Technical Bulletin

BT14B001GB-01

# CLIVETPack

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

R-410A

## CSRN-XHE2 49.4 - 110.4 RANGE

## AIR-AIR HEAT PUMP R-410A

Airflow from 22000 to 60000 $m^3/h$

- High efficiency
- Energy recovery of exhaust air
- Variable airflow
- Maximum compactness
- Great versatility
- Quick installation

# Air conditioning systems

The continuous evolution of air conditioning systems for medium and large areas shows how packaged independent units are gradually replacing systems based on traditional AHU technology (air handling unit) connected to hot and cold water generators, with passive recovery and pumping systems.

The air-conditioning market sees remarkable advantages in these systems, in terms of energy and plant engineering execution.

These trends are more evident in systems with variable air flow-rate, as the energy requirements depend on the building load and the presence of occupants. Over the entire annual cycle, the control of these systems is, therefore, very complex due to the changing indoor conditions, as well as the changing conditions of the air mixture, which needs to be handled.

Clivet is committed to making traditional systems obsolete, by proposing innovative rooftop air-conditioning systems.

## PACKAGED System


| | Medium attendance applications | | | High attendance applications | Full fresh air applications |
|---|---|---|---|---|---|
| | **SMARTPack** | **CLIVETPack** | **CLIVETPack** | **CLIVETPack** | **CLIVETPack FFA** |
| Air flow | 610 ÷ 2700 l/s (12 ÷ 52 kW) | 2500 ÷ 6800 l/s (45 ÷ 138 kW) | 7200 ÷ 16700 l/s (155 ÷ 376 kW) | 1000 ÷ 4600 l/s (33 ÷ 138 kW) | 1700 ÷ 2200 l/s (69 ÷ 83 kW) |
| |  |  |  |  |  |
| Air source Cooling only | CKT-XHE 41-151 DC Inverter | CSRT-XHE2 DC Inverter | CSRT-XHE2 49.4-110.4 | | CSRT-XHE2 FFA DC Inverter |
| Air source Heat pumps | CKN-XHE 41-151 DC Inverter | CSRN-XHE2 DC Inverter | CSRN-XHE2 49.4-110.4 | CSNX-XHE2 DC Inverter | CSRN-XHE2 FFA DC Inverter |
| Water source Heat pumps | | CRH-XHE2 DC Inverter | CRH-XHE2 49.4-110.4 | CSNX-XHE2-H DC Inverter | |
| Electronically controlled ventilation and variable air flow | ✔ | ✔ | ✔ | ✔ | ✔ |
| Free cooling | ✔ | ✔ | ✔ | ✔ | ✔ |
| Thermodynamic energy recovery | ✔ | ✔ | ✔ | ✔ | ✔ |
| THOR (Thermodynamic Overboost Recovery) | | ✔ | ✔ | ✔ | |
| Electronic filtration | ✔ | ✔ | ✔ | ✔ | ✔ |

### High efficiency systems

System strong points:

- THOR thermodynamic energy recovery
- Ventilation electronically controlled
- Variable airflow
- High efficiency filtration
- FREE-COOLING
- Horizontal or bottom return and supply

### 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 single-block 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

# CLIVETPack series for medium attendance applications

## Air conditioning systems only for cooling

### CSRT-XHE 82 - 302

nominal airflow: 5400 - 18000 m3/h

cooling capacity: 33 - 102 kW

### CSRT-XHE2 49.4 - 110.4

nominal airflow: 22000 - 60000 m3/h

cooling capacity: 150 - 370 kW

## Reversible heat pump air conditioning systems

### CSRN-XHE 82-302

nominal airflow: 5400 - 18000 m3/h

cooling capacity: 33 - 102 kW

### CSRN-XHE2 49.4 - 110.4

nominal airflow: 22000 - 60000 m3/h

cooling capacity: 150 - 370 kW

# 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.

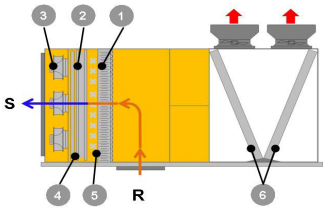
# CLIVETPack CSRN-XHE2 delivers all the technological evolution by Clivet to the applications for middle attendance

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

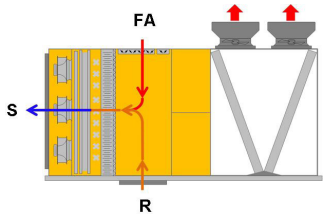
For air conditioning applications only, without the need for air renewal. The supply fan section provides the required supply and return available static pressure.




## 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.

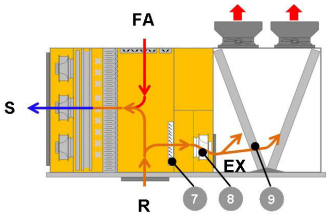
As for the CAK configuration, the supply fan section provides the supply and return available static pressure.




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

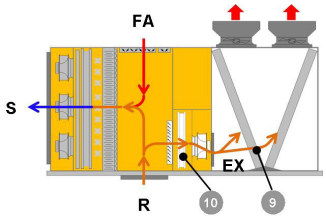
For applications with automatic air renewal and free-cooling function control. In addition to the parts contained in the CBK configuration, the unit is equipped with an exhaust section with thermodynamic energy recovery of the exhaust air.

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. Handling exchanger
3. Supply fan section
4. Hot gas reheating exchanger
5. Electric heaters.
6. Source side exchanger
7. Exhaust damper
8. Exhaust fan section
9. Thermodynamic recovery on exhaust air
10. Thermodynamic recovery exchanger, THOR

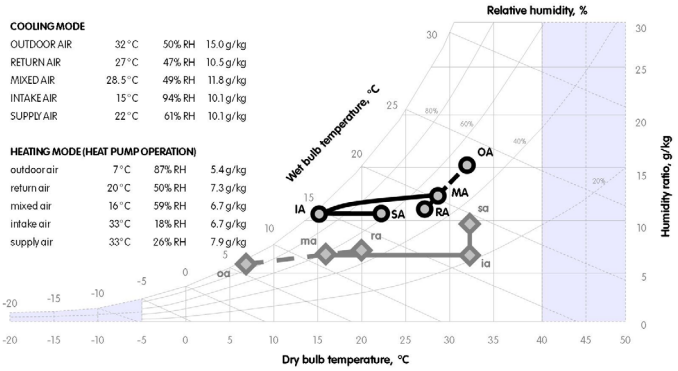
# Comfort and air quality in only one product

## 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 49.4 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:

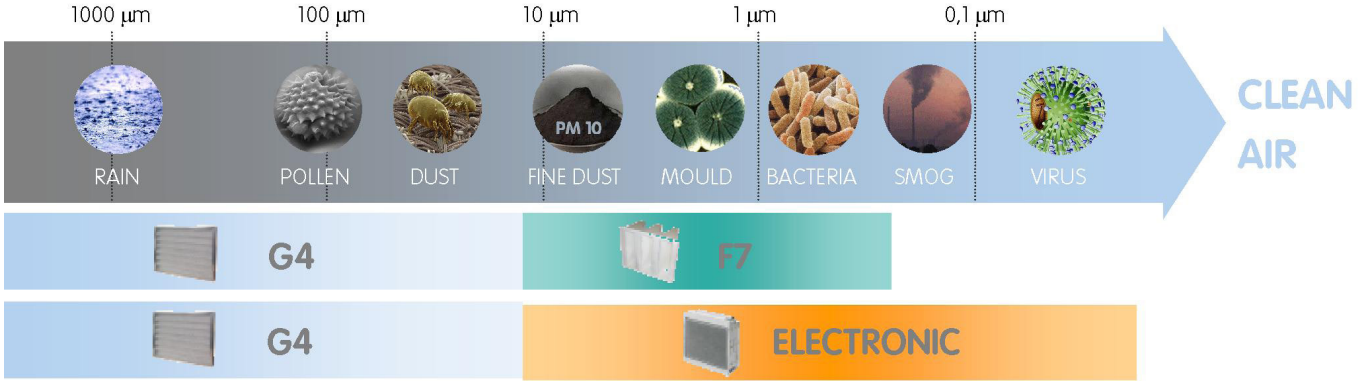
- Carries out the transient steady state in all recirculation mode, to reduce its duration and quickly reach comfort conditions
- Once these conditions have been reached, it operates with fixed open damper, based on the users preferred settings
- Carry out the FREE-COOLING as soon as the external conditions 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 CO2 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.

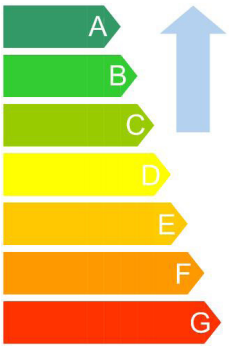
# High energy efficiency within the annual cycle

## Increases the building value

The high efficiency reduces the complex primary energy requirements and the CO2 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.




## 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.

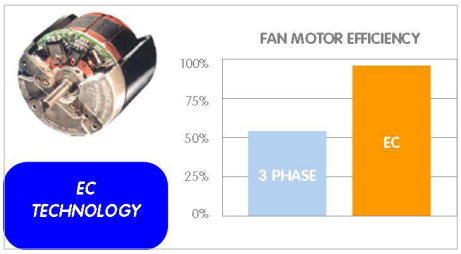
## Versatility of reversed blades rotor

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.

## 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:

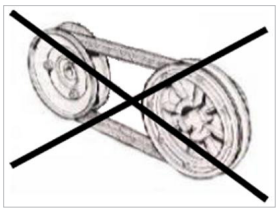
- The lack of brushes and the particular power supply increase efficiency by 70%;
- Even the life cycle increases, thanks to the elimination of the brushes' natural abrasive erosion effects;
- The electronic control also includes a "soft start" solution, which drastically reduces the starting current 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):

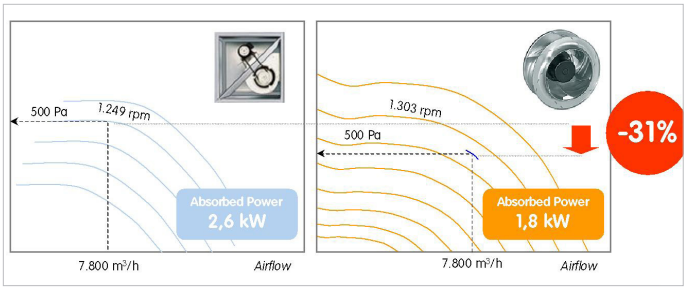
- the transmissions' inefficiencies are eliminated;
- the transmissions' wear and maintenance is eliminated.



## 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.

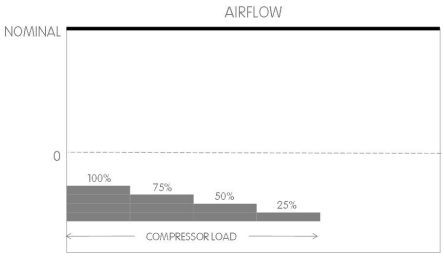



Electrical power absorbed by electric motor, data constructor - Example, referred to flow of 7.800 m3/h with 500 Pa external static pressure.

# Automatic management of the air flow

## Standard mode

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

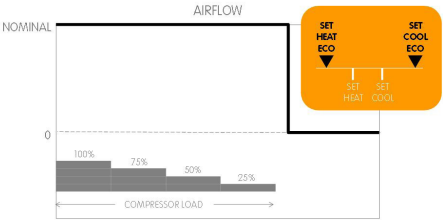



## ECO mode

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 the functionality of daily and weekly programming supplied as standard
- Automatically by means of the Clivet supervision System

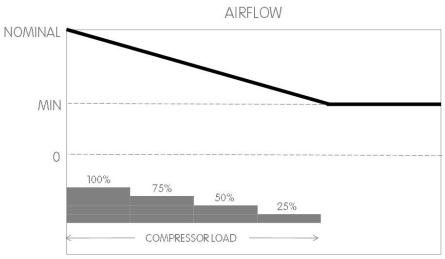
# Variable airflow

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

# Applications with textile channels

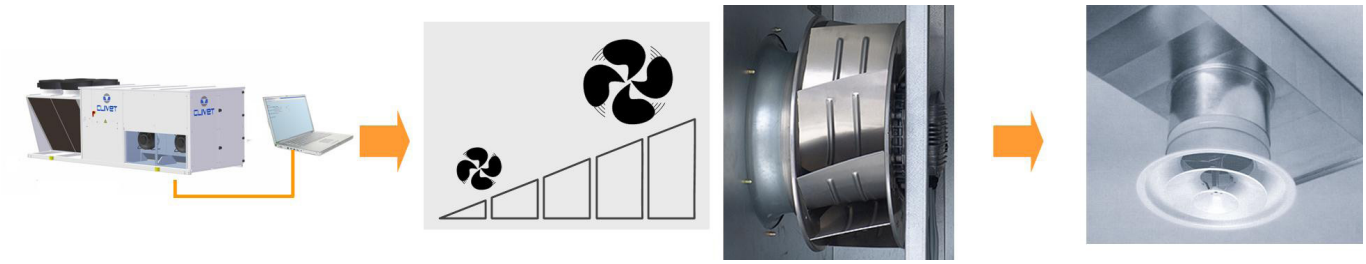
The fans with electronic control allow choosing the preferred ramp for fan start-up.

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

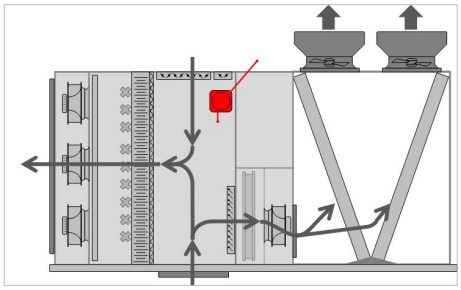
By controlling the fan speed, the airflow can be varied and the static pressure capacity can be adapted to the system pressure drop, making the unit start-up particularly simple. The adjustment or modification of the transmission is no longer required as the ventilation system will adapt itself to the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



## 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.



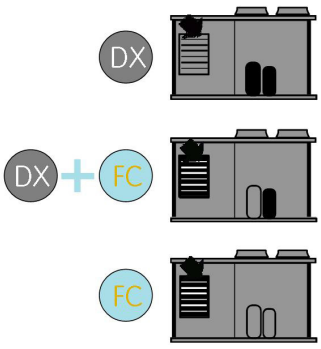
The room pressure control device is fitted as standard in the units with extraction and exhaust (Clivet reference code CCK and CCKP)

## 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 cqapacity 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.




## Min. outdoor air damper

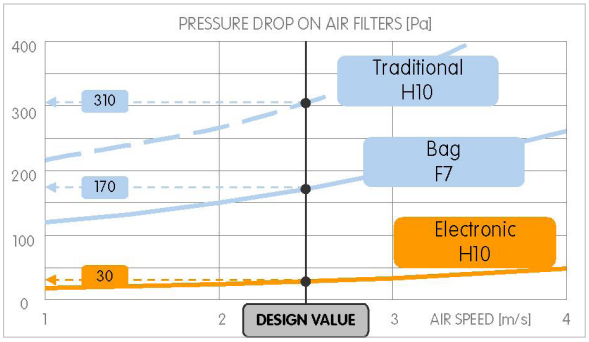
Together with the FREE-COOLING damper, it realizes the air renewal in the space. Its size provides more accurate control for minimum air renewal flow rates. It guarantees the lowest possible noise levels in the room at low air crossing speeds, even with minimum openings.

## 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%.

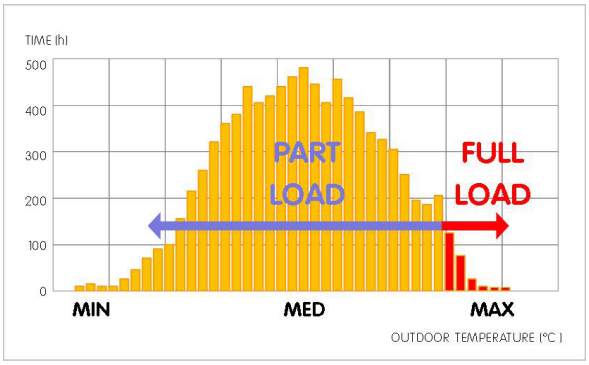



## Part load efficiency determines the seasonal efficiency

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.

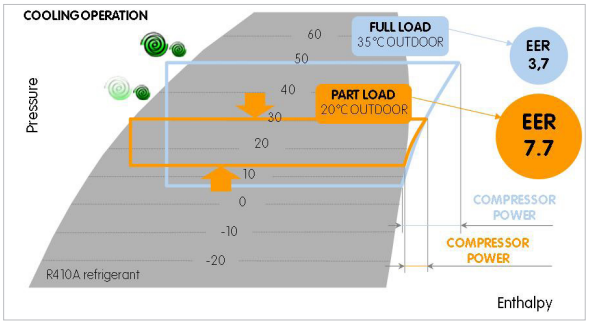
All sizes have a double refrigeration circuit with compressors connected in tandem, for greater reliability and safe operation.

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.

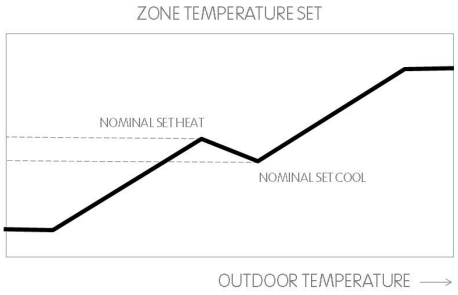



Example referred to CSRN-XHE 49.4 in the all recirculation operation

## Set-point automatic compensation

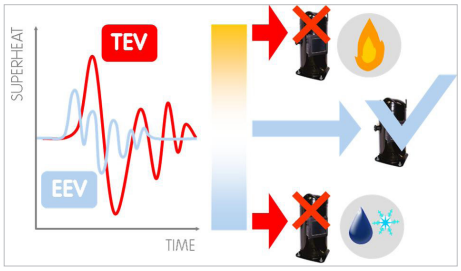
With this function as standard, the temperature set-point can automatically vary in view of the outdoor temperature and of the User settings:

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




## Stable and reliable operation

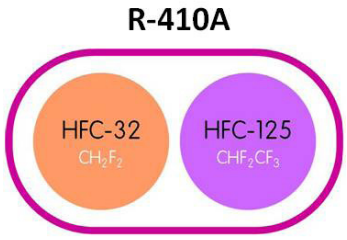
The electronic expansion valve (EEV) adapts rapidly and precisely to the actual load required for usage, allowing stable and reliable adjustment in comparison with mechanical thermostatic valves (TEV). This results also in a further increase in efficiency and longer compressor life. Through control of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



## 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.

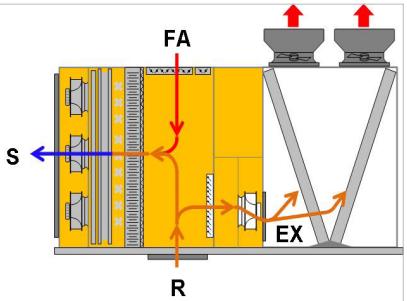
## Rooftop in CCK and CCKP configuration are equipped with the energy recovery on the exhaust air

### 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.

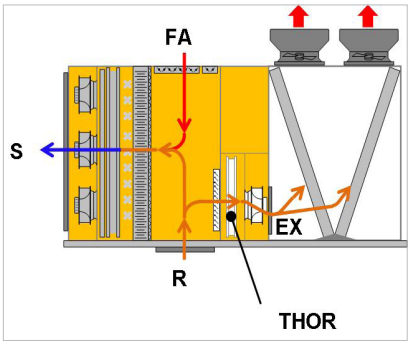



### CCKP - THOR thermodynamic energy recovery (THermodynamic Overboost Recovery)

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.

## Evolution and optimization of the external ventilation

A new diffuser on the fans in the outdoor section optimizes air distribution, with a considerable increase in efficiency.

The amount of electric power input by the motor leads to an equally greater air flow rate till 8%, which improves the energy exchange with a considerable increase in the heating and cooling output.

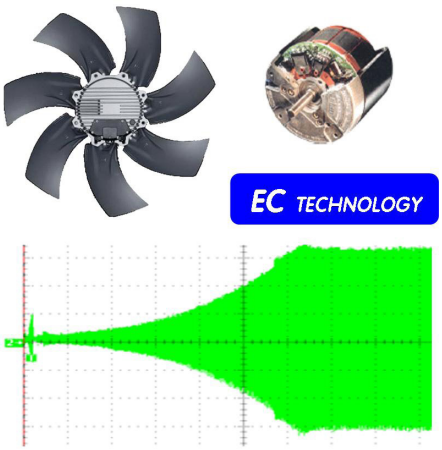
Also, the special aerodynamic shape lowers sound emissions by -3dB(A), to the full benefit of indoor and outdoor sound comfort.

## 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.

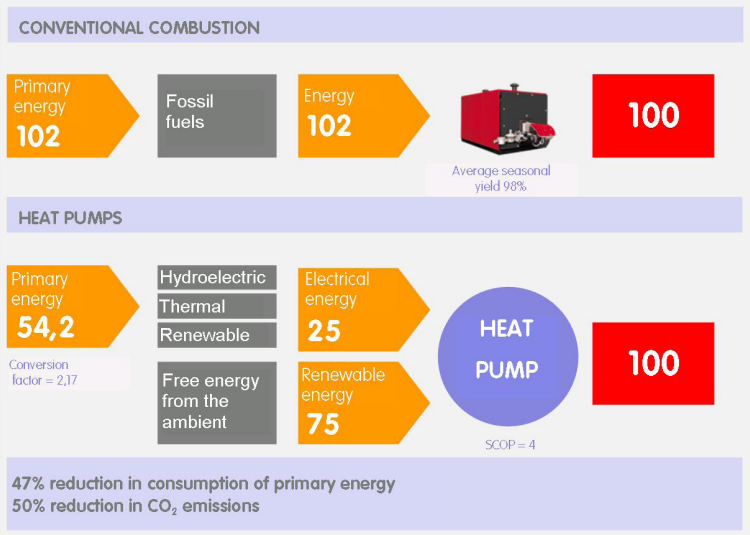


## Renewable energy heat pump technology

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 CO2 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.



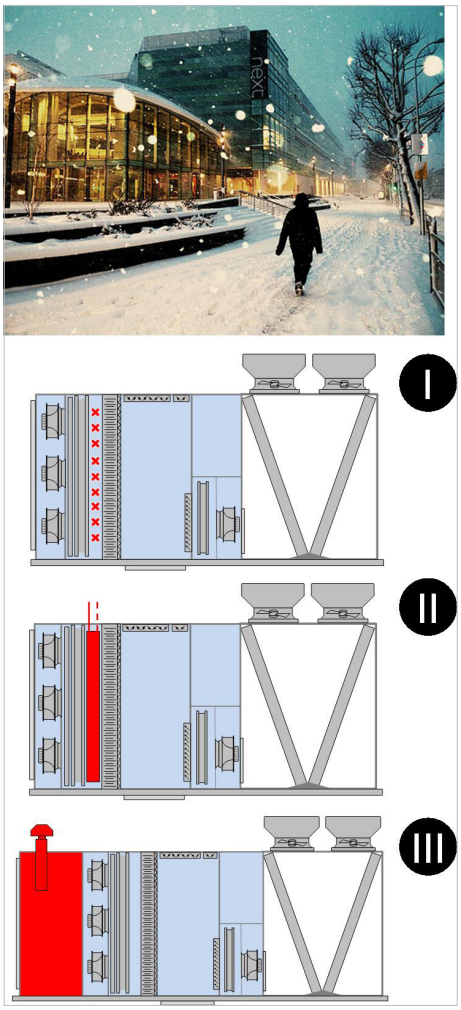

## High efficiency heating solutions

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 kinds of modules are available with different heating capacities:

- heating module only with a combustion chamber: the burner is chosen and installed by the user, a flexible option in terms of brand and model, type of operation, fuel and being able to do maintenance with your own technician.
- gas or oil heating module with 2-stage control: both an efficient and cost-effective solution for its low initial investment costs.
- 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.

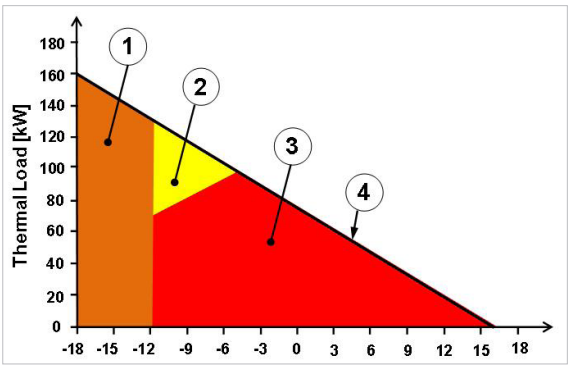
The size of the heat generator is based on one of the modes below:

- 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 49.4 CAK configuration.
Condensing gas module with modulating control 96kW (Hybrid function)
Condensing gas module with modulating control 200kW (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.

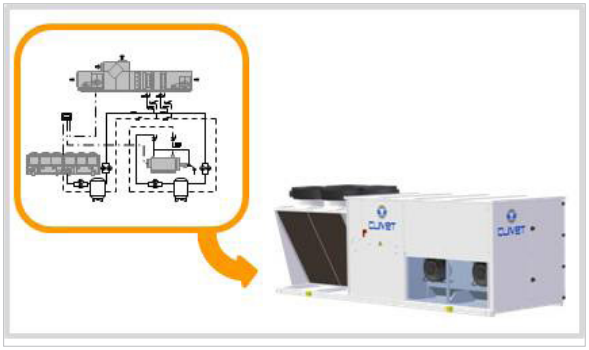
# Reliability and saving throughout the entire life-cycle

## Great system simplification and increase in reliability

The single block solution significantly reduces the initial system costs in respect of the traditional solutions based on the hydronic systems with separate production, for example by means of chillers and boilers, or on direct expansion systems with fresh air.

Most of the normal engineering activities are in fact created by Clivet inside the unit

- Component selection and dimensioning
- Water and mechanical connections
- Electric and control wiring
- Functional test



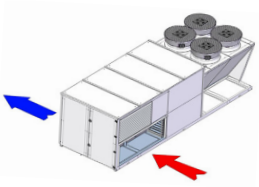
Only the air distribution ducts connection and the power supply of the unit are provided by the Customer.

## The air distribution depending on the installation

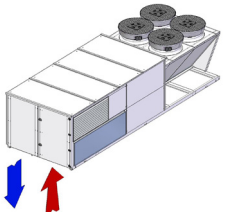
Great flexibility of set-up on site, the air supply and return of these units can be from the side or bottom.

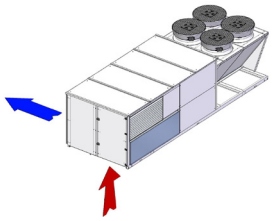
The configuration is selected during offering, choosing the supply and return set-up for the air duct connections, and to adapt the unit to certain architectural design constraints or make it easier to replace existing systems.

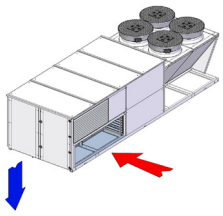
Standard Version



Other available versions







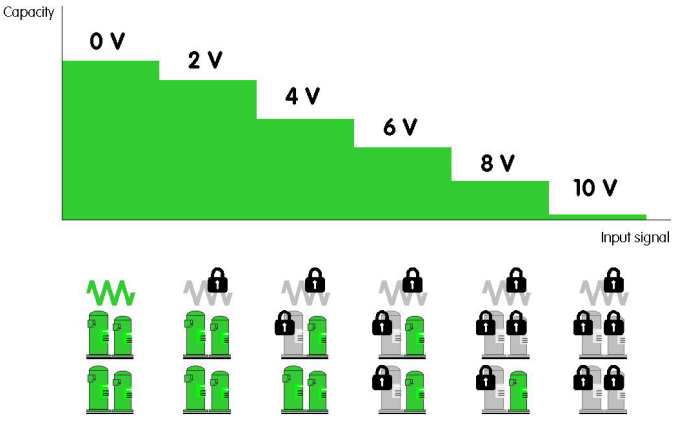
## Demand limit

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 0-10 V / 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.




Airflow configuration: S= supply R = return

The represented number of compressors constitutes an indicative example

## Operating completely automatic

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

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

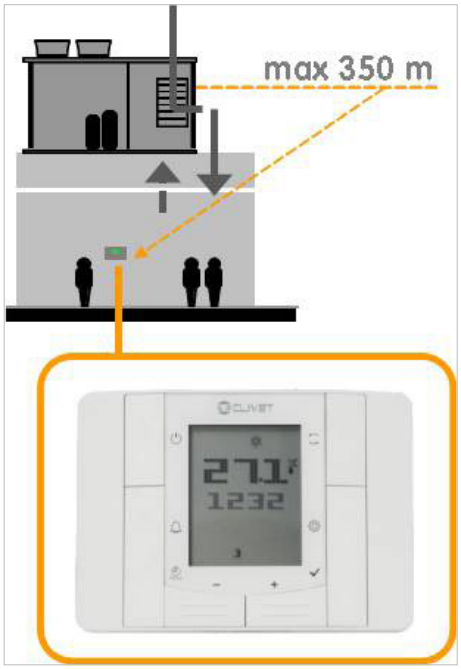
## Simple and intuitive user interface

The remote control with user interface (for wall mounting) is supplied as standard and it can be easily used also by not specialized personnel. The connecting cable (not supplied) has a double function of serial communication and power supply.

Among the main functions it allows to:

- unit switching on and off
- daily/weekly start-up or power-off programming of the unit and the Comfort or ECO (energy saving) or Ventilation-only mode
- display the alarm code and the unit stata
- management of the main operating parameters (password-protected)
- selective key lock, unlocked with password

The temperature and humidity measurement is made by probes into the unit: the remote control can therefore be installed also inside the technical control compartment. When the centralised supervision system or an other remote control device is provided, the unit can be supplied without the remote control with the user interface.




## Remote system management

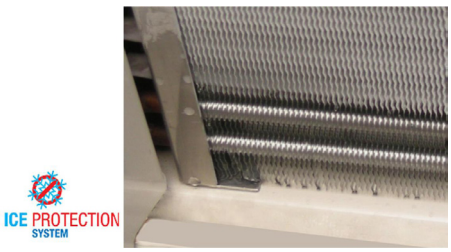
The unit can be remotely managed by:

- 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
- Free contacts supplied as standard, to remotely control the main functions and to display alarms and operating stata.
- Different communication protocols to exchange information with the main supervision systems by serial line.

## Coils protected against the formation of ice

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

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




## Smart management of defrosts

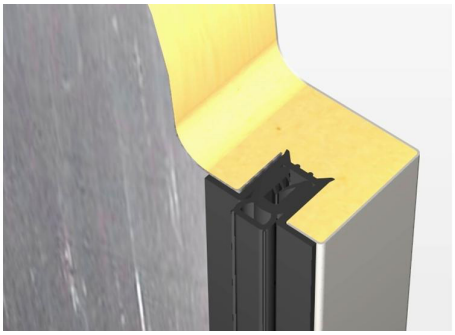
The automatic defrost cycles on the remaining external exchanger surface are managed in predictive mode, reducing both the frequency and the duration. The built-in electronics analyses not only the external conditions, but also the evaporation pressure variation in the exchanger.

The standard defrosting cycle management activates one circuit at a time without stopping ventilation. This reduces the time required for defrosting and prevents the introduction of too cold air in the served area, maintaining comfortable conditions for the users.

## 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.

## Simplified maintenance

Thanks to the local plug RJ45 available outside the unit, the authorised technical personnel will be able to undertake all the operations to control and maintain the unit by:

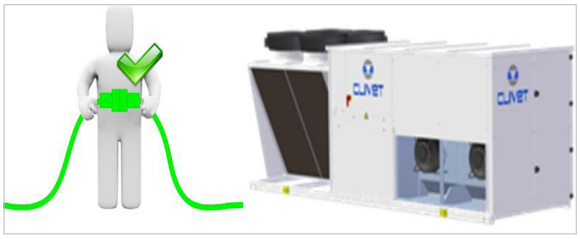
- laptop computer equipped of Ethernet network cable and of web browser (like for example Firefox, Explorer, Chrome, Safari).
- service interface with extensible cable of 1.5 m as available option.

## Controlled power supply

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

The phase monitor, standard supplied:

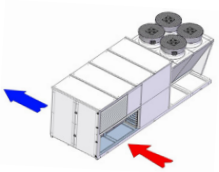
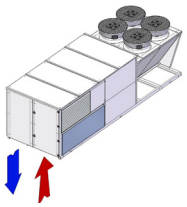
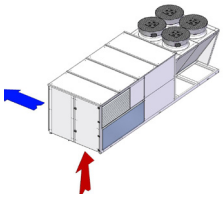
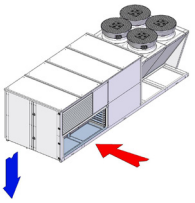
- controls the presence and exact sequence of the phases
- verifica eventuali anomalie di tensione (+/-10%)
- automatically restarts the unit as soon as the proper power supply is restored.



Furthermore it is possible to choose the multifunction phase monitor as optional adding to the previous functions also the manual setting of the overvoltage, undervoltage and slot limit values, over which the unit is automatically switched off.

# Unit configuration

| Model | Version | Size | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| CSRN-XHE2 | **CAK** - Full recirculation | 49.4 | 54.4 | 60.4 | 70.4 | 80.4 | 90.4 | 100.4 | 110.4 |
| | **CBK** - Fresh air | | | | | | | | |
| | **CCK** - FREE-COOLING, thermodynamic recovery | | | | | | | | |
| | **CCKP** - FREE-COOLING, THOR thermodynamic recovery | | | | | | | | |

| Functionalities | | | | |
|---|---|---|---|---|
| **Air supply and return** | **M0 - R0**<br>Standard unit | **M3 - R3**<br>Option | **M0 - R3**<br>Option | **M3 - R0**<br>Option |
| |  |  |  |  |

| Filtration | G4 | G4 + F7 | G4 + FES H10 |
|---|---|---|---|

| Auxiliary heating | Heat pump standard unit | Heat pump and electric heater option | Heat pump and hot water coil option | Heat pump and combustion module option |
|---|---|---|---|---|

| Configuration options | | |
|---|---|---|
| • **FC** - Thermal FREE-COOLING (standard for CCK and CCKP configuration)<br>• **FCE** - Enthalpic FREE-COOLING<br>• **CPHG** - Hot gas re-heating coil<br>• **F7** - High efficiency air filter<br>• **FES** - Electronic filters<br>• **PSAF** - Clogged filter differential pressure switch air side<br>• **EH** - Electric elements<br>• **CHW2** - Two-rows hot water coil<br>• **3WVM** - Modulating 3-way valve<br>• **GD, OD, GC** - Combustion heating module | • **HSE** - Immersed electrodes steam humidifier<br>• **HWS** - Steam humidifier with disposable water<br>• **VENH** - High static pressure fans<br>• **PAQC** - Air quality probe for the CO2 rate check<br>• **PAQCV** - Air quality probe for the CO2 and VOC rate check<br>• **SERM** - Outdoor air motorized ON/OFF damper only CBK)<br>• **SFCM** - Modulating motorized FREE-COOLING damper (only CBK)<br>• **SFCEM** - FREE-COOLING and min. outdoor air motorized and modulating dampers (only for CCK and CCKP configuration)<br>• **MHP** - High and low pressure gauges | • **PCM0** - Sandwich panels of the handling zone in M0 fire reaction class<br>• **DESM** - Smoke detector<br>• **CREFP** - Fan consumption reduction device of external section at variable speed (phase cutting) (standard).<br>• **CREFB** - ECOBREEZE external section fans consumption reduction device<br>• **MOB** - Modbus serial communication module<br>• **LON** - LonWorks serial communication module<br>• **BACIP** - BACnet-IP serial communication module<br>• **MF2** - Multifunction phase monitor<br>• **PFCP** - Power factor correction capacitors (cosfi > 0.9) |

| Accessories separately supplied | | |
|---|---|---|
| **SIX** - Service interface | **CLMX** - Clivet Master System | **AMRX** - Rubber anti-vibrating dampers |

# 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/m3), thickness of outer sheet metal 6/10 mm galvanized and painted using polyester powders colour RAL 9001, polyurethane thickness with thermal conductivity coefficient 0.022W/mK, thickness of internal sheet metal 5/10 mm hot galvanized. The panel is also 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.

**External section**

Helical fans with shaped aluminium blades coupled directly to a three phase electric motor with thermal protection incorporated in version IP 54. Housed in aerodynamically shaped nozzles to increase efficiency and minimise noise levels. They are fitted with protective safety guard grilles.

Supplied with phase cutting speed modulation.

## Refrigeration circuit

Refrigeration circuit with:

- refrigerant charge
- sight glass with moisture and liquid indicator
- high pressure safety pressure switch
- low pressure safety 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 drain pipe.

