

Data Book

T_wAVDL_0621_EN

W-AV DL

29-41 kW

Air conditioners for IT Cooling for chilled water feeding.



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



HPC
Hydronic Plant Connect

- Perimeter installation
- Variable air flow and water flow
- Displacement air delivery
- Plug fans with EC electric motor
- 2-way chilled water valve
- Air suction temperature up to 45°C

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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

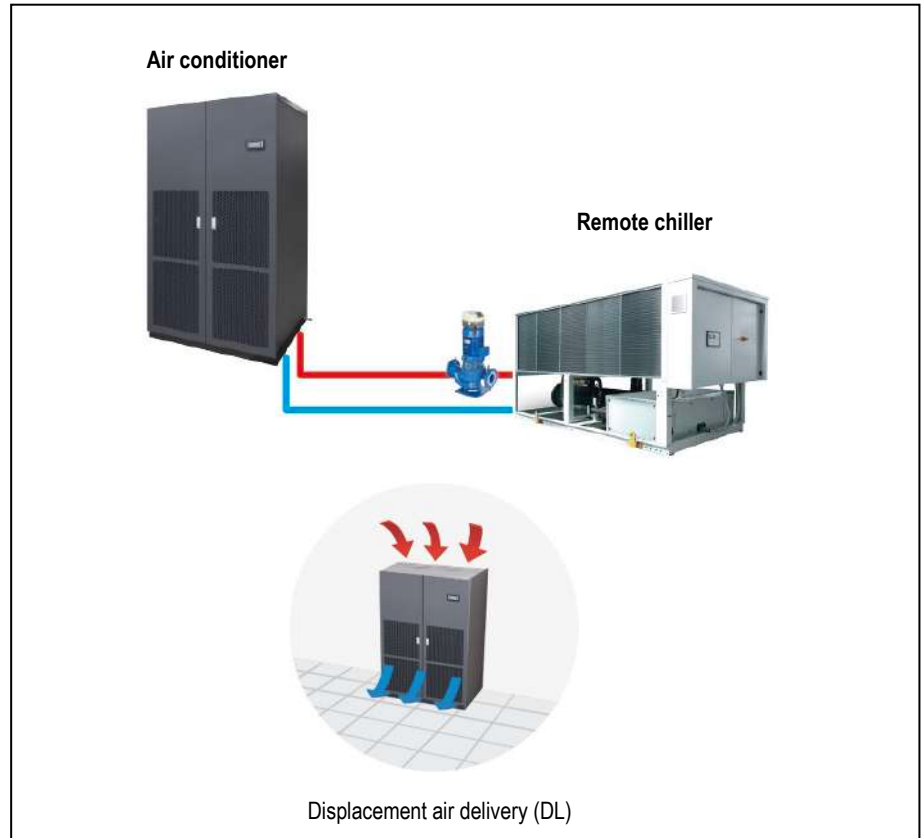


Displacement air delivery

Air conditioners for IT Cooling for chilled water feeding.

This series is offered in 2 models, all available with displacement air delivery:

Cooling capacity: 29 ÷ 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.

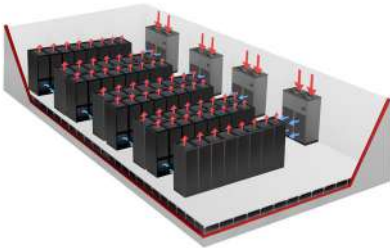
The installation requires electrical and hydraulic connections.

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

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.

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.

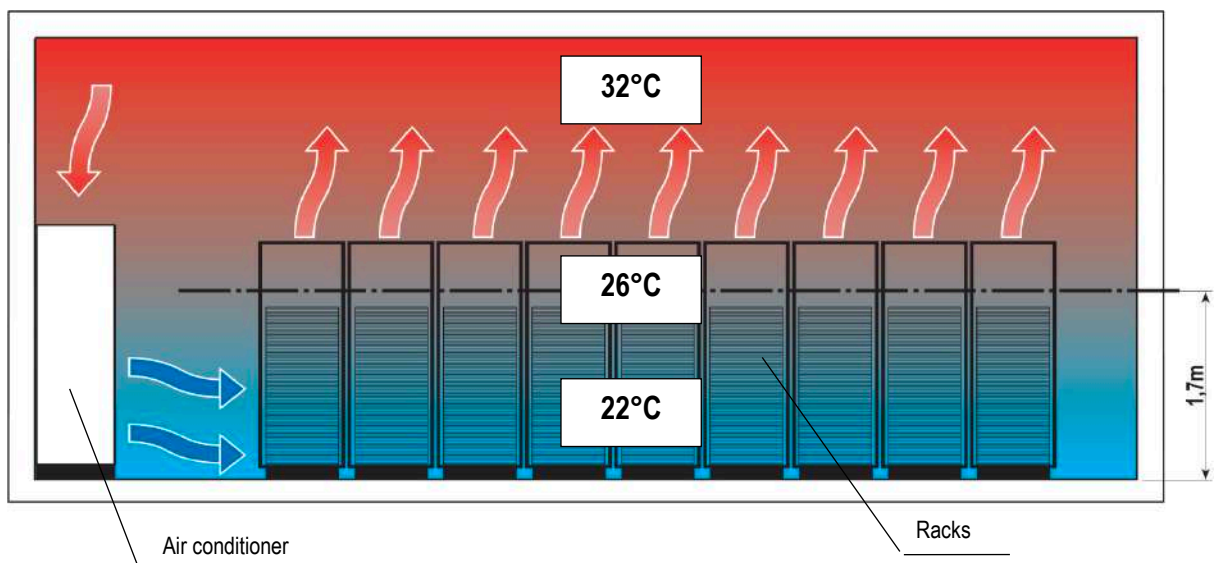
This concept has been developed and applied for the air conditioning in Data Center, Telephone Exchangers and Hi-Tech. facilities.

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.



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

THE SERIES

DISPLACEMENT

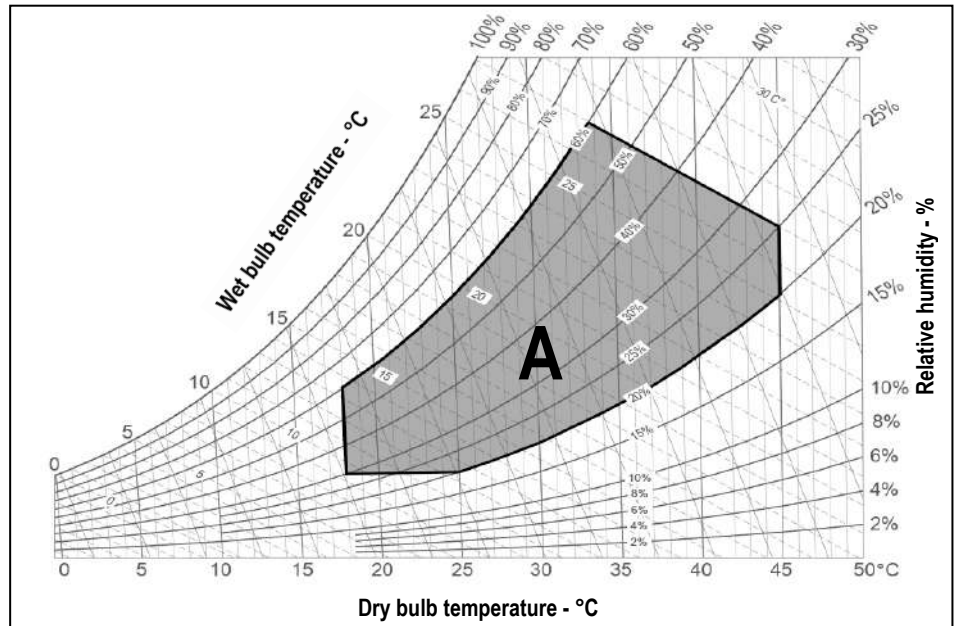
E3/E3P



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



ROOM AIR CONDITIONS

Room air temperature:

- 10°C minimum temperature with wet bulb.
- 27°C maximum temperature with wet bulb.
- 18°C minimum temperature with dry bulb.
- 45°C maximum temperature with dry bulb.

AREA "A". Machine operating envelope.

Room air humidity:

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

CHILLED WATER TEMPERATURE

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

HYDRAULIC CIRCUIT

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

POWER SUPPLY

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

LIMIT OF CHILLED WATER TEMPERATURE AT THE UNIT'S INLET

The table shows the recommended minimum water temperature at the unit's inlet (°C), at different ambient air conditions.

Lower chilled water temperatures may cause water droplets in the air flow or condensate drain problem.

		Room Air Temperature					
		18°C	25°C	30°C	35°C	40°C	45°C
Relative Humidity	60%	6,0	10,4	16,4	--	--	--
	50%	6,0	8,2	13,9	19,5	--	--
	40%	6,0	6,0	11,2	16,5	--	--
	30%	6,0	6,0	7,0	12,1	16,2	--
	25%	--	6,0	6,0	8,9	13,2	--
	20%	--	6,0	6,0	6,0	9,7	13,8

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 airtight.
- 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.
- Temperature sensor on air intake with function of temperature display.
- Temperature sensor on air delivery with function of control and regulation.
- Temperature probe on chilled water inlet.

