e-Baltic

Air cooled rooftop packaged unit

Application guide

LENNOX participates in the ECP programme for RT.
Check ongoing validity of certificate :
www.eurovent-certification.com

e-Baltic-AGU-2023.05-EN

TABLE OF CONTENT

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.

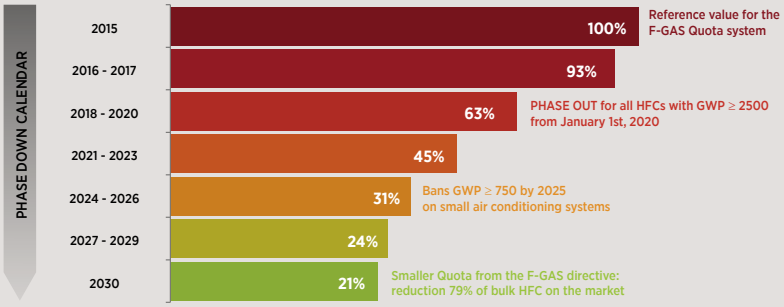
As a major player in the European HVAC market, Lennox is a reference in sustainable development and has been assembling its products in ISO-14001 certified factories since 2007.

Like any other Lennox rooftop unit, the entire e-Baltic range is Eurovent certified.

F-GAS DIRECTIVE RELATED TO THE EU REGULATION NO. 517/2014

It entered in force in January 2015, to contribute to the reduction of the global warming by limiting the use of HFCs.

High GWP refrigerants may have a speculative price increase after each quota, due to the reduced availability of bulk HFC on the market.



SAFETY CLASS: R32

A2L refrigerants have a low burning velocity and a low heat of combustion. These characteristics makes them hard to ignite and eliminates the risk of an explosion.

The European standard EN378 classifies R32 as an A2 refrigerant, while ASHRAE Standard 34 classifies it as an A2L. Both regulations define R32 as a mildly flammable gas. However, it is unlikely to start the fire, as a large amount of refrigerant is required to sustain combustion.

A1 BALTIC/FLEXAIR R410A	**B1**	**NO FLAME PROPAGATION**
A2L E-BALTIC R32	**B2L**	**LOWER FLAMMABILITY**
A2	**B2**	**LOWER FLAMMABILITY**
A3	**B3**	**HIGHER FLAMMABILITY**
HIGHER TOXICITY	**HIGHER TOXICITY**	

SAFETY DEVICES TO AVOID RISK OF FIRE

LEAK DETECTOR

Optical leak detector installed on the indoor coil that identifies any leakage from 20 to 2000ppm.

- Standard feature
- Easy maintenance and calibration
- No building adaptation required
- Factory mounted sensors
- IP65 certified
- High accurate detection

LEAK DETECTOR

When a leak is detected, the system turns off after a pump down procedure, with the entire refrigerant charge stored on the outdoor coil.

Both indoor and outdoor fans remains active, and increase their speed to provide maximum air flow, helping the dilution of the leaked refrigerant.

Conformity to EN 378-1:2016 and IEC335-2-40:2018.

BENEFITS OF R32

Low charge refrigerant:
- Up to 30% charge reduction on the total thermodynamic circuit

Single component substance:
- No glide
- Easy to handle and recover

Availability:
- Largely applied on the residential market
- Low price and easy to source

ASHRAE safety group: A2L

Composition:
- 100% Difluoromethane (HFC)

CO2e : CARBON DIOXIDE EQUIVALENT

CO2e indicates the amount of CO2 which would have the equivalent global warming impact of any refrigerant.

To limit the use of high GWP refrigerants, many countries have set taxes to be applied on the sale those substances.

The tax is usually proportional to the CO2e and to the amount of fluorinated refrigerant used on the system (HFCs).

$$CO2e = \frac{\text{Refrigerant charge (kg)} \times GWP}{1000}$$

FRENCH FARES

from 2021: 15 €/CO2e

from 2025: 30 €/CO2e

ADDITIONAL REFRIGERANT CHARGES

To exemplify one of the benefits of the e-Baltic over its previous version (Baltic/Flexair), a comparison between two models with similar capacity presents 74% of savings on the additional refrigerant charges along the unit lifespan.

UNIT	Flexair FAH200	e-Baltic eBFH180
Refrigerant	R410a	R32
GWP[1]	1924	677
Refrigerant Price[2] (€/kg)	€ 38,00	€ 15,00
Total Refrigerant Charge (kg)	36	25,6
Leakage Charge per year[3] (kg)	1,8	1,28
Leakage Charge / 10 years (kg)	18	12,8
Refrigerant Cost (€/10 years)	€ 684	€ 192
Leaked charge from 2021 to 2024	7,2	5,12
CO2e	13,9	3,5
French taxes	€ 208	€ 52
Leaked charge from 2025 to 2030	10,8	7,68
CO2e	20,8	5,2
French taxes	€ 623	€ 156
TOTAL COST	**€ 1.515**	**€ 400**

1. GWP values based on the IPCC 5th assessment report
2. Average price for French market (2019)
3. Considering average leakage rate of 5% per year

74% OF SAVINGS

LEAK TEST FREQUENCY

According to F-Gas, the amount of CO2e of the total refrigerant charge on a circuit will define how often a leakage test will be required.

A leak test usually takes a technician half day of work on the job site and may cost around 450€/test[1].

Considering the same units from the previous example, the e-Baltic can offer 50% of savings on the leak test costs along the unit lifespan.

CO2e	F-GAS LEAK CHECKING FREQUENCY	
	With no leak detection equipment fitted	With leak detection equipment fitted
CO2e ≤ 5	None	None
5 < CO2e ≤ 50	once every 12 months	once every 24 months[3]
50 < CO2e ≤ 500	once every 6 months[2]	once every 12 months
CO2e ≥ 500	once every 3 months	once every 6 months

UNIT	Flexair FAH200	e-Baltic eBFH180
Refrigerant	R410a	R32
GWP[2]	1924	677
Refrigerant Charge per circuit (kg)	18 / 18	12.8 / 12.8
CO2e per circuit	34.6 / 34.6	8.7 / 8.7
Leak detection equipment	Optional feature[3]	Standard feature[4]
Leak test frequency on each circuit	once every 12 months	once every 24 months
Leak tests along 10 years of lifespan	20 (10 on each circuit)	10 (5 on each circuit)
Leak test cost (€/test)	450 €/test	450 €/test
TOTAL COST	**€ 9.000**	**€ 4.500**

1. The leakage test cost may diverge by region
2. GWP values based on the IPCC 5th assessment report
3. Standard R410a units are not fitted with leakage detection equipment
4. Standard R32 units are fitted with leak detection equipment due to flammability risk (A2L)

50% OF SAVINGS

INCREASED SAVINGS WITH AN ENVIRONMENTALLY FRIENDLY SOLUTION

LOW ENERGY CONSUMPTION

35% energy savings with e-Baltic 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 R32 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 R32 to reduce GWP / 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 LennoxCloud

eB(A) B(B) H(C) 100(D) D(E) P(F) 1(G) M(H)

(A) **eB** = e-Baltic
(B) **B** = Steel - **F** = Aluminium
(C) **H** = Heat pump unit
(D) Cooling capacity in kW (x 100 m^3/h)
(E) **S** = 1 circuit - **D** = 2 circuits
(F) **P** = R32 - **H** = HFO - **N** = No refrigerant
(G) Revision number
(H) 400V/3/50Hz

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.

NEW EC FAN-MOTOR GENERATION

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

NEW REFRIGERANT: R32

Better efficiency with a low GWP solution.

NEW HEAT EXCHANGER

Improved heat transfer efficiency thanks to new tubes geometry and new fin design.

GENERAL FEATURES

e-Baltic range constitutes a packaged solution, easy to deliver and quick to install on the roof or in the floor.

Operating range shall be between 46°C outdoor in cooling mode and minus 12°C outdoor in heating mode.

All units are factory assembled, internally wired, fully charged with refrigerant, and 100% run-tested before leaving the factory.

CASING

e-Baltic air treatment section is built with precoated steel or aluminum panels painted in RAL 9003 color, specially designed for corrosion resistance and to ensure long operation life time.

Double skin panels are optional.

