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

CLIVETPack^2

CSRN-XHE2 15.2-44.4 HSE

TECHNICAL BULLETIN

R-410A

ErP 2021 COMPLIANT

SIZE	15.2	18.2	20.4	25.4	30.4	33.4	40.4	44.4
COOLING CAPACITY kW	55,0	65,7	82,6	94,7	103,0	118,6	137,5	146,2
HEATING CAPACITY kW	49,8	63,4	74,4	90,4	98,3	118,0	145,3	154,0

EUROVENT CERTIFIED PERFORMANCE
www.eurovent-certification.com

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Clivet is taking part in the EUROVENT certification programme up to 1.500 kW. The products concerned appear in the certified products list of the EUROVENT www.eurovent-certification.com site.

Features

CLIVETPack for medium attendance applications

The CSRN-XHE2 units are high-efficiency stand-alone air conditioners designed for medium and large commercial areas. They are specific for use in medium crowded environments such as: shopping centres, shopping arcades, supermarkets, hypermarkets, railway stations, airports and industrial warehouses.
The series is characterised by a dual refrigeration circuit with scroll compressors connected in tandem to the single circuit. This solution makes it possible to follow the trend of the thermal load even in mid-seasons, reaching very high seasonal performance as required by the ErP 2021 regulations.

Clivet rooftop are Eurovent certified products

The ClivetPack2 series has the Eurovent Certified Performance quality mark, which means it has been tested strictly in accordance with the European standards. This provides an additional guarantee for the customer; in fact, the Eurovent tests confirm the performance of the product and permit accurate analysis of the running costs: “Total Life Cycle Cost”.

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

There are four main configurations, from the full recirculation version, with minimum fresh air, to versions with renewal and energy recovery on the exhaust air. Each one can be integrated with a broad range of accessories that customise the product according to the application.

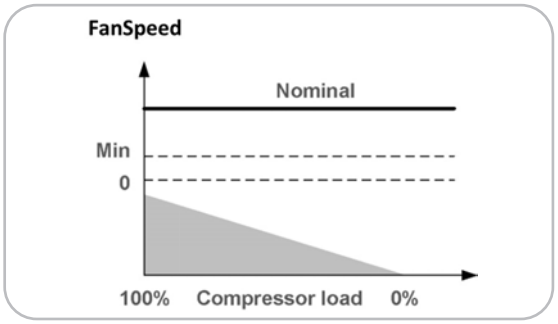
- ✓ Independent dual refrigeration circuit with two scroll compressors connected in parallel that allow for up to 3 partialisation steps per circuit (from size 20.4).
- ✓ Radial fans directly coupled to EC brushless motors (plug fans) permit control of the airflow for adapting to the characteristics of the aeraulic system. On both the supply and the exhaust section.
- ✓ Filtration of air in several stages, from coarse particles (G4 filters) to classes of absolute filtration (electronic filters).
- ✓ Constant or variable control of the flow of supply air.
- ✓ Automatic and variable control of the amount of fresh air based on the actual requirement of occupants, with air quality probe.
- ✓ Freecooling function when it is possible to use outdoor air directly to meet the internal loads.
- ✓ Great flexibility of the distribution of air, with the possibility of connecting a roofcurb for supply and/or return from below.
- ✓ Summer dehumidification function with hot-gas post-heating to increase comfort even with high latent loads
- ✓ Heating solutions that can be used together with or instead of the heat pump: electric heaters, hot water coil, modulating gas module with condensation technology.
- ✓ Humidification systems integrated in the unit.
- ✓ Possibility of connection to the main supervision systems with communication protocol: ModBus, LonWorks, Bacnet.

All the accessories are cabled and supplied on board the unit unless specified otherwise.

Automatic management of the air flow

Standard mode

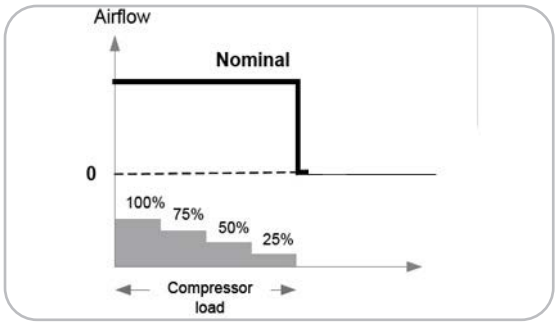
The supply airflow is managed with 0-10V signal.
The signal remains constant and keeps the fan speed consistent in all thermal load conditions and operating mode.



ECO mode (standard function)

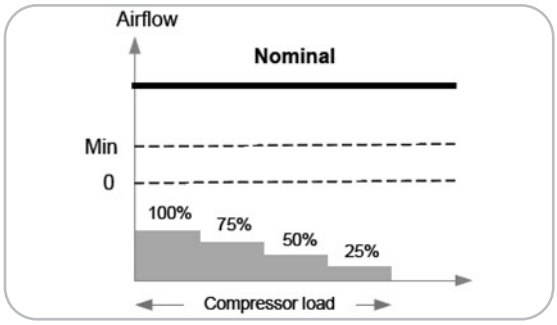
The air flow supply remains constant at varied heat loads and is shutdown when the load is fulfilled (dead zone).
To further increase the energy savings in this condition, it is also possible to set less demanding operation setpoints for the unit in respect to the standard mode.
This function is indicated 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 from supervisor input signal



Constant airflow (PCOSM option)

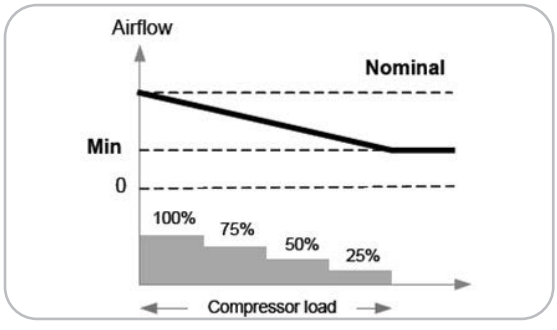
The supply airflow remains constant even if the filters get progressively clogged, thus compensating for the increased load drops.



Variable airflow (PVAR option)

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.i
- 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.



Features

Smart management of defrosts

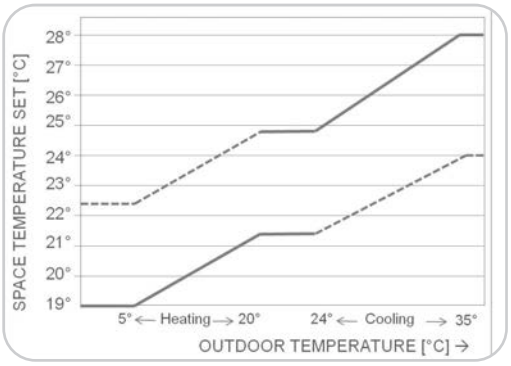
The automatic defrost cycles on the remaining external exchanger surface are managed in predictive mode, reducing both the frequency and the duration. The built-in electronics analyses not only the external conditions, but also the evaporation pressure variation in the exchanger.

The standard management of the defrosting cycles enables one circuit at a time without stopping ventilation. This reduces the time required for defrosting while preventing excessively cold air from being introduced into the room, thus maintaining comfort conditions for users.

Set-point automatic compensation

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

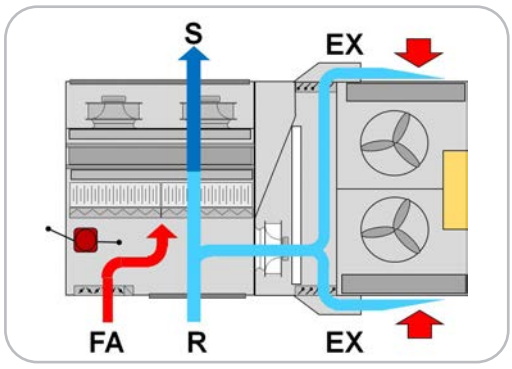
- further increases the energy saving;
- reduces the temperature difference between the outside and the served area, increasing the user comfort.



Ambient pressure control

The ambient pressure control device compares the return pressure with the external pressure and compensates any variations by acting on the outdoor air damper.
This way, the unit maintains the relevant ambient pressure desired by the user, who can choose between the overpressure, depression or equal-pressure.

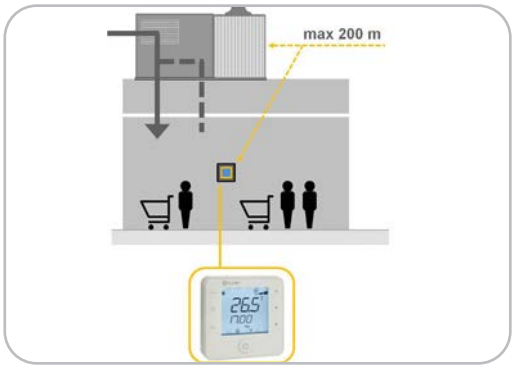
The room pressure control device is fitted as standard in the units with extraction and exhaust (Clivet reference code CCK and CCKP)



Simple and intuitive user interface

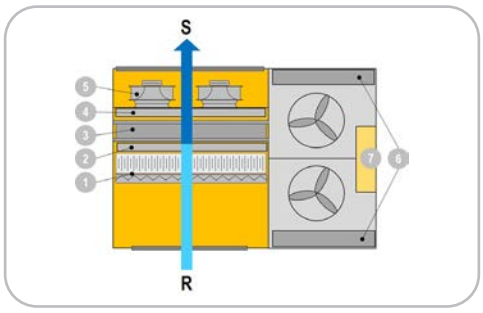
An innovative graphic interface prepared for wall-installation (with 230V power supply and wiring at the customer's care) is supplied as standard, with the option to be removed from the support and connected on-board for maintenance operations.
Among the main functions it allows to:

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



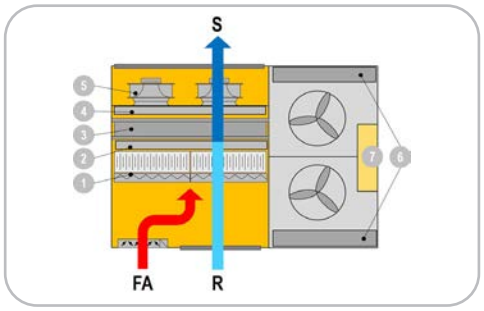
CAK - Configuration: single fan section for full recirculation

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



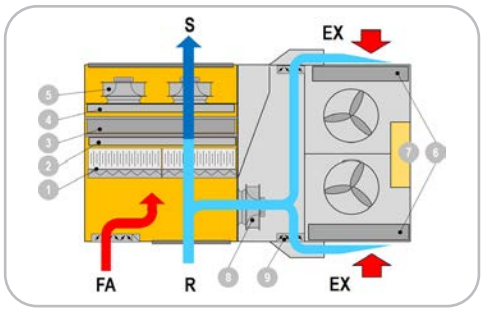
CBK - configuration: single fan section for recirculation and fresh air

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



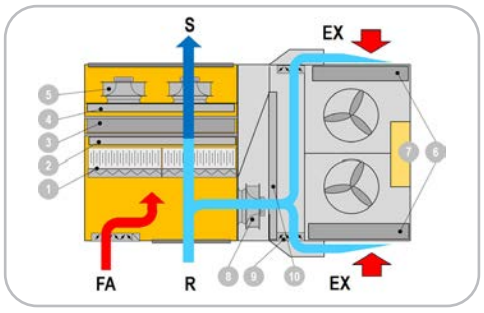
CCK - double fan section for recirculation, fresh air, exhaust, thermodynamic recovery

For applications with automatic air renewal and free-cooling function control. 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.
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 - 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 innovative THOR recovery is always included in the CCKP configuration and uses direct expansion refrigeration circuit technology.
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

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

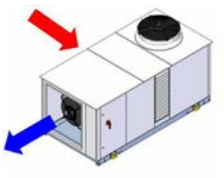
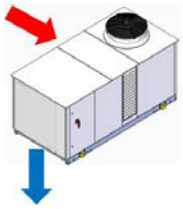
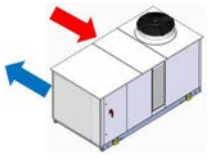
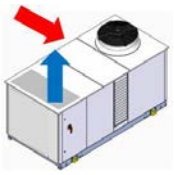
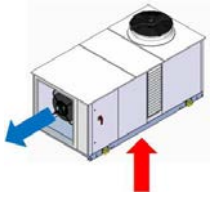
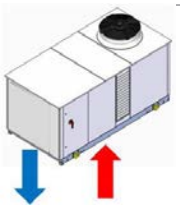
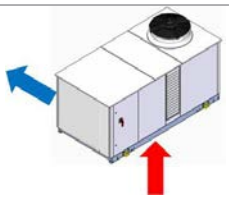
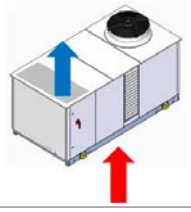
1. First and second filtration stage (opt.)
2. Hot water exchanger or electric heaters
3. Handling exchanger
4. Hot gas reheating exchanger
5. Return + supply fan section
6. Source side exchanger
7. Electrical panel
8. Exhaust fan
9. Overpressure damper
10. Thermodynamic recovery exchanger, THOR

Unit configurations

Supply and return configurations

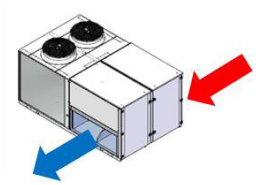
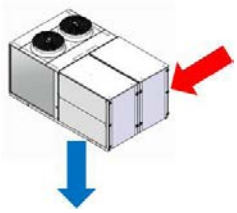
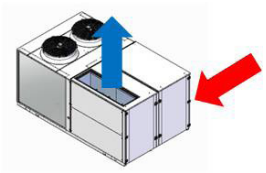
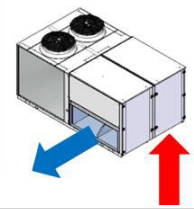
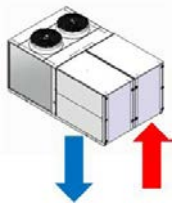
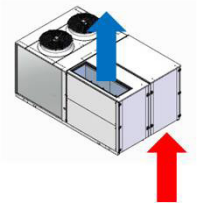
FUNCTIONALITIES Size 15.2 - 18.2

Air supply and return

M0 - R0	M3 - R0	ML - R0	M5 - R0
Standard unit	Option	Option	Option
			
M0 - R3	**M3 - R3**	**ML-R3**	**M5 - R3**
Option	Option	Option	Option
			

FUNCTIONALITIES Size 20.4 - 44.4

Air supply and return

M0 - R0	M3 - R0	M5 - R0
Standard unit	Option	Option
		
M0 - R3	**M3 - R3**	**M5-R3**
Option	Option	Option
		

Filter nomenclature in accordance with EN ISO 16890

The classification of air filters is based on the ability to retain airborne particulate matter.
To make it possible and easier to select appropriate filters according to different applications, a new global standard for filtration has been recently introduced: EN ISO 16890.
It defines a new and alternative classification for air filters based on their ability to retain dispersed airborne particulate matter (PM10, PM2.5 and PM1) through new, more stringent and specific test methods.
The previous standards in force, such as EN 779-2012, ASHRAE 52.2 and other local standards, are thus unified for all countries worldwide.
Below, the correlation between the traditional nomenclature and the new standard for filters used in Clivet units. For easier reading, both names have been kept in the text.

1st stage of filtration (standard)	G4	ISO 16890 Coarse 60%
2st stage of filtration (optional)	F7	ISO 16890 ePM1 55%
2st stage of filtration (optional)	FES (electronic filters)	ISO 16890 ePM1 90%

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 30 mm with thermal conductivity coefficient 0.022W/mK, thickness of internal sheet metal 5/10 mm hot galvanized. The access door panels for the routine maintenance are provided with a PVC profile for thermal insulation and a EPDM rubber gasket that ensures the hermetic seal.
All panelling can easily be removed to allow complete accessibility to internal components.

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

External exchanger
Direct expansion finned coil exchanger made with copper pipes placed on staggered rows mechanically expanded to better adhere to the fin collar. The fins are made from aluminium with a corrugated surface and adequately distanced to ensure the maximum heat exchange efficiency.
A correct power supply to the expansion valve is ensured by the subcooling circuit; this circuit also prevents the formation of ice at the base of the heat exchanger during winter operation.

Fan
Internal section
Plug fans without scroll with reverse blades driven by electronically-controlled “brushless” dc motors with direct coupling. No transmission sizing is needed. The motor is in compliance with ErP 2015according to Regulation UE 640/2009. Class IE4.
External section
Helical fans with die-cast aluminium blades, directly coupled to a three-phase electric motor with external rotor, with built-in thermal overload protection, IP 54 index of protection. Housed inside an aerodinamically shaped nozzles to increase efficiency and minimise noise levels; fitted with safety grills. The motor is in compliance with ErP 2015according to Regulation UE 640/2009.

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

Filtration
Outdoor air inlet side and environment return side
Pleated filter for greater filtering surface, made of a galvanized sheet frame with a galvanized and electric-welded protective mesh, and regenerable filtering media made from polyester fibre sized with synthetic resins. Efficiency G4 (ISO 16890 Coarse 60%). Self-extinguishing type (flame resistant class 1 - DIN 53438).

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

Electrical panel
The electrical panel is situated inside the units and is accessed through a hinged door that is opened by a special key.
The capacity section includes:
- main door lock isolator switch
- compressor circuit breaker
- compressor power supply remote control switch
- fan motor thermal protections of internal and external section
- circuit breaker to protect auxiliary circuit

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

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

Standard unit technical features

Accessories

- VENH - High static pressure fans
- CREFB - Device for fan consumption reduction of the external section, ECOBREEZE type
- F7 - High efficiency F7 air filter (ISO 16890 ePM1 55%)
- FES - Electronic filters (ISO 16890 ePM1 90%)
- UVC - UV-C germicidal lamps
- PSAF - Differential pressure switch for dirty air filters
- PCOSM - Constant supply airflow
- PVAR - Variable airflow
- FCE - Enthalpy FREE-COOLING
- PAQC - Air quality probe for CO2 rate check
- PAQCV - Air quality probe for CO2 and VOC rate check
- MHP - High and low pressure gauges
- CPHG - Hot gas re-heating coil
- CTERM - Remote keypad for indoor temperature and humidity control
- CSOND - Temperature and humidity ambient control with built-in probes
- EH - Electric heaters
- CHW2 - Two-rows hot water coil
- 3WVM - Modulating 2-way valve
- 2WVM - Modulating 3-way valve
- 3WVM - Modulating 3-way valve for energy recovery from food refrigeration
- CHWER - Energy recovery from the food refrigeration
- GC - Condensig gas heating module with modulating control
- HSE - Immersed electrodes steam humidifier
- LTEMP1 - Application for low outdoor temperature
- PCM0 - Sandwich panels of the handling zone M10 fire reaction class
- CMSC9 - Serial communication module for Modbus supervisor
- CMSC10 - Serial communication module for LonWorks spervisor
- CMSC11 - Serial communication module for BACnet-IP supervior
- DML - Demand limit
- DESM - Smoke detector
- PM - Phase monitor
- PFCC - Power factor correction capacitors (cosfi > 0.95)
- SFSTC - Progressive compressor start-up Soft starter
- PTCO - Set up for shipping via container
- M3 - Downflow supply
- M5 - Upward supply air
- R3 - Floor air inlet

Accessories separately supplied

- CLMX - Clivet Master System RCX - Roof curb
- RCX - Roof curb
- AMRX - Rubber antivibration mounts
- AMRMX - Rubber antivibration mounts for unit and gas module

All the handling coils can be provided with coated aluminium - Fin Guard - copper/copper.

Test

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

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

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

- **Modulating motorized outdoor air damper for renewal and e FREE-COOLING**
- **Exhaust fan**
  Plug fans without scroll with reverse blades driven by electronically-controlled “brushless” DC motors with direct coupling. No drive sizing is required.
- **Thermodynamic recovery on the exhaust air**
  The energy content of the exhaust air is recovered by the external exchanger, through a dedicated fan section. The favourable air temperature on the source side increases unit capacity.

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

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

- **Modulating motorized outdoor air damper for renewal and e FREE-COOLING**
- **Exchanger for thermodynamic recovery - THOR**
  The energy content of the exhaust air is recovered by a dedicated exchanger, as integral part of the refrigeration circuit. It is a direct expansion finned coil exchanger made with copper pipes placed on staggered rows mechanically expanded to better adhere to the fin collar. The fins are made from aluminium with a corrugated surface and adequately distanced to ensure the maximum heat exchange efficiency.

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

1. Configuration
CAK configuration: single fan section for full recirculation
CBK configuration: single fan section for recirculation and fresh air
CCK double fan section for recirculation, fresh air, exhaust, thermodynamic recovery
CCKP double fan section with fresh air and THOR thermodynamic recovery

2. Air supply
M0 Horizontal supply
M3 Downflow supply
M5 Upflow supply
ML Lateral supply

3. Air return
R0 Horizontal return
R3 Downflow return

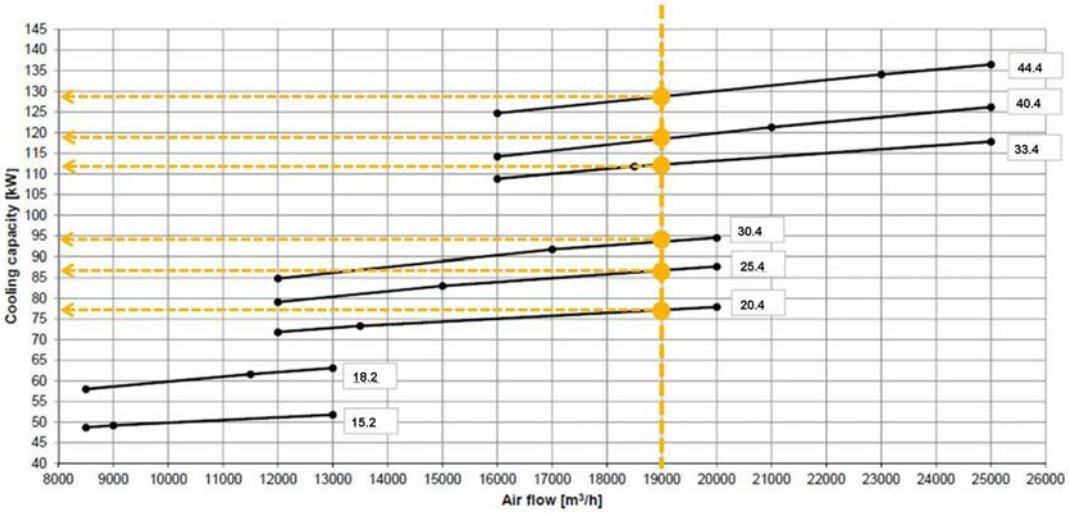
4. Outdoor air damper
- not required (Std)
SERM - Outdoor air on/off motorized damper
SERMD - Modulating motorized fresh air shutter

5. Auxiliary heating
- not required (Std)
EH - Electric elements
CHW2 - two rows hot water coil
GC - Gas heating module
CHWER - Energy recovery from the food refrigeration

6. Airflow
- not required (Std)
PCOSM - Supply constant airflow
PVAR - Variable airflow

7. External section fan
CREFO - Device to reduce the consumption levels of on/off fans on the external section
CREFB - ECOBREEZE external section fans consumption reduction device

How choosing the unit
The selection of the most appropriate size for an installation can be performed starting from the supply airflow value, established this value it is possible to choose among different available thermo-refrigerant treatments.
It is well-known that buildings built with modern technologies, that improve efficiency, have different needs than the previous buildings. In this case, the designer has to design systems with different potentialities.
Example: with airflow at 19000 m3/h, 6 possible cooling capacities are highlighted to do a different treatment, allowing to the designer to have a wide choice.



