AERMEC

air conditioning

R410A

Installation Manual

- Chiller
- Air-Water
- Outdoor Intallation
- Axial Fans
- Scroll Compressors
- Compact
- High Efficiency

NRL 0280-0750 Cooling Only °-L / A-E

EN

AERMEC COMPANY QUALITY SYSTEM ICIM ISO 9001:2008 - Cert. n° 0128 CISQ IQNet AERMEC S.P.A.

CE

EUROVENT CERTIFIED PERFORMANCE www.eurovent-certification.com

Aermec
participate in the EUROVENT program: **LCP**
the products are present on the site www.eurovent-certification.com

INRLIY_17.03_5280107_01

Standards complied with WHEN DESIGNING and CONSTRUCTING the unit:
SAFETY

1. Machinery directive 2006/42/EC
2. Low voltage directive LVD 2006/95/EC
3. Electromagnetic compatibility directive EMC 2004/108/EC
4. Directive regarding pressurised devices PED 97/23/EC, EN 378,
5. UNI12735, UNI14276

ELECTRIC PART

1. IEC EN 60335-2-40,
2. IEC EN 61000-6-1/2/3/4

ACOUSTIC PART

1. ISO DIS 9614/2 (intensimetric method)

PROTECTION RATING
IP24

REFRIGERANT GAS
TYPE: R410A
This unit contains fluoride gases with greenhouse effect covered by the Kyoto Protocol. Maintenance and disposal must only be performed by qualified staff, in compliance with standards in force.

CERTIFICATIONS:

EUROVENT CERTIFIED PERFORMANCE
www.eurovent-certification.com

1. GENERAL WARNINGS

The units are constructed according to the recognised technical standards and safety regulations.
They are designed for the production of chilled water for technical installations.
Any contractual or extracontractual liability of the Company is excluded for injury/damage to persons, animals or objects owing to installation, regulation and maintenance errors or improper use.
All uses not expressly indicated in this manual are prohibited.

PRESERVATION OF THE DOCUMENTATION

1. The instructions along with all the related documentation must be given to the user of the system, who assumes the responsibility to conserve the instructions so that they are always at hand in case of need.
2. Read this sheet carefully; the execution of all works must be performed by qualified staff, according to Standards in force on this subject in different countries. (D.M. 329/2004).
3. The appliance warranty does not cover the costs for ladders, scaffolding or other elevation systems, which may become necessary for carrying out interventions under warranty.
4. Do not modify or tamper with the heat pump as dangerous situations can be created and the manufacturer will not be liable for any damage caused. The warranty shall be become null and void if the above-mentioned indications are not respected.

WARNINGS REGARDING SAFETY AND INSTALLATION STANDARDS

1. Before beginning any operation, ***READ THESE INSTRUCTIONS CAREFULLY AND CARRY OUT THE SAFETY CHECKS TO AVOID ALL RISKS.***
2. All the staff involved must have thorough knowledge of the operations and any dangers that may arise at the moment in which the installation operations are carried out.

AERMEC will not assume any responsibility for damage due to failure to follow these instructions.

PRODUCT IDENTIFICATION

The units can be identified through:

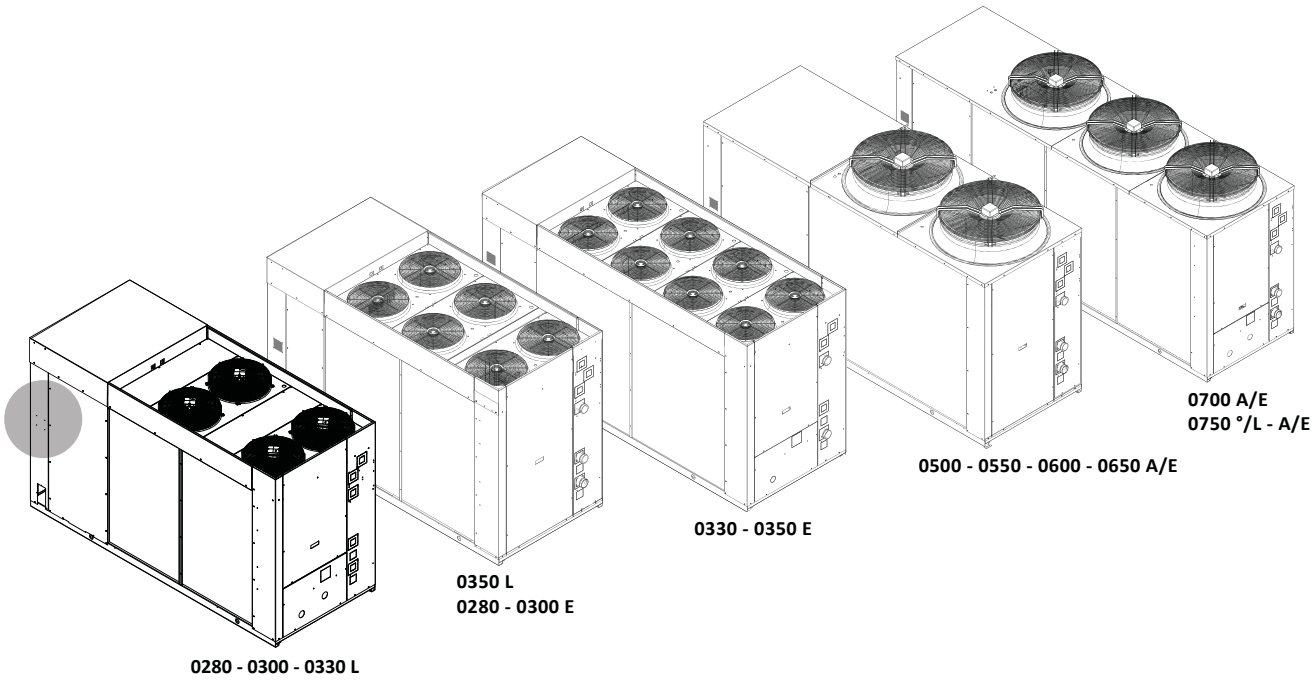
- PACKING LABEL
which shows the product identification data.
- TECHNICAL PLATE