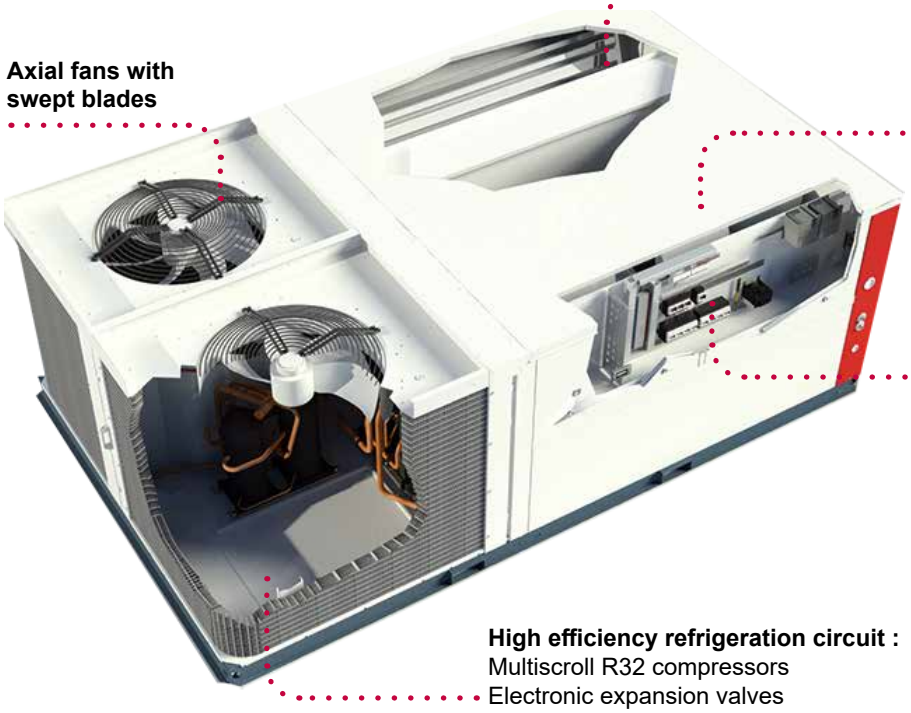
Condensing section mounted in a rigid base frame to ensure good support for compressors and giving rigidity to the complete structure.

ADVANCED REFRIGERANT CIRCUIT

e-Baltic 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 R32 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.



Fresh air & free cooling

Axial fans with swept blades

eDrive :
Variable speed direct drive fan with eFlow airflow measurement

eCLIMATIC Advanced controller :
Intelligent controller to improve efficiency and help set up and service

High efficiency refrigeration circuit :
Multiscroll R32 compressors
Electronic expansion valves
Optimized heat exchange surface area
Dual circuits

SAVING ENERGY WITH ADVANCED REFRIGERATION CIRCUIT DESIGN

R32 REFRIGERANT

Efficient systems such as e-Baltic are designed around R32 refrigerant to achieve the best performances.

- New generation of heat exchanger optimized for R32.
- Environmentally friendly refrigerant:

It contains No Chlorine (ODP =0). Significant refrigerant charge reduction (-30%) that limits the global warming potential of the system.

MULTISCROLL COMPRESSOR TECHNOLOGY

e-Baltic units are provided with tandem compressors, to profit from the multiscroll compressor technology and giving the highest seasonal performance and the best SEER / SCOP coefficients.

HIGH EFFICIENCY MULTISCROLL TECHNOLOGY

Air conditioning equipment 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.

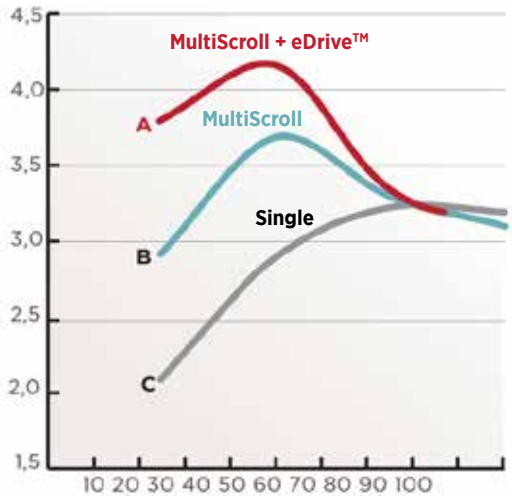
e-Baltic provides high efficiency and best possible part load efficiencies year round with high efficiency multiscroll R32 compressor technology.

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.

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

PLUG FAN / EC MOTOR TECHNOLOGY IN SUPPLY AND EXTRACTION

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

EC fan-motor technology offers the maximum efficiency together with the minimum power consumption. That is the reason why e-Baltic is equipped with EC fans both in indoor and condensing section.

e-Baltic 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 plug fan 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.

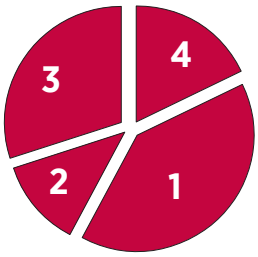
eDRIVE VENTILATION

eDRIVE is a standard technology of LENNOX e-Baltic 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.



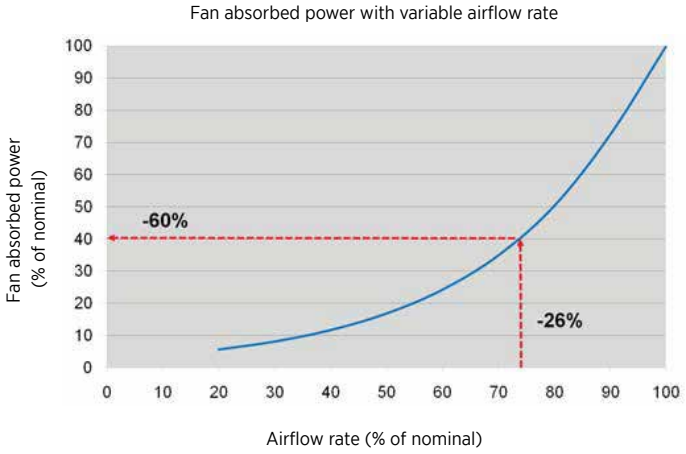
1 - Annual compressor consumption	**40%**
2 - Annual consumption of other electical systems	**18%**
3 - Remaining annual fan motor consumption	**12%**
4 - Energy savings thanks to eDRIVE	**30%**

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.

- E-Baltic 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.



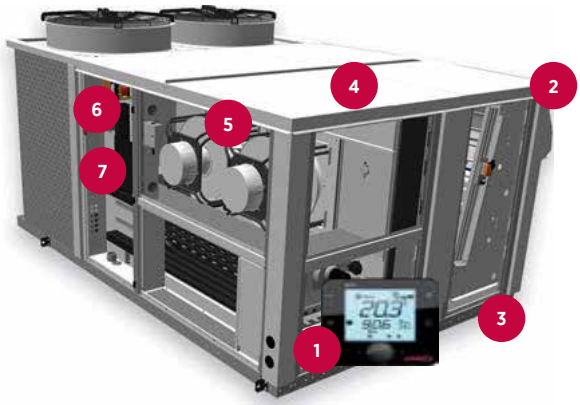
eCLIMATIC NEW CONTROL

Our e-Baltic 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 miss wirings
- 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:

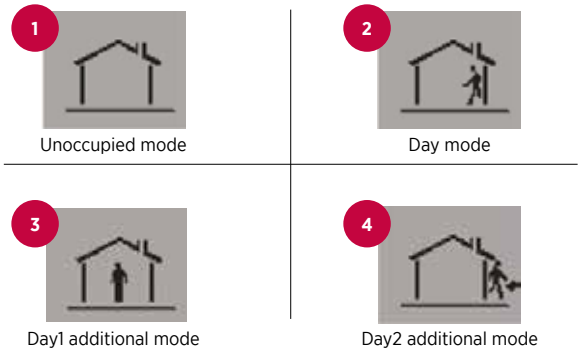
This unique feature on the market, allows the user to program the priority between the different heating elements (thermodynamic, electric pre-heaters or auxiliary heating). This is particularly interesting on dual fuel units or units with electrical pre-heaters. This feature maximizes energy efficiency 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 set-points 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.

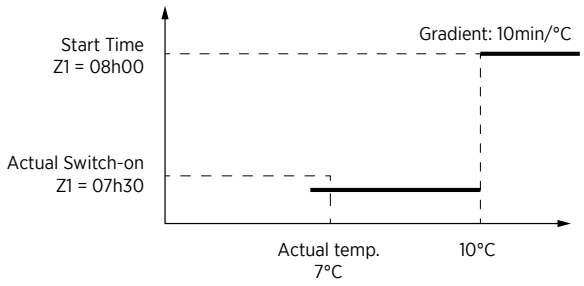


MORNING ANTICIPATION AND DYNAMIC SET POINT

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 e-Baltic units. It can be used to connect up to 12 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 applying 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

e-Baltic by Lennox is assembled with the highest standards of quality.

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, e-Baltic 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, e-Baltic 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.

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 e-Baltic 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		
		IDA 2	IDA 3	IDA 4
		Medium	Moderate	Low
		CO_2 (ppm)		
		400-600	600-1000	> 1000
		Rate of outdoor air (m3/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

*GS = Gas Filter

FILTERS

As standard the unit comes with EU3 filters We can increase the capacity of filtration with an option of G4 and an option of M5 or F7-ePM1.

DOUBLE SKIN PANEL (OPTION)

Indoor unit of e-Baltic 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

e-Baltic is fitted with EC fans as standard, ensuring that no belt particles can be carried away into building.

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 dirtiness is identified by a pressure drop above the maximum threshold.

