance in Heating: Indoor air temp. 20°C D.B./12°C W.B. entering air to the external exchanger 7°C/6°C W.B. COP referred only to compressors

1. Performance refers to operation at full re-circulation
2. Performance with 30% of outdoor air
3. Performance with 30% of outdoor air including the energy recovery on the exhaust air
4. Energy recovery efficiency determined on the exhaust air. Indoor temperature 20°C D.B./12°C W.B., outdoor temperature 7°C D.B./6°C W.B.

5. SCROLL = scroll compressor
6. Indicative values for standard units with possible +/-10% variation. The actual data are indicated on the label of the unit
7. RAD = radial fan electronically controlled
8. Net outside static pressure to win the outlet and intake onboard pressure drops
9. Configuration with double fan section for recirculation, fresh air, exhaust, thermodynamic recovery (CCK) and configuration with double fan section with fresh air and THOR thermodynamic recovery (CCKP)
10. AX = axial fan
11. Data calculated in accordance with EN 14825:2018

## Sound levels

| Size | Sound power level (dB) |     |     |     |      |      |      |      | Sound power level | Sound pressure level |
|------|------------------------|-----|-----|-----|------|------|------|------|-------------------|----------------------|
|      | Octave band (Hz)       |     |     |     |      |      |      |      |                   |                      |
|      | 63                     | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | dB(A)             | dB(A)                |
| 15.2 | 85                     | 86  | 84  | 79  | 78   | 72   | 69   | 63   | 83                | 64                   |
| 18.2 | 86                     | 83  | 85  | 81  | 80   | 75   | 70   | 64   | 84                | 66                   |
| 20.4 | 90                     | 88  | 89  | 82  | 80   | 78   | 71   | 66   | 86                | 67                   |
| 25.4 | 91                     | 89  | 89  | 83  | 81   | 78   | 73   | 69   | 87                | 68                   |
| 30.4 | 90                     | 89  | 89  | 85  | 83   | 80   | 74   | 69   | 88                | 69                   |
| 33.4 | 92                     | 89  | 90  | 86  | 84   | 82   | 74   | 71   | 89                | 70                   |
| 40.4 | 93                     | 90  | 91  | 86  | 84   | 82   | 75   | 72   | 90                | 71                   |
| 44.4 | 94                     | 91  | 92  | 88  | 85   | 82   | 77   | 73   | 91                | 72                   |

The sound levels are referred to unit operating at full load in nominal conditions. The sound pressure level is referred at a distance of 1 m. from the ducted unit surface operating in free field conditions. External static pressure 50 Pa. (standard UNI EN ISO 9614-2)

Please note that when the unit is installed in conditions different from nominal test conditions (e.g. near walls or obstacles in general), the sound levels may undergo substantial variations.

## Electrical data

**Configuration: with direct ductable return (CAK) and outdoor air recirculation (CBK)**

| Size                                                               |   |    | 15.2  | 18.2  | 20.4  | 25.4  | 30.4  | 33.4  | 40.4  | 44.4  |
|--------------------------------------------------------------------|---|----|-------|-------|-------|-------|-------|-------|-------|-------|
| <b>F.L.A. - Full load current at max admissible conditions</b>     |   |    |       |       |       |       |       |       |       |       |
| F.L.A. - Compressor 1                                              |   | A  | 14,6  | 15,4  | 9,2   | 9,2   | 14,6  | 14,6  | 15,4  | 15,4  |
| F.L.A. - Compressor 2                                              |   | A  | 14,6  | 23,0  | 14,3  | 14,3  | 14,6  | 14,6  | 23,0  | 30,9  |
| F.L.A. - Compressor 3                                              |   | A  | -     | -     | 9,2   | 14,6  | 14,6  | 15,4  | 15,4  | 15,4  |
| F.L.A. - Compressor 4                                              |   | A  | -     | -     | 14,3  | 14,6  | 14,6  | 23    | 30,9  | 30,9  |
| F.L.A. - Single External Fan                                       |   | A  | 3,9   | 3,9   | 3,9   | 3,9   | 3,9   | 3,9   | 3,9   | 3,9   |
| F.L.A. - Single supply fan                                         |   | A  | 4,3   | 4,3   | 4,4   | 4,4   | 4,4   | 4,3   | 4,3   | 4,3   |
| F.L.A. - Total                                                     | 1 | A  | 38,0  | 47,1  | 64,1  | 69,9  | 75,7  | 84,6  | 101,5 | 109,4 |
| <b>L.R.A. - Locked rotor amperes</b>                               |   |    |       |       |       |       |       |       |       |       |
| L.R.A. - Compressor 1                                              |   | A  | 101,0 | 95,0  | 51,5  | 51,5  | 101,0 | 101,0 | 95,0  | 95,0  |
| L.R.A. - Compressor 2                                              |   | A  | 101,0 | 118,0 | 101,0 | 101,0 | 101,0 | 101,0 | 118,0 | 174,0 |
| L.R.A. - Compressor 3                                              |   | A  | -     | -     | 51,5  | 101,0 | 101,0 | 95,0  | 95,0  | 95,0  |
| L.R.A. - Compressor 4                                              |   | A  | -     | -     | 101,0 | 101,0 | 101,0 | 118,0 | 174,0 | 174,0 |
| <b>F.L.I. - Full load power input at max admissible conditions</b> |   |    |       |       |       |       |       |       |       |       |
| F.L.I. - Compressor 1                                              |   | kW | 8,6   | 9,1   | 5,6   | 5,6   | 8,6   | 8,6   | 9,1   | 9,1   |
| F.L.I. - Compressor 2                                              |   | kW | 8,6   | 13,5  | 8,3   | 8,3   | 8,6   | 8,6   | 13,5  | 17,2  |
| F.L.I. - Compressor 3                                              |   | kW | -     | -     | 5,6   | 8,6   | 8,6   | 9,1   | 9,1   | 9,1   |
| F.L.I. - Compressor 4                                              |   | kW | -     | -     | 8,3   | 8,6   | 8,6   | 13,5  | 17,2  | 17,2  |
| F.L.I. - Single External Fan                                       |   | kW | 1,9   | 1,9   | 1,9   | 1,9   | 1,9   | 1,9   | 1,9   | 1,9   |
| F.L.I. - Single supply fan                                         |   | kW | 2,8   | 2,8   | 2,9   | 2,9   | 2,9   | 2,8   | 2,8   | 2,8   |
| F.L.I. - Total                                                     | 2 | kW | 22,1  | 27,6  | 37,6  | 40,9  | 44,2  | 49,3  | 58,5  | 62,2  |
| <b>M.I.C. Maximum inrush current</b>                               |   |    |       |       |       |       |       |       |       |       |
| M.I.C. - Value                                                     |   | A  | 120,4 | 138,2 | 150,8 | 156,3 | 162,1 | 179,5 | 244,7 | 252,5 |

**Configuration: with recirculation, exhaust and fresh air (CCK) and mixing chamber with recovery exchanger (CCKP)**

| Size                                                               |   |    | 15.2  | 18.2  | 20.4  | 25.4  | 30.4  | 33.4  | 40.4  | 44.4  |
|--------------------------------------------------------------------|---|----|-------|-------|-------|-------|-------|-------|-------|-------|
| <b>F.L.A. - Full load current at max admissible conditions</b>     |   |    |       |       |       |       |       |       |       |       |
| F.L.A. - Compressor 1                                              |   | A  | 14,6  | 15,4  | 9,2   | 9,2   | 14,6  | 14,6  | 15,4  | 15,4  |
| F.L.A. - Compressor 2                                              |   | A  | 14,6  | 23,0  | 14,3  | 14,3  | 14,6  | 14,6  | 23,0  | 30,9  |
| F.L.A. - Compressor 3                                              |   | A  | -     | -     | 9,2   | 14,6  | 14,6  | 15,4  | 15,4  | 15,4  |
| F.L.A. - Compressor 4                                              |   | A  | -     | -     | 14,3  | 14,6  | 14,6  | 23,0  | 30,9  | 30,9  |
| F.L.A. - Single External Fan                                       |   | A  | 3,9   | 3,9   | 3,9   | 3,9   | 3,9   | 3,9   | 3,9   | 3,9   |
| F.L.A. - Single supply fan                                         |   | A  | 4,3   | 4,3   | 4,4   | 4,4   | 4,4   | 4,3   | 4,3   | 4,3   |
| F.L.A. - Single exhaust fan                                        |   | A  | 4,0   | 4,0   | 2,1   | 2,1   | 2,1   | 4,0   | 4,0   | 4,0   |
| F.L.A. - Total                                                     | 1 | A  | 41,9  | 51,0  | 68,3  | 74,1  | 79,9  | 92,5  | 109,4 | 117,3 |
| <b>L.R.A. - Locked rotor amperes</b>                               |   |    |       |       |       |       |       |       |       |       |
| L.R.A. - Compressor 1                                              |   | A  | 101,0 | 95,0  | 51,5  | 51,5  | 101,0 | 101,0 | 95,0  | 95,0  |
| L.R.A. - Compressor 2                                              |   | A  | 101,0 | 118,0 | 101,0 | 101,0 | 101,0 | 101,0 | 118,0 | 174,0 |
| L.R.A. - Compressor 3                                              |   | A  | -     | -     | 51,5  | 101,0 | 101,0 | 95,0  | 95,0  | 95,0  |
| L.R.A. - Compressor 4                                              |   | A  | -     | -     | 101,0 | 101,0 | 101,0 | 118,0 | 174,0 | 174,0 |
| <b>F.L.I. - Full load power input at max admissible conditions</b> |   |    |       |       |       |       |       |       |       |       |
| F.L.I. - Compressor 1                                              |   | kW | 8,6   | 9,1   | 5,6   | 5,6   | 8,6   | 8,6   | 9,1   | 9,1   |
| F.L.I. - Compressor 2                                              |   | kW | 8,6   | 13,5  | 8,3   | 8,3   | 8,6   | 8,6   | 13,5  | 17,2  |
| F.L.I. - Compressor 3                                              |   | kW | -     | -     | 5,6   | 8,6   | 8,6   | 9,1   | 9,1   | 9,1   |
| F.L.I. - Compressor 4                                              |   | kW | -     | -     | 8,3   | 8,6   | 8,6   | 13,5  | 17,2  | 17,2  |
| F.L.I. - Single External Fan                                       |   | kW | 1,9   | 1,9   | 1,9   | 1,9   | 1,9   | 1,9   | 1,9   | 1,9   |
| F.L.I. - Single supply fan                                         |   | kW | 2,8   | 2,8   | 2,9   | 2,9   | 2,9   | 2,8   | 2,8   | 2,8   |
| F.L.I. - Single exhaust fan                                        |   | kW | 2,6   | 2,6   | 1,3   | 1,3   | 1,3   | 2,6   | 2,6   | 2,6   |
| F.L.I. - Totale                                                    | 2 | kW | 24,7  | 30,1  | 40,2  | 43,5  | 46,8  | 54,5  | 63,7  | 67,4  |
| <b>M.I.C. Maximum inrush current</b>                               |   |    |       |       |       |       |       |       |       |       |
| M.I.C. - Valore                                                    |   | A  | 124,4 | 142,1 | 155,0 | 160,5 | 166,3 | 187,4 | 252,6 | 260,4 |

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

1. Values not including the accessories. To obtain the value of F.L.A. including accessories, add to the total F.L.A. value that of any accessories (see electrical data of accessories)

2. Values not including the accessories. To obtain the value of F.L.I. including accessories, add to the total F.L.I. value that of any accessories (see electrical data of accessories)

## Electrical input of optional components

To obtain the electrical input of the unit including accessories, add the standard data in Electrical Data table to those for the selected accessories.

| SIZES                                                         |   |    | 15.2 | 18.2 | 20.4 | 25.4 | 30.4 | 33.4 | 40.4 | 44.4 |
|---------------------------------------------------------------|---|----|------|------|------|------|------|------|------|------|
| <b>F.L.A. Absorbed current</b>                                |   |    |      |      |      |      |      |      |      |      |
| F.L.A. EH12 - 9 kW electric elements                          |   | A  | 13   | 13   | -    | -    | -    | -    | -    | -    |
| F.L.A. EH14 - 12 kW electric elements                         |   | A  | 17,3 | 17,3 | 17,3 | 17,3 | 17,3 | -    | -    | -    |
| F.L.A. EH17 - 18 kW electric elements                         |   | A  | 26,0 | 26,0 | 26,0 | 26,0 | 26,0 | 26,0 | 26,0 | 26,0 |
| F.L.A. EH20 - 24 kW electric elements                         |   | A  | -    | -    | 34,6 | 34,6 | 34,6 | 34,6 | 34,6 | 34,6 |
| F.L.A. EH24 - 36 kW electric elements                         |   | A  | -    | -    | -    | -    | -    | 52,0 | 52,0 | 52,0 |
| F.L.A. HSE3 - Immersed electrodes steam humidifier of 3 kg/h  |   | A  | 3,2  | 3,2  | 3,2  | 3,2  | 3,2  | -    | -    | -    |
| F.L.A. HSE5 - Immersed electrodes steam humidifier of 5 kg/h  |   | A  | 8,7  | 8,7  | 8,7  | 8,7  | 8,7  | -    | -    | -    |
| F.L.A. HSE8 - Immersed electrodes steam humidifier of 8 kg/h  |   | A  | 8,7  | 8,7  | 8,7  | 8,7  | 8,7  | 8,7  | 8,7  | 8,7  |
| F.L.A. HSE9 - Immersed electrodes steam humidifier of 15 kg/h |   | A  | 16,2 | 16,2 | 16,2 | 16,2 | 16,2 | 16,2 | 16,2 | 16,2 |
| F.L.A. LTEMP1 - Application for low outdoor temperature       |   | A  | 1,0  | 1,0  | 1,0  | 1,0  | 1,0  | 1,0  | 1,0  | 1,0  |
| F.L.A. VENH - High static pressure fans                       | 1 | A  | 4,1  | 4,1  | 8,0  | 8,0  | 8,0  | 8,2  | 8,2  | 8,2  |
| <b>F.L.I. Power input</b>                                     |   |    |      |      |      |      |      |      |      |      |
| F.L.I. EH12 - 9 kW electric elements                          |   | kW | 9,0  | 9,0  | -    | -    | -    | -    | -    | -    |
| F.L.I. EH14 - 12 kW electric elements                         |   | kW | 12,0 | 12,0 | 12,0 | 12,0 | 12,0 | -    | -    | -    |
| F.L.I. EH17 - 18 kW electric elements                         |   | kW | 18,0 | 18,0 | 18,0 | 18,0 | 18,0 | 18,0 | 18,0 | 18,0 |
| F.L.I. EH20 - 24 kW electric elements                         |   | kW | -    | -    | 24,0 | 24,0 | 24,0 | 24,0 | 24,0 | 24,0 |
| F.L.I. EH24 - 36 kW electric elements                         |   | kW | -    | -    | -    | -    | -    | 36,0 | 36,0 | 36,0 |
| F.L.I. HSE3 - Immersed electrodes steam humidifier of 3 kg/h  |   | kW | 2,3  | 2,3  | 2,3  | 2,3  | 2,3  | -    | -    | -    |
| F.L.I. HSE5 - Immersed electrodes steam humidifier of 5 kg/h  |   | kW | 6,0  | 6,0  | 6,0  | 6,0  | 6,0  | -    | -    | -    |
| F.L.I. HSE8 - Immersed electrodes steam humidifier of 8 kg/h  |   | kW | 6,0  | 6,0  | 6,0  | 6,0  | 6,0  | 6,0  | 6,0  | 6,0  |
| F.L.I. HSE9 - Immersed electrodes steam humidifier of 15 kg/h |   | kW | 11,3 | 11,3 | 11,3 | 11,3 | 11,3 | 11,3 | 11,3 | 11,3 |
| F.L.I. LTEMP1 - Application for low outdoor temperature       |   | kW | 0,3  | 0,3  | 0,3  | 0,3  | 0,3  | 0,3  | 0,3  | 0,3  |
| F.L.I. VENH - High static pressure fans                       | 1 | kW | 2,7  | 2,7  | 5,2  | 5,2  | 5,2  | 5,4  | 5,4  | 5,4  |

1. The absorption value that needs to be added on takes into account the difference between the optional high head fans and the standard fans.

## Pressure drops of optional components

The value of static pressure available on the supply and return duct is obtained by subtracting from the available net maximum pressure (see general table of technical data) the pressure drops of any accessories.

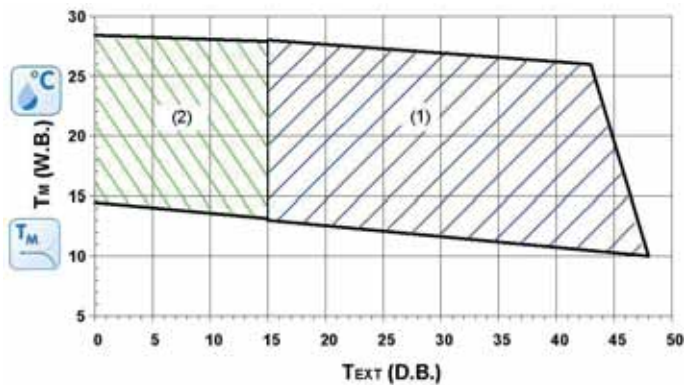
| SIZES                                               |   |    | 15.2 | 18.2 | 20.4 | 25.4 | 30.4 | 33.4 | 40.4 | 44.4 |
|-----------------------------------------------------|---|----|------|------|------|------|------|------|------|------|
| CHW2 - Two-row hot water coil                       |   | Pa | 22   | 34   | 22   | 26   | 32   | 25   | 31   | 36   |
| CPHG - Hot gas re-heating coil                      |   | Pa | 11   | 17   | 11   | 13   | 17   | 13   | 16   | 18   |
| CHWER - Energy recovery from the food refrigeration |   | Pa | 42   | 64   | 42   | 49   | 60   | 47   | 58   | 68   |
| HWS - Steam humidifier                              |   | Pa | 31   | 52   | 31   | 35   | 50   | 35   | 50   | 60   |
| GC - Heating module                                 |   | Pa | 80   | 90   | 80   | 90   | 100  | 80   | 90   | 100  |
| F7 - F7 high efficiency air filter                  | 1 | Pa | 145  | 168  | 145  | 153  | 167  | 159  | 167  | 178  |
| FES - High efficiency electronic filters            |   | Pa | 28   | 44   | 28   | 33   | 45   | 38   | 50   | 62   |

The values shown are to be considered approximate for units operating power in normal use with standard air flow rate.

1. Pressure drops with filters with average dirtiness



## Operating range (Cooling)



The limits are meant as an indication and they have been calculated by considering:

- general and non specific sizes,
- standard airflow,
- non-critical positioning of the unit and correct operating and maintenance of the unit,
- operating at full load

To verify the operation field of the operating units with percentages of outdoor air, always calculate the  $T_m$  mixing temperature at the internal heat exchanger input.

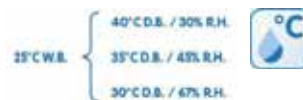
$T_m$  = entering internal exchanger air temperature, temperature measured with wet bulb (W.B.=WET BULB)

$T_{ext}$  = entering internal exchanger air temperature, temperature measured with dry bulb (D.B.=DRY BULB)

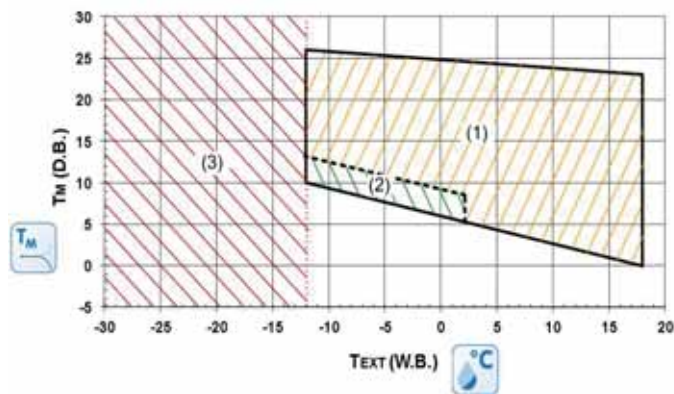
1. Standard operating range

2. Operation range of the unit in FREE-COOLING mode

### WET BULB TEMPERATURE - EXAMPLE



## Operating range (Heating)



The limits are meant as an indication and they have been calculated by considering:

- general and non specific sizes,
- standard airflow,
- non-critical positioning of the unit and correct operating and maintenance of the unit,
- operating at full load

To verify the operation field of the operating units with percentages of outdoor air, always calculate the  $T_m$  mixing temperature at the internal heat exchanger input.

$T_m$  = entering internal exchanger air temperature, temperature measured with dry bulb (D.B.=DRY BULB)

$T_{ext}$  = entering internal exchanger air temperature, temperature measured with wet bulb (W.B.=WET BULB)

1. Operation range at full load
2. Range in which the unit operation is allowed only for a limited period (max 1 hour)
3. Operation range of the unit equipped with "application for low outdoor temperature" and "hot water coil" or "gas heating module" options. The heat pump circuit is not active.

In extended operating mode, in heat pump operation with an outdoor air temperature of less than 6°C, the unit performs defrosts by reversing the cycle, activating one circuit at a time and maintaining the ventilation active to eliminate the ice that forms on the surfaces of the outside exchanger. In the event of negative temperatures, the water resulting from the defrosts must be drained so as to avoid the accumulation of ice near the base of the unit. Make sure that this does not constitute a danger for people or things. With an outdoor air temperature between -10°C and -30°C install the following options: hot water coil or gas heating module and outdoor air low temperature configuration.

## Accessories

### EH - Electric elements

This option is suggested for cold climates, allows the integration of heating capacity from the heat pump. The electrical heaters are placed before the treatment coil and perform the air preheating function, extending the operating range of the unit and helping quickly to reach the comfort in the room.

Ideal for climate areas in applications with low outside temperature where it is required to active the heaters only for short time in the year. In these cases the resulting system simplification (no water supply) compensates the energy costs. T

The fins are made of aluminum, of suitable dimension to ensure high efficiency and maintain low power density on the surfaces to limit overheating. The low temperature of the heating elements increases the lifespan and limits the effect of air ionization

The electrical heating elements are managed by the controller with two power steps.



### Matching of the electric elements

| Size  | 15.2 | 18.2 | 20.4 | 25.4 | 30.4 | 33.4 | 40.4 | 44.4 |
|-------|------|------|------|------|------|------|------|------|
| 9 kW  | √    | √    | -    | -    | -    | -    | -    | -    |
| 12 kW | √    | √    | √    | √    | √    | -    | -    | -    |
| 18 kW | √    | √    | √    | √    | √    | √    | √    | √    |
| 24 kW | -    | -    | √    | √    | √    | √    | √    | √    |
| 36 kW | -    | -    | -    | -    | -    | √    | √    | √    |



This option involves variation of the main electrical data of the unit.

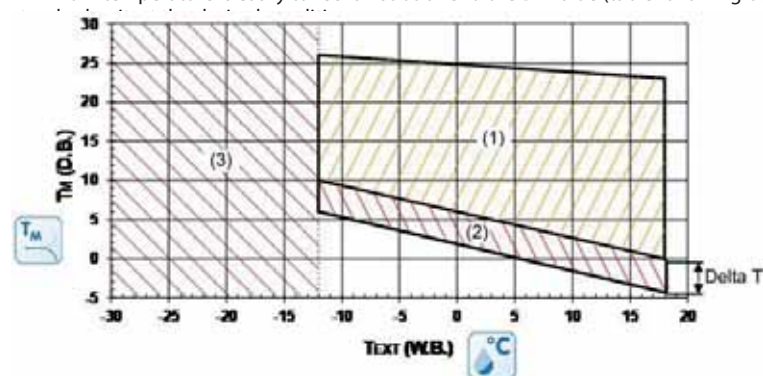


'Electric elements', '2-row hot water coil', 'Combustion heating module' and 'Energy recovery from food refrigeration' cannot be assembled simultaneously.

### Operation field extension with electric heaters

| SIZES | Airflow [m <sup>3</sup> /h] | POWER ELECTRIC HEATERS / DELTA T [°C] |       |       |      |       |
|-------|-----------------------------|---------------------------------------|-------|-------|------|-------|
|       |                             | 9 kW                                  | 12 kW | 18 kW | 24kW | 36 kW |
| 15.2  | 9000                        | 3.0                                   | 4.0   | 5.9   | -    | -     |
| 18.2  | 11500                       | 2.3                                   | 3.1   | 4.6   | -    | -     |
| 20.4  | 13500                       | -                                     | 2.6   | 4.0   | 5.3  | -     |
| 25.4  | 15000                       | -                                     | 2.4   | 3.6   | 4.7  | -     |
| 30.4  | 17000                       | -                                     | 2.1   | 3.1   | 4.2  | -     |
| 33.4  | 18500                       | -                                     | -     | 2.9   | 3.8  | 5.8   |
| 40.4  | 21000                       | -                                     | -     | 2.5   | 3.4  | 5.1   |
| 44.4  | 23000                       | -                                     | -     | 2.3   | 3.1  | 4.6   |

The minimum operating temperature of the heat pump with electric heater change and depends on the series and the power of the electric heater. The minimum temperature is easily to reckon subtrahend the DT value (table following below) to the entering internal exchanger air temperature  $T_m$  (D.M.) for



The limits are meant as an indication and they have been calculated by considering:

- general and non specific sizes,
- standard airflow,
- non-critical positioning of the unit and correct operating and maintenance of the unit,
- operating at full load

To verify the operation field of the operating units with percentages of outdoor air, always calculate the  $T_m$  mixing temperature at the internal heat exchanger input.

$T_m$  = entering internal exchanger air temperature, , temperature measured with dry bulb (D.B.=DRY BULB)

Text = entering internal exchanger air temperature, temperature measured with wet bulb (W.B.=WET BULB)

1. Operation range at full load
2. Operation field of the unit equipped with electric elements
3. Operation range of the unit equipped with "application for low outdoor temperature" and "hot water coil" or "gas heating module" options. The heat pump circuit is not active.

With an outdoor air temperature between  $-10^{\circ}\text{C}$  and  $-30^{\circ}\text{C}$  install the following options: Hot water coil or gas heating module and outdoor air low temperature configuration

## GC - Modulating condensation gas heating module

Option consisting of a combustion chamber and condensation burner with modulating control. It is available in various capacities and heats the environment served. The module can be chosen to integrate the heat pump or as an alternative to it. In this case, its heating capacity must be at least equal to the capacity envisioned in the project.

Thanks to the condensation technology with pre-mix and extremely efficient modulation (up to 105% depending on the lower heat value), consumption is very contained and considerably reduced during operation at partial load. The burner has low polluting emissions (NOx lower than 80mg/kWh) in accordance with Class 5 of European standard EN 676.

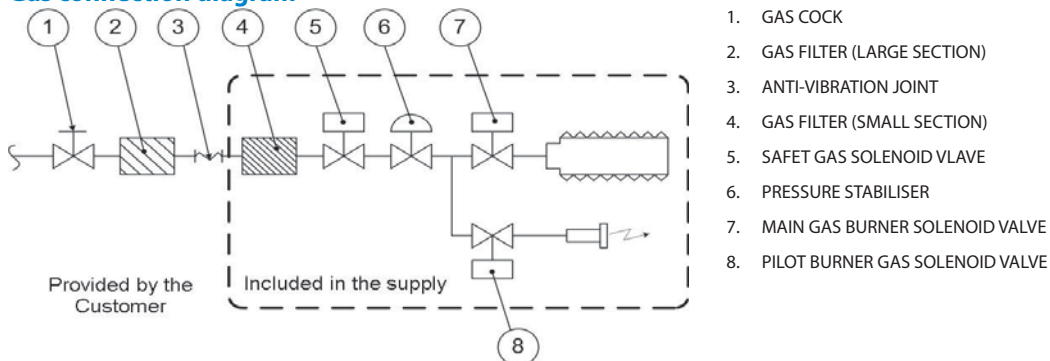
The module is supplied ready for use, for size 15.2-18.2 is an essential part of the unit, for the other sizes it is supplied on a separate module, easy to connect to the unit during installation.

The gas module presence needs the horizontal supply.

The heating module includes:

- hot air generator with condensation and integrated modulating adjustment, powered with methane gas
- kit for transformation of power with liquefied petroleum gas (LPG)
- kit of steel chimney for exhaust fumes
- All the control and safety devices

### Gas connection diagram



### Gas use features

|                                               |  |     | 35kW                   |       | 44kW                   |       | 65kW                   |       | 82kW                   |       | 100kW                  |        | 130kW                  |        |
|-----------------------------------------------|--|-----|------------------------|-------|------------------------|-------|------------------------|-------|------------------------|-------|------------------------|--------|------------------------|--------|
| NOx class                                     |  | Val | 5                      |       |                        |       |                        |       |                        |       |                        |        |                        |        |
|                                               |  |     | min                    | max   | min                    | max   | min                    | max   | min                    | max   | min                    | max    | min                    | max    |
| Rated thermal input                           |  | kW  | 7.60                   | 34.85 | 8.50                   | 42.00 | 12.40                  | 65.00 | 16.40                  | 82.00 | 21.00                  | 100.00 | 12.40                  | 130.00 |
| Efficiency Hi (P.C.I.)                        |  | %   | 106.97                 | 96.30 | 105.88                 | 96.19 | 108.06                 | 96.82 | 108.35                 | 97.60 | 108.57                 | 97.15  | 108.06                 | 96.82  |
| Efficiency Hs (P.C.S.)                        |  | %   | 96.37                  | 86.76 | 95.39                  | 86.66 | 97.36                  | 87.22 | 97.62                  | 87.93 | 97.81                  | 87.52  | 97.36                  | 87.22  |
| Max condensation produced                     |  | l/h | 0.9                    |       | 1.1                    |       | 2.1                    |       | 3.3                    |       | 2.7                    |        | 4.2                    |        |
| Carbon monoxide CO (0% di O <sub>2</sub> )    |  | ppm | <5                     |       | <5                     |       | <5                     |       | <5                     |       | <5                     |        | <5                     |        |
| Nitrogen oxides - NOx (0% di O <sub>2</sub> ) |  |     | 41 mg / k Wh<br>23 ppm |       | 35 mg / k Wh<br>20 ppm |       | 40 mg / k Wh<br>23 ppm |       | 34 mg / k Wh<br>19 ppm |       | 45 mg / k Wh<br>26 ppm |        | 40 mg / k Wh<br>23 ppm |        |
| Available flue pressure                       |  | Pa  | 90                     |       | 100                    |       | 120                    |       | 120                    |       | 120                    |        | 120                    |        |
| Gas connection diameter                       |  | GAS | UNI ISO 7/1-3/4"       |       | UNI ISO 7/1-3/4"       |       | UNI ISO 7/1-3/4"       |       | UNI ISO 7/1-1"         |       | UNI ISO 7/1-1"         |        | UNI ISO 7/1-1"         |        |
| Exhaust pipe diameter                         |  | mm  | 80                     |       | 80                     |       | 80                     |       | 80                     |       | 80                     |        | 2 X 80                 |        |

### Matching of the condensing gas heating module

|       | Capacity | 15.2 | 18.2 | 20.4 | 25.4 | 30.4 | 33.4 | 40.4 | 44.4 |
|-------|----------|------|------|------|------|------|------|------|------|
| GC01X | 35 kW    | √    | √    | √    | √    | -    | -    | -    | -    |
| GC08X | 44 kW    | √    | √    | √    | √    | √    | -    | -    | -    |
| GC09X | 65 kW    | √    | √    | √    | √    | √    | √    | √    | √    |
| GC10X | 82 kW    | -    | -    | √    | √    | √    | √    | √    | √    |
| GC11X | 100 kW   | -    | -    | -    | √    | √    | √    | √    | √    |
| GC12X | 130 kW   | -    | -    | -    | -    | -    | √    | √    | √    |

**This option reduces the available static pressure (supply air side).**



The component requires gas supply (gas connections to be made by the Customer). The location of the unit and the fume drain mode must comply with laws and standards in force in the Country of use.



The assembly of the chimney kit must be performed on site by the Customer. According to specific requirements of installation, the chimney length can be increased by means of appropriate joints and fittings (not supplied by Clivet). For further details, refer to the Installation, use and maintenance manual.



'Electric elements', '2-row hot water coil', 'Combustion heating module' and 'Energy recovery from food refrigeration' cannot be assembled simultaneously.

## CHW2 - Two-row hot water coil

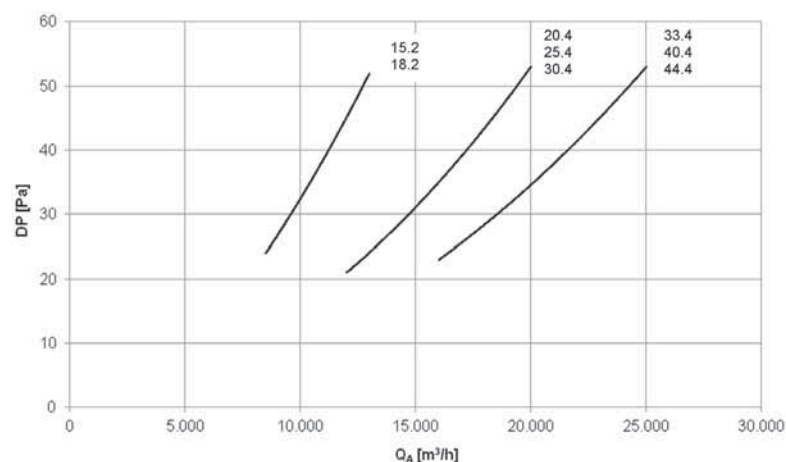
Option indicated for very cold climates, as it allows to heat up the area served. The exchanger comes with a thermostat for the antifreeze function, which is always active even when the unit is in stand-by, as long as it is operated electrically. If required, force the opening of the valve to the maximum value allowed to allow the air to pass through the exchanger and prevent frost from forming.

The hot water coil allows the integration of the heat pump capacity, as being placed before the treating coil, it pre-heats the air, extending the operation limits of the unit. If the water coil operates as integration to the heat pump, the control logic reduces the potential at a pre-determined limit value, which prevents to make the compressors work at too high condensation temperatures. On the other hand, if the water coil is used as main resource (i.e. availability of the compressors) the potential supplied will be the highest.

In the event laws or local standards encourage the use of the district heating, and so the use of hot water coil heating with the obligation to recover the energy contained inside the exhaust air flow, a turning point can be set, that is an outside air temperature, below which the unit uses the water coil as main resource and operates also as thermodynamic recuperator at very high efficiency, using the nominal capacity of the heat pump circuit only partially.

With the option is available a potential-free contact for the water circulator start-up (provided by the Installer).

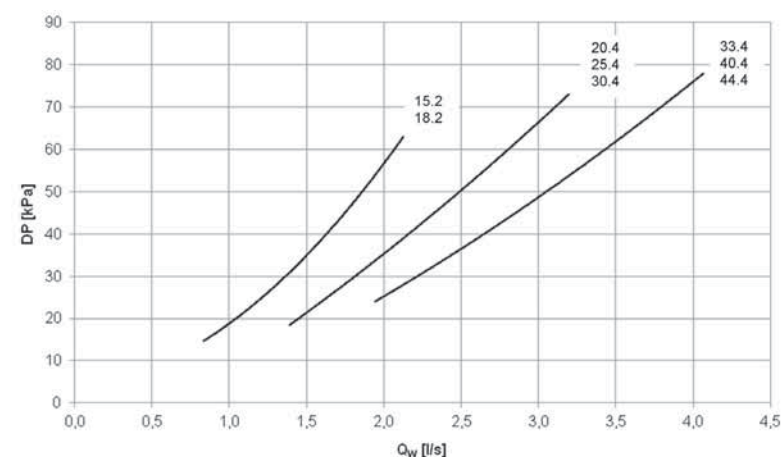
### Hot water coil pressure drops: AIR side



The air side pressure drops are relative to the medium air temperature of 20°C and are to be added to the pressure drops due to ducts, terminal devices and any other component that causes a drop in working discharge head.

QA [m³/h] = air flow  
DP [Pa] = pressure drops

### Hot water coil pressure drops: WATER side



Pressure drops on the water side are calculated considering an average water temperature of 65°C

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

$Qw [l/s] = P / (4.186 \times DT)$

P = Water coil heating capacity in KW  
DT = Temperature difference between inlet / outlet water

**This option reduces the available static pressure (supply air side).**



The component requires connection to the hot water plumbing system (to be provided for by the client).



'2 range hot water coil', 'Electric elements' and gas module cannot be assembled simultaneously.

## Performances of hot water coil (two-row)

|                      |             | Ti/To (°C) |         |         |         |         |         |         |         |         |         |         |         |       |
|----------------------|-------------|------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-------|
|                      |             | 60 / 40    | 70 / 55 | 70 / 60 | 80 / 65 | 60 / 40 | 70 / 55 | 70 / 60 | 80 / 65 | 60 / 40 | 70 / 55 | 70 / 60 | 80 / 65 |       |
|                      |             | kWt        | kWt     | kWt     | kWt     | kWt     | kWt     | kWt     | kWt     | kWt     | kWt     | kWt     | kWt     |       |
| 15.2<br>18.2         | Qo (m3 / h) |            | 8500    |         |         |         | 10750   |         |         |         | 13000   |         |         |       |
|                      | Qo (l / s)  |            | 2361    |         |         |         | 2986    |         |         |         | 3611    |         |         |       |
|                      | TM (°C)     | 5          | 71,0    | 93,8    | 98,9    | 110,9   | 82,5    | 109,5   | 115,7   | 129,6   | 93,0    | 123,7   | 130,9   | 146,5 |
|                      |             | 10         | 62,2    | 84,9    | 90,0    | 102,0   | 72,3    | 99,2    | 105,4   | 119,2   | 81,4    | 112,0   | 119,2   | 134,8 |
|                      |             | 14         | 55,2    | 77,9    | 83,0    | 94,9    | 64,1    | 91,0    | 97,1    | 110,9   | 72,1    | 102,8   | 109,9   | 125,4 |
|                      |             | 16         | 51,7    | 74,4    | 79,5    | 91,4    | 60,0    | 86,9    | 93,0    | 106,8   | 67,5    | 98,2    | 105,3   | 120,8 |
|                      |             | 18         | 48,2    | 71,0    | 76,0    | 87,9    | 55,9    | 82,9    | 89,0    | 102,7   | 62,9    | 93,6    | 100,7   | 116,2 |
|                      |             | 20         | 44,7    | 67,5    | 72,5    | 84,4    | 51,9    | 78,8    | 84,9    | 98,7    | 58,3    | 89,0    | 96,1    | 111,6 |
| 20.4<br>25.4<br>30.4 | Qo (m3 / h) |            | 12000   |         |         |         | 16000   |         |         |         | 20000   |         |         |       |
|                      | Qo (l / s)  |            | 3333    |         |         |         | 4444    |         |         |         | 5555    |         |         |       |
|                      | TM (°C)     | 5          | 103,4   | 136,1   | 143,4   | 160,9   | 124,5   | 164,9   | 174,0   | 195,2   | 143,4   | 190,3   | 201,2   | 225,4 |
|                      |             | 10         | 90,6    | 123,3   | 130,5   | 147,9   | 109,2   | 149,3   | 158,5   | 179,3   | 125,4   | 172,4   | 183,2   | 207,2 |
|                      |             | 14         | 80,5    | 113,1   | 120,3   | 137,7   | 96,9    | 137,0   | 146,1   | 166,9   | 111,2   | 158,2   | 169,0   | 192,9 |
|                      |             | 16         | 75,4    | 108,1   | 115,2   | 132,6   | 90,7    | 130,9   | 140,0   | 160,8   | 104,2   | 151,1   | 161,9   | 185,7 |
|                      |             | 18         | 70,3    | 103,1   | 110,2   | 127,5   | 84,6    | 124,8   | 133,9   | 154,6   | 97,1    | 144,0   | 154,8   | 178,7 |
|                      |             | 20         | 65,3    | 98,0    | 105,1   | 122,5   | 78,4    | 118,7   | 127,8   | 148,5   | 90,0    | 137,0   | 147,8   | 171,6 |
| 33.4<br>40.4<br>44.4 | Qo (m3 / h) |            | 16000   |         |         |         | 19500   |         |         |         | 25000   |         |         |       |
|                      | Qo (l / s)  |            | 4444    |         |         |         | 5416    |         |         |         | 6944    |         |         |       |
|                      | TM (°C)     | 5          | 134,9   | 177,9   | 187,4   | 210,3   | 153,4   | 202,8   | 214,0   | 240,0   | 179,4   | 238,0   | 251,6   | 281,9 |
|                      |             | 10         | 118,4   | 161,1   | 170,6   | 193,3   | 134,4   | 183,8   | 194,9   | 220,6   | 157,0   | 215,6   | 229,2   | 259,1 |
|                      |             | 14         | 105,1   | 147,9   | 157,3   | 179,9   | 119,4   | 168,6   | 179,7   | 205,3   | 139,3   | 197,9   | 211,3   | 241,2 |
|                      |             | 16         | 98,5    | 141,3   | 150,7   | 173,3   | 111,8   | 161,1   | 172,1   | 197,8   | 130,5   | 189,0   | 202,5   | 232,3 |
|                      |             | 18         | 91,8    | 134,7   | 144,1   | 166,6   | 104,2   | 153,6   | 164,6   | 190,2   | 121,6   | 180,2   | 193,6   | 223,5 |
|                      |             | 20         | 85,2    | 128,1   | 137,5   | 160,0   | 96,7    | 146,1   | 157,2   | 182,7   | 112,7   | 171,4   | 184,9   | 214,6 |

TM = air inlet temperature of water coil (°C)

Ti/To = water temperature inlet/outlet (°C)

Qo = airflow (l/s and m3/h)

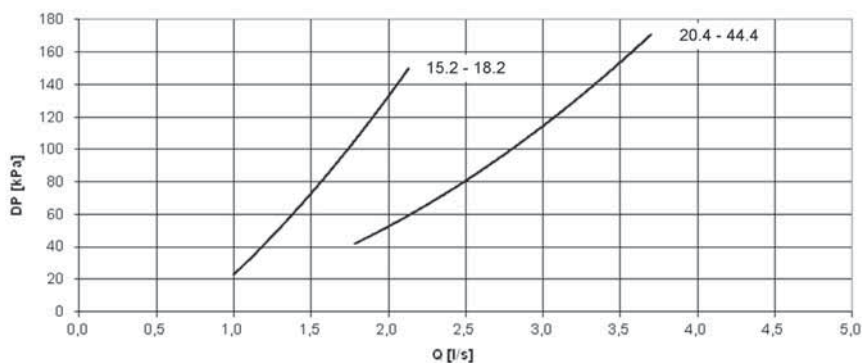
kWt = Provided heating capacity (kW)

Thermal yields referred to the max. water coil capacity. The thermo regulator cokes the 3-way modulating valve limiting the inlet air temperature at desired values.

