MITSUBISHI ELECTRIC
HYDRONICS & IT COOLING SYSTEMS S.p.A.

Data Book

T_wAVS_1119_EN

w-AV S

7-234 kW

Air conditioners for IT Cooling for chilled water feeding.

The picture of the unit is indicative and may vary depending on the model

- **Perimeter installation**
- **Variable air flow and water flow**
- **Air delivery from the bottom or from the top**
- **Plug fans with EC electric motor**
- **2-way chilled water valve**
- **Air suction temperature up to 45°C**

INDEX

CERTIFICATIONS

SYSTEM CERTIFICATIONS

ISO 9001 CERTIFICATION
Quality Management System

ISO 14001 CERTIFICATION
Environmental Management System

BS OHSAS 18001 CERTIFICATION
Occupational Health and Safety Management System

PRODUCT CERTIFICATIONS BY COUNTRY

CE MARKING

CCC – CQC CERTIFICATION
(People's Republic of China)

EAC CERTIFICATION
(Russian Federation, Belarus, Kazakhstan)

GENERAL CHARACTERISTICS

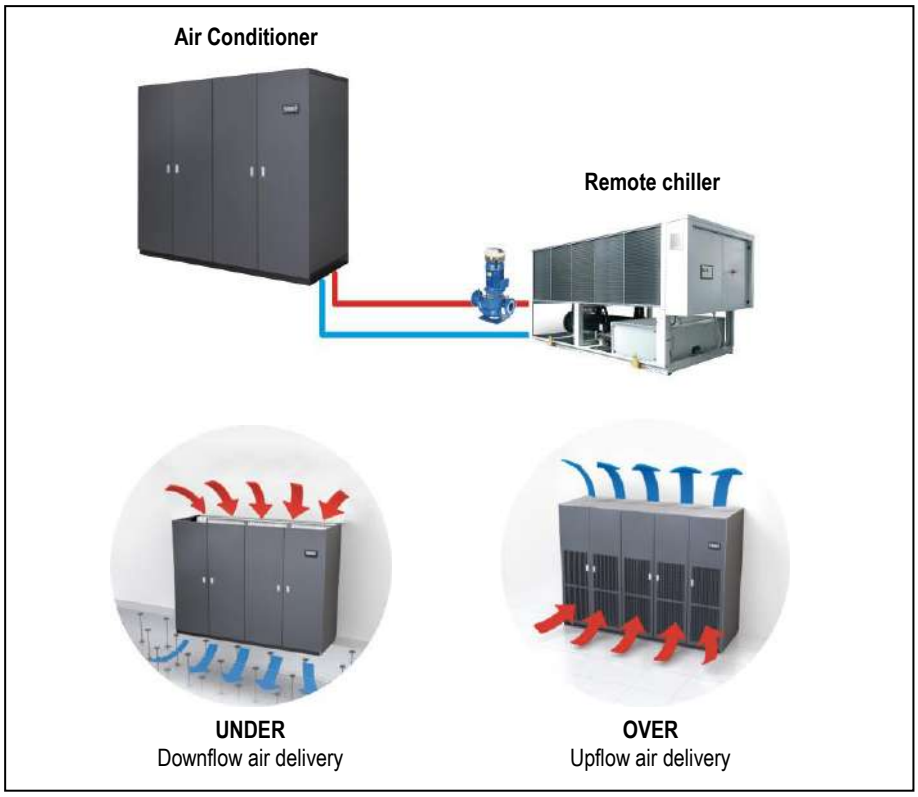
UNDER
Downflow air delivery

OVER
Upflow air delivery

Air conditioners for IT Cooling with variable air flow, for chilled water feeding.
This series is offered in 13 models, available in the following versions:

- Air intake from the front through honeycomb grille and air delivery from the top of the unit (Over).
- Air intake from the top and air delivery from the bottom of the unit (Under). For unit size E0 air intake from the front through honeycomb grille and air delivery from the bottom.

Cooling capacity: 7 ÷ 234 kW



The machines are made for indoor installation.

The constructive solutions and the internal lay-out allow high application flexibility and the frontal access to the main components for the inspection and routine maintenance.

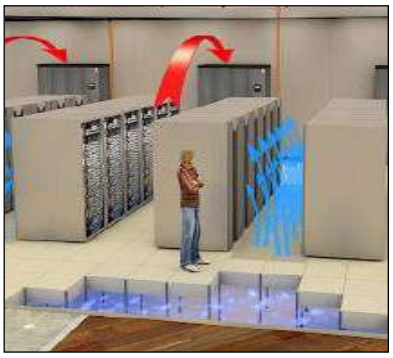
The installation requires electrical and hydraulic connections.

Final assembly on all machines before shipment including running test, reading and monitoring of operating parameters, alarms simulation and visual check.

PRODUCT FEATURES AND BENEFITS

- Wider range and performance increasing
- SHR ratio compared to the previous series, up to 0,95;
- Optimization of the hydraulic circuit;
- New plug fans with EC electric motors with impeller in composite material, which guarantees a reduction of power consumption
- New fans electric motor that do not require maintenance;
- Improvement of the control software with advanced control logic;
- Increased cooling density, up to 65,2 kW per m^2;
- Total front access for the routine maintenance;
- Panels fully removable to facilitate the operations of extraordinary maintenance;

INSTALLATION



DOWNFLOW VERSION (Under)
Typical installation is on the perimeter.
The units are placed along the perimeter of the data center. Air suction from the top of the unit and air delivery in the underfloor void.
The air distribution is achieved by special tiles placed in front of the racks row, forming cold aisle for air diffusion. On the rear of the racks is expelled the hot air (hot aisle) then aspirated by the unit.
For an optimal installation is advisable to provide the cold aisle containment.

Some solutions provide a service corridor around the server rooms where to place the units. In this case it is necessary to provide the air intake plenum for each unit. With this solution all the space in the Data Center is available for the installation of racks.

UPFLOW VERSION (Over)
The type of installation is practically similar to the previous. The only difference is that for the air distribution in the Data Center is not used the raised floor but ducts in the ceiling.

OPTIONAL
An extensive list of accessories allows the unit to adapt effectively to the real needs of the system, reducing the time and cost of installation.

MODEL IDENTIFICATION

Air conditioners for IT Cooling for chilled water feeding
model: w-AV S O 072 E5

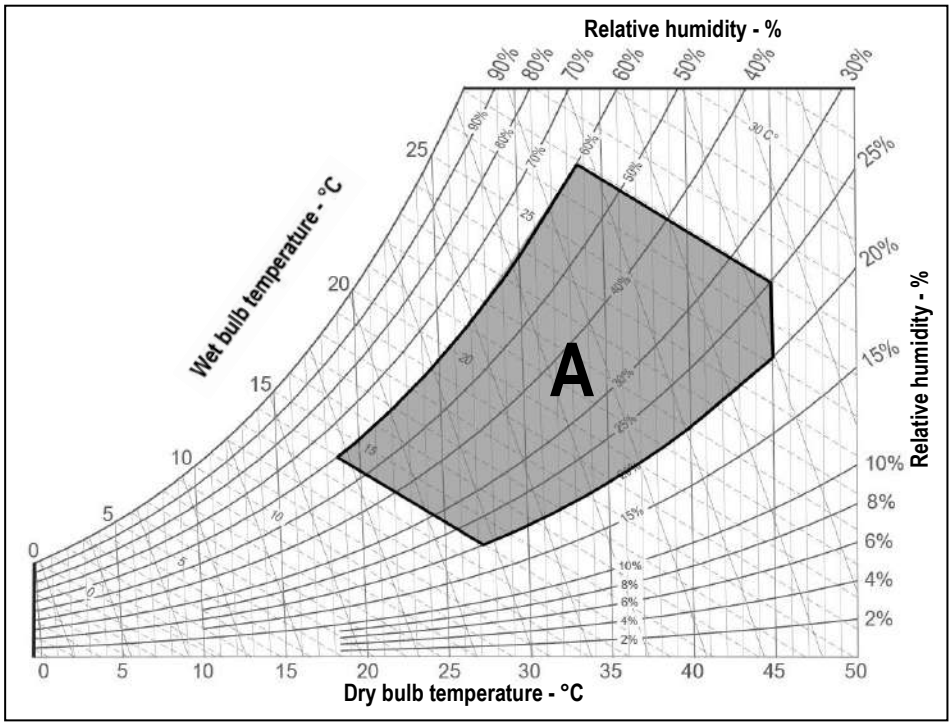
w-AV S	**Series**
O	**Air delivery** O = over – upflow air delivery U = under – downflow air delivery
072	**Model / Cooling capacity (kW) at nominal conditions**
E5	**Size**

THE RANGE

UNDER

OVER

WORKING LIMITS



ROOM AIR CONDITIONS
Room air temperature:

14°C	minimum temperature with wet bulb.
27°C	maximum temperature with wet bulb.
18°C	minimum temperature with dry bulb.
45°C	maximum temperature with dry bulb.

AREA "A". Machine operating envelope.

Room air humidity:

20%RH	minimum relative humidity.
60%RH	maximum relative humidity.

CHILLED WATER TEMPERATURE

6°C	Minimum chilled water inlet temperature
25°C	Maximum chilled water inlet temperature
ΔT 3°C	Minimum temperature difference between chilled water inlet and outlet
ΔT 10°C	Maximum temperature difference between chilled water inlet and outlet

HYDRAULIC CIRCUIT

ΔP 5-150kPa	Pressure drop range of the hydraulic circuit.
10 Bar	Maximum working pressure of the hydraulic circuit

POWER SUPPLY

± 10%	Maximum tolerance of the supply voltage (V)
± 2%	Maximum unbalancing of the phases.

TRANSPORT AND STORAGE TEMPERATURE

During transport and if the machine is not installed at the reception, do not remove the packaging and place the machine in an enclosed, dry and protected from sunlight site at temperatures ranging between -30°C and 50°C in absence of superficial condensation.

MAIN COMPONENTS

FRAMEWORK

- Base in aluminium extrusion, painted with epoxy powders. Colour RAL 9005;
- Frame in aluminium profile, painted with epoxy powders. The inner frame is provided with seals for the panels. Colour RAL 9005;
- Panels in galvanized steel sheet with protective surfaces treatment in compliance with UNI ISO 9227/ASTMB117 and ISO 7253, and painted with epoxy powders. Colour RAL 7016 hammered;
- Panels insulated with polyurethane foam and seals to ensure air tight.
- Hinged front panels with quick release removal system.
- Total front access for routine maintenance.
- Removable lateral and back side panels.
- Air flow OVER version:
  - Air intake from the front through honeycomb type grille and air delivery from the top.
- Air flow UNDER version:
  Machine size E0:
  - Air intake from the front through honeycomb type grille and air delivery from the bottom.
  Machine size E1, E2, E3, E3P, E4, E5, E6, E7, E8, E9, E10:
  - Air intake from the top and air delivery from the bottom.
- Compartment for electrical panel on unit front for direct access to control and regulation devices;

FILTER SECTION

- Size E0:
  - Washable air filters with COARSE 40% efficiency (according to ISO EN 16890), with cells in synthetic fibre and metallic frame.
- Size E1, E2, E3, E3P, E4, E5, E6, E7, E8, E9, E10:
  - Washable air filters with COARSE 60% efficiency (according to ISO EN 16890), with cells in synthetic fibre and metallic frame.
- Air filters access:
  OVER version
  - Frontal access for all machines
  UNDER version
  - For machines size E0 - E1 – E2 – E3 frontal access
  - For machine size E3P - E4 – E5 – E6 – E7 – E8 – E9 – E10 access from upper side

COOLING SECTION

- Heat exchanger coil with internally corrugated copper tubes and high efficiency aluminium fins, specifically developed to provide high heat transfer and lower pressure drops.
- Finned pack with hydrophilic treatment that assure the condensate water drop, high thermal conductivity and does not favour the growth of micro-organisms.
- 2-way motorized valve for water flow regulation with 0÷10 VDC control actuator and emergency manual control.
- Frame in galvanized steel.
- Condensate tray in peraluman with PVC flexible discharge pipe.
- Temperature sensor on air intake with function of temperature display.
- Temperature sensor on air delivery with function of control and regulation.
- Temperature probe on chilled water inlet.

FANS SECTION

The fan section is contained within the machine and includes:

- Centrifugal fans with backward curved blades with wing profile, single suction and without scroll housings (Plug-fans), directly coupled to external rotor electric motor.
  - Impeller in composite material exempt from rust formation.
  - Brushless type synchronous EC motor with integrated electronic commutated system and continuous variation of the rotation speed. The motor rotation control is obtained with the EC system (Electronic Commutation) that manage the motor according to the signal coming from the microprocessor control.
- Fans control through ModBus. In case of failure, the control stops the interested fan indicating the type of fault. The machine with more than one fan is not stopped.
- Adjustable External Static Pressure (ESP).
- Fan guard with rubber support (UNDER version)

ELECTRICAL PANEL

In accordance with EN60204-1 norms, suitable for indoor installation, complete with:

- Main switch with door lock safety on frontal panel;
- Magnetothermic switches for supply fans.
  The supply fans equipped with EC electric motor and don't require contactors.
- Transformer for auxiliary circuit and microprocessor supply.
- Numbered wirings.
- Terminals:
  OUTLETS
  - Voltage free deviating contact for General Alarm 1-2.
  - Voltage free contact for supply fans status.
  - Voltage free contact for smoke / fire sensor (the sensors are accessory)

  INLETS
  - External enabling.
- Power supply 230/1/50 for size E0; 400/3+N/50 for size from E1 to E10, both included.

CONTROL SYSTEM

Microprocessor control system with graphic display for control and monitor of operating and alarms status.
The system includes:

- Built-in clock for alarms date and time displaying and storing;
- Built-in memory for the storing of the intervened events (up to 200 events recorded);
- Predisposition for additional connectivity board housing (MODBUS, LON, BACNET MS/TP RS485, BACNET OVER IP). The electronic cards are optional accessories.
- Main components hour-meter;
- Non-volatile "Flash" memory for data storage in case of power supply faulty;
- Menu with protection password;
- LAN connection (max 10 units).

OPTIONAL ACCESSORIES

The descriptions of these additional components can be found in Chapter OPTIONAL ACCESSORIES.

P121 ..... **Front air intake + bottom panel**. Unit base noise insulation with special bottom panel for OVER version (size E0 excluded). Restriction: Non-compatible with "P122 Bottom air intake + blind panels" for OVER version.

P122 ..... **Bottom air intake + blind panels.** Blind frontal panel for OVER version (size E0 excluded). The accessory allows the intake air from the bottom of the machine. Restriction: Not compatible with "P121 Front air intake + bottom panel" for OVER version

A548 ..... **Constant prevalence**. Automatic system for the air pressure control in the underfloor (Under version) or in the duct (Over version). The system controls the supply fans rotation speed in order to keep constant the air pressure in the underfloor/duct via a differential pressure transmitter connected to the microprocessor control.

P091 ..... **Back-up module controller.** The system guarantees the microprocessor power supply for a few minutes, in case of supply voltage failure.

383 ..... **Numbered wirings + UK requests.** Size E0 excluded.

4181 / 4182 / 4184 / 4185 ... **Serial cards**:
4181 – Serial card MODBUS;
4182 – Serial card LON;
4184 – Serial card BACNET MS/TP RS485;
4185 – Serial card BACNET OVER IP.

A491 ..... **Water leakage detector.** Supplied in mounting kit.

A492 ..... **Water leakage detector + additional sensor**. Supplied in mounting kit.

A501 ..... **Clogged filter sensor.** Differential pressure switch on the air side for clogged filters alarm signal.

A511 ..... **Smoke detector.** Supplied in mounting kit.

A521 ..... **Fire detector.** Supplied in mounting kit.

A822 ..... **ADAPTIVE SET POINT:** function that optimizes the operation of liquid chillers connected to the indoor air conditioners by control of the effective room thermal load.

P141 ..... **Analogue set-point compensation**. Analogue set point compensation according to an external analogue signal at Customer care (size E0 excluded).

A842 ..... **Network analyser.** Size E0 excluded. Multifunction utility for calculating and displaying the machine electrical measurements.

A812 (1) ..... **Free-cooling direct control.** Size E0 excluded.

A663 ..... **3-way 0-10V modulating water valve**. For size E0 only. 3-way motorized valve with 0÷10 VDC control actuator and emergency manual control for the third way (by-pass) of the chilled water hydraulic circuit. The valve is in substitution of the main water flow control valve.

P021 ..... **2-way ball by-pass valve.** Size E0 excluded. 2-way modulating motorized valve with 0÷10 VDC control actuator and emergency manual control for the third way (by-pass) of the chilled water hydraulic circuit. The valve is in combination with the main water flow control valve.

P131 ..... **Hot water coil + 2-way valve.** Hot water heating system (size E0, E10 excluded).

A431 ..... **Electric heater.** Heating with electric heaters.

A432 ..... **Extra power electric heater.** Size E0, E1, E2 excluded.

4301 / 4303 / 4305 (2) ..... **Humidification**: Modulating steam humidifier with immersed electrodes with electronic control.
4301 - Steam humidifier 3kg/h
4303 - Steam humidifier 8kg/h
4305 - Steam humidifier 15kg/h

P051 (3) ..... **Dehumidification function**.

A791 ..... **Air temperature control on suction air.**

P161 ..... **T/rH air intake sensor.** Combined Temperature / Humidity sensor on air intake. The optional replace the standard temperature sensor on machine air intake.

4666 ..... **External air probe.** External air temperature probe.

P071 ..... **Remote T/rH probe.** Combined Temperature / Humidity sensor for remote installation. The optional is added to the standard temperature sensor on machine air intake.

P111 / P112 / P113 / P114 . **Dual power supply**. Size E0 excluded. Dual power supply with automatic change-over.
P111 - Dual power supply.
P112 - Dual power supply + optional.
P113 - Dual power supply kit.
P114 - Dual power supply kit + optional.

A381 ..... **Drain pump.** Supplied in mounting kit. The system includes pump with activation float and 10 linear meters long discharge pipe.

P084 ..... **Air filter ePM$_{10}$ 50%**. Washable high efficiency air filter (according to ISO EN 16890) – size E0 excluded. Not compatible with "P017 / P018 / P019 Plenum + filter ePM$_{2.5}$ 50%, ePM$_1$ 50%, ePM$_1$ 85% (according to ISO EN 16890)".

A531 (4) ..... **On-off damper**. Non-return air damper with frame driven by electric servomotor installed on the machine air delivery (size E0 excluded).

P011 ..... **Empty plenum** (size E0 excluded).

P012 ..... **Empty plenum CL.A1**. Plenum with fire reaction in class "0" or "A1". (size E0 excluded).

P013 ..... **Plenum + 3 grilles** on three sides with double adjustable row.

P014 ..... **Plenum + 3 grilles CL.A1.** Plenum with grilles on three sides with double adjustable row, with fire reaction in class "0" or "A1".

P015 ..... **Silenced plenum**. – size E0 excluded. Not compatible with "P084 Air filter ePM$_{10}$ 50%".

P016 ..... **Silenced plenum + 1 grille**. Grille with double adjustable row on front side and sound absorbers (size E0 excluded).

P017 ..... **Plenum + filter ePM$_{2,5}$ 50%**. Plenum with high efficiency air filter (according to ISO EN 16890) – size E0 excluded. Not compatible with "P084 Air filter ePM$_{10}$ 50%".

P018 ..... **Plenum + filter ePM$_1$ 50%**. Plenum with high efficiency air filter (according to ISO EN 16890) – size E0 excluded. Not compatible with "P084 Air filter ePM$_{10}$ 50%".

P019 ..... **Plenum + filter ePM$_1$ 85%**. Plenum with high efficiency air filter (according to ISO EN 16890) – size E0 excluded. Not compatible with "P084 Air filter ePM$_{10}$ 50%.

P031 (5) ..... **Empty intake plenum**. (size E0 excluded).

P032 (5) ..... **Empty intake plenum CL.A1**. Plenum with fire reaction in class "0" or "A1". (size E0 excluded).

P034 (6) ..... **Intake free-cooling plenum.** Size E0 excluded.

P041 / P042 / P043 ..... **Support frame** with height adjusting rubber holders. Supplied in mounting kit. It is not possible to match the support frame with plenum installed under the machine.
P041 – Support frame h 255-350mm
P042 – Support frame h 355-450mm
P043 – Support frame h 400-510mm

A272 ..... **CL. 0 or A1 (EN 13501-1) insulation:** Panelling with fire reaction in class "0" or "A1;

P151 ..... **Lowered display for Under** – for UNDER units equipped with plenum under the unit; (size E0 excluded).

9973 ..... **Wooden cage packing.** The machines are delivered on wooden pallet, covered with shrink wrap and packaged in wooden cage.

BQ39900001 ..... **Remote terminal.** Graphic display for remote installation, the optional is added to the standard graphic display placed on machine frontal panel.

WARNING
The Manufacturers reserves the right to accept the matching of the optional installed on the machine.

MANDATORY COMBINATIONS OF ACCESSORIES

1. When optional accessory “A812 Free cooling direct control” is present, it requires mandatory accessories “P161 T/rH air intake sensor“ and “4666 External air probe”.
2. When optional accessories “4301 / 4303 / 4305 Steam humidifier” are present, they require mandatory accessory “P161 T/rH air intake sensor“.
3. When optional accessory “P051 Dehumidification function” is present, it requires mandatory accessory “P161 T/rH air intake sensor“.
4. When optional accessory “A531 On-off damper” is present, it requires mandatory accessory “9973 Wooden cage packing”.
5. When optional accessories “P031 Empty intake plenum, for OVER version” and “P032 Empty intake plenum CL.A1, for OVER version” are present, they require mandatory accessory “P122 Bottom air intake+blind panels, for OVER version only”
6. When optional accessory “P034 Intake free-cooling plenum” is present, it requires mandatory accessories “P161 T/rH air intake sensor“, “4666 External air probe”, “A812 Free-cooling direct control” and “P122 Bottom air intake+blind panels, for OVER version only”

TECHNICAL DATA

VERSION (1)		U / O	U / O	U / O	U / O	U / O	U / O
MODEL		007	013	021	032	045	053
SIZE		E0	E1	E2	E3	E3P	E4
COOLING CAPACITY (2)							
Total	kW	7,03	13,6	21,4	32,1	45,5	53,5
Sensible	kW	5,82	11,9	19,4	29,9	42,1	49,8
SHR (3)		0,83	0,88	0,91	0,93	0,93	0,93
"EC" SUPPLY FANS	n.	1	1	1	1	1	1
Air flow	m^3/h	1800	2900	4920	7800	10800	13100
Nominal external static pressure	Pa	20	20	20	20	20	20
Maximum external static pressure	Pa	82	75	101	471	297	194
Fans power input (4)	kW	0,12	0,37	0,88	1,66	2,20	2,15
COOLING COIL							
Water flow rate (2)	m^3/h	1,22	2,34	3,67	5,54	7,84	9,21
dP coil + valve (2)	kPa	29,4	23,3	57,3	49,3	41,5	45,6
Water volume	l	2,2	4,2	5,3	7,8	11,4	13,8
AIR FILTERS	n.	1	1	1	2	2	3
Filter area	m^2	0,28	0,61	0,78	1,24	1,71	2,07
Efficiency (ISO EN 16890)	COARSE	40%	60%	60%	60%	60%	60%
POWER SUPPLY	V/Ph/Hz	230/1/50	400/3+N/50	400/3+N/50	400/3+N/50	400/3+N/50	400/3+N/50
ENERGY EFFICIENCY INDEX (2)							
EER Energy Efficiency Ratio	kW/kW	58,6	36,8	24,3	19,3	20,7	24,9
DIMENSIONS							
Length	mm	655	650	785	1085	1085	1305
Width	mm	445	675	675	775	930	930
Height	mm	1680	1925	1925	1925	1925	1980
NET WEIGHT OVER	kg	150	203	239	302	321	345
NET WEIGHT UNDER	kg	150	216	257	325	329	379
HYDRAULIC CONNECTIONS							
WATER INLET / OUTLET ISO 7/1 - R	Ø	3/4"	1"	1"	1+1/4"	1+1/4"	1+1/2"
CONDENSATE DISCHARGE							
Rubber pipe – internal diameter	Ø mm	19	19	19	19	19	19

THE COOLING CAPACITY DOES NOT CONSIDER THE SUPPLY FAN MOTOR THERMAL LOAD

1. U = Under, downflow / O = Over, upflow
2. Gross value. Characteristics referred to entering air at 24°C-50%RH with chilled water temperature 7-12°C - 0% glycol. ESP=20Pa.
3. SHR = Sensible cooling capacity / Total cooling capacity.
4. Corresponding to the nominal external static pressure.

TECHNICAL DATA

VERSION (1)		U / O	U / O	U / O	U / O	U / O
MODEL		072	081	100	120	138
SIZE		E5	E6	E7	E8	E9
COOLING CAPACITY (2)						
Total	kW	78,8	81,7	101	128	140
Sensible	kW	67,7	76,1	94	114	130
SHR (3)		0,87	0,93	0,93	0,89	0,93
"EC" SUPPLY FANS	n.	2	2	2	3	3
Air flow	m^3/h	16350	20000	24200	28300	33100
Nominal external static pressure	Pa	20	20	20	20	20
Maximum external static pressure	Pa	532	458	247	237	309
Fans power input (4)	kW	2,90	3,47	3,98	6,22	6,42
COOLING COIL						
Water flow rate (2)	m^3/h	13,57	14,07	17,42	21,96	24,04
dP coil + valve (2)	kPa	59,6	43,4	38,1	62,6	56,9
Water volume	l	18,1	21,2	24,6	28,5	33,8
AIR FILTERS	n.	3	4	4	5	6
Filter area	m^2	2,59	3,16	3,83	4,47	5,24
Efficiency (ISO EN 16890)	COARSE	60%	60%	60%	60%	60%
POWER SUPPLY	V/Ph/Hz	400/3+N/50	400/3+N/50	400/3+N/50	400/3+N/50	400/3+N/50
ENERGY EFFICIENCY INDEX (2)						
EER Energy Efficiency Ratio	kW/kW	27,2	23,5	25,4	20,6	21,8
DIMENSIONS						
Length	mm	1630	1875	2175	2499	2899
Width	mm	930	930	930	930	930
Height	mm	1980	1980	1980	1980	1980
NET WEIGHT OVER	kg	428	483	535	598	679
NET WEIGHT UNDER	kg	470	531	589	660	753
HYDRAULIC CONNECTIONS						
WATER INLET / OUTLET ISO 7/1 - R	Ø	2"	2"	2+1/2"	2+1/2"	3"
CONDENSATE DISCHARGE						
Rubber pipe – internal diameter	Ø mm	19	19	19	19	19

THE COOLING CAPACITY DOES NOT CONSIDER THE SUPPLY FAN MOTOR THERMAL LOAD

1. U = Under, downflow / O = Over, upflow
2. Gross value. Characteristics referred to entering air at 24°C-50%RH with chilled water temperature 7-12°C - 0% glycol. ESP=20Pa.
3. SHR = Sensible cooling capacity / Total cooling capacity.
4. Corresponding to the nominal external static pressure.

TECHNICAL DATA

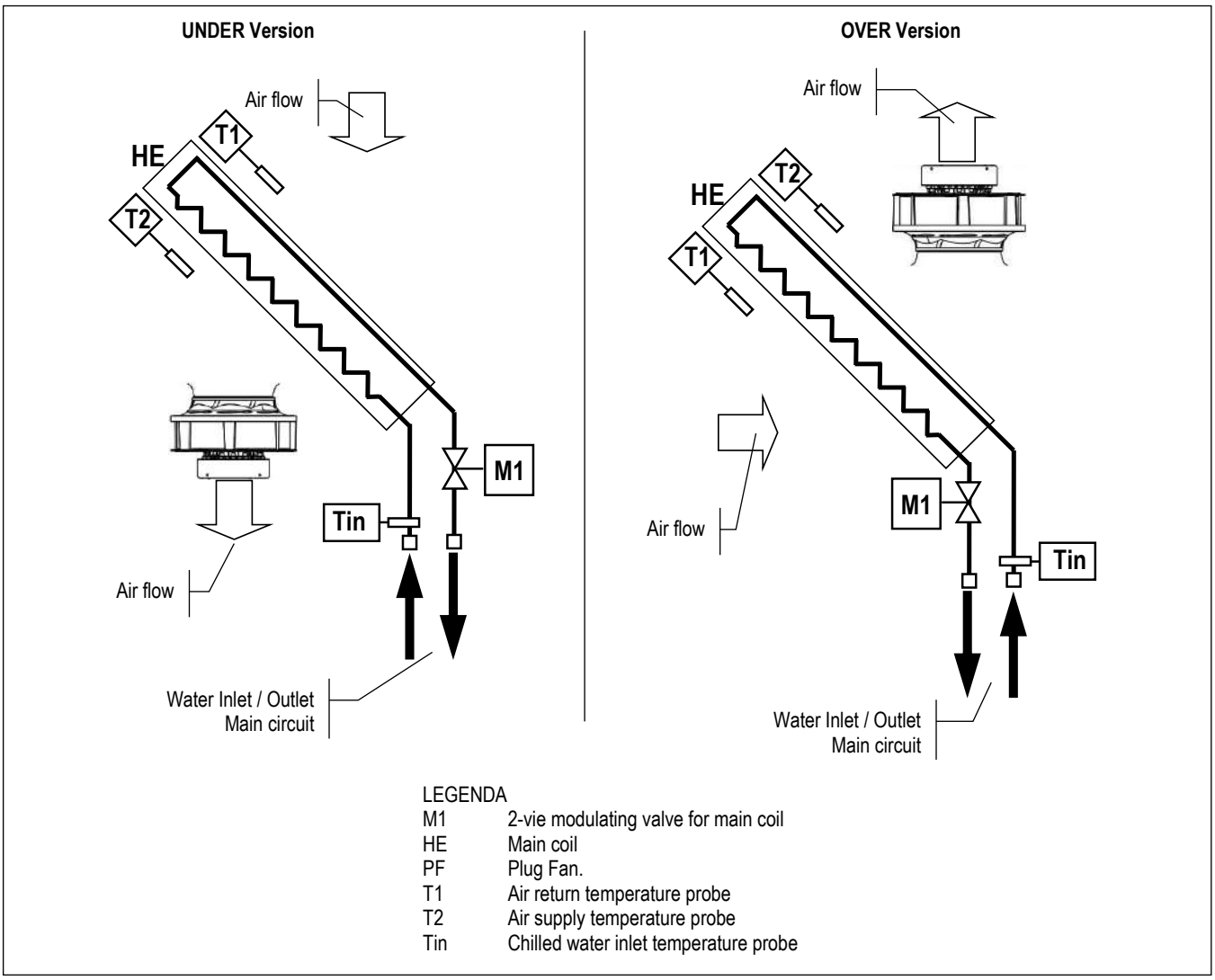
VERSION (1)		**U**	**U**
MODEL		**160**	**215**
SIZE		**E10**	**E10**
COOLING CAPACITY (2)			
Total	kW	**171**	**234**
Sensible	kW	**151**	**177**
SHR (3)		0,88	0,76
"EC" SUPPLY FANS	n.	3	3
Air flow	m^3/h	37150	37150
Nominal external static pressure	Pa	20	20
Maximum external static pressure	Pa	207	207
Fans power input (4)	kW	6,44	6,44
COOLING COIL			
Water flow rate (2)	m^3/h	29,48	40,32
dP coil + valve (2)	kPa	89,1	79,7
Water volume	l	44	66
AIR FILTERS	n.	6	6
Filter area	m^2	6,54	6,54
Efficiency (ISO EN 16890)	COARSE	60%	60%
POWER SUPPLY	V/Ph/Hz	400/3+N/50	400/3+N/50
ENERGY EFFICIENCY INDEX (2)			
EER Energy Efficiency Ratio	kW/kW	26,6	36,3
DIMENSIONS			
Length	mm	3510	3510
Width	mm	930	930
Height	mm	1980	1980
NET WEIGHT OVER	kg	-	-
NET WEIGHT UNDER	kg	900	970
HYDRAULIC CONNECTIONS			
WATER INLET / OUTLET ISO 7/1 - R	Ø	3”	3”
CONDENSATE DISCHARGE			
Rubber pipe – internal diameter	Ø mm	19	19

THE COOLING CAPACITY DOES NOT CONSIDER THE SUPPLY FAN MOTOR THERMAL LOAD

1. U = Under, downflow / O = Over, upflow
2. Gross value. Characteristics referred to entering air at 24°C-50%RH with chilled water temperature 7-12°C - 0% glycol. ESP=20Pa.
3. SHR = Sensible cooling capacity / Total cooling capacity.
4. Corresponding to the nominal external static pressure.

HYDRAULIC DIAGRAM

Below hydraulic diagram referred to the standard configuration without optional.



LEGENDA

M1	2-vie modulating valve for main coil
HE	Main coil
PF	Plug Fan.
T1	Air return temperature probe
T2	Air supply temperature probe
Tin	Chilled water inlet temperature probe

2-WAY BALL VALVE FOR CHILLED WATER FLOW CONTROL

The water flow control in the finned coil is acieved through a **2-way modulating ball valve with equal percentage flow control** ensured by the integrated characterizing disc.

