

WU - WUL

WATER CHILLED CLOSE CONTROL UNITS



INSTALLATION, USE AND MANTEINANCE MANUAL

The present Manual is composed by the followings:

- Conformity Declaration
- Technical Manual



PRESERVE THE PRESENT FOR FUTURE



Instructions:
Referring to the specify



Read and understand all
the present Manual before
any intervention.

The copy, transmission or memorisation of the present Manual is forbidden in any form without the written authorisation from the Manufacturer.

The Manufacturer can be contact to have any informations about his products.

The Manufacturer work in constant policy of products development and reserves the right to modify every unit, the specifics and the instructions about use and maintenance without any prior notice.

Confromity declaration

We declare under our responsability that the supplied units comply in every part with the CE mark directives and the current EN standards; the Conformity declaration is attached to the onboard documentation. Be informed that the unit contains fluorinated greenhouses gases.

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1. INTRODUCTION

1.1 Preliminary informations

The copy, transmission or memorisation of the present Manual is forbidden in any form without the written authorization from the Manufacturer.

The unit which the present Manual refers is designed only for the uses presented in the following pages, comply with their performances and characteristics. Any contractual or extra-contractual liability of the Manufacturer for damages caused to people, animals, things or environment during the installation, regulation, maintenance faults or improper uses are excluded.
All the not mentioned uses are not allowed.

The present documentation is an informative support and has not to be considered as a contract with third parts.
The Manufacturer works constantly in a develop policy of his products and reserves the right to modify them, their specifics, the instructions and also the documentation in any moment without any prior notice.

1.2 Instructions content and purpose

The present instructions propose to give all the informations concerning the selection, installation, use and maintenance of the units. The instructions are written following the UE legislative dispositions and to the technical available norms.
The instructions include the indication to avoid reasonably foreseeable improper uses of the unit.

1.3 Instruction conservation

The instructions must be stored in a proper place, away from the dust, humidity and where every person in charge to use and operate with it could easily find them.
The instructions must be always on board during all the cycle life of the unit, therefore has to be transferred to every subsequent user.

1.4 Instructions updating

Is suggested to verify that all the instructions are correctly updated to the last release available. Any updates sended to the user must be kept attached to the present Manual.
The Manufacturer is available to provide any information about use of his products.

1.5 Instructions use



The instructions are integral part of the unit which are referred.



The users and operators must to consult the instructions before any intervention on the units and in occasion of any doubt regarding the transport, handling, installation, maintenance, use and disposal of the unit.

In the following are mentioned all the graphic symbols which indicate all the operations must be safety done.

1.6 Residual risks

The units are deigned to reduce at minimum the risk for the people who will use them. Anyway is impossible to eliminate completely the risk, so is strictly necessary refers to the following prescription in order to avoid them at the maximum.

ELEMENTS CONSIDERED (if presents)	RESIDUAL RISK	MODE	PRECAUTIONS
Exchanger coils	Small cutting wounds	Contact	Avoid the contact, use protective gloves.
Fans and grid fans.	Injury	Insertion of tools through the fans grid during the fans operation	Do not insert any tools throught the fans grid during their operation
Inside unit: metallic components and electrical cables.	Electrocution, several burns	Power supply cables insulation defect, electrical tension on metallic components.	Adequate supply line electrical protection; utmost care making the metallic parts ground connection.
Outside unit: Area around the unit	Intoxicaions, several burns	Fire due to short-circuit or overheating of the power supply line upstream of the unit's electrical panel	Section of the cables and protection system of the power supply line complying with the standard in force
Unit	Burst, injuries, burns, poisoning due to external incense.	Fire due to natural disaster or combustion of elemets adjacent to the unit.	Prepare the necessary fire-fighting equipment and / or adequate signals indicating that the uniti s under pressure
Unit	Burst, injuries, poisoning, electrocution due to natural disasters, earthquake	Breaks, sagging for natural disasters or earthquake	Prepare the necessary precautions, both electrical (adequate thermal magnetic circuit breaker and electrical protection of the power supply lines; treatment for maximum calamity when connecting the metal parts to earth, and mechanical (for example special antisismic anchors or anti-vibration dampers to avoid cause accidentals breakages or falls).

1.7 Safety symbols generality

ISO 3864-2 complied safety symbols:



PROHIBITION

Black symbol inside a red circle with red diagonal indicates a forbidden action.



ADVISE

A black graphic symbol inside a yellow triangle with black edges indicates a danger.



MANDATORY ACTION

A white symbol inside a blue circle indicates a mandatory action to avoid a risk.

ISO 3864-2 complied combined safety symbols:



The advise graphic symbol is complied with additional safety informations (text or many symbols).

1.8 Safety symbols



GENERIC DANGER

Follow strictly all the advises near the symbol.
Failure to follow the indications could generate use health risks.



ELECTRICAL DANGER

Follow strictly all the advises near the symbol.
The symbol indicates unit components or, int he present Manual, actions could generate electrical risks.



MOVING COMPONENTS

The symbol indicates unit's moving components could generate risk situations



HOT SURFACES

The symbol indicates uni's components could be very hot and can cause several burns



SHARP EDGES/SURFACES

The symbol indicates unit components could cause cutting wounds by contact.



GROUND CONNECTION

The symbol indicates the unit's ground connection point.



READ AND UNDERSTAND THE INSTRUCTIONS

Read and understand the instructions before any intervention on the unit.



RECOVERABLE OR RECYCLABLE MATERIAL

1.9 Unit use's limits and not allowed uses

The unit is designed and produced exclusively for the Manual "Use limits" mentioned uses; any other use is forbidden because could generate user health risks



The unit is not suitable to operate in environmental:

- Excessively dusty or potentially explosive;
- Where are present excessive vibrations;
- Where are present electromagnetic fields;
- Where are present aggressive ambients.

1.10 Unit identification

Each unit has an indelible plate which contains it's main informations; the data plate could be different from the Technical Manual because in the Manual are mentioned the standard ones without any option installed.

On the serial number i salso mentioned the refrigerant charge.

For the not mentioned electrical informations refer to the Wiring diagram attached to the present Manual. Hereafter is reported a FAC-SIMILE of the plate.

TEL.+39 0543495611 FAX+39 0543 495612 Via A.Volta 49 Meldola FC ITALY			
MODELLO MODEL MODÈLE MODEL	WU 240 V	ANNO DI COSTRUZIONE MANUFACTURE YEAR JAHR VON KONSTRUCT ANNÉ DE FABBRICA	2019
MATRICOLA SERIAL NR N° DE SÈRIE STAMM NR		PED CATEGORIA PED CATEGORY PED KATEGORIE CAT&GORIE PED	
ALIMENTAZIONE ELET. SUPPLY VOLTAGE ALIMENTATION ELECT. SPANNUNG		VOLUME INTERNO INTERNAL VOLUME INNENVOLUMEN VOLUMME INTERNE	COOL WATER Lt.6,6 WARM WATER Lt.1,5
GAS REFRIGERAN REFRIGERANT RéFRIGÉrant KALTEMITTEL	ACQUA/WATER WASSER/EAU	PRESSIONE DI PROGETTO DESIGN PRESSURE DRUCK DES PROJEKTES PRESSION DE PROJET	Bar 6,0
PESO OPERATIVO OPERATING WEIGHT POIDS OPERATION. ARBEITSGEWICHT	Kg. 222	MAX TEMPERAURA PROGETTO MAX DESIGN TEMPERATURE MAXIMALE TEMP.DES PROJEKTES MAXIMUM TEMP DE PROJET	°C 80
CORRENTE MAX MAX CURRENT INPUT MAXIMALEN STROM AMPÈRES MAXIMALE	A 14	CORRENTE CORTO CIRCUITO SHORT CIRCUIT CURRENT COURANT COURT-CIRCUIT STROM KURZSCHLUSS	Ka 10
ASSORBIMENTO ELETTRICO NOMINALE NOMINAL ABSORBED POWER NOMINALE LEISTUNGS-AUFNAHME PUISSANCE ÉLECTRIQUE NOMINALE	kW 2,6		



THE PLATE MUST NEVER BE REMOVED FROM THE UNIT

2. TECHNICAL FEATURES

2.1 Unit description

WU-WUL close control unit are designed and realized to conditioning of technological plants, data center where specific thermo-igrometric conditions are requested, with a strictly control.

Following series are presents for WU-WUL range:

- WU series :
- Up (U) version (front air suction, upside discharge);
- Vertical (V) version (downside air suction, upside discharge);
- Down (D) version (upside air suction, downside discharge).
- WU L series (Down only):
- HP version (High Performance Air Flow);
- ES version (Energy Saving Air Flow).

This diversification can satisfy almost any customer's request from performances, air flow and energy saving points of view. WU series is composed by an unique fans module air treatment.

WU series is composed by the upper part as for air treatment and the internal fans module installed under the false floor.

WU-WUL series are built with the most advanced industry technology and components can be find on the market, including single aspiration centrifugal fans with back curved blades made of high efficiency composite material, equipped with triphase electrical motor directly coupled, with IP%\$ protection degree F Class provided with internal thermal protection of electrical motor winding.

2.1.1 Frame

The modular structure of this equipment is made up of pressed-formed sections in galvanized sheet elements painted with a RAL 9004 epoxy powder cycle.

The elements are assembled together to make up a sturdy frame, capable of supporting units parts and to sustain strain which may derive from unit handling and operation.

The devices are arranged inside the frame in a way that they are easy to reach from the front to make necessary handling during unit operation and easier, more safety maintenance.

2.1.2 EC radial fans

The units are supplied with backward curved blades radial fans in composite material equipped with high efficiency brushless EC motor. The electric motori s suitable to be used at a variable rotation speed managed using the controller with 0-10V signal. The blades , with a commutated motor equièpped with internal thermal protection.

For further details on controlling the EC fans (rate calibration and static counter-pressure) please refer to Microprocessor's Manual.

2.1.3 Water chilled cooling coil with hydrophilic treatment

The coil has copper tubes with aluminium packed fins and superficial hydrophilic treatment to reduce the tension between water and metallic coil surface, increasing the film-type condensation and avoiding the dew dragging risk outside of condensation tray. The aluminium fins are equipped with spacer collars against which the copper tubes are forced by expansion, so as to reduce the thermal contact resistance to a minimum.

The tubes and fins surfaces are made in order to maximize the thermal exchange coefficient between them, maintaining the air pressure drop to a acceptable range. The cooling circuit are designed and realized in order to maximize the capacity avoiding an excessive pressure drop, granting a good refrigerant speed.

Each coil is tested by Manufacturer before the installation.

2.1.4 Electrical heaters

Wu-WUL series have as an optional electrical heaters to post-heat the discahrge air in order to compensate the unit sensible cooling during dehumidific cycle.

The electrical heaters are installed directy by the Manufacturer:

- In the WUL series are installed in the fan module and managed directly by onboard controller.
- In the WU series are installed on the coil, in the air outlet and managed directly by onboard controller.

2.1.5 Electrical board

The unit electrical board is in compliance with the European regulations in force and has been realized inside a metal compartment with main characteristics are the following:

- Three phases power supply 400V / 3Ph / 50 Hz on all units, unless different special requests are demanded;
- Auxiliary circuit in low voltage 24VAc with isolation transformer;
- Main switch (mechanical interlock is an optional);
- Terminal board for signal and control free contacts.

In this compartment, which access is allowed by a main switch, are contained moreover the following main devices:

- Contactors;
- Transformers;
- Numbered conductors;
- Low tension auxiliary circuits;
- Terminal board;
- Electronic cards to unit manage and control.

All the units undergo a safety cycle with continuity test on protection conductors, insulation resistance and withstanding test. The unit control is managed directly by onboard controller.

The controller is composed by:

- Electronic control card with terminals installed for the transmission of functional parameters and power devices drive;
- User interface card with programming keys and graphic display to visualize operation modes and alarm messages;

The control electronic card manages all the devices installed on the unit, following the operation variables values, realizing also the following main functions:

- Remote or keyboard unit ON/OFF;
- Management of alert/alarm messages

The user interface display allows also to visualize the following informations:

- Regulation parameters settled values;
- Functioning variables values;
- Analogic and digital input/output mode;
- Unit operation mode;
- Alert/alarm indications;
- Possibility to interface with BMS systems.

2.1.6 Controller

The unit electronic controller is installed in the electrical board, it manage the water cooled temperature with double inlet/outlet double control from evaporator, operation parameters, hour counter with hour equalizer (optionals), faults autodiagnosis, alarm log, unit switch on and set-point programming, possibility to remote management using the standard protocol interfaces.

2.1.7 Two way valve

Provided to water cooled coil flow; This valve is directly managed by the onboard controller using a standard 3 points servocommand. The valve is suitable to operate with water mixture, ethylene and propylene glycol, until 50%.

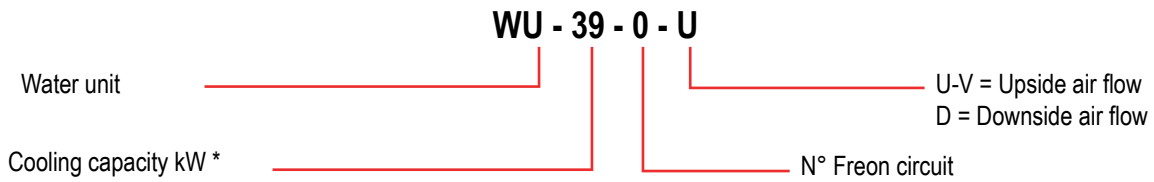
2.1.8 Tests

Once the unit is complete, the cooling circuit is completely tested (following the Manufacturer's warranty procedures) to a pressure and leak test to find any losses.

Before delivery the unit is subjects to a complete functional test.

2.1.9 WU series nomenclature

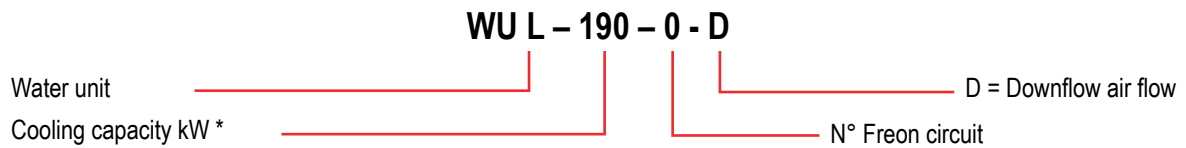
Following is shown the unit name meanings:



* The cooling capacity is calculated with an air temperature of 27°C and humidity of 50%.

