

Comfort and energy savings

1.1.1.1.2

PACARE // HPE+

Double flow vertical heat pump with recovery wheel
High Performance of Energy range

 *A different climate*
Environmental control solutions

2014 edition

Vertical double flow heat pump with recovery wheel

High Performance of Energy range



Tailor made for ventilation, heating and air conditioning of areas requiring important supply of fresh air, by advantaging exhaust air energy recovery.

PACARE // HPE+ : Vertical double flow heat pump

Summary

PACARE // HPE+

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General description

The ETT packaged unit, delivered ready to operate, is made of aluminium frame & casing, giving an extremely high resistance to the elements (20-year warranty against corrosion). The ETT unit can be installed at ground level (plantroom) or on a roof.

GREEN DESIGN involves DECONSTRUCTION: ETT units are 98% recyclable (re-use and recycling rates based on CH 99 RR HPE+).

Our technical choices have several impacts on the environment:



- **Law:** European directive 2008/98/EC of 19th November 2008:
 - The 26th point: "The polluter-pays principle is a guiding principle at European and international levels. The waste producer and the waste holder should manage the waste in a way that guarantees a high level of protection of the environment and human health".
- **Energy:** ETT, innovator in Heat Transfer solutions.
- **Aluminium:** a good choice for the planet!
 - aluminium is 100% recyclable and endlessly;
 - recycling gives 30% of aluminium needs.
- **Low polluting ETT manufacturing process:**
 - sorting done by job. All wastes are recycled. No paint, no use of water;
 - ISO 14001 Certification (Environmental Management System);
 - ETT has been recognized able to manipulate refrigerant fluid as stipulated by the F-gas Regulation European Directive, and more particularly, the fifth Article "minimum requirements and the conditions for mutual recognition shall be established in accordance with the procedure referred to in Article 12(2) in respect of training programmes and certification for both the companies and the relevant personnel involved in installation, maintenance or servicing of the equipment and systems covered by Article 3(1)" which are "refrigeration, air conditioning and heat pump equipment".
- **An efficient waste management:**
 - filtration: ETT includes "green-designed" air filters (sorting frame - grille - media);



Ease of operation was our first preoccupation during design of these units:

- a **separated technical section** simplifying service and control of the unit and permitting measurement and adjustment during the operation of the machine;
- the **BEST controller** specifically designed for this application, allows great flexibility of operation and therefore optimum performance of the ETT unit, it being user-friendly whether it is with local or remote (with remote display, PC or BMS) communication.



Each unit, prior to shipment, is checked and tested at the factory, with issue of a test certificate. ETT Quality organization is certified **ISO 9001** (AFNOR Certificate 1994/2016f).



Moreover, each unit is delivered with an **EC certificate of conformity** and respects standards below listed:

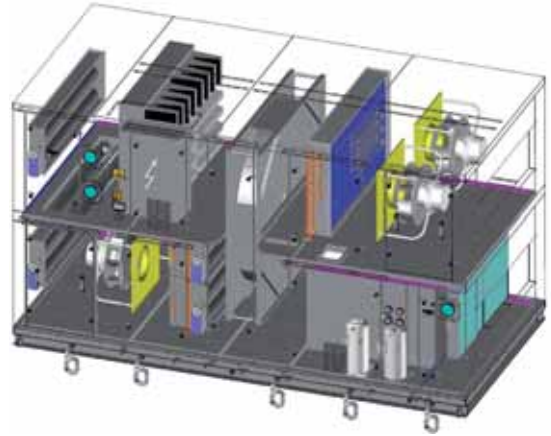
- 2006/42/EC machine Directive - Safety prescriptions
- 2006/95/EC low voltage Directive - Electricity
- EMC 2004/108/EC - Electromagnetic compatibility
- 2009/142/EC Directive
- EN 1886 - Air treatment box mechanical performances
- EN 60204-1 - Electrical appliances



Principle of operation

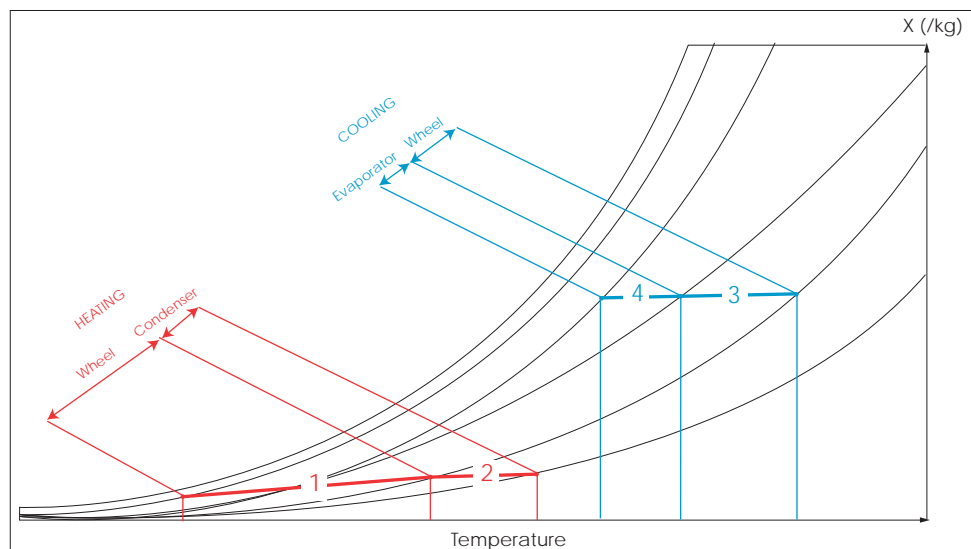
The ETT package comprises 4 different sections:

- 1/ An exhaust air section for exhaust air calories removal and/or recovery (according to the mode).
- 2/ A separated technical section including electric board and regulating elements.
- 3/ A supply air section for fresh air change and handling.
- 4/ A technical section including compressors and refrigerant components.



The unit works as a reversible heat pump:

- > Source: exhaust air
- > Treated fluid: hygienic fresh air
- > In all fresh air / all exhaust air mode with supply air temperature control.



- The exhaust air energy recovery in heating and cooling mode is done with a recovery wheel. It can maintain the setpoint temperature or be associated to the reversible heat pump refrigerant cycle if necessary.

Heating mode: Exhaust air calories are transferred to the fresh air with the recovery wheel ($\eta=70\%$ mini) [1]. The additional heating can be done by the variable capacity refrigerant cycle condenser to maintain the setpoint, if it is necessary for the requested capacity [2].

Cooling mode: Exhaust air frigories are transferred to the fresh air with the recovery wheel ($\eta=70\%$ mini) [3]. The variable capacity refrigerant cycle evaporator can be used to maintain the requested setpoint if necessary [4].

Description

■ Aluminium frame and casing packaged unit made of:

- a **rigid, compact, lightweight and weather-resistant casing** that includes a 20-year corrosion-resistant warranty on frame & casing;
- a **watertight floor** with drainage outlets located at the border of the unit and linked to rubber siphons;
- **AG3-type aluminium** casing;
- **access is made through large lockable aluminium panels**. Doors tightness is ensured by flexible gasket under compression, providing an ideal elasticity day after day;
- **inside sound and thermal insulation** with M0/A2-s1, d0 glass wool, 50 mm thickness, protected by double skin composed of 13/10 thickness aluminium sheet for mechanical protection and an easy maintenance;
- **floor acoustic and thermal insulation** made by double skin M0/A1 rock wool;
- **3-damper mixing box** with motorized fresh air damper with bird proof grid, exhaust air damper and mixing air damper ensuring the proportions wanted and optimizing economizer phases. Dampers have extruded aluminium blades with low pressure drop thanks to the plane wing profile. The damper frame is in aluminium. The unit can operate in all recycling mode during defrosting phases or in unoccupancy regime.

■ Air section made of:

- **easy-to-remove green-designed filtration, 98 mm thickness** (supply and exhaust air) - folded, 95% ASHRAE gravimetric (G4) efficiency, fouling controlled by pressure-switch;
- **F7 filtration, 292mm thickness polydihedral in polypropylene**;
- **high performance free wheeling ventilation on supply and exhaust air sections** to permit avoiding losses due to pulley-belt transmissions and so, improving the unit energy performance;
- **each "Premium efficiency" class equivalent IE 4 electronic switching fan motor** is associated with an integrated frequency inverter to:
 - limit the kickback during the starting for textile ducts (soft start mode);
 - set-up the maximum rotation speed according to pressure drops on site;
 - be in reduced speed during free-cooling mode to save energy.

■ Energetic and thermodynamic section made of:

- **refrigerant circuits** respectful of the European directive concerning pressure equipments (PED 97/23/EC);
- **R410A refrigerant fluid**;
- **direct expansion exchangers**, copper pipes and aluminium fins, with high exchange power. They have been selected for an air speed avoiding condensates. Those nested exchangers in the supply air section permit rise of COP and EER in partial load;
- **variable cooling system** using a frequency inverter on compressor or modulating valve (according to the unit);
- **2 expansion valves** on each circuit to optimize the refrigerant circuit efficiency, by controlling the evaporator overheating and so, limiting the energy consumption;
- independent **refrigerant circuit**;
- **anti-acid filter drier**;
- **HP and LP switches**;
- **switchover valve**;
- **buffer** to optimize refrigerant circuit performances according to the operating mode;
- **high efficiency aluminium recovery wheel** (70% minimum efficiency) with integrated inverter drive and draining section.

Control Description

■ Electric section made of:

an electric board wired according to the European standard EN 60204-01, in particular:

- **ETT controller** with display;
- **disconnecter** with lockable external handle to cut in full load;
- **400-230-24 volts transformer** for control circuits;
- **fault synthesis** with pending dry contact on terminal;
- **numbered terminal blocks** with disconnecting terminals for remote controls or transfers;
- **terminal block for compressors load shedding**;
- **internal wiring** numbered at both extremities using numbered ferrules;
- **1k3 breaking capacity** of basis 10 kA;
- **components protection** using circuit breakers;
- **phases checker** to detect phases order and to indicate the fault on the controller.

■ Control section made of:

- **one or more BEST-type controllers** (Building Energy Saving Technology) especially developed by ETT for this range of units. The microprocessor, the memory and the controllers size are adapted to the applications as well as selected options by integrating a factory program with 160 possible configurations. The controller is in a plastic box which guarantees a high mechanical protection and reduces electrostatic shocks threats;
- **CTN type temperature sensors**. Their accuracy and liability have been tested and validated at the factory and on site.

