CLIMATIC
ENVIRONMENT
SOLUTIONS
AND EQUIPMENT





Green Line

ULTI+ R290 EX

Solution ErP 2021

R290

Double-flow heat pump with extraction module

MADE IN FRANCE

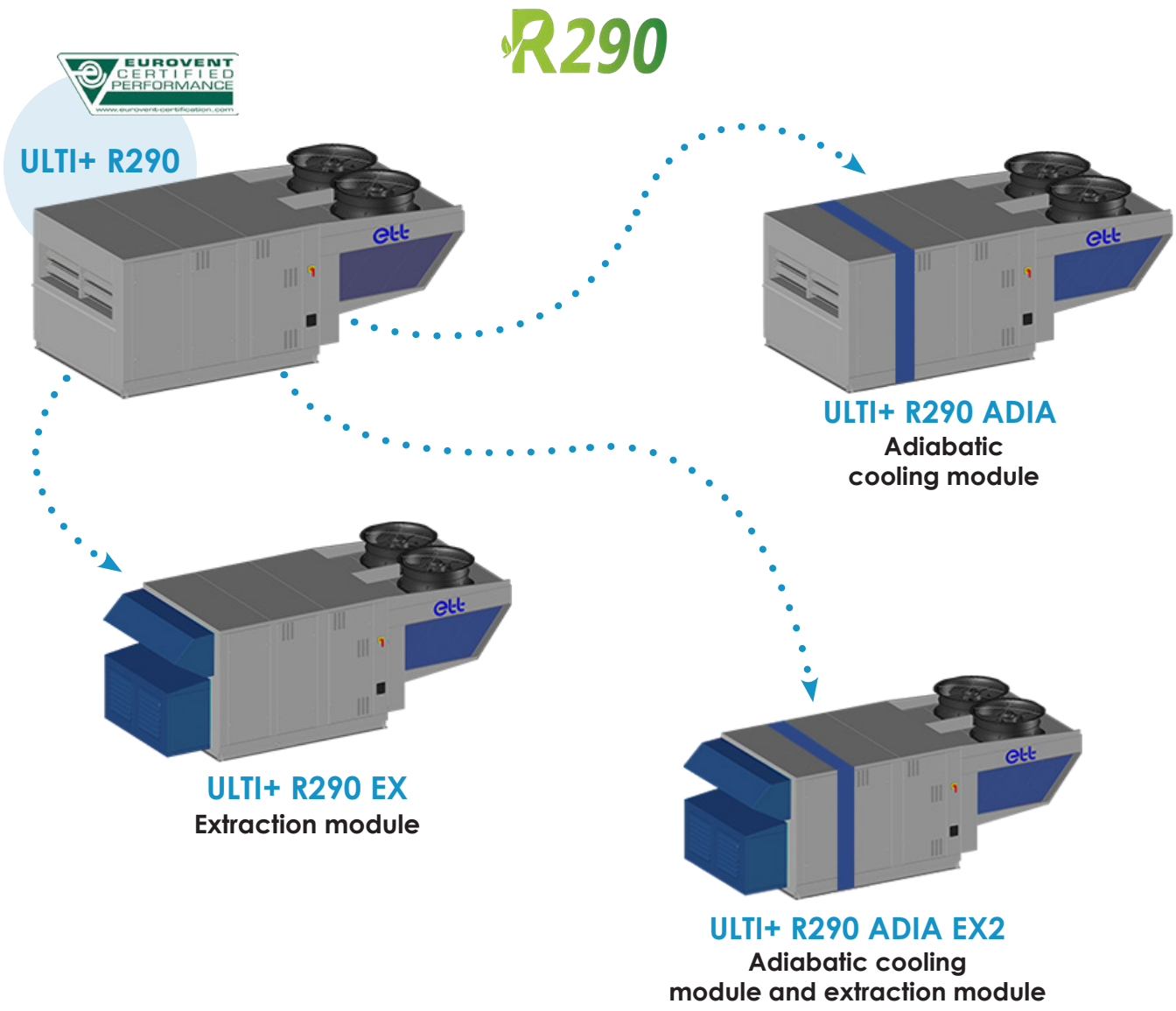
www.ett-hvac.com

ULTI+ R290 EX : Machine from the ULTIMA Green Line range

The **ULTIMA Green Line** is **ETT's latest-generation** modular rooftop range. It combines **quality materials, performance, energy savings, acoustics, regulation** and **new-generation connected components** to ensure that the units operate at optimum efficiency at all times.

The modular design allows for easy expansion of this range's capacities. Users can choose to install the **standard ULTI+ R290 heat pump**, or add modules (extraction module, adiabatic module), to this packaged unit in order to adjust the unit's performance to the environment and the requirements of the application.

ULTIMA Green Line modular principle



ULTI+ R290 EX: 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**.

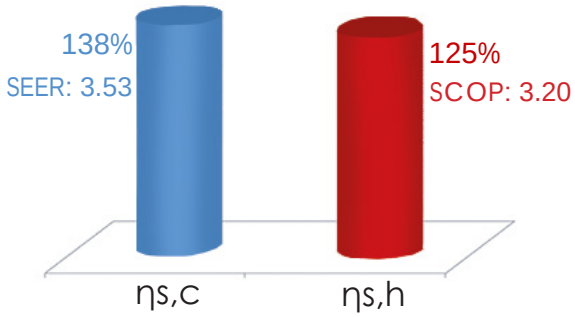
- **1st January 2021**

Regulatory impacts since 1st 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

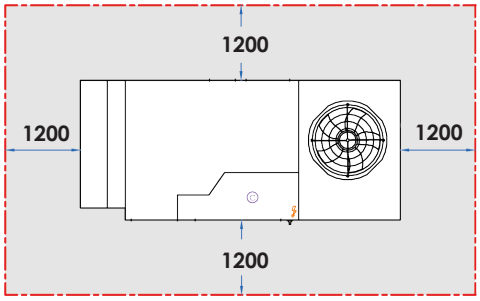
Since propane is heavier than air, it is important to avoid any areas where gas could accumulate near the machine in the event of a leak.

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.

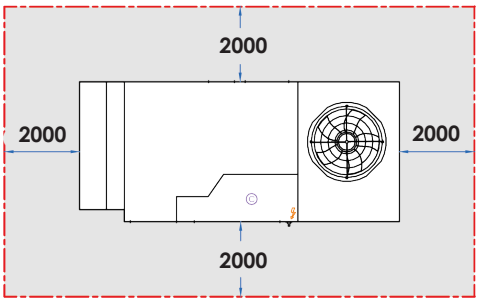
Likewise, it is necessary to ensure the absence of air intakes, wall openings, drainage channels, and low points near the machine.

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.

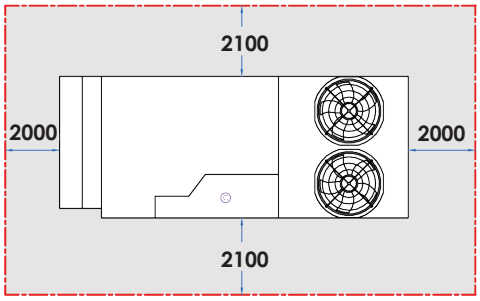
SAFETY AND INTERVENTION ZONE DEPENDING ON THE TYPE OF MACHINE



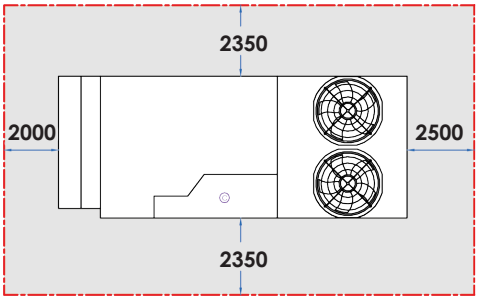
ULTI+ R290 01



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.

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 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.

EcoLogic

• 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.

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

ENERGY SAVING

ENVIRONMENTAL ATTITUDE

SERVICE LINK

Unit description

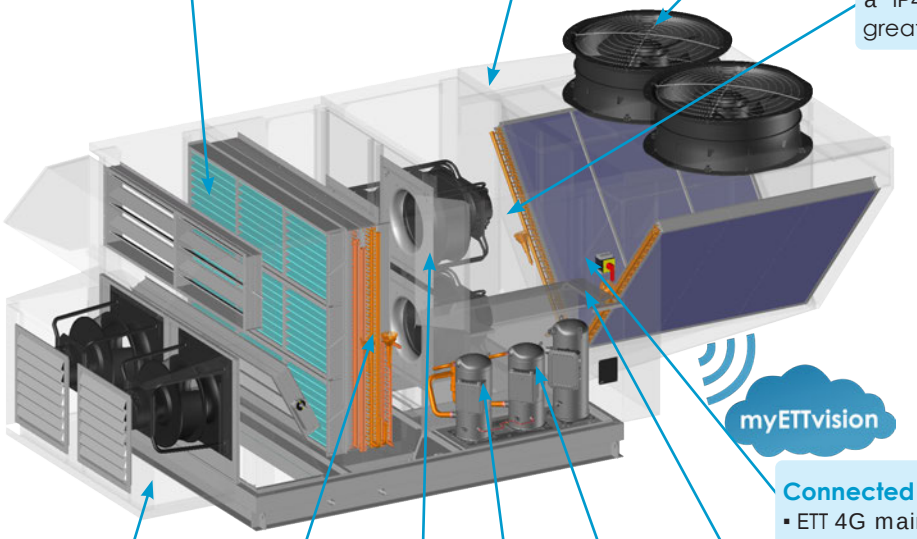
Aluminium frame and casing assembly
- Optimised tightness and thermal insulation.
- Reduced weight, for new and refurbish project
- Multiple airflow configurations available.

20-year guarantee against corrosion frame - casing

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

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 13).

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



Connected components
- ETT 4G maintenance router included.

Extraction case

PLC with display
- Control enabling optimum operation in all conditions.

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

Multi-stage circuit with R290 compressors New Generation
- Optimum performance whatever the part load.
- Electronic expansion valves.

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).

Leak detection
- With propane leak detector and safety chain.

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 & Components

- **Sustainable and recyclable equipment**: **Aluminium frame and casing**, 100% recyclable, 20-year anti-corrosion warranty
- Non-polluting processes
- **Eco Design approach** to combine **savings** 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

- New **ULTIMA Green Line** range with R290, a low GWP fluid (0.02).
- **Plays an active role in meeting the** CO_2 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).

EX MODULE
Extraction Module

TO AVOID PRESSURISING YOUR BUILDINGS

The EX module is used **to precisely control the air supplied to and extracted from your building**.

Without this extraction module, the building must be equipped with a means of extracting air from the air conditioning unit.

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.

Operating principles

The machine operates as a reversible heat pump:

> Source: outside air

> Processed fluid: inside air + Hygienic fresh air

Operating modes can be:

> Heat pump

> Air conditioning

> Free Cooling: cooling using outside air, without thermodynamics

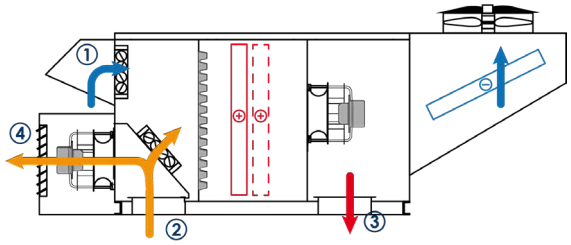
In these modes, the unit can operate:

> With all recirculated air

> With all fresh air

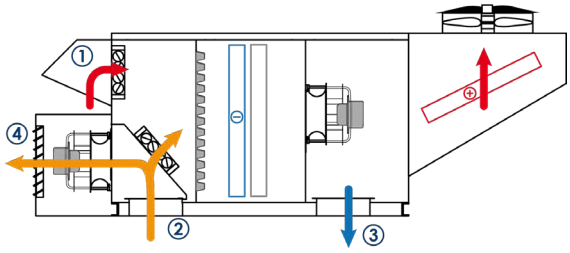
> With mixed air

Heating Mode



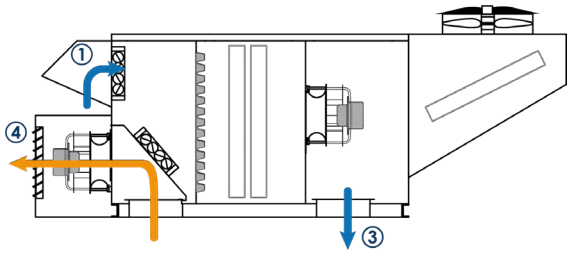
Heating Mode: Comfort temperature maintained in winter by the thermodynamic system and by the auxiliary heaters (optional).

Cooling mode



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

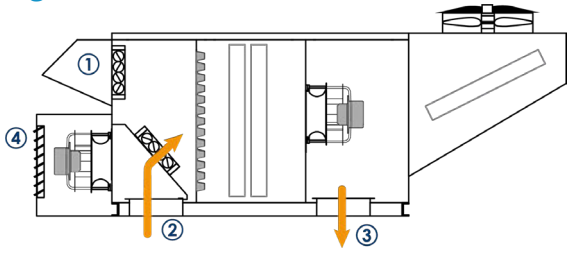
Free Cooling Mode



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.

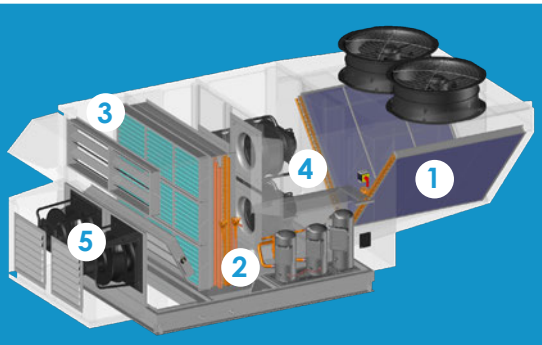
Recycling Mode



Recycling Mode: Destratification of the volume treated by recycling, when the return temperature is much higher than the ambient temperature in winter.

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

Detailed components of the unit



The ETT packaged unit consists of 5 separate compartments:

1. An external compartment to ensure heat exchange with the environment.
2. A separate technical compartment housing the refrigerating and regulating components.
3. An internal compartment ensures air change and air treatment.
4. A sealed electrical compartment (IP44).
5. An extraction compartment/ box.

Aluminium frame and casing assembly :

- **The ULTI+ R290 EX 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_2 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), article CH36 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 reduces compressor energy consumption, by optimizing operating pressures, with lower high-pressure (HP) and higher low-pressure (LP) values across different 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 heat recovery wheel,
  - ✓ 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 EX is equipped with leak detection as standard. This detection enables the unit to be shut down in the event of an R290 fluid leak.

Extraction assembly - EX module

- **Pressure relief vent** to close the discharge compartment if the extract fan stops.
- **Last generation exhaust 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 heat recovery wheel,
  - ✓ Communicating, for real time operation adjustment,
  - ✓ With integrated Soft Starter to reduce starting current and enable soft starting (textile ducts).

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 repeaters or remote controls.
  - ✓ **A terminal block** for compressor load shedding.
  - ✓ **An internal wiring** fully numbered at both ends with numbered rings.
  - ✓ **A basic short-circuit breaking capacity** (Ik3) 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 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 corresponds to the additional voltage drop generated at a network point if 1 kW single-phase is added at that same point.

