

OPERATION AND MAINTENANCE MANUAL



PRECISION AIR CONDITIONING UNIT
WITH DIRECT EXPANSION COIL

ED “MILLENNIUM”

CONTENTS

1	INTRODUCTION	Pag. 2
1.1	Manual content	Pag. 2
1.2	Safety marks	Pag. 2
1.3	Referring standards	Pag. 2
1.4	Warranty	Pag. 3
1.5	Readers of the Manual	Pag. 3
2	MAIN SAFETY RULES	Pag. 3
2.1	Main warnings	Pag. 3
2.2	Allowed use	Pag. 3
2.3	Forbidden use	Pag. 3
2.4	Dangerous areas	Pag. 4
3	GENERAL DESCRIPTION	Pag. 4
3.1	Units description	Pag. 4
3.2	Main components	Pag. 7
3.2.1	Cooling circuits	Pag. 10
3.3	Specification	Pag. 14
3.4	Dimensions	Pag. 14
3.5	Accessories	Pag. 15
4	INSTALLATION	Pag. 17
4.1	Identification tag	Pag. 17
4.2	Receiving and inspection	Pag. 17
4.3	Handling	Pag. 18
4.4	Arrangements and placing	Pag. 19
4.5	Cooling connections (ED.A, ED.M)	Pag. 20
4.6	Hydraulic connections for condensers (ED.W)	Pag. 26
4.7	Condensate drain connection	Pag. 26
4.8	Humidifier connections	Pag. 26
4.9	Renewal air intake connections	Pag. 28
4.10	Electric connection	Pag. 28
4.10.1	Power supply connection	Pag. 29
4.10.2	Remote control connection	Pag. 29
4.10.3	Connections to condenser (ED.A) or to motor-condenser (ED.M)	Pag. 30
4.11	System vacuum and charge execution (ED.A, ED.M)	Pag. 31
4.11.1	General warnings	Pag. 31
4.11.2	Vacuum execution	Pag. 31
4.11.3	Refrigerant charger	Pag. 32
5	OPERATING	Pag. 34
5.1	First startup	Pag. 34
5.1.1	Cooling circuit (ED.A, ED.M)	Pag. 34
5.1.2	Hydraulic circuit	Pag. 34
5.1.3	Startup	Pag. 34
5.1.4	Setup	Pag. 35
5.1.5	Microprocessor setting	Pag. 36
5.1.6	Steam production setting (unit with humidifier)	Pag. 36
5.2	Fault alarm and display system	Pag. 37
5.3	Troubleshooting	Pag. 38
5.4	Routine Maintenance	Pag. 40
5.5	Spare parts list	Pag. 41
5.5.1	Optional spare parts list	Pag. 42
6	DISMANTLING ATTACHMENTS	Pag. 43

The manufacturer reserves the right to modify this manual without any notice.

1 - INTRODUCTION

1.1 Manual content

This handbook, written originally in Italian, was completed in compliance with the “Machinery Directive p 1.7.4. and the harmonized standard UNI EN 292/2. It contains all the necessary information for carrying out transportation, installation, start up, operating, adjustments, maintenance and disposal of the Air Conditioning Machines series ED “Millennium”.

In case of doubt about the correct understanding of these instructions, please contact the manufacturer in order to get accurate explanation.

1.2 Safety marks

Following safety marks are employed in this manual to draw attention to all useful information in order to avoid dangerous situation which can be unsafe and harmful for people, can damage equipment and environment besides breaking the machine.



It means operation and behavior 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.

It is necessary to pay the maximum attention to text paragraphs marked with this symbol.

1.3 Referring standards

The machines of the 'ED' series are designed and manufactured in compliance with the relevant European Directives and satisfy the essential safety requirements as set out in the Directive 89/392 CE, and further amendments, as also attested by the CE mark, which is found on each unit.

The requirements of these air conditioning machines are certified by the manufacturer, who has signed, attached to this manual, the CE Declaration of Conformity.

1.4 Warranty

The manufacturer warrants the Air Conditioning Machines according to what stated on his general sales terms or according to what else explicitly agreed. The manufacturer warranty is void in cases where the guidance of this manual has not been carefully respected.

The manufacturer liability does not cover any damages to people, animals, properties or environment caused by incorrect installation, maintenance errors or misuse of the machine.

It is considered "misuse" of the machine any use not allowed in this operation and maintenance manual.

1.5 Readers of the Manual

This operation and maintenance manual, included all its attachments, is supplied with the described unit. This manual must be kept by the owner of the unit in a proper place. To this end, a plastic bag has been placed on the rear of the upper cover in order to store the manual together with the machine and have it always available for checking instructions.

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

2 - MAIN SAFETY RULES

2.1 Main warnings



It is necessary to pay maximum attention and read carefully this handbook before performing any operation on the unit. Only qualified and trained technicians must perform any operations 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 all package parts (cardboard, plastic bag, staples, etc.), they may be source of dangers.

2.2 Allowed use

The machine has been designed and manufactured for air conditioning of technology centers and therefore it must be used only for this purpose, according to its performing features. All different uses are not allowed and disclaim the manufacturer from any liability for damages caused to environment, people, animals, proprieties, etc.

2.3 Forbidden use

The followings are absolutely forbidden use of the machine :

- ▶ other use than that described in paragraph 2.2;
- ▶ exposed to rainfall;
- ▶ in spaces with high risk of fire or explosion;
- ▶ in environment or atmosphere highly corrosive.



Any installation or maintenance operation must be carried out in compliance with local technical standards.

2.4 Dangerous areas

The machine is completely closed by case panels in order to avoid any accidental contact with its dangerous parts.



