

USE AND MAINTENANCE MANUAL



WATER COOLED PRECISION AIR
CONDITIONING UNIT

UV "MILLENNIUM"

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The manufacturer reserves the right to modify the present handbook without prior notice.

1 - INTRODUCTION

1.1 Manual content

The present handbook, originally written in Italian, was completed in compliance with the "Machinery Directive" par. 1.7.4 and according to the harmonized norm UNI EN 12100/2 and EN 378-2. It contains all the necessary information for carrying out without any risk transportation, installation, startup, operation, setting, maintenance and dismantling of the air conditioning unit of UV 'Millennium' series.

Should you have any doubt on the correct understanding of these instructions, please contact the Manufacturer in order to get further explanations.

1.2 Safety marks

The following safety marks are used in this manual to draw attention to all useful information in order to avoid any dangerous situation which could be unsafe and harmful for people, could damage equipment and environment besides breaking the unit.



It means operation and behaviour not allowed.



It means danger or risk to people, things or environment.



It means an electrical danger.



It means a warning about important functions or useful information. Pay the maximum attention to the paragraphs marked with this symbol.

1.3 Referring standards

The units of the 'UV' series are designed and manufactured in compliance with the relevant European Directives and in particular, they meet the "Essential Safety Requirements" as set out in the European Directive 89/392/CEE, and further amendments, as attested by the CE mark that is on each unit.

As a matter of fact, the units are certified by the manufacturer and are provided together with the CE Declaration of Conformity which is attached to the present manual.

Where applicable, the units mentioned in this handbook are in conformity with the directive 97/23/CE (PED), concerning the pressure devices.

1.4 Warranty

The manufacturer warrants the conditioning units according to what stated on his general sales terms or according to what else explicitly agreed.

The manufacturer Warranty is void in case the guidance of this manual has not been carefully respected.

The manufacturer refuses all responsibility for any damage to people, animals, things or environment caused by incorrect installation, maintenance, setting or misuse of the machine. It is considered as "misuse" of the machine any use not explicitly allowed in this manual.



Warning: on the first startup, duly fill in the relevant report attached to this manual and send a copy to Emicon A.C. (Customer Service), in order to make the warranty valid

1.5 Readers of the Manual

This manual and all its attachments are supplied with the described unit. The manual must be kept by the machine's owner in a proper place. To this end, a plastic bag where to store the manual has been placed inside the machine so that it can be always easily accessible for consultation and at the same time, it can be preserved in a good state.

In case the manual is lost or deteriorated, a new copy must be requested directly to the manufacturer.

2 - MAIN SAFETY RULES

2.1 General warnings



Read carefully the whole handbook before performing any operation on the unit. Only qualified and trained technicians must perform any operation on the machine.

Do not touch the machine if with bare feet or with humid or wet parts of the body.



Do not perform any cleaning operation before the main switch is "OFF" and power line disconnected.

Do not spread, leave unattended or to the reach of children any packaging material (carton box, staples, plastic bags, etc.) as they may be a source of danger.

2.2 Allowed use

The machine has been designed and produced for air conditioning of technology centres and therefore it must be used only for this purpose, according to its performing features. All different uses are not allowed and disclaim all manufacturer's responsibility for damages caused to environment, people, animals and properties.

2.3 Forbidden use

Do not use the machine:

- Ø for other use than that described in paragraph 2.2;
- Ø when it is exposed to rainfall;
- Ø in atmosphere with high risk of fire or explosion;
- Ø in spaces with corrosive atmosphere.

Any operation on the unit must be carried out in compliance with local technical standards.



2.4 Dangerous areas

The machine is closed by case panels, at the exception of the upper part on some models. The dangerous parts inside the unit are not accessible from outside.

Only qualified and trained personnel is allowed to remove the covering panels because inside the unit there are parts with high risk of electric shock, areas with high temperature and working mechanical components.

3 - GENERAL DESCRIPTION

3.1 Unit description

The water cooled precision air conditioning units of UV Millennium series have been designed for being used in technology centres, computer processing centres, telecom applications and whenever special thermic and humidity conditions are required.

The machines are suitable only for internal installation.

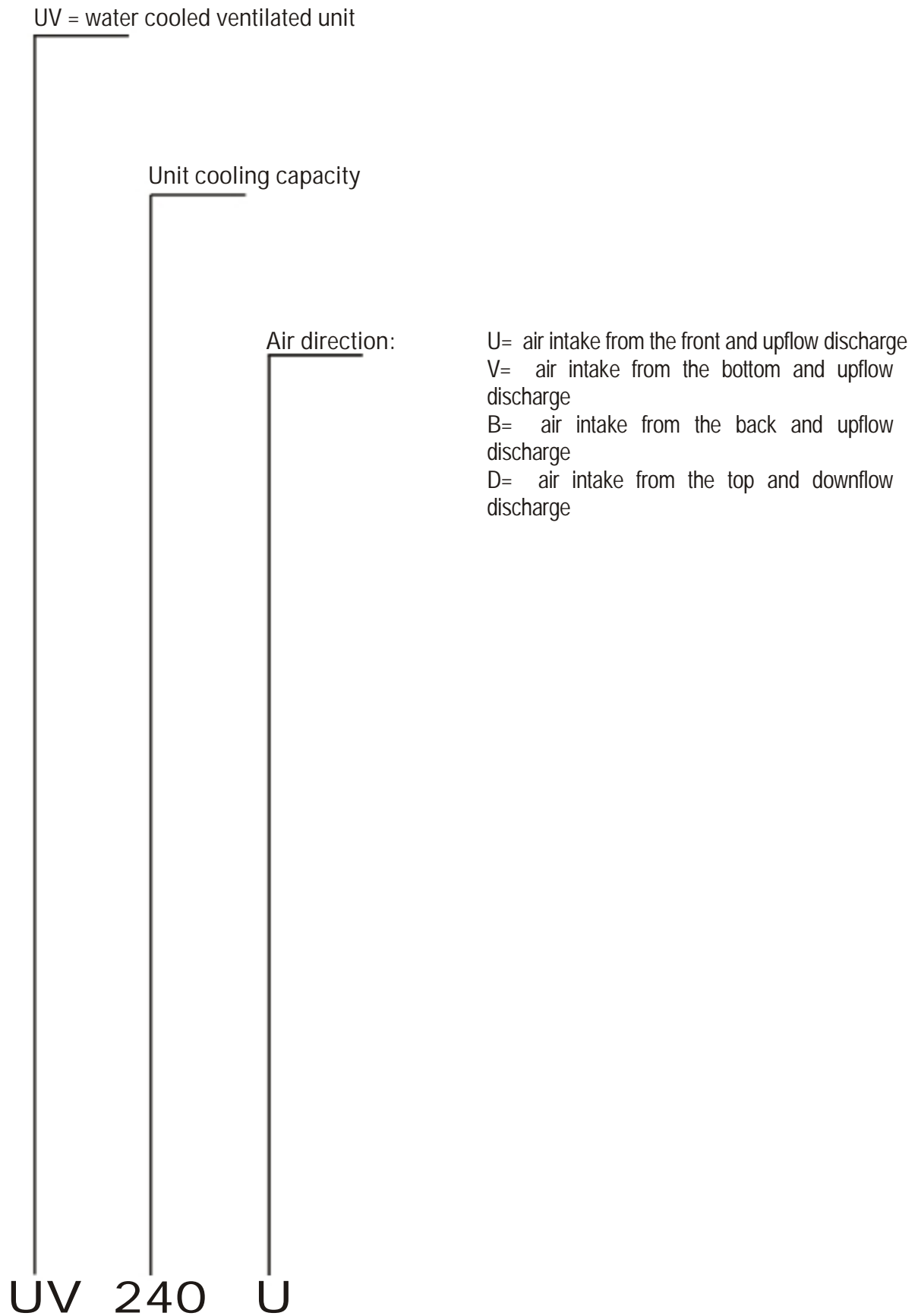
All units undergo a complete operating test at the factory.

The units are available in different configurations according to the air intake and discharge:

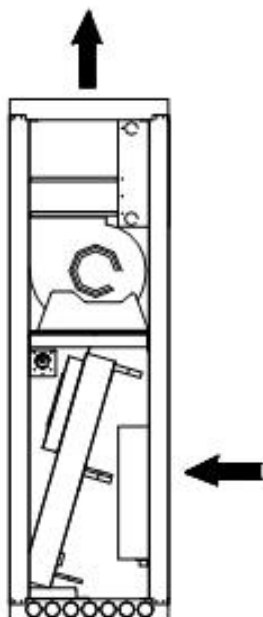
- U: Air intake from the front and upflow air discharge;
- V: Air intake from the bottom and upflow air discharge;
- B: Air intake from the back and upflow air discharge;
- D: Air intake from the top and downflow air discharge.

The different unit models of UV Millennium series are marked with initials, whose interpreting key is shown in the scheme on page 5.

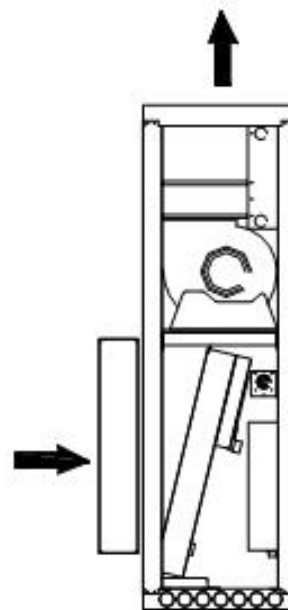
Interpreting key for the initials used to mark the air conditioning units of the UV Millennium series



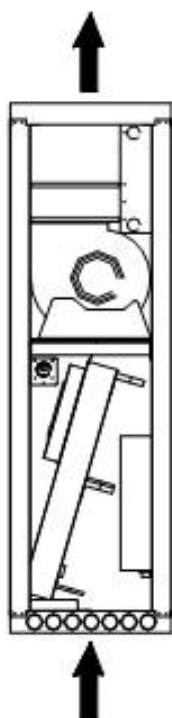
As shown in the scheme in the previous page, the air conditioning units are classified according to the transfer path of the air inside the conditioning machine before being discharged into the working room at the desired temperature. The following pictures show the four possible different configurations, according to the air distribution system.