This type of valve offers the following series of benefits:

- Equal percentage flow control.
- No peaks initial flow.
- Excellent stability control thanks to the integrated characterizing disc.
- Excellent characteristic in partialisation.
- Stability in control.
- Maintenance free.
- Self-cleaning.

CHARACTERISTICS OF THE 2-WAY BALL VALVE

- Closing seal with leakage rate in Class A (EN 12266-1)
- Maximum fluid pressure Ps=1600kPa
- Maximum closing pressure (Close-off) ΔPs=1400kPa

The rotative actuator is controlled by a signal 0 … 10VDC from the microprocessor controller. The actuator is equipped with an emergency button for manual operation and is maintenance-free.

ACOUSTIC DATA

Acoustic data of the standard machine at full load working conditions.

WARNING:
In a closed room the noise produced by a sound source reaches the listener in two different ways:

- Directly
- Reflected from the surrounding walls, floor, ceiling, from furniture.

With the same sound source, the noise produced in a closed room is greater than that produced outdoors. In fact, the sound pressure level generated by the source, must be added to the one reflected from the room. Also, the shape of the room affects the sound.

VERSION (1)		U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U	U
MODEL		007	013	021	032	045	053	072	081	100	120	138	160	215
SIZE		E0	E1	E2	E3	E3P	E4	E5	E6	E7	E8	E9	E10	E10
SOUND LEVEL (2)														
On air delivery Under	dB(A)	62,9	65,5	75,2	76,0	78,8	79,1	79,7	80,2	80,7	84,5	84,1	83,0	83,0
On air intake Under	dB(A)	50,1	56,0	60,9	61,9	66,2	66,5	65,5	67,5	68,0	70,4	71,5	70,3	70,3
On front side Under	dB(A)	43	47	51	52	57	57	56	58	59	61	62	61	61
On air delivery Over	dB(A)	62,9	65,5	75,2	76,0	78,8	79,1	79,7	80,2	80,7	84,5	80,7	--	--
On air intake Over (3)	dB(A)	50	51	55	56	61	61	60	62	63	65	63	--	--
On front side Over (4)	dB(A)	43,4	46,8	51,4	52,3	56,7	57,1	55,9	58,1	58,6	60,8	58,6	--	--

1. U = Under, mandata aria verso il basso / O = Over, mandata aria verso l'alto
2. Noise pressure level at 1 meter in free field – ISO 3744
3. Air intake from the front
4. Air intake from the bottom

ELECTRICAL DATA

VERSION (1)		U / O	U / O	U / O	U / O	U / O	U / O	U / O
MODEL		007	013	021	032	045	053	072
SIZE		E0	E1	E2	E3	E3P	E4	E5
Power supply	V/Ph/Hz	230/1/50	400/3+N/50	400/3+N/50	400/3+N/50	400/3+N/50	400/3+N/50	400/3+N/50
Maximum current input (FLA)	A	1,2	2,10	1,7	4,2	4,43	4,15	8,4

VERSION (1)		U / O	U / O	U / O	U / O	U	U
MODEL		081	100	120	138	160	215
SIZE		E6	E7	E8	E9	E10	E10
Power supply	V/Ph/Hz	400/3+N/50	400/3+N/50	400/3+N/50	400/3+N/50	400/3+N/50	400/3+N/50
Maximum current input (FLA)	A	8,86	8,3	12,6	13,3	12,5	12,5

1. U = Under, downflow / O = Over, upflow

WARNING:
The electric data indicated refer only to the indoor unit.
Optional accessory electric data are included within the dedicated chapters and must be added.
Please refer to ELCA WORLD selection program to calculate the electrical data of the air conditioner according to the requested optional accessories.

WATER QUALITY OF THE HYDRAULIC CIRCUITS

The values shown in the table must be guaranteed during the entire life cycle of the machine.

	Description	Symbol	Range
1	Hydrogen Ions	pH	7.5 ÷ 9
2	Presence of calcium (Ca) and magnesium (Mg)	Hardness	4 ÷ 8.5 °D
3	Chlorine ions	Cl^-	< 150 ppm
4	Iron Ions	Fe^{3+}	< 0.5 ppm
5	Manganese Ions	Mn^{2+}	< 0.05 ppm
6	Carbon dioxide	CO_2	< 10 ppm
7	Hydrogen sulphide	H_2S	< 50 ppb
8	Oxygen	O_2	< 0.1 ppm
9	Chlorine	Cl_2	< 0.5 ppm
10	Ammonia	NH_3	< 0.5 ppm
11	Ratio between carbonates and sulphates	HCO_3-/SO_4^{2-}	> 1
12	Sulphate ions	SO_4^{--}	< 100 ppm
13	Phosphate ions	PO_4^{3-}	< 2.0 ppm

where: 1/1.78°D = 1°Fr with 1°Fr = 10 gr $CaCO_3$ / m^3
ppm = parts for millions
ppb = part for billion

Explanatory notes:

ref.1: A greater concentration of hydrogen ions (pH) than 9 implies a high risk of deposits, whereas a lower pH than 7 implies a high risk of corrosion.
ref.2: The hardness measures the amount of Ca and Mg carbonate dissolved in the water with a temperature lower than 100°C (temporary hardness). A high hardness implies a high risk of deposits.
ref.3: The concentration of chloride ions with higher values than those indicated causes corrosion.
ref. 4 - 5 - 8: The presence of iron and manganese ions and oxygen leads to corrosion.
ref.6 - 7: Carbon dioxide and hydrogen sulphide are impurities that promote corrosion.
ref.9: Usually in water from the waterworks it is a value of between 0.2 and 0.3 ppm. High values cause corrosion.
ref.10: The presence of ammonia reinforces the oxidising power of oxygen
ref.11: Below the value shown in the table, there is a risk of corrosion due to the trigger of galvanic currents between copper and other less noble metals.
ref.12: The presence of sulphates ions triggers corrosion phenomenon.
ref.13: The presence of phosphates ions triggers corrosion phenomenon.

It is necessary to carry out periodic checks, with withdrawals at different points of the hydraulic system. During the first year of operation, checks are recommended every 4 months which can be reduced every 6 months starting from the second year of operation.

WARNING:
Values of the parameters outside the indicated ranges can lead to the formation of deposits and limescale and/or favour corrosive phenomena within the plant. For operating fluids other than water (mixtures of ethylene and propylene glycol) it is recommended to use specific inhibitors, designed to offer thermal stability within the operating temperature range and protection against corrosion. It is necessary that, in the presence of dirty and / or aggressive waters, an intermediate heat exchanger is installed upstream of the heat exchangers.

ANTIFREEZE MIXTURES

In plants that are not adequately protected by heating cables, protect the hydraulic circuit with an anti-freeze mixture when the ambient air temperature can drop below 5°C.

Minimum ambient air temperature	°C	5	0	-5	-10	-15	-20	-25	-30
ETHYLENE GLYCOL (suggested % in weight)	%	0	12	20	30	35	40	45	50

Minimum ambient air temperature	°C	5	2	-3	-9	-13	-17	-23	-29
PROPYLENE GLYCOL (suggested % in weight)	%	0	10	20	30	35	40	45	50

The values are indicative and may significantly vary depending on the glycol manufacturer. Refer to your glycol supplier for detail.
The values consider a precautionary difference of 5°C between the minimum ambient air temperature and the freezing temperature of the mixture.

In the hydraulic circuit do not send fluids other than water or mixtures with ethylene / propylene glycol.
If other products are provided, in addition to mixtures of water and ethylene or propylene glycol, contact the Manufacturer to check the compatibility with the machine components.

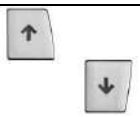
MICROPROCESSOR CONTROL SYSTEM

Controller

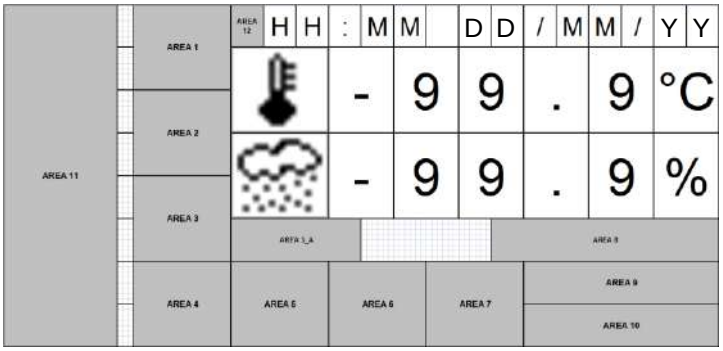
Keyboard and Display

The unit is equipped with the controller connected to a 6 keys keyboard with graphic display on which all information in English language or easily identifiable symbols are displayed.
The controller disposes of a "flash" memory that preserves the information even in absence of power supply. Part of memory is dedicated to the registration of intervened events - up to 200 events.

DISPLAY – KEYBOARD FUNCTIONS

	ALARM	Alarm presence with red light. Push for alarm description. In case of more alarms scroll by UP / DOWN.
	PRG	Menu list, scrolled by UP/DOWN: **Unit; Set-point; In/Out; Clock; History; User; Service; Factory.** ENTER to execute.
	ESC	Home. Used to come back to the previous menu level or to the main screen.
	UP DOWN	Changes pages and values of sets. By pressing in HOME mask, the synoptic of the main controls is displayed.
	ENTER	Moving the cursor on adjustable Program(s) fields to confirm the changes. Press ENTER to get out the fields.

DISPLAY - MAIN MASK

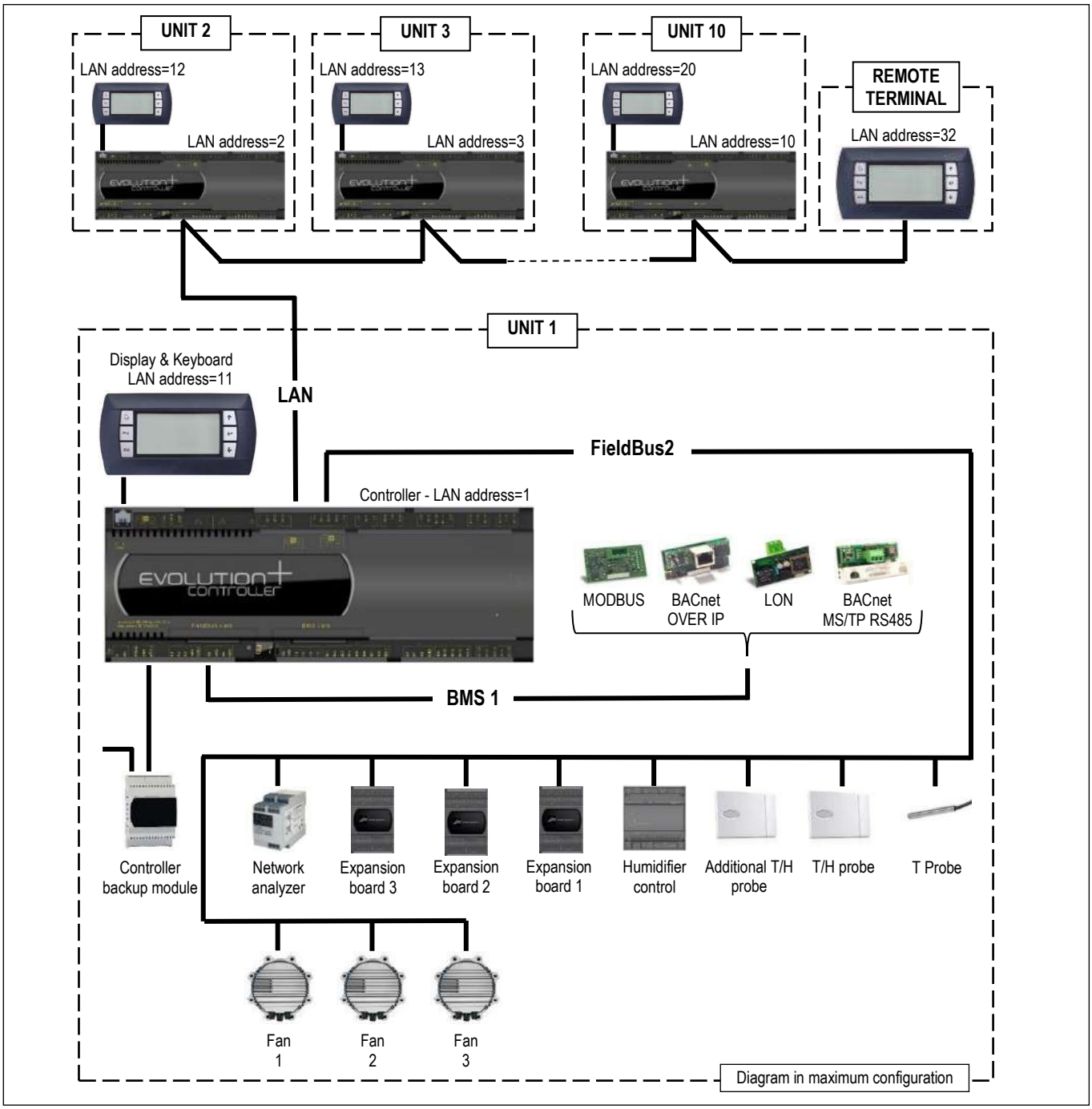


The main mask shows time, date, room temperature and humidity values (if the relative probe is present) and areas for displaying operating and alarm status with dedicated icons:

Area 1: Status of the unit: on / off
Area 2: Status detail
Area 3: Type of event (only in case of an event)
Area 3_A: Code and type of event
Area 4: Active cooling devices
Area 5: Active free-cooling devices
Area 6: Active humidity devices
Area 7: Active heating devices
Area 8: on / off parameters
Area 9: BMS address
Area 10: LAN address
Area 11: Schematic representation of units
Area 12: Active function presence icon

CONNECTIVITY
Through the optional serial port, the microprocessor control enables communication with the modern buildings BMS systems with the following protocols: MODBUS; LON; BACNET MS/TP RS485; BACNET OVER IP.

PASSWORD
Level 1: On request of the End User. Allowing to reach USER menu
Level 2: Asks to Service: Allowing to reach SERVICE menu
Level 3: Asks to Service: Allowing to reach FACTORY menu
No passwords request to enter: UNIT, SETPOINT, IN/OUT, CLOCK, HISTORY menu



LAN NETWORK

The LAN is part of the control software and it is possible to connect up to 10 units.
This type of connection allows to control the units in coherent way, moreover the units can be controlled and managed from a shared remote terminal.

LAN ADDRESS LIST

Unit #	1	2	3	4	5	6	7	8	9	10	Remote Terminal
Mother board address	1	2	3	4	5	6	7	8	9	10	--
Terminal address	11	12	13	14	15	16	17	18	19	20	32

The unit connection to the local network (LAN) allows to perform the following functions:

- Balancing the operating hours among the different units by rotating the reserve units (Stand-by)
- Turning on the reserve units in case other units should turn off due to an alarm, maintenance or power feed interruption
- Turning on reserve units to offset the excessive thermal load
- Checking up to 10 units with a single user terminal (shared user terminal)

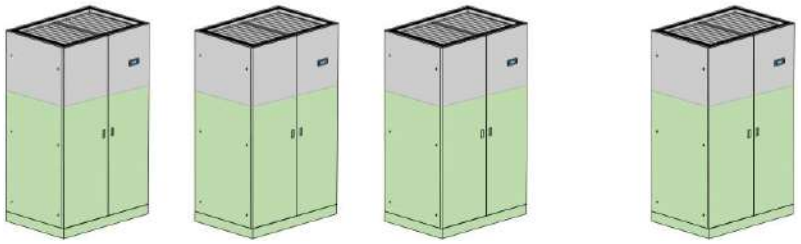
ACTIVE REDUNDANCY

Chilled water units, thanks to its electronically commutated EC fans, 2-way motorized valves for chilled water flow control and an advanced algorithm to balance the heat loads among the units (including the units in stand-by), achieve an ACTIVE REDUNDANCY combining reliability, efficiency and reduced Total Cost of Ownership.

PASSIVE REDUNDANCY

3 units **ON_100%**	1 units **OFF_Stand-by**

ACTIVE REDUNDANCY



4 units **ON_75%**

TEMPERATURE PROBE ON AIR SUCTION / DELIVERY

Temperature probe installed on the air suction and delivery of the unit.
Standard temperature control and regulation are on air delivery.
Is possible to select the optional accessory A791 “Air temperature control on suction air” to realize the temperature control and regulation on suction air.
With following optional accessories temperature control and regulation is exclusively on suction air:

- A431 – Electric heater;
- A432 – Extra power electric heater;
- P131 – Hot water coil+2way valve.

POSSIBLE AIR INTAKE FOR OVER VERSIONS

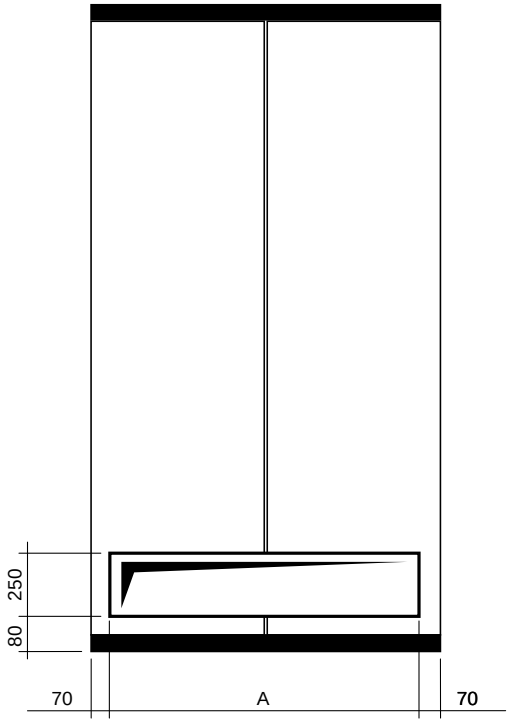
OVER VERSION - AIR INTAKE FROM THE BOTTOM
Thanks to the basement design, it is possible to have the unit air intake from the bottom side.
With this solution, it is necessary to foresee the optional blind frontal panels

OVER VERSION - AIR INTAKE FROM THE BACK SIDE
(Sizes E0, E3P, E4, E5, E6, E7, E8, E9, E10 excluded)
It is possible to have the unit air intake from the back side.
Due to the limited size of the air intake, the air flow is limited to the 20% of the nominal one.
The air intake has to be made by Customer during installation.
In case the air intake is used for fresh air, it is necessary the temperature / humidity probe reposition in front of the heat exchanger, to allow for optimum reading of the values of temperature / humidity.
The electric cable of the probe has sufficient length for the repositioning.

AIR INTAKE FROM THE BACK SIDE

Back side view

VERSION OVER
E1 – E2 – E3



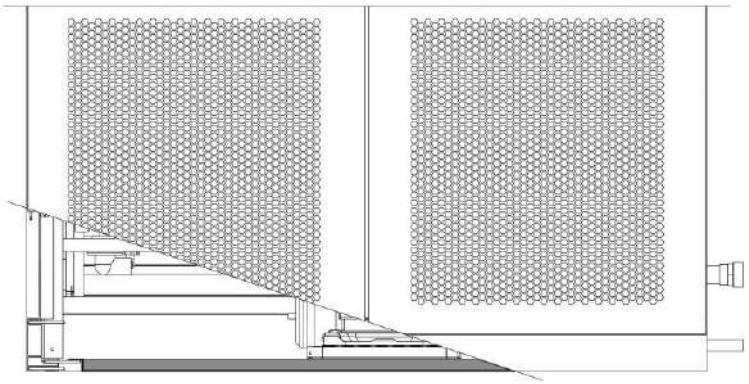
SIZE		E1	E2	E3
A	mm	510	645	945
Max air flow	m^3/h	600	1000	1500

OPTIONAL ACCESSORIES: P121 – FRONT AIR INTAKE + BOTTOM PANEL

Available for OVER units (size E0 excluded).
The optional is not compatible with “P122 Bottom air intake+blind panels” for OVER units.
With this accessory, it is possible a noise insulation of the machine base, when the machine is installed directly on floor as raised floor, wood floor etc.
The accessory includes:

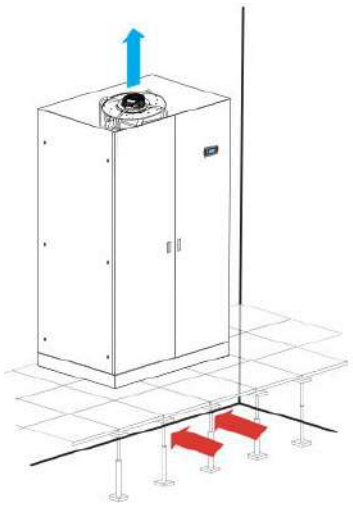
- Panel in galvanized steel sheet.
- Noise insulation with special soundproof material.

The bottom panel is supplied assembled inside the unit base and does not modify the unit dimensions.



OPTIONAL ACCESSORIES: P122 - BOTTOM AIR INTAKE+BLIND PANELS

Available for OVER units (size E0 excluded).
The optional is not compatible with “P121 Front air intake+bottom panel” for OVER units.
Thanks to the design of the basement is possible the air suction from the unit bottom. The air flow rate is the nominal one
The accessory foresees the blind frontal panels.



OPTIONAL ACCESSORIES: A548 - CONSTANT PREVALENCE

The optional is a differential pressure sensor with a 0…20mA output signal. The device is installed in the machine.
The sensor is connected to the microprocessor control of the indoor unit and allows the control of:

A548 - CONSTANT PREVALENCE
The system controls the air pressure in the raised floor (Under version) or in the duct (Over version). Through the relief piping of the room pressure (low pressure side) and the air supply of the fan (high pressure side) the fan rotation speed is controlled to keep the air pressure constant.
Pressure control range from 0 to 100 Pa.

OPTIONAL ACCESSORIES: P091 – BACK-UP MODULE CONTROLLER

The optional is installed within the electrical panel.

The system powers the microprocessor for a few minutes in the event of a power failure or voltage surges, preventing the re-boot of the controller.
.

OPTIONAL ACCESSORIES: 383 – NUMBERED WIRINGS + UK REQUESTS

The machine's electrical cables are all numbered for easy identification. For the power section it is possible to change the colour for the UK market.

CABLE	383 – COLOUR FOR UK
EARTH	YELLOW / GREEN
NEUTRAL	BLUE SKY
PHASE 1 (L1)	BROWN
PHASE 2 (L2)	BLACK
PHASE 3 (L3)	GREY
AUXILIARIES	RED

OPTIONAL ACCESSORIES: 4181 – SERIAL CARD MODBUS

The card is factory installed.
Consult the Interface Manual for all technical information.

OPTIONAL ACCESSORIES: 4182 – SERIAL CARD LON

The card is factory installed.
The manufacturer will supply the serial card and .NXE file and a .XIF files necessary for LonWorks technicians to configure the network.
The board is programmed by the technician in charge of the integration.
Consult the Interface Manual for all technical information.

OPTIONAL ACCESSORIES: 4184 – SERIAL CARD BACNET MS/TP RS485

The card is factory installed.
The supervision network is set up by the technicians developing the BACnet interface.
The Modbus protocol database is used for interfacing.
Consult the Interface Manual for all technical information.

OPTIONAL ACCESSORIES: 4185 – SERIAL CARD BACNET OVER IP

The card is factory installed.
The supervision network is set up by the technicians developing the BACnet interface. The Modbus protocol database is used for interfacing.
The manufacturer will supply the card and .MIB file necessary for technicians to configure the network.
The board is programmed by the technician in charge of the integration.
Consult the Interface Manual for all technical information and what is necessary for Internet connection to view and modify variables.

OPTIONAL ACCESSORIES: A491 – WATER LEACKAGE DETECTOR

The system includes an electronic relay installed in the electrical panel of the machine and a water detector.
The electrical connections for the probe and the alarm contact are present in the machine's terminal board.
Sensor is supplied to be connected and installed at customer care.

OPTIONAL ACCESSORIES: A492 – WATER LEACKAGE DETECTOR + ADDITIONAL DETECTOR

The system includes an electronic relay installed in the electrical panel of the indoor machine and 2 water detectors to be connected in series.
The electrical connections for the probe and the alarm contact are present in the indoor machine's terminal board.
The sensors are supplied to be connected and installed at customer care.

OPTIONAL ACCESSORIES: A501 - CLOGGED FILTERS SENSOR

The system includes a differential pressure switch installed in the electrical panel or in the front of the indoor unit and the plastic hoses for the relief of the pressure upstream and downstream the air filters.

Control range:	0.3 … 4.0 mbar (30 … 400 Pa)
Differential for intervention:	0.15 mbar (15 Pa)

OPTIONAL ACCESSORIES: A511 – SMOKE DETECTOR
OPTIONAL ACCESSORIES: A521 – FIRE DETECTOR

Is possible to install one or both of the following sensors. Sensors are supplied in mounting kit.
Installation within the room at customer care.

A511 - SMOKE DETECTOR
The device in supplied in mounting kit.
The optical smoke detector senses the presence of combustion by-products (visible smoke) and activates an alarm.
The operating principle is based on the light scattering technique (Tyndall effect).
The device is in conformity to EN 54-7 standard.
Technical features:

Material	ABS		Relative humidity	<93% not-condensing
Power supply	12...28 Vdc		Index of protection	IP 20
Normal current	50µA 24 Vdc		Testing by magnet	Yes
Alarm current	25mA 24 Vdc		Relay	max. 1A 30Vdc
LED visibility	360° (double led)		Signal repeater	14mA 24 Vdc
Storage temperature	-10…+70°C		Covered area	40m^2 max.
Operating temperature	-10…+70°C		Shielded connection	Min. 0.5 mm^2
Max. speed air	0.2 m/s		Colour	White

Supplied with unit to be connected and installed at customer care close to the unit.

A521 - FIRE DETECTOR
The device in supplied in mounting kit.
The fire detector has been designed to identify temperatures at which fires may start. When the temperature exceeds the set threshold or when there is a rapid variation in temperature, the relay is activated to signal an alarm.
The device is in conformity to EN 54-5 standard.
Technical features:

Material	ABS		Index of protection	IP 20
Power supply	12...28 Vdc		Testing by magnet	Yes
Normal current	50µA 24 Vdc		Relay	max. 1A 30Vdc
Alarm current	25mA 24 Vdc		Signal repeater	14mA - 24 Vdc
LED visibility	360° (double LED)		Alarm temperature	62°C
Storage temperature	-10…+70°C		Covered area	40m^2 max.
Operating temperature	-10…+70°C		Shielded connection	Min. 0.5 mm^2
Relative humidity	<93% non-condensing		Colour	White

Supplied with unit to be connected and installed at customer care close to the unit.

OPTIONAL ACCESSORIES: A822 – ADAPTIVE SET-POINT

ADAPTIVE SET-POINT
An advanced algorithm that instantaneously detects the real thermal load of the indoor units and then conveys this information to the outdoor chillers, strongly increasing their operation.

- Dynamic variation of the chillers set point and water flow.
- Increasing of the free cooling mode.
- Adoption of the active redundancy system to better exploit stand-by chillers.

DATA CENTER MANAGER (Optional accessory)
DATA CENTER MANAGER is a centralized management system that ensures a smart communication between indoor chilled water units and the outdoor chillers.
The device manages the outdoor units according to the inlet and outlet temperature registered by the probes and by request of the indoor unit.

OPTIONAL ACCESSORIES: P141 – ANALOGUE SET-POINT COMPENSATION

Size E0 excluded.
Analogue set point compensation according to an external analogue signal at Customer care.
The microprocessor control, through the additional module “expansion card”, can manage a compensation signal of the return air setpoint by analogue input (0...1V; 0...5V; 0,5...4,5V; 4...20mA; 0...20mA). The compensation curve allows to assign a temperature setpoint offset respectively to the minimum and maximum signal managed by the input.

OPTIONAL ACCESSORIES: A842 – NETWORK ANALYZER

INTERNAL installation

The optional is not available for size E0.
The optional is installed within the electrical box downstream the main switch with door safety lock:

- Network transducer;
- Current transformers, one for each power supply phase cable.

This device provides continuous measurement of power consumption, monitoring current, voltage and power. These values are sent to unit microprocessor via RS485 serial cable, as shown on the unit wiring diagram.
The displayed variables are:

- Phase to phase voltage, only for three-phase units;
- Phase voltage (phase-neutral);
- Phase current;
- Neutral current only for three-phase units;
- Active phase power, only for three-phase units;
- Total active power;
- Active energy;
- Hour counts.

OPTIONAL ACCESSORIES: A812 – FREE-COOLING DIRECT CONTROL

Size E0 excluded.
Preparation of the machine and the electrical panel for the direct free-cooling system "P034 Intake free-cooling plenum "

OPTIONAL ACCESSORIES: P021 – 2-WAY BALL BYPASS VALVE (Main circuit)

The optional is not available for size E0 (**).
The optional is available for main chilled water circuit only.
2-way modulating motorized valve with 0÷10 VDC control actuator and emergency manual control for the third way (by-pass) of the hydraulic circuit.

The valve is in combination with the main 2-way water flow control valve.
The optional accessory is factory installed and don’t modify the overall dimensions of the unit.

The coupling to the main 2-way control valve of a second modulating valve, connected in by-pass, allows to obtain the same control system of a 3-way mixing valve for plant with constant water flow.
At the same time the appropriate sizing of these valves allows hydraulic balancing of the by-pass way.

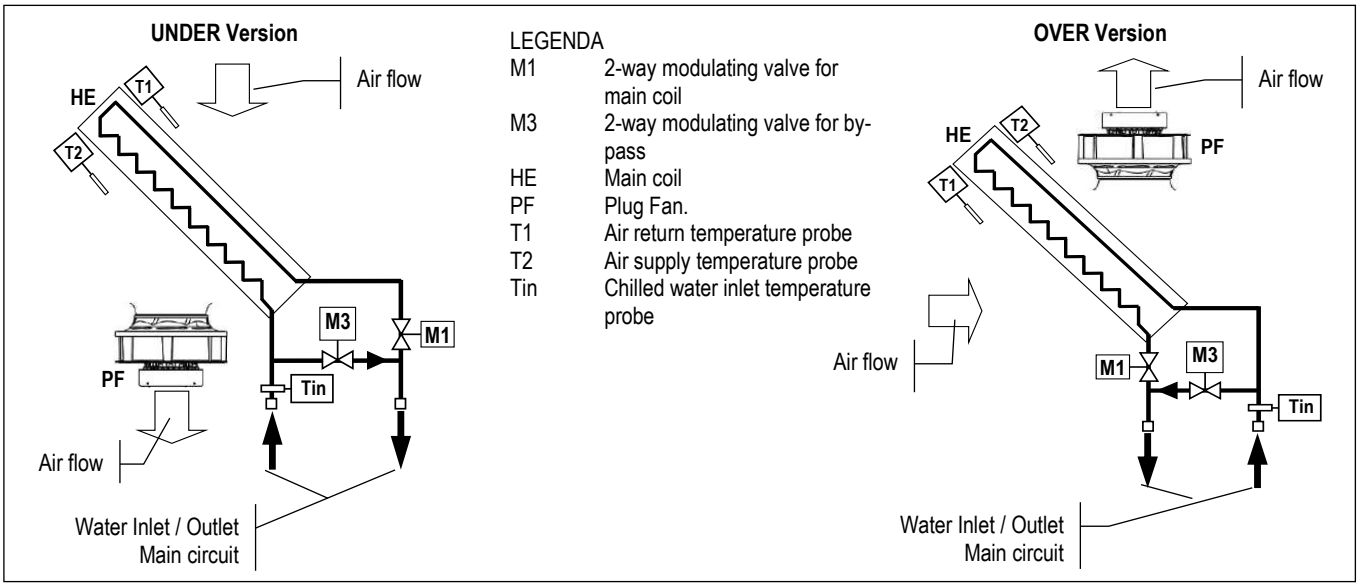
This type of valve offers the following series of benefits:

- Equal percentage flow control.
- No peaks initial flow.
- Excellent stability control thanks to the integrated characterizing disc.
- Excellent characteristic in partialisation.
- Stability in control.
- Maintenance free.
- Self-cleaning.

CHARACTERISTICS OF THE 2-WAY BALL VALVE

- Closing seal with leakage rate in Class A (EN 12266-1)
- Maximum fluid pressure Ps=1600kPa
- Maximum closing pressure (Close-off) ΔPs=1400kPa

The rotative actuator is controlled by a signal 0 … 10VDC from the microprocessor controller. The actuator is equipped with an emergency button for manual operation and is maintenance-free.



TECHNICAL DATA

VERSION (1)		U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U	U
MODEL		007	013	021	032	045	053	072	081	100	120	138	160	215
SIZE		E0	E1	E2	E3	E3P	E4	E5	E6	E7	E8	E9	E10	E10
2-WAY VALVE FOR BY-PASS														
k_V – Flow coefficient	m^3/h	(**)	4,0	4,0	6,3	8,6	8,6	16,0	16,0	16,0	25,0	25,0	25,0	40,0

1. U = Under, downflow / O = Over, upflow

(**) Installation of a "A663 3-way 0-10V modulating water valve". 3 way globe valve in place of a 2-way modulating ball valve for main coil (M1) and a 2-way modulating ball valve for by-pass (M3). CHARACTERISTICS OF THE 3-WAY GLOBE VALVE: Maximum differential pressure ΔPmax=300kPa.