ATTENTION
Tampering, removal, lack of the identification plate or anything else does not allow the sure identification of the product and will make any installation or maintenance operation to be performed difficult.

Versions with Total Recovery and Condensing Units are equipped with GR3 electronics (standard remote panel)

All the other versions have pCO^5 electronics (remote panel available as accessory)

TECNICAL PLATE



2. RECEIPT AND HANDLING

- The machine is delivered from the factory wrapped in estincoil.
- Before handling the unit, verify the lifting capacity of the machines used.
- Handling must be performed by qualified, suitably equipped staff.

HANDLING THE MACHINE:

Whenever the machine must be lifted using belts, place protections between the belts and the framework to prevent damage to the structure.

LIFTING REGULATIONS

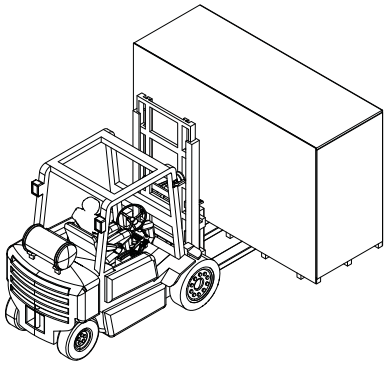
1. All panels must be tightly fixed before handling the unit;
2. Before lifting, check the specific weight on the technical plate;
3. Use all, and only, the lifting points indicated;
4. Use ropes in compliance with Standards and of equal length;
5. Use a spacer beam in compliance with Standards (not included);
6. Handle the unit with care and without sudden movements

SELECTION AND PLACE OF INSTALLATION

The Units sent from the factory already inspected and only requires electric and hydraulic connections in the place of installation.

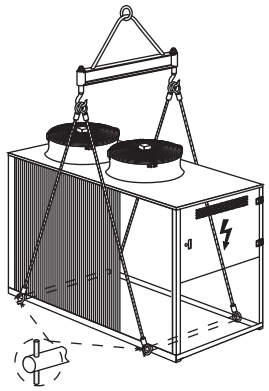
Before beginning the installation process, decide with the customer where the unit is to be installed, whilst paying attention to the following:

1. The support surface must be capable of supporting the unit weight.
2. The safety distances between the units and other appliances or structures must be scrupulously respected.
3. The unit must be installed by a qualified technician in compliance with national laws in the country of destination.
4. It is mandatory to envision the necessary technical spaces in order to allow ROUTINE AND EXTRAORDINARY MAINTENANCE interventions.
5. Remember that during operation, the chiller can cause vibrations; **therefore anti-vibration mounts (ACCESSORIES) are recommended**, which are fixed to the base according to the assembly layout.
6. Fix the unit checking that it is level.