2.1.10 WU L series nomenclature

Following is shown the unit name meanings:

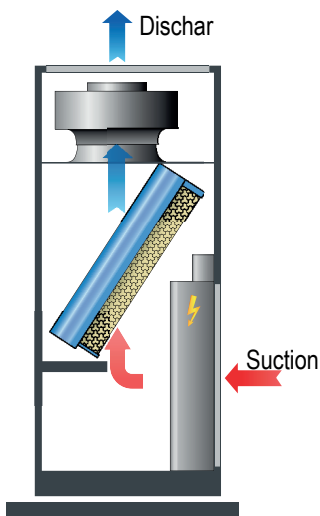


* The cooling capacity is calculated with an air temperature of 27°C and humidity of 50%

2.2 Configurations

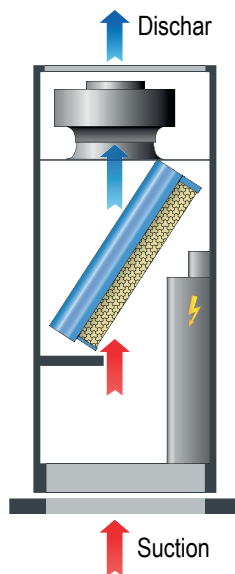
WU - U

Front suction
Upside discharge



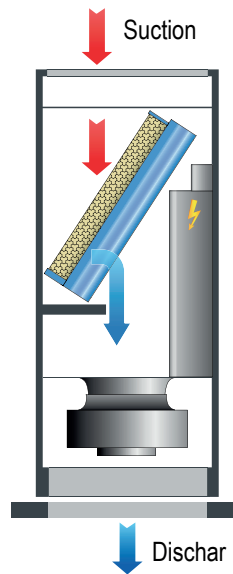
WU - V

Downside suction
Upside discharge



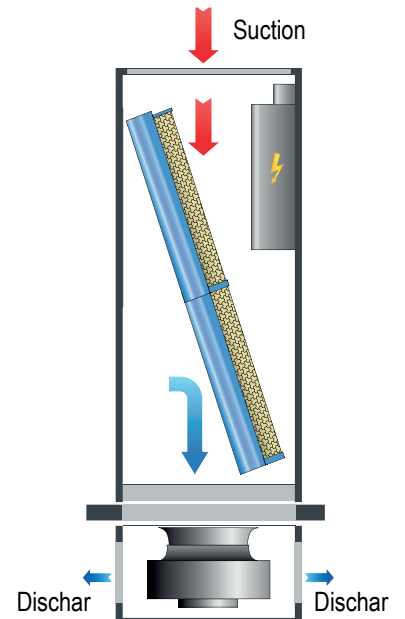
WU - D

Upside suction
Downside discharge



WU L - D

Upside suction
Downside discharge



2.3 Option description

- AA Flooding alarm:** Water sensible probe, is already wired by Manufacturer; this option has to be installed under the unit by the technicians;
- AE Electrical power supply different from standard:** Mainly, 230V three phase, 460V three phase, with 50/60Hz of frequency;
- AL Smoke alarm:** Smoke sensible probe installed inside the unit which activates an alarm in case of smoke or fire presence which stops the fans and compressors;
- B Basement:** Suitable for installation on raised floor, it can be regulate from 170mm to 600mm. It is provided with adjustable feet;
- BAS Baseframe for lateral connections**
- BC Hot water coil:** One or two-row water coil, placed after the cooling coil to re-heating and/or heating of treated air; provided with modulating actuator and with three-way valve is controlled directly by the onboard controller. This option has the priority when installed with electrical heating.
- DH Dehumidification control system:** Composed by a humidity probe.
- DP Double panels:** Internal panels for closing the compartments affected by the air flow made with profiles in galvanized pre-painted sheets steel which allow the reduction of the noise transmitted through the paneling and a better air tightness even without external panels. It allows the unit operation also during maintenance operation with removed panels, such as a filetr replacement.
- EPM6, EPM7 Air filter options:** Flat efficiency filters ePM10 and ePM1 50% supplied as an option as an alternative to standard ones.
- FR Spare filters COARSE 60%:** In alternative to standard ones (already installed);
- FRM6 Spare filters kit: ePM10 60%**
- FRM7 Spare filters kit: ePM1 50%**
- H Humidifier:** Of immerse-electrode type for modulating steam production; it is made of a steam cylinder, a steam distributor, water inlet and outlet valves and a maximum water level probe. The onboard controller indicates when the steam cylinder needs to be replaced in order to be able to make a maintenance during the unit operation.
- IE Fumigated wooden crate packing:** Available on request for critical transports in order to assure a protection of the unit.
- IH RS485 serial interface:** Allows the communication between the unit and the external supervisor system (the software and the supervisor are not provided with the unit, please contact the Manufacturer in order to have more info about communication protocols available);
- IH-BAC Protocol Serial Interface:** Gateway to be connected to the controller allows the remote supervision by an external system with BACNET protocol; (alternative to IH, IH LON and IWG)
- IH-LON LON Protocol Serial interface:** Gateway to be connected to the controller allows the remote supervision by an external system with LON protocol; (alternative to IH, IH BACNET and IWG)
- IM Seawood packing:** Fumigated seawood case and protection bag with hygroscopic salts suitable for long sea transports;
- IP Magnetothermal switches for auxiliary circuit:** Installed instead of standard fuses for auxiliary circuits protection;
- IS1 Class 1 insulation:** In conformity to the main European regulations in force;
- IWG SNMP or TCP/IP Protocol serial interface:** Gateway to be connected to the controller allows the remote supervision by an external system with SNMP or TCP/IP protocol; (alternative to IH, IH LON, IH BACNET)
- MF Phase monitor:** Electronic device controlling the correct sequence and/or the eventual lack of one of three phases switching off the unit if necessary
- MN Neutral wire lack for 400/3/50 power supply:** Unit general power supply without neutral wire; for IT power supplies the Manufacturer has to release, after a check, the connection authorization.
- MP Advanced controller card:** Which contains Ethernet gateway;
- PB Condensation water pump:** Micro pump for discharge condensing water produced by the unit, provided already installed;
- PBH Humidifier and condensation water pump:** Micro pump for discharge condensing water produced by the unit and the water in humidifier, provided in a kit for outdoor installation.
- PL Distribution plenum :** Provided with a frontal grid and a double row of adjustable fins for a better air distribution (available only for WU series U and V versions);

- PQ Remote display:** Remote terminal which allows the visualization of temperature and humidity values detected by probes, the input digital alarms, the outputs and the remote ON/OFF of the unit, to change the parameters set, the sound signals and the visualization of present alarms, if any;
- PR Renewal air inlet:** External renewal air inlet with flat filter placed in unit side (WU series left standard) with circular connection. WU L series available only on the right side;
- RE Electrical heaters:** Made of aluminium, installed after the cooling coil, suitable for re-heating and/or heating of the treated air in order to compensate for the sensitive cooling of the system during the dehumidification cycle; the heating capacity is split on 3 steps max so to reduce the energy consumption. The heaters are managed by the onboard controller meanwhile the electrical protections managed by a magnetothermal switch;
- REM Oversized electrical heaters;**
- RV Personalized frame painting RAL color;**
- SEP Set point compensation card (6 mt max);**
- SM Servo motor 0-10V for cooled water coil:** The signal type is possible to set by onboard controller or directly on the servo motor.
- STP Air flow stabilisation.**
- TS Touch screen graphic display:** The new electric display allows to develop simple and appealing interfaces for the final user; the touch screen can combine different colors and transparency levels using Alpha Blending technology.
- V3V Three way valve:** Provided to control the water flow in the cooled water coil; The valve is managed directly by onboard controller using a standard 3 point servo command. The valve is also suitable to operate with a mixture of water and ethylene or propylene glycol, up to 50% of concentration

2.4 Technical data

WU		80	150	190	250	310	440	550	640	700	840
Cooling capacity (Totale) ¹ ESP 20 Pa	kW	6,3	10,1	13	16,7	20,9	29,6	37	42,9	48	55,3
Cooling capacity (Sensible) ¹ ESP 20 Pa	kW	5,8	8,6	10,6	14,2	16,8	24,9	29,8	35,2	38,4	47,4
Tot. absorbed power (fans) ² ESP 20 Pa	kW	0,3	0,3	0,4	0,6	0,7	0,9	1,1	1,2	1,2	1,7
SHR		0,92	0,85	0,81	0,84	0,8	0,84	0,80	0,81	0,79	0,85
Air flow	m ³ /h	2550	2550	2550	4100	4100	7200	7200	9100	9100	13400
N° Fan		1	1	1	1	1	1	1	1	1	1
ESP max.	Pa	563	517	480	445	405	570	522	349	337	338
Coil+2 way valve pressure drop	kPa	32	20	28	41	31	31	31	34	40	34
Water flow	m ³ /h	1,1	1,7	2,2	2,9	3,6	5,1	6,4	7,4	8,3	9,5
Power supply	V/ph/Hz	400/3+N+T/50	400/3+N+T/50	400/3+N+T/50	400/3+N+T/50	400/3+N+T/50	400/3+N+T/50	400/3+N+T/50	400/3+N+T/50	400/3+N+T/50	400/3+N+T/50
Humidifier											
Steam production (nominal)	kg/h	1,5	1,5	1,5	3,0	3,0	5,0	5,0	8,0	8,0	8,0
Steam production (max)	kg/h	3	3	3	3	3	8	8	8	8	8
Maximum absorbed power	kW	1,12	1,12	1,12	2,25	2,25	3,75	3,75	6,0	6,0	6,0
Maximum absorbed current	A	5,0	5,0	5,0	10,0	10,0	5,5	5,5	8,7	8,7	8,7
Specific conducibility at 20°C (min/max)	µS/cm	300/1250	300/1250	300/1250	300/1250	300/1250	300/1250	300/1250	300/1250	300/1250	300/1250
Total hardness (min/max)	mg/l CaCO ₃	100/400	100/400	100/400	100/400	100/400	100/400	100/400	100/400	100/400	100/400
Electrical heaters											
Steps	n°	1	1	1	1	1	2	2	3	3	3
Power	kW	3,0	3,0	3,0	4,5	4,5	6,0	6,0	9,0	9,0	9,0
Absorbed current	A	4,3	4,3	4,3	6,5	6,5	8,7	8,7	13,0	13,0	13,0
Oversized electrical heaters											
Steps	n°	1	1	1	2	2	3	3	3	3	3
Power	kW	4,5	4,5	4,5	6,0	6,0	9,0	9,0	12,0	12,0	12,0
Absorbed current	A	6,5	6,5	6,5	8,7	8,7	13,0	13,0	17,3	17,3	17,3
Hot water coil											
Thermal capacity ⁽³⁾	kW	4,9	4,9	4,9	7,3	7,3	10,67	10,67	16,7	16,7	24,5
Water flow	m ³ /h	0,85	0,85	0,85	1,3	1,3	1,86	1,86	2,91	2,91	4,3
Coil+3way valv pressure drop	kPa	36	36	36	31	31	48	48	56	56	46
Coil internal volume	dm ³	1,1	1,1	1,1	1,4	1,4	2,1	2,1	3,3	3,3	4,7
Condensing water pump											
Nominal flow	l/h	27,5	27,5	27,5	390,0	390,0	390,0	390,0	390,0	390,0	390,0
Maximum flow (prevalence = 0m)	l/h	34	34	34	500	500	500	500	500	500	500
Max. discharge height (flow=0m3h)	m	15,0	15,0	15,0	5,4	5,4	5,4	5,4	5,4	5,4	5,4
Humidifier + condensig water pump											
Nominal flow	l/h	-	-	-	-	-	-	-	600	600	600
Maximum flow (prevalence = 0m)	l/h	-	-	-	-	-	-	-	900	900	900
Max. discharge height (flow=0m3h)	m	-	-	-	-	-	-	-	6,0	6,0	6,0
Dimensions											
Frame	n°	1	1	1	2	2	3	3	4	4	4,5
Widht	mm	550	550	550	750	750	980	980	1160	1160	1505
Depth	mm	550	550	550	550	550	750	750	850	850	850
Height	mm	1980	1980	1980	1980	1980	1980	1980	1980	1980	1980
Weight	kg	139	143	148	173	179	237	248	312	318	360

(1) Ambient temperature 24°, Relative humidity 50% , Water temperature 7/12°C

(2) The fans absorbed electrical power must be added to the ambient charge.

(3) Water temperature 40/45°C, Ambient temperature 20°C, Relative humidity 50%.

WU		960	1050	1300	1450	1600	1710	1900	2100	2300
Cooling capacity (Totale) ¹ ESP 20 Pa	kW	63,2	68,9	88,2	95,2	106,9	115,4	126,2	140,1	157,5
Cooling capacity (Sensible) ¹ ESP 20 Pa	kW	51,6	55,4	70,4	77,6	85,2	93,9	100,7	114,3	125,6
Tot. absorbed power (fans) ² ESP 20 Pa	kW	1,9	2	2,2	2,7	2,9	3,1	3,3	3,5	3,8
SHR		0,81	0,80	0,79	0,81	0,79	0,81	0,79	0,81	0,79
Air flow	m ³ /h	13400	13400	16600	20100	20100	23800	23800	29500	29500
N° Fan		1	1	2	2	2	2	2	3	3
ESP max.	Pa	308	291	369	277	293	371	366	398	413
Coil+2 way valve pressure drop	kPa	41	42	35	40	43	47	50	37	40
Water flow	m ³ /h	10,9	11,9	15,2	16,4	18,4	19,8	21,7	24,1	27,1
Power supply	V/ph/Hz	400/3+N+T/ 50	400/3+N+T/ 50	400/3+N+T/ 50	400/3+N+T/ 50	400/3+N+T/ 50	400/3+N+T/ 50	400/3+N+T/ 50	400/3+N+T/ 50	400/3+N+T/ 50
Humidifier										
Steam production (nominal)	kg/h	8,0	8,0	8,0	8,0	8,0	8,0	8,0	8,0	8,0
Steam production (max)	kg/h	8	8	8	8	8	8	8	8	8
Maximum absorbed power	kW	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0
Maximum absorbed current	A	8,7	8,7	8,7	8,7	8,7	8,7	8,7	8,7	8,7
Specific conducibility at 20°C (min/max)	µS/cm	300/1250	300/1250	300/1250	300/1250	300/1250	300/1250	300/1250	300/1250	300/1250
Total hardness (min/max)	mg/l CaCO ₃	100/400	100/400	100/400	100/400	100/400	100/400	100/400	100/400	100/400
Electrical heaters										
Steps	n°	3	3	3	3	3	3	3	3	3
Power	kW	9,0	9,0	15,0	18,0	18,0	24,0	24,0	27,0	27,0
Absorbed current	A	13,0	13,0	21,7	26,0	26,0	34,6	34,6	39,0	39,0
Oversized electrical heaters										
Steps	n°	3	3	3	3	3	3	3	3	3
Power	kW	12,0	12,0	18,0	24,0	24,0	27,0	27,0	36,0	36,0
Absorbed current	A	17,3	17,3	26,0	34,6	34,6	39,0	39,0	52,0	52,0
Hot water coil										
Thermal capacity ⁽³⁾	kW	24,5	24,5	31,1	37,4	37,4	48,9	48,9	60,8	60,8
Water flow	m ³ /h	4,3	4,3	5,43	6,5	6,5	8,5	8,5	10,6	10,6
Coil+3way valv pressure drop	kPa	46	46	53	34	34	48	48	42	42
Coil internal volume	dm ³	4,7	4,7	5,8	7,1	7,1	10,45	10,45	12,6	12,6
Condensing water pump										
Nominal flow	l/h	390,0	390,0	390,0	390,0	390,0	390,0	390,0	390,0	390,0
Maximum flow (prevalence = 0m)	l/h	500	500	500	500	500	500	500	500	500
Max. discharge height (flow=0m3h)	m	5,4	5,4	5,4	5,4	5,4	5,4	5,4	5,4	5,4
Humidifier + condensig water pump										
Nominal flow	l/h	600	600	600	600	600	600	600	600	600
Maximum flow (prevalence = 0m)	l/h	900	900	900	900	900	900	900	900	900
Max. discharge height (flow=0m3h)	m	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0	6,0
Dimensions										
Frame	n°	4,5	4,5	5	6	6	7	7	8	8
Widht	mm	1505	1505	1860	2210	2210	2565	2565	3100	3100
Depth	mm	850	850	850	850	850	850	850	850	850
Height	mm	1980	1980	1980	1980	1980	1980	1980	1980	1980
Weight	kg	366	373	456	503	520	600	617	715	751

(1) Ambient temperature 24°, Relative humidity 50%, Water temperature 7/12°C

(2) The fans absorbed electrical power must be added to the ambient charge.

(3) Water temperature 40/45°C, Ambient temperature 20°C, Relative humidity 50%.

WU L		900	1350	1800	2200	2500	3200
Cooling capacity (Totale) ¹ ESP 20 Pa	kW	59,5	85	115,3	136,9	169,1	216,5
Cooling capacity (Sensible) ¹ ESP 20 Pa	kW	48,6	69,4	95	111,6	138,6	176,5
Tot. absorbed power (fans) ² ESP 20 Pa	kW	1,6	2,5	2,9	3,8	5,2	5,4
SHR		0,82	0,82	0,82	0,82	0,82	0,82
Air flow	m ³ /h	12000	16500	22000	26000	33000	41000
N° Fan		1	1	2	2	2	3
ESP max.	Pa	239	161	295	160	150	318
Coil+2 way valve pressure drop	kPa	28	24	37	24	33	52
Water flow	m ³ /h	10,2	14,6	19,8	23,5	29,1	37,2
Power supply	V/ph/Hz	400/3+N+T/ 50	400/3+N+T/ 50	400/3+N+T/ 50	400/3+N+T/ 50	400/3+N+T/ 50	400/3+N+T/ 50
Humidifier							
Steam production (nominal)	kg/h	8	8	15	15	15	15
Steam production (max)	kg/h	8	8	15	15	15	15
Maximum absorbed power	kW	6	6	11,2	11,2	11,2	11,2
Maximum absorbed current	A	8,7	8,7	16,2	16,2	16,2	16,2
Specific conductivity at 20°C (min/max)	µS/cm	300/1250	300/1250	300/1250	300/1250	300/1250	300/1250
Total hardness (min/max)	mg/l CaCO ₃	100/400	100/400	100/400	100/400	100/400	100/400
Electrical heaters							
Steps	n°	2	2	2	2	3	3
Power	kW	7,4	7,4	14,8	14,8	22,2	29,6
Absorbed current	A	10,7	10,7	21,4	21,4	32,0	42,7
Hot water coil							
Thermal capacity ⁽³⁾	kW	29,7	41,37	54,98	65,62	81,32	101,37
Water flow	m ³ /h	5,18	7,21	9,58	11,43	14,2	17,66
Coil+3way valv pressure drop	kPa	51	50	71	73	61	86
Coil internal volume	dm ³	7,6	11,54	13,47	15,28	17,27	22,23
Condensing water pump							
Nominal flow	l/h	390	390	390	390	390	390
Maximum flow (prevalence = 0m)	l/h	500	500	500	500	500	500
Max. discharge height (flow=0m3h)	m	5,4	5,4	5,4	5,4	5,4	5,4
Humidifier + condensig water pump							
Nominal flow	l/h	600	600	600	600	600	600
Maximum flow (prevalence = 0m)	l/h	900	900	900	900	900	900
Max. discharge height (flow=0m3h)	m	6,0	6,0	6,0	6,0	6,0	6,0
Dimensions							
Frame	n°	4	4,5	5	6	7	8
Widht	mm	1160	1505	1860	2210	2565	3100
Depth	mm	850	850	850	850	850	850
Height	mm	1980 + 550	1980 + 550	1980 + 550	1980 + 550	1980 + 550	1980 + 550
Weight	kg	383	485	577	646	775	959

(1) Ambient temperature 24°, Relative humidity 50% , Water temperature 7/12°C

(2) The fans absorbed electrical power must be added to the ambient charge.