Detailed components of the unit

Advanced control assembly:

- **Temperature control with 2 cooling/heating set points. Responsiveness, accuracy, and proactive adjustment.**
  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 control of the rotational speed of propeller fans** based on operating mode, outdoor temperature, and thermodynamic power, ensuring optimal 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_2, 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

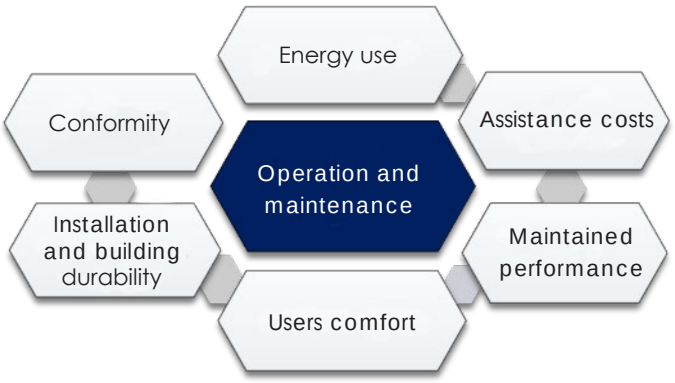
Operating tips for the ULTI+ R290 EX unit

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 Fans, Supply air and Exhaust

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
- Cowl for pressure relief vent
- Fresh air cowl extension

Thermodynamics

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

Auxiliaries

- Hot water recovery coil with analogue frost protection thermostat
- Auxiliary hot water coil with analogue frost protection thermostat
- Modulating 3-way valve for hot water coil
- Shut-off valve on the supply + 'TA' regulating valve on the return for hot water coil

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

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
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
Warranty	■ Extended warranty available. Please consult us

Technical features

ULTI+ R290 01 EX

	DESIGNATION	Unit	040
VENTILATION	**FLOW RATES**		
	Rated air flow rate	**m³/h**	7,500
	Minimum air flow rate	**m³/h**	5,500
	Maximum air flow rate	**m³/h**	8,500
	ACOUSTICS (1)		
	Sound power level at supply air	**dB(A)**	83
	Outside sound power level	**dB(A)**	72
	Resulting external sound pressure at 10m ref. $2*10^{-5}$ in free field, directivity 1	**dB(A)**	44
COOLING PERFORMANCE	**NOMINAL PERFORMANCE AT +35°C**		
	Net cooling capacity	**kW**	36.0
	Net EER	**kW/kW**	2.87
	SEASONAL EFFICIENCY (2)		
	Net design cooling capacity	**kW**	36.0
	SEER	**kW/kW**	4.30
	ηs,C	**%**	169
HEATING PERFORMANCE	**NOMINAL PERFORMANCE AT +7°C**		
	Net heating capacity	**kW**	36.7
	Net COP	**kW/kW**	3.60
	RATED PERFORMANCE AT -7°C (3)		
	Net heating capacity	**kW**	27.1
	Net COP	**kW/kW**	3.01
	SEASONAL EFFICIENCY (2)		
	Net design heat output	**kW**	34.4
	SCOP	**kW/kW**	3.70
	ηs,H	**%**	145
GENERAL INFORMATION	**ELECTRICAL DATA**		
	Total installed electrical power (4)	**kW**	23.0
	Total installed electrical current (4)	**A**	36.0
	Starting current	**A**	125.6
	Maximum absorbed electrical power (5)	**kW**	16.8
	REFRIGERATION CIRCUIT(S)		
	Power stages	**-**	2
	OPERATING LIMITS IN COOLING MODE		
	Maximum outside temperature (6)	**°C**	+55
	Minimum outside temperature (6)	**°C**	+15
	Minimum inside coil inlet temperature	**°C**	+18
	OPERATING LIMITS IN HEATING MODE		
	Minimum outside temperature	**°C**	-15
	Minimum inside coil inlet temperature	**°C**	+12
	WEIGHT		
	Unit weight without options(7)	**kg**	586
	Weight of connecting roof curb	**kg**	73
	Weight of standard ventilated roof curb	**kg**	102

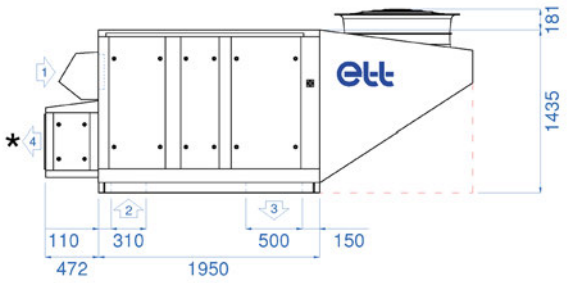
(1) In accordance with EN 14511.
Cooling mode: Indoor conditions: +27°C DB/+19°C WB and outside conditions: +35°C DB / 24°C WB
Heating mode: Indoor conditions: +20°C DB/+12°C WB and outside conditions: +7°C DB / +6°C WB.
(2) According to EcoDesign regulation 2016/2281.
(3) In accordance with EN 14511.
Heating mode: Indoor conditions: +20°C DB and outside conditions: -7°C DB / -8°C WB.
(4) Three-phase power supply 400V - 50 Hz + earth without neutral.
The values given do not include any options and may change during the design stage. They must be confirmed after the purchase order has been placed.

(5) Cooling mode: Indoor conditions: +27°C DB /+19°C WB and outside conditions: +35°C DB / 24°C WB. Nominal flow, 400Pa available pressure on return + supply & ISO Coarse 65% filters clogged.
(6) For indoor conditions: +27°C DB /+19°C WB at nominal air flow.
(7) Weight for an available pressure of 400 Pa.

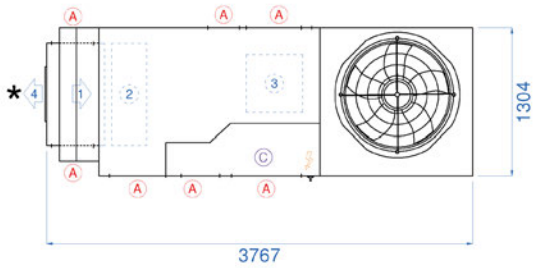
Dimensions and connections

SUPPLY AIR *from below*

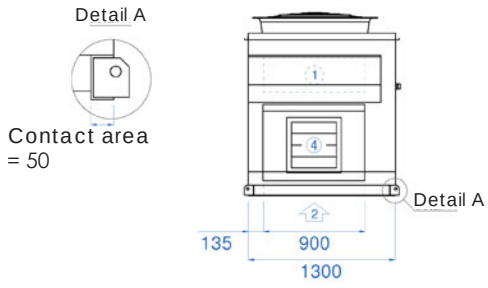
Front view:



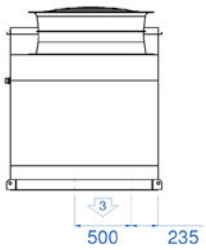
Top view:



Return side view:



Supply air side view :



* Minimum distance: 8 m between exhaust and fresh air.

① Fresh air
② Return air
③ Supply air
④ Exhaust air
Ⓐ Access
⚡ Power supply
Ⓒ Technical compartment
- - - Allow at least 400 mm of air space under the machine

	Length	Width (1)	Height
Casing dimensions	3,767 mm	1,304 mm	1,435 mm

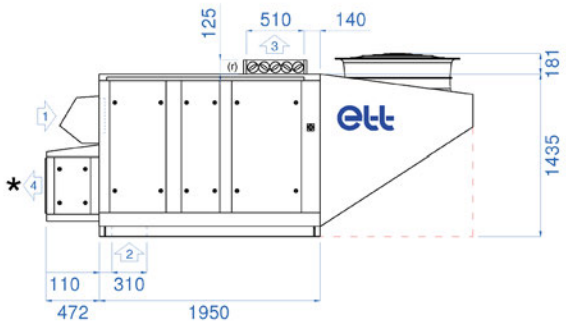
(1) Side return: +125 mm

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

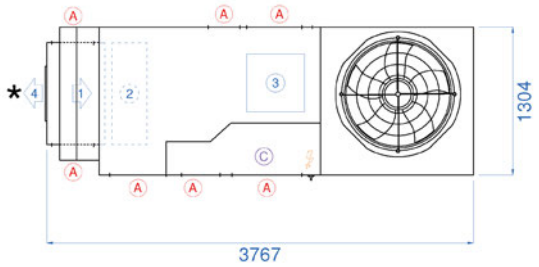
Dimensions and connections

SUPPLY AIR *from above*

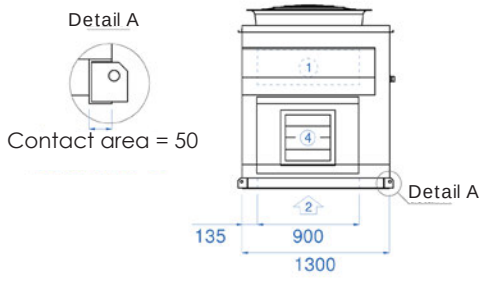
Front view:



Top view:



Return side view:



Supply air side view :

* Minimum distance: 8 m between exhaust and fesh air.

① Fresh air
② Return air
③ Supply air
④ Exhaust air
Ⓐ Access
⚡ Power supply
Ⓒ Technical compartment
- - - Allow at least 400 mm of air space under the machine

	Length	Width (1)	Height
Casing dimensions	3,767 mm	1,304 mm	1,435 mm

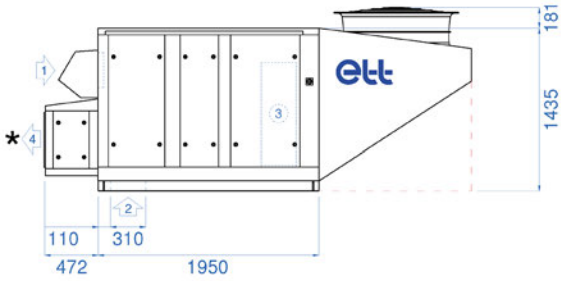
(1) Side return: +125 mm

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

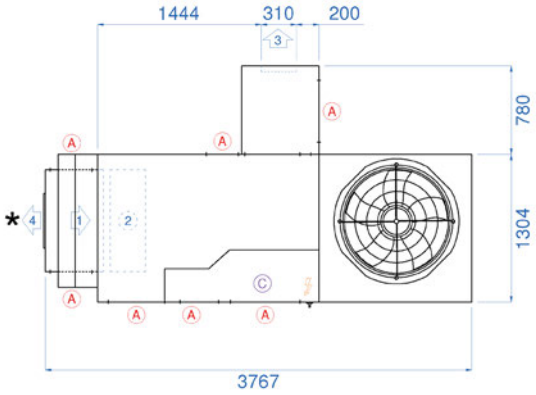
Dimensions and connections

Side SUPPLY AIR

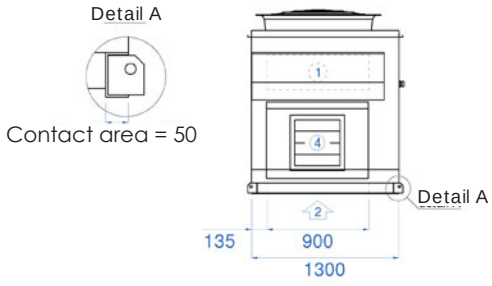
Front view:



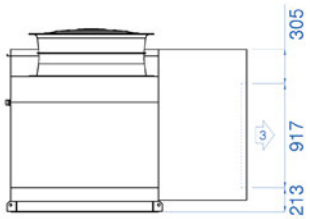
Top view:



Return side view:



Supply air side view :



* Minimum distance: 8 m between exhaust and fresh air.

① Fresh air
② Return air
③ Supply air
④ Exhaust air
Ⓐ Access
⚡ Power supply
Ⓒ Technical compartment
- - - Allow at least 400 mm of air space under the machine

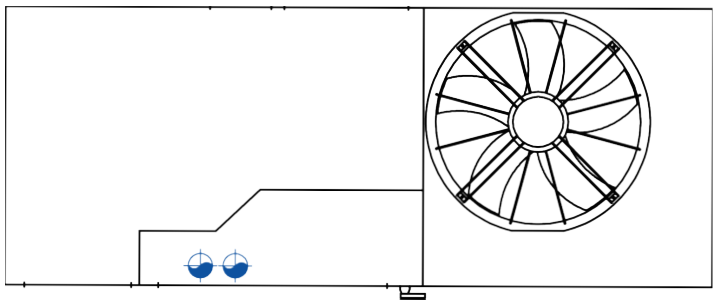
	Length	Width (1)	Height
Casing dimensions	3,767 mm	1,304 mm	1,435 mm

(1) Side return: +125 mm

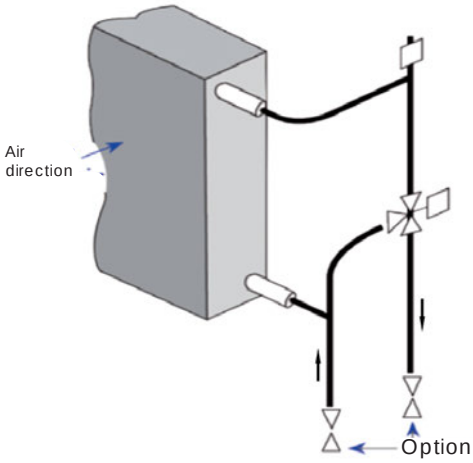
Note: fresh air cowls shall be installed by the installer.

FUNCTIONAL DIAGRAM AND CONNECTION

Top view



Principle



POWER RATINGS

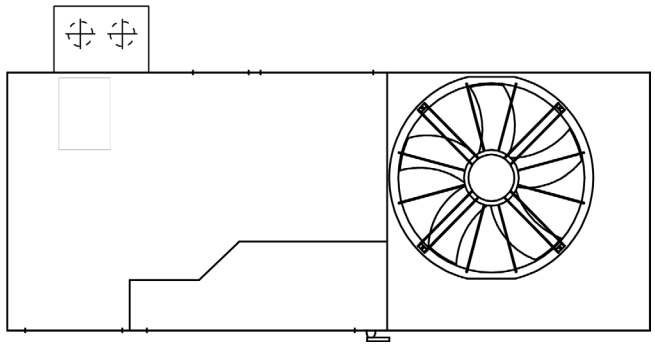
		Unit	040
Water regime 90/70°C and Exchanger inlet air temperature 10°C	Heating capacity	kW	104.9
	Water flow rate	m³/h	4.7
	Exchanger pressure drop	mWC	1.6
	ΔPexch and 3-WV	mWC	2.4
	ΔPexch, 3-WV, VA and VTA	mWC	3.2
Water regime 80/60°C and Exchanger inlet air temperature 10°C	Heating capacity	kW	88.5
	Water flow rate	m³/h	3.9
	Exchanger pressure drop	mWC	1.2
	ΔPexch and 3-WV	mWC	1.8
	ΔPexch, 3-WV, VA and VTA	mWC	2.4
Water regime 90/70°C and Exchanger inlet air temperature 20°C	Heating capacity	kW	89.2
	Water flow rate	m³/h	3.9
	Exchanger pressure drop	mWC	1.2
	ΔPexch and 3-WV	mWC	1.8
	ΔPexch, 3-WV, VA and VTA	mWC	2.4
Water regime 80/60°C and Exchanger inlet air temperature 20°C	Heating capacity	kW	72.8
	Water flow rate	m³/h	3.2
	Exchanger pressure drop	mWC	0.8
	ΔPexch and 3-WV	mWC	1.2
	ΔPexch, 3-WV, VA and VTA	mWC	1.6

3-WV: 3-Way valve
VA: Return flow shut-off valve
VTA: TA return control valve, 7/8th opening
Technical data for non-glycol water at nominal air flow rate.