IMPORTANT

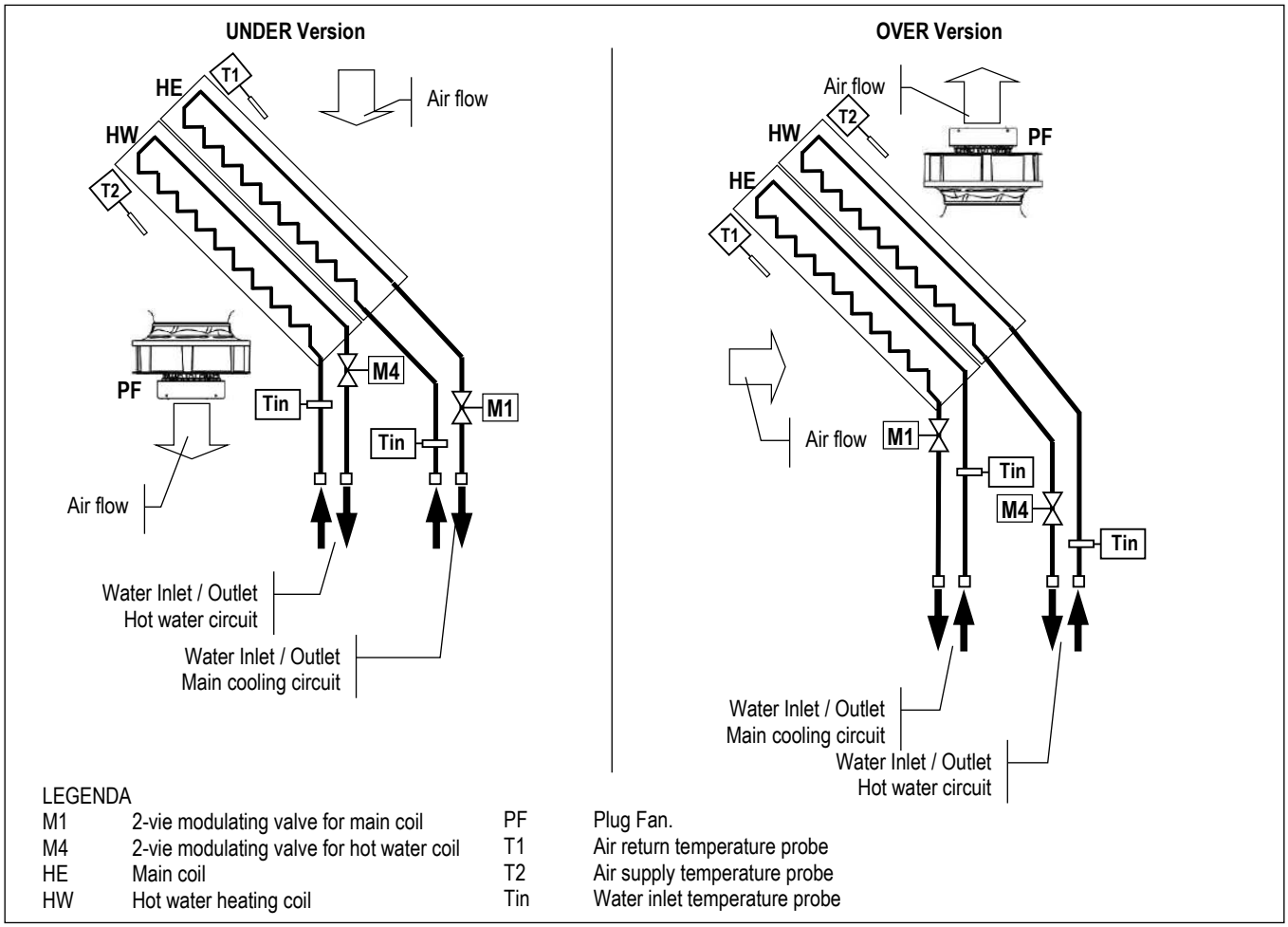
For further information, please refer to chapter "VALVE PRESSURE DROP CALCULATION AS FUNCTION OF WATER FLOW RATE"

OPTIONAL ACCESSORIES: P131 – HOT WATER COIL + 2WAY VALVE

The optional is not available for size E0, E10.
The optional accessory is factory installed and don't modify the overall dimensions of the unit.
Hot water heating system installed downstream the main cooling coil.
Components:

- Heat exchanger coil with internally corrugated copper tubes and high efficiency aluminium fins, specifically developed to provide high heat transfer and lower pressure drops.
- 2-way motorized valve for water flow regulation with 0÷10 VDC control actuator and emergency manual control.
- Temperature probe on water inlet.
- Frame in galvanized steel.

The hot water heating system can be installed in combination with the "A431 electric heater". The operation is alternate with priority to the hot water heating coil.
It is not possible to combine the "A432 extra power electric heater" with the hot water heating coil
For the water quality of the heating circuit, please refer to the chapter "WATER QUALITY OF THE HYDRAULIC CIRCUITS".
Temperature control on suction air .



LEGENDA

M1	2-vie modulating valve for main coil	PF	Plug Fan.
M4	2-vie modulating valve for hot water coil	T1	Air return temperature probe
HE	Main coil	T2	Air supply temperature probe
HW	Hot water heating coil	Tin	Water inlet temperature probe

TECHNICAL DATA

VERSION (1)		**U / O**	**U / O**	**U / O**	**U / O**	**U / O**	**U / O**	**U / O**
MODEL		**007**	**013**	**021**	**032**	**045**	**053**	**072**
SIZE		**E0**	**E1**	**E2**	**E3**	**E3P**	**E4**	**E5**
THERMAL CAPACITY (2)	kW	**--**	**25,4**	**38,6**	**60,1**	**85,1**	**101**	**131**
HEATING COIL								
Water flow rate (2)	m^3/h	--	2,2	3,4	5,3	7,5	8,9	11,4
dP coil + valve (2)	kPa	--	29,1	27,1	32,1	31	13,4	27
Water volume	l	--	2,1	2,6	3,9	5,7	6,9	9,1
NET WEIGHT (3)	kg	--	15	18	25	30	35	42
HYDRAULIC CONNECTIONS								
WATER INLET / OUTLET ISO 7/1 - R	Ø	--	3/4"	3/4"	1"	1"	1+1/4"	1+1/2"

VERSION (1)		**U / O**	**U / O**	**U / O**	**U / O**	**U**	**U**
MODEL		**081**	**100**	**120**	**138**	**160**	**215**
SIZE		**E6**	**E7**	**E8**	**E9**	**E10**	**E10**
THERMAL CAPACITY (2)	kW	**159**	**182**	**215**	**255**	**--**	**--**
HEATING COIL							
Water flow rate (2)	m^3/h	13,9	15,9	18,8	22,4	--	--
dP coil + valve (2)	kPa	51,3	8,3	13,4	21,6	--	--
Water volume	l	10,6	12,3	14,2	16,9	--	--
NET WEIGHT (3)	kg	50	57	65	75	--	--
HYDRAULIC CONNECTIONS							
WATER INLET / OUTLET ISO 7/1 - R	Ø	1+1/2"	2"	2"	2"	--	--

1. U = Under, downflow / O = Over, upflow
2. Characteristics referred to entering air at 20°C-50%UR with hot water temperature 70/60°C - 0% glycol.
3. Value to be added to the weight of the standard unit. Does not include the weight of the water content.

2-WAY BALL VALVE FOR HOT WATER FLOW CONTROL

The water flow control in the finned coil is acieved through a **2-way modulating ball valve with equal percentage flow control** ensured by the integrated characterizing disc.

This type of valve offers the following series of benefits:

- Equal percentage flow control.
- No peaks initial flow.
- Excellent stability control thanks to the integrated characterizing disc.
- Excellent characteristic in partialisation.
- Stability in control.
- Maintenance free.
- Self-cleaning.

CHARACTERISTICS OF THE 2-WAY BALL VALVE

- Closing seal with leakage rate in Class A (EN 12266-1)
- Maximum fluid pressure Ps=1600kPa
- Maximum closing pressure (Close-off) ΔPs=1400kPa

The rotative actuator is controlled by a signal 0 … 10VDC from the microprocessor controller. The actuator is equipped with an emergency button for manual operation and is maintenance-free.

OPTIONAL ACCESSORIES: A431 - ELECTRIC HEATERS
OPTIONAL ACCESSORIES: A432 - EXTRA POWER ELECTRIC HEATERS

A431 – ELECTRIC HEATERS

Electric heater consisting of finned aluminum elements, ensuring low surface temperature and deleting the air ionization problems. The optional is installed downstream the main cooling coil.
In electric heaters with three working steps the activation is binary type.
Components:

- Electric heater in aluminium armoured elements with integral fins
- Electrical control
- Safety thermostat.

The electric heater can be installed in combination with the “P131 hot water coil + 2-way valve”. The operation is alternate with priority to the hot water heating coil.
Temperature control on suction air.

TECHNICAL DATA

VERSION (1)		U / O	U / O	U / O	U / O	U / O	U / O	U / O
MODEL		007	013	021	032	045	053	072
SIZE		E0	E1	E2	E3	E3P	E4	E5
THERMAL CAPACITY	kW	2,6	5,1	5,1	6,0	6,0	9,0	13,5
Absorbed current (OA)	A	11,3	7,4	7,4	8,7	8,7	13,0	19,5
First working step	kW	2,6	5,1	5,1	3,0	3,0	3,0	4,5
Second working step	kW	--	--	--	3,0+3,0	3,0+3,0	6,0	9,0
Third working step	kW	--	--	--	--	--	3,0+6,0	4,5+9,0
NET WEIGHT (2)	kg	3	4	4	7	7	9,5	10

VERSION (1)		U / O	U / O	U / O	U / O	U	U
MODEL		081	100	120	138	160	215
SIZE		E6	E7	E8	E9	E10	E10
THERMAL CAPACITY	kW	13,5	13,5	18,0	18,0	27,0	27,0
Absorbed current (OA)	A	19,5	19,5	26,0	26,0	39,0	39,0
First working step	kW	4,5	4,5	4,5	4,5	9,0	9,0
Second working step	kW	9,0	9,0	13,5	13,5	18,0	18,0
Third working step	kW	4,5+9,0	4,5+9,0	4,5+13,5	4,5+13,5	9,0+18,0	9,0+18,0
NET WEIGHT (2)	kg	9,5	9,5	11	11	15	15

1. U = Under, downflow / O = Over, upflow
2. Value to be added to the weight of the standard unit.

A432 – EXTRA POWER ELECTRIC HEATERS

The optional is not available for size E0, E1 and E2.
The components are the same standard accessory.
It is not possible to combine the extra power electric heaters with the “P131 hot water coil + 2-way valve”
Temperature control on suction air.

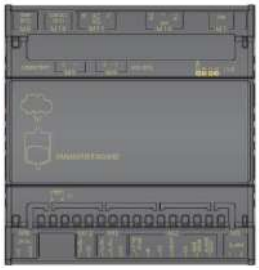
TECHNICAL DATA

VERSION (1)		U / O	U / O	U / O	U / O	U / O	U / O	U / O
MODEL		007	013	021	032	045	053	072
SIZE		E0	E1	E2	E3	E3P	E4	E5
THERMAL CAPACITY	kW	--	--	--	9,0	9,0	13,5	18,0
Absorbed current (OA)	A	--	--	--	13,0	13,0	19,5	26,0
First working step	kW	--	--	--	4,5	4,5	4,5	4,5
Second working step	kW	--	--	--	4,5+4,5	4,5+4,5	9,0	13,5
Third working step	kW	--	--	--	--	--	4,5+9,0	4,5+13,5
NET WEIGHT (2)	kg	--	--	--	7	7	9,5	12

VERSION (1)		U / O	U / O	U / O	U / O	U	U
MODEL		081	100	120	138	160	215
SIZE		E6	E7	E8	E9	E10	E10
THERMAL CAPACITY	kW	18,0	18,0	27,0	27,0	36,0	36,0
Absorbed current (OA)	A	26,0	26,0	39,0	39,0	52	52
First working step	kW	4,5	4,5	9,0	9,0	13,5	13,5
Second working step	kW	13,5	13,5	18,0	18,0	22,5	22,5
Third working step	kW	4,5+13,5	4,5+13,5	9,0+18,0	9,0+18,0	13,5+22,5	13,5+22,5
NET WEIGHT (2)	kg	11,5	11,5	14,5	14,5	18,5	18,5

1. U = Under, downflow / O = Over, upflow
2. Value to be added to the weight of the standard unit.

OPTIONAL ACCESSORIES: 4301 – STEAM HUMIDIFIER 3KG/H
OPTIONAL ACCESSORIES: 4303 – STEAM HUMIDIFIER 8KG/H
OPTIONAL ACCESSORIES: 4305 – STEAM HUMIDIFIER 15KG/H



Humidifier control board

Modulating steam humidifier with immersed electrodes fitted with safety and running accessories.
The optional includes the control board.
The optional requires mandatory accessory "P161 T/rH air intake sensor".
The optional is factory installed and requires only water filling connection.
Humidifier water charge and discharge pipes are not supplied.
It is recommended to install a filter and a shut-off valve on the pipe to the water inlet.
This humidifier produces non-pressurized steam by electrodes immersed in the water inside the cylinder: they bring the electric phase in the water that works as an electrical resistance and overheats. The steam so produced is distributed with dedicated distributors and used for ambient humidification or for industrial processes.

CHARACTERISTICS OF THE SUPPLY WATER
The quality of the used water influences the evaporation process, so the humidifier can be fed with **not-treated water, only when potable and non-demineralised.**

LIMIT VALUES

			Min	Max
Hydrogen ions	pH		7	8,5
Specific conductivity at 20°C	$\sigma_{R,\ 20\ °C}$	µS/cm	350	750
Total dissolved solids	TDS	mg/l	(1)	(1)
Dry residue at 180°C	R_{180}	mg/l	(1)	(1)
Total hardness	TH	mg/l $CaCO_3$	100 (2)	400
Temporary hardness		mg/l $CaCO_3$	60 (3)	300
Iron + Manganese		mg/l Fe + Mn	0	0,2
Chlorides		ppm Cl	0	30
Silica		mg/l SiO_2	0	20
Residual chlorine		mg/l Cl^-	0	0,2
Calcium sulphate		mg/l $CaSO_4$	0	100
Metallic impurities		mg/l	0	0
Solvents, diluents, soaps, lubricants		mg/l	0	0

(1) Values depending on specific conductivity; in general: TDS ≅ 0,93 * $\sigma_{R,\ 20\ °C;}$ R_{180} ≅ 0,65 * σ_R
(2) Not lower than 200% of the chloride content in mg/l di Cl^-
(3) Not lower than 300% of the chloride content in mg/l di Cl^-

WARNING:

- **Use only with drinking water.**
- **There is no reliable relationship between hardness and water conductivity**
- **Do not treat water with softeners! This could cause corrosion of the electrodes or the formation of foam, leading to potential operating problems or failures.**
- **Do not add disinfectants or corrosion inhibiters to water, as these substances are potentially irritant.**
- **Is absolutely forbidden to use well water, industrial water or water drawn from cooling circuits; in general, avoid using potentially contaminated water, either from a chemical or bacteriological point of view.**

HUMIDIFIER

TECHNICAL DATA

VERSION (1)		**U / O**	**U / O**	**U / O**	**U / O**	**U / O**	**U / O**	**U / O**	**U / O**	**U / O**	**U / O**	**U / O**	**U**	**U**
MODEL		**007**	**013**	**021**	**032**	**045**	**053**	**072**	**081**	**100**	**120**	**138**	**160**	**215**
SIZE		**E0**	**E1**	**E2**	**E3**	**E3P**	**E4**	**E5**	**E6**	**E7**	**E8**	**E9**	**E10**	**E10**
VAPOUR PRODUCTION	**kg/h**	**2,0**	**3,0**	**3,0**	**3,0**	**3,0**	**8,0**	**8,0**	**8,0**	**15,0**	**15,0**	**15,0**	**15,0**	**15,0**
Power input	kW	1,4	2,3	2,3	2,3	2,3	6,0	6,0	6,0	11,3	11,3	11,3	11,3	11,3
Absorbed current (OA)	A	6,1	3,2	3,2	3,2	3,2	8,7	8,7	8,7	16,2	16,2	16,2	16,2	16,2
Max absorbed current (FLA)	A	8,8	4,5	4,5	4,5	4,5	12,4	12,4	12,4	23,0	23,0	23,0	23,0	23,0
Water content	l	3,9	3,9	3,9	3,9	3,9	6,4	6,4	6,4	10,3	10,3	10,3	10,3	10,3
Max water supply pressure	Bar	1÷8	1÷8	1÷8	1÷8	1÷8	1÷8	1÷8	1÷8	1÷8	1÷8	1÷8	1÷8	1÷8
NET WEIGHT (2)	kg	3	4	5	6	6	10	12	14	16	18	20	20	20
HYDRAULIC CONNECTION														
WATER INLET - ISO 228/1 – G M	Ø	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"
WATER OUTLET - external diameter	Ø mm	19	19	19	19	19	19	19	19	19	19	19	19	19

1. U = Under, downflow / O = Over, upflow
2. Value to be added to the weight of the standard unit. Does not include the weight of the water content.

EXTRA POWER HUMIDIFIER
The optional is not available for sizes E0, E7, E8, E9, E10.
The components are the same standard accessory

TECHNICAL DATA

VERSION (1)		**U / O**	**U / O**	**U / O**	**U / O**	**U / O**	**U / O**	**U / O**	**U / O**	**U / O**	**U / O**	**U / O**	**U**	**U**
MODEL		**007**	**013**	**021**	**032**	**045**	**053**	**072**	**081**	**100**	**120**	**138**	**160**	**215**
SIZE		**E0**	**E1**	**E2**	**E3**	**E3P**	**E4**	**E5**	**E6**	**E7**	**E8**	**E9**	**E10**	**E10**
VAPOUR PRODUCTION	**kg/h**	**--**	**8,0**	**8,0**	**8,0**	**8,0**	**15,0**	**15,0**	**15,0**	**--**	**--**	**--**	**--**	**--**
Power input	kW	--	6,0	6,0	6,0	6,0	11,3	11,3	11,3	--	--	--	--	--
Absorbed current (OA)	A	--	8,7	8,7	8,7	8,7	16,2	16,2	16,2	--	--	--	--	--
Max absorbed current (FLA)	A	--	12,4	12,4	12,4	12,4	23,0	23,0	23,0	--	--	--	--	--
Water content	l	--	6,4	6,4	6,4	6,4	10,3	10,3	10,3	--	--	--	--	--
Max water supply pressure	Bar	--	1÷8	1÷8	1÷8	1÷8	1÷8	1÷8	1÷8	--	--	--	--	--
NET WEIGHT (2)	kg	--	10	10	10	10	16	16	16	--	--	--	--	--
HYDRAULIC CONNECTION														
WATER INLET - ISO 228/1 – G M	Ø	--	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"	--	--	--	--	--
WATER OUTLET - external diameter	Ø mm	--	19	19	19	19	19	19	19	--	--	--	--	--

1. U = Under, downflow / O = Over, upflow
2. Value to be added to the weight of the standard unit. Does not include the weight of the water content.

OPTIONAL ACCESSORIES: P051 – DEHUMIDIFICATION FUNCTION

The optional requires mandatory accessory “P161 T/rH air intake sensor“.

Components:
- T/rH air intake sensor.
- Temperature sensor on cooling coil water inlet / outlet.
- Electronic control system of the dew point temperature for the combined intervention of cooling capacity and air flow.

OPTIONAL ACCESSORIES: P161 – T/RH AIR INTAKE SENSOR
OPTIONAL ACCESSORIES: P071 – REMOTE T/RH PROBE

P161: T/RH AIR INTAKE SENSOR
The accessory replaces the temperature sensor installed on the air intake in the unit and allows the displaying of the relative humidity room value
The sensor is mandatorily required with following option:
- 4301 / 4303 / 4305 Humidifier;
- P051: Dehumidification function;
- P034 Intake free-cooling plenum.

P071: REMOTE T/RH PROBE
The accessory is added to the standard temperature sensor or to the temperature / humidity sensor (optional) on the machine air intake. For indoor installation in a specific point of the room to be conditioned.

OPTIONAL ACCESSORIES: 4666 – EXTERNAL AIR PROBE

The probe must be installed protected against atmospheric agent and allows the displaying of the external air temperature.
The sensor is mandatorily required with following option:
- P034 Intake free-cooling plenum.

OPTIONAL ACCESSORIES: P111 – DUAL POWER SUPPLY
OPTIONAL ACCESSORIES: P112 – DUAL POWER SUPPLY + OPTIONAL
OPTIONAL ACCESSORIES: P113 – DUAL POWER SUPPLY KIT
OPTIONAL ACCESSORIES: P114 – DUAL POWER SUPPLY KIT + OPTIONAL

The optional is not available for size E0.
The motorised changeover switches automatically manage changeover under load between two three-phase power supplies, or manually for emergency operations.
These devices are suitable for low voltage systems with interruption of the supply to the load during transfer.
The model supplied in the automatic version checks the source and switches over automatically, based on configurable parameters.

OPEN TRANSITION TYPE TRANSFER SWITCH WITH A MINIMUM INTERRUPTION OF THE SUPPLY DURING TRANSFER.

To maintain the microprocessor powered and avoid its restarts it is suggested the “P091 Back-up module controller” optional accessory. The back-up module guarantees the microprocessor power supply for a few minutes, in case of supply voltage failure.

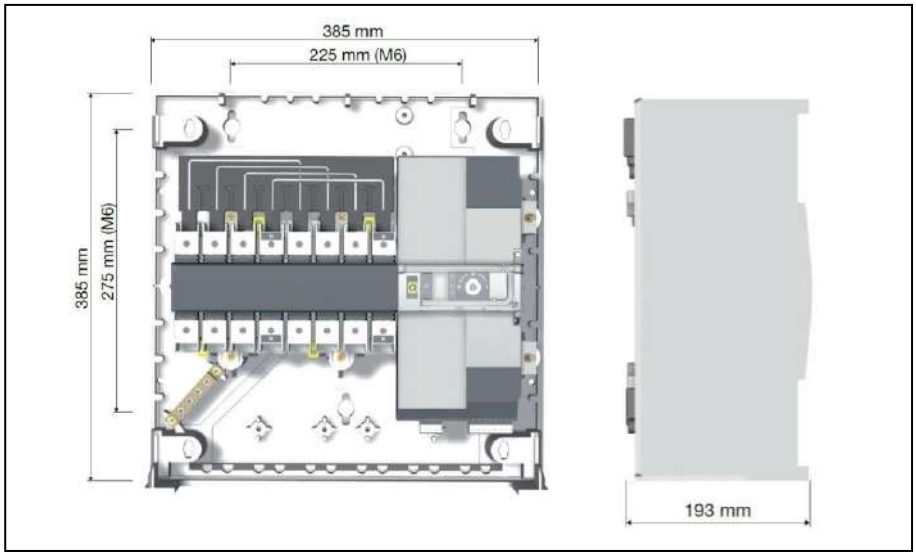
INSTALLATION

Frame	Power Supply	Installation	Code
E0	230/1/50	Not Available	-
E1	400/3+N/50	EXTERNAL to the unit, supplied in kit	P113, P114 (*)
E2	400/3+N/50	EXTERNAL to the unit, supplied in kit	P113, P114 (*)
E3	400/3+N/50	EXTERNAL to the unit, supplied in kit	P113, P114 (*)
E3P	400/3+N/50	EXTERNAL to the unit, supplied in kit	P113, P114 (*)
E4	400/3+N/50	EXTERNAL to the unit, supplied in kit	P113, P114 (*)
E5	400/3+N/50	INTERNAL (on unit electrical panel)	P111, P112 (*)
E6	400/3+N/50	INTERNAL (on unit electrical panel)	P111, P112 (*)
E7	400/3+N/50	INTERNAL (on unit electrical panel)	P111, P112 (*)
E8	400/3+N/50	INTERNAL (on unit electrical panel)	P111, P112 (*)
E9	400/3+N/50	INTERNAL (on unit electrical panel)	P111, P112 (*)
E10	400/3+N/50	INTERNAL (on unit electrical panel)	P111, P112 (*)

(*) P112, P114 for units with optional (with electric heaters and/or humidifier)

MOUNTING KIT

For EXTERNAL installation, the optional accessory is supplied in special box with IP 3X ingress protection, with the dimensions shown in the figure below.



OPTIONAL ACCESSORIES: A381 - DRAIN PUMP

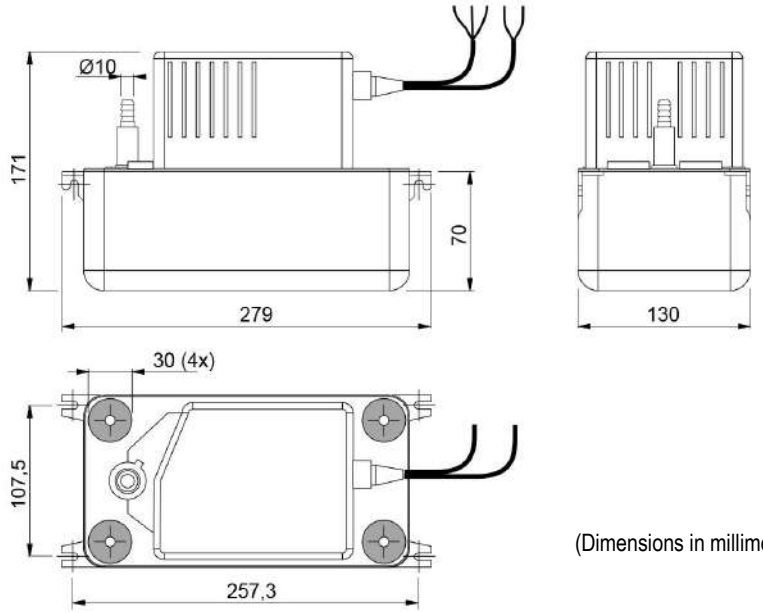
A plastic case contains the vertical type pump, the water tank with float plus safety switch and hydraulic and electric connection.
Together the pump 10 linear meters anti-crushing plastic discharge spiral tube is supplied
The optional must be installed as shown in the documentation delivered together with the unit.
Wiring includes power supply and an alarm, displayed on microprocessor, that includes motor pump thermal protection and tank overflow.
The condensate discharge pump operation is fully automatic.

WARNING

For all the machines the optional accessory is supplied in mounting kit.

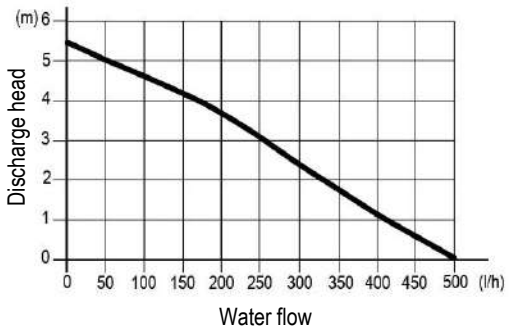
TECHNICAL DATA
Power supply: 230V~ 50Hz
Electrical data: 70W – 0,67A
Maximum water flow: 500 l/h
Maximum delivery height: 5.0 m
Sound level: 45dBA a 1 m
Maximum water temperature: 70°C
Water acidity: pH>2.5
Tray volume: 2.0 l
Protection IP 20

CONDENSATE DISCHARGE PUMP



(Dimensions in millimetres)

OPERATING DATA



	Total length of discharge pipes (Ø 10 mm internal)			
Discharge head	**5m**	**10m**	**20m**	**30m**
1m	380	300	240	190
2m	310	260	200	150
3m	240	200	145	110
4m	150	130	80	60
5m	30	20	0	0

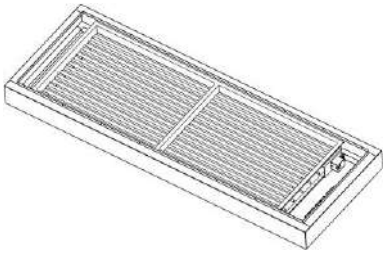
OPTIONAL ACCESSORIES: P084 – AIR FILTER ePM$_{10}$ 50%

The optional is not available for size E0.
The ePM$_{10}$ 50% air filters (according to ISO EN 16890), replace the standard one.
The filters generate a pressure drops higher than the standard ones.
The filters are made of glass micro-fibre and are not regenerable.

VERSION (1)		**U / O**	**U / O**	**U / O**	**U / O**	**U / O**	**U / O**	**U / O**	**U / O**	**U / O**	**U / O**	**U / O**	**U**	**U**
MODEL		**007**	**013**	**021**	**032**	**045**	**053**	**072**	**081**	**100**	**120**	**138**	**160**	**215**
SIZE		**E0**	**E1**	**E2**	**E3**	**E3P**	**E4**	**E5**	**E6**	**E7**	**E8**	**E9**	**E10**	**E10**
Additional pressure drops (2)	Pa	--	58	78	102	94	68	65	73	77	60	78	63	63

1. U = Under, downflow / O = Over, upflow
2. Additional pressure drops referred to nominal air flow and clean filter.

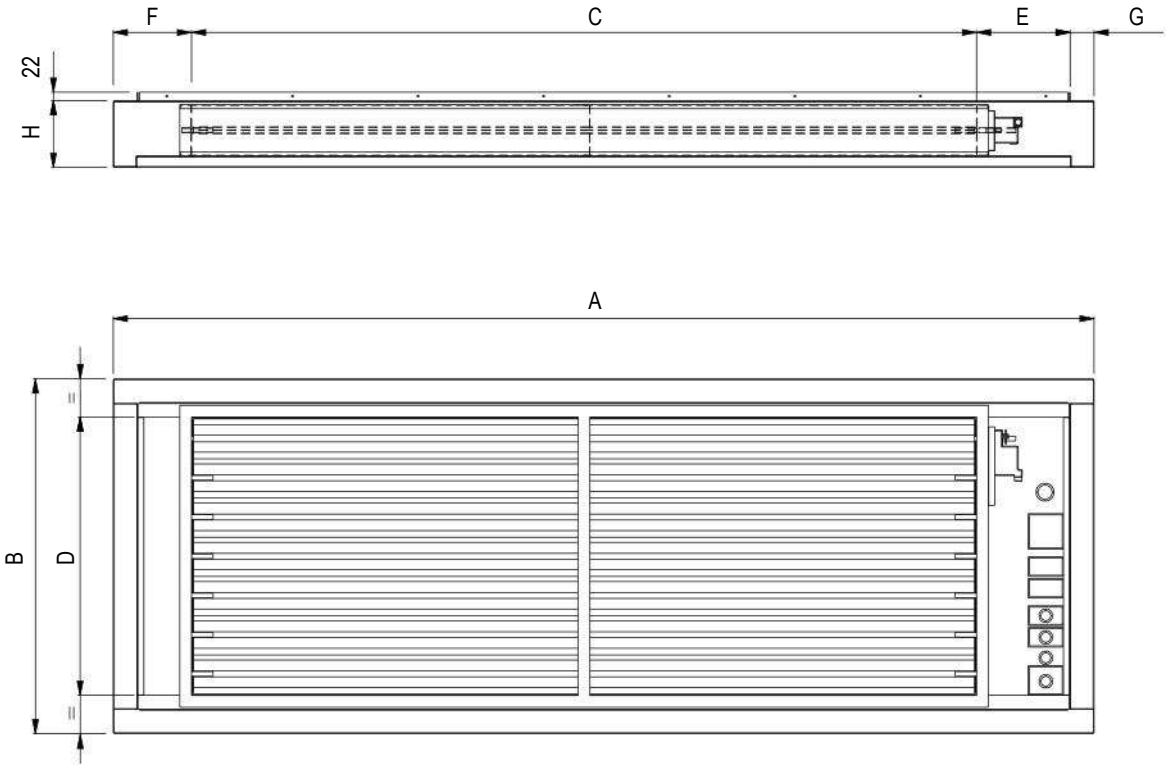
OPTIONAL ACCESSORIES: A531 – ON-OFF DAMPER



The optional is not available for size E0.
Non-return air damper with frame driven by electric servomotor.
Accessory installed on unit air delivery and it can be matched to plenums and support frame.
The accessory requires mandatory accessory “9973 Wooden cage packing”.

