ENVIRONMENTAL
CLIMATE CONTROL
EQUIPMENT
& SOLUTIONS

X-RCAM+

R32

Double flow heat pump with plate heat exchanger for treatment of hygienic fresh air

MADE IN FRANCE

www.ett-hvac.com

ENERGIE TRANSFERT THERMIQUE

C O N T E N T S

General description

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

Aluminium promotes the REFURBISHING of machines for a second life: Aluminium allows our machines to be refurbished for a second life, unlike a steel structure.

Environmental impact :

The Ultima Green Line is environmentally responsible and uses the R32, a refrigerant with low environmental impact:

- ✓ Zero ozone depletion (ODP)
- ✓ Global Warming Potential (GWP) of 675

Our technical choices have a major impact on the environment

- **DECARBONATION:**

ETT is committed to an ambitious approach to reducing Greenhouse Gas Emissions:

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

- **ALUMINIUM: PERFORMANCE AND DURABILITY!**
  - Lightweight: 3 times lighter than steel
  - Corrosion resistant and long lifespan
  - Thermal performance
  - 100% recyclable indefinitely
  - Facilitates the refurbishing of our machines

- **ECO-DESIGN:**

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

- **LOW-POLLUTION MANUFACTURING PROCESS:**

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

- **END OF MACHINE LIFE:**

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

EcoLogic

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

GOLD | Top 5% ecovadis Sustainability Rating JAN 2025

- **Iso 14001 & Iso 9001 certification** for our Quality and Environmental Management system

ISO 14001 ISO 9001

- **Certificate of competence for handling refrigerants**
- **Membership of the UN Global Compact**
- **Qualiopi certification** for our training centre

Qualiopi processus certifié RÉPUBLIQUE FRANÇAISE
La certification qualité a été délivrée au titre de la catégorie d'action suivante : Actions de formation

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

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

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

20-year guarantee against corrosion frame - casing

ENERGY SAVING ett

ett ENVIRONMENTAL ATTITUDE

ett SERVICE LINK

Unit description

The **X-RCAM+** (**R**ecovery **C**lean **A**ir **M**anagement) is a double flow heat pump with double energy recovery from the exhaust air. It is designed to supply **fresh hygienic air at neutral temperature** as required by the regulations for ERP (Public Access Buildings): hotels, collective housing, hospitals and nursing homes, as well as office buildings in compliance with the French Labour Code.

In such case is made in order to maintain supply air temperature.

Thanks to the various innovations and materials used, **X-RCAM+** combines performance, reliability, air quality and respect of the environment.

Connected components

Can be connected to myETTvision communication platform

Remote box for communication outside the engine room (optional)

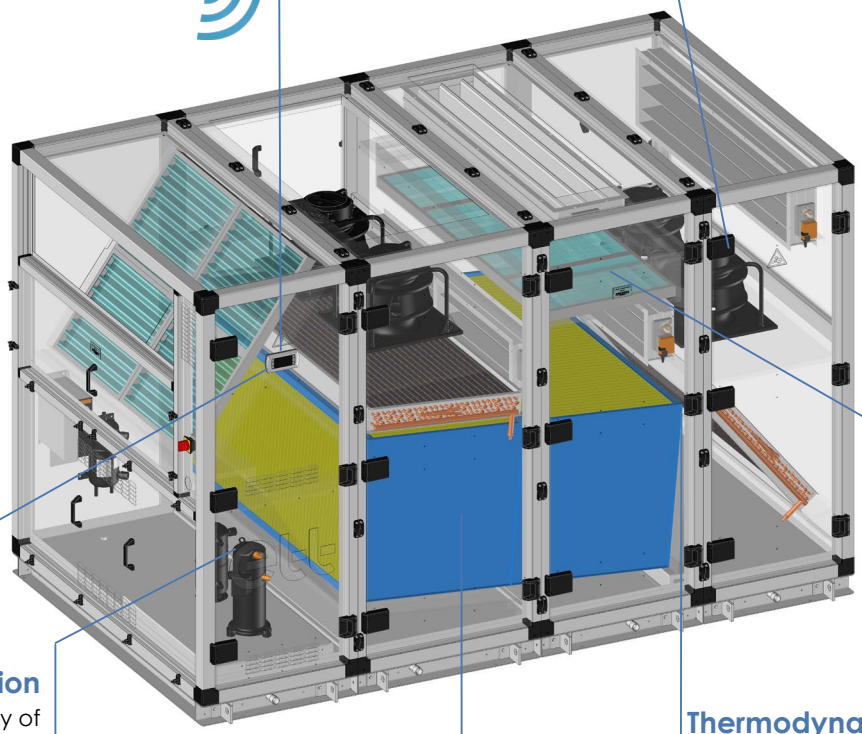
myETTvision

Fans

Base epoxy protection

Analogue Flow Controller (AFC), communicating, direct transmission, engine Electronically commuted "EC",

Optimum performance and low acoustic level



New generation PLC with display unit

Control for optimal operation

New ETT touch screen display Control Box (optional)

Electrical board ventilated separately from the technical section.

Basic phase controller

Eco-design filtration

Low pressure drop.

Fouling analogue control.

Base ISO ePM10 50% (M5) and ISO ePM1 50% (F7) on air supply, ISO ePM10 50% (M5) on exhaust.

Leak detection

Reduces the frequency of periodic visits to your equipment.

Thermodynamic coils

New low-GWP R32 refrigerant NEW!

GWP = Global warming potential

Optimised heat exchangers for reduced refrigerant charge

Vinyl-coated finned batteries

Electronic expansion valves

Energy recovery

Cross-flow plate exchanger

Anti-corrosion paint

NEW! Yield greater than 73% in All new air (according to EN308)

Eurovent certified exchanger

R32

Unit description

Aluminium frame and casing

INNOVATION : the first aluminium heat pump to comply with class T2/TB2 performance (according to NF EN 1886) NEW!

Optimised tightness and thermal insulation.

Compression locks.

Reduced weight, for new and refurbish projects.

Optional roof for outdoor installations NEW!

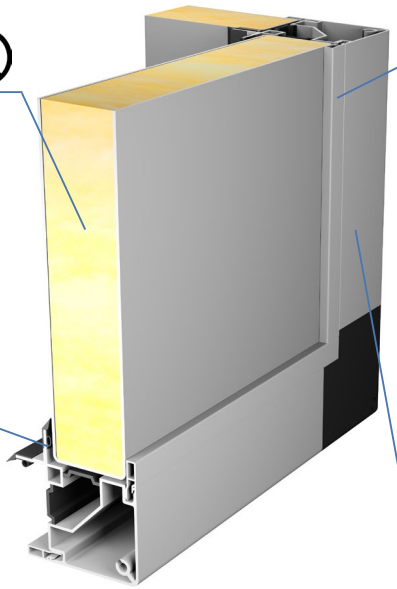
20-year guarantee against corrosion frame - casing

Reinforced insulation

Glass wool 50 mm thich classified M0/A2s1d0

Integrated thermal bridge breaker

Reinforced acoustic attenuation by double skin and high density glass wool



Seal

Air tightness level **L1**
(according to NF EN 1886) hygienic quality VDI6022

100% recyclable aluminium

Installation in technical room

Depressurization of the technical section to prevent the release of refrigerant into the technical room in the event of a leak.

Compact casing that can be placed against a wall.

Narrow unit width for easy door access during installation.

Multi-block delivery possible as an option.

Easy to clean unit with integrated condensate tray.

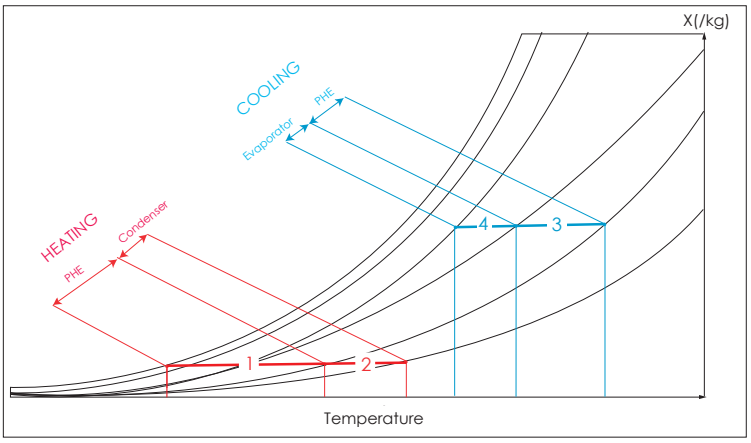
TÜV NORD

*Performance level EN1886 on ETT model housing tested and validated by the TÜV Nord laboratory (2022)

NF EN 1886: 2008	ETT 'Model Box' performance				
Mechanical deformation			D3	D2	D1
Box leakage (overpressure +700Pa)			L3	L2	L1
Box leakage (vacuum -400Pa)			L3	L2	L1
Filter frame leakage	M5	F6	F7	F8	F9
Transmittance	T5	T4	T3	T2	T1
Thermal bridge	TB5	TB4	TB3	TB2	TB1

Operating principals

Energy recovery from the extracted air in winter and summer is achieved through a plate heat exchanger (PHE). The set temperature can be maintained by this recovery and, if this is not enough, by the reversible refrigeration cycle of the heat pump.



The unit operates as a reversible heat pump:

> Source: exhaust air

> Treated fluid: hygienic fresh air

> With all fresh air/all exhaust air with supply air temperature control.

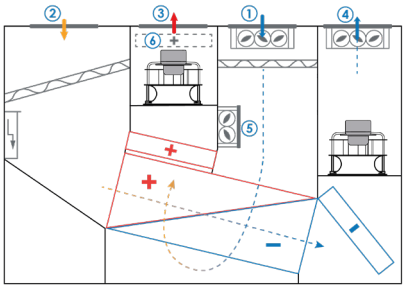
The following operating modes are available:

> Heating mode : l'the extracted air transfers its heat to the fresh outside air via the plate heat exchanger (minimum efficiency 70%) [1]. If the heat demand requires it, additional heating is carried out by the condenser of the variable capacity refrigeration circuit for optimum maintenance of the setpoint [2].

