

LAMBDA ECHOS HE small

54 to 76 kW



General

Self-contained, cooling only or heat pump air conditioner with scroll compressors in "Roof-Top" version.

Configurations

HP: Roof Top type conditioner in reversible heat pump version

Strengths

- ▶ High energy performance
- ▶ Easy and quick to install
- ▶ Wide configurability

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LAMBDA ECHOS HE SMALL

High efficiency, self-contained, cooling only or air/air heat pump air conditioner with scroll compressors in "Roof-Top" version.

BODY

Base, cover and frame: made of very thick, galvanized sheet-iron, which is epoxy polyester powder coated in RAL 7035 (light grey).

Panelling: made with 25mm thick sandwich panels (50mm on request) consisting of a 0.5mm thick externally pre-painted galvanized sheet-iron casing that encloses polyurethane foam matting, which guarantees the thermal and acoustic insulation of the unit. The surface of the panels in contact with the treated air is made of galvanized sheet-iron to facilitate cleaning and sanitizing operations.

The non-removable panels are fixed to the body with screws contained in nylon bushes with plug.

The removable panels are attached to the body with nylon eccentrics or inserts and have handles to make them easier to remove.

COMPRESSORS

Hermetic scroll compressors, with protection for starting at low temperatures by means of crankcase heaters and thermal overload protection of the motor by internal temperature sensor. The compressors are mounted on rubber anti-vibration mounts inside a technical compartment separated from the air flow, and therefore maintenance operations can be carried out in total safety even with units running. A safety device prevents reverse rotation of the compressor spiral.

REFRIGERANT CIRCUIT

Comprises: charging valves, valve on the liquid line, dehydrator filter, liquid sight glass, safety valve, thermostatic expansion valve, high and low pressure switches.

CONDENSER

Consists of finned coil with internally grooved copper tubes and louvred aluminium fins. The particular geometry and careful sizing favour heat exchange performance and give the coil high efficiency. A protective metal grille is installed as standard to protect the finned pack when it is situated towards the outside of the unit.

CONDENSING-SIDE FANS

Axial fans directly coupled to an electric motor, with internal klixon thermal overload protection.

All the fans are fixed to the body by interposition of rubber anti-vibration mounts.

The protection rating of the motors is IP 54. The fan includes a safety guard.

EVAPORATOR

Finned coil with copper tubes and corrugated aluminium fins.

A stainless steel condensation collection basin is installed at the base of the coil, complete with drain fitting.

EVAPORATING-SIDE FANS

Statically and dynamically balanced dual suction centrifugal fans.

The transmission is a belt-pulley transmission with V belt and variable-diameter drive pulley.

The three-phase electric motor, with IP 55 protection rating, is installed on a belt-tightener slide.

Motors with powers of 7.5 kW or higher are started with the star/delta method to limit inrush currents.

Each fan is mounted on a special support frame separated from the rest of the body by rubber anti-vibration mounts.

The air supply can be supplied on request with different directions from the standard one depending on the indications in the "Versions that are not possible" section.

The standard available pressure is 100 Pa, and can be increased up to 400 Pa on request; any need for higher pressures must be assessed by our technical department.

The version with radial plug fans without scroll, directly coupled to an electronically controlled "EC" electric motor, is available as accessory.

The electric motor, with IP 55 protection rating, is directly flush fitted on the fan shaft, thereby avoiding the presence of transmissions and consequent dissipation of energy.

Each fan has an intake nozzle on which are fitted pressure probes that can provide a signal proportional to the processed air flow rate, so as to keep it constant regardless of the surrounding conditions (head losses in channel, dirtying of filters, etc.) over the entire life of the unit.

AIR FILTERS

All the units have a filtering section that precedes the treatment coil and therefore works on the entire flow of treated air with the same efficiency.

The standard version is supplied complete with 48mm thick (98mm on BASE and FC2S versions) corrugated filter with galvanized sheet-iron frame with filter grade G4 (according to EN 779). The filter media is made of synthetic matting, which is regeneratable and self-extinguishing.

There are other filter grades based on the type of pollutant to be removed:

F5: 48mm/98mm thick corrugated filter with galvanized sheet-iron frame with filter grade F5 (according to EN 779). The filter media is made of synthetic matting, which is regeneratable and self-extinguishing.

F7: 300mm thick rigid bag filter in polyester with pleated glass fibre paper filter media with even, calibrated spacing. F7 filters are always preceded by grade G4 filters to protect them.

The bag filter housing does not require changes to the dimensions of the units.

There is always a door or removable panel to make the filter maintenance and/or replacement operations easier.

ELECTRICAL CONTROL PANEL

The panel comprises:

- main disconnect switch

- fuses to protect the compressors
- fuses to protect the axial fans
- thermal magnetic circuit breakers for centrifugal fans
- fuses to protect the primary and secondary circuits of the transformer
- compressor contactors
- fan contactors
- connection for connection
- remote control panel
- terminals for external OK signal
- potential free contacts for general alarm
- terminals for external OK signal
- potential free contacts for general alarm
- Microprocessor to control the following functions.
 - Air temperature control with return control
 - Freeze protection on the hot water coil
 - Compressor timing
 - Automatic rotation of compressor starting sequence
 - Alarm signalling
 - Alarm reset
 - Stepped capacity reduction of the capacity delivered by the unit
 - Cumulative alarm contact for remote signalling
 - Forcing of capacity reduction due to pressure limit on machines with four compressors
 - Alarm log recording
 - Programming of operation on settable time bands
 - Display of the following on the display.
 - Return air temperature
 - Set temperature and differential set points
 - Description of alarms
 - Hour meter operation and number of unit, compressor and pump (where present) start-ups
- 400V/3~/50Hz + N power supply

CONTROLS AND SAFETY DEVICES

- High pressure switch with manual reset
- High pressure safety valve
- Minimum temperature probe for supply air
- Maximum temperature probe on heat generator
- Thermal cut-out device for compressors and fans
- Condensation pressure control

TESTING

The units are factory-tested and supplied complete with oil and refrigerant.

VERSIONS

LAMBDA ECHOS HE /HP: reversible heat pump

In addition to the LAMBDA ECHOS components, this comprises: four-way reversing valve, liquid receiver, second thermostatic expansion valve, microprocessor for automatic summer/winter switching and a patented automatic coil defrost system.

AIR HANDLING MODULE SET-UP

LAMBDA ECHOS HE BASE

Version suitable for working in 100% recirculation. Air exchanges are not included.

LAMBDA ECHOS HE FC2S

Version suitable for working with input of external air.

Compared to the basic version, this is equipped with a 2-damper mixing chamber, where one damper is placed on the air return and the other on the external air intake.

The unit is suitable for working in free cooling/free heating mode.

For all versions that have dampers, the "damper servo controls" accessory is available. To obtain automatic modulation of them, the "Pco" control must also be installed.

LAMBDA ECHOS HE FC3S (high efficiency with free energy recovery)

Version suitable for working with input of external air and with exhaustion of stale air. Compared to the FC2S version, this is equipped with a 3-damper mixing chamber and stale air return and exhaust fans. The unit is suitable for working in free cooling/free heating mode.

The return fan is supplied as standard with rear return and the same performance as the supply fan. The following can be supplied on request.

- Different air flow rates and pressures
- Different air flow return directions.

The innovative configuration of the unit allows part of the energy expelled from the treated environment to be recovered. The air being exhausted is conveyed over the condensing coil, which reduces the condensing temperature and thus increases the efficiency of the unit. In the same way, the air being exhausted is conveyed over the evaporating coil also during operation in heat pump mode, thereby considerably increasing its performance.

LAMBDA ECHOS HE GC2S

Compared to the FC2S version, the unit is equipped with a module containing a direct exchange condensation gas heat generator.

The main components of the generator are:

- combustion chamber and surfaces that can be in contact with condensation are made of AISI 441.
- premixed gas burner that guarantees absence of carbon-monoxide and nitrogen oxide emissions below 24 parts per million
- electronic board that controls the burner and modulates heat output (fuel consumption) continuously between the minimum value and the maximum value according to the control parameters set and measured by the Pco control
- combustion fume exhaust flue.

With the technology of premixing and modulation as heat demand from the room falls, the generator consumes less gas and increases its efficiency up to 109% (value calculated according to the net calorific value).

The generator certified by the GASTEC body and built in compliance with gas directive 90/396/EC and 2009/142/CE is housed in a module whose panels are insulated with rock wool according to the criteria of Italian Ministerial Decree DM 12/04/96, the air flow is separated from the gas intake point and an aeration grille puts the external environment in contact with the burner.

The following safety devices are also present on the generator.

- Safety thermostat downline of the exchanger
- Flame detection electrode
- Safety pressure switch that controls any obstruction of the fume pipe and/or the air intake pipe
- Differential pressure switch for air flow detection (supplied as standard with all the units).

All these devices, when activated, cause the burner to stop. They are indicated cumulatively by the Pco control and must be reset manually.

LAMBDA ECHOS HE GC3S (high efficiency with free energy recovery)

Compared to the FC3S version, the unit is equipped with a module containing a direct exchange condensation gas heat generator. For the characteristics of the generator, please see description of version GC2S.