(3) Water temperature 40/45°C, Ambient temperature 20°C, Relative humidity 50%.

2.5 Operation limits



The unit is designed and built for air conditioning technological environments and must be used exclusively for this purpose within its characteristics. All the other uses are not allowed and dissolve the Manufacturer from any liability for damages caused to the peoples, animals, environment or things.



In case of different uses from the overmentioned please contact the Manufacturer.



The minimum temperature of the ambient to be cooled has to be of 18°C.
The maximum temperature of the ambient to be cooled has to be of 35°C.



The units in standard configuration are not suitable for marine installations.

Operation limits		
Indoor air conditions	Temperature	From 18°C ± 1°C to 35°C ± 1°C
	Relative humidity	From 20% ± 5% to 60% ± 5%
Hot water circuit	Water inlet temperature	Max. 85°C
	Water pressure	Max. 8.5 bar
Storage conditions	Temperature	From -20°C to 50°C
	Specific humidity	Maximum relative humidity percentage accepted is 90% to prevent condensation on surfaces
Power supply tolerances		V ± 10%, Hz ± 2



In order to have a homogenous ambient temperature, the installer must grant a suitable insulation and take into consideration any possible heat source inside the ambient itself. The manufacturer declines any responsibility for any performance or tolerance different from the ones declared for units installed in a non-compliant ambient.



Lower heat load will not ensure precise temperature and humidity control than causing frequent compressor start & stop.
The room heat load cannot be less than 20% of the sensible cooling capacity of the precision air conditioner.

2.6 Sound data

WU											
Mod.	Octave band noise (Hz)								Lw	Lp1	Lp10
	63	125	250	500	1K	2K	4K	8K			
	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
80	33	46	53	58	63	63	57	47	67	47	36
150	34	47	54	59	63	63	58	48	68	48	37
190	34	47	54	59	63	63	58	48	68	48	37
250	38	55	59	63	69	69	65	58	74	54	43
310	38	55	59	63	69	69	65	58	74	54	43
440	38	55	59	63	69	69	65	58	74	54	43
550	39	56	60	64	70	70	66	59	75	55	44
640	47	58	62	68	70	69	66	56	75	55	44
700	47	58	62	68	70	69	66	56	75	55	44
840	40	59	64	72	73	72	69	59	78	58	47
960	40	59	64	72	73	72	69	59	78	58	47
1050	40	59	64	72	73	72	69	59	78	58	47
1300	48	62	64	71	72	72	69	60	78	58	47
1450	49	63	65	72	73	73	70	61	79	59	48
1600	49	63	65	72	73	73	70	61	79	59	48
1710	40	60	65	73	74	73	70	60	79	59	48
1900	40	60	65	73	74	73	70	60	79	59	48
2100	40	60	65	73	74	73	70	60	79	59	48
2300	40	60	65	73	74	73	70	60	79	59	48

Lw: Sound power level measured in compliance with ISO 3744.

Lp1: Sound pressure level measured in 2mt free field from unit in compliance with ISO 3744

Lp10: Sound pressure level measured in 10mt free field from unit in compliance with ISO 3744.



The unit can autonomously and automatically works so no operator is required; is it therefore not required provide the sound data in the command statio. The average sound pressure level is anyway mentioned in the "Technical Ambients general Catalogue" and in the unit data sheet, referred to 2 mt distance in free field from unit (ISO 3746) with suction and discharged connected (except U version). The data are referred to standard prevalence and water flow and to maximum available prevalence and air flow.

WU L											
Mod.	Octave band noise (Hz)								Lw	Lp1	Lp10
	63	125	250	500	1K	2K	4K	8K			
	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
900	53	66	69	75	77	75	74	66	82	62	51
1350	45	66	69	77	77	77	75	65	83	63	52
1800	53	69	71	76	78	77	75	68	83	63	52
2200	58	73	73	78	80	78	77	70	85	65	54
2500	48	70	73	80	80	79	78	69	86	66	55
3200	48	68	72	79	79	79	77	69	85	65	54

Lw: Sound power level measured in compliance with ISO 3744.

Lp1: Sound pressure level measured in 2mt free field from unit in compliance with ISO 3744. Lp10: Sound pressure level measured with 10mt free field from unit in compliance with ISO 3744.

3. INSTALLATION

3.1 General advices and symbols use



Before to operate any intervention the technicians must known perfectly the unit functioning and all its components, also to having read the present Manual.



All the maintenance operations must be performed by well trained technicians in compliance with national legislation in the country of destination



The unit installation and maintenance must be performed in compliance with regulations and norms in force.



Do not approach or insert any object into unit moving parts.

3.2. Operators health and safety



The operator's workplace must be kept clean, tidy and free from object could limitate free movements, also must be adequately lit fot the intended operation. Inadequate or excessive lighting could pose risks.



Ensure that excellent ventilation of the work room is always granted and that extraction system is always works properly, in compliance with the provisions of the law.

3.3 Individual protection devices



The technicians in charge for unit installation and maintenance must mandatory wear, following the laws in force, the below mentioned protection devices;



Protective shoes.



Protective glasses.



Protective gloves.



Respiratory path protection.



Ears path protection.

3.4 Receipt and inspection

During the installation or any intervention it is mandatory to follow strictly any norm reported on the present Manual, to follow the onboard indications and apply every precaution in order to avoid any dangerous situation. At the unit receipt it is necessary to make a visual inspection; the unit left the Manufacturer in perfect conditions, damages occurs during transport has to be immediately disputed with the carrier noticing on the delivery sheet before signing it. The Manufacturer must be informed about the damages within 8days from receiving the unit. The unit owner must to complete a written report in the event of significant damage.

Before to accept the delivery check carefully:

- The unit has not be damaged during the transport;
- The delivery unit corresponds to the one indicated on the transport and customer documents.

In case of any anomalie or damage:

- Note immediately the damage on delivery document;
- Inform Manufacturer or supplier, mandatory within 8 days from receipt, about the damage type (reports after 8 days from receiving are invalid);
- In case of relevant damage, a complete report must be written.

3.5 Storage

If it was necessary to store the unit ensure to leave it in a closed and dry place; if the unit is already unpacked please follow the indications hereafter to avoid a possible corrosion, damage or deterioration as much as possible:

- Be sure about every unit opening is well plugged or sealed;
- To clean the unit never use steam or aggressive detergents;
- If any key is provided with the unit please take out and entrust to the site manager.

3.5.1 Transport

The transport must be done by authorized carrier and the truck characteristics must be such by to not damage the unit during the load and the transport. If the roads are bumpy use a truck with suspensions suitable to protect the unit from any damage



The unit can be stored to temperatures between -10°C to +65°C; during this period, to avoid breaks, corrosive phenomena, deposits the user side exchanger must be totally emptied from the water or completely full with a glycol-water mixture.

3.6 Unpacking



The packaging could create risks for all operators

It is suggested to leave the unit packed during the handling and to remove the pack just before its installation. Be careful to remove the pack in order to avoid any damage to unit and operators danger.

The material which compose the packing could be from different nature (wood, nylon, carboard, etc.)



The packaging materials must be separately preserved and delivered for disposal or eventually recycle to the responsible companies to reduce at minimum the environmental impact. Keep out the material of reach of childrens.

3.7 Unit lifting and handling

During the unit unloading it is strongly recommended to avoid any sudden movement to protect internal components; unit can be lifted using a forklift, or in alternative, using belts. Take care the used method does not damage the side panels or the cover; it is also important to keep the unit vertical during all the handling to avoid any damage risk.



The coil fins could cause contact wounds; it is suggested to use protective gloves.



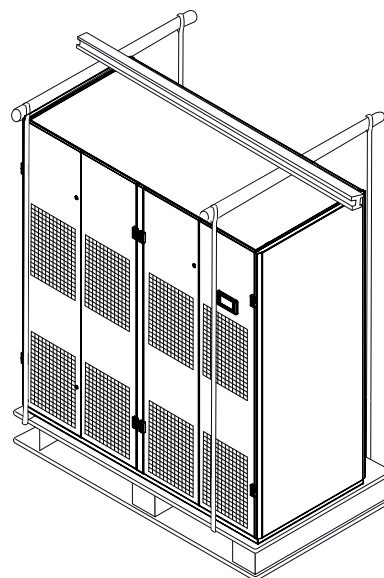
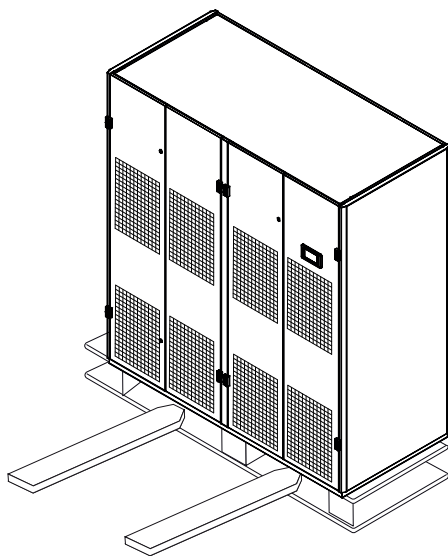
The weight of some model could be unbalanced, so before to start the unit handling is recommended to verify its stability to avoid any problem during the operation.



Is forbidden to put one unit over the other even if packed; if the units are stored after receipt must be away from elements even if packed.



The lifting devices (cables, belts, etc) must be in compliance with laws and local norms.



3.8 Positioning and minimum technical clearances

All the units are designed to internal installation; unit vibrations level is very low. It is of vital importance to avoid air circulation between discharge and suction to avoid poor performances or even the normal operation stop. For this reason is necessary to observe the following clearance.

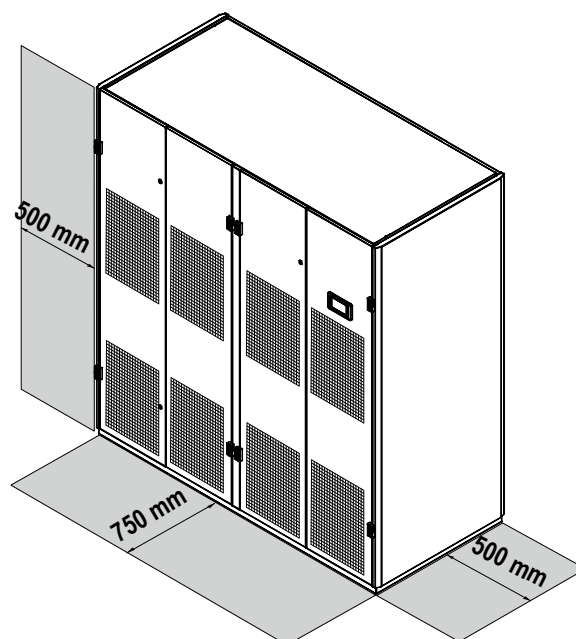
The unit doesn't need to special foundation, as it cans simply be placed on the installation site to work.



Is recommended to respect the hereafter clarences which allow ordinary and extraordinary maintenance. The guarantee does not cover any costs related to repairs deriving from not well unit handling.



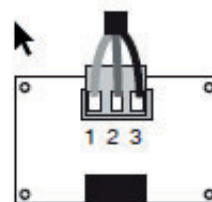
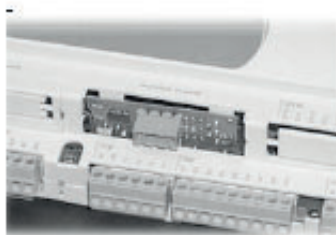
The installation site should be chosen in compliance with EN 378-1 and 378-3 standards; during the installation site choose should be taken in consideration any risk caused by accidentale refrigerant leakage.



3.9 RS485 serial interface card

Gateway to be connected to the unit controller in order to be able to interface with supervision system (available only RS485 MODBUS system) which allows remote unit management of operation parameters and to change their values.

It is necessary to follow the wiring polarity as the below image; the polarity inversion will not be good to switch on the unit. Supervision cable must be twisted and shelded with 2 AWG20/22 wires; the unit is factory set to serial address 1. In case of MODBUS system use it is possible to ask the variables list to Manufacturer's after salesdepartment.



pin	significato meaning
1	GND
2	RX+/TX+
3	RX-/TX-

3.10 Hydraulic circuit

The unit is designed to be connected to a water chilled network. The pipe line must be made from an expert technician.



The fluid to be cooled has not to contain aggressive substances or not compatibles with copper, carbon steel, aluminium and any material which unit is composed. For any doubt is necessary to send to the Manufacturer a fluid chemical analysis in order to find the necessary solution.

The cooling circuit must be made by an expert designer and realized by a qualified technician on behalf of the unit owner following the regulations and laws in force.

Hereafter are mentioned some indications for the cooling circuit realization:

- The pipe line must be as short as possible in order to prevent excessive pressure drops in the circuit;
- The path must be adequately bracketed and posed in order to allow inspections and maintenances;
- The nominal pressure of the material used for the system must be at least PN10;
- During the circuit realization pay attention to avoid the dirty and dust entrance in the pipes;
- The water pump must be able to flows the adequate water quantity and with necessary prevalence to win the pressure drop present on the system in every work operation;
- The water system must be insulated by a close cell anti-condensation material with thermal characteristics, steam proof and suitable in thickness to the worst possible operating/stop conditions;
- The system safety valve must be choose of adequate size and with regulate pressure not over to 10bar;
- To the higher point of the circuit, or wherever could create air pockets, must be installed air discharge valves;
- The system must be provided of discharging connections;
- The system must be equipped with water charge connections and, if excepted, the charge of non-freezing solutions;
- Once the circuit is completed must be clean with idoneous substances to avoid the dusty or dirty entrance, could cause anomalies or damages during the operation.

3.11 Hydraulic connections

The cooling circuit connection must be made by an expert technician in compliance with norms and regulations in force.

- Is suggested to install the interseption shut-off valves to the inlet and outlet of the unit to help the extraordinary maintenance operations; is appropriate also to connect the unit to the system using 3 point joints, which help the cooling circuit interventions;
- Is suggested to install to unit inlet a water filter with a grid dimensions not over than 1mm;
- To the hydraulic system connection must be used the connections indicated in the technical drawing;
- Once the circuit is completed and the unit installed is necessary to make a hydraulic test to the system in order to find a leak, if present, before the filling and the operation.



During the leak test the pressure in the system should not be higher than 10bar.



Using non-freezing mixture, not aggressive towards the material which the unit and the system are composed by, must consider the changing in the cooling capacity and other unit's parameters such as pressure drops.



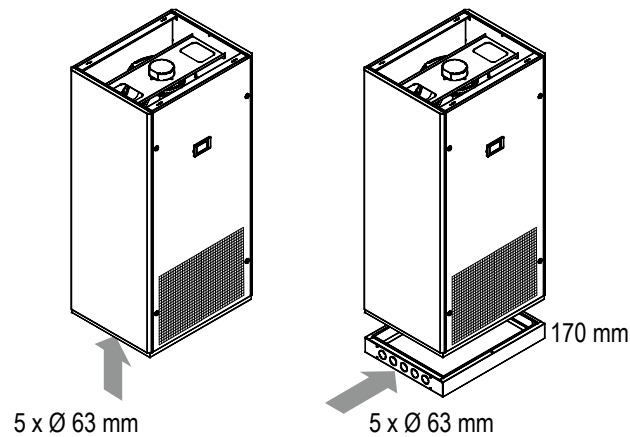
After the system pressure test made with water, if it will be stopped for a long period or if the expepted air temperature are going near or sub 0°C it will be necessary discharge all the water or insert a suitable quantity of non-freezing mixture.