FANS SECTION

The fan section is contained within the machine and includes:

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

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.
- Numbered wirings.
- OUTLETS Terminals:
 - Voltage free deviating contact for General Alarm 1-2.
 - Voltage free contact for supply fans status.
- INLETS Terminals:
 - 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).

OPTIONAL ACCESSORIES

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

- P091.....**Back-up module controller.** The system guarantees the microprocessor power supply for a few minutes, in case of supply voltage failure.
- 383.....**Numbered wirings + UK requests.**
- 4181 / 4182 / 4184 / 4185...**Serial cards:**
 - 4181 – Serial card MODBUS.
 - 4182 – Serial card LON.
 - 4184 – Serial card BACNET MS/TP RS485.
 - 4185 – Serial card BACNET OVER IP.
- A491.....**Water leakage detector.** Supplied in mounting kit.
- A492.....**Water leakage detector + additional sensor.** Supplied in mounting kit.
- A501.....**Clogged filter sensor.** Differential pressure switch on the air side for clogged filters alarm signal.
- A511.....**Smoke detector.** Supplied in mounting kit.
- A521.....**Fire detector.** Supplied in mounting kit.
- 5891.....**Control unit via kiplink.**
- 6461.....**HPC.**
- A35B.....**Graphic display "Evolution Touch"**
- A352.....**No Display**
- A822.....**ADAPTIVE SET POINT:** function that optimizes the operation of liquid chillers connected to the indoor air conditioners by control of the effective room thermal load.
- P141.....**Analogue set-point compensation.** Analogue set point compensation according to an external analogue signal at Customer care.
- A842.....**Network analyser.** Multifunction utility for calculating and displaying the machine electrical measurements.
- A812 (1).....**Free-cooling direct control.**
- P021.....**2-way ball by-pass valve.** 2-way modulating motorized valve with 0÷10 VDC control actuator and emergency manual control for the third way (by-pass) of the chilled water hydraulic circuit. The valve is in combination with the main water flow control valve.
- A431.....**Electric heater.** Heating with electric heaters.
- A432.....**Extra power electric heater.**
- 4301 / 4303 (2).....**Humidification:** Modulating steam humidifier with immersed electrodes with electronic control.
 - 4301 - Steam humidifier 3kg/h
 - 4303 - Steam humidifier 8kg/h
- P051 (3).....**Dehumidification function.**
- A791.....**Air temperature control on suction air.**
- P161.....**T/rH air intake sensor.** Combined Temperature / Humidity sensor on air intake. The optional replace the standard temperature sensor on machine air intake.
- 4666.....**External air probe.** External air temperature probe.
- P071/ P072 / P073 / P074 ..**Remote T/rH probe:** combined Temperature / Relative Humidity probe. For remote installation, in addition to the combined probe on the air intake of the unit.
- P113 / P114.....**Dual power supply.** Dual power supply with automatic change-over.
 - P113 - Dual power supply kit.
 - P114 - Dual power supply kit + optional.

A381	Drain pump. Supplied in mounting kit. The system includes pump with activation float and 10 linear meters long discharge pipe.
P084	Air filter ePM₁₀ 50%. Washable high efficiency air filter (according to ISO EN 16890).
P034 (4)	Intake free-cooling plenum.
P041 / P042 / P043	Support frame with height adjusting rubber holders. Supplied in mounting kit. It is not possible to match the support frame with plenum installed under the machine. P041 – Support frame h 255-350mm P042 – Support frame h 355-450mm P043 – Support frame h 400-510mm
9973	Wooden cage packing. The machines are delivered on wooden pallet, covered with shrink wrap and packaged in wooden cage.
B912	Remote keyboard K200. 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 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"
6. When accessory 6461 "HPC" is present, it requires mandatory accessory 5891 "Unit control via Kiplink"

TECHNICAL DATA

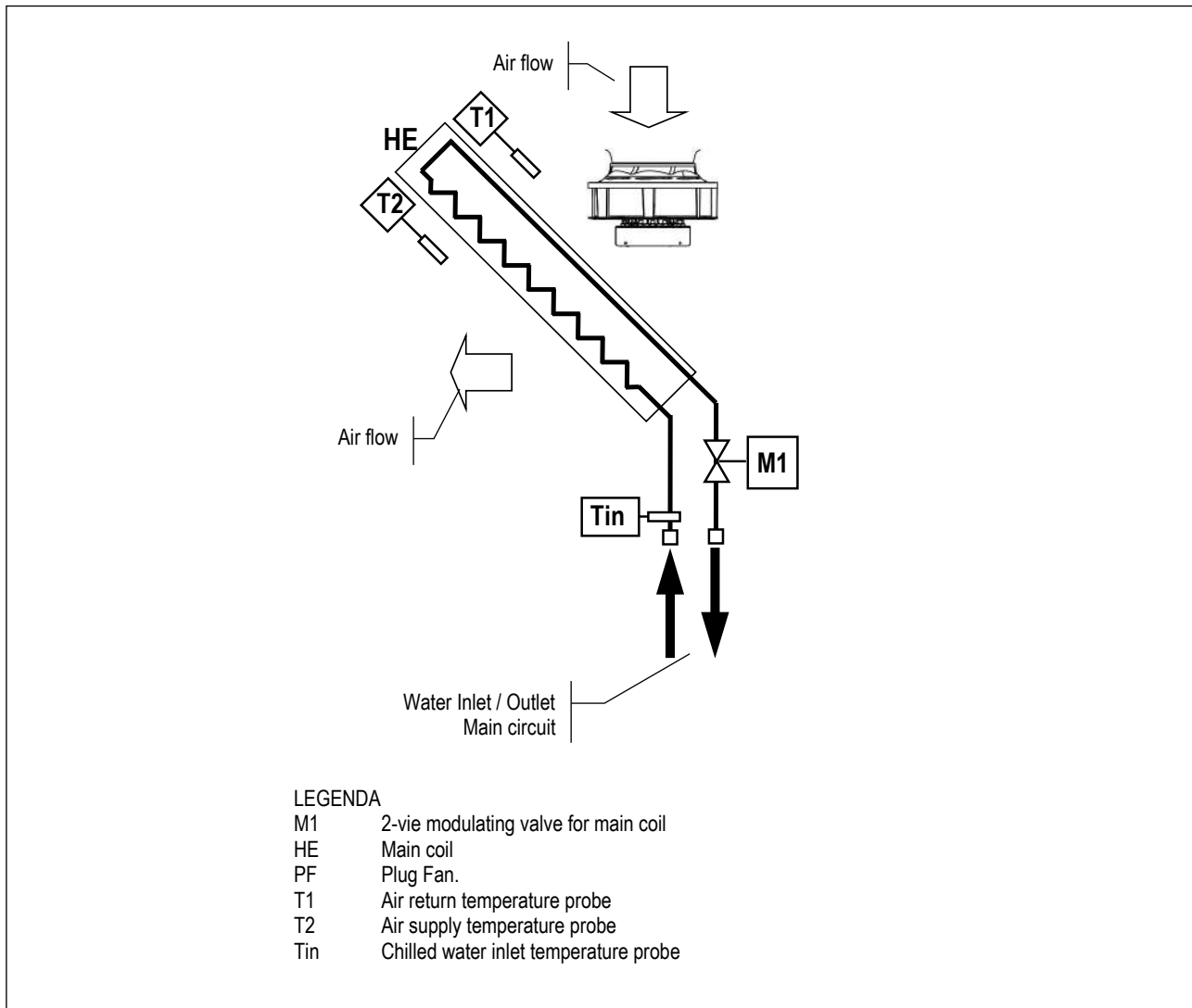
VERSION (1)		DL	DL
MODEL		030	042
SIZE		E3	E3P
COOLING CAPACITY (2)			
Total	kW	29,4	41,3
Sensible	kW	29,4	41,3
SHR (3)		1,00	1,00
"EC" SUPPLY FANS	n.	1	1
Air flow	m ³ /h	6240	8640
Nominal external static pressure	Pa	20	20
Max external static pressure	Pa	1000	823
Power input (4)	kW	0,81	1,50
COOLING COIL			
Water flow (2)	m ³ /h	5,06	7,11
Pressure drops (coil + valve) (2)	kPa	30,3	27,9
Water content	l	7,8	11,5
AIR FILTERS	n.	2	2
Efficiency (ISO EN 16890)	COARSE	60%	60%
POWER SUPPLY	V/Ph/Hz	400/3+N/50	400/3+N/50
ENERGY EFFICIENCY INDEX (2)			
EER Energy Efficiency Ratio	kW/kW	36,3	27,5
DIMENSIONS			
Length	mm	1085	1085
Width	mm	775	930
Height	mm	1925	2110
NET WEIGHT	kg	290	320
HYDRAULIC CONNECTIONS			
Cooling coil inlet/outlet – ISO 228/1-G	M Ø	1+1/4"	1+1/4"
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; 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.



