ENVIRONMENTAL
CLIMATE CONTROL
EQUIPMENT & SOLUTIONS

Green Line

ULTI+ R32 ADIA

R32

Patented

Single flow heat pump with adiabatic cooling

MADE IN FRANCE

www.ett-hvac.com

ULTI+ R32 ADIA : ULTIMA Green Line unit

Up to 72% energy savings !

The **ULTI+ R32 ADIA EX2** is **ETT's latest generation** rooftop range developed on the basis of the EUROVENT certified ULTI+ R32 range, for which a patent has been filed. It combines quality materials, energy savings, acoustic performance, regulation and new generation connected components allowing the units to operate constantly in an optimal way.

The **combination** of **thermodynamic** and **direct adiabatic** technologies allows energy consumption to be minimised while at the same time ensuring that indoor comfort requirements are met at all times, regardless of the weather conditions outside.

In hot weather, the high-efficiency adiabatic function takes precedence over the activation of the compressors. Thanks to a **specific regulation** (artificial intelligence), the cooling periods by evaporation are largely in the majority, which makes it possible to 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.

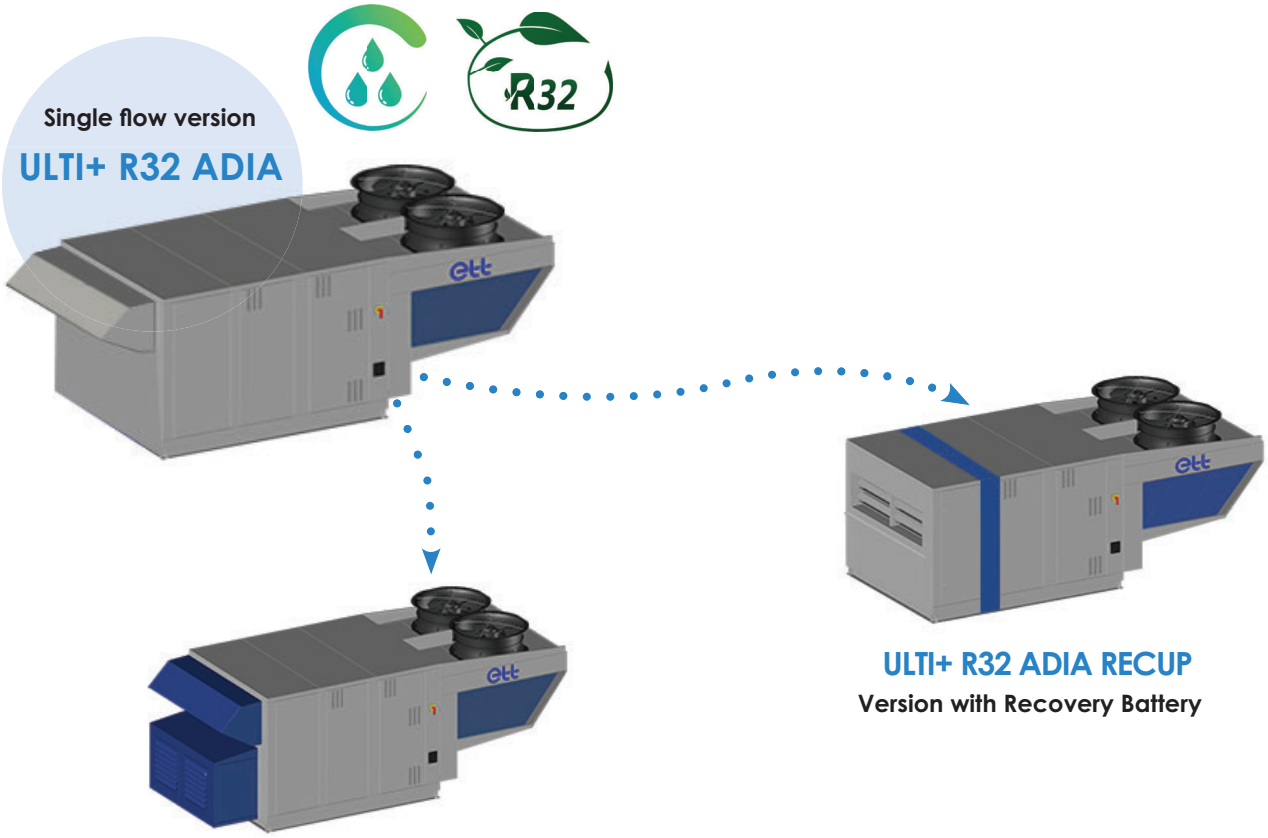
Several instrumentations were carried out during 2 years and revealed **energy gains of 60% on average over the summer** and up to 72% in the most favourable climatic zones.

The **ULTI+ R32 ADIA** range has been developed to cover a wide range of flow rates and capacities. Particular attention has also been paid to the size and weight of the units so that it can be easily installed to replace existing units.

The modular design makes it easy to expand the capabilities of this range. The single flow **ULTI+ R32 ADIA** can be fitted with a box with an extraction fan, allowing heat extraction in summer.

The **ULTI+ R32 ADIA** can also be equipped with a water recovery coil for suitable installations.

Modularity principle of the ULTIMA Green Line Adiabatic range



ULTI+ R32 ADIA : Rooftop compliant with ErP 2021

When they adopted the KYOTO protocol, the Member States of the European Union (EU) voted a set of measures called the "energy-climate package", with the aim of:

- ✓ Reduce greenhouse gas emissions by 20%.
- ✓ Reduce energy consumption by 20%
- ✓ Increase the share of renewable energy in final energy consumption to 20%

To achieve these goals,
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 **" bunch of regulations "** setting performance requirements by product type.
EU Regulation **2016/2281** covers **air heaters**, **cooling** appliances, high temperature industrial **chillers** and **fan coil units.**

As of 1st January 2018,

rooftops that do not comply with the ErP Regulation EU 2016/2281 can no longer be marketed in Europe.

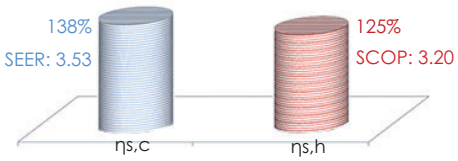
The regulatory impacts of EU 2016/2281

The European Parliament obliges rooftop manufacturers to comply with the **ErP Regulation EU 2016/2281** so that **users can estimate their energy consumption.**

A method for assessing the energy efficiency of rooftops is defined in this regulation, which specifies the minimumEco-C**design requirements**.
This measure gives **the most possible realistic indication of the energy efficiency** of a heating or cooling system and its impact on the environment.

Since 1 January 2021, the minimum performance values to be achieved have been increased.

Seasonal efficiency to be achieved according to ErP 2021.



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

SCOP

Seasonal Coefficient of Performance

SCOP corresponds to the ratio between the annual demand in heating for the reference climate and the annual electricity consumption for heating.

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

SEER

Seasonal efficiency

SEER corresponds to the ratio between the annual demand in cooling for the reference climate and the annual electricity consumption for cooling.

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

2.5: Conversion coefficient to the primary energy
3 % : Control-related factor

ENERGIE TRANSFERT THERMIQUE

CONTENTS

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

- **Iso 14001 & Iso 9001 certification** for 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 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

ENVIRONMENTAL ATTITUDE

SERVICE LINK

Unit description

20-year guarantee against corrosion frame - casing

Aluminium frame and casing

Optimised tightness and thermal insulation.

Reduced weight, for new and renovation projects.

Numerous available arrangements.

20-Year anti-corrosion guarantee.

Eco-design filtration

Low pressure drop.

Fouling analogue control.

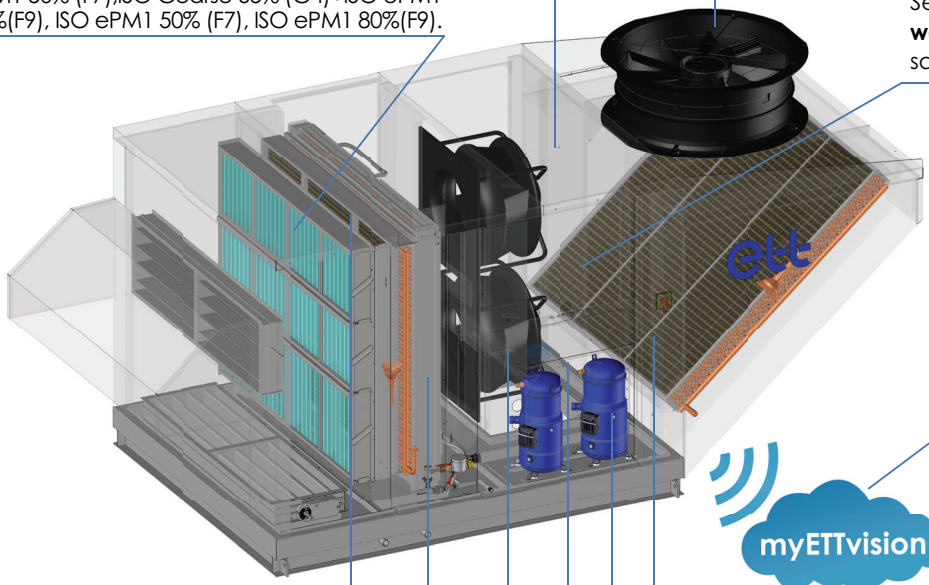
Options ISO Coarse 65% (G4) refillable, ISO ePM10 50% (M5), ISO Coarse 65% (G4)+ISO ePM1 50% (F7),ISO Coarse 65% (G4)+ISO ePM1 80%(F9), ISO ePM1 50% (F7), ISO ePM1 80%(F9).

Propeller fans

Variable-speed propeller fans, communicating, with bionic blade design, electronically commutated (EC) motor, optimum performance and low acoustic level.

Waterproof electrical enclosure

Separate electrical board in **IP44 waterproof** housing for added safety.



Connected components

Optimum unit operation.

Connection to myETTvision communication platform possible

myETTvision

New generation PLC with display

Control enabling optimum operation in all conditions.

Thermal exchangers

Optimized exchangers for better energy performance.

Vinyl option available.

Adiabatic chiller

Fiberglass media non-flammable M0 and inorganic with low pressure drop and high efficiency.

Multi-stage circuit with new generation R32 compressors

Optimum performance whatever the part load.

Electronic expansion valves.

Leak detection

Reduces the number of periodic visits.

R32

Internal fans

Variable-speed fans with air flow rate measurement.

Analogue Flow Controller (AFC), communicating, direct drive, electronically commutated « EC » motor, optimal efficiency and low noise level.

Low Noise option available.

AFC option available with flow rate auto-adjustment.

** ErP (Energy related Product) 2021: the Ultima Green Line range complies with the eco-design regulatory requirements for air heaters, cooling appliances (Regulation 2016/2281).*

Unit description

Energy savings

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

The design of the ULTI+ R32 ADIA provides precise regulation for optimum and continuous energy performance throughout its years of operation.

Premium process and component QUALITY

- **Sustainable and recyclable equipment: aluminium body and frame,** 100% recyclable, 20 year corrosion proof warranty
- Non-polluting process
- **Eco Design approach** to combine **economy** and **optimum performance** (SEER, SCOP)
- Simplified replacement of existing machines; **identical existing roof curbs.**
- Reduced unit size and weight

Accessibility and flexibility

- **Technical compartment** allowing simple and rapid access to the air ducts.
- **Free and simplified access to the filters** by removable panels.
- **Accessible components for maintenance.**
- **Wide range of power ratings** to suit the needs of each project
- **Numerous airflow configurations,** meeting integration constraints

Connected components

New Generation PLC

- allows communication between units
- sends technical data from the units to an external server to allow optimum remote control with myETTvision

R32 fluid

Low GWP

- **ULTIMA Green Line** range with R32, a low GWP fluid (675).
- **plays an active role in ensuring compliance with the tonnage equivalent CO_2,** a legal obligation imposed on gas producers and importers.
- minimizes the impact on the greenhouse effect.

Indoor air quality

- Ecodesign filtration
- CO_2 sensor to control fresh air supply
- **Quick and easy filter replacement.**

Acoustic performance

MAIN FEATURES

- **New generation variable-speed propellers and fans**
- **Control system adjusting rotation speed to power stages**

Because environmental noise reduction is essential, our standard self-contained units are designed to meet your acoustic requirements.

ETT goes the extra mile...

Installation

Outdoor, on the rooftop or at ground level.