ACCESSORIES

MOTOCONDENSING SECTION ACCESSORIES

- High and low pressure gauges
- Suction and delivery valves
- Solenoid valve on the liquid line (double valve for the HP version)
- Liquid receiver (standard on the HP version)
- Pre-painted aluminium condensing coil
- Condensing coil treated with anti-corrosion paints
- Coil protection mesh with metal filter (on FC3S and GC3S versions)

versions)

VENTILATING SECTION ACCESSORIES

- Air supply different from the standard one
- Air return different from the standard one
- Increased pressure of the supply fans (from 100 to 400Pa)
- Increased pressure of the return fans (from 100 to 400Pa)
- Corrugated filters of grade F5
- Rigid bag filters of grade F7
- Hot water heating coil
- Electric heating coil
- 3-way valve with modulating servo control for hot water coil control
- Immersed electrode humidifier with steam distribution nozzle
- Servo controls for dampers
- Servo controls for dampers with spring return
- Dirty filter alarm
- Rain hoods on external dampers (exchange and exhaustion)
- Plug Fans without scroll with electronically controlled "EC" motor

ELECTRICAL ACCESSORIES

- "Pco" control
- Remote control panel
- RS485 serial interface
- Power factor correction to $\cos\theta \geq 0.9,5$
- Potential free operating contacts
- Enthalpy free-cooling
- Electronic soft starter
- Power supplies different from the standard one

OTHER ACCESSORIES

- Rubber anti-vibration mounts
- Soundproof casings on the compressors

TECHNICAL SPECIFICATIONS - LAMBDA ECHOS HE SMALL

Unit size		5.2	6.2	7.2	8.2
Cooling					
Nominal refrigeration capacity	(1) kW	54.0	61.0	68.3	76.5
Sensible cooling capacity	(1) kW	43.2	48.8	54.0	60.0
Power absorbed by the compressors	(1) kW	11.6	13.4	16.2	19.0
Heating					
Nominal heating capacity	(2) kW	56.2	64.0	73.0	80.5
Power absorbed by the compressors	(2) kW	10.5	12.1	14.5	16.9
Compressors					
Type		Scroll	Scroll	Scroll	Scroll
Quantity/Refrigerant circuits	no./no.	2 / 1	2 / 1	2 / 1	2 / 1
Capacity reduction steps	%	0 - 50 - 100	0 - 50 - 100	0 - 50 - 100	0 - 50 - 100
Total oil charge	l	3.54	6.5	6.5	6.5
Total refrigerant charge LAMBDA ECHOS	kg	13	13	13	13
Total refrigerant charge LAMBDA ECHOS/HP	kg	17	17	17	17
Ventilating section					
Type		Centrifugal	Centrifugal	Centrifugal	Centrifugal
Air flow	m³/h	9,500	11,000	12,100	13,200
Std available static pressure	Pa	100	100	100	100
Speed through coil	m/s	1.85	2.13	2.34	2.55
Air filters					
Thickness	mm	48	48	48	48
Efficiency		G4	G4	G4	G4
Motocondensing section					
Type		Axial	Axial	Axial	Axial
Air flow	m³/h	19,000	19,000	19,000	19,000
Water heating coil (accessory)					
Capacity	(3) kW	78	85	90	95
Water flow rate	l/s	1.27	1.38	1.46	1.54
Head loss	kPa	17	20	22	33
Electric heating coil (accessory)					
Capacity	kW	15	15	20	20
Operating stages	no.	2	2	2	2
Hot air generator for GC2S GC3S					
Quantity		1	1	1	1
Model	(4)	S	S	S	L
Maximum nominal heating capacity	kW	63	63	63	97
Generator efficiency related to H1	%	96,8	96,8	96,8	97,1
Maximum natural gas consumption	(5) m³/h	6,9	6,9	6,9	10,6
Amount of condensation produced	l/h	2,1	2,1	2,1	2,7
Dimensions and weights of basic unit					
Length	mm	3,530	3,530	3,530	3,530
Depth	mm	2,245	2,245	2,245	2,245
Height	mm	1,750	1,750	1,750	1,750
Operating weight	kg	1,345	1,345	1,345	1,345

(1) Calculation conditions: ambient air 27°C DB, 19.5°C WB; external air 35°C. Mixture with 30% external air.

(2) Calculation conditions: ambient air 20°C; external air 8.3°C DB, 6.1°C WB. Mixture with 30% external air.

(3) Coil data related to: Incoming air temperature 20°C; in/out water temperature: 80/65

(4) Nominal heating capacity: S= 63 kW; L= 97 kW; XL= 160 kW; XXL= 194 kW

(5) Related to 15°C, 1013 mbar and supply pressure of 20 mbar

ELECTRICAL SPECIFICATIONS - LAMBDA ECHOS HE SMALL

Unit size		5.2	6.2	7.2	8.2
Supply ventilating section	(3)				
nº of supply fans	no.	1	1	1	1
Nominal fan power	kW	2.2	2.2	3	4
Nominal fan current	A	5.1	5.1	7.1	9
Return ventilating section	(4)				
nº of return fans	no.	1	1	1	1
Nominal fan power	kW	1.5	2.2	2.2	3
Nominal fan current	A	3.6	5.1	5.1	7.1
Motocondensing section					
nº of axial fans	no.	2	2	2	2
Nominal fan power	kW	0.6	0.6	0.6	0.6
Nominal fan current	A	2.62	2.62	2.62	2.62
Immersed electrode humidifier (accessory)					
Nominal steam production	kg/h	8	8	10	11
Number of cylinders	no.	1	1	1	1
Operating interval	kg/h	5–8	5–8	10–15	10–15
Absorbed power	kW	3.75–6	3.75–6	7.50–11.25	7.50–11.25
Absorbed current	A	5.4–8.7	5.4–8.7	10.8–16.2	10.8–16.2
Total					
Max. absorbed power	(1),(5)	22.1	26	30.2	34.2
Max. inrush current	(5)	128.8	143.0	155.1	160.8
Max. absorbed current	(2),(5)	41.7	48.6	56.8	64.3
Power supply	V/ph/Hz	400/3N/50	400/3N/50	400/3N/50	400/3N/50
Power supply for auxiliary circuits	V/ph/Hz	230-24/1/50	230-24/1/50	230-24/1/50	230-24/1/50

(1) Electrical power that must be supplied by the electricity network for operation of the unit.

(2) Current at which the internal unit protection devices are triggered. This is the max. current absorbed by the unit. This value is never exceeded and must be used to size the line and relevant protective devices (refer to the wiring diagram supplied with the units).

(3) Value related to units in FC3S set-up and available supply pressure of 100Pa

(4) Value related to units in FC3S set-up and for available return pressure of 100Pa

(5) The indicated values refer solely to the unit in FC3S set-up with available pressure of 100Pa and cannot be used for sizing the power lines of units in other versions for which it is necessary to refer to the wiring diagram supplied with them.

VERSIONS THAT ARE NOT POSSIBLE - LAMBDA ECHOS HE SMALL

Configuration	Versions that are not possible LAMBDA ECHOS					Supply EC plug fans
	BASIC	FC2S	FC3S	GC2S	GC3S	
Return from top	X	X	X	X	X	
Return from bottom	X	X	X	X	X	
Supply from top	X	X	X	X	X	X
Supply from right				X	X	X
Supply from left				X	X	X
Supply from bottom				X	X	X
Return from right + External air from right		X		X		
Return from left + External air from left		X		X		
Rear return + Rear external air	X		X			

x: not possible

AIR FLOW RATES - LAMBDA ECHOS HE SMALL

Unit size	5.2	6.2	7.2	8.2
Max. air flow rate [m³/h]	10,005	11,500	12,650	13,800
Standard air flow rate [m³/h]	9,570	11,000	12,100	13,200
Min. air flow rate [m³/h]	7,395	8,500	9,350	10,200

The table indicates the interval of flow rate values within which the units can be selected by selection software.
Outside the indicated flow rates, please contact our technical department for feasibility verification.

COOLING PERFORMANCE OF VERSIONS FC3S_GC3S (NOMINAL AIR FLOW RATE)

Model	Air flow rate [m³/h]	Internal Air		External air conditions T DB [°C] / T WB [°C]															
		T DB [°C]	T WB [°C]	25 / 18				30 / 22				35 / 24				40 / 25			
				kWf	kWs	kWe	kWf	kWs	kWe	kWf	kWs	kWe	kWf	kWs	kWe	kWf	kWs	kWe	
5.2	9570	24	17	52.70	41.70	9.20	52.70	40.40	10.30	52.10	41.50	11.50	50.50	45.10	12.90	50.00	46.30	13.50	
		26	18	54.40	41.80	9.20	54.30	40.60	10.40	53.70	41.70	11.60	52.20	44.90	13.00	51.60	46.50	13.50	
		27	19	55.10	42.90	9.30	54.80	42.00	10.40	54.00	43.20	11.60	52.70	46.80	13.00	52.10	48.00	13.60	
		28	20	55.70	42.90	9.30	55.60	41.90	10.40	55.00	43.10	11.70	53.40	46.70	13.00	52.80	48.10	13.60	
		30	22	57.60	41.30	9.40	57.50	40.40	10.50	56.80	41.70	11.80	55.40	45.10	13.10	54.80	46.40	13.70	
6.2	11000	24	17	59.40	47.80	10.60	59.30	46.30	11.80	58.60	47.30	13.20	57.20	51.10	14.70	56.70	52.30	15.40	
		26	18	61.10	47.80	10.70	61.10	46.40	11.90	60.40	47.40	13.30	59.00	51.20	14.90	58.50	52.60	15.50	
		27	19	61.80	49.10	10.70	61.70	47.70	12.00	61.00	48.80	13.40	59.50	52.80	14.90	59.00	54.20	15.60	
		28	20	62.70	49.00	10.80	62.60	47.70	12.10	61.70	49.00	13.50	60.30	53.00	15.00	59.70	54.40	15.70	
		30	22	64.80	47.10	10.90	64.60	46.20	12.20	63.70	47.40	13.60	62.20	51.20	15.10	61.70	52.40	15.80	
7.2	12100	24	17	66.90	53.60	12.60	66.70	51.70	14.20	65.70	52.50	15.90	64.20	55.30	17.80	63.40	57.30	18.70	
		26	18	69.00	53.30	12.80	68.60	51.80	14.30	67.60	52.60	16.10	66.10	56.10	18.00	65.30	57.40	18.80	
		27	19	69.70	54.80	12.80	69.30	53.10	14.40	68.30	54.00	16.20	66.60	57.90	18.10	65.90	59.10	18.90	
		28	20	70.70	54.70	12.90	70.30	53.10	14.50	69.20	54.10	16.20	67.60	57.90	18.10	66.90	59.10	18.90	
		30	22	73.10	52.50	13.00	72.50	51.30	14.60	71.50	52.40	16.40	69.80	55.90	18.30	69.00	57.10	19.10	
8.2	13200	24	17	74.90	60.30	15.10	74.50	58.10	16.80	73.50	58.70	18.70	71.80	62.20	20.80	70.90	63.30	21.70	
		26	18	77.10	60.10	15.30	76.60	58.10	17.00	75.50	58.80	18.90	73.90	62.30	21.00	73.20	63.50	21.80	
		27	19	78.10	61.50	15.30	77.60	59.60	17.00	76.50	60.00	19.00	74.50	64.10	21.10	73.80	65.40	21.90	
		28	20	79.20	61.30	15.40	78.60	59.50	17.10	77.40	60.30	19.10	75.60	64.30	21.10	74.90	65.40	22.00	
		30	22	81.70	59.10	15.50	81.10	57.40	17.30	79.80	58.40	19.20	78.00	62.00	21.30	77.20	63.10	22.20	

