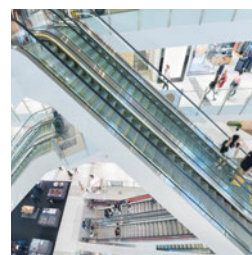
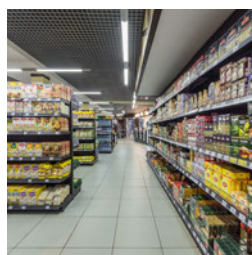
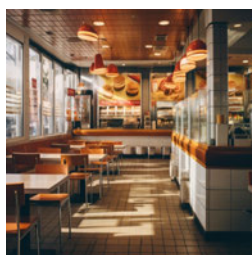




CLIMATIC  
ENVIRONMENT  
SOLUTIONS  
AND EQUIPMENT



Green  
Line

## ULTI+ R290 ADIA



# R290

Single-flow heat pump with adiabatic cooling



[www.ett-hvac.com](http://www.ett-hvac.com)



# ULTI+ R290 ADIA: Machine from the ULTIMA Green Line range

## Up to 72% energy savings!

The **ULTI+ R290 ADIA** is an evolution of **ETT's latest generation** rooftop range. Developed from the ULTI+ R290 series, this unit is the subject of a pending patent application. It combines quality materials, energy savings, acoustic performance, regulation and next-generation connected components, to allowing the units to operate optimally at all times.

The **combination** of **thermodynamic** and **direct adiabatic** technologies means that energy consumption is kept to a minimum, while ensuring that indoor comfort requirements are met at all times, whatever the climatic conditions outside.

In hot weather, the high-efficiency adiabatic function takes priority over compressor activation. Thanks to **specific regulation** (artificial intelligence), cooling periods by evaporation are by far the majority, which means we can benefit from the environmental and economic advantages of water as a refrigerant.

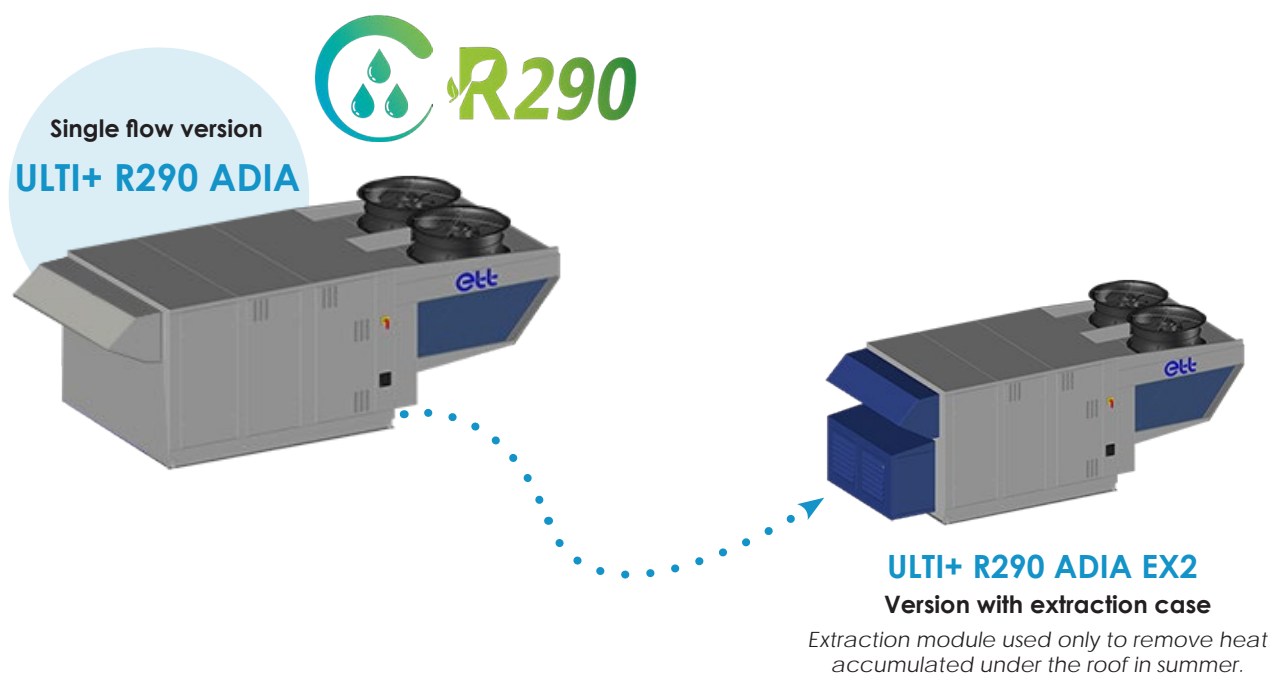
When climatic conditions no longer allow adiabatic operation, the thermodynamic function takes over to ensure that the set points are maintained.

Several tests were carried out over 2 years and revealed **energy savings of 60% on average over the summer**, and up to 72% in the most favourable climatic zones.

Particular attention has been paid to dimensions and weight of the **ULTI+ R290 ADIA**, so that they can be easily installed to replace existing machines.

The modular design allows for easy expansion of this range's capacities. The **ULTI+ R290 ADIA** single flow unit can be fitted with an extraction fan to extract heat in summer. (**ULTI+ R290 ADIA EX2** version).

## ULTIMA Green Line adiabatic modular principle



# ULTI+ R290 ADIA: Rooftop and ErP



When they adopted the KYOTO protocol, the Member States of the European Union (EU) voted a set of measures known as the "energy-climate package", aiming at:

- ✓ Reducing greenhouse gas emissions by 20%;
- ✓ Reducing energy consumption by 20%
- ✓ Increasing the proportion of renewable energies to 20% of the final energy consumption

To achieve these objectives, the ErP directive (Energy-related Products) 2009/125/EC Eco-Design has been adopted.

This directive applies to all products using energy or having an impact on energy consumption. It encompasses a " set of regulations " establishing performance requirements for each type of product. EU regulation 2016/2281 covers air heaters, cooling appliances, high-temperature industrial chillers and fan coil units.

- 1<sup>st</sup> January 2021



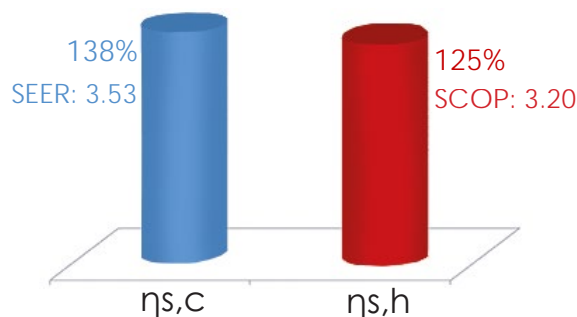
## Regulatory impacts since 1<sup>st</sup> January 2021

The European Parliament compels rooftop manufacturers to comply with Regulation (EU) 2281/2016 on ErPs, in order to give the users the possibility to evaluate their energy consumption.

A new method for assessing the energy efficiency of rooftops has been defined under this regulation, which specifies the minimum eco-design requirements: **seasonal efficiency**.

This new measure gives a **more realistic indication of the energy efficiency** of a heating or air-conditioning system and its impact on the environment.

**Seasonal energy efficiency requirements** to be achieved according ErP 2021.



A summary sheet stating **rated capacity & seasonal efficiency** is available on request.

### SCOP

#### Seasonal Coefficient of Performance

The SCOP is the ratio between annual heating demand to the reference climate and the annual electricity consumption for heating.

$$\eta_{s,h} = \frac{SCOP}{2.5} - 3\%$$

### SEER

#### Seasonal energy efficiency

The SEER is the ratio between annual cooling demand to the reference climate and the annual electricity consumption for cooling.

$$\eta_{s,c} = \frac{SEER}{2.5} - 3\%$$

2.5: Primary energy conversion coefficient

3: Factor corresponding to regulation.

# Risk analysis

It is up to the building operator to carry out a risk analysis in line with local regulations concerning the installation of machines containing propane.

In Europe, Directive 1999/92/EC applies, requiring employers to carry out an assessment of explosion risks, define ATEX zones and draw up a document detailing the prevention and protection measures put in place to protect workers. This risk assessment is to be provided at the time of commissioning.



## Safety and intervention zone

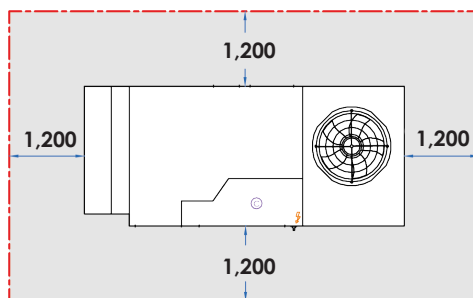
Since propane is heavier than air, it is important to avoid any areas where gas could accumulate near the machine in the event of a leak.

Therefore, for flat roofs, special attention must be paid to the positioning of the machines in relation to openings (such as Skydomes) and roof parapets.

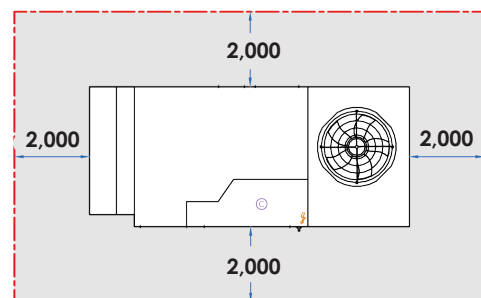
Likewise, it is necessary to ensure the absence of air intakes, wall openings, drainage channels, and low points near the machine.

For each machine size, a safety zone must be maintained (indicated by the shaded area in the diagrams below), and this zone must be free of any external rooftop equipment.

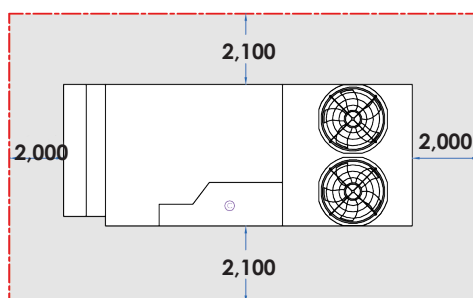
### SAFETY AND INTERVENTION ZONE DEPENDING ON THE TYPE OF MACHINE



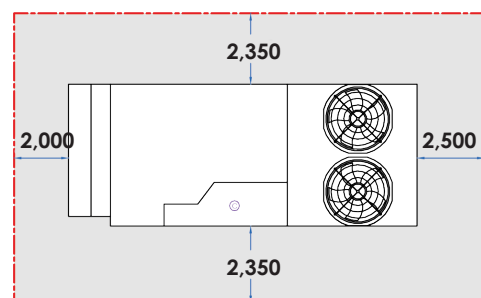
ULTI+ R290 01



ULTI+ R290 11 & ULTI+ R290 12



ULTI+ R290 21



ULTI+ R290 22

### Special case of work on the refrigeration circuit:

In this case, the technician must maintain a **5-meter** safety distance **all around** the machine (not shown in the diagrams).

During the intervention, it is essential to secure this expanded zone by preventing any ignition sources and checking that there is no possibility of gas leakage into the building (by closing openings and air intakes, in particular). If it is not possible to seal these openings, an analysis must be carried out to implement preventive measures such as a deflector or a safety system must be installed.

This analysis must be carried out as soon as the machine is installed.

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# General description

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

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

## Environmental impact:



**The Ultima Green Line range is eco-friendly and uses the R290, a natural refrigerant with low environmental impact:**

- ✓ Zero ozone depletion (ODP)
- ✓ Global Warming Potential (GWP) of 0.02
- ✓ Does not generate any PFAS (forever chemicals)

## Our technical choices have a major impact on the environment

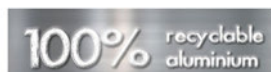
### • DECARBONATION:

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

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

### • ALUMINIUM : PERFORMANCE AND DURABILITY!

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



### • ECO-DESIGN:

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

### • LOW-POLLUTION MANUFACTURING PROCESS:

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

### • END OF MACHINE LIFE:

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



### • ETT CERTIFICATIONS

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



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



- **Certificate of competence for handling refrigerants**

- **Membership of the UN Global Compact**

- **Qualiopi certification** for our training centre



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

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

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

**20-year guarantee  
against corrosion  
frame - casing**





# Unit description



## Aluminium frame and casing assembly

- Optimised tightness and thermal insulation.
- Reduced weight, for new and refurbish projects.
- Multiple airflow configurations available.