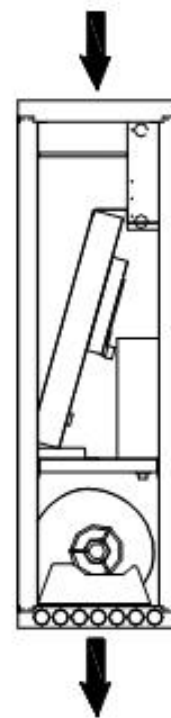
Configuration U: air intake from the front and upflow air discharge



Configuration B: air intake from the back and upflow air discharge



Configuration V: air intake from the bottom and upflow air discharge



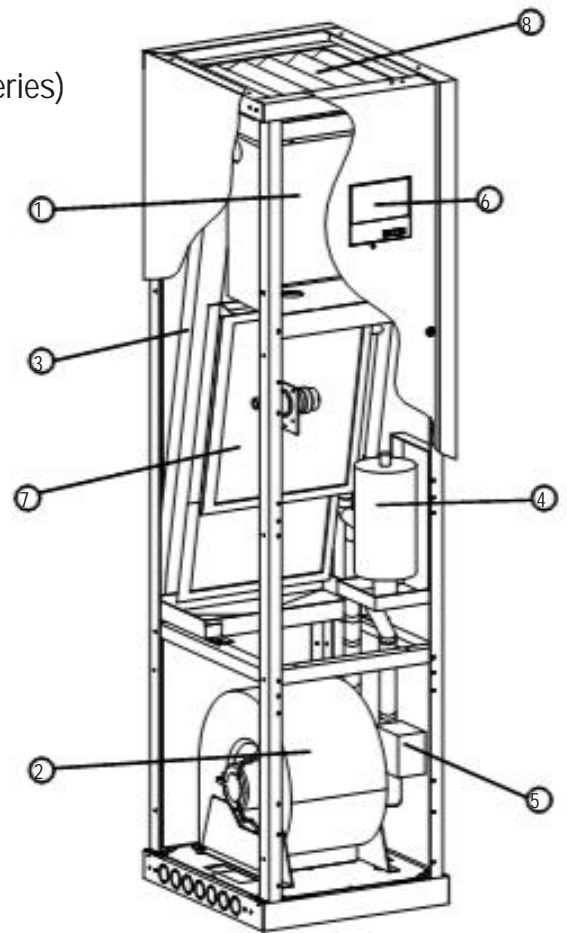
Configuration D: air intake from the top and downflow air discharge

3.2 Main components

The units of UV Millennium series are made of the following main components:

- Ø The supporting structure frame is made of galvanized steel beams covered with epoxy painted steel plate panels. The panels are also provided with internal polyurethane plate covers to reduce noise.
- Ø Centrifugal fans with engine pre-set to a low number of revolutions.
- Ø Cooling coil with cooled water.
- Ø Condensate collecting tank.
- Ø Electronically-controlled modulating valve.
- Ø Regenerable air filters with efficiency grade F4.
- Ø The electric board in compliance with CE regulations and provided with main disconnecting switch; thermal and amperometric protections, contactors, auxiliary low voltage circuit, terminal board and control by microprocessor.

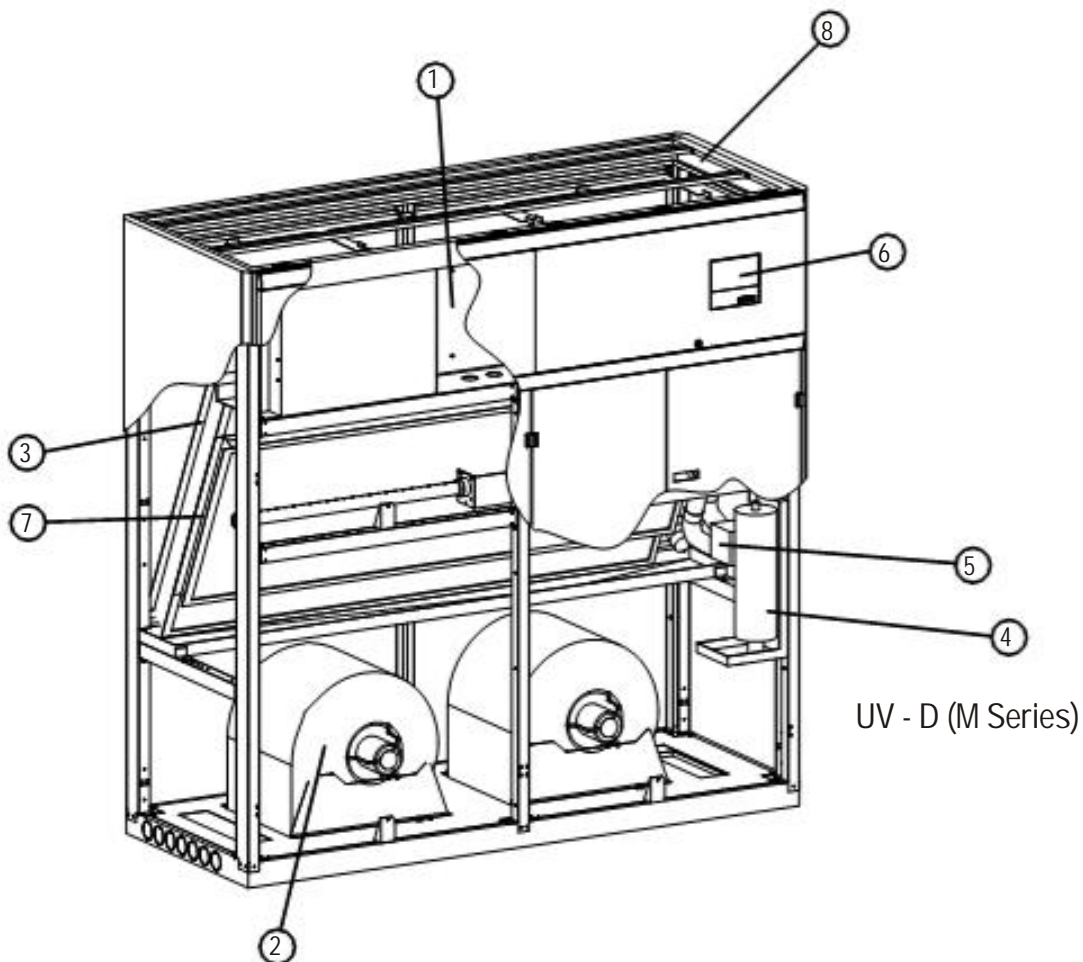
UV - D (L Series)



Key

- 1) Electric board
- 2) Fan
- 3) Water cooled coil
- 4) Humidifier (optional)
- 5) 3-way valve
- 6) Microprocessor display
- 7) Heating coil (optional)
- 8) Air filters

Fig. 1



UV - D (M Series)

UV - U (L Series)

Key

- 1) Electric board
- 2) Fan
- 3) Water cooled coil
- 4) Humidifier (optional)
- 5) 3-way valve
- 6) Microprocessor display
- 7) Heating coil (optional)
- 8) Air filters

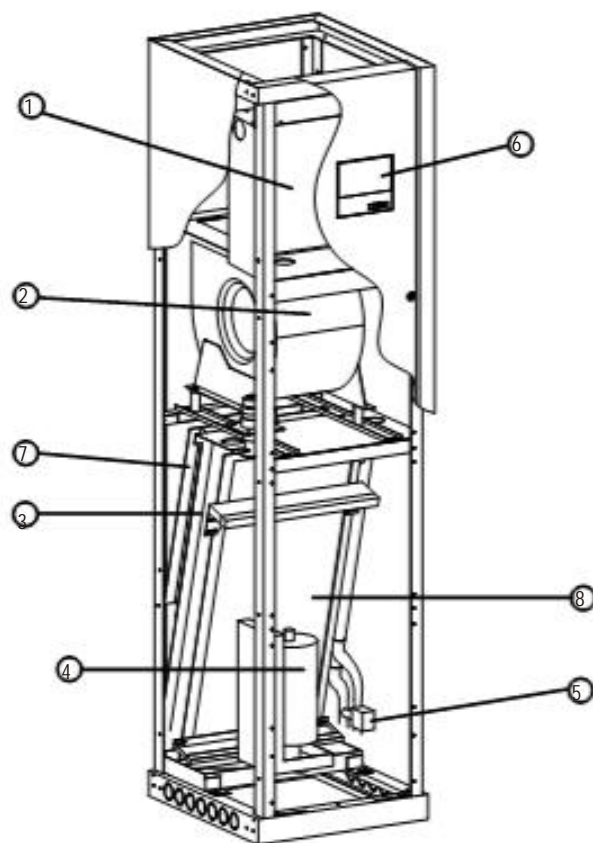
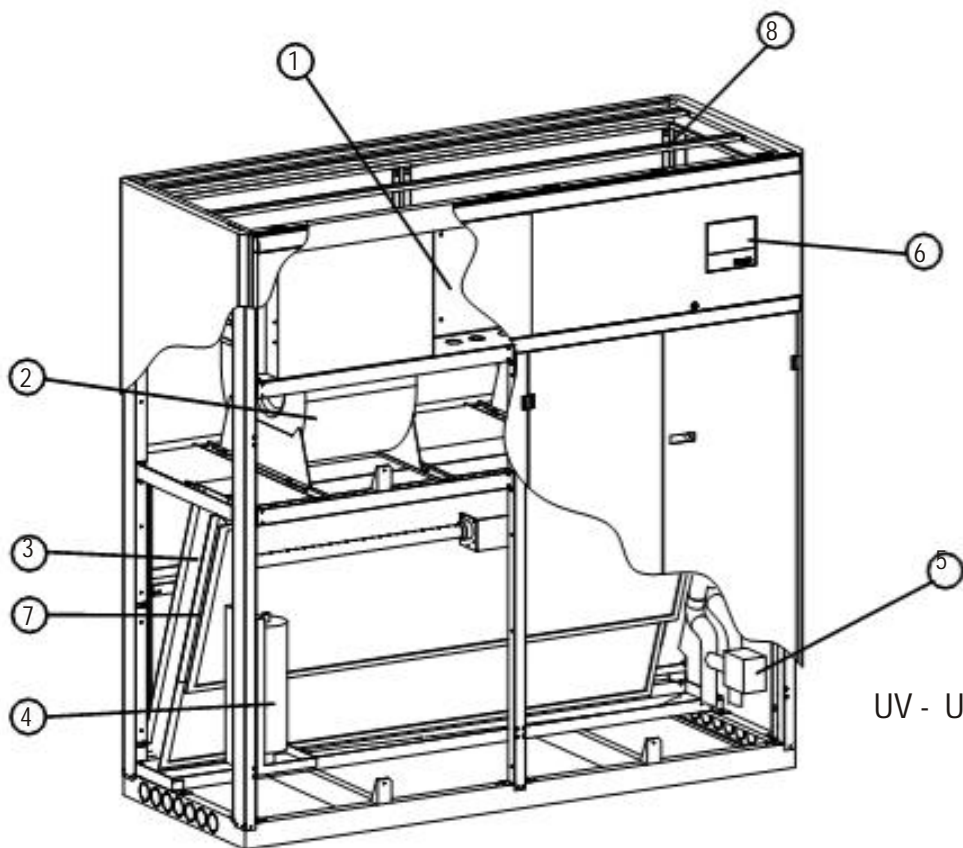
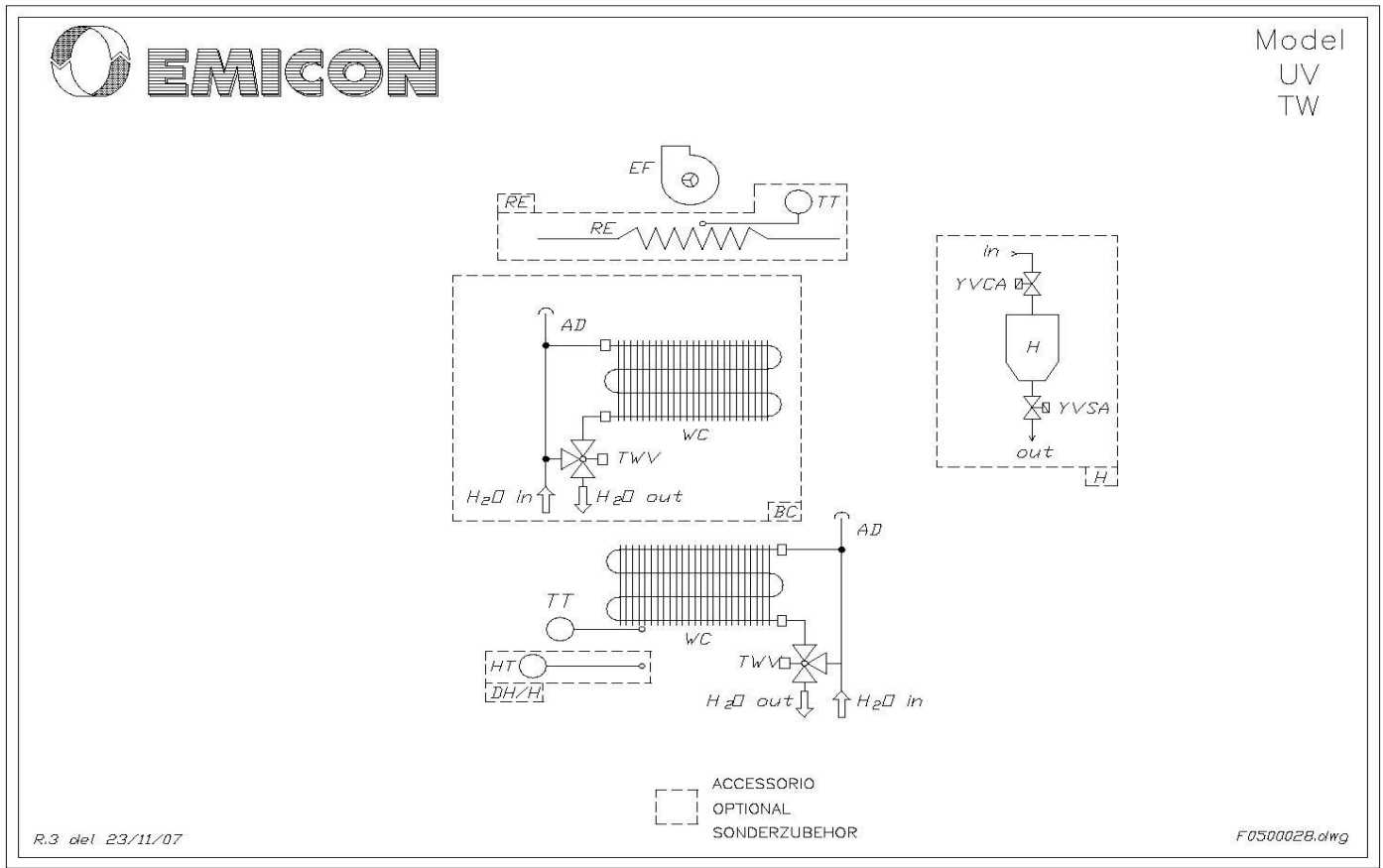