FRAMEWORK

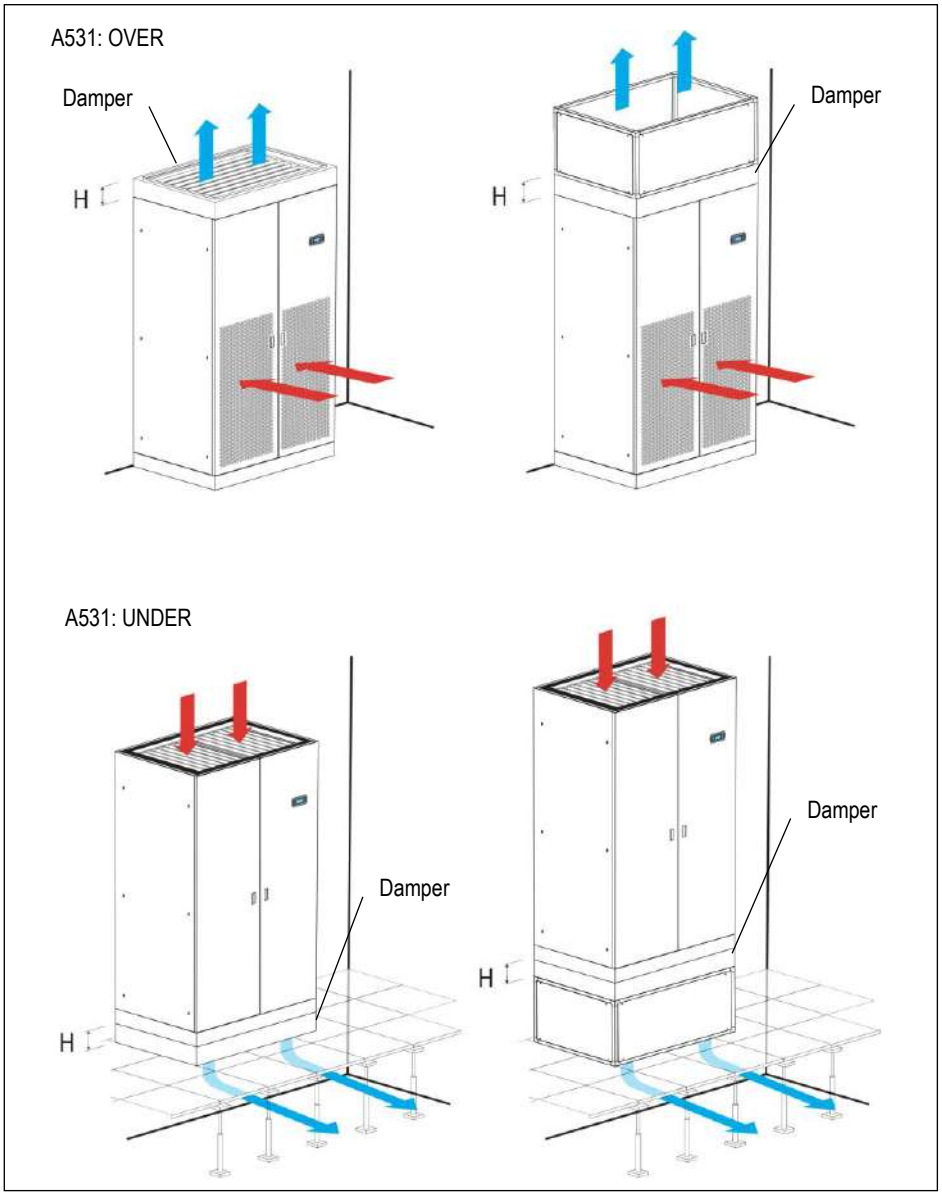
- Frame in galvanized steel sheet with protective surfaces treatment in compliance with UNI ISO 9227/ASTMB117 and ISO 7253, and painted with epoxy powders. Colour RAL 9005;
- Opposed blade dampers in galvanized steel sheet.
- Actuator for damper control.
- Terminals for electric connection to the unit.



VERSION (1)		U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U
SIZE		E0	E1	E2	E3	E3P	E4	E5	E6	E7	E8	E9	E10
A	mm	--	650	785	1085	1085	1305	1630	1873	2175	2499	2899	3510
B	mm	--	650	650	750	905	905	905	905	905	905	905	905
C	mm	--	300	450	750	750	900	1250	1500	1750	2000	2300	2800
D	mm	--	510	510	610	710	710	710	710	710	710	710	710
E	mm	--	231	216	216	216	142	204	250,5	226,5	238,5	288,5	294
F	mm	--	73	73	73	73	202	115	61,5	137,5	199,5	249,5	355
G	mm	--	46	46	46	46	61	61	61	61	61	61	61
H	mm	--	170	170	170	170	170	170	170	170	170	170	170
Weight (2)	kg	--	20	23	30	35	40	50	58	65	75	90	115

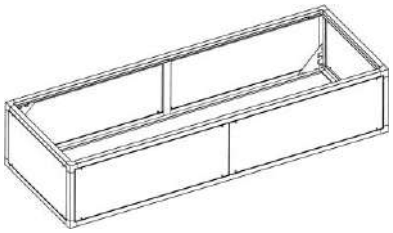
1. U = Under, downflow / O = Over, upflow
2. Add this value to the total unit weight

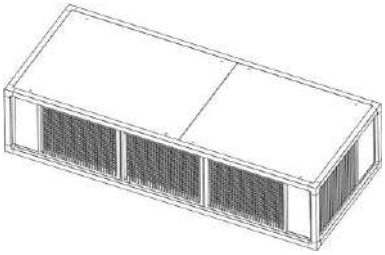
INSTALLATION EXAMPLE

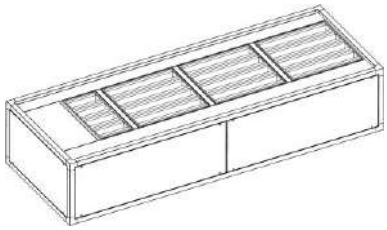


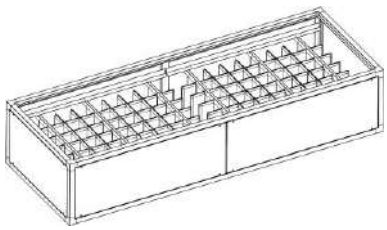
WORKING LOGIC
The damper opens at supply fans activation to allow air flow.
When the fans stop for failure or stop command, the damper closes, preventing air flow into the unit.

OPTIONAL ACCESSORIES: P011 - EMPTY PLENUM
OPTIONAL ACCESSORIES: P012 - EMPTY PLENUM CL.A1
OPTIONAL ACCESSORIES: P031 - EMPTY INTAKE PLENUM
OPTIONAL ACCESSORIES: P032 - EMPTY INTAKE PLENUM CL.A1
OPTIONAL ACCESSORIES: P013 - PLENUM + 3 GRILLES
OPTIONAL ACCESSORIES: P014 - PLENUM + 3 GRILLES CL.A1
OPTIONAL ACCESSORIES: P015 - SILENCED PLENUM
OPTIONAL ACCESSORIES: P016 - SILENCED PLENUM + 1 GRILLE
OPTIONAL ACCESSORIES: P017 - PLENUM + FILTER EPM2.5 50%
OPTIONAL ACCESSORIES: P018 - PLENUM + FILTER EPM1 50%
OPTIONAL ACCESSORIES: P019 - PLENUM + FILTER EPM1 85%









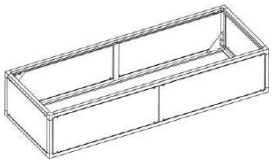
The optional is supplied separately and the installation on the unit is at Customer care.
The plenums have same technical characteristics and base dimensions of the machine cabinet.

It is possible to install only a single plenum to ensure stability to the unit.

FRAMEWORK

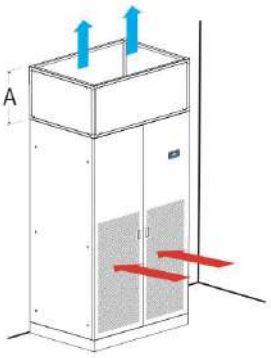
- Frame in aluminium extrusion, painted with epoxy powders. Colour RAL 9005;
- Panels in galvanized steel sheet with protective surfaces treatment in compliance with UNI ISO 9227/ASTMB117 and ISO 7253, and painted with epoxy powders. Colour RAL 9005;
- Panels insulated with polyurethane foam and seals to ensure air tight.
- Panels fixed with screws.
- Removable panels.
- Set of fixing elements to fasten the plenum to the unit.

WARNING
In UNDER version units the hydraulic piping is inside the machine.
The air delivery plenums sometime don't allow the extension of the pipes downwards.
In special cases, to keep the connections inside the machine, foresee a plenum 200mm higher than the standard one.

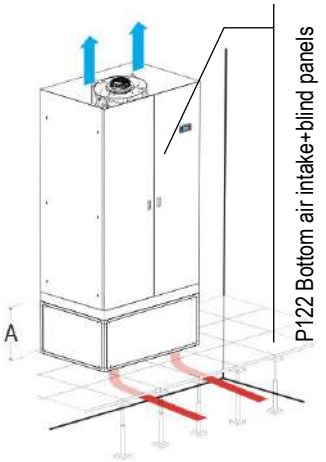


P011 / P012 – P031 / P032: EMPTY PLENUM
The optional is not available for size E0.
The plenum is void and can be used to rise the intake/delivery air inlet/outlet.
Remove the frontal panels for inspection.
Also available with fire reaction in class "0" or "A1" (EN 13501-1).
The optional accessories "P031 Empty intake plenum, for OVER version" and "P032 Empty intake plenum CL.A1, for OVER version" require mandatory accessory "P122 Bottom air intake+blind panels, for OVER version only".

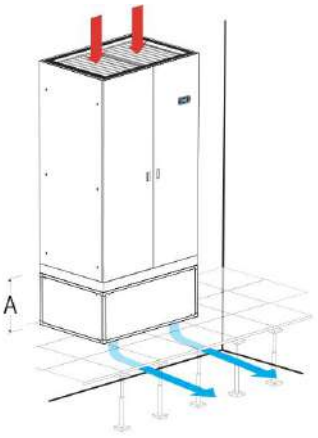
P011 / P012 OVER



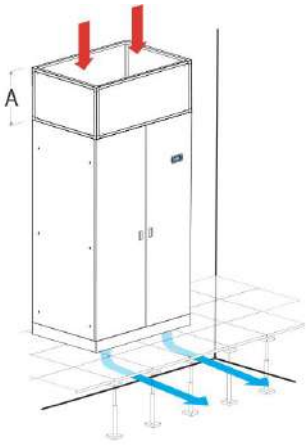
P031 / P032 OVER



P011 / P012 UNDER

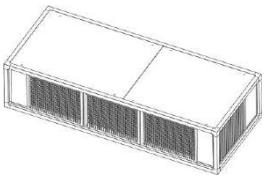


P031 / P032 UNDER



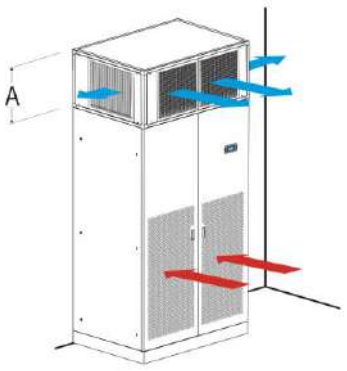
VERSION (1)		U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U
SIZE		E0	E1	E2	E3	E3P	E4	E5	E6	E7	E8	E9	E10
A	mm	--	490	490	490	510	510	510	510	510	510	510	510
Weight (2)	kg	--	20	21	20	25	30	40	45	50	60	70	78
Weight CL.0 or A1 (EN 13501-1) (2)	kg	--	25	27	27	33	39	50	56	62	74	85	96

1. U = Under, downflow / O = Over, upflow
2. Add this value to the total unit weight

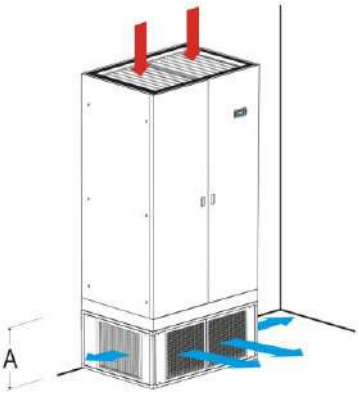


P013 / P014: PLENUM + 3 GRILLES
The plenum must be installed on air delivery.
The plenum allows the air distribution directly into the room. The plenum is supplied with air distribution grilles with double row adjustable grilles on front and lateral side.
Also available with fire reaction in class "0" or "A1" (EN 13501-1).

P013 / P014 OVER

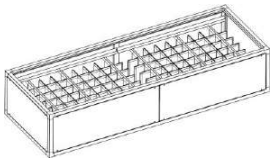


P013 / P014 UNDER



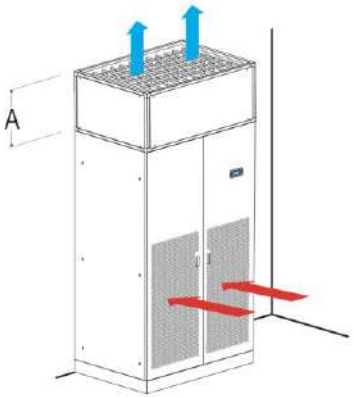
VERSION (1)		U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U
SIZE		E0	E1	E2	E3	E3P	E4	E5	E6	E7	E8	E9	E10
A	m	490	490	490	490	510	510	510	510	510	510	510	510
Weight (2)	kg	15	21	23	30	36	45	50	65	75	90	100	120
Weight CL.0 or A1 (EN 13501-1) (2)	kg	18	25	28	37	44	54	61	77	89	106	118	142

1. U = Under, downflow / O = Over, upflow
2. Add this value to the total unit weight

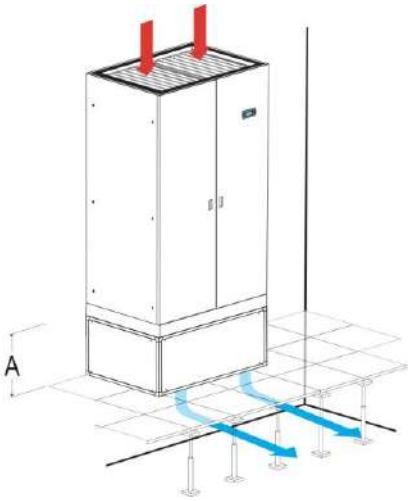


P015: SILENCED PLENUM
The optional is not available for size E0.
The plenum must be installed on air delivery.
The plenum is fitted with noise absorption partitions to reduce the noise emission.
Remove the frontal panels for inspection.

P015 OVER



P015 UNDER



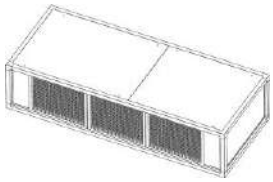
VERSION (1)		U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U
SIZE		E0	E1	E2	E3	E3P	E4	E5	E6	E7	E8	E9	E10
A	mm	--	490	490	490	510	510	510	510	510	510	510	510
Weight (2)	kg	--	25	27	30	36	45	50	65	80	90	100	120

1. U = Under, downflow / O = Over, upflow
2. Add this value to the total unit weight

ACOUSTIC DATA

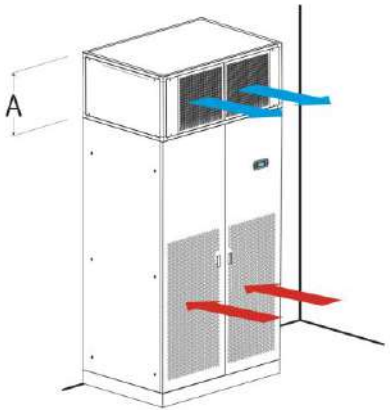
VERSION (1)		U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U	U
MODEL		007	013	021	032	045	053	072	081	100	120	138	160	215
SIZE		E0	E1	E2	E3	E3P	E4	E5	E6	E7	E8	E9	E10	E10
NOISE LEVEL (2)														
On air delivery Under	dB(A)	--	62,1	70,6	72,0	74,5	75,1	75,5	75,9	76,9	80,3	79,8	79,1	79,1
On air intake Under	dB(A)	--	56,0	60,9	62,1	66,2	66,7	65,6	67,5	68,5	70,4	71,4	70,7	70,7
On front side Under	dB(A)	--	46,7	51,4	52,5	56,7	57,2	56,0	58,1	59,0	60,8	61,9	61,2	61,2
On air delivery Over	dB(A)	--	62,1	70,6	72,0	74,5	75,1	75,5	75,9	76,9	80,3	79,8	--	--
On air intake Over (3)	dB(A)	--	50,8	55,3	56,6	60,7	61,2	60,1	62,1	63,0	64,9	62,6	--	--
On front side Over (4)	dB(A)	--	46,7	51,4	52,5	56,7	57,2	56,0	58,1	59,0	60,8	58,6	--	--
Additional pressure drops (5)	Pa	--	24	29	48	60	64	63	72	79	61	82	131	131
Air flow	m^3/h	--	2850	4800	7800	10800	13100	16350	20000	24200	28300	33100	37150	37150

1. U = Under, downflow / O = Over, upflow
2. Noise pressure level at 1 meter in free field – ISO 3744
3. Air intake from the front
4. Air intake from the bottom
5. Value to be subtracted from the nominal external static pressure of the unit.

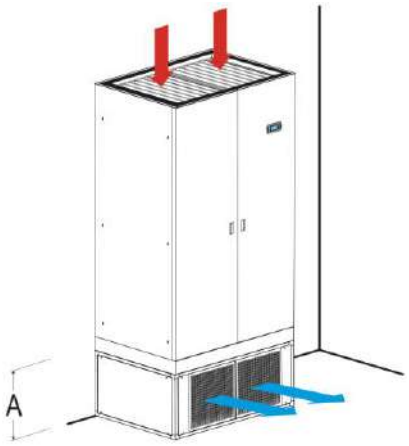


P016: SILENCED PLENUM + 1 GRILLE
The optional is not available for size E0.
The plenum must be installed on air delivery.
The plenum allows the frontal air distribution directly into the room and a noise reduction of the air delivery. The plenum is supplied with air distribution grille with double row adjustable grilles on front side and noise absorption partitions,

P016 OVER



P016 UNDER



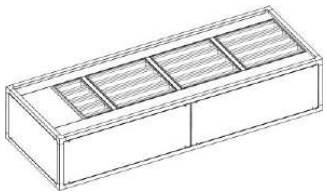
VERSION (1)		U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U
SIZE		E0	E1	E2	E3	E3P	E4	E5	E6	E7	E8	E9	E10
A	mm	--	490	490	490	510	510	510	510	510	510	510	510
Weight (2)	kg	--	30	30	37	45	67	72	78	88	110	130	150

1. U = Under, downflow / O = Over, upflow
2. Add this value to the total unit weight

ACOUSTIC DATA

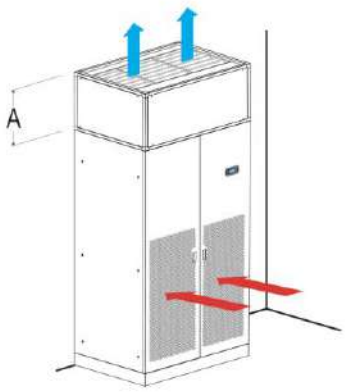
VERSION (1)		U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U	U
MODEL		007	013	021	032	045	053	072	081	100	120	138	160	215
SIZE		E0	E1	E2	E3	E3P	E4	E5	E6	E7	E8	E9	E10	E10
SOUND LEVEL (2)														
On air delivery Under	dB(A)	--	60,0	70,5	71,7	74,0	73,8	75,1	75,4	76,1	79,3	78,8	78,0	78,0
On air intake Under	dB(A)	--	55,3	61,0	62,5	66,2	66,1	65,9	67,6	68,4	70,0	71,1	70,3	70,3
On front side Under	dB(A)	--	46,0	51,5	52,9	56,8	56,6	56,3	58,2	58,9	60,5	61,6	60,8	60,8
On air delivery Over	dB(A)	--	60,0	70,5	71,7	74,0	73,8	75,1	75,4	76,1	79,3	78,8	--	--
On air intake Over (3)	dB(A)	--	50,1	55,4	57,0	60,8	60,6	60,4	62,2	62,9	64,6	62,6	--	--
On front side Over (4)	dB(A)	--	46,0	51,5	52,9	56,8	56,6	56,3	58,2	58,9	60,5	58,6	--	--
Additional pressure drops (5)	Pa	--	60	100	118	150	159	157	178	196	180	204	180	180
Air flow	m^3/h	--	2700	4650	7800	10800	12500	16350	20000	23200	27500	32500	35300	35300

1. U = Under, downflow / O = Over, upflow
2. Noise pressure level at 1 meter in free field – ISO 3744
3. Air intake from the front
4. Air intake from the bottom
5. Value to be subtracted from the nominal external static pressure of the unit

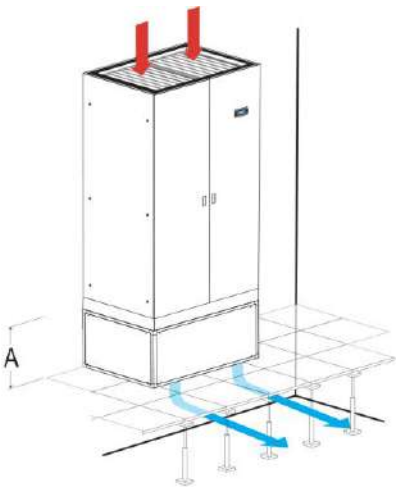


P017 / P018 / P019: PLENUM + FILTER
The optional is not available for size E0.
The plenum must be installed on air delivery.
The optional is not compatible with “P084 air filter ePM10 50%”.
The plenum is fitted with high efficiency rigid bag filters.
Filters are made of glass micro fibre and are not regenerable.
Remove the frontal panels for filters replacement.

P017 / P018 / P019 OVER



P017 / P018 / P019 UNDER



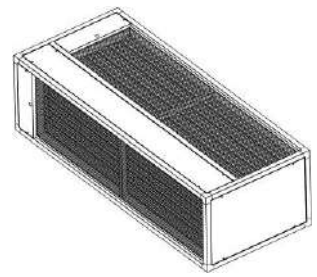
VERSION (1)		U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U
SIZE		E0	E1	E2	E3	E3P	E4	E5	E6	E7	E8	E9	E10
A	mm	--	490	490	490	510	510	510	510	510	510	510	510
Weight (2)	kg	--	26	27	30	33	45	55	65	80	90	100	120

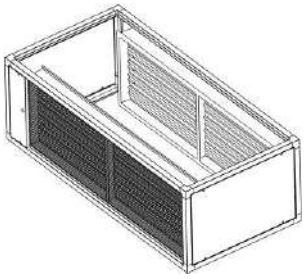
1. U = Under, downflow / O = Over, upflow
2. Add this value to the total unit weight

VERSION (1)		U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U / O	U
SIZE		E0	E1	E2	E3	E3P	E4	E5	E6	E7	E8	E9	E10
PRESSURE DROPS (2)													
Filters ISO $ePM_{2.5}$ 50%	Pa	--	67	114	152	153	137	151	185	165	140	183	145
Filters ISO ePM_1 50%	Pa	--	82	144	187	188	167	186	227	202	176	225	197
Filters ISO ePM_1 85%	Pa	--	100	179	226	228	204	226	295	265	237	272	216

1. U = Under, downflow / O = Over, upflow
2. Data referred to the nominal air flow and clean filters. Value to be subtracted from the nominal external static pressure of the unit.

OPTIONAL ACCESSORIES: P034 – INTAKE FREE-COOLING PLENUM



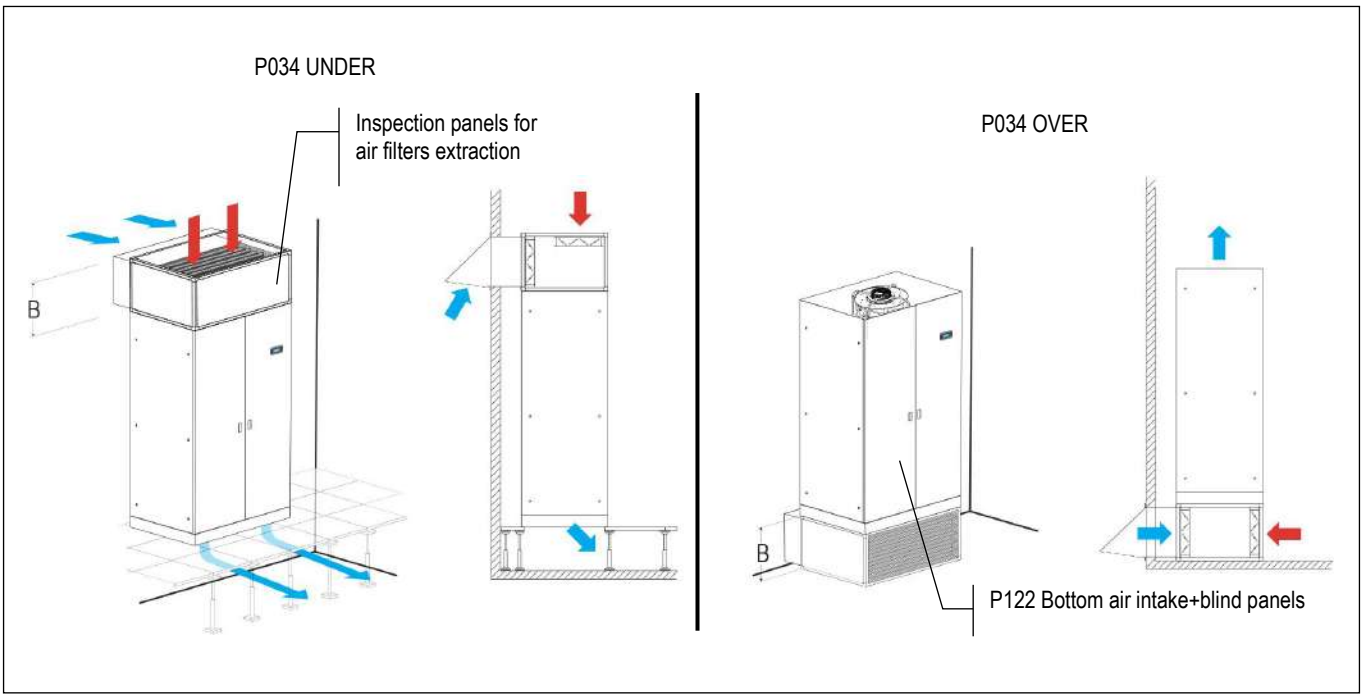


The optional is supplied separately and the installation on the unit is at Customer care.
The optional is not available for size E0.
The optional requires mandatory accessories “P161 T/rH air intake sensor“, “4666 External air probe”, “A812 Free-cooling direct control” and “P122 Bottom air intake+blind panels, for OVER version only”.
The plenums have same technical characteristics and base dimensions of the machine cabinet.
The optional allow to obtain free-cooling by direct ambient air intake into the room.
The dampers are proportionally managed by the microprocessor control, that regulates the quantity of the ambient air to put in the room per the set-point.

COMPONENTS

- Frame in aluminium extrusion, painted with epoxy powders. Colour RAL 9005;
- Panels in galvanized steel sheet with protective surfaces treatment in compliance with UNI ISO 9227/ASTMB117 and ISO 7253, and painted with epoxy powders. Colour RAL 9005;
- Panels insulated with polyurethane foam and seals to ensure air tight.
- Removable panels with screws.
- Opposed blade dampers in galvanized steel sheet and safety grille for ambient air and room air suction.
- Actuator for each damper.
- Terminals for electric connection to the unit.
- Set of fixing elements to fasten the plenum to the unit.
- T/rH air intake sensor. The sensor must be moved outside the air conditioners for a proper read of the room temperature value.
- External air probe. The sensor must be installed in the outdoor air suction duct or anyway protected against atmospherics agent.
- Free contact for free-cooling operating status monitoring.
- Terminals on indoor unit for:
  - 24 Vac power supply for the overpressure damper servomotor
  - 0-10Vdc control signal for the servomotor

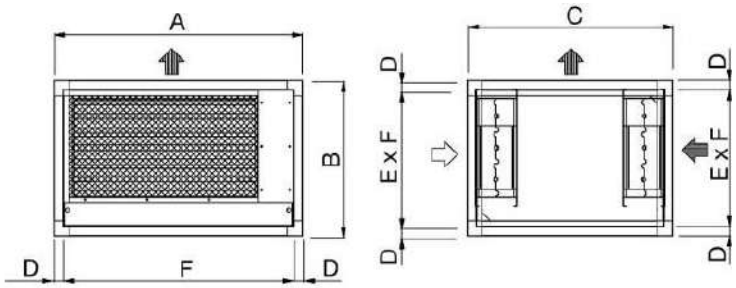
INSTALLATION EXAMPLE



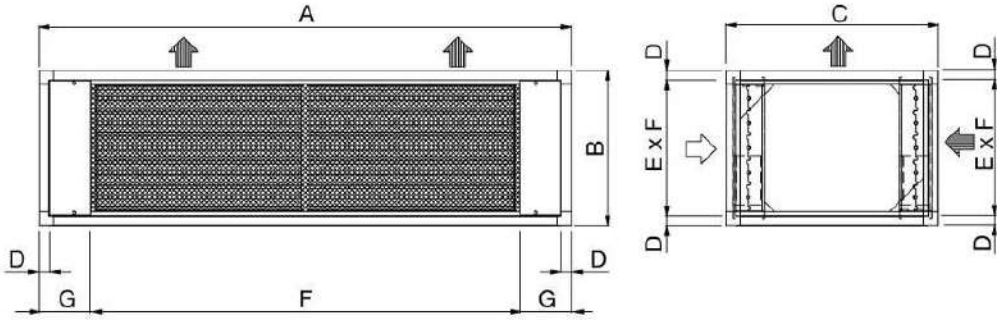
Ducting for ambient air suction are at Customer care.
A rain cover with grille on ambient air intake is recommended.

