

Comfort and energy savings

0.1.1.4.1

FR CH RE // **HPE+** RL
Double flow heat pump
High Performance of Energy range

 *A different climate*
Environmental control solutions

2013 edition

Double Flow

Heatpump & Rooftop

High Performance of Energy range



Tailor-made for ventilation, heating and air conditioning of buildings with variable occupancy such as cinemas, theatres, community centres, etc. Those units have different equipments for a **rational use of energy**.

CH RE // HPE+ RL: Reversible double flow heat pump and air conditioner

FR RE // HPE+ RL: Non reversible double flow air conditioner

Summary

FR CH RE // HPE+ RL

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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 Directive - Electromagnetic compatibility
- 2009/142/EC Directive
- EN 1886 - Air treatment box mechanical performances
- EN 60204-1 - Electrical appliances



Principle of operation

The unit works as a reversible heat pump:

- > Source : Outside air + Internal air (in recovery mode)
- > Treated fluid: Internal air + Hygienic air

In those cases, the unit can operate:

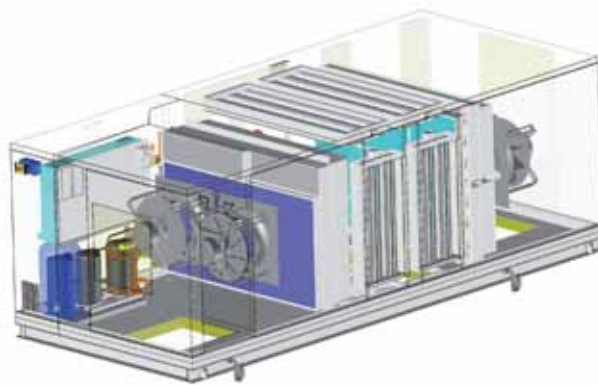
- > In all recycling mode
- > In all fresh air / all exhaust air
- > In mixing mode
Air extraction and fresh air modulation without indoor pressure change.

Operating modes can be:

- > Heat pump
- > Air conditioner
- > Free cooling: cooling with external air, without thermodynamics

The ETT package comprises 3 different sections:

- 1/ a separated technical section including refrigerant components, electric board and regulating elements;
- 2/ an internal section for air change and handling;
- 3/ an exhaust air section for exhaust air calories removal and/or recovery (according to the mode).



Aluminium frame and casing packaged unit made of:

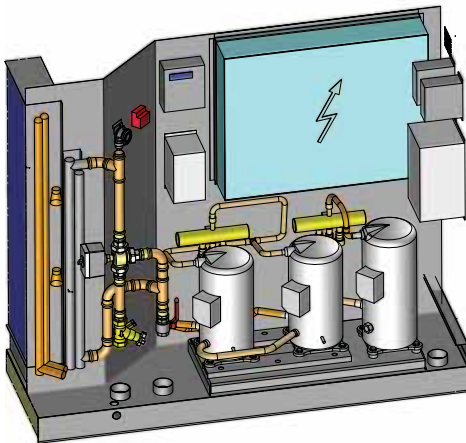
- a **rigid, compact, lightweight and weather-resistant casing** that includes a 20-year corrosion-resistant warranty on frame & casing;
- a **watertight floor** with drainage outlets located at the border of the unit and linked to rubber siphons;
- **vertical AG3-type aluminium panels and roof**;
- **access is made through large "easy to remove" 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/A1 glass wool, 50 mm thickness, protected by a 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, 100 mm thickness;
- **4-damper mixing box** with motorized fresh air damper with bird proof grid, additional fresh air damper with bird proof grid, return air damper and exhaust air damper ensuring the proportions wanted and optimizing "free cooling" economizer phases. Dampers have class 3 extruded aluminium blades with low pressure drop. The damper frame is in aluminium.

Description

■ Air section made of:

- **2 sets (supply and exhaust air) of easy-to-remove green-designed filters** - 98 mm, folded, 95% ASHRAE gravimetric (G4) efficiency, fouling controlled by pressure-switch;
- **The free wheeling supply and exhaust air fans** have electronic switching motors. This technology permits avoiding losses due to pulley-belt transmissions;
- **the supply air motor has an inverter drive** 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;
- **the exhaust air motor** has a frequency inverter to optimize the defrosting;
- **supply and exhaust air fans** respect EuP 2013 / ErP 2015 directives.

■ 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 internal exchanger**, made with copper pipes and aluminium fins and frame, associated with a thermostatic expansion valve in heat pump mode. Those nested exchangers (except for series 1) permit rise of COP and EER in partial load. Moreover, the VDP (Flow rate / Capacity variation) technology permits changing the air flow rate according to the capacity required leading to high ventilation consumption reduction;
- **direct expansion external exchanger**, made with copper pipes and aluminium fins and frame, associated with a thermostatic expansion valve in heat pump mode;
- **tandem circuit**, operation in part load permits reducing markedly the number of defrostings and their duration;
- **two external pressure balanced thermostatic expansion valves** per circuit, essential to optimize each evaporator refrigerant cycle efficiency and so, to limit energy consumption;
- **anti-acid filter drier**;
- **HP and LP switches**;
- **switchover valve**.

■ Additional and compulsory heating equipment: compulsory auxiliary (please consult pages 8-10-12-14-16).

Control Description

■ Electric section made of:

an electric board wired according to the European standards EN 15-100 and 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.

■ Control section made of:

- **one or more BEST-type controllers** (Building Energy Saving Technology) especially developed by ETT for this range of units. Programs update is done once a year in order to add functions requested in some applications and to optimize units electrical consumptions. 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** (cooling and heating) according to the 2002/91/EC European directive;
- **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, stop of the concerned exchanger ventilation, coil drying and starting of a new heating cycle in heat pump mode. The defrosting efficiency is guaranteed as well with a dynamic system with motorized dampers in front of the external coils (except for series 1). Concerning multi-circuits units, comfort and energy savings are ensured with the banning of simultaneous defrostings;
- **"free-cooling" economizer management** by analysing internal temperature and comparing return and outside air temperatures;
- **management of the compressors stages** by giving an advantage to the highest COP and EER in part load;
- **out-of-frost restart**;
- **auxiliaries management** (Possibility of banning according to outside temperature);
- **night energy consumption management** with limitation of compressors use;
- **written faults history** (no code needed) displaying hour and outside temperature;
- unit, compressors and auxiliaries **operating hours counting**;
- **air quality control** by CO₂ sensor to optimize fresh air quantities to introduce, and then, to limit energy consumptions.

Options

Frame - Casing

- > Motorized external damper for supply air (Directive 2006/42/EC)
- > Unit painting
- > Cowl in the shape of a whistle for fresh air on the top
- > 2-block delivery

Acoustic

- > Technical section acoustic insulation using flexible polyurethane foam made of fire-proof polyester
- > Fresh air cowl sound insulation
- > Compressors insulation jackets

Air

- > Magnehelic dial pressure gauge per filtration stage
- > Analog air flow switch (CDA), air flow indication and measurement
- > Filters fouling analog control (CAEF)
- > Backed-up smoke detector
- > Epoxy coating for fans & Vinyl coating for exchangers
- > Supply air fan available pressure 600 Pa maxi
- > Exhaust air fan available pressure 400 Pa maxi
- > Operation in all recycling or all fresh air mode (out of Public Buildings)
- > G4 refillable filters
- > Spare G4 filters, 98 mm thickness
- > F6 to F9 opacimetric filters, 98 mm thickness

Heating

- > HP and LP pressure gauges
- > Electronic expansion valves

Thermal exchangers

- > 3-stage electric heater
- > Triac
- > 2-row hot water coil with analog freezestat
- > Vinyl coating on hot water coil
- > Hot water progressive 3-way valve mounted with analog freezestat
- > Mounted stop valve + thermostatic circulation valve on inlet

Electrical

- > Unit global energy counting

Control

- > Banning of free cooling using water weight comparison
- > Hygrometry probe (for external humidifier control)

Laying

- > Adjustable aluminium ventilated roof curb
- > Adjustable aluminium connection roof curb
- > 200 or 400 mm aluminium feet

Energy Recovery

- > SRF: exchanger for DHW using subcooling with a 15-28°C capacity (please consult us for performances) (except for CH 09-19 units)
- > Desuperheater: additional air to refrigerant exchanger to partially dehumidify supply air

Technical features

Type 09 - 19

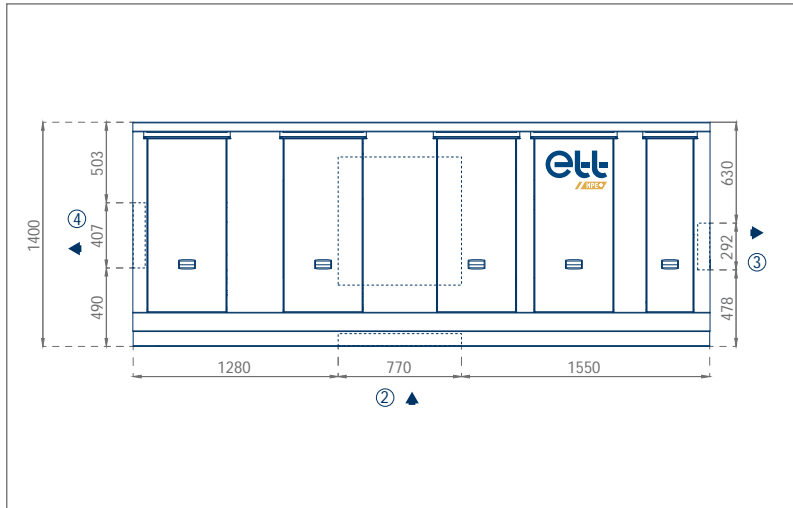
Specifications		09	19
Rated supply air flow rate for 400 Pa	m ³ / h	3000	5000
Mini / Maxi supply air flow rate	m ³ / h	2500/4500	4000/6000
Rated exhaust air flow rate		4000	6500
Gross rated cooling capacity with 35°C outside temperature 27°C return air and 47% HR - 40% fresh air	kW	15.2	22.2
Net rated cooling capacity with 35°C outside temperature 27°C return air and 47% HR - 40% fresh air	kW	14.3	20.7
Net EER (Coefficient of performance in cooling mode) with 35°C outs. temp.		2.75	2.84
Gross rated thermodynamic capacity with 7°C / 87% HR outside temperature 20°C return air - 40% fresh air (**)	kW	15.4	21.9
Net rated thermodynamic capacity with 7°C / 87% HR outside temperature 20°C return air - 40% fresh air (**)	kW	16.4	23.4
Net COP (Coefficient of performance in heating mode) with +7°C outs. temp.		4.21	4.52
Gross rated thermodynamic capacity with -7°C / 73% HR outside temperature 20°C return air - 40% fresh air (**)	kW	12.3	17.4
Net rated thermodynamic capacity with -7°C / 73% HR outside temperature 20°C return air - 40% fresh air (**)	kW	13.3	18.9
Net COP (Coefficient of performance in heating mode) with -7°C outs. temp.		3.92	4.13
Number of independent refrigerant circuits		1	1
Power stages		0-52-100%	
Electrical connection			
400 Pa total installed electrical power in supply air + 200 Pa in exhaust air (***)	kW	13.4	16.0
400 Pa rated / start current in supply air + 200 Pa in exhaust air (***)	A	23/76	28/109
600 Pa total installed electrical power in supply air + 400 Pa in exhaust air (***)	kW	13.4	16.0
600 Pa rated / start current in supply air + 400 Pa in exhaust air (***)	A	23/76	28/109
Partial load			
Partial load ratio	%	50	50
Net EER in partial load (****)		3.80	3.90
Net COP in partial load (****)		4.40	4.69
Supply air fan			
Number of supply air centrifugal fan / motor		1/1	1/1
400 Pa absorbed electrical / installed mechanical power in supply air mode	kW	1.0/2.7	1.5/2.7
600 Pa absorbed electrical / installed mechanical power in supply air mode	kW	1.4/2.7	2.1/2.7
2002/91/EC - Ventilation average capacity per 400 Pa flow rate unit in supply air mode	W/ (m ³ /h)	0.32	0.30
2002/91/EC - Ventilation average capacity per 600 Pa flow rate unit in supply air mode	W/ (m ³ /h)	0.47	0.42
2002/91/EC - Fans total regulatory capacity Supply air 400 Pa + Exhaust air 200 Pa "Central air savings"	kW	1.2	1.7
2002/91/EC - Fans total regulatory capacity Supply air 600 Pa + Exhaust air 400 Pa "Central air savings"	kW	2.1	3.0
Exhaust air fan			
Number of exhaust air centrifugal fan / motor		1/1	1/1
200 Pa input / installed electric power in exhaust air mode	kW	0.7/2.7	1.4/3.1
400 Pa input / installed electric power in exhaust air mode	kW	1.2/2.7	2.1/3.1
Advised auxiliary for use in tertiary sector / offices			
Mini 3-stage electric heater heating capacity	kW	12	18
3-stage electric heater intensity	A	17	26
Heating capacity - Hot water coil with 80°/60°C capacity, air inlet at +10°C mini	kW	18	18
General			
Average sound pressure at 10 m, reference: 2x10 ⁻⁵ in free field	dB(A)	40	44
Filters efficiency		G4	
Filters dimensions & number (supply and exhaust air)	mm	(4x) 595x495x98	
Maximum outside operating temperature in cooling mode	°C	+45	+45
Minimum outside operating temperature in cooling mode	°C	+15	+15
Minimum outside operating temperature in heating mode	°C	-15	-15
Minimum inside coil inlet temperature in heating mode	°C	+10	+10
Unit weight without any option (****)	kg	759	785
Connection roof curb weight	kg	125	125
Adjustable ventilated roof curb weight	kg	175	175