## 3WVM - Modulating 3-way valve

To be combined with hot water coil (optional). It is managed by the built-in microprocessor via a 0-10V signal and allows the fully automatic control of the water coil. The valve with modulating actuator is provided already assembled and wired built-in the unit.

### Valve pressure drops



Q [l/s] = water flow-rate

DP [kPa] = pressure drops



This accessory has to be coupled to the "CHW2 - Two-row hot water coil" option

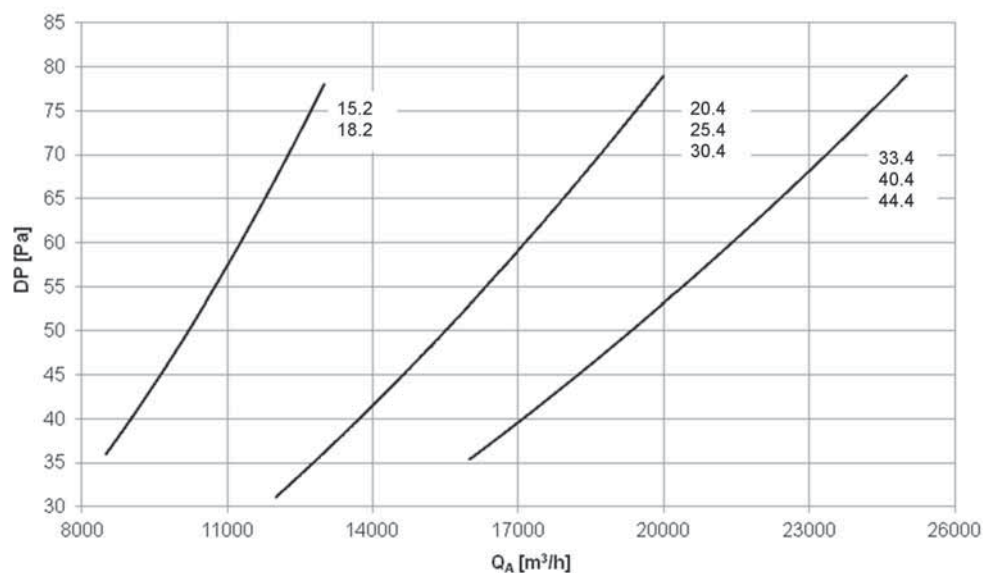
## CHWER - Energy recovery from food refrigeration

This option makes it possible, during the winter season, to recover the heating energy produced by food storage in supermarkets, hypermarkets or food factories. It is a technical solution that recovers a significant heating resource, which is otherwise normally released outdoors.

The unit logic assigns a priority value to this function based on the heating availability of the resource, and integrates the overall output of the unit.

The option is comprised of a water exchanger, which is automatically controlled by a dedicated valve. With electrically powered units, the frost function is enabled, which forces the valve open when required.

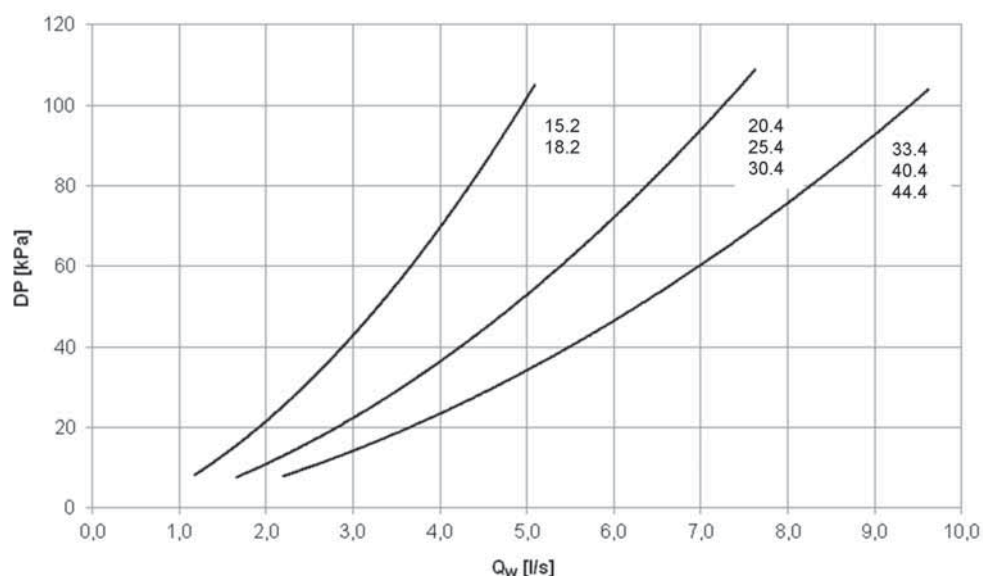
### Hot water coil pressure drops: AIR side



The air side pressure drops are relative to the medium air temperature of 20°C and are to be added to the pressure drops due to ducts, terminal devices and any other component that causes a drop in working discharge head.

QA [m³/h] = airflow  
DP[Pa] = pressure drops

### Hot water coil pressure drops: WATER side



Pressure drops on the water side are calculated considering an average water temperature of 65°C

Qw [l/s] = water flow-rate  
DP[kPa] = pressure drops

$$Q_w [l/s] = P / (4.186 \times \Delta T)$$

P = Water coil heating capacity in KW  
DT = Temperature difference between inlet / outlet water

**This option reduces the available static pressure (supply air side).**



The component requires connection to the hot water plumbing system (to be provided for by the client).



'Electric elements', '2-row hot water coil', 'Combustion heating module' and 'Energy recovery from food refrigeration' cannot be assembled simultaneously.



## Performances of water heating coil from food refrigeration

|                      |             |    | Ti/To (°C) |         |         |         |         |         |         |         |         |
|----------------------|-------------|----|------------|---------|---------|---------|---------|---------|---------|---------|---------|
|                      |             |    | 45 / 40    | 40 / 35 | 35 / 30 | 45 / 40 | 40 / 35 | 35 / 30 | 45 / 40 | 40 / 35 | 35 / 30 |
|                      |             |    | kWt        | kWt     | kWt     | kWt     | kWt     | kWt     | kWt     | kWt     | kWt     |
| 15.2<br>18.2         | Qo (m3 / h) |    | 8500       |         |         | 10750   |         |         | 13000   |         |         |
|                      | Qo (l / s)  |    | 2361       |         |         | 2986    |         |         | 3611    |         |         |
|                      | TM (°C)     | 5  | 78,5       | 67,8    | 57,0    | 93,2    | 80,4    | 67,6    | 106,6   | 91,9    | 77,2    |
|                      |             | 10 | 67,5       | 56,8    | 46,1    | 80,0    | 67,3    | 54,6    | 91,6    | 76,9    | 62,3    |
|                      |             | 14 | 58,7       | 48,0    | 37,4    | 69,6    | 57,0    | 44,3    | 79,6    | 65,1    | 50,5    |
|                      |             | 16 | 54,3       | 43,7    | 33,2    | 64,4    | 51,8    | 39,2    | 73,7    | 59,2    | 44,7    |
|                      |             | 18 | 50,0       | 39,5    | 28,9    | 59,3    | 46,7    | 34,1    | 67,8    | 53,3    | 38,9    |
|                      |             | 20 | 45,7       | 35,2    | 24,6    | 54,2    | 41,6    | 29,1    | 62,0    | 47,6    | 33,1    |
| 20.4<br>25.4<br>30.4 | Qo (m3 / h) |    | 12000      |         |         | 16000   |         |         | 20000   |         |         |
|                      | Qo (l / s)  |    | 3333       |         |         | 4444    |         |         | 5555    |         |         |
|                      | TM (°C)     | 5  | 110,7      | 95,6    | 80,5    | 136,5   | 117,8   | 99,0    | 159,6   | 137,6   | 115,6   |
|                      |             | 10 | 95,1       | 80,1    | 65,0    | 117,2   | 98,6    | 80,0    | 137,1   | 115,2   | 93,3    |
|                      |             | 14 | 82,7       | 67,8    | 52,9    | 102,0   | 83,5    | 64,9    | 119,2   | 97,5    | 75,7    |
|                      |             | 16 | 76,6       | 61,7    | 46,9    | 94,4    | 75,9    | 57,5    | 110,4   | 88,7    | 67,0    |
|                      |             | 18 | 70,5       | 55,7    | 40,8    | 86,9    | 68,5    | 50,1    | 101,6   | 79,9    | 58,3    |
|                      |             | 20 | 64,5       | 49,7    | 34,9    | 79,4    | 61,1    | 42,7    | 92,8    | 71,3    | 49,6    |
| 33.4<br>40.4<br>44.4 | Qo (m3 / h) |    | 16000      |         |         | 19500   |         |         | 25000   |         |         |
|                      | Qo (l / s)  |    | 4444       |         |         | 5416    |         |         | 6944    |         |         |
|                      | TM (°C)     | 5  | 146,3      | 126,4   | 106,3   | 175,2   | 151,2   | 127,0   | 201,3   | 173,7   | 145,8   |
|                      |             | 10 | 125,6      | 105,8   | 85,9    | 150,4   | 126,5   | 102,6   | 173,0   | 145,3   | 117,7   |
|                      |             | 14 | 109,3      | 89,5    | 69,8    | 130,9   | 107,1   | 83,3    | 150,4   | 123,0   | 95,5    |
|                      |             | 16 | 101,2      | 81,6    | 61,8    | 121,1   | 97,4    | 73,7    | 139,2   | 111,9   | 84,5    |
|                      |             | 18 | 93,2       | 73,6    | 53,9    | 111,5   | 87,9    | 64,2    | 128,1   | 100,8   | 73,5    |
|                      |             | 20 | 85,2       | 65,6    | 46,0    | 101,9   | 78,4    | 54,7    | 117,1   | 89,9    | 62,6    |

TM = air inlet temperature of water coil (°C)

Ti/To = water temperature inlet/outlet (°C)

Qo = airflow (l/s and m3/h)

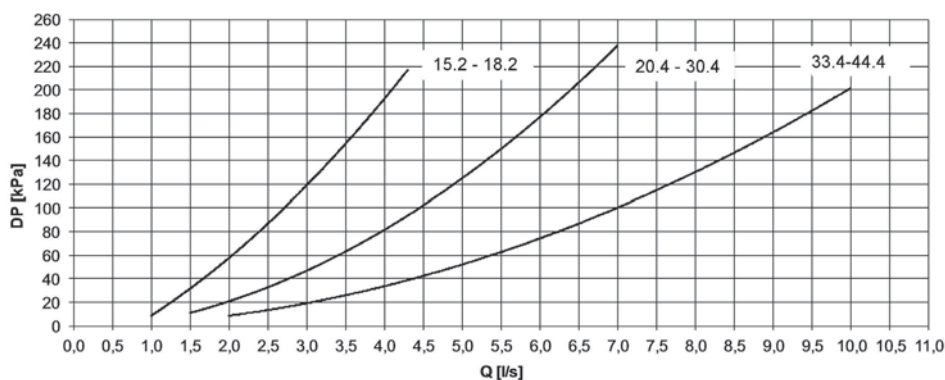
kWt = Provided heating capacity (kW)

Thermal yields referred to the max. water coil capacity. The thermo regulator cokes the 3-way modulating valve limiting the inlet air temperature at desired values.

## 3WVM - Modulating 3-way valve for energy recovery from food refrigeration

To be combined with water coil for the energy recovery from food refrigeration. It is managed by the built-in microprocessor via a 0-10V signal and allows the fully automatic control of the water coil. The valve with modulating actuator is provided already assembled and wired built-in the unit.

### Valve pressure drops



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



This accessory has to be coupled to the "CHWER - Energy recovery from food refrigeration" option

## LTEMP1 - Application for low outdoor temperature

Option indicated for very cold climates, where the outside temperature can be between -10 and -30°C.

- A. The option includes self-regulating heaters with thermostats that can protect the electrical panel from freezing to make sure it operates correctly.
- B. The special version of the outdoor air damper for the application for low outdoor temperature is made of anti-seize devices that facilitate the correct control of the fresh air in every climatic situation, thanks to the teflon supporting bushings, aluminium flaps, PVC end gaskets and steel leverages to compensate expansions.
- C. The motorised actuator is suitable for operating with low outdoor temperatures
- D. Electrical connection cables suitable for outdoor low temperatures.



This operation involves variation of the main electrical data of 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.

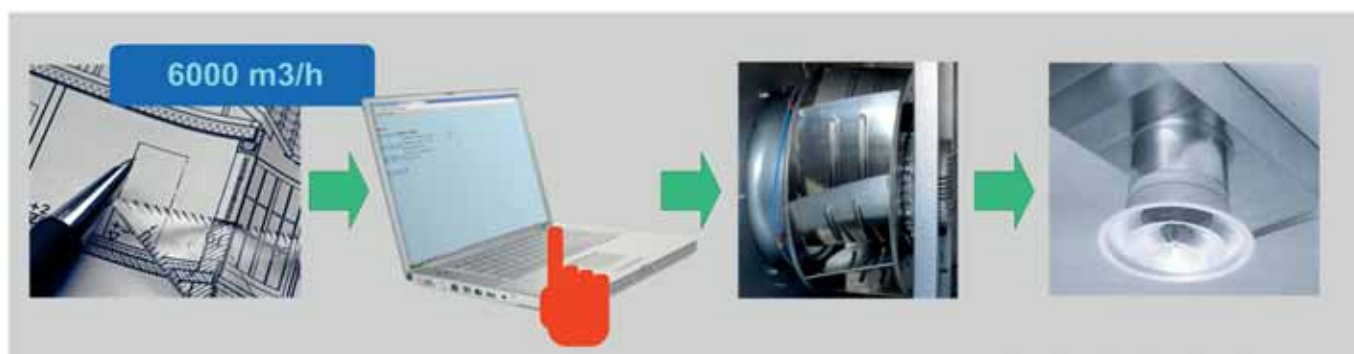


It is necessary to make precautions against build up of snow and ice in front of the exhaust and outdoor air inlet locations.



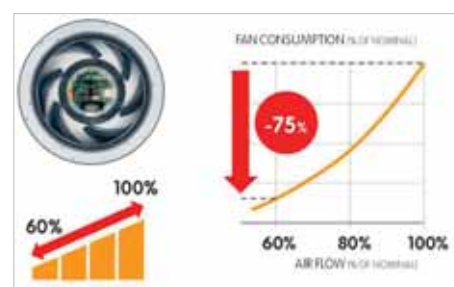
## PCOSM - Constant supply airflow

The original technology used eliminates the need for on-site calibration of traditional fans, as well as the time that would be required and the associated costs. The required flow rate is set on the display and maintained automatically by the unit, which controls the speed of the ventilating sections. During the installation and start-up phase, the unit controls to the effective pressure drop in the air distribution and diffusion system. Furthermore, during its entire operating life, the progressive fouling of the air filters is automatically compensated for thanks to this system.



## PVAR - Variable airflow

Option that enables the automatic variation of the treated air flow, according to the effective load. This allows great energy saving, thanks to the reduction of ventilation electrical consumptions. The minimum flow value equal to 60% of the nominal one occurs during the partial load and satisfied set-point operation. As a result, the supply temperature remains unchanged either during full load operation or partial load operation. The device also includes the functions of configuration of the nominal flow directly on the unit display and its automatic control to compensate the dirtying of the air filters.



This option already includes the device for controlling the airflow, called 'PCOSM - Supply constant airflow', which must not be selected



When sizing the distribution and diffusion of the air, keep into consideration that the airflow varies from the nominal value (at full load, in FREE-COOLING mode and during the defrosting phases) to the minimum value, equal to 60% of the nominal flow (at partial load)

## CPHG - Hot gas re-heating coil

This option is recommended during the summer when the intake air dehumidification is required.

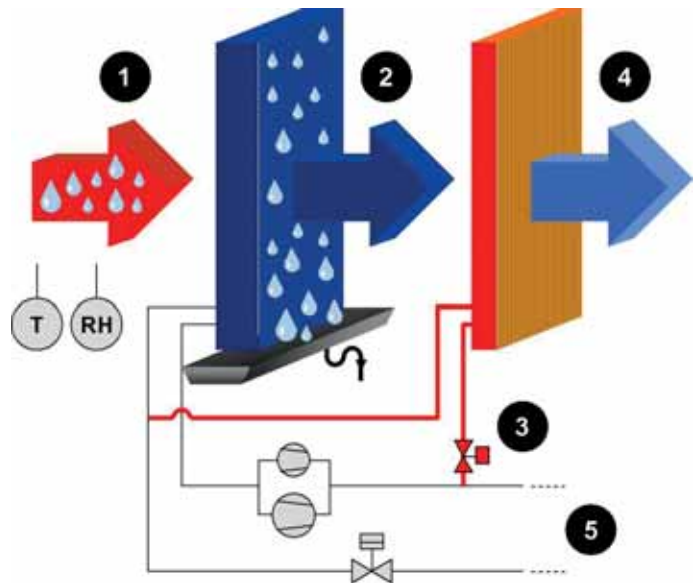
The air flow to enter the room may contain a higher level of humidity than desired. The dehumidification process is used to reduce it. The air flow is first cooled in the handling coil with separation of condensation. It is then freely re-heated to maintain the desired condition of comfort in the served room.

The re-heat coil is located behind the handling coil and is activated by diverting a flow of hot refrigerant gas downstream from the compressors through the action of a dedicated solenoid valve.

The process starts operating based on the humidity set-point established by the user.

With respect to traditional devices, such as electrical electric elements or hot water coils, use of the re-heat coil does not consume any extra energy. It also lowers refrigerant condensation temperature, which provides two positive effects: power absorbed by the compressors is considerably reduced, and at the same time, cooling capacity is increased, resulting in greater efficiency (EER).

Ambient humidity is measured by means of a return humidity probe, which is provided already assembled and wired built-in the unit.



1. Outdoor air and humidity / temperature probe
2. Chilled and dehumidified air in the internal exchanger (evaporator)
3. Automatic hot gas pump valve
4. Air treated by the post-heating exchanger
5. External exchanger (condenser)

Indicative scheme - not in scale

## Performances of hot gas re-heating coil

| SIZE |             | OUTDOOR AIR TEMPERATURE (°C) |      |      |      |      |       |      |      |      |      |       |      |      |      |      |      |
|------|-------------|------------------------------|------|------|------|------|-------|------|------|------|------|-------|------|------|------|------|------|
|      |             | 25                           | 27   | 30   | 32   | 35   | 25    | 27   | 30   | 32   | 35   | 25    | 27   | 30   | 32   | 35   |      |
|      |             | kWt                          | kWt  | kWt  | kWt  | kWt  | kWt   | kWt  | kWt  | kWt  | kWt  | kWt   | kWt  | kWt  | kWt  | kWt  |      |
| 15.2 | Qo (m3 / h) | 8000                         |      |      |      |      | 9000  |      |      |      |      | 13000 |      |      |      |      |      |
|      | Qo (l / s)  | 2361                         |      |      |      |      | 2500  |      |      |      |      | 3611  |      |      |      |      |      |
|      | Ta (°C)     | 10                           | 17,9 | 19,2 | 21,3 | 22,7 | 24,9  | 18,5 | 19,9 | 22,1 | 23,5 | 25,7  | 22,9 | 24,7 | 27,4 | 29,2 | 31,9 |
|      |             | 12                           | 16,5 | 17,8 | 19,9 | 21,3 | 23,4  | 17,0 | 18,5 | 20,6 | 22,1 | 24,2  | 21,1 | 22,9 | 25,5 | 27,4 | 30,1 |
|      |             | 14                           | 15,1 | 16,5 | 18,5 | 19,9 | 22,0  | 15,6 | 17,0 | 19,2 | 20,6 | 22,8  | 19,3 | 21,1 | 23,7 | 25,5 | 28,2 |
|      |             | 16                           | 13,7 | 15,1 | 17,1 | 18,5 | 20,6  | 14,2 | 15,6 | 17,7 | 19,1 | 21,3  | 17,5 | 19,3 | 21,9 | 23,7 | 26,4 |
|      |             | 18                           | 12,3 | 13,7 | 15,7 | 17,1 | 19,2  | 12,8 | 14,2 | 16,3 | 17,7 | 19,8  | 15,8 | 17,5 | 20,1 | 21,9 | 24,6 |
| 20   | 11,0        | 12,3                         | 14,4 | 15,7 | 17,8 | 11,4 | 12,8  | 14,9 | 16,3 | 18,4 | 14,0 | 15,8  | 18,4 | 20,1 | 22,8 |      |      |
| 18.2 | Qo (m3 / h) | 8500                         |      |      |      |      | 11500 |      |      |      |      | 13000 |      |      |      |      |      |
|      | Qo (l / s)  | 2361                         |      |      |      |      | 3194  |      |      |      |      | 3611  |      |      |      |      |      |
|      | Ta (°C)     | 10                           | 17,9 | 19,2 | 21,3 | 22,7 | 24,9  | 21,4 | 23,0 | 25,5 | 27,2 | 29,8  | 22,9 | 24,7 | 27,4 | 29,2 | 31,9 |
|      |             | 12                           | 16,5 | 17,8 | 19,9 | 21,3 | 23,4  | 19,7 | 21,3 | 23,8 | 25,5 | 28,0  | 21,1 | 22,9 | 25,5 | 27,4 | 30,1 |
|      |             | 14                           | 15,1 | 16,5 | 18,5 | 19,9 | 22,0  | 18,0 | 19,7 | 22,1 | 23,8 | 26,3  | 19,3 | 21,1 | 23,7 | 25,5 | 28,2 |
|      |             | 16                           | 13,7 | 15,1 | 17,1 | 18,5 | 20,6  | 16,4 | 18,0 | 20,4 | 22,1 | 24,6  | 17,5 | 19,3 | 21,9 | 23,7 | 26,4 |
|      |             | 18                           | 12,3 | 13,7 | 15,7 | 17,1 | 19,2  | 14,7 | 16,3 | 18,8 | 20,4 | 22,9  | 15,8 | 17,5 | 20,1 | 21,9 | 24,6 |
| 20   | 11,0        | 12,3                         | 14,4 | 15,7 | 17,8 | 13,1 | 14,7  | 17,1 | 18,8 | 21,3 | 14,0 | 15,8  | 18,4 | 20,1 | 22,8 |      |      |
| 20.4 | Qo (m3 / h) | 12000                        |      |      |      |      | 13500 |      |      |      |      | 20000 |      |      |      |      |      |
|      | Qo (l / s)  | 3333                         |      |      |      |      | 3750  |      |      |      |      | 5556  |      |      |      |      |      |
|      | Ta (°C)     | 10                           | 26,7 | 28,7 | 31,8 | 33,9 | 37,0  | 28,6 | 30,8 | 34,1 | 36,4 | 39,7  | 36,0 | 38,8 | 43,0 | 45,8 | 50,1 |
|      |             | 12                           | 24,6 | 26,6 | 29,7 | 31,8 | 34,9  | 26,4 | 28,6 | 31,9 | 34,1 | 37,5  | 33,2 | 36,0 | 40,2 | 43,0 | 47,2 |
|      |             | 14                           | 22,6 | 24,6 | 27,6 | 29,7 | 32,8  | 24,3 | 26,4 | 29,7 | 31,9 | 35,2  | 30,5 | 33,2 | 37,4 | 40,2 | 44,4 |
|      |             | 16                           | 20,6 | 22,6 | 25,6 | 27,6 | 30,7  | 22,1 | 24,3 | 27,5 | 29,7 | 33,0  | 27,8 | 30,5 | 34,6 | 37,4 | 41,6 |
|      |             | 18                           | 18,6 | 20,6 | 23,6 | 25,6 | 28,7  | 19,9 | 22,1 | 25,3 | 27,5 | 30,8  | 25,0 | 27,8 | 31,8 | 34,6 | 38,8 |
| 20   | 16,6        | 18,6                         | 21,5 | 23,6 | 26,6 | 17,8 | 19,9  | 23,1 | 25,3 | 28,6 | 22,3 | 25,0  | 29,1 | 31,8 | 36,0 |      |      |

| SIZE |             | OUTDOOR AIR TEMPERATURE (°C) |      |      |      |      |       |      |      |      |      |       |      |      |      |      |      |
|------|-------------|------------------------------|------|------|------|------|-------|------|------|------|------|-------|------|------|------|------|------|
|      |             | 25                           | 27   | 30   | 32   | 35   | 25    | 27   | 30   | 32   | 35   | 25    | 27   | 30   | 32   | 35   |      |
|      |             | kWt                          | kWt  | kWt  | kWt  | kWt  | kWt   | kWt  | kWt  | kWt  | kWt  | kWt   | kWt  | kWt  | kWt  | kWt  |      |
| 25.4 | Qo (m3 / h) | 12000                        |      |      |      |      | 15000 |      |      |      |      | 20000 |      |      |      |      |      |
|      | Qo (l / s)  | 3333                         |      |      |      |      | 4167  |      |      |      |      | 5556  |      |      |      |      |      |
|      | Ta (°C)     | 10                           | 26,7 | 28,7 | 31,8 | 33,9 | 37,0  | 30,5 | 32,8 | 36,4 | 38,7 | 42,3  | 36,0 | 38,8 | 43,0 | 45,8 | 50,1 |
|      |             | 12                           | 24,6 | 26,6 | 29,7 | 31,8 | 34,9  | 28,2 | 30,5 | 34,0 | 36,3 | 39,9  | 33,2 | 36,0 | 40,2 | 43,0 | 47,2 |
|      |             | 14                           | 22,6 | 24,6 | 27,6 | 29,7 | 32,8  | 25,8 | 28,1 | 31,6 | 34,0 | 37,5  | 30,5 | 33,2 | 37,4 | 40,2 | 44,4 |
|      |             | 16                           | 20,6 | 22,6 | 25,6 | 27,6 | 30,7  | 23,5 | 25,8 | 29,3 | 31,6 | 35,1  | 27,8 | 30,5 | 34,6 | 37,4 | 41,6 |
|      |             | 18                           | 18,6 | 20,6 | 23,6 | 25,6 | 28,7  | 21,2 | 23,5 | 26,9 | 29,3 | 32,8  | 25,0 | 27,8 | 31,8 | 34,6 | 38,8 |
| 20   | 16,6        | 18,6                         | 21,5 | 23,6 | 26,6 | 18,9 | 21,2  | 24,6 | 26,9 | 30,4 | 22,3 | 25,0  | 29,1 | 31,8 | 36,0 |      |      |
| 30.4 | Qo (m3 / h) | 12000                        |      |      |      |      | 17000 |      |      |      |      | 20000 |      |      |      |      |      |
|      | Qo (l / s)  | 3333                         |      |      |      |      | 4722  |      |      |      |      | 5556  |      |      |      |      |      |
|      | Ta (°C)     | 10                           | 26,7 | 28,7 | 31,8 | 33,9 | 37,0  | 32,8 | 35,3 | 39,1 | 41,7 | 45,6  | 36,0 | 38,8 | 43,0 | 45,8 | 50,1 |
|      |             | 12                           | 24,6 | 26,6 | 29,7 | 31,8 | 34,9  | 30,3 | 32,8 | 36,6 | 39,1 | 43,0  | 33,2 | 36,0 | 40,2 | 43,0 | 47,2 |
|      |             | 14                           | 22,6 | 24,6 | 27,6 | 29,7 | 32,8  | 27,8 | 30,3 | 34,0 | 36,6 | 40,4  | 30,5 | 33,2 | 37,4 | 40,2 | 44,4 |
|      |             | 16                           | 20,6 | 22,6 | 25,6 | 27,6 | 30,7  | 25,3 | 27,8 | 31,5 | 34,0 | 37,8  | 27,8 | 30,5 | 34,6 | 37,4 | 41,6 |
|      |             | 18                           | 18,6 | 20,6 | 23,6 | 25,6 | 28,7  | 22,8 | 25,3 | 29,0 | 31,5 | 35,3  | 25,0 | 27,8 | 31,8 | 34,6 | 38,8 |
| 20   | 16,6        | 18,6                         | 21,5 | 23,6 | 26,6 | 20,4 | 22,8  | 26,5 | 29,0 | 32,8 | 22,3 | 25,0  | 29,1 | 31,8 | 36,0 |      |      |
| 33.4 | Qo (m3 / h) | 16000                        |      |      |      |      | 19000 |      |      |      |      | 25000 |      |      |      |      |      |
|      | Qo (l / s)  | 4444                         |      |      |      |      | 5278  |      |      |      |      | 6944  |      |      |      |      |      |
|      | Ta (°C)     | 10                           | 33,8 | 36,5 | 40,4 | 43,1 | 47,1  | 37,5 | 40,4 | 44,8 | 47,8 | 52,3  | 43,9 | 47,4 | 52,6 | 56,1 | 61,4 |
|      |             | 12                           | 31,2 | 33,8 | 37,7 | 40,4 | 44,4  | 34,5 | 37,4 | 41,8 | 44,8 | 49,2  | 40,5 | 43,9 | 49,0 | 52,5 | 57,8 |
|      |             | 14                           | 28,5 | 31,1 | 35,0 | 37,7 | 41,7  | 31,6 | 34,5 | 38,8 | 41,8 | 46,2  | 37,0 | 40,4 | 45,5 | 49,0 | 54,2 |
|      |             | 16                           | 25,9 | 28,5 | 32,4 | 35,0 | 39,0  | 28,7 | 31,6 | 35,9 | 38,8 | 43,2  | 33,6 | 37,0 | 42,1 | 45,5 | 50,7 |
|      |             | 18                           | 23,3 | 25,9 | 29,8 | 32,4 | 36,3  | 25,8 | 28,7 |      |      |       |      |      |      |      |      |

Ta = leaving air temperature from the handling coil and entering the post-heating coil

Qo = airflow (l/s)

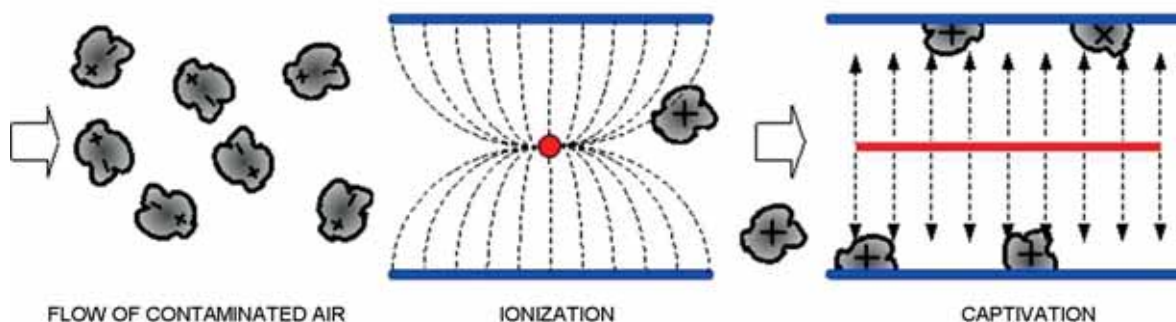
kWt = Heating capacity (kW)

The reheating coil is powered by the cold gas bled from the condensing coil.

As the condensation hot gas temperature is linked to the outdoor air temperature, the indicative potentials of the post-heating coil are expressed according to the outdoor air temperature.

## FES - H10 high efficiency electrostatic air filter

Class H10 high-efficiency filters are additional filtering components with an active electrostatic system. Solid or liquid particles contained in the air flow are trapped by an electrical field. The air flow through the filter is affected in two main phases: release of an electrical charge to the particles (ionization), and capture of the particles by electrostatic deposit (captivation). Periodically the filters must be cleaned to remove the captured particles (washing). The filters are able of trapping fine dusts, some types of viruses and micro-organisms (anti-bacterial action) with very modest pressure drops. The range of use normally includes fine powders that measure less than 1  $\mu\text{m}$ . Typical pollutants are cigarette smoke ( $0.5 \div 0.3 \mu\text{m}$ ), oily vapours ( $1 \div 0.2 \mu\text{m}$ ), PM10 (particles < 10  $\mu\text{m}$ ), PM2.5 (particles < 2.5  $\mu\text{m}$ ), PM1 (particles < 1  $\mu\text{m}$ ), etc. The clogging of the electric filter is signalled by a sensor that allows to schedule the periodic maintenance, which can be easily performed by washing in water with a special non-aggressive detergent for aluminium. The greater initial cost, as compared to a traditional pocket filter, is recovered quickly since the electrostatic filters last for the entire life of the unit, whereas pocket filters require periodic replacement.



**This option reduces the available static pressure (supply air side).**



The electronic filters are not suited to filter water steams also in low concentration, oily vapours, large amounts of dust, shavings, powdered iron filings and residues generally, gas. The electronic filters have to absolutely avoid all the following substances: powdered metals also fine, smoke produced by combustion of organic materials and not, flour dusts, dusts and vapours of explosive environments.

## F7 - F7 high efficiency air filter

The class F7 are filtering components that are in addition to the standard G4 filters, for more effective filtering. They are widely used in air conditioning systems and industrial applications that require suitable performance concerning fine dusts and particles with dimensions greater than 1  $\mu\text{m}$ . Class F7 filters are made of fibreglass paper, pleated with constant calibrated spacing, mounted on a metallic frame; the ample filtering surface reduces air side pressure drops. Class F7 filters must be replaced after reaching their limits of dirtiness with scheduled periodic maintenance. An optional accessory, dirty filter differential switch, can be fitted to signal when admissible limit of fouling has been reached so as not to excessively reduce the airflow with respect to the nominal value



**This option reduces the available static pressure (supply air side).**

## PSAF - Clogged filter differential pressure switch air side

It makes it possible to detect and signal (with a suitable alarm) when the dirtiness of the air filter reaches its maximum level. This provides the unit operator with information on when filter maintenance is required. The detection signal is installed in the unit. It is already connected to the electrical panel and pre-calibrated in the factory. Calibration can be modified by an authorized personnel.



## CCCA - Copper / aluminium coil with acrylic lining

Coils with copper pipes and aluminium fins with acrylic lacquering. Can be used in settings with moderately aggressive low 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



Option available on request



## CCCA1 - Copper/aluminum coil with Fin Guard (Silver) treatment

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.



Option available on request



## CCCC - Copper / copper coil

Coils with copper pipes, copper fins and brass structure. Can be used in settings with moderately aggressive saline concentrations and other chemical agents. The options are available for:

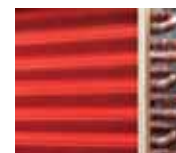
- external coil
- internal coil
- hot water coil
- re-heating coil



This option is not suitable for application in sulphuric environments



Option available on request



## HSE - Immersed electrodes steam humidifier

This device is suitable for winter operation when humidity is required for the ambient without cooling the air flow.

The automatic modulating control allows you to adjust the steam production and its relative management costs to the actual requirements.

Available in different capacities, the device is suitable for using soft water having medium conductivity and is equipped with: water load solenoid valve, disposable cylinder, water drainage solenoid valve, distribution nozzle, control electronic board to verify the water level, conductivity, anti-foam device, water drainage manual forcing. To ensure maximum hygiene, the cylinder can automatically empty after a determined period of stand-by.

The accessory is installed inside the unit and is connected to the electrical panel of the unit.

Ambient humidity is measured by means of a return humidity probe, which is provided already assembled and wired built-in the unit.

With the option is available a potential-free contact for the water emptying during the period in which the unit is not used (connection provided by the Customer).



### Matching of immersed electrode and steam humidification module

| Size    | 15.2 | 18.2 | 20.4 | 25.4 | 30.4 | 33.4 | 40.4 | 44.4 |
|---------|------|------|------|------|------|------|------|------|
| 3 kg/h  | √    | √    | √    | √    | √    | -    | -    | -    |
| 5 kg/h  | √    | √    | √    | √    | √    | -    | -    | -    |
| 8 kg/h  | √    | √    | √    | √    | √    | √    | √    | √    |
| 15 kg/h | √    | √    | √    | √    | √    | √    | √    | √    |



This option involves variation of the main electrical data of the unit.



This accessory requires connection to a water supply network and discharge water circuit with adequate frost protection. Requires its own power supply and have to be connected to the unit. Installation and wiring to customer care.



## HWS - Water to waste evaporating wet-deck humidifier

This option is recommended when quick, efficient humidification of the served room during winter operation is required. Humidification of the air mixture occurs by passing the air flow through a honeycomb package that is kept humid at all times by a series of nozzles that inject water in small drops. The reserve of water for treatment is taken directly from the water mains. During operation, the pure water vapour is mixed with the air currents. The remaining part, enriched with mineral salts, is collected in the tub and eliminated. The constant exchange of water ensures cleaning of the evaporation septum and provides maximum limitation of the formation and proliferation of Legionnaire's Disease. With this option, energy consumption for water evaporation is limited. Whenever the packaged humidifier is active, in addition to humidifying, adiabatic cooling of the air takes place, which is constantly compensated for by the thermal control device. Direct connection to the plumbing system eliminates the need for special water treatment and easy control of the humidification process by means of the measuring and adjusting device of the water flow rate provided standard.



The accessory is installed inside the unit and is connected to the electrical panel of the unit.

Ambient humidity is measured by means of a return humidity probe, which is provided already assembled and wired built-in the unit.

### Calculation of evaporating water flow from the humidifier

| Size         |              | 15.2 | 18.2 | 20.4 | 25.4 | 30.4 | 33.4 | 40.4 | 44.4 |
|--------------|--------------|------|------|------|------|------|------|------|------|
| TA (°C) D.B. | TA (°C) W.B. | kg/h | kg/h | kg/h | kg/h | kg/h | kg/h | kg/h | kg/h |
| 30           | 15,1         | 26   | 33   | 39   | 43   | 49   | 53   | 60   | 66   |
| 35           | 17,6         | 32   | 41   | 49   | 54   | 61   | 67   | 76   | 83   |
| 40           | 19,8         | 39   | 50   | 59   | 66   | 74   | 81   | 92   | 101  |

Ta D.B.= dry bulb temperature of inlet air to the wet deck.

Ta W.B.= wet bulb temperature of inlet air to the wet deck.

Approximate values of the maximum rate of steam released by the steam humidifier to the air to obtain controlled thermal and humidity conditions in supply. The data refer to a unit with standard airflow in supply.

### Calculating water flow to the humidifier

| Size         |              | 15.2  | 18.2  | 20.4  | 25.4  | 30.4  | 33.4  | 40.4  | 44.4  |
|--------------|--------------|-------|-------|-------|-------|-------|-------|-------|-------|
| TA (°C) D.B. | TA (°C) W.B. | l/min | l/min | l/min | l/min | l/min | l/min | l/min | l/min |
| 30           | 15,1         | 1     | 1     | 2     | 2     | 2     | 2     | 3     | 3     |
| 35           | 17,6         | 1     | 2     | 2     | 2     | 3     | 3     | 3     | 3     |
| 40           | 19,8         | 2     | 2     | 2     | 3     | 3     | 3     | 4     | 4     |

Ta D.B.= dry bulb temperature of inlet air to the wet deck.

Ta W.B.= wet bulb temperature of inlet air to the wet deck.

Approximate values of the maximum rate of steam released by the steam humidifier to the air to obtain controlled thermal and humidity conditions in supply. The data refer to a unit with standard airflow in supply.

The table shows the indicative water flow rates for the calibration of the flow rate meter supplied with the wet pack.

The values have been obtained considering an average efficiency of the wet pack equal to 50%

### This option reduces the available static pressure (supply air side).



This accessory requires connection to a water supply network and discharge water circuit. To customer care.



Not available if re-heating is present.

- during use there will be a part of water that will be dispersed and not totally supplied to the air flow, this to ensure the humidification of the entire surface and to carry out a continuous washing of the septum.
- do not use particularly hard water. The presence of limestone ( $\text{CaCO}_3$ ) may lead to progressive obstruction to water distribution
- the humidification effect can be reduced over time depending on the quality of the water used and the progressive deterioration of the component materials.

## CSOND - Humidity and temperature control with built-in probes

This option makes it possible to measure the temperature and humidity of the ambient directly on the airflow entering the unit. The automatic thermal regulation is done using the on-board probes, whereas the probes on the remote control are inhibited.

## CTERM - Humidity and temperature control with remote thermostat

This option makes it possible to directly measure the temperature and humidity of the ambient. The automatic thermal regulation is done on the humidity and temperature probes in the thermostat installed in ambient.

## PAQC - Air quality probe for the CO2 rate check

This option is recommended for areas with highly variable crowding. The probe measure the amount of CO<sub>2</sub> in the environment and initiates a 0/10V proportional signal. Based on the received signal, the controller regulates amount of outdoor air necessary for IAQ ventilation and thus minimises energy used for treatment.

The probe is installed and wired built-in the unit and is located in the return air duct of the unit.



## PAQCV - Air quality probe for the CO2 and VOC rate check

The option is recommended in areas with tobacco smoke, formaldehyde (from solvents, deodorants, glues, paints, detergents, food preparation, etc). The probe measures the rate of CO<sub>2</sub> and VOC (volatile organic compounds) in the environment and initiates a 0/10V proportional signal. Based on the received signal, the controller regulates amount of outdoor air necessary for IAQ ventilation and thus minimises energy used for treatment.

The probe is installed and wired built-in the unit and is located in the return air duct of the unit.