## Electrical panel

The electrical panel is positioned inside the units, with access through a swing 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
- Demand limit
- potential-free contacts for remote ON-OFF, cumulative alarm, fire alarm inlet, fan status, compressor status, summer/winter mode
- phase monitor
- RJ45 located on the unit's outer surface for inspection and maintenance operations

**Remote control with user interface**

- switching the unit on and off
- daily/weekly start-up or power-off programming of the unit and the Comfort or ECO (energy saving) or Ventilation-only mode
- manual change of the operating mode (heat or cool) and / or of the temperature setpoint
- display the alarm code and the unit stata
- management of the main operating parameters (password-protected)
- selective key lock, unlocked with password

## Accessories

- Downflow version
- Floor air inlet
- Two-rows hot water coil
- Modulating three-way valve
- Modulating two-way valve
- Hot gas re-heating coil
- Combustion heating module
- Recovery exchanger from food refrigeration
- Immersed electrodes steam humidifier
- Water to waste evaporating wet-deck humidifier
- Electric heaters.
- Air quality sensor for CO2 p.p.m. control
- Air quality sensor for CO2 and VOC p.p.m. control
- Outdoor air motorized on/off damper (only for CBK configuration)
- Modulating motorized FREE-COOLING damper (optional for CBK configuration, standard for CCK and CCKP configuration)
- Modulating motorized FREE-COOLING damper and min. outdoor air motorized on/off damper (only for CCK and CCKP configuration)
- High efficiency F7 air filter
- Electronic filters
- Differential pressure switch for dirty air filters
- Serial port RS485 with Modbus protocol
- LonWorks serial communication module
- BACnet-IP serial communication module
- Multi-function phase monitor
- Service interface (accessory separately supplied)
- Power factor correction capacitors (cosfi > 0.9)
- Enthalpy FREE-COOLING (only for CCK and CCKP configuration)
- Constant supply airflow
- Variable airflow
- Device for consumption reduction of the external section ECOBREEZE fans
- High and low pressure gauges
- Smoke detector
- Application for low outdoor temperature
- Spring antivibration mounts (accessory separately supplied)
- Roof curb (separately supplied accessories)
- Clivet Master System (accessory separately supplied)
- Sandwich panels of the handling zone in M0 fire reaction class
- Shipping via Container

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:

**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.

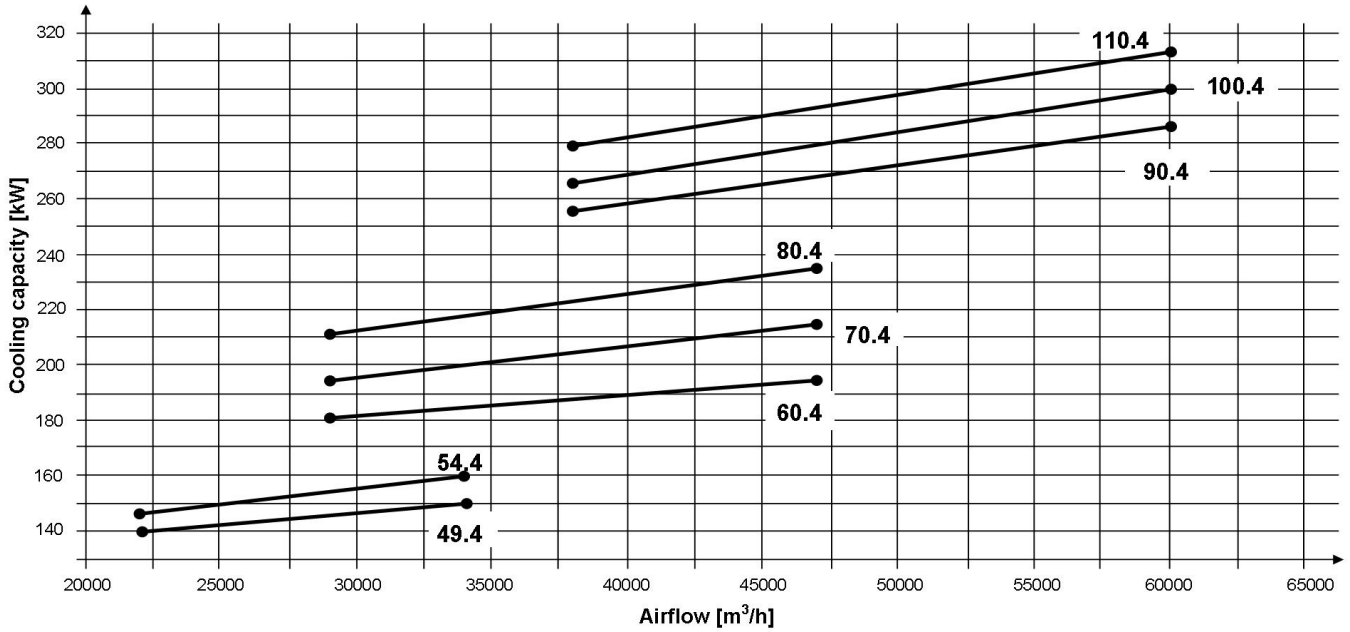
# Configuration with double fan section for recirculation, fresh air, exhaust, THOR thermodynamic recovery (CCKP)

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

**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.

## The broad CLIVETPack CSRN-XHE2 series




Different heating-cooling handling is available depending on the air flow, based on the selected size.

# STANDARD AIRFLOW

## General technical data

| Size | | | | 49.4 | 54.4 | 60.4 | 70.4 | 80.4 | 90.4 | 100.4 | 110.4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Cooling** | | | | | | | | | | | |
| Cooling capacity | CAK | 1 | kW | 154.6 | 164.6 | 195.0 | 213.0 | 245.2 | 297.3 | 311.9 | 333.6 |
| Sensible capacity | | | kW | 116.3 | 124.3 | 143.6 | 164.2 | 184.2 | 222.8 | 234.7 | 246.0 |
| Compressor power input | | 1 | kW | 40.9 | 45.0 | 49.9 | 58.4 | 64.7 | 75.7 | 84.1 | 94.7 |
| EER | | 1 | | 3.78 | 3.66 | 3.91 | 3.64 | 3.79 | 3.93 | 3.71 | 3.52 |
| Cooling capacity | CBK | 2 | kW | 161.2 | 171.3 | 202.9 | 223.2 | 257.6 | 310.1 | 328.2 | 346.8 |
| Sensible capacity | | 2 | kW | 119.4 | 128.6 | 148.7 | 167.3 | 187.8 | 229.3 | 238.0 | 253.8 |
| Compressor power input | | 2 | kW | 41.5 | 45.5 | 50.6 | 59.5 | 65.5 | 76.8 | 85.7 | 96.2 |
| EER | | 2 | | 3.88 | 3.76 | 4.01 | 3.75 | 3.93 | 4.04 | 3.83 | 3.60 |
| Cooling capacity | CCK | 3 | kW | 164.2 | 175.1 | 206.0 | 227.1 | 262.5 | 314.7 | 333.2 | 353.0 |
| Sensible capacity | | 3 | kW | 121.2 | 130.7 | 150.2 | 169.0 | 190.3 | 231.9 | 240.8 | 256.9 |
| Compressor power input | | 3 | kW | 40.2 | 43.9 | 49.4 | 58.1 | 63.6 | 74.9 | 83.5 | 93.6 |
| EER | | 3 | | 4.08 | 3.99 | 4.17 | 3.91 | 4.13 | 4.20 | 3.99 | 3.77 |
| Cooling capacity | CCKP | 3 | kW | 174.9 | 185.9 | 220.2 | 242.1 | 279.5 | 336.4 | 356.0 | 376.2 |
| Sensible capacity | | 3 | kW | 128.7 | 138.6 | 160.2 | 180.3 | 202.4 | 247.1 | 256.5 | 273.6 |
| Compressor power input | | 3 | kW | 41.1 | 45.1 | 50.1 | 59.0 | 65.1 | 76.4 | 85.1 | 95.3 |
| EER | | 3 | | 4.26 | 4.12 | 4.40 | 4.10 | 4.29 | 4.40 | 4.18 | 3.95 |
| **Heating** | | | | | | | | | | | |
| Heating capacity | CAK | 1 | kW | 161.1 | 171.9 | 198.9 | 220.6 | 255.1 | 302.1 | 323.1 | 350.0 |
| ompressor power input | | 1 | kW | 34.4 | 36.9 | 42.5 | 48.6 | 55.4 | 64.8 | 69.9 | 79.2 |
| COP | | 1 | | 4.68 | 4.66 | 4.68 | 4.54 | 4.60 | 4.66 | 4.62 | 4.42 |
| Heating capacity | CBK | 2 | kW | 163.5 | 174.3 | 202.5 | 223.7 | 258.9 | 306.2 | 327.4 | 354.5 |
| ompressor power input | | 2 | kW | 31.7 | 33.8 | 39.0 | 44.8 | 51.3 | 60.1 | 65.1 | 72.6 |
| COP | | 2 | | 5.16 | 5.16 | 5.19 | 4.99 | 5.05 | 5.09 | 5.03 | 4.88 |
| Heating capacity | CCK | 3 | kW | 167.8 | 179.3 | 206.4 | 228.7 | 265.4 | 311.7 | 333.4 | 361.9 |
| ompressor power input | | 3 | kW | 32.1 | 34.2 | 39.4 | 45.4 | 51.9 | 61.1 | 65.8 | 73.6 |
| COP | | 3 | | 5.23 | 5.24 | 5.24 | 5.04 | 5.11 | 5.10 | 5.07 | 4.92 |
| Heating capacity | CCKP | 3 | kW | 176.3 | 186.6 | 218.3 | 241.2 | 279.1 | 330.1 | 353.0 | 382.2 |
| ompressor power input | | 3 | kW | 32.8 | 36.5 | 40.3 | 46.3 | 53.0 | 62.1 | 67.3 | 75.0 |
| COP | | 3 | kW | 5.38 | 5.11 | 5.42 | 5.21 | 5.27 | 5.32 | 5.25 | 5.10 |
| THOR recovery efficiency | | 4 | % | 91 | 88 | 94 | 93 | 87 | 84 | 84 | 85 |
| **Compressor** | | | | | | | | | | | |
| Type of compressors | | 5 | | Scroll | Scroll | Scroll | Scroll | Scroll | Scroll | Scroll | Scroll |
| No. of compressors | | | Nr | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Std Capacity control steps | | | Nr | 6 | 6 | 4 | 6 | 6 | 6 | 6 | 6 |
| Refrigeration circuits | | | Nr | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| **Air Handling Section Fans (Supply)** | | | | | | | | | | | |
| Type of supply fan | | 6 | | RAD | RAD | RAD | RAD | RAD | RAD | RAD | RAD |
| No. of supply fans | | | Nr | 3 | 3 | 4 | 4 | 4 | 6 | 6 | 6 |
| Fan diameter | | | mm | 560 | 560 | 560 | 560 | 560 | 560 | 560 | 560 |
| Supply airflow | | | $m^3/h$ | 26000 | 29000 | 33000 | 37000 | 44000 | 51000 | 56000 | 60000 |
| Supply airflow | | | l/s | 7222 | 8056 | 9167 | 10278 | 12222 | 14167 | 15556 | 16667 |
| Installed unit power | | | kW | 2.90 | 2.90 | 2.90 | 2.90 | 2.90 | 2.90 | 2.90 | 2.90 |
| Max. static pressure supply fan | | 7 | Pa | 760 | 690 | 740 | 650 | 540 | 760 | 690 | 580 |

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 determinated 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. RAD = radial fan electronically controlled
7. Net outside static pressure to win the outlet and intake onboard pressure drops
8. 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)
9. AX = axial fan

| Size | | | | 49.4 | 54.4 | 60.4 | 70.4 | 80.4 | 90.4 | 100.4 | 110.4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Fans (Exhaust) (only CCK, CCKP-THOR configuration)** | | | | | | | | | | | |
| Type of fans | | 6 | | RAD | RAD | RAD | RAD | RAD | RAD | RAD | RAD |
| No. of fans | | 8 | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Installed unit power | | 8 | kW | 2.60 | 2.60 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 | 2.70 |
| **External Section Fans** | | | | | | | | | | | |
| Type of fans | | 9 | | AX | AX | AX | AX | AX | AX | AX | AX |
| No. of fans | | | Nr | 2 | 2 | 4 | 4 | 4 | 6 | 6 | 6 |
| Standard airflow | | | l/s | 12500 | 12500 | 23333 | 23333 | 23333 | 35000 | 35000 | 35000 |
| Single power input | | | kW | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| **Connections** | | | | | | | | | | | |
| Condensate drain | | | mm | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| **Power supply** | | | | | | | | | | | |
| Standard power supply | | | V | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 | 400/3/50 |

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 determinated 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. RAD = radial fan electronically controlled
7. Net outside static pressure to win the outlet and intake onboard pressure drops
8. 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)
9. AX = axial fan

# Sound levels

| Size | Sound Power [dB] | | | | | | | | Sound pressure level | Sound power level |
|---|---|---|---|---|---|---|---|---|---|---|
| | Octave band (Hz) | | | | | | | | | |
| | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 | [dB(A)] | [dB(A)] |
| **49.4** | 99 | 95 | 98 | 88 | 84 | 75 | 70 | 67 | 72 | 92 |
| **54.4** | 101 | 95 | 95 | 90 | 87 | 78 | 74 | 72 | 72 | 92 |
| **60.4** | 105 | 95 | 95 | 91 | 86 | 80 | 75 | 73 | 72 | 93 |
| **70.4** | 106 | 96 | 95 | 92 | 88 | 83 | 77 | 75 | 73 | 94 |
| **80.4** | 106 | 97 | 96 | 93 | 89 | 82 | 77 | 75 | 74 | 95 |
| **90.4** | 107 | 101 | 100 | 94 | 92 | 85 | 79 | 78 | 76 | 97 |
| **100.4** | 108 | 102 | 101 | 95 | 93 | 86 | 80 | 79 | 77 | 98 |
| **110.4** | 109 | 103 | 102 | 96 | 94 | 87 | 81 | 80 | 78 | 99 |

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 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 | | | | 49.4 | 54.4 | 60.4 | 70.4 | 80.4 | 90.4 | 100.4 | 110.4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **F.L.A. Absorbed current** | | | | | | | | | | | |
| F.L.A. EH20 - 24 kW electric elements | | | A | 34.6 | 34.6 | 34.6 | 34.6 | 34.6 | 34.6 | 34.6 | 34.6 |
| F.L.A. EH24 - 36 kW Heating elements | | | A | 52.0 | 52.0 | 52.0 | 52.0 | 52.0 | 52.0 | 52.0 | 52.0 |
| F.L.A. EH28 - 48 kW electric elements | | | A | 69.4 | 69.4 | 69.4 | 69.4 | 69.4 | 69.4 | 69.4 | 69.4 |
| 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 | 8.7 | 8.7 | 11.6 | 11.6 | 11.6 | 17.4 | 17.4 | 17.4 |
| **F.L.I. Power input** | | | | | | | | | | | |
| F.L.I. EH20 - Electric elements of 24 kW | | | kW | 24.0 | 24.0 | 24.0 | 24.0 | 24.0 | 24.0 | 24.0 | 24.0 |
| F.L.I. EH24 - 36 kW heating elements | | | kW | 36.0 | 36.0 | 36.0 | 36.0 | 36.0 | 36.0 | 36.0 | 36.0 |
| F.L.I. EH28 - 48 kW electric elements | | | kW | 48.0 | 48.0 | 48.0 | 48.0 | 48.0 | 48.0 | 48.0 | 48.0 |
| 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 | 4.5 | 4.5 | 6.0 | 6.0 | 6.0 | 9.0 | 9.0 | 9.0 |

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.

# Electrical data

### Configuration: with direct ductable return (CAK) and outdoor air recicrculation (CBK)

| Size | | | 49.4 | 54.4 | 60.4 | 70.4 | 80.4 | 90.4 | 100.4 | 110.4 |
|---|---|---|---|---|---|---|---|---|---|---|
| **F.L.A. - Full load current at max admissible conditions** | | | | | | | | | | |
| F.L.A. - Compressor 1 | | A | 14.6 | 21.5 | 30.0 | 30.0 | 30.0 | 30.0 | 36.5 | 44.6 |
| F.L.A. - Compressor 2 | | A | 30.0 | 30.0 | 30.0 | 36.5 | 44.6 | 59.0 | 59.0 | 59.0 |
| F.L.A. - Compressor 3 | | A | 21.5 | 21.5 | 30.0 | 30.0 | 30.0 | 30.0 | 36.5 | 44.6 |
| F.L.A. - Compressor 4 | | A | 30.0 | 30.0 | 30.0 | 36.5 | 44.6 | 59.0 | 59.0 | 59.0 |
| F.L.A. - Single External Fan | | A | 3.90 | 3.90 | 3.90 | 3.90 | 3.90 | 3.90 | 3.90 | 3.90 |
| F.L.A. - Single supply fan | | A | 4.40 | 4.40 | 4.40 | 4.40 | 4.40 | 4.40 | 4.40 | 4.40 |
| F.L.A. - Total | 1 | A | 118 | 125 | 154 | 167 | 183 | 229 | 242 | 258 |
| **L.R.A. - Locked rotor amperes** | | | | | | | | | | |
| L.R.A. - Compressor 1 | | A | 95.0 | 118 | 174 | 174 | 174 | 174 | 225 | 272 |
| L.R.A. - Compressor 2 | | A | 174 | 174 | 174 | 225 | 272 | 310 | 310 | 310 |
| L.R.A. - Compressor 3 | | A | 118 | 118 | 174 | 174 | 174 | 174 | 225 | 272 |
| L.R.A. - Compressor 4 | | A | 174 | 174 | 174 | 225 | 272 | 310 | 310 | 310 |
| **F.L.I. - Full load power input at max admissible conditions** | | | | | | | | | | |
| F.L.I. - Compressor 1 | | kW | 9.10 | 13.1 | 17.0 | 17.0 | 17.0 | 17.0 | 22.6 | 27.6 |
| F.L.I. - Compressor 2 | | kW | 17.0 | 17.0 | 17.0 | 22.6 | 27.6 | 36.1 | 36.1 | 36.1 |
| F.L.I. - Compressor 3 | | kW | 13.1 | 13.1 | 17.0 | 17.0 | 17.0 | 17.0 | 22.6 | 27.6 |
| F.L.I. - Compressor 4 | | kW | 17.0 | 17.0 | 17.0 | 22.6 | 27.6 | 36.1 | 36.1 | 36.1 |
| F.L.I. - Single External Fan | | kW | 1.90 | 1.90 | 1.90 | 1.90 | 1.90 | 1.90 | 1.90 | 1.90 |
| F.L.I. - Single supply fan | | kW | 2.90 | 2.90 | 2.90 | 2.90 | 2.90 | 2.90 | 2.90 | 2.90 |
| F.L.I. - Total | 2 | kW | 69.1 | 73.1 | 87.7 | 99.0 | 109 | 135.6 | 146.3 | 156.9 |
| **M.I.C. Maximum inrush current** | | | | | | | | | | |
| M.I.C. - Value | | A | 262 | 269 | 298.2 | 355.6 | 410.8 | 479.8 | 492.7 | 509 |

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

| Size | | | 49.4 | 54.4 | 60.4 | 70.4 | 80.4 | 90.4 | 100.4 | 110.4 |
|---|---|---|---|---|---|---|---|---|---|---|
| **F.L.A. - Full load current at max admissible conditions** | | | | | | | | | | |
| F.L.A. - Compressor 1 | | A | 14.6 | 21.5 | 30.0 | 30.0 | 30.0 | 30.0 | 36.5 | 44.6 |
| F.L.A. - Compressor 2 | | A | 30.0 | 30.0 | 30.0 | 36.5 | 44.6 | 59.0 | 59.0 | 59.0 |
| F.L.A. - Compressor 3 | | A | 21.5 | 21.5 | 30.0 | 30.0 | 30.0 | 30.0 | 36.5 | 44.6 |
| F.L.A. - Compressor 4 | | A | 30.0 | 30.0 | 30.0 | 36.5 | 44.6 | 59.0 | 59.0 | 59.0 |
| F.L.A. - Single External Fan | | A | 3.90 | 3.90 | 3.90 | 3.90 | 3.90 | 3.90 | 3.90 | 3.90 |
| F.L.A. - Single supply fan | | A | 4.40 | 4.40 | 4.40 | 4.40 | 4.40 | 4.40 | 4.40 | 4.40 |
| F.L.A. - Single exhaust air fan | | A | 4.00 | 4.00 | 4.30 | 4.30 | 4.30 | 4.30 | 4.30 | 4.30 |
| F.L.A. - Total | 1 | A | 126.0 | 132.9 | 162.8 | 175.7 | 192.0 | 237.4 | 250.3 | 266.5 |
| **L.R.A. - Locked rotor amperes** | | | | | | | | | | |
| L.R.A. - Compressor 1 | | A | 95.0 | 118 | 174 | 174 | 174 | 174 | 225 | 272 |
| L.R.A. - Compressor 2 | | A | 174 | 174 | 174 | 225 | 272 | 310 | 310 | 310 |
| L.R.A. - Compressor 3 | | A | 118 | 118 | 174 | 174 | 174 | 174 | 225 | 272 |
| L.R.A. - Compressor 4 | | A | 174 | 174 | 174 | 225 | 272 | 310 | 310 | 310 |
| **F.L.I. - Full load power input at max admissible conditions** | | | | | | | | | | |
| F.L.I. - Compressor 1 | | kW | 9.10 | 13.1 | 17.0 | 17.0 | 17.0 | 17.0 | 22.6 | 27.6 |
| F.L.I. - Compressor 2 | | kW | 17.0 | 17.0 | 17.0 | 22.6 | 27.6 | 36.1 | 36.1 | 36.1 |
| F.L.I. - Compressor 3 | | kW | 13.1 | 13.1 | 17.0 | 17.0 | 17.0 | 17.0 | 22.6 | 27.6 |
| F.L.I. - Compressor 4 | | kW | 17.0 | 17.0 | 17.0 | 22.6 | 27.6 | 36.1 | 36.1 | 36.1 |
| F.L.I. - Single External Fan | | kW | 1.90 | 1.90 | 1.90 | 1.90 | 1.90 | 1.90 | 1.90 | 1.90 |
| F.L.I. - Single supply fan | | kW | 2.90 | 2.90 | 2.90 | 2.90 | 2.90 | 2.90 | 2.90 | 2.90 |
| F.L.I. – Single exhaust air fan | | kW | 2.60 | 2.60 | 2.80 | 2.80 | 2.80 | 2.80 | 2.80 | 2.80 |
| F.L.I. - Total | 2 | kW | 74.3 | 78.2 | 93.2 | 104.5 | 114.5 | 141.1 | 152.4 | 162.4 |
| **M.I.C. Maximum inrush current** | | | | | | | | | | |
| M.I.C. - Value | | A | 269.2 | 276.9 | 306.8 | 364.2 | 419.4 | 488.4 | 501.3 | 517.6 |

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

Values not including accessories

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)

# Pressure drops of optional components

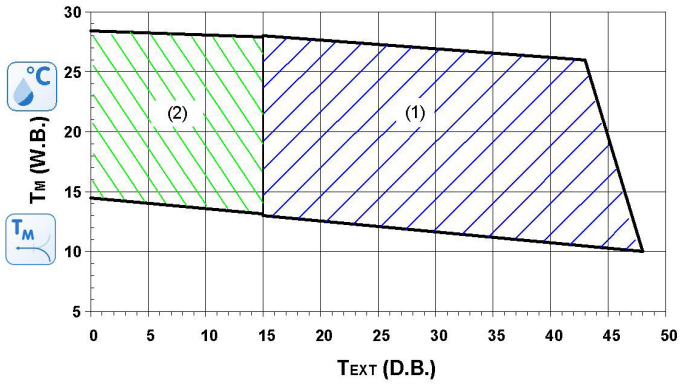
The value of static pressure available on the supply and return duct is obtained by subtracting from the available net maximum pressure (see general table of technical data) the pressure drops of any accessories.

| SIZES | | | 49.4 | 54.4 | 60.4 | 70.4 | 80.4 | 90.4 | 100.4 | 110.4 |
|---|---|---|---|---|---|---|---|---|---|---|
| CHW2 - Two-row hot water coil | | Pa | 35 | 43 | 31 | 39 | 52 | 46 | 54 | 61 |
| CPHG - Hot gas re-heating coil | | Pa | 18 | 20 | 19 | 21 | 25 | 23 | 26 | 28 |
| CHWER - Energy recovery from food refrigeration | | Pa | 65 | 79 | 59 | 73 | 100 | 90 | 102 | 116 |
| HWS - Steam humidifier with disposable water | | Pa | 23 | 25 | 24 | 26 | 30 | 28 | 31 | 33 |
| GC - Heating module | | Pa | 90 | 100 | 80 | 90 | 100 | 80 | 90 | 100 |
| F7 - F7 high efficiency air filter | 1 | Pa | 130 | 138 | 128 | 137 | 152 | 151 | 162 | 172 |
| FES - Electronic filters | | Pa | 61 | 70 | 56 | 65 | 82 | 81 | 92 | 101 |

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 Tm mixing temperature at the internal heat exchanger input.

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

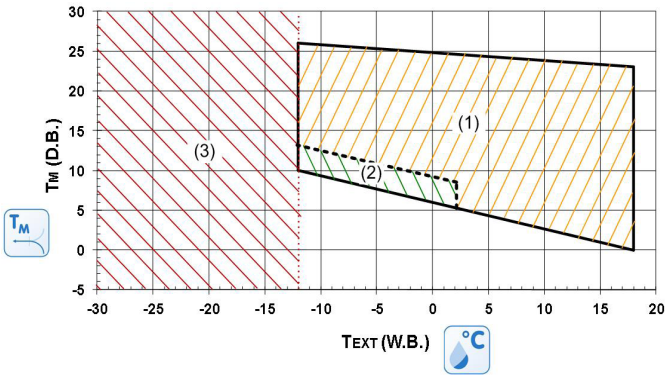
Text = inlet air temperature in the external exchanger
dry bulb measured temperature (D.B.=DRY BULB)

1. Standard operating range
2. Operation range of the unit in FREE-COOLING mode or with automatic distribution of the outdoor ventilation

WET BULB TEMPERATURE - EXAMPLE

25°C W.B. { 40°C D.B. / 30% R.H. | 35°C D.B. / 45% R.H. | 30°C D.B. / 67% R.H.

# 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 Tm mixing temperature at the internal heat exchanger input.

Tm = internal exchanger entering air temperature
dry bulb measured temperature (D.B.=DRY BULB)

Text = inlet air temperature in the external exchanger
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

The option is indicated for cold climate and permit to preheat the inlet air to the water treatment battery and to extend the work limit.

Ideal for lower outside temperature applications where it is required to active the heaters only for short duration in the year. In these cases, simplification of the system is more economical than electrical conduction cost.

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

The electrical heating elements are managed by a thermal control device with two power settings.

### Matching of the electric elements

| Size | 49.4 | 54.4 | 60.4 | 70.4 | 80.4 | 90.4 | 100.4 | 110.4 |
|---|---|---|---|---|---|---|---|---|
| 24 kW | √ | √ | √ | √ | √ | √ | √ | √ |
| 36 kW | √ | √ | √ | √ | √ | √ | √ | √ |
| 48 kW | √ | √ | √ | √ | √ | √ | √ | √ |

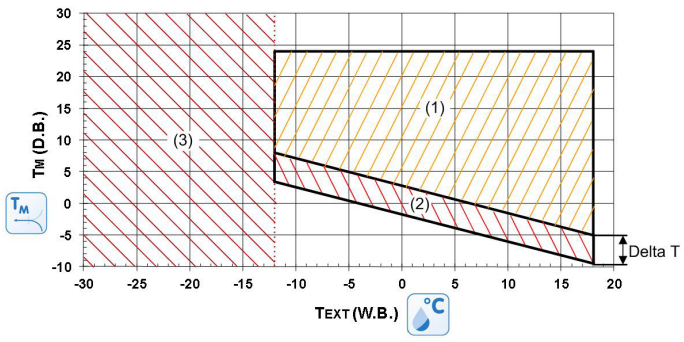
This option involves variation of the main electrical data of the unit.

'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

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 TM(D.M.) for standard unit, at the desired conditions.

| SIZES | Airflow [m3/h] | POWER ELECTRIC HEATERS / DELTA T [°C] | | |
|---|---|---|---|---|
| | | 24kW | 36 kW | 48kW |
| **49.4** | 26000 | 2.7 | 4.1 | 5.5 |
| **54.4** | 29000 | 2.5 | 3.7 | 4.9 |
| **60.4** | 33000 | 2.2 | 3.2 | 4.3 |
| **70.4** | 37000 | 1.9 | 2.9 | 3.8 |
| **80.4** | 44000 | 1.6 | 2.4 | 3.2 |
| **90.4** | 52000 | 1.4 | 2.1 | 2.7 |
| **100.4** | 56000 | 1.3 | 1.9 | 2.5 |
| **110.4** | 60000 | 1.2 | 1.8 | 2.4 |




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 Tm mixing temperature at the internal heat exchanger input.

Tm = internal exchanger entering air temperature
dry bulb measured temperature (D.B.=DRY BULB)

Text = inlet air temperature in the external exchanger
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.

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

## Combustion heating module

Option recommended for very cold weather, heats the air that needs to be introduced into the room.

The energy modules described below are all made with welded sheet steel and tested in line with European standards. They can be easily inspected for normal cleaning and maintenance. The modules consist of an AISI 430 stainless steel combustion chamber and an AISI 304L stainless steel exchanger on the air line: these are both important materials suitable to operate across a wide operating range in terms of condensation and low temperatures.

The combustion chamber is cylindrical with inverted flame technology. It has wide heat exchange surfaces and allows for low thermal loads. Thanks to these specific features the module can be used with very low input air temperatures and can be combined with burners with a very variable heating capacity.

It is possible to use burners that employ various fuels: natural gas, LPG or oil.

All the chambers are designed to ensure top efficiency in terms of thermal exchange with the air and maximum duration.

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

## CC0 - Heating module with combustion chamber only

The option allows the choice of combustion module without the burner, which can be selected and installed directly by the Customer.

The module can be coupled both with single-stage, 2-stage or modulating burners. The normal operating range also includes low input air temperatures and high airflows.

The burners used can be any brand of forced draft burner with fuel: natural gas, LPG or oil. When combining a combustion chamber and a burner, follow the maximum capacity values allowed, as shown in the table.

When choosing the model, it is fundamental to use the combustion model based on the capacity that needs to be supplied. Moreover, when the order is placed, state the manufacturer and burner model chosen in order to set up the coupling flange for the combustion chamber. If this information is not available, a standard flange will be supplied, one with a hole for the burner's nozzle. This does not have areas to secure it, which can be created at the installation stage (see the nozzle diameter in the table).

The unit logic is designed to manage the burner with an ON/OFF or modulating (0-10V) signal, a return signal to report any failures or unavailability. The electrical panel is already set up to power the burner (230Vac/1Ph/50Hz max 200 W).

Attention: the installation, the control, the burner check and the correspondence with current regulations in the installation site are provided by the Customer.

### Combustion chamber combined with the maximum capacity allowed for the burner

| Combustion chamber | Max capacity (kW) | Flue side pressure drop (Pa) | Nozzle diameter (mm) | Min-Max nozzle length (mm) | Available sizes: |
|---|---|---|---|---|---|
| G40 | 46 | 18 | 100 | 100-210 | 49.4-54.4 |
| G60 | 69 | 20 | 100 | 100-210 | 49.4-70.4 |
| G80 | 93 | 25 | 130 | 100-220 | 49.4-80.4 |
| G110 | 127 | 28 | 130 | 100-220 | 49.4-110.4 |
| G130 | 151 | 32 | 130 | 100-220 | 49.4-110.4 |
| G160 | 186 | 40 | 150 | 100-280 | 60.4-110.4 |
| G200 | 232 | 43 | 150 | 100-280 | 80.4-110.4 |
| G250 | 290 | 52 | 170 | 110-340 | 90.4-110.4 |
| G300 | 348 | 60 | 170 | 110-340 | 110.4 |

**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 Costumer may choose the flue chimney. Check the available static pressure provided by the burner net of the pressure drops of the combustion chamber.

Important: report the brand and model of the burner to set up the fixing flange. Otherwise, a standard flange will be supplied. Customers will need to drill a hole in it and thread it based on their requirements.

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

# GD - 2-stage gas heating module

Option consisting of a combustion chamber and a 2-stage gas burner with setting damper and servomotor. The burner with low pollutant emissions (NOx below 80 mg/kWh*), in line with Class 3 of the EN 676 European standard is supplied with a gas increase control for methane or LPG.

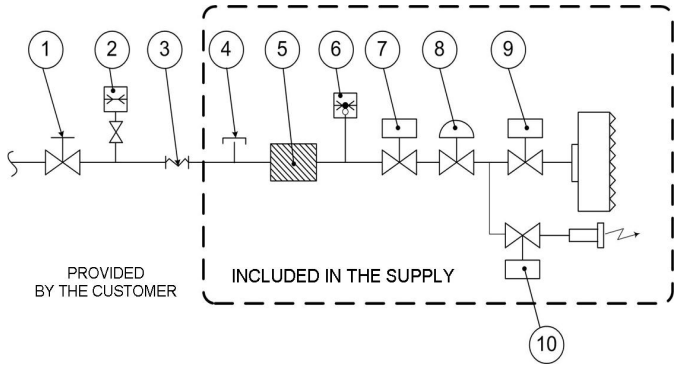
The unit logic controls the whole module as it interacts with the burner's built-in microprocessor control. Sound emissions are extremely contained thanks to the sound-proofed casings. It is easier to conduct maintenance on the equipment thanks to the fact that the components can be accessed even when the burner is installed. The combustion air can be calibrated with a damper that is easy to adjust.

The module with the burner is installed and wired on the unit.

* The value of the emissions is determined in accordance with the requirements of the EN 676 standard, in a normalised combustion chamber, based on the mean value of the points of the operating range and standardised at the reference conditions required by the standard.

Heating modules with a burner include:

- 2-stage hot air generator powered with methane
- kit for transformation of power with liquefied petroleum gas (LPG)
- all the control and safety devices




1. GAS COCK
2. GAS PRESSURE GAUGE
3. ANTI-VIBRATION JOINT
4. SUPPLY PRESSURE MEASURING INTAKE
5. GAS FILTER (SMALL SECTION)
6. GAS PRESSURE SWITCH
7. SAFET GAS SOLENOID VLAVE
8. PRESSURE STABILISER
9. REGULATING VALVE
10. START-UP GAS SOLENOID VALVE

## Gas use features

| Size | | | G40 | | G60 | | G80 | | G110 | | G130 | | G160 | | G200 | | G250 | | G300 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | |
| Description | | | min | max | min | max | min | max | min | max | min | max | min | max | min | max | min | max | min | max |
| Nominal heating capacity | | kW | 16.0 | 46.0 | 35.0 | 69.0 | 65.0 | 93.0 | 65 | 127 | 65 | 151 | 65 | 186 | 120 | 232 | 160 | 290 | 125 | 348 |
| Efficiency | | % | 92.2 | | 91.8 | | 91.3 | | 91.0 | | 90.7 | | 90.3 | | 90.6 | | 90.9 | | 91.3 | |
| Available head for the chimney | | Pa | 70 | | 140 | | 275 | | 250 | | 200 | | 50 | | 55 | | 100 | | 180 | |
| Fume chimney diameter | | mm | 120 | | 160 | | 160 | | 180 | | 180 | | 200 | | 200 | | 250 | | 250 | |

## Matching of the gas heating module

| Size | 49.4 | 54.4 | 60.4 | 70.4 | 80.4 | 90.4 | 100.4 | 110.4 |
|---|---|---|---|---|---|---|---|---|
| G40 (46 kW) | √ | √ | X | X | X | X | X | X |
| G60 (69 kW) | √ | √ | √ | √ | X | X | X | X |
| G80 (93 kW) | √ | √ | √ | √ | √ | X | X | X |
| G110 (127 kW) | √ | √ | √ | √ | √ | √ | √ | √ |
| G130 (151 kW) | √ | √ | √ | √ | √ | √ | √ | √ |
| G160 (186 kW) | X | X | √ | √ | √ | √ | √ | √ |
| G200 (232 kW) | X | X | X | X | √ | √ | √ | √ |
| G250 (290 kW) | X | X | X | X | X | √ | √ | √ |
| G300 (348 kW) | X | X | X | X | X | X | X | √ |

**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 Costumer is responsible for mounting the chimney kit during installation. Based on the specific installation requirements, the length of the chimney can be increased with suitable joints and fittings (not supplied by Clivet).

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

# OD - 2-stage oil heating module

Option consisting of a combustion chamber and a 2-stage oil burner with a manually set damper. The burner produces standard polluting emissions and in any case below Class 1 of the EN 267 European standard (NOx below 250 mg/kWh), it is supplied with a nozzle and hoses for the oil. It has low sound emissions thanks to the sound-proofing casing. All components are easily accessible simplifying maintenance operations. All components are easily accessible simplifying the maintenance operations. The setting of the combustion air occurs through a damper controlled by an hydraulic piston.

The unit logic controls the module and it interacts with the burner's built-in microprocessor control.

The module with the burner is installed and wired on the unit.

