



ENVIRONMENTAL
CLIMATE CONTROL
EQUIPMENT
& SOLUTIONS



Double flow vertical heat pump with recovery wheel



www.ett-hvac.com

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General description

The **ETT** packaged unit is delivered ready to operate. Its full aluminium structure (frame and casing), ensures an excellent corrosion protection (20-year anti-corrosion guarantee).

Aluminium facilitates the REFURBISHMENT of machines for a second life, unlike a steel structure.

Our technical choices have a major impact on the environment

• DECARBONATION:

ETT is committed to an ambitious approach to reducing greenhouse gas emissions:

- Reducing the energy consumption of our machines
- Fluid refrigerants with low GWP
- Energy monitoring & AI
- Adiabatic cooling
- Development of machine retrofits

• ALUMINIUM : PERFORMANCE AND DURABILITY!

- Lightweight: 3 times lighter than steel
- Corrosion resistant and long lifespan
- Thermal performance
- 100% recyclable indefinitely
- Facilitates the refurbishment of our machines



• ECO-DESIGN:

Our technologies are designed with sustainability in mind, reducing their environmental impact throughout their life cycle.

• LOW-POLLUTION MANUFACTURING PROCESS:

- Selective sorting: 80% recovery rate
- No paint or solvents

• END OF MACHINE LIFE:

In compliance with regulations, ETT is a member of the Ecologic eco-organisation for the end-of-life processing of machines, which are 98% recyclable.



• ETT CERTIFICATIONS

- **CSR assessment:** ECOVADIS Gold Medal for our CSR approach



- **ISO 14001 & ISO 9001 certification :** our Quality and Environmental Management System



- **Certificate of competence for handling refrigerants**

- **Membership of the UN Global Compact**

- **Qualiopi certification** for our training centre



As a positive-impact company, ETT contributes to a more sustainable world through its decarbonising products and services.

CE In addition, each unit is delivered with a certificate of conformity to EU standards and complies with the following standards:

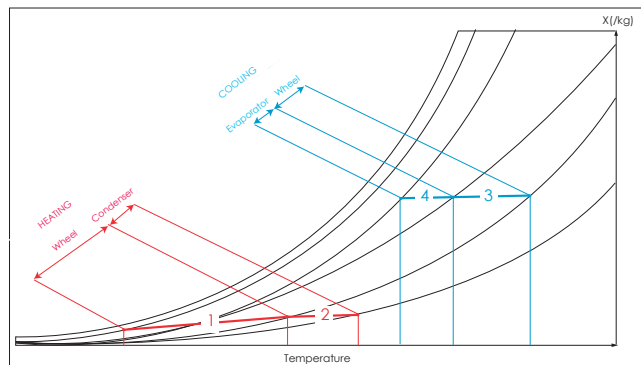
- Machinery Directive 2006/42/EC - Operator's safety
- Low Voltage Directive (LVD) 2014/35/EU - Electricity
- Electromagnetic Compatibility (EMC) Directive 2014/30/EU
- Regulation (EU) 2016/426 – Gas appliances
- Standard NF EN 60204 -1- Electrical appliances
- Standard EN 378-2 : 2017 – Safety and environmental requirements
- PED Directive 2014/68/EU (in accordance with Articles 2.10, 2.11, 3.4, 5a and 5d of Annex 1) - Pressure equipment
- EcoDesign regulations ErP UE 2281/2016

20-year guarantee
against corrosion
frame - casing



Operating principles

The rotary heat exchanger allows energy recovery on exhaust air in both Heating and Cooling modes. It can maintain the setpoint temperature or be associated to the reversible heat pump cooling cycle if necessary.



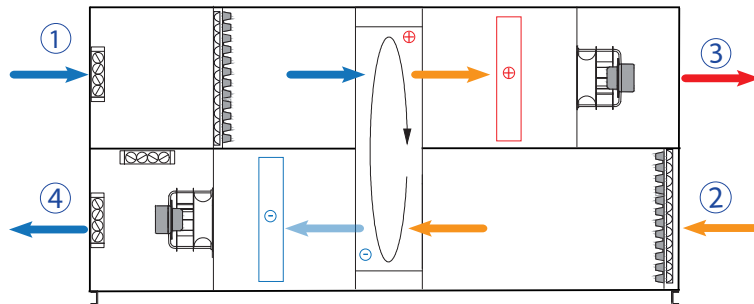
The unit operates as a reversible heat pump:

- > Source: exhaust air
- > Treated fluid: hygienic fresh air
- > With all fresh air/all exhaust air with supply air temperature control;

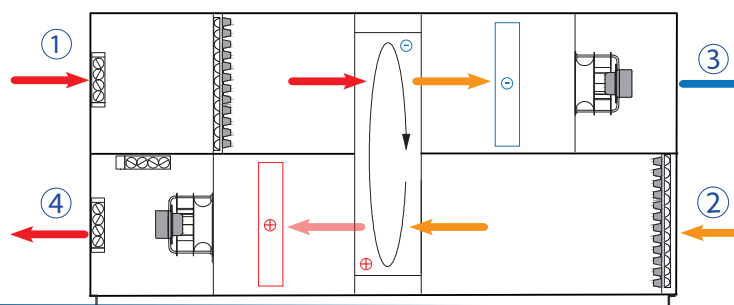
The following operating modes are available:

- > Heating mode: exhaust air calories are transferred to fresh air from outside through the recovery wheel ($\eta = \text{min. } 70\%$) [1]. The additional heating can be done by the variable capacity cooling cycle condenser to maintain the setpoint, if it is necessary for the requested capacity [2].
- > Cooling mode: exhaust air frigories are transferred to fresh air through the recovery wheel ($\eta = \text{min. } 70\%$) [3]. The variable capacity cooling cycle evaporator can be used to maintain the requested setpoint if necessary [4].
- > Free Cooling Mode

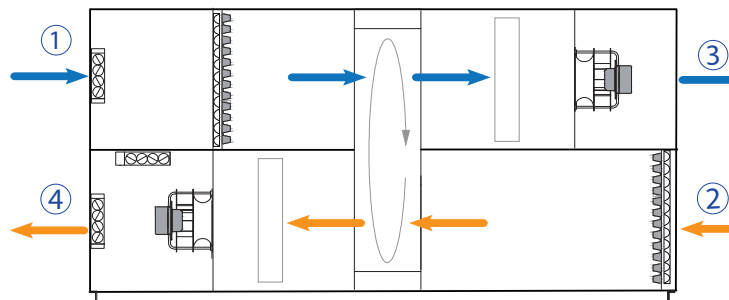
Heating mode:



Cooling mode:

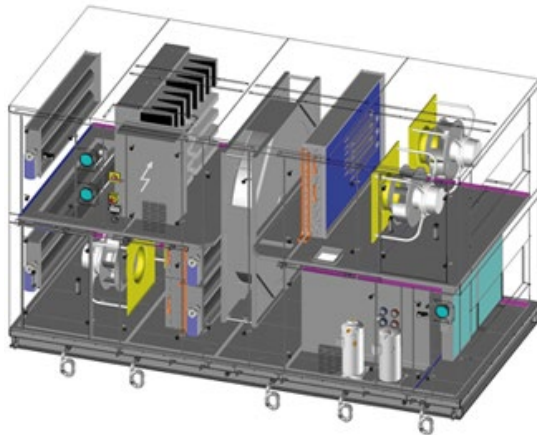


Free Cooling mode:



① Fresh air ② Return air ③ Supply air ④ Exhaust air

Unit description



The ETT packaged unit comprises 4 different sections:

- 1 The exhaust air section allows heat recovery and/or removal on exhaust air (depending on the operating mode).
- 2 The separate electrical section houses the electrical board and the control components.
- 3 The supply air section ensures air change and fresh air treatment.
- 4 The technical section houses the compressors and other refrigeration components.

Aluminium frame and casing:

- **Rigid, compact and lightweight packaged unit**, perfectly weather-resistant, with a 20-year anti corrosion guarantee on casing.
- **Watertight floor** with drainage outlets around the unit, connected to rubber siphons.
- **Full aluminium casing** (AG3).
- A separate **technical compartment** that facilitates maintenance and control of the unit, enables measurements to be taken and settings to be fine-tuned during operation.
- **Access through large “easy to remove” panels**. Panels are closed with square locks. Doors tightness is ensured by a flexible gasket under compression, providing ideal elasticity day after day.
- **Inner acoustic and thermal insulation on panels** using 50 mm M0/A2-s1, d0 glass wool with a 1.3 mm aluminium sheet for mechanical protection and easy maintenance.
- **Floor acoustic and thermal insulation** using 80 mm M0/A rock wool with double skin.
- **3-damper mixing box** with motorised fresh air damper with bird proof grid, exhaust air damper and mixed air damper ensuring the desired proportions and optimising Free Cooling phases. Dampers have extruded aluminium blades with low pressure drop thanks to the plane wing profile. The damper frame is made of aluminium. The unit can operate with all recirculated air during defrost cycles or in vacancy mode.