kWf: refrigeration capacity [kW]

kWs: sensible cooling capacity [kW]

kWe: electrical power absorbed by the compressors [kW]

The performance values are related to operation with 30% external air and 70% recirculation air

The 3-damper version includes energy recovery on exhausted air

HEATING PERFORMANCE OF VERSIONS FC3S_GC3S (NOMINAL AIR FLOW RATE)

Model	Air flow rate [m³/h]	Internal Air		Internal air conditions T DB [°C]											
		T DB [°C]	T WB [°C]	10		15		18		19		20		25	
		Kwt	kWe	Kwt	kWe	Kwt	kWe	Kwt	kWe	Kwt	kWe	Kwt	kWe	Kwt	kWe
5.2	9570	-10.00	-10.30	40.20	6.70	40.70	7.40	41.00	7.80	41.20	8.00	41.60	8.20	42.20	8.90
		-5.00	-6.00	44.30	7.30	44.90	8.00	45.20	8.50	45.40	8.60	45.60	8.80	46.20	9.60
		0.00	-1.00	49.00	7.90	49.60	8.70	49.90	9.20	50.00	9.30	50.50	9.50	50.90	10.40
		5.00	4.00	54.00	8.60	54.50	9.40	54.70	9.90	54.60	10.10	55.00	10.30	55.20	11.20
		7.00	6.00	55.80	8.90	56.10	9.70	56.20	10.20	56.20	10.40	56.20	10.50	56.60	11.50
		10.00	9.00	57.60	9.30	58.10	10.10	58.30	10.60	58.50	10.80	58.90	11.00	59.10	11.90
		15.00	13.00	63.50	10.10	63.50	11.00	63.80	11.50	64.00	11.70	64.10	11.90	64.70	12.90
6.2	11000	-10.00	-10.30	45.20	7.90	46.50	8.70	47.00	9.20	47.20	9.30	48.00	9.50	48.80	10.40
		-5.00	-6.00	50.20	8.60	51.10	9.30	51.70	9.80	51.90	10.00	52.60	10.20	53.40	11.10
		0.00	-1.00	55.50	9.20	56.60	10.10	57.10	10.60	57.30	10.80	57.70	11.00	58.30	11.90
		5.00	4.00	61.20	10.00	61.70	10.90	62.40	11.40	62.60	11.60	62.80	11.80	63.30	12.80
		7.00	6.00	63.20	10.30	63.70	11.20	64.00	11.70	64.00	11.90	64.00	12.10	64.60	13.10
		10.00	9.00	65.40	10.70	65.80	11.60	66.40	12.20	66.30	12.40	66.90	12.60	67.20	13.70
		15.00	13.00	71.50	11.60	71.90	12.60	72.30	13.20	72.40	13.40	72.70	13.70	73.30	14.80
7.2	12100	-10.00	-10.30	53.10	9.20	54.20	10.20	54.70	10.80	55.00	11.00	55.90	11.20	56.70	12.30
		-5.00	-6.00	58.20	10.00	59.30	11.00	59.80	11.60	60.10	11.90	60.90	12.10	61.80	13.30
		0.00	-1.00	63.90	10.90	64.90	12.00	65.40	12.60	65.60	12.80	66.30	13.10	67.00	14.30
		5.00	4.00	69.50	11.80	70.60	12.90	71.30	13.60	71.50	13.90	71.80	14.20	72.20	15.40
		7.00	6.00	72.00	12.20	72.80	13.30	73.00	14.00	72.90	14.30	73.00	14.50	73.70	15.80
		10.00	9.00	74.50	12.70	74.90	13.80	75.40	14.60	75.60	14.80	76.20	15.20	76.60	16.50
		15.00	13.00	80.50	13.80	81.40	15.00	82.00	15.80	81.80	16.10	82.40	16.40	82.80	17.80
8.2	13200	-10.00	-10.30	59.50	11.20	60.70	12.20	61.70	12.90	61.90	13.10	62.60	13.40	63.60	14.50
		-5.00	-6.00	64.90	12.10	66.20	13.10	67.00	13.80	67.20	14.10	68.00	14.30	69.10	15.60
		0.00	-1.00	70.60	13.00	72.00	14.10	72.80	14.90	73.00	15.10	73.80	15.40	74.80	16.70
		5.00	4.00	77.00	14.00	78.20	15.20	78.70	16.00	78.90	16.20	79.00	16.50	79.90	17.90
		7.00	6.00	79.20	14.40	80.10	15.60	80.60	16.40	80.60	16.60	80.50	16.90	81.60	18.30
		10.00	9.00	81.90	14.90	82.60	16.20	83.00	17.00	83.10	17.20	83.80	17.60	84.60	19.00
		15.00	13.00	88.10	16.10	89.30	17.50	89.60	18.20	89.90	18.60	90.30	18.90	91.00	20.50

kWt: heating capacity [kW]

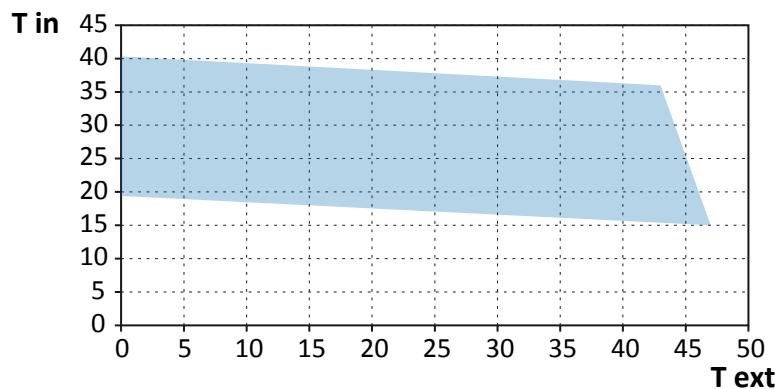
kWe: electrical power absorbed by the compressors [kW]

The performance values are related to operation with 30% external air and 70% recirculation air

The 3-damper version includes energy recovery on exhausted air

OPERATING LIMITS - LAMBDA ECHOS HE SMALL

COOLING

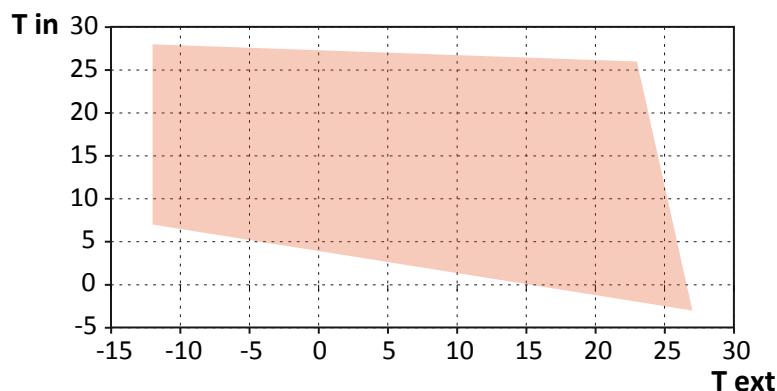


T_{ext} : Temperature of the external air that strikes the condensing coil (dry bulb)

T_{in} : Temperature of the internal air that strikes the evaporating coil (dry bulb)

The operating limits should be understood as average quantities for the line and therefore not generically extensible to each individual unit. They are calculated for standard air flow rates and consider that the units are positioned as per instructions.

HEATING



T_{ext} : Temperature of the external air that strikes the evaporating coil (dry bulb)

T_{in} : Temperature of the internal air that strikes the condensing coil (dry bulb)

The operating limits should be understood as average quantities for the line and therefore not generically extensible to each individual unit. They are calculated for standard air flow rates and consider that the units are positioned as per instructions.

