

CUBE HE

26 to 44 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
- ▶ High efficiency

TABLE OF CONTENTS

CUBE HE	3
VERSIONS	4
ACCESSORIES	5
TECHNICAL SPECIFICATIONS - CUBE HE	6
ELECTRICAL SPECIFICATIONS - CUBE HE	7
VERSIONS THAT ARE NOT POSSIBLE - CUBE HE	7
AIR FLOW RATES - CUBE HE	8
COOLING PERFORMANCE OF VERSIONS FC3S_GC3S	8
HEATING PERFORMANCE OF VERSIONS FC3S_GC3S	9
COOLING PERFORMANCE OF VERSION WITH HEAT RECOVERY UNIT	10
HEATING PERFORMANCE OF VERSION WITH HEAT RECOVERY UNIT	11
OPERATING LIMITS - CUBE HE	12
NOISE LEVELS - CUBE HE	12
COOLING	12
HEATING	12
DIMENSIONAL DIAGRAMS	13

CUBE HE

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

High pressure 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 spacers.

The protection rating of the motors is IP 54. The fan is fitted with 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

Radial plug fans without scroll, directly coupled to an electronically controlled electric motor.

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.

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 of the supply fans 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 standard available pressure of the return fans depends on the set-up of the unit and must be obtained from the technical booklet.

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 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 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.

ELECTROSTATIC FILTERS: if there is a need for high efficiency filtration (up to H10) while keeping head losses within moderate values, it is possible to include electrically powered electrostatic filters.

These filters consist of a metal pre-filter, a filtering section for ionization and separation of suspended particles from the air flow and a section for collecting the captured particles.

The filters autonomously indicate the need for cleaning.

There is always a door or removable panel to make the filter maintenance and/or replacement/cleaning 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
 - control panel
 - potential free contacts for general alarm
 - terminals for external OK signal
 - 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+N~/50Hz 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
- Probes for checking correct supply air flow rate

TESTING

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

VERSIONS

CUBE HE /HP: reversible heat pump

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

AIR HANDLING MODULE SET-UP

CUBE HE BASE

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

CUBE 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.

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

Air is exhausted by the axial fan that, concomitantly with the over-pressure that is generated in the room because of the amount of external air put in through the relevant damper, can autonomously extract the portion of air to be exhausted from the return air flow.

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.

CUBE 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.

CUBE 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.

CUBE HE RS4S

The return/exhaust fans and a module inside which is positioned a static air/air cross-flow plate heat recovery unit are added to the unit in FC3S set-up.

Consisting of an aluminium plate pack, it allows recovery of sensible heat from the exhausted air with an efficiency, during winter operation, ranging from 50 to 55% depending on the model. The two air flows (exhaustion and return) are completely separate and therefore every type of contamination between them is avoided.

The Pco control, which manages recovery according to a set-table logic depending on whether or not the air quality probe is present, will be installed as standard with this set-up too.

The possibility of obtaining the free cooling option with RS version unit too is guaranteed by the presence of a fourth damper for external air as recovery unit by-pass.

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

VENTILATING SECTION ACCESSORIES

- Air supply different from the standard one
- Air return different from the standard one
- Increased pressure of the supply fans
- Increased pressure of the return fans (only for RS4S version)
- Corrugated filters of grade F5
- Rigid bag filters of grade F7
- Electrostatic filters
- 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)
- 25 or 50 mm thick sandwich panels

ELECTRICAL ACCESSORIES

- 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 - CUBE HE

Unit size		1.2	2.2	3.2	4.2
Cooling					
Nominal refrigeration capacity	(1) kW	26.5	33.1	39.2	44.1
Sensible cooling capacity	(1) kW	21.8	26.1	31.8	36.3
Power absorbed by the compressors	(1) kW	5.4	7.2	8.1	10.1
Heating					
Nominal heating capacity	(2) kW	26.5	33.8	39.2	45.1
Power absorbed by the compressors	(2) kW	4.7	6.3	6.9	8.1
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	2.5	2.5	3.3	3.5
Total refrigerant charge	kg	7	7	11	11
Total refrigerant charge /HP	kg	7,5	7,5	13	13
Ventilating section					
Type		Radial	Radial	Radial	Radial
Air flow rate	m³/h	4,950	6,050	7,260	8,250
Std available static pressure	Pa	100	100	100	100
Air filters					
Thickness	mm	48	48	48	48
Efficiency		G4	G4	G4	G4
Motocondensing section					
Type		Axial	Axial	Axial	Axial
Air flow rate	m³/h	11,500	11,500	12,300	12,300
Water heating coil (accessory)					
Capacity	(3) kW	39.2	44.3	59.3	64.2
Water flow rate	l/s	0.637	0.72	0.963	1.043
Head loss	kPa	12.2	15.3	38.3	44.2
Electric heating coil (accessory)					
Capacity	kW	9	9	9	9
Operating stages	no.	2	2	2	2
Hot air generator for GC2S GC3S GS4S					
Quantity		1	1	1	1
Model	(4)	XXS	XXS	XS	XS
Maximum nominal heating capacity	kW	34	34	41	41
Generator efficiency related to HI	%	96,3	96,3	96,3	96,3
Maximum natural gas consumption	(5) m³/h	3,69	3,69	4,44	4,44
Amount of condensation produced	l/h	0,9	0,9	1,1	1,1

(1) Calculation conditions: ambient air 27°C DB, 19°C WB; external air 35°C DB, 24°C WB. Mixture with 30% external air.

(2) Calculation conditions: ambient air 20°C DB, 15°C WB; external air 7°C DB, 6°C WB. Mixture with 30% external air.

(3) Coil data related to: Incoming air temperature 20°C DB, 15°C WB; in/out water temperature: 80/65

(4) XXS= xxsmall (nominal heating capacity 34 kW); XS= xsmall (nominal heating capacity 41 kW)

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

ELECTRICAL SPECIFICATIONS - CUBE HE

Unit size		1.2	2.2	3.2	4.2
Supply/return ventilating section	(3)				
nº of supply fans	no.	1	1	1	1
Nominal fan power	kW	1	2.16	2.16	2.16
Nominal fan current	A	1.85	3.3	3.3	3.3
Motocondensing section	(4)				
nº of axial fans	no.	1	1	1	1
Nominal fan power	kW	0.95	0.95	0.95	0.95
Nominal fan current	A	4.4	4.4	4.4	4.4
Immersed electrode humidifier (accessory)					
Nominal steam production	kg/h	5	5	5	5
Number of cylinders	no.	1	1	1	1
Operating interval	kg/h	5 - 8	5 - 8	5 - 8	5 - 8
Absorbed power	kW	3.75 - 6	3.75 - 6	3.75 - 6	3.75 - 6
Absorbed current	A	5.4 - 8.7	5.4 - 8.7	5.4 - 8.7	5.4 - 8.7
Total					
Max. absorbed power	(1),(5)	10.8	15.3	15.4	17.7
Max. inrush current	(5)	56.6	81.8	82.1	94.8
Max. absorbed current	(2),(5)	20.9	27.9	28.5	31.8
Power supply	V/ph/Hz	400/3+N/50 ±5%	400/3+N/50 ±5%	400/3+N/50 ±5%	400/3+N/50 ±5%
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 - CUBE HE

Configuration	Versions that are not possible CUBE HE						
	BASIC	FC2S	FC3S	GC2S	GC3S	RS4S	GS4S
Return from top	X	X	X	X	X	X	X
Return from bottom	X	X	X	X	X	X	X
Return from right	X	X	X	X	X	X	X
Return from left	X	X	X	X	X		
Rear return						X	X
Supply from top	X	X	X	X	X	X	X
Supply from bottom	X	X	X	X	X	X	X
Supply from right	X	X	X	X	X	X	X
Supply from left				X	X		
Front supply							
External air from top	#	X	X	X	X	X	X
External air from bottom	#	X	X	X	X	X	X
External air from right	#	X	X	X	X	X	X
External air from left	#	X	X	X	X	X	X
Rear external air	#						
Exhaustion from top	#	#	#	#	#	#	#
Exhaustion from bottom	#	#	#	#	#	#	#
Exhaustion from right	#	#	#	#	#	#	#
Exhaustion from left	#	#	#	#	#	#	#
Rear exhaustion	#	#	#	#	#	#	#

#: not necessary

x: not possible

AIR FLOW RATES - CUBE HE

Unit size	1.2	2.2	3.2	4.2
Max. air flow rate [m³/h]	5,175	6,325	7,590	8,625
Standard air flow rate [m³/h]	4,950	6,050	7,260	8,250
Min. air flow rate [m³/h]	3,825	4,675	5,610	6,375

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	T WB	25 / 18			30 / 22			35 / 24			40 / 25			42 / 25.5		
		[°C]	[°C]	kWf	kWs	kWe	kWf	kWs	kWe	kWf	kWs	kWe	kWf	kWs	kWe	kWf	kWs	kWe
1.2	4950	24	17	26.0	20.3	4.2	25.9	19.7	4.7	25.4	20.7	5.3	24.5	23.4	6.0	24.1	24.1	6.3
		26	18	26.9	20.3	4.2	26.7	19.9	4.8	26.2	20.8	5.4	25.3	23.5	6.0	24.9	24.5	6.3
		27	19	27.2	21.0	4.3	27.0	20.6	4.8	26.5	21.8	5.4	25.6	24.5	6.0	25.1	25.1	6.3
		28	20	27.6	20.9	4.2	27.4	20.6	4.8	26.9	21.7	5.4	25.9	24.6	6.0	25.6	25.6	6.3
		30	22	28.6	20.0	4.3	28.4	19.7	4.8	27.8	20.8	5.4	26.9	23.5	6.1	26.5	24.5	6.4
2.2	6050	24	17	32.4	25.0	5.6	32.3	24.2	6.3	31.8	25.1	7.1	30.8	28.0	8.1	30.4	28.9	8.5
		26	18	33.4	24.9	5.6	33.3	24.3	6.4	32.7	25.3	7.2	31.7	28.0	8.1	31.3	29.1	8.5
		27	19	33.7	25.9	5.6	33.6	25.0	6.4	33.1	26.1	7.2	31.9	29.0	8.2	31.5	30.3	8.6
		28	20	34.3	25.7	5.7	34.1	25.1	6.4	33.5	26.1	7.2	32.4	29.1	8.2	31.9	30.2	8.6
		30	22	35.4	24.5	5.7	35.2	24.1	6.5	34.6	25.0	7.3	33.6	27.8	8.3	32.9	28.9	8.7
3.2	7260	24	17	38.5	29.7	6.3	38.4	28.8	7.1	37.7	30.3	8.0	36.3	34.4	9.0	35.8	34.8	9.5
		26	18	39.8	29.7	6.3	39.6	29.0	7.2	39.0	30.5	8.1	37.6	34.5	9.1	37.0	35.9	9.6
		27	19	40.2	30.8	6.3	40.1	30.2	7.2	39.2	31.8	8.1	37.9	36.0	9.1	37.4	36.3	9.6
		28	20	40.8	30.8	6.4	40.7	30.2	7.2	39.9	31.8	8.1	38.5	36.0	9.1	38.0	36.9	9.6
		30	22	42.3	29.3	6.4	42.1	29.0	7.3	41.4	30.5	8.2	40.0	34.2	9.2	39.5	35.9	9.7
4.2	8250	24	17	43.2	34.4	8.0	43.1	33.4	8.9	42.4	34.7	10.0	41.0	39.5	11.2	40.7	39.9	11.7
		26	18	44.6	34.3	8.0	44.4	33.4	9.0	43.6	34.9	10.1	42.4	39.3	11.3	41.8	40.3	11.8
		27	19	45.1	35.5	8.1	44.8	34.7	9.0	44.1	36.3	10.1	42.8	40.6	11.3	42.2	41.4	11.8
		28	20	45.7	35.5	8.1	45.5	34.7	9.1	44.6	36.4	10.2	43.5	40.7	11.3	42.9	42.1	11.8
		30	22	47.3	33.8	8.2	47.0	33.3	9.2	46.2	34.8	10.3	45.0	38.9	11.4	44.5	40.4	11.9