ETT services

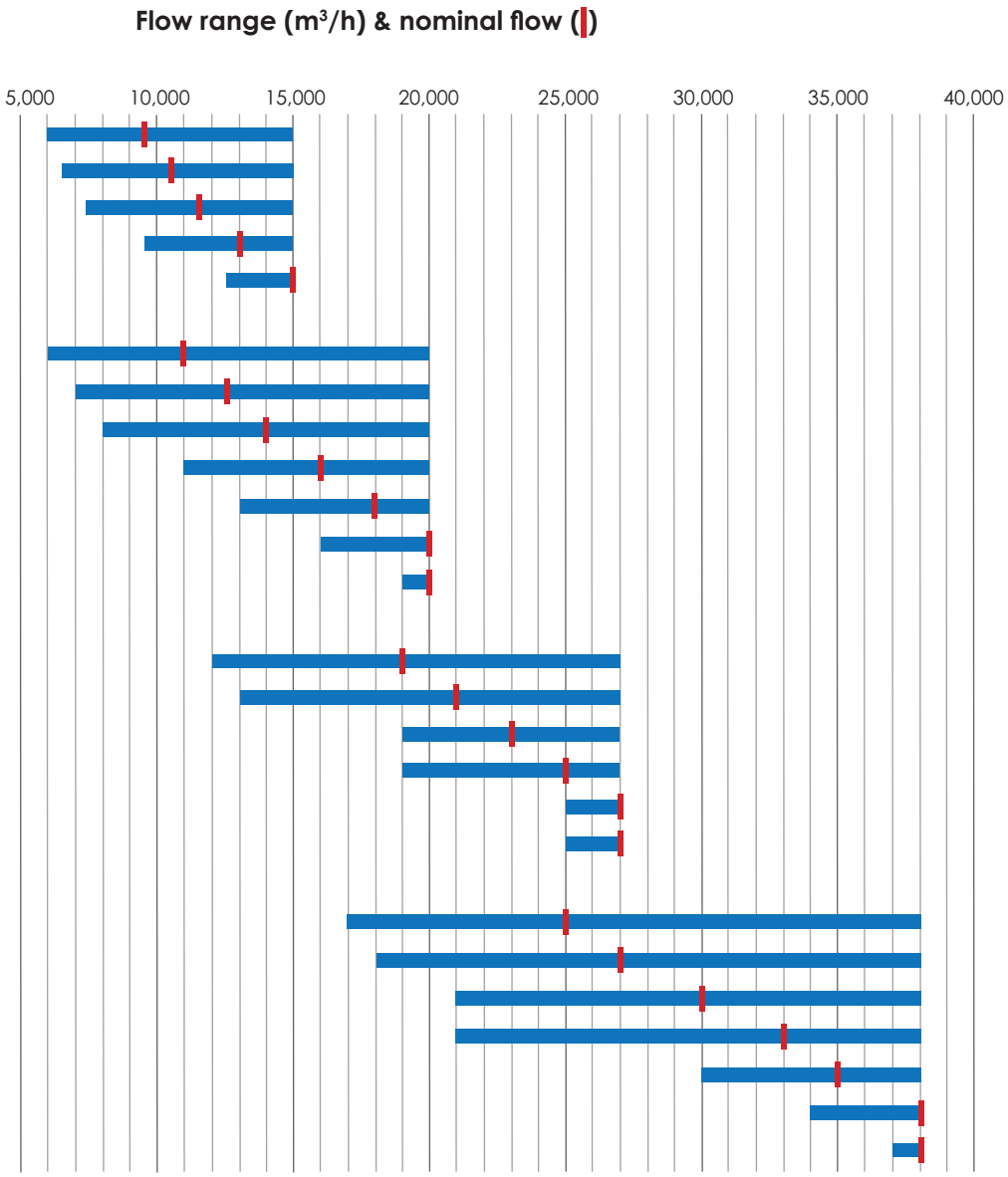
- A team to guide you from commissioning to operational support
- Manufacturer visits and audits
- Installation optimisation and retrofit
- Service contracts
- Staff training
- Access to the ETT Services hotline

myETTvision platform

myETTvision allows you to control and optimize your installation remotely.

A WIDE RANGE

Unit	Power*
ULTI+ R32 11-045 ADIA	44
ULTI+ R32 11-050 ADIA	47
ULTI+ R32 11-055 ADIA	52
ULTI+ R32 11-065 ADIA	60
ULTI+ R32 11-075 ADIA	68
ULTI+ R32 12-050 ADIA	50
ULTI+ R32 12-055 ADIA	56
ULTI+ R32 12-065 ADIA	63
ULTI+ R32 12-075 ADIA	70
ULTI+ R32 12-080 ADIA	78
ULTI+ R32 12-090 ADIA	87
ULTI+ R32 12-100 ADIA	93
ULTI+ R32 21-090 ADIA	85
ULTI+ R32 21-095 ADIA	91
ULTI+ R32 21-110 ADIA	103
ULTI+ R32 21-115 ADIA	116
ULTI+ R32 21-130 ADIA	123
ULTI+ R32 21-140 ADIA	132
ULTI+ R32 22-115 ADIA	110
ULTI+ R32 22-130 ADIA	124
ULTI+ R32 22-140 ADIA	133
ULTI+ R32 22-150 ADIA	145
ULTI+ R32 22-160 ADIA	162
ULTI+ R32 22-180 ADIA	178
ULTI+ R32 22-200 ADIA	190



* Thermodynamic cooling capacity

Operating principles

The unit operates as a reversible heat pump:

> Source : Outdoor air and city water
> Treated fluid : Indoor and/or outdoor air

Basis for regulation :

> Indoor and outdoor conditions

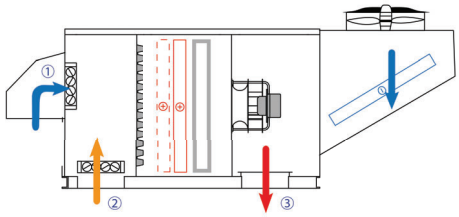
Operating modes can be :

> Heating by heat pump and/or heat recovery coil
> Free cooling with outside air : Free-Cooling
> Cooling by adiabatic chiller or air conditioning by heat pump
> Recycling

In these modes, the unit can operate :

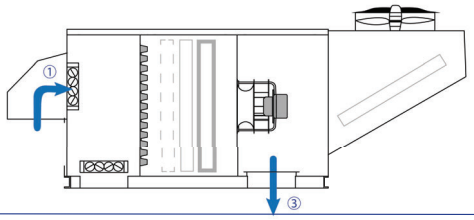
> In full recycling mode
> With all fresh air
> With mixed-air

Heating mode



Heating mode: Maintenance of the comfort temperature in winter by the thermodynamic system. If the water recovery coil option is chosen, it is used as a priority and the thermodynamic system is used as a back-up.

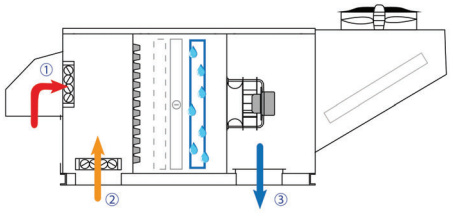
Free Cooling mode



Free Cooling mode: In mid-season, comfort temperature is maintained using in priority the difference between outside air and inside air to cool the building.

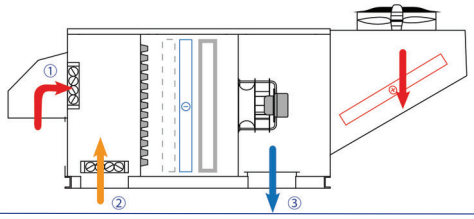
Free Cooling allows significant savings by delaying the start-up of the thermodynamic system.

Adiabatic Cooling mode



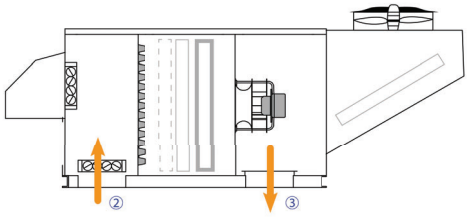
Cooling mode: activation of the adiabatic system with automatic switchover between fresh and recycled air depending on the most favourable ambient/external conditions.

Cooling mode



Air conditioning: In summer, comfort temperature is maintained thanks to the thermodynamic system.

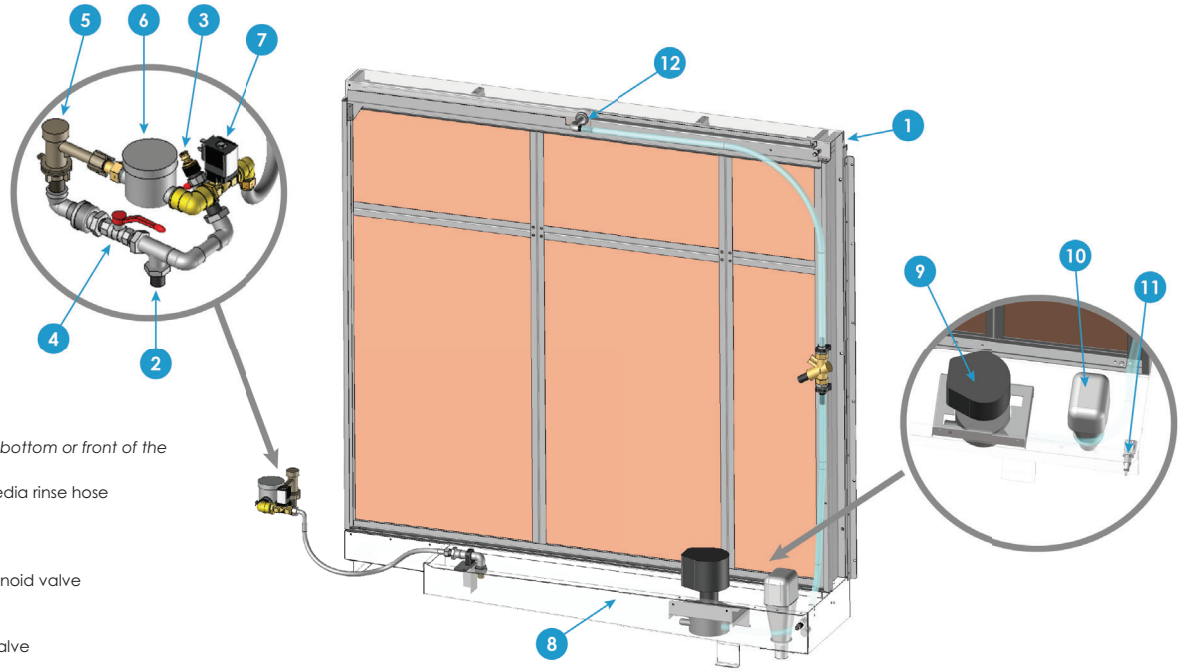
Recycling mode



Recycling mode: Circulation by recycling the air from the treated volume, when the return air temperature is significantly higher than the room temperature in winter.

① Fresh air ② Return air ③ Supply air

Operating principle 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:

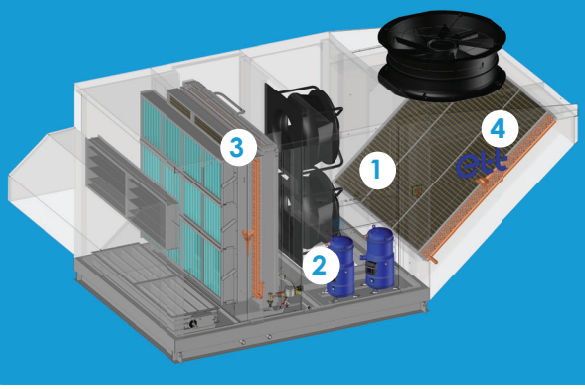
> automatic emptying of the water tank when the machine is switched off prevents water from standing for long periods of time.

> 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**.

Detailed components of the unit



The ULTI+ R32 ADIA comprises 4 different sections:

1 A sealed, air-flow insulated electrical compartment (IP44).

2 A technical section isolated from the air flow, containing the refrigeration and hydraulic components and the control units.

3 The body of the machine including filters, recovery water coil (optional), adiabatic cooler, thermodynamic coil and fans..

4 An external section to ensure heat exchange with the environment.

Aluminium frame-casing assembly :

- **Equipped with a 2-flap mixing box with low pressure drop motorised dampers, made of aluminium and with an Upstream-Downstream Class 3 sealing and a Class B frame sealing (according to EN1751) the ULTI+ R32 ADIA enables:**
  - ✓ Optimum fresh air supply proportions, thanks to the CO_2 sensor.
  - ✓ Switching to Free Cooling mode, delaying the operation of the adiabatic module, resulting in significant energy savings.
  - ✓ **Perfect weather resistance, 20-year anti corrosion guarantee on casing.**
- **Watertight floor** with drainage outlets around the unit, connected to rubber siphons.
- **Aluminium vertical panels and roof, mounted on aluminium frame.**
- A separate **technical section** facilitates unit control and maintenance and allows measurement and adjustment during operation.
- **Access through large removable panels**. Doors tightness is ensured by a flexible gasket under compression, providing ideal sealing day after day.
- **Sound and thermal insulation provided by 80 mm to 100 mm rock wool** (M0 classification) in the frame and **by 50 mm glass wool** (M0 classification in accordance with **Public Access Buildings regulations,** article CH36) **in the walls and roof.**
- **Optional rain proof cowl on fresh air** (to be fitted by the installer).

Air assembly:

- **Eco-design type filtration,** easily removable - ISO 65% Coarse efficiency (G4) in **98 mm** pleated media to increase filter life and reduce pressure drop, clogging controlled by analogue pressure switch.
- **Various filtration levels available** to suit your project needs: ISO Coarse 65% refillable (G4) 98mm, ISO ePM10 50% (M5) 98mm, ISO Coarse 65% (G4) + ISO ePM1 50% (F7) 48+48mm, ISO ePM1 50% (F7) 98mm, ISO Coarse 65% (G4) + ISO ePM1 80% (F9) 48+48mm, ISO F9).
- **Replacement filter kit available as an option**
- **Propeller fans (High Energy Performance)**

  Pioneer, ETT has opted for last generation fans:
  - ✓ Equipped with an electronically commutated "EC" motor « EC » with variable speed - these newly designed fans can increase the air flow rate of the heat exchangers by up to 15% while maintaining the same power consumption. These "EC" fans ensure a precise temperature for better comfort and energy savings by adapting their rotation speed to the real needs.
  - ✓ **Innovative blade design** resulting in lower compressors consumption thanks to lower HP and higher LP in the different operating modes.
  - ✓ Communicating for real time operation adjustment.
  - ✓ Increased diameter for optimum performance and low acoustic level: unprecedented values.
- **Last generation internal fans (High Energy Performance):**
  - ✓ **Direct transmission** (gain on maintenance, reliability and consumption).
  - ✓ **Equipped with a variable speed "EC" electronic switching motor** associated with the analogue flow controller - AFC (commissioning gain) flow measurement,
  - ✓ With an aluminium wheel design,
  - ✓ Communicating for real time operation adjustment.
  - ✓ Integrated Soft Starter system for reduced starting current and soft start (textile ducting)
- **AFC option with flow rate auto-adjustment**, tocompensate for filter fouling.
- **VDP option** (power/flow rate variation) for energy consumption reduction.

Detailed components

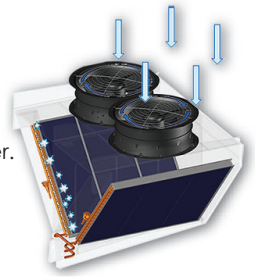
Thermodynamic assembly:

- **For units with several thermodynamic circuits,** only the first circuit is equipped with a tandem. This allows the thermal power provided to be spread according to the application needs, for less consumption and more comfort.
- **Communicating electronic expansion valves** combining increased optimisation of the exchangers and fast stabilisation of the thermodynamic system.
- **Reinforced thermal exchangers** made with aluminium fins and copper pipes with double helical grooving for better thermal exchange. External exchangers designed for delayed frosting and quick and efficient defrosting.
  Vinyl coating available on request.
- **Refrigeration circuits** compliant with the European directive on pressure equipment (PED 2014/68/EU).
- **Refrigerant** type **R32**.
- **Tandem circuits** to stage the supplied power and save energy during operation in part load. Operation in part load considerably reduces the number of defrost cycles and their duration.
- **The refrigerant circuit is equipped with isolation valves** at the terminals of the compression unit. When working on the compression unit, these isolation valves make it easier to repair and maintain the refrigerant circuit.
- **Independent refrigeration circuit:** each refrigeration circuit has a propeller fan to ventilate the exchanger.
- **Anti-acid filter drier.**
- **Cycle reversal valve**.
- **Optimised defrosting** thanks to the new design of the external section (**optimised for ecodesign**).

