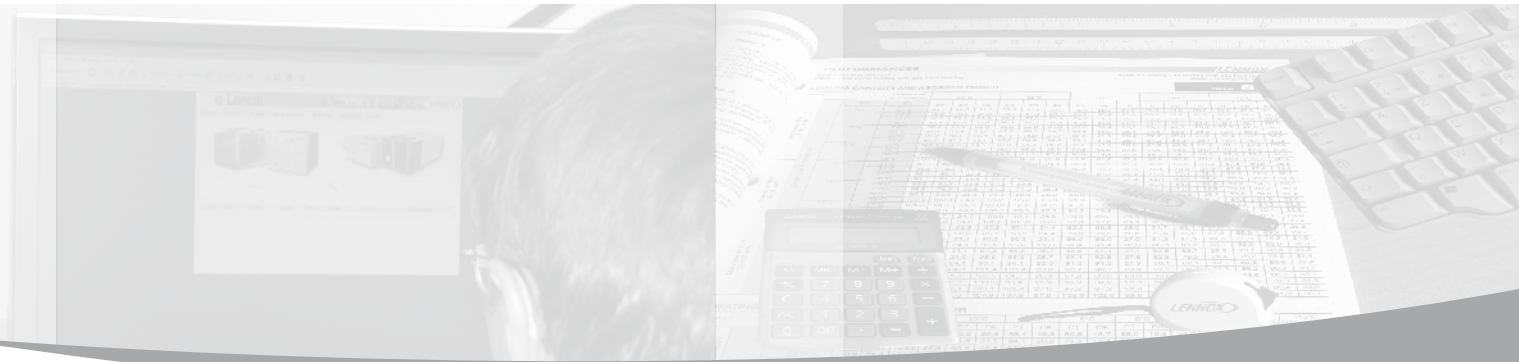


# Application guide BALTIC



- Providing indoor climate comfort





All data are at Eurovent conditions.  
<http://www.eurovent-certification.com/>

**PROGRAMA : AC2-A-P-C& AC3-A-P-C**

**BALTIC - BAC = COOLING ONLY ROOFTOP BAG = COOLING ONLY WITH GAS FIRED HEATING**

MODEL DESIGNATION	BAC-BAG	020S	030S	035S	045S
Cooling Mode					
Net cooling capacity	kW	21,2	26	34,5	43,4
Power input	kW	7,2	9,3	12,9	14,8
EER		2,95	2,71	2,65	2,94
Acoustic					
Outside sound power on Standard Unit	DBA	86	87	84	85
Indoor blower outlet sound power Standard unit	DBA	78	83	79	79

MODEL DESIGNATION	BAC-BAG	055S	065D	075D
Cooling Mode				
Net cooling capacity	kW	51	63,6	72,5
Power input	kW	18,5	21,9	27,4
EER		2,76	2,9	2,64
Acoustic	kW			
Outside sound power on Standard Unit	DBA	86	85	86
Indoor blower outlet sound power Standard unit	DBA	84	82	85

**PROGRAM : AC2-A-P-R & AC3-A-P-R**

**BAH = HEAT PUMP ROOFTOP BAM = HEAT PUMP ROOFTOP WITH GAS FIRED HEATING**

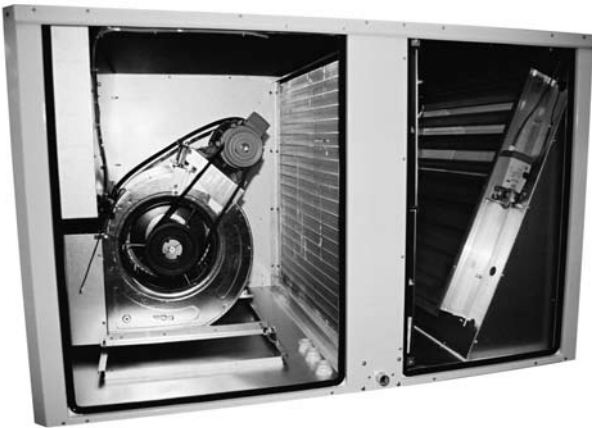
MODEL DESIGNATION	BAH-BAM	020S	030S	035S	045S
Cooling mode					
Net cooling capacity	kW	20,9	24,8	34,2	43
Power input	kW	7,2	9,2	12,9	14,8
EER		2,9	2,69	2,65	2,91
Heating mode					
Net heating capacity	kW	20,5	24,9	35,6	43,3
Power input	kW	6,79	8,45	11,43	13,5
COP		3,02	2,95	3,12	3,21
Acoustic					
Outside sound power	dBA	86	87	85	85
Indoor blower outlet sound power	dBA	81	86	85	85

MODEL DESIGNATION	BAH-BAM	055S	065D	075D
Cooling mode				
Net cooling capacity	kW	50,1	62,8	71,6
Power input	kW	18,5	21,9	27,4
EER		2,71	2,87	2,61
Heating mode				
Net heating capacity	kW	51,8	65,9	77,2
Power input	kW	16,76	19,94	23,77
COP		3,09	3,3	3,25
Acoustic				
Outside sound power	dBA	86	86	86
Indoor blower outlet sound power	dBA	87	85	89

**Air flow configuration**

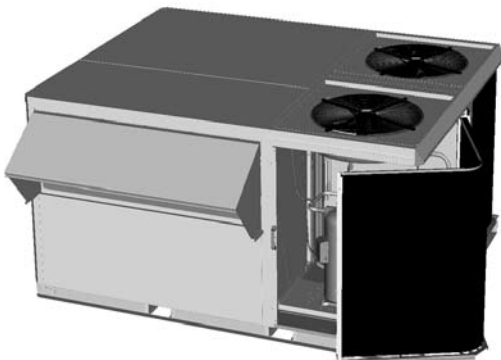
Unless specified otherwise when ordered, the BALTIC rooftops are shipped with downflow configuration and with 100 Pa external static pressure at nominal air flow, and 100% return air. However, the air flow and pressure characteristics can be set up at the factory to your particular project requirements, that will help reducing time spent on site.

**Variable Pulley**



For cases where the actual external static pressure or air flow on a particular project is different from what is specified on an order, LENNOX has enhanced the BALTIC rooftop by providing an adjustable belt and pulley. The installer can easily and quickly adjust the air flow within a 20% window without moving the mounted fan motors. This variable pulley provides flexibility and peace of mind during commissioning.

**Easy to access (under patent March 2004)**



External panels are easily removed providing clear access to all components.

On the size 60 and 70, the compressor's box is opened thanks to the LENNOX patented system "Hinged Access coil". This very unique feature is giving a very good access to the 2 compressors meantime increasing the machine compactness.

**External access to the pressure gauges**



Measuring the low-pressure and high-pressure on a rooftop is a basic and normal operation that Lennox wanted to make as simple and easy for service technicians.

This is why, remote pressure taps have been made accessible from the outside (on a post), without entering the refrigeration section of the unit.

**EU3 / G3 grade - Disposable Filters**

Ensuring easy service and maintenance. On start-up we recommend that you change the throwaway filter for replaceable washable filters, with metal frames.

Be careful to the filter fire class related to the local rules

**EXTENDED LIFE CYCLE**

**Assembly quality, compliance to PED 97-23, EN 60204-1, CE, made in an ISO 9001v2000 Factory**

What probably makes the difference are those small details which have given LENNOX its reputation.

Electrical components are selected to the highest standards, refrigeration components are generously sized to ensure maximum performance and reliability.

Quality manufacturing procedures together with a culture of continuous improvement at all LENNOX factories, ensure the products are built to the highest standards.

BALTIC complies to EN60204 norms, PED 97-23 directive, is CE compliant and is built in an ISO9001v2000 certified Factory.



**Anticorrosion fixings and Anticorrosion Coating on the casing (10 years warranty)**

The BALTIC has been designed to ensure that it has a long operational life.

The RAL 9002 powdered polyester paint is UV resistant, protecting the unit from damaging UV rays.