Fig. 2



UV - U (M Series)

3.2.1 Hydraulic circuit



AC	AIR HEAT EXCHANGER	PDIO	OIL GAUGE	VE	EXPANSION VESSEL
AD	AIR DISCHARGE VALVE	PDSO	OIL LEVEL PRESSOSTATIC VALVE	VP	EVAPORATOR
AV	VIBRATION DAMPER	PDSW	DIFFERENTIAL WATER SWITCH	VT	THERMOSTATIC EXPANSION VALVE
CM	COMPRESSOR	PIH	HIGH PRESSURE GAUGE	WC	WATER COIL
CO	CONDENSER	PIL	LOW PRESSURE GAUGE	WD	WATER CHARGE AND DISCAHRGE VALVE
CT	CONDUCTIVITY PROBE	PIW	WATER VALVE	WE	WATER EXCHANGER
EF	FAN	PRV	OVERPRESSURE DISCHARGE DEVICE	WF	WATER FILTER
EHA	ANTIFREEZE HEATER	PRW	SAFETY WATER FLOW SWITCH	WP	WATER PUMP
EHC	CRANK-CASE HEATER	PSH	HIGH PRESSURE SWITCH	WT	WATER BUFFER TANK
EV	SOLENOID VALVE	PSL	LOW PRESSURE SWITCH	BG	HOT GAS COIL
FSR	FAN SPEED REGULATOR	PT	PRESSURE TRANSDUCER	YVCA	HUMIDIFIER FILL VALVE
FWV	4-WAY VALVE	RE	ELECTRIC HEATER	YVSA	HUMIDIFIER DRAIN VALVE
H	HUMIDIFIER	RV	MODULATING VALVE		
HR	HEAT RECOVERY	SA	LIQUID SEPARATOR		
HT	HUMIDITY PROBE	SFF	FREON - FREON HEAT EXCHANGER		
LF	DEHYDRATING FILTER	SFO	FREON - OIL HEAT EXCHANGER		
LS	SIGHT GLASS	SL	NOISE LEVEL REDUCER		
LT	LIQUID RECEIVER	SO	OIL SEPARATOR		
NR	NON-RETURN VALVE	SV	SHUT-OFF VALVE		
OF	OIL FILTER	TS	SAFETY THERMOSTATIC VALVE		
OLR	OIL LEVEL REGULATOR	TT	TEMPERATURE PROBE		
OT	OIL RESERVE	TWV	3-WAY VALVE		

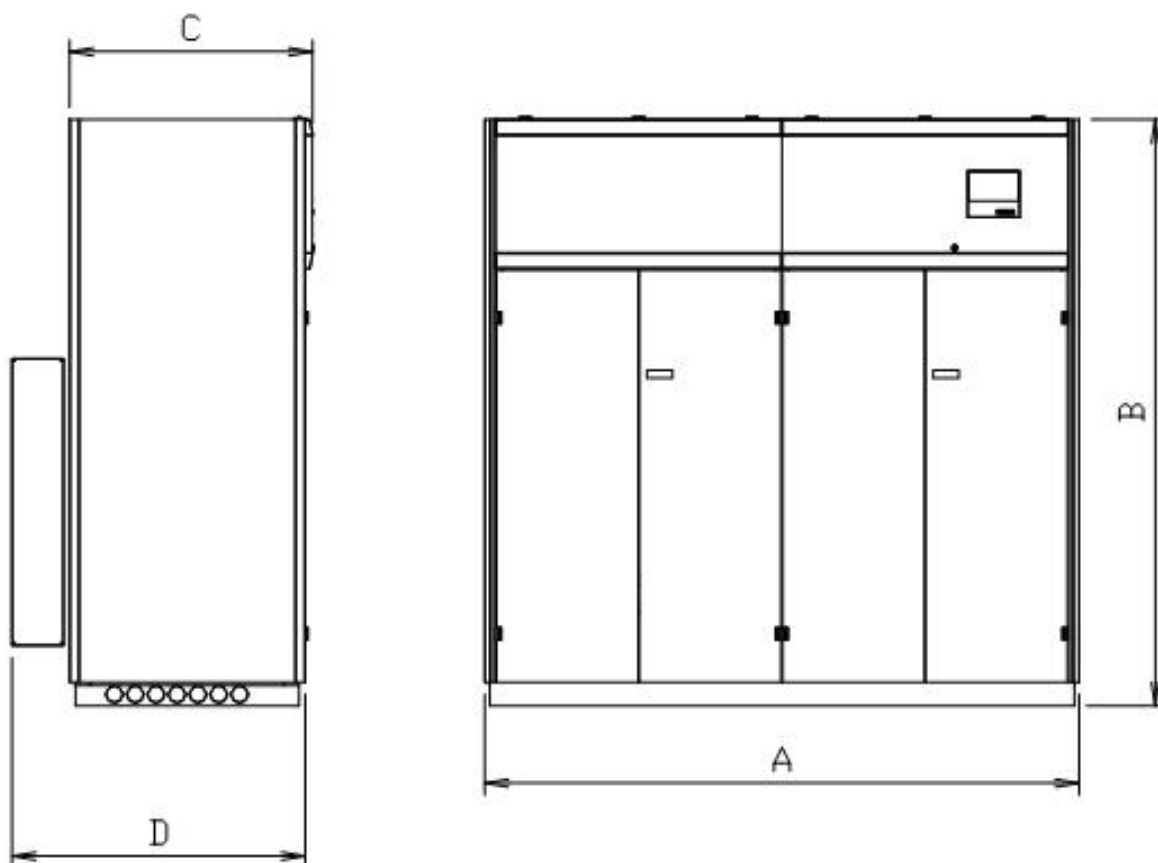
3.3 Technical specification

The main technical features of the units are shown in the attachments.

3.4 Dimensional drawings

Table 1 shows the dimensions of the different models of air conditioning units with reference to Picture 3.

Table 2 shows the available unit models for each steel frame size of the series.



Picture 3

TABLE 1

STEEL FRAME SIZE	L1	L2	L3	M1	M2	M3	M4	M5	M6
A	490	640	940	1230	1530	1730	1990	2390	2950
B	1800			1975	1995				
U/V/D version	C	565		815		815			
B version	D	615		965		965			

TABLE 2

STEEL FRAME SIZE	L1	L2	L3	M1	M2	M3	M4	M5	M6
MODELS	60 80	120	170	190 240 280	320 380	470	550	640 740	800 870 1000

3.5 Accessories

The units can be equipped with a wide range of optional accessories. They can be selected on the manufacturer price list.

AA: Flooding probe sensitive to the water present under the floor.

AE: Power supply different from the nominal power.

AF: Clogged filters alarm.

AL: Smoke alarm.

AM: Soundproofing baffles on air outlet.

AR: Soundproofing baffles on air inlet.

B: The base frame in welded steel tubes is available for every unit model and its height is adjustable between 140 and 580 mm.

BC: Hot water coil with three-way valve and modulating actuator.

BN: Base frame equipped with conveyor (min H 380mm - max 550mm)

BS: Base frame provided with On/off motorised damper for D version.

DH: Dehumidification control system without H.

ETF: Electronic tangential fans (for steel frame sizes from M1 to M5 - not available for M3 D).

ETF 1M: Electronic tangential fans (for steel frame size M5) with higher available pressure.

F5,F6,F7a: Different efficiency grades of air filtration (thickness 50-100mm)

F7b, F9: Different efficiency grades of air filtration (thickness 300mm) (not available for steel frame size L1).

FP: Plenum for filter extraction on D version

H: Humidifier.

HG: Hot gas by-pass.

IE: Wooden cage packaging.

IG: Watch card.

IH: Serial interface RS485.

IM: Seawood packaging.

- IP: Magnetothermic switch for auxiliary circuits.
- IT: Magnetothermic switch for auxiliary circuits with RE and H.
- KC: Spare F4 efficiency filters kit.
- MF: Phase monitor
- MP: Oversized microprocessor
- PB: Condensing water pump (not available for steel frame size L1).
- PL: Distribution plenum provided with adjustable grid for U, V, B versions.
- PQ: Remote microprocessor.
- PR: Fresh air inlet with filter.
- RE: Electrical heater with aluminium armoured elements and safety thermostat.
- RV: Personalized RAL paint.
- SL: Main switch with padlock.
- SM: 0-10 servomotor for 3-way valve
- SS: 3 fan speed manual switch (not available with option 1M - 5M)
- ST: Calibration damper.
- SV: Gravity damper for U/V/B versions.
- 1M,2M,3M,4M,5M: Different levels of higher available pressure for fans.