Unit description

Air assembly:

- **Filter assemblies** (on supply and exhaust air) with easy-to-remove ecodesign filters - efficiency 95% ASHRAE gravimetric (ISO Coarse 65% (G4)), 98 mm pleated media, with pressure switch for fouling control.
- **ISO ePM1 50% (F7) filtration with 292 mm polydihedral polypropylene filters.**
- **High performance plug fan for supply and exhaust air** to avoid losses due to pulley-belt transmissions thus improving energy efficiency.
- **Each "Premium efficiency" class IE4 electronically commutated fan motor** features a variable-frequency drive that allows:
 - ✓ reduced kickback during start-up when textile ducts are used (soft start mode);
 - ✓ maximum rotation speed regulation according to pressure drops on site;
 - ✓ reduced speed operation in Free Cooling mode to save energy.

Energy and thermodynamic assembly:

- **Refrigeration circuits** compliant with the European directive on pressure equipment (PED 2014/68/EU).
- **R410A refrigerant.**
- **Variable cooling system** using a compressor with variable-frequency drive or a modulating valve (depending on the model).
- **Direct expansion exchangers**, copper pipes and aluminium fins, with high exchange capacity, selected for low air speed to avoid condensates entrainment. Interlaced exchangers on supply air enhance COP and EER in part load.
- **2 electronic expansion valves** per circuit to optimise refrigeration circuit efficiency through superheat control, thus reducing energy consumption.
- **Anti-acid filter drier.**
- **Independent refrigeration circuit.**
- **Cycle reversal valve.**
- **HP and LP switches.**
- **Buffer tank** for optimised refrigeration circuit performances according to the operating mode.
- **High efficiency aluminium rotary exchanger** (minimum 70% efficiency) with integrated variable-speed drive and purge sector.



Control description

Electrical assembly:

- **Electrical board** compliant with French standards NF EN C 15-100 and NF EN 60204-01, including:
 - ✓ **ETT controller** with display.
 - ✓ **Power switch** with lockable external handle for full load cut-off.
 - ✓ **400-230-24 volts transformer** for regulation and control circuits.
 - ✓ **Fault synthesis** with pending dry contact on terminal.
 - ✓ **Numbered terminal blocks** with disconnecting terminals for remote controls and transfers.
 - ✓ **Terminal block** for compressors load shedding.
 - ✓ **Internal wiring** with numbered ferrules at both extremities.
 - ✓ **1k3 breaking capacity** of basis 10 kA.
 - ✓ **All components protected** by circuit breakers.
 - ✓ **Phase checker** to detect phases order and report faults on the controller.

Control assembly:

- **CTN type temperature probes.** Their accuracy and reliability have been tested and validated both at the factory and on site.
- **One or more BEST controllers** (Building Energy Saving Technology) especially developed by ETT for this range of units. The microprocessor, memory and controller size are adapted to the chosen applications and options by integrating a program set-up in the factory out of 160 possible configurations. The controller is in a plastic box that guarantees a high mechanical protection and reduces electrostatic shock threats.

Among other functions, the controller includes:

- ✓ **On/Off with remote contact** or vacancy contact.
- ✓ **On/Off** according to programmed schedule (2 time slots per day).
- ✓ **External calibrated adjustment for supply air temperature** according to outside air temperature.
- ✓ **Fault synthesis** with dry contact for transfer to customer system.
- ✓ **2 setpoints** for supply air temperature (Cooling/Heating) according to the 2002/91/EC directive.
- ✓ **Security management** (frost protection thermostat, smoke detector, HP switch, etc.) and faults management.

- ✓ **Economical analogue management** of alternate defrost cycles (flash-type) for each refrigeration circuit using frost detection, end of defrosting through analogue probes and start of a new heating cycle in heat pump mode. Concerning multi-circuits units, comfort and energy savings are ensured by deactivating simultaneous defrost cycles.
- ✓ **Optimisation** and equalisation of compressors operating time.
- ✓ **Management of the rotary exchanger** with variable speed for precise control of supply air temperature and optimised performance in Heating mode by delaying defrost cycle.
- ✓ **Compressor stage management** giving priority to the highest COP and EER in part load.
- ✓ **Written fault history** (no code needed) with time and outside temperature display.
- ✓ **Operating time counting** (unit, compressors and auxiliaries).
- ✓ **Compressor stage management** giving priority to the highest COP and EER in part load.
- ✓ **Frost protection** based on room air or return air temperature.
- ✓ **Auxiliaries management** (possibility of deactivation according to outside temperature).
- ✓ **Constant air flow rate control:** in this version, the PACARE unit ensures constant supply air flow rate thanks to ETT CEF equipment (filters fouling compensation). ETT SRV variable cooling system ensures comfort through supply air conditions control. This configuration is recommended for applications with constant fresh air treatment and induction diffusers.



Main options

Frame - Casing	<ul style="list-style-type: none"> ▪ Motorised external damper for supply air (2006/42/EC Directive) ▪ Painting ▪ Multiblock unit ▪ Symmetrical unit ▪ Porthole
Acoustics	<ul style="list-style-type: none"> ▪ Technical section acoustic insulation ▪ Fresh and exhaust air cowl sound insulation ▪ Compressors acoustic jackets
Air handling	<ul style="list-style-type: none"> ▪ Supply and exhaust air filters dial pressure gauge ▪ Filters fouling analogue control (FFAC) ▪ Actuating smoke detector with battery back-up ▪ Spare 98 mm ISO Coarse 65% (G4) filters ▪ Spare 292 mm ISO ePM1 50% (F7) filters ▪ Fans epoxy coating ▪ Fresh air arrangement on top ▪ Supply air arrangement on top ▪ 292 mm ISO ePM1 50% (F7) activated carbon filtration ▪ 292 mm ISO ePM1 80% (F9) filtration ▪ Spare 292 mm ISO ePM1 80% (F9) filtration
Thermodynamics	<ul style="list-style-type: none"> ▪ HP and LP pressure gauges
Thermal exchangers	<ul style="list-style-type: none"> ▪ 2-sequential stage electric heater ▪ Triac ▪ Hot water coil ▪ Chilled water coil ▪ Additional evaporator + condenser compressor split box (Cooling mode only) ▪ Mounted hot water or chilled water progressive 3-way valve ▪ Mounted stop valve + regulating valve on outlet: hot water or chilled water ▪ Vinyl coating on thermodynamic coils ▪ Vinyl coating on hot water coil or chilled water coil ▪ Epoxy coating on recovery wheel ▪ Vinyl coating on heat pipe
Installation	<ul style="list-style-type: none"> ▪ 200 or 400 mm aluminium feet
Electricity	<ul style="list-style-type: none"> ▪ Unit global energy metering ▪ Emergency stop push button
Control	<ul style="list-style-type: none"> ▪ Supply air constant pressure control (SCP with air flow rate variation ensuring constant supply air conditions) (*) ▪ Return air hygrometry probe (for external humidifier control) ▪ Room air probe (for supply air temperature compensation control)
Recovery	<ul style="list-style-type: none"> ▪ Heat pipe recuperator (51% efficiency) + associated compressors, instead of the recovery wheel

* Contact our factory to consult operation minimum flow rate.