OVER VERSION

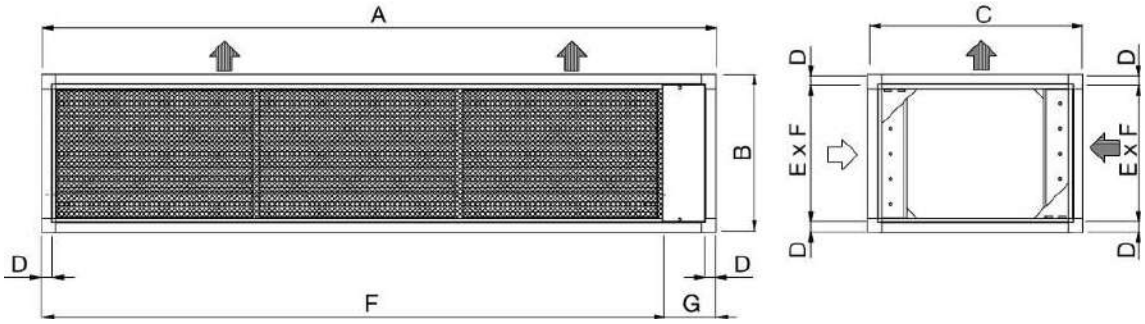
SIZE E1 / E2 / E3 / E3P



SIZE E4 / E5



SIZE E6 / E7 / E8 / E9 / E10

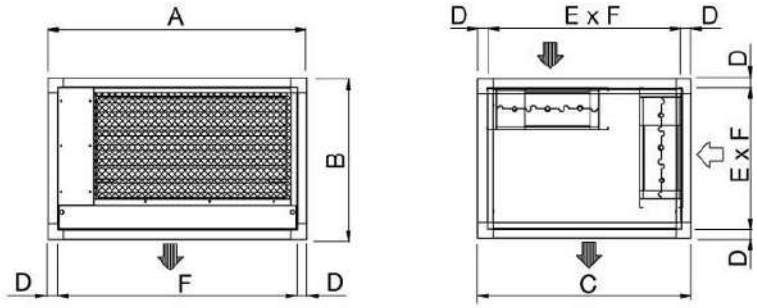


VERSION (1)		O	O	O	O	O	O	O	O	O	O	O	O
SIZE		E0	E1	E2	E3	E3P	E4	E5	E6	E7	E8	E9	E10
A	mm	--	650	785	1085	1085	1305	1630	1873	2175	2499	2899	--
B	mm	--	490	490	490	630	630	630	630	630	630	630	--
C	mm	--	650	650	750	905	905	905	905	905	905	905	--
D	mm	--	30	30	30	40	40	40	40	40	40	40	--
E	mm	--	430	430	430	550	550	550	550	550	550	550	--
F	mm	--	590	725	1025	1005	1035	1335	1664	1965	2220	2670	--
G	mm	--	--	--	--	--	135	147,5	209	210	279	229	--
Weight (2)	kg	--	24	27	35	43	53	61	78	90	110	130	--

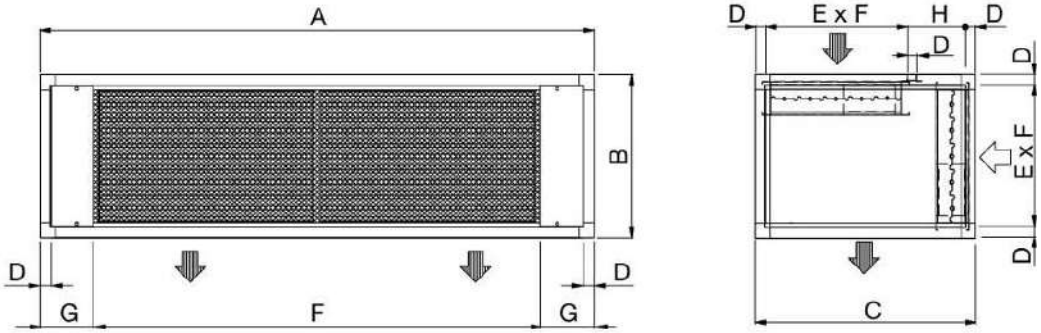
1. U = Under, downflow / O = Over, upflow
2. Add this value to the total unit weight

UNDER VERSION

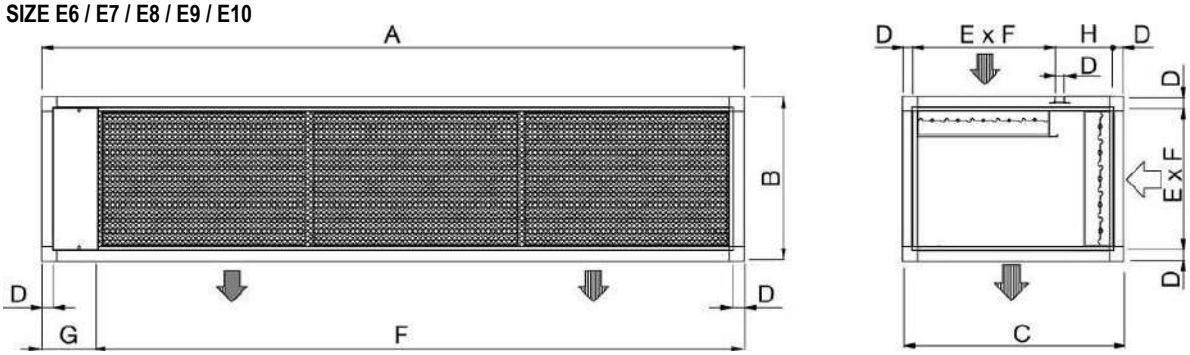
SIZE E1 / E2 / E3 / E3P



SIZE E4 / E5



SIZE E6 / E7 / E8 / E9 / E10



VERSION (1)		U	U	U	U	U	U	U	U	U	U	U	U
SIZE		E0	E1	E2	E3	E3P	E4	E5	E6	E7	E8	E9	E10
A	mm	--	650	785	1085	1085	1305	1630	1873	2175	2499	2899	3510
B	mm	--	490	490	490	630	630	630	630	630	630	630	630
C	mm	--	650	650	750	905	905	905	905	905	905	905	905
D	mm	--	30	30	30	40	40	40	40	40	40	40	40
E	mm	--	430	430	430	550	550	550	550	550	550	550	550
F	mm	--	590	725	1025	1005	1035	1335	1664	1965	2220	2670	3135
G	mm	--	--	--	--	--	135	147,5	209	210	279	229	375
H	mm	--	--	--	--	275	275	275	275	275	275	275	275
Weight (2)	kg	--	24	27	35	43	53	61	78	90	110	130	155

1. U = Under, downflow / O = Over, upflow
2. Add this value to the total unit weight

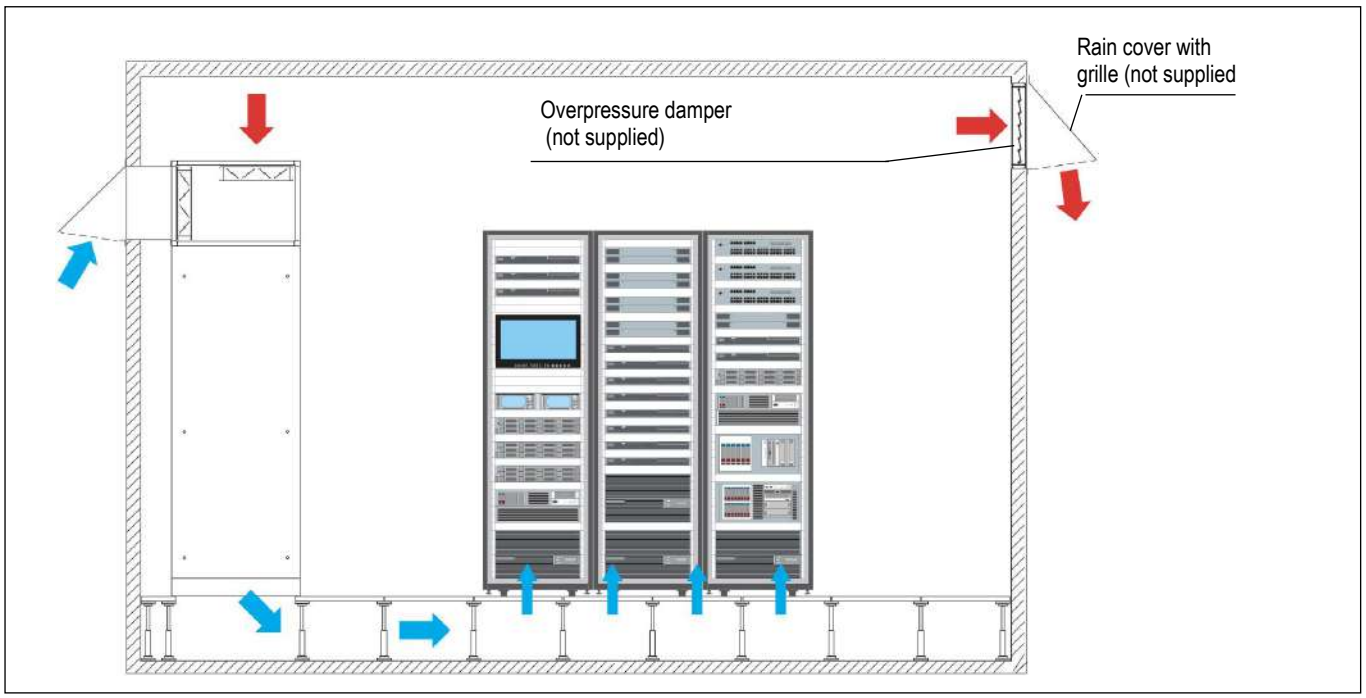
WARNING

IT IS COMPULSORY TO INSTALL INTO THE ROOM AN APPROPRIATELY SIZED OVERPRESSURE DAMPER TO ALLOW THE ROOM AIR EXHAUSTION DURING FREE-COOLING WORKING MODE

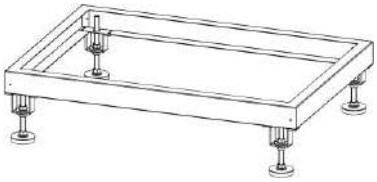
OVERPRESSURE DAMPER – Not supplied

During free-cooling operation, the air conditioner supplies ambient air directly into the room, this causes an increase in air pressure inside the room.
The overpressure damper avoids the increase in pressure in the room.
The damper must be installed at the highest point of the room to expel excess hot air to the outside.
Install the damper if possible in opposite position to air conditioner.

Air exhaustion must be protected with a rain cover and a grille (at Customer care).

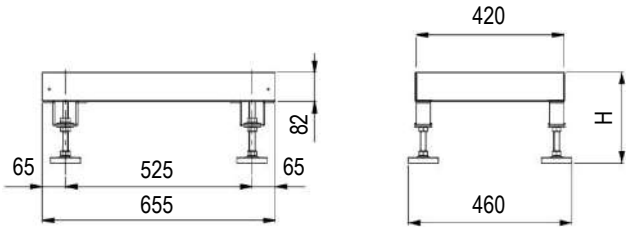


OPTIONAL ACCESSORIES: P041 – SUPPORT FRAME H 255-350MM
OPTIONAL ACCESSORIES: P042 – SUPPORT FRAME H 355-450MM
OPTIONAL ACCESSORIES: P043 – SUPPORT FRAME H 400-510MM

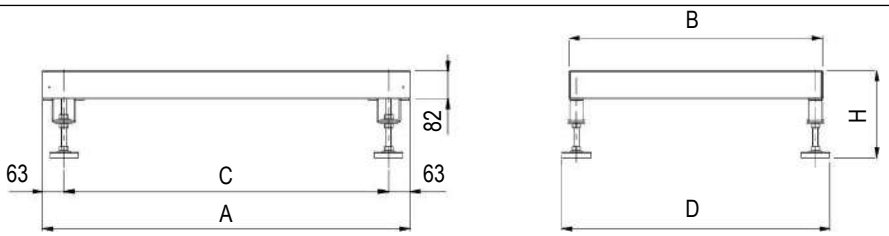


The accessory is supplied as an assembly kit.
It is not possible to match the support frame with plenum installed under the machine.
The floor stand is available in 3 different heights.

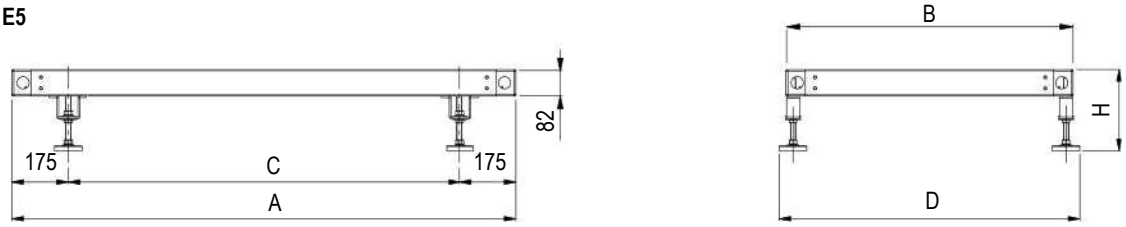
SIZE E0



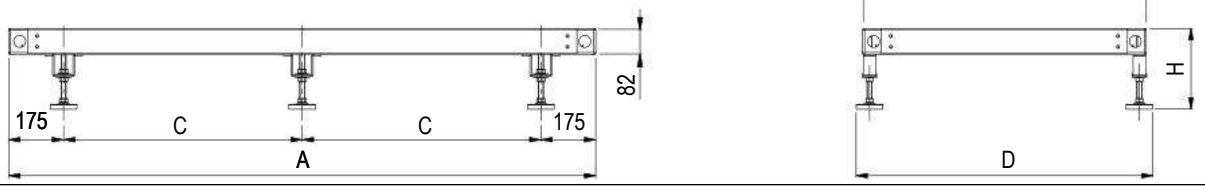
SIZE E1 – E2 – E3 – E3P



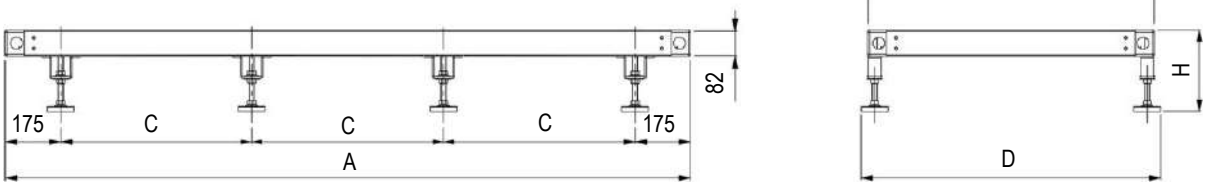
SIZE E4 – E5



SIZE E6 – E7 - E8 – E9



SIZE E10



SIZE		E0	E1	E2	E3	E3P	E4	E5	E6	E7	E8	E9	E10
A	mm	655	650	785	1085	1085	1305	1630	1873	2175	2499	2899	3510
B	mm	420	650	650	750	905	905	905	905	905	905	905	905
C	mm	525	524	659	959	959	955	1280	761,5	912,5	1074,5	1274,5	1053
D	mm	460	691	691	791	946	945	945	945	945	945	945	945

MODEL		P041 - Hmax350	P042 - Hmax450	P043 - Hmax510
H min height	mm	255	355	400
H max height	mm	350	450	510

OPTIONAL ACCESSORIES: A272 – CL.0 or A1 (EN13501-1) INSULATION

The optional is designed **TO SUPPLY THE PANELING ONLY WITH FIRE REACTION IN CLASS "0" OR "A1 (EN 13501-1)"**; furthermore allows a noise insulation of the panels of the air conditioners.

The pressure level reduction of the unit is about 2 dB(A). The reduction refers ONLY to the sound level radiated from the unit or in front of the unit. The noise level data on return and delivery air do not undergo reductions.

The accessory includes:

- External part as standard panel.
- Internal part in galvanized steel sheet.
- The inside noise insulation with special soundproof material.

REACTION TO FIRE CLASSIFICATION
On Italian territory, the classification is per the D.M. of June 26, 1984 and subsequent amendments, providing for a sort in "Classes" from 0 (non-combustible material) to 5 (extremely flammable material). The EN 13501-1 regulation is ordered in classes from A1 (non-combustible material) to F (extremely flammable material).
A comparison of the classes is not possible because the methods and evaluation criteria are completely different. The comparison table below is being considered purely indicative.

Definition	Italian classes	EN 13501-1
Non-combustible material	Class 0	A1
Combustible material, very limited contribution to fire	Class 1	A2 – B
Combustible material, limited contribution to fire	Class 2	A2 – B - C
Combustible material, medium contribution to fire	Class 3	C – D
Combustible material, highly contribution to fire	Class 4	E
Combustible material, easily flammable	Class 5	F

Is possible to provide the sandwich panels for the OVER units with air flow from the top.
This implies that the air intake must necessarily be from the base of the unit with front blind paneling.

The accessory increases the unit weight:

OVER													
Size		**E0**	**E1**	**E2**	**E3**	**E3P**	**E4**	**E5**	**E6**	**E7**	**E8**	**E9**	**E10**
Weight increasing (1)	kg	25	26	42	48	58	64	72	86	100	115	130	--

UNDER													
Size		**E0**	**E1**	**E2**	**E3**	**E3P**	**E4**	**E5**	**E6**	**E7**	**E8**	**E9**	**E10**
Weight increasing (1)	kg	25	30	48	55	65	70	86	110	130	145	165	195

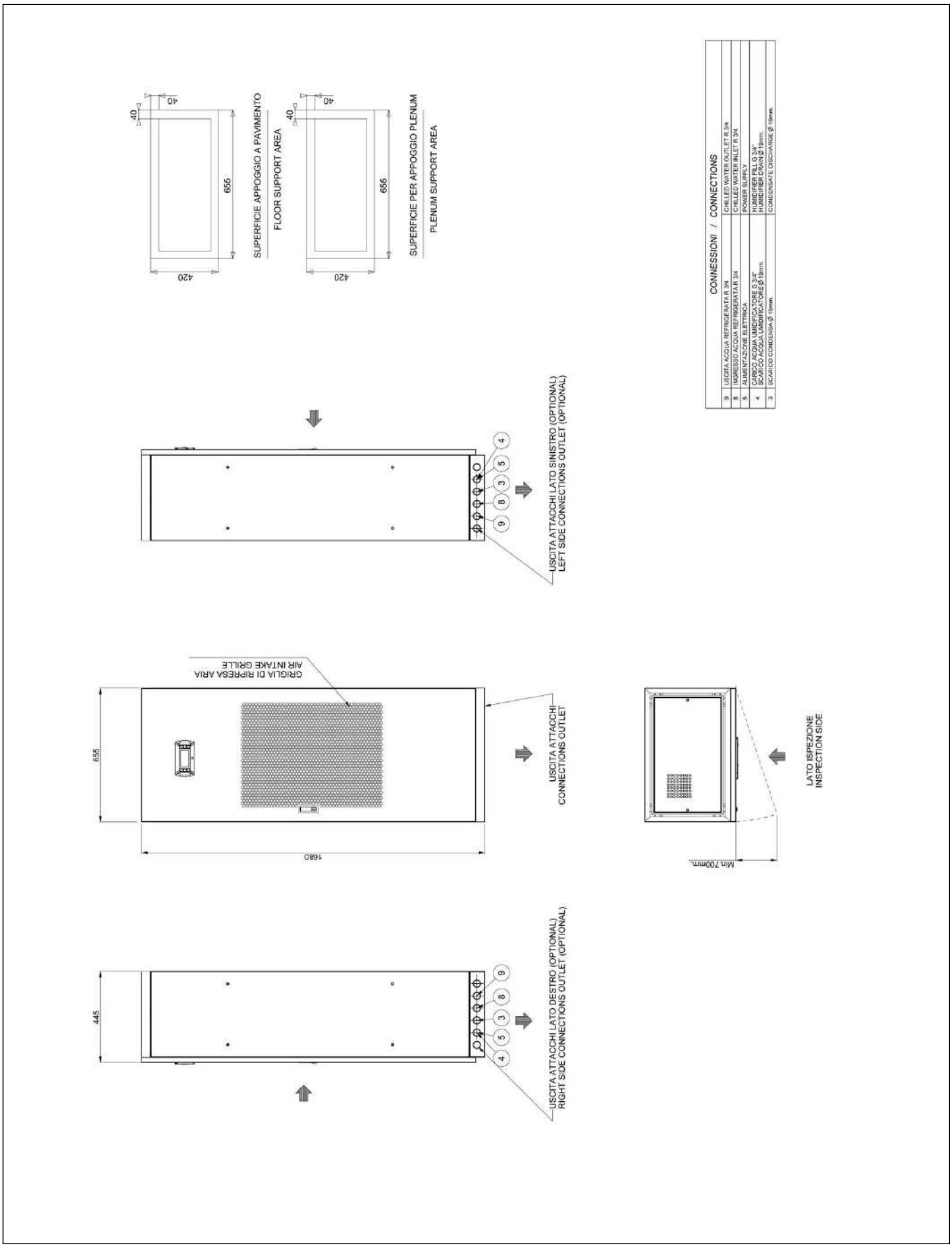
1. Add this value to the total unit weight

OPTIONAL ACCESSORIES: P151 – LOWERED DISPLAY FOR UNDER

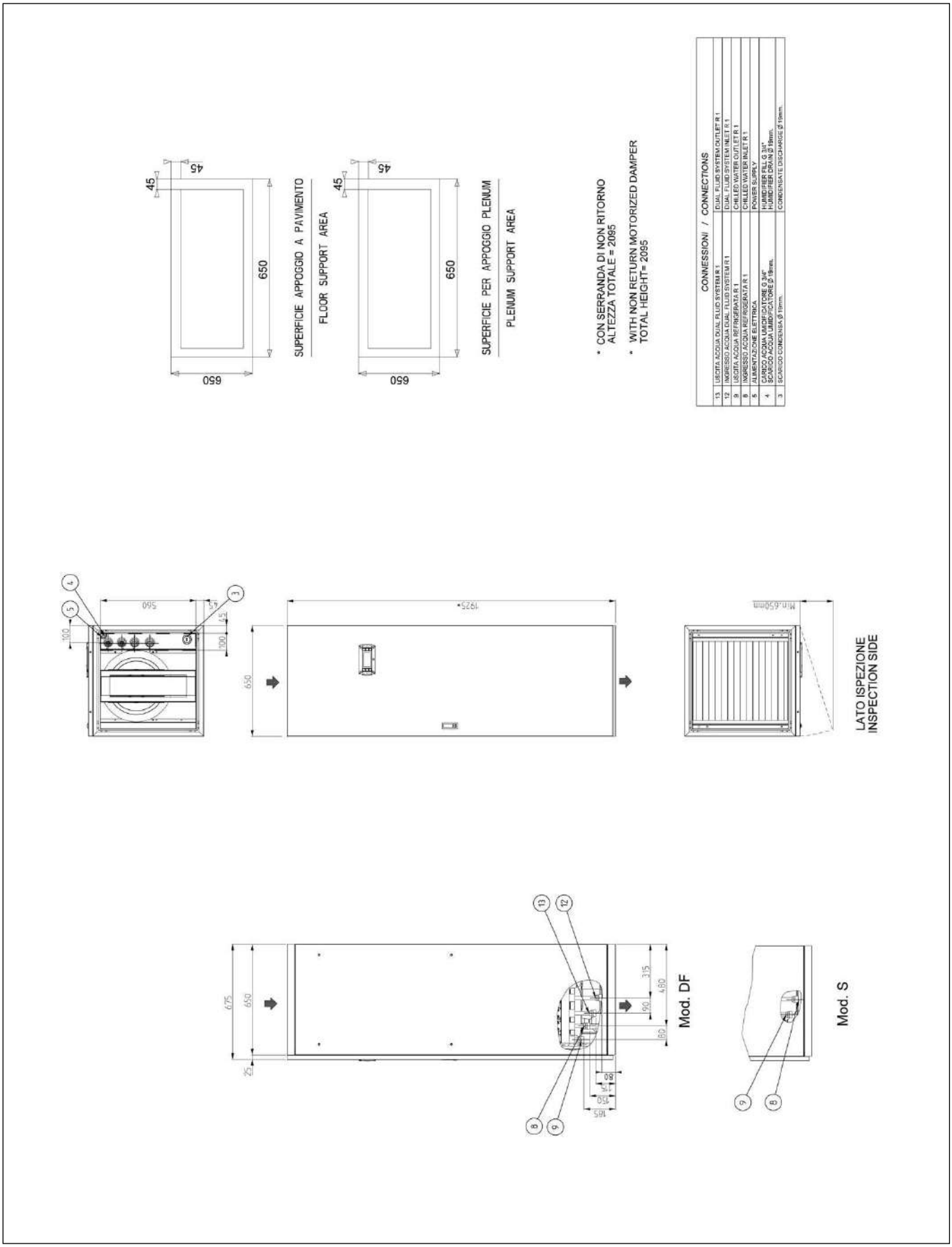
Size E0 excluded.
For machines installed above the supply plenum.
The display / keypad on the front panel of the machine is installed lowered by about 50cm to facilitate consultation and use.

MACHINE DRAWINGS

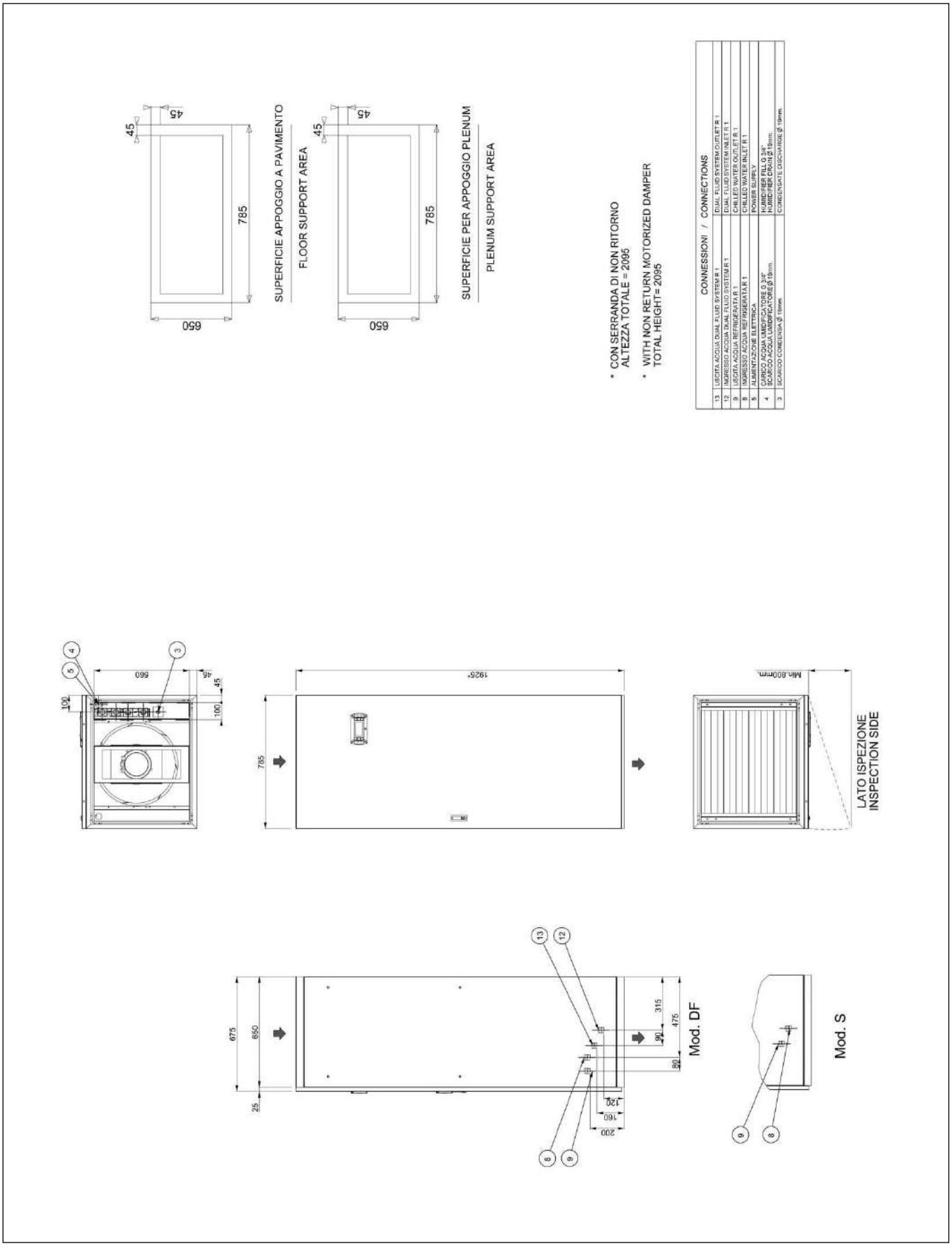
Dimensions in mm - UNDER E0



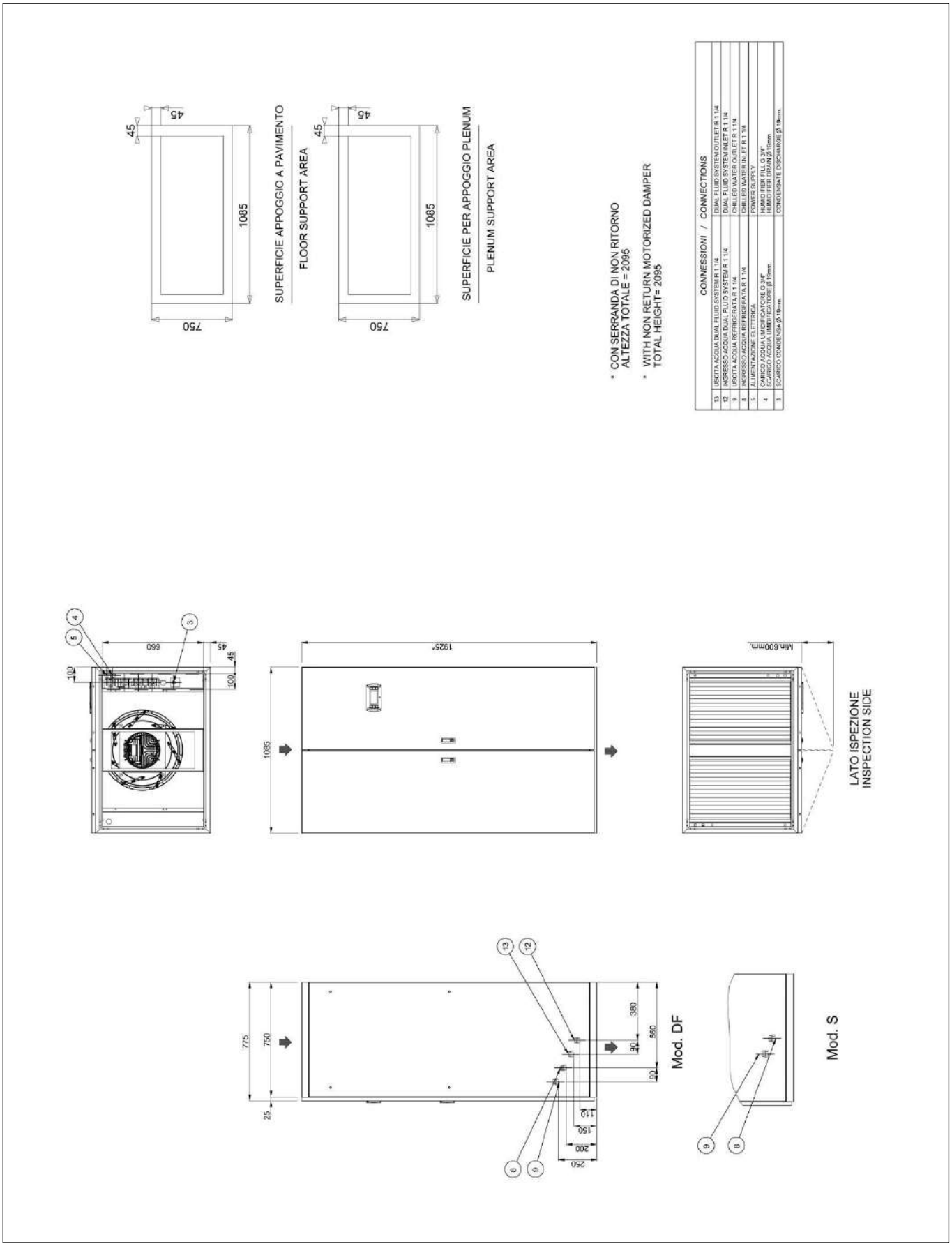
MACHINE DRAWINGS - Dimensions in mm - UNDER E1



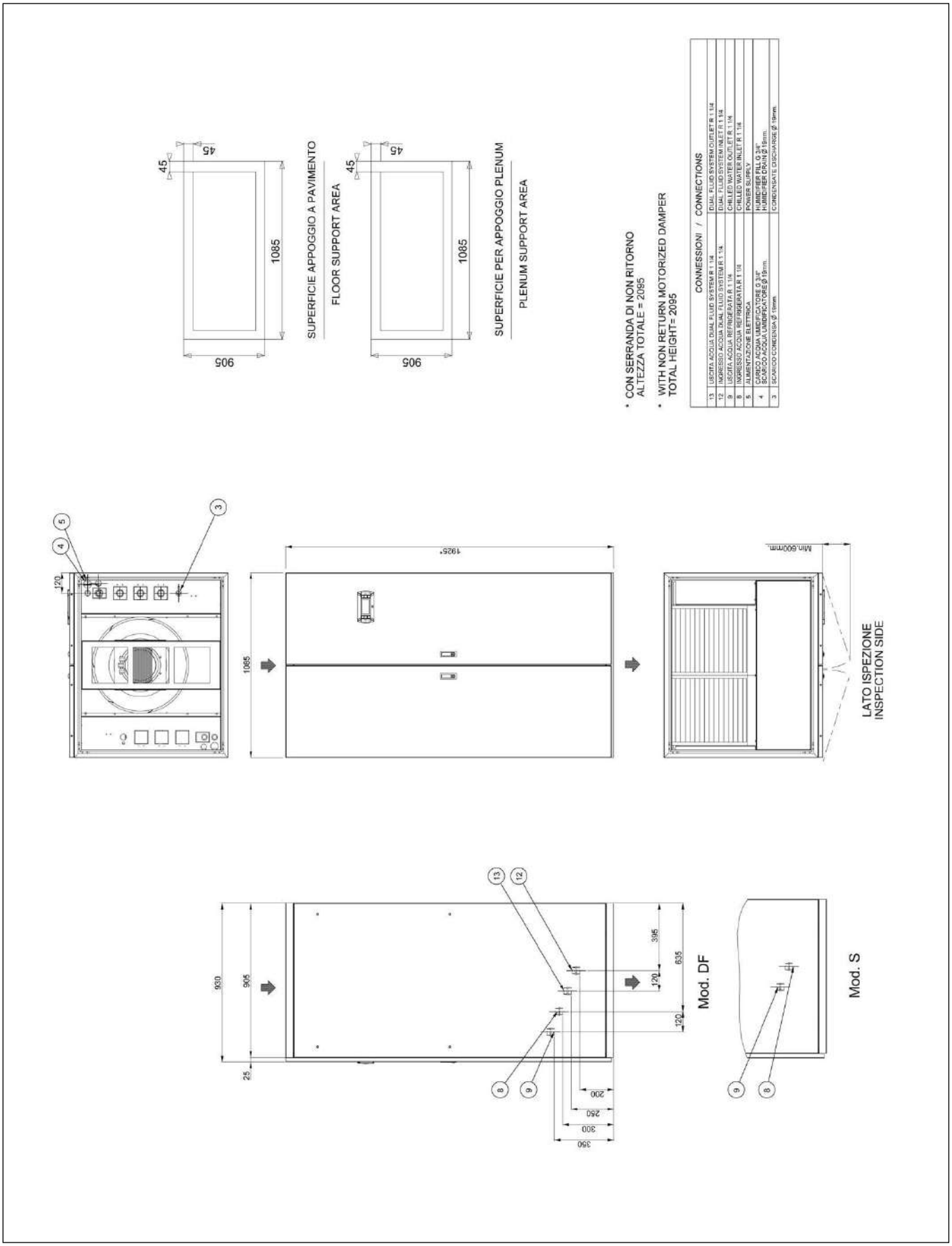
MACHINE DRAWINGS - Dimensions in mm - UNDER E2