** Thermodynamic instantaneous capacity (out of defrosting) - *** Out of electrical resistances - **** Consult pages 26 and 27 for electric heaters and hot water coils weight. - ***** Values in partial load calculated according to those conditions: COOLING: OutsT° 23°C - InT° 27(19)°C HEATING: OutsT° +7(6)°C - InT° 20°C

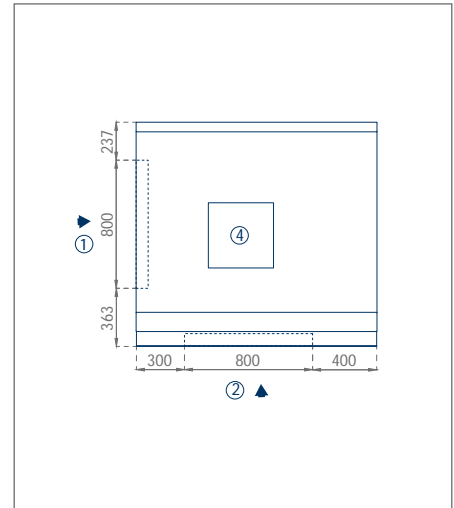
Dimensions and connections

Type 09 - 19

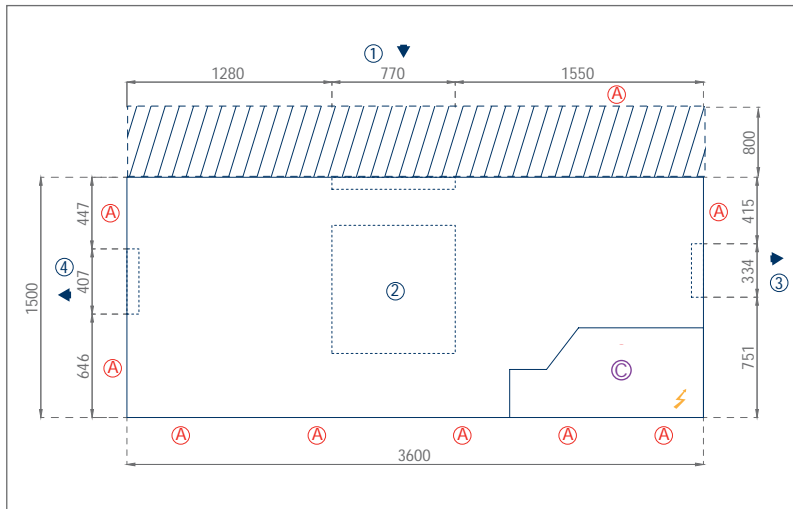
Side view



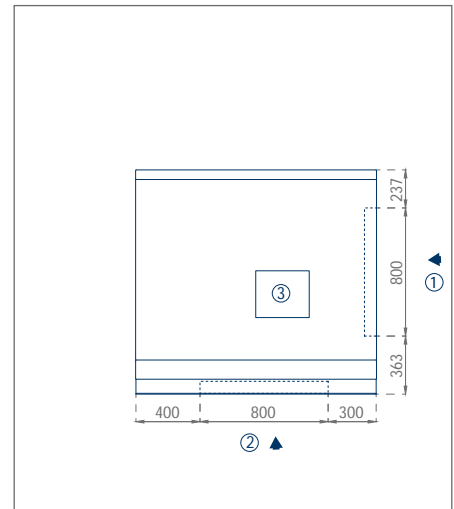
Exhaust air view



Top view



Supply air view



A1 arrangement (please consult pages 18-19 for other arrangements)

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

	Length	Width	Height
Casing dimensions	3600 mm	1500 mm	1400 mm
Transport overall dimensions	3700 mm	1550 mm	1450 mm

Note: Fresh air and exhaust air (external units) cowls laying shall be made by the installer. Optional: Feet can be supplied. Feet laying shall be made by the installer. Ducts connection (supply air, return air, fresh air and exhaust air) is done using inserts (supplied by ETT) to install ducts using 40 mm Metu frame.

Technical features

Type 29 – 39 – 49

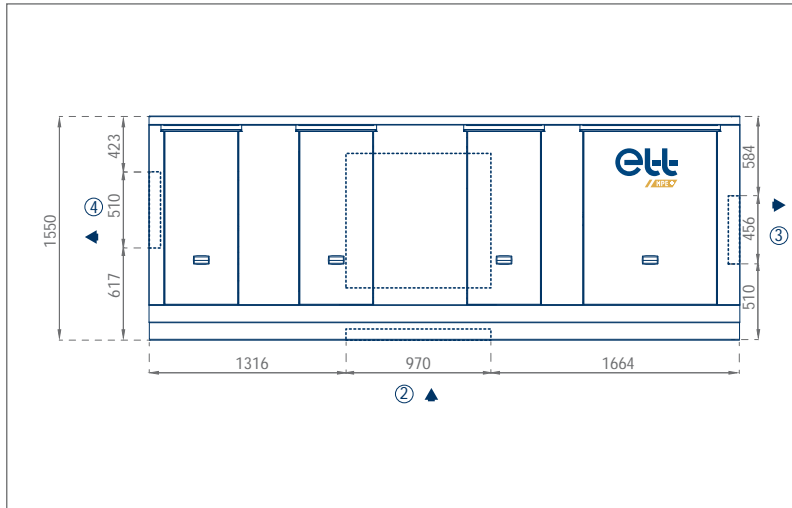
Specifications		29	39	49
Rated supply air flow rate for 400 Pa	m ³ / h	7000	7500	9000
Mini / Maxi supply air flow rate	m ³ / h	6000/8000	7000/9000	8000/11000
Rated exhaust air flow rate		9500	10000	13000
Gross rated cooling capacity with 35°C outside temperature 27°C return air and 47% HR - 40% fresh air	kW	32.2	40.1	45.6
Net rated cooling capacity with 35°C outside temperature 27°C return air and 47% HR - 40% fresh air	kW	30.2	37.9	43.2
Net EER (Coefficient of performance in cooling mode) with 35°C outs. temp.		3.11	2.72	2.80
Gross rated thermodynamic capacity with 7°C / 87% HR outside temperature 20°C return air - 40% fresh air (**)	kW	31.6	40.6	45.6
Net rated thermodynamic capacity with 7°C / 87% HR outside temperature 20°C return air - 40% fresh air (**)	kW	33.6	42.8	48.0
Net COP (Coefficient of performance in heating mode) with +7°C outs. temp.		4.59	4.44	4.24
Gross rated thermodynamic capacity with -7°C / 73% HR outside temperature 20°C return air - 40% fresh air (**)	kW	25.1	32.5	36.2
Net rated thermodynamic capacity with -7°C / 73% HR outside temperature 20°C return air - 40% fresh air (**)	kW	27.1	34.7	38.6
Net COP (Coefficient of performance in heating mode) with -7°C outs. temp.		4.29	4.37	3.93
Number of independent refrigerant circuits		1	1	1
Power stages			0-52-100%	
Electrical connection				
400 Pa total installed electrical power in supply air + 200 Pa in exhaust air (***)	kW	21.7	27.7	27.8
400 Pa rated / start current in supply air + 200 Pa in exhaust air (***)	A	37/144	46/218	47/214
600 Pa total installed electrical power in supply air + 400 Pa in exhaust air (***)	kW	21.7	27.7	27.8
600 Pa rated / start current in supply air + 400 Pa in exhaust air (***)	A	37/144	46/218	47/214
Partial load				
Partial load ratio	%	50	50	50
Net EER in partial load (****)		4.03	3.83	3.57
Net COP in partial load (****)		4.78	4.92	4.41
Supply air fan				
Number of supply air centrifugal fan / motor		1/1	1/1	1/1
400 Pa absorbed electrical / installed mechanical power in supply air mode	kW	2.0/3.1	2.2/3.1	2.4/3.1
600 Pa absorbed electrical / installed mechanical power in supply air mode	kW	2.8/3.1	2.7/3.1	3.3/3.1
2002/91/EC - Ventilation average capacity per 400 Pa flow rate unit in supply air mode	W/ (m ³ /h)	0.28	0.29	0.27
2002/91/EC - Ventilation average capacity per 600 Pa flow rate unit in supply air mode	W/ (m ³ /h)	0.39	0.35	0.36
2002/91/EC - Fans total regulatory capacity Supply air 400 Pa + Exhaust air 200 Pa "Central air savings"	kW	2.4	2.5	3.0
2002/91/EC - Fans total regulatory capacity Supply air 600 Pa + Exhaust air 400 Pa "Central air savings"	kW	3.9	3.9	5.0
Exhaust air fan				
Number of exhaust air centrifugal fan / motor		1/1	1/1	1/1
200 Pa input / installed electric power in exhaust air mode	kW	1.7/5.0	1.9/5.0	3.2/5.0
400 Pa input / installed electric power in exhaust air mode	kW	2.5/5.0	2.7/5.0	4.1/5.0
Advised auxiliary for use in tertiary sector / offices				
Mini 3-stage electric heater heating capacity	kW	24	27	27
3-stage electric heater intensity	A	35	39	39
Heating capacity - Hot water coil with 80°/60°C capacity, air inlet at +10°C mini	kW	24	27	27
General				
Average sound pressure at 10 m, reference: 2x10 ⁻⁵ in free field	dB(A)	51	52	53
Filters efficiency			G4	
Filters dimensions & number (supply and exhaust air)	mm		(8x) 595x495x98	
Maximum outside operating temperature in cooling mode	°C	+45	+45	+45
Minimum outside operating temperature in cooling mode	°C	+15	+15	+15
Minimum outside operating temperature in heating mode	°C	-15	-15	-15
Minimum inside coil inlet temperature in heating mode	°C	+10	+10	+10
Unit weight without any option (****)	kg	1181	1180	1232
Connection roof curb weight	kg	145	145	145
Adjustable ventilated roof curb weight	kg	215	215	215