REMOVABLE ALUMINIUM DRAIN PAN

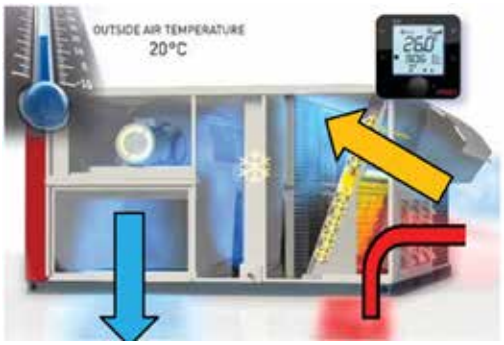
All units are equipped with a sloped removable drain pan in aluminum which can be removed for maintenance, preventing the growth of bacteria and algae in the drain pan.

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.

Managing fresh air is recommended in a building to control CO2 level and comfort.

Fresh air management and Free Cooling are standard features of e-Baltic that can reduce annual energy consumption.



SAVING ENERGY WITH FRESH AIR & FREE COOLING

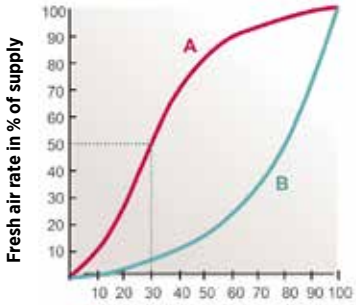
- Thermodynamic cooling can be replaced by Free Cooling when outdoor temperature is below the building set point saving up to 15% on annual energy consumption.
- Introducing just the required amount of Fresh Air in a building can reduce energy consumption.

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, e-Baltic can manage the percentage of fresh air more accurately.

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.

e-Baltic 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.



Curve A: ΔP return ducts > Fresh air: Too much fresh air
Curve B: ΔP return ducts < Fresh air: Not enough fresh air

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.

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 like 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).

ELECTRIC PRE-HEATER

The electric pre-heater is located before the main thermodynamic coil. This option is designed to authorize heat pump operation with low mixed air temperature.(low outdoor temperature with units running with a high fresh air rate in winter).

GAS BURNER

e-Baltic units could be equipped with a gas burner.

MODULATING CONDENSING GAS BURNER TECHNOLOGY:

This condensing gas burner is developed to reach condensing behavior, allowing both very high efficiency and high modulating ratios.

Efficiency level reaches 108%. This gas burner has been designed to guarantee a level of NOx emissions < 30 ppm, no CO emissions.

This gas burner uses Venturi air/gas valve as an additional safety.

When there isn't air suction in the combustion chamber, there will be not gas intake on the chamber.

This gas burner includes a pre-installed gas pilot that allows safety start-up cycles independently from different gas supply conditions that may vary from country to country and also from one period to another.

It is possible to regulate the OFF-SET ratio in order to optimize combustion, although already fixed in factory assembly.

The system is completely pre-regulated and tested in the production line with high efficiency valves, safety devices and emission values certified on each single case.

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.

e-BALTIC		035	045	055	065	075	085	095	100	115	120	130	150	180	210
Box size		C	C	D	D	E	E	EX	F	EX	F	G	G	H	H
ELECTRIC HEATER															
Standard heat - 2 stages	kW	18	18	27	27	27	27	27	30	27	30	45	45	72	72
Medium heat - fully modulating (Triac)	kW	-	-	-	-	-	-	-	54	-	54	72	72	108	108
High heat - fully modulating (Triac)	kW	36	36	54	54	54	54	54	72	54	72	108	108	162	162
ELECTRIC PRE-HEATER															
Standard heat - modulating	kW	18	18	24	24	36	36	36	-	36	-	-	-	-	-
High heat - modulating	kW	36	36	48	48	72	72	72	-	72	-	-	-	-	-
GAS BURNER															
Modulating condensing gas burner	kW	33,9	33,9	57	57	72,9	72,9	96,5	98,1	96,5	98,1	137,6	137,6	166,4	166,4
HOT WATER COIL															
Hot water coil	kW	Capacity depends on air and water conditions.													

HEAT RECOVERY OPTIONS

ENERGY RECOVERY ON EXHAUST AIR (HEAT RECOVERY WHEEL)

To match Lennox commitment to a greener planet and to generate energy savings, e-Baltic 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.

ERECOVERY : HEAT RECOVERY FROM FOOD REFRIGERATION SYSTEMS

eRecovery is the most advanced heat transfer and recovery solution to recover free heat produced by food refrigeration systems.

50% of supermarket total annual energy consumption is used to cool chilled and frozen food in display cases and cold rooms. Most supermarket applications with food refrigeration systems reject thermal energy to the ambient environment through air cooled condensers.

- With eRecovery, free thermal energy is transferred to the sales area through a hot water coil located in the rooftop before the thermodynamic heating coil.
- eRecovery provides more than just preheating, as it is designed to cover up to 100% of the heating needs.
- It is also the most flexible heat recovery solution on the market as when heating demand is high, BALTIC can always supply additional thermodynamic and auxiliary heating.

Freeze protection on eRecovery coil

From 8°C supply air temperature: The fresh air damper is closed ▶ 100% return air The 3 way valve is forced to open fully.

From 6°C supply air temperature: Unit is stopped completely: no ventilation and no cooling and 3 way valve is still open. The Low Supply Air Temperature alarm is “ON”

In addition to that, the 3 ways is also opened at 10% (adjustable) if the outdoor air temperature falls below a pre-set value.

As this heat recovery hot water coil is located just after the fresh air intake it is highly recommended to use glycol water in the circuit to prevent risks of freezing.

ENERGY RECOVERY ON EXHAUST AIR (PLATE HEAT EXCHANGER)

Built around a EUROVENT certified plate heat exchanger equipped with bypass damper, the heat recovery module is fully controlled by the eCLIMATIC.

It has been designed to handle free-cooling (when heat recovery shouldn’t apply) and the exchanger is protected against freezing of the exhaust air.

This module is fitted as a standard with G4 filters on the fresh air section.

This will protect the exchanger against outdoor dust and increase the global filtration capacity of the machine.

THERMODYNAMIC HEAT RECOVERY SYSTEM

This system recovers the heat from the extraction air through a refrigerant system, and is ideal for climates in which the average outdoor temperature is mild.

This option consists on an additional thermodynamic circuit equipped with a pre-treatment coil before the standard treatment coil, a coil on the exhaust air, a compressor and a 4-way valve. This module is able to recover sensible and latent energy and can offer an efficiency up to 80%.

FILTRATION OPTIONS

e-Baltic 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 correspondence 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

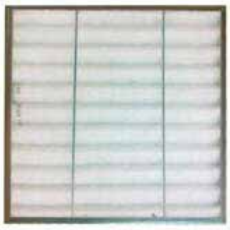
Compliant to minimum 50% efficiency

Exceed the minimum efficiency

E-BALTIC OPTIONS:

- G4 with 50 mm depth metallic frame
- G4 with 50 mm depth metallic frame with replaceable media
- M5 with 50mm depth metallic frame
- 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 recommended 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 e-Baltic 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 e-Baltic consumption in Wh.

Values for e-Baltic, 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 DCTM 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 e-Baltic units and e-savvy or LennoxCloud service 3G supervision solutions. One BMS interface required per rooftop.

E-SAVVY

General Description

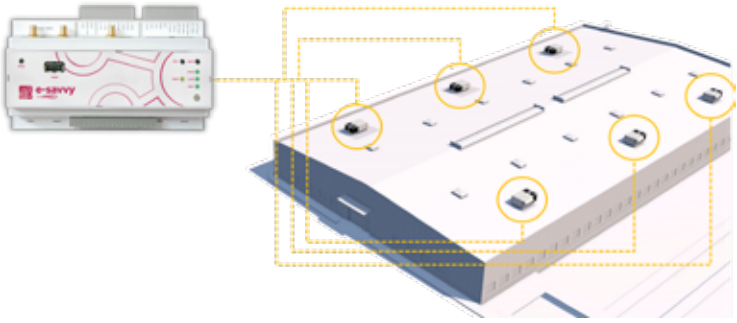
e-savvy is an innovative solution from Lennox for the monitoring and management of HVAC systems.

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



REFRIGERATION OPTIONS

LOW NOISE OPTION

As rooftops are often installed in a noise sensitive area, LENNOX proposes a low noise option on the e-Baltic range. To achieve low noise level, e-Baltic receives a quieter variable speed EC fan-motor with dedicated mode on eClimatic controller, a compressor jacket.

ALL SEASONS KIT (AIR COOLED UNITS OPTION)

EC (Electronically commutated) axial condenser fans regulate the speed depending on outdoor temperature, building load and time zone (Low pressure floating / High pressure floating management throw eClimatic controller).

In cooling mode, this option is mandatory below 15°C outside temperature.

REFRIGERANT LEAK DETECTION

To fulfill A2L regulation and risk analysis of public area, e-Baltic unit will be equipped with optical refrigerant detector

Auto-secure unit equipped with optical refrigerant leak detectors. See Lennox representative for periodic re-calibration.

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 economizer is fitted as standard with the e-Baltic.

ADVANCED CONTROL PACK

Where a higher level of controllability is required to make the

e-Baltic even more flexible, LENNOX have compiled a pack that includes two advanced control features.

“ENTHALPY CONTROL ON ECONOMIZER”.

