



CPAN-U 17-21-25-31-41-51

“ELFOFRESH LARGE”

Make-up unit, full fresh air

Installation and Use Manual

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UNIT IDENTIFICATION

SERIAL NUMBER LABEL

The units are identified by the serial number label shown here.

The label lists the type of unit (series and size), serial number, year of manufacture, number of electrical diagram, main technical data, logo and address of the manufacturer.

The label is placed on the unit, generally near the electrical panel and also on the external panelling.

IT MUST NEVER BE REMOVED.

SERIAL NUMBER

This provides unique identification of the machine. It makes it possible to trace the specific features of the unit and to identify the components installed in it.

Without this number, it is not possible to identify with certainty the spare parts that are specific to that unit.

When requesting assistance, always provide the type of machine and the serial number.

Write them in the space below so that they are readily available when needed.

Type of unit : _____

Serial number : _____

Wiring diagram : _____

Year of manufacture : _____

LOGO

CE

TIPO TYPE / TYP TYPE / TIPO	
NUMERO MATRICOLA SERIAL NUMBER / SERIENNUMMER NUMERO DE SERIE / NUMERO DE SÉRIE	
ANNO DI FABBRICAZIONE YEAR OF MANUFACTURE (SILVER) ANNÉE DE FABRICATION / ANNO DE FABRICATION	
REFRIGERANTE REFRIGERANT / KÄLTEMITTEL REFRIGERANT / REFRIGÉRANTE	GRUPPO / GRUPPI GROUP / GROUPS GRUPO / GRUPOS
REFRIGERANTE FABBRICA / FACTORY FACTORY / VALTEMIETTEL / D'USINE REFRIGERANTE FABRICA	
REFRIGERANTE IMPIANTO / SYSTEM REFRIGERANT / ANLAGENKÄLTEMITTEL / REFRIGÉRANT IMPLANTATION / REFRIGÉRANT	
REFRIGERANTE TOTALE / TOTAL REFRIGERANT INSEAMTKÄLTEMITTEL / REFRIGÉRANT TOTAL REFRIGÉRANTE TOTALE	
TENSIONE VOLTAGE / SPANNUNG TENSION / TENSION	
F.L.A. A	F.L.I. KW
SCHEMA ELETTRICO WIRING DIAGRAM SCHEMA ÉLECTRIQUE N°	
PRESSIONE MAX. / MAX. DRUCK MAX. OPERATING PRESSURE / MAX. BETRIEBSDRUCK PRESS. MAX. / MAX. DRUCK	
PS-HL	bar
TEMPERATURA TEMPERATURE ON LP SIDE / TEMP. NO-BITE TEMP. OUTF. BP / TEMP. PANTS BP	
°C	
SISTEMA TIRATTAMENTE SCELTO / HERMETICALLY SEAL SYSTEM HERMETISCH GESCHLOSSENES SYSTEM - SYSTEME HERMETIQUEMENT SCELLE SISTEMA SELLADO / HERMETICAMENTE	
CONTIENE GAS FLUORATI AD EFFETTO SERRA DISCIPLINATI DAL PROTOCOLLO DI KYOTO CONTAINS FLUORINATED GREENHOUSE GASES COVERED BY THE KYOTO PROTOCOL CONTIENE GAS FLUORATI AD EFFETTO SERRA DISCIPLINATI DAL PROTOCOLLO DI KYOTO CONTIENE GAS FLUORATI AD EFFETTO SERRA DISCIPLINATI DAL PROTOCOLLO DI KYOTO CONTIENE GAS FLUORATI AD EFFETTO SERRA DISCIPLINATI DAL PROTOCOLLO DI KYOTO	
INDIRIZZO / ADDRESS / ADRESSE / ADRESSE / DIRECTION	

INSTRUCTIONS FOR THE USER

- **This is a partial sintex of the information provided in the manual; carefully read this manual**
- Carefully read this manual. Keep it with the electrical diagram. Make it available to technicians for servicing.
- Ask the installer for training on start-up, shutdown, changing set points, placing in at-rest status, maintenance, what to do or not to do in the event of a breakdown.
- Provide for scheduled maintenance by specialized technicians so as to ensure long-lasting operation of the unit.
- If you expect the machine to be shut down for long periods of time, disconnect the electrical power supply. In winter, take necessary measures to deal with possible freezing (unit and system pipes) .

TO DO FOR

ON-OFF Key hold pressed	
SET THE WORKING SETPOINT :	
DISPLAY THE ROOM TEMPERATURE : keys hold pressed	
SUMMER/WINTER MODE CHANGE Key hold pressed. The key is not operative if the unit is set for the automatic operating mode: under such conditions, the AUTO indication is displayed.	
SOLO FAN Holding pressed the key Up The characters "----" are displayed in this mode instead of the setpoint, and the bars for the thermo-adjuster power requirement are all active.	
DISPLAY THE ROOM HUMIDITY Hold and simultaneous pressed of both keys	
ALARMS Each time the unit is in alarm, the code of the current alarm is displayed instead of the setpoint. The code alternates with intervals of about 3 seconds with the displaying of the room temperature. In case of multiple alarms, the one occurring first is displayed.	
ALARM RESET The current alarms are reset holding the buttons ECO and Clean pressed.	 
KEY LOCK All button functions can be locked by holding the buttons Clean and On-Off pressed. The lock is signalled by the characters "----" whenever any key is pressed.	 

COMMON CAUSES OF SHUTDOWN

air filter dirty

GENERAL WARNINGS

MANUAL PURPOSE

This manual has been designed to enable the unit to be installed, started up and maintained correctly.

MANUAL INSTRUCTIONS

It is essential to observe these instructions.

The manufacturer declines all liability for any damage that may be caused whether directly or indirectly to persons or things if these instructions are not heeded.

MANUAL STORAGE

This manual and the unit's wiring diagram should be carefully stored so that they are readily available to the operator when required.

EXPERT PERSONAL

The unit must be installed, tested and maintained by expert personal who meet the relevant legal requirements (Italian law No. 46 of 5/3/1990).

LOCAL SAFETY REGULATION INSTALLATION

The installation must be performed observing the local safety regulations.

POWER SUPPLY

Make sure the power supply conforms to the data on the unit's rating plate, located inside the door of the main electrical panel.

PACKAGING

The packaging material (plastic bags, polystyrene foam, nails, etc.) is potentially dangerous and should therefore be kept away from children and recycled in compliance with the local regulations in force.

MAINTENANCE

Before performing any service operations, cut off the power. Perform the operations in conformity with the local regulations in force.

PERIODICAL INSPECTIONS

Perform periodical inspections to locate possible loosened or broken parts. If the repairs are not performed, there will be a higher risk for things and peoples to become damaged and injured.

FAULT – POOR OPERATION

Switch off the unit in the event of faults or poor operation.

REPAIR

Only have repairs carried out by a service centre authorised by the manufacturer, and insist on the use of original spare parts only.

Failure to comply with the above may compromise the safety of the unit.

MODIFICATIONS

The manufacturer will not accept any responsibility, and the warranty will lapse, in the event of electric and/or mechanical modifications. Any modification which is not formally authorized, and which does not respect the instructions given in this manual, will cause the warranty to lapse.

INTENDED USE

The unit must only be used for the specific purpose it was designed :

The unit is designed for civil air-conditioning within the limits defined in the technical bulletin and this manual.

Any use other than that specified does not imply any commitment or constraint by the manufacturer in any way whatsoever.

ADDITIONAL SAFETY PRECAUTIONS

This unit has been especially designed and manufactured so to prevent any risk to persons and health hazard.

For this reason, design solutions fit to eliminate (where possible) any cause of risk and sensibly reduce the probability of danger have been adopted.

Please refer to the "Residual Risks" section of this manual and strictly observe the behaviour prescriptions listed there in order to prevent any possible risk that hasn't been possible to avoid in the design stage.

DATA UPDATING

The manufacturer may be able to modify the data without prior notice as a consequence of constant improvements.

REGULATIONS AND CERTIFICATIONS

UNI EN ISO 9001 CERTIFICATION

Clivet S.p.A., in order to guarantee customer satisfaction, has chosen the ISO 9001 Quality System as the reference for all its business activities. This is demonstrated by the company's commitment to ongoing improvements in the quality and reliability of its products; its sales, design, purchasing, production and after-sales service activities are the means used to reach such purpose.

CE MARK



Clivet products bear the CE mark, in compliance with the requirements of the following EC directives, including the latest amendments, and with the corresponding national approximated legislation:

- Directive of the European Parliament about units ("Units" directive).
- Directive of the European Parliament for the rapprochement of the Member States' laws about the pressure equipments ("PED" directive).
- Directive of the European Parliament concerning the rapprochement of the Member States' laws about the electrical equipment intended to be used within certain voltage limits ("Low Voltage" Directive).
- Directive of the European Parliament concerning the rapprochement of the Member States' laws about the electromagnetic compatibility ("Electromagnetic compatibility" Directive).

RESIDUAL RISKS

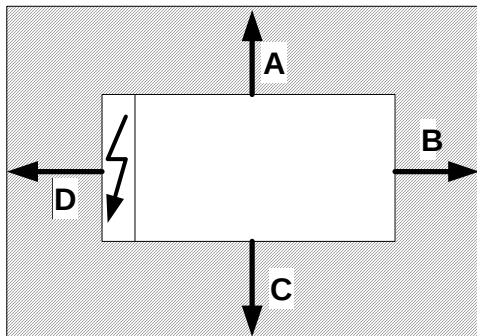
GENERAL

This section lists some of the more common situations which, being beyond the control of the manufacturer, could be a source of risk to persons or property.

DANGER AREA

The figure below highlights the area in which only authorised personnel may operate.

- **External danger zone**, identified by a precise area around the unit and its vertical projection on the ground in the case of hanging unit.
- **Internal danger zone**, identified by the area that can be entered only after having intentionally removed the protecting panels or parts of these.



A = 1000 mm

B = 1000 mm

C = 1000 mm

D = 1000 mm

HANDLING

If handling operations are undertaken without adopting all the necessary safety procedures and exercising due care, the unit can fall or topple, causing damage — possibly extremely serious — to persons and/or property, and to the unit itself.

Ensure the unit is handled and manoeuvred as directed on the packing and in the present manual, and in accordance with local regulations.

In the event of refrigerant gas escaping, refer to the “Safety datasheet” for the particular refrigerant.

INSTALLATION

Incorrect installation of the unit can result in water leaks, accumulation of condensate, escape of refrigerant, electric shocks, fire, as well as irregular operation or damage to the unit itself.

Make certain that the installation is carried out only by a qualified technician, also that the directions contained in this manual are followed and local statutory regulations observed.

In the event of the unit being installed in a site where there is even the slightest risk of inflammable gas escapes and consequently the possibility of such gases accumulating in area around the unit, the risk of explosion and fire cannot be discounted.

Take every care and precaution when selecting the installation site.

Installation on a structure not able to bear the weight and/or afford a secure anchorage of the equipment may cause the unit to fall and/or topple, resulting in damage to persons or property, or to the unit itself. Make certain that every care

and precaution is taken when positioning and securing the unit.

If the unit is easily accessible to children, unauthorized persons or animals, this is a situation that can give rise to accidents and injuries, perhaps serious. Install the unit in a place where access is allowed only to authorized persons, or install barriers or guards preventing unauthorized entry.

GENERAL RISKS

A smell of burning, smoke or other indications of serious irregularity could signal the onset of situations liable to cause damage to persons or property or to the unit itself. Isolate the unit from the electrical power supply (red-and-yellow) switch.

Contact an authorized service centre so that the source of the problem can be identified and remedied.

Accidental contact with heat exchange coils, compressors, pressure pipelines or other components can result in wounding or burns, or both.

Always wear suitable clothing, including protective gloves, when working in the danger area.

Maintenance or repairs carried out by unskilled operatives can result in harm or damage to persons and property, or to the unit itself. Always contact an authorized service centre.

Failure to close the panels of the unit, or to check that all the fixing screws of the panels are properly tightened, can result in harm or damage to persons or property, or to the unit itself.

Verify periodically that all panels are closed and made properly secure.

In the event of fire, the temperature of the refrigerant can rise to the point that pressure will exceed safety levels and perhaps cause fluid to be projected. It may also happen that parts of the circuit isolated by closed valves will explode.

Do not stand near safety valves, and never leave the valves of the refrigerant circuit closed.

ELECTRICAL SYSTEM

If the power line connecting the unit to the a.c. supply is incomplete, or if the connection is made with cables of incorrect cross section and/or with insufficiently rated protective devices, this can result in electric shock, toxicity hazard, damage to the unit or fire.

All work on the electrical system should be carried out referring to the wiring diagram and to the directions given in this manual, and the system itself must be dedicated.

Failure to secure the cover enclosing electrical components can lead to the infiltration of dust and water, ultimately causing electric shocks, damage to the unit, or fire.

Always fasten the cover securely to the unit.

If live metal parts of the unit are not connected properly to the earth system, they can cause electric shock or even death by electrocution.

Make absolutely certain that the connection to the earth system is made in accordance with correct practice.

Contact with live parts rendered accessible internally of the unit when the guards are removed can result in electric shock, burns or death by electrocution.

Before exposing these parts, make certain the isolating switch on the power line to the unit is set to the OFF position and padlocked, and post a warning sign.

Contact with parts that could become live when the unit is started up can result in electric shock, burns or death by electrocution.

When there is no need for circuits to be powered up, set the isolating switch on the power line to the OFF position, padlock it and post a warning sign.

MOVING PARTS

Contact with the fan rotors can cause injury.

Before removing the protective grilles or the fans themselves, make certain the isolating switch on the power line to the unit is set to the OFF position and padlocked, and post a warning sign.

Before removing the protective grilles or the fans themselves, make certain the isolating switch on the power line to the unit is set to the OFF position and padlocked, and post a warning sign.

REFRIGERANT

In the event of safety valves coming into operation and releasing refrigerant gas, persons in the vicinity can be

injured or suffer toxic effects. Always wear suitable clothing and protective goggles when working in potential hazard areas.

In the event of refrigerant gas escaping, refer to the "Safety datasheet" for the particular refrigerant.

If an open flame or heat source is brought into contact with the refrigerant, or the pressurized gas circuit should overheat (e.g. during welding operations), this can cause explosion or fire. Do not position any heat source within the hazard area.

Maintenance or repair operations involving welding must be carried out with the system emptied of refrigerant.

WATER SYSTEM

Defects affecting pipelines, connections or valves and other control componentry can result in water being leaked or sprayed from the system, occasioning damage to property or causing short circuits in the unit.

Make certain all hydraulic connections are securely made, following the directions given in the present manual.