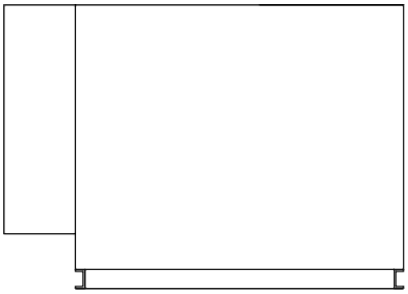
FUNCTIONAL DIAGRAM AND CONNECTION

► Connection opposite the technical compartment.

Top view



Side view



► Connection identical to hot water coil connection.

See functional diagram and connection diagram.

POWER RATINGS

		Unit	040
Water regime 35/30°C and Exchanger inlet air temperature 10°C	Heating capacity	kW	32.9
	Water flow rate	m³/h	5.7
	Exchanger pressure drop	mWC	2.6
	ΔPexch and 3-WV	mWC	3.9
	ΔPexch, 3-WV, VA and VTA	mWC	5.2
Water regime 35/30°C and Exchanger inlet air temperature 20°C	Heating capacity	kW	17.3
	Water flow rate	m³/h	3.0
	Exchanger pressure drop	mWC	0.8
	ΔPexch and 3-WV	mWC	1.2
	ΔPexch, 3-WV, VA and VTA	mWC	1.5

3-WV: 3-Way valve
VA: Return flow shut-off valve
VTA: TA return control valve, 7/8th opening
Technical data for non-glycol water at nominal air flow rate

Technical features

ULTI+ R290 11 EX

	DESIGNATION	Unit	065	075
VENTILATION	**FLOW RATES**			
	Rated air flow rate	**m³/h**	13,000	15,000
	Minimum air flow rate	**m³/h**	9,500	12,500
	Maximum air flow rate	**m³/h**	15,000	15,000
	ACOUSTICS			
	Sound power level at supply air	**dB(A)**	84	82
	Outside sound power level	**dB(A)**	87	90
	Resulting external sound pressure at 10m ref. $2*10^{-5}$ in free field, directivity 1	**dB(A)**	56	59
PERFORMANCE COOLING	**NOMINAL PERFORMANCE AT +35°C**			
	Net cooling capacity	**kW**	60.4	69.8
	Net EER	**kW/kW**	3.00	2.80
	SEASONAL EFFICIENCY (2)			
	Net design cooling capacity	**kW**	60.4	69.8
	SEER	**kW/kW**	4.40	3.98
	ηs,C	**%**	173	156
HEATING PERFORMANCE	**NOMINAL PERFORMANCE AT +7°C**			
	Net heating capacity	**kW**	61.4	72.2
	Net COP	**kW/kW**	3.83	3.74
	RATED PERFORMANCE AT -7°C (3)			
	Net heating capacity	**kW**	44.0	48.3
	Net COP	**kW/kW**	3.11	2.84
	SEASONAL EFFICIENCY (2)			
	Net design heat output	**kW**	56.6	60.2
	SCOP	**kW/kW**	3.75	3.52
	ηs,H	**%**	147	138
GENERAL INFORMATION	**ELECTRICAL DATA**			
	Total installed electrical power (4)	**kW**	35.2	41.0
	Total installed electrical current (4)	**A**	58.4	67.4
	Starting current	**A**	184.6	182.1
	Maximum absorbed electrical power (5)	**kW**	26.8	33.5
	REFRIGERATION CIRCUIT(S)			
	Power stages	**-**	2	2
	OPERATING LIMITS IN COOLING MODE			
	Maximum outside temperature (6)	**°C**	57	55
	Minimum outside temperature (6)	**°C**	+15	
	Minimum inside coil inlet temperature	**°C**	+18	
	OPERATING LIMITS IN HEATING MODE			
	Minimum outside temperature	**°C**	-15	
	Minimum inside coil inlet temperature	**°C**	+12	
	WEIGHT			
	Unit weight without options(7)	**kg**	1,002	1,002
	Weight of connecting roof curb	**kg**	80	
	Weight of standard ventilated roof curb	**kg**	112	

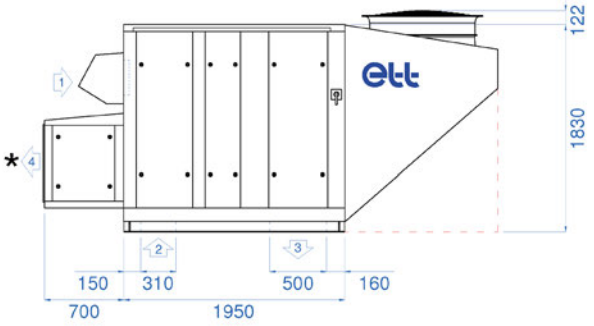
(1) In accordance with EN 14511.
Cooling mode: Indoor conditions: +27°C DB/+19°C WB and outside conditions: +35°C DB / 24°C WB
Heating mode: Indoor conditions: +20°C DB/+12°C WB and outside conditions: +7°C DB / +6°C WB.
(2) According to EcoDesign regulation 2016/2281.
(3) In accordance with EN 14511.
Heating mode: Indoor conditions: +20°C DB and outside conditions: -7°C DB / -8°C WB.
(4) Three-phase power supply 400V - 50 Hz + earth without neutral.
The values given do not include any options and may change during the design stage. They must be confirmed after the purchase order has been placed.

(5) Cooling mode: Indoor conditions: +27°C DB /+19°C WB and outside conditions: +35°C DB / 24°C WB. Nominal flow, 400Pa available pressure on return + supply & ISO Coarse 65% filters clogged.
(6) For indoor conditions: +27°C DB /+19°C WB at nominal air flow.
(7) Weight for an available pressure of 400 Pa.

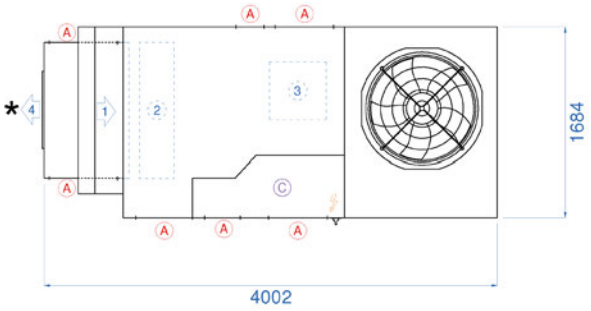
Dimensions and connections

SUPPLY AIR *from below*

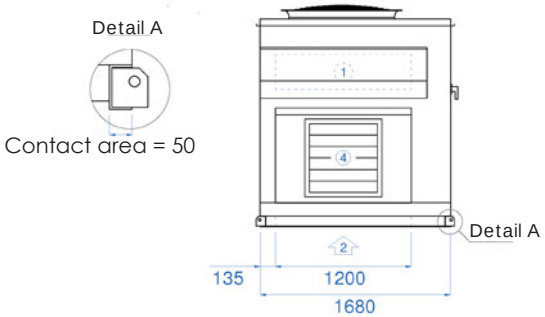
Front view:



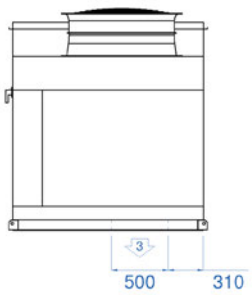
Top view:



Return side view:



Supply air side view :



* Minimum distance: 8 m between exhaust and fresh air.

① Fresh air
② Return air
③ Supply air
④ Exhaust air
Ⓐ Access
⚡ Power supply
Ⓒ Technical compartment
- - - Allow at least 400 mm of air space under the machine

	Length	Width (1)	Height
Casing dimensions	4,002 mm	1,684 mm	1,830 mm

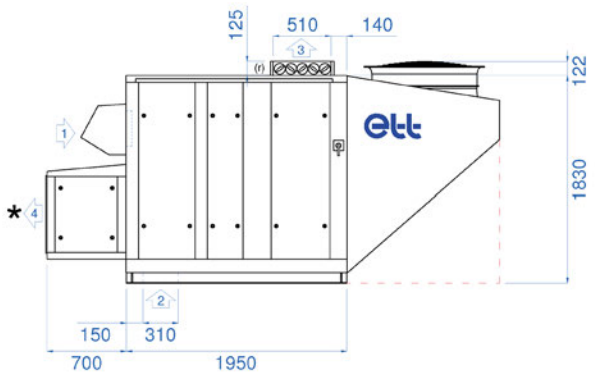
(1) Side return: +125 mm

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

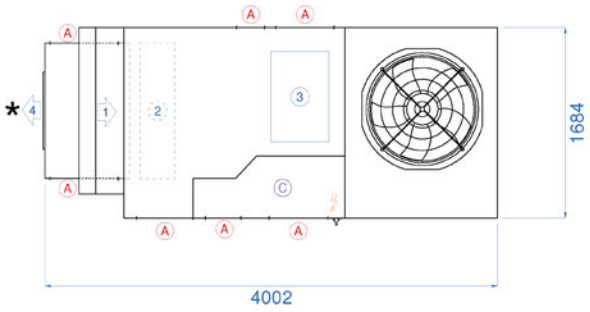
Dimensions and connections

SUPPLY AIR *from above*

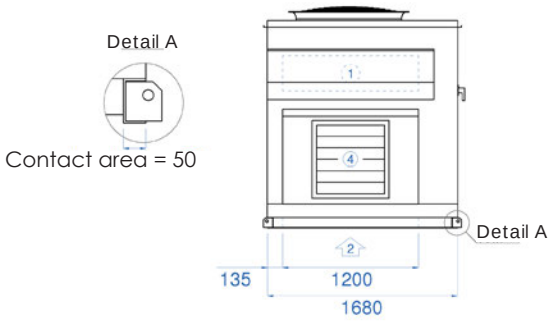
Front view:



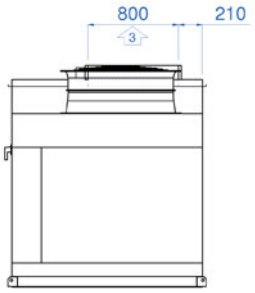
Top view:



Return side view:



Supply air side view :



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⚡ Power supply
Ⓒ Technical compartment
- - - Allow at least 400 mm of air space under the machine

	Length	Width (1)	Height
Casing dimensions	4,002 mm	1,684 mm	1,830 mm

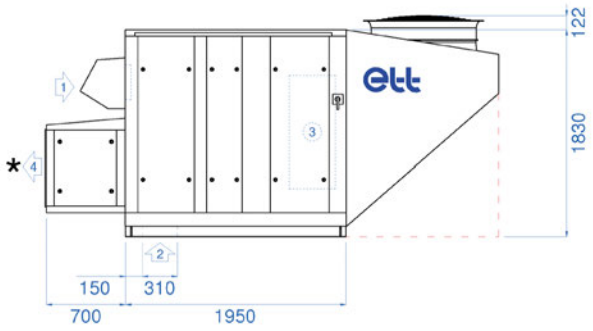
(1) Side return: +125 mm

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

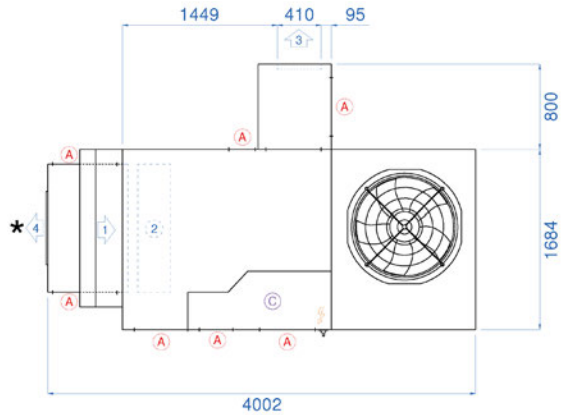
Dimensions and connections

Side SUPPLY AIR

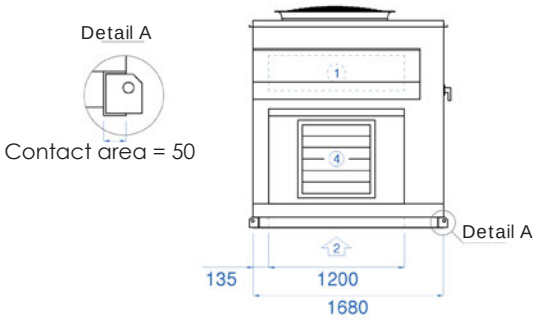
Front view:



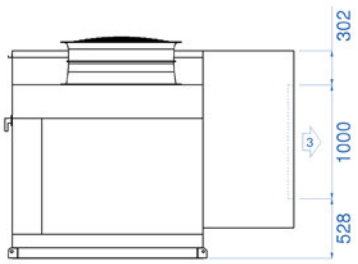
Top view:



Return side view:



Supply air side view :



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① Fresh air
② Return air
③ Supply air
④ Exhaust air
Ⓐ Access
⚡ Power supply
Ⓒ Technical compartment
- - - Allow at least 400 mm of air space under the machine

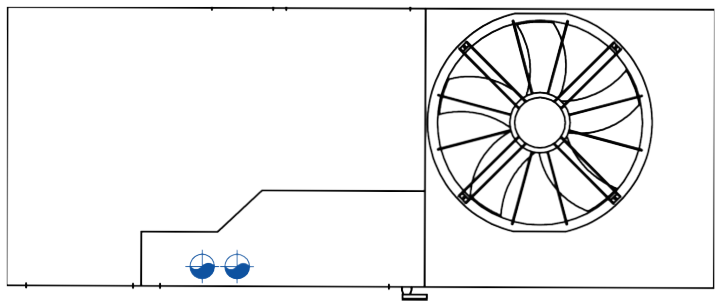
	Length	Width (1)	Height
Casing dimensions	4,002 mm	1,684 mm	1,830 mm

(1) Side return: +125 mm

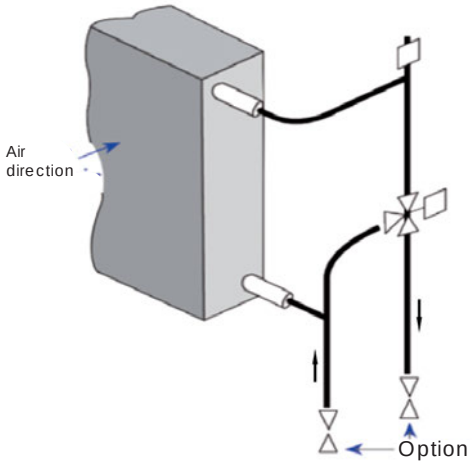
Note: fresh air cowls shall be installed by the installer.