** Thermodynamic instantaneous capacity (out of defrosting) - *** Out of electrical resistances - **** Consult pages 26 and 27 for electric heaters and hot water coils weight. - ***** Values in partial load calculated according to those conditions: COOLING: OutsT° 23°C - IntT° 27(19)°C HEATING: OutsT° +7(6)°C - IntT° 20°C

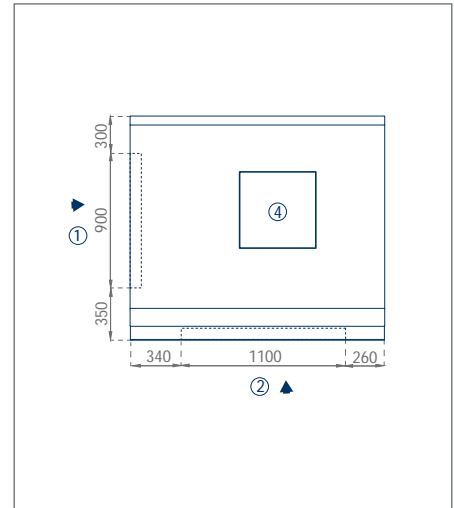
Dimensions and connections

Type 29 – 39 – 49

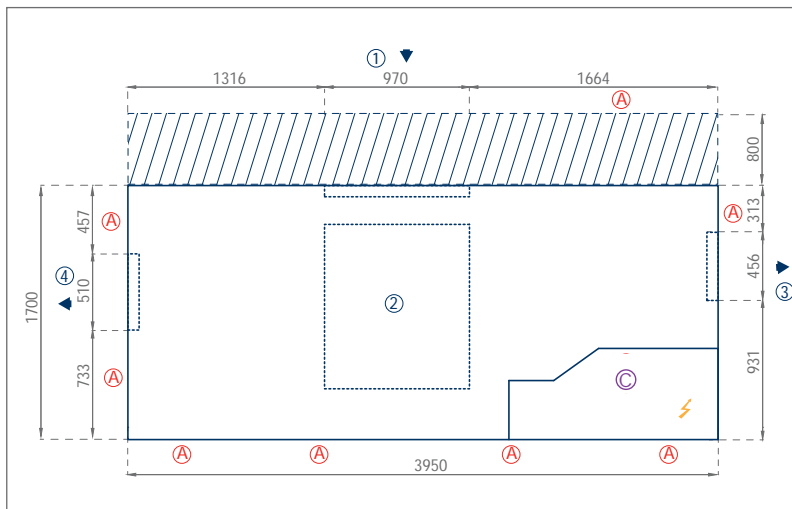
Side view



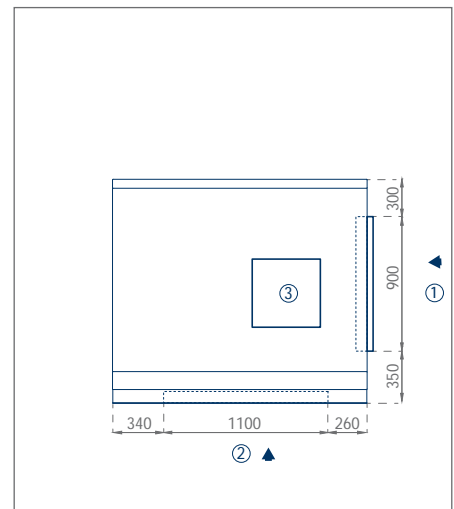
Exhaust air view



Top view



Supply air view



A1 arrangement (please consult pages 18-19 for other arrangements)

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

	Length	Width	Height
Casing dimensions	3950 mm	1700 mm	1550 mm
Transport overall dimensions	4040 mm	1750 mm	1600 mm

Note: Fresh air and exhaust air (external units) cowls laying shall be made by the installer. Optional: Feet can be supplied. Feet laying shall be made by the installer. Ducts connection (supply air, return air, fresh air and exhaust air) is done using inserts (supplied by ETT) to install ducts using 40 mm Metu frame.

Technical features

Type 59 – 69 – 79 – 99

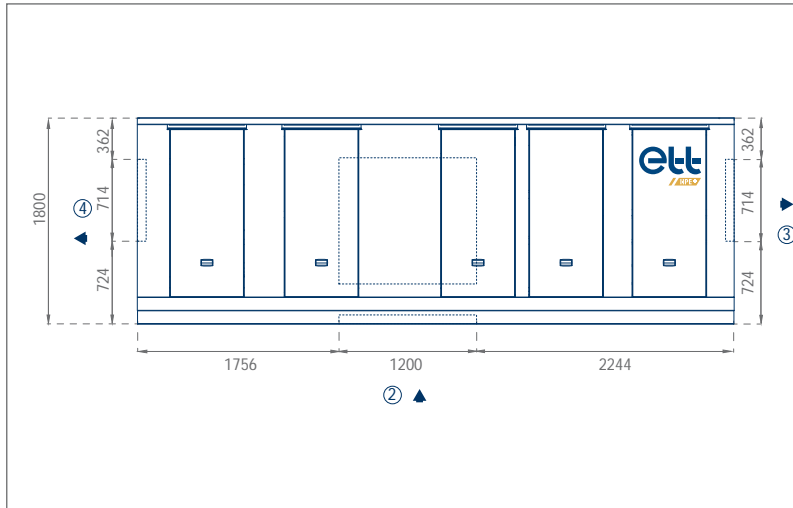
Specifications		59	69	79	99
Rated supply air flow rate for 400 Pa	m ³ / h	12000	14000	16000	20000
Mini / Maxi supply air flow rate	m ³ / h	10000/14000	12000/16000	14000/16000	18000/22000
Rated exhaust air flow rate		16000	18500	21000	26000
Gross rated cooling capacity with 35°C outside temperature 27°C return air and 47% HR - 40% fresh air	kW	56.8	64.4	80.0	94.3
Net rated cooling capacity with 35°C outside temperature 27°C return air and 47% HR - 40% fresh air	kW	53.8	60.8	75.7	88.8
Net EER (Coefficient of performance in cooling mode) with 35°C outs. temp.		3.11	3.13	2.94	2.89
Gross rated thermodynamic capacity with 7°C / 87% HR outside temperature 20°C return air - 40% fresh air (**)	kW	56.0	63.7	80.6	94.1
Net rated thermodynamic capacity with 7°C / 87% HR outside temperature 20°C return air - 40% fresh air (**)	kW	59.0	67.3	84.9	99.6
Net COP (Coefficient of performance in heating mode) with +7°C outs. temp.		4.80	4.86	4.63	4.40
Gross rated thermodynamic capacity with -7°C / 73% HR outside temperature 20°C return air - 40% fresh air (**)	kW	43.5	50.6	64.3	75.2
Net rated thermodynamic capacity with -7°C / 73% HR outside temperature 20°C return air - 40% fresh air (**)	kW	46.5	54.2	68.6	80.7
Net COP (Coefficient of performance in heating mode) with -7°C outs. temp.		4.52	4.62	4.41	4.19
Number of independent refrigerant circuits		2	2	2	2
Power stages		0-35-55-80-100%			
Electrical connection					
400 Pa total installed electrical power in supply air + 200 Pa in exhaust air (***)	kW	45.1	51.2	56.0	57.0
400 Pa rated / start current in supply air + 200 Pa in exhaust air (***)	A	74/166	84/184	91/263	94/262
600 Pa total installed electrical power in supply air + 400 Pa in exhaust air (***)	kW	45.1	51.2	56.0	57.0
600 Pa rated / start current in supply air + 400 Pa in exhaust air (***)	A	74/166	84/184	91/263	94/262
Partial load					
Partial load ratio	%	50	50	50	50
Net EER in partial load (****)		4.12	4.25	4.02	3.83
Net COP in partial load (****)		5.03	5.18	5.00	4.73
Supply air fan					
Number of supply air centrifugal fan / motor		1/1	1/1	1/1	1/1
400 Pa absorbed electrical / installed mechanical power in supply air mode	kW	3.0/11.0	3.6/11.0	4.3/11.0	5.5/10.1
600 Pa absorbed electrical / installed mechanical power in supply air mode	kW	4.2/11.0	4.9/11.0	5.7/11.0	7.2/10.1
2002/91/EC - Ventilation average capacity per 400 Pa flow rate unit in supply air mode	W/ (m ³ /h)	0.25	0.26	0.27	0.28
2002/91/EC - Ventilation average capacity per 600 Pa flow rate unit in supply air mode	W/ (m ³ /h)	0.35	0.35	0.36	0.36
2002/91/EC - Fans total regulatory capacity Supply air 400 Pa + Exhaust air 200 Pa "Central air savings"	kW	3.7	4.3	5.1	6.5
2002/91/EC - Fans total regulatory capacity Supply air 600 Pa + Exhaust air 400 Pa "Central air savings"	kW	6.3	7.3	8.3	10.4
Exhaust air fan					
Number of exhaust air centrifugal fan / motor		1/1	1/1	1/1	1/1
200 Pa input / installed electric power in exhaust air mode	kW	2.6/11.0	3.3/11.0	4.2/11.0	6.5/10.1
400 Pa input / installed electric power in exhaust air mode	kW	4.0/10.1	4.8/10.1	5.8/10.1	8.3/10.1
Advised auxiliary for use in tertiary sector / offices					
Mini 3-stage electric heater heating capacity	kW	24	27	30	36
3-stage electric heater intensity	A	35	39	43	52
Heating capacity - Hot water coil with 80°/60°C capacity, air inlet at +10°C mini	kW	24	27	30	36
General					
Average sound pressure at 10 m, reference: 2x10 ⁻⁵ in free field	dB(A)	41	43	46	49
Filters efficiency		G4			
Filters dimensions & number (supply and exhaust air)	mm	(12x) 595x495x98 (6x) 595x287x98			
Maximum outside operating temperature in cooling mode	°C	+45	+45	+45	+45
Minimum outside operating temperature in cooling mode	°C	+15	+15	+15	+15
Minimum outside operating temperature in heating mode	°C	-15	-15	-15	-15
Minimum inside coil inlet temperature in heating mode	°C	+10	+10	+10	+10
Unit weight without any option (****)	kg	1848	1861	1864	1909
Connection roof curb weight	kg	225	225	225	225
Adjustable ventilated roof curb weight	kg	310	310	310	310