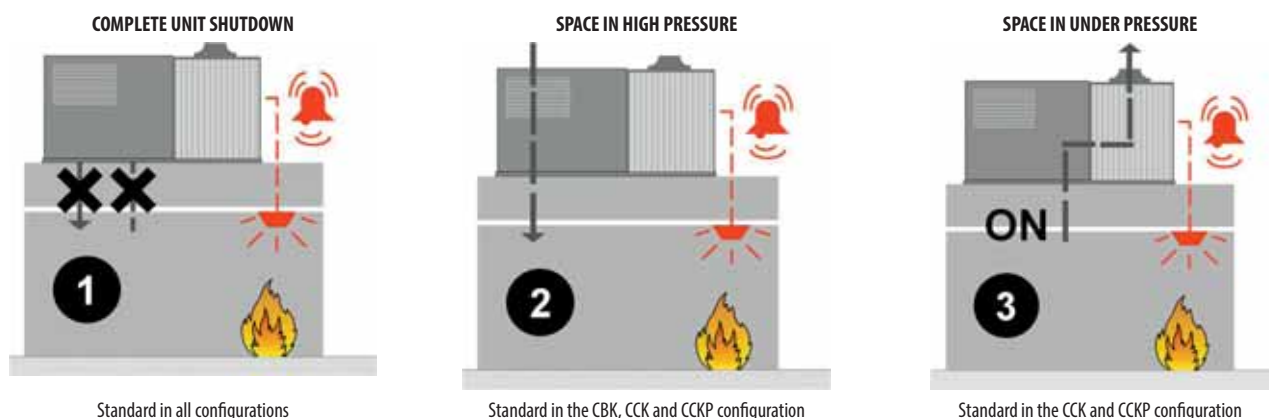


## DESM - Smoke detector

This option allows detection of smoke in the room by analyzing the return air. The Tyndal-effect increased sensitivity smoke detector is perfect for ventilation ducts since it is able to detect rarefied smoke in high-speed air flows. Smoke detection occurs using a photo-optical system with a labyrinth chamber. The alarm signal is processed by a built-in micro-processor which verifies the condition and sends a message to the unit controller such as smoke alarm, failure, or service required. The device is installed inside the return duct and it is made up of a sensor, installed inside the return piping, and of a controller that is located on the outside duct.



## Control logics in the event of alarm signal



The unit is able to manage the signal coming from a fire detection system or fire control unit installed built-in, activating one of the logics illustrated, which can be set by parameters. In presence of alarm signal, the compressors are always switched off; moreover, the remote ON-OFF is disabled together with the switch on/off control from keypad. The unit is manually reset. Rooftop units cannot be used as fume extractor.



Any fire detection devices built-in the unit must be considered as an auxiliary safety system, and, accordingly, must not be a replacement for any fire detection devices in the room.

## CREFB - ECOBREEZE external section fans consumption reduction device

Option indicated to reduce the ventilation electric energy consumption considerably and limit sound emissions inside the external section of the unit. ECOBREEZE logic allows the external axial fans to operate at a variable rotation speed, according to the operation conditions of the cooling circuit. Reducing the speed when the heat load is reduced, benefits the sound emissions, especially during the night, when sensitivity to noise is enhanced.

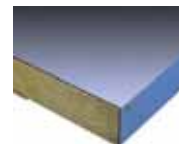
During summer operation, fans can further increase their speed, to respond to situations in which operation limits are temporarily exceeded. ECOBREEZE option uses special fans powered by brushless electrical motors, with complete electronic control, and distinguished by a very high efficiency.

To ensure the continuous cooling operation even at temperatures lower than 15°C, the option is necessary to maintain a proper condensation on the external exchanger.



## PCM0 - Sandwich panels of the handling zone in M0 fire reaction class

Option indicated when, by law, the air treatment area must have metallic internal walls made with fire-proof insulating material. Sandwich panels with dual walls made of steel sheet metal with fire-proof insulation made of Rockwool (90 kg/m<sup>3</sup>) comply with the French standards, which require "M0" reaction to fire class.



## MHP - High and low pressure gauges

Allows the pressure measurement of the refrigerant to the compressor intake and supply, making the inspection of these parameters easier for the technicians involved in the management of the unit.

The two liquid pressure gauges and corresponding pressure sockets are installed built-in the unit in an easily accessible location.



## PTCO - Set up for shipping via container

Option that allows shipping via container.

It includes the sheet steel slide application for an easy unit scrolling, packaging with protective angle brackets and nylons, anchoring systems. If necessary the lateral lifting brackets and the main isolator switch handle can be removed to avoid damages during transport (components removed and put inside the unit).

For particular requirements, please contact Clivet Shipping Department.

## VENH - High static pressure fans

A higher capacity fan section is available for applications requiring high supply and return head. The option is comprised of radial fans coupled directly to electronically controlled motors (brushless). When you select a unit on the [www.clivet.com](http://www.clivet.com) website, if you enter the air flow, the available supply and return pressure and the accessories that determine the head loss on the air side, you will be automatically shown a selection of high head fans, when required.

**This option reduces the available static pressure (supply air side).**

et 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)

## FCE - Enthalpic FREE-COOLING

This option is used to reduce energy consumption and compressor wear by using the outdoor air as an energy source to lower the thermal loads and ambient humidity. The temperature control compares the temperature and the humidity between the outdoor environment and the served environment and decides the amount of fresh air needed to guarantee the correct temperature and humidity set-points in the environment, keeping the compressors shut off.

The air humidity, both outside and inside the environment, is measured by means of humidity probes on the outdoor and return air intake, which are provided already installed and wired on the unit.

## DML - Demand Limit

The partial or total activation of the compressors - and the heating electric resistance where present - can be disabled to limit the overall electric capacity absorbed. The external signal is of analogical type 4-20 mA. The greater the signal, the lower the capacity that the unit is enabled to deliver, activating the compressors and the electric elements.

The Demand Limit function does not act on the control or on the ventilation, which are therefore always guaranteed, nor on the remaining resources such as hot water coil or the gas heating module. The Demand Limit function on the reversible heat pump models can affect any automatic defrosting cycles. In these conditions, the user can therefore decide to limit its activation.



The represented number of compressors constitutes an indicative example

## CMSC9 - Serial communication module for 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 for LonWorks supervisor

It allows the serial connection to supervision systems, using LonWorks as the communication protocol. It allows access to a list of operating variables, control and alarms compliant 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.



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

## CMSC11 - Serial communication module for BACnet-IP supervisor

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 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)

## 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, such as asynchronous motors. By re-phasing it is possible to reduce the intensity of the line current by reducing a part of the power of the mains (reactive power). This leads to an economic benefit which the energy provider grants to the final user. The component makes it possible to bring the cosfi power factor to values which on average are greater than 0.9.

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



## PM - Phase monitor

The phase monitor allows verifying the proper phase connection and their unbalance in the units, which are powered by a three-phase system.

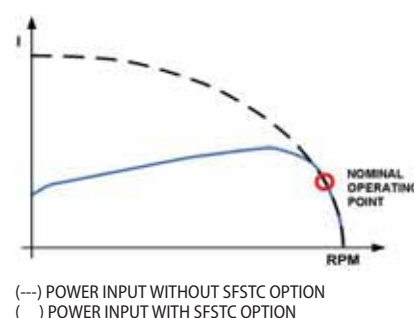
The monitor communicates with the control circuit and orders the switch-off of the unit, should one of the following cases occur: improper phase connection, the limit value referring to the unbalance between the phases is exceeded, over/undervoltage for a certain amount of time. Once the line conditions are restored, the unit is reactivated manually.

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

## SFSTC - Progressive compressor start-up Soft starter

This option is also known as "Soft starter". An electronic device which automatically starts up the compressors gradually, reducing the starting current for the unit by around 40% in comparison with the nominal value. This results in the electrical capacity system and the related protection devices being sized with lower parameters, thus having a lower initial investment cost.

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



## Accessories separately supplied

### AMRX - Rubber antivibration mounts

The rubber antivibration mounts must be fixed to designated housings on the support stringers and are used to dampen vibrations produced by the unit, thereby reducing the noise transmitted to the support structures. They are flexible bodies able to dampen axial and tangential stresses and maintain the mechanical properties almost constant over time thanks to high resistance materials of which they are made.

Alternatively, rubberized neoprene anti-vibration strips may be used on the unit longitudinal support members (not supplied by Clivet).



### CLMX - Clivet Master System

CLIVET MASTER SYSTEM is the ideal system for the remote and centralised control of the CLIVETPack and SMARTPack climate control units. It can manage up to eight units connected with a serial connection.

It includes a box for wall installation, as well as the electronic power supply and serial communication devices, a controller with a touch-screen display and a USB port at the front used to export the alarm log.

The device allows to easily and intuitively access all the information on the status of the system and the climate control units. It also provides:

- auto-detection of units connected,
- setting all unit parameters,
- setting of the zone set-point
- unit status display,
- control and management of the alarms and creation of an alarm log,
- hourly operation scheduling (ON / OFF / ECO),
- rotation of the units even for individual areas,
- temperature, humidity and air quality trends
- automatic language management (English, Italian, French, Spanish and German)



The component must be combined with the RS485 serial port option with Modbus protocol built-in of each rooftop



Operating temperature from 0°C to 50°C with relative humidity lower than 90% without condensate

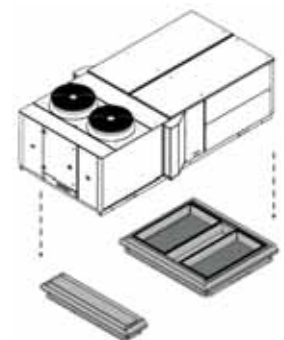
### RCX - Roof curb

Option that allows to connect the unit to the building roof, ideal with downflow supply and return.

It is made up of two part, a solid steel frame for the air duct connection and a adjustment support in height. Both parts are made of galvanized steel with a steel rain cover profile painted in the same unit colour. It has an adequate support and a duct connection simplification. It is supplied not assembled and it has to be assembled directly in the construction site, to facilitate the transport and installation. It is complete with adjusting screws to adapt to any slopes or difference in height of the cover. Once the frame is assembled, it will be necessary to insulate and seal the roof curb to the roof to guarantee the resistance to atmospheric agents, later it will be necessary only to place the unit.



Option not available with gas module.



## Performance

On the web site [www.clivet.com](http://www.clivet.com) are available the performances of the CAK, CBK, CCK configurations.

### Size 15.2 CCKP configuration

#### Cooling performance with 30% of outdoor air

| Airflow    | Ta °C DB/WB | Outdoor air temperature °C D.B./W.B. |      |     |     |         |      |      |     |         |      |      |     |         |      |      |     |         |      |      |     |         |      |      |     |
|------------|-------------|--------------------------------------|------|-----|-----|---------|------|------|-----|---------|------|------|-----|---------|------|------|-----|---------|------|------|-----|---------|------|------|-----|
|            |             | 20 / 12                              |      |     |     | 25 / 18 |      |      |     | 30 / 22 |      |      |     | 35 / 24 |      |      |     | 40 / 25 |      |      |     | 45 / 26 |      |      |     |
|            |             | kWf                                  | kWs  | kWe | EER | kWf     | kWs  | kWe  | EER | kWf     | kWs  | kWe  | EER | kWf     | kWs  | kWe  | EER | kWf     | kWs  | kWe  | EER | kWf     | kWs  | kWe  | EER |
| 8500 m³/h  | 22 / 16     | 50,5                                 | 37,6 | 8,9 | 5,7 | 54,3    | 38,7 | 10,0 | 5,4 | 53,4    | 37,3 | 11,1 | 4,8 | 51,1    | 38,4 | 12,5 | 4,1 | 49,1    | 40,7 | 13,9 | 3,5 | 49,3    | 42,3 | 15,9 | 3,1 |
|            | 24 / 17     | 51,9                                 | 39,0 | 8,9 | 5,8 | 55,2    | 40,2 | 10,0 | 5,5 | 54,6    | 39,2 | 11,2 | 4,9 | 51,9    | 39,9 | 12,6 | 4,1 | 50,2    | 42,2 | 14,0 | 3,6 | 50,3    | 43,5 | 16,0 | 3,1 |
|            | 26 / 18     | 53,3                                 | 40,3 | 9,0 | 5,9 | 54,7    | 40,4 | 10,1 | 5,4 | 55,8    | 41,1 | 11,3 | 4,9 | 53,4    | 41,9 | 12,6 | 4,2 | 51,2    | 43,6 | 14,1 | 3,6 | 51,1    | 44,2 | 16,1 | 3,2 |
|            | 27 / 19     | 54,2                                 | 39,9 | 9,1 | 6,0 | 54,7    | 39,5 | 10,2 | 5,4 | 55,7    | 40,2 | 11,3 | 4,9 | 54,4    | 41,8 | 12,7 | 4,3 | 52,2    | 43,3 | 14,2 | 3,7 | 51,7    | 43,9 | 16,2 | 3,2 |
|            | 28 / 20     | 55,2                                 | 39,5 | 9,1 | 6,1 | 54,7    | 38,5 | 10,2 | 5,4 | 55,7    | 39,2 | 11,4 | 4,9 | 55,4    | 41,7 | 12,7 | 4,4 | 53,1    | 43,1 | 14,3 | 3,7 | 52,4    | 43,6 | 16,3 | 3,2 |
|            | 30 / 22     | 57,0                                 | 38,6 | 9,2 | 6,2 | 56,4    | 37,6 | 10,3 | 5,5 | 55,5    | 37,3 | 11,5 | 4,8 | 57,1    | 41,0 | 12,8 | 4,5 | 55,0    | 42,6 | 14,4 | 3,8 | -       | -    | -    | -   |
| 9000 m³/h  | 22 / 16     | 50,9                                 | 38,4 | 8,9 | 5,7 | 54,7    | 39,4 | 10,0 | 5,5 | 53,8    | 38,3 | 11,2 | 4,8 | 51,5    | 39,1 | 12,5 | 4,1 | 49,5    | 41,6 | 13,9 | 3,6 | 49,7    | 43,4 | 15,9 | 3,1 |
|            | 24 / 17     | 52,3                                 | 39,8 | 9,0 | 5,8 | 55,7    | 41,1 | 10,1 | 5,5 | 55,0    | 40,1 | 11,2 | 4,9 | 52,3    | 40,7 | 12,6 | 4,2 | 50,6    | 43,2 | 14,0 | 3,6 | 50,8    | 44,6 | 16,1 | 3,2 |
|            | 26 / 18     | 53,7                                 | 41,3 | 9,0 | 6,0 | 55,1    | 41,3 | 10,1 | 5,5 | 56,2    | 42,0 | 11,3 | 5,0 | 53,9    | 42,8 | 12,7 | 4,2 | 51,8    | 44,6 | 14,2 | 3,6 | 51,6    | 45,3 | 16,2 | 3,2 |
|            | 27 / 19     | 54,7                                 | 40,9 | 9,1 | 6,0 | 55,1    | 40,3 | 10,2 | 5,4 | 56,1    | 41,1 | 11,4 | 4,9 | 55,0    | 42,7 | 12,7 | 4,3 | 52,7    | 44,4 | 14,2 | 3,7 | 52,3    | 45,0 | 16,3 | 3,2 |
|            | 28 / 20     | 55,6                                 | 40,4 | 9,1 | 6,1 | 55,1    | 39,3 | 10,2 | 5,4 | 56,0    | 40,1 | 11,4 | 4,9 | 56,0    | 42,5 | 12,7 | 4,4 | 53,5    | 44,2 | 14,3 | 3,7 | 52,9    | 44,7 | 16,4 | 3,2 |
|            | 30 / 22     | 57,5                                 | 39,5 | 9,2 | 6,3 | 56,8    | 38,4 | 10,3 | 5,5 | 55,9    | 38,1 | 11,5 | 4,9 | 57,5    | 41,8 | 12,9 | 4,5 | 55,3    | 43,7 | 14,4 | 3,8 | -       | -    | -    | -   |
| 13000 m³/h | 22 / 16     | 53,6                                 | 44,2 | 9,0 | 6,0 | 57,6    | 44,7 | 10,2 | 5,6 | 56,7    | 43,5 | 11,4 | 5,0 | 54,2    | 45,1 | 12,6 | 4,3 | 52,4    | 48,4 | 14,2 | 3,7 | 51,5    | 51,5 | 16,2 | 3,2 |
|            | 24 / 17     | 55,1                                 | 46,2 | 9,1 | 6,1 | 58,8    | 47,0 | 10,3 | 5,7 | 57,8    | 46,3 | 11,4 | 5,1 | 54,9    | 47,5 | 12,7 | 4,3 | 53,2    | 50,9 | 14,2 | 3,7 | 52,2    | 52,2 | 16,3 | 3,2 |
|            | 26 / 18     | 56,6                                 | 48,2 | 9,2 | 6,2 | 58,1    | 47,8 | 10,3 | 5,6 | 59,0    | 48,9 | 11,5 | 5,1 | 56,7    | 49,8 | 12,8 | 4,4 | 54,1    | 53,3 | 14,3 | 3,8 | 53,7    | 52,7 | 16,5 | 3,3 |
|            | 27 / 19     | 57,6                                 | 47,7 | 9,2 | 6,3 | 58,0    | 46,6 | 10,4 | 5,6 | 58,9    | 47,7 | 11,5 | 5,1 | 57,8    | 49,2 | 12,9 | 4,5 | 55,0    | 53,0 | 14,4 | 3,8 | 54,7    | 52,7 | 16,6 | 3,3 |
|            | 28 / 20     | 58,5                                 | 47,1 | 9,3 | 6,3 | 57,9    | 45,4 | 10,4 | 5,6 | 58,8    | 46,5 | 11,6 | 5,1 | 59,0    | 48,7 | 13,0 | 4,5 | 56,0    | 52,6 | 14,4 | 3,9 | 55,8    | 52,6 | 16,8 | 3,3 |
|            | 30 / 22     | 60,5                                 | 45,7 | 9,4 | 6,4 | 59,6    | 44,2 | 10,5 | 5,7 | 58,7    | 43,9 | 11,7 | 5,0 | 60,6    | 48,0 | 13,1 | 4,6 | 58,0    | 51,9 | 14,6 | 4,0 | -       | -    | -    | -   |

#### Heating performance with 30% of outdoor and exhaust air

| Airflow    | Ta (°C) DB | Outdoor air temperature °C D.B./W.B. |     |      |         |     |      |        |     |      |       |     |      |       |      |      |         |      |      |
|------------|------------|--------------------------------------|-----|------|---------|-----|------|--------|-----|------|-------|-----|------|-------|------|------|---------|------|------|
|            |            | -7 / -8                              |     |      | -5 / -6 |     |      | 0 / -1 |     |      | 2 / 1 |     |      | 7 / 6 |      |      | 12 / 11 |      |      |
|            |            | kWt                                  | kWe | COP  | kWt     | kWe | COP  | kWt    | kWe | COP  | kWt   | kWe | COP  | kWt   | kWe  | COP  | kWt     | kWe  | COP  |
| 8500 m³/h  | 10         | 37,6                                 | 6,4 | 5,88 | 39,4    | 6,6 | 5,97 | 43,3   | 7,2 | 6,01 | 44,8  | 7,5 | 5,97 | 48,7  | 8,1  | 6,01 | 52,2    | 8,7  | 6,00 |
|            | 15         | 37,7                                 | 7,0 | 5,39 | 39,4    | 7,2 | 5,47 | 44,0   | 7,8 | 5,64 | 45,8  | 8,1 | 5,65 | 49,5  | 8,8  | 5,63 | 53,2    | 9,5  | 5,60 |
|            | 18         | 37,7                                 | 7,3 | 5,16 | 39,4    | 7,6 | 5,18 | 44,1   | 8,2 | 5,38 | 45,8  | 8,5 | 5,39 | 49,9  | 9,3  | 5,37 | 53,5    | 9,9  | 5,40 |
|            | 20         | 37,8                                 | 7,6 | 4,97 | 39,5    | 7,8 | 5,06 | 44,2   | 8,5 | 5,20 | 45,8  | 8,8 | 5,20 | 49,8  | 9,5  | 5,24 | 53,4    | 10,1 | 5,29 |
|            | 22         | 37,9                                 | 7,9 | 4,80 | 39,6    | 8,1 | 4,89 | 44,3   | 8,8 | 5,03 | 45,7  | 9,0 | 5,08 | 49,5  | 9,7  | 5,10 | 53,3    | 10,3 | 5,17 |
|            | 25         | 38,0                                 | 8,2 | 4,63 | 39,7    | 8,5 | 4,67 | 44,1   | 9,1 | 4,85 | 45,5  | 9,4 | 4,84 | 49,0  | 10,0 | 4,90 | 53,1    | 10,7 | 4,96 |
| 9000 m³/h  | 10         | 37,6                                 | 6,3 | 5,97 | 39,4    | 6,5 | 6,06 | 43,3   | 7,1 | 6,10 | 44,8  | 7,4 | 6,05 | 48,7  | 7,9  | 6,16 | 52,3    | 8,5  | 6,15 |
|            | 15         | 37,7                                 | 6,9 | 5,46 | 39,4    | 7,1 | 5,55 | 44,0   | 7,7 | 5,71 | 45,9  | 8,0 | 5,74 | 49,5  | 8,7  | 5,69 | 53,3    | 9,3  | 5,73 |
|            | 18         | 37,7                                 | 7,3 | 5,16 | 39,5    | 7,5 | 5,27 | 44,1   | 8,1 | 5,44 | 45,9  | 8,4 | 5,46 | 49,9  | 9,1  | 5,48 | 53,5    | 9,7  | 5,52 |
|            | 20         | 37,8                                 | 7,5 | 5,04 | 39,6    | 7,7 | 5,14 | 44,2   | 8,4 | 5,26 | 45,9  | 8,7 | 5,28 | 49,8  | 9,3  | 5,35 | 53,4    | 9,9  | 5,39 |
|            | 22         | 37,9                                 | 7,8 | 4,86 | 39,6    | 8,0 | 4,95 | 44,3   | 8,7 | 5,09 | 45,8  | 8,9 | 5,15 | 49,5  | 9,5  | 5,21 | 53,3    | 10,2 | 5,23 |
|            | 25         | 38,0                                 | 8,1 | 4,69 | 39,8    | 8,4 | 4,74 | 44,1   | 9,0 | 4,90 | 45,5  | 9,3 | 4,89 | 49,1  | 9,8  | 5,01 | 53,2    | 10,5 | 5,07 |
| 13000 m³/h | 10         | -                                    | -   | -    | 39,7    | 6,0 | 6,62 | 43,5   | 6,6 | 6,59 | 45,0  | 6,7 | 6,72 | 49,1  | 7,2  | 6,82 | 52,7    | 7,7  | 6,84 |
|            | 15         | 37,9                                 | 6,4 | 5,92 | 39,7    | 6,6 | 6,02 | 44,1   | 7,1 | 6,21 | 46,0  | 7,4 | 6,22 | 49,8  | 7,9  | 6,30 | 53,6    | 8,4  | 6,38 |
|            | 18         | 37,9                                 | 6,8 | 5,57 | 39,7    | 7,0 | 5,67 | 44,2   | 7,5 | 5,89 | 46,0  | 7,7 | 5,97 | 50,1  | 8,3  | 6,04 | 53,9    | 8,8  | 6,13 |
|            | 20         | 38,0                                 | 7,0 | 5,43 | 39,8    | 7,3 | 5,45 | 44,3   | 7,8 | 5,68 | 46,0  | 8,0 | 5,75 | 50,1  | 8,5  | 5,89 | 54,0    | 9,0  | 6,00 |
|            | 22         | 38,1                                 | 7,3 | 5,22 | 39,9    | 7,5 | 5,32 | 44,3   | 8,0 | 5,54 | 45,9  | 8,2 | 5,60 | 49,9  | 8,7  | 5,74 | 54,0    | 9,2  | 5,87 |
|            | 25         | 38,2                                 | 7,6 | 5,03 | 40,0    | 7,9 | 5,06 | 44,2   | 8,4 | 5,26 | 45,7  | 8,6 | 5,31 | 49,5  | 9,0  | 5,50 | 54,0    | 9,6  | 5,63 |

Ta = Indoor air temperature D.B./W.B.

DB = Dry bulb

WB = Wet bulb

kWf = Cooling capacity in kW

kWs = Sensible cooling capacity (kW)

kWe = Compressor power input in kW

kWt = Heating capacity (kW)

EER referred only to compressors

COP referred only to compressors

The fan motor heating is not considered

#### Integrated heating capacities

| Air temperature external exchanger inlet °C (D.B. / W.B.) | -5 / -5.4 | 0 / -0.6 | 5 / 3.9 | Others |
|-----------------------------------------------------------|-----------|----------|---------|--------|
| Heating capacity multiplication coefficient               | 0,89      | 0,88     | 0,94    | 1      |

The integrated heating capacity represents the real heating capacity considering the defrost cycles too.

To obtain the integrated heating capacity multiply the heating performance value in kWt (shown in the heating performance tables) by the coefficients indicated in the table.

DB = dry bulb

WB = wet bulb

In case of below zero external air temperature with a long period of heat pump operating mode it is necessary to help the evacuation of the water produced during the defrost cycle; this to avoid the formation of ice in the unit basement. Pay attention that the evacuation will not create inconveniences to things or persons.



## Size 18.2 CCKP configuration

### Cooling performance with 30% of outdoor air

| Airflow       | Ta °C<br>DB/WB | Outdoor air temperature °C D.B./W.B. |      |      |     |         |      |      |     |         |      |      |     |         |      |      |     |         |      |      |     |         |      |      |     |
|---------------|----------------|--------------------------------------|------|------|-----|---------|------|------|-----|---------|------|------|-----|---------|------|------|-----|---------|------|------|-----|---------|------|------|-----|
|               |                | 20 / 12                              |      |      |     | 25 / 18 |      |      |     | 30 / 22 |      |      |     | 35 / 24 |      |      |     | 40 / 25 |      |      |     | 45 / 26 |      |      |     |
|               |                | kWf                                  | kWs  | kWe  | EER | kWf     | kWs  | kWe  | EER | kWf     | kWs  | kWe  | EER | kWf     | kWs  | kWe  | EER | kWf     | kWs  | kWe  | EER | kWf     | kWs  | kWe  | EER |
| 8500<br>m³/h  | 22 / 16        | 58,6                                 | 42,7 | 11,2 | 5,2 | 62,9    | 43,5 | 12,6 | 5,0 | 61,9    | 42,4 | 14,3 | 4,3 | 58,7    | 41,9 | 16,0 | 3,7 | 56,5    | 43,9 | 18,3 | 3,1 | 55,6    | 44,6 | 21,5 | 2,6 |
|               | 24 / 17        | 60,1                                 | 44,1 | 11,3 | 5,3 | 64,0    | 44,7 | 12,7 | 5,0 | 63,2    | 44,1 | 14,3 | 4,4 | 59,2    | 43,2 | 16,0 | 3,7 | 57,1    | 45,7 | 18,5 | 3,1 | 56,0    | 45,6 | 21,6 | 2,6 |
|               | 26 / 18        | 61,7                                 | 45,4 | 11,4 | 5,4 | 63,2    | 45,2 | 12,8 | 4,9 | 64,5    | 45,7 | 14,4 | 4,5 | 61,1    | 45,4 | 16,2 | 3,8 | 57,9    | 47,4 | 18,7 | 3,1 | 57,6    | 46,5 | 22,0 | 2,6 |
|               | 27 / 19        | 62,8                                 | 45,0 | 11,5 | 5,5 | 63,0    | 44,4 | 12,9 | 4,9 | 64,4    | 44,7 | 14,5 | 4,4 | 62,3    | 45,4 | 16,3 | 3,8 | 58,9    | 47,1 | 18,8 | 3,1 | 58,9    | 46,2 | 22,2 | 2,7 |
|               | 28 / 20        | 63,8                                 | 44,6 | 11,5 | 5,5 | 62,9    | 43,6 | 12,9 | 4,9 | 64,3    | 43,6 | 14,5 | 4,4 | 63,5    | 45,5 | 16,4 | 3,9 | 60,0    | 46,8 | 18,8 | 3,2 | 60,3    | 45,8 | 22,3 | 2,7 |
|               | 30 / 22        | 65,9                                 | 43,7 | 11,6 | 5,7 | 64,7    | 42,6 | 13,0 | 5,0 | 64,1    | 41,5 | 14,7 | 4,4 | 65,5    | 44,6 | 16,6 | 3,9 | 62,2    | 46,2 | 19,0 | 3,3 | -       | -    | -    | -   |
| 11500<br>m³/h | 22 / 16        | 61,7                                 | 47,4 | 11,4 | 5,4 | 66,3    | 47,9 | 12,8 | 5,2 | 65,2    | 46,5 | 14,4 | 4,5 | 61,8    | 46,4 | 16,2 | 3,8 | 59,7    | 49,4 | 18,7 | 3,2 | 60,5    | 51,5 | 22,5 | 2,7 |
|               | 24 / 17        | 63,3                                 | 49,1 | 11,5 | 5,5 | 67,5    | 49,8 | 12,9 | 5,2 | 66,4    | 48,7 | 14,5 | 4,6 | 62,5    | 48,0 | 16,3 | 3,8 | 61,1    | 51,2 | 18,9 | 3,2 | 61,5    | 53,1 | 22,7 | 2,7 |
|               | 26 / 18        | 64,9                                 | 50,7 | 11,6 | 5,6 | 66,5    | 50,4 | 13,0 | 5,1 | 67,6    | 50,9 | 14,6 | 4,6 | 64,4    | 51,0 | 16,5 | 3,9 | 62,5    | 53,0 | 19,0 | 3,3 | 62,3    | 53,6 | 22,7 | 2,7 |
|               | 27 / 19        | 66,0                                 | 50,2 | 11,6 | 5,7 | 66,4    | 49,3 | 13,1 | 5,1 | 67,4    | 49,6 | 14,7 | 4,6 | 65,7    | 51,0 | 16,5 | 4,0 | 63,7    | 52,6 | 19,1 | 3,3 | 63,1    | 53,1 | 22,8 | 2,8 |
|               | 28 / 20        | 67,1                                 | 49,7 | 11,7 | 5,7 | 66,2    | 48,1 | 13,1 | 5,1 | 67,3    | 48,3 | 14,8 | 4,5 | 66,9    | 51,0 | 16,6 | 4,0 | 64,8    | 52,2 | 19,2 | 3,4 | 63,9    | 52,6 | 22,9 | 2,8 |
|               | 30 / 22        | 69,2                                 | 48,5 | 11,8 | 5,9 | 68,2    | 46,7 | 13,3 | 5,1 | 67,0    | 45,7 | 14,9 | 4,5 | 68,8    | 50,1 | 16,8 | 4,1 | 67,2    | 51,4 | 19,5 | 3,4 | -       | -    | -    | -   |
| 13000<br>m³/h | 22 / 16        | 63,1                                 | 49,4 | 11,5 | 5,5 | 67,9    | 49,2 | 12,9 | 5,3 | 66,7    | 48,0 | 14,5 | 4,6 | 63,4    | 47,9 | 16,4 | 3,9 | 61,0    | 52,0 | 18,7 | 3,3 | 60,7    | 54,8 | 22,5 | 2,7 |
|               | 24 / 17        | 64,6                                 | 51,2 | 11,6 | 5,6 | 69,1    | 51,5 | 13,0 | 5,3 | 68,1    | 50,4 | 14,6 | 4,7 | 64,1    | 49,6 | 16,5 | 3,9 | 62,4    | 54,3 | 18,9 | 3,3 | 62,3    | 56,4 | 22,8 | 2,7 |
|               | 26 / 18        | 66,3                                 | 53,0 | 11,7 | 5,7 | 68,0    | 52,6 | 13,1 | 5,2 | 69,5    | 52,7 | 14,8 | 4,7 | 66,0    | 53,1 | 16,6 | 4,0 | 63,8    | 56,6 | 19,1 | 3,3 | 63,6    | 57,1 | 22,8 | 2,8 |
|               | 27 / 19        | 67,4                                 | 52,4 | 11,7 | 5,8 | 67,7    | 51,4 | 13,2 | 5,1 | 69,2    | 51,4 | 14,8 | 4,7 | 67,2    | 53,3 | 16,7 | 4,0 | 65,0    | 56,2 | 19,3 | 3,4 | 64,5    | 56,8 | 22,9 | 2,8 |
|               | 28 / 20        | 68,4                                 | 51,9 | 11,8 | 5,8 | 67,5    | 50,3 | 13,2 | 5,1 | 68,9    | 50,1 | 14,9 | 4,6 | 68,4    | 53,4 | 16,7 | 4,1 | 66,1    | 55,9 | 19,4 | 3,4 | 65,3    | 56,3 | 23,0 | 2,8 |
|               | 30 / 22        | 70,6                                 | 50,6 | 12,0 | 5,9 | 69,6    | 48,7 | 13,4 | 5,2 | 68,2    | 47,5 | 15,1 | 4,5 | 70,3    | 52,3 | 16,9 | 4,2 | 68,4    | 55,0 | 19,7 | 3,5 | -       | -    | -    | -   |

### Heating performance with 30% of outdoor and exhaust air

| Airflow       | Ta (°C)<br>DB | Outdoor air temperature °C D.B./W.B. |      |      |         |      |      |        |      |      |       |      |      |       |      |      |         |      |      |
|---------------|---------------|--------------------------------------|------|------|---------|------|------|--------|------|------|-------|------|------|-------|------|------|---------|------|------|
|               |               | -7 / -8                              |      |      | -5 / -6 |      |      | 0 / -1 |      |      | 2 / 1 |      |      | 7 / 6 |      |      | 12 / 11 |      |      |
|               |               | kWt                                  | kWe  | COP  | kWt     | kWe  | COP  | kWt    | kWe  | COP  | kWt   | kWe  | COP  | kWt   | kWe  | COP  | kWt     | kWe  | COP  |
| 8500<br>m³/h  | 10            | 48,4                                 | 8,8  | 5,50 | 50,5    | 9,1  | 5,55 | 55,2   | 9,9  | 5,58 | 57,0  | 10,2 | 5,59 | 61,7  | 11,1 | 5,56 | 65,9    | 12,0 | 5,49 |
|               | 15            | 48,3                                 | 9,5  | 5,08 | 50,4    | 9,9  | 5,09 | 55,9   | 10,7 | 5,22 | 58,2  | 11,1 | 5,24 | 62,6  | 12,1 | 5,17 | 66,9    | 13,1 | 5,11 |
|               | 18            | 48,2                                 | 10,0 | 4,82 | 50,3    | 10,3 | 4,88 | 56,0   | 11,2 | 5,00 | 58,1  | 11,6 | 5,01 | 63,0  | 12,7 | 4,96 | 67,0    | 13,7 | 4,89 |
|               | 20            | 48,3                                 | 10,3 | 4,69 | 50,5    | 10,7 | 4,72 | 56,1   | 11,6 | 4,84 | 58,1  | 12,0 | 4,84 | 62,8  | 13,1 | 4,79 | 66,8    | 14,1 | 4,74 |
|               | 22            | 48,4                                 | 10,7 | 4,52 | 50,6    | 11,1 | 4,56 | 56,1   | 12,0 | 4,68 | 58,0  | 12,4 | 4,68 | 62,3  | 13,4 | 4,65 | 66,5    | 14,4 | 4,62 |
|               | 25            | 48,6                                 | 11,2 | 4,34 | 50,8    | 11,6 | 4,38 | 55,9   | 12,5 | 4,47 | 57,5  | 12,9 | 4,46 | 61,5  | 13,9 | 4,42 | 66,2    | 15,0 | 4,41 |
| 11500<br>m³/h | 10            | 48,8                                 | 8,2  | 5,95 | 51,0    | 8,4  | 6,07 | 55,7   | 9,1  | 6,12 | 57,5  | 9,4  | 6,12 | 62,4  | 10,1 | 6,18 | 66,7    | 10,9 | 6,12 |
|               | 15            | 48,7                                 | 8,9  | 5,47 | 50,7    | 9,2  | 5,51 | 56,4   | 9,8  | 5,76 | 58,7  | 10,2 | 5,75 | 63,2  | 11,0 | 5,75 | 67,8    | 11,9 | 5,70 |
|               | 18            | 48,6                                 | 9,3  | 5,23 | 50,7    | 9,6  | 5,28 | 56,5   | 10,3 | 5,49 | 58,6  | 10,7 | 5,48 | 63,6  | 11,6 | 5,48 | 67,9    | 12,4 | 5,48 |
|               | 20            | 48,6                                 | 9,7  | 5,01 | 50,8    | 10,0 | 5,08 | 56,5   | 10,7 | 5,28 | 58,6  | 11,0 | 5,33 | 63,4  | 11,9 | 5,33 | 67,8    | 12,8 | 5,30 |
|               | 22            | 48,7                                 | 10,0 | 4,87 | 50,9    | 10,3 | 4,94 | 56,6   | 11,0 | 5,15 | 58,4  | 11,4 | 5,12 | 63,0  | 12,2 | 5,16 | 67,6    | 13,1 | 5,16 |
|               | 25            | 48,8                                 | 10,5 | 4,65 | 51,0    | 10,8 | 4,72 | 56,2   | 11,6 | 4,84 | 58,0  | 11,9 | 4,87 | 62,4  | 12,7 | 4,91 | 67,4    | 13,6 | 4,96 |
| 13000<br>m³/h | 10            | 48,9                                 | 7,9  | 6,19 | 51,1    | 8,1  | 6,31 | 55,9   | 8,8  | 6,35 | 57,7  | 9,1  | 6,34 | 62,6  | 9,8  | 6,39 | 67,0    | 10,5 | 6,38 |
|               | 15            | 48,8                                 | 8,7  | 5,61 | 50,9    | 8,9  | 5,72 | 56,6   | 9,5  | 5,96 | 58,9  | 9,9  | 5,95 | 63,5  | 10,6 | 5,99 | 68,2    | 11,4 | 5,98 |
|               | 18            | 48,7                                 | 9,1  | 5,35 | 50,8    | 9,4  | 5,40 | 56,7   | 10,0 | 5,67 | 58,8  | 10,4 | 5,65 | 64,0  | 11,2 | 5,71 | 68,4    | 12,0 | 5,70 |
|               | 20            | 48,7                                 | 9,4  | 5,18 | 50,9    | 9,7  | 5,25 | 56,7   | 10,4 | 5,45 | 58,8  | 10,7 | 5,50 | 63,8  | 11,5 | 5,55 | 68,2    | 12,3 | 5,54 |
|               | 22            | 48,8                                 | 9,7  | 5,03 | 50,9    | 10,0 | 5,09 | 56,8   | 10,7 | 5,31 | 58,7  | 11,0 | 5,34 | 63,3  | 11,8 | 5,36 | 68,1    | 12,6 | 5,40 |
|               | 25            | 48,9                                 | 10,2 | 4,79 | 51,0    | 10,5 | 4,86 | 56,4   | 11,2 | 5,04 | 58,3  | 11,5 | 5,07 | 62,6  | 12,2 | 5,13 | 67,9    | 13,1 | 5,18 |

Ta = Indoor air temperature D.B./W.B.

DB = Dry bulb

WB = Wet bulb

kWf = Cooling capacity in kW

kWs = Sensible cooling capacity (kW)

kWe = Compressor power input in kW

kWt = Heating capacity (kW)

EER referred only to compressors

COP referred only to compressors

The fan motor heating is not considered

### Integrated heating capacities

| Air temperature external exchanger inlet °C (D.B. / W.B.) | -5 / -5.4 | 0 / -0.6 | 5 / 3.9 | Others |
|-----------------------------------------------------------|-----------|----------|---------|--------|
| Heating capacity multiplication coefficient               | 0,89      | 0,88     | 0,94    | 1      |

The integrated heating capacity represents the real heating capacity considering the defrost cycles too.

To obtain the integrated heating capacity multiply the heating performance value in kWt (shown in the heating performance tables) by the coefficients indicated in the table.

DB = dry bulb

WB = wet bulb

In case of below zero external air temperature with a long period of heat pump operating mode it is necessary to help the evacuation of the water produced during the defrost cycle; this to avoid the formation of ice in the unit basement. Pay attention that the evacuation will not create inconveniences to things or persons.