Heating modules with a burner include:

- 2-stage hot air generator powered with oil
- kit of steel chimney for exhaust fumes
- all the control and safety devices

## Matching of the oil heating module

| Size | 49.4 | 54.4 | 60.4 | 70.4 | 80.4 | 90.4 | 100.4 | 110.4 |
|---|---|---|---|---|---|---|---|---|
| G60 (69 kW) | √ | √ | √ | √ | X | X | X | X |
| G80 (93 kW) | √ | √ | √ | √ | √ | X | X | X |
| G110 (127 kW) | √ | √ | √ | √ | √ | √ | √ | √ |
| G130 (151 kW) | √ | √ | √ | √ | √ | √ | √ | √ |
| G160 (186 kW) | X | X | √ | √ | √ | √ | √ | √ |
| G200 (232 kW) | X | X | X | X | √ | √ | √ | √ |
| G250 (290 kW) | X | X | X | X | X | √ | √ | √ |
| G300 (348 kW) | X | X | X | X | X | X | X | √ |

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

The component requires oil supply (oil 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 Costumer is responsible for mounting the chimney kit during installation. Based on the specific installation requirements, the length of the chimney can be increased with suitable joints and fittings (not supplied by Clivet).

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

# GC - Condensing gas heating module and modulating control

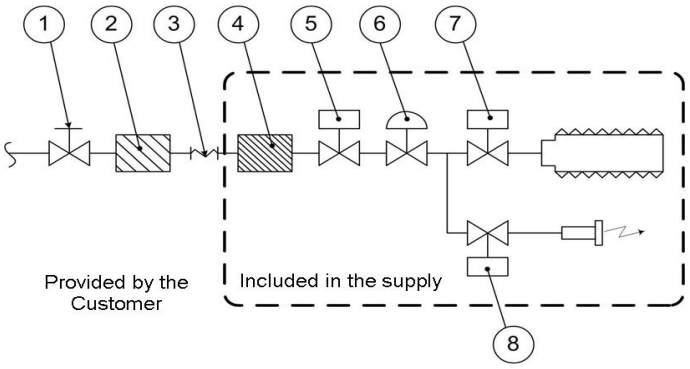
Option consisting of a combustion chamber and condensation burner with modulating control. It is available in various capacities and heats the environment served. The module can be chosen to integrate the heat pump or as an alternative to it. In this case, its heating capacity must be at least equal 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 with low polluting emissions (NOx lower than 80mg/kWh) in accordance with Class 3 of European standard EN 676.

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




1. GAS COCK
2. GAS FILTER (LARGE SECTION)
3. ANTI-VIBRATION JOINT
4. GAS FILTER (SMALL SECTION)
5. SAFET GAS SOLENOID VLAVE
6. PRESSURE STABILISER
7. MAIN GAS BURNER SOLENOID VALVE
8. PILOT BURNER GAS SOLENOID VALVE

## Gas use features

| Size | | | 54kW | | 72kW | | 96kW | | 150kW | | 200kW | | 300kW | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | |
| Description | | | min | max | min | max | min | max | min | max | min | max | min | max |
| Nominal heating capacity | | kW | 15.5 | 58.0 | 22.0 | 78.0 | 31.5 | 93.4 | 46.3 | 145.0 | 55.7 | 197.0 | 92.6 | 290.0 |
| Efficiency | | % | 105 | 93.1 | 105 | 93.8 | 105 | 95.3 | 105.2 | 93.5 | 105.1 | 91.6 | 105.2 | 93.5 |
| Produced condensation | | l/h | 1.45 | | 2.2 | | 2.6 | | 3.87 | | 4.9 | | 7.74 | |
| Gas connection diameter | | | UNI ISO 7/1-3/4" M | | UNI ISO 7/1-1" M | | UNI ISO 7/1-1" M | | UNI ISO 7/1-1" M | | UNI ISO 7/1-1" M | | UNI ISO 7/1-1" M | |
| Fume chimney diameter | | mm | 80 | | 100 | | 100 | | 100 | | 130 | | 100 | |
| G20 methane gas supply pressure | | mbar | 20 (Min. 17 Max. 25) | | | | | | | | | | | |
| Gas consumption | | m3/h | 1.64 | 6.14 | 2.33 | 8.25 | 3.17 | 10.37 | 4.66 | 16.4 | 5.61 | 22.75 | 9.32 | 32.8 |
| LPG G31 supply pressure | | mbar | 37 (Min. 25 Max. 45) | | | | | | | | | | | |
| Gas consumption | | m3/h | 0.98 | 3.68 | 1.4 | 4.95 | 1.9 | 6.21 | 2.79 | 9.83 | 3.36 | 13.63 | 6.72 | 27.26 |

## Matchning of the condensing gas heating module

| Size | 49.4 | 54.4 | 60.4 | 70.4 | 80.4 | 90.4 | 100.4 | 110.4 |
|---|---|---|---|---|---|---|---|---|
| 54 kW | √ | √ | X | X | X | X | X | X |
| 72 kW | √ | √ | √ | √ | √ | X | X | X |
| 96 kW | √ | √ | √ | √ | √ | √ | √ | √ |
| 150 kW | √ | √ | √ | √ | √ | √ | √ | √ |
| 200 kW | X | X | √ | √ | √ | √ | √ | √ |
| 300 kW | X | X | X | X | X | √ | √ | √ |

**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). The maximum length of the chimney is 16 m, in case of fully straight development of the ducts. 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.

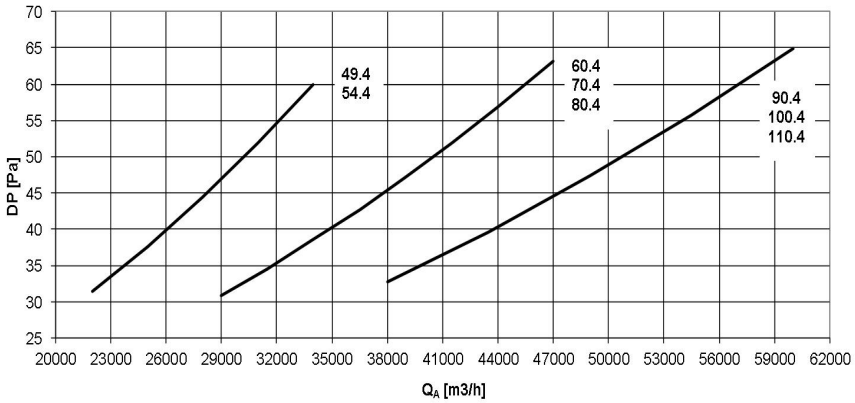
# CHW2 - Two-row hot water coil

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

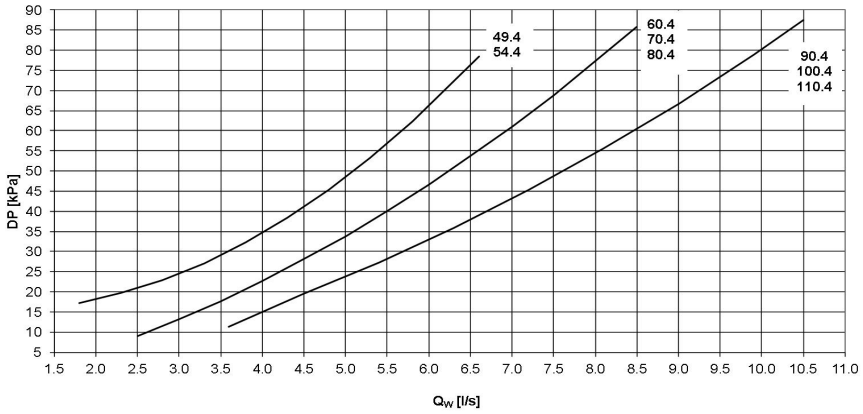
## Hot water coil pressure drops: AIR side




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

**Qw [l/s] =P / (4.186 x 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).

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

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

| SIZE | | | Ti/To (°C) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 80 / 65 | 70 / 55 | 70 / 60 | 60 / 40 | 80 / 65 | 70 / 55 | 70 / 60 | 60 / 40 | 80 / 65 | 70 / 55 | 70 / 60 | 60 / 40 |
| | | | kWt | kWt | kWt | kWt | kWt | kWt | kWt | kWt | kWt | kWt | kWt | kWt |
| 49.4<br>54.4 | Qo (m3 / h) | | 22000 | | | | 28000 | | | | 34000 | | | |
| | Qo (l / s) | | 4444 | | | | 5556 | | | | 6667 | | | |
| | TM (°C) | 5 | 283,9 | 240,1 | 253,2 | 182,0 | 333,2 | 281,4 | 297,3 | 212,2 | 377,5 | 318,5 | 337,0 | 239,7 |
| | | 10 | 261,1 | 217,5 | 230,4 | 159,3 | 306,3 | 254,9 | 270,7 | 185,9 | 347,0 | 288,6 | 306,9 | 209,7 |
| | | 14 | 243,0 | 199,5 | 212,5 | 141,4 | 285,1 | 233,9 | 249,6 | 165,0 | 323,0 | 264,7 | 283,0 | 186,0 |
| | | 16 | 234,0 | 190,5 | 203,5 | 132,5 | 274,5 | 223,4 | 239,1 | 154,5 | 311,0 | 252,9 | 271,1 | 174,2 |
| | | 18 | 225,0 | 181,7 | 194,6 | 123,5 | 264,0 | 213,0 | 228,7 | 144,0 | 299,2 | 241,1 | 259,3 | 162,3 |
| | | 20 | 216,1 | 172,9 | 185,7 | 114,6 | 253,6 | 202,6 | 218,3 | 133,5 | 287,3 | 229,3 | 247,5 | 150,4 |
| 60.4<br>70.4<br>80.4 | Qo (m3 / h) | | 29000 | | | | 38000 | | | | 47000 | | | |
| | Qo (l / s) | | 4889 | | | | 6111 | | | | 7222 | | | |
| | TM (°C) | 5 | 370,3 | 312,8 | 330,4 | 235,7 | 442,5 | 373,4 | 395,4 | 280,1 | 506,7 | 427,2 | 453,1 | 319,3 |
| | | 10 | 340,4 | 283,0 | 300,7 | 206,3 | 406,9 | 338,0 | 359,9 | 245,1 | 465,9 | 386,8 | 412,5 | 279,2 |
| | | 14 | 316,7 | 259,7 | 277,0 | 182,8 | 378,6 | 310,0 | 331,7 | 217,0 | 433,6 | 354,7 | 380,3 | 247,3 |
| | | 16 | 304,9 | 247,8 | 265,3 | 171,1 | 364,5 | 295,9 | 317,5 | 203,1 | 417,5 | 338,7 | 364,0 | 231,2 |
| | | 18 | 293,2 | 236,4 | 253,8 | 159,5 | 350,5 | 282,1 | 303,7 | 189,1 | 401,4 | 322,8 | 348,1 | 215,2 |
| | | 20 | 281,4 | 224,8 | 242,2 | 147,9 | 336,6 | 268,3 | 289,9 | 175,1 | 385,5 | 306,7 | 332,3 | 199,2 |
| 90.4<br>100.4<br>110.4 | Qo (m3 / h) | | 38000 | | | | 49000 | | | | 60000 | | | |
| | Qo (l / s) | | 5333 | | | | 6667 | | | | 7500 | | | |
| | TM (°C) | 5 | 487,8 | 412,6 | 434,6 | 313,4 | 576,9 | 487,4 | 514,4 | 369,1 | 656,5 | 554,3 | 585,8 | 418,3 |
| | | 10 | 448,6 | 373,9 | 395,6 | 275,1 | 530,6 | 441,7 | 468,5 | 323,3 | 603,9 | 502,4 | 533,6 | 366,8 |
| | | 14 | 417,3 | 343,2 | 364,8 | 244,5 | 493,6 | 405,5 | 432,1 | 287,0 | 561,8 | 461,1 | 492,2 | 325,3 |
| | | 16 | 402,0 | 327,9 | 349,6 | 229,0 | 475,4 | 387,4 | 414,0 | 269,1 | 541,2 | 440,6 | 471,6 | 304,8 |
| | | 18 | 386,7 | 312,7 | 334,3 | 213,7 | 457,4 | 369,5 | 396,0 | 251,1 | 520,6 | 420,1 | 451,1 | 284,0 |
| | | 20 | 371,4 | 297,6 | 319,2 | 198,4 | 439,3 | 351,5 | 378,0 | 232,9 | 500,1 | 399,7 | 430,7 | 263,6 |

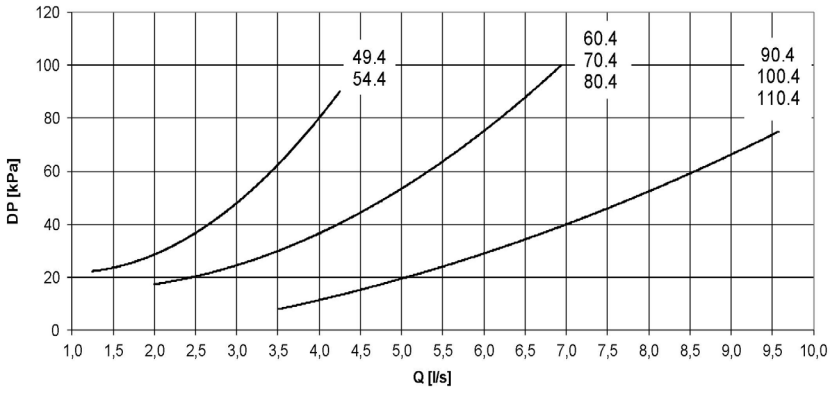
TM = air inlet temperature of water coil (°C)
Ti/To = water temperature inlet/outlet (°C)
Qo = airflow (l/s and m3/h)
kWt = Provided heating capacity (kW)
Thermal yields referred to the max. water coil capacity. The thermo regulator coke the 3-way modulating valve limiting the inlet air temperature at 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 drop

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

## LTEMP1 - Application for low outdoor temperature

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

The option involves self-regulating heater thermostatically controlled able to protect the electrical panel from freezing, ensuring the correct operation.

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.

The motorised actuator is suitable for operating with low outdoor temperatures.

The devices are built-in installed and wired

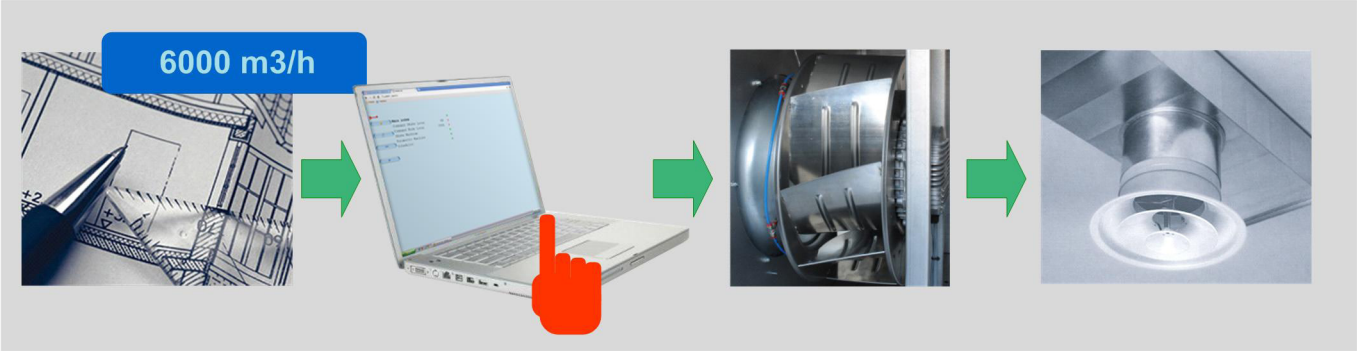

This operation involves variation of the main electrical data of the unit.

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.

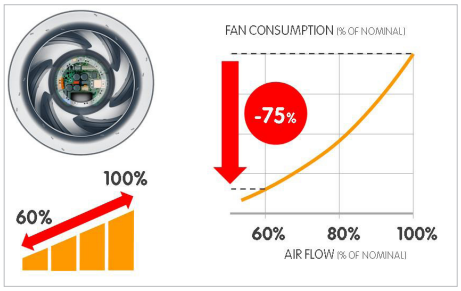
## PCOSM - Constant supply airflow

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 fan 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 intakr air dehumidification is required.

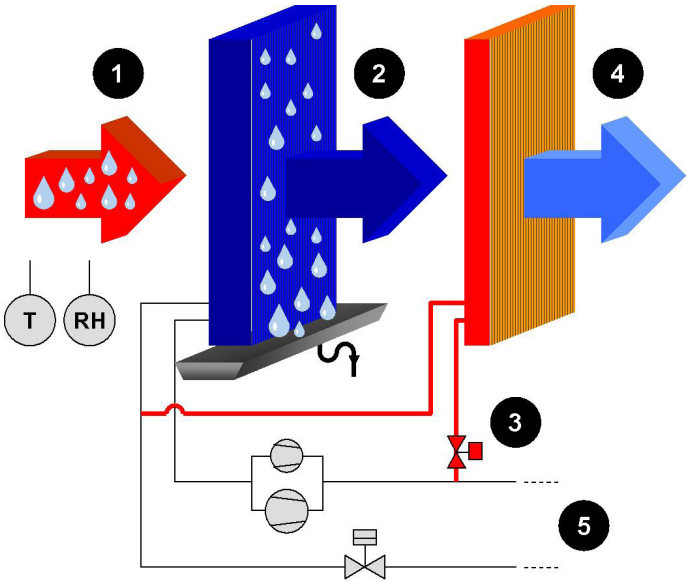
The air flow to enter the room may contain a higher level of humidity than desired. The dehumidification process is used to reduce it. The air flow is first cooled in the handling coil with separation of condensation. It is then freely re-heated to maintain the desired condition of comfort in the served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

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

## 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 |
| 49,4 | Qo (m3 / h) | | 22000 | | | | | 26000 | | | | | 34000 | | | | |
| | Qo (l / s) | | 6111 | | | | | 7222 | | | | | 9444 | | | | |
| | Ta (°C) | 10 | 45,9 | 49,5 | 54,8 | 58,4 | 63,9 | 51,2 | 55,2 | 61,2 | 65,3 | 71,4 | 59,2 | 63,8 | 70,8 | 75,5 | 82,6 |
| | | 12 | 42,3 | 45,8 | 51,2 | 54,8 | 60,2 | 47,2 | 51,2 | 57,1 | 61,1 | 67,2 | 54,5 | 59,1 | 66,1 | 70,8 | 77,8 |
| | | 14 | 38,7 | 42,2 | 47,5 | 51,1 | 56,5 | 43,2 | 47,1 | 53,0 | 57,1 | 63,1 | 49,9 | 54,5 | 61,3 | 66,0 | 73,0 |
| | | 16 | 35,2 | 38,7 | 44,0 | 47,5 | 52,9 | 39,2 | 43,1 | 49,0 | 53,0 | 59,0 | 45,2 | 49,8 | 56,7 | 61,3 | 68,3 |
| | | 18 | 31,6 | 35,1 | 40,4 | 43,9 | 49,3 | 35,2 | 39,2 | 45,0 | 49,0 | 55,0 | 40,7 | 45,2 | 52,0 | 56,6 | 63,6 |
| | | 20 | 28,1 | 31,6 | 36,8 | 40,3 | 45,7 | 31,3 | 35,2 | 41,1 | 45,0 | 50,9 | 36,1 | 40,6 | 47,4 | 52,0 | 58,9 |
| 54,4 | Qo (m3 / h) | | 22000 | | | | | 29000 | | | | | 34000 | | | | |
| | Qo (l / s) | | 6111 | | | | | 8056 | | | | | 9444 | | | | |
| | Ta (°C) | 10 | 46,4 | 50,0 | 55,4 | 59,0 | 64,6 | 54,6 | 58,8 | 65,2 | 69,6 | 76,1 | 59,8 | 64,5 | 71,5 | 76,3 | 83,5 |
| | | 12 | 42,7 | 46,3 | 51,7 | 55,3 | 60,8 | 50,3 | 54,5 | 60,9 | 65,2 | 71,7 | 55,1 | 59,7 | 66,7 | 71,5 | 78,6 |
| | | 14 | 39,1 | 42,7 | 48,0 | 51,6 | 57,1 | 46,0 | 50,2 | 56,5 | 60,8 | 67,3 | 50,4 | 55,0 | 62,0 | 66,7 | 73,8 |
| | | 16 | 35,5 | 39,1 | 44,4 | 48,0 | 53,4 | 41,7 | 45,9 | 52,2 | 56,5 | 62,9 | 45,7 | 50,3 | 57,2 | 61,9 | 69,0 |
| | | 18 | 32,0 | 35,5 | 40,8 | 44,3 | 49,8 | 37,5 | 41,7 | 48,0 | 52,2 | 58,6 | 41,1 | 45,7 | 52,5 | 57,2 | 64,2 |
| | | 20 | 28,4 | 31,9 | 37,2 | 40,7 | 46,1 | 33,4 | 37,5 | 43,8 | 47,9 | 54,3 | 36,5 | 41,1 | 47,9 | 52,5 | 59,5 |
| 60,4 | Qo (m3 / h) | | 29000 | | | | | 33000 | | | | | 47000 | | | | |
| | Qo (l / s) | | 8056 | | | | | 9167 | | | | | 13056 | | | | |
| | Ta (°C) | 10 | 61,7 | 66,4 | 73,5 | 78,4 | 85,7 | 67,3 | 72,5 | 80,3 | 85,6 | 93,6 | 81,8 | 88,1 | 97,7 | 104,2 | 113,9 |
| | | 12 | 56,8 | 61,6 | 68,7 | 73,5 | 80,8 | 62,0 | 67,2 | 75,0 | 80,2 | 88,2 | 75,4 | 81,7 | 91,2 | 97,6 | 107,4 |
| | | 14 | 52,1 | 56,8 | 63,9 | 68,6 | 75,9 | 56,8 | 62,0 | 69,7 | 74,9 | 82,8 | 69,0 | 75,3 | 84,7 | 91,2 | 100,8 |
| | | 16 | 47,4 | 52,0 | 59,1 | 63,8 | 71,0 | 51,7 | 56,8 | 64,5 | 69,7 | 77,5 | 62,7 | 69,0 | 78,3 | 84,7 | 94,3 |
| | | 18 | 42,7 | 47,3 | 54,3 | 59,0 | 66,2 | 46,5 | 51,6 | 59,3 | 64,4 | 72,2 | 56,4 | 62,6 | 72,0 | 78,3 | 87,9 |
| | | 20 | 38,0 | 42,6 | 49,6 | 54,3 | 61,4 | 41,4 | 46,5 | 54,1 | 59,2 | 67,0 | 50,2 | 56,4 | 65,7 | 72,0 | 81,5 |
| 70,4 | Qo (m3 / h) | | 29000 | | | | | 37000 | | | | | 47000 | | | | |
| | Qo (l / s) | | 8056 | | | | | 10278 | | | | | 13056 | | | | |
| | Ta (°C) | 10 | 62,3 | 67,1 | 74,3 | 79,2 | 86,6 | 72,0 | 77,5 | 85,9 | 91,6 | 100,2 | 82,6 | 89,0 | 98,7 | 105,2 | 115,1 |
| | | 12 | 57,4 | 62,2 | 69,4 | 74,2 | 81,6 | 66,4 | 71,9 | 80,2 | 85,9 | 94,4 | 76,1 | 82,5 | 92,1 | 98,6 | 108,4 |
| | | 14 | 52,6 | 57,4 | 64,5 | 69,3 | 76,6 | 60,8 | 66,3 | 74,6 | 80,2 | 88,7 | 69,7 | 76,1 | 85,6 | 92,1 | 101,8 |
| | | 16 | 47,8 | 52,6 | 59,7 | 64,5 | 71,7 | 55,2 | 60,7 | 68,9 | 74,5 | 83,0 | 63,3 | 69,7 | 79,1 | 85,6 | 95,3 |
| | | 18 | 43,1 | 47,8 | 54,9 | 59,6 | 66,8 | 49,7 | 55,2 | 63,4 | 68,9 | 77,3 | 57,0 | 63,3 | 72,7 | 79,1 | 88,8 |
| | | 20 | 38,4 | 43,1 | 50,1 | 54,8 | 62,0 | 44,3 | 49,7 | 57,9 | 63,4 | 71,7 | 50,7 | 57,0 | 66,4 | 72,7 | 82,3 |
| 80,4 | Qo (m3 / h) | | 29000 | | | | | 44000 | | | | | 47000 | | | | |
| | Qo (l / s) | | 8056 | | | | | 12222 | | | | | 13056 | | | | |
| | Ta (°C) | 10 | 62,9 | 67,8 | 75,0 | 80,0 | 87,4 | 79,6 | 85,7 | 95,0 | 101,3 | 110,8 | 83,4 | 89,9 | 99,7 | 106,3 | 116,2 |
| | | 12 | 58,0 | 62,8 | 70,1 | 75,0 | 82,4 | 73,3 | 79,5 | 88,7 | 95,0 | 104,4 | 76,9 | 83,3 | 93,0 | 99,6 | 109,5 |
| | | 14 | 53,1 | 57,9 | 65,1 | 70,0 | 77,4 | 67,1 | 73,3 | 82,4 | 88,7 | 98,1 | 70,4 | 76,8 | 86,5 | 93,0 | 102,9 |
| | | 16 | 48,3 | 53,1 | 60,3 | 65,1 | 72,4 | 61,0 | 67,1 | 76,2 | 82,4 | 91,8 | 63,9 | 70,3 | 79,9 | 86,4 | 96,2 |
| | | 18 | 43,5 | 48,3 | 55,4 | 60,2 | 67,5 | 54,9 | 61,0 | 70,0 | 76,2 | 85,5 | 57,6 | 63,9 | 73,4 | 79,9 | 89,7 |
| | | 20 | 38,8 | 43,5 | 50,6 | 55,4 | 62,6 | 48,9 | 54,9 | 64,0 | 70,0 | 79,3 | 51,2 | 57,5 | 67,1 | 73,4 | 83,1 |
| 90,4 | Qo (m3 / h) | | 38000 | | | | | 51000 | | | | | 60000 | | | | |
| | Qo (l / s) | | 10556 | | | | | 14167 | | | | | 16667 | | | | |
| | Ta (°C) | 10 | 80,5 | 86,6 | 95,9 | 102,2 | 111,7 | 96,1 | 103,6 | 114,7 | 122,3 | 133,7 | 105,0 | 113,1 | 125,3 | 133,6 | 146,1 |
| | | 12 | 74,2 | 80,4 | 89,6 | 95,9 | 105,3 | 88,7 | 96,1 | 107,2 | 114,7 | 126,1 | 96,8 | 104,9 | 117,0 | 125,3 | 137,7 |
| | | 14 | 68,0 | 74,2 | 83,3 | 89,6 | 99,0 | 81,3 | 88,6 | 99,7 | 107,2 | 118,4 | 88,7 | 96,8 | 108,8 | 117,0 | 129,4 |
| | | 16 | 61,9 | 68,0 | 77,1 | 83,3 | 92,7 | 73,9 | 81,2 | 92,2 | 99,6 | 110,9 | 80,6 | 88,7 | 100,7 | 108,8 | 121,1 |
| | | 18 | 55,8 | 61,9 | 71,0 | 77,1 | 86,4 | 66,6 | 73,9 | 84,8 | 92,2 | 103,4 | 72,6 | 80,6 | 92,5 | 100,7 | 112,9 |
| | | 20 | 49,8 | 55,8 | 64,8 | 70,9 | 80,2 | 59,3 | 66,6 | 77,5 | 84,8 | 95,9 | 64,7 | 72,6 | 84,5 | 92,6 | 104,7 |

| 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 |
| 100,4 | Qo (m3 / h) | | 38000 | | | | | 56000 | | | | | 60000 | | | | |
| | Qo (l / s) | | 10556 | | | | | 15556 | | | | | 16667 | | | | |
| | Ta (°C) | 10 | 80,9 | 87,0 | 96,4 | 102,7 | 112,3 | 100,9 | 108,8 | 120,5 | 128,5 | 140,4 | 105,5 | 113,7 | 126,0 | 134,3 | 146,8 |
| | | 12 | 74,6 | 80,8 | 90,1 | 96,4 | 105,8 | 93,1 | 100,8 | 112,5 | 120,5 | 132,4 | 97,3 | 105,4 | 117,6 | 125,9 | 138,4 |
| | | 14 | 68,4 | 74,5 | 83,8 | 90,0 | 99,5 | 85,3 | 93,1 | 104,6 | 112,5 | 124,4 | 89,1 | 97,3 | 109,4 | 117,6 | 130,0 |
| | | 16 | 62,2 | 68,3 | 77,5 | 83,7 | 93,1 | 77,6 | 85,3 | 96,8 | 104,6 | 116,4 | 81,0 | 89,1 | 101,2 | 109,4 | 121,7 |
| | | 18 | 56,1 | 62,2 | 71,3 | 77,5 | 86,8 | 69,9 | 77,5 | 89,0 | 96,8 | 108,5 | 73,0 | 81,0 | 93,0 | 101,2 | 113,5 |
| | | 20 | 50,0 | 56,0 | 65,2 | 71,3 | 80,6 | 62,2 | 69,8 | 81,2 | 89,0 | 100,7 | 65,0 | 73,0 | 84,9 | 93,0 | 105,2 |
| 110,4 | Qo (m3 / h) | | 38000 | | | | | 56000 | | | | | 60000 | | | | |
| | Qo (l / s) | | 10556 | | | | | 15556 | | | | | 16667 | | | | |
| | Ta (°C) | 10 | 81,3 | 87,5 | 96,9 | 103,3 | 112,8 | 101,4 | 109,3 | 121,1 | 129,1 | 141,1 | 106,1 | 114,2 | 126,6 | 135,0 | 147,6 |
| | | 12 | 75,0 | 81,2 | 90,5 | 96,8 | 106,4 | 93,6 | 101,4 | 113,1 | 121,1 | 133,1 | 97,8 | 105,9 | 118,2 | 126,6 | 139,1 |
| | | 14 | 68,7 | 74,9 | 84,2 | 90,5 | 100,0 | 85,7 | 93,5 | 105,2 | 113,1 | 125,0 | 89,6 | 97,7 | 109,9 | 118,2 | 130,7 |
| | | 16 | 62,5 | 68,7 | 77,9 | 84,1 | 93,6 | 78,0 | 85,7 | 97,3 | 105,2 | 117,0 | 81,4 | 89,5 | 101,7 | 109,9 | 122,3 |
| | | 18 | 56,4 | 62,5 | 71,7 | 77,9 | 87,3 | 70,2 | 77,9 | 89,4 | 97,3 | 109,1 | 73,4 | 81,4 | 93,5 | 101,7 | 114,0 |
| | | 20 | 50,3 | 56,3 | 65,5 | 71,6 | 81,0 | 62,6 | 70,2 | 81,6 | 89,4 | 101,2 | 65,3 | 73,3 | 85,3 | 93,5 | 105,8 |

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.

## 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 soften 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 device is equipped with anti-freeze function with automatic activation.

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.

### Matching of immersed electrode and steam humidification module

| Size | 49.4 | 50.4 | 60.4 | 70.4 | 80.4 | 90.4 | 100.4 | 110.4 |
|---|---|---|---|---|---|---|---|---|
| 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 adeguate 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 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.

| Size | | 49.4 | 54.4 | 60.4 | 70.4 | 80.4 | 90.4 | 100.4 | 110.4 |
|---|---|---|---|---|---|---|---|---|---|
| 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 | 150 | 167 | 190 | 213 | 253 | 294 | 323 | 346 |
| 35 | 17,6 | 187 | 209 | 238 | 266 | 317 | 367 | 403 | 432 |
| 40 | 19,8 | 228 | 254 | 289 | 324 | 385 | 447 | 491 | 526 |

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.

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

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

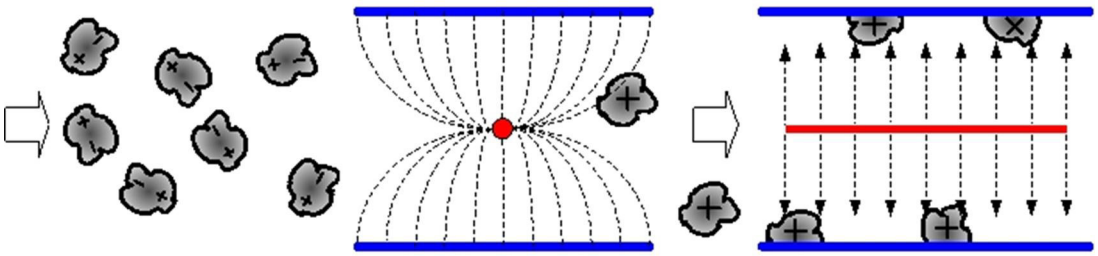
## FES - H10 high efficiency electrostatic air filter

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 µm. Typical pollutants are cigarette smoke (0.5÷0.3 µm), oily vapours (1÷0.2 µm), PM10 (particles < 10 µm), PM2.5 (particles < 2.5µm), PM1 (particles < 1µm), 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 µm.

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.

## 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.

## 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 CO2 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 CO2 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.

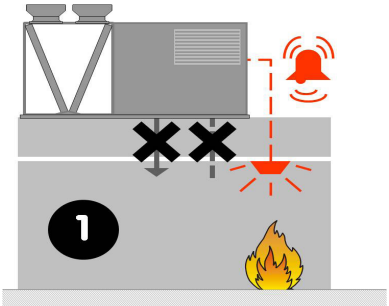
The probe is installed and wired built-in the unit and is located in the return air duct of the unit.

## 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.

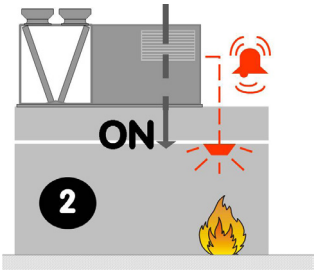
### Control logics in the event of alarm signal

**COMPLETE UNIT SHUTDOWN**



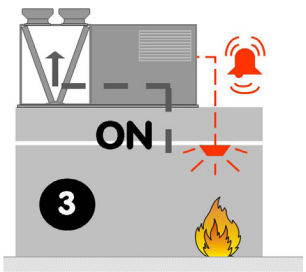

Standard in all configurations

**SPACE IN OVERPRESSURE**




Standard in the configurations CBK, CCK and CCKP

**SPACE IN NEGATIVE PRESSURE**




Only with units in CCK and CCKP configuration, thus provided with extraction fans.

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 on board 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

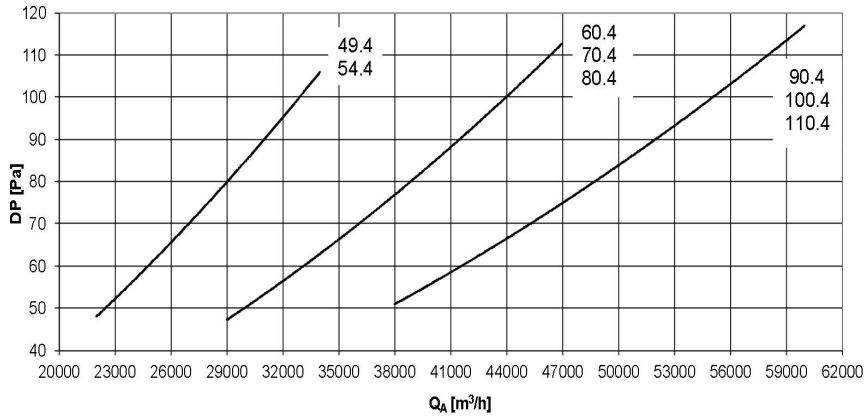
# CHWER - Energy recovery from food refrigeration

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.