** Thermodynamic instantaneous capacity (out of defrosting) - *** Out of electrical resistances - **** Consult pages 26 and 27 for electric heaters and hot water coils weight. - ***** Values in partial load calculated according to those conditions: COOLING: Outs[°] 23°C - Int[°] 27(19)°C HEATING: Outs[°] +7(6)°C - Int[°] 20°C

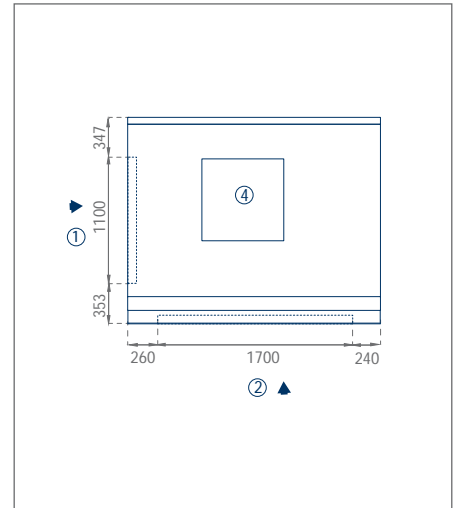
Dimensions and connections

Type 59 – 69 – 79 – 99

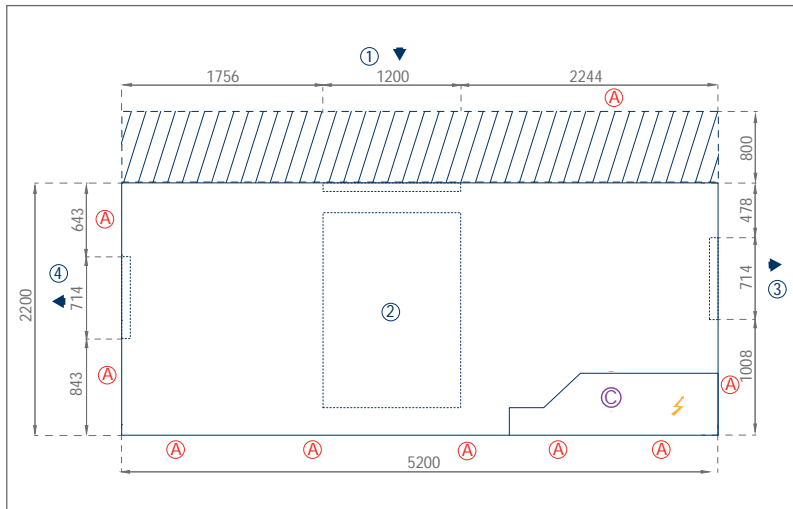
Side view



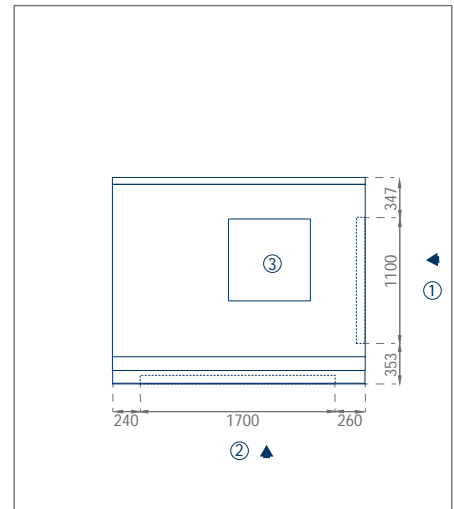
Exhaust air view



Top view



Supply air view



A1 arrangement (please consult pages 18-19 for other arrangements)

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

	Length	Width	Height
Casing dimensions	5200 mm	2200 mm	1800 mm
Transport overall dimensions	5260 mm	2250 mm	1850 mm

Note: Fresh air and exhaust air (external units) cowls laying shall be made by the installer. Optional: Feet can be supplied. Feet laying shall be made by the installer. Ducts connection (supply air, return air, fresh air and exhaust air) is done using inserts (supplied by ETT) to install ducts using 40 mm Metu frame.

Technical features

Type 129 - 149

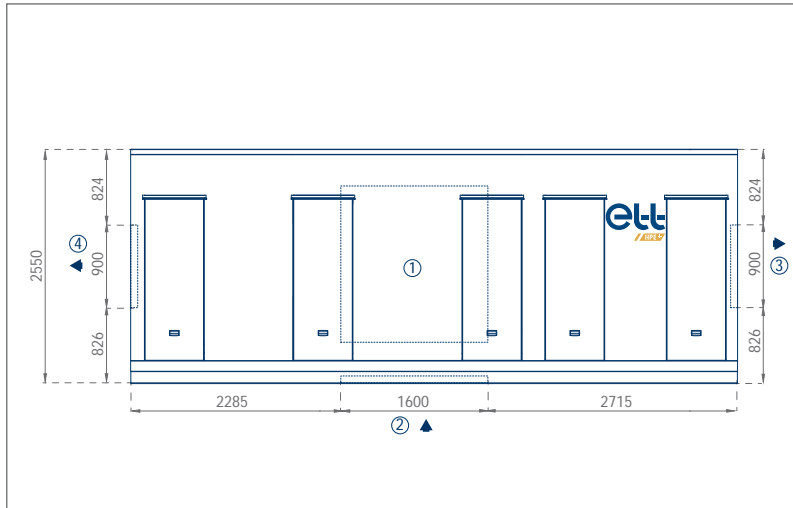
Specifications		129	149
Rated supply air flow rate for 400 Pa	m ³ / h	24000	30000
Mini / Maxi supply air flow rate	m ³ / h	21000/27000	27000/30000
Rated exhaust air flow rate		31000	39000
Gross rated cooling capacity with 35°C outside temperature 27°C return air and 47% HR - 40% fresh air	kW	119.9	141.8
Net rated cooling capacity with 35°C outside temperature 27°C return air and 47% HR - 40% fresh air	kW	113.6	133.5
Net EER (Coefficient of performance in cooling mode) with 35°C outs. temp.		2.96	2.90
Gross rated thermodynamic capacity with 7°C / 87% HR outside temperature 20°C return air - 40% fresh air (**)	kW	121	141.4
Net rated thermodynamic capacity with 7°C / 87% HR outside temperature 20°C return air - 40% fresh air (**)	kW	127.3	149.7
Net COP (Coefficient of performance in heating mode) with +7°C outs. temp.		4.71	4.43
Gross rated thermodynamic capacity with -7°C / 73% HR outside temperature 20°C return air - 40% fresh air (**)	kW	96.8	112.9
Net rated thermodynamic capacity with -7°C / 73% HR outside temperature 20°C return air - 40% fresh air (**)	kW	103.1	121.2
Net COP (Coefficient of performance in heating mode) with -7°C outs. temp.		4.50	4.21
Number of independent refrigerant circuits		3	3
Power stages		0-23-35-53-66-86-100%	
Electrical connection			
400 Pa total installed electrical power in supply air + 200 Pa in exhaust air (***)	kW	79.1	84.4
400 Pa rated / start current in supply air + 200 Pa in exhaust air (***)	A	129/302	138/306
600 Pa total installed electrical power in supply air + 400 Pa in exhaust air (***)	kW	79.1	84.4
600 Pa rated / start current in supply air + 400 Pa in exhaust air (***)	A	129/302	138/306
Partial load			
Partial load ratio	%	60	60
Net EER in partial load (****)		4.15	3.88
Net COP in partial load (****)		5.20	4.87
Supply air fan			
Number of supply air fan / motor		3/3	3/3
400 Pa absorbed electrical / installed mechanical power in supply air mode	kW	6.3/15.1	8.3/15.1
600 Pa absorbed electrical / installed mechanical power in supply air mode	kW	8.6/15.1	10.9/15.1
2002/91/EC - Ventilation average capacity per 400 Pa flow rate unit in supply air mode	W/ (m ³ /h)	0.26	0.28
2002/91/EC - Ventilation average capacity per 600 Pa flow rate unit in supply air mode	W/ (m ³ /h)	0.36	0.36
2002/91/EC - Fans total regulatory capacity Supply air 400 Pa + Exhaust air 200 Pa "Central air savings"	kW	7.5	9.8
2002/91/EC - Fans total regulatory capacity Supply air 600 Pa + Exhaust air 400 Pa "Central air savings"	kW	11.7	15.7
Exhaust air fan			
Number of exhaust air centrifugal fan / motor		3/3	3/3
200 Pa input / installed electric power in exhaust air mode	kW	6.1/15.1	9.8/15.1
400 Pa input / installed electric power in exhaust air mode	kW	7.5/15.1	12.4/15.1
Advised auxiliary for use in tertiary sector / offices			
Mini 3-stage electric heater heating capacity	kW	30	36
3-stage electric heater intensity	A	43	52
Heating capacity - Hot water coil with 80°/60°C capacity, air inlet at +10°C mini	kW	30	36
General			
Average sound pressure at 10 m, reference: 2x10 ⁻⁵ in free field	dB(A)	44	50
Filters efficiency		G4	
Filters dimensions & number (supply and exhaust air)	mm	(24x) 595x495x98	
Maximum outside operating temperature in cooling mode	°C	+45	+45
Minimum outside operating temperature in cooling mode	°C	+15	+15
Minimum outside operating temperature in heating mode	°C	-15	-15
Minimum inside coil inlet temperature in heating mode	°C	+10	+10
Unit weight without any option (****)	kg	2482	2531
Connection roof curb weight	kg	285	285
Adjustable ventilated roof curb weight	kg	405	405

** Thermodynamic instantaneous capacity (out of defrosting) - *** Out of electrical resistances - **** Consult pages 26 and 27 for electric heaters and hot water coils weight. - ***** Values in partial load calculated according to those conditions: COOLING: OutsT° 23°C - InT° 27(19)°C HEATING: OutsT° +7(6)°C - InT° 20°C