	DESIGNATION		Unit	207	208
SPECIFICATIONS	Rated air flow rate (for 250 Pa available)		m ³ /h	7500	10000
	Min./Max. air flow rate		m ³ /h	7300/8200	8400/11500
	Gross cooling capacity with 35°C/40% RH outside temperature - Return air at 27°C / 47% RH		kW	38.9	46.9
	Recovery capacity with 35°C/40% RH outside temperature - Return air at 27°C / 47% RH		kW	15.0	19.0
	Recovery efficiency with 35°C/40% RH outside temperature - Return air at 27°C / 47% RH		%	76	70
	Net total cooling capacity with 35°C/40% RH outside temperature - Return air at 27°C/47% RH ⁽⁴⁾		kW	53.9	65.9
	Net EER (Coefficient of performance in Cooling mode)			3.6	3.7
	Gross heating capacity +7°C/87% RH outside temperature - Return air at 20°C DB ⁽²⁾		kW	40.0	47.9
	Recovery capacity with +7°C/87% RH outside temperature - Return air at 20°C DB ⁽²⁾		kW	25.0	30.0
	Recovery efficiency with +7°C/87% RH outside temperature - Return air at 20°C DB ⁽²⁾		%	75	70
	Net total heating capacity +7°C/87% RH outside temperature - Return air at 20°C DB ⁽²⁾⁽⁴⁾		kW	65.0	77.9
	Net COP (Coefficient of performance in Heating mode) with +7°C outside temperature			6.01	5.65
	Gross heating capacity -7°C/73% RH outside temperature - Return air at 20°C DB ⁽²⁾		kW	32.9	40.8
	Recovery capacity with -7°C/73% RH outside temperature - Return air at 20°C DB ⁽²⁾		kW	58.0	73.0
	Recovery efficiency with -7°C/73% RH outside temperature - Return air at 20°C DB ⁽²⁾		%	75	70
	Net total heating capacity -7°C/73% RH outside temperature - Return air at 20°C DB ⁽²⁾⁽⁴⁾		kW	90.9	113.8
	Net COP with -7°C outside temperature (Coefficient of Performance in Heating mode)			9.49	9.21
	SPECIFICATIONS FOR SUPPLY AIR AT 25°C IN COOLING MODE/20°C IN HEATING MODE				
	Net total cooling capacity with 35°C/40% RH outside temperature - Return air at 27°C/47% RH ⁽⁴⁾		kW	23.9	32.3
	Net EER (Coefficient of performance in Cooling mode)			3.47	3.33
	Net total heating capacity +7°C/87% RH outside temperature - Return air at 20°C DB ⁽²⁾⁽⁴⁾		kW	34.1	44.7
	Net COP with +7°C outside temperature (Coefficient of Performance in Heating mode)			5.89	5.12
	Net total heating capacity -7°C/73% RH outside temperature - Return air at 20°C DB ⁽²⁾⁽⁴⁾		kW	76.1	102.7
	Net COP with -7°C outside temperature (Coefficient of Performance in Heating mode)			12.51	9.26
	Number of independent refrigeration circuits		u	2	2
	Power stage			9 to 100%	9 to 100%
	ELECTRICAL CONNECTION				
	Total installed electrical power ⁽³⁾		kW	26.23	39.2
	Rated/Starting current		A	43/106	64/151
FANS	SUPPLY AIR				
	Number of supply air fans		u	1	2
	Absorbed electrical power/Installed mechanical power with 250 Pa		kW	2.5/5.4	4.0/10.7
	Absorbed electrical power/Installed mechanical power with 450 Pa		kW	3.1/5.4	5.2/10.7
	2002/91/EC - Ventilation average capacity per 250 Pa unit		W/(m ³ /h)	0.34	0.40
	2002/91/EC - Ventilation average capacity per 450 Pa unit		W/(m ³ /h)	0.41	0.52
	2002/91/EC - Fans total regulatory capacity with 250 Pa		W/(m ³ /h)	1.83	2.43
	2002/91/EC - Fans total regulatory capacity with 450 Pa		W/(m ³ /h)	3.11	4.48
	RETURN AIR FAN				
	Number of return air fans		u/u	1	2
	250 Pa absorbed electrical/installed mechanical power		kW	2.3/5.4	3.4/10.7
	450 Pa absorbed electrical/installed mechanical power		kW	2.8/5.4	4.5/10.7
GENERAL	Average sound pressure level at 10 m, ref. 2x10 ⁻⁵ in free field (with ducts connected)		dB(A)	46.4	45.2
	Filters efficiency (supply air)			G4+F7	G4+F7
	Filters efficiency (exhaust air)			G4	G4
	Max. outside operating temperature in Cooling mode		°C	40.0	40.0
	Min. outside operating temperature in Cooling mode		°C	15.0	15.0
	Min. outside operating temperature in Heating mode		°C	-15.0	-15.0
	Min. internal coil inlet temperature in Heating mode		°C	10.0	10.0
	Unit block weight without options ⁽¹⁾		kg	1483	1490

400 V/50 Hz 3-phase power supply + earth without neutral.

(1) For hot water coils and electric heaters weight, please consult "Auxiliaries".

For accessories weight, please consult "Installation accessories".

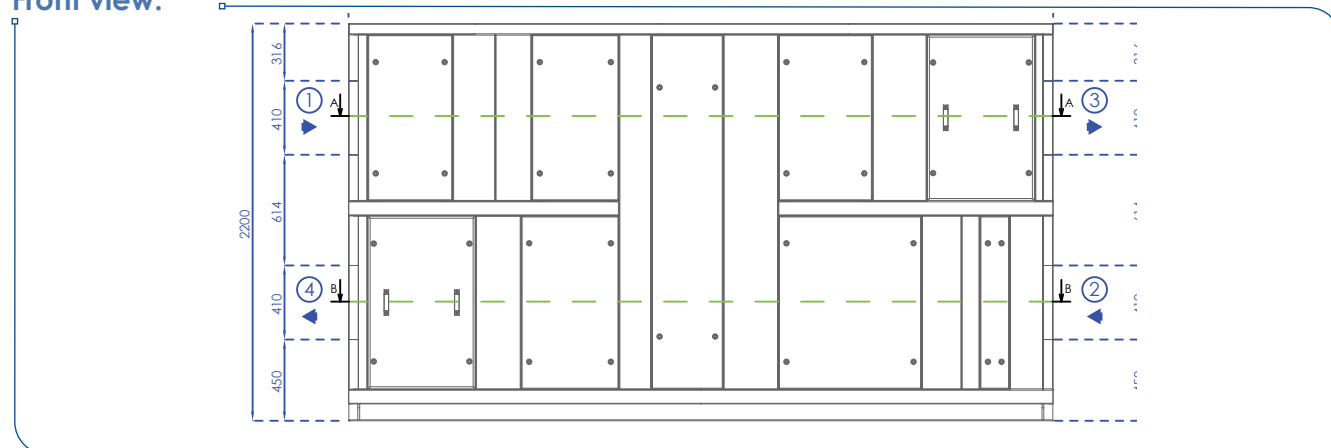
(2) Instantaneous thermodynamic capacity (outside of defrost cycle).

(3) Excluding electrical heating elements.

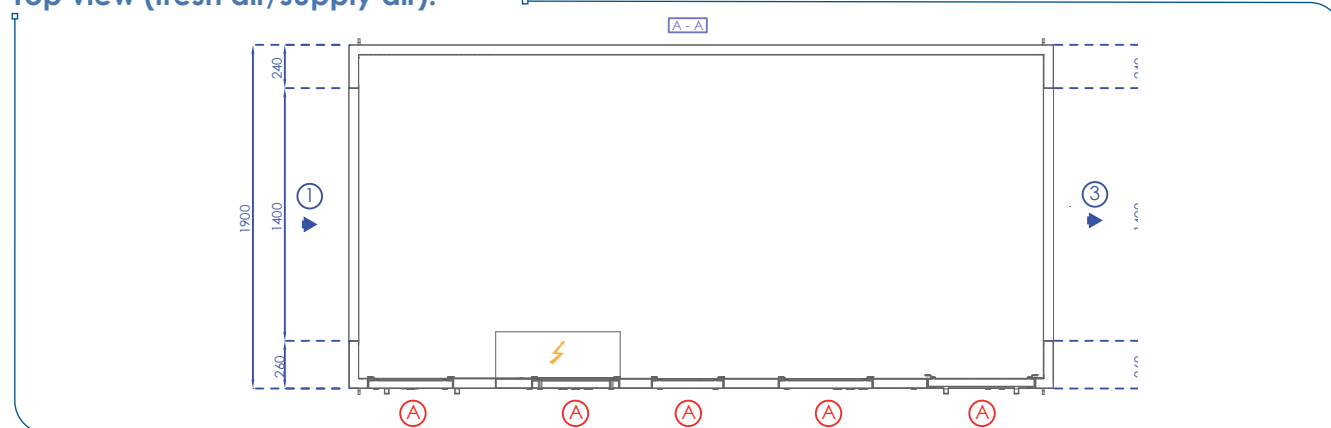
(4) Net total capacity = Net cooling or heating capacity + Recovery capacity.

Nota: Calculations based on air with atmospheric pressure properties, at sea level.

Front view:



Top view (fresh air/supply air):



Top view (return air/exhaust air):



- ① Fresh air
- ② Return air
- ③ Supply air
- ④ Exhaust air
- (A) Access
- ⚡ Power supply
- (C) Technical section

	Length	Width	Height
Casing dimensions	3900 mm	1900 mm	2200 mm
Transport overall dimensions	3900 mm	1970 mm	2200 mm

Nota: Provide 200 mm clearance (minimum) below the unit for condensates siphons connection.

