

w-AV DL

12 – 41 kW

Air conditioners for IT Cooling for chilled water feeding.



EC FAN

DISPLACEMENT

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

- PERIMETER INSTALLATION
- VARIABLE AIR AND WATER FLOW
- DISPLACEMENT AIR DELIVERY
- PLUG FAN WITH EC ELECTRIC MOTOR
- 2-WAY CHILLED WATER VALVE
- AIR SUCTION TEMPERATURE UP TO 45°C

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MEHITS CERTIFICATIONS



SYSTEM CERTIFICATIONS

ISO 9001 CERTIFICATION – MEHITS S.p.A.
Quality Management System

ISO 14001 CERTIFICATION – MEHITS S.p.A.
Environmental Management System

BS OHSAS 18001 CERTIFICATION – MEHITS S.p.A.
Occupational Health and Safety Management System

PRODUCT CERTIFICATIONS BY COUNTRY



CE MARKING
MEHITS units are in compliance with the European Directives in force.

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

EAC CERTIFICATION
(Russian Federation, Belarus, Kazakhstan)



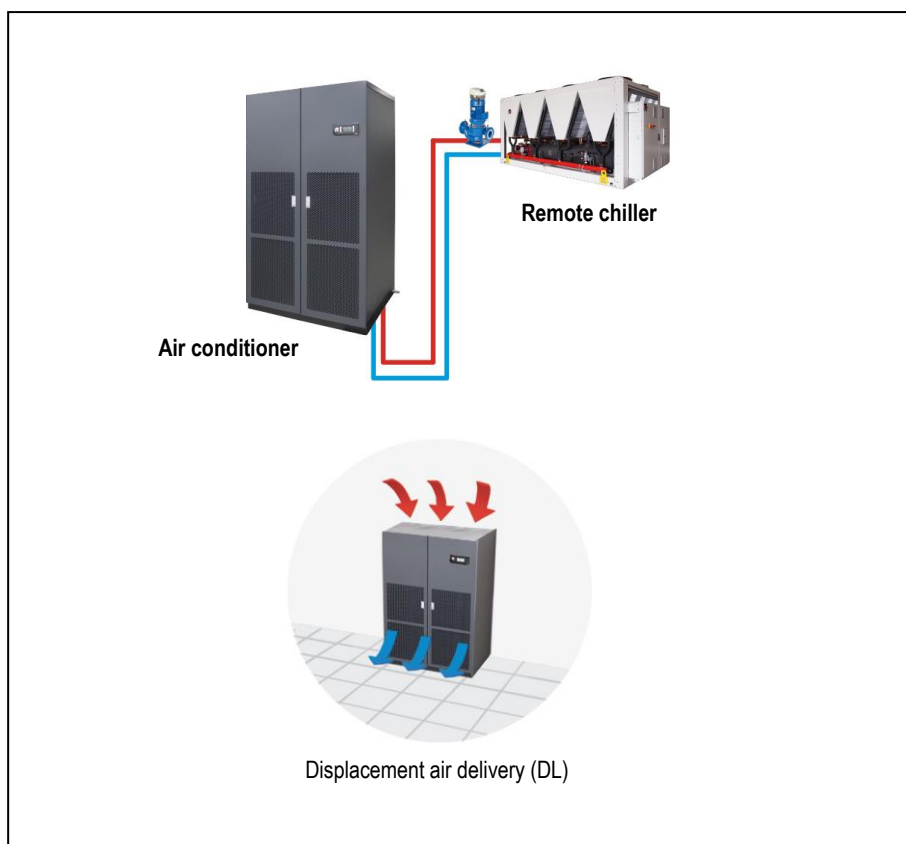
GENERAL CHARACTERISTICS



Displacement air delivery



Air conditioners for IT Cooling for chilled water feeding.
This series is offered in 4 models, all available with displacement air delivery:
Cooling capacity: 12 ÷ 41 kW



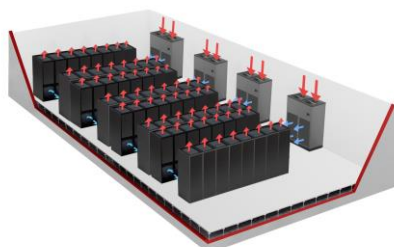
The machines are made for indoor installation.

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.

INSTALLATION



The series is particularly suitable for installation in Data Center of medium / small size with constant load, which is planned to DISPLACEMENT air delivery.

DISPLACEMENT AIR DELIVERY

Typical installation is on the perimeter.

The units are placed along the walls. Air suction from the top of the unit and frontal air delivery in for the cooling of the racks.

The hot air is expelled from the racks at the top, and then aspirated again from the air conditioner.

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.

DISPLACEMENT AIR DELIVERY

AIR CONDITIONING SYSTEM WITH DISPLACEMENT AIR DELIVERY

The basic concept of the air conditioning system with displacement air delivery is based on the natural convection principle, where the cold air is at the lower ambient zones, while the hot air is at the higher ones.

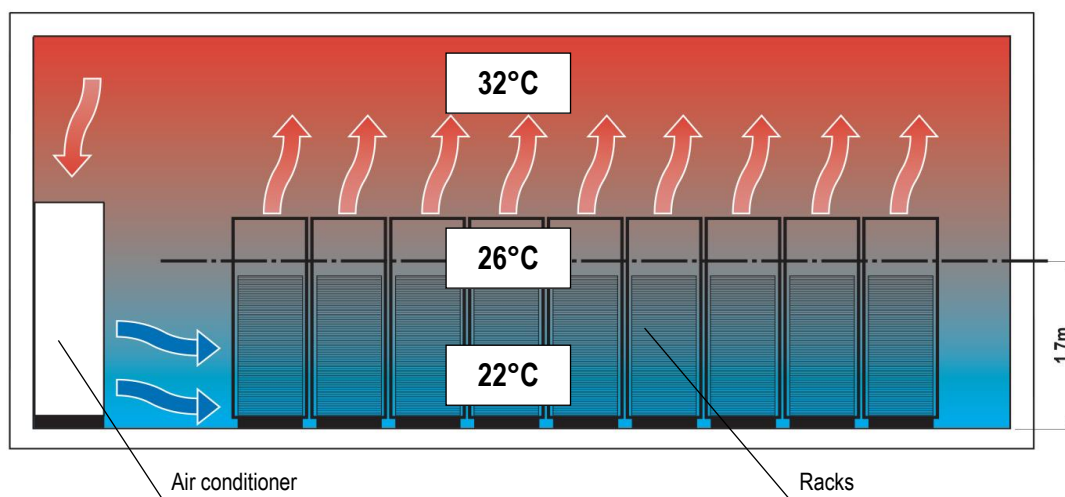
This concept has been developed and applied for the air conditioning in Data Center, Telephone Exchangers and Hi-Tech. facilities.

The air conditioning system with displacement air delivery supplies the cold air directly into the room at low air speed and intakes the air from the top side of the conditioner where the air temperature is higher. The air circulation in the rack can take place in a natural way, or through proper internal fans.

This system, together with the low air distribution speed, causes a strong stratification of the air with temperature differences of about 10°C between the coldest part and the warmest part.

For example, we can consider a temperature condition of 22°C close to the floor and 32°C close to the ceiling with a mean temperature of 26°C at 1,7m height from the floor.

By hot air suction in the higher ambient zone, the air conditioner remarkably increases both the thermodynamic performance and the efficiency, with consequent working conditions and energy consumption optimization.