Optimised defrosting:

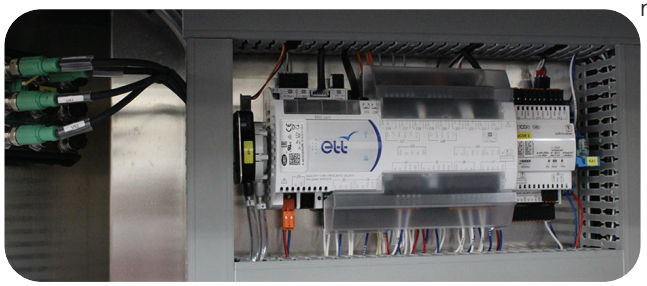
Defrosting principle:

- ✓ The condensation of humidity produces frost on the coil.
- ✓ The concerned propeller fan stops operating (simultaneous defrosting cycles are banned).
- ✓ The refrigeration system 4-way valve reverses: during defrosting, the coil operates as a condenser.
- ✓ The coil is dried.
- ✓ The other refrigeration circuit continues to operate normally.



Electrical assembly in a sealed compartment (IP44):

- **Electric stage** in accordance with NF EN C 15-100 and NF EN 60204-01 comprising:
  - ✓ **ETT PLC** with optional ETT Control Box remote display or via native Modbus BMS.
  - ✓ **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.
  - ✓ **Fault synthesis** with pending dry contact on terminal.
  - ✓ **Numbered terminal blocks** with disconnecting terminals for remote controls and transfers.
  - ✓ **A terminal block for** compressor **load shedding.**
  - ✓ **Internal wiring** with numbered ferrules at both extremities
  - ✓ **Ik3 breaking capacity** of basis 10 kA.
  - ✓ **All components protected** by circuit breakers.
  - ✓ **A phase controller.**
  - ✓ **The LV distribution voltage rating** is governed by the Interministerial French 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 ml), 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 is the additional voltage drop generated at a point in the network if 1 single phase kW is added at the same point. Consult us if the regulations of the country of installation require other characteristics



Detailed components

Adiabatic assembly :

- High efficiency direct adiabatic humidifier (93%).
- Inorganic, non-flammable (M0) glass fibre media that complies with EN ISO 1182 and is therefore approved for use in public buildings in accordance with the European Machinery Directive 2006/42/EC.

Principle of adiabatic control

The unit regulates:

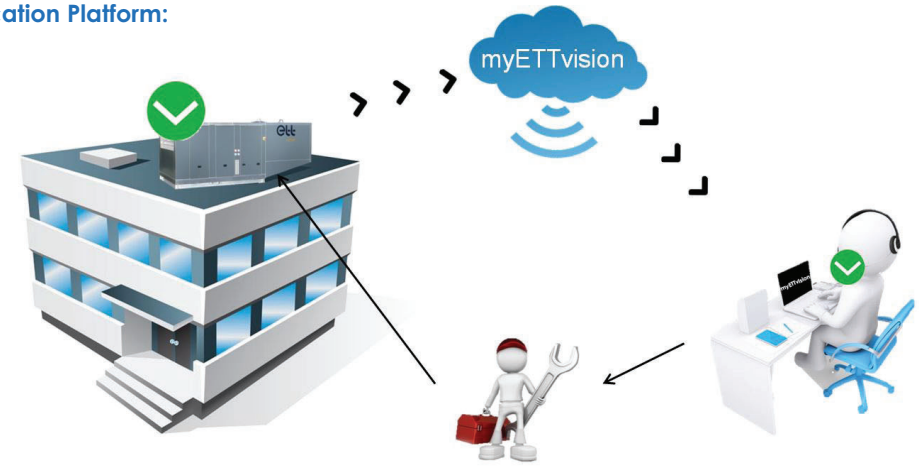
- Keeping the room temperature setpoint: when the setpoint is exceeded, the adiabatic system is switched on.
- Artificial intelligence allows the chiller to be switched on according to weather conditions and building response to maximise chiller usage and minimise, or even eliminate, the activation of thermodynamics.
- Keeping the CO_2 level below a high limit by progressively opening the fresh air damper (when it is not already in the open position).
- Maintaining the humidity and water weight below the high limits (configurable) by stopping the adiabatic system and starting the thermodynamics if necessary to maintain the room temperature setpoint. It also measures indoor and outdoor air conditions in real time and makes decisions on fresh air and return air operation to maximise performance.

Advanced control assembly:

- **Temperature control with 2 set points for Cooling/Heating mode according to 2002/91/EC Directive: reactivity, accuracy and anticipation.**
  Economy mode or Comfort mode controls available.
- **Filters fouling analogue control** (FFAC), fouling measurement and indication on the controller enabling preventive filter replacement for optimum air quality and reduced consumption.
- **Real time control of propeller fan rotation speed** depending on operating mode, outside temperature and thermodynamic capacity, for optimum acoustic performance and energy savings.
- **VDP function (power/flow rate variation)**, as an option, to allow inside air flow rate adjustment according to thermodynamic capacity.
- **Analogue air flow controller (AFC)** to measure and display supply air fans flow rate on the controller, with optional flow rate auto-adjustment for filter fouling compensation.
- **Air quality control with CO_2 sensor** to optimise fresh air quantities and reduce energy consumption.
- **Free Cooling function**: free cooling with outside air, delaying adiabatic operation for significant energy savings.
- **Optional free cooling by water weight** comparison to limit latent inputs during the free cooling phase by comparing the indoor and outdoor water weights.
- **Optional all-season kit function** for air conditioning operation at outdoor temperatures below 15°C.
- **Electrical energy metering**, with distribution of power consumption according to operating modes.
- **Monitoring, diagnostic and security and fault management** (anti-freeze thermostat, smoke detector, fire thermostat, HP switch, compressor MAP monitoring…), with written fault history.
- **Leak detection :** The ULTI+ R32 ADIA is equipped with leak detection as standard. This detection allows the user to be warned in case of R32 fluid leakage. Leak detection also reduces the need for periodic visits to your equipment.
- **myETTvision remote communication platform allowing access to parametrisation, operation and energy monitoring, access to faults in your fleet of units.**

myETTvision:

ETT Remote Communication Platform:

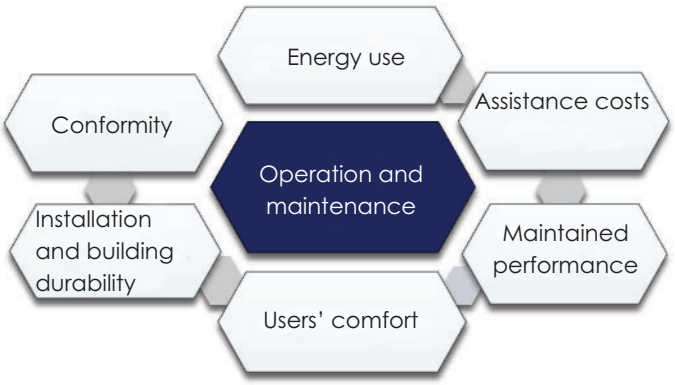


OPERATION: COSTS, PERFORMANCE AND GUARANTEES

Equipment installation and optimisation have a major impact on **units total cost.**

They affect 3 levers:

- **Total cost**
  - ✓ Purchase and Implementation (15%)
  - ✓ Operating costs (85%)
- **Installation efficiency**
  - ✓ **Operating cost**
  - ✓ **Users' comfort**
  - ✓ **Durability**
  - ✓ **Availability**
- **Conformity**
  - ✓ **Regulations**
  - ✓ Manufacturer's guarantee



Equipment operation and maintenance must ensure regulatory compliance, starting with commissioning. Operating instructions aim at optimising unit performance and settings. Also, the validity of the guarantee is conditional upon strict compliance with these instructions.

Periodic checks must include, at least:

- **Technical features control and setting** (safety devices, ventilation, refrigeration circuits, etc.)
- **Control adjustment** (setpoints, operating schedule, advanced parameters, etc.)
- **Technical and regulatory checks:**
  - Leakage checking, once or twice a year
  - Commissioning, periodic checks and periodic requalification (pressure equipment monitoring)
  - Filters replacement, 2 to 4 times a year depending on the type of filters and installation environment
  - Sensor element control and replacement for humidity sensors, CO_2 sensors and smoke detectors
- Related equipment control and maintenance (diffusion networks, sensors condition, etc.)

ETT services allow **trouble-free operation of your equipment** and guarantee **optimum performance** and **regulatory compliance** of the installation.

Main options

Frame - Casing	▪ Aluminium double skin in internal section ▪ External damper powered by blowing except blow down (CH38 - Directive 2006/42/EC) ▪ Fresh air cowl acoustic insulation ▪ Painting ▪ Vertical supply air ▪ Supply air on side ▪ Return air on side ▪ Fresh air cowl extension
Air handling	▪ Actuating smoke detector with battery back-up ▪ Epoxy coating for supply air fans ▪ Analogue air flow controller (AFC) with supply air fans flow rate auto-adjustment ▪ 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 ▪ EPM1 55% (F7) 98mm blow-by ISO filters with analogue sensor ▪ EPM1 80% (F9) 98mm blow-by ISO filters with analogue sensor
Adiabatic	▪ Water meter ▪ Hydraulic services on unit floor ▪ Hydraulic services on unit front ▪ Inspection window and ceiling light in adiabatic compartment with timer switch
Thermodynamics	▪ Cooling only operating mode (non-reversible unit) ▪ Compressor MAP monitoring ▪ Vinyl coating on thermodynamic coils ▪ HP and LP pressure gauge
Preheating	▪ Hot water recovery coil with analogue anti-freeze thermostat (services opposite the technical section) ▪ Progressive 3-way valve for hot water recovery coil ▪ Shut-off valve on the flow + TA control valve on the return for hot water recovery coil ▪ Fresh air preheating through auxiliary 3-stage electric heaters
Electricity	▪ Total electrical energy metering according to 2002/91/EC ▪ Aluminium/ Copper connection terminal blocks (Mandatory for aluminium supply cables) ▪ Single-phase 230V / 16A PC socket in the technical room (separate power supply to be provided by the installer) ▪ IT earthing system compatibility ▪ Cable protective cowl for outside power supply (to be mounted by the installer)
Installation	▪ Aluminium adjustable connection roof curb ▪ Aluminium adaptation connection roof curb ▪ Aluminium adjustable ventilated roof curb ▪ Aluminium ventilated adaptation roof curb ▪ 200, 400 or 600mm aluminium feet
Control	▪ Year-round operation (compressor authorisation for air conditioning with outside temperature < +15°C) ▪ Control function in Comfort mode (setpoint temperatures control by PID) ▪ Free Cooling banning based on specific humidity comparison ▪ VDP operation (power/flow rate variation) ▪ HPE+ operation (High Energy Performance) ▪ Average room temperature (4 sensors) ▪ Minimum fresh air slaving using turret contacts (3 maximum)
Communication	▪ **myETTvision** ▪ ETT CONTROL BOX control remote display ▪ CCAD remote display ▪ Native RS485 Modbus ▪ Modbus IP ▪ BacNet IP
Guarantee	▪ Please consult us

Technical features

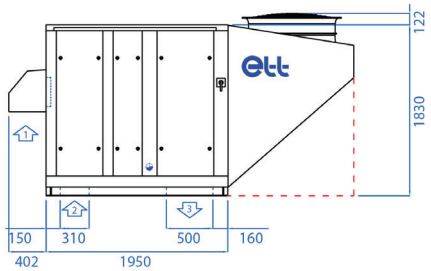
	DESIGNATION	Unit	11-045	11-050	11-055	11-065	11-075
VENTILATION DATA	**FLOW RATES**						
	Rated air flow rate	**m3/h**	9,500	10,500	11,500	13,000	15,000
	Minimum air flow rate	**m3/h**	6,000	6,500	7,500	9,500	12,500
	Maximum air flow rate	**m3/h**	15,000	15,000	15,000	15,000	15,000
	ACOUSTICS(1)						
	Outside sound power level	**dB(A)**	77	77	80	85	88
	Resulting outside sound pressure at 10 m, reference 10^{-5} in free field	**dB(A)**	49	49	52	57	60
	ACOUSTICS IN ADIABATIC OPERATION (1)						
	Outside sound power level	**dB(A)**	58	53	55	57	61
	Resulting outside sound pressure at 10 m, reference 10^{-5} in free field	**dB(A)**	27	22	24	26	30
PERFORMANCE IN ADIABATIC COOLING MODE	**RATED PERFORMANCES AT +35°C/ +35°C.**						
	Adiabatic humidifier efficiency	**%**	93	93	93	93	93
	Net cooling capacity in adiabatic operation (9)	**kW**	33.4	36.5	39.8	44.6	50.8
	Supply air temperature at 35°C / 40% with 100% open fresh air damper	**°C**	25.3	25.4	25.4	25.5	25.6
	Water flow rate consumed (8)	**m3/h**	0.06	0.07	0.08	0.09	0.10
	net EER in adiabatic operation(9)	**kW/kW**	34.1	23.7	21.3	18.0	14.3
THERMODYNAMIC EFFICIENCY IN COOLING MODE	**RATED PERFORMANCES AT +35°C** (1)						
	Net rated thermodynamic capacity	**kW**	43.2	46.5	52.0	59.8	67.0
	Net EER	**kW/kW**	3.4	3.3	3.2	3.2	3.1
	SEASONAL EFFICIENCY(2)						
	Design net cooling capacity	**kW**	43.2	46.5	52.0	59.8	67.0
	SEER	**kW/kW**	5.3	4.8	4.7	4.6	4.7
	ηC	**%**	208	188	184	179	183
THERMODYNAMIC EFFICIENCY HEATING MODE	**RATED PERFORMANCES AT +7°C** (1)						
	Net rated thermodynamic capacity	**kW**	43.9	47.5	54.1	61.6	69.9
	Net COP	**kW/kW**	4.2	4.2	4.1	4.0	3.9
	RATED PERFORMANCES AT -7°C (3)						
	Net rated thermodynamic capacity	**kW**	30.0	33.1	37.1	43.0	48.3
	Net COP	**kW/kW**	3.3	3.4	3.3	3.2	3.0
	SEASONAL EFFICIENCY(2)						
	Design net heating capacity	**kW**	39.3	40.7	45.3	51.8	58.5
	SCOP	**kW/kW**	4.2	4.1	4.0	3.8	3.7
	ηH	**%**	166	162	158	149	144
GENERAL DATA	**ELECTRICAL DATA**						
	Total installed electrical power **excluding auxiliary**(4)	**kW**	25	26	30	33	35
	Total installed electrical current **excluding auxiliary** (4)	**A**	40	42	48	53	55
	Starting current **excluding auxiliary**	**A**	128	129	160	174	172
	Maximum electrical power input **excluding auxiliary** (5)	**kW**	15	17	19	22	25
	REFRIGERATION CIRCUIT(S)						
	Power stages	**-**			2		
	OPERATING LIMITS IN COOLING MODE						
	Maximum outside temperature (6)	**°C**	+50	+ 49	+ 51	+ 50	+ 48
	Minimum outside temperature (6)	**°C**			+15		
	Minimum internal coil inlet temperature	**°C**			+18		
	OPERATING LIMITS IN HEATING MODE						
	Minimum outside temperature	**°C**			-15		
	Minimum internal coil inlet temperature	**°C**			+12		
	WEIGHT						
	Unit weight without options (7)	**kg**	832	838	852	847	922
	Connection roof curb weight	**kg**			80		
	Standard ventilated roof curb weight	**kg**			112		