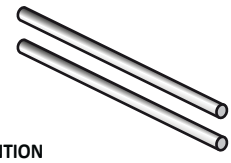


ATTENTION
The unit is delivered fixed on a pallet. Use forklifts for handling

LIFT THE UNIT



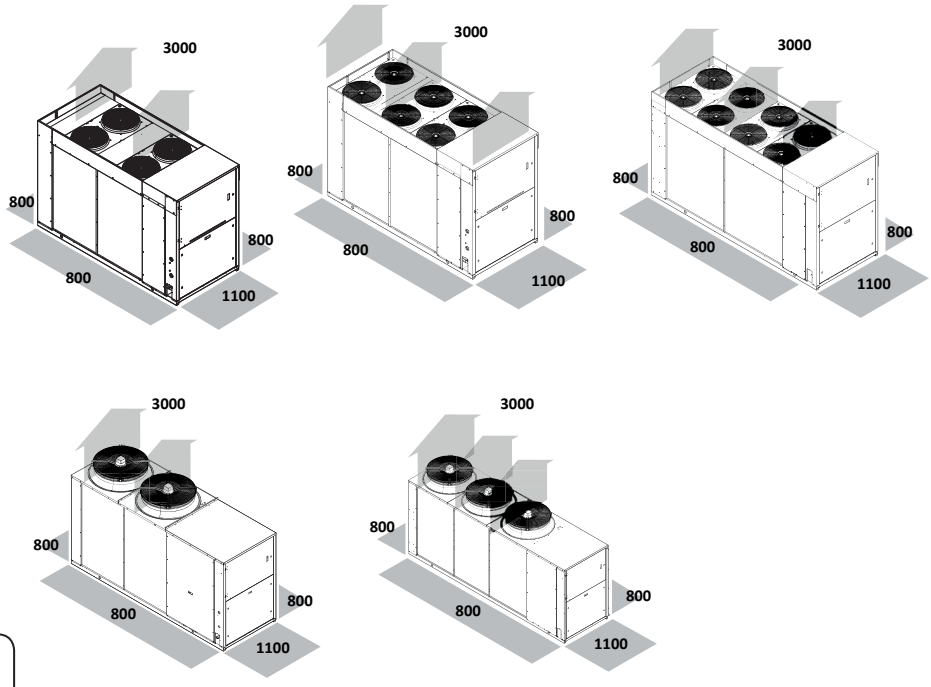
ATTENTION:
Diameter of holes Ø 40



ATTENTION
Lifting rods NOT supplied.

ATTENTION:
In windy areas, for correct operation it is recommended to install a windbreak barrier.
It should be installed if wind velocity is beyond 2.5 m/s.

MINIMUM TECHNICAL



ATTENTION:
- **It is prohibited to stop under the unit during lifting operations.**
- **The units CANNOT be stacked.**
- **The unit must be installed in order to make possible the maintenance and / or repair.**

10. ELECTRIC CONNECTIONS

The units are completely wired at the factory and only require connection to the electrical mains, downstream from a unit switch, according to that envisioned by the Standards in force on this subject in the country of installation.

It Is also advised to check that:

1. The electrical mains features are suitable for the input values indicated in the electrical data table, also taking any other machines operating at the same time into consideration.
2. The unit must only be powered when installation has been completed (hydraulic and electric).
3. Respect the connection indications of the phase and grounding wires.
4. The power supply line must have a relevant protection against short circuits mounted upstream and dispersions to grounding, which isolate the system with respect to other utilities.
5. The voltage must be within a tolerance of ±10% of the nominal power supply voltage of the machine (for unbalanced three-phase unit max 3% between the phases). Whenever these parameters are not respected, contact the electric energy public body.
6. For electric connections, use the cables with double isolation according to the Standards in force on this subject in the different countries.

THE FOLLOWING ARE MANDATORY

1. The use of an omnipolar magnet circuit breaker switch is mandatory, in compliance with the IEC-EN Standards (contact opening at least 3 mm), with suitable cut-off power and differential protection on the basis of the electric data table shown below, installed as near as possible to the appliance.

2. It is mandatory to make an effective grounding connection. The manufacturer is not liable for any damage caused by the lack of or ineffective appliance grounding connection.

3. For units with three-phase power supply, check the correct connection of the phases.

4. It is mandatory to verify that the machine is watertight before making the electrical connections and it must only be powered after the hydraulic and electrical works have been completed.

All the electrical operations must be carried out by **STAFF IN POSSESSION OF THE NECESSARY QUALIFICATIONS BY LAW,** suitably trained and informed on the risks related to these operations.

The features of the electrical lines and of the related components must be determined by **STAFF QUALIFIED TO DESIGN ELECTRICAL SYSTEMS,** in compliance with the international and national regulations of the place of installation of the unit and in compliance with the regulations in force at the time of installation.

For the installation requirements refer only to the wiring diagram supplied with the appliance.
THE WIRING DIAGRAM ALONG WITH THE MANUALS MUST BE KEPT IN GOOD CONDITION AND ALWAYS BE AVAILABLE FOR ANY FUTURE INTERVENTIONS ON THE UNIT.