	DESIGNATION		Unit	210	225
SPECIFICATIONS	Rated air flow rate (for 250 Pa available)		m ³ /h	12500	15000
	Min./Max. air flow rate		m ³ /h	10600/14300	12400/16000
	Gross cooling capacity with 35°C/40% RH outside temperature - Return air at 27°C / 47% RH		kW	59.7	71.4
	Recovery capacity with 35°C/40% RH outside temperature - Return air at 27°C / 47% RH		kW	26.0	30.0
	Recovery efficiency with 35°C/40%RH outside temperature - Return air at 27°C / 47% RH		%	76	73
	Net total cooling capacity with 35°C/40% RH outside temperature - Return air at 27°C/47% RH ⁽⁴⁾		kW	85.7	101.4
	Net EER (Coefficient of performance in Cooling mode)			4.19	3.89
	Gross heating capacity +7°C/87% RH outside temperature - Return air at 20°C DB ⁽²⁾		kW	59.3	69.5
	Recovery capacity with +7°C/87% RH outside temperature - Return air at 20°C DB ⁽²⁾		kW	41.0	47.0
	Recovery efficiency with +7°C/87% RH outside temperature - Return air at 20°C DB ⁽²⁾		%	75	72
	Net total heating capacity +7°C/87% RH outside temperature - Return air at 20°C DB ⁽²⁾⁽⁴⁾		kW	100.3	116.5
	Net COP with +7°C outside temperature (Coefficient of Performance in Heating mode)			6.48	5.89
	Gross heating capacity -7°C/73% RH outside temperature - Return air at 20°C DB ⁽²⁾		kW	48.5	60.3
	Recovery capacity with -7°C/73% RH outside temperature - Return air at 20°C DB ⁽²⁾		kW	96.0	112.0
	Recovery efficiency with -7°C/73% RH outside temperature - Return air at 20°C DB ⁽²⁾		%	76	72
	Net total heating capacity -7°C/73% RH outside temperature - Return air at 20°C DB ⁽²⁾⁽⁴⁾		kW	144.5	172.3
	Net COP with -7°C outside temperature (Coefficient of Performance in Heating mode)			10.31	9.40
	SPECIFICATIONS FOR SUPPLY AIR AT 25°C IN COOLING MODE/20°C IN HEATING MODE				
	Net total cooling capacity with 35°C/40% RH outside temperature - Return air at 27°C/47% RH ⁽⁴⁾		kW	40.3	48.7
	Net EER (Coefficient of performance in Cooling mode)			3.92	3.83
	Net total heating capacity +7°C/87% RH outside temperature - Return air at 20°C DB ⁽²⁾⁽⁴⁾		kW	56.7	67.3
	Net COP with +7°C outside temperature (Coefficient of Performance in Heating mode)			6.15	5.84
	Net total heating capacity -7°C/73% RH outside temperature - Return air at 20°C DB ⁽²⁾⁽⁴⁾		kW	125.7	152.3
	Net COP with -7°C outside temperature (Coefficient of Performance in Heating mode)			11.46	9.86
	Number of independent refrigeration circuits		u	2	2
	Power stage			9 to 100%	15 to 100%
	ELECTRICAL CONNECTION				
	Total installed electrical power ⁽³⁾		kW	42.4	47.9
	Rated/Starting current		A	70/163	79/177
FANS	SUPPLY AIR				
	Number of supply air fans		u	2	2
	Absorbed electrical power/Installed mechanical power with 250 Pa		kW	4.2/10.7	5.6/10.7
	Absorbed electrical power/Installed mechanical power with 450 Pa		kW	5.3/10.7	6.8/10.7
	2002/91/EC - Ventilation average capacity per unit with 250 Pa		W/(m ³ /h)	0.34	0.37
	2002/91/EC - Ventilation average capacity per unit with 450 Pa		W/(m ³ /h)	0.43	0.45
	2002/91/EC - Fans total regulatory capacity with 250 Pa		W/(m ³ /h)	2.92	3.57
	2002/91/EC - Fans total regulatory capacity with 450 Pa		W/(m ³ /h)	5.20	6.16
	RETURN AIR FAN				
	Number of return air fans		u	2	2
GENERAL	250 Pa absorbed electrical/installed mechanical power		kW	4.0/10.7	5.0/10.7
	450 Pa absorbed electrical/installed mechanical power		kW	5.1/10.7	6.1/10.7
	Average sound pressure level at 10 m, ref. 2x10 ⁻⁵ in free field (with ducts connected)		dB(A)	46.5	49.6
	Filters efficiency (supply air)			G4+F7	G4+F7
	Filters efficiency (exhaust air)			G4	G4
	Max. outside operating temperature in Cooling mode		°C	40.0	40.0
	Min. outside operating temperature in Cooling mode		°C	15.0	15.0
	Min. outside operating temperature in Heating mode		°C	-15.0	-15.0
	Min. internal coil inlet temperature in Heating mode		°C	10.0	10.0
	Unit block weight without options ⁽¹⁾		kg	1949	1946

400 V/50 Hz 3-phase power supply + earth without neutral.

(1) For hot water coils and electric heaters weight, please consult "Auxiliaries".
For accessories weight, please consult "Installation accessories".

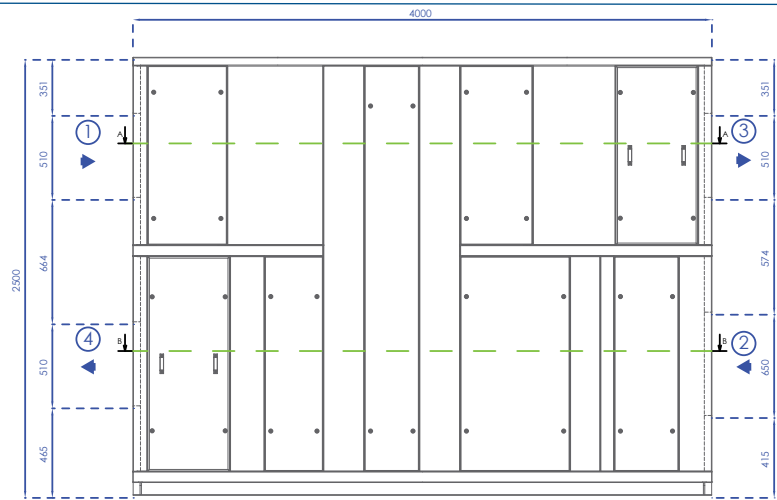
(2) Instantaneous thermodynamic capacity (outside of defrost cycle).

(3) Excluding electrical heating elements.

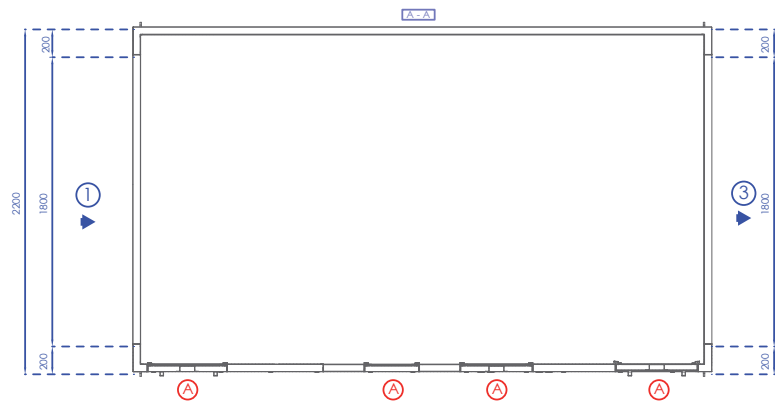
(4) Net total capacity = Net cooling or heating capacity + Recovery capacity.

Nota: Calculations based on air with atmospheric pressure properties, at sea level.

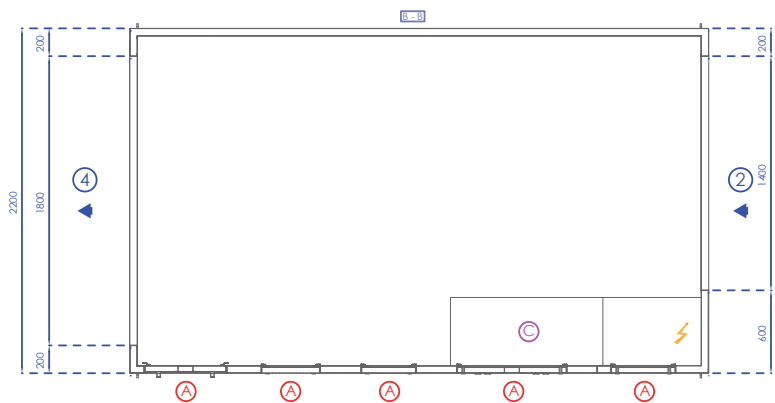
Front view:



Top view (fresh air/supply air):



Top view (return air/exhaust air):



- ① Fresh air
- ② Return air
- ③ Supply air
- ④ Exhaust air
- (A) Access
- ⚡ Power supply
- (C) Technical section

	Length	Width	Height
Casing dimensions	4000 mm	2200 mm	2500 mm
Transport overall dimensions	4000 mm	2270 mm	2500 mm

Nota: Provide 200 mm clearance (minimum) below the unit for condensates siphons connection.

