

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

Data Book  
DB\_CV\_i-AV DL DX 18-22\_052023\_EN\_rev01

## i-AV DL DX

**23,1-25,3 kW**

FULL INVERTER direct expansion air conditioners for IT Cooling.  
To be matched with remote air-cooled condenser.



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

- PERIMETER INSTALLATION
- FULLY HERMETIC BLDC INVERTER COMPRESSORS
- SINGLE REFRIGERANT CIRCUIT
- DISPLACEMENT AIR DELIVERY
- PLUG FANS WITH EC ELECTRIC MOTOR
- ELECTRONIC EXPANSION VALVE
- AIR SUCTION TEMPERATURE UP TO 40°C

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# CERTIFICATIONS

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## CERTIFICATIONS



**ISO 9001 CERTIFICATION**  
Quality Management System



**ISO 14001 CERTIFICATION**  
Environmental Management System



**BS OHSAS 18001 CERTIFICATION**  
Occupational Health and Safety Management System



**CE MARKING**



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



**EAC CERTIFICATION**  
(Russian Federation, Belarus, Kazakhstan)

# GENERAL CHARACTERISTICS

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## GENERAL CHARACTERISTICS



Displacement air delivery



### FULL INVERTER Air Conditioners for IT Cooling.

- Direct expansion, air cooled.
- For matching with remote air-cooled condenser.
- BLDC inverter compressors.
- Plug fans with EC electric motor.
- Single refrigerant circuit.

This series is available with displacement air delivery:  
Cooling capacity 23,1-25,3 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 refrigerant charge, 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

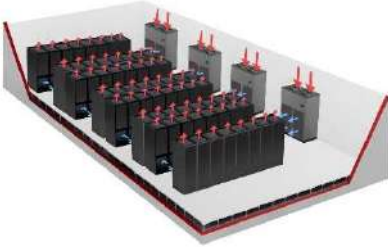
- Single BLDC hermetic inverter compressor in order to provide always the best efficiency;
- New plug fans with EC electric motors and impeller in composite material, which guarantees a reduction of power consumption;
- New fans electric motor that do not require maintenance;
- Improvement of the control software with advanced control logic;
- Hinged frontal panels and lateral panels fully removable to facilitate the operations of extraordinary maintenance;

## GENERAL CHARACTERISTICS

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### INSTALLATION



The series is particularly suitable for installation in Data Centre of medium / small size with variable 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.

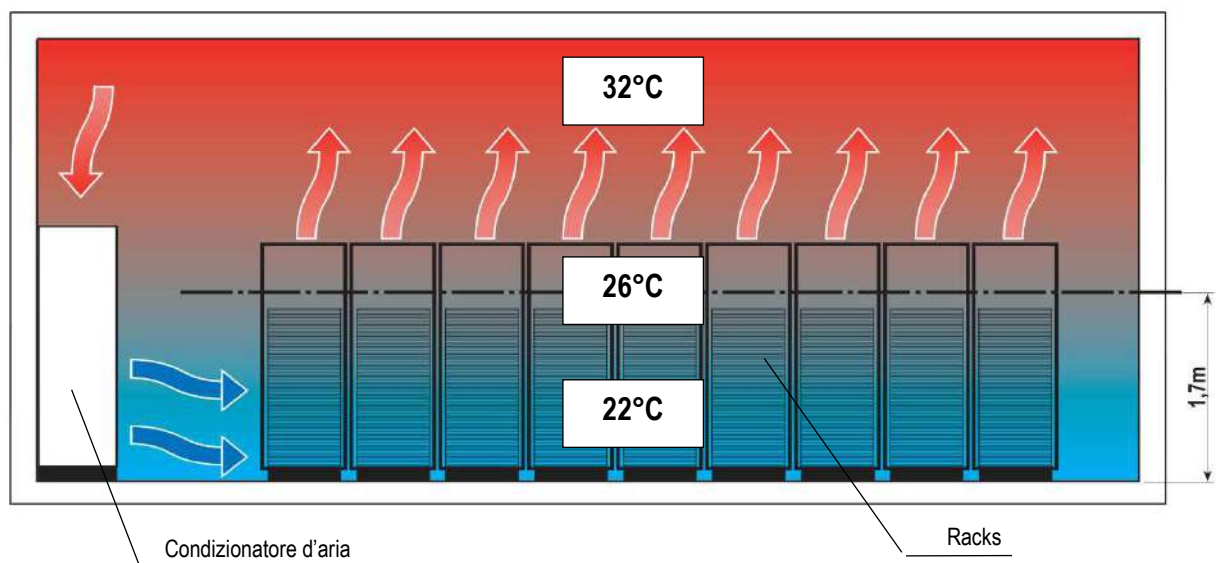
The MEHITS air conditioning system with displacement air delivery supplies the cold air directly into the room at low air speed and intakes the air from the top side of the conditioner where the air temperature is higher.

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.



# GENERAL CHARACTERISTICS

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## F-GAS DIRECTIVE

The units highlighted in this publication contain <HFC R410A [GWP<sub>100</sub> 2088]> fluorinated greenhouse gases.

## MODEL IDENTIFICATION

Air conditioners for IT Cooling

Model: i-AV DL DX 022 M1 E3

i-AV	Series identification
DL	Displacement air delivery
DX	Direct expansion, air cooled
022	Cooling capacity (kW) at nominal conditions
M1	Number and type of compressors
	M = BLDC inverter compressor for R410A
	1 = number of compressors
E3	Cabinet size

### THE SERIES

DISPLACEMENT

E2

E3



## TRANSPORT AND STORAGE TEMPERATURE

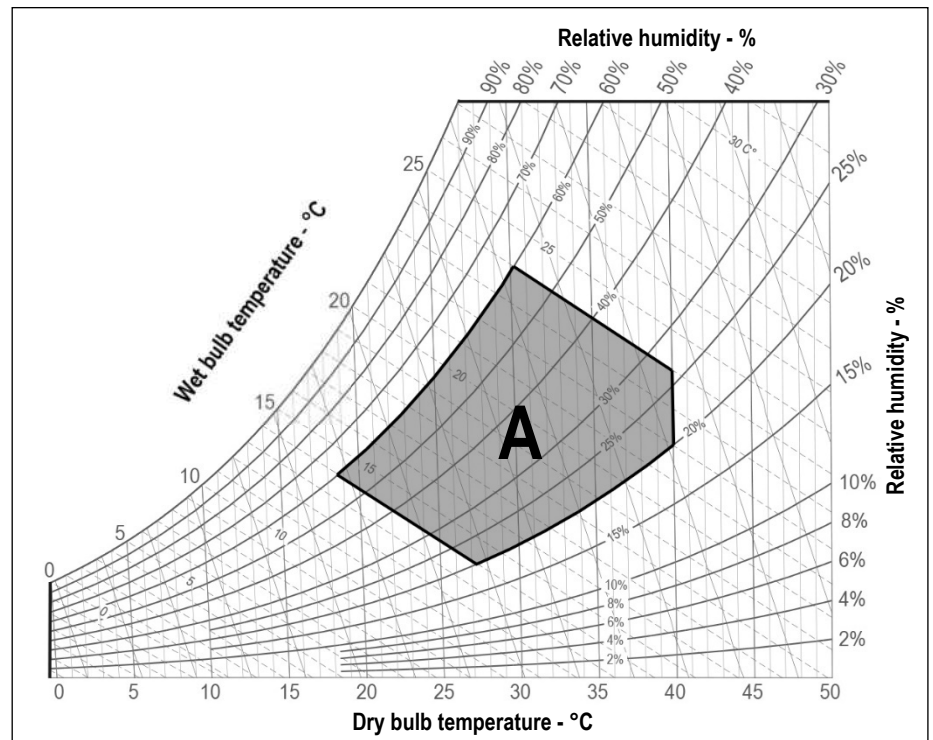
During transport and if the machine is not installed at the reception, do not remove the packaging and place the machine in an enclosed, dry and protected from sunlight site at temperatures ranging between -30°C and 50°C in absence of superficial condensation.

# WORKING LIMITS

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## WORKING LIMITS



### ROOM AIR CONDITIONS

Room air temperature:

14°C	minimum temperature with wet bulb.
24°C	maximum temperature with wet bulb.
18°C	minimum temperature with dry bulb.
40°C	maximum temperature with dry bulb.

### AREA "A". Machine operating envelope.

Room air humidity:

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

### AMBIENT AIR TEMPERATURE

45°C	Maximum ambient air temperature
-20°C	Minimum ambient air temperature

With "Kit for air -45°C" for low ambient temperature operation (optional)

-45°C	minimum ambient air temperature with remote condensers with AC fans
-------	---

All the values are indicative. The working temperatures are influenced by a series of variables as:

- Working conditions;
- Thermal load;
- Set of the microprocessor control.

### POWER SUPPLY

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



# COMPONENTS OF THE UNIT

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## 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
- Clogged filters sensor with differential pressure switch on air side.

### BLDC SCROLL INVERTER COMPRESSORS SECTION

- Scroll BLDC inverter compressors with spiral profile optimized for R410A refrigerant:
- Single refrigerant circuit.
- Synchronous brushless inverter driven motor.
- Inverter for modulating capacity control.
- Reactance for the reduction of electromagnetic noise and interference.
- Crankcase heater.
- Soundproof jacket for each compressor.
- Rubber supports.

### 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.
- Frame in galvanized steel or peralluman.
- Condensate tray in peralluman 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.
- Under floor water alarm through sensor to be placed on the floor.

# COMPONENTS OF THE UNIT

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## REFRIGERANT CIRCUIT

Components for each refrigerant circuit:

- Electronic expansion valve. The valve allows high performance and system efficiency thanks to a timely and accurate response to changes in temperature and pressure
- Sight glass.
- Filter dryer on liquid line.
- Pressure transducers with indication, control and protection functions, on low and high refrigerant pressure.
- High pressure safety switch with manual reset.
- Liquid receiver.
- Refrigerant circuit with copper tubing with anticondensate insulation of the suction line.
- Lubricant oil charge.
- Oil separator on gas discharge.
- Valves on gas delivery and liquid return for coupling to remote air cooled condenser.
- 0÷10V proportional signal to manage the condensing control system of the remote air cooled condenser.
- Condensing control by continuous variation of remote condenser fan rotation speed for operations with ambient temperature down to -20°C.



## 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).



## 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 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.
  - 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 (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 15 units).



## COMPONENTS OF THE UNIT

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### REMOTE AIR-COOLED CONDENSERS



Remote air-cooled condensers for matching to air conditioners for IT Cooling.

