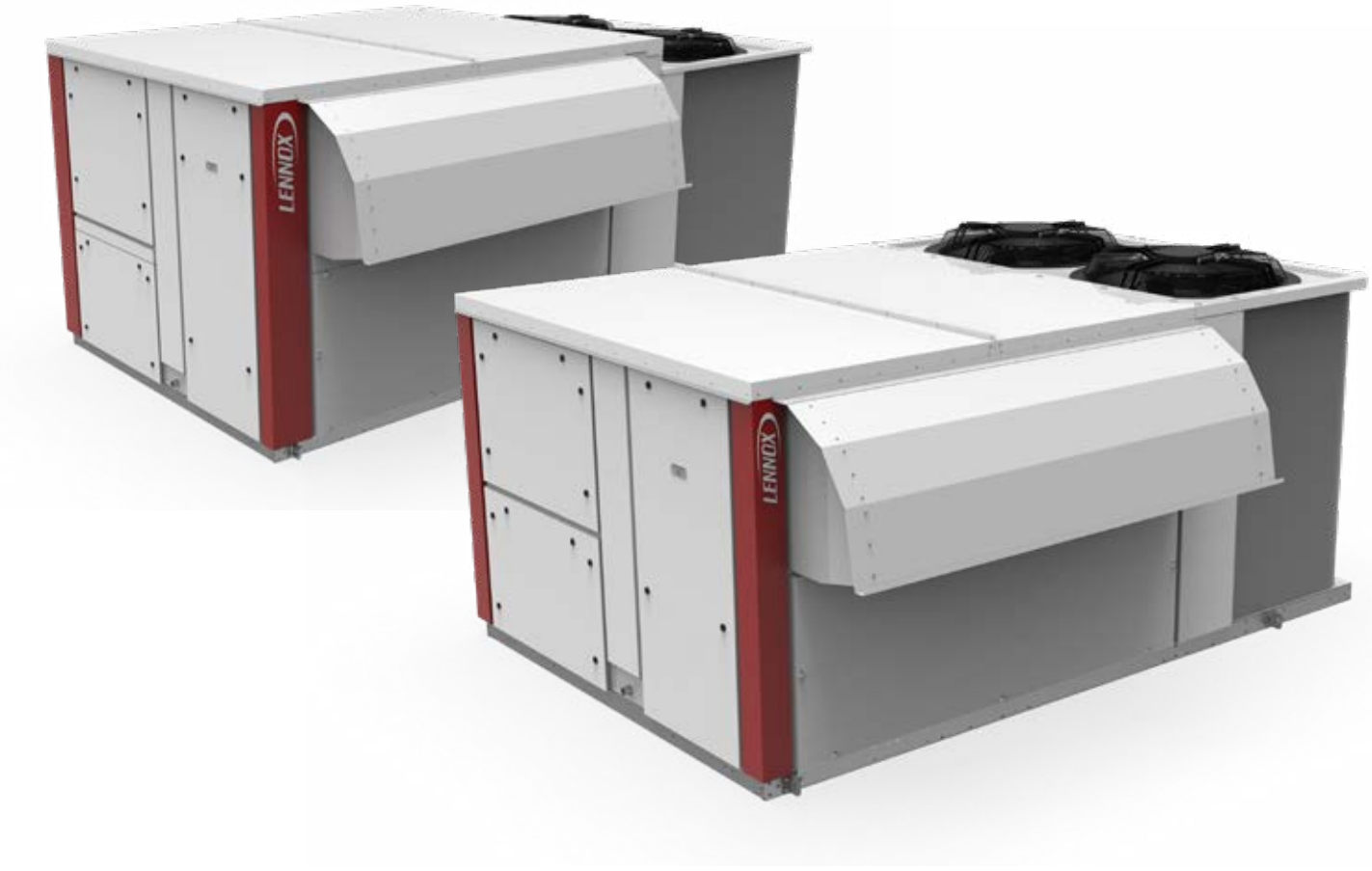
FLEXAIR
FAC - FAH

Air cooled and water cooled rooftop packaged units

Application guide



EUROVENT CERTIFIED PERFORMANCE
www.eurovent-certification.com

LENNOX participates in the ECP programme for RT.
Check ongoing validity of certificate :
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FLEXAIR-AGU-2023.04-EN

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Product designed and manufactured under :

- Quality management system: ISO 9001
- Environmental management system: ISO 14001.
- Occupational health and safety management systems : OHSAS 18001

www.eurovent-certification.com*

www.certiflash.com

Our company's products comply with European standards*

The specifications and technical characteristics in this booklet are given for information purposes. The manufacturer reserves the right to modify them without prior notice or obligation to modify in a similar manner, the equipments previously supplied.

* For out of EEC countries, non CE marked, and non EUROVENT certified units are available on request, please consult us.

THE EXPERIENCE & COMMITMENT OF THE EUROPEAN LEADER TO DRIVE CONTINUOUS ENERGY SAVINGS

Lennox contribution to combat rising energy costs and global warming is to design innovative, efficient and dependable products, while providing best comfort and air quality.

As a major player in the European HVAC market, Lennox is a reference in sustainable development and has been assembling its products in ISO-14001 certified factories since 2007.

Like any other Lennox rooftop unit, the entire Flexair range is Eurovent certified.

ECODESIGN DIRECTIVE 2009/125/EC – ROOFTOP RANGES

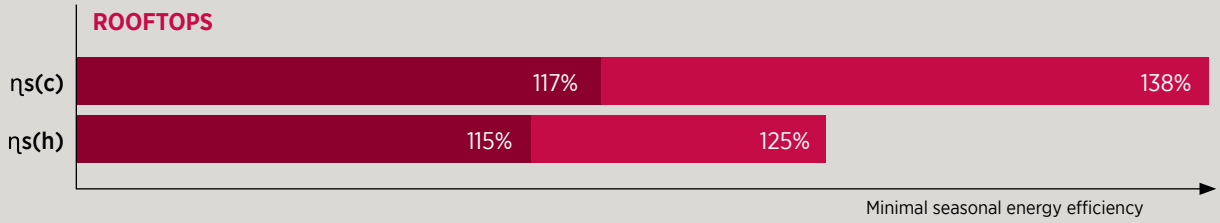
ORIGINS & PERSPECTIVES

- KYOTO (1997), COP21 (Paris 2015) and COP 22 (Marrakech 2016) define the targets to restrict the global warming to 1,5°C.
- EcoDesign directive 2009/125/EC define a framework for all energy-consuming equipment. It is mandatory for all products sold and used in European Union.
- The regulations resulting from EcoDesign define, for each product family, minimum efficiencies to achieve in 2 steps.

Air heating products, cooling products high temperature process chillers and fan coil units EU 2016/2281:

1st tier: 1st July 2018

2nd tier: 1st January 2021



FLEXAIR : THE BEST LIFE CYCLE COST IN THE MARKET

LOW ENERGY CONSUMPTION

35% energy savings with Flexair when compared to a standard rooftop installed on a retail building.

Innovative solutions for long lasting energy savings:

- eDrive Direct transmission variable speed ventilation system
- Advanced refrigeration system with multiscroll R410A compressor assemblies, electronic expansion valves, extended heat exchange surface area, alternate and dynamic defrost cycles.
- Fresh air and free cooling management.
- Optimized operation with eClimatic

BETTER RECYCLING MANAGEMENT

- Unit assembled in an ISO14001 certified facility.
- Refrigerant R410A to reduce refrigerant charge.
- Reduced material usage with compact packaged design.

REDUCED MAINTENANCE COSTS

- Fully factory tested plug and play packaged system.
- eDRIVE direct transmission plug-fan with zero maintenance and airflow measurement with eFlow.
- eClimatic, eClimatic Wizard, unit remote management and supervision through GPRS with e-savvy.

FA(A) C(B) 100(C) D(D) N(E) M(F) 2(G) M(H)

(A) **FA** = FLEXAIR
(B) **C** = Cooling - **H** = Heat pump
(C) Cooling capacity in kW
(D) **S** = 1 circuit - **D** = 2 circuits - **T** = 3 circuits - **F** = 4 circuits
(E) **H** = High heat - **S** = Standard heat - **N** = No heat
(F) **M** = R410A - **H** = HFO - **Z** = No refrigerant
(G) Revision number
(H) **M** = 400V/3/50Hz - **T** = 230V/1/50Hz

KEY FEATURES

- Installation and replacement made easy thanks to the unit's compactness, same footprint and weight than previous models.
- Optimized design and integration of highly efficient components, allowing significant energy savings.
- Flexibility in capacity and airflow rates, ventilation options, energy sources and design (configurations and roof curbs) to best fit your application's needs.
- Low noise level thanks to several sound attenuation options available.

ECODESIGN 2021

HIGHLY EFFICIENCY COMPRESSORS

Tandem scroll compressors allowing capacity modulation.

EC FANS

Variable speed EC axial fans with swept blades for improved efficiency.

HEAT RECOVERY

Heat recovery wheel and eRecovery systems available.

GENERAL FEATURES

FLEXAIR range constitutes a packaged solution, easy to deliver and quick to install on the roof.
Operating range shall be between 46°C and minus 15°C with 4 versions : cooling, heating, cooling with gas burner or dual heat (heating with gas burner). All units are factory assembled, internally wired, fully charged with refrigerant, and 100% run-tested before leaving the factory.

EC FANS TECHNOLOGY

FLEXAIR units are fitted with EC fans as standard, the variable speed will save energy and reduce maintenance costs.

HIGH INDOOR AIR QUALITY

Filtration
FLEXAIR offers different filtration levels, ensuring the minimum pressure drop.
The unit is fitted with EU3 filters as standard, but it can be configured with :

- G4 filters
- G4+F7-ePM1 filter option / efficiency > 85% / 0,4 µm particles

Free cooling
Some times the thermodynamic cooling can be replaced by free cooling by introducing cold outside air into the building.
FLEXAIR saves energy with automatic calibration of fresh air :

- Intelligent Fresh Air Management (patent 03 50616)
- Motorised fresh air damper with enthalpy control (option)
- CO_2 sensor to adjust the percentage of fresh air to the Indoor Air Quality (option)

eClimatic ADVANCED CONTROLLER

eClimatic is the new generation controller that improves efficiency and helps set up and service operations to guarantees long lasting performance

HEAT RECOVERY SOLUTIONS

FLEXAIR range includes a heat recovery wheel to recovery energy from the extraction air
This heat recovery wheel is fitted in a separated module to be installed on site

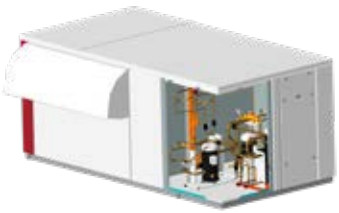
CASING

FLEXAIR air treatment section is built with precoated aluminium panels painted in RAL 9003 colour, specially designed for corrosion resistance and to ensure long operation life time.
Double skin panels are optional.
Condensing section mounted in a rigid base frame to ensure good support for compressors and giving rigidity to the complete structure.

ADVANCED REFRIGERANT CIRCUIT

FLEXAIR presents the most advanced design in the refrigerant pipes, optimizing pipe length and at the same time giving the best access for service and maintenance operations.
The exchangers have been specially designed by Lennox for R410A operation, this copper tube and aluminum fins exchangers have been tested to give the best heat transfer and the best energy ratios.
The refrigeration circuit is responsible for up to 40% of the annual energy consumption of a typical packaged air conditioning unit.

FLEXAIR features high efficiency, environmentally friendly refrigeration circuits with multiscroll R410A compressors, electronic expansion valves and optimized heat exchange surface area.



WATER HEAT EXCHANGER

- Mono or dual circuit plate heat exchanger
- Copper brazed Stainless steel plate heat exchanger.
- 13 mm thermal insulation foam.
- Located in a technical cabinet protecting the insulation against climatic conditions (UV light, rain).
- Anti-freeze protection (down to -20°C) with resistance heaters on the plate exchanger.

KIT FOR GROOVE LOCK COUPLING

The chilled water connections of the condensers are Victaulic type.

SAVING ENERGY WITH ADVANCED REFRIGERATION CIRCUIT DESIGN

R410A REFRIGERANT

Efficient systems such as **FLEXAIR** are designed around R410A refrigerant to achieve the best performances.

- Energy efficient refrigerant thanks with pressure drop in the pipes: Higher evaporating pressure and lower condensing pressure improve compressor EER & COP.
- R410A compressors have a better isentropic efficiency.
- Environmentally friendly refrigerant:
  It contains No Chlorine (ODP =0). Significant refrigerant charge reduction (-40%) that limits the global warming potential of the system.
  R410A optimized heat exchangers use less material (copper, aluminum ...)

MULTISCROLL COMPRESSOR TECHNOLOGY

FLEXAIR units are provided with tandem compressors, to profit from the multiscroll compressor technology and giving the highest seasonal performance and the best SEER coefficients.

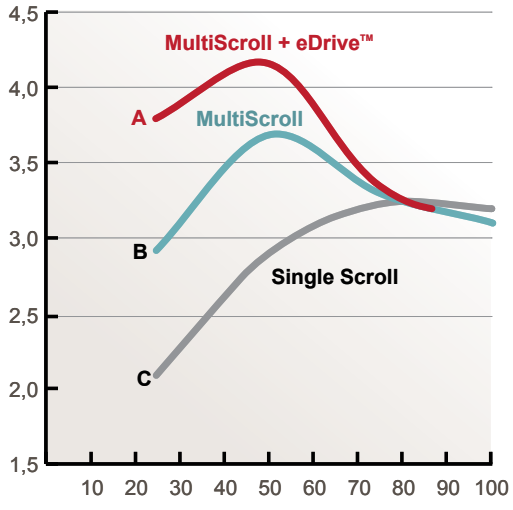
HIGH EFFICIENCY MULTISCROLL TECHNOLOGY

Air conditioning equipments are sized to cover the need for the most critical weather conditions which most likely will occur only a few days or even a few hours during the year.

Most of the time, the external temperature drops below the reference value and consequently systems usually run 96% of the time at part load. It is therefore important to design system around part load performance to achieve the lowest possible annual energy consumption.

FLEXAIR provides high efficiency and best possible part load efficiencies year round with high efficiency multiscroll R410A compressor technology.

Evolution of the net EER with varying capacity load



A Multiscroll + eDrive

B Multiscroll

C Single scroll

Source: PERSAPAC Study by Cetiat, Eurovent, Armine & EDF
Lennox Europe Laboratory comparative testing on rooftops

ELECTRONIC EXPANSION VALVES

The new electronic expansion valves are directly driven by the eClimatic and optimize the performances in both cooling and heating mode and provide reliable and accurate operation in all conditions all year round.
This model of electronic expansion valves ensures also smooth and precise control at low capacities for improved part load performances.

EC FANS IN SUPPLY AND EXTRACTION

EC fan technology offers the maximum efficiency together with the minimum power consumption. That is the reason why **FLEXAIR** is equipped with EC fans both in indoor and exhaust section.

FLEXAIR will adapt the fan pressure to any building's need, and will provide high pressure available in the duct even when all the options have been selected.

The EC plug-fan technology allows:

- Adapting airflow at commissioning
- Varying airflow during unit operation providing progressive inflation of smooth /textile ductworks
- Easy maintenance operations, as there is not pulleys and belts regulation

eClimatic profits about this EC technology by:

- Monitoring the airflow in the service terminal
- Compensating the airflow if the filters are dirty
- Regulating the airflow to arrive to the desired set point temperature.

Optimize the air-flow to the load demand (reduce consumption when possible)

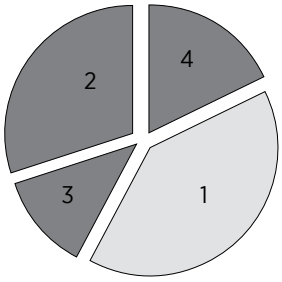
Condensing section mounted in a rigid base frame to ensure good support for compressors and giving rigidity to the complete structure.

eDRIVE VENTILATION

eDRIVE is a standard technology of LENNOX **FLEXAIR** units.
The variable speed drive allows significant energy savings and direct transmission reduces the maintenance costs.

SAVING ENERGY WITH eDRIVE VARIABLE SPEED, DIRECT DRIVE FAN.

In a rooftop unit, the blower fan motor is one of the major contributors to annual energy consumption. Fans usually run 97% of the year at full speed to circulate the air inside the building. 42% of the annual energy consumption of an air conditioning unit results from the fan motor, which can be higher than compressors one.



1	Annual compressor consumption	40 %
2	Annual consumption of other electical systems	18 %
3	Remaining annual fan motor consumption	12 %
4	Energy savings thanks to eDRIVE	30 %

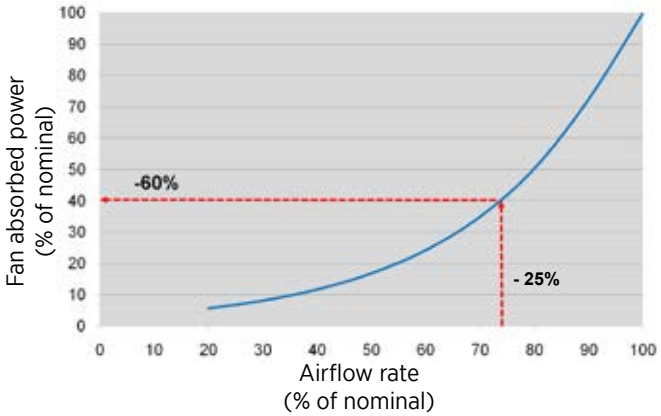
VARIABLE SPEED DRIVE

Airflow reduction during part load operation and dead zone can help save on energy consumption.

There is no need to reduce airflow rate too much to achieve important energy savings: For example reducing airflow rate by only 25% will save 60% on the fan motor energy usage.

- **FLEXAIR** integrates the new eDRIVE which automatically adjust airflow rate to the needs, saving up to 30% annual rooftop energy consumption.
- Airflow Rate can be easily adjusted to the exact needs, thanks to eFlow the airflow measurement and display system.
- eDRIVE will correct power factor to reduce current.
- eDRIVE integrates soft starter feature as standard, that will reduce inrush current during fan starts and makes the unit fully compatible with flexible ducts air diffusion systems.

Fan absorbed power with variable airflow rate



eCLIMATIC NEW CONTROL

Our **FLEXAIR** range includes our New e-climatic control generation.The main features of this control are :

- Plastic cover to protect the circuit board from water entry and humidity and with all the different connection terminals correctly identified.
- Two independent buses, one for display and sensors connection and another one for internal components.
- Possibility of storing all parameterized conditions before an alarm is produced.
- Stronger hardware thanks to the plastic cover which protects the circuit board from water entry and humidity (and at the same time clearly identify all the different connection terminals)
- More reliable hardware thanks to the different communication buses for internal/main devices (compressors, fans, etc.) and for the remote/accessory ones (display, probes), which preserve the regular unit operation even in case of commissioning miswirings
- Enhanced ClimaticTM regulation thanks to the better embedded processor and to the new Universal I/O chip, which allows to match better contacts, probes and relays to the controller board.
- Internal log memory to record unit operating trends (e.g. temperatures before alarm occurrence).

OPTIMIZED OPERATION AND SETUP SAVES ENERGY

eClimatic is designed to provide the best efficiency throughout unit's lifecycle while ensuring reliable and consistent operation with user-friendly interfaces .This controller monitories more machine parameters than ever to improve energy efficiency and reliability

1 Indoor air temperature (humidity and CO2 levels as an option)

2 Outdoor air temperature (outdoor humidity as an option)

3 Return and supply air temperature

4 Filter pressure drop

5 Airflow rate with eFlow

6 Refrigerant pressures, temperatures & compressor monitoring

7 Power energy metering (option)

THREE DIFFERENT PLATFORMS ARE AVAILABLE :

- **DC End customer display** : with basic configurations, set points, main temperature readings and alarms.
- **DM Multiple display** : graphic customer display with basic configuration of the end customer display plus schedule programming and set of fresh air %.
- **DS Service display** : Specially focused to maintenance aspect

REFRIGERATION CIRCUIT EFFICIENCY MANAGEMENT

Climatic control regulation

The Climatic controls the blowing air temperature to achieve the customer comfort in the most efficient way, matching perfectly the cooling/heating load with the optimum unit capacity staging (multiscroll compressors, heat recovery modules, freecooling, gas burners, water coils, etc.).

The unit reliability is ensured by a complete set of protections as compressor envelop control, air-flow and pressure drops check, advanced refrigerant leakage detection, compressor anti short cycling rules.

All these features are designed to optimize the unit performance, but at the same time to increase its life-time and make easier its maintenance.

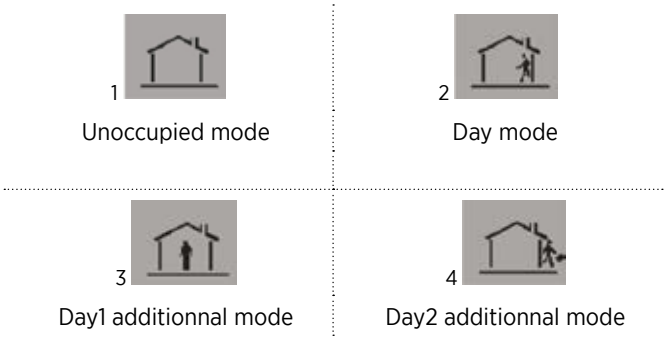
DYNAMIC DEFROST:
It is a standard feature of all Lennox heat pumps. It limits in winter the number and the duration of the defrost cycles to maximize COP. With a smart and proprietary frost-detection system, the lennox rooftops automatically optimize the number and the duration of the defrost cycles to get the best units performances in every environmental conditions.

FREE COOLING:
It is one of the most important features of this rooftop as it maximize seasonal efficiency by reducing the use of thermodynamic cooling in mid season.

INTELLIGENT FRESH AIR MANAGEMENT:
With accurate percentage of fresh air the dampers are regularly calibrated to introduce just the required amount of fresh air in the building to reduce annual energy consumption. The fresh air ratio can also be controlled using the indoor CO2 level as an input.

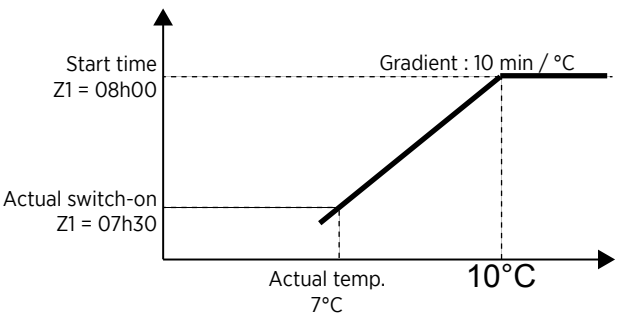
INTELLIGENT HEATING PRIORITY OPTIMIZATION:
This unique feature on the market, allows the user to program the priority between the different heating elements (thermodynamic, electric pre-heaters or auxiliary heating). This is particularly interesting on dual fuel units or units with electrical pre-heaters. This feature maximizes energy efficiency by optimizing heat pump operation depending on the outdoor temperature.

FULL SCHEDULING
Impressive energy savings can be done with a proper time-scheduling that optimizes the unit operation to the different load scenarios of each installation.
For that reason the Climatic offers a weekly-based calendar with up to 7 time-bands per day and 4 pre-set modes (Unoccupied, Day, Day 1, Day 2).
For each of this pre-set modes, plenty of unit settings can be optimized to the different moments of the day, for example during the un-occupancy periods the comfort setpoints could be relaxed, during the energy-cost peaks hours the hot water coils or gas burners could be preferred to compressor or electrical heaters, fresh-air introduction can be reduced to warm-up the building before customer arrival, etc.



MORNING ANTICIPATION AND DYNAMIC SET POINT
The unit can be programmed to switch-on in the morning to reach the occupied zone temperature set point just in time.
The rooftop will start heating the building at a different time in the morning depending on the outdoor temperature: The lower the outdoor temperature, the earlier the rooftop would start to ensure that the set point is reached by the time the first occupied zone (Z1) is starting. This is to avoid early start when outdoor temperature is mild.
Example for a unit programmed to anticipate morning switch-on if outdoor temperature is below 10°C at a rate of 10 minutes/°C.

Dynamic set point can be used in summer to offset the ambient temperature set point according to the outdoor temperature. This is to avoid large temperature difference between indoor and outdoor. The indoor temperature set point would then increase with the outdoor temperature improving comfort and saving large amount of energy.



COMMUNICATION AND UNIT INTERLINK

Master/slave or cascade control is a standard feature of the **FLEXAIR** units. It can be used to connect up to 24 rooftops. The units can then be programmed to optimize efficiency and improve reliability following 6 different strategies

MULTI ROOFTOPS REGULATION

In case of multi-rooftop installations, The Climatic control of each unit can improve the unit synergies and optimize the total air-conditioning performance, without any additional cost or external dedicated "Building Manager System", but just linking the units together (up to 8) in the same network and applyng any of the following smart strategies :

1: Master Slave "total":
The master gives the ventilation order, its set point and its room temperature/humidity/CO2 to all other rooftops.

2: Master Slave "temperature":
The master gives the ventilation order and its room temperature/humidity/CO2 to all other rooftops, but they have their own set point.

3: Master Slave "average":
The master gives the ventilation order and the room temperature/humidity/CO2 used by all rooftop is the average of all rooftop, each rooftop has its own set point.

4: Master Slave "cooling/heating":
All rooftop are stand-alone but the slaves have to have the same running mode as the master (Cooling or heating).

5: Master Slave “Back-up”:
One rooftop is the back-up unit and will operate if any of the other rooftops is stopped due to a major problem.

6: Rolling Back-up mode:
Same as above, except the "back-up" unit will change once a week on Tuesday.

Note that, the outside temperature/humidity/CO2 given to all rooftops can either be the average of all unit connected or the external humidity/temperature of the master, allowing the use of a single "weather station" for the whole site.

FAULTS AND ALARMS

eCLIMATIC manages more than 90 different faults and alarms codes and can store the last 32 with time and date. The stored faults and alarms can then be displayed on the DS service display and on the communication bus with the full text detail.

CONSTRUCTION, INSTALLATION AND SERVICE

UNIT CONSTRUCTION

FLEXAIR by Lennox is assembled with the highest standards of quality.

FLEXAIR units comply with the PED 2014/68/UE directive and EN 60204 standard.

This construction guarantees high corrosion resistance and lower the weight impact, also ensuring that the air leakages are reduced to the minimum. To improve the resistance to anticorrosion, the panels are pre-painted in RAL 9003.

TRANSPORT AND HANDLING

To facilitate handling of the unit and minimize the risk of damage, **FLEXAIR** units are provided with lifting lugs located in the base frame of the unit.

For transport and handling, the units are wrapped in a retractable plastic protection

PLUG AND PLAY UNIT

All options are factory installed on the unit, which means that they are ready for use, optimizing the time spent on site for the installation.
Bottom entry (through the base) for electrical power and hot water (if option fitted) lines are available as standard.
To make installation easier, **FLEXAIR** power supply does not require "neutral" connection. It is powered by 400 V, 3 phases, 50 Hz.

CIRCUIT BREAKERS

To improve safety and extend life time, circuit breakers protect against over-loading, over current and a disconnected supply phase. Maintenance is also improved as there is no requirement to change fuses. The electrical panel is manufactured in accordance with EN60204 electrical directive.