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
1.2	4950	-10	-10.3	18.3	3.0	18.0	3.3	17.9	3.5	17.8	3.6	17.8	3.6	17.7	4.0
		-5	-6	20.6	3.3	20.4	3.6	20.2	3.8	20.1	3.9	20.1	3.9	20.0	4.3
		0	-1	23.4	3.6	23.2	3.9	23.1	4.1	23.1	4.2	23.0	4.3	22.8	4.6
		5	4	26.3	3.9	25.9	4.3	25.9	4.5	25.8	4.6	25.7	4.6	25.5	5.0
		7	6	27.1	4.0	26.9	4.4	26.7	4.6	26.6	4.7	26.5	4.7	26.5	5.1
		10	9	28.5	4.2	28.3	4.6	28.3	4.8	28.2	4.9	28.1	5.0	27.9	5.4
		15	13	31.8	4.6	31.5	5.0	31.3	5.2	31.2	5.3	31.2	5.4	30.9	5.8
2.2	6050	-10	-10.3	23.4	3.9	23.3	4.3	23.3	4.5	23.2	4.6	23.4	4.7	23.4	5.2
		-5	-6	26.1	4.3	26.3	4.7	26.1	5.0	26.0	5.0	26.4	5.1	26.4	5.6
		0	-1	29.7	4.7	29.7	5.1	29.7	5.4	29.6	5.5	29.6	5.6	29.7	6.1
		5	4	33.2	5.1	33.2	5.6	33.1	5.9	33.0	6.0	33.1	6.1	32.9	6.7
		7	6	34.4	5.3	34.1	5.8	34.1	6.1	33.9	6.1	33.8	6.3	34.0	6.9
		10	9	36.0	5.5	35.9	6.0	35.7	6.3	35.7	6.5	35.7	6.6	35.6	7.2
		15	13	39.9	6.0	39.7	6.6	39.6	6.9	39.5	7.1	39.5	7.2	39.2	7.9
3.2	7260	-10	-10.3	26.4	4.3	26.0	4.8	26.1	5.1	26.0	5.2	25.9	5.3	25.6	5.8
		-5	-6	30.2	4.7	29.8	5.2	29.6	5.5	29.5	5.6	29.7	5.7	29.4	6.2
		0	-1	34.4	5.2	34.1	5.7	33.8	6.0	33.8	6.1	33.8	6.2	33.4	6.8
		5	4	38.6	5.6	38.4	6.2	38.2	6.5	38.1	6.6	38.0	6.7	37.7	7.3
		7	6	39.9	5.8	39.7	6.4	39.5	6.7	39.4	6.8	39.2	6.9	39.2	7.6
		10	9	42.1	6.1	41.8	6.7	41.7	7.0	41.5	7.1	41.5	7.3	41.2	7.9
		15	13	47.1	6.7	46.7	7.3	46.5	7.6	46.4	7.8	46.3	7.9	45.8	8.6
4.2	8250	-10	-10.3	30.7	5.1	30.3	5.6	30.0	5.8	29.9	5.9	30.3	6.0	29.9	6.5
		-5	-6	34.6	5.6	34.4	6.1	34.2	6.3	34.2	6.4	34.1	6.6	34.0	7.1
		0	-1	39.3	6.1	38.9	6.6	38.8	6.9	38.7	7.0	38.5	7.1	38.2	7.7
		5	4	44.7	6.8	44.2	7.3	43.7	7.6	43.6	7.7	43.6	7.9	42.8	8.4
		7	6	46.3	7.0	46.0	7.6	45.6	7.9	45.4	8.0	45.1	8.1	45.0	8.8
		10	9	49.1	7.4	48.5	7.9	48.1	8.3	47.9	8.4	47.9	8.5	47.4	9.2
		15	13	54.5	8.1	53.9	8.7	53.5	9.1	53.3	9.2	53.1	9.4	52.3	10.1

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

COOLING PERFORMANCE OF VERSION WITH HEAT RECOVERY UNIT (NOMINAL AIR FLOW RATE)

Model	Air flow rate [m³/h]	External air conditions T DB [°C] / T WB [°C]																										
		T DB		T WB																								
		[°C]	[°C]	25 / 18				30 / 22				35 / 24				40 / 25				42 / 25.5								
		kWf+r	kWf	kWs+r	kWs	kWe	kWf+r	kWf	kWs+r	kWs	kWe	kWf+r	kWf	kWs+r	kWs	kWe	kWf+r	kWf	kWs+r	kWs	kWe	kWf+r	kWf	kWs+r	kWs	kWe		
1.2	4950	24	17	26.3	25.9	19.8	19.4	4.3	28.3	25.8	19.7	17.2	4.9	30.0	25.5	21.9	17.4	5.5	31.1	24.5	26.1	19.5	6.2	31.5	24.1	27.6	20.2	6.5
		26	18	-	-	-	-	-	28.3	26.7	19.6	18.0	4.9	29.8	26.1	21.8	18.1	5.5	31.0	25.2	26.1	20.3	6.2	31.4	24.8	27.7	21.1	6.5
		27	19	-	-	-	-	-	28.2	27.0	19.9	18.7	4.9	29.7	26.4	22.2	18.9	5.5	30.8	25.5	26.7	21.4	6.2	31.2	25.0	28.4	22.2	6.5
		28	20	-	-	-	-	-	28.2	27.4	19.9	19.1	4.9	29.7	26.8	22.2	19.3	5.6	30.7	25.8	26.9	22.0	6.2	31.1	25.3	28.4	22.6	6.5
		30	22	-	-	-	-	-	28.2	28.2	19.0	19.0	5.0	29.7	27.6	21.5	19.4	5.6	30.8	26.7	25.9	21.8	6.3	31.1	26.2	27.6	22.7	6.5
		24	17	34.5	34.0	24.9	24.4	5.7	36.9	33.9	25.0	22.0	6.5	38.9	33.5	27.5	22.1	7.4	40.2	32.3	32.4	24.5	8.3	40.7	31.8	34.2	25.3	8.7
2.2	6050	26	18	-	-	-	-	-	36.8	34.8	24.7	22.7	6.6	38.7	34.3	27.3	22.9	7.4	40.1	33.2	32.3	25.4	8.4	40.6	32.7	34.0	26.1	8.8
		27	19	-	-	-	-	-	36.8	35.3	25.2	23.7	6.6	38.6	34.7	27.9	24.0	7.4	39.9	33.5	32.9	26.5	8.4	40.3	32.9	34.8	27.4	8.8
		28	20	-	-	-	-	-	36.7	35.7	25.1	24.1	6.6	35.4	32.0	26.8	23.4	7.5	39.8	33.9	32.9	27.0	8.4	40.3	33.4	34.8	27.9	8.8
		30	22	-	-	-	-	-	36.9	36.9	24.1	24.1	6.6	38.6	36.1	26.8	24.3	7.5	39.9	35.0	31.9	27.0	8.5	40.4	34.5	33.7	27.8	8.9
		24	17	41.3	40.7	29.8	29.2	6.5	44.4	40.7	29.7	26.0	7.4	46.7	40.0	32.9	26.2	8.4	48.3	38.5	39.4	29.6	9.4	49.0	38.0	41.5	30.5	9.9
		26	18	-	-	-	-	-	44.4	42.0	29.6	27.2	7.5	46.7	41.2	32.8	27.3	8.4	48.1	39.5	39.5	30.9	9.5	48.9	39.1	41.7	31.9	10.0
3.2	7260	27	19	-	-	-	-	-	44.1	42.3	30.2	28.4	7.5	46.4	41.5	33.6	28.7	8.5	48.0	40.1	40.3	32.4	9.5	48.7	39.5	42.7	33.5	10.0
		28	20	-	-	-	-	-	44.3	43.1	30.1	28.9	7.5	46.5	42.2	33.5	29.2	8.5	47.9	40.6	40.3	33.0	9.5	48.6	40.0	42.8	34.2	10.0
		30	22	-	-	-	-	-	44.4	44.4	29.0	29.0	7.6	46.6	43.5	32.4	29.3	8.6	48.1	42.0	39.2	33.1	9.6	48.7	41.4	41.6	34.3	10.0
		24	17	45.8	45.1	34.5	33.8	8.0	49.3	45.2	34.4	30.3	9.0	51.9	44.4	37.9	30.4	10.0	53.9	42.9	44.8	33.8	11.2	54.7	42.4	47.2	34.9	11.7
		26	18	-	-	-	-	-	49.2	46.5	34.2	31.5	9.0	51.8	45.6	37.7	31.5	10.1	53.7	44.1	44.8	35.2	11.3	54.6	43.6	47.3	36.3	11.8
		27	19	-	-	-	-	-	49.0	46.9	34.8	32.7	9.1	51.6	46.1	38.5	33.0	10.1	53.6	44.7	45.8	36.9	11.3	54.4	44.1	48.2	37.9	11.8
4.2	8250	28	20	-	-	-	-	-	49.0	47.6	34.6	33.2	9.1	51.4	46.6	40.5	35.7	10.2	53.5	45.3	45.7	37.5	11.3	54.3	44.7	48.3	38.7	11.8
		30	22	-	-	-	-	-	49.1	49.1	33.3	33.3	9.2	51.7	48.3	37.2	33.8	10.3	53.6	46.7	44.5	37.6	11.4	54.3	46.1	47.0	38.8	11.9

- : free cooling conditions

kWf+r: refrigeration capacity + recovery [kW]

kWf: refrigeration capacity [kW]

kWs+r: sensible cooling capacity + recovery [kW]

kWs: sensible cooling capacity [kW]

kWe: electrical power absorbed by the compressors [kW]