PRODUCT FEATURES AND BENEFITS

- SHR ratio 1,00;
- New plug fans with EC electric motors and 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;
- Hinged frontal panels and lateral panels fully removable to facilitate the operations of extraordinary maintenance;

MODEL IDENTIFICATION

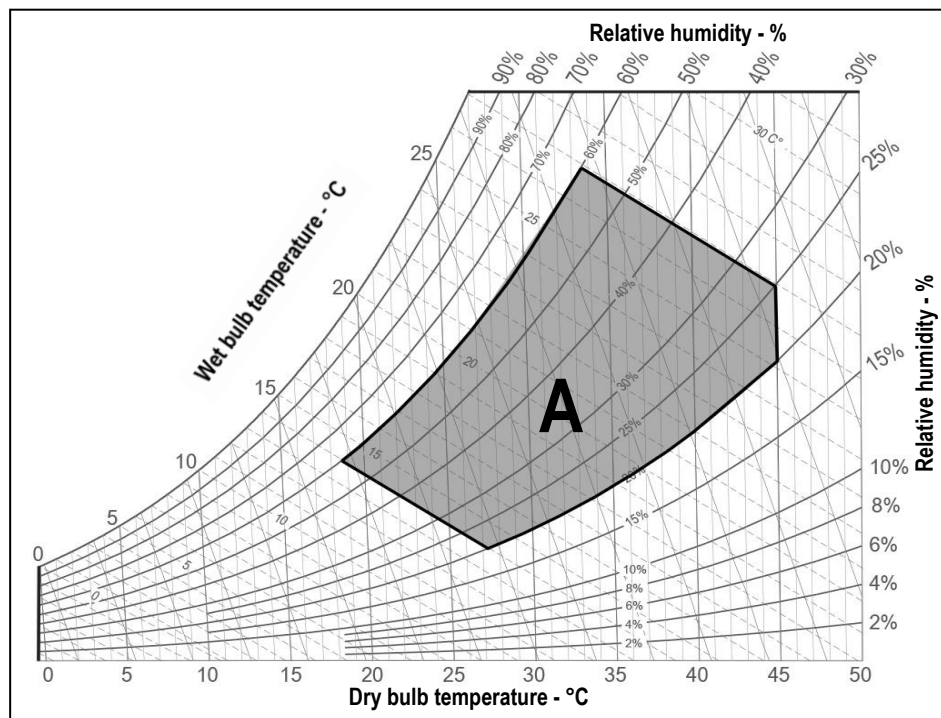
Air conditioners for IT Cooling for chilled water feeding

model: **w-AV DL 030 E3**

w-AV	Series identification chilled water feeding
DL	Displacement air delivery
030	Cooling capacity (kW) at nominal conditions
E3	Cabinet size



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

$\pm 10\%$	Maximum tolerance of the supply voltage (V)
$\pm 2\%$	Maximum unbalancing of the phases.

STORING TEMPERATURE

If the machine is not installed on receipt and is stored for a long time, store it in a protected place, at temperatures ranging between -30°C and 50°C in absence of superficial condensation and direct sun light.

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:
 - Air intake from the top and frontal air delivery through honeycomb type grille.
- Compartment for electrical panel on unit front for direct access to control and regulation devices;

FILTER SECTION

- Washable air filters with COARSE 60% efficiency (according to ISO EN 16890) with cells in synthetic fibre and metallic frame;
- Frontal air filters access:

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.
- Air temperature sensors upstream and downstream the cooling section, with control, regulation and limitation functions.
- 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.

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
- Transformer for auxiliary circuit and microprocessor supply.
- Terminals:

OUTLETS

- Voltage free deviating contact for General Alarm 1-2.
- Voltage free contact for supply fans status.

INLETS

- External enabling.
- Power supply 400/3+N/50.



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 (MBUS RS485/JBUS, MBUS RS232/JBUS for GSM modem, LON, BACnet for Ethernet (SNMP- TCP/IP), BACnet for MS/TP). 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.

- Condensate drain system. Supplied in mounting kit. The system includes pump with activation float and 10 linear meters long discharge pipe.
- Modulating steam humidifier with immersed electrodes with electronic control (size E1, E2 excluded). The optional foresee the combined Temperature / Humidity sensor on return air.
- Dehumidification system. The optional foresee the combined Temperature / Humidity sensor on return air.
- Electric heating system consisting of aluminium armoured elements with integral fins
- 2-way 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 water flow control valve.
- Washable air filter with ePM₁₀ 50% efficiency (according to ISO EN 16890).
- Plenum for direct free-cooling on air intake. The optional foresee the combined Temperature / Humidity sensor on machine air suction and the Temperature sensor for ambient air.
- COOLNET: application software to maximize energy saving in Load Sharing.
- ADAPTIVE SET POINT: software that optimizes the operation of liquid chillers connected to the indoor air conditioners by control of the effective room thermal load.
- KIP LINK: Keyboard in your pocket. Allows to operate on the unit with smartphone or tablet.
- CLOUD PLATFORM: Web services based on cloud technology for remote monitoring and management.

OTHER ACCESSORIES

- Differential pressure switch on the air side for clogged filters alarm signal.
- Under floor water alarm through sensor to be placed on the floor.
- Additional underfloor water sensor kit.
- Remote temperature sensor for the compensation of the return air set-point. Each conditioner can be wired to an additional probe to measure the room temperature in a determinate point of the room. These additional probes must be used only if strictly requested.

We suggest two types of usage:

- The presence of a highly temperature sensitive device and/or with a thermal load higher than the average. In this situation the probe should be placed close to the device and wired to the nearest conditioner.
- Some particular situations of the room lay-out
- Combined Temperature / Humidity sensor on return air.
- Temperature sensor for outdoor installation.
- Combined Temperature / Humidity sensor for remote installation. The optional is added to the standard sensor on machine air suction.
- Microprocessor control accessories:
 - Remote terminal.
 - Serial card MBUS RS485/JBUS.
 - Serial card MBUS RS232/JBUS for GSM modem.
 - Serial card LON.
 - Serial card BACnet for Ethernet – SNMP – TCP/IP.
 - Serial card BACnet for MS/TP.
 - Temporary microprocessor power supply. The system guarantees the microprocessor power supply for a few minutes, in case of supply voltage failure.
 - 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.

WARNING

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

TECHNICAL DATA

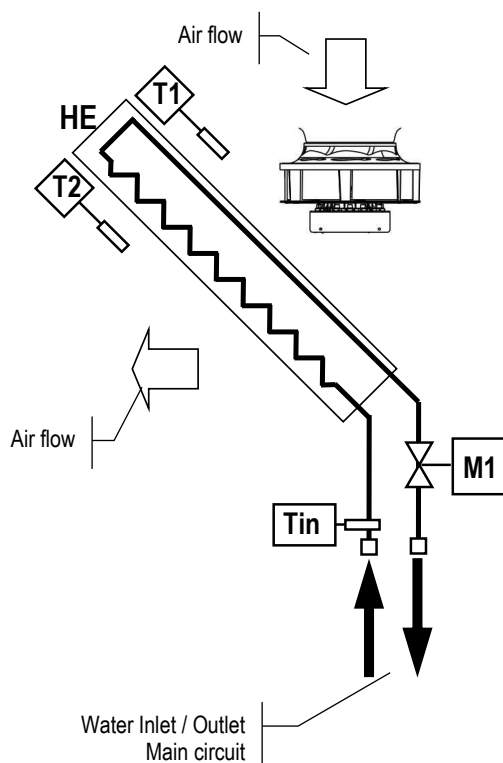
MODEL		012	022	030	042
SIZE		E1	E2	E3	E3P
VERSION (1)		DL	DL	DL	DL
COOLING CAPACITY (2)					
Total	kW	11,6	18,9	29,4	41,3
Sensible	kW	11,6	18,9	29,4	41,3
SHR (3)		1	1	1	1
"EC" SUPPLY FANS	n.	1	1	1	1
Air flow	m ³ /h	2320	3936	6240	8640
Nominal external static pressure	Pa	20	20	20	20
Max external static pressure	Pa	190	385	832	489
Power input (4)	kW	0,17	0,42	0,81	1,5
COOLING COIL					
Water flow (2)	m ³ /h	1,98	3,27	5,07	7,12
Pressure drops (coil + valve) (2)	kPa	12,9	35,3	30,3	27,9
Water content	l	4,2	5,3	7,8	11,5
AIR FILTERS	n.	1	1	2	2
Efficiency (ISO EN 16890)	COARSE	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
ENERGY EFFICIENCY INDEX (2)					
EER Energy Efficiency Ratio	kW/kW	68,2	45	36,3	27,5
DIMENSIONS					
Length	mm	650	785	1085	1155
Width	mm	675	675	775	930
Height	mm	1925	1925	1925	2110
NET WEIGHT	kg	196	230	290	320
HYDRAULIC CONNECTIONS					
Cooling coil inlet/outlet – ISO 228/1-G	M Ø	1"	1"	1+1/4"	1+1/4"
Condensate discharge – Rubber pipe	F Ø	1/2"	1/2"	1/2"	1/2"

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

1. DL = Displacement air delivery
2. Gross value. Characteristics referred to entering air at 30°C-30%RH; chilled water temperature 10/15°C. ESP=20Pa.
3. SHR = Sensible cooling capacity / Net cooling capacity.
4. Corresponding to the nominal external static pressure

HYDRAULIC CIRCUIT

The diagrams refer 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 VALVE FOR WATER FLOW CONTROL



The water flow control in the finned coil is achieved 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.
- Closing seal with leakage rate in Class A (EN 12266-1)
- No peaks initial flow.
- Excellent stability control thanks to the integrated characterizing disc.
- Closing pressure very high.
- Excellent characteristic in partialisation.
- Stability in control.
- Wide operating pressures which provide an optimal adjustment of the water flow even under extreme conditions.
- Maintenance free.
- Self-cleaning.