The constructive solutions allow high application flexibility.

Horizontal air flow, from coil to fan.

The series has an independent power supply from the indoor unit.

Among the indoor unit and the condenser is necessary the refrigerant connection and electrical connection of the condensing proportional control signal and the alarms.:

Is available the optional "P191 Power supply for condenser" from the indoor machine electrical board.

#### Remote air-cooled condenser:

Remote air-cooled condenser in PERALUMAN aluminium alloy with microchannel condensing coil:

- with AC axial fans and standard acoustic version
- with AC axial fans and low noise acoustic version
- with EC axial fans and standard acoustic version
- with EC axial fans and low noise acoustic version

Remote air-cooled condenser with condensing coil with copper tubes and aluminium fins:

- with AC axial fans and standard acoustic version
- with AC axial fans and low noise acoustic version
- with EC axial fans and standard acoustic version
- with EC axial fans and low noise acoustic version

#### WARNING:

Please refer to ELCA WORLD selection program to calculate the cooling capacity of the air conditioner according to the selected remote condenser

### OPTIONAL ACCESSORIES

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

601 .....	<b>Solenoid valve on liquid line.</b>
P091 .....	<b>Back-up module controller.</b> The system guarantees the microprocessor power supply for a few minutes, in case of supply voltage failure. (size E1 excluded).
P171 .....	<b>Kit for air -45°C MCH axial AC</b> Kit for operations with low ambient air temperature down to -45°C. For machine start up and operation with very low ambient air temperatures (between -20°C and -45°C).
P191 .....	<b>Power supply for condenser.</b> Electrical power supply for remote condenser from the indoor machine electrical board. The optional includes magneto-thermic switches for condenser fans and the control/alarm signals.
383 .....	<b>Numbered wirings + UK requests;</b>
4181 / 4182 / 4184 / 4185 ...	<b>Serial cards:</b>
	4181 – Serial card MODBUS;
	4182 – Serial card LON;
	4184 – Serial card BACNET MS/TP RS485;
	4185 – Serial card BACNET OVER IP.
A492 .....	<b>Water leakage detector + additional sensor.</b> Supplied in mounting kit.
A511 .....	<b>Smoke detector.</b> Supplied in mounting kit.
A521 .....	<b>Fire detector.</b> Supplied in mounting kit.
5891 .....	<b>Control unit via kiplink.</b>
A35B .....	<b>Graphic display "Evolution Touch"</b>
A352 .....	<b>No Display</b>
P141 .....	<b>Analogue set-point compensation.</b> - Analogue set point compensation according to an external analogue signal at Customer care.
P181 .....	<b>Network analyser</b> (standard machine) Multifunction utility for calculating and displaying the machine electrical measurements.
P182 .....	<b>Network analyser+optional</b> (full optional machine) Multifunction utility for calculating and displaying the machine electrical measurements.

## COMPONENTS OF THE UNIT

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P183.....	<b>Kit network analyser</b> (standard machine) Multifunction utility for calculating and displaying the machine electrical measurements. Supplied in mounting kit.
P184.....	<b>Kit network analyser+optional</b> (full optional machine) Multifunction utility for calculating and displaying the machine electrical measurements. Supplied in mounting kit.
A812 (2) .....	<b>Free-cooling direct control</b>
A431.....	<b>Electric heater.</b> Heating with electric heaters.
A432.....	<b>Extra power electric heater.</b> Size E2 excluded.
P051 (4) .....	<b>Dehumidification function.</b>
A791.....	<b>Air temperature control on suction air.</b>
P161.....	<b>T/rH air intake sensor.</b> Combined Temperature / Humidity sensor on air intake. The optional replace the standard temperature sensor on machine air intake.
4666 .....	<b>External air probe.</b> External air temperature probe.
P071/ P072 / P073 / P074 ..	<b>Remote T/rH probe:</b> combined Temperature / Relative Humidity probe. For remote installation, in addition to the combined probe on the air intake of the unit.
P113 / P114 .....	<b>Dual power supply.</b> Dual power supply with automatic change-over. <b>P113 - Dual power supply kit.</b> Supplied in mounting kit. <b>P114 - Dual power supply kit + optional.</b> Supplied in mounting kit.
A381.....	<b>Drain pump.</b> Supplied in mounting kit. The system includes pump with activation float and 10 linear meters long discharge pipe.
P084.....	<b>Air filter ePM<sub>10</sub> 50%.</b> Washable high efficiency air filter (according to ISO EN 16890).
P034 (5) .....	<b>Intake free-cooling plenum.</b>
P041 / P042 / P043.....	<b>Support frame</b> with height adjusting rubber holders. Supplied in mounting kit. It is not possible to match the support frame with plenum installed under the machine. <b>P041 – Support frame h 255-350mm</b> <b>P042 – Support frame h 355-450mm</b> <b>P043 – Support frame h 400-510mm</b>
3601 .....	<b>Compressor operating signal contact.</b> Voltage free contact for compressor status signalling.
2411 .....	<b>Phase sequence relay.</b> Phases sequence control relay for the machine.
9973 .....	<b>Wooden cage packing.</b> The machines are delivered on wooden pallet, covered with shrink wrap and packaged in wooden cage.
B912.....	<b>Remote keyboard K200.</b> 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 "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" .
5. When accessory A352 "NO DISPLAY" is present, it requires mandatory accessory 5891 "Unit control via Kiplink"

# TECHNICAL DATA

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## TECHNICAL DATA

VERSION (1)		DL					DL				
MODEL		018 M1 S					022 M1 S				
SIZE		E2					E3				
<b>COOLING CAPACITY (2)</b>		<b>100%</b>	<b>80%</b>	<b>60%</b>	<b>40%</b>	<b>30%</b>	<b>100%</b>	<b>80%</b>	<b>60%</b>	<b>40%</b>	<b>30%</b>
Total	kW	21,7	17,4	13	8,68	7,02	24,4	19,5	14,6	9,76	7,94
Sensible	kW	21	17,2	13	8,68	7,02	24,4	19,5	14,6	9,76	7,94
SHR (3)	kW/kW	0,97	0,98	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
Total power input (Comp. + Fans)	kW	6,26	4,52	2,92	1,8	1,4	6,31	4,64	3,03	1,82	1,40
<b>"EC" SUPPLY FANS</b>	n.	1					1				
Air flow	m <sup>3</sup> /h	3280	2757	2235	1712	1512	4400	3757	3114	2472	2232
Nominal external static pressure	Pa	20	20	20	20	20	20	20	20	20	20
Maximum external static pressure	Pa	502	--	--	--	--	1000	--	--	--	--
Power input (4)	kW	0,28	0,22	0,15	0,10	0,08	0,36	0,23	0,15	0,12	0,1
<b>COMPRESSORS</b>		Scroll					Scroll				
BLDC INVERTER compressors	n.	1					1				
Cooling Capacity Control		Modulating					Modulating				
Compressors power input	kW	5,98	4,31	2,78	1,7	1,32	5,95	4,4	2,88	1,7	1,3
<b>AIR FILTERS</b>	n.	1					1				
Efficiency (ISO EN 16890)	COARSE	60%					60%				
<b>GAS CIRCUITS</b>	n.	1					1				
<b>POWER SUPPLY</b>	V/Ph/Hz	400/3+N/50					400/3+N/50				
<b>ENERGY EFFICIENCY INDEXES (2)</b>											
EER - Energy Efficiency Ratio (5)	kW/kW	3,47	3,85	4,45	4,82	5,01	3,87	4,2	4,82	5,36	5,67
<b>DIMENSIONS</b>											
Length	mm	785					1085				
Width	mm	675					775				
Height	mm	1925					1925				
<b>NET WEIGHT</b>	kg	240					320				
<b>REFRIGERANT CONNECTIONS</b>											
Gas delivery	ODS Ø	16					16				
Liquid return	ODS Ø	12					16				
<b>HYDRAULIC CONNECTIONS</b>											
<b>CONDENSATE DISCHARGE</b>											
Condensate discharge - Rubber pipe	F Ø	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; condensing temperature 45°C. ESP=20Pa.
3. SHR = Sensible cooling capacity / Total cooling capacity.
4. Corresponding to the nominal external static pressure
5. The Energy Efficiency Index does not consider the remote air cooled condenser.

The units highlighted in this publication contain <HFC R410A [GWP<sub>100</sub> 2088]> fluorinated greenhouse gas.

### NOTE:

Below 30% of cooling capacity, the inverter compressor enters the "cycling" area in which the compressor operates with ON / OFF cycles below the minimum modulation frequency (operation only for short periods).

SELECT THE UNIT IN THE MODULATION FIELD.

# REFRIGERANT CHARGE

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## REFRIGERANT CHARGE

The air conditioner is supplied with a minimum R410A refrigerant charge. **Refrigerant must be charged.** The following table shows the refrigerant charge that must be introduced for the air conditioner only. Remote condenser, connections pipes and optional are excluded.

VERSION (1)		DL	DL
MODEL		018 M1 S	022 M1 S
SIZE		E2	E3
REFRIGERANT		R410A	R410A
Refrigerant circuits x Refrigerant charge (2)	n x kg	1 x 3,6	1 x 4,3
HFC R410A - F Gas - CO <sub>2</sub> equivalent	t	7,51	8,97

- DL = Displacement air delivery
- Refrigerant charge required for the air conditioner only operation. Remote condenser, connections pipes and optional are excluded.

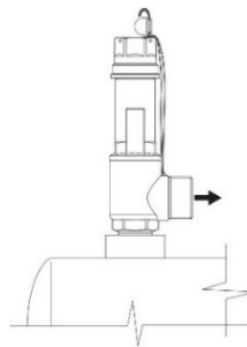
## PRESSURE RELIEF VALVE

The pressure relief valve of the refrigerant circuit is installed in the machines when required by Directive 2014/68/EU.

The valve is installed on liquid receiver and oil separator of each refrigerant circuit of the machine with the purpose to protect the circuit from overpressure. **It is up to the installer to check whether the system complies with the 2014/68 / EU standard regarding the installation of the pressure relief valve. By plant we mean the complete system that includes the internal machine, the remote condenser and the connecting pipes**

The installer must calculate the amount of refrigerant contained in the system and, if the refrigerant charge is higher than 10 kg, he must install the pressure relief valve.