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

General technical data

Standard airflow

SIZE				15.2	18.2	20.4	25.4	30.4	33.4	40.4	44.4
COOLING											
Cooling capacity		1	kW	46,6	54,5	69,8	79,8	88,2	105,1	122,2	130,2
Sensible capacity		1	kW	36,6	42,4	52,8	59,9	67,2	78,6	89,6	94,2
Compressor power input		1	kW	12,9	16,4	20,2	22,6	25,5	28,0	34,8	38,6
EER	CAK	1	-	3,61	3,32	3,46	3,53	3,46	3,75	3,51	3,37
Cooling capacity (EN14511:2018)		11	kW	45,6	53,3	68,3	78,7	86,0	103,8	121,3	128,3
EER (EN14511:2018)		11	-	3,06	2,85	2,82	2,86	2,86	3,17	3,73	2,90
SEER		12		3,98	3,75	3,56	3,65	3,61	3,99	4,25	3,77
ηsc		12	%	156,1	146,8	139,2	143,2	141,4	156,8	166,9	147,7
Cooling capacity		2	kW	50,3	59,8	75,4	86,6	94,3	109,3	126,7	134,8
Sensible capacity	CBK	2	kW	39,2	46,7	57,5	64,4	70,7	81,5	91,8	97,1
Compressor power input		2	kW	12,9	16,7	20,3	22,2	25,4	28,3	35,3	39,1
EER		2	-	3,90	3,58	3,71	3,90	3,71	3,86	3,59	3,45
Cooling capacity		3	kW	51,3	61,5	76,7	88,0	95,9	111,0	129,2	137,3
Sensible capacity	CCK	3	kW	39,7	47,5	58,2	65,2	71,7	82,3	92,9	98,5
Compressor power input		3	kW	12,5	16,1	19,9	21,6	24,8	27,5	34,2	37,8
EER		3	-	4,10	3,82	3,85	4,07	3,87	4,04	3,78	3,63
Cooling capacity		3	kW	55,0	65,7	82,6	94,7	103,0	118,6	137,5	146,2
Sensible capacity	CCKP	3	kW	42,7	51,0	63,2	70,6	72,8	87,8	99,0	104,6
Compressor power input		3	kW	12,7	16,5	20,1	21,8	25,1	28,0	35,0	38,7
EER		3	-	4,33	3,98	4,11	4,34	4,10	4,24	3,93	3,78
HEATING											
Heating capacity		1	kW	43,8	55,8	66,0	79,9	86,1	108,4	133,3	141,1
Compressor power input		1	kW	10,0	13,0	16,6	19,0	22,2	24,8	30,5	34,6
COP		1	-	4,38	4,29	3,98	4,21	3,88	4,37	4,37	4,08
Cooling capacity (EN14511:2018)	CAK	13	kW	44,2	56,7	66,7	80,7	87,6	101,5	124,6	132,0
COP (EN14511:2018)		13	-	3,59	3,59	3,15	3,38	3,20	3,30	3,34	3,15
SCOP		11		3,20	3,43	3,26	3,49	3,32	3,50	3,81	3,64
ηsh		11	%	125	134	127	137	130	137	149	143
Heating capacity		2	kW	44,2	56,6	67,0	80,8	87,2	110,0	135,4	143,6
Compressor power input	CBK	2	kW	9,23	11,8	15,0	17,4	20,3	22,7	28,0	31,9
COP		2	-	4,79	4,80	4,47	4,64	4,30	4,85	4,84	4,50
Heating capacity		3	kW	45,6	58,8	68,6	82,8	89,5	113,2	139,8	148,4
Compressor power input	CCK	3	kW	9,34	12,0	15,2	17,6	20,5	23,0	28,5	32,6
COP		3	-	4,88	4,90	4,51	4,70	4,37	4,92	4,91	4,55
Heating capacity		3	kW	49,8	63,4	74,4	90,4	98,3	118,0	145,3	154,0
Compressor power input	CCKP	3	kW	9,35	11,9	15,2	17,5	20,4	23,4	28,9	32,9
COP		3	-	5,33	5,33	4,89	5,17	4,82	5,04	5,03	4,68
THOR recovery efficiency		4	%	83	81	84	83	81	85	82	81
COMPRESSOR											
Type of compressors		5		Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll
No. of compressors			Nr	2	2	4	4	4	4	4	4
Std Capacity control steps			Nr	2	3	4	4	4	4	4	4
Refrigerant charge (C1)	CAK	6	kg	13.0	17.5	8.5	13.0	15.0	18.0	21.5	22.5
Refrigerant charge (C2)		6	kg	-	-	8.5	15.0	15.0	21.5	21.5	22.5
Refrigerant charge (C1)	CBK	6	kg	13.0	17.5	8.5	13.0	15.0	18.0	21.5	22.5
Refrigerant charge (C2)		6	kg	-	-	8.5	15.0	15.0	21.5	21.5	22.5
Refrigerant charge (C1)	CCK	6	kg	13.0	17.5	8.5	13.0	15.0	18.0	21.5	22.5
Refrigerant charge (C2)		6	kg	-	-	8.5	15.0	15.0	21.5	21.5	22.5
Refrigerant charge (C1)	CCKP	6	kg	17.0	22.0	15.0	17.0	20.0	24..5	26.5	29.0
Refrigerant charge (C2)		6	kg	-	-	15.0	19.0	20.0	29.5	26.5	29.0
Refrigeration circuits			Nr	1	1	2	2	2	2	2	2

SIZE			15.2	18.2	20.4	25.4	30.4	33.4	40.4	44.4
AIR HANDLING SECTION FANS (SUPPLY)										
Type of supply fan	7		RAD	RAD	RAD	RAD	RAD	RAD	RAD	RAD
No. of supply fans		Nr	1	1	2	2	2	2	2	2
Fan diameter		mm	630	630	560	560	560	630	630	630
Supply airflow		l/s	2500	3194	3750	4167	4722	5139	5833	6389
Supply airflow		m^3/h	9000	11500	13500	15000	17000	18500	21000	23000
Installed unit power		kW	2.75	2.75	2.90	2.90	2.90	2.75	2.75	2.75
Max. static pressure supply fan	8	Pa	510	390	510	510	510	510	440	380
HIGH STATIC PRESSURE AIR HANDLING SECTION FANS (OPTIONAL)										
Type of supply fan			RAD	RAD	RAD	RAD	RAD	RAD	RAD	RAD
No. of supply fans		Nr	1	1	2	2	2	2	2	2
Fan diameter		mm	500	500	500	500	500	500	500	500
Supply airflow		l/s	2500	3194	3750	4167	4722	5139	5833	6389
Supply airflow		m^3/h	9000	11500	13500	15000	17000	18500	21000	23000
Installed unit power		kW	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Max. static pressure supply fan		Pa	1020	825	1020	1020	1020	1020	1000	830
FANS (EXHAUST) (ONLY CCK, CCKP-THOR CONFIGURATION)										
Type of fans	7		RAD	RAD	RAD	RAD	RAD	RAD	RAD	RAD
No. of fans	9		1	1	2	2	2	2	2	2
Installed unit power	9	kW	2,7	2,7	1,3	1,3	1,3	2,7	2,7	2,7
EXTERNAL SECTION FANS										
Type of fans	10		AX	AX	AX	AX	AX	AX	AX	AX
No. of fans		Nr	1	1	2	2	2	2	2	2
Fan diameter		mm	800	800	800	800	800	800	800	800
Supply airflow		l/s	5835	5835	11670	11670	11670	11670	11670	11670
Max. static pressure supply fan		kW	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
CONNECTIONS										
Condensate drain		mm	20	20	20	20	20	20	20	20
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

The Product is compliant with the Erp (Energy Related Products) European Directive. It includes the Commission delegated Regulation (EU) No 2016/2281, also known as Ecodesign Lot21.
Contains fluorinated greenhouse gases (GWP 2087,5)
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. Indicative values for standard units with possible +/-10% variation. The actual data are indicated on the label of the unit
7. RAD = radial fan electronically controlled
8. Net outside static pressure to win the outlet and intake onboard pressure drops
9. Configuration with double fan section for recirculation, fresh air, exhaust, thermodynamic recovery (CCK) and configuration with double fan section with fresh air and THOR thermodynamic recovery (CCKP)
10. AX = axial fan
11. Capacity in total recirculation according to EN 14511-2018, indoor air temperature 27°C D.B./19°CW.B.; outdoor temperature 35°C. EER according to EN 14511-2018
12. Data calculated in accordance with EN 14825: 2018
13. Capacity in total recirculation according to EN 14511-2018, indoor air temperature 20°C; outdoor temperature 7°CD.B./6°CW.B.. COP according to EN 14511-2018

Sound levels

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

The sound levels are referred to unit operating at full load in nominal conditions. The sound pressure level is referred at a distance of 1 m. from the ducted unit surface operating in free field conditions. External static pressure 50 Pa. (standard UNI EN ISO 9614-2)
Please note that when the unit is installed in conditions different from nominal test conditions (e.g. near walls or obstacles in general), the sound levels may undergo substantial variations.

Electrical data

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

SIZE			15.2	18.2	20.4	25.4	30.4	33.4	40.4	44.4
F.L.A. - FULL LOAD CURRENT AT MAX ADMISSIBLE CONDITIONS										
F.L.A. - Compressor 1		A	14,6	15,4	9,2	9,2	14,6	14,6	15,4	15,4
F.L.A. - Compressor 2		A	14,6	23,0	14,3	14,3	14,6	14,6	23,0	30,9
F.L.A. - Compressor 3		A	-	-	9,2	14,6	14,6	15,4	15,4	15,4
F.L.A. - Compressor 4		A	-	-	14,3	14,6	14,6	23	30,9	30,9
F.L.A. - Single External Fan		A	3,9	3,9	3,9	3,9	3,9	3,9	3,9	3,9
F.L.A. - Single supply fan		A	4,3	4,3	4,4	4,4	4,4	4,3	4,3	4,3
F.L.A. - Total	1	A	38,0	47,1	64,1	69,9	75,7	84,6	101,5	109,4
L.R.A. - LOCKED ROTOR AMPERES										
L.R.A. - Compressor 1		A	101,0	95,0	51,5	51,5	101,0	101,0	95,0	95,0
L.R.A. - Compressor 2		A	101,0	118,0	101,0	101,0	101,0	101,0	118,0	174,0
L.R.A. - Compressor 3		A	-	-	51,5	101,0	101,0	95,0	95,0	95,0
L.R.A. - Compressor 4		A	-	-	101,0	101,0	101,0	118,0	174,0	174,0
F.L.I. - FULL LOAD POWER INPUT AT MAX ADMISSIBLE CONDITIONS										
F.L.I. - Compressor 1		kW	8,6	9,1	5,6	5,6	8,6	8,6	9,1	9,1
F.L.I. - Compressor 2		kW	8,6	13,5	8,3	8,3	8,6	8,6	13,5	17,2
F.L.I. - Compressor 3		kW	-	-	5,6	8,6	8,6	9,1	9,1	9,1
F.L.I. - Compressor 4		kW	-	-	8,3	8,6	8,6	13,5	17,2	17,2
F.L.I. - Single External Fan		kW	1,9	1,9	1,9	1,9	1,9	1,9	1,9	1,9
F.L.I. - Single supply fan		kW	2,8	2,8	2,9	2,9	2,9	2,8	2,8	2,8
F.L.I. - Total	2	kW	22,1	27,6	37,6	40,9	44,2	49,3	58,5	62,2
M.I.C. MAXIMUM INRUSH CURRENT										
M.I.C. - Value		A	120,4	138,2	150,8	156,3	162,1	179,5	244,7	252,5

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

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

General technical data

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

SIZE			15.2	18.2	20.4	25.4	30.4	33.4	40.4	44.4
F.L.A. - FULL LOAD CURRENT AT MAX ADMISSIBLE CONDITIONS										
F.L.A. - Compressor 1		A	14,6	15,4	9,2	9,2	14,6	14,6	15,4	15,4
F.L.A. - Compressore 2		A	14,6	23,0	14,3	14,3	14,6	14,6	23,0	30,9
F.L.A. - Compressor 3		A	-	-	9,2	14,6	14,6	15,4	15,4	15,4
F.L.A. - Compressor 4		A	-	-	14,3	14,6	14,6	23,0	30,9	30,9
F.L.A. - Single External Fan		A	3,9	3,9	3,9	3,9	3,9	3,9	3,9	3,9
F.L.A. - Single supply fan		A	4,3	4,3	4,4	4,4	4,4	4,3	4,3	4,3
F.L.A. - Single exhaust fan		A	4,0	4,0	2,1	2,1	2,1	4,0	4,0	4,0
F.L.A. - Totale	1	A	41,9	51,0	68,3	74,1	79,9	92,5	109,4	117,3
L.R.A. - LOCKED ROTOR AMPERES										
L.R.A. - Compressor 1		A	101,0	95,0	51,5	51,5	101,0	101,0	95,0	95,0
L.R.A. - Compressor 2		A	101,0	118,0	101,0	101,0	101,0	101,0	118,0	174,0
L.R.A. - Compressor 3		A	-	-	51,5	101,0	101,0	95,0	95,0	95,0
L.R.A. - Compressor 4		A	-	-	101,0	101,0	101,0	118,0	174,0	174,0
F.L.I. - FULL LOAD POWER INPUT AT MAX ADMISSIBLE CONDITIONS										
F.L.I. - Compressor 1		kW	8,6	9,1	5,6	5,6	8,6	8,6	9,1	9,1
F.L.I. - Compressor 2		kW	8,6	13,5	8,3	8,3	8,6	8,6	13,5	17,2
F.L.I. - Compressor 3		kW	-	-	5,6	8,6	8,6	9,1	9,1	9,1
F.L.I. - Compressor 4		kW	-	-	8,3	8,6	8,6	13,5	17,2	17,2
F.L.I. - Single External Fan		kW	1,9	1,9	1,9	1,9	1,9	1,9	1,9	1,9
F.L.I. - Single supply fan		kW	2,8	2,8	2,9	2,9	2,9	2,8	2,8	2,8
F.L.I. - Single exhaust fan		kW	2,6	2,6	1,3	1,3	1,3	2,6	2,6	2,6
F.L.I. - Total	2	kW	24,7	30,1	40,2	43,5	46,8	54,5	63,7	67,4
M.I.C. MAXIMUM INRUSH CURRENT										
M.I.C. - Value		A	124,4	142,1	155,0	160,5	166,3	187,4	252,6	260,4

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

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

Electrical input of optional components

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

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

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

Pressure drops of optional components

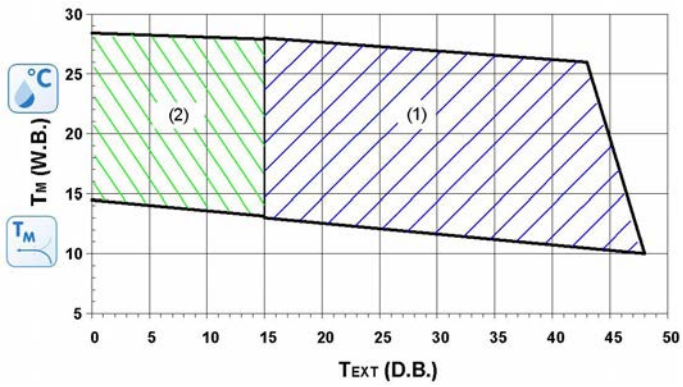
The value of static pressure available on the supply and return duct is obtained by subtracting from the available net maximum pressure (see general table of technical data) the pressure drops of any accessories.

SIZE			15.2	18.2	20.4	25.4	30.4	33.4	40.4	44.4
CHW2 - Two-row hot water coil										
CPHG - Hot gas re-heating coil		Pa	22	34	22	26	32	25	31	36
CHWER - Energy recovery from the food refrigeration		Pa	11	17	11	13	17	13	16	18
GC - Heating module		Pa	80	90	80	90	100	80	90	100
F7 - F7 high efficiency air filter (ISO 16890 ePM1 55%)	1	Pa	145	168	145	153	167	159	167	178
FES - High efficiency electronic filters (ISO 16890 ePM1 90%)		Pa	28	44	28	33	45	38	50	62

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

1. Pressure drops with filters with average dirtiness

Operating range (Cooling)



The limits are meant as an indication and they have been calculated by considering:
- general and non specific sizes,
- standard airflow,
- non-critical positioning of the unit and correct operating and maintenance of the unit,
- operating at full load

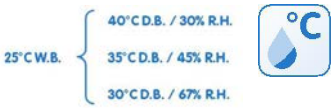
To verify the operation field of the operating units with percentages of outdoor air, always calculate the Tm mixing temperature at the internal heat exchanger input.

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

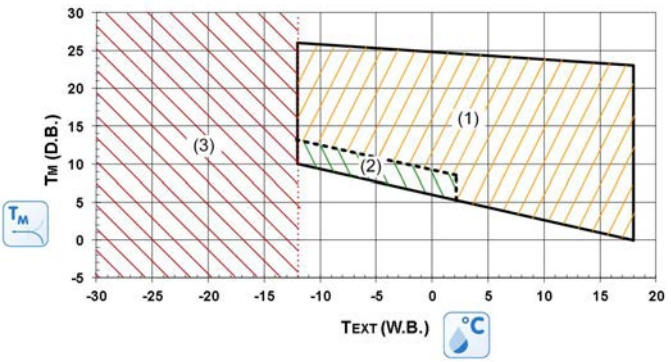
Text = entering internal exchanger air temperature, , temperature measured with dry bulb (D.B.=DRY BULB)

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

WET BULB TEMPERATURE - EXAMPLE



Operating range (Heating)



The limits are meant as an indication and they have been calculated by considering:
- general and non specific sizes,
- standard airflow,
- non-critical positioning of the unit and correct operating and maintenance of the unit,
- operating at full load

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

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

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

1. Operation range at full load
2. 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.

Option compatibility

RIF.	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	-	-	O	O
	CONFIGURATIONS				
CREFO	Device for fan consumption reduction of the external section type on/off	√	√	√	√
CREFB	Device for consumption reduction of the external section ECOBREEZE fans	O	O	O	O
CHWER	Energy recovery from the food refrigeration	O	O	O	O
CHW2	Two-rows hot water coil	O	O	O	O
3WVM	Modulating 3-way valve	O	O	O	O
2WVM	Modulating 2-way valve	O	O	O	O
EH	Electric heaters.	O	O	O	O
GC	Modulating condensation gas heating module	O	O	O	O
AMRX	Rubber antivibration mounts	◊	◊	◊	◊
AMRMX	Rubber antivibration mounts for unit and gas module	◊	◊	◊	◊
RCX	Roof curb	◊	◊	◊	◊
PCM0	Sandwich panels of the handling zone in M0 fire reaction class	O	O	O	O
	REFRIGERATION CIRCUIT				
EVE	Electronic expansion valve	√	√	√	√
MHP	High and low pressure gauges	O	O	O	O
CPHG	hot gas re-heating coil	O	O	O	O
	AERAULIC CIRCUIT				
M0	Front air outlet	√	√	√	√
M3	Downward air supply	O	O	O	O
M5	Upflow air supply	O	O	O	O
ML	Sideward air supply (size 15.2 - 18.2)	O	O	O	O
RO	Horizontal air return	√	√	√	√
R3	Downward air return	O	O	O	O
PCOSM	Constant supply airflow	O	O	O	O
PVAR	Variable airflow	O	O	O	O
FPG4	Pleated air filter class G4 (ISO 16890 Coarse 60%)	√	√	√	√
F7	High efficiency F7 air filter (ISO 16890 ePM1 55%)	O	O	O	O
FES	Electronic filters (ISO 16890 ePM1 90%)	O	O	O	O
UVC	UV-C germicidal lamps	O	O	O	O
PSAF	Clogged filter differential pressure switch air side	O	O	O	O
HSE	Immersed electrodes steam humidifier	O	O	O	O
LTEMP1	Application for low outdoor temperature	O	O	O	O
VENH	High static pressure fans	O	O	O	O
PAQC	Air quality probe for CO2 rate check	-	O	O	O
PAQCV	Air quality sensor for CO2 and VOC rate check	-	O	O	O
SER	Outdoor air damper manually set	-	√	-	-
SERM	Outdoor air motorized on/off damper	-	O	-	-
SERMD	Modulating motorized outdoor air damper	-	O	√	√

√ Standard component
O Optional component
◊ Separately supplied accessory (optional)
- Not available

Option compatibility

RIF.	DESCRIPTION	CAK	CBK	CCK	CCKP
	ELECTRIC CIRCUIT				
THTUNE	Wall mounted electronic room control	√	√	√	√
CMSC9	Serial communication module to Modbus supervisor	O	O	O	O
CMSC10	Serial communication module to LonWorks supervisor	O	O	O	O
CMSC11	Serial communication module for BACnet-IP supervisor	O	O	O	O
CTERM	Remote keypad for indoor temperature and humidity control	O	O	O	O
CSOND	Temperature and humidity ambient control with built-in probes	O	O	O	O
CTEM	Ambient temperature control with built-in probes	√	√	√	√
DML	Demand Limit	O	O	O	O
CLMX	Clivet Master System	◊	◊	◊	◊
DESM	Smoke detector	O	O	O	O
PM	Phase monitor	O	O	O	O
PFCC	Power factor correction capacitors (cosfi > 0.95)	O	O	O	O
SFSTC	Progressive compressor start-up device	O	O	O	O
	VARIOUS				
PTCO	Set up for shipping via container	O	O	O	O

√ Standard component

O Optional component

◊ Separately supplied accessory (optional)

- Not available

VENH

High static pressure fans

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

CREFB

Device for fan consumption reduction of the external section, ECOBREEZE type

Option indicated to reduce the ventilation electric energy consumption considerably and limit sound emissions inside the external section of the unit. ECOBREEZE logic allows the external axial fans to operate at a variable rotation speed, according to the operation conditions of the cooling circuit. Reducing the speed when the heat load is reduced, benefits the sound emissions, especially during the night, when sensitivity to noise is enhanced.
During summer operation, fans can further increase their speed, to respond to situations in which operation limits are temporarily exceeded. ECOBREEZE option uses special fans powered by brushless electrical motors, with complete electronic control, and distinguished by a very high efficiency.
To ensure the continuous cooling operation even at temperatures lower than 15°C, the option is necessary to maintain a proper condensation on the external exchanger.