The performance values are related to operation with 50% external air, 50% recirculation air and with static recovery

HEATING PERFORMANCE OF VERSION WITH HEAT RECOVERY UNIT (NOMINAL AIR FLOW RATE)

Model	Air flow rate [m³/h]	Internal air conditions T DB [°C]																			
		Internal Air		T DB		T WB															
		[°C]	[°C]	10			15			18			19			20			25		
				kWt+r	kWt	kWe	kWt+r	kWt	kWe	kWt+r	kWt	kWe	kWt+r	kWt	kWe	kWt+r	kWt	kWe	kWt+r	kWt	kWe
1.2	4950	-10	-10.3	27.5	18.8	2.7	30.0	18.7	2.9	31.4	18.5	3.1	32.0	18.5	3.2	33.5	18.3	3.3	35.4	18.2	3.5
		-5	-6	27.5	21.3	3.0	29.6	20.9	3.2	30.9	20.7	3.4	31.5	20.7	3.5	32.9	20.6	3.6	34.7	20.5	3.8
		0	-1	28.2	24.1	3.4	30.0	23.8	3.6	31.3	23.7	3.8	31.8	23.7	3.8	33.0	23.6	3.9	34.8	23.4	4.2
		5	4	28.8	26.7	3.8	30.7	26.6	4.0	31.8	26.5	4.2	32.2	26.4	4.2	32.9	26.4	4.3	34.9	26.3	4.6
		7	6	29.1	27.9	3.9	30.8	27.5	4.2	32.1	27.6	4.3	32.4	27.5	4.4	33.0	27.5	4.4	34.9	27.3	4.7
		10	9	29.1	29.1	4.2	31.0	28.9	4.4	32.1	28.8	4.6	32.6	28.9	4.6	32.9	28.8	4.7	34.8	28.6	5.0
		15	13	-	-	-	32.1	32.1	4.9	33.2	32.0	5.1	33.6	32.0	5.1	34.0	31.9	5.2	35.8	31.7	5.5
		-10	-10.3	35.3	24.9	3.4	38.2	24.6	3.7	40.1	24.6	4.0	40.9	24.6	4.0	42.9	24.7	4.2	45.0	24.4	4.5
		-5	-6	35.3	27.8	3.8	37.9	27.5	4.2	40.0	27.8	4.4	40.7	27.8	4.5	42.3	27.6	4.6	44.8	27.8	5.0
		0	-1	36.3	31.4	4.3	38.8	31.4	4.6	40.4	31.3	4.9	41.0	31.3	4.9	42.5	31.3	5.1	44.9	31.2	5.4
2.2	6050	5	4	37.5	35.0	4.9	39.9	35.0	5.2	41.3	34.9	5.4	41.8	34.9	5.5	42.8	35.0	5.6	45.1	34.8	6.0
		7	6	38.0	36.5	5.1	40.3	36.4	5.4	41.7	36.3	5.6	42.3	36.4	5.7	43.0	36.4	5.8	45.3	36.2	6.2
		10	9	38.1	38.1	5.4	40.4	37.9	5.7	41.9	38.0	6.0	42.2	37.8	6.0	42.8	37.9	6.1	45.2	37.8	6.5
		15	13	-	-	-	41.8	41.8	6.4	43.2	41.7	6.7	43.7	41.7	6.8	44.1	41.6	6.8	46.4	41.5	7.3
		-10	-10.3	40.2	27.3	3.7	44.2	27.4	4.1	46.3	27.1	4.4	47.1	27.0	4.5	49.5	26.9	4.7	52.1	26.6	5.0
		-5	-6	40.2	30.9	4.2	43.8	30.9	4.6	45.8	30.7	4.8	47.0	30.9	4.9	49.1	30.8	5.1	51.7	30.6	5.5
		0	-1	41.4	35.3	4.7	44.3	35.1	5.1	46.3	34.9	5.3	47.0	34.9	5.4	48.7	34.8	5.6	51.3	34.4	6.0
		5	4	42.6	39.5	5.3	45.6	39.5	5.7	47.3	39.4	6.0	47.8	39.2	6.0	48.9	39.2	6.2	51.8	38.9	6.6
		7	6	43.1	41.3	5.6	46.0	41.1	6.0	47.7	41.0	6.2	48.3	41.0	6.3	49.1	40.9	6.4	51.9	40.6	6.8
		10	9	43.4	43.4	6.0	46.4	43.3	6.4	47.9	43.0	6.6	48.7	43.2	6.7	49.1	43.0	6.8	52.1	42.9	7.2
3.2	7260	15	13	-	-	-	47.9	47.9	7.1	49.6	47.8	7.3	50.1	47.7	7.4	50.6	47.5	7.5	53.3	47.2	8.0
		-10	-10.3	46.0	31.5	4.6	50.1	31.2	4.9	52.5	30.9	5.2	53.4	30.8	5.2	56.0	30.6	5.4	59.3	30.6	5.8
		-5	-6	45.9	35.5	5.1	49.8	35.3	5.5	52.1	35.1	5.7	53.0	35.0	5.8	55.3	34.8	6.0	58.5	34.8	6.3
		0	-1	46.9	40.0	5.7	50.1	39.7	6.1	52.4	39.6	6.3	53.1	39.6	6.4	55.0	39.4	6.5	58.1	39.1	6.9
		5	4	48.4	45.0	6.4	51.5	44.6	6.8	53.3	44.4	7.0	54.0	44.4	7.1	55.2	44.3	7.2	58.3	43.9	7.6
		7	6	49.1	47.0	6.7	52.0	46.5	7.1	53.8	46.3	7.3	54.6	46.4	7.4	55.4	46.2	7.5	58.4	45.7	8.0
		10	9	49.8	49.8	7.2	53.0	49.6	7.6	54.7	49.2	7.8	55.3	49.1	7.9	55.8	48.9	8.0	58.8	48.5	8.4
		15	13	-	-	-	54.6	54.6	8.5	56.3	54.2	8.8	57.1	54.4	8.9	57.6	54.2	9.0	60.4	53.5	9.5

- : free heating conditions

kW+r: heating capacity + recovery [kW]

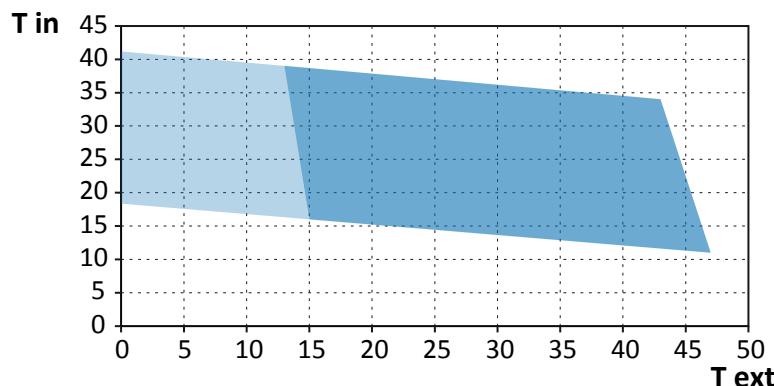
kWt: heating capacity [kW]

kWe: electrical power absorbed by the compressors [kW]

The performance values are related to operation with 50% external air, 50% recirculation air and with static recovery

OPERATING LIMITS - CUBE HE

COOLING



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

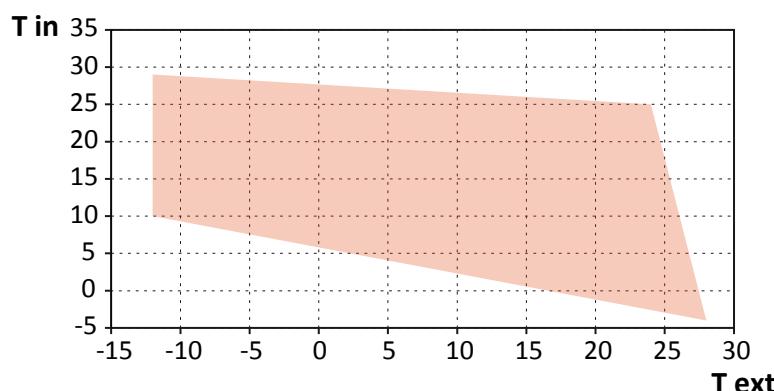
T_{in} : Temperature of the internal air that strikes the evaporating coil (dry bulb)

■ : operating range of the standard unit

■ : wide operating range of the unit with accessories with axial fan speed controller (standard)

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 - CUBE HE

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
1.2	SPL_bc	61	58	62	56	56	55	49	44
	SPL_qe	54	57	59	55	55	54	48	42
2.2	SPL_bc	61	58	62	56	56	55	49	44
	SPL_qe	54	57	59	55	55	54	48	42
3.2	SPL_bc	61	58	62	56	56	55	49	44
	SPL_qe	54	57	59	55	55	54	48	42
4.2	SPL_bc	61	58	62	56	56	55	49	44
	SPL_qe	54	57	59	55	55	54	48	42

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.

The indicated values are calculated at full load and under standard working conditions for basic version units.