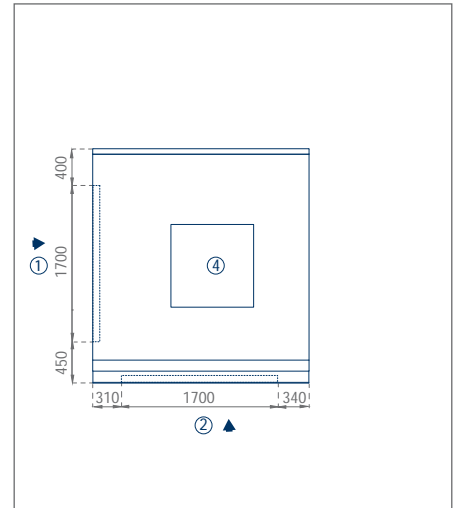
Dimensions and connections

Type 129 - 149

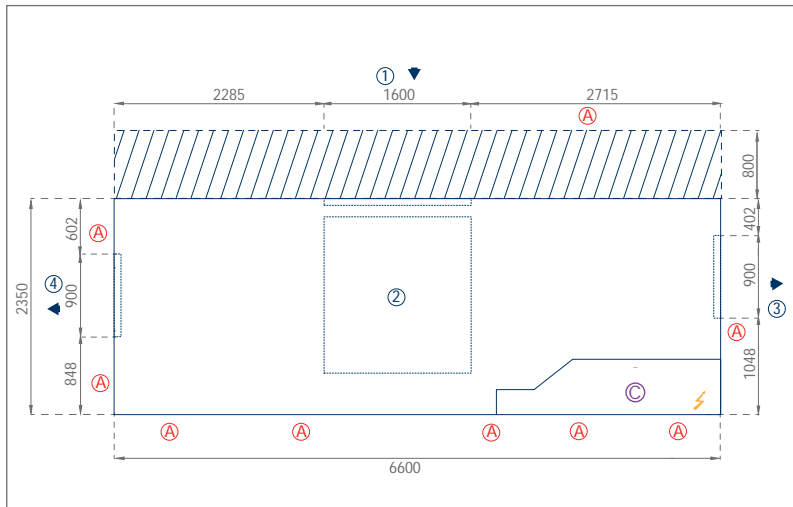
Side view



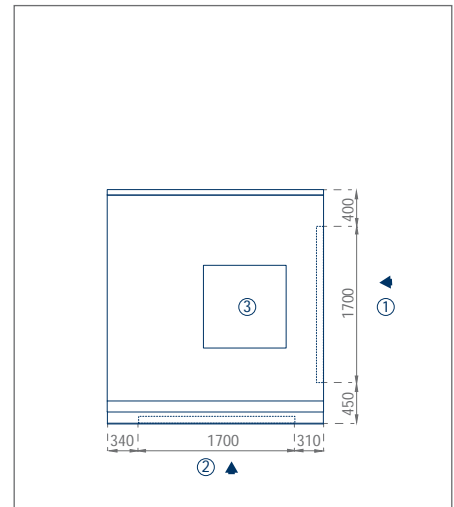
Exhaust air view



Top view



Supply air view



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

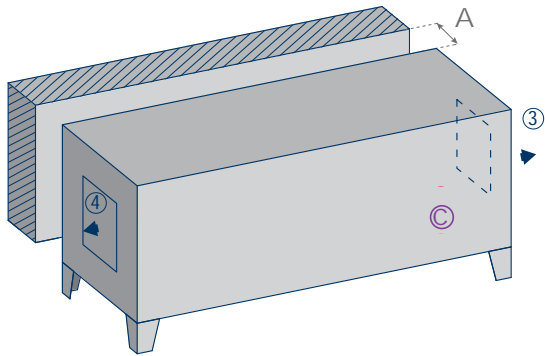
	Length	Width	Height
Casing dimensions	6600 mm	2350 mm	2550 mm
Transport overall dimensions	6700 mm	2400 mm	2600 mm

Note: Fresh air and exhaust air (external units) cowls laying shall be made by the installer. Optional: Feet can be supplied. Feet laying shall be made by the installer. Ducts connection (supply air, return air, fresh air and exhaust air) is done using inserts (supplied by ETT) to install ducts using 40 mm Metu frame.

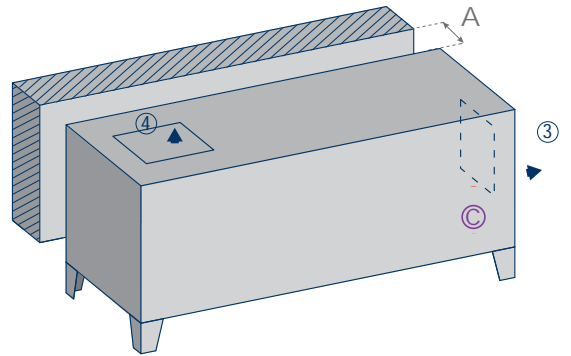
Arrangements

of fans for CH RE HPE+ RL and FR RE HPE+ RL

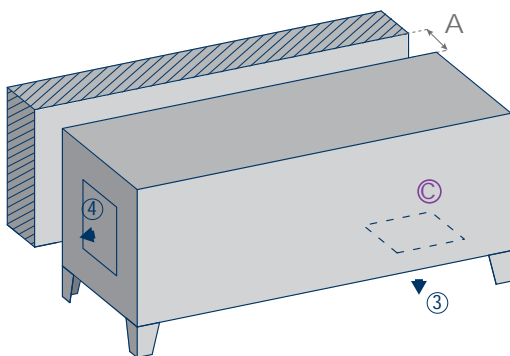
A arrangement



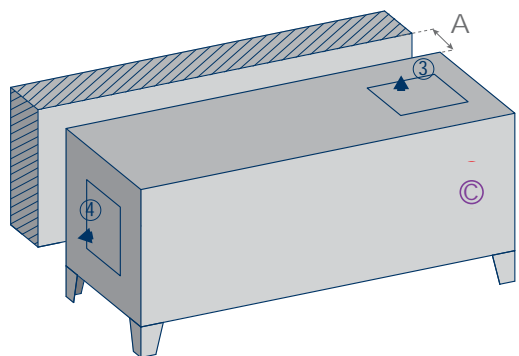
B arrangement



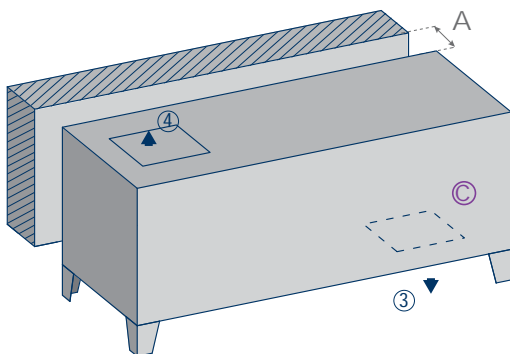
C arrangement



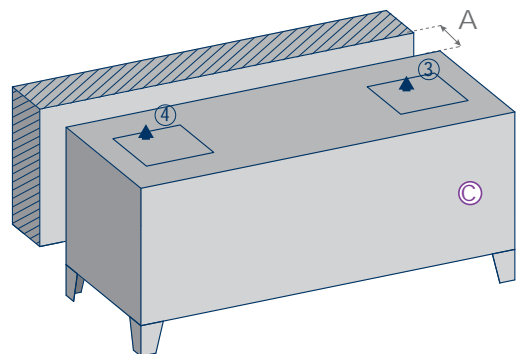
D arrangement



E arrangement



F arrangement



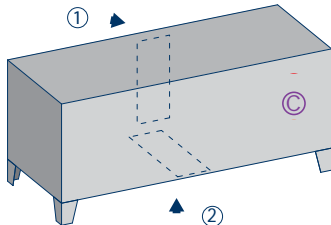
③ Supply air ④ Exhaust air C Technical section

A : Minimum maintenance area between the wall and the unit
CH 09-149: 800mm

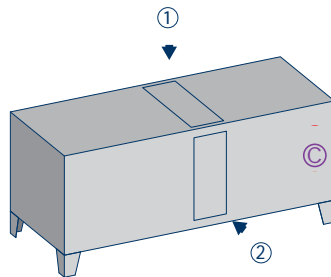
Nota: Optional: Feet can be supplied. Feet laying shall be made by the user.

Dimensions and connections of dampers for CH RE HPE+ RL and FR RE HPE+ RL

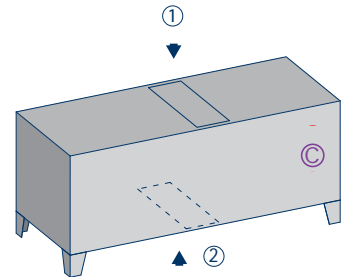
Arrangement 1



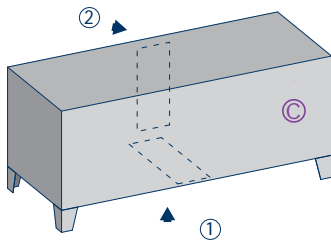
Arrangement 2



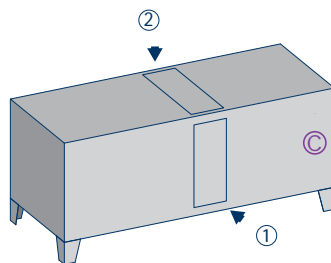
Arrangement 3



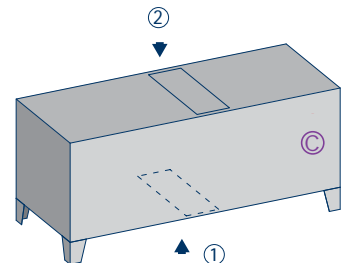
Arrangement 4



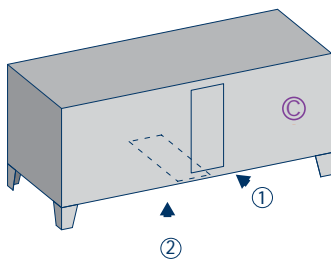
Arrangement 5



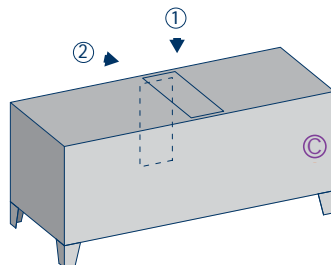
Arrangement 6



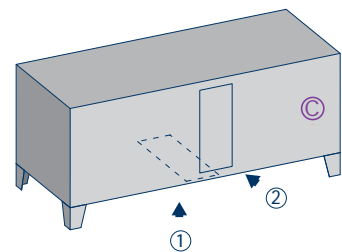
Arrangement 7



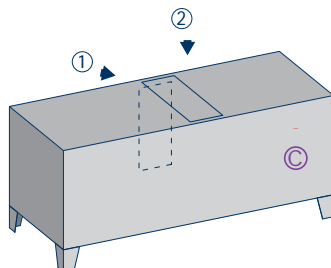
Arrangement 8



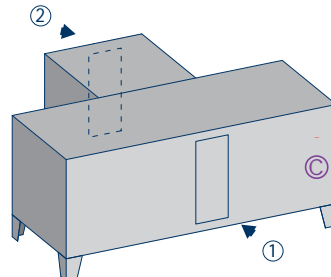
Arrangement 9



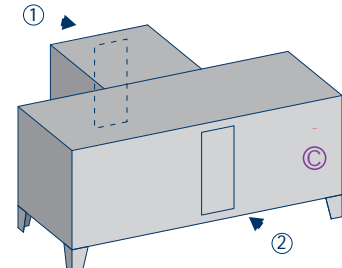
Arrangement 10



Arrangement 11



Arrangement 12



① Fresh air ② Return air (C) Technical section

Nota: We do not recommend the arrangements 2, 5 and 7 when the unit is against a wall, as it is impossible to have access to filters. In this case, you'd better choose arrangement 11 as an option. Please consult us for other arrangements. Optional: Feet can be supplied. Feet laying shall be made by the user.

Roof curb general arrangements

The roof curb permits an interfacing between roof and rooftop. It has been designed for an easy assembly on the roof and a simplified unit laying.

■ Adjustable connection packaged roof curb

- Consistent with P 84-206-1 French standard (watertight ribbed sheet metal implement);
- the packaged AG3 aluminium roof curb is lighter than other galvanized steel constructions;
- adjustable angles to compensate roof slope. You can ask for other slope percentages (optional). In this case, please confirm percentage and slope direction during execution;
- sealing string reinforcing tightness and insulation up to 100 mm maximum (as stipulated by the directive 2002/91/EC);
- roof curbs with a 145 mm steel tank and a 200 mm insulation maximum height (that is to say maxi H = 345 mm).