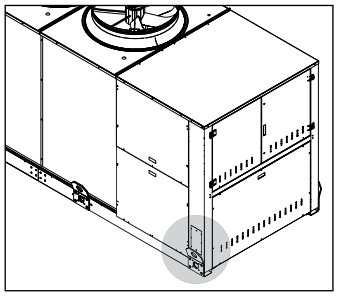
⚠ ATTENTION

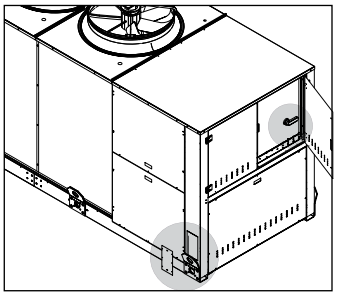
1. **It is prohibited to use the water pipes to earth the appliance.**

2. Check the tightening of all power wire clamps on commissioning and after 30 days from start-up. Successively check them every six months. Loose terminals can cause overheating of the cables and components.

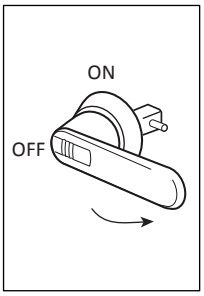
ELECTRIC POWER CONNECTION TO THE ELECTRICAL MAINS

1. Before connecting the unit to the power supply mains, make sure that the isolating switch is open.
2. Open the front panel.
3. Use the plates to pass the main electric power supply cable and the cables of the other external connections under the responsibility of the installer.
4. It is prohibited to access positions not specifically envisioned in this manual with electric cables.
5. Avoid direct contact with non-insulated copper piping and with the compressor.
6. Identify the clamps for the electric connection and always refer exclusively to the wiring diagram supplied with the unit.
7. For the functional connection of the unit, take the power supply cable to the electric control board inside the unit and connect it to clamps. L1-L2-L3 and PE respecting the polarities. **L1-L2-L3 as phases, and PE as grounding;**
8. Re-position the inspection panels.
9. Ensure that all protections removed for the electric connection have been restored before powering the unit electrically.
10. Position the system master switch (outside the appliance) at “ON”.

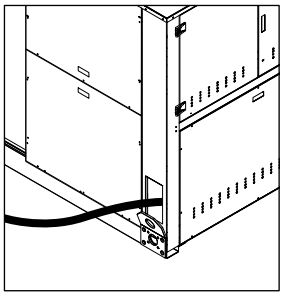




Holes for passage of electric cables



Master Switch ON/OFF



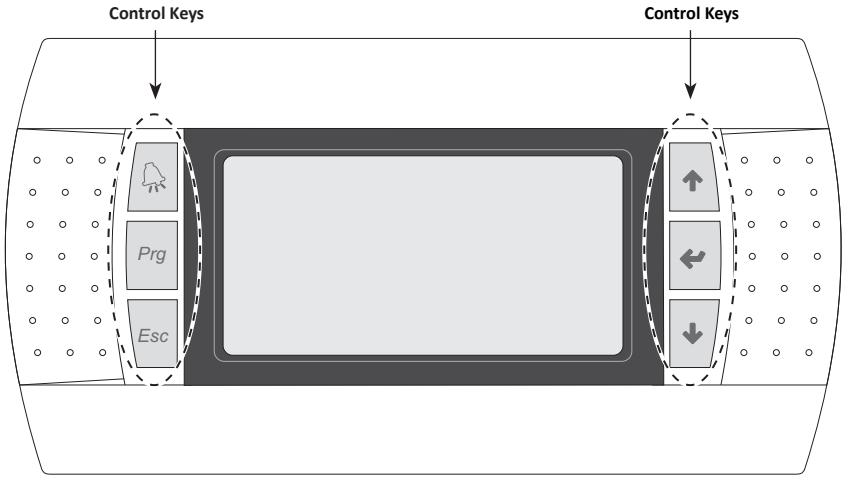
Restoring the protection degree of the electrical box by the installer

12. USER INTERFACE (PGD1)

The unit control panel allows the quick setting and display of the unit's operating parameters. The board memorises all the default settings and any modifications. By installing the remote control panel PGD1 it is possible to remotely replicate all the functions and the settings available on the unit. After a power failure the unit is capable of an automatic restart, retaining the original settings.

The user interface consists of a graphic display with six navigation keys; the display is arranged through a menu hierarchy, activated by pressing the navigation keys. The default display of these menus is the main screen. The navigation between the various parameters is by using the arrow keys located on the right of the display. These keys are also used for the modification of the selected parameter.