- The eCLIMATIC and its humidity sensors (return air and fresh air) ensures that the economizer 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

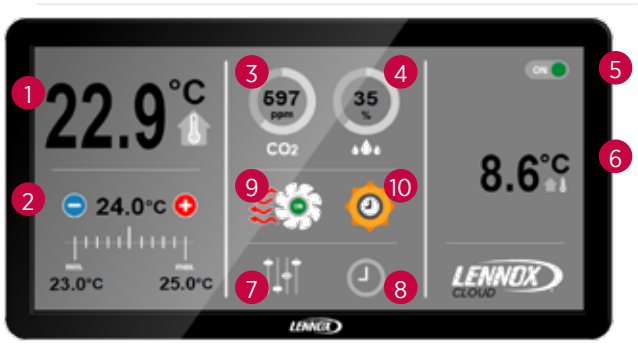
Indoor air quality is controlled from the eCLIMATIC main controller. A VOC (Volatile Organic Component) sensor detects the amount of CO2 in the ambient air between 0 and 2000PPM. (This obviously varies depending upon space occupancy levels). The VOC sensor sends a proportional signal (0-20mA) to the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

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

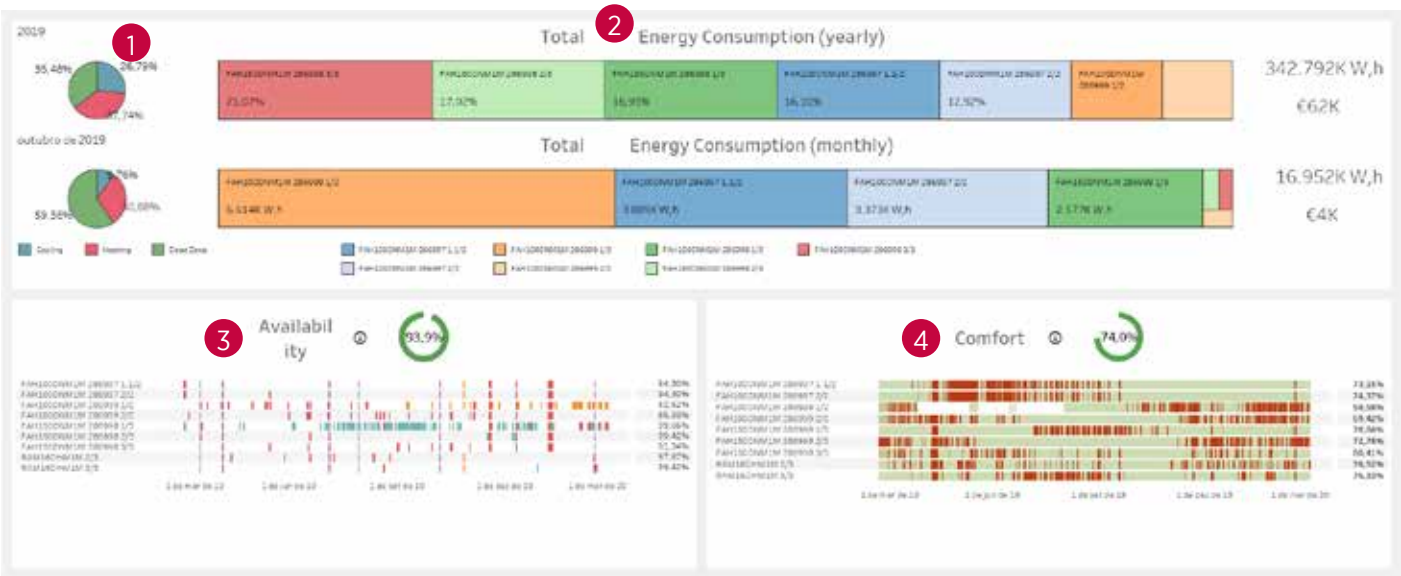
Daytime operation

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.

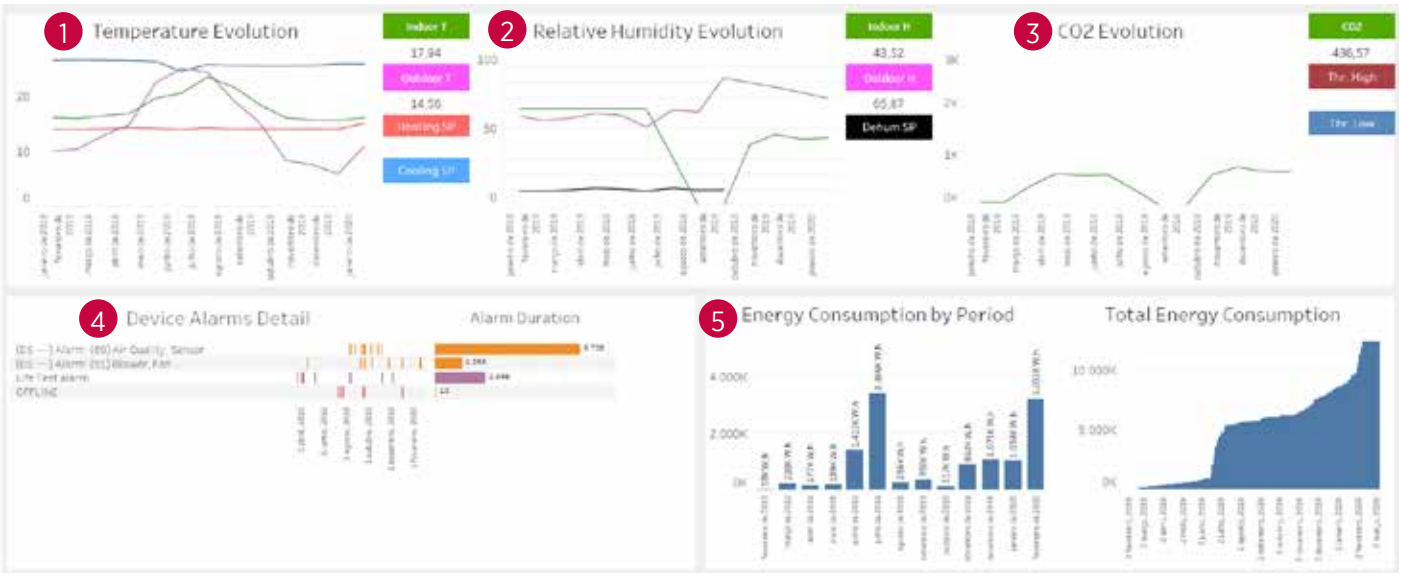
REMOTE MONITORING

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

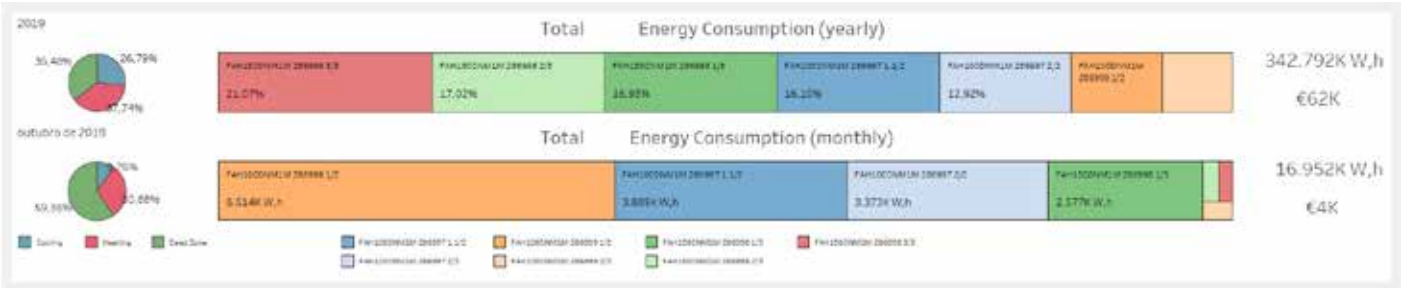
ELECTRIC ENERGY METER

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:

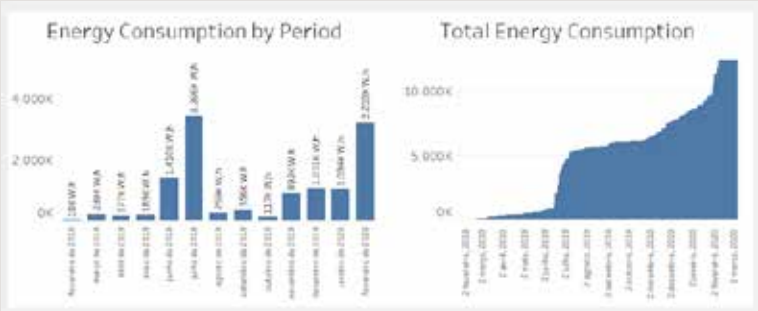
SITE DASHBOARD

- 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.