FUNCTIONAL DIAGRAM AND CONNECTION

Top view



Principle



POWER RATINGS

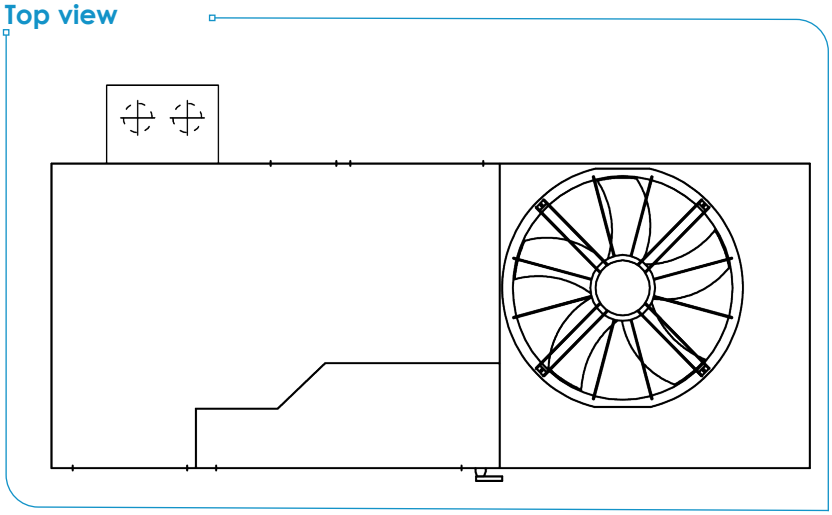
		Unit	065	075
Water regime 90/70°C and Exchanger inlet air temperature 10°C	Heating capacity	kW	187.7	205.1
	Water flow rate	m³/h	8.3	9.1
	Exchanger pressure drop	mWC	3.5	4.1
	ΔPexch and 3-WV	mWC	6.1	7.2
	ΔPexch, 3-WV, VA and VTA	mWC	8.8	10.4
Water regime 80/60°C and Exchanger inlet air temperature 10°C	Heating capacity	kW	159.1	173.6
	Water flow rate	m³/h	7.0	7.7
	Exchanger pressure drop	mWC	2.6	3.0
	ΔPexch and 3-WV	mWC	4.5	5.3
	ΔPexch, 3-WV, VA and VTA	mWC	6.4	7.6
Water regime 90/70°C and Exchanger inlet air temperature 20°C	Heating capacity	kW	160.0	174.7
	Water flow rate	m³/h	7.1	7.7
	Exchanger pressure drop	mWC	2.6	3.0
	ΔPexch and 3-WV	mWC	4.5	5.3
	ΔPexch, 3-WV, VA and VTA	mWC	6.4	7.6
Water regime 80/60°C and Exchanger inlet air temperature 20°C	Heating capacity	kW	131.3	143.1
	Water flow rate	m³/h	5.8	6.3
	Exchanger pressure drop	mWC	1.8	2.1
	ΔPexch and 3-WV	mWC	3.1	3.7
	ΔPexch, 3-WV, VA and VTA	mWC	4.4	5.2

3-WV: 3-Way valve
VA: Return flow shut-off valve
VTA: TA return control valve, 7/8th opening
Technical data for non-glycol water at nominal air flow rate.

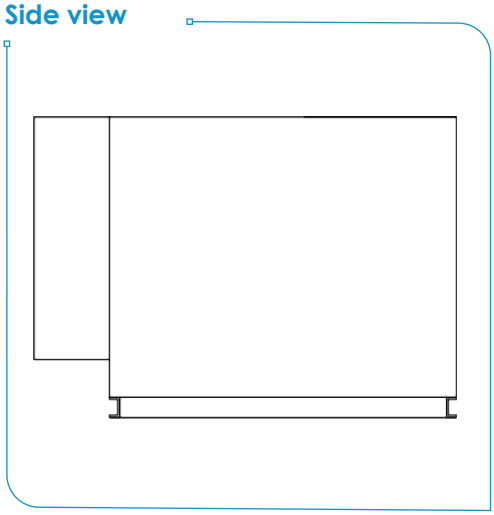
FUNCTIONAL DIAGRAM AND CONNECTION

► Connection opposite the technical compartment.

Top view



Side view



► Connection identical to hot water coil connection.

See functional diagram and connection diagram.

POWER RATINGS

		Unit	065	075
Water regime 35/30°C and Exchanger inlet air temperature 10°C	Heating capacity	kW	59.1	64.6
	Water flow rate	m³/h	10.2	11.2
	Exchanger pressure drop	mWC	5.8	6.8
	ΔPexch and 3-WV	mWC	9.8	11.6
	ΔPexch, 3-WV, VA and VTA	mWC	14.0	16.6
Water regime 35/30°C and Exchanger inlet air temperature 20°C	Heating capacity	kW	31.5	34.3
	Water flow rate	m³/h	5.5	6.0
	Exchanger pressure drop	mWC	1.8	2.1
	ΔPexch and 3-WV	mWC	3.0	3.5
	ΔPexch, 3-WV, VA and VTA	mWC	4.2	4.9

3-WV: 3-Way valve
VA: Return flow shut-off valve
VTA: TA return control valve, 7/8th opening
Technical data for non-glycol water at nominal air flow rate.

Technical features

ULTI+ R290 12 EX

	DESIGNATION	Unit	080	090
VENTILATION	**FLOW RATES**			
	Rated air flow rate	**m³/h**	18,000	20,000
	Minimum air flow rate	**m³/h**	13,000	16,000
	Maximum air flow rate	**m³/h**	20,000	20,000
	ACOUSTICS			
	Sound power level at supply air	**dB(A)**	87	88
	Outside sound power level	**dB(A)**	83	87
	Resulting external sound pressure at 10m ref. $2*10^{-5}$ in free field, directivity 1	**dB(A)**	52	56
COOLING PERFORMANCE	**NOMINAL PERFORMANCE AT +35°C**			
	Net cooling capacity	**kW**	81.4	86.4
	Net EER	**kW/kW**	2.97	2.89
	SEASONAL EFFICIENCY (2)			
	Net design cooling capacity	**kW**	81.4	86.4
	SEER	**kW/kW**	4.27	4.02
	ηs,C	**%**	168	158
HEATING PERFORMANCE	**NOMINAL PERFORMANCE AT +7°C**			
	Net heating capacity	**kW**	80.6	85.2
	Net COP	**kW/kW**	4.09	4.02
	RATED PERFORMANCE AT -7°C (3)			
	Net heating capacity	**kW**	56.4	54.9
	Net COP	**kW/kW**	3.21	2.99
	SEASONAL EFFICIENCY (2)			
	Net design heat output	**kW**	70.7	74.5
	SCOP	**kW/kW**	3.91	3.65
	ηs,H	**%**	153	143
GENERAL INFORMATION	**ELECTRICAL DATA**			
	Total installed electrical power (4)	**kW**	54.7	57.0
	Total installed electrical current (4)	**A**	88.8	94.3
	Starting current	**A**	243.9	249.4
	Maximum absorbed electrical power (5)	**kW**	35.2	38.8
	REFRIGERATION CIRCUIT(S)			
	Power stages	**-**	2	2
	OPERATING LIMITS IN COOLING MODE			
	Maximum outside temperature (6)	**°C**	57	57
	Minimum outside temperature (6)	**°C**	+15	
	Minimum inside coil inlet temperature	**°C**	+18	
	OPERATING LIMITS IN HEATING MODE			
	Minimum outside temperature	**°C**	-15	
	Minimum inside coil inlet temperature	**°C**	+12	
	WEIGHT			
	Unit weight without options(7)	**kg**	1,190	1,190
	Weight of connecting roof curb	**kg**	104	
	Weight of standard ventilated roof curb	**kg**	146	

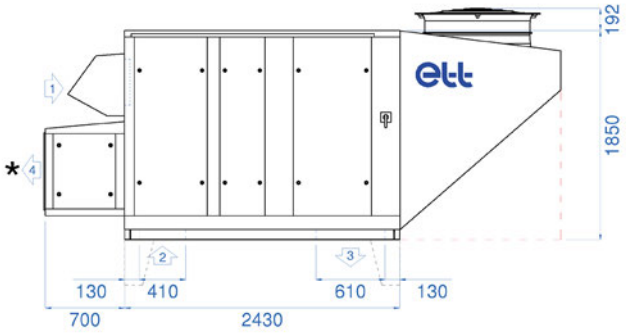
(1) In accordance with EN 14511.
Cooling mode: Indoor conditions: +27°C DB/+19°C WB and outside conditions: +35°C DB / 24°C WB
Heating mode: Indoor conditions: +20°C DB/+12°C WB and outside conditions: +7°C DB / +6°C WB.
(2) According to EcoDesign regulation 2016/2281.
(3) In accordance with EN 14511.
Heating mode: Indoor conditions: +20°C DB and outside conditions: -7°C DB / -8°C WB.
(4) Three-phase power supply 400V - 50 Hz + earth without neutral.
The values given do not include any options and may change during the design stage. They must be confirmed after the purchase order has been placed.

(5) Cooling mode: Indoor conditions: +27°C DB /+19°C WB and outside conditions: +35°C DB / 24°C WB. Nominal flow, 400Pa available pressure on return + supply & ISO Coarse 65% filters clogged.
(6) For indoor conditions: +27°C DB /+19°C WB at nominal air flow.
(7) Weight for an available pressure of 400 Pa.

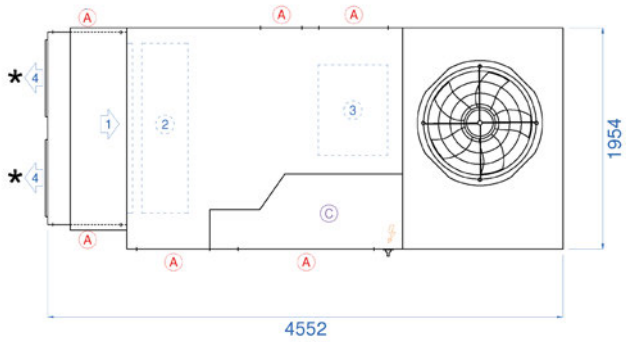
Dimensions and connections

SUPPLY AIR *from below*

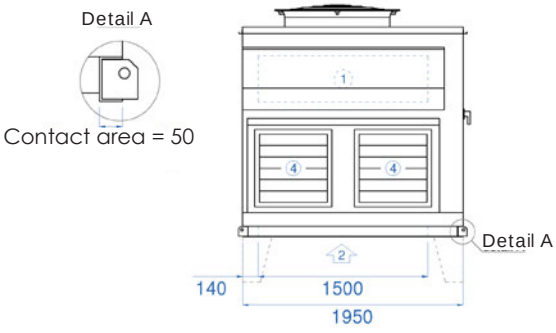
Front view:



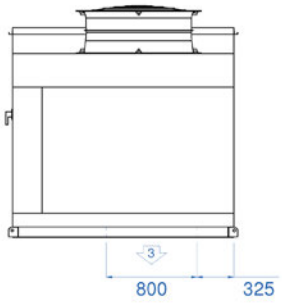
Top view:



Return side view:



Supply air side view :



* Minimum distance: 8 m between exhaust and fresh air.

① Fresh air
② Return air
③ Supply air
④ Exhaust air
Ⓐ Access
⚡ Power supply
Ⓒ Technical compartment
- - - Allow at least 400 mm of air space under the machine

	Length	Width (1)	Height
Casing dimensions	4,552 mm	1,954 mm	1,850 mm

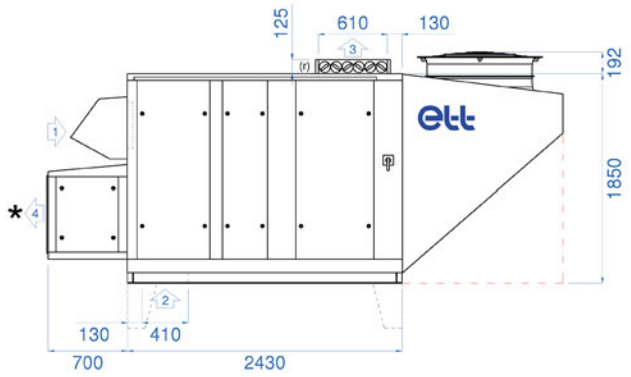
(1) Side return: +125 mm

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

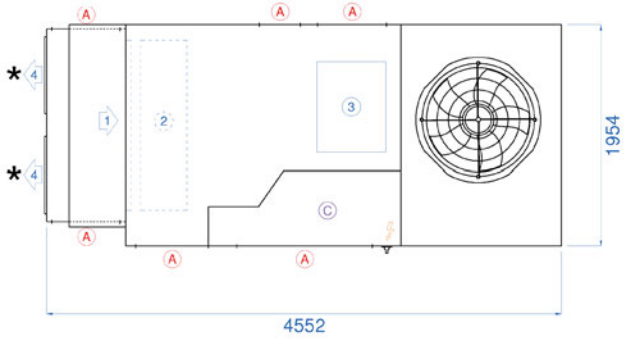
Dimensions and connections

SUPPLY AIR *from above*

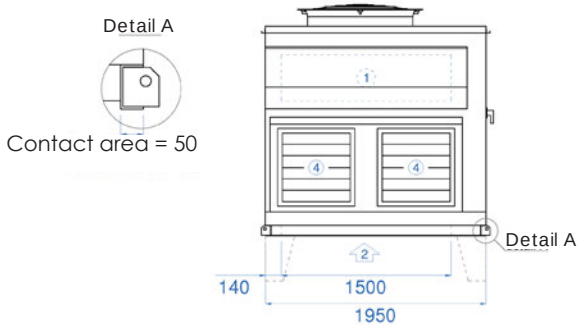
Front view:



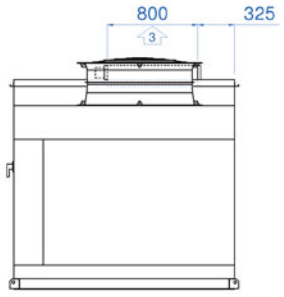
Top view:



Return side view:



Supply air side view :



* Minimum distance: 8 m between exhaust and fresh air.

① Fresh air
② Return air
③ Supply air
④ Exhaust air
Ⓐ Access
⚡ Power supply
Ⓒ Technical compartment
- - - Allow at least 400 mm of air space under the machine

	Length	Width (1)	Height
Casing dimensions	4,552 mm	1,954 mm	1,850 mm

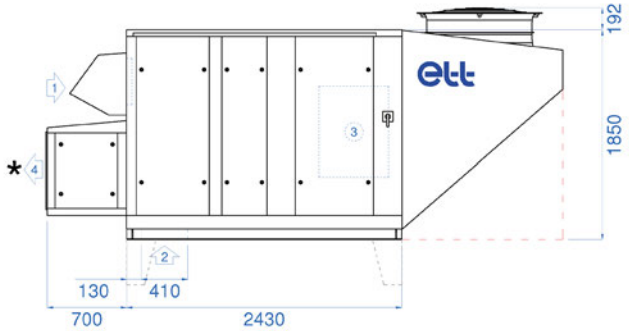
(1) Side return: +125 mm

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

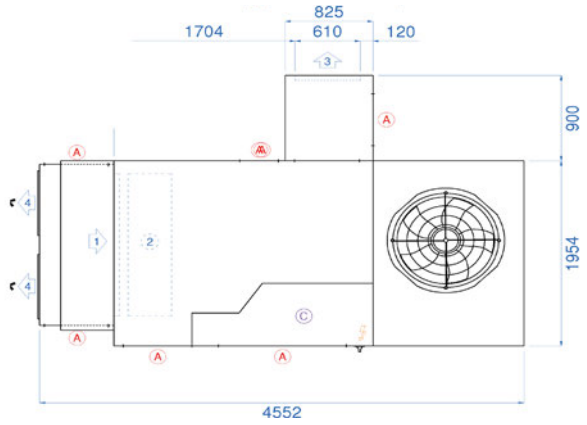
Dimensions and connections

Side SUPPLY AIR

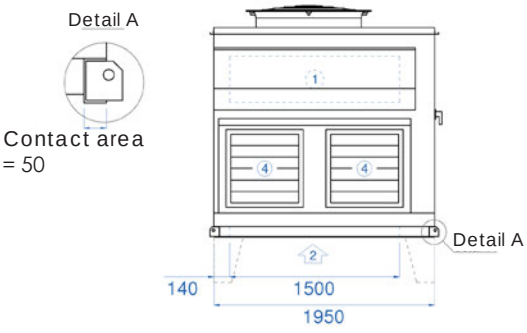
Front view:



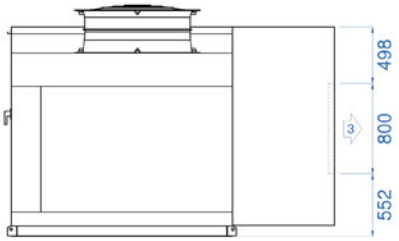
Top view:



Return side view:



Supply air side view :



* Minimum distance: 8 m between exhaust and fresh air.