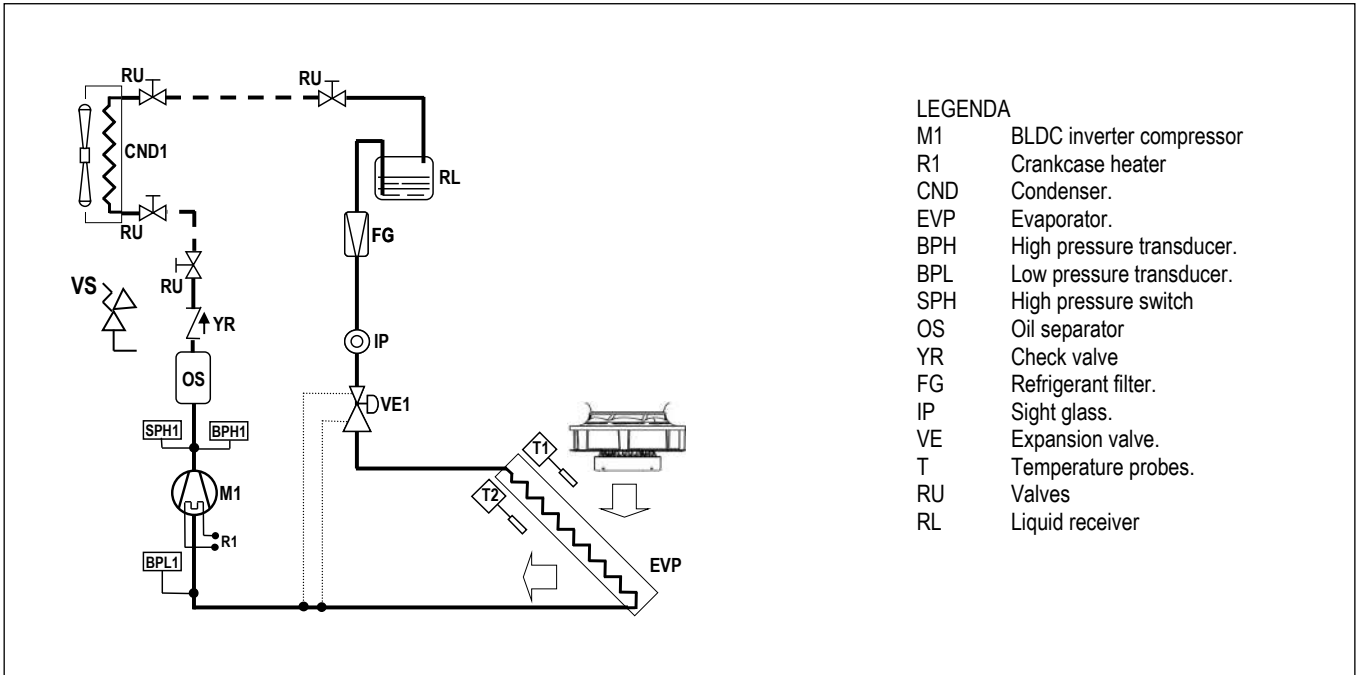
	Factory installed components		At Installer care
	Pressure relief valve on liquid receiver	Pressure relief valve on oil separator	Possible pressure relief valve
Model	[bar]	[bar]	[bar]
018 M1 S	---	---	41,5
022 M1 S	---	---	41,5



Exhaust flow  
CONNECTION Ø 3/4" G – M

# REFRIGERANT CIRCUIT

The diagrams refer to the standard configuration, without optional.



## RECOMMENDED REFRIGERANT LINES

Diameter of the recommended refrigerant lines for connection to MEHITS S.p.A. air conditioners and referred to "EQUIVALENT LENGHT".

Please always refer to the "INSTALLATION DIAGRAM" to properly select all necessary components

Verify the need to use pressure limiting devices (safety valves) where not already provided for by Directive 2014/68 / EU.

**Nominal diameter: Refrigerant connection of the indoor unit. In some cases, the diameter of the refrigerant lines may not correspond with the nominal diameter. This is completely normal. It is enough to provide a reduction fitting to adjust the diameter.**

## "SI" INTERNATIONAL SYSTEM PIPES DIAMETERS

SI system	Diameter	mm	6	8	10	12	16	18	22	28	35
	Thickness	mm	1	1	1	1	1	1	1	1,5	1,5

## INVERTER COMPRESSORS

Model	Line	Nominal diameter Ø [mm]	EQUIVALENT LENGHT [m] FOR INVERTER COMPRESSORS R410A																				
			5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	
18 M1 S	Gas	16	16	16	16	16	16	16	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
	Liquid	12	12	12	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
22 M1 S	Gas	16	16	16	16	16	16	16	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
	Liquid	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16

For equivalent lengths over 100m please contact the Manufacturer's Sales Office.

## IMPERIAL" SYSTEM PIPES DIAMETERS

IMPERIAL system	Diameter	inch	1/4"	3/8"	1/2"	5/8"	3/4"	7/8"	1"	1 1/8"	1 3/8"
		mm	6,35	9,52	12,7	15,87	19,05	22,22	25,4	28,57	34,92
	Thickness	mm	1	1	1	1	1	1	1	1,25	1,25

## INVERTER COMPRESSORS

Model	Line	Nominal diameter Ø [mm]	EQUIVALENT LENGHT [ft] FOR INVERTER INVERTER R410A																				
			15	35	50	65	80	100	115	130	150	165	180	195	215	230	245	260	280	295	310	330	
18 M1 S	Gas	16	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	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"	3/4"	3/4"
	Liquid	12	1/2"	1/2"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"
22 M1 S	Gas	16	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	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"	3/4"	3/4"
	Liquid	16	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"	5/8"

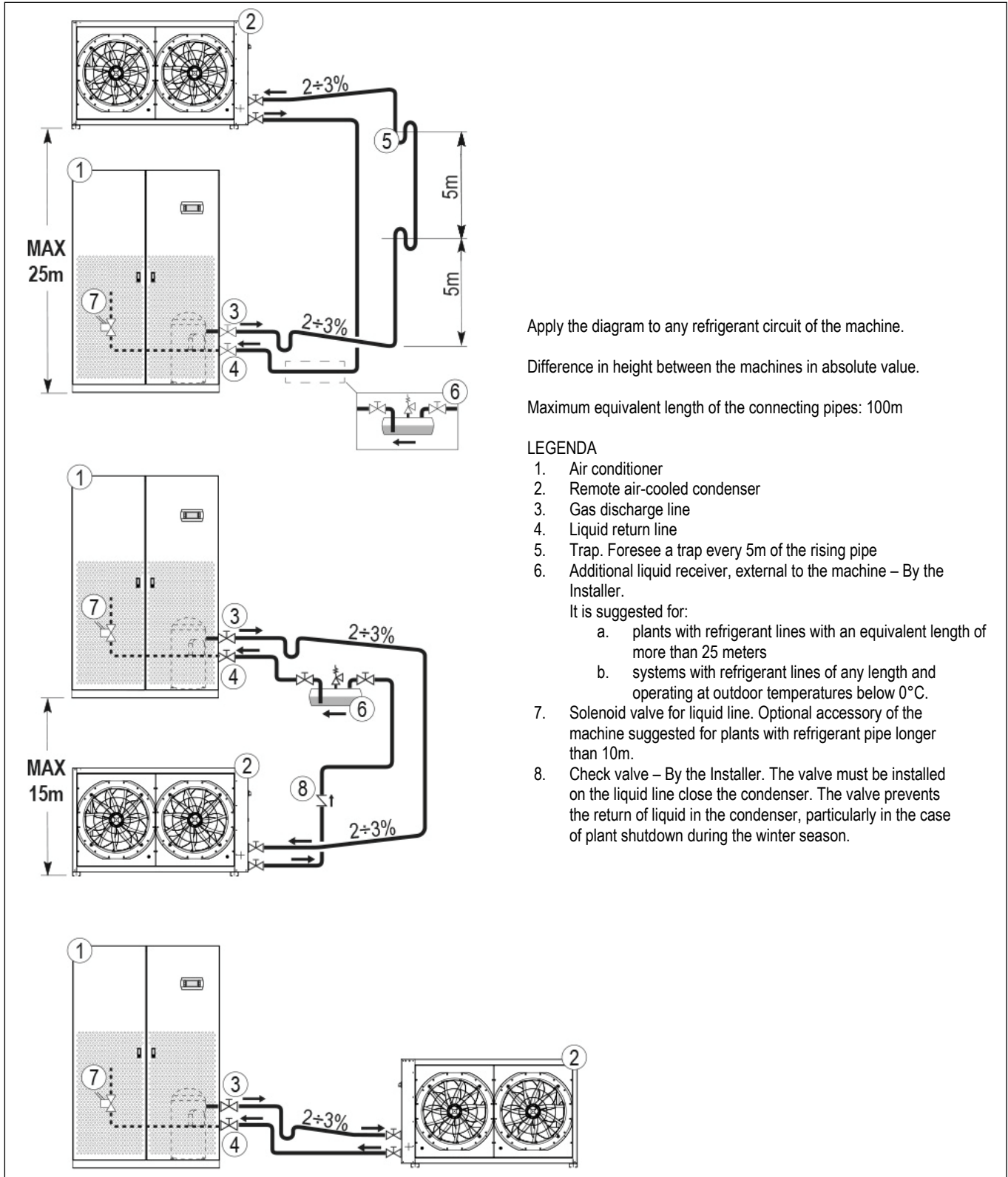
For equivalent lengths over 330ft please contact the Manufacturer's Sales Office.

# INSTALLATION DIAGRAM

Data Book

DB\_CV\_i-AV DL DX 12-22\_052023\_EN\_rev01

## INSTALLATION DIAGRAM



### WARNING

It is necessary to provide the refrigerant charge for the connection pipes and for the remote air-cooled condenser.

Charge refrigerant in the suitable quantity and lubricant oil in 10% ratio of charged refrigerant.

Lubricant oil must be the same type as the charged one as shown on the compressor plate.



# ACOUSTIC DATA ELECTRICAL DATA

DB\_CV\_i-AV-DL DX-12

Data Book  
DB\_CV\_i-AV DL DX 12-22\_052023\_EN\_rev01

## 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)		DL	DL
MODEL		018 M1 S	022 M1 S
SIZE		E2	E3
COOLING CAPACITY		100%	100%
<b>SOUND LEVEL ISO 3744 (2)</b>			
On Unit Front	dB(A)	53	53

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

## ELECTRICAL DATA

Electrical data of the system at full load working conditions.