INTERFACE CONTROL KEYS

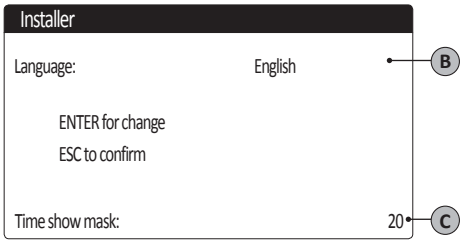


Key	Fucntion
	ALARM key Displays the list of active and historical alarms (red LED on = active alarm)
Prg	**MENU ACTIVATION key** • Pressing this key activates the navigation between menus (orange LED on = winter operating mode active)
Esc	**EXIT MENU key** • Pressing this key returns to the previous menu
	NAVIGATION (+) key • Pressing this key when navigating between menu/parameters passes to the next menu/parameter • Pressing this key when modifying a parameter increases the value of the selected parameter
	NAVIGATION (enter) key • Pressing this key when navigating between menus allows entry to the selected menu • Pressing this key when navigating between parameters allows selection of the parameter displayed to modify it • Pressing the key when modifying a parameter confirms the modification of the parameter value selected
	NAVIGATION (-) key • Pressing this key when navigating between menu/parameters passes to the previous menu/parameter • Pressing this key when modifying a parameter decreases the value of the selected parameter

13. START-UP PROCEDURE

After having powered up the unit the control board will carry out preliminary operations before being ready for use. This initial procedure takes around 60 seconds to complete. During the initial loading procedure two screens are displayed: a start-up screen and a screen to select the system language. These screens are detailed in the table below.

WARNING: The system language can be set on the screen displayed at the start-up or can be modified at any time through the appropriate screen contained in the Installer menu.

Display on the unit	Index	Display/Parameter
	A	**Remaining time for software loading:** this value shows the remaining time to starting the software loaded on the unit, and passing the to system language selection
	B	**System language:** this parameter shows the current language set for the system. To change the language follow the instructions shown on the screen.
	C	**Remaining time to select the language:** this value shows the remaining time to modify the language. When the time elapses the display goes to the main screen (Main screen - General monitoring). **WARNING: It is possible to modify the system language at any time using the appropriate screen contained in the Installer menu. (Menu password = 0000).**
WARNING: It is possible to modify the system language at any time using the appropriate screen contained in the Installer menu. (Menu password = 0000).		

14. MENU STRUCTURE AND NAVIGATION

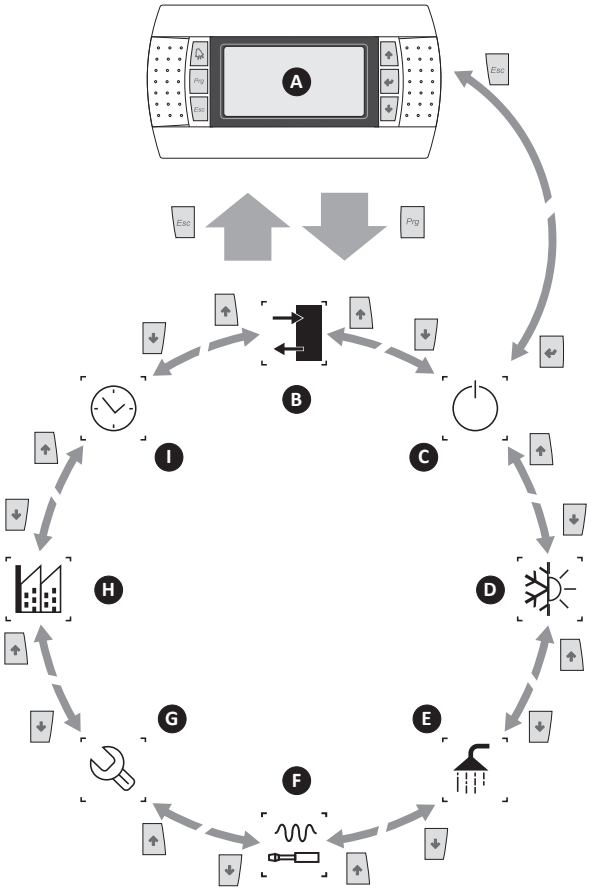
Both the functions to control the unit and the operating information are displayed on the unit mounted control panel. All the functions and information are arranged in screens which in turn are grouped into menus.

During the normal operation of the unit the main screen is displayed, from which it is possible to access the selection of the other operating menus.

The menus are displayed through the rotation of the icons that they represent. Once the desired icon is selected the chosen menu is entered, permitting the display or modification of the parameters that it is made up from. The procedure for navigating the menus, or changing parameters, is explained in detail in the chapter "User operating procedures".

The adjacent drawing shows the relation between the various menus and the navigation keys used.