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.

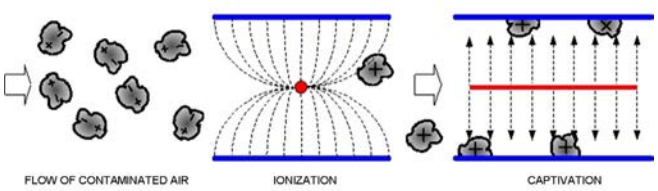
FES

Electronic filters (ISO 16890 ePM1 90%)

The high efficiency filters with active electrostatic system are additional filtration components of the standard G4 filters. They are active on a wide range of pollutants, including pollen, dust, micro-dust and nano powders, toners, mould, smog, bacteria and viruses with a 98.5% to 99.9% typical efficiency.
The air filtration process follows three main steps defined as “electrostatic precipitation”:

- transfer of a positive electrical charge to particles (ionisation)
- particle capture (uptake)
- removal of captured particles (without filter replacement)

Electronic filters have very high filtration efficiency with very low load drops, and therefore reduced ventilation consumption. Clivet units’ typical air crossing speeds ensure filtration efficiencies higher than ISO 16890, and PM1 90% (equivalent to class E10 of absolute filters in accordance with EN 1822).
The normal service lives of electronic filters are as long as that of the whole unit. For this result to be guaranteed and the micro-bicidal action against bacteria and viruses kept steady over time while ensuring minimum load drops, the filters require proper maintenance.
Filters must be cleaned at least every six months; we recommend quarterly or more frequent cleaning if the units are located in excessively polluted areas. Servicing the filters during the unit’s routine maintenance includes washing the electronic cells on site and replacing any damaged ionising wires. The Customer should make an area with suitable equipment available for washing near the unit.
The higher initial cost, compared to a traditional pocket filter, can be amortized in a short time; the electrostatic filters’ lifespan is indeed the same as that of the unit, whereas pocket filters need periodic replacement.
This option determines a reduction in the available static head (air side).



⚠ The clogging of an electronic filter is signalled by a sensor, thus making it possible to schedule periodic maintenance.
⚠ Electronic filters are not suitable for filtering water vapours even in low concentrations, oily vapours, large quantities of dust, shavings and iron filing dust, residues in general and gases.
⚠ All the following substances must be absolutely avoided with electronic filters: metallic material dust, even very fine; fumes produced by the combustion of organic and non-organic materials; flour dust; dust and vapours from potentially explosive atmospheres.

Accessories

F7

F7 high efficiency air filter (ISO 16890 ePM1 55%)

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.

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

UVC

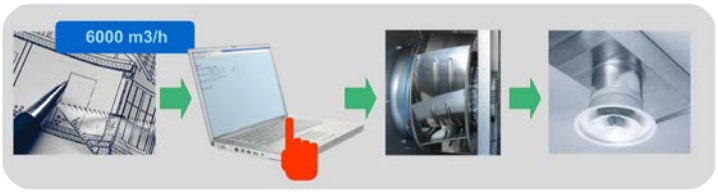
UV-C germicidal lamps

UV-C lamps use ultraviolet radiation to purify the air from the development of bacteria, moulds, fungi and viruses. For this reason they are called germicidal lamps.
Their effectiveness is proven by many years of scientific experimentation and use in the world of HVAC. Recent Italian and Japanese studies have demonstrated the effectiveness on Coronavirus SARS CoV2 (known as Covid-19) by defining the dose of UV-C rays required to deactivate it.
The bactericidal and virucidal action is achieved with low pressure mercury lamps through the direct radiation of the air flow with a wavelength of 254 mm.
In rooftop systems, UV-C lamps are installed downstream of the handling coil and act directly in the air flow and on the irradiated surfaces, such as the handling coil and the drain pan. The radiating power is sized to be effective on viruses like SARS-COV2 and main bacteria like Legionella, etc.
The option is installed and wired on the unit and is active when the supply ventilators are working. The radiation is completely contained and shielded inside the unit to avoid accidental contact with people; in fact, exposure to the rays without the necessary safety devices can cause skin burns and damage vision. Unit is provided with aluminium fan impeller.

PCOSM

Constant supply airflow

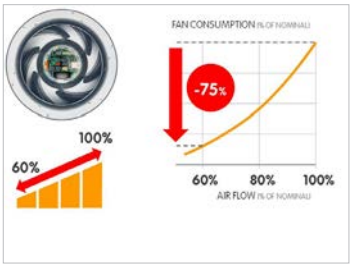
The original technology used eliminates the need for on-site calibration of traditional fans, as well as the time that would be required and the associated costs. The required flow rate is set on the display and maintained automatically by the unit, which controls the speed of the ventilating sections.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



PVAR

Variable airflow

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



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

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

PAQC

Air quality probe for the CO_2 rate check

This option is recommended for areas with highly variable crowding. The probe measure the amount of CO_2 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 CO_2 and VOC rate check

The option is recommended in areas with tobacco smoke, formaldehyde (from solvents, deodorants, glues, paints, detergents, food preparation, etc. The probe measures the rate of CO_2 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.

FCE

Enthalpy FREE-COOLING

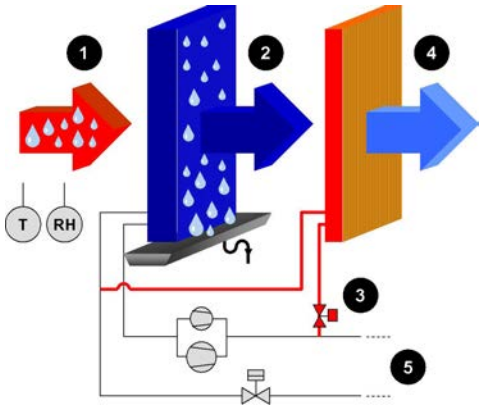
This option is used to reduce energy consumption and compressor wear by using the outdoor air as an energy source to lower the thermal loads and ambient humidity. The temperature control compares the temperature and the humidity between the outdoor environment and the served environment and decides the 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.

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.

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



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

CPHG Performances of hot gas re-heating coil

SIZE			OUTDOOR AIR TEMPERATURE (°C)														
			25	27	30	32	35	25	27	30	32	35	25	27	30	32	35
			kWt	kWt	kWt	kWt	kWt	kWt	kWt	kWt	kWt	kWt	kWt	kWt	kWt	kWt	kWt
15.2	Qo (m³/h)		8500					9000					13000				
	Qo (l/s)		2361					2500					3611				
	Ta (°C)	10	17,9	19,2	21,3	22,7	24,9	18,5	19,9	22,1	23,5	25,7	22,9	24,7	27,4	29,2	31,9
		12	16,5	17,8	19,9	21,3	23,4	17,0	18,5	20,6	22,1	24,2	21,1	22,9	25,5	27,4	30,1
		14	15,1	16,5	18,5	19,9	22,0	15,6	17,0	19,2	20,6	22,8	19,3	21,1	23,7	25,5	28,2
		16	13,7	15,1	17,1	18,5	20,6	14,2	15,6	17,7	19,1	21,3	17,5	19,3	21,9	23,7	26,4
		18	12,3	13,7	15,7	17,1	19,2	12,8	14,2	16,3	17,7	19,8	15,8	17,5	20,1	21,9	24,6
		20	11,0	12,3	14,4	15,7	17,8	11,4	12,8	14,9	16,3	18,4	14,0	15,8	18,4	20,1	22,8
18.2	Qo (m³/h)		8500					11500					13000				
	Qo (l/s)		2361					3194					3611				
	Ta (°C)	10	17,9	19,2	21,3	22,7	24,9	21,4	23,0	25,5	27,2	29,8	22,9	24,7	27,4	29,2	31,9
		12	16,5	17,8	19,9	21,3	23,4	19,7	21,3	23,8	25,5	28,0	21,1	22,9	25,5	27,4	30,1
		14	15,1	16,5	18,5	19,9	22,0	18,0	19,7	22,1	23,8	26,3	19,3	21,1	23,7	25,5	28,2
		16	13,7	15,1	17,1	18,5	20,6	16,4	18,0	20,4	22,1	24,6	17,5	19,3	21,9	23,7	26,4
		18	12,3	13,7	15,7	17,1	19,2	14,7	16,3	18,8	20,4	22,9	15,8	17,5	20,1	21,9	24,6
		20	11,0	12,3	14,4	15,7	17,8	13,1	14,7	17,1	18,8	21,3	14,0	15,8	18,4	20,1	22,8
20.4	Qo (m³/h)		12000					13500					20000				
	Qo (l/s)		3333					3750					5556				
	Ta (°C)	10	26,7	28,7	31,8	33,9	37,0	28,6	30,8	34,1	36,4	39,7	36,0	38,8	43,0	45,8	50,1
		12	24,6	26,6	29,7	31,8	34,9	26,4	28,6	31,9	34,1	37,5	33,2	36,0	40,2	43,0	47,2
		14	22,6	24,6	27,6	29,7	32,8	24,3	26,4	29,7	31,9	35,2	30,5	33,2	37,4	40,2	44,4
		16	20,6	22,6	25,6	27,6	30,7	22,1	24,3	27,5	29,7	33,0	27,8	30,5	34,6	37,4	41,6
		18	18,6	20,6	23,6	25,6	28,7	19,9	22,1	25,3	27,5	30,8	25,0	27,8	31,8	34,6	38,8
		20	16,6	18,6	21,5	23,6	26,6	17,8	19,9	23,1	25,3	28,6	22,3	25,0	29,1	31,8	36,0
25.4	Qo (m³/h)		12000					15000					20000				
	Qo (l/s)		3333					4167					5556				
	Ta (°C)	10	26,7	28,7	31,8	33,9	37,0	30,5	32,8	36,4	38,7	42,3	36,0	38,8	43,0	45,8	50,1
		12	24,6	26,6	29,7	31,8	34,9	28,2	30,5	34,0	36,3	39,9	33,2	36,0	40,2	43,0	47,2
		14	22,6	24,6	27,6	29,7	32,8	25,8	28,1	31,6	34,0	37,5	30,5	33,2	37,4	40,2	44,4
		16	20,6	22,6	25,6	27,6	30,7	23,5	25,8	29,3	31,6	35,1	27,8	30,5	34,6	37,4	41,6
		18	18,6	20,6	23,6	25,6	28,7	21,2	23,5	26,9	29,3	32,8	25,0	27,8	31,8	34,6	38,8
		20	16,6	18,6	21,5	23,6	26,6	18,9	21,2	24,6	26,9	30,4	22,3	25,0	29,1	31,8	36,0
30.4	Qo (m³/h)		12000					17000					20000				
	Qo (l/s)		3333					4722					5556				
	Ta (°C)	10	26,7	28,7	31,8	33,9	37,0	32,8	35,3	39,1	41,7	45,6	36,0	38,8	43,0	45,8	50,1
		12	24,6	26,6	29,7	31,8	34,9	30,3	32,8	36,6	39,1	43,0	33,2	36,0	40,2	43,0	47,2
		14	22,6	24,6	27,6	29,7	32,8	27,8	30,3	34,0	36,6	40,4	30,5	33,2	37,4	40,2	44,4
		16	20,6	22,6	25,6	27,6	30,7	25,3	27,8	31,5	34,0	37,8	27,8	30,5	34,6	37,4	41,6
		18	18,6	20,6	23,6	25,6	28,7	22,8	25,3	29,0	31,5	35,3	25,0	27,8	31,8	34,6	38,8
		20	16,6	18,6	21,5	23,6	26,6	20,4	22,8	26,5	29,0	32,8	22,3	25,0	29,1	31,8	36,0
40.4	Qo (m³/h)		16000					21000					25000				
	Qo (l/s)		4444					5833					6944				
	Ta (°C)	10	33,8	36,5	40,4	43,1	47,1	39,8	42,9	47,5	50,7	55,5	43,9	47,4	52,6	56,1	61,4
		12	31,2	33,8	37,7	40,4	44,4	36,6	39,7	44,3	47,5	52,2	40,5	43,9	49,0	52,5	57,8
		14	28,5	31,1	35,0	37,7	41,7	33,5	36,6	41,2	44,3	49,0	37,0	40,4	45,5	49,0	54,2
		16	25,9	28,5	32,4	35,0	39,0	30,4	33,5	38,0	41,2	45,8	33,6	37,0	42,1	45,5	50,7
		18	23,3	25,9	29,8	32,4	36,3	27,3	30,4	35,0	38,0	42,7	30,2	33,5	38,6	42,0	47,2
		20	20,7	23,3	27,2	29,7	33,7	24,3	27,3	31,9	34,9	39,6	26,8	30,2	35,2	38,6	43,7

CPHG — 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
44.4	Qo (m³/h)		16000					23000					25000				
	Qo (l/s)		4444					6389					6944				
	Ta (°C)	10	33,8	36,5	40,4	43,1	47,1	41,9	45,2	50,1	53,5	58,5	43,9	47,4	52,6	56,1	61,4
		12	31,2	33,8	37,7	40,4	44,4	38,6	41,9	46,7	50,1	55,1	40,5	43,9	49,0	52,5	57,8
		14	28,5	31,1	35,0	37,7	41,7	35,3	38,5	43,4	46,7	51,7	37,0	40,4	45,5	49,0	54,2
		16	25,9	28,5	32,4	35,0	39,0	32,0	35,3	40,1	43,4	48,3	33,6	37,0	42,1	45,5	50,7
		18	23,3	25,9	29,8	32,4	36,3	28,8	32,0	36,8	40,1	45,0	30,2	33,5	38,6	42,0	47,2
		20	20,7	23,3	27,2	29,7	33,7	25,6	28,8	33,6	36,8	41,7	26,8	30,2	35,2	38,6	43,7

Ta = Leaving air temperature from the handling coil and entering the post-heating coil
Qo = Airflow (l/s)
kWt = Heating capacity (kW)
The reheating coil is powered by the cold gas bled from the condensing coil.
As the condensation hot gas temperature is linked to the outdoor air temperature, the indicative potentials of the post-heating coil are expressed according to the outdoor air temperature.

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.

CTERM — Remote keypad for indoor temperature and humidity control

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

CSOND — Temperature and humidity ambient control with built-in probes

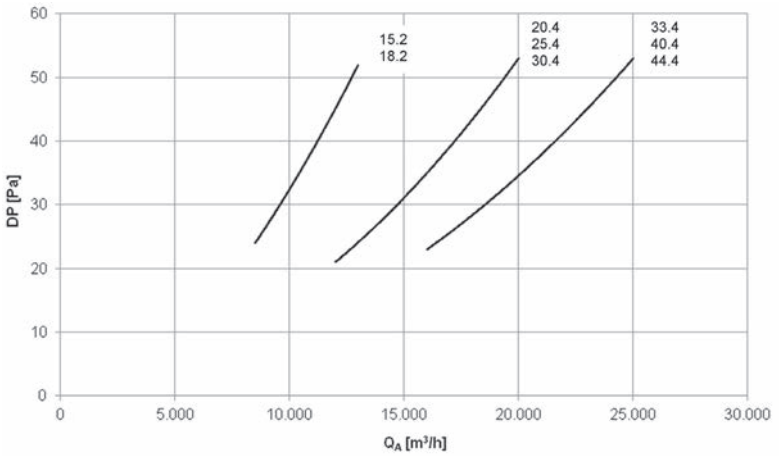
This option makes it possible to measure the temperature and humidity of the ambient directly on the airflow entering the unit. The automatic thermal regulation is done using the on-board probes, whereas the probes on the remote control are inhibited.

CHW2 — Two-rows hot water coil

Option indicated for very cold climates, as it allows to heat up the area served. The exchanger comes with a thermostat for the antifreeze function, which is always active even when the unit is in stand-by, as long as it is operated electrically. If required, force the opening of the valve to the maximum value allowed to allow the air to pass through the exchanger and prevent frost from forming.
The hot water coil allows the integration of the heat pump capacity, as being placed before the treating coil, it pre-heats the air, extending the operation limits of the unit. If the water coil operates as integration to the heat pump, the control logic reduces the potential at a pre-determined limit value, which prevents to make the compressors work at too high condensation temperatures. On the other hand, if the water coil is used as main resource (i.e. availability of the compressors) the potential supplied will be the highest.
In the event laws or local standards encourage the use of the district heating, and so the use of hot water coil heating with the obligation to recover the energy contained inside the exhaust air flow, a turning point can be set, that is an outside air temperature, below which the unit uses the water coil as main resource and operates also as thermodynamic recuperator at very high efficiency, using the nominal capacity of the heat pump circuit only partially.
With the option is available a potential-free contact for the water circulator start-up (provided by the Installer).

CHW2

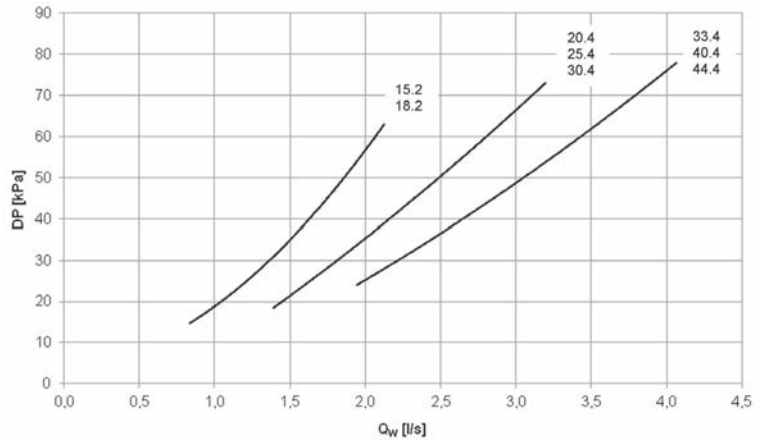
Hot water coil pressure drops: AIR side



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 [m^3/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 = Pressure drop [kPa]

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

CHW2 Performances of hot water coil (two-row)

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

TM = Air inlet temperature of water coil (°C)
Ti/To = Water temperature inlet/outlet (°C)
Qo = Airflow (l/s e m^3/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.

EH Electric elements

This option is suggested for cold climates, allows the integration of heating capacity from the heat pump. The electrical heaters are placed before the treatment coil and perform the air preheating function, extending the operating range of the unit and helping quickly to reach the comfort in the room.
Ideal for climate areas in applications with low outside temperature where it is required to active the heaters only for short time in the year. In these cases the resulting system simplification (no water supply) compensates the energy costs.
The fins are made of aluminum, of suitable dimension to ensure high efficiency and maintain low power density on the surfaces to limit overheating. The low temperature of the heating elements increases the lifespan and limits the effect of air ionization.

Matching of the electric elements

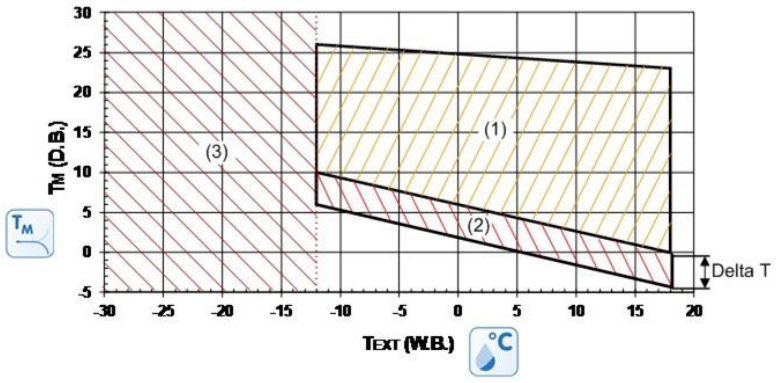
SIZE	15.2	18.2	20.4	25.4	30.4	33.4	40.4	44.4
9kW	√	√	-	-	-	-	-	-
12kW	√	√	√	√	√	-	-	-
18kW	√	√	√	√	√	√	√	√
24kW	-	-	√	√	√	√	√	√
36kW	-	-	-	-	-	√	√	√

⚠ This option involves variation of the main electrical data of the unit.
⚠ Electric elements', '2-row hot water coil' and 'Combustion heating module' cannot be assembled simultaneously

Operation field extension with electric heaters DT (°C)

SIZE	Air flow [m³/h]	9kW	12kW	18kW	24kW	36kW
15.2	9000	3.0	4.0	5.9	-	-
18.2	11500	2.3	3.1	4.6	-	-
20.4	13500	-	2.6	4.0	5.3	-
25.4	15000	-	2.4	3.6	4.7	-
30.4	17000	-	2.1	3.1	4.2	-
33.4	18500	-	-	2.9	3.8	5.8
40.4	21000	-	-	2.5	3.4	5.1
44.4	23000	-	-	2.3	3.1	4.6

The minimum operating temperature of the heat pump with electric heater change and depends on the series and the power of the electric heater. The minimum temperature is easily to reckon subtrahend the DT value (previous table) to the entering internal exchanger air temperature TM(D.M.) for standard unit, at the desired conditions.



The limits are meant as a guide. Please note that they have been calculated by considering:
- general and non specific sizes
- standard airflow
- non-critical positioning and correct use of the unit
- operation at full load

To verify the operating range of the operating units with percentages of fresh air, always calculate the Tm mixing temperature at the internal heat exchanger input.