## Size 20.4 CCKP configuration

### Cooling performance with 30% of outdoor air

| Airflow       | Ta °C<br>DB/WB | Outdoor air temperature °C D.B./W.B. |      |      |     |         |      |      |     |         |      |      |     |         |      |      |     |         |      |      |     |         |      |      |     |
|---------------|----------------|--------------------------------------|------|------|-----|---------|------|------|-----|---------|------|------|-----|---------|------|------|-----|---------|------|------|-----|---------|------|------|-----|
|               |                | 20 / 12                              |      |      |     | 25 / 18 |      |      |     | 30 / 22 |      |      |     | 35 / 24 |      |      |     | 40 / 25 |      |      |     | 45 / 26 |      |      |     |
|               |                | kWf                                  | kWs  | kWe  | EER | kWf     | kWs  | kWe  | EER | kWf     | kWs  | kWe  | EER | kWf     | kWs  | kWe  | EER | kWf     | kWs  | kWe  | EER | kWf     | kWs  | kWe  | EER |
| 12000<br>m³/h | 22 / 16        | 73,5                                 | 57,2 | 13,4 | 5,5 | 80,2    | 58   | 15,3 | 5,2 | 79,9    | 55,7 | 17,4 | 4,6 | 76,8    | 55,4 | 19,7 | 3,9 | 74,1    | 57,9 | 22,3 | 3,3 | 73,1    | 60,8 | 25,8 | 2,8 |
|               | 24 / 17        | 75,3                                 | 59,3 | 13,5 | 5,6 | 81,6    | 60,1 | 15,4 | 5,3 | 81,1    | 58,4 | 17,5 | 4,6 | 77,8    | 57,4 | 19,8 | 3,9 | 75,7    | 60,1 | 22,5 | 3,4 | 73,9    | 62,4 | 26   | 2,8 |
|               | 26 / 18        | 77,1                                 | 61,4 | 13,6 | 5,7 | 80,5    | 60,5 | 15,5 | 5,2 | 82,8    | 60,6 | 17,7 | 4,7 | 79,9    | 60,6 | 19,9 | 4,0 | 77,2    | 62,3 | 22,6 | 3,4 | 75,3    | 63,7 | 26,2 | 2,9 |
|               | 27 / 19        | 78,5                                 | 60,8 | 13,7 | 5,7 | 80,4    | 59,1 | 15,6 | 5,2 | 82,6    | 59,3 | 17,8 | 4,6 | 81,4    | 60,7 | 20   | 4,1 | 78,5    | 62,1 | 22,7 | 3,5 | 76,4    | 63,5 | 26,3 | 2,9 |
|               | 28 / 20        | 79,9                                 | 60,2 | 13,8 | 5,8 | 80,4    | 57,7 | 15,7 | 5,1 | 82,5    | 58   | 17,9 | 4,6 | 82,8    | 60,7 | 20,1 | 4,1 | 79,9    | 61,9 | 22,8 | 3,5 | 77,7    | 63,2 | 26,4 | 2,9 |
|               | 30 / 22        | 82,7                                 | 58,8 | 14   | 5,9 | 83      | 56,3 | 15,9 | 5,2 | 82,1    | 55,3 | 18,1 | 4,5 | 84,9    | 60   | 20,3 | 4,2 | 82,8    | 61,4 | 22,9 | 3,6 | -       | -    | -    | -   |
| 13500<br>m³/h | 22 / 16        | 75                                   | 59   | 13,5 | 5,6 | 81,7    | 59,9 | 15,4 | 5,3 | 81,3    | 57,7 | 17,5 | 4,6 | 78,1    | 57,2 | 19,8 | 3,9 | 75,6    | 60,3 | 22,5 | 3,4 | 74,6    | 63,6 | 26   | 2,9 |
|               | 24 / 17        | 76,8                                 | 61,2 | 13,6 | 5,6 | 83,1    | 62,2 | 15,5 | 5,4 | 82,6    | 60,5 | 17,6 | 4,7 | 79      | 59,7 | 19,9 | 4,0 | 76,9    | 63,1 | 22,6 | 3,4 | 75,8    | 65,3 | 26,3 | 2,9 |
|               | 26 / 18        | 78,6                                 | 63,6 | 13,7 | 5,7 | 82,1    | 62,7 | 15,6 | 5,3 | 84,3    | 62,9 | 17,8 | 4,7 | 81,1    | 63,2 | 20   | 4,1 | 78,3    | 65,9 | 22,7 | 3,4 | 76,7    | 66,5 | 26,4 | 2,9 |
|               | 27 / 19        | 80                                   | 63   | 13,8 | 5,8 | 82      | 61,2 | 15,7 | 5,2 | 84,2    | 61,5 | 17,9 | 4,7 | 82,6    | 63,2 | 20,1 | 4,1 | 79,6    | 65,5 | 22,8 | 3,5 | 77,6    | 66,3 | 26,4 | 2,9 |
|               | 28 / 20        | 81,4                                 | 62,3 | 13,9 | 5,9 | 81,9    | 59,7 | 15,8 | 5,2 | 84,1    | 60   | 18   | 4,7 | 84      | 63,2 | 20,2 | 4,2 | 81,1    | 65,1 | 22,9 | 3,5 | 78,5    | 66   | 26,5 | 3,0 |
|               | 30 / 22        | 84,3                                 | 60,8 | 14,1 | 6,0 | 84,6    | 58,1 | 16   | 5,3 | 83,8    | 57   | 18,2 | 4,6 | 86,3    | 62,3 | 20,4 | 4,2 | 83,9    | 64,1 | 23,1 | 3,6 | -       | -    | -    | -   |
| 20000<br>m³/h | 22 / 16        | 80,5                                 | 66,8 | 13,8 | 5,8 | 87,3    | 67,2 | 15,7 | 5,6 | 85,6    | 65,9 | 17,8 | 4,8 | 82,3    | 66,3 | 20,2 | 4,1 | 79,9    | 70,4 | 22,9 | 3,5 | 78,6    | 75,3 | 26,4 | 3,0 |
|               | 24 / 17        | 82,8                                 | 69,5 | 14   | 5,9 | 88,5    | 71,1 | 15,9 | 5,6 | 87,7    | 69,1 | 18   | 4,9 | 83,7    | 70   | 20,4 | 4,1 | 81,6    | 74,1 | 23,1 | 3,5 | 80,4    | 76,9 | 26,7 | 3,0 |
|               | 26 / 18        | 85                                   | 72,2 | 14,1 | 6,0 | 87,4    | 72,3 | 16   | 5,5 | 89,7    | 72,3 | 18,1 | 5,0 | 86,3    | 74,3 | 20,5 | 4,2 | 83,4    | 77,6 | 23,2 | 3,6 | 83,4    | 78,1 | 27,1 | 3,1 |
|               | 27 / 19        | 86,4                                 | 71,4 | 14,2 | 6,1 | 87,3    | 70,5 | 16,1 | 5,4 | 89,6    | 70,5 | 18,2 | 4,9 | 88      | 74   | 20,6 | 4,3 | 84,5    | 77,4 | 23,3 | 3,6 | 85,1    | 78,2 | 27,3 | 3,1 |
|               | 28 / 20        | 87,8                                 | 70,6 | 14,3 | 6,1 | 87,3    | 68,7 | 16,2 | 5,4 | 89,4    | 68,7 | 18,4 | 4,9 | 89,7    | 73,8 | 20,7 | 4,3 | 85,7    | 77,1 | 23,4 | 3,7 | 86,8    | 78,3 | 27,5 | 3,2 |
|               | 30 / 22        | 90,7                                 | 68,5 | 14,6 | 6,2 | 90,1    | 66,2 | 16,5 | 5,5 | 89,1    | 65   | 18,6 | 4,8 | 92,1    | 72,4 | 20,9 | 4,4 | 88,1    | 76,3 | 23,5 | 3,7 | -       | -    | -    | -   |

### Heating performance with 30% of outdoor and exhaust air

| Airflow       | Ta (°C)<br>DB | Outdoor air temperature °C D.B./W.B. |      |      |         |      |      |        |      |      |       |       |      |       |      |      |         |      |      |
|---------------|---------------|--------------------------------------|------|------|---------|------|------|--------|------|------|-------|-------|------|-------|------|------|---------|------|------|
|               |               | -7 / -8                              |      |      | -5 / -6 |      |      | 0 / -1 |      |      | 2 / 1 |       |      | 7 / 6 |      |      | 12 / 11 |      |      |
|               |               | kWt                                  | kWe  | COP  | kWt     | kWe  | COP  | kWt    | kWe  | COP  | kWt   | kWe   | COP  | kWt   | kWe  | COP  | kWt     | kWe  | COP  |
| 12000<br>m³/h | 10            | 57,0                                 | 10,2 | 5,59 | 59,7    | 10,6 | 5,63 | 65,8   | 11,6 | 5,67 | 67,70 | 12,00 | 5,64 | 73,2  | 13,0 | 5,63 | 78,2    | 14,1 | 5,55 |
|               | 15            | 57,1                                 | 11,3 | 5,05 | 59,5    | 11,7 | 5,09 | 67,0   | 12,7 | 5,28 | 69,30 | 13,20 | 5,25 | 74,2  | 14,4 | 5,15 | 79,3    | 15,5 | 5,12 |
|               | 18            | 57,0                                 | 11,9 | 4,79 | 59,4    | 12,4 | 4,79 | 66,9   | 13,4 | 4,99 | 69,10 | 13,90 | 4,97 | 74,5  | 15,3 | 4,87 | 79,4    | 16,3 | 4,87 |
|               | 20            | 57,1                                 | 12,4 | 4,60 | 59,6    | 12,8 | 4,66 | 66,8   | 13,9 | 4,81 | 69,00 | 14,40 | 4,79 | 74,3  | 15,7 | 4,73 | 79,0    | 16,8 | 4,70 |
|               | 22            | 57,3                                 | 12,8 | 4,48 | 59,7    | 13,3 | 4,49 | 66,8   | 14,4 | 4,64 | 68,80 | 14,90 | 4,62 | 73,7  | 16,1 | 4,58 | 78,7    | 17,3 | 4,55 |
|               | 25            | 57,4                                 | 13,5 | 4,25 | 59,9    | 14,0 | 4,28 | 66,3   | 15,2 | 4,36 | 68,10 | 15,70 | 4,34 | 72,8  | 16,8 | 4,33 | 78,4    | 18,1 | 4,33 |
| 13500<br>m³/h | 10            | 57,3                                 | 9,9  | 5,79 | 60,0    | 10,3 | 5,83 | 65,6   | 11,2 | 5,86 | 67,60 | 11,60 | 5,83 | 73,2  | 12,5 | 5,86 | 78,2    | 13,6 | 5,75 |
|               | 15            | 57,3                                 | 11,0 | 5,21 | 59,7    | 11,4 | 5,24 | 66,8   | 12,3 | 5,43 | 69,20 | 12,80 | 5,41 | 74,3  | 13,9 | 5,35 | 79,4    | 15,0 | 5,29 |
|               | 18            | 57,2                                 | 11,6 | 4,93 | 59,7    | 12,0 | 4,98 | 66,8   | 13,0 | 5,14 | 69,10 | 13,50 | 5,12 | 74,7  | 14,7 | 5,08 | 79,5    | 15,7 | 5,06 |
|               | 20            | 57,3                                 | 12,0 | 4,78 | 59,8    | 12,5 | 4,78 | 66,7   | 13,5 | 4,94 | 69,00 | 14,00 | 4,93 | 74,4  | 15,2 | 4,89 | 79,3    | 16,2 | 4,90 |
|               | 22            | 57,5                                 | 12,5 | 4,60 | 60,0    | 12,9 | 4,65 | 66,7   | 13,9 | 4,80 | 68,80 | 14,50 | 4,74 | 73,9  | 15,6 | 4,74 | 79,0    | 16,7 | 4,73 |
|               | 25            | 57,7                                 | 13,2 | 4,37 | 60,2    | 13,6 | 4,43 | 66,3   | 14,7 | 4,51 | 68,20 | 15,20 | 4,49 | 73,1  | 16,2 | 4,51 | 78,8    | 17,4 | 4,53 |
| 20000<br>m³/h | 10            | -                                    | -    | -    | 59,8    | 9,2  | 6,50 | 65,7   | 10,0 | 6,57 | 67,80 | 10,30 | 6,58 | 73,3  | 11,1 | 6,60 | 78,2    | 11,9 | 6,57 |
|               | 15            | 57,4                                 | 9,9  | 5,80 | 59,9    | 10,2 | 5,87 | 66,7   | 11,0 | 6,06 | 69,30 | 11,40 | 6,08 | 74,4  | 12,3 | 6,05 | 79,6    | 13,2 | 6,03 |
|               | 18            | 57,5                                 | 10,5 | 5,48 | 60,0    | 10,8 | 5,56 | 66,9   | 11,7 | 5,72 | 69,20 | 12,10 | 5,72 | 74,8  | 13,0 | 5,75 | 80,0    | 13,9 | 5,76 |
|               | 20            | 57,6                                 | 10,9 | 5,28 | 60,1    | 11,3 | 5,32 | 67,0   | 12,2 | 5,49 | 69,20 | 12,50 | 5,54 | 74,7  | 13,4 | 5,57 | 80,0    | 14,3 | 5,59 |
|               | 22            | 57,7                                 | 11,3 | 5,11 | 60,3    | 11,7 | 5,15 | 67,1   | 12,6 | 5,33 | 69,10 | 13,00 | 5,32 | 74,4  | 13,8 | 5,39 | 80,0    | 14,8 | 5,41 |
|               | 25            | 57,8                                 | 12,0 | 4,82 | 60,4    | 12,3 | 4,91 | 66,7   | 13,3 | 5,02 | 68,70 | 13,60 | 5,05 | 73,9  | 14,4 | 5,13 | 79,9    | 15,4 | 5,19 |

Ta = Indoor air temperature D.B./W.B.

DB = Dry bulb

WB = Wet bulb

kWf = Cooling capacity in kW

kWs = Sensible cooling capacity (kW)

kWe = Compressor power input in kW

kWt = Heating capacity (kW)

EER referred only to compressors

COP referred only to compressors

The fan motor heating is not considered

### Integrated heating capacities

| Air temperature external exchanger inlet °C (D.B. / W.B.) | -5 / -5.4 | 0 / -0.6 | 5 / 3.9 | Others |
|-----------------------------------------------------------|-----------|----------|---------|--------|
| Heating capacity multiplication coefficient               | 0,89      | 0,88     | 0,94    | 1      |

The integrated heating capacity represents the real heating capacity considering the defrost cycles too.

To obtain the integrated heating capacity multiply the heating performance value in kWt (shown in the heating performance tables) by the coefficients indicated in the table.

DB = dry bulb

WB = wet bulb

In case of below zero external air temperature with a long period of heat pump operating mode it is necessary to help the evacuation of the water produced during the defrost cycle; this to avoid the formation of ice in the unit basement. Pay attention that the evacuation will not create inconveniences to things or persons.

## Size 25.4 CCKP configuration

### Cooling performance with 30% of outdoor air

| Airflow       | Ta °C DB/<br>WB | Outdoor air temperature °C D.B./W.B. |      |      |     |         |      |      |     |         |      |      |     |         |      |      |     |         |      |      |     |         |      |      |     |
|---------------|-----------------|--------------------------------------|------|------|-----|---------|------|------|-----|---------|------|------|-----|---------|------|------|-----|---------|------|------|-----|---------|------|------|-----|
|               |                 | 20 / 12                              |      |      |     | 25 / 18 |      |      |     | 30 / 22 |      |      |     | 35 / 24 |      |      |     | 40 / 25 |      |      |     | 45 / 26 |      |      |     |
|               |                 | kWf                                  | kWs  | kWe  | EER | kWf     | kWs  | kWe  | EER | kWf     | kWs  | kWe  | EER | kWf     | kWs  | kWe  | EER | kWf     | kWs  | kWe  | EER | kWf     | kWs  | kWe  | EER |
| 12000<br>m³/h | 22 / 16         | 81,8                                 | 61,1 | 14,8 | 5,5 | 88,9    | 62,9 | 16,8 | 5,3 | 88,8    | 60,9 | 18,8 | 4,7 | 85,6    | 60,5 | 21,4 | 4,0 | 83,1    | 62,3 | 23,9 | 3,5 | 82,2    | 64,9 | 27,6 | 3,0 |
|               | 24 / 17         | 83,8                                 | 63,2 | 14,9 | 5,6 | 90,5    | 64,9 | 16,9 | 5,4 | 90,6    | 63,1 | 19,0 | 4,8 | 86,6    | 62,4 | 21,7 | 4,0 | 84,7    | 65,1 | 24,1 | 3,5 | 84,0    | 66,9 | 27,8 | 3,0 |
|               | 26 / 18         | 85,9                                 | 65,3 | 15,0 | 5,7 | 89,8    | 64,6 | 17,0 | 5,3 | 92,5    | 65,2 | 19,2 | 4,8 | 89,3    | 65,4 | 21,6 | 4,1 | 86,4    | 67,8 | 24,2 | 3,6 | 84,5    | 68,7 | 27,8 | 3,0 |
|               | 27 / 19         | 87,6                                 | 64,6 | 15,1 | 5,8 | 90,0    | 62,9 | 17,1 | 5,3 | 92,4    | 63,7 | 19,2 | 4,8 | 91,1    | 65,4 | 21,7 | 4,2 | 88,0    | 67,2 | 24,3 | 3,6 | 85,1    | 68,5 | 27,9 | 3,1 |
|               | 28 / 20         | 89,3                                 | 63,8 | 15,2 | 5,9 | 90,1    | 61,2 | 17,2 | 5,2 | 92,4    | 62,2 | 19,3 | 4,8 | 92,9    | 65,3 | 21,7 | 4,3 | 89,6    | 66,6 | 24,4 | 3,7 | 85,8    | 68,2 | 28,0 | 3,1 |
|               | 30 / 22         | 92,7                                 | 62,3 | 15,3 | 6,1 | 93,0    | 59,8 | 17,3 | 5,4 | 92,3    | 59,0 | 19,5 | 4,7 | 95,7    | 64,3 | 21,8 | 4,4 | 92,8    | 65,1 | 24,6 | 3,8 | -       | -    | -    | -   |
| 15000<br>m³/h | 22 / 16         | 85,5                                 | 65,5 | 15,0 | 5,7 | 92,9    | 66,5 | 17,0 | 5,5 | 92,5    | 64,4 | 19,1 | 4,8 | 89,1    | 64,9 | 21,6 | 4,1 | 86,6    | 68,1 | 24,2 | 3,6 | 85,3    | 70,8 | 27,7 | 3,1 |
|               | 24 / 17         | 87,8                                 | 67,7 | 15,1 | 5,8 | 94,5    | 68,9 | 17,1 | 5,5 | 94,4    | 67,2 | 19,2 | 4,9 | 90,1    | 67,4 | 21,9 | 4,1 | 88,2    | 70,9 | 24,3 | 3,6 | 87,7    | 71,9 | 27,9 | 3,1 |
|               | 26 / 18         | 90,1                                 | 70,0 | 15,2 | 5,9 | 93,7    | 69,0 | 17,2 | 5,4 | 96,3    | 70,1 | 19,4 | 5,0 | 92,9    | 70,7 | 21,8 | 4,3 | 89,8    | 73,6 | 24,5 | 3,7 | 88,2    | 73,8 | 28,1 | 3,1 |
|               | 27 / 19         | 91,7                                 | 69,3 | 15,3 | 6,0 | 93,7    | 67,2 | 17,2 | 5,4 | 96,2    | 68,5 | 19,4 | 5,0 | 94,7    | 70,6 | 21,8 | 4,3 | 91,2    | 73,3 | 24,6 | 3,7 | 88,8    | 73,7 | 28,1 | 3,2 |
|               | 28 / 20         | 93,3                                 | 68,5 | 15,4 | 6,1 | 93,8    | 65,4 | 17,3 | 5,4 | 96,0    | 66,8 | 19,5 | 4,9 | 96,5    | 70,3 | 21,8 | 4,4 | 92,8    | 73,0 | 24,7 | 3,8 | 89,4    | 73,5 | 28,2 | 3,2 |
|               | 30 / 22         | 96,6                                 | 66,8 | 15,5 | 6,2 | 96,6    | 63,8 | 17,5 | 5,5 | 95,6    | 63,5 | 19,7 | 4,9 | 99,4    | 69,2 | 22,0 | 4,5 | 95,9    | 72,2 | 24,8 | 3,9 | -       | -    | -    | -   |
| 20000<br>m³/h | 22 / 16         | 90,4                                 | 71,6 | 15,2 | 5,9 | 98,1    | 72,2 | 17,2 | 5,7 | 97,0    | 70,5 | 19,3 | 5,0 | 93,8    | 70,8 | 21,8 | 4,3 | 90,6    | 76,5 | 24,4 | 3,7 | 90,2    | 78,9 | 28,1 | 3,2 |
|               | 24 / 17         | 92,6                                 | 74,6 | 15,3 | 6,1 | 100,0   | 75,3 | 17,4 | 5,7 | 99,0    | 74,0 | 19,5 | 5,1 | 94,6    | 74,7 | 22,1 | 4,3 | 92,5    | 80,1 | 24,6 | 3,8 | 91,5    | 81,2 | 28,1 | 3,3 |
|               | 26 / 18         | 94,8                                 | 77,6 | 15,4 | 6,2 | 98,9    | 76,1 | 17,5 | 5,7 | 101,0   | 77,5 | 19,6 | 5,2 | 97,6    | 78,9 | 22,1 | 4,4 | 94,5    | 83,4 | 24,8 | 3,8 | 93,1    | 82,7 | 28,4 | 3,3 |
|               | 27 / 19         | 96,5                                 | 76,6 | 15,5 | 6,2 | 98,8    | 74,1 | 17,5 | 5,6 | 100,8   | 75,4 | 19,7 | 5,1 | 99,4    | 78,7 | 22,1 | 4,5 | 96,1    | 82,8 | 24,9 | 3,9 | 94,2    | 82,6 | 28,6 | 3,3 |
|               | 28 / 20         | 98,2                                 | 75,5 | 15,6 | 6,3 | 98,7    | 72,1 | 17,6 | 5,6 | 100,6   | 73,3 | 19,8 | 5,1 | 101,3   | 78,5 | 22,1 | 4,6 | 97,7    | 82,1 | 25,1 | 3,9 | 95,3    | 82,4 | 28,8 | 3,3 |
|               | 30 / 22         | 101,6                                | 73,2 | 15,8 | 6,4 | 101,1   | 70,4 | 17,8 | 5,7 | 100,3   | 69,0 | 20,0 | 5,0 | 104,3   | 76,5 | 22,3 | 4,7 | 100,9   | 80,6 | 25,3 | 4,0 | -       | -    | -    | -   |

### Heating performance with 30% of outdoor and exhaust air

| Airflow       | Ta (°C)<br>DB | Outdoor air temperature °C D.B./W.B. |      |      |         |      |      |        |      |      |       |      |      |       |      |      |         |      |      |
|---------------|---------------|--------------------------------------|------|------|---------|------|------|--------|------|------|-------|------|------|-------|------|------|---------|------|------|
|               |               | -7 / -8                              |      |      | -5 / -6 |      |      | 0 / -1 |      |      | 2 / 1 |      |      | 7 / 6 |      |      | 12 / 11 |      |      |
|               |               | kWt                                  | kWe  | COP  | kWt     | kWe  | COP  | kWt    | kWe  | COP  | kWt   | kWe  | COP  | kWt   | kWe  | COP  | kWt     | kWe  | COP  |
| 12000<br>m³/h | 10            | 68,4                                 | 12,3 | 5,56 | 71,7    | 12,8 | 5,60 | 78,8   | 14,0 | 5,63 | 81,3  | 14,5 | 5,61 | 88,2  | 15,8 | 5,58 | 94,2    | 17,2 | 5,48 |
|               | 15            | 68,5                                 | 13,5 | 5,07 | 71,7    | 13,9 | 5,16 | 80,0   | 15,2 | 5,26 | 83,2  | 15,8 | 5,27 | 89,4  | 17,3 | 5,17 | 95,5    | 18,9 | 5,05 |
|               | 18            | 68,6                                 | 14,1 | 4,87 | 71,8    | 14,7 | 4,88 | 80,2   | 16,0 | 5,01 | 83,1  | 16,6 | 5,01 | 89,9  | 18,3 | 4,91 | 95,7    | 19,7 | 4,86 |
|               | 20            | 68,8                                 | 14,7 | 4,68 | 72,0    | 15,2 | 4,74 | 80,3   | 16,5 | 4,87 | 83,0  | 17,2 | 4,83 | 89,6  | 18,8 | 4,77 | 95,4    | 20,2 | 4,72 |
|               | 22            | 69,0                                 | 15,2 | 4,54 | 72,3    | 15,7 | 4,61 | 80,4   | 17,0 | 4,73 | 82,8  | 17,7 | 4,68 | 88,9  | 19,2 | 4,63 | 95,1    | 20,7 | 4,59 |
|               | 25            | 69,3                                 | 15,9 | 4,36 | 72,5    | 16,5 | 4,39 | 79,9   | 17,8 | 4,49 | 82,1  | 18,4 | 4,46 | 88,0  | 19,8 | 4,44 | 94,6    | 21,5 | 4,40 |
| 15000<br>m³/h | 10            | 68,5                                 | 11,6 | 5,91 | 71,8    | 12,0 | 5,98 | 79,1   | 13,2 | 5,99 | 81,7  | 13,6 | 6,01 | 88,7  | 14,7 | 6,03 | 95,0    | 15,9 | 5,97 |
|               | 15            | 68,7                                 | 12,7 | 5,41 | 71,8    | 13,1 | 5,48 | 80,4   | 14,3 | 5,62 | 83,6  | 14,8 | 5,65 | 90,1  | 16,2 | 5,56 | 96,6    | 17,5 | 5,52 |
|               | 18            | 68,7                                 | 13,4 | 5,13 | 71,9    | 13,8 | 5,21 | 80,5   | 15,0 | 5,37 | 83,5  | 15,6 | 5,35 | 90,7  | 17,0 | 5,34 | 96,9    | 18,3 | 5,30 |
|               | 20            | 68,9                                 | 13,9 | 4,96 | 72,1    | 14,3 | 5,04 | 80,5   | 15,5 | 5,19 | 83,4  | 16,1 | 5,18 | 90,4  | 17,5 | 5,17 | 96,7    | 18,7 | 5,17 |
|               | 22            | 69,1                                 | 14,3 | 4,83 | 72,3    | 14,8 | 4,89 | 80,5   | 16,0 | 5,03 | 83,2  | 16,6 | 5,01 | 89,8  | 17,9 | 5,02 | 96,5    | 19,2 | 5,03 |
|               | 25            | 69,3                                 | 15,1 | 4,59 | 72,5    | 15,6 | 4,65 | 80,2   | 16,8 | 4,77 | 82,7  | 17,3 | 4,78 | 89,0  | 18,5 | 4,81 | 96,1    | 20,0 | 4,81 |
| 20000<br>m³/h | 10            | 68,8                                 | 10,7 | 6,43 | 72,1    | 11,1 | 6,50 | 79,2   | 12,2 | 6,49 | 81,8  | 12,5 | 6,54 | 89,1  | 13,5 | 6,60 | 95,7    | 14,5 | 6,60 |
|               | 15            | 68,9                                 | 11,8 | 5,84 | 72,0    | 12,2 | 5,90 | 80,5   | 13,3 | 6,05 | 83,7  | 13,7 | 6,11 | 90,5  | 14,8 | 6,11 | 97,4    | 16,0 | 6,09 |
|               | 18            | 68,9                                 | 12,5 | 5,51 | 72,1    | 12,9 | 5,59 | 80,7   | 14,0 | 5,76 | 83,8  | 14,5 | 5,78 | 91,1  | 15,7 | 5,80 | 97,9    | 16,7 | 5,86 |
|               | 20            | 69,1                                 | 13,0 | 5,32 | 72,4    | 13,4 | 5,40 | 80,8   | 14,5 | 5,57 | 83,8  | 14,9 | 5,62 | 91,0  | 16,1 | 5,65 | 97,9    | 17,2 | 5,69 |
|               | 22            | 69,3                                 | 13,4 | 5,17 | 72,6    | 13,9 | 5,22 | 80,9   | 15,0 | 5,39 | 83,7  | 15,4 | 5,44 | 90,5  | 16,5 | 5,48 | 97,9    | 17,6 | 5,56 |
|               | 25            | 69,6                                 | 14,1 | 4,94 | 72,8    | 14,6 | 4,99 | 80,5   | 15,6 | 5,16 | 83,2  | 16,0 | 5,20 | 89,8  | 17,1 | 5,25 | 97,7    | 18,3 | 5,34 |

Ta = Indoor air temperature D.B./W.B.

DB = Dry bulb

WB = Wet bulb

kWf = Cooling capacity in kW

kWs = Sensible cooling capacity (kW)

kWe = Compressor power input in kW

kWt = Heating capacity (kW)

EER referred only to compressors

COP referred only to compressors

The fan motor heating is not considered

### Integrated heating capacities

| Air temperature external exchanger inlet °C (D.B. / W.B.) | -5 / -5.4 | 0 / -0.6 | 5 / 3.9 | Others |
|-----------------------------------------------------------|-----------|----------|---------|--------|
| Heating capacity multiplication coefficient               | 0,89      | 0,88     | 0,94    | 1      |

The integrated heating capacity represents the real heating capacity considering the defrost cycles too.

To obtain the integrated heating capacity multiply the heating performance value in kWt (shown in the heating performance tables) by the coefficients indicated in the table.

DB = dry bulb

WB = wet bulb

In case of below zero external air temperature with a long period of heat pump operating mode it is necessary to help the evacuation of the water produced during the defrost cycle; this to avoid the formation of ice in the unit basement. Pay attention that the evacuation will not create inconveniences to things or persons.

## Size 30.4 CCKP configuration

### Cooling performance with 30% of outdoor air

| Airflow       | Ta °C<br>DB/WB | Outdoor air temperature °C D.B./W.B. |      |      |     |         |      |      |     |         |      |      |     |         |      |      |     |         |      |      |     |         |      |      |     |
|---------------|----------------|--------------------------------------|------|------|-----|---------|------|------|-----|---------|------|------|-----|---------|------|------|-----|---------|------|------|-----|---------|------|------|-----|
|               |                | 20 / 12                              |      |      |     | 25 / 18 |      |      |     | 30 / 22 |      |      |     | 35 / 24 |      |      |     | 40 / 25 |      |      |     | 45 / 26 |      |      |     |
|               |                | kWf                                  | kWs  | kWe  | EER | kWf     | kWs  | kWe  | EER | kWf     | kWs  | kWe  | EER | kWf     | kWs  | kWe  | EER | kWf     | kWs  | kWe  | EER | kWf     | kWs  | kWe  | EER |
| 12000<br>m³/h | 22 / 16        | 86,6                                 | 65,2 | 17,2 | 5,0 | 95,0    | 65,8 | 19,4 | 4,9 | 94,3    | 64,4 | 21,7 | 4,3 | 90,6    | 64,3 | 24,4 | 3,7 | 88,6    | 65,6 | 27,4 | 3,2 | 86,8    | 68,6 | 31,1 | 2,8 |
|               | 24 / 17        | 88,8                                 | 66,7 | 17,3 | 5,1 | 96,9    | 67,9 | 19,6 | 4,9 | 95,9    | 66,9 | 21,8 | 4,4 | 91,9    | 66,3 | 24,6 | 3,7 | 90,4    | 67,8 | 27,5 | 3,3 | 87,1    | 71,4 | 31,1 | 2,8 |
|               | 26 / 18        | 90,6                                 | 68,5 | 17,4 | 5,2 | 95,5    | 68,2 | 19,7 | 4,8 | 97,4    | 69,3 | 22,0 | 4,4 | 94,7    | 68,9 | 24,7 | 3,8 | 92,1    | 70,0 | 27,7 | 3,3 | 89,1    | 72,6 | 31,3 | 2,8 |
|               | 27 / 19        | 92,5                                 | 68,0 | 17,5 | 5,3 | 95,3    | 66,9 | 19,7 | 4,8 | 97,3    | 67,8 | 22,1 | 4,4 | 96,5    | 68,8 | 24,7 | 3,9 | 93,5    | 69,7 | 27,8 | 3,4 | 91,0    | 71,7 | 31,5 | 2,9 |
|               | 28 / 20        | 94,4                                 | 67,5 | 17,6 | 5,4 | 95,1    | 65,5 | 19,8 | 4,8 | 97,1    | 66,4 | 22,2 | 4,4 | 98,3    | 68,6 | 24,8 | 4,0 | 95,0    | 69,4 | 27,9 | 3,4 | 92,9    | 70,7 | 31,6 | 2,9 |
|               | 30 / 22        | 98,1                                 | 66,4 | 17,8 | 5,5 | 98,3    | 63,8 | 20,0 | 4,9 | 96,8    | 63,3 | 22,3 | 4,3 | 101,1   | 67,4 | 25,0 | 4,0 | 97,9    | 68,6 | 28,2 | 3,5 | -       | -    | -    | -   |
| 17000<br>m³/h | 22 / 16        | 93,5                                 | 72,2 | 17,6 | 5,3 | 100,9   | 69,9 | 19,8 | 5,1 | 100,7   | 66,9 | 22,2 | 4,5 | 97,6    | 66,6 | 24,8 | 3,9 | 94,2    | 69,7 | 27,8 | 3,4 | 93,6    | 72,8 | 31,5 | 3,0 |
|               | 24 / 17        | 95,6                                 | 75,1 | 17,7 | 5,4 | 102,7   | 72,8 | 19,9 | 5,2 | 102,8   | 69,8 | 22,3 | 4,6 | 98,7    | 70,4 | 25,0 | 3,9 | 96,1    | 72,8 | 28,0 | 3,4 | 95,8    | 74,6 | 31,8 | 3,0 |
|               | 26 / 18        | 97,6                                 | 78,2 | 17,8 | 5,5 | 102,0   | 74,5 | 20,0 | 5,1 | 104,9   | 72,6 | 22,5 | 4,7 | 101,2   | 73,3 | 25,1 | 4,0 | 98,3    | 75,7 | 28,1 | 3,5 | 97,5    | 76,8 | 32,0 | 3,0 |
|               | 27 / 19        | 99,6                                 | 77,0 | 17,9 | 5,6 | 102,1   | 73,4 | 20,1 | 5,1 | 104,6   | 71,9 | 22,6 | 4,6 | 103,0   | 72,8 | 25,1 | 4,1 | 99,9    | 75,3 | 28,2 | 3,5 | 98,8    | 76,6 | 32,2 | 3,1 |
|               | 28 / 20        | 101,6                                | 75,9 | 18,0 | 5,6 | 102,2   | 72,2 | 20,2 | 5,1 | 104,2   | 71,1 | 22,7 | 4,6 | 104,7   | 72,3 | 25,2 | 4,2 | 101,6   | 74,8 | 28,4 | 3,6 | 100,2   | 76,3 | 32,4 | 3,1 |
|               | 30 / 22        | 105,5                                | 73,4 | 18,3 | 5,8 | 105,2   | 70,5 | 20,4 | 5,2 | 103,6   | 69,3 | 22,9 | 4,5 | 107,6   | 71,1 | 25,4 | 4,2 | 104,9   | 73,7 | 28,7 | 3,7 | -       | -    | -    | -   |
| 20000<br>m³/h | 22 / 16        | 96,1                                 | 76,2 | 17,8 | 5,4 | 104,3   | 76,7 | 20,0 | 5,2 | 104,1   | 73,2 | 22,4 | 4,6 | 100,2   | 73,8 | 25,0 | 4,0 | 96,1    | 79,9 | 27,9 | 3,4 | 97,6    | 83,7 | 31,8 | 3,1 |
|               | 24 / 17        | 98,8                                 | 78,9 | 17,9 | 5,5 | 106,3   | 79,7 | 20,1 | 5,3 | 105,6   | 77,4 | 22,5 | 4,7 | 101,3   | 77,5 | 25,3 | 4,0 | 97,9    | 83,4 | 28,1 | 3,5 | 100,0   | 85,7 | 32,1 | 3,1 |
|               | 26 / 18        | 101,6                                | 81,6 | 18,0 | 5,6 | 105,1   | 80,4 | 20,2 | 5,2 | 107,4   | 81,2 | 22,6 | 4,8 | 103,9   | 81,9 | 25,3 | 4,1 | 99,9    | 86,6 | 28,3 | 3,5 | 100,4   | 87,7 | 32,2 | 3,1 |
|               | 27 / 19        | 103,3                                | 80,6 | 18,1 | 5,7 | 105,0   | 78,4 | 20,3 | 5,2 | 107,3   | 79,1 | 22,7 | 4,7 | 105,7   | 81,7 | 25,4 | 4,2 | 101,7   | 86,0 | 28,4 | 3,6 | 100,9   | 87,4 | 32,3 | 3,1 |
|               | 28 / 20        | 105,0                                | 79,6 | 18,2 | 5,8 | 104,9   | 76,3 | 20,4 | 5,1 | 107,1   | 77,0 | 22,9 | 4,7 | 107,4   | 81,5 | 25,4 | 4,2 | 103,5   | 85,4 | 28,5 | 3,6 | 101,5   | 87,1 | 32,4 | 3,1 |
|               | 30 / 22        | 108,5                                | 77,3 | 18,4 | 5,9 | 107,7   | 74,4 | 20,6 | 5,2 | 106,8   | 72,5 | 23,1 | 4,6 | 110,4   | 79,7 | 25,7 | 4,3 | 107,2   | 84,0 | 28,8 | 3,7 | -       | -    | -    | -   |

### Heating performance with 30% of outdoor and exhaust air

| Airflow       | Ta (°C)<br>DB | Outdoor air temperature °C D.B./W.B. |      |      |         |      |      |       |      |      |       |      |      |       |      |      |         |      |      |
|---------------|---------------|--------------------------------------|------|------|---------|------|------|-------|------|------|-------|------|------|-------|------|------|---------|------|------|
|               |               | -7 / -8                              |      |      | -5 / -6 |      |      | 0 / 1 |      |      | 2 / 1 |      |      | 7 / 6 |      |      | 12 / 11 |      |      |
|               |               | kWt                                  | kWe  | COP  | kWt     | kWe  | COP  | kWt   | kWe  | COP  | kWt   | kWe  | COP  | kWt   | kWe  | COP  | kWt     | kWe  | COP  |
| 12000<br>m³/h | 10            | 74,3                                 | 15,2 | 4,89 | 77,9    | 15,8 | 4,93 | 85,7  | 17,4 | 4,93 | 88,3  | 18,0 | 4,91 | 95,3  | 19,5 | 4,89 | 101,3   | 21,1 | 4,80 |
|               | 15            | 74,8                                 | 16,5 | 4,53 | 78,2    | 17,1 | 4,57 | 86,9  | 18,6 | 4,67 | 90,2  | 19,4 | 4,65 | 96,7  | 21,2 | 4,56 | 102,8   | 23,0 | 4,47 |
|               | 18            | 75,0                                 | 17,3 | 4,34 | 78,4    | 17,9 | 4,38 | 87,1  | 19,6 | 4,44 | 90,2  | 20,4 | 4,42 | 97,3  | 22,1 | 4,40 | 102,9   | 24,0 | 4,29 |
|               | 20            | 75,2                                 | 17,9 | 4,20 | 78,6    | 18,5 | 4,25 | 87,2  | 20,2 | 4,32 | 90,2  | 21,0 | 4,30 | 96,9  | 22,7 | 4,27 | 102,5   | 24,6 | 4,17 |
|               | 22            | 75,3                                 | 18,4 | 4,09 | 78,8    | 19,0 | 4,15 | 87,3  | 20,9 | 4,18 | 89,9  | 21,5 | 4,18 | 96,1  | 23,2 | 4,14 | 102,0   | 25,1 | 4,06 |
|               | 25            | 75,6                                 | 19,2 | 3,94 | 78,9    | 19,9 | 3,96 | 86,5  | 21,7 | 3,99 | 89,0  | 22,3 | 3,99 | 94,8  | 24,0 | 3,95 | 101,4   | 26,0 | 3,90 |
| 17000<br>m³/h | 10            | 74,7                                 | 13,8 | 5,41 | 78,3    | 14,3 | 5,48 | 86,1  | 15,7 | 5,48 | 88,9  | 16,2 | 5,49 | 96,3  | 17,4 | 5,53 | 102,8   | 18,7 | 5,50 |
|               | 15            | 75,0                                 | 15,0 | 5,00 | 78,4    | 15,6 | 5,03 | 87,4  | 16,9 | 5,17 | 90,9  | 17,5 | 5,19 | 97,9  | 18,9 | 5,18 | 104,6   | 20,4 | 5,13 |
|               | 18            | 75,1                                 | 15,8 | 4,75 | 78,6    | 16,3 | 4,82 | 87,6  | 17,7 | 4,95 | 91,0  | 18,3 | 4,97 | 98,6  | 19,9 | 4,95 | 104,9   | 21,3 | 4,92 |
|               | 20            | 75,3                                 | 16,3 | 4,62 | 78,8    | 16,9 | 4,66 | 87,7  | 18,3 | 4,79 | 91,0  | 18,9 | 4,81 | 98,3  | 20,4 | 4,82 | 104,7   | 21,8 | 4,80 |
|               | 22            | 75,5                                 | 16,8 | 4,49 | 79,0    | 17,4 | 4,54 | 87,8  | 18,8 | 4,67 | 90,8  | 19,4 | 4,68 | 97,6  | 20,8 | 4,69 | 104,5   | 22,3 | 4,69 |
|               | 25            | 75,8                                 | 17,5 | 4,33 | 79,2    | 18,1 | 4,38 | 87,4  | 19,5 | 4,48 | 90,0  | 20,1 | 4,48 | 96,6  | 21,5 | 4,49 | 104,1   | 23,1 | 4,51 |
| 20000<br>m³/h | 10            | 75,5                                 | 13,3 | 5,68 | 79,0    | 13,7 | 5,77 | 86,1  | 15,0 | 5,74 | 89,0  | 15,4 | 5,78 | 96,6  | 16,5 | 5,85 | 103,4   | 17,7 | 5,84 |
|               | 15            | 75,3                                 | 14,5 | 5,19 | 78,6    | 14,9 | 5,28 | 87,3  | 16,2 | 5,39 | 90,9  | 16,7 | 5,44 | 98,1  | 18,0 | 5,45 | 105,2   | 19,4 | 5,42 |
|               | 18            | 75,1                                 | 15,2 | 4,94 | 78,5    | 15,7 | 5,00 | 87,4  | 17,0 | 5,14 | 90,9  | 17,5 | 5,19 | 98,8  | 18,9 | 5,23 | 105,6   | 20,3 | 5,20 |
|               | 20            | 75,3                                 | 15,7 | 4,80 | 78,8    | 16,2 | 4,86 | 87,5  | 17,5 | 5,00 | 90,8  | 18,1 | 5,02 | 98,6  | 19,4 | 5,08 | 105,5   | 20,7 | 5,10 |
|               | 22            | 75,5                                 | 16,2 | 4,66 | 79,0    | 16,7 | 4,73 | 87,5  | 18,1 | 4,83 | 90,6  | 18,6 | 4,87 | 98,1  | 19,9 | 4,93 | 105,5   | 21,2 | 4,98 |
|               | 25            | 75,8                                 | 16,9 | 4,49 | 79,2    | 17,5 | 4,53 | 87,1  | 18,7 | 4,66 | 90,1  | 19,2 | 4,69 | 97,3  | 20,5 | 4,75 | 105,2   | 22,0 | 4,78 |

Ta = Indoor air temperature D.B./W.B.