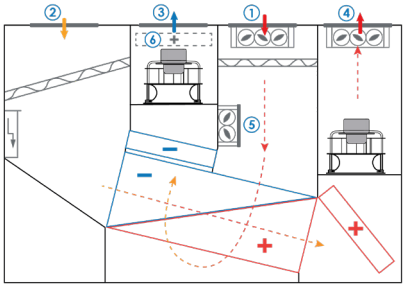
> Air conditioning mode : the heat from the fresh air is extracted and transmitted to the exhaust air via the plate heat exchanger (minimum efficiency 70%).[3]. The evaporator of the variable capacity refrigeration circuit is used to precisely maintain the required setpoint if required [4].

> Free Cooling mode

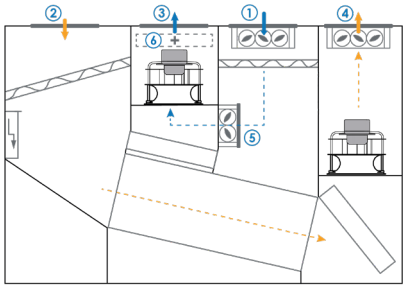
Heating Mode :



Air conditioning Mode :

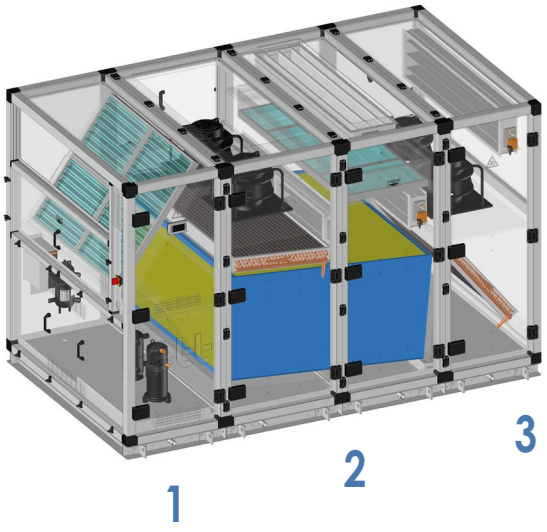


Free Cooling Mode :



(1) Fresh air (2) Return air (3) Supply air (4) Exhaust air (5) Free Cooling damper (6) Heating auxiliary

Detailed components



The ETT packaged unit comprises 3 different sections:

1. A technical section containing the refrigeration components, the electric board and the control units.
2. A supply air section for the renewal of fresh air
3. An extraction section for the recovery and/or exhaust of heat from the extract air (depending on the operating mode).

Aluminium frame and casing:

- **Rigid, compact and light packaged unit**, perfectly weather-resistant, with a 20-year anti corrosion guarantee on the entire casing.
- **Watertight floor** with drainage outlets around the unit, connected to rubber siphons.
- **Full aluminium casing** (AG3).
- A separate **technical section** facilitates unit control and maintenance and allows measurement and adjustment during operation.
- **High thermal and aeraulic performance housing : Thermal class T2 & TB2 Leak level L1 & F9 according to NF EN 1886.**
- **Access doors on removable hinges** largely dimensioned. The panels are equipped with closures **with compression locks**. The removable panels are sealed by compression on a flexible lip seal, ensuring perfect elasticity over time.
- **Double skin internal sound and thermal insulation** of the walls provided by 50 mm thick glass wool classified M0/A2s1d0, protected by a 13/10 thick aluminium sheet ensuring mechanical protection and easy maintenance
- **Sound and thermal insulation of the floor** provided by 50 mm of glass wool classified M0/A2s1d0 with double skin.
- **Different motorised dampers** : on fresh air (with anti bird netting), on discharge, on return and by-pass (free cooling mode) to ensure the different possible operating modes. These aluminium-framed dampers have low pressure losses due to their airfoil shaped extruded aluminium blades.

Detailed components

Aeraulic assembly:

- **Eco-design filtration.... thickness 48 mm + 48 mm** at supply, easily removable, efficiency ISO ePM10 50% (M5) in pleated media + ISO ePM1 50% (F7), fouling controlled by the regulator.
- **Eco-design filtration 48 mm thick** on return, easily removable, efficiency ISO ePM10 50% (M5) in pleated media controlled by the regulator.
- **Last generation internal fans (High Energy Performance):**
  - ✓ **Direct transmission** (gain on maintenance, reliability and consumption).
  - ✓ **Equipped with a variable speed "EC" motor** associated with the analogue flow controller - AFC (commissioning gain),
  - ✓ Communicating, allowing their operation to be adjusted in real time.
  - ✓ With integrated Soft Starter for reduced starting current and soft start (textile ducting).

Energy and thermodynamic assembly:

- **Refrigeration circuits** compliant with European directive on pressure equipment (PED 2014/68/EU).
- **Variable speed compressor** for unit optimum efficiency. Control of the supply air temperature by the variable speed unit.
- **R32 refrigerant**.
- **A plate heat exchanger,** aluminium plates, with high recover capacity and dimensioned to optimise heat pump efficiency. The plate exchanger recovers heat from the extract air and transfers it to the fresh air side of the second half of the plate exchanger. This process uses no energy. The plate exchanger has vinyl coated plates and anti corrosion coated frame
- **Direct expansion exchangers,** copper tubes and aluminium fins, with high exchange power optimised by electronic expansion valve, selected for an air speed of less than 2,6 m/s thus avoiding any risk of condensate carryover. Direct expansion exchangers are protected by a vinyl coating.
- **2 electronic expansion valves** combining increased optimisation of heat exchanger operation and rapid of stabilisation of the thermodynamic system
- Anti-acid **filter drier.**
- HP **pressure switch.**
- **Liquid receiver** with safety valve.
- **Anti-liquid** spill **bottle**.
- **Leak detection :** The X-RCAM+ is equipped with leak detection as standard. The leakage detection warns the user in case of a leakage of R32 refrigerant. The leak detection also allows you to reduce the periodic visits of your equipment, according to the French decree of 29/02/2016 on certain refrigerants and fluorinated greenhouse gases.

Detailed components

Electrical assembly:

- **Electrical board** compliant with NF EN C 15-100 and NF EN 60204-01, including:
- ✓ **ETT PLC** with display.
- ✓ **A disconnecting switch** with lockable external handle for full load cut-off. Standard universal cable connection. Optional copper/aluminium junction boxes.
- ✓ **A** 400-230-24 V **transformer** for control and regulation circuits.
- ✓ **Numbered terminal blocks** with disconnecting terminals for remote controls and transfers.
- ✓ **Terminal block** for compressors load shedding.
- ✓ An **inner wiring** fully numbered at both ends with numbered marker rings.
- ✓ An **Ik3 breaking capacity** of 10 kA basic.
- ✓ All components **protected** by circuit breakers.
- ✓ **A phase controller.**

Control assembly :

- **CTN type temperature sensors.** Their accuracy and reliability have been tested and validated both at the factory and on site.
- **One or more BEST PLCs** (Building Energy Saving Technology) especially developed by ETT for this range of units. Programs are updated annually in order to add functions requested for some applications and to optimise units power consumption.
- **Native IP MODBUS** communication protocol (BACnet IP optional)

The microprocessor, memory and PLC size are adapted to the chosen applications and options by integrating a program set-up in the factory out of 160 possible configurations.

The PLC is in a plastic box that guarantees a high mechanical protection and reduces electrostatic shock threats.

The PLC offers the following functions, among others:

- ✓ **On/Off with remote contact** or vacancy contact.
- ✓ **Occupancy/Vacancy mode** according to programmed schedule (2 time slots per day).
- ✓ Weather compensation on supply air temperature according to the outside air temperature.
- ✓ **Fault overview** with dry contact for transfer to customer system.
- ✓ **Security** (frost protection thermostat, smoke detector, HP pressure switch, etc.) and fault **management**.
- ✓ **Measurement, indication and adjustment of the supply/exhaust air flow rate** for accurate control of the air flow rates according to the operating modes of the unit.
- ✓ **Written faults history** (no code) with time and outside temperature display.
- ✓ Recording of unit, compressor and auxiliaries **operating time.**
- ✓ **Management of the unit's operating points** regardless of the external environment, enabling comfort management for users while considering both energy efficiency and building conservation.
- ✓ **Constant air flow rate control**: The X-RCAM+ ensures a constant airflow rate thanks to the ETT filter fouling control device. The ETT AFC progressive cooling control ensures comfort by controlling the supply air conditions. This configuration is recommended for applications with hygienic fresh air treatment at neutral temperatures.
- ✓ **Variable airflow control** possible via CSP and CRP sensors.
- ✓ **Management of the auxiliaries** (electric auxiliary or hot water coil depending on the options).
- ✓ **Defrost management** according to the energy saving mode in full return mode without auxiliary or in air quality mode in full fresh air.