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.

WATER QUALITY

For a correct and optimal functioning of the hydraulic circuits (chilled water and heating water), a water quality must be guaranteed as indicated in the table below.

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 ₂ S	< 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: $1/1.78^{\circ}\text{D} = 1^{\circ}\text{Fr}$ with $1^{\circ}\text{Fr} = 10 \text{ gr CaCO}_3 / \text{m}^3$

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:

It is necessary that, in the presence of dirty and / or aggressive waters, an intermediate heat exchanger is installed upstream of the heat exchangers

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.

MODEL		012	022	030	042
SIZE		E1	E2	E3	E3P
VERSION (1)		DL	DL	DL	DL
SOUND LEVEL ISO 3744 (2)					
On unit front	dB(A)	47	50	54	55

1. DL = Displacement air delivery
2. Noise pressure level at 1 meter in free field – ISO 3744

ELECTRICAL DATA

MODEL		012	022	030	042
SIZE		E1	E2	E3	E3P
VERSION (1)		DL	DL	DL	DL
Power supply	V/ph/Hz	400/3+N/50	400/3+N/50	400/3+N/50	400/3+N/50
Maximum current input (FLA)	A	0,33	1,7	4,2	4,2

1. DL = Displacement air delivery

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.

MICROPROCESSOR CONTROL SYSTEM



The microprocessor control system is equipped with 6 keys terminal and back lighted graphic display on which all information in different languages or easily identifiable symbols are displayed.

The system 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.

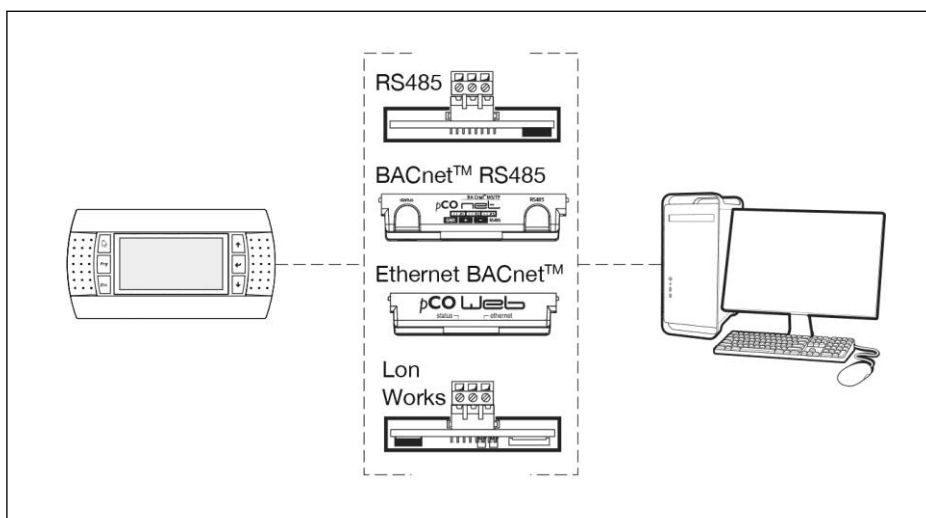
KEYBOARD FUNCTIONS

	ALARM	Alarm, Back-red light active – alarm presence, push to have alarm description. If more than one alarm(s), the others can be scrolled by Key UP / DOWN
	PRG	Menu list, scrolled by key UP/DOWN: Unit; Set-point; In/Out; Clock; History; User; Service; Factory. Use the ENTER key to execute the mode.
	ESC	Home. Used to come back to the previous menu level or to the main screen.
	UP DOWN	Used to change the pages and values of sets. When display is in main screen (HOME), pressing one of them (UP/DOWN) will display the synoptic of the main controls.
	ENTER	Moving the cursor on adjustable Program(s) fields, to confirm the changes, press the key (ENTER) to get out of the fields.

CONNECTIVITY

Through the optional serial port, the microprocessor control enables communication with the modern buildings BMS systems with the following protocols:

- MBUS/JBUS (RS485) serial card;
- MBUS/JBUS (RS232) for GSM modem serial card;
- LON Works serial card;
- BACnet per Ethernet – SNMP – TCP/IP serial card;
- BACnet per MS/TP serial card;



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

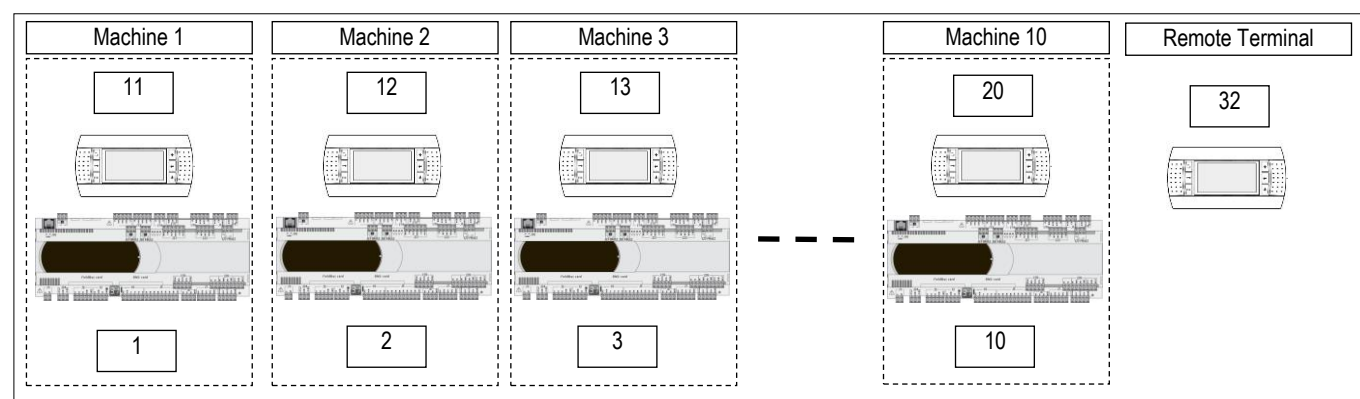
The LAN is part of the control software and it is possible to connect up to 10 units.

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.

Electrical connections are on electrical panel connecting terminals.

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)

OPTIONAL ACCESSORIES - CONDENSATE DISCHARGE 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

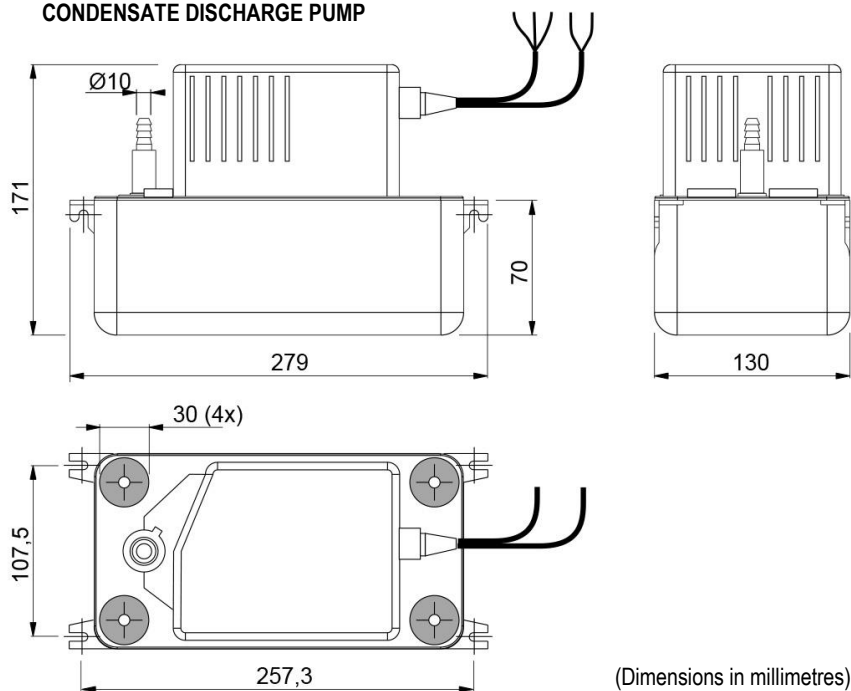
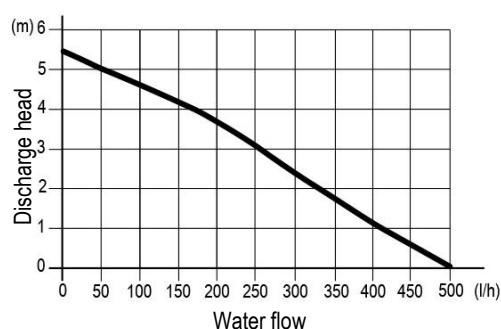
Sound level: 45dBA a 1 m

Maximum water temperature: 70°C

Water acidity: pH>2.5

Tray volume: 2.0 l

Protection IP 20

CONDENSATE DISCHARGE PUMP**OPERATING DATA**

Discharge head	Total length of discharge pipes (Ø 10 mm internal)			
	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 – MODULATING STEAM HUMIDIFIER



Modulating steam humidifier with immersed electrodes fitted with safety and running accessories.