NUMBERED WIRES

All wires and connectors are numbered as shown on the electrical drawing to facilitate maintenance and diagnostic

MAIN DISCONNECT SWITCH

The main switch is used as an emergency cut off.
It is mandatory to guarantee a proper accessibility to this switch. Specific footbridges must be installed if the machine environment is requiring it.
Main disconnect switch is lockable to increase safety around the rooftop unit.
Switching off the unit with the disconnect switch will reset all.
Disconnect switch will be sized accordingly to the options picked with the unit.

EASY ACCESS TO THE UNIT COMPONENTS

In **FLEXAIR** we keep the accessibility of all the components to the indoor unit, as well as all the internal refrigerant components

INDOOR AIR QUALITY

BUILDING AIR QUALITY

According to the EN 13779 the filtration level should be in accordance with the application and the environment.

The outdoor air is categorized in 3 levels, from ODA 1 where the air is pure except for temporary pollution such as pollen, up to ODA 3 with high concentrations of both gases and particles.
The indoor air is also categorized in 4 levels (IDA1 is not applicable for rooftop ranges).

For rooftop applications :

IDA2: Offices, University, Retirement houses, Hotel lobbies, Museums, Pools

IDA3: Commercial buildings, cinemas, Theatres, Restaurants, Bars, Sport halls...

IDA4: Low Air Quality such as Industrial Buildings

		Indoor air quality		
		IDA2	**IDA3**	**IDA4**
		Medium	Moderate	Low
		CO_2 (ppm)		
		400-600	600-1000	> 1000
		Rate of outdoor air (m^3/h/person) Non-smoking area		
		36-54	22-36	< 22
Outdoor air quality	**ODA1**	F8	F7	M5
	ODA2	M6/F8	M5/F7	M5/M6
	ODA3	F7/GF*/F9	M5/F7	M5/M6

* GF = Gas filter

FILTERS

As standard the unit comes with EU3 filters We can increase the capacity of fi ltration with an option of G4 and an option of G4+ F7-ePM1, to arrive offering an average arrestance of synthetic dust above 90% (according to EN779:2012/ISO16890).

DOUBLE SKIN PANEL (OPTION)

Indoor unit of **FLEXAIR** may be provided by a double skin panel (option), to avoid the carrying of insulation particles inside the building (25 mm of thickness).

EC FANS VENTILATION SYSTEM

FLEXAIR is fitted with EC fans as standard, ensuring that no belt particles can be carried away into building .This ventilation system is compliant with EN 13977 air quality norm.

ANALOGUE FILTER DETECTION

Thanks to this sensor, the filter presence and the proper fan operation is ensured by a pressure drop above the minimum threshold, and at the same time the filter dirtyness is identified by a pressure drop above the maximum threshold.

REMOVABLE ALUMINIUM DRAIN PAN

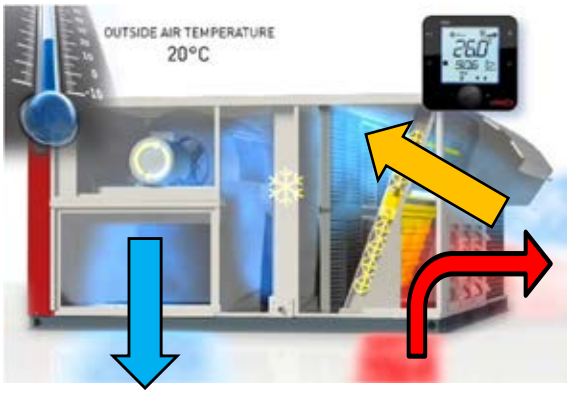
All units are equipped with a sloped removable drain pan in aluminum which can be removed for maintenance, preventing the growth of bacteria and algae in the drain pan.

FRESH AIR AND FREE COOLING SYSTEM

Freecooling system is a standard feature for all Lennox rooftops, with a two sections damper made in aluminum, and connected with a proportional servomotor commanded by the control e-CLIMATIC.

New buildings that comply with EPBD will have good thermal insulation with high internal loads and will require cooling even when outdoor temperatures are low. Managing fresh air is mandatory in a building to control CO2 level and comfort.

Fresh air management and Free Cooling are standard features of **FLEXAIR** that can reduce annual energy consumption.

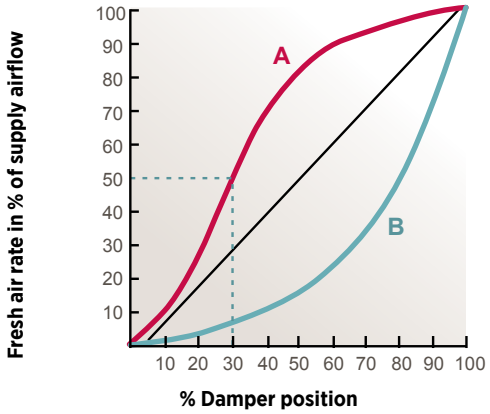


SAVING ENERGY WITH FRESH AIR & FREE COOLING

- Thermodynamic cooling can be replaced by Free Cooling when outdoor temperature is below the building set point saving up to 15% on annual energy consumption.
- Introducing just the required amount of Fresh Air in a building can reduce energy consumption.

Because a fresh air damper curve is not linear, it is not accurate to assume that the percentage of opening of the damper is equal to the percentage of fresh air entering the building. However, this linear control of a damper is by far the most used in the industry.

With Indoor air quality and running cost of a building being more important to our customer, **FLEXAIR** can manage the percentage of fresh air more accurately.



Curve A : ΔP return ducts > Fresh air: Too much fresh air

Curve B : ΔP return ducts < Fresh air: Not enough fresh air

If the pressure drop in return air duct is high, the amount of fresh air actually introduced in the building can be higher than required. This extra fresh air will have to be cooled in summer and heated in winter, increasing energy consumption of the system.

FLEXAIR will periodically recalibrates fresh air dampers to ensure just the required amount of fresh air is introduced in the building. This recalibration is achieved using the return air, outdoor air and supply air sensors.

AUXILIARY HEATING OPTIONS

HOT WATER COILS

A water coil made of copper pipe and aluminum fins can be installed to answer heating requirements. This water coil can, for example, be connected to a boiler or a heat pump. Two sizes of water coils are proposed to cope with the cooling and heating requirements. The water coil is equipped with a 3-way valve.
To check the different capacities of the water coils, please refer to the section "Heating auxiliary performances" of this application guide.
The hot water coil are protected from freezing by the Climatic, through low environment protections based on low supply and external temperatures, which activates safety procedures Icve pump starts, valve opening or return air damper opening.

ELECTRIC HEATER

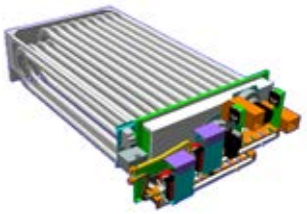
The auxiliary electric heater is made of shielded resistance heaters, which are smooth 6 W/cm2 resistances. The heater is protected against high temperature with a thermal overload protection set at 90°C 150mm after the heating elements.
For any rooftop unit size, two sizes of electric heater are available as option, S (standard) and H (high).

F Box: 85 to 120 Kw
- Standard heat : 30 kW, 2 stages
- Medium heat : 54 kW, fully modulating (Triac)
- High heat : 72 kW, fully modulating (Triac)

G Box: 150 and 170 kW
- Standard heat : 45 kW, 2 stages
- Medium heat : 72 kW, fully modulating (Triac)
- High heat : 108 kW, fully modulating (Triac)

H Box: 200 and 230 kW
- Standard heat : 72 kW, 2 stages
- Medium heat : 108 kW, fully modulating (Triac)
- High heat : 162 kW, fully modulating (Triac)

GAS BURNER



FLEXAIR units are fitted with a gas burner. It is a safe and reliable atmospheric gas burner made of aluminized steel tube heat exchanger designed to offer maximum heat transfer and 92% efficiency (PCI%).
It runs with natural gas 20 mbar and an operating range of 13-26 mbar.

The standard gas module offers 2 stages of control which helps in improving space comfort by avoiding large supply air temperature deviations.

If required, an expansion device can be provided with the unit allowing it to operate with gas pressures of up to 300 mbar.

Gas fired rooftop cannot be installed inside a technical room.

F Box: 85 to 120 Kw
- Standard heat (2 stages): 60 kW
- High heat (4 stages): 120 kW

G Box: 150 and 170 kW
- Standard heat (2 stages): 120 kW
- High heat (4 stages): 180 kW

H Box: 200 and 230 kW
- Standard heat (2 stages) : 180 kW
- High heat (4 stages): 240 kW

HEAT RECOVERY OPTIONS

FLEXAIR RECOVERY ON EXHAUST AIR (HEAT RECOVERY WHEEL)

To match Lennox commitment to a greener planet and to generate energy savings, by Lennox can be equipped with one system to recover energy from the extraction air.

Ideal for climates in which the difference between the outdoor temperature and the extraction air temperature is high. This new hybrid rotary wheel will generate very high sensible but also latent transfer.

Fresh air and return air are protected with G4 filter.

FILTRATION OPTIONS

FLEXAIR offer several different levels of filtration that will allow coping with every application and any level of filtration demanded in the installation.

As standard the unit comes with EU3 filters

FILTERS EFFICIENCY CORRESPONDANCE

Standards correspondance EN779:2012/ISO16890

		ISO16890		
	Class	ePM1	ePM2,5	ePM10
EN779:2012	M5	< 20%	< 40%	> 50%
	M6	< 40%	50-60%	> 60%
	F7	50-75%	> 70%	> 80%
	F8	70-85%	> 80%	> 90%
	F9	> 85%	> 90%	> 95%

Not compliant to minimum 50% efficiency

Compliant to minimum 50% efficiency

Exceed the minimum efficiency

FLEXAIR options :

- G4 with 50 mm depth metallic frame
- G4 with 50 mm depth metallic frame with replaceable media
- F7-ePM1 with 100 mm depth.

With the new 100 mm F7 filter, the pressure drop is reduced by up to 50% compared to the previous 50 mm version. Lower pressure drop gives more available pressure for the customer and lower fan running costs. It also takes 4 times longer to get plugged with dirt reducing maintenance costs.

ELECTRICAL OPTIONS

ENTHALPY CONTROL AND CO2 SENSOR

This option includes combined temperature and humidity sensors, to ensure that the economizer does not use 100% fresh air if the outside air has a higher enthalpy than the return air.

The CO2 sensor A VOC (Volatile Organic Component) detects the amount of CO2 in the ambient air between 0 and 2000PPM. (This obviously varies depending upon space occupancy levels). The VOC sensor sends a proportional signal (0-20mA) to the controller which will modulate the fresh air.

This option is highly recomended in commercial installations like restaurants, shops, etc., where the CO2 level strongly varies during the day (e.g. depending on the people occupancy). In these installations in fact the energy savings coming from the correct air-renewal air-flow management (depending on CO2 level) can definitively pay back this sensor cost in a very short time.

ENERGY METER

The **FLEXAIR** meter option is a device that measures and displays the following parameters :

- Average, total and maximum current, voltage and frequency for each phase.
- Active & reactive power.
- Power factor (Cosφ).
- Total active & reactive **FLEXAIR** consumption in Wh.

Values for **FLEXAIR**, current and absorbed power can be reset with password.
Some of these data will be collected by the controller and made available in the BMS tables for Modbus, BACnet and Trend protocols.

3 PHASE CONTROL

This phase control device offers the guarantee of the correct phase connection, together with an overvoltage and under voltage protection.

FIRE DETECTOR

It is a thermostat that provides a signal to switch off the unit, close the fresh air damper and open the return damper when the temperature in the return air stream is above an adjustable set point (Factory setting: 70°C).

SMOKE DETECTOR

Located downstream of the filter, the optical head of the smoke detector can detect any type of smoke. When this occurs the unit will stop operating, the return air damper will be fully closed and the fresh air damper will fully open while sending an alarm signal to the unit. In accordance with the European norm, it is also compliant with the French regulation on public buildings.

CONTROL OPTIONS

DC COMFORT DISPLAY

This is a remote controller for non-technical customer. It is designed to fit aesthetically inside a room and be very easy to use. It has a 24V supply to be connected to the rooftop and can be installed at maximum 30 meters away from the unit.
The graphical display gives information such as running mode of the unit, status of the fan, set point, % of fresh air, outside air temperature.

Customer can set the temperature set point for a given time zone, switch the unit “On” or “Off” and adjust the clock. DC can display fault codes with a reset possibility, ambient, supply and outdoor temperature, fresh air damper position (%), time zone and operating mode pictogram, heating or cooling status.
It is also able to display supply fan airflow rate (0-33-66-100%) and component status for compressors, defrost, condenser fans and auxiliary heaters.
DC™ comfort display is equipped with a temperature sensor that can be used as room temperature sensor.

DM MULTI-ROOFTOP DISPLAY

This display gives access to more functionality than the DC™ and allows managing up to 8 rooftops on a single Bus-wire. Customer will be able to change the operating time zone and mode. The rooftops can be connected to operate on a Master/Slave principle. Installation up to 1000m from the unit.

DS SERVICE DISPLAY

This new plug and play service display and controller allows service personal to set up to read and modify all unit parameters (Unit settings, operating time and number of compressor starts, low and high pressure reading, airflow rate of supply fan, and read the history of last 32 faults...).

This controller has been designed to be very user friendly, with 6 different keys and graphic display. It includes scrolling menus and full text (no codes) explanation. It is available in English or another alternate language.

COMMUNICATION INTERFACES AND SUPERVISION:

The CLIMATIC ModBus interface is required to connect the unit to a BMS using "ModBus protocol". No other hardware than this board is required to have ModBus communication. One board required per rooftop. The ModBus interface is available in two versions to be connected with RS485 or TCP/IP depending on site requirements.

This board is also mandatory for any connection between one or several **FLEXAIR** units and Lennox e-savvy, Lennox Cloud service 3G supervision solutions. One BMS interface required per rooftop.

E-SAVVY

General Description

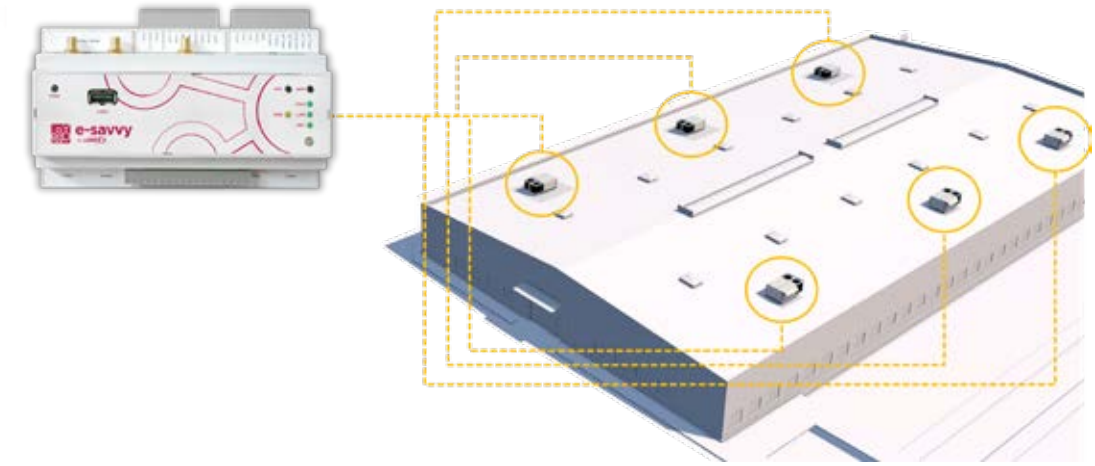
e-savvy is an innovative solution from Lennox for the monitoring and management of HVAC systems.

Thanks to its intuitive man machine interface, e-savvy allows you to monitor in real time the status of all the devices.
The interactive system allows the modification of several parameters such as settings and schedules of each area and to follow the trends.
e-savvy is a connected system able to send alerts in real time to it's users.

e-savvy is a simple, intuitive and user friendly tool allowing the zoning and the creation of several schedules in order to closely follow the needs of its end users.

Customer benefits

- Compatible with Climatic 60 and eClimatic from Lennox
- Electrical load shedding function (stop, 50% and 100% capacity)
- Very easy to install, it is compatible with several devices such as tablets and PC computers
- Alarm function by mail



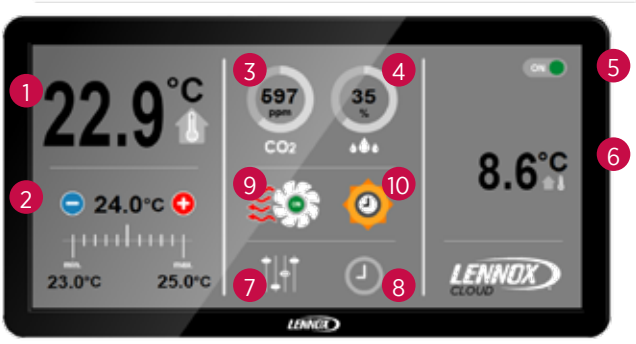
LENNOX CLOUD

Lennox cloud is the best tool to remotely monitor and manage all your rooftop and chiller units, independent of their location and condition.
It allows you to monitor and control all units on the same place, from any web browser.
Remotely adjust set points from any installation site through a friendly and self-explanatory layout.
Lennox Cloud grants you access to alarm history and dashboards with real-time system performance and energy consumption[1] from the entire installation site or from individual units.

WEBVIEW

Remote adjust of system setpoints:

1. Room temperature;
2. Room temperature set points;
3. Indoor CO2 levels[2];
4. Indoor humidity levels[3];
5. System ON or OFF button;
6. External temperature;
7. Adjust settings;
8. Adjust time schedule;
9. Fan status:
10. Time schedule status:



Dead Zone operation (Fan ON)

Heating operation (Fan ON)

Cooling operation (Fan ON)

System stop (Fan OFF)

BMS mode (building management system)

Day 2 mode

Day 1 mode

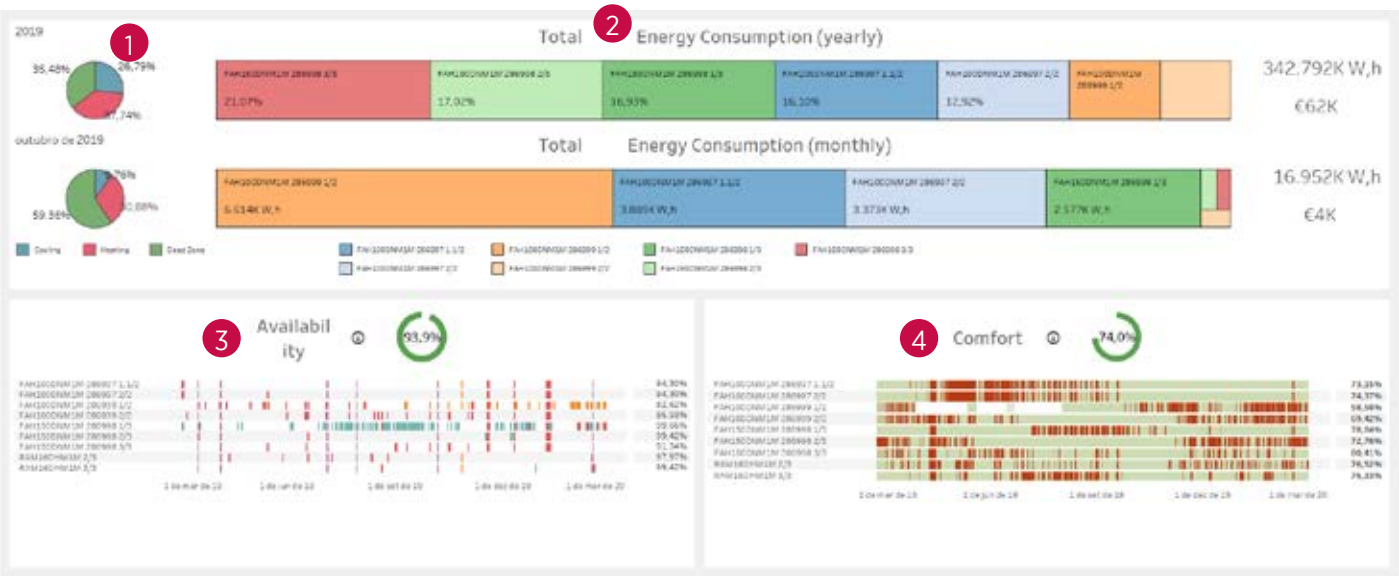
Daytime operation

Night operation

1. Require Electric Energy Meter - optional feature
2. Require Air Quality Sensor (CO2) - optional feature
3. Require Humidity Control Pack - optional feature

SITE DASHBOARD

Provides real-time analysis of all units on the installation site.



1. Evaluate cooling, heating and dead zone periods (yearly or monthly);
2. Measure energy consumption[1] of all units on the site (yearly or monthly);
   Identify which unit is consuming the most or highlight individual units by selecting them.
3. Identify the unit availability in the designated period by colored bars:

Very high level alarm	High level alarm	Low level alarm	Technical alarm	Period with no alarm

4. Identify average Comfort condition for the selected period:

Green bars:	Red bars:
Control temperature inside heating and cooling set points.	Control temperature outside heating and cooling set points.

ANNUAL ENERGY CONSUMPTION COMPARISON

Energy “slices” should keep very similar along the months, if not a check should be done.

TOTAL COST OF OWNERSHIP

Evaluate savings on each maintenance procedure by using real time collected data.

MAINTENANCE & SERVICE TRACKING

Rate the quality of the provided maintenance by checking Alarm frequency and Comfort ratio.

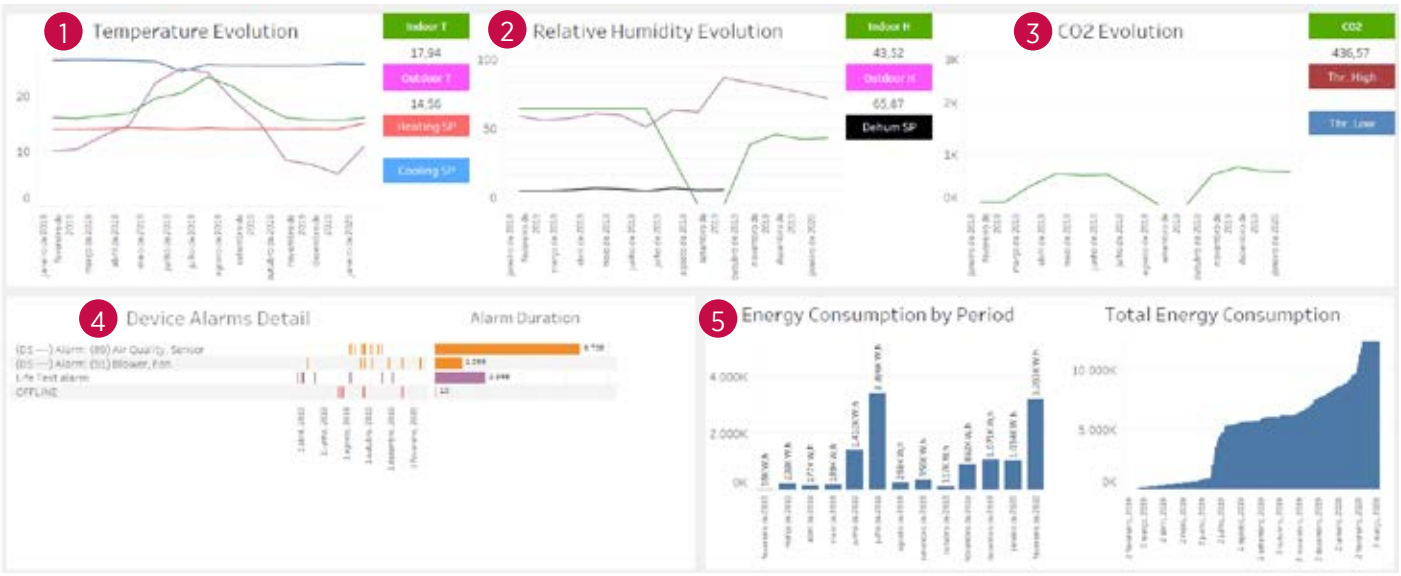
REMOTE MONITORING

Ease identification of proper unit performance by comparing energy consumption.

1. Require Electric Energy Meter - optional feature

UNIT DASHBOARD

Provides individual real-time analysis of each unit from the installation site.



1. Evaluate temperature evolution within selected period:
   Indoor temperature, outdoor temperature, heating set point and cooling set point.
2. Evaluate Relative Humidity[1] within the selected period:
   Indoor humidity, outdoor humidity and dehumidification set point.
3. Evaluate CO2 levels[2] inside the building and configure Set Point for Fresh Air management on the supply air stream;
4. Identify alarms detail and duration for the specified period:

Very high level alarm	High level alarm	Low level alarm	Technical alarm	Period with no alarm

5. Measure monthly energy consumption[3] and the accumulated for the designated period.

REMOTE ADJUSTMENTS
Detect set points changes over time and adjust them remotely.

GUARANTEED COMFORT
Ensure comfort condition at any season with automatic management of humidity[1] and CO2 levels[2].

MAINTENANCE & SERVICE TRACKING
Rate the quality of the provided maintenance by checking the indoor temperature oscillation.

MAXIMUM PERFORMANCE
Comparing the energy consumption with the outdoor temperature oscillation to evaluate system performance.

1. Require Humidity Control Pack - optioznal feature
2. Require Air Quality Sensor (CO2) - optional feature
3. Require Electric Energy Meter - optional feature

OPTIONAL FEATURES COMBINED WITH LENNOX CLOUD

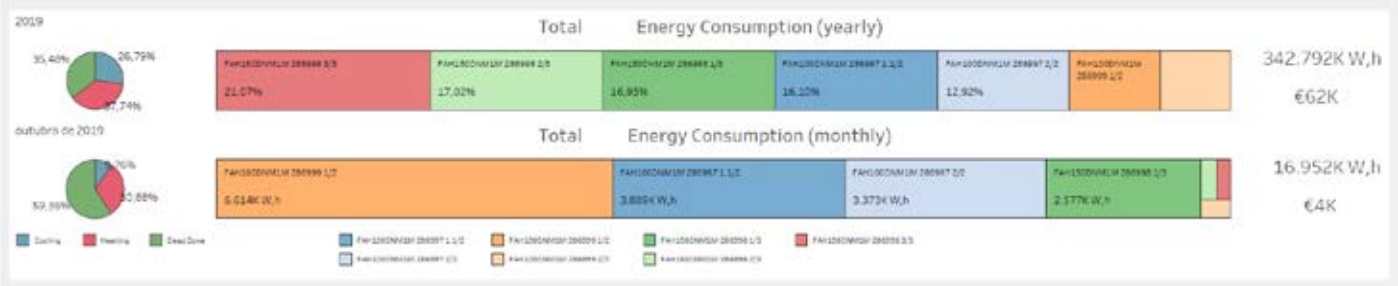
ELECTRIC ENERGY METER

When combined with the Lennox Cloud, it allows the estimation of electrical expenses (based on an average energy cost defined by the user), and the energy consumption of each or all units available on an installation site.

All collected data can be remotely managed on the Lennox Cloud Dashboard visualization:

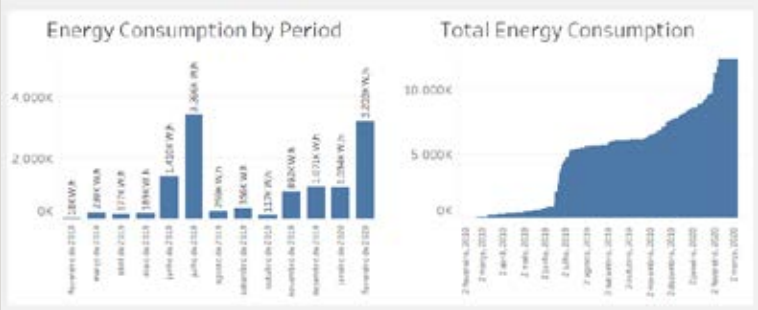
SITE DASHBOARD

- Compare energy consumption of all units (monthly and yearly);
- Measure energy consumption on each operation type (heating, cooling or dead zone).