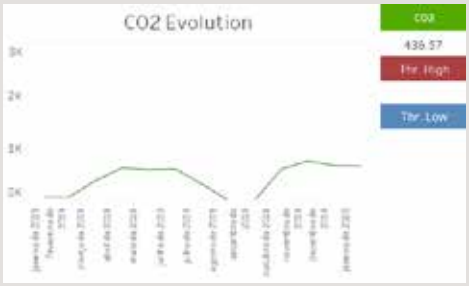
All collected data can be remotely managed on the Lennox Cloud Webview and Dashboard:

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;

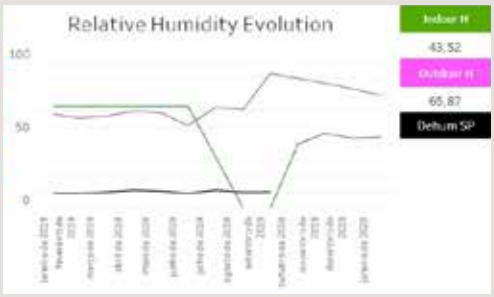
All collected data can be remotely managed on the Lennox Cloud Webview and Dashboard:

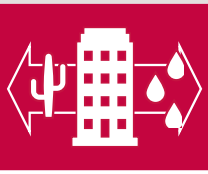
WEBVIEW

- 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.





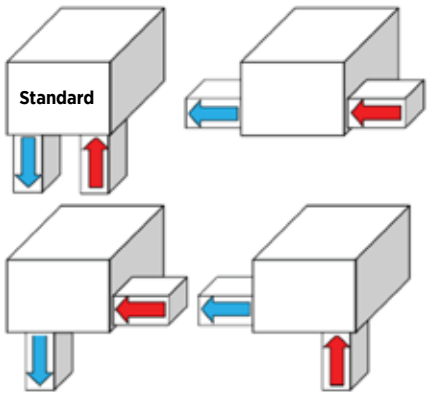
GUARANTEED COMFORT

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

AIRFLOW CONFIGURATIONS AND ROOFCURBS

BASIC AIRFLOW CONFIGURATIONS

Unless specified otherwise when ordered, e-Baltic 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 e-Baltic, 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

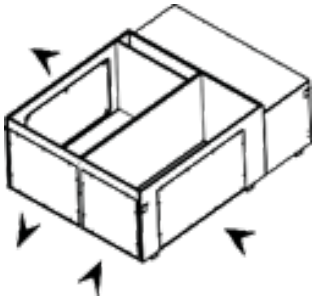
NON ADJUSTABLE NON ASSEMBLED ROOFCURB.

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 e-Baltic 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

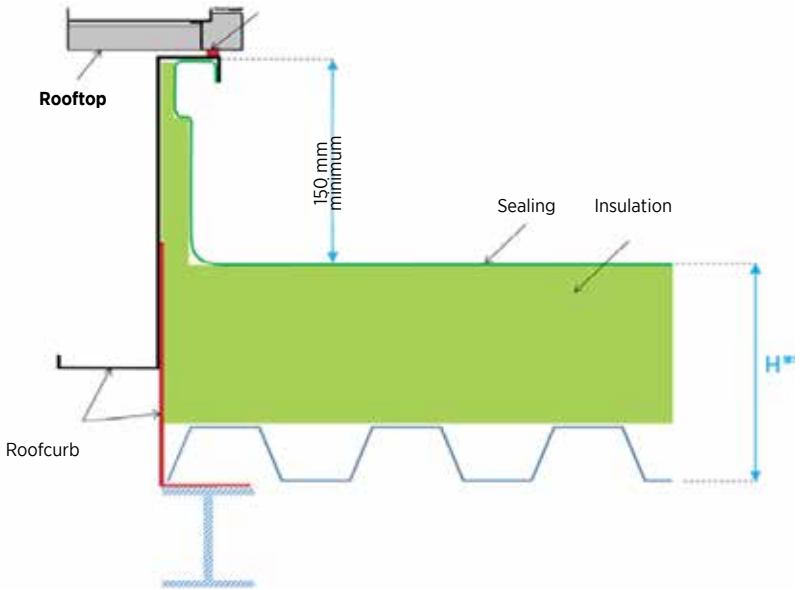


MULTIDIRECTIONAL ROOFCURB

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...).

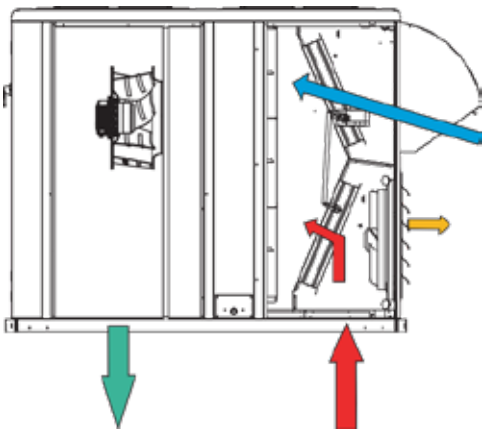


EXTRACTION OPTIONS

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



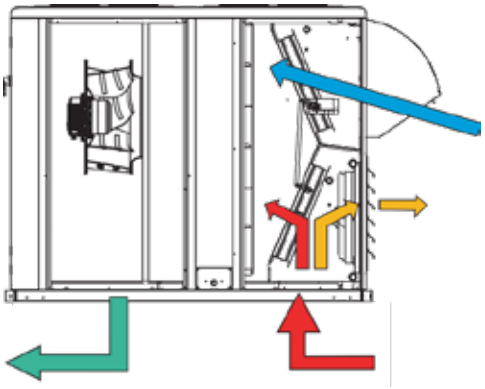
Building air tightness	Medium
Fresh air & Free cooling	High fresh air rate Free cooling
Pressure drop in the return ductwork	Low < 50 Pa
Building pressure control	Low control

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

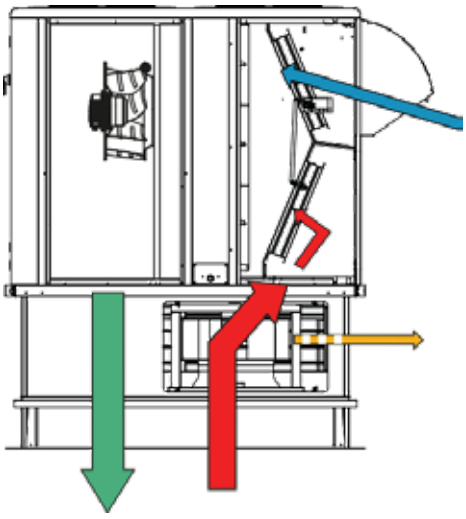
EXTRACTION ROOFCURB

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

AIR COOLED VERSION — HEAT PUMP UNITS

e-Baltic		035	045	055	065	075	085	095
Nominal thermal performances - Cooling mode								
Cooling capacity (1)	kW	31,3	43,0	45,9	57,6	66,7	81,0	98,4
Total Power Input	kW	9,50	13,86	14,89	19,86	22,48	28,44	30,37
EER net (1)		3,30	3,10	3,08	2,90	2,97	2,85	3,22
Nominal thermal performances - Heating mode								
Heating capacity (2)	kW	29,7	37,2	43,0	56,5	64,3	83,0	92,7
Total Power Input	kW	7,94	10,54	12,61	16,57	18,71	25,80	24,14
COP net (2)		4.70	4.68	4.02	4.19	4.23	4.35	4.32
Seasonal efficiencies - Cooling mode								
Seasonal Energy Efficiency Ratio - **SEER** (3)		4,41	4,41	3,99	3,93	3,98	3,71	4,51
Seasonal energy efficiency - **ηs,c** (4)	%	173.4	173.4	156.6	154.2	156.2	145.4	177.4
Eurovent energy efficiency class - Part load operation		B	B	B	B	B	B	B
Seasonal efficiencies - Heating mode								
Seasonal Coefficient of Performance - **SCOP** (5)		3,48	3,29	3,45	3,26	3,52	3,26	3,38
Seasonal energy efficiency - **ηs,h** (6)	%	136.2	128.6	135	127.4	137.8	127.4	132.2
Eurovent energy efficiency class - Part load operation		B	B	B	B	B	B	B
Ventilation data								
Minimum airflow rate	m^3/h	4200	4500	5000	6600	9500	9600	12300
Nominal airflow rate	m^3/h	7000	7500	8000	11000	13500	16000	20500
Maximum airflow rate	m^3/h	8000	10000	11200	16000	22000	22000	23000
Acoustic data - Standard unit								
Outdoor sound power	dB(A)	82	83	74,1	76,4	79,0	81,7	81,4
Indoor blower outlet sound power	dB(A)	80,2	81,5	75,5	80,8	82,2	86,2	85,2
Electrical data								
Tension		400V / 3P / 50Hz						
Maximum power	kW	14,5	21,3	22,6	26,6	33,3	37,9	47,8
Maximum current	A	24,5	34,2	39,3	44,9	56,0	63,4	75,8
Starting current	A	82,2	112,1	98,4	102,6	118,3	130,4	162,7
Short circuit current	kA	10	10	10	10	10	10	10
Refrigeration circuit								
Number of circuits		1	1	2	2	2	2	2
Number of compressors		2	2	4	4	4	4	4
Refrigerant load	kg	5.1	6.75	6.2 / 6.2	6.2 / 6.2	5.7 / 5.7	5.7 / 5.7	7.7 / 7.7
Unit weight								
Standard air cooled unit	kg	640	640	980	980	1150	1150	1300