Main options

Frame - Casing	▪ Unit for outdoor installation ▪ Motorised external damper at air supply (2006/42/EC Directive) ▪ Frame : METU ▪ Multiblock *
Acoustics	▪ Technical section acoustic insulation using STOPFLAM flexible fire-proof polyurethane foam ▪ Fresh air cowl acoustic insulation
Air handling	▪ Pressure gauge per filtration cell ▪ Filters fouling analogue control (FFAC) ▪ Actuating smoke detector with battery back-up ▪ Opacimetric filters ISO ePM1 80% (F9) thickness 48 mm on supply air ▪ Spare filters ▪ CSP and PCR sensors
Thermal exchangers	▪ 2-stage electric heater ▪ Hot water coil with analogue anti-freeze thermostat ▪ 3-way progressive valve mounted on hot water coil ▪ Pre-mounted shut-off valve + balancing valve ▪ Indirect adiabatic module option (see pages 27 & 28).
Installation	▪ Aluminium feet 200, 400 mm
Electrics and communication	▪ Unit global energy metering ▪ Software licence for BacNet IP protocol ▪ IT regime compatibility Global Machine Energy Metering ▪ ETT Control Box remote touch display ▪ MyETTvision remote communication platform ▪ TWIN control (see page 20)
Reinforced protections	▪ Hot water coil with heresite coating ▪ Thermodynamic coils with heresite coating ▪ High performance plug fans with H2+S protective coating

* depending on models

Technical features

X-RCAM+
2- 3000/ 2- 4000

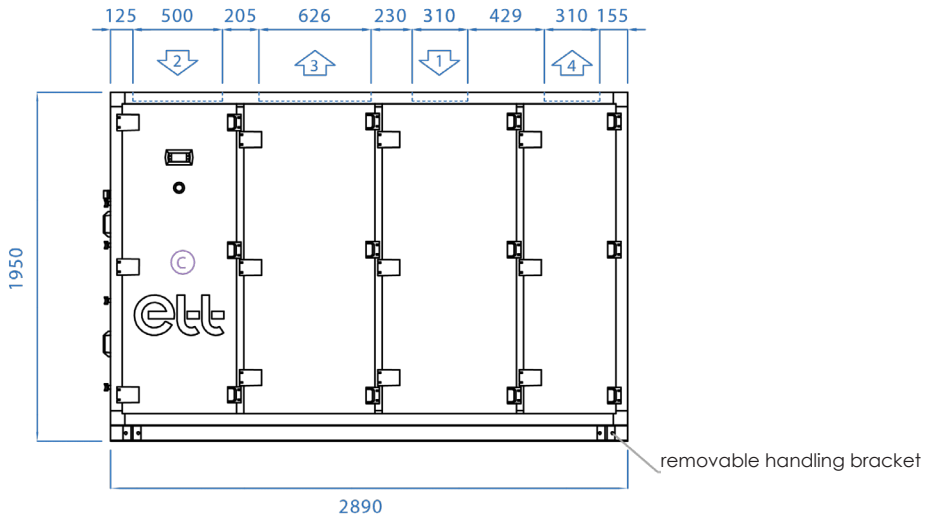
	DESIGNATION	Unit	2- 3000	2- 4000
VENTILATION	**SUPPLY AIR**			
	Nominal air flow rate for supply and return	**m3/h**	3000	4000
	Min./Max. air flow rate	**m3/h**	3000 / 4000	
	FANS(1)			
	Absorbed electrical power on supply air	**kW**	0.8	1.5
	Absorbed electrical power on exhaust air	**kW**	0.7	1.2
	ACOUSTICS(1)			
	Sound power level on supply air	**dB(A)**	81	86
	Outside sound power level	**dB(A)**	65	69
	Resulting external sound pressure at 10m ref. 10-5 in free field	**dB(A)**	34	38
AIR CONDITIONING EFFICIENCY	**RATED PERFORMANCES AT +35°C** (1)(2)			
	Total cooling capacity	**kW**	10.2	13.1
	Overall EER	**kW/kW**	3.8	3.2
	Cooling capacity recovered by plate heat exchanger	**kW**	5.9	8.3
	Plate heat exchanger efficiency	**%**	71	75
HEATING EFFICIENCY	**RATED PERFORMANCES AT +7°C** (1)(3)			
	Total heating capacity	**kW**	13.8	18.7
	Overall COP	**kW/kW**	7.1	6.0
	Heat recovered by plate heat exchanger	**kW**	9.8	13.2
	Plate heat exchanger efficiency	**%**	74	75
	RATED PERFORMANCES AT -7°C (1)(3)			
	Total heating capacity	**kW**	27,3	37,0
	Overall COP	**kW/kW**	11,3	10,0
	Heat recovered by plate heat exchanger	**kW**	21,7	29,4
	Plate heat exchanger efficiency	**%**	79	81
GENERAL	**ELECTRICAL DATA** (1)			
	Total installed electrical power	**kW**	13.3	13.3
	Total installed electrical power	**A**	21	21
	Starting current	**A**	32	32
	REFRIGERATION CIRCUIT			
	Number of Compressors	**-**	1	
	Type	**-**	VARIABLE	
	OPERATING LIMITS			
	Maximum outside temperature	**°C**	45	
	Minimum outside temperature	**°C**	-15	
	WEIGHT (1)			
	Unit weight without option	**kg**	670	

(1) Standard configuration for an external static pressure of 250 Pa on the supply side, 250 Pa on the exhaust side, and ISO ePM10 50% (M5) + ISO ePM1 50% (F7) filtration on the supply side and ISO ePM10 50% (M5) on the exhaust side without auxliary.
(2) Indoor conditions: +27°C DB/ +19°C WB- Outsideconditions : +35°C DB /24°C WB - Air supply conditions: +26°C
(3) Indoor conditions: +20°C DB/ +12°C WB- Outsideconditions : +7°C DB/ +6°C WB- Outsideconditions : -7°C DB /-8°C WB - Air supply conditions: +20°C

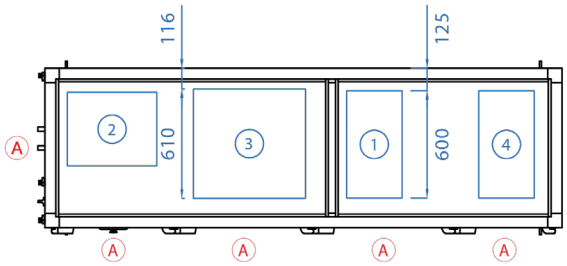
Dimensions and connections

X-RCAM+
2- 3000/ 2- 4000

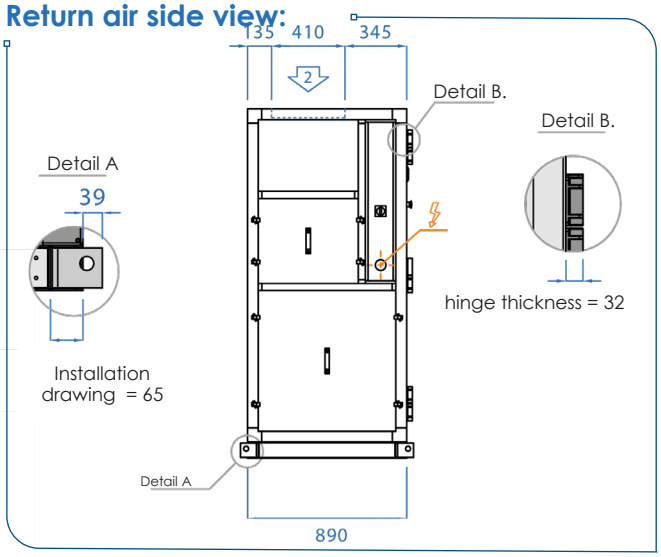
Front view:



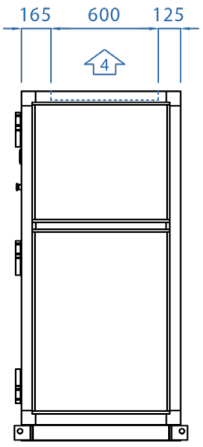
Top view:



Return air side view:



Exhaust air side view:



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

	Length	Width	Height
Assembled Casing Dimensions (mm)	2890	890	1950
Overall dimensions for transport (mm)	2930	967	1950

Note: Provide a 200 mm support (as a minimum) below the unit for the connection of the condensate traps.