REFRIGERANT SAFETY CHARGE

R-410A		
01	Identification of the product and of the supplier	Chart No FRIG 8 Product R-410A Identification of the supplier. See heading or bottom of page. No of emergency telephone. See heading or bottom of page.
02	Composition / information on ingredients	Substance/ Compound . Compound Elements / Impurities. It contains the following elements Difluorometan (R32) 50 % in weight Pentafluoroetan (R125) 50 % in weight CEE No Non applicable for mixtures. Commercial name /
03	Hazard identification	Hazard identification. Liquefied gas. Vapours are heavier than air and can cause choking by reducing the oxygen available for breathing. A rapid evaporation of the liquid can cause freezing. It can cause cardiac arrhythmia.
04	First aid measures	Inhalation. Do not administer anything to fainted people. Take to open air. Administer oxygen or practice artificial breathing if necessary. Do not administer adrenaline or similar substances. Contact with eyes. Rinse carefully with plenty of water for at least 15 minutes and consult a doctor. Contact with the skin. Rinse immediately with plenty of water. Immediately take off all contaminated cloths. Ingestion. Way of exposure not very probable.
05	Anti-fire measures	Specific hazards. Pressure increase. Dangerous combustible products. Halogen acids, traces of carbonyl halogens. Exinction means. You can use all extinction means available. Special methods. Cool the containers/tanks with sprays of water. Special protection means. In close spaces, use the self-breather.
06	Measures against the accidental leakages of the product.	Personal protections. Evacuate the personnel in safety areas. Foresee adequate ventilation. Use means of personal protection. Protection for the environment. It evaporates. Methods for eliminating the product. It evaporates.
07	Handling and stocking.	Handling and stocking. Assure a sufficient exchange of air and/or a suction system in work areas. Use only in well-ventilated rooms. Do not breathe vapours or aerosols. Carefully close the containers and keep them in a cool, dry and well-ventilated place. Keep in the original containers. Incompatible products. Explosives, inflammable materials, organic peroxides.
08	Check of the exposition / personal protection	Personal protection. Assure adequate ventilation, especially in closed rooms. Control parameters. Difluorometan (R32): Recommended limits of exposition: AEL (8h and 12h TWA) = 1000 ml/m ³ Pentafluoroetan (R125): Recommended limits of exposition: AEL (8h and 12h TWA) = 1000 ml/m ³ Protection of respiratory tract. For the rescue and for service work in the tanks, use an autonomous breather. Vapours are heavier than the air and can cause choking by reducing the oxygen available for breathing. Protection for the eyes. Total protection glasses. Protection for the hands. Rubber gloves. Hygienic measures. Do not smoke.

09	Chemical -physical properties.	Relative density, gas (air=1) Heavier than air. Solubility in water (mg/l). Not known, but probably very low. Aspect. Colourless liquefied gas. Smell. Simile to ether. Point of ignition. Don't ignite.
10	Stability and reactivity.	Stability and reactivity. No decomposition if used following the instructions. Materials to avoid. Alkaline metals, earth alkaline metals, granulated metal salts, Al, Zn, Be etc. in powder. Dangerous decomposition products. Halogen acids, traces of carbonyl halogens.
11	Toxicological information	Local effects. Concentration substantially above the TLV value (1000 ppm) can cause narcotic effects. Inhalation of products at high concentration decomposition can cause respiratory insufficiency (pulmonary edema). Long-term toxicity. It has shown no carcinogenic, teratogen or mutagenic effects on animal experiments. Specific effects. A rapid evaporation of the liquid can cause freezing. It can cause cardiac arrhythmia.
12	Ecological information	Effects connected to ecotoxicity Pentafluoroetan (R125) Potential of global heating of halocarbides; HGWP; (R-11 = 1) = 0.84 Potential of ozone impoverishment; ODP; (R-11 = 1) = 0
13	Disposal considerations	General considerations. Do not drain where the accumulation can be dangerous Usable as reconditioning. Depressurized containers should be given back to the supplier. Contact the supplier if the use of instructions is necessary.
14	Transport information	Designation for the transport LIQUEFIED GAS N.A.S (DIFLUOROMETAN, PENTAFLUOROETAN) UN No 3163 Class/Div 2.2 ADR /RID Nr 2, 2°A No hazard ADR/RID 20 ADR Label. Label 2: not toxic gas not inflammable. CEPIC Groupcard 20g39 - A Other information for the transport. Avoid the transport on vehicles where the loading zone is not separated from the driver compartment. Verify that the driver is informed on the potential risk of the load and that he knows what to do in case of an accident or emergency. Before starting the transport, verify that the load is well fixed and: Verify that the container valve is closed and does not leak Verify that the blind cap of the valve, if supplied, is correctly assembled. Verify that the cap (if supplied) is well assembled and that there is adequate ventilation Verify that the norms in force are respected.
15	Information on the norms in force	The product must be labelled according to the 1999/45/CE normative. Observe the following norms, the relevant updating and the applicable modifications: Circulars no.46/79 and 61/81 of the Work Ministry: risks connected to the use of products containing aromatic amines. Law Decree no. 133/92 : Norms relevant to the draining of dangerous substances in water Law Decree no. 277/91: Protection of workers for noise, lead and amianthus Law 256/74, Ministerial Decree of 28th Jan. 1992, Legislative Decree no 52 of 3rd Feb. 1997, Ministerial Decree of 28 th Apr. 1997 and following modifications: Classification, packaging and labelling of compounds and dangerous substances Decree of the Republic President no.175/88, following modifications and updating: Activities with risks of serious accidents (Seveso Law) Decree of the Republic President no 203/88: Emissions in the atmosphere Decree of the Republic President no.303/56: Hygiene of work Decree of the Republic President no.547/55: Norms concerning the accident prevention Legislative Decree. No.152 of 11th May 1999: Protection of waters.
16	Other information	Suggested uses. Refrigerant. High concentrations can cause asphyxia. Keep in a dry and well-ventilated place. Do not breathe in the gas. The asphyxia risk is often under-evaluated and must be put into evidence during the operator's training.

Verify that all national and regional regulations are observed.

Before using this product in any new process or experiment, a deep study about the safety and the product compatibility with the materials must be performed.

The above information is based on our present know-how and describes the product considering the safety needs. However, they do not represent a guarantee and a warranty of the qualities in a juridical sense. Everyone is personally responsible for the observation of these norms.

Information present in this document is valid at the time of printing. The company is not responsible for any damages caused by the incorrect use of the product and/or for the use in conditions different from the conditions suggested.

RECEPTION

INSPECTION UPON RECEPTION

Check on arrival that the unit has not suffered damage during transit and that it is complete in every part as specified in the order. In the event of visible damage/deficiencies being discovered, make a note immediately on the delivery document with the comment: **CONDITIONAL ACCEPTANCE — CLEAR EVIDENCE OF DEFICIENCIES/DAMAGE DURING TRANSIT**

Inform both the supplier and the carrier of the details by fax and by registered mail with advice of receipt not later than 8 days after taking consignment. Notifications sent after 8 days have elapsed will be ignored.

STORAGE

Shelter from: direct sunlight, rain, sand and wind

Temperature: maximum 60°C minimum -10°C

Maximum humidity: 90%

The respect of the instructions on the exterior side of the packaging assures the physical and functional integrity of the unit for the final user's advantage.

It is recommended to:

- Handle carefully
- Keep in a dry place
- Avoid putting other objects on top of the unit (respect the limits of levels of superimposition shown in the package)
- Avoid placing the unit with thermoretractable protection under the sun since the pressure of the circuits can assume values which activate the safety valves.

HANDLING

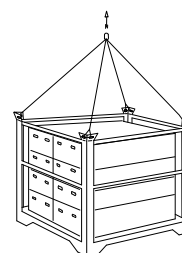
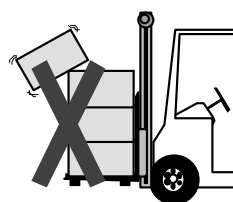
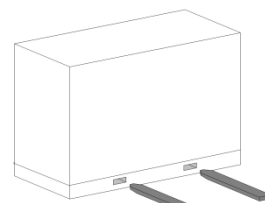
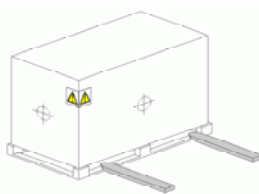
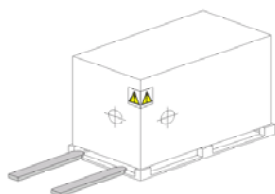
The operation of handling the unit must be carried out respecting the instructions of the safety norms in force (Legislative Decree 626/94 and following modifications)

Before starting the handling operations:

- Value the critical points during handling (stairs, flights, disconnected routes, doors, etc)
- Verify that the lifting capacity of the means used is adequate to the unit weight
- Consider that the barycentre could be moved with respect to the center of the unit
- Before starting to lift, verify that the unit is at a stable balance

The following examples are indications; the choice of the means and of the handling modes will depend on factors, such as:

- The unit weight
- Type and overall dimensions of the unit
- Place and route for the handling (dirt yard, asphalted square, etc)
- Condition of the place of destination (roof, square, etc)
- Handling distance characteristics (distances, flights, steps, doors)



DO NOT LEAVE THE PACKAGES LOOSE

DO NOT MOVE THE UNITS ALONE

FOR SEVERAL UNITS, USE A SUITABLE CONTAINER

REMOVING THE PACKING

For removing the packaging, use specific personal protection for the operator (gloves, glasses, etc.). While removing the packaging, pay attention not to damage the unit.

Check for any visible damage.

Dispose of the packaging by taking it to specialist collection or recycling centres in accordance with local regulations

POSITIONING

GENERAL

For installing air-conditioning systems, it is necessary to consider the following:

- the technical spaces necessary for the machine and system
- the place where the machine will be installed
- the transport of thermal carrier fluids and relevant connections to the unit:
 - water
 - air
 - refrigerant (unit in more sections)
- electrical connections

If these aspects are not evaluated carefully, they can affect the performances and the working life of the unit.

FUNCTIONAL CLEARANCES

When placing the unit, please respect the functional clearances indicated in DIMENSIONS section.

The functional spaces need to be observed because of the following:

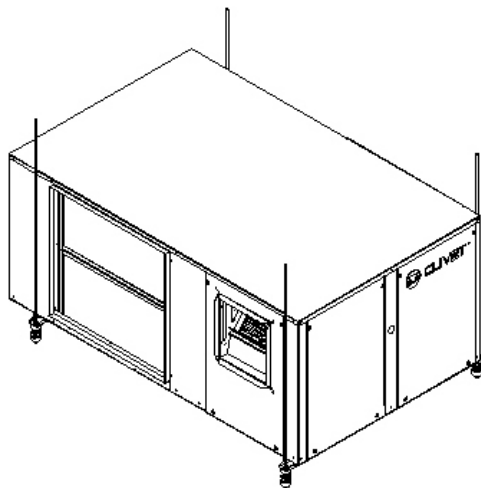
- to guarantee the good operation of the unit
- to allow the performance of all maintenance operations
- to protect the authorized operators and exposed people

If more units are placed close to one another, the functional spaces must be doubled.

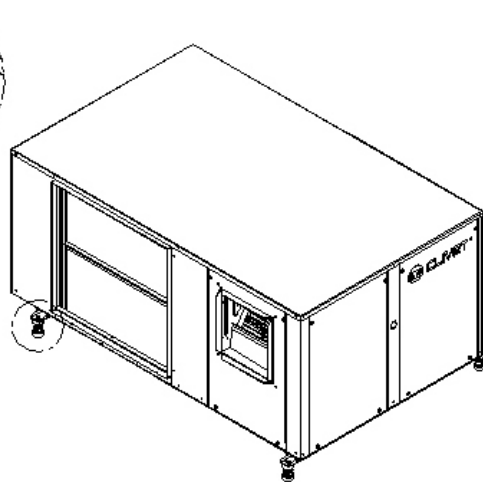
POSITIONING

1. The units are designed for **INDOOR** installations, performed in fixed positions and in areas accessible only to qualified and authorized personnel
2. **SAFETY VALVE** (only if present on the unit) : the installer is responsible for evaluating the opportunity of installing drain tubes, in conformity with the local regulations in force (EN 378)
3. Install the unit **raised** from the ground
4. avoid installations in places subject to **flooding**
5. Verify that the fixing/supporting points are level and suitable to support the **weight of the unit** (see the weight and the weights distribution)
6. It is recommended to put the unit on specific **antivibration devices**
Flexible joints are necessary on all the hydraulic/ aeraulic connections (the joints are not supplied by Clivet)
7. In the false ceiling, provide the indicated openings in the functional spaces so as to allow **access** to the unit for maintenance.
8. Leave free the surface projection of the unit and the functional spaces so as to allow access with ladders or other means

false ceiling-installation



floor-installation



WATER CONNECTIONS

GENERAL

Piping must be designed with the least possible number of bends and head variations. If the pressure chute of the installation is above the useful prevalence of the pump, the water delivery capacity is reduced as well as, as a consequence, the thermal exchange and the yield.

INTERCEPTING VALVES

Install on the input and output of the user parts (exchangers, coils, humidifiers, etc) So that it will be possible to carry out all the service operations and possible substitutions without emptying the installation.

PRESSURE AND TEMPERATURE INDICATOR

Install on the input and output of the user parts (exchangers, coils, humidifiers, etc) So that it will be possible to carry out all the service operations.

AUTOMATIC OR MANUAL ESCAPE VALVES

Install the highest points of tubes in a way that the air can escape form the circuit.

BLEEDING COCK

Install them at the lowest points of the circuit, so as to allow emptying.

LEAKAGE TESTS

Before performing the insulation of the tubes, carry out a leakage test.

TUBE INSULATION

All tubes of water must be insulated so that to avoid the formation of condensation and thermal dispersions along the tubes themselves. Verify that the insulation is the vapour coil type. The connections for the air escape and for the emptying must be out of the insulating thickness to assure the accessibility.

CONNECTIONS SUPPORTS

The weight of the hydraulic connections must be supported in the exterior of the unit so as not to stress the connections of user devices (exchangers, coils, humidifiers, etc) .

ANTI-VIBRATION DEVICES

In case of units with anti-vibration devices, it is necessary to assemble elastic joints, even on water connections.

RISK OF FREEZE

If the unit and the relevant water connections are subject to temperatures near 0°C:

- mix the water of the system with glycol
- protect the tubes with heating cables under the tubes insulation
- empty the system by verifying that:
 - no taps are closed so they can not trap the water, even after emptying
 - there are no low points where the water can stagnate even after emptying; blow if necessary

INSTALLATION EMPTYING

The refilling of the water present in the installation increase the oxidation phenomena and lime deposits.

If necessary empty only the interested system section and anyway empty or refill the installation if necessary .

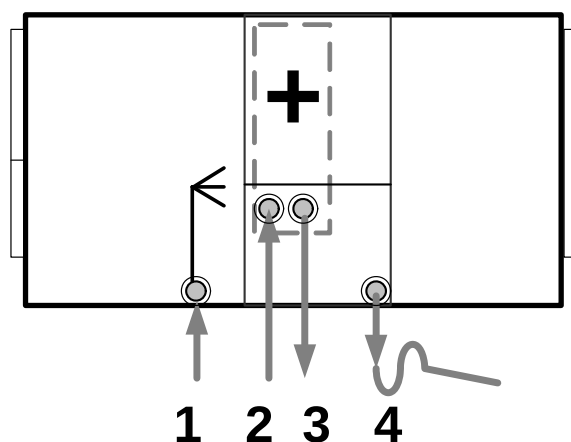
EXPANSION TANK

The installation must be kept at the right pressure by both an expansion tank and a combined valve of pressure reduction and discharge; if the components are present on the unit, they must be installed on the installation. The expansion tank must be dimensioned in function of the water in the installation.

MAX. WORKING PRESSURE

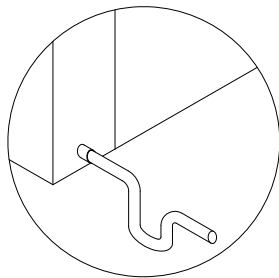
With option of water integrative coil + 3-way control valve = **300kPa**

ARIES EFFECTS AND AIR BUBBLES CAN PRODUCE THE OVERCOMING AND CAUSE WATER DROPS.



1. Humidifier
2. Water heating coil input
3. Water heating coil output
4. Condensate discharge

CONDENSATE DISCHARGE CONNECTION



1. The condensate must be dispersed to avoid damages to persons and property.
2. Unit discharge fitting : the connection must avoid the transmission of mechanical stresses and must be performed paying attention to avoid the damaging of the unit discharge fitting
3. Make a trap that, eliminating the depression caused by the fan, stops the return of gas from the discharge pipe (see the figure).
4. Connect the condensate discharge to a rainwater drain. Do NOT use sewerage drains, so as to avoid the return of odours if the water contained in the trap evaporates.
5. Finally, check that the condensate will drain correctly by pouring water into the tray stud.
6. **RISK OF FREEZE** : If the unit operates in cooling with external temperatures lower than 0°C, value the possibility that the condensate can freeze blocking the downflow and provoking flooding. Use heat cables or other devices to guarantee the disposal.