The optional includes the combined temperature / humidity sensor on unit air intake.

The optional is not available for size E1, E2.

The optional includes the combined temperature / humidity sensor on unit air intake.

The accessory 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	$\sigma_R, 20^\circ\text{C}$ $\mu\text{S/cm}$	300	1250
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: $\text{TDS} \cong 0,93 * \sigma_R, 20^\circ\text{C}$; $R_{180} \cong 0,65 * \sigma_R$

(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:

- No relation can be demonstrated between water hardness and 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 inhibitors 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

TECHNICAL DATA

MODEL		012	022	030	042
SIZE		E1	E2	E3	E3P
VERSION (1)		DL	DL	DL	DL
VAPOUR PRODUCTION	kg/h	---	---	3,0	3,0
Power input	kW	---	---	2,3	2,3
Absorbed current (OA)	A	---	---	3,2	3,2
Max absorbed current (FLA)	A	---	---	4,5	4,5
Water content	l	---	---	3,9	3,9
Max water supply pressure	Bar	---	---	1÷8	1÷8
NET WEIGHT (2)	kg	---	---	6	6
HYDRAULIC CONNECTION					
WATER INLET - ISO 7/1 - R	Ø	---	---	3/4"	3/4"

1. DL = Displacement air delivery

2. Value to be added to the weight of the standard unit. Does not include the weight of the water content.

OVERSIZED HUMIDIFIERS

The optional is not available for size E1, E2.

On request it is possible to install the oversized humidifiers system.

The components are the same of the standard accessory.

TECHNICAL DATA

MODEL		012	022	030	042
SIZE		E1	E2	E3	E3P
VERSION (1)		DL	DL	DL	DL
VAPOUR PRODUCTION	kg/h	---	---	8,0	8,0
Power input	kW	---	---	6,0	6,0
Absorbed current (OA)	A	---	---	8,7	8,7
Max absorbed current (FLA)	A	---	---	12,4	12,4
Water content	l	---	---	6,4	6,4
Max water supply pressure	Bar	---	---	1÷8	1÷8
NET WEIGHT (2)	kg	---	---	10	10
HYDRAULIC CONNECTION					
WATER INLET - ISO 7/1 - R	Ø	---	---	3/4"	3/4"

1. DL = Displacement air delivery

2. Value to be added to the weight of the standard unit. Does not include the weight of the water content.

OPTIONAL ACCESSORIES – DEHUMIDIFICATION SYSTEM

Components:

- Temperature / Humidity sensor on the air intake.
- 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 – 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.

TECHNICAL DATA

MODEL		012	022	030	042
SIZE		E1	E2	E3	E3P
VERSION (1)		DL	DL	DL	DL
THERMAL CAPACITY	kW	5,1	5,1	6,0	6,0
Absorbed current (OA)	A	7,4	7,4	8,7	8,7
First working step	kW	5,1	5,1	3,0	3,0
Second working step	kW	--	--	3,0+3,0	3,0+3,0
Third working step	kW	--	--	--	--
NET WEIGHT (2)	kg	4	4	7	7

1. DL = Displacement air delivery
2. Value to be added to the weight of the standard unit.

OVERSIZED ELECTRIC HEATERS

The optional is not available E1, E2.

On request it is possible to install the oversized electric heating system.

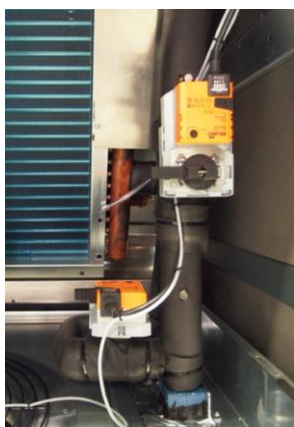
The components are the same of the standard accessory

TECHNICAL DATA

MODEL		012	022	030	042
SIZE		E1	E2	E3	E3P
VERSION (1)		DL	DL	DL	DL
THERMAL CAPACITY	kW	--	--	9,0	9,0
Absorbed current (OA)	A	--	--	13,0	13,0
First working step	kW	--	--	4,5	4,5
Second working step	kW	--	--	4,5+4,5	4,5+4,5
Third working step	kW	--	--	--	--
NET WEIGHT (1)	kg	--	--	7	7

1. DL = Displacement air delivery
2. Value to be added to the weight of the standard unit.

OPTIONAL ACCESSORIES – 2-WAY BY-PASS VALVE CHILLED WATER CIRCUIT

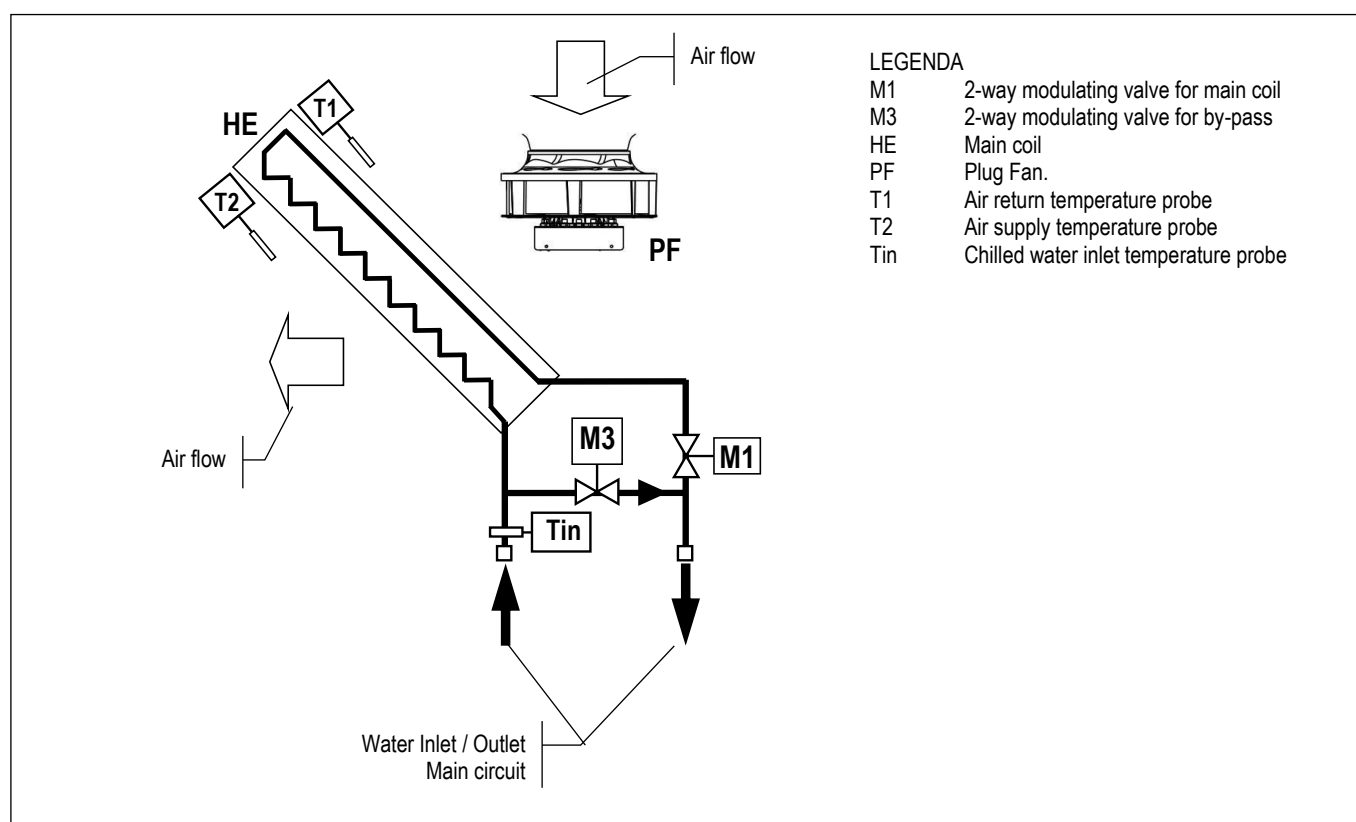


2-way motorized valve with 0÷10 VDC control actuator and emergency manual control for the third way (by-pass) of the hydraulic circuit.