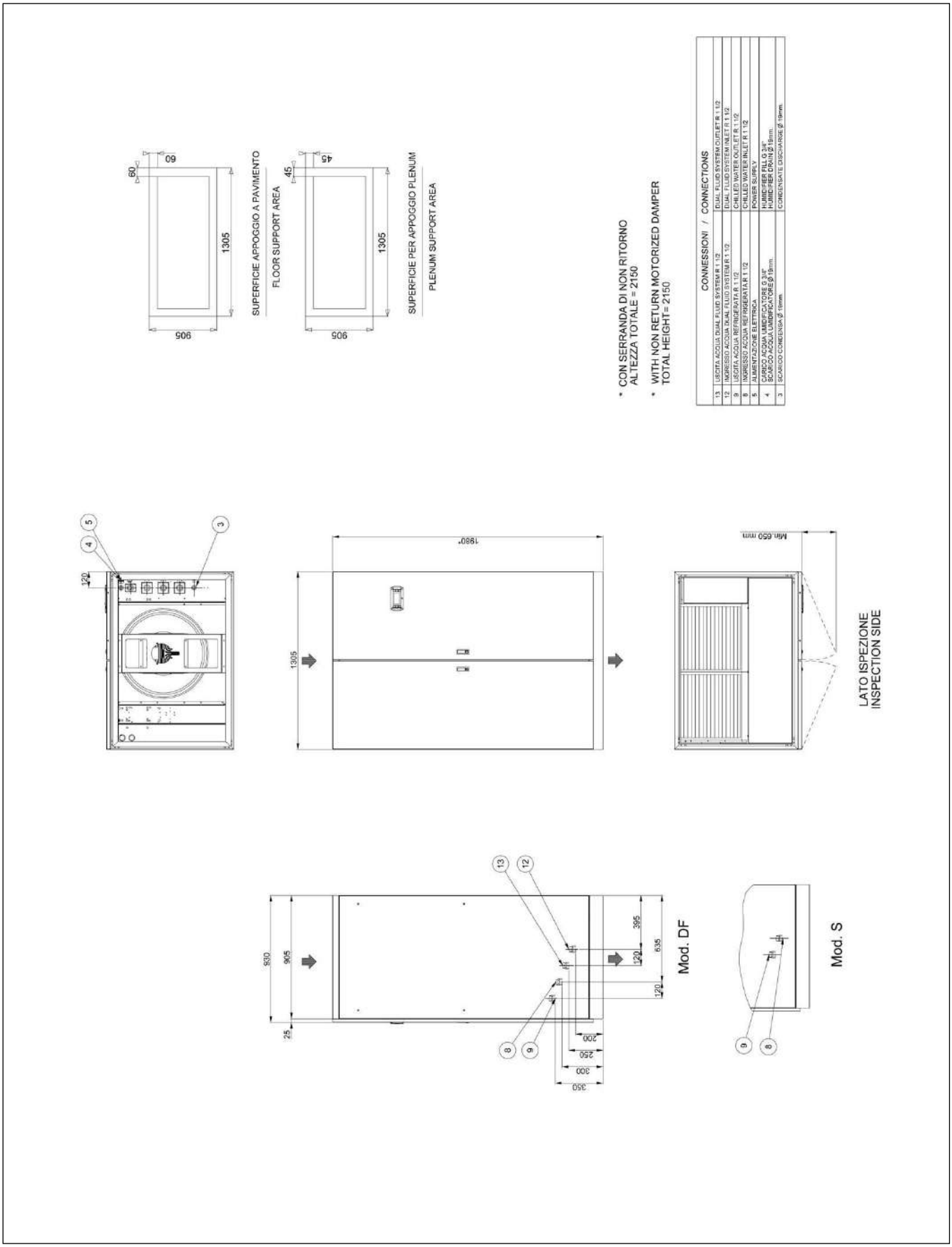
MACHINE DRAWINGS - Dimensions in mm - UNDER E3



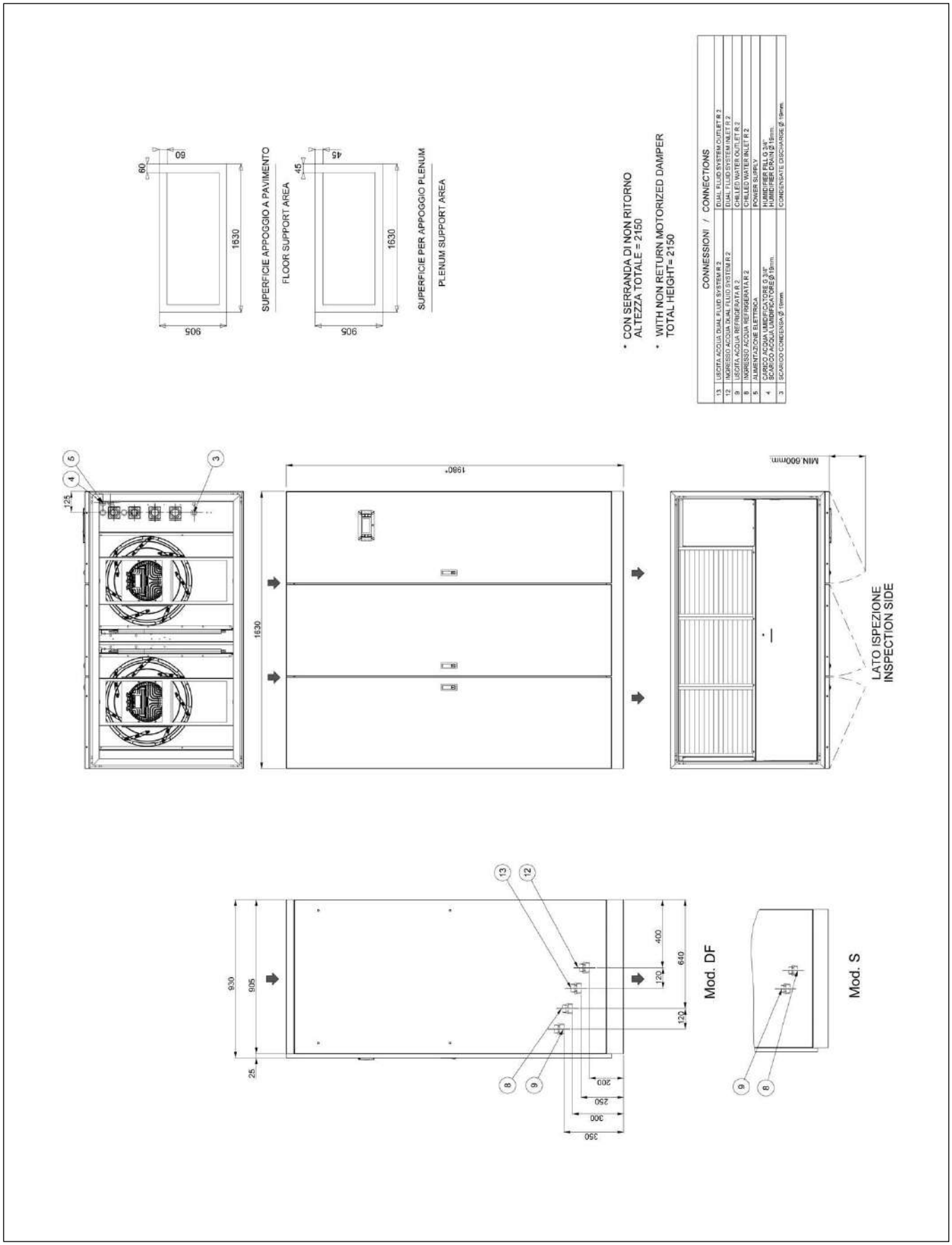
MACHINE DRAWINGS - Dimensions in mm - UNDER E3P



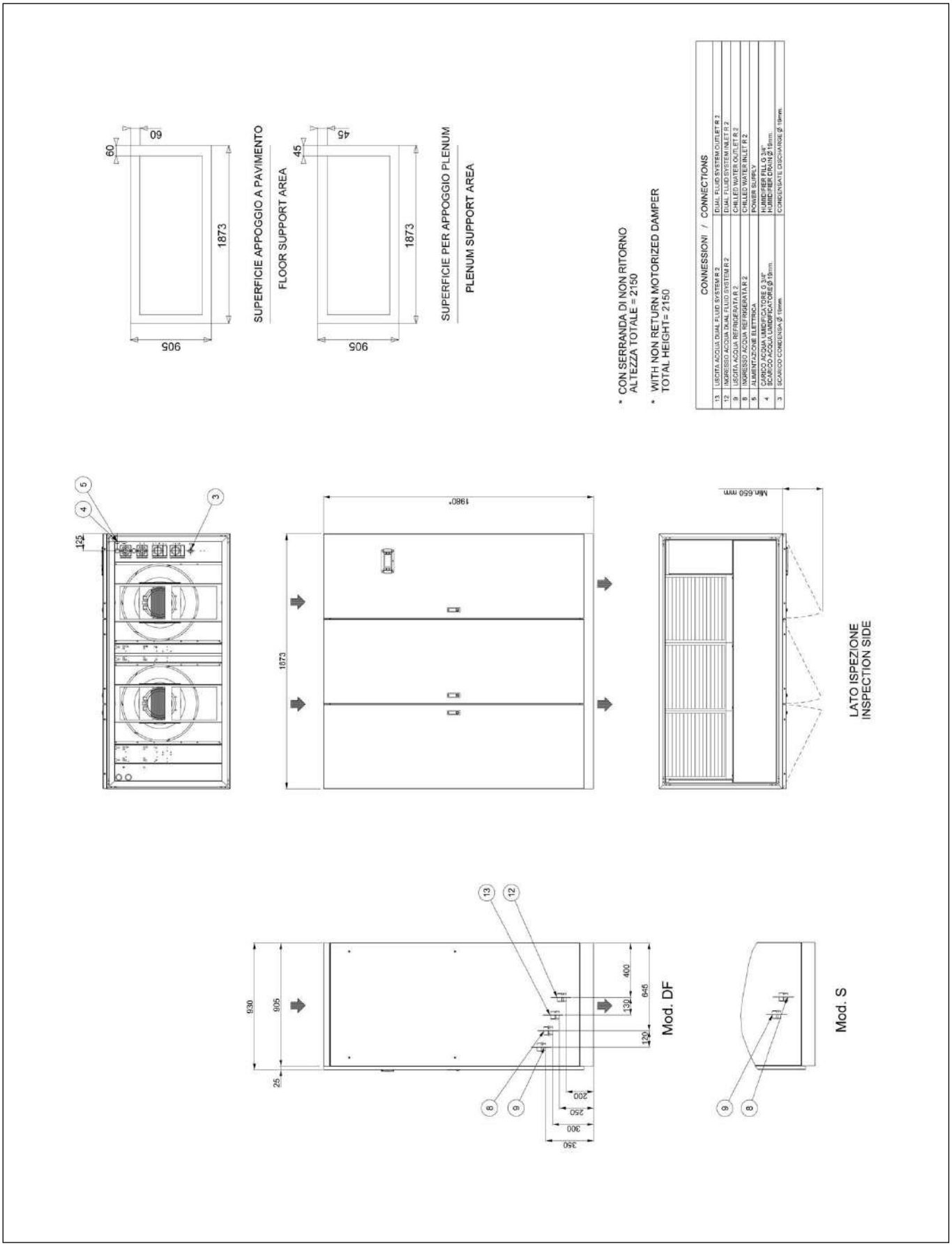
MACHINE DRAWINGS - Dimensions in mm - UNDER E4



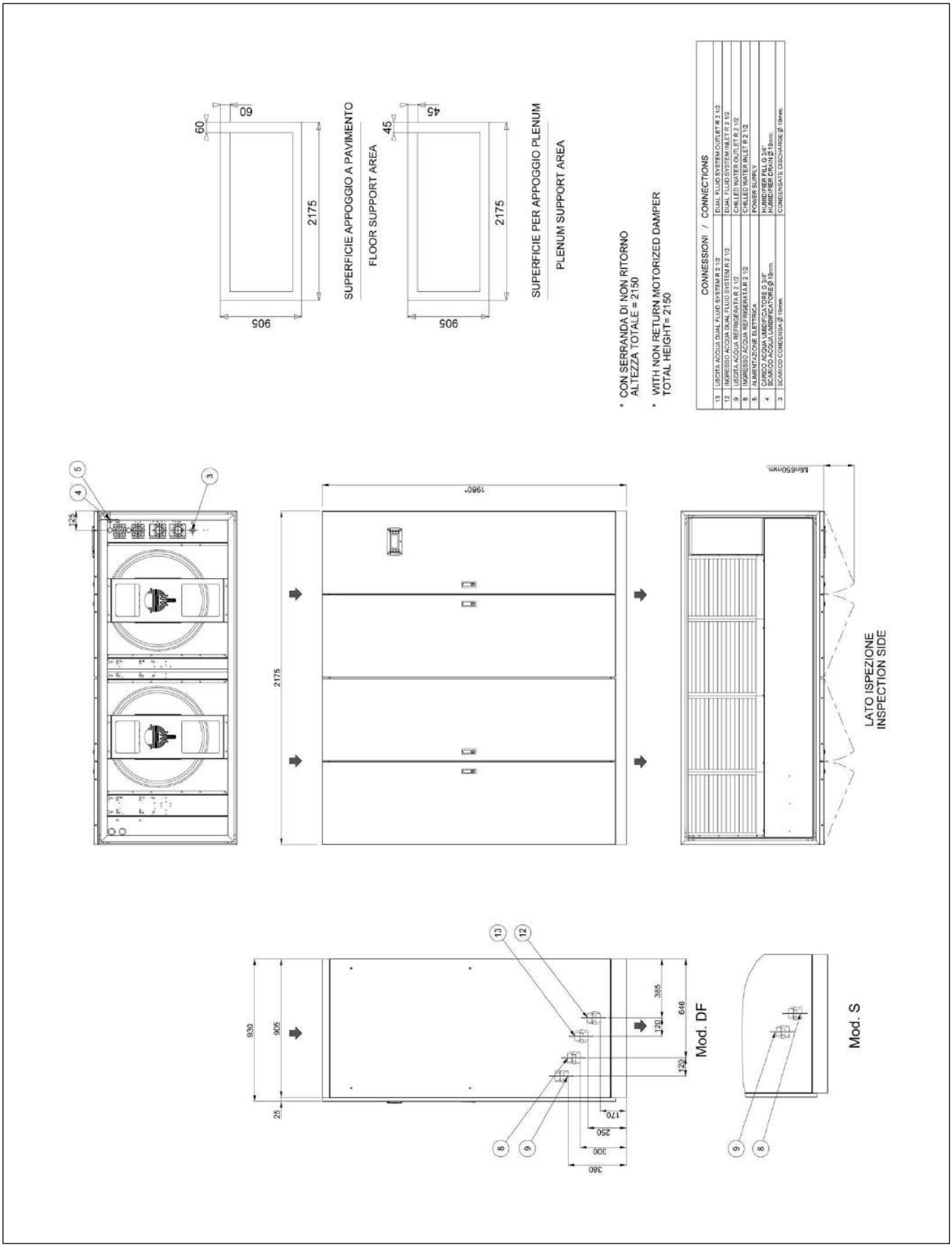
MACHINE DRAWINGS - Dimensions in mm - UNDER E5



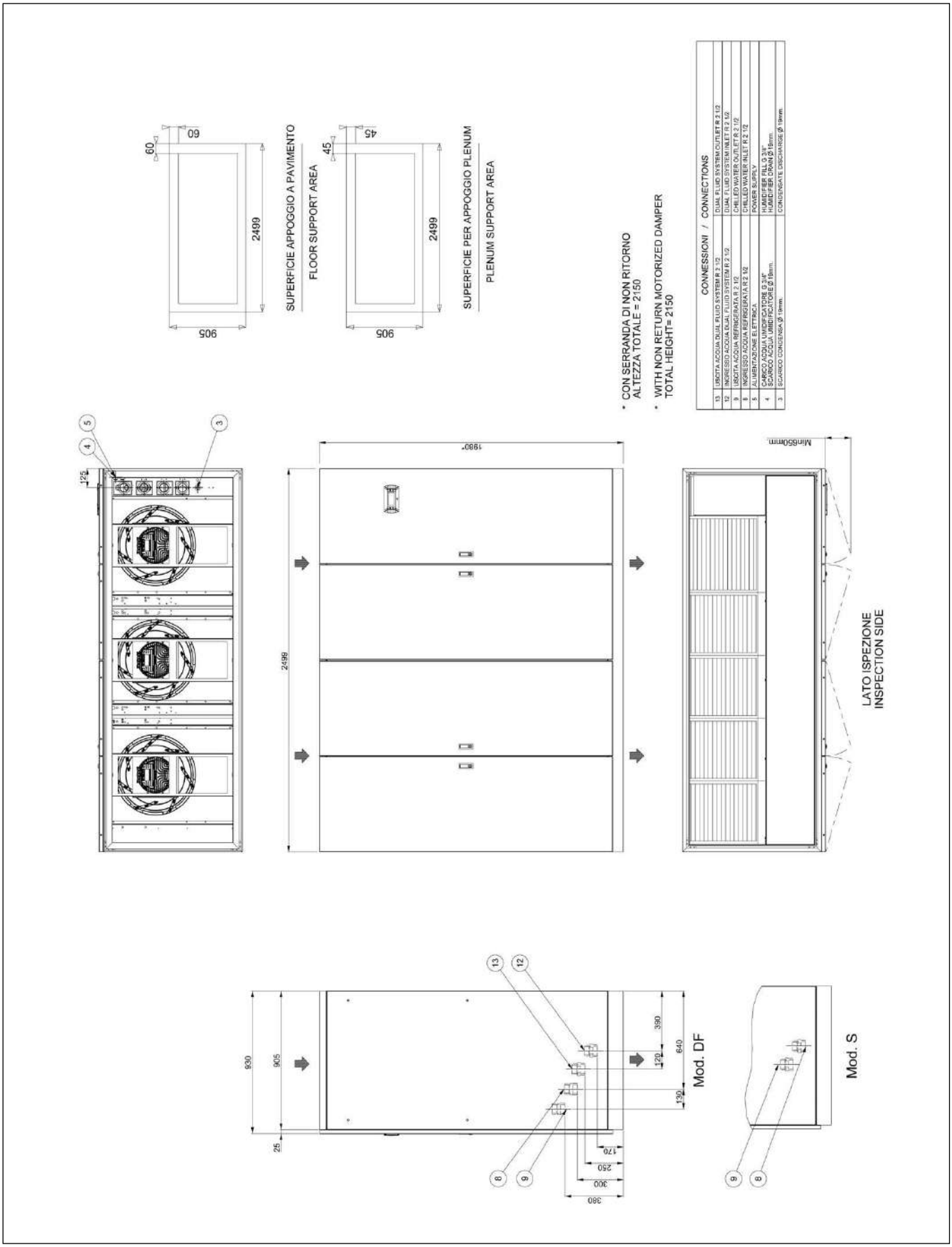
MACHINE DRAWINGS - Dimensions in mm - UNDER E6



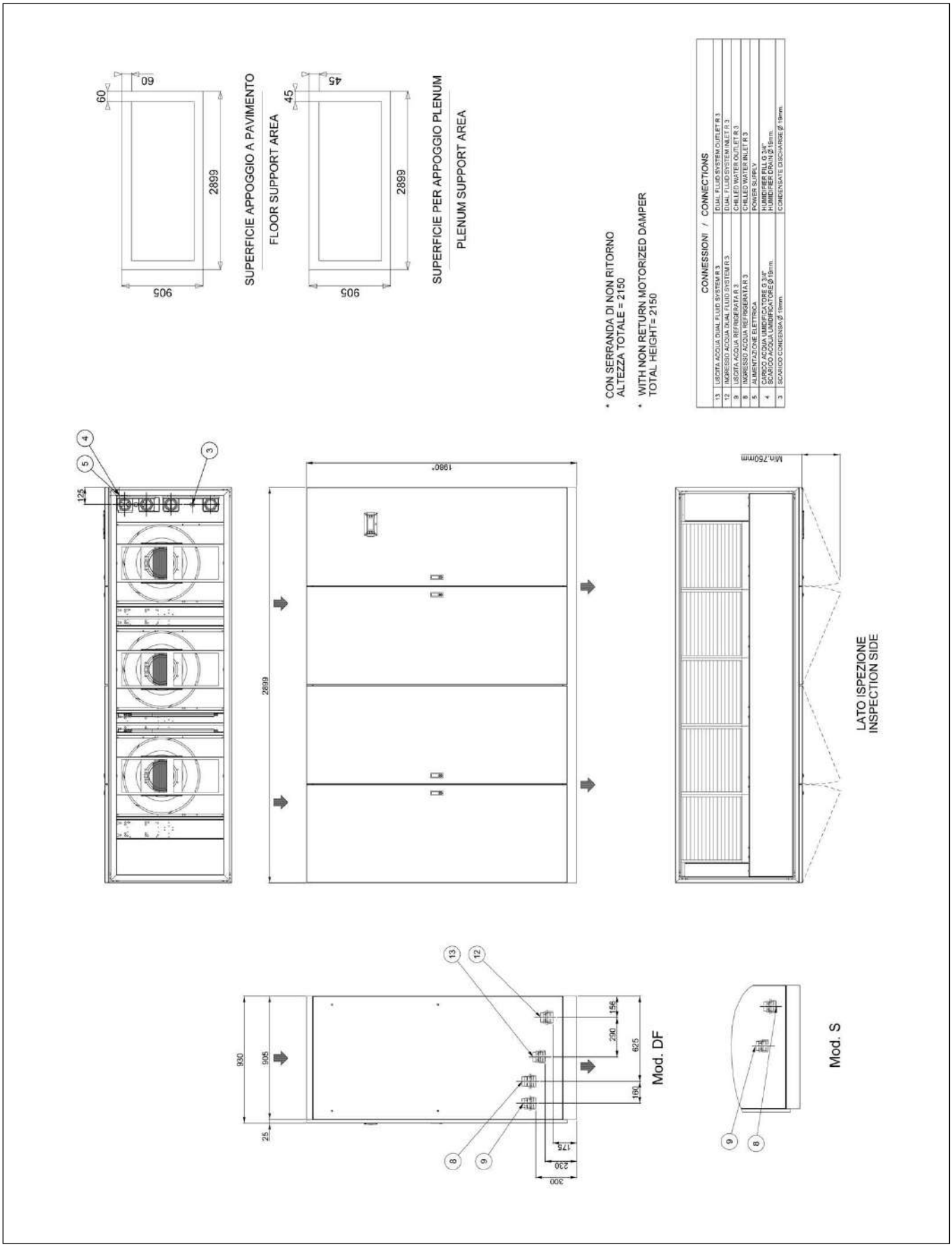
MACHINE DRAWINGS - Dimensions in mm - UNDER E7



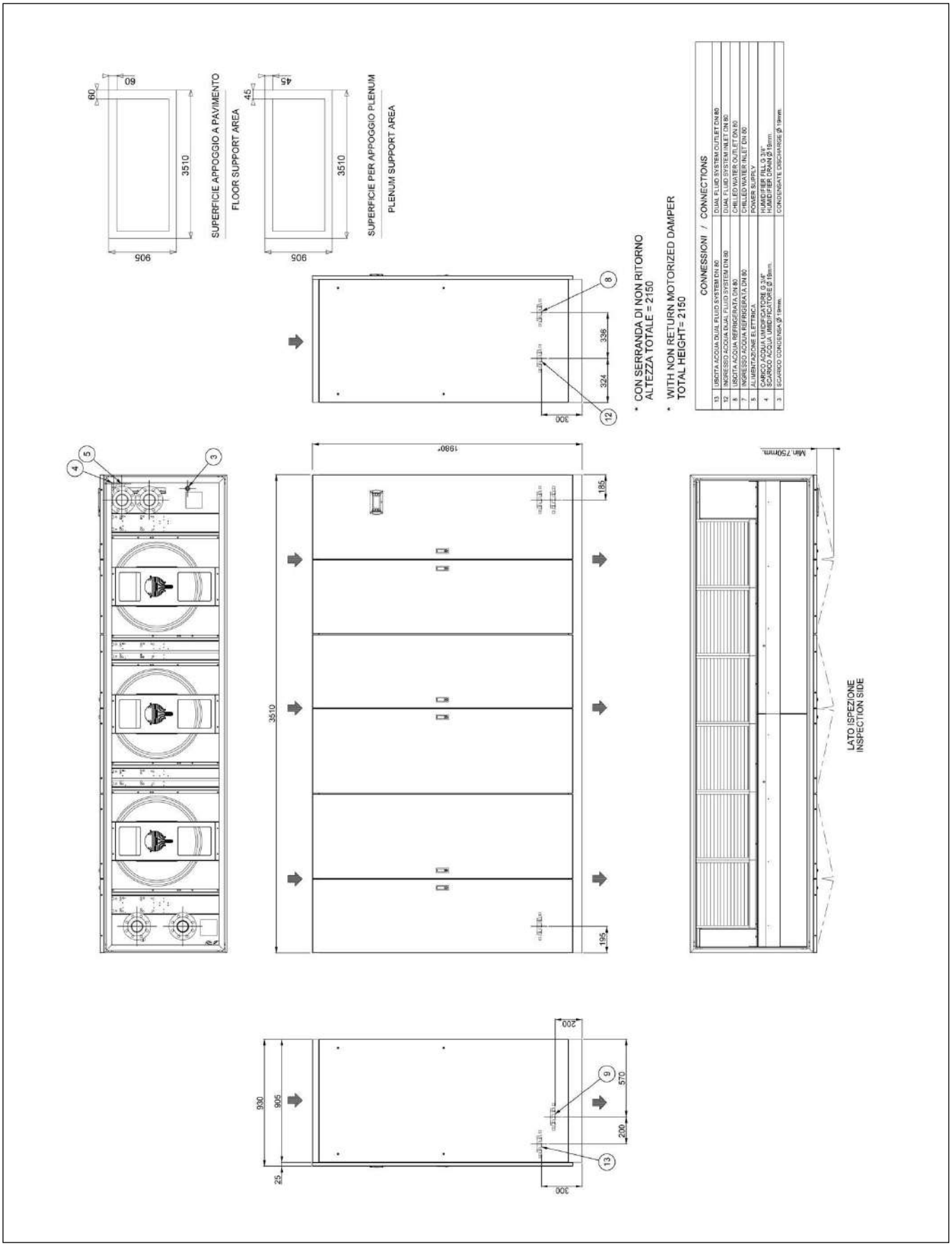
MACHINE DRAWINGS - Dimensions in mm - UNDER E8



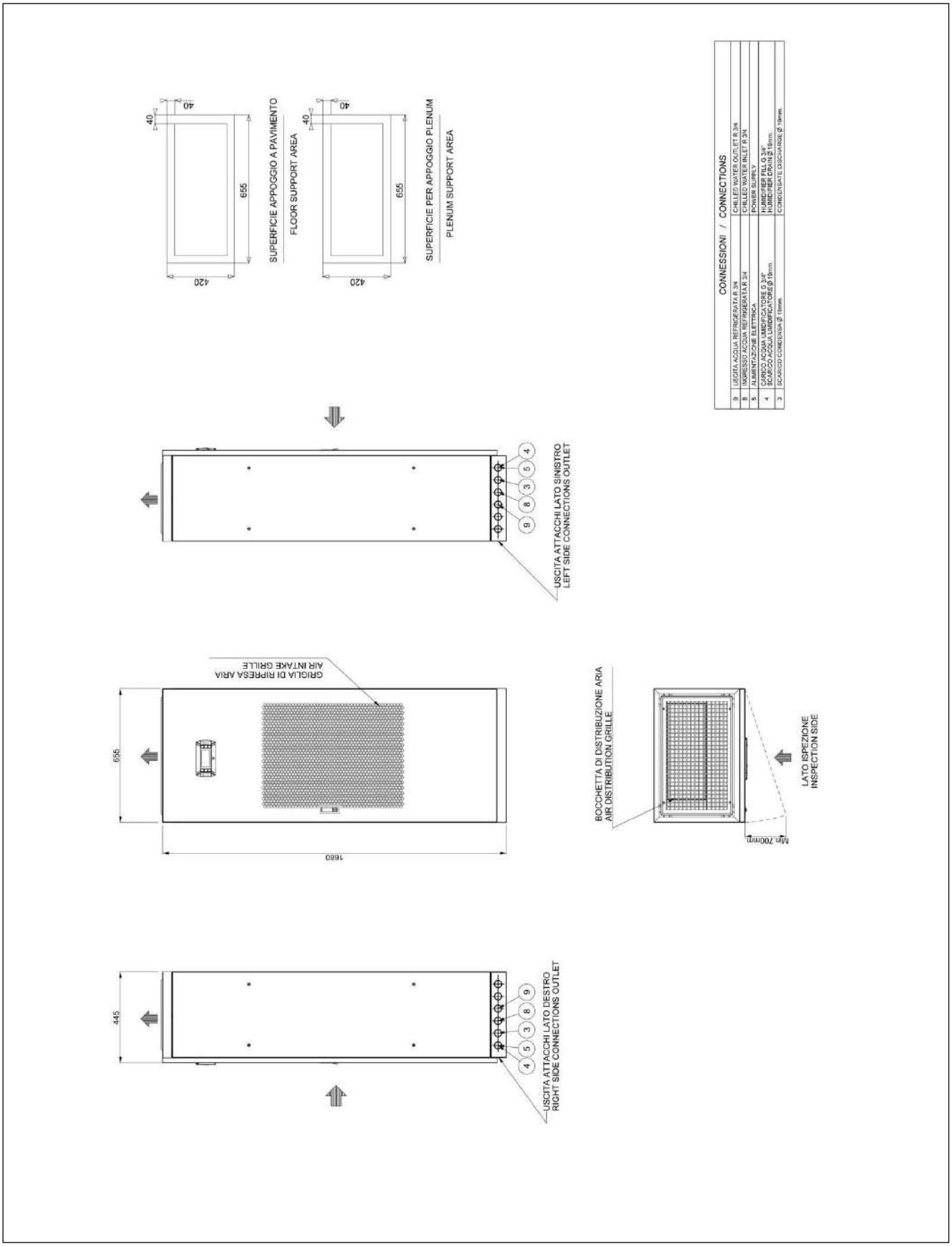
MACHINE DRAWINGS - Dimensions in mm - UNDER E9



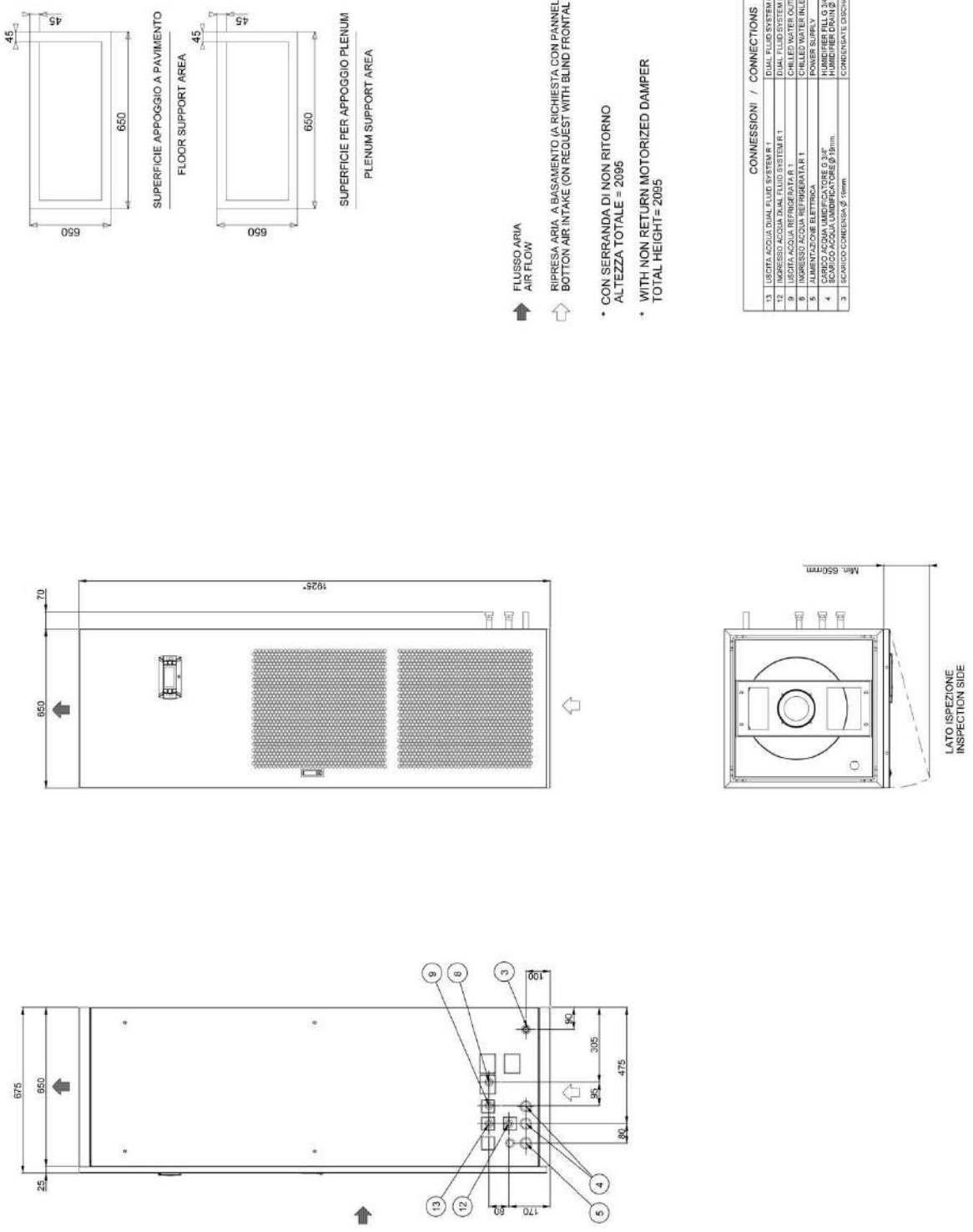
MACHINE DRAWINGS - Dimensions in mm - UNDER E10



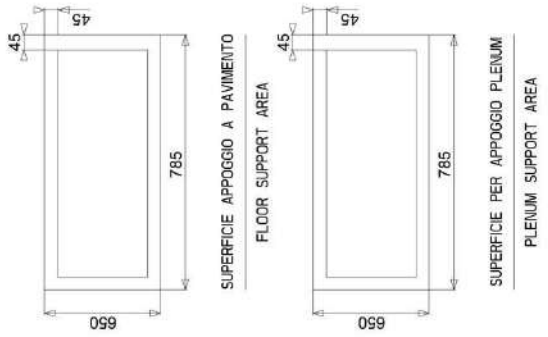
MACHINE DRAWINGS - Dimensions in mm - OVER E0



MACHINE DRAWINGS - Dimensions in mm - OVER E1



MACHINE DRAWINGS - Dimensions in mm - OVER E2



FLUSSO ARIA
AIR FLOW

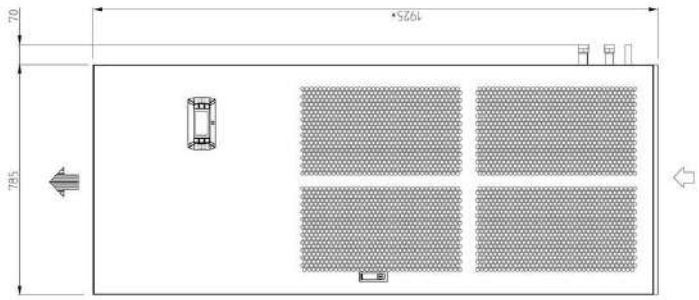
RIPRESA ARIA A BASAMENTO (A RICHIESTA CON PANNELLI FRONTALI CIECHI)
BOTTON AIR INTAKE (ON REQUEST WITH BLIND FRONTAL PANELS)

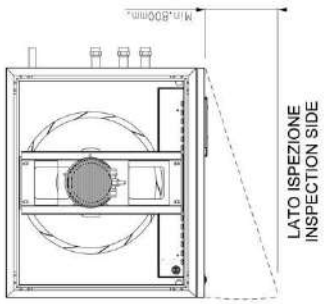
* CON SERRANDA DI NON RITORNO
ALTEZZA TOTALE = 2095

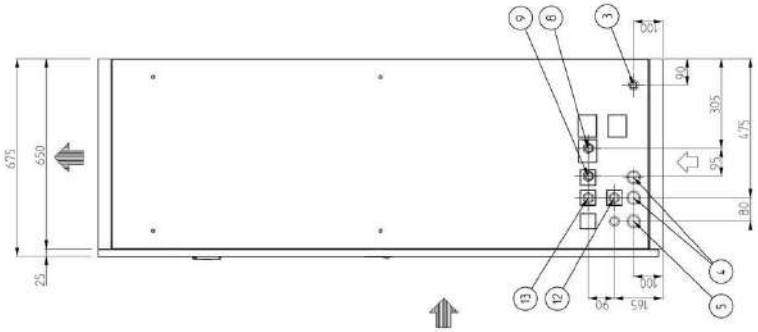
* WITH NON RETURN MOTORIZED DAMPER
TOTAL HEIGHT= 2095

CONNESSIONI / CONNECTIONS

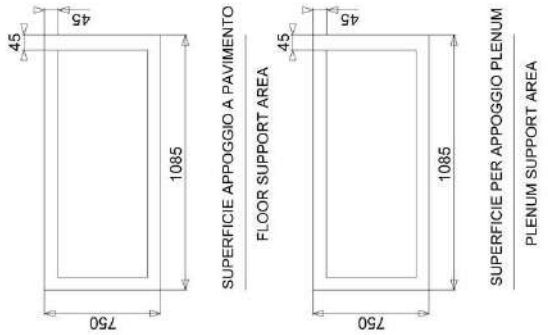
13	USCITA ACQUA DUAL FLUID SYSTEM R 1	DUAL FLUID SYSTEM OUTLET R 1
12	INGRESSO ACQUA DUAL FLUID SYSTEM R 1	DUAL FLUID SYSTEM INLET R 1
9	USCITA ACQUA REFRIGERATA R 1	CHILLED WATER OUTLET R 1
6	INGRESSO ACQUA REFRIGERATA R 1	CHILLED WATER INLET R 1
5	ALIMENTAZIONE ELETTRICA	POWER SUPPLY
4	CARICO ACQUA UMIDIFICATORE Ø 3/4"	HUMIDIFIER FILL Ø 3/4"
3	SCARICO CONDENSA UMIDIFICATORE Ø 18mm.	HUMIDIFIER DISCHARGE Ø 18mm.
	SCARICO CONDENSA, Ø 19mm.	CONDENSATE DISCHARGE Ø 19mm.