VERSION (1)		DL	DL
MODEL		018 M1 S	022 M1 S
SIZE		E2	E3
Power supply	V/ph/Hz	400/3+N/50	400/3+N/50
Maximum current input (FLA)	A	18,7	22,6

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.

The remote air cooled condenser is not included because it has independent power supply.

## 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. The system can manage up to 4 T/H probes on air intake, 4 T/H probes on air delivery, 4 remote T/H probes and a T/H probe for outdoor air.

### 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: <b>Unit; Set-point; In/Out; Clock; History; User; Service; Factory.</b> 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

		AREA 12	H	H	:	M	M	D	D	/	M	M	/	Y	Y
		AREA 1		-	9	9	.	9	°C						
		AREA 2		-	9	9	.	9	%						
		AREA 3													
		AREA 3_A													
		AREA 4													
		AREA 5													
		AREA 6													
		AREA 7													
		AREA 8													
		AREA 9													
		AREA 10													

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

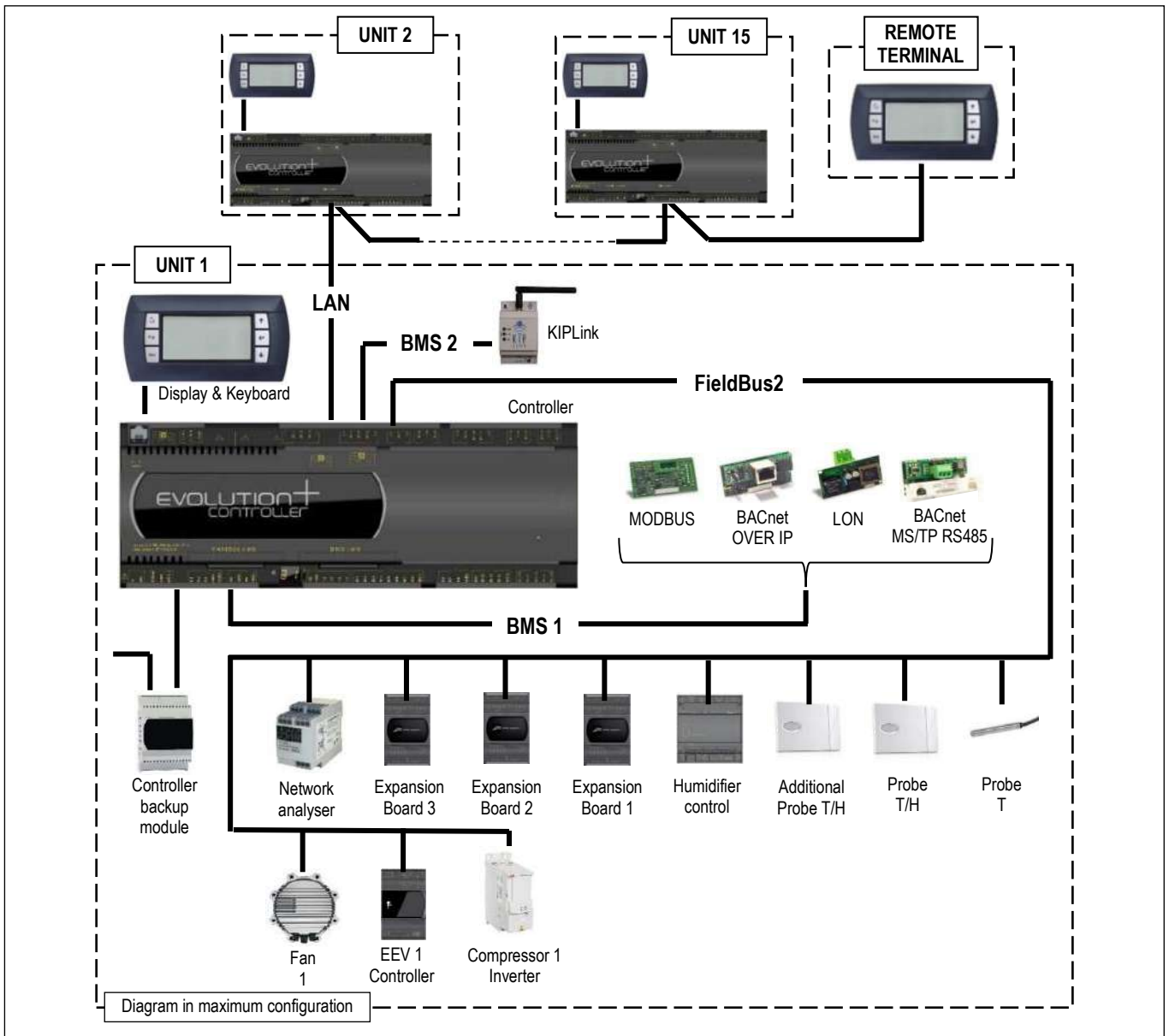
### CONNECTIVITY

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

# MICROPROCESSOR CONTROL SYSTEM



### LAN NETWORK

The LAN is part of the control software and it is possible to connect up to 15 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

Units n.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Remote terminal
Controller address	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	---
Display & Keyboard address	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	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.
- 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.
- Operating with all units based on the average temperature and humidity values read by the temperature probes only in the operating units.
- DYNAMIC MASTER function that makes the role of the Master unit dynamic. In case of alarm, shutdown, maintenance, power failure, etc. on the Master unit, the function automatically elects a new Master unit.

## TEMPERATURE PROBE ON AIR RETURN / DELIVERY



Temperature probe installed on the air return and delivery of the unit.  
Standard temperature control and regulation 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 the following optional accessories installed temperature control and regulation are exclusively on suction air:

- A431 – Electric Heater;
- A432 – Extra power electric heaters;

## 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)

## FLOOD SENSOR



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.

## COMPRESSOR SOUNDPROOF JACKET



The system includes a soundproof jacket for each compressor to obtain a reduction of the sound level of the unit.

## OPTIONAL ACCESSORIES: 601 – SOLENOID VALVE ON LIQUID LINE



The accessory has the function of closing the liquid line, in the event of the machine stopping or blackout, avoiding the risk of liquid refrigerant migration into the evaporator.

Recommended accessory for:

- Refrigerating lines greater than 10m in equivalent length.
- Machines equipped with electronic expansion valve.

## 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: P171 – KIT FOR AIR -45°C MCH AXIAL AC

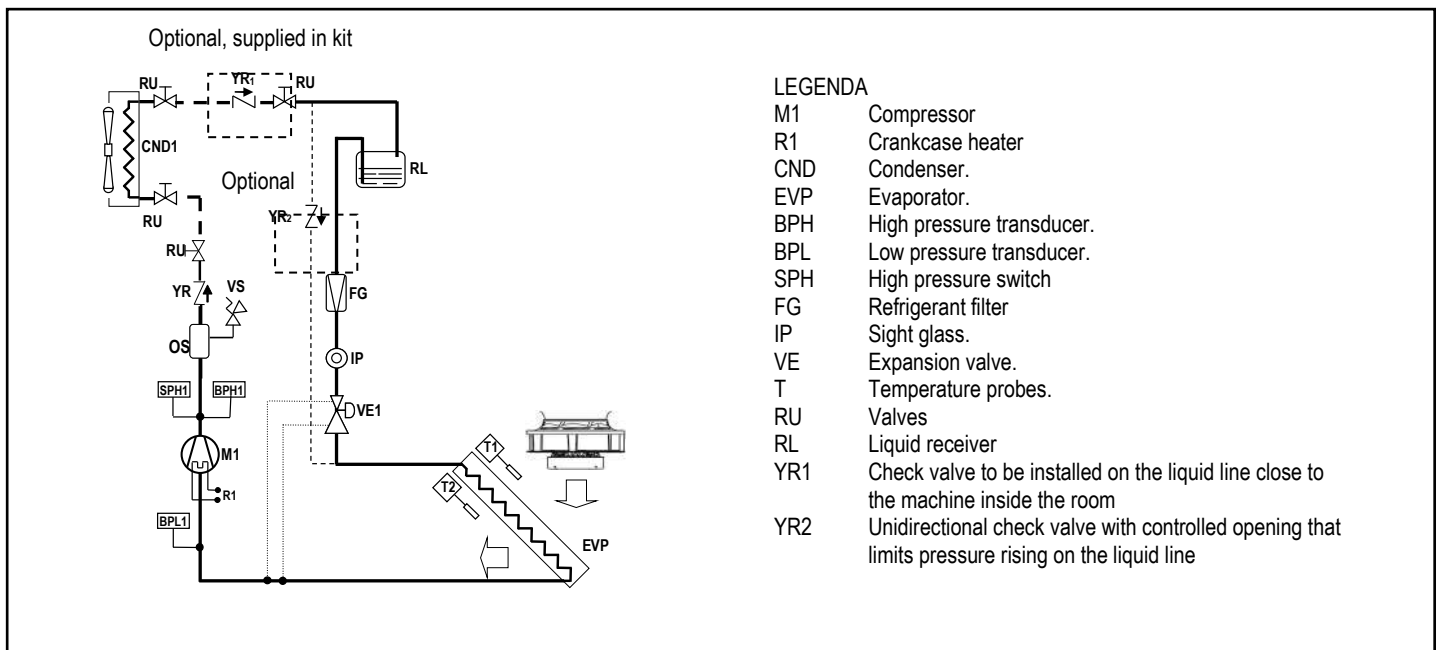
### P171 – KIT FOR AIR -45°C MCH AXIAL AC

The optional is available only for air conditioners matched with remote air-cooled condensers with axial fans with AC electric motors:

The system is necessary for the correct machine start up and operation with very low ambient air temperatures: between -20°C and -45°C.

Components for each refrigerant circuit:

- A check valve (YR<sub>1</sub>), supplied in kit. The valve must be installed indoor, near to the air conditioner, on the liquid line on the return of the remote condenser. This valve avoids the migration of the refrigerant at liquid state in presence of very low ambient air condition.
- A check valve (YR<sub>2</sub>), with controlled opening, installed in factory within the unit. It limits the pressure raising on the liquid pipe between the expansion valve and the check valve (YR<sub>1</sub>).



## OPTIONAL ACCESSORIES: P191 – POWER SUPPLY FOR CONDENSER

The accessory allows the power supply of the remote condenser from the internal machine. The electrical panel of the internal machine is set up with the electrical control components and terminal board for the electrical connection to the condenser.