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



If the machine is supplied with the cooling circuit already charged with pressure gas, pay the maximum attention in order to avoid accidental release of the gas in the atmosphere.

3 - GENERAL DESCRIPTION

3.1 Unit description

The precision air conditioning units with direct expansion coil, ED Millennium series, have been designed for use and installation in technology centers, in data processing centers, in telephone companies and in every building where special thermic and humidity conditions are required.

The machines have been specially designed for operating either with refrigerant R22 and with ecological gas R407C (k version) or R134a (Ka version).

The machines are suitable for internal installation.

All units are electrically tested (ED.W units undergo also a complete operating test).

The groups are supplied with nitrogen pressure cooling circuit (ED.W units are supplied with refrigerant gas charge) and with anti-freezing oil in the compressor (ED.M units excluded).

The available versions are:

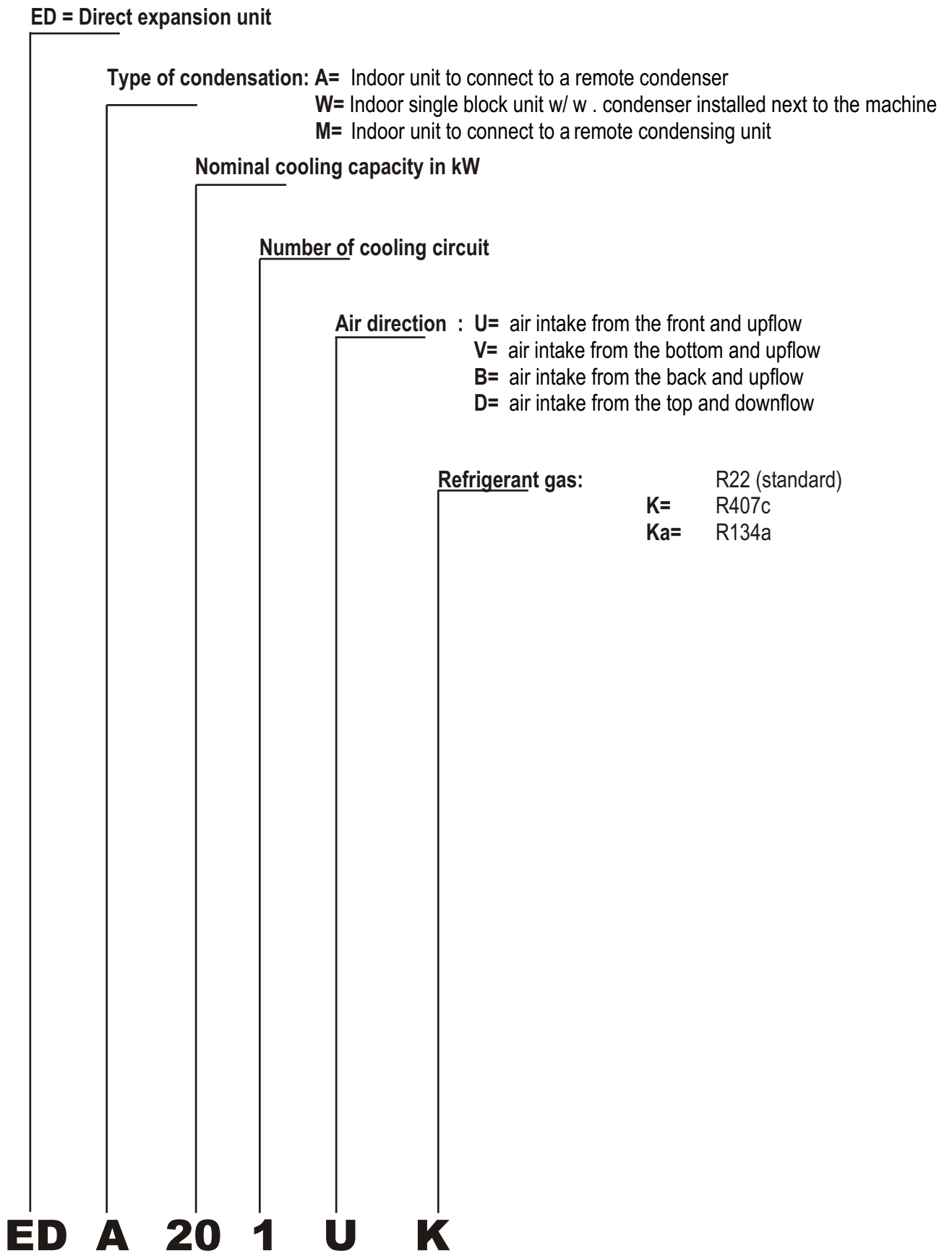
ED...A	Indoor unit to connect to a remote condenser
ED...W	Indoor single block unit with water cooled condenser installed next to the machine
ED...M	Indoor unit to connect to a remote condensing unit (indoor unit with compressors).

All models are available in different configuration according to air intake and discharge:

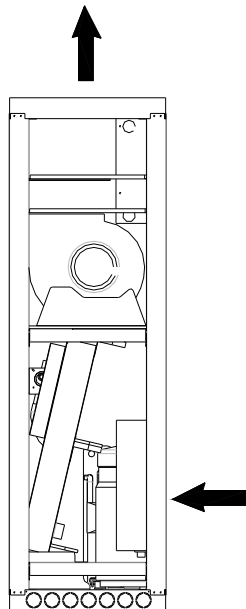
- U:** air intake from the front and upflow;
- V:** air intake from the bottom and upflow;
- B:** air intake from the back and upflow;
- D:** air intake from the top and downflow.