2-WAY BALL VALVE FOR CHILLED 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.
- No peaks initial flow.
- Excellent stability control thanks to the integrated characterizing disc.
- Excellent characteristic in partialisation.
- Stability in control.
- Maintenance free.
- Self-cleaning.

CHARACTERISTICS OF THE 2-WAY BALL VALVE

- Closing seal with leakage rate in Class A (EN 12266-1)
- Maximum fluid pressure $P_s=1600\text{kPa}$
- Maximum closing pressure (Close-off) $\Delta P_s=1400\text{kPa}$

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 OF THE HYDRAULIC CIRCUITS

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

	Description	Symbol	Range
1	Hydrogen Ions	pH	7.5 ÷ 9
2	Presence of calcium (Ca) and magnesium (Mg)	Hardness	4 ÷ 8.5 °D
3	Chlorine ions	Cl ⁻	< 150 ppm
4	Iron Ions	Fe ³⁺	< 0.5 ppm
5	Manganese Ions	Mn ²⁺	< 0.05 ppm
6	Carbon dioxide	CO ₂	< 10 ppm
7	Hydrogen sulphide	H 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°D = 1°Fr with 1°Fr = 10 gr CaCO₃ / m³

ppm = parts for millions

ppb = part for billion

Explanatory notes:

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

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

WARNING:

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

ANTIFREEZE MIXTURES

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

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

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

The values are indicative and may significantly vary depending on the glycol manufacturer. Refer to your glycol supplier for detail.

The values consider a precautionary difference of 5°C between the minimum ambient air temperature and the freezing temperature of the mixture.

In the hydraulic circuit do not send fluids other than water or mixtures with ethylene / propylene glycol.

If other products are provided, in addition to mixtures of water and ethylene or propylene glycol, contact the Manufacturer to check the compatibility with the machine components.

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	030	042
SIZE	E3	E3P
SOUND LEVEL ISO 3744 (2)		
On unit front	dB(A)	54
		55

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

ELECTRICAL DATA

VERSION (1)	DL	DL
MODEL	030	042
SIZE	E3	E3P
Power supply	V/Ph/Hz	400/3+N/50
Maximum current input (FLA)	A	5,60
		5,60

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



Controller



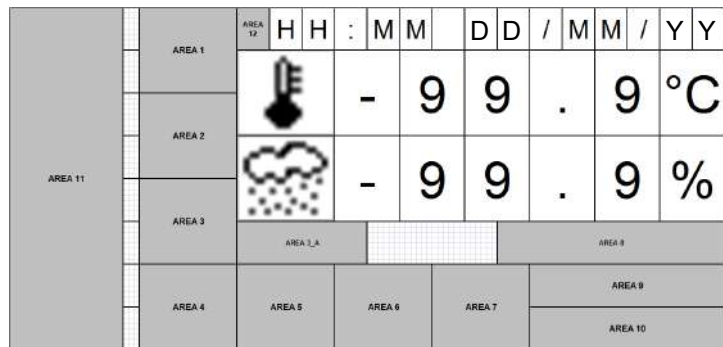
Keyboard and Display

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: Unit; Set-point; In/Out; Clock; History; User; Service; Factory. ENTER to execute.
	ESC	Home. Used to come back to the previous menu level or to the main screen.
	UP DOWN	Changes pages and values of sets. By pressing in HOME mask, the synoptic of the main controls is displayed.
	ENTER	Moving the cursor on adjustable Program(s) fields to confirm the changes. Press ENTER to get out the fields.

DISPLAY - MAIN MASK



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

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

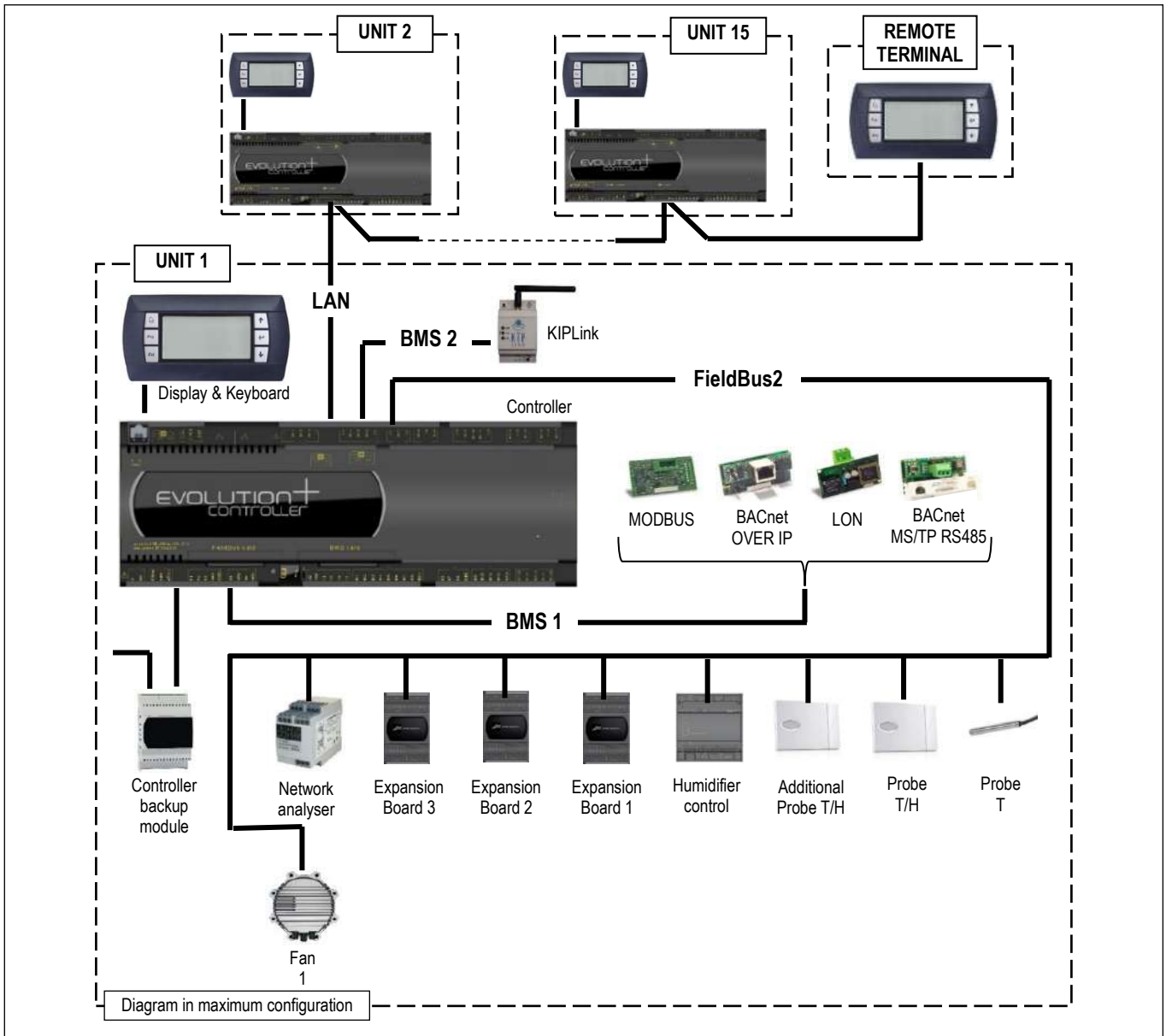
CONNECTIVITY

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

PASSWORD

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





LAN NETWORK

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

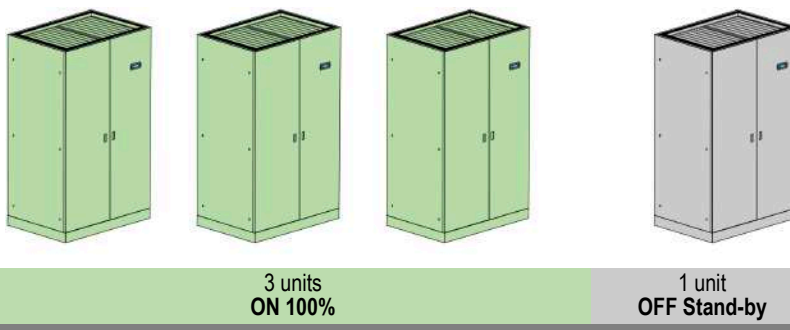


ACTIVE REDUNDANCY

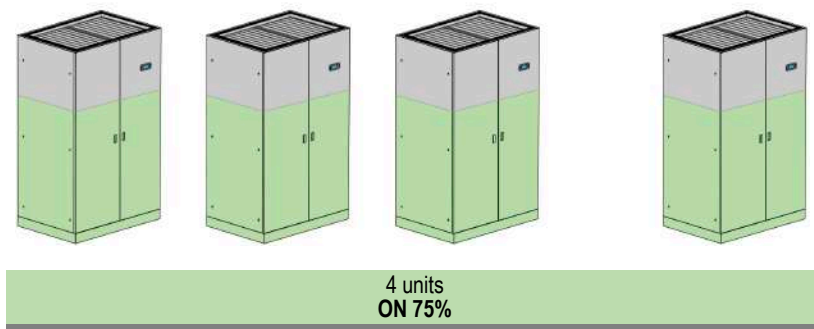


Chilled water units, thanks to its electronically commutated EC fans, 2-way motorized valves for chilled water flow control and an advanced algorithm to balance the heat loads among the units (including the units in stand-by), achieve an ACTIVE REDUNDANCY combining reliability, efficiency and reduced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

PASSIVE REDUNDANCY



ACTIVE REDUNDANCY



TEMPERATURE PROBE ON AIR SUCTION / DELIVERY



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

- A431 – Electric heater.
- A432 – Extra power electric heater.