The operating menus are arranged as in the following drawing:



⚠ **WARNING: Improper selection of the parameters in the Installer menu may cause malfunctions of the unit. It is recommended that these parameters are only modified by personnel qualified in the installation and configuration of the unit.**

Index	Icon	Menu	Menu function
A	---	MAIN	The screens in this menu display the current conditions of the unit (unit status, setpoints,circuit data, etc.)
B		IN/OUT	This menu contains advanced information on the unit operation
C		ON/OFF	This menu permits the unit to be enabled or disabled, and provides information on the status
D		SYSTEM	This menu permits the selection of the operating modes, the water setpoints and the time-clock for the system
E		RECOVERY	If the unit includes heat recovery, this menu permits the setting of the parameters associated with the heat recovery
F		INSTALLER	This menu contains the settings useful for the installer (enabling digital inputs, BMS configuration, control, pumps, etc.) **WARNING: This menu is password protected. The password is: 0000**
G		ASSISTANCE	This menu is only accessible to qualified personnel
H		FACTORY	This menu is only accessible to qualified personnel
I		CLOCK	This menu contains the clock settings for the system control (date, hour, calender)

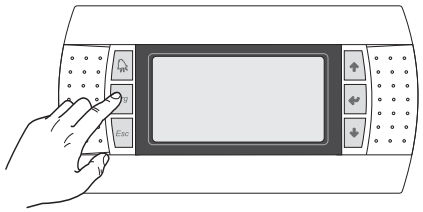
15. USER OPERATING PROCEDURES

To check or modify the operating parameters of the unit it is necessary to use the interface of the control panel on the unit. The basic operations that the user must be capable of, for the correct use of the unit, are:
(1) Moving from one menu to the next.
(2) Selecting and modifying a parameter.

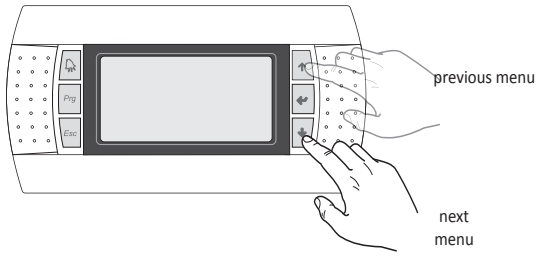
1

Moving between menus

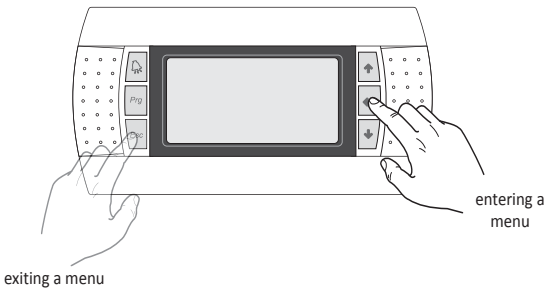
(a) To move between the menus, the order in which they are displayed is shown in the previous page, enter the menu selection mode by pressing the key (Prg).



(b) Once in the menu selection mode it is possible to move between menus using the arrow keys: the key (↑) to move to the previous menu, and the key (↓) to move to the next menu.



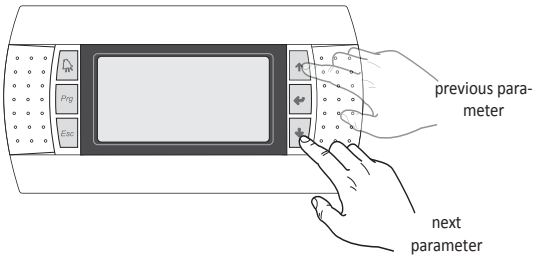
(c) When the desired menu is shown press the key (↵)to enter the menu. Press the key(Esc) to return to the menu selection mode.



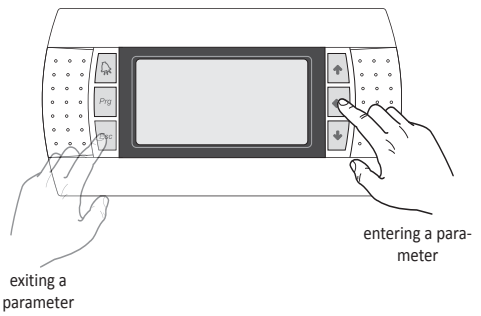
2

Selecting and modifying a menu

(a) Once the menu is selected, by following the procedure (1), it is possible to move between the screens using the arrow keys: the key (↑) to move to the previous parameter, and the key (↓) to move to the next parameter.