20-year guarantee  
against corrosion  
frame - casing

## Eco-design filtration

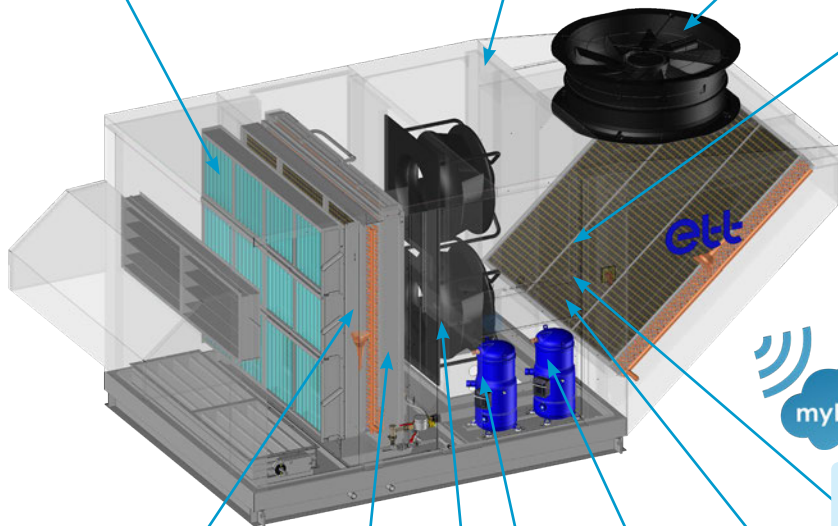
- Low pressure drop.
- Analogue clogging controller.
- Basic ISO Coarse 65% (G4) efficiency, with several other combinations available (single or double filtration - see options list on page 14).

## Propeller fans

- Variable speed, communicating axial fans, bionic blade design, electronically commutated "EC" motor, optimum efficiency and low noise levels.

## Waterproof electrical enclosure

- Separate electrical board in a IP44 waterproof enclosure for greater safety.



## Connected components

- ETT 4G maintenance router included.

## Thermal heat exchangers

- Optimized heat exchanger for improved energy performance.
- Electrofin option available.



## Adiabatic chiller

- Non-flammable M0 inorganic fibreglass media with low pressure drop and high efficiency.

## PLC with display

- Control enabling optimum operation in all conditions.

## Multi-stage circuit with R290 compressors New Generation

- Optimum performance whatever the part load.
- Electronic expansion valves.

## Leak detection

- With propane leak detector and safety chain.

**R290**

## Internal fans

- Direct-drive fans with low noise level.
- "EC" electronically commutated motor (variable speed with airflow measurement and optimal efficiency).
- Communicating Analogue Flow Controller (AFC).



# Unit description



## Energy savings

The ULTIMA Green Line range is an efficient, economical and environmentally friendly solution for heating or cooling buildings.

Thanks to its design, the ULTI+ R290 delivers **comfortable conditions while ensuring optimal and continuous energy performance** throughout its entire operational life.

## QUALITY

### Premium Process and Components

- **Sustainable and recyclable equipment: Aluminium frame and casing**, 100% recyclable, 20-year anti-corrosion warranty
- Non-polluting processes
- **Eco Design approach** to combine **economy** and **optimum performance** (SEER, SCOP)
- Simplified replacement of existing machines; identical connection roof curbs for each generation of machine.
- Reduced unit size and weight

## Access and flexibility

- A separate **technical compartment** isolated from the air stream, allows simple and quick access to refrigeration components and control devices, thus facilitating maintenance.
- Easy and quick access to the air stream and to the technical compartment via **removable panels**.
- **Multiple airflow layouts**, to meet integration requirements.

## Connected components New Generation PLC

- Allows communication between units
- Transfers the technical data from the units to an external server for optimum remote control with myETTvision.



## R290 fluid Low GWP

# R290

- New **ULTIMA Green Line** range with R290, a low GWP fluid (0.02).
- **Plays an active role in meeting the CO<sub>2</sub> equivalent tonnage quota**, a legal obligation imposed on gas producers/importers.
- No restriction on the use of R290 over time under regulation 2024/573 (F-GAS III).

## INDOOR AIR QUALITY

- Eco Design - Filtration (low pressure drops).
- CO<sub>2</sub> sensor controlling the supply of fresh air.
- **Quick and easy filter replacement**

## Acoustic performance

### MAIN FEATURES

- New-generation variable-speed fans and propeller fans
- **A control system adapting fan rotation speeds to power stages.**

Because respect for the sound environment is essential, we offer **standard stand-alone units that meet your acoustic constraints.**

## ETT GOES THE EXTRA MILE...

### Installation

Outdoor, on the rooftop or at ground level.

### ETT Services

- Warranty: Please contact us.
- A team to guide you from commissioning to operational support
- Manufacturer visits and audits
- Installation optimisation and retrofit
- Service contracts (comfort - tranquillity - serenity - à la carte).
- Training your teams.
- Access to the ETT Services hotline

### myETTvision platform

**myETTvision** allows you to control and optimize your installation remotely.

ULTI+R290 ADIA  
MARK-BRO\_67-EN\_A



# Operating principles

The machine operates as a reversible heat pump:

- > Source: outside air
- > Processed fluid: inside air + Hygienic fresh air

Control basis:

- > Indoor and outdoor conditions

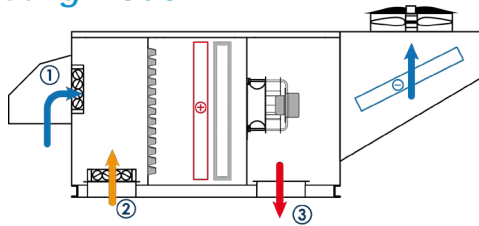
Operating modes can be:

- > Heat pump
- > Cooling by adiabatic chiller or air conditioning by heat pump
- > Free Cooling: cooling using outside air, without thermodynamics

In these modes, the unit can operate:

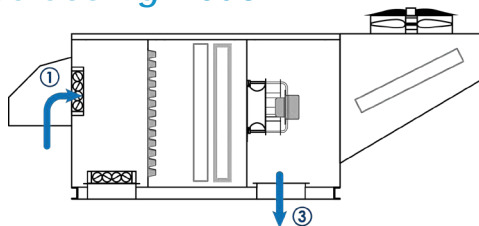
- > With all recirculated air
- > With all fresh air
- > With mixed air

## Heating Mode



**Heating mode:** The thermodynamic system maintains a comfortable temperature in winter.

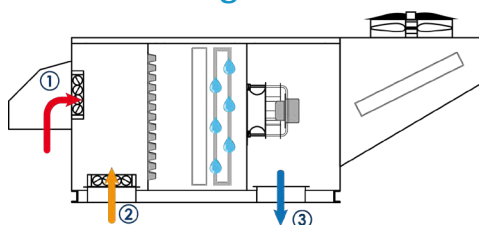
## Free Cooling Mode



**Free Cooling Mode:** Mid-season comfort temperature maintained by using the temperature difference between the outside air and the inside air to cool the building.

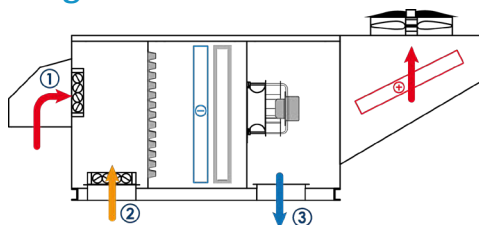
Free Cooling **enables significant savings** delaying the start-up of the thermodynamic system.

## Adiabatic cooling Mode



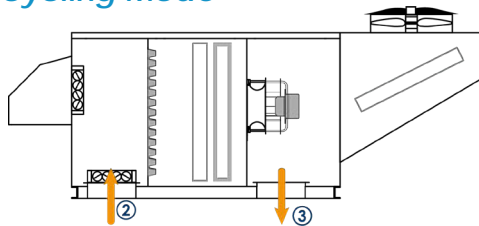
**Adiabatic cooling Mode :** activation of the adiabatic system with automatic switchover between fresh and recycled air depending on the most favourable ambient/external conditions.

## Cooling Mode



**Cooling Mode:** The thermodynamic system maintains a comfortable temperature in summer.

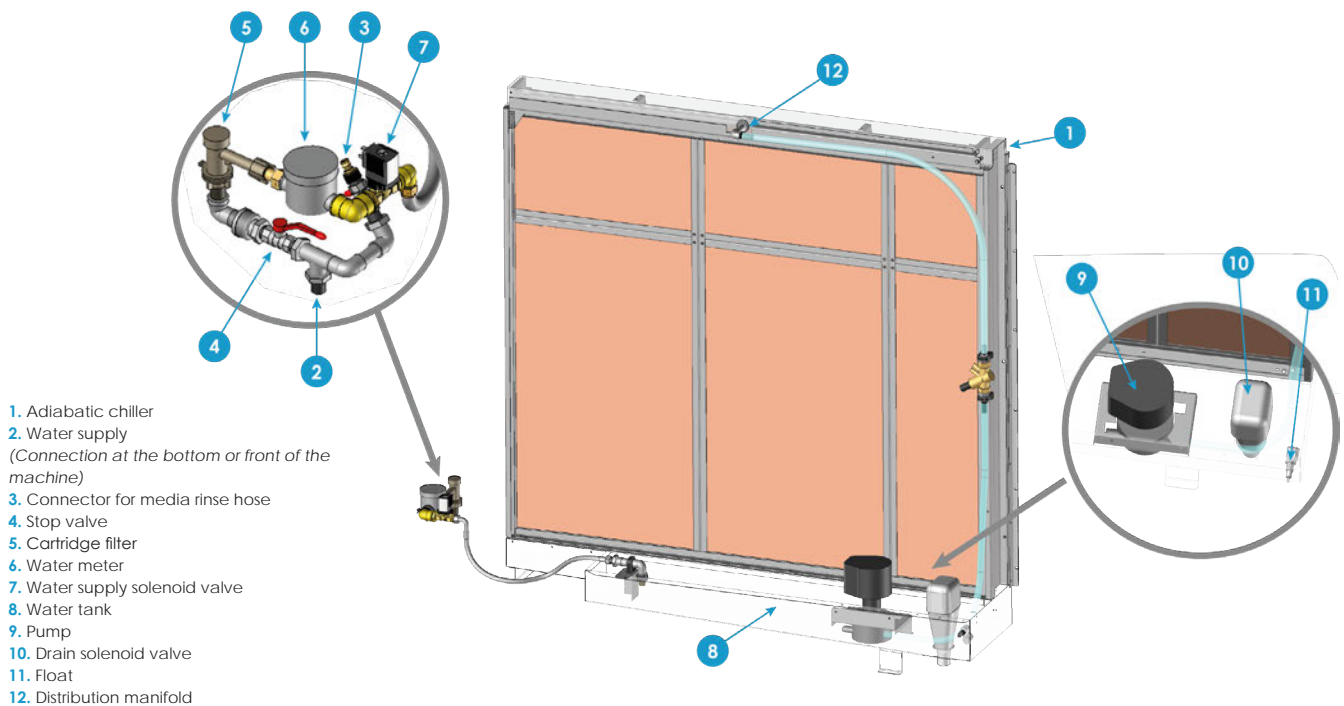
## Recycling Mode



**Recycling Mode:** Circulation by recycling air from the treated volume, when the return air temperature is much higher than the ambient temperature in winter.

① Fresh air      ② Return air      ③ Supply air

# Operating principles of the adiabatic chiller



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.

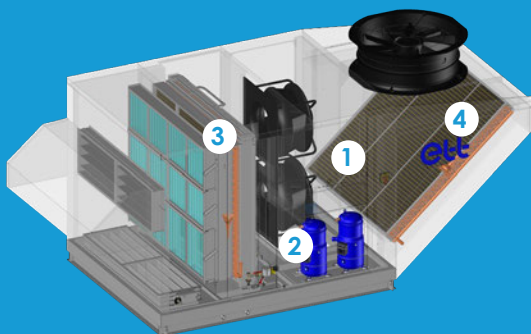
## Adiabatic cooling and legionella

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.

# Detailed components of the unit



The ULTI+ R290 ADIA comprises 4 different compartments:

- 1 A sealed electrical compartment isolated from the airflow and sealed (IP44).
- 2 A separate technical compartment isolated from the airflow housing the refrigeration and hydraulic components, and the control devices.
- 3 The machine main body houses the filters, adiabatic cooler, thermodynamic coil, and fans.
- 4 An external compartment to ensure heat exchange with the environment.