UNIT DASHBOARD

- Estimate monthly energy cost;
- Estimate accumulated energy cost for the specified period



EVALUATE UNIT PERFORMANCE

Analyze monthly energy consumption of each unit and comp are to outside temperature oscillations along the year.

AIR QUALITY SENSOR (CO2)

When combined with the Lennox Cloud, it displays real-time measurement of the indoor CO2 levels and automatically controls the fresh air rate on the supply air stream.

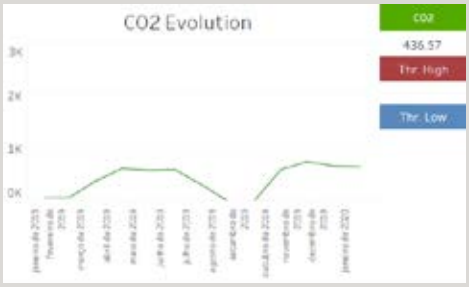
All collected data can be remotely managed on the Lennox Cloud Webview and Dashboard:

WEBVIEW

- Displays the real-time CO2 level on the indoor air and adjusts the fresh air dampers to improve air quality.

UNIT DASHBOARD

- Real time measurements and display of indoor air quality;
- Allows remote set point configuration through Lennox Cloud.



GUARANTEED COMFORT

Ensure comfort condition at any season with automatic management of CO_2 levels inside the building.

HUMIDITY CONTROL PACK

When combined with the Lennox Cloud, it displays real-time measurement of the indoor and outdoor humidity levels and automatically controls the fresh air entry.

- Controls Fresh Air entry by its Relative Humidity;
- Reduces energy consumption by limiting the Fresh Air entry with high enthalpy levels (high relative humidity);
- Avoid indoor air with high humidity levels;
- Improve air quality and comfort;
- Reduces frost formation on supermarket open display cases;

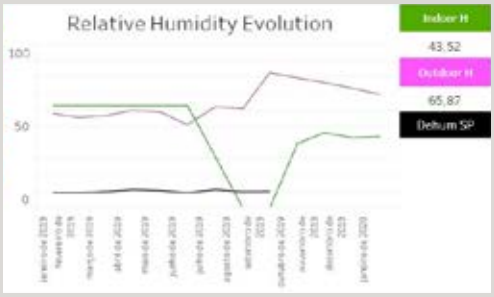
All collected data can be remotely managed on the Lennox Cloud Webview and Dashboard:

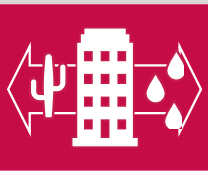
WEBVIEW

- Displays the real-time Relative Humidity of the indoor air and adjusts the fresh airdampers avoid entry of wet air.

UNIT DASHBOARD

- Real time measurements of Relative Humidity for Indoor and Outdoor Air.
- Allows adjustment of Dehumidification Set Point on Lennox Cloud.





GUARANTEED COMFORT

Ensure comfort condition at any season with automatic management of indoor humidity.

REFRIGERATION OPTIONS

LOW NOISE OPTION
As rooftops are often installed in a noise sensitive area, LENNOX proposes a low noise option on the **FLEXAIR** range. To achieve low noise level, **FLEXAIR** receives a quieter variable speed EC fan-motor, a compressor jacket, and fully equipped refrigeration section with acoustic insulation (size 085 to 170).

LOW OUTSIDE TEMPERATURE (AIR COOLED UNITS OPTION)
EC (Electronically commutated) axial condenser fans regulate the speed depending on outdoor temperature, building load and time zone. In cooling mode, this option is mandatory below 15°C outside temperature.

LOW WATER LOOP TEMPERATURE (WATER COOLED UNITS OPTION)
2 ways valve for water flow modulation.
This option allows to extend the operating limits of the unit, for all year round operation.

REFRIGERANT LEAK DETECTION
With this option the unit will be equipped with refrigerant high and low pressure sensor and suction /liquid temperature probes.
The control will monitor the subcooling and overheating to detect
any refrigerant leak.

ANTI CORROSION PROTECTION
When the units are installed in potentially aggressive environments, which can often be the case for example in coastal environments, it is often a requirement that the coils are specially treated to protect them against the corrosive effects.
LenGuard™ anti-corrosion treatment is available for condensers, evaporators and hot water coil.

FRESH AIR OPTIONS

As managing fresh air is becoming mandatory in most buildings economiser is now fitted as standard with the **FLEXAIR**.

ADVANCED CONTROL PACK
Where a higher level of controllability is required to make the
FLEXAIR even more flexible, LENNOX have compiled a pack that includes two advanced control features.

- **"Enthalpy control on economiser"**.

  The eCLIMATIC and its humidity sensors (return air and fresh air) ensures that the economiser does not use 100% fresh air if the outside air has a higher enthalpy than the return air. This feature is relevant in regions where the relative humidity is high or when the desired room air condition is very dry.

- **"Humidity control"**

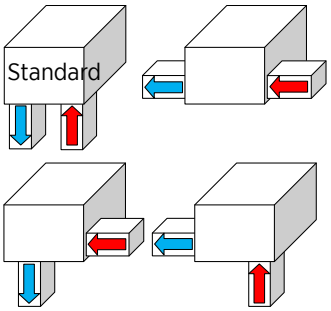
  The eCLIMATIC and its humidity sensors, analyze dry and wet bulb temperatures to control dehumidification. Humidity control is only available if ambient temperature is in cooling or dead zone. The dehumidification algorithm can dry the air by passing it through the coil in cooling mode.
  A specific function in the program can be activated to control the minimum supply air temperature, by maintaining it equal to the heating set point, using auxiliary heaters (Electric, Hot water coil or gas burner).
  A proportional 0-10V contact is also available to control an external humidifier.

INDOOR AIR QUALITY SENSOR
Indoor air quality is controlled from the eCLIMATIC main controller. A VOC (Volatile Organic Component) sensor detects the amount of CO2 in the ambient air between 0 and 2000PPM. (This obviously varies depending upon space occupancy levels). The VOC sensor sends a proportional signal (0-20mA) to the eCLIMATIC controller which will then modulate the fresh air.

AIRFLOW CONFIGURATIONS AND ROOFCURBS

BASIC AIRFLOW CONFIGURATIONS

A Unless specified otherwise when ordered, FLEXAIR rooftops are shipped with downflow supply and return configuration. Units can be configured before shipment with the required airflow configurations to suit the building needs.



AIR SOCK CONTROL

A standard feature in **FLEXAIR**, EC fan regulation allow the air socks to be progressively filled with air on start up. It takes one minute to go from 0% of air to Nominal airflow rate

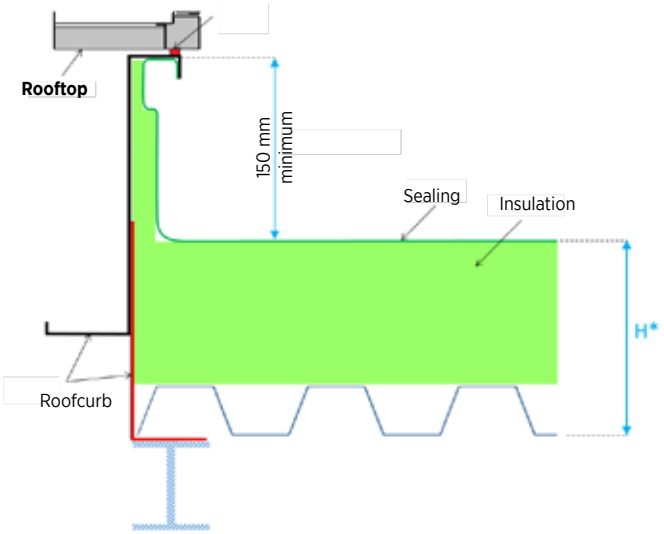
ROOFCURBS

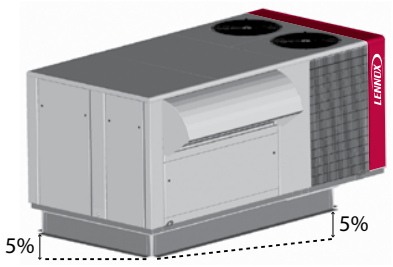
NON ADJUSTABLE NON ASSEMBLED ROOFCURB.
A sturdy mounting frame designed for single package units providing an automatic weatherproof sealed rooftop installation.
This roofcurb is shipped knocked down and must be assembled on site.

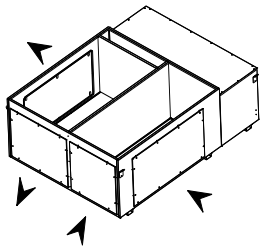
ADJUSTABLE ROOFCURB.
This adjustable and assembled roofcurb is made of galvanized steel with 2.5 mm. This adjustable roofcurb is designed to be installed in roofs with slopes up to 4 to 5% in all directions, enabling **FLEXAIR** to be compatible with most roof profiles.

Down flow roofcurbs are the easiest and the cheapest way to install packaged air conditioning systems to a single volume building.
The frame can be secured directly to the roof structure thanks to its built in adjustable flanges and sealing liner returns

MULTIDIRECTIONAL ROOFCURB
This option is a required when customer wants to have horizontal return and horizontal supply on the same side.
It is also required with the power exhaust fan or gravity exhaust damper options combined with horizontal return flow configuration.







Check that the roofcurb height is enough to respect a sealing height of 150mm minimum (french dtu 43.3) Considering the building specifications : geometry of the roof, material and thickness of the insulations and other protection layers, slope of the roof...).

EXTRACTIONION OPTIONS

UNIT WITH NO EXHAUST AIR OPTION

1 ➞ 2 : External static pressure given in eLencal (LENNOX units selection tool) corresponds to the static pressure between inlet and outlet of the unit and includes all options and accessories delivered with the unit with the exception of the ductwork. This external static pressure will be used to push the air through the supply and the return ductwork installed on site.

With an eLencal ESP = 350 Pa and a return ductwork pressure drop of 150 Pa ➞ Remaining available static pressure for the supply ductwork = 200 Pa

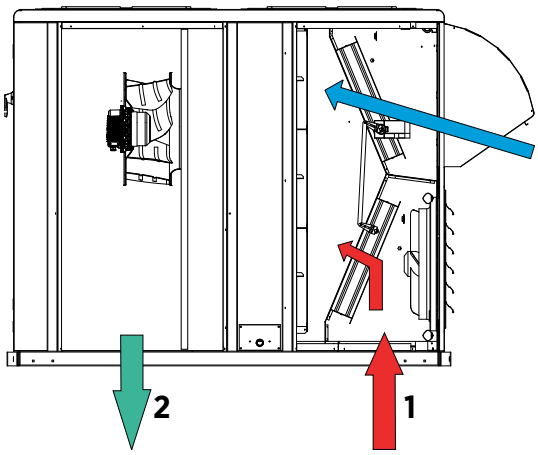
In any case, on a basic unit, the return ductwork pressure drop should be lower than 150 Pa.

The airflow is usually set during start up for a given fresh air rate. During normal operation the fresh air ratio will change and eventually the unit will go to full fresh air during free cooling operation. If the pressure drop in the return ductwork is high, the fan may trip on over current protection when it operates with full fresh air where the pressure drop is much lower.

If the return ductwork pressure drop is higher than 150 Pa :

- Select an extraction roofcurb which will include an extraction fan and the appropriate drive kit for the given airflow and pressure drop.
- with eDRIVE includes constant airflow operation that can control and limit the airflow as the pressure drop reduces.

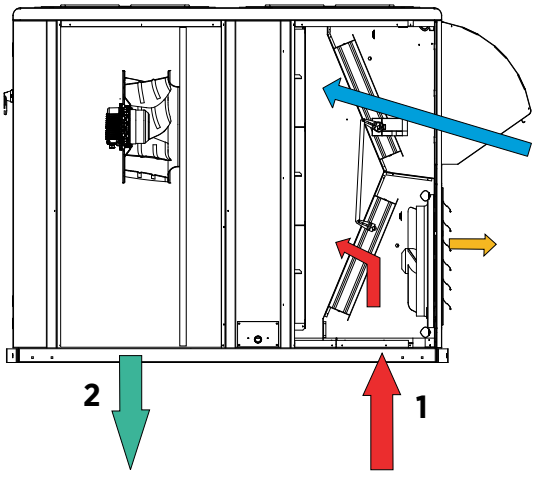
Building air tightness	Low air tightness
Fresh air & Free cooling	Medium fresh air rate Free cooling possible
Pressure drop in the return ductwork	Medium < 150 Pa
Building pressure control	NO control
Typical applications	Existing hypermarkets and super-markets (old buildings with high leakage rates)



GRAVITY EXHAUST DAMPER

1 ➞ 2: External static pressure “Supply”
Gravity exhaust dampers are used to relief pressure when outside air is being introduced in a building with good air tightness.

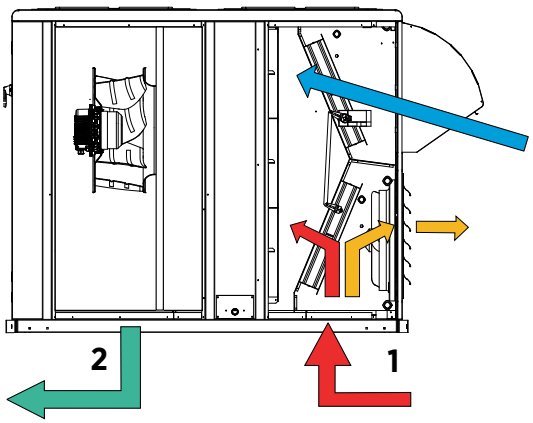
Building air tightness	Medium
Fresh air & Free cooling	High fresh air rate Free cooling
Pressure drop in the return ductwork	Low < 50 Pa
Building pressure control	Low control
Typical applications	Warehouses



POWER EXHAUST FAN

1 ➞ 2: External static pressure “Supply”
Power exhaust axial fans with gravity exhaust dampers provide exhaust air pressure relief when high levels of outside air are being introduced in the building with good air tightness.
It is interlocked to run when return air dampers are being closed and supply air blower is in operation. The power exhaust fan runs when outdoor air dampers are at least 50% open (adjustable by set point). It is also overload protected. A gravity exhaust damper is supplied with this option to prevent air from entering the unit when fan is off.

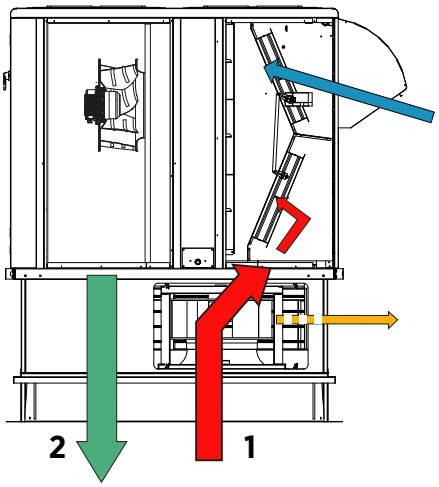
Building air tightness	Medium
Fresh air & Free-cooling	High fresh air rate Free-cooling
Pressure drop in the return ductwork	Medium 50 Pa to 150 Pa
Building pressure control	Low control
Typical applications	Light commercial, petrol stations...



EXTRACTION ROOFCURB

1 ➞ 3: External static pressure “Return ”
3 ➞ 2: External static pressure “Supply”
Where system balancing is critical and return ductwork pressure drop is high, it is recommended to use extraction fan such as the one located in the extraction roofcurb.
A plug fan installed with a 3rd damper (1 inside the Roofcurb + 2 inside the rooftop), is able to extract up to 300 Pa with the Nominal airflow rate of the unit. This roof curb can be used in either horizontal or downflow applications.

Building air tightness	High
Fresh air & Free-cooling	High fresh air rate Free-cooling
Pressure drop in the return ductwork	High > 150 Pa
Building pressure control	Pressure balance possible
Typical applications	Theatres, cinemas, data centres, new air tight buildings with long return ductworks



AIR COOLED UNITS - HEAT PUMP

NOMINAL THERMAL PERFORMANCES

FLEXAIR		090	100	120	150	170	200	230
Cooling capacity (1) For variable speed only	kW	85,4	103,9	115,3	129,6	152,8	175,2	203,6
EER (1)		3,28	3,08	2,94	2,72	2,66	2,95	2,82
Heating capacity (2) For variable speed only	kW	81,1	100,5	112,9	129,7	150,4	180,0	211,8
COP (2)		3,70	3,44	3,30	3,47	3,23	3,47	3,21
Nominal airflow rate	m^3/h	15000	18500	22000	26500	28000	33000	35000

(1) **Cooling mode :**
Outdoor temperature 35°C DB
Indoor temperature 27°C DB / 19°C WB

(2) **Heating mode :**
Outdoor temperature 7°C DB / 6°C WB
Indoor temperature 20°C DB

(1) & (2) According to **EN14511** nominal conditions
Cooling and heating modes

SEASONAL EFFICIENCIES

FLEXAIR		090	100	120	150	170	200	230
Seasonal Energy Efficiency Ratio **SEER** (1)		4.48	4.43	4.20	4.20	4.06	4.20	3.86
Seasonal energy efficiency **ηs,c** (2)	**%**	176.2	174.2	164.9	165	159.5	165.1	151.4
EUROVENT energy class		B	B	B	B	B	B	B
Seasonal Coefficient of Performance **SCOP** (3)		3.36	3.3	3.21	3.42	3.2	3.26	3.21
Seasonal energy efficiency **ηs,h** (4)	**%**	131.6	128.8	125.3	133.8	125.1	127.5	125.4
EUROVENT energy class		B	B	B	B	B	B	B

(1) SEER in accordance with standard EN14825.

(2) Space cooling energy efficiency following Ecodesign regulation EU 2016/2281

(3) in accordance with standard EN14825 (average climate).

(4) Space heating energy efficiency following Ecodesign regulation EU 2016/2281.

AIRFLOW DATA

FLEXAIR		090	100	120	150	170	200	230
Air treatment unit								
Minimum airflow rate	m^3/h	12000	14800	15000	18000	21000	24000	24000
Maximum airflow rate		23000	23000	23000	35000	35000	43000	43000
Maximum available static pressure	Pa	800						
Condensing unit								
Nominal airflow rate	m^3/h	39068	46586	46586	42718	51928	77866	92784

AIR COOLED UNITS - HEAT PUMP

ACOUSTIC DATA

FLEXAIR		090	100	120	150	170	200	230
Sound power level Outdoor unit	dB(A)	82,7	86,8	90,3	86,4	87,6	86,2	89,8
Sound power level Indoor unit (1)		85,9	91	95,3	91,4	91,7	88,5	89,8

(1) Supply duct

ELECTRICAL DATA

⚠ VALUES FOR STANDARD UNITS ONLY

FLEXAIR		090	100	120	150	170	200	230
Voltage	V	400						
Frequency	Hz	50						
Maximum current	A	162,2	174	197,2	204,6	249	296	313,6
Starting current		75,5	86,9	98,9	106,2	133	152	169,6
Short circuit current	kA	10						

REFRIGERATION CIRCUIT

FLEXAIR		090	100	120	150	170	200	230
Number of circuits/Number of compressors		2/4						
Refrigerant		R410A						
Charge of refrigerant	kg	8.2 + 8.2	8.5 + 9	9 + 9	14.5 + 14.5	13.75 + 13.25	18 + 18	19.3 + 19.3

OPERATING LIMITS

FLEXAIR		090	100	120	150	170	200	230
Operating limits - Cooling mode (2)								
Maxi. outdoor temperature (Indoor temperature 27°C DB / 19°C WB)	°C	48			46		48	
Maxi. outdoor temperature with unloading		50			48		50	
Mini. outdoor temperature (Indoor temperature 20°C DB) (3)		10			10		10	
Maxi. outdoor temp DB/WB 100% fresh air		38			38		38	
Operating limits - Heating mode (2)								
Mini. outdoor temperature (Indoor temperature 20°C DB) (3)	°C	-15			-15		-15 -	
Mini. outdoor temperature with unloading		-15			-15		-15	
Mini. entering indoor coil temperature (Outdoor air temperature = 35°C DB)		7			7		7	

(2) The cooling and heating operating limits are given for steady state running condition with noted temperature condition

(3) Below this value, the "low ambient" option is required

WATER COOLED UNITS - HEAT PUMP

NOMINAL THERMAL PERFORMANCES

FLEXAIR		085	100	120	150	170
Cooling capacity (1) (Mini - Maxi) For variable speed only	kW	90,2	114,4	125,9	159,8	175,2
EER (1)		4,66	4,64	4,36	5,02	4,48
EUROVENT energy class Full load operation		A	A	A	B	A
Heating capacity (2) (Mini - Maxi) For variable speed only	kW	111,9	131,5	153,2	191,6	226,9
COP (2)		4,74	4,48	4,41	4,97	4,41
EUROVENT energy class Full load operation		B	B	C	A	C
Nominal airflow rate	m^3/h	15000	18500	20500	26000	30000

(1) **Cooling mode :**
Outdoor temperature 35°C DB
Indoor temperature 27°C DB / 19°C WB

(2) **Heating mode :**
Outdoor temperature 7°C DB / 6°C WB
Indoor temperature 20°C DB

(1) & (2) According to **EN14511** nominal conditions
Cooling and heating modes

SEASONAL EFFICIENCIES

FLEXAIR		085	100	120	150	170
Seasonal Energy Efficiency Ratio **SEER**		5,16	5,11	4,65	5,73	5,44
Seasonal energy efficiency **ηs,c**	**%**	201	199	181	224	212
Seasonal Coefficient of Performance **SCOP**		3,53	3,69	3,12	4,21	4,27
Seasonal energy efficiency **ηs,h**	**%**	136	143	120	163	166

According to 2016/2281 Ecodesign directive

AIRFLOW DATA

FLEXAIR		085	100	120	150	170
Air treatment unit						
Minimum airflow rate	m^3/h	12000	14800	15000	18000	21000
Maximum airflow rate		23000	23000	23000	35000	35000
Maximum available static pressure	Pa	800				

ACOUSTIC DATA

FLEXAIR		085	100	120	150	170
Sound power level Outdoor unit	dB(A)	**82,2**	**84,7**	**87,4**	**86,2**	**87,5**
Sound power level Indoor unit (1)		**87,8**	**89,4**	**93,3**	**92,7**	**95,5**

(1) Supply duct

WATER COOLED UNITS - HEAT PUMP

ELECTRICAL DATA

⚠ VALUES FOR STANDARD UNITS ONLY

FLEXAIR		085	100	120	150	170
Voltage	V	400				
Frequency	Hz	50				
Maximum power	A	39,5	45,1	53,2	62,7	74,7
Maximum current		67	73,5	85,9	108,8	127
Starting current		211	262	274,4	252,8	271
Short circuit current	kA	10				

REFRIGERATION CIRCUIT

FLEXAIR		085	100	120	150	170
Number of circuits/Number of compressors		2/2	2/2	2/2	2/3	2/4
Refrigerant		R410A				
Charge of refrigerant	kg	10,6 + 10,6	12,3 + 12,3	12,4 + 12,4	15,9 + 15,9	16 + 16

OPERATING LIMITS

		085	100	120	150	170
Operating limits - Cooling mode (1)						
Maxi. outdoor air temperature (Indoor temp. 27°C DB / 19°C WB)	°C	46				
Max. Outdoor relative air humidity	%	75				
Mini. inlet water temperature (Indoor temp. 20°C DB)	°C	25				
Maxi. inlet water temperature 100% fresh air / Outdoor air temperature 35°C		38				
Maxi. inlet water temperature with unloading		48				
Operating limits - Heating mode (1)						
Mini. inlet glycoled water temperature (2) (Indoor temp. 20°C DB)	°C	10				
Mini. outlet glycoled water temperature (2) (Indoor temp. 20°C DB)		5				
Mini. entering indoor coil temperature (Outdoor temp. 7°C DB)		0				
Maxi. entering indoor air temperature		30				

(2) The cooling and heating operating limits are given for steady state running condition with noted temperature condition

(3) Below this value, the "low ambient" option is required

AIR COOLED & WATER COOLED UNITS

FLEXAIR	AIR COOLED			090	100	120	150	170	200	230
	WATER COOLED			085	100	120	150	170	200	230
Nominal airflow rate			m³/h	15000	18500	20500	26000	30000	35000	39000
Heating - Electric										
Type of modulation			m³/h	Staged on S / Triac on M & H						
Available heating capacity		S	kW	30	30	30	45	45	72	72
		M		54	54	54	72	72	108	108
		H		72	72	72	108	108	162	162
Amps S / M / H				42/75/99			42/75/99		99/149/196	
Heating - Hot water coil										
Available heating capacity (1)		S	kW	114	126	133	145	156	177	186
		H		177	201	212	254	275	295	313
Gas modulating										
Modulation range		H	%	40-100			20-100			
Heat recovery module										
Type of exchanger				Wheel exchanger						
Protection against frosting on exhaust air				Air differential pressure switch 20 to 300 Pa						
Lenght			mm	2146			2330		2516	
Height				1796			2170		2418	
Width with/without fresh air hood				1422 / 1055			1518 / 1055		1676 / 623	
Weight			kg	525			635		730	
Wheel diameter			mm	1500			1800		2050	
Number of filters Fresh air / Return air				3 / 3			8 / 8		10 / 10	
Filter G4 and G4+F7-ePM1										
Efficiency (gravimetric) / class EN779				90% / G4						
Efficiency (opacimetric) / class EN779 / ISO16890				85% / F7-ePM1						
Number of filters				8			12		10 + 5	
Filter size			mm	625 x 500 x 50			625 x 500 x 50		500x500 + 800x500	
Power exhaust fan (axial fan)										
Number of fans				3			3			
Diameter				450			560			

(1) Conditions : entering water temperature 90°C, leaving water temperature 70°C, entering air temperature 20°C,
S = standart heat, M = medium heat, H = high heat