The controller has the following functions:

- **on / off with remote contact** or unoccupancy contact;
- **on / off according to operating hours** (2 slots per day);
- **fault synthesis** with dry contact for transfer on customer system;
- **2 setpoints** of the supply air temperature in cooling and heating mode according to the 2002/91/EC directive;
- **external calibrated adjustment for supply air temperature** according to the outside air temperature;
- **securities (fire thermostat, smoke detector, HP switch...) and faults management**;
- **compressors operating time balancing and optimization**;
- **flash-type analog and economic management** of alternate defrostings for each refrigerant circuit using frost detection and end of defrosting through analog probes and starting of a new heating cycle in heat pump mode. Concerning multi-circuits units, comfort and energy savings are ensured with the banning of simultaneous defrostings;
- **recovery wheel management** in variable speed for a precise control of the supply air temperature and an optimization of performances in heating mode by delaying the defrosting cycle;
- **management of the compressors stages** by giving an advantage to the highest COP and EER in part load;
- **out-of-frost restart** on room air or return air temperature;
- **auxiliaries management** (Possibility of banning according to outside temperature);
- **written faults history** (no code needed) displaying hour and outside temperature;
- **unit, compressors and auxiliaries operating hours counting**;
- **control with constant air flow rate**. The PACARE unit has ETT CEF equipment. The ETT SRV progressive cooling control ensures comfort by controlling supply air conditions. This configuration is advised for constant fresh air treatment and diffusion using induction terminals applications.

Options

Frame - Casing

- > Motorized external damper for supply air (Directive 2006/42/EC)
- > Unit painting
- > Porthole
- > Multiblocks unit
- > Symmetric unit

Acoustic

- > Technical section acoustic insulation
- > Fresh and exhaust air cowl sound insulation
- > Compressors insulation jackets

Air

- > Supply and exhaust air filters dial pressure gauge
- > Filters fouling analog control (CAEF)
- > Backed-up smoke detector
- > Spare G4 filters, 98 mm thickness
- > Spare F7 filters, 292 mm thickness
- > Fans epoxy coating
- > Fresh air arrangement on top
- > Supply air arrangement on top
- > Activated carbon F7 filtration, 292 mm thickness
- > F7 filtration, 292 mm thickness
- > Spare F9 filters, 292 mm thickness

Heating

- > HP and LP pressure gauges

Thermal exchangers

- > 2-sequential stage electric heater
- > Triac
- > Hot water coil
- > Chilled water coil
- > Additional evaporator + condenser compressor split box (cooling mode only)
- > Hot water or mounted chilled water progressive 3-way valve
- > Mounted stop valve + Regulating valve mounted on inlet: hot water or chilled water
- > Vinyl coating on heating coils
- > Vinyl coating on hot water coil or chilled water coil
- > Epoxy coating on recovery wheel
- > Vinyl coating on heatpipe

Electrical

- > Emergency stop button
- > Unit global energy counting

Control

- > Supply air constant pressure control (SCP (PCS) with air flow rate variation by ensuring constant supply air conditions) (*)
- > Return air hygrometry probe (for external humidifier control)
- > Room air probe (for supply air temperature compensation control)

Laying

- > 200 or 400 mm aluminium feet

Energy Recovery

- > Heatpipe (51% efficiency) + associated compressors, instead of the recovery wheel

* Contact our factory to consult operation minimum flow rate.

Technical features

Type 103 - 104

Specifications		103	104
Rated air flow rate for 250 Pa	m ³ /h	2000	3000
Mini / Maxi air flow rate	m ³ /h	1800/2500	2200/3500
Gross cooling capacity with 35°C/40% HR outside temperature - Return air at 27°C / 47% HR	kW	10.1	12.6
Recovery capacity with 35°C/40% HR outside temperature - Return air at 27°C / 47% HR	kW	4.2	5.8
Recovery efficiency with 35°C/40% HR outside temperature - Return air at 27°C / 47% HR	%	78	71
Net total cooling capacity with 35°C/40% HR outside temp. - Return air at 27°C / 47% HR (****)	kW	14.31	18.38
Net EER (Coefficient of performance in cooling mode)		3.85	3.70
Gross heating capacity +7°C/87% HR outside temperature - Return air at 20°C DB (**)	kW	10.0	12.9
Recovery capacity with +7°C/87% HR outside temperature - Return air at 20°C DB (**)	kW	6.7	9.2
Recovery efficiency with +7°C/87% HR outside temperature - Return air at 20°C DB (**)	%	77	70
Net total heating capacity +7°C/87% HR outside temperature - Return air at 20°C DB (**) (****)	kW	16.75	22.07
Net COP (Coefficient of performance in heating mode) with +7°C outs. temp.		5.34	5.35
Gross heating capacity -7°C/73% HR outside temperature - Return air at 20°C DB (**)	kW	8.1	10.9
Recovery capacity with -7°C/73% HR outside temperature - Return air at 20°C DB (**)	kW	16.0	22.0
Recovery efficiency with -7°C/73% HR outside temperature - Return air at 20°C DB (**) (****)	%	77	70
Net total heating capacity -7°C/73% HR outside temperature - Return air at 20°C DB (**)	kW	24.12	32.87
Net COP (Coefficient of performance in heating mode) with -7°C outs. temp.		8.32	8.52
Specifications for 25°C / 20°C heating mode supply air conditions			
Net total cooling capacity with 35°C/40% HR outside temp. - Return air at 27°C / 47% HR (****)	kW	6.71	9.13
Net EER (Coefficient of performance in cooling mode)		3.05	2.83
Net total heating capacity +7°C/87% HR outside temperature - Return air at 20°C DB (**) (****)	kW	9.19	13.87
Net COP (Coefficient of performance in heating mode) with +7°C outs. temp.		3.19	3.59
Net total heating capacity -7°C/73% HR outside temperature - Return air at 20°C DB (**) (****)	kW	20.49	30.67
Net COP (Coefficient of performance in heating mode) with -7°C outs. temp.		8.35	8.63
Number of independent refrigerant circuits		1	1
Power stage		17 to 100%	17 to 100%
Electrical connection			
Installed total electrical power (****)	kW	10.46	11.10
Rated / Starting current	A	17.15/75.00	18.16/54.00
Supply air fan			
Number of supply air fan / motor		1/1	1/1
250 Pa absorbed electrical / installed mechanical power	kW	0.9/2.9	1.4/2.9
450 Pa absorbed electrical / installed mechanical power	kW	1.1/2.9	1.7/2.9
2002/91/EC - Ventilation average capacity per 250 Pa unit	W/ (m ³ /h)	0.43	0.45
2002/91/EC - Ventilation average capacity per 450 Pa unit	W/ (m ³ /h)	0.56	0.55
2002/91/EC - Fans total regulatory capacity	W/ (m ³ /h)	0.65	0.83
250 Pa "Central air savings"			
2002/91/EC - Fans total regulatory capacity	W/ (m ³ /h)	1.14	1.46
450 Pa "Central air savings"			
Return air fan			
Number of return air fan / motor		1/1	1/1
250 Pa absorbed electrical / installed mechanical power	kW	0.8/2.9	1.2/2.9
450 Pa absorbed electrical / installed mechanical power	kW	1.0/2.9	1.5/2.9
General			
Average sound pressure at 10 m, reference 2x10 ⁻⁵ in free field (connected units ducts)	dB(A)	42.0	45.3
Filters efficiency (supply air)		G4+F7	G4+F7
Filters efficiency (exhaust air)		G4	G4
Maximum outside operating temperature in cooling mode	°C	40.0	40.0
Minimum outside operating temperature in cooling mode	°C	15.0	15.0
Minimum outside operating temperature in heating mode	°C	-15.0	-15.0
Minimum inside coil inlet temperature in heating mode	°C	10.0	10.0
Unit block weight without any option (*)	kg	675	675

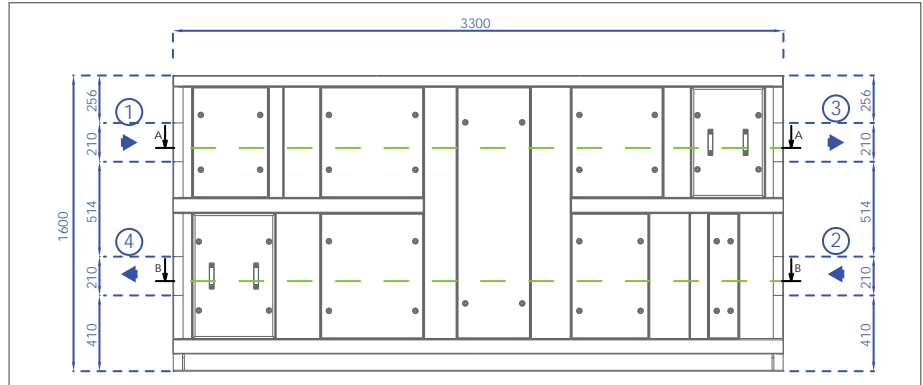
400V - 50 Hz + earth without neutral 3-phase power supply (*) Please consult "Auxiliaries" for hot water coils and electric heaters weight. Please consult "Installation accessories" for accessories weight. (**) Instantaneous heating capacity (out of defrosting mode) (****) Out of electrical resistances (*****) Net total capacity = Net cooling or heating capacity + Recovery Capacity

Nota: Calculations made from air with atmospheric pressure properties, at sea level.

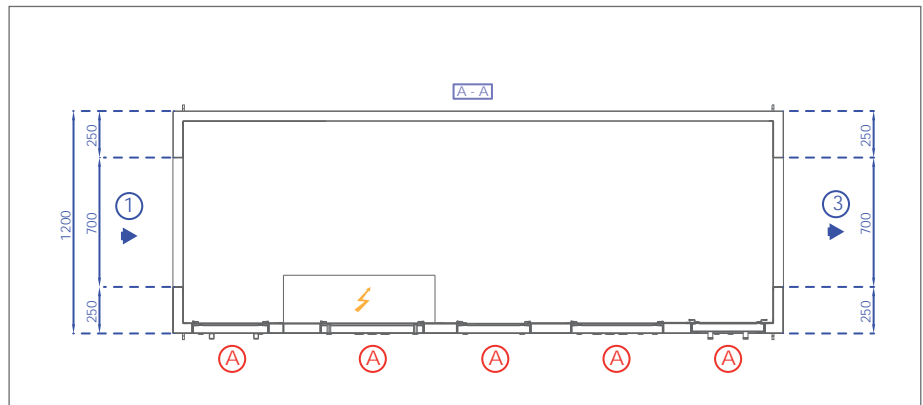
Dimensions and connections

Type 103 - 104

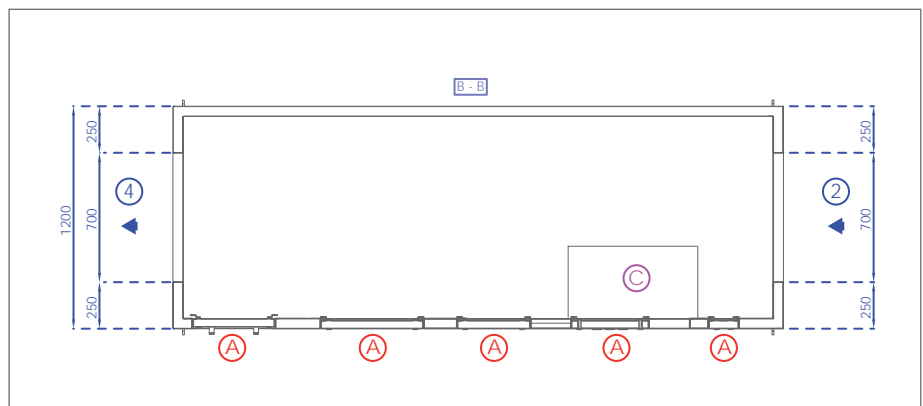
Front view



Top view:
Fresh / Supply air



Top view:
Return / Exhaust Air



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

	Length	Width	Height
Casing dimensions	3300	1200	1600
Transport overall dimensions	3300	1270	1600

Nota: A 200 mm minimum support is necessary below the unit for condensates siphons connection.