Further resistance is provided on the BALTIC range through the use of anticorrosion fixings (A2 Anticorrosion) as a standard feature.

These standard features allows LENNOX to offer a 10 year warranty against corrosion (\*).

(\* ) *Corrosion LENNOX policy : Nevertheless the LENNOX coating is highly resistant to corrosion, the warranty will not be applied for Rooftop installed at less than 1000 m away from the sea.*

**More reliable refrigeration circuit**



To minimise the risk of leaks, refrigeration circuit has been drastically simplified to reduce the number joints (potential cause of leak). For example a BALTIC BAHM40 would have only 28 joints, when a typical rooftop of the same size would have 38 joints).

The second innovation of the refrigeration circuit will reduce maintenance time.

All joints and all pipes are located in the refrigeration section. This includes evaporator collector located in the same compartment. Service technician only have one door to open to access the whole circuit.

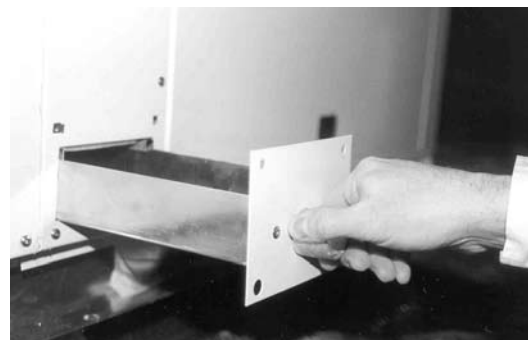
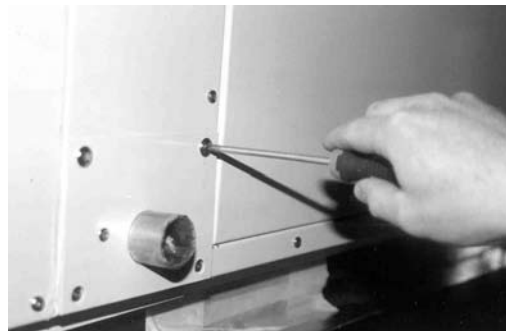
**INDOOR AIR QUALITY DOES MATTER**

**Fire proof (M0) insulation (Indoor Air Section)**

Because, for LENNOX, health and safety issues cannot be compromised, in all rooftops fire insulation (M0 fire Class) is fitted as standard. 65 kg/m3 insulation is mechanically fitted to the unit. This feature improves the safety of the rooftop against fire, as the specification suggests, the insulation will not burn and smoke is not generated.

Edges of insulation are protected on the edge to perfectly seal the insulation.

**Removable Aluminium Drain Pan**



This gives the drain pan a longer life. The underside of the unit is insulated to reduce condensation.

The bent drain traps are shipped in a kit form. Drain pan is sloped to prevent stagnation of water. It is removable with 2 screws. It slides out and can be easily cleaned, preventing growth of bacteria in the drain pan.

**Accurate percentage of fresh air (under patent INPI MAY 2003)**

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, Lennox wanted to pilot the % of fresh air more accurately.

The CLIMATIC™ 50 can now periodically recalibrate the dampers, in calculating the real percentage of fresh air entering the building for the each different positions of the damper.

This recalibration is achieved using the return air sensor, the outdoor sensor and supply air sensor. When all heating or cooling elements are off, the percentage of fresh air actually entering the rooftop is the result of the following equation :

$$\begin{aligned} \text{"%Fresh Air"} &= \\ & \frac{\text{"Supply Air temperature"} - \text{"Return Air Temperature"}}{\text{"Fresh air Temperature"} - \text{"Return Air Temperature"}} \end{aligned}$$

For example, CLIMATIC™ 50 would accurately adjust the damper position to get 20% fresh air and not 30% or 10%.

Therefore, this feature either saves a lot of energy cost by not bringing more fresh air than needed or makes sure that air quality is at the expected level.

This allows CLIMATIC™ 50 to send an alarm when damper can not be calibrated (faulty damper )

**Transition Curb**

According to the French regulation CH40 (Public buildings), which says, that a gas rooftop with a burner bigger than 70 kW, can not be installed directly on a roofcurb. Lennox has made approved by the French minister of interior a special transition curb including a free air ventilation of 20 cm high underneath the Rooftop floor, located between the standard roofcurb and the rooftop. This is a big time saver, because it allows again the use of roofcurb on gas rooftop.

**Horizontal / vertical Air Flow**

Lennox believes that rooftops should be adaptable to specific design requirements, this is why a variety of downflow return and supply, horizontal supply and return or a mix of both are offered.

**Drive Kit up to 500 Pa (400Pa on size 20, 25, 30 and 35)**

As all systems are different, it is useful to have the ability to adapt to different air flow conditions and this can be achieved through the selection of various choices of motors and drives that can provide up to 500Pa at nominal air flow. This means that commissioning on site can be done easily and quickly, helping you to keep your installation costs to a minimum (\*).

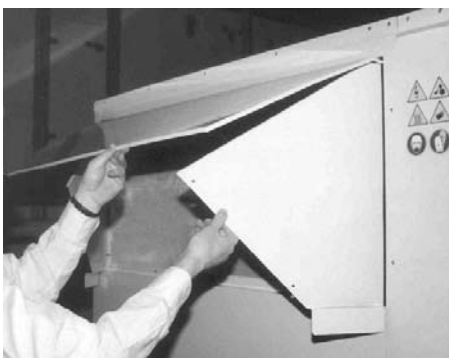
(\* ) In order to minimize energy consumption and reliability, it is highly recommended by LENNOX not to oversize the ESP (external static pressure) of the Rooftop during the selection.

**Air Sock Control**

The use of air socks for space conditioning allows high air volumes to be distributed at low velocity and is becoming a common feature in many applications. To accommodate this trend, Airsock control is offered which allows the air socks to be progressively filled with air on start up. BALTIC has been enhanced with an electronic device to soft start the fan. It takes 1 minute to go from 0% of air to full air flow.

**FRESH AIR AND EXHAUST AIR**

**Economiser**



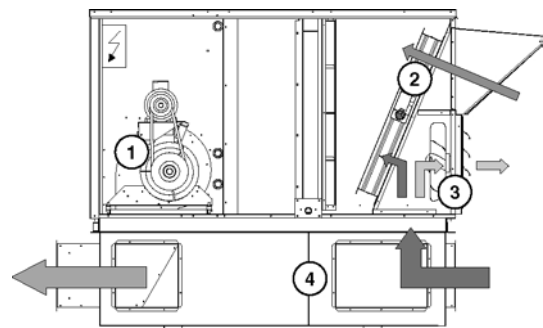
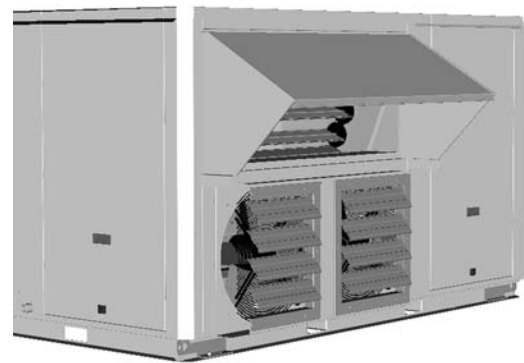
"Free cooling" is provided through the use of fresh air where appropriate rather than cooling the return air. The use of an economiser is the easiest and most efficient way to modulate fresh volumes and reduce running costs for a rooftop application, as well as improving air quality. Fully controlled by the CLIMATIC™ 50, it is also able to ensure that minimum fresh air is provided in line with Indoor Air Quality Regulations. Economiser operates using a "sensible" control. It is possible to prevent the economiser from supplying air below a certain temperature (adjustable set point, 10°C as default).

The economiser is factory fitted and tested, prior to shipment and includes 2 dampers operating from a 24V actuator. It includes a rain hood factory fitted. Hood will be folded during transportation to limit risk of damage and is unfolded on site.