WATER HEATING COIL

OPTIONAL - The position of the connections is shown on the dimensional drawing of the unit.

The air valve is placed on the top of the coil manifold, it is used to eliminate possible air bubbles on the circuit.

The discharge valve is placed on the bottom of the manifold, it is used to empty the coil if it is unused for a long period.

TO AVOID THE FREEZE FORMING INSIDE THE COIL

1. If the unit or the relevant water connection are subjects to temperatures next to 0°C see **RISK OF FREEZE** in the **GENERAL WARNINGS** paragraph.
2. The freeze forming is possible also in summer in abnormal operating conditions (ex. Insufficient air flow-rate for clogged filters). It is so recommended to glycolate or empty also in summer

HUMIDIFIER

WATER SUPPLY

The humidifier is to be supplied with mains water with the following characteristics:

- pressure inclusive between 0.1 and 0.8 Mpa (1–8bar)
- temperature inclusive between 1 and 40°C

Do not use:

- softened water: it may cause corrosion of the electrodes and foaming resulting in malfunctions/failures
- well water, industrial water, or any other water which may be contaminated (by chemicals or bacteria)
- disinfectant or anti-corrosion substances mixed with the water, as they are potential irritants

DRAINAGE WATER

- may reach a temperature of 100 °C
- contains the same substances as the water supply but in greater concentrations
- it is not toxic and may be disposed of with clear water

RISK OF ICING:

- insulate the pipes
- empty in case of extended periods of disuse
- provide anti-freeze heating element in case of especially severe temperatures

AIR CONNECTIONS

Proper execution and sizing of air connections are essential for ensuring correct operation of the unit and an acceptable level of silence in the room.

When designing and creating ducts, consider **PRESSURE DROPS**, **FLOW RATE** and **AIR SPEED** which need to be compatible with the characteristics of the unit. Special consideration needs to be made for pressure drops that are greater than the unit's static pressure, which would lead to a reduction in flow rate resulting in unit shutdown.

- the weight of the ducts must not be supported by the connection flanges
- place anti-vibration joints between the ducts and the unit

- the connection to the flanges and between the various sections of the ducts must ensure an airtight seal, preventing leakage in delivery and intake which would compromise overall system efficiency.
- for units installed outdoors, the connection to the flanges and between the various duct sections must be watertight (external unit only - do not print note)
- limit pressure drops by optimizing the path, the type and number of curves and the branches
- use curves with a wide radius. Consider whether it might be useful to equip them with deflectors (especially if the air speed is high or if curves are tight)

ELECTRICAL CONNECTION

GENERAL

The characteristics of the electrical lines and relevant components must be determined by SPECIALIZED PERSONNEL ABLE TO DESIGN ELECTRICAL INSTALLATIONS; moreover, the lines must be in conformity with professional procedures and the regulations in force.

All electrical operations should be performed by trained PERSONNEL HAVING THE NECESSARY REQUISITES UNDER LAW and being informed about the risks relevant to these activities.

Before performing any operation on the electrical system, make sure that the unit supply line is SELECTED AT START.

The earth connection must be made prior to other electrical connections.

For all electrical type operations, REFER TO THE ELECTRICAL DIAGRAM ATTACHED TO THE UNIT; the number of the diagram is shown on the registration plate positioned on the electrical board or next to it.

The electrical diagram should be carefully kept together with this manual and should be AVAILABLE FOR FUTURE INTERVENTION ON THE UNIT.

LINE OF UNIT POWER SUPPLY

The ELECTRICAL DATA OF THE UNIT are shown in the technical chart of this manual and on the unit registration plate. The presence of accessories can vary according to the unit; the electrical data shown in the technical chart

refer to standard units. In the event of differences between the data of the registration plate and the data shown in this manual, as well as in the technical chart, please refer to the DATA SHOWN IN THE REGISTRATION PLATE.

The protection device of the unit power supply line should break off the short circuit power whose value should be determined according to the plant features.

The section of supply cables and protection cable must be seized according to the characteristics of the protections used.

SIGNALS / DATA LINES

Do not overpass the maximum power allowed, which varies, according to the type of signal.

Lay the cables far from power cables or cables having a different tension and that are able to emit electromagnetic disturbances.

Do not lay the cable near devices which can generate electromagnetic interferences.

Do not lay the cables parallel to other cables; cable crossings are possible, only if laid at 90°.

Connect the screen to the ground, only if there are no disturbances

Assure the continuity of the screen during the entire extension of the cable.

Observe, if any, the requirements about impendancy, capacity, attenuation

STANDARD UNIT ELECTRICAL DATA

Voltage		230/1/50		400/3/50 + NEUTRAL			
Size		17	21	25	31	41	51
F.L.A. Full load current at max admissible conditions							
F.L.A. - Compressor 1	A	8,6	10,7	11	5,4	8	10,3
F.L.A. - Single Outlet fan	A	2,4	2,4	5	5	4,6	6,7
F.L.A. - Single exhaust air fan	A	2,4	2,4	5	5	4,6	6,7
F.L.A. - Total	A	13,4	15,5	21	15,4	17,2	23,7
L.R.A. Locked rotor amperes							
L.R.A. - Compressor 1	A	43	62	62	43	48	64
L.R.A. - Single Outlet fan	A	12	12	25	25	29,5	34
F.L.I. Full load power input at max admissible condition							
F.L.I. - Compressor 1	kW	1,9	2,4	2,5	3,1	4,3	6,1
F.L.I. - Single Outlet fan	kW	0,3	0,3	0,37	0,37	0,55	0,55
F.L.I. - Single exhaust air fan	kW	0,3	0,3	0,37	0,37	0,55	0,55
F.L.I. - Total	kW	2,5	3	3,3	3,8	5,4	7,2
M.I.C. Maximum inrush current							
M.I.C. - Value	A	67	86	112	93	107	132

Power supply: 230/1/50 Hz +/-6%

Power supply: 400/3/50 Hz +/-6%

voltage unbalance: max 2 %

Values not including accessories

CONNECTION TO THE MAINS

1. Make sure that the sectioning device at the beginning of the unit's power line is opened, locked and equipped with a signal.
2. Open the general line disconnecting switch (if present)
3. Verify that the net is in conformity with the data shown in the registration plate placed on the electrical board.
4. Check the dimensional drawing for the input of the electrical lines
5. Take away the closing plate placed on the electric board (ONLY IF PRESENT) and drill a hole through it to pass the cables through)
6. Protect the cables, using the fairlead of an adequate size.
7. Using the layout of the electrical diagram, single out the connecting terminals of the electrical supply cables, of the neutral (if foreseen) and the PE protection cable
8. Connect the cables to the relevant terminal boards
9. Before supplying power to the unit, make sure that all the safety devices that were removed during electrical connections are positioned again.

FUNCTIONAL CONNECTIONS

- FOR ALL CONNECTIONS REFER TO THE WIRING DIAGRAM ENCLOSED WITH THE UNIT
- Use voltage-free remote control devices that are suitable to commutate very low loads (12V, 10mA).
- Few inputs must be activated by configuration parameters whose access is reserved to authorized assistance centres (in order to avoid unauthorized modifications).

ON / OFF FROM REMOTE CONTROL

Generally the unit is delivered with bridged terminals; if the control is not used, the bridge should not be removed.

CHANGING FROM SUMMER TO WINTER USING THE REMOTE CONTROL

This function is activated with the 161 RemMode = 1 parameter.

Selection switch open – unit in heating mode, selection switch closed – unit in cooling mode.

This way the keyboard, thermostat or supervisor unit selection is deactivated

VENTILATION ONLY FROM REMOTE CONTROL

This function is activated with the 161 RemMode = 1 parameter.

This way the keyboard, thermostat or supervisor unit selection is deactivated.

CLEAN

This function is activated with the 161 RemMode = 1 parameter.

This way the keyboard, thermostat or supervisor unit selection is deactivated.

FIRE ALARM INPUT

Generally the unit is delivered with bridged terminals; if the control is not used, the bridge should not be removed.

SIGNALIZATION OF MALFUNCTIONING/ UNIT FUNCTIONING

Remote signalization of the proper function (ex. green light) or signalization of blocks of the machine (ex. red light).

Maximum voltage at the terminal ends is 24v ac and maximum power is 5A (AC1).

REMOTE KEYPAD

Signal conductor number:	2 + shield
Min. section:	0.34 mm ²
Max. length:	100 metri
Power supply:	230/1/50

HID-P1 ROOM THERMOSTAT

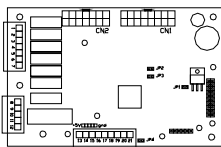
CONDUCTOR NUMBER :	3 + SHIELD
MIN. SECTION:	0.34 MM ²
MAX. LENGTH:	100 METERS

SYSTEM COMPOSITION

The complete system is made of the following modules.

Some are optional so they could not be present.

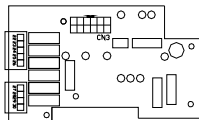
Some are supplied in packages separated by the unit: verify the shipping documents.



MAIN ADJUSTMENT MODULE

STANDARD ON THE UNIT - code C5110776

It controls unit (inlets, outlets, configuration parameters)

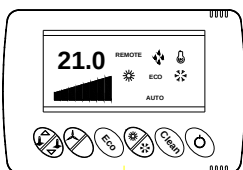


EXPANSION PLUG-IN MODULE

OPTIONAL - code C5110767

Plugged-in on the main module.

It controls some inputs and outputs.

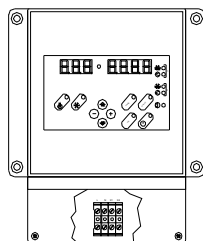


HID-P1 ROOM THERMOSTAT

STANDARD - Code PE6B0015

Equipped with a thermoregulation probe that is used:

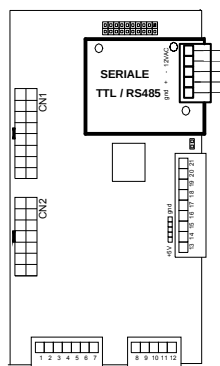
- in case of failure of the probe on the unit return
- if the return probe is disabled by parameter



REMOTE KEYPAD

OPTIONAL - Code PE6B0017

It remotely repeats all functions available on the machine keyboard



SERIAL CONVERTER TTL/RS485

OPTIONAL - code PE6B0020

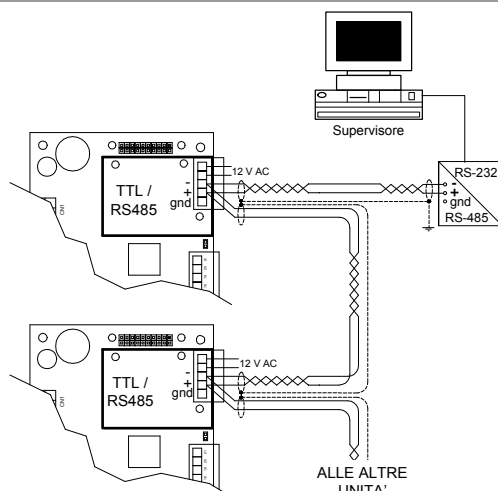
The supervision services are available, with standard modbus protocol. Plugged-in in the main module on the electric board (see lay in the wiring diagram). It is possible to connect up to 127 units with a single supervision system.

The connection with a PC must use a RS485/232 converter; the serial line RS232 can be max. 10-m long.

CONNECTIONS:

refer to the wiring diagram and to the SERIAL LINES/DATA paragraph SPECIFICS FOR THE RS485 CONNECTION

- cable with 2 twisted wires + screen
- the serial line RS-485 can be max. 1000-m long.



START-UP

ALL THE EQUIPMENT MUST BE COMMISSIONED BY AUTHORISED SERVICE CENTRES.
THIS SERVICE IS LIMITED TO START-UP OF THE UNIT ONLY AND NOT THE CONNECTIONS OR INSTALLATION OF THE SYSTEM.

ONLY QUALIFIED TECHNICIANS MUST PERFORM THE FOLLOWING OPERATIONS.

PRELIMINARY CHECKS

Before checking, please verify the following

1. the unit should be installed properly and in conformity with this manual.
2. the electrical power supply line should be sectioned at the beginning.
3. the sectioning device is locked and the proper warning "not to operate" sign is placed on the handle.
4. make sure no tension is present
5. the coils must be clean and free of obstacles
6. the ventilators must be free of leaves, cardboard, fixed obstacles (beams, barriers, etc.), snow, etc
7. the external ventilators must not be blocked

The external ventilators can be subject to a temporary block, especially if the inactivity period before the first start-up was quite long or if external temperature is very low. It is also possible to unblock them manually (ONLY WHEN THE UNIT IS UNPLUGGED – RISK OF INJURES) so that jams or electric overloads are avoided when the unit is restarted.

AEREAULIC SYSTEM

Check that:

1. the air filters are not removed from unit and are cleaned (possible ventilation checks and the operating starting period determinate a ducting "cleaning" with consequent filter precocious clogging, filters that must be cleaned and replaced)
2. ducting are completed, connected and without obstructions
3. possible dampers are opened (for ex. fire stop dampers) and calibrated (for ex. external air damper, control damper, ejection damper)
4. Grilles, outlets, and diffusers must be free of obstructions (furniture, shelves, etc.), open and pre-calibrated, so as to ensure proper air distribution, which is essential to comfort in the room.

REFRIGERANT SYSTEM

Carefully check the refrigerating circuit: the presence of oil stains can mean leakage caused by transportation, movements or other).

Open the cocks of the refrigerator circuit, if there are any.

Using the unit manometers, if present, or service manometers, verify that the refrigerating circuit is in pressure.

Make sure that all the service outlets are closed with proper caps; if caps are not present a leak of refrigerant can be possible.

WATER SYSTEM

Ensure that the plumbing system has been washed. Drain the wash water before connecting the unit to the system.

Check that the water circuit has been filled and pressurised.

Perform a seal check at max. working pressure checking that no leaks are present.

Check that the shut-off valves in the circuit are in the "OPEN" position.

Check that there is no air in the circuit. If required, bleed it using the vent valves in the system.

Check that there are no ARIES EFFECTS in the transient (pump and / or valve activation/deactivation)

When using antifreeze solutions, make sure the glycol percentage is suitable for the type of use envisaged.

% weight of ethylene glycol	10 %	20 %	30 %	40 %
Freezing point	- 4 °C	- 9 °C	- 15 °C	- 23 °C
Safety temperature	- 2 °C	- 7 °C	- 13 °C	- 21 °C

Check that the circulator pumps are not blocked. In fact, their motor shaft may seize up, especially after long shutdowns. Unblocking can be accomplished with a screwdriver using the purge hole.

ELECTRICAL SYSTEM

Check the proper tightening of the screws that fix the conductors to the electrical components in the board (during handling and transportation, the vibrations could have loosened them).

Verify that the unit is connected to the ground plant.

Control that all panels and protection devices of the unit are repositioned and blocked.

Charge the unit by closing the sectioning device, but leave it on OFF.

Make sure that the tension and net frequency values are within the limit of:

230 +/- 6% single phase unit; 400/3/50 +/- 6% three-phase unit

Control the unbalancing of the phases: it must be lower than 2% .

Example:

$L1 - L2 = 388 \text{ V}$, $L2 - L3 = 379 \text{ V}$, $L3 - L1 = 377 \text{ V}$

average of the measured values = $(388 + 379 + 377) / 3 = 381$

maximum deviation from the average = $388 - 381 = 7 \text{ V}$

Unbalancing = $(7/381) \times 100 = 1.83\% = \text{ACCEPTABLE}$

Operating out of the indicated limits causes the loss of the guarantee as well as very serious damages.