(1) According to NF EN 14511 : All return air operation without filter and damper by integrating the fan(s) correction related to the external pressure of the machine.
Cooling Mode: Inside conditions: +27°C DB /+19°C WB and Outdoor conditions: +35°C DB / 24°C WB.
Heating mode : Inside conditions: +20°C DB / +12°C WB & outdoor conditions :+7°C DB/ +6°C WB.
(2) According to EcoDesign regulations 2016/2281.
(3) according to NF EN 14511.
Heating mode : Inside conditions: +20°C DB / +12°C WB & outdoor conditions :-7°C DB/ -8°C WB.
(4) Power to be used for the power cables. 400V/50 Hz 3-phase power supply + earth without neutral.
(5) Air conditioning mode :
Inside conditions: +27°C DB /+19°C WB and Outdoor conditions: +35°C DB / 24°C WB. Rated air flow rate, 400Pa available pressure on return + supply air & fouled G4 filters
(6) For indoor conditions : +27°C DB /+19°C WB at nominal air flow rate
(7) Machine weight loaded with water
(8) Water flow rate calculated for 2 cycles before emptying
(9) Adiabatic cooling mode at nominal flow with all fresh air for an available pressure of 400Pa + damper and ISO Coarse filtration 65%: Outside conditions: +35°C DB / 24°C WB.
Calculation according to NF EN 14511.

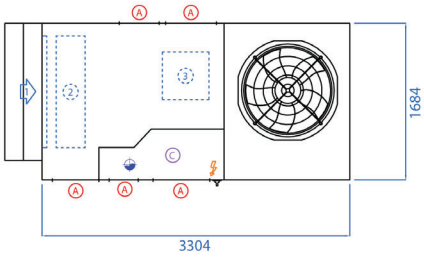
Arrangement 1.1 : Supply air below

For any other configuration, ask your sales contact for the drawing.

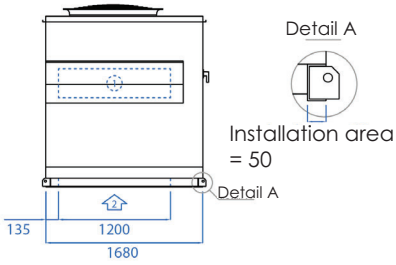
Front view:



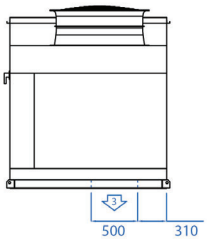
Top view:



Return air side view:



Supply air side view:



① Fresh air
② Return air
③ Supply air
⚡ Power supply
Ⓐ Access
Ⓒ Technical section
--- Provide 400 mm clearance (minimum) to allow air passage below the unit.
Water supply with a choice of two services: one from below for an internal connection and one in front for an external connection

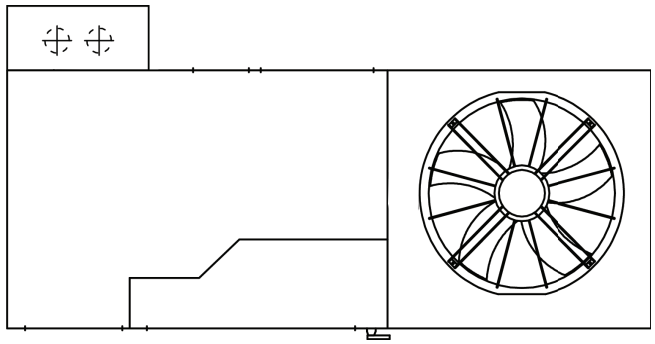
	Length	Width [1]	Height
Casing dimensions	3 304 mm	1 684 mm	1 830 mm

Nota: Fresh air cowls shall be fitted by the installer.

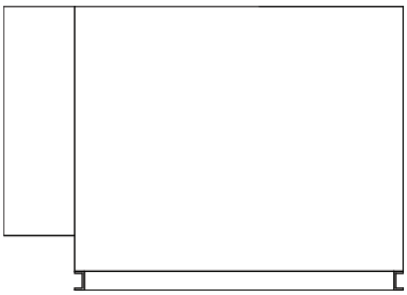
SCHEMATIC DIAGRAM AND CONNECTION

► Connection opposite the technical compartment.

Top view



Side view



CAPACITIES

		Unit	045	050	055	065	075
Water regime 35/30°C and Exchanger inlet air temperature 10°C	Heating capacity	kW	48.2	51.5	54.7	59.1	64.6
	Water flow rate	m³/h	8.4	8.9	9.5	10.2	11.2
	Exchanger pressure drop	mWC	4.0	4.5	5.0	5.8	6.8
	Exchanger and 3WV pressure drop (1)	mWC	6.7	7.6	8.5	9.8	11.6
	Exchanger, 3WV, SV and TAV pressure drop (2)	mWC	9.4	10.7	12.0	14.0	16.6
Water regime 35/30°C and Exchanger inlet air temperature 20°C	Heating capacity	kW	25.9	27.6	29.3	31.5	34.3
	Water flow rate	m³/h	4.5	4.8	5.1	5.5	6.0
	Exchanger pressure drop	mWC	1.3	1.4	1.6	1.8	2.1
	Exchanger and 3WV pressure drop (1)	mWC	2.1	2.3	2.6	3.0	3.5
	Exchanger, 3WV, SV and TAV pressure drop (2)	mWC	2.9	3.2	3.6	4.2	4.9

(1) With 3WV option
(2) With 3WV, SV and TAV option

3WV: 3-way valve
SV: Stop valve on outlet
TAV: TA regulating valve on inlet, opened 7/8
Technical data for non-glycol water, at rated air flow rate.

Technical features

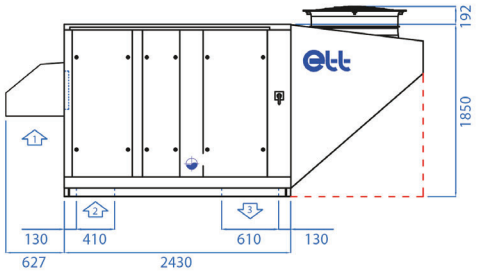
	DESIGNATION	Unit	12-050	12-055	12-065	12-075	12-080	12-090	12-100
VENTILATION DATA	**FLOW RATES**								
	Rated air flow rate	m3/h	11,000	12,500	14,000	16,000	18,000	20,000	20,000
	Minimum air flow rate	m3/h	6,000	7,000	8,000	11,000	13,000	16,000	19,000
	Maximum air flow rate	m3/h	20,000	20,000	20,000	20,000	20,000	20,000	20,000
	ACOUSTICS(1)								
	Outside sound power level	dB(A)	77	80	83	85	89	95	96
	Resulting outside sound pressure at 10 m, reference 10^{-5} in free field	dB(A)	49	52	55	57	61	67	68
	ACOUSTICS IN ADIABATIC OPERATION (1)								
	Outside sound power level	dB(A)	51	54	55	58	60	70	70
	Resulting outside sound pressure at 10 m, reference 10^{-5} in free field	dB(A)	20	23	24	27	29	39	39
PERFORMANCE IN ADIABATIC COOLING MODE	**RATED PERFORMANCES AT +35°C/ +35°C.**								
	Adiabatic humidifier efficiency	%	93	93	93	93	93	93	93
	Net cooling capacity in adiabatic operation (9)	kW	38.8	44.0	49.2	55.8	62.4	67.8	67.8
	Supply air temperature at 35°C / 40% with 100% open fresh air damper	°C	25.2	25.2	25.3	25.3	25.4	25.6	25.6
	Water flow rate consumed (8)	m3/h	0.07	0.08	0.09	0.10	0.12	0.13	0.13
	Net EER in adiabatic operation (9)	kW/kW	41.2	36.4	33.4	27.0	22.3	14.4	14.4
THERMODYNAMIC EFFICIENCY IN COOLING MODE	**RATED PERFORMANCES AT +35°C (1)**								
	Net rated thermodynamic capacity	kW	49.0	55.1	62.8	69.9	77.6	87.0	92.1
	Net EER	kW/kW	3.5	3.4	3.3	3.2	3.2	2.9	3.0
	SEASONAL EFFICIENCY(2)								
	Design net cooling capacity	kW	49.0	55.1	62.8	69.9	77.6	87.0	92.1
	SEER	kW/kW	5.1	5.1	4.9	4.9	4.7	4.8	4.4
	ηC	%	200	199	191	193	186	189	172
THERMODYNAMIC EFFICIENCY HEATING MODE	**RATED PERFORMANCES AT +7°C (1)**								
	Net rated thermodynamic capacity	kW	48.1	54.2	63.5	71.5	80.1	91.5	97.7
	Net COP	kW/kW	4.7	4.6	4.4	4.3	4.1	3.7	3.7
	RATED PERFORMANCES AT -7°C (3)								
	Net rated thermodynamic capacity	kW	33.0	37.1	43.4	48.7	55.0	63.3	66.9
	Net COP	kW/kW	3.7	3.6	3.4	3.3	3.2	2.9	2.9
	SEASONAL EFFICIENCY(2)								
	Design net heating capacity	kW	43.8	48.0	55.8	62.6	70.0	79.7	84.6
	SCOP	kW/kW	4.6	4.5	4.2	4.2	3.9	3.7	3.6
	ηH	%	181	175	165	164	154	145	142
GENERAL DATA	**ELECTRICAL DATA**								
	Total installed electrical power **excluding auxiliary**(4)	kW	25	28	32	34	38	46	45
	Total installed electrical current **excluding auxiliary** (4)	A	41	44	52	54	62	77	73
	Starting current **excluding auxiliary**	A	127	156	172	171	183	242	217
	Maximum electrical power **excluding auxiliary** (5)	kW	17	19	22	25	29	34	35
	REFRIGERATION CIRCUIT(S)								
	Power stages	-				2			
	OPERATING LIMITS IN COOLING MODE								
	Maximum outside temperature (6)	°C	+ 50	+ 48	+50	+ 49	+ 50	+ 49	+ 48
	Minimum outside temperature (6)	°C				+15			
	Minimum internal coil inlet temperature	°C				+18			
	OPERATING LIMITS IN HEATING MODE								
	Minimum outside temperature	°C				-15			
	Minimum internal coil inlet temperature	°C				+12			
	WEIGHT								
	Unit weight without options (7)	kg	1,034	1,044	1,059	1,109	1,119	1,109	1,154
	Connection roof curb weight	kg				104			
	Standard ventilated roof curb weight	kg				146			

(1) According to NF EN 14511 : All return air operation without filter and damper by integrating the fan(s) correction related to the external pressure of the machine.
Cooling Mode: Inside conditions: +27°C DB /+19°C WB and Outdoor conditions: +35°C DB / 24°C WB.
Heating mode : Inside conditions: +20°C DB / +12°C WB & outdoor conditions :+7°C DB/ +6°C WB.
(2) According to EcoDesign regulations 2016/2281.
(3) according to NF EN 14511.
Heating mode : Inside conditions: +20°C DB / +12°C WB & outdoor conditions :-7°C DB/ -8°C WB.
(4) Power to be used for the power cables. 400V/50 Hz 3-phase power supply + earth without neutral.
(5) Air conditioning mode :
Inside conditions: +27°C DB /+19°C WB and Outdoor conditions: +35°C DB / 24°C WB. Rated air flow rate, 400Pa available pressure on return + supply air & fouled G4 filters
(6) For indoor conditions : +27°C DB /+19°C WB at nominal air flow rate
(7) Machine weight loaded with water
(8) Water flow rate calculated for 2 cycles before emptying
(9) Adiabatic cooling mode at nominal flow with all fresh air for an available pressure of 400Pa + damper and ISO Coarse filtration 65%: Outside conditions: +35°C DB / 24°C WB.
Calculation according to NF EN 14511.

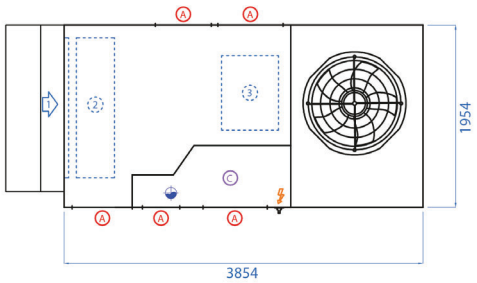
Arrangement 1.1 : Supply air below

For any other configuration, ask your sales contact for the drawing.