(c) When the desired parameter is shown press the key (↵) to enter the parameter. To exit the parameter and return to the parameter selection mode press the key (Esc).
WARNING: Once a parameter is selected by pressing the key (↵), the parameter selection mode is automatically accessed and in this mode the desired parameter values can be set with the following procedure:
(1) Pressing the key (↵) causes a flashing cursor to appear on the first modifiable field of the parameter. If no modifiable fields are displayed then the cursor will not appear.
(2) Pressing the key (↑) or the key (↓), the value of the field can be increased or decreased.
(3) Pressing the key (↵) confirms the modification of the field value, saving it in memory. On the basis of the type of parameter selected the number of modifiable fields can change.



17. CONTROL AND COMMIS

PREPARATION FOR COMMISSIONING

Please note that, on request by the Aermec customer or the legitimate owner of the machine, the units in this series can be started up by the AERMEC After-Sales Service in your area (valid only on Italian territory).
The start of operation must be scheduled in advance based on the frame regarding the realisation of the system. Prior to the intervention, all other works (electrical and hydraulic connections, priming and bleeding of air from the system) must have been completed.

START - UP

PRELIMINARY OPERATIONS TO BE PERFORMED WITH NO VOLTAGE PRESENT

Control:

1. All safety conditions have been respected.
2. The unit is correctly fixed to the support surface.
3. The minimum technical spaces have been respected.
4. That the main power supply cables have appropriate cross-section, which can support the total absorption of the unit **(see electric data sections)** and that the unit has been duly connected to earth.
5. That all the electrical connections have been made correctly and all the clamps adequately tightened.

THE FOLLOWING OPERATIONS ARE TO BE CARRIED OUT WHEN THE UNIT IS LIVE.

1. Supply power to the unit by turning the master switch to the ON position; see (fig1.) The display will switch on a few seconds after voltage has been supplied; check that the operating status is on OFF (OFF BY KEY B on lower side of the display).
2. Check with a tester that the value of the supply voltage to the phases: single-phase – three-phase is within the present limits: ±10% (230V ±10% - 400V ±10%), and that the unbalance between the phases is not more than 3% (only for three-phase models)
3. Check that the connections made by the installer are in compliance with the documentation.
4. Verify that the compressor sump resistance/s is/are operating by measuring the increase in temperature of the oil pan. The resistance/s must function for at least 12 hours before start-up of the compressor and in any event, the temperature of the oil pan must be 10-15°C higher than room temperature.

HYDRAULIC CIRCUIT

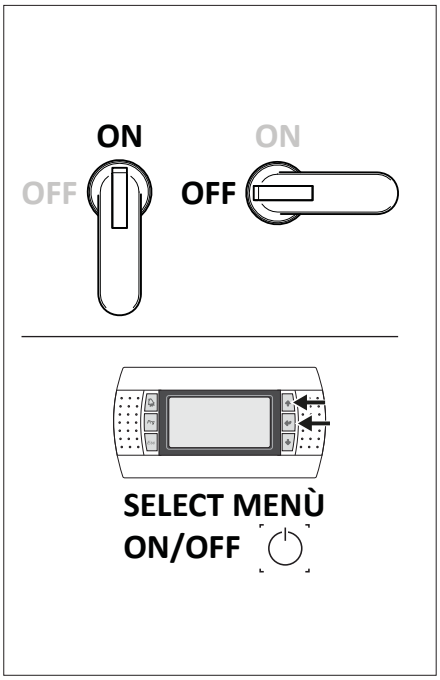
1. Check that all hydraulic connections are made correctly, that the plate indications are complied with and that a mechanical filter has been installed at the evaporator inlet **(mandatory component for warranty to be valid).**
2. Make sure that the circulation pump/s is/are operating and that the water flow rate is sufficient to close the flow switch contact.
3. Check the water flow rate, measuring the pressure difference between evaporator inlet and outlet and calculate the flow rate using the evaporator pressure drop diagram present in the technical manual ***(available on the software selection and on the website www.aermec.com***
4. Check correct operation of the flow meters, if installed (or supplied with the unit or by the installer – see the chapter of hydraulic circuit to know the components supplied with the unit):

- **Flow switch/Pressure switch:** on closing the cut-off valve at the heat exchanger outlet, the unit must display the block. Finally, open the valve and rearm the block.

MACHINE COMMISSIONING

The unit can be used after all of the above-mentioned controls have been performed.
- Close the electric control board hatch.