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

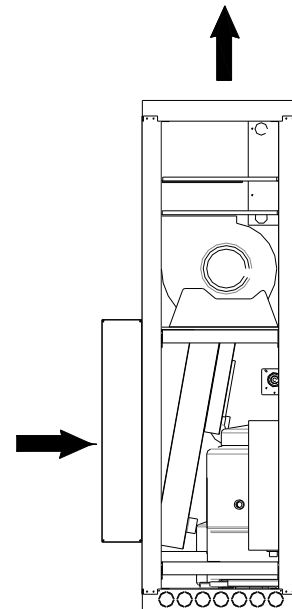
Interpreting key for initials employed to mark the conditioning unit of ED.Millennium series



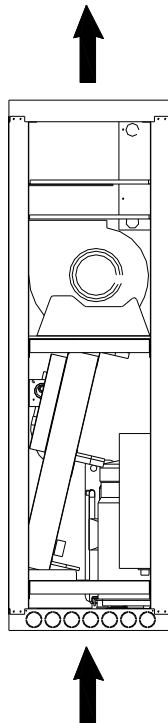
The conditioning units are classified, as shown in the scheme of the preceding page, for the transfer path of the air inside the conditioning machine before being discharged into the working space at the desired temperature. Following pictures show the four different configuration, according to the air distribution system.



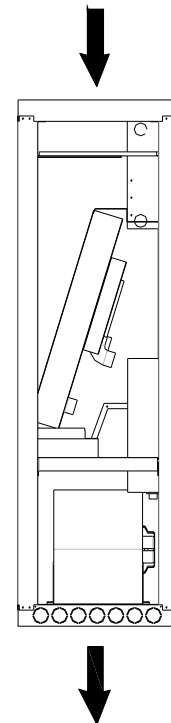
Configuration U: air intake from the front and upflow



Configuration B: air intake from the back and upflow



Configuration V: air intake from the bottom and upflow



Configuration D: air intake from the top and downflow

3.2 Main Components

The ED Millennium series units are made of following main components:

- ▶ The supporting structure frame is made of galvanized steel beams covered with epoxy painted steel plate panels. The panels are provided with internal polyurethane plate covers to reduce noise.
- ▶ ED.A and ED.W versions are equipped with high efficiency scroll compressors mounted on rubber anti-vibration and complete with thermal protection (the compressors installed on models 451D, 601D, 581, 651, 721 and 821 are sealed type with pistons).
- ▶ Centrifugal fans with engine pre -set to a low number of revolutions.
- ▶ Direct expansion cooling coil with copper pipes and aluminum fins.
- ▶ Stainless steel condensate collecting tank.
- ▶ Regenerative air filters with efficiency grade F4.
- ▶ Cooling circuit composed by all required components fit for correct and reliable unit operation, as shown in Par. 3.2.1.
- ▶ The electric board, which comply to CE standard, is provided with main disconnecting switch, amperometric and thermal protection, auxiliary low voltage circuit, connector and control by microprocessor.

ED - D (L Series)

Legend

- 1) Electric board
- 2) Fan
- 3) Direct expansion coil
- 4) Humidifer(optional)
- 5) Compressor(except for ED.M)
- 6) Liquid receiver(ED.W only)
- 7) Water condenser(ED.W only)
- 8) Microprocessor display
- 9) Heating coil battery(optional)
- 10) Air filters