Technical features

Type 203 - 204

Specifications		203	204
Rated air flow rate for 250 Pa	m ³ /h	4000	5000
Mini / Maxi air flow rate	m ³ /h	3600/4600	4400/5600
Gross cooling capacity with 35°C/40% HR outside temperature - Return air at 27°C / 47% HR	kW	19.6	24.3
Recovery capacity with 35°C/40% HR outside temperature - Return air at 27°C / 47% HR	kW	8.1	9.5
Recovery efficiency with 35°C/40% HR outside temperature - Return air at 27°C / 47% HR	%	74	70
Net total cooling capacity with 35°C/40% HR outside temp. - Return air at 27°C / 47% HR (****)	kW	27.66	33.84
Net EER (Coefficient of performance in cooling mode)		3.76	3.75
Gross heating capacity +7°C/87% HR outside temperature - Return air at 20°C DB (**)	kW	19.9	24.4
Recovery capacity with +7°C/87% HR outside temperature - Return air at 20°C DB (**)	kW	13.0	15.0
Recovery efficiency with +7°C/87% HR outside temperature - Return air at 20°C DB (**)	%	74	70
Net total heating capacity +7°C/87% HR outside temperature - Return air at 20°C DB (**) (****)	kW	32.94	39.36
Net COP (Coefficient of performance in heating mode) with +7°C outs. temp.		5.77	5.62
Gross heating capacity -7°C/73% HR outside temperature - Return air at 20°C DB (**)	kW	16.5	20.7
Recovery capacity with -7°C/73% HR outside temperature - Return air at 20°C DB (**)	kW	30.0	36.0
Recovery efficiency with -7°C/73% HR outside temperature - Return air at 20°C DB (**)	%	74	70
Net total heating capacity -7°C/73% HR outside temperature - Return air at 20°C DB (**) (****)	kW	46.48	56.70
Net COP (Coefficient of performance in heating mode) with -7°C outs. temp.		8.96	8.84
Specifications for 25°C / 20°C heating mode supply air conditions			
Net total cooling capacity with 35°C/40% HR outside temp. - Return air at 27°C / 47% HR (****)	kW	12.36	15.64
Net EER (Coefficient of performance in cooling mode)		3.70	3.25
Net total heating capacity +7°C/87% HR outside temperature - Return air at 20°C DB (**) (****)	kW	18.74	22.86
Net COP (Coefficient of performance in heating mode) with +7°C outs. temp.		5.28	5.03
Net total heating capacity -7°C/73% HR outside temperature - Return air at 20°C DB (**) (****)	kW	40.34	50.86
Net COP (Coefficient of performance in heating mode) with -7°C outs. temp.		9.67	8.89
Number of independent refrigerant circuits		2	2
Power stage		9 to 100%	9 to 100%
Electrical connection			
Installed total electrical power (****)	kW	18.84	20.33
Rated / Starting current	A	31.62/89.47	32.94/68.76
Supply air fan			
Number of supply air fan / motor		1/1	1/1
250 Pa absorbed electrical / installed mechanical power	kW	1.5/5.4	2.0/5.4
450 Pa absorbed electrical / installed mechanical power	kW	2.0/5.4	2.6/5.4
2002/91/EC - Ventilation average capacity per 250 Pa unit	W/ (m ³ /h)	0.39	0.40
2002/91/EC - Ventilation average capacity per 450 Pa unit	W/ (m ³ /h)	0.50	0.51
2002/91/EC - Fans total regulatory capacity 250 Pa "Central air savings"	W/ (m ³ /h)	1.06	1.21
2002/91/EC - Fans total regulatory capacity 450 Pa "Central air savings"	W/ (m ³ /h)	1.92	2.24
Return air fan			
Number of return air fan / motor		1/1	1/1
250 Pa absorbed electrical / installed mechanical power	kW	1.3/5.4	1.7/5.4
450 Pa absorbed electrical / installed mechanical power	kW	1.8/5.4	2.3/5.4
General			
Average sound pressure at 10 m, reference 2x10 ⁻⁵ in free field (connected units ducts)	dB(A)	41.8	42.1
Filters efficiency (supply air)		G4+F7	G4+F7
Filters efficiency (exhaust air)		G4	G4
Maximum outside operating temperature in cooling mode	°C	40.0	40.0
Minimum outside operating temperature in cooling mode	°C	15.0	15.0
Minimum outside operating temperature in heating mode	°C	-15.0	-15.0
Minimum inside coil inlet temperature in heating mode	°C	10.0	10.0
Unit block weight without any option (*)	kg	1032	1034

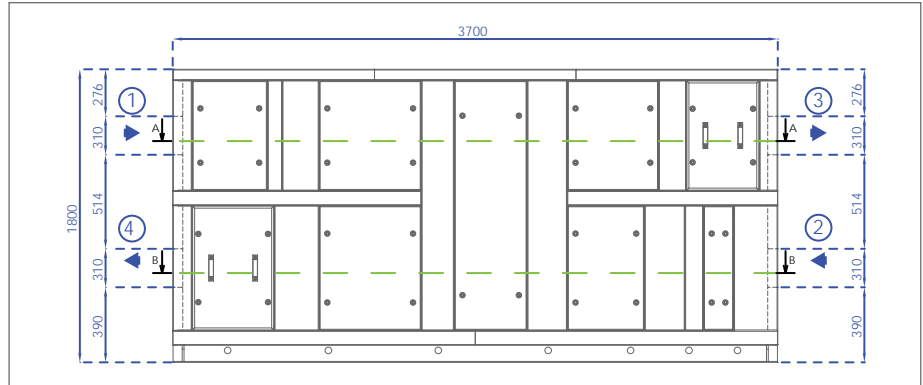
400V - 50 Hz + earth without neutral 3-phase power supply (*) Please consult "Auxiliaries" for hot water coils and electric heaters weight. Please consult "Installation accessories" for accessories weight. (**) Instantaneous heating capacity (out of defrosting mode) (****) Out of electrical resistances (*****) Net total capacity = Net cooling or heating capacity + Recovery Capacity

Nota: Calculations made from air with atmospheric pressure properties, at sea level.

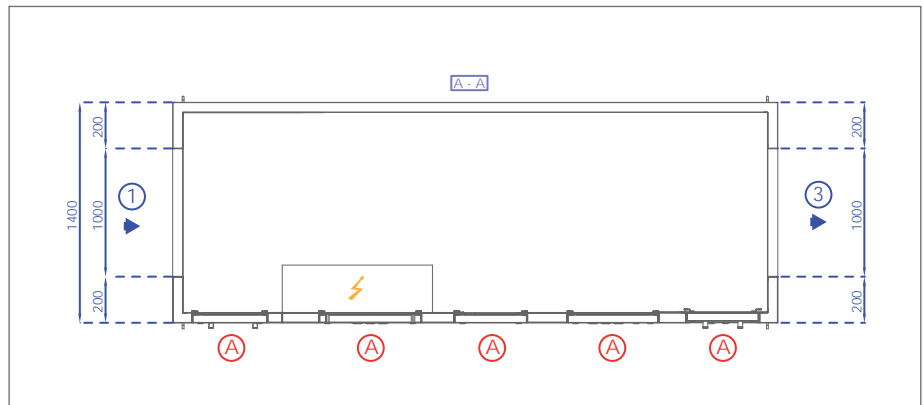
Dimensions and connections

Type 203 - 204

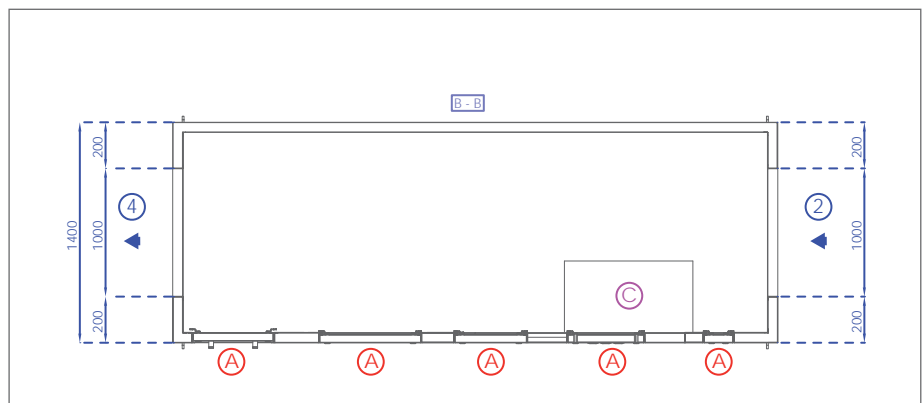
Front view



Top view:
Fresh / Supply air



Top view:
Return / Exhaust Air



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

	Length	Width	Height
Casing dimensions	3700	1400	1800
Transport overall dimensions	3700	1470	1800

Nota: A 200 mm minimum support is necessary below the unit for condensates siphons connection.

Technical features

Type 207 - 208

Specifications		207	208
Rated air flow rate for 250 Pa	m ³ /h	7500	10000
Mini / Maxi air flow rate	m ³ /h	7300/8200	8400/11500
Gross cooling capacity with 35°C/40% HR outside temperature - Return air at 27°C / 47% HR	kW	38.9	46.9
Recovery capacity with 35°C/40% HR outside temperature - Return air at 27°C / 47% HR	kW	15.0	19.0
Recovery efficiency with 35°C/40% HR outside temperature - Return air at 27°C / 47% HR	%	76	70
Net total cooling capacity with 35°C/40% HR outside temp. - Return air at 27°C / 47% HR (****)	kW	53.93	65.86
Net EER (Coefficient of performance in cooling mode)		3.64	3.69
Gross heating capacity +7°C/87% HR outside temperature - Return air at 20°C DB (**)	kW	40.0	47.9
Recovery capacity with +7°C/87% HR outside temperature - Return air at 20°C DB (**)	kW	25.0	30.0
Recovery efficiency with +7°C/87% HR outside temperature - Return air at 20°C DB (**)	%	75	70
Net total heating capacity +7°C/87% HR outside temperature - Return air at 20°C DB (**) (****)	kW	64.97	77.94
Net COP (Coefficient of performance in heating mode) with +7°C outs. temp.		6.01	5.65
Gross heating capacity -7°C/73% HR outside temperature - Return air at 20°C DB (**)	kW	32.9	40.8
Recovery capacity with -7°C/73% HR outside temperature - Return air at 20°C DB (**)	kW	58.0	73.0
Recovery efficiency with -7°C/73% HR outside temperature - Return air at 20°C DB (**)	%	75	70
Net total heating capacity -7°C/73% HR outside temperature - Return air at 20°C DB (**) (****)	kW	90.87	113.84
Net COP (Coefficient of performance in heating mode) with -7°C outs. temp.		9.49	9.21
Specifications for 25°C / 20°C heating mode supply air conditions			
Net total cooling capacity with 35°C/40% HR outside temp. - Return air at 27°C / 47% HR (****)	kW	23.93	32.26
Net EER (Coefficient of performance in cooling mode)		3.47	3.33
Net total heating capacity +7°C/87% HR outside temperature - Return air at 20°C DB (**) (****)	kW	34.07	44.74
Net COP (Coefficient of performance in heating mode) with +7°C outs. temp.		5.89	5.12
Net total heating capacity -7°C/73% HR outside temperature - Return air at 20°C DB (**) (****)	kW	76.07	102.74
Net COP (Coefficient of performance in heating mode) with -7°C outs. temp.		12.51	9.26
Number of independent refrigerant circuits		2	2
Power stage		9 to 100%	9 to 100%
Electrical connection			
Installed total electrical power (****)	kW	26.23	39.2
Rated / Starting current	A	42.54/105.66	63.83/150.55
Supply air fan			
Number of supply air fan / motor		1/1	2/2
250 Pa absorbed electrical / installed mechanical power	kW	2.5/5.4	4.0/10.7
450 Pa absorbed electrical / installed mechanical power	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 250 Pa "Central air savings"	W/ (m ³ /h)	1.83	2.43
2002/91/EC - Fans total regulatory capacity 450 Pa "Central air savings"	W/ (m ³ /h)	3.11	4.48
Return air fan			
Number of return air fan / motor		1/1	2/2
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 at 10 m, reference 2x10 ⁻⁵ in free field (connected units ducts)	dB(A)	46.4	45.2
Filters efficiency (supply air)		G4+F7	G4+F7
Filters efficiency (exhaust air)		G4	G4
Maximum outside operating temperature in cooling mode	°C	40.0	40.0
Minimum outside operating temperature in cooling mode	°C	15.0	15.0
Minimum outside operating temperature in heating mode	°C	-15.0	-15.0
Minimum inside coil inlet temperature in heating mode	°C	10.0	10.0
Unit block weight without any option (*)	kg	1483	1490