OPTIONAL ACCESSORIES: P091 – BACK-UP MODULE CONTROLLER



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

OPTIONAL ACCESSORIES: 383 – NUMBERED WIRINGS + UK REQUESTS

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

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

OPTIONAL ACCESSORIES: 4181 – SERIAL CARD MODBUS



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

OPTIONAL ACCESSORIES: 4182 – SERIAL CARD LON



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

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



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

OPTIONAL ACCESSORIES: 4185 – SERIAL CARD BACNET OVER IP



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

OPTIONAL ACCESSORIES: A491 – WATER LEAKAGE DETECTOR



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

OPTIONAL ACCESSORIES: A492 – WATER 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: A501 - CLOGGED FILTERS SENSOR



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

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

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



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

A511 - SMOKE DETECTOR

The device 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.



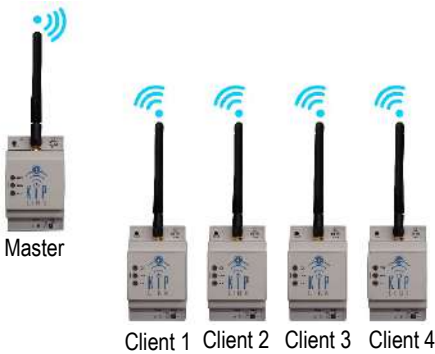
A521 - FIRE DETECTOR

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



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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.

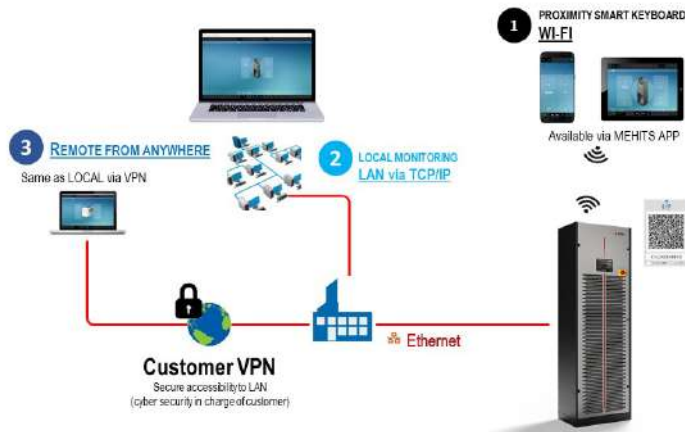
DATA STORE

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: 6461 – HPC



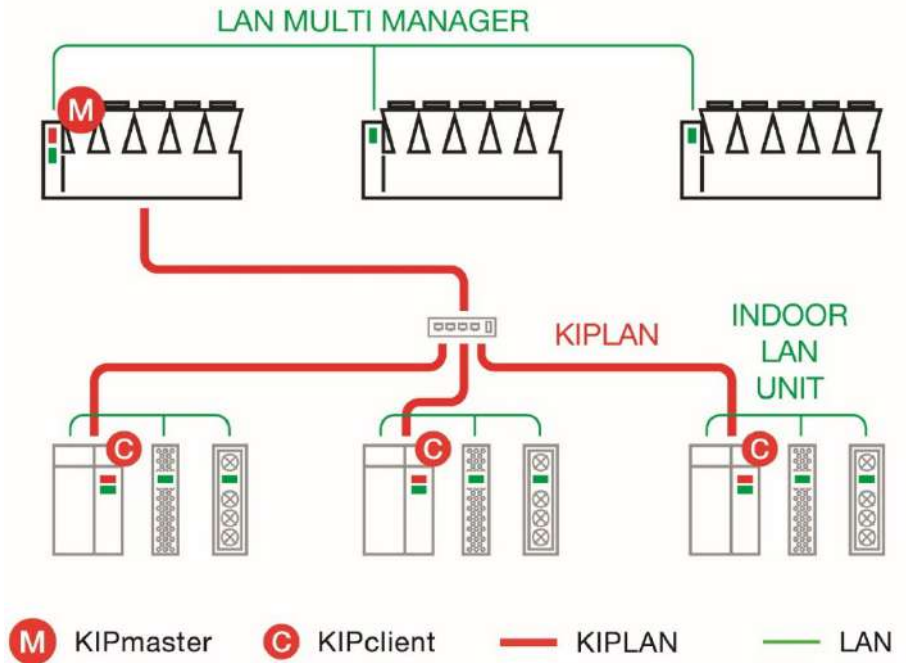
HPC is the new advanced and fully integrated control function designed by MEHITS for hydronic plant optimization. It connects MEHITS chillers and indoor CRAH units without any external devices.

INFRASTRUCTURE

The HPC function is based on LAN groups and the KIPLink network (KIPLAN).

- Every indoor and outdoor unit must be equipped with KIPLink.
- Every outdoor unit must be equipped with Multi Manager.
- HPC supports up to 20 LAN groups of indoor air conditioners (max 15 units per group) and 1 LAN group of outdoor chillers (max 8 units).
- HPC requires a KIPLAN (KIPLink network) made up of one unit per each LAN group. The result is a KIPLAN made of 1 chiller unit (KIP Master), and up to 20 indoor units (KIP Clients).
- KIPLAN network allows HPC data communication between the different LAN groups (indoor and outdoor).

KIPLink allows direct access to all HPC variables and parameters with devoted menus and pages. The most important parameters are also available on the Compact/Large Keyboard.



Further information is available in the dedicated Manuals (W3000+, Evolution+, KIPLink).

WORKING LOGICS

The HPC control logics enhance the system efficiency leveraging on partial loads, redundant units, and favourable ambient conditions. HPC acts on time intervals. The time lapse between each HPC action can be set from 1 to 500 minutes. The time left until the AV action is visible in the KIPLink group interface section. According to the instantaneous operating conditions detected in the chilled water system, HPC regulates: the chillers' set-point, the pumps' speed, and the indoor air conditioners' valves and fans.

The main variables taken into consideration are:

- Cooling demand of each indoor unit group (room temperature, fans' speed, valve opening)
- Chilled water temperature
- Pumps' speed
- Chillers' group operating status (outdoor air temperature, FC availability)

The highest benefits are achieved in systems with VSD pumps and free-cooling chillers.

IT cooling load satisfaction is paramount. HPC always gives priority to room cooling dependability. Therefore, actions are taken on the basis of the indoor unit groups' status.

There are 4 operating modes, in order of priority:

1. Reset

When the cooling demand of at least one group of indoor units suddenly increases.

HPC contribution is reset and suspended until the Reset message is active.

The system immediately increases the cooling capacity.

2. Reduce

When the cooling demand of at least one group of indoor units slightly increases.

HPC contribution is reduced. The system increases the cooling capacity.

3. Optimization On

When the cooling demand of all groups of indoor units remains stable or decreases.

HPC optimizes the system by increasing its contribution.

4. No Action

When the cooling demand of all groups of indoor units remains stable or decreases, but HPC has already pushed the system to the best performance achievable in the current conditions.

No further action is taken.



PLUS

- Fully in house developed and patent pending
- Completely integrated, no need for any external devices
- Based on proprietary logics and devices (Multi Manager, KIPlink)
- Energy simulations, comparisons, and payback analysis available on ELCA software
- Ideal to complete the package of a MEHITS chilled water system (chillers and CRAHs)

OPTIONAL ACCESSORIES: A35B – GRAPHIC DISPLAY “Evolution Touch”

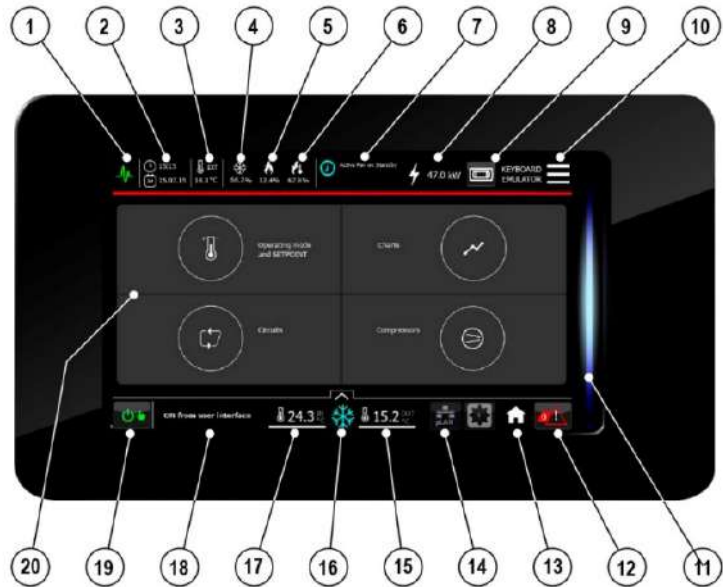


The optional is factory installed.