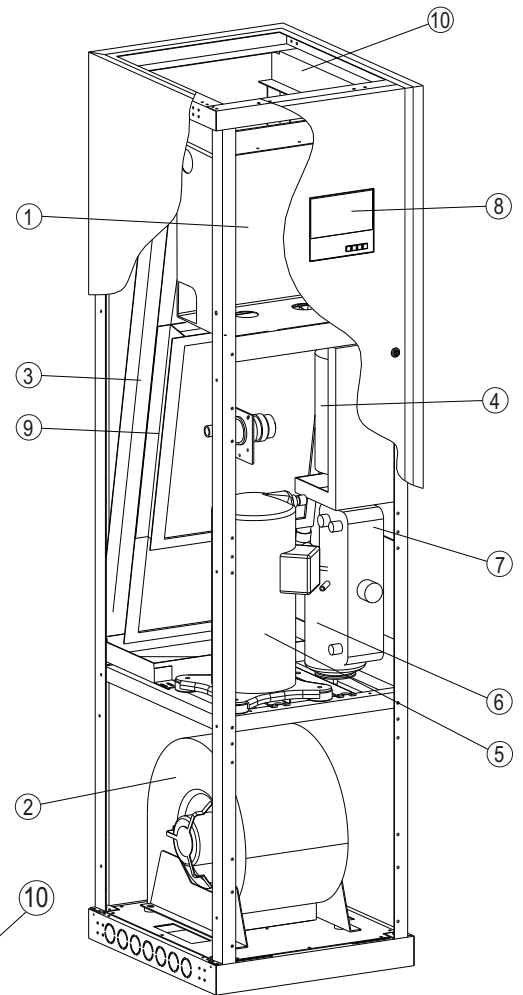
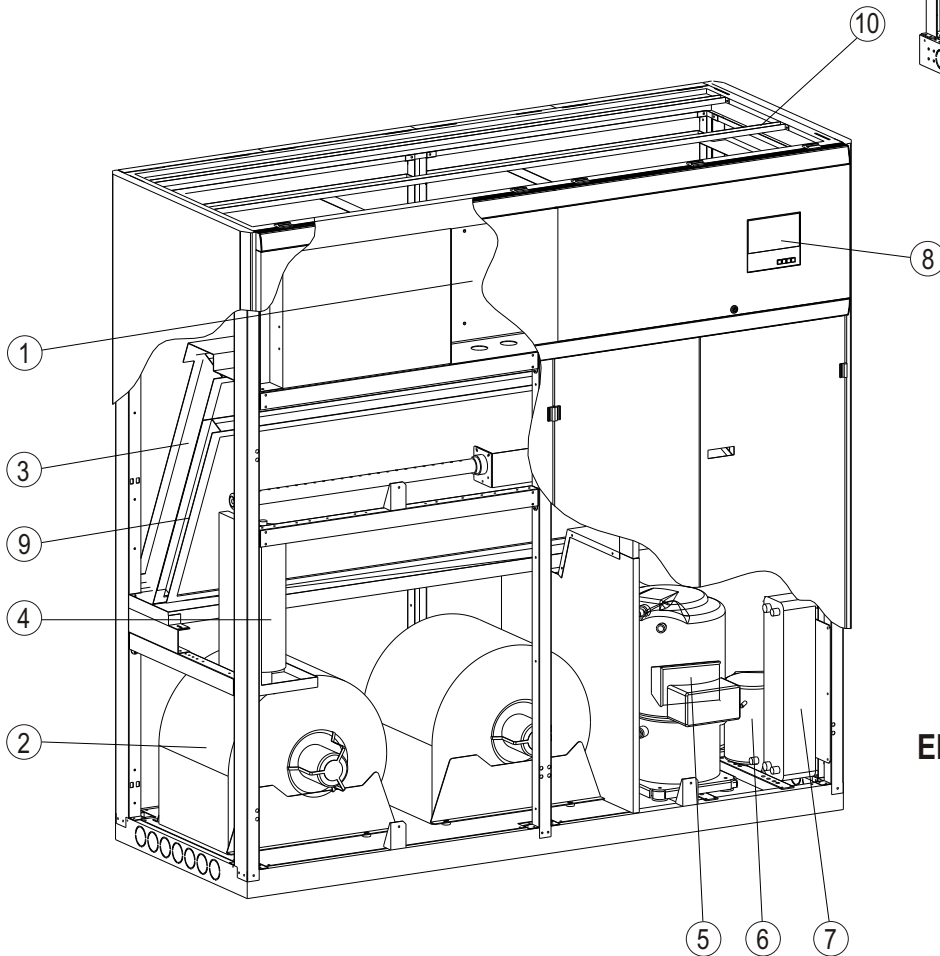


Fig. 1



ED - D (M Series)

ED - U (L Series)

Legend

- 1) Electric board
- 2) Fan
- 3) Direct expansion coil
- 4) Humidifer(optional)
- 5) Compressor(except for ED.M)
- 6) Liquid receiver(ED.W only)
- 7) Water condenser(ED.W only)
- 8) Microprocessor display
- 9) Heating coil battery(optional)
- 10) Air filters

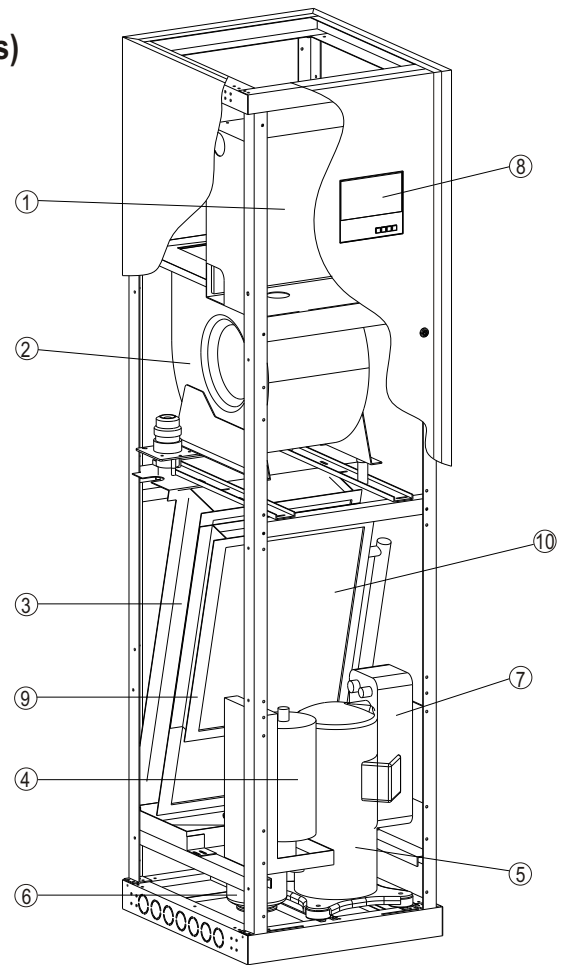
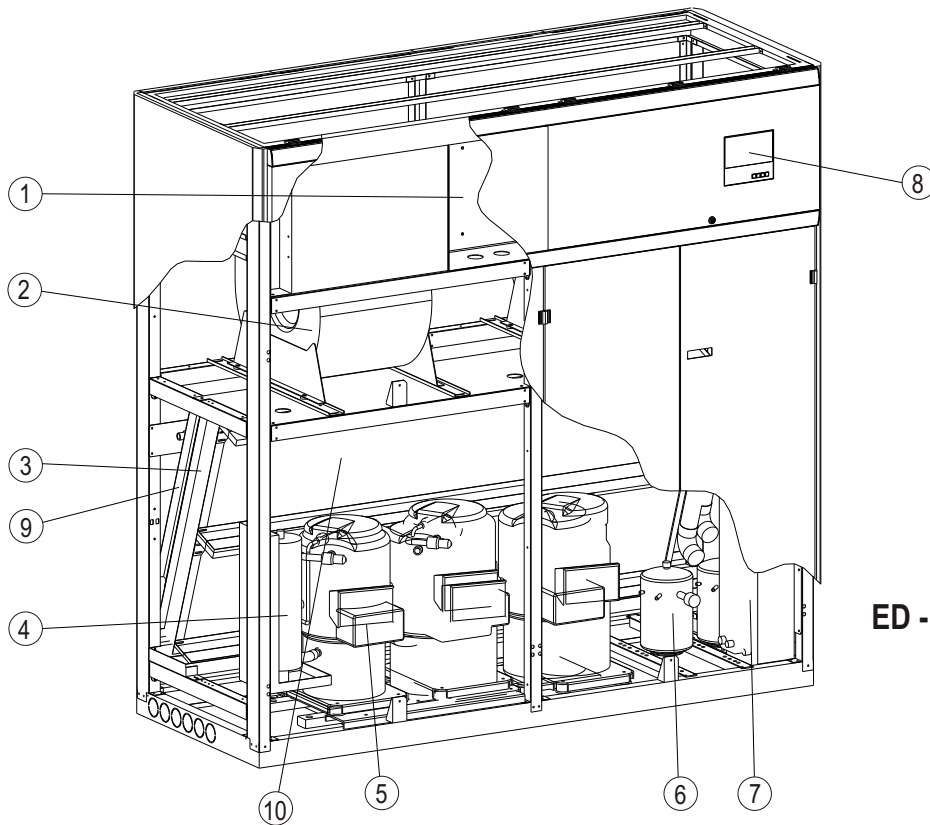