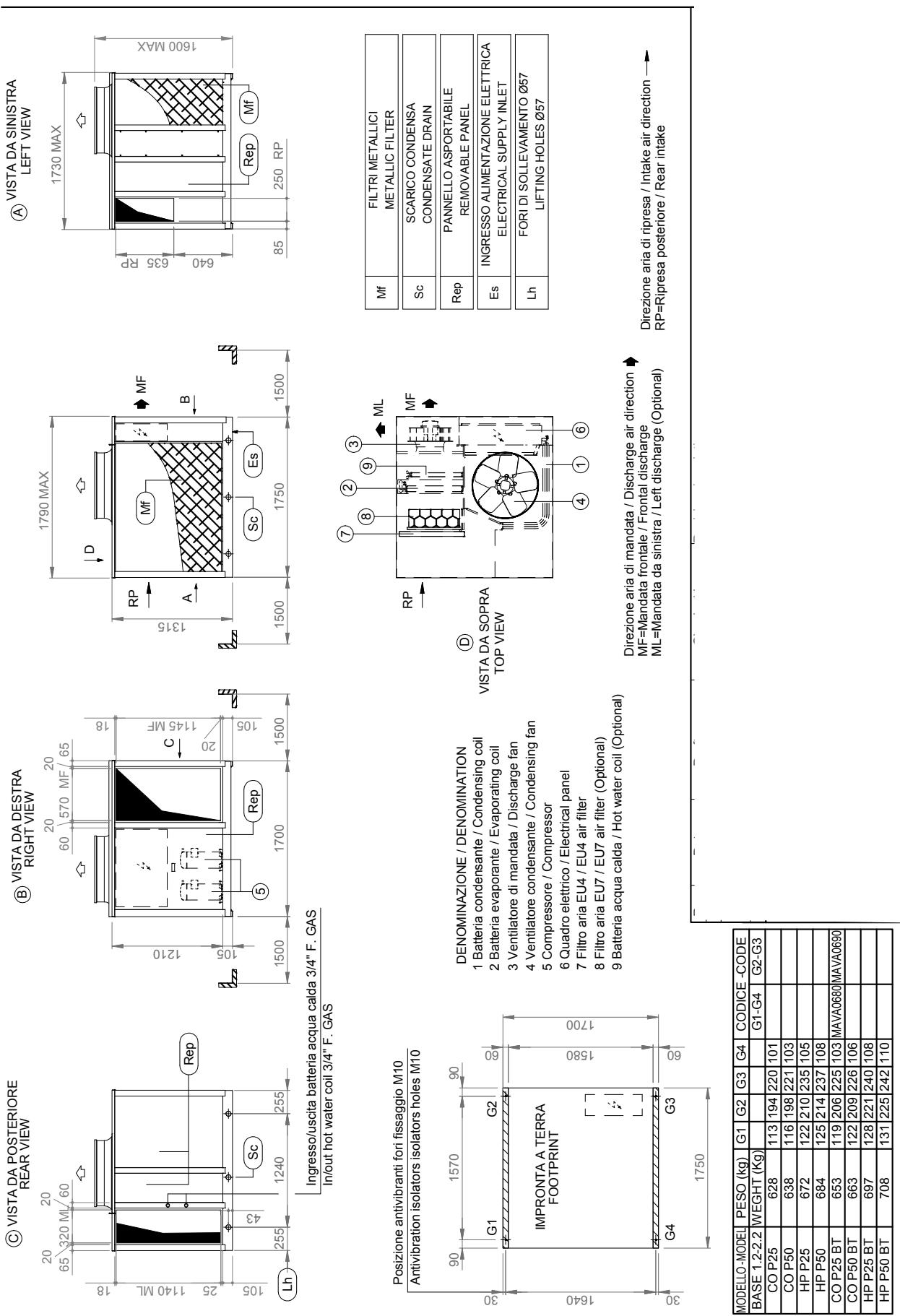
THEORETICAL NOISE ATTENUATION VALUES BASED ON DISTANCE IN FREE FIELD

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

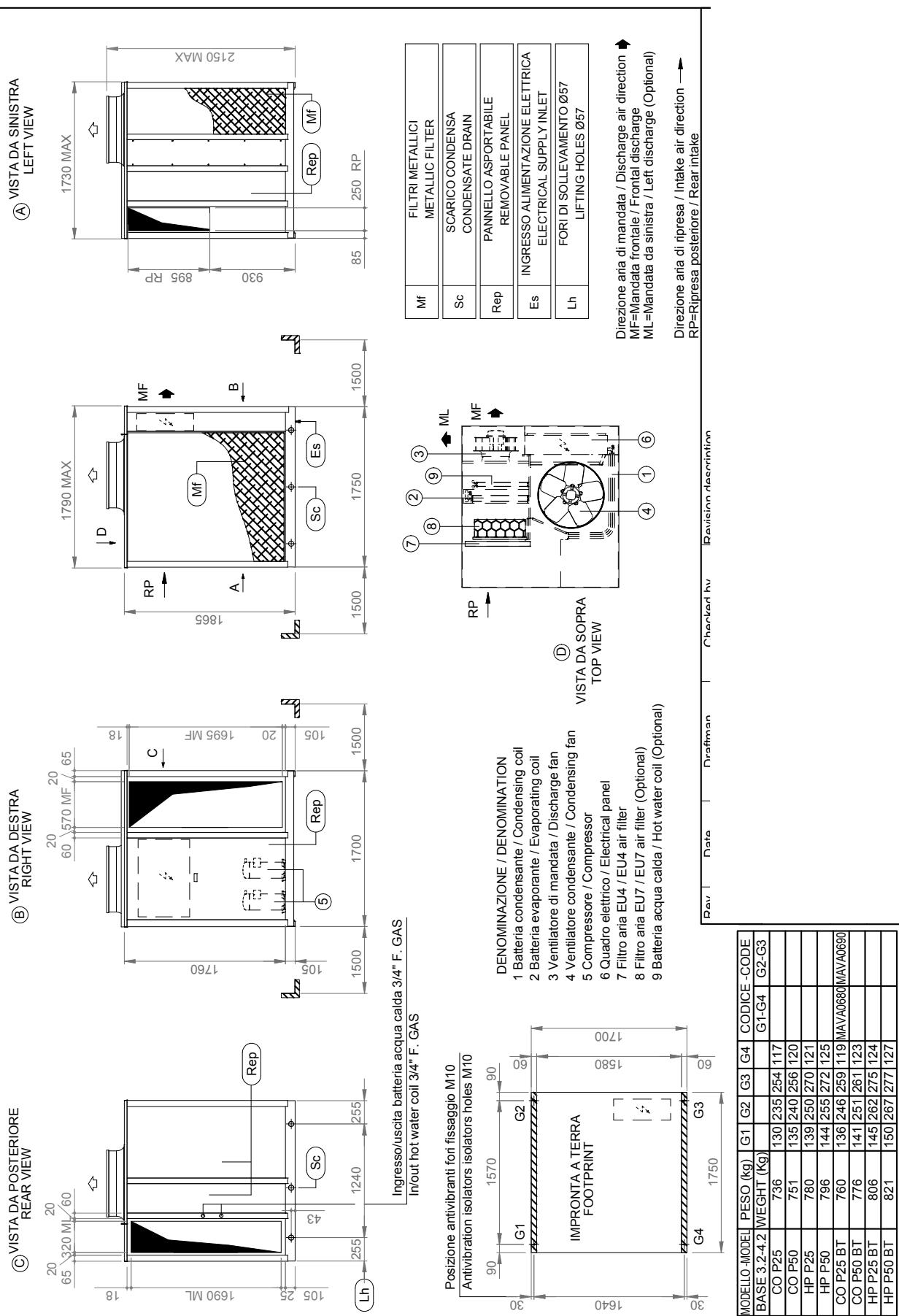
CUBE 1.2 - 2.2 BASE

C412718-C



DIMENSIONAL DIAGRAMS

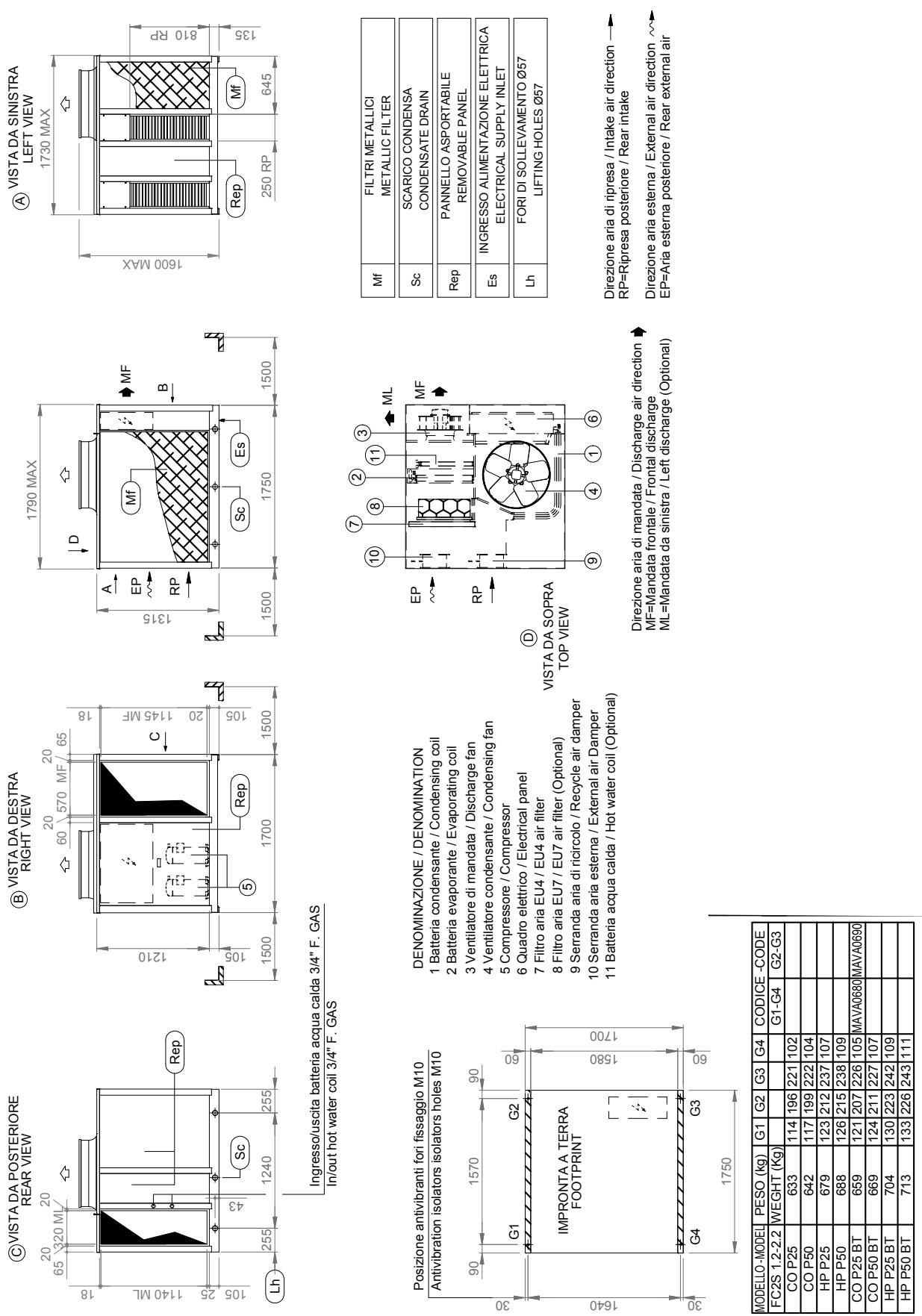
CUBE 3.2 - 4.2 BASE



DIMENSIONAL DIAGRAMS

CUBE 1.2 - 2.2 FC2S