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: A822 – ADAPTIVE SET-POINT



ADAPTIVE SET-POINT

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

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

DATA CENTER MANAGER (Optional accessory)

DATA CENTER MANAGER is a centralized management system that ensures a smart communication between indoor chilled water units and the outdoor chillers.

The device manages the outdoor units according to the inlet and outlet temperature registered by the probes and by request of the indoor unit.

OPTIONAL ACCESSORIES: P141 – ANALOGUE SET-POINT COMPENSATION

Analogue set point compensation according to an external analogue signal at Customer care.

The microprocessor control, through the additional module "expansion card", can manage a compensation signal of the return air setpoint by analogue input (0...1V; 0...5V; 0,5...4,5V; 4...20mA; 0...20mA). The compensation curve allows to assign a temperature setpoint offset respectively to the minimum and maximum signal managed by the input.

OPTIONAL ACCESSORIES: A842 – NETWORK ANALYZER



INTERNAL installation

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

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

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

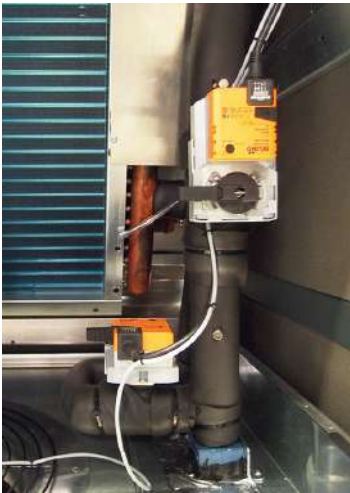
The displayed variables are:

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

OPTIONAL ACCESSORIES: A812 – FREE-COOLING DIRECT CONTROL

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

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



The optional is available for main chilled water circuit only. 2-way modulating motorized valve with 0÷10 VDC control actuator and emergency manual control for the third way (by-pass) of the hydraulic circuit. The valve is in combination with the main 2-way water flow control valve. The optional accessory is factory installed and don't modify the overall dimensions of the unit. The coupling to the main 2-way control valve of a second modulating valve, connected in by-pass, allows to obtain the same control system of a 3-way mixing valve for plant with constant water flow. At the same time the appropriate sizing of these valves allows hydraulic balancing of the by-pass way.

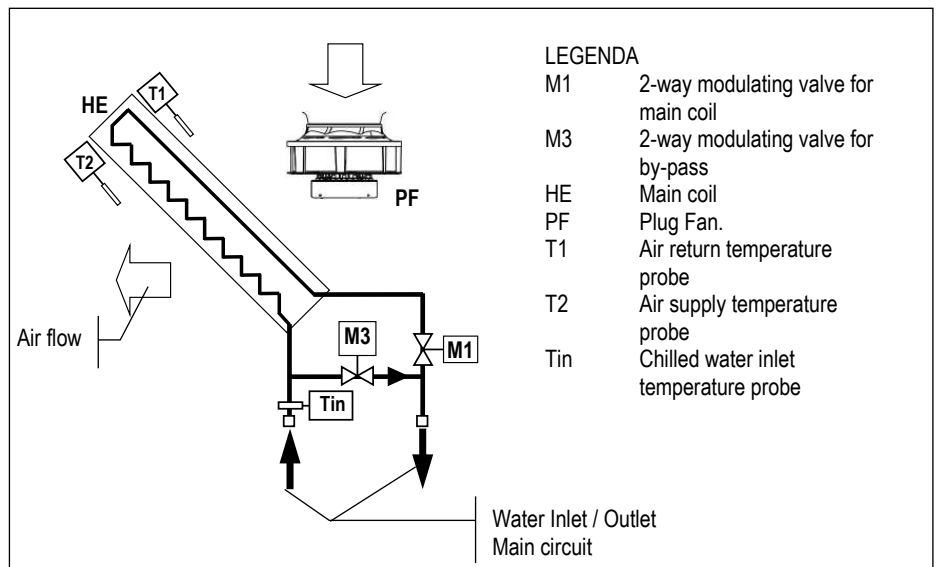
This type of valve offers the following series of benefits:

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

CHARACTERISTICS OF THE 2-WAY BALL VALVE

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

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



TECHNICAL DATA

VERSION (1)	DL	DL
MODEL	030	042
SIZE	E3	E3P
2-WAY VALVE FOR BY-PASS		
k_v – Flow coefficient	m^3/h	
	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: 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		030	042
SIZE		E3	E3P
THERMAL CAPACITY	kW	6,0	6,0
Absorbed current (OA)	A	8,7	8,7
First working step	kW	3,0	3,0
Second working step	kW	3,0+3,0	3,0+3,0
Third working step	kW	--	--
NET WEIGHT (2)	kg	7	7

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

A432 – EXTRA POWER ELECTRIC HEATERS

The components are the same standard accessory

Temperature control on suction air.

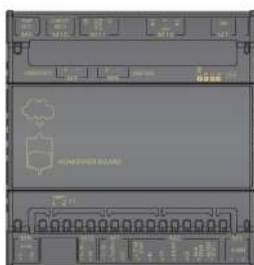
TECHNICAL DATA

VERSION (1)		DL	DL
MODEL		030	042
SIZE		E3	E3P
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 (2)	kg	7	7

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

OPTIONAL ACCESSORIES: 4301 – STEAM HUMIDIFIER 3KG/H

OPTIONAL ACCESSORIES: 4303 – STEAM HUMIDIFIER 8KG/H



Humidifier control board

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

The optional includes the control board.

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

The optional is factory installed and requires only water filling connection.

Humidifier water charge and discharge pipes are not supplied.

It is recommended to install a filter and a shut-off valve on the pipe to the water inlet.

This humidifier produces non pressurized steam by electrodes immersed in the water inside the cylinder: they bring the electric phase in the water that works as an electrical resistance and overheats. The steam so produced is distributed with dedicated distributors and used for ambient humidification or for industrial processes.

CHARACTERISTICS OF THE SUPPLY WATER

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

LIMIT VALUES

		Min	Max
Hydrogen ions	pH	7	8,5
Specific conductivity at 20°C	$\sigma_{R, 20^\circ C}$ $\mu S/cm$	350	750
Total dissolved solids	TDS mg/l	(1)	(1)
Dry residue at 180°C	R ₁₈₀ mg/l	(1)	(1)
Total hardness	TH mg/l CaCO ₃	100 (2)	400
Temporary hardness	mg/l CaCO ₃	60 (3)	300
Iron + Manganese	mg/l Fe + Mn	0	0,2
Chlorides	ppm Cl	0	30
Silica	mg/l SiO ₂	0	20
Residual chlorine	mg/l Cl ⁻	0	0,2
Calcium sulphate	mg/l CaSO ₄	0	100
Metallic impurities	mg/l	0	0
Solvents, diluents, soaps, lubricants	mg/l	0	0

(1) Values depending on specific conductivity; in general: TDS $\cong 0,93 * \sigma_{R, 20^\circ C}$; R₁₈₀ $\cong 0,65 * \sigma_{R, 20^\circ C}$

(2) Not lower than 200% of the chloride content in mg/l di Cl⁻

(3) Not lower than 300% of the chloride content in mg/l di Cl⁻

WARNING:

- Use only with drinking water.
- There is no reliable relationship between hardness and water conductivity
- Do not treat water with softeners! This could cause corrosion of the electrodes or the formation of foam, leading to potential operating problems or failures.
- Do not add disinfectants or corrosion 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

VERSION (1)		DL	DL
MODEL		030	042
SIZE		E3	E3P
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.

EXTRA POWER HUMIDIFIERS

The components are the same of the standard accessory.

TECHNICAL DATA

VERSION (1)		DL	DL
MODEL		030	042
SIZE		E3	E3P
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 : P051 – DEHUMIDIFICATION FUNCTION

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

Components:

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

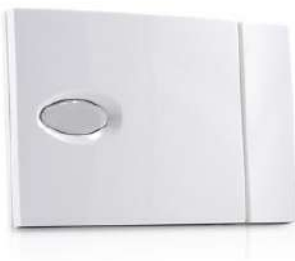
OPTIONAL ACCESSORIES: P161 - T/RH AIR INTAKE SENSOR

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, 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 – DUAL POWER SUPPLY KIT

OPTIONAL ACCESSORIES: P114 – DUAL POWER SUPPLY KIT + 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.