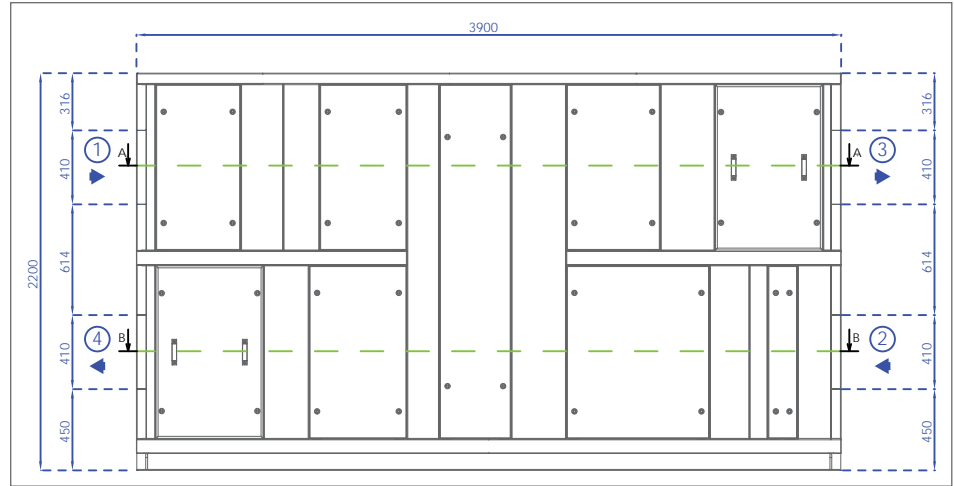
400V - 50 Hz + earth without neutral 3-phase power supply (*) Please consult "Auxiliaries" for hot water coils and electric heaters weight. Please consult "Installation accessories" for accessories weight. (**) Instantaneous heating capacity (out of defrosting mode) (****) Out of electrical resistances (*****) Net total capacity = Net cooling or heating capacity + Recovery Capacity

Nota: Calculations made from air with atmospheric pressure properties, at sea level.

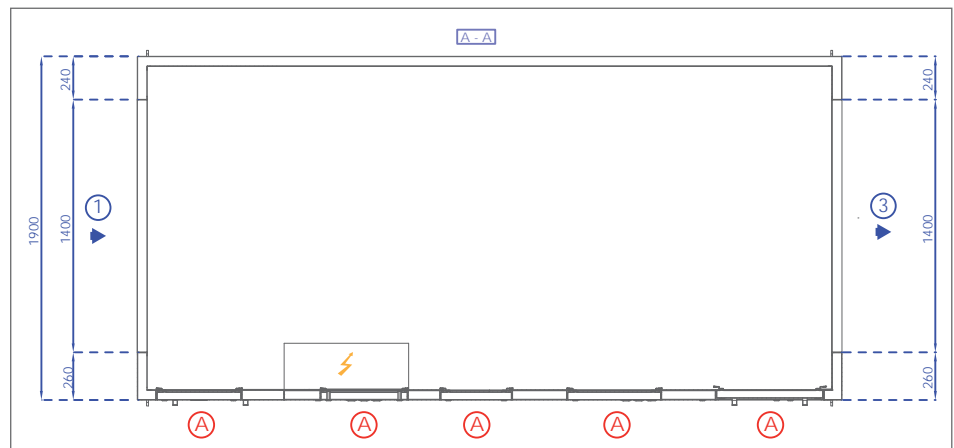
Dimensions and connections

Type 207 - 208

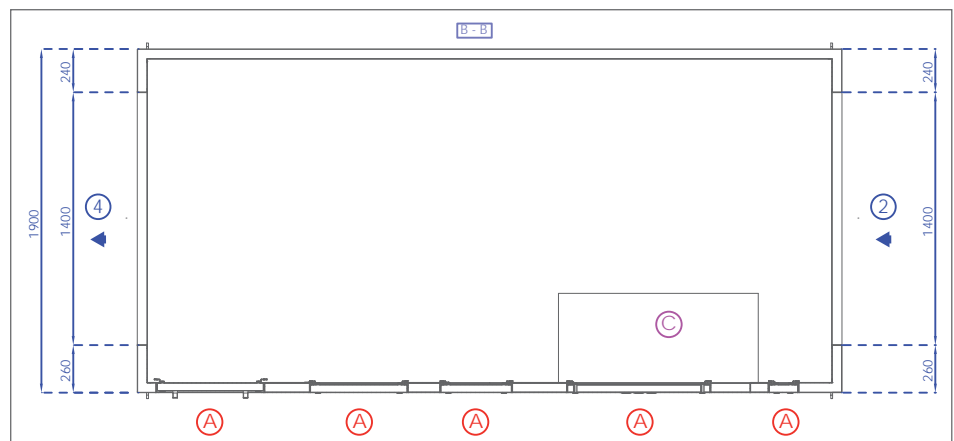
Front view



Top view:
Fresh / Supply air



Top view:
Return / Exhaust Air



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

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

Nota: A 200 mm minimum support is necessary below the unit for condensates siphons connection.

Technical features

Type 210 - 225

Specifications		210	225
Rated air flow rate for 250 Pa	m ³ /h	12500	15000
Mini / Maxi air flow rate	m ³ /h	10600/14300	12400/16000
Gross cooling capacity with 35°C/40% HR outside temperature - Return air at 27°C / 47% HR	kW	59.7	71.4
Recovery capacity with 35°C/40% HR outside temperature - Return air at 27°C / 47% HR	kW	26.0	30.0
Recovery efficiency with 35°C/40% HR outside temperature - Return air at 27°C / 47% HR	%	76	73
Net total cooling capacity with 35°C/40% HR outside temp. - Return air at 27°C / 47% HR (****)	kW	85.72	101.41
Net EER (Coefficient of performance in cooling mode)		4.19	3.89
Gross heating capacity +7°C/87% HR outside temperature - Return air at 20°C DB (**)	kW	59.3	69.5
Recovery capacity with +7°C/87% HR outside temperature - Return air at 20°C DB (**)	kW	41.0	47.0
Recovery efficiency with +7°C/87% HR outside temperature - Return air at 20°C DB (**)	%	75	72
Net total heating capacity +7°C/87% HR outside temperature - Return air at 20°C DB (**) (****)	kW	100.28	116.51
Net COP (Coefficient of performance in heating mode) with +7°C outs. temp.		6.48	5.89
Gross heating capacity -7°C/73% HR outside temperature - Return air at 20°C DB (**)	kW	48.5	60.3
Recovery capacity with -7°C/73% HR outside temperature - Return air at 20°C DB (**)	kW	96.0	112.0
Recovery efficiency with -7°C/73% HR outside temperature - Return air at 20°C DB (**)	%	76	72
Net total heating capacity -7°C/73% HR outside temperature - Return air at 20°C DB (**) (****)	kW	144.48	172.32
Net COP (Coefficient of performance in heating mode) with -7°C outs. temp.		10.31	9.40
Specifications for 25°C / 20°C heating mode supply air conditions			
Net total cooling capacity with 35°C/40% HR outside temp. - Return air at 27°C / 47% HR (****)	kW	40.32	48.74
Net EER (Coefficient of performance in cooling mode)		3.92	3.83
Net total heating capacity +7°C/87% HR outside temperature - Return air at 20°C DB (**) (****)	kW	56.68	67.26
Net COP (Coefficient of performance in heating mode) with +7°C outs. temp.		6.15	5.84
Net total heating capacity -7°C/73% HR outside temperature - Return air at 20°C DB (**) (****)	kW	125.68	152.26
Net COP (Coefficient of performance in heating mode) with -7°C outs. temp.		11.46	9.86
Number of independent refrigerant circuits		2	2
Power stage		9 to 100%	15 to 100%
Electrical connection			
Installed total electrical power (****)	kW	42.43	47.88
Rated / Starting current	A	69.85/163.49	79.05/176.60
Supply air fan			
Number of supply air fan / motor		2/2	2/2
250 Pa absorbed electrical / installed mechanical power	kW	4.2/10.7	5.6/10.7
450 Pa absorbed electrical / installed mechanical power	kW	5.3/10.7	6.8/10.7
2002/91/EC - Ventilation average capacity per 250 Pa unit	W/ (m ³ /h)	0.34	0.37
2002/91/EC - Ventilation average capacity per 450 Pa unit	W/ (m ³ /h)	0.43	0.45
2002/91/EC - Fans total regulatory capacity	W/ (m ³ /h)	2.92	3.57
250 Pa "Central air savings"			
2002/91/EC - Fans total regulatory capacity	W/ (m ³ /h)	5.20	6.16
450 Pa "Central air savings"			
Return air fan			
Number of return air fan / motor		2/2	2/2
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
General			
Average sound pressure at 10 m, reference 2x10 ⁻⁵ in free field (connected units ducts)	dB(A)	46.5	49.6
Filters efficiency (supply air)		G4+F7	G4+F7
Filters efficiency (exhaust air)		G4	G4
Maximum outside operating temperature in cooling mode	°C	40.0	40.0
Minimum outside operating temperature in cooling mode	°C	15.0	15.0
Minimum outside operating temperature in heating mode	°C	-15.0	-15.0
Minimum inside coil inlet temperature in heating mode	°C	10.0	10.0
Unit block weight without any option (*)	kg	1949	1946