DESIGNATION		Unit	260	285
SPECIFICATIONS	Rated air flow rate (for 250 Pa available)	m ³ /h	20000	25000
	Min./Max. air flow rate	m ³ /h	15600/23000	18800/25000
	Gross cooling capacity with 35°C/40% RH outside temperature - Return air at 27°C / 47% RH	kW	89.8	99.6
	Recovery capacity with 35°C/40% RH outside temperature - Return air at 27°C / 47% RH	kW	41.0	48.0
	Recovery efficiency with 35°C/40% RH outside temperature - Return air at 27°C/47% RH	%	75	71
	Net total cooling capacity with 35°C/40% RH outside temperature - Return air at 27°C/47% RH ⁽⁴⁾	kW	130.8	147.6
	Net EER (Coefficient of performance in Cooling mode)		4.11	3.79
	Gross heating capacity +7°C/87% RH outside temperature - Return air at 20°C DB ⁽²⁾	kW	90.1	102.4
	Recovery capacity with +7°C/87% RH outside temperature - Return air at 20°C DB ⁽²⁾	kW	65.0	77.0
	Recovery efficiency with +7°C/87% RH outside temperature - Return air at 20°C DB ⁽²⁾	%	74	70
	Net total heating capacity +7°C/87% RH outside temperature - Return air at 20°C DB ⁽²⁾⁽⁴⁾	kW	155.2	179.4
	Net COP with +7°C outside temperature (Coefficient of Performance in Heating mode)		6.21	5.61
	Gross heating capacity -7°C/73% RH outside temperature - Return air at 20°C DB ⁽²⁾	kW	74.2	86.3
	Recovery capacity with -7°C/73% RH outside temperature - Return air at 20°C DB ⁽²⁾	kW	153.0	183.0
	Recovery efficiency with -7°C/73% RH outside temperature - Return air at 20°C DB ⁽²⁾	%	75	71
	Net total heating capacity -7°C/73% RH outside temperature - Return air at 20°C DB ⁽²⁾⁽⁴⁾	kW	227.2	269.3
	Net COP with -7°C outside temperature (Coefficient of Performance in Heating mode)		10.16	9.37
	SPECIFICATIONS FOR SUPPLY AIR AT 25°C IN COOLING MODE/20°C IN HEATING MODE			
	Net total cooling capacity with 35°C/40% RH outside temperature - Return air at 27°C/47% RH ⁽⁴⁾	kW	64.2	78.8
	Net EER (Coefficient of performance in Cooling mode)		4.37	3.61
	Net total heating capacity +7°C/87% RH outside temperature - Return air at 20°C DB ⁽²⁾⁽⁴⁾	kW	89.8	113.2
	Net COP with +7°C outside temperature (Coefficient of Performance in Heating mode)		6.67	5.45
	Net total heating capacity -7°C/73% RH outside temperature - Return air at 20°C DB ⁽²⁾⁽⁴⁾	kW	202.8	255.2
	Net COP with -7°C outside temperature (Coefficient of Performance in Heating mode)		11.45	9.77
	Number of independent refrigeration circuits	u	2	2
	Power stage		15 to 100%	15 to 100%
ELECTRICAL CONNECTION				
Total installed electrical power ⁽³⁾		kW	65.7	68.1
Rated/Starting current		A	107/221	112/255
FANS	SUPPLY AIR			
	Number of supply air fans	u	3	3
	Absorbed electrical power/Installed mechanical power with 250 Pa	kW	6.9/16.1	10.1/16.1
	Absorbed electrical power/Installed mechanical power with 450 Pa	kW	8.6/16.1	12.0/16.1
	2002/91/EC - Ventilation average capacity per unit with 250 Pa	W/(m ³ /h)	0.35	0.41
	2002/91/EC - Ventilation average capacity per unit with 450 Pa	W/(m ³ /h)	0.43	0.48
	2002/91/EC - Fans total regulatory capacity with 250 Pa	W/(m ³ /h)	4.72	6.11
	2002/91/EC - Fans total regulatory capacity with 450 Pa	W/(m ³ /h)	8.26	10.45
	RETURN AIR FAN			
	Number of return air fans	u	3	3
GENERAL	250 Pa absorbed electrical/installed mechanical power	kW	6.2/16.1	9.2/16.1
	450 Pa absorbed electrical/installed mechanical power	kW	7.8/16.1	11.0/16.1
	Average sound pressure level at 10 m, ref. 2x10 ⁻⁵ in free field (with ducts connected)	dB(A)	49.4	53.6
	Filters efficiency (supply air)		G4+F7	G4+F7
	Filters efficiency (exhaust air)		G4	
	Max. outside operating temperature in Cooling mode	°C	40.0	40.0
	Min. outside operating temperature in Cooling mode	°C	15.0	15.0
	Min. outside operating temperature in Heating mode	°C	-15.0	-15.0
	Min. internal coil inlet temperature in Heating mode	°C	10.0	10.0
	Unit block weight without options ⁽¹⁾	kg	2634	2635

400 V/50 Hz 3-phase power supply + earth without neutral.

(1) For hot water coils and electric heaters weight, please consult "Auxiliaries".

For accessories weight, please consult "Installation accessories".

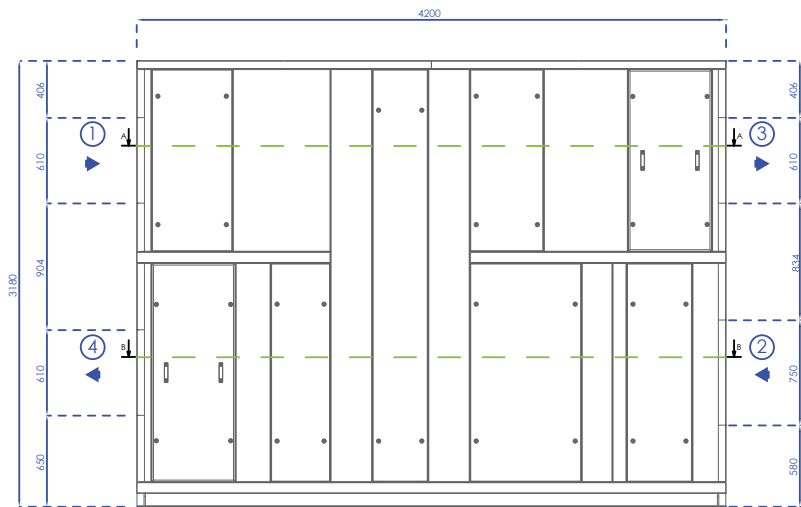
(2) Instantaneous thermodynamic capacity (outside of defrost cycle).

(3) Excluding electrical heating elements.

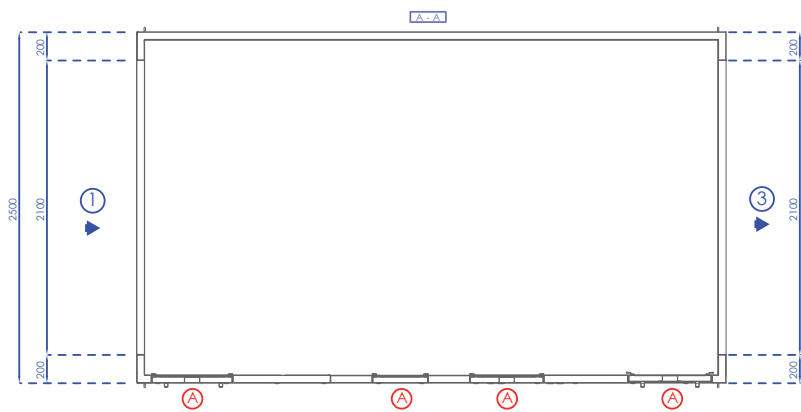
(4) Net total capacity = Net cooling or heating capacity + Recovery capacity.

Nota: Calculations based on air with atmospheric pressure properties, at sea level.

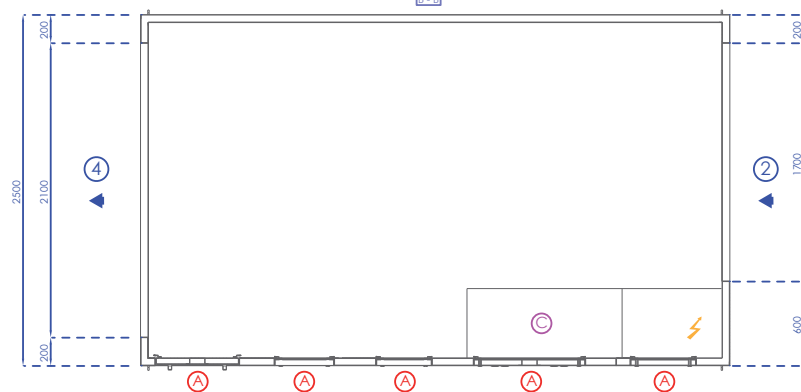
Front view:



Top view (fresh air/supply air):



Top view (return air/exhaust air):



- ① Fresh air
- ② Return air
- ③ Supply air
- ④ Exhaust air
- (A) Access
- ⚡ Power supply
- (C) Technical section

	Length	Width	Height
Casing dimensions	4100 mm	4200 mm	3200 mm
Transport overall dimensions	4180 mm	4300 mm	3250 mm

Nota: Provide 200 mm clearance (minimum) below the unit for condensates siphons connection.