MACHINE DRAWINGS - Dimensions in mm - OVER E3



FLUSSO ARIA
AIR FLOW

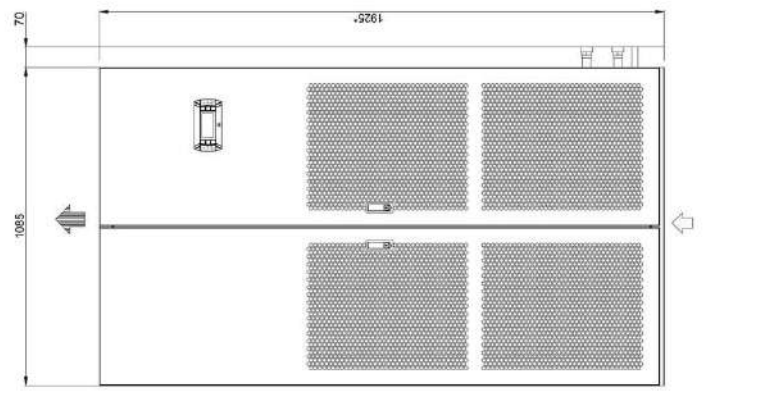
RIPRESA ARIA A BASAMENTO (A RICHIESTA CON PANNELLI FRONTALI CIECHI)
BOTTON AIR INTAKE (ON REQUEST WITH BLIND FRONTAL PANELS)

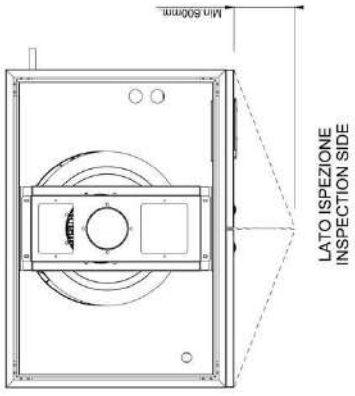
* CON SERRANDA DI NON RITORNO
ALTEZZA TOTALE = 2095

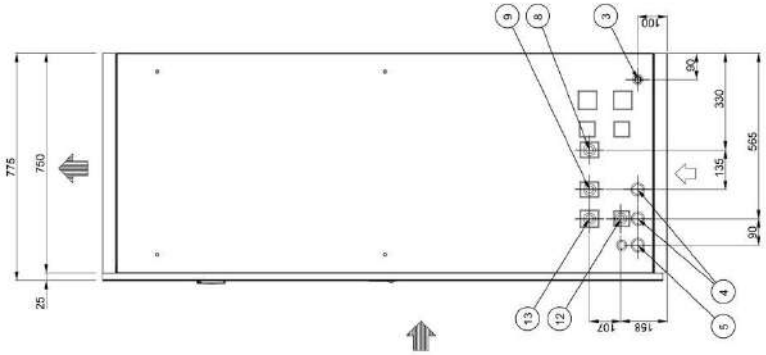
* WITH NON RETURN MOTORIZED DAMPER
TOTAL HEIGHT= 2095

CONNESSIONI / CONNECTIONS

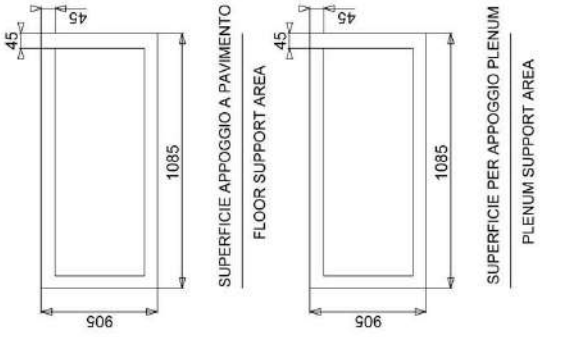
13	USCITA ACQUA DUAL FLUID SYSTEM R 1 1/4	DUAL FLUID SYSTEM OUTLET R 1 1/4
12	INGRESSO ACQUA DUAL FLUID SYSTEM R 1 1/4	DUAL FLUID SYSTEM INLET R 1 1/4
9	USCITA ACQUA REFRIGERATA R 1 1/4	CHILLED WATER OUTLET R 1 1/4
8	INGRESSO ACQUA REFRIGERATA R 1 1/4	CHILLED WATER INLET R 1 1/4
5	ALIMENTAZIONE ELETTRICA	POWER SUPPLY
4	SCARICO ACQUA UMIDIFICATORE Ø 3/4"	HUMIDIFIER PIL G 3/4"
	SCARICO ACQUA CONDENSA Ø 16mm	WATER DRAIN Ø 16mm
3	SCARICO CONDENSA Ø 19mm	CONDENSATE DISCHARGE Ø 19mm







MACHINE DRAWINGS - Dimensions in mm - OVER E3P



FLUSSO ARIA
AIR FLOW

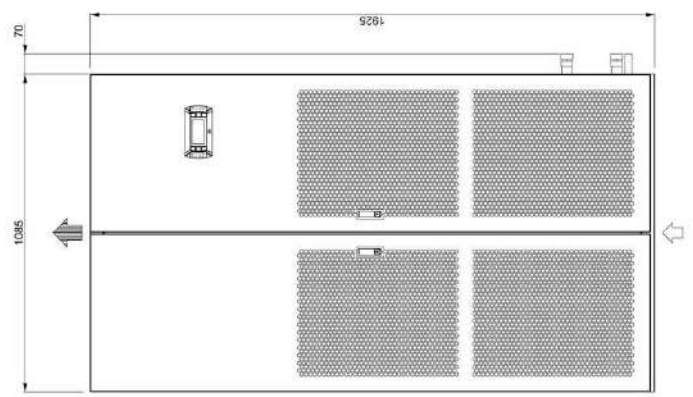
RIPRESA ARIA A BASAMENTO (A RICHIESTA CON PANNELLI FRONTALI CIECHI)
BOTTON AIR INTAKE (ON REQUEST WITH BLIND FRONTAL PANELS)

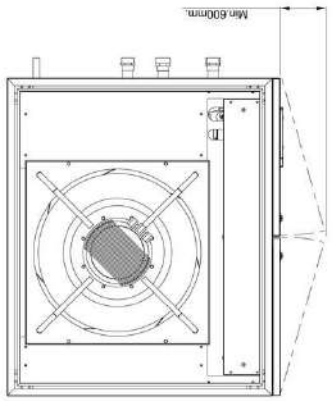
* CON SERRANDA DI NON RITORNO
ALTEZZA TOTALE = 2095

* WITH NON RETURN MOTORIZED DAMPER
TOTAL HEIGHT= 2095

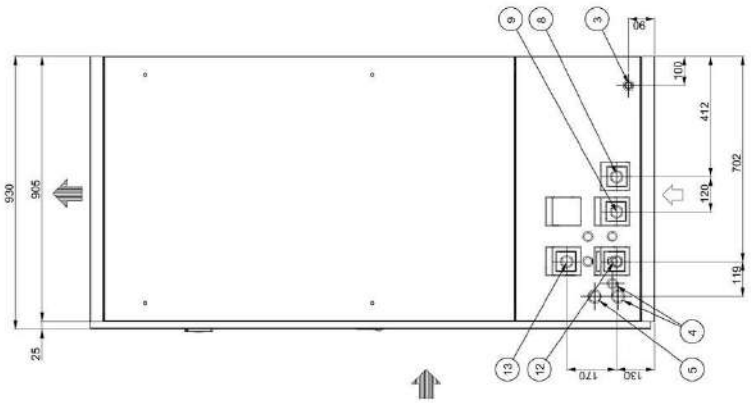
CONNESSIONI / CONNECTIONS

13	USCITA ACQUA DUAL FLUID SYSTEM Ø 1 1/4	DUAL FLUID SYSTEM OUTLET Ø 1 1/4
12	INGRESSO ACQUA DUAL FLUID SYSTEM Ø 1 1/4	DUAL FLUID SYSTEM INLET Ø 1 1/4
9	USCITA ACQUA REFRIGERATA Ø 1 1/4	CHILLED WATER OUTLET Ø 1 1/4
8	INGRESSO ACQUA REFRIGERATA Ø 1 1/4	CHILLED WATER INLET Ø 1 1/4
5	ALIMENTAZIONE ELETTRICA	POWER SUPPLY
4	CARICO ACQUA UMIDIFICATORE Ø 3/4"	HUMIDIFIER FILL Ø 3/4"
	SCARICO ACQUA UMIDIFICATORE Ø 18mm	HUMIDIFIER DRAIN Ø 18mm
3	SCARICO CONDENSA Ø 19mm	CONDENSATE DISCHARGE Ø 19mm

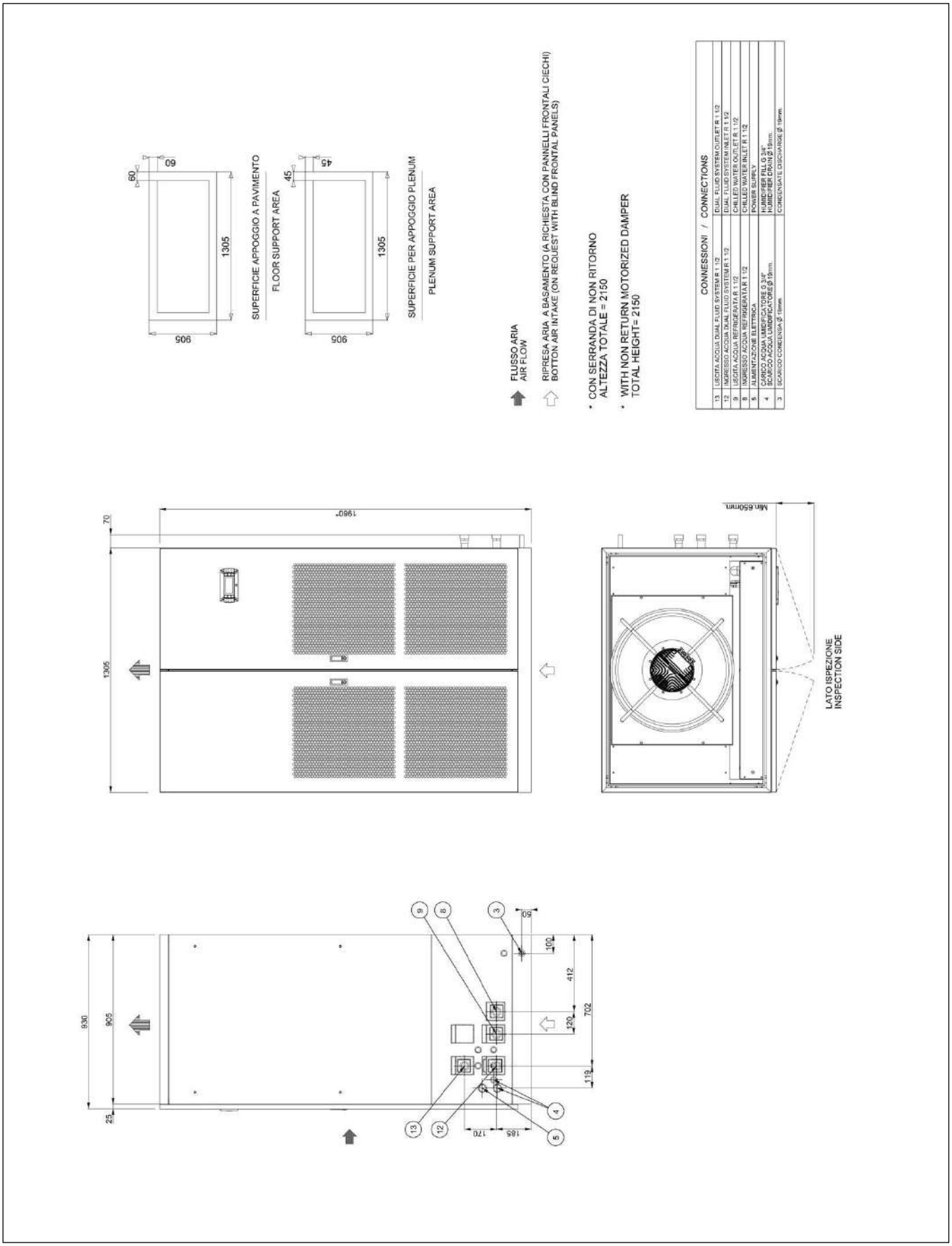




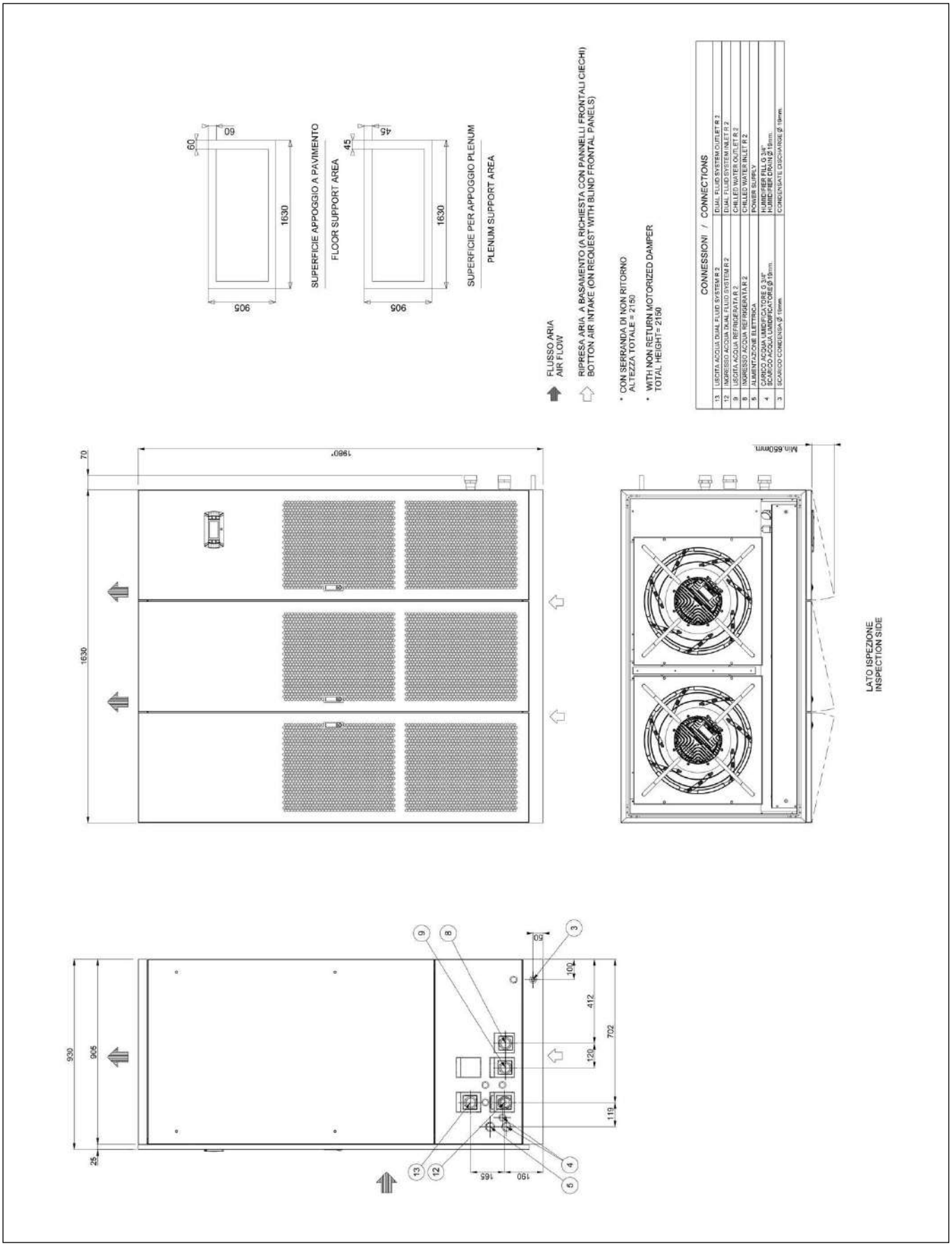
LATO ISPEZIONE
INSPECTION SIDE



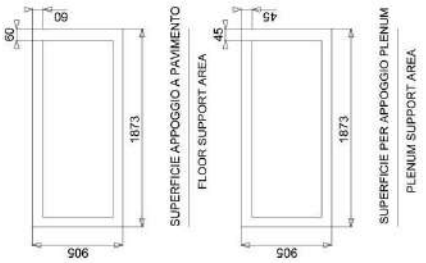
MACHINE DRAWINGS - Dimensions in mm - OVER E4



MACHINE DRAWINGS - Dimensions in mm - OVER E5



MACHINE DRAWINGS - Dimensions in mm - OVER E6



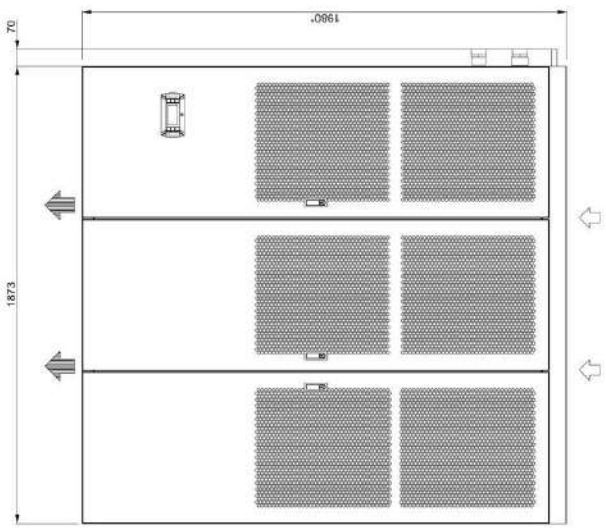
FLUSSO ARIA
AIR FLOW

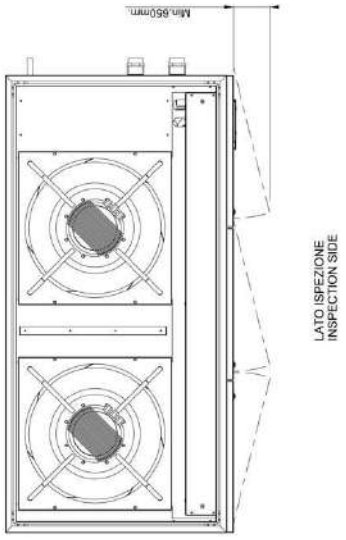
RIPRESA ARIA A BASAMENTO (A RICHIESTA CON PANNELLI FRONTALI CIECHI)
BOTTON AIR INTAKE (ON REQUEST WITH BLIND FRONTAL PANELS)

* CON SERRANDA DI NON RITORNO
ALTEZZA TOTALE = 2150
* WITH NON RETURN MOTORIZED DAMPER
TOTAL HEIGHT= 2150

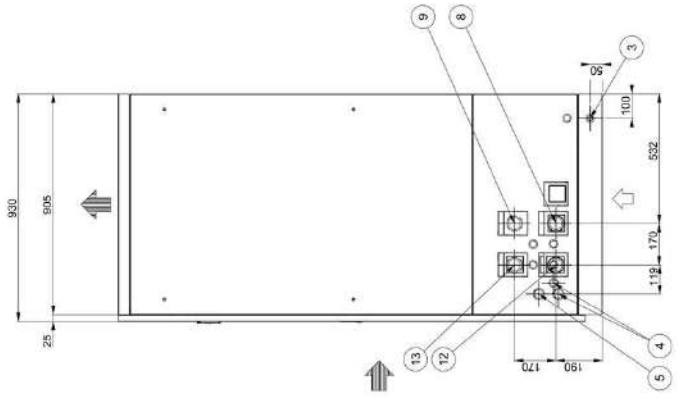
CONNESSIONI / CONNECTIONS

13	USCITA ACQUA DUAL FLUID SYSTEM R 2	DUAL FLUID SYSTEM OUTLET R 2
12	INGRESSO ACQUA DUAL FLUID SYSTEM R 2	DUAL FLUID SYSTEM INLET R 2
9	USCITA ACQUA REFRIGERATA R 2	CHILLED WATER OUTLET R 2
8	INGRESSO ACQUA REFRIGERATA R 2	CHILLED WATER INLET R 2
5	ALIMENTAZIONE ELETTRICA	POWER SUPPLY
4	CARICO ACQUA UMIDIFICATORE Ø 3/4"	HUMIDIFIER FILL Ø 3/4"
	SCARICO ACQUA UMIDIFICATORE Ø 19mm	HUMIDIFIER DRAIN Ø 19mm
3	SCARICO CONDENSA Ø 19mm	CONDENSATE DISCHARGE Ø 19mm

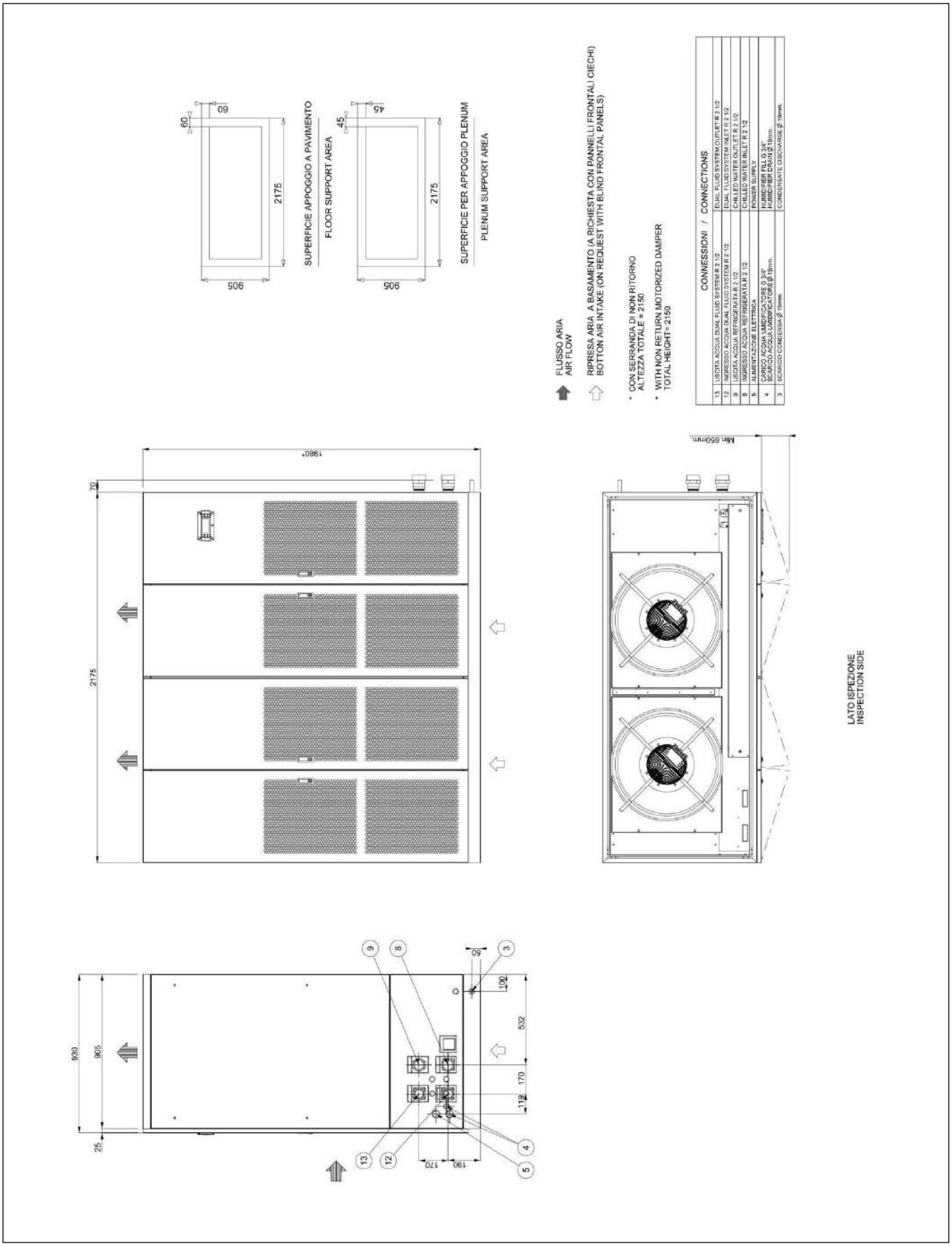




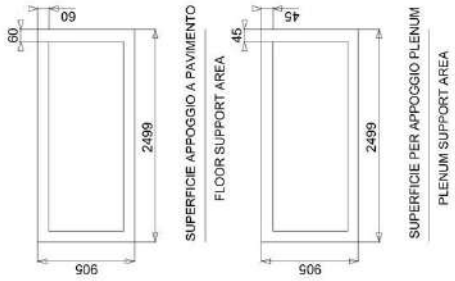
LATO ISPEZIONE
INSPECTION SIDE

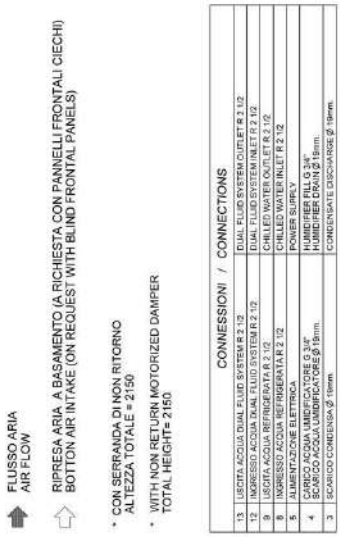


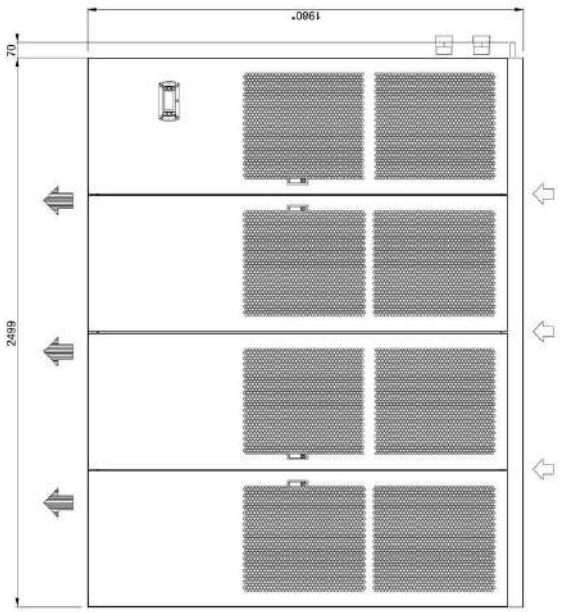
MACHINE DRAWINGS - Dimensions in mm - OVER E7

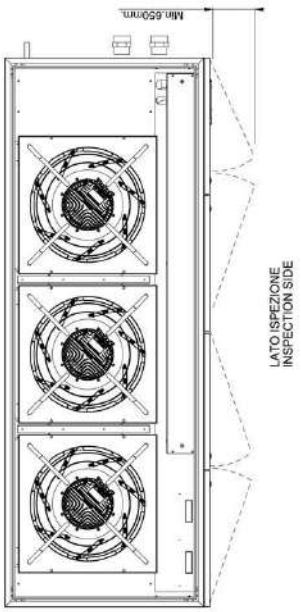


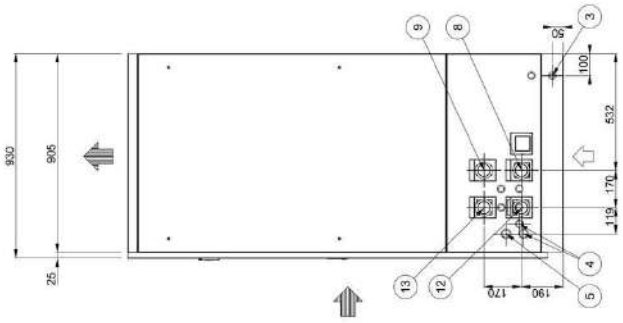
MACHINE DRAWINGS - Dimensions in mm - OVER E8