**Gravity exhaust damper**

Installed with economiser assembly, gravity exhaust damper relief pressure when outside air is being introduced in the system. It is a cheap and smart way to avoid overpressure in a building. **NOTE :** When horizontal flow configuration is required, the multidirectional roofcurb must be installed.

**Power Exhaust Fan**



Installed with economiser assembly, it provides exhaust air pressure relief when high levels of outside air are being introduced in the system.

Interlocked to run when return air dampers are being closed and supply air blower is in operation. The extraction fan runs when outdoor air dampers are at least 50% open (adjustable). It is also overload protected. A gravity exhaust damper is supplied with this option to prevent air from entering the unit during shutdown.

**Return Roofcurb**

Where system balancing is critical, it is recommended that an exhaust fan is installed in the system. Instead of including the exhaust fan inside the rooftop, LENNOX has designed a special roofcurb that incorporates the return fan and handles the exhaust function.

A centrifugal fan installed with a 3rd damper (1 inside the Roofcurb + 2 inside the rooftop), is able to exhaust up to the nominal air flow of the unit with a maximum of 300Pa static pressure available. This roof curb can be used in either horizontal or downflow applications.

**Energy Recovery module (under patent INPI Mars 2004)**

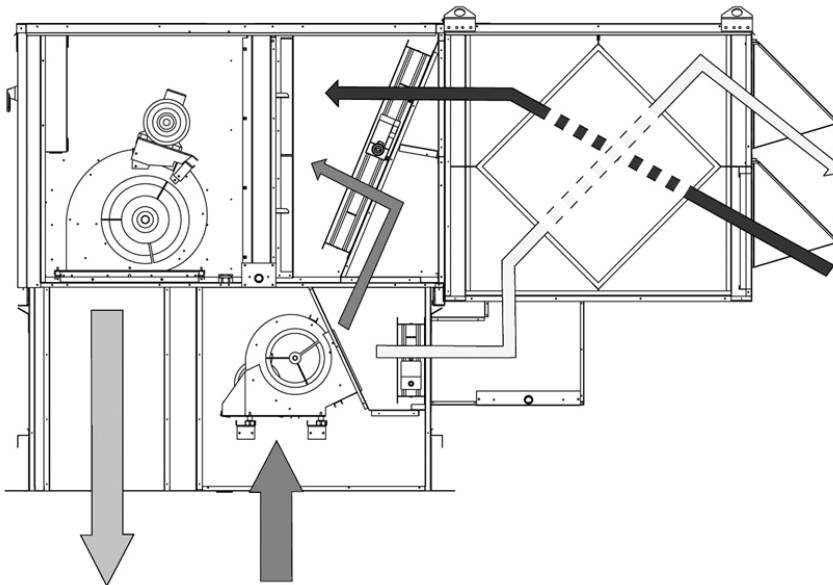
Based on the market trend to use more and more fresh air, Lennox had to offer the possibility to recover the energy of the exhaust air.

Made of a EUROVENT certified plate heat exchanger and a by-pass damper, the heat recovery module is fully controlled by the Climatic50. 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.

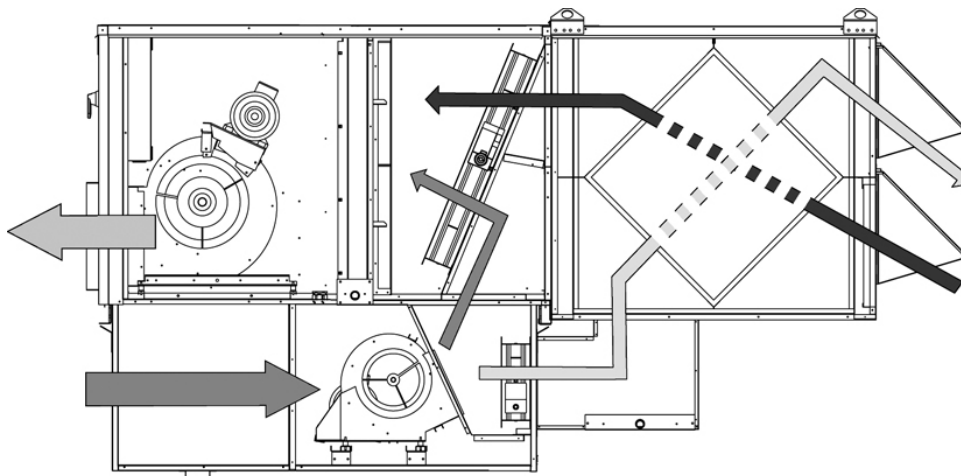
This module is fitted as a standard with G4 filters on the fresh air section. This will protect the exchanger against outdoor dust and increase the global filtration capacity of the machine.

The Analogic blower pressure sensor and dirty filter indication is mandatory with that option. This will garanty a supply airflow control and will indicate the dirtytness of Heat recovery module fresh air filter.

This option, in addition to match Lennox commitment to a greener planet, is a real money saving feature for the customer.



*Vertical Airflow*



*Horizontal Airflow*

**INDOOR AIR QUALITY**

**Analogic Blower sensor and dirty filter indication**

A differential pressure sensor measures the pressure drop across the evaporator coil and filters. If this pressure drop is above 50Pa, the rooftop is considered to be operating. The exact pressure drop can be seen through the Intelligent CLIMATIC™ 50 board. This option further improves security and reliability of the BALTIC rooftops. It prevents overheating of any device if the fan belt is broken.

Using the same pressure sensor as the "Blower On Sensor", pressure drop information is interpreted by the CLIMATIC™ 50 board to determine whether the filter is dirty or not. This information is available with all CLIMATIC™ 50 controllers.

The set point between "dirty" and "clean" is fully adjustable by the installer/users. (Default value is approximately 250Pa).

**Panel filters with metal frames and disposable filter media (EU4 / G4) (Be careful to the filter fire class related to the local rules)**



When units are installed in an environment when it is expected that filters will be changed more frequently than usual, it is advisable that the end user includes metallic frame with washable filter (classified EU4/G4) media. This is a more cost-effective answer to disposable filters.

**EU7 / F7 Panels filters (Be careful to the filter fire class related to the local rules).**

As different applications have differing needs, it is more and more important that LENNOX can provide various options for a mixed range of requirements. The EU7/F7 filter capability with EU4/G4 pre-filters is available to add additional flexibility for specific projects, where Indoor Air Quality is of particular importance.

**Indoor Air Quality Sensor**

Indoor air quality is controlled from the CLIMATIC™ 50 board. A VOC (Volatile Organic Component) sensor will detect the amount of CO2 in the air between 0 and 2000PPM. (This obviously varies depending upon space occupancy levels). The VOC sensor will then send a proportional signal (0-20mA) to the CLIMATIC™ 50 controller which will then modulate the fresh air.

**HEATING OPTIONS**

**Electric Heater**

The electric heater comprises of shielded resistance heaters, which are smooth anticorrosion tubes 6 W/cm2 capacity. High temperature limit control offers overload protection and is set to 90°C and located at less than 150mm after electric heaters. This is provided as a standard feature on the electric heater, with the electric power supply cables made of reticulated silicon rubber, resistant to temperatures up to 200°C. For any rooftop unit size, three sizes of electric heater are available, S (standard), M (Medium) and H (high).

**BALTIC 20 and 30 have :**

- Standard heat : 12 kW , 2 stages
- Medium Heat : 24 kW , 2 stages
- High Heat : 36 kW, Fully modulating (Triac)

**BALTIC 35 have :**

- Standard heat : 24 kW , 2 stages
- Medium Heat : 36 kW , 2 stages
- High Heat : 48 kW, Fully modulating (Triac)

**BALTIC 45, 55 have :**

- Standard heat : 27 kW , 2 stages
- Medium Heat : 45 kW , 2 stages
- High Heat : 54 kW, Fully modulating (Triac)

**BALTIC 65, 75 have :**

- Standard heat : 27 kW , 2 stages
- Medium Heat : 45 kW , 2 stages
- High Heat : 54 kW, Fully modulating (Triac)

Capacity of the high heat heater can be limited electronically to an exact value through the CLIMATIC™ 50.