## 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: A492 – WATER LEAKAGE 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: A511 - SMOKE DETECTORS

## OPTIONAL ACCESSORIES: A521 – FIRE DETECTORS

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 is 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	40m² max.
Operating temperature	-10...+70°C	Shielded connection	Min. 0.5 mm²
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 is 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	40m² max.
Operating temperature	-10...+70°C	Shielded connection	Min. 0.5 mm²
Relative humidity	<93% non-condensing	Colour	White

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

## OPTIONAL ACCESSORIES: 5891 – CONTROL UNIT VIA KIPLINK



Logos, Trademarks and Company Name, are property of the respective Owners.

The optional is factory installed.

KIPLink is an innovative system based on Wi-Fi technology that allows to operate on a unit directly from Smartphone or Tablet via an APP.

### WI-FI MODULE:

- Standard: IEEE 802.11n – 802.11g
- Frequencies: 2.4 – 2.4835 GHz
- Output power: <20 dBm (equivalent to <100mW)
- Safety: WPA2
- Flow: < 20m

### MEHITS APP

- Operating System: Android 5® or higher, IOS 8® or higher, Windows 10® or higher
- Download: Google Play®, Apple Store® e Microsoft Store®.

### HOW TO USE KIPLINK

KIPLink can be used in three ways:

#### Proximity keyboard:

Approaching the machine with a Smartphone or a Tablet with the MEHITS APP installed, you can connect to the machine via Wi-Fi and you can control it like the standard controller keyboard. It is possible to switch off / on the machine, change sets and reset alarms. Knowing the relative passwords, you access the parameters of the USER, SERVICE and MANUFACTURER menus.

#### Local Monitoring:

Using a Smartphone, a Tablet or PC connected to the LAN of the building where the machine is also connected. Access is via WEB via a browser. The system has two access profiles: ONLY READ and READ & WRITE.

ONLY READ allows only the visualization of the parameters and it is not possible to control the unit.

READ & WRITE allows you to switch off / on the machine, change sets and reset alarms. Knowing the relative passwords, you access the parameters of the USER, SERVICE and MANUFACTURER menus.

#### Remote monitoring:

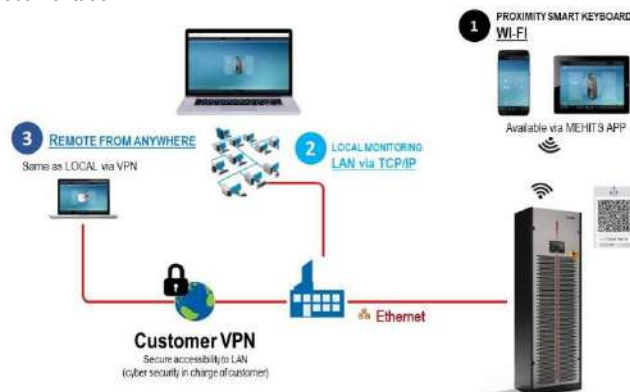
Using a Smartphone, Tablet or PC connected to the VPN of the building where the machine is also connected, it is possible to operate and control from any geographical location where there is an internet connection. Use a secure VPN to avoid access by third parties that could compromise the operation of the machine. The cyber security is in charge of costumer.

### DATA STORE

The system can store some data on a 1GB MicroSD card to be installed on the device. The data can be used for Service diagnostics. The card is not provided.

### KIPLINK NETWORK

It is possible to set up mixed networks consisting of several KIPLink devices (10 maximum), to display information from different devices (called Client KIPLink) on one single device (called Master KIPLink). The information is collected from the various Client KIPLink devices connected to EVOLUTION+ / W3000 TE/ CX-4 controllers and sent through the Wi-Fi or Ethernet network to the Master KIPLink device, which stores them and makes them available through an appropriate user interface. The connection with the Master KIPLink can take place via Wi-Fi, via Ethernet or a combination of the two. For complete information on the KIPLink system, please consult the relative technical documentation.





## OPTIONAL ACCESSORIES: A35B – GRAPHIC DISPLAY “Evolution Touch”

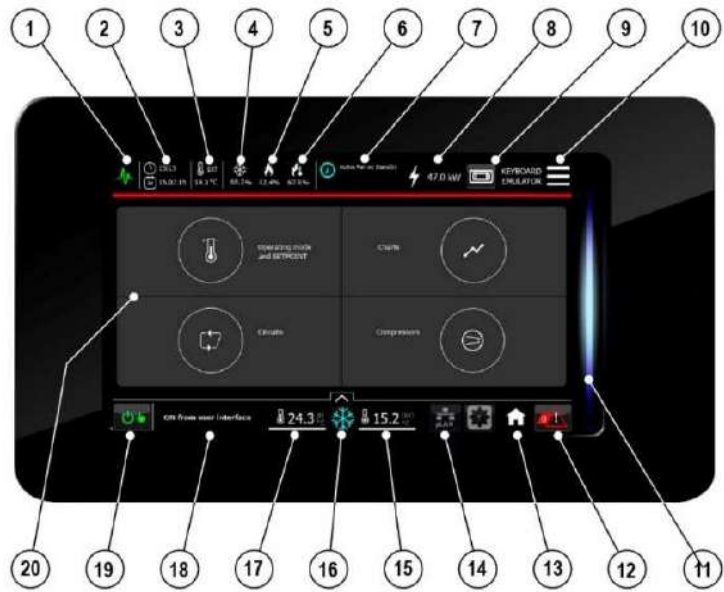


The optional is factory installed.

7" touch-screen graphic display with 16.7 million colors for the management and monitoring of operating and alarm status.

The Display is equipped with a MicroUSB 2.0 port for the service connection.

The navigation bars are always present on the display to allow quick and intuitive navigation.



### TOP NAVIGATION BAR

1. Status of connection with the controller. Green: connection OK; Red: connection Error
2. Time and date
3. External temperature value by dedicated probe
4. Active percentage of Cooling
5. Active percentage of Heating
6. Active percentage of Post-Heating
7. Unit active functions
8. Power meter readings
9. PGD1 keyboard emulator
10. Rapid access to the menu (Quick menu)

### BOTTOM NAVIGATION BAR

11. Light bar for machine status identification
12. Alarm button to access the alarm management screen and the number of active alarms
13. Home button for returning to the Homepage
14. pLAN network
15. Temperature of outlet air or percentage of humidity.
16. Operating mode button.
17. Inlet air temperature
18. Unit status
19. On/Off button

### DISPLAY AREA

20. Main menu
  - a. Operating mode and Set-Point
  - b. Circuits
  - c. Charts
  - d. Compressors

For complete information on Graphic Display system, please consult the relative technical documentation.

## OPTIONAL ACCESSORIES: A352 - NO DISPLAY

The unit is supplied without display and adjustment is only possible with the KipLink accessory.

## OPTIONAL ACCESSORIES: P141 – ANALOGUE SET-POINT COMPENSATION

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: P181 – NETWORK ANALYZER

## OPTIONAL ACCESSORIES: P182 – NETWORK ANALYZER+OPTIONAL

## OPTIONAL ACCESSORIES: P183 – KIT NETWORK ANALYZER

## OPTIONAL ACCESSORIES: P184 – KIT NETWORK ANALYZER+OPTIONAL



INTERNAL installation

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

### INSTALLATION

Frame	Power Supply	Installation	Code
E2	400/3+N/50	EXTERNAL to the unit, supplied in kit	P183 / P184 (*)
E3	400/3+N/50	EXTERNAL to the unit, supplied in kit	P183 / P184 (*)

(\*) P182, P184 for units with optional (with electric heaters and/or humidifier)

### INTERNAL INSTALLATION

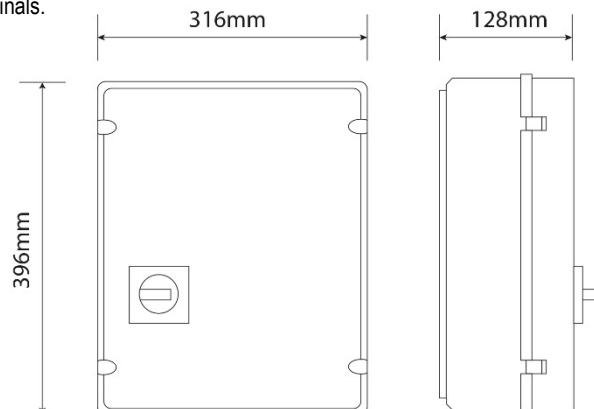
The optional is installed within the electrical box downstream the main switch with door safety lock and includes:

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

### MOUNTING KIT

The optional is supplied in box for external installation to the machine with the dimensions showed in the figure below, and includes:

- Main switch with door lock safety;
- Fuse;
- Network transducer;
- Current transformers, one for each power supply phase cable;
- Terminals.



EXTERNAL installation

## OPTIONAL ACCESSORIES: A812 – FREE-COOLING DIRECT CONTROL

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

## 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.

Temperature control on suction air.

### TECHNICAL DATA

VERSION (1)		DL	DL
MODEL		018	022 M1 S
SIZE		E2	E3
THERMAL CAPACITY	kW	5,1	6,0
Absorbed current (OA)	A	7,4	8,7
First working step	kW	5,1	3,0
Second working step	kW	---	3,0+3,0
Third working step	kW	---	---
NET WEIGHT (2)	kg	4	7

### A432 - EXTRA POWER ELECTRIC HEATERS

The optional is not available for size E2

The components are the same of the standard accessory

Temperature control on suction air.

### TECHNICAL DATA

VERSION (1)		DL	DL
MODEL		018 M1 S	022 M1 S
SIZE		E2	E3
THERMAL CAPACITY	kW	---	9,0
Absorbed current (OA)	A	---	13,0
First working step	kW	---	4,5
Second working step	kW	---	4,5+4,5
Third working step	kW	---	---
NET WEIGHT (2)	kg	---	7

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

## OPTIONAL ACCESSORIES : P051 – DEHUMIDIFICATION FUNCTION

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

Components:

- T / rH air intake sensor.
- 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

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
- P161 Dehumidification function

## OPTIONAL ACCESSORIES: P071 / P072 / P073 / P074 - REMOTE T/RH PROBE



In addition to the on-board temperature probes, In addition to the on-board temperature probes, the unit's control can manage up to 4 remote T/RH probes (optional), to measure the return and the delivery air temperature in different positions.

Depending on the individual characteristics of the room and the cooling equipment, the customer can choose where to install the additional probes to achieve best measurement results (N. add. return probes + N. add. delivery probes ≤ 4).

The probes can be configured from the Service menu of the controller.

The probes that are enabled, contribute to the calculation of the return and delivery temperature used for capacity adjustment purposes.