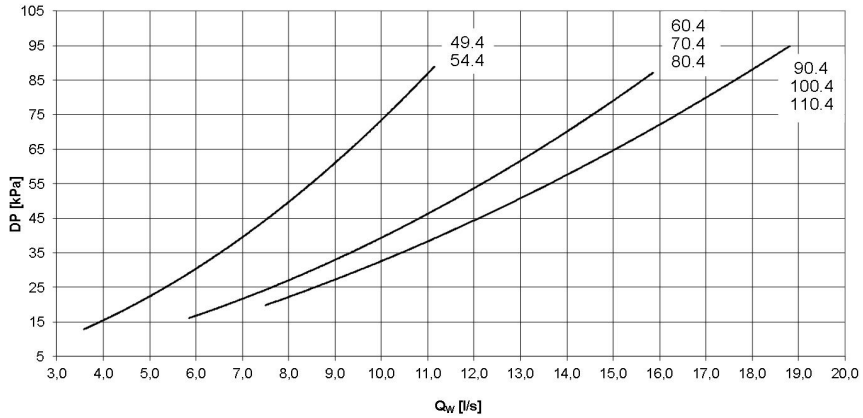
## Hot water coil pressure drops: AIR side




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

**Qw [l/s] =P / (4.186 x 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).

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

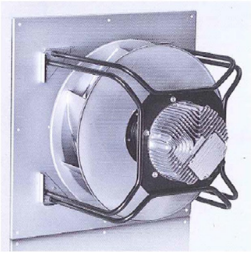
## Performances of water heating coil

| SIZE | | | 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 |
| 49.4<br>54.4 | Qo (m3 / h) | | 22000 | | | 28000 | | | 34000 | | |
| | Qo (l / s) | | 4444 | | | 5555 | | | 6667 | | |
| | TM (°C) | 5 | 233,1 | 201,7 | 170,3 | 280,9 | 242,9 | 204,9 | 324,9 | 280,9 | 236,7 |
| | | 10 | 200,0 | 168,9 | 138,0 | 241,1 | 203,4 | 165,9 | 278,9 | 235,2 | 191,5 |
| | | 14 | 174,1 | 143,3 | 112,5 | 209,9 | 172,5 | 135,1 | 242,8 | 199,4 | 155,9 |
| | | 16 | 161,3 | 130,7 | 99,9 | 194,3 | 157,2 | 119,9 | 224,8 | 181,7 | 138,3 |
| | | 18 | 148,6 | 118,0 | 87,3 | 179,1 | 142,0 | 104,7 | 207,1 | 164,1 | 120,7 |
| | | 20 | 136,1 | 105,5 | 74,8 | 163,8 | 126,9 | 89,6 | 189,5 | 146,5 | 103,2 |
| 60.4<br>70.4<br>80.4 | Qo (m3 / h) | | 29000 | | | 38000 | | | 47000 | | |
| | Qo (l / s) | | 4889 | | | 6111 | | | 7222 | | |
| | TM (°C) | 5 | 311,1 | 269,2 | 227,4 | 384,0 | 332,1 | 280,1 | 450,4 | 389,4 | 328,1 |
| | | 10 | 267,0 | 225,6 | 184,2 | 329,5 | 278,0 | 226,7 | 386,7 | 326,0 | 265,4 |
| | | 14 | 232,4 | 191,4 | 150,2 | 286,8 | 235,8 | 184,7 | 336,5 | 276,4 | 216,1 |
| | | 16 | 215,3 | 174,5 | 133,4 | 265,6 | 214,9 | 163,8 | 311,6 | 251,8 | 191,6 |
| | | 18 | 198,4 | 157,6 | 116,7 | 244,7 | 194,1 | 143,1 | 287,1 | 227,4 | 167,2 |
| | | 20 | 181,6 | 140,9 | 100,0 | 223,9 | 173,4 | 122,5 | 262,6 | 203,0 | 143,0 |
| 90.4<br>100.4<br>110.4 | Qo (m3 / h) | | 38000 | | | 49000 | | | 60000 | | |
| | Qo (l / s) | | 5333 | | | 6667 | | | 7500 | | |
| | TM (°C) | 5 | 403,4 | 349,3 | 295,0 | 491,2 | 424,7 | 358,5 | 571,2 | 494,0 | 416,4 |
| | | 10 | 346,2 | 292,7 | 239,0 | 421,5 | 355,9 | 290,2 | 490,6 | 413,9 | 337,1 |
| | | 14 | 301,4 | 248,3 | 195,0 | 367,0 | 301,8 | 236,6 | 427,1 | 350,9 | 274,7 |
| | | 16 | 279,3 | 226,4 | 173,2 | 340,0 | 275,1 | 210,0 | 395,7 | 319,7 | 243,6 |
| | | 18 | 257,3 | 204,6 | 151,5 | 313,1 | 248,7 | 183,5 | 364,4 | 288,8 | 212,7 |
| | | 20 | 235,6 | 182,9 | 129,9 | 286,6 | 222,1 | 157,1 | 333,4 | 258,0 | 181,9 |

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 coke the 3-way modulating valve limiting the inlet air temperature at desired values.

## VENH - High static pressure electric fans

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



Option that cause the variation of the unit electrical data.

## 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.

## 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.

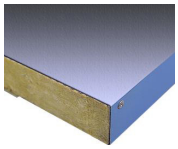

## MHP - High and low pressure gauges

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.


## 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/m3) comply with the French standards, which require "M0" reaction to fire class.



## CCCA - Copper / aluminium coil with acrylic lining

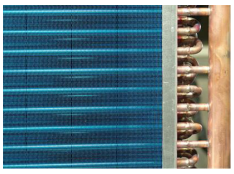
Coils with copper pipes and aluminium fins with acrylic lacquering. Can be used in settings with moderately aggressive low saline concentrations and other chemical agents.

Attention!

- Cooling capacity variation -2.7%

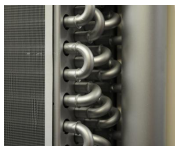
- variation in compressor power input +4.2%

- operating range reduction -2.1°C



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

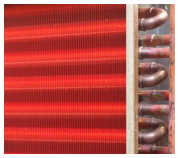
A treatment which offers an optimal thermal exchange and guarantees and protects the finned coil exchangers from corrosion over time. Can be used in settings with very aggressive saline concentrations and other chemical agents in the air thus maintaining the performance of the coils over time.



## 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

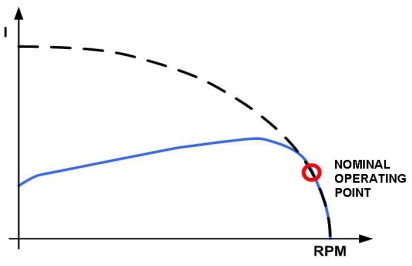
Option available on request

## 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.




(---) POWER INPUT WITHOUT SFSTC OPTION
(__) POWER INPUT WITH SFSTC OPTION

## MOB - RS485 Serial port with Modbus protocol.

It allows the serial connection to supervision systems, using Modbus as the communication protocol. It allows the access to the complete list of operating variables, controls and alarms.

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)

## LON - RS485 Serial port with LonWorks protocol

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)

## BACIP - BACnet-IP serial communication module

Allows to perform the connection to supervision systems by using BACnet-IP as a communication protocol. It allows to access the entire list of operating variables, controls and alarms.

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.

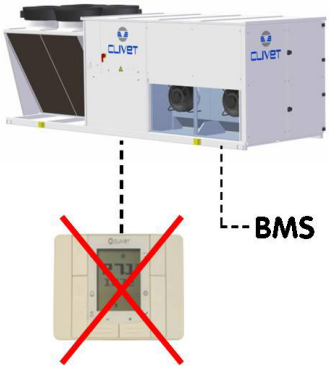
## MF2 - Multifunction phase monitor


The phase monitor controls the electrical parameters of the power line to the unit. It works on the command circuit and orders the unit to be switched off when one of the following cases is present: when the phase connections do not respect the correct sequence, or when there is over voltage or under voltage for a certain amount of time (limit values of over and under voltage and the time interval can be manually and separately set). When the line conditions are re-established, the unit is re-armed automatically.

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

The device prevents sudden changes of voltage; however, the voltage must always be in a range between 380V and 480V.

## NCRC - Remote control with user interface: not required



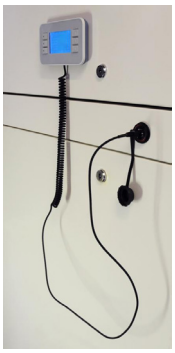

If you choose this option, the unit is supplied without a graphical control user interface, although it retains all the features. Option that can be chosen when there is a supervision system or another remote management device.

The remote control with user interface can be still used in conjunction with a supervision system and in general with a serial connection.

# Accessories separately supplied

## SIX - Service interface

The device allows to fully control the unit for start-up and maintenance operations conducted by authorised technical personnel. It must be connected on the outside of the unit via the RJ45 connector and the 1.5m connection cable that can be further extended. The device can be easily applied on the unit's surface thanks to the magnetic support. It is protected from the elements thanks to the IP68 protection. The control has a backlit screen, comfortable buttons and a graphical interface with a browsing menu and submenu.



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

## AMRX - Rubber anti-vibrating dampers

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 stata 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

## P-MATIC - Clivet supervisory system

Clivet P-MATIC is a Clivet supervision system that allow to schedule and manage all the installed Clivet conditioning units, optimizing their functional operating and the others systems in order to reduce the energy consumption.

The software navigation is easy and intuitive, thanks to the tridimensional graphic interface. It is so possible to change complex activities of system operating into simple and reliable activities made by the Customer.

Clivet P-MATIC let to visualize the maintenance status of the conditioning units, valuate and manage the alarms.

The user operates on the system, through the supervision Workstation or the user interface display on the PLC (Programmable Logic Controller), according to the controller installation component. The data Exchange between the Workstation, the units and the remote control electronic devices is performed by serial/bus network on RS485 standard communication protocol, or by LAN network (Local Area Network) Ethernet TCP/IP.

The integrated remote monitoring software allows accessing to the Clivet on-line technical assistance services.

For further information refer to the technical documentation.

# Performance

On the web site www.clivet.com are available the performances of the CAK, CBK, CCK and CCKP configuration.

## Size 49.4 CCKP configuration

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

| Air flow | Ta (°C) D.B./ W.B. | 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 |
| 22000 m³/h | 22 / 16 | 150,9 | 112,9 | 28,5 | 5,29 | 166,3 | 116 | 32,1 | 5,18 | 166 | 112,3 | 36 | 4,61 | 160,4 | 112,9 | 40 | 4,01 | 152,3 | 115,4 | 44,6 | 3,41 | 152,7 | 117,3 | 49,7 | 3,07 |
| | 24 / 17 | 154,2 | 116,6 | 28,7 | 5,37 | 168,6 | 119,6 | 32,3 | 5,22 | 168,9 | 116,2 | 36,2 | 4,67 | 163,3 | 117,3 | 40,2 | 4,06 | 154,4 | 119,5 | 44,8 | 3,45 | 155,6 | 123,6 | 51,3 | 3,03 |
| | 26 / 18 | 157,2 | 120,3 | 28,9 | 5,44 | 166 | 119,9 | 32,5 | 5,11 | 171,7 | 120,1 | 36,5 | 4,70 | 165,9 | 121,2 | 40,4 | 4,11 | 156,8 | 123,2 | 45 | 3,48 | 162,2 | 129,1 | 52,6 | 3,08 |
| | 27 / 19 | 160,8 | 119,7 | 29,1 | 5,53 | 166,4 | 117,8 | 32,7 | 5,09 | 171,8 | 118,2 | 36,7 | 4,68 | 168,7 | 121,2 | 40,7 | 4,14 | 160 | 122,7 | 45,3 | 3,53 | 167,4 | 130 | 53,3 | 3,14 |
| | 28 / 20 | 164,5 | 119,1 | 29,3 | 5,61 | 166,8 | 115,7 | 32,9 | 5,07 | 172 | 116,2 | 36,9 | 4,66 | 171,5 | 121,1 | 40,9 | 4,19 | 163,5 | 122,2 | 45,6 | 3,59 | 172,9 | 130,8 | 54,1 | 3,20 |
| | 30 / 22 | 172,1 | 117,6 | 29,7 | 5,79 | 174 | 113,9 | 33,4 | 5,21 | 172,4 | 112,1 | 37,4 | 4,61 | 178,1 | 119,7 | 41,4 | 4,30 | 170,6 | 120,9 | 46,1 | 3,70 | - | - | - | - |
| 26000 m³/h | 22 / 16 | 157,1 | 119,5 | 28,9 | 5,44 | 171,9 | 123,6 | 32,5 | 5,29 | 171,3 | 119,5 | 36,4 | 4,71 | 166,1 | 119,7 | 40,3 | 4,12 | 158,3 | 121,6 | 45,1 | 3,51 | 153,2 | 126,8 | 50 | 3,06 |
| | 24 / 17 | 160,6 | 123,6 | 29,1 | 5,52 | 174,5 | 127,4 | 32,7 | 5,34 | 174,2 | 124,1 | 36,6 | 4,76 | 169,3 | 124,5 | 40,6 | 4,17 | 160,1 | 126,7 | 45,3 | 3,53 | 159,6 | 133,7 | 51,4 | 3,11 |
| | 26 / 18 | 163,9 | 127,8 | 29,3 | 5,59 | 172,4 | 127,5 | 32,9 | 5,24 | 176,8 | 128,8 | 36,9 | 4,79 | 172 | 129 | 40,8 | 4,22 | 161,7 | 132 | 45,5 | 3,55 | 168,2 | 139,4 | 52,8 | 3,19 |
| | 27 / 19 | 167,7 | 127,2 | 29,4 | 5,70 | 173 | 125 | 33,1 | 5,23 | 177,1 | 126,5 | 37,1 | 4,77 | 174,9 | 128,7 | 41,1 | 4,26 | 165,1 | 131,5 | 45,8 | 3,60 | 173,8 | 140,3 | 53,5 | 3,25 |
| | 28 / 20 | 171,5 | 126,5 | 29,6 | 5,79 | 173,8 | 122,5 | 33,3 | 5,22 | 177,4 | 124,2 | 37,3 | 4,76 | 177,9 | 128,3 | 41,4 | 4,30 | 168,6 | 130,9 | 46,1 | 3,66 | 179,5 | 141,1 | 54,2 | 3,31 |
| | 30 / 22 | 179,3 | 125 | 30 | 5,98 | 180,9 | 120,6 | 33,8 | 5,35 | 178 | 119,5 | 37,8 | 4,71 | 184,5 | 126,9 | 41,9 | 4,40 | 175,8 | 129,6 | 46,8 | 3,76 | - | - | - | - |
| 34000 m³/h | 22 / 16 | 165,5 | 132,8 | 29,3 | 5,65 | 181,7 | 134,9 | 33,1 | 5,49 | 180,3 | 131,2 | 36,9 | 4,89 | 173,9 | 132 | 40,9 | 4,25 | 164,7 | 136,3 | 45,7 | 3,60 | 162,7 | 142,3 | 50,7 | 3,21 |
| | 24 / 17 | 169,4 | 137,3 | 29,5 | 5,74 | 184,1 | 140,2 | 33,3 | 5,53 | 183,3 | 136,7 | 37,2 | 4,93 | 177 | 138,1 | 41,2 | 4,30 | 167,4 | 141,3 | 46 | 3,64 | 169,7 | 151,7 | 52,4 | 3,24 |
| | 26 / 18 | 173,1 | 142,1 | 29,7 | 5,83 | 181,5 | 141 | 33,5 | 5,42 | 186,3 | 142 | 37,4 | 4,98 | 179,6 | 143,9 | 41,4 | 4,34 | 169,8 | 146,4 | 46,3 | 3,67 | 178,4 | 157,6 | 53,5 | 3,33 |
| | 27 / 19 | 177 | 141,2 | 29,9 | 5,92 | 181,9 | 138,3 | 33,7 | 5,40 | 186,4 | 139,5 | 37,7 | 4,94 | 182,6 | 143,7 | 41,7 | 4,38 | 173 | 146,3 | 46,6 | 3,71 | 183,8 | 158,7 | 54 | 3,40 |
| | 28 / 20 | 181 | 140,3 | 30,1 | 6,01 | 182,4 | 135,6 | 34 | 5,36 | 186,6 | 136,8 | 37,9 | 4,92 | 185,5 | 143,4 | 42 | 4,42 | 176,4 | 146,2 | 46,8 | 3,77 | 189,2 | 159,7 | 54,4 | 3,48 |
| | 30 / 22 | 189 | 138,5 | 30,5 | 6,20 | 189,9 | 133,5 | 34,4 | 5,52 | 187,1 | 131,4 | 38,5 | 4,86 | 192,1 | 142 | 42,5 | 4,52 | 183,4 | 145,8 | 47,4 | 3,87 | - | - | - | - |

### 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 |
| 22000 m³/h | 10 | 128.4 | 23.1 | 5,56 | 134,8 | 23,9 | 5,64 | 150,2 | 26,3 | 5,71 | 156,2 | 27,3 | 5,72 | 172,3 | 30,1 | 5,72 | 188,2 | 33,3 | 5,65 |
| | 15 | 128.7 | 25.0 | 5,15 | 134,7 | 25,8 | 5,22 | 152,2 | 28,2 | 5,40 | 159,3 | 29,4 | 5,42 | 174,4 | 32,5 | 5,37 | 190 | 36 | 5,28 |
| | 18 | 128.6 | 26.0 | 4,95 | 134,9 | 27 | 5,00 | 152,4 | 29,5 | 5,17 | 159,2 | 30,7 | 5,19 | 175,2 | 34 | 5,15 | 189,7 | 37,3 | 5,09 |
| | 20 | 129.2 | 26.9 | 4,80 | 135,6 | 27,8 | 4,88 | 152,6 | 30,4 | 5,02 | 159,2 | 31,6 | 5,04 | 174,4 | 34,8 | 5,01 | 188,8 | 38 | 4,97 |
| | 22 | 129.8 | 27.7 | 4,69 | 136,3 | 28,7 | 4,75 | 152,8 | 31,3 | 4,88 | 158,8 | 32,5 | 4,89 | 173 | 35,5 | 4,87 | 187,9 | 38,8 | 4,84 |
| | 25 | 130.7 | 29.0 | 4,51 | 137,1 | 30 | 4,57 | 152,1 | 32,6 | 4,67 | 157,6 | 33,8 | 4,66 | 170,9 | 36,6 | 4,67 | 186,7 | 40,1 | 4,66 |
| 26000 m³/h | 10 | 128.3 | 22.1 | 5,81 | 134,5 | 22,8 | 5,90 | 150,1 | 25 | 6,00 | 156,4 | 25,9 | 6,04 | 173,1 | 28,3 | 6,12 | 190,1 | 31,1 | 6,11 |
| | 15 | 128.8 | 23.9 | 5,39 | 134,8 | 24,7 | 5,46 | 152 | 26,7 | 5,69 | 159,7 | 27,9 | 5,72 | 175,7 | 30,6 | 5,74 | 192,4 | 33,6 | 5,73 |
| | 18 | 129.0 | 25.0 | 5,16 | 135,1 | 25,9 | 5,22 | 152,8 | 28,1 | 5,44 | 160 | 29,2 | 5,48 | 176,9 | 32 | 5,53 | 192,5 | 34,9 | 5,52 |
| | 20 | 129.4 | 25.8 | 5,02 | 135,7 | 26,7 | 5,08 | 153,3 | 28,9 | 5,30 | 160,2 | 30 | 5,34 | 176,3 | 32,8 | 5,38 | 191,7 | 35,6 | 5,38 |
| | 22 | 129.9 | 26.6 | 4,88 | 136,2 | 27,5 | 4,95 | 153,8 | 29,8 | 5,16 | 160 | 30,9 | 5,18 | 175 | 33,4 | 5,24 | 191 | 36,4 | 5,25 |
| | 25 | 130.5 | 27.7 | 4,71 | 136,9 | 28,7 | 4,77 | 153,3 | 31 | 4,95 | 159 | 32 | 4,97 | 172,9 | 34,4 | 5,03 | 190 | 37,7 | 5,04 |
| 34000 m³/h | 10 | 129.2 | 20.9 | 6,18 | 135,7 | 21,6 | 6,28 | 150,7 | 23,4 | 6,44 | 157,1 | 24,1 | 6,52 | 174,2 | 26,1 | 6,67 | 192,5 | 28,4 | 6,78 |
| | 15 | 129.4 | 22.6 | 5,73 | 135,5 | 23,3 | 5,82 | 152,9 | 25 | 6,12 | 160,6 | 25,9 | 6,20 | 177,3 | 28,3 | 6,27 | 195,4 | 30,8 | 6,34 |
| | 18 | 129.3 | 23.7 | 5,46 | 135,7 | 24,4 | 5,56 | 153,7 | 26,2 | 5,87 | 161 | 27,1 | 5,94 | 178,8 | 29,6 | 6,04 | 195,9 | 32 | 6,12 |
| | 20 | 129.8 | 24.4 | 5,32 | 136,3 | 25,1 | 5,43 | 154,2 | 27 | 5,71 | 161,3 | 28 | 5,76 | 178,4 | 30,3 | 5,89 | 195,5 | 32,7 | 5,98 |
| | 22 | 130.2 | 25.1 | 5,19 | 136,8 | 25,9 | 5,28 | 154,7 | 27,8 | 5,56 | 161,2 | 28,7 | 5,62 | 177,2 | 30,9 | 5,73 | 195 | 33,4 | 5,84 |
| | 25 | 130.9 | 26.2 | 5,00 | 137,4 | 27 | 5,09 | 154,3 | 28,9 | 5,34 | 160,3 | 29,8 | 5,38 | 175,4 | 31,9 | 5,50 | 194,3 | 34,5 | 5,63 |

kWf = Cooling capacity in kW
kWe = Compressor power input in kW
kWs = Sensible cooling capacity (kW)
kWt = Heating capacity (kW)
EER referred only to compressors
COP referred only to compressors
Ta = Indoor air temperature D.B/W.B
DB = dry bulb
WB = wet bulb
The fan motor heating is not considered.

# Size 54.4 CCKP configuration

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

| Air flow | Ta (°C) D.B./ W.B. | 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 |
| 22000 m³/h | 22 / 16 | 157,2 | 118,1 | 30,8 | 5,10 | 173,5 | 120,7 | 34,9 | 4,97 | 171,6 | 117,8 | 39,2 | 4,38 | 167,4 | 116,4 | 43,6 | 3,84 | 160,3 | 116,7 | 48,8 | 3,28 | 160,8 | 124,5 | 56,1 | 2,87 |
| | 24 / 17 | 161,1 | 121,2 | 31,1 | 5,18 | 175,8 | 124,3 | 35,1 | 5,01 | 175,3 | 121 | 39,5 | 4,44 | 170,5 | 120,4 | 43,9 | 3,88 | 161,5 | 121,6 | 49,1 | 3,29 | 162,6 | 131 | 57,3 | 2,84 |
| | 26 / 18 | 164,9 | 124,3 | 31,3 | 5,27 | 172,8 | 124,8 | 35,2 | 4,91 | 178,9 | 124,2 | 39,7 | 4,51 | 173,5 | 124,1 | 44,1 | 3,93 | 162 | 127,1 | 49,4 | 3,28 | 165,7 | 133,2 | 57,1 | 2,90 |
| | 27 / 19 | 168,3 | 124 | 31,5 | 5,34 | 173 | 122,9 | 35,4 | 4,89 | 179 | 122,1 | 39,9 | 4,49 | 176,8 | 123,6 | 44,4 | 3,98 | 165,5 | 126,6 | 49,7 | 3,33 | 169,1 | 132,4 | 57,2 | 2,96 |
| | 28 / 20 | 171,8 | 123,7 | 31,7 | 5,42 | 173,3 | 120,9 | 35,6 | 4,87 | 179,1 | 119,9 | 40,2 | 4,46 | 180,1 | 123,1 | 44,6 | 4,04 | 169,4 | 125,8 | 50 | 3,39 | 172,6 | 131,5 | 57,2 | 3,02 |
| | 30 / 22 | 179,1 | 122,9 | 32,2 | 5,56 | 180,8 | 118,9 | 36,2 | 4,99 | 179,7 | 115,4 | 40,7 | 4,42 | 186,2 | 122,5 | 45,2 | 4,12 | 177,1 | 124,4 | 50,6 | 3,50 | - | - | - | -- |
| 29000 m³/h | 22 / 16 | 168,8 | 128,9 | 31,7 | 5,32 | 184,5 | 132,7 | 35,6 | 5,18 | 183,1 | 128 | 39,9 | 4,59 | 176,3 | 128,9 | 44,3 | 3,98 | 167,6 | 132,1 | 49,5 | 3,39 | 171,8 | 141,7 | 57,1 | 3,01 |
| | 24 / 17 | 172,7 | 133,1 | 31,9 | 5,41 | 187,1 | 137,1 | 35,8 | 5,23 | 185,7 | 133,8 | 40,1 | 4,63 | 180,2 | 133,1 | 44,7 | 4,03 | 170,5 | 135,9 | 49,9 | 3,42 | 175,8 | 145 | 57,6 | 3,05 |
| | 26 / 18 | 176,5 | 137,4 | 32 | 5,52 | 184,6 | 137,4 | 36 | 5,13 | 188,1 | 139,4 | 40,3 | 4,67 | 182,9 | 138,5 | 44,9 | 4,07 | 173,4 | 139,3 | 50,4 | 3,44 | 187,1 | 151,9 | 59,1 | 3,17 |
| | 27 / 19 | 180,1 | 137,1 | 32,2 | 5,59 | 185,1 | 134,8 | 36,2 | 5,11 | 188,6 | 136,6 | 40,6 | 4,65 | 185,9 | 138,6 | 45,1 | 4,12 | 176,7 | 139,2 | 50,7 | 3,49 | 195,3 | 154,1 | 60,1 | 3,25 |
| | 28 / 20 | 183,9 | 136,8 | 32,4 | 5,68 | 185,7 | 132,2 | 36,5 | 5,09 | 189,1 | 133,8 | 40,9 | 4,62 | 188,9 | 138,5 | 45,3 | 4,17 | 180,1 | 139,3 | 51 | 3,53 | 203,7 | 156,3 | 61,1 | 3,33 |
| | 30 / 22 | 191,6 | 135,7 | 32,8 | 5,84 | 193,4 | 130,1 | 37 | 5,23 | 190,3 | 128 | 41,4 | 4,60 | 195,7 | 137,1 | 45,9 | 4,26 | 187,1 | 139,3 | 51,5 | 3,63 | - | - | - | - |
| 34000 m³/h | 22 / 16 | 174,5 | 136,6 | 31,9 | 5,47 | 191,2 | 139,3 | 35,9 | 5,33 | 188,7 | 135,5 | 40,3 | 4,68 | 180,9 | 137,4 | 44,6 | 4,06 | 172,1 | 140,5 | 49,9 | 3,45 | 177,5 | 150,6 | 56,9 | 3,12 |
| | 24 / 17 | 178,2 | 141,7 | 32,1 | 5,55 | 194,3 | 143,5 | 36,2 | 5,37 | 191,3 | 141,4 | 40,6 | 4,71 | 184,7 | 142,5 | 44,9 | 4,11 | 174,8 | 145,9 | 50,2 | 3,48 | 180 | 157 | 57,5 | 3,13 |
| | 26 / 18 | 181,9 | 146,7 | 32,3 | 5,63 | 190,9 | 145,1 | 36,4 | 5,24 | 194,2 | 146,9 | 40,8 | 4,76 | 188,6 | 146,6 | 45,3 | 4,16 | 177,2 | 151 | 50,4 | 3,52 | 192 | 164,6 | 59,2 | 3,24 |
| | 27 / 19 | 185,9 | 146 | 32,5 | 5,72 | 191 | 142,8 | 36,6 | 5,22 | 194,7 | 143,9 | 41,1 | 4,74 | 192 | 145,9 | 45,6 | 4,21 | 180,4 | 151 | 50,8 | 3,55 | 200,4 | 167,1 | 60,2 | 3,33 |
| | 28 / 20 | 190 | 145,1 | 32,8 | 5,79 | 191,2 | 140,6 | 36,8 | 5,20 | 195,2 | 140,9 | 41,3 | 4,73 | 195,5 | 145,1 | 45,9 | 4,26 | 183,8 | 150,9 | 51,3 | 3,58 | 209,1 | 169,6 | 61,2 | 3,42 |
| | 30 / 22 | 198,5 | 142,9 | 33,3 | 5,96 | 199,1 | 138,1 | 37,4 | 5,32 | 196,2 | 135 | 41,9 | 4,68 | 201,9 | 144,3 | 46,5 | 4,34 | 190,6 | 150,5 | 52,2 | 3,65 | - | - | - | - |

## 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 |
| 22000 m³/h | 10 | 136.6 | 25.3 | 5,40 | 143,3 | 26,2 | 5,47 | 159,8 | 29 | 5,51 | 165,9 | 30,1 | 5,51 | 182,5 | 33,2 | 5,50 | 199,6 | 36,9 | 5,41 |
| | 15 | 136.8 | 27.3 | 5,01 | 143,1 | 28,2 | 5,07 | 162,1 | 31,1 | 5,21 | 169,3 | 32,5 | 5,21 | 184,8 | 36 | 5,13 | 201,2 | 40 | 5,03 |
| | 18 | 136.8 | 28.5 | 4,80 | 143,3 | 29,6 | 4,84 | 162,7 | 32,6 | 4,99 | 169,5 | 34 | 4,99 | 185,7 | 37,7 | 4,93 | 200,6 | 41,5 | 4,83 |
| | 20 | 137.3 | 29.5 | 4,65 | 144 | 30,6 | 4,71 | 163,1 | 33,6 | 4,85 | 169,6 | 35 | 4,85 | 184,7 | 38,6 | 4,78 | 199,3 | 42,3 | 4,71 |
| | 22 | 137.9 | 30.5 | 4,52 | 144,6 | 31,6 | 4,58 | 163,5 | 34,6 | 4,73 | 169,2 | 36 | 4,70 | 182,9 | 39,4 | 4,64 | 198 | 43 | 4,60 |
| | 25 | 138.7 | 31.9 | 4,35 | 145,5 | 33,2 | 4,38 | 162,7 | 36,2 | 4,49 | 167,7 | 37,5 | 4,47 | 180,3 | 40,6 | 4,44 | 196,6 | 44,6 | 4,41 |
| 29000 m³/h | 10 | 136.6 | 23.5 | 5,81 | 143,1 | 24,3 | 5,89 | 159,9 | 26,6 | 6,01 | 166,6 | 27,5 | 6,06 | 184,5 | 30 | 6,15 | 202,9 | 33 | 6,15 |
| | 15 | 137.4 | 25.4 | 5,41 | 143,9 | 26,3 | 5,47 | 162,1 | 28,5 | 5,69 | 170,2 | 29,6 | 5,75 | 187,3 | 32,5 | 5,76 | 205,3 | 35,7 | 5,75 |
| | 18 | 137.8 | 26.6 | 5,18 | 144,5 | 27,5 | 5,25 | 162,9 | 29,9 | 5,45 | 170,6 | 31 | 5,50 | 188,6 | 34 | 5,55 | 205,5 | 37,1 | 5,54 |
| | 20 | 138.2 | 27.4 | 5,04 | 144,9 | 28,4 | 5,10 | 163,4 | 30,8 | 5,31 | 170,8 | 32 | 5,34 | 188 | 34,9 | 5,39 | 204,8 | 37,9 | 5,40 |
| | 22 | 138.6 | 28.3 | 4,90 | 145,4 | 29,2 | 4,98 | 164 | 31,7 | 5,17 | 170,7 | 32,9 | 5,19 | 186,6 | 35,7 | 5,23 | 204,1 | 38,7 | 5,27 |
| | 25 | 139.2 | 29.5 | 4,72 | 145,9 | 30,5 | 4,78 | 163,7 | 33,1 | 4,95 | 169,8 | 34,2 | 4,96 | 184,5 | 36,8 | 5,01 | 203,2 | 40,1 | 5,07 |
| 34000 m³/h | 10 | 137.2 | 22.7 | 6,04 | 143,9 | 23,5 | 6,12 | 160,4 | 25,5 | 6,29 | 167 | 26,3 | 6,35 | 185 | 28,6 | 6,47 | 203,9 | 31,2 | 6,54 |
| | 15 | 137.8 | 24.6 | 5,60 | 144,4 | 25,4 | 5,69 | 162,7 | 27,2 | 5,98 | 170,7 | 28,3 | 6,03 | 188,2 | 31 | 6,07 | 207 | 33,8 | 6,12 |
| | 18 | 137.9 | 25.7 | 5,37 | 144,8 | 26,6 | 5,44 | 163,1 | 28,6 | 5,70 | 170,9 | 29,7 | 5,75 | 189,7 | 32,4 | 5,85 | 207,6 | 35,2 | 5,90 |
| | 20 | 138.5 | 26.5 | 5,23 | 145,4 | 27,4 | 5,31 | 163,4 | 29,5 | 5,54 | 171 | 30,6 | 5,59 | 189,3 | 33,2 | 5,70 | 207,2 | 35,9 | 5,77 |
| | 22 | 139.0 | 27.3 | 5,09 | 145,9 | 28,2 | 5,17 | 163,7 | 30,4 | 5,38 | 170,9 | 31,4 | 5,44 | 188,1 | 33,9 | 5,55 | 206,8 | 36,6 | 5,65 |
| | 25 | 139.8 | 28.5 | 4,91 | 146,6 | 29,5 | 4,97 | 163,6 | 31,7 | 5,16 | 170,2 | 32,6 | 5,22 | 186,3 | 34,9 | 5,34 | 206,1 | 38 | 5,42 |

kWf = Cooling capacity in kW
kWe = Compressor power input in kW
kWs = Sensible cooling capacity (kW)
kWt = Heating capacity (kW)
EER referred only to compressors
COP referred only to compressors
Ta = Indoor air temperature D.B/W.B
DB = dry bulb
WB = wet bulb
The fan motor heating is not considered.