4 - INSTALLATION

4.1 Identification tag

The data for the identification of the unit are marked on a permanent tag (Picture 4) attached both on the packing and inside the unit, close to the electrical panel.

EMICON		TEL. ++39 0445 41881 FAX ++39 0445 41882		CE
Via Oregon 88-Pad. 7		MADE IN EUROPE		
MODEL NUMBER		MODEL NUMBER		
NB 0407		NUMBER OF PHASES		
SERIAL NUMBER		VOLTAGE		
SPRINKLING		Hz		
REFRIGERANT TYPE		REFRIGERANT		
R		REFRIGERANT		
WEIGHT (kg)		WEIGHT (kg)		
Kg		WEIGHT (kg)		
WEIGHT (kg)		WEIGHT (kg)		
Kg		WEIGHT (kg)		
WEIGHT (kg)		WEIGHT (kg)		
L.P. kg		H.P. kg		
WEIGHT (kg)		WEIGHT (kg)		



The correct unit identification by means of the serial number is essential for the execution of any operation to carry out on the unit. The serial number must be always advised whenever submitting a request of technical service support.

4.2 Reception and inspection

It is very important to check the packing integrity immediately upon delivery. In case the packing is found damaged, it is necessary to accept the goods "with reservation" and indicate on the consignment note the state of the received goods and let the driver countersign it. Any claim concerning the delivered material must be sent to the manufacturer by fax or by registered letter within 8 days from the receiving date. It is advisable to unpack the unit only when the installation begins and possibly after the unit has been moved to the location where it must be installed.



It is forbidden to stack units, even if they are packed. If the unit is stored after receiving, it must be not exposed to weather agents, even if packed.

4.3 Handling

The handling of the unit must be carried out by expert personnel, equipped with appropriate equipment in relation to the weight and to the dimensions of the machine. During the handling operation, the machine must be always kept upright.



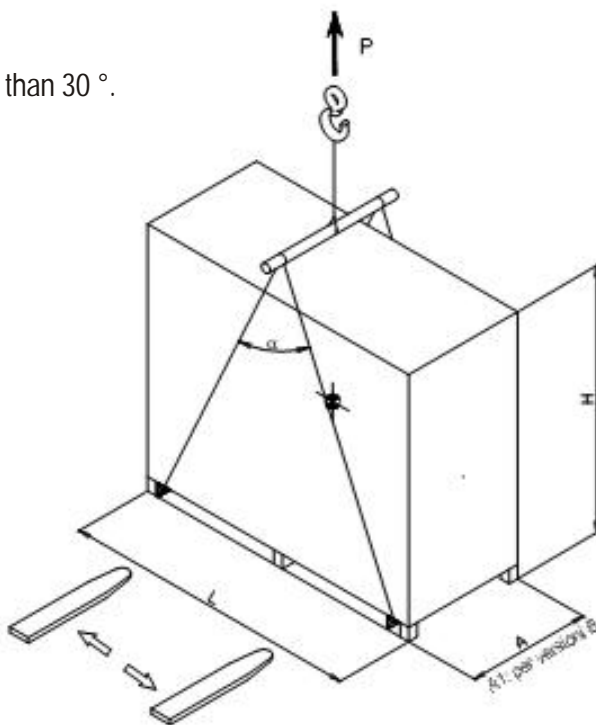
The weight of some models is unbalanced: check the unit stability before starting to handle it.

For any unit handling, follow what shown in (Picture 5).

In case the fork lift is employed, the forks must be spaced out to the maximum allowed by the pallet size. In case the machine is moved by means of a crane, it is important to avoid that cables and belts exert a too high tractive effort on the packing that might damage it.



Angle α must not be greater than 30° .



Picture 5

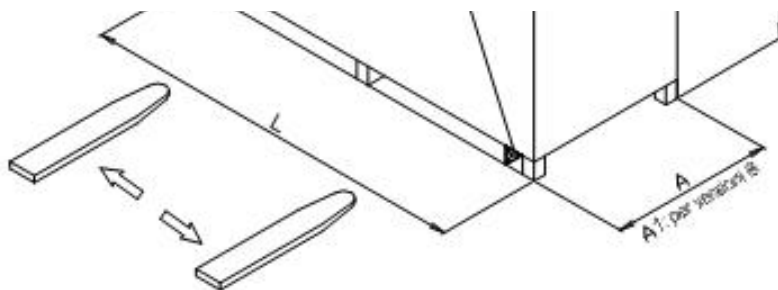


Table 3 shows the overall dimensions of the different models packaging included.

The overall dimensions of the units packaging included are indicated in the table here below

TABLE 3

Model	Steel frame size	H	L	A	A1
60 - 80	L1	1225	540	610	760
120	L2		690		
170	L3		990		
190 - 240 - 280	M1	2145	1290	710	860
320 - 380	M2		1600		
470	M3		1770	850	1000
550	M4		2030		
640 - 740	M5		2430		
800 - 870 - 1000	M6		3000		

The lifting weight P of the unit is the result of the weight as indicated on the data sheet attached to the unit plus the packaging weight as shown in the following table.

TABLE 4

STEEL FRAME SIZE	L1	L2	L3	M1	M2	M3	M4	M5	M6
Packing weight (kg)	10	12	15	18	22	24	27	32	40

4.4 Arrangements and placing

The installation of the machine is under the responsibility of the installer who must supervise the execution operations. The execution of a correct installation presupposes that a plan has been drawn up by an expert and that is carried out by skilled and trained technicians.

In the following paragraphs there are some tips and information to keep in mind when planning and executing the machine installation.

 The unit installation must comply with local existing laws.

Before placing the unit, the following points must be checked:

- ∅ Connections for cooling, electrical, hydraulic and condensate drain circuits must be done;
- ∅ Enough room must be left around the unit to allow routine maintenance as shown in Picture 6 by the dashed area in front of the machine. It is necessary to keep some free room on the right and /or left side of the unit in case option PR is installed or if connections are on the unit sides. If possible, also leave the necessary free lateral room for special maintenance, such as heat exchanger and fans replacement. These areas are shown in Picture 6 as a dashed area on the right and on the left of the unit, while their dimensions are indicated in Table 5;
- ∅ The floor where the machine is positioned can bear the total weight of the unit under normal operation.

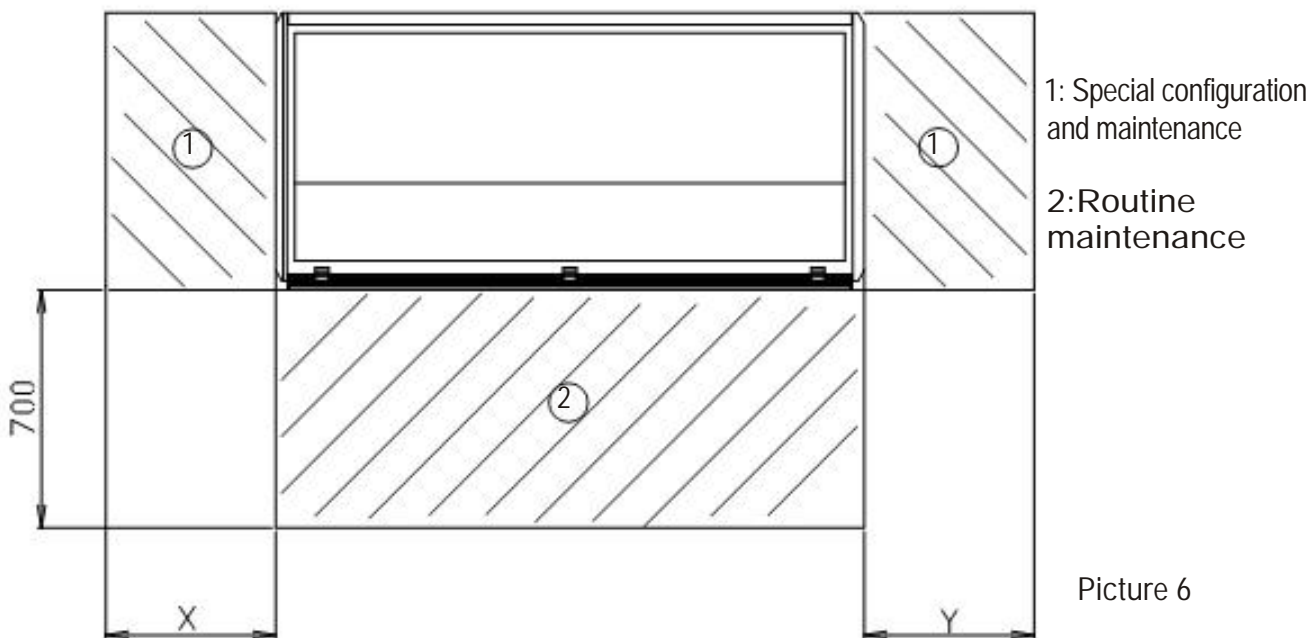


TABLE 5

	500 mm	1000 mm
X	- left hand connections - PR option on the left	- fans replacement M5-M6 U/V/B/D
Y	- right hand connections - PR option on the right - B version (air filters extraction)	- fans replacement L1-M4 U/V/B/D

Before starting to handle the unit to position it, it is necessary to identify the best way to arrive to the place, taking into consideration the unit overall dimensions and weight, the available lifting equipment and any optional accessory dimensions. All units described in this manual do not need any special foundation, since they can be simply laid down on the chosen surface or arranged on a base frame (option) just placing a rubber protective plate underneath.

Make sure that the hydraulic features of the unit, as described in the attached data sheets, match those required for the undertaken project.

In case of units provided with downflow air discharge, it is necessary to take into account the height of the floating floor because it can greatly influence the unit performance.

In order to avoid high noise level and / or unacceptable reductions of airflow, the height of the floating floor should be never inferior than the unit width.

Make sure that the value of the pressure drop of the air distribution system is not higher than the unit available pressure in its standard configuration. In case of special requirement, higher levels of available pressure are available as an optional.

Make sure that the number and the characteristics of the air suction and distribution grids are suitable for the unit airflow capacity.

For the installation of any spare accessory, strictly follow the instructions attached to each of them.

4.5 Hydraulic connections

The units are designed to be connected to a distribution system of cooled water. The piping installation must be carried out by a skilled technician.

The piping path must be carried out in order to limit as much as possible the pressure drop in the circuit. In any case, the circulating pump for cooled water must be able to deliver a suitable water flow capacity with the necessary available pressure in order to overcome possible pressure drops of the system in any operating conditions. Pipes must be adequately supported by brackets and allow easy access for installation and inspection. All materials used for the realisation of the circuit must stand a nominal pressure not lower than PN 6. The cooled water circuit must be insulated with closed-cells material whose heat insulation and steam resistance features are appropriate to the unit operating conditions.

When performing the installation, make sure all necessary measures to prevent dirt and solid particles from entering the pipes are taken.

Once pipelines and the unit installation are completed, the circuit must be leak tested to detect any possible leakage to be repaired before the unit startup.



Do not exceed 6 bar during the leak test.

The connection of the unit to the cooled water circuit must be performed using the proper areas as indicated in Picture 7. The diameters of the unit hydraulic connections are listed in Tab. 6.