Tm = internal exchanger entering air temperatur
Dry bulb measured temperature (D.B.=DRY BULB)
Text = internal exchanger entering air temperature
Temperature measured with wet bulb (W.B.=WET BULB)

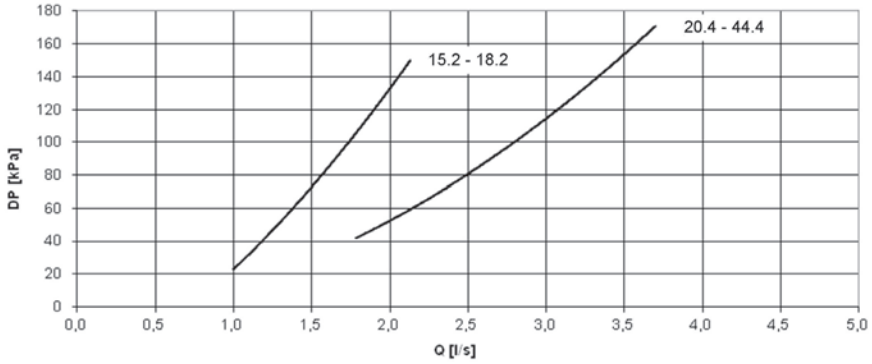
1. Operation at full load
2. Operating range of the unit equipped with electric elements
3. Operating range of the unit equipped with “Application for low outdoor temperature” and “hot water coil or gas heating module” options. The heat pump circuit is not active.

With fresh air temperature within -10°C and -30 °C, the following options will be required: hot water coil and outdoor low temperature set-up.

2WVM **Modulating 2-way valve**
3WVM **Modulating 3-way valve**

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

Valve pressure drops



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

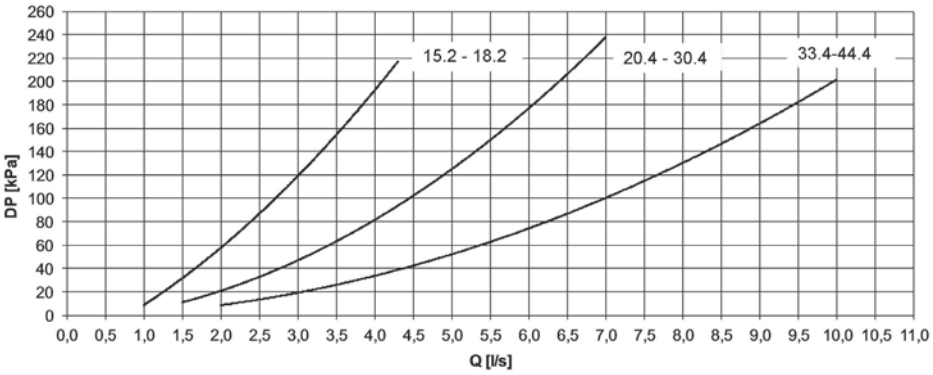
⚠ This accessory has to be coupled to the “CHW2 - Two-row hot water coil” option.

3WVM

Modulating 3-way valve for energy recovery from food refrigeration

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

Valve pressure drops



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

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

CHWER

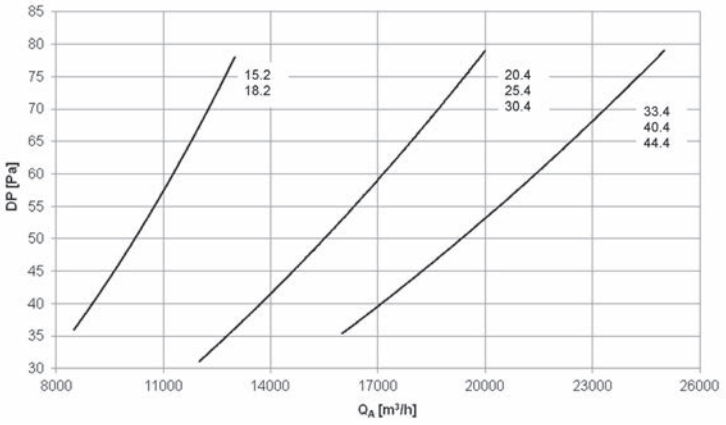
Energy recovery from food refrigeration

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

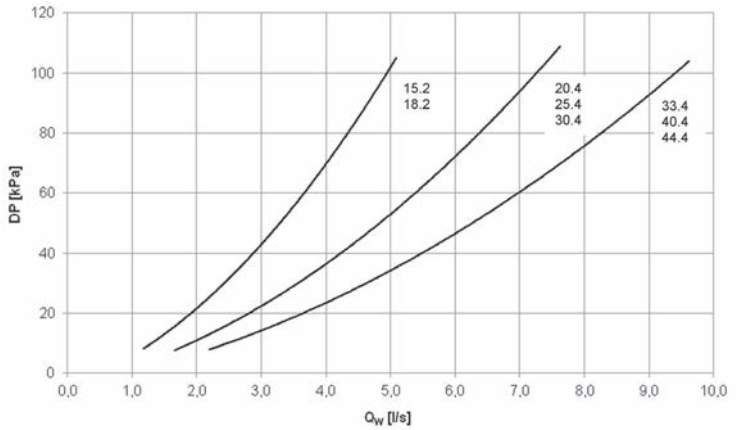


The air side pressure drops are relative to the medium air temperature of 20°C and are to be added to the pressure drops due to ducts, terminal devices and any other component that causes a drop in working discharge head.

QA [m^3/h] = airflow
DP[Pa] = pressure drops

CHWER

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 from food refrigeration

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

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

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 accessory is installed inside the unit and is connected to the electrical panel of the unit.
Ambient humidity is measured by means of a return humidity probe, which is provided already assembled and wired built-in the unit.
With the option is available a potential-free contact for the water emptying during the period in which the unit is not used (connection provided by the Customer).

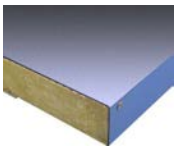
Matching of immersed electrode and steam humidification module

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

⚠ This option involves variation of the main electrical data of the unit.
⚠ This accessory requires connection to a water supply network and discharge water circuit with adeguate frost protection. Installation provided by the Customer.
⚠ Operation is available in heating mode

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.

LTEMP1

Application for low outdoor temperature

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

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

⚠ This operation involves variation of the main electrical data of the unit.
⚠ This accessory operates even when the unit is switched off provided that the power supply is maintained active and the unit continues to be connected.
⚠ It is necessary to make precautions against build up of snow and ice in front of the exhaust and outdoor air inlet locations.

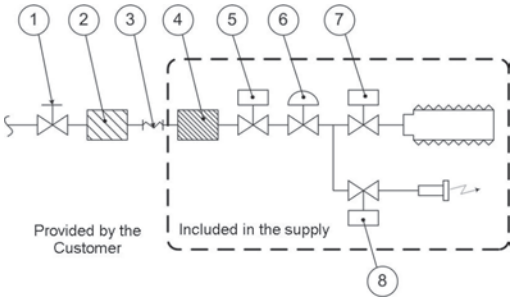
GC

Modulating condensation gas heating module

Option consisting of a combustion chamber and condensation burner with modulating control. It is available in various capacities and heats the environment served. The module can be chosen to integrate the heat pump or as an alternative to it. In this case, its heating capacity must be at least equal to the capacity envisioned in the project.
Thanks to the condensation technology with pre-mix and extremely efficient modulation (up to 105% depending on the lower heat value), consumption is very contained and considerably reduced during operation at partial load. The burner with low polluting emissions (NOx lower than 80mg/kWh) in accordance with Class 5 of European standard EN 676.
The option is supplied on a separate module, easy to connect to the unit during installation. Power, control and alarm signals are directly managed by the unit.
The gas module presence needs the horizontal supply.
The heating module includes:

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

Gas connection diagram



1. gas shut-off valve
2. gas filter (large section)
3. anti-vibration joint
4. gas filter (small section)
5. safety gas solenoid valve
6. pressure stabiliser
7. main gas burner solenoid valve
8. pilot burner gas solenoid valve

Gas use features

		35kW		44kW		65kW		82kW		100kW		130kW	
		min	max	min	max	min	max	min	max	min	max	min	max
Rated thermal input	kW	7,6	34,8	8,5	42,0	12,4	65,0	16,4	82,0	21,0	100,0	12,4	130,0
Efficiency Hi (P.C.I.)	%	107,0	96,3	105,9	96,2	108,1	96,8	108,4	97,6	108,6	97,2	108,1	96,8
Efficiency Hs (P.C.S.)	%	96,4	86,8	95,4	86,7	97,4	87,2	97,6	87,9	97,8	87,5	97,4	87,2
Max condensation produced	l/h	0,9		1,1		2,1		3,3		2,7		4,2	
Carbon monoxide CO (0% di O_2)	ppm	<5		<5		<5		<5		<5		<5	
Nitrogen oxides - NOx (0% di O_2)		UNI ISO 228/1 - G 3/4"		UNI ISO 228/1 - G 3/4"		UNI ISO 228/1 - G 3/4"		UNI ISO 228/1 - G 3/4"		UNI ISO 228/1 - G 3/4"		UNI ISO 228/1 - G 1 1/2"	
Available flue pressure	Pa	90		90		120		120		120		120	
Gas connection diameter	GAS	UNI ISO 228/1-3/4" M		UNI ISO 228/1-3/4" M		UNI ISO 228/1-3/4" M		UNI ISO 228/1-3/4" M		UNI ISO 228/1-3/4" M		UNI ISO 228/1 - 1/2" M	
Exhaust pipe diameter	mm	80		80		80		80		80		2 X 80	
Seasonal space heating energy efficiency [EU Reg./2281/2016] [ηs, h]	%	92,1		90,8		93,2		93,2		93,1		93,9	
Emission efficiency [EU Reg./2281/2016] [ηsflow]	%	97,3		97,0		97,4		97,1		97,0		98,1	
Power supply pressure (for gas G20)	mbar	20 [min 17-max 25]											
Gas consumption @15°C - 1013 mbar (for G20 gas)	m3/h	0,8	3,69	0,9	4,44	1,31	6,88	1,74	8,68	2,22	10,58	2,62	13,76

Matching of the condensing gas heating module

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

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

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

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

⚠ Electric elements', '2-row hot water coil' and 'Combustion heating module' cannot be assembled simultaneously.

CMSC9

Serial communication module for Modbus supervisor

This enables the serial connection of the supervision system, using Modbus as the communication protocol. It enables access to the complete list of operational variables, commands and alarms. Using this accessory every unit can dialogue with the main supervision systems.
The device is installed and wired built-in the unit.

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

CMSC10

Serial communication module for LonWorks supervisor

It allows the serial connection to supervision systems, using LonWorks as the communication protocol. It allows access to a list of operating variables, control and alarms compliant with the Echelon standard.
The device is installed and wired built-in the unit.

⚠ The configuration and management activities for the LonWorks networks are the responsibility of the client.
⚠ LonWorks technology uses the LonTalk® protocol for communicating between the network nodes. Contact the service supplier for further information.
⚠ The total length of each serial line do not exceed 1000 meters and the line must be connected in bus typology (in/out).

CMSC11

Serial communication module for BACnet-IP supervisor

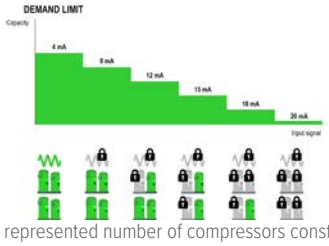
Allows the serial connection to supervision systems by using BACnet-IP as a communication protocol. It allows the access to the entire list of operating variables, controls and alarms. With this accessory every unit can communicate with the main supervision systems.
The device is installed and wired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

⚠ The configuration and management activities for the BACnet networks are the responsibility of the client.
⚠ The total length of each serial line do not exceed 1000 meters and the line must be connected in bus typology (in/out).

DML

Demand Limit

The partial or total activation of the compressors - and the heating electric resistance where present - can be disabled to limit the overall electric capacity absorbed. The external signal is of analogical type 4-20 mA. The greater the signal, the lower the capacity that the unit is enabled to deliver, activating the compressors and the electric elements. The Demand Limit function does not act on the control or on the ventilation, which are therefore always guaranteed, nor on the remaining resources such as hot water coil or the gas heating module.



The represented number of compressors constitutes an indicative example

PM

Phase monitor

The phase monitor allows verifying the proper phase connection and their unbalance in the units, which are powered by a three-phase system.
The monitor communicates with the control circuit and orders the switch-off of the unit, should one of the following cases occur: improper phase connection, the limit value referring to the unbalance between the phases is exceeded, over/undervoltage for a certain amount of time. Once the line conditions are restored, the unit is reactivated manually.
The device is installed and wired built-in the unit.

PFCC

Power factor correction capacitors (cosfi > 0.95)

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 0.95.
The device is installed and wired built-in the unit.

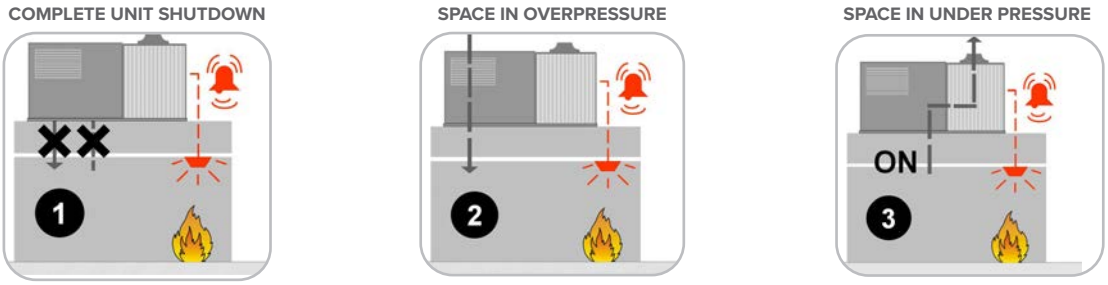
Accessories

DESM

Smoke detector

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

Control logics in the event of alarm signal



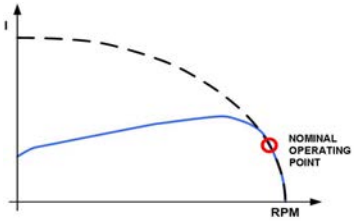
The unit is able to manage the signal coming from a fire detection system activating one of the logics illustrated, which can be set by parameters. In presence of alarm signal, the compressors are always switched off; moreover, the remote ON-OFF is disabled together with the switch on/off control from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

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

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

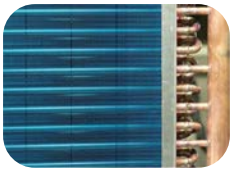
PTCO

Set up for shipping via container

Option that allows shipping via container.
It includes the sheet steel slide application for an easy unit scrolling, packaging with protective angle brackets and nylons, anchoring systems. If necessary the lateral lifting brackets and the main isolator switch handle can be removed to avoid damages during transport (components removed and put inside the unit).
For particular requirements, please contact Clivet Shipping Department.

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.

⚠ Configurable coating for all the coils of the refrigerant circuit (Treatment, Source, Hot gas post-heating - CPHG, THOR energy recovery).
⚠ Water coil treatment (CHW2 and CHWER) available on request

CCCA1

Copper/aluminum coil with Fin Guard (Silver) treatment

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

⚠ Option available on request.

CCCC

Copper / copper coil

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

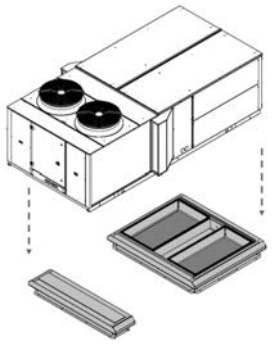
- external coil;
- internal coil;
- hot water coil;
- re-heating coil.

⚠ This option is not suitable for application in sulphuric environments.
⚠ Option available on request.

Accessories separately supplied

RCX **Roof curb**

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



⚠ If the gas module is selected, provide for an appropriate support structure, the supply air can only be horizontal
⚠ Installation provided by the Custormer.

AMRX **Rubber antivibration mounts**
AMMRX **Rubber antivibration mounts for unit and gas module**

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).

⚠ Installation provided by the Customer..

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 10 units connected with a serial connection.
It includes a box for wall installation, as well as the electronic power supply and serial communication devices, a controller with a touch-screen display and a USB port at the front used to export the alarm log.
The device allows to easily and intuitively access all the information on the status of the system and the climate control units. It also provides:

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

⚠ The component must be combined with the RS485 serial port option with Modbus protocol built-in of each rooftop.
⚠ Operating temperature from 0°C to 50°C with relative humidity lower than 90% without condensate.
⚠ Installation provided by the Customer.

On the web site www.clivet.com are available the performances of the CCK configuration.

Size 15.2 Configuration CCKP

Cooling performance with 30% of outdoor and exhaust air

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

Heating performance with 30% of outdoor and exhaust air

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

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

Integrated heating capacities

AIR TEMPERATURE EXTERNAL EXCHANGER INLET °C (D.B. / W.B.)	-5 / -5.4	0 / -0.6	5 / 3.9	ALTRI
Heating capacity multiplication coefficient	0,89	0,88	0,94	1

The integrated heating capacity represents the real heating capacity considering the defrost cycles too.
To obtain the integrated heating capacity multiply the heating performance value in kWt (shown in the heating performance tables) by the coefficients indicated in the table.
DB = dry bulb
WB = wet bulb
In case of below zero external air temperature with a long period of heat pump operating mode it is necessary to help the evacuation of the water produced during the defrost cycle; this to avoid the formation of ice in the unit basement. Pay attention that the evacuation will not create inconveniences to things or persons.

Size 18.2 Configuration CCKP

Cooling performance with 30% of outdoor and exhaust air

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

Heating performance with 30% of outdoor and exhaust air

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

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

Integrated heating capacities

AIR TEMPERATURE EXTERNAL EXCHANGER INLET °C (D.B. / W.B.)	-5 / -5.4	0 / -0.6	5 / 3.9	ALTRI
Heating capacity multiplication coefficient	0,89	0,88	0,94	1

The integrated heating capacity represents the real heating capacity considering the defrost cycles too.
To obtain the integrated heating capacity multiply the heating performance value in kWt (shown in the heating performance tables) by the coefficients indicated in the table.
DB = dry bulb
WB = wet bulb
In case of below zero external air temperature with a long period of heat pump operating mode it is necessary to help the evacuation of the water produced during the defrost cycle; this to avoid the formation of ice in the unit basement. Pay attention that the evacuation will not create inconveniences to things or persons.

Size 20.4 Configuration CCKP

Cooling performance with 30% of outdoor and exhaust air

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

Heating performance with 30% of outdoor and exhaust air

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

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

Integrated heating capacities

AIR TEMPERATURE EXTERNAL EXCHANGER INLET °C (D.B. / W.B.)	-5 / -5.4	0 / -0.6	5 / 3.9	ALTRI
Heating capacity multiplication coefficient	0,89	0,88	0,94	1

The integrated heating capacity represents the real heating capacity considering the defrost cycles too.
To obtain the integrated heating capacity multiply the heating performance value in kWt (shown in the heating performance tables) by the coefficients indicated in the table.
DB = dry bulb
WB = wet bulb
In case of below zero external air temperature with a long period of heat pump operating mode it is necessary to help the evacuation of the water produced during the defrost cycle; this to avoid the formation of ice in the unit basement. Pay attention that the evacuation will not create inconveniences to things or persons.

Size 25.4 Configuration CCKP

Cooling performance with 30% of outdoor and exhaust air

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

Heating performance with 30% of outdoor and exhaust air

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

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

Integrated heating capacities

AIR TEMPERATURE EXTERNAL EXCHANGER INLET °C (D.B. / W.B.)	-5 / -5.4	0 / -0.6	5 / 3.9	ALTRI
Heating capacity multiplication coefficient	0,89	0,88	0,94	1

The integrated heating capacity represents the real heating capacity considering the defrost cycles too.
To obtain the integrated heating capacity multiply the heating performance value in kWt (shown in the heating performance tables) by the coefficients indicated in the table.
DB = dry bulb
WB = wet bulb
In case of below zero external air temperature with a long period of heat pump operating mode it is necessary to help the evacuation of the water produced during the defrost cycle; this to avoid the formation of ice in the unit basement. Pay attention that the evacuation will not create inconveniences to things or persons.

Size 30.4 Configuration CCKP

Cooling performance with 30% of outdoor and exhaust air

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

Heating performance with 30% of outdoor and exhaust air

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

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

Integrated heating capacities

AIR TEMPERATURE EXTERNAL EXCHANGER INLET °C (D.B. / W.B.)	-5 / -5.4	0 / -0.6	5 / 3.9	ALTRI
Heating capacity multiplication coefficient	0,89	0,88	0,94	1

The integrated heating capacity represents the real heating capacity considering the defrost cycles too.
To obtain the integrated heating capacity multiply the heating performance value in kWt (shown in the heating performance tables) by the coefficients indicated in the table.
DB = dry bulb
WB = wet bulb
In case of below zero external air temperature with a long period of heat pump operating mode it is necessary to help the evacuation of the water produced during the defrost cycle; this to avoid the formation of ice in the unit basement. Pay attention that the evacuation will not create inconveniences to things or persons.