# Size 60.4 CCKP configuration

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

| Air flow | Ta (°C) D.B./ W.B. | 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 |
| 29000 m³/h | 22 / 16 | 190,1 | 142,8 | 34,8 | 5,46 | 209,4 | 147 | 39,3 | 5,33 | 210,1 | 141 | 44,2 | 4,75 | 202,6 | 142,7 | 48,8 | 4,15 | 193,3 | 143,3 | 54,5 | 3,55 | 190 | 154 | 61,6 | 3,08 |
| | 24 / 17 | 194,9 | 146,9 | 35,1 | 5,55 | 213,1 | 150,9 | 39,5 | 5,39 | 213 | 146,9 | 44,4 | 4,80 | 205,9 | 148,8 | 49 | 4,20 | 195,3 | 149,6 | 54,7 | 3,57 | 192,6 | 159 | 61,7 | 3,12 |
| | 26 / 18 | 199,3 | 151 | 35,3 | 5,65 | 209,3 | 152 | 39,7 | 5,27 | 215,8 | 152,9 | 44,7 | 4,83 | 209,1 | 154,3 | 49,3 | 4,24 | 197,1 | 156,2 | 54,8 | 3,60 | 197,8 | 162,5 | 62,4 | 3,17 |
| | 27 / 19 | 203,3 | 150,9 | 35,5 | 5,73 | 209,5 | 149,8 | 39,9 | 5,25 | 216,1 | 150,3 | 44,9 | 4,81 | 212,9 | 153,9 | 49,6 | 4,29 | 201 | 155,7 | 55,2 | 3,64 | 202,5 | 162,1 | 62,9 | 3,22 |
| | 28 / 20 | 207,6 | 150,6 | 35,7 | 5,82 | 209,7 | 147,6 | 40,2 | 5,22 | 216,4 | 147,8 | 45,2 | 4,79 | 216,8 | 153,4 | 49,9 | 4,34 | 205,2 | 154,9 | 55,6 | 3,69 | 207,4 | 161,6 | 63,5 | 3,27 |
| | 30 / 22 | 216,7 | 149,3 | 36 | 6,02 | 218,5 | 145,4 | 40,8 | 5,36 | 217 | 142,7 | 45,7 | 4,75 | 225,7 | 151,3 | 50,5 | 4,47 | 214 | 153 | 56,5 | 3,79 | - | - | - | |
| 33000 m³/h | 22 / 16 | 197,1 | 148,8 | 35,1 | 5,62 | 215,2 | 153,9 | 39,8 | 5,41 | 216 | 147,3 | 44,6 | 4,84 | 208,9 | 148,6 | 49,2 | 4,25 | 197,1 | 152,3 | 54,9 | 3,59 | 197,7 | 161,3 | 62,4 | 3,17 |
| | 24 / 17 | 201,6 | 153,8 | 35,3 | 5,71 | 218,9 | 158,4 | 40 | 5,47 | 218,9 | 154,6 | 44,7 | 4,90 | 213,3 | 154 | 49,6 | 4,30 | 199,8 | 157,6 | 55,3 | 3,61 | 198,4 | 168,3 | 62,2 | 3,19 |
| | 26 / 18 | 206,4 | 158,4 | 35,6 | 5,80 | 216,2 | 158,5 | 40,3 | 5,36 | 222,5 | 160,7 | 44,9 | 4,96 | 216,7 | 160,1 | 49,8 | 4,35 | 201,9 | 163 | 55,8 | 3,62 | 203,4 | 172,8 | 62,7 | 3,24 |
| | 27 / 19 | 211 | 157,7 | 35,8 | 5,89 | 217 | 155,5 | 40,5 | 5,36 | 223 | 157,7 | 45,2 | 4,93 | 220,2 | 160,2 | 50,1 | 4,40 | 205,8 | 162,9 | 56,2 | 3,66 | 208 | 172,7 | 63,2 | 3,29 |
| | 28 / 20 | 215,7 | 156,8 | 36 | 5,99 | 217,8 | 152,4 | 40,8 | 5,34 | 223,6 | 154,7 | 45,5 | 4,91 | 223,7 | 160,2 | 50,4 | 4,44 | 210 | 162,7 | 56,5 | 3,72 | 212,7 | 172,6 | 63,7 | 3,34 |
| | 30 / 22 | 225,6 | 154,8 | 36,5 | 6,18 | 226,2 | 151 | 41,4 | 5,46 | 225 | 148,3 | 46 | 4,89 | 231,4 | 159,5 | 51 | 4,54 | 218,5 | 162,3 | 57,1 | 3,83 | - | - | - | - |
| 47000 m³/h | 22 / 16 | 212,5 | 168,9 | 35,9 | 5,92 | 231,1 | 175,5 | 40,5 | 5,71 | 228,7 | 170,9 | 45,4 | 5,04 | 222,3 | 170,1 | 50,1 | 4,44 | 207,3 | 178,5 | 55,9 | 3,71 | 202,8 | 188,6 | 62,6 | 3,24 |
| | 24 / 17 | 216,9 | 176,2 | 36,1 | 6,01 | 234,6 | 181,8 | 40,8 | 5,75 | 233,5 | 177,1 | 45,7 | 5,11 | 226,1 | 178,9 | 50,4 | 4,49 | 209,9 | 185,6 | 56,5 | 3,72 | 199 | 195,3 | 62,3 | 3,19 |
| | 26 / 18 | 221,5 | 182,9 | 36,3 | 6,10 | 231,7 | 182,2 | 41,1 | 5,64 | 238,6 | 182,9 | 46 | 5,19 | 229,9 | 186,1 | 50,7 | 4,53 | 212,3 | 192,3 | 57 | 3,72 | 204,3 | 199,1 | 62,5 | 3,27 |
| | 27 / 19 | 226,3 | 182 | 36,5 | 6,20 | 232,5 | 178,6 | 41,4 | 5,62 | 238,6 | 179,7 | 46,3 | 5,15 | 233,8 | 185,7 | 51 | 4,58 | 216,6 | 192 | 57,3 | 3,78 | 207,6 | 199 | 62,6 | 3,32 |
| | 28 / 20 | 231,1 | 181,1 | 36,7 | 6,30 | 233,3 | 174,9 | 41,7 | 5,59 | 238,7 | 176,5 | 46,6 | 5,12 | 237,7 | 185,2 | 51,3 | 4,63 | 221,2 | 191,8 | 57,6 | 3,84 | 210,8 | 198,7 | 62,8 | 3,36 |
| | 30 / 22 | 241 | 178,7 | 37,3 | 6,46 | 242 | 173,3 | 42,2 | 5,73 | 239 | 170 | 47,2 | 5,06 | 245,9 | 183,9 | 51,9 | 4,74 | 230,6 | 191 | 58,2 | 3,96 | - | - | - | - |

## 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 |
| 29000 m³/h | 10 | 159.5 | 27.8 | 5,74 | 167,8 | 28,8 | 5,83 | 186,3 | 31,6 | 5,90 | 193,7 | 33 | 5,87 | 213,9 | 36,5 | 5,86 | 234 | 40,2 | 5,82 |
| | 15 | 159.7 | 30.0 | 5,32 | 167,3 | 31,1 | 5,38 | 189 | 33,8 | 5,59 | 197,7 | 35,5 | 5,57 | 216,5 | 39,4 | 5,49 | 235,7 | 43,5 | 5,42 |
| | 18 | 159.6 | 31.4 | 5,08 | 167,5 | 32,6 | 5,14 | 189,4 | 35,5 | 5,34 | 197,6 | 37,1 | 5,33 | 217,4 | 41,1 | 5,29 | 235,2 | 45,1 | 5,22 |
| | 20 | 160.2 | 32.4 | 4,94 | 168,3 | 33,7 | 4,99 | 189,6 | 36,6 | 5,18 | 197,6 | 38,1 | 5,19 | 216,4 | 42,1 | 5,14 | 233,9 | 45,9 | 5,10 |
| | 22 | 160.9 | 33.4 | 4,82 | 169 | 34,8 | 4,86 | 189,9 | 37,6 | 5,05 | 197,1 | 39,2 | 5,03 | 214,4 | 42,9 | 5,00 | 232,6 | 46,7 | 4,98 |
| | 25 | 162.0 | 34.9 | 4,64 | 169,9 | 36,4 | 4,67 | 188,9 | 39,4 | 4,79 | 195,5 | 40,7 | 4,80 | 211,6 | 44,1 | 4,80 | 230,8 | 48,3 | 4,78 |
| 33000 m³/h | 10 | 159.4 | 26.9 | 5,93 | 167,4 | 27,8 | 6,02 | 186,5 | 30,5 | 6,11 | 194,5 | 31,6 | 6,16 | 214,9 | 34,7 | 6,19 | 235,1 | 38,1 | 6,17 |
| | 15 | 159.7 | 29.0 | 5,51 | 167,1 | 29,9 | 5,59 | 189,9 | 32,7 | 5,81 | 198,8 | 34,1 | 5,83 | 217,9 | 37,5 | 5,81 | 238,5 | 41,4 | 5,76 |
| | 18 | 159.7 | 30.3 | 5,27 | 167,4 | 31,3 | 5,35 | 189,9 | 34,2 | 5,55 | 198,5 | 35,6 | 5,58 | 219,2 | 39,3 | 5,58 | 238,6 | 43 | 5,55 |
| | 20 | 160.3 | 31.2 | 5,14 | 168,1 | 32,3 | 5,20 | 189,9 | 35,2 | 5,39 | 198,3 | 36,6 | 5,42 | 218,3 | 40,3 | 5,42 | 237,3 | 43,9 | 5,41 |
| | 22 | 160.9 | 32.2 | 5,00 | 168,9 | 33,3 | 5,07 | 189,9 | 36,2 | 5,25 | 197,8 | 37,7 | 5,25 | 216,4 | 41,1 | 5,27 | 236,1 | 44,7 | 5,28 |
| | 25 | 161.9 | 33.6 | 4,82 | 169,8 | 34,9 | 4,87 | 189,7 | 37,9 | 5,01 | 196,7 | 39,2 | 5,02 | 213,6 | 42,4 | 5,04 | 234,4 | 46,2 | 5,07 |
| 47000 m³/h | 10 | 160.8 | 24.9 | 6,46 | 169,1 | 25,7 | 6,58 | 187,4 | 27,9 | 6,72 | 195,3 | 28,7 | 6,80 | 216,4 | 30,9 | 7,00 | 239,2 | 33,5 | 7,14 |
| | 15 | 160.4 | 27.0 | 5,94 | 167,9 | 27,8 | 6,04 | 190,7 | 29,9 | 6,38 | 199,9 | 30,9 | 6,47 | 220,3 | 33,6 | 6,56 | 243,1 | 36,6 | 6,64 |
| | 18 | 159.9 | 28.2 | 5,67 | 167,8 | 29,1 | 5,77 | 191,4 | 31,4 | 6,10 | 200,5 | 32,5 | 6,17 | 222,3 | 35,3 | 6,30 | 243,9 | 38,1 | 6,40 |
| | 20 | 160.5 | 29.0 | 5,53 | 168,5 | 30 | 5,62 | 191,9 | 32,4 | 5,92 | 200,8 | 33,5 | 5,99 | 221,9 | 36,2 | 6,13 | 243,4 | 38,9 | 6,26 |
| | 22 | 161.2 | 29.9 | 5,39 | 169,2 | 30,8 | 5,49 | 192,4 | 33,4 | 5,76 | 200,6 | 34,4 | 5,83 | 220,5 | 36,9 | 5,98 | 242,9 | 39,7 | 6,12 |
| | 25 | 162.3 | 31.2 | 5,20 | 170,1 | 32,2 | 5,28 | 191,6 | 34,8 | 5,51 | 199,3 | 35,7 | 5,58 | 218,3 | 37,9 | 5,76 | 242,1 | 41,1 | 5,89 |

kWf = Cooling capacity in kW
kWe = Compressor power input in kW
kWs = Sensible cooling capacity (kW)
kWt = Heating capacity (kW)
EER referred only to compressors
COP referred only to compressors
Ta = Indoor air temperature D.B/W.B
DB = dry bulb
WB = wet bulb
The fan motor heating is not considered.

# Size 70.4 CCKP configuration

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

| Air flow | Ta (°C) D.B./ W.B. | 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 |
| 29000 m³/h | 22 / 16 | 207,3 | 153,1 | 40,6 | 5,11 | 226,1 | 159,1 | 45,6 | 4,96 | 225,9 | 153,5 | 51 | 4,43 | 218,6 | 153,1 | 56,8 | 3,85 | 206,2 | 155,9 | 64,3 | 3,21 | 217,1 | 169,8 | 74,2 | 2,93 |
| | 24 / 17 | 211,4 | 158,2 | 40,9 | 5,17 | 230 | 163,2 | 45,9 | 5,01 | 230,4 | 158,1 | 51,4 | 4,48 | 222,6 | 158,8 | 57,1 | 3,90 | 209,8 | 161 | 64,6 | 3,25 | 227,3 | 174,8 | 75,7 | 3,00 |
| | 26 / 18 | 216 | 162,6 | 41,2 | 5,24 | 226,6 | 163,1 | 46,2 | 4,90 | 234,9 | 162,4 | 51,8 | 4,53 | 225,7 | 164,2 | 57,5 | 3,93 | 214 | 165,5 | 64,8 | 3,30 | 238,2 | 181,5 | 76,8 | 3,10 |
| | 27 / 19 | 220,4 | 162,6 | 41,5 | 5,31 | 227,1 | 160,3 | 46,6 | 4,87 | 235 | 159,7 | 52,2 | 4,50 | 229,2 | 164,2 | 57,9 | 3,96 | 218,5 | 164,9 | 65,3 | 3,35 | 247 | 182,9 | 77,7 | 3,18 |
| | 28 / 20 | 225 | 162,3 | 41,8 | 5,38 | 227,7 | 157,4 | 46,9 | 4,86 | 235,2 | 156,9 | 52,5 | 4,48 | 232,8 | 164,1 | 58,2 | 4,00 | 223,1 | 164,4 | 65,8 | 3,39 | 256,3 | 184,4 | 78,6 | 3,26 |
| | 30 / 22 | 234,9 | 161,1 | 42,4 | 5,54 | 237,2 | 155,6 | 47,6 | 4,98 | 235,8 | 151 | 53,3 | 4,42 | 241,9 | 162,4 | 59 | 4,10 | 232,6 | 163,3 | 66,9 | 3,48 | - | - | - | - |
| 37000 m³/h | 22 / 16 | 219 | 168,9 | 41,4 | 5,29 | 240,9 | 172 | 46,5 | 5,18 | 237,4 | 168,7 | 51,9 | 4,57 | 229,8 | 167,1 | 57,8 | 3,98 | 219,4 | 170,2 | 65 | 3,38 | 233,4 | 192,1 | 75,7 | 3,08 |
| | 24 / 17 | 224,1 | 174,5 | 41,7 | 5,37 | 243,6 | 178,6 | 46,8 | 5,21 | 242,4 | 173,7 | 52,3 | 4,63 | 233,3 | 175,8 | 58 | 4,02 | 222,4 | 176,7 | 65,7 | 3,39 | 242,2 | 194,9 | 76,2 | 3,18 |
| | 26 / 18 | 229,1 | 180,3 | 42 | 5,45 | 240,3 | 178,8 | 47,2 | 5,09 | 247,5 | 178,2 | 52,8 | 4,69 | 237,8 | 181,1 | 58,5 | 4,06 | 225,2 | 183 | 66,2 | 3,40 | 253 | 204,4 | 77,4 | 3,27 |
| | 27 / 19 | 234,3 | 179,1 | 42,4 | 5,53 | 241,4 | 174,9 | 47,6 | 5,07 | 247,5 | 175,4 | 53,2 | 4,65 | 242,1 | 180,3 | 59 | 4,10 | 229,6 | 182,9 | 66,8 | 3,44 | 261,7 | 207,5 | 78,4 | 3,34 |
| | 28 / 20 | 239,6 | 178 | 42,8 | 5,60 | 242,6 | 171 | 48 | 5,05 | 247,5 | 172,5 | 53,6 | 4,62 | 246,4 | 179,4 | 59,4 | 4,15 | 234,2 | 182,9 | 67,4 | 3,47 | 270,5 | 210,3 | 79,2 | 3,42 |
| | 30 / 22 | 250,4 | 175,6 | 43,5 | 5,76 | 252,6 | 168,7 | 48,7 | 5,19 | 247,6 | 166,6 | 54,4 | 4,55 | 255,1 | 177,6 | 60,4 | 4,22 | 243,9 | 182,4 | 68,6 | 3,56 | - | - | - | - |
| 47000 m³/h | 22 / 16 | 229,8 | 185,4 | 42,2 | 5,45 | 252,5 | 187,9 | 47,3 | 5,34 | 248,8 | 183 | 52,8 | 4,71 | 240,4 | 182,6 | 58,7 | 4,10 | 227,9 | 189,4 | 65,9 | 3,46 | 249,4 | 218 | 76,6 | 3,26 |
| | 24 / 17 | 236,3 | 190,6 | 42,5 | 5,56 | 255,8 | 195,4 | 47,6 | 5,37 | 252,9 | 190,2 | 53,2 | 4,75 | 244,9 | 190,7 | 59,1 | 4,14 | 232,1 | 196,6 | 66,2 | 3,51 | 264,4 | 227,2 | 78,2 | 3,38 |
| | 26 / 18 | 242,8 | 195,5 | 42,9 | 5,66 | 251,5 | 197 | 48 | 5,24 | 257,2 | 197,2 | 53,7 | 4,79 | 248,3 | 198,9 | 59,5 | 4,17 | 236,4 | 203,4 | 66,4 | 3,56 | 263,2 | 247,2 | 78,7 | 3,34 |
| | 27 / 19 | 247,8 | 194,9 | 43,3 | 5,72 | 252,1 | 193,3 | 48,4 | 5,21 | 257,7 | 193,4 | 54,1 | 4,76 | 252,4 | 198,5 | 59,9 | 4,21 | 241,2 | 203,1 | 67,1 | 3,59 | 263,2 | 256,6 | 79,1 | 3,33 |
| | 28 / 20 | 252,9 | 194,2 | 43,6 | 5,80 | 252,6 | 189,5 | 48,8 | 5,18 | 258,3 | 189,5 | 54,5 | 4,74 | 256,5 | 198,1 | 60,4 | 4,25 | 246,3 | 202,9 | 67,8 | 3,63 | 266,3 | 266,3 | 79,4 | 3,35 |
| | 30 / 22 | 263,2 | 192,7 | 44,2 | 5,95 | 264 | 185,5 | 49,5 | 5,33 | 259,8 | 181,2 | 55,3 | 4,70 | 265,2 | 197 | 61,3 | 4,33 | 257,2 | 202,1 | 69,4 | 3,71 | - | - | - | - |

## 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 |
| 29000 m³/h | 10 | 175.9 | 33.5 | 5,25 | 184,9 | 34,7 | 5,33 | 204,5 | 38,3 | 5,34 | 212,6 | 39,8 | 5,34 | 234,3 | 44,1 | 5,31 | 255,3 | 48,9 | 5,22 |
| | 15 | 176.0 | 36.1 | 4,88 | 184,6 | 37,4 | 4,94 | 207,2 | 41,1 | 5,04 | 216,8 | 42,9 | 5,05 | 236,8 | 47,6 | 4,97 | 257,2 | 52,7 | 4,88 |
| | 18 | 175.9 | 37.6 | 4,68 | 184,7 | 39,1 | 4,72 | 207,5 | 43 | 4,83 | 216,4 | 44,8 | 4,83 | 237,7 | 49,8 | 4,77 | 256,7 | 54,7 | 4,69 |
| | 20 | 176.4 | 38.8 | 4,55 | 185,2 | 40,3 | 4,60 | 207,8 | 44,3 | 4,69 | 216,2 | 46,1 | 4,69 | 236,5 | 51 | 4,64 | 255,4 | 55,8 | 4,58 |
| | 22 | 176.9 | 40.0 | 4,42 | 185,7 | 41,5 | 4,47 | 208 | 45,5 | 4,57 | 215,5 | 47,4 | 4,55 | 234,5 | 52,1 | 4,50 | 254,1 | 57 | 4,46 |
| | 25 | 177.7 | 41.8 | 4,25 | 186,3 | 43,4 | 4,29 | 206,8 | 47,6 | 4,34 | 213,9 | 49,4 | 4,33 | 231,4 | 53,7 | 4,31 | 252,1 | 59 | 4,27 |
| 37000 m³/h | 10 | 177.2 | 31.6 | 5,61 | 185,8 | 32,6 | 5,70 | 206,1 | 35,5 | 5,81 | 214,9 | 36,8 | 5,84 | 237,6 | 40,3 | 5,90 | 260,1 | 44,5 | 5,84 |
| | 15 | 177.1 | 33.9 | 5,22 | 185,4 | 34,9 | 5,31 | 208,8 | 38 | 5,49 | 219,1 | 39,5 | 5,55 | 240,7 | 43,4 | 5,55 | 263,7 | 47,8 | 5,52 |
| | 18 | 176.8 | 35.2 | 5,02 | 185,4 | 36,4 | 5,09 | 209,2 | 39,7 | 5,27 | 218,9 | 41,2 | 5,31 | 242 | 45,2 | 5,35 | 264 | 49,5 | 5,33 |
| | 20 | 177.3 | 36.3 | 4,88 | 185,9 | 37,5 | 4,96 | 209,5 | 40,8 | 5,13 | 218,8 | 42,4 | 5,16 | 241,2 | 46,3 | 5,21 | 263,1 | 50,5 | 5,21 |
| | 22 | 177.8 | 37.4 | 4,75 | 186,4 | 38,5 | 4,84 | 209,8 | 42 | 5,00 | 218,3 | 43,5 | 5,02 | 239,4 | 47,2 | 5,07 | 262,2 | 51,4 | 5,10 |
| | 25 | 178.5 | 38.9 | 4,59 | 187 | 40,1 | 4,66 | 208,6 | 43,7 | 4,77 | 216,7 | 45,1 | 4,80 | 236,8 | 48,6 | 4,87 | 260,7 | 53,2 | 4,90 |
| 47000 m³/h | 10 | 177.5 | 29.9 | 5,94 | 186,1 | 30,8 | 6,04 | 207,4 | 33,5 | 6,19 | 216,2 | 34,5 | 6,27 | 239,8 | 37,4 | 6,41 | 264,1 | 40,8 | 6,47 |
| | 15 | 177.4 | 32.2 | 5,51 | 185,4 | 33,2 | 5,58 | 209,2 | 35,5 | 5,89 | 220,6 | 36,9 | 5,98 | 243,7 | 40,3 | 6,05 | 267,5 | 44 | 6,08 |
| | 18 | 177.1 | 33.6 | 5,27 | 185,6 | 34,6 | 5,36 | 210,5 | 37,3 | 5,64 | 221,1 | 38,6 | 5,73 | 245,5 | 42,1 | 5,83 | 268 | 45,7 | 5,86 |
| | 20 | 177.7 | 34.6 | 5,14 | 186,5 | 35,7 | 5,22 | 211,3 | 38,4 | 5,50 | 221,4 | 39,8 | 5,56 | 244,7 | 43,1 | 5,68 | 267,3 | 46,7 | 5,72 |
| | 22 | 178.4 | 35.6 | 5,01 | 187,4 | 36,7 | 5,11 | 212,1 | 39,6 | 5,36 | 221 | 40,8 | 5,42 | 242,7 | 44 | 5,52 | 266,6 | 47,7 | 5,59 |
| | 25 | 179.4 | 37.1 | 4,84 | 188,5 | 38,3 | 4,92 | 211,1 | 41,1 | 5,14 | 219,3 | 42,3 | 5,18 | 239,8 | 45,3 | 5,29 | 265,7 | 49,3 | 5,39 |

kWf = Cooling capacity in kW
kWe = Compressor power input in kW
kWs = Sensible cooling capacity (kW)
kWt = Heating capacity (kW)
EER referred only to compressors
COP referred only to compressors
Ta = Indoor air temperature D.B/W.B
DB = dry bulb
WB = wet bulb
The fan motor heating is not considered

# Size 80.4 CCKP configuration

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

| Air flow | Ta (°C) D.B./ W.B. | 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 |
| 29000 m³/h | 22 / 16 | 221,2 | 164,8 | 44,2 | 5,00 | 245 | 169,9 | 49,7 | 4,93 | 247,6 | 163,1 | 55,9 | 4,43 | 239,3 | 163,1 | 62,3 | 3,84 | 225,4 | 164,1 | 70,9 | 3,18 | 225 | 172,4 | 77,3 | 2,91 |
| | 24 / 17 | 227,7 | 168,3 | 44,5 | 5,12 | 248,5 | 174,6 | 49,9 | 4,98 | 252,1 | 167,8 | 56,3 | 4,48 | 242,6 | 170,5 | 62,3 | 3,89 | 230,5 | 167,4 | 71,3 | 3,23 | 227,2 | 177,4 | 77,7 | 2,92 |
| | 26 / 18 | 233,7 | 172 | 44,7 | 5,23 | 244,6 | 174,4 | 50,2 | 4,87 | 256,8 | 172,1 | 56,7 | 4,53 | 248,3 | 174,2 | 62,7 | 3,96 | 235,7 | 170,1 | 71,7 | 3,29 | 232,2 | 180,8 | 78,4 | 2,96 |
| | 27 / 19 | 238,5 | 172 | 45 | 5,30 | 245 | 171,8 | 50,5 | 4,85 | 257,4 | 169,2 | 57 | 4,52 | 253,6 | 173,1 | 63,1 | 4,02 | 239,8 | 170 | 72,2 | 3,32 | 237,2 | 179,6 | 79 | 3,00 |
| | 28 / 20 | 243,3 | 172 | 45,2 | 5,38 | 245,6 | 169,1 | 50,8 | 4,83 | 258,1 | 166,3 | 57,3 | 4,50 | 258,9 | 172,1 | 63,4 | 4,08 | 243,8 | 170,2 | 72,7 | 3,35 | 242,3 | 178,4 | 79,6 | 3,04 |
| | 30 / 22 | 253,2 | 171,6 | 45,8 | 5,53 | 257,5 | 166,4 | 51,5 | 5,00 | 259,4 | 160,6 | 57,9 | 4,48 | 268,9 | 170,6 | 64,3 | 4,18 | 252,1 | 170,3 | 73,7 | 3,42 | - | - | - | - |
| 44000 m³/h | 22 / 16 | 248,7 | 190,7 | 45,7 | 5,44 | 274,7 | 195,1 | 51,2 | 5,37 | 272,7 | 189,9 | 57,4 | 4,75 | 263,7 | 189 | 64 | 4,12 | 245,4 | 193,6 | 72,9 | 3,37 | 251,5 | 205,1 | 80,1 | 3,14 |
| | 24 / 17 | 254,4 | 197,3 | 46 | 5,53 | 278,4 | 202 | 51,5 | 5,41 | 277,8 | 196,5 | 57,9 | 4,80 | 268,4 | 197,2 | 64,3 | 4,17 | 250 | 200,3 | 73,1 | 3,42 | 253,6 | 213,5 | 80,3 | 3,16 |
| | 26 / 18 | 260,2 | 203,6 | 46,2 | 5,63 | 274,1 | 203 | 51,8 | 5,29 | 282,4 | 203,2 | 58,3 | 4,84 | 274,2 | 203,1 | 64,7 | 4,24 | 254,3 | 207,1 | 73,3 | 3,47 | 261,1 | 219,4 | 81,4 | 3,21 |
| | 27 / 19 | 266,5 | 202,2 | 46,6 | 5,72 | 275,1 | 199,2 | 52,1 | 5,28 | 283,4 | 199,2 | 58,6 | 4,84 | 279,5 | 202,4 | 65,1 | 4,29 | 259,2 | 207,1 | 73,7 | 3,52 | 267,8 | 219,8 | 82,3 | 3,25 |
| | 28 / 20 | 272,9 | 200,5 | 47 | 5,81 | 276,1 | 195,4 | 52,5 | 5,26 | 284,3 | 195,3 | 59 | 4,82 | 284,7 | 201,6 | 65,4 | 4,35 | 264,3 | 207 | 74,1 | 3,57 | 274,6 | 220 | 83,2 | 3,30 |
| | 30 / 22 | 286,5 | 196,4 | 47,9 | 5,98 | 288,2 | 191,9 | 53,4 | 5,40 | 286 | 187,6 | 59,7 | 4,79 | 294,3 | 200,2 | 66,3 | 4,44 | 275 | 206,5 | 75 | 3,67 | - | - | - | - |
| 47000 m³/h | 22 / 16 | 253,4 | 194,7 | 45,8 | 5,53 | 279,3 | 199 | 51,5 | 5,42 | 275,2 | 196,3 | 57,5 | 4,79 | 266 | 195,6 | 64,1 | 4,15 | 251,1 | 196,4 | 72,9 | 3,44 | 255,8 | 212,6 | 80,5 | 3,18 |
| | 24 / 17 | 258,8 | 201,8 | 46,1 | 5,61 | 283,7 | 205,1 | 51,9 | 5,47 | 281,6 | 201,5 | 58 | 4,86 | 271,3 | 203,7 | 64,4 | 4,21 | 253,9 | 205,7 | 73,2 | 3,47 | 258 | 220,1 | 80,7 | 3,20 |
| | 26 / 18 | 264,5 | 208,4 | 46,5 | 5,69 | 279,1 | 206,3 | 52,3 | 5,34 | 287,4 | 207,1 | 58,5 | 4,91 | 276,6 | 210,5 | 64,7 | 4,28 | 255,9 | 215,6 | 73,3 | 3,49 | 263 | 226,6 | 81,4 | 3,23 |
| | 27 / 19 | 270,8 | 207 | 46,8 | 5,79 | 279,8 | 202,5 | 52,6 | 5,32 | 287,8 | 203,8 | 58,8 | 4,89 | 281,6 | 210,1 | 65,1 | 4,33 | 261,4 | 214,8 | 73,8 | 3,54 | 268 | 227,2 | 82 | 3,27 |
| | 28 / 20 | 277,2 | 205,4 | 47,2 | 5,87 | 280,5 | 198,8 | 53 | 5,29 | 288,3 | 200,4 | 59,1 | 4,88 | 286,7 | 209,6 | 65,4 | 4,38 | 267,3 | 213,6 | 74,3 | 3,60 | 273,1 | 227,8 | 82,5 | 3,31 |
| | 30 / 22 | 290,3 | 201,8 | 48,1 | 6,04 | 291,8 | 196,4 | 53,8 | 5,42 | 289,5 | 193,4 | 59,7 | 4,85 | 296,5 | 208 | 66,3 | 4,47 | 279,1 | 211,3 | 75,3 | 3,71 | - | - | - | - |

## 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 |
| 29000 m³/h | 10 | 203.6 | 40.3 | 5,05 | 213,7 | 42 | 5,09 | 236,2 | 46,8 | 5,05 | 245,1 | 49 | 5,00 | 268 | 54,7 | 4,90 | 288,8 | 60,7 | 4,76 |
| | 15 | 203.8 | 43.5 | 4,69 | 213,3 | 45,2 | 4,72 | 239,2 | 50,2 | 4,76 | 249,5 | 52,7 | 4,73 | 269,9 | 58,7 | 4,60 | 289,5 | 65,1 | 4,45 |
| | 18 | 203.6 | 45.4 | 4,48 | 213,6 | 47,3 | 4,52 | 239,6 | 52,5 | 4,56 | 249,1 | 54,9 | 4,54 | 270,5 | 61 | 4,43 | 288,7 | 67,4 | 4,28 |
| | 20 | 204.4 | 46.9 | 4,36 | 214,4 | 48,8 | 4,39 | 239,8 | 54,1 | 4,43 | 248,8 | 56,4 | 4,41 | 268,8 | 62,4 | 4,31 | 287,3 | 68,7 | 4,18 |
| | 22 | 205.3 | 48.4 | 4,24 | 215,2 | 50,2 | 4,29 | 240,1 | 55,7 | 4,31 | 247,8 | 57,9 | 4,28 | 266 | 63,6 | 4,18 | 286 | 70,1 | 4,08 |
| | 25 | 206.6 | 50.6 | 4,08 | 216 | 52,5 | 4,11 | 238,3 | 57,8 | 4,12 | 245,2 | 60 | 4,09 | 261,8 | 65,5 | 4,00 | 285,4 | 70,4 | 4,05 |
| 44000 m³/h | 10 | 204.9 | 35.8 | 5,72 | 215,5 | 37 | 5,82 | 239,2 | 40,6 | 5,89 | 249,1 | 42 | 5,93 | 274,5 | 45,9 | 5,98 | 300,7 | 50,6 | 5,94 |
| | 15 | 205.2 | 38.5 | 5,33 | 215,1 | 39,8 | 5,40 | 243 | 43,5 | 5,59 | 254,3 | 45,2 | 5,63 | 278,3 | 49,5 | 5,62 | 305,2 | 54,4 | 5,61 |
| | 18 | 205.0 | 40.1 | 5,11 | 215,3 | 41,5 | 5,19 | 243,8 | 45,5 | 5,36 | 254,4 | 47,3 | 5,38 | 280,1 | 51,8 | 5,41 | 305,3 | 56,3 | 5,42 |
| | 20 | 205.8 | 41.4 | 4,97 | 216,1 | 42,8 | 5,05 | 244,4 | 46,9 | 5,21 | 254,5 | 48,7 | 5,23 | 279,1 | 53 | 5,27 | 303,7 | 57,4 | 5,29 |
| | 22 | 206.7 | 42.6 | 4,85 | 217 | 44,1 | 4,92 | 244,9 | 48,2 | 5,08 | 253,9 | 50 | 5,08 | 277 | 53,9 | 5,14 | 302,2 | 58,4 | 5,17 |
| | 25 | 207.9 | 44.5 | 4,67 | 218 | 46,1 | 4,73 | 243,5 | 50,1 | 4,86 | 252 | 51,6 | 4,88 | 273,9 | 55,4 | 4,94 | 300,2 | 60,4 | 4,97 |
| 47000 m³/h | 10 | 205.2 | 35.2 | 5,83 | 215,9 | 36,4 | 5,93 | 239,2 | 39,8 | 6,01 | 249,1 | 41,1 | 6,06 | 275,5 | 44,9 | 6,14 | 302,3 | 49,4 | 6,12 |
| | 15 | 205.4 | 37.9 | 5,42 | 215,2 | 39,2 | 5,49 | 242,3 | 42,3 | 5,73 | 254,4 | 44,1 | 5,77 | 279,3 | 48,5 | 5,76 | 305,9 | 53,1 | 5,76 |
| | 18 | 205.1 | 39.6 | 5,18 | 215,4 | 40,9 | 5,27 | 242,9 | 44,4 | 5,47 | 254,4 | 46,3 | 5,49 | 280,9 | 50,7 | 5,54 | 305,9 | 55,1 | 5,55 |
| | 20 | 206.0 | 40.8 | 5,05 | 216,3 | 42,2 | 5,13 | 243,3 | 45,8 | 5,31 | 254,5 | 47,7 | 5,34 | 280 | 51,9 | 5,39 | 304,7 | 56,1 | 5,43 |
| | 22 | 206.9 | 42.0 | 4,93 | 217,2 | 43,5 | 4,99 | 243,8 | 47,2 | 5,17 | 254 | 49 | 5,18 | 277,9 | 52,9 | 5,25 | 303,5 | 57,2 | 5,31 |
| | 25 | 208.2 | 43.9 | 4,74 | 218,4 | 45,4 | 4,81 | 243,1 | 49,1 | 4,95 | 252,5 | 50,7 | 4,98 | 274,8 | 54,5 | 5,04 | 301,8 | 59,1 | 5,11 |

kWf = Cooling capacity in kW
kWe = Compressor power input in kW
kWs = Sensible cooling capacity (kW)
kWt = Heating capacity (kW)
EER referred only to compressors
COP referred only to compressors
Ta = Indoor air temperature D.B/W.B
DB = dry bulb
WB = wet bulb
The fan motor heating is not considered.

# Size 90.4 CCKP configuration

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

| Air flow | Ta (°C) D.B./ W.B. | 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 |
| 38000 m³/h | 22 / 16 | 276,7 | 202,5 | 52,6 | 5,26 | 303,8 | 210,6 | 59,2 | 5,13 | 304,6 | 206,9 | 65,6 | 4,64 | 298,6 | 204,7 | 73,1 | 4,08 | 286,4 | 205,5 | 81,8 | 3,50 | 281,1 | 213,2 | 91,7 | 3,07 |
| | 24 / 17 | 281,6 | 209,9 | 52,9 | 5,32 | 308,7 | 216,3 | 59,5 | 5,19 | 309,4 | 213,6 | 66 | 4,69 | 303,5 | 212,5 | 73,5 | 4,13 | 289,9 | 212,2 | 82,4 | 3,52 | 284,2 | 219,9 | 92,2 | 3,08 |
| | 26 / 18 | 286,4 | 217,2 | 53,2 | 5,38 | 303,7 | 216,5 | 59,9 | 5,07 | 313,7 | 220,9 | 66,5 | 4,72 | 306,7 | 220,7 | 73,8 | 4,16 | 292,9 | 219,2 | 82,9 | 3,53 | 287,2 | 227,1 | 92,9 | 3,09 |
| | 27 / 19 | 293,7 | 215,8 | 53,6 | 5,48 | 304,6 | 212,8 | 60,2 | 5,06 | 315,2 | 216,4 | 66,9 | 4,71 | 311,5 | 220,9 | 74,3 | 4,19 | 297,8 | 219,6 | 83,3 | 3,58 | 291,7 | 227 | 93,6 | 3,12 |
| | 28 / 20 | 301,2 | 214,4 | 54 | 5,58 | 305,6 | 209,1 | 60,7 | 5,03 | 316,7 | 212 | 67,4 | 4,70 | 316,4 | 221 | 74,7 | 4,24 | 303,1 | 220 | 83,7 | 3,62 | 296,3 | 226,8 | 94,3 | 3,14 |
| | 30 / 22 | 316,3 | 211,4 | 54,9 | 5,76 | 319,3 | 206,3 | 61,6 | 5,18 | 320 | 203 | 68,3 | 4,69 | 330 | 217,7 | 75,8 | 4,35 | 314 | 220,4 | 84,5 | 3,72 | - | - | - | - |
| 51000 m³/h | 22 / 16 | 297,7 | 227,6 | 53,8 | 5,53 | 327,6 | 233,9 | 60,5 | 5,41 | 328,1 | 227,4 | 67,3 | 4,88 | 317,8 | 228,5 | 74,8 | 4,25 | 303,4 | 232,6 | 83,1 | 3,65 | 299,1 | 245,6 | 93,7 | 3,19 |
| | 24 / 17 | 305,8 | 233,9 | 54,2 | 5,64 | 333,2 | 240,7 | 60,8 | 5,48 | 334 | 235,8 | 67,7 | 4,93 | 324,5 | 236,4 | 75,4 | 4,30 | 308,8 | 240 | 83,6 | 3,69 | 300,2 | 256,2 | 94,2 | 3,19 |
| | 26 / 18 | 313,7 | 240,3 | 54,5 | 5,76 | 328,9 | 240,7 | 61,4 | 5,36 | 339,8 | 243,7 | 68,2 | 4,98 | 329,8 | 245,2 | 75,8 | 4,35 | 313,6 | 248 | 84 | 3,73 | 308,5 | 261,1 | 95,7 | 3,22 |
| | 27 / 19 | 319,9 | 240,4 | 54,9 | 5,83 | 330,1 | 236 | 61,9 | 5,33 | 340,1 | 240,2 | 68,6 | 4,96 | 335,3 | 245,1 | 76,3 | 4,39 | 319,1 | 248,1 | 84,6 | 3,77 | 316 | 260,1 | 96,9 | 3,26 |
| | 28 / 20 | 326,2 | 240,3 | 55,3 | 5,90 | 331,2 | 231,3 | 62,4 | 5,31 | 340,5 | 236,5 | 69 | 4,93 | 340,9 | 244,8 | 76,8 | 4,44 | 324,8 | 248,2 | 85,1 | 3,82 | 323,7 | 259 | 98,1 | 3,30 |
| | 30 / 22 | 339,2 | 239,5 | 56 | 6,06 | 344,7 | 228,8 | 63,3 | 5,45 | 341,9 | 228,4 | 69,8 | 4,90 | 352,4 | 243,5 | 77,9 | 4,52 | 336,4 | 248,2 | 86,3 | 3,90 | - | - | - | - |
| 60000 m³/h | 22 / 16 | 309,6 | 240,6 | 54,5 | 5,68 | 338,8 | 248,2 | 61,2 | 5,54 | 338,8 | 241,1 | 68 | 4,98 | 327,8 | 243,3 | 75,4 | 4,35 | 309,9 | 251,5 | 84 | 3,69 | 310,6 | 263,5 | 95,2 | 3,26 |
| | 24 / 17 | 316,2 | 250,3 | 54,7 | 5,78 | 344 | 256,4 | 61,7 | 5,58 | 344,8 | 251,4 | 68,4 | 5,04 | 332,5 | 255,6 | 75,8 | 4,39 | 314,4 | 260,6 | 84,5 | 3,72 | 316,3 | 269,5 | 96,4 | 3,28 |
| | 26 / 18 | 322,8 | 259,7 | 55 | 5,87 | 338,6 | 258,4 | 62,1 | 5,45 | 351,5 | 260,2 | 68,8 | 5,11 | 338,7 | 264,5 | 76,4 | 4,43 | 319,1 | 269,4 | 85 | 3,75 | 339,8 | 284,7 | 100 | 3,40 |
| | 27 / 19 | 330,4 | 257,9 | 55,5 | 5,95 | 339,5 | 253,9 | 62,5 | 5,43 | 352,2 | 255,3 | 69,3 | 5,08 | 345 | 263,1 | 76,9 | 4,49 | 325,1 | 269,4 | 85,4 | 3,81 | 356,7 | 290,4 | 102,5 | 3,48 |
| | 28 / 20 | 338,1 | 256,2 | 55,9 | 6,05 | 340,4 | 249,3 | 62,9 | 5,41 | 353,1 | 250,3 | 69,8 | 5,06 | 351,4 | 261,7 | 77,5 | 4,53 | 331,5 | 269,4 | 85,9 | 3,86 | 374,3 | 296,2 | 105,1 | 3,56 |
| | 30 / 22 | 353,4 | 252,7 | 56,8 | 6,22 | 356 | 244,6 | 63,9 | 5,57 | 355 | 240,1 | 70,9 | 5,01 | 363,6 | 260 | 78,6 | 4,63 | 344,4 | 269,1 | 86,9 | 3,96 | - | - | - | - |

## 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 |
| 38000 m³/h | 10 | 238.7 | 44.8 | 5,33 | 250,7 | 46,5 | 5,39 | 278 | 52,1 | 5,34 | 290,1 | 54,5 | 5,32 | 319,7 | 60,8 | 5,26 | 346,9 | 67,6 | 5,13 |
| | 15 | 239.9 | 48.8 | 4,92 | 251,4 | 50,6 | 4,97 | 282,2 | 56,1 | 5,03 | 295,7 | 58,8 | 5,03 | 322,6 | 65,3 | 4,94 | 348,5 | 72,4 | 4,81 |
| | 18 | 240.3 | 51.2 | 4,69 | 252,1 | 53,2 | 4,74 | 282,8 | 58,8 | 4,81 | 295,5 | 61,4 | 4,81 | 323,6 | 67,9 | 4,77 | 347,8 | 74,9 | 4,64 |
| | 20 | 241.3 | 52.9 | 4,56 | 253 | 54,9 | 4,61 | 283,2 | 60,7 | 4,67 | 295,4 | 63,2 | 4,67 | 322 | 69,5 | 4,63 | 346,2 | 76,4 | 4,53 |
| | 22 | 242.2 | 54.6 | 4,44 | 253,9 | 56,6 | 4,49 | 283,6 | 62,5 | 4,54 | 294,7 | 64,9 | 4,54 | 319,1 | 71 | 4,49 | 344,7 | 77,8 | 4,43 |
| | 25 | 243.6 | 57.2 | 4,26 | 255 | 59,3 | 4,30 | 282,7 | 65,3 | 4,33 | 292,5 | 67,5 | 4,33 | 314,8 | 73,1 | 4,31 | 343 | 80,8 | 4,25 |
| 51000 m³/h | 10 | 239.2 | 41.0 | 5,83 | 251,2 | 42,6 | 5,90 | 282,2 | 47,2 | 5,98 | 294,2 | 49 | 6,00 | 324,9 | 53,7 | 6,05 | 356,5 | 59,3 | 6,01 |
| | 15 | 239.9 | 44.6 | 5,38 | 251,3 | 46,2 | 5,44 | 286,5 | 50,7 | 5,65 | 300 | 52,8 | 5,68 | 329,2 | 58,2 | 5,66 | 360,2 | 64,3 | 5,60 |
| | 18 | 240.0 | 46.7 | 5,14 | 251,9 | 48,4 | 5,20 | 286,4 | 53,2 | 5,38 | 299,7 | 55,4 | 5,41 | 331 | 61,1 | 5,42 | 360,4 | 66,6 | 5,41 |
| | 20 | 241.0 | 48.3 | 4,99 | 252,9 | 49,9 | 5,07 | 286,4 | 54,9 | 5,22 | 299,4 | 57,2 | 5,23 | 329,9 | 62,5 | 5,28 | 359,3 | 67,7 | 5,31 |
| | 22 | 242.1 | 49.8 | 4,86 | 253,9 | 51,5 | 4,93 | 286,3 | 56,6 | 5,06 | 298,8 | 58,7 | 5,09 | 327,5 | 63,6 | 5,15 | 358,1 | 68,8 | 5,20 |
| | 25 | 243.6 | 52.1 | 4,68 | 255,2 | 53,8 | 4,74 | 285,8 | 58,9 | 4,85 | 297,2 | 60,7 | 4,90 | 323,8 | 65,2 | 4,97 | 356,1 | 71,1 | 5,01 |
| 60000 m³/h | 10 | 240.4 | 39.4 | 6,10 | 253,1 | 41 | 6,17 | 282,5 | 45 | 6,28 | 294,1 | 46,6 | 6,31 | 326 | 51 | 6,39 | 359,9 | 55,8 | 6,45 |
| | 15 | 241.0 | 42.9 | 5,62 | 252,8 | 44,5 | 5,68 | 286,6 | 48,1 | 5,96 | 300,4 | 50,2 | 5,98 | 330,5 | 55,2 | 5,99 | 364,2 | 60,2 | 6,05 |
| | 18 | 241.1 | 45.0 | 5,36 | 253,1 | 46,7 | 5,42 | 287,5 | 50,4 | 5,70 | 300,6 | 52,6 | 5,71 | 332,4 | 57,7 | 5,76 | 364,8 | 62,5 | 5,84 |
| | 20 | 242.0 | 46.5 | 5,20 | 254,1 | 48,2 | 5,27 | 288,1 | 52 | 5,54 | 300,7 | 54,2 | 5,55 | 331,7 | 59,1 | 5,61 | 363,9 | 63,9 | 5,69 |
| | 22 | 243.0 | 48.1 | 5,05 | 255 | 49,8 | 5,12 | 288,7 | 53,5 | 5,40 | 300,3 | 55,6 | 5,40 | 329,9 | 60,3 | 5,47 | 363 | 65,2 | 5,57 |
| | 25 | 244.4 | 50.3 | 4,86 | 256,1 | 52,1 | 4,92 | 287,4 | 55,7 | 5,16 | 298,8 | 57,7 | 5,18 | 327,3 | 62,1 | 5,27 | 361,5 | 67,5 | 5,36 |

kWf = Cooling capacity in kW
kWe = Compressor power input in kW
kWs = Sensible cooling capacity (kW)
kWt = Heating capacity (kW)
EER referred only to compressors
COP referred only to compressors
Ta = Indoor air temperature D.B/W.B
DB = dry bulb
WB = wet bulb
The fan motor heating is not considered.