## Aluminium frame and casing assembly :

■ The ULTI+ R290 ADIA is equipped with a mixing box featuring motorized aluminum double dampers, specifically designed to minimize pressure losses. These dampers ensure Class 3 upstream-downstream airtightness and Class B frame airtightness, in compliance with EN 1751 standard. The ULTI+ R290EX allows:

- ✓ Optimised fresh air supply dosage, combined with the CO<sub>2</sub> sensor.
- ✓ Switching to Free Cooling mode, delaying the operation of the thermodynamic unit, for significant energy savings.
- ✓ **Perfect weather resistance, 20-year anti-corrosion guarantee on casing.**
- **Watertight floor** with drainage outlets around the unit, connected to rubber traps.
- **Aluminium vertical panels and roof, mounted on aluminium frame**
- A separate **technical compartment** that facilitates maintenance and control of the unit, enables measurements to be taken and settings to be fine-tuned during operation
- **Access through large "easy to remove" panels.** The removable panels are sealed by compression on a flexible lip seal, ensuring a perfect sealing over time.
- **Soundproofing and thermal insulation provided by 80 mm to 100 mm rock wool** (M0 classification) in the frame and **50 mm glass wool** (M0 classification in accordance with **PAB regulations** (Public Access Buildings), Directive 2006/42/EC) in the walls and roof.
- **Optional rain proof cowl on fresh air** (to be fitted by the installer).

## Aeraulics assembly :

- **Eco-design filtration**, easy to dismantle - ISO Coarse efficiency 65% (G4) in **98 mm** pleated media to increase filter life and reduce pressure drops, fouling controlled by analogue pressure switch.
- **Replacement filter kit available as an option.**
- **High Energy Efficiency propeller fans**

**As a forerunner, ETT has chosen the latest generation of fans:**

- ✓ Fitted with a variable-speed electronically commutated " EC " motor, these newly-designed fans can increase the airflow through the heat exchangers by up to 15%, while maintaining the same power consumption. These "EC" fans ensure a precise temperature for greater comfort and energy savings by adapting their rotation speed to real needs.
- ✓ **Innovative blade design** - this new blade profile generates lower compressor consumption, given the lower and higher HP and LP respectively in the various operating modes,
- ✓ Communicating, for real time operation adjustment,
- ✓ Increased diameter for unrivalled efficiency and low noise levels.
- **Last generation internal fans (High Energy Performance):**
  - ✓ **Direct transmission** (savings in maintenance, reliability and consumption),
  - ✓ **Fitted with a variable speed " EC " electronically commutated motor** combined with an Analogue Flow Controller - AFC (savings on commissioning),
  - ✓ With an aluminium wheel design,
  - ✓ Communicating, for real time operation adjustment,
  - ✓ With integrated Soft Starter to reduce starting current and enable soft starting (textile ducts).



# Detailed components of the unit

## Energy and thermodynamic assembly:

- **For units with several thermodynamic circuits**, only the first circuit is equipped with a tandem. This allows the thermal power provided to be staggered according to the needs of the application, for less consumption and greater comfort.
- **Communicating electronic expansion valves** combining increased optimisation of the exchangers and fast stabilisation of the thermodynamic system.
- **Reinforced heat exchangers** with aluminium fins and copper tubes with double helical grooves for improved heat exchange. External heat exchangers designed to delay frost build-up and ensure fast and efficient defrosting.
- **Refrigeration circuits** compliant with the European directive on pressure equipment (PED 2014/68/EU).
- **R290 refrigerant** (GWP=0.02 in accordance with F-GAS III).
- **Tandem circuits**, for staggered power delivery and energy savings during part-load operation. Operation in part load considerably reduces the number of defrost cycles and their duration.
- **Completely independent refrigeration circuit**: each refrigeration circuit has its own independent propeller fan ventilating its heat exchanger.
- **Anti-acid filter drier**.
- **Switch over valve**.
- **Leak detection**: The ULTI+ R290 ADIA is equipped with leak detection as standard. This detection enables the unit to be shut down in the event of an R290 fluid leak.

## Electrical assembly in a sealed compartment (IP44):

- **Electrical board** compliant with NF EN C 15-100 and NF EN 60204-01 standards including:
  - ✓ **An ETT PLC** with optional Control Box remote display or via native Modbus BMS.
  - ✓ **A power switch** with lockable external handle for full load cut-off. Connection using standard universal cable. Optional copper/aluminium connection boxes.
  - ✓ **A 400-230-24 volt transformer** for control and regulation circuits.
  - ✓ **A fault summary** with a dry contact on standby terminal.
  - ✓ **Numbered terminal blocks** with disconnectable terminals for all transfers or remote controls.
  - ✓ **A terminal block** for compressor load shedding.
  - ✓ **An internal wiring** fully numbered at both ends with numbered rings.
  - ✓ **A basic breaking capacity** 1k3 of 10 kA.
  - ✓ **All components** protected by circuit breakers.
  - ✓ **A phase controller**.
- ✓ The LV distribution voltage rating is governed by the French interministerial Order of 24 December 2007. This sets the nominal voltage level at 230/400 V. It defines minimum and maximum values that are acceptable at a user's point of delivery (average value over 10 m), corresponding to a range of -10 % / +10 % around the nominal values. It also defines the maximum allowable value of the voltage drop gradient: 2%. This corresponds to the additional voltage drop generated at a network point if 1 kW single-phase is added at that same point.



## Adiabatic assembly:

- Direct adiabatic humidifier with high efficiency (93%).
- Inorganic, non-flammable (M0) fibreglass media complying with EN ISO 1182, and therefore authorised for use in Public Access Buildings in accordance with the European Machinery Directive 2006/42/EC.

## Principle of adiabatic control

### The machine regulates:

- Maintaining the room temperature set point: when this is exceeded, the adiabatic system is activated.
- Artificial intelligence enables the chiller to be switched on according to weather conditions and the building's response, maximising the use of the chiller and minimising, or even eliminating, the need to activate thermodynamics.
- The CO<sub>2</sub> level is kept below an upper limit by gradually opening the fresh air damper (if it is not already in the open position).
- Humidity level and water content (both configurable) are kept below their upper limits by shutting down the adiabatic system and activating the thermodynamic system if needed, in order to maintain the desired room temperature. It also measures indoor and outdoor air conditions in real time, and automatically adjusts the operation of the fresh air and return air to optimise performance.



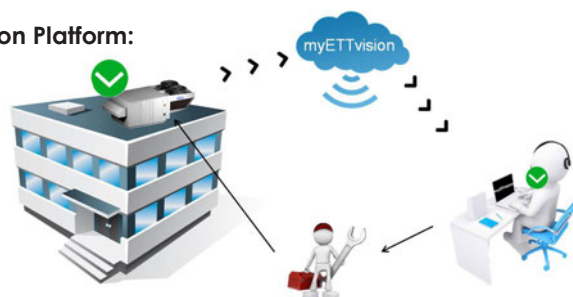
# Detailed components of the unit

## Advanced control assembly:

- **Temperature control with 2 cooling/heating set points, Responsiveness, accuracy, and foresight.**  
Savings or Comfort Mode controls available.
- **Filters Fouling Analogue control (FFAC), measures and indicates filter fouling to the PLC,** enabling preventive filter replacement for optimum air quality and reduced consumption.
- **Real-time regulation of the speed of the propeller fans** according to operating mode, outdoor temperature and thermodynamic power, for optimum acoustic performance and energy savings.
- **Analogue air flow controller (AFC)** to measure and indicate the air flow rate of the supply fans on the PLC.
- **Air quality control by a CO<sub>2</sub> sensor** to optimise fresh air dosage and reduce energy consumption.
- **Free Cooling function,** free cooling with outside air, delaying thermodynamic operation for significant energy savings.
- **Metering of electrical energy,** with breakdown of electrical consumption by operating modes.
- **Monitoring, diagnostic and safety devices and faults management** (anti-freeze thermostat, smoke detector, fire thermostat, HP switch, compressor MAP monitoring...), with written fault history.
- **Diagnostic assistance for detecting refrigerant leaks.**
- **myETTVision remote communication platform providing access to parameter setting, operation and energy monitoring, and access to faults in your fleet of machines.**
- De-stratification (comparison between ambient and outdoor temperature)

## myETTVision:

### ETT Remote Communication Platform:



ETT 4G router included

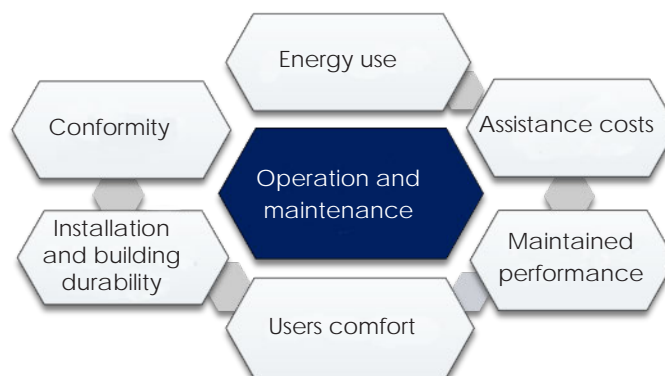
# Operating tips for the ULTI+ R290 ADIA unit

## OPERATION: COSTS, PERFORMANCE AND WARRANTY

The **quality of the operation** combined with the installation has a major impact on the overall **cost of the units**.

It affects 3 parameters:

- **Total cost**
  - ✓ Purchase and implementation: 15%
  - ✓ Operating costs: 85%
- **Installation efficiency**
  - ✓ **Operating costs**
  - ✓ **Users' comfort**
  - ✓ **Durability**
  - ✓ **Availability**
- **Conformity**
  - ✓ **Regulations**
  - ✓ **Manufacturer's warranty conditions**



**As soon as it is commissioned, the plant must be operated and maintained** in such a way as to guarantee regulatory compliance. Compliance with the manufacturer's recommendations is a prerequisite for guaranteeing and optimising operation and settings.

# Main options

## Frame - Casing

- Double aluminium insulation in inner compartment
- Motorised external damper for the supply air, except downward supply (2006/42/EC Directive)

## Acoustics

- EC Low Noise supply fans

## Air handling

- Operation with all recirculated air (excluding Public Access Buildings)
- All fresh air operation
- Actuating smoke detector with battery back-up
- Analogue air flow controller (AFC) that automatically adjusts supply fan airflow to compensate for filter clogging
- Pressure gauge for supply air filters
- ISO Coarse 65% (G4) refillable 98mm supply filters with analogue sensor
- ISO ePM10 50% (M5) 98mm supply filters with analogue sensor
- Double filters ISO Coarse 65% (G4) + ISO ePM1 50% (F7) or ISO ePM1 80% (F9) (48 + 48mm) at supply with analogue sensor
- ISO ePM1 50% (F7) 98mm supply filters with analogue sensor
- ISO ePM1 80% (F9) 98mm supply filters with analogue sensor
- Defrosting damper
- Fresh air cowl
- Fresh air cowl extension

## Adiabatics

- Water meter
- Hydraulic services at the base of the machine
- Hydraulic services on the front side
- Inspection window and ceiling light in the adiabatic compartment with timer switch

## Thermodynamics

- Cooling-only operation (non-reversible machine)
- Compressor MAP monitoring
- Complete Electrofin protection for thermodynamic coils

## Electrics

- Totalising electrical energy meter
- Aluminium/copper terminal block (mandatory for aluminium supply cables)
- 230V / 16A single-phase PC socket in the technical compartment (separate power supply to be provided by the installer)
- IT earthing system compatibility
- Cable cover for external power supply (to be fitted by the installer)

## Installation

- Adaptor adjustable aluminium curb
- Adaptor aluminium curb on existing curb
- Ventilated adjustable aluminium curb
- Ventilated adaptor aluminium curb
- 200, 400 or 600mm aluminium feet
- Fixed or slope-adjustable plenum



# Main options

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## Control

- Comfort mode control function (setpoint temperatures control by PID)
- HPE+ operation (High Energy Efficiency)
- Average room temperature (4 sensors)
- Minimum fresh air control via turret contacts (up to 3 turrets)
- Year-round kit: Air conditioning operation enabled even at outdoor temperatures < 15°C
- Banning of Free Cooling based on water weight comparison: limits latent heat gain inside the room when outdoor water weight > indoor water weight
- FPV operation (Flow/Power Variation): adapts the value of the supply air flow to the thermodynamic power generated, reducing energy consumption

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## Communication

- Subscription to the myETTvision monitoring tool is possible, provided the service is available in the relevant country
- ETT 'Control Box' remote touch display
- CCAD remote display
- Native RS485 Modbus
- IP Modbus
- BacNet IP