To the unit cooled water system connection use the hereafter indicated connections; the hydraulic connections diameters are listed in the relative tabs.

3.11.1 Hydraulic connection areas



The connections are planned on the bottom for all the series unit.
 The option **BAS** can be requested in order to raise the unit (lateral connections base frame). The accessory **BAS** will be fitted to the base of the unit at factory.



3.11.2 WU series hydraulic connections

WU U/V/D	Cooled water	Hot water	Condensation disch	Humidifier	
	Ø In / Out (inch)	Ø In / Out (inch)	Ø Internal (mm)	Ø In (inch)	Ø Out Internal (mm)
80	¾" GAS M	½" GAS M	19	¾" GAS F	22
150	¾" GAS M	½" GAS M	19	¾" GAS F	22
190	¾" GAS M	½" GAS M	19	¾" GAS F	22
250	¾" GAS M	¾" GAS M	19	¾" GAS F	22
310	1" GAS F	¾" GAS M	19	¾" GAS F	22
440	1" ¼ GAS F	¾" GAS M	19	¾" GAS F	22
550	1" ½ GAS F	¾" GAS M	19	¾" GAS F	22
640	1" ½ GAS F	¾" GAS M	19	¾" GAS F	22
700	1" ½ GAS F	¾" GAS M	19	¾" GAS F	22
840	2" GAS F	1" GAS F	19	¾" GAS F	22
960	2" GAS F	1" GAS F	19	¾" GAS F	22
1050	2" GAS F	1" GAS F	19	¾" GAS F	22
1300	2" GAS F	1" GAS F	19	¾" GAS F	22
1450	2" GAS F	1" ¼ GAS F	19	¾" GAS F	22
1600	2" GAS F	1" ¼ GAS F	19	¾" GAS F	22
1710	2" GAS F	1" ¼ GAS F	19	¾" GAS F	22
1900	2" GAS F	1" ¼ GAS F	19	¾" GAS F	22
2100	2" GAS F	1" ½ GAS F	19	¾" GAS F	22
2300	2" GAS F	1" ½ GAS F	19	¾" GAS F	22

WU L D HP/ES	Cooled water	Hot water	Condensation disch	Humidifier	
	Ø In / Out (inch)	Ø In / Out (inch)	Ø Internal (mm)	Ø In (inch)	Ø Out Internal (mm)
900	2" GAS F	1" GAS F	19	¾" GAS F	22
1350	2" GAS F	1" ½ GAS F	19	¾" GAS F	22
1800	2" GAS F	1" ½ GAS F	19	¾" GAS F	22
2200	2" GAS F	1" ½ GAS F	19	¾" GAS F	22
2500	2" ½ GAS F	2" GAS F	19	¾" GAS F	22
3200	2" ½ GAS F	2" GAS F	19	¾" GAS F	22

3.12 Chemical water characteristics

In the following tab are listed the main parameters which determinates the water quality; It is necessary follow these to avoid corrosive phenomena or any deposit could decrease the cooling capacity and also damage the user exchanger; It is suggested to check these values once a year.

PH	7,3-9	Oxigen O₂	< 0,1 mg/l
Electric conductivity	100-700 µS/cm	Nitrates NO₃	< 50 mg/l
Sulphates SO₄	< 100 mg/l	NH₃	Assente
Bicarbonate HCO₃	< 200 mg/l	H₂S	Assente
Clorure Cl	< 50 mg/l	Clorithes	Assente
Phosphate PO₄ 3	<2 mg/l	Free Chlorine	< 0.1 mg/l
Carbon dioxide CO₂	< 5 mg/l		
Langelier index - (pH - pS - pAlc - pCa)		<0 Corrosive tendent water = 0 Neutral water >0 Water that tends to create deposits	
Ryznar stability index - (2x (pS + pAlc + pCa) - pH)		<5,5 Water with high tendency to create deposits 5,5 - 6,2 Water that tends to create deposits 6,2 - 6,8 Neutral water 6,8 - 8,5 Corrosive water >8,5 High corrosive water	

pS = Suspended solids partícels logarithm, expressed in ppm and measured at the temperature of the water on the point of precipitation
 pAlc = logarithm of the alkalinity factor expressed in ppm CaCO₃
 pCa = logarithm to the limestone hardness expressed in ppm CaCO₃

With the purpose to avoid corrosive phenomena and any deposit is recommended to:

- Empty the evaporator before any maintenance operation;
- Not clean with mechanical devices non idoneous, which drill bits or too high pressure flows;
- Not clean with aggressive detergents; Before to any detergent use be careful and verify the copper and any other material the unit is composed compatibility;
- During the winter stops be careful to well empty the exchanger



In case of long stops leave the exchanger or totally filled with non-freezing mixture or completely empty

3.13 Hydraulic circuit filling

Once the hydraulic circuit is completed and the unit connected to the system will be necessary to fill the system following the hereafter indications:

- Open all the vent valves present on circuit;
- Connect the circuit to water supply network, permanently if possible, using an automatic fill group equipped with a pressure gauge, check valve suitable with temperature and operation mode of the unit;
- Start to charge the water in the system;
- Close all the air discharge valve present on the circuit when begins to come out water;
- Continue to charge water to reach the pressure between 1,5 and 3,5bar (recommended use pressure).



If the unit works with a non-freezing mixture, fill the circuit with an adequate quantity of pure non-freezing fluid considering the system volume and the concentration to realize.

In case of manual fill suspend the water charge and switch on the water pump in order to collect all the air (if present) in the highest system points (where air discharge valves are installed).

After 2 hour of work, switch off the pumps and discharge the air (if present), then continue to charge the water to reach the original pressure value (1,5 ÷ 3,5 bar); if necessary repeat the operation till from the valves come out only water.



It is recommended to maintain the water pressure between 1,5 and 3,5 bar; It is necessary equip the system with one or more membran expansion vessels with adequate volume and pressure.

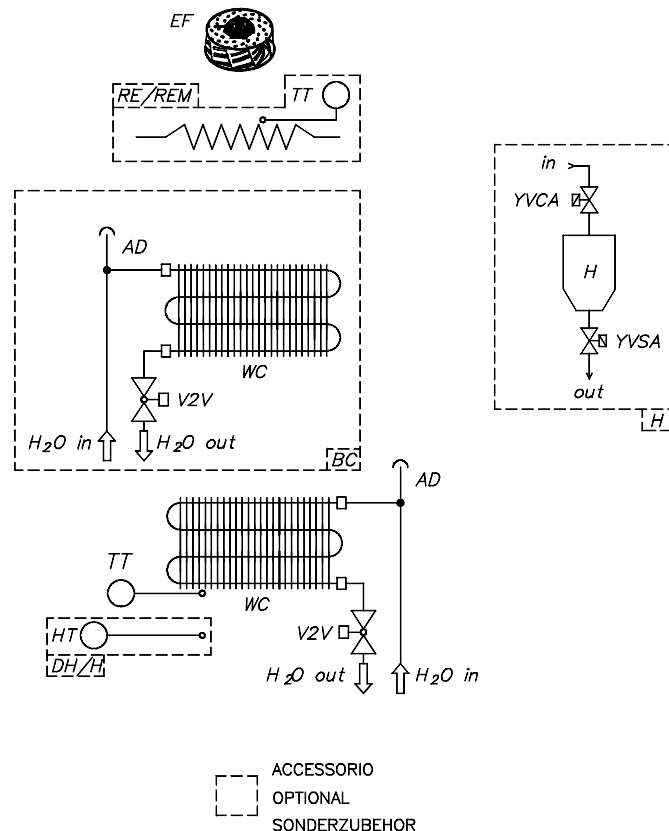
3.14 System empty

- Before the system empty it is necessary to put the main switch on OFF position.
- Be sure about filling system valve is closed;
- Open the unit external shut-off and all the system and terminals vent valves;



If the fluid inside the system is a non-freezing mixture, is not allowed to discharge in the environment cause is polluting; it must be collect for disposal or re-use.

3.15 WU – WUL cooling circuit



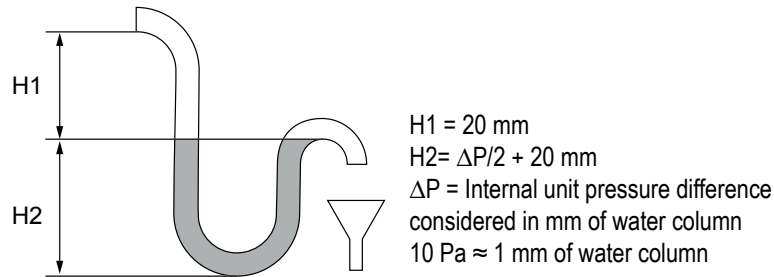
3.16 Condensing water connection

3.16.1 Condensing water connection

The unit is provided with a painted material basin for condensate collection situated under the coil, connected through a flexible plastic tube (supplied with the unit) with syphon (internal diameter of 19mm) to a drain collector which must respect a small downward slope (around 1%) to exhaust direction.



In the discharge line a syphon must be made with minimum head equal to the prevalence in fan's suction or in any case never less than 35mm.

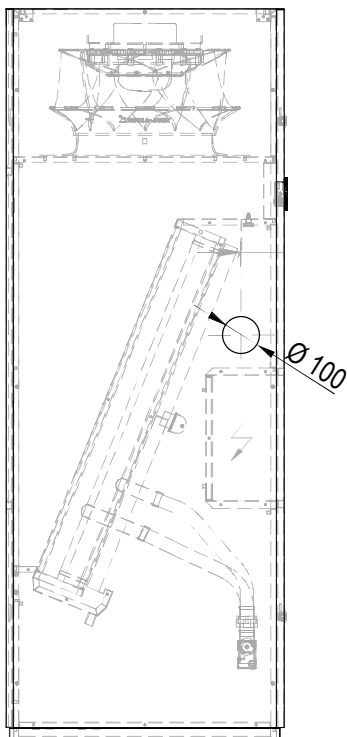


3.17 Renewal air intake connection (Optional) (PR)

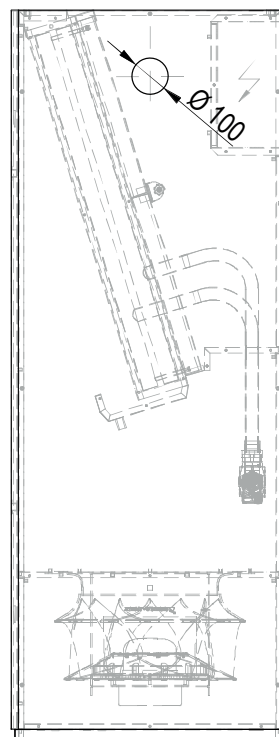
This module is usually installed inside of the unit on the left side but on request is possible to install on the right one.

The renewal air duct is coming from the nearest outlets must be fixed to the collar located on the unit lateral panel; The module of this option is provided with a flat filter, easily removable for his cleaning or replacement (moving the special catch).

Vers. U/V



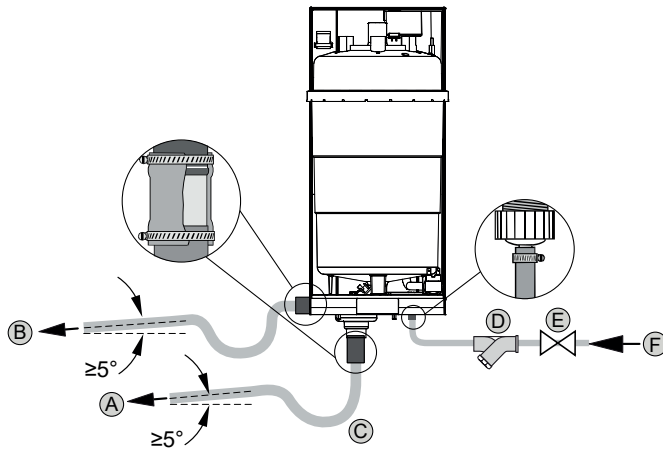
Vers. D



3.18 Humidifier (optional) (H)

3.18.1 Humidifier connection (optional)

The unit is designed to be supplied with water, sanitary preferably, using a suitable conduit provided with an interceptor shut-off valve which must be connected also to drain pipe in order to collect the condensation and excessive water. It is recommended to use clean water to supply the unit (impurity must be not bigger than 100micro) even the humidifier is provided with a filter.



A	Exhaust
B	Steam production exhaust ≥ 25 kg/h
C	Syphon
D	Filter
E	Shut-off valve
F	Power supply



It is recommended to add a mechanical filter and a shut-off valve to hold back solid impurities.



The exhaust pipe must be free, without backpressure and provided with a syphon immediately under humidifier connection.

3.18.2 Exhaust

Discharge max flow	~ 4 l/min
Discharge water connection	32 mm
Exhaust min. internal \varnothing	45 mm

3.18.3 Power supply

Supply max flow	~ 4 l/min
Supply water pump connection	$\frac{3}{4}$ " G M
Internal charge minimal \varnothing (rigid/flexible pipe)	45 mm

The drain water connection is realized using a plastic/rubber pipe (100°C resistant) with internal section between 32 ÷ 40mm (DIN 19535, UNI 8451/8452 compliant).

The discharge junction is suitable for hot blade welder with discharge pipes in Polypropilene.

3.18.3 Steam conveyeur and condensation return pipe installation

- The connection between humidifier and distributor must be realized with a suitable tube;
- During the installation avoid pocket or syphons where condense water could stop;
- Be careful not create tube bottlenecks where could be possible (turns, kinking);
- Fasten with cable ties, fixing screw provided the pipe extremities.



Suggested to limit the length of the pipe to 4mt in order to correct operation; the steam condensate pipe syphon must be filled with water before start up the humidifier

3.19 Electric connections: safety primary advices

The electrical cabinet is located inside on the front of the unit where are placed also the cooling circuit components; for the access please remove the frontal panel.



The electronic connection must be made following the electrical diagram attached to the unit following the local and international norms in force.



Ensure the power supply line is sectioned upstream of it;
Ensure the sectioning device is locked and that on the drive handle is positioned the advice to not operate.



Verify the power supply corresponds to the unit nominal data (tension, phases, frequency) provided on the wiring diagram and on the Identification Tag attached on the unit.



The power supply cables must be protected upstream against the effect of short circuits and overloads by a suitable device complying with the regulations and norms in force.



Ensure the cable supply section is suitable to the unit capacity and that safety devices taking into consideration all the factors can influence it (temperature, isolation type, length, etc.).



The electrical power supply must respect the mentioned limits otherwise the warranty will be immediately decay.



Make all the ground connections required by the legislation and norms in force.



Before to start any intervention on the unit ensure the power supply is disconnected.



The electrical line and unit external safety devices must be dimensioned in order to guarantee the power supply tension to the maximum operation conditions, provided in the wiring diagram.



If any IT power supply is present the Manufacturer must release, after checking, the connection authorisation.

3.20 Electrical data



Refer to electrical data provided in the wiring diagram;



The supply power cannot suffer variations higher than $\pm 10\%$ and the unbalance between phases less than 1% (en 60204 NORM). If those tolerances cannot be respected please contact the Manufacturer's technical department; the unit with different voltage than designed (signed in the wiring diagram) will make decay the warranty.

Model		80	150	190	250	310	440	550
Power supply	V/~ /Hz	400/3+N/50	400/3+N/50	400/3+N/50	400/3+N/50	400/3+N/50	400/3+N/50	400/3+N/50
Control circuit	V/~ /Hz	24V/50	24V/50	24V/50	24V/50	24V/50	24V/50	24V/50
Auxiliary circuit	V/~ /Hz	24V/50	24V/50	24V/50	24V/50	24V/50	24V/50	24V/50
Fans power supply	V/~ /Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Line section	mm ²	2,5	2,5	2,5	2,5	2,5	2,5	2,5
PE section	mm ²	2,5	2,5	2,5	2,5	2,5	2,5	2,5

Model		640	700	840	960	1050	1300
Power supply	V/~ /Hz	400/3+N/50	400/3+N/50	400/3+N/50	400/3+N/50	400/3+N/50	400/3+N/50
Control circuit	V/~ /Hz	24V/50	24V/50	24V/50	24V/50	24V/50	24V/50
Auxiliary circuit	V/~ /Hz	24V/50	24V/50	24V/50	24V/50	24V/50	24V/50
Fans power supply	V/~ /Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Line section	mm ²	2,5	2,5	2,5	2,5	2,5	4
PE section	mm ²	2,5	2,5	2,5	2,5	2,5	4

Model		1450	1600	1710	1900	2100	2300
Power supply	V/~ /Hz	400/3+N/50	400/3+N/50	400/3+N/50	400/3+N/50	400/3+N/50	400/3+N/50
Control circuit	V/~ /Hz	24V/50	24V/50	24V/50	24V/50	24V/50	24V/50
Auxiliary circuit	V/~ /Hz	24V/50	24V/50	24V/50	24V/50	24V/50	24V/50
Fans power supply	V/~ /Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Line section	mm ²	4	4	4	4	4	4
PE section	mm ²	4	4	4	4	4	4



The electrical data could change without any advice; it is necessary to refer always to the wiring diagram provided with the unit.