NOISE LEVELS - LAMBDA ECHOS HE SMALL

MODEL	Octave bands [Hz]								Total [dB(A)]
	63 [dB]	125 [dB]	250 [dB]	500 [dB]	1000 [dB]	2000 [dB]	4000 [dB]	8000 [dB]	
	Lp	Lp	Lp	Lp	Lp	Lp	Lp	Lp	Lp
5.2	SPL_bc	78	78	68	63	63	59	52	41
	SPL_qe	71	68	65	57	54	47	43	34
6.2	SPL_bc	78	78	68	63	63	59	52	41
	SPL_qe	71	68	65	57	54	47	43	34
7.2	SPL_bc	79	79	69	65	63	60	53	43
	SPL_qe	73	70	67	59	57	49	44	35
8.2	SPL_bc	79	79	69	65	63	60	53	43
	SPL_qe	73	70	67	59	57	49	44	35

Lp: sound pressure values

SPL_bc: sound pressure level measured in free field at 1m from the machine, at 1.5m from the ground on the condensing coil side

SPL_qe: sound pressure level measured in free field at 1m from the machine, at 1.5m from the ground on the electrical control panel side

For noise level values regarding the supply and return fans, please consult the relevant technical specifications table.

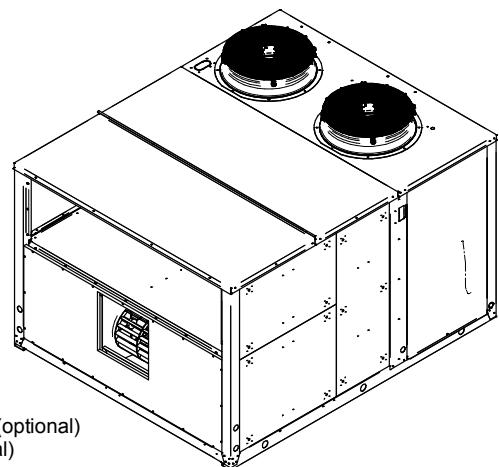
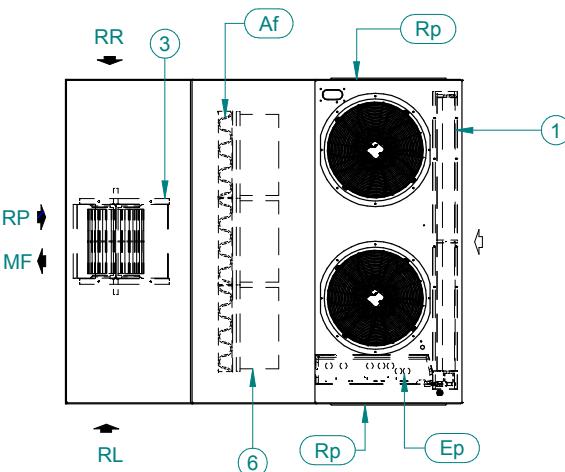
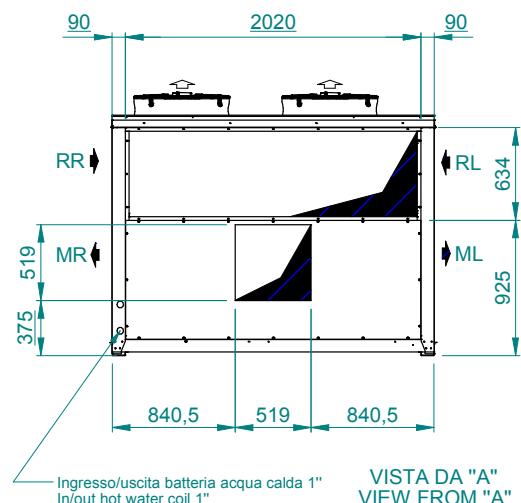
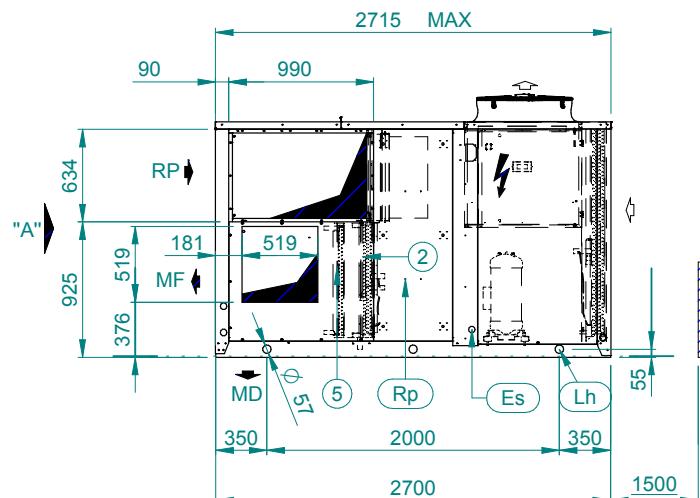
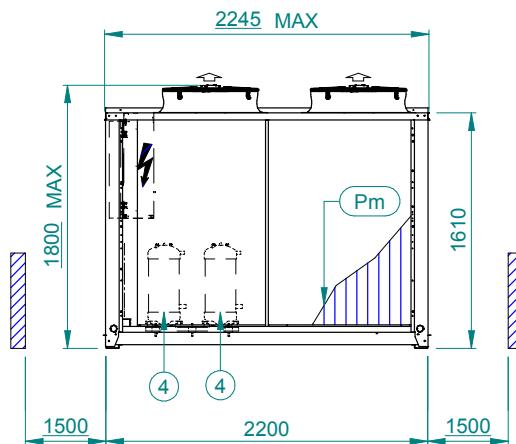
THEORETICAL NOISE ATTENUATION VALUES BASED ON DISTANCE IN FREE FIELD

Distance	(m)	1	2	3	4	5	6	7	8	9	10
Attenuation	(dB)	0	6	9.5	12	14	15.5	17	18	19	20

DIMENSIONAL DIAGRAMS

LAMBDA ECHOS HE SMALL 5.2 / 6.2 / 7.2 / 8.2

C411913-C



Direzione aria di mandata/Discharge air direction
MD=Mandata da sotto/Bottom discharge (Optional)
ML= Mandata da sinistra/Left discharge (Optional)
MR=Mandata da destra/Right discharge (Optional)
MF=Mandata frontale/Front discharge (Standard)

Direzione aria di ripresa/Intake air direction
RP=Ripresa posteriore/Rear intake (Standard)
RR=Destra/Right (Optional)
RL=Sinistra/Left (Optional)

DENOMINAZIONE/DENOMINATION

- 1) Batteria condensante/Condensing coil
- 2) Batteria evaporante/Evaporating coil
- 3) Ventilatore di manda/Discharge fan
- 4) Compressore/Compressor
- 5) Batteria acqua calda (optional)/Hot water coil (optional)
- 6) Filtro aria EU7 (optional)/Air filter EU7 (optional)

Pm	GRIGLIE DI PROTEZIONE PROTECTIVE METAL MESH			
Af	FILTRO ARIA AIR FILTER			
Lh	FORI DI SOLLEVAMENTO LIFTING HOLES			
Rev.	Date	Draftman	Checked by	Revision description

Rp	PANNELLO ASPORTABILE REMOVABLE PANEL
Ep	QUADRO ELETTRICO ELECTRICAL PANEL
Es	INGRESSO ALIMENTAZIONE ELETTRICA ELECTRICAL SUPPLY INLET

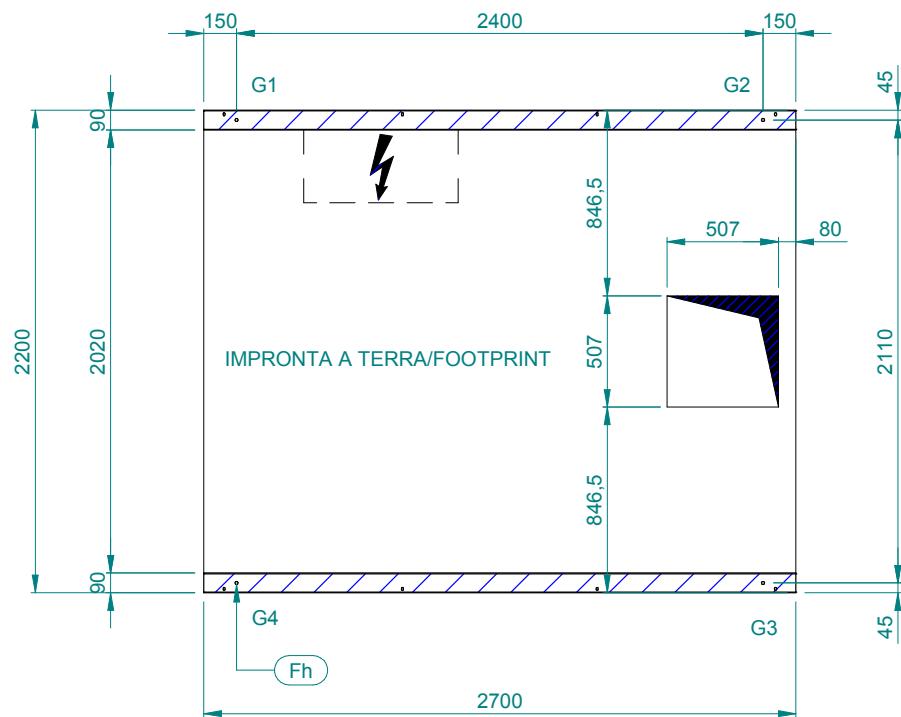
Fh	FORI DI FISSAGGIO FIXING HOLES	M10
G..	PUNTI DI APPOGGIO ANTIVIBRANTI VIBRATION DAMPER FOOT HOLDS	
		SPAZI DI INSTALLAZIONE CLEARANCES

Valid only for the version with centrifugal fans and without bag filters. For the other versions, the dimensional drawing must be identified by selection sw.