- Position the appliance master switch at ON
- Starting the unit



WITH THE MACHINE ON, CHECK

COOLING CIRCUIT

CHECK:

- That the compressor input current is lower than the maximum indicated in the technical data table.
- That in models with three-phase power supply, the compressor noise level is not abnormal. If this is the case, invert a phase.
- That the voltage value lies within the pre-fixed limits and that unbalance between the three phases (three-phase power supply) is not above 3%.
- The presence of any refrigerant GAS leaks, particularly in correspondence with the manometers pressure transducers and pressure switches pressure points (vibrations during transportation may have loosened the fittings).
- Overheating
  Comparing the temperature read using a contact thermostat positioned on the compressor intake with the temperature shown on the low pressure manometer (saturation temperature corresponding to the evaporation pressure). The difference between these two temperatures gives the overheating value. Optimal values are between 4 and 8°C.
- Pressing line temperature. If the subcooling and overheating values are regular, the temperature measured in the pressing line pipe at the outlet of the compressor must be 30/40°C above the condensation temperature.

Operating features (Factory set)	
7°C / Δt=5°C	Cooling Only
	Heat Pump in Cooling Mode
45°C / Δt=5°C	Heat Pump in Heating Mode
If the unit power supply is restored after a temporary interruption, the mode set will be kept in the memory.	
Compressor Start-Up Delay	
Two functions have been set-up to prevent compressor start-ups that are too close.	
Minimum time from last switch-off	
60 seconds	in Cooling Mode
Minimum time from last switch-on	
300 seconds	in Heating mode

⚠ATTENTION

1)Commissioning must be performed with standard settings. Only when the inspection has been completed can the functioning Set Point values by changed.
Before start-up, power the unit for at least 12-24 hours, positioning the protection magnet circuit breaker switch and the door lock isolating switch at ON.
Make sure that the control panel is off in order to allow the compressor oil sump to heat.

2) We recommend to envision a machine book (not supplied, but the user's responsibility), which allows to keep track of the interventions performed on the unit.
In this way it will be easy to suitably organise the interventions making research and the prevention of any
machine breakdowns easier. Use the date to record date, type of intervention made (routine maintenance, inspection or repairs), description of the intervention,
measures actuated.

3)It is forbidden to LOAD the cooling circuit with a refrigerant different to that indicated. Using a different refrigerant gas can cause serious damage to the unit.

20. TROUBLESHOOTING

ANOMALY	CAUSE	REMEDY
The unit does not start	• No electric voltage	• Check the presence of voltage • Check the safety systems upstream from the appliance
	• Master switch at OFF • Remote switch at OFF (if present) • Control panel at OFF • Main switch at OFF • Compressor magnet circuit breaker at OFF	• Position at ON
	• Power supply voltage too low	• Check power supply line
	• Remote control switch coil broken • Circuit board broken • Peak condenser broken • Compressor broken	• Replace the component
Insufficient yield	• No refrigerant • Dirty coils • Water filter clogged • Appliance dimensioning • Operation outside of operational limits	• Check the load and any leaks • Clean the coils • Clean the filter • Check • Check the operational limits using the graphics
Noisy compressor	• Liquid return to the compressor • Inadequate fixing	• Check
	• Inverted phase	• Invert a phase
Noise and vibrations	• Contacts between metal bodies	• Check
	• Weak support	• Restore
	• Loose screws	• Tighten the screws
The compressor stops due to intervention of the protections	• Excessive flow pressure • Low intake pressure • Low power supply voltage • Electric connections fastened badly • Operation outside of operational limits	• Check the operational limits using the graphics
	• Pressure switch malfunctioning	• Replace the component
	• Circuit breaker protection intervention	• Check power supply voltage • Check electric isolation of the windings
Compressor high discharge pressure	• High external water temperature • High utility water inlet temperature	• Check the operational limits using the graphics
	• Insufficient air flow • Insufficient water flow	• Check: 1. Fan operation 2. Cleanliness of the coils 3. Pump operation (speed) 4. Filter cleanliness
	• Fan regulation anomalous operation	• Check or replace if broken
	• Air in the hydraulic system	• Bleed the circuit
	• Excessive refrigerant gas load	• Restore the correct load
Low discharge pressure	• Low external air temperature • Low inlet water temperature	• Check the operational limits using the graphics, as above
	• Humidity in the cooling circuit	• Empty and restore the gas load
	• Air in the hydraulic system	• Bleed the circuit
	• Insufficient gas load	• Restore the correct load
High intake pressure	• High external air temperature • High utility inlet water temperature • Thermostatic expansion valve too open or damaged	• Check the operational limits using the graphics • Adjust or replace if damaged
Low intake pressure	• Low utility water inlet temperature • Low external water inlet temperature • Thermostatic expansion valve damaged or blocked	• Check the operational limits using the graphics • Adjust or replace if damaged
	• Insufficient water flow • Insufficient air flow	• Check: 1. Fan operation 2. Cleanliness of the coils 3. Pump operation (speed) 4. Filter cleanliness