3.21 How to connect the power supply

The unit must be powered with a 5-poles cable (3phases +N +T) if the power supply is 400V / 3ph / 50Hz; on request is possible to provide the unit with a special power supply (refer to Identification Tag and wiring diagram).

Connect three phases and the neutral wire to prepared terminals of the main switch and the earth one to its corresponding terminal; Use a power supply cable of adequate section and as short as possible in order to avoid voltage drops.

Protect the main cable with an automatic switch of appropriate size and features, both specified in the wiring diagram, attached to the present Manual.

The entrance of the power supply wire is indicated in the technical wiring of the unit attached to the present Manual, the entrance must be adequately protected in accordance with local norms in force.



If the main wire comes from the top of the unit it is advisable to make a bend break before plugging in into the connection.

As soon as the customer will receive the unit it is recommended to perform a visual inspection on the electric circuit to avoid a transport damage; Particularly check every terminal screw, their tightening and the integrity of every cable isolation.

The conductors for the phases of the power supply wire must be connected to the free terminal in the input to the general switch of the unit, the earth conductor must be fixed to the corresponding terminal or bar (identify with PE).

For WU L series the ventilation module supply wires must be connected to derivation box provided.

3.21.1 User terminal board connection

A user terminal board is available with free contacts designed for:

- General alarm (1);
- Unit remote ON/OFF (2).

Inside of the electrical board are available a terminal where are positioned the digital and analogic signals for the unit operation; the terminal configuration could change unit by unit so refer to the one represented in the wiring diagram attached to the present Manual.

3.21.1 Phases sequence check

The unit devices rotation (pump, fans, compressors, etc) are verified and harmonized during the factory tests performed directly by the Manufacturer (except for the unit with a special power supply or the units cannot be started). Once connection is made it is necessary to check if the phases are well connected, on this purpose make sure all electric devices rotation is right.

For three phases units if one component rotation is wrong it must be assumed that every component rotation is wrong, so two of three phases must be inverted on the main switch terminal.



To avoid connection errors other conductors belonging to the main switch must not be disconnected, in addition to the two involved in the operation.

4. START UP

4.1 Preliminary checks

Before to start up the unit must be necessary perform some electric, hydraulic and cooling checks.



Commissioning operations must be performed following the previous mentioned indications.



It is recommended to never switch OFF the unit for the temporary stop using the main switch; this device must be used only to disconnect the unit when a current is absent, for example when the unit is OFF.

4.1.1 Before to start up



Malfunctions or damages can derive also by lack of attention during shipping and installation.

- Check the right installation in accordance with advices in the present Manual;
- Check the electric connection and the terminal screw connections;
- Check the phases voltage (R S T) and the compliance with the Identification Tag;
- Check the unit ground connection;
- Check all the hydraulic connections are correctly performed and all the indications on the plates are respected;
- Check the system has been properly vented;
- Check the fluid temperatures, they must respect the operation limits;
- Before to start up the unit check every panel is in right position and well closed with the fixing screws.



Do not modify any unit connection, otherwise the warranty immediately decay.

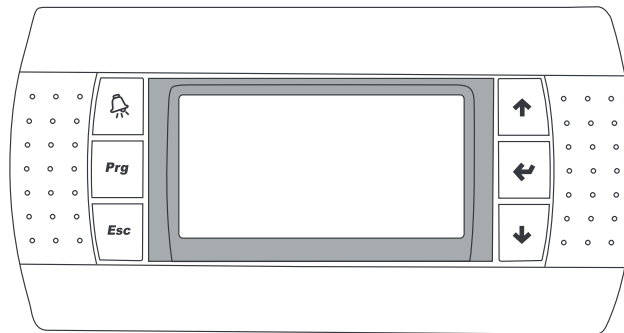
4.1.2 Safety and control devices calibration

Device		Set-point	Differential	Reset type
Air temperature	°C	24	2	----
Relative humidity	%	50	2	----

4.1.3 Operating checks

Check the fans rotation; if is incorrect disconnect immediately the main switch and change one of the main power supply phases in order to invert the motor rotation.

4.2 Controller description

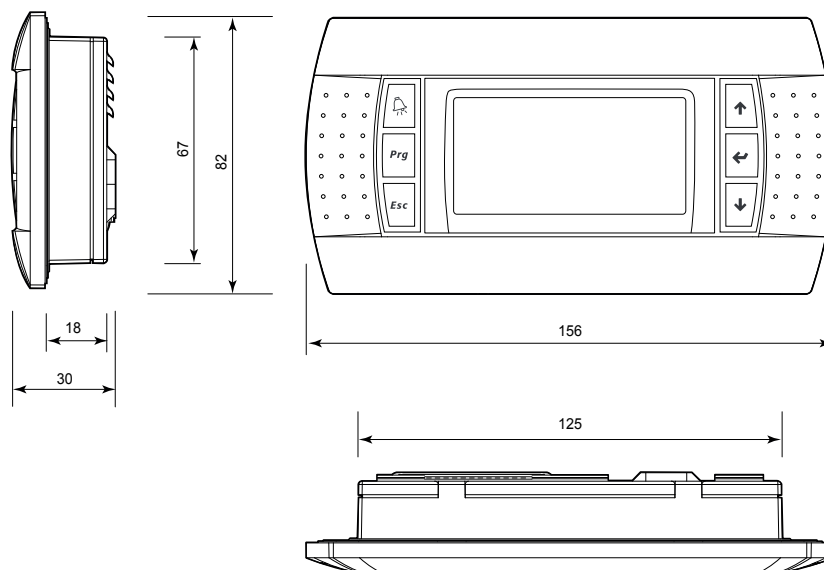


4.2.1 Keys function

	Allows alarms display with manual reset possibility.
Prg	Allows to enter to the main Menu.
Esc	Back to previous or standby mask.
	Scrolling the menu or values to be modified.
	Enter: allows to enter in the parameter to be modified or to enter into selected menu.
	Scrolling the menu or the values to be modified.

4.3 Remote control description

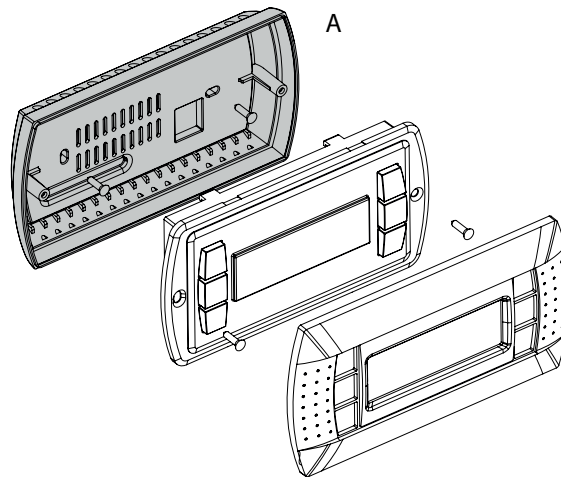
4.3.1 Dimensions



4.3.2 Wall installation

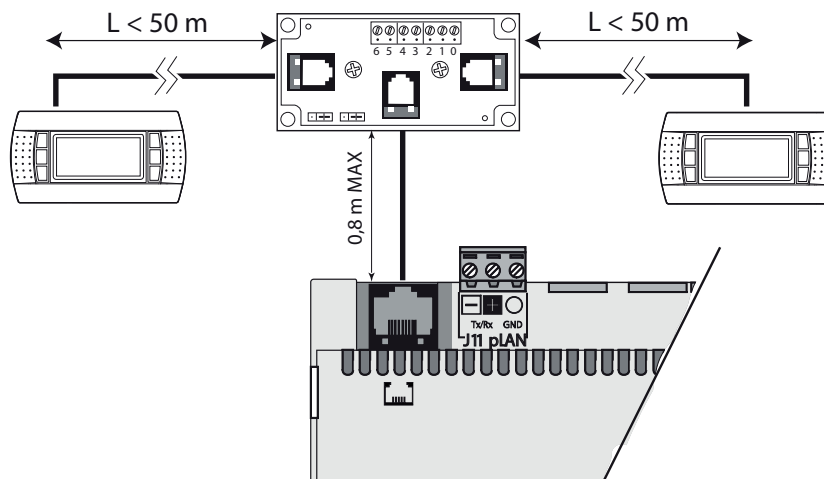
This type of installation excepts for first to install the back panel A using a standard box with 3 modules.

- Fix the back panel using the provided screws;
- Connect the phone cable;
- Lay the frontal panel (display) and fix it with provided screws as shown in the below picture;
- Install the final frame pushing over to the clip.



4.3.3 Electrical connection

The phone cable connection is coming from the card to the back terminal suitable connector.



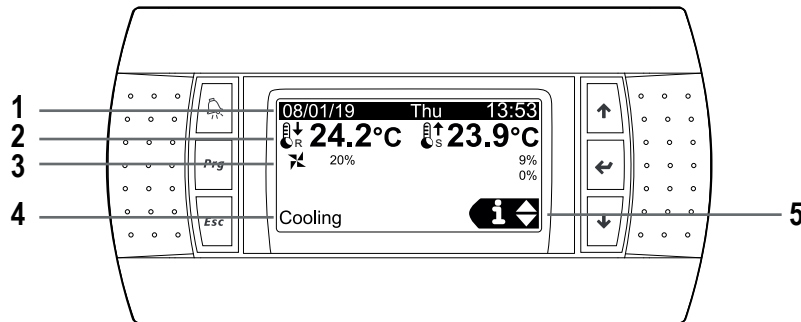
For the control panel electrical connection refer to the wiring diagram provided with the unit



If a wiring controller/terminal trouble occurs the faulty communication between the controller and remote terminal will be displayed with "noL" (no Link) error message.

4.4 User interface

Below picture is the standby visualisation:



1	Date and time;																																												
2	Regulation probes (suction air “R” and discharge “S”); in case of humidity control is enabled the temperature value is alternated with humidity one;																																												
3	Compressors mode; thermoregulation request and actual discharge fan speed;																																												
4	<table border="1"> <tr> <td colspan="2">Unit mode:</td> </tr> <tr> <td>Stand by</td> <td>Only fan active, no cooling requirement</td> </tr> <tr> <td>Off by alarm</td> <td>Several alarm unit STOP</td> </tr> <tr> <td>Off by BMS</td> <td>Supervision control unit STOP</td> </tr> <tr> <td>Off by sched</td> <td></td> </tr> <tr> <td>Off by DI</td> <td>Digital input unit STOP</td> </tr> <tr> <td>Off by keyboard</td> <td>Keyboard unit STOP</td> </tr> <tr> <td>Manual mode</td> <td>Unit with at least one device in manual mode</td> </tr> <tr> <td>Start-up</td> <td>BLDC compressors ON with start-up speed</td> </tr> <tr> <td>Shutdown</td> <td>Power decrease after a request of unit OFF</td> </tr> <tr> <td colspan="2">Safety off</td> </tr> <tr> <td>High Delta P</td> <td>BLDC compressor wait about pressure reduction to start</td> </tr> <tr> <td>Cooling</td> <td>Cooling ON unit</td> </tr> <tr> <td>Restarting</td> <td>BLDC compressor s trying to restart</td> </tr> <tr> <td>Wait timings</td> <td>Waiting timing OFF compressors</td> </tr> <tr> <td>Oil recovering</td> <td>BLDC oil recovery function enabled</td> </tr> <tr> <td>Off by network</td> <td>Unit OFF by duty-standby function</td> </tr> <tr> <td>Destabilization</td> <td>Oil recovery function enabled using destabilisation system</td> </tr> <tr> <td>Dehumidification</td> <td>Dehumidification mode enabled</td> </tr> <tr> <td>Pump down</td> <td>Pump down mode enabled</td> </tr> <tr> <td colspan="2">Heating</td> </tr> <tr> <td colspan="2">Freecooling</td> </tr> </table>	Unit mode:		Stand by	Only fan active, no cooling requirement	Off by alarm	Several alarm unit STOP	Off by BMS	Supervision control unit STOP	Off by sched		Off by DI	Digital input unit STOP	Off by keyboard	Keyboard unit STOP	Manual mode	Unit with at least one device in manual mode	Start-up	BLDC compressors ON with start-up speed	Shutdown	Power decrease after a request of unit OFF	Safety off		High Delta P	BLDC compressor wait about pressure reduction to start	Cooling	Cooling ON unit	Restarting	BLDC compressor s trying to restart	Wait timings	Waiting timing OFF compressors	Oil recovering	BLDC oil recovery function enabled	Off by network	Unit OFF by duty-standby function	Destabilization	Oil recovery function enabled using destabilisation system	Dehumidification	Dehumidification mode enabled	Pump down	Pump down mode enabled	Heating		Freecooling	
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Dehumidification	Dehumidification mode enabled																																												
Pump down	Pump down mode enabled																																												
Heating																																													
Freecooling																																													
5	Quick access Menu																																												

5. USE


5.1 Password settings

The program has 3 different password levels:

- User: allows only to read all the parameters;
- Service: allows to read all the parameters and to modify some of them;
- Manufacturer: allows to read and modify all the parameters.



In the present Manual will be described only User password use.


5.1.1 Masks loop and organisation

Inside every menu the masks are arranged in loop; with  and  s possible to switch through them. Every mask is defined using a 4-digit code displayed to the top-right of the screen and it is composed as follow:




- 1° digit: Main menu code;
- 2° digit: Secondary menu code;
- 3° and 4° digit: mask code

5.2 Quick access menu

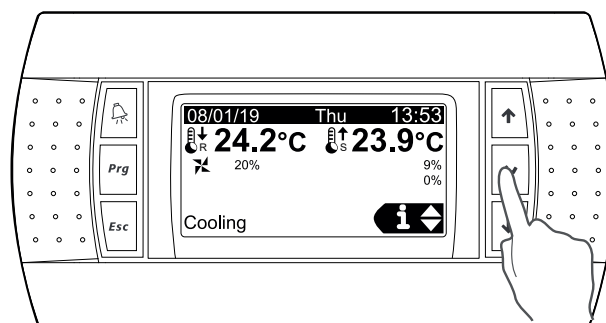
From main screen using  and  keys is possible to slide the areas of quick access menu;

To enter presse  key. Is it possible to display the parameters without any password

The quick menu areas are:

	INFO: Contains the actual unit operating functions in synoptic form, input states and outputs, serial devices and software informations
	ON/OFF: Allows to start up or shut down the unit
	SET POINT: Allow to change the temperature, humidity and fan set points

5.2.1 INFO menu



<p>Info - Inv.circl1 Z001</p> <p>Out: 0 0.0 DAR 0.0 T.disp: 0.0 STATUS: DeltaP: 0.0 OFF T.suc: 0.0 0.0 DAR 0.0</p>	<p>Compressor circ.1 condition (with inverter): intake and exhaust temperature, low and high pressure.</p>
<p>Info - Circuit 1 Z002</p> <p>Safety Timing Inverter comp.1 On-On: (0s) Min.On: (0s)</p>	<p>Compressor safety timing circ.1 (inverter).</p>
<p>Info - Inv.circl2 Z003</p> <p>Out: 0 0.0 DAR 0.0 T.disp: 0.0 STATUS: DeltaP: 0.0 OFF T.suc: 0.0 0.0 DAR 0.0</p>	<p>Compressor circ.2 condition (with inverter): intake and exhaust temperature, low and high pressure.</p>
<p>Info - Circuit 2 Z004</p> <p>Inverter comp.3 Req 0% --> 0% On->On: (0s) Min.On: (0s) Compressor 4 Req: OFF -> Status: ALARM</p>	<p>Compressor safety timing circ.2 (inverter).</p>
<p>Info - EEV 1 Z005</p> <p>0% 0stp STATUS: Set: 0.0°C Suction SH: 0.0°C</p>	<p>Thermostatic valve condition - circ.1</p>
<p>Info - EEV 1 Z006</p> <p>Suct.P.: 0.0 bar Suct.T.: 0.0 °C Suction SH: 0.0 °C Dscg.P.: 0.0 bar Dscg.T.: 0.0 °C</p>	<p>Overheating condition circ.1</p>
<p>Info - EEV 2 Z007</p> <p>0% 0stp STATUS: Set: 0.0°C Suction SH: 0.0°C</p>	<p>Thermostatic valve condition - circ.s</p>
<p>Info - EEV 2 Z008</p> <p>Suct.P.: 0.0 bar Suct.T.: 0.0 °C Suction SH: 0.0 °C Dscg.P.: 0.0 bar Dscg.T.: 0.0 °C</p>	<p>Overheating condition circ.2</p>
<p>Info - Source 2 Z009</p> <p>PREVENT ACTIVE Disc.press: 19.9 bar Setpoint: 18.0 bar Source: 0.0%</p>	<p>Shown when the PREVENT function is activated.</p>
<p>Info - Source 2 Z010</p> <p>Disc.press: 19.9 bar Setpoint: 18.0 bar Source: 0.0%</p>	<p>Shown when the PREVENT function is activated.</p>
<p>Info - Humid. Z012</p> <p>Rich. attuale: 0% Corrente: 0.0 A Conducib.: 0µs Prod.Vapore: 0.0kg/h Stato cilindro: Ness.prod.</p>	<p>It shows the Humidifier status (demand, absorbed current, steam production).</p>