AIR COOLED & WATER COOLED UNITS

HOT WATER COIL

RETURN AIR AT 0°C

AIR COOLED	WATER COOLED	Type (1)	Airflow rate m³/h	Δ water temperature											
				90-70				80-60				70-50			
				Heating capacity kW	Pressure drop (2) kPa	Δ Air temperature	Water flow rate m³/h	Heating capacity kW	Pressure drop (2) kPa	Δ Air temperature	Water flow rate m³/h	Heating capacity kW	Pressure drop (2) kPa	Δ Air temperature	Water flow rate m³/h
090	085	S	12000	142	109	33	6	123	83	28	5	104	59	24	4
		H		217	90	50	9	189	69	44	8	160	50	37	7
		S	15000	160	137	30	7	138	104	26	6	116	74	22	5
		H		249	118	46	11	216	90	40	9	183	65	34	8
		S	23000	-	-	-	-	170	156	21	7	143	111	17	6
		H		318	191	38	14	275	145	33	12	232	103	28	10
100	100	S	14000	154	127	31	7	133	97	26	6	112	69	22	5
		H		239	109	47	10	207	83	41	9	175	60	35	8
		S	18500	178	168	27	8	154	127	23	7	129	91	19	6
		H		282	151	42	12	244	114	37	11	206	83	31	9
		S	23000	-	-	-	-	170	156	21	7	143	111	17	6
		H		318	191	38	14	275	145	33	12	232	103	28	10
120	120	S	15000	160	137	30	7	138	104	26	6	116	74	22	5
		H		249	118	46	11	216	90	40	9	183	65	34	8
		S	20500	187	185	25	8	161	140	22	7	136	100	18	6
		H		298	169	40	13	258	128	35	11	218	92	29	9
		S	23000	-	-	-	-	170	156	21	7	143	111	17	6
		H		318	191	38	14	275	145	33	12	232	103	28	10
150	150	S	18000	172	50	26	7	148	37	23	6	123	26	19	5
		H		286	70	44	12	249	54	38	11	211	40	33	9
		S	26000	206	72	22	9	177	53	19	8	147	37	16	6
		H		356	107	38	15	309	82	33	13	262	60	28	11
		S	35000	236	94	19	10	202	69	16	9	169	49	13	7
		H		420	147	33	18	364	113	29	16	308	83	24	13
170	170	S	21000	186	59	25	8	159	43	21	7	133	30	18	6
		H		314	84	41	14	273	65	36	12	231	48	31	10
		S	30000	220	82	20	10	189	60	17	8	158	42	15	7
		H		386	125	36	17	335	96	31	14	283	70	26	12
		S	35000	236	94	19	10	202	69	16	9	169	49	13	7
		H		420	147	33	18	364	113	29	16	308	83	24	13
200	200	S	24000	208	62	24	9	178	46	21	8	149	32	17	6
		H		335	78	39	14	290	60	34	13	246	44	28	11
		S	35000	251	91	20	11	215	67	17	9	180	47	14	8
		H		414	118	33	18	359	91	28	15	304	66	24	13
		S	43000	277	110	18	12	237	81	15	10	198	57	13	9
		H		461	147	30	20	400	112	26	17	338	82	22	15
230	230	S	27000	221	70	23	10	189	52	19	8	158	36	16	7
		H		358	89	37	15	311	68	32	13	263	50	27	11
		S	39000	264	101	19	11	227	74	16	10	189	52	13	8
		H		438	133	31	19	380	101	27	16	322	74	23	14
		S	43000	277	110	18	12	237	81	15	10	198	57	13	9
		H		461	147	30	20	400	112	26	17	338	82	22	15

(1)	S	Standard heat	H	High heat
(2)	Pressure drop = Internal coil + 3-way valve			
Water without glycol				
Reminder : 10 kPa=1mCe = 1mH_2O				

AIR COOLED & WATER COOLED UNITS

HOT WATER COIL

RETURN AIR AT 10°C

AIR COOLED	WATER COOLED	Type (1)	Airflow rate m³/h	Δ water temperature											
				90-70				80-60				70-50			
				Heating capacity kW	Pressure drop (2) kPa	Δ Air temperature	Water flow rate m³/h	Heating capacity kW	Pressure drop (2) kPa	Δ Air temperature	Water flow rate m³/h	Heating capacity kW	Pressure drop (2) kPa	Δ Air temperature	Water flow rate m³/h
090	085	S	12000	121	80	29	5	102	57	25	4	83	39	20	4
		H		185	66	44	8	157	48	38	7	129	33	31	6
		S	15000	137	100	26	6	115	72	22	5	94	49	18	4
		H		213	87	41	9	180	63	34	8	147	43	28	6
		S	23000	168	151	21	7	142	108	18	6	115	73	14	5
		H		271	140	34	12	229	101	29	10	187	68	23	8
100	100	S	14000	132	94	27	6	111	67	23	5	90	46	19	4
		H		204	80	42	9	173	58	35	7	141	39	29	6
		S	18500	152	123	24	7	128	88	20	6	104	60	16	4
		H		240	110	37	10	203	80	32	9	166	54	26	7
		S	23000	168	151	21	7	142	108	18	6	115	73	14	5
		H		271	140	34	12	229	101	29	10	187	68	23	8
120	120	S	15000	137	100	26	6	115	72	22	5	94	49	18	4
		H		213	87	41	9	180	63	34	8	147	43	28	6
		S	20500	160	136	22	7	134	97	19	6	109	66	15	5
		H		255	124	36	11	215	90	30	9	175	60	25	8
		S	23000	168	151	21	7	142	108	18	6	115	73	14	5
		H		271	140	34	12	229	101	29	10	187	68	23	8
150	150	S	18000	146	36	23	6	122	26	20	5	99	17	16	4
		H		244	52	39	11	208	38	33	9	170	26	27	7
		S	26000	175	52	19	8	147	37	16	6	118	24	13	5
		H		304	79	34	13	258	58	28	11	211	40	23	9
		S	35000	201	68	16	9	168	48	14	7	135	31	11	6
		H		358	109	29	15	304	80	25	13	248	54	20	11
170	170	S	21000	158	42	22	7	132	30	18	6	106	20	15	5
		H		268	62	37	12	228	46	31	10	187	31	26	8
		S	30000	187	59	18	8	157	42	15	7	126	27	12	5
		H		329	92	32	14	279	68	27	12	229	46	22	10
		S	35000	201	68	16	9	168	48	14	7	135	31	11	6
		H		358	109	29	15	304	80	25	13	248	54	20	11
200	200	S	24000	176	45	21	8	148	32	18	6	119	21	14	5
		H		286	58	34	12	242	42	29	10	199	29	24	9
		S	35000	213	65	18	9	178	46	15	8	143	30	12	6
		H		353	87	29	15	300	64	25	13	245	43	20	11
		S	43000	235	79	16	10	197	56	13	8	158	36	11	7
		H		394	108	26	17	334	79	22	14	273	54	18	12
230	230	S	27000	187	51	20	8	157	36	17	7	126	23	13	5
		H		306	66	33	13	259	48	28	11	213	33	23	9
		S	39000	225	72	17	10	188	51	14	8	151	33	11	7
		H		374	98	28	16	317	72	23	14	260	49	19	11
		S	43000	235	79	16	10	197	56	13	8	158	36	11	7
		H		394	108	26	17	334	79	22	14	273	54	18	12

(1)	S	Standard heat	H	High heat
(2)	Pressure drop = Internal coil + 3-way valve			
Water without glycol				
Reminder : 10 kPa=1mCe = 1mH_2O				

AIR COOLED & WATER COOLED UNITS

HOT WATER COIL

RETURN AIR AT 20°C

AIR COOLED	WATER COOLED	Type (1)	Airflow rate m³/h	Δ water temperature											
				90-70				80-60				70-50			
				Heating capacity kW	Pressure drop (2) kPa	Δ Air temperature	Water flow rate m³/h	Heating capacity kW	Pressure drop (2) kPa	Δ Air temperature	Water flow rate m³/h	Heating capacity kW	Pressure drop (2) kPa	Δ Air temperature	Water flow rate m³/h
090	085	S	12000	101	56	25	4	83	38	20	4	64	23	16	3
		H		155	47	38	7	127	32	31	5	99	20	25	4
		S	15000	114	70	23	5	93	48	18	4	72	29	14	3
		H		177	61	35	8	145	41	29	6	113	26	22	5
		S	23000	140	106	18	6	114	71	15	5	88	43	11	4
		H		226	98	29	10	185	66	24	8	143	41	19	6
100	100	S	14000	110	65	23	5	90	44	19	4	69	27	15	3
		H		170	56	36	7	139	38	30	6	109	24	23	5
		S	18500	126	86	20	5	103	58	17	4	79	35	13	3
		H		201	78	32	9	164	52	26	7	127	32	20	6
		S	23000	140	106	18	6	114	71	15	5	88	43	11	4
		H		226	98	29	10	185	66	24	8	143	41	19	6
120	120	S	15000	114	70	23	5	93	48	18	4	72	29	14	3
		H		177	61	35	8	145	41	29	6	113	26	22	5
		S	20500	133	95	19	6	108	64	16	5	83	39	12	4
		H		212	87	31	9	174	59	25	7	135	36	20	6
		S	23000	140	106	18	6	114	71	15	5	88	43	11	4
		H		226	98	29	10	185	66	24	8	143	41	19	6
150	150	S	18000	121	25	20	5	98	17	16	4	75	10	12	3
		H		204	37	34	9	168	25	28	7	132	16	22	6
		S	26000	145	36	17	6	117	24	13	5	89	14	10	4
		H		254	56	29	11	209	38	24	9	163	24	19	7
		S	35000	167	47	14	7	135	31	11	6	102	18	9	4
		H		300	77	25	13	246	53	21	11	191	33	16	8
170	170	S	21000	131	29	19	6	106	19	15	5	81	11	11	3
		H		224	44	32	10	184	30	26	8	144	19	20	6
		S	30000	156	41	15	7	126	27	12	5	95	16	9	4
		H		275	65	27	12	226	45	22	10	176	28	17	8
		S	35000	167	47	14	7	135	31	11	6	102	18	9	4
		H		300	77	25	13	246	53	21	11	191	33	16	8
200	200	S	24000	146	31	18	6	118	20	15	5	90	12	11	4
		H		239	41	30	10	196	28	24	8	154	18	19	7
		S	35000	177	45	15	8	143	30	12	6	108	17	9	5
		H		295	62	25	13	242	42	21	10	189	26	16	8
		S	43000	195	55	14	8	157	36	11	7	119	21	8	5
		H		330	76	23	14	270	52	19	12	210	32	15	9
230	230	S	27000	156	35	17	7	126	23	14	5	96	13	11	4
		H		256	47	28	11	210	32	23	9	164	20	18	7
		S	39000	186	50	14	8	150	33	11	6	114	19	9	5
		H		313	69	24	14	257	47	20	11	200	29	15	9
		S	43000	195	55	14	8	157	36	11	7	119	21	8	5
		H		330	76	23	14	270	52	19	12	210	32	15	9

(1)	S	Standard heat	H	High heat
(2)	Pressure drop = Internal coil + 3-way valve			
Water without glycol				
Reminder : 10 kPa=1mCe = 1mH_2O				

AIR COOLED & WATER COOLED UNITS

ELECTRICAL HEATERS

AIR COOLED	WATER COOLED	Airflow rate m³/h	TYPE	Available capacity kW	Type of Modulation	Stages	Temperature rise °C	Stages	Temperature rise °C
090	085	15000	S	30	2 stages	Stage 1:	2,9	Stage 2:	5,7
			M	54	0-100%	50%-->	5,2	100%-->	10,3
			H	72	0-100%	50%-->	6,9	100%-->	13,8
100	100	18500	S	30	2 stages	Stage 1:	2,3	Stage 1:	4,6
			M	54	0-100%	50%-->	4,2	100%-->	8,4
			H	72	0-100%	50%-->	5,6	100%-->	11,2
120	120	20500	S	30	2 stages	Stage 1:	2,1	Stage 2:	4,2
			M	54	0-100%	50%-->	3,8	100%-->	7,6
			H	72	0-100%	50%-->	5,0	100%-->	10,1
150	150	26000	S	45	2 stages	Stage 1:	2,5	Stage 2:	5,0
			M	72	0-100%	50%-->	4,0	100%-->	7,9
			H	108	0-100%	50%-->	6,0	100%-->	11,9
170	170	30000	S	45	2 stages	Stage 1:	2,2	Stage 2:	4,3
			M	72	0-100%	50%-->	3,4	100%-->	6,9
			H	108	0-100%	50%-->	5,2	100%-->	10,3
200	200	35000	S	72	2 stages	Stage 1:	2,9	Stage 2:	5,9
			M	108	0-100%	50%-->	4,4	100%-->	8,8
			H	162	0-100%	50%-->	6,6	100%-->	13,3
230	230	39000	S	72	2 stages	Stage 1:	2,6	Stage 2:	5,3
			M	108	0-100%	50%-->	4,0	100%-->	7,9
			H	162	0-100%	50%-->	6,0	100%-->	11,9

GAS BURNER

AIR COOLED	WATER COOLED	Airflow rate m³/h	TYPE	Gas power input	Gas power input	Electrical absorbed power	Number of stages
				KW	KW	KW	
090	085	15000	S	60	55.2	0.16	4
			H	120	110.4	0.25	
100	100	18500	S	60	55.2	0.16	
			H	120	110.4	0.25	
120	120	20500	S	60	55.2	0.16	
			H	120	110.4	0.25	
150	150	26000	S	120	110.4	0.25	
			H	180	165.6	0.25	
170	170	30000	S	120	110.4	0.25	
			H	180	165.6	0.25	
200	200	35000	S	180	165.6	0.25	
			H	240	220.8	0.25	
230	230	39000	S	180	165.6	0.25	
			H	240	220.8	0.25	

AIR COOLED & WATER COOLED UNITS

AIR COOLED	WATER COOLED	Airflow rate	Filters		Hot water coil	
		m³/h	G4	F7	S	H
090	085	12000	1	75	9	15
		15000	7	105	13	22
		23000	28	199	26	44
100	100	14000	5	94	11	19
		18500	15	143	18	31
		23000	28	199	26	44
120	120	15000	7	105	13	22
		20500	21	167	21	37
		23000	28	199	26	44
150	150	18000	1	75	6	10
		26000	12	130	12	19
		35000	29	204	19	33
170	170	21000	5	94	8	14
		30000	19	161	15	25
		35000	29	204	19	33
200 (1)	200	24000	3	88	7	11
		35000	18	154	13	22
		43000	31	211	19	31
230 (1)	230	27000	7	105	8	14
		39000	24	182	16	26
		43000	31	211	19	31

AIR COOLED	WATER COOLED	Airflow rate	Electric heater			Heating gas fired	Adjustable roofcurb	Multidirectional roofcurb	Heat recovery module Fresh air
		m³/h	S	M	H	H			
090	085	12000	3	5	6	14	17	22	161
		15000	6	7	7	23	27	33	201
		23000	7	9	11	53	63	73	309
100	100	14000	6	7	8	20	23	30	187
		18500	8	10	11	34	41	51	248
		23000	11	14	16	53	63	78	309
120	120	15000	7	8	9	23	27	35	201
		20500	10	12	13	42	50	62	276
		23000	12	15	17	53	63	78	309
150	150	18000	4	5	7	16	30	35	167
		26000	9	10	13	33	62	72	241
		35000	15	18	23	59	112	131	325
170	170	21000	8	9	10	21	40	49	194
		30000	10	13	15	44	82	95	278
		35000	17	19	21	59	112	131	325
200 (1)	200	24000	16	15	14	21	53	67	171
		35000	22	21	20	44	112	133	250
		43000	24	26	29	66	169	195	307
230 (1)	230	27000	18	18	17	26	67	84	192
		39000	24	24	25	55	139	163	278
		43000	24	26	29	66	169	195	307

(1) Air cooled units only

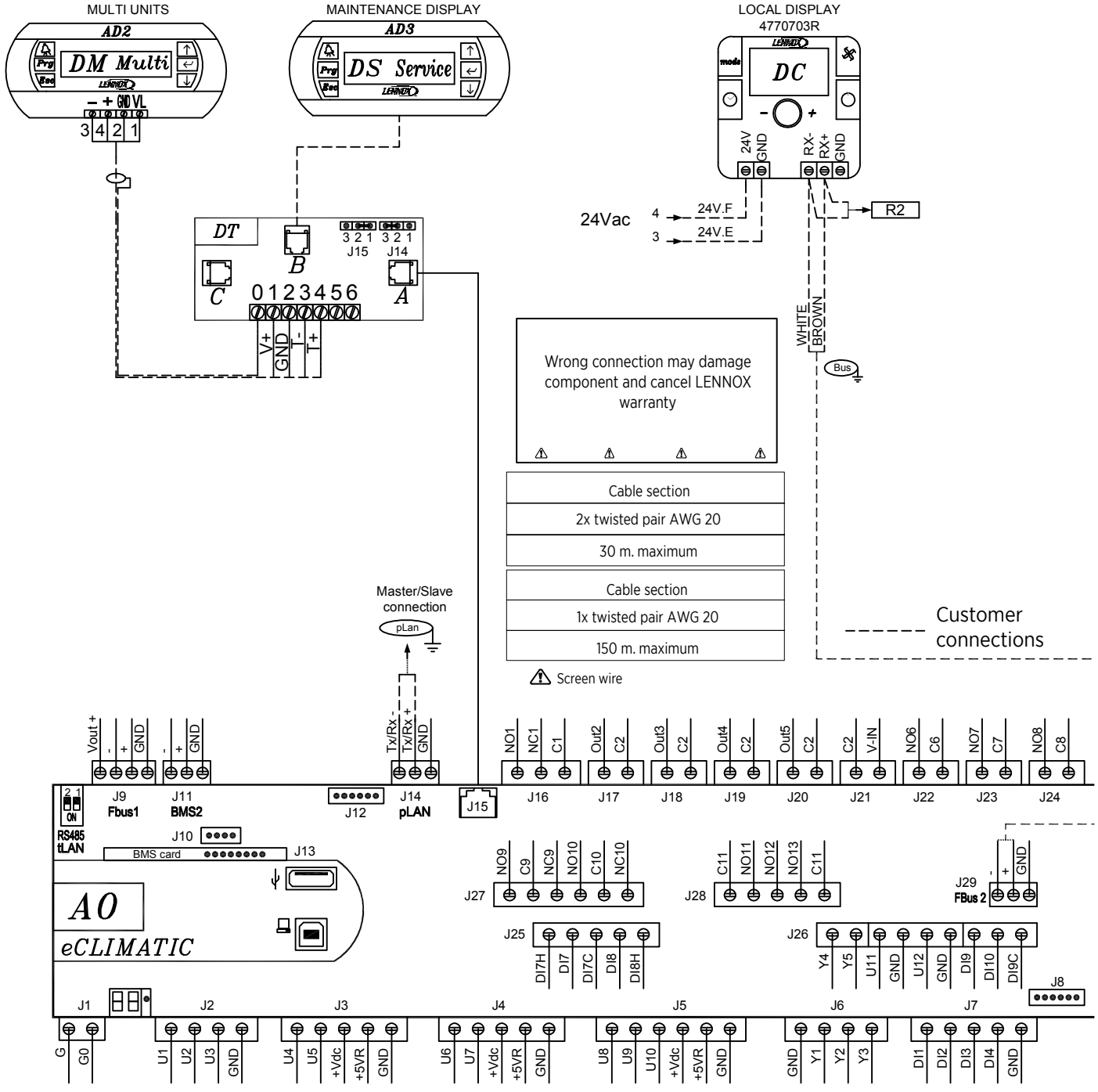
AIR COOLED & WATER COOLED UNITS

			090			085			100			120		
			PA kW	FLA A	SUA A	PA kW	FLA A	SUA A	PA kW	FLA A	SUA A	PA kW	FLA A	SUA A
With (not cumulative):														
Transformer			0,3	0,8	0,8	0,3	0,8	0,8	0,3	0,8	0,8	0,3	0,8	0,8
Compressor			31,1	50,6	183,3	34,8	58,6	226,3	46,6	75,6	252,8			
Condensing fan Aircooled units only			3,9	7,8	16,9	3,9	7,8	16,9	5,0	10,3	23,7			
Condensing fan (EC fan) Aircooled units only			3,7	5,7	5,7	3,7	5,7	5,7	4,2	6,4	6,4			
Indoor supply kit	Ø500 Aluminium	LP	5,7	8,6	8,6	5,7	8,6	8,6	5,7	8,6	8,6			
		HP	11,0	16,8	16,8	11,0	16,8	16,8	11,0	16,8	16,8			
	Ø560 Aluminium	LP	6,0	9,2	9,2	6,0	9,2	9,2	6,0	9,2	9,2			
		HP	9,4	14,6	14,6	9,4	14,6	14,6	9,4	14,6	14,6			
	Ø500 - Composite material	LP	5,2	8,0	8,0	5,2	8,0	8,0	5,2	8,0	8,0			
	Ø560 - Composite material	LP	5,8	8,9	8,9	5,8	8,9	8,9	5,8	8,9	8,9			
ELECTRICAL														
Electric heater		S	30,0	41,2	41,2	30,0	41,2	41,2	30,0	41,2	41,2			
		M	54,0	74,2	74,2	54,0	74,2	74,2	54,0	74,2	74,2			
		H	72,0	99,0	99,0	72,0	99,0	99,0	72,0	99,0	99,0			
Gas burner		S	0,16	0,40	0,40	0,16	0,40	0,40	0,16	0,40	0,40			
		H	0,25	0,63	0,63	0,25	0,63	0,63	0,25	0,63	0,63			
POWER AXIAL FAN VERTICAL														
			1,0	1,8	5,1	1,0	1,8	5,10	1,0	1,8	5,1			
EXTRACTION														
Axial extraction fan (Vertical or horizontal)	Aluminium	LP	5,7	8,6	8,6	5,7	8,6	8,6	5,7	8,6	8,6			
	Composite material	LP	5,8	8,9	8,9	5,8	8,9	8,9	5,8	8,9	8,9			
	Aluminium	HP	11,0	16,8	16,8	11,0	16,8	16,8	11,0	16,8	16,8			
ENERGY RECOVERY														
Rotary wheel motor			0,09	0,29	1,16	0,09	0,29	1,16	0,09	0,29	1,16			

			150			170			200			230		
			PA kW	FLA A	SUA A	PA kW	FLA A	SUA A	PA kW	FLA A	SUA A	PA kW	FLA A	SUA A
With (not cumulative):														
Transformer			0,3	0,8	0,8	0,3	0,8	0,8	0,3	0,8	0,8	0,3	0,8	0,8
Compressor			54,4	88,4	265,6	62,2	101,2	233,9	69,5	117,2	284,9	93,2	151,2	328,4
Condensing fan Aircooled unit only			3,9	7,8	16,9	5,0	10,3	23,7	7,8	15,6	33,8	9,9	20,6	47,5
Condensing fan (EC fan) Aircooled unit only			3,7	5,7	5,7	4,2	6,4	6,4	7,4	11,4	11,4	8,4	12,8	12,8
Indoor supply kit	Ø500 Aluminium	LP	8,5	12,9	12,9	8,5	12,9	12,9	9,0	13,8	13,8	9,0	13,8	13,8
		HP	16,5	25,2	25,2	16,5	25,2	25,2	14,1	21,9	21,9	14,1	21,9	21,9
	Ø560 Aluminium	LP	9,0	13,8	13,8	9,0	13,8	13,8	11,3	17,2	17,2	11,3	17,2	17,2
		HP	14,1	21,9	21,9	14,1	21,9	21,9	22,0	33,6	33,6	16,5	25,2	25,2
	Ø500 - Composite material	LP	7,8	12,0	12,0	7,8	12,0	12,0	8,7	13,3	13,3	8,7	13,3	13,3
	Ø560 - Composite material	LP	8,7	13,3	13,3	8,7	13,3	13,3	10,4	16,0	16,0	10,4	16,0	16,0
ELECTRICAL														
Electric heater		S	45,0	61,8	61,8	45,0	61,8	61,8	72,0	99,0	99,0	72,0	99,0	99,0
		M	72,0	99,0	99,0	72,0	99,0	99,0	108,0	148,5	148,5	108,0	148,5	148,5
		H	108,0	148,5	148,5	108,0	148,5	148,5	162,0	195,3	195,3	162,0	195,3	195,3
Gas burner		S	0,25	0,63	0,63	0,25	0,63	0,63	0,25	0,63	0,63	0,25	0,63	0,63
		H	0,25	0,63	0,63	0,25	0,63	0,63	0,25	0,63	0,63	0,25	0,63	0,63
POWER AXIAL FAN VERTICAL														
			1,02	1,83	5,10	1,02	1,83	5,10	1,02	1,83	5,10	1,02	1,83	5,10
EXTRACTION														
Axial extraction fan (Vertical or horizontal)	Aluminium	LP	8,5	12,9	12,9	8,5	12,9	12,9	9,0	13,8	13,8	9,0	13,8	13,8
	Composite material	LP	8,7	13,3	13,3	8,7	13,3	13,3	8,7	13,3	13,3	8,7	13,3	13,3
	Aluminium	HP	16,5	25,2	25,2	16,5	25,2	25,2	14,1	21,9	21,9	14,1	21,9	21,9
ENERGY RECOVERY														
Rotary wheel motor			0,18	0,58	2,32	0,18	0,58	2,32	0,18	0,58	2,32	0,18	0,58	2,32

PA	Absorbed power (kW)	**LP**	Low pressure	**S**	Standard heat
FLA	Full load amps (A)	**HP**	High pressure	**M**	Medium heat
SUA	Start up amps (A)			**H**	High heat

CONTROL TERMINAL CONNECTION
DS : REMOTE SERVICE DISPLAY / DC : COMFORT REMOTE DISPLAY
DM : REMOTE MULTI-UNITS DISPLAY

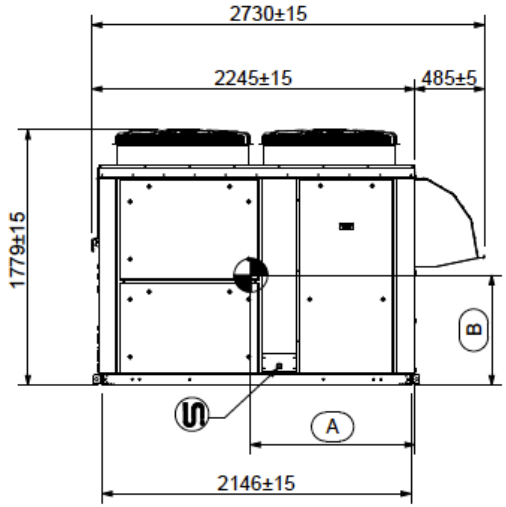


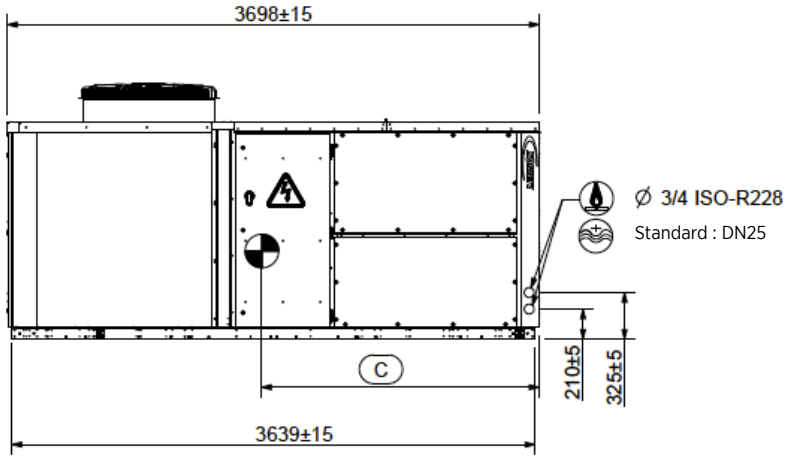
- For securing and connecting the Control Panel, consult the control panel Manual supplied with the unit.
- Connection between the DC and the unit must be made using shielded twisted pair cables (where the screen is connected to the earth by the side of the electrical panel) and with a two-lead cable.
- The Tx+ and Tx- polarities must strictly comply with the electrical diagram supplied with the unit.
- Wire the control. Minimum distance of 500 mm between control and power cables.
- Wire the control. Minimum distance of 500 mm between control and halogen lamps.
- Wire the control. Minimum distance of 500 mm between control and switchboard, antennas, transmitters...
- **NEVER ROLL UP THE EXCESSING CABLE, CUT THE CABLE FROM THE SIDE OF THE TERMINAL.**

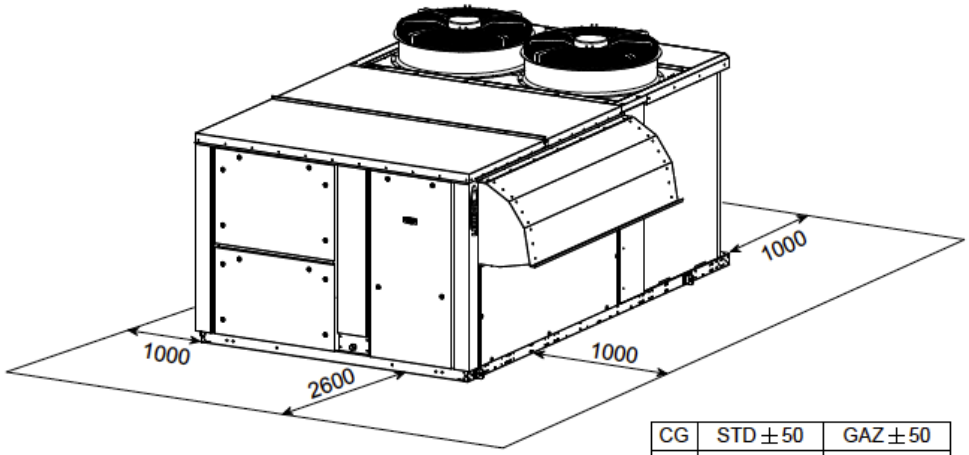
AIR COOLED UNITS

BASIC UNITS

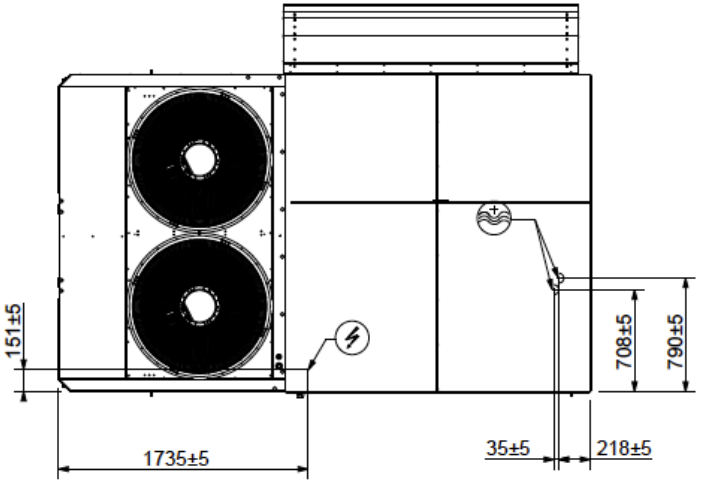
F BOX







CG	STD ± 50	GAZ ± 50
A	1059	1092
B	799	786
C	1635	1572



Electrical connection

Condensate draining

Water connection

Centre of gravity

All dimensions expressed in mm

For information only.
Centre of gravity position may vary according to the selected options.