It is recommended the installation of a water filter with grid not greater than 1 mm on the inlet unit. It is advisable to install a ball check valve on the water inlet and outlet to facilitate any special maintenance operation. It is also recommended to connect the unit to the circuit by means of three-piece joints since they will significantly ease any operation on the hydraulic circuit.



Install air discharge valves in the higher levels of the hydraulic circuit and wherever a gas pocket can be produced and hinder the water circulation.

If an anti-freeze mixture is employed, the consequent changes of the unit cooling capacity and pressure drop must be taken into consideration.



Employ only anti-freeze liquids which are compatible with the materials used both in the unit and in the circuit.

The circuit must be provided with an appropriate pressure holding device (for example an automatic fill group and an expansion vessel) to the operating temperature and the circuit size.



The circuit realisation must comply with local existing laws.

Picture 7

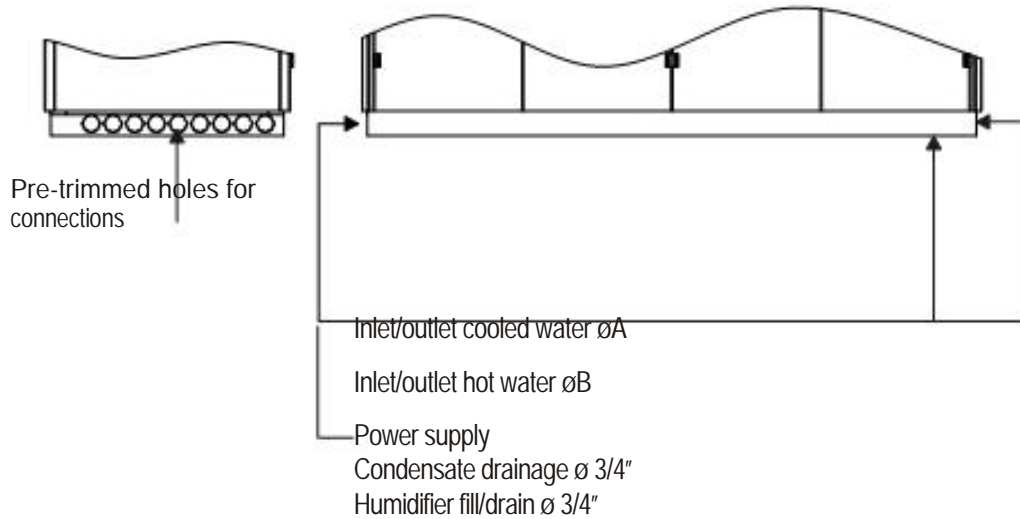



TABLE 6

UV.	IN / OUT Cooled water	IN / OUT Hot water
	Ø A	Ø B
60	3/4"	3/4"
80		
120	1"	
170		
190	1" ¼	
240		
280		
320		
380	1" ½	
470		
550	2"	
640		
740	2" ½	1"
800		
870		
1000		

4.6 Condensate drainage connection

The air conditioning unit is provided with a stainless steel tank collecting the condensate generated during the dehumidification phase. The tank must be connected to the drainage collector by means of a flexible pipe having internal diameter of 27 mm. The drainage line must have a slight slope (about 1%) toward the outlet direction.

 To guarantee a correct condensate drainage, it is necessary to set up a siphon of at least 20 mm in the flexible pipe before doing the connection to the drainage collector.

4.7 Humidifier connections

The humidifier can be supplied on request (Picture 8). The unit is designed to be supplied with water, preferably coming from city water system, through pipelines equipped with a shut-off valve. The unit must be also connected to a drainage line in order to outflow possible condensate and overflow water. Even if the humidifier is provided with a filter, the supply water must be free from any impurity bigger than 100 microns.



Do not use demineralised water (suggested hardness between 15-30° F and conductivity between 125-1250 µSv/cm). The supply water pressure must range between 0,8 and 7 bar.



Picture 8

4.8 Fresh air intake connection

The fresh air intake optional is installed inside the conditioning unit on the left side or, on demand, on the right side. The new air intake duct is connected to the nearest external intake through a coupling of 100 mm diameter, mounted on the left side panel of the unit (Picture 9a).

The fresh air intake optional is equipped with a filter easily removable for cleaning purpose (Picture 9b).



Picture 9a



Picture 9b

4.9 Electric connections

Check the electric circuits have not been damaged during transportation. Check all terminals screws are tight. Make sure the power tension and frequency match the same data as specified on the unit identification tag.



Check the attached wiring diagram.

4.9.1 Power supply connection (Picture 10)

The unit can be powered with a 5-pole cable (3 poles+N+ T). The standard power supply tension is 400 V/3f/50Hz; on request, it is also possible to supply units with arrangements for special power supply tension (check the identification tag and the wiring diagram). Connect the phases and the neutral to the terminals of the main switch and the earth wire to its corresponding terminal (PE). Use a power supply cable of adequate cross section and of moderate length to avoid voltage drops.

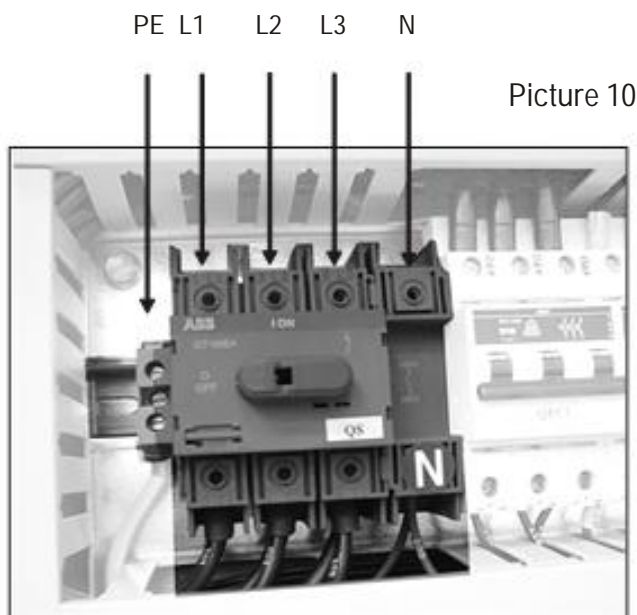
Protect the power supply cable by means of an automatic switch of appropriate size and features. The cross section of the power supply cable and the size of the automatic switch can be found on Table 7, where it is indicated the main switch size according to different unit models and configurations.

4.9.2 User's terminal board connection

A user terminal board (Picture 11) is available with free contacts designed for:

- Ø Generic alarm state (1);
- Ø Unit remote ON/OFF (2).

For the exact correspondence of the terminal numbers, check the wiring diagram.



Picture 10

Picture 11



TABLE 7 - Automatic switch size and power cable cross section

Model	STD	H	RE
60 - 80 - 120	16A 4P	25A 4P	25A 4P
170	16A 4P	25A 4P	40A 4P
190 - 240 - 280	16A 4P	32A 4P	50A 4P
320 - 380	20A 4P	32A 4P	63A 4P
470 - 550	20A 4P	50A 4P	80A 4P
640 - 740	25A 4P		100A 4P
800 - 870 - 1000			

Key:

STD: standard unit (without humidifier and electric heater)


H: Unit with humidifier (without electric heater)

RE: unit with electric heater or with both electric heater and humidifier

4.10 Hydraulic circuit filling

Once the hydraulic circuit and the unit connection are performed, it is necessary to fill the circuit. Open all the air discharge valves on the circuit.

Connect the circuit to a water supply system, possibly in a permanent way, by means of an automatic fill group provided with a manometer and a non-return valve.


 If the circuit works with an anti-freeze mixture, fill the circuit with an appropriate quantity of pure anti-freeze mixture according to the system size and to the anti-freeze concentration to get.

Start filling the system with water.

Check all the air discharge valves present on the system and shut them when water, instead of air, starts to go out.

Once all valves are closed, go on filling the system with water until a pressure between 1,5 and 3,5 bar is reached.

In case filling is done manually, stop the water charge and start the circulating pumps so that any presence of air can be gathered in the top points where air discharge valves are present. After two operating hours, stop the pumps and discharge the air by means of the air discharge valves. Charge more water to bring pressure back to its original value. Repeat the operation until no air goes out from the air discharge valves.

 Make sure the water pressure in the system always ranges between 1,5 and 3,5 bar.

5 - OPERATION

5.1 First startup

Before starting the unit, the following simple operations must be carried out:

- Hydraulic circuit

Check the hydraulic circuit is completely air free and the water flow capacity and temperature are correct.

- Startup

Perform all operations as described in par. 4.9 'Electric connections' and then follow the instructions here below:



Turn the main switch to ON position.



Start the unit pressing the ON/OFF button on the microprocessor keyboard;

Check if the fans rotation is right. In case the rotation is reversed and fans are 3-phase, two out of three phases must be inverted in the terminals of the main switch.

Once the unit is started, after a short period needed to the microprocessor for an auto-test, the unit electric fans will start to rotate. At this point, all system components will start working automatically according to the selected and detected thermal and humidity parameters.

To stop the air conditioning unit, push the ON/OFF button on the microprocessor keyboard.

If the unit should not work for more than 24 hours, turn the main switch to OFF position

- Setup

The setup must be performed when the unit is operating in conditions as close as possible to the nominal ones.

Make sure:

- Ø The thermal load is adequate;
- Ø Doors and windows are closed;
- Ø Surrounding spaces are clean.

- Microprocessor setting

Make sure the desired thermal and humidity parameters are set on the microprocessor.

If the preset parameters need to be changed, proceed as described in the microprocessor manual (see attachment).

Standard units are designed to work with room temperature between 22 and 27 °C (50% relative humidity).



- Steam production setting (unit with humidifier):

Steam production must not exceed 60 - 70% of humidifier maximum capacity in order to guarantee a long operating life of the humidifier.

To set and modify the operating parameters, check the humidifier manual (here attached).

TABLE 8: Main electric components (see attached wiring diagram)

MODEL UV.U/ UV.D	STEEL FRAME TYPE	STANDARD FANS	STANDARD FANS	OPTIONAL AA	FUT (10X38)
		KMV	QMV	FUAA	
60 - 80	L1	9A	NO	500mA glass	2A 2P
120	L2	9A	NO	500mA galss	2A 2P
170	L3	9A	NO	500mA glass	2A 2P
190	M1	9A	NO	500mA glass	2A 2P
240	M1	9A	NO	500mA glass	2A 2P
280	M1	9A	NO	500mA glass	2A 2P
320	M2	18A	NO	500mA glass	2A 2P
380	M2	18A	NO	500mA glass	2A 2P
470	M3	18A	NO	500mA glass	2A 2P
550	M4	18A	NO	500mA glass	2A 2P
640	M5	18A	4 - 6,3A	500mA glass	2A 2P
740	M5	18A	4 - 6,3A	500mA glass	2A 2P
800	M6	25A	4 - 6,3A	500mA glass	2A 2P
870	M6	25A	4 - 6,3A	500mA glass	2A 2P
1000	M6	25A	4 - 6,3A	500mA glass	2A 2P

5.2 Fault alarm and display system

The troubleshooting is realised by the microprocessor, which activates an alarm and shows on its display the type of fault occurred (see also the attached microprocessor manual).