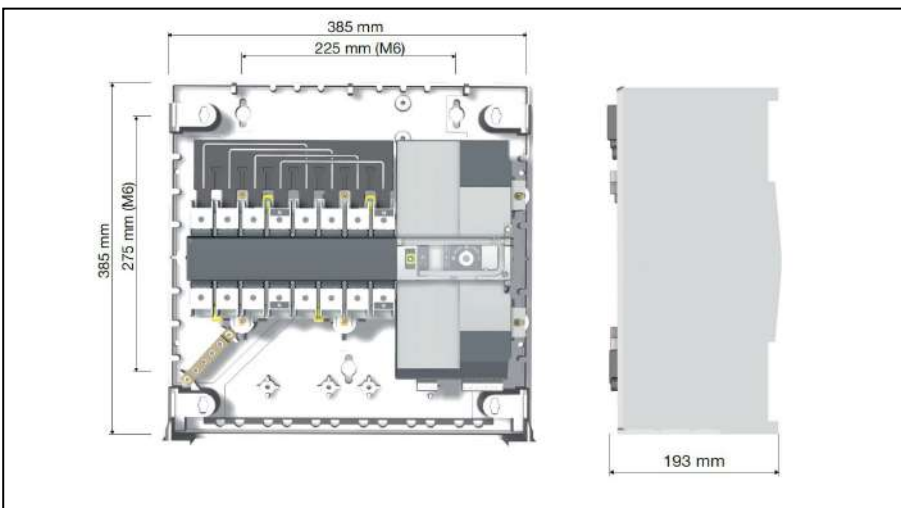
ATS INSTALLATION

Frame	Power Supply	Installation	Code
E3	400/3+N/50	EXTERNAL to the unit, supplied in kit	P113, P114 (*)
E3P	400/3+N/50	EXTERNAL to the unit, supplied in kit	P113, P114 (*)

(*) 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.

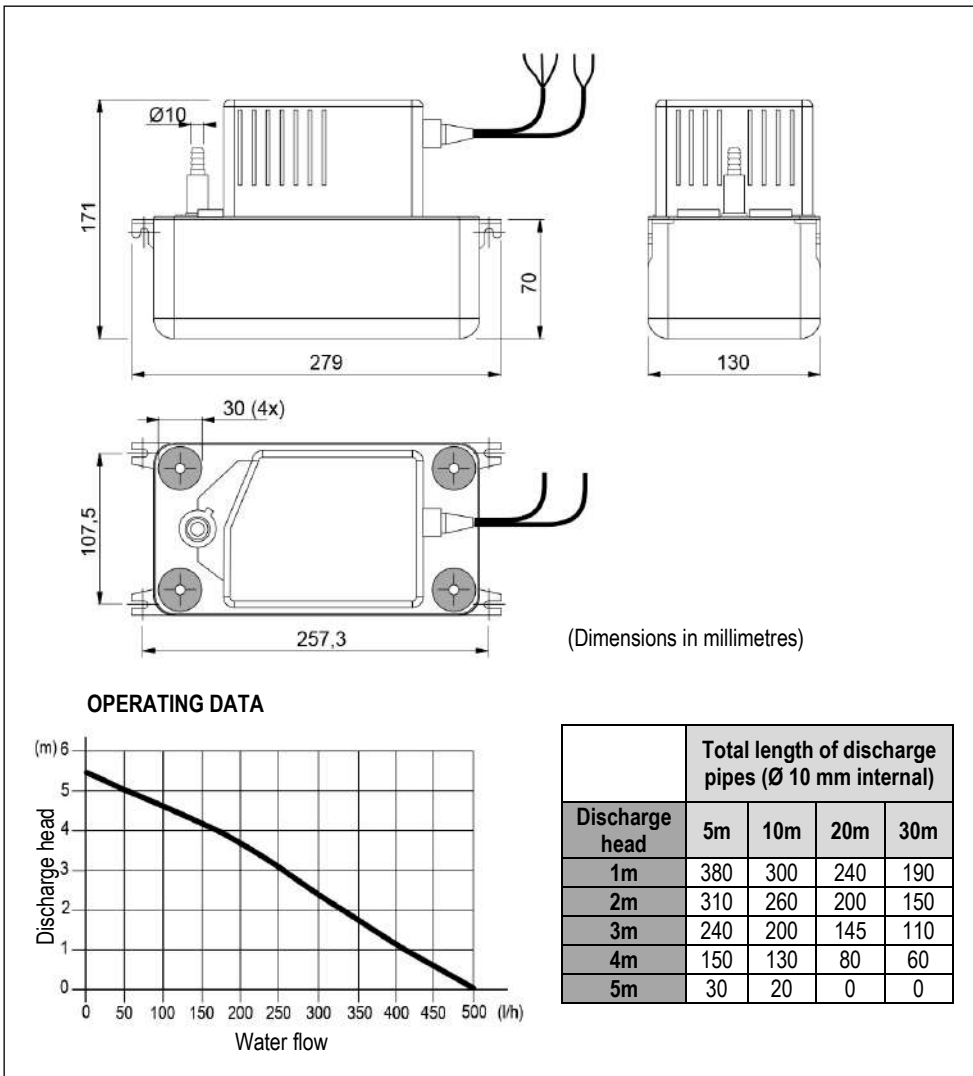


OPTIONAL ACCESSORIES: A381 - DRAIN PUMP



The optional is supplied as mounting kit.
 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.

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



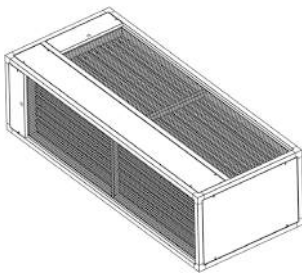
OPTIONAL ACCESSORIES: P084 – AIR FILTER ePM₁₀ 50%

The ePM₁₀ 50% air filters (according to ISO EN 16890) replaces 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	030	042
SIZE	E3	E3P
Additional pressure drops (2) Pa	55	42

1. DL = Displacement air delivery
2. 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.

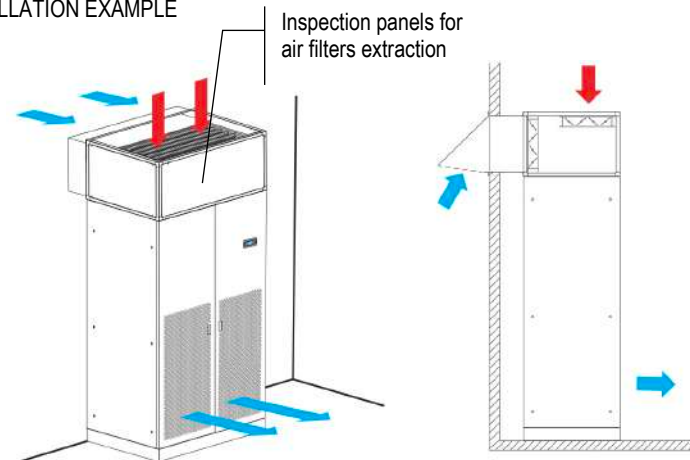
The optional allow to obtain free-cooling by direct ambient air intake into the room.

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

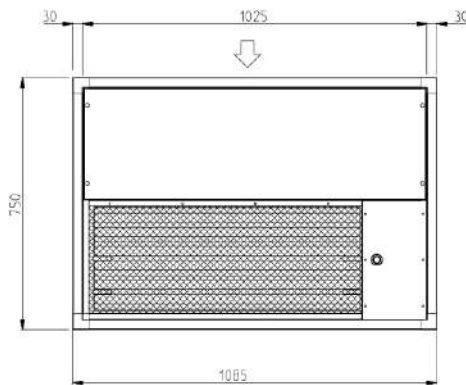
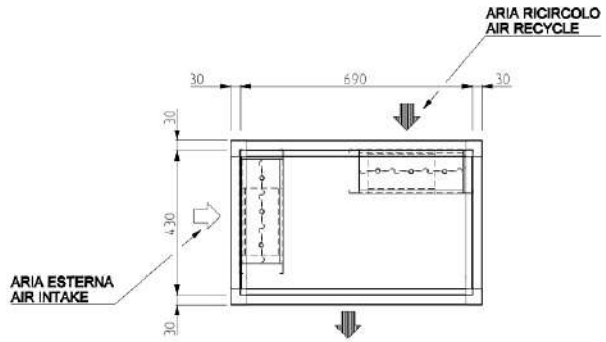
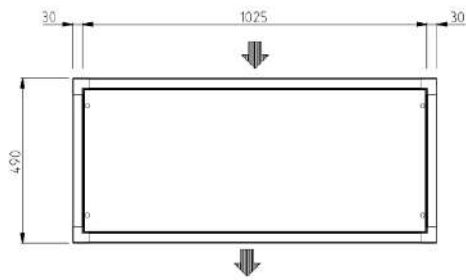
- Frame in aluminium extrusion, painted with epoxy powders. Colour RAL 9005.
- Panels in galvanized steel sheet with protective surfaces treatment in compliance with UNI ISO 9227/ASTMB117 and ISO 7253, and painted with epoxy powders. Colour RAL 9005.
- Panels insulated with polyurethane foam and seals to ensure airtight.
- 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

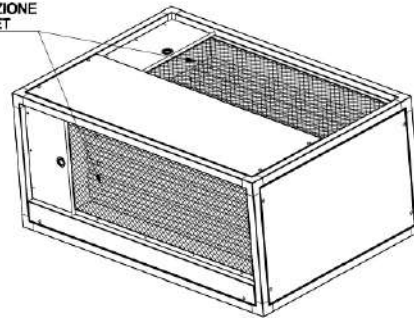


Ducting for ambient air suction are at Customer care. A rain cover with grille on ambient air intake is recommended.