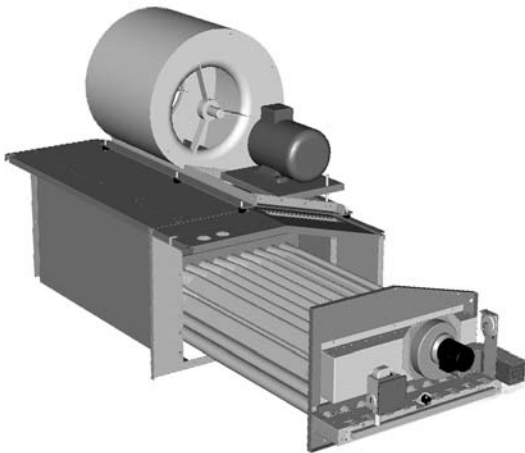
To reduce installation time and hence cost, electric heaters are always factory fitted, fully wired and tested, prior to shipment.

**Hot Water Coil**

Hot water coils offer fully modulating control through the use of a 3 way valve. The hot water coil, connections and valves are all tested at pressure of 15 bars. Frost protection is provided by forcing the opening the 3 way valve when supply temperature from hot water coil falls below 8°C and by stopping the outdoor fan when that supply temperature falls below 6°C. In addition to that, the 3 ways is also opened at 10% value if the outdoor temperature falls below an adjustable value.

Hot water coils are always factory fitted, wired and fully tested, prior to shipment.

**93% high efficiency Gas Burner Option (PCI %)**



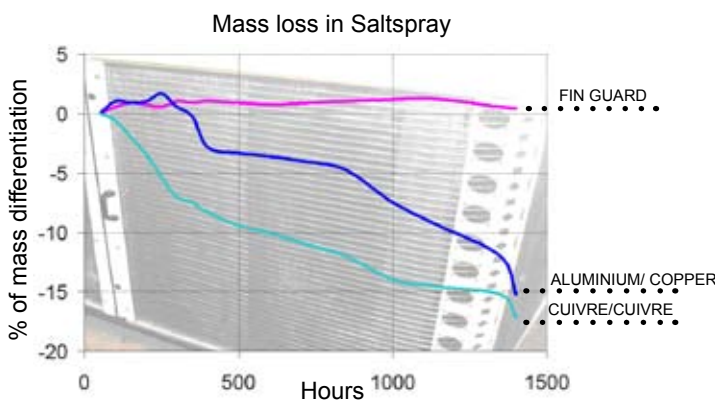
Lennox is proud to introduce the first high efficiency gas burner available on rooftop in Europe with 93% efficiency. Ebox, size 60- 70, have a 92% efficient gas burner. The standard gas burner is designed to work with 20 mbar (with an operating range of 13-26 mbar) .

Gas module offer 2 stages of control. This assists in improving space comfort levels by avoiding large supply air temperature deviations.

The aluminized steel tube heat exchanger is designed to offer maximum heat transfer efficiency. If required, an expansion device can be provided in the BALTIC allowing it to operate with gas pressures of up to 300 mbar. A "propane gas" option at 37 mbar is also available. Gas fired rooftop can not be installed inside a technical room.

**TREATMENT OPTIONS**

**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 .

After extensive testing, Lennox has chosen to use Thermo-guard anticorrosion cleaning for the FLEXY II. The results of Thermoguard® on saline test were so good, that coil can be guaranteed against corrosion during 3 years (provided regular maintenance is performed).

Thermoguard® treatment is available on Condensing coil, evaporator coil and hot water coil.  
 (\*) see corrosion LENNOX policy.

**ELECTRICAL OPTIONS**

**Fire-Stat**

This is a thermostat that provides a signal 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 (70°C standard).

**Disconnect Switch**

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 option picked with the unit. 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.

**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**

**Advance control pack**

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

- "Enthalpy control on economiser".

Software and its sensors will ensure 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" software and its sensors, are able to analyze dry and wet bulb temperatures, and therefore can control a dehumidification algorithm. This will dehumidify the air in cooling mode as it passes through the coil, then reheating it with either electric heater or hot water coil. If there is a need to humidify the air, a proportional contact is now available to control a humidifier that will be provided by the customer.

**DC 50 : Comfort Display**



This is a remote controller for non-technical customer. It has been wanted to aesthetically fit inside a room and be very easy to use. It can be installed at maximum 500 meters from the unit.

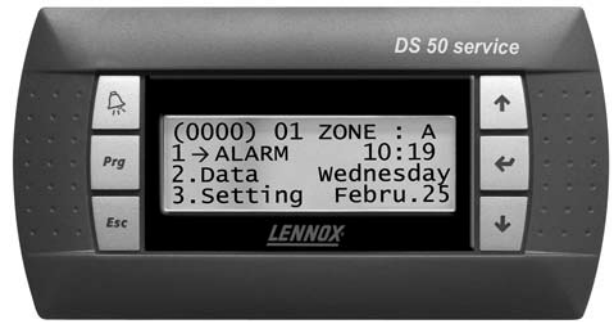
This graphical display gives information such as running mode of the unit, status of the fan, set point, % of fresh air, outside air temperature.

Customer can change the scheduling of the different time zone, can modify temperature set point and % of fresh air for each zone. Customer can also override the scheduling in either changing the set point for 3 hours or in forcing the rooftop to unoccupied mode for 1 to 7 days. ON/OFF key is also available.

DC50 Comfort display, shows faults number when rooftop is in the failure mode. Customer can reset fault thanks to a combination of keys.

Time and day of the rooftop can be seen and modified easily through the DC50.

**DS 50 : Service Display**



This new service display controller directly plugs on the external wall of the unit.

This allows service personal to set up to 90 settings, read up to 125 variables, up to 45 faults and read the history of the last 16 faults.

This controller has been designed to be very user friendly, with 6 different keys, a 4 lines display and this controller includes scrolling menus and true language (no codes). It will be in English or an other alternate language.

**TCB (Thermostat Control Board)**

This board has been developed for any customer who wants to take over the control of the unit. With 6 logical inputs (Compressor stage 1 and stage 2, heating step 1 and 2, 4 way valves and fan), this board will replace the control algorithm. However CLIMATIC™ 50 controller will stay in charge of all safety algorithm, defrost operation or free cooling operation. All Input are volt free contact.

This is the perfect board, to have BALTIC rooftop managed by a zoning system, a universal thermostat or even a BMS system.

**Communication interface / Modbus interface**

Electronic board needed for Climalink or Climalook use. One board required per rooftop.