DB = Dry bulb

WB = Wet bulb

kWf = Cooling capacity in kW

kWs = Sensible cooling capacity (kW)

kWe = Compressor power input in kW

kWt = Heating capacity (kW)

EER referred only to compressors

COP referred only to compressors

The fan motor heating is not considered

### Integrated heating capacities

| Air temperature external exchanger inlet °C (D.B. / W.B.) | -5 / -5.4 | 0 / -0.6 | 5 / 3.9 | Others |
|-----------------------------------------------------------|-----------|----------|---------|--------|
| Heating capacity multiplication coefficient               | 0,89      | 0,88     | 0,94    | 1      |

The integrated heating capacity represents the real heating capacity considering the defrost cycles too.

To obtain the integrated heating capacity multiply the heating performance value in kWt (shown in the heating performance tables) by the coefficients indicated in the table.

DB = dry bulb

WB = wet bulb

In case of below zero external air temperature with a long period of heat pump operating mode it is necessary to help the evacuation of the water produced during the defrost cycle; this to avoid the formation of ice in the unit basement. Pay attention that the evacuation will not create inconveniences to things or persons.

## Size 33.4 CCKP configuration

### Cooling performance with 30% of outdoor air

| Airflow       | Ta °C<br>DB/WB | Outdoor air temperature °C D.B./W.B. |      |      |     |         |      |      |     |         |      |      |     |         |      |      |     |         |      |      |     |         |      |      |     |
|---------------|----------------|--------------------------------------|------|------|-----|---------|------|------|-----|---------|------|------|-----|---------|------|------|-----|---------|------|------|-----|---------|------|------|-----|
|               |                | 20 / 12                              |      |      |     | 25 / 18 |      |      |     | 30 / 22 |      |      |     | 35 / 24 |      |      |     | 40 / 25 |      |      |     | 45 / 26 |      |      |     |
|               |                | kWf                                  | kWs  | kWe  | EER | kWf     | kWs  | kWe  | EER | kWf     | kWs  | kWe  | EER | kWf     | kWs  | kWe  | EER | kWf     | kWs  | kWe  | EER | kWf     | kWs  | kWe  | EER |
| 16000<br>m³/h | 22 / 16        | 103,6                                | 79,1 | 19,2 | 5,4 | 112,8   | 80,5 | 21,7 | 5,2 | 112,1   | 78,2 | 24,3 | 4,6 | 109,1   | 78,0 | 27,4 | 4,0 | 104,5   | 80,1 | 31,1 | 3,4 | 102,4   | 82,6 | 36,2 | 2,8 |
|               | 24 / 17        | 106,6                                | 81,4 | 19,3 | 5,5 | 114,9   | 83,1 | 21,8 | 5,3 | 114,3   | 81,2 | 24,4 | 4,7 | 111,8   | 80,8 | 27,5 | 4,1 | 106,6   | 82,9 | 31,3 | 3,4 | 103,4   | 85,4 | 36,4 | 2,8 |
|               | 26 / 18        | 109,6                                | 83,6 | 19,4 | 5,6 | 113,7   | 83,2 | 21,9 | 5,2 | 116,5   | 84,1 | 24,6 | 4,7 | 114,3   | 83,8 | 27,7 | 4,1 | 108,9   | 85,4 | 31,5 | 3,5 | 104,8   | 87,0 | 36,5 | 2,9 |
|               | 27 / 19        | 111,6                                | 82,9 | 19,5 | 5,7 | 113,6   | 81,3 | 22,0 | 5,2 | 116,3   | 82,1 | 24,7 | 4,7 | 116,2   | 83,3 | 27,8 | 4,2 | 110,4   | 85,2 | 31,7 | 3,5 | 106,1   | 86,3 | 36,6 | 2,9 |
|               | 28 / 20        | 113,5                                | 82,2 | 19,6 | 5,8 | 113,6   | 79,5 | 22,1 | 5,1 | 116,1   | 80,1 | 24,8 | 4,7 | 118,1   | 82,7 | 27,9 | 4,2 | 111,9   | 85,0 | 31,8 | 3,5 | 107,4   | 85,5 | 36,7 | 2,9 |
|               | 30 / 22        | 117,4                                | 80,5 | 19,9 | 5,9 | 117,1   | 77,6 | 22,3 | 5,3 | 115,7   | 76,0 | 25,1 | 4,6 | 121,2   | 81,5 | 28,2 | 4,3 | 115,0   | 84,4 | 32,1 | 3,6 | -       | -    | -    | -   |
| 18500<br>m³/h | 22 / 16        | 107,2                                | 82,1 | 19,3 | 5,6 | 116,2   | 83,6 | 21,8 | 5,3 | 115,2   | 80,8 | 24,5 | 4,7 | 111,8   | 81,6 | 27,5 | 4,1 | 107,3   | 84,1 | 31,3 | 3,4 | 105,5   | 87,1 | 36,4 | 2,9 |
|               | 24 / 17        | 110,0                                |      |      |     |         |      |      |     |         |      |      |     |         |      |      |     |         |      |      |     |         |      |      |     |

### Heating performance with 30% of outdoor and exhaust air

| Airflow       | Ta (°C)<br>DB | Outdoor air temperature °C D.B./W.B. |      |      |       |      |      |        |      |      |       |      |      |       |      |      |         |      |      |
|---------------|---------------|--------------------------------------|------|------|-------|------|------|--------|------|------|-------|------|------|-------|------|------|---------|------|------|
|               |               | -7 / -8                              |      |      | -5 -6 |      |      | 0 / -1 |      |      | 2 / 1 |      |      | 7 / 6 |      |      | 12 / 11 |      |      |
|               |               | kWt                                  | kWe  | COP  | kWt   | kWe  | COP  | kWt    | kWe  | COP  | kWt   | kWe  | COP  | kWt   | kWe  | COP  | kWt     | kWe  | COP  |
| 16000<br>m³/h | 10            | 90,0                                 | 16,2 | 5,56 | 94,2  | 16,8 | 5,61 | 103,7  | 18,4 | 5,64 | 107,0 | 19,0 | 5,63 | 115,7 | 20,8 | 5,56 | 123,7   | 22,7 | 5,45 |
|               | 15            | 90,1                                 | 17,6 | 5,12 | 94,1  | 18,3 | 5,14 | 105,1  | 19,9 | 5,28 | 109,1 | 20,7 | 5,27 | 117,1 | 22,7 | 5,16 | 125,0   | 24,7 | 5,06 |
|               | 18            | 90,1                                 | 18,5 | 4,87 | 94,2  | 19,2 | 4,91 | 105,2  | 20,9 | 5,03 | 108,9 | 21,7 | 5,02 | 117,6 | 23,9 | 4,92 | 125,0   | 25,8 | 4,84 |
|               | 20            | 90,3                                 | 19,1 | 4,73 | 94,4  | 19,8 | 4,77 | 105,3  | 21,6 | 4,88 | 108,8 | 22,4 | 4,86 | 117,1 | 24,5 | 4,78 | 124,5   | 26,4 | 4,72 |
|               | 22            | 90,5                                 | 19,7 | 4,59 | 94,6  | 20,4 | 4,64 | 105,3  | 22,2 | 4,74 | 108,4 | 23,0 | 4,71 | 116,1 | 25,0 | 4,64 | 124,0   | 27,0 | 4,59 |
|               | 25            | 90,8                                 | 20,6 | 4,41 | 94,7  | 21,3 | 4,45 | 104,4  | 23,2 | 4,50 | 107,3 | 23,9 | 4,49 | 114,6 | 25,8 | 4,44 | 123,3   | 28,1 | 4,39 |
| 18500<br>m³/h | 10            | 90,3                                 | 15,6 | 5,79 | 94,6  | 16,2 | 5,84 | 104,0  | 17,7 | 5,88 | 107,4 | 18,3 | 5,87 | 116,5 | 19,9 | 5,85 | 124,7   | 21,6 | 5,77 |
|               | 15            | 90,4                                 | 17,0 | 5,32 | 94,4  | 17,6 | 5,36 | 105,5  | 19,1 | 5,52 | 109,6 | 19,9 | 5,51 | 117,9 | 21,7 | 5,43 | 126,2   | 23,5 | 5,37 |
|               | 18            | 90,3                                 | 17,8 | 5,07 | 94,4  | 18,5 | 5,10 | 105,6  | 20,1 | 5,25 | 109,5 | 20,9 | 5,24 | 118,5 | 22,8 | 5,20 | 126,3   | 24,6 | 5,13 |
|               | 20            | 90,5                                 | 18,4 | 4,92 | 94,6  | 19,1 | 4,95 | 105,7  | 20,7 | 5,11 | 109,4 | 21,5 | 5,09 | 118,0 | 23,4 | 5,04 | 125,8   | 25,2 | 4,99 |
|               | 22            | 90,7                                 | 19,0 | 4,77 | 94,8  | 19,7 | 4,81 | 105,8  | 21,4 | 4,94 | 109,1 | 22,2 | 4,91 | 117,1 | 23,9 | 4,90 | 125,3   | 25,8 | 4,86 |
|               | 25            | 90,9                                 | 19,9 | 4,57 | 95,0  | 20,6 | 4,61 | 105,1  | 22,3 | 4,71 | 108,1 | 23,0 | 4,70 | 115,8 | 24,7 | 4,69 | 124,7   | 26,8 | 4,65 |
| 25000<br>m³/h | 10            | 90,8                                 | 14,5 | 6,26 | 95,1  | 15,0 | 6,34 | 104,4  | 16,4 | 6,37 | 108,1 | 16,8 | 6,43 | 117,6 | 18,1 | 6,50 | 126,6   | 19,4 | 6,53 |
|               | 15            | 90,8                                 | 15,8 | 5,75 | 94,8  | 16,4 | 5,78 | 105,9  | 17,7 | 5,98 | 110,3 | 18,3 | 6,03 | 119,1 | 19,7 | 6,05 | 130,3   | 21,3 | 6,12 |
|               | 18            | 90,7                                 | 16,6 | 5,46 | 94,8  | 17,2 | 5,51 | 106,0  | 18,6 | 5,70 | 110,0 | 19,2 | 5,73 | 119,6 | 20,7 | 5,78 | 130,6   | 22,2 | 5,88 |
|               | 20            | 90,9                                 | 17,2 | 5,28 | 95,1  | 17,8 | 5,34 | 106,0  | 19,1 | 5,55 | 109,9 | 19,8 | 5,55 | 119,3 | 21,3 | 5,60 | 129,5   | 22,8 | 5,68 |
|               | 22            | 91,1                                 | 17,8 | 5,12 | 95,4  | 18,3 | 5,21 | 106,1  | 19,7 | 5,39 | 109,6 | 20,3 | 5,40 | 118,6 | 21,8 | 5,44 | 128,5   | 23,3 | 5,52 |
|               | 25            | 91,4                                 | 18,6 | 4,91 | 95,6  | 19,2 | 4,98 | 105,6  | 20,6 | 5,13 | 109,0 | 21,1 | 5,17 | 117,5 | 22,5 | 5,22 | 127,3   | 24,3 | 5,24 |

Ta = Indoor air temperature D.B./W.B.

DB = Dry bulb

WB = Wet bulb

kWf = Cooling capacity in kW

kWs = Sensible cooling capacity (kW)

kWe = Compressor power input in kW

kWt = Heating capacity (kW)

EER referred only to compressors

COP referred only to compressors

The fan motor heating is not considered

### Integrated heating capacities

| Air temperature external exchanger inlet °C (D.B. / W.B.) | -5 / -5.4 | 0 / -0.6 | 5 / 3.9 | Others |
|-----------------------------------------------------------|-----------|----------|---------|--------|
| Heating capacity multiplication coefficient               | 0,89      | 0,88     | 0,94    | 1      |

The integrated heating capacity represents the real heating capacity considering the defrost cycles too.

To obtain the integrated heating capacity multiply the heating performance value in kWt (shown in the heating performance tables) by the coefficients indicated in the table.

DB = dry bulb

WB = wet bulb

In case of below zero external air temperature with a long period of heat pump operating mode it is necessary to help the evacuation of the water produced during the defrost cycle; this to avoid the formation of ice in the unit basement. Pay attention that the evacuation will not create inconveniences to things or persons.

## Size 40.4 CCKP configuration

### Cooling performance with 30% of outdoor air

| Airflow       | Ta °C<br>DB/WB | Outdoor air temperature °C D.B./W.B. |       |      |     |         |       |      |     |         |       |      |     |         |       |      |     |         |       |      |     |         |       |      |     |
|---------------|----------------|--------------------------------------|-------|------|-----|---------|-------|------|-----|---------|-------|------|-----|---------|-------|------|-----|---------|-------|------|-----|---------|-------|------|-----|
|               |                | 20 / 12                              |       |      |     | 25 / 18 |       |      |     | 30 / 22 |       |      |     | 35 / 24 |       |      |     | 40 / 25 |       |      |     | 45 / 26 |       |      |     |
|               |                | kWf                                  | kWs   | kWe  | EER | kWf     | kWs   | kWe  | EER | kWf     | kWs   | kWe  | EER | kWf     | kWs   | kWe  | EER | kWf     | kWs   | kWe  | EER | kWf     | kWs   | kWe  | EER |
| 16000<br>m³/h | 22 / 16        | 117,1                                | 87,1  | 23,8 | 4,9 | 127,7   | 88,8  | 26,7 | 4,8 | 126,5   | 86,2  | 30,0 | 4,2 | 123,6   | 85,4  | 33,9 | 3,6 | 116,7   | 86,7  | 39,2 | 3,0 | 116,6   | 89,3  | 45,4 | 2,6 |
|               | 24 / 17        | 120,1                                | 89,4  | 23,9 | 5,0 | 129,5   | 91,7  | 26,8 | 4,8 | 129,5   | 88,8  | 30,2 | 4,3 | 126,0   | 88,9  | 34,0 | 3,7 | 118,9   | 89,5  | 39,4 | 3,0 | 118,3   | 91,9  | 45,7 | 2,6 |
|               | 26 / 18        | 123,0                                | 91,6  | 24,0 | 5,1 | 127,9   | 91,3  | 27,0 | 4,7 | 132,1   | 91,7  | 30,3 | 4,4 | 128,0   | 92,0  | 34,2 | 3,7 | 121,2   | 92,4  | 39,6 | 3,1 | 119,5   | 93,9  | 45,8 | 2,6 |
|               | 27 / 19        | 125,3                                | 90,9  | 24,2 | 5,2 | 128,0   | 88,9  | 27,2 | 4,7 | 131,8   | 89,7  | 30,5 | 4,3 | 129,8   | 91,5  | 34,4 | 3,8 | 123,3   | 91,7  | 39,9 | 3,1 | 121,1   | 92,8  | 46,0 | 2,6 |
|               | 28 / 20        | 127,6                                | 90,1  | 24,3 | 5,3 | 128,0   | 86,6  | 27,3 | 4,7 | 131,5   | 87,7  | 30,6 | 4,3 | 131,5   | 90,9  | 34,5 | 3,8 | 125,5   | 91,0  | 40,2 | 3,1 | 122,8   | 91,7  | 46,2 | 2,7 |
|               | 30 / 22        | 132,3                                | 88,4  | 24,6 | 5,4 | 131,7   | 85,2  | 27,6 | 4,8 | 130,8   | 83,6  | 30,9 | 4,2 | 135,5   | 88,6  | 34,8 | 3,9 | 129,9   | 89,4  | 40,7 | 3,2 | -       | -     | -    | -   |
| 21000<br>m³/h | 22 / 16        | 125,1                                | 93,8  | 24,2 | 5,2 | 135,6   | 95,2  | 27,2 | 5,0 | 134,4   | 92,0  | 30,5 | 4,4 | 130,2   | 92,4  | 34,3 | 3,8 | 123,3   | 94,8  | 39,7 | 3,1 | 124,7   | 99,3  | 45,8 | 2,7 |
|               | 24 / 17        | 127,9                                | 97,3  | 24,3 | 5,3 | 138,1   | 98,3  | 27,4 | 5,0 | 137,4   | 95,3  | 30,7 | 4,5 | 133,2   | 96,4  | 34,5 | 3,9 | 125,9   | 97,8  | 40,0 | 3,1 | 127,2   | 101,9 | 45,9 | 2,8 |
|               | 26 / 18        | 130,6                                | 100,9 | 24,4 | 5,4 | 136,2   | 99,0  | 27,5 | 5,0 | 140,4   | 98,6  | 30,9 | 4,5 | 135,7   | 99,7  | 34,8 | 3,9 | 128,8   | 100,4 | 40,4 | 3,2 | 129,1   | 104,8 | 46,2 | 2,8 |
|               | 27 / 19        | 132,8                                | 99,7  | 24,5 | 5,4 | 135,9   | 96,8  | 27,6 | 4,9 | 139,9   | 96,3  | 31,1 | 4,5 | 137,5   | 99,0  | 35,0 | 3,9 | 131,1   | 99,9  | 40,6 | 3,2 | 130,9   | 104,2 | 46,4 | 2,8 |
|               | 28 / 20        | 135,1                                | 98,4  | 24,7 | 5,5 | 135,6   | 94,5  | 27,7 | 4,9 | 139,5   | 94,1  | 31,2 | 4,5 | 139,3   | 98,2  | 35,1 | 4,0 | 133,4   | 99,4  | 40,7 | 3,3 | 132,7   | 103,5 | 46,6 | 2,8 |
|               | 30 / 22        | 139,6                                | 95,8  | 25,0 | 5,6 | 139,6   | 92,1  | 28,1 | 5,0 | 138,6   | 89,4  | 31,5 | 4,4 | 142,9   | 96,6  | 35,4 | 4,0 | 138,0   | 98,3  | 40,9 | 3,4 | -       | -     | -    | -   |
| 25000<br>m³/h | 22 / 16        | 129,5                                | 98,7  | 24,4 | 5,3 | 140,0   | 100,0 | 27,5 | 5,1 | 139,4   | 95,8  | 30,8 | 4,5 | 133,9   | 97,6  | 34,6 | 3,9 | 126,4   | 100,0 | 40,2 | 3,1 | 127,6   | 106,7 | 46,5 | 2,7 |
|               | 24 / 17        | 132,7                                | 102,4 | 24,5 | 5,4 | 142,2   | 103,8 | 27,7 | 5,1 | 141,8   | 100,1 | 31,0 | 4,6 | 136,6   | 102,4 | 34,8 | 3,9 | 129,3   | 104,0 | 40,6 | 3,2 | 129,8   | 108,6 | 46,5 | 2,8 |
|               | 26 / 18        | 136,1                                | 105,8 | 24,7 | 5,5 | 140,5   | 104,5 | 27,9 | 5,0 | 144,3   | 104,2 | 31,3 | 4,6 | 139,2   | 105,8 | 35,0 | 4,0 | 132,2   | 107,9 | 41,0 | 3,2 | 131,6   | 110,9 | 46,8 | 2,8 |
|               | 27 / 19        | 138,2                                | 104,8 | 24,8 | 5,6 | 140,4   | 101,8 | 28,0 | 5,0 | 143,9   | 101,7 | 31,4 | 4,6 | 141,0   | 104,7 | 35,2 | 4,0 | 134,3   | 107,3 | 41,1 | 3,3 | 133,4   | 110,1 | 47,0 | 2,8 |
|               | 28 / 20        | 140,2                                | 103,7 | 25,0 | 5,6 | 140,2   | 99,1  | 28,1 | 5,0 | 143,6   | 99,2  | 31,5 | 4,6 | 142,8   | 103,5 | 35,3 | 4,0 | 136,5   | 106,7 | 41,2 | 3,3 | 135,1   | 109,3 | 47,2 | 2,9 |
|               | 30 / 22        | 144,2                                | 101,3 | 25,2 | 5,7 | 144,5   | 96,1  | 28,4 | 5,1 | 142,9   | 94,1  | 31,8 | 4,5 | 146,6   | 101,8 | 35,7 | 4,1 | 140,7   | 105,3 | 41,4 | 3,4 | -       | -     | -    | -   |

### Heating performance with 30% of outdoor and exhaust air

| Airflow       | Ta (°C)<br>DB | Outdoor air temperature °C D.B./W.B. |      |      |         |      |      |        |      |      |       |      |      |       |      |      |         |      |      |
|---------------|---------------|--------------------------------------|------|------|---------|------|------|--------|------|------|-------|------|------|-------|------|------|---------|------|------|
|               |               | -7 / -8                              |      |      | -5 / -6 |      |      | 0 / -1 |      |      | 2 / 1 |      |      | 7 / 6 |      |      | 12 / 11 |      |      |
|               |               | kWt                                  | kWe  | COP  | kWt     | kWe  | COP  | kWt    | kWe  | COP  | kWt   | kWe  | COP  | kWt   | kWe  | COP  | kWt     | kWe  | COP  |
| 16000<br>m³/h | 10            | 111,1                                | 21,0 | 5,29 | 116,3   | 21,7 | 5,36 | 127,5  | 23,9 | 5,33 | 131,5 | 24,8 | 5,30 | 141,8 | 27,0 | 5,25 | 150,6   | 29,6 | 5,09 |
|               | 15            | 111,0                                | 22,7 | 4,89 | 115,8   | 23,5 | 4,93 | 129,1  | 25,6 | 5,04 | 133,8 | 26,7 | 5,01 | 143,0 | 29,5 | 4,85 | 151,7   | 32,3 | 4,70 |
|               | 18            | 110,8                                | 23,7 | 4,68 | 115,6   | 24,6 | 4,70 | 128,8  | 26,9 | 4,79 | 133,2 | 28,0 | 4,76 | 143,2 | 31,0 | 4,62 | 151,5   | 33,6 | 4,51 |
|               | 20            | 110,9                                | 24,4 | 4,55 | 115,8   | 25,4 | 4,56 | 128,6  | 27,7 | 4,64 | 132,8 | 28,9 | 4,60 | 142,4 | 31,8 | 4,48 | 150,9   | 34,4 | 4,39 |
|               | 22            | 111,0                                | 25,2 | 4,40 | 115,9   | 26,2 | 4,42 | 128,4  | 28,5 | 4,51 | 132,2 | 29,7 | 4,45 | 141,1 | 32,4 | 4,35 | 150,2   | 35,2 | 4,27 |
|               | 25            | 111,1                                | 26,3 | 4,22 | 115,9   | 27,4 | 4,23 | 127,4  | 29,8 | 4,28 | 130,8 | 30,8 | 4,25 | 139,1 | 33,4 | 4,16 | 149,5   | 36,6 | 4,08 |
| 21000<br>m³/h | 10            | 112,1                                | 19,6 | 5,72 | 117,3   | 20,2 | 5,81 | 128,7  | 22,0 | 5,85 | 132,9 | 22,7 | 5,85 | 144,0 | 24,7 | 5,83 | 153,7   | 26,8 | 5,74 |
|               | 15            | 111,9                                | 21,1 | 5,30 | 116,8   | 21,8 | 5,36 | 130,1  | 23,6 | 5,51 | 135,2 | 24,6 | 5,50 | 145,5 | 26,9 | 5,41 | 155,3   | 29,1 | 5,34 |
|               | 18            | 111,7                                | 22,1 | 5,05 | 116,7   | 22,8 | 5,12 | 129,9  | 24,8 | 5,24 | 134,7 | 25,8 | 5,22 | 145,9 | 28,2 | 5,17 | 155,4   | 30,4 | 5,11 |
|               | 20            | 111,7                                | 22,7 | 4,92 | 116,8   | 23,5 | 4,97 | 129,7  | 25,6 | 5,07 | 134,4 | 26,6 | 5,05 | 145,3 | 28,9 | 5,03 | 154,9   | 31,1 | 4,98 |
|               | 22            | 111,8                                | 23,4 | 4,78 | 117,0   | 24,2 | 4,83 | 129,6  | 26,4 | 4,91 | 133,8 | 27,3 | 4,90 | 144,1 | 29,5 | 4,88 | 154,3   | 31,9 | 4,84 |
|               | 25            | 112,0                                | 24,5 | 4,57 | 117,1   | 25,3 | 4,63 | 128,7  | 27,5 | 4,68 | 132,7 | 28,3 | 4,69 | 142,4 | 30,4 | 4,68 | 153,4   | 33,1 | 4,63 |
| 25000<br>m³/h | 10            | 112,7                                | 18,8 | 5,99 | 118,0   | 19,4 | 6,08 | 129,4  | 21,0 | 6,16 | 133,7 | 21,6 | 6,19 | 145,2 | 23,4 | 6,21 | 155,7   | 25,2 | 6,18 |
|               | 15            | 112,4                                | 20,3 | 5,54 | 117,4   | 20,9 | 5,62 | 131,0  | 22,5 | 5,82 | 136,1 | 23,4 | 5,82 | 146,6 | 25,4 | 5,77 | 157,2   | 27,5 | 5,72 |
|               | 18            | 112,1                                | 21,2 | 5,29 | 117,2   | 21,9 | 5,35 | 130,9  | 23,7 | 5,52 | 135,7 | 24,5 | 5,54 | 147,0 | 26,7 | 5,51 | 157,3   | 28,7 | 5,48 |
|               | 20            | 112,2                                | 21,9 | 5,12 | 117,3   | 22,6 | 5,19 | 130,8  | 24,4 | 5,36 | 135,4 | 25,3 | 5,35 | 146,4 | 27,4 | 5,34 | 156,8   | 29,4 | 5,33 |
|               | 22            | 112,3                                | 22,5 | 4,99 | 117,4   | 23,2 | 5,06 | 130,7  | 25,2 | 5,19 | 134,9 | 26,0 | 5,19 | 145,3 | 28,0 | 5,19 | 156,3   | 30,1 | 5,19 |
|               | 25            | 112,4                                | 23,5 | 4,78 | 117,5   | 24,3 | 4,84 | 129,6  | 26,2 | 4,95 | 133,6 | 27,0 | 4,95 | 143,7 | 28,9 | 4,97 | 155,4   | 31,3 | 4,96 |

Ta = Indoor air temperature D.B./W.B.

DB = Dry bulb

WB = Wet bulb

kWf = Cooling capacity in kW

kWs = Sensible cooling capacity (kW)

kWe = Compressor power input in kW

kWt = Heating capacity (kW)

EER referred only to compressors

COP referred only to compressors

The fan motor heating is not considered

### Integrated heating capacities

| Air temperature external exchanger inlet °C (D.B. / W.B.) | -5 / -5.4 | 0 / -0.6 | 5 / 3.9 | Others |
|-----------------------------------------------------------|-----------|----------|---------|--------|
| Heating capacity multiplication coefficient               | 0,89      | 0,88     | 0,94    | 1      |

The integrated heating capacity represents the real heating capacity considering the defrost cycles too.

To obtain the integrated heating capacity multiply the heating performance value in kWt (shown in the heating performance tables) by the coefficients indicated in the table.

DB = dry bulb

WB = wet bulb

In case of below zero external air temperature with a long period of heat pump operating mode it is necessary to help the evacuation of the water produced during the defrost cycle; this to avoid the formation of ice in the unit basement. Pay attention that the evacuation will not create inconveniences to things or persons.



## Size 44.4 CCKP configuration

### Cooling performance with 30% of outdoor air

| Airflow       | Ta °C<br>DB/WB | Outdoor air temperature °C D.B./W.B. |       |      |     |         |       |      |     |         |       |      |     |         |       |      |     |         |       |      |     |         |       |      |     |
|---------------|----------------|--------------------------------------|-------|------|-----|---------|-------|------|-----|---------|-------|------|-----|---------|-------|------|-----|---------|-------|------|-----|---------|-------|------|-----|
|               |                | 20 / 12                              |       |      |     | 25 / 18 |       |      |     | 30 / 22 |       |      |     | 35 / 24 |       |      |     | 40 / 25 |       |      |     | 45 / 26 |       |      |     |
|               |                | kWf                                  | kWs   | kWe  | EER | kWf     | kWs   | kWe  | EER | kWf     | kWs   | kWe  | EER | kWf     | kWs   | kWe  | EER | kWf     | kWs   | kWe  | EER | kWf     | kWs   | kWe  | EER |
| 16000<br>m³/h | 22 / 16        | 122,1                                | 90,7  | 26,2 | 4,7 | 133,4   | 91,9  | 29,5 | 4,5 | 131,1   | 90,3  | 32,9 | 4,0 | 129,6   | 88,2  | 37,1 | 3,5 | 121,7   | 89,9  | 42,7 | 2,9 | 120,8   | 93,4  | 49,5 | 2,4 |
|               | 24 / 17        | 124,9                                | 92,7  | 26,3 | 4,7 | 135,9   | 94,5  | 29,7 | 4,6 | 135,2   | 91,9  | 33,3 | 4,1 | 132,1   | 91,6  | 37,3 | 3,5 | 123,4   | 92,8  | 43,0 | 2,9 | 123,1   | 95,8  | 49,9 | 2,5 |
|               | 26 / 18        | 127,4                                | 94,9  | 26,5 | 4,8 | 133,8   | 94,6  | 29,9 | 4,5 | 139,2   | 93,5  | 33,6 | 4,1 | 134,3   | 94,4  | 37,6 | 3,6 | 125,0   | 95,6  | 43,3 | 2,9 | 124,7   | 98,1  | 49,9 | 2,5 |
|               | 27 / 19        | 129,8                                | 94,4  | 26,7 | 4,9 | 133,7   | 92,5  | 30,1 | 4,4 | 138,7   | 91,7  | 33,7 | 4,1 | 136,0   | 93,6  | 37,8 | 3,6 | 127,2   | 95,0  | 43,5 | 2,9 | 126,7   | 97,3  | 50,1 | 2,5 |
|               | 28 / 20        | 132,1                                | 93,9  | 26,8 | 4,9 | 133,6   | 90,4  | 30,2 | 4,4 | 138,1   | 89,9  | 33,9 | 4,1 | 137,7   | 92,9  | 38,0 | 3,6 | 129,7   | 94,4  | 43,7 | 3,0 | 128,7   | 96,4  | 50,2 | 2,6 |
|               | 30 / 22        | 136,5                                | 92,9  | 27,1 | 5,0 | 138,0   | 88,2  | 30,6 | 4,5 | 137,1   | 86,0  | 34,2 | 4,0 | 141,1   | 92,0  | 38,3 | 3,7 | 134,6   | 93,0  | 44,2 | 3,0 | -       | -     | -    | -   |
| 23000<br>m³/h | 22 / 16        | 133,2                                | 98,6  | 26,9 | 5,0 | 142,9   | 101,8 | 30,2 | 4,7 | 142,4   | 98,0  | 33,8 | 4,2 | 138,7   | 97,1  | 37,9 | 3,7 | 131,4   | 100,6 | 43,7 | 3,0 | 131,9   | 103,9 | 50,1 | 2,6 |
|               | 24 / 17        | 136,3                                | 102,6 | 27,1 | 5,0 | 145,4   | 105,2 | 30,3 | 4,8 | 145,3   | 101,5 | 34,0 | 4,3 | 142,0   | 101,4 | 38,2 | 3,7 | 133,5   | 104,5 | 44,1 | 3,0 | 134,7   | 106,5 | 50,3 | 2,7 |
|               | 26 / 18        | 139,2                                | 106,9 | 27,3 | 5,1 | 144,4   | 105,0 | 30,6 | 4,7 | 148,3   | 104,9 | 34,3 | 4,3 | 144,5   | 105,3 | 38,5 | 3,8 | 136,2   | 108,0 | 44,6 | 3,1 | 137,0   | 109,7 | 50,7 | 2,7 |
|               | 27 / 19        | 141,7                                | 105,7 | 27,4 | 5,2 | 144,6   | 102,2 | 30,8 | 4,7 | 147,8   | 102,6 | 34,5 | 4,3 | 146,2   | 104,6 | 38,7 | 3,8 | 138,5   | 107,1 | 44,7 | 3,1 | 139,0   | 108,9 | 51,0 | 2,7 |
|               | 28 / 20        | 144,1                                | 104,5 | 27,6 | 5,2 | 144,8   | 99,4  | 31,0 | 4,7 | 147,3   | 100,2 | 34,6 | 4,3 | 148,0   | 103,9 | 38,9 | 3,8 | 141,0   | 106,0 | 44,9 | 3,1 | 141,1   | 108,1 | 51,3 | 2,8 |
|               | 30 / 22        | 148,8                                | 102,0 | 27,9 | 5,3 | 148,4   | 97,2  | 31,3 | 4,7 | 146,3   | 95,3  | 35,0 | 4,2 | 151,8   | 101,9 | 39,2 | 3,9 | 146,0   | 103,7 | 45,2 | 3,2 | -       | -     | -    | -   |
| 25000<br>m³/h | 22 / 16        | 135,9                                | 100,4 | 27,1 | 5,0 | 145,9   | 104,3 | 30,4 | 4,8 | 144,7   | 100,2 | 34,0 | 4,3 | 140,7   | 99,9  | 38,2 | 3,7 | 132,9   | 104,2 | 43,8 | 3,0 | 133,7   | 106,8 | 50,4 | 2,7 |
|               | 24 / 17        | 139,3                                | 104,7 | 27,2 | 5,1 | 148,3   | 108,1 | 30,5 | 4,9 | 147,7   | 104,1 | 34,2 | 4,3 | 144,5   | 104,0 | 38,4 | 3,8 | 135,0   | 108,4 | 44,3 | 3,0 | 136,0   | 109,1 | 50,3 | 2,7 |
|               | 26 / 18        | 142,7                                | 108,9 | 27,5 | 5,2 | 147,1   | 108,0 | 30,8 | 4,8 | 150,7   | 107,9 | 34,4 | 4,4 | 146,8   | 108,2 | 38,7 | 3,8 | 137,6   | 112,1 | 44,8 | 3,1 | 140,6   | 112,4 | 50,9 | 2,8 |
|               | 27 / 19        | 145,0                                | 107,8 | 27,6 | 5,3 | 147,2   | 105,0 | 31,0 | 4,7 | 150,2   | 105,4 | 34,6 | 4,3 | 148,5   | 107,6 | 38,9 | 3,8 | 140,1   | 111,3 | 44,9 | 3,1 | 143,9   | 111,7 | 51,3 | 2,8 |
|               | 28 / 20        | 147,4                                | 106,6 | 27,7 | 5,3 | 147,3   | 101,9 | 31,1 | 4,7 | 149,7   | 102,8 | 34,8 | 4,3 | 150,0   | 106,9 | 39,1 | 3,8 | 142,7   | 110,5 | 45,0 | 3,2 | 147,4   | 111,0 | 51,7 | 2,9 |
|               | 30 / 22        | 152,1                                | 103,9 | 28,0 | 5,4 | 150,8   | 99,6  | 31,5 | 4,8 | 148,9   | 97,4  | 35,2 | 4,2 | 154,1   | 104,6 | 39,4 | 3,9 | 148,0   | 108,6 | 45,2 | 3,3 | -       | -     | -    | -   |

### Heating performance with 30% of outdoor and exhaust air

| Airflow       | Ta (°C)<br>DB | Outdoor air temperature °C D.B./W.B. |      |      |         |      |      |        |      |      |       |      |      |       |      |      |         |      |      |
|---------------|---------------|--------------------------------------|------|------|---------|------|------|--------|------|------|-------|------|------|-------|------|------|---------|------|------|
|               |               | -7 / -8                              |      |      | -5 / -6 |      |      | 0 / -1 |      |      | 2 / 1 |      |      | 7 / 6 |      |      | 12 / 11 |      |      |
|               |               | kWt                                  | kWe  | COP  | kWt     | kWe  | COP  | kWt    | kWe  | COP  | kWt   | kWe  | COP  | kWt   | kWe  | COP  | kWt     | kWe  | COP  |
| 16000<br>m³/h | 10            | 118,3                                | 24,7 | 4,79 | 123,8   | 25,6 | 4,84 | 135,0  | 28,3 | 4,77 | 139,0 | 29,4 | 4,73 | 149,5 | 32,4 | 4,61 | 158,0   | 35,4 | 4,46 |
|               | 15            | 118,4                                | 26,4 | 4,48 | 123,6   | 27,5 | 4,49 | 136,7  | 30,4 | 4,50 | 141,4 | 31,7 | 4,46 | 150,5 | 34,9 | 4,31 | 159,0   | 38,3 | 4,15 |
|               | 18            | 118,3                                | 27,5 | 4,30 | 123,5   | 28,7 | 4,30 | 136,7  | 31,8 | 4,30 | 140,9 | 33,1 | 4,26 | 150,6 | 36,5 | 4,13 | 158,7   | 39,8 | 3,99 |
|               | 20            | 118,4                                | 28,4 | 4,17 | 123,6   | 29,6 | 4,18 | 136,6  | 32,7 | 4,18 | 140,7 | 34,0 | 4,14 | 149,7 | 37,4 | 4,00 | 158,0   | 40,5 | 3,90 |
|               | 22            | 118,6                                | 29,3 | 4,05 | 123,6   | 30,5 | 4,05 | 136,6  | 33,6 | 4,07 | 140,0 | 34,9 | 4,01 | 148,3 | 38,1 | 3,89 | 157,3   | 41,3 | 3,81 |
|               | 25            | 118,7                                | 30,6 | 3,88 | 123,6   | 31,9 | 3,87 | 135,5  | 34,9 | 3,88 | 138,5 | 36,1 | 3,84 | 146,2 | 39,2 | 3,73 | 156,5   | 42,8 | 3,66 |
| 23000<br>m³/h | 10            | 119,5                                | 22,3 | 5,36 | 125,1   | 23,1 | 5,42 | 137,0  | 25,3 | 5,42 | 141,3 | 26,1 | 5,41 | 152,7 | 28,4 | 5,38 | 162,5   | 30,8 | 5,28 |
|               | 15            | 119,5                                | 23,9 | 5,00 | 124,7   | 24,8 | 5,03 | 138,6  | 27,1 | 5,11 | 143,8 | 28,1 | 5,12 | 154,2 | 30,7 | 5,02 | 164,2   | 33,5 | 4,90 |
|               | 18            | 119,3                                | 24,9 | 4,79 | 124,7   | 25,9 | 4,81 | 138,3  | 28,3 | 4,89 | 143,3 | 29,3 | 4,89 | 154,8 | 32,2 | 4,81 | 164,2   | 34,8 | 4,72 |
|               | 20            | 119,5                                | 25,7 | 4,65 | 124,9   | 26,7 | 4,68 | 138,1  | 29,1 | 4,75 | 142,9 | 30,2 | 4,73 | 154,0 | 32,9 | 4,68 | 163,5   | 35,5 | 4,61 |
|               | 22            | 119,7                                | 26,5 | 4,52 | 125,1   | 27,5 | 4,55 | 138,0  | 29,9 | 4,62 | 142,4 | 30,9 | 4,61 | 152,7 | 33,6 | 4,54 | 162,8   | 36,3 | 4,48 |
|               | 25            | 120,0                                | 27,6 | 4,35 | 125,3   | 28,7 | 4,37 | 137,0  | 31,0 | 4,42 | 141,1 | 32,0 | 4,41 | 150,8 | 34,5 | 4,37 | 161,8   | 37,5 | 4,31 |
| 25000<br>m³/h | 10            | 119,9                                | 21,8 | 5,50 | 125,5   | 22,6 | 5,55 | 137,4  | 24,7 | 5,56 | 141,9 | 25,5 | 5,56 | 153,5 | 27,6 | 5,56 | 163,5   | 29,9 | 5,47 |
|               | 15            | 119,7                                | 23,4 | 5,12 | 125,0   | 24,2 | 5,17 | 139,1  | 26,4 | 5,27 | 144,5 | 27,4 | 5,27 | 154,9 | 29,9 | 5,18 | 165,1   | 32,5 | 5,08 |
|               | 18            | 119,5                                | 24,4 | 4,90 | 124,9   | 25,3 | 4,94 | 138,9  | 27,6 | 5,03 | 143,9 | 28,6 | 5,03 | 155,3 | 31,3 | 4,96 | 165,2   | 33,8 | 4,89 |
|               | 20            | 119,7                                | 25,2 | 4,75 | 125,1   | 26,1 | 4,79 | 138,7  | 28,4 | 4,88 | 143,5 | 29,4 | 4,88 | 154,6 | 32,0 | 4,83 | 164,7   | 34,5 | 4,77 |
|               | 22            | 119,9                                | 25,9 | 4,63 | 125,3   | 26,9 | 4,66 | 138,6  | 29,1 | 4,76 | 142,9 | 30,2 | 4,73 | 153,5 | 32,6 | 4,71 | 164,2   | 35,2 | 4,66 |
|               | 25            | 120,2                                | 27,0 | 4,45 | 125,5   | 28,0 | 4,48 | 137,5  | 30,3 | 4,54 | 141,7 | 31,2 | 4,54 | 151,8 | 33,6 | 4,52 | 163,3   | 36,4 | 4,49 |

Ta = Indoor air temperature D.B./W.B.

DB = Dry bulb

WB = Wet bulb

kWf = Cooling capacity in kW

kWs = Sensible cooling capacity (kW)

kWe = Compressor power input in kW

kWt = Heating capacity (kW)

EER referred only to compressors

COP referred only to compressors

The fan motor heating is not considered

### Integrated heating capacities

| Air temperature external exchanger inlet °C (D.B. / W.B.) | -5 / -5.4 | 0 / -0.6 | 5 / 3.9 | Others |
|-----------------------------------------------------------|-----------|----------|---------|--------|
| Heating capacity multiplication coefficient               | 0,89      | 0,88     | 0,94    | 1      |

The integrated heating capacity represents the real heating capacity considering the defrost cycles too.

To obtain the integrated heating capacity multiply the heating performance value in kWt (shown in the heating performance tables) by the coefficients indicated in the table.

DB = dry bulb

WB = wet bulb

In case of below zero external air temperature with a long period of heat pump operating mode it is necessary to help the evacuation of the water produced during the defrost cycle; this to avoid the formation of ice in the unit basement. Pay attention that the evacuation will not create inconveniences to things or persons.