IF THE CRANKCASE HEATERS ARE FITTED

when the unit is started up for the first time and following all prolonged periods of inactivity is **OBLIGATORY** to connect the oil heaters on the compressor crankcase at least 8 hours before the compressor is to be started.

BEFORE POWERING THE HEATERS, OPEN THE COMPRESSORS COCKS, IF PRESENT.

To supply the heaters is necessary to switch off the isolator switch on the unit.

To make sure that the heaters are working, check the power input with amperometric pliers.

At start-up the compressor crankcase temperature on the lower side must be higher at least of 10°C than the external temperature.

DO NOT START THE COMPRESSOR WITH THE CRANKCASE OIL BELOW OPERATING TEMPERATURE.

VERIFY TENSIONS – ABSORPTIONS

Check that the temperatures of the fluids are included in the **WORKING LIMITS**.

If the controls of the previous paragraphs are positive, it is possible to restart the unit.

For information on the control panel, refer to the paragraph **CONTROL**.

While the unit is working (**ATTENTION ELECTRIC RISK: WORK SAFELY**) check:

- Power supply tension
- Phase unbalance
- Total absorption of the unit
- Absorption of the single electric loads

UNIT EQUIPPED WITH SCROLL COMPRESSORS

The **GENERAL TECHNICAL DATA** table shows the type of compressor on the unit.

The Scroll compressors have only one direction of rotation.

In the event that the direction is reversed, the compressor will not be damaged, but its noisiness will increase and pumping will be negatively affected. After a few minutes, the compressor will stop because of the activation of the thermal protection. In this event, cut the power and reverse the 2 phases on the machine power.

Prevent the compressor from working with in reverse rotation: more than 2-3 anomalous starts up can damage it.

Make sure the direction of rotation is correct, measure the condensation and suction pressure. Pressure must clearly differ: at the start, the suction pressure decreases whilst the condensation pressure increases.

The phase optional monitor, which controls the phase sequence, can be installed later.

REMOTE INPUT CONFIGURATIONS

Check used remote inputs are activated (ON-OFF etc.) as given in the instructions in the **ELECTRIC WIRING** chapter.

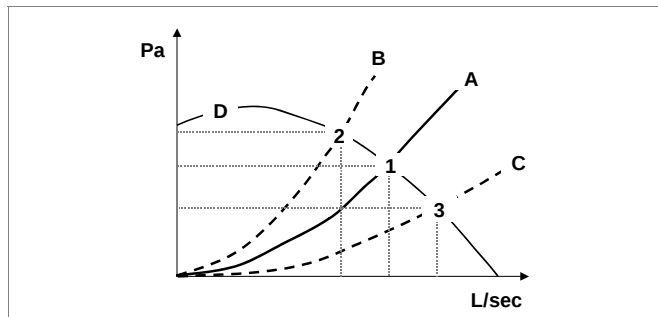
SETTING THE SET-POINT

Check if it is necessary to modify the set-points shown in the **CONTROL** chapter

AIR FLOW CHECK

The effective unit flow-rate is function of the aerodynamic system characteristics.

It is so necessary to check the air flow-rate and eventually to proceed with the appropriate calibrations on the system (dampers, diffusers etc) and on the unit (fan speed control, pulley calibrations etc in base of the unit type and its configuration). Before performing the check, make sure that the system has been completed in all its parts (derivations, dampers, grilles, diffusers etc) .



D = unit head-flow rate curve

A = system calculated curve

1 = project theoretical working point

3 = if the system has pressure drop lower than the project ones, the working point will be the 3, with flow-rate higher than the project one

2 = if the system has pressure drop higher than the project ones, the working point will be the 2, with flow-rate lower than the project one

In the time the working point can change, for example for the operations on the system (grilles covered by furniture, closed outlets to modify the air diffusion, exclusion or addition of the distribution sections etc.) or for lacking maintenance (clogged air filters, blocked dampers etc) .

REFRIGERANT CIRCUIT PARAMETER CHECK

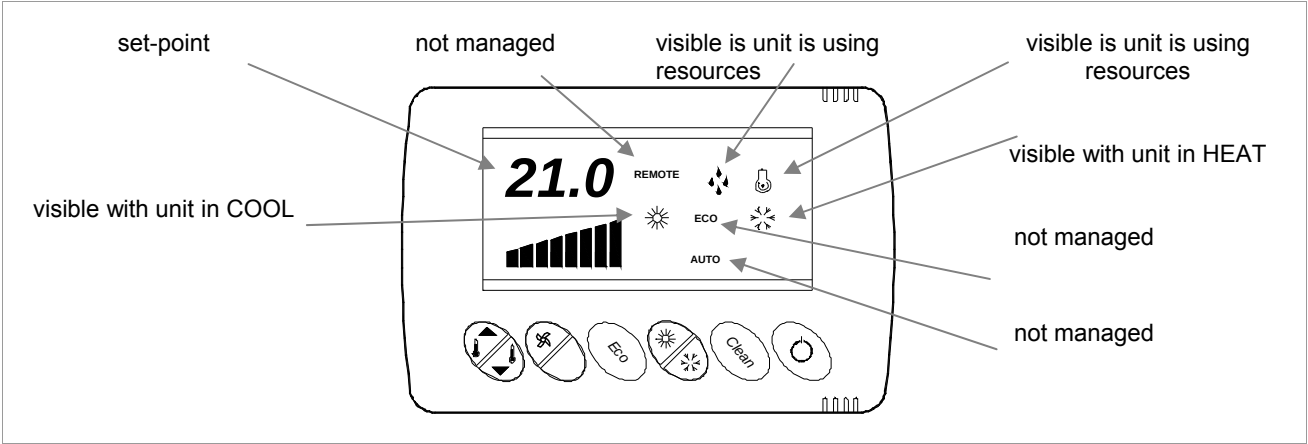
Detecting the operational conditions is useful to control the unit along time: the performed records must be kept and be available during maintenance interventions.

When the unit works in stable conditions and according to the operating limits, take note of the following data:

1. compressor discharge temperature (WARNING – BURN DANGER!)
2. condensing pressure
3. liquid temperature
4. dehydrator filter upstream and downstream temperature
5. return pressure
6. return temperature
7. return air temperature
8. supply air temperature
9. external air temperature (coil input)
10. air temperature coming out from fans

CONTROL

CONTROL INTERFACE



WORKING LOGICS

The unit is designed to manage the incoming external air. When the temperature is above set limits, the ventilation is stopped so that the room disturbance is minimized. When ventilation is deactivated, the compressor is also deactivated. The compressor is also deactivated when the external temperature is out of limits.

ventilation	
EXTERNAL temperature	- 10 °C 35 °C OFF ON OFF
AMBIENT temperature	16 °C 30 °C OFF ON OFF
OUTLET temperature	15 °C 35 °C OFF ON OFF

OPERATING MODES

SUMMER/WINTER MODE

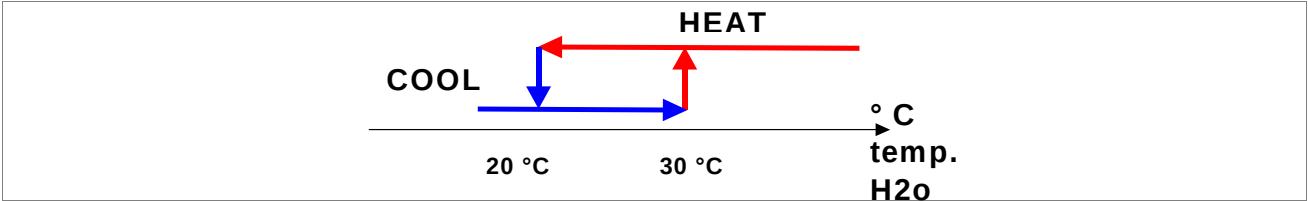
MODE CHANGE

MANUAL

The choice between the HEATING or the COOLING mode is carried out **manually** by the keypad, the room thermostat or the remote selector (see the chapter ELECTRICAL CONNECTIONS).

AUTOMATIC

The choice between the HEATING or the COOLING mode is carried out **automatically** by the electronic module according to the system water temperature measured by a specific probe.



The choice between the automatic or manual change is defined by thermostat with parameter P03 OnModeMan:

- MANUAL = 1
- AUTOMATIC = 0

CLEAN

In the CLEAN mode, the unit is on the ejection mode with injection of all the external air for a fixed time; after this time, the mode deactivates.

It can be activated from the thermostat, keyboard or remote selector (see ELECTRICAL CONNECTIONS section).

VENTILATION

When the unit is in ONLY VENTILATION mode, it operates like a fan; the fans are activated; no adjustment on the room temperature.

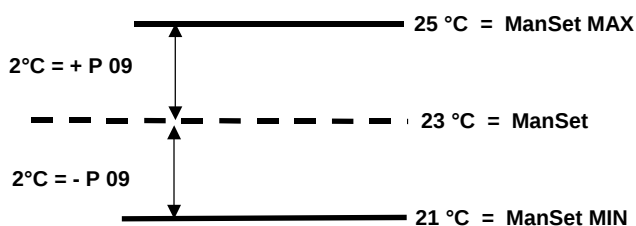
It can be activated from the thermostat, keyboard or remote selector.

SET-POINT

MANUAL AMBIENT SET POINT

The room set point is defined by thermostat with parameter P01 ManSet = 23°C.

The set is modifiable MANUALLY, the modify is limited in values: 25°C > ManSet > 21°C



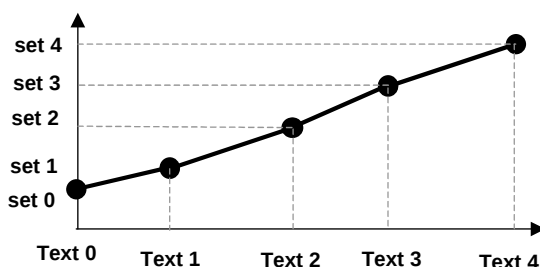
Starting from ManSet the module calculates the set point for HEATING and COLING, spacing them of 1°C respect the manual set:

COOLING = 24°C

HEATING = 22°C

AUTOMATIC AMBIENT SET POINT

The set-point can also be adjusted AUTOMATICALLY to the external temperature variations: the variation curve is defined by 5 points, modifiable by service centers through the service keypad.



The curve can be raised or lowered through parameter P09 of the room thermostat.

The choice between MANUAL or AUTOMATIC setpoint is carried out by thermostat with parameter P02 **OnSetMan**.

- 1 manual operating
- 0 automatic operating

RELATIVE WINTER HUMIDITY SET POINT

Only if the optional humidifier is present.

The humidification action is not activated with the unit in the SUMMER mode or when the compressors are working in the refrigeration mode.

The set point can also be modified by the thermostat with the parameter P05 SetUrHeat.

HID-P1 ROOM THERMOSTAT

The unit is arranged for being connected with a remote HID-P1 thermostat to be installed in the room.
The thermo-adjustment can be performed according to the temperature detected by the room thermostat probe.

ON-OFF Key hold pressed	
SET THE WORKING SETPOINT :	
DISPLAY THE ROOM TEMPERATURE : keys hold pressed	
SUMMER/WINTER MODE CHANGE Key hold pressed The key is not operative if the unit is set for the automatic operating mode: under such conditions, the AUTO indication is displayed.	
SOLO FAN Holding pressed the key Up The characters "---" are displayed in this mode instead of the setpoint, and the bars for the thermo-adjuster power requirement are all active.	
DISPLAY THE ROOM HUMIDITY Hold and simultaneous pressed of both keys	
NOT MANAGED	
CLEAN - CLEANING	
ALARMS Each time the unit is in alarm, the code of the current alarm is displayed instead of the setpoint. The code alternates with intervals of about 3 seconds with the displaying of the room temperature. In case of multiple alarms, the one occurring first is displayed.	
LIST OF THE ALARMS IN PROGRESS Press the Dw ventilation key: the alarm list is scrolled by a code at a time. After 5 seconds from the last pressing of the key Dw the display returns to the standard appearance.	
ALARM RESET The current alarms are reset holding the buttons ECO and Clean pressed.	 
KEY LOCK All button functions can be locked by holding the buttons Clean and On-Off pressed. The lock is signalled by the characters "---" whenever any key is pressed.	 

PARAMETERS

IT IS NOT NECESSARY TO ACCESS THE PARAMETERS FOR THE STANDARD USE.

THE OPERATIONS INDICATED HERE BELOW ARE NEEDED EXCLUSIVELY FOR CALIBRATIONS AND CONFIGURATIONS; THEY ARE THEREFORE ADDRESSED EXCLUSIVELY TO AUTHORIZED SERVICE CENTERS, OR ANYWAY TO QUALIFIED TECHNICIANS.

The parameter from 01 to 08 are present in the main module on the machine: the modification can be realized either by the thermostat or by the keypad.

The parameters from 09 to 12 are on the thermostat.

To access the parameters:

- switch the machine off and on again by the key ON-OFF.
- Wait for the display to show the setpoint.
- Press both setpoint adjustment keys for a few seconds, till the code P01 is displayed.
- Then press the ECO key to display the value associated with the parameter P01.
- The parameter value can be changed while it is displayed using the setpoint adjustment keys.
- The new value is stored pressing again the ECO key.
- To move to another parameter use the keys arrow "UP" or arrow "DOWN" for adjusting the setpoint.
- To exit the programming mode press again and simultaneously the setpoint adjustment keys in the parameter list menu. If the keys are not pressed for at least 10 seconds the module anyway exits the programming mode.

P01: Manual AmbientSetPoint (ManSet)
P02: Manual or auto setpoint enabling (ONSetMan)
P03: manual or automatic mode change enabling (ONModeMan)
P04: humidity setpoint in the Cool mode (SetURCool)
P05: humidity setpoint in the Heat mode (SetURHeat)
P06: Outlet temperature Setpoint in Cool mode (SetOutCool)
P07: Outlet temperature Setpoint in Heat mode (SetOutHeat)
P08: NOT USED (The displayed value is in "ppm / 10")
P09: setpoint positive/negative max. variation range by the user
P10 thermostat temperature probe offset
P11 thermostat humidity probe offset
P12 Clivet Bus thermostat address

By P09 the range within which the user can modify the machine set-point is defined.

ALARM LIST

BEFORE RESETTING AN ALARM, IDENTIFY AND REMOVE ITS CAUSE.
REPEATED RESETS CAN CAUSE IRREVERSIBLE DAMAGE.

The ALARMS indicate a potentially hazardous situation for the machine integrity.

Before resetting the alarm, identify and remove the reason of the lock: a repeated reset can cause irreversible damage. That's why the reset is MANUAL, namely through keyboard (provided that the cause no longer exists).

PRE-ALARMS and SIGNALS indicate a close risk situation. Their occurrence can be accepted if occasional and/or in temporary situations (for example at the system start-up).

The reset is AUTOMATIC, that is there is a self-reset as soon as the cause ceases without any keyboard intervention.

FAILURES signal the malfunctioning of probes and transducers; they are AUTOMATICALLY reset, so that anyway the unit can operate, even if possibly with reduced functions.

In case of doubt contact an authorized service center.

The presence of one or more alarms is signalled by the ALARM CODE blinking and by the machine time it/they occurred.

The cumulative lock relay activates simultaneously with the alarm code displaying.

Some alarms, typically PRE-ALARMS, do not activate the relay.

The table shows all the variables which can be managed by the electronic system.

According to the machine configuration and the accessories, some alarms can be not relevant.