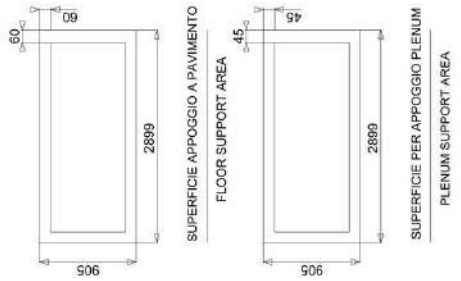








MACHINE DRAWINGS - Dimensions in mm - OVER E9



FLUSSO ARIA
AIR FLOW

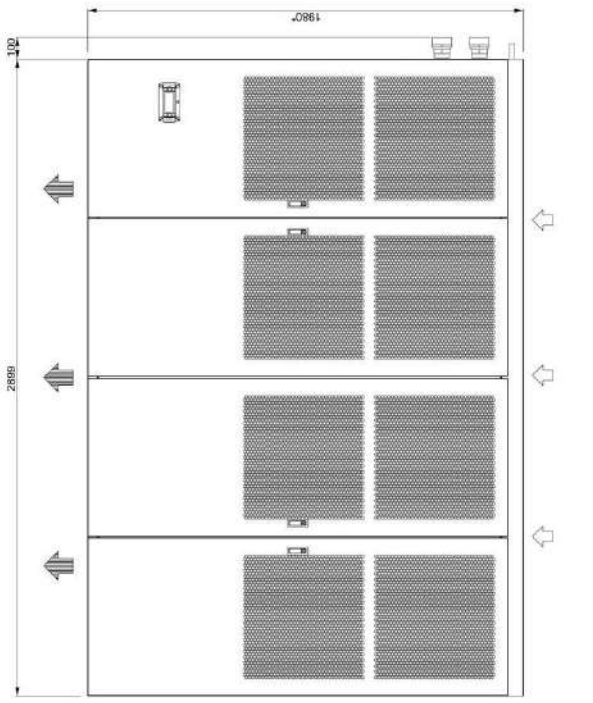
RIPRESA ARIA A BASAMENTO (A RICHIESTA CON PANNELLI FRONTALI CIECHI)
BOTTON AIR INTAKE (ON REQUEST WITH BLIND FRONTAL PANELS)

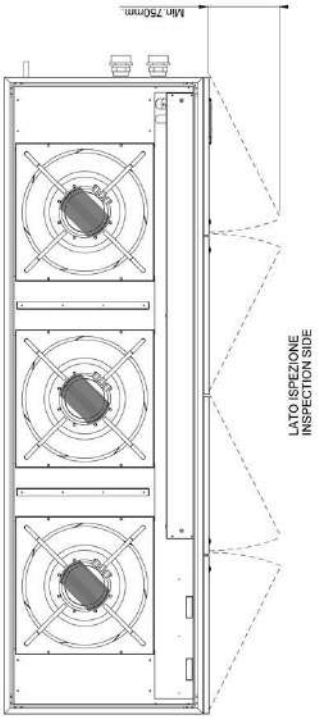
* CON SERRANDA DI NON RITORNO
ALTEZZA TOTALE = 2150

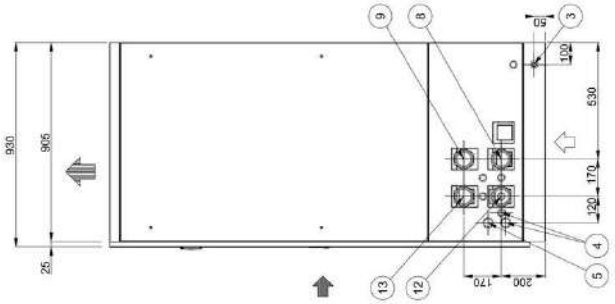
* WITH NON RETURN MOTORIZED DAMPER
TOTAL HEIGHT= 2150

CONNESSIONI / CONNECTIONS

13	USCITA ACQUA DUAL FLUID SYSTEM R 3	DUAL FLUID SYSTEM OUTLET R 3
12	INGRESSO ACQUA DUAL FLUID SYSTEM R 3	DUAL FLUID SYSTEM INLET R 3
9	USCITA ACQUA REFRIGERATA R 3	CHILLED WATER OUTLET R 3
8	INGRESSO ACQUA REFRIGERATA R 3	CHILLED WATER INLET R 3
5	ALIMENTAZIONE ELETTRICA	POWER SUPPLY
4	CARICO ACQUA UMIDIFICATORE Ø 3/4"	HUMIDIFIER FILL Ø 3/4"
	SCARICO ACQUA UMIDIFICATORE Ø 18mm	HUMIDIFIER DRAIN Ø 18mm
3	SCARICO CONDENSA Ø 19mm	CONDENSATE DISCHARGE Ø 19mm

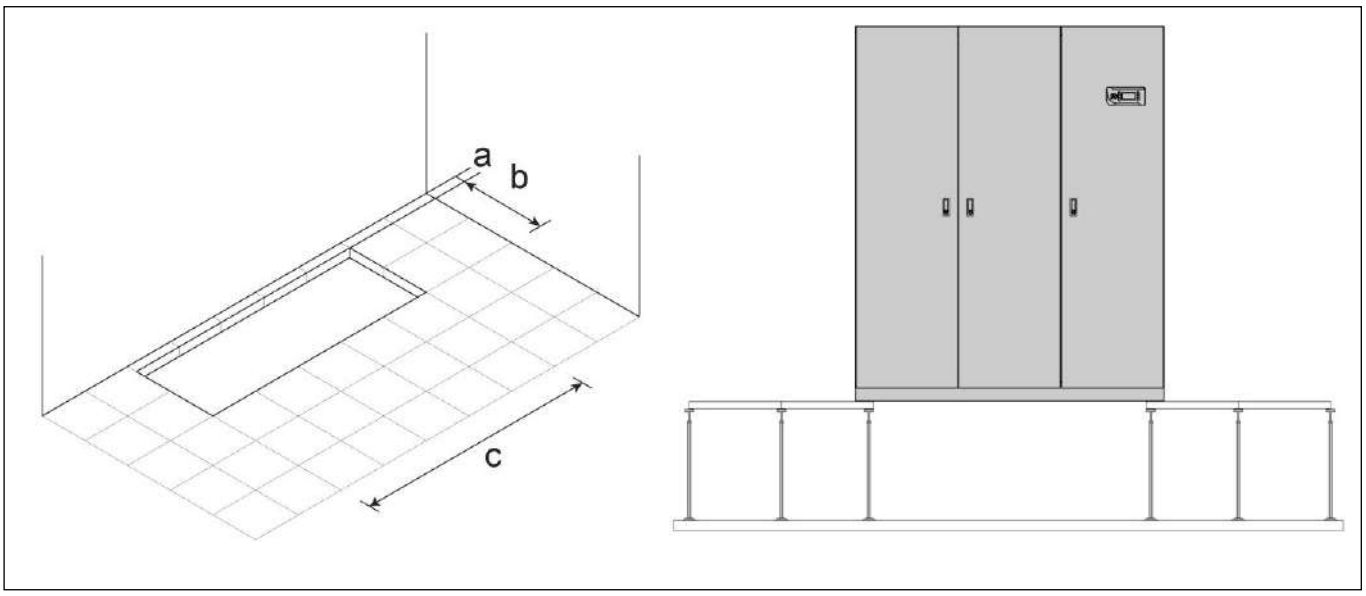






HOLE IN THE RAISED FLOOR FOR DOWNFLOW VERSION

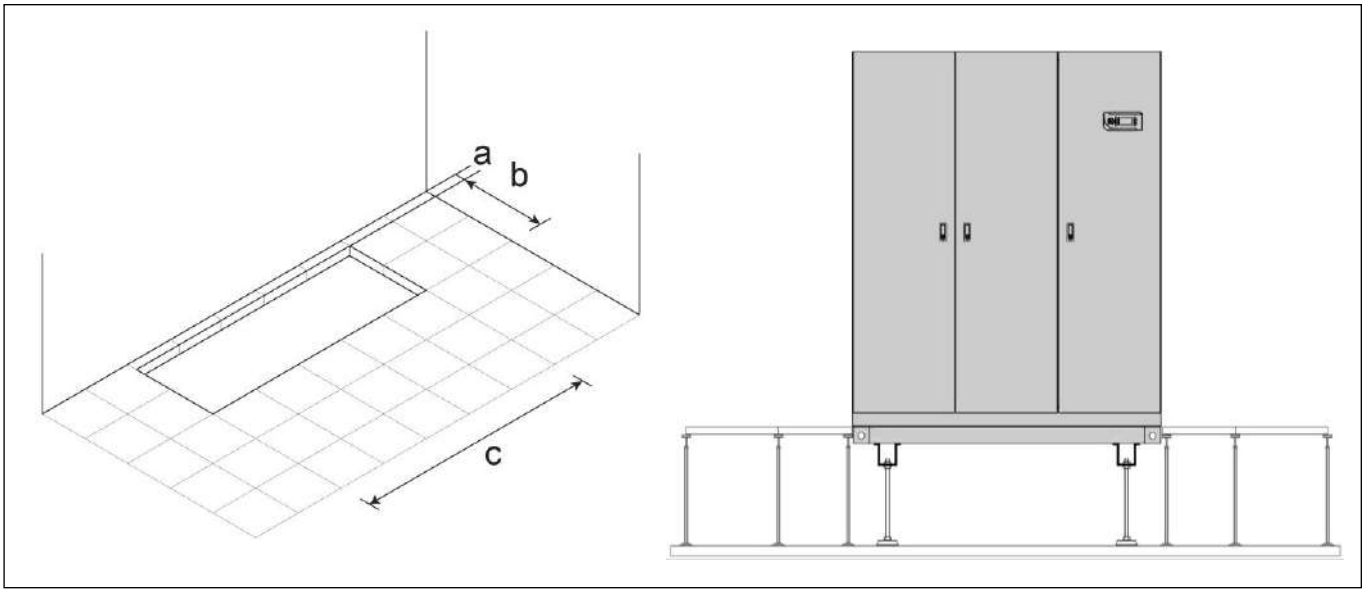
HOLE IN THE RAISED FLOOR WITHOUT FLOOR STAND



Foresee a hole in the floor with the following dimensions:

SIZE		E0	E1	E2	E3	E3P	E4	E5	E6	E7	E8	E9	E10
a	mm	90	95	95	95	95	110	110	110	110	110	110	110
b	mm	340	560	560	660	815	785	785	785	785	785	785	785
c	mm	585	560	695	995	995	1185	1510	1755	2055	2380	2780	3390

HOLE IN THE RAISED FLOOR WITH FLOOR STAND (OPTION)

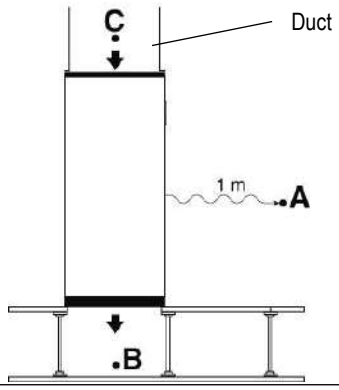


Foresee a hole in the floor with the following dimensions:

SIZE		E0	E1	E2	E3	E3P	E4	E5	E6	E7	E8	E9	E10
a	mm	50	50	50	50	50	50	50	50	50	50	50	50
b	mm	440	670	670	770	925	925	925	925	925	925	925	925
c	mm	675	670	805	1105	1105	1325	1650	1895	2195	2520	2920	3530

EXAMPLE FOR MACHINES NOISE EMISSION CALCULATION

UNDER MACHINE WITH DUCT ON AIR INTAKE



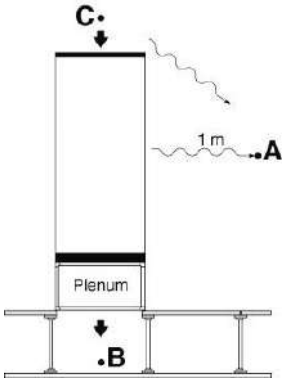
Lp **A** = Front side Under catalogue value

Lp **B** = Air delivery Under catalogue value

Lp **C** = Air intake Under catalogue value

The points **B** and **C** do not influence the point **A**

UNDER MACHINE WITH PLENUM ON AIR DELIVERY



Lp **A** = Front side Under catalogue value

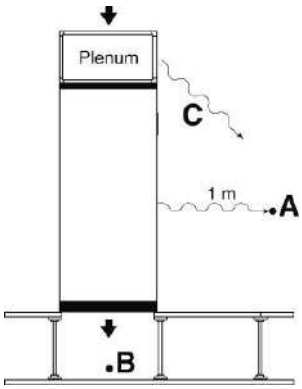
Lp **B** = Air delivery Under catalogue value –plenum noise reduction

Lp **C** = Air intake Under catalogue value

$$Lp\ \mathbf{A+C} = 10\log_{10}\left(10^{\frac{LpA}{10}} + 10^{\frac{LpC}{10}}\right)$$

The point **B** do not influence the point **A**

UNDER MACHINE WITH PLENUM ON AIR INTAKE



Lp **A** = Front side Under catalogue value

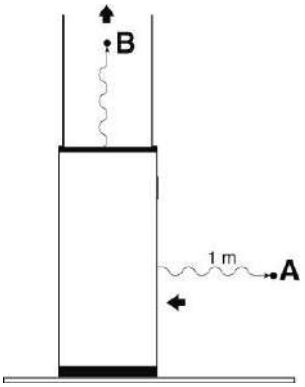
Lp **B** = Air delivery Under catalogue value

Lp **C** = Air intake Under catalogue value – plenum noise reduction

$$Lp\ \mathbf{A+C} = 10\log_{10}\left(10^{\frac{LpA}{10}} + 10^{\frac{LpC}{10}}\right)$$

The point **B** do not influence the point **A**

OVER MACHINE WITH DUCT



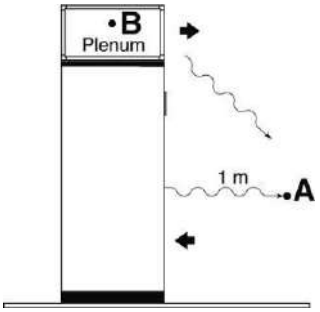
Lp **A** = Air intake Over catalogue value

Lp **B** = Air delivery Over catalogue value

The point **B** do not influence the point **A**

EXAMPLE FOR MACHINES NOISE EMISSION CALCULATION

OVER MACHINE WITH PLENUM ON AIR DELIVERY

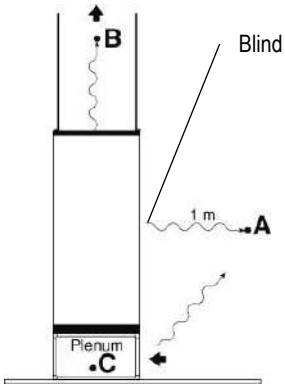


Lp **A** = Air intake Over catalogue value

Lp **B** = Air delivery Over catalogue value – plenum noise reduction

$$Lp\ \mathbf{A+B} = 10\log_{10}\left(10^{\frac{LpA}{10}} + 10^{\frac{LpC}{10}}\right)$$

OVER MACHINE WITH DUCT AND PLENUM ON AIR DELIVERY



Lp **A** = Front side Over catalogue value

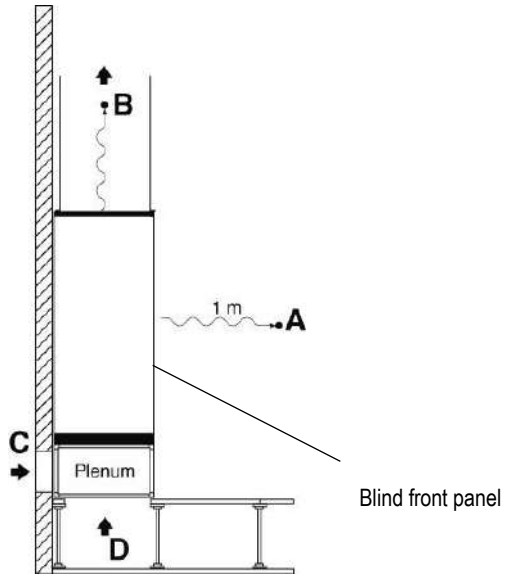
Lp **B** = Air delivery Over catalogue value

Lp **C** = Lp **A** + 6dB(A) – plenum noise reduction

$$Lp\ \mathbf{A+C} = 10\log_{10}\left(10^{\frac{LpA}{10}} + 10^{\frac{LpC}{10}}\right)$$

The point **B** do not influence the point **A+C**

OVER MACHINE WITH DUCT AND PLENUM ON AIR DELIVERY



Lp **A** = Front side Over catalogue value

Lp **B** = Air delivery Over catalogue value

Lp **C** = Lp **D** = Lp A + 6 dB(A) – plenum noise reduction

The points **B, C** and **D** do not influence the point **A**

IMPORTANT
The declared noise levels are intended in free field conditions.
The noise pressure level of an installed unit is affected by the room acoustic characteristics.
Please consider an average noise increase of +4/+6 dB(A).

VALVE PRESSURE DROP CALCULATION AS FUNCTION OF WATER FLOW RATE

Flow coefficient k_V defines the water flow (between 5°C and 40°C) expressed in m^3/h that cross a valve with a pressure drop of 1bar (100kPa).

With this data is possible to calculate the localized pressure drop as function of the water flow rate.

$\Delta P = (Q / k_V)^2$

ΔP (bar) = localized pressure drop of valve;
Q (m^3/h) = water flow rate – it varies according to the desired operating condition;
k_V (m^3/h) = valve flow coefficient.

The formula allows to calculate the value of the localized pressure drop (in bar).
The pressure drops values showed on the documentation are supplied in kPa.
Is possible to change from one unit to another through the following conversion.

1 bar = 100kPa

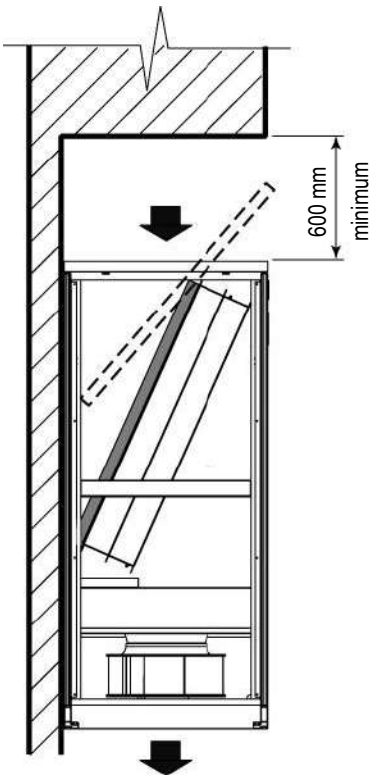
CALCULATION EXAMPLE OF 2-WAY VALVE FOR BY-PASS PRESSURE DROP IN FUNCTION OF CHILLED WATER COIL WATER FLOW RATE

Model 120 E8 – CHILLED WATER COIL
Example at nominal conditions. Characteristics referred to entering air at 24°C-50%RH with chilled water temperature 7-12°C - 0% glycol.

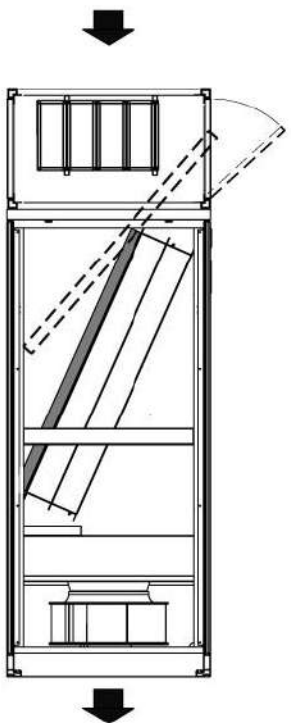
Water flow rate: 20,9 m^3/h
Valve flow coefficient k_V: 25 m^3/h

2-way valve for by-pass pressure drop: $\Delta P = (Q / k_V)^2 = (20,9 / 25)^2 = 0,698$ (bar) * 100 (kPa / bar) = 69,8 kPa

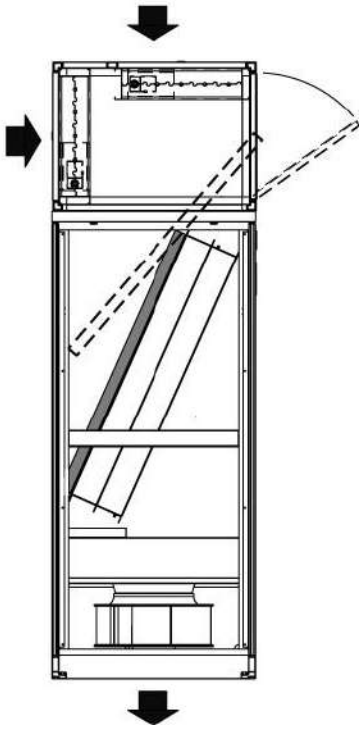
AIR FILTERS REPLACEMENT
FOR UNDER VERSION MACHINES SIZE E3P – E4 – E5 – E6 – E7 – E8 – E9 – E10



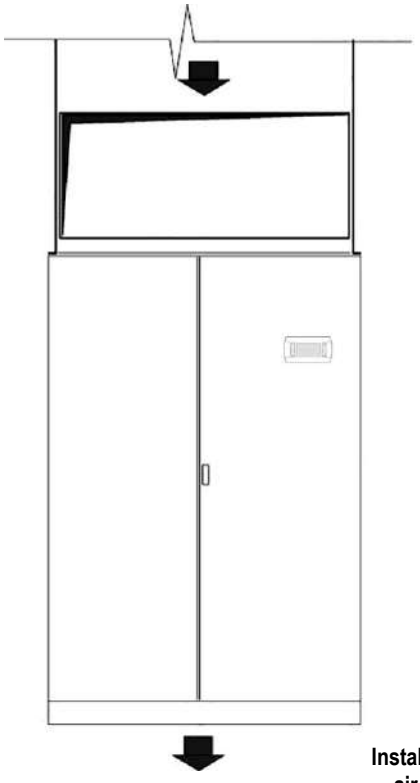
Installation with an obstacle on the top

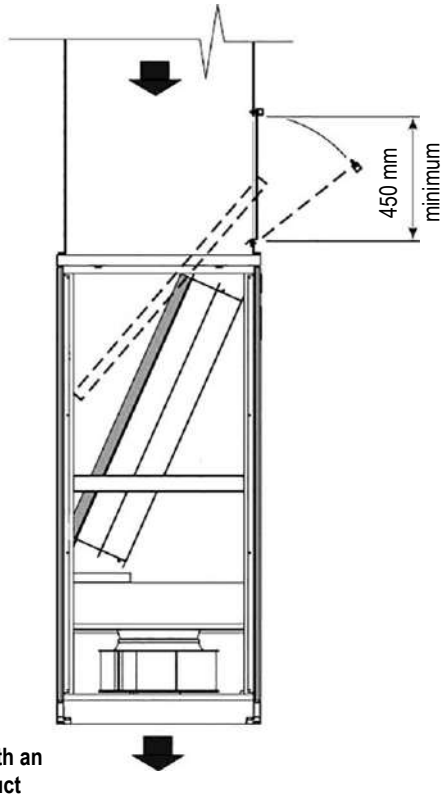


Installation with an air intake plenum with noise partitions



Installation with a Free-Cooling plenum





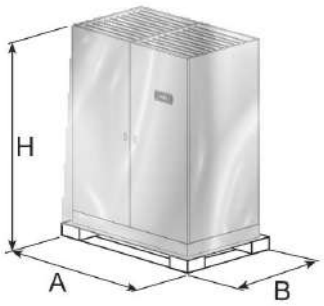
Installation with an air intake duct

SHIPMENT: PACKING DIMENSIONS

Values referred to basic machine. The presence of some accessories increases the weight of machine.

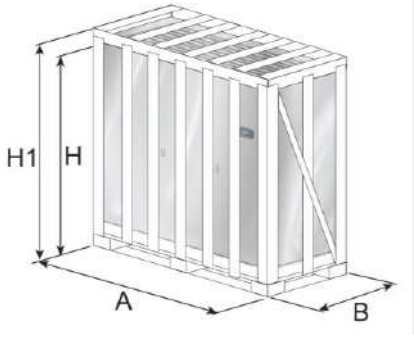
The machines are shipped on pallet and covered with shrink wrap.
On request packing on pallet covered with shrink wrap and wooden cage.

STANDARD PACKING DIMENSIONS



Size	A (mm)	B (mm)	H (mm)
E0	700	500	1800
E1	750	750	2080
E2	900	750	2080
E3	1200	910	2080
E3P	1200	1050	2080
E4	1400	1050	2130
E5	1750	1050	2130
E6	2000	1050	2130
E7	2280	1050	2130
E8	2650	1050	2130
E9	3000	1050	2130
E10	3600	1050	2130

OPTIONAL 9973: WOODEN CAGE PACKING DIMENSIONS



Size	A (mm)	B (mm)	H (mm)	H1 (*) (mm)
E0	740	540	1850	--
E1	790	790	2150	2350
E2	940	790	2150	2350
E3	1240	950	2150	2350
E3P	1240	1090	2150	2350
E4	1440	1090	2200	2350
E5	1790	1090	2200	2350
E6	2040	1090	2200	2350
E7	2320	1090	2200	2350
E8	2690	1090	2200	2350
E9	3040	1090	2200	2350
E10	3640	1090	2200	2350

H1 (*) = Packing height with optional A531 on/off damper

SHIPMENT: SHIPPING WEIGHT

STANDARD PACKING

Model		**007**	**013**	**021**	**032**	**045**	**053**	**072**	**081**	**100**	**120**	**138**	**160**	**215**
Size		**E0**	**E1**	**E2**	**E3**	**E3P**	**E4**	**E5**	**E6**	**E7**	**E8**	**E9**	**E10**	**E10**
Weight UNDER	kg	160	230	272,2	346	354	408,5	506	571,5	635	714,5	814,5	973	1043
Weight OVER	kg	160	217	254,2	323	346	374,5	464	523,5	581	652,5	740,5	--	--

OPTIONAL 9973: WOODEN CAGE PACKING

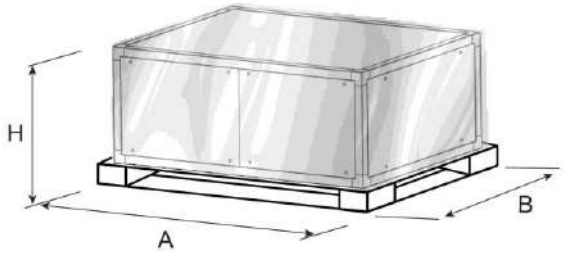
Model		**007**	**013**	**021**	**032**	**045**	**053**	**072**	**081**	**100**	**120**	**138**	**160**	**215**
Size		**E0**	**E1**	**E2**	**E3**	**E3P**	**E4**	**E5**	**E6**	**E7**	**E8**	**E9**	**E10**	**E10**
Weight UNDER	kg	184	257	300,2	378	386	444,5	542	615,5	687	764,5	872,5	1031	1101
Weight UNDER (1)	kg	--	279	325,2	411	425	488,5	597	678,5	759	847,5	970,5	1154	1224
Weight OVER	kg	183	244	282,2	355	378	410,5	500	567,5	633	702,5	798,5	--	--
Weight OVER (1)	kg	--	266	307,2	388	417	454,5	555	630,5	705	788,5	896,5	--	--

(1) Machine with optional A531 on/off damper

SHIPMENT: OPTIONALS PACKING DIMENSIONS AND SHIPPING WEIGHT

P011 - EMPTY PLENUM
P012 - EMPTY PLENUM CL.A1
P031 - EMPTY INTAKE PLENUM
P032 - EMPTY INTAKE PLENUM CL.A1
P013 - PLENUM + 3 GRILLES
P014 - PLENUM + 3 GRILLES CL.A1
P015 - SILENCED PLENUM
P016 - SILENCED PLENUM + 1 GRILLE
P017 - PLENUM + FILTER EPM2.5 50%
P018 - PLENUM + FILTER EPM1 50%
P019 - PLENUM + FILTER EPM1 85%

The plenums are shipped on pallet and covered with shrink wrap.

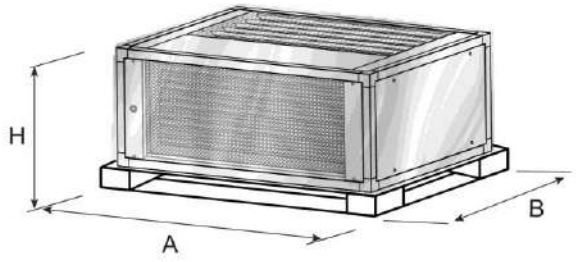


Size		E0	E1	E2	E3	E3P	E4
DIMENSIONS							
A	mm	700	750	900	1200	1200	1400
B	mm	500	750	750	910	1050	1050
H	mm	630	630	630	630	630	630
SHIPPING WEIGHT							
P011 - Empty plenum “O” / “U”	kg	--	31	34	41	44	53
P012 – Empty plenum CL.A1 “O” / “U”	kg	--	36	39	47	52	62
P031 - Empty intake plenum “O” / “U”	kg	--	31	34	41	44	53
P032 – Empty intake plenum CL.A1 “O” / “U”	kg	--	36	39	47	52	62
P013 – Plenum + 3 grilles “O” / “U”	kg	23	32	35	47	56	68
P014 – Plenum + 3 grilles CL.A1 “O” / “U”	kg	26	36	40	54	63	77
P015 – Silenced plenum “O” / “U”	kg	--	36	39	47	56	68
P016 – Silenced plenum + 1 grille “O” / “U”	kg	--	41	44	54	64	88
P017 - P018 - P019 – Plenum + filter “O” / “U”	kg	--	37	39	47	52	68

Size		E5	E6	E7	E8	E9	E10
DIMENSIONS							
A	mm	1750	2000	2280	2650	3000	3600
B	mm	1050	1050	1050	1050	1050	1050
H	mm	630	630	630	630	630	630
SHIPPING WEIGHT							
P011 - Empty plenum “O” / “U”	kg	69	78	88	105	122	146
P012 – Empty plenum CL.A1 “O” / “U”	kg	79	89	100	119	137	167
P031 - Empty intake plenum “O” / “U”	kg	69	78	88	105	122	146
P032 – Empty intake plenum CL.A1 “O” / “U”	kg	79	89	100	119	137	167
P013 – Plenum + 3 grilles “O” / “U”	kg	79	96	106	135	152	192
P014 – Plenum + 3 grilles CL.A1 “O” / “U”	kg	90	107	122	151	170	212
P015 – Silenced plenum “O” / “U”	kg	81	98	113	130	152	182
P016 – Silenced plenum + 1 grille “O” / “U”	kg	101	111	126	155	182	212
P017 - P018 - P019 – Plenum + filter “O” / “U”	kg	84	98	118	135	152	182

“O” Over / “U” Under

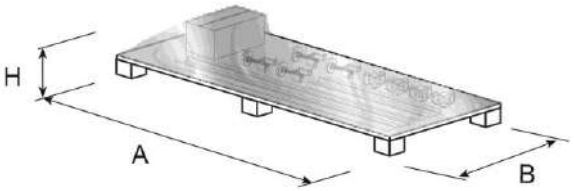
P034: INTAKE FREE-COOLING PLENUM
The plenums are shipped on pallet and covered with shrink wrap.



Size		E0	E1	E2	E3	E3P	E4	E5	E6	E7	E8	E9	E10
DIMENSIONS													
A	mm	--	750	900	1200	1200	1400	1750	2000	2280	2650	3000	3600
B	mm	--	750	750	910	1050	1050	1050	1050	1050	1050	1050	1050
H	mm	--	630	630	630	630	750	750	750	750	750	750	750
SHIPPING WEIGHT													
P034 - Intake free-cooling plenum “U”	kg	--	35	39	52	62	76	90	111	128	155	182	217
P034 - Intake free-cooling plenum “O”	kg	--	35	39	52	62	76	90	111	128	155	182	217

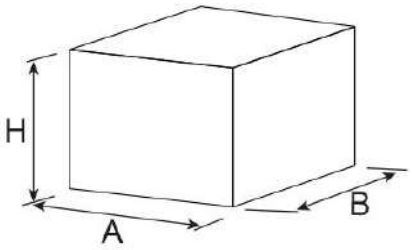
“O” Over / “U” Under

P041 / P042 / P043: SUPPORT FRAME
The support frames are shipped on pallet and covered with shrink wrap.



Size		E0	E1	E2	E3	E3P	E4	E5	E6	E7	E8	E9	E10
DIMENSIONS													
A	mm	1200	1200	1200	1200	1200	1400	1750	2000	2280	2650	3000	3600
B	mm	900	900	900	900	900	900	900	900	900	900	900	900
H	mm	500	500	500	500	500	500	500	500	500	500	500	500
SHIPPING WEIGHT	kg	25	26	27	29	30	37	40	44	47	49	53	58

P113 / P114: DUAL POWER SUPPLY KIT / DUAL POWER SUPPLY KIT+OPTIONAL
The optionals are shipped in a cardboard box.



P113 / P114: DUAL POWER SUPPLY KIT / DUAL POWER SUPPLY KIT+OPTIONAL

Size		E0	E1	E2	E3	E3P	E4	E5	E6	E7	E8	E9	E10
DIMENSIONS													
A	mm	--	400	400	400	400	400	--	--	--	--	--	--
B	mm	--	400	400	400	400	400	--	--	--	--	--	--
H	mm	--	210	210	210	210	210	--	--	--	--	--	--
SHIPPING WEIGHT	kg	--	12	12	12	12	12	--	--	--	--	--	--

CLIMAVENETA®

MITSUBISHI ELECTRIC HYDRONICS & IT COOLING SYSTEMS S.p.A.

Via Caduti di Cefalonia, 1 - 36061 Bassano del Grappa (VI) Italy
Ph. (+39) 0424 509 500 • Fax (+39) 0424 509 509
www.melcohit.com