DESIGNATION		Unit	2-235	2-295
SPECIFICATIONS	Rated air flow rate (for 250 Pa available)	m ³ /h	30000	35000
	Min./Max. air flow rate	m ³ /h	24000/32000	30000/35000
	Gross cooling capacity with 35°C/40% RH outside temperature - Return air at 27°C / 47% RH	kW	135.1	164.1
	Recovery capacity with 35°C/40% RH outside temperature - Return air at 27°C / 47% RH	kW	59.0	66.0
	Recovery efficiency with 35°C/40%RH outside temperature - Return air at 27°C / 47% RH	%	73	70
	Net total cooling capacity with 35°C/40% RH outside temperature - Return air at 27°C/47% RH ⁽⁴⁾	kW	194.1	230.1
	Net EER (Coefficient of performance in Cooling mode)		4.04	3.62
	Gross heating capacity +7°C/87% RH outside temperature - Return air at 20°C DB ⁽²⁾	kW	134.0	162.1
	Recovery capacity with +7°C/87% RH outside temperature - Return air at 20°C DB ⁽²⁾	kW	94.0	105.0
	Recovery efficiency with +7°C/87% RH outside temperature - Return air at 20°C DB ⁽²⁾	%	72	69
	Net total heating capacity +7°C/87% RH outside temperature - Return air at 20°C DB ⁽²⁾⁽⁴⁾	kW	227.9	267.1
	Net COP with +7°C outside temperature (Coefficient of Performance in Heating mode)		5.91	5.41
	Gross heating capacity -7°C/73% RH outside temperature - Return air at 20°C DB ⁽²⁾	kW	112.4	138.8
	Recovery capacity with -7°C/73% RH outside temperature - Return air at 20°C DB ⁽²⁾	kW	223.0	252.0
	Recovery efficiency with -7°C/73% RH outside temperature - Return air at 20°C DB ⁽²⁾	%	72	69
	Net total heating capacity -7°C/73% RH outside temperature - Return air at 20°C DB ⁽²⁾⁽⁴⁾	kW	335.4	390.8
	Net COP with -7°C outside temperature (Coefficient of Performance in Heating mode)		9.55	8.74
	SPECIFICATIONS FOR SUPPLY AIR AT 25°C IN COOLING MODE/20°C IN HEATING MODE			
	Net total cooling capacity with 35°C/40% RH outside temperature - Return air at 27°C/47% RH ⁽⁴⁾	kW	96.5	110.3
	Net EER (Coefficient of performance in Cooling mode)		3.96	3.48
	Net total heating capacity +7°C/87% RH outside temperature - Return air at 20°C DB ⁽²⁾⁽⁴⁾	kW	135.5	158.7
	Net COP with +7°C outside temperature (Coefficient of Performance in Heating mode)		6.05	5.35
	Net total heating capacity -7°C/73% RH outside temperature - Return air at 20°C DB ⁽²⁾⁽⁴⁾	kW	304.5	357.7
	Net COP with -7°C outside temperature (Coefficient of Performance in Heating mode)		10.07	9.47
	Number of independent refrigeration circuits	u	2	2
	Power stage		15 to 100%	15 to 100%
	ELECTRICAL CONNECTION			
	Total installed electrical power ⁽³⁾	kW	92.56	97.66
	Rated/Starting current	A	147/335	155/382
FANS	SUPPLY AIR			
	Number of supply air fans	u	4	4
	Absorbed electrical power/Installed mechanical power with 250 Pa	kW	11.0/21.5	13.2/21.5
	Absorbed electrical power/Installed mechanical power with 450 Pa	kW	13.4/21.5	17.0/21.5
	2002/91/EC - Ventilation average capacity per unit with 250 Pa	W/(m ³ /h)	0.37	0.38
	2002/91/EC - Ventilation average capacity per unit with 450 Pa	W/(m ³ /h)	0.45	0.48
	2002/91/EC - Fans total regulatory capacity with 250 Pa	W/(m ³ /h)	7.14	8.29
	2002/91/EC - Fans total regulatory capacity with 450 Pa	W/(m ³ /h)	12.32	14.75
	RETURN AIR FAN			
	Number of return air fans	u	4	4
GENERAL	250 Pa absorbed electrical/installed mechanical power	kW	9.9/21.5	13.2/21.5
	450 Pa absorbed electrical/installed mechanical power	kW	12.2/21.5	15.7/21.5
	Average sound pressure level at 10 m, ref. 2x10 ⁻⁵ in free field (with ducts connected)	dB(A)	52.7	56.1
	Filters efficiency (supply air)		G4+F7	
	Filters efficiency (exhaust air)		G4	G4
	Max. outside operating temperature in Cooling mode	°C	40.0	40.0
	Min. outside operating temperature in Cooling mode	°C	15.0	15.0
	Min. outside operating temperature in Heating mode	°C	-15.0	-15.0
	Min. internal coil inlet temperature in Heating mode	°C	10.0	10.0
	Unit block weight without options ⁽¹⁾	kg	3314	3350

400 V/50 Hz 3-phase power supply + earth without neutral.

(1) For hot water coils and electric heaters weight, please consult "Auxiliaries".
For accessories weight, please consult "Installation accessories".

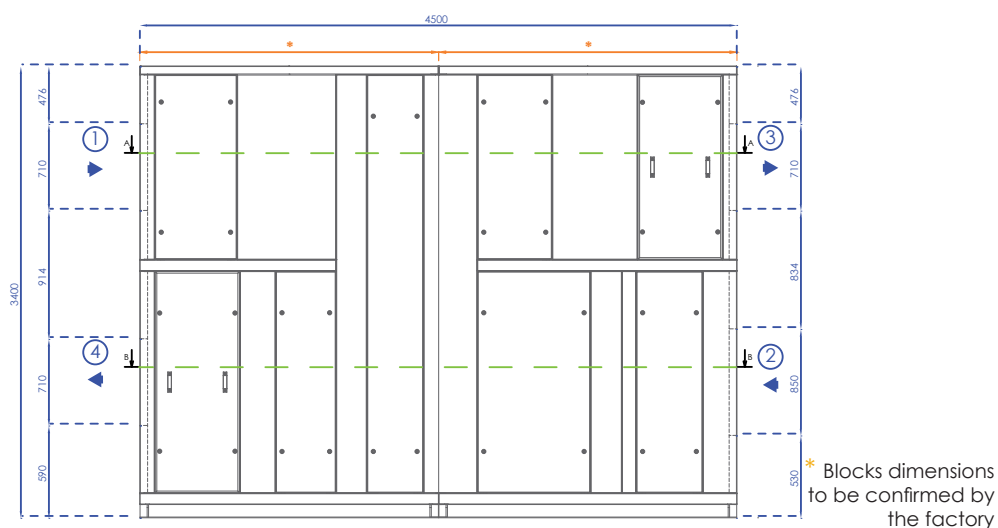
(2) Instantaneous thermodynamic capacity (outside of defrost cycle).

(3) Excluding electrical heating elements.

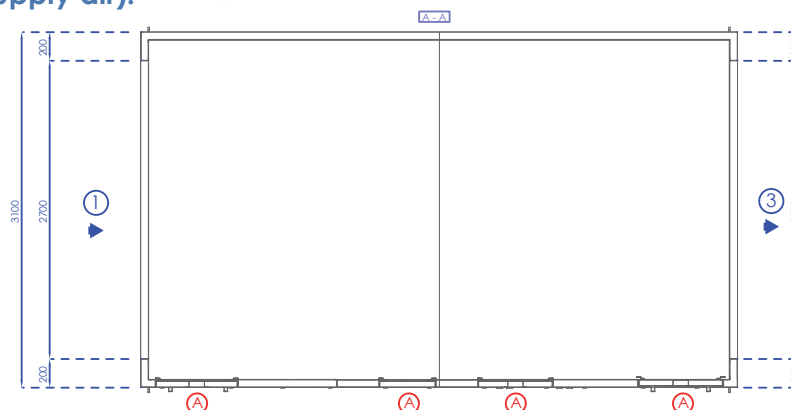
(4) Net total capacity = Net cooling or heating capacity + Recovery capacity.

Nota: Calculations based on air with atmospheric pressure properties, at sea level.

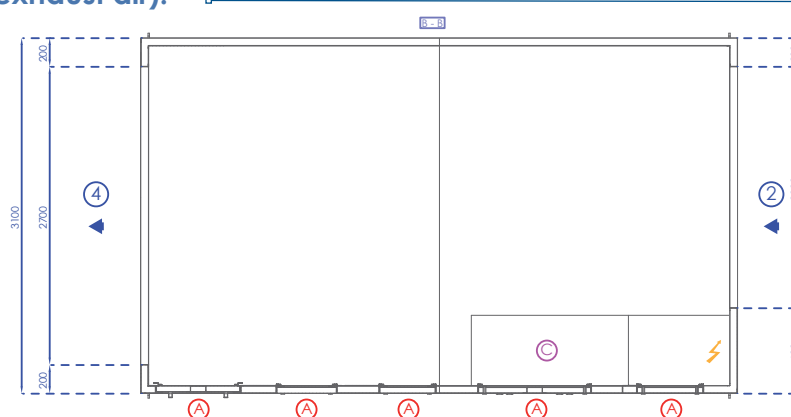
Front view:



Top view (fresh air/supply air):



Top view (return air/exhaust air):



- ① Fresh air
- ② Return air
- ③ Supply air
- ④ Exhaust air
- Ⓐ Access
- ⚡ Power supply
- Ⓒ Technical section

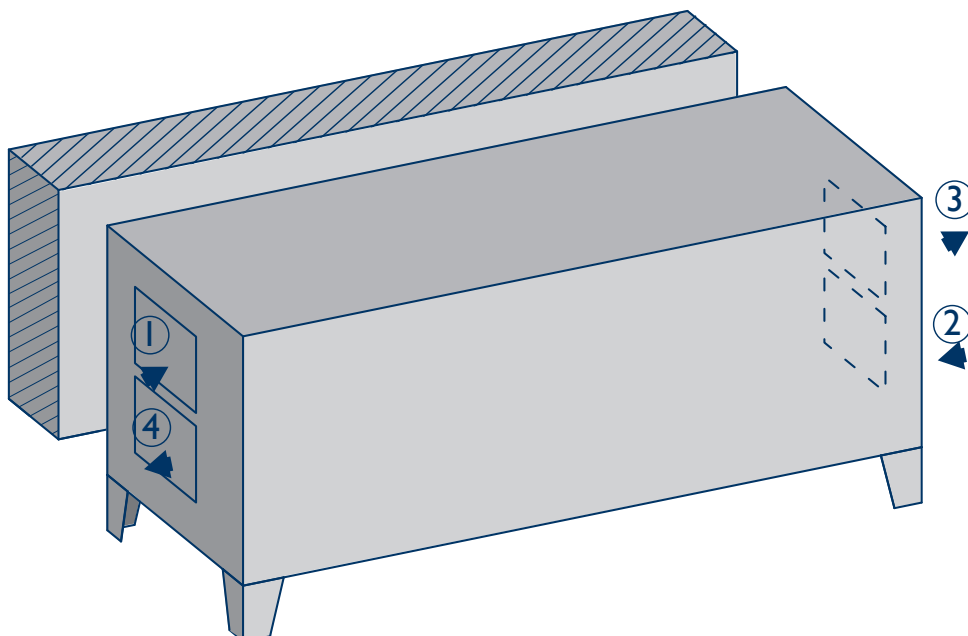
	Length	Width	Height
Casing dimensions	4500 mm	3100 mm	3400 mm
Transport overall dimensions	4500 mm	3170 mm	3400 mm

Nota: Provide 200 mm clearance (minimum) below the unit for condensates siphons connection.