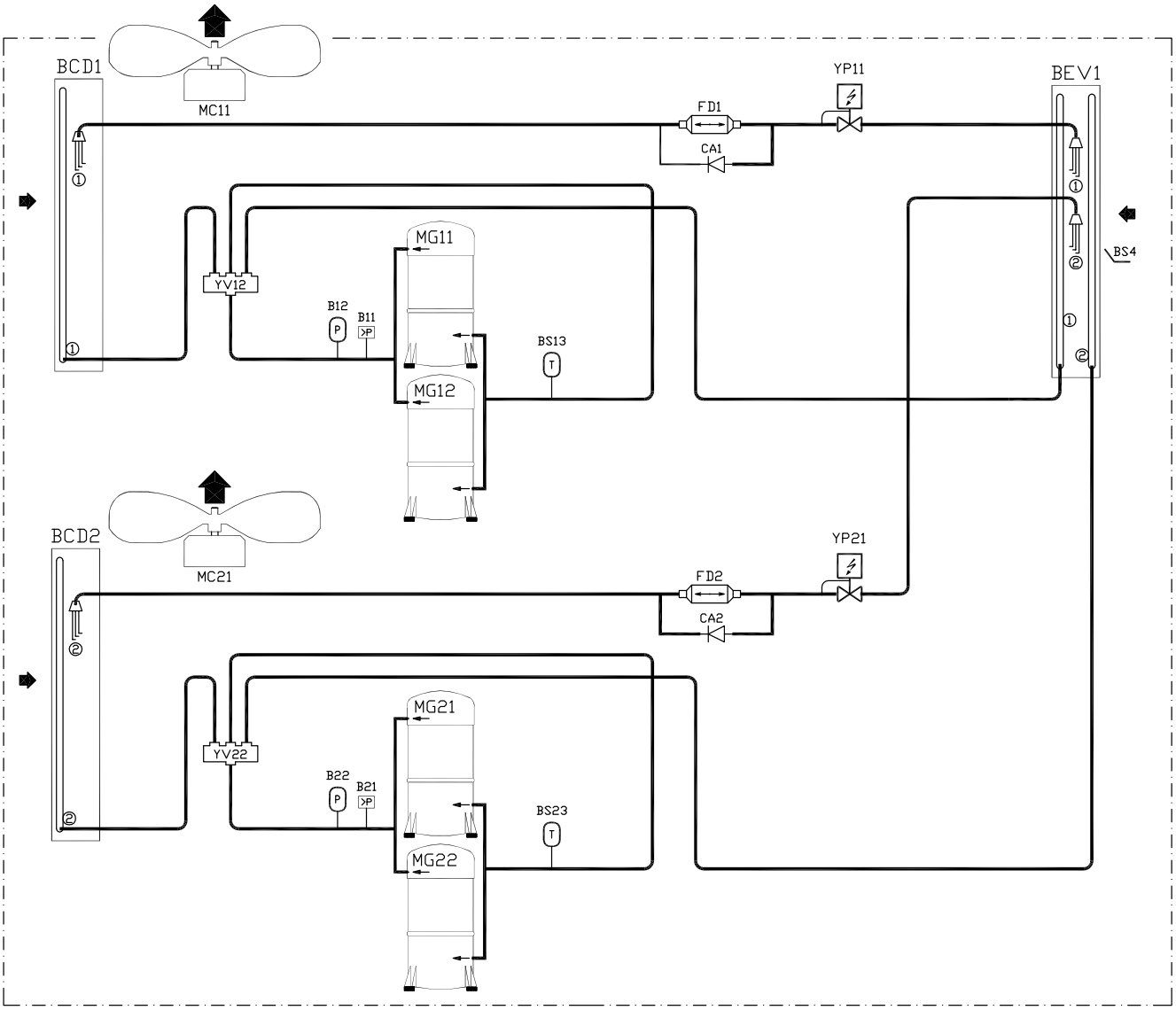
(1) **Cooling mode :** According to EN14511 nominal conditions - Outdoor temperature 35°C DB - Indoor temperature 27°C DB / 19°C WB
(2) **Heating mode :** According to EN14511 nominal conditions - Outdoor temperature 7°C DB / 6°C WB - Indoor temperature 20°C DB
(3) SEER in accordance with standard EN14825.
(4) Space cooling energy efficiency following Ecodesign regulation EU 2016/2281
(5) SCOP in accordance with standard EN 14825 (average climate conditions).
(6) Space heating energy efficiency following Ecodesign regulation EU 2016/2281.

AIR COOLED VERSION — HEAT PUMP UNITS

e-Baltic		100	115	120	130	150	180	210
Nominal thermal performances - Cooling mode								
Cooling capacity (1)	kW	97,5	117,1	117,7	134,7	150,2	180,0	206,7
Total Power Input	kW	31,05	38,52	38,59	45,36	51,09	57,51	71,27
EER net (1)		3,14	3,04	3,05	2,97	2,94	3,13	2,90
Nominal thermal performances - Heating mode								
Heating capacity (2)	kW	93,5	114,0	115,0	129,3	145,9	172,9	207,0
Total Power Input	kW	24,60	31,84	32,86	34,95	41,10	45,86	59,65
COP net (2)		4.33	4.33	4.38	4.35	4.33	4.28	3,47
Seasonal efficiencies - Cooling mode								
Seasonal Energy Efficiency Ratio - **SEER** (3)		4,50	4,26	4,20	4,29	4,23	4,31	3,81
Seasonal energy efficiency - **ηs,c** (4)	%	177	167.4	165	168.8	166.2	169.4	149
Eurovent energy efficiency class - Part load operation		B	B	B	B	B	B	B
Seasonal efficiencies - Heating mode								
Seasonal Coefficient of Performance - **SCOP** (5)		3.4	3,37	3,34	3,39	3,39	4	3,35
Seasonal energy efficiency - **ηs,h** (6)	%	133	131.8	130.6	132.6	132.6	133	131
Eurovent energy efficiency class - Part load operation		B	B	B	B	B	B	B
Ventilation data								
Minimum airflow rate	m^3/h	15000	13800	15700	19000	21000	24000	28000
Nominal airflow rate	m^3/h	20500	23000	23000	26000	28000	33000	35000
Maximum airflow rate	m^3/h	23000	23000	23000	35000	35000	43000	43000
Acoustic data - Standard unit								
Outdoor sound power	dB(A)	81,4	83,2	83,7	84,5	86,4	85,7	87,5
Indoor blower outlet sound power	dB(A)	85,2	87,7	87,7	89,4	91,0	88,6	89,8
Electrical data								
Tension		400V / 3P / 50Hz						
Maximum power	kW	47,9	55,8	56,3	62,6	68,8	82,0	98,6
Maximum current	A	76,0	93,6	94,5	98,4	108,6	129,4	155,4
Starting current	A	162,9	212,6	213,5	202,8	230,2	273,8	328,7
Short circuit current	kA	10	10	10	10	10	10	10
Refrigeration circuit								
Number of circuits		2	2	2	2	2	2	2
Number of compressors		4	4	4	4	4	4	4
Refrigerant load	kg	7.3 / 7.3	7.8 / 7.8	7.4 / 7.4	11.25 / 10.5	11.25 / 10.5	12.8 / 12.8	13.5 / 13.5
Unit weight								
Standard air cooled unit	kg	1300	1300	1300	1700	1700	2150	2150

(1) **Cooling mode :** According to EN14511 nominal conditions - Outdoor temperature 35°C DB - Indoor temperature 27°C DB / 19°C WB
(2) **Heating mode :** According to EN14511 nominal conditions - Outdoor temperature 7°C DB / 6°C WB - Indoor temperature 20°C DB
(3) SEER in accordance with standard EN14825.
(4) Space cooling energy efficiency following Ecodesign regulation EU 2016/2281
(5) SCOP in accordance with standard EN 14825 (average climate conditions).
(6) Space heating energy efficiency following Ecodesign regulation EU 2016/2281.