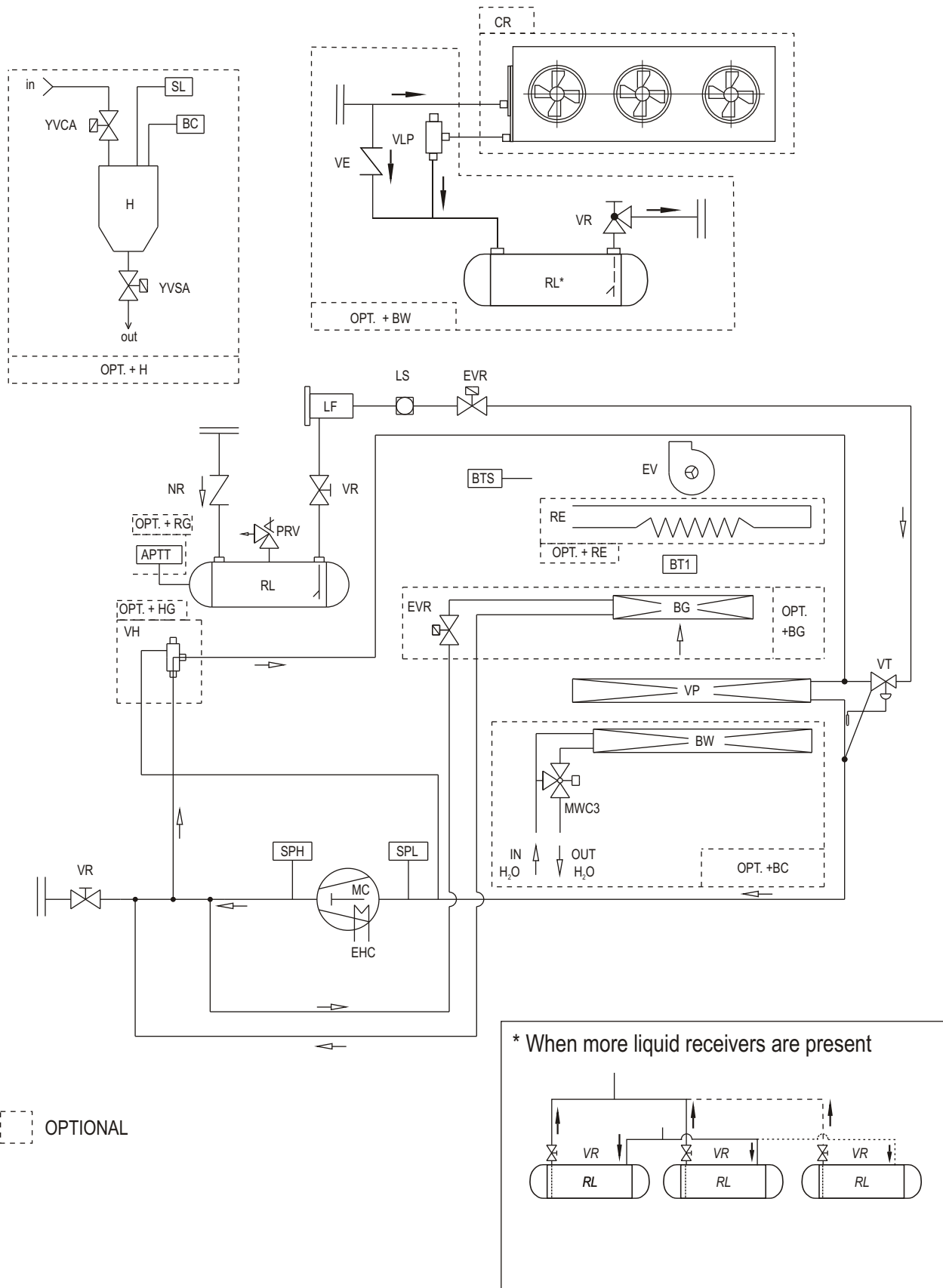
Fig. 2



ED - U (M Series)