DIMENSIONAL DIAGRAMS

LAMBDA ECHOS HE SMALL 5.2 / 6.2 / 7.2 / 8.2

C411913-C



MODELLO MODEL	PESO(Kg) WEIGHT(Kg)	G1(Kg)	G2(Kg)	G3(Kg)	G4(Kg)	CODICE ANTIVIBRANTE-ANTIVIBRATION CODE
						G1 G2 G3 G4
LAMBDA ECHOS CO 5.2/8.2 BASE P25	1047	314	273	214	246	MAVA0690
LAMBDA ECHOS CO 5.2/8.2 BASE P50	1095	318	293	232	252	MAVA0690
LAMBDA ECHOS HP 5.2/8.2 BASE P25	1068	323	277	216	252	MAVA0690
LAMBDA ECHOS HP 5.2/8.2 BASE P50	1116	327	297	234	258	MAVA0690
LAMBDA ECHOS CO 5.2/8.2 BASE P25 BT	1081	316	283	228	254	MAVA0690
LAMBDA ECHOS CO 5.2/8.2 BASE P50 BT	1132	321	303	247	261	MAVA0690
LAMBDA ECHOS HP 5.2/8.2 BASE P25 BT	1104	325	288	231	260	MAVA0690
LAMBDA ECHOS HP 5.2/8.2 BASE P50 BT	1152	329	308	249	266	MAVA0690

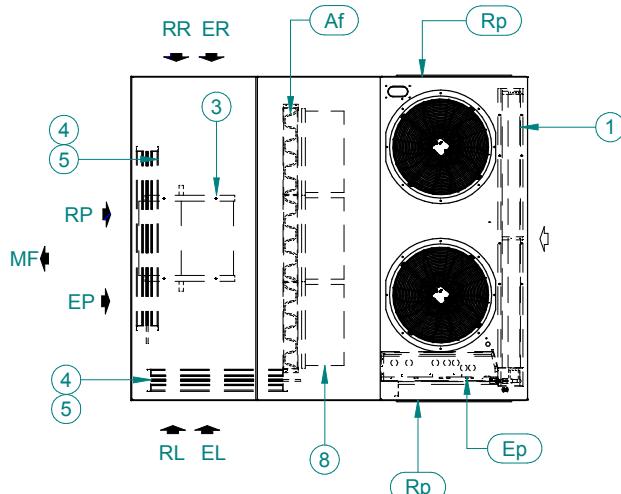
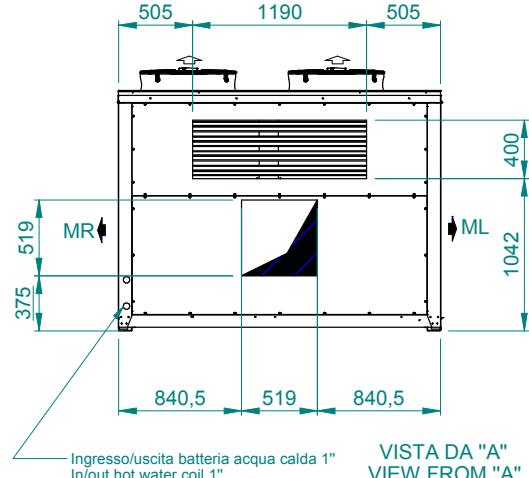
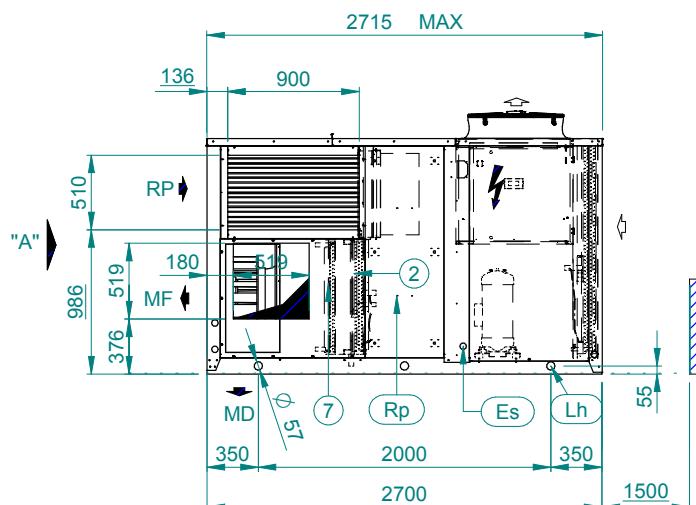
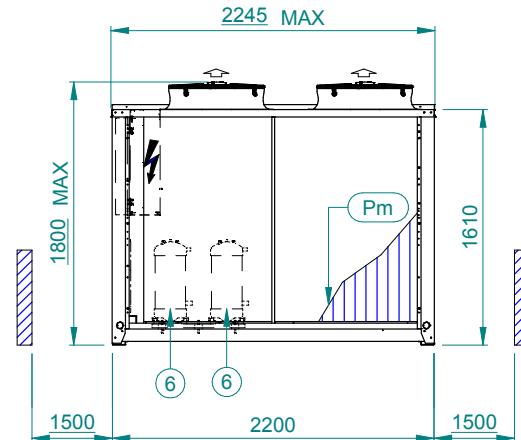
Rev.	Date	Draftman	Checked by	Revision description

Valid only for the version with centrifugal fans and without bag filters. For the other versions, the dimensional drawing must be identified by selection sw.

DIMENSIONAL DIAGRAMS

LAMBDA ECHOS HE SMALL 5.2 / 6.2 / 7.2 / 8.2 FC2S

C411906-B



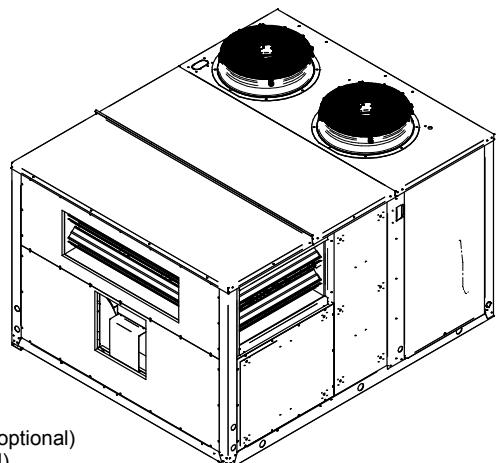
Direzione aria di mandata/Discharge air direction
MD=Mandata da sotto/Bottom discharge (Optional)
ML= Mandata da sinistra/Left discharge (Optional)
MR=Mandata da destra/Right discharge (Optional)
MF=Mandata frontale/Front discharge (Standard)

Direzione aria esterna/External air direction
ER=Destra/Right (Optional)
EL=Sinistra/Left (Standard)
EP=Posteriore/Intake (Optional)

Direzione aria di ripresa/Intake air direction
RP=Ripresa posteriore/Rear intake (Standard)
RR=Destra/Right (Optional)
RL=Sinistra/Left (Optional)

DENOMINAZIONE/DENOMINATION

- 1) Batteria condensante/Condensing coil
- 2) Batteria evaporante/Evaporating coil
- 3) Ventilatore di mandata/Discharge fan
- 4) Serranda aria esterna/ External air Damper
- 5) Serranda aria di ricircolo/Recycle air damper
- 6) Compressore/Compressor
- 7) Batteria acqua calda (optional)/Hot water coil (optional)
- 8) Filtro aria EU7 (optional)/Air filter EU7 (optional)



Pm	GRIGLIE DI PROTEZIONE PROTECTIVE METAL MESH
Af	FILTRO ARIA AIR FILTER
Lh	FORI DI SOLLEVAMENTO LIFTING HOLES

Rp	PANNELLO ASPORTABILE REMOVABLE PANEL
Ep	QUADRO ELETTRICO ELECTRICAL PANEL
Es	INGRESSO ALIMENTAZIONE ELETTRICA ELECTRICAL SUPPLY INLET

Fh	FORI DI FISSAGGIO FIXING HOLES	M10
G..	PUNTI DI APPOGGIO ANTIVIBRANTI VIBRATION DAMPER FOOT HOLDS	
	SPAZI DI INSTALLAZIONE CLEARANCES	

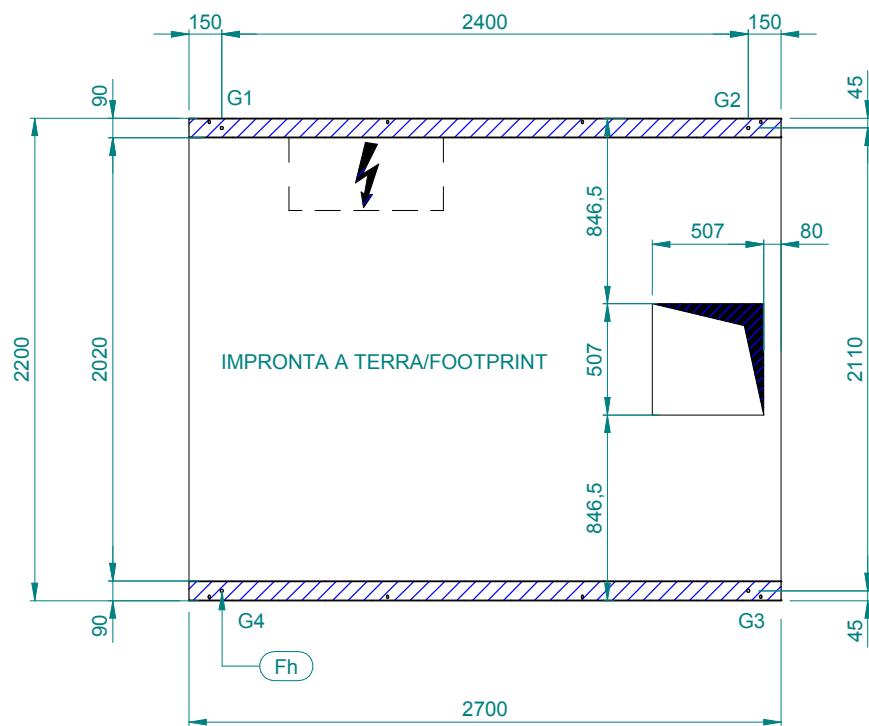
Rev.	Date	Draftman	Checked by	Revision description

Valid only for the version with centrifugal fans and without bag filters. For the other versions, the dimensional drawing must be identified by selection sw.