PLENUM FREE-COOLING - SIZE E3

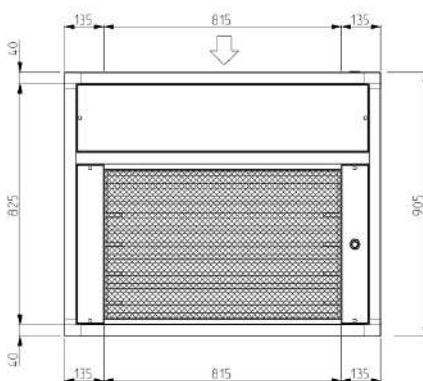
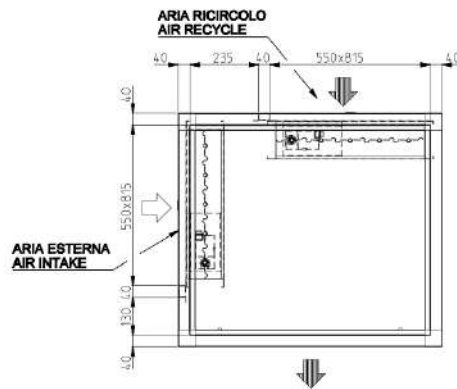
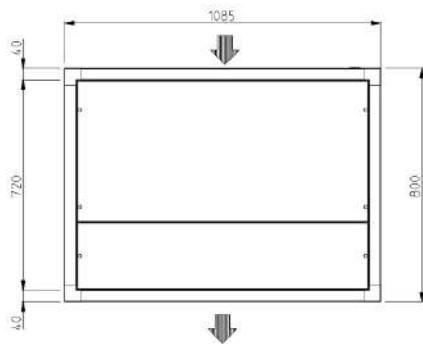


RETE DI PROTEZIONE
PROTECTION NET

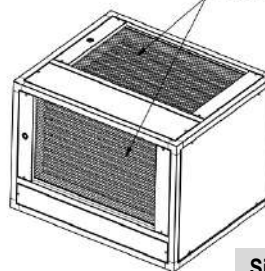


Size	E3
Weight (1) kg	35

PLENUM FREE-COOLING - SIZE E3P



RETE DI PROTEZIONE
PROTECTION NET



Size	E3P
Weight (1) kg	52

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 exhaustion damper avoids the increase in pressure in the room.

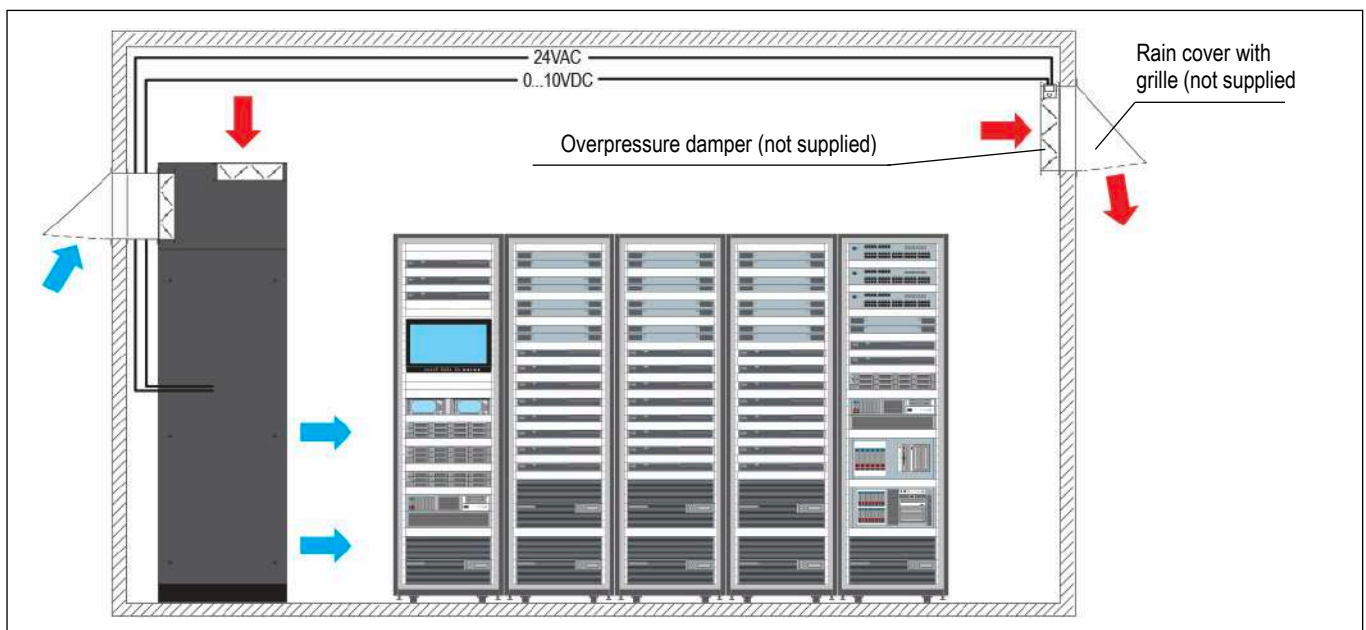
The damper must be installed at the highest point of the room to exhaust excess hot air to the outside.

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

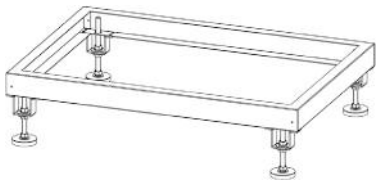
The electrical connection cables are not supplied.



OPTIONAL ACCESSORIES: P041 – SUPPORT FRAME H 255-350MM

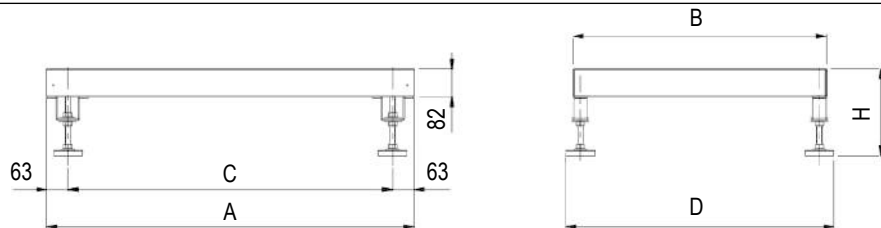
OPTIONAL ACCESSORIES: P042 – SUPPORT FRAME H 355-450MM