<p>Info - Humid. Z013 Curr.request: 0% Dehum.Running: 0 Rel. Abs. [%] [gH2O/kg] Hum. 21.4 3.32 Set. 5.0 0.92</p>	<p>It allows to consult the information on the dehumidification mode.</p>
<p>Info - Freecool. Z014 Damper/valve on: 0 Freec.temp.: 23.1 °C Freec.request: 0.0%</p>	<p>Shown when the FREECOOLING function is activated.</p>
<p>Info - Hot Req. Z017 Request heaters: 81%</p>	<p>It allows to consult the information on the heating mode.</p>
<p>Info - Heater. Z018 Heater 1: 0 Heater 2: 0</p>	<p>It allows you to check whether the digital outputs of the heaters are active.</p>
<p>Unit Conf. Z101 Return temperature (U01) Value: 24.2 °C Offset: 0.0 °C Type: NTC</p>	<p>Provides information on the input temperature of the machine.</p>
<p>Unit Conf. Z102 Supply temperature (U02) Value: 23.2 °C Offset: 0.0 °C Type: NTC</p>	<p>Provides information on the output temperature of the machine.</p>
<p>Unit Conf. Z103 Return humidity (U04) Value: 48.4% Offset: 0.0% Type: 0-10U Minimum: 10.0% Maximum: 90.0%</p>	<p>Provides information on the input humidity value of the machine. It can be enabled by the Ga10 mask.</p>
<p>Unit Conf. Z105 Freecool. temperature (U06) Value: 23.1 °C Offset: 0.0 °C Type: NTC</p>	<p>Provides information on freecooling settings. It can be enabled by the Ga07 mask.</p>
<p>Unit Conf. Z106 Fan diff. press. (U05) Value: 7166.9 m3/h Minimum: 0.0 m3/h Maximum: 7589.5 m3/h</p>	<p>Provides information on the differential pressure level of the fans. It can be enabled by the Ga10 mask.</p>
<p>Unit Conf. Z121 External temperature for compensation (U07) Value: 20.8 °C Offset: 0.0 °C Type: NTC</p>	<p>Provides information on temperature set point compensation settings.</p>
<p>Conf. unita' Z122 Setpoint esterno (U08) Valore: -9,9 °C Offset: 0.0 °C Tipo: 0-1U Minimo: -9,9 °C Massimo: 9,9 °C</p>	<p>It provides information on the external set point setting.</p>
<p>Info - IO Z201 Start/Stop (ID01) Value: Active Logic: NC HW valve: Closed</p>	<p>On/Off digital input condition</p>

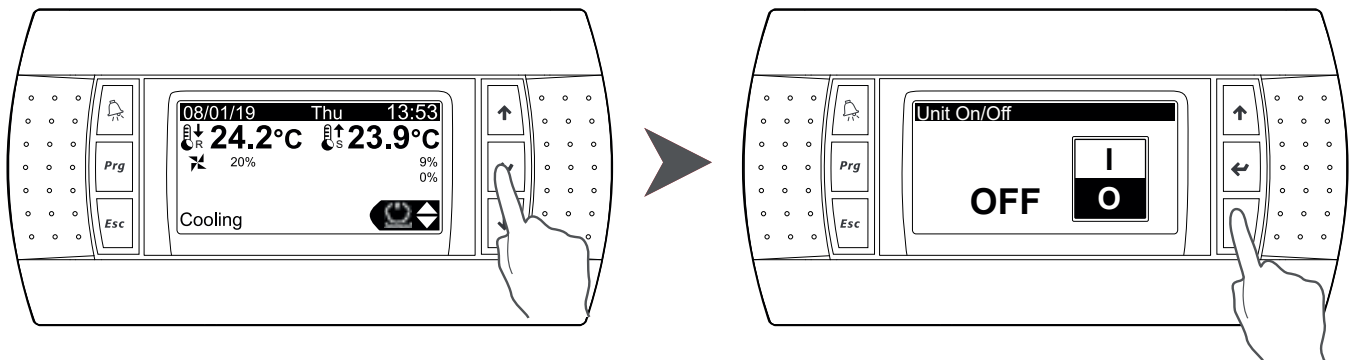
<p>Info - IO Z207 Pressostato LP circ.1 (ID09) Valore: Attivo Logica: NC Valore HW: Aperto</p>	<p>Pressure Switch digital input status.</p>
<p>Info - IO Z209 Pressostato LP circ.2 (ID10) Valore: Attivo Logica: NC Valore HW: Aperto</p>	<p>Pressure Switch digital input status.</p>
<p>Info - IO Z210 Humidifier Alarm (ID07) Value: Not Active Logic: NC HW valve: Closed</p>	<p>Digital input condition of humidifier alarm.</p>
<p>Info - IO Z211 Heaters overload (ID04) Value: Not Active Logic: NC HW valve: Closed</p>	<p>Thermal state electrical heaters 1 and 2. Possibility to enable them with sigital input from Ga10 mask.</p>
<p>Info - IO Z123 Air filter (ID03) Value: Active Logic: NC HW Value: Open</p>	<p>Provides information on filter cleaning status.</p>
<p>Info - IO Z223 Air flw./Ovld.main fan (ID02) Value: Not Active Logic: NC HW valve: Closed</p>	<p>Display the condition of the air flow switch & main fan thermostat.</p>
<p>Info - IO Z224 Term.comp.1/2 circ 1 o HPS 2 (ID04) Valore: Attivo Logica: NO Valore HW: Aperto</p>	<p>Compressor overload protection digital input status.</p>
<p>Info - IO Z225 Smoke/Fire detector (ID06) Value: Active Logic: NO HW valve: Open</p>	<p>It shows the fire/smoke alarm status (from digital input). It can be enabled from the mask Ga09 and can have the same input of the flooding detector.</p>
<p>Info - IO Z226 Term.comp.1/2 circ 2 o HPS 2 (ID08) Valore: Attivo Logica: NO Valore HW: Aperto</p>	<p>Compressor overload protection digital input status.</p>
<p>Info - IO Z302 Comp.1 Circ.1 OnOff (N005) Valore: Non attivo Logica: NO Valore HW: Aperto</p>	<p>Display of Compressor 1 Circuit 1 status digital output (On/Off type).</p>
<p>Info - IO Z304 Comp.1 Circ.2 OnOff (N012) Valore: Non attivo Logica: NO Valore HW: Aperto</p>	<p>Display of Compressor 1 Circuit 2 status digital output (On/Off type).</p>
<p>Info - IO Z309 Valv.eq.olio circi.2 (N010) Valore: Non attivo Logica: NO Valore HW: Aperto</p>	<p>Display of oil equalization valve circuit 2 digital output.</p>

<p>Info - IO Z323 Open hot valve (NO02) Value: Not Active Logic: NO HW valve: Opened</p>	<p>Display of the digital outputs condition of the hot valve or the electrical heater.</p>
<p>Info - IO Z324 Close hot valve (NO03) Value: Active Logic: NO HW valve: Closed</p>	<p>Display of the condition of the digital outputs of the hot valve or the electrical heater.</p>
<p>Info - IO Z325 Allgrave (NO06) Valore: Attivo Logica: NO Valore HW: Chiuso</p>	<p>Display of serious Alarm/ general alarm digital output.</p>
<p>Info - IO Z326 Warning (NO07) Valore: Attivo Logica: NO Valore HW: Aperto</p>	<p>Display of Warning/ minor alarm digital output</p>
<p>Info - IO Z329 Supply fan (NO01) Value: Active Logic: NO HW valve: Closed</p>	<p>Display of the condition of the main fan</p>
<p>Info - IO Z330 On/Off analogic hum. (NO08) Value: Active Logic: NO HW valve: Closed</p>	<p>Display of the digital output condition for the humidifier on/off</p>
<p>Info - IO Z331 Freecooling (NO09) Value: Not Active Logic: NO HW valve: Opened</p>	<p>Display of the freecooling digital output. It can be enabled by the Ga11 mask.</p>
<p>Info - IO Z332 On/Off dehumidifier (NO10) Value: Active Logic: NO HW valve: Closed</p>	<p>Display of On/Off for external dehumidifier output.</p>
<p>Info - IO Z333 On/Off source (NO11) Value: Active Logic: NO HW valve: Closed</p>	<p>Display of On/Off for remote condenser output.</p>
<p>Info - IO Z334 Inverter comp.1 (NO04) Valore: Non attivo Logica: NO Valore HW: Aperto</p>	<p>Display of compressor 1 inverter digital output.</p>
<p>Info - IO Z335 Equaliz.olio circ.1 (NO08) Valore: Non attivo Logica: NO Valore HW: Aperto</p>	<p>Display of oil equalization valve circuit 1 digital output .</p>
<p>Info - IO Z336 Inverter comp.2 (NO11) Valore: Non attivo Logica: NO Valore HW: Aperto</p>	<p>Display of compressor 2 inverter digital output.</p>

<p>Info - IO Z337 Equaliz.olio circ.2 (N008) Valore: Non attivo Logica: NO Valore HW: Aperto</p>	Display of oil equalization valve circuit 2 digital output.
<p>Info - IO Z413 Inverter comp.1 (Y03) Valore: 0.0% Tipo: 0-10V</p>	Display of compressor 1 inverter analogue output.
<p>Info - IO Z413 Inverter comp.2 (Y04) Valore: 0.0% Tipo: 0-10V</p>	Display of compressor 2 inverter analogue output.
<p>Info - IO Z414 Supply vent (Y01) Valore: 0.0% Tipo: 0-10V</p>	Display of main fan analogue output.
<p>Info - IO Z415 Freecooling (Y02) Valore: 0.0% Tipo: 0-10V</p>	Display Freecooling analogue output.
<p>Info - IO Z408 Humidifier (Y02) Value: 100.0% Type: 0-10V</p>	Display the conditions of the analogical humidifier
<p>Info - IO Z409 Hot Valve (Y03) Value: 0.0% Type: 0-10V</p>	Display the conditions of the hot valve
<p>Info - IO Z410 Freecooling (Y03) Value: 0.0% Type: 0-10V</p>	Display analogical freecooling output
<p>Working hours Z500 Inv.comp,circ.1 Hours: 0h Next thresh.: 30000h Reset hours: NO Dev.Status: OFF N.Start: 45 Reset N.start: NO</p>	Compressor counter circuit 1.
<p>Ore lavoro Z501 Inv.comp,circ.1 (OnOff) Hours: 0h Next thresh.: 30000h Reset hours: NO Dev.Status: OFF N.Start: 45 Reset N.start: NO</p>	Contaore compressore circuito 1.
<p>Working hours Z503 Inv.comp,circ.2 Hours: 0h Next thresh.: 30000h Reset hours: NO Dev.Status: OFF N.Start: 25 Reset N.start: NO</p>	Compressor counter circuit 2
<p>Working hours Z504 Inv.comp,circ.2 (OnOff) Hours: 0h Next thresh.: 30000h Reset hours: NO Dev.Status: OFF N.Start: 25 Reset N.start: NO</p>	Contaore compressore circuito 2.

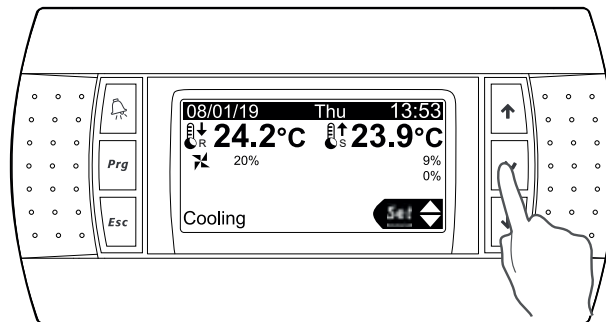
Working hours Z506 Heaters 1 Hours: 0h Next thresh.: 99000h Reset hours: NO Dev.Status: OFF	Heater 1 hour counter
Working hours Z507 Heaters 2 Hours: 0h Next thresh.: 99000h Reset hours: NO Dev.Status: OFF	Heater 2 hour counter
Ore lavoro Z509 Vent.Source. 1 Ore: 0h Soglia succ.: 99000h Reset ore: NO Stato dispos.: OFF	Condenser fan 1 Hour Counter.
Ore lavoro Z510 Vent.Source. 2 Ore: 0h Soglia succ.: 99000h Reset ore: NO Stato dispos.: OFF	Condenser fan 2 Hour Counter.
Working hours Z512 Unit working Hours: 6h Next thresh.: 99000h Reset hours: NO Dev.Status: ON	Unit operation hour counter.
Info Z530 Info blackout Ora attuale: 01/03/21 13:28:59 PowerOff temp: 27/02/21 01:56:05 Durata ultimo spegnim: 2Giorni 100re 24Min	Information Power On / Power Off.
Info Z531 Info Sist. Scheda type: uPC3 Scheda size: Medium Scheda temp: 0° C Ret mem writes: 131 Funz.princ.: 182ms 5.5Ciclo/s	Information H.W type.
Info Z532 Code: EMP8 SW ver: 2.2.001 Data: 15/12/2020 OS: 4.8.000 Boot: 4.8.000	information F.W.

5.2.2 Menu ON/OFF



To switch ON/OFF the unit enter to dedicated menu (ON/OFF) using **↑** and **↓** keys to move the cursor. Press **←** key to confirm.

5.2.3 Menu SET

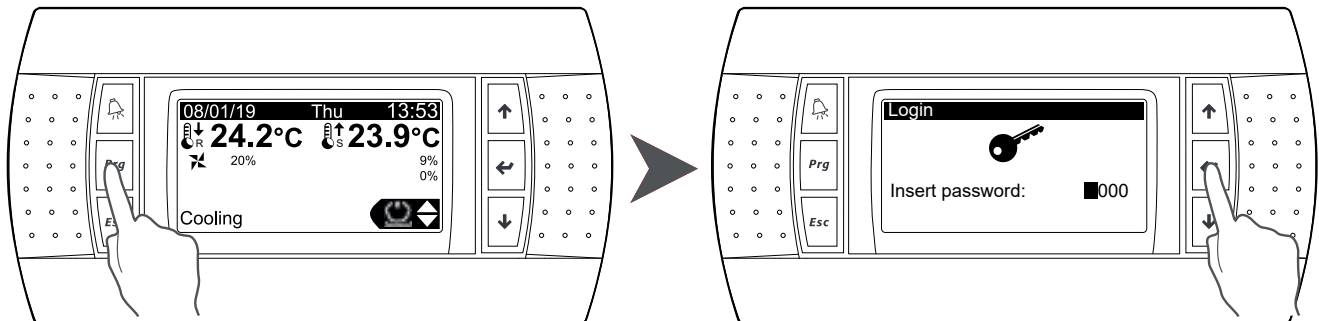


To enter in the SET menu use **↑** and **↓** keys, then press **←** key to confirm. Some set-point dedicated mask can be displayed. Move through the masks using **↑** and **↓** keys.

SCHEDULER ST00 SET POINT ACTIVE Supply : 20.0°C Return : 23.0°C Humidif. : 30.0 % Dehumidif. : 70.0 % Diff.press. : 300.0 Pa	Displaying of scheduler enable set-point.
Set point ST03 Return regulation Setpoint: 23.0°C	Return temperature set-point setting.
Set point ST04 Supply air low limit Setpoint: 20.0°C	Discharge temperature set-point setting.
Set point ST05 Fan speed: AUTO	Fan speed regulation setting.
Set point ST07 Humidification Setpoint: 30%	Umidity set-point setting.

5.3 Main menu

Regardless of the mask you are in, pressing **Prg** key is possible to enter into main menu using the password.