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.



TECHNICAL DATA

MODEL		012	022	030	042
SIZE		E1	E2	E3	E3P
VERSION (1)		DL	DL	DL	DL
2-WAY VALVE FOR BY-PASS					
k _v – Flow coefficient	m ³ /h	4,0	4,0	6,3	8,6

1. DL = Displacement air delivery

IMPORTANT

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

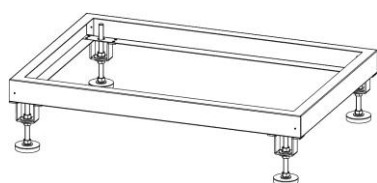
OPTIONAL ACCESSORIES – ePM₁₀ 50% EFFICIENCY AIR FILTERS

The ePM₁₀ 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.

MODEL	012	022	030	042
SIZE	F1	F2	F3	F3P
VERSION (1)	DL	DL	DL	DL
Additional pressure drops (2) Pa	42	65	55	42

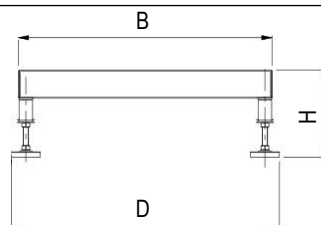
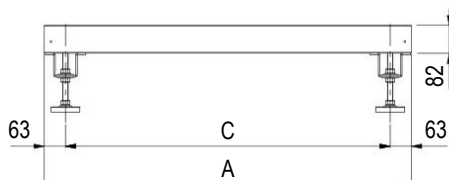
- DL = Displacement air delivery
- Additional pressure drops referred to nominal air flow and clean filter.

OPTIONAL ACCESSORIES - FLOOR STAND



The accessory is supplied as an assembly kit.
For a correct installation of the air conditioner we suggest you to utilize a gasket between the floor stand and the unit base.
The floor stand is available in 3 different heights.

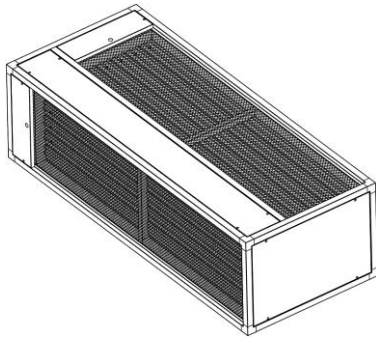
SIZE E1 - E2 - E3 - E3P



SIZE		E1	E2	E3	E3P
A	mm	650	785	1085	1085
B	mm	650	650	750	905
C	mm	524	659	959	959
D	mm	691	691	791	946

MODEL		Hmax350	Hmax450	Hmax510
H min height	mm	255	355	400
H max height	mm	350	450	510

OPTIONAL ACCESSORIES – DIRECT FREE-COOLING PLENUM



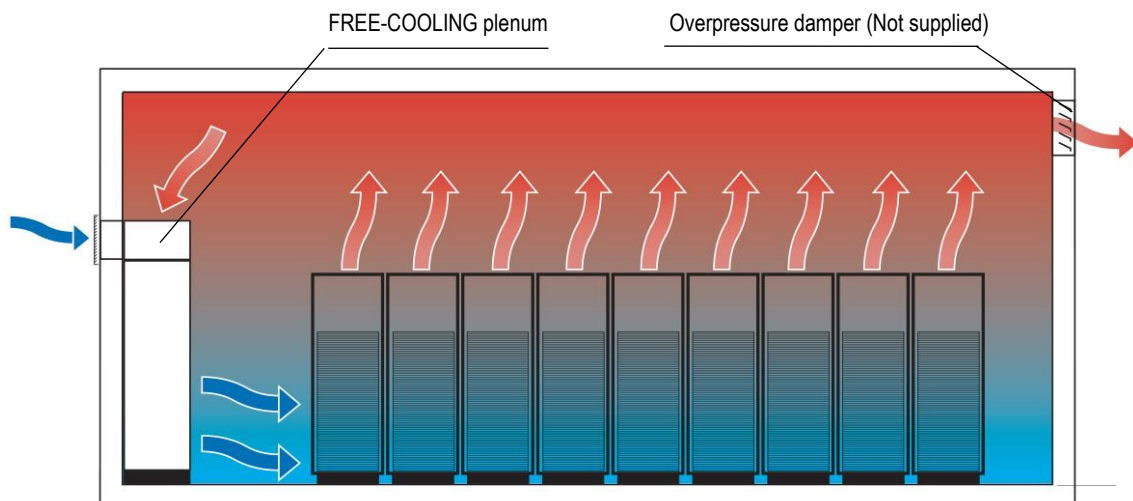
For a further energy-saving, the conditioners are equipped with a proportional automatic free-cooling system in order to obtain free cooling when the indoor temperature is higher than outdoor one. Practically, the fresh air is used as coolant, when the outside conditions allow for this, in order to cool the ambient.

The cooling system is fully proportional and allows three working modes:

- total free-cooling: only fresh air is used to cool the ambient
- partial free-cooling: the fresh air is used for a pre-cooling and the compressor is used to balance the load.
- mechanical cooling: the compressor is used to cool the ambient.

The fresh air input into the room causes an internal pressure increase, that must be avoided to grant a correct performance of the plant.

For this reason, it is necessary to install an overpressure damper close to the ceiling, to allow the hot air discharge.



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.

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 according to the set-point.

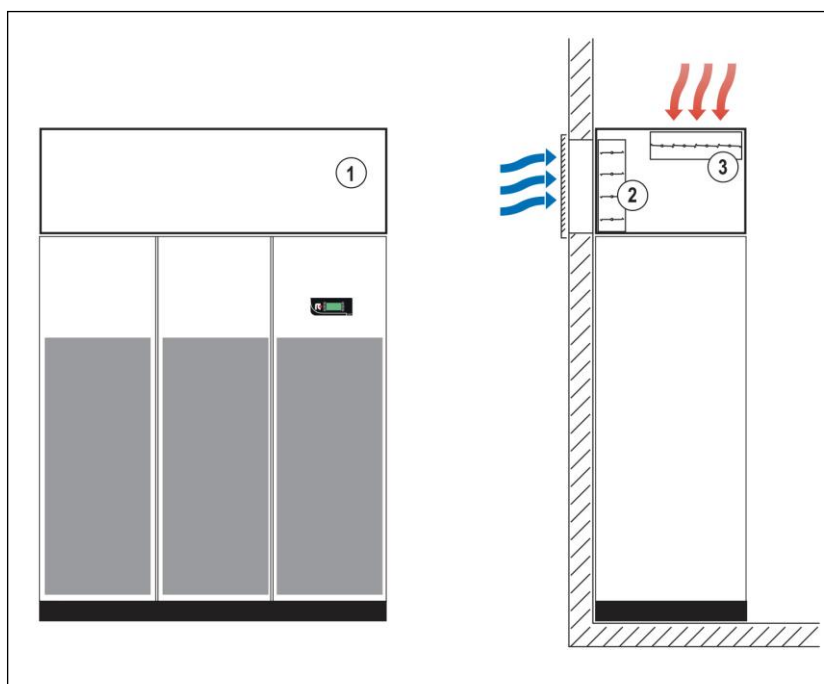
FRAMEWORK

- 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.
- 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.
- Combined Temperature / Humidity sensor on machine air suction. The sensor must be moved outside the air conditioners for a proper read of the room temperature value.
- Temperature sensor for outdoor air. The sensor must be installed in the outdoor air suction duct or anyway protected against atmospheric agent.
- Free contact for free-cooling operating status monitoring.
- Set of fixing elements to fasten the plenum to the unit.

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.