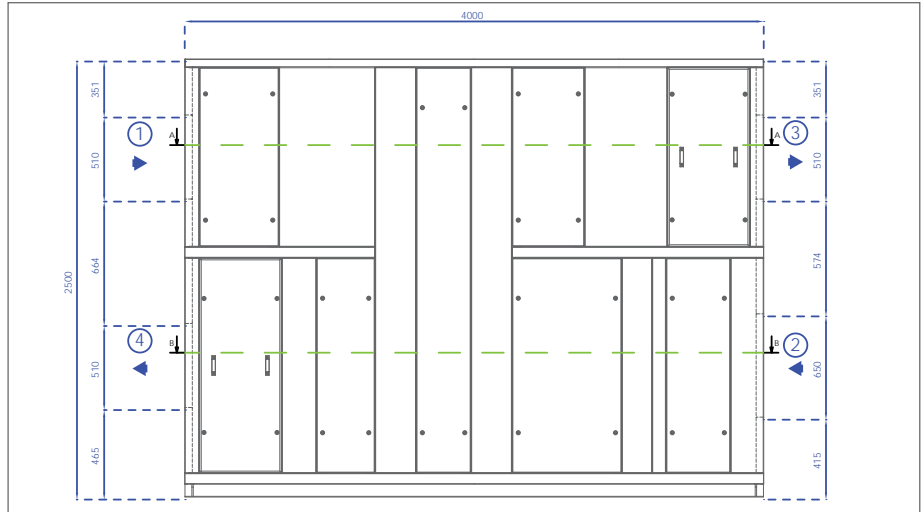
400V - 50 Hz + earth without neutral 3-phase power supply (*) Please consult "Auxiliaries" for hot water coils and electric heaters weight. Please consult "Installation accessories" for accessories weight. (**) Instantaneous heating capacity (out of defrosting mode) (****) Out of electrical resistances (*****) Net total capacity = Net cooling or heating capacity + Recovery Capacity

Nota: Calculations made from air with atmospheric pressure properties, at sea level.

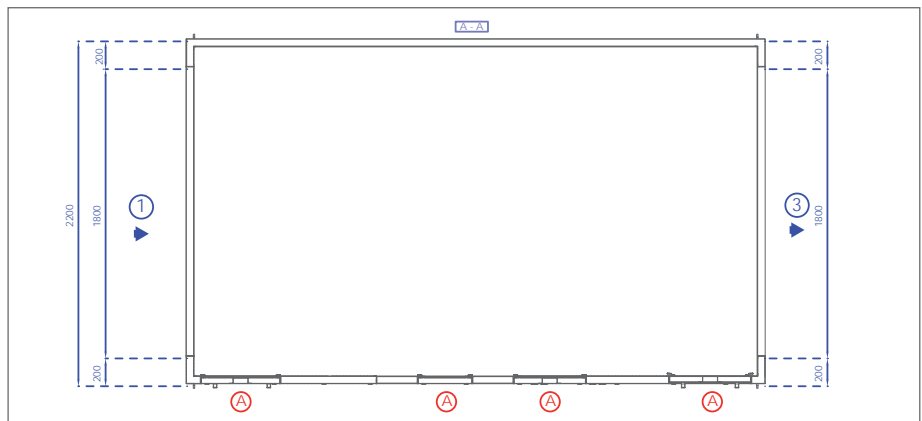
Dimensions and connections

Type 210 - 225

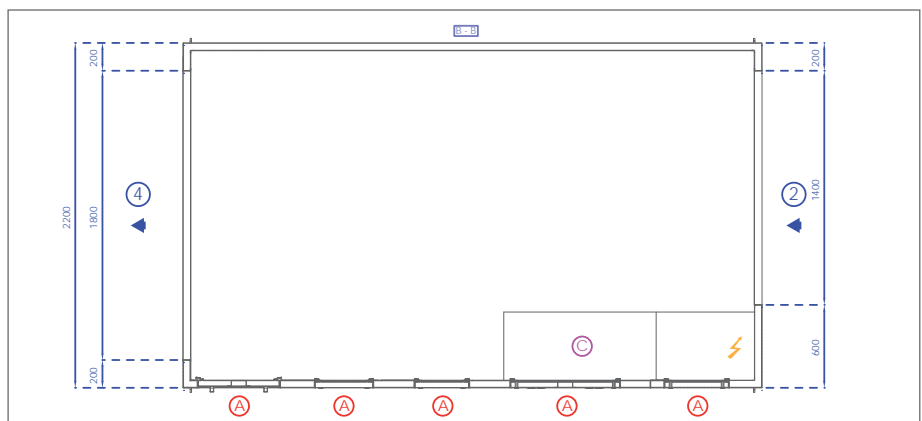
Front view



Top view:
Fresh / Supply air



Top view:
Return / Exhaust Air



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

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

Nota: A 200 mm minimum support is necessary below the unit for condensates siphons connection.

Technical features

Type 260 - 285

Specifications		260	285
Rated air flow rate for 250 Pa	m ³ /h	20000	25000
Mini / Maxi air flow rate	m ³ /h	15600/23000	18800/25000
Gross cooling capacity with 35°C/40% HR outside temperature - Return air at 27°C / 47% HR	kW	89.8	99.6
Recovery capacity with 35°C/40% HR outside temperature - Return air at 27°C / 47% HR	kW	41.0	48.0
Recovery efficiency with 35°C/40% HR outside temperature - Return air at 27°C / 47% HR	%	75	71
Net total cooling capacity with 35°C/40% HR outside temp. - Return air at 27°C / 47% HR (****)	kW	130.83	147.61
Net EER (Coefficient of performance in cooling mode)		4.11	3.79
Gross heating capacity +7°C/87% HR outside temperature - Return air at 20°C DB (**)	kW	90.1	102.4
Recovery capacity with +7°C/87% HR outside temperature - Return air at 20°C DB (**)	kW	65.0	77.0
Recovery efficiency with +7°C/87% HR outside temperature - Return air at 20°C DB (**)	%	74	70
Net total heating capacity +7°C/87% HR outside temperature - Return air at 20°C DB (**) (****)	kW	155.15	179.39
Net COP (Coefficient of performance in heating mode) with +7°C outs. temp.		6.21	5.61
Gross heating capacity -7°C/73% HR outside temperature - Return air at 20°C DB (**)	kW	74.2	86.3
Recovery capacity with -7°C/73% HR outside temperature - Return air at 20°C DB (**)	kW	153.0	183.0
Recovery efficiency with -7°C/73% HR outside temperature - Return air at 20°C DB (**)	%	75	71
Net total heating capacity -7°C/73% HR outside temperature - Return air at 20°C DB (**) (****)	kW	227.17	269.33
Net COP (Coefficient of performance in heating mode) with -7°C outs. temp.		10.16	9.37
Specifications for 25°C / 20°C heating mode supply air conditions			
Net total cooling capacity with 35°C/40% HR outside temp. - Return air at 27°C / 47% HR (****)	kW	64.23	78.78
Net EER (Coefficient of performance in cooling mode)		4.37	3.61
Net total heating capacity +7°C/87% HR outside temperature - Return air at 20°C DB (**) (****)	kW	89.77	113.22
Net COP (Coefficient of performance in heating mode) with +7°C outs. temp.		6.67	5.45
Net total heating capacity -7°C/73% HR outside temperature - Return air at 20°C DB (**) (****)	kW	202.77	255.22
Net COP (Coefficient of performance in heating mode) with -7°C outs. temp.		11.45	9.77
Number of independent refrigerant circuits		2	2
Power stage		15 to 100%	15 to 100%
Electrical connection			
Installed total electrical power (****)	kW	65.72	68.12
Rated / Starting current	A	106.71/221.30	111.81/255.30
Supply air fan			
Number of supply air fan / motor		3/3	3/3
250 Pa absorbed electrical / installed mechanical power	kW	6.9/16.1	10.1/16.1
450 Pa absorbed electrical / installed mechanical power	kW	8.6/16.1	12.0/16.1
2002/91/EC - Ventilation average capacity per 250 Pa unit	W/ (m ³ /h)	0.35	0.41
2002/91/EC - Ventilation average capacity per 450 Pa unit	W/ (m ³ /h)	0.43	0.48
2002/91/EC - Fans total regulatory capacity	W/ (m ³ /h)	4.72	6.11
250 Pa "Central air savings"			
2002/91/EC - Fans total regulatory capacity	W/ (m ³ /h)	8.26	10.45
450 Pa "Central air savings"			
Return air fan			
Number of return air fan / motor		3/3	3/3
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
General			
Average sound pressure at 10 m, reference 2x10 ⁻⁵ in free field (connected units ducts)	dB(A)	49.4	53.6
Filters efficiency (supply air)		G4+F7	G4+F7
Filters efficiency (exhaust air)		G4	G4
Maximum outside operating temperature in cooling mode	°C	40.0	40.0
Minimum outside operating temperature in cooling mode	°C	15.0	15.0
Minimum outside operating temperature in heating mode	°C	-15.0	-15.0
Minimum inside coil inlet temperature in heating mode	°C	10.0	10.0
Unit block weight without any option (*)	kg	2634	2635

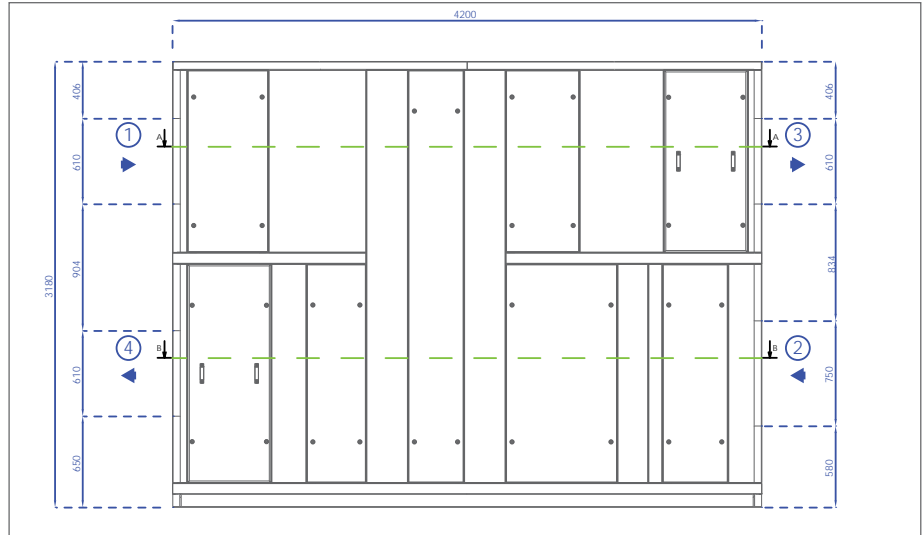
400V - 50 Hz + earth without neutral 3-phase power supply (*) Please consult "Auxiliaries" for hot water coils and electric heaters weight. Please consult "Installation accessories" for accessories weight. (**) Instantaneous heating capacity (out of defrosting mode) (****) Out of electrical resistances (*****) Net total capacity = Net cooling or heating capacity + Recovery Capacity

Nota: Calculations made from air with atmospheric pressure properties, at sea level.