Code	Meaning	Reset
E01	Inlet temp. Probe fault	Automatic – block only of the recovery compressor
E02	Outlet temp. Probe fault	Automatic – blockout of the unit
E03	Externe temperature probe fault	Automatic - block only of the recovery compressor
E04	Antifreeze probe fault	Automatic – blockout of the unit
E05	Ambient UR% probe fault	Automatic – humidity control block
E06	Externe UR% probe fault	Automatic – the external UR is ignored
E07	Outlet UR% probe fault	Automatic – humidity control block only in winter mode
E08	Air quality probe fault	Automatic – inhibits air quality control
E09	Flow-rate transducer fault	Automatic – exclusion only of the recovery compressor
E10	Water temperature probe fault	Automatic – closing of the water valve and deactivation of the automatic change of the machine mode
E11	Fire alarm	Manual
E12	Outlet – inlet fan protection intervention	Manual - blockout of the unit
E13	Recovery compressor low pressure	Automatic – recovery compressor block
E14	Recovery compressor high pressure	Manual - recovery compressor block
E15	Recovery thermal compressor	Manual - recovery compressor block
E16	Water coil antifreeze thermostat	Manual - blockout of the unit
E17	Antifreeze alarm from water probe	Manual - blockout of the unit
E18	Humidifier alarm	Manual – winter humidification block
E19	Outlet 1 high temp. signaling	Automatic
E20	Outlet 2 high temp. signaling	Manual
E21	Outlet 1 low temp. signaling	Automatic
E22	Outlet 2 low temp. signaling	Manual

C23	Clogged filter signal ***	Automatic - no intervention (even if electrostatic filters)
E24	Water temperature out of limit	Automatic - water coil reclusion
E25	Ventilation block due to external low temperature	Automatic
E26	Ventilation block due to external high temperature	Automatic
E27	Ventilation block due to ambient low temperature	Automatic
E28	Ventilation block due to ambient high temperature	Automatic
E29	Unit configuration error	Automatic - it switches off the outputs, except the alarm relay
E30	Overtemperature alarm from water probe	Manual - total blackout of the unit
E31	Alarm of max supply temperature limit	Manual - total blackout of the unit
C32	Fast dehumidification in progress ***	Dehumidification signalling with reduced flow rate
E33	Recovery compressor lockout for low enthalpy/ambient air temperature (heat mode)	Automatic - Recovery compressor lockout and ventilation lockout (off for Timecycle)
E34	Recovery compressor lockout for high ambient air temperature (cool mode)	Automatic - Recovery compressor lockout and ventilation lockout (off for Timecycle)
C35	Humidifier on in antifreeze protection	Automatic - signalling only

*** Cumulative shutdown relay not activated by alarms

The code **C** indicates a warning, but it doesn't compromise the unit operating.

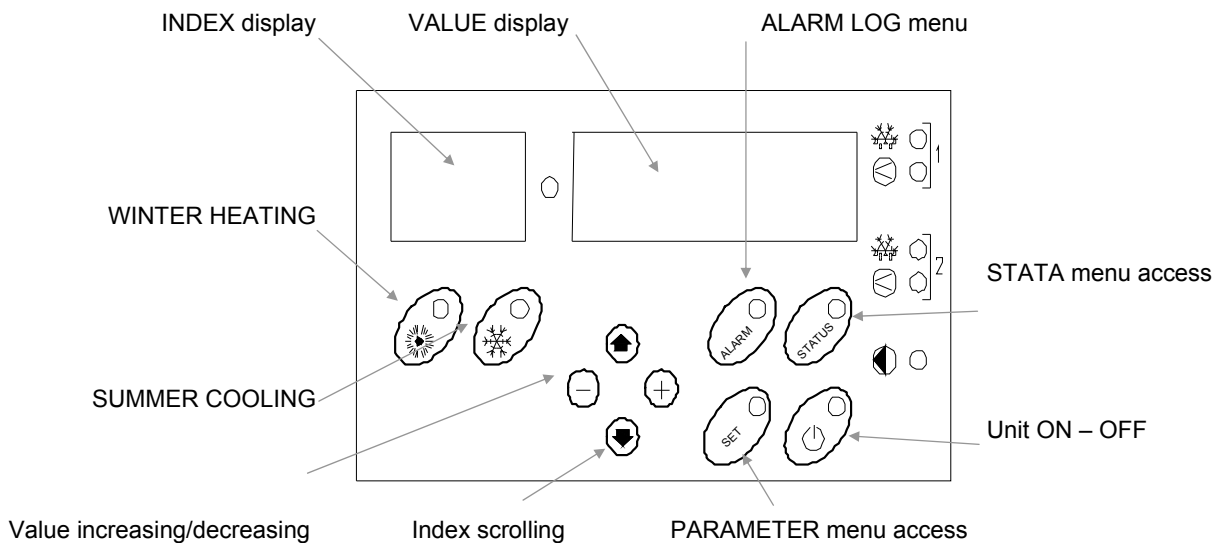
Example: **C23** indicates that filters have to be replaced or cleaned.

The **E** code indicates alarms that compromise the unit operating.

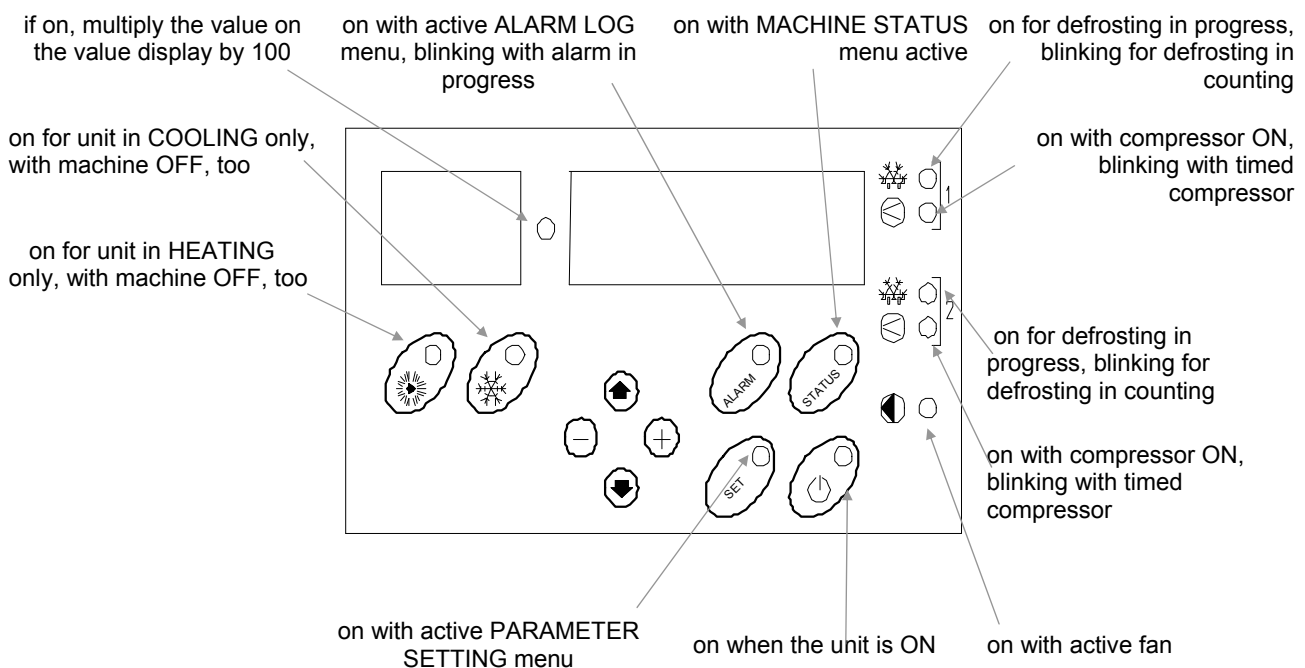
The passage from a code **C** to a code **E** occurs if the alarm switches from an automatic to a manual reset, this because the number of events per hour that occurred exceeded the critical threshold.

KEYPAD (OPTIONAL)

BUTTON FUNCTION



LED MEANING



SWITCH THE UNIT OFF AND ON

Hold the key **ON-OFF** pressed.

With unit off, the indication **OFF** is displayed (even if the unit has been switched off by a digital input or supervisor).

COOLING/HEATING SELECTION

To select the unit operating mode hold the keys **HEAT** or **COOL** pressed (the operating mode selection must be set manual). The LEDs on the right of each key indicate the current unit operating mode, even when the machine is off.

ECO MODE SELECTION

In the main menu, holding both keys **▲ ▼** pressed the ECO mode is activated and the display shows the writing **ECO**.

To restore the machine standard operation repeat this step.

SUPPLY TEMPERATURE

Displayed on the value display in standard operating conditions (the index display has no indication).

CLEAN - WASHING

In the main menu, holding both keys **+** and **-** pressed the washing mode is activated.

To restore the machine standard operation repeat this step.

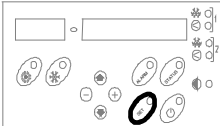
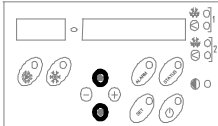
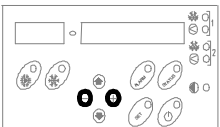
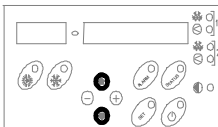
With the unit in Clean mode, the display still shows the outlet temperature value, while the index display shows the code **CLn**.

SOLO FAN

In the main menu, holding both keys **HEAT** and **COOL** pressed the SOLO FAN mode is activated. To restore the machine standard operation repeat this step.

The SOLO FAN indication is displayed with the unit in solo fan mode, instead of the outlet temperature.

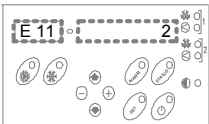
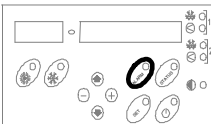
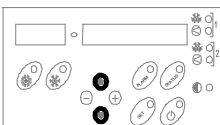
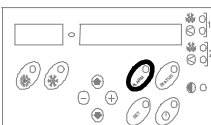
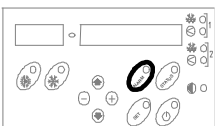
PARAMETER MODIFY

- 1  Push SET button
- 2  Select the parameter
- 3  Modify the value
- 4  Select another parameter
- 5  SET to esc

ACCESSIBLE PARAMETERS FROM KEYPAD

Accessibile parameters				
Num.	Control parameters	Mnemonic	Value	UM
1	Enables manual selection of the operating mode	OnModeMan	1	Flag
4	Enables manual ambient setpoint	OnSetMan	1	Flag
5	Manual ambient Setpoint	ManSet	23	°C
7	Setpoint compensation: outside temperature 0	Text0	15	°C
8	Setpoint compensation: outside temperature 1	Text1	18	°C
9	Setpoint compensation: outside temperature 2	Text2	21	°C
10	Setpoint compensation: outside temperature 3	Text3	24	°C
11	Setpoint compensation: outside temperature 4	Text4	30	°C
12	Setpoint compensation: value 0	set-00	19	°C
13	Setpoint compensation: value 1	set-01	21	°C
14	Setpoint compensation: value 2	set-02	23	°C
15	Setpoint compensation: value 3	set-03	25	°C
16	Setpoint compensation: value 4	set-04	27	°C
26	Supply SetPoint in the winter operating	SetOutHeat	21	°C
30	RH SetPoint in the winter operating	SetURHeat	55	%
40	Supply SetPoint in the summer operating	SetOutCool	25	°C
66	Air quality Set point	SetCO2	900	%
97	RH Set point in the summer operating	SetURCool	60	%

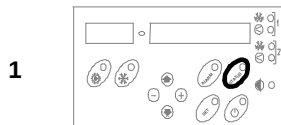
ALARM DISPLAYING

- 1  blinking alarm code alarm machine hours
- 2  alarm log access short pressing ALARM
- 3  the most recent alarm is displayed to display further alarms arrow keys
- 4  to quit short pressing ALARM
- 5  to RESET ALARM HOLD PRESSED

STATUS LIST

The MACHINE STATUS menu enables to display a few variables, even when an alarm is in progress.

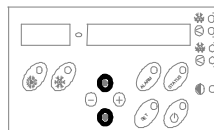
STATUS DISPLAYING



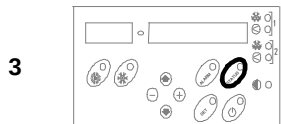
1

Push STATUS button

2



Select status



3

STATUS to esc

The tables shows all the variables which can be managed by the electronic system.
According to the machine configuration and the accessories, some alarms can be not used.
In this case, one can see " - - " in the display instead of the status value.

Status num.	Status by keypad	UM
001	Supply current SetPoint	°C
002	Return current SetPoint	°C
003	Return temperature	°C
004	Outside temperature	°C
005	VHeat/CoolExt control component	%
006	VHeat/CoolAmb control component	%
007	VHeat/CoolRec control component	%
008	Signal of compressor inverter control	%
009	Compressor operating mode (1= heat pump)	0 ÷ 1
010	Active dehumidification status	0 ÷ 1
011	Free-Cooling status	0 ÷ 1
012	Free-Heating status	0 ÷ 1
013	Vfan control variable	%
014	Supply Fan control signal	%
015	Supply Fan active Step number	0 ÷ 3
016	Return Fan control signal	%
017	Return Fan active Step number	0 ÷ 3
018	Water coil control signal	%
019	System water temperature	°C
020	RH probe in Ambient	%
021	RH probe in Supply	%
022	External RH probe	%
023	On-Off humidifier status	0 ÷ 1
024	Humidifier control signal	%
025	Post-heating status	0 ÷ 1
026	Preheating status (replaces the previous on/off electrostatic filter status)	0 ÷ 1
027	Control signal of Electrostatic Filters	%
028	Antifreeze probe	°C
029	Air quality probe	ppm o Volt/10
030	Stato serranda esterna	0 ÷ 1
031	Unit clock	Hours
032	C1 operating hours	Hours
033	C2 operating hours	Hours
034	C1 starts	Int

035	C2 starts	Int
036	Zf-t	-
037	"keypad homologation year "	-
038	"keypad homologation month"	-
039	"keypad homologation day"	-
040	Zf-b	-
041	"base homologation year "	-
042	"base homologation month"	-
043	"base homologation day"	-
044	Modulation time of resi stance water/control valve opening (count)	sec
045	Correction time of resi stance water/control valve opening (count)	sec
046	On/off status of electrostatic filters	0 ÷ 1
047	Number of active steps of the condensing unit	0 ÷ 1
048	Control signal of modulating preheating	%
049	Air flow status of reduced ventilation	0 ÷ 1
050	Status supply temperature probe	°C

ROUTINE MAINTENANCE

BEFORE UNDERTAKING ANY SORT OF MAINTENANCE OR CLEANING, DISCONNECT THE ELECTRICAL POWER SUPPLY TO THE UNIT, AND ENSURE THAT OTHER PEOPLE CANNOT RE-CONNECT IT .

All equipment is subjected to wear out.

The maintenance makes :

1. keeps the unit efficiency
2. the components last longer
3. keeps their efficiency and limits breakdowns

Therefore, it is fundamental to perform periodical checks: a few controls can be performed by the user (AUTONOMOUS MAINTENANCE) and they are mainly

cleaning activities; otherwise, controls have to be performed by specialized technicians (INSPECTIONS).

The machine should have a log book used to keep track of the performed controls. This will make fixing up breakdowns easier.

Take note of the date, type of control (autonomous maintenance, inspection or fixing up), description of the control, actions taken and so on.

SERVICES

Parts subject to intervention:

- EXTERNAL AIR COIL
- ROOM AIR TREATMENT COIL
- FILTERS
- STRUCTURE
- CONDENSATE DISCHARGE

- EXTERNAL FANS
- DUCTING
- STEAM HUMIDIFIER AND IMMERSSED ELECTRODES
- ELECTRIC ELEMENTS

EXTERNAL AIR COIL

ATTENTION: contact with the exchanger fins can cause cuts. Wear protective gloves to perform the above described operations.

It is extremely important that the battery gives the maximum thermal exchange; therefore, its surface must be cleaned from dust and deposits. Remove all impurities from the surface.