# Size 100.4 CCKP configuration

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

| Air flow | Ta (°C) D.B./ W.B. | 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 |
| 38000 m³/h | 22 / 16 | 281,9 | 210,6 | 57,8 | 4,88 | 312,9 | 217 | 64,8 | 4,83 | 312,3 | 212,1 | 72,6 | 4,30 | 306,3 | 209,2 | 81,2 | 3,77 | 295,8 | 209,3 | 90,9 | 3,25 | 292,5 | 218,3 | 102,1 | 2,86 |
| | 24 / 17 | 289,9 | 215,3 | 58,3 | 4,97 | 316,9 | 223,4 | 65,1 | 4,87 | 317,2 | 218,6 | 73,1 | 4,34 | 311,7 | 216,5 | 81,6 | 3,82 | 299,7 | 215,5 | 91,4 | 3,28 | 294,3 | 226,1 | 102,6 | 2,87 |
| | 26 / 18 | 297,5 | 220 | 58,7 | 5,07 | 312,4 | 222,4 | 65,7 | 4,75 | 321,3 | 225,9 | 73,6 | 4,37 | 316,5 | 223,8 | 81,9 | 3,86 | 302,9 | 222,1 | 91,8 | 3,30 | 298,5 | 232,5 | 103,5 | 2,88 |
| | 27 / 19 | 304,7 | 219,1 | 59,2 | 5,15 | 313,9 | 218,2 | 66,2 | 4,74 | 322,7 | 221,7 | 74,1 | 4,35 | 322,2 | 223,7 | 82,3 | 3,91 | 308,5 | 221,9 | 92,4 | 3,34 | 303,9 | 231,8 | 104,4 | 2,91 |
| | 28 / 20 | 311,9 | 218,3 | 59,6 | 5,23 | 315,5 | 214 | 66,7 | 4,73 | 324,2 | 217,5 | 74,6 | 4,35 | 327,9 | 223,5 | 82,7 | 3,96 | 314,4 | 221,7 | 93,1 | 3,38 | 309,5 | 231 | 105,3 | 2,94 |
| | 30 / 22 | 326,4 | 216,8 | 60,5 | 5,40 | 328,8 | 212,2 | 67,6 | 4,86 | 327,1 | 209 | 75,6 | 4,33 | 341 | 221 | 84 | 4,06 | 326,4 | 221,2 | 94,5 | 3,45 | - | - | - | - |
| 56000 m³/h | 22 / 16 | 315,8 | 241,2 | 59,9 | 5,27 | 348,8 | 246 | 67,2 | 5,19 | 349,1 | 236,6 | 75,2 | 4,64 | 334,4 | 242,4 | 83,3 | 4,01 | 316,2 | 250,9 | 92,9 | 3,40 | 317,2 | 264,2 | 105,5 | 3,01 |
| | 24 / 17 | 322,6 | 249,7 | 60,3 | 5,35 | 355,4 | 252,1 | 67,7 | 5,25 | 354,2 | 246,6 | 75,8 | 4,67 | 341,5 | 251,3 | 83,8 | 4,08 | 322,2 | 257,1 | 93,8 | 3,43 | 323,9 | 272,2 | 107,1 | 3,02 |
| | 26 / 18 | 329,3 | 258,2 | 60,7 | 5,43 | 349,7 | 253,6 | 68,2 | 5,13 | 359,4 | 256 | 76,3 | 4,71 | 349,1 | 258 | 84,5 | 4,13 | 328,1 | 263,1 | 94,8 | 3,46 | 335,2 | 280,5 | 109 | 3,08 |
| | 27 / 19 | 337 | 257,2 | 61,1 | 5,52 | 350,1 | 249,8 | 68,6 | 5,10 | 360,3 | 251,5 | 76,8 | 4,69 | 356 | 256,5 | 85,1 | 4,18 | 334,4 | 263 | 95,4 | 3,51 | 343,9 | 282 | 110,4 | 3,12 |
| | 28 / 20 | 344,9 | 255,9 | 61,6 | 5,60 | 350,6 | 245,9 | 69,1 | 5,07 | 361,4 | 246,8 | 77,3 | 4,68 | 363 | 254,8 | 85,8 | 4,23 | 340,8 | 263,2 | 96 | 3,55 | 353 | 283,4 | 111,9 | 3,15 |
| | 30 / 22 | 361,2 | 252,7 | 62,6 | 5,77 | 364,3 | 243,7 | 70,2 | 5,19 | 363,9 | 237 | 78,3 | 4,65 | 375,6 | 253,4 | 87 | 4,32 | 353,9 | 263,4 | 97,1 | 3,64 | - | - | - | - |
| 60000 m³/h | 22 / 16 | 320,2 | 248,6 | 60,1 | 5,33 | 352,5 | 253,7 | 67,5 | 5,22 | 351 | 246,7 | 75,3 | 4,66 | 340,8 | 245,5 | 83,9 | 4,06 | 320,7 | 255,7 | 93,8 | 3,42 | 322,9 | 274,6 | 106,7 | 3,03 |
| | 24 / 17 | 327,5 | 257,1 | 60,5 | 5,41 | 357,7 | 262,6 | 67,8 | 5,28 | 357,5 | 255,4 | 75,9 | 4,71 | 346,3 | 256,4 | 84,5 | 4,10 | 327,6 | 262,8 | 94,4 | 3,47 | 332,4 | 281 | 108,6 | 3,06 |
| | 26 / 18 | 335 | 265 | 61 | 5,49 | 353,6 | 262,5 | 68,4 | 5,17 | 363,6 | 264,2 | 76,5 | 4,75 | 352,1 | 266,7 | 84,9 | 4,15 | 334,5 | 269,4 | 95 | 3,52 | 343,2 | 288,9 | 110,1 | 3,12 |
| | 27 / 19 | 343 | 263,6 | 61,5 | 5,58 | 355,4 | 256,9 | 68,9 | 5,16 | 364,5 | 259,4 | 77 | 4,73 | 358,1 | 266,8 | 85,4 | 4,19 | 340,9 | 269,2 | 95,6 | 3,57 | 351,7 | 290,2 | 111,2 | 3,16 |
| | 28 / 20 | 351,2 | 262 | 62 | 5,66 | 357,1 | 251,5 | 69,4 | 5,15 | 365,4 | 254,7 | 77,6 | 4,71 | 364,2 | 266,8 | 85,8 | 4,24 | 347,2 | 269,3 | 96,3 | 3,61 | 360,3 | 291,5 | 112,4 | 3,21 |
| | 30 / 22 | 367,8 | 258,4 | 63 | 5,84 | 371,5 | 248,7 | 70,5 | 5,27 | 367,1 | 245,4 | 78,6 | 4,67 | 378,7 | 263 | 87,2 | 4,34 | 360,1 | 269,3 | 97,7 | 3,69 | - | - | - | - |

## 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 |
| 38000 m³/h | 10 | 254.8 | 50.3 | 5,07 | 267,7 | 52,2 | 5,13 | 298,4 | 58,6 | 5,09 | 309,7 | 61 | 5,08 | 339,6 | 67,7 | 5,02 | 369,8 | 75,6 | 4,89 |
| | 15 | 255.8 | 54.6 | 4,68 | 268,1 | 56,8 | 4,72 | 302,2 | 62,8 | 4,81 | 315,2 | 65,7 | 4,80 | 343,4 | 73 | 4,70 | 371,2 | 81,2 | 4,57 |
| | 18 | 256.2 | 57.3 | 4,47 | 268,7 | 59,6 | 4,51 | 303,4 | 66 | 4,60 | 315,7 | 68,8 | 4,59 | 345,2 | 76,2 | 4,53 | 370,4 | 84,3 | 4,39 |
| | 20 | 257.1 | 59.3 | 4,34 | 269,5 | 61,7 | 4,37 | 304,2 | 68,2 | 4,46 | 316,1 | 70,9 | 4,46 | 343,4 | 78 | 4,40 | 368,9 | 86,2 | 4,28 |
| | 22 | 258.1 | 61.2 | 4,22 | 270,3 | 63,7 | 4,24 | 304,9 | 70,3 | 4,34 | 315,3 | 72,8 | 4,33 | 340,2 | 79,7 | 4,27 | 367,3 | 88 | 4,17 |
| | 25 | 259.5 | 64.2 | 4,04 | 271,4 | 66,8 | 4,06 | 303,1 | 73,2 | 4,14 | 312,3 | 75,6 | 4,13 | 335,3 | 82,2 | 4,08 | 366,7 | 90,2 | 4,07 |
| 56000 m³/h | 10 | 256.8 | 44.8 | 5,73 | 269,9 | 46,4 | 5,82 | 301,3 | 51 | 5,91 | 313,7 | 52,9 | 5,93 | 347,4 | 57,8 | 6,01 | 381,3 | 63,6 | 6,00 |
| | 15 | 257.4 | 48.7 | 5,29 | 270,1 | 50,4 | 5,36 | 304,3 | 54,6 | 5,57 | 319,7 | 56,9 | 5,62 | 352,1 | 62,7 | 5,62 | 386 | 69,1 | 5,59 |
| | 18 | 257.5 | 51.0 | 5,05 | 270,5 | 52,8 | 5,12 | 305,4 | 57,4 | 5,32 | 319,9 | 59,7 | 5,36 | 354,1 | 65,8 | 5,38 | 386,6 | 71,6 | 5,40 |
| | 20 | 258.4 | 52.7 | 4,90 | 271,3 | 54,5 | 4,98 | 306,2 | 59,3 | 5,16 | 320 | 61,6 | 5,19 | 353 | 67,3 | 5,25 | 385,7 | 72,8 | 5,30 |
| | 22 | 259.2 | 54.4 | 4,76 | 272,1 | 56,3 | 4,83 | 306,9 | 61,1 | 5,02 | 319,6 | 63,3 | 5,05 | 350,5 | 68,4 | 5,12 | 384,7 | 74,1 | 5,19 |
| | 25 | 260.5 | 57.0 | 4,57 | 273 | 58,8 | 4,64 | 306,4 | 63,5 | 4,83 | 318 | 65,4 | 4,86 | 346,8 | 70 | 4,95 | 383,1 | 76,5 | 5,01 |
| 60000 m³/h | 10 | 214.5 | 44.7 | 4,80 | 226,3 | 46,5 | 4,87 | 258,7 | 50,9 | 5,08 | 274,3 | 53 | 5,18 | 313,2 | 58,2 | 5,38 | 355,2 | 64 | 5,55 |
| | 15 | 213.5 | 48.3 | 4,42 | 225,3 | 50,1 | 4,50 | 257,7 | 54,5 | 4,73 | 272,9 | 56,7 | 4,81 | 310,2 | 62,4 | 4,97 | 351 | 68,5 | 5,12 |
| | 18 | 213.0 | 50.4 | 4,23 | 224,7 | 52,3 | 4,30 | 257,2 | 56,8 | 4,53 | 271,9 | 59,2 | 4,59 | 308,3 | 65 | 4,74 | 348,3 | 71,3 | 4,88 |
| | 20 | 212.7 | 51.9 | 4,10 | 224,3 | 53,8 | 4,17 | 256,8 | 58,4 | 4,40 | 271,2 | 60,8 | 4,46 | 307,1 | 66,8 | 4,60 | 346,3 | 73,4 | 4,72 |
| | 22 | 212.5 | 53.4 | 3,98 | 223,8 | 55,3 | 4,05 | 256,5 | 59,9 | 4,28 | 270,6 | 62,5 | 4,33 | 305,9 | 68,7 | 4,45 | 344,4 | 75,4 | 4,57 |
| | 25 | 212.2 | 55.7 | 3,81 | 223,2 | 57,6 | 3,88 | 255,9 | 62,7 | 4,08 | 269,7 | 65,2 | 4,14 | 304,2 | 71,5 | 4,25 | 341,3 | 78,5 | 4,35 |

kWf = Cooling capacity in kW
kWe = Compressor power input in kW
kWs = Sensible cooling capacity (kW)
kWt = Heating capacity (kW)
EER referred only to compressors
COP referred only to compressors
Ta = Indoor air temperature D.B/W.B
DB = dry bulb
WB = wet bulb
The fan motor heating is not considered.

# Size 110.4 CCKP configuration

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

| Air flow | Ta (°C) D.B./ W.B. | 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 |
| 38000 m³/h | 22 / 16 | 296,1 | 218,4 | 64,3 | 4,60 | 327,5 | 225,6 | 72,1 | 4,54 | 326,1 | 221,2 | 80,8 | 4,04 | 321,7 | 216,2 | 90,1 | 3,57 | 309,4 | 216 | 101,1 | 3,06 | 308,1 | 226,8 | 113,2 | 2,72 |
| | 24 / 17 | 303,9 | 223,2 | 64,8 | 4,69 | 331,4 | 232,3 | 72,4 | 4,58 | 334,8 | 224,8 | 81,5 | 4,11 | 326,7 | 224,2 | 90,6 | 3,61 | 310,4 | 225 | 101,5 | 3,06 | 313,6 | 231,1 | 114,3 | 2,74 |
| | 26 / 18 | 312,3 | 227,2 | 65,5 | 4,77 | 326,7 | 231,2 | 73 | 4,48 | 343 | 228,6 | 82,2 | 4,17 | 332,5 | 230,2 | 91,1 | 3,65 | 312,1 | 233,2 | 102,1 | 3,06 | 317,6 | 239,9 | 115,7 | 2,75 |
| | 27 / 19 | 318,8 | 227,2 | 65,9 | 4,84 | 328 | 226,9 | 73,6 | 4,46 | 343,1 | 225,4 | 82,6 | 4,15 | 338,8 | 229,7 | 91,7 | 3,69 | 318,5 | 232,6 | 102,7 | 3,10 | 322,9 | 241,1 | 116,9 | 2,76 |
| | 28 / 20 | 325,6 | 226,9 | 66,4 | 4,90 | 329,5 | 222,6 | 74,2 | 4,44 | 343,4 | 222,1 | 83,1 | 4,13 | 345,1 | 229 | 92,2 | 3,74 | 325,8 | 231,5 | 103,3 | 3,15 | 328,3 | 242,3 | 118,1 | 2,78 |
| | 30 / 22 | 340,2 | 225,7 | 67,4 | 5,05 | 343,9 | 220,3 | 75,2 | 4,57 | 344,4 | 215,1 | 84,1 | 4,10 | 358,6 | 226,6 | 93,5 | 3,84 | 340,8 | 229,1 | 104,7 | 3,26 | - | - | - | - |
| 60000 m³/h | 22 / 16 | 336,8 | 258,2 | 67,1 | 5,02 | 370,9 | 264,4 | 75,1 | 4,94 | 369 | 256,2 | 83,9 | 4,40 | 357,5 | 254,8 | 93,3 | 3,83 | 338,4 | 262,5 | 104,3 | 3,24 | 348,1 | 280,9 | 112 | 3,11 |
| | 24 / 17 | 344,4 | 266,3 | 67,7 | 5,09 | 377,7 | 270,8 | 75,8 | 4,98 | 376,9 | 263,7 | 84,6 | 4,46 | 365,1 | 263,5 | 94 | 3,88 | 342,6 | 272,7 | 104,9 | 3,27 | 351,4 | 293,6 | 106 | 3,32 |
| | 26 / 18 | 352,1 | 274 | 68,3 | 5,16 | 372,9 | 270,5 | 76,4 | 4,88 | 383,2 | 272,7 | 85,2 | 4,50 | 370,2 | 273,7 | 94,7 | 3,91 | 346,4 | 282,9 | 105,5 | 3,28 | 357,4 | 298,6 | 107,3 | 3,33 |
| | 27 / 19 | 360,7 | 272,3 | 68,8 | 5,24 | 374,2 | 265,2 | 77 | 4,86 | 383,8 | 267,7 | 85,8 | 4,47 | 376,2 | 273,6 | 95,3 | 3,95 | 353,8 | 281,8 | 106,3 | 3,33 | 363,6 | 297 | 107,8 | 3,37 |
| | 28 / 20 | 369,5 | 270,5 | 69,4 | 5,32 | 375,7 | 259,9 | 77,6 | 4,84 | 384,4 | 262,7 | 86,5 | 4,44 | 382,3 | 273,2 | 96 | 3,98 | 361,7 | 280,5 | 107,2 | 3,37 | 370 | 295 | 108,3 | 3,42 |
| | 30 / 22 | 387,7 | 266,2 | 70,5 | 5,50 | 391,4 | 256,2 | 78,9 | 4,96 | 385,6 | 252,8 | 87,8 | 4,39 | 397 | 270,4 | 97,3 | 4,08 | 377,7 | 277,8 | 109 | 3,47 | - | - | - | - |

## 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 |
| 38000 m³/h | 10 | 276.7 | 57.4 | 4,82 | 290,2 | 59,8 | 4,85 | 323 | 67,5 | 4,79 | 335,4 | 70,7 | 4,74 | 366,2 | 78,5 | 4,66 | 394,8 | 87,4 | 4,52 |
| | 15 | 278.0 | 62.6 | 4,44 | 290,7 | 65,2 | 4,46 | 329,1 | 72,9 | 4,51 | 342,3 | 76,2 | 4,49 | 369,6 | 84,6 | 4,37 | 397,5 | 94,1 | 4,22 |
| | 18 | 278.4 | 65.7 | 4,24 | 291,9 | 68,6 | 4,26 | 328,9 | 76,6 | 4,29 | 341,4 | 80 | 4,27 | 370,8 | 88,5 | 4,19 | 400,3 | 99,1 | 4,04 |
| | 20 | 280.1 | 68.1 | 4,11 | 293,8 | 71,1 | 4,13 | 328,9 | 79,1 | 4,16 | 340,9 | 82,4 | 4,14 | 368,9 | 90,7 | 4,07 | 402,9 | 102,9 | 3,92 |
| | 22 | 281.9 | 70.5 | 4,00 | 295,8 | 73,6 | 4,02 | 328,8 | 81,5 | 4,03 | 339,7 | 84,7 | 4,01 | 365,5 | 92,6 | 3,95 | 405,5 | 106,7 | 3,80 |
| | 25 | 284.5 | 74.1 | 3,84 | 298,2 | 77,3 | 3,86 | 327,4 | 85 | 3,85 | 336,9 | 87,8 | 3,84 | 360,5 | 95,4 | 3,78 | 380,7 | 109,1 | 3,49 |
| 60000 m³/h | 10 | 278.1 | 49.6 | 5,61 | 292,4 | 51,5 | 5,68 | 325,4 | 56,6 | 5,75 | 339,3 | 58,9 | 5,76 | 376,3 | 64,8 | 5,81 | 413,4 | 71,1 | 5,81 |
| | 15 | 279.2 | 54.0 | 5,17 | 292,4 | 55,8 | 5,24 | 329,9 | 60,5 | 5,45 | 346,5 | 63,4 | 5,47 | 381,3 | 70 | 5,45 | 417,6 | 77 | 5,42 |
| | 18 | 279.5 | 56.6 | 4,94 | 293 | 58,5 | 5,01 | 331,9 | 63,6 | 5,22 | 347,4 | 66,4 | 5,23 | 383,4 | 73,1 | 5,24 | 417,7 | 79,9 | 5,23 |
| | 20 | 280.5 | 58.5 | 4,79 | 294 | 60,5 | 4,86 | 333,2 | 65,7 | 5,07 | 347,9 | 68,4 | 5,09 | 382,2 | 75 | 5,10 | 416,2 | 81,6 | 5,10 |
| | 22 | 281.5 | 60.4 | 4,66 | 295,1 | 62,5 | 4,72 | 334,5 | 67,8 | 4,93 | 347,5 | 70,3 | 4,94 | 379,5 | 76,6 | 4,95 | 414,8 | 83,2 | 4,99 |
| | 25 | 283.1 | 63.3 | 4,47 | 296,5 | 65,4 | 4,53 | 332,8 | 70,9 | 4,69 | 345,2 | 73,3 | 4,71 | 375,6 | 79,1 | 4,75 | 412,8 | 86,1 | 4,79 |

kWf = Cooling capacity in kW
kWe = Compressor power input in kW
kWs = Sensible cooling capacity (kW)
kWt = Heating capacity (kW)
EER referred only to compressors
COP referred only to compressors
Ta = Indoor air temperature D.B/W.B
DB = dry bulb
WB = wet bulb
The fan motor heating is not considered.

# 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 49.4 | Airflow | m3/h | 26000 | 26000 | 26000 | 26000 | 26000 | 26000 | 26000 | 26000 | 26000 | 26000 | 26000 | 26000 | 26000 | 26000 | 26000 |
| | Airflow | l/s | 7222 | 7222 | 7222 | 7222 | 7222 | 7222 | 7222 | 7222 | 7222 | 7222 | 7222 | 7222 | 7222 | 7222 | 7222 |
| | Fan RPM | rpm | 1183 | 1192 | 1210 | 1236 | 1262 | 1285 | 1311 | 1337 | 1364 | 1387 | 1413 | 1439 | 1462 | 1488 | 1535 |
| | Total input | kW | 2.94 | 3.03 | 3.21 | 3.48 | 3.77 | 4.02 | 4.34 | 4.65 | 4.92 | 5.16 | 5.44 | 5.74 | 6.00 | 6.31 | 6.92 |
| 54.4 | Airflow | m3/h | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 |
| | Airflow | l/s | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 |
| | Fan RPM | rpm | 1300 | 1308 | 1323 | 1347 | 1368 | 1392 | 1413 | 1436 | 1460 | 1481 | 1505 | 1526 | 1550 | 1574 | 1619 |
| | Total input | kW | 3.77 | 3.86 | 4.04 | 4.34 | 4.62 | 4.93 | 5.21 | 5.55 | 5.90 | 6.23 | 6.56 | 6.83 | 7.15 | 7.47 | 8.11 |
| 60.4 | Airflow | m3/h | 33000 | 33000 | 33000 | 33000 | 33000 | 33000 | 33000 | 33000 | 33000 | 33000 | 33000 | 33000 | 33000 | 33000 | 33000 |
| | Airflow | l/s | 9167 | 9167 | 9167 | 9167 | 9167 | 9167 | 9167 | 9167 | 9167 | 9167 | 9167 | 9167 | 9167 | 9167 | 9167 |
| | Fan RPM | rpm | 1141 | 1150 | 1166 | 1194 | 1221 | 1246 | 1274 | 1299 | 1327 | 1355 | 1379 | 1407 | 1435 | 1457 | 1507 |
| | Total input | kW | 3.60 | 3.72 | 3.91 | 4.28 | 4.64 | 5.00 | 5.40 | 5.72 | 6.04 | 6.44 | 6.76 | 7.16 | 7.56 | 7.92 | 8.72 |
| 70.4 | Airflow | m3/h | 37000 | 37000 | 37000 | 37000 | 37000 | 37000 | 37000 | 37000 | 37000 | 37000 | 37000 | 37000 | 37000 | 37000 | 37000 |
| | Airflow | l/s | 10278 | 10278 | 10278 | 10278 | 10278 | 10278 | 10278 | 10278 | 10278 | 10278 | 10278 | 10278 | 10278 | 10278 | 10278 |
| | Fan RPM | rpm | 1257 | 1263 | 1280 | 1305 | 1327 | 1351 | 1378 | 1398 | 1423 | 1445 | 1470 | 1495 | 1517 | 1542 | 1590 |
| | Total input | kW | 4.60 | 4.72 | 4.96 | 5.36 | 5.72 | 6.12 | 6.52 | 6.92 | 7.40 | 7.76 | 8.16 | 8.56 | 8.92 | 9.36 | 10.24 |
| 80.4 | Airflow | m3/h | 44000 | 44000 | 44000 | 44000 | 44000 | 44000 | 44000 | 44000 | 44000 | 44000 | 44000 | - | - | - | - |
| | Airflow | l/s | 12222 | 12222 | 12222 | 12222 | 12222 | 12222 | 12222 | 12222 | 12222 | 12222 | 12222 | - | - | - | - |
| | Fan RPM | rpm | 1456 | 1463 | 1477 | 1497 | 1518 | 1539 | 1558 | 1579 | 1597 | 1618 | 1636 | - | - | - | - |
| | Total input | kW | 6.84 | 6.96 | 7.28 | 7.68 | 8.12 | 8.60 | 9.00 | 9.48 | 9.92 | 10.44 | 10.92 | - | - | - | - |
| 90.4 | Airflow | m3/h | 51000 | 51000 | 51000 | 51000 | 51000 | 51000 | 51000 | 51000 | 51000 | 51000 | 51000 | 51000 | 51000 | 51000 | 51000 |
| | Airflow | l/s | 14167 | 14167 | 14167 | 14167 | 14167 | 14167 | 14167 | 14167 | 14167 | 14167 | 14167 | 14167 | 14167 | 14167 | 14167 |
| | Fan RPM | rpm | 1184 | 1193 | 1211 | 1235 | 1262 | 1289 | 1313 | 1340 | 1364 | 1391 | 1418 | 1442 | 1468 | 1491 | 1540 |
| | Total input | kW | 6.06 | 6.24 | 6.60 | 7.08 | 7.62 | 8.28 | 8.82 | 9.36 | 9.84 | 10.38 | 10.98 | 11.52 | 12.12 | 12.72 | 13.98 |
| 100.4 | Airflow | m3/h | 56000 | 56000 | 56000 | 56000 | 56000 | 56000 | 56000 | 56000 | 56000 | 56000 | 56000 | 56000 | 56000 | 56000 | 56000 |
| | Airflow | l/s | 15556 | 15556 | 15556 | 15556 | 15556 | 15556 | 15556 | 15556 | 15556 | 15556 | 15556 | 15556 | 15556 | 15556 | 15556 |
| | Fan RPM | rpm | 1286 | 1294 | 1310 | 1332 | 1357 | 1381 | 1403 | 1427 | 1452 | 1474 | 1496 | 1521 | 1545 | 1570 | 1615 |
| | Total input | kW | 7.56 | 7.68 | 8.10 | 8.64 | 9.24 | 9.84 | 10.44 | 11.16 | 11.82 | 12.30 | 12.84 | 16.50 | 14.16 | 14.82 | 16.08 |
| 110.4 | Airflow | m3/h | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | - |
| | Airflow | l/s | 16667 | 166667 | 166667 | 166667 | 166667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | - |
| | Fan RPM | rpm | 1364 | 1372 | 1387 | 1408 | 1431 | 11451 | 1476 | 1496 | 1517 | 1540 | 1563 | 1583 | 1606 | 1627 | - |
| | Total input | kW | 8.76 | 9.00 | 9.42 | 9.96 | 10.62 | 11.16 | 11.94 | 12.60 | 13.26 | 14.04 | 14.64 | 15.24 | 15.90 | 16.50 | - |

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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 49.4 | Airflow | m3/h | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 |
| | Airflow | l/s | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 |
| | Fan RPM | rpm | 1032 | 1043 | 1060 | 1091 | 1120 | 1152 | 1180 | 1212 | 1239 | 1270 | 1297 | 1327 | 1354 | 1384 | 1439 |
| | Total input | kW | 2,09 | 2,17 | 2,31 | 2,56 | 2,81 | 3,06 | 3,27 | 3,51 | 3,72 | 3,99 | 4,25 | 4,53 | 4,80 | 5,10 | 5,73 |
| 54.4 | Airflow | m3/h | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 |
| | Airflow | l/s | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 |
| | Fan RPM | rpm | 1032 | 1043 | 1060 | 1091 | 1120 | 1152 | 1180 | 1212 | 1239 | 1270 | 1297 | 1327 | 1354 | 1384 | 1439 |
| | Total input | kW | 2,09 | 2,17 | 2,31 | 2,56 | 2,81 | 3,06 | 3,27 | 3,51 | 3,72 | 3,99 | 4,25 | 4,53 | 4,80 | 5,10 | 5,73 |
| 60.4 | Airflow | m3/h | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 |
| | Airflow | l/s | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 |
| | Fan RPM | rpm | 1029 | 1040 | 1057 | 1086 | 1118 | 1150 | 1178 | 1210 | 1238 | 1266 | 1296 | 1327 | 1353 | 1380 | 1439 |
| | Total input | kW | 2,79 | 2,89 | 3,07 | 3,38 | 3,75 | 4,04 | 4,32 | 4,68 | 4,96 | 5,28 | 5,64 | 6,04 | 6,40 | 6,76 | 7,60 |
| 70.4 | Airflow | m3/h | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 |
| | Airflow | l/s | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 |
| | Fan RPM | rpm | 1029 | 1040 | 1057 | 1086 | 1118 | 1150 | 1178 | 1210 | 1238 | 1266 | 1296 | 1327 | 1353 | 1380 | 1439 |
| | Total input | kW | 2,79 | 2,89 | 3,07 | 3,38 | 3,75 | 4,04 | 4,32 | 4,68 | 4,96 | 5,28 | 5,64 | 6,04 | 6,40 | 6,76 | 7,60 |
| 80.4 | Airflow | m3/h | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 |
| | Airflow | l/s | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 |
| | Fan RPM | rpm | 1029 | 1040 | 1057 | 1086 | 1118 | 1150 | 1178 | 1210 | 1238 | 1266 | 1296 | 1327 | 1353 | 1380 | 1439 |
| | Total input | kW | 2,79 | 2,89 | 3,07 | 3,38 | 3,75 | 4,04 | 4,32 | 4,68 | 4,96 | 5,28 | 5,64 | 6,04 | 6,40 | 6,76 | 7,60 |
| 90.4 | Airflow | m3/h | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 |
| | Airflow | l/s | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 |
| | Fan RPM | rpm | 942 | 954 | 978 | 1011 | 1044 | 1080 | 1111 | 1146 | 1177 | 1211 | 1245 | 1274 | 1307 | 1335 | 1393 |
| | Total input | kW | 3,44 | 3,60 | 3,92 | 4,28 | 4,66 | 5,10 | 5,51 | 6,00 | 6,48 | 7,02 | 7,56 | 8,40 | 8,64 | 9,12 | 10,26 |
| 100.4 | Airflow | m3/h | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 |
| | Airflow | l/s | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 |
| | Fan RPM | rpm | 942 | 954 | 978 | 1011 | 1044 | 1080 | 1111 | 1146 | 1177 | 1211 | 1245 | 1274 | 1307 | 1335 | 1393 |
| | Total input | kW | 3,44 | 3,60 | 3,92 | 4,28 | 4,66 | 5,10 | 5,51 | 6,00 | 6,48 | 7,02 | 7,56 | 8,40 | 8,64 | 9,12 | 10,26 |
| 110.4 | Airflow | m3/h | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 |
| | Airflow | l/s | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 |
| | Fan RPM | rpm | 942 | 954 | 978 | 1011 | 1044 | 1080 | 1111 | 1146 | 1177 | 1211 | 1245 | 1274 | 1307 | 1335 | 1393 |
| | Total input | kW | 3,44 | 3,60 | 3,92 | 4,28 | 4,66 | 5,10 | 5,51 | 6,00 | 6,48 | 7,02 | 7,56 | 8,40 | 8,64 | 9,12 | 10,26 |