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 E3 – E3P

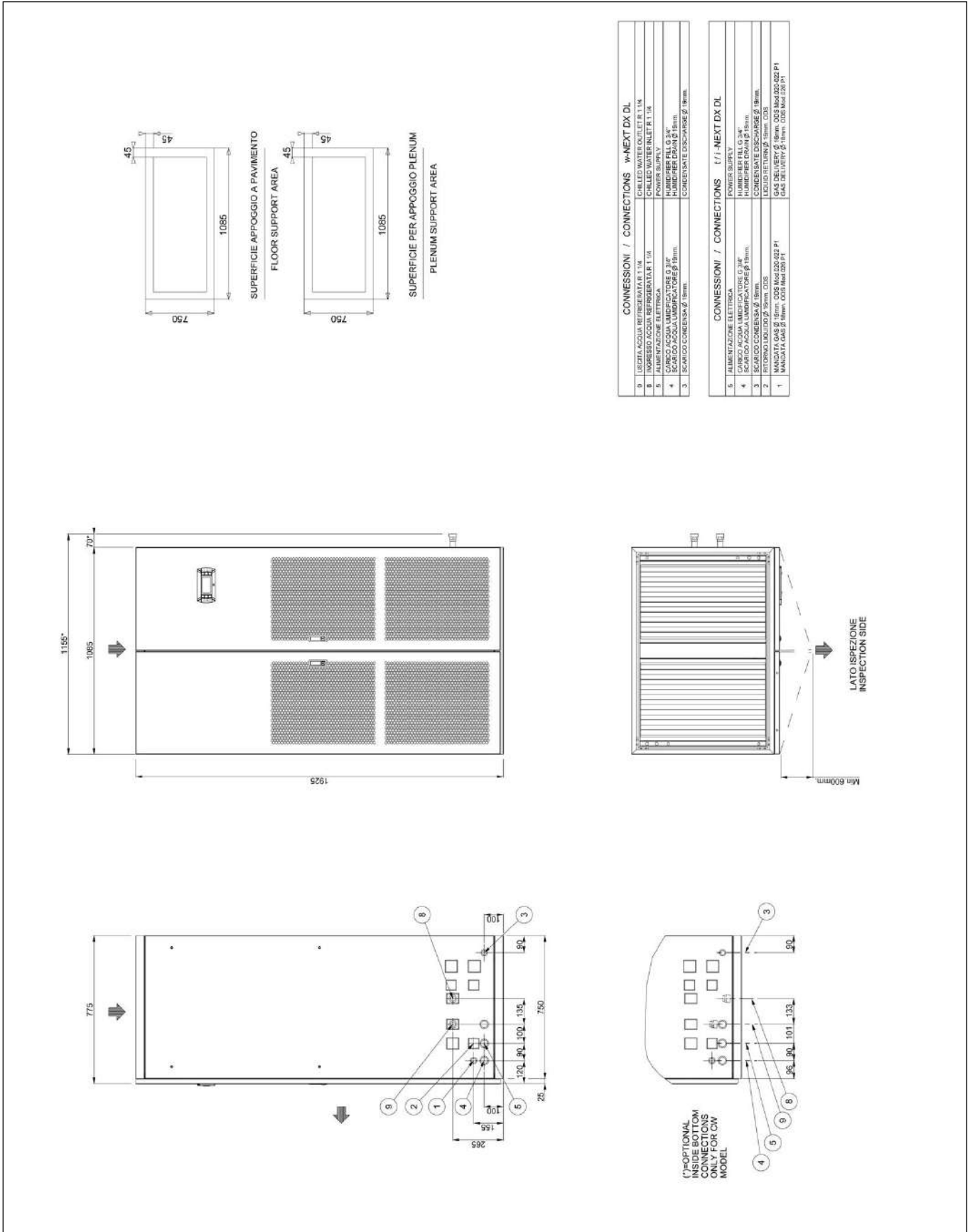


SIZE		E3	E3P
A	mm	1085	1085
B	mm	750	905
C	mm	959	959
D	mm	791	946

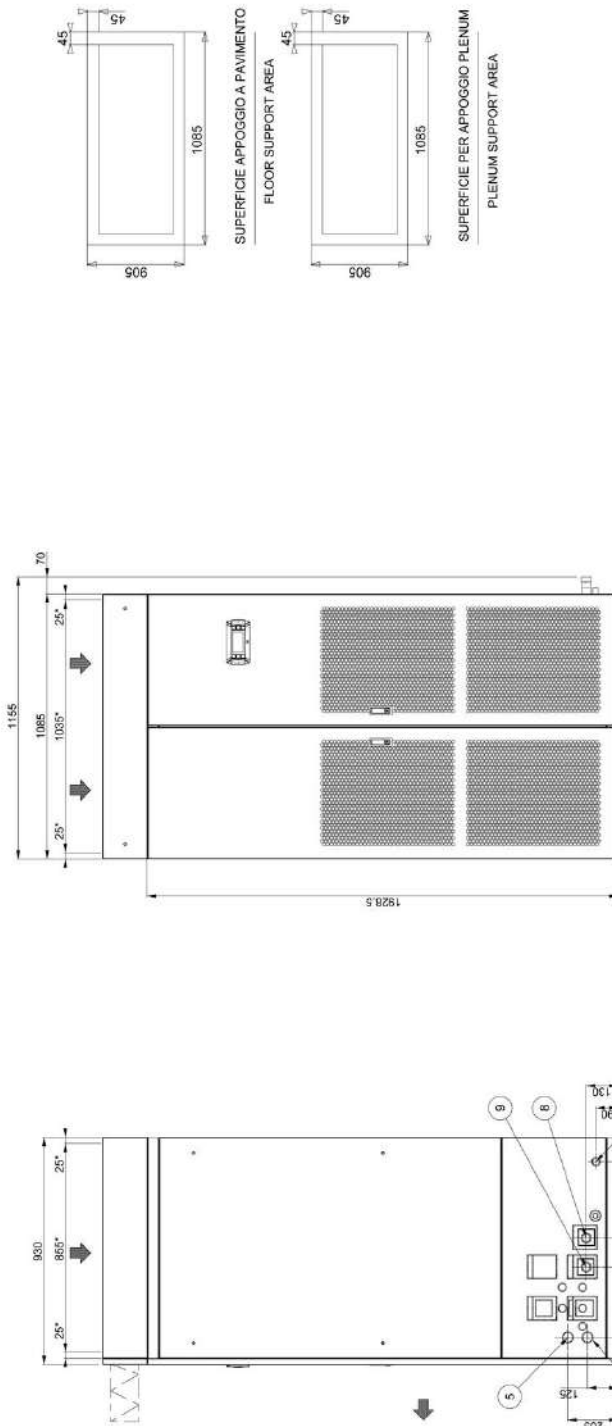
MODEL		P041 - Hmax350	P042 - Hmax450	P043 - Hmax510
H min height	mm	255	355	400
H max height	mm	350	450	510

MACHINE DRAWINGS

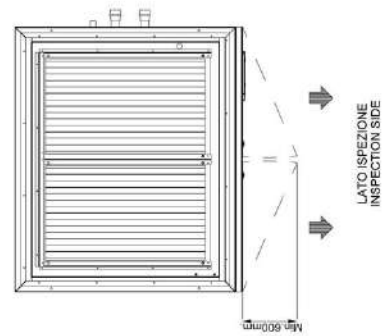
MACHINE DRAWINGS - Dimensions in mm – SIZE E3



MACHINE DRAWINGS - Dimensions in mm – SIZE E3P



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



CONNESSIONI / CONNECTIONS	
9	USCITA ACQUA REFRIGERANTE R.1.14
8	IMMISSO ACQUA REFRIGERANTE R.1.14
7	IMMISSO ACQUA REFRIGERANTE R.1.14
6	IMMISSIONE ELETTRICA
5	IMMISSIONE ELETTRICA
4	SCARICO ACQUA UMIDIFICATORE Ø 19mm
3	SCARICO CONDENSATO Ø 12mm

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 drops 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

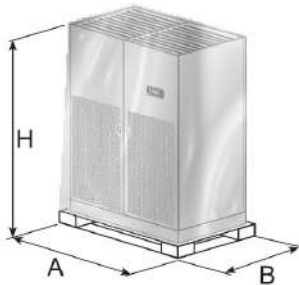
2-way valve for by-pass pressure drop: $\Delta P = (Q / k_v)^2 = (5,1 / 6,3)^2 = 0,65 \text{ (bar)} * 100 \text{ (kPa / bar)} = 65,0 \text{ kPa}$

SHIPMENT: PACKING DIMENSIONS

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

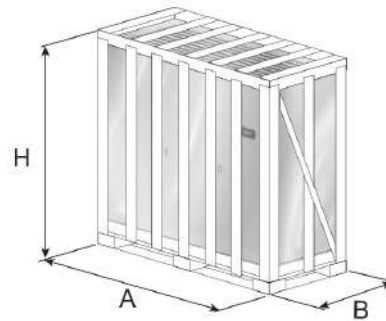
The machines are shipped on pallet and covered with shrink wrap.
On request packing on pallet covered with shrink wrap and wooden cage.

STANDARD PACKING DIMENSIONS



Size	A (mm)	B (mm)	H (mm)
E3	1200	910	2080
E3P	1200	1050	2080

OPTIONAL 9973: WOODEN CAGE PACKING DIMENSIONS



Size	A (mm)	B (mm)	H (mm)
E3	1240	950	2150
E3P	1240	1090	2150

SHIPMENT: SHIPPING WEIGHT

STANDARD PACKING

Model	030	042
Size	E3	E3P
Weight	kg 311	345

OPTIONAL 9973: WOODEN CAGE PACKING

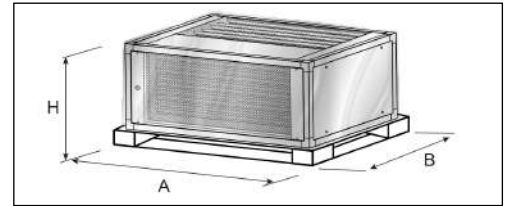
Model	030	042
Size	E3	E3P
Weight	kg 343	377

SHIPMENT: OPTIONALS PACKING DIMENSIONS AND SHIPPING WEIGHT

P034: INTAKE FREE-COOLING PLENUM

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

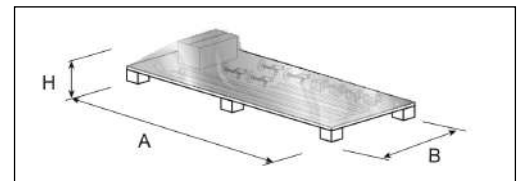
Size		E3	E3P
DIMENSIONS			
A	mm	1200	1200
B	mm	910	1050
H	mm	630	630
SHIPPING WEIGHT			
P034 - Intake free-cooling plenum	kg	52	62



P041 / P042 / P043: SUPPORT FRAME

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

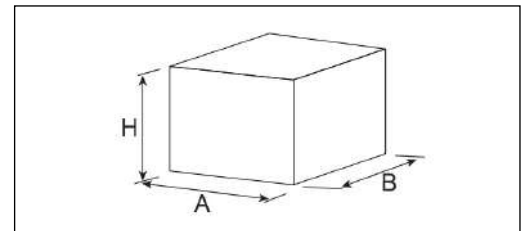
Size		E3	E3P
DIMENSIONS			
A	mm	1200	1200
B	mm	900	900
H	mm	500	500
SHIPPING WEIGHT			
	kg	29	30



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

The optional are shipped in a cardboard box.

Size		E3	E3P
DIMENSIONS			
A	mm	400	400
B	mm	400	400
H	mm	210	210
SHIPPING WEIGHT			
	kg	12	12





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.



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