The customer can choose between different types of calculation:

- Temperature of the first probe enabled
- Average temperature of the probes
- Highest temperature of the probes
- Lowest temperature of the probes.

**Notes:** if a probe is connected but not enabled, its measurement can still be read on the display and by the BMS, but it is not used to calculate the adjustment temperature. It is possible to disable the probe on the unit and use only the remote probes for capacity adjustment purpose.

- **P071:** One probe
- **P072:** Two probes
- **P073:** Three probes
- **P074:** Four probes

## 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: P113 – KIT DUAL POWER SUPPLY OPTIONAL ACCESSORIES: P114 – KIT DUAL POWER SUPPLY + OPTIONAL



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.

**The remote condenser must be powered by the automatic transfer switch.**

It is suggested the optional “P191 power supply for condenser” from the indoor machine electrical board. The optional includes magnetothermic switches for condenser fans.

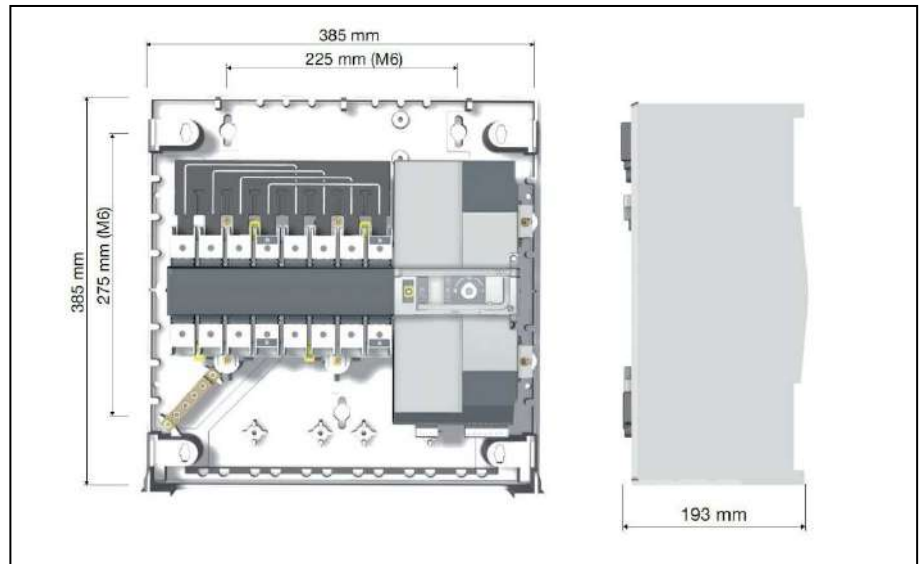
### INSTALLATION

Frame	Power Supply	Installation	Code
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 (*)

(\*) 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

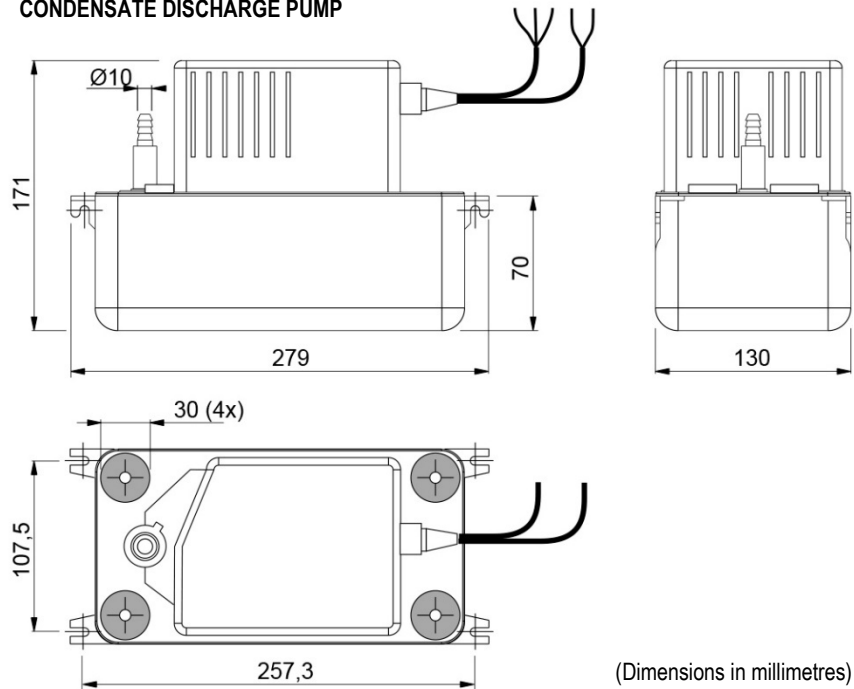
Maximum water temperature: 70°C

Water acidity: pH>2.5

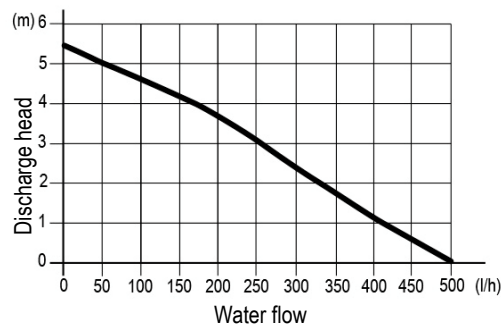
Tray volume: 2.0 l

Protection IP 20

### CONDENSATE DISCHARGE PUMP



### OPERATING DATA



Discharge head	Total length of discharge pipes ( $\varnothing 10$ 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

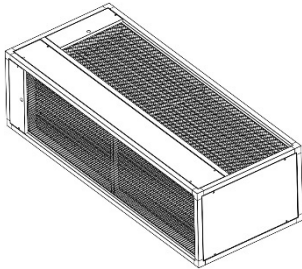
## OPTIONAL ACCESSORIES: P084 – AIR FILTER ePM<sub>10</sub> 50%

The ePM<sub>10</sub> 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)		DL	DL
MODEL		018 M1 S	022 M1 S
SIDE		E2	E3
Additional pressure drops (2)	Pa	71	62

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

## OPTIONAL ACCESSORIES: P034 – INTAKE FREE-COOLING PLENUM



The optional is supplied separately and the installation on the unit is at Customer care. The optional requires mandatory accessories "P161 T/rH air intake sensor", "4666 External air probe", "A812 Free-cooling direct control".

The plenums have same technical characteristics and base dimensions of the machine cabinet.

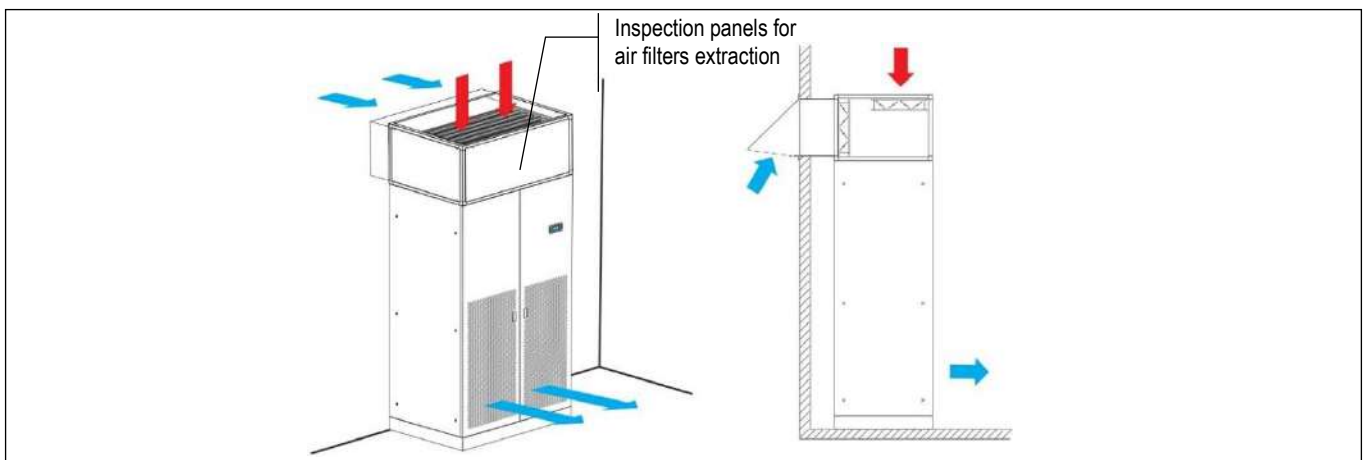
The optional allow to obtain free-cooling by direct ambient air intake into the room.

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 atmospheric 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

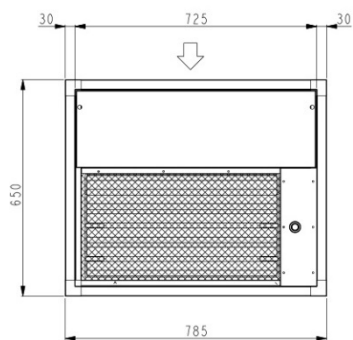
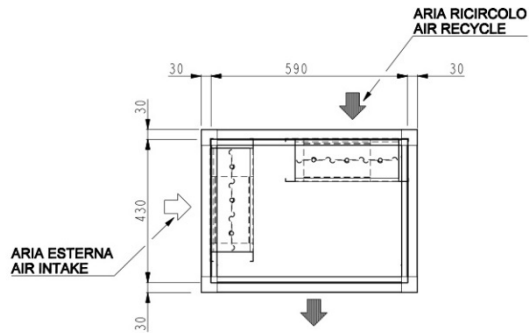
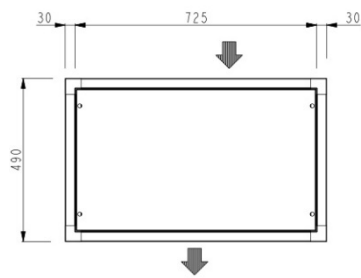
### INSTALLATION EXAMPLE



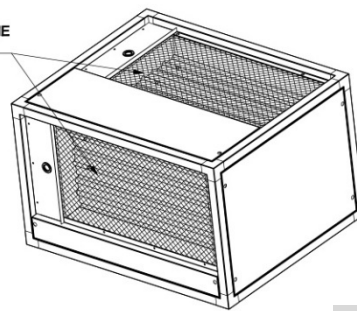
Ducting for ambient air suction are at Customer care. A rain cover with grille on ambient air intake is recommended.