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## Warranty

- Extended warranty available. Please consult us
-

	DESIGNATION	Unit	065	075
VENTILATION	<b>FLOW RATES</b>			
	Rated air flow rate	m <sup>3</sup> /h	13,000	15,000
	Minimum air flow rate	m <sup>3</sup> /h	9,500	12,500
	Maximum air flow rate	m <sup>3</sup> /h	15,000	15,000
	<b>ACOUSTICS <sup>(1)</sup></b>			
	Outside sound power level	dB(A)	85	88
	Resulting external sound pressure at 10m ref. 10 <sup>-5</sup> in free field	dB(A)	57	60
	<b>ACOUSTICS IN ADIABATIC OPERATION <sup>(1)</sup></b>			
	Outside sound power level	dB(A)	57	61
	Resulting external sound pressure at 10m ref. 10 <sup>-5</sup> in free field	dB(A)	26	30
PERFORMANCE ADIABATICS	<b>NOMINAL PERFORMANCE AT +35°C / 40%</b>			
	Adiabatic humidifier efficiency	%	93	93
	Net cooling capacity in adiabatic operation <sup>(9)</sup>	kW	44.6	50.8
	Supply air temperature under conditions 35°C / 40% with fresh air damper fully open	°C	25.5	25.6
	Water consumption <sup>(8)</sup>	m <sup>3</sup> /h	0.09	0.10
	Net EER in adiabatic operation <sup>(9)</sup>	kW/kW	18.0	14.3
PERFORMANCE AIR CONDITIONING	<b>RATED PERFORMANCE AT +35°C <sup>(1)</sup></b>			
	Net cooling capacity	kW	60.4	69.8
	Net EER	kW/kW	3.0	2.8
	<b>SEASONAL EFFICIENCY <sup>(2)</sup></b>			
	Net design cooling capacity	kW	60.4	69.8
	SEER	kW/kW	4.4	4.0
	ηs,C	%	173	156
	<b>RATED PERFORMANCE AT +7°C<sup>(1)</sup></b>			
	Net nominal thermodynamic power	kW	61.4	72.2
	Net COP	kW/kW	3.8	3.7
HEATING PERFORMANCE	<b>RATED PERFORMANCE AT -7°C<sup>(3)</sup></b>			
	Net nominal thermodynamic power	kW	44.0	48.3
	Net COP	kW/kW	3.1	2.8
	<b>SEASONAL EFFICIENCY <sup>(2)</sup></b>			
	Design net heating capacity	kW	56.6	60.2
	SCOP	kW/kW	3.8	3.5
	ηH	%	147	138
	<b>ELECTRICAL DATA</b>			
	Total installed electrical power <sup>(4)</sup>	kW	31	36
	Total installed electrical current <sup>(4)</sup>	A	51	6
GENERAL INFORMATION	Starting current	A	177	176
	Maximum absorbed electrical power <sup>(5)</sup>	kW	18	30
	<b>REFRIGERATION CIRCUIT(S)</b>			
	Power stages	-	2	
	<b>OPERATING LIMITS IN AIR CONDITIONING MODE</b>			
	Maximum outside temperature <sup>(4)</sup>	°C	57	55
	Minimum outside temperature <sup>(4)</sup>	°C	+15	
	Minimum inside coil inlet temperature	°C	+12	
	<b>OPERATING LIMITS IN HEATING MODE</b>			
	Minimum outside temperature	°C	-15	
	Minimum inside coil inlet temperature	°C	+12	
	<b>WEIGHT</b>			
	Unit weight without options <sup>(7)</sup>	kg	914	914
	Weight of connecting roof curb	kg	80	
	Weight of standard ventilated roof curb	kg	112	

(1) In accordance with NF EN 14511: Operation with all recirculated air without filter and without damper, incorporating fan correction related to the machine's external pressure.

**Cooling mode:** Indoor conditions : +27°C DB/+19°C WB & outdoor conditions : +35°C DB / 24°C WB.

**Heating mode:** Indoor conditions : +20°C DB/+12°C WB & outdoor conditions : +7°C DB/+6°C WB.

(2) According to EcoDesign regulation 2016/2281.

(3) According to NF EN 14511.

**Heating mode:** Indoor conditions : +20°C DB/+12°C WB & outdoor conditions : -7°C DB/-8°C WB.

(4) Power to be considered for the supply cables. Three-phase power supply 400V - 50 Hz + ground without neutral.

(5) **Air conditioning mode:**

Indoor conditions : +27°C DB/+19°C WB & outdoor conditions : +35°C DB / 24°C WB. Nominal flow rate, 400Pa available pressure for return + supply and dirty G4 filters.

(6) For indoor conditions : +27°C DB / +19°C WB at nominal air flow.

(7) Weight of machine loaded with water

(8) Water flow calculated for 2 cycles before draining

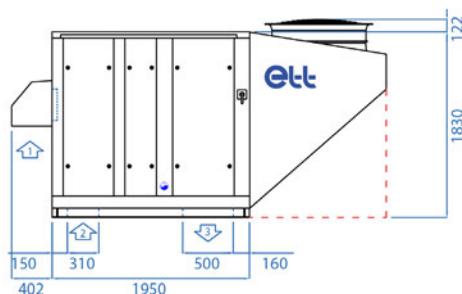
(9) Adiabatic cooling mode at nominal flow rate in all fresh air for an available pressure of 400Pa + damper and ISO Coarse 65% filtration: Outdoor conditions : +35°C DB / 24°C WB.

Calculation according to NF EN 14511.

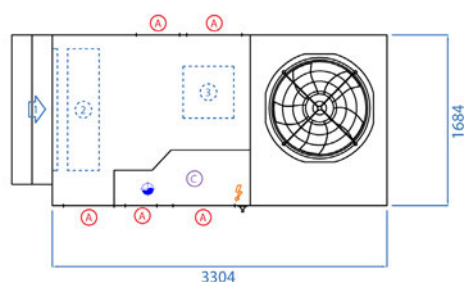
## Layout 1.1: Supply air from below

For any other configuration, please contact your sales representative for the appropriate drawing.

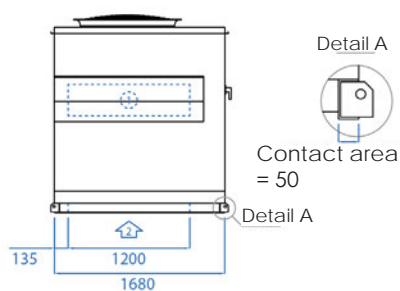
Front view:



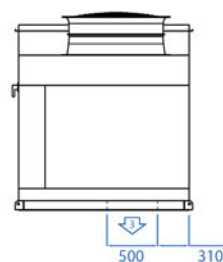
Top view:



Return side view:



Supply air side view :



① Fresh air

② Return air

③ Supply air

⚡ Power supply

Ⓐ Access

Ⓒ Technical compartment

--- Allow at least 400 mm of air space under the machine.

⦿ Water supply with two possible connection points: one underneath for indoor piping, and one on the front for outdoor connection."

	Length	Width <sup>(1)</sup>	Height
Casing dimensions	3,304 mm	1,684 mm	1,830 mm

(1) Side return: +125 mm

Note: fresh air cowls shall be installed by the installer.

	DESIGNATION	Unit	080	090
VENTILATION	<b>FLOW RATES</b>			
	Rated air flow rate	m <sup>3</sup> /h	18,000	20,000
	Minimum air flow rate	m <sup>3</sup> /h	13,000	16,000
	Maximum air flow rate	m <sup>3</sup> /h	20,000	20,000
	<b>ACOUSTICS <sup>(1)</sup></b>			
	Outside sound power level	dB(A)	89	95
	Resulting external sound pressure at 10m ref. 10 <sup>-5</sup> in free field	dB(A)	61	67
	<b>ACOUSTICS IN ADIABATIC OPERATION <sup>(1)</sup></b>			
	Outside sound power level	dB(A)	60	70
	Resulting external sound pressure at 10m ref. 10 <sup>-5</sup> in free field	dB(A)	29	39
PERFORMANCE ADIABATICS	<b>NOMINAL PERFORMANCE AT +35°C / 40%</b>			
	Adiabatic humidifier efficiency	%	93	93
	Net cooling capacity in adiabatic operation <sup>(9)</sup>	kW	62.4	67.8
	Supply air temperature under conditions 35°C / 40% with fresh air damper fully open	°C	25.4	25.6
	Water consumption <sup>(8)</sup>	m <sup>3</sup> /h	0.12	0.13
	Net EER in adiabatic operation <sup>(9)</sup>	kW/kW	22.3	14.4
PERFORMANCE AIR CONDITIONING	<b>RATED PERFORMANCE AT +35°C <sup>(1)</sup></b>			
	Net cooling capacity	kW	81.4	86.4
	Net EER	kW/kW	3.0	2.9
	<b>SEASONAL EFFICIENCY <sup>(2)</sup></b>			
	Net design cooling capacity	kW	81.4	86.4
	SEER	kW/kW	4.3	4.0
	ηs,C	%	168	158
	<b>RATED PERFORMANCE AT +7°C <sup>(1)</sup></b>			
HEATING PERFORMANCE	Net nominal thermodynamic power	kW	80.6	85.2
	Net COP	kW/kW	4.1	4.0
	<b>RATED PERFORMANCE AT -7°C <sup>(3)</sup></b>			
	Net nominal thermodynamic power	kW	56.4	54.9
	Net COP	kW/kW	3.2	3.0
	<b>SEASONAL EFFICIENCY <sup>(2)</sup></b>			
	Design net heating capacity	kW	70.7	74.5
	SCOP	kW/kW	3.9	3.6
	ηH	%	153	143
	<b>ELECTRICAL DATA</b>			
GENERAL INFORMATION	Total installed electrical power <sup>(4)</sup>	kW	44	46
	Total installed electrical current <sup>(4)</sup>	A	73	78
	Starting current	A	228	234
	Maximum absorbed electrical power <sup>(5)</sup>	kW	33	35
	<b>REFRIGERATION CIRCUIT(S)</b>			
	Power stages	-	2	
	<b>OPERATING LIMITS IN AIR CONDITIONING MODE</b>			
	Maximum outside temperature <sup>(6)</sup>	°C	57	57
	Minimum outside temperature <sup>(6)</sup>	°C	+15	
	Minimum inside coil inlet temperature	°C	+12	
	<b>OPERATING LIMITS IN HEATING MODE</b>			
	Minimum outside temperature	°C	-15	
	Minimum inside coil inlet temperature	°C	+12	
	<b>WEIGHT</b>			
	Unit weight without options <sup>(7)</sup>	kg	1,094	1,094
	Weight of connecting roof curb	kg	104	
	Weight of standard ventilated roof curb	kg	146	

(1) In accordance with NF EN 14511: Operation with all recirculated air without filter and without damper, incorporating fan correction related to the machine's external pressure.  
**Cooling mode:** Indoor conditions : +27°C DB/+19°C WB & outdoor conditions : +35°C DB / 24°C WB.

**Heating mode:** Indoor conditions : +20°C DB/+12°C WB & outdoor conditions : +7°C DB/+6°C WB.

(2) According to EcoDesign regulation 2016/2281.

(3) According to NF EN 14511.

**Heating mode:** Indoor conditions : +20°C DB/+12°C WB & outdoor conditions : -7°C DB/-8°C WB.

(4) Power to be considered for the supply cables. Three-phase power supply 400V - 50 Hz + ground without neutral.

(5) **Air conditioning mode:**

Indoor conditions : +27°C DB/+19°C WB & outdoor conditions : +35°C DB / 24°C WB. Nominal flow rate, 400Pa available pressure for return + supply and dirty G4 filters.

(6) For indoor conditions : +27°C DB / +19°C WB at nominal air flow.

(7) Weight of machine loaded with water

(8) Water flow calculated for 2 cycles before draining

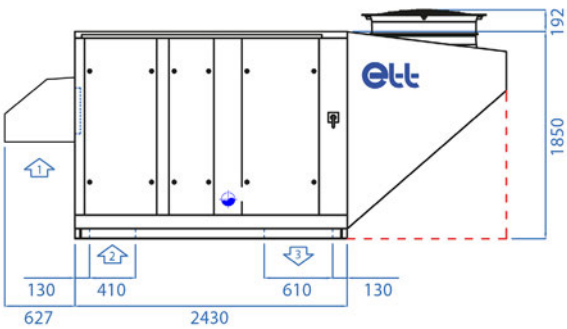
(9) Adiabatic cooling mode at nominal flow rate in all fresh air for an available pressure of 400Pa + damper and ISO Coarse 65% filtration: Outdoor conditions : +35°C DB / 24°C WB.

Calculation according to NF EN 14511.

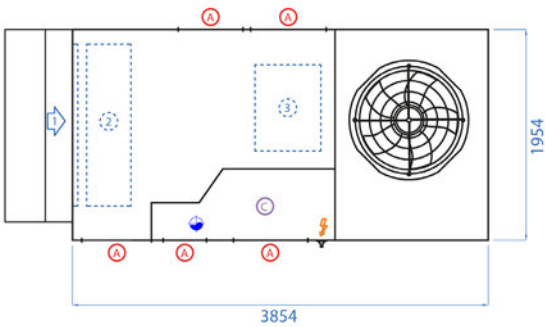
Layout 1.1: Supply air from below

For any other configuration, please contact your sales representative for the appropriate drawing.