Technical features

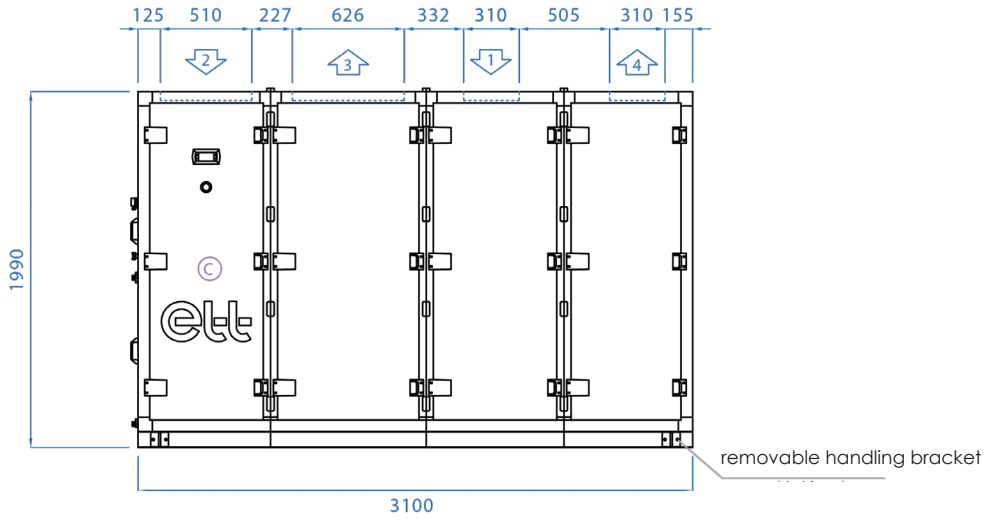
X-RCAM+
3- 5000/ 3- 6000

	DESIGNATION	Unit	3- 5000	3- 6000
VENTILATION	**SUPPLY AIR**			
	Nominal air flow rate for supply and return	**m3/h**	5000	6000
	Min./Max. air flow rate	**m3/h**	5000 / 6000	
	FANS(1)			
	Absorbed electrical power on supply air	**kW**	1.5	2.2
	Absorbed electrical power on exhaust air	**kW**	1.3	1.9
	ACOUSTICS(1)			
	Sound power level on supply air	**dB(A)**	86	90
	Outside sound power level	**dB(A)**	70	73
	Resulting external sound pressure at 10m ref. 10-5 in free field	**dB(A)**	39	42
AIR CONDITIONING EFFICIENCY	**RATED PERFORMANCES AT +35°C** (1)(2)			
	Total cooling capacity	**kW**	16.1	18.9
	Overall EER	**kW/kW**	3.8	3.3
	Cooling capacity recovered by plate heat exchanger	**kW**	10.2	12.5
	Plate heat exchanger efficiency	**%**	74	75
HEATING EFFICIENCY	**RATED PERFORMANCES AT +7°C** (1)(3)			
	Total heating capacity	**kW**	22.9	27.9
	Overall COP	**kW/kW**	6.9	6.1
	Heat recovered by plate heat exchanger	**kW**	16.4	19.8
	Plate heat exchanger efficiency	**%**	74	75
	RATED PERFORMANCES AT -7°C (1)(3)			
	Total heating capacity	**kW**	45.7	54.8
	Overall COP	**kW/kW**	11.2	10.2
	Heat recovered by plate heat exchanger	**kW**	36.4	44.1
	Plate heat exchanger efficiency	**%**	80	81
GENERAL	**ELECTRICAL DATA** (1)			
	Total installed electrical power	**kW**	15.8	15.8
	Total installed electrical power	**A**	24	24
	Starting current	**A**	36	36
	REFRIGERATION CIRCUIT			
	Number of Compressors	**-**	1	
	Type	**-**	VARIABLE	
	OPERATING LIMITS			
	Maximum outside temperature	**°C**	45	
	Minimum outside temperature	**°C**	-15	
	WEIGHT (1)			
	Unit weight without option	**kg**	940	

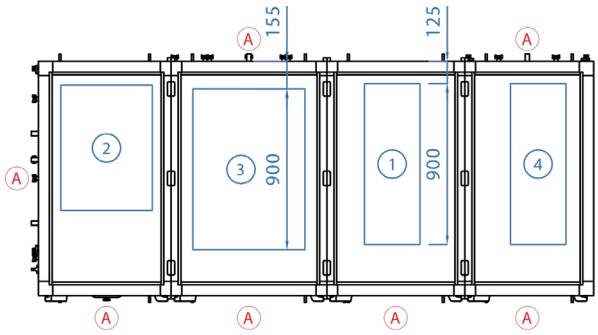
(1) Standard configuration for an external static pressure of 250 Pa on the supply side, 250 Pa on the exhaust side, and ISO ePM10 50% (M5) + ISO ePM1 50% (F7) filtration on the supply side and ISO ePM10 50% (M5) on the exhaust side without auxliary.
(2) Indoor conditions: +27°C DB/ +19°C WB- Outsideconditions : +35°C DB /24°C WB - Air supply conditions: +26°C
(3) Indoor conditions: +20°C DB/ +12°C WB- Outsideconditions : +7°C DB/ +6°C WB- Outsideconditions : -7°C DB /-8°C WB - Air supply conditions: +20°C

Dimensions and connections

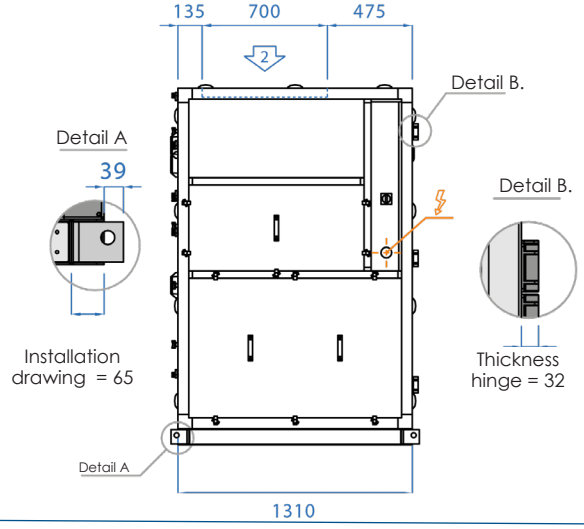
Front view:



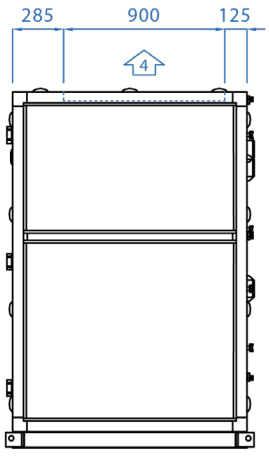
Top view:



Return air side view:



Exhaust air side view:



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

	Length	Width	Height
Assembled Body Dimensions (mm)	3100	1310	1990
Overall dimensions Transport (mm)	3140	1387	1990

Note: Provide a 200 mm support (as a minimum) below the unit for the connection of the condensate traps.

Technical features

X-RCAM+
4- 7000/ 4- 8000/ 4-9000/ 4-10000

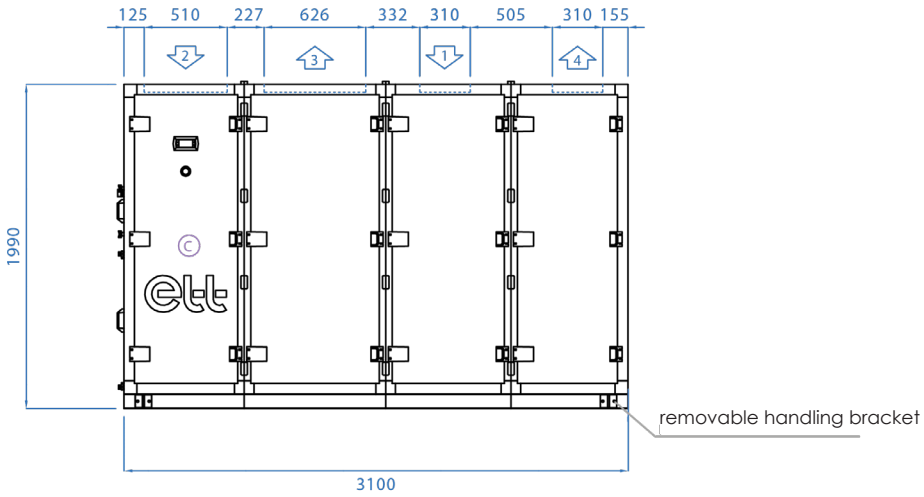
	DESIGNATION	Unit	4- 7000	4- 8000	4- 9000	4- 10000
VENTILATION	**SUPPLY AIR**					
	Nominal air flow rate for supply and return	**m3/h**	7000	8000	9000	10000
	Min./Max. air flow rate	**m3/h**	7000 / 10000			
	FANS(1)					
	Absorbed electrical power on supply air	**kW**	1.9	2.5	3.2	4.1
	Absorbed electrical power on exhaust air	**kW**	1.7	2.2	2.8	3.5
	ACOUSTICS(1)					
	Sound power level on supply air	**dB(A)**	86	88	90	92
	Outside sound power level	**dB(A)**	70	72	73	75
	Resulting outdoor sound pressure at 10m ref. 10-5 in free field	**dB(A)**	39	41	42	44
AIR CONDITIONING EFFICIENCY	**RATED PERFORMANCES AT +35°C** (1)(2)					
	Total cooling capacity	**kW**	22.1	26.8	30.5	33.0
	Overall EER	**kW/kW**	4.1	3.7	3.3	2.9
	Cooling capacity recovered by plate heat exchanger	**kW**	14.3	16.4	18.6	20.8
	Plate heat exchanger efficiency	**%**	74	74	75	75
HEATING EFFICIENCY	**RATED PERFORMANCES AT +7°C** (1)(3)					
	Total heating capacity	**kW**	31.8	36.8	41.5	46.9
	Overall COP	**kW/kW**	7.4	6.9	6.2	5.7
	Heat recovered by plate heat exchanger	**kW**	22.9	26.5	29.8	33.3
	Plate heat exchanger efficiency	**%**	74	75	75	75
	RATED PERFORMANCES AT -7°C (1)(3)					
	Total heating capacity	**kW**	63.9	73.0	82.5	91.5
	Overall COP	**kW/kW**	11.7	11.2	10.2	9.5
	Heat recovered by plate heat exchanger	**kW**	51.1	58.9	66.3	73.9
	Plate heat exchanger efficiency	**%**	80	81	81	81
GENERAL	**ELECTRICAL DATA** (1)					
	Total installed electrical power	**kW**	17.8	17.8	17.8	17.8
	Total installed electrical power	**A**	28	28	28	28
	Starting current	**A**	39	39	39	39
	REFRIGERATION CIRCUIT					
	Number of Compressors	**-**	1			
	Type	**-**	VARIABLE			
	OPERATING LIMITS					
	Maximum outside temperature	**°C**	45			
	Minimum outside temperature	**°C**	-15			
	WEIGHT (1)					
	Unit weight without option	**kg**	1210			

(1) Standard configuration for an external static pressure of 250 Pa on the supply side, 250 Pa on the exhaust side, and ISO ePM10 50% (M5) + ISO ePM1 50% (F7) filtration on the supply side and ISO ePM10 50% (M5) on the exhaust side without auxliary.
(2) Indoor conditions: +27°C DB/ +19°C WB- Outsideconditions : +35°C DB /24°C WB - Air supply conditions: +26°C
(3) Indoor conditions: +20°C DB/ +12°C WB- Outsideconditions : +7°C BS / +6°C BH - Outsideconditions : -7°C DB /-8°C WB - Air supply conditions: +20°C