DIMENSIONAL DIAGRAMS

LAMBDA ECHOS HE SMALL 5.2 / 6.2 / 7.2 / 8.2 FC2S

C411906-B



MODELLO MODEL	PESO(Kg) WEIGHT(Kg)	G1(Kg)	G2(Kg)	G3(Kg)	G4(Kg)	CODICE ANTIVIBRAZIONE-ANTIVIBRATION CODE			
						G1	G2	G3	G4
LAMBDA ECHOS CO 5.2/8.2 FC2S P25	1077	313	289	228	247	MAVA0690			
LAMBDA ECHOS CO 5.2/8.2 FC2S P50	1120	316	307	245	252	MAVA0690			
LAMBDA ECHOS HP 5.2/8.2 FC2S P25	1098	322	293	230	253	MAVA0690			
LAMBDA ECHOS HP 5.2/8.2 FC2S P50	1141	325	311	247	258	MAVA0690			
LAMBDA ECHOS CO 5.2/8.2 FC2S P25 BT	1113	315	299	243	256	MAVA0690			
LAMBDA ECHOS CO 5.2/8.2 FC2S P50 BT	1156	319	317	259	261	MAVA0690			
LAMBDA ECHOS HP 5.2/8.2 FC2S P25 BT	1134	324	304	245	261	MAVA0690			
LAMBDA ECHOS HP 5.2/8.2 FC2S P50 BT	1175	327	321	261	266	MAVA0690			

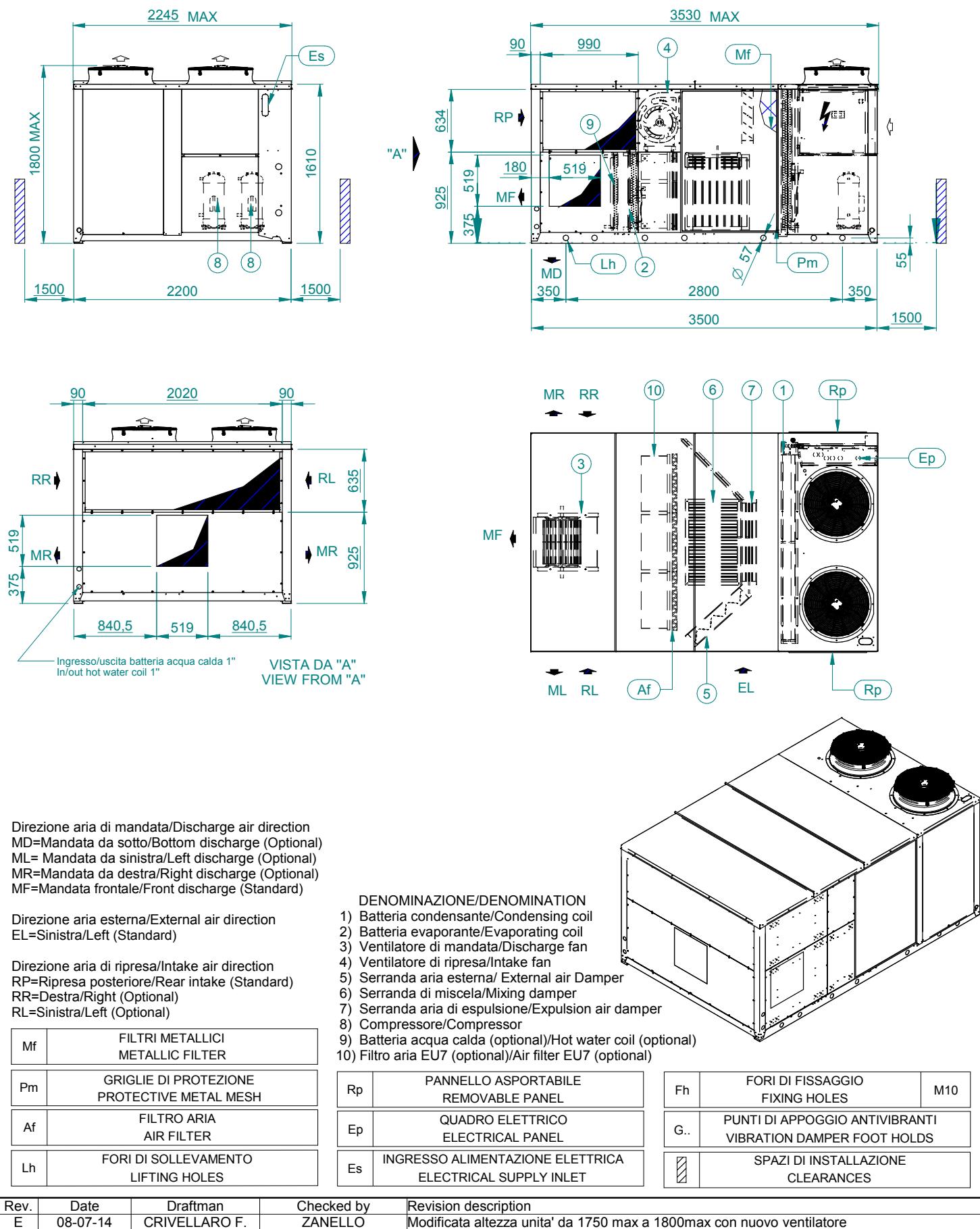
Rev.	Date	Draftman	Checked by	Revision description

Valid only for the version with centrifugal fans and without bag filters. For the other versions, the dimensional drawing must be identified by selection sw.

DIMENSIONAL DIAGRAMS

LAMBDA ECHOS HE SMALL 5.2 / 6.2 / 7.2 / 8.2 FC3S

C411277-E

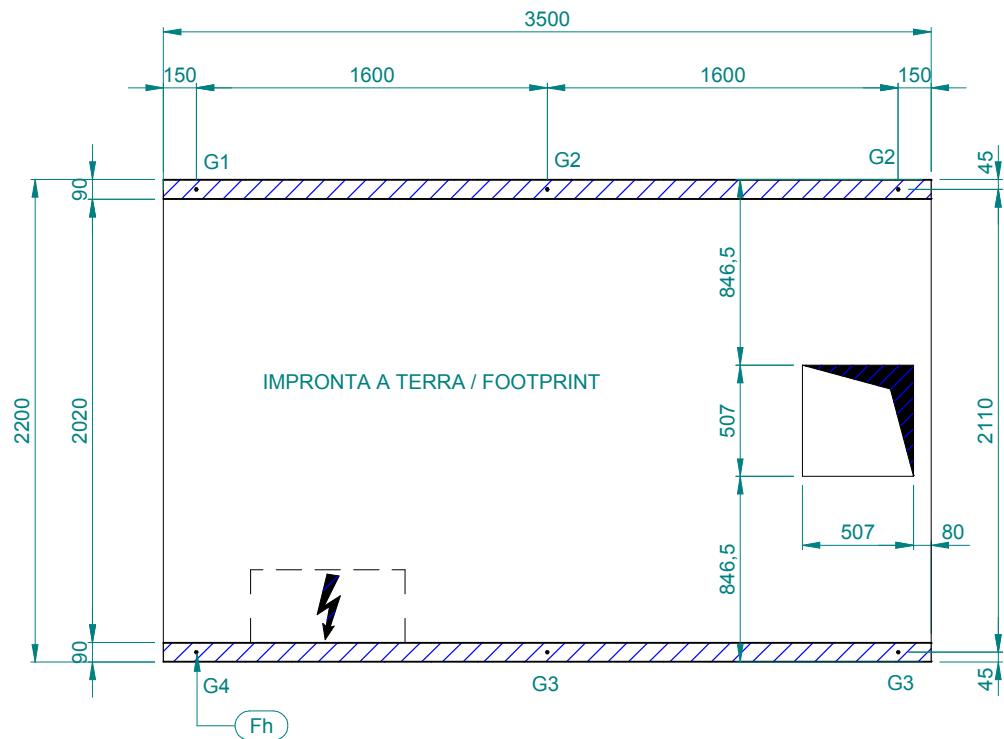


Valid only for the version with centrifugal fans and without bag filters. For the other versions, the dimensional drawing must be identified by selection sw.