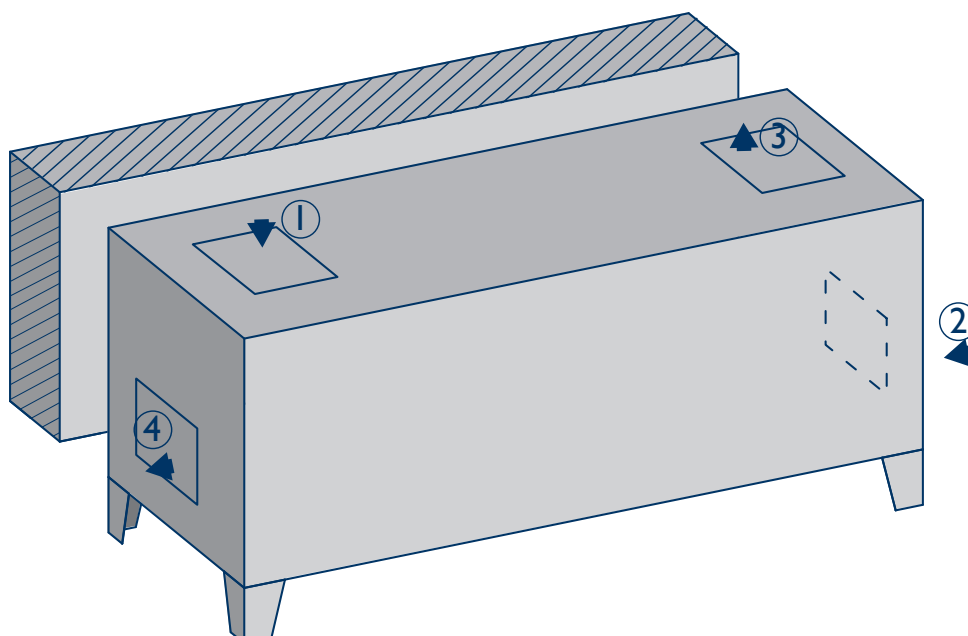
Arrangements

Standard unit configuration

Arrangement A



Arrangement B

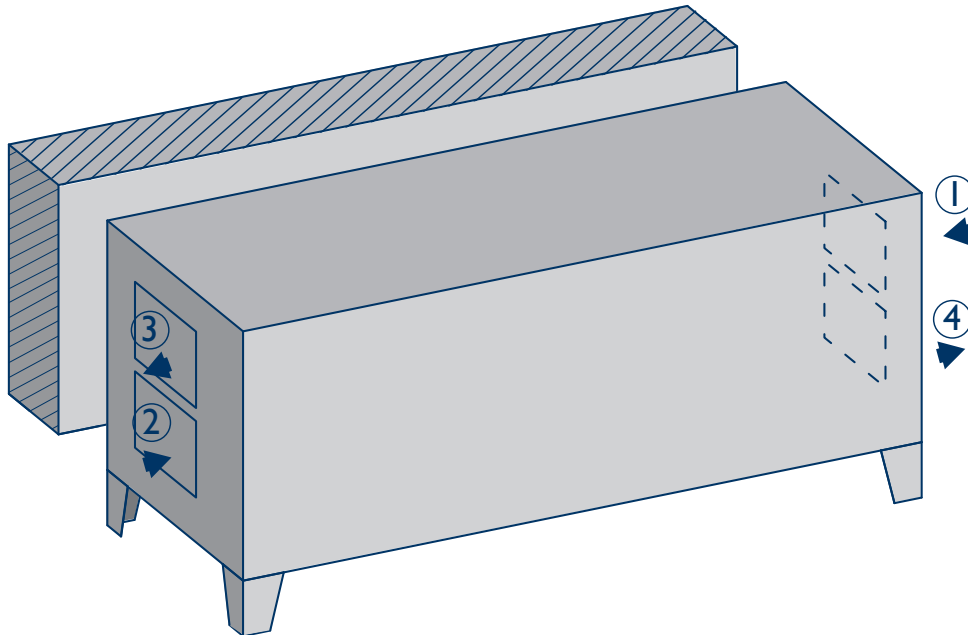


① Fresh air ② Return air ③ Supply air ④ Exhaust air

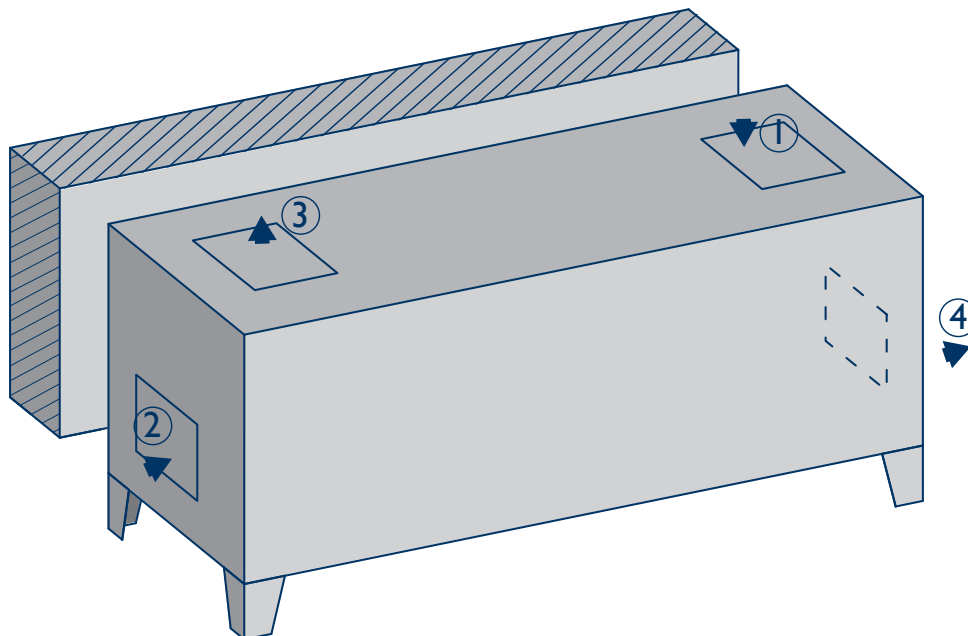
Arrangements

Symmetrical unit configuration (Optional)

Arrangement A



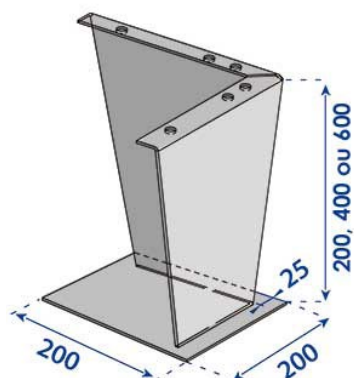
Arrangement B



① Fresh air ② Return air ③ Supply air ④ Exhaust air

Installation accessories: Feet

AG3 fixed foot
Unit weight: 1kg
Available feet heights: 200 or 400 mm.



Unit	207	208	210	225	260	285	2-235	2-295
No. of feet	4	4	4	4	4	4	4	4



Auxiliary: Electric heaters

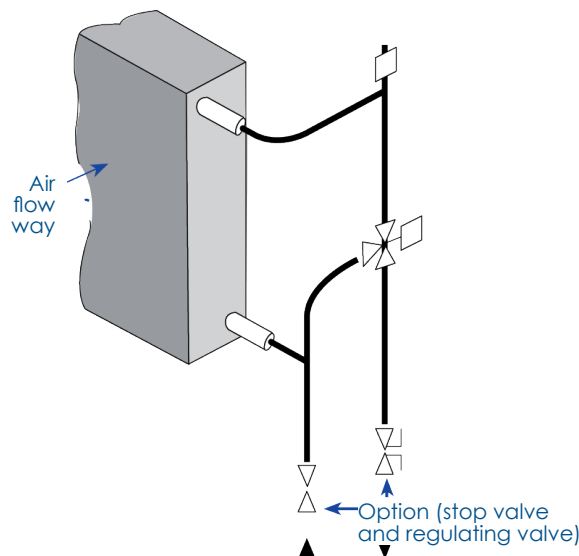
Available capacities (in kW)

Total capacity (kW)	Current (A)	1 st stage	2 nd stage	207	208	210	225	260	285	2-235	2-295	Weight (kg)
9	13.0	3	6									9.6
12	17.3	3	9									13.3
15	21.7	6	9	•	•							19.9
18	26.0	6	12	•	•							24.3
21	30.3	6	15	•	•	•	•					29.1
24	34.6	9	15	•	•	•	•					32.7
27	39.0	9	18	•	•	•	•					37.2
30	43.3	12	18			•	•					41.7
33	47.6	12	21			•	•	•	•			44.1
36	52.0	15	21					•	•			48.9
39	56.3	15	24					•	•			53.7
42	60.6	18	24					•	•			58.2
45	65.0	18	27					•	•	•	•	62.7
48	69.3	21	27							•	•	65.1
54	77.9	21	33							•	•	74.4
60	86.6	21	39							•	•	81.3
63	90.9	27	36							•	•	88.2

Nota: An additional coil can be mounted in the supply air duct or on the fresh air inlet for higher performances. Please consult us.