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 | 510 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 49.4 | Airflow | m3/h | 34000 | 34000 | 34000 | 34000 | 34000 | 34000 | 34000 | 34000 | 34000 | - | - | - | - | - | - |
| | Airflow | l/s | 9444 | 9444 | 9444 | 9444 | 9444 | 9444 | 9444 | 9444 | 9444 | - | - | - | - | - | - |
| | Fan RPM | rpm | 1484 | 1493 | 1505 | 1527 | 1546 | 1567 | 1585 | 1603 | 1624 | - | - | - | - | - | - |
| | Total input | kW | 5,37 | 5,52 | 5,70 | 6,06 | 6,36 | 6,72 | 7,05 | 7,38 | 7,77 | - | - | - | - | - | - |
| 54.4 | Airflow | m3/h | 34000 | 34000 | 34000 | 34000 | 34000 | 34000 | 34000 | 34000 | 34000 | - | - | - | - | - | - |
| | Airflow | l/s | 9444 | 9444 | 9444 | 9444 | 9444 | 9444 | 9444 | 9444 | 9444 | - | - | - | - | - | - |
| | Fan RPM | rpm | 1484 | 1493 | 1505 | 1527 | 1546 | 1567 | 1585 | 1603 | 1624 | - | - | - | - | - | - |
| | Total input | kW | 5,37 | 5,52 | 5,70 | 6,06 | 6,36 | 6,72 | 7,05 | 7,38 | 7,77 | - | - | - | - | - | - |
| 60.4 | Airflow | m3/h | 47000 | 47000 | 47000 | 47000 | 47000 | 47000 | 47000 | - | - | - | - | - | - | - | - |
| | Airflow | l/s | 13056 | 13056 | 13056 | 13056 | 13056 | 13056 | 13056 | - | - | - | - | - | - | - | - |
| | Fan RPM | rpm | 1545 | 1552 | 1566 | 1586 | 1605 | 1625 | 1641 | - | - | - | - | - | - | - | - |
| | Total input | kW | 8,04 | 8,20 | 8,52 | 9,00 | 9,44 | 9,92 | 10,36 | - | - | - | - | - | - | - | - |
| 70.4 | Airflow | m3/h | 47000 | 47000 | 47000 | 47000 | 47000 | 47000 | 47000 | - | - | - | - | - | - | - | - |
| | Airflow | l/s | 13056 | 13056 | 13056 | 13056 | 13056 | 13056 | 13056 | - | - | - | - | - | - | - | - |
| | Fan RPM | rpm | 1545 | 1552 | 1566 | 1586 | 1605 | 1625 | 1641 | - | - | - | - | - | - | - | - |
| | Total input | kW | 8,04 | 8,20 | 8,52 | 9,00 | 9,44 | 9,92 | 10,36 | - | - | - | - | - | - | - | - |
| 80.4 | Airflow | m3/h | 47000 | 47000 | 47000 | 47000 | 47000 | 47000 | 47000 | - | - | - | - | - | - | - | - |
| | Airflow | l/s | 13056 | 13056 | 13056 | 13056 | 13056 | 13056 | 13056 | - | - | - | - | - | - | - | - |
| | Fan RPM | rpm | 1545 | 1552 | 1566 | 1586 | 1605 | 1625 | 1641 | - | - | - | - | - | - | - | - |
| | Total input | kW | 8,04 | 8,20 | 8,52 | 9,00 | 9,44 | 9,92 | 10,36 | - | - | - | - | - | - | - | - |
| 90.4 | Airflow | m3/h | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | - |
| | Airflow | l/s | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | - |
| | Fan RPM | rpm | 1366 | 1371 | 1387 | 1410 | 1431 | 1454 | 1474 | 1497 | 1518 | 1541 | 1562 | 1585 | 1606 | 1627 | - |
| | Total input | kW | 8,82 | 8,94 | 9,36 | 10,02 | 10,62 | 11,28 | 11,88 | 12,60 | 13,26 | 14,04 | 14,64 | 15,30 | 15,84 | 16,50 | - |
| 100.4 | Airflow | m3/h | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | - |
| | Airflow | l/s | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | - |
| | Fan RPM | rpm | 1366 | 1371 | 1387 | 1410 | 1431 | 1454 | 1474 | 1497 | 1518 | 1541 | 1562 | 1585 | 1606 | 1627 | - |
| | Total input | kW | 8,82 | 8,94 | 9,36 | 10,02 | 10,62 | 11,28 | 11,88 | 12,60 | 13,26 | 14,04 | 14,64 | 15,30 | 15,84 | 16,50 | - |
| 110.4 | Airflow | m3/h | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | - |
| | Airflow | l/s | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | - |
| | Fan RPM | rpm | 1366 | 1371 | 1387 | 1410 | 1431 | 1454 | 1474 | 1497 | 1518 | 1541 | 1562 | 1585 | 1606 | 1627 | - |
| | Total input | kW | 8,82 | 8,94 | 9,36 | 10,02 | 10,62 | 11,28 | 11,88 | 12,60 | 13,26 | 14,04 | 14,64 | 15,30 | 15,84 | 16,50 | - |

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 | 840 | 900 | 960 | 1020 | 1080 | 1140 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 49.4 | Airflow | m3/h | 26000 | 26000 | 26000 | 26000 | 26000 | 26000 | 26000 | 26000 | 26000 | 26000 | 26000 | 26000 | 26000 | 26000 | 26000 |
| | Airflow | l/s | 7222 | 7222 | 7222 | 7222 | 7222 | 7222 | 7222 | 7222 | 7222 | 7222 | 7222 | 7222 | 7222 | 7222 | 7222 |
| | Fan RPM | rpm | 1550 | 1593 | 1638 | 1682 | 1727 | 1775 | 1817 | 1854 | 1900 | 1940 | 1981 | 2020 | 2055 | 2098 | 2136 |
| | Total input | kW | 5,37 | 5,91 | 6,51 | 7,08 | 7,68 | 8,37 | 9,00 | 9,60 | 10,38 | 11,07 | 11,73 | 12,42 | 13,05 | 13,99 | 14,61 |
| 54.4 | Airflow | m3/h | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | - |
| | Airflow | l/s | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | - |
| | Fan RPM | rpm | 1673 | 1713 | 1753 | 1798 | 1833 | 1877 | 1917 | 1956 | 1995 | 2032 | 2070 | 2111 | 2147 | 2181 | - |
| | Total input | kW | 6,48 | 7,08 | 7,68 | 8,37 | 8,97 | 9,69 | 10,35 | 11,04 | 11,76 | 12,48 | 13,23 | 14,10 | 14,91 | 15,60 | - |
| 60.4 | Airflow | m3/h | 33000 | 33000 | 33000 | 33000 | 33000 | 33000 | 33000 | 33000 | 33000 | 33000 | 33000 | 33000 | 33000 | 33000 | 33000 |
| | Airflow | l/s | 9167 | 9167 | 9167 | 9167 | 9167 | 9167 | 9167 | 9167 | 9167 | 9167 | 9167 | 9167 | 9167 | 9167 | 9167 |
| | Fan RPM | rpm | 1500 | 1548 | 1596 | 1643 | 1690 | 1732 | 1777 | 1821 | 1867 | 1907 | 1946 | 1991 | 2031 | 2069 | 2109 |
| | Total input | kW | 6,64 | 7,40 | 8,12 | 8,92 | 9,72 | 10,48 | 11,36 | 12,24 | 13,20 | 14,00 | 14,84 | 15,84 | 16,80 | 17,72 | 18,72 |
| 70.4 | Airflow | m3/h | 37000 | 37000 | 37000 | 37000 | 37000 | 37000 | 37000 | 37000 | 37000 | 37000 | 37000 | 37000 | 37000 | 37000 | 37000 |
| | Airflow | l/s | 10278 | 10278 | 10278 | 10278 | 10278 | 10278 | 10278 | 10278 | 10278 | 10278 | 10278 | 10278 | 10278 | 10278 | 10278 |
| | Fan RPM | rpm | 1626 | 1668 | 1711 | 1750 | 1793 | 1835 | 1877 | 1918 | 1955 | 1995 | 2034 | 2067 | 2109 | 2147 | 2184 |
| | Total input | kW | 8,08 | 8,84 | 9,68 | 10,48 | 11,32 | 12,16 | 13,08 | 14,00 | 14,88 | 15,88 | 16,88 | 17,76 | 18,84 | 19,84 | 20,88 |
| 80.4 | Airflow | m3/h | 44000 | 44000 | 44000 | 44000 | 44000 | 44000 | 44000 | 44000 | 44000 | 44000 | 44000 | - | - | - | - |
| | Airflow | l/s | 12222 | 12222 | 12222 | 12222 | 12222 | 12222 | 12222 | 12222 | 12222 | 12222 | 1222 | - | - | - | - |
| | Fan RPM | rpm | 1852 | 1889 | 1926 | 1962 | 1995 | 2031 | 2067 | 2102 | 2136 | 2171 | 2206 | - | - | - | - |
| | Total input | kW | 11,32 | 12,16 | 13,04 | 13,96 | 14,84 | 15,84 | 16,88 | 17,92 | 18,84 | 19,88 | 20,96 | - | - | - | - |
| 90.4 | Airflow | m3/h | 51000 | 51000 | 51000 | 51000 | 51000 | 51000 | 51000 | 51000 | 51000 | 51000 | 51000 | 51000 | 51000 | 51000 | 51000 |
| | Airflow | l/s | 14167 | 14167 | 14167 | 14167 | 14167 | 14167 | 14167 | 14167 | 14167 | 14167 | 14167 | 14167 | 14167 | 14167 | 14167 |
| | Fan RPM | rpm | 1546 | 1592 | 1639 | 1685 | 1730 | 1771 | 1815 | 1858 | 1900 | 1942 | 1980 | 2018 | 2058 | 2100 | 2139 |
| | Total input | kW | 10,80 | 11,94 | 13,14 | 14,28 | 15,54 | 16,74 | 18,06 | 19,38 | 20,82 | 22,14 | 23,46 | 24,78 | 26,22 | 27,78 | 29,34 |
| 100.4 | Airflow | m3/h | 56000 | 56000 | 56000 | 56000 | 56000 | 56000 | 56000 | 56000 | 56000 | 56000 | 56000 | 56000 | 56000 | 56000 | 56000 |
| | Airflow | l/s | 15556 | 15556 | 15556 | 15556 | 15556 | 15556 | 15556 | 15556 | 15556 | 15556 | 15556 | 15556 | 15556 | 15556 | 15556 |
| | Fan RPM | rpm | 1652 | 1695 | 1737 | 1779 | 1821 | 1860 | 1901 | 1942 | 1982 | 2018 | 2057 | 2093 | 2131 | 2171 | 2206 |
| | Total input | kW | 12,78 | 13,92 | 15,24 | 16,50 | 17,82 | 19,02 | 20,40 | 21,78 | 23,28 | 24,66 | 26,22 | 27,60 | 29,10 | 30,78 | 32,22 |
| 110.4 | Airflow | m3/h | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | - | - |
| | Airflow | l/s | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | - | - |
| | Fan RPM | rpm | 1740 | 1780 | 1816 | 1856 | 1895 | 1935 | 1974 | 2010 | 2048 | 2086 | 2126 | 2160 | 2193 | - | - |
| | Total input | kW | 14,58 | 15,78 | 16,98 | 18,36 | 19,80 | 21,12 | 22,56 | 23,88 | 25,38 | 26,94 | 28,62 | 30,12 | 31,68 | - | - |

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 electric 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 49.4 | Airflow | m3/h | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 |
| | Airflow | l/s | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 |
| | Fan RPM | rpm | 1496 | 1545 | 1596 | 1642 | 1692 | 1737 | 1785 | 1828 | 1874 | 1919 | 1957 | 2000 | 2044 | 2081 | 2126 |
| | Total input | kW | 5,19 | 5,70 | 6,30 | 6,87 | 7,47 | 8,01 | 8,64 | 9,27 | 9,93 | 10,65 | 11,25 | 11,94 | 12,63 | 13,26 | 14,07 |
| 54.4 | Airflow | m3/h | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 | 22000 |
| | Airflow | l/s | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 | 6111 |
| | Fan RPM | rpm | 1496 | 1545 | 1596 | 1642 | 1692 | 1737 | 1785 | 1828 | 1874 | 1919 | 1957 | 2000 | 2044 | 2081 | 2126 |
| | Total input | kW | 5,19 | 5,70 | 6,30 | 6,87 | 7,47 | 8,01 | 8,64 | 9,27 | 9,93 | 10,65 | 11,25 | 11,94 | 12,63 | 13,26 | 14,07 |
| 60.4 | Airflow | m3/h | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 |
| | Airflow | l/s | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 |
| | Fan RPM | rpm | 1489 | 1542 | 1590 | 1644 | 1686 | 1732 | 1783 | 1826 | 1869 | 1914 | 1953 | 1994 | 2040 | 2080 | 2122 |
| | Total input | kW | 6,84 | 7,60 | 8,32 | 9,16 | 9,84 | 10,60 | 11,52 | 12,32 | 13,16 | 14,08 | 14,88 | 15,72 | 16,72 | 17,64 | 18,60 |
| 70.4 | Airflow | m3/h | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 |
| | Airflow | l/s | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 |
| | Fan RPM | rpm | 1489 | 1542 | 1590 | 1644 | 1686 | 1732 | 1783 | 1826 | 1869 | 1914 | 1953 | 1994 | 2040 | 2080 | 2122 |
| | Total input | kW | 6,84 | 7,60 | 8,32 | 9,16 | 9,84 | 10,60 | 11,52 | 12,32 | 13,16 | 14,08 | 14,88 | 15,72 | 16,72 | 17,64 | 18,60 |
| 80.4 | Airflow | m3/h | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 | 29000 |
| | Airflow | l/s | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 | 8056 |
| | Fan RPM | rpm | 1489 | 1542 | 1590 | 1644 | 1686 | 1732 | 1783 | 1826 | 1869 | 1914 | 1953 | 1994 | 2040 | 2080 | 2122 |
| | Total input | kW | 6,84 | 7,60 | 8,32 | 9,16 | 9,84 | 10,60 | 11,52 | 12,32 | 13,16 | 14,08 | 14,88 | 15,72 | 16,72 | 17,64 | 18,60 |
| 90.4 | Airflow | m3/h | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 |
| | Airflow | l/s | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 |
| | Fan RPM | rpm | 1418 | 1467 | 1523 | 1578 | 1627 | 1675 | 1726 | 1772 | 1821 | 1870 | 1910 | 1957 | 2000 | 2042 | 2086 |
| | Total input | kW | 9,18 | 10,02 | 11,10 | 12,24 | 13,32 | 14,40 | 15,60 | 16,68 | 17,94 | 19,20 | 20,34 | 21,72 | 22,98 | 24,30 | 25,80 |
| 100.4 | Airflow | m3/h | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 |
| | Airflow | l/s | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 |
| | Fan RPM | rpm | 1418 | 1467 | 1523 | 1578 | 1627 | 1675 | 1726 | 1772 | 1821 | 1870 | 1910 | 1957 | 2000 | 2042 | 2086 |
| | Total input | kW | 9,18 | 10,02 | 11,10 | 12,24 | 13,32 | 14,40 | 15,60 | 16,68 | 17,94 | 19,20 | 20,34 | 21,72 | 22,98 | 24,30 | 25,80 |
| 110.4 | Airflow | m3/h | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 | 38000 |
| | Airflow | l/s | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 | 10556 |
| | Fan RPM | rpm | 1418 | 1467 | 1523 | 1578 | 1627 | 1675 | 1726 | 1772 | 1821 | 1870 | 1910 | 1957 | 2000 | 2042 | 2086 |
| | Total input | kW | 9,18 | 10,02 | 11,10 | 12,24 | 13,32 | 14,40 | 15,60 | 16,68 | 17,94 | 19,20 | 20,34 | 21,72 | 22,98 | 24,30 | 25,80 |

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 electric fans" option.

# High static pressure electric fan performance - High airflow

| Available static pressure (Pa) (supply+return) | | | 240 | 300 | 360 | 420 | 480 | 540 | 600 | 660 | 720 | 780 | 840 | 900 | 960 | 1020 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 49.4 | Airflow | m3/h | 34000 | 34000 | 34000 | 34000 | 34000 | 34000 | 34000 | 34000 | 34000 | 34000 | 34000 | - | - | - |
| | Airflow | l/s | 9444 | 9444 | 9444 | 9444 | 9444 | 9444 | 9444 | 9444 | 9444 | 9444 | 9444 | - | - | - |
| | Fan RPM | rpm | 1901 | 1884 | 1919 | 1956 | 1990 | 2026 | 2059 | 2095 | 2128 | 2164 | 2197 | - | - | - |
| | Total input | kW | 8,88 | 8,85 | 9,48 | 10,17 | 10,83 | 11,55 | 12,27 | 13,05 | 13,83 | 14,64 | 15,39 | - | - | - |
| 54.4 | Airflow | m3/h | 34000 | 34000 | 34000 | 34000 | 34000 | 34000 | 34000 | 34000 | 34000 | 34000 | 34000 | - | - | - |
| | Airflow | l/s | 9444 | 9444 | 9444 | 9444 | 9444 | 9444 | 9444 | 9444 | 9444 | 9444 | 9444 | - | - | - |
| | Fan RPM | rpm | 1901 | 1884 | 1919 | 1956 | 1990 | 2026 | 2059 | 2095 | 2128 | 2164 | 2197 | - | - | - |
| | Total input | kW | 8,88 | 8,85 | 9,48 | 10,17 | 10,83 | 11,55 | 12,27 | 13,05 | 13,83 | 14,64 | 15,39 | - | - | - |
| 60.4 | Airflow | m3/h | 47000 | 47000 | 47000 | 47000 | 47000 | 47000 | 47000 | 47000 | 47000 | - | - | - | - | - |
| | Airflow | l/s | 13056 | 13056 | 13056 | 13056 | 13056 | 13056 | 13056 | 13056 | 13056 | - | - | - | - | - |
| | Fan RPM | rpm | 1916 | 1949 | 1983 | 2019 | 2052 | 2086 | 2118 | 2153 | 2184 | - | - | - | - | - |
| | Total input | kW | 12,16 | 12,96 | 13,80 | 14,76 | 15,68 | 16,68 | 17,64 | 18,72 | 19,76 | - | - | - | - | - |
| 70.4 | Airflow | m3/h | 47000 | 47000 | 47000 | 47000 | 47000 | 47000 | 47000 | 47000 | 47000 | - | - | - | - | - |
| | Airflow | l/s | 13056 | 13056 | 13056 | 13056 | 13056 | 13056 | 13056 | 13056 | 13056 | - | - | - | - | - |
| | Fan RPM | rpm | 1916 | 1949 | 1983 | 2019 | 2052 | 2086 | 2118 | 2153 | 2184 | - | - | - | - | - |
| | Total input | kW | 12,16 | 12,96 | 13,80 | 14,76 | 15,68 | 16,68 | 17,64 | 18,72 | 19,76 | - | - | - | - | - |
| 80.4 | Airflow | m3/h | 47000 | 47000 | 47000 | 47000 | 47000 | 47000 | 47000 | 47000 | 47000 | - | - | - | - | - |
| | Airflow | l/s | 13056 | 13056 | 13056 | 13056 | 13056 | 13056 | 13056 | 13056 | 13056 | - | - | - | - | - |
| | Fan RPM | rpm | 1916 | 1949 | 1983 | 2019 | 2052 | 2086 | 2118 | 2153 | 2184 | - | - | - | - | - |
| | Total input | kW | 12,16 | 12,96 | 13,80 | 14,76 | 15,68 | 16,68 | 17,64 | 18,72 | 19,76 | - | - | - | - | - |
| 90.4 | Airflow | m3/h | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 |
| | Airflow | l/s | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 |
| | Fan RPM | rpm | 1700 | 1739 | 1779 | 1817 | 1857 | 1895 | 1935 | 1972 | 2009 | 2049 | 2084 | 2123 | 2160 | 2195 |
| | Total input | kW | 13,38 | 14,52 | 15,78 | 17,04 | 18,42 | 19,74 | 21,18 | 22,50 | 23,88 | 25,38 | 26,88 | 28,50 | 30,12 | 31,74 |
| 100.4 | Airflow | m3/h | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 |
| | Airflow | l/s | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 |
| | Fan RPM | rpm | 1700 | 1739 | 1779 | 1817 | 1857 | 1895 | 1935 | 1972 | 2009 | 2049 | 2084 | 2123 | 2160 | 2195 |
| | Total input | kW | 13,38 | 14,52 | 15,78 | 17,04 | 18,42 | 19,74 | 21,18 | 22,50 | 23,88 | 25,38 | 26,88 | 28,50 | 30,12 | 31,74 |
| 110.4 | Airflow | m3/h | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 | 60000 |
| | Airflow | l/s | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 | 16667 |
| | Fan RPM | rpm | 1700 | 1739 | 1779 | 1817 | 1857 | 1895 | 1935 | 1972 | 2009 | 2049 | 2084 | 2123 | 2160 | 2195 |
| | Total input | kW | 13,38 | 14,52 | 15,78 | 17,04 | 18,42 | 19,74 | 21,18 | 22,50 | 23,88 | 25,38 | 26,88 | 28,50 | 30,12 | 31,74 |

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 electric fans" option.

# Exhaust electric fan performance

| % of exhaust air | | | 10% | 20% | 30% | 40% | 50% |
|---|---|---|---|---|---|---|---|
| 49.4 | Airflow | m3/h | 2600 | 5200 | 7800 | 10400 | 13000 |
| | Airflow | l/s | 722 | 1444 | 2167 | 2889 | 3611 |
| | Fan RPM | rpm | 663 | 707 | 811 | 955 | 1115 |
| | Total input | kW | 0,16 | 0,47 | 0,67 | 0,96 | 1,37 |
| 54.4 | Airflow | m3/h | 2900 | 5800 | 8700 | 11600 | 14500 |
| | Airflow | l/s | 806 | 1611 | 2417 | 3222 | 4028 |
| | Fan RPM | rpm | 665 | 726 | 858 | 1029 | 1212 |
| | Total input | kW | 0,33 | 0,51 | 0,75 | 1,13 | 1,66 |
| 60.4 | Airflow | m3/h | 3300 | 6600 | 9900 | 13200 | 16500 |
| | Airflow | l/s | 917 | 1833 | 2750 | 3667 | 4583 |
| | Fan RPM | rpm | 600 | 603 | 649 | 719 | 811 |
| | Total input | kW | 0,47 | 0,61 | 0,79 | 1,01 | 1,33 |
| 70.4 | Airflow | m3/h | 3700 | 7400 | 11100 | 14800 | 18500 |
| | Airflow | l/s | 1028 | 2056 | 3083 | 4111 | 5139 |
| | Fan RPM | rpm | 600 | 611 | 672 | 761 | 871 |
| | Total input | kW | 0,49 | 0,65 | 0,86 | 1,16 | 1,57 |
| 80.4 | Airflow | m3/h | 4400 | 8800 | 13200 | 17600 | 22000 |
| | Airflow | l/s | 1222 | 2444 | 3667 | 4889 | 6111 |
| | Fan RPM | rpm | 600 | 630 | 719 | 843 | 987 |
| | Total input | kW | 0,52 | 0,72 | 1,01 | 1,45 | 2,10 |
| 90.4 | Airflow | m3/h | 5200 | 10400 | 15600 | 20800 | 26000 |
| | Airflow | l/s | 1444 | 2889 | 4333 | 5778 | 7222 |
| | Fan RPM | rpm | 590 | 652 | 780 | 943 | 1123 |
| | Total input | kW | 0.54 | 0.80 | 1.21 | 1.88 | 2.88 |
| 100.4 | Airflow | m3/h | 5600 | 11200 | 16800 | 22400 | 28000 |
| | Airflow | l/s | 1556 | 3111 | 4667 | 6222 | 7778 |
| | Fan RPM | rpm | 591 | 669 | 815 | 998 | 1193 |
| | Total input | kW | 0.56 | 0.85 | 1.34 | 2.15 | 3.38 |
| 110.4 | Airflow | m3/h | 6000 | 12000 | 18000 | 24000 | 30000 |
| | Airflow | l/s | 1667 | 3333 | 5000 | 6667 | 8333 |
| | Fan RPM | rpm | 593 | 686 | 853 | 1052 | 1265 |
| | Total input | kW | 0.57 | 0.91 | 1.48 | 2.44 | 3.96 |

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** | | | | |
| **CREFP** | Device for consumption reduction of the external section at variable speed (phase-cutting) | √ | √ | √ | √ |
| **CREFB** | Device for consumption reduction of the external section ECOBREEZE fans | 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 |
| **CC0** | Heating module with combustion chamber only | 0 | 0 | 0 | 0 |
| **GD** | Gas heating module with 2-stage modulation | 0 | 0 | 0 | 0 |
| **OD** | Oil heating module with 2-stage modulation | 0 | 0 | 0 | 0 |
| **GC** | Modulating condensation gas heating module | 0 | 0 | 0 | 0 |
| **CHWER** | Energy recovery from food refrigeration | 0 | 0 | 0 | 0 |
| **AMRX** | Rubber antivibration mounts | ◊ | ◊ | ◊ | ◊ |
| **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** | | | | |
| **MF** | Front air outlet | √ | √ | √ | √ |
| **M3** | Downflow version | 0 | 0 | 0 | 0 |
| **R0** | Horizontal return | √ | √ | √ | √ |
| **R3** | Floor air inlet | 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** | Water to waste evaporating wet-deck humidifier | 0 | 0 | 0 | 0 |
| **LTEMP1** | Application for low outdoor temperature | 0 | 0 | 0 | 0 |
| **VENH** | High head fans | 0 | 0 | 0 | 0 |
| **AXI** | High efficiency diffuser for axial fan - AxiTop | √ | √ | √ | √ |
| **PAQC** | Air quality probe for $CO_2$ rate check | 0 | 0 | 0 | 0 |
| **PAQCV** | Air quality sensor for $CO_2$ and VOC rate check | 0 | 0 | 0 | 0 |
| **SER** | Outdoor air damper manually set | - | √ | - | - |
| **SERM** | Outdoor air motorized on/off damper | - | 0 | - | - |
| **SFCM** | Modulating motorized FREE-COOLING damper | - | √ | √ | √ |
| **SFCEM** | Modulating motorized FREE-COOLING damper and min. outdoor air motorized on/off damper | - | - | 0 | 0 |

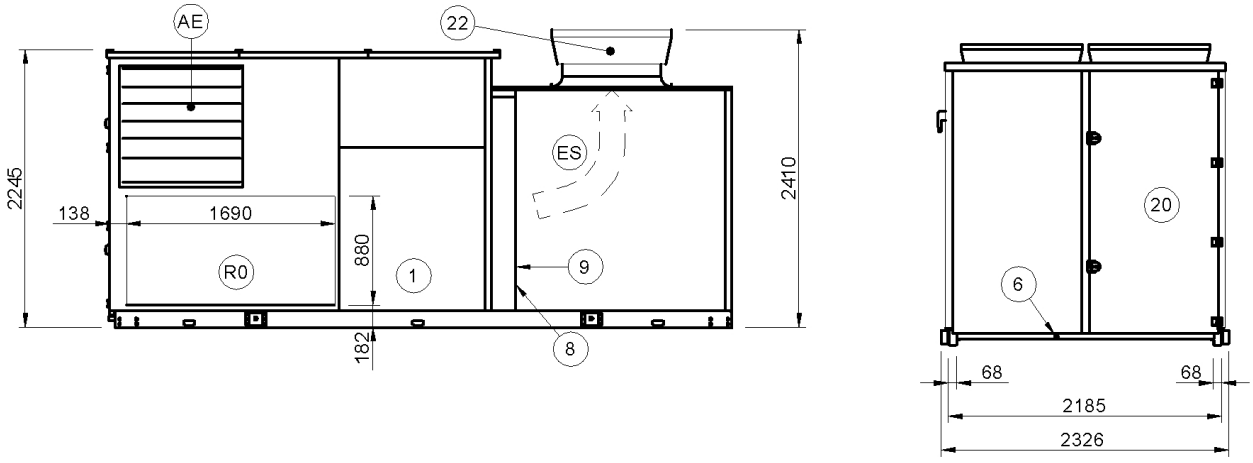
√ Standard componen
0 Optional component
◊ The accessory can be separately supplied (optional
- Not available

| REF. | DESCRIPTION | CAK | CBK | CCK | CCKP |
|---|---|---|---|---|---|
| | **Electric circuit** | | | | |
| **CRC** | Remote control with user interface | √ | √ | √ | √ |
| **NCRC** | Remote control with user interface: not required | 0 | 0 | 0 | 0 |
| **SIX** | Service interface | ◊ | ◊ | ◊ | ◊ |
| **MOB** | Serial port RS485 with Modbus protocol | 0 | 0 | 0 | 0 |
| **LON** | RS485 serial port with LONWORKS protocol | 0 | 0 | 0 | 0 |
| **BACIP** | BACnet-IP communication module | 0 | 0 | 0 | 0 |
| **CLMX** | Clivet Master System | ◊ | ◊ | ◊ | ◊ |
| **DESM** | Smoke detector | 0 | 0 | 0 | 0 |
| **PM** | Phase monitor | √ | √ | √ | √ |
| **MF2** | Multi-function phase monitor | 0 | 0 | 0 | 0 |
| **PFCP** | Power factor correction capacitors (cosfi > 0.9) | 0 | 0 | 0 | 0 |
| **SFSTC** | Progressive compressor start-up device | 0 | 0 | 0 | 0 |
| | **Various** | | | | |
| **SC0** | Shipping via Container | 0 | 0 | 0 | 0 |

√ Standard componen
0 Optional component
◊ The accessory can be separately supplied (optional
- Not available

# Dimensional drawings

## Size 49.4 - 54.4




1. Compressor compartment
2. Electrical panel
3. Connector for keyboard or PC connection
4. Power input
5. Humidifier connections
6. Condensate drain
7. Functional spaces
8. Water heating coil inlet Ø 1" 1/2
9. Water heating coil outlet Ø 1" 1/2
10. Reheat coil (optional)
11. Treatment coil
12. water heating coil (optional)
13. F7 / Electronic filters (optional)
14. Standard G4 filters
15. Electric fan (supply - return)
16. Exhaust electric fan (CCK - CCKP version)
17. Lifting brackets (removable)
18. Outdoor air damper (CBK - CCK - CCKP version)
19. Exhaust overpressure damper (CCK - CCKP version)
20. Access for coil - filter - heater inspection
21. Exhaust air recovery coil (only CCKP version)
22. Axitop (removable)

(R0) Horizontal air return
(R3) Downflow return (optional)
(M0) Horizontal air supply
(M3) Downflow supply (optional)
(AE) Outdoor air intake
(ES) Exhaust air (CCK - CCKP version)
(H1) Wall with same height as unit on a maximum of three sides
(*) Anti-vibration mount position
(**) Suggested minimum clearance

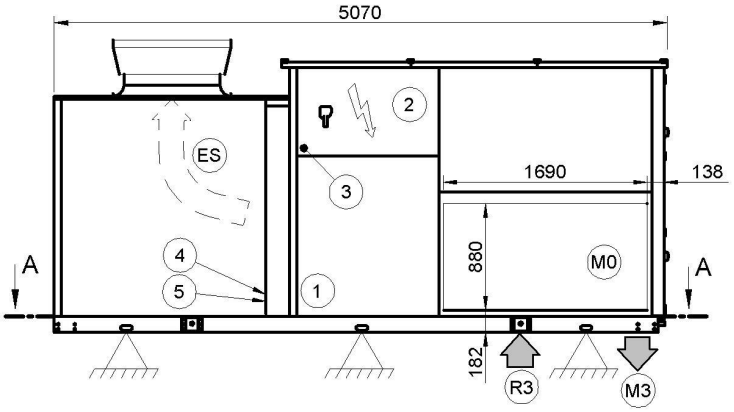
### WEIGHT DISTRIBUTION

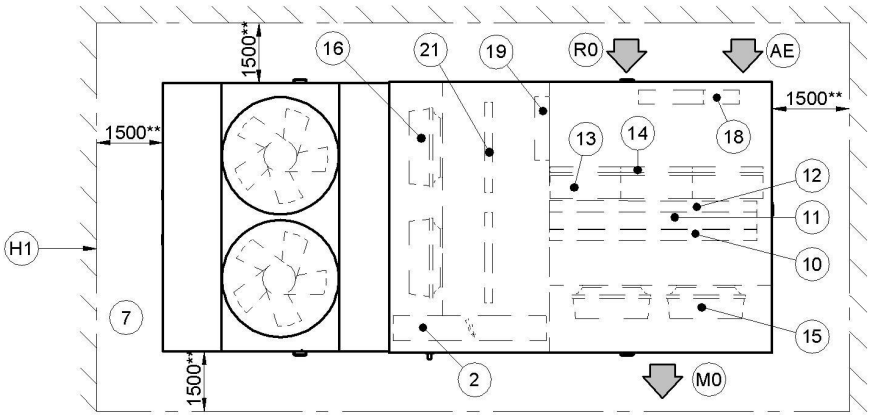
| Size | | 49.4 | | | 54.4 | | |
|---|---|---|---|---|---|---|---|
| **Configuration** | **kg** | **CAK/CBK** | **CCK** | **CCKP** | **CAK/CBK** | **CCK** | **CCKP** |
| W1 Supporting point | kg | 427 | 449 | 468 | 490 | 512 | 531 |
| W2 Supporting point | kg | 383 | 403 | 420 | 440 | 460 | 477 |
| W3 Supporting point | kg | 317 | 334 | 348 | 364 | 381 | 395 |
| W4 Supporting point | kg | 317 | 334 | 348 | 364 | 381 | 395 |
| W5 Supporting point | kg | 350 | 369 | 384 | 402 | 420 | 436 |
| W6 Supporting point | kg | 394 | 415 | 432 | 452 | 473 | 490 |
| Operating weight | kg | 2189 | 2304 | 2400 | 2512 | 2628 | 2724 |
| Shipping weight | kg | 2189 | 2304 | 2400 | 2512 | 2628 | 2724 |

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

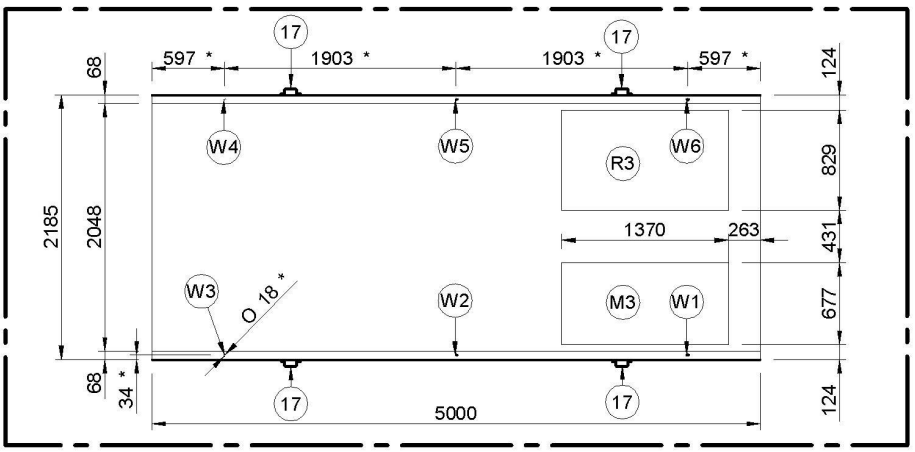
## Size 49.4 - 54.4

**DAA7V49 4_54 4_00**
Date: 20/01/2014

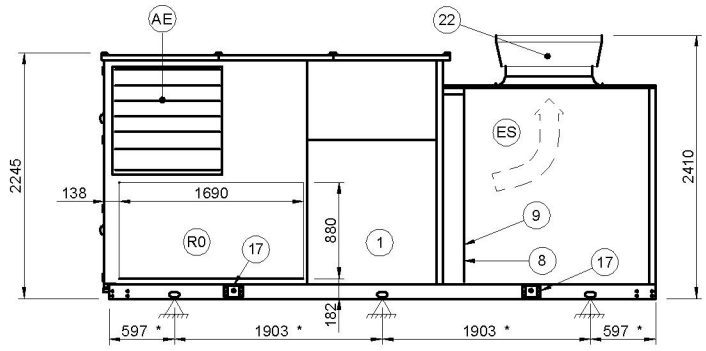


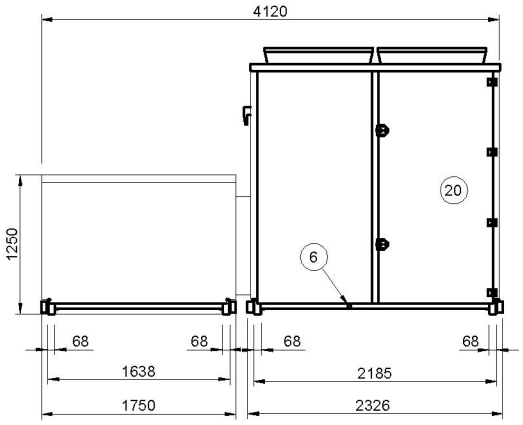




**Sez A-A**



# Size 49.4 - 54.4 Combustion module




1. Compressor compartment
2. Electrical panel
3. Connector for keyboard or PC connection
4. Power input
5. Humidifier connections
6. Condensate drain
7. Functional spaces
8. Water heating coil inlet Ø 1" 1/2
9. Water heating coil outlet Ø 1" 1/2
10. Reheat coil (optional)
11. Treatment coil
12. Water heating coil (optional)
13. F7 / Electronic filters (optional)
14. Standard G4 filters
15. Electric fan (supply - return)
16. Exhaust electric fan (CCK - CCKP version)
17. Lifting brackets (removable)
18. Outdoor air damper (CBK - CCK - CCKP version)
19. Exhaust overpressure damper (CCK - CCKP version)
20. Access for coil - filter - heater inspection
21. Exhaust air recovery coil (only CCKP version)
22. Axitop (removable)
23. Gas module (to be connected to the unit during installation)