① Fresh air
② Return air
③ Supply air
④ Exhaust air
Ⓐ Access
⚡ Power supply
Ⓒ Technical compartment
- - - Allow at least 400 mm of air space under the machine

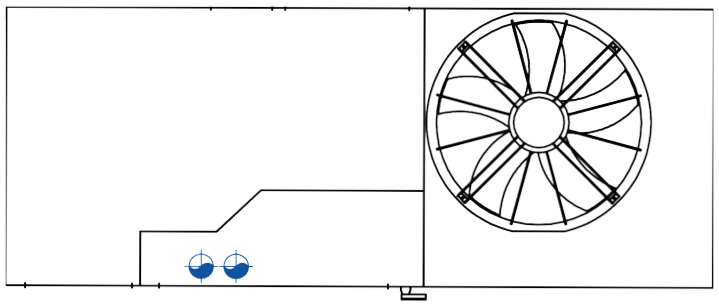
	Length	Width (1)	Height
Casing dimensions	4,552 mm	1,954 mm	1,850 mm

(1) Side return: +125 mm

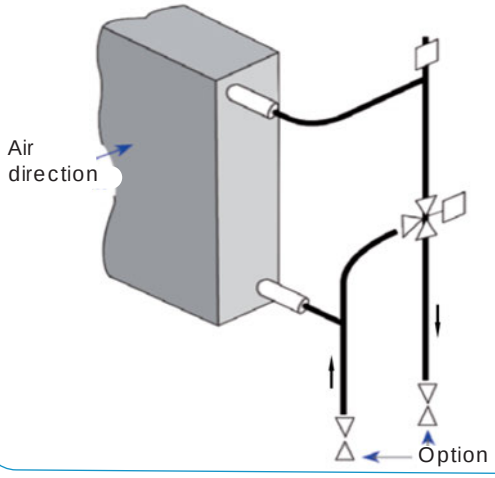
Note: fresh air cowls shall be installed by the installer.

FUNCTIONAL DIAGRAM AND CONNECTION

Top view



Principle



POWER RATINGS

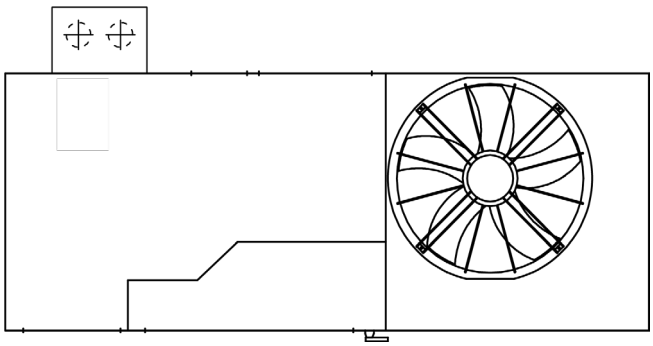
		Unit	080	090
Water regime 90/70°C and Exchanger inlet air temperature 10°C	Heating capacity	kW	246.8	263.0
	Water flow rate	m³/h	11.0	11.7
	Exchanger pressure drop	mWC	1.6	1.9
	ΔPexch and 3-WV	mWC	3.3	3.8
	ΔPexch, 3-WV, VA and VTA	mWC	5.2	5.9
Water regime 80/60°C and Exchanger inlet air temperature 10°C	Heating capacity	kW	207.4	220.9
	Water flow rate	m³/h	9.2	9.8
	Exchanger pressure drop	mWC	1.2	1.4
	ΔPexch and 3-WV	mWC	2.4	2.7
	ΔPexch, 3-WV, VA and VTA	mWC	3.7	4.2
Water regime 90/70°C and Exchanger inlet air temperature 20°C	Heating capacity	kW	209.3	223.0
	Water flow rate	m³/h	9.2	9.8
	Exchanger pressure drop	mWC	1.2	1.4
	ΔPexch and 3-WV	mWC	2.4	2.7
	ΔPexch, 3-WV, VA and VTA	mWC	3.8	4.3
Water regime 80/60°C and Exchanger inlet air temperature 20°C	Heating capacity	kW	170.0	180.9
	Water flow rate	m³/h	7.5	8.0
	Exchanger pressure drop	mWC	0.8	0.9
	ΔPexch and 3-WV	mWC	1.6	1.8
	ΔPexch, 3-WV, VA and VTA	mWC	2.5	2.8

3-WV: 3-Way valve
VA: Return flow shut-off valve
VTA: TA return control valve, 7/8th opening
Technical data for non-glycol water at nominal air flow rate.

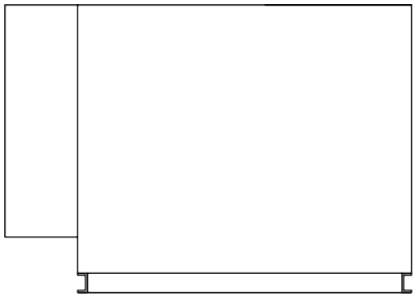
FUNCTIONAL DIAGRAM AND CONNECTION

Connection opposite the technical compartment.

Top view



Side view



► Connection identical to hot water coil connection.
See functional diagram and connection diagram.

POWER RATINGS

		Unit	080	090
Water regime 35/30°C and Exchanger inlet air temperature 10°C	Heating capacity	kW	77.1	82.2
	Water flow rate	m³/h	13.4	14.2
	Exchanger pressure drop	mWC	2.7	3.0
	ΔPexch and 3-WV	mWC	5.2	5.9
	ΔPexch, 3-WV, VA and VTA	mWC	8.1	9.2
Water regime 35/30°C and Exchanger inlet air temperature 20°C	Heating capacity	kW	40.0	42.5
	Water flow rate	m³/h	6.9	7.4
	Exchanger pressure drop	mWC	0.8	0.9
	ΔPexch and 3-WV	mWC	1.5	1.6
	ΔPexch, 3-WV, VA and VTA	mWC	2.2	2.5

3-WV: 3-Way valve
VA: Return flow shut-off valve
VTA: TA return control valve, 7/8th opening
Technical data for non-glycol water at nominal air flow rate.

	DESIGNATION	Unit	110
VENTILATION	**FLOW RATES**		
	Rated air flow rate	**m³/h**	23,000
	Minimum air flow rate	**m³/h**	19,000
	Maximum air flow rate	**m³/h**	27,000
	ACOUSTICS		
	Sound power level at supply air	**dB(A)**	90
	Outside sound power level	**dB(A)**	86
	Resulting external sound pressure at 10m ref. $2*10^{-5}$ in free field, directivity 1	**dB(A)**	55
COOLING PERFORMANCE	**NOMINAL PERFORMANCE AT +35°C**		
	Net cooling capacity	**kW**	107.8
	Net EER	**kW/kW**	3.13
	SEASONAL EFFICIENCY (2)		
	Net design cooling capacity	**kW**	107.8
	SEER	**kW/kW**	4.67
	ηs,C	**%**	184
HEATING PERFORMANCE	**NOMINAL PERFORMANCE AT +7°C**		
	Net heating capacity	**kW**	105.6
	Net COP	**kW/kW**	3.98
	RATED PERFORMANCE AT -7°C (3)		
	Net heating capacity	**kW**	74.9
	Net COP	**kW/kW**	3.25
	SEASONAL EFFICIENCY (2)		
	Net design heat output	**kW**	102.3
	SCOP	**kW/kW**	3.78
	ηs,H	**%**	148
GENERAL INFORMATION	**ELECTRICAL DATA**		
	Total installed electrical power (4)	**kW**	66.2
	Total installed electrical current (4)	**A**	107.9
	Starting current	**A**	389.1
	Maximum absorbed electrical power (5)	**kW**	46.4
	REFRIGERATION CIRCUIT(S)		
	Power stages	**-**	4
	OPERATING LIMITS IN COOLING MODE		
	Maximum outside temperature (6)	**°C**	57
	Minimum outside temperature (6)	**°C**	+15
	Minimum inside coil inlet temperature	**°C**	+18
	OPERATING LIMITS IN HEATING MODE		
	Minimum outside temperature	**°C**	-15
	Minimum inside coil inlet temperature	**°C**	+12
	WEIGHT		
	Unit weight without options(7)	**kg**	1,636
	Weight of connecting roof curb	**kg**	121
	Weight of standard ventilated roof curb	**kg**	169

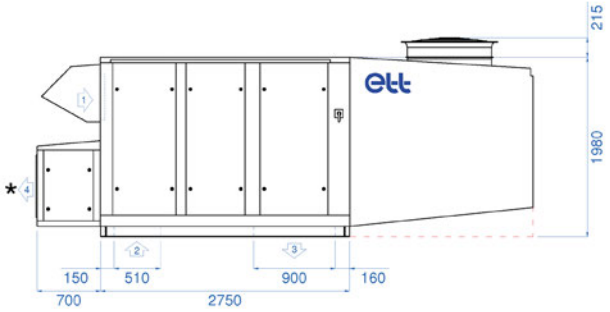
(1) In accordance with EN 14511.
Cooling mode: Indoor conditions: +27°C DB/+19°C WB and outside conditions: +35°C DB / 24°C WB
Heating mode: Indoor conditions: +20°C DB/+12°C WB and outside conditions: +7°C DB / +6°C WB.
(2) According to EcoDesign regulation 2016/2281.
(3) In accordance with EN 14511.
Heating mode: Indoor conditions: +20°C DB and outside conditions: -7°C DB / -8°C WB.
(4) Three-phase power supply 400V - 50 Hz + earth without neutral.
The values given do not include any options and may change during the design stage. They must be confirmed after the purchase order has been placed.

(5) Cooling mode: Indoor conditions: +27°C DB /+19°C WB and outside conditions: +35°C DB / 24°C WB. Nominal flow, 400Pa available pressure on return + supply & ISO Coarse 65% filters clogged.
(6) For indoor conditions: +27°C DB /+19°C WB at nominal air flow.
(7) Weight for an available pressure of 400 Pa.

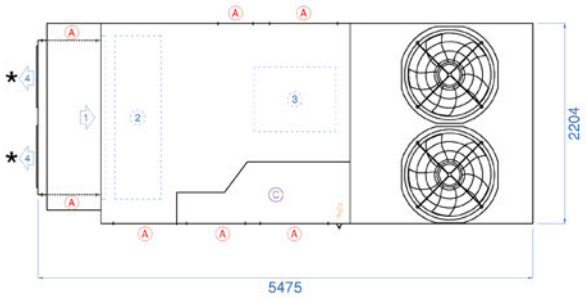
Dimensions and connections

SUPPLY AIR *from below*

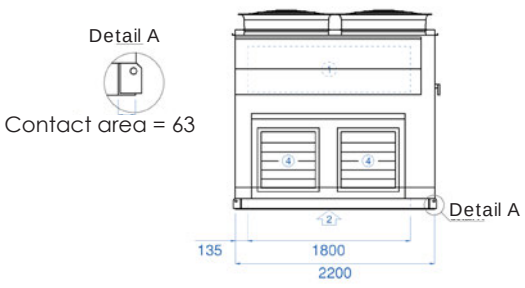
Front view:



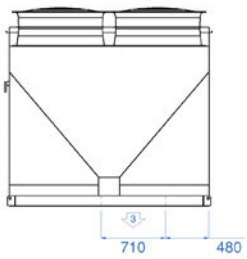
Top view:



Return side view:



Supply air side view :



* Minimum distance: 8 m between exhaust and fresh air.

① Fresh air
② Return air
③ Supply air
④ Exhaust air
Ⓐ Access
⚡ Power supply
Ⓒ Technical compartment
- - - Allow at least 400 mm of air space under the machine

	Length	Width (1)	Height
Casing dimensions	5,475 mm	2,204 mm	1,980 mm

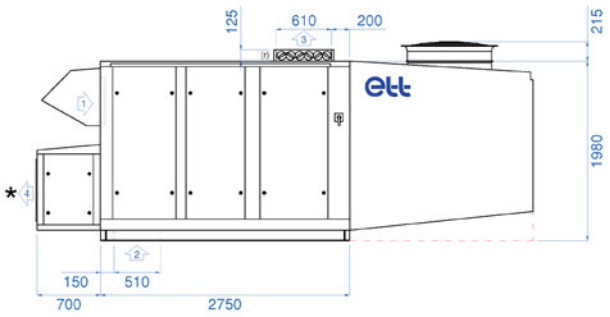
(1) Side return: +125 mm

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

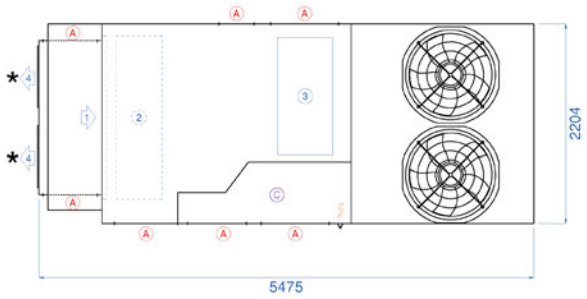
Dimensions and connections

SUPPLY AIR *from above*

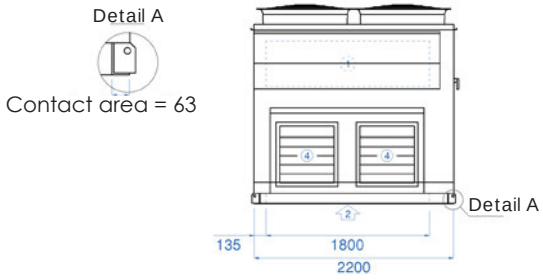
Front view:



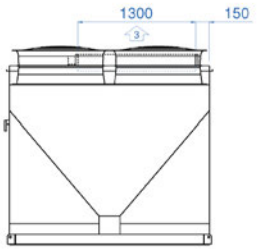
Top view:



Return side view:



Supply air side view :



* Minimum distance 8 m between discharge and fesh air.

① Fresh air
② Return air
③ Supply air
④ Exhaust air
Ⓐ Access
⚡ Power supply
Ⓒ Technical compartment
- - - Allow at least 400 mm of air space under the machine

	Length	Width (1)	Height
Casing dimensions	5,475 mm	2,204 mm	1,980 mm

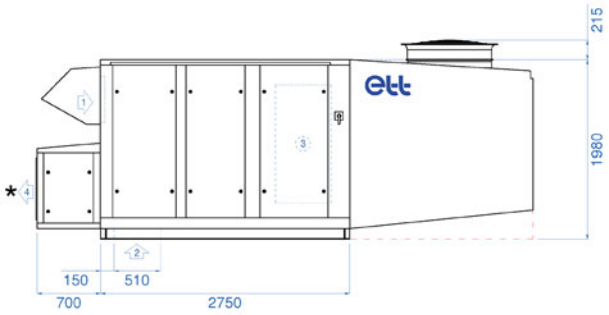
(1) Side return: +125 mm

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

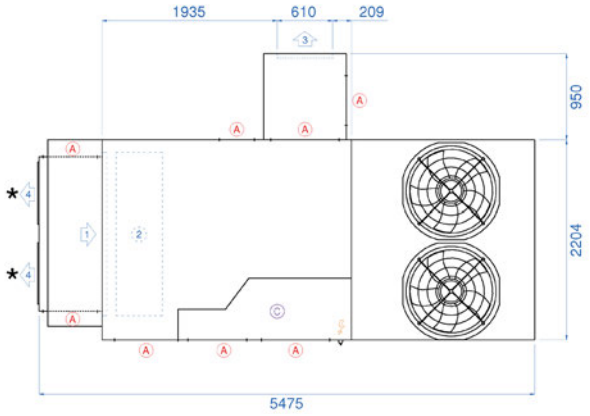
Dimensions and connections

Side SUPPLY AIR

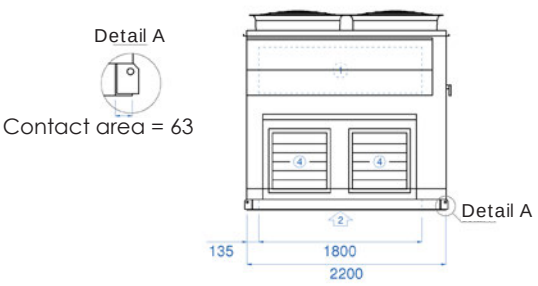
Front view:



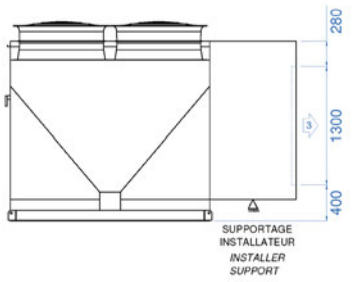
Top view:



Return side view:



Supply air side view :



* Minimum distance: 8 m between exhaust and fresh air.