■ Adjustable ventilated packaged roof curb

- Consistent with P 84-206-1 French standard (watertight ribbed sheet metal implement);
- the packaged AG3 aluminium roof curb is lighter than other galvanized steel constructions;
- adjustable angles to compensate roof slope. You can ask for other slope percentages (optional). In this case, please confirm percentage and slope direction during execution;
- 200 mm ventilated air space conforming to French standards for public buildings. 4 (or 6) feet fixed by bolting and tightness guaranteed with foam gasket on supply air and return air ducts frames;
- sound insulation is ensured by an air space which considerably limits the noise below the unit;
- 200 mm length double skin insulated supply and return air ducts connections, with an aluminium external mechanical protection;
- cable pipes below the unit for power supply and hot water coils pipework;
- the insulation below the roof curb is ensured with a 25 mm thickness glass wool with a protection veil. The insulation is fixed by aluminium clips welded on the sheet metal for a better fastening than other gluing methods. The insulation limits waste and avoids an under-surface condensation;
- sealing string reinforcing tightness and insulation up to 100 mm maximum (as stipulated by the directive 2002/91/EC);
- roof curbs with a 145 mm steel tank and a 200 mm insulation maximum height (that is to say maxi H = 345 mm);
- lifting lugs to make the crantage easier.

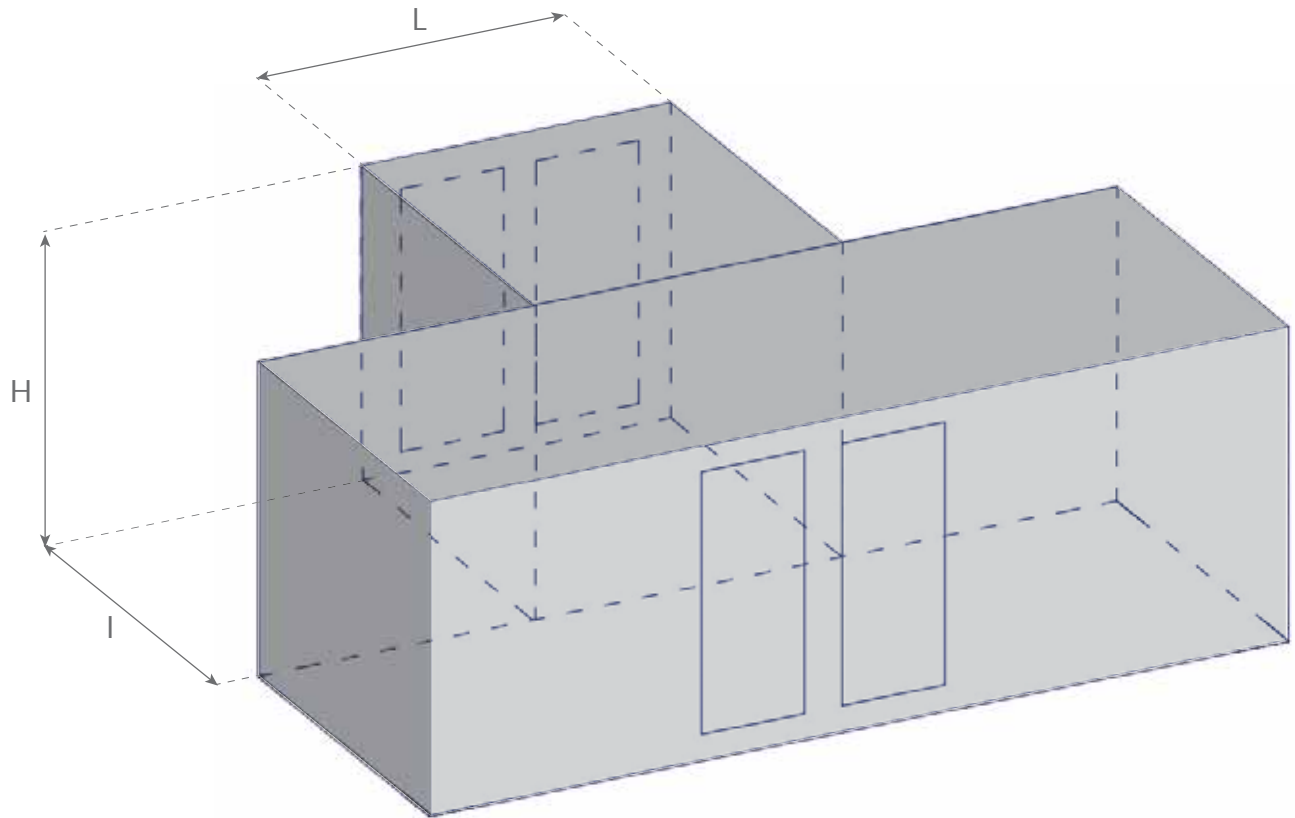
■ Adapter interface on existing roof curb

Bespoke roof curb to be adapted on every type of existing roof curbs or headers according to dimensions sent by the installer (see our particular clauses for this equipment).

Installation accessories

Additional damper box

Arrangements 11 and 12

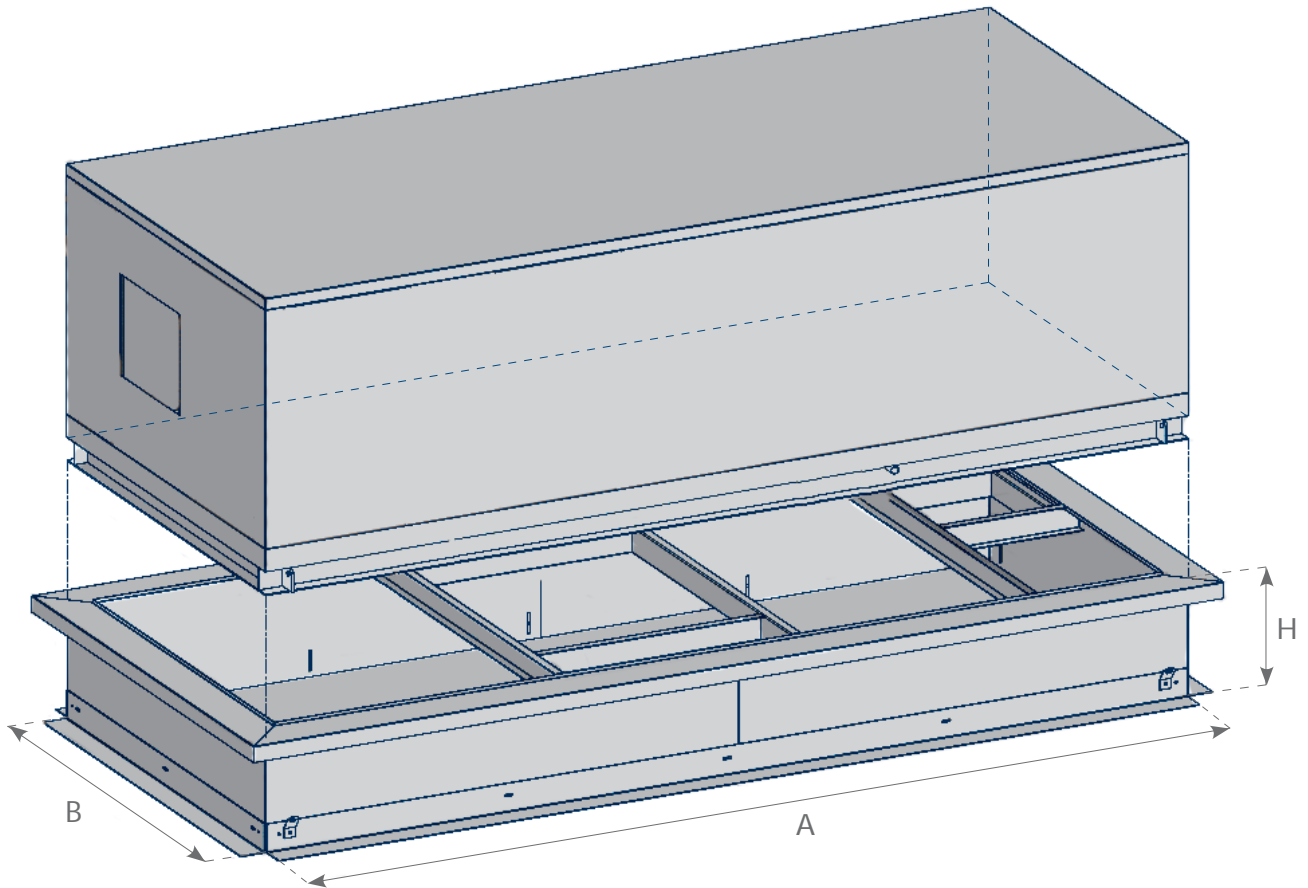


Dimension		09 - 19	29 - 39 - 49	59 - 69 - 79 - 99	129 - 149
L	mm	1200	1400	1600	2000
I	mm	600	700	700	800
H	mm	1400	1500	1800	2550
Weight	kg	75	100	120	210

Nota: Dampers actuators shall be electrically connected by the installer. The damper box shall be connected by the installer.