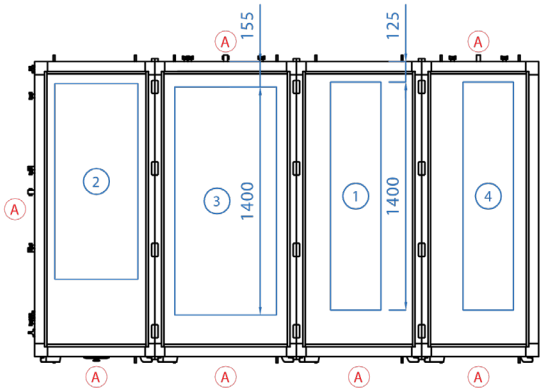
Dimensions and connections

X-RCAM+
4- 7000/ 4- 8000/ 4-9000/ 4-10000

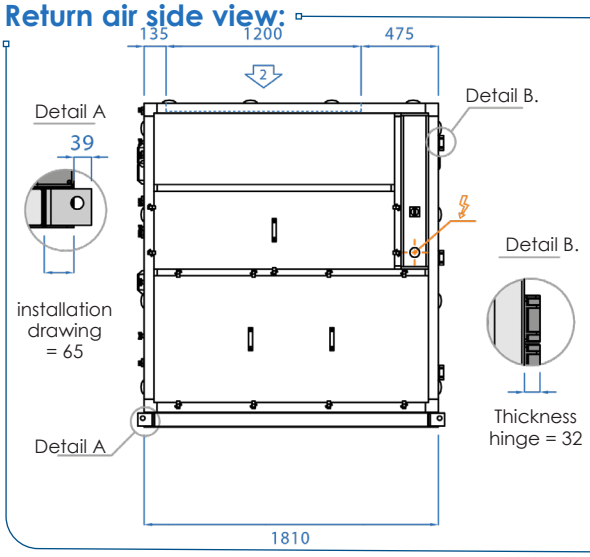
Front view:



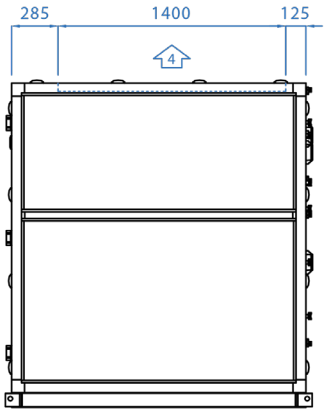
Top view:



Return air side view:



Exhaust air side view:



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

	Length	Width	Height
Assembled Body Dimensions (mm)	3100	1810	1990
Overall dimensions for transport (mm)	3140	1889	1990

Note: Provide a 200 mm support (as a minimum) below the unit for the connection of the condensate traps.

Technical features

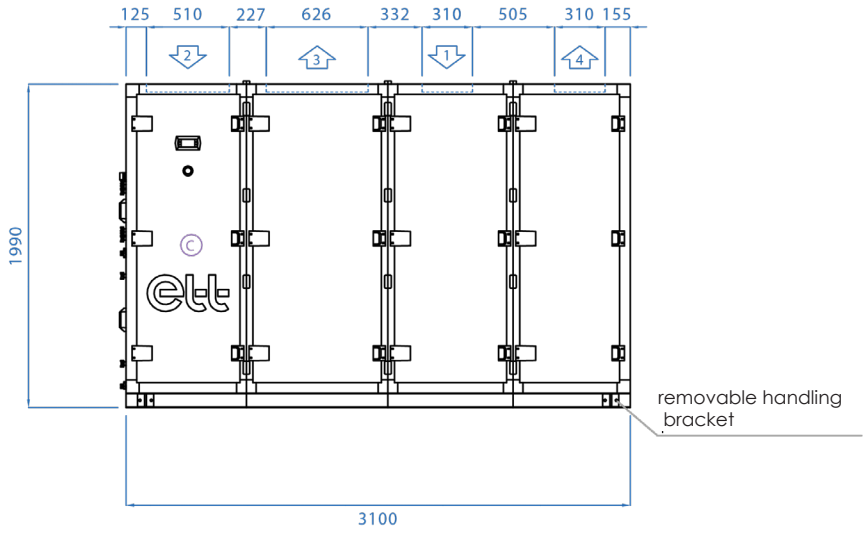
X-RCAM+
5-11000 / 5-12000 / 5-13000 / 5-14000 / 5-15000

	DESIGNATION	Unit	5- 11000	5- 12000	5- 13000	5- 14000	5- 15000
VENTILATION	**SUPPLY AIR**						
	Rated air flow	m3/h	11000	12000	13000	14000	15000
	Minimum/Maximum air flow rate	m3/h	11000 / 15000				
	FANS(1)						
	Absorbed electrical power on supply air	kW	3.3	4.0	4.3	5.1	6.1
	Absorbed electrical power on exhaust air	kW	2.9	3.6	3.7	4.3	5.1
	ACOUSTICS(1)						
	Sound power level on supply air	dB(A)	91	92	87	89	91
	Outside sound power level	dB(A)	74	76	72	74	75
	Resulting outdooor sound pressure at 10m ref.. 10-5 in free field	dB(A)	43	45	41	43	44
AIR CONDITIONING EFFICIENCY	**RATED PERFORMANCES AT +35°C** (1)(2)						
	Total cooling capacity	kW	37.5	38.9	41.0	45.0	47.4
	EER	kW/kW	3.8	3.5	3.6	3.3	3.0
	Cooling capacity recovered by plate heat exchanger	kW	22.5	24.6	26.9	29.0	31.2
	Plate heat exchanger efficiency	%	74	74	75	75	75
HEATING EFFICIENCY	**RATED PERFORMANCES AT +7°C** (1)(2)						
	Total heating capacity	kW	51.2	56.5	60.2	64.9	69.7
	COP	kW/kW	6.9	6.5	6.6	6.2	5.4
	Heat recovered by plate heat exchanger	kW	36.0	39.9	43.0	46.5	49.9
	Plate heat exchanger efficiency	%	74	75	75	75	75
	RATED PERFORMANCES AT -7°C (1)(2)						
	Total heating capacity	kW	101.4	111.1	119.8	129.2	138.5
	COP	kW/kW	10.7	10.3	10.5	10.0	9.4
	Heat recovered by plate heat exchanger	kW	80.1	88.2	95.7	103.3	110.9
	Plate heat exchanger efficiency	%	80	81	81	81	81
GENERAL	**ELECTRICAL DATA** (1)						
	Total installed electrical power	kW	24.9	24.9	28.8	28.8	28.8
	Total installed electrical power	A	38	38	44	44	44
	Starting current	A	44	44	50	50	50
	REFRIGERATION CIRCUIT						
	Number of Compressors	-	1				
	Type	-	VARIABLE				
	OPERATING LIMITS						
	Maximum outside temperature	°C	45				
	Minimum outside temperature	°C	-15				
	WEIGHT (1)						
	Unit weight without option	kg	1540				

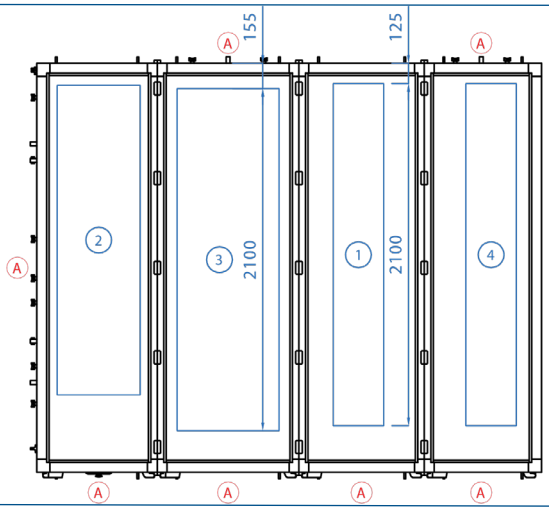
(1) Standard configuration for an external static pressure of 250 Pa on the supply side, 250 Pa on the exhaust side, and ISO ePM10 50% (M5) + ISO ePM1 50% (F7) filtration on the supply side and ISO ePM10 50% (M5) on the exhaust side without auxliary.
(2) Indoor conditions: +27°C BS / +19°C BH - Outsideconditions : +35°C DB /24°C WB - Air supply conditions: +26°C
(3) Indoor conditions: +20°C BS / +12°C BH - Outsideconditions : +7°C BS / +6°C BH - Outsideconditions : -7°C DB /-8°C WB - Air supply conditions: +20°C

Dimensions & connections

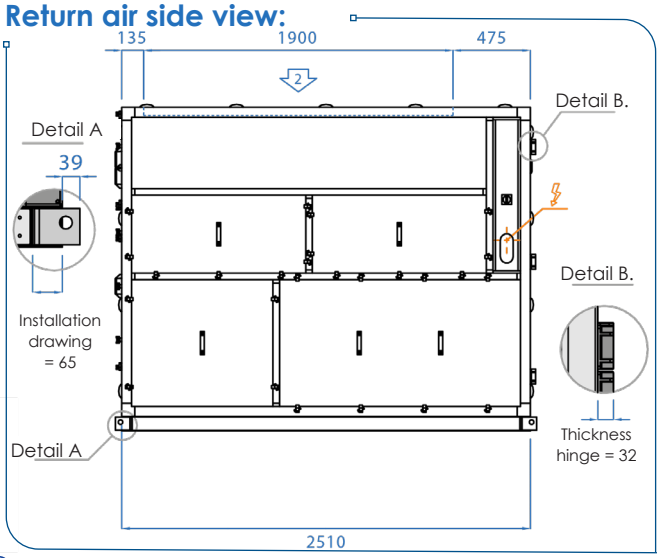
Front view:



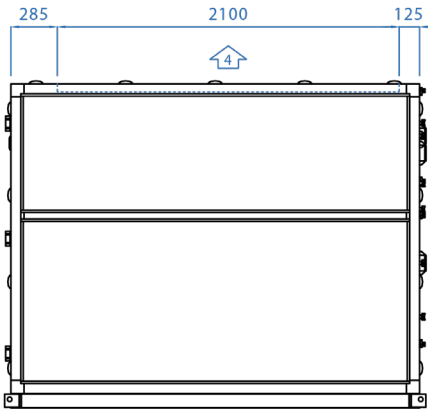
Top view:



Return air side view:



Exhaust air side view:



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

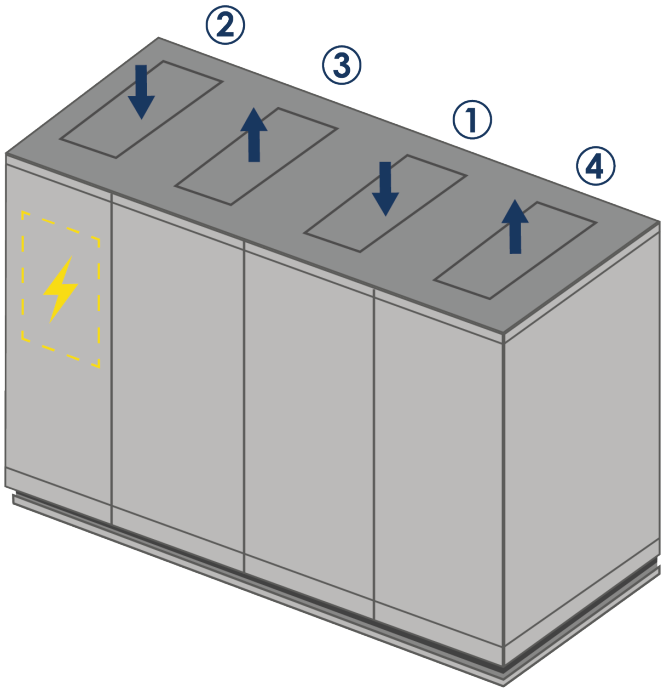
	Length	Width	Height
Assembled Casing Dimensions (mm)	3100	2510	1990
Overall dimensions for transport (mm)	3140	2589	1990

Note: Provide a 200 mm support (as a minimum) below the unit for the connection of the condensate traps.

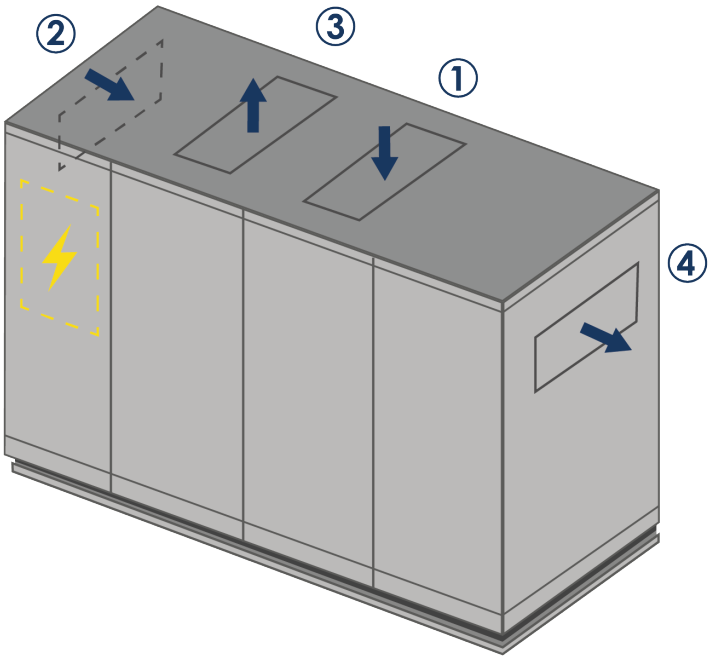
Arrangements

Arrangement A

only available for indoor unit



Arrangement B



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

TWIN control option

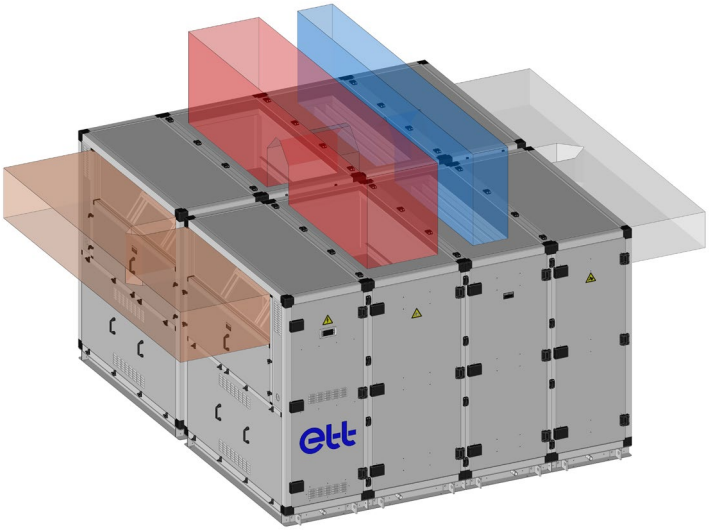
The X-RCAM+ has the particularity to be coupled.

This process allows :

- ✓ **Double** the processed air flow rates
- ✓ Be able **to adapt to specific** installation **constraints.**

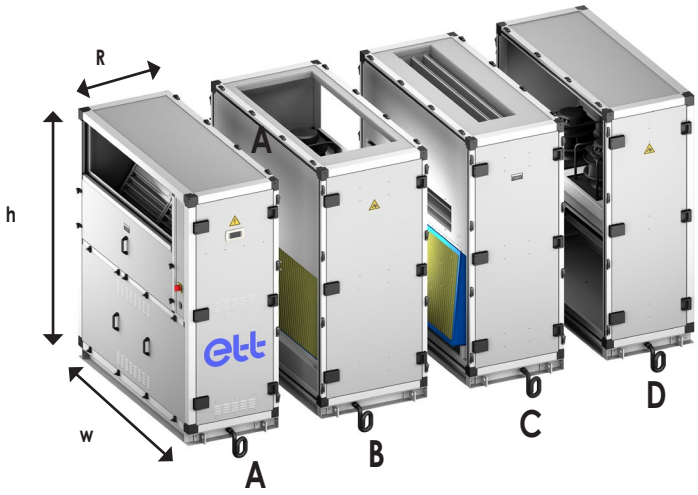
The units can be installed back to back or separately.

The units are controlled via the installation of a master PLC.



Multiblock option

The X-RCAM+ can be delivered in multiblocks on casing sizes 3 - 4 - 5



Block	Unit	Length (l)			Width (w)	Height (H)
		X-RCAM+ 3	X-RCAM+ 4	X-RCAM+ 5	X-RCAM+ 3 / 4 / 5	
A	mm	1310	1810	2510	740	1990
B					870	
C					770	
D					720	

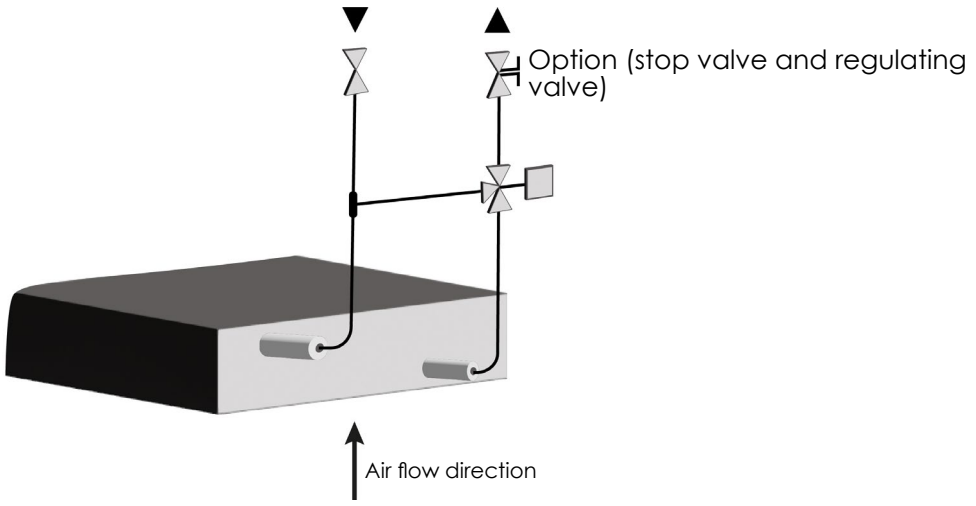
Auxiliaries: Electric heaters

Available capacities (in kW)

Available capacities (in kW)						
Total capacity (kW)	6	12	18	24	30	36
Current (A)	9	17	26	35	43	52
1st stage	3	3	6	9	12	12
2nd stage	3	9	12	15	18	24
2- 3000	•	•	•			
2-4000	•	•	•			
3-5000		•	•	•		
3-6000		•	•	•		
4-7000			•	•	•	
4-8000			•	•	•	
4-9000			•	•	•	
4-10000			•	•	•	
5-11000				•	•	•
5-12000				•	•	•
5-13000				•	•	•
5-14000				•	•	•
5-15000				•	•	•
Weight (Kg)	16	17	23	24	32	32