Since the alarm state is very often generated by an unfitted electric contact, in case of fault make sure all wiring connections are plugged in the corresponding terminals.

In case of fault, consult the attached microprocessor manual to check the parameters setting has been done properly.

5.3 Troubleshooting

TROUBLE	POSSIBLE CAUSE	CHECK / CORRECTIVE ACTION
1) The unit does not work	A) The electric panel is not powered.	Check presence of electric tension; make sure the main switch is closed.
	B) The auxiliary circuits are not powered.	Check fuse FUT
2) The unit does not start	A) The microprocessor does not start the unit	Check the electric connections to the microprocessor
	B) The external impulse to the microprocessor fails	Check the remote ON/OFF contact is closed
3) Room temperature too high (high temperature alarm signal)	A) The unit does not work	See trouble 2
	B) The control system setting is not correct	Check the setting of the control system
	C) The air flow capacity is too low	See trouble 6
	D) The 3-way valve does not work	See trouble 7
	E) The cooled water capacity is not sufficient	1) Check the circulating pump operation 2) Make sure the circulating pump features are appropriate for the system requirements 3) Check for unexpected pressure drop in the system 4) Make sure the water filter is clean
	F) The control system does not work	Consult the attached Microprocessor manual
	G) Thermal load higher than estimated	Check the room thermal load value.
4) Room temperature too low (low temperature alarm signal)	A) The control system setting is not correct	Check the setting of the control system.
	B) The heating system does not work (if installed)	See trouble 8
	C) The control system does not work	Consult the attached Microprocessor manual
	D) Thermal loss higher than estimate	Check the thermal loss value
5) Room humidity too high (High room humidity alarm) (if the humidity control is installed)	A) The control system setting is not correct	Check the setting of the control system
	B) Latent load higher than estimated	Check the room latent load value
	C) The 3-way valve does not work when in dehumidification phase	See trouble 7
	D) The control system does not work	Consult the attached Microprocessor manual
6) Low or no air flow (flow or fans alarm)	A) Fans are not powered	Check the fans electric circuit.
	B) Clogged filter (filter alarm, if installed)	Clean or replace the filter.
	C) Obstruction in the air duct or excess of pressure drop in the air ducts	Check the total pressure drop and compare it with the unit available pressure
	D) Fan heat protection system is activated	Check fan winding resistance; after reset, check tension and electric absorption
7) The 3-way valve does not work	A) The control system does not work	Consult the attached Microprocessor manual
	B) The valve servomotor does not work	Check electric connections and replace the servomotor, if defective
	C) The valve is mechanically stuck	Try to loose the valve and replace it if needed
8) The electric heater or the heat coil do not work (if installed)	A) The safety thermostat is activated	1) the air flow capacity is too low: see trouble 6. 2) check the safety thermostat and replace it if needed
	B) Fuses are activated	Replace damaged fuses
	C) The contactor is not working	Check the contacts and the coil.
9) Alarm of any probe	The probe corresponding to the alarm code is defective or disconnected	Check the connection of the probe and make sure it works; if it is defective replace it

5.4 Routine maintenance

	Monthly	Quarterly	Annual
Air filter cleaning	X		
Condensate tank cleaning		X	
Humidifier cylinder cleaning		X	
Fans noise level check		X	
Electric connection tightening check		X	
Contactors status check		X	
Check of duct insulation status			X
Water flow check	X		
Electric absorption check		X	
General unit conditions check			X
Probes setting check			X
Set parameter values check		X	
Electric protections operation check		X	
3-way valve operation check			X
Check of air presence in the hydraulic circuit	X		

6 - DISMANTLING

When the unit has to be dismantled, the unit components must be sorted and sent to a waste management facility. This operation must be performed by waste collection companies in compliance with local environmental laws. Usually the unit does not contain hazardous liquids to people, things or environment as it works by water.



If the unit has worked with an anti-freeze mixture, carefully collect the fluid contained in the unit and deliver it to an authorized company for disposal.



Do not release the anti-freeze mixture contained in the unit into the environment.

USE AND MAINTENANCE MANUAL



STEAM HUMIDIFIER

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1 - INTRODUCTION

The humidifier described in this manual is an immersed electrode steam humidifier and it is equipped with the most advanced microprocessor technology.

The operation is completely automatic and it can be employed in any geographical area since it is able to adapt its functioning according to the chemical - physical characteristics of water, provided that water is drinkable and it is not demineralised.

1.1 Principle of operation

By giving an electric tension to two metal electrodes immersed in water, an electric current is generated and it heats water up to make it boil. As a matter of fact, as long as water contains a minimum quantity of salts, it acts as an electric heater which closes the circuit between two electrodes.

1.2 Operation and unit components

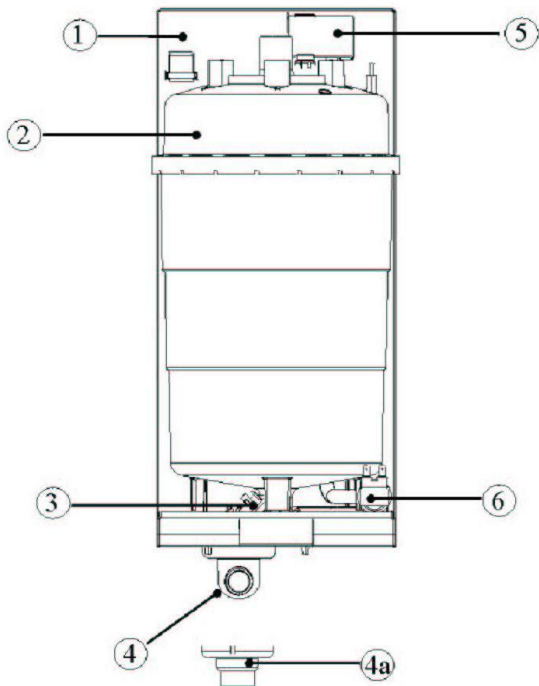
When a steam production is needed, the electronic control sends an electric tension to the electrodes immersed in the water contained in the boiler, by closing the appropriate contactor. Steam production is controlled with an amperometric transformer (TAM) which measures the energy transferred from water.

When water level decreases and, consequently, energy goes below the set parameter, the fill electrovalve is open to allow water to reach the fill tank. From here, water flows inside the cylinder by gravity.

The two small electrodes located on the top of the cylinder monitor that the water level does not exceed the maximum value. As a matter of fact, beyond this level the water is drained by means of the overflow pipe into the fill tank.

The other two electrodes placed on the fill tank measure the supply water conductivity. This is useful for the electronic control in order to optimize the humidifier operation following the chemical characteristics of water.

The fill electrovalve is activated from the control as much frequently is needed depending on the supply water characteristics in order to maintain the optimal saline concentration inside the cylinder.



n.	description
1	Supporting frame
2	Cylinder
3	Draining electrovalve
4	Exhaust pipe fitting swinging at 90°
4a	Flat Pipe fitting (equipped)
5	Fill tank + Conductivity meter
6	Supply electrovalve

2 - USE

2.1 Main warnings



The electric components contained in the unit are powered.



Only qualified and trained personnel must carry out any operations on the unit.

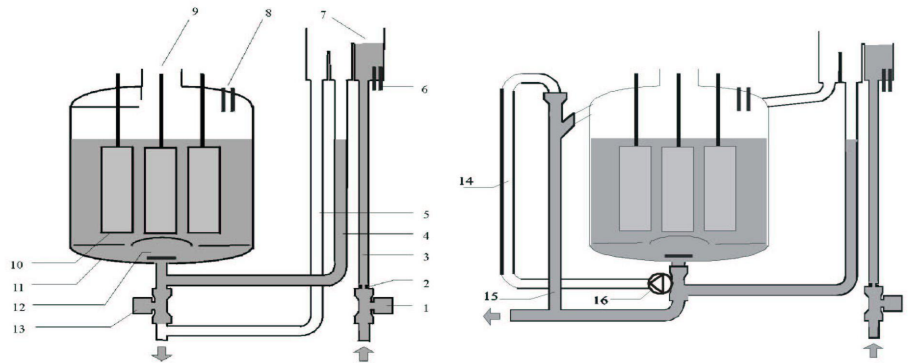


The unit contains hot surfaces, in particular:

∅ The steam cylinder can reach temperatures over 60°C;

∅ The steam produced and therefore the draining pipe, in particular conditions, can reach the temperature of 100°C.

n.	description
1	Supply Electrovalve
2	Flow limiting device
3	Supply Pipe
4	Fill Pipe
5	Overflow pipe
6	Electrodes to measure conductivity
7	Supply tank - overflow
8	High level electrodes
9	Steam outlet
10	Electrodes (2/6 for monophasic models, 3/6 for triphase models)
11	Cylinder case
12	filter
13	Draining Electrovalve
14	Exhaust corrugated pipe
15	Draining Column
16	Exhaust pump



2.2 Supply water characteristics

LIMIT VALUES OF SUPPLY WATERS WITH MEDIUM-HIGH CONDUCTIVITY FOR HUMIDIFIERS WITH IMMERSSED ELECTRODES

Parameter	Unit	Limit
Hydrogenions Activity	pH	-
Specific conductivity at 20°C	°R 20 °C	-
Total dissolved solids	TDS	-
Fixed Residual at 180°C	R ₁₈₀	-
Total hardness	TH	-
Temporary hardness	-	-
Iron + Manganese	-	-
Chlorides	-	-
Silicon Dioxide	-	-
Residual Chloride	-	-
Anhydrite	-	-
Metallic matters	-	-
Solvents, diluents,soaps, lubricants	-	-

LIMITS	
Min.	Max
7	8,5
300	1250
(1)	(1)
(1)	(1)
100(2)	400
60(3)	300
0	0,2
0	30
0	20
0	0,2
0	100
0	0
0	0

(1) Values depending on the specific conductivity; generally speaking: TDS≈ 0,93 ° 20; R₁₈₀≈0,65 ° 20

(2) Not less than 200% of chlorides content in mg/l of Cl

(3) Not less than 300% of chlorides content in mg/l of Cl

LIMIT VALUES OF SUPPLY WATERS WITH MEDIUM-LOW CONDUCTIVITY

FOR HUMIDIFIERS WITH IMMERSSED ELECTRODES

				LIMITS	
				Min.	Max
Hydrogenions Activity	pH	-		7	8,5
Specific conductivity at 20°C	°R 20 °C	-	µS/cm	125	500
Total dissolved solids	TDS	-	mg/l	(1)	(1)
Fixed Residual at 180°C	R ₁₈₀	-	mg/l	(1)	(1)
Total hardness	TH	-	mg/l CaCO ₃	50(2)	250
Temporary hardness		-	mg/l CaCO ₃	30(3)	150
Iron + Manganese		-	mg/l Fe+Mn	0	0,2
Chlorides		-	ppm Cl	0	20
Silicon Dioxide		-	mg/l SiO ₂	0	20
Residual Chloride		-	mg/l Cl	0	0,2
Anhydrite		-	mg/l CaSO ₄	0	60
Metallic matters		-	mg/l	0	0
Solvents, diluents,soaps, lubricants		-	mg/l	0	0

(1) Values depending on the specific conductivity; generally speaking: TDS= 0,93 * ° 20; R₁₈₀= 0,65 * ° 20

(2) Not less than 200% of chlorides content in mg/l of Cl

(3) Not less than 300% of chlorides content in mg/l of Cl

Warning: there exists no reliable relation between hardness and conductivity of water.