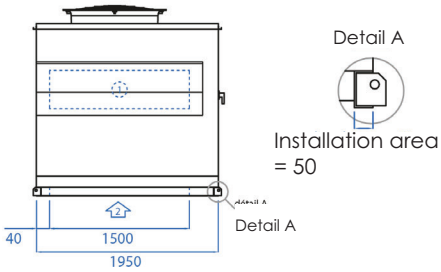
Front view:



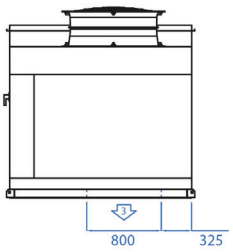
Top view:



Return air side view:



Supply air side view:



① Fresh air
② Return air
③ Supply air
⚡ Power supply
Ⓐ Access
Ⓒ Technical section
--- Provide 400 mm clearance (minimum) to allow air passage below the unit.
Water supply with a choice of two services: one from below for an internal connection and one in front for an external connection

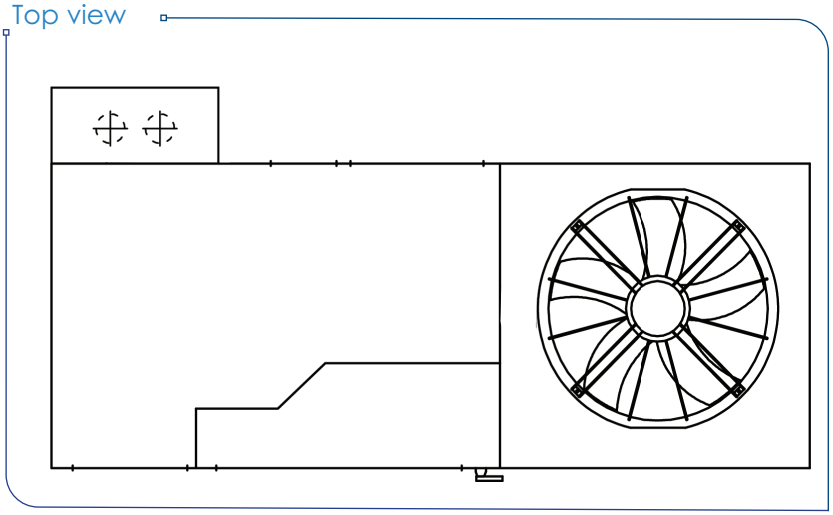
	Length	Width [1]	Height
Casing dimensions	3 854 mm	1 954 mm	1 850 mm

Nota: Fresh air cowls shall be fitted by the installer.

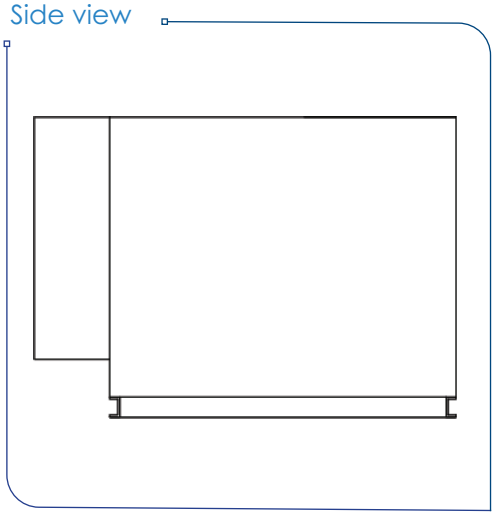
SCHEMATIC DIAGRAM AND CONNECTION

► Connection opposite the technical compartment.

Top view



Side view



CAPACITIES

		Unit	050	055	065	075	080	090	100
Water regime 35/30°C and Exchanger inlet air temperature 10°C	Heating capacity	kW	56.1	61.1	65.8	71.7	77.1	82.2	82.2
	Water flow rate	m³/h	9.7	10.6	11.4	12.4	13.4	14.2	14.2
	Exchanger pressure drop	mWC	1.5	1.7	2.0	2.3	2.7	3.0	3.0
	Exchanger and 3WV pressure drop (1)	mWC	2.8	3.3	3.9	4.5	5.2	5.9	5.9
	Exchanger, 3WV, SV and TAV pressure drop (2)	mWC	4.4	5.2	6.0	7.0	8.1	9.2	9.2
Water regime 35/30°C and Exchanger inlet air temperature 20°C	Heating capacity	kW	29.5	32.0	34.4	37.3	40.0	42.5	42.5
	Water flow rate	m³/h	5.1	5.5	6.0	6.5	6.9	7.4	7.4
	Exchanger pressure drop	mWC	0.4	0.5	0.6	0.7	0.8	0.9	0.9
	Exchanger and 3WV pressure drop (1)	mWC	0.8	0.9	1.1	1.3	1.5	1.6	1.6
	Exchanger, 3WV, SV and TAV pressure drop (2)	mWC	1.2	1.4	1.7	2.0	2.2	2.5	2.5

(1) With 3WV option
(2) With 3WV, SV and TAV option

3WV: 3-way valve
SV: Stop valve on outlet
TAV: TA regulating valve on inlet, opened 7/8
Technical data for non-glycol water, at rated air flow rate.

Technical features

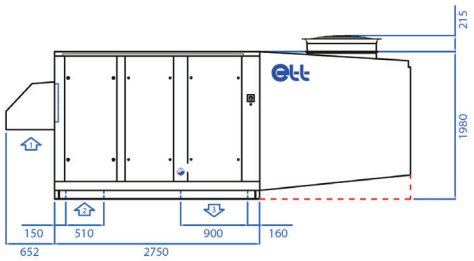
	DESIGNATION	Unit	21-090	21-095	21-110	21-115	21-130	21-140
VENTILATION DATA	**FLOW RATES**							
	Rated air flow rate	m3/h	19,000	21,000	23,000	25,000	27,000	27,000
	Minimum air flow rate	m3/h	12,000	13,000	19,000	19,000	25,000	25,000
	Maximum air flow rate	m3/h	27,000	27,000	27,000	27,000	27,000	27,000
	ACOUSTICS(1)							
	Outside sound power level	dB(A)	81	81	86	86	90	92
	Resulting outside sound pressure at 10 m, reference 10^{-5} in free field	dB(A)	53	53	58	58	62	64
	ACOUSTICS IN ADIABATIC OPERATION (1)							
	Outside sound power level	dB(A)	56	57	58	59	61	61
	Resulting outside sound pressure at 10 m, reference 10^{-5} in free field	dB(A)	25	26	27	28	30	30
PERFORMANCE IN ADIABATIC COOLING MODE	**RATED PERFORMANCES AT +35°C/ +35°C.**							
	Adiabatic humidifier efficiency	%	93	93	93	93	93	93
	Net cooling capacity in adiabatic operation (9)	kW	66.1	72.8	79.5	86.0	92.4	92.4
	Supply air temperature at 35°C / 40% with 100% open fresh air damper	°C	25.4	25.4	25.4	25.5	25.5	25.5
	Water flow rate consumed (8)	m3/h	0.12	0.13	0.15	0.16	0.17	0.17
	Net EER in adiabatic operation (9)	kW/kW	25.2	23.4	21.8	19.2	17.2	17.2
THERMODYNAMIC EFFICIENCY IN COOLING MODE	**RATED PERFORMANCES AT +35°C** (1)							
	Net rated thermodynamic capacity	kW	84.2	90.0	102.1	115.1	122.2	131.8
	Net EER	kW/kW	3.5	3.4	3.2	3.2	3.1	3.0
	SEASONAL EFFICIENCY(2)							
	Design net cooling capacity	kW	84.2	90.0	102.1	115.1	122.2	131.8
	SEER	kW/kW	5.4	5.0	4.9	4.8	4.7	4.6
	ηC	%	211	198	191	187	186	180
THERMODYNAMIC EFFICIENCY HEATING MODE	**RATED PERFORMANCES AT +7°C** (1)							
	Net rated thermodynamic capacity	kW	84.5	90.9	105.9	120.1	127.3	139.5
	Net COP	kW/kW	4.3	4.3	4.0	4.0	4.0	3.8
	RATED PERFORMANCES AT -7°C (3)							
	Net rated thermodynamic capacity	kW	57.4	62.5	72.3	81.9	86.4	95.1
	Net COP	kW/kW	3.4	3.4	3.2	3.2	3.1	3.0
	SEASONAL EFFICIENCY(2)							
	Design net heating capacity	kW	76.8	80.3	92.5	101.5	111.1	117.3
	SCOP	kW/kW	4.1	4.0	3.8	3.7	3.7	3.4
	ηH	%	159	156	148	146	144	134
GENERAL DATA	**ELECTRICAL DATA**							
	Total installed electrical power **excluding auxiliary**(4)	kW	45	49	57	62	64	69
	Total installed electrical current **excluding auxiliary** (4)	A	74	79	92	100	102	111
	Starting current **excluding auxiliary**	A	189	209	222	305	307	353
	Maximum electrical power **excluding auxiliary** (5)	kW	30	33	38	43	46	50
	REFRIGERATION CIRCUIT(S)							
	Power stages	-	4					
	OPERATING LIMITS IN COOLING MODE							
	Maximum outside temperature (6)	°C	+ 50	+ 49	+ 49	+ 49	+ 48	+ 48
	Minimum outside temperature (6)	°C	+15					
	Minimum internal coil inlet temperature	°C	+18					
	OPERATING LIMITS IN HEATING MODE							
	Minimum outside temperature	°C	-15					
	Minimum internal coil inlet temperature	°C	+12					
	WEIGHT							
	Unit weight without options (7)	kg	1,424	1,434	1,504	1,524	1,564	1,579
	Connection roof curb weight	kg	121					
	Standard ventilated roof curb weight	kg	169					

(1) According to NF EN 14511 : All return air operation without filter and damper by integrating the fan(s) correction related to the external pressure of the machine.
Cooling Mode: Inside conditions: +27°C DB /+19°C WB and Outdoor conditions: +35°C DB / 24°C WB.
Heating mode : Inside conditions: +20°C DB / +12°C WB & outdoor conditions :+7°C DB/ +6°C WB.
(2) According to EcoDesign regulations 2016/2281.
(3) according to NF EN 14511.
Heating mode : Inside conditions: +20°C DB / +12°C WB & outdoor conditions :-7°C DB/ -8°C WB.
(4) Power to be used for the power cables. 400V/50 Hz 3-phase power supply + earth without neutral.
(5) Air conditioning mode :
Inside conditions: +27°C DB /+19°C WB and Outdoor conditions: +35°C DB / 24°C WB. Rated air flow rate, 400Pa available pressure on return + supply air & fouled G4 filters
(6) For indoor conditions : +27°C DB /+19°C WB at nominal air flow rate
(7) Machine weight loaded with water
(8) Water flow rate calculated for 2 cycles before emptying
(9) Adiabatic cooling mode at nominal flow with all fresh air for an available pressure of 400Pa + damper and ISO Coarse filtration 65%: Outside conditions: +35°C DB / 24°C WB.
Calculation according to NF EN 14511.

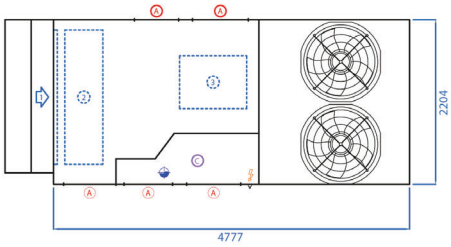
Arrangement 1.1 : Supply air below

For any other configuration, ask your sales contact for the drawing.

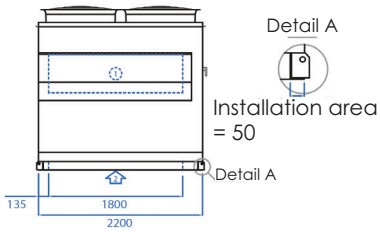
Front view:



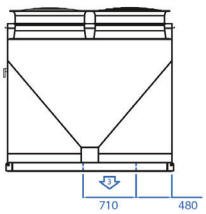
Top view:



Return air side view:



Supply air side view:



① Fresh air
② Return air
③ Supply air
⚡ Power supply
Ⓐ Access
Ⓒ Technical section
--- Provide 400 mm clearance (minimum) to allow air passage below the unit.
Water supply with a choice of two services: one from below for an internal connection and one in front for an external connection

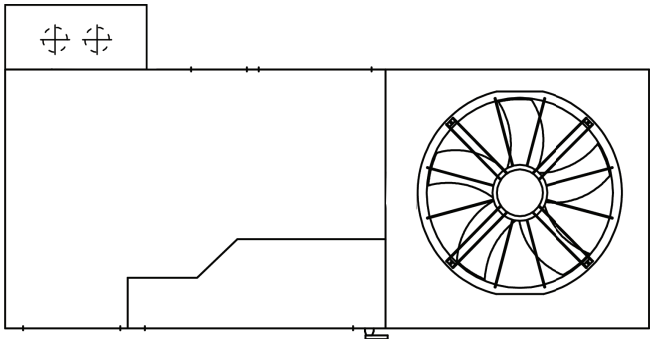
	Length	Width [1]	Height
Casing dimensions	4 777 mm	2 204 mm	1 980 mm

Nota: Fresh air cowls shall be fitted by the installer.

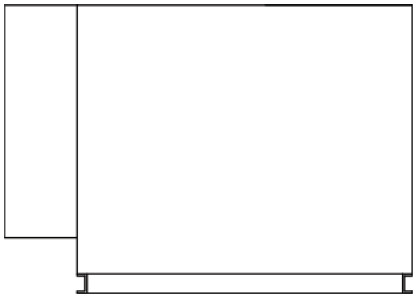
SCHEMATIC DIAGRAM AND CONNECTION

Connection opposite the technical section

Top view



Side view



CAPACITIES

		Unit	090	095	110	115	130	140
Water regime 35/30°C and Exchanger inlet air temperature 10°C	Heating capacity	kW	90.1	96.0	101.7	107.0	112.1	112.1
	Water flow rate	m³/h	15.6	16.6	17.6	18.5	19.4	19.4
	Exchanger pressure drop	mWC	3.3	3.7	4.2	4.6	5.0	5.0
	Exchanger and 3WV pressure drop (1)	mWC	6.8	7.7	8.7	9.6	10.5	10.5
	Exchanger, 3WV, SV and TAV pressure drop (2)	mWC	10.8	12.2	13.7	15.2	16.6	16.6
Water regime 35/30°C and Exchanger inlet air temperature 20°C	Heating capacity	kW	47.4	50.4	53.3	56.0	58.5	58.5
	Water flow rate	m³/h	8.2	8.7	9.2	9.7	10.1	10.1
	Exchanger pressure drop	mWC	1.0	1.1	1.2	1.4	1.5	1.5
	Exchanger and 3WV pressure drop (1)	mWC	2.0	2.2	2.5	2.7	2.9	2.9
	Exchanger, 3WV, SV and TAV pressure drop (2)	mWC	3.1	3.5	3.8	4.2	4.6	4.6

(1) With 3WV option
(2) With 3WV, SV and TAV option

3WV: 3-way valve
SV: Stop valve on outlet
TAV: TA regulating valve on inlet, opened 7/8
Technical data for non-glycol water, at rated air flow rate.