Size 33.4 Configuration CCKP

Cooling performance with 30% of outdoor and exhaust air

AIRFLOW	Ta [°C] DB/ WB	OUTDOOR AIR TEMPERATURE °C D.B/W.B.																							
		20 / 12				25 / 18				30 / 22				35 / 24				40 / 25				45 / 26			
		kWf	kWs	kWe	EER	kWf	kWs	kWe	EER	kWf	kWs	kWe	EER	kWf	kWs	kWe	EER	kWf	kWs	kWe	EER	kWf	kWs	kWe	EER
16000 m³/h	22 / 16	103,6	79,1	19,2	5,4	112,8	80,5	21,7	5,2	112,1	78,2	24,3	4,6	109,1	78,0	27,4	4,0	104,5	80,1	31,1	3,4	102,4	82,6	36,2	2,8
	24 / 17	106,6	81,4	19,3	5,5	114,9	83,1	21,8	5,3	114,3	81,2	24,4	4,7	111,8	80,8	27,5	4,1	106,6	82,9	31,3	3,4	103,4	85,4	36,4	2,8
	26 / 18	109,6	83,6	19,4	5,6	113,7	83,2	21,9	5,2	116,5	84,1	24,6	4,7	114,3	83,8	27,7	4,1	108,9	85,4	31,5	3,5	104,8	87,0	36,5	2,9
	27 / 19	111,6	82,9	19,5	5,7	113,6	81,3	22,0	5,2	116,3	82,1	24,7	4,7	116,2	83,3	27,8	4,2	110,4	85,2	31,7	3,5	106,1	86,3	36,6	2,9
	28 / 20	113,5	82,2	19,6	5,8	113,6	79,5	22,1	5,1	116,1	80,1	24,8	4,7	118,1	82,7	27,9	4,2	111,9	85,0	31,8	3,5	107,4	85,5	36,7	2,9
	30 / 22	117,4	80,5	19,9	5,9	117,1	77,6	22,3	5,3	115,7	76,0	25,1	4,6	121,2	81,5	28,2	4,3	115,0	84,4	32,1	3,6	-	-	-	-
18500 m³/h	22 / 16	107,2	82,1	19,3	5,6	116,2	83,6	21,8	5,3	115,2	80,8	24,5	4,7	111,8	81,6	27,5	4,1	107,3	84,1	31,3	3,4	105,5	87,1	36,4	2,9
	24 / 17	110,0	85,0	19,5	5,6	118,2	86,6	22,0	5,4	117,5	84,3	24,6	4,8	114,6	84,7	27,7	4,1	109,5	86,8	31,6	3,5	106,5	89,9	36,6	2,9
	26 / 18	112,8	87,7	19,6	5,8	116,7	87,1	22,1	5,3	119,8	87,9	24,8	4,8	116,9	88,3	27,9	4,2	111,8	89,3	31,8	3,5	108,4	91,8	36,8	2,9
	27 / 19	114,6	87,0	19,7	5,8	116,5	85,1	22,2	5,2	119,6	85,7	24,9	4,8	118,6	87,8	28,0	4,2	113,4	89,1	31,9	3,6	110,0	91,3	37,0	3,0
	28 / 20	116,5	86,2	19,8	5,9	116,4	83,1	22,3	5,2	119,4	83,5	25,0	4,8	120,4	87,3	28,1	4,3	115,0	89,0	32,0	3,6	111,6	90,8	37,1	3,0
	30 / 22	120,3	84,5	20,0	6,0	120,0	81,1	22,5	5,3	119,0	79,0	25,3	4,7	123,8	85,8	28,4	4,4	118,3	88,4	32,3	3,7	-	-	-	-
25000 m³/h	22 / 16	113,0	90,8	19,7	5,7	123,0	90,8	22,2	5,5	121,7	87,5	24,8	4,9	118,3	89,5	27,9	4,2	112,9	93,7	31,9	3,5	111,3	100,9	36,9	3,0
	24 / 17	116,1	94,1	19,8	5,9	125,0	94,8	22,3	5,6	124,5	91,7	25,0	5,0	121,0	94,2	28,1	4,3	115,4	97,8	32,1	3,6	114,9	102,4	37,4	3,1
	26 / 18	119,2	97,5	19,9	6,0	123,6	95,7	22,5	5,5	127,3	95,9	25,2	5,1	123,2	98,2	28,3	4,4	118,1	101,8	32,3	3,7	117,1	104,4	37,5	3,1
	27 / 19	121,3	96,3	20,0	6,1	123,4	93,3	22,6	5,5	126,9	93,6	25,4	5,0	124,7	97,5	28,4	4,4	119,5	101,7	32,4	3,7	118,5	104,1	37,6	3,2
	28 / 20	123,3	95,1	20,2	6,1	123,2	91,0	22,7	5,4	126,6	91,4	25,5	5,0	126,2	96,7	28,6	4,4	120,8	101,6	32,5	3,7	120,0	103,8	37,7	3,2
	30 / 22	127,3	92,4	20,4	6,2	126,7	88,6	22,9	5,5	125,9	86,7	25,7	4,9	129,8	94,8	28,8	4,5	123,6	101,3	32,7	3,8	-	-	-	-

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

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

Integrated heating capacities

AIR TEMPERATURE EXTERNAL EXCHANGER INLET °C (D.B. / W.B.)	-5 / -5.4	0 / -0.6	5 / 3.9	ALTRI
Heating capacity multiplication coefficient	0,89	0,88	0,94	1

The integrated heating capacity represents the real heating capacity considering the defrost cycles too.
To obtain the integrated heating capacity multiply the heating performance value in kWt (shown in the heating performance tables) by the coefficients indicated in the table.
DB = dry bulb
WB = wet bulb
In case of below zero external air temperature with a long period of heat pump operating mode it is necessary to help the evacuation of the water produced during the defrost cycle; this to avoid the formation of ice in the unit basement. Pay attention that the evacuation will not create inconveniences to things or persons.

Size 40.4 Configuration CCKP

Cooling performance with 30% of outdoor and exhaust air

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

Heating performance with 30% of outdoor and exhaust air

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

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

Integrated heating capacities

AIR TEMPERATURE EXTERNAL EXCHANGER INLET °C (D.B. / W.B.)	-5 / -5.4	0 / -0.6	5 / 3.9	ALTRI
Heating capacity multiplication coefficient	0,89	0,88	0,94	1

The integrated heating capacity represents the real heating capacity considering the defrost cycles too.
To obtain the integrated heating capacity multiply the heating performance value in kWt (shown in the heating performance tables) by the coefficients indicated in the table.
DB = dry bulb
WB = wet bulb
In case of below zero external air temperature with a long period of heat pump operating mode it is necessary to help the evacuation of the water produced during the defrost cycle; this to avoid the formation of ice in the unit basement. Pay attention that the evacuation will not create inconveniences to things or persons.

Size 44.4 Configuration CCKP

Cooling performance with 30% of outdoor and exhaust air

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

Heating performance with 30% of outdoor and exhaust air

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

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

Integrated heating capacities

AIR TEMPERATURE EXTERNAL EXCHANGER INLET °C (D.B. / W.B.)	-5 / -5.4	0 / -0.6	5 / 3.9	ALTRI
Heating capacity multiplication coefficient	0,89	0,88	0,94	1

The integrated heating capacity represents the real heating capacity considering the defrost cycles too.
To obtain the integrated heating capacity multiply the heating performance value in kWt (shown in the heating performance tables) by the coefficients indicated in the table.
DB = dry bulb
WB = wet bulb
In case of below zero external air temperature with a long period of heat pump operating mode it is necessary to help the evacuation of the water produced during the defrost cycle; this to avoid the formation of ice in the unit basement. Pay attention that the evacuation will not create inconveniences to things or persons.

Handling electric fan performance - Standard airflow

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

The performance takes into account the pressure drops in the unit (pressure drops in handling coil, standard filters, etc.).
To determine the performance required of the fans, you must add to the usable static pressure desired the pressure drops of any accessories.

Prerformance

Handling electric fan performance - Minimum airflow

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

The performance takes into account the pressure drops in the unit (pressure drops in handling coil, standard filters, etc.).
To determine the performance required of the fans, you must add to the usable static pressure desired the pressure drops of any accessories.

Handling electric fan performance - High airflow

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

The performance takes into account the pressure drops in the unit (pressure drops in handling coil, standard filters, etc.).
To determine the performance required of the fans, you must add to the usable static pressure desired the pressure drops of any accessories.

High static pressure electric fan performance - Standard airflow

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

The performance takes into account the pressure drops in the unit (pressure drops in handling coil, standard filters, etc.).
To determine the performance required of the fans, you must add to the usable static pressure desired the pressure drops of any accessories.
Performances with “VENH - High static pressure fans” option

High static pressure electric fan performance - Minimum airflow

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

The performance takes into account the pressure drops in the unit (pressure drops in handling coil, standard filters, etc.).
To determine the performance required of the fans, you must add to the usable static pressure desired the pressure drops of any accessories.
Performances with “VENH - High static pressure fans” option

Prerformance

High static pressure electric fan performance - High airflow

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

The performance takes into account the pressure drops in the unit (pressure drops in handling coil, standard filters, etc.).
To determine the performance required of the fans, you must add to the usable static pressure desired the pressure drops of any accessories.
Performances with “VENH - High static pressure fans” option

Exhaust electric fan performance

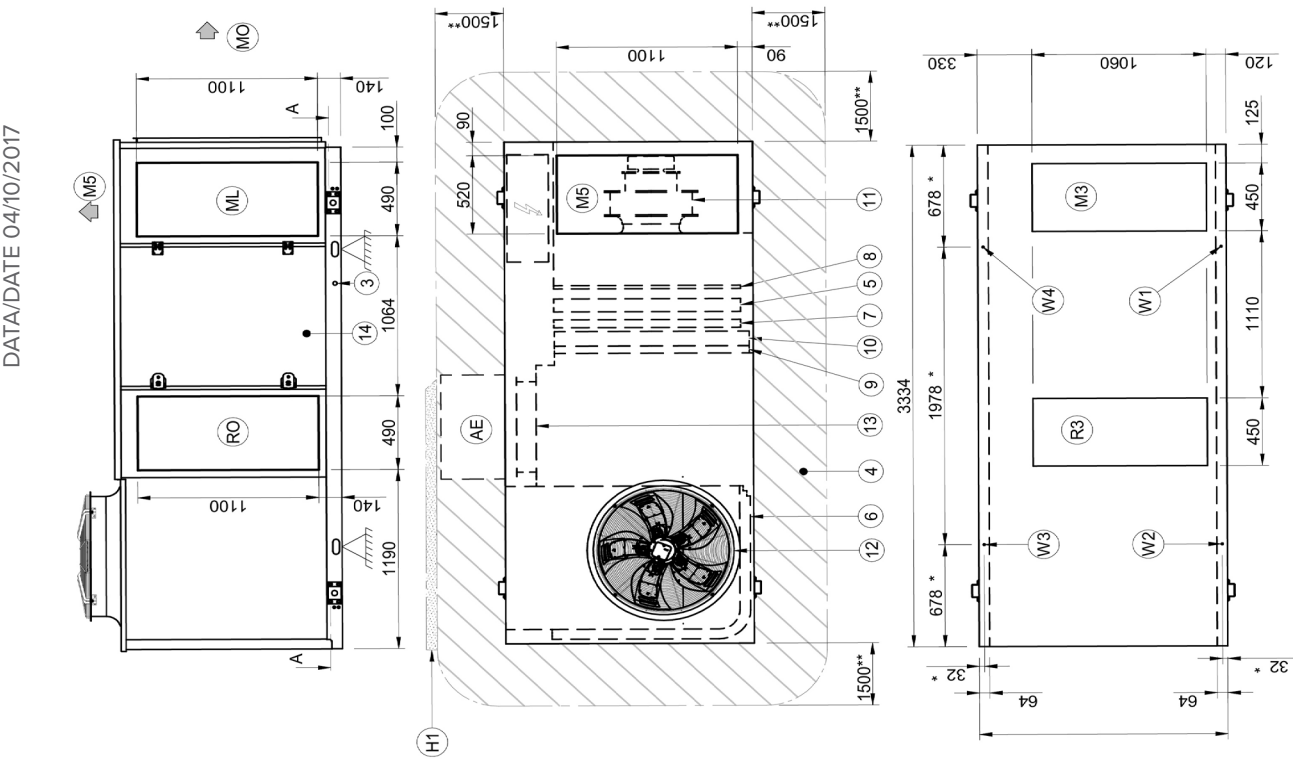
AVAILABLE STATIC PRESSURE (RETURN) (Pa)			150				
% OF EXHAUST AIR			10%	20%	30%	40%	50%
15.2	Airflow	m^3/h	900	1800	2700	3600	4500
	Airflow	l/s	250	500	750	1000	1250
	Fan RPM	rpm	740	780	830	898	976
	Total input	kW	0,17	0,25	0,34	0,44	0,55
18.2	Airflow	m^3/h	1150	2300	3450	4600	5750
	Airflow	l/s	319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

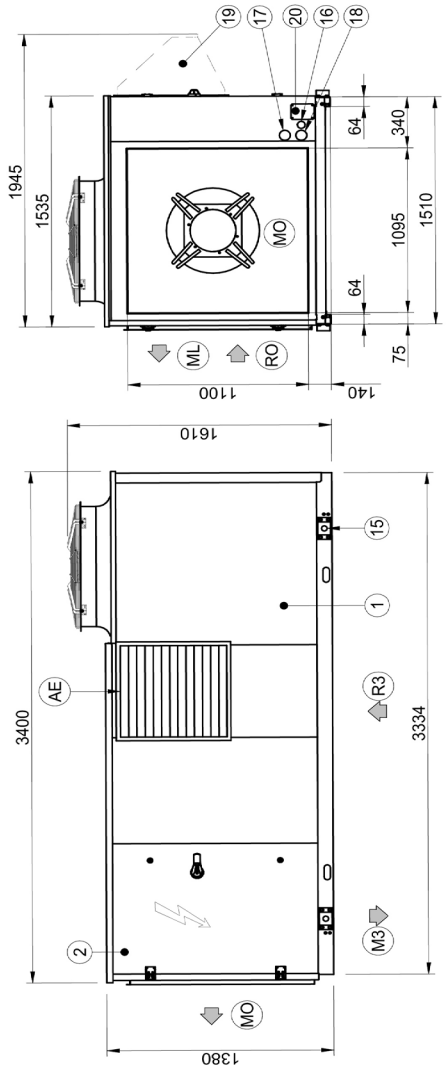
The percentage of exhaust air refers to the unit rated flow.
Exhaust electric fans collect from the environment only the quantity of air that will be exhausted.
The data refer to the return static pressure of 150 Pa, which usually occurs in the systems.

Dimensional drawings

Size 15.2 - 18.2 - CAK and CBK configuration

DAA8F15-1_04
DATA/DATE 04/10/2017





1. Compressor compartment
2. Electrical panel
3. Condensate drain
4. Functional clearances
5. Internal exchanger
6. External exchanger
7. H2O heating coil / recovery coil from food refrigeration / heating elements (optional)
8. Re-heating coil (Optional)
9. G4 air filters (Standard)
10. F7 filters / electrostatic filters (optional)
11. Electric fan (Supply - return)
12. External electric fan
13. Outdoor air damper (CBK config.)
14. Access for inspection of coils, filters, heating elements
15. Lifting brackets (removable)
16. Humidifier connections
17. H2O heating coil input Ø 1"1/4 / recovery coil from food refrigeration, input Ø 1"1/4 (optional)
18. H2O heating coil output Ø 1"1/4 / recovery coil from food refrigeration, output Ø 1"1/4 (optional)
19. Outdoor air return cap (only with config. CBK plus M3 and/or R3) accessory separately supplied
20. Power input

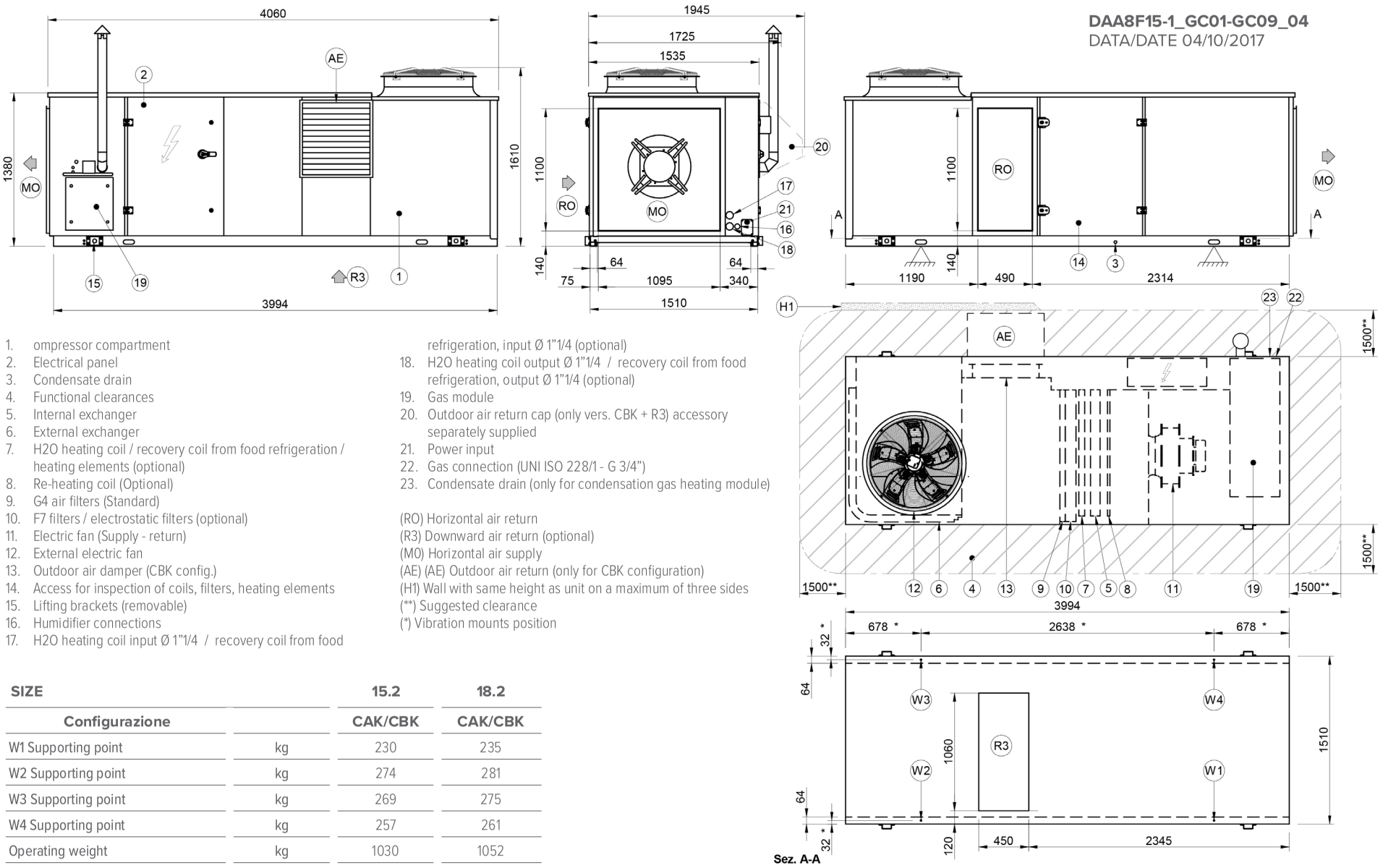
(RO) Horizontal air return
(R3) Downward air return (optional)
(MO) Horizontal air supply
(M3) Downward air supply (Optional)
(M5) Upflow air supply (Optional)
(ML) Sideward air supply (Optional)
(AE) Outdoor air return (only for CBK configuration)
(H1) Wall with same height as unit on a maximum of three sides
(**) Suggested clearance
(*) Vibration mounts position

SIZE		15.2	18.2
Configuration		**CAK/CBK**	**CAK/CBK**
W1 Supporting point	kg	181	185
W2 Supporting point	kg	249	255
W3 Supporting point	kg	244	250
W4 Supporting point	kg	207	211
Operating weight	kg	881	901
Shipping weight	kg	881	901

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

Size 15.2 - 18.2 Combustion module - CAK and CBK configuration

DAA8F15-1_GC01-GC09_04
DATA/DATE 04/10/2017



1. ompressor compartment
2. Electrical panel
3. Condensate drain
4. Functional clearances
5. Internal exchanger
6. External exchanger
7. H2O heating coil / recovery coil from food refrigeration / heating elements (optional)
8. Re-heating coil (Optional)
9. G4 air filters (Standard)
10. F7 filters / electrostatic filters (optional)
11. Electric fan (Supply - return)
12. External electric fan
13. Outdoor air damper (CBK config.)
14. Access for inspection of coils, filters, heating elements
15. Lifting brackets (removable)
16. Humidifier connections
17. H2O heating coil input Ø 1"1/4 / recovery coil from food refrigeration, input Ø 1"1/4 (optional)
18. H2O heating coil output Ø 1"1/4 / recovery coil from food refrigeration, output Ø 1"1/4 (optional)
19. Gas module
20. Outdoor air return cap (only vers. CBK + R3) accessory separately supplied
21. Power input
22. Gas connection (UNI ISO 228/1 - G 3/4")
23. Condensate drain (only for condensation gas heating module)

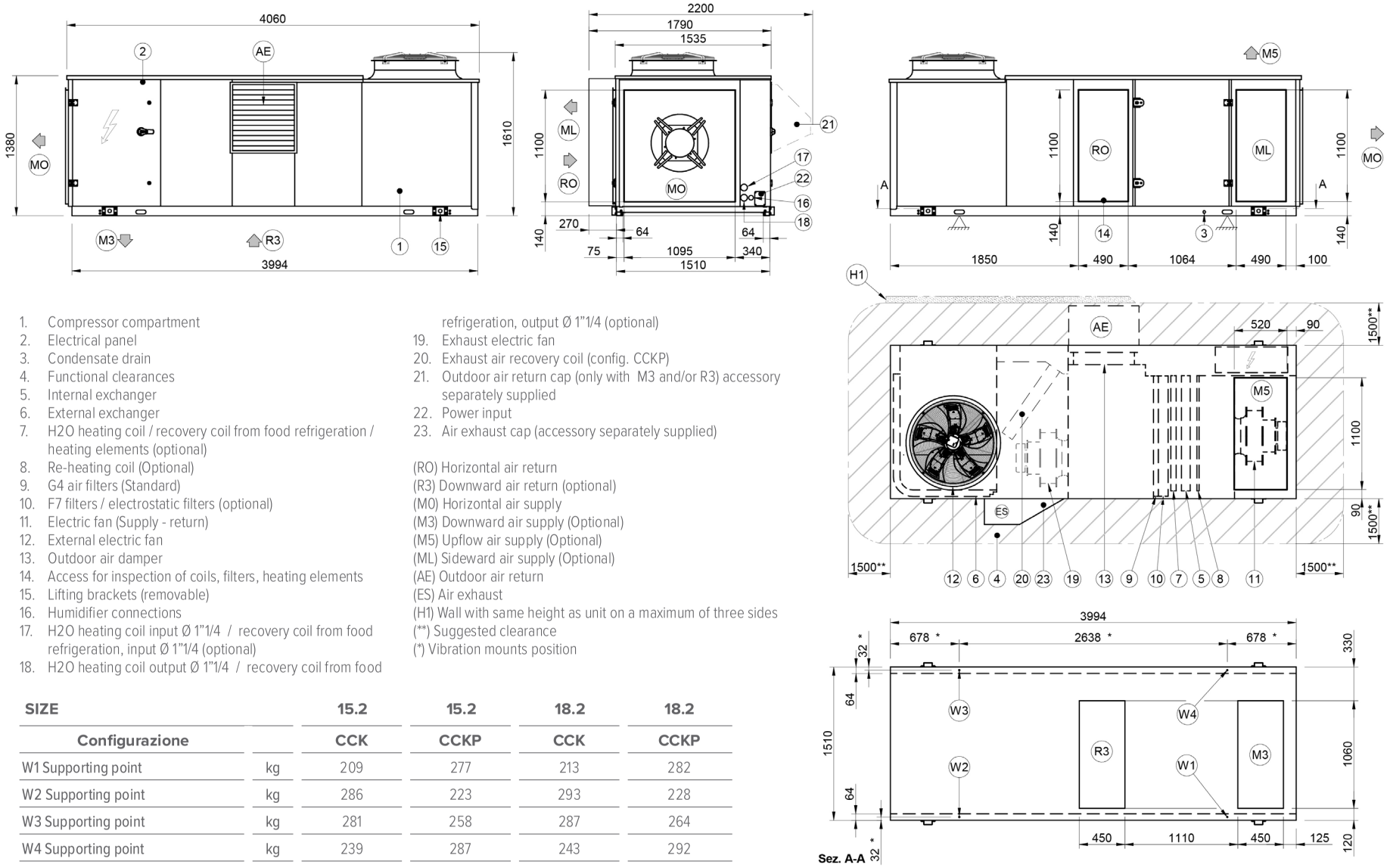
(RO) Horizontal air return
(R3) Downward air return (optional)
(MO) Horizontal air supply
(AE) (AE) Outdoor air return (only for CBK configuration)
(H1) Wall with same height as unit on a maximum of three sides
(**) Suggested clearance
(*) Vibration mounts position