Using an air pressure gun, clean the aluminum surface of the battery. Be careful to direct the air in the opposite direction of the fan air movement. Hold the gun parallel to the fins to avoid damages. As an alternative, an aspirator can be used to suck impurities from the air input side. Verify that the aluminum fins are not bent or damaged. In the event of damages, contact the authorized assistance center and get the battery "ironed out" in order to restore the initial condition for an optimal air flow.

ROOM AIR TREATMENT COIL

ATTENTION: accidental contact with the fins of the exchanger may cause small cuts. When performing the following steps, use protective gloves.

The finned surfaces of the cooling coils and especially the condensation collection trays are the places where micro-organisms and moulds most easily flourish. It is therefore very important to clean regularly with suitable detergents and disinfect with appropriate products as necessary.

AIR FILTERS

It is very important for the air treatment coil to be able to offer maximum thermal exchange. Therefore, the unit must always operate with the filters installed and clean.

Cleaning and replacement of filters are very important in terms of health and hygiene.

Operation with clogged filters leads to a reduction in the air flow rate, resulting in malfunctions and unit shutdowns. It may even cause the unit to break down.

How often the filters need to be checked depends on the quality of outdoor air, unit operating hours, dust and number of persons in the rooms.

As a guideline, cleaning should ideally take place between weekly and monthly. It is advisable to start with frequent checks, and to adjust the frequency based on how much dirt is discovered.

PLEATED FILTERS

1. Remove the closing doors
2. Carefully extract the filter so that no dust reaches the parts below
3. Wash the filtering mattress in warm water with a common detergent.
4. Carefully rinse it under water while preventing to pour water in the room
5. Dry the filter
6. Reinsert it to its seat
7. Reassemble the closing doors

Old filters, washing residuals and residual parts must be disposed of, according to the law in force.

ELECTRONIC FILTERS (OPTIONAL)

1



Materials required for maintenance:

1. Alkaline detergent A01212 (code CLIVET C6460315)
2. Acid detergent B01212 (code CLIVET C6460316)
3. Protective gloves and goggles
4. Graduated beaker
5. Manual or pneumatic pump for spraying

2



Pour part of the alkaline detergent into the graduated cylinder

Dilute with one part water so as to form a 50% solution

3



Fill the spray pump with the prepared solution

4



Position the filter to be washed on a support so you can work comfortably.

Spray the detergent on the blades of the electrostatic filter

5



Also spray the detergent on the base of the contacts.
Let the detergent stand for 2-3 minutes

6



Rinse with a jet of water or with a pressurized water cleaner at low pressure

7



Thoroughly rinse the insulators of the electrostatic cell
Turn the filter and rinse the back as well

8



After washing with alkaline detergent, this is how the filter should look.
Otherwise repeat steps 4 to 7

9



Prepare a tub with a 1/20 solution of detergent B01212 diluted in water.
Immerse the filter you have just washed in this solution to eliminate alkaline detergent residue.
Make sure that the solution covers the entire filter.
Do not use aluminium or galvanized sheet metal tubs.

10



Within 2-3 minutes you will note a slight chemical reaction with the formation of foam. This indicates that the alkaline residues have been eliminated

11



Rinse the filter again with a jet of water or with a pressurized water cleaner at low pressure

12



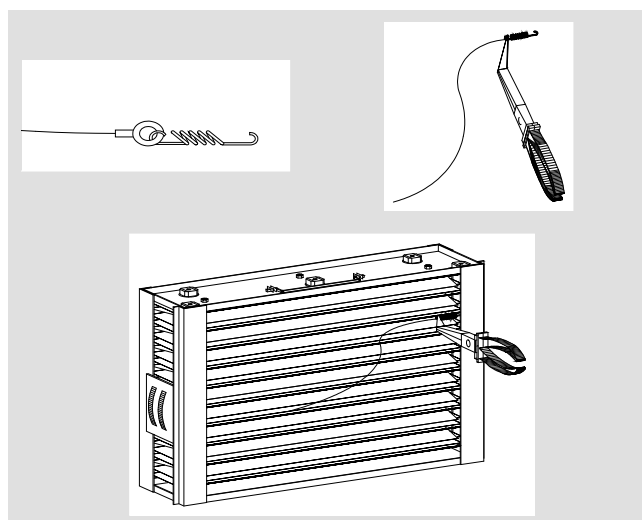
Dry the electrostatic cells in a warm room or in direct sunlight for a few hours.
Keep the cells up off the ground with two pieces of wood or metal.

IONIZATION WIRES

Impurities may cause oxidation or encrustation on the wires. These may be removed using a cloth soaked in alcohol or with very fine grain steel wool.
Because of the high voltage that powers them, the ionization wires are subject to wear. Yearly replacement will prevent unexpected breakage.

If breakage occurs:

1. Remove all pieces of wire in the cell and remove the spring that holds the wires taut.
2. Hook the spring onto the eyelet of the wire.
3. Grasp the ionization wire with a curved pincer.
4. Hook the end of the spring with the open eyelet to the wire-tensioning rod of the electro-static cell
5. Holding the ionization wire taut with the other hand, hook it onto the other wire-tensioning rod, again using a curved pincer



STRUCTURE

Check the condition of the parts making up the structure.

Paint so as to eliminate or reduce oxidation at the points in the unit where this problem may occur. Check that the panelling is fastened correctly. Poor fastening may give rise to malfunctions and abnormal noise and vibration.

CONDENSATE DISCHARGE

Dust and deposits could cause obstructions.

Clean the tank, pour some water into the tank and check water flows normally.

DUCTING

Check the fixing screws and the operation of the anti-vibration devices in order to prevent the transmission of vibrations in the room.

ELECTRIC FANS

Make sure that the fans and the relative protection grids are well fixed.

Check, if possible, the unbalances of the electro-fan evident by noise and anomalous vibrations. Verify that the terminal protection covers are closed and the cable holders are properly positioned.

STEAM HUMIDIFIER AND IMMERSED ELECTRODES

The humidifier and the cylinder contain live electrical components and hot surfaces. All maintenance operations must be performed by qualified, experienced personnel who have been trained on possible hazards.

During operation, the steam production cylinder reaches high temperatures!

Maintenance must be performed after the cylinder has cooled. Use protective gloves.

The cylinder must be replaced periodically. This operation is necessary when lime incrustations build up on the inside such that sufficient current passage does not occur. How frequently this needs to be done depends on the water supply. The harder the water, the more often the cylinder will need to be replaced. The water supply must not be softened. This causes corrosion of the electrodes, foaming and possible abnormal operation. After prolonged use or use with very hard water, the solid deposits on the electrodes may increase in size until they adhere to the inner wall of the cylinder. With especially conductive deposits, the plastic may heat so much that it melts, resulting in water leakage.

In case of leaks, power off the unit before touching the cylinder, because electrical current may be flowing through the water.

PERIODIC CHECKS OF CYLINDER

fortnightly	after not more than 300 hours of service	check of operation, general condition, lack of leaks
quarterly	after not more than 1000 hours of service	check of operation, general condition, lack of leaks, any replacement required
yearly	after not more than 2500 hours of service (disposable cylinders)	replacement of cylinder
5 years	after not more than 10000 hours of service (for inspectable cylinders)	replacement of cylinder

YEARLY CHECK OF COMPONENTS

Do not use detergents or solvents to clean plastic components.

To remove incrustations, wash with a 20% solution of vinegar or acetic acid, and then rinse with water.

filling solenoid valve	disconnect the electrical power supply, remove the valve, and clean the filter
drainage solenoid valve	disconnect the electrical power supply, remove the bobbin, disassemble the valve body, remove any impurities and rinse
supply tub, pipes	check that they are free and without impurities

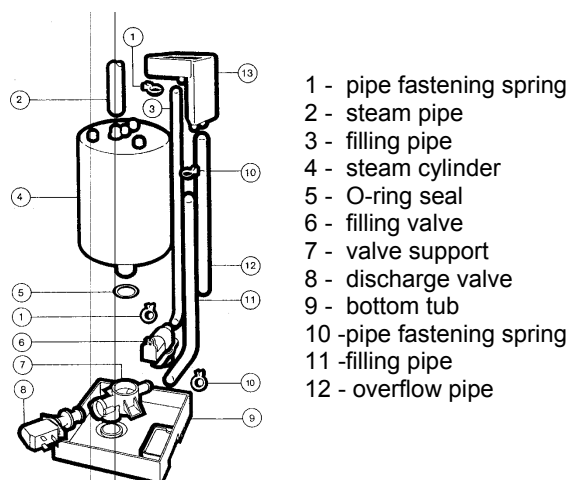
REPLACEMENT OF CYLINDER

To remove the cylinder:

- Completely drain the water.
- Cut power to the humidifier using the disconnecting switch of the unit.
- Remove the steam tube from the cylinder.
- Detach the electrical connections of the electrodes and remove the plugs from the high-level electrodes.
- Unscrew the ring nut to remove the nozzle and the filter (when the filter is outside the cylinder)
- Lift the cylinder to extract it

Before putting it back in place:

- The filter body does not need to be replaced. Wash it with water and place it on the new cylinder, using the new gasket that comes with it.
- Check the gasket for the seal between the cylinder and the drain group.
- Put the cylinder back in place by repeating the operations in reverse order



ELECTRICAL HEATING ELEMENTS

The convector finned heating elements need to be checked regularly to ensure that they are clean and properly fastened to the support.

MAINTENANCE INSPECTIONS

Foresee inspection assistance carried out by authorized centers or by qualified personnel.

The inspections should be carried out at least:

- - Every year for only the cooling units
- - Every six months for the cooling and warming units

The frequency, however, depends on the use: in the event of frequent use (continuous or very intermittent use, near the operating limits, etc) or critical use (service necessary) it is recommended to plan inspections at close intervals.

The inspections to be performed are as follows:

- verify the power supply tension (when emptied or filled)
- inspect the electrical board (status of solenoid starter contacts, terminal closings, the status of wiring and relevant insulations)
- inspect the absorption of the single electrical loads
- verify the cleaning and the efficiency of the exchangers

- inspect the cleaning of the filters (air/water)
- verify the leakage from the refrigerating circuit
- Verify the protection devices (safety valves, pressure switches, thermostats, etc.), the adjustment systems, the control devices (alarm signalizations, probes, manometers, etc)
- check the operating parameters of the refrigerating circuit (see the following REFRIGERANT TABLES and the START-UP section)

For units equipped with safety valves, follow the Manufacturer's instructions.

Verify periodically the cleaning of the safety valves and that oxidative / corrosive phenomena are not present, in particular for installations near the sea, in industrial areas or in rooms with a corrosive atmosphere.

97/23 CE PED DIRECTIVE

97/23 CE PED DIRECTIVE gives instructions for installers, users and maintenance technicians as well.

Refer to local actuation norms; briefly and as an example, see the following :

- **COMPULSORY VERIFICATION OF THE FIRST INSTALLATION** only for units assembled on the installer's building site (for ex. Condensing circuit + direct expansion unit)
- **CERTIFICATION OF SETTING IN SERVICE** for all the units
- **PERIODICAL VERIFICATIONS** to be executed with the frequency indicated by the Manufacturer (see the MAINTENANCE INSPECTIONS section)

PUT AT REST

If a long period of inactivity is foreseen, for example the winter for the cooling unit, the following is recommended:

- to turn the power off in order to avoid electrical risks or damages by lightning strike
- to avoid the risk of frosts as shown in the HYDRAULIC CONNECTIONS section, and, in particular
 - to empty or add glycole in the plant sections subjected to temperatures below zero
 - to empty or add glycole in the water heating coils, also in summer
 - to power antifreeze heaters if present

If the period of inactivity is particularly long or in the event of extremely low temperatures, the external fans can be blocked temporarily; therefore, it is recommended to switch them on every month in order to avoid seizures or electrical overloads when the unit will be switched on.

The restarting of the unit has to be carried out by qualified personnel, in particular, after the winter break for cooling units or when seasonal switching should be performed.

When restarting, refer to the SWITCHING ON section.

Schedule technical assistance in advance to avoid hitches and be able to use the installation when necessary.

REFRIGERANT TABLES

THIS SECTION IS DEVOTED ONLY TO QUALIFIED TECHNICIANS THAT KNOW THE FOLLOWING:

- THE OPERATIONAL PRINCIPLES OF THE REFRIGERATING CIRCUIT OPERATION
- THE MODES OF DETECTING TEMPERATURE AND PRESSURE
- THE RISKS RELEVANT TO THESE OPERATIONS

The data of the tables allow the testing of the refrigerating circuit operation by the detection of a few objective parameters. The data are significant if they are detected simultaneously and while the refrigerating circuit is running.

OVERHEATING = return temperature – Saturation temperature		SUBCOOLING = condensing temperature (pressure *) – liquid temperature	
Return pressure	7.2 bar	Condensing pressure	29.6 bar
Return temperature	7.3 °C	Liquid temp.	45 °C
overheating	7.3 – 0.8 = 6.5 °C	subcooling	49.91 – 45 = 4.91 °C

* It is important that the condensation pressure is detected as close as possible to the point where the liquid temperature is detected, in the event that the calculation will be effected by the losses of charge (and, therefore, of temperature) caused by the refrigerating circuit components placed between the two measurement points.

Pg = P gauge = relevant pressure (read on the pressure gauge) , Ts : saturation pressure

For R410A the glide was not considered, since it is close to 0															
Pg	Ts [°C]	Pg	Ts [°C]	Pg	Ts [°C]	Pg	Ts [°C]	Pg	Ts [°C]	Pg	Ts [°C]	Pg	Ts [°C]	Pg	Ts [°C]
0.0	-51.66	5.0	-8.69	10.0	10.42	15.0	23.74	20.0	34.22	25.0	42.95	30.0	50.47	35.0	57.10
0.2	-48.02	5.2	-7.73	10.2	11.03	15.2	24.20	20.2	34.59	25.2	43.27	30.2	50.75	35.2	57.35
0.4	-44.83	5.4	-6.79	10.4	11.63	15.4	24.66	20.4	34.97	25.4	43.59	30.4	51.03	35.4	57.60
0.6	-41.98	5.6	-5.87	10.6	12.23	15.6	25.12	20.6	35.34	25.6	43.90	30.6	51.31	35.6	57.85
0.8	-39.40	5.8	-4.97	10.8	12.82	15.8	25.57	20.8	35.71	25.8	44.22	30.8	51.59	35.8	58.09
1.0	-37.03	6.0	-4.10	11.0	13.40	16.0	26.01	21.0	36.08	26.0	44.53	31.0	51.86	36.0	58.34
1.2	-34.84	6.2	-3.24	11.2	13.97	16.2	26.46	21.2	36.44	26.2	44.85	31.2	52.14	36.2	58.58
1.4	-32.81	6.4	-2.40	11.4	14.54	16.4	26.90	21.4	36.81	26.4	45.16	31.4	52.41	36.4	58.82
1.6	-30.90	6.6	-1.57	11.6	15.10	16.6	27.33	21.6	37.17	26.6	45.47	31.6	52.68	36.6	59.07
1.8	-29.10	6.8	-0.77	11.8	15.66	16.8	27.76	21.8	37.52	26.8	45.77	31.8	52.95	36.8	59.31
2.0	-27.39	7.0	0.02	12.0	16.20	17.0	28.19	22.0	37.88	27.0	46.08	32.0	53.22	37.0	59.55
2.2	-25.78	7.2	0.80	12.2	16.74	17.2	28.62	22.2	38.23	27.2	46.38	32.2	53.49	37.2	59.78
2.4	-24.24	7.4	1.56	12.4	17.28	17.4	29.04	22.4	38.58	27.4	46.69	32.4	53.75	37.4	60.02
2.6	-22.76	7.6	2.31	12.6	17.81	17.6	29.45	22.6	38.93	27.6	46.99	32.6	54.02	37.6	60.26
2.8	-21.35	7.8	3.05	12.8	18.33	17.8	29.87	22.8	39.28	27.8	47.28	32.8	54.28	37.8	60.50
3.0	-20.00	8.0	3.77	13.0	18.85	18.0	30.28	23.0	39.62	28.0	47.58	33.0	54.54	38.0	60.73
3.2	-18.69	8.2	4.48	13.2	19.36	18.2	30.69	23.2	39.96	28.2	47.88	33.2	54.80	38.2	60.96
3.4	-17.44	8.4	5.18	13.4	19.87	18.4	31.09	23.4	40.30	28.4	48.17	33.4	55.06	38.4	61.20
3.6	-16.22	8.6	5.87	13.6	20.37	18.6	31.49	23.6	40.64	28.6	48.46	33.6	55.32	38.6	61.43
3.8	-15.05	8.8	6.55	13.8	20.86	18.8	31.89	23.8	40.98	28.8	48.76	33.8	55.58	38.8	61.66
4.0	-13.91	9.0	7.22	14.0	21.36	19.0	32.28	24.0	41.31	29.0	49.05	34.0	55.84	39.0	61.89
4.2	-12.81	9.2	7.88	14.2	21.84	19.2	32.68	24.2	41.64	29.2	49.33	34.2	56.09	39.2	62.12
4.4	-11.74	9.4	8.53	14.4	22.32	19.4	33.07	24.4	41.97	29.4	49.62	34.4	56.34	39.4	62.35
4.6	-10.69	9.6	9.16	14.6	22.80	19.6	33.45	24.6	42.30	29.6	49.91	34.6	56.60	39.6	62.57
4.8	-9.68	9.8	9.79	14.8	23.27	19.8	33.84	24.8	42.62	29.8	50.19	34.8	56.85	39.8	62.80

TROUBLESHOOTING

THE OPERATIONS MUST BE CARRIED OUT BY TECHNICAL QUALIFIED PERSONNEL HAVING THE REQUISITES UNDER LAW REQUISITES AND IN CONFORMITY WITH THE SAFETY REGULATIONS IN FORCE.