① Fresh air
② Return air
③ Supply air
④ Exhaust air
Ⓐ Access
⚡ Power supply
Ⓒ Technical compartment
- - - Allow at least 400 mm of air space under the machine

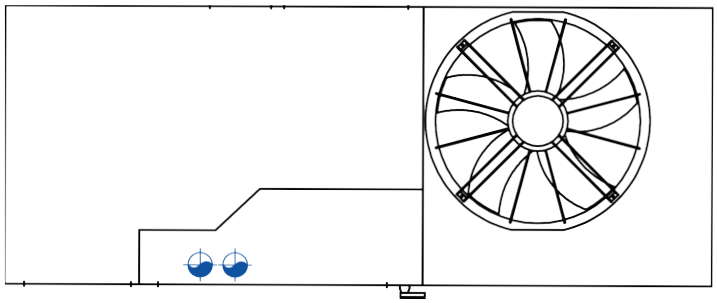
	Length	Width (1)	Height
Casing dimensions	5,475 mm	2,204 mm	1,980 mm

(1) Side return: +125 mm

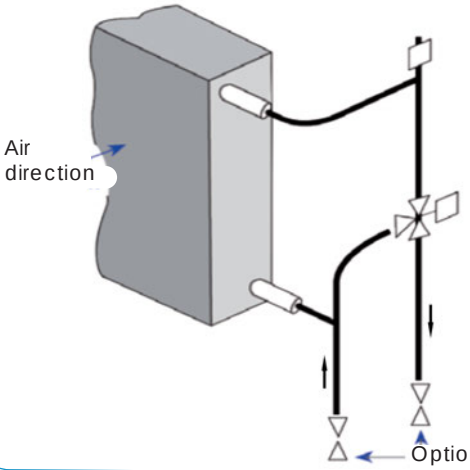
Note: fresh air cowls shall be installed by the installer.

FUNCTIONAL DIAGRAM AND CONNECTION

Top view



Principle



POWER RATINGS

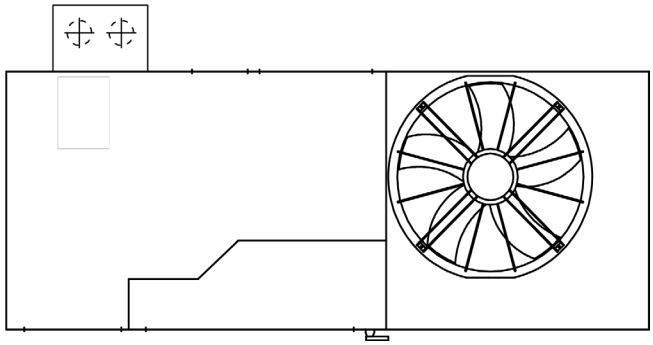
		Unit	110
Water regime 90/70°C and Exchanger inlet air temperature 10°C	Heating capacity	kW	324.5
	Water flow rate	m³/h	14.4
	Exchanger pressure drop	mWC	2.6
	ΔPexch and 3-WV	mWC	5.5
	ΔPexch, 3-WV, VA and VTA	mWC	8.8
Water regime 80/60°C and Exchanger inlet air temperature 10°C	Heating capacity	kW	273.5
	Water flow rate	m³/h	12.1
	Exchanger pressure drop	mWC	1.9
	ΔPexch and 3-WV	mWC	4.0
	ΔPexch, 3-WV, VA and VTA	mWC	6.3
Water regime 90/70°C and Exchanger inlet air temperature 20°C	Heating capacity	kW	275.7
	Water flow rate	m³/h	12.2
	Exchanger pressure drop	mWC	1.9
	ΔPexch and 3-WV	mWC	4.0
	ΔPexch, 3-WV, VA and VTA	mWC	6.4
Water regime 80/60°C and Exchanger inlet air temperature 20°C	Heating capacity	kW	224.8
	Water flow rate	m³/h	9.9
	Exchanger pressure drop	mWC	1.3
	ΔPexch and 3-WV	mWC	2.7
	ΔPexch, 3-WV, VA and VTA	mWC	4.3

3-WV: 3-Way valve
VA: Return flow shut-off valve
VTA: TA return control valve, 7/8th opening
Technical data for non-glycol water at nominal air flow rate.

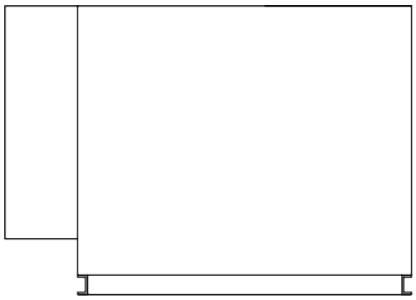
FUNCTIONAL DIAGRAM AND CONNECTION

► Connection opposite the technical compartment.

Top view



Side view



► Connection identical to hot water coil connection.

See functional diagram and connection diagram.

POWER RATINGS

		Unit	110
Water regime 35/30°C and Exchanger inlet air temperature 10°C	Heating capacity	kW	101.7
	Water flow rate	m³/h	17.6
	Exchanger pressure drop	mWC	4.2
	ΔPexch and 3-WV	mWC	8.7
	ΔPexch, 3-WV, VA and VTA	mWC	13.7
Water regime 35/30°C and Exchanger inlet air temperature 20°C	Heating capacity	kW	53.3
	Water flow rate	m³/h	9.2
	Exchanger pressure drop	mWC	1.2
	ΔPexch and 3-WV	mWC	2.5
	ΔPexch, 3-WV, VA and VTA	mWC	3.8

3-WV: 3-Way valve
VA: Return flow shut-off valve
VTA: TA return control valve, 7/8th opening
Technical data for non-glycol water at nominal air flow rate.

Technical features

ULTI+ R290 22 EX

	DESIGNATION	Unit	130	150	180
VENTILATION	**FLOW RATES**				
	Rated air flow rate	**m³/h**	27,000	33,000	38,000
	Minimum air flow rate	**m³/h**	18,000	21,000	34,000
	Maximum air flow rate	**m³/h**	38,000	38,000	38,000
	ACOUSTICS				
	Sound power level at supply air	**dB(A)**	80	83	85
	Outside sound power level	**dB(A)**	89	89	83
	Resulting external sound pressure at 10m ref. $2*10^{-5}$ in free field, directivity 1	**dB(A)**	58	58	52
COOLING PERFORMANCE	**RATED PERFORMANCE AT +35°C** (1)				
	Net cooling capacity	**kW**	124.8	142.4	172.2
	Net EER	**kW/kW**	3.35	3.09	2.91
	SEASONAL EFFICIENCY (2)				
	Net design cooling capacity	**kW**	124.8	142.4	172.2
	SEER	**kW/kW**	5.07	4.83	4.24
	ηs,C	**%**	200	190	167
HEATING PERFORMANCE	**RATED PERFORMANCE AT +7°C** (1)				
	Net heating capacity	**kW**	119.1	137.4	170.7
	Net COP	**kW/kW**	4.34	4.28	4.07
	RATED PERFORMANCE AT -7°C (3)				
	Net heating capacity	**kW**	83.1	95.5	107.4
	Net COP	**kW/kW**	3.33	3.28	2.93
	SEASONAL EFFICIENCY (2)				
	Net design heat output	**kW**	111.2	114.8	161.7
	SCOP	**kW/kW**	4.18	3.84	3.56
	ηs,H	**%**	164	151	140
GENERAL INFORMATION	**ELECTRICAL DATA**				
	Total installed electrical power (4)	**kW**	74.5	83.9	103.1
	Total installed electrical current (4)	**A**	120.4	134.6	172.2
	Starting current	**A**	377.8	386.8	482.4
	Maximum absorbed electrical power (5)	**kW**	50.8	62.7	75.2
	REFRIGERATION CIRCUIT(S)				
	Power stages	**-**	4	4	4
	OPERATING LIMITS IN COOLING MODE				
	Maximum outside temperature (6)	**°C**	58	57	57
	Minimum outside temperature (6)	**°C**		+15	
	Minimum inside coil inlet temperature	**°C**		+18	
	OPERATING LIMITS IN HEATING MODE				
	Minimum outside temperature	**°C**		-15	
	Minimum inside coil inlet temperature	**°C**		-12	
	WEIGHT				
	Unit weight without options(7)	**kg**	2,502	2,502	2,502
	Weight of connecting roof curb	**kg**		163	
	Weight of standard ventilated roof curb	**kg**		228	

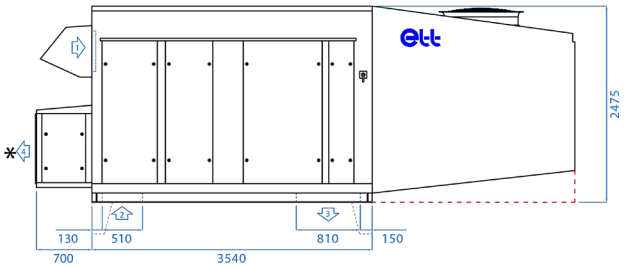
(1) In accordance with EN 14511.
Cooling mode: Indoor conditions: +27°C DB/+19°C WB and outside conditions: +35°C DB / 24°C WB
Heating mode: Indoor conditions: +20°C DB/+12°C WB and outside conditions: +7°C DB / +6°C WB.
(2) According to EcoDesign regulation 2016/2281.
(3) In accordance with EN 14511.
Heating mode: Indoor conditions: +20°C DB and outside conditions: -7°C DB / -8°C WB.
(4) Three-phase power supply 400V - 50 Hz + earth without neutral.
The values given do not include any options and may change during the design stage. They must be confirmed after the purchase order has been placed.

(5) Cooling mode: Indoor conditions: +27°C DB /+19°C WB and outside conditions: +35°C DB / 24°C WB. Nominal flow, 400Pa available pressure on return + supply & ISO Coarse 65% filters clogged.
(6) For indoor conditions: +27°C DB /+19°C WB at nominal air flow.
(7) Weight for an available pressure of 400 Pa.

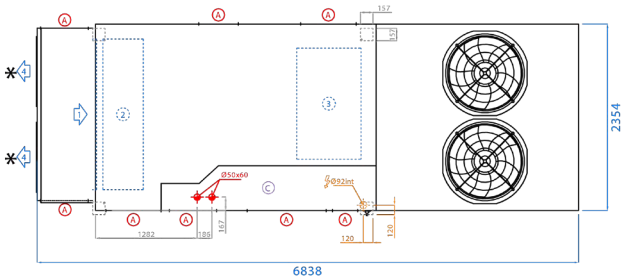
Dimensions and connections

SUPPLY AIR *from below*

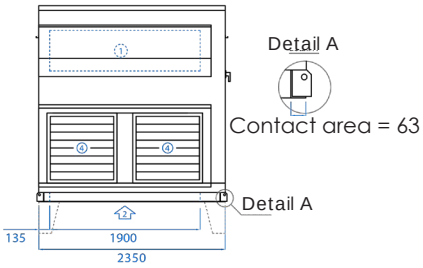
Front view:



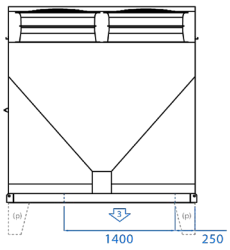
Top view:



Return side view:



Supply air side view :



* Minimum distance: 8 m between exhaust and fresh air.

① Fresh air
② Return air
③ Supply air
④ Exhaust air
Ⓐ Access
⚡ Power supply
Ⓒ Technical compartment
- - - Allow at least 400 mm of air space under the machine

	Length	Width (1)	Height
Casing dimensions	6,800 mm	2,354 mm	2,475 mm

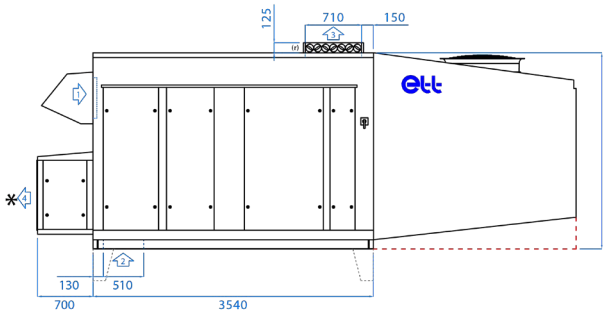
(1) Side return: +125 mm

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

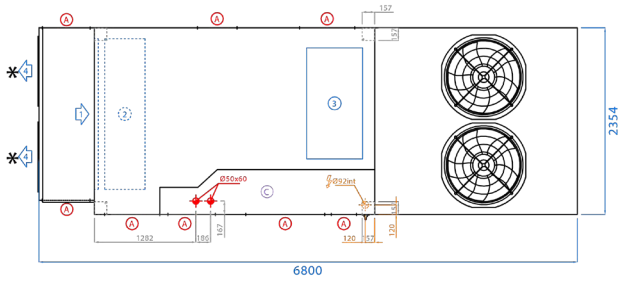
Dimensions and connections

SUPPLY AIR *from above*

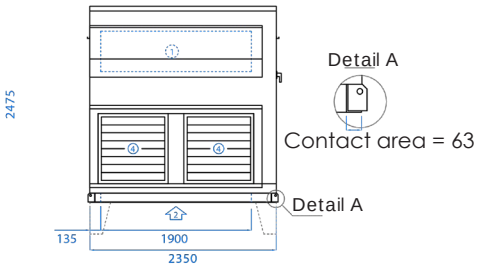
Front view:



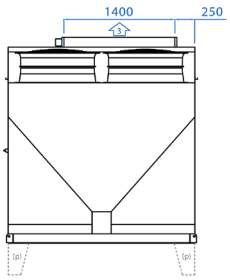
Top view:



Return side view:



Supply air side view :



✱ Minimum distance: 8 m between exhaust and fresh air.