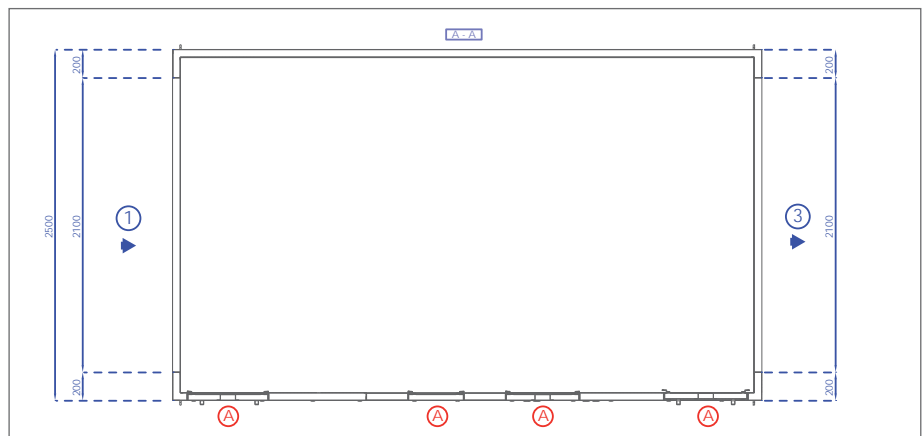
Dimensions and connections

Type 260 - 285

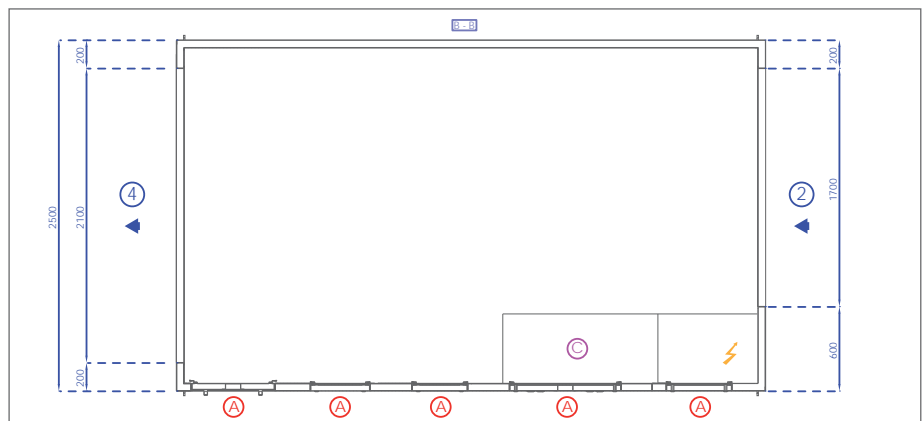
Front view



Top view:
Fresh / Supply air



Top view:
Return / Exhaust Air



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

	Length	Width	Height
Casing dimensions	4200	2500	3180
Transport overall dimensions	4200	2570	3180

Nota: A 200 mm minimum support is necessary below the unit for condensates siphons connection.

Technical features

Type 2-235 - 2-295

Specifications		2-235	2-295
Rated air flow rate for 250 Pa	m ³ /h	30000	35000
Mini / Maxi air flow rate	m ³ /h	24000/32000	30000/35000
Gross cooling capacity with 35°C/40% HR outside temperature - Return air at 27°C / 47% HR	kW	135.1	164.1
Recovery capacity with 35°C/40% HR outside temperature - Return air at 27°C / 47% HR	kW	59.0	66.0
Recovery efficiency with 35°C/40% HR outside temperature - Return air at 27°C / 47% HR	%	73	70
Net total cooling capacity with 35°C/40% HR outside temp. - Return air at 27°C / 47% HR (****)	kW	194.11	230.13
Net EER (Coefficient of performance in cooling mode)		4.04	3.62
Gross heating capacity +7°C/87% HR outside temperature - Return air at 20°C DB (**)	kW	134.0	162.1
Recovery capacity with +7°C/87% HR outside temperature - Return air at 20°C DB (**)	kW	94.0	105.0
Recovery efficiency with +7°C/87% HR outside temperature - Return air at 20°C DB (**)	%	72	69
Net total heating capacity +7°C/87% HR outside temperature - Return air at 20°C DB (**) (****)	kW	227.95	267.06
Net COP (Coefficient of performance in heating mode) with +7°C outs. temp.		5.91	5.41
Gross heating capacity -7°C/73% HR outside temperature - Return air at 20°C DB (**)	kW	112.4	138.8
Recovery capacity with -7°C/73% HR outside temperature - Return air at 20°C DB (**)	kW	223.0	252.0
Recovery efficiency with -7°C/73% HR outside temperature - Return air at 20°C DB (**)	%	72	69
Net total heating capacity -7°C/73% HR outside temperature - Return air at 20°C DB (**) (****)	kW	335.40	390.76
Net COP (Coefficient of performance in heating mode) with -7°C outs. temp.		9.55	8.74
Specifications for 25°C / 20°C heating mode supply air conditions			
Net total cooling capacity with 35°C/40% HR outside temp. - Return air at 27°C / 47% HR (****)	kW	96.54	110.34
Net EER (Coefficient of performance in cooling mode)		3.96	3.48
Net total heating capacity +7°C/87% HR outside temperature - Return air at 20°C DB (**) (****)	kW	135.46	158.66
Net COP (Coefficient of performance in heating mode) with +7°C outs. temp.		6.05	5.35
Net total heating capacity -7°C/73% HR outside temperature - Return air at 20°C DB (**) (****)	kW	304.46	357.66
Net COP (Coefficient of performance in heating mode) with -7°C outs. temp.		10.07	9.47
Number of independent refrigerant circuits		2	2
Power stage		15 to 100%	15 to 100%
Electrical connection			
Installed total electrical power (****)	kW	92.56	97.66
Rated / Starting current	A	146.96/335.50	155.06/382.50
Supply air fan			
Number of supply air fan / motor		4/4	4/4
250 Pa absorbed electrical / installed mechanical power	kW	11.0/21.5	13.2/21.5
450 Pa absorbed electrical / installed mechanical power	kW	13.4/21.5	17.0/21.5
2002/91/EC - Ventilation average capacity per 250 Pa unit	W/ (m ³ /h)	0.37	0.38
2002/91/EC - Ventilation average capacity per 450 Pa unit	W/ (m ³ /h)	0.45	0.48
2002/91/EC - Fans total regulatory capacity 250 Pa "Central air savings"	W/ (m ³ /h)	7.14	8.29
2002/91/EC - Fans total regulatory capacity 450 Pa "Central air savings"	W/ (m ³ /h)	12.32	14.75
Return air fan			
Number of return air fan / motor		4/4	4/4
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
General			
Average sound pressure at 10 m, reference 2x10 ⁻⁵ in free field (connected units ducts)	dB(A)	52.7	56.1
Filters efficiency (supply air)		G4+F7	G4+F7
Filters efficiency (exhaust air)		G4	G4
Maximum outside operating temperature in cooling mode	°C	40.0	40.0
Minimum outside operating temperature in cooling mode	°C	15.0	15.0
Minimum outside operating temperature in heating mode	°C	-15.0	-15.0
Minimum inside coil inlet temperature in heating mode	°C	10.0	10.0
Unit block weight without any option (*)	kg	3314	3350

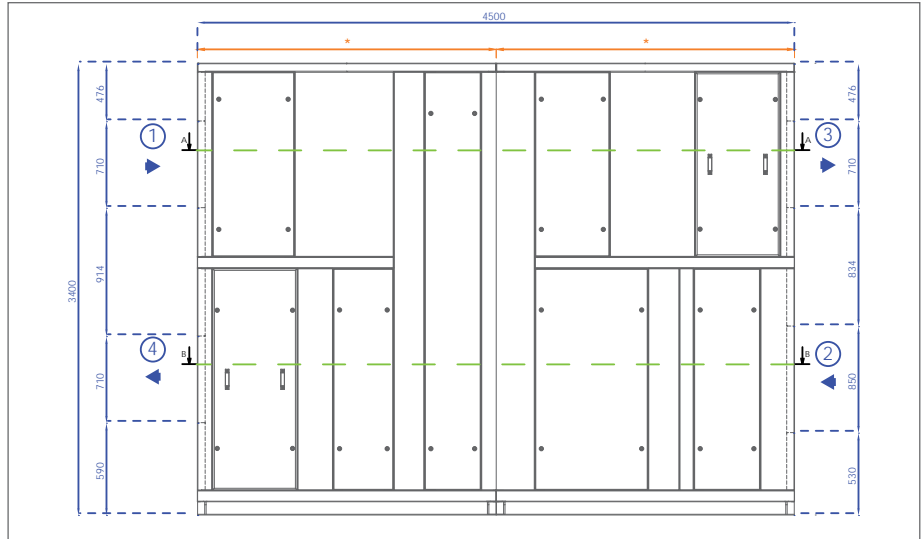
400V - 50 Hz + earth without neutral 3-phase power supply (*) Please consult "Auxiliaries" for hot water coils and electric heaters weight. Please consult "Installation accessories" for accessories weight. (**) Instantaneous heating capacity (out of defrosting mode) (****) Out of electrical resistances (*****) Net total capacity = Net cooling or heating capacity + Recovery Capacity

Nota: Calculations made from air with atmospheric pressure properties, at sea level.