# ACCESSORIES

## FREE-COOLING PLENUM - SIZE E2

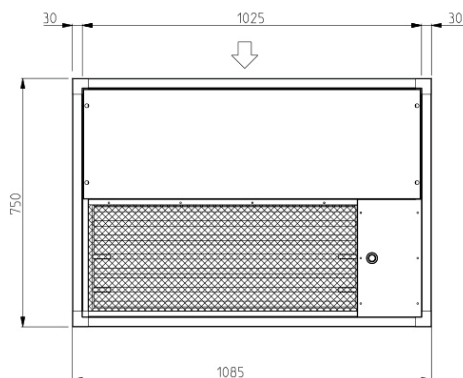
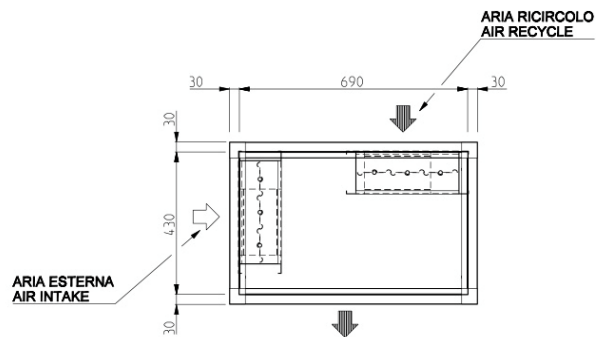
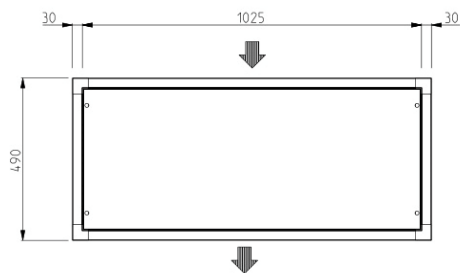


RETE DI PROTEZIONE  
PROTECTION NET

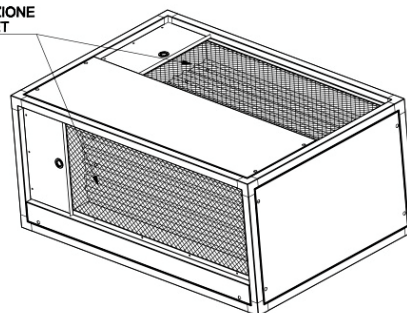


Size	E2
Weight (1) kg	27

## FREE-COOLING PLENUM - SIZE E3



RETE DI PROTEZIONE  
PROTECTION NET



Size	E3
Weight (1) kg	35

1. Add this value to the total unit weight



## AIR EXHAUSTION DAMPER – Not supplied

### WARNING

**IT IS COMPULSORY TO INSTALL IN THE ROOM TO BE CONDITIONED A MOTORIZED DAMPER APPROPRIATELY DIMENSIONED FOR THE EXHAUSTION OF AIR FROM THE ROOM DURING FREE-COOLING OPERATION.**

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 exhaust damper avoids the increase in pressure in the room.

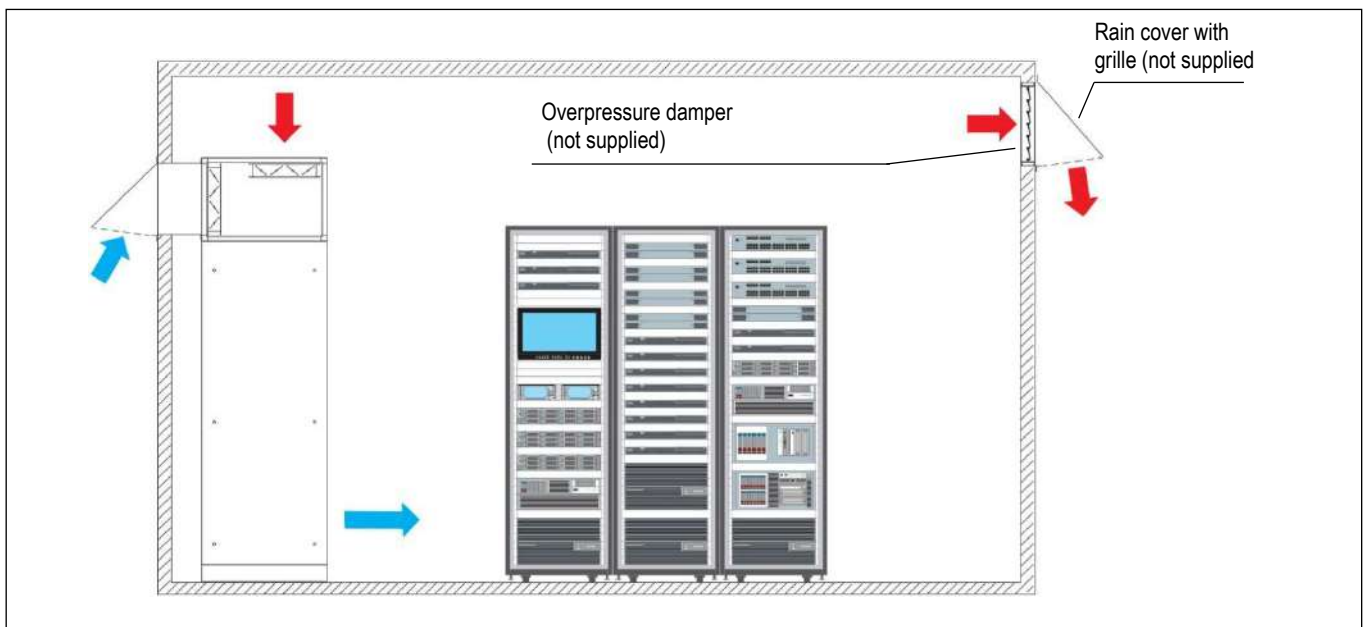
The damper must be installed at the highest point of the room to exhaust excess hot air to the outside.

Install the damper if possible, in opposite position to air conditioner.

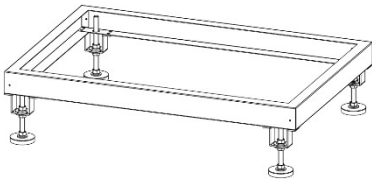
The damper is controlled by the modulating signal 0-10Vdc of the free-cooling control of the air conditioner. The 24Vac power supply of the servomotor and the 0-10Vdc free-cooling signal is available on the unit's electrical terminal block (see wiring diagram for connections).

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

The electrical connection cables are not supplied.

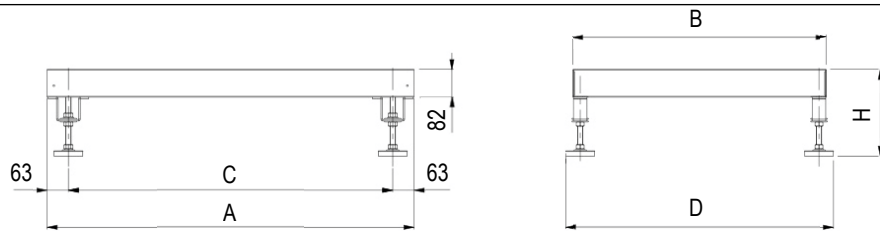


**OPTIONAL ACCESSORIES: P041 – SUPPORT FRAME H 255-350MM**  
**OPTIONAL ACCESSORIES: P042 – SUPPORT FRAME H 355-450MM**  
**OPTIONAL ACCESSORIES: P043 – SUPPORT FRAME H 400-510MM**



The accessory is supplied as an assembly kit.  
 The floor stand is available in 3 different heights.

**SIZE E1 - E2 – E3**



SIZE		E2	E3
A	mm	785	1085
B	mm	650	750
C	mm	659	959
D	mm	691	791

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

**OPTIONAL ACCESSORIES: 3601 – COMPRESSOR OPERATING SIGNAL CONTACT**

A voltage free electrical contact is supplied for remote signalling "Compressor operation".  
 Electrical connection on the machine's terminal board.