Technical features

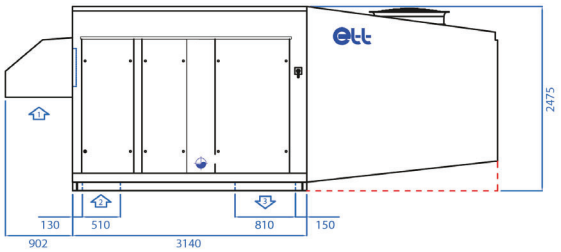
	DESIGNATION	Unit	22-115	22-130	22-140	22-150	22-160	22-180	22-200
VENTILATION DATA	**FLOW RATES**								
	Rated air flow rate	**m3/h**	25,000	27,000	30,000	33,000	35,000	38,000	38,000
	Minimum air flow rate	**m3/h**	17,000	18,000	21,000	21,000	30,000	34,000	37,000
	Maximum air flow rate	**m3/h**	38,000	38,000	38,000	38,000	38,000	38,000	38,000
	ACOUSTICS(1)								
	Outside sound power level	**dB(A)**	86	87	89	90	93	94	97
	Resulting outside sound pressure at 10 m, reference 10^{-5} in free field	**dB(A)**	58	59	61	62	65	66	69
	ACOUSTICS IN ADIABATIC OPERATION (1)								
	Outside sound power level	**dB(A)**	53	55	57	60	61	61	61
	Resulting outside sound pressure at 10 m, reference 10^{-5} in free field	**dB(A)**	22	24	26	29	30	30	30
PERFORMANCE IN ADIABATIC COOLING MODE	**RATED PERFORMANCES AT +35°C/ +35°C.**								
	Adiabatic humidifier efficiency	**%**	93	93	93	93	93	93	93
	Net cooling capacity in adiabatic operation (9)	**kW**	87.8	94.6	104.5	114.3	120.6	130.0	130.0
	Supply air temperature at 35°C / 40% with 100% open fresh air damper	**°C**	25.3	25.3	25.3	25.4	25.5	25.5	25.5
	Water flow rate consumed (8)	**m3/h**	0.16	0.17	0.19	0.20	0.22	0.24	0.24
	Net EER in adiabatic operation (9)	**kW/kW**	35.2	31.9	26.4	22.6	19.9	17.1	17.1
THERMODYNAMIC EFFICIENCY IN COOLING MODE	**RATED PERFORMANCES AT +35°C** (1)								
	Net rated thermodynamic capacity	**kW**	109.3	123.9	132.0	144.4	161.2	177.4	183.9
	Net EER	**kW/kW**	3.6	3.5	3.4	3.3	3.2	3.0	3.1
	SEASONAL EFFICIENCY(2)								
	Design net cooling capacity	**kW**	109.3	123.9	132.0	144.4	161.2	177.4	183.9
	SEER	**kW/kW**	5.3	5.1	5.2	5.1	4.8	4.6	4.7
	ηC	**%**	209	201	205	199	189	180	186
THERMODYNAMIC EFFICIENCY HEATING MODE	**RATED PERFORMANCES AT +7°C** (1)								
	Net rated thermodynamic capacity	**kW**	107.5	123.0	130.9	144.3	163.4	183.4	190.8
	Net COP	**kW/kW**	4.6	4.6	4.6	4.5	4.2	4.1	4.0
	RATED PERFORMANCES AT -7°C (3)								
	Net rated thermodynamic capacity	**kW**	72.8	82.7	89.3	98.8	112.3	127.7	132.3
	Net COP	**kW/kW**	3.5	3.5	3.5	3.4	3.2	3.0	3.0
	SEASONAL EFFICIENCY(2)								
	Design net heating capacity	**kW**	93.0	106.5	116.7	119.8	139.0	156.9	163.2
	SCOP	**kW/kW**	4.2	4.1	4.2	4.0	3.7	3.4	3.6
	ηH	**%**	166	161	164	158	145	133	143
GENERAL DATA	**ELECTRICAL DATA**								
	Total installed electrical power **excluding auxiliary**(4)	**kW**	59	64	66	71	82	91	95
	Total installed electrical current **excluding auxiliary** (4)	**A**	95	103	105	114	132	144	152
	Starting current **excluding auxiliary**	**A**	225	308	310	357	375	397	417
	Maximum electrical power **excluding auxiliary** (5)	**kW**	37	42	45	51	58	67	66
	REFRIGERATION CIRCUIT(S)								
	Power stages	**-**				4			
	OPERATING LIMITS IN COOLING MODE								
	Maximum outside temperature (6)	**°C**	+ 50	+ 50	+ 49	+ 48	+ 49	+ 48	+ 48
	Minimum outside temperature (6)	**°C**				+15			
	Minimum internal coil inlet temperature	**°C**				+18			
	OPERATING LIMITS IN HEATING MODE								
	Minimum outside temperature	**°C**				-15			
	Minimum internal coil inlet temperature	**°C**				+12			
	WEIGHT								
	Unit weight without options (7)	**kg**	1,879	1,924	1,994	2,029	2,039	2,099	2,099
	Connection roof curb weight	**kg**				163			
	Standard ventilated roof curb weight	**kg**				228			

(1) According to NF EN 14511 : All return air operation without filter and damper by integrating the fan(s) correction related to the external pressure of the machine.
Cooling Mode: Inside conditions: +27°C DB /+19°C WB and Outdoor conditions: +35°C DB / 24°C WB.
Heating mode : Inside conditions: +20°C DB / +12°C WB & outdoor conditions :+7°C DB/ +6°C WB.
(2) According to EcoDesign regulations 2016/2281.
(3) according to NF EN 14511.
Heating mode : Inside conditions: +20°C DB / +12°C WB & outdoor conditions :-7°C DB/ -8°C WB.
(4) Power to be used for the power cables. 400V/50 Hz 3-phase power supply + earth without neutral.
(5) Air conditioning mode :
Inside conditions: +27°C DB /+19°C WB and Outdoor conditions: +35°C DB / 24°C WB. Rated air flow rate, 400Pa available pressure on return + supply air & fouled G4 filters
(6) For indoor conditions : +27°C DB /+19°C WB at nominal air flow rate
(7) Machine weight loaded with water
(8) Water flow rate calculated for 2 cycles before emptying
(9) Adiabatic cooling mode at nominal flow with all fresh air for an available pressure of 400Pa + damper and ISO Coarse filtration 65%: Outside conditions: +35°C DB / 24°C WB.
Calculation according to NF EN 14511.

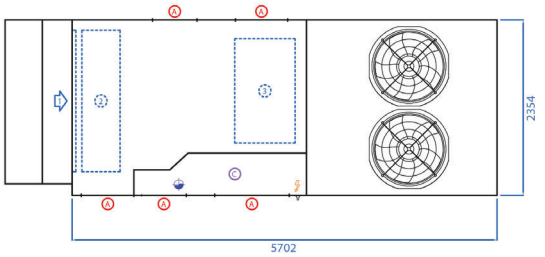
Arrangement 1.1 : Supply air below

For any other configuration, ask your sales contact for the drawing.

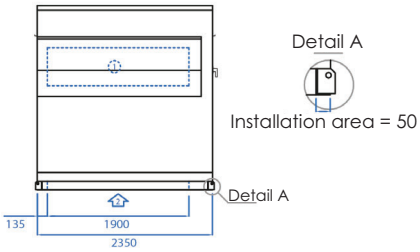
Front view:



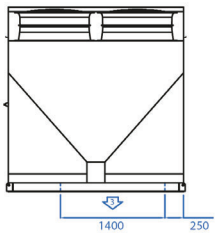
Top view:



Return air side view:



Supply air side view:



① Fresh air
② Return air
③ Supply air
⚡ Power supply
Ⓐ Access
Ⓒ Technical section
--- Provide 400 mm clearance (minimum) to allow air passage below the unit.

Water supply with a choice of two services: one from below for an internal connection and one in front for an external connection

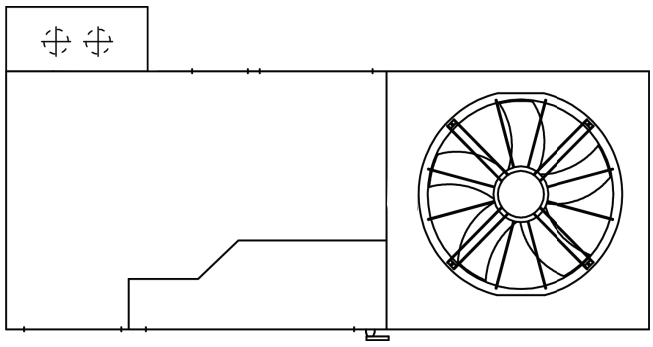
	Length	Width [1]	Height
Casing dimensions	5 702 mm	2 354 mm	2 475 mm

Nota: Fresh air cowls shall be fitted by the installer.

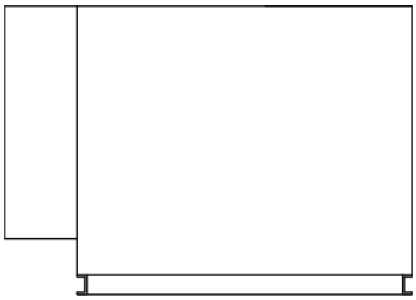
SCHEMATIC DIAGRAM AND CONNECTION

► Connection opposite the technical compartment.

Top view



Side view



Capacities

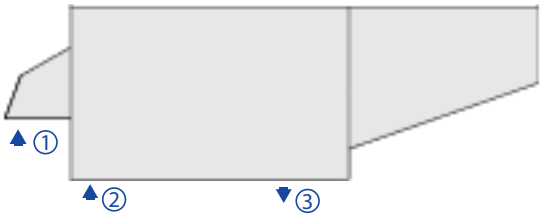
		Unit	115	130	140	150	160	180	200
Water regime 35/30°C and Exchanger inlet air temperature 10°C	Heating capacity	kW	93.7	98.5	105.4	111.9	116.0	121.9	121.9
	Water flow rate	m³/h	16.2	17.1	18.3	19.4	20.1	21.1	21.1
	Exchanger pressure drop	mWC	3.5	3.9	4.4	4.9	5.3	5.8	5.8
	Exchanger and 3WV pressure drop (1)	mWC	7.3	8.1	9.2	10.4	11.1	12.3	12.3
	Exchanger, 3WV, SV and TAV pressure drop (2)	mWC	11.6	12.8	14.6	16.5	17.7	19.5	19.5
Water regime 35/30°C and Exchanger inlet air temperature 20°C	Heating capacity	kW	49.6	52.0	55.5	58.8	60.8	63.8	63.8
	Water flow rate	m³/h	8.6	9.0	9.6	10.2	10.5	11.1	11.1
	Exchanger pressure drop	mWC	1.1	1.2	1.3	1.5	1.6	1.7	1.7
	Exchanger and 3WV pressure drop (1)	mWC	2.1	2.3	2.6	3.0	3.2	3.5	3.5
	Exchanger, 3WV, SV and TAV pressure drop (2)	mWC	3.3	3.6	4.1	4.6	5.0	5.5	5.5

(1) With 3WV option
(2) With 3WV, SV and TAV option

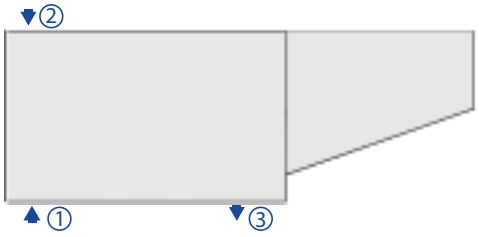
3WV: 3-way valve
SV: Stop valve on outlet
TAV: TA regulating valve on inlet, opened 7/8
Technical data for non-glycol water, at rated air flow rate.

SUPPLY AIR *downwards*
Installation on roof curb or on customer frame on roof

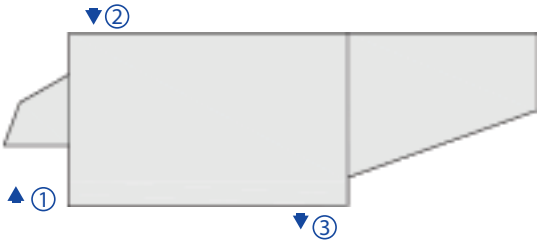
Arrangement 1.1



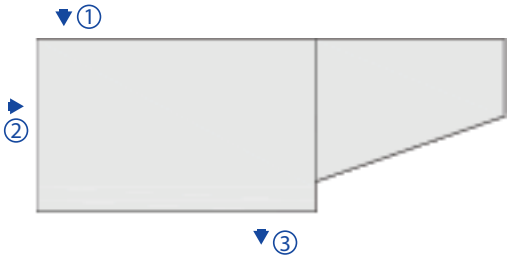
Arrangement 1.2



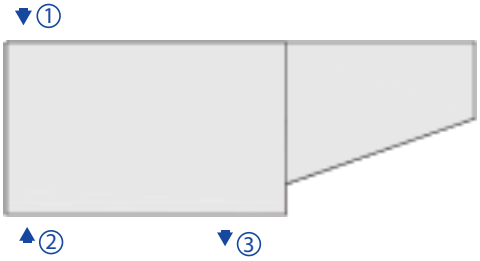
Arrangement 1.3



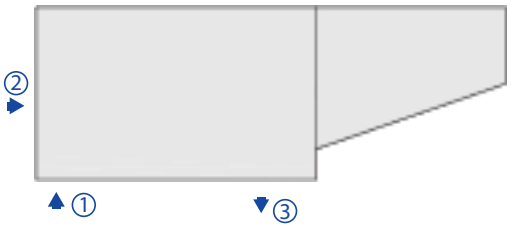
Arrangement 1.4: with whistle shaped cowl (optional)



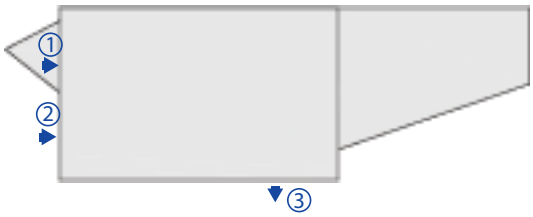
Arrangement 1.5: with whistle shaped cowl (optional)