Dimensions and connections

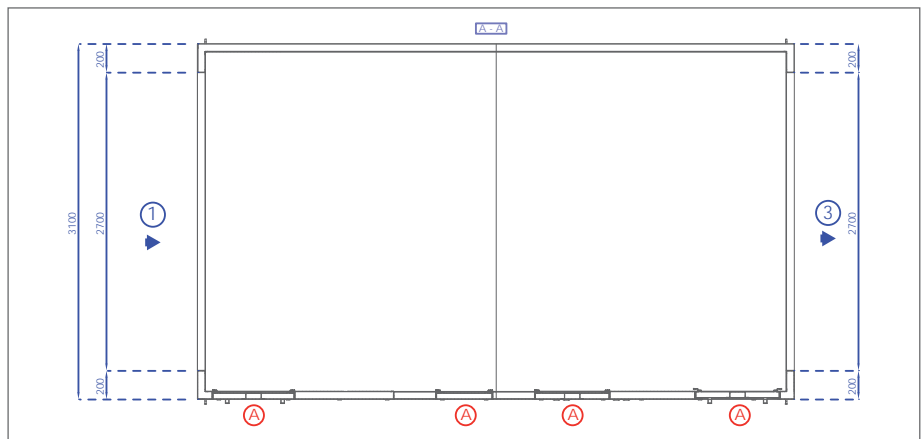
Type 2-235 - 2-295

Front view

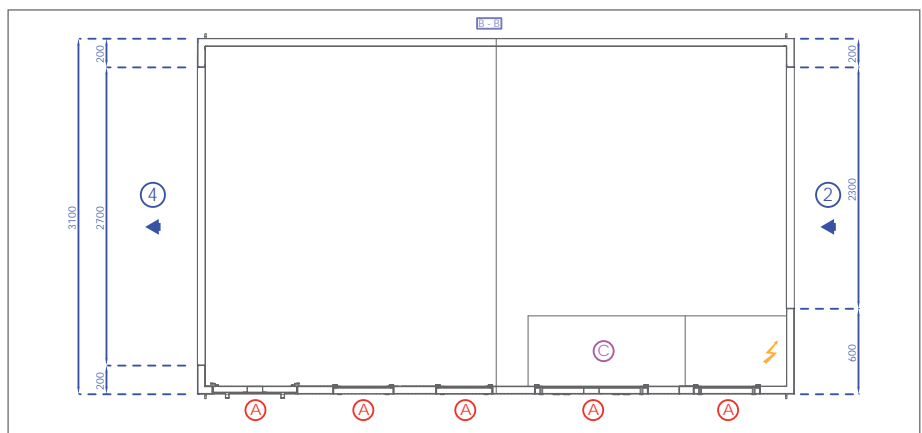


* Blocks dimensions to be confirmed by the factory

Top view:
Fresh / Supply air



Top view:
Return / Exhaust Air



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

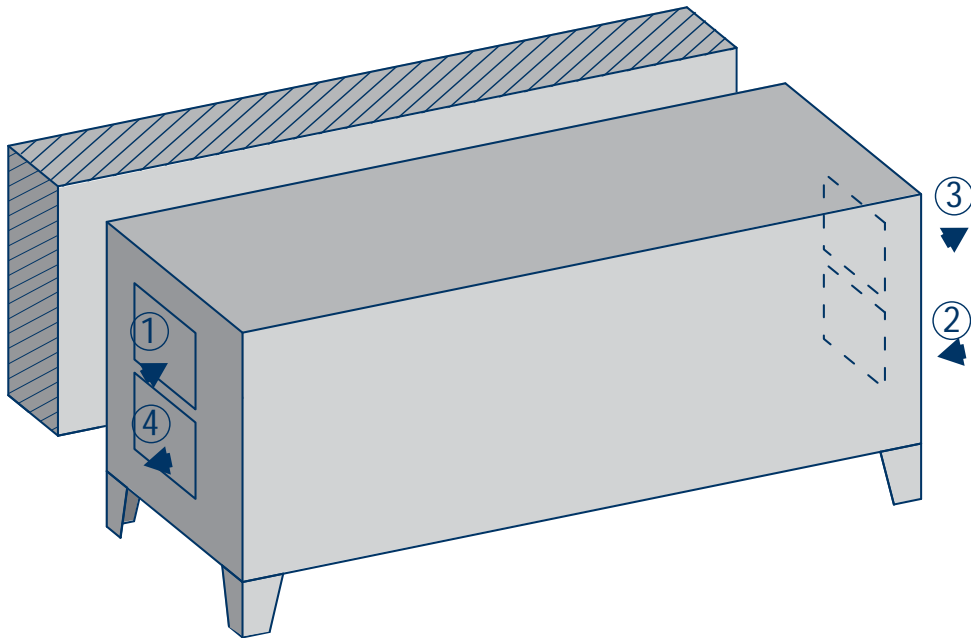
	Length	Width	Height
Casing dimensions	4500	3100	3400
Transport overall dimensions	4500	3170	3400

Nota: A 200 mm minimum support is necessary below the unit for condensates siphons connection.

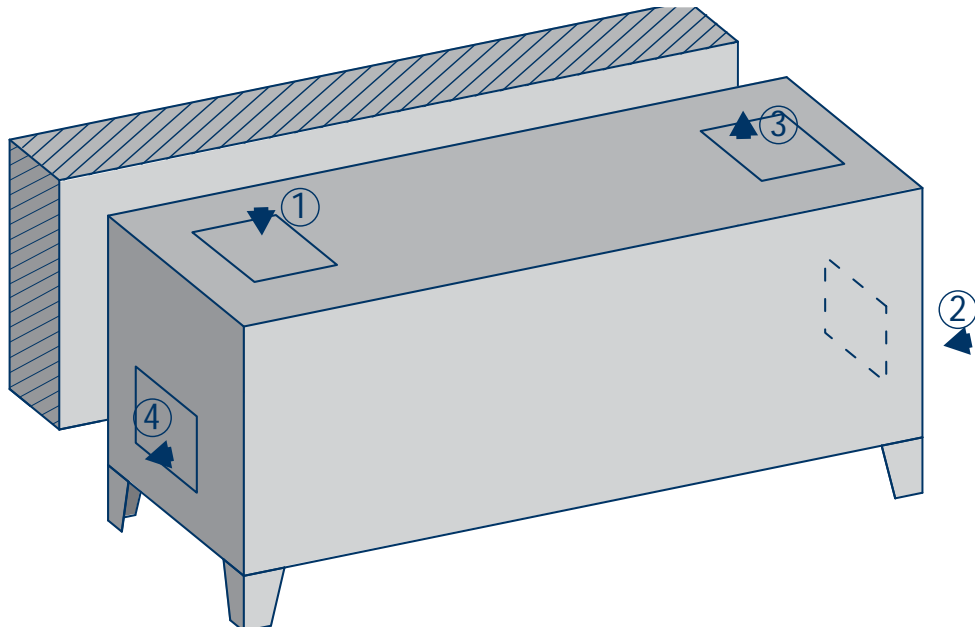
Arrangements

Standard unit

A arrangement



B arrangement

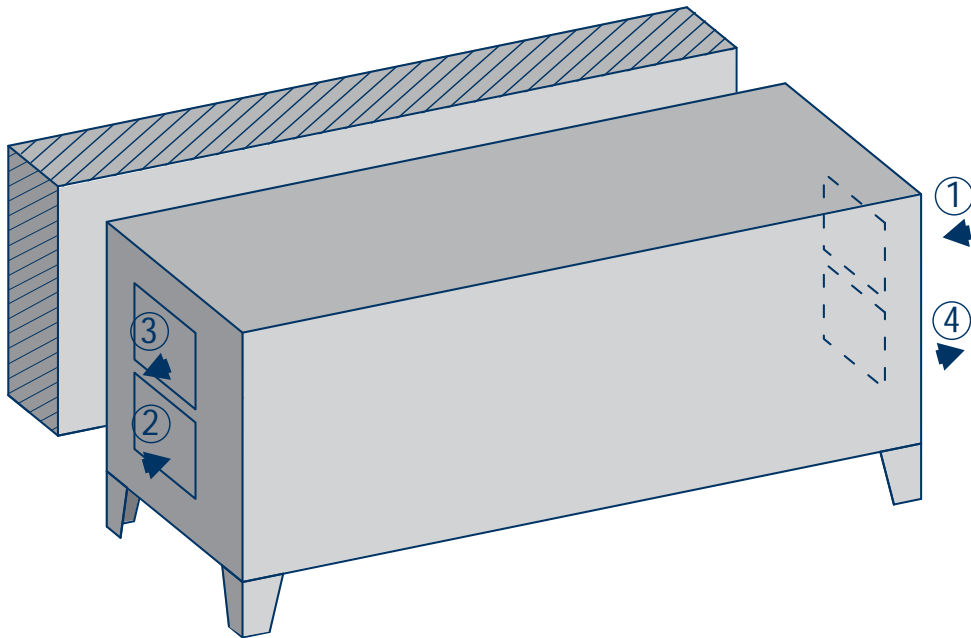


① Fresh air ② Return air ③ Supply air ④ Exhaust air

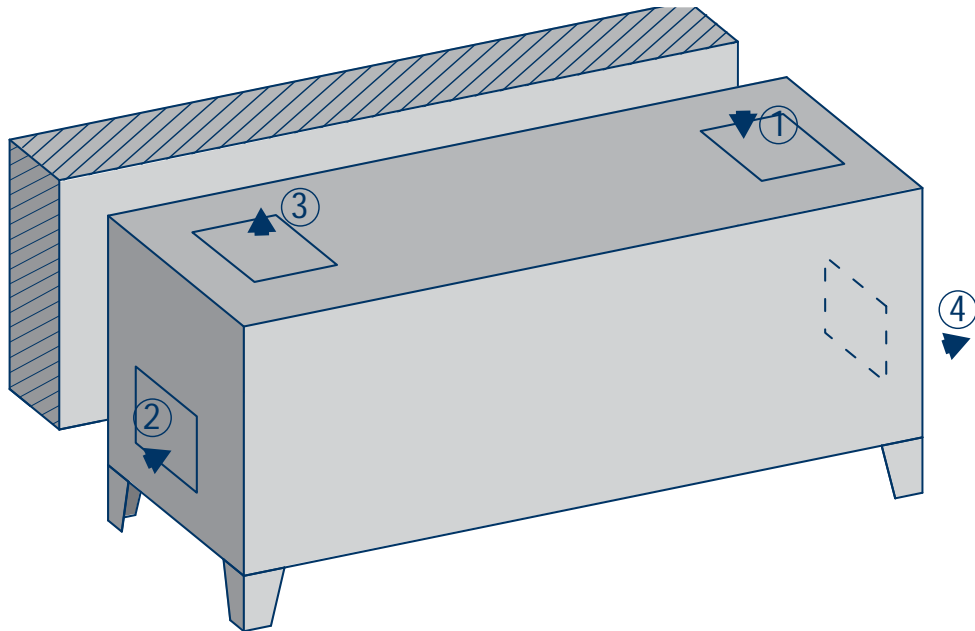
Arrangements

Symmetric unit (optional)

A arrangement



B arrangement



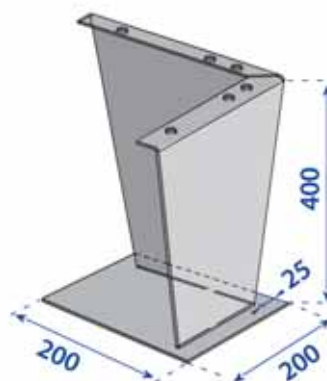
① Fresh air ② Return air ③ Supply air ④ Exhaust air

Installation accessories/Auxiliary

Laying on feet/Electric heaters

Feet

AG3 Fixed feet
Unit weight: 1kg
Feet available with 200 or 400 mm height



	103	104	203	204	207	208	210	225	260	285	2-235	2-295
Nr. of feet	4	4	4	4	4	4	4	4	4	4	4	4

Available powers (in kW)

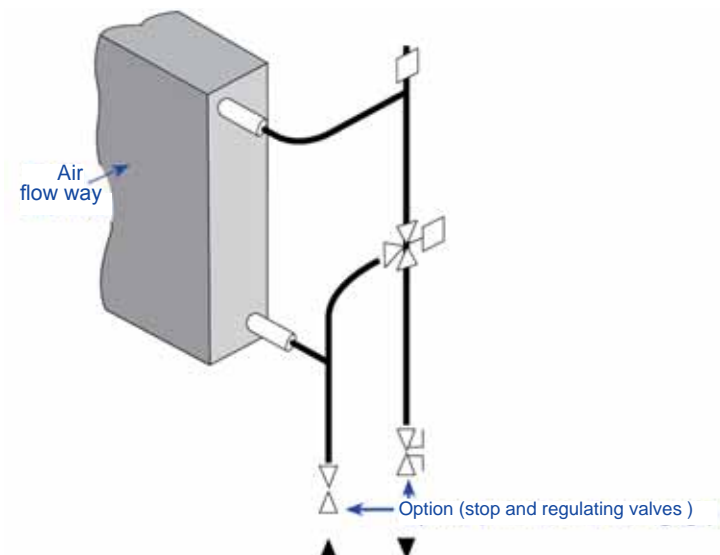
Total power (kW)	Intensity (A)	1 st stage	2 nd stage	103	104	203	204	207	208	210	225	260	285	2-235	2-295	Weight (Kg)
9	13	3	6	•	•	•	•									9.6
12	17.3	3	9	•	•	•	•									13.3
15	21.7	6	9	•	•	•	•	•	•							19.9
18	26	6	12	•	•	•	•	•	•							24.3
21	30.3	6	15			•	•	•	•	•	•					29.1
24	34.6	9	15					•	•	•	•					32.7
27	39	9	18					•	•	•	•					37.2
30	43.3	12	18							•	•					41.7
33	47.6	12	21							•	•	•	•			44.1
36	52	15	21									•	•			48.9
39	56.3	15	24									•	•			53.7
42	60.6	18	24									•	•			58.2
45	65	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: it is possible to add a coil in supply air duct or fresh air inlet for higher performances. Please consult us.