SIZE		15.2	18.2
Configurazione		CAK/CBK	CAK/CBK
W1 Supporting point	kg	230	235
W2 Supporting point	kg	274	281
W3 Supporting point	kg	269	275
W4 Supporting point	kg	257	261
Operating weight	kg	1030	1052
Shipping weight	kg	1030	1052

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

Dimensional drawings

Size 15.2 - 18.2 - CCK and CCKP configuration



1. Compressor compartment
2. Electrical panel
3. Condensate drain
4. Functional clearances
5. Internal exchanger
6. External exchanger
7. H2O heating coil / recovery coil from food refrigeration / heating elements (optional)
8. Re-heating coil (Optional)
9. G4 air filters (Standard)
10. F7 filters / electrostatic filters (optional)
11. Electric fan (Supply - return)
12. External electric fan
13. Outdoor air damper
14. Access for inspection of coils, filters, heating elements
15. Lifting brackets (removable)
16. Humidifier connections
17. H2O heating coil input Ø 1"1/4 / recovery coil from food refrigeration, input Ø 1"1/4 (optional)
18. H2O heating coil output Ø 1"1/4 / recovery coil from food refrigeration, output Ø 1"1/4 (optional)
19. Exhaust electric fan
20. Exhaust air recovery coil (config. CCKP)
21. Outdoor air return cap (only with M3 and/or R3) accessory separately supplied
22. Power input
23. Air exhaust cap (accessory separately supplied)

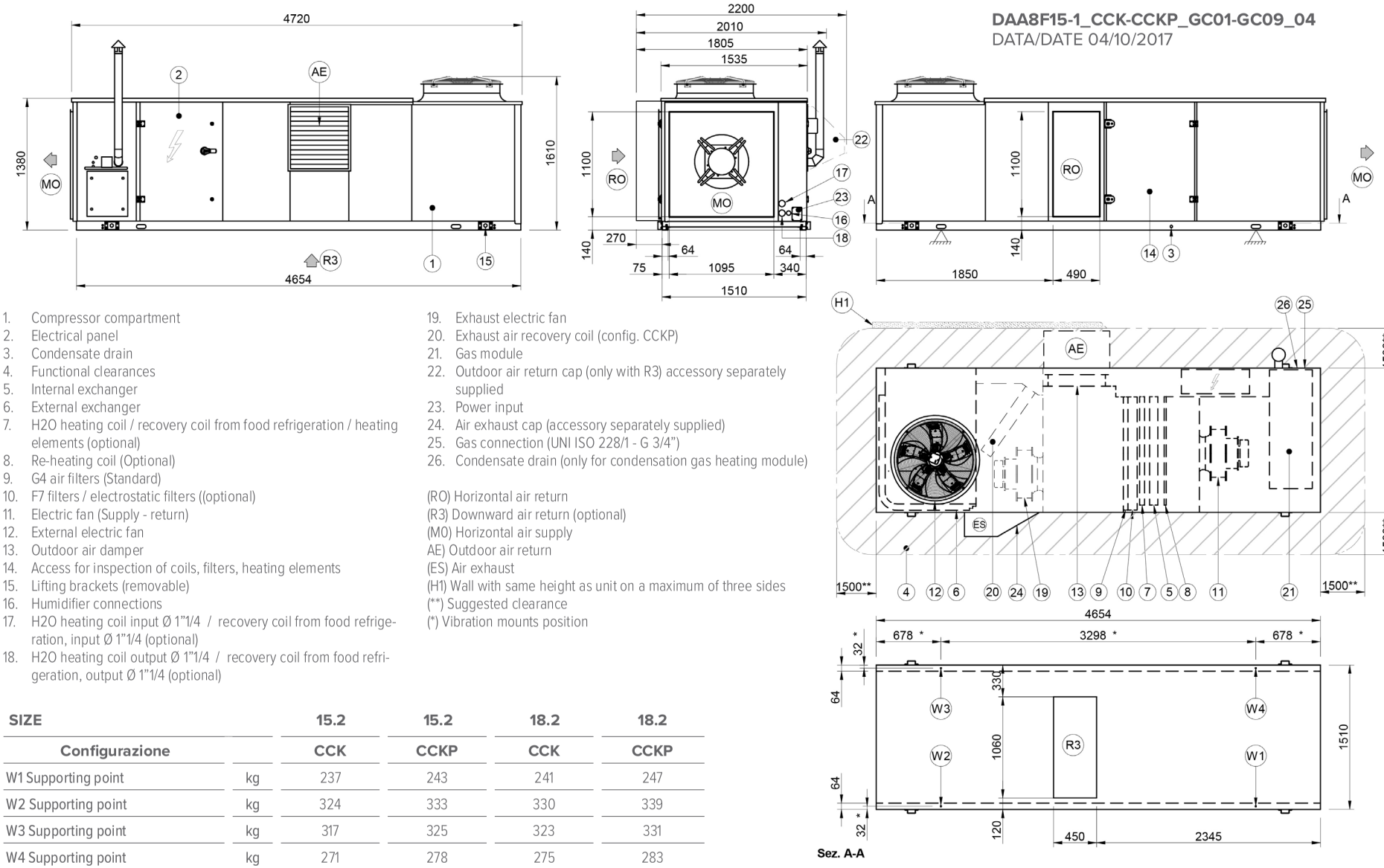
(RO) Horizontal air return
(R3) Downward air return (optional)
(MO) Horizontal air supply
(M3) Downward air supply (Optional)
(M5) Upflow air supply (Optional)
(ML) Sideward air supply (Optional)
(AE) Outdoor air return
(ES) Air exhaust
(H1) Wall with same height as unit on a maximum of three sides
(**) Suggested clearance
(*) Vibration mounts position

SIZE		15.2	15.2	18.2	18.2
Configurazione		**CCK**	**CCKP**	**CCK**	**CCKP**
W1 Supporting point	kg	209	277	213	282
W2 Supporting point	kg	286	223	293	228
W3 Supporting point	kg	281	258	287	264
W4 Supporting point	kg	239	287	243	292
Operating weight	kg	1015	1045	1036	1066
Shipping weight	kg	1015	1045	1036	1066

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

Size 15.2 - 18.2 Combustion module - CCK and CCKP configuration

DAA8F15-1_CCK-CCKP_GC01-GC09_04
DATA/DATE 04/10/2017



1. Compressor compartment
2. Electrical panel
3. Condensate drain
4. Functional clearances
5. Internal exchanger
6. External exchanger
7. H2O heating coil / recovery coil from food refrigeration / heating elements (optional)
8. Re-heating coil (Optional)
9. G4 air filters (Standard)
10. F7 filters / electrostatic filters ((optional)
11. Electric fan (Supply - return)
12. External electric fan
13. Outdoor air damper
14. Access for inspection of coils, filters, heating elements
15. Lifting brackets (removable)
16. Humidifier connections
17. H2O heating coil input Ø 1"1/4 / recovery coil from food refrigeration, input Ø 1"1/4 (optional)
18. H2O heating coil output Ø 1"1/4 / recovery coil from food refrigeration, output Ø 1"1/4 (optional)
19. Exhaust electric fan
20. Exhaust air recovery coil (config. CCKP)
21. Gas module
22. Outdoor air return cap (only with R3) accessory separately supplied
23. Power input
24. Air exhaust cap (accessory separately supplied)
25. Gas connection (UNI ISO 228/1 - G 3/4")
26. Condensate drain (only for condensation gas heating module)

(RO) Horizontal air return
(R3) Downward air return (optional)
(MO) Horizontal air supply
AE) Outdoor air return
(ES) Air exhaust
(H1) Wall with same height as unit on a maximum of three sides
(**) Suggested clearance
(*) Vibration mounts position

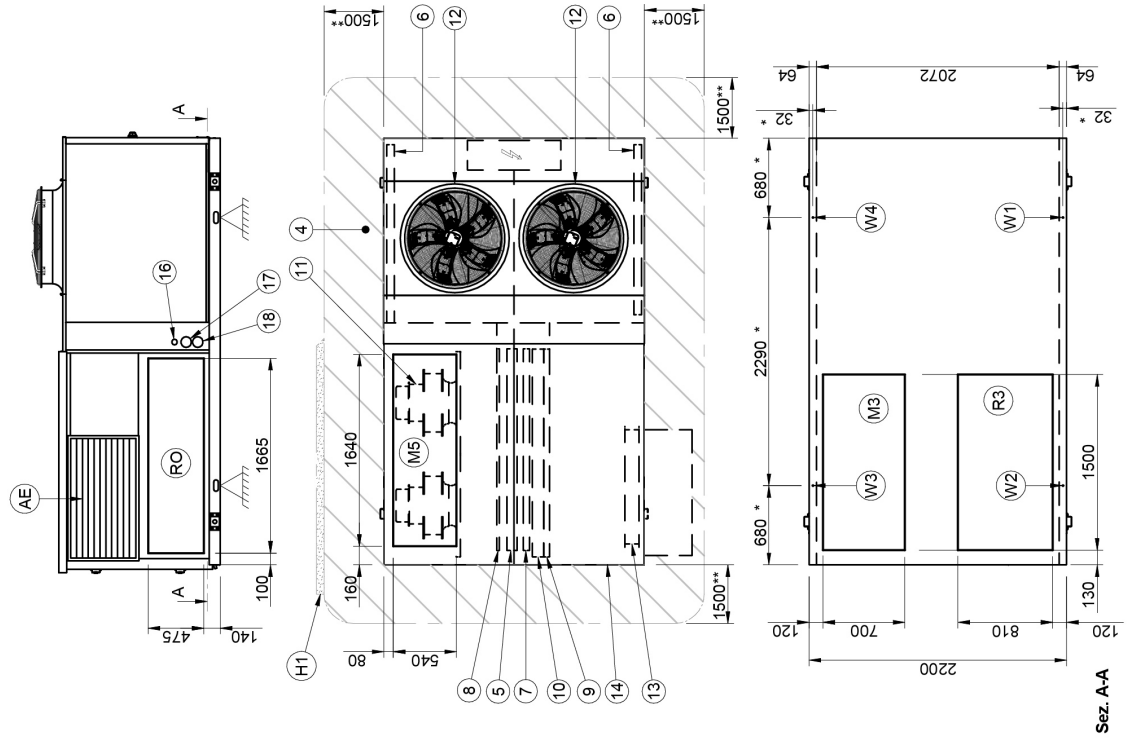
SIZE		15.2	15.2	18.2	18.2
Configurazione		CCK	CCKP	CCK	CCKP
W1 Supporting point	kg	237	243	241	247
W2 Supporting point	kg	324	333	330	339
W3 Supporting point	kg	317	325	323	331
W4 Supporting point	kg	271	278	275	283
Operating weight	kg	1149	1179	1169	1200
Shipping weight	kg	1149	1179	1169	1200

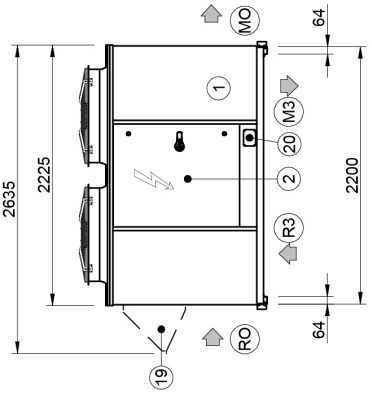
The presence of optional accessories may result in a substantial variation of the weights shown in the table.

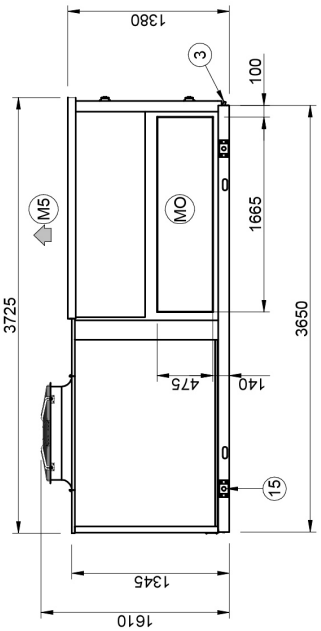
Dimensional drawings

Size 20.4 - 25.4 - 30.4 - CAK and CBK configuration

DAA8F24-2_04
DATA/DATE 04/10/2017







1. Compressor compartment
2. Electrical panel
3. Condensate drain
4. Functional clearances
5. Internal exchanger
6. External exchanger
7. H2O heating coil / recovery coil from food refrigeration / heating elements (optional)
8. Re-heating coil (Optional)
9. G4 air filters (Standard)
10. F7 filters / electrostatic filters (optional)
11. Electric fan (Supply - return)
12. External electric fan
13. Outdoor air damper
14. Access for inspection of coils, filters, heating elements
15. Lifting brackets (removable)
16. Humidifier connections
17. H2O heating coil input Ø 1"1/4 / recovery coil from food refrigeration, input Ø 1"1/4 (optional)
18. H2O heating coil output Ø 1"1/4 / recovery coil from food refrigeration, output Ø 1"1/4 (optional)
19. Outdoor air return cap (only for CBK version + M3 and/or R3) accessory separately supplied
20. Power input

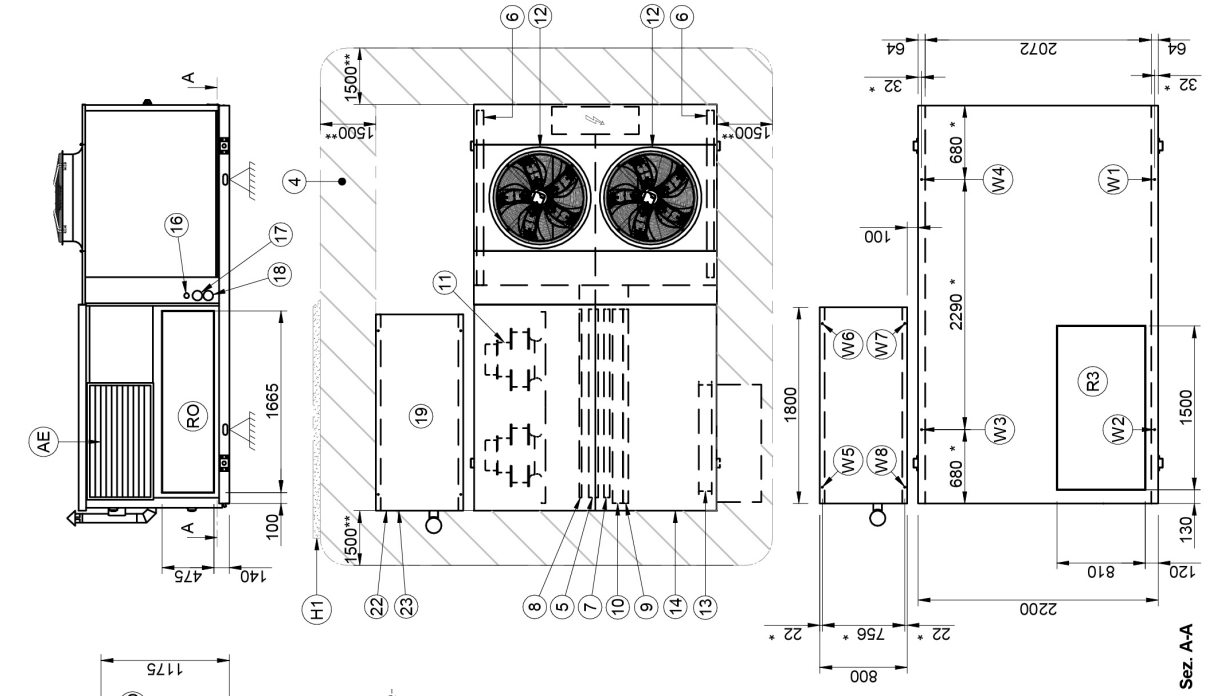
(RO) Horizontal air return
(R3) Downward air return (optional)
(MO) Horizontal air supply
(M3) Downward air supply (Optional)
(M5) Upflow air supply (Optional)
(AE) Outdoor air return
(H1) Wall with same height as unit on a maximum of three sides
(**) Suggested clearance
(*) Vibration mounts position

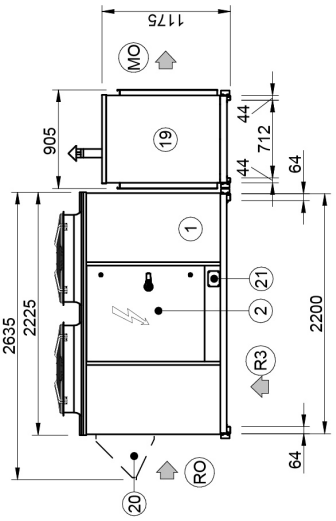
SIZE		20.4	25.4	30.4
Configurazione		**CAK/CBK**	**CAK/CBK**	**CAK/CBK**
W1 Supporting point	kg	391	400	403
W2 Supporting point	kg	294	302	304
W3 Supporting point	kg	336	345	347
W4 Supporting point	kg	405	414	417
Operating weight	kg	1426	1461	1471
Shipping weight	kg	1426	1461	1471

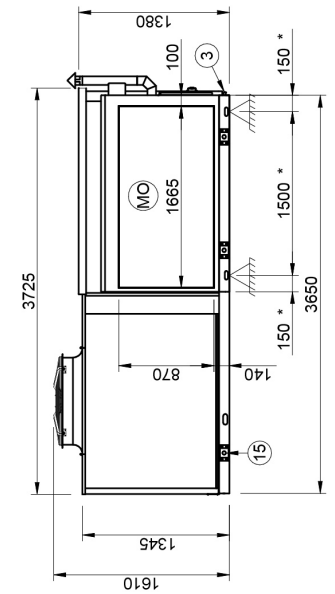
The presence of optional accessories may result in a substantial variation of the weights shown in the table.