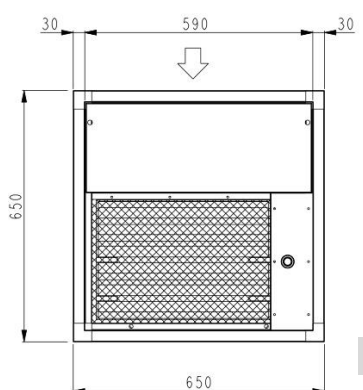
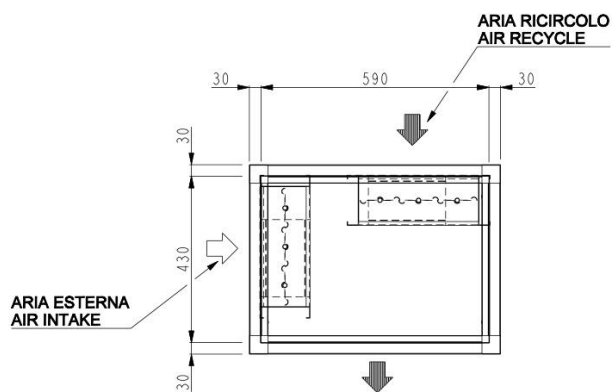
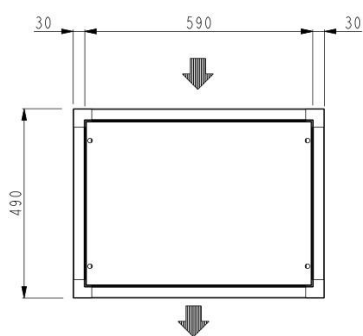
INSTALLATION EXAMPLE



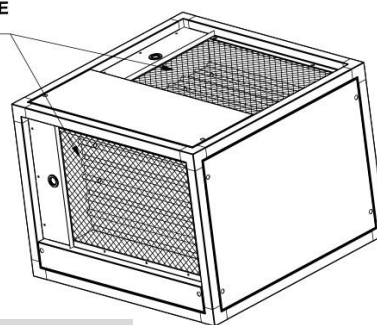
1. Free-Cooling plenum
2. Ambient air damper
3. Return air damper

Ducting are at Customer care.
We suggest you to install a rain-proof grille on ambient air intake.

PLENUM FREE-COOLING - SIZE E1



RETE DI PROTEZIONE
PROTECTION NET

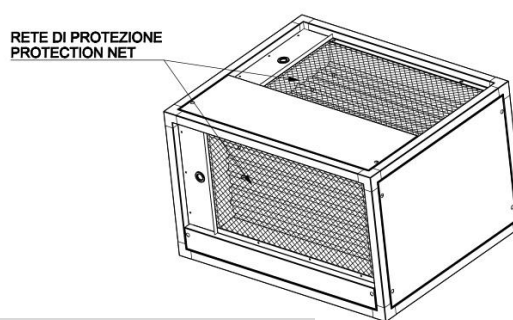
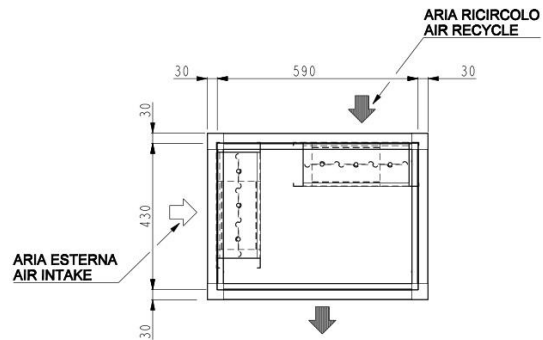
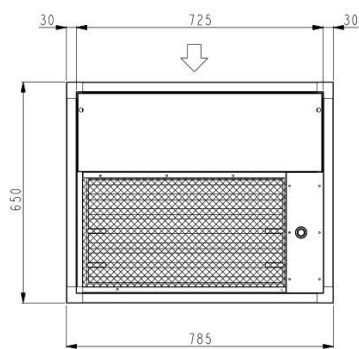
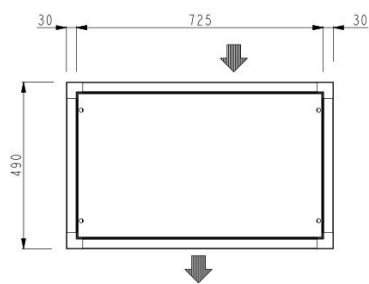


Size **E1**

Weight kg 24

Add this value to the total unit weight

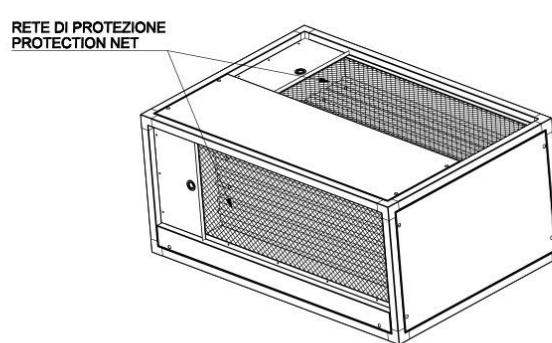
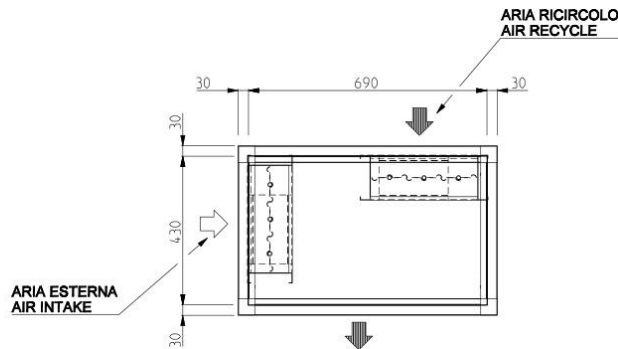
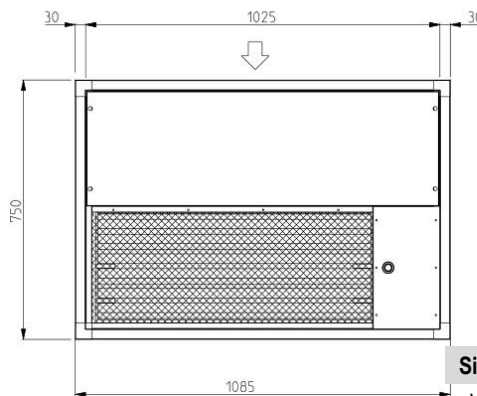
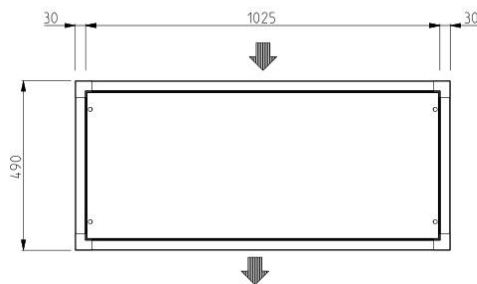
PLENUM FREE-COOLING - SIZE E2



Size	E2
Weight	kg 27

Add this value to the total unit weight

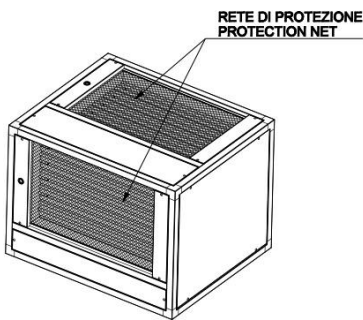
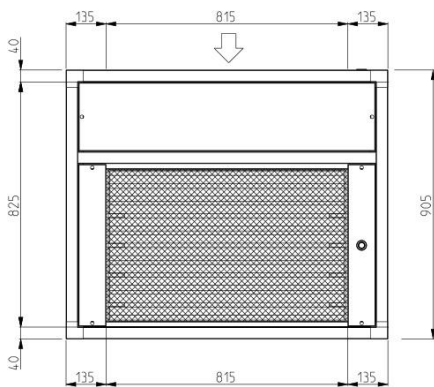
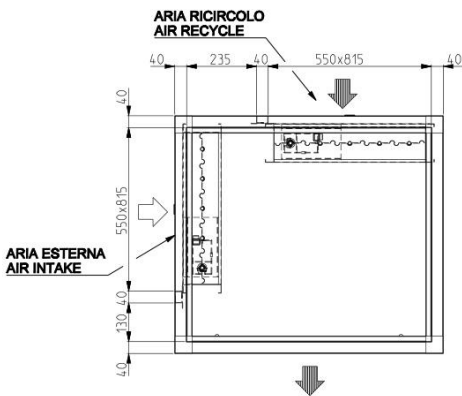
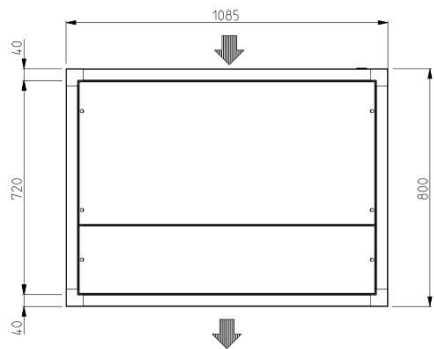
PLENUM FREE-COOLING - SIZE E3



Size	E3
Weight	kg 35

Add this value to the total unit weight

PLENUM FREE-COOLING - SIZE E3P



Size	E3P
Weight	kg 52

Add this value to the total unit weight

OPTIONAL ACCESSORIES – COOLNET



COOLNET: Intelligent NET for IT Cooling that maximizes the energy saving in LOAD SHARING

MAIN FEATURES

COOLNET is a software that applies to chilled water air conditioners microprocessor control system. It optimizes the LOAD SHARING working mode and maximizes the energy savings.