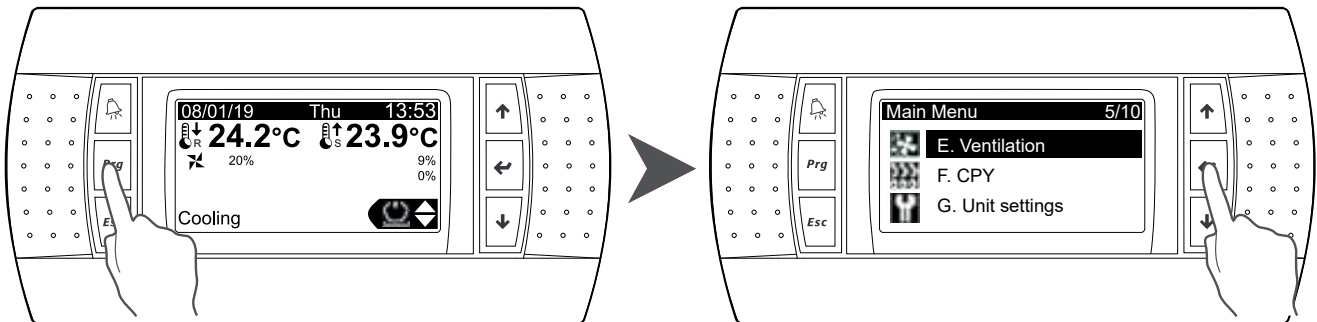
Select the value using **↑** and **↓**, keys, than press **↵** or confirm.

5.3.1 Schema menu principale

	A. Compressor (Non disponibile)
	B. ExV (Non disponibile)
	C. Power+ (Non disponibile)
	D. Source (Non disponibile)
	E. Ventilation
	F. CPY
	G. Unit settings
	<ul style="list-style-type: none"> Configuration Regulation
	H. Alarm logs
	I. Other settings
	<ul style="list-style-type: none"> Date / Time Language Network Pwd Change Inizialization
	L. Logout

5.3.2 Ventilation menu

For the access to ventilation menu press **Prg**, key, then using **↑** and **↓** keys, select E.Fans menu and press **←** key to confirm.

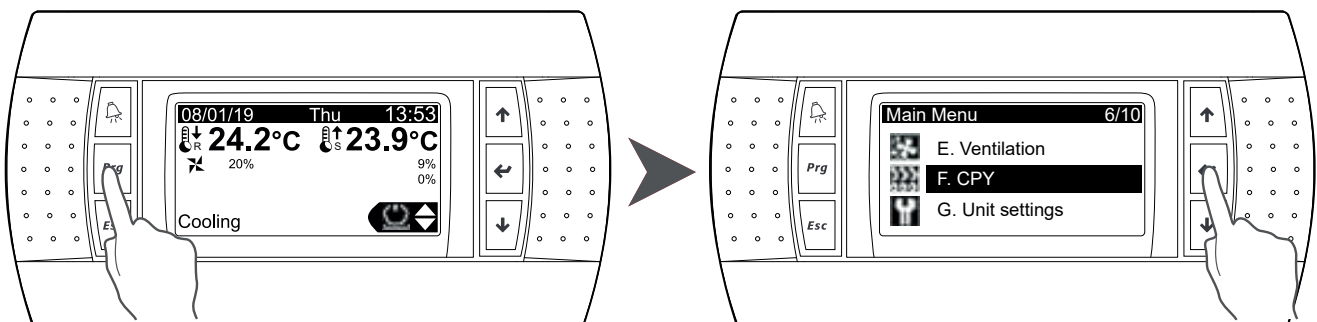


It will be possible the visualisation of some masks referred to the fans and their parameters.

Supply fan E001 Type: EC Min speed(%): 40.0% Max speed(%): 70.0% Manual/Dehum.speed: 20.0%	Visualisation of fan speed (min & max) and the dehumidification mode.
Supply fan E002 Limit speed Min speed(%): 20.0% Time startup: 60 s Time shutdown: 30 s	During the switch ON and shut OFF the fans are maintained to a constant speed for a settable time; in this mask is possible to visualize the set time.
Supply fan E003 Fan enabled: [v] Num.of fans: 2 Fan 1 online: [] Fan 1 online: []	Displaying the enabled fans, it is possible to enable 4 fans in serial mode.

5.3.3 Menu CPY

For the access to CPY menu press **Prg**, then with **↑** and **↓** keys select F.CPY menu and press **←** key to confirm.

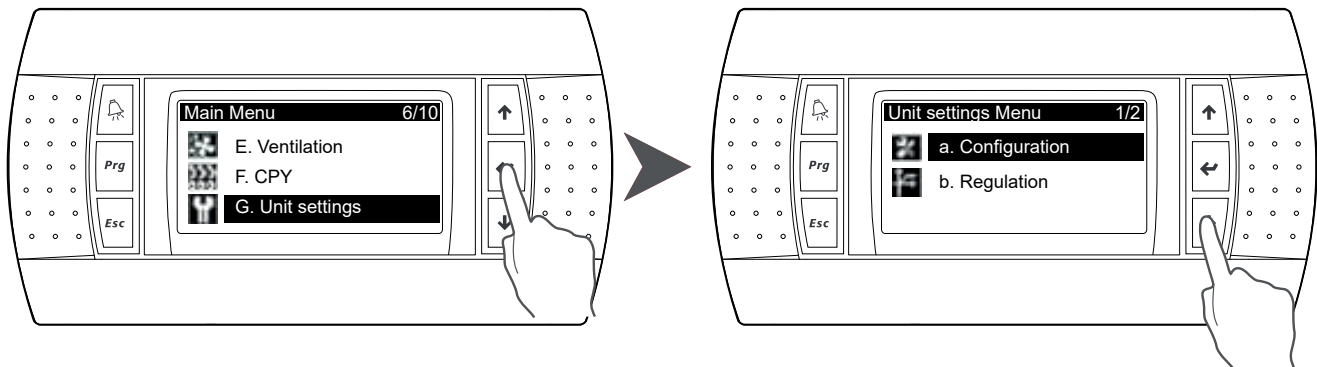


CPY F001 CPY Enable: [] Only if the humidity probe is enabled	Allows the visualization to check if the humidifier management card is enabled.
---	---

5.3.4 Unit settings menu

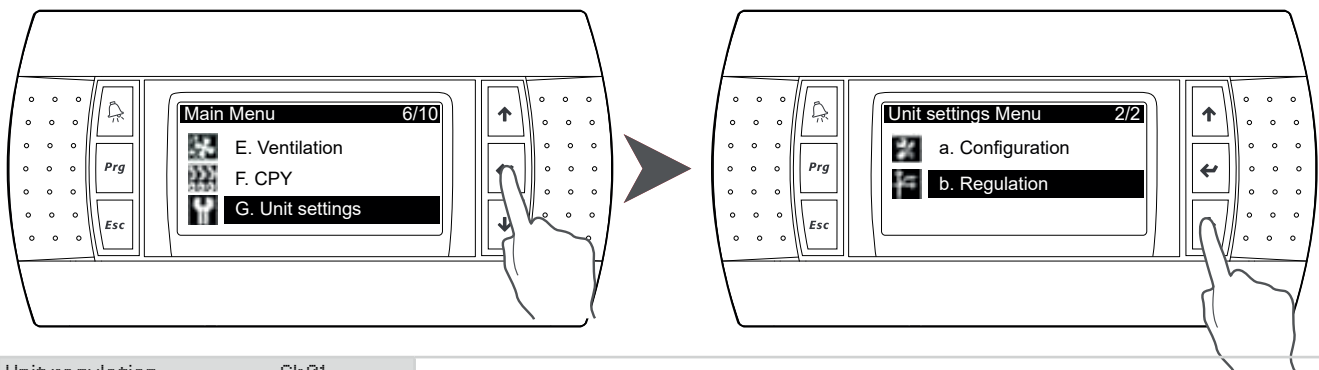
Inside of the "Unit setting" menu are two submenus: "configuration" and "regulation".

Per accedere a questi menu, dal menu "Unit settings" con i tasti and keys and select desire one, then press to confirm.



Unit config. Ga00 Unit Configuration: CW	Indicates the cooling type; in this case Chilled Water water cooled units.
Unit conf.funct. Ga07 Freecooling: [] Source: [] Humidification: [v] Dehumidification: [] Heating: REHEAT+INTEGR	Allows some function enebbling;therefore using the user password allows the visualization of enabled ones.
Unit conf.funct. Ga08 External setpoint: [] Compensation sp.: [] Control delta T.: []	Allows the visualisation of some information of set-point compensation.
Unit conf.en.IO Ga09 Ecternal setpoint: [] Return humidity: [v] Diff.pressure: [] Freecooling temp.: [] Overload heater: [v] Al.fire/smoke: [v] Al.water flooding: [v]	Allows to configure the enabled functions management.
Unit conf.en.IO Ga12 Al. fire/smoke serius: [v] Al. w.flooding serius: [v]	Allows to enable the digital input with the shown functions.
Unit conf.en.IO Ga13 Open hot vlv./heater1: [v] Close hot vlv./heater2: [v] Type dout heat.: Heater	Heaters digital outputs status configuration.
Unit conf.en.IO Ga14 Ext.air compens.: [] Warning: [] Freecool.On/Off: [] Hot vlv/Cold vlv/Hum: [v] Type analogic output: Cold valve	Analog or digital outputs enabled configuration.
Unit conf.en.IO Ga16 (Y03) Hot vlv/Cold vlv/FC Cold valve	Analog outputs configuration as selected function.

Unit conf.en.IO	Ga20	Digital output enabled as dehumidification mode.
Dehumi. On/Off:	[]	
Unit conf.en.IO	Ga23	Enabling "emergency ventilation" mode.
Emergency Ventilation		
Enable:	[]	
Unit config.	Ga24	
Main mask info:		Selection the probe type on the main mask.
Supply temp./Ret.Hum.		
Time change:	7 s	
Unit config.	Ga25	
Serial probe		Temperature serial probe configuration.
Enable serial probe for return air temp. and humidity:	[]	
Unit config.	Ga28	
Floating valve running time:	180s	Floating valve opening timing setting (2 or 3 points).
Unit config.	Ga44	
Air filter switch alarm delay:	60s	Filter alarm lag setting.
Unit config.	Ga56	
Enable On/Off by supervisor:	NO	Supervision ON/OFF enabling.
Status:	Off	
Unit config.	Ga99	
Import/Export:	IMPORT	Configuration of import/export parameter file.
Memory type:	INTERNAL FLASH MEMORY	
File name:	EXPORT_00	
Confirm:	NO	

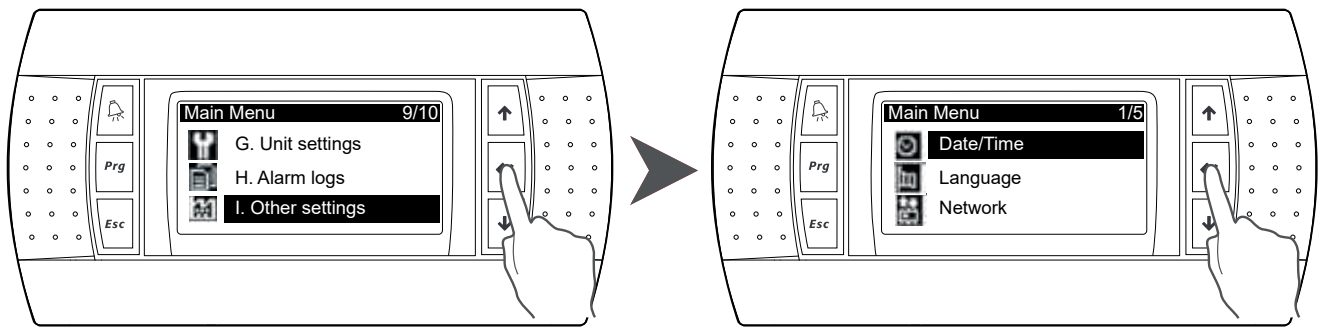


Unit regulation	Gb01	
Temp.Regulation:		Regulation mode setting.
	RETURN + SUP.LIM	
	↓	
Start unit delay:	10s	
Unit regulation	Gb02	
Return Regulation		Set-point min/max limits configuration.
Min.setpoint:	10.0°C	
Max.setpoint:	40.0°C	
Supply Regulation		
Min.setpoint:	0.0°C	
Max.setpoint:	35.0°C	

Unit regulation Gb12		
Fan Regulation Kp: 6.0 Ti: 120s		PI fan displaying/ settings.
Unit regulation Gb17		
DZ Fan: 0.0°C		PI neutral zones displaying / settings.
Unit regulation Gb20		
Comps./cooling coil Kp: 8.0 Ti: 120s		PI cold valve regulator displaying / settings.
Unit regulation Gb21		
DZ Cooling: 0.0°C		PI cooling neutral zones displaying / settings.
Unit regulation Gb22		
Supply air low limit regulation Kp: 6.0 Ti: 80s		PI discharge temperature regulation displaying / settings.
Unit regulation Limit max. dead zone Gb23		
Fan: 0.5°C		PI neutral zones limit set displaying / settings.
Cooling: 0.5°C		
Unit regulation Gb24		
Humidification Kp: 6.0 Ti: 80s		Allows to display / set the parameters for humidifier function regulation.
Unit regulation Rehating heaters Gb32		
Rehating: 2 STEPS Setpoint offset: 5.0°C Current set: Return Step delay: 60s		Heaters regulation type displaying / settings.
Unit regulation Rehating PID heaters Gb36		
Kp: 8.0 Ti: 60s Td: 0s		Heaters PID displaying / settings.
Unit regulation Temperature alarms Gb40		
High return temp: Setpoint: 30.0°C Differential: 1.0°C		High and low suction temperature values displaying / settings.
Low return temp: Setpoint: 5.0°C Differential: 1.0°C		
Unit regulation Temperature alarms Gb44		
High supply temp: Setpoint: 30.0°C Differential: 1.0°C		High and low discharge temperature values displaying / settings.
Low supply temp: Setpoint: 5.0°C Differential: 1.0°C		
Unit regulation Humidity alarms Gb46		
High return hum: Setpoint: 95.0% Differential: 5.0%		High and low suction pressure values displaying / settings.
Low return hum: Setpoint: 5.0% Differential: 5.0%		

Unit regulation Temperature and humidity alarm	Gb48	High and low humidity or temperature delay alarm displaying / settings.
Delay time:	600s	
Unit regulation overload fan	Gb49	Main fan thermal alarm delay displaying / settings.
Delay time:	10s	
Unit regulation Number alarm/hour	Gb51	Heaters thermal alarm delay number (per hour) displaying / settings.
Overload Heater:	3	
Unit regulation	Gb56	Possibility to set integral time = 0 or not.
Disable Ti:	[v]	
Unit regulation	Gb57	Air flow regulation enabling.
En.Reg.Flow:	[v]	

5.3.5 Other settings menu

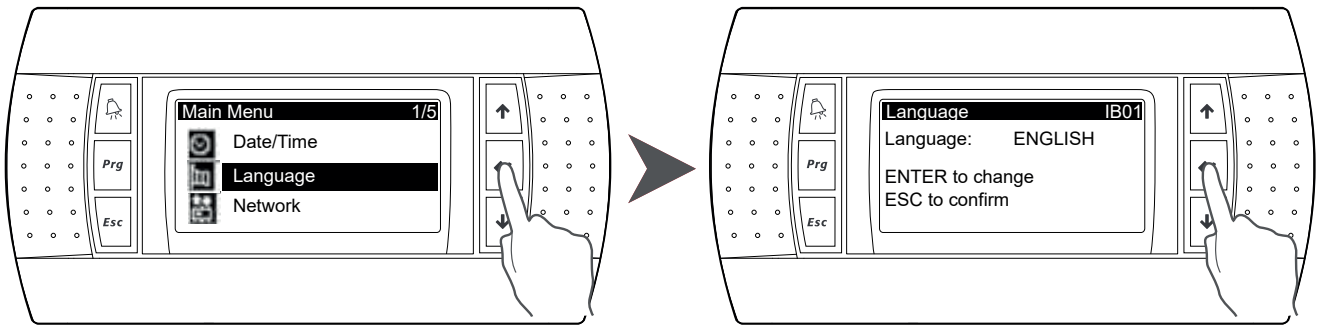


Data/Time

Date./Time change	IA01	Date and time format settings.
Format:	DD/MM/YY	
Date:	05/04/19	
Hour:	10:52:02	
Day:	Friday	Time zone enabling.
Timezone	IA02	
Current timezone:	GMT	
Change to:	GMT	
Update Timezone:	NO	Scheduler enabling.
SCHEDULER	IA03	
Enable?	Yes	
10:55 FRI 05/04/2019		
Sched. is not running		Economy mode set-point settings.
Unit status:	COMFORT	
SCHEDULER	IA04	
ECONOMY SETPOINT		
Supply :	20.0°C	
Return :	20.0°C	
Humidif. :	30.0%	
Dehumidif. :	70.0%	
Diff.press. :	300 Pa	

SCHEDULER IA04a ECONOMY SETPOINT Source max speed: 90.0%	Economy mode condenser max speed settings.
SCHEDULER IA05 PRE-COMF SETPOINT Supply : 20.0°C Return : 23.0°C Humidif. : 30.0% Dehumidif. : 70.0% Diff.press. : 300 Pa	Economy mode condenser max speed settings.
SCHEDULER IA05a PRE-COMF SETPOINT Source max speed: 90.0%	Pre comfort mode condenser max speed settings.
SCHEDULER IA06 COMFORT SETPOINT Supply : 20.0°C Return : 23.0°C Humidif. : 30.0% Dehumidif. : 70.0% Diff.press. : 300 Pa	Comfort mode set point settings.
SCHEDULER IA06a COMFORT SETPOINT Source max speed: 90.0%	Comfort mode condenser max speed settings.
DAILY EVENTS IA07 Day: Sunday Copy to: ALL Ok? No [] 1 --:-- :-- [] 2 --:-- :-- [] 3 --:-- :-- [] 4 --:-- :-- Save data? No	Daily scheduler settings.
VACATIONS PERIOD IA08 Start End Status [] --/-- --/-- --- [] --/-- --/-- --- [] --/-- --/-- ---	Daily scheduler settings.
SPECIAL DAYS IA09 [] 1 --:-- :-- [] 2 --:-- :-- [] 3 --:-- :-- [] 4 --:-- :-- [] 5 --:-- :-- [] 6 --:-- :--	Daily scheduler settings.