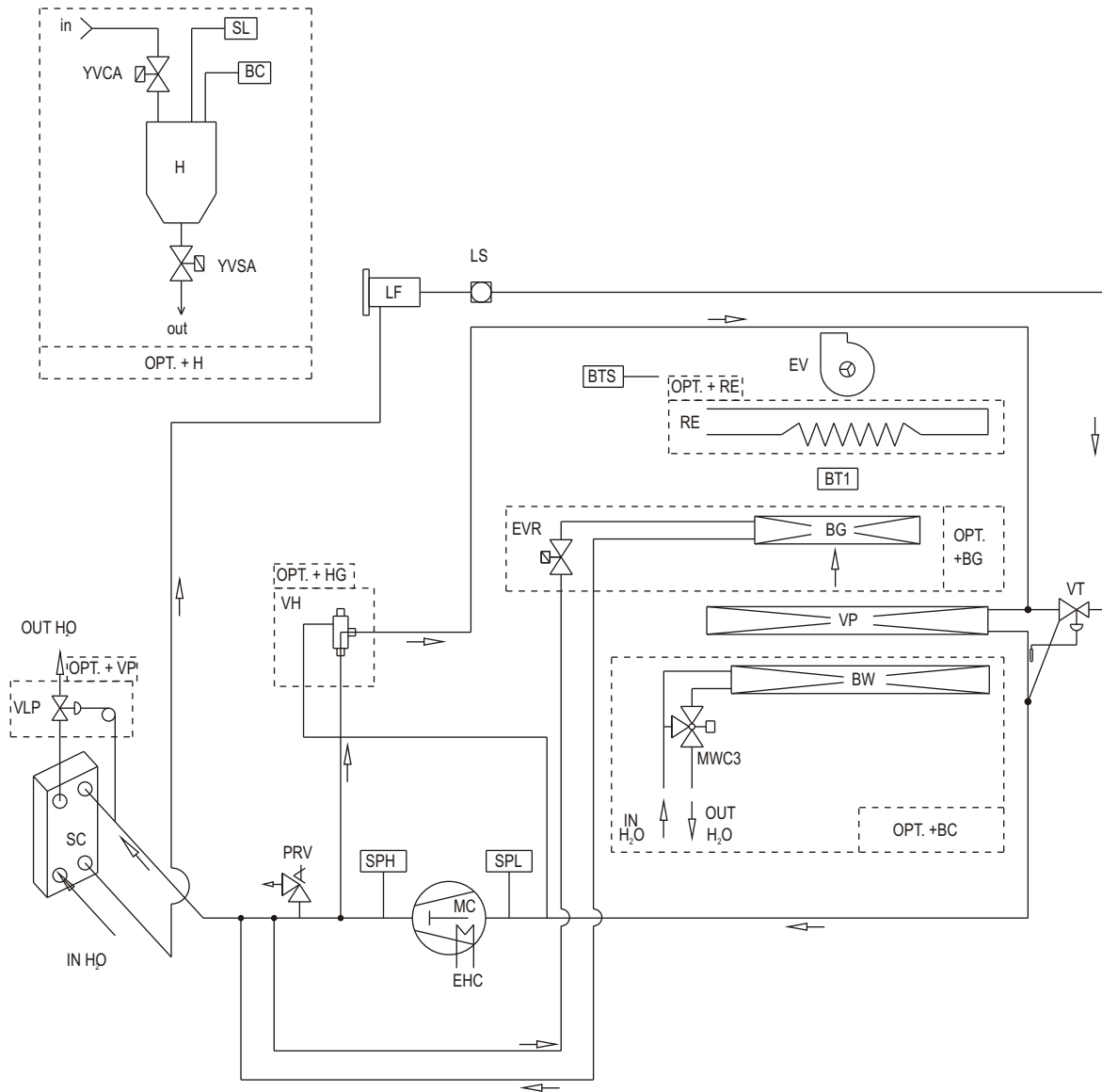
3.2.1 Cooling circuits

Air conditioning unit with remote condenser (ED.A)



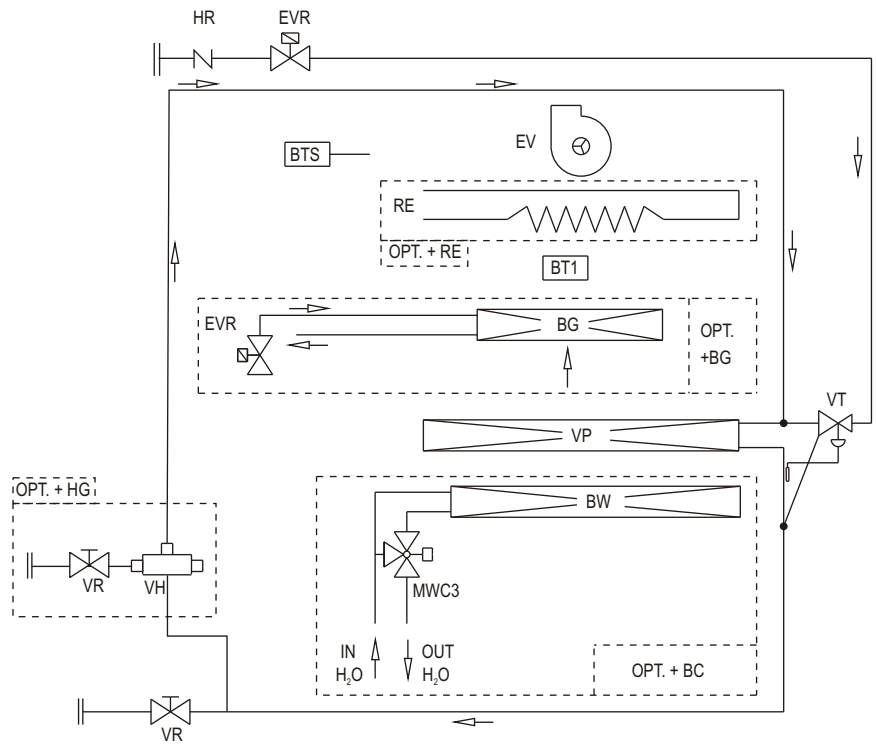
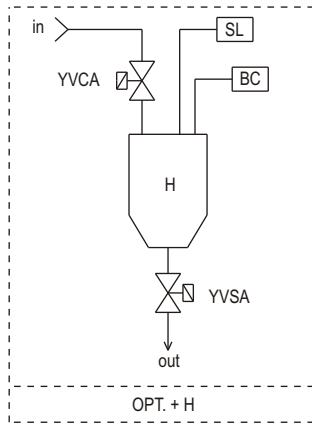
OPTIONAL