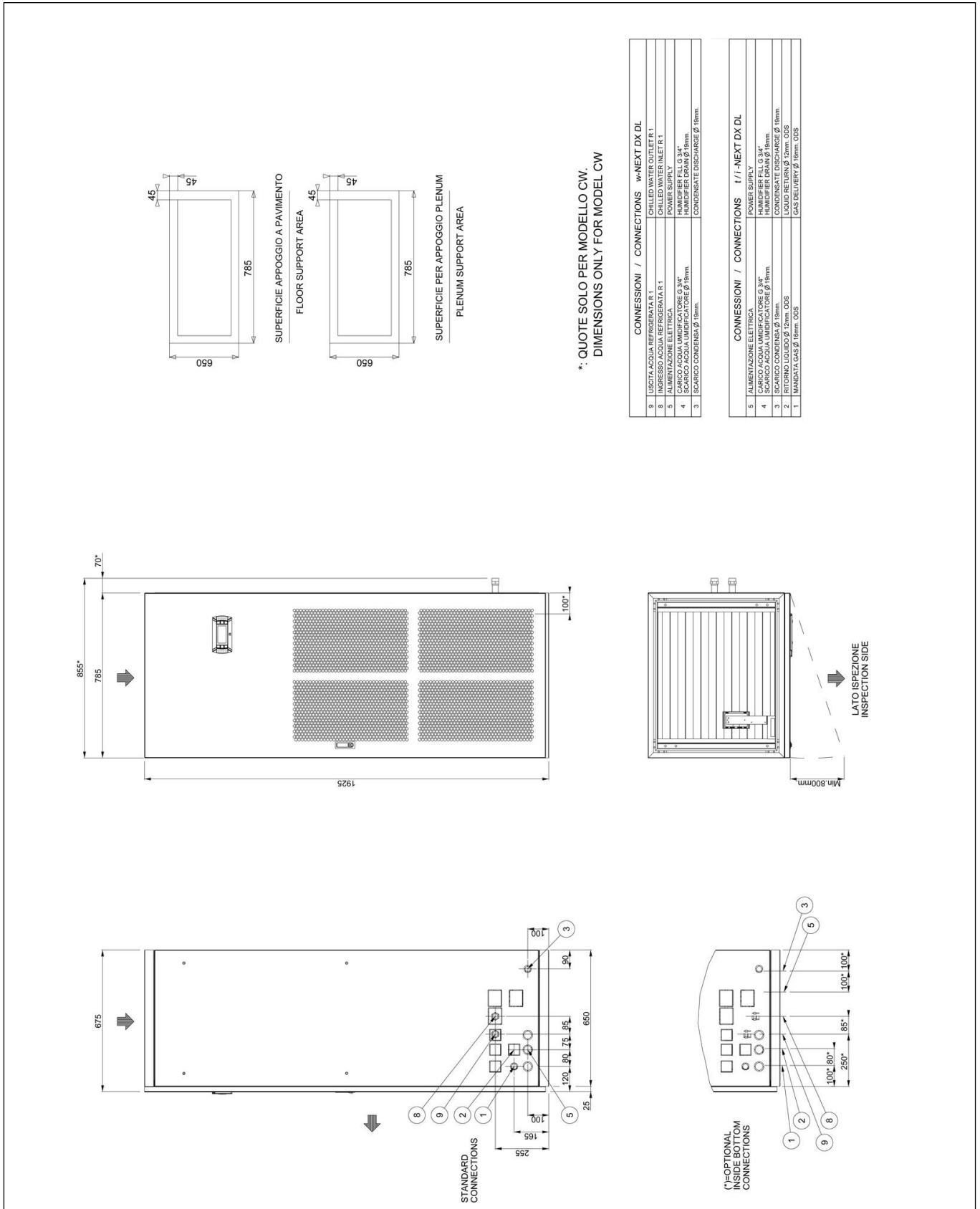
**OPTIONAL ACCESSORIES: 2411 – PHASE SEQUENCE RELAY**



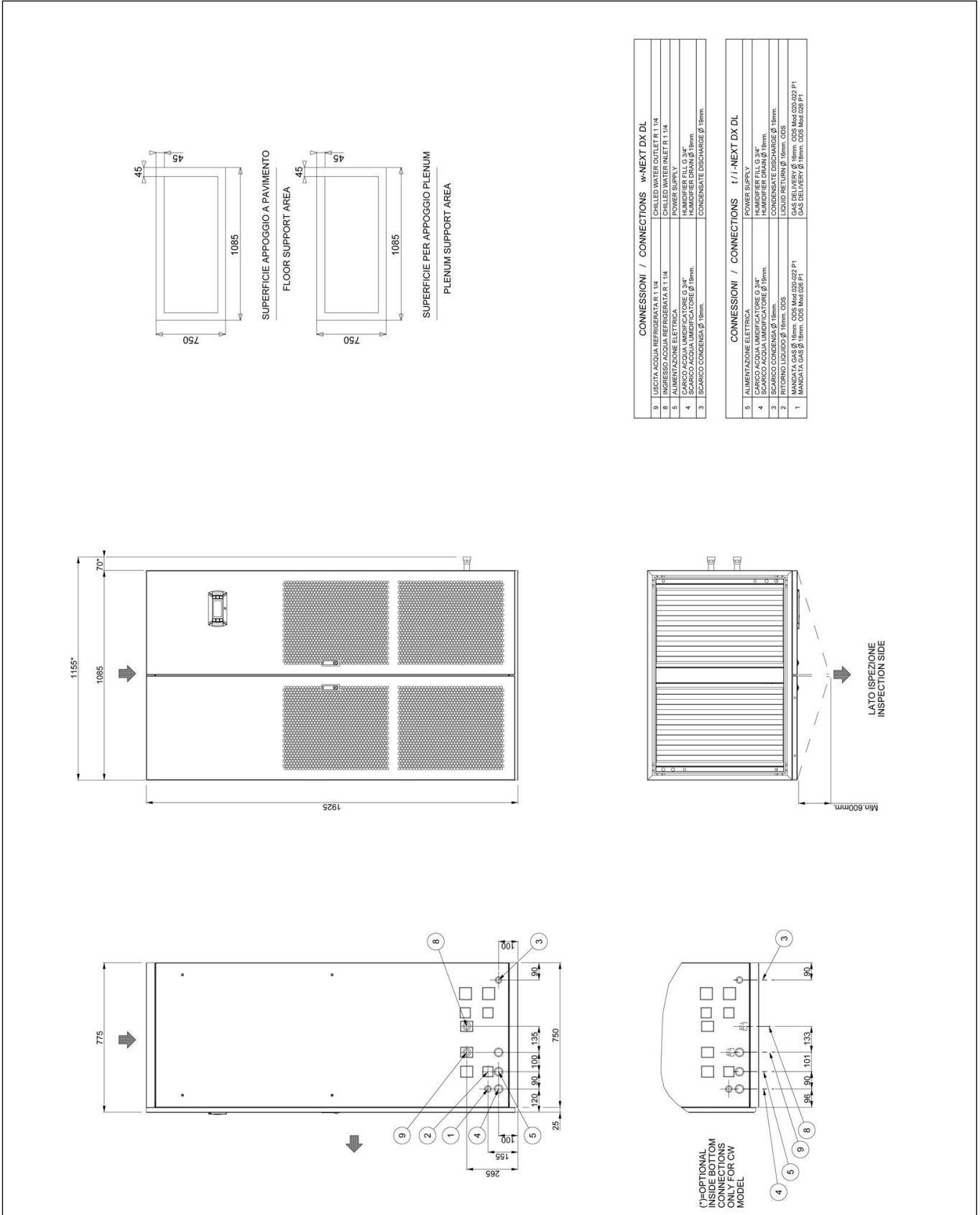
The system checks that the phase sequence of the power supply is correct to prevent the opposite rotation of the three phase electric motors of the machine as compressors. The optional is installed in the electrical box downstream the main switch with door lock safety and in case of wrong phase sequence prevents starting the machine.

## MACHINE DRAWINGS

Dimensions in mm – SIZE E2



MACHINE DRAWINGS - Dimensions in mm – SIZE E3



# SHIPMENT INFORMATIONS

DB\_CV\_i-AV-DL DX-12

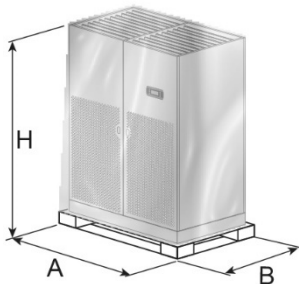
Data Book  
DB\_CV\_i-AV DL DX 12-22\_052023\_EN\_rev01

## SHIPMENT: PACKING DIMENSIONS

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

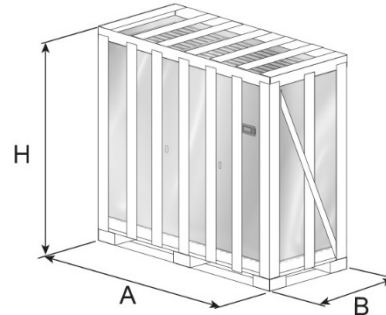
The machines are shipped on pallet and covered with shrink wrap.  
On request packing on pallet covered with shrink wrap and wooden cage.

### STANDARD PACKING DIMENSIONS



Size	A (mm)	B (mm)	H (mm)
E2	900	750	2080
E3	1200	910	2080

### OPTIONAL 9973: WOODEN CAGE PACKING DIMENSIONS



Size	A (mm)	B (mm)	H (mm)
E2	940	790	2150
E3	1240	950	2150

## SHIPMENT: SHIPPING WEIGHT

### STANDARD PACKING

Model	018 M1 S	022 M1 S
Size	E2	E3
Weight	kg 255,2	341

### OPTIONAL 9973: WOODEN CAGE PACKING

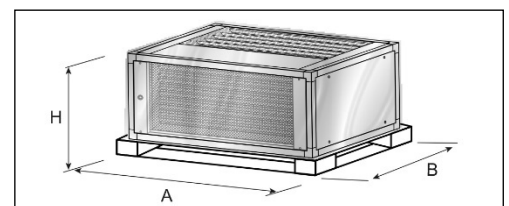
Model	018 M1 S	022 M1 S
Size	E2	E3
Weight	kg 283,2	373

## SHIPMENT: OPTIONALS PACKING DIMENSIONS AND SHIPPING WEIGHT

### P034: INTAKE FREE-COOLING PLENUM

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

Size		E2	E3
<b>DIMENSIONS</b>			
A	mm	900	1200
B	mm	750	910
H	mm	630	630
<b>SHIPPING WEIGHT</b>			
P034 - Intake free-cooling plenum	kg	39	52



# SHIPMENT INFORMATIONS

DB\_CV\_i-AV-DX-12

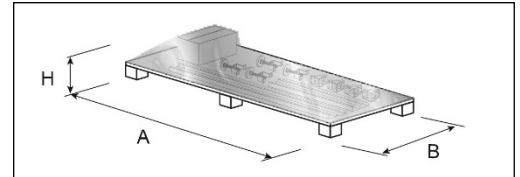
Data Book

DB\_CV\_i-AV DL DX 12-22\_052023\_EN\_rev01

## P041 / P042 / P043: SUPPORT FRAME

The support frames are shipped on pallet and covered with shrink wrap.

Size		E2	E3
<b>DIMENSIONS</b>			
A	mm	1200	1200
B	mm	900	900
H	mm	500	500
<b>SHIPPING WEIGHT</b>			
	kg	27	29

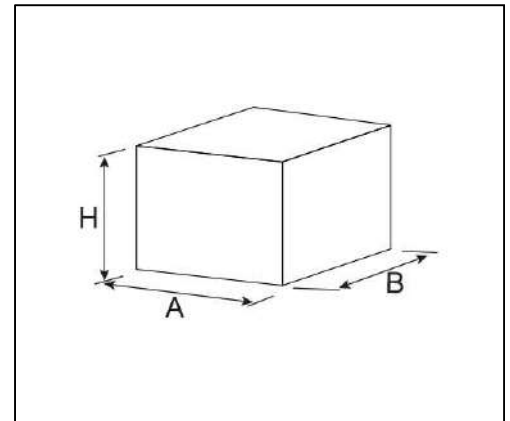


## P183 / P184: KIT NETWORK ANALYZER / KIT NETWORK ANALYZER+OPTIONAL P113 / P114: DUAL POWER SUPPLY KIT / DUAL POWER SUPPLY KIT+OPTIONAL

The optionals are shipped in a cardboard box.

### P183 / P184 - KIT NETWORK ANALYZER / KIT NETWORK ANALYZER+OPTIONAL

Size		E2	E3
<b>DIMENSIONS</b>			
A	mm	410	410
B	mm	410	410
H	mm	210	210
<b>SHIPPING WEIGHT</b>			
	kg	5	5



### P113 / P114 - DUAL POWER SUPPLY KIT / DUAL POWER SUPPLY KIT+OPTIONAL

Size		E2	E3
<b>DIMENSIONS</b>			
A	mm	400	400
B	mm	400	400
H	mm	210	210
<b>SHIPPING WEIGHT</b>			
	kg	12	12



**INSERT HERE  
YOUR CONTACT  
DETAILS**