Auxiliary: Hot water coils

Schematic diagram



Connections and weights

	Unit	207	208	210	225	260	285	2-235	2-295
Customer connection diameter	mm	40x49	40x49	50x60	50x60	50x60	50x60	66x76	66x76
Coil + 3WV with water	kg	53	53	80	80	111	111	215	215

Capacities and pressure drops with 20°C air inlet temperature on coils

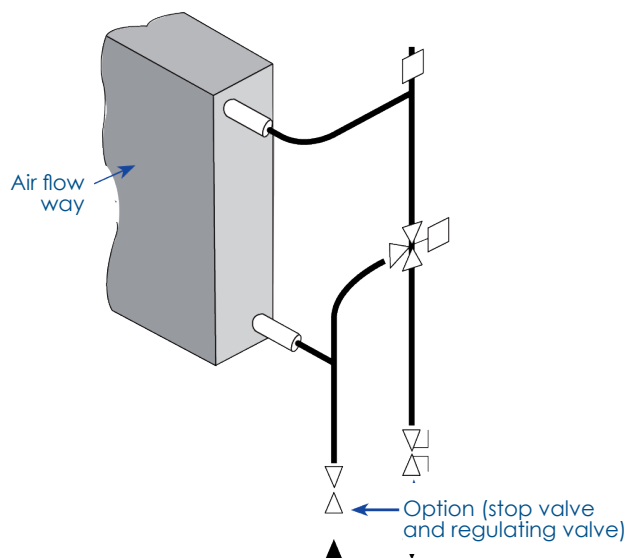
		Unit	207	208	210	225	260	285	2-235	2-295
90/70°C water regime	Max. power	kW	80.1	95.5	122	137	196	224	300	329
	Max. flow rate	m³/h	3.53	4.21	5.40	6.02	8.65	9.88	13.22	14.50
	3WV + coil pressure drop	mCE	2.28	3.36	0.90	1.11	2.25	2.84	3.40	3.66
80/60°C water regime	Max. power	kW	65.6	78.1	99.3	111	160	182	245	269
	Max. flow rate	m³/h	2.87	3.42	4.35	4.85	7.00	7.99	10.74	11.78
	3WV + coil pressure drop	mCE	1.50	2.16	0.60	0.73	1.48	1.93	2.19	2.47

Optional: Stop valve on outlet and TA regulating valve on inlet

		Unit	207	208	210	225	260	285	2-235	2-295
90/70°C water regime	Stop and TA valves pressure drop (opened by 3 turns)	mCE	0.7	1.49	0.72	0.87	1.75	2.25	0.8	0.56
80/60°C water regime	Stop and TA valves pressure drop (opened by 3 turns)	mCE	0.63	0.85	0.51	0.6	1.18	1.5	0.35	0.41

Auxiliary: Chilled water coils

Schematic diagram



Connections and weights

	Unit	207	208	210	225	260	285	2-235	2-295
Customer connection diameter	mm	50x60	50x60	50x60	50x60	66x76	66x76	80x89	80x89
Coil + 3WV with water	kg	95	95	126	126	246	246	349	349

Capacities and pressure drops for 14°C supply air temperature and full load cooling capacity with 40°C outside

		Unit	207	208	210	225	260	285	2-235	2-295
07/12°C water regime	Max. power	kW	34.7	45	57.1	65.1	83.2	101	134	146
	Max. flow rate	m³/h	5.96	7.73	9.82	11.19	14.29	17.29	23.11	25.18
	3WV + coil pressure drop	mCE	2.32	3.94	4.13	5.54	3.43	5.32	5.11	6.29

Optional: Stop valve on outlet and TA regulating valve on inlet

		Unit	207	208	210	225	260	285	2-235	2-295
07/12°C water regime	Stop and TA valves pressure drop (opened by 3 turns)	mCE	0.88	1.42	2.22	2.86	0.55	0.76	0.96	1.1

Sound level* on supply and fresh air side

Frequency band spectrum

On fresh air side: Available pressure on supply air and exhaust air: 250 Pa

	FREQUENCY BAND Hz ►	63	125	250	500	1000	2000	4000	8000	Overall level L _w (dB(A))
	Supply air flow rate (m³/h) ▼									
207	7500	37.9	45.3	66	58	62.1	62.9	57.7	52.4	69.5
208	10000	42.8	48	65.6	58.7	61.7	63.5	54.2	49.4	69.3
210	12500	37.9	45.8	65.4	58.6	62.4	63.8	56.6	50.4	69.5
225	15000	40.1	48.4	69	61.4	65.4	66.2	60.6	54.8	72.7
260	20000	39.8	48.2	68.4	61.3	65.1	66.3	59.8	53.7	72.3
285	25000	45.2	52.4	73	65	69.2	69.9	64.8	59.6	76.5
2-235	30000	43.3	51.3	72	64.3	68.3	69.1	63.6	57.9	75.6
2-295	35000	48.2	54.7	75.3	66.9	71.3	71.9	67.1	62.6	78.8

On supply air side: Available pressure on supply air and exhaust air: 250 Pa

	FREQUENCY BAND Hz ►	63	125	250	500	1000	2000	4000	8000	Overall level L _w (dB(A))
	Supply air flow rate (m³/h) ▼									
207	7500	51.1	55.2	74.1	82	88.2	84	82.8	77.4	91.3
208	10000	54	60	77.3	82.5	88.3	84.1	80	74.6	91.1
210	12500	51.7	56.9	75.8	82.3	88.7	84.7	82	75.9	91.6
225	15000	54.2	58.6	78	85.2	91.6	87.4	85.7	80	94.6
260	20000	54.1	59	78.4	85	91.4	87.3	85	79.1	94.3
285	25000	58.2	62.2	81.1	89.1	95.3	91	89.9	84.6	98.3
2-235	30000	57.2	61.5	80.8	88.2	94.5	90.3	88.7	83.1	97.5
2-295	35000	60.4	64.1	82.6	91.2	97.3	93	92.3	87.3	100.5

*L_w: sound power level (dB(A))

Sound level* on return and exhaust air side

Frequency band spectrum

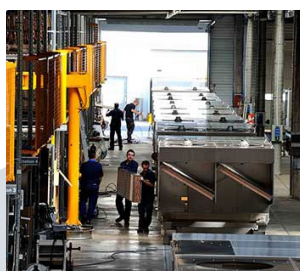
On return air side: Available pressure on supply air and exhaust air: 250 Pa

	FREQUENCY BAND Hz ►	63	125	250	500	1000	2000	4000	8000	Overall level Lw (dB(A))
	Supply air flow rate (m³/h) ▼									
207	7500	40.8	47.1	69.4	63.4	68.1	70.5	68.3	63.8	75.8
208	10000	41.9	47.7	67.2	63	66.6	70.3	63.7	58.2	74.1
210	12500	39	47.2	68.8	64.3	68.4	71.4	67.1	60.9	75.7
225	15000	42.9	50.1	72.5	66.8	71.3	73.8	71.2	65.9	78.9
260	20000	40.9	49.4	71.8	66.7	70.9	73.6	70.3	64.3	78.3
285	25000	47.9	54.2	76.5	70.4	75.2	77.6	75.4	70.9	82.8
2-235	30000	46	53.1	75.5	69.7	74.3	76.8	74.2	69	81.9
2-295	35000	50.6	56.5	78.4	72.4	77.3	79.6	78	73.7	85.1

On exhaust air side: Available pressure on supply air and exhaust air: 250 Pa

	FREQUENCY BAND Hz ►	63	125	250	500	1000	2000	4000	8000	Overall level Lw (dB(A))
	Supply air flow rate (m³/h) ▼									
207	7500	51.4	54.3	70.4	79.1	87.5	83.2	82.2	76.7	90.3
208	10000	52.3	57.3	72.5	78.2	86.5	82.5	78.2	71.9	89
210	12500	51.7	55.9	72.7	79.4	88	84	81.1	74.6	90.6
225	15000	54.5	58.3	74.3	82.3	90.8	86.6	85	79.2	93.5
260	20000	53.9	57.6	74.8	81.8	90.5	86.3	84.1	77.9	93.1
285	25000	58.5	61.3	77.5	86.2	94.6	90.3	89.3	83.8	97.4
2-235	30000	57.5	60.6	77.2	85.3	93.8	89.5	88	82.2	96.5
2-295	35000	60.7	63.4	79.4	88.3	96.7	92.4	91.8	86.5	99.6

*Lw: sound power level (dB(A))



Reference: MARK-BRO_18-EN_D

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