Air conditioning unit with water condenser (ED.W)



OPTIONAL

Air conditioning unit with remote condensing unit (ED.M)



OPTIONAL

Cooling circuits key

APTT	FAN SPEED CONTROLLER
BC	CONDUCTIBILITY PROBE
BG	HOT GAS COIL
BTS	SAFETY THERMOSTATIC
BT1	INLET EVAPORATOR WATER PROBE
BW	WATER COIL
CR	REMOTE CONDENSER UNIT
EHC	CRANK-CASE HEATER
EV	FAN
EVR	SOLENOID VALVE
H	UMIDIFIER
LF	FILTER DRYER
LS	FLOW INDICATOR
MC	COMPRESSOR
MWC3	THREE WAYS VALVE
NR	CHECK VALVE
RE	ELECTRIC HEATERS
PRV	PRESSURE RELIEFE DEVICE
RL	LIQUID RECEIVER
SC	PLATE CONDENSER
SL	LEVEL GAUGE
SPH	HIGH PRESSURE SWITCH
SPL	LOW PRESSURE SWITCH
VE	PRESSURIZATION VALVE
VH	HOT-GAS INJECTION VALVE
VLP	PRESSOSTATIC VALVE
VP	EVAPORATOR
VR	SHUT OFF VALVE
VT	THERMOSTATIC EXPANSION VALVE
YVCA	HUMIDIFIER INLET VALVE
YVSA	HUMIDIFIER OUTLET VALVE

3.3 Specification

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

3.4 Dimensions

The table 1 shows the dimensions of the different models of air conditioning machine referring to Fig. 3.

The table 2 shows the unit models available for each steel frame series.

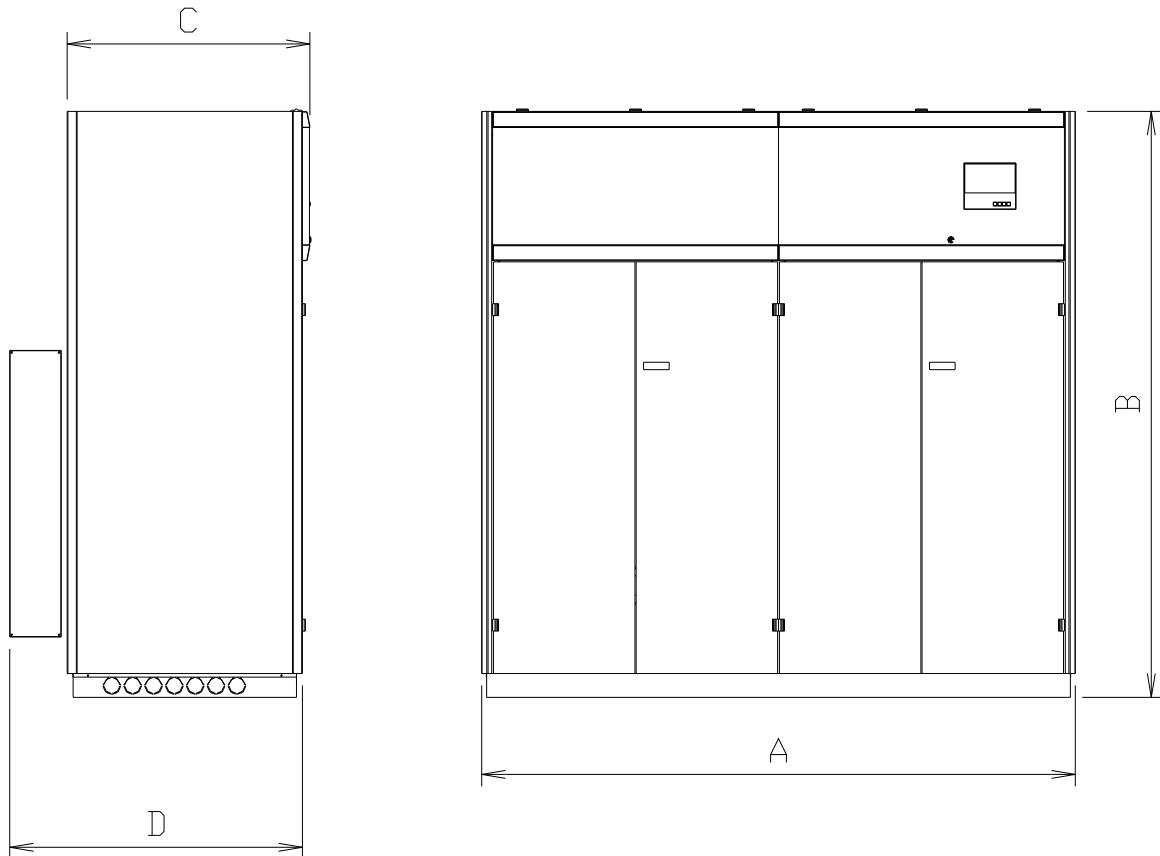


Fig. 3

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		665		815			
B version	D	615		815		965			