(R0) Horizontal air return
(R3) Downflow return (optional)
(M0) Horizontal air supply
(AE) Outdoor air intake
(ES) Exhaust air (CCK - CCKP version)
(H1) Wall with same height as unit on a maximum of three sides
(*) Anti-vibration mount position
(**) Suggested minimum clearance

## WEIGHT DISTRIBUTION

| Size | | 49.4 | | | 54.4 | | |
|---|---|---|---|---|---|---|---|
| **Configuration** | **kg** | **CAK/CBK** | **CCK** | **CCKP** | **CAK/CBK** | **CCK** | **CCKP** |
| W1 Supporting point | kg | 427 | 449 | 468 | 490 | 512 | 531 |
| W2 Supporting point | kg | 383 | 403 | 420 | 440 | 460 | 477 |
| W3 Supporting point | kg | 317 | 334 | 348 | 364 | 381 | 395 |
| W4 Supporting point | kg | 317 | 334 | 348 | 364 | 381 | 395 |
| W5 Supporting point | kg | 350 | 369 | 384 | 402 | 420 | 436 |
| W6 Supporting point | kg | 394 | 415 | 432 | 452 | 473 | 490 |
| Operating weight | kg | 2189 | 2304 | 2400 | 2512 | 2628 | 2724 |
| Shipping weight | kg | 2189 | 2304 | 2400 | 2512 | 2628 | 2724 |

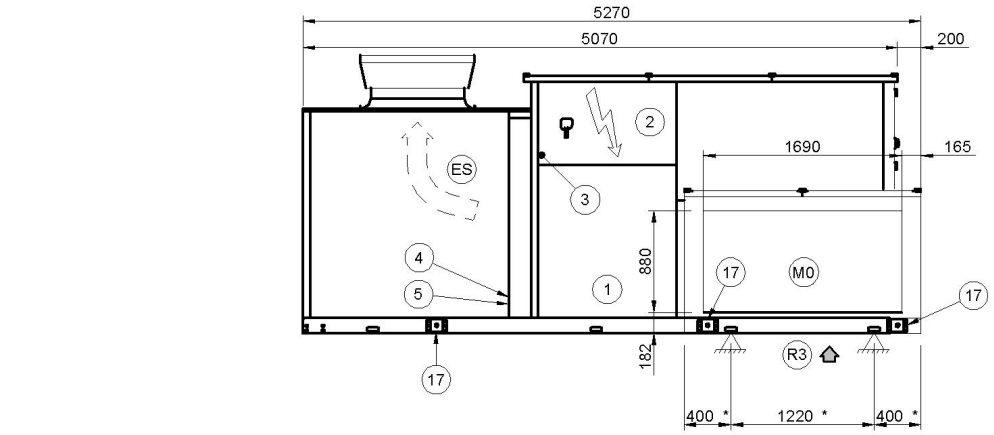
## GAS MODULE WEIGHT DISTRIBUTION

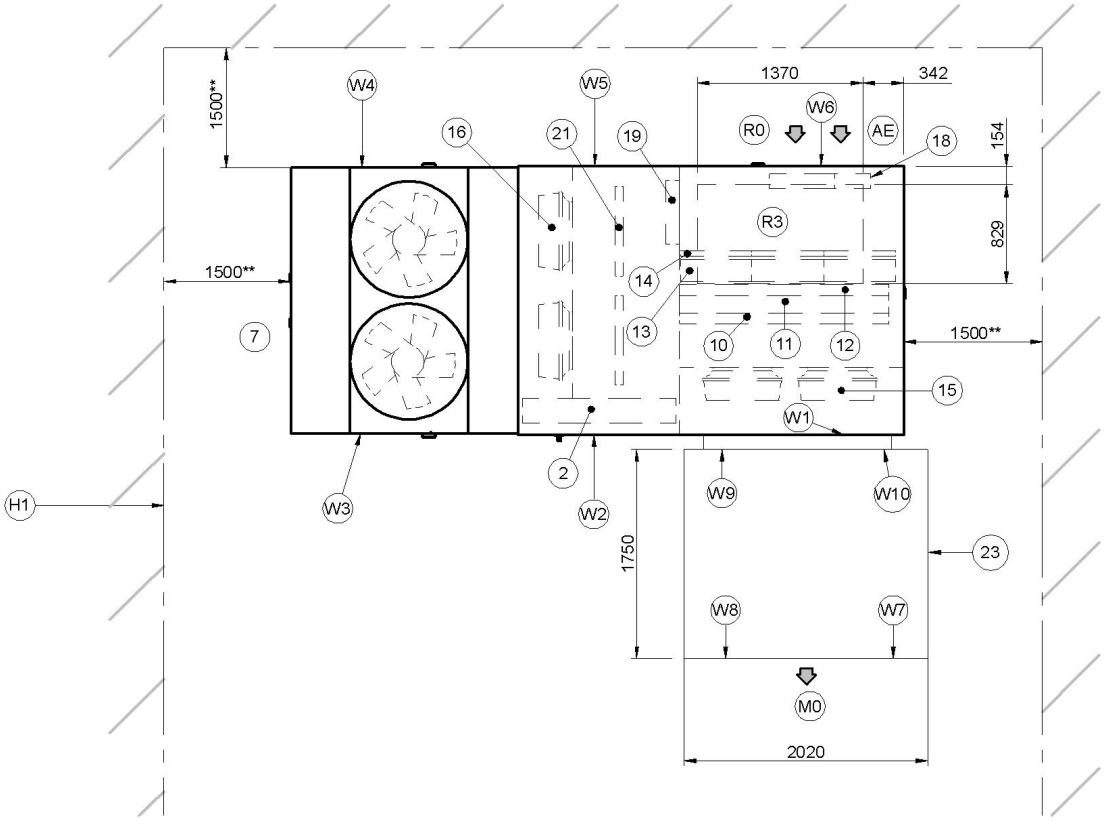
| Size | | 49.4 | 54.4 |
|---|---|---|---|
| W7 Supporting point | kg | 140 | 140 |
| W8 Supporting point | kg | 95 | 95 |
| W9 Supporting point | kg | 95 | 95 |
| W10 Supporting point | kg | 140 | 140 |
| Operating weight | kg | 470 | 470 |
| Shipping weight | kg | 470 | 470 |

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

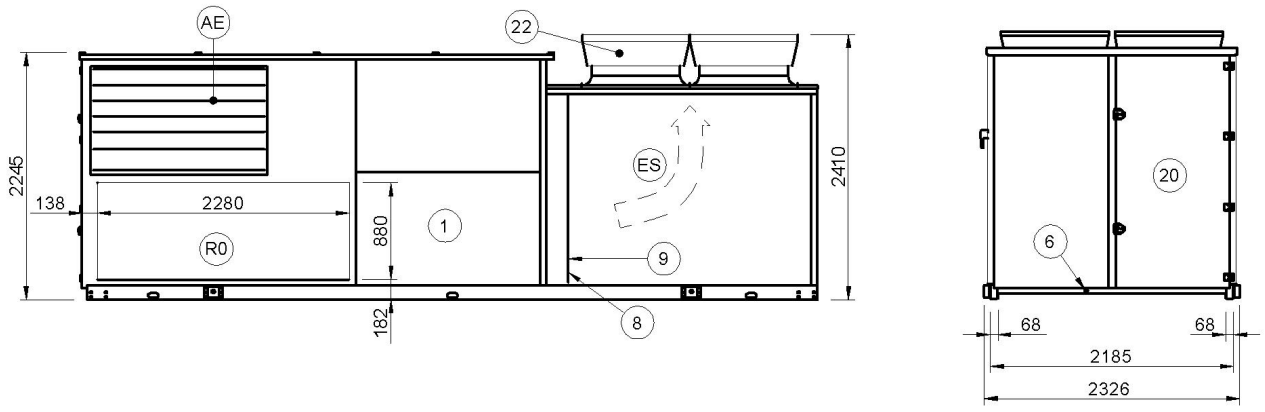
## Size 49.4 - 54.4 Combustion module

**DAA7V49 4_54 4_G01X_00**
Date: 20/01/2014



## Size 60.4 - 70.4 - 80.4




1. Compressor compartment
2. Electrical panel
3. Connector for keyboard or PC connection
4. Power input
5. Humidifier connections
6. Condensate drain
7. Functional spaces
8. Water heating coil inlet Ø 2"
9. Water heating coil outlet Ø 2"
10. Reheat coil (optional)
11. Treatment coil
12. Water heating coil (optional)
13. F7 / Electronic filters (optional)
14. Standard G4 filters
15. Electric fan (supply - return)
16. Exhaust electric fan (CCK - CCKP version)
17. Lifting brackets (removable)
18. Outdoor air damper (CBK - CCK - CCKP version
19. Exhaust overpressure damper (CCK - CCKP version)
20. Access for coil - filter - heater inspection
21. Exhaust air recovery coil (only CCKP version)
22. Axitop (removable)

(R0) Horizontal air return
(R3) Downflow return (optional)
(M0) Horizontal air supply
(M3) Downflow supply (optional)
(AE) Outdoor air intake
(ES) Exhaust air (CCK - CCKP version)
(H1) Wall with same height as unit on a maximum of three sides
(*) Anti-vibration mount position
(**) Suggested minimum clearance

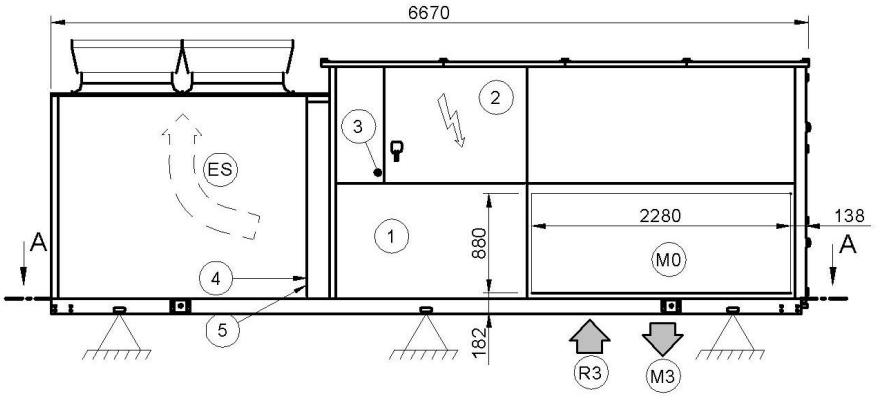
### WEIGHT DISTRIBUTION

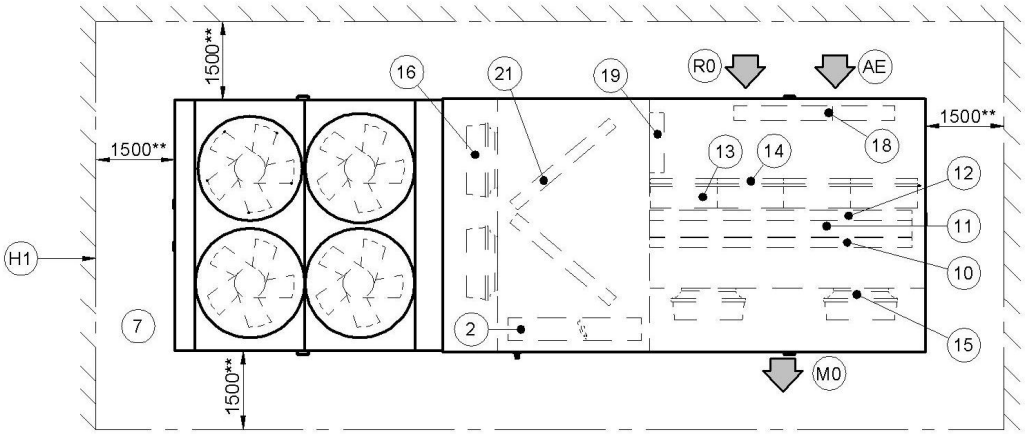
| Size | | 60.4 | | | 70.4 | | | 80.4 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Configuration** | **kg** | **CAK/CBK** | **CCK** | **CCKP** | **CAK/CBK** | **CCK** | **CCKP** | **CAK/CBK** | **CCK** | **CCKP** |
| W1 Supporting point | kg | 524 | 554 | 578 | 562 | 591 | 616 | 644 | 674 | 699 |
| W2 Supporting point | kg | 470 | 497 | 519 | 504 | 530 | 553 | 578 | 605 | 627 |
| W3 Supporting point | kg | 390 | 412 | 430 | 418 | 440 | 458 | 479 | 501 | 520 |
| W4 Supporting point | kg | 390 | 412 | 430 | 418 | 440 | 458 | 479 | 501 | 520 |
| W5 Supporting point | kg | 430 | 454 | 475 | 461 | 485 | 505 | 529 | 553 | 573 |
| W6 Supporting point | kg | 484 | 511 | 534 | 518 | 546 | 568 | 595 | 622 | 645 |
| Operating weight | kg | 2688 | 2839 | 2966 | 2880 | 3031 | 3158 | 3305 | 3457 | 3583 |
| Shipping weight | kg | 2688 | 2839 | 2966 | 2880 | 3031 | 3158 | 3305 | 3457 | 3583 |

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

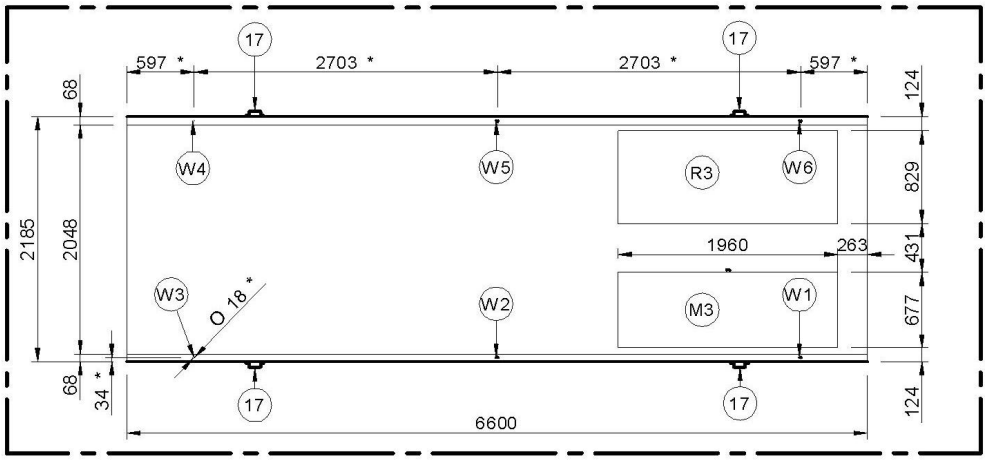
## Size 60.4 - 70.4 - 80.4

**DAA7V60 4_80 4_00**
Date: 20/01/2014

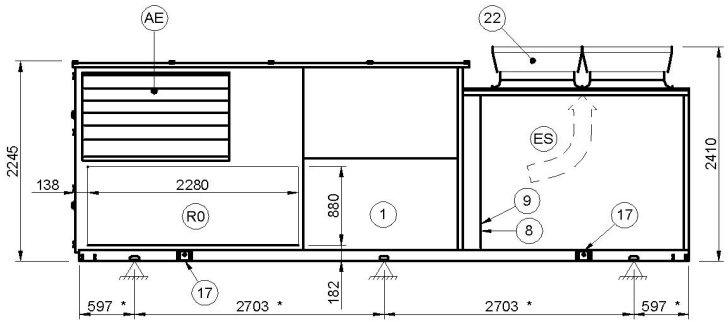


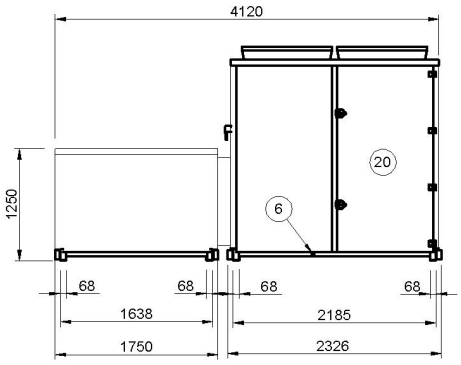




Sez A-A



# Size 60.4 - 70.4 - 80.4 Combustion module




1. Compressor compartment
2. Electrical panel
3. Connector for keyboard or PC connection
4. Power input
5. Humidifier connections
6. Condensate drain
7. Functional spaces
8. Water heating coil inlet Ø 2"
9. Water heating coil outlet Ø 2"
10. Reheat coil (optional)
11. Treatment coil
12. Water heating coil (optional)
13. F7 / Electronic filters (optional)
14. Standard G4 filters
15. Electric fan (supply - return)
16. Exhaust electric fan (CBK - CCK - CCKP version)
17. Lifting brackets (removable)
18. Outdoor air damper
19. Exhaust overpressure damper (CCK - CCKP version)
20. Access for coil - filter - heater inspection
21. Exhaust air recovery coil (only CCKP version)
22. Axitop (removable)
23. Gas module (to be connected to the unit during installation)

(R0) Horizontal air return
(R3) Downflow return (optional)
(M0) Horizontal air supply
(AE) Outdoor air intake
(ES) Exhaust air (CCK - CCKP version)
(H1) Wall with same height as unit on a maximum of three sides
(*) Anti-vibration mount position
(**) Suggested minimum clearance

## WEIGHT DISTRIBUTION

| Size | | 60.4 | | | 70.4 | | | 80.4 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Configuration** | **kg** | **CAK/CBK** | **CCK** | **CCKP** | **CAK/CBK** | **CCK** | **CCKP** | **CAK/CBK** | **CCK** | **CCKP** |
| W1 Supporting point | kg | 524 | 554 | 578 | 562 | 591 | 616 | 644 | 674 | 699 |
| W2 Supporting point | kg | 470 | 497 | 519 | 504 | 530 | 553 | 578 | 605 | 627 |
| W3 Supporting point | kg | 390 | 412 | 430 | 418 | 440 | 458 | 479 | 501 | 520 |
| W4 Supporting point | kg | 390 | 412 | 430 | 418 | 440 | 458 | 479 | 501 | 520 |
| W5 Supporting point | kg | 430 | 454 | 475 | 461 | 485 | 505 | 529 | 553 | 573 |
| W6 Supporting point | kg | 484 | 511 | 534 | 518 | 546 | 568 | 595 | 622 | 645 |
| Operating weight | kg | 2688 | 2839 | 2966 | 2880 | 3031 | 3158 | 3305 | 3457 | 3583 |
| Shipping weight | kg | 2688 | 2839 | 2966 | 2880 | 3031 | 3158 | 3305 | 3457 | 3583 |

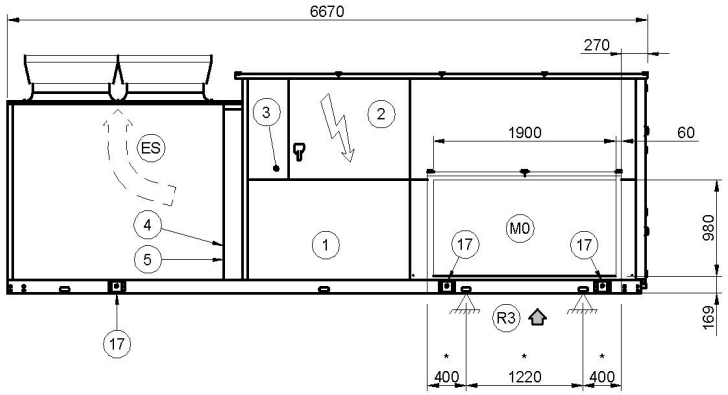
## GAS MODULE WEIGHT DISTRIBUTION

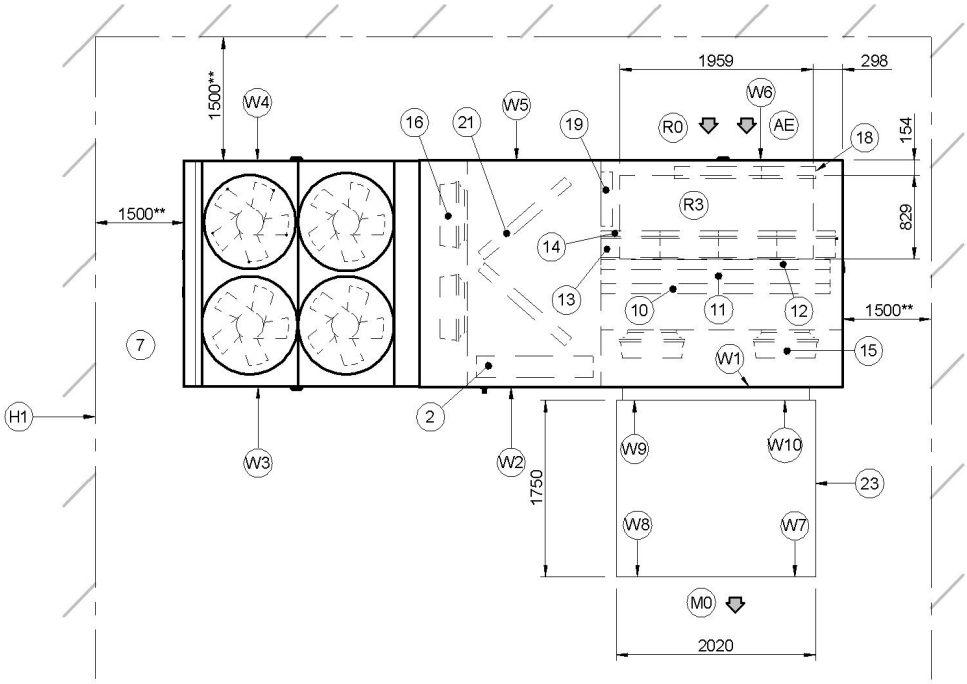
| Size | | 60.4 | 70.4 | 80.4 |
|---|---|---|---|---|
| W7 Supporting point | kg | 140 | 140 | 140 |
| W8 Supporting point | kg | 95 | 95 | 95 |
| W9 Supporting point | kg | 95 | 95 | 95 |
| W10 Supporting point | kg | 140 | 140 | 140 |
| Operating weight | kg | 470 | 470 | 470 |
| Shipping weight | kg | 470 | 470 | 470 |

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

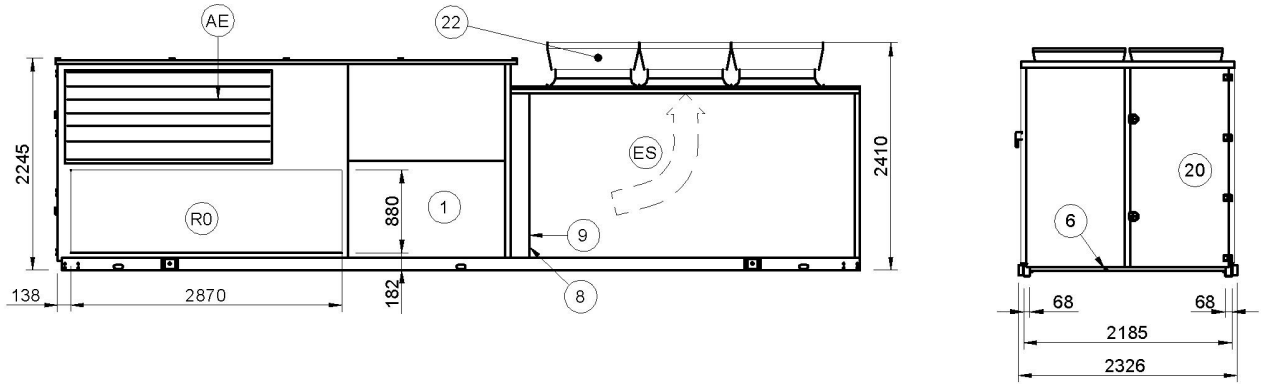
## Size 60.4 - 70.4 - 80.4 Combustion module

**DAA7V60 4_80 4_G01X_00**
Date: 20/01/2014



## Size 90.4 - 100.4 - 110.4




1. Compressor compartment
2. Electrical panel
3. Connector for keyboard or PC connection
4. Power input
5. Humidifier connections
6. Condensate drain
7. Functional spaces
8. Water heating coil inlet Ø 2"
9. Water heating coil outlet Ø 2"
10. Reheat coil (optional)
11. Treatment coil
12. Water heating coil (optional)
13. F7 / Electronic filters (optional)
14. Standard G4 filters
15. Electric fan (supply - return)
16. Exhaust electric fan (CCK - CCKP version)
17. Lifting brackets (removable)
18. Outdoor air damper (CBK - CCK - CCKP version)
19. Exhaust overpressure damper (CCK - CCKP version)
20. Access for coil - filter - heater inspection
21. Exhaust air recovery coil (only CCKP version)
22. Axitop (removable)

(R0) Horizontal air return
(R3) Downflow return
(M0) Horizontal air supply
(M3) Downflow supply (optional)
(AE) Outdoor air intake
(ES) Exhaust air (CCK - CCKP version)
(H1) Wall with same height as unit on a maximum of three sides
(*) Anti-vibration mount position
(**) Suggested minimum clearance

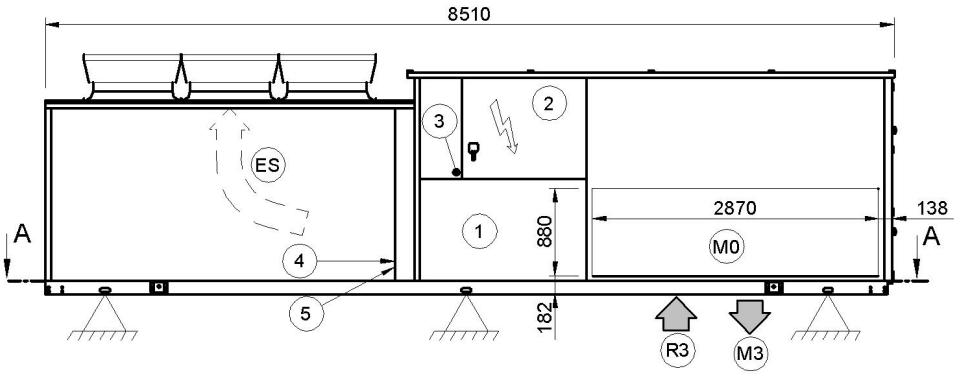
### WEIGHT DISTRIBUTION

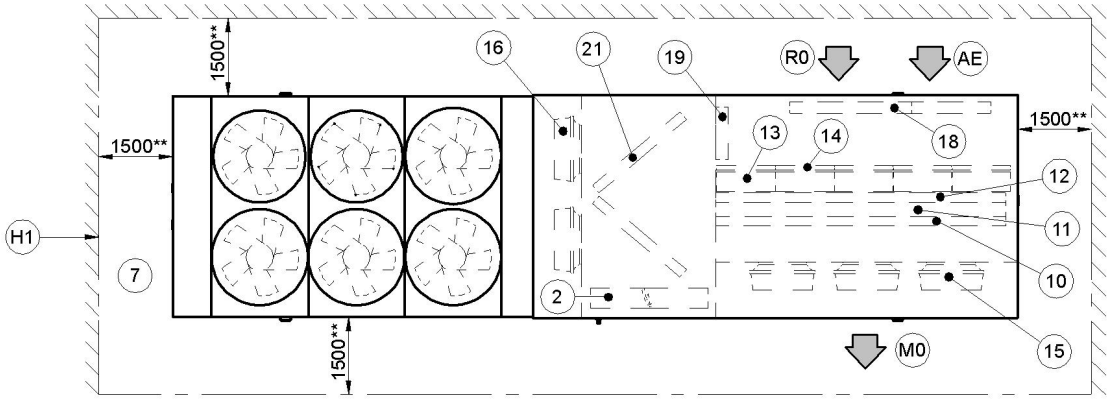
| Size | | 90.4 | | | 100.4 | | | 110.4 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Configuration** | **kg** | **CAK/CBK** | **CCK** | **CCKP** | **CAK/CBK** | **CCK** | **CCKP** | **CAK/CBK** | **CCK** | **CCKP** |
| W1 Supporting point | kg | 669 | 706 | 738 | 717 | 754 | 786 | 822 | 860 | 891 |
| W2 Supporting point | kg | 600 | 634 | 662 | 643 | 677 | 705 | 738 | 772 | 800 |
| W3 Supporting point | kg | 497 | 525 | 549 | 533 | 561 | 584 | 611 | 640 | 663 |
| W4 Supporting point | kg | 497 | 525 | 549 | 533 | 561 | 584 | 611 | 640 | 663 |
| W5 Supporting point | kg | 549 | 580 | 605 | 588 | 619 | 645 | 675 | 706 | 731 |
| W6 Supporting point | kg | 617 | 652 | 681 | 661 | 696 | 725 | 759 | 794 | 823 |
| Operating weight | kg | 3430 | 3622 | 3784 | 3674 | 3867 | 4029 | 4217 | 4411 | 4571 |
| Shipping weight | kg | 3430 | 3622 | 3784 | 3674 | 3867 | 4029 | 4217 | 4411 | 4571 |

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

## Size 90.4 - 100.4 - 110.4

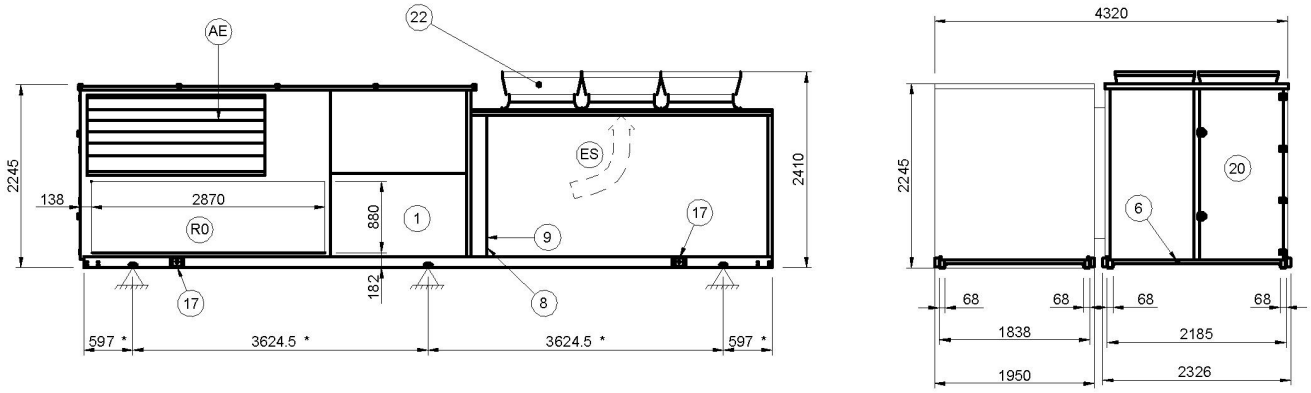
**DAA7V90 4_110 4_00**
Date: 20/01/2014




Sez A-A

# Size 90.4 - 100.4 - 110.4 Combustion module




1. Compressor compartment
2. Electrical panel
3. Connector for keyboard or PC connection
4. Power input
5. Humidifier connections
6. Condensate drain
7. Functional spaces
8. Water heating coil inlet Ø 2"
9. Water heating coil outlet Ø 2"
10. Reheat coil (optional)
11. Treatment coil
12. Water heating coil (optional)
13. F7 / Electronic filters (optional)
14. Standard G4 filters
15. Electric fan (supply - return)
16. Exhaust electric fan (CCK - CCKP version)
17. Lifting brackets (removable)
18. Outdoor air damper (CBK - CCK - CCKP version)
19. Exhaust overpressure damper (CCK - CCKP version)
20. Access for coil - filter - heater inspection
21. Exhaust air recovery coil (only CCKP version)
22. Axitop (removable)
23. Gas module (to be connected to the unit during installation)

(R0) Horizontal air return
(R3) Downflow return (optional)
(M0) Horizontal air supply
(AE) Outdoor air intake
(ES) Exhaust air (CCK - CCKP version)
(H1) Wall with same height as unit on a maximum of three sides
(*) Anti-vibration mount position
(**) Suggested minimum clearance

## WEIGHT DISTRIBUTION

| Size | | 90.4 | | | 100.4 | | | 110.4 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Configuration** | **kg** | **CAK/CBK** | **CCK** | **CCKP** | **CAK/CBK** | **CCK** | **CCKP** | **CAK/CBK** | **CCK** | **CCKP** |
| W1 supporting point | kg | 669 | 706 | 738 | 717 | 754 | 786 | 822 | 860 | 891 |
| W2 Supporting point | kg | 600 | 634 | 662 | 643 | 677 | 705 | 738 | 772 | 800 |
| W3 Supporting point | kg | 497 | 525 | 549 | 533 | 561 | 584 | 611 | 640 | 663 |
| W4 Supporting point | kg | 497 | 525 | 549 | 533 | 561 | 584 | 611 | 640 | 663 |
| W5 Supporting point | kg | 549 | 580 | 605 | 588 | 619 | 645 | 675 | 706 | 731 |
| W6 Supporting point | kg | 617 | 652 | 681 | 661 | 696 | 725 | 759 | 794 | 823 |
| Operating weight | kg | 3430 | 3622 | 3784 | 3674 | 3867 | 4029 | 4217 | 4411 | 4571 |
| Shipping weight | kg | 3430 | 3622 | 3784 | 3674 | 3867 | 4029 | 4217 | 4411 | 4571 |

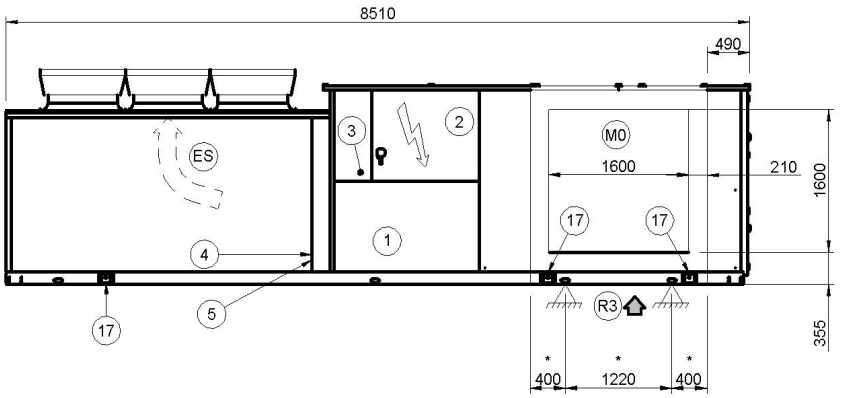
## GAS MODULE WEIGHT DISTRIBUTION

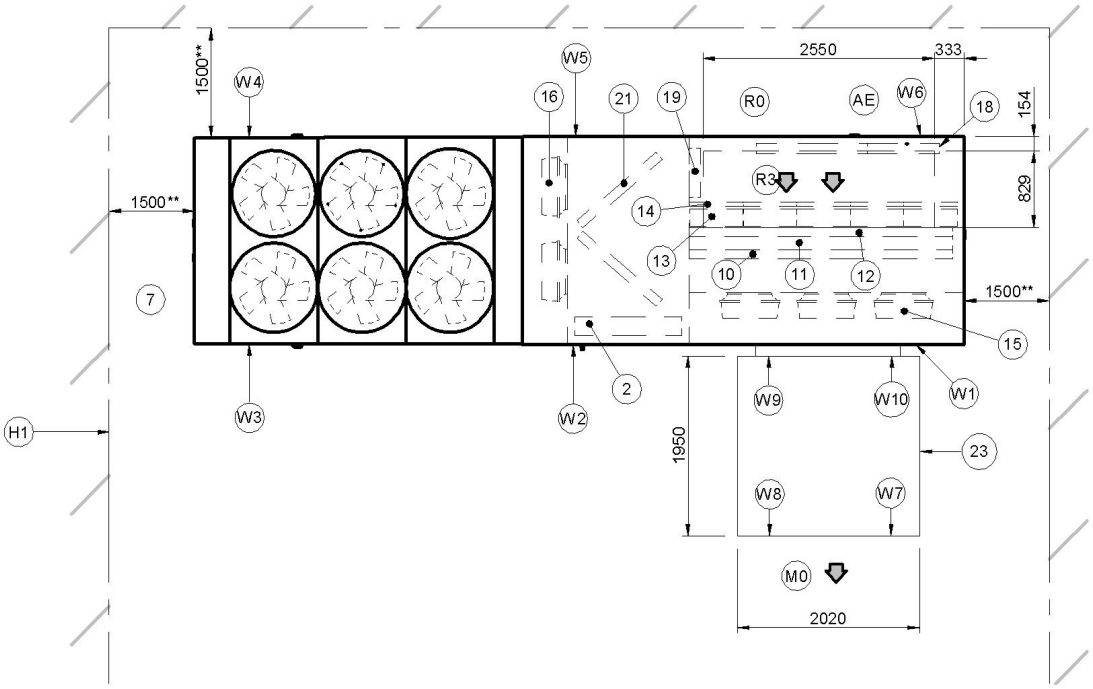
| Size | | 90.4 | 100.4 | 110.4 |
|---|---|---|---|---|
| W7 Supporting point | kg | 245 | 245 | 245 |
| W8 Supporting point | kg | 165 | 165 | 165 |
| W9 Supporting point | kg | 165 | 165 | 165 |
| W10 Supporting point | kg | 245 | 245 | 245 |
| Operating weight | kg | 820 | 820 | 820 |
| Shipping weight | kg | 820 | 820 | 820 |

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

## Size 90.4 - 100.4 - 110.4 Combustion module

**DAA7V90 4_110 4_G02X_00**
Date: 20/01/2014



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