## Handling electric fan performance - Standard airflow

| Available static pressure (Pa) (supply+return) |                |       | 90    | 100   | 120   | 150   | 180   | 210   | 240   | 270   | 300   | 330   | 360   | 390   | 420   | 450   | 510   |
|------------------------------------------------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 15.2                                           | Airflow        | m³/h  | 9000  | 9000  | 9000  | 9000  | 9000  | 9000  | 9000  | 9000  | 9000  | 9000  | 9000  | 9000  | 9000  | 9000  | 9000  |
|                                                | Airflow        | l/s   | 2500  | 2500  | 2500  | 2500  | 2500  | 2500  | 2500  | 2500  | 2500  | 2500  | 2500  | 2500  | 2500  | 2500  | 2500  |
|                                                | Fan RPM        | rpm   | 916   | 925   | 945   | 974   | 1003  | 1031  | 1059  | 1086  | 1113  | 1140  | 1167  | 1193  | 1218  | 1243  | 1292  |
|                                                | Sound pressure | dB(A) | 75,9  | 76,0  | 76,2  | 76,7  | 77,1  | 77,5  | 78,0  | 78,6  | 79,3  | 79,9  | 80,5  | 81,1  | 81,6  | 82,2  | 83,4  |
|                                                | Total input    | kW    | 0,95  | 0,98  | 1,05  | 1,15  | 1,26  | 1,37  | 1,49  | 1,60  | 1,72  | 1,84  | 1,97  | 2,10  | 2,24  | 2,37  | 2,64  |
| 18.2                                           | Airflow        | m³/h  | 11500 | 11500 | 11500 | 11500 | 11500 | 11500 | 11500 | 11500 | 11500 | 11500 | 11500 | -     | -     | -     | -     |
|                                                | Airflow        | l/s   | 3194  | 3194  | 3194  | 3194  | 3194  | 3194  | 3194  | 3194  | 3194  | 3194  | 3194  | -     | -     | -     | -     |
|                                                | Fan RPM        | rpm   | 1108  | 1116  | 1131  | 1153  | 1176  | 1199  | 1221  | 1244  | 1259  | 1281  | 1303  | -     | -     | -     | -     |
|                                                | Sound pressure | dB(A) | 81,5  | 81,5  | 81,4  | 81,3  | 81,2  | 81,6  | 81,7  | 82,0  | 82,2  | 82,4  | 82,7  | -     | -     | -     | -     |
|                                                | Total input    | kW    | 1,57  | 1,61  | 1,69  | 1,82  | 1,95  | 2,08  | 2,21  | 2,34  | 2,43  | 2,58  | 2,72  | -     | -     | -     | -     |
| 20.4                                           | Airflow        | m³/h  | 13500 | 13500 | 13500 | 13500 | 13500 | 13500 | 13500 | 13500 | 13500 | 13500 | 13500 | 13500 | 13500 | 13500 | 13500 |
|                                                | Airflow        | l/s   | 3750  | 3750  | 3750  | 3750  | 3750  | 3750  | 3750  | 3750  | 3750  | 3750  | 3750  | 3750  | 3750  | 3750  | 3750  |
|                                                | Fan RPM        | rpm   | 1040  | 1050  | 1072  | 1105  | 1137  | 1169  | 1200  | 1231  | 1261  | 1291  | 1321  | 1351  | 1380  | 1408  | 1454  |
|                                                | Sound pressure | dB(A) | 78,6  | 78,6  | 78,6  | 78,6  | 78,6  | 78,7  | 79,0  | 79,5  | 80,1  | 80,6  | 81,1  | 81,7  | 82,4  | 83,1  | 84,2  |
|                                                | Total input    | kW    | 1,54  | 1,58  | 1,68  | 1,82  | 1,96  | 2,12  | 2,26  | 2,44  | 2,62  | 2,80  | 2,98  | 3,18  | 3,36  | 3,56  | 3,90  |
| 25.4                                           | Airflow        | m³/h  | 15000 | 15000 | 15000 | 15000 | 15000 | 15000 | 15000 | 15000 | 15000 | 15000 | 15000 | 15000 | 15000 | 15000 | 15000 |
|                                                | Airflow        | l/s   | 4167  | 4167  | 4167  | 4167  | 4167  | 4167  | 4167  | 4167  | 4167  | 4167  | 4167  | 4167  | 4167  | 4167  | 4167  |
|                                                | Fan RPM        | rpm   | 1125  | 1144  | 1154  | 1183  | 1223  | 1252  | 1271  | 1299  | 1327  | 1355  | 1383  | 1410  | 1437  | 1464  | 1517  |
|                                                | Sound pressure | dB(A) | 80,5  | 80,7  | 80,9  | 80,9  | 80,9  | 80,9  | 80,9  | 81,0  | 81,2  | 81,6  | 82,1  | 82,5  | 82,9  | 83,3  | 84,4  |
|                                                | Total input    | kW    | 1,86  | 1,98  | 2,04  | 2,20  | 2,40  | 2,56  | 2,68  | 2,84  | 3,02  | 3,20  | 3,40  | 3,60  | 3,80  | 4,02  | 4,44  |
| 30.4                                           | Airflow        | m³/h  | 17000 | 17000 | 17000 | 17000 | 17000 | 17000 | 17000 | 17000 | 17000 | 17000 | 17000 | 17000 | 17000 | 17000 | 17000 |
|                                                | Airflow        | l/s   | 4722  | 4722  | 4722  | 4722  | 4722  | 4722  | 4722  | 4722  | 4722  | 4722  | 4722  | 4722  | 4722  | 4722  | 4722  |
|                                                | Fan RPM        | rpm   | 1234  | 1243  | 1260  | 1285  | 1312  | 1346  | 1372  | 1398  | 1415  | 1440  | 1465  | 1490  | 1515  | 1539  | 1588  |
|                                                | Sound pressure | dB(A) | 82,7  | 82,8  | 83,0  | 83,3  | 83,6  | 83,6  | 83,6  | 83,6  | 83,6  | 83,6  | 83,7  | 83,8  | 84,1  | 84,4  | 85,1  |
|                                                | Total input    | kW    | 2,36  | 2,42  | 2,54  | 2,74  | 2,94  | 3,16  | 3,34  | 3,52  | 3,64  | 3,82  | 4,02  | 4,22  | 4,44  | 4,64  | 5,10  |
| 33.4                                           | Airflow        | m³/h  | 18500 | 18500 | 18500 | 18500 | 18500 | 18500 | 18500 | 18500 | 18500 | 18500 | 18500 | 18500 | 18500 | 18500 | 18500 |
|                                                | Airflow        | l/s   | 5139  | 5139  | 5139  | 5139  | 5139  | 5139  | 5139  | 5139  | 5139  | 5139  | 5139  | 5139  | 5139  | 5139  | 5139  |
|                                                | Fan RPM        | rpm   | 908   | 916   | 935   | 963   | 992   | 1019  | 1048  | 1075  | 1101  | 1129  | 1154  | 1180  | 1206  | 1231  | 1280  |
|                                                | Sound pressure | dB(A) | 78,6  | 78,5  | 78,4  | 78,5  | 79,0  | 79,4  | 79,8  | 80,2  | 80,7  | 81,3  | 81,9  | 82,5  | 83,0  | 83,5  | 84,5  |
|                                                | Total input    | kW    | 1,81  | 1,87  | 2,00  | 2,20  | 2,42  | 2,64  | 2,88  | 3,10  | 3,34  | 3,58  | 3,82  | 4,08  | 4,34  | 4,62  | 5,18  |
| 40.4                                           | Airflow        | m³/h  | 21000 | 21000 | 21000 | 21000 | 21000 | 21000 | 21000 | 21000 | 21000 | 21000 | 21000 | 21000 | 21000 | -     | -     |
|                                                | Airflow        | l/s   | 5833  | 5833  | 5833  | 5833  | 5833  | 5833  | 5833  | 5833  | 5833  | 5833  | 5833  | 5833  | 5833  | -     | -     |
|                                                | Fan RPM        | rpm   | 999   | 1007  | 1024  | 1048  | 1047  | 1098  | 1123  | 1148  | 1172  | 1197  | 1221  | 1244  | 1269  | -     | -     |
|                                                | Sound pressure | dB(A) | 81,5  | 81,4  | 81,3  | 81,2  | 81,1  | 81,4  | 81,7  | 82,0  | 82,3  | 82,6  | 82,9  | 83,4  | 83,9  | -     | -     |
|                                                | Total input    | kW    | 2,32  | 2,38  | 2,54  | 2,76  | 3,00  | 3,22  | 3,46  | 3,72  | 3,96  | 4,24  | 4,52  | 4,78  | 5,06  | -     | -     |
| 44.4                                           | Airflow        | m³/h  | 23000 | 23000 | 23000 | 23000 | 23000 | 23000 | 23000 | 23000 | 23000 | 23000 | 23000 | -     | -     | -     | -     |
|                                                | Airflow        | l/s   | 6389  | 6389  | 6389  | 6389  | 6389  | 6389  | 6389  | 6389  | 6389  | 6389  | 6389  | -     | -     | -     | -     |
|                                                | Fan RPM        | rpm   | 1074  | 1082  | 1097  | 1119  | 1142  | 1165  | 1187  | 1210  | 1232  | 1255  | 1277  | -     | -     | -     | -     |
|                                                | Sound pressure | dB(A) | 83,7  | 83,6  | 83,5  | 83,3  | 83,2  | 83,1  | 83,1  | 83,4  | 83,7  | 84,0  | 84,2  | -     | -     | -     | -     |
|                                                | Total input    | kW    | 2,80  | 2,88  | 3,04  | 3,26  | 3,52  | 3,78  | 4,02  | 4,28  | 4,54  | 4,82  | 5,10  | -     | -     | -     | -     |

The performance takes into account the pressure drops in the unit (pressure drops in handling coil, standard filters, etc.).

To determine the performance required of the fans, you must add to the usable static pressure desired the pressure drops of any accessories.

## Handling electric fan performance - Minimum airflow

| Available static pressure (Pa) (supply+return) |                |       | 90    | 100   | 120   | 150   | 180   | 210   | 240   | 270   | 300   | 330   | 360   | 390   | 420   | 450   | 510   |
|------------------------------------------------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 15.2                                           | Airflow        | m³/h  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  |
|                                                | Airflow        | l/s   | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  |
|                                                | Fan RPM        | rpm   | 846   | 856   | 876   | 906   | 938   | 967   | 998   | 1026  | 1054  | 1084  | 1111  | 1139  | 1165  | 1191  | 1242  |
|                                                | Sound pressure | dB(A) | 73,6  | 73,5  | 73,5  | 74,0  | 74,5  | 75,0  | 75,5  | 76,2  | 76,9  | 77,5  | 78,2  | 78,8  | 79,4  | 80,1  | 81,4  |
|                                                | Total input    | kW    | 0,75  | 0,78  | 0,85  | 0,94  | 1,04  | 1,14  | 1,26  | 1,36  | 1,47  | 1,59  | 1,71  | 1,84  | 1,96  | 2,09  | 2,34  |
| 18.2                                           | Airflow        | m³/h  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  |
|                                                | Airflow        | l/s   | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  |
|                                                | Fan RPM        | rpm   | 846   | 856   | 876   | 906   | 938   | 967   | 998   | 1026  | 1054  | 1084  | 1111  | 1139  | 1165  | 1191  | 1242  |
|                                                | Sound pressure | dB(A) | 73,6  | 73,5  | 73,5  | 74,0  | 74,5  | 75,0  | 75,5  | 76,2  | 76,9  | 77,5  | 78,2  | 78,8  | 79,4  | 80,1  | 81,4  |
|                                                | Total input    | kW    | 0,75  | 0,78  | 0,85  | 0,94  | 1,04  | 1,14  | 1,26  | 1,36  | 1,47  | 1,59  | 1,71  | 1,84  | 1,96  | 2,09  | 2,34  |
| 20.4                                           | Airflow        | m³/h  | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 |
|                                                | Airflow        | l/s   | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  |
|                                                | Fan RPM        | rpm   | 917   | 928   | 954   | 988   | 1024  | 1060  | 1095  | 1127  | 1164  | 1197  | 1230  | 1262  | 1293  | 1322  | 1382  |
|                                                | Sound pressure | dB(A) | 74,7  | 74,9  | 74,9  | 74,9  | 74,9  | 75,1  | 75,8  | 76,5  | 77,1  | 77,8  | 78,7  | 79,5  | 80,3  | 81,1  | 82,5  |
|                                                | Total input    | kW    | 1,09  | 1,13  | 1,22  | 1,34  | 1,47  | 1,61  | 1,76  | 1,91  | 2,08  | 2,21  | 2,42  | 2,60  | 2,78  | 2,94  | 3,34  |
| 25.4                                           | Airflow        | m³/h  | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 |
|                                                | Airflow        | l/s   | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  |
|                                                | Fan RPM        | rpm   | 917   | 928   | 954   | 988   | 1024  | 1060  | 1095  | 1127  | 1164  | 1197  | 1230  | 1262  | 1293  | 1322  | 1382  |
|                                                | Sound pressure | dB(A) | 74,7  | 74,9  | 74,9  | 74,9  | 74,9  | 75,1  | 75,8  | 76,5  | 77,1  | 77,8  | 78,7  | 79,5  | 80,3  | 81,1  | 82,5  |
|                                                | Total input    | kW    | 1,09  | 1,13  | 1,22  | 1,34  | 1,47  | 1,61  | 1,76  | 1,91  | 2,08  | 2,21  | 2,42  | 2,60  | 2,78  | 2,94  | 3,34  |
| 30.4                                           | Airflow        | m³/h  | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 |
|                                                | Airflow        | l/s   | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  |
|                                                | Fan RPM        | rpm   | 917   | 928   | 954   | 988   | 1024  | 1060  | 1095  | 1127  | 1164  | 1197  | 1230  | 1262  | 1293  | 1322  | 1382  |
|                                                | Sound pressure | dB(A) | 74,7  | 74,9  | 74,9  | 74,9  | 74,9  | 75,1  | 75,8  | 76,5  | 77,1  | 77,8  | 78,7  | 79,5  | 80,3  | 81,1  | 82,5  |
|                                                | Total input    | kW    | 1,09  | 1,13  | 1,22  | 1,34  | 1,47  | 1,61  | 1,76  | 1,91  | 2,08  | 2,21  | 2,42  | 2,60  | 2,78  | 2,94  | 3,34  |
| 33.4                                           | Airflow        | m³/h  | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 |
|                                                | Airflow        | l/s   | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  |
|                                                | Fan RPM        | rpm   | 821   | 833   | 853   | 886   | 917   | 949   | 980   | 1010  | 1040  | 1069  | 1097  | 1125  | 1152  | 1178  | 1230  |
|                                                | Sound pressure | dB(A) | 75,2  | 75,4  | 75,7  | 76,3  | 76,8  | 77,5  | 78,3  | 79,0  | 79,7  | 80,4  | 81,1  | 81,6  | 82,6  | 83,3  | 84,7  |
|                                                | Total input    | kW    | 1,42  | 1,48  | 1,59  | 1,78  | 1,98  | 2,20  | 2,40  | 2,60  | 2,82  | 3,06  | 3,28  | 3,52  | 3,76  | 4,00  | 4,52  |
| 40.4                                           | Airflow        | m³/h  | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 |
|                                                | Airflow        | l/s   | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  |
|                                                | Fan RPM        | rpm   | 821   | 833   | 853   | 886   | 917   | 949   | 980   | 1010  | 1040  | 1069  | 1097  | 1125  | 1152  | 1178  | 1230  |
|                                                | Sound pressure | dB(A) | 75,2  | 75,4  | 75,7  | 76,3  | 76,8  | 77,5  | 78,3  | 79,0  | 79,7  | 80,4  | 81,1  | 81,6  | 82,6  | 83,3  | 84,7  |
|                                                | Total input    | kW    | 1,42  | 1,48  | 1,59  | 1,78  | 1,98  | 2,20  | 2,40  | 2,60  | 2,82  | 3,06  | 3,28  | 3,52  | 3,76  | 4,00  | 4,52  |
| 44.4                                           | Airflow        | m³/h  | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 |
|                                                | Airflow        | l/s   | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  |
|                                                | Fan RPM        | rpm   | 821   | 833   | 853   | 886   | 917   | 949   | 980   | 1010  | 1040  | 1069  | 1097  | 1125  | 1152  | 1178  | 1230  |
|                                                | Sound pressure | dB(A) | 75,2  | 75,4  | 75,7  | 76,3  | 76,8  | 77,5  | 78,3  | 79,0  | 79,7  | 80,4  | 81,1  | 81,6  | 82,6  | 83,3  | 84,7  |
|                                                | Total input    | kW    | 1,42  | 1,48  | 1,59  | 1,78  | 1,98  | 2,20  | 2,40  | 2,60  | 2,82  | 3,06  | 3,28  | 3,52  | 3,76  | 4,00  | 4,52  |

The performance takes into account the pressure drops in the unit (pressure drops in handling coil, standard filters, etc.).

To determine the performance required of the fans, you must add to the usable static pressure desired the pressure drops of any accessories.

## Handling electric fan performance - High airflow

| Available static pressure (Pa) (supply+return) |                |       | 90    | 100   | 120   | 150   | 180   | 210   | 240   | 270   | 300   | 330   | 360   | 390   | 420   | 450   |
|------------------------------------------------|----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 15.2                                           | Airflow        | m³/h  | 13000 | 13000 | 13000 | 13000 | 13000 | 13000 | 13000 | -     | -     | -     | -     | -     | -     | -     |
|                                                | Airflow        | l/s   | 3611  | 3611  | 3611  | 3611  | 3611  | 3611  | 3611  | -     | -     | -     | -     | -     | -     | -     |
|                                                | Fan RPM        | rpm   | 1183  | 1189  | 1203  | 1224  | 1243  | 1263  | 1284  | -     | -     | -     | -     | -     | -     | -     |
|                                                | Sound pressure | dB(A) | 83,7  | 83,6  | 83,4  | 83,3  | 83,1  | 83,0  | 82,9  | -     | -     | -     | -     | -     | -     | -     |
|                                                | Total input    | kW    | 1,80  | 1,84  | 1,93  | 2,06  | 2,19  | 2,32  | 2,47  | -     | -     | -     | -     | -     | -     | -     |
| 18.2                                           | Airflow        | m³/h  | 13000 | 13000 | 13000 | 13000 | 13000 | 13000 | 13000 | -     | -     | -     | -     | -     | -     | -     |
|                                                | Airflow        | l/s   | 3611  | 3611  | 3611  | 3611  | 3611  | 3611  | 3611  | -     | -     | -     | -     | -     | -     | -     |
|                                                | Fan RPM        | rpm   | 1183  | 1189  | 1203  | 1224  | 1243  | 1263  | 1284  | -     | -     | -     | -     | -     | -     | -     |
|                                                | Sound pressure | dB(A) | 83,7  | 83,6  | 83,4  | 83,3  | 83,1  | 83,0  | 82,9  | -     | -     | -     | -     | -     | -     | -     |
|                                                | Total input    | kW    | 1,80  | 1,84  | 1,93  | 2,06  | 2,19  | 2,32  | 2,47  | -     | -     | -     | -     | -     | -     | -     |
| 20.4                                           | Airflow        | m³/h  | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 |
|                                                | Airflow        | l/s   | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  |
|                                                | Fan RPM        | rpm   | 1364  | 1371  | 1387  | 1409  | 1431  | 1451  | 1475  | 1495  | 1517  | 1540  | 1562  | 1584  | 1607  | 1627  |
|                                                | Sound pressure | dB(A) | 84,6  | 84,6  | 84,5  | 84,5  | 84,8  | 85,0  | 85,2  | 85,5  | 85,7  | 86,0  | 86,0  | 86,0  | 86,0  | 86,0  |
|                                                | Total input    | kW    | 2,94  | 3,00  | 3,14  | 3,34  | 3,54  | 3,74  | 3,98  | 4,18  | 4,42  | 4,68  | 4,88  | 5,08  | 5,30  | 5,50  |
| 25.4                                           | Airflow        | m³/h  | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 |
|                                                | Airflow        | l/s   | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  |
|                                                | Fan RPM        | rpm   | 1364  | 1371  | 1387  | 1409  | 1431  | 1451  | 1475  | 1495  | 1517  | 1540  | 1562  | 1584  | 1607  | 1627  |
|                                                | Sound pressure | dB(A) | 84,6  | 84,6  | 84,5  | 84,5  | 84,8  | 85,0  | 85,2  | 85,5  | 85,7  | 86,0  | 86,0  | 86,0  | 86,0  | 86,0  |
|                                                | Total input    | kW    | 2,94  | 3,00  | 3,14  | 3,34  | 3,54  | 3,74  | 3,98  | 4,18  | 4,42  | 4,68  | 4,88  | 5,08  | 5,30  | 5,50  |
| 30.4                                           | Airflow        | m³/h  | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 |
|                                                | Airflow        | l/s   | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  |
|                                                | Fan RPM        | rpm   | 1364  | 1371  | 1387  | 1409  | 1431  | 1451  | 1475  | 1495  | 1517  | 1540  | 1562  | 1584  | 1607  | 1627  |
|                                                | Sound pressure | dB(A) | 84,6  | 84,6  | 84,5  | 84,5  | 84,8  | 85,0  | 85,2  | 85,5  | 85,7  | 86,0  | 86,0  | 86,0  | 86,0  | 86,0  |
|                                                | Total input    | kW    | 2,94  | 3,00  | 3,14  | 3,34  | 3,54  | 3,74  | 3,98  | 4,18  | 4,42  | 4,68  | 4,88  | 5,08  | 5,30  | 5,50  |
| 33.4                                           | Airflow        | m³/h  | 25000 | 25000 | 25000 | 25000 | 25000 | 25000 | 25000 | 25000 | -     | -     | -     | -     | -     | -     |
|                                                | Airflow        | l/s   | 6944  | 6944  | 6944  | 6944  | 6944  | 6944  | 6944  | 6944  | -     | -     | -     | -     | -     | -     |
|                                                | Fan RPM        | rpm   | 1154  | 1161  | 1175  | 1196  | 1217  | 1237  | 1257  | 1279  | -     | -     | -     | -     | -     | -     |
|                                                | Sound pressure | dB(A) | 85,6  | 85,5  | 85,4  | 85,3  | 85,1  | 85,0  | 84,9  | 84,9  | -     | -     | -     | -     | -     | -     |
|                                                | Total input    | kW    | 3,42  | 3,48  | 3,64  | 3,90  | 4,16  | 4,42  | 4,70  | 5,00  | -     | -     | -     | -     | -     | -     |
| 40.4                                           | Airflow        | m³/h  | 25000 | 25000 | 25000 | 25000 | 25000 | 25000 | 25000 | 25000 | -     | -     | -     | -     | -     | -     |
|                                                | Airflow        | l/s   | 6944  | 6944  | 6944  | 6944  | 6944  | 6944  | 6944  | 6944  | -     | -     | -     | -     | -     | -     |
|                                                | Fan RPM        | rpm   | 1154  | 1161  | 1175  | 1196  | 1217  | 1237  | 1257  | 1279  | -     | -     | -     | -     | -     | -     |
|                                                | Sound pressure | dB(A) | 85,6  | 85,5  | 85,4  | 85,3  | 85,1  | 85,0  | 84,9  | 84,9  | -     | -     | -     | -     | -     | -     |
|                                                | Total input    | kW    | 3,42  | 3,48  | 3,64  | 3,90  | 4,16  | 4,42  | 4,70  | 5,00  | -     | -     | -     | -     | -     | -     |
| 44.4                                           | Airflow        | m³/h  | 25000 | 25000 | 25000 | 25000 | 25000 | 25000 | 25000 | 25000 | -     | -     | -     | -     | -     | -     |
|                                                | Airflow        | l/s   | 6944  | 6944  | 6944  | 6944  | 6944  | 6944  | 6944  | 6944  | -     | -     | -     | -     | -     | -     |
|                                                | Fan RPM        | rpm   | 1154  | 1161  | 1175  | 1196  | 1217  | 1237  | 1257  | 1279  | -     | -     | -     | -     | -     | -     |
|                                                | Sound pressure | dB(A) | 85,6  | 85,5  | 85,4  | 85,3  | 85,1  | 85,0  | 84,9  | 84,9  | -     | -     | -     | -     | -     | -     |
|                                                | Total input    | kW    | 3,42  | 3,48  | 3,64  | 3,90  | 4,16  | 4,42  | 4,70  | 5,00  | -     | -     | -     | -     | -     | -     |

The performance takes into account the pressure drops in the unit (pressure drops in handling coil, standard filters, etc.).

To determine the performance required of the fans, you must add to the usable static pressure desired the pressure drops of any accessories.

## High static pressure electric fan performance - Standard airflow

| Available static pressure (Pa) (supply+return) |             |       | 300   | 360   | 420   | 480   | 540   | 600   | 660   | 720   | 780   | 820   | 900   | 960   | 1020  | 1080  | 1140  |
|------------------------------------------------|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 15.2                                           | Airflow     | m³/h  | 9000  | 9000  | 9000  | 9000  | 9000  | 9000  | 9000  | 9000  | 9000  | 9000  | 9000  | 9000  | 9000  | 9000  | 9000  |
|                                                | Airflow     | l/s   | 2500  | 2500  | 2500  | 2500  | 2500  | 2500  | 2500  | 2500  | 2500  | 2500  | 2500  | 2500  | 2500  | 2500  | 2500  |
|                                                | Fan RPM     | rpm   | 1587  | 1627  | 1671  | 1714  | 1757  | 1800  | 1843  | 1884  | 1925  | 1951  | 2005  | 2044  | 2080  | 2119  | 2156  |
|                                                | Sound power | dB(A) | 90,6  | 90,4  | 90,3  | 90,3  | 90,6  | 90,8  | 91,2  | 91,5  | 91,8  | 92    | 92,4  | 92,7  | 93,1  | 93,4  | 93,3  |
|                                                | Total input | kW    | 1,89  | 2,06  | 2,26  | 2,47  | 2,68  | 2,89  | 3,11  | 3,33  | 3,57  | 3,72  | 4,06  | 4,29  | 4,52  | 4,77  | 5,02  |
| 18.2                                           | Airflow     | m³/h  | 11500 | 11500 | 11500 | 11500 | 11500 | 11500 | 11500 | 11500 | 11500 | 11500 | -     | -     | -     | -     | -     |
|                                                | Airflow     | l/s   | 3194  | 3194  | 3194  | 3194  | 3194  | 3194  | 3194  | 3194  | 3194  | 3194  | -     | -     | -     | -     | -     |
|                                                | Fan RPM     | rpm   | 1905  | 1941  | 1977  | 2011  | 2045  | 2077  | 2113  | 2145  | 2179  | 2203  | -     | -     | -     | -     | -     |
|                                                | Sound power | dB(A) | 96,5  | 96,3  | 96,1  | 96,3  | 95,8  | 95,7  | 95,6  | 95,6  | 95,5  | 95,6  | -     | -     | -     | -     | -     |
|                                                | Total input | kW    | 3,03  | 3,24  | 3,47  | 3,7   | 3,94  | 4,16  | 4,44  | 4,69  | 4,96  | 5,15  | -     | -     | -     | -     | -     |
| 20.4                                           | Airflow     | m³/h  | 13500 | 13500 | 13500 | 13500 | 13500 | 13500 | 13500 | 13500 | 13500 | 13500 | 13500 | 13500 | 13500 | 13500 | 13500 |
|                                                | Airflow     | l/s   | 3750  | 3750  | 3750  | 3750  | 3750  | 3750  | 3750  | 3750  | 3750  | 3750  | 3750  | 3750  | 3750  | 3750  | 3750  |
|                                                | Fan RPM     | rpm   | 1347  | 1403  | 1458  | 1511  | 1563  | 1614  | 1663  | 1712  | 1760  | 1790  | 1849  | 1898  | 1939  | 1980  | 2026  |
|                                                | Sound power | dB(A) | 87,6  | 88,1  | 88,6  | 89,2  | 89,8  | 90,4  | 91,1  | 91,7  | 92,3  | 92,7  | 93,6  | 94,3  | 94,9  | 95,5  | 96,2  |
|                                                | Total input | kW    | 2,58  | 2,92  | 3,26  | 3,62  | 3,98  | 4,34  | 4,72  | 5,12  | 5,52  | 5,8   | 6,32  | 6,76  | 7,16  | 7,58  | 8,06  |
| 25.4                                           | Airflow     | m³/h  | 15000 | 15000 | 15000 | 15000 | 15000 | 15000 | 15000 | 15000 | 15000 | 15000 | 15000 | 15000 | 15000 | 15000 | 15000 |
|                                                | Airflow     | l/s   | 4167  | 4167  | 4167  | 4167  | 4167  | 4167  | 4167  | 4167  | 4167  | 4167  | 4167  | 4167  | 4167  | 4167  | 4167  |
|                                                | Fan RPM     | rpm   | 1436  | 1484  | 1535  | 1584  | 1633  | 1680  | 1727  | 1773  | 1819  | 1847  | 1906  | 1949  | 1986  | 2030  | 2071  |
|                                                | Sound power | dB(A) | 89,3  | 89,7  | 90,2  | 90,6  | 91    | 91,5  | 92    | 92,5  | 93    | 93,4  | 94    | 94,5  | 95    | 95,5  | 96,1  |
|                                                | Total input | kW    | 3,02  | 3,34  | 3,7   | 4,08  | 4,48  | 4,88  | 5,28  | 5,68  | 6,1   | 6,36  | 6,96  | 7,42  | 7,84  | 8,32  | 8,8   |
| 30.4                                           | Airflow     | m³/h  | 17000 | 17000 | 17000 | 17000 | 17000 | 17000 | 17000 | 17000 | 17000 | 17000 | 17000 | 17000 | 17000 | 17000 | 17000 |
|                                                | Airflow     | l/s   | 4722  | 4722  | 4722  | 4722  | 4722  | 4722  | 4722  | 4722  | 4722  | 4722  | 4722  | 4722  | 4722  | 4722  | 4722  |
|                                                | Fan RPM     | rpm   | 1553  | 1599  | 1645  | 1691  | 1736  | 1777  | 1820  | 1863  | 1904  | 1931  | 1987  | 2027  | 2067  | 2106  | 2144  |
|                                                | Sound power | dB(A) | 92    | 92    | 92,1  | 92,5  | 92,8  | 93,2  | 93,5  | 93,9  | 94,2  | 94,5  | 95    | 95,4  | 95,8  | 96,2  | 96,6  |
|                                                | Total input | kW    | 3,66  | 4,04  | 4,44  | 4,82  | 5,24  | 5,62  | 6,06  | 6,52  | 6,98  | 7,26  | 7,88  | 8,36  | 8,84  | 9,34  | 9,86  |
| 33.4                                           | Airflow     | m³/h  | 18500 | 18500 | 18500 | 18500 | 18500 | 18500 | 18500 | 18500 | 18500 | 18500 | 18500 | 18500 | 18500 | 18500 | 18500 |
|                                                | Airflow     | l/s   | 5139  | 5139  | 5139  | 5139  | 5139  | 5139  | 5139  | 5139  | 5139  | 5139  | 5139  | 5139  | 5139  | 5139  | 5139  |
|                                                | Fan RPM     | rpm   | 1620  | 1663  | 1705  | 1747  | 1790  | 1832  | 1873  | 1914  | 1954  | 1980  | 2032  | 2068  | 2106  | 2147  | 2215  |
|                                                | Sound power | dB(A) | 94,1  | 93,9  | 93,8  | 93,8  | 94    | 94,3  | 94,6  | 94,8  | 95,1  | 95,3  | 95,7  | 96    | 96,4  | 96,7  | 97    |
|                                                | Total input | kW    | 4     | 4,38  | 4,78  | 5,2   | 5,62  | 6,06  | 6,5   | 6,96  | 7,42  | 7,74  | 8,42  | 8,9   | 9,38  | 9,92  | 10,9  |
| 40.4                                           | Airflow     | m³/h  | 21000 | 21000 | 21000 | 21000 | 21000 | 21000 | 21000 | 21000 | 21000 | 21000 | 21000 | 21000 | -     | -     | -     |
|                                                | Airflow     | l/s   | 5833  | 5833  | 5833  | 5833  | 5833  | 5833  | 5833  | 5833  | 5833  | 5833  | 5833  | 5833  | -     | -     | -     |
|                                                | Fan RPM     | rpm   | 1780  | 1818  | 1856  | 1893  | 1931  | 1965  | 2003  | 2040  | 2077  | 2100  | 2150  | 2185  | -     | -     | -     |
|                                                | Sound power | dB(A) | 97,2  | 97    | 96,8  | 96,7  | 96,6  | 96,6  | 96,6  | 96,8  | 97    | 97,2  | 97,5  | 97,7  | -     | -     | -     |
|                                                | Total input | kW    | 5,08  | 5,48  | 5,92  | 6,36  | 6,82  | 7,26  | 7,76  | 8,24  | 8,72  | 9,06  | 9,76  | 10,3  | -     | -     | -     |
| 44.4                                           | Airflow     | m³/h  | 23000 | 23000 | 23000 | 23000 | 23000 | 23000 | 23000 | 23000 | 23000 | 23000 | -     | -     | -     | -     | -     |
|                                                | Airflow     | l/s   | 6389  | 6389  | 6389  | 6389  | 6389  | 6389  | 6389  | 6389  | 6389  | 6389  | -     | -     | -     | -     | -     |
|                                                | Fan RPM     | rpm   | 1910  | 1938  | 1974  | 2009  | 2043  | 2077  | 2108  | 2145  | 2176  | 2198  | -     | -     | -     | -     | -     |
|                                                | Sound power | dB(A) | 99,5  | 99,2  | 99    | 98,9  | 98,8  | 98,7  | 98,6  | 98,6  | 98,5  | 98,6  | -     | -     | -     | -     | -     |
|                                                | Total input | kW    | 6,12  | 6,46  | 6,9   | 7,36  | 7,84  | 8,32  | 8,8   | 9,38  | 9,88  | 10,24 | -     | -     | -     | -     | -     |

The performance takes into account the pressure drops in the unit (pressure drops in handling coil, standard filters, etc.).

To determine the performance required of the fans, you must add to the usable static pressure desired the pressure drops of any accessories.

Performances with "VENH - High static pressure fans" option

## High static pressure electric fan performance - Minimum airflow

| Available static pressure (Pa) (supply+return) |             |       | 420   | 480   | 540   | 600   | 660   | 720   | 780   | 840   | 900   | 960   | 1020  | 1080  | 1140  | 1200  | 1260  |
|------------------------------------------------|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 15.2                                           | Airflow     | m³/h  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  |
|                                                | Airflow     | l/s   | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  |
|                                                | Fan RPM     | rpm   | 1616  | 1662  | 1707  | 1752  | 1769  | 1835  | 1878  | 1919  | 1961  | 1998  | 2038  | 2078  | 2120  | 2155  | 2196  |
|                                                | Sound power | dB(A) | 89    | 89,3  | 89,6  | 90    | 90,3  | 90,6  | 91    | 91,4  | 91,8  | 92,2  | 92,5  | 92,9  | 93,3  | 93,7  | 94,1  |
|                                                | Total input | kW    | 2,09  | 2,28  | 2,48  | 2,69  | 2,91  | 3,11  | 3,34  | 3,57  | 3,8   | 4,01  | 4,25  | 4,49  | 4,76  | 5     | 5,28  |
| 18.2                                           | Airflow     | m³/h  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  | 8500  |
|                                                | Airflow     | l/s   | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  | 2361  |
|                                                | Fan RPM     | rpm   | 1616  | 1662  | 1707  | 1752  | 1769  | 1835  | 1878  | 1919  | 1961  | 1998  | 2038  | 2078  | 2120  | 2155  | 2196  |
|                                                | Sound power | dB(A) | 89    | 89,3  | 89,6  | 90    | 90,3  | 90,6  | 91    | 91,4  | 91,8  | 92,2  | 92,5  | 92,9  | 93,3  | 93,7  | 94,1  |
|                                                | Total input | kW    | 2,09  | 2,28  | 2,48  | 2,69  | 2,91  | 3,11  | 3,34  | 3,57  | 3,8   | 4,01  | 4,25  | 4,49  | 4,76  | 5     | 5,28  |
| 20.4                                           | Airflow     | m³/h  | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 |
|                                                | Airflow     | l/s   | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  |
|                                                | Fan RPM     | rpm   | 1391  | 1444  | 1500  | 1554  | 1607  | 1658  | 1709  | 1758  | 1807  | 1858  | 1898  | 1941  | 1986  | 2034  | 2083  |
|                                                | Sound power | dB(A) | 87,3  | 88,1  | 88,9  | 89,6  | 90,4  | 91,3  | 92,1  | 92,9  | 93,7  | 94,4  | 95,1  | 95,9  | 96,6  | 97,3  | 98    |
|                                                | Total input | kW    | 2,90  | 3,20  | 3,54  | 3,90  | 4,26  | 4,62  | 5,00  | 5,38  | 5,78  | 6,22  | 6,58  | 6,98  | 7,44  | 7,90  | 8,40  |
| 25.4                                           | Airflow     | m³/h  | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 |
|                                                | Airflow     | l/s   | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  |
|                                                | Fan RPM     | rpm   | 1391  | 1444  | 1500  | 1554  | 1607  | 1658  | 1709  | 1758  | 1807  | 1858  | 1898  | 1941  | 1986  | 2034  | 2083  |
|                                                | Sound power | dB(A) | 87,3  | 88,1  | 88,9  | 89,6  | 90,4  | 91,3  | 92,1  | 92,9  | 93,7  | 94,4  | 95,1  | 95,9  | 96,6  | 97,3  | 98    |
|                                                | Total input | kW    | 2,90  | 3,20  | 3,54  | 3,90  | 4,26  | 4,62  | 5,00  | 5,38  | 5,78  | 6,22  | 6,58  | 6,98  | 7,44  | 7,90  | 8,40  |
| 30.4                                           | Airflow     | m³/h  | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 | 12000 |
|                                                | Airflow     | l/s   | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  | 3333  |
|                                                | Fan RPM     | rpm   | 1391  | 1444  | 1500  | 1554  | 1607  | 1658  | 1709  | 1758  | 1807  | 1858  | 1898  | 1941  | 1986  | 2034  | 2083  |
|                                                | Sound power | dB(A) | 87,3  | 88,1  | 88,9  | 89,6  | 90,4  | 91,3  | 92,1  | 92,9  | 93,7  | 94,4  | 95,1  | 95,9  | 96,6  | 97,3  | 98    |
|                                                | Total input | kW    | 2,90  | 3,20  | 3,54  | 3,90  | 4,26  | 4,62  | 5,00  | 5,38  | 5,78  | 6,22  | 6,58  | 6,98  | 7,44  | 7,90  | 8,40  |
| 33.4                                           | Airflow     | m³/h  | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 |
|                                                | Airflow     | l/s   | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  |
|                                                | Fan RPM     | rpm   | 1568  | 1617  | 1664  | 1710  | 1755  | 1796  | 1840  | 1884  | 1926  | 1971  | 2009  | 2054  | 2085  | 1280  | 2170  |
|                                                | Sound power | dB(A) | 91,1  | 91,4  | 91,8  | 92,2  | 92,6  | 93    | 93,4  | 93,9  | 94,3  | 94,8  | 95,2  | 95,6  | 96,1  | 96,5  | 96,9  |
|                                                | Total input | kW    | 3,90  | 4,28  | 4,66  | 5,08  | 5,50  | 5,90  | 6,32  | 6,74  | 7,20  | 7,68  | 8,12  | 8,66  | 9,06  | 9,60  | 10,14 |
| 40.4                                           | Airflow     | m³/h  | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 |
|                                                | Airflow     | l/s   | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  |
|                                                | Fan RPM     | rpm   | 1568  | 1617  | 1664  | 1710  | 1755  | 1796  | 1840  | 1884  | 1926  | 1971  | 2009  | 2054  | 2085  | 1280  | 2170  |
|                                                | Sound power | dB(A) | 91,1  | 91,4  | 91,8  | 92,2  | 92,6  | 93    | 93,4  | 93,9  | 94,3  | 94,8  | 95,2  | 95,6  | 96,1  | 96,5  | 96,9  |
|                                                | Total input | kW    | 3,90  | 4,28  | 4,66  | 5,08  | 5,50  | 5,90  | 6,32  | 6,74  | 7,20  | 7,68  | 8,12  | 8,66  | 9,06  | 9,60  | 10,14 |
| 44.4                                           | Airflow     | m³/h  | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 | 16000 |
|                                                | Airflow     | l/s   | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  | 4444  |
|                                                | Fan RPM     | rpm   | 1568  | 1617  | 1664  | 1710  | 1755  | 1796  | 1840  | 1884  | 1926  | 1971  | 2009  | 2054  | 2085  | 1280  | 2170  |
|                                                | Sound power | dB(A) | 91,1  | 91,4  | 91,8  | 92,2  | 92,6  | 93    | 93,4  | 93,9  | 94,3  | 94,8  | 95,2  | 95,6  | 96,1  | 96,5  | 96,9  |
|                                                | Total input | kW    | 3,90  | 4,28  | 4,66  | 5,08  | 5,50  | 5,90  | 6,32  | 6,74  | 7,20  | 7,68  | 8,12  | 8,66  | 9,06  | 9,60  | 10,14 |

The performance takes into account the pressure drops in the unit (pressure drops in handling coil, standard filters, etc.).

To determine the performance required of the fans, you must add to the usable static pressure desired the pressure drops of any accessories.