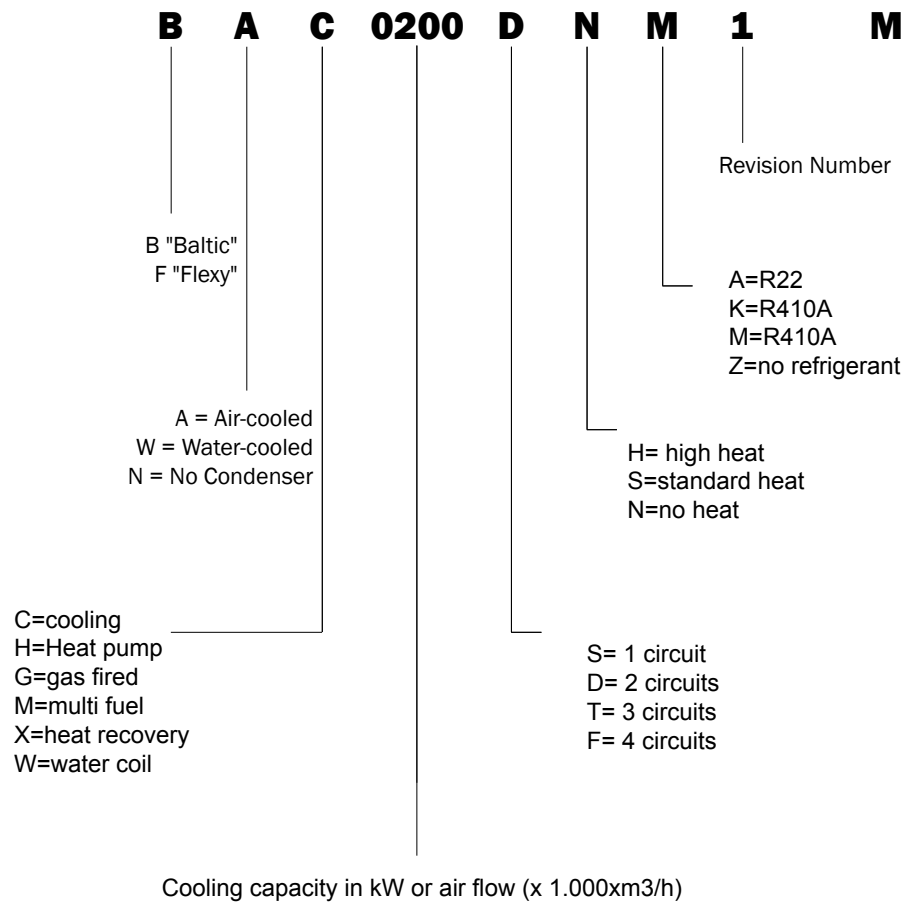
This board is a well a modbus interface, which is needed for anyone who would like a BMS system to talk to the Baltic with "Modbus protocol". No other hardware than this board is required to have modbus dialog. One board required per rooftop.

**LonTalk® interface**

This board is a LonTalk® interface, which is needed for anyone who would like a BMS system to talk to the Baltic with «Lon protocol» with FTT10. No other hardware than this board is required to have LonTalk® dialog. One board required per rooftop.

**Bacnet® interface**

This board is a Bacnet® interface, which is needed for anyone who would like a BMS system to talk to the FLEXY II with "Bacnet protocol» RS485.



		<b>020</b>	<b>030</b>	<b>035</b>
<b>Table 3.3</b>				
<b>Nominal Airflow</b>	m <sup>3</sup> /h	3600	4500	6300
<b>Heating - electric</b>				
Type of modulation		Staged S & M TRIAC on H	Staged S & M TRIAC on H	Staged S & M TRIAC on H
Heating capacity available	kW S (2)	12	12	24
Heating capacity available	kW M (2)	24	24	36
Heating capacity available	kW H (2)	36	36	48
Amps S / M / H	A	17 / 33 / 50	17 / 33 / 50	33 / 50 / 67
<b>Heating - hot water coil</b>				
Heating capacity available (1)	kW H (2)	33,7	38,4	53,5
<b>GAS modulating</b>				
Modulation Range	% H	40 - 100	40 - 100	40 - 100
<b>Filter</b>				
Efficiency (gravimetric) class EN779 / Eurovent	type	90% / G4 / EU4	90% / G4 / EU4	90% / G4 / EU4
Nb of filter	nb	2	2	2 + 2
Filter size	mm	500x625x50	500x625x50	400x500x50 + 500x500x50
Fire class	type	M1	M1	M1
<b>Dynamic Defrost</b>				
Axial fan number	nb	2	2	2
Motor power (total)	kW	0,32	0,32	0,9
<b>Soft start option : CEM - A CLASS ISO 55022 / ISO 55011</b>				
Soft Starter	Available	Yes	Yes	Yes
<b>Acoustic low NOISE @ 100 Pa</b>				
Outside sound power on standard unit (1)	dB(A)	76	76,9	81,4
Outside sound power on GAS unit (1)	dB(A) S & H	76,3	77,8	81,6

**Note :**

- (1) Condition Entering water 90°C, Leaving water 70°C, Entering air 20°C, S = Standart heat, H = High heat
- (2) not available with BAM and BAG version
- (3) All data at eurovent condition at 400V/3Ph/50Hz

		<b>045</b>	<b>055</b>	<b>065</b>	<b>075</b>
<b>Table 3.3</b>					
<b>Nominal Airflow</b>	m <sup>3</sup> /h	8100	9000	11700	13500
<b>Heating - electric</b>					
Type of modulation		Staged S & M TRIAC on H	Staged S & M TRIAC on H	Staged S & M TRIAC on H	Staged S & M TRIAC on H
Heating capacity available	kW S (2)	27	27	27	27
Heating capacity available	kW M (2)	45	45	45	45
Heating capacity available	kW H (2)	54	54	54	54
Amps S / M / H	A	38 / 63 / 75	38 / 63 / 75	38 / 63 / 75	38 / 63 / 75
<b>Heating - hot water coil</b>					
Heating capacity available (1)	kW H (2)	71,2	75,5	107,6	118,1
<b>GAS modulating</b>					
Modulation Range	% H	40 - 100	40 - 100	20 - 100	20 - 100
<b>Filter</b>					
Efficiency (gravimetric) class EN779 / Eurovent	type	90% / G4 / EU4	90% / G4 / EU4	90% / G4 / EU4	90% / G4 / EU4
Nb of filter	nb	4	4	4 + 2	4 + 2
Filter size	mm	500x625x50	500x625x50	500x600x50 500x500x50	500x600x50 500x500x50
Fire class	type	M1	M1	M1	M1
<b>Dynamic Defrost</b>					
Axial fan number	nb	2	2	2	2
Motor power (total)	kW	1,48	1,48	1,6	1,6
<b>Soft start option : CEM - A CLASS ISO 55022 / ISO 55011</b>					
Soft Starter	Available	Yes	Yes	Yes	Yes
<b>Acoustic low NOISE @ 100 Pa</b>					
Outside sound power on standard unit (1)	dB(A)	81,9	82,1	81,9	82,2
Outside sound power on GAS unit (1)	dB(A) S & H	82,1	82,6	82,2 / 82,3	82,7 / 82,9

**Note :**

- (1) Condition Entering water 90°C, Leaving water 70°C, Entering air 20°C, S = Standart heat, H = High heat
- (2) not available with BAM and BAG version
- (3) All data at eurovent condition at 400V/3Ph/50Hz



**BAC** = Cooling only unit  
**BAH** = Heat pump rooftop

**RETURN AIR  
 AT 20°C**

Table 4.41

Δ water temperature		90-70				80-60				70-50			
SIZE	Air flow M³/h	Heating capacity kW	Pressure drop (1) kPa	Δ temp air	Water flow rate m³/h	Heating capacity kW	Pressure drop (1) kPa	Δ temp air	Water flow rate m³/h	Heating capacity kW	Pressure drop (1) kPa	Δ temp air	Water flow rate m³/h
<b>20</b>	2900	29,6	14,3	30,3	1,3	24,1	9,5	24,7	1,1	18,6	5,7	19,0	0,8
	3600	33,7	18,4	27,8	1,5	27,4	12,2	22,6	1,2	21,1	7,3	17,4	0,9
	4300	37,4	22,6	25,8	1,6	30,4	15,0	21,0	1,3	23,4	8,9	16,1	1,0
<b>30</b>	3600	33,7	18,4	27,8	1,5	27,4	12,2	22,6	1,2	21,1	7,3	17,4	0,9
	4500	38,4	23,7	25,3	1,7	31,2	15,7	20,6	1,4	24,0	9,4	15,8	1,0
	5400	42,5	29,0	23,3	1,9	34,5	19,1	18,9	1,5	26,4	11,3	14,5	1,2
<b>35</b>	5000	46,8	34,0	27,8	2,1	38,1	22,6	22,6	1,7	29,5	13,6	17,5	1,3
	6300	53,5	44,2	25,2	2,4	43,5	29,3	20,5	1,9	33,5	17,5	15,8	1,5
	7600	59,3	54,1	23,1	2,6	48,2	35,9	18,8	2,1	37,1	21,4	14,5	1,6
<b>45</b>	6500	62,6	22,2	28,6	2,8	51,3	15,3	23,4	2,2	39,9	9,6	18,2	1,7
	8100	71,2	28,3	26,1	3,1	58,2	19,5	21,3	2,6	45,2	12,2	16,6	2,0
	9700	78,7	34,2	24,1	3,5	64,3	23,5	19,7	2,8	49,9	14,7	15,3	2,2
<b>55</b>	7200	66,5	24,9	27,4	2,9	54,4	17,1	22,4	2,4	42,3	10,8	17,4	1,8
	9000	75,5	31,7	24,9	3,3	61,7	21,8	20,4	2,7	47,9	13,6	15,8	2,1
	10800	83,4	38,2	22,9	3,7	68,1	26,3	18,7	3,0	52,8	16,4	14,5	2,3
<b>65</b>	8600	93,3	24,6	32,2	4,1	76,5	16,7	26,4	3,4	59,7	10,3	20,6	2,6
	11500	111,8	34,9	28,8	4,9	91,5	23,6	23,6	4,0	75,2	16,1	17,7	3,3
	13000	120,3	40,3	27,5	5,3	98,5	27,2	22,5	4,3	76,5	16,6	17,5	3,3
<b>75</b>	9950	103,2	29,9	30,3	4,5	84,6	20,2	24,8	3,7	65,9	12,4	19,4	2,9
	13500	123,1	42,1	27,0	5,4	100,7	28,4	22,1	4,4	78,2	17,4	17,2	3,4
	16000	135,9	51,1	25,2	6,0	111,1	34,4	20,6	4,9	86,2	21,0	16,0	3,8