Do not treat water with softeners! They can cause electrodes corrosion and generate foam, thus involving troubles of irregular functioning.



It is not advisable:

- Ø To employ well water, industrial water, process water coming from the cooling circuits or contaminated water with chemical or bacteriological substances;
- Ø To employ supply water containing disinfectants or anticorrosion compounds because they are potentially irritant.

2.3 Startup, check and stop



Before the startup, make sure the humidifier is in perfect condition, there are no water leakages and the electric parts are dry.

Do not give power, if the unit is damaged or partially wet!



Once the installation is completed, purge the supply water pipe for about 30 minutes letting water flow directly to the drainage line without entering the humidifier; this will help eliminate any remains or installation debris which could clog the drainage valve and cause foam generation during boiling.



Before starting the unit, it is advisable to eliminate the PE film around the pipe to allow a correct heat exchange (the film is part of the pipe packing)

2.3.1 Preliminary checks

Before starting the humidifier, it is necessary to check the following:


- Ø Hydraulic and electric connections and the steam distribution system must be performed according to the instructions described in this handbook
- Ø The water shut-off valve on humidifier must be opened;
- Ø The line fuses must be installed and they must not be damaged;
- Ø Terminals AB of control CP4 must be jumpered or must be connected to the remote ON/OFF contact and the latter must be closed;
- Ø The steam outlet pipe must not present any choking.


2.3.2 Startup with vacuum cylinder

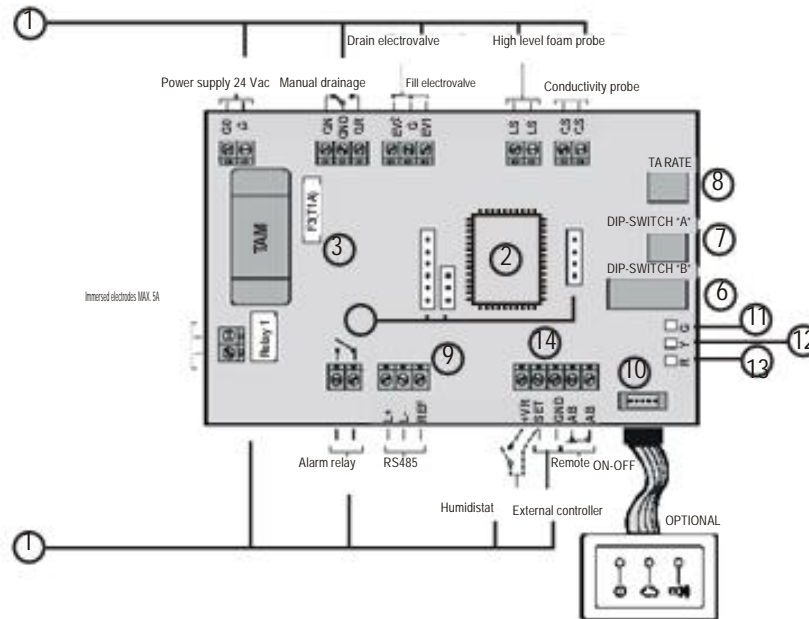
This phase is performed automatically as soon as the humidifier starts: before obtaining the nominal steam production, it is necessary to wait for an adequate period of time which mainly depends on the supply water conductivity and it may also take a few hours.

3 - SETTING

The control CP4 is a microprocessor electronic card which is installed on the unit electric board when Emiro microprocessor is used.

 CP4 card is not present in case Emiplus microprocessor is installed, since CP4 functions are already integrated in Emiplus software. In this case, for humidifier setting, refer to the attached microprocessor manual.

 The unit contains powered electric parts.
Before acceding to the inside parts, disconnect the unit from the power supply.



3.1 Electric parts

1 - Connection terminals: see the attached wiring diagram

2 - Configuration microprocessor: it is the component where the humidifier operating data are memorized.

3 - 2A fuses.

4 - TAM: amperometric transformer. Its function is to detect the humidifier absorbed current during the steam production phase.

5 - Combs: see the attached wiring diagram

3.2 Dip-switch

6 - Dip-switch B: it is used for auxiliary functions and to set the automatic drainage time. It is set up from the manufacturer.

7 - Dip-switch A: it is used to set the alarm relay (usually closed) and the maximum steam production. It is set up from the manufacturer.

8 - TA rate: used to set TAM transformation rate. It is set up from the manufacturer.

3.3 Connectors

9 - It allows the connection to the serial interface RS485.

10 - It allows the connection to the remote display (if present)

3.4 Led

11 - Green: is switched on when the electronic card is powered correctly.

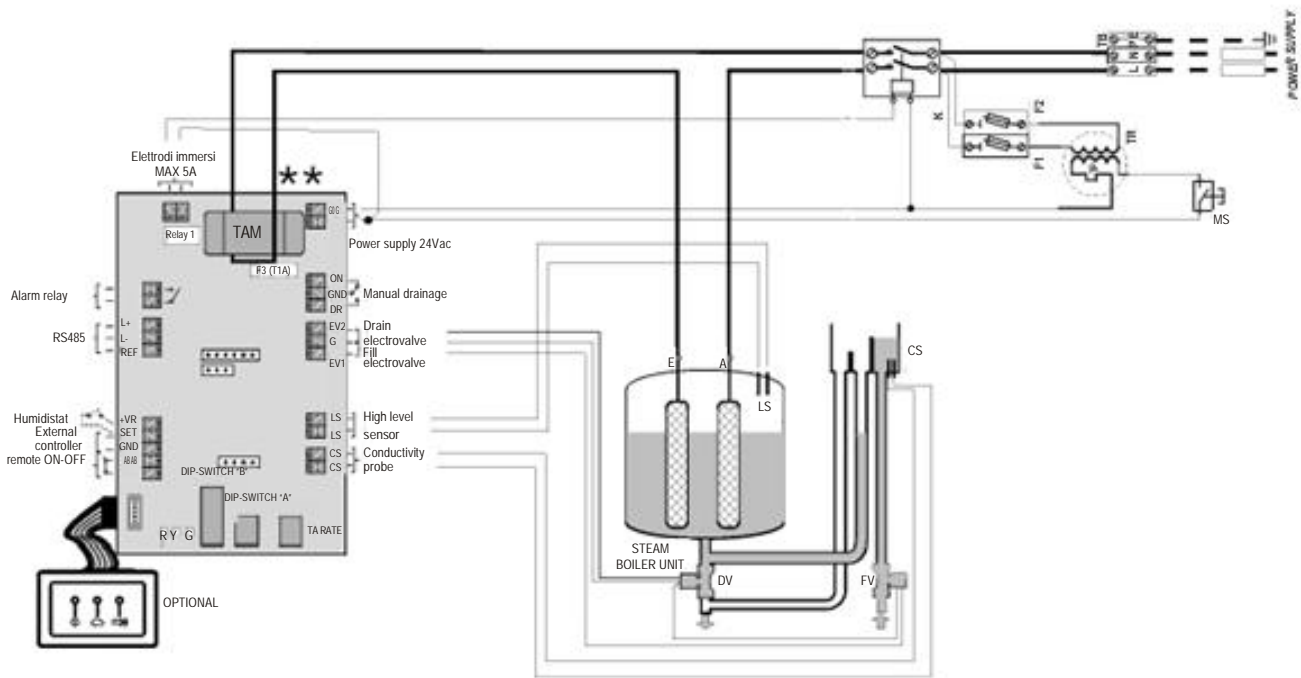
12 - Yellow: it is switched off when steam is not produced, while it is permanently switched on when at 100% of its nominal production. During the transitory production it winks at a frequency of 2 Hz. Once the nominal production is achieved it winks at a frequency of 0,5 Hz. A series of pulses is generated: each train of pulses is separated from the following train by means of a 3-seconds pause: by counting the number of pulses it is possible to determine the steam production in that moment.

13 - Red: in absence of alarms it is off; according to the type of alarm activated it emits short flashings (frequency of 2 Hz) or long flashings (frequency of 0,5 Hz); all trains of pulses are separated one from the other by a 3-seconds pause.

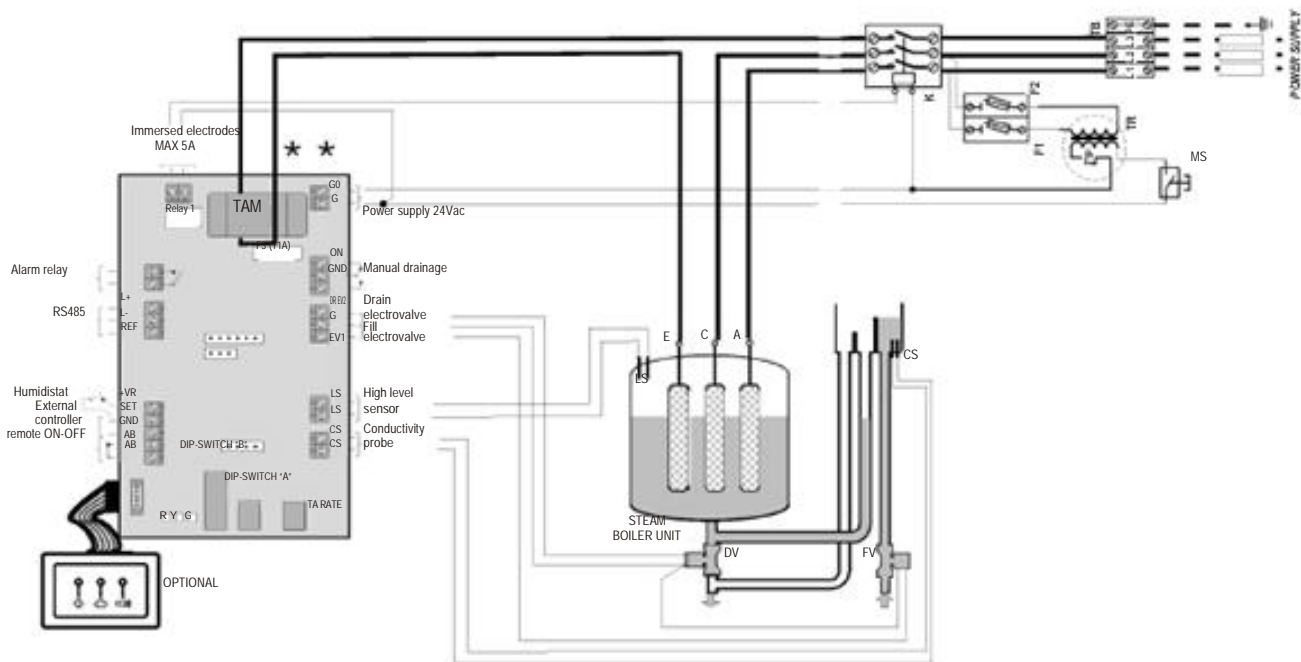
3.5 Digital terminals

14 - AB - AB remote ON-OFF activation.