Auxiliary

Hot water coils

Principle



Connection and weight

	103	104	203	204	207	208	210	225	260	285	2-235	2-295
Customer connection diameter (mm)	20x27	20x27	33x42	33x42	40x49	40x49	50X60	50X60	50X60	50X60	66x76	66x76
Coil+ 3WV water weight (kg)	17	17	35	35	53	53	80	80	111	111	215	215

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

		103	104	203	204	207	208	210	225	260	285	2-235	2-295
90/70 °C water supply	Maxi power (kW)	21	26.9	41.8	48	80.1	95.5	122	137	196	224	300	329
	Maxi flow rate (m³/h)	0.93	1.19	1.84	2.11	3.53	4.21	5.40	6.02	8.65	9.88	13.22	14.50
	3-way valve + coil pressure drop (wcm)	0.89	1.36	0.70	0.94	2.28	3.36	0.90	1.11	2.25	2.84	3.40	3.66
80/60 °C water supply	Maxi power (kW)	17	21.7	34	39	65.6	78.1	99.3	111	160	182	245	269
	Maxi flow rate (m³/h)	0.75	0.95	1.49	1.71	2.87	3.42	4.35	4.85	7.00	7.99	10.74	11.78
	3-way valve + coil pressure drop (wcm)	0.56	0.85	0.47	0.61	1.50	2.16	0.60	0.73	1.48	1.93	2.19	2.47

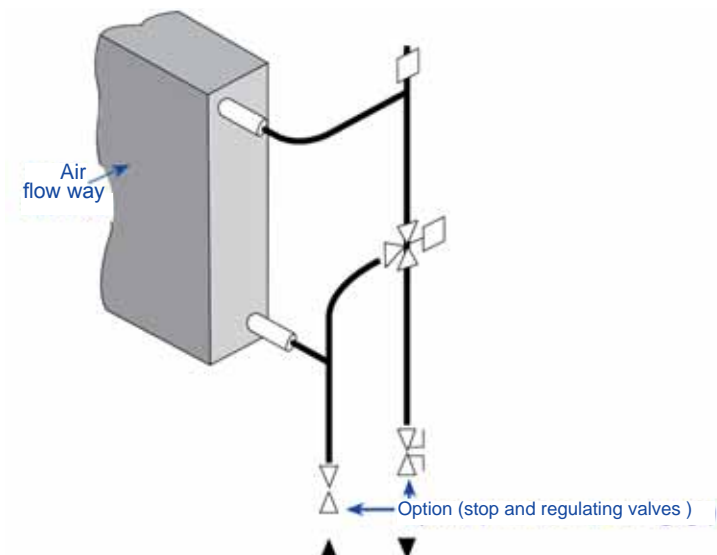
Optional: stop valve on outlet and regulating thermostatic circulation valve on inlet

		103	104	203	204	207	208	210	225	260	285	2-235	2-295
Water supply 90/70 °C	Stop and TC valves pressure drop 3 rounds opening (wcm)	0.67	1.04	0.47	0.9	0.7	1.49	0.72	0.87	1.75	2.25	0.8	0.56
Water supply 80/60 °C	Stop and TC valves pressure drop 3 rounds opening (wcm)	0.47	0.7	0.34	0.42	0.63	0.85	0.51	0.6	1.18	1.5	0.35	0.41

Auxiliary

Chilled water coils

Principle



Connection and weight

	103	104	203	204	207	208	210	225	260	285	2-235	2-295
Customer connection diameter (mm)	33x42	33x42	40x49	40x49	50X60	50X60	50X60	50X60	66x76	66x76	80x89	80x89
Coil+ 3WV water weight (kg)	33	33	54	54	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 temperature.

		103	104	203	204	207	208	210	225	260	285	2-235	2-295
07/12 °C water supply	Maxi power (kW)	9.32	13.6	16.7	19.7	34.7	45	57.1	65.1	83.2	101	134	146
	Maxi flow rate (m ³ /h)	1.6	2.34	2.87	3.39	5.96	7.73	9.82	11.19	14.29	17.29	23.11	25.18
	3-way valve + coil pressure drop (wcm)	1.89	3.77	0.708	1.007	2.32	3.94	4.13	5.54	3.43	5.32	5.11	6.29

Optional: stop valve on outlet and regulating thermostatic circulation valve on inlet

		103	104	203	204	207	208	210	225	260	285	2-235	2-295
Water supply 07/12 °C	Stop and TC valves pressure drop 3 rounds opening (wcm)	0.39	0.72	0.63	0.84	0.88	1.42	2.22	2.86	0.55	0.76	0.96	1.1

Sound level*

Fresh and supply air fan Frequency band spectrum

In the fresh air section

FREQUENCY BAND Hz ►	63	125	250	500	1000	2000	4000	8000	General level Lw (dB(A))
Supply air flow rate (m ³ /h) ▼									
2000	35.4	43.8	54.1	57.7	57.6	58.9	53.2	45.2	63.9
3000	36.3	42.4	49.4	59.6	60.4	61.4	53.9	52.6	65.9
4000	43.1	48.5	66	56.3	58.6	60.3	50.6	45.8	68.1
5000	39.6	44.8	62.5	55.6	58.6	60.4	51.1	46.2	66.2
7500	37.9	45.3	66	58	62.1	62.9	57.7	52.4	69.5
10000	42.8	48	65.6	58.7	61.7	63.5	54.2	49.4	69.3
12500	37.9	45.8	65.4	58.6	62.4	63.8	56.6	50.4	69.5
15000	40.1	48.4	69	61.4	65.4	66.2	60.6	54.8	72.7
20000	39.8	48.2	68.4	61.3	65.1	66.3	59.8	53.7	72.3
25000	45.2	52.4	73	65	69.2	69.9	64.8	59.6	76.5
30000	43.3	51.3	72	64.3	68.3	69.1	63.6	57.9	75.6
35000	48.2	54.7	75.3	66.9	71.3	71.9	67.1	62.6	78.8

Data for 250 Pa available in supply and exhaust air section - *Lw: Acoustic power (dB(A))

In the supply air section

FREQUENCY BAND Hz ►	63	125	250	500	1000	2000	4000	8000	General level Lw (dB(A))
Supply air flow rate (m ³ /h) ▼									
2000	50	53.4	66.4	77.7	81.8	81.6	79.6	72.7	86.7
3000	51.7	54.1	63.6	81.3	84.8	84.5	82.3	78.2	89.8
4000	53	60.1	77.8	79.9	85.2	80.7	76.3	71	88.2
5000	50.9	56.8	74.1	79.3	85.1	81	77	71.5	88
7500	51.1	55.2	74.1	82	88.2	84	82.8	77.4	91.3
10000	54	60	77.3	82.5	88.3	84.1	80	74.6	91.1
12500	51.7	56.9	75.8	82.3	88.7	84.7	82	75.9	91.6
15000	54.2	58.6	78	85.2	91.6	87.4	85.7	80	94.6
20000	54.1	59	78.4	85	91.4	87.3	85	79.1	94.3
25000	58.2	62.2	81.1	89.1	95.3	91	89.9	84.6	98.3
30000	57.2	61.5	80.8	88.2	94.5	90.3	88.7	83.1	97.5
35000	60.4	64.1	82.6	91.2	97.3	93	92.3	87.3	100.5

Data for 250 Pa available in supply and exhaust air section - *Lw: Acoustic power (dB(A))

Sound level*

Return and exhaust air fan Frequency band spectrum

In the return air section

FREQUENCY BAND Hz ►	63	125	250	500	1000	2000	4000	8000	General level Lw (dB(A))
Supply air flow rate (m ³ /h) ▼									
2000	35	42.2	54.7	61.3	62.1	65.3	62.5	54.9	69.4
3000	36.9	43.5	52	64.6	66.3	68.5	63.7	61.2	72.6
4000	40.2	44.7	63.9	58.8	61.7	65.2	58.1	53.9	69.5
5000	39.1	44.8	64.4	60.1	63.7	67.4	60.8	55.4	71.2
7500	40.8	47.1	69.4	63.4	68.1	70.5	68.3	63.8	75.8
10000	41.9	47.7	67.2	63	66.6	70.3	63.7	58.2	74.1
12500	39	47.2	68.8	64.3	68.4	71.4	67.1	60.9	75.7
15000	42.9	50.1	72.5	66.8	71.3	73.8	71.2	65.9	78.9
20000	40.9	49.4	71.8	66.7	70.9	73.6	70.3	64.3	78.3
25000	47.9	54.2	76.5	70.4	75.2	77.6	75.4	70.9	82.8
30000	46	53.1	75.5	69.7	74.3	76.8	74.2	69	81.9
35000	50.6	56.5	78.4	72.4	77.3	79.6	78	73.7	85.1

Data for 250 Pa available in supply and exhaust air section - *Lw: Acoustic power (dB(A))

In the exhaust air section

FREQUENCY BAND Hz ►	63	125	250	500	1000	2000	4000	8000	General level Lw (dB(A))
Supply air flow rate (m ³ /h) ▼									
2000	48.3	50.1	60.7	72.8	79.8	79.7	77.5	70.5	84.4
3000	51.1	53.1	60	77.9	84.2	83.3	80.8	75.5	88.4
4000	49.3	54.6	69.5	73.9	81.7	77.4	72.7	67.3	84.2
5000	49.4	54.4	69.7	75.3	83.6	79.6	75.3	69	86.1
7500	51.4	54.3	70.4	79.1	87.5	83.2	82.2	76.7	90.3
10000	52.3	57.3	72.5	78.2	86.5	82.5	78.2	71.9	89
12500	51.7	55.9	72.7	79.4	88	84	81.1	74.6	90.6
15000	54.5	58.3	74.3	82.3	90.8	86.6	85	79.2	93.5
20000	53.9	57.6	74.8	81.8	90.5	86.3	84.1	77.9	93.1
25000	58.5	61.3	77.5	86.2	94.6	90.3	89.3	83.8	97.4
30000	57.5	60.6	77.2	85.3	93.8	89.5	88	82.2	96.5
35000	60.7	63.4	79.4	88.3	96.7	92.4	91.8	86.5	99.6

Data for 250 Pa available in supply and exhaust air section - *Lw: Acoustic power (dB(A))

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