Language



Press key to select the language you want to use and then **Esc** to confirm.

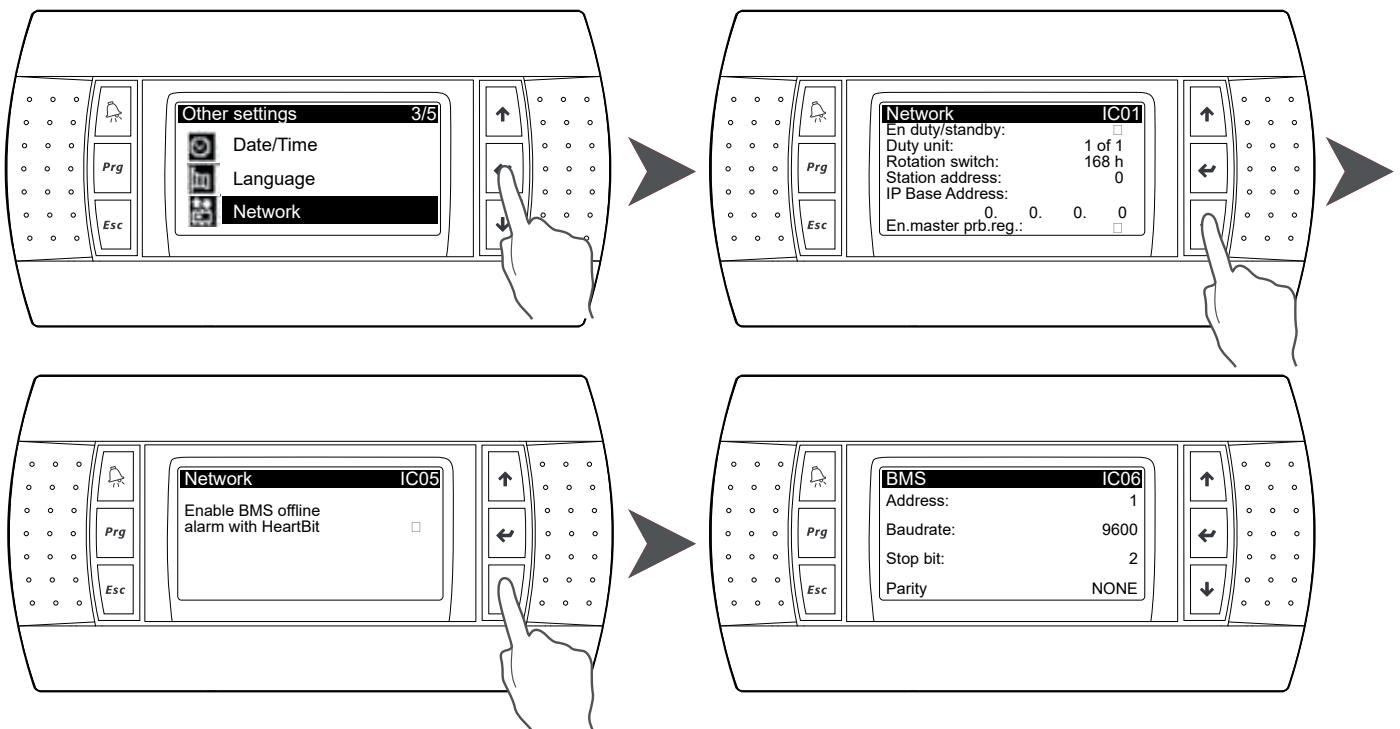
Are available the following languages: Italia, English, French, German and Spanish.

Network

It is possible to manage until 16 units using the multimaster network; the duty / stand-by rotation allows to exclude some units meanwhile the others are in backup mode, ready to start in case any alarm or issue occurs.

To maintain always operative the stand-by units as planned rotation is performed; the unit with more hours worked will shut OFF meanwhile the one with fewer switch ON.

Is possible to enable the regulation of all the network units on the master return probe.



6. UNIT MAINTENANCE

6.1 General advices

Maintenance allows to:

- Keep the unit efficiency;
- To prevent any type of failure;
- Extend the unit lifetime and to reduce deteriorating time.



It is advisable to have a unit booklet with a purpose to sign any intervention performed helping the troubleshooting.



The maintenance operations must be performed in accordance with all the overmentioned prescriptions.



To perform any intervention on the unit pay attention to use any individual protection device in accordance with local norms.



In case of winter or long stops, the water contained in the circuit can freeze harming the unit; is advisable to remove carefully all the water contained checking that all the circuit and all the internal/external syphons are empty.



Before to perform any electrical intervention is necessary to switch OFF the power supply turning the main switch to OFF position.

6.2 Unit access

Once the unit is installed the access is allowed only to trained and expert technicians; the owner is the company legal representative, entity or natural person owner of the plant where it is installed. He is responsible to enforce all the safety norms indicated on the present Manual and the local norms. If the unit access cannot be avoided to not qualified people, must be provided of fenced area at least 1,5mt far from the unit, which inside can operate only the technicians.

6.3 Scheduled maintenance

The unit owner must be sure to make an adequate maintenance following the instructions on the present Manual, based on type, size, age of the unit and in accordance with the regulations and local norms and the instructions contained in the present Manual

During the unit lifetime it must be subjected to inspections following the local norms in force; particularly, more strictly specifics don't exist, it is necessary refer to the following table paying attention to the situations below described.

SITUATION	Visual inspection (par. 4.2, p.ti a - l)	Circuit pressure test	Circuit leaks test
A	X	X	X
B	X	X	X
C	X		X

A	Inspection performed after an intervention, with possible effects on the mechanical resistance, after a change of purpose or after a stop longer than 2 years; all unit components must be replaced. Do not carry on any check with higher pressure than designed one.
B	Inspection performed after an intervention or a relevant system modification (also for its components); this inspection can be restricted to the involved components, but if a refrigerant leak is detected the control must be performed to the all system
C	Inspection performed after changed a unit position; if there is the chance to have effects on the mechanical resistance refer to point A.



If a fault is detected could endanger the reliable unit operation, it's necessary to rectified it before restart the group.

6.4 Periodical checks



The commissioning operations must be performed following all the before mentioned indications.



All the operations mentioned in this part of the Manual **MUST BE PERFORMED BY QUALIFIED AND TRAINED TECHNICIANS ONLY**. Before any unit intervention be sure to disconnect it from the power supply. pay attention when the operations involves the coil; the aluminium fins are particularly sharp and could cause serious injuries. After the maintenance operations be sure to close well all the panels using the apposite screws.

6.4.1 Electrical system and control devices

Operation to perform	Periodicity						
	Daily	Monthly	Every 2 months	Every 6 months	Once years	Every 5 years	If Needed
Unit operation and alarm presence check	X						
Unit visual inspection		X					
Unit noise and vibration check		X					
Safety devices and interlocks operation check				X			
Unit performances check				X			
Unit devices electrical absorption check (fans, etc...)				X			
Unit power supply check				X			
Check every cable is well fixed and in dedicated terminal				X			
Check the insulation integrity of electrical cables					X		
Contactors operation and state check					X		
Controller and display operation check			X				
Check the controller set parameters and values					X		
Clean all the electrical components from the dust (if present)				X			
Check the operation and the calibration of the probes and transducers					X		

6.4.2 Cooling circuit, coils and fans

Operation to perform	Periodicity						
	Daily	Monthly	Every 2 months	Every 6 months	Once years	Every 5 years	If Needed
Visual inspection of the coil		X					
Cleaning operation fo finned coil				X			
Cleaning operation of finned coil of outdoor unit (if present) ⁽¹⁾				X			
Air filter ⁽²⁾ cleaning operation /replacement			X				
Cleaning operation of the condensate tray			X				
Humidifier cylinder ⁽²⁾ cleaning operation			X				
Water flow check		X					
Fan's noise and vibration check		X					
Fan's power supply check				X			
Fan's electrical connection check					X		
Check the operation and calibration of the fans speed regulation system					X		
3way valve operation check					X		
Check the presence of air inside the hydraulic circuit		X					



⁽¹⁾ If the unit is installed in strongly windy areas, near coasts or deserts or in areas subjects to wind and/or sand storms, or near airports, industries or in places with high levels of air pollution in general inspect the unit more frequently (**every three months or more**) to check the real condition of the surface protection.



⁽¹⁾ The filter and humidifier clean situation depending by installation type

6.4.3 Seasonality and winter stops

If is expected to stops the unit for a long period of time the hydraulic circuit must be well empty to avoid the freezing of the water inside the pipes and the exchanger. This operation is mandatory if, during the stop, the temperature can go down the freezing point of the fluid inside the system.

7. UNIT DISPOSAL

7.1 Unit disconnection



All the disposal operations must be performed by expert technicians following the national legislation (referring to destination country).

- Evitate to dissipate refrigerant in the environment;
- Before the unit disconnection recovery (if present):
 - The anti-freezing fluid contained in the cooling circuit;

Waiting the disposal, unit could be stored also in outdoor place, only if all the circuits (electrical and hydraulic) are well plugged and undamaged.

7.2 Dismantling and recycling

If frame and devices are unusable must be demolish and divide for a well recycling; particularly attention must be used for the copper and the aluminium.

All the materials must be recovered and disposed in accordance with the regulations and norms in force.



In case of the unit has worked with an anti-freeze mixture is necessary to recovery all the fluid in a suitable tank in order to deliver it to an authorized recycle center.



It is forbidden to release the refrigerant in the environment.

7.3 RAEE norm (UE members only)



The barred symbol here on left indicates the correspondence of the unit to electric and electronic device norm about the recycle.

The abandonment of the unit or abusive disposal are punished by law.

This products is complied into 2012/19/UE norm concerning the electric and electronic waste management (RAEE).

The unit must not be recycling with home waste because is composed by different material suitable to disposal only to recycling centers. Ask to authorities where these centers are located in order to delivery all the different material a well recycling.

The system is potentially dangerous for human and animal health and the environment, also if any dangerous substance is contained (as 2011/65/UE (RoHS) Directive) is abandoned could create a serious pollution risk.

Read carefully the instructions before the first use of the system. Any use not clearly mentioned in the present Manual is forbidden, also for electrical shock risk for improper use.

8. TROUBLESHOOTING

8.1 Fault detection

All the units are totally factory tested before the delivery, anyway it is possible any trouble or anomalie during operation. If any alarmi s present before to perform an operation is suggest to verify that:

- All the opearting conditions are the same of excepted ones, compatibies with the unit's operation limits;
- All the component's electrical cables are well fixed in the relative terminal (refer to the attached wiring diagram);
- The set values for the involved parameters are coherent with the operative conditions (refer to the Microprocessor Manual).



IS RECCOMENDED TO RESET ANY ALARM ONLY AFTER CAUSE OF IT REMOVED; REPEATED RESET COULD CAUSE SEVERAL DAMAGES TO THE UNIT AND ALSO MISS THE WARRANTY IMMEDIATELY.

Malfunction	Probable cause	Suggested action
1. The unit doesn't work	The electrical panel is not powered	Verify the voltage of each phase of the main supply line Verify the main switch is closed (ON position)
	The auxiliary circuit is not powered	Verify the fuses of the auxiliary circuit (refer to the attached wiring diagram)
	The microprocessor doesn't start the unit	Verify the electrical connections of the microprocessor Check the temperature set values
	The external impulse fails at the unit starting	Verify the remote ON(OFF switch is closed (refer to the wiring diagram) Enable the external impusle from the user terminal (display) when the unit starts
2. Temperatura ambiente troppo elevata (intervento della soglia allarme di alta temperatura ambiente)	The unit doesn't work	Refer to point 1.
	The control system calibration is not correct	Verify the control system calibration
	The air flow is too low	Refer to point 5.
	3way valve not work	Refer to point 6.
	Cooled water flow is not sufficient	Verify the circulating pump operating characteristics are adequate to the system requirement Verify the pressure drop nto calculated in the system Verify the cleaning status of the water fileter
	Control system doesn't work	Refer to Controller's Manual attached Verify the ambient thermal load
Thermal load higher than estimated	Verify the control system calibration	

3. Room temperature too low (low temperature alarm signal)	The control system calibration is not correct	Refer to points 7 & 8
	The heating system doesn't work (if present)	Check the Controller's Manual attached
	The control system doesn't work	Verify the thermal dispersions
	Thermal dispersion lower than estimated	Verify the control system calibration
4. Ambient humidity too high (high humidity alarm signal)	Control system calibration not correct	Verify the ambient latent load
	Latent load higher than estimated	Refer to point 6.
	3 way valve doesn't work for dehumidification mode	Check the Controller Manual attached
	Control system doesn't work	Check the Controller manual attached
5. Ambient humidity too low (low humidity alarm signal)	Verify the humidifier is present	Install the humidifier if not present
	Humidity set-point calibrated too low	Increase set-point value
	The humidifier doesn't work	Check the humidifier manual attached
6. Low or absent air flow (fans alarm signal)	Fans are not powered	Verify the fans electrical circuit supply
	Clogged filter	Clean or if necessary replace filters
	Obstruction presence in the air duct or pressure drop to high	Verify the total pressure drop and compare it with the unit available pressure
	Fans thermal protection is active	Verify the fans winding heater (after reset, if necessary, check the voltage and electrical absorption)
7. 3way valve doesn't work	Control system doesn't work	Check the Controller manual attached
	The valve servomotor doesn't work	Verify the electrical connections and eventually replace the servomotor if defective
	The valve is mechanically locked	Try to unlock manually the valve or replace it
8. Electrical heaters are not working (if presents)	Set-point temperature is too low	Incrementare la temperatura di set point
	Magnetothermal switch open	Verify there is not a short circuit Reset the open switch Verify the absorbed current
	Safety thermostat is active	Air flow too low; refer to point 5. Verify the safety thermostat operation and replace it if necessary
	The contactor doesn't work	Verify connections and the coil of contactor
9. Hot coil doesn't work (if present)	Hot water flow too low	Verify the hot water supply source Inspection the water duct searching any obstruction
	Discharge hot water temperature too low	Verify the hot water dispenser
	Set point temperature too low	Increase the set point value
10. Probe alarm	The alarm code corresponding probe is disconnected or faulty	Verify the probe connection and it's operating, if necessary replace it

11. Fan doesn't start	Current interruption / black out	Verify main switch and power cable
	Protection switch open	Reset protection switch and check the motor current and absorption
	Transformer protection activated	Verify for any auxiliary short circuit
	Defective contactor	Repair or if necessary replace contactor
	The fans are not powered	Verify the fans electric power supply
	Fan thermal protection block its operative	Verify if the roto is locked of if the power supply is not sufficient or therefore if a phase loss
	Controller not powered (display OFF)	Verify for any auxiliary short circuit
	Unit shut off (OFF position)	Set ON position from the keyboard



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Technical data shown in this booklet are not binding.

The Company shall have the right to introduce at any time whatever modifications necessary to the improvement of the product.
The reference languages for the whole documentation are Italian and English. The other languages are to be considered only as guidelines.