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

DAA8F24-2_GC01X-GC11X_04
DATA/DATE 04/10/2017







1. Compressor compartment
2. Electrical panel
3. Condensate drain
4. Functional clearances
5. Internal exchanger
6. External exchanger
7. H2O heating coil / recovery coil from food refrigeration / heating elements (optional)
8. Re-heating coil (Optional)
9. G4 air filters (Standard)
10. F7 filters / electrostatic filters (optional)
11. Electric fan (Supply - return)
12. External electric fan
13. Outdoor air damper (Config. CBK)
14. Access for inspection of coils, filters, heating elements
15. Lifting brackets (removable)
16. Humidifier connections
17. H2O heating coil input Ø 1"1/4 / recovery coil from food refrigeration, input Ø 1"1/4 (optional)
18. H2O heating coil output Ø 1"1/4 / recovery coil from food refrigeration, output Ø 1"1/4 (optional)
19. Gas module
20. Outdoor air return cap (only with config. CBK plus R3) accessory separately supplied
21. Power input
22. Gas connection (UNI ISO 228/1 - G 3/4")
23. Condensate drain (only for condensation gas heating module)

(RO) Horizontal air return
(R3) Downward air return (optional)
(MO) Horizontal air supply
(AE) (AE) Outdoor air return (CBK version)
(H1) Wall with same height as unit on a maximum of three sides
(**) Suggested clearance
(*) Vibration mounts position

GAS MODULE WEIGHT DISTRIBUTION

SIZE		24.4	25.4	30.4
W5 Supporting point		75	75	75
W6 Supporting point	kg	63	63	63
W7 Supporting point	kg	63	63	63
W8 Supporting point	kg	75	75	75
Operating weight	kg	276	276	276
Shipping weight	kg	276	276	276

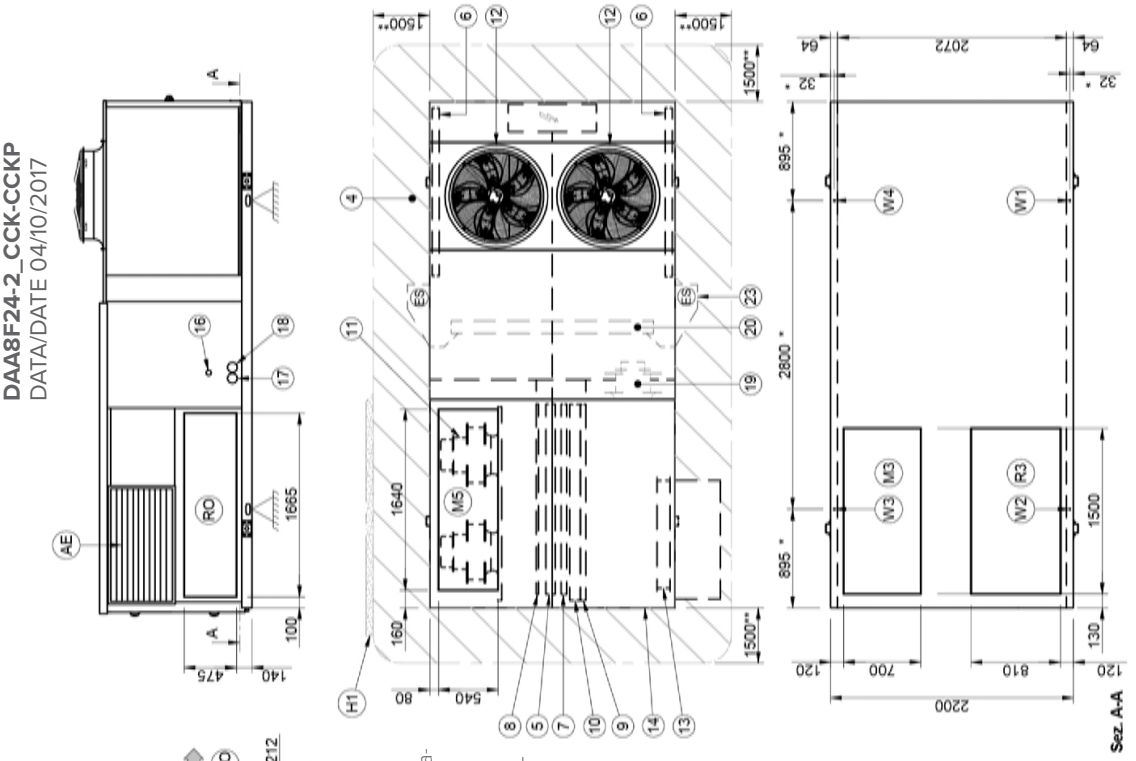
SIZE		20.4	25.4	30.4
Configurazione		CAK/CBK	CAK/CBK	CAK/CBK
W1 Supporting point	kg	391	400	403
W2 Supporting point	kg	294	302	304
W3 Supporting point	kg	336	345	347
W4 Supporting point	kg	405	414	417
Operating weight	kg	1426	1461	1471
Shipping weight	kg	1426	1461	1471

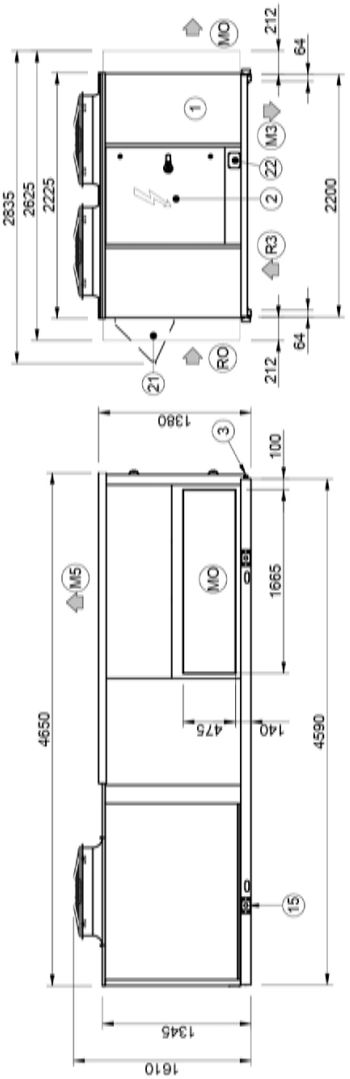
The presence of optional accessories may result in a substantial variation of the weights shown in the table.

Dimensional drawings

Size 20.4 - 25.4 - 30.4 - CCK and CCKP configuration

DAA8F24-2_CCK-CCKP
DATA/DATE 04/10/2017





1. Compressor compartment
2. Electrical panel
3. Condensate drain
4. Functional clearances
5. Internal exchanger
6. External exchanger
7. H2O heating coil / recovery coil from food refrigeration / heating elements (optional)
8. Re-heating coil (Optional)
9. G4 air filters (Standard)
10. F7 filters / electrostatic filters (optional)
11. Electric fan (Supply - return)
12. External electric fan
13. Outdoor air damper
14. Access for inspection of coils, filters, heating elements
15. Lifting brackets (removable)
16. Humidifier connections
17. H2O heating coil input Ø 1"1/4 / recovery coil from food refrigeration, input Ø 1"1/4 (optional)
18. H2O heating coil output Ø 1"1/4 / recovery coil from food refrigeration, output Ø 1"1/4 (optional)
19. Exhaust electric fan
20. Exhaust air recovery coil (CCKP version)
21. Outdoor air return cap (only with M3 and/or R3) (accessory separately supplied)
22. Power input
23. Air exhaust cap (accessory separately supplied)

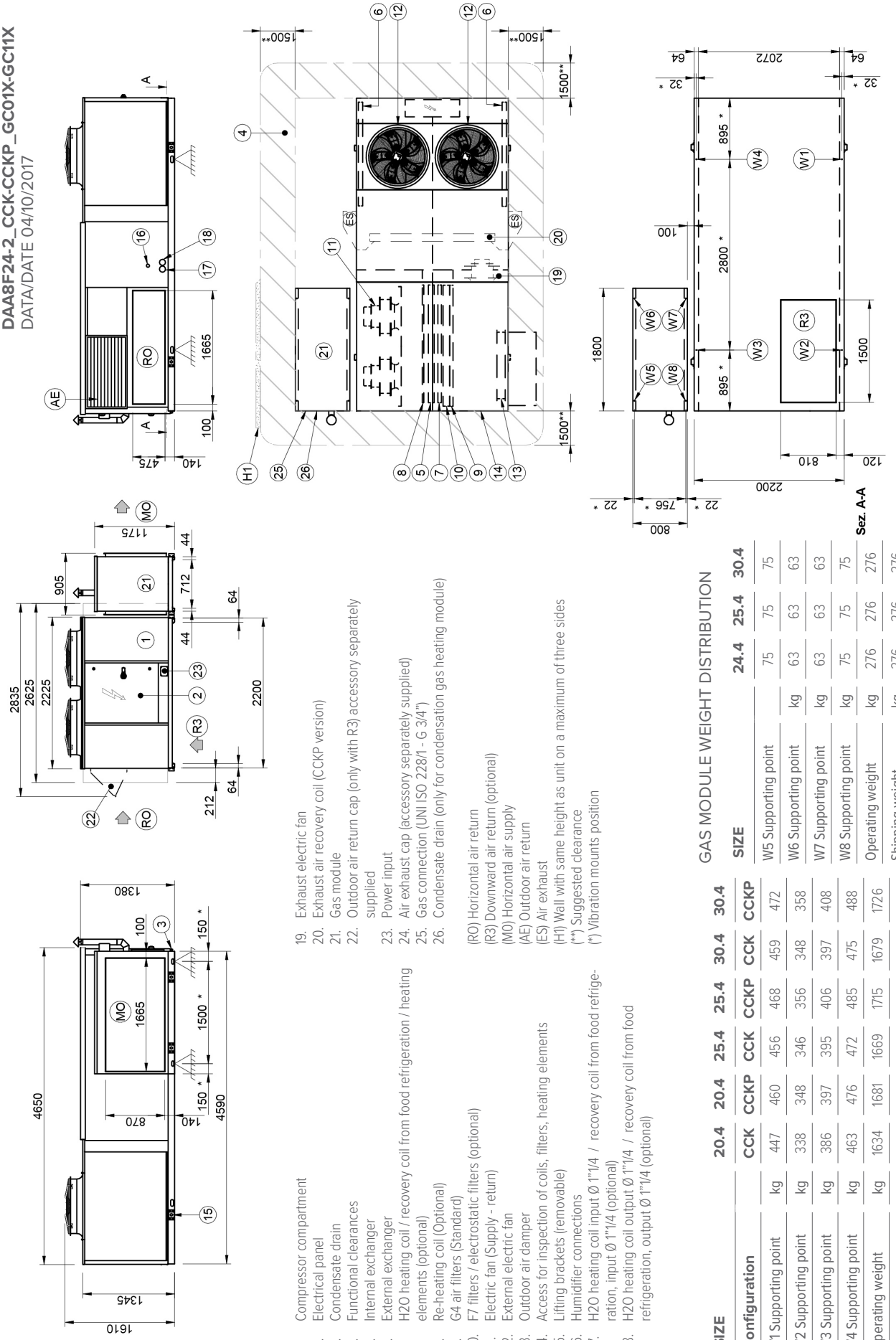
(RO) Horizontal air return
(R3) Downward air return (optional)
(M0) Horizontal air supply
(M3) Downward air supply (Optional)
(M5) Upflow air supply (Optional)
(AE) Outdoor air return
(ES) Air exhaust
(H1) Wall with same height as unit on a maximum of three sides
(**) Suggested clearance
(*) Vibration mounts position

SIZE		20.4	20.4	25.4	25.4	30.4	30.4
Configurazione		**CCK**	**CCKP**	**CCK**	**CCKP**	**CCK**	**CCKP**
W1 Supporting point	kg	447	460	456	468	459	472
W2 Supporting point	kg	338	348	346	356	348	358
W3 Supporting point	kg	386	397	395	406	397	408
W4 Supporting point	kg	463	476	472	485	475	488
Operating weight	kg	1634	1681	1669	1715	1679	1726
Shipping weight	kg	1634	1681	1669	1715	1679	1726

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

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

DAA8F24-2_CCK-CCKP_GC01X-GC11X
DATA/DATE 04/10/2017



1. Compressor compartment
2. Electrical panel
3. Condensate drain
4. Functional clearances
5. Internal exchanger
6. External exchanger
7. H2O heating coil / recovery coil from food refrigeration / heating elements (optional)
8. Re-heating coil (Optional)
9. G4 air filters (Standard)
10. F7 filters / electrostatic filters (optional)
11. Electric fan (Supply - return)
12. External electric fan
13. Outdoor air damper
14. Access for inspection of coils, filters, heating elements
15. Lifting brackets (removable)
16. Humidifier connections
17. H2O heating coil input Ø 1"1/4 / recovery coil from food refrigeration, input Ø 1""1/4 (optional)
18. H2O heating coil output Ø 1"1/4 / recovery coil from food refrigeration, output Ø 1"1/4 (optional)
19. Exhaust electric fan
20. Exhaust air recovery coil (CCKP version)
21. Gas module
22. Outdoor air return cap (only with R3) accessory separately supplied
23. Power input
24. Air exhaust cap (accessory separately supplied)
25. Gas connection (UNI ISO 228/1 - G 3/4")
26. Condensate drain (only for condensation gas heating module)

(RO) Horizontal air return
(R3) Downward air return (optional)
(MO) Horizontal air supply
(AE) Outdoor air return
(ES) Air exhaust
(H1) Wall with same height as unit on a maximum of three sides
(**) Suggested clearance
(*) Vibration mounts position

GAS MODULE WEIGHT DISTRIBUTION

SIZE		20.4	20.4	25.4	25.4	30.4	30.4
Configuration		**CCK**	**CCKP**	**CCK**	**CCKP**	**CCK**	**CCKP**
W1 Supporting point	kg	447	460	456	468	459	472
W2 Supporting point	kg	338	348	346	356	348	358
W3 Supporting point	kg	386	397	395	406	397	408
W4 Supporting point	kg	463	476	472	485	475	488
Operating weight	kg	1634	1681	1669	1715	1679	1726
Shipping weight	kg	1634	1681	1669	1715	1679	1726

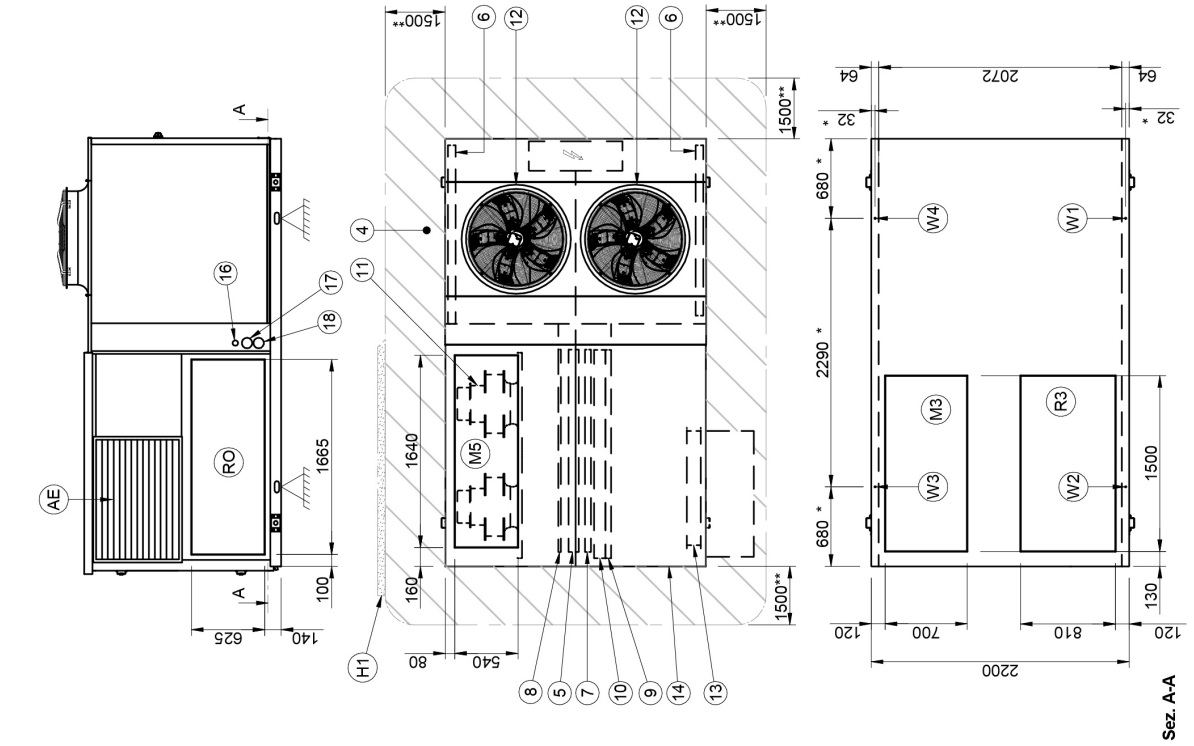
SIZE		24.4	25.4	30.4
W5 Supporting point		75	75	75
W6 Supporting point	kg	63	63	63
W7 Supporting point	kg	63	63	63
W8 Supporting point	kg	75	75	75
Operating weight	kg	276	276	276
Shipping weight	kg	276	276	276

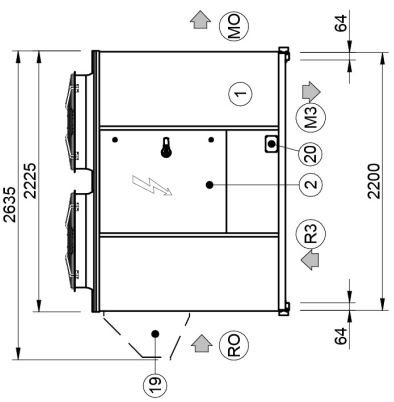
The presence of optional accessories may result in a substantial variation of the weights shown in the table.

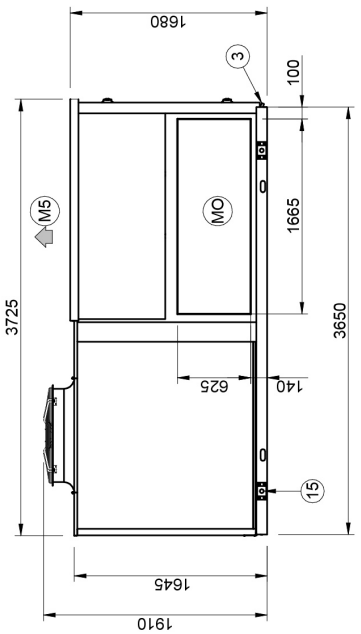
Dimensional drawings

Size 33.4-40.4-44.4 - CAK and CBK configuration

DAA8F35_2_04
DATA/DATE 04/10/2017







1. Compressor compartment
2. Electrical panel
3. Condensate drain
4. Functional clearances
5. Internal exchanger
6. External exchanger
7. H2O heating coil / recovery coil from food refrigeration / heating elements (optional)
8. Re-heating coil (Optional)
9. G4 air filters (Standard)
10. F7 filters / electrostatic filters (optional)
11. Electric fan (Supply - return)
12. External electric fan
13. Outdoor air damper (CBK version)
14. Access for inspection of coils, filters, heating elements
15. Lifting brackets (removable)
16. Humidifier connections
17. H2O heating coil input Ø 1"1/4 / recovery coil from food refrigeration, input Ø 1"1/4 (optional)
18. H2O heating coil output Ø 1"1/4 / recovery coil from food refrigeration, output Ø 1"1/4 (optional)
19. Outdoor air return cap (inly CBK version plus M3 and/or E3) accessory separately supplied
20. Power input

(RO) Horizontal air return
(R3) Downward air return (optional)
(MO) Horizontal air supply
(M3) Downward air supply (Optional)
(M5) Upflow air supply (Optional)
(AE) Outdoor air return
(H1) Wall with same height as unit on a maximum of three sides
(**) Suggested clearance
(*) Vibration mounts position

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

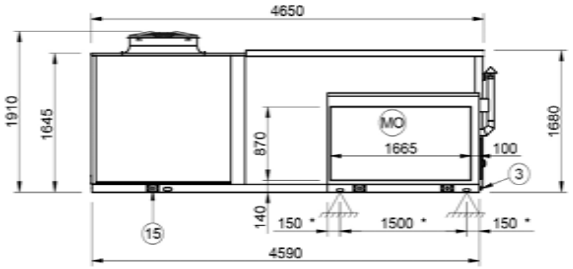
The presence of optional accessories may result in a substantial variation of the weights shown in the table.

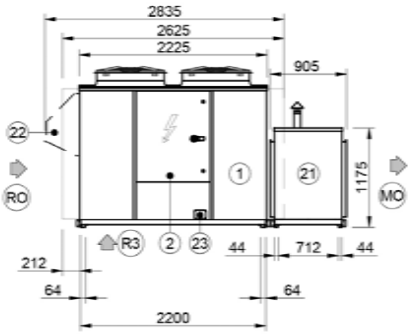
Dimensional drawings

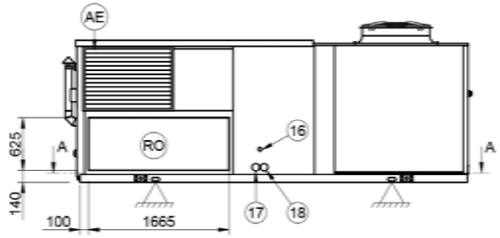
Size 33.4-40.4-44.4 Combustion module - CAK and CBK configuration

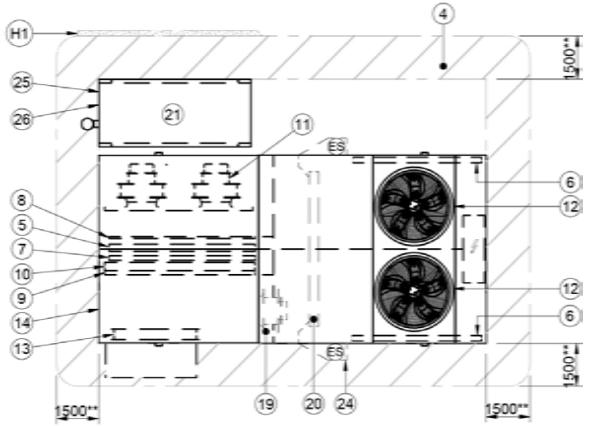
Single chamber (GC09X 65 kW - GC10X 82 kW - GC11X 100 kW)

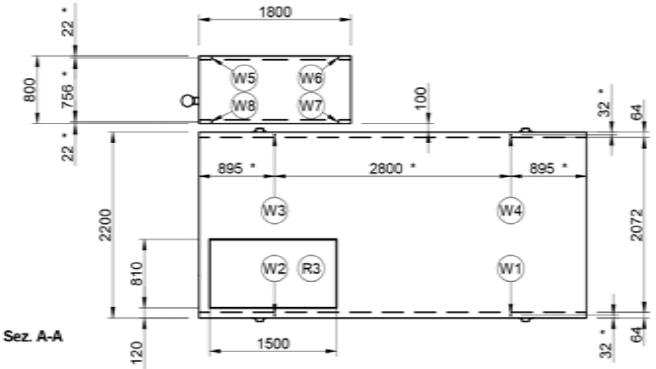
DAA8F35_2_CCK-CCKP_GC09X-GC10X_04
DATA/DATE 04/10/2017











Sez. A-A

1. Compressor compartment
2. Electrical panel
3. Condensate drain
4. Functional clearances
5. Internal exchanger
6. External exchanger
7. H2O heating coil / recovery coil from food refrigeration / heating elements (optional)
8. Re-heating coil (Optional)
9. G4 air filters (Standard)
10. F7 filters / electrostatic filters (optional)
11. Electric fan (Supply - return)
12. External electric fan
13. Outdoor air damper
14. Access for inspection of coils, filters, heating elements
15. Lifting brackets (removable)
16. Humidifier connections
17. H2O heating coil input Ø 1"1/4 / recovery coil from food refrigeration, input Ø 1"1/4 (optional)
18. H2O heating coil output Ø 1"1/4 / recovery coil from food refrigeration, output Ø 1"1/4 (optional)
19. Exhaust electric fan
20. Exhaust air recovery coil (CCKP version)
21. Gas module
22. Outdoor air return cap (only with R3) accessory separately supplied
23. Power input
24. Air exhaust cap (accessory separately supplied)
25. Gas connection (UNI ISO 228/1 - G 3/4")
26. Condensate drain (only for condensation gas heating module)

(RO) Horizontal air return
(R3) Downward air return (optional)
(M0) Horizontal air supply
(AE) Outdoor air return
(ES) Air exhaust
(H1) Wall with same height as unit on a maximum of three sides
(**) Suggested clearance
(*) Vibration mounts position

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

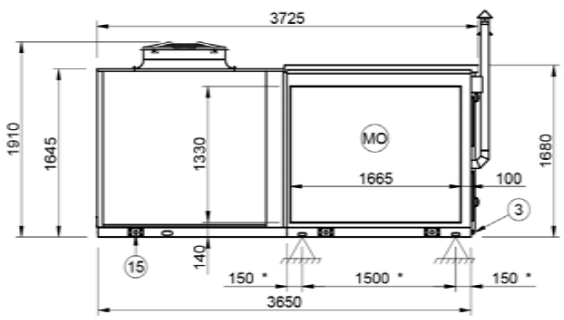
GAS MODULE WEIGHT DISTRIBUTION

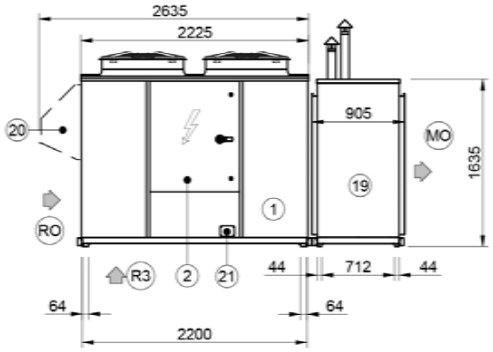
SIZE		33.4	40.4	44.4
W5 Supporting point	kg	70	70	70
W6 Supporting point	kg	58	58	58
W7 Supporting point	kg	58	58	58
W8 Supporting point	kg	70	70	70
Operating weight	kg	256	256	256
Shipping weight	kg	256	256	256

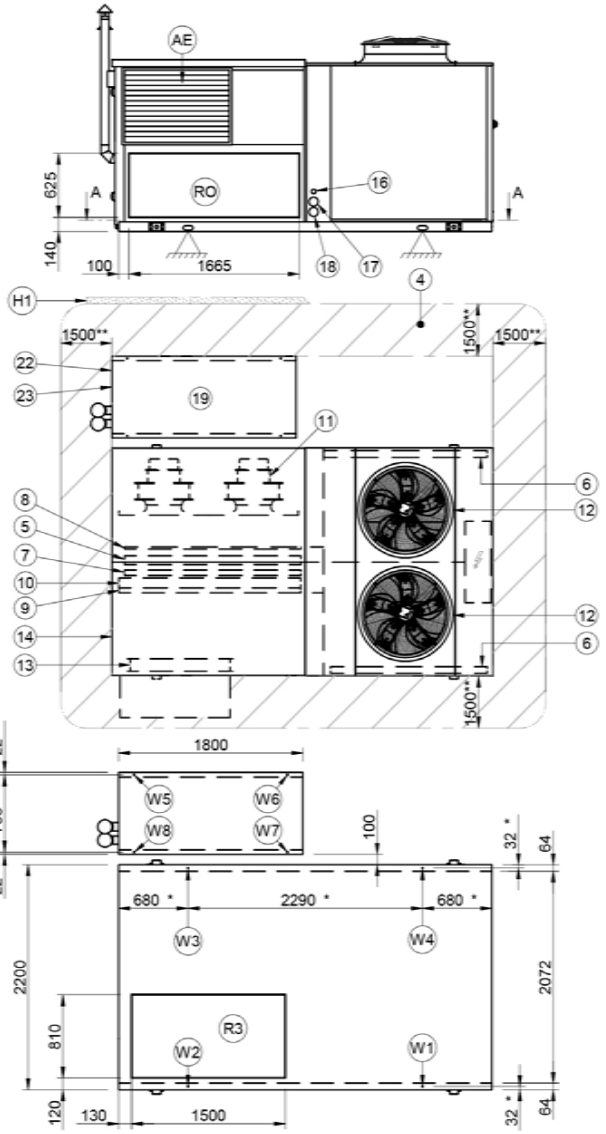
The presence of optional accessories may result in a substantial variation of the weights shown in the table.