DIMENSIONAL DIAGRAMS

LAMBDA ECHOS HE SMALL 5.2 / 6.2 / 7.2 / 8.2 FC3S

C411277-E



MODELLO MODEL	PESO(Kg) WEIGHT(Kg)	G1(Kg)	G2(Kg)	G3(Kg)	G4(Kg)	CODICE ANTIVIBRANTI-ANTIVIBRATION MOUNTS CODE			
						G1	G2	G3	G4
LAMBDA ECHOS CO 5.2/8.2 FC3S P25	1345	240	192	222	277				MAVA0690
LAMBDA ECHOS CO 5.2/8.2 FC3S P50	1387	241	202	232	278				MAVA0690
LAMBDA ECHOS HP 5.2/8.2 FC3S P25	1382	250	194	226	292				MAVA0690
LAMBDA ECHOS HP 5.2/8.2 FC3S P50	1422	252	203	236	292				MAVA0690
LAMBDA ECHOS CO 5.2/8.2 FC3S P25 BT	1380	238	199	233	278				MAVA0690
LAMBDA ECHOS CO 5.2/8.2 FC3S P50 BT	1423	240	209	243	279				MAVA0690
LAMBDA ECHOS HP 5.2/8.2 FC3S P25 BT	1417	248	201	237	293				MAVA0690
LAMBDA ECHOS HP 5.2/8.2 FC3S P50 BT	1457	250	210	247	293				MAVA0690

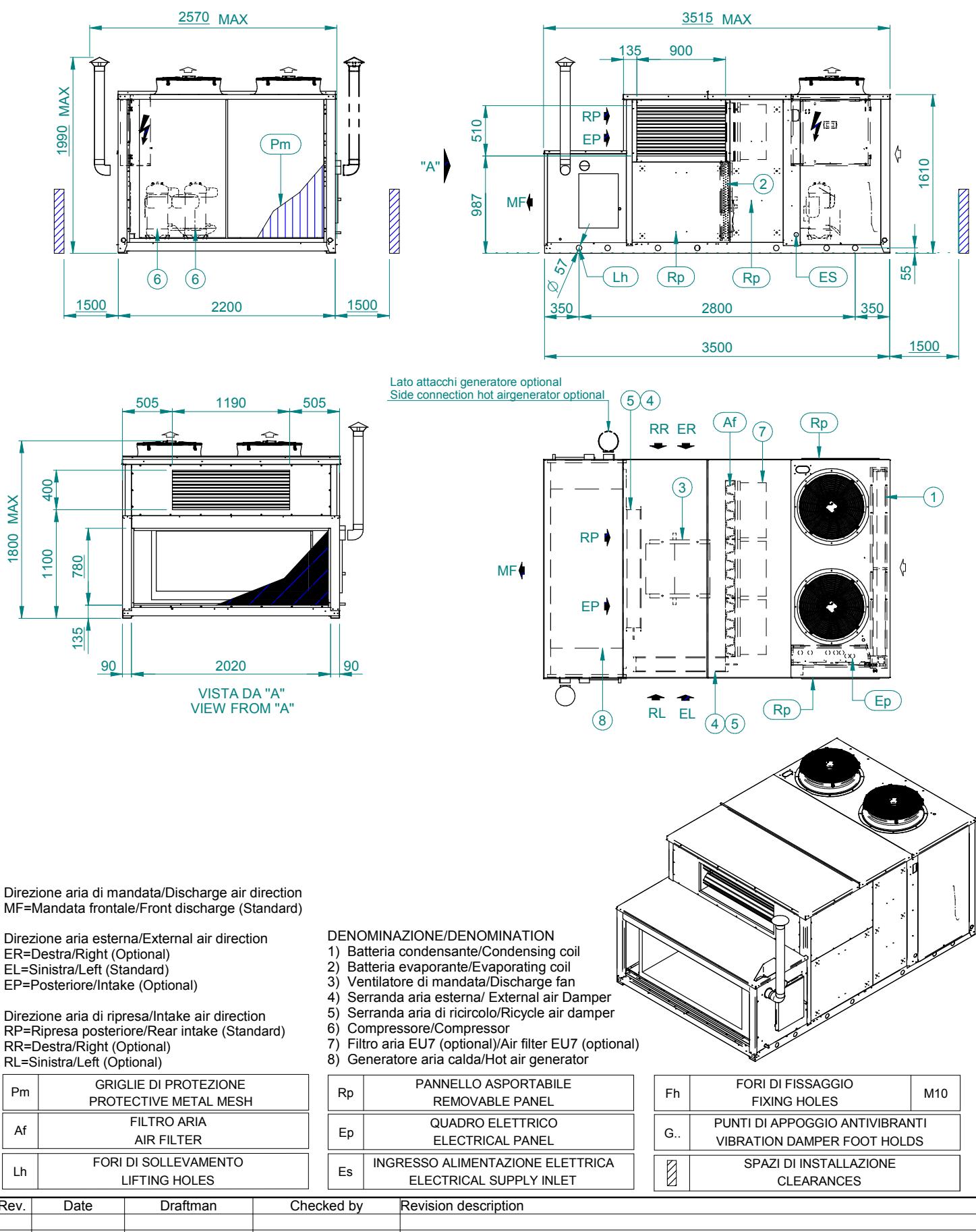
Rev.	Date	Draftman	Checked by	Revision description
E	08-07-14	CRIVELLARO F.	ZANELLO	Modificata altezza unita' da 1750 max a 1800max con nuovo ventilatore

Valid only for the version with centrifugal fans and without bag filters. For the other versions, the dimensional drawing must be identified by selection sw.

DIMENSIONAL DIAGRAMS

LAMBDA ECHOS HE SMALL 5.2 / 6.2 / 7.2 / 8.2 GC2S

C411924-C

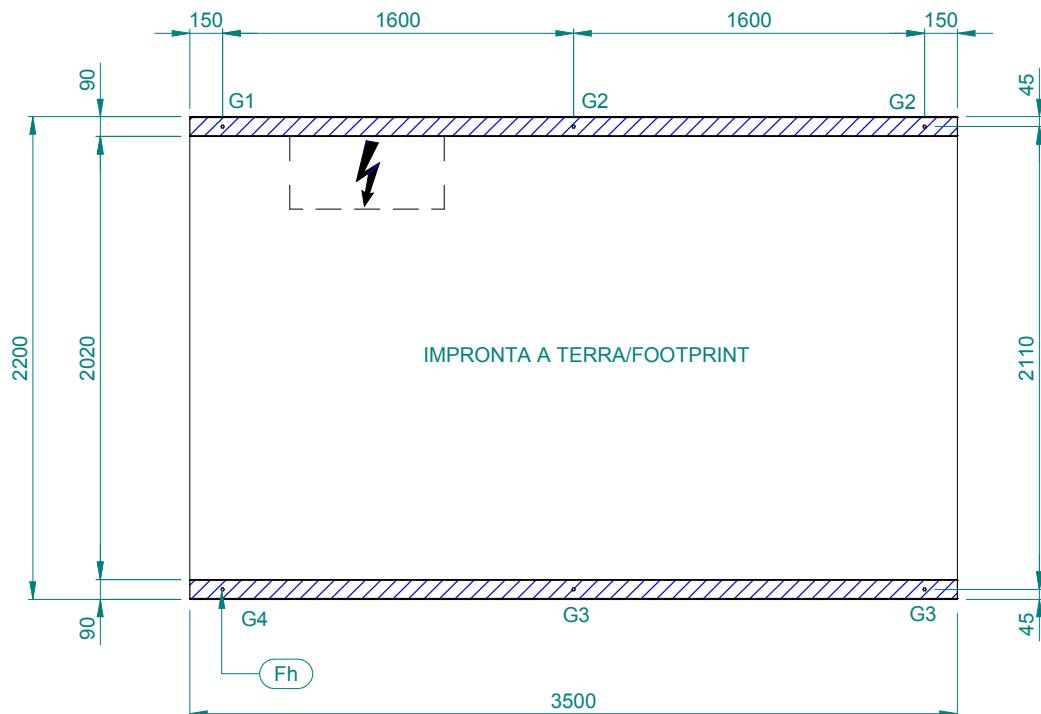


Valid only for the version with centrifugal fans and without bag filters. For the other versions, the dimensional drawing must be identified by selection sw.

DIMENSIONAL DIAGRAMS

LAMBDA ECHOS HE SMALL 5.2 / 6.2 / 7.2 / 8.2 GC2S

C411924-C



MODELLO MODEL	PESO(Kg) WEIGHT(Kg)	G1(Kg)	G2(Kg)	G3(Kg)	G4(Kg)	CODICE ANTIVIBRANTI-ANTIVIBRATION MOUNTS CODE			
						G1	G2	G3	G4
LAMBDA ECHOS CO 5.2/8.2 GC2S P25	1440	344	230	182	272				MAVA0690
LAMBDA ECHOS CO 5.2/8.2 GC2S P50	1587	368	258	205	293	MAVA0700			MAVA0690
LAMBDA ECHOS HP 5.2/8.2 GC2S P25	1460	352	232	183	278				MAVA0690
LAMBDA ECHOS HP 5.2/8.2 GC2S P50	1608	377	260	206	299	MAVA0700			MAVA0690