THE INTERVENTIONS WITHIN THE WARRANTY PERIOD WILL BE CARRIED OUT BY AUTHORIZED SERVICE CENTERS.

**BEFORE RESETTING AN ALARM, IDENTIFY AND ELIMINATE ITS CAUSE.
REPEATED RESETS MAY CAUSE SERIOUS DAMAGES.**

In certain machine configurations, some safeties may be placed in series and lead back to a single input on the electronic module.

Therefore, check on the electrical diagram whether the device to which the alarm corresponds has other devices or safeties connected in series.

Below is a list of the possible causes of alarms.

FAULTY PROBE

1. Identify the part on the wiring diagram.
2. Loose electric contacts/terminals, leads broken
3. Check the correct probe ohmic level (using a tester)
4. Change the probe.
5. Check the electronic module configuration (only an authorised service centre can do this)
6. Change the electronic module

COMPRESSOR PROTECTION

1. Identify the part on the wiring diagram
2. Loose electric contacts/terminals, leads broken
3. electrical windings interrupted
4. Vacuum power voltage below the limits
5. power contactors / contacts defective
6. start-up power voltage lower than the limits
7. electrical absorption high / unbalanced
8. High compressor discharge temperature > thermostatic device needs calibrating, insufficient refrigerant charge

HIGH PRESSURE

1. high air temperature (see operating limits)
2. fans do not work, direction of rotation inverted
3. insufficient air flow to coil
4. not CONSTANT flow (for example, if the pumps are turned off, certain areas of the plant are excluded or included, other uses are isolated, etc)
5. dirty air filter
6. condensation gas in the cooling circuit o
7. Too much refrigerant
8. Check the trigger point for the manostat and transducer
9. Manostat/transducer: loose electric contacts/terminals, wiring cables interrupted
10. Check the manostat or transducer pressure control point (deposits of oil, dirt, pin blocked mechanically)

FAN PROTECTION

1. Identify the part on the wiring diagram
2. fan mechanically jammed, bearings / drive belt (if present)
3. Loose electric contacts/terminals, leads broken
4. electrical windings of fan interrupted
5. power supply voltage below limits
6. electrical absorption high / unbalanced

LOW PRESSURE

1. low air temperature (see operating limits)
2. not CONSTANT flow (for example, if the pumps are turned off, certain areas of the plant are excluded or included, other uses are isolated, etc)
3. insufficient air flow to coil (high thermal difference between input and output)
4. air filter dirty
5. fans do not work, direction of rotation inverted
6. Manostat/transducer: loose electric contacts/terminals, wiring cables interrupted
7. refrigerant circuit empty, visible leaks of refrigerant/oil, insufficient charge
8. dryer filter clogged
9. thermostatic device not operating correctly
10. Check the trigger point for the manostat and transducer

DECOMMISSIONING OF THE UNIT

DISCONNECTING THE UNIT

The units must be disconnected by authorised personnel, who before proceeding must first read the Residual Risks section in this manual.

Before disconnecting the unit, the following must be recovered, if present:

- the refrigerant (if the circuits cannot be isolated): the refrigerant must be removed using suction devices operating in a closed circuit, so as to ensure that none of the compound is released into the atmosphere.
- the antifreeze in the circuits: when removing this fluid, make sure that it does not leak and that it is not released into the environment. The antifreeze fluid must be stored in special containers.

When recovering the substances present in the unit, all measures must be taken to avoid damaging persons and things and polluting the surrounding area.

Awaiting dismantling and disposal, the unit can also be stored outdoors, as bad weather and rapid changes in temperature will not cause damage to the environment, if electric, cooling and hydraulic circuits of the unit are integral and closed.

DISMANTLING AND DISPOSAL

THE UNIT MUST ALWAYS BE SENT TO AUTHORISED CENTRES FOR DISMANTLING AND DISPOSAL.

When dismantling the unit, the fan, the motor and the coil, if operating, may be recovered by the specialist centres for reuse.

All the materials must be recovered or disposed of in compliance with the corresponding national standards in force.

For further information on the decommissioning of the unit, contact the manufacturer.

TECHNICAL DATA

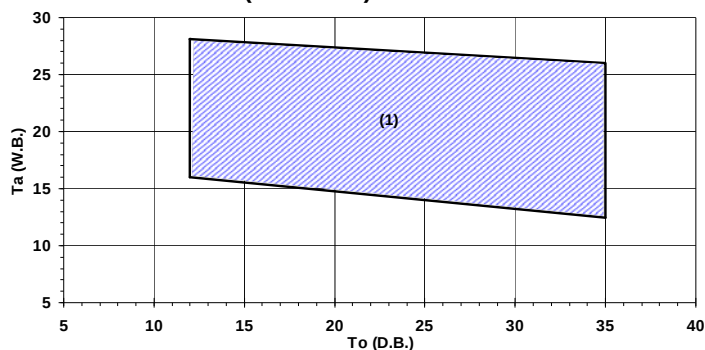
Size		17	21	25	31	41	51
COOLING							
Cooling capacity	1 kW	6,2	7,6	8,6	10,9	12,4	15,9
Sensible capacity	1 kW	5	5,8	7	8,6	9,5	12,5
Compressor power input	1 kW	1,7	2,1	2,2	2,9	2,8	3,8
HEATING							
Heat output	2 kW	6,8	8,3	9,2	11,9	13,2	16,9
Compressor power input	2 kW	1,3	1,7	1,8	2,2	2	2,8
COMPRESSORS							
Type of compressors	3	Rot				Scroll	
No. of Compressors		1					
Std Capacity control steps		1					
Refrigerant circuits		1					
AIR HANDLING SECTION FANS (OUTLET)							
Type of fans	4	CFG					
Number of fans		1					
Standard air flow	l/s]	330	390	470	610	690	920
Installed unit power	kW	0,3	0,3	0,4	0,4	0,6	0,6
Max outside static pressure	5 Pa	190	175	300	180	270	340
AIR HANDLING SECTION FANS (EXHAUST)							
Type of fans	4	CFG					
Number of fans		1					
Standard air flow	l/s	300	360	440	550	640	860
Installed unit power	kW	0,3	0,3	0,4	0,4	0,6	0,6
Max outside static pressure	5 Pa	180	165	290	210	250	360
DIMENSIONS							
Length	mm	1503					
Depth	mm	950					
Height	mm	442		517		668	

- (1) exhaust coil inlet air temperature 27°C B.S. - 19°C B.U.
 outdoor air temperature 35°C B.S. - 24°C B.U.
- (2) exhaust coil inlet air temperature 20°C B.S. - 12°C B.U.
 outdoor air temperature 7°C DB - 6°C WB
- (3) SCROLL = scroll compressor
 ROT = rotary compressor
- (4) CFG = centrifugal fan
- (5) Static pressure available on unit with electronic filters (excluding integration coil)

OVERLOAD AND CONTROL DEVICE CALIBRATION

		On	Off	Value
High pressure safety switch	kPa	4200	3300	--
Low pressure safety switch	kPa	300	450	--
Max no. of compressor starts per hour	Nr	--	--	10

OPERATING LIMITS (COOLING)



THE LIMITS ARE INDICATIVE AND HAVE BEEN CALCULATED CONSIDERING:

- VALUES GENERAL AND NOT SPECIFICATIONS,
- STANDARD AIR FLOW-RATE,
- NON-CRITICAL POSITIONING AND CORRECT USE OF THE UNIT,
- OPERATION AT FULL LOAD

TA = EXTERNAL AIR TEMPERATURE/TREATMENT COIL INLET (°C) W.B.

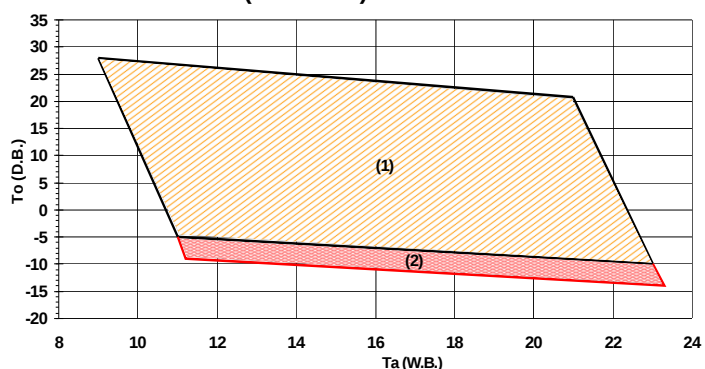
WB = WET BULB

TO = EXHAUST COIL INLET AIR TEMPERATURE (°C)

DB = DRY BULB

(1) THE DASHED AREA REFERS TO THE FIELD OF UNITS OPERATION STANDARD

OPERATING LIMITS (HEATING)



THE LIMITS ARE INDICATIVE AND HAVE BEEN CALCULATED CONSIDERING:

- VALUES GENERAL AND NOT SPECIFICATIONS,
- STANDARD AIR FLOW-RATE,
- NON-CRITICAL POSITIONING AND CORRECT USE OF THE UNIT,
- OPERATION AT FULL LOAD

TA = EXHAUST COIL INLET AIR TEMPERATURE (°C) W.B.

WB = WET BULB

TO = OUTDOOR AIR TEMPERATURE/HANDLING COIL INLET (°C)

DB = DRY BULB

(1) THE DASHED AREA REFERS TO THE FIELD OF UNITS OPERATION STANDARD

(2) OPERATION FIELD EXTENSION WITH PREHEATING HEATERS

SOUND LEVELS

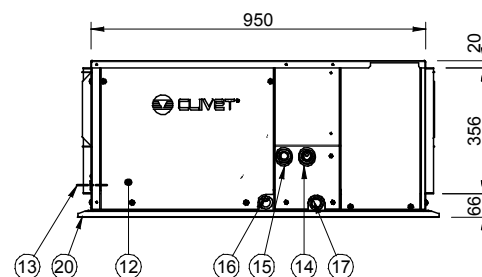
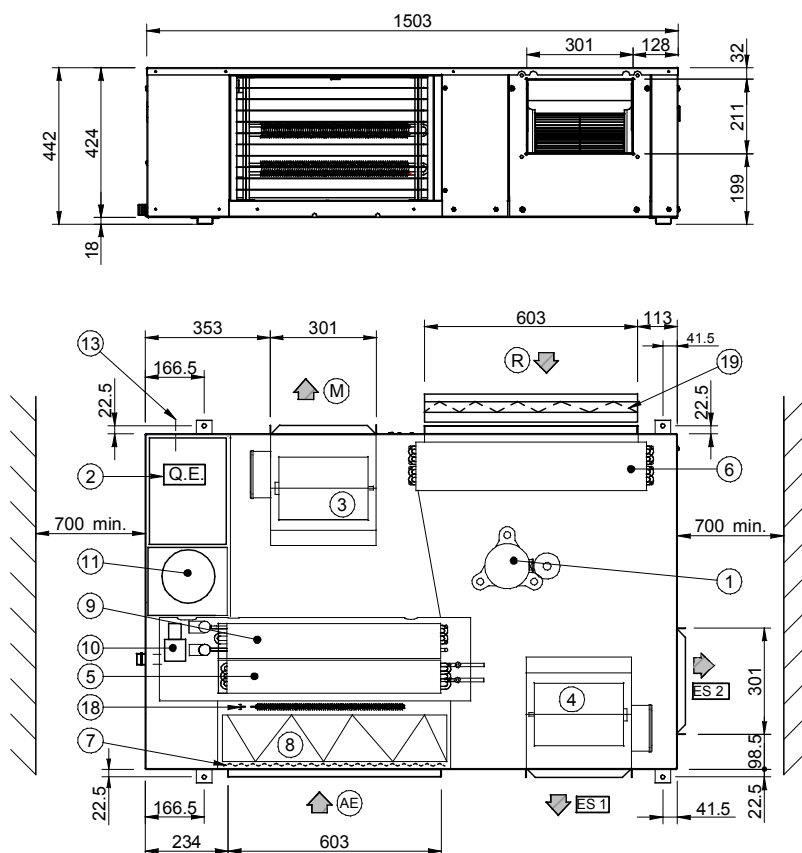
	Sound Power Level (dB)								Sound pressur e level dB(A)	Sound power level dB(A)
Size	Octave band (Hz)									
	63	125	250	500	1000	2000	4000	8000		
17	77	75	70	65	62	57	47	35	53	68
21	79	77	72	67	64	59	49	37	55	70
25	80	79	74	69	66	61	52	41	57	72
31	85	81	76	71	68	63	54	43	59	74
41	83	82	77	74	70	65	56	45	61	76
51	88	85	79	75	71	66	57	46	62	77

The sound levels are referred to units working at full load in nominal conditions.

The sound pressure level is referred at a distance of 1 m. From the ducted unit surface working in free field conditions. external static pressure 50 pa.