① Fresh air
② Return air
③ Supply air
④ Exhaust air
Ⓐ Access
⚡ Power supply
Ⓒ Technical compartment
- - - Allow at least 400 mm of air space under the machine

	Length	Width (1)	Height
Casing dimensions	6,800 mm	2,354 mm	2,475 mm

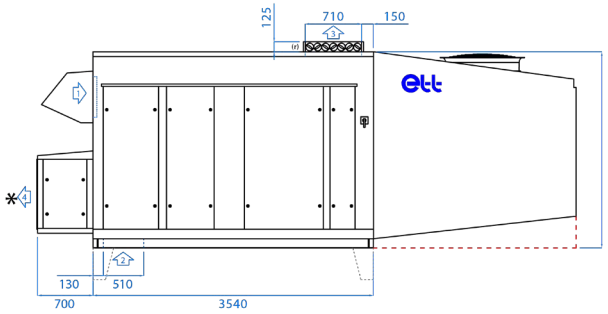
(1) Side return: +125 mm

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

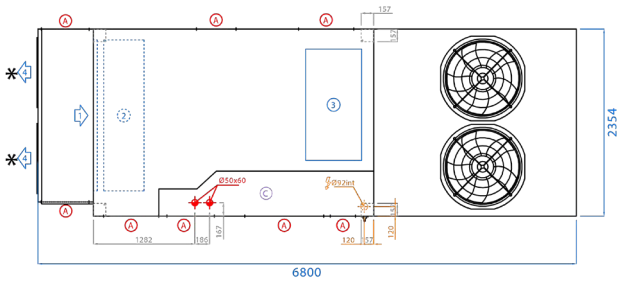
Dimensions and connections

Side SUPPLY AIR

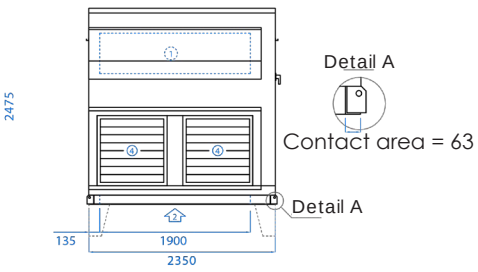
Front view:



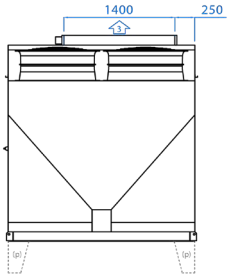
Top view:



Return side view:



Supply air side view :



* Minimum distance: 8 m between exhaust and fresh air.

① Fresh air
② Return air
③ Supply air
④ Exhaust air
Ⓐ Access
⚡ Power supply
Ⓒ Technical compartment
- - - Allow at least 400 mm of air space under the machine

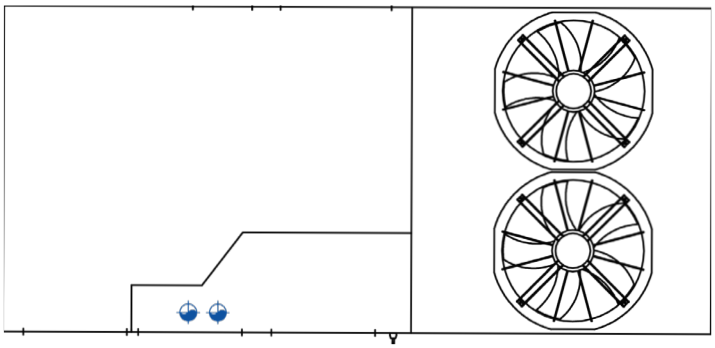
	Length	Width (1)	Height
Casing dimensions	6,800 mm	2,354 mm	2,475 mm

(1) Side return: +125 mm

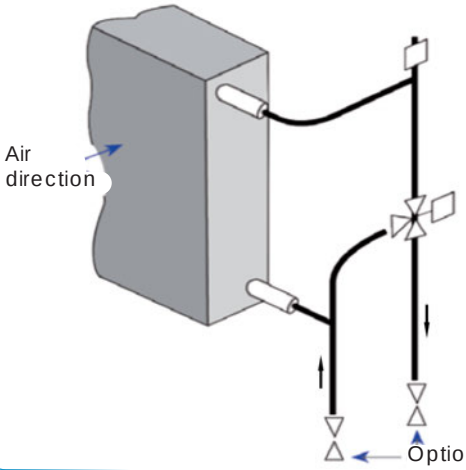
Note: fresh air cowls shall be installed by the installer.

FUNCTIONAL DIAGRAM AND CONNECTION

Top view



Principle



POWER RATINGS

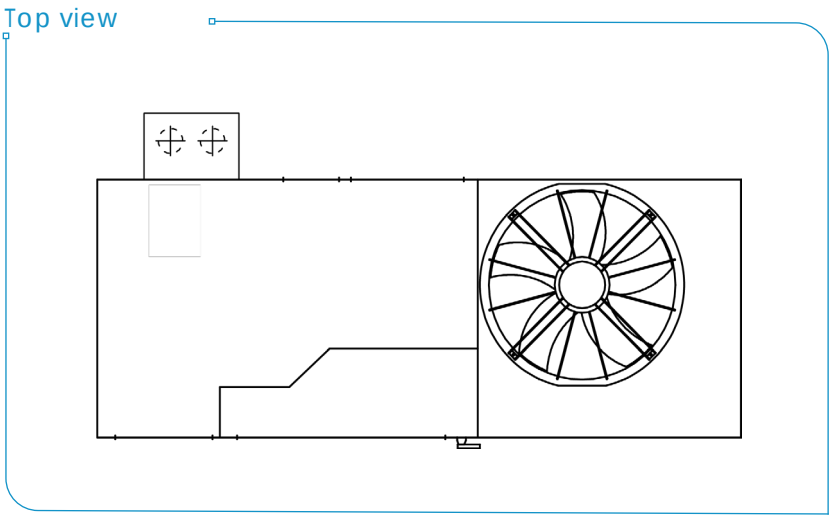
		Unit	130	150	180
Water regime 90/70°C and Exchanger inlet air temperature 10°C	Heating capacity	kW	314.3	356.8	388.9
	Water flow rate	m³/h	14.0	15.9	17.3
	Exchanger pressure drop	mWC	2.4	3.0	3.6
	ΔPexch and 3-WV	mWC	5.1	6.6	7.8
	ΔPexch, 3-WV, VA and VTA	mWC	8.2	10.6	12.5
Water regime 80/60°C and Exchanger inlet air temperature 10°C	Heating capacity	kW	265.5	301.0	327.7
	Water flow rate	m³/h	11.7	13.3	14.5
	Exchanger pressure drop	mWC	1.8	2.2	2.6
	ΔPexch and 3-WV	mWC	3.7	4.7	5.6
	ΔPexch, 3-WV, VA and VTA	mWC	5.9	7.5	8.9
Water regime 90/70°C and Exchanger inlet air temperature 20°C	Heating capacity	kW	267.5	303.3	330.3
	Water flow rate	m³/h	11.8	13.4	14.6
	Exchanger pressure drop	mWC	1.8	2.2	2.6
	ΔPexch and 3-WV	mWC	3.7	4.8	5.7
	ΔPexch, 3-WV, VA and VTA	mWC	6.0	7.7	9.1
Water regime 80/60°C and Exchanger inlet air temperature 20°C	Heating capacity	kW	218.6	247.5	269.2
	Water flow rate	m³/h	9.7	10.9	11.9
	Exchanger pressure drop	mWC	1.2	1.5	1.8
	ΔPexch and 3-WV	mWC	2.5	3.2	3.8
	ΔPexch, 3-WV, VA and VTA	mWC	4.0	5.1	6.1

3-WV: 3-Way valve
VA: Return flow shut-off valve
VTA: TA return control valve, 7/8th opening
Technical data for non-glycol water at nominal air flow rate.

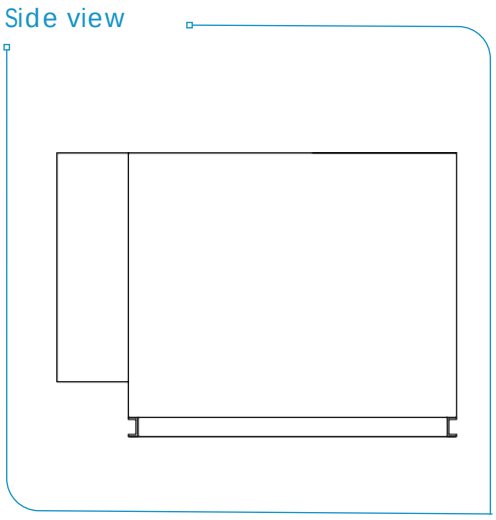
FUNCTIONAL DIAGRAM AND CONNECTION

► Connection opposite the technical compartment.

Top view



Side view



► Connection identical to hot water coil connection.

See functional diagram and connection diagram.

POWER RATINGS

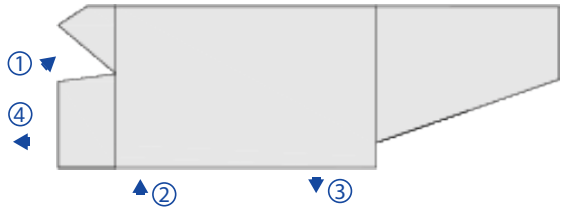
		Unit	130	150	180
Water regime 35/30°C and Exchanger inlet air temperature 10°C	Heating capacity	kW	98.5	111.9	121.9
	Water flow rate	m³/h	17.1	19.4	21.1
	Exchanger pressure drop	mWC	3.9	4.9	5.8
	ΔPexch and 3-WV	mWC	8.1	10.4	12.3
	ΔPexch, 3-WV, VA and VTA	mWC	12.8	16.5	19.5
Water regime 35/30°C and Exchanger inlet air temperature 20°C	Heating capacity	kW	52.0	58.8	63.8
	Water flow rate	m³/h	9.0	10.2	11.1
	Exchanger pressure drop	mWC	1.2	1.5	1.7
	ΔPexch and 3-WV	mWC	2.3	3.0	3.5
	ΔPexch, 3-WV, VA and VTA	mWC	3.6	4.6	5.5

3-WV: 3-Way valve
VA: Return flow shut-off valve
VTA: TA return control valve, 7/8th opening
Technical data for non-glycol water at nominal air flow rate.

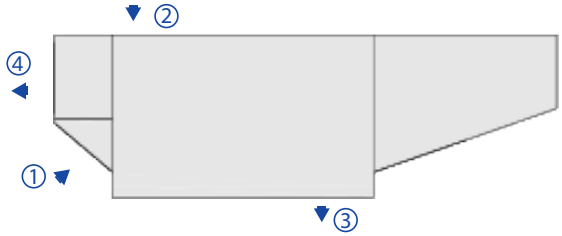
Airflow layouts

SUPPLY AIR *Downwards*

Layout 1.1

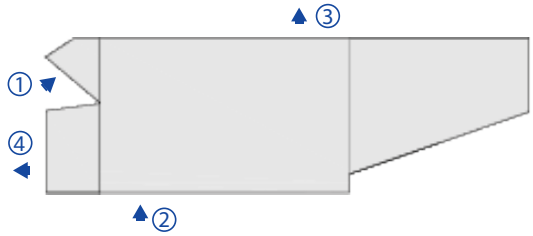


Layout 1.3

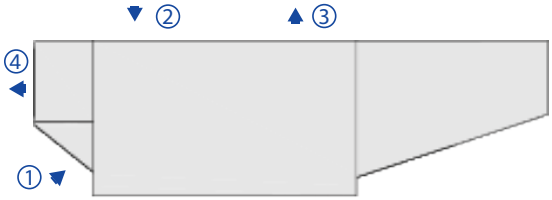


SUPPLY AIR *Upwards*

Layout 2.1

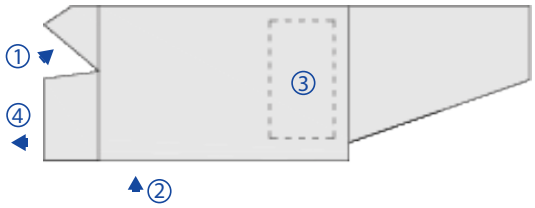


Layout 2.3

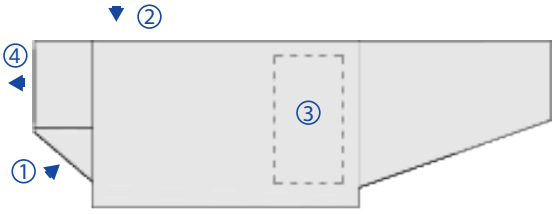


Side SUPPLY AIR

Layout 3.1



Layout 3.3



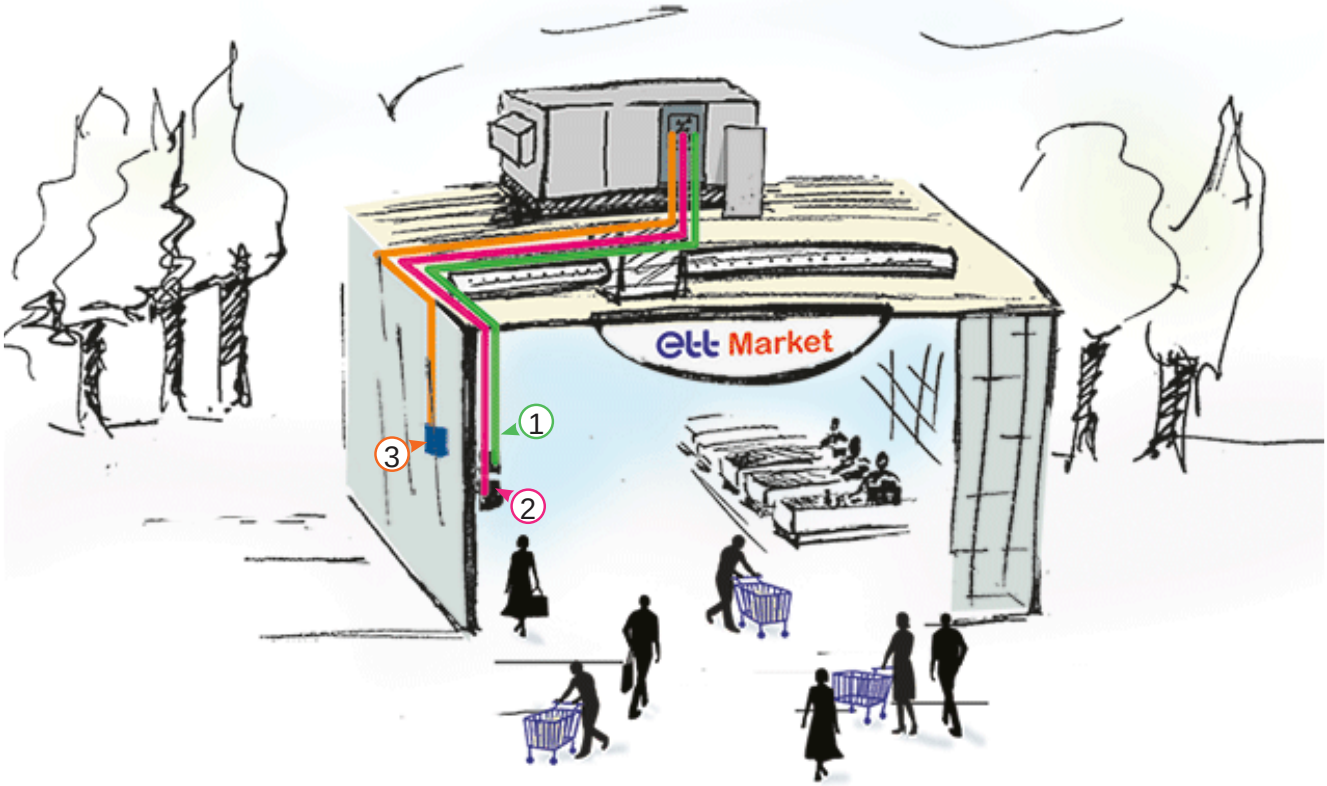
① Fresh air ② Return air ③ Supply air ④ Exhaust air