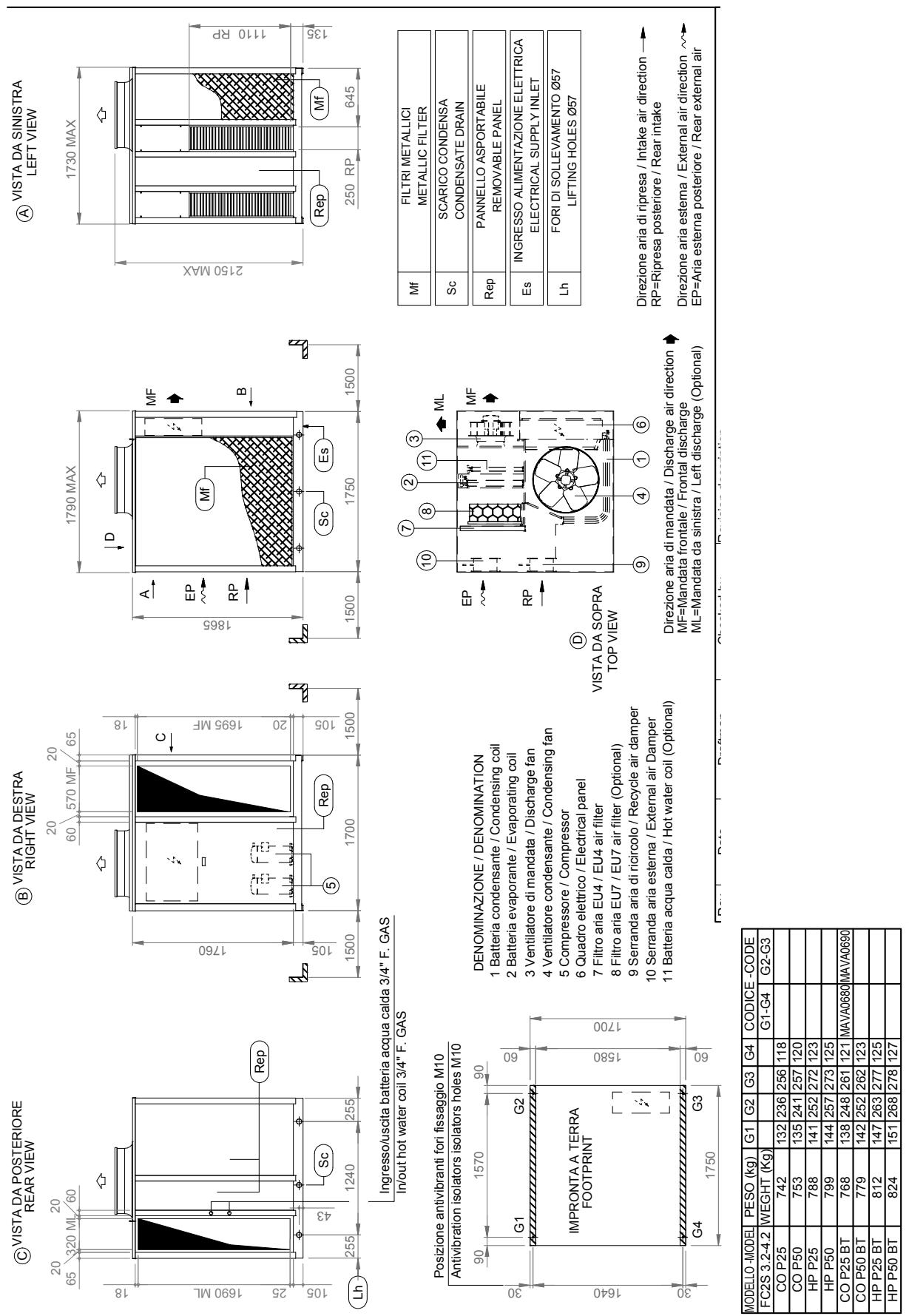
C412718-D



DIMENSIONAL DIAGRAMS

CUBE 3.2 - 4.2 FC2S

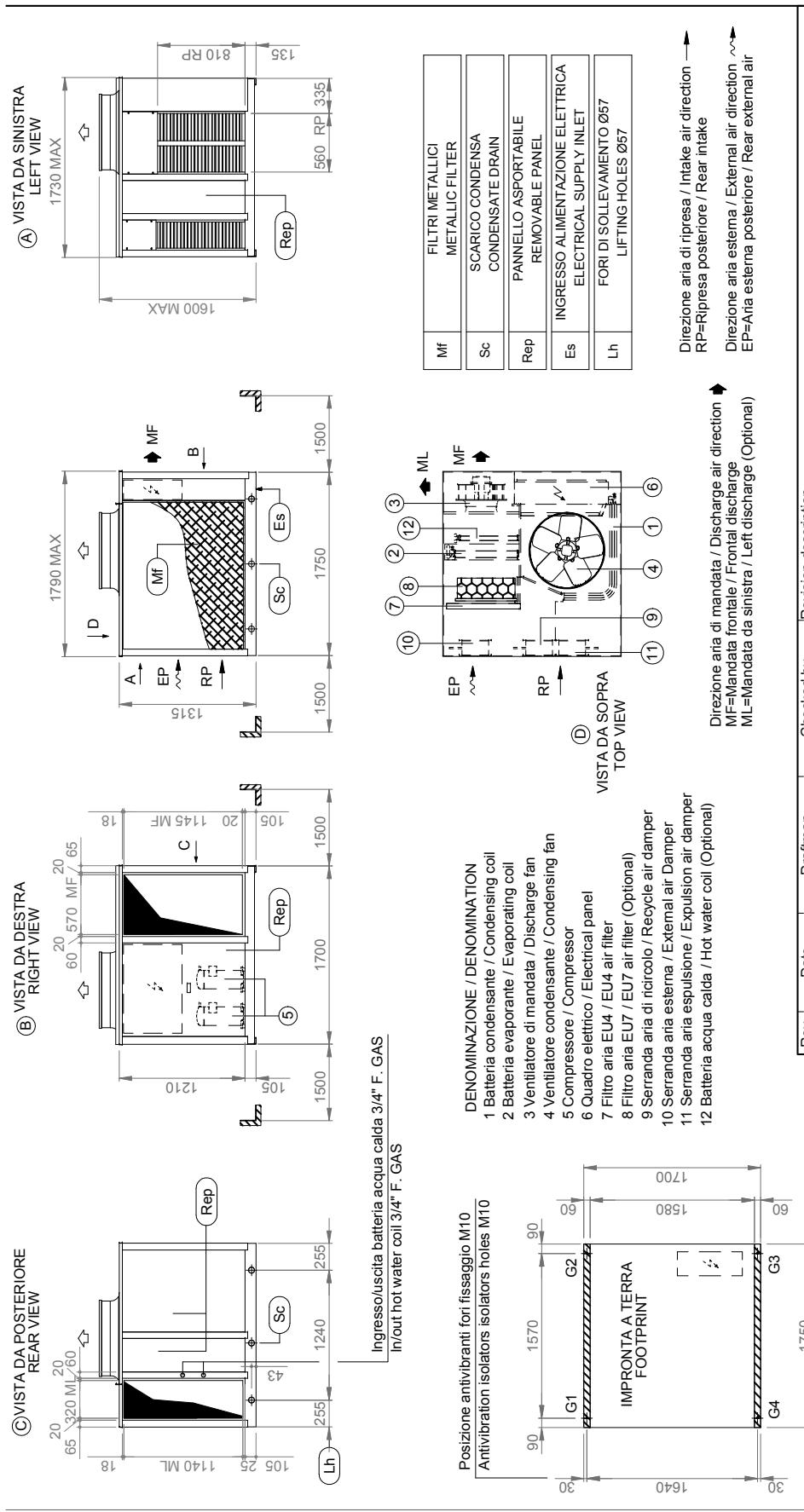
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DIMENSIONAL DIAGRAMS

CUBE 1.2 - 2.2 FC3S

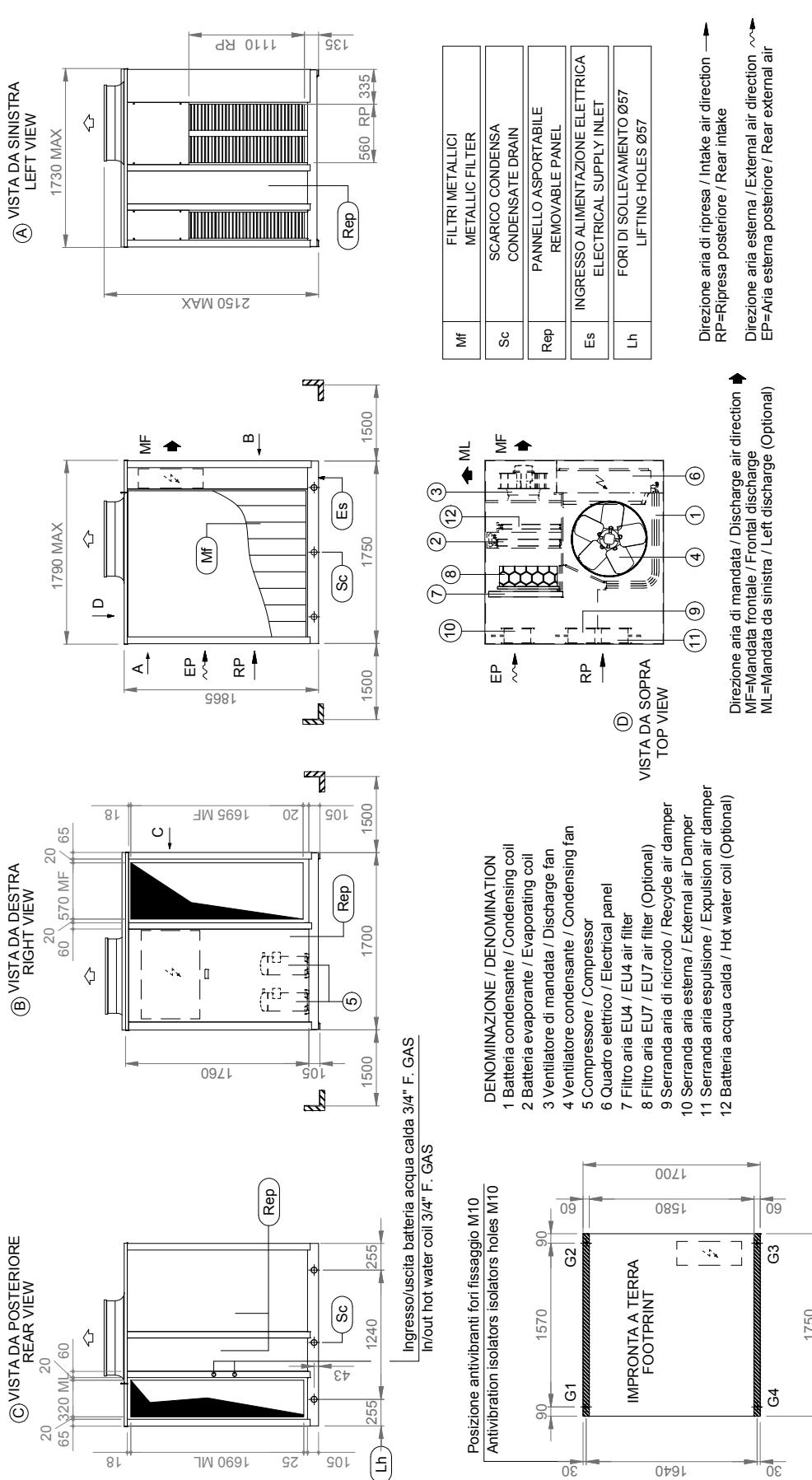
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DIMENSIONAL DIAGRAMS