(1) pressure drop = internal coil + 3 way valve  
 All dat calculated for water without glycol

Correction factor to get data for 82 - 71 from 90 - 70

Note : 10 kPa=1mCe

SIZE	Heating capacity kW	Pressure drop kPa	Water flow rate Kg/s
<b>020-030</b>	0,97	3,05	1,76
<b>035</b>	0,97	3,05	1,76
<b>045-055</b>	<b>0,96</b>	<b>2,91</b>	<b>1,75</b>
<b>065-075</b>	0,96	3,00	1,75

**BAC** = Cooling only unit  
**BAH** = Heat pump rooftop

**RETURN AIR  
 AT 10°C**

Table 4.41

Δ water temperature		90-70				80-60				70-50			
SIZE	Air flow M³/h	Heating capacity kW	Pressure drop (1) kPa	Δ temp air	Water flow rate m³/h	Heating capacity kW	Pressure drop (1) kPa	Δ temp air	Water flow rate m³/h	Heating capacity kW	Pressure drop (1) kPa	Δ temp air	Water flow rate m³/h
<b>20</b>	2900	35,4	20,3	35,0	1,6	29,8	14,4	29,5	1,3	24,2	9,6	24,0	1,1
	3600	40,3	26,2	32,2	1,8	33,9	18,6	27,0	1,5	27,5	12,3	21,9	1,2
	4300	44,7	32,0	29,8	2,0	37,6	22,7	25,1	1,6	30,4	15,0	20,3	1,3
<b>30</b>	3600	40,3	26,2	32,2	1,8	33,9	18,6	27,0	1,5	27,5	12,3	21,9	1,2
	4500	45,9	33,7	29,3	2,0	38,6	23,8	24,6	1,7	31,2	15,7	19,9	1,4
	5400	50,8	41,1	27,0	2,2	42,6	29,0	22,6	1,9	34,5	19,1	18,3	1,5
<b>35</b>	5000	55,9	48,2	32,1	2,5	47,1	34,2	27,0	2,1	38,3	22,7	22,0	1,7
	6300	63,8	62,6	29,1	2,8	53,7	44,3	24,5	2,4	43,6	29,3	19,9	1,9
	7600	70,7	76,7	26,7	3,1	59,5	54,2	22,5	2,6	48,3	35,8	18,2	2,1
<b>45</b>	6500	74,6	30,9	32,9	3,3	63,1	22,7	27,8	2,8	51,6	15,6	22,8	2,2
	8100	84,7	39,4	30,0	3,7	71,6	28,8	25,4	3,1	58,5	19,8	20,7	2,5
	9700	93,7	47,7	27,7	4,1	79,1	34,8	23,4	3,5	64,5	23,9	19,1	2,8
<b>55</b>	7200	79,2	34,7	31,6	3,5	67,0	25,4	26,7	2,9	54,7	17,5	21,8	2,4
	9000	89,9	44,1	28,7	4,0	75,9	32,2	24,2	3,3	62,0	22,1	19,8	2,7
	10800	99,3	53,2	26,4	4,4	83,8	38,9	22,3	3,7	68,3	26,6	18,1	3,0
<b>65</b>	8600	111,3	34,6	37,1	4,9	94,2	25,0	31,4	4,1	77,1	16,9	25,7	3,4
	11500	133,3	49,2	33,2	5,9	112,7	35,4	28,1	4,9	97,2	26,5	22,1	4,2
	13000	143,4	56,8	31,6	6,3	121,2	40,8	26,7	5,3	98,9	27,4	21,8	4,3
<b>75</b>	9950	123,0	42,1	34,9	5,4	104,1	30,3	29,6	4,6	85,1	20,4	24,2	3,7
	13500	146,6	59,3	31,2	6,5	123,9	42,6	26,3	5,4	101,1	28,6	21,5	4,4
	16000	161,8	71,9	29,0	7,1	136,6	51,5	24,5	6,0	111,5	34,6	20,0	4,9

(1) pressure drop = internal coil + 3 way valve  
 All dat calculated for water without glycol

Correction factor to get data for 82 - 71 from 90 - 70

Note : 10 kPa=1mCe

SIZE	Heating capacity kW	Pressure drop kPa	Water flow rate Kg/s
<b>020-030</b>	0,97	3,05	1,76
<b>035</b>	0,97	3,05	1,76
<b>045-055</b>	<b>0,96</b>	<b>2,91</b>	<b>1,75</b>
<b>065-075</b>	0,96	3,04	1,75

**BAC** = Cooling only unit  
**BAH** = Heat pump rooftop

**RETURN AIR  
 AT 0°C**

Table 4.41

Δ water temperature		90-70				80-60				70-50			
SIZE	Air flow M³/h	Heating capacity kW	Pressure drop (1) kPa	Δ temp air	Water flow rate m³/h	Heating capacity kW	Pressure drop (1) kPa	Δ temp air	Water flow rate m³/h	Heating capacity kW	Pressure drop (1) kPa	Δ temp air	Water flow rate m³/h
<b>20</b>	2900	41,4	27,6	39,5	1,8	35,7	20,5	34,1	1,6	30,0	14,5	28,6	1,3
	3600	47,1	35,5	36,3	2,1	40,6	26,4	31,2	1,8	34,1	18,7	26,2	1,5
	4300	52,2	43,4	33,6	2,3	45,0	32,2	28,9	2,0	37,7	22,7	24,3	1,6
<b>30</b>	3600	47,1	35,5	36,3	2,1	40,6	26,4	31,2	1,8	34,1	18,7	26,2	1,5
	4500	53,6	45,7	33,0	2,4	46,1	33,9	28,4	2,0	38,7	23,9	23,8	1,7
	5400	59,2	55,6	30,4	2,6	51,0	41,2	26,1	2,2	42,7	29,0	21,9	1,9
<b>35</b>	5000	65,2	65,4	36,1	2,9	56,3	48,6	31,2	2,5	47,3	34,4	26,2	2,1
	6300	74,4	84,8	32,7	3,3	64,2	62,9	28,2	2,8	53,9	44,5	23,7	2,3
	7600	82,5	103,7	30,0	3,6	71,1	76,9	25,9	3,1	59,6	54,2	21,7	2,6
<b>45</b>	6500	86,9	41,4	37,0	3,8	75,2	31,7	32,0	3,3	63,5	23,2	27,0	2,8
	8100	98,7	52,7	33,7	4,4	85,4	40,2	29,2	3,7	72,0	29,4	24,6	3,1
	9700	109,0	63,7	31,1	4,8	94,3	48,6	26,9	4,1	79,5	35,4	22,7	3,5
<b>55</b>	7200	92,3	46,4	35,5	4,1	79,8	35,4	30,7	3,5	67,4	25,9	25,9	2,9
	9000	104,7	58,9	32,2	4,6	90,5	45,0	27,8	4,0	76,3	32,8	23,5	3,3
	10800	115,5	71,0	29,6	5,1	99,8	54,2	25,6	4,4	84,1	39,5	21,6	3,7
<b>65</b>	8600	129,9	46,8	41,8	5,7	112,4	35,2	36,2	4,9	95,0	25,3	30,6	4,1
	11500	155,3	66,4	37,4	6,8	134,4	49,9	32,3	5,9	119,7	39,7	26,3	5,2
	13000	167,1	76,6	35,6	7,4	144,5	57,5	30,8	6,3	121,9	41,2	26,0	5,3
<b>75</b>	9950	143,4	56,8	39,3	6,3	124,1	42,7	34,0	5,4	104,8	30,7	28,7	4,6
	13500	170,8	79,9	35,0	7,5	147,7	60,0	30,3	6,5	124,6	43,0	25,6	5,4
	16000	188,4	96,8	32,6	8,3	162,8	72,6	28,2	7,1	137,3	51,9	23,8	6,0