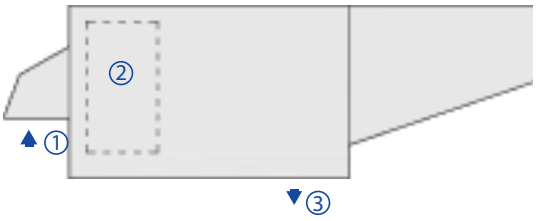
Arrangement 1.6



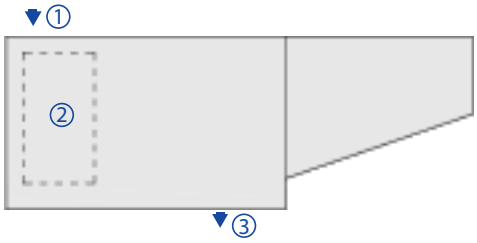
Arrangement 1.7



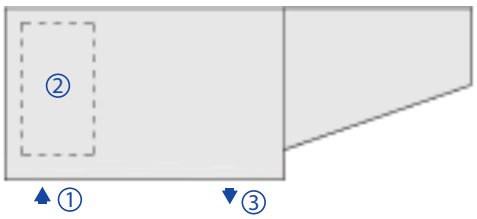
Arrangement 1.8



Arrangement 1.9: with whistle shaped cowl (optional)



Arrangement 1.10



① Fresh air ② Return air ③ Supply air

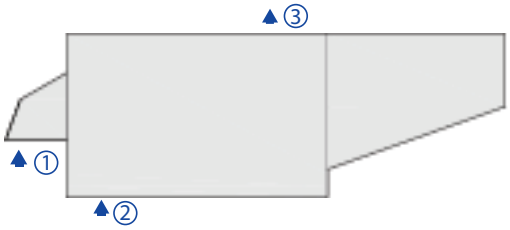
Arrangements

SUPPLY AIR *upwards*

Installation on feet (400 mm minimum) or customer frame

Feet are optional. A supply air damper is necessary for units bigger than 10000 m³/h in Public Access Buildings.

Arrangement 2.1



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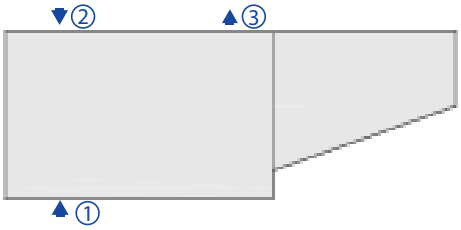

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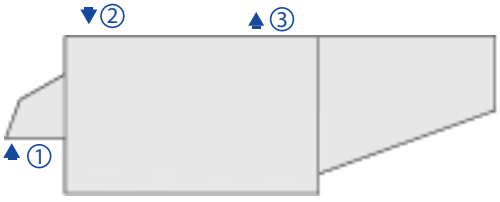
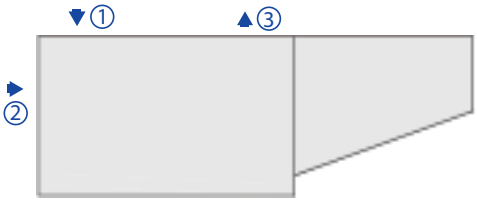
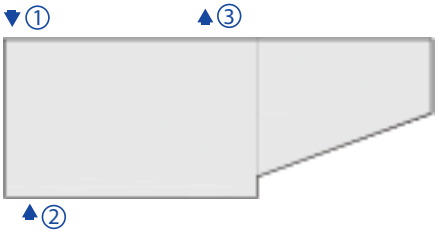


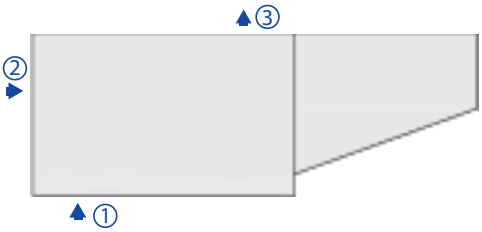
Arrangement 2.4: with whistle shaped cowl (optional)



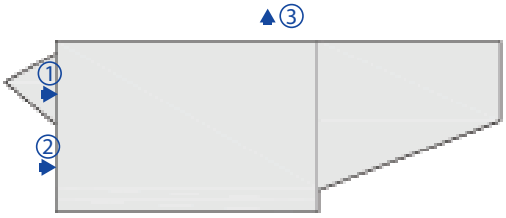
Arrangement 2.5: with whistle shaped cowl (optional)



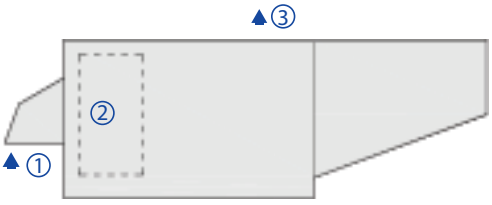
Arrangement 2.6



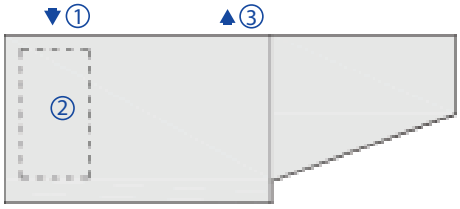
Arrangement 2.7



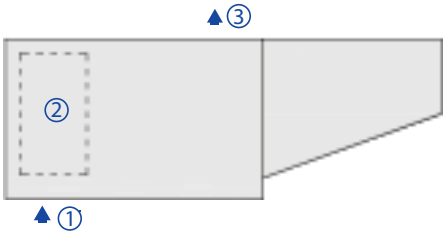
Arrangement 2.8



Arrangement 2.9: with whistle shaped cowl (optional)



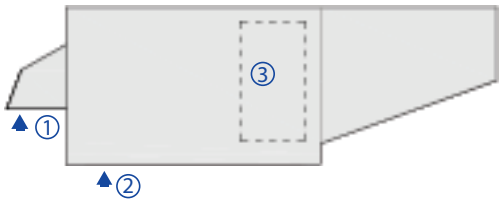
Arrangement 2.10



① Fresh air ② Return air ③ Supply air

SUPPLY AIR *on side*
Opposite the technical section (with 400 mm feet minimum)

Arrangement 3.1



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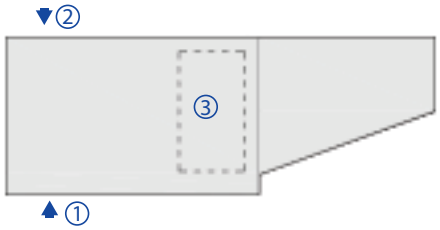

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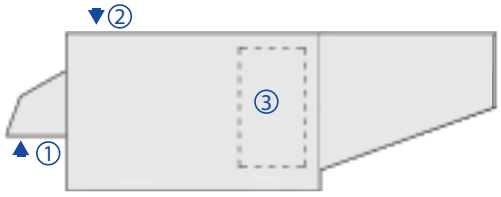
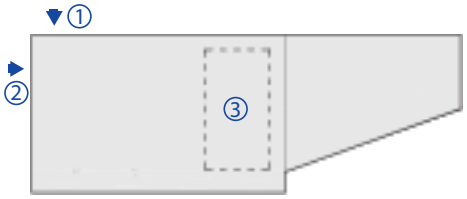
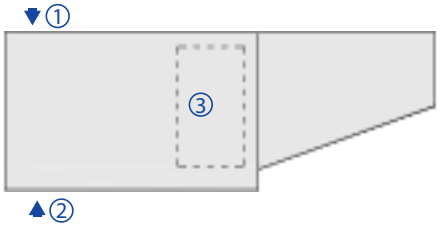


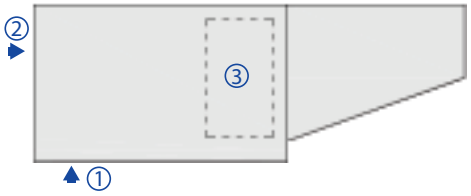
Arrangement 3.4: with whistle shaped cowl (optional)



Arrangement 3.5: with whistle shaped cowl (optional)



Arrangement 3.6



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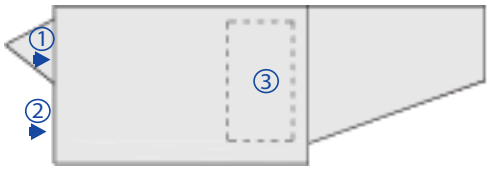
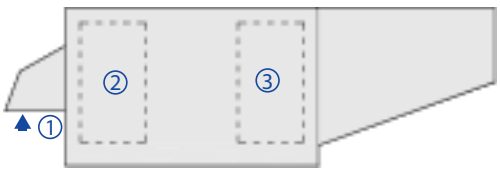
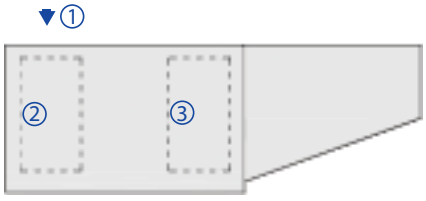


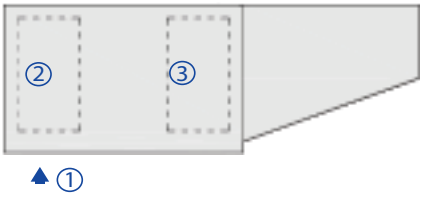
Arrangement 3.8



Arrangement 3.9: with whistle shaped cowl (optional)



Arrangement 3.10



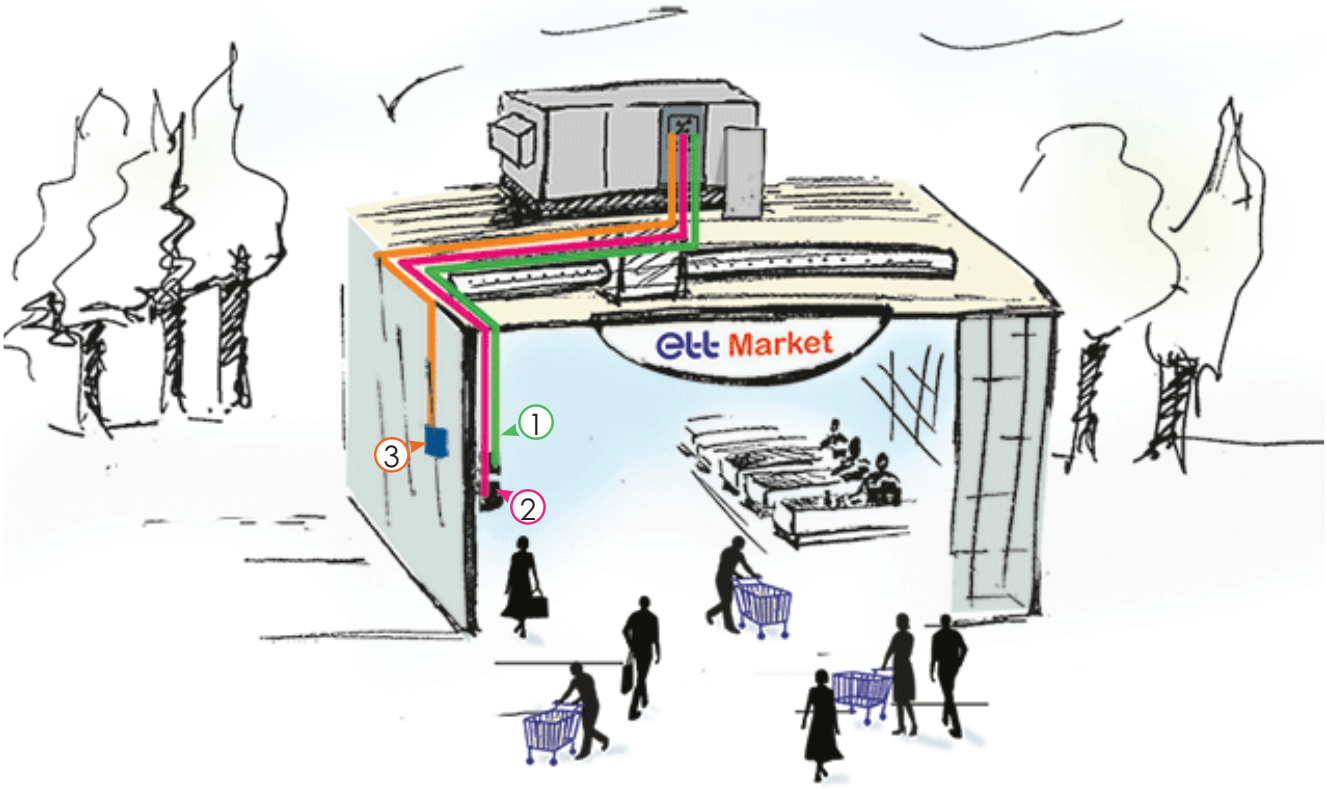
① Fresh air ② Return air ③ Supply air

Options weight (kg)

Options	ULTI+ R32 11 ADIA	ULTI+ R32 12 ADIA	ULTI+ R32 21 ADIA	ULTI+ R32 22 ADIA
Frame - Casing				
Unit with supply air on side (L)	36	42	45	51
Removal of FA + RA dampers	-16	-22	-33	-34
Double skin	14	17	30	43
Fresh air cowl	7	12	15	22
Thermal exchangers				
Hot water recovery coil in preheating on the opposite side of the TC	36	48	61	65
Hot water recovery coil in preheating on opposite side of TC with 3WV option	52	67	83	83
Hot water recovery coil in preheating on opposite of TC side with 3WV, TAV and VA options	54	70	87	87
Weight of the protective casing of the hot water recovery coil option on the opposite side of the TC	14	15	18	30
Installation				
Aluminium connection roof curb	80	104	121	163
Aluminium ventilated roof curb	12	146	169	228

3WV: 3-way valve
SV: Stop valve on outlet
TAV: TA regulating valve on inlet, opened 7/8

Sensors connection principle



- ① **Room sensor:** 1 pair shielded cable, 2 x 0,75 mm² (max.length. 100 lm)
- ② **CO_2 sensor:** 2-pair shielded twisted cable, 3 x 0.75 mm² (max. length 100 lm)
- ③ **Humidity sensor:** shielded twisted cable, 5 x 0,75 mm² LIY-CY (max. length 100 lm)
  (Optional, replaces the room sensor)

Nota:

- 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 ducts);
  > 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).