3.6 Wiring diagram for single phase humidifier



3.7 Wiring diagram for three-phase humidifier



3.8 Types of alarm

TYPE	DESCRIPTION	RESTART (if the cause of the alarm has been corrected)	RED LED	ALARM RELAY
Stop	The card stops the humidifier	Manual: to restart, switch on and switch off the card	Alarm codes: each code is displayed in sequence.	SPST relay, usually closed according to DIP A setting. The relay action is cumulative: <ul style="list-style-type: none"> • The contact is open in presence of at least 1 alarm and AB-AB closed; • the contact is closed when: <ul style="list-style-type: none"> - all alarm causes have been eliminated; - all alarms have been cancelled, both manually and automatically, or when AB-AB is open**.
Disabled	The card stops the humidifier	- Automatic - Manual: to restart, switch on and switch off the card or send a reset order via RS485*.	Codes are displayed even if the alarm causes have been eliminated: to cancel the codes display, switch off and then switch on the card or send a reset order via RS485	
Pre - alarm	The card stops the humidifier	automatic		

(*) Check in the following table the automatic-restart alarms and the manual-restart alarms.

(**)Not all alarms are associated to the relay (check the following table)

3.9 Alarms description

Red LED flashings	Description and possible causes	Corrective action	Alarm		
			Type	Reset	Alarm relay
2 short flashings	Overcurrent at the electrodes: 1. water conductivity too high (usually when the unit restarts after a short stop) 2. high water level caused by a drain valve malfunction 3. high water level caused by a fill valve leakage 4. electrodes malfunction	1. drain some water and re-start 2. check the discharge valve operates properly 3. check possible leakage of the fill valve when not energised	stop	manual	active
3 short flashings	No current at the electrodes: when the humidifier is on, no steam is produced	1. check the external control signal: type (V or mA)? Value?Connections? 2. switch off the unit and disconnect the internal connections	stop	manual	active
4 short flashings	Internal memory error	1. download the appropriate configuration by means of Humiset 2. if the problem persists, contact CAREL customer service	stop	manual	active
5 short flashings	High supply water conductivity	1. check the threshold set with the parameter via RS485 2. switch off the unit and clean the conductivity probe electrodes 3. if the problem persists, change the supply water source or install a suitable treatment system (demineralisation, even only partially) N.B.: the problem cannot be solved by softening the supply water .	stop	manual	active
2 long flashings	Cylinder depleted	Perform the maintenance and/or replace the cylinder	signal	manual	Not affected
3 long flashings	No supply water	1. make sure the charge pipe to the humidifier and the internal pipe are not blocked or bended and supply pressure is sufficient (0.1/0.8 MPa) 2. Check the fill valve operates properly 3. check the counter pressure in steam outlet hose does not exceed the maximum limit, preventing the supply water from flowing into the cylinder by gravity 4. check the steam outlet hose is not clogged and there is no condensate	disabled	manual	active
4 long flashings	Excessive reduction in production	Cylinder completely depleted or excessive foam. Carry out the cylinder maintenance.	disabled	manual	active
5 long flashings	Drain malfunctioning	Check the drain circuit and the correct operation of the drain valve	disabled	manual	active
6 long flashings	User parameters error	1. download the appropriate configuration by means of Humiset 2. if the problem persists, contact CAREL customer service	stop	manual	active
7 long flashings	Pre-alarm of high water supply conductivity	1. check the water supply conductivity 2. check the limit set by parameter b5 via RS485 3. if needed, install an appropriate demineralisation system N.B.: the problem cannot be solved by softening the supply water.	signal	Display, automatic reset	Not affected
8 long flashings	Control signal not correctly connected (only 0/10V)	1. check the connection to the external controller 2. check the setting of parameters A0 and A2 via RS485	Disabled	Alarm: Automatic Display: manual	active
9 long flashings	Full cylinder with no production	With the humidifier OFF: 1. check between the fill valve filaments and the condensate return pipe 2. check the level sensors are clean	disabled	manual	active
10 long flashings	Foam	Foam is generally caused by surface-active agents container in water (lubricants, solvents, detergents, agents for water treatment, softeners) or by an excessive concentration of dissolved salts: 1. drain and clean the supply water pipes 2. clean the cylinder 3. check the presence of softeners (in this case employ a different type of supply water or reduce the softening)	signal	Display, manual reset	Not affected
11 long flashings	Cylinder almost completely depleted	Carry out the maintenance and/or replace the cylinder	Signal	Display, manual reset	Not affected
RS 485	Hour counter error	Switch off the humidifier and make sure there is no defective electric connection or damage, then clear the hour counter via RS485	signal	Only via RS485	Not affected

4 - GENERAL MAINTENANCE



The routine maintenance operations refer to the steam cylinder replacement and to the yearly unit cleaning.



Before starting any maintenance operation, disconnect the humidifier power supply.

4.1 Steam cylinder replacement

This operation is necessary when the electrodes active surface is so encrusted as to impede a sufficient current flow. When this situation occurs, an alarm is activated from the control card.



The cylinder might be hot. Leave it cool down before touching it or wear gauntlets.

How often this operation must be done depends on the supply water quality and on the operating conditions. Anyway, it is recommended to replace the cylinder at least every 5 years or after 10,000 hours of operation.

To replace the cylinder, it is necessary to:

- Ø Drain completely the water contained into the cylinder;
- Ø Disconnect the unit power supply by means of the main switch or the line fuses;
- Ø Take the steam pipe off the cylinder;
- Ø Disconnect the electric connections on main electrodes and take the plugs off the level electrodes;
- Ø Unblock the cylinder from the fixing system and lift it to remove it;
- Ø Install the new cylinder on the humidifier, performing the previous operations in reverse order.

4.2 Periodical checks

After one hour of operation:

- Ø Make sure there is no significant water leakage.

Every 15 days or no more than 300 operating hours:

- Ø Check operation, the absence of significant water leaks, the general humidifier conditions. Make sure during operation there is no arc or spark between the electrodes.

Every three months or no more than 1000 operating hours:

- Ø Check operation, the absence of significant water leaks, and replace the cylinder if necessary.



In case of leakage, disconnect the humidifier from the power supply before touching the cylinder.

4.3 Unit cleaning

The unit must be checked and cleaned yearly. It is advisable to do it in summer when the unit stops working.



Do not employ detergents or solvents to clean plastic components.



Descaling washings can be carried out with a solution containing 20% of vinegar or acetic acid, then rinse with water.

After taking the boiler cylinder off, the following operations must be performed:

- Ø After disconnecting the wirings and the pipes, remove the fill solenoid valve and check if the inlet filter needs any cleaning. If needed, wash the filter with water and a soft brush.
- Ø Remove the drain pump and check there are no deposits in the cylinder connection and remove, if it is the case, the impurities. Make sure the O-ring seal is not damaged or cracked and replace it if necessary.
- Ø Disconnect the drain valve from the power supply, unscrew the collector, remove the coil and dismantle the valve body, remove any impurities and rinse with water.
- Ø Make sure there are no clogging up or solid particles in the fill tank and check the conductivity electrodes are clean; remove any impurities and rinse with water.
- Ø Check the inlet supply water pipes, the fill water pipes and the overflow pipes. No debris must be present. If it is the case, remove them and rinse with water.



After replacing or checking the hydraulic parts, check the connections have been carried out correctly. Re-start the unit and execute a number of fill and drain cycles (from 2 to 4). Once the cycles are completed, check there are no water leaks by employing the safety procedure.



When stopping the unit for a certain period, empty the steam cylinder completely.

5 - TROUBLESHOOTING

TROUBLE	POSSIBLE CAUSE	CORRECTIVE ACTION
Humidifier cannot start	No power supply	check the protection upstream the humidifier and check if there is power supply
	Controller connectors are not plugged correctly	make sure the connectors are plugged properly in the terminal board
	Fuses interrupted	check fuses F1/F2/F3
	Damaged transformer	check that on secondary side of transformer there are 24 VAC
Humidifier does not work	Remote ON/OFF contact open (relay/terminals AB- AB) on control CP4	close ON/OFF contacts (relay/terminals AB- AB) on control CP4
	Control signal not compatible with the set signal	make sure the external signal is 0-10V
Humidifier fills water without producing steam	Too high counter pressure into steam outlet hose	check the steam outlet hose has no bending or choking
	Clogged inlet cylinder filter	clean the filter
	Limestone deposit in the fill tank	wash the fill tank
	Malfunctioning of the drain electrovalve	check if any irregular presence of 24 Vac on drain electrovalve and/or replace the drain electrovalve
The line magnetothermic switch is activated	The magnetothermic switch is undersized	make sure the magnetothermic switch is oversized for a current value equivalent to at least 1,5 times the humidifier nominal current value
	Overcurrent at the electrodes	check the drain electrovalve operation, the fill electrovalve tightness when it is not excited, drain some water and restart.
Humidifier wets into the duct	The system is oversized	reduce the steam production set on the electronic card
Humidifier wets the floor	The supply hydraulic circuit or the overflow circuit is leaking	check the entire hydraulic circuit
	The steam outlet hose is not fixed properly to the cylinder	Check the steam outlet hose is well fixed



For troubles reported by the electronic card CP4 alarms, see par. 3.8

6 - DISMANTLING

The unit is made of plastic and metal parts.

Do not release these parts in the environment, but dispose them in compliance with local laws in force

**DICHIARAZIONE CE DI CONFORMITÀ
EC DECLARATION OF CONFORMITY
CE-KONFORMITÄTSERKLÄRUNG
DECLARATION CE DE CONFORMITÉ**

Il Fabbricante

The Manufacturer

Der Hersteller

Le Fabricant

EMICON A.C. S.P.A.
via A. Volta, 49
47014 Meldola (FC)
tel. (+39) 0543/495611
fax. (+39) 0543/495612
e-mail emicon@emiconac.it

DICHIARA

che la macchina

DECLARES

that the machinery

ERKLÄRT

daß die Einheit

DECLARE

que l'unité

Modello

Model

Modell

Modèle

Matricola

Serial Nr.

Seriennr.

N.ro de série

*è conforme a tutte le
disposizioni pertinenti
delle direttive*

2004/108/EC

*in quanto è stata
progettata, costruita e
collaudata in accordo
con le seguenti Norme*

**EN 61000-6-1
EN 61000-6-2
EN 61000-6-3
EN 61000-6-4**

*fulfils all the relevant
provisions of the
directives*

2006/42/EC

*because it has been
designed, manufactured
and tested according to
the following Standards*

**EN ISO 12100-1
EN ISO 12100-2**

*den folgenden
Vorschriften entspricht*

*da sie in Übereinstimmung
mit den folgenden
Normen geplant gebaut
und getestet wurde*

*est conforme aux
dispositions*

2006/95/EC

*étant l' appareil conçu,
réalisé et testé dans le
respect des normes
suivantes*

**EN 60204-1
EN 60335-1
EN 60335-2-40
EN 60439-1**

AUTORIZZA

*a costituire il Fascicolo
Tecnico.*

AUTHORISES

Romano Santucci

via A Volta, 49
47014 Meldola (FC)
*to compile its Technical
File.*

AUTORISIERT

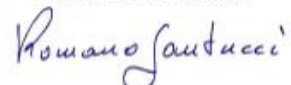
*die technischen
Unterlagen zu erstellen*

AUTORISE

*à réaliser le dossier
technique.*

Meldola, ___/___/_____

Romano Santucci



Technical Manager

Emicon A.C. S.p.a. reserves the right to make changes to its products without any prior notice.



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