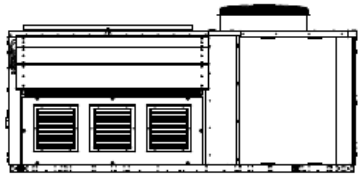
FLEXAIR_F_AC1(b)

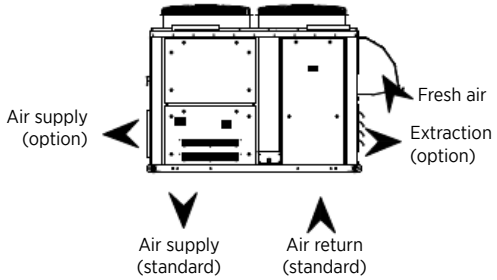
FAC/FAH 90/100/120

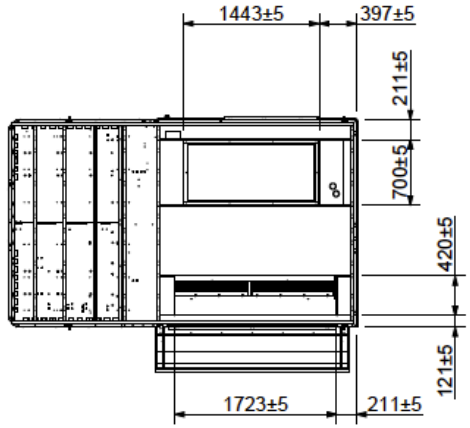
F BOX

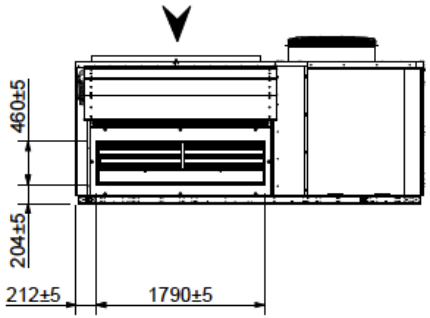
AIR COOLED UNITS

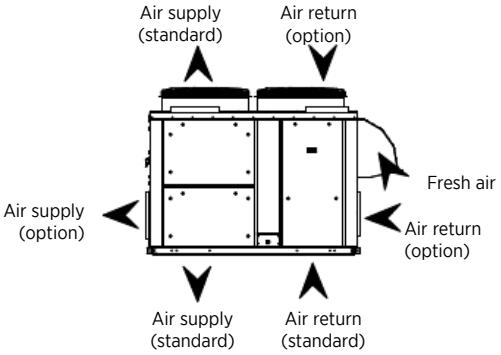
BASIC UNITS

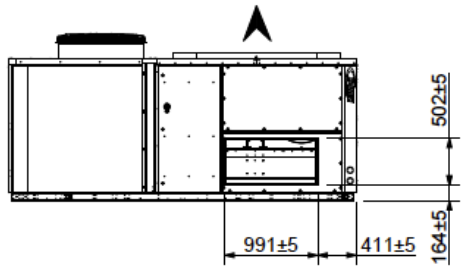


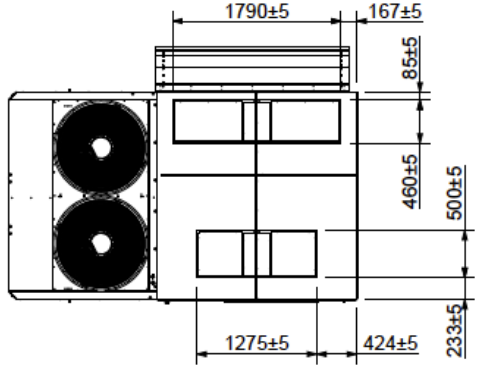












WEIGHTS - KG

FLEXAIR	090	100	120
Standard air cooled unit FAH	1050	1150	1150

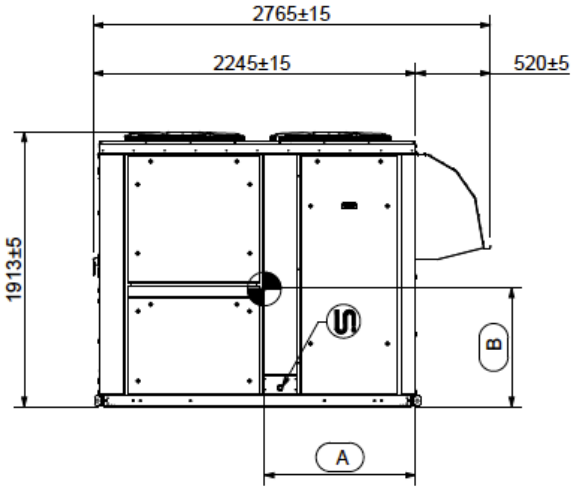
All dimensions expressed in mm

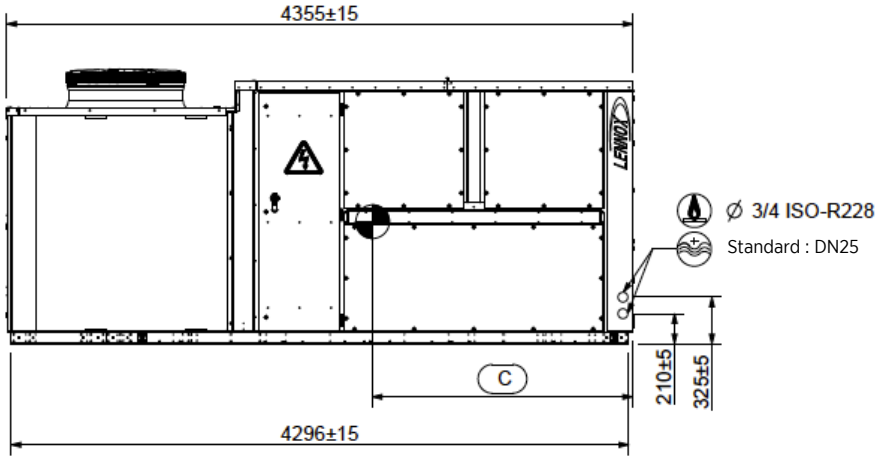
FLEXAIR_F_AC1(b)

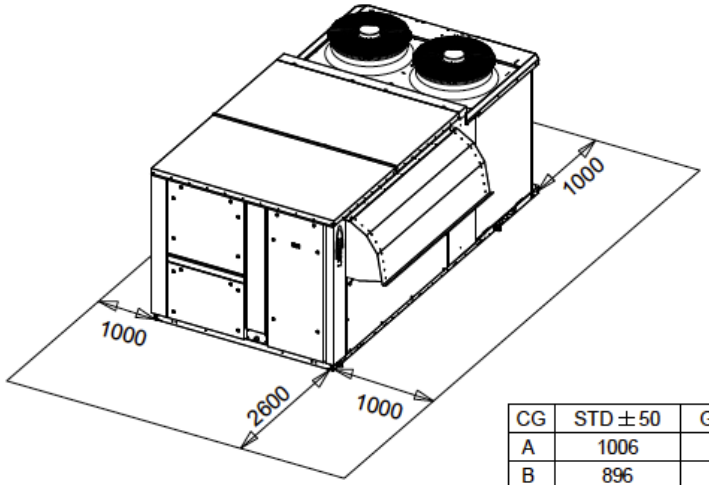
FAC/FAH 150/170 G BOX

AIR COOLED UNITS

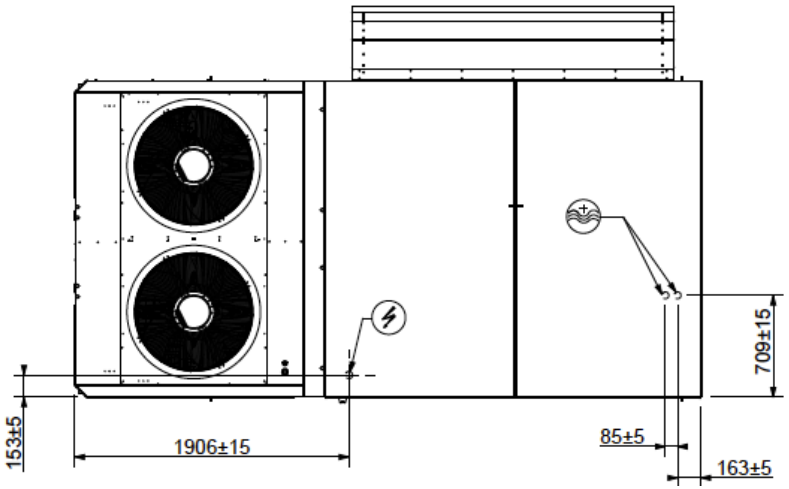
BASIC UNITS







CG	STD ± 50	GAZ ± 50
A	1006	1023
B	896	887
C	1849	1830



Electrical connection

Condensate draining

Water connection

Centre of gravity

All dimensions expressed in mm

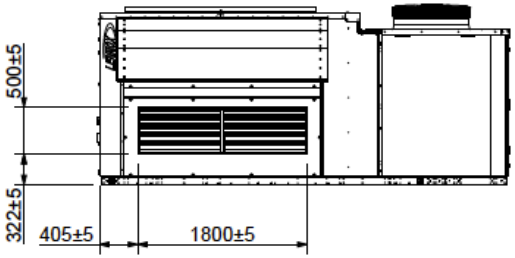
For information only.
Centre of gravity position may vary according to the selected options.

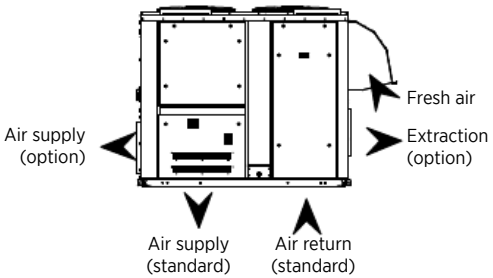
FLEXAIR_G_AC1(b)

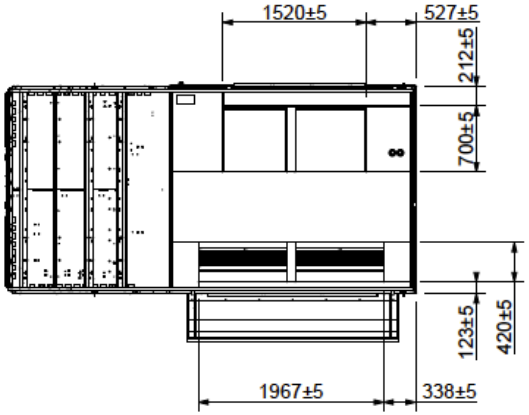
FAC/FAH 150/170
G BOX

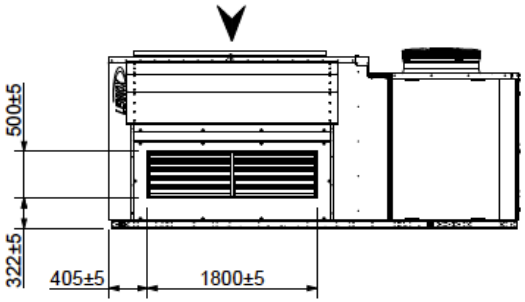
AIR COOLED UNITS

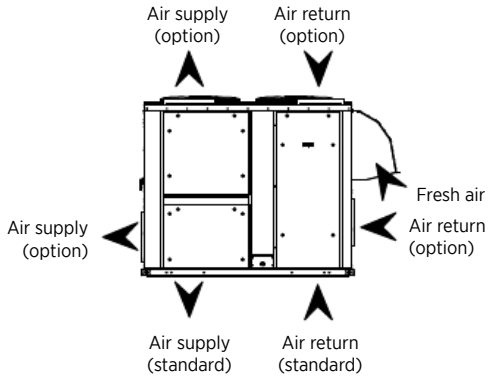
BASIC UNITS

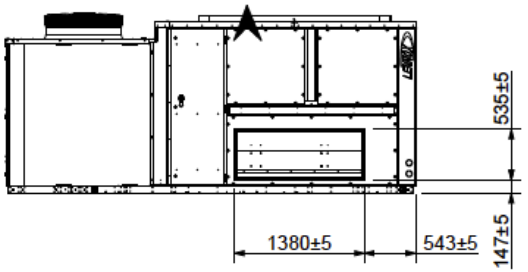


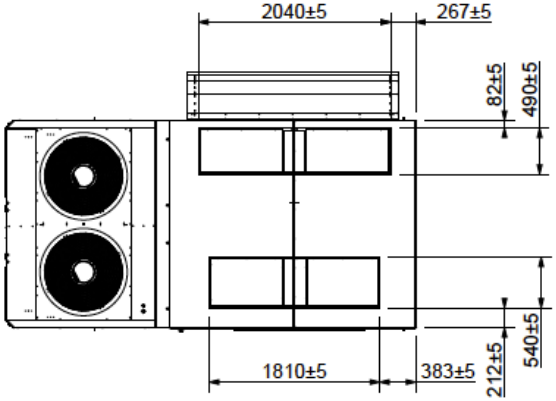












WEIGHTS - KG

FLEXAIR	150	170
Standard air cooled unit FAH	1500	1600

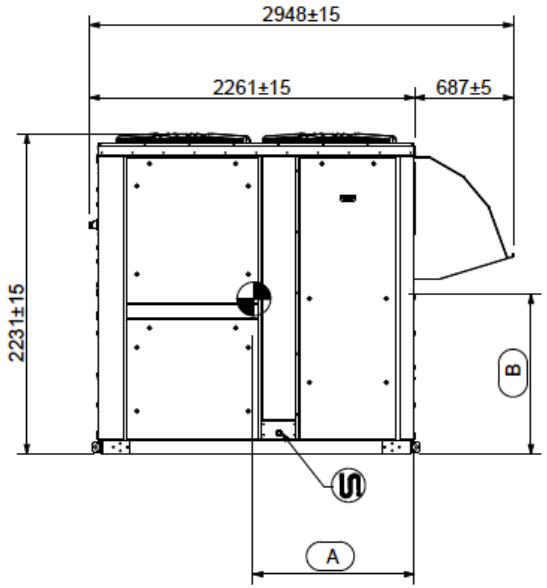
All dimensions expressed in mm

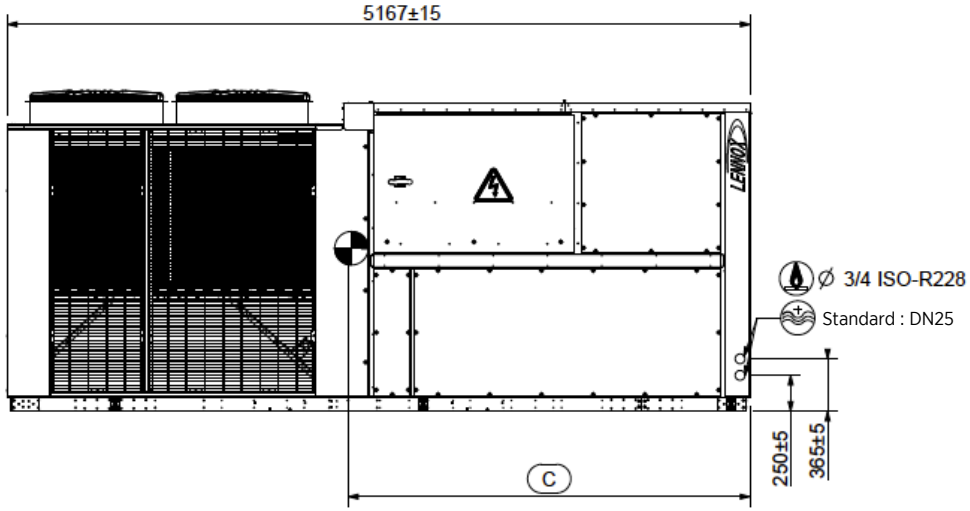
FLEXAIR_G_AC1(b)

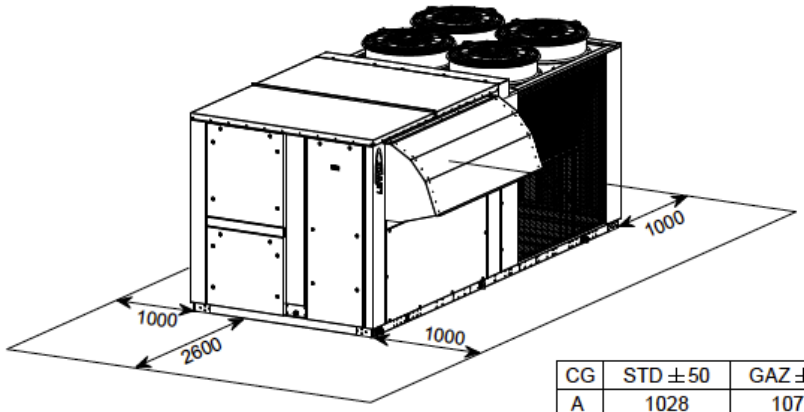
FAC/FAH 200/230 H BOX

AIR COOLED UNITS

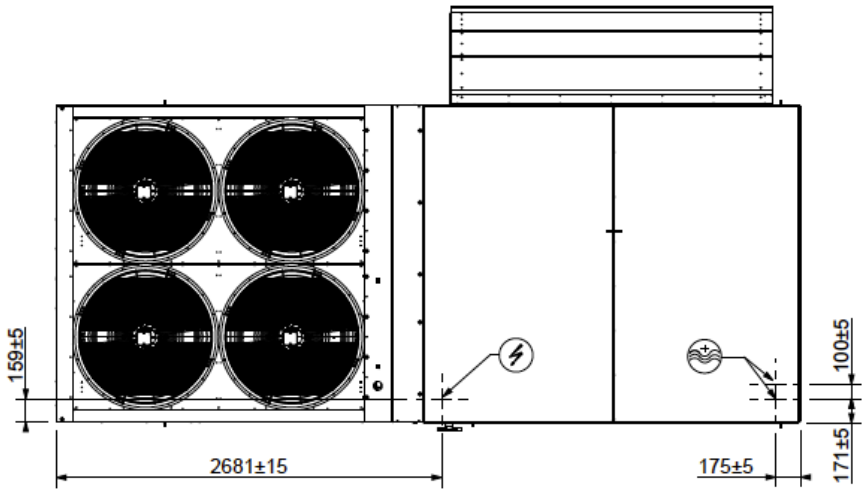
BASIC UNITS







CG	STD ±50	GAZ ±50
A	1028	1077
B	1081	1073
C	1914	1834



Electrical connection
Condensate draining
Water connection
Centre of gravity

All dimensions expressed in mm

For information only.
Centre of gravity position may vary according to the selected options.

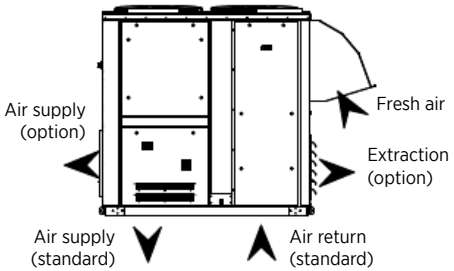
FLEXAIR_H_AC1(b)

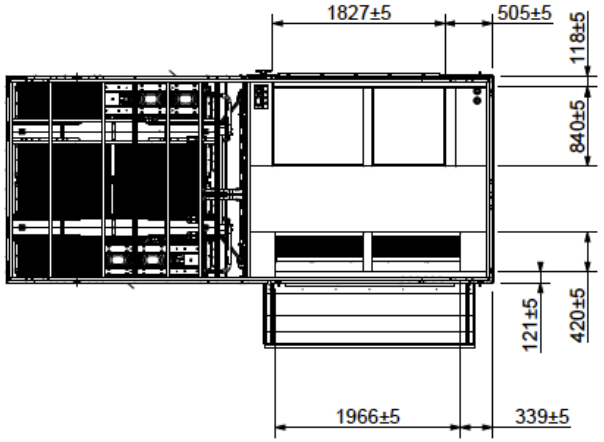
FAC/FAH 200/230

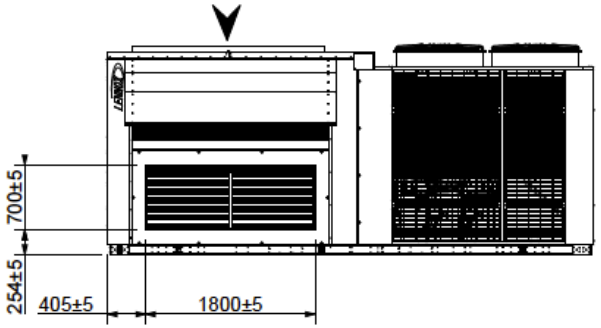
H BOX

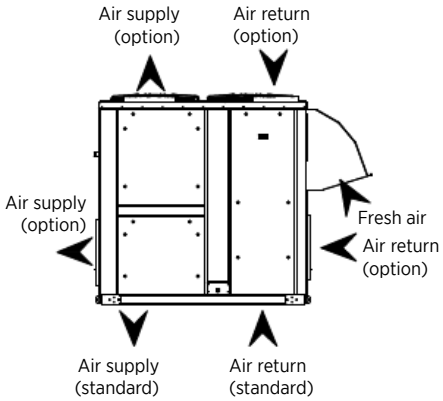
AIR COOLED UNITS

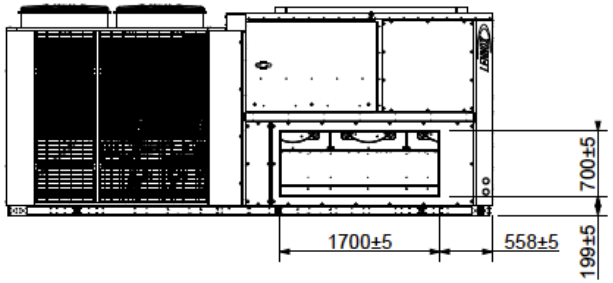
BASIC UNITS

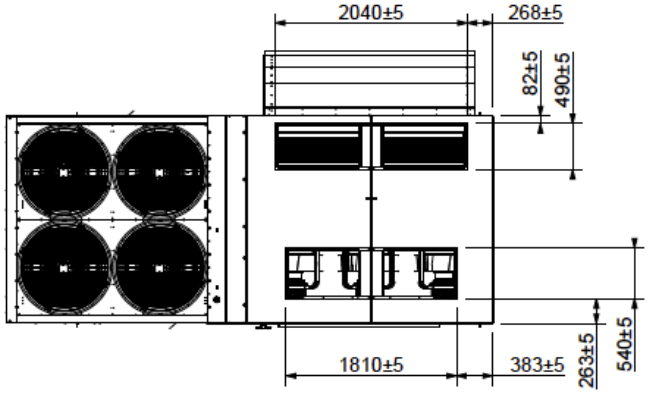












WEIGHTS - KG

FLEXAIR	200	230
Standard air cooled unit FAH	2100	2100

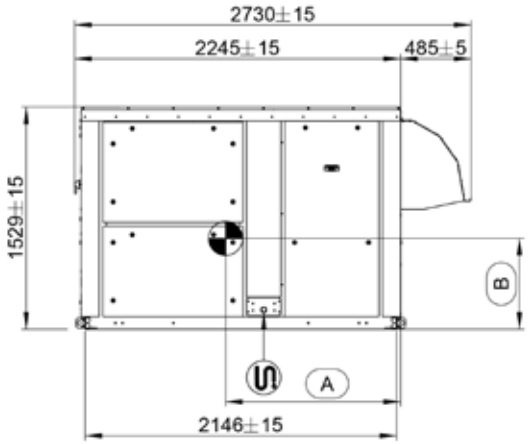
All dimensions expressed in mm

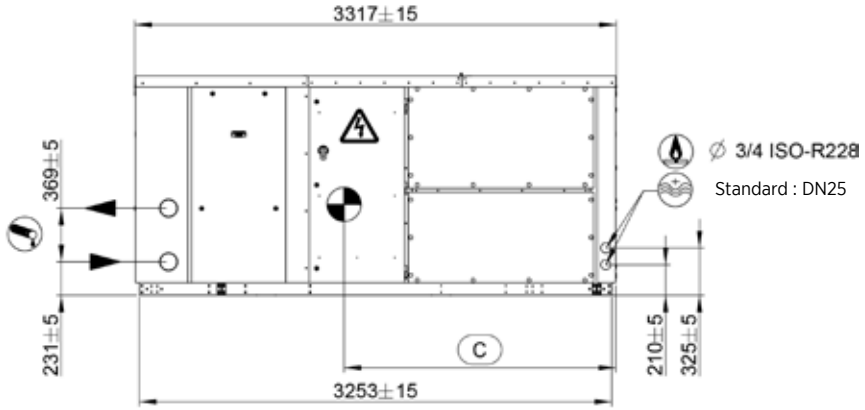
FLEXAIR_H_AC1(b)

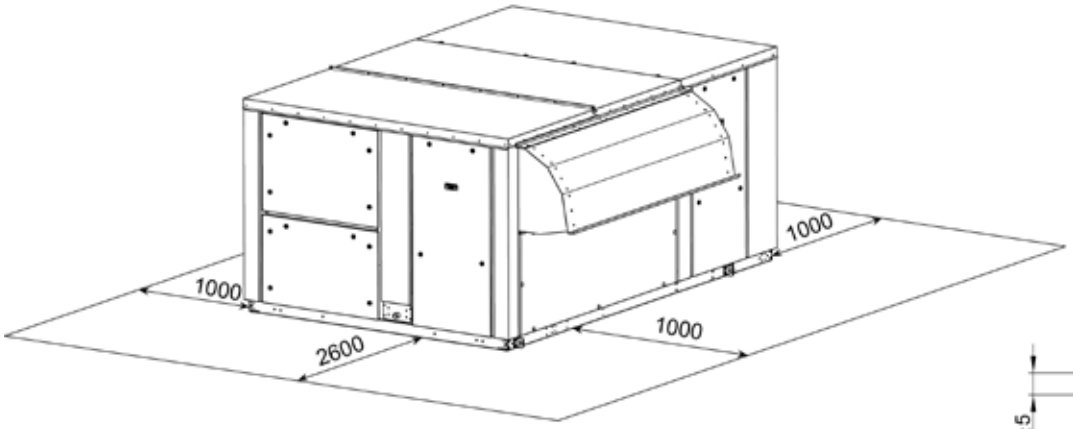
FAC/FAH
085/100/120
F BOX

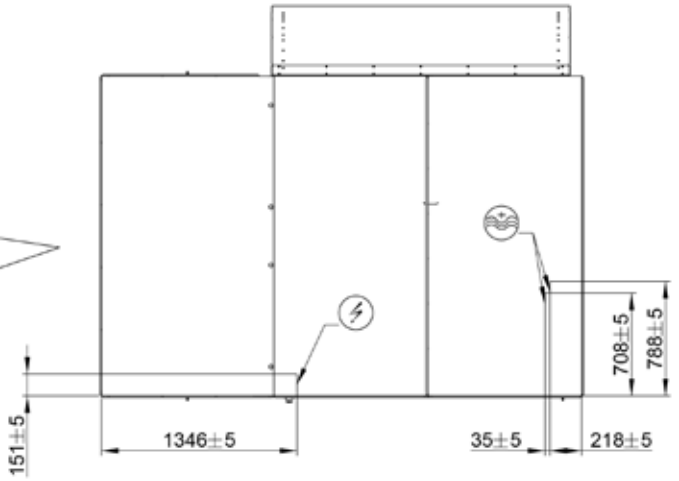
WATER COOLED UNITS

BASIC UNITS









- Electrical connection
- Condensate draining
- Water connection
- Centre of gravity
- Water inlet/outlet

CG	STD ±50	GAZ ±50
A	1205	1235
B	625	620
C	1870	1785

All dimensions expressed in mm

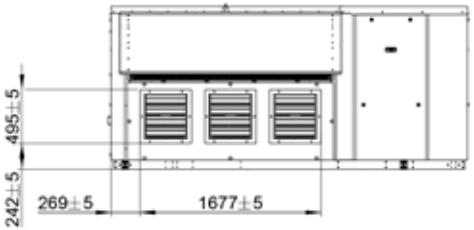
For information only.
Centre of gravity position may vary according to the selected options.