Installation accessories

Connection roof curb

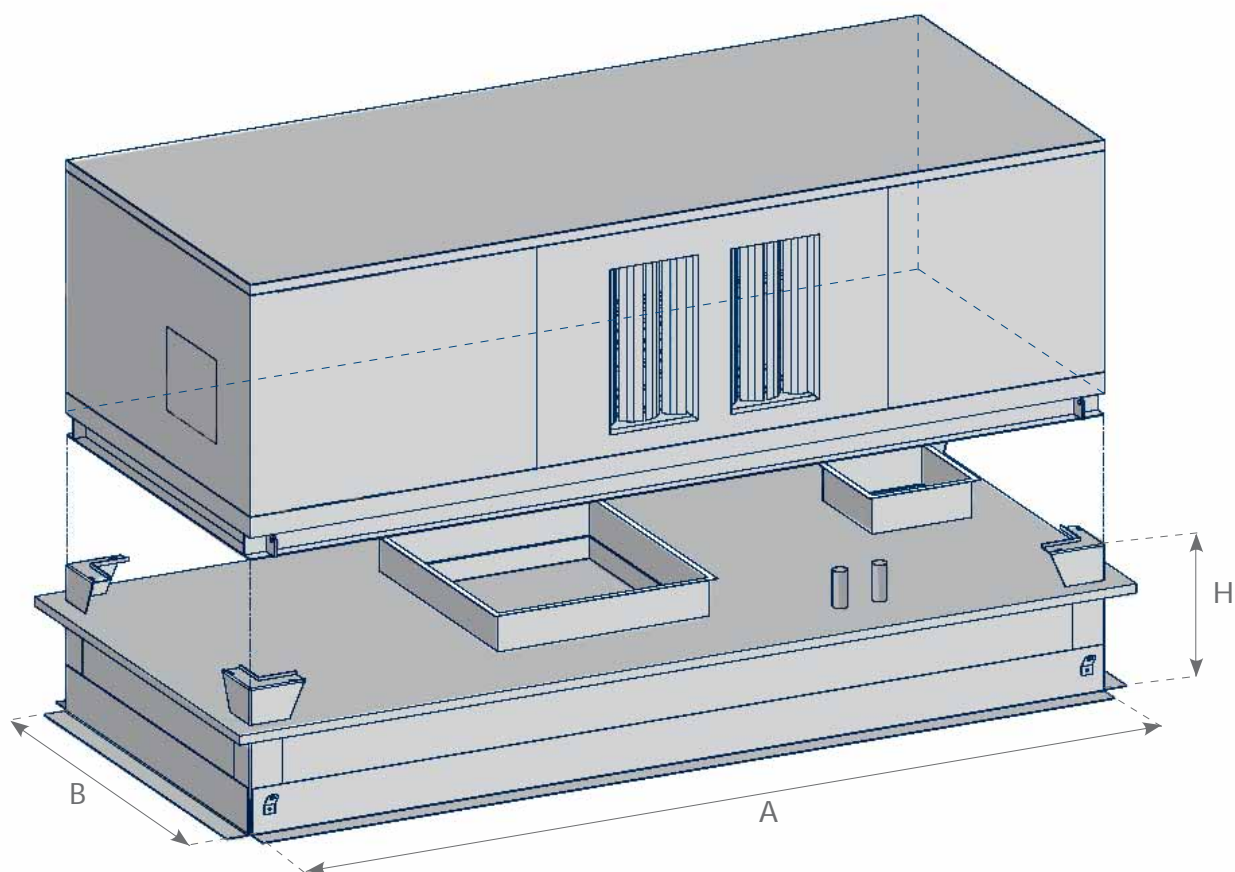


Series	Laying dimensions (mm)			Overall width	Overall length	Overall height	Maxi slope (%)
	A	B	H				
09 - 19	3620	1520	600	3810	1710	615	5
29 - 39 - 49	3970	1720	600	4160	1910	620	5
59 - 69 - 79 - 99	5220	2220	600	5410	2410	620	5
129 - 149	6620	2370	650	6810	2560	660	5

WARNING: for this roof curb laying, the installer has the decennial responsibility for cover warranty. Please indicate the roof **pitch and direction** when you pass the order. Roof curbs for a 145 mm steel tank and a 200 mm insulation maximum height (that is to say maxi H = 345 mm). Roof curbs have to be drilled back-to-back after mounting. Sealant below the unit frame.

Installation accessories

Ventilated roof curb

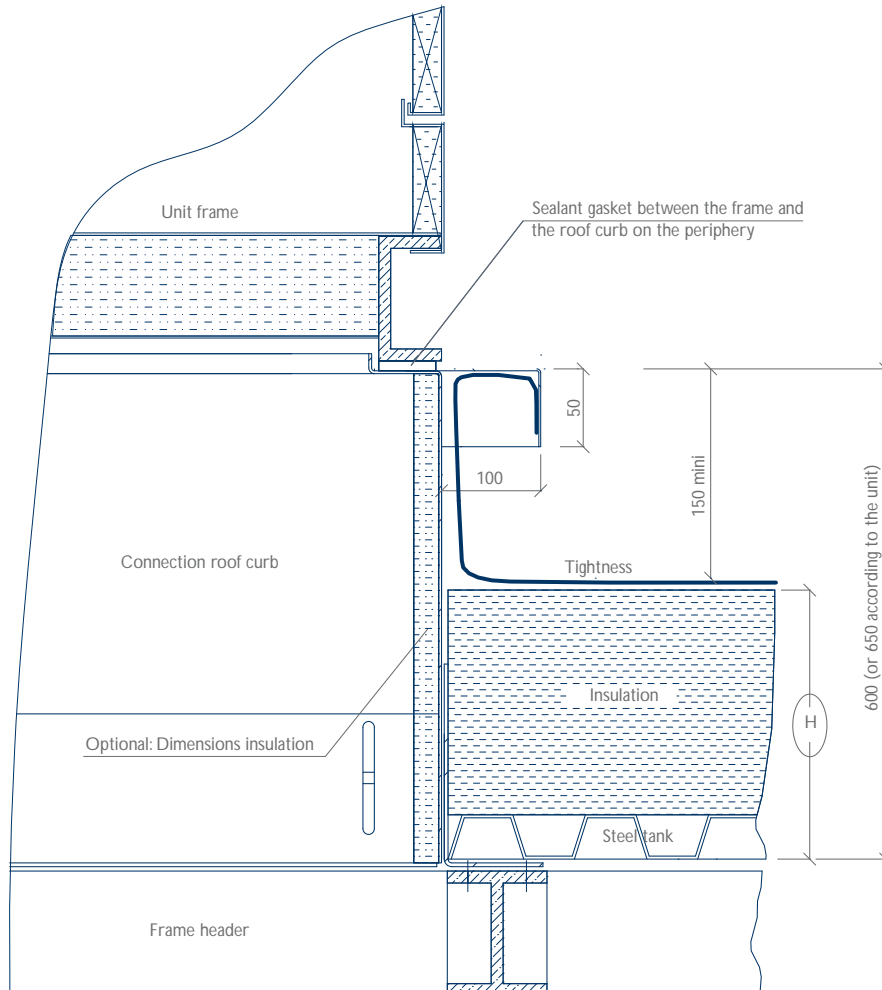


Series	Laying dimensions (mm)			Overall width	Overall length	Overall height	Maxi slope (%)
	A	B	H				
09 - 19	3620	1520	800	3820	1720	815	5
29 - 39 - 49	3970	1720	800	4170	1916	820	5
59 - 69 - 79 - 99	5220	2220	800	5420	2420	825	5
129 - 149	6620	2370	850	6820	2570	875	5

WARNING: for this roof curb laying, the installer has the decennial responsibility for cover warranty. Please indicate the roof **pitch and direction** when you pass the order. Roof curbs for a 145 mm steel tank and a 200 mm insulation maximum height (that is to say maxi H = 345 mm). **Roof curbs have to be drilled back-to-back after mounting.** Unit must be bolted on the roof curb. Unit feet must be bolted to the roof curb.

Installation accessories

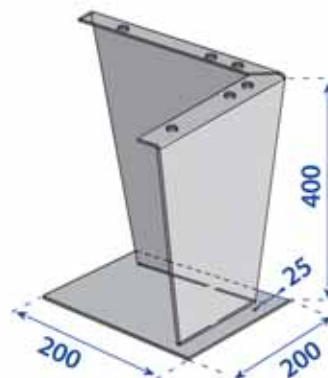
Roof curbs laying principle



Nota: an optional cover sheet can be added to protect the building from the weather during the time between the roof curb and the unit layings.

Feet

AG3 Fixed feet
 Unit weight: 1kg
 Item code: TPP 50010



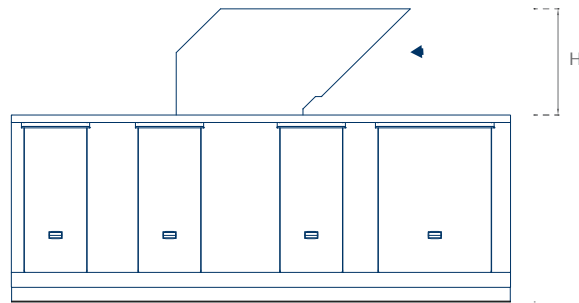
	09	19	29	39	49	59	69	79	99	129	149
Nr. of feet	4	4	4	4	4	6	6	6	6	6	6

Installation accessories

for CH RE HPE+ RL and FR RE HPE+ RL

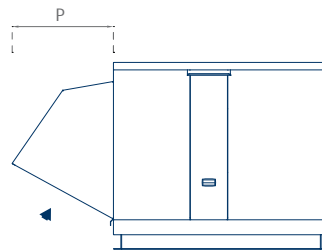
Fresh air cowl

Inlet on top (optional)



	09	19	29	39	49	59	69	79	99	129	149
H (mm)	650	650	820	820	820	1150	1150	1150	1150	1650	1650

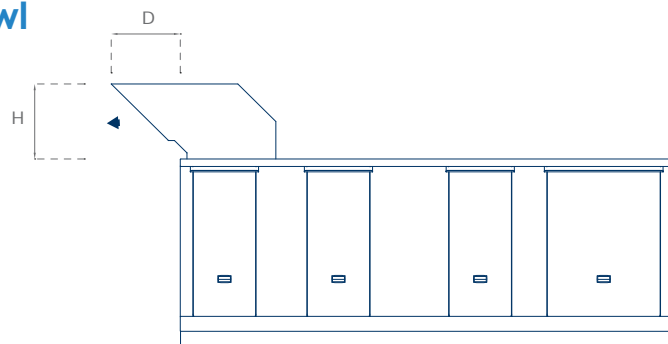
Inlet on side



	09	19	29	39	49	59	69	79	99	129	149
P (mm)	450	450	800	800	800	1100	1100	1100	1100	1300	1300

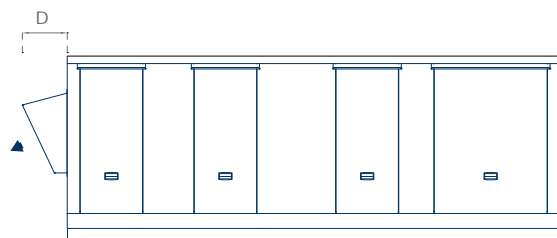
Exhaust air cowl

On top (optional)



	09	19	29	39	49	59	69	79	99	129	149
H (mm)	500	500	600	600	600	700	700	700	700	900	900
D (mm)	440	440	550	550	550	600	600	600	600	800	800

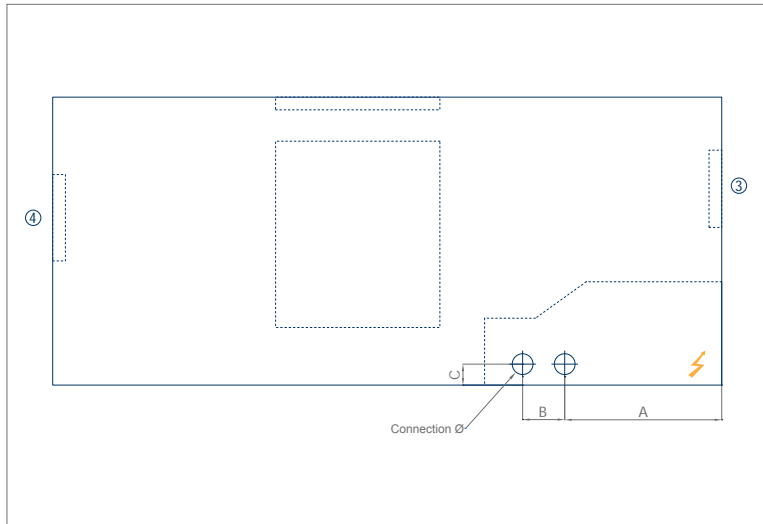
On side



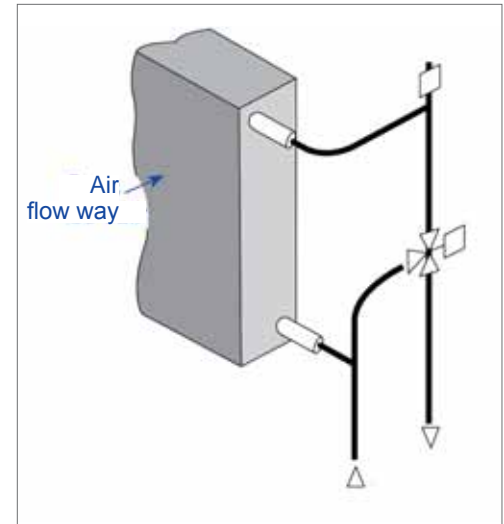
	09	19	29	39	49	59	69	79	99	129	149
D (mm)	320	320	355	355	355	465	465	465	465	550	550