Weight of options (in kg)

Options	ULTI+ R290 01 EX	ULTI+ R290 11 EX	ULTI+ R290 12 EX	ULTI+ R290 EX 21	ULTI+ R290 22 EX
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
Thermal heat exchangers					
Auxiliary hot water coil or pre-heating, in water	21	35	47	60	76
Auxiliary hot water coil or pre-heating, in water, with 3-WV option	23	37	49	63	79
Auxiliary hot water coil or pre-heating, in water) with 3-WV, VTA, VA option	26	39	53	66	83
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 mm² LIY-CY (max. length. 100 lm)
- 2 **CO_2 sensor:** 2-pair shielded cable, 3 x 0,75 mm² LIY-CY (max. length. 100 lm)
- 3 **Humidity sensor:** shielded twisted pair cable, 5 x 0.75 mm² 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":

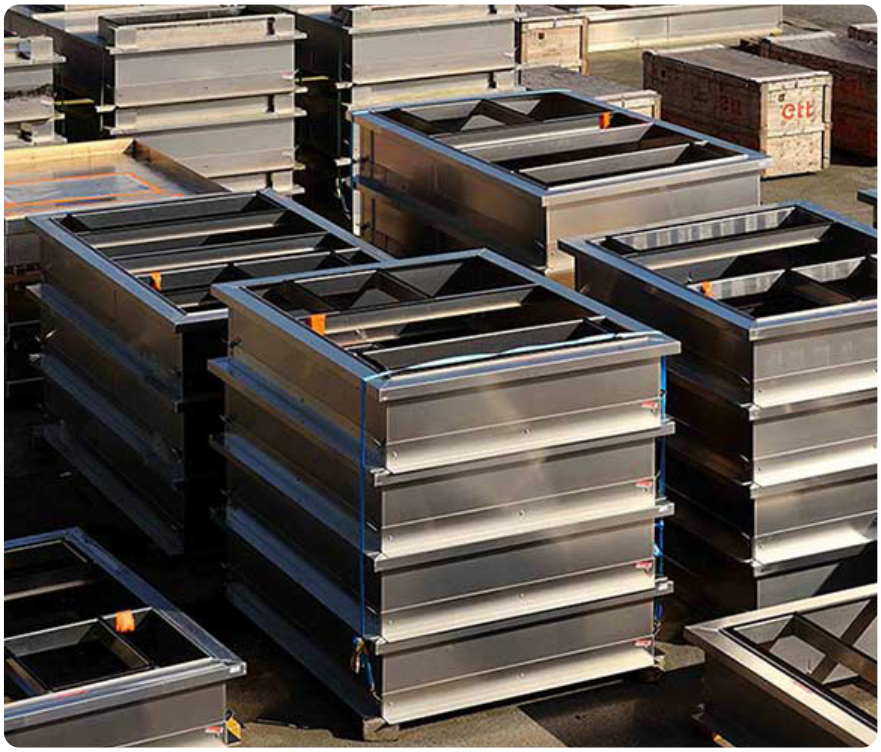
- Ventilated air gap of 200 mm. The machine is bolted on 4 (or 6) legs, with foam gasket sealing applied to the frames of the supply and return air ducts.
- The air gap also provides acoustic insulation, significantly reducing the noise radiated from the underside of the machine.
- The outlets of the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

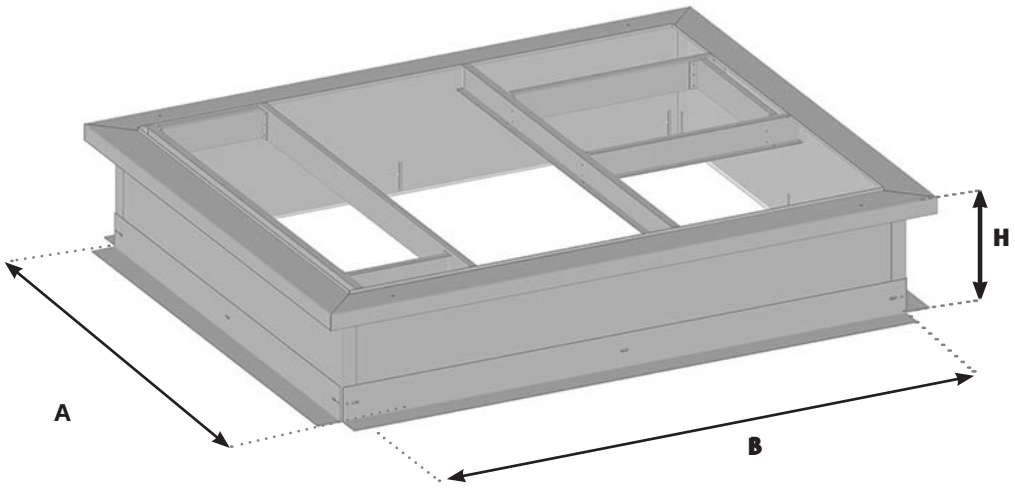
Or existing roof curb

- 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):

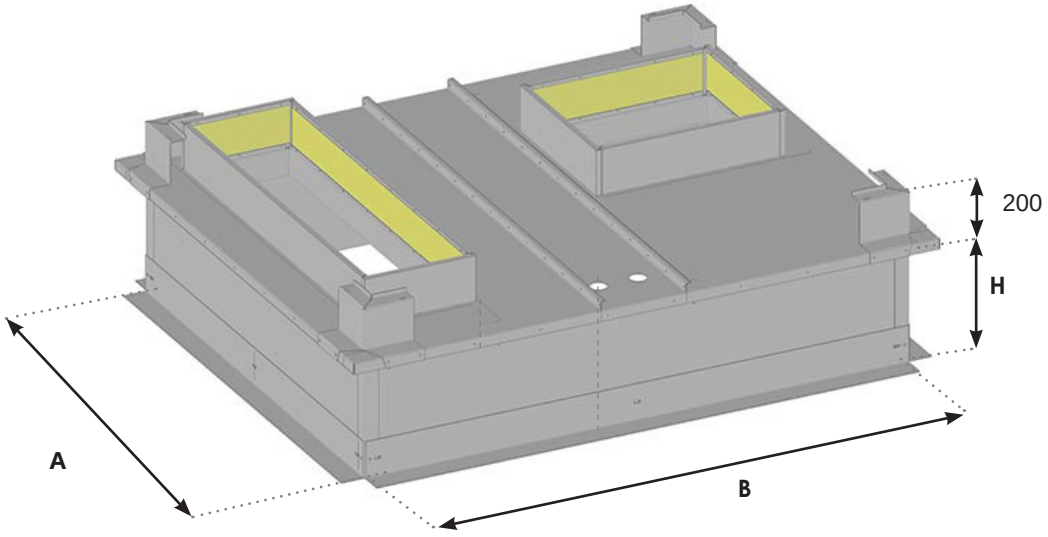
- the value of the slope of your roof in %,
- the direction of the slope
- the orientation of the machine in relation to the slope of the building
- the thickness of the waterproofing complex (insulation + steel deck + membrane)

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 EX	1,320	1,970	550	1,534	2,178	568	5.0	7.5	73
ULTI+ R290 11 EX	1,700	1,970	550	1,914	2,178	563	5.0	5.8	80
ULTI+ R290 12 EX	1,970	2,450	600	2,184	2,658	618	5.0	6.2	104
ULTI+ R290 21 EX	2,220	2,770	600	2,434	2,978	618	5.0	6.2	121
ULTI+ R290 22 EX	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)

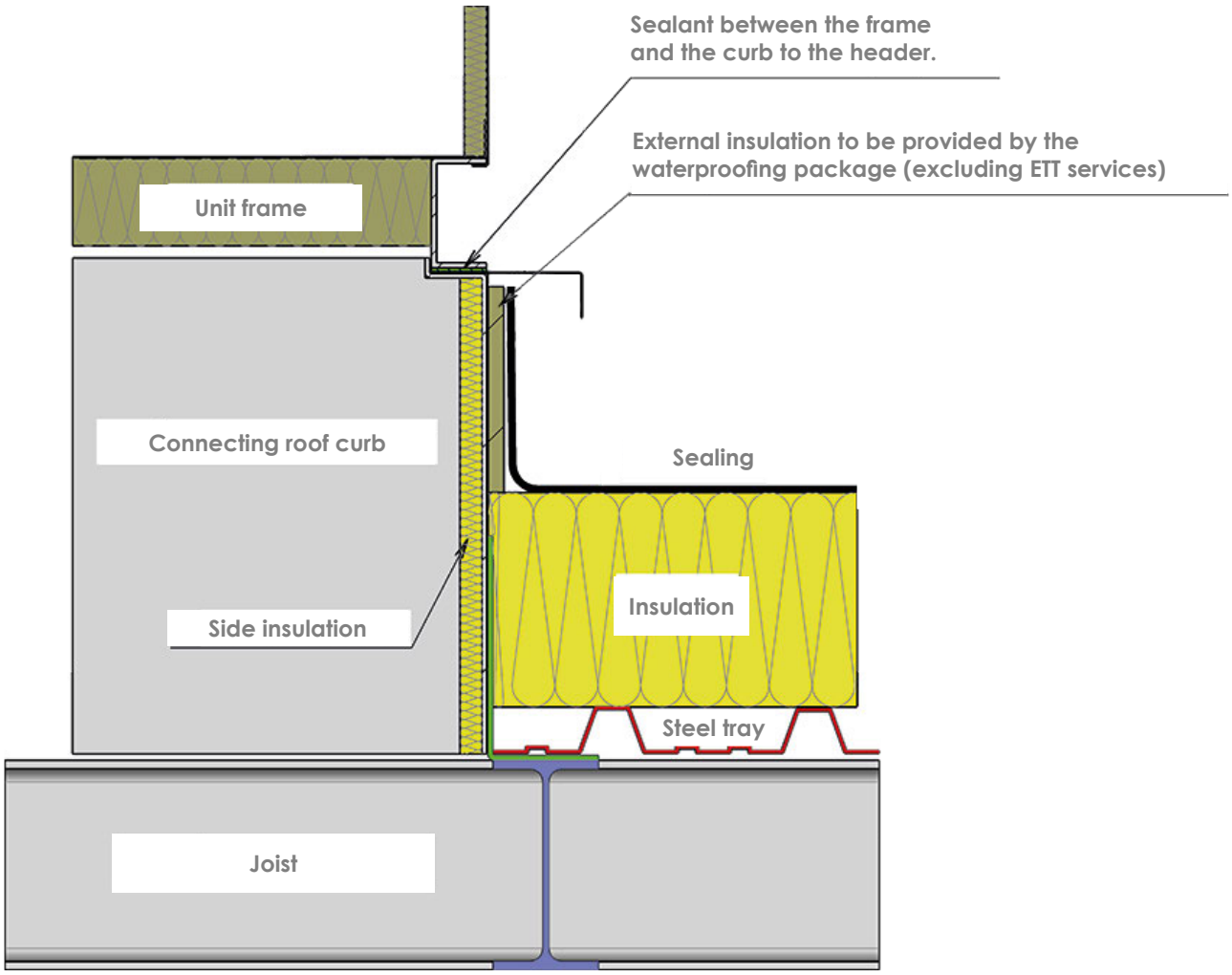
The roof curbs must be counter-drilled after assembly. **The machine must be bolted to the roof curb.**

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 EX	1,320	1,970	550	1,524	2,168	768	5.0	7.5	102
ULTI+ R290 11 EX	1,700	1,970	550	1,904	2,168	763	5.0	5.8	112
ULTI+ R290 12 EX	1,970	2,450	600	2,174	2,648	818	5.0	6.2	146
ULTI+ R290 21 EX	2,220	2,770	600	2,424	2,968	818	5.0	6.2	169
ULTI+ R290 22 EX	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):

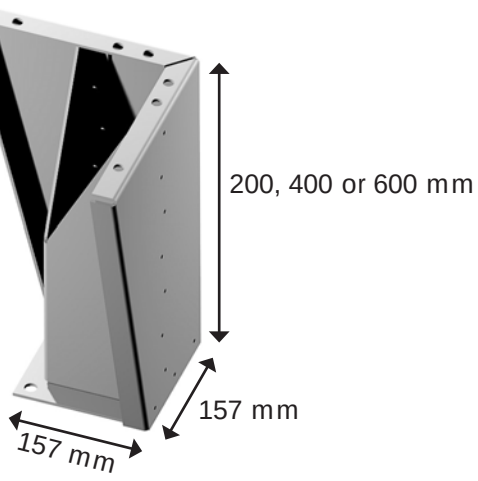


Note: The curbs are designed for a maximum total height of 345 mm of steel tray and insulation.
To maintain a standard curb height (refer to the curb drawing), you need to check that, depending on the slope of the roof on site, the 'insulation and steel tray' height dimension leaves sufficient insulation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

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

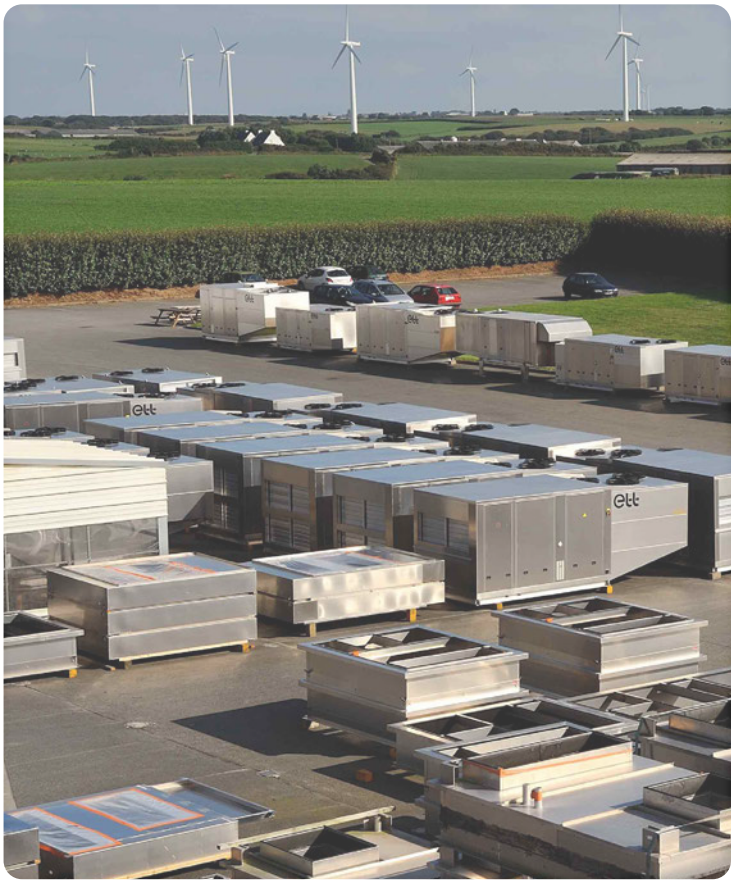
Fixed aluminium foot
Unit weight: 1 kg

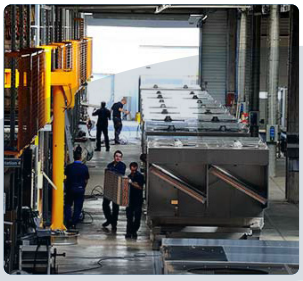


The feet are mounted on the corners of the frame.

	ULTI+ R290 01 EX	ULTI+ R290 11 EX	ULTI+ R290 12 EX	ULTI+ R290 21 EX	ULTI+ R290 22 EX
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_66-EN_B

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