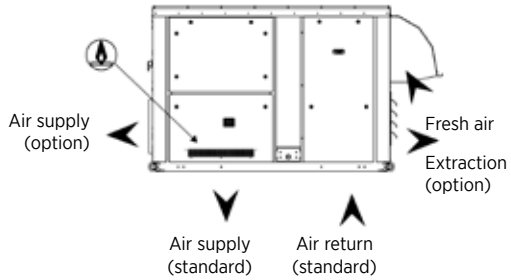
FLEXAIR_F_ac1_WC_z

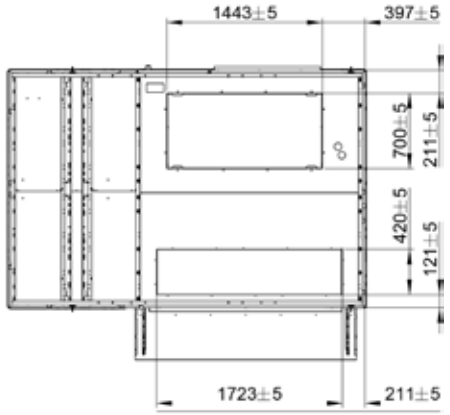
FAC/FAH 085/100/120 F BOX

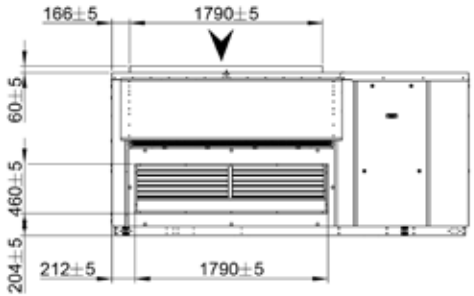
WATER COOLED UNITS

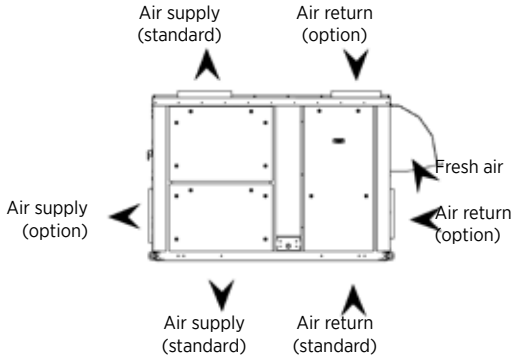
BASIC UNITS

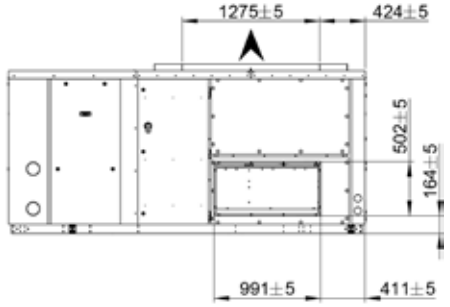


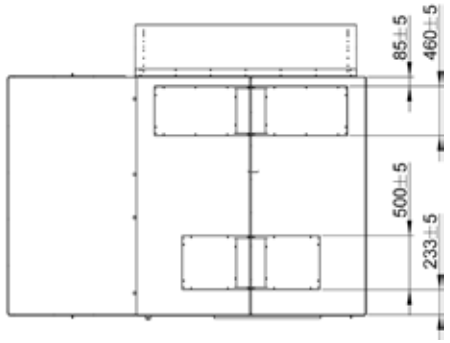












WEIGHTS - KG

FLEXAIR	085	100	120
Standard water cooled unit FAH	1000	1100	1150

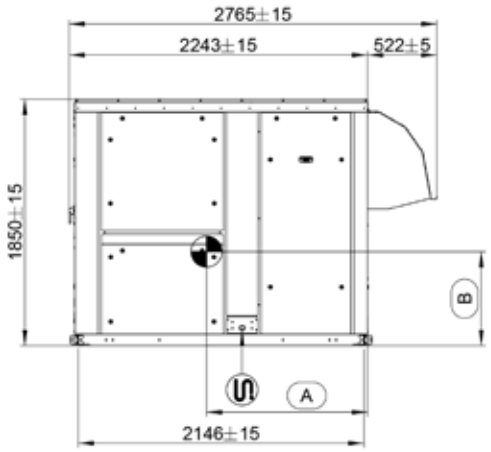
All dimensions expressed in mm

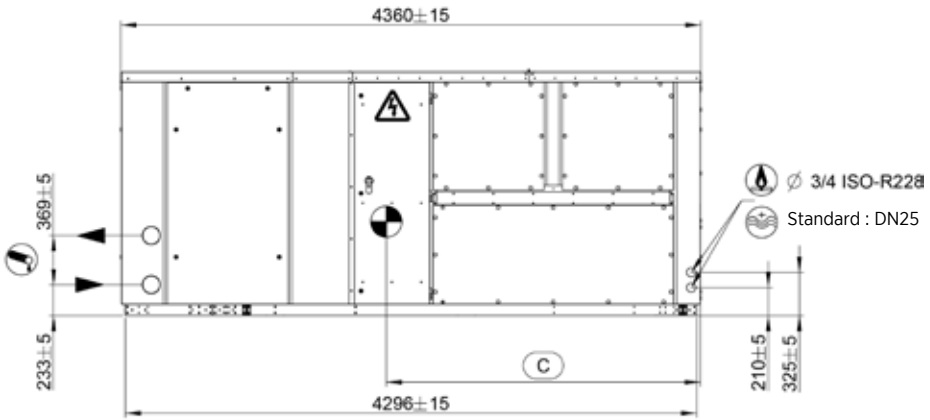
FLEXAIR_F_ac1_WC_z

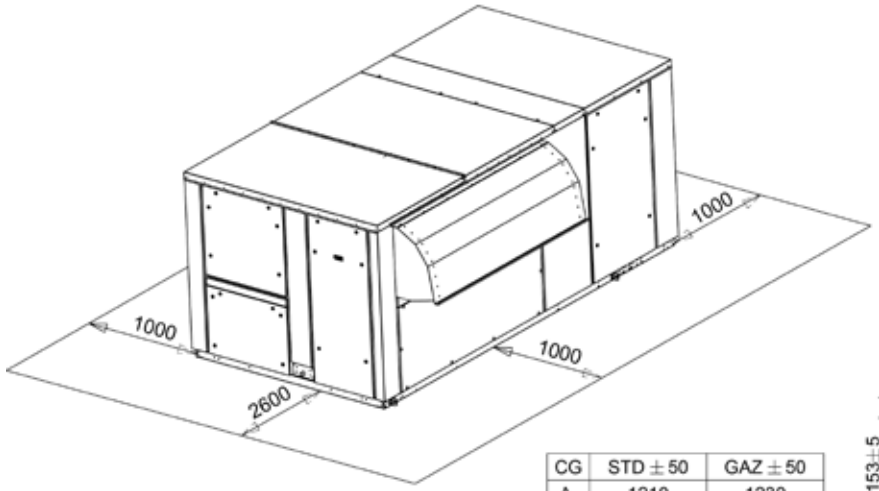
FAC/FAH 150/170 G BOX

WATER COOLED UNITS

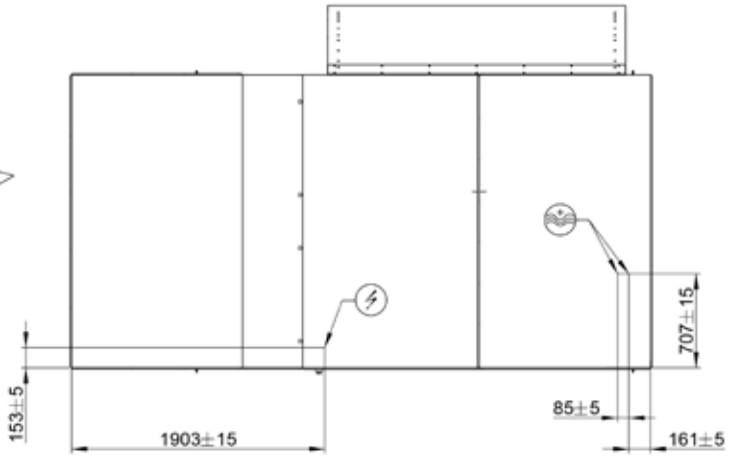
BASIC UNITS







CG	STD ± 50	GAZ ± 50
A	1210	1230
B	705	700
C	2360	2210



- Electrical connection
- Condensate draining
- Water connection
- Centre of gravity
- Water inlet/outlet

All dimensions expressed in mm

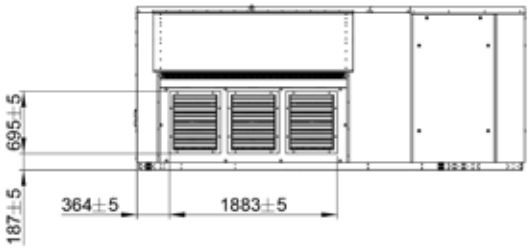
For information only.
Centre of gravity position may vary according to the selected options.

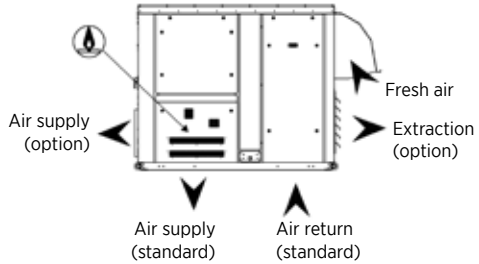
FLEXAIR_G_AC1(b)

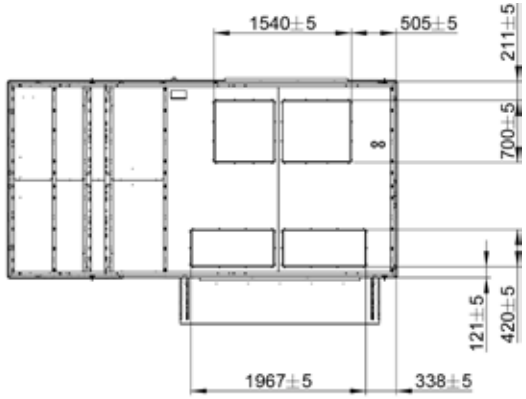
FAC/FAH 150/170

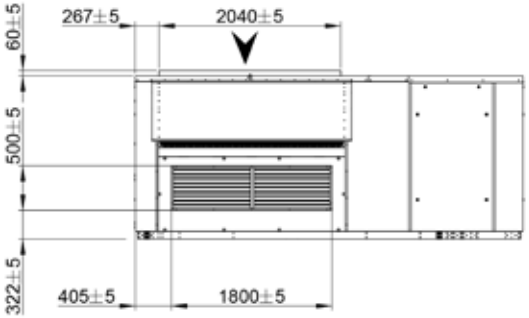
WATER COOLED UNITS

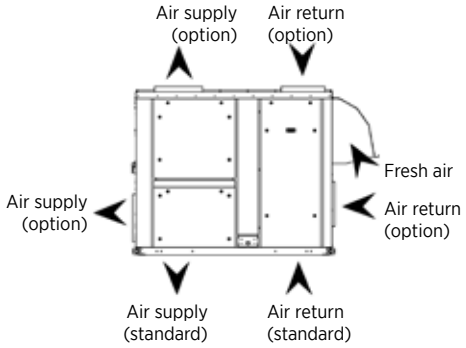
BASIC UNITS

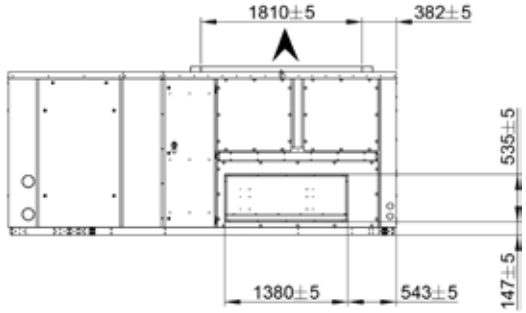






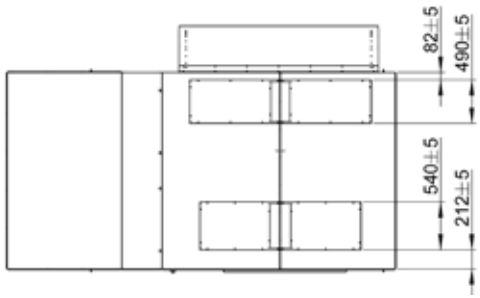






WEIGHTS - KG

FLEXAIR	150	170
Standard water cooled unit FAH	1400	1500



All dimensions expressed in mm

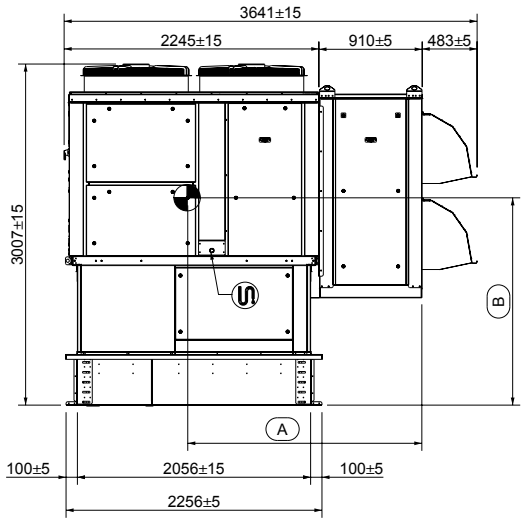
FLEXAIR_G_AC1(b)

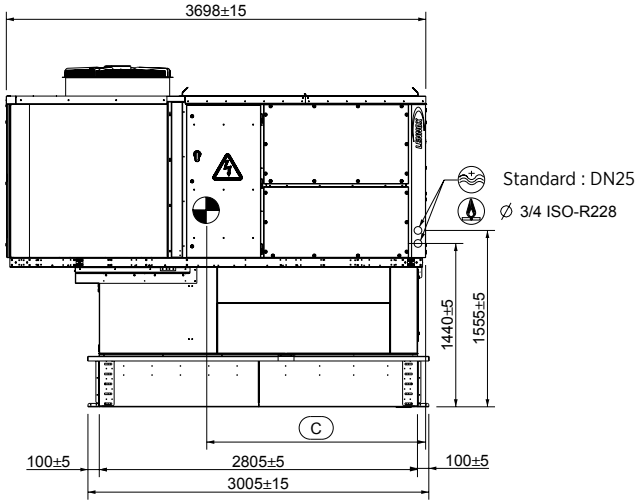
FAC/FAH 090/100/120

F BOX

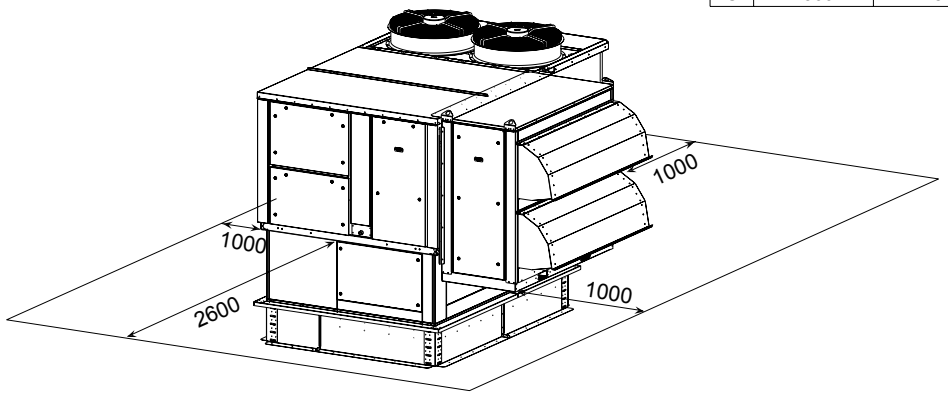
AIR COOLED UNITS

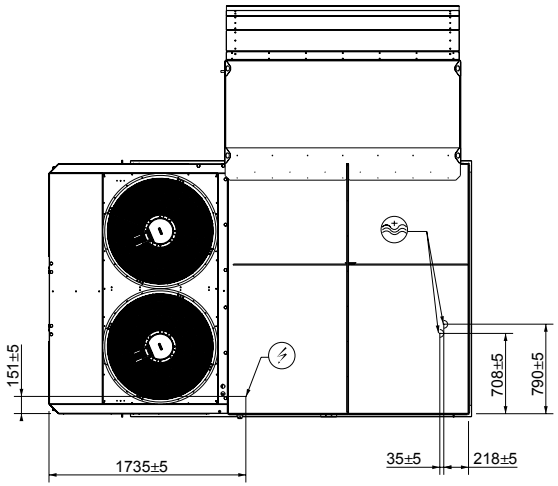
UNITS WITH MULTIDIRECTIONAL ROOFCURB AND ENERGY RECOVERY MODULE





CG	STD ± 50	GAZ ± 50
A	1787	1826
B	1742	1734
C	1509	1482





Electrical connection

Condensate draining

Water connection

Centre of gravity

All dimensions expressed in mm

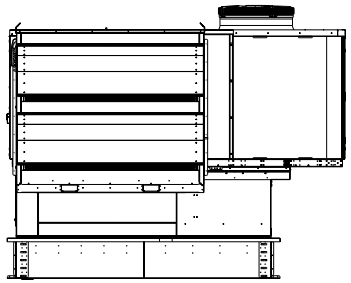
For information only.
Centre of gravity position may vary according to the selected options.

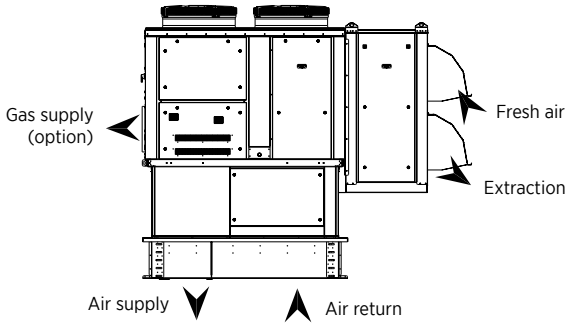
FLEXAIR_F_A1_ERHO_HRMO (a)

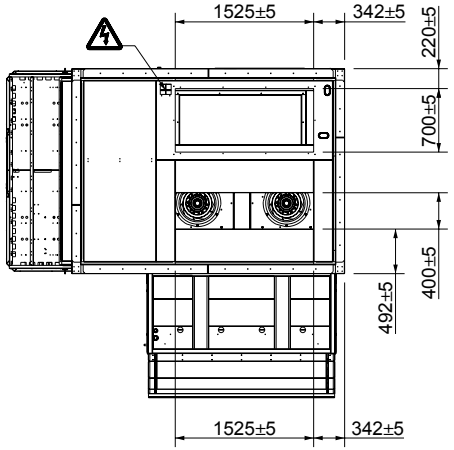
FAC/FAH
090/100/120
F BOX

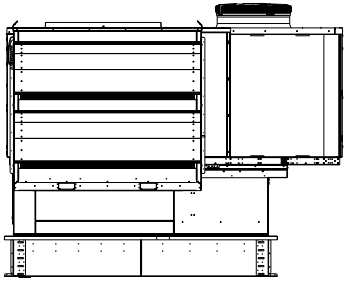
AIR COOLED UNITS

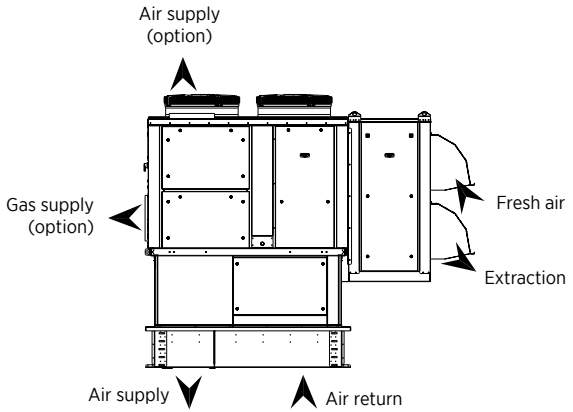
UNITS WITH MULTIDIRECTIONAL ROOFCURB AND ENERGY RECOVERY MODULE

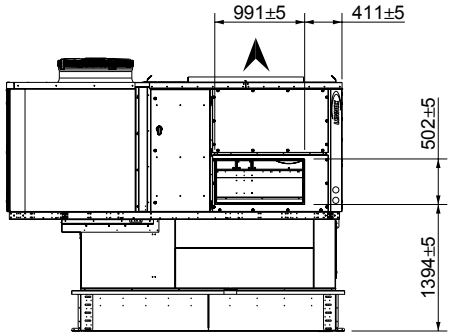


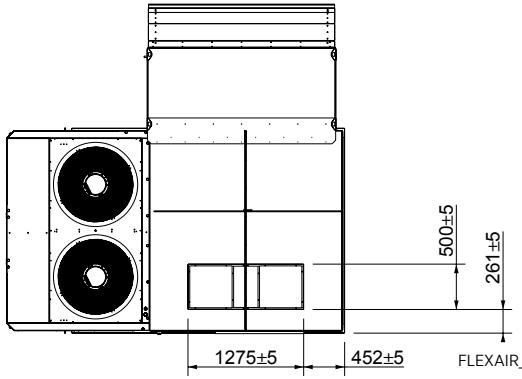












All dimensions expressed in mm

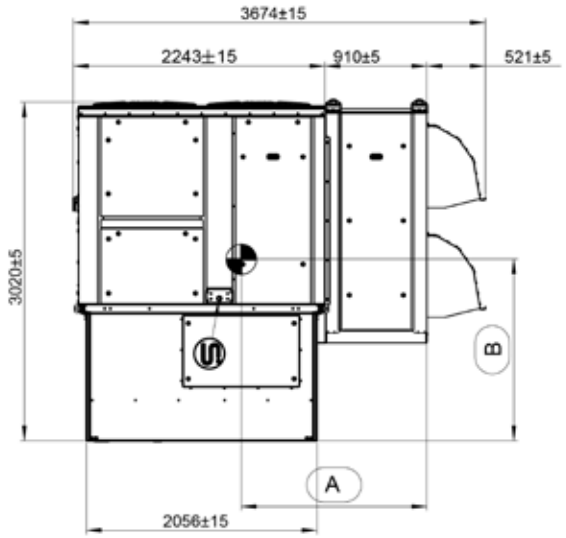
FLEXAIR_F_A1_ERHO_HRMO (a)

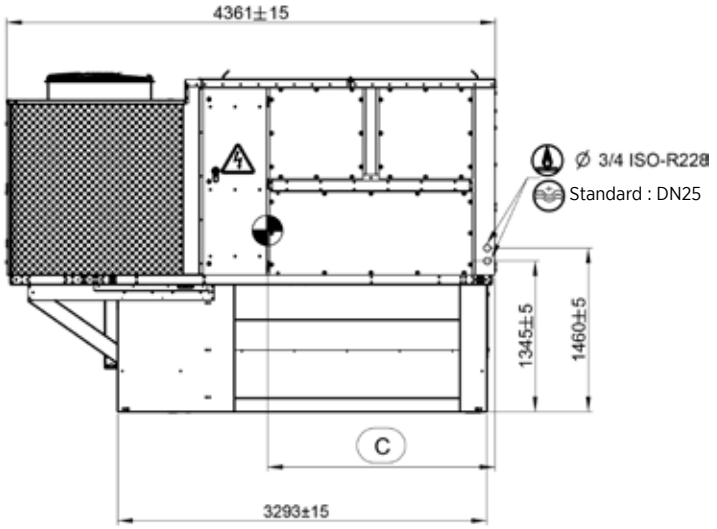
FAC/FAH 150/170

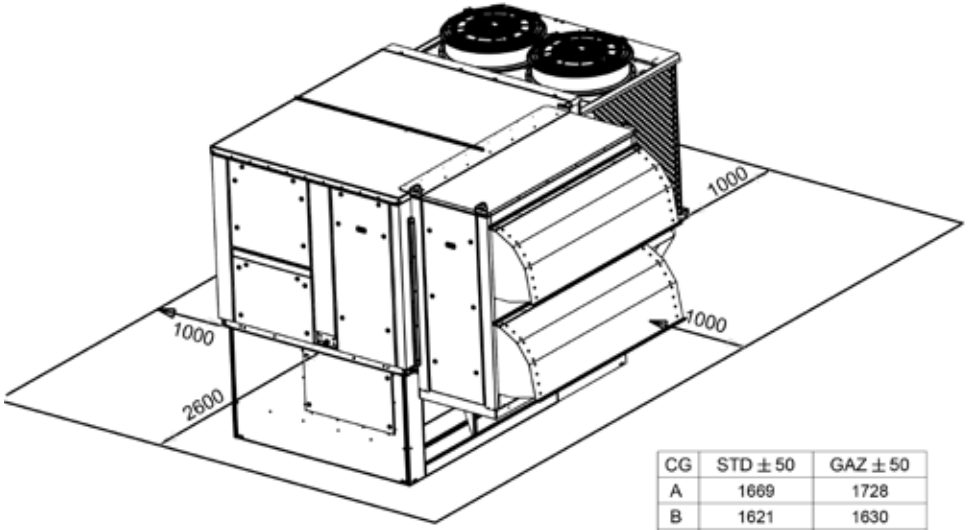
G BOX

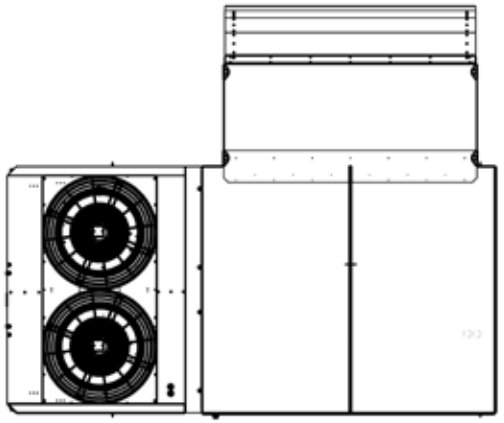
AIR COOLED UNITS

UNITS WITH MULTIDIRECTIONAL ROOFCURB AND ENERGY RECOVERY MODULE









CG	STD ± 50	GAZ ± 50
A	1669	1728
B	1621	1630
C	2027	1960

Electrical connection

Condensate draining

Water connection

Centre of gravity

All dimensions expressed in mm

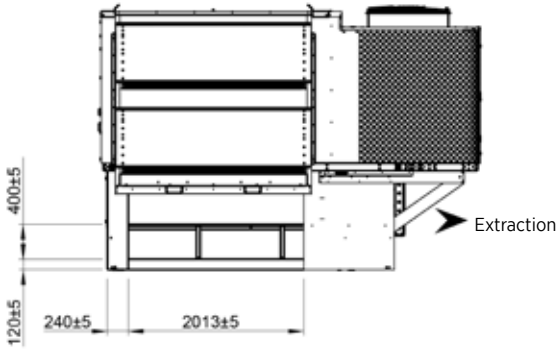
For information only.
Centre of gravity position may vary according to the selected options.