CUBE 3.2 - 4.2 FC3S

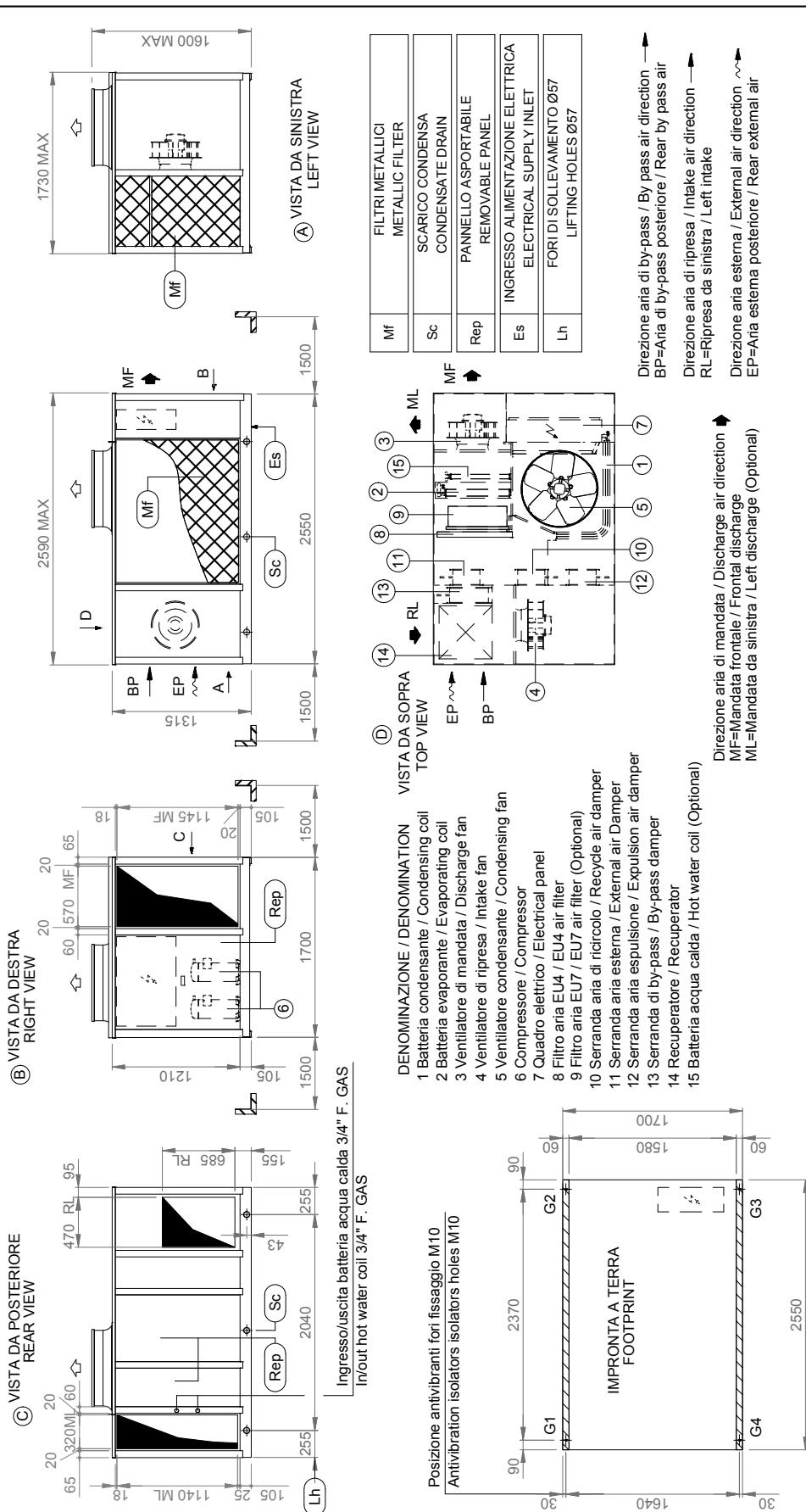
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DIMENSIONAL DIAGRAMS

CUBE 1.2 - 2.2 RS4S

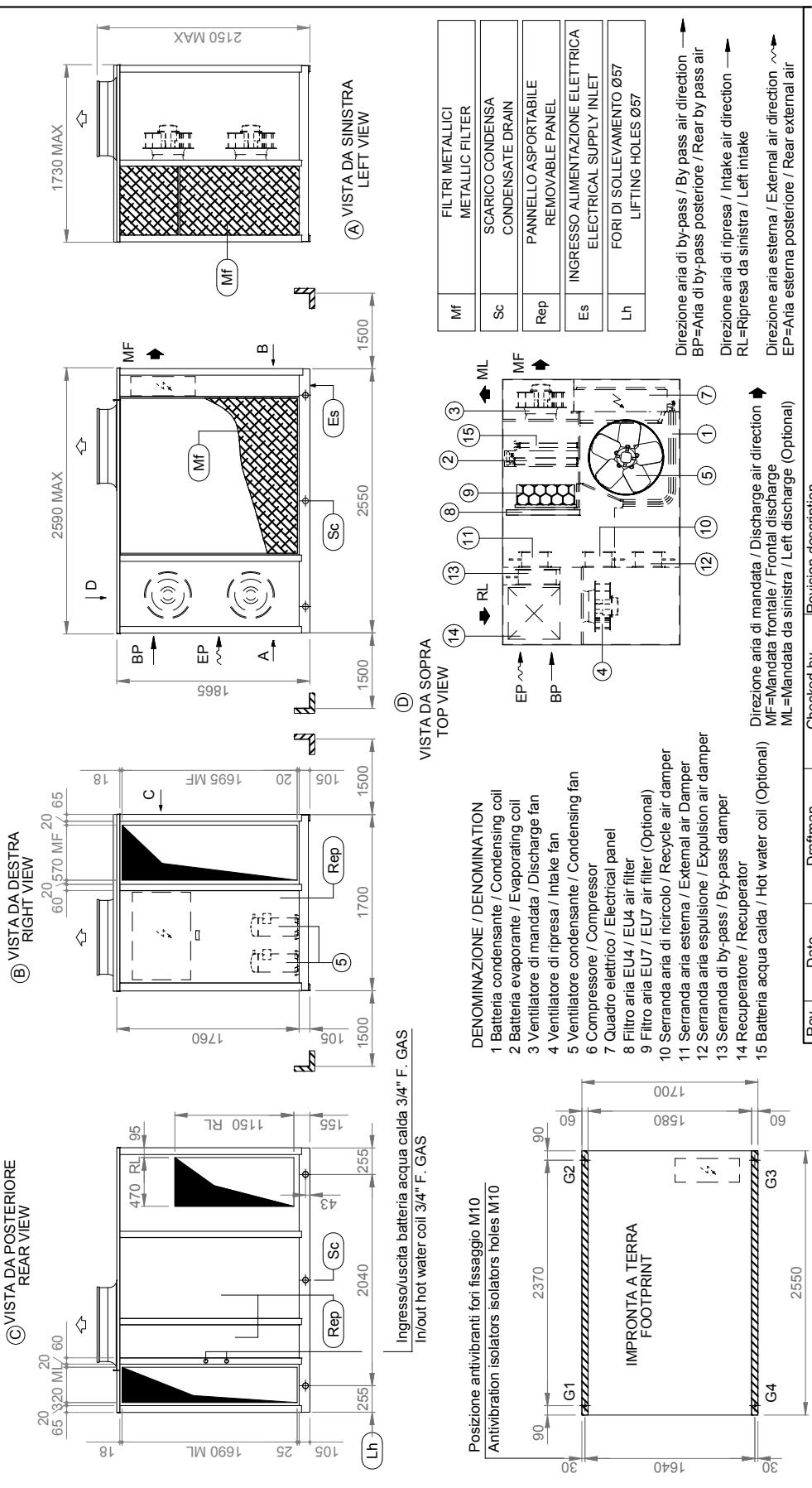
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DIMENSIONAL DIAGRAMS