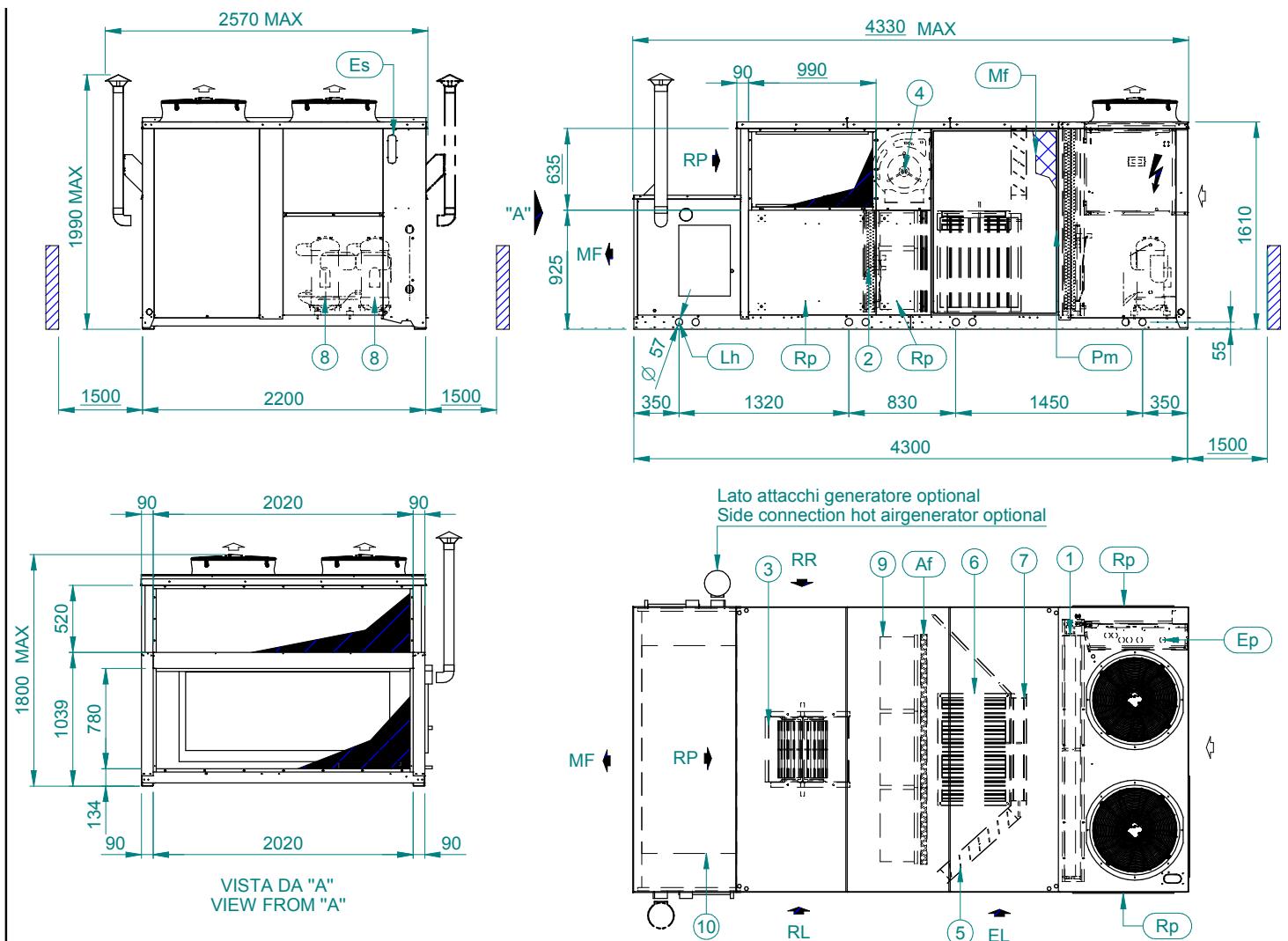
Rev.	Date	Draftman	Checked by	Revision description

Valid only for the version with centrifugal fans and without bag filters. For the other versions, the dimensional drawing must be identified by selection sw.

DIMENSIONAL DIAGRAMS

LAMBDA ECHOS HE SMALL 5.2 / 6.2 / 7.2 / 8.2 GC3S

C411925-C



Direzione aria di mandata/Discharge air direction
MF=Mandata frontale/Front discharge (Standard)

Direzione aria esterna/External air direction
EL=Sinistra/Left (Standard)

Direzione aria di ripresa/Intake air direction
RP=Ripresa posteriore/Rear intake (Standard)
RR=Destra/Right (Optional)
RL=Sinistra/Left (Optional)

Mf	FILTRI METALLICI METALLIC FILTER
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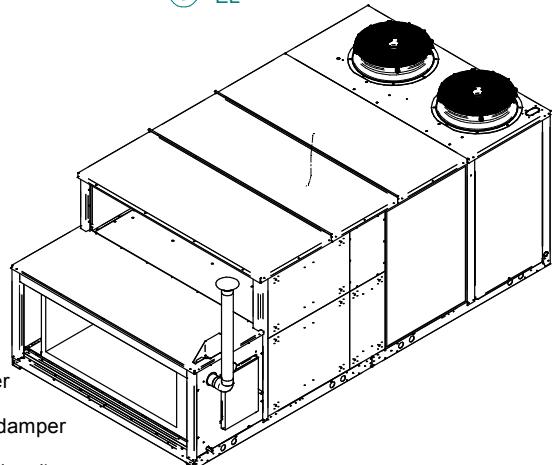
Pm	GRIGLIE DI PROTEZIONE PROTECTIVE METAL MESH
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Af	FILTRO ARIA AIR FILTER
----	---------------------------

Lh	FORI DI SOLLEVAMENTO LIFTING HOLES
----	---------------------------------------

DENOMINAZIONE/DENOMINATION

- 1) Batteria condensante/Condensing coil
- 2) Batteria evaporatore/Evaporating coil
- 3) Ventilatore di mandata/Discharge fan
- 4) Ventilatore di ripresa/Intake fan
- 5) Serranda aria esterna/ External air Damper
- 6) Serranda di miscela/Mixing damper
- 7) Serranda aria di espulsione/Expulsion air damper
- 8) Compressore/Compressor
- 9) Filtro aria EU7 (optional)/Air filter EU7 (optional)
- 10) Generatore aria calda/Hot air generator



Fh	FORI DI FISSAGGIO FIXING HOLES	M10
G..	PUNTI DI APPOGGIO ANTIVIBRANTI VIBRATION DAMPER FOOT HOLDS	
	SPAZI DI INSTALLAZIONE CLEARANCES	

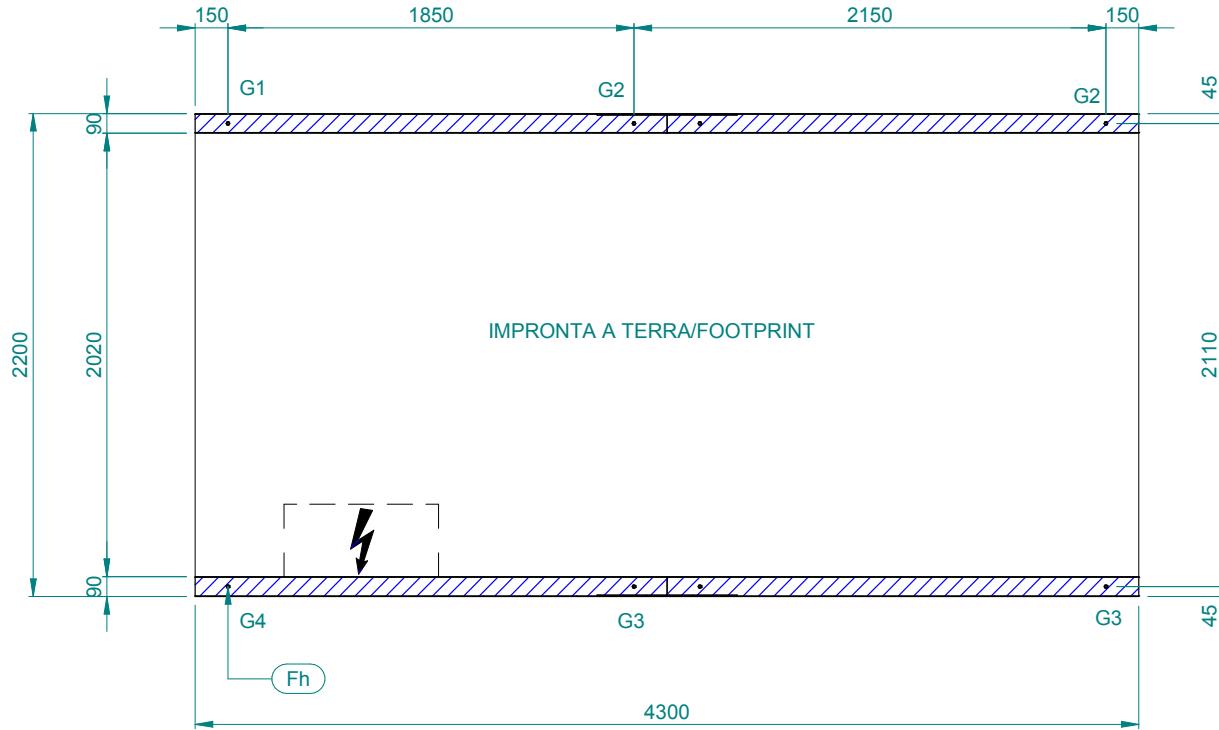
Rev.	Date	Draftman	Checked by	Revision description

Valid only for the version with centrifugal fans and without bag filters. For the other versions, the dimensional drawing must be identified by selection sw.

DIMENSIONAL DIAGRAMS

LAMBDA ECHOS HE SMALL 5.2 / 6.2 / 7.2 / 8.2 GC3S

C411925-C



MODELLO MODEL	PESO(Kg) WEIGHT(Kg)	G1(Kg)	G2(Kg)	G3(Kg)	G4(Kg)	CODICE ANTI VIBRAZIONI-ANTIVIBRATION MOUNTS CODE			
						G1	G2	G3	G4
LAMBDA ECHOS CO 5.2/8.2 GC3S P25	1595	333	233	232	332				MAVA0690
LAMBDA ECHOS CO 5.2/8.2 GC3S P50	1723	325	269	268	324				MAVA0690
LAMBDA ECHOS HP 5.2/8.2 GC3S P25	1631	348	233	234	349				MAVA0690
LAMBDA ECHOS HP 5.2/8.2 GC3S P50	1759	340	269	270	341				MAVA0690

Rev.	Date	Draftman	Checked by	Revision description

Valid only for the version with centrifugal fans and without bag filters. For the other versions, the dimensional drawing must be identified by selection sw.



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