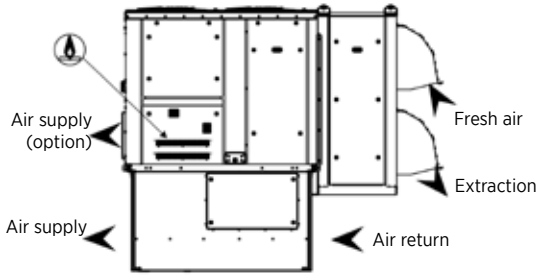
FLEXAIR_G_ERHO_HRMO(a)_Folio 1

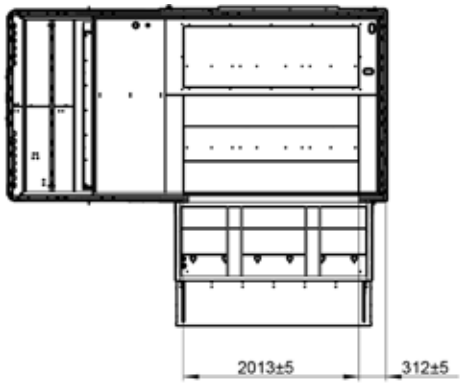
FAC/FAH
150/170
G BOX

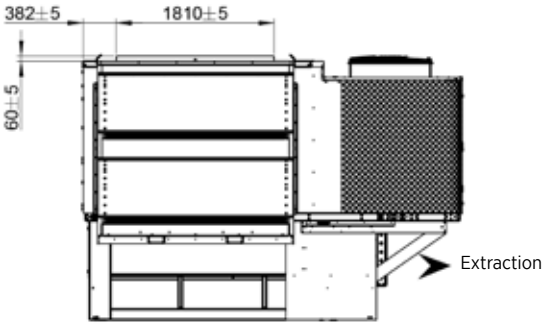
AIR COOLED UNITS

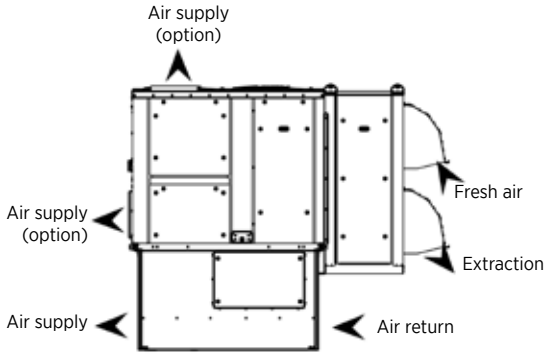
UNITS WITH MULTIDIRECTIONAL ROOFCURB AND ENERGY RECOVERY MODULE

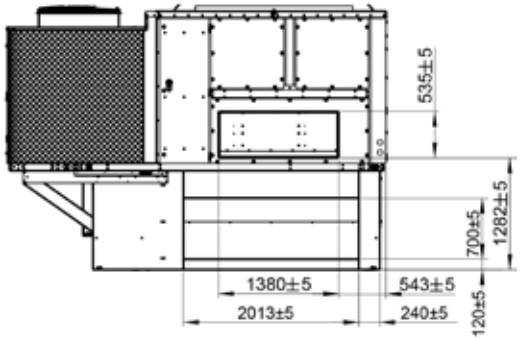


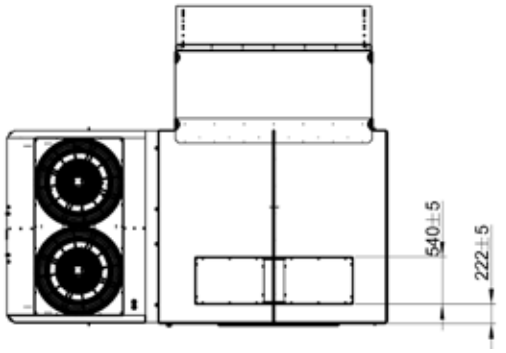












All dimensions expressed in mm

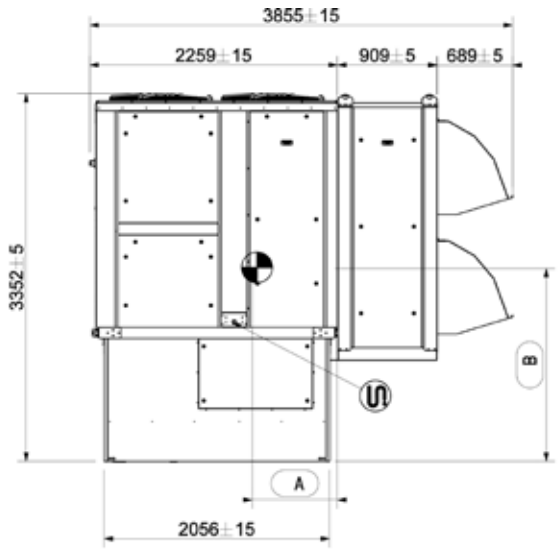
FLEXAIR_G_ERHO_HRMO(a)_
Folio 2

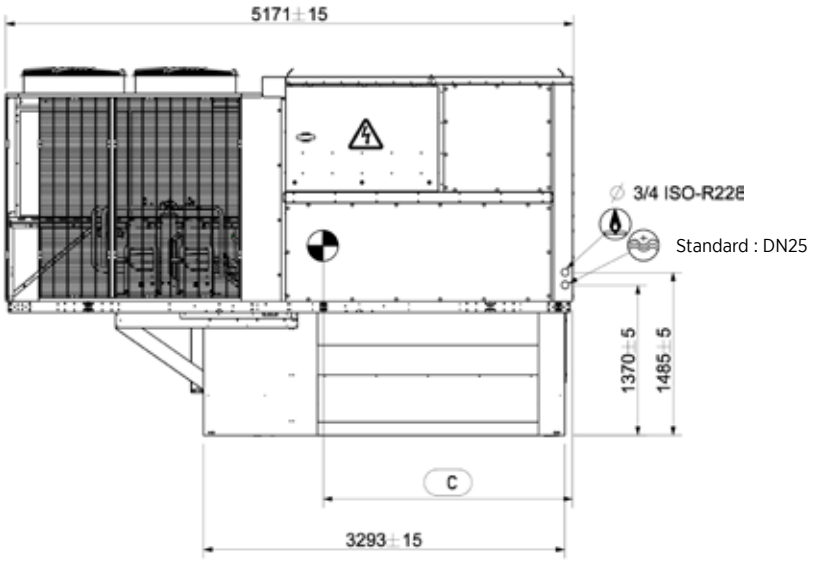
FAC/FAH 200/230

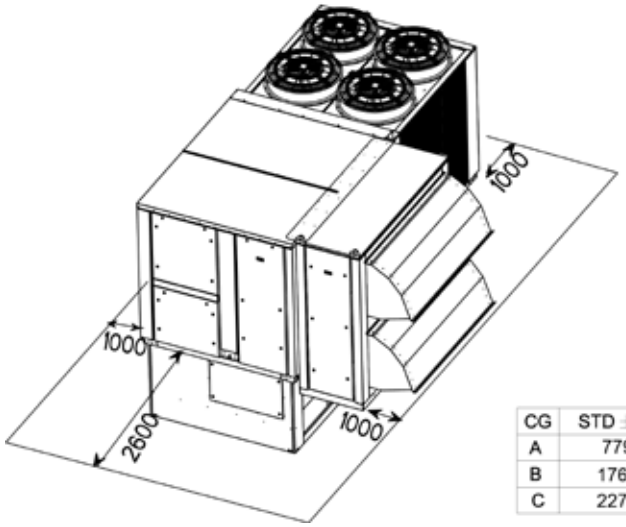
H BOX

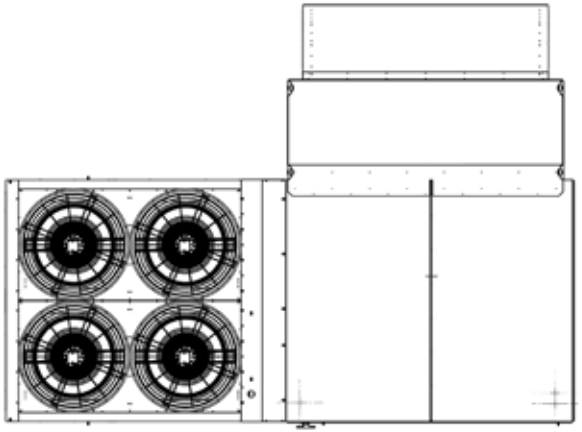
AIR COOLED UNITS

UNITS WITH MULTIDIRECTIONAL ROOFCURB AND ENERGY RECOVERY MODULE









- Electrical connection
- Condensate draining
- Water connection
- Centre of gravity

CG	STD ±50	GAZ ±50
A	779	840
B	1763	1770
C	2273	2199

All dimensions expressed in mm

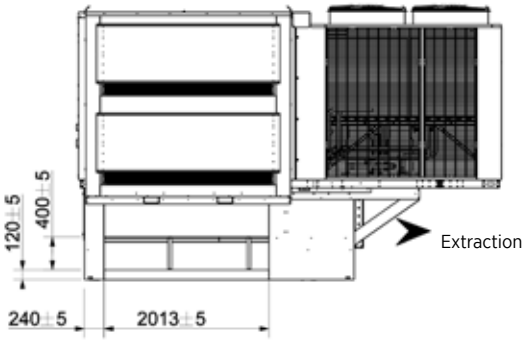
For information only.
Centre of gravity position may vary according to the selected options.

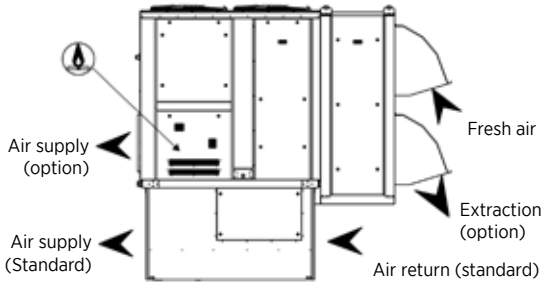
FLEXAIR_F_AC1_ERHO_HRMO(b)_
Folio 1

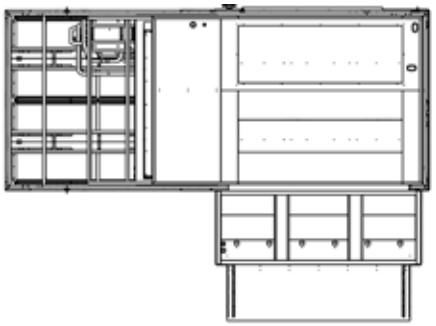
FAC/FAH
200/230
H BOX

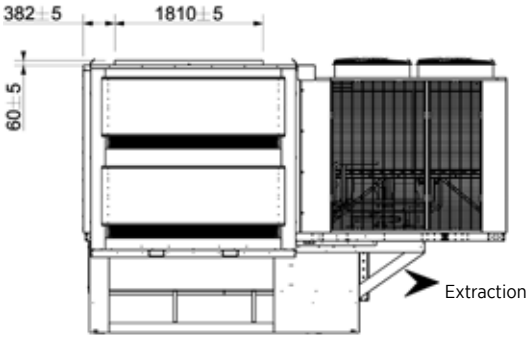
AIR COOLED UNITS

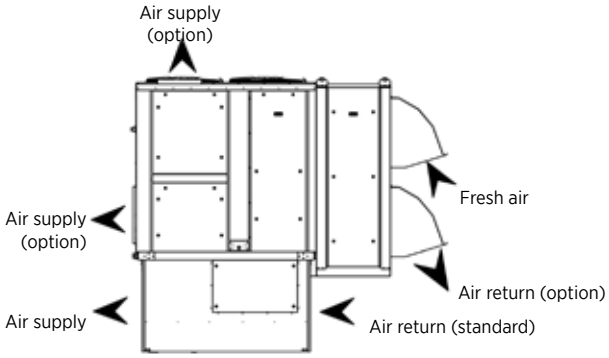
UNITS WITH MULTIDIRECTIONAL ROOFCURB AND ENERGY RECOVERY MODULE

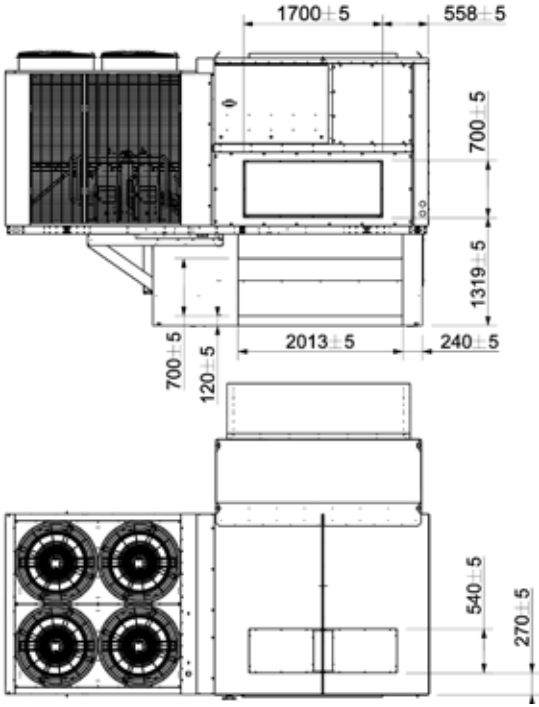












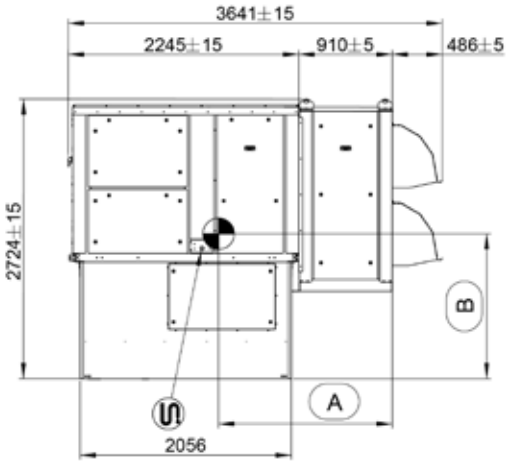
All dimensions expressed in mm

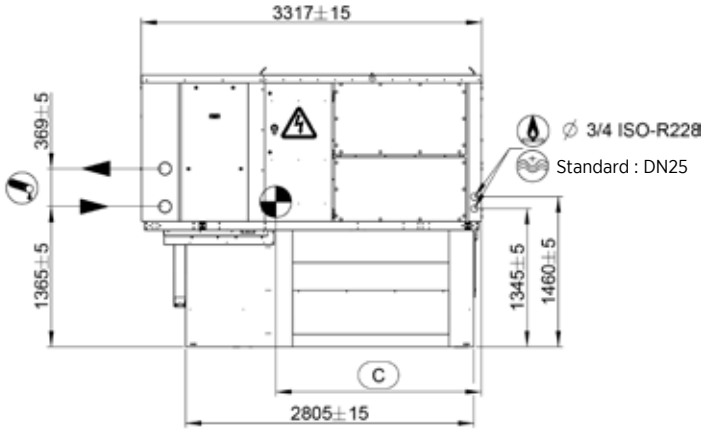
FLEXAIR_F_AC1_ERHO_HRMO(b)_
Folio 2

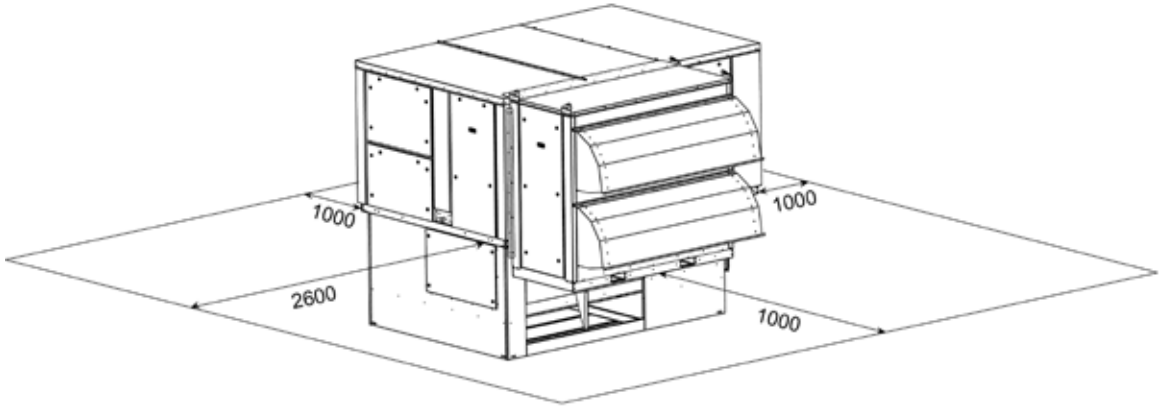
FAC/FAH
085/100/120
F BOX

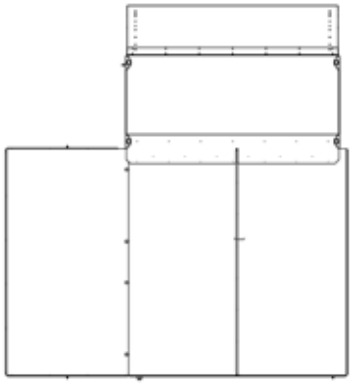
WATER COOLED UNITS

UNITS WITH MULTIDIRECTIONAL ROOFCURB AND ENERGY RECOVERY MODULE









Electrical connection
Condensate draining
Water connection
Centre of gravity
Water inlet/outlet

CG	STD ±50	GAZ ±50
A	1690	1730
B	1410	1425
C	1595	1570

All dimensions expressed in mm

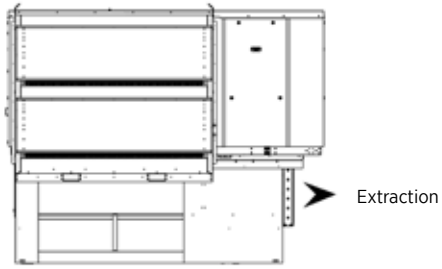
For information only.
Centre of gravity position may vary according to the selected options.

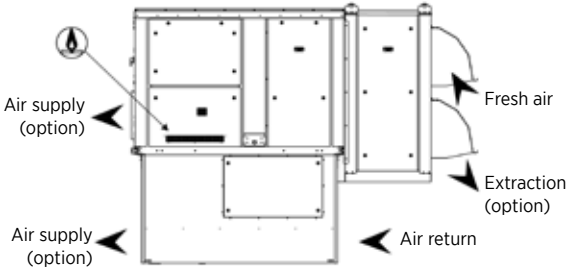
FLEXAIR_F_AC1(b)

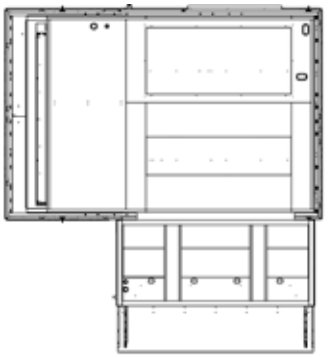
FAC/FAH
085/100/120
F BOX

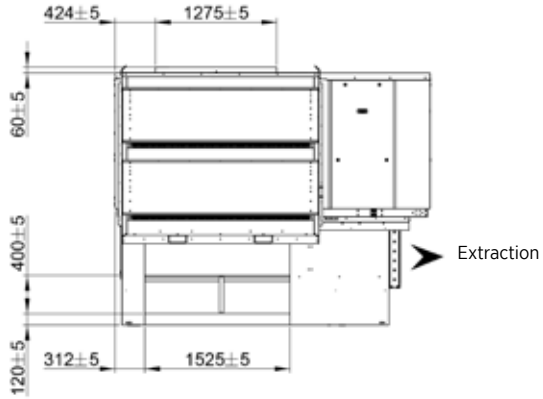
WATER COOLED UNITS

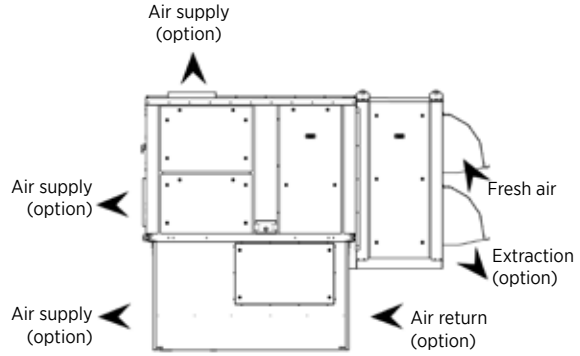
UNITS WITH MULTIDIRECTIONAL ROOFCURB AND ENERGY RECOVERY MODULE

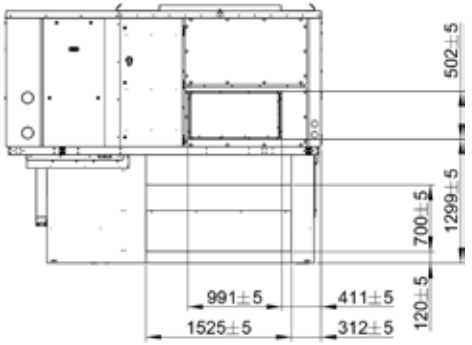


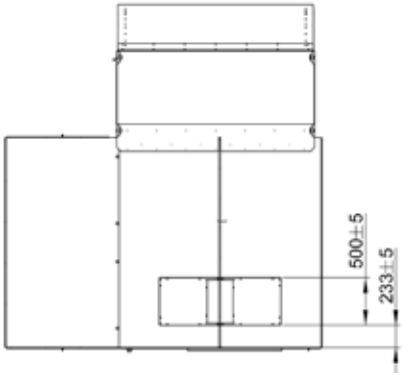












All dimensions expressed in mm

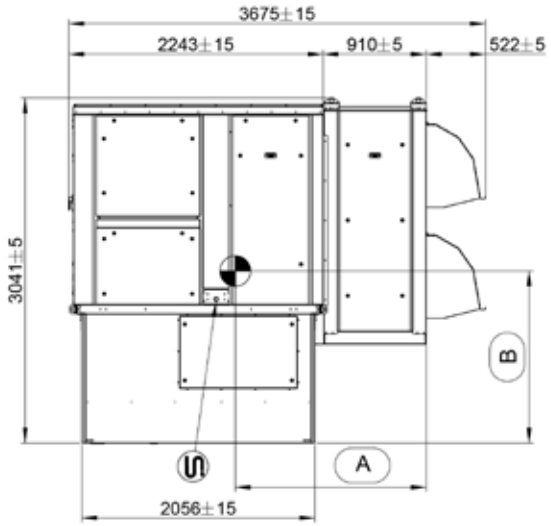
IR_F_AC1(b)

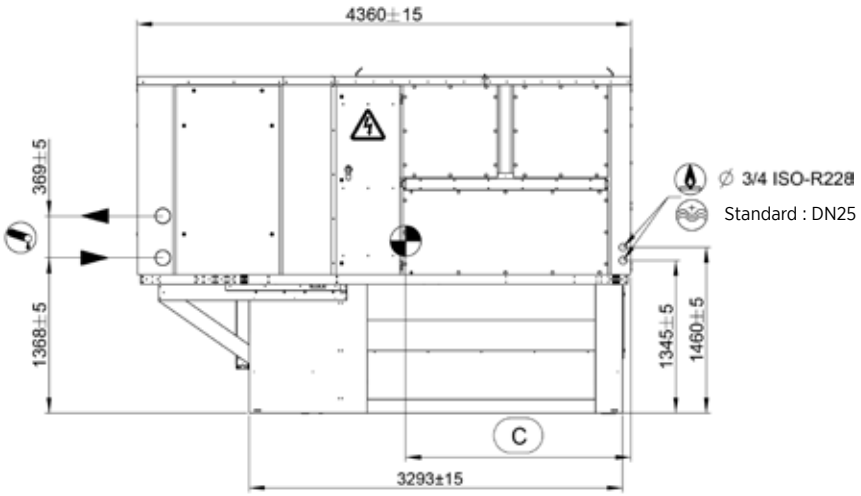
FAC/FAH 150/170

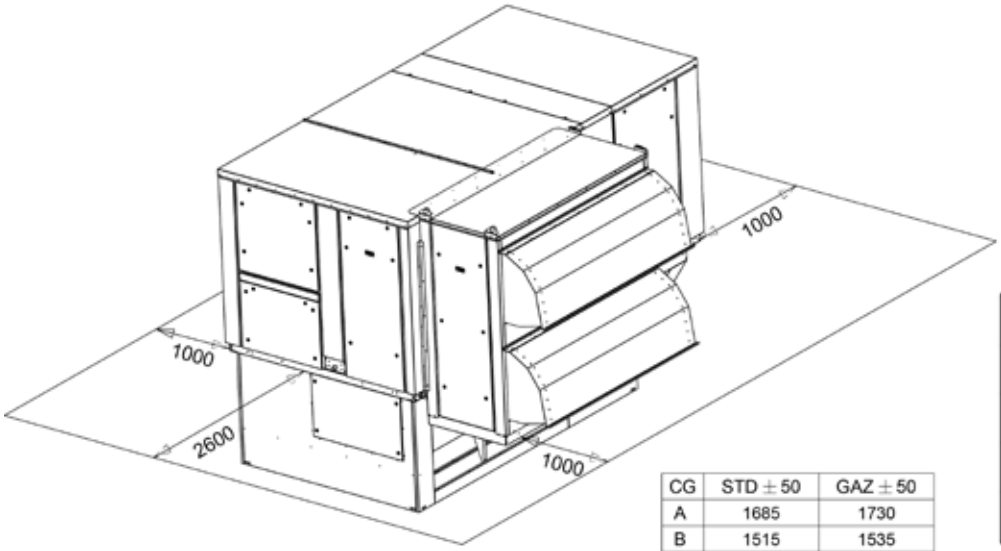
G BOX

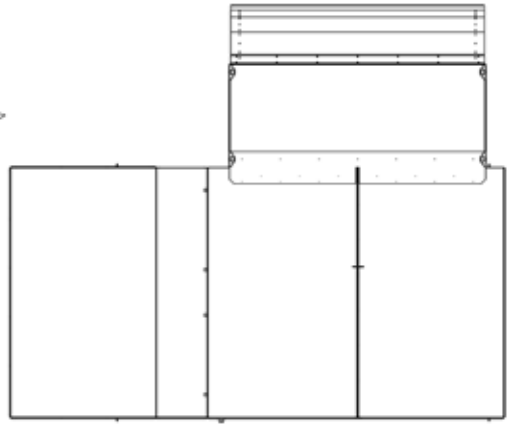
WATER COOLED UNITS

UNITS WITH MULTIDIRECTIONAL ROOFCURB AND ENERGY RECOVERY MODULE









CG	STD ± 50	GAZ ± 50
A	1685	1730
B	1515	1535
C	1985	1940

- Electrical connection
- Condensate draining
- Water connection
- Centre of gravity
- Water inlet/outlet

All dimensions expressed in mm

For information only.
Centre of gravity position may vary according to the selected options.