CUBE 3.2 - 4.2 RS4S

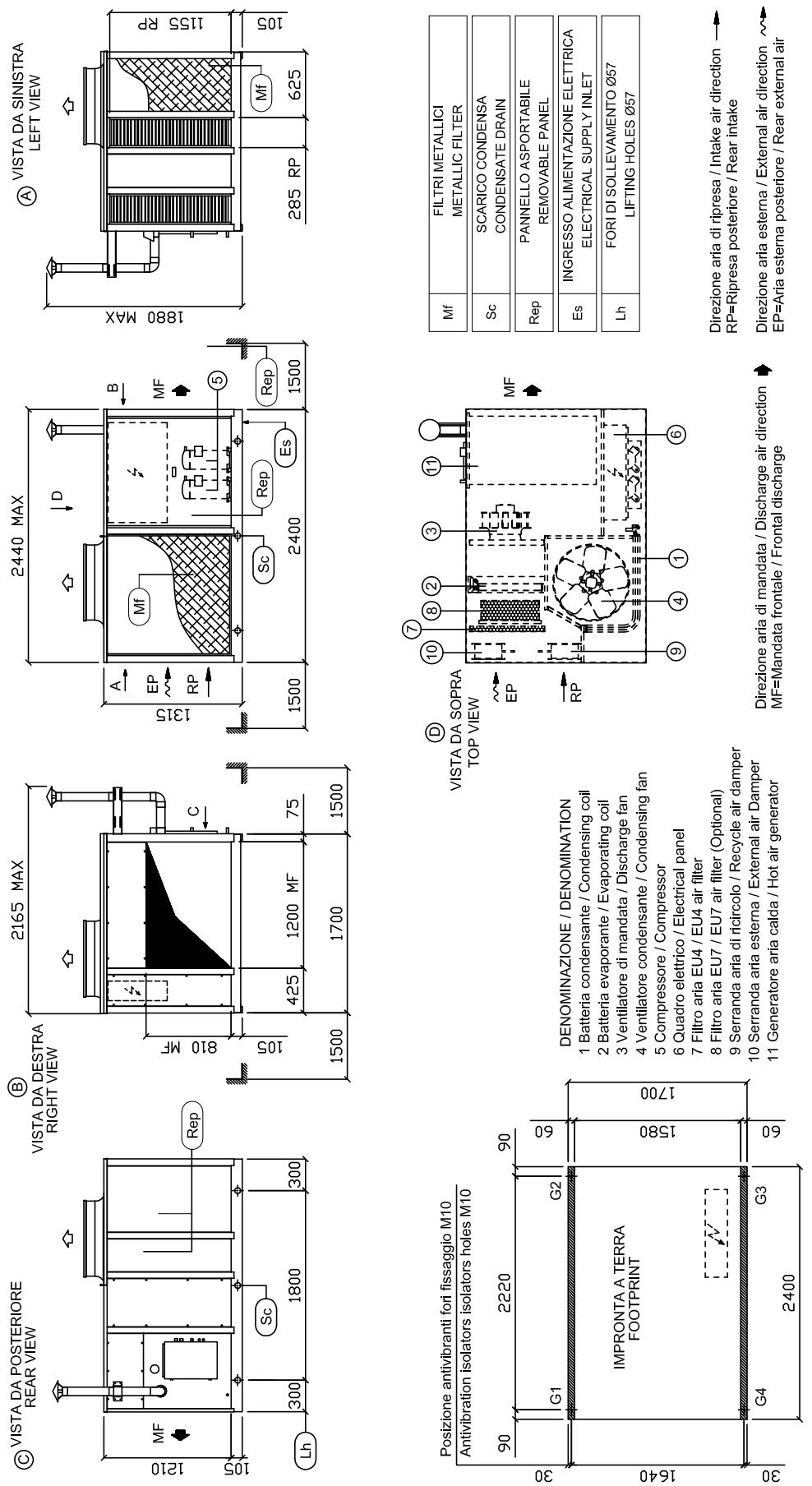
C412725-C



DIMENSIONAL DIAGRAMS

CUBE 1.2 - 2.2 GC2S

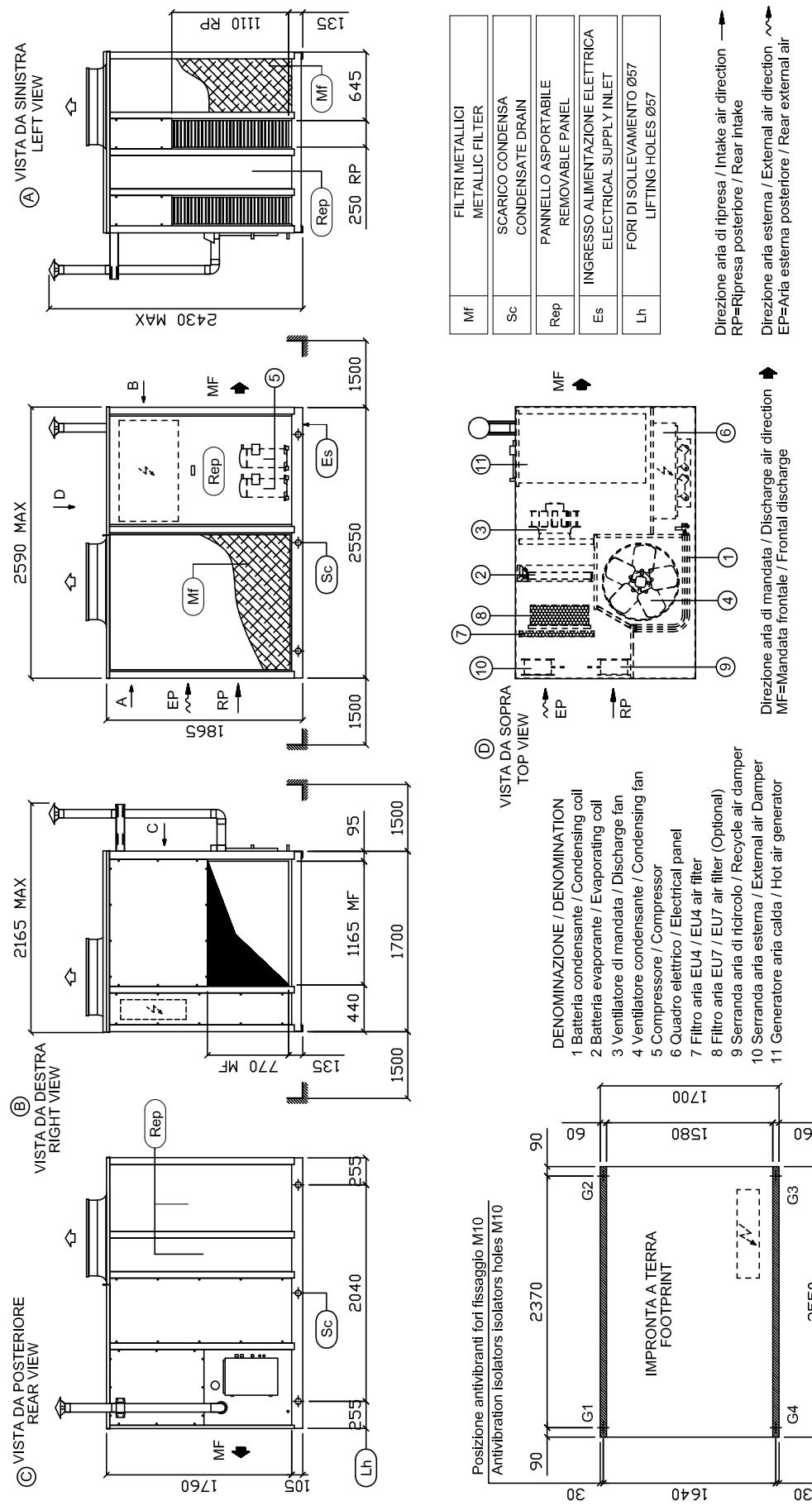
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DIMENSIONAL DIAGRAMS

CUBE 3.2 - 4.2 GC2S

C412724-C

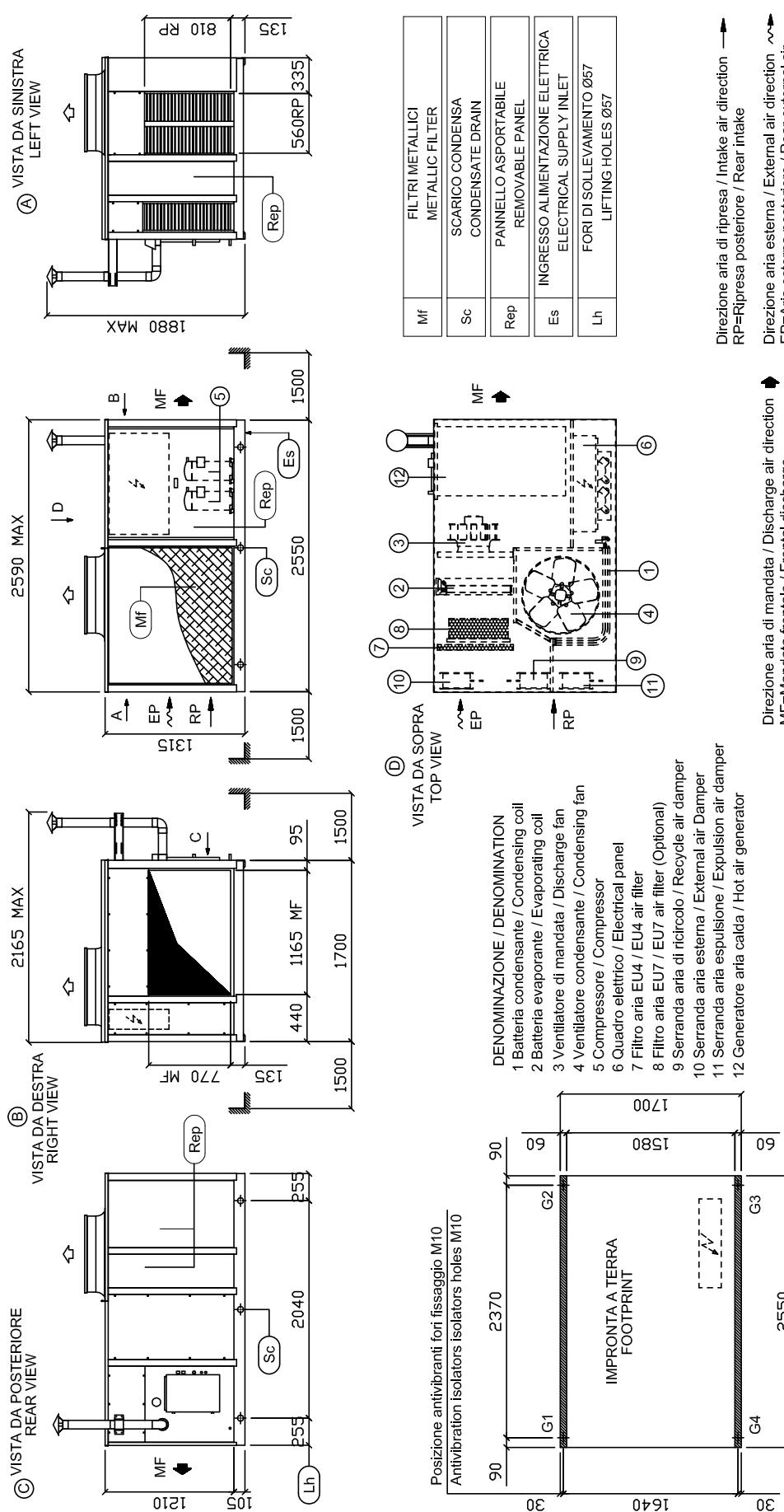


MODELLO-MODEL	PESO (Kg)	G1	G2	G3	G4	CODICE-CODE
GC2S 3.2-4.2	WEIGHT (Kg)	240	279	323	227	G1-G2-G4 G3
CO P25	1069	266	342	368	230	MAVA0690 MAVA0700
CO P50	1186	266	342	368	230	MAVA0690 MAVA0700