Performances with "VENH - High static pressure fans" option



## High static pressure electric fan performance - High airflow

| Available static pressure (Pa) (supply+return) |             |       | 240   | 270   | 300   | 330   | 360   | 390   | 420   | 450   | 510   | 570   | 600   | 720   | 900   | 1020  |
|------------------------------------------------|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 15.2                                           | Airflow     | m3/h  | 13000 | 13000 | 13000 | 13000 | 13000 | 13000 | 13000 | 13000 | 13000 | -     | -     | -     | -     | -     |
|                                                | Airflow     | l/s   | 3611  | 3611  | 3611  | 3611  | 3611  | 3611  | 3611  | 3611  | 3611  | -     | -     | -     | -     | -     |
|                                                | Fan RPM     | rpm   | 2069  | 2085  | 2101  | 2117  | 2132  | 2148  | 2164  | 2180  | 2210  | -     | -     | -     | -     | -     |
|                                                | Sound power | dB(A) | 99,9  | 99,8  | 99,6  | 99,5  | 99,4  | 99,2  | 99,1  | 99    | 98,8  | -     | -     | -     | -     | -     |
|                                                | Total input | kW    | 3,75  | 3,85  | 3,97  | 4,08  | 4,19  | 4,31  | 4,43  | 4,56  | 4,79  | -     | -     | -     | -     | -     |
| 18.2                                           | Airflow     | m3/h  | 13000 | 13000 | 13000 | 13000 | 13000 | 13000 | 13000 | 13000 | 13000 | -     | -     | -     | -     | -     |
|                                                | Airflow     | l/s   | 3611  | 3611  | 3611  | 3611  | 3611  | 3611  | 3611  | 3611  | 3611  | -     | -     | -     | -     | -     |
|                                                | Fan RPM     | rpm   | 2069  | 2085  | 2101  | 2117  | 2132  | 2148  | 2164  | 2180  | 2210  | -     | -     | -     | -     | -     |
|                                                | Sound power | dB(A) | 99,9  | 99,8  | 99,6  | 99,5  | 99,4  | 99,2  | 99,1  | 99    | 98,8  | -     | -     | -     | -     | -     |
|                                                | Total input | kW    | 3,75  | 3,85  | 3,97  | 4,08  | 4,19  | 4,31  | 4,43  | 4,56  | 4,79  | -     | -     | -     | -     | -     |
| 20.4                                           | Airflow     | m3/h  | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 |
|                                                | Airflow     | l/s   | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  |
|                                                | Fan RPM     | rpm   | 1698  | 1721  | 1738  | 1758  | 1780  | 1797  | 1817  | 1836  | 1875  | 1915  | 1934  | 2009  | 2124  | 2199  |
|                                                | Sound power | dB(A) | 96,2  | 96,1  | 96    | 95,9  | 95,8  | 95,8  | 95,7  | 95,6  | 95,6  | 95,6  | 95,8  | 96,2  | 97    | 97,4  |
|                                                | Total input | kW    | 4,44  | 4,66  | 4,84  | 5,04  | 5,28  | 5,46  | 5,68  | 5,90  | 6,36  | 6,82  | 7,04  | 7,94  | 9,52  | 10,64 |
| 25.4                                           | Airflow     | m3/h  | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 |
|                                                | Airflow     | l/s   | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  |
|                                                | Fan RPM     | rpm   | 1698  | 1721  | 1738  | 1758  | 1780  | 1797  | 1817  | 1836  | 1875  | 1915  | 1934  | 2009  | 2124  | 2199  |
|                                                | Sound power | dB(A) | 96,2  | 96,1  | 96    | 95,9  | 95,8  | 95,8  | 95,7  | 95,6  | 95,6  | 95,6  | 95,8  | 96,2  | 97    | 97,4  |
|                                                | Total input | kW    | 4,44  | 4,66  | 4,84  | 5,04  | 5,28  | 5,46  | 5,68  | 5,90  | 6,36  | 6,82  | 7,04  | 7,94  | 9,52  | 10,64 |
| 30.4                                           | Airflow     | m3/h  | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 | 20000 |
|                                                | Airflow     | l/s   | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  | 5556  |
|                                                | Fan RPM     | rpm   | 1698  | 1721  | 1738  | 1758  | 1780  | 1797  | 1817  | 1836  | 1875  | 1915  | 1934  | 2009  | 2124  | 2199  |
|                                                | Sound power | dB(A) | 96,2  | 96,1  | 96    | 95,9  | 95,8  | 95,8  | 95,7  | 95,6  | 95,6  | 95,6  | 95,8  | 96,2  | 97    | 97,4  |
|                                                | Total input | kW    | 4,44  | 4,66  | 4,84  | 5,04  | 5,28  | 5,46  | 5,68  | 5,90  | 6,36  | 6,82  | 7,04  | 7,94  | 9,52  | 10,64 |
| 33.4                                           | Airflow     | m3/h  | 25000 | 25000 | 25000 | 25000 | 25000 | 25000 | 25000 | 25000 | 25000 | 25000 | 25000 | -     | -     | -     |
|                                                | Airflow     | l/s   | 6944  | 6944  | 6944  | 6944  | 6944  | 6944  | 6944  | 6944  | 6944  | 6944  | 6944  | -     | -     | -     |
|                                                | Fan RPM     | rpm   | 2008  | 2024  | 2040  | 2057  | 2073  | 2090  | 2109  | 2123  | 2156  | 2188  | 2203  | -     | -     | -     |
|                                                | Sound power | dB(A) | 101,9 | 101,7 | 101,6 | 101,4 | 101,3 | 101,2 | 101,1 | 101   | 100,8 | 100,7 | 100,6 | -     | -     | -     |
|                                                | Total input | kW    | 6,90  | 7,12  | 7,34  | 7,56  | 7,78  | 8,02  | 8,30  | 8,50  | 9,00  | 9,50  | 9,76  | -     | -     | -     |
| 40.4                                           | Airflow     | m3/h  | 25000 | 25000 | 25000 | 25000 | 25000 | 25000 | 25000 | 25000 | 25000 | 25000 | 25000 | -     | -     | -     |
|                                                | Airflow     | l/s   | 6944  | 6944  | 6944  | 6944  | 6944  | 6944  | 6944  | 6944  | 6944  | 6944  | 6944  | -     | -     | -     |
|                                                | Fan RPM     | rpm   | 2008  | 2024  | 2040  | 2057  | 2073  | 2090  | 2109  | 2123  | 2156  | 2188  | 2203  | -     | -     | -     |
|                                                | Sound power | dB(A) | 101,9 | 101,7 | 101,6 | 101,4 | 101,3 | 101,2 | 101,1 | 101   | 100,8 | 100,7 | 100,6 | -     | -     | -     |
|                                                | Total input | kW    | 6,90  | 7,12  | 7,34  | 7,56  | 7,78  | 8,02  | 8,30  | 8,50  | 9,00  | 9,50  | 9,76  | -     | -     | -     |
| 44.4                                           | Airflow     | m3/h  | 25000 | 25000 | 25000 | 25000 | 25000 | 25000 | 25000 | 25000 | 25000 | 25000 | 25000 | -     | -     | -     |
|                                                | Airflow     | l/s   | 6944  | 6944  | 6944  | 6944  | 6944  | 6944  | 6944  | 6944  | 6944  | 6944  | 6944  | -     | -     | -     |
|                                                | Fan RPM     | rpm   | 2008  | 2024  | 2040  | 2057  | 2073  | 2090  | 2109  | 2123  | 2156  | 2188  | 2203  | -     | -     | -     |
|                                                | Sound power | dB(A) | 101,9 | 101,7 | 101,6 | 101,4 | 101,3 | 101,2 | 101,1 | 101   | 100,8 | 100,7 | 100,6 | -     | -     | -     |
|                                                | Total input | kW    | 6,90  | 7,12  | 7,34  | 7,56  | 7,78  | 8,02  | 8,30  | 8,50  | 9,00  | 9,50  | 9,76  | -     | -     | -     |

The performance takes into account the pressure drops in the unit (pressure drops in handling coil, standard filters, etc.).

To determine the performance required of the fans, you must add to the usable static pressure desired the pressure drops of any accessories.

performances with "VENH - High static pressure fans" option

## Exhaust electric fan performance

| AVAILABLE STATIC PRESSURE (RETURN) (Pa) |             |                   | 150  |      |      |      |       |
|-----------------------------------------|-------------|-------------------|------|------|------|------|-------|
| % OF EXHAUST AIR                        |             |                   | 10%  | 20%  | 30%  | 40%  | 50%   |
| 15.2                                    | Airflow     | m <sup>3</sup> /h | 900  | 1800 | 2700 | 3600 | 4500  |
|                                         | Airflow     | l/s               | 250  | 500  | 750  | 1000 | 1250  |
|                                         | Fan RPM     | rpm               | 740  | 780  | 830  | 898  | 976   |
|                                         | Total input | kW                | 0,17 | 0,25 | 0,34 | 0,44 | 0,55  |
| 18.2                                    | Airflow     | m <sup>3</sup> /h | 1150 | 2300 | 3450 | 4600 | 5750  |
|                                         | Airflow     | l/s               | 319  | 639  | 958  | 1278 | 1597  |
|                                         | Fan RPM     | rpm               | 744  | 796  | 881  | 987  | 1112  |
|                                         | Total input | kW                | 0,19 | 0,29 | 0,42 | 0,56 | 0,74  |
| 20.4                                    | Airflow     | m <sup>3</sup> /h | 1350 | 2700 | 4050 | 5400 | 6750  |
|                                         | Airflow     | l/s               | 375  | 750  | 1125 | 1500 | 1875  |
|                                         | Fan RPM     | rpm               | 950  | 1032 | 1135 | 1271 | 1410  |
|                                         | Total input | kW                | 0,29 | 0,43 | 0,57 | 0,74 | 0,94  |
| 25.4                                    | Airflow     | m <sup>3</sup> /h | 1500 | 3000 | 4500 | 6000 | 7500  |
|                                         | Airflow     | l/s               | 417  | 833  | 1250 | 1667 | 2083  |
|                                         | Fan RPM     | rpm               | 974  | 1055 | 1177 | 1335 | 1495  |
|                                         | Total input | kW                | 0,31 | 0,46 | 0,62 | 0,83 | 1,06  |
| 30.4                                    | Airflow     | m <sup>3</sup> /h | 1700 | 3400 | 5100 | 6800 | 8500  |
|                                         | Airflow     | l/s               | 472  | 944  | 1417 | 1889 | 2361  |
|                                         | Fan RPM     | rpm               | 977  | 1084 | 1245 | 1412 | 1614  |
|                                         | Total input | kW                | 0,33 | 0,50 | 0,71 | 0,95 | 1,23  |
| 33.4                                    | Airflow     | m <sup>3</sup> /h | 1850 | 3700 | 5550 | 7400 | 9250  |
|                                         | Airflow     | l/s               | 514  | 1028 | 1542 | 2056 | 2569  |
|                                         | Fan RPM     | rpm               | 740  | 779  | 833  | 912  | 995   |
|                                         | Total input | kW                | 0,33 | 0,51 | 0,69 | 0,92 | 1,15  |
| 40.4                                    | Airflow     | m <sup>3</sup> /h | 2100 | 4200 | 6300 | 8400 | 10500 |
|                                         | Airflow     | l/s               | 583  | 1167 | 1750 | 2333 | 2917  |
|                                         | Fan RPM     | rpm               | 747  | 793  | 862  | 948  | 1057  |
|                                         | Total input | kW                | 0,36 | 0,56 | 0,77 | 1,02 | 1,32  |
| 44.4                                    | Airflow     | m <sup>3</sup> /h | 2300 | 4600 | 6900 | 9200 | 11500 |
|                                         | Airflow     | l/s               | 639  | 1278 | 1917 | 2556 | 3194  |
|                                         | Fan RPM     | rpm               | 749  | 807  | 893  | 992  | 1121  |
|                                         | Total input | kW                | 0,38 | 0,60 | 0,86 | 1,14 | 1,52  |

The percentage of exhaust air refers to the unit rated flow.

Exhaust electric fans collect from the environment only the quantity of air that will be exhausted.

The data refer to the return static pressure of 150 Pa, which usually occurs in the systems.

## Option compatibility

| REF.                  | DESCRIPTION                                                              | CAK | CBK | CCK | CCKP |
|-----------------------|--------------------------------------------------------------------------|-----|-----|-----|------|
| Versions              |                                                                          |     |     |     |      |
| REC                   | Active energy recovery of the exhaust air (CCK version)                  | -   | -   | √   | -    |
| THR                   | THOR thermodynamic energy recovery of the exhaust air (CCKP version)     | -   | -   | -   | √    |
| FC                    | Thermal FREE-COOLING                                                     | -   | -   | √   | √    |
| FCE                   | Enthalpy FREE-COOLING                                                    | -   | -   | 0   | 0    |
| Configurations        |                                                                          |     |     |     |      |
| CREFO                 | Device for fan consumption reduction of the external section type on/off | √   | √   | √   | √    |
| CREFB                 | Device for consumption reduction of the external section ECOBREEZE fans  | 0   | 0   | 0   | 0    |
| CHWER                 | Energy recovery from the food refrigeration                              | 0   | 0   | 0   | 0    |
| CHW2                  | two-rows hot water coil                                                  | 0   | 0   | 0   | 0    |
| 3WVM                  | Modulating 3-way valve                                                   | 0   | 0   | 0   | 0    |
| 2WVM                  | Modulating 2-way valve                                                   | 0   | 0   | 0   | 0    |
| EH                    | Electric heaters.                                                        | 0   | 0   | 0   | 0    |
| GC                    | Modulating condensation gas heating module                               | 0   | 0   | 0   | 0    |
| AMRX                  | Rubber antivibration mounts                                              | ◊   | ◊   | ◊   | ◊    |
| AMRMX                 | Rubber antivibration mounts for unit and gas module                      | ◊   | ◊   | ◊   | ◊    |
| RCX                   | Roof curb                                                                | ◊   | ◊   | ◊   | ◊    |
| PCM0                  | Sandwich panels of the handling zone in M0 fire reaction class           | 0   | 0   | 0   | 0    |
| Refrigeration circuit |                                                                          |     |     |     |      |
| EVE                   | Electronic expansion valve                                               | √   | √   | √   | √    |
| MHP                   | High and low pressure gauges                                             | 0   | 0   | 0   | 0    |
| CPHG                  | hot gas re-heating coil                                                  | 0   | 0   | 0   | 0    |
| Aeraulic circuit      |                                                                          |     |     |     |      |
| M0                    | Front air outlet                                                         | √   | √   | √   | √    |
| M3                    | Downward air supply                                                      | 0   | 0   | 0   | 0    |
| M5                    | Upflow air supply                                                        | 0   | 0   | 0   | 0    |
| ML                    | Sideward air supply (size 15.2 - 18.2)                                   | 0   | 0   | 0   | 0    |
| RO                    | Horizontal air return                                                    | √   | √   | √   | √    |
| R3                    | Downward air return                                                      | 0   | 0   | 0   | 0    |
| PCOSM                 | Constant supply airflow                                                  | 0   | 0   | 0   | 0    |
| PVAR                  | Variable airflow                                                         | 0   | 0   | 0   | 0    |
| FPG4                  | Pleated air filter class G4 (EN779 norm)                                 | √   | √   | √   | √    |
| F7                    | High efficiency F7 air filter                                            | 0   | 0   | 0   | 0    |
| FES                   | Electronic filters                                                       | 0   | 0   | 0   | 0    |
| PSAF                  | Clogged filter differential pressure switch air side                     | 0   | 0   | 0   | 0    |
| HSE                   | Immersed electrodes steam humidifier                                     | 0   | 0   | 0   | 0    |
| HWS                   | Steam humidifier with disposable water                                   | 0   | 0   | 0   | 0    |
| LTEMP1                | Application for low outdoor temperature                                  | 0   | 0   | 0   | 0    |
| VENH                  | High static pressure fans                                                | 0   | 0   | 0   | 0    |
| PAQC                  | Air quality probe for CO2 rate check                                     | -   | 0   | 0   | 0    |
| PAQCV                 | Air quality sensor for CO2 and VOC rate check                            | -   | 0   | 0   | 0    |
| SER                   | Outdoor air damper manually set                                          | -   | √   | -   | -    |
| SERM                  | Outdoor air motorized on/off damper                                      | -   | 0   | -   | -    |
| SERMD                 | Modulating motorized outdoor air damper                                  | -   | 0   | √   | √    |
| Electric circuit      |                                                                          |     |     |     |      |
| THTUNE                | Wall mounted electronic room control                                     | √   | √   | √   | √    |
| CMSC9                 | Serial communication module to Modbus supervisor                         | 0   | 0   | 0   | 0    |
| CMSC10                | Serial communication module to LonWorks supervisor                       | 0   | 0   | 0   | 0    |
| CMSC11                | Serial communication module for BACnet-IP supervisor                     | 0   | 0   | 0   | 0    |
| CTERM                 | Ambient humidity temperature control with remote thermostat              | 0   | 0   | 0   | 0    |
| CSOND                 | Ambient humidity temperature control with built-in probes                | 0   | 0   | 0   | 0    |
| CTEM                  | Ambient temperature control with built-in probes                         | √   | √   | √   | √    |
| DML                   | Demand Limit                                                             | 0   | 0   | 0   | 0    |
| CLMX                  | Clivet Master System                                                     | ◊   | ◊   | ◊   | ◊    |
| DESM                  | Smoke detector                                                           | 0   | 0   | 0   | 0    |
| PM                    | Phase monitor                                                            | 0   | 0   | 0   | 0    |
| PFCP                  | Power factor correction capacitors (cosφ > 0.9)                          | 0   | 0   | 0   | 0    |
| SFSTC                 | Progressive compressor start-up device                                   | 0   | 0   | 0   | 0    |
| Various               |                                                                          |     |     |     |      |
| PTCO                  | Set up for shipping via container                                        | 0   | 0   | 0   | 0    |

√ Standard component

0 Optional component

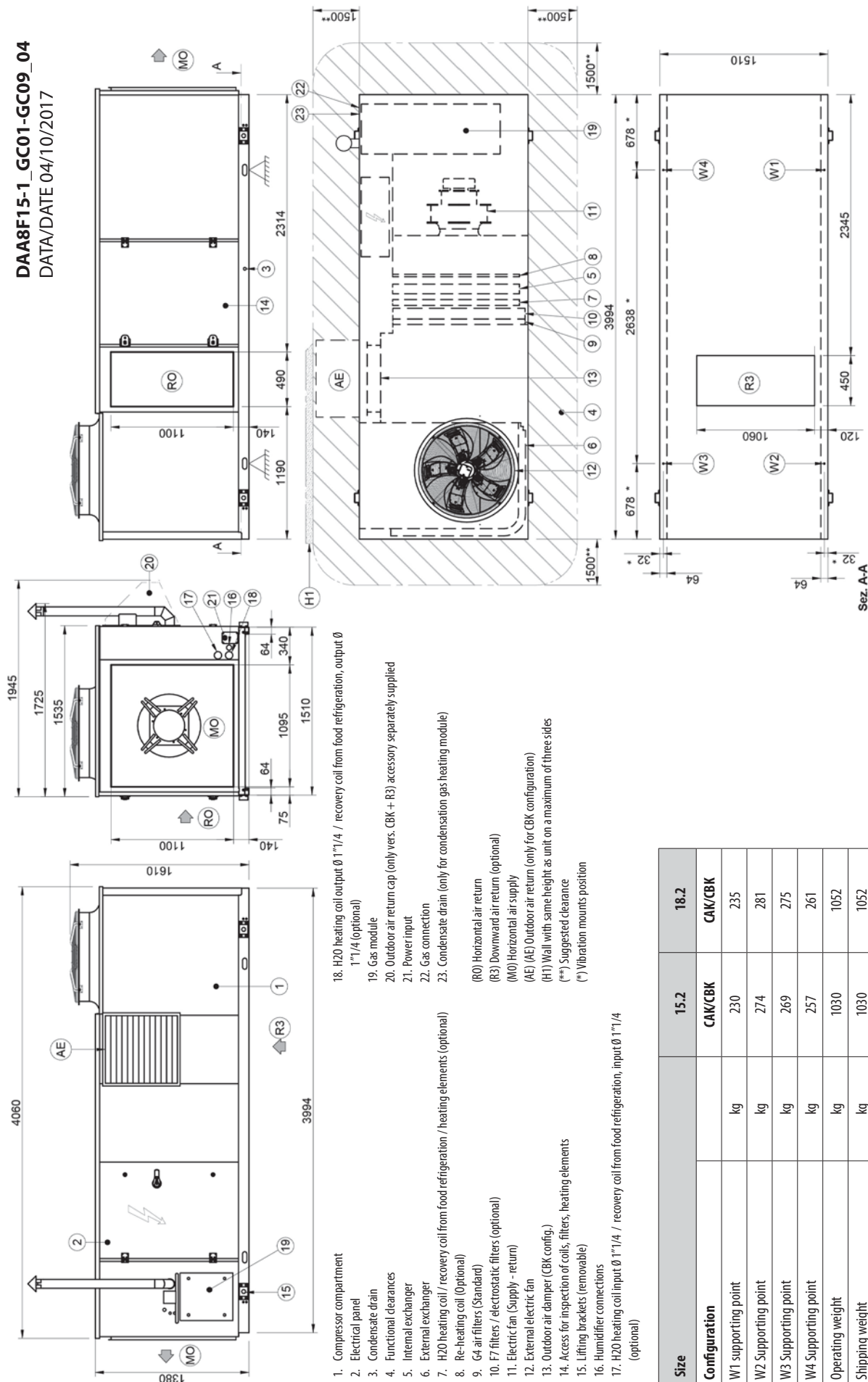
◊ Separately supplied accessory (optional)

- Not available

The presence of optional

## Size 15.2 - 18.2 Combustion module - CAK and CBK configuration

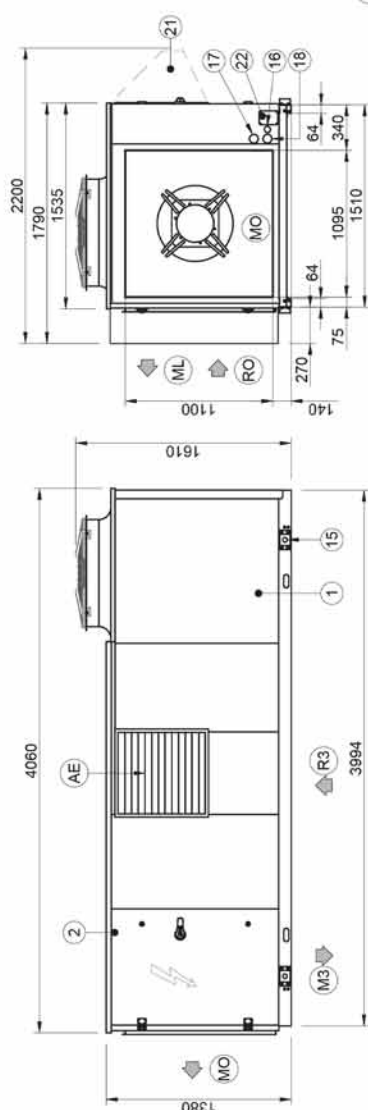
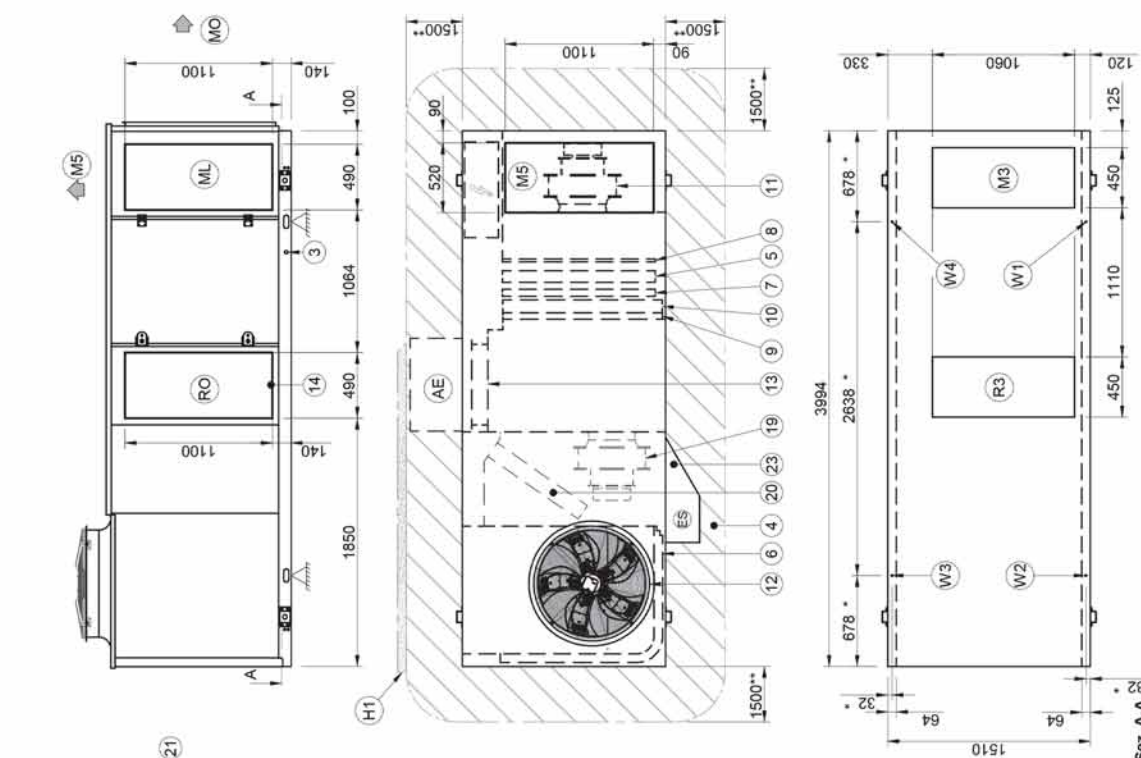
**DAA8F15-1\_GC01-GC09\_04**  
DATA/DATE 04/10/2017



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

## Size 15.2 - 18.2 - CCK and CCKP configuration

DAA8F15-1\_CCK-CCKP\_04  
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- |                                                                                                      |                                                                                                        |
|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| 1. Compressor compartment                                                                            | 18. H2O heating coil output Ø 1"1/4 / recovery coil from food refrigeration, output Ø 1"1/4 (optional) |
| 2. Electrical panel                                                                                  | 19. Exhaust electric fan                                                                               |
| 3. Condensate drain                                                                                  | 20. Exhaust air recovery coil (config. CCKP)                                                           |
| 4. Functional clearances                                                                             | 21. Outdoor air return cap (only with M3 and/or R3) accessory separately supplied                      |
| 5. Internal exchanger                                                                                | 22. Power input                                                                                        |
| 6. External exchanger                                                                                | 23. Air exhaust cap (accessory separately supplied)                                                    |
| 7. H2O heating coil / recovery coil from food refrigeration / heating elements (optional)            | (R0) Horizontal air return                                                                             |
| 8. Re-heating coil (Optional)                                                                        | (R3) Downward air return (optional)                                                                    |
| 9. G4 air filters (Standard)                                                                         | (M0) Horizontal air supply                                                                             |
| 10. F7 filters / electrostatic filters (optional)                                                    | (M3) Downward air supply (Optional)                                                                    |
| 11. Electric fan (Supply - return)                                                                   | (M5) Upflow air supply (Optional)                                                                      |
| 12. External electric fan                                                                            | (ML) Sideward air supply (Optional)                                                                    |
| 13. Outdoor air damper                                                                               | (AE) Outdoor air return                                                                                |
| 14. Access for inspection of coils, filters, heating elements                                        | (E5) Air exhaust                                                                                       |
| 15. Lifting brackets (removable)                                                                     | (***) Wall with same height as unit on a maximum of three sides                                        |
| 16. Humidifier connections                                                                           | (***) Suggested clearance                                                                              |
| 17. H2O heating coil input Ø 1"1/4 / recovery coil from food refrigeration, input Ø 1"1/4 (optional) | (*) Vibration mounts position                                                                          |

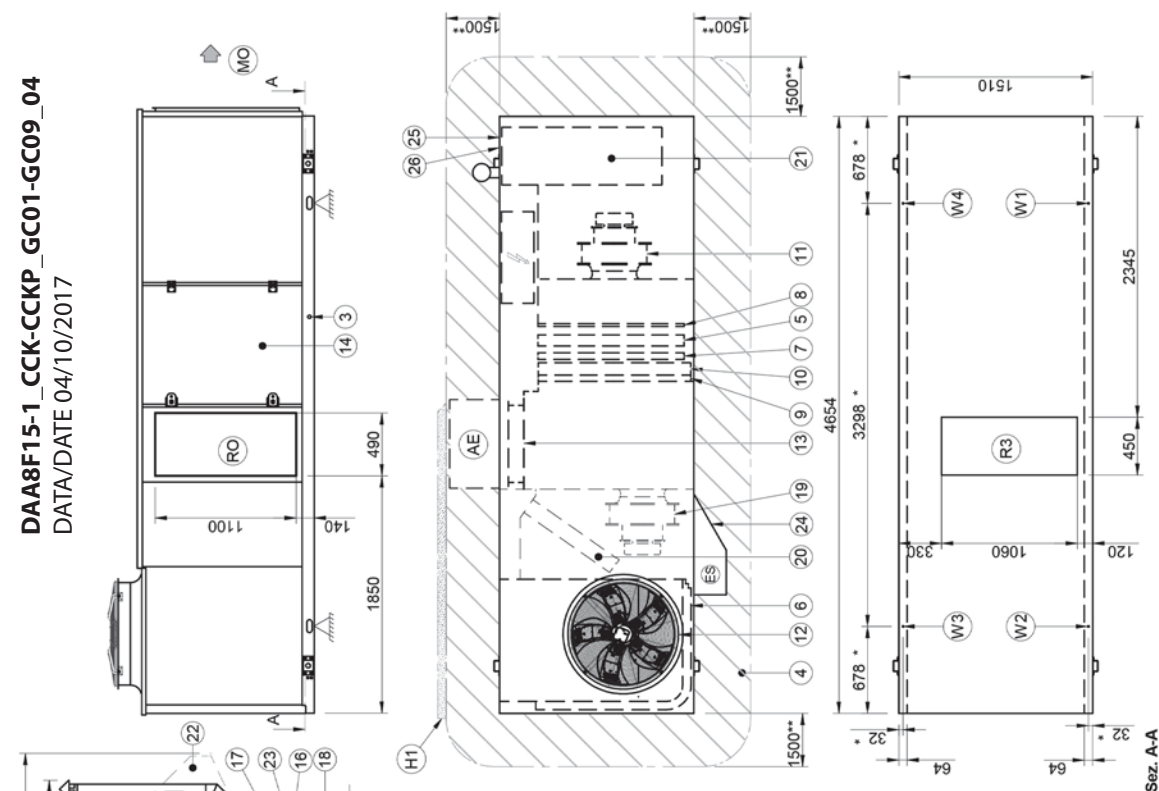
| Size                |    | 15.2 | 15.2 | 18.2 | 18.2 |
|---------------------|----|------|------|------|------|
| Configuration       |    |      | CCK  | CCK  | CCK  |
| W1 supporting point | kg | 209  | 277  | 213  | 282  |
| W2 Supporting point | kg | 286  | 223  | 293  | 228  |
| W3 Supporting point | kg | 281  | 258  | 287  | 264  |
| W4 Supporting point | kg | 239  | 287  | 243  | 292  |
| Operating weight    | kg | 1015 | 1045 | 1036 | 1066 |
| Shipping weight     | kg | 1015 | 1045 | 1036 | 1066 |

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



## Size 15.2 - 18.2 Combustion module - CCK and CCKP configuration

**DAA8F15-1\_CCK-CCKP\_GC01-GC09\_04**  
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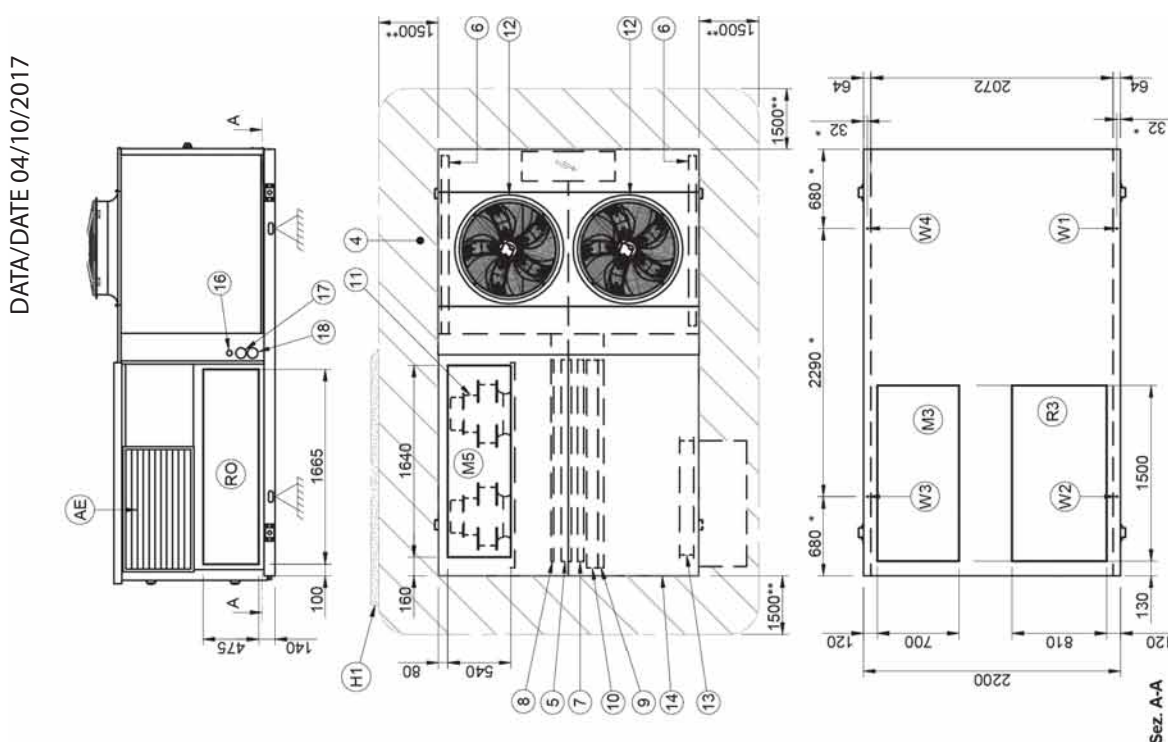


- |                                                                                                      |                                                                                                        |
|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| 1. Compressor compartment                                                                            | 18. H2O heating coil output Ø 1"1/4 / recovery coil from food refrigeration, output Ø 1"1/4 (optional) |
| 2. Electrical panel                                                                                  | 19. Exhaust electric fan                                                                               |
| 3. Condensate drain                                                                                  | 20. Exhaust air recovery coil (config. CCP)                                                            |
| 4. Functional clearances                                                                             | 21. Gas module                                                                                         |
| 5. Internal exchanger                                                                                | 22. Outdoor air return cap (only with R3) accessory separately supplied                                |
| 6. External exchanger                                                                                | 23. Power input                                                                                        |
| 7. H2O heating coil / recovery coil from food refrigeration / heating elements (optional)            | 24. Air exhaust cap (accessory separately supplied)                                                    |
| 8. Re-heating coil (Optional)                                                                        | 25. Gas connection                                                                                     |
| 9. G4 air filters (Standard)                                                                         | 26. Condensate drain (only for condensation gas heating module)                                        |
| 10. F7 filters / electrostatic filters (optional)                                                    |                                                                                                        |
| 11. Electric fan (Supply - return)                                                                   | (R0) Horizontal air return                                                                             |
| 12. External electric fan                                                                            | (R3) Downward air return (optional)                                                                    |
| 13. Outdoor air damper                                                                               | (M0) Horizontal air supply                                                                             |
| 14. Access for inspection of coils, filters, heating elements                                        | AE Outdoor air return                                                                                  |
| 15. Lifting brackets (removable)                                                                     | (E5) Air exhaust                                                                                       |
| 16. Humidifier connections                                                                           | (H1) Wall with same height as unit on a maximum of three sides                                         |
| 17. H2O heating coil input Ø 1"1/4 / recovery coil from food refrigeration, input Ø 1"1/4 (optional) | (**) Suggested clearance                                                                               |
|                                                                                                      | (*) Vibration mounts position                                                                          |

| Size          |                     | 15.2 | 15.2 | 18.2 | 18.2 |
|---------------|---------------------|------|------|------|------|
| Configuration |                     |      | CCK  | CCK  | CCNP |
|               | W1 supporting point | kg   | 237  | 243  | 241  |
|               | W2 Supporting point | kg   | 324  | 333  | 330  |
|               | W3 Supporting point | kg   | 317  | 325  | 323  |
|               | W4 Supporting point | kg   | 271  | 278  | 275  |
|               | Operating weight    | kg   | 1149 | 1179 | 1169 |
|               | Shipping weight     | kg   | 1149 | 1179 | 1169 |

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

## Size 20.4-25.4-30.4 - CAK and CBK configuration

DAA8F24-2\_04  
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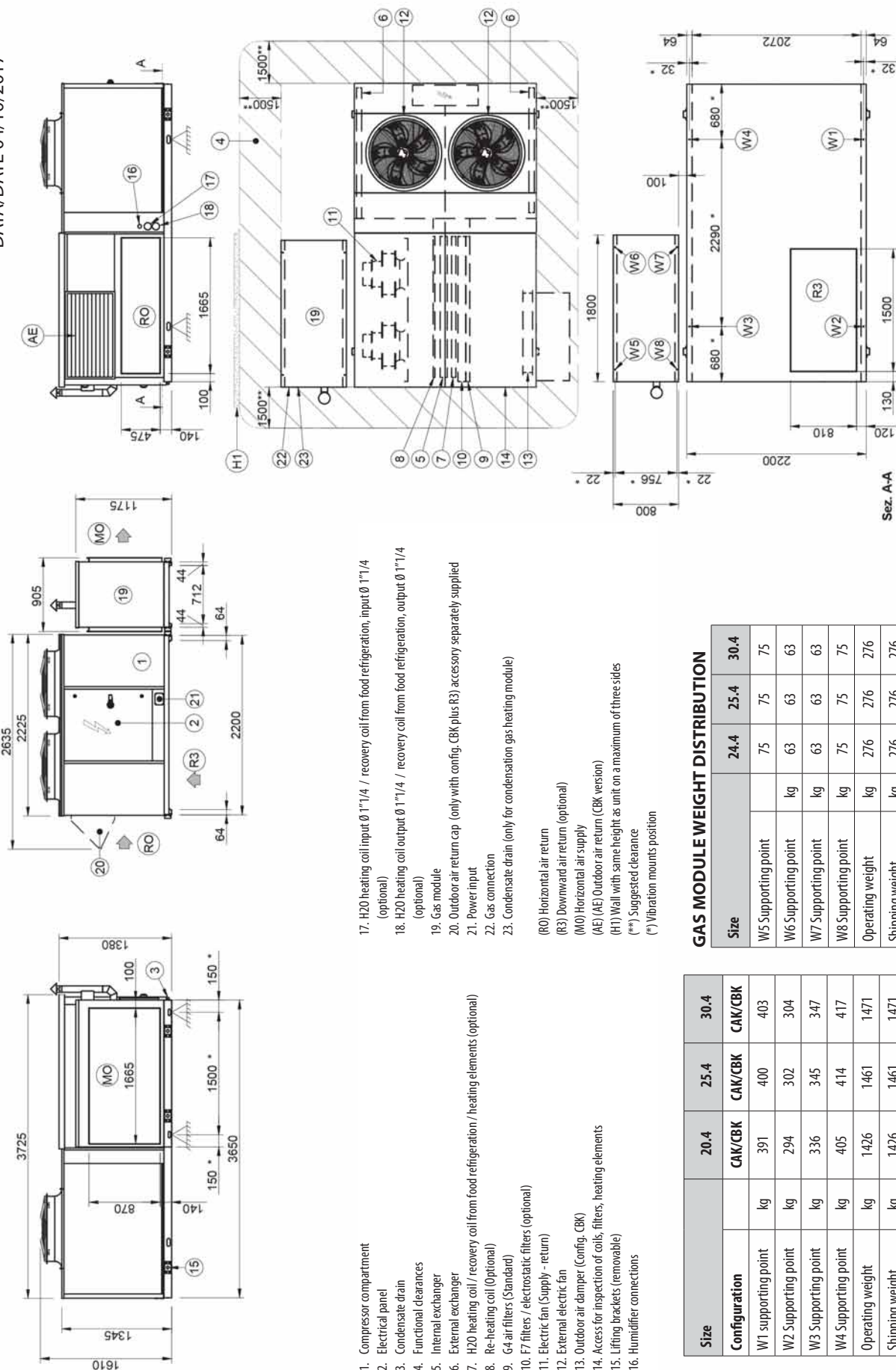
1. Compressor compartment
  2. Electrical panel
  3. Condensate drain
  4. Functional clearances
  5. Internal exchanger
  6. External exchanger
  7. H2O heating coil / recovery coil from food refrigeration / heating elements (optional)
  8. Re-heating coil (Optional)
  9. G4 air filters (Standard)
  10. F7 filters / electrostatic filters (optional)
  11. Electric fan (Supply - return)
  12. External electric fan
  13. Outdoor air damper
  14. Access for inspection of coils, filters, heating elements
  15. Lifting brackets (removable)
  16. Humidifier connections
  17. H2O heating coil input  $\emptyset$  1"1/4 / recovery coil from food refrigeration, input  $\emptyset$  1"1/4 (optional)
  18. H2O heating coil output  $\emptyset$  1"1/4 / recovery coil from food refrigeration, output  $\emptyset$  1"1/4 (optional)
  19. Outdoor air return cap (only for CBK version + M3 and/or R3) accessory separately supplied
  20. Power input
- (R0) Horizontal air return  
(R3) Downward air return (optional)  
(M0) Horizontal air supply  
(M3) Downward air supply (Optional)  
(M5) Upflow air supply (Optional)  
(AE) Outdoor air return  
(H1) Wall with same height as unit on a maximum of three sides  
(\*\*) Suggested clearance  
(\*) Vibration mounts position

| Size                | 20.4    | 25.4    | 30.4    |
|---------------------|---------|---------|---------|
| Configuration       | CAK/CBK | CAK/CBK | CAK/CBK |
| W1 supporting point | kg      | 400     | 403     |
| W2 Supporting point | kg      | 302     | 304     |
| W3 Supporting point | kg      | 345     | 347     |
| W4 Supporting point | kg      | 414     | 417     |
| Operating weight    | kg      | 1426    | 1471    |
| Shipping weight     | kg      | 1461    | 1471    |