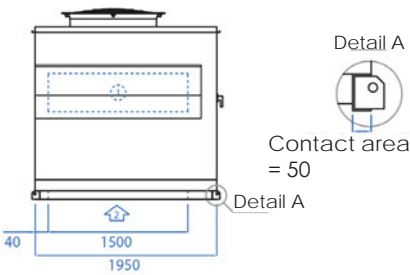
Front view:



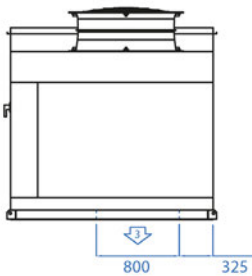
Top view:



Return side view:



Supply air side view :



- ① Fresh air
- ② Return air
- ③ Supply air
- ⚡ Power supply
- Ⓐ Access
- Ⓒ Technical compartment
- Allow at least 400 mm of air space under the machine.
- Water supply with two possible connection points: one underneath for indoor piping, and one on the front for outdoor connection.

	Length	Width <sup>(1)</sup>	Height
Casing dimensions	3,854 mm	1,954 mm	1,850 mm

(1) Side return: +125 mm

Note: fresh air cowls shall be installed by the installer.

	DESIGNATION	Unit	110
VENTILATION	<b>FLOW RATES</b>		
	Rated air flow rate	m <sup>3</sup> /h	23,000
	Minimum air flow rate	m <sup>3</sup> /h	19,000
	Maximum air flow rate	m <sup>3</sup> /h	27,000
	<b>ACOUSTICS <sup>(1)</sup></b>		
	Outside sound power level	dB(A)	86
	Resulting external sound pressure at 10m ref. 10 <sup>-5</sup> in free field	dB(A)	58
	<b>ACOUSTICS IN ADIABATIC OPERATION <sup>(1)</sup></b>		
	Outside sound power level	dB(A)	58
	Resulting external sound pressure at 10m ref. 10 <sup>-5</sup> in free field	dB(A)	27
PERFORMANCE ADIABATICS	<b>NOMINAL PERFORMANCE AT +35°C / 40%</b>		
	Adiabatic humidifier efficiency	%	93
	Net cooling capacity in adiabatic operation <sup>(9)</sup>	kW	79.5
	Supply air temperature under conditions 35°C / 40% with fresh air damper fully open	°C	25.4
	Water consumption <sup>(8)</sup>	m <sup>3</sup> /h	0.15
	Net EER in adiabatic operation <sup>(9)</sup>	kW/kW	21.8
PERFORMANCE AIR CONDITIONING	<b>RATED PERFORMANCE AT +35°C <sup>(1)</sup></b>		
	Net cooling capacity	kW	107.8
	Net EER	kW/kW	3.1
	<b>SEASONAL EFFICIENCY <sup>(2)</sup></b>		
	Net design cooling capacity	kW	107.8
	SEER	kW/kW	4.7
	ηs,C	%	184
HEATING PERFORMANCE	<b>RATED PERFORMANCE AT +7°C <sup>(1)</sup></b>		
	Net nominal thermodynamic power	kW	105.6
	Net COP	kW/kW	4.0
	<b>RATED PERFORMANCE AT -7°C <sup>(3)</sup></b>		
	Net nominal thermodynamic power	kW	74.9
	Net COP	kW/kW	3.3
	<b>SEASONAL EFFICIENCY <sup>(2)</sup></b>		
	Design net heating capacity	kW	102.3
	SCOP	kW/kW	3.8
	ηH	%	148
GENERAL INFORMATION	<b>ELECTRICAL DATA</b>		
	Total installed electrical power <sup>(4)</sup>	kW	102.3
	Total installed electrical current <sup>(4)</sup>	A	3.8
	Starting current	A	1
	Maximum absorbed electrical power <sup>(5)</sup>	kW	18
	<b>REFRIGERATION CIRCUIT(S)</b>		
	Power stages	-	4
	<b>OPERATING LIMITS IN AIR CONDITIONING MODE</b>		
	Maximum outside temperature <sup>(4)</sup>	°C	57
	Minimum outside temperature <sup>(4)</sup>	°C	+15
	Minimum inside coil inlet temperature	°C	+18
	<b>OPERATING LIMITS IN HEATING MODE</b>		
	Minimum outside temperature	°C	-15
	Minimum inside coil inlet temperature	°C	+12
	<b>WEIGHT</b>		
	Unit weight without options <sup>(7)</sup>	kg	1,760
	Weight of connecting roof curb	kg	121
	Weight of standard ventilated roof curb	kg	169

(1) In accordance with NF EN 14511: Operation with all recirculated air without filter and without damper, incorporating fan correction related to the machine's external pressure.

**Cooling mode:** Indoor conditions : +27°C DB/+19°C WB & outdoor conditions : +35°C DB / 24°C WB.

**Heating mode:** Indoor conditions : +20°C DB/+12°C WB & outdoor conditions : +7°C DB/+6°C WB.

(2) According to EcoDesign regulation 2016/2281.

(3) According to NF EN 14511.

**Heating mode:** Indoor conditions : +20°C DB/+12°C WB & outdoor conditions : -7°C DB/-8°C WB.

(4) Power to be considered for the supply cables. Three-phase power supply 400V - 50 Hz + ground without neutral.

(5) **Air conditioning mode:**

Indoor conditions : +27°C DB/+19°C WB & outdoor conditions : +35°C DB / 24°C WB. Nominal flow rate, 400Pa available pressure for return + supply and dirty G4 filters.

(6) For indoor conditions : +27°C DB / +19°C WB at nominal air flow.

(7) Weight of machine loaded with water

(8) Water flow calculated for 2 cycles before draining

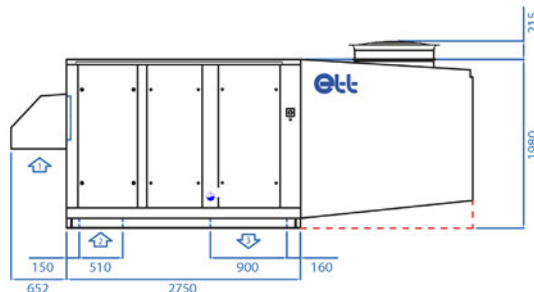
(9) Adiabatic cooling mode at nominal flow rate in all fresh air for an available pressure of 400Pa + damper and ISO Coarse 65% filtration: Outdoor conditions : +35°C DB / 24°C WB.

Calculation according to NF EN 14511.

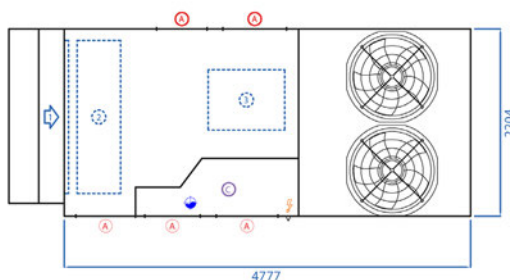
## Layout 1.1: Supply air from below

For any other configuration, please contact your sales representative for the appropriate drawing.

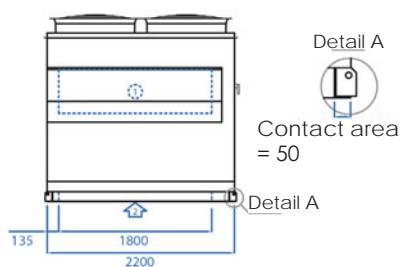
Front view:



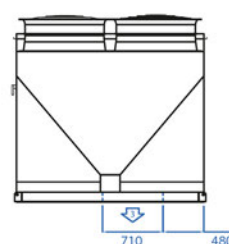
Top view:



Return side view:



Supply air side view :



- ① Fresh air
- ② Return air
- ③ Supply air
- ⚡ Power supply
- Ⓐ Access
- Ⓒ Technical compartment

--- Allow at least 400 mm of air space under the machine.

⦿ Water supply with two possible connection points: one underneath for indoor piping, and one on the front for outdoor connection.

	Length	Width <sup>(1)</sup>	Height
Casing dimensions	4,777 mm	2,204 mm	1,980 mm

(1) Side return: +125 mm

Note: fresh air cowls shall be installed by the installer.



	DESIGNATION	Unit	130	150	180
VENTILATION	<b>FLOW RATES</b>				
	Rated air flow rate	m <sup>3</sup> /h	27,000	33,000	38,000
	Minimum air flow rate	m <sup>3</sup> /h	18,000	21,000	34,000
	Maximum air flow rate	m <sup>3</sup> /h	38,000	38,000	38,000
	<b>ACOUSTICS <sup>(1)</sup></b>				
	Outside sound power level	dB(A)	87	90	94
	Resulting external sound pressure at 10m ref. 10 <sup>-5</sup> in free field	dB(A)	59	62	66
	<b>ACOUSTICS IN ADIABATIC OPERATION <sup>(1)</sup></b>				
	Outside sound power level	dB(A)	55	60	61
	Resulting external sound pressure at 10m ref. 10 <sup>-5</sup> in free field	dB(A)	24	29	30
PERFORMANCE ADIABATICS	<b>NOMINAL PERFORMANCE AT +35°C / 40%</b>				
	Adiabatic humidifier efficiency	%	93	93	93
	Net cooling capacity in adiabatic operation <sup>(9)</sup>	kW	94.6	114.3	130.0
	Supply air temperature under conditions 35°C / 40% with fresh air damper fully open	°C	25.3	25.4	25.5
	Water consumption <sup>(8)</sup>	m <sup>3</sup> /h	0.17	0.20	0.24
	Net EER in adiabatic operation <sup>(9)</sup>	kW/kW	31.9	22.6	17.1
PERFORMANCE AIR CONDITIONING	<b>RATED PERFORMANCE AT +35°C <sup>(1)</sup></b>				
	Net cooling capacity	kW	124.8	142.4	172.2
	Net EER	kW/kW	3.4	3.1	2.9
	<b>SEASONAL EFFICIENCY <sup>(2)</sup></b>				
	Net design cooling capacity	kW	124.8	142.4	172.2
	SEER	kW/kW	5.1	4.8	4.2
	ηs,C	%	200	190	167
	<b>RATED PERFORMANCE AT +7°C <sup>(1)</sup></b>				
	Net nominal thermodynamic power	kW	119.1	137.4	170.7
	Net COP	kW/kW	4.3	4.3	4.1
HEATING PERFORMANCE	<b>RATED PERFORMANCE AT -7°C <sup>(3)</sup></b>				
	Net nominal thermodynamic power	kW	83.1	95.5	107.4
	Net COP	kW/kW	3.3	3.3	2.9
	<b>SEASONAL EFFICIENCY <sup>(2)</sup></b>				
	Design net heating capacity	kW	111.2	114.8	161.7
	SCOP	kW/kW	4.2	3.8	3.6
	ηH	%	2	2	1
	<b>ELECTRICAL DATA</b>				
	Total installed electrical power <sup>(4)</sup>	kW	75	84	103
	Total installed electrical current <sup>(4)</sup>	A	120	135	172
GENERAL INFORMATION	Starting current	A	378	387	482
	Maximum absorbed electrical power <sup>(5)</sup>	kW	164	151	140
	<b>REFRIGERATION CIRCUIT(S)</b>				
	Power stages	-		4	
	<b>OPERATING LIMITS IN AIR CONDITIONING MODE</b>				
	Maximum outside temperature <sup>(6)</sup>	°C	58	57	57
	Minimum outside temperature <sup>(6)</sup>	°C		+15	
	Minimum inside coil inlet temperature	°C		+18	
	<b>OPERATING LIMITS IN HEATING MODE</b>				
	Minimum outside temperature	°C		-15	
	Minimum inside coil inlet temperature	°C		+12	
	<b>WEIGHT</b>				
	Unit weight without options <sup>(7)</sup>	kg	2,651	2,651	2,651
	Weight of connecting roof curb	kg		163	
	Weight of standard ventilated roof curb	kg		228	

(1) In accordance with NF EN 14511: Operation with all recirculated air without filter and without damper, incorporating fan correction related to the machine's external pressure.  
**Cooling mode:** Indoor conditions : +27°C DB/+19°C WB & outdoor conditions : +35°C DB / 24°C WB.

**Heating mode:** Indoor conditions : +20°C DB/+12°C WB & outdoor conditions : +7°C DB/+6°C WB.

(2) According to EcoDesign regulation 2016/2281.

(3) According to NF EN 14511.

**Heating mode:** Indoor conditions : +20°C DB/+12°C WB & outdoor conditions : -7°C DB/-8°C WB.

(4) Power to be considered for the supply cables. Three-phase power supply 400V - 50 Hz + ground without neutral.

(5) **Air conditioning mode:**

Indoor conditions : +27°C DB/+19°C WB & outdoor conditions : +35°C DB / 24°C WB. Nominal flow rate, 400Pa available pressure for return + supply and dirty G4 filters.