Table 2

STEEL FRAME		L1	L2	L3	M1	M2	M3	M4	M5	M6
MODELS	ONE – CIRCUIT	61 81 91	101 121 141	151 171 201	221 241 251 291 301 341	321 431 531	351 431 531	471 521 601	581 651 721 821	
	TWO – CIRCUIT			172 192	202 232 272 342	412 452 492	412 452 492	482 532 572 602	542 622 682 842	762 892 1002 1102

3.5 Accessories

Each unit can be equipped with a wide range of optional accessories, the main ones are explained in the list below.

AA: Flooding probe, sensitive to the water present on the floor

AE: Power supply different from the nominal power. Particularly 230 V 3-phase for all machine sizes and single phase only for L1. Operating frequency 50/60 Hz.

AF: Clogged filters alarm is made of a differential pressure switch, sensitive to the dirt of the filters, which activates an alarm signal through the control board.

AL: Smoke alarm is made of a sensor, which detects the presence of smoke inside the unit activating an alarm signal through the control board.

AM: Sound attenuator sets on the air outlet. These are made of noise-absorbing plates material placed in a galvanized steel case. They are housed inside the machines or they are installed in the plenum depending on the machine size. These sets are not available for D version.

AR: Sound attenuator sets on the recycled air inlet. These are made of noise-absorbing plates material placed in a galvanized steel case. They are housed inside the machines or they are installed in the plenum depending on the machine size. These sets are available for D version only.

B: Base frame made of welded steel tubes. It is available for any machine models, it is height adjustable between 140 and 580 mm.

BC: Hot water coil with 1 row; it is placed after the cooling coil in order to make the post-heating and/or the heating of the treated air. It is regulated by a special three-way mixing solenoid valve controlled by the microprocessor of the machine

BG: Hot gas coil. It is positioned after the cooling coil and is meant to perform the post-heating of the treated air only. It is regulated by a suitable solenoid valve controlled by the microprocessor of the machine. The hot gas coil can be mounted only when also the de-humidification control (option H and DH) is installed.

BN: Base frame equipped with a special conveyor which ease the air flow, reducing to the minimum the pressure losses when the air direction is to the front.

BS: Base frame provided with ON/OFF motorized damper for units of the D version. This device prevents air recycling inside stand-by unit while other units are working on the same air circuit.

BW: Control device for the condensation pressure when the external air temperature is lower than -15°C , supplied as separate kit for installation on site. Two versions available, one for external temperature up to -30°C and one for external temperature up to -40°C (to be specified when ordering the unit).

CI: Cap made of noise-absorbing material covering the compressors completely for further reduction of the noise generated by the machine.

CS: Electro-mechanical device memorizing the total numbers of the compressors start-up. It is located inside the electrical panel.

DH: Operation of the dehumidification function through controlled activation of the cooling battery

F5,F6,F7a: High efficiency air filters. They are pleated filters of 50 or 100 mm thickness, depending to the machine version.

F7b, F8, F9: High efficiency air filters. They are rigid pocket filters of 300 mm thickness.

G2: Division of the refrigeration power between two steps. It is available for one-circuit machines only, starting from a certain power.

H: Steam humidifier, immersed electrode type, for steam production. The controller is of the modulating type.

HG: It is a mechanical device which allows to modulate the cooling power produced by the machine.

IB: Serial interface for communication system RS422; this interface needs also option MP.

IE: Wooden cage packaging, available on request for critical transportation in order to assure the best protection to the machine.

IH: Electronic board connected to the microprocessor in order to allow the connection of the machines to the Carel conversion system. In this way the machine can be completely controlled by a remote place. The system communicate in RS485. For connection to other systems of different type it is available the protocol of controlled parameters.

K: Unit charged with ecological gas R407C

Ka: Unit charged with ecological gas R134a

KC: F4 efficiency filters kit, as spare filters

MD: Wired terminal board in order to remote the alarms as free contacts.

MG: Microprocessor with graphic display showing state and memory of the main environment features controlled by the machine. It also shows messages pertinent to the machine status.

MN: Power supply 400 V 3-phase without neutral.

MP: Oversize microprocessor.

PB: Micro pump for extracting condensate water generated by the machine.

PL: Plenum with grid for frontal air distribution for unit U/V/B.

PR: External air intake, placed on the side of the unit for treated air renewal.

RE: Heating elements made of finned aluminum installed after the cooling coil in order to perform the after-heat and/or the heating of treated air. They are controlled by the microprocessor of the unit.

RG: Electronic device controlling the rotation speed of the remote condenser fans. It stabilizes the condensation pressure for low temperature of the outside air (up to -15°C).

SL: Main isolator switch with mechanical lock and with external pad lock arrangement

ST: Hand adjustable damper setting for the treated air.

SV: Over pressure gravity damper for U/V/B units which are provided with duct preventing air return inside stand-by units

VP: Pressostatic valve for water cooled units ED.W. It is installed on the plate exchanger and adjusting the water flow it controls the unit condensing pressure.

1M,2M,3M,4M,5M: Different available values of external delivery head pressure: for all values and combinations available in relation to machine models and to filtering types, refer to the company's catalogue