Auxiliary Hot water coils

Top view



Principle



③ Supply air ④ Exhaust air ⚡ Power supply

Dimensions

	09	19	29	39	49	59	69	79	99	129	149
A	935	935	1015	1015	1015	1300	1300	1300	1300	1740	1740
B	80	80	120	120	120	200	200	200	200	200	200
C	120	120	180	180	180	125	125	125	125	150	150
Customer connection diameter (mm)	33x42	33x42	33x42	33x42	33x42	40x49	40x49	40x49	40x49	40x49	40x49
Coil+ 3WV water weight (kg)	30	30	50	50	50	74	74	74	74	74	74

Capacity

With +10°C air inlet temperature on coils

		09	19	29	39	49	59	69	79	99	129	149
90/70 °C water supply	Maxi power (kW)	45.2	63.6	59.2	64.6	71.9	149	166	180	180	180	180
	Maxi flow rate (m ³ /h)	2	2.8	2.6	2.8	3.2	6.6	7.3	7.4	4.4	7.4	4.3
	3-way valve + coil pressure drop (wcm)	1.6	2	3.4	3.8	4.7	4.1	5.1	5.1	2.1	5.1	2
	Stop and TC valves pressure drop 3 rounds opening (wcm)	0.55	0.98	0.86	1.01	1.23	2.87	3.55	3.6	1.4	3.6	1.3
80/60 °C water supply	Maxi power (kW)	38.1	53.4	49.9	54.4	60.5	127	142	155	180	155	180
	Maxi flow rate (m ³ /h)	1.7	2.4	2.2	2.4	2.7	5.6	6.2	6.8	7.9	6.8	7.9
	3-way valve + coil pressure drop (wcm)	1.3	2.2	2.6	2.9	3.6	3.1	3.9	4.4	5.9	4.3	5.9
	Stop and TC valves pressure drop 3 rounds opening (wcm)	0.43	0.72	0.64	0.75	0.9	2.1	2.56	3.1	4.1	3.1	4.1

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

Auxiliary Electric heaters

Available powers (in kW)

Total power (kW)	1 st stage	2 nd stage	09	19	29	39	49	59	69	79	99	129	149	Weight (kg)
9	3	6	•	•	•	•	•	•	•	•	•	•	•	9.6
12	3	9	•	•	•	•	•	•	•	•	•	•	•	13.3
15	6	9	•	•	•	•	•	•	•	•	•	•	•	19.9
18	6	12	•	•	•	•	•	•	•	•	•	•	•	24.3
21	6	15	•	•	•	•	•	•	•	•	•	•	•	29.1
24	9	15			•	•	•	•	•	•	•	•	•	32.7
27	9	18			•	•	•	•	•	•	•	•	•	37.2
30	12	18						•	•	•	•	•	•	41.7
33	12	21						•	•	•	•	•	•	44.1
36	15	21						•	•	•	•	•	•	48.9
39	15	24						•	•	•	•	•	•	53.7
42	18	24						•	•	•	•	•	•	58.2
45	18	27						•	•	•	•	•	•	62.7
48	21	27										•	•	65.1
54	21	33										•	•	74.4
60	21	39										•	•	81.3
63	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.

Sound level*

Supply and exhaust air fan - *Frequency band spectrum*

At supply air

	FREQUENCY BAND		63	125	250	500	1000	2000	4000	8000	General level Lw (dB(A))
	Supply air flow rate (m ³ /h) ▼	Exhaust air flow rate (m ³ /h) ▼									
09	3000	4000	51.8	64.0	76.6	76.3	79.9	77.4	71.5	64.3	84.2
19	5000	6500	53.5	63.0	79.4	80.1	84.3	82.2	77.3	69.9	88.4
29	7000	9500	53.6	62.9	73.1	78.5	82.2	79.1	74.5	66.8	85.7
39	7500	10000	53.9	62.3	73.2	79.2	82.9	79.6	75.1	67.3	86.3
49	9000	13000	49.5	66.4	77.2	83.9	88.0	85.9	80.3	76.1	91.7
59	12000	16000	42.4	59.7	66.2	76.2	76.6	77.1	72.7	62.4	82.2
69	14000	18500	47.8	55.7	72.2	79.0	85.4	82.8	80.7	76.3	89.0
79	16000	21000	52.0	60.0	78.8	84.4	90.4	86.5	85.7	78.1	93.7
99	20000	26000	49.5	66.4	77.2	83.9	88.0	85.9	80.3	76.1	91.7
129	24000	31000	47.7	65.5	75.3	81.6	85.9	83.6	77.9	73.6	89.4
149	30000	39000	48.7	62.9	76.3	84.1	87.8	84.3	80.6	77.2	91.7

(*) Lw acoustic power (dB(A))

Data for 400 Pa available in supply air and 200 Pa in exhaust air

At exhaust air

	FREQUENCY BAND		63	125	250	500	1000	2000	4000	8000	General level Lw (dB(A))
	Supply air flow rate (m ³ /h) ▼	Exhaust air flow rate (m ³ /h) ▼									
09	3000	4000	42.5	52.1	67.6	71.3	75.4	73.2	68.7	61.0	79.2
19	5000	6500	45.8	58.9	72.5	77.6	82.0	79.9	77.1	66.2	85.9
29	7000	9500	41.4	57.6	66.4	75.8	76.3	78.3	72.9	64.6	82.4
39	7500	10000	42.3	59.0	67.8	77.1	77.4	79.9	73.8	67.2	83.8
49	9000	13000	51.0	61.7	77.7	86.8	89.6	90.0	83.3	82.8	94.6
59	12000	16000	42.4	59.7	66.2	76.2	76.6	77.1	72.7	62.4	82.2
69	14000	18500	53.0	62.1	74.1	81.6	85.0	80.9	76.5	67.0	88.2
79	16000	21000	46.4	63.8	72.2	81.4	81.4	84.8	77.7	72.9	88.3
99	20000	26000	51.0	61.7	77.7	86.8	89.6	89.7	83.3	82.8	94.5
129	24000	31000	47.9	65.0	73.6	82.7	82.8	86.0	79.3	73.8	89.6
149	30000	39000	52.5	68.2	80.2	88.3	89.6	93.1	85.3	83.2	96.3

(*) Lw acoustic power (dB(A))

Data for 400 Pa available in supply air and 200 Pa in exhaust air

Sound level*

Fan at fresh air - fresh make-up air inlet
in the exhaust air - return air inlet - *Frequency band spectrum*

At fresh air / fresh make-up air inlet

	FREQUENCY BAND		63	125	250	500	1000	2000	4000	8000	General level Lw (dB(A))
	Supply air flow rate (m³/h) ▼	Exhaust air flow rate (m³/h) ▼									
09	3000	4000	46.7	62.3	68.0	68.4	65.2	67.0	63.9	57.6	74.2
19	5000	6500	49.0	58.9	72.8	73.2	70.0	72.4	71.3	63.3	79.2
29	7000	9500	49.4	58.9	66.1	69.3	68.8	72.2	69.0	61.5	76.7
39	7500	10000	49.9	58.6	66.5	70.1	69.5	73.1	69.8	64.6	77.6
49	9000	13000	49.1	60.8	74.9	76.9	76.6	81.6	78.1	79.3	86.3
59	12000	16000	41.1	56.2	62.2	68.2	67.1	71.4	69.7	58.7	75.8
69	14000	18500	48.9	57.8	70.0	72.9	71.4	74.4	74.9	72.3	80.8
79	16000	21000	46.3	59.8	73.6	74.6	74.6	78.3	79.9	73.4	84.3
99	20000	26000	49.1	60.8	74.9	76.9	76.6	81.6	78.1	79.3	86.3
129	24000	31000	46.1	62.0	70.5	73.5	73.3	78.1	75.0	70.6	82.2
149	30000	39000	49.7	64.2	75.4	77.8	77.1	83.9	78.4	79.1	87.4

(*) Lw acoustic power (dB(A))

Data for 400 Pa available in supply air and 200 Pa in exhaust air

In the exhaust air / return air inlet

	FREQUENCY BAND		63	125	250	500	1000	2000	4000	8000	General level Lw (dB(A))
	Supply air flow rate (m³/h) ▼	Exhaust air flow rate (m³/h) ▼									
09	3000	4000	46.7	62.3	68.0	68.4	65.2	67.0	63.9	57.6	74.2
19	5000	6500	49.0	58.9	72.8	73.2	70.0	72.4	71.3	63.3	79.2
29	7000	9500	49.4	58.9	66.1	69.3	68.8	72.2	69.0	61.5	76.7
39	7500	10000	49.9	58.6	66.5	70.1	69.5	73.1	69.8	64.6	77.6
49	9000	13000	49.1	60.8	74.9	76.9	76.6	81.6	78.1	79.3	86.3
59	12000	16000	41.1	56.2	62.2	68.2	67.1	71.4	69.7	58.7	75.8
69	14000	18500	48.9	57.8	70.0	72.9	71.4	74.4	74.9	72.3	80.8
79	16000	21000	46.3	59.8	73.6	74.6	74.6	78.3	79.9	73.4	84.3
99	20000	26000	49.1	60.8	74.9	76.9	76.6	81.6	78.1	79.3	86.3
129	24000	31000	46.1	62.0	70.5	73.5	73.3	78.1	75.0	70.6	82.2
149	30000	39000	49.7	64.2	75.4	77.8	77.1	83.9	78.4	79.1	87.4

(*) Lw acoustic power (dB(A))

Data for 400 Pa available in supply air and 200 Pa in exhaust air

Probes connection scheme

Probes connection principle



- ① **Room probe:** 1 shielded pair wire, 2 x 0.75 mm² LIY-CY (maxi. length 100 ml)
- ② **CO₂ sensor:** 2 shielded pairs wire, 4 x 0.75 mm² LIY-CY (maxi. length 100 ml)
- ③ **Hygrometry probe:** 2 shielded pairs wire, 4 x 0.75 mm² LIY-CY (maxi. length 100 ml) *(optional)*

Nota: - Please note that depending on where you install the probe, the value indicated can change. For that reason, in order to have the most accurate results representing the room air, do not install them:

- > Close to heat sources (spotlight, cooking appliances, glass wall, chimney)
- > In drafts zones (close to entrance, stockrooms, openings)
- > In dead zones (behind shelvings, building angle)
- > Close to crowded areas (checkout, fitting rooms)

- Those conditions can disturb measures:

- > Probes must not be in the axis of the duct used for their wiring to avoid false air flow
- > Holes for control cables must be different from those for power cables (risk of electromagnetic interference)

Comfort and energy savings



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Route de Brest - CS 93002 - 29830 Ploudalmézeau - France
Phone number: +33 (0)2 98 48 14 22 - Fax: +33 (0)2 98 48 09 12
Export contact: +33 (0)2 98 48 00 70 - ETT Services: +33 (0)2 98 48 02 22

www.ett.fr