(6) For indoor conditions : +27°C DB / +19°C WB at nominal air flow.

(7) Weight of machine loaded with water

(8) Water flow calculated for 2 cycles before draining

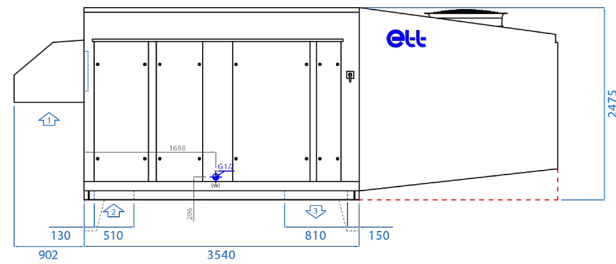
(9) Adiabatic cooling mode at nominal flow rate in all fresh air for an available pressure of 400Pa + damper and ISO Coarse 65% filtration: Outdoor conditions : +35°C DB / 24°C WB.

Calculation according to NF EN 14511.

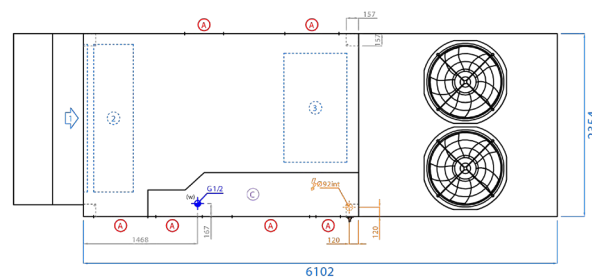
## Layout 1.1: Supply air from below

For any other configuration, please contact your sales representative for the appropriate drawing.

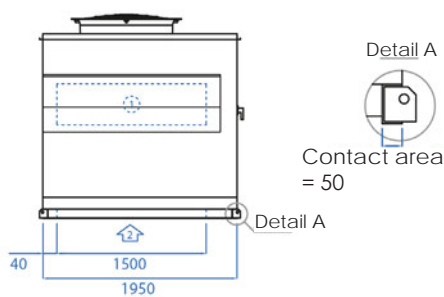
Front view:



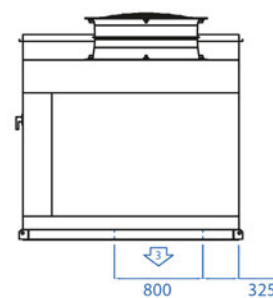
Top view:



Return side view:



Supply air side view :



- ① Fresh air
- ② Return air
- ③ Supply air
- ⚡ Power supply
- Ⓐ Access
- Ⓒ Technical compartment
- Allow at least 400 mm of air space under the machine.

Water supply with two possible connection points: one underneath for indoor piping, and one on the front for outdoor connection.

	Length	Width <sup>(1)</sup>	Height
Casing dimensions	6,102 mm	2,354 mm	2,475 mm

(1) Side return: +125 mm

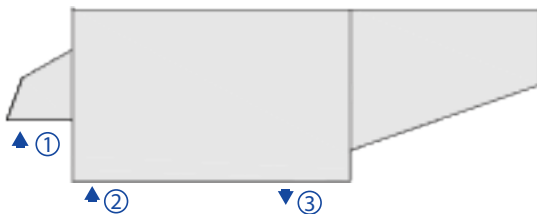
Note: fresh air cowls shall be installed by the installer.

# Airflow layouts

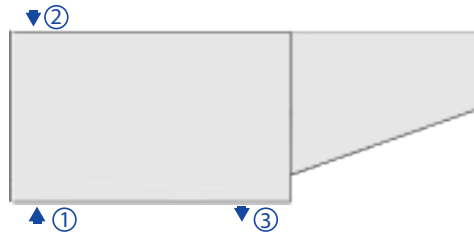
## Downward supply air

Installed on curb or customer frame, on the roof.

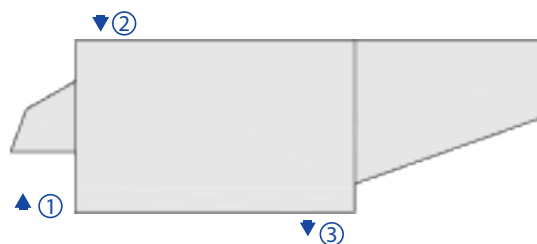
Layout 1.1



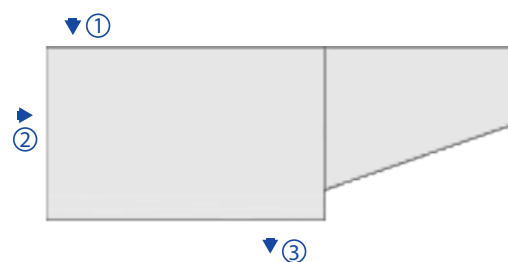
Layout 1.2



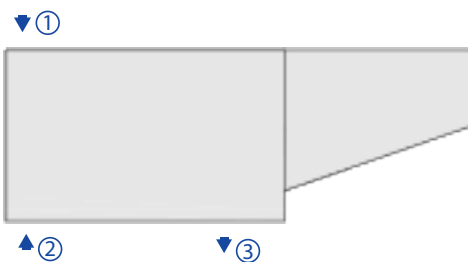
Layout 1.3



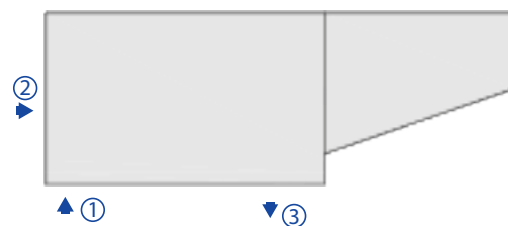
Layout 1.4 : with optional grilled air vent



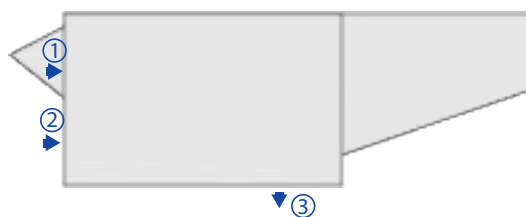
Layout 1.5 : with optional grilled air vent



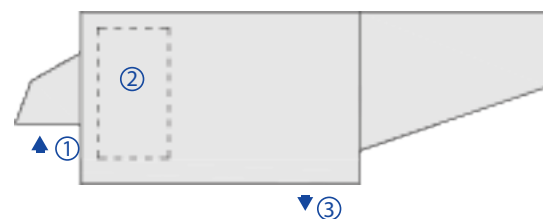
Layout 1.6



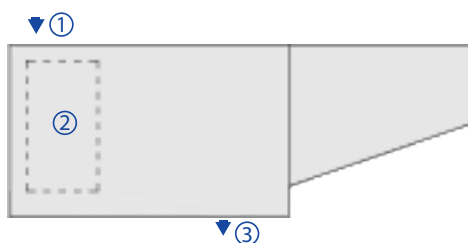
Layout 1.7



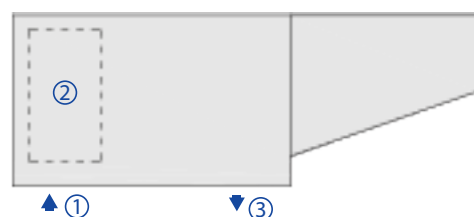
Layout 1.8



Layout 1.9 : with optional grilled air vent



Layout 1.10



① Fresh air      ② Return air      ③ Supply air

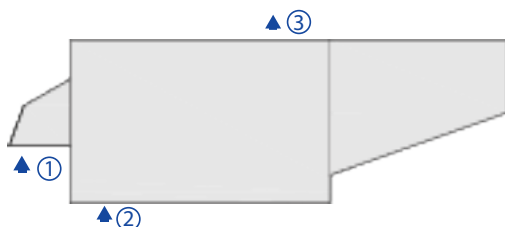
# Airflow layouts

## Upward supply air

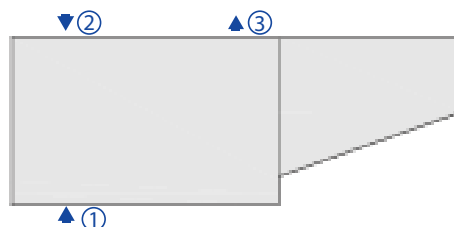
Mounted on feet (minimum 400 mm) or on customer frame.

Feet are optional. For a machine of more than 10,000<sup>3</sup>/h in an ERP building, a supply air damper must be provided.

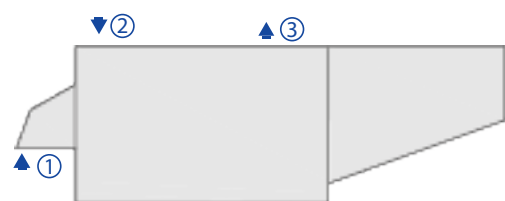
Layout 2.1



Layout 2.2



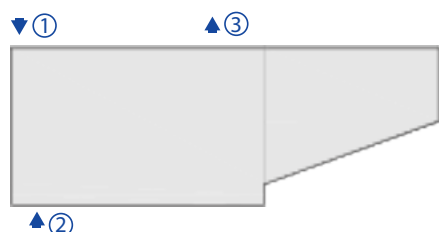
Layout 2.3



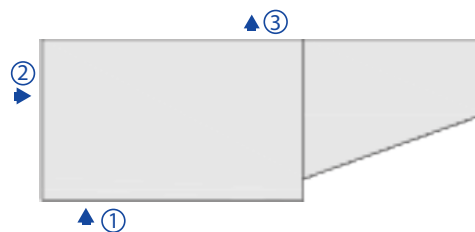
Layout 2.4 : with optional grilled air vent



Layout 2.5 : with optional grilled air vent



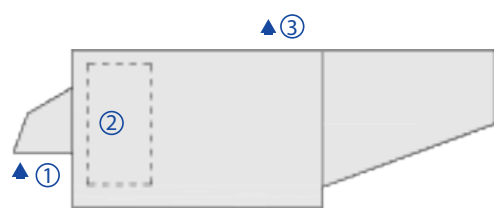
Layout 2.6



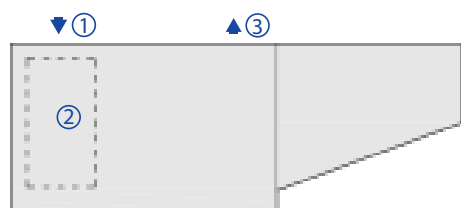
Layout 2.7



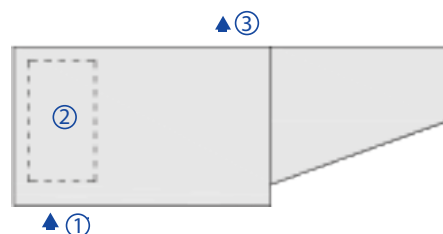
Layout 2.8



Layout 2.9: with optional cover



Layout 2.10



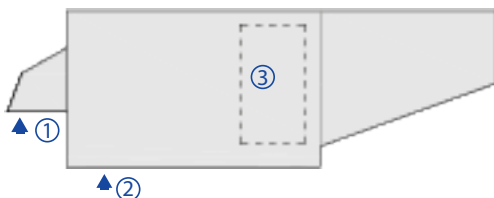
① Fresh air      ② Return air      ③ Supply air

# Airflow layouts

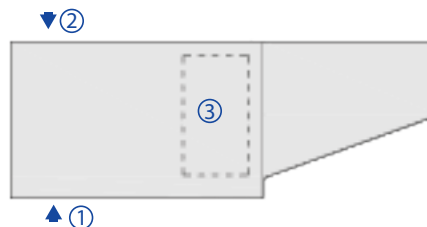
## Side SUPPLY AIR

Opposite the technical compartment (with feet 400 mm minimum).