Size 33.4-40.4-44.4 Combustion module - CAK and CBK configuration
Double chamber (GC12X 130 kW)

DAA8F35_2_GC12X_04
DATA/DATE 04/10/2017







Sez. A-A

1. Compressor compartment
2. Electrical panel
3. Condensate drain
4. Functional clearances
5. Internal exchanger
6. External exchanger
7. H2O heating coil / recovery coil from food refrigeration / heating elements (optional)
8. Re-heating coil (Optional)
9. G4 air filters (Standard)
10. F7 filters / electrostatic filters (optional)
11. Electric fan (Supply - return)
12. External electric fan
13. Outdoor air damper (CBK version)
14. Access for inspection of coils, filters, heating elements
15. Lifting brackets (removable)
16. Humidifier connections
17. H2O heating coil input Ø 1"1/4 / recovery coil from food refrigeration, input Ø 1"1/4 (optional)
18. H2O heating coil output Ø 1"1/4 / recovery coil from food refrigeration, output Ø 1"1/4 (optional)
19. Gas module
20. Outdoor air return cap (only with CBK version plus R3) accessory separately supplied
21. Power input
22. Gas connection (UNI ISO 228/1 - G 3/4")
23. Condensate drain (only for condensation gas heating module)

(RO) Horizontal air return
(R3) Downward air return (optional)
(MO) Horizontal air supply
(AE) Outdoor air return (only for CBK configuration)
(H1) Wall with same height as unit on a maximum of three sides
(**) Suggested clearance
(*) Vibration mounts position

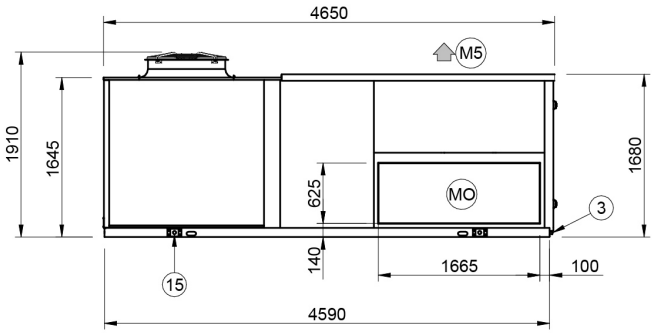
SIZE		33.4	40.4	44.4
Configuration		CAK/CBK	CAK/CBK	CAK/CBK
W1 Supporting point	kg	416	423	424
W2 Supporting point	kg	319	327	329
W3 Supporting point	kg	365	374	375
W4 Supporting point	kg	431	439	440
Operating weight	kg	1531	1563	1568
Shipping weight	kg	1531	1563	1568

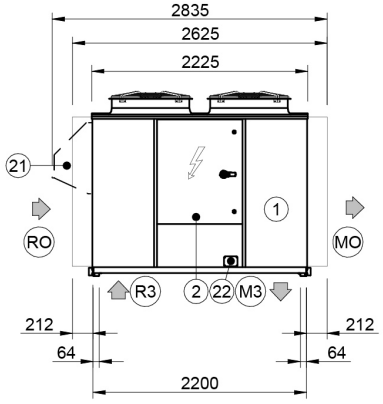
GAS MODULE WEIGHT DISTRIBUTION

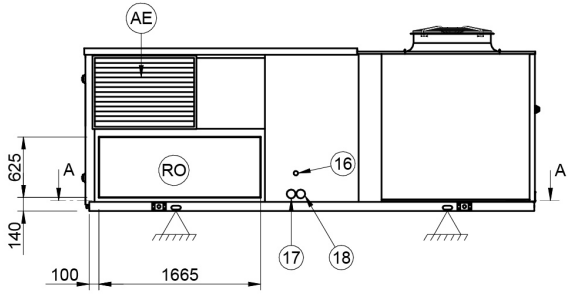
SIZE		33.4	40.4	44.4
W5 Supporting point	kg	90	90	90
W6 Supporting point	kg	78	78	78
W7 Supporting point	kg	78	78	78
W8 Supporting point	kg	90	90	90
Operating weight	kg	336	336	336
Shipping weight	kg	336	336	336

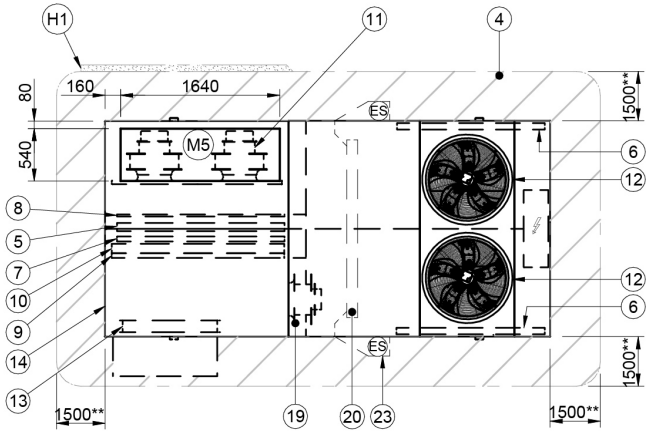
The presence of optional accessories may result in a substantial variation of the weights shown in the table.

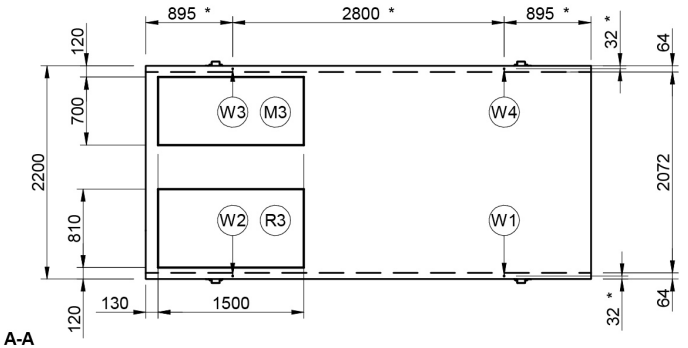
DAA8F35_2_CCK-CCKP_04
DATA/DATE 04/10/2017











Sez. A-A

1. Compressor compartment
2. Electrical panel
3. Condensate drain
4. Functional clearances
5. Internal exchanger
6. External exchanger
7. H2O heating coil / recovery coil from food refrigeration / heating elements (optional)
8. Re-heating coil (Optional)
9. G4 air filters (Standard)
10. F7 filters / electrostatic filters (optional)
11. Electric fan (Supply - return)
12. External electric fan
13. Outdoor air damper
14. Access for inspection of coils, filters, heating elements
15. Lifting brackets (removable)
16. Humidifier connections
17. H2O heating coil input Ø 1"1/4 / recovery coil from food refrigeration, input Ø 1"1/4 (optional)
18. H2O heating coil output Ø 1"1/4 / recovery coil from food refrigeration, output Ø 1"1/4 (optional)
19. Exhaust electric fan
20. Exhaust air recovery coil (CCKP version)
21. Outdoor air return cap (only with M3 and/or R3) accessory separately supplied
22. Power input
23. Air exhaust cap (accessory separately supplied)
24.

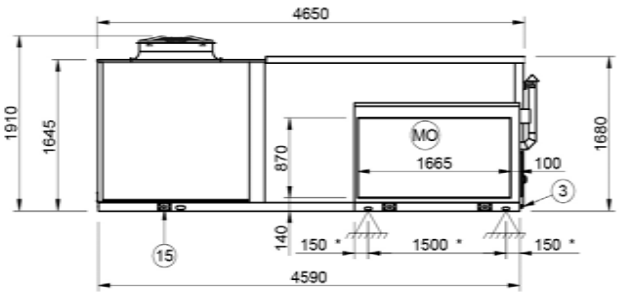
(RO) Horizontal air return
(R3) Downward air return (optional)
(M0) Horizontal air supply
(M3) Downward air supply (Optional)
(M5) Upflow air supply (Optional)
(AE) Outdoor air return
(ES) Air exhaust
(H1) Wall with same height as unit on a maximum of three sides
(**) Suggested clearance
(*) Vibration mounts position

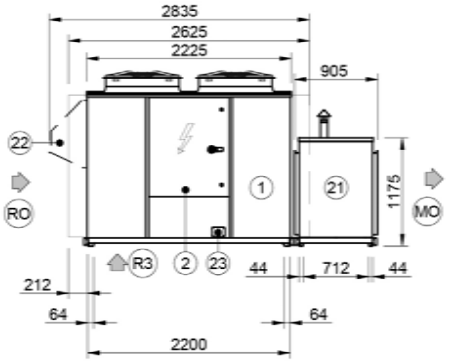
SIZE		33.4	33.4	40.4	40.4	44.4	44.4
Configuration		**CCK**	**CCKP**	**CCK**	**CCKP**	**CCK**	**CCKP**
W1 Supporting point	kg	485	501	492	508	494	509
W2 Supporting point	kg	373	386	381	394	382	395
W3 Supporting point	kg	427	441	436	450	437	451
W4 Supporting point	kg	503	519	511	527	512	528
Operating weight	kg	1778	1847	1820	1879	1825	1883
Shipping weight	kg	1778	1847	1820	1879	1825	1883

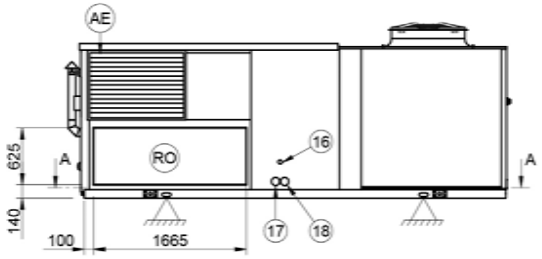
The presence of optional accessories may result in a substantial variation of the weights shown in the table.

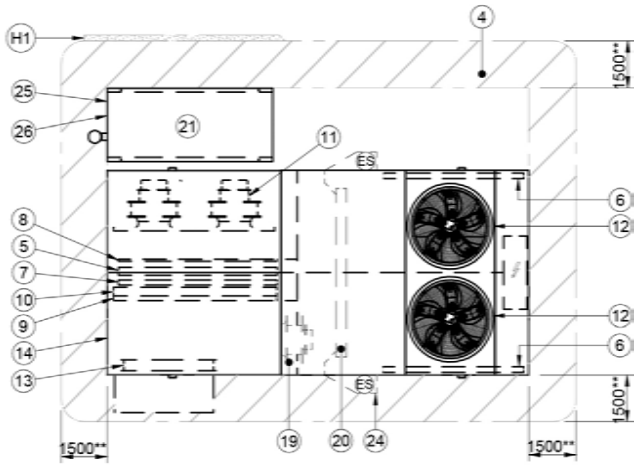
Size 33.4-40.4-44.4 Combustion module - CCK and CCKP configuration
Single chambre(GC09X 65 kW - GC10X 82 kW - GC11X 100 kW)

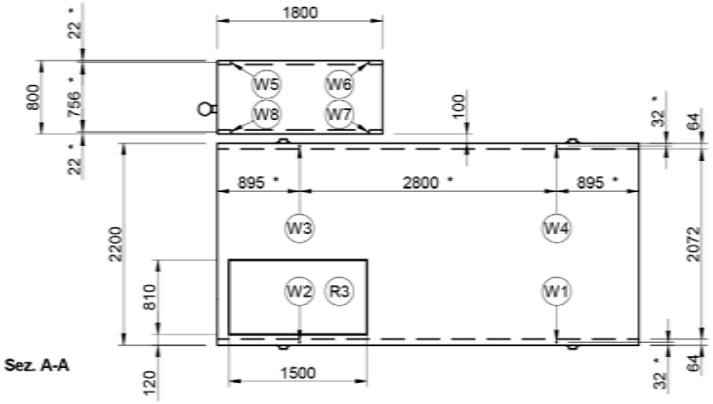
DAA8F35_2_CCK-CCKP_GC09X-GC10X_04
DATA/DATE 04/10/2017











Sez. A-A

1. Compressor compartment
2. Electrical panel
3. Condensate drain
4. Functional clearances
5. Internal exchanger
6. External exchanger
7. H2O heating coil / recovery coil from food refrigeration / heating elements (optional)
8. Re-heating coil (Optional)
9. G4 air filters (Standard)
10. F7 filters / electrostatic filters (optional)
11. Electric fan (Supply - return)
12. External electric fan
13. Outdoor air damper
14. Access for inspection of coils, filters, heating elements
15. Lifting brackets (removable)
16. Humidifier connections
17. H2O heating coil input Ø 1"1/4 / recovery coil from food refrigeration, input Ø 1"1/4 (optional)
18. H2O heating coil output Ø 1"1/4 / recovery coil from food refrigeration, output Ø 1"1/4 (optional)
19. Exhaust electric fan
20. Exhaust air recovery coil (config. CCKP)
21. Gas module
22. Outdoor air return cap (only with R3) accessory separately supplied
23. Power input
24. Outdoor air return cap (accessory separately supplied)
25. Gas connection (UNI ISO 228/1 - G 3/4")
26. Condensate drain (only for condensation gas heating module)

(RO) Horizontal air return
(R3) Downward air return (optional)
(M0) Horizontal air supply
(AE) Outdoor air return
(ES) Air exhaust
(H1) Wall with same height as unit on a maximum of three sides
(**) Suggested clearance
(*) Vibration mounts position

SIZE		33.4	33.4	40.4	40.4	44.4	44.4
Configuration		CCK	CCKP	CCK	CCKP	CCK	CCKP
W1 Supporting point	kg	485	501	492	508	494	509
W2 Supporting point	kg	373	386	381	394	376	395
W3 Supporting point	kg	427	441	436	450	430	451
W4 Supporting point	kg	503	519	511	527	503	528
Operating weight	kg	1788	1847	1820	1879	1825	1883
Shipping weight	kg	1788	1847	1820	1879	1825	1883

DISTRIBUZIONE PESI MODULO GAS

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

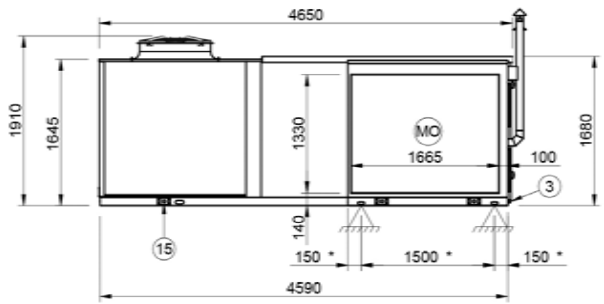
The presence of optional accessories may result in a substantial variation of the weights shown in the table.

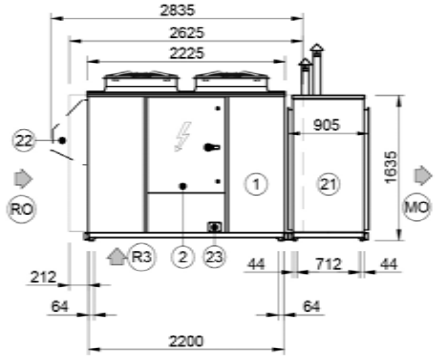
Dimensional drawings

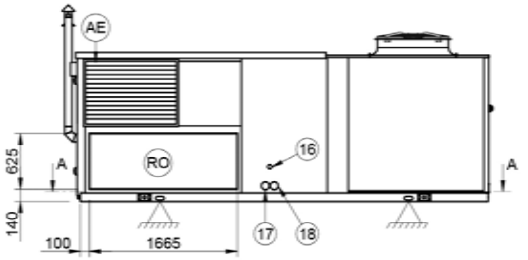
Size 33.4-40.4-44.4 Combustion module - CCK and CCKP configuration

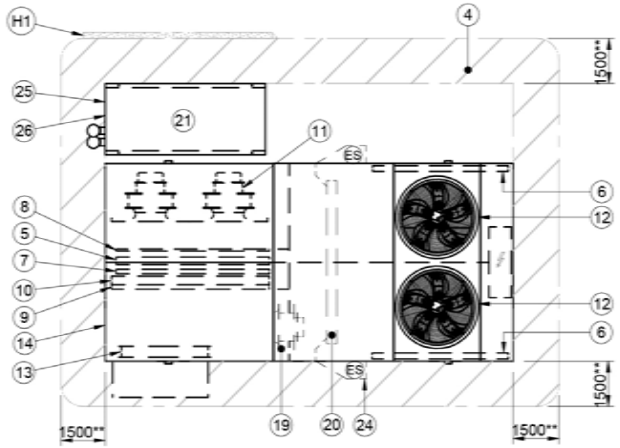
Double chambre (GC12X 130 kW)

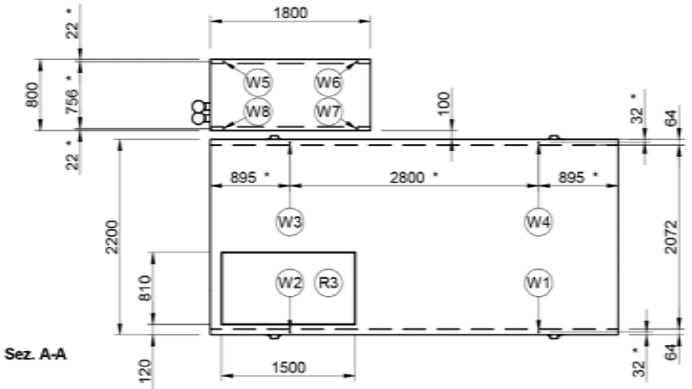
DAA8F35_2_CCK-CCKP_GC12X_04
DATA/DATE 04/10/2017











Sez. A-A

1. Compressor compartment
2. Electrical panel
3. Condensate drain
4. Functional clearances
5. Internal exchanger
6. External exchanger
7. H2O heating coil / recovery coil from food refrigeration / heating elements (optional)
8. Re-heating coil (Optional)
9. G4 air filters (Standard)
10. F7 filters / electrostatic filters (optional)
11. Electric fan (Supply - return)
12. External electric fan
13. Outdoor air damper
14. Access for inspection of coils, filters, heating elements
15. Lifting brackets (removable)
16. Humidifier connections
17. H2O heating coil input Ø 1"1/4 / recovery coil from food refrigeration, input Ø 1"1/4 (optional)
18. H2O heating coil output Ø 1"1/4 / recovery coil from food refrigeration, output Ø 1"1/4 (optional)
19. Exhaust electric fan
20. Exhaust air recovery coil (config. CCKP)
21. Gas module
22. Outdoor air return cap (only with R3) accessory separately supplied
23. Power input
24. Outdoor air return cap (accessory separately supplied)
25. Gas connection (UNI ISO 228/1 - G 1 1/2")
26. Condensate drain (only for condensation gas heating module)

(RO) Horizontal air return
(R3) Downward air return (optional)
(MO) Horizontal air supply
(AE) Outdoor air return
(ES) Air exhaust
(H1) Wall with same height as unit on a maximum of three sides
(**) Suggested clearance
(*) Vibration mounts position

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

GAS MODULE WEIGHT DISTRIBUTION

SIZE		33.4	40.4	44.4
W5 Supporting point	kg	90	90	90
W6 Supporting point	kg	78	78	78
W7 Supporting point	kg	78	78	78
W8 Supporting pointo	kg	90	90	90
Operating weight	kg	336	336	336
Shipping weight	kg	336	336	336

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

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