



R410A



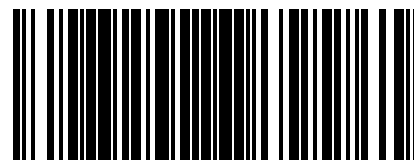
Installation and Maintenance Manual

# NRV 0550

EN



Aermec  
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Dear Customer,

Thank you for choosing an AERMEC product. This product is the result of many years of experience and in-depth engineering research, and it is manufactured using top quality materials and cutting edge technologies.

In addition, the CE mark guarantees that our appliances fully comply with the requirements of the European Machinery Directive in terms of safety. We constantly monitor the quality level of our products, and as a result they are synonymous with Safety, Quality, and Reliability.

Product data may be subject to modifications deemed necessary for improving the product without the obligation to give prior notice.

Thank you again.

AERMEC S.p.A

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**DICHIARAZIONE DI CONFORMITÀ CE**  
**EC DECLARATION OF CONFORMITY / DECLARATION DE CONFORMITE CE**  
**KONFORMITÄTSEKTLÄRUNG EG / DECLARACIÓN DE CONFORMIDAD CE**

# NRV

MODEL	_____	[ ]
SERIAL NUMBER	_____	
DATE	_____	

Noi, firmatari della presente, dichiariamo sotto la nostra esclusiva responsabilità che l'insieme in oggetto così definito:  
We, the undersigned, hereby declare under our own responsibility that the assembly in question, defined as follows:  
Nous, Signataires du présent acte, déclarons sous notre responsabilité exclusive que le groupe cité à l'objet défini de la façon suivante:  
Die Unterzeichner erklären unter eigener Verantwortung, dass die oben genannte Maschineneinheit, bestehend aus:  
Nosotros, los abajo firmantes, declaramos