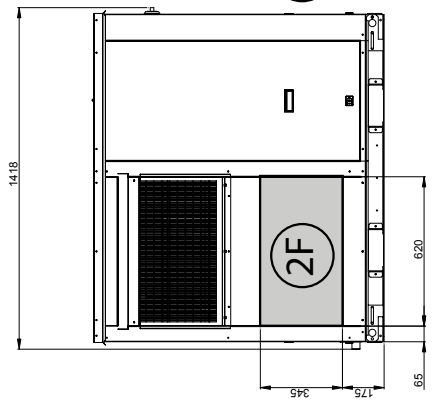
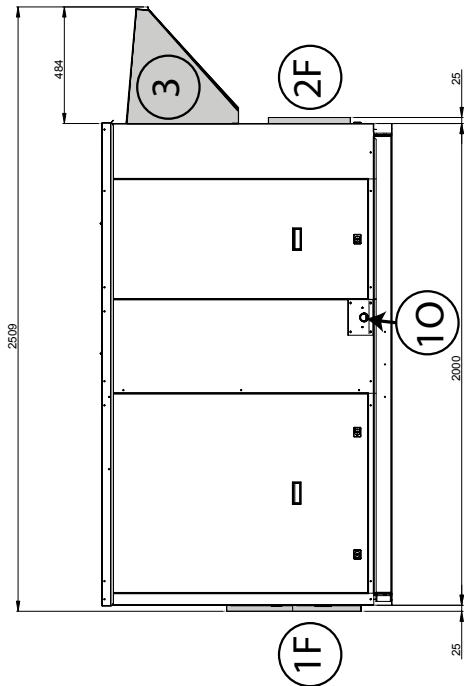
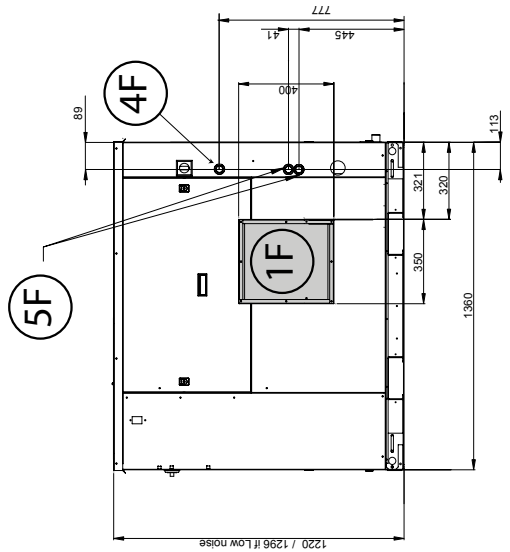
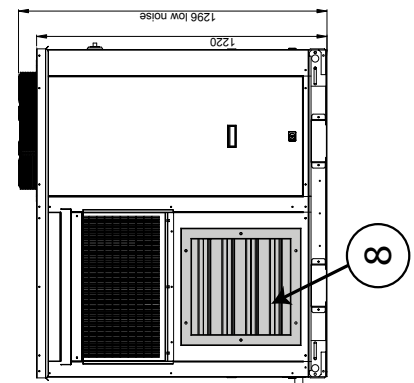
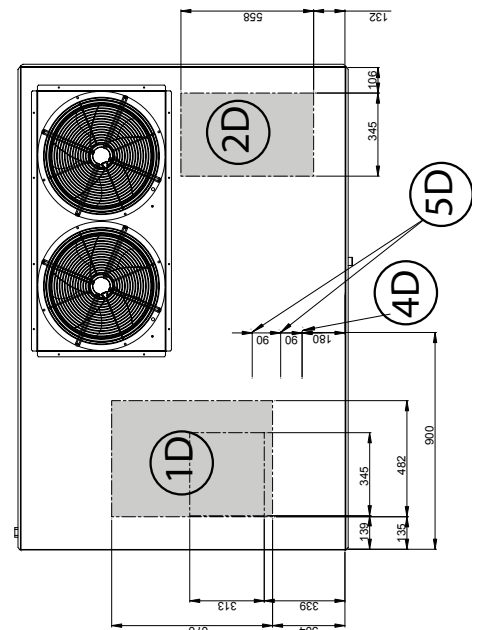
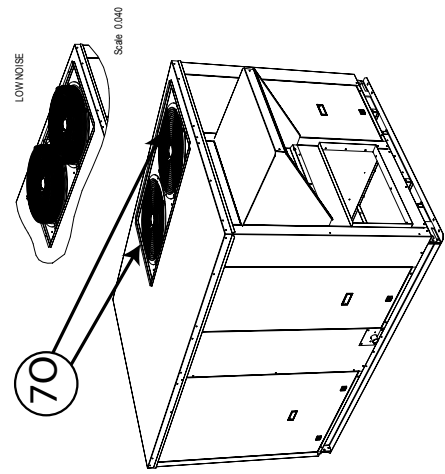
(1) pressure drop = internal coil + 3 way valve  
 All dat calculated for water without glycol

Correction factor to get data for 82 - 71 from 90 - 70

Note : 10 kPa=1mCe

SIZE	Heating capacity kW	Pressure drop kPa	Water flow rate Kg/s
<b>020-030</b>	0,98	3,08	1,77
<b>035</b>	0,97	3,07	1,77
<b>045-055</b>	<b>0,97</b>	<b>2,94</b>	<b>1,76</b>
<b>065-075</b>	0,98	3,07	1,77

**BAC BAH**    **020**    **030**



**WITH OPTIONS**

( Return and supply opening shown on this drawing do not apply to BAC/BAH with electric heater or hot water coil )