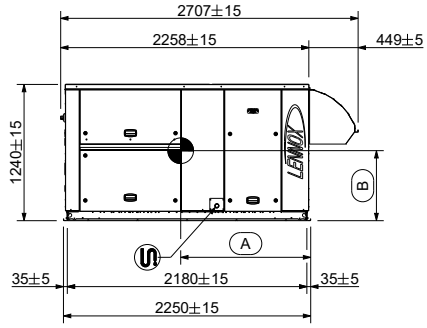
AIR COOLED UNITS

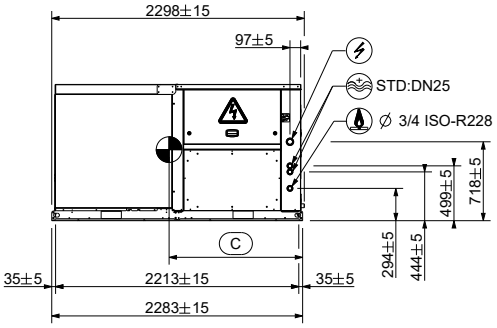


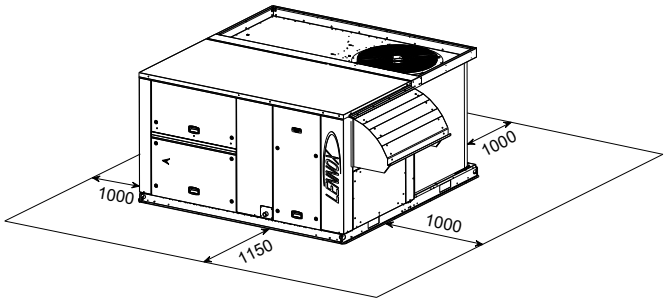
B 11/21	HIGH PRESSURE SWITCH	**CA 1/2**	NON RETURN VALVE
B 12/22	HIGH PRESSURE TRANSDUCER	**FDN**	FILTER DRYER
BCDN	OUTDOOR COIL	**MC 11/21**	OUTDOOR AXIAL FAN
BEV	INDOOR COIL	**MG 11/12/21/22**	COMPRESSOR
BS 13/23	SUCTION TEMPERATURE SENSOR	**YP 11/21**	ELECTRONIC EXPANSION VALVE
BS4	RETURN AIR TEMPERATURE SENSOR	**YV 12/22**	4-WAY VALVE