DIMENSIONAL DIAGRAMS

CUBE 1.2 - 2.2 GC3S

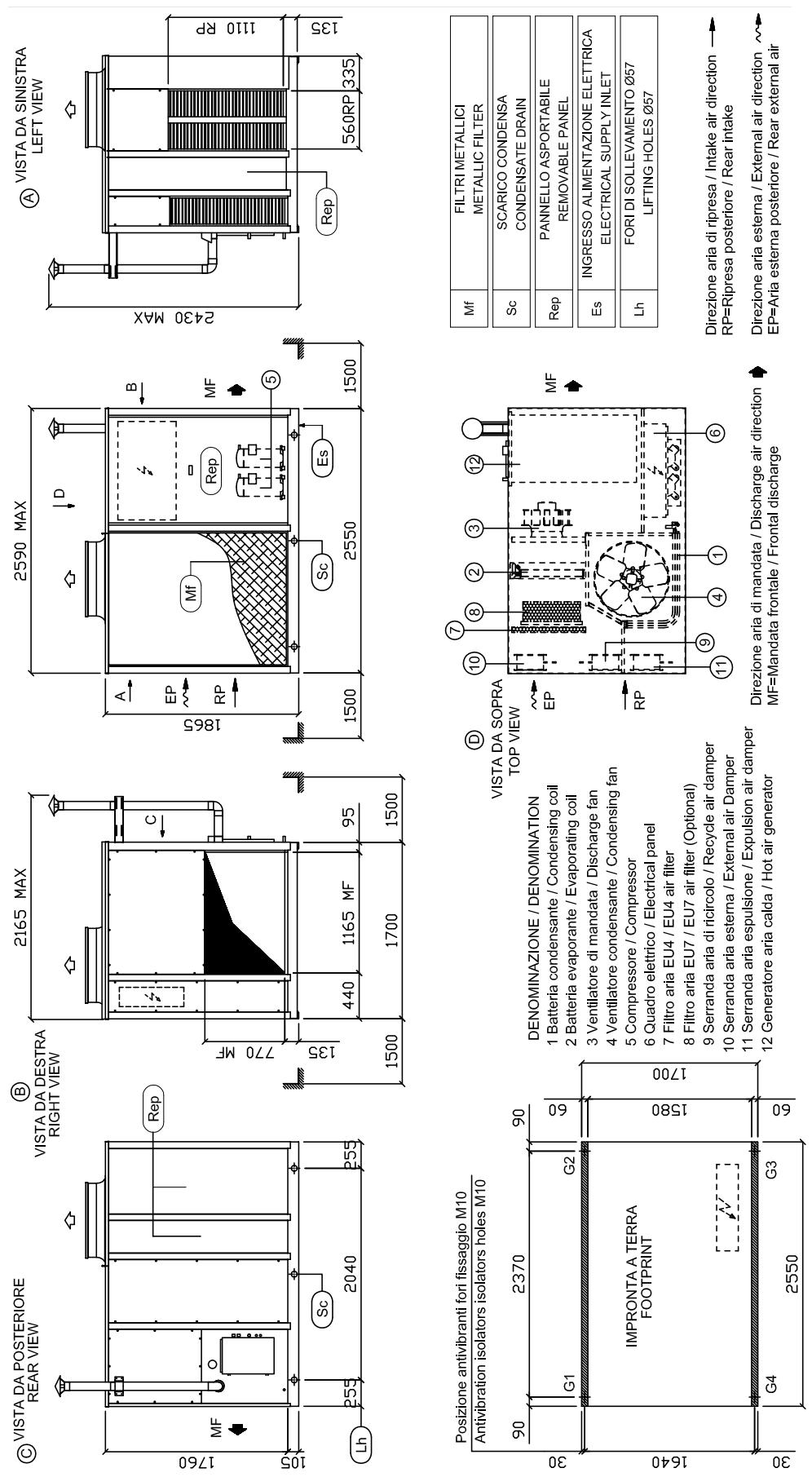
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DIMENSIONAL DIAGRAMS

CUBE 3.2 - 4.2 GC3S

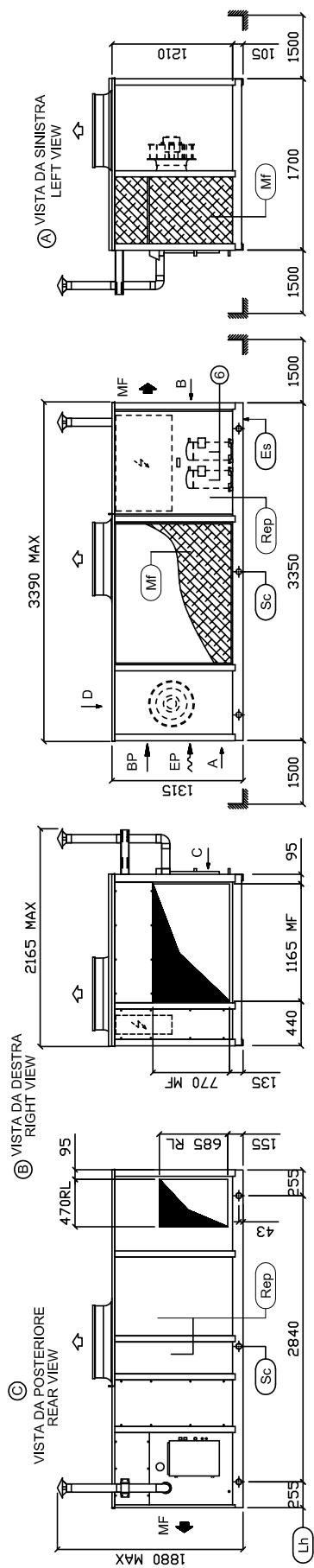
C412680-C



DIMENSIONAL DIAGRAMS

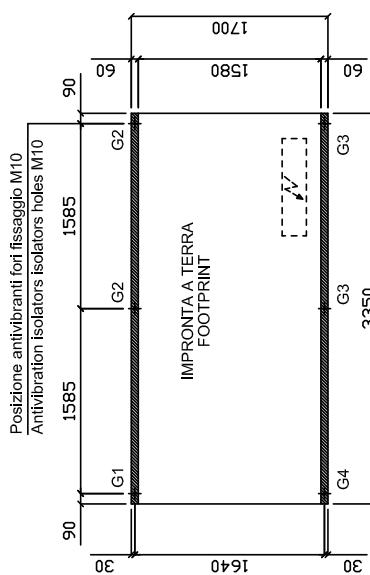
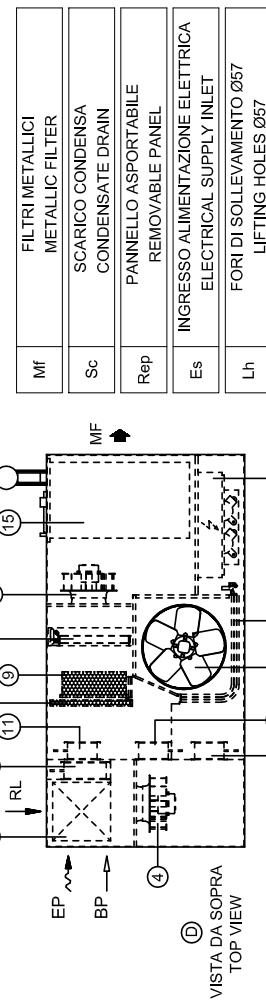
CUBE 1.2 - 2.2 GC4S

C412721-C



DENOMINAZIONE / DENOMINATION

- 1 Batteria condensante / Condensing coil
- 2 Batteria evaporante / Evaporating coil
- 3 Ventilatore di manda / Discharge fan
- 4 Ventilatore di ripresa / Intake fan
- 5 Ventilatore condensante / Condensing fan
- 6 Compressore / Compressor
- 7 Quadro elettrico / Electrical panel
- 8 Filtro aria EU4 / EU4 air filter
- 9 Filtro aria EU7 / EU7 air filter (Optional)
- 10 Serrianda aria di ricircolo / Recycle air damper
- 11 Serrianda aria esterna / External air Damper
- 12 Serrianda aria espulsione / Expulsion air damper
- 13 Serrianda di by-pass / By-pass damper
- 14 Recuperatore / Recuperator
- 15 Generatore aria calda / Hot air generator

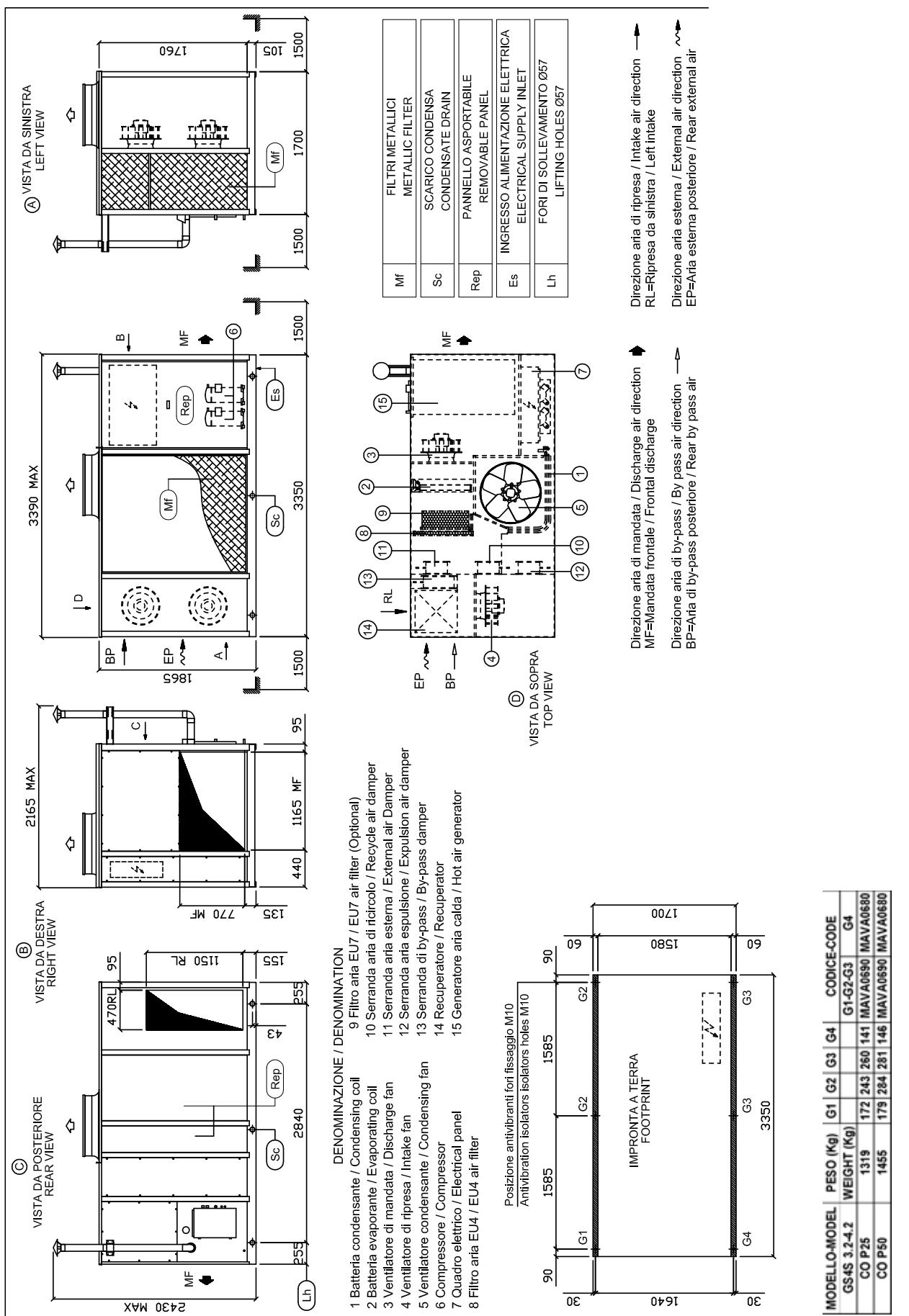


MODELLO / MODEL	PESO (Kg) / WEIGHT (Kg)	G1	G2	G3	G4	CODICE / CODE
GS4S 1.2-2.2						
CO P26	1097	136	201	223	113	MAVA0680 MAVAG690
CO P50	1207	143	232	241	118	MAVA0680 MAVAG690

DIMENSIONAL DIAGRAMS

CUBE 3.2 - 4.2 GC4S

C412726-C





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