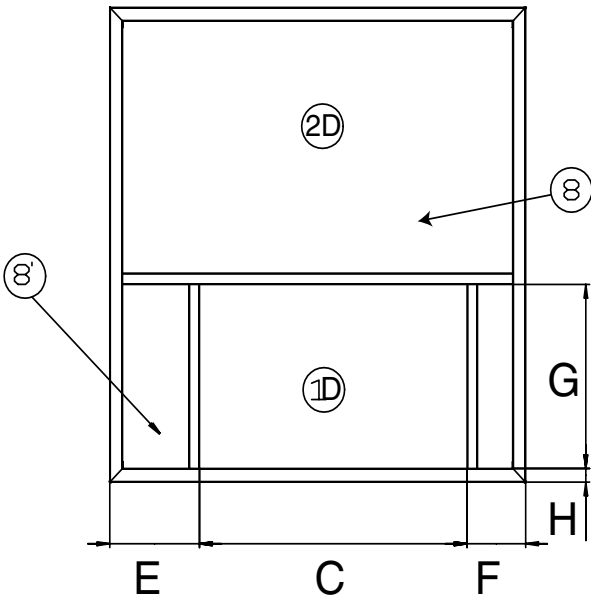
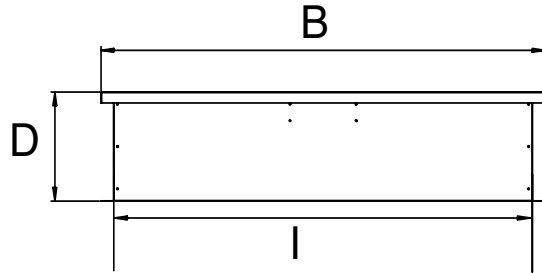
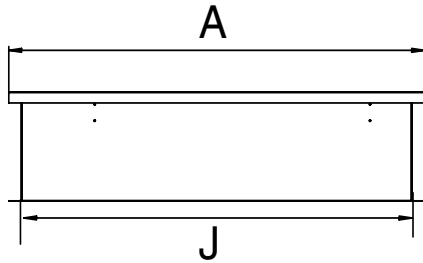
1D	DOWN SUPPLY AIR	3	FRESH AIR	5D	DOWN HOT WATER ENTRY	8	EXTRACTION
1F	FRONT SUPPLY AIR	4F	FRONT MAIN POWER ENTRY			9	SMOKE OUTLET
2D	DOWN RETURN AIR	4D	DOWN MAIN POWER ENTRY	7I	OUTDOOR COIL INLET	10	CONDENSATE DRAINAGE
2F	FRONT RETURN AIR	5F	FRONT HOT WATER ENTRY	7O	OUTDOOR COIL OUTLET		

(\*) Total Length (unit + option)

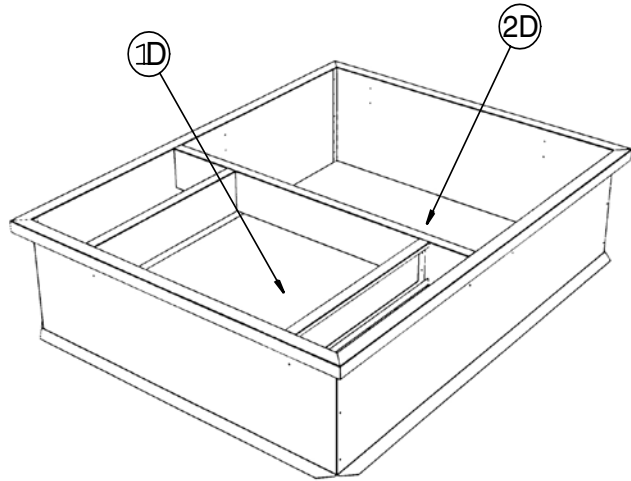


**ALL  
UNITS**

**BAC** = Cooling only unit  
**BAH** = Heat pump unit  
**BAG** = Cooling only unit with gas fired heating  
**BAM** = Heat pump unit with gas fired heating



Roof opening I x J



①D Down Supply Air

⑧ Main Power Entry 030-035-040-045-050

②D Return Air

⑧' Main Power Entry 020-025

Type	Size	A	B	C	D	E	F	G	H	I	J
All	020	1183	1893	691	400	246	246	515	50	1783	1083
	030										
All	035	1380	1740	790	400	351	240	675	50	1640	1280
All	045	1630	1740	1050	400	352	229	675	50	1640	1530
	055										
All	065	2080	2090	1400	400	425	255	720	156	1990	1980
	075										

# OPTION WEIGHTS



Tabella 9.1

Base	020	030	035	045	055	065	075
Base Unit BAC	394	414	547	604	619	796	852
Base Unit BAH	397	418	551	609	625	804	859
Base Unit BAG (S)	445	465	608	678	693	904	960
Base Unit BAG (H)	454	474	627	700	715	963	1019
Base Unit BAM (S)	448	469	612	683	699	910	968
Base Unit BAM (H)	457	478	631	705	721	971	1026
<b>Air flow configuration</b>							
Horizontal return, horizontal supply	3	3	5	1	1	3	3
Horizontal return, downflow supply	0	0	2	2	2	-4	-4
Downflow return, horizontal supply	3	3	4	-1	-1	7	7
<b>Exhaust air options</b>							
Gravity exhaust damper for downflow return	7	7	10	14	14	19	19
Power exhaust fan axial + gravity exhaust damper downflow return	18	18	20	34	34	48	48
Centrifugal built-in exhaust fan	50	50	78	92	92	140	140
Extraction roofcurb vertical (no aux. heating)	192	192	220	240	240	370	370
Extraction roofcurb vertical (with aux. heating)	194	194	194	240	240	365	365
Extraction roofcurb horizontal	142	142	168	185	185	301	301
Heat recovery module	143	143	172	229	229	317	317
<b>Filtration option</b>							
G4 metallic frame, washable filter	2,2	2,2	3,8	4,4	4,4	16,8	16,8
F7 metallic frame + G4 pre-filter, washable filter	10,1	10,1	13,6	18,3	18,3	40,1	40,1
<b>Refrigeration option</b>							
Mono circuit	-	-	-18	0	-	-	-
Low Noise	0,6	0,6	-2	-3	-3	-5	-5
<b>Drive kits Standard Units</b>							
K1	0	0	-4	-2	-7	-7	-7
K2	0	0	-2	-2	-5	-	-3
K3	0	0	-2	0	0	-5	0
K4	0	2	0	5	0	0	0
K5	0	2	0	5	3	0	6
K6	2	2	7	5	3	3	6
K7	2	4	5	7	-5	6	18
K8	4	2	5	7	0	6	18
K9	2	4	7	0	6	0	6
K10	0	9	7	5	3	3	18
K11	2	9	-	11	6	3	0
K12	4	4	-	7	21	21	34
K13						6	-
K14						-	
<b>Drive kits Gas S Units</b>							
K1	0	-2	-2	-5	-3	-3	-6
K2	0	0	0	0	-3	-3	-6
K3	0	7	0	0	0	0	-4
K4	2	0	5	0	4	4	0
K5	2	2	5	3	0	4	14
K6	4	2	5	3	4	4	14
K7	2	7	7	6	18	0	30
K8	4	9	7	3	-	18	-4
K9	9	-	7	6	-	18	0
K10	-	-	11	21	-	34	30
K11	-	-	-	-	-	-	30
K12	-	-	-	-	-	-	-
<b>Drive kits Gas H Units</b>							
K1	-	-	-	-	-	-7	-21
K2	-	-	-	-	-	-3	-18
K3	-	-	-	-	-	0	-14
K4	-	-	-	-	-	4	-14
K5	-	-	-	-	-	4	0
K6	-	-	-	-	-	-	16
K7	-	-	-	-	-	4	-18
K8	-	-	-	-	-	18	-14
K9	-	-	-	-	-	34	0
K10	-	-	-	-	-	-	16
K11						18	
<b>Heating options versus BAC or BAG</b>							
Electric heater (Standard heat)	34	34	39	47	47	71	71
Electric heater (Medium heat)	36	36	41	49	49	74	74
Electric heater (high heat)	39	39	45	62	62	77	77
Hot water coil (High heat)	45	45	54	70	70	122	122
<b>Electrical and safety options</b>							
Air sock control	1,5	1,5	1,5	1,5	1,5	1,5	1,5
<b>Other Options</b>							
Non Adjustable non assembled roofcurb	31	31	31	33	33	45	45
Adjustable assembled roofcurb	87	87	94	104	104	152	152
Multidirectional horizontalflow curb	81	81	88	100	100	147	147
Adjustable assembled roofcurb (with aux.heating)	86	86	90	100	100	138,2	138,2
Multidirectional horizontalflow curb(with aux.heating)	90	90	93	103	103	146,7	146,7

The weight of the Electric Heater and HWC options must be added to a BAC or BAH base unit. Apart from bases all weights are given as differential.



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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.



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