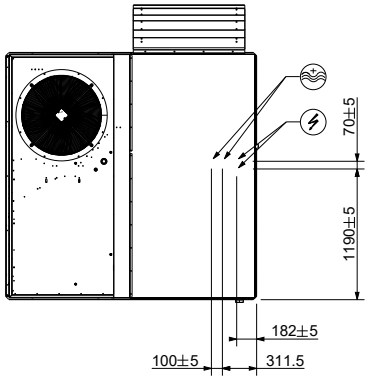
BOX C

eBBH035
eBBH045



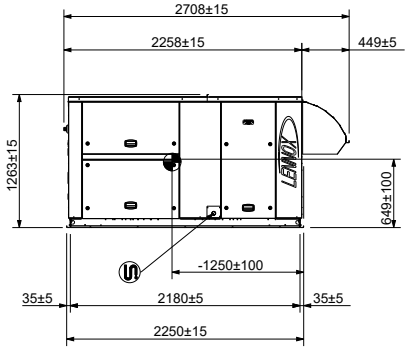


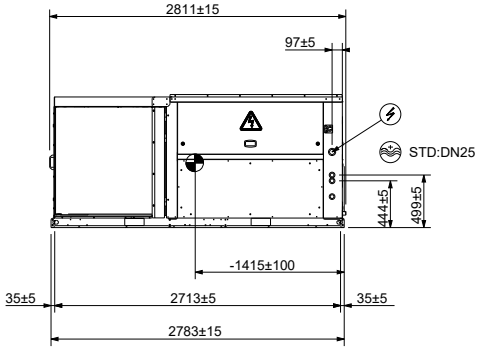


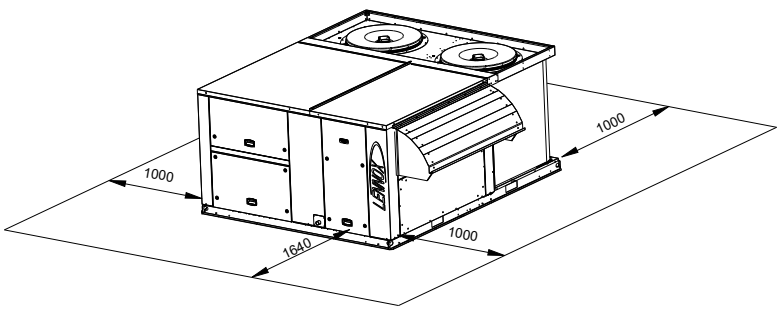


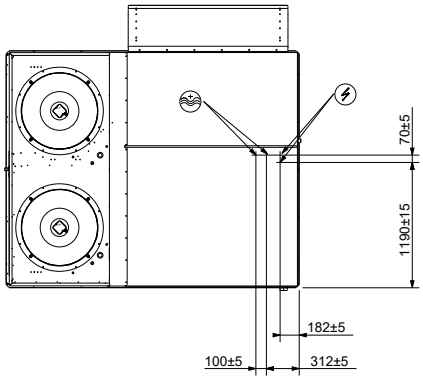
BOX D

eBBH055
eBBH065



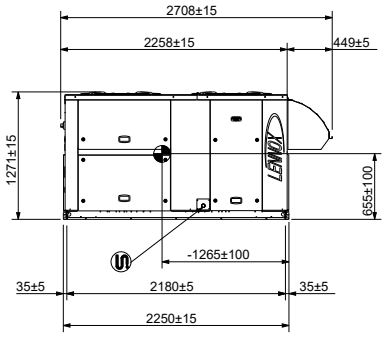


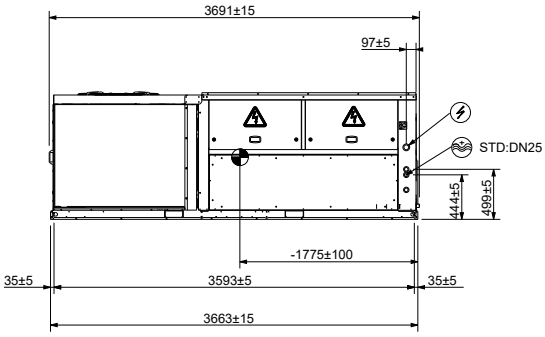


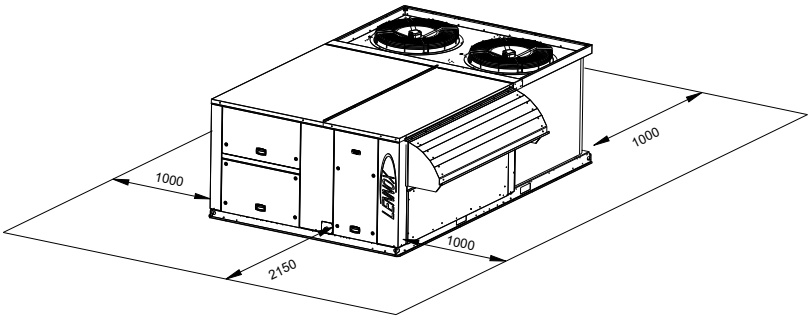


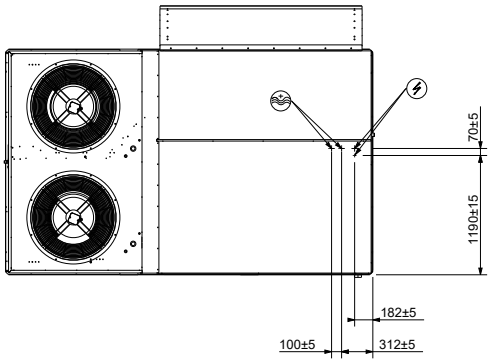
BOX E

eBBH075
eBBH085



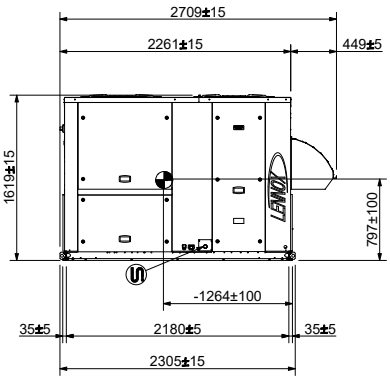


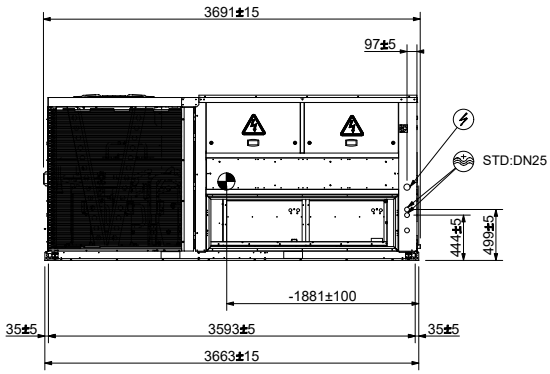


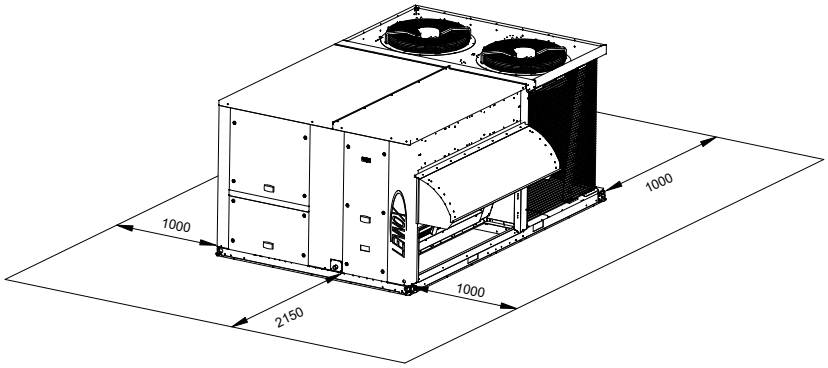


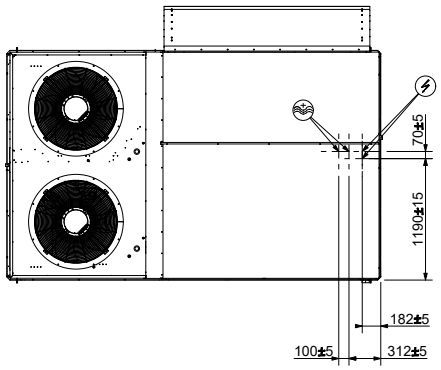
BOX Ex

eBBH095
eBBH115



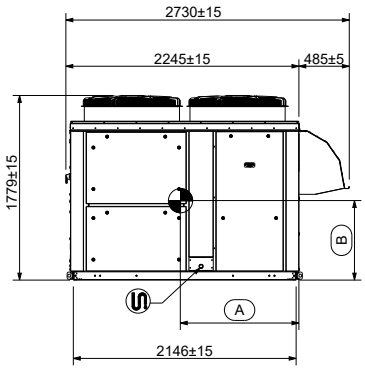


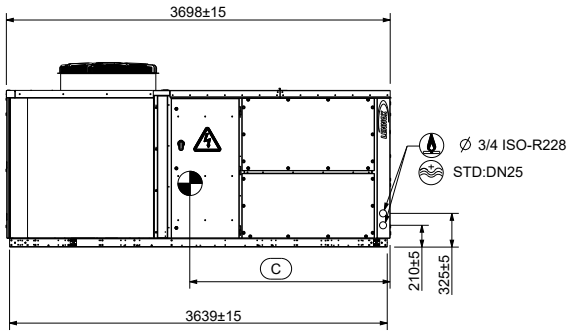


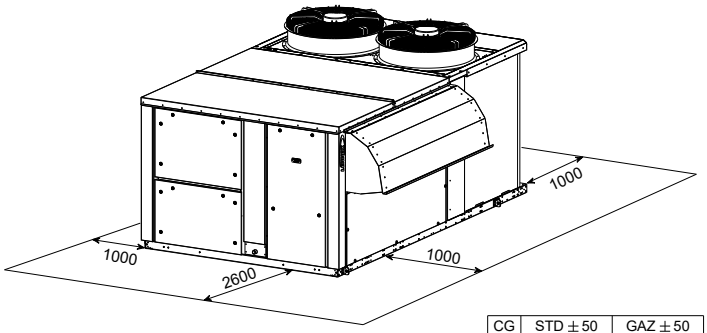


BOX F

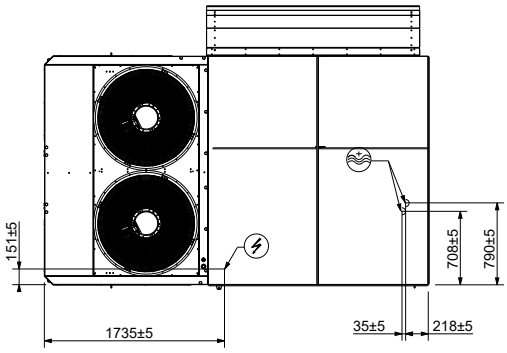
eBBH100
eBBH120





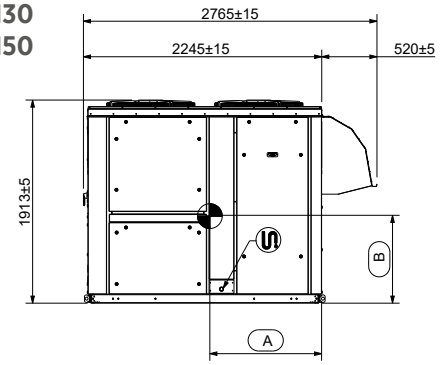


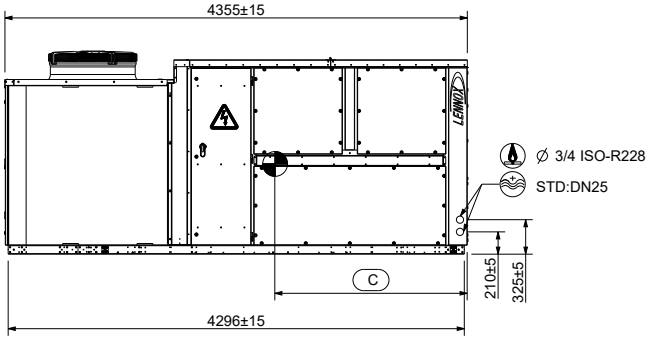
CG	STD ± 50	GAZ ± 50
A	1059	1092
B	799	786
C	1635	1572

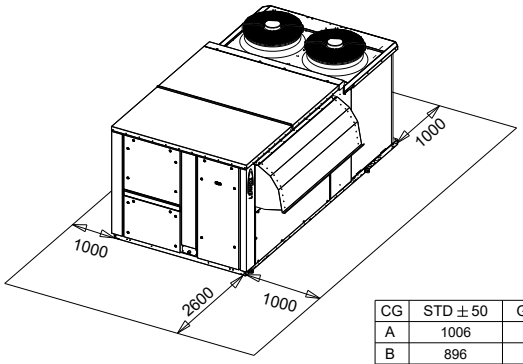


BOX G

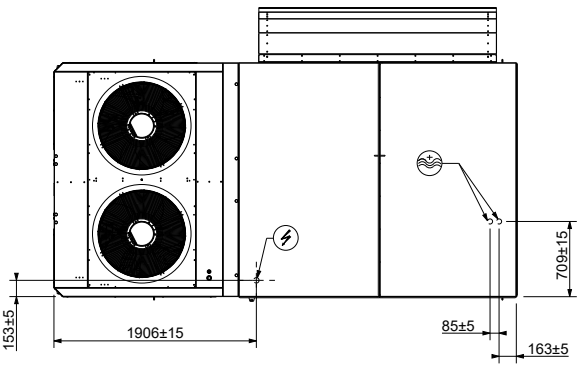
eBBH130
eBBH150





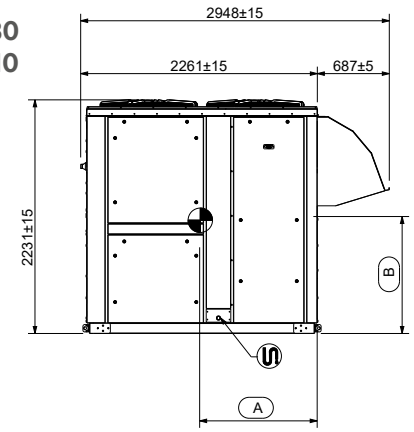


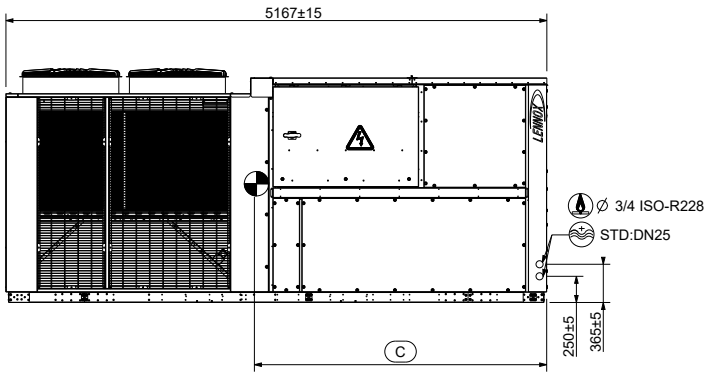
CG	STD ± 50	GAZ ± 50
A	1006	1023
B	896	887
C	1849	1830

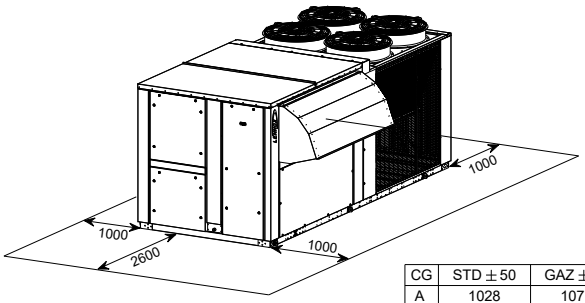


BOX H

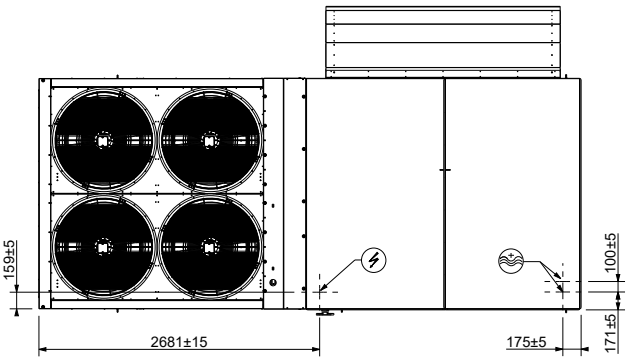
eBBH180
eBBH210







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



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

Headquarters LENNOX EMEA
7 rue des Albatros - Z.I. Les Meurières, 69780 Mions - France
+33 (0) 810 502 502
www.lennoxemea.com