Auxiliaries: Hot water coils

Schematic diagram



Connections and weights

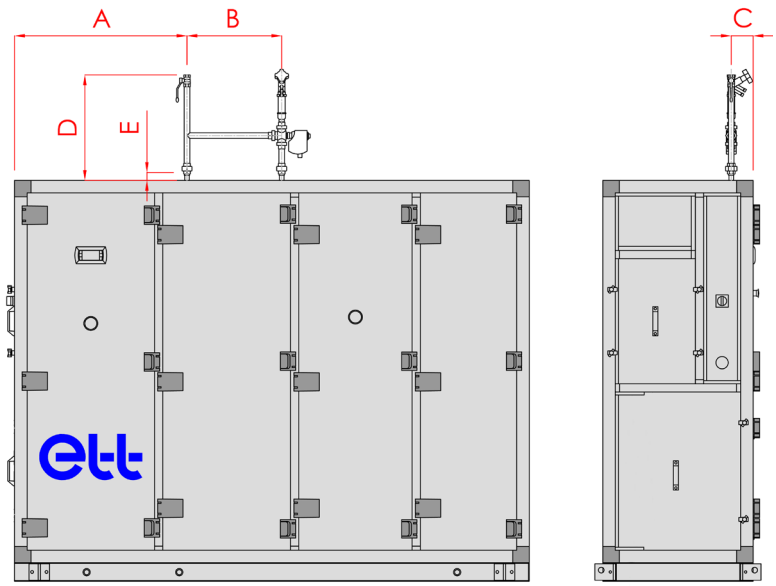
	Unit	2- 3000	2- 4000	3- 5000	3- 6000	4- 7000	4- 8000	4- 9000	4- 10000	5- 11000	5- 12000	5- 13000	5- 14000	5- 15000
Customer connection diameter	mm	20x27		26x34		33x42				33x42				
Coil + 3WV with water	kg	11		14		20				29				

Capacities

		Unit	2- 3000	2- 4000	3- 5000	3- 6000	4- 7000	4- 8000	4- 9000	4- 10000	5- 11000	5- 12000	5- 13000	5- 14000	5- 15000
Water regime 90/ 70	Max. power	kW	15.0	17.5	24.9	27.4	36.0	38.8	41.3	43.7	53.9	56.6	59.0	61.4	63.7
	Max. flow rate	m3/h	0.6	0.8	1.1	1.2	1.6	1.7	1.8	1.9	2.4	2.5	2.6	2.7	2.8
	V3V + coil pressure drop	mWH	1.7	2.3	3.7	4.5	3.0	3.3	3.7	4.0	1.2	1.4	1.5	1.7	1.7
	Shut-off and TA valves pressure drop (3 turns open)	mWH	0.35	0.54	0.36	0.41	0.35	0.38	0.42	0.46	0.67	0.72	0.77	0.82	0.88
Water regime 80/ 60	Max. power	kW	12.5	14.6	20.7	22.9	30.0	32.3	34.4	36.4	44.7	46.9	48.9	50.9	52.8
	Max. flow rate	m3/h	0.5	0.6	0.9	1.0	1.3	1.4	1.5	1.6	2.0	2.1	2.2	2.2	2.3
	V3V + coil pressure drop	mWH	1.2	1.6	2.5	3.0	2.0	2.3	2.8	2.9	0.9	1.0	1.0	1.1	1.2
	Shut-off and TA valves pressure drop (3 turns open)	mWH	0.27	0.35	0.27	0.31	0.26	0.29	0.32	0.35	0.49	0.54	0.58	0.58	0.62

Connections: Hot water coil

Schematic diagram - Front View



Connection interface «Auxiliary : hot water coil»

Dimensions

	Unit	2- 3000	2- 4000	3- 5000	3- 6000	4- 7000	4- 8000	4- 9000	4- 10000	5- 11000	5- 12000	5- 13000	5- 14000	5- 15000
A	mm	834		867		867				867				
B	mm	617		617		617				617				
C	mm	103		129		129				129				
D	mm	521		521		521				521				
E	mm	48		63		63				63				

Sound level* on supply/exhaust air side
Frequency band spectrum

X-RCAM+

On supply air side

Available pressure : 250 Pa at supply air, 250 Pa at exhaust air

	FREQUENCY BANDS Hz ►		63	125	250	500	1000	2000	4000	8000	Overall level Lw (dB(A))
	Supply air flow rate (m³/h) ▼	Treated air flow rate (m³/h) ▼									
2- 3000	3000	3000	42	51	68	72	78	77	72	65	82
2- 4000	4000	4000	45	52	71	76	82	82	76	70	86
3- 5000	5000	5000	46	55	69	77	82	81	78	70	86
3- 6000	6000	6000	48	57	74	81	86	85	80	74	90
4- 7000	7000	7000	45	53	71	76	82	83	76	69	86
4- 8000	8000	8000	47	54	72	78	84	84	78	72	88
4- 9000	9000	9000	49	56	74	80	86	85	81	75	90
4- 10000	10000	10000	52	57	75	82	88	87	83	77	92
5- 11000	11000	11000	49	59	74	82	87	85	82	74	91
5- 12000	12 000	12000	50	59	76	83	89	87	83	76	92
5- 13000	13000	13000	53	65	71	78	82	83	80	72	87
5- 14000	14000	14000	54	66	73	80	84	85	82	74	89
5- 15000	15000	15000	47	67	74	81	85	87	83	76	91

On exhaust air side

Available pressure: 250 Pa at supply air, 250 Pa at exhaust air

	FREQUENCY BANDS Hz ►		63	125	250	500	1000	2000	4000	8000	Overall level Lw (dB(A))
	Supply air flow rate (m³/h) ▼	Treated air flow rate (m³/h) ▼									
2- 3000	3000	3000	40	50	65	71	77	75	71	64	80
2- 4000	4000	4000	44	51	69	75	81	82	75	69	86
3- 5000	5000	5000	45	55	69	77	82	81	77	69	86
3- 6000	6000	6000	47	56	74	81	86	85	80	73	90
4- 7000	7000	7000	44	53	69	76	81	82	75	69	86
4- 8000	8000	8000	46	54	71	78	83	85	77	71	88
4- 9000	9000	9000	48	55	73	80	85	85	80	74	89
4- 10000	10000	10000	50	56	74	81	88	86	82	77	91
5- 11000	11000	11000	48	58	74	81	87	85	82	74	90
5- 12000	12 000	12000	49	59	76	83	89	87	83	76	92
5- 13000	13000	13000	51	65	70	77	82	82	80	72	87
5- 14000	14000	14000	52	66	72	78	83	84	81	75	88
5- 15000	15000	15000	52	67	73	79	84	86	83	78	90

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

Sound level* at fresh air inlet/on return air side
Frequency band spectrum

X-RCAM+

At fresh air inlet

Available pressure: 250 Pa at supply air, 250 Pa at exhaust air

	FREQUENCY BANDS Hz ►		63	125	250	500	1000	2000	4000	8000	Overall level Lw (dB(A))
	Supply air flow rate (m^3/h) ▼	Treated air flow rate (m^3/h) ▼									
2- 3000	3000	3000	33	39	54	55	54	54	47	37	61
2- 4000	4000	4000	35	39	60	58	58	58	51	43	65
3- 5000	5000	5000	38	43	57	60	59	57	50	43	65
3- 6000	6000	6000	39	45	60	63	62	60	54	48	68
4- 7000	7000	7000	36	40	57	59	58	60	51	42	65
4- 8000	8000	8000	37	42	61	61	60	61	53	45	67
4- 9000	9000	9000	38	43	63	62	62	62	55	48	69
4- 10000	10000	10000	39	44	64	64	64	63	58	51	70
5- 11000	11000	11000	41	47	61	64	63	61	55	48	69
5- 12000	12 000	12000	41	47	62	65	65	63	56	50	70
5- 13000	13000	13000	47	52	60	60	60	58	57	44	66
5- 14000	14000	14000	47	54	61	61	62	59	59	47	68
5- 15000	15000	15000	47	55	63	63	63	61	61	50	69

On return air side

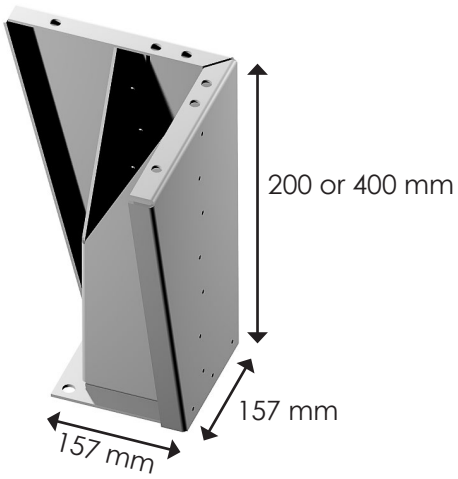
Available pressure: 250 Pa at supply air, 250 Pa at exhaust air

	FREQUENCY BANDS Hz ►		63	125	250	500	1000	2000	4000	8000	Overall level Lw (dB(A))
	Supply air flow rate (m^3/h) ▼	Treated air flow rate (m^3/h) ▼									
2- 3000	3000	3000	31	38	53	55	54	54	48	40	60
2- 4000	4000	4000	34	40	59	59	58	59	52	46	65
3- 5000	5000	5000	37	44	57	61	60	58	52	47	66
3- 6000	6000	6000	38	46	61	64	63	61	56	52	69
4- 7000	7000	7000	35	41	58	60	58	62	52	45	66
4- 8000	8000	8000	36	42	61	62	60	64	54	48	68
4- 9000	9000	9000	38	44	64	63	62	63	57	51	69
4- 10000	10000	10000	39	45	65	65	65	64	59	54	71
5- 11000	11000	11000	40	48	62	65	64	63	57	52	70
5- 12000	12 000	12000	41	49	63	66	66	64	59	54	72
5- 13000	13000	13000	45	54	60	60	60	59	59	49	67
5- 14000	14000	14000	45	55	62	61	62	60	61	52	69
5- 15000	15000	15000	45	56	63	63	63	62	62	55	70