OPTIONAL ACCESSORIES – 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 – KIPlink – Keyboard in your Pocket



KIPlink - Keyboard In Your Pocket - is the innovative user interface based on WiFi technology that allows one to operate on the unit directly from the smartphone or tablet. Using KIPlink, it is possible to turn the unit on and off, adjust the set-point, plot the main operating variables, monitor in detail the status of the refrigerant circuits, the compressors, the fans and display and reset the possible alarms.

Scan the QR code on the electrical board of the unit to have access to the unit control through web browser web or App. The access is possible within the local WiFi network.

KIPlink hardware:

- Wi-Fi antenna in the electrical board;
- ON/OFF button with power LED and Unit status LED. Provided when the unit is equipped with KIPlink and without 6-keys keyboard (optional).

KIPlink allows;

- Easy and enhanced unit management
- Real-Time graphs and key trends
- Different information for each kind of user

OPTIONAL ACCESSORIES – CLOUD PLATFORM: WEB SERVICES BASED ON CLOUD TECHNOLOGY FOR REMOTE MONITORING AND MANAGEMENT OF AIR CONDITIONING PLANTS.



CLOUD PLATFORM is an ecosystem of web services for remote monitoring and management of air conditioning plants; specifically designed for mobile usage on tablets and smartphones, it allows to access plant data everywhere on the go so saving time, money and delivering a higher service level to the customer.

TECHNOLOGY

Based on cloud technology it allows, through machines data telemetry, to monitor and control units on the field, process data and perform proactive maintenance.

The hardware heart of the system is the Cloud box that can collect plant data (up to 31 devices and up to 1000 registers).

Connectivity between monitored devices and Cloud box may be wired in Ethernet, RS485, RS232 and must be in MODBUS protocol.

Cloud Platform then send these data to dedicated server in cloud in through the mobile (GPRS or 3G) network or ADSL.

Information security; each communication channel can be encrypted in VPN, ensuring data privacy.

USER SIDE

Cloud Platform is designed for mobile communication. So, the user just need a tablet or a smartphone to access the RC Cloud Platform and check his plant.

Cloud Platform App is available both on Android and iOS operating systems so the environment may be accessed directly from them beyond company site and platform site. Access through pc is available too.

FUNCTIONS

Telemetry & Data Export

Data polling and history of all data (1 year).

Export diagram and table (csv). **Your data always on the go.**

Multi Device

Many type of devices can be connected to the same box (chillers, close control, energy meters, flow meters, pumps,...).

Only a request: MODBUS protocol. Electrical connection in Ethernet, RS 485 or RS 232.

Multi Language

English native, Cloud Platform language pack is available for the main markets.

Virtual Display

Monitoring and control (on/off, alerts reset, main parameters change) as being beside the unit, in an augmented reality way.

Designed for Mobile.

Same as standing in front of the unit, when in your office or in any other place.

Internet Connectivity

ETHERNET + GPRS + 3G connection capability on Public and Virtual Private Network (VPN).

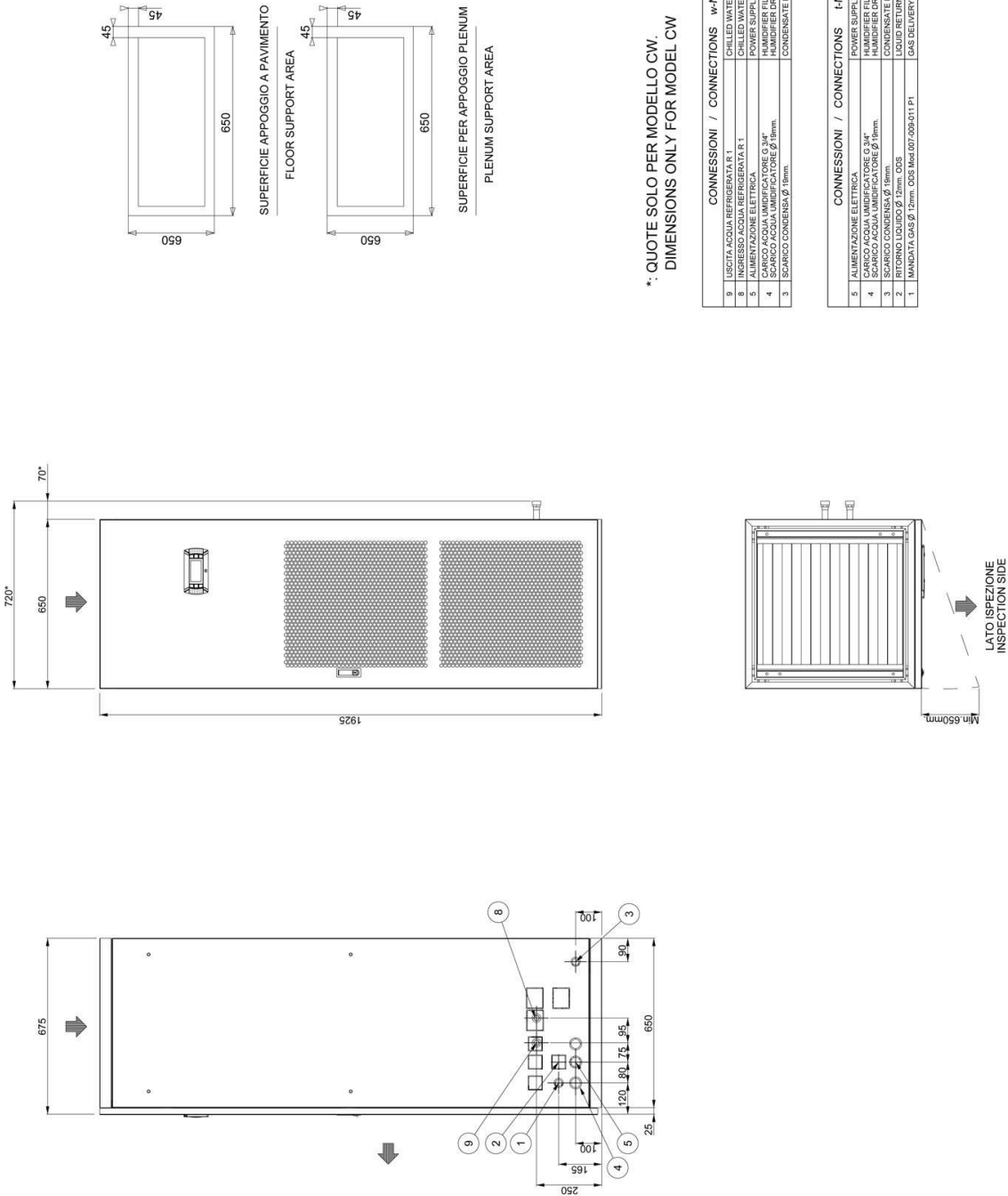
Alerts Warning through:

- Push notification
- e-mail
- Voice calls
- SMS

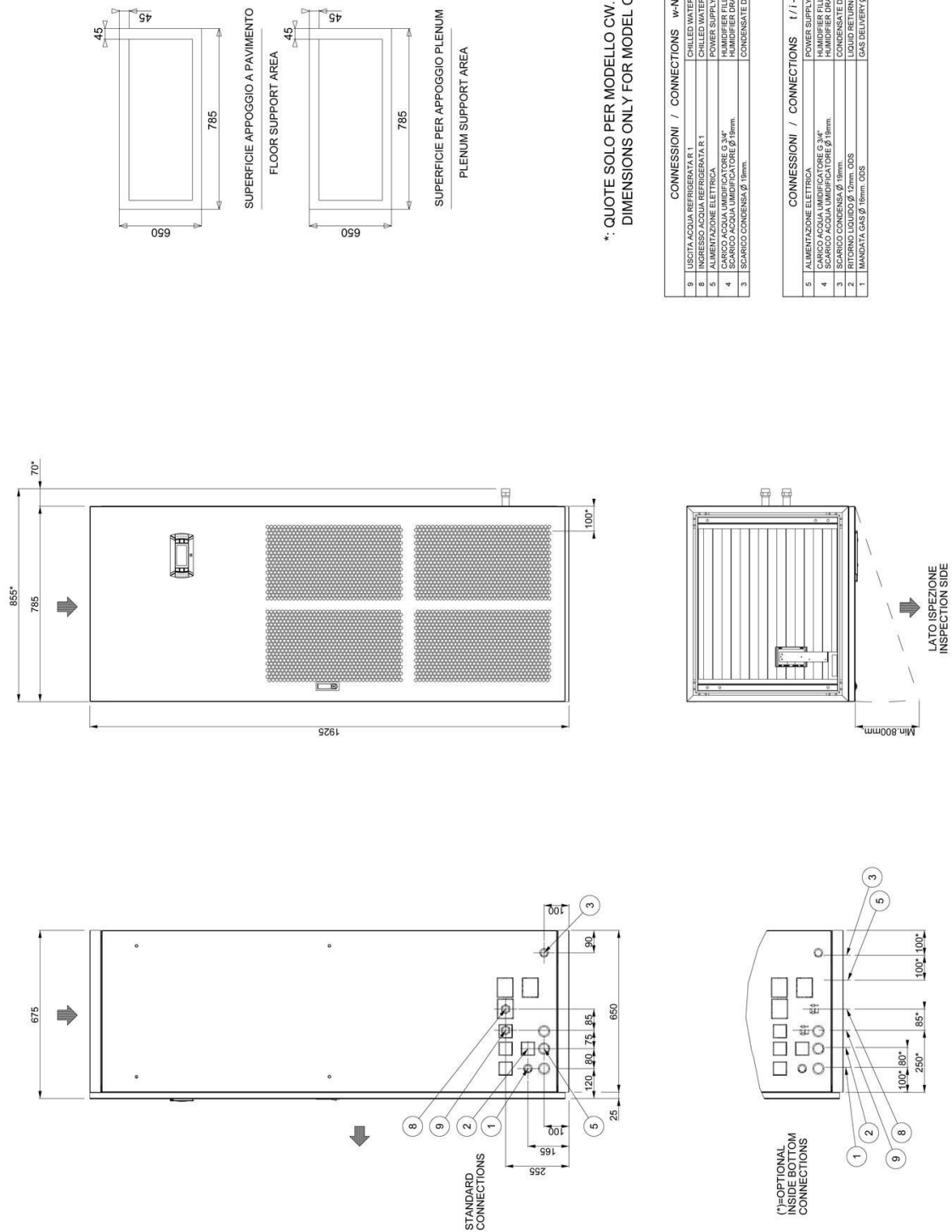
Processing of specialized plant KPI to get:

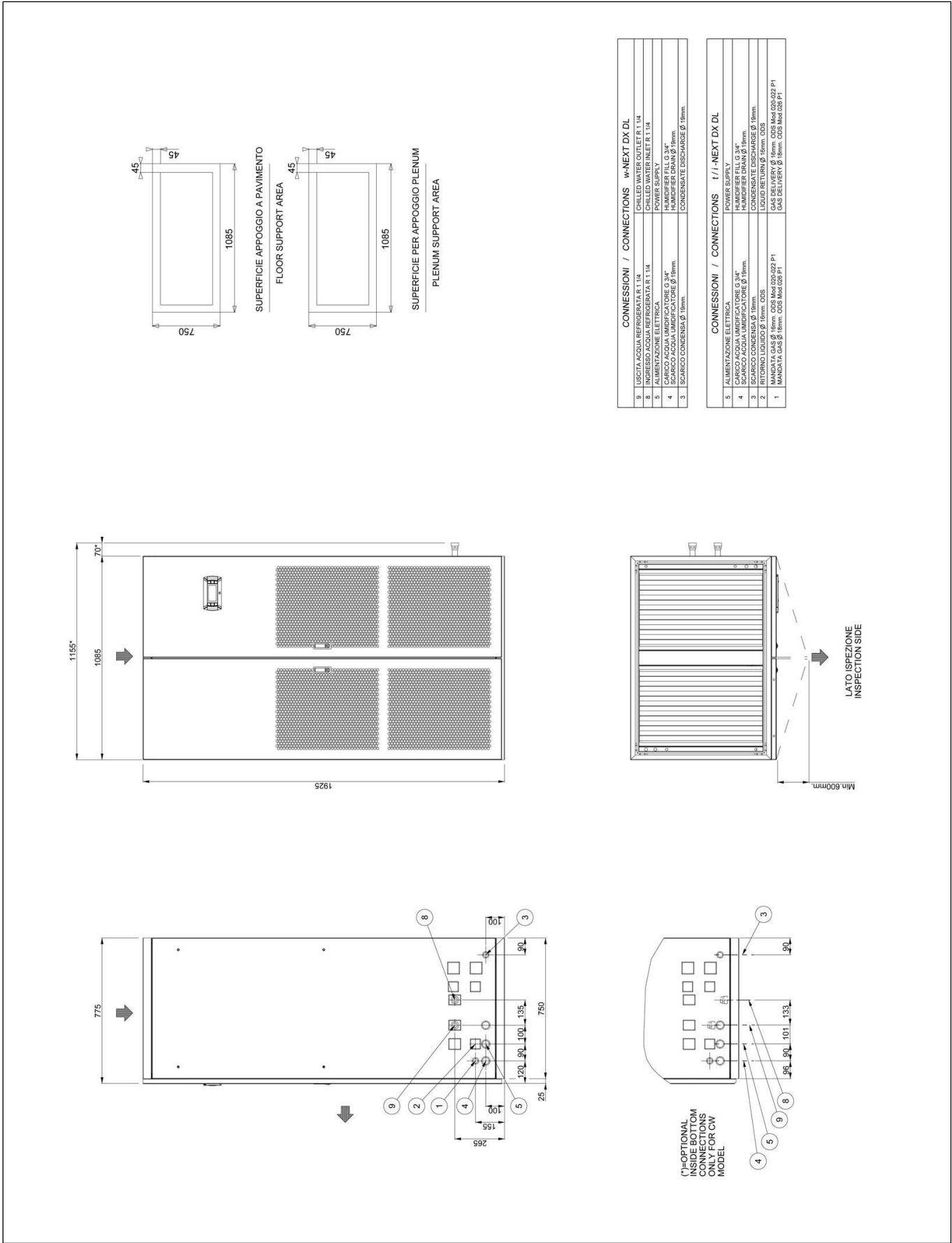
- Energy performance (gross instant EER)
- Components Failure Forecast (coming soon)
- Unit diagnosis

MACHINE DRAWINGS
Dimensions in mm – SIZE E1



*: QUOTE SOLO PER MODELLO CW.
DIMENSIONS ONLY FOR MODEL CW







*: QUOTE PER CANALE DI ASPIRAZIONE ARIA
DIMENSIONS FOR AIR INTAKE DUCT

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 m³/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 (m³/h) = water flow rate – it varies according to the desired operating condition;

k_v (m³/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.

$$1 \text{ bar} = 100\text{kPa}$$

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

Model 030 F3 - CHILLED WATER COIL

Example at nominal conditions. Characteristics referred to entering air at 30°C-30%RH with chilled water temperature 10-15°C - 0% glycol. ESP=20Pa.

Water flow rate: 5,1 m³/h

Valve flow coefficient k_v : 6,3 m³/h

$$\text{2-way valve for by-pass pressure drop: } \Delta P = (Q / k_v)^2 = (5,1 / 6,3)^2 = 0,65 \text{ (bar)} * 100 \text{ (kPa / bar)} = 65,0 \text{ kPa}$$



for a greener tomorrow

Eco Changes is the Mitsubishi Electric Group's environmental statement, and expresses the Group's stance on environmental management. Through a wide range of businesses, we are helping contribute to the realization of a sustainable society.



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

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