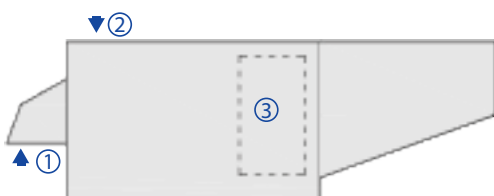
Layout 3.1



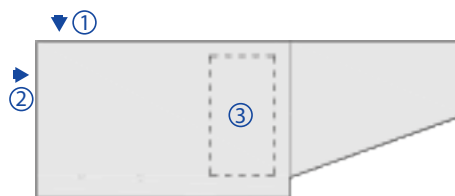
Layout 3.2



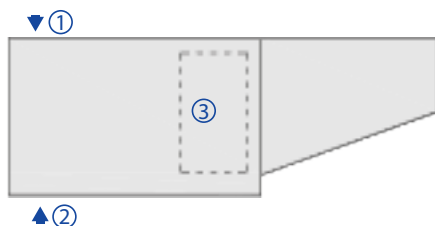
Layout 3.3



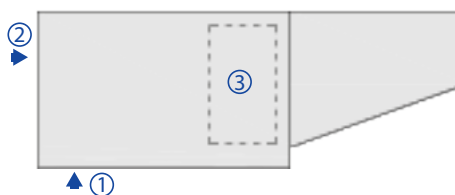
Layout 3.4 : with optional grilled air vent



Layout 3.5 : with optional grilled air vent



Layout 3.6



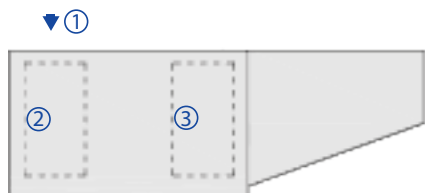
Layout 3.7



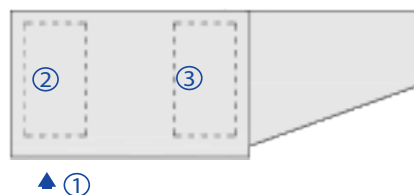
Layout 3.8



Layout 3.9 : with optional grilled air vent



Layout 3.10



① Fresh air

② Return air

③ Supply air

# Weight of options (in kg)

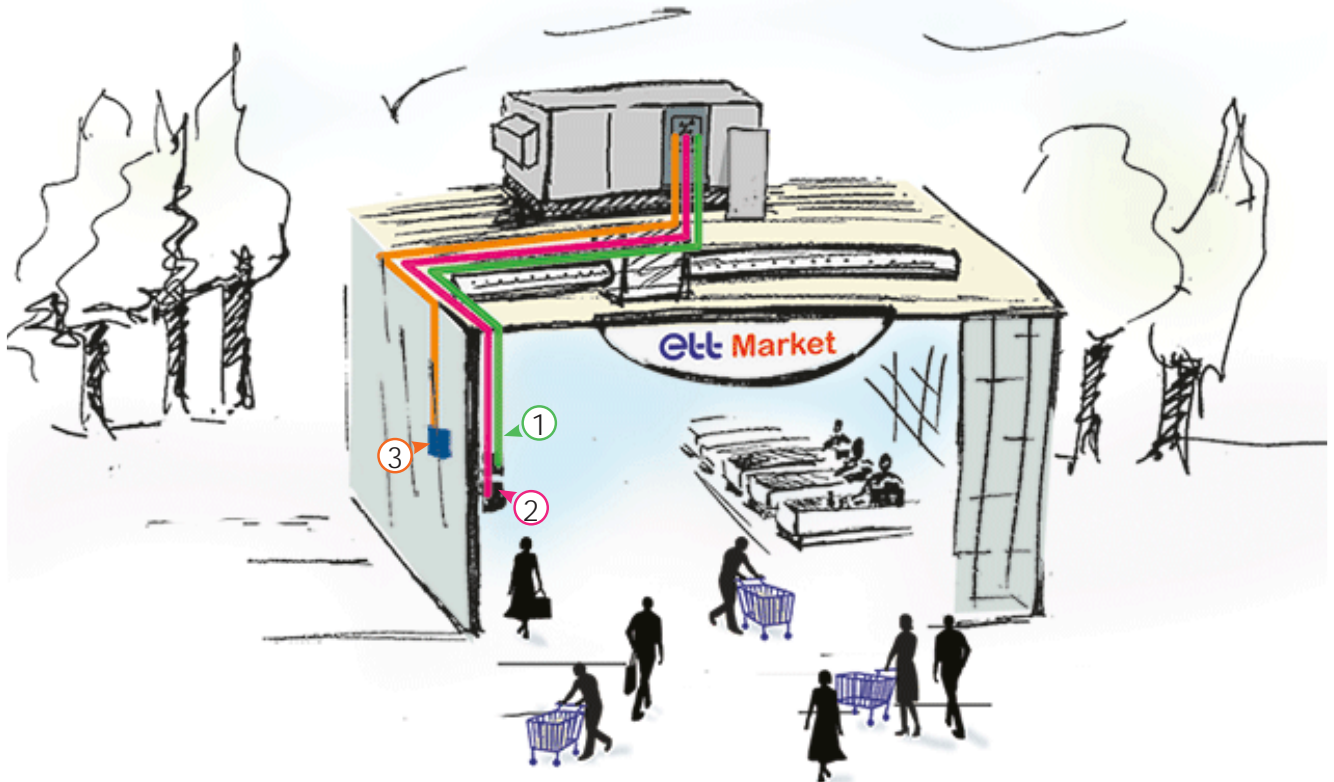
Options	ULTI+ R290 ADIA 01	ULTI+ R290 ADIA 11	ULTI+ R290 ADIA 12	ULTI+ R290 ADIA 21	ULTI+ R290 ADIA 22
Frame - Casing					
Unit with vertical (V) or lateral (L) supply air	31	55	73	84	119
Removal of the FA and RA dampers	-10	-16	-22	-33	-34
Double skin 50mm	28	40	54	70	97
Fresh air cowl	7	9	10	19	20
Installation					
Adjustable connecting aluminium roof curb	73	80	104	121	163
Aluminium ventilated roof curb	102	112	146	169	228

3-WV: 3-Way valve

VA: Return flow shut-off valve

VTA: TA return control valve, 7/8th opening

# Sensor connection principle



- ① **Room sensor:** 1 pair shielded cable, 2 x 0,75 mm<sup>2</sup> LIY-CY (max.length. 100 lm)
- ② **CO<sub>2</sub>sensor:** 2-pair shielded cable, 3 x 0,75 mm<sup>2</sup> LIY-CY (max. length. 100 lm)
- ③ **Humidity sensor:** shielded twisted pair cable, 5 x 0.75 mm<sup>2</sup> LIY-CY (max. length 100 ml)  
(Optional, replaces room sensor)

- Note:**
- In order to measure the sensor value that is most representative of the environment, avoid installing them:
    - > near a heat source (spotlights, cooking appliances, glass walls, chimney duct);
    - > in draughty areas (near storerooms, entrances, openings, etc.);
    - > in dead zones (back of shelving, corners of buildings);
    - > close to high-traffic areas (checkouts, fitting rooms).
  - To avoid disrupting the measurements:
    - > the sensors must not be located in the axis of the duct used for their wiring, otherwise they may be disturbed by a parasitic air flow;
    - > the routing of control cables must be separate from the routing of power cables (risk of electromagnetic interference).



# Accessories for installation: Roof curbs

## DESCRIPTION

The roof curb provides the interface between the roof and the rooftop. Its design makes it easy to mount on roofs and simplifies installation of the machine.

### Standard curb on header:

#### Adjustable connecting curb:

- Complies with French standard NF P 84-206-1 (installation of corrugated steel sheet roofs with a waterproofing coating) and fire regulations for Public Access Buildings (French Order of 14 February 2000).
- A one-piece aluminium curb that is significantly lighter than a galvanised steel curb.
- Adjustable L-sections to compensate for the slope of the roof. Other slope percentages are available on request (option). In this case, specify the percentage and direction of the slope when carrying out the work.
- Skirtboard for up to 100 mm of insulation according to French RT 2005 specifications.
- The curbs are designed for a maximum height of 145 mm for

the steel tray and 200 mm for the insulation (i.e. maximum height  $H = 345$  mm).

- Lifting lugs for easy positioning when craning.
- Inside side insulation in Stopflam 20 mm, to limit the risk of condensation.

#### Adjustable ventilated curb

In addition to the 7 points listed for the "connection adjustment":

- Ventilated air gap of 200 mm. The machine is bolted on 4 (or 6) legs, with foam gasket sealing applied to the frames of the supply and return air ducts.
- The air gap also provides acoustic insulation, significantly reducing the noise radiated from the underside of the machine.
- The outlets of the supply and return

ducts and the roof of the ventilated curb are insulated with 25 mm thick glass wool with protective fleece. The insulation is welded to the sheet using aluminium clips, providing a better hold than glued solutions. Insulation limits heat loss and prevents condensation on the underside.

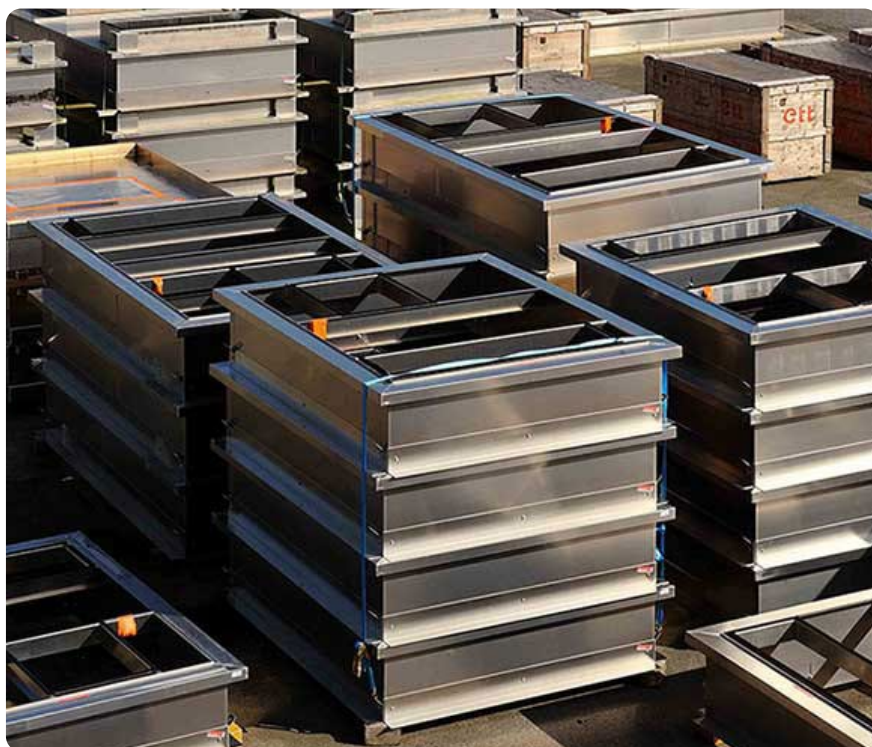
- Sleeves for routing power supply cable and hot water coil pipes through the underside of the machine.

### Adaptation curb:

#### on existing header

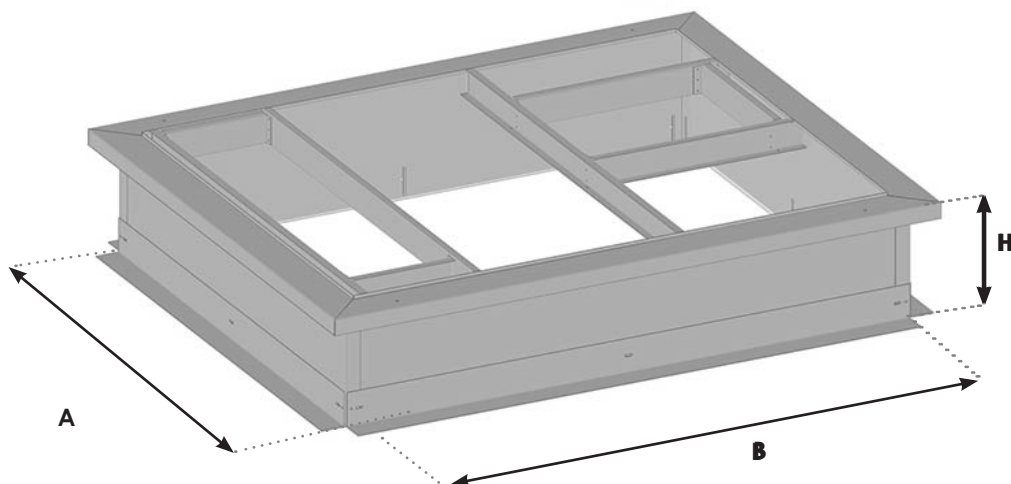
#### Or existing roof curb

- Custom-made curb to fit all types of existing curbs or headers according to dimensions supplied by the installer (see our special clauses for this type of equipment).
- Complies with French standard NF P 84-206-1 (installation of corrugated steel sheet roofs with a waterproofing coating) and fire regulations for Public Access Buildings (French Order of 14 February 2000).
- A one-piece aluminium curb that is significantly lighter than a galvanised steel curb.
- Possible compensation for the slope of the roof. To be checked with the Engineering and Design office.
- Inside isolation.