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

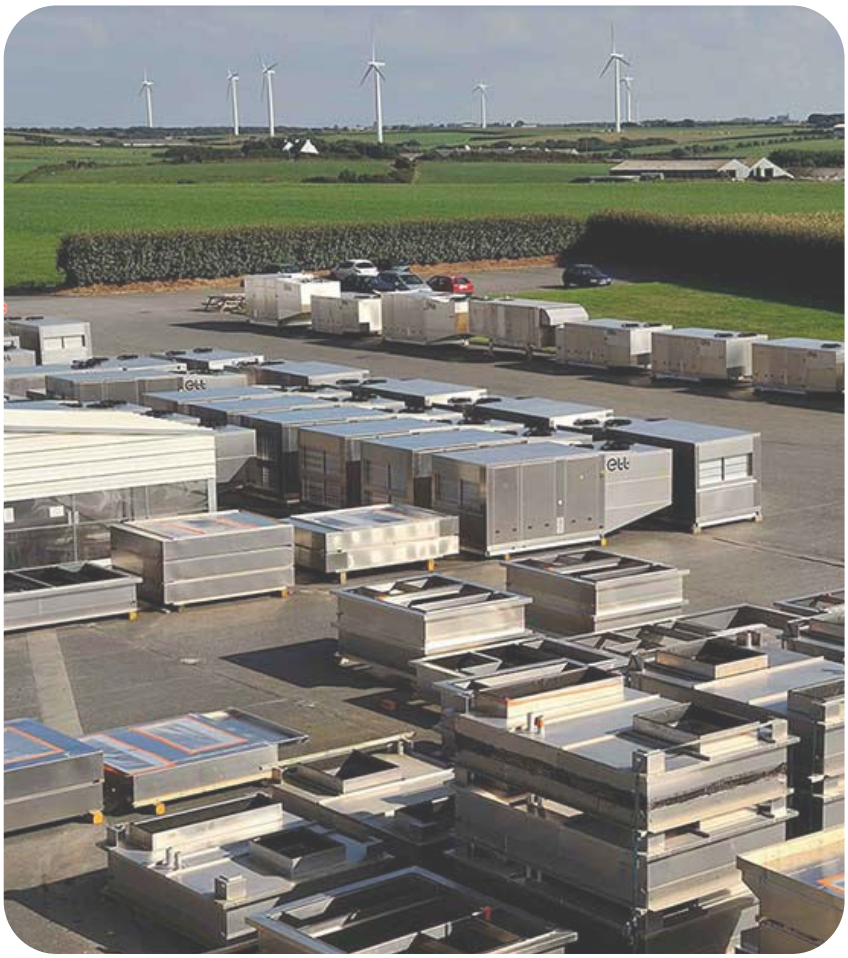
Installation accessories: Feet

Aluminium fixed foot
Unit weight: 1 kg



All single packaged X-RCAM+ , regardless of size, require 4 support legs.

Unit	2- 3000	2- 4000	3- 5000	3- 6000	4- 7000	4- 8000	4- 9000	4- 10000	5- 11000	5- 12000	5- 13000	5- 14000	5- 15000
Number of feet (Packaged unit)	4		4		4				4				



Indirect adiabatic option

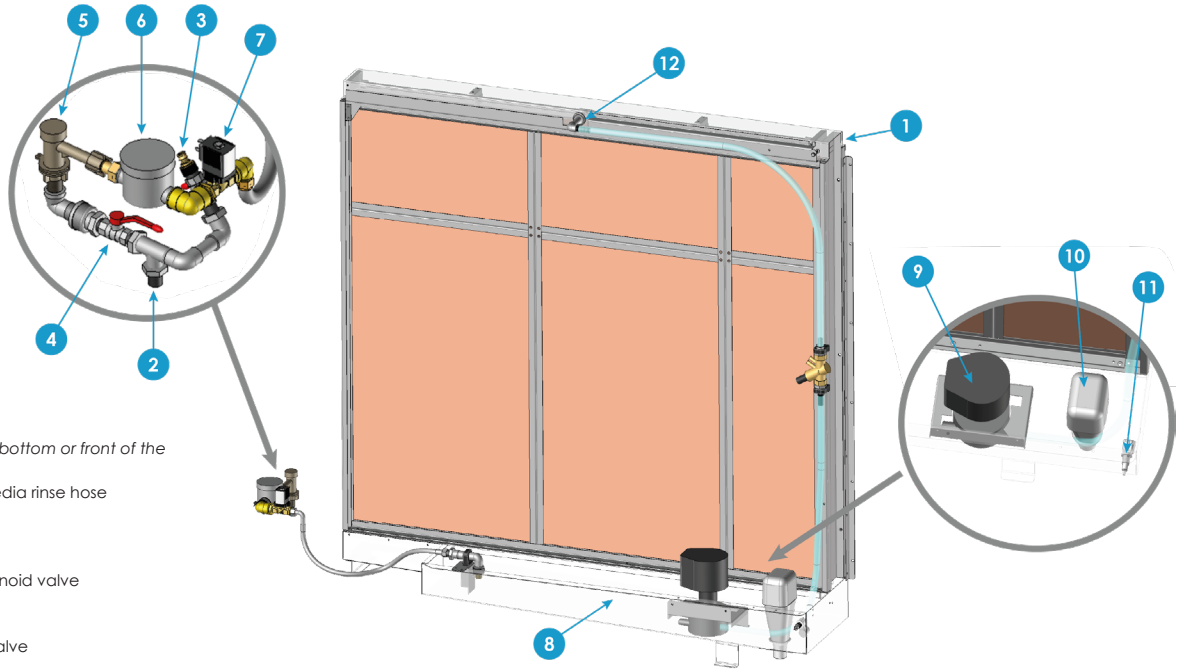
Description

The adiabatic module is installed on the return flow of the machine upstream of the plate heat exchanger.
It reduces the return temperature and thus improves the efficiency of the plate heat exchanger.
The system makes it possible to greatly reduce the operating times of the thermodynamic circuit in summer. The option is available as a remote housing for sizes 02 and 03 and as an integrated version for sizes 04 and 05.

	Size	2-3000	2-4000	3-5000	3-6000	4-7000	4-8000	4-9000	4-10000	5-11000	5-12000	5-13000	5-14000	5-15000
Installation	/	Remote housing		Remote housing		Built-in housing				Built-in housing				
Size l*W*h (with feet 200mm)	mm	960 x 600 x 1485		1310 x 600 x 1485		+ 60 mm on the unit length				+ 60 mm on the unit length				
Ø Water connection	mm	G 1/2"		G 1/2"		G 1/2"				G 1/2"				
Weight of the Adiabatic module in water	kg	89		130		74				112				
RATED PERFORMANCES AT +35°C (1)(2)														
Total cooling capacity	kW	10.3	13.9	17.8	21.1	25.1	28.4	31.6	34.6	39.2	42.3	46.1	49.2	52.0
EER	kW/kW	5.92	4.75	5.91	4.86	6.55	5.79	5.00	4.32	6.00	5.38	5.55	5.01	4.44
Plate heat exchanger efficiency	%	71	75	74	75	74	74	75	75	74	74	75	75	75
Adiabatic humidifier Efficiency	%	88	85	88	86	89	88	86	85	88	88	87	86	85

(1) Standard configuration for an external static pressure of 250 Pa on the supply, 250 Pa on the exhaust side, and ISO ePM10 50% (M5) + ISO ePM1 50% (F7) filtration on the supply side ISO ePM10 50% (M5) on the return side, without auxiliary
(2) Indoor conditions: +27°C DB /+19°C WB - Oudoor conditions: +35°C DB /24°C WB - Air supply conditions: +26°C

Principle of operation of the adiabatic chiller



1. Adiabatic chiller
2. Water supply
(Connection at the bottom or front of the machine)
3. Connector for media rinse hose
4. Stop valve
5. Cartridge filter
6. Water meter
7. Water supply solenoid valve
8. Water tank
9. Pump
10. Drain solenoid valve
11. Float
12. Distribution manifold

When cold is required, the water supply solenoid valve opens to fill the tank until the float contact is activated. Once this level is reached, the pump starts to feed a water distribution manifold located above the adiabatic media. The fibreglass media will uniformly become saturated with water through run-off.

The hot air passing through the moist media will transfer its heat to the water and evaporate some of it.

At the media outlet, the air is cooled while the water, which is still in the liquid phase, continues to trickle and then falls back into the tank. It is then pumped back into the media loop. There is no loss of water.

Drain cycles are intelligently controlled to ensure minerals are properly removed, based on both water hardness and the amount of water evaporated. This reduces water consumption by 20% compared with traditional dilution systems.

If there is no cooling demand (room temperature set point reached, machine shut down at the end of the day, etc.), a time delay is started, after which the tank and all the water distribution pipes are completely drained to eliminate the risk of Legionella developing.

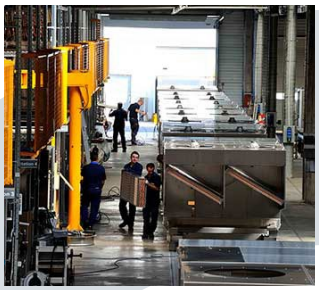
Caution:
The water supply pressure to the adiabatic module must be greater than 1 bar and must not exceed 3 bar for each machine.
The water hardness of the water to be supplied to the adiabatic module must be provided when the purchase order is placed. If this is not the case, the number of cycles before emptying will be defined according to the average water hardness for the department.

Adiabatic cooling and legionella

The risk of legionella developing is eliminated because the 3 simultaneous conditions that could favour it are not met:

> automatic emptying of the water tank when the machine is switched off prevents water from standing for long periods of time.
> the temperature of the run-off water remains below temperatures conducive to the development of the bacteria (between 25 and 45°C).
> due to the technology and the effective air speed through the soaked media, there is no water entrainment.

This is why this type of 'adiabatic chiller with water trickling over media' **was officially excluded** from French **ICPE heading 2921** (risk management of water dispersion cooling installations) by the French **Ministerial Order of 14/12/2013**.



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ETT - Route de Brest - BP26
29830 Ploudalmézeau - France
Tel.: +33 (0)2 98 48 14 22
Export Contact: +33 (0)2 98 48 00 70
ETT Services: +33 (0)2 98 48 02 22

www.ett-hvac.com

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