DIMENSIONS

Sizes 17-21



- (1) COMPRESSOR
- (2) ELECTRICAL PANEL
- (3) SUPPLY FAN
- (4) EXHAUST FAN
- (5) TREATED AIR DIRECT EXPANSION COIL
- (6) EXHAUST AIR DIRECT EXPANSION COIL
- (7) AIR FILTER
- (8) ELECTRIC FILTERS (OPTIONAL)
- (9) ADDITIONAL WATER COIL (OPTIONAL)
- (10) 3 WAYS-VALVE (OPTIONAL)
- (11) STEAM HUMIDIFIER (OPTIONAL)
- (12) REMOVABLE PANEL FOR ACCESS TO THE TECHNICAL COMPARTMENT
- (13) POWER INPUT
- (14) WATER OUTLET ADDITIONAL COIL Ø 3/4"
- (15) WATER INLET ADDITIONAL COIL Ø 3/4"
- (16) HUMIDIFIER INLET WATER Ø 1/2" GAS
- (17) CONDENSATE DISCHARGE
- (18) AUXILIARY ELECTRIC HEATERS (OPTIONAL)
- (19) EXHAUST AIR FILTER G4 (OPTIONAL)
- (20) BRACKETS FOR ANCHORING THE UNIT TO THE CEILING

R = AIR INTAKE FROM OUTSIDE

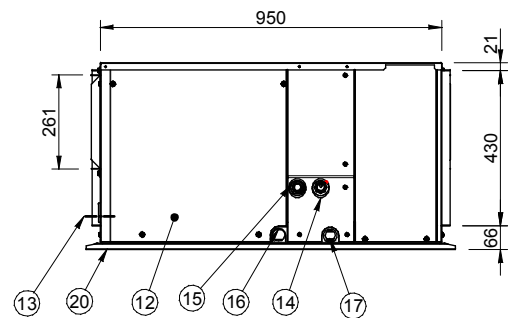
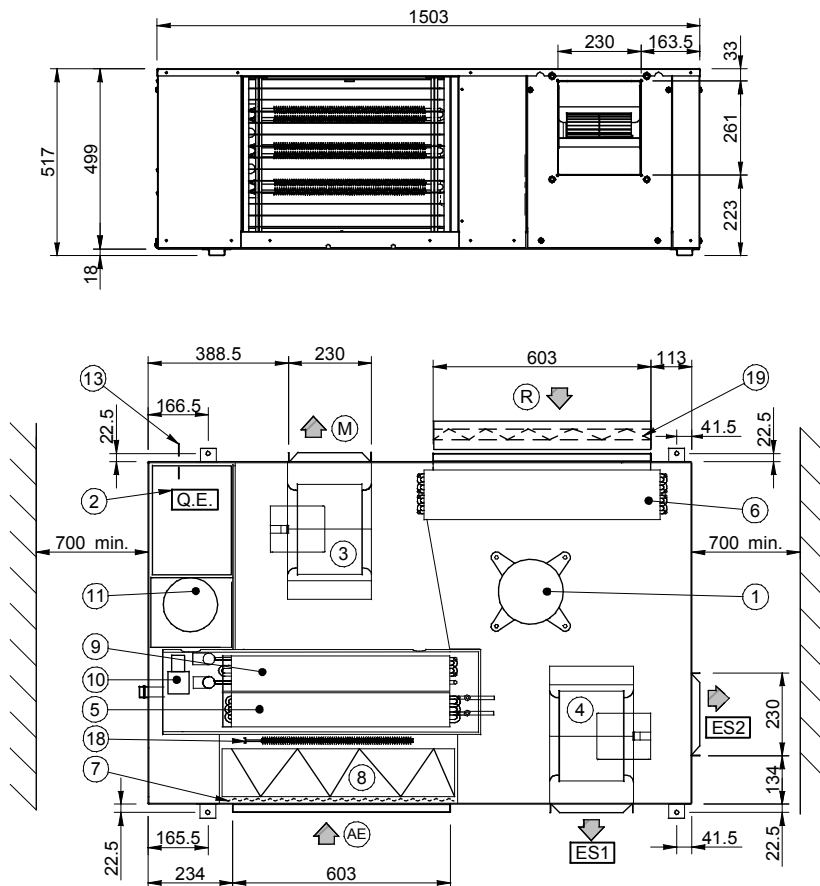
M=OUTLET AIR

AE = FRESH AIR INTAKE

ES1 = STANDARD AIR EXHAUST

ES2 = OPTIONAL AIR EXHAUST

Sizes 25-31



- (1) COMPRESSOR
- (2) ELECTRICAL PANEL
- (3) SUPPLY FAN
- (4) EXHAUST FAN
- (5) TREATED AIR DIRECT EXPANSION COIL
- (6) EXHAUST AIR DIRECT EXPANSION COIL
- (7) AIR FILTER
- (8) ELECTRIC FILTERS (OPTIONAL)
- (9) ADDITIONAL WATER COIL (OPTIONAL)
- (10) 3 WAYS-VALVE (OPTIONAL)
- (11) STEAM HUMIDIFIER (OPTIONAL)
- (12) REMOVABLE PANEL FOR ACCESS TO THE TECHNICAL COMPARTMENT
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- (18) AUXILIARY ELECTRIC HEATERS (OPTIONAL)
- (19) EXHAUST AIR FILTER G4 (OPTIONAL)
- (20) BRACKETS FOR ANCHORING THE UNIT TO THE CEILING

R = AIR INTAKE FROM OUTSIDE

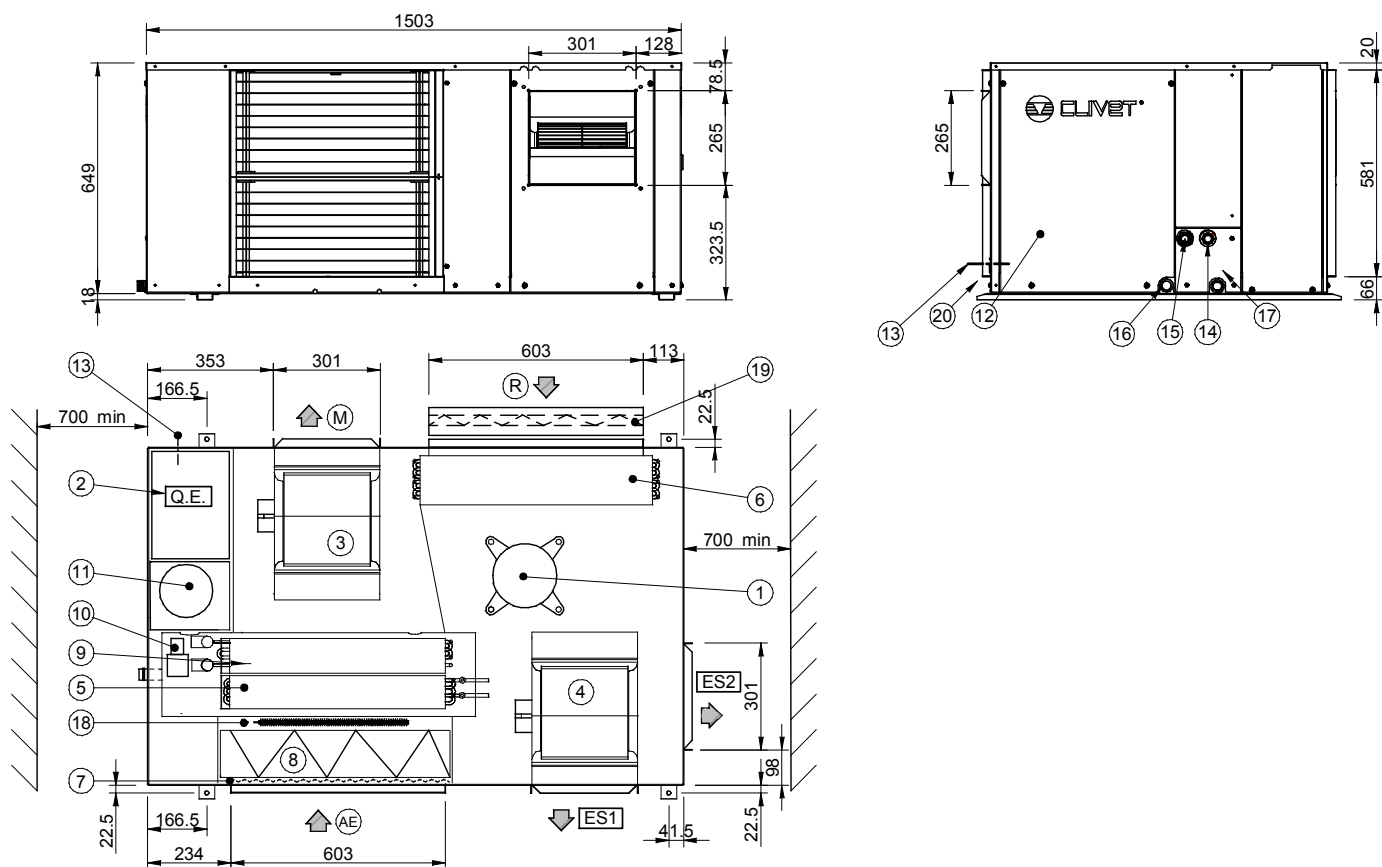
M=OUTLET AIR

AE = FRESH AIR INTAKE

ES1 = STANDARD AIR EXHAUST

ES2 = OPTIONAL AIR EXHAUST

Size 41



- (1) COMPRESSOR
- (2) ELECTRICAL PANEL
- (3) SUPPLY FAN
- (4) EXHAUST FAN
- (5) TREATED AIR DIRECT EXPANSION COIL
- (6) EXHAUST AIR DIRECT EXPANSION COIL
- (7) AIR FILTER
- (8) ELECTRIC FILTERS (OPTIONAL)
- (9) ADDITIONAL WATER COIL (OPTIONAL)
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- (19) EXHAUST AIR FILTER G4 (OPTIONAL)
- (20) BRACKETS FOR ANCHORING THE UNIT TO THE CEILING

R = AIR INTAKE FROM OUTSIDE

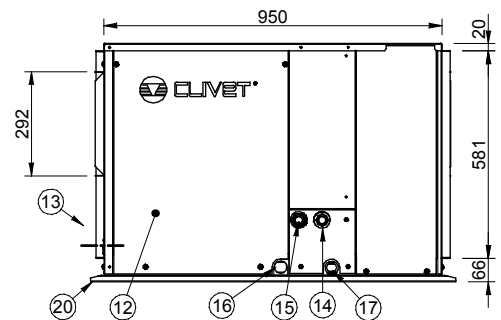
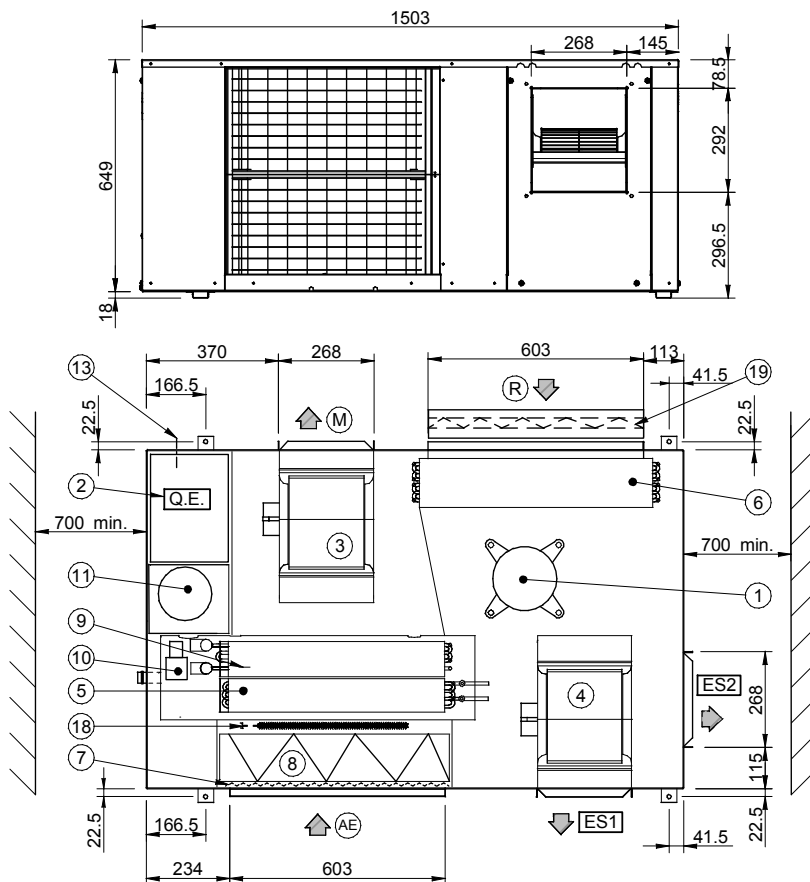
M=OUTLET AIR

AE = FRESH AIR INTAKE

ES1 = STANDARD AIR EXHAUST

ES2 = OPTIONAL AIR EXHAUST

Size 51



- (1) COMPRESSOR
- (2) ELECTRICAL PANEL
- (3) SUPPLY FAN
- (4) EXHAUST FAN
- (5) TREATED AIR DIRECT EXPANSION COIL
- (6) EXHAUST AIR DIRECT EXPANSION COIL
- (7) AIR FILTER
- (8) ELECTRIC FILTERS (OPTIONAL)
- (9) ADDITIONAL WATER COIL (OPTIONAL)
- (10) 3 WAYS-VALVE (OPTIONAL)
- (11) STEAM HUMIDIFIER (OPTIONAL)
- (12) REMOVABLE PANEL FOR ACCESS TO THE TECHNICAL COMPARTMENT
- (13) POWER INPUT
- (14) WATER OUTLET ADDITIONAL COIL Ø 3/4"
- (15) WATER INLET ADDITIONAL COIL Ø 3/4"
- (16) HUMIDIFIER INLET WATER Ø 1/2" GAS
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- (18) AUXILIARY ELECTRIC HEATERS (OPTIONAL)
- (19) EXHAUST AIR FILTER G4 (OPTIONAL)
- (20) BRACKETS FOR ANCHORING THE UNIT TO THE CEILING

R = AIR INTAKE FROM OUTSIDE

M=OUTLET AIR

AE = FRESH AIR INTAKE

ES1 = STANDARD AIR EXHAUST

ES2 = OPTIONAL AIR EXHAUST

**CLIVET SPA**

Via Camp Lonc 25, Z.I. Villapaiera - 32032 Feltre (BL) - Italy
Tel. + 39 0439 3131 - Fax + 39 0439 313300 - info@clivet.it

CLIVET UK LTD

4 Kingdom Close, Segensworth East - Fareham, Hampshire - PO15 5TJ - United Kingdom
Tel. + 44 (0) 1489 572238 - Fax + 44 (0) 1489 573033 - info@clivet-uk.co.uk

CLIVET AIRCON LTD (Service and Maintenance Division)

Units F5&F6 Railway Triangle Ind Est, Walton Road - Portsmouth, Hampshire - PO6 1TG - United Kingdom
Tel. + 44 (0) 2392 381235 - Fax + 44 (0) 2392 381243 - info@clivetaircon.co.uk

CLIVET ESPAÑA COMERCIAL S.L. (Sales)

Calle Gurb, 17 1º 1ª - 08500 Vic, Barcelona - España
Tel. + 34 93 8606248 - Fax + 34 93 8855392 - info@clivetcomercial.com

CLIVET ESPAÑA S.A.U. (Service and Maintenance Division)

Calle Real de Burgos Nº 12 - 28860, Paracuellos del Jarama, Madrid - España
Tel. + 34 91 6658280 - Fax + 34 91 6657806 - info@clivet.es

CLIVET GmbH

Hummelsbütteler Steindamm 84, 22851 Norderstedt - Germany
Tel. + 49 (0) 40 32 59 57-0 - Fax + 49 (0) 40 32 59 57-194 - info.de@clivet.com

CLIVET NEDERLAND B.V.

Siliciumweg 20a, 3812 SX Amersfoort - Netherlands
Tel. + 31 (0) 33 7503420 - Fax + 31 (0) 33 7503424 - info@clivet.nl

CLIVET RUSSIA

Elektrozavodskaya st. 24, office 509 - 107023, Moscow, Russia
Tel. + 74956462009 - Fax + 74956462009 - info.ru@clivet.com

CLIVET MIDEAST FZCO

Dubai Silicon Oasis (DSO), High Bay Complex, Ind Unit No. 3, PO BOX 28178 - Dubai, UAE
Tel. + 9714 3208499 - Fax + 9714 3208216 - info@clivet.ae

CLIVET AIRCONDITIONING SYSTEMS PRIVATE LIMITED

4BA, Gundecha Onclave - Kherani Road, Saki Naka, Andheri (East) - Mumbai 400 072 - India
Tel. + 91 22 6193 7000 - Fax + 91 22 6193 7001 - info.in@clivet.com