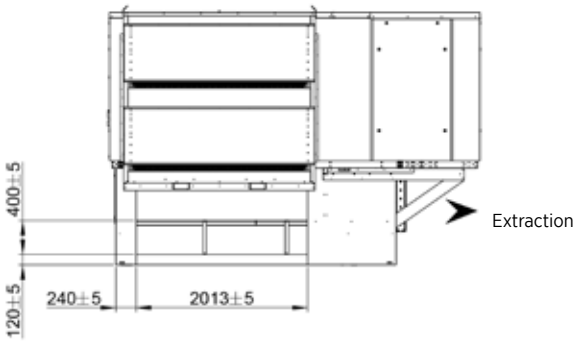
FLEXAIR_G_AC1_
ERHO_HRMO(b)_Folio 1

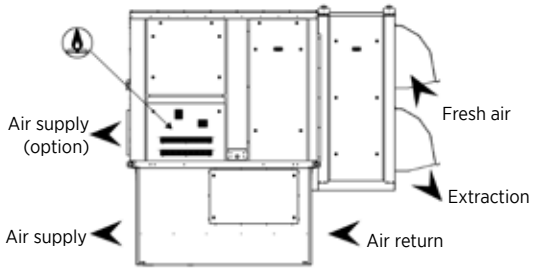
FAC/FAH 150/170

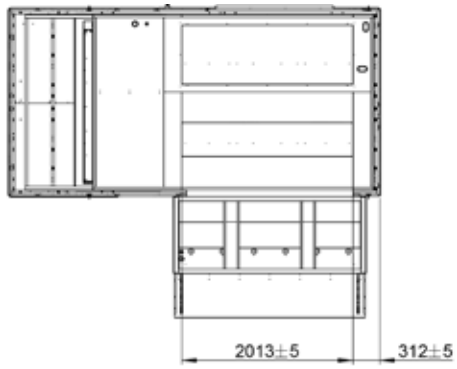
G BOX

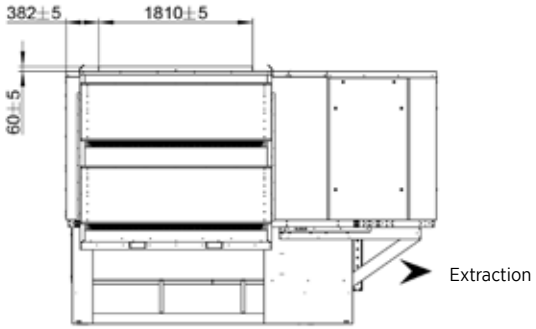
WATER COOLED UNITS

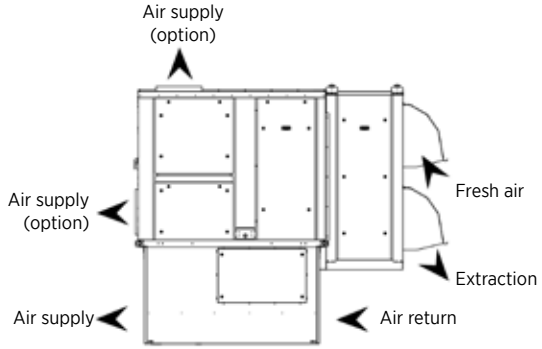
UNITS WITH MULTIDIRECTIONAL ROOFCURB AND ENERGY RECOVERY MODULE

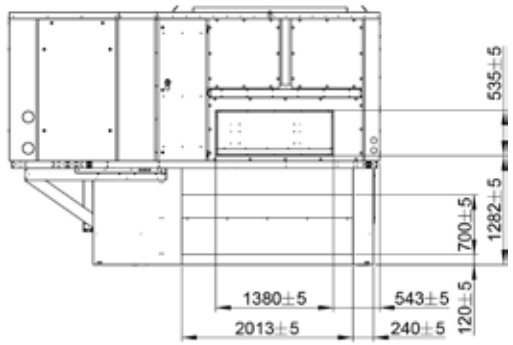


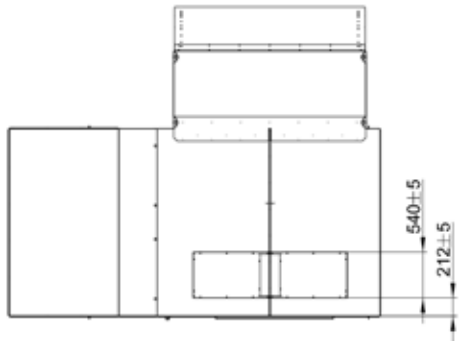












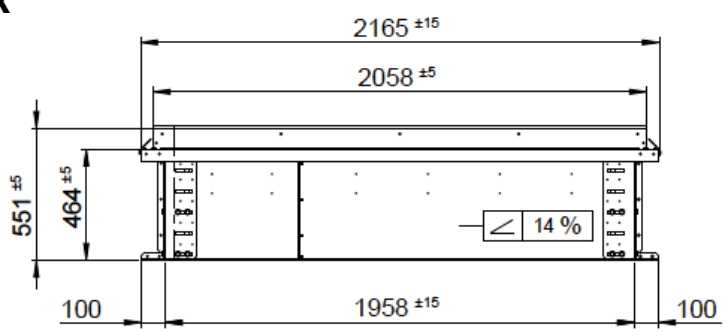
All dimensions expressed in mm

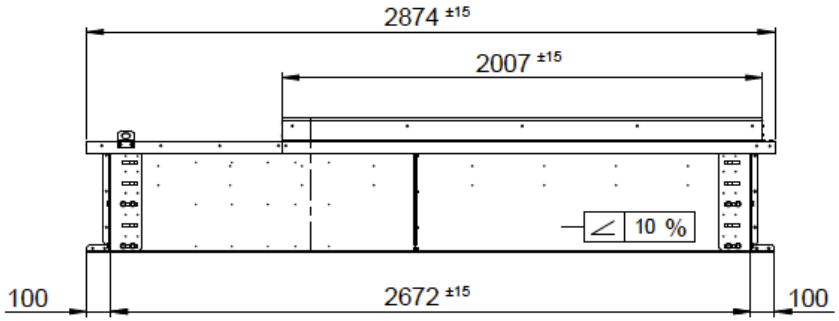
FLEXAIR_G_AC1_
ERHO_HRMO(b)_Folio 2

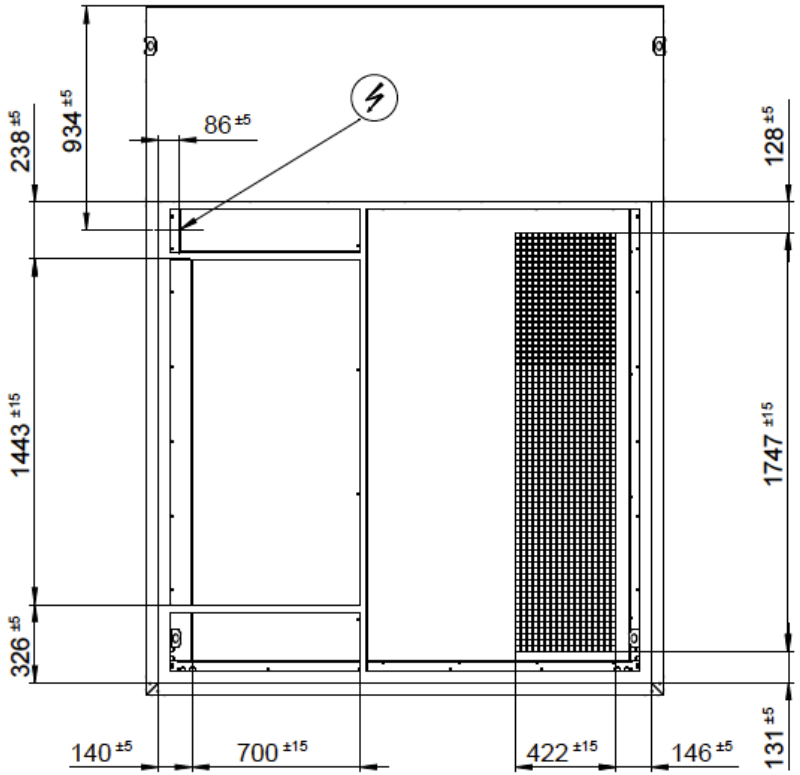
FAC/FAH
090-085/100/120
F BOX

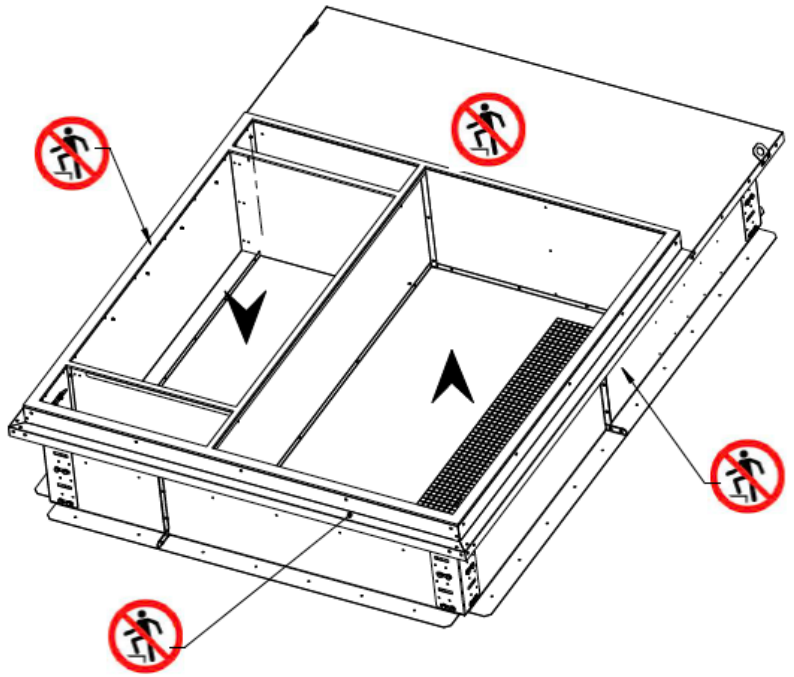
AIR COOLED & WATER COOLED UNITS

ADJUSTABLE ROOFCURB









All dimensions expressed in mm

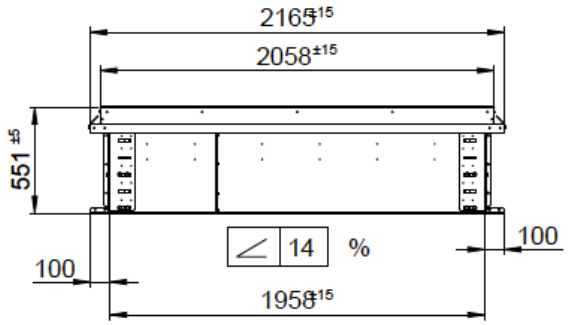
ACF10013_Z

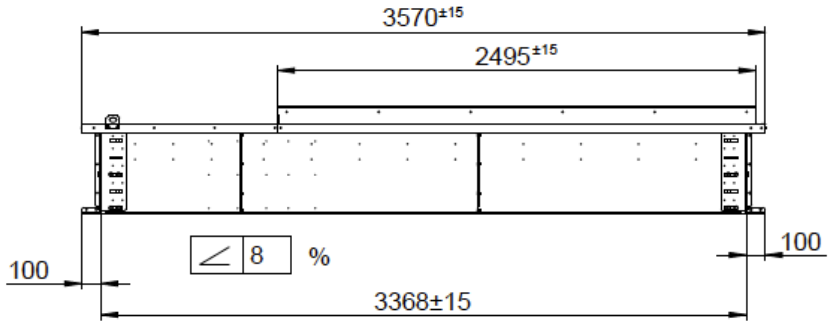
FAC/FAH 150/170

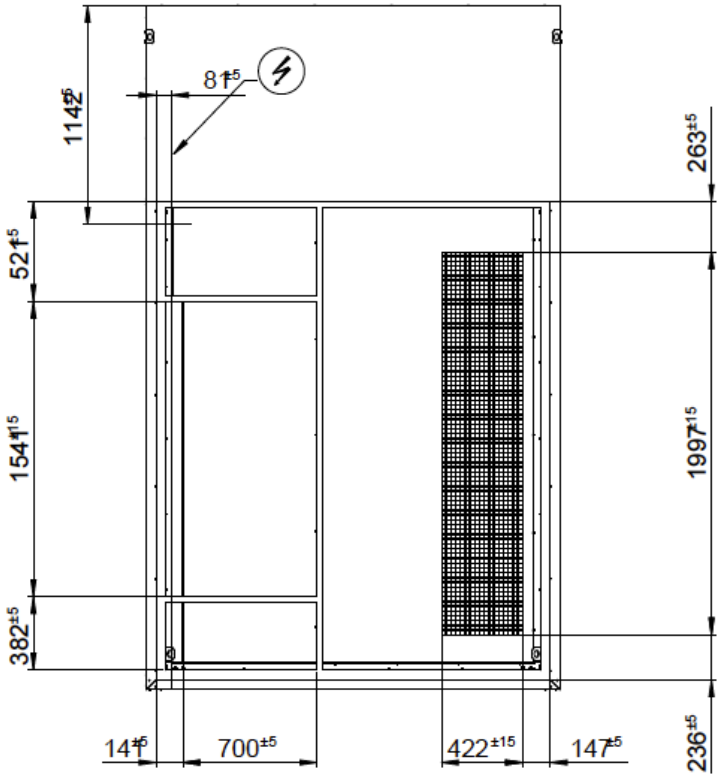
G BOX

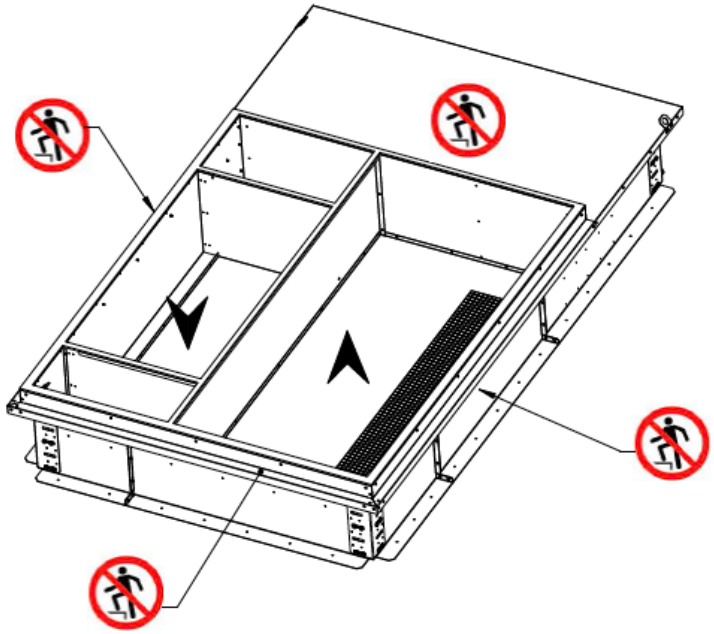
AIR COOLED & WATER COOLED UNITS

ADJUSTABLE ROOFCURB









All dimensions expressed in mm

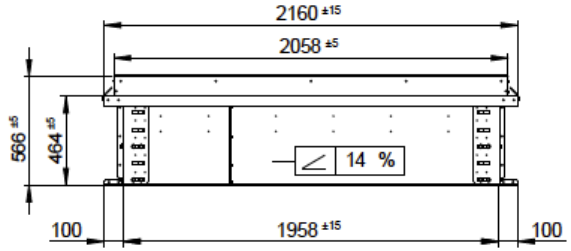
ACG10009_Z

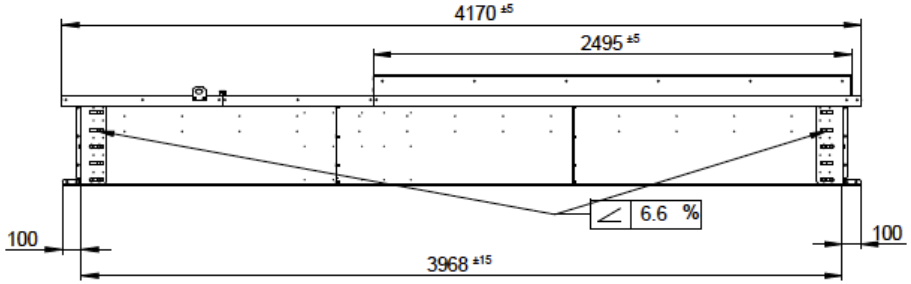
FAC/FAH 200/230

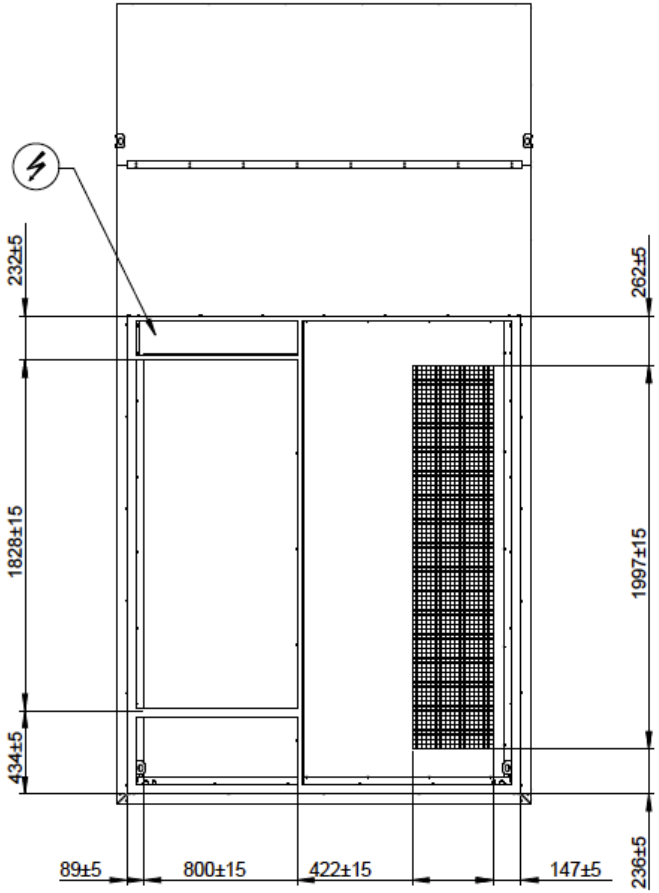
H BOX

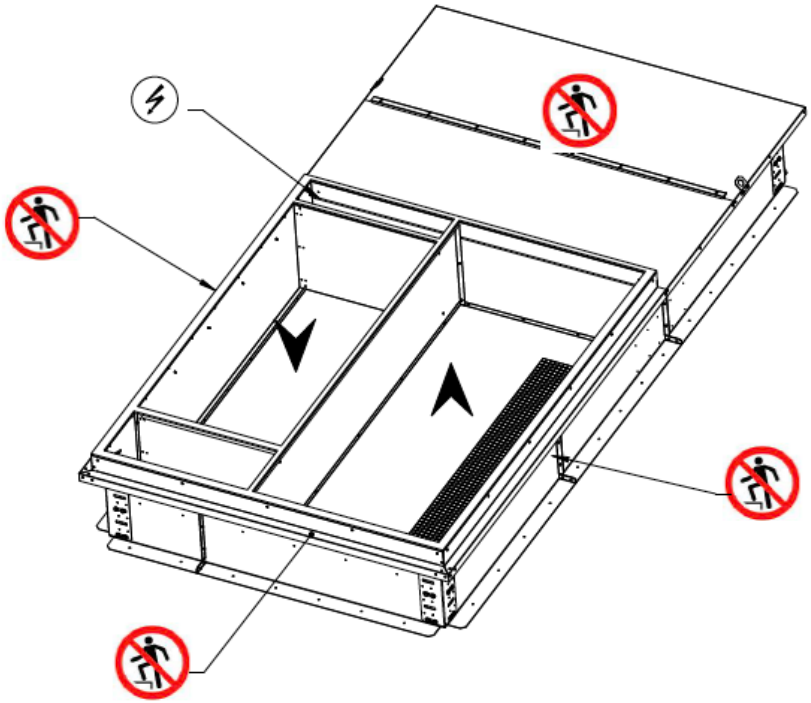
AIR COOLED & WATER COOLED UNITS

ADJUSTABLE ROOFCURB









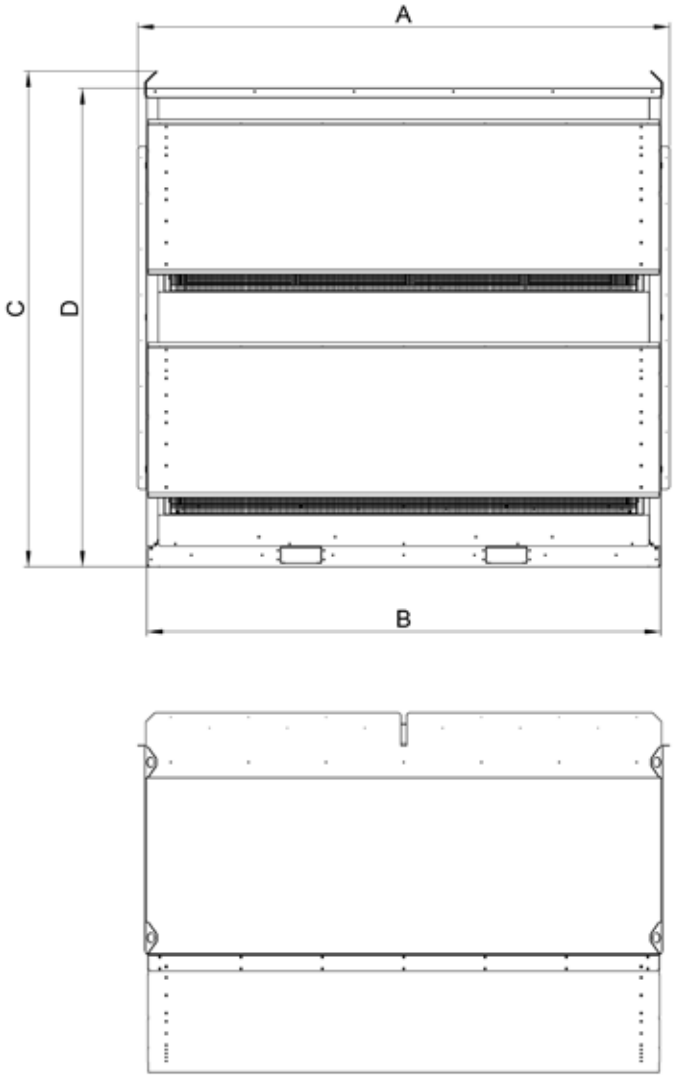
All dimensions expressed in mm

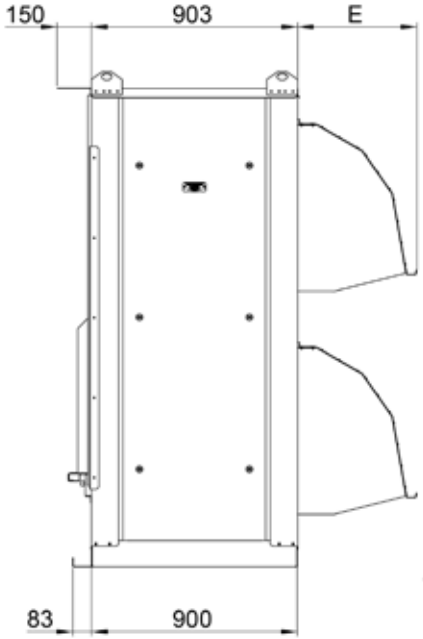
ACH10009_Z

FAC/FAH
090-085/100/120
F BOX

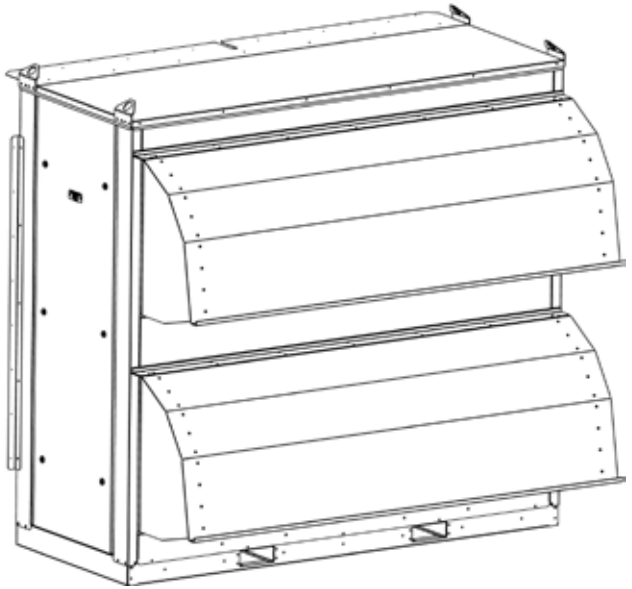
AIR COOLED & WATER COOLED UNITS

ENERGY RECOVERY OPTION





	A	B	C	D	E
85-100-120	2146	2063	1871	1795	483
150-170	2330	2250	2170	2096	522
200-230	2516	2497	2420	2344	689



All dimensions expressed in mm

ACG30004_AGenerique

Due to LENNOX EMEA ongoing commitment to quality, the specifications, ratings and dimensions are subject to change without notice and without incurring liability.
Improper installation, adjustment, alteration, service or maintenance can cause property damage or personal injury.
Installation and service must be performed by a qualified installer and servicing agency.

brand of LENNOX EMEA

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