# Accessories for installation: Roof curbs

## ADJUSTABLE CONNECTING ROOF CURB



**ATTENTION :** With this type of roof curb installation, the installer is responsible for the ten-year roofing guarantee. If the value of the slope is greater than that in the table below, you must send us (see MARK-NOT\_55-EN\_ Measurement\_ Form):

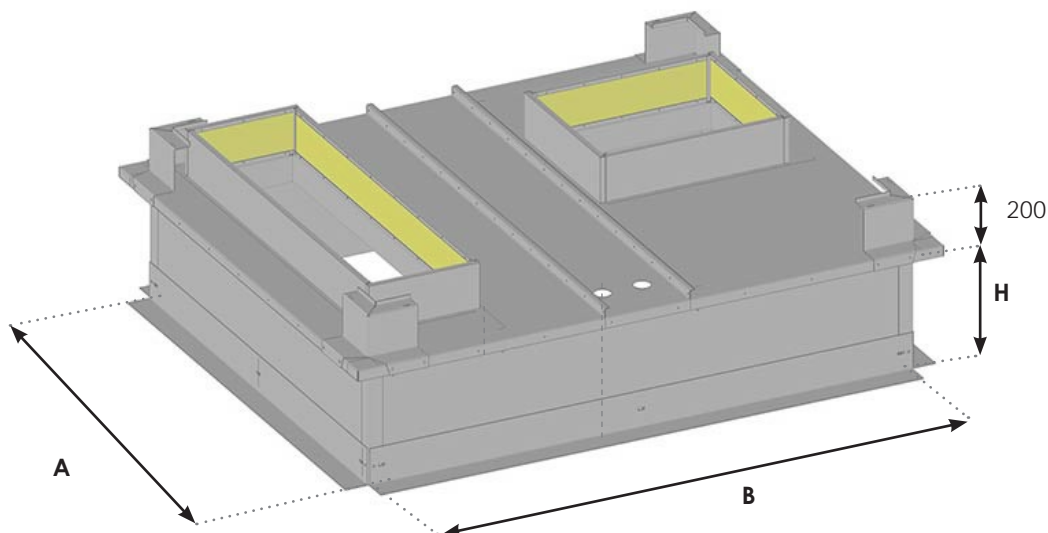
- the value of the slope of your roof in %,
- the direction of the slope
- the orientation of the machine in relation to the slope of the building
- the thickness of the waterproofing complex (insulation + steel deck + membrane)

The roof curbs must be counter-drilled after assembly. **The machine must be bolted to the roof curb.** Putty must be applied to the underside of the machine frame.

Dimensions of the recess (mm)	A	B	H	Overall width	Overall length	Overall height	Max. slope length (%)	Max. slope width (%)	Weight (kg)
ULTI+ R290 01 ADIA	1,320	1,970	550	1,534	2,178	568	5.0	7.5	73
ULTI+ R290 11 ADIA	1,700	1,970	550	1,914	2,178	563	5.0	5.8	80
ULTI+ R290 12 ADIA	1,970	2,450	600	2,184	2,658	618	5.0	6.2	104
ULTI+ R290 21 ADIA	2,220	2,770	600	2,434	2,978	618	5.0	6.2	121
ULTI+ R290 22 ADIA	2,370	3,160	600	2,584	3,368	618	5.0	6.7	163

# Accessories for installation: Roof curbs

## VENTILATED ADJUSTABLE ROOF CURB



**ATTENTION :** With this type of roof curb installation, the installer is responsible for the ten-year roofing guarantee.

If the value of the slope is greater than that in the table below, you must send us (see MARK-NOT\_55-EN\_ Measurement\_Form):

- the value of the slope of your roof in %,
- the direction of the slope
- the orientation of the machine in relation to the slope of the building
- the thickness of the waterproofing complex (insulation + steel deck + membrane)

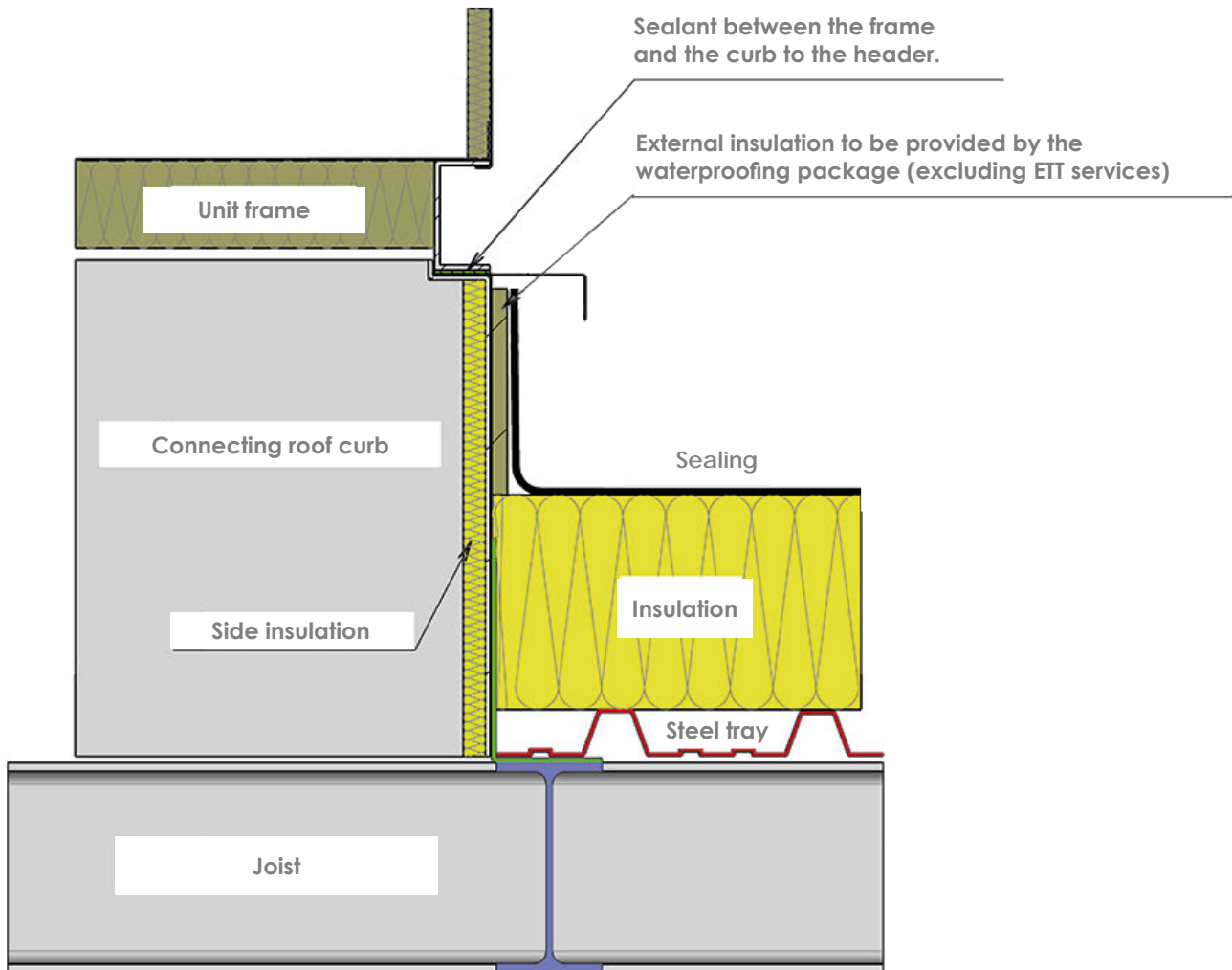
The roof curbs must be counter-drilled after assembly. **The machine must be bolted to the roof curb.**

Dimensions of the recess (mm)	A	B	H	Overall width	Overall length	Overall height	Max. slope length (%)	Max. slope width (%)	Weight (Kg)
ULTI+ R290 01 ADIA	1,320	1,970	550	1,524	2,168	768	5.0	7.5	102
ULTI+ R290 11 ADIA	1,700	1,970	550	1,904	2,168	763	5.0	5.8	112
ULTI+ R290 12 ADIA	1,970	2,450	600	2,174	2,648	818	5.0	6.2	146
ULTI+ R290 21 ADIA	2,220	2,770	600	2,424	2,968	818	5.0	6.2	169
ULTI+ R290 22 ADIA	2,370	3,160	600	2,574	3,358	818	5.0	6.7	228

# Accessories for installation: Roof curbs

## HOW TO INSTALL ROOF CURBS

The diagram below is a schematic diagram,, se conforming to French standard DTU 43.1 (Sealing of flat roofs and pitched roofs with load-bearing masonry elements in lowland climates):

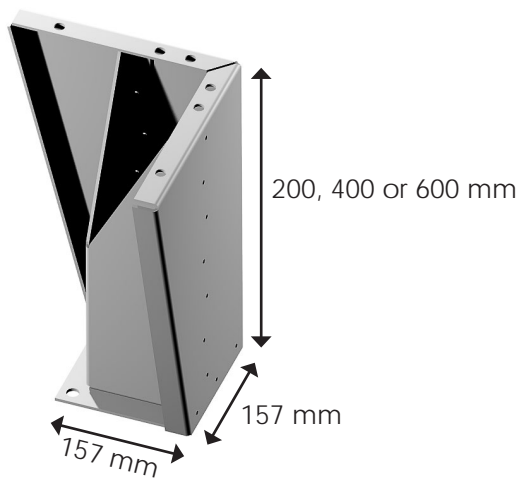


**Note:** The curbs are designed for a maximum total height of 345 mm of steel tray and insulation. To maintain a standard curb height (refer to the curb drawing), you need to check that, depending on the slope of the roof on site, the 'insulation and steel tray' height dimension leaves sufficient insulation height in accordance with French standard DTU 43.1.

An optional blanking plate can be supplied to protect the building from the bad weather between the installation of the curb and the unit.

# Accessories for installation: Feet

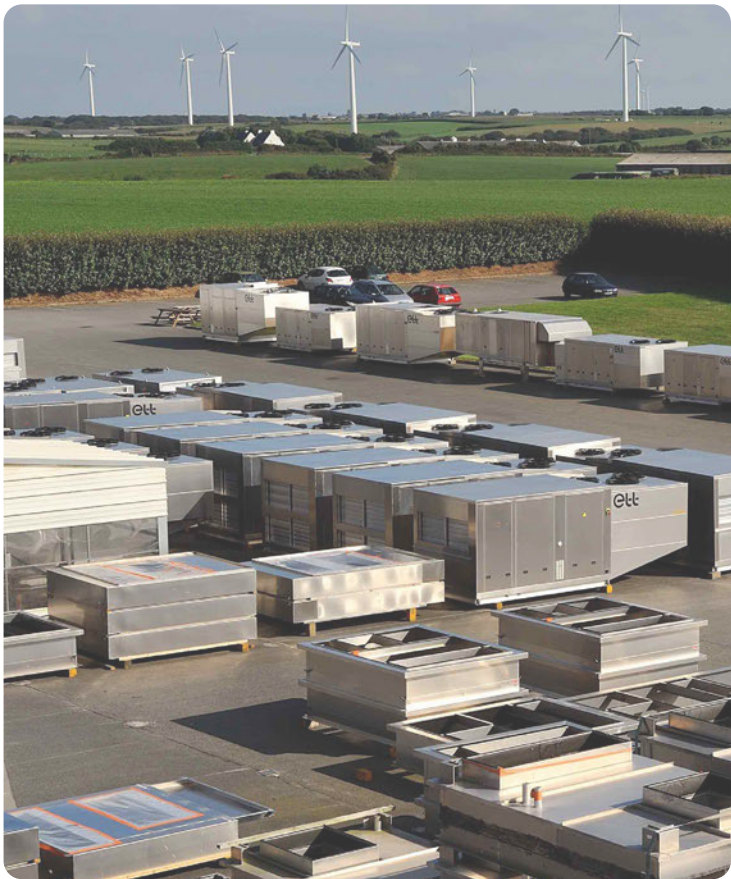
Fixed aluminium foot  
Unit weight: 1 kg



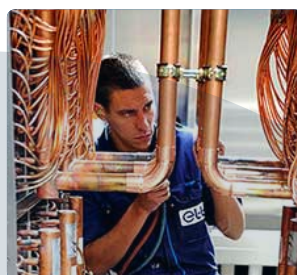
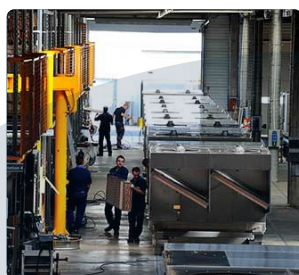
The feet are mounted on the corners of the frame.

	ULTI+ R290 01 ADIA	ULTI+ R290 11 ADIA	ULTI+ R290 12 ADIA	ULTI+ R290 21 ADIA	ULTI+ R290 22 ADIA
No. of feet	4	4	4	4	4

(\*) The central feet have a 200 x 200 mm base (instead of 157 x 157 mm).







Reference: MARK-BRO\_67-EN\_A

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