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 angles 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 RT 2005 specifications.
- The roof curbs are designed for a maximum height of 145 mm for the steel panel and 200 mm for the insulation (i.e. maximum height H = 345 mm).
- Lifting lugs for easy positioning when craning.
- Interior side insulation in Stopflam 20 mm, to limit the risk of condensation.

Adjustable ventilated curb

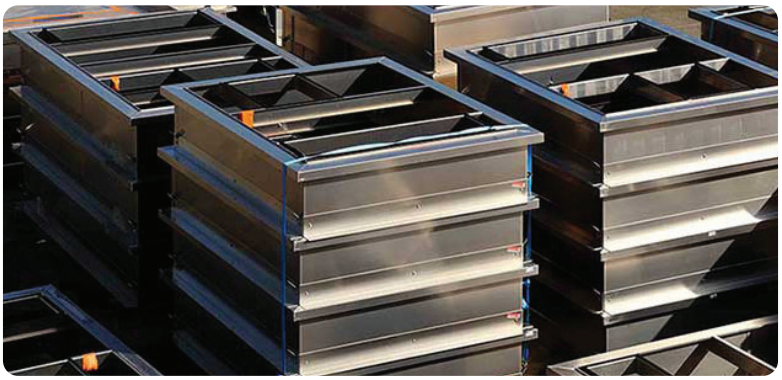
In addition to the 7 points listed for the "adjustable connecting curb":

- 200 mm ventilated air section. The machine is bolted to 4 (or 6) feet and sealed with a foam gasket on the frames of the supply and return 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.

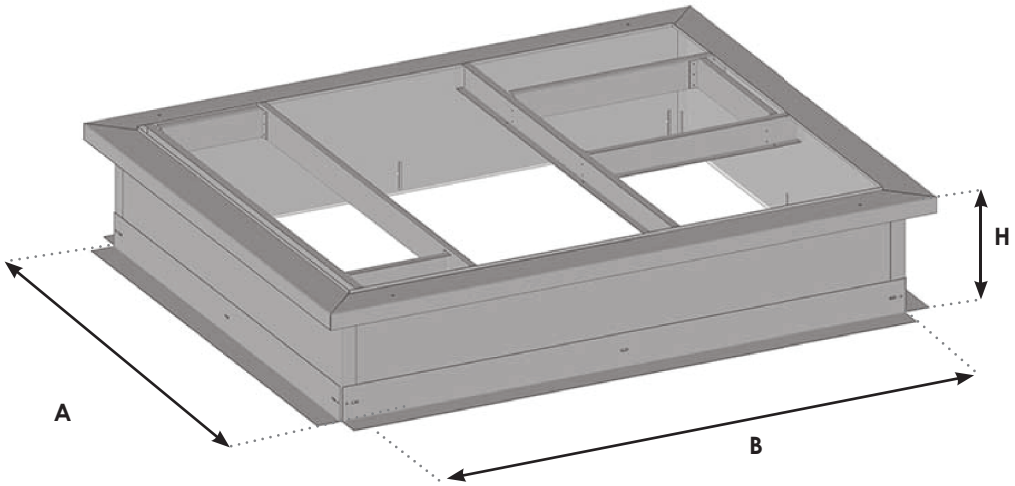
Adaptation curb:

on existing header or curb

- Custom-made roof 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 material).
- 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.
- Internal insulation.



ADJUSTABLE CONNECTION ROOF CURB

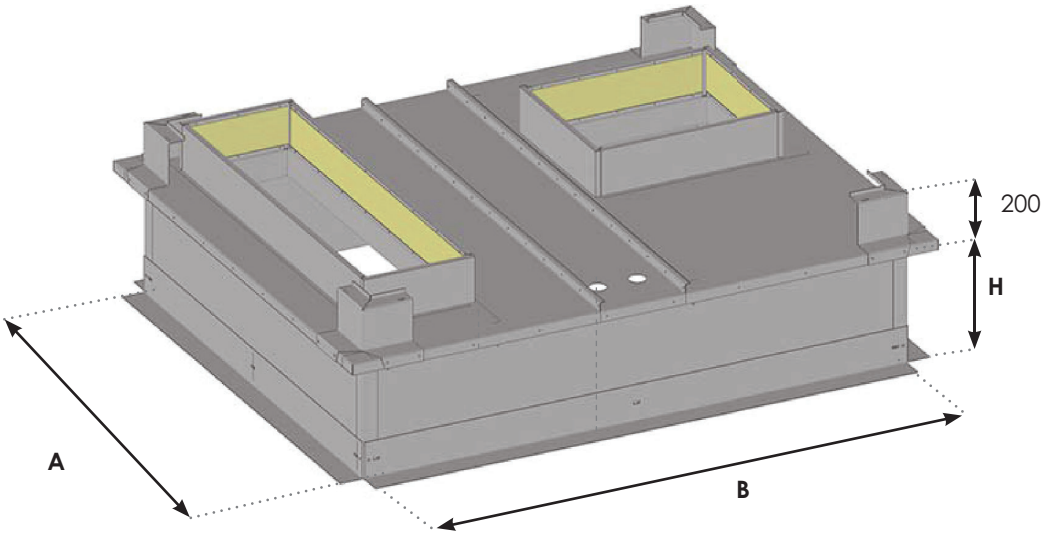


ATTENTION: With this type of roof curb installation, the installer is responsible for the ten-year roofing guarantee.
If the value of the slope is greater than that in the table below, you must send us (see MARK-NOT_55-EN_ Measurement_ Form):
- the value of the slope of your roof in %,
- the direction 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 (mm)	A	B	H	Overall width	Overall length	Overall height	Maxi slope lengthwise (%)	Maxi slope widthwise (%)	Weight (kg)
ULTI+ R32 11 ADIA	1 700	1,970	550	1,914	2,178	563	5.0	5.8	80
ULTI+ R32 12 ADIA	1 970	2,450	600	2,184	2,658	618	5.0	6.2	104
ULTI+ R32 21 ADIA	2 220	2,770	600	2,434	2,978	618	5.0	6.2	121
ULTI+ R32 22 ADIA	2 370	3,160	600	2,584	3,368	618	5.0	6.7	163

ADJUSTABLE VENTILATED ROOF CURB



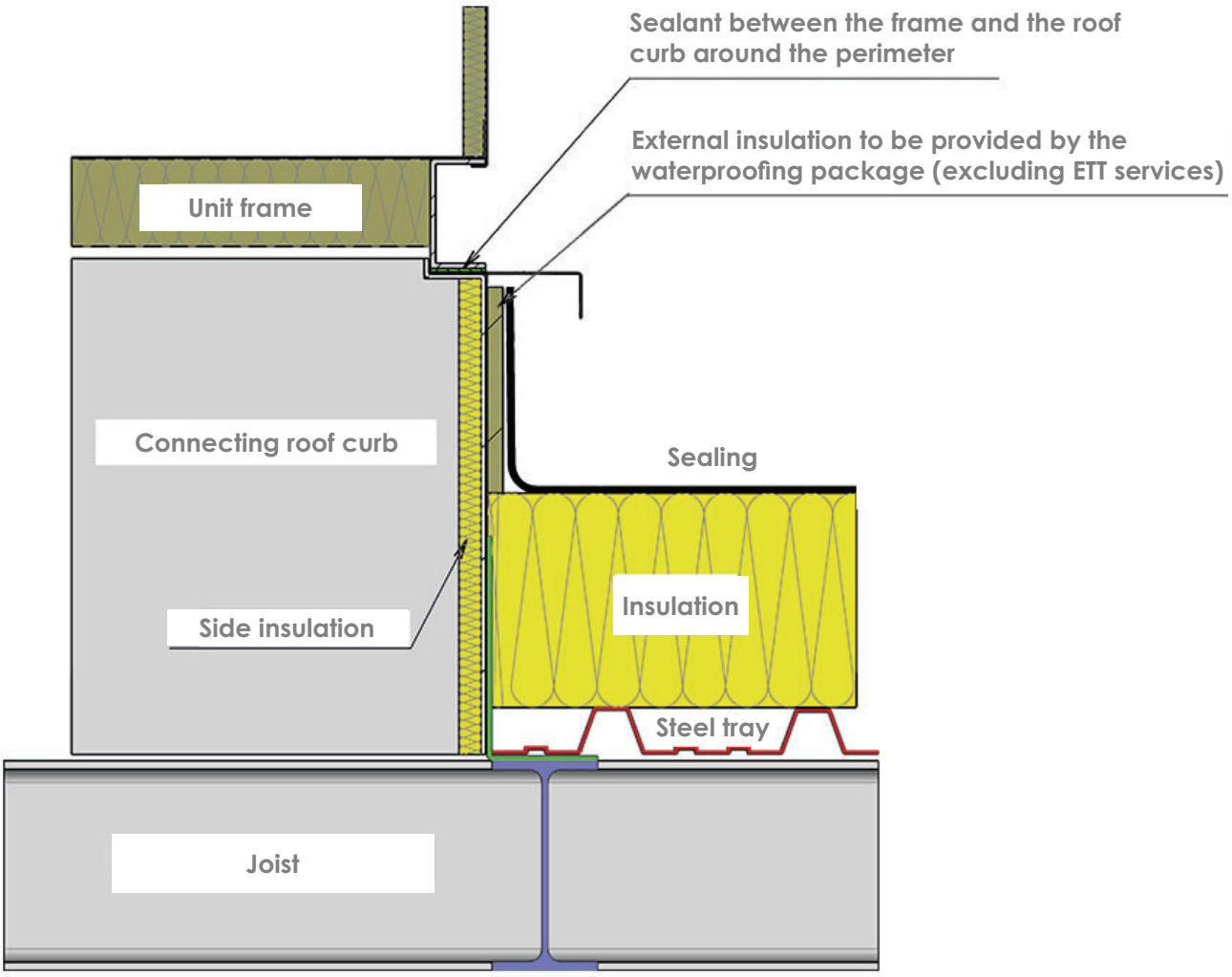
ATTENTION: With this type of roof curb installation, the installer is responsible for the ten-year roofing guarantee.
If the value of the slope is greater than that in the table below, you must send us (see MARK-NOT_55-EN_ Measurement_ Form):
- the value of the slope of your roof in %,
- the direction 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 Dimensions (mm)	A	B	H	Overall width	Overall length	Overall height	Maxi slope lengthwise (%)	Maxi slope widthwise (%)	Weight (Kg)
ULTI+ R32 11 ADIA	1 700	1,970	550	1,904	2,168	763	5.0	5.8	148.0
ULTI+ R32 12 ADIA	1 970	2,450	600	2,174	2,648	818	5.0	6.2	192.4
ULTI+ R32 21 ADIA	2 220	2,770	600	2,424	2,968	818	5.0	6.2	223.9
ULTI+ R32 22 ADIA	2 370	3,160	600	2,574	3,358	818	5.0	6.7	301.6

HOW TO INSTALL ROOF CURBS

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

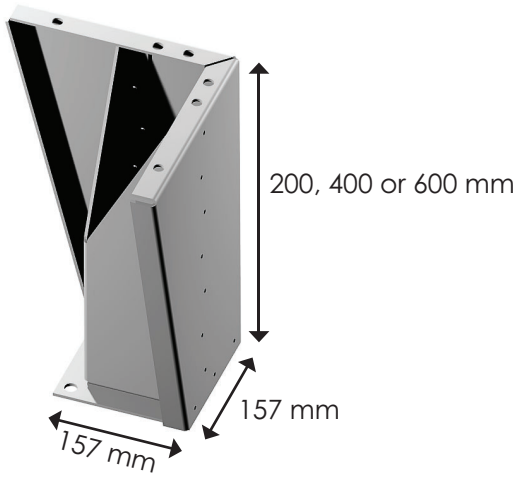


Note: The curbs are designed for a maximum total height of 345 mm of steel tray and insulation.
To maintain a standard curb height (refer to the curb drawing), you need to check that, depending on the slope of the roof on site, the 'insulation and steel tray' height dimension leaves sufficient insulation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

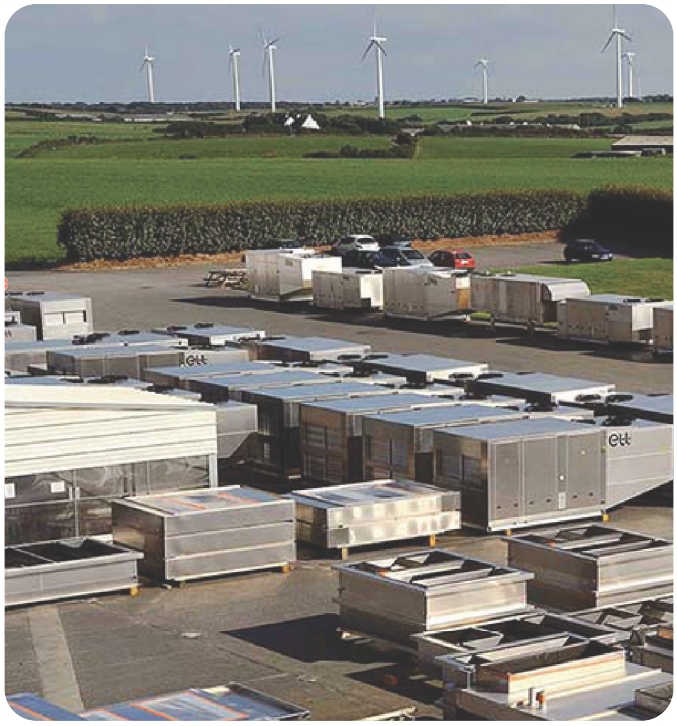
Aluminium fixed foot
Unit weight: 1 kg

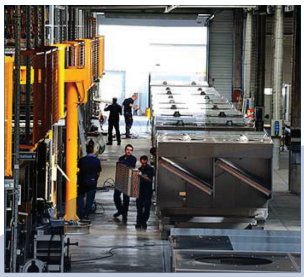


The legs are to be mounted on the corners of the frame.

	ULTI+ R32 11 ADIA	ULTI+ R32 12 ADIA	ULTI+ R32 21 ADIA	ULTI+ R32 22 ADIA
No. of feet	4	4	4	4

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





Reference: MARK-BRO_55-EN_I

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