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

## Size 20.4-25.4-30.4 Combustion module - CAK and CBK configuration

DAA8F24-2\_GC01X-GC11X\_04  
DATA/DATE 04/10/2017

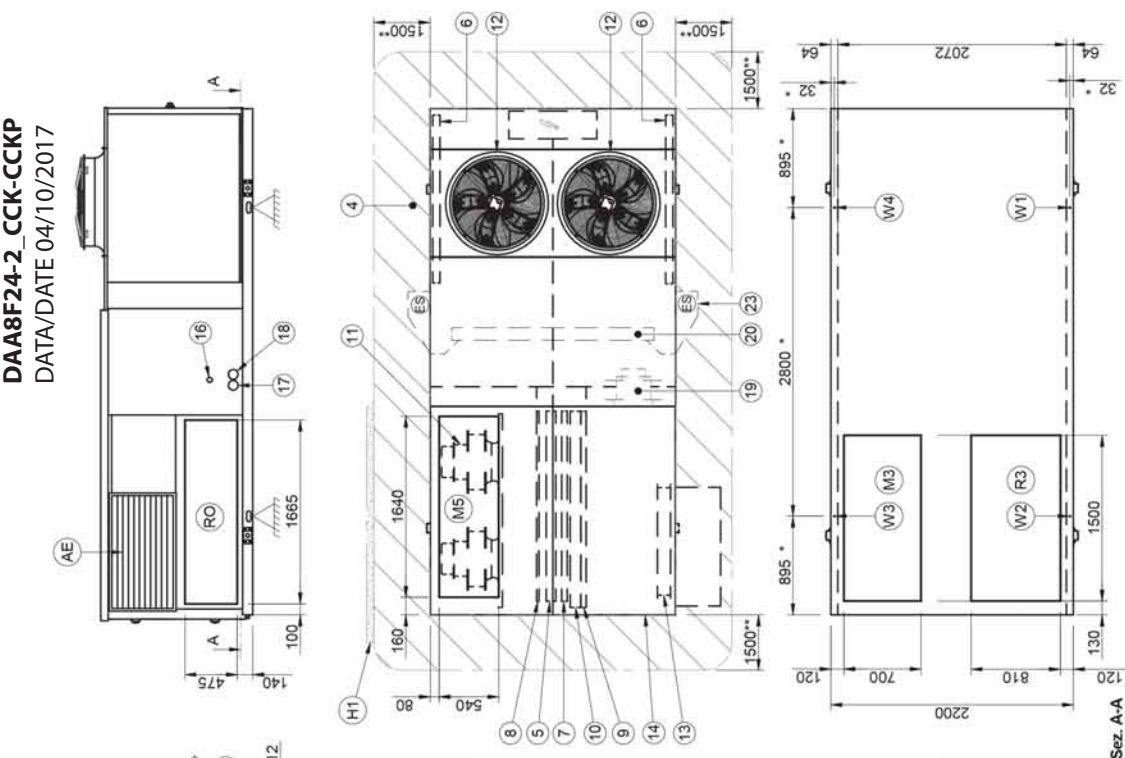


| Size                           |                     | 20.4    |         | 25.4    |         | 30.4 |  |
|--------------------------------|---------------------|---------|---------|---------|---------|------|--|
|                                |                     | CAK/CBK | CAK/CBK | CAK/CBK | CAK/CBK |      |  |
| GAS MODULE WEIGHT DISTRIBUTION | Configuration       |         |         |         |         |      |  |
|                                | W1 supporting point | kg      | 391     | 400     | 403     |      |  |
|                                | W2 Supporting point | kg      | 294     | 302     | 304     |      |  |
|                                | W3 Supporting point | kg      | 336     | 345     | 347     |      |  |
|                                | W4 Supporting point | kg      | 405     | 414     | 417     |      |  |
|                                | Operating weight    | kg      | 1426    | 1461    | 1471    |      |  |
|                                | Shipping weight     | kg      | 1426    | 1461    | 1471    |      |  |
|                                |                     |         |         |         |         |      |  |
| Size                           |                     |         | 24.4    | 25.4    | 30.4    |      |  |
|                                | W5 Supporting point |         | 75      | 75      | 75      |      |  |
|                                | W6 Supporting point | kg      | 63      | 63      | 63      |      |  |
|                                | W7 Supporting point | kg      | 63      | 63      | 63      |      |  |
|                                | W8 Supporting point | kg      | 75      | 75      | 75      |      |  |
| Operating weight               |                     | kg      | 276     | 276     | 276     |      |  |
| Shipping weight                |                     | kg      | 276     | 276     | 276     |      |  |

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

## Size 20.4-25.4-30.4 - CCK and CCKP configuration

DAA8F24-2\_CCK-CCKP  
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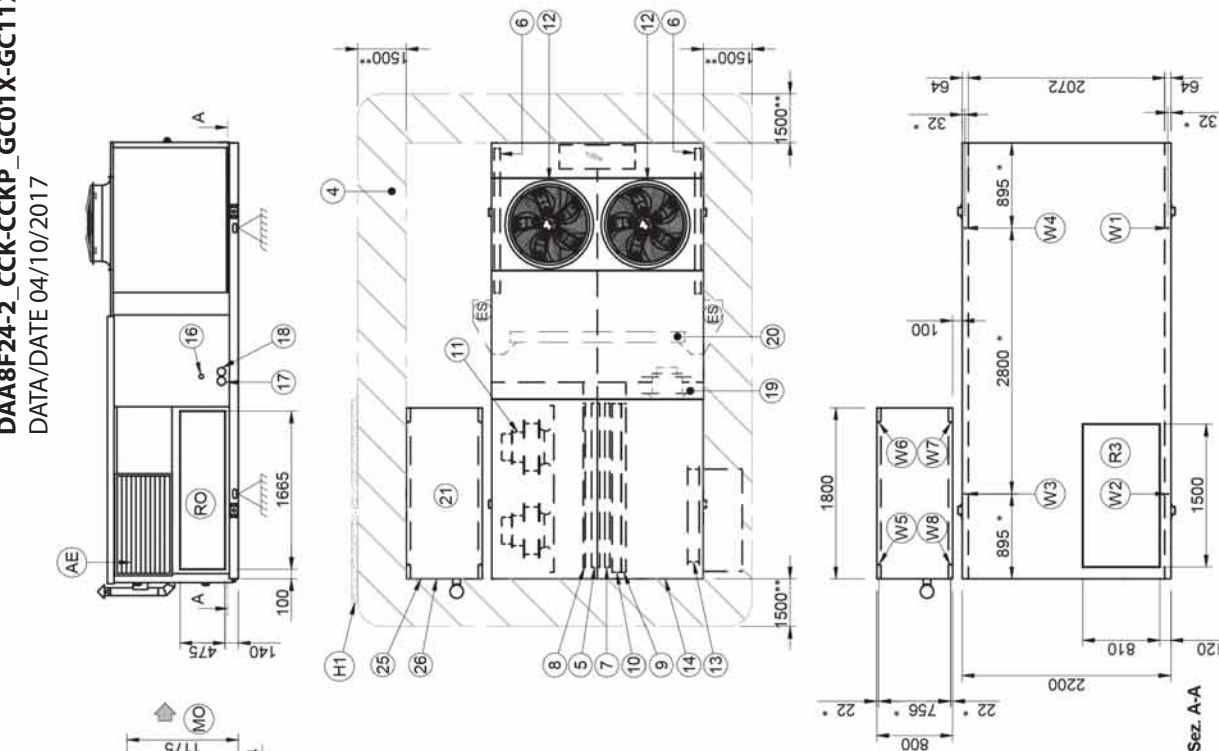
- |                                                                                                      |                                                                                                        |
|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| 1. Compressor compartment                                                                            | 18. H2O heating coil output Ø 1"1/4 / recovery coil from food refrigeration, output Ø 1"1/4 (optional) |
| 2. Electrical panel                                                                                  | 19. Exhaust electric fan                                                                               |
| 3. Condensate drain                                                                                  | 20. Exhaust air recovery coil (CCCP version)                                                           |
| 4. Functional clearances                                                                             | 21. Outdoor air return cap (only with M3 and/or R3) (accessory separately supplied)                    |
| 5. Internal exchanger                                                                                | 22. Power input                                                                                        |
| 6. External exchanger                                                                                | 23. Air exhaust cap (accessory separately supplied)                                                    |
| 7. H2O heating coil / recovery coil from food refrigeration / heating elements (optional)            | (R0) Horizontal air return                                                                             |
| 8. Re-heating coil (Optional)                                                                        | (R3) Downward air return (optional)                                                                    |
| 9. G4 air filters (Standard)                                                                         | (M0) Horizontal air supply                                                                             |
| 10. F7 filters / electrostatic filters (optional)                                                    | (M3) Downward air supply (Optional)                                                                    |
| 11. Electric fan (Supply - return)                                                                   | (M5) Upflow air supply (Optional)                                                                      |
| 12. External electric fan                                                                            | (AB) Outdoor air return                                                                                |
| 13. Outdoor air damper                                                                               | (ES) Air exhaust                                                                                       |
| 14. Access for inspection of coils, filters, heating elements                                        | (H1) Wall with same height as unit on a maximum of three sides                                         |
| 15. Lifting brackets (removable)                                                                     | (**) Suggested clearance                                                                               |
| 16. Humidifier connections                                                                           | (*) Vibration mounts position                                                                          |
| 17. H2O heating coil input Ø 1"1/4 / recovery coil from food refrigeration, input Ø 1"1/4 (optional) |                                                                                                        |

| Size |                      | 20.4       | 20.4        | 25.4       | 25.4        | 30.4       | 30.4        |
|------|----------------------|------------|-------------|------------|-------------|------------|-------------|
|      | <b>Configuration</b> | <b>CCK</b> | <b>CCKP</b> | <b>CCK</b> | <b>CCKP</b> | <b>CCK</b> | <b>CCKP</b> |
|      | W1 supporting point  | 447        | 460         | 456        | 468         | 459        | 472         |
|      | W2 Supporting point  | 338        | 348         | 346        | 356         | 348        | 358         |
|      | W3 Supporting point  | 386        | 397         | 395        | 406         | 397        | 408         |
|      | W4 Supporting point  | 463        | 476         | 472        | 485         | 475        | 488         |
|      | Operating weight     | 1634       | 1681        | 1669       | 1715        | 1679       | 1726        |
|      | Shipping weight      | 1634       | 1681        | 1669       | 1715        | 1679       | 1726        |

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

## Size 20.4-25.4-30.4 Combustion module - CCK and CCKP configuration

DAA8F24-2\_CCK-CCKP\_GC01X-GC11X  
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- |                                                                                                        |                                                                |
|--------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|
| 1. Compressor compartment                                                                              |                                                                |
| 2. Electrical panel                                                                                    |                                                                |
| 3. Condensate drain                                                                                    |                                                                |
| 4. Functional clearances                                                                               |                                                                |
| 5. Internal exchanger                                                                                  |                                                                |
| 6. External exchanger                                                                                  |                                                                |
| 7. H2O heating coil / recovery coil from food refrigeration / heating elements (optional)              |                                                                |
| 8. Re-heating coil (Optional)                                                                          |                                                                |
| 9. G4 air filters (Standard)                                                                           |                                                                |
| 10. F7 filters / electrostatic filters (optional)                                                      |                                                                |
| 11. Electric fan (Supply - return)                                                                     |                                                                |
| 12. External electric fan                                                                              |                                                                |
| 13. Outdoor air damper                                                                                 |                                                                |
| 14. Access for inspection of coils, filters, heating elements                                          |                                                                |
| 15. Lifting brackets (removable)                                                                       |                                                                |
| 16. Humidifier connections                                                                             |                                                                |
| 17. H2O heating coil input Ø 1"1/4 / recovery coil from food refrigeration, input Ø 1"1/4 (optional)   |                                                                |
| 18. H2O heating coil output Ø 1"1/4 / recovery coil from food refrigeration, output Ø 1"1/4 (optional) |                                                                |
| 19. Exhaust electric fan                                                                               |                                                                |
| 20. Exhaust air recovery coil (CCCP version)                                                           |                                                                |
| 21. Gas module                                                                                         |                                                                |
| 22. Outdoor air return cap (only with R3) accessory separately supplied                                |                                                                |
| 23. Power input                                                                                        |                                                                |
| 24. Air exhaust cap (accessory separately supplied)                                                    |                                                                |
| 25. Gas connection                                                                                     |                                                                |
| 26. Condensate drain (only for condensation gas heating module)                                        |                                                                |
|                                                                                                        | (R0) Horizontal air return                                     |
|                                                                                                        | (R3) Downward air return (optional)                            |
|                                                                                                        | (M0) Horizontal air supply                                     |
|                                                                                                        | (AE) Outdoor air return                                        |
|                                                                                                        | (E5) Air exhaust                                               |
|                                                                                                        | (H1) Wall with same height as unit on a maximum of three sides |
|                                                                                                        | (**) Suggested clearance                                       |
|                                                                                                        | (*) Vibration mounts position                                  |

## GAS MODULE WEIGHT DISTRIBUTION

| Size                | 20.4 |      | 20.4 |      | 25.4 |      | 25.4 |      | 30.4 |      |
|---------------------|------|------|------|------|------|------|------|------|------|------|
|                     | CCK  | CCKP | CCK  | CCKP | CCK  | CCKP | CCK  | CCKP | CCK  | CCKP |
| Configuration       |      |      |      |      |      |      |      |      |      |      |
| W1 supporting point | kg   | 447  | 460  | 456  | 468  | 459  | 472  |      |      |      |
| W2 Supporting point | kg   | 338  | 348  | 346  | 356  | 348  | 358  |      |      |      |
| W3 Supporting point | kg   | 386  | 397  | 395  | 406  | 397  | 408  |      |      |      |
| W4 Supporting point | kg   | 463  | 476  | 472  | 485  | 475  | 488  |      |      |      |
| Operating weight    | kg   | 1634 | 1681 | 1669 | 1715 | 1679 | 1726 |      |      |      |
| Shipping weight     | kg   | 1724 | 1771 | 1759 | 1805 | 1769 | 1816 |      |      |      |

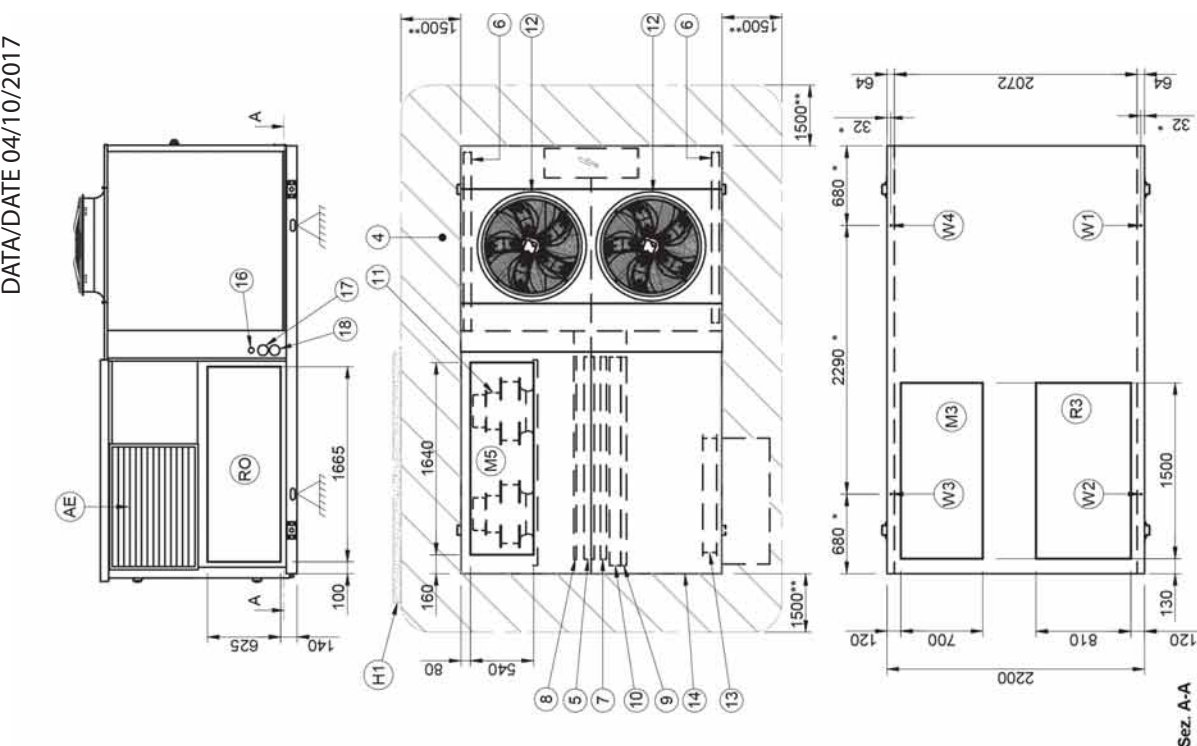
The presence of optional accessories may result in a substantial variation of the weights shown in the table.



### Size 33.4-40.4-44.4 - CAK and CBK configuration

**DAA8F35\_2\_04**

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- |                                                                                           |                                                                                                        |
|-------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| 1. Compressor compartment                                                                 |                                                                                                        |
| 2. Electrical panel                                                                       |                                                                                                        |
| 3. Condensate drain                                                                       |                                                                                                        |
| 4. Functional clearances                                                                  |                                                                                                        |
| 5. Internal exchanger                                                                     |                                                                                                        |
| 5. External exchanger                                                                     |                                                                                                        |
| 7. H2O heating coil / recovery coil from food refrigeration / heating elements (optional) | 17. H2O heating coil input Ø 1"1/4 / recovery coil from food refrigeration, input Ø 1"1/4 (optional)   |
| 8. Re-heating coil (Optional)                                                             |                                                                                                        |
| 9. G4 air filters (Standard)                                                              |                                                                                                        |
| 10. F7 filters / electrostatic filters (optional)                                         |                                                                                                        |
| 11. Electric fan (Supply - return)                                                        |                                                                                                        |
| 12. External electric fan                                                                 |                                                                                                        |
| 13. Outdoor air damper (CBK version)                                                      |                                                                                                        |
| 14. Access for inspection of coils, filters, heating elements                             |                                                                                                        |
| 15. Lifting brackets (removable)                                                          |                                                                                                        |
| Humidifier connections                                                                    |                                                                                                        |
|                                                                                           | 18. H2O heating coil output Ø 1"1/4 / recovery coil from food refrigeration, output Ø 1"1/4 (optional) |
|                                                                                           | 19. Outdoor air return cap (only CBK version plus M3 and/or E3) accessory separately supplied          |
|                                                                                           | 20. Power input                                                                                        |
|                                                                                           | (R0) Horizontal air return                                                                             |
|                                                                                           | (R3) Downward air return (optional)                                                                    |
|                                                                                           | (M0) Horizontal air supply                                                                             |
|                                                                                           | (M3) Downward air supply (Optional)                                                                    |
|                                                                                           | (M5) Upflow air supply (Optional)                                                                      |
|                                                                                           | (AE) Outdoor air return                                                                                |
|                                                                                           | (H1) Wall with same height as unit on a maximum of three sides                                         |
|                                                                                           | (**) Suggested clearance                                                                               |
|                                                                                           | (*) Vibration mounts position                                                                          |

| Size                | 33.4    |         |         | 40.4    |         |         | 44.4    |         |         |
|---------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|                     | CAK/CBK | CAK/CBK | CAK/CBK | CAK/CBK | CAK/CBK | CAK/CBK | CAK/CBK | CAK/CBK | CAK/CBK |
| Configuration       |         |         |         |         |         |         |         |         |         |
| W1 supporting point | kg      | 416     | 423     | 424     |         |         |         |         |         |
| W2 Supporting point | kg      | 319     | 327     | 329     |         |         |         |         |         |
| W3 Supporting point | kg      | 365     | 374     | 375     |         |         |         |         |         |
| W4 Supporting point | kg      | 431     | 439     | 440     |         |         |         |         |         |
| Operating weight    | kg      | 1531    | 1563    | 1568    |         |         |         |         |         |
| Shipping weight     | kg      | 1531    | 1563    | 1568    |         |         |         |         |         |

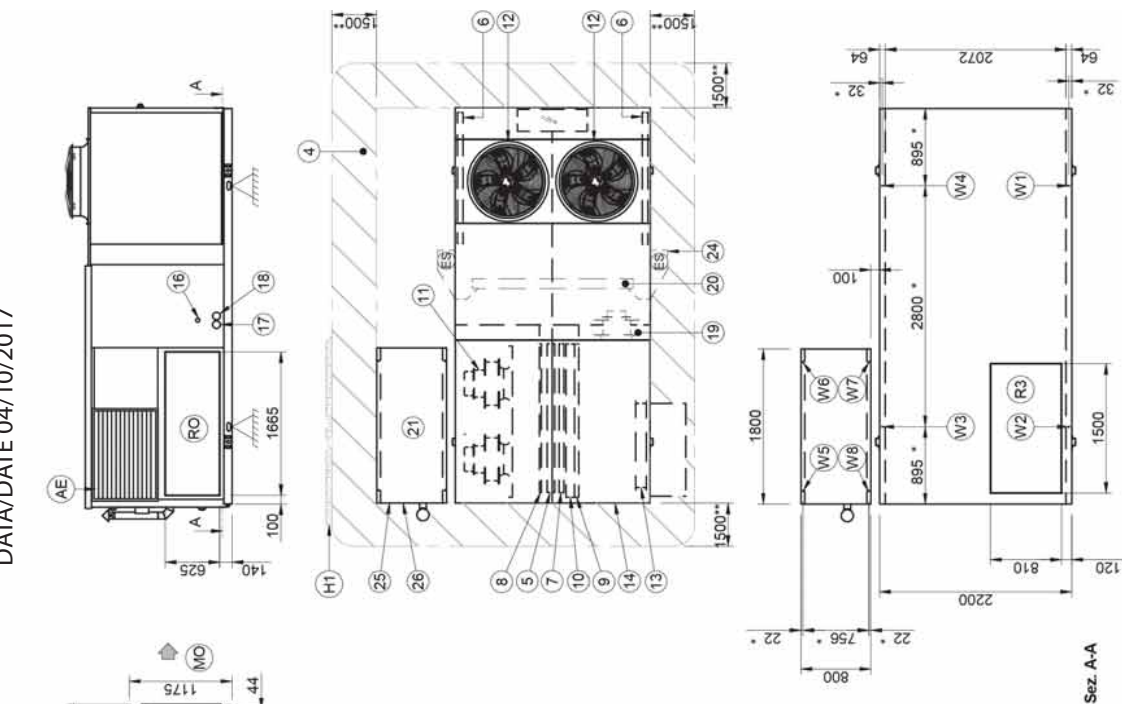
The presence of optional accessories may result in a substantial variation of the weights shown in the table.



## Size 33.4-40.4-44.4 combustion module - CAK and CBK configuration

### Single chamber(GC09X 65 kW - GC10X 82 kW - GC11X 100 kW)

DAA8F35\_2\_CCK-CCKP\_GC09X-GC10X\_04  
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18. H2O heating coil output Ø 1"1/4 / recovery coil from food refrigeration, output Ø 1"1/4 (optional)

19. Exhaust electric fan

20. Exhaust air recovery coil (CCRP version)

21. Gas module

22. Outdoor air return cap (only with R3) accessory separately supplied

23. Power input

24. Air exhaust cap (accessory separately supplied)

25. Gas connection

26. Condensate drain (only for condensation gas heating module)

(R0) Horizontal air return

(R3) Downward air return (optional)

(M0) Horizontal air supply

(AE) Outdoor air return

(ES) Air exhaust

(H1) Wall with same height as unit on a maximum of three sides

(\*\*) Suggested clearance

(\*) Vibration mounts position

#### GAS MODULE WEIGHT DISTRIBUTION

| Size                | 33.4 | 40.4 | 44.4 |
|---------------------|------|------|------|
| W5 Supporting point | kg   | 70   | 70   |
| W6 Supporting point | kg   | 58   | 58   |
| W7 Supporting point | kg   | 58   | 58   |
| W8 Supporting point | kg   | 70   | 70   |
| Operating weight    | kg   | 256  | 256  |
| Shipping weight     | kg   | 256  | 256  |

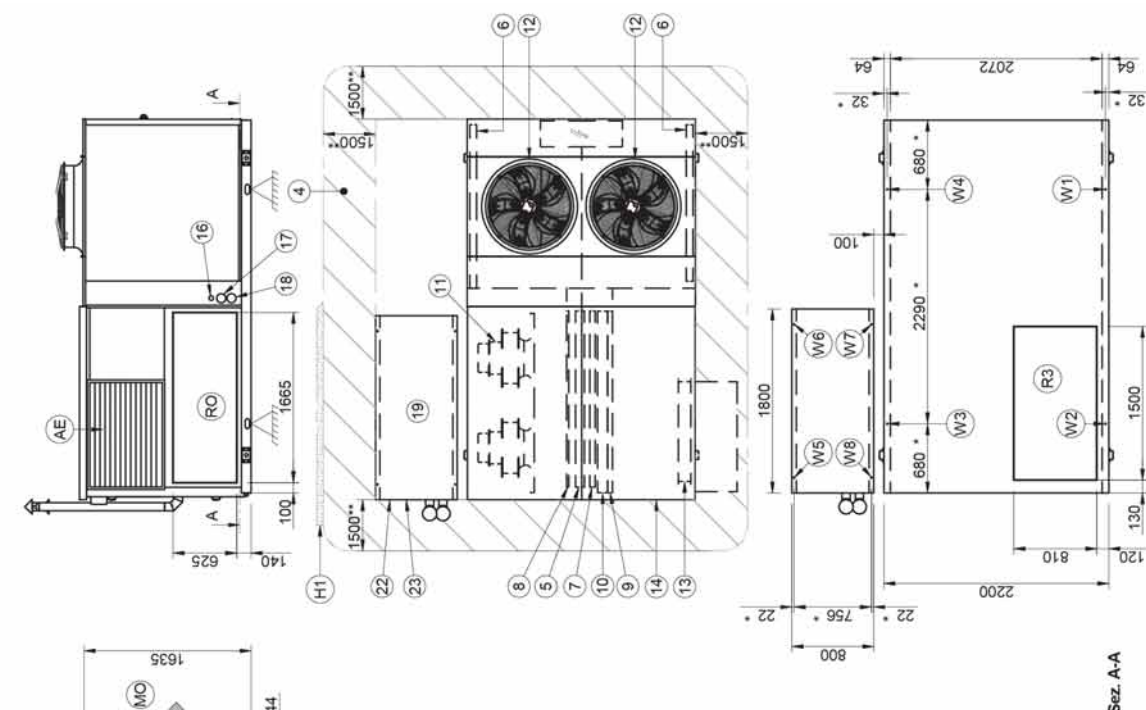
| Size                | 33.4    | 40.4    | 44.4    |
|---------------------|---------|---------|---------|
| Configuration       | CAK/CBK | CAK/CBK | CAK/CBK |
| W1 supporting point | kg      | 407     | 415     |
| W2 Supporting point | kg      | 313     | 321     |
| W3 Supporting point | kg      | 358     | 367     |
| W4 Supporting point | kg      | 422     | 430     |
| Operating weight    | kg      | 1500    | 1532    |
| Shipping weight     | kg      | 1500    | 1532    |

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

# Size 33.4-40.4-44.4 Combustion module - CAK and CBK configuration

## Double chamber(GC12X 130 kW)

DAA8F35\_2\_GC12X\_04  
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1. Compressor compartment
  2. Electrical panel
  3. Condensate drain
  4. Functional clearances
  5. Internal exchanger
  6. External exchanger
  7. H2O heating coil / recovery coil from food refrigeration / heating elements (optional)
  8. Re-heating coil (Optional)
  9. G4 air filters (Standard)
  10. F7 filters / electrostatic filters (optional)
  11. Electric fan (Supply - return)
  12. External electric fan
  13. Outdoor air damper (CBK version)
  14. Access for inspection of coils, filters, heating elements
  15. Lifting brackets (removable)
  16. Humidifier connections
  17. H2O heating coil input Ø 1"1/4 / recovery coil from food refrigeration, input Ø 1"1/4 (optional)
  18. H2O heating coil output Ø 1"1/4 / recovery coil from food refrigeration, output Ø 1"1/4 (optional)
  19. Gas module
  20. Outdoor air return cap (only with CBK version plus R3) accessory separately supplied
  21. Power input
  22. Gas connection
  23. Condensate drain (only for condensation gas heating module)
- (RO) Horizontal air return  
(R3) Downward air return (optional)  
(MO) Horizontal air supply  
(AE) Outdoor air return (only for CBK configuration)  
(H1) Wall with same height as unit on a maximum of three sides  
(\*\*) Suggested clearance  
(\*) Vibration mounts position

### GAS MODULE WEIGHT DISTRIBUTION

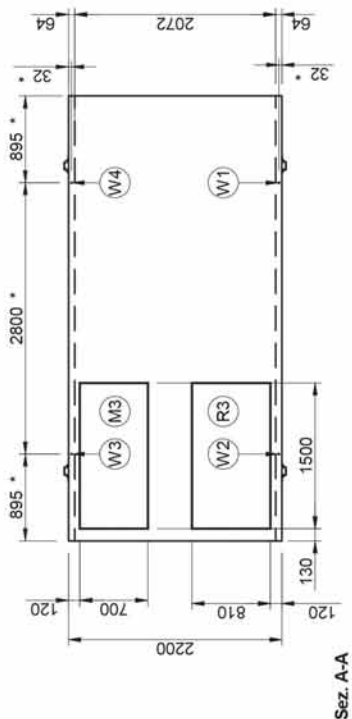
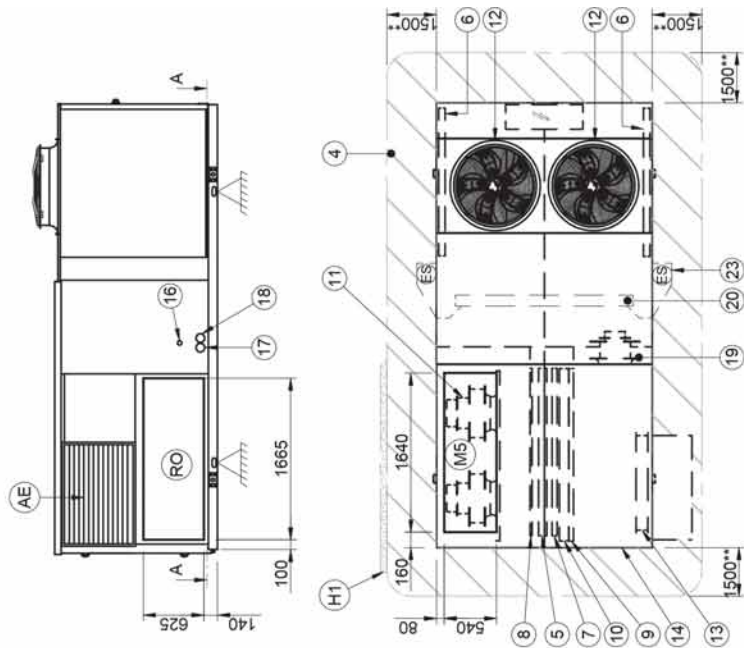
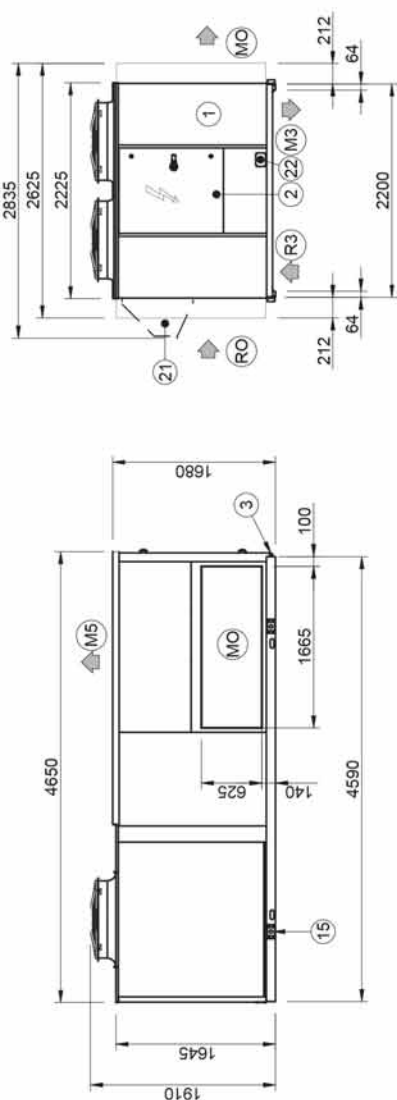
| Size                | 33.4 | 40.4 | 44.4 |
|---------------------|------|------|------|
| W5 Supporting point | kg   | 90   | 90   |
| W6 Supporting point | kg   | 78   | 78   |
| W7 Supporting point | kg   | 78   | 78   |
| W8 Supporting point | kg   | 90   | 90   |
| Operating weight    | kg   | 336  | 336  |
| Shipping weight     | kg   | 336  | 336  |

| Size                | 33.4    | 40.4    | 44.4    |
|---------------------|---------|---------|---------|
| Configuration       | CAK/CBK | CAK/CBK | CAK/CBK |
| W1 supporting point | kg      | 416     | 423     |
| W2 Supporting point | kg      | 319     | 327     |
| W3 Supporting point | kg      | 365     | 374     |
| W4 Supporting point | kg      | 431     | 439     |
| Operating weight    | kg      | 1531    | 1563    |
| Shipping weight     | kg      | 1531    | 1563    |

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

## Size 33.4-40.4-44.4 - CCK and CCKP configuration

DAA8F35\_2\_CCK-CCKP\_04  
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- |                                                                                                      |                                                                                                        |
|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| 1. Compressor compartment                                                                            | 18. H2O heating coil output Ø 1"1/4 / recovery coil from food refrigeration, output Ø 1"1/4 (optional) |
| 2. Electrical panel                                                                                  | 19. Exhaust electric fan                                                                               |
| 3. Condensate drain                                                                                  | 20. Exhaust air recovery coil (CCRP version)                                                           |
| 4. Functional clearances                                                                             | 21. Outdoor air return cap (only with M3 and/or R3) accessory separately supplied                      |
| 5. Internal exchanger                                                                                | 22. Power input                                                                                        |
| 6. External exchanger                                                                                | 23. Air exhaust cap (accessory separately supplied)                                                    |
| 7. H2O heating coil / recovery coil from food refrigeration / heating elements (optional)            | (R0) Horizontal air return                                                                             |
| 8. Re-heating coil (Optional)                                                                        | (R3) Downward air return (optional)                                                                    |
| 9. G4 air filters (Standard)                                                                         | (M0) Horizontal air supply                                                                             |
| 10. F7 filters / electrostatic filters (optional)                                                    | (M3) Downward air supply (Optional)                                                                    |
| 11. Electric fan (Supply - return)                                                                   | (M5) Upflow air supply (Optional)                                                                      |
| 12. External electric fan                                                                            | (AE) Outdoor air return                                                                                |
| 13. Outdoor air damper                                                                               | (E5) Air exhaust                                                                                       |
| 14. Access for inspection of coils, filters, heating elements                                        | (H1) Wall with same height as unit on a maximum of three sides                                         |
| 15. Lifting brackets (removable)                                                                     | (**) Suggested clearance                                                                               |
| 16. Humidifier connections                                                                           | (*) Vibration mounts position                                                                          |
| 17. H2O heating coil input Ø 1"1/4 / recovery coil from food refrigeration, input Ø 1"1/4 (optional) |                                                                                                        |

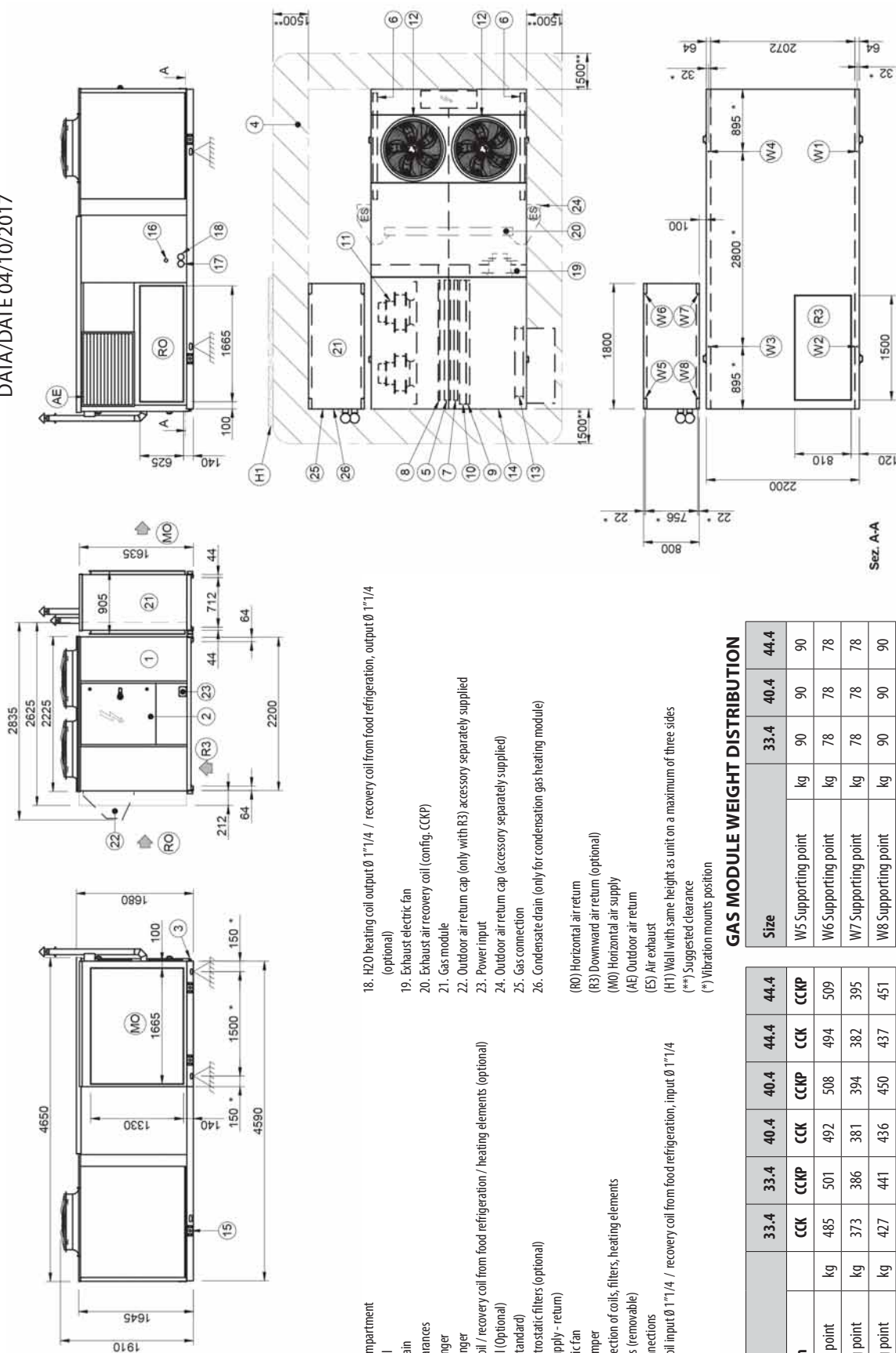
| Size                 | 33.4 | 33.4       | 40.4       | 40.4        | 44.4       | 44.4        |
|----------------------|------|------------|------------|-------------|------------|-------------|
| <b>Configuration</b> |      | <b>CKK</b> | <b>CKK</b> | <b>CKKP</b> | <b>CKK</b> | <b>CKKP</b> |
| W1 supporting point  | kg   | 485        | 501        | 492         | 508        | 494         |
| W2 Supporting point  | kg   | 373        | 386        | 381         | 394        | 382         |
| W3 Supporting point  | kg   | 427        | 441        | 436         | 450        | 437         |
| W4 Supporting point  | kg   | 503        | 519        | 511         | 527        | 512         |
| Operating weight     | kg   | 1778       | 1847       | 1820        | 1879       | 1825        |
| Shipping weight      | kg   | 1778       | 1847       | 1820        | 1879       | 1825        |

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



### Size 33.4-40.4-44.4 Combustion module - CCK and CCKP configuration

DAA8F35\_2\_CCK-CCKP\_GC12X\_04  
DATA/DATE 04/10/2017



## GAS MODULE WEIGHT DISTRIBUTION

| Size                | 33.4 | 40.4 | 44.4 |
|---------------------|------|------|------|
| W5 Supporting point | kg   | 90   | 90   |
| W6 Supporting point | kg   | 78   | 78   |
| W7 Supporting point | kg   | 78   | 78   |
| W8 Supporting point | kg   | 90   | 90   |
| Operating weight    | kg   | 336  | 336  |
| Shipping weight     | kg   | 336  | 336  |

| Size                | 33.4 |      | 33.4 |      | 40.4 |      | 40.4 |      | 44.4 |      | 44.4 |      |
|---------------------|------|------|------|------|------|------|------|------|------|------|------|------|
|                     | CCK  | CCNP | CCK  | CCNP | CCK  | CCNP | CCK  | CCNP | CCK  | CCNP | CCK  | CCNP |
| Configuration       |      |      |      |      |      |      |      |      |      |      |      |      |
| W1 supporting point | kg   | 485  | 501  | 492  | 508  | 494  | 509  |      |      |      |      |      |
| W2 Supporting point | kg   | 373  | 386  | 381  | 394  | 382  | 395  |      |      |      |      |      |
| W3 Supporting point | kg   | 427  | 441  | 436  | 450  | 437  | 451  |      |      |      |      |      |
| W4 Supporting point | kg   | 503  | 519  | 511  | 527  | 512  | 528  |      |      |      |      |      |
| Operating weight    | kg   | 1788 | 1847 | 1820 | 1879 | 1825 | 1883 |      |      |      |      |      |
| Shipping weight     | kg   | 1788 | 1847 | 1820 | 1879 | 1825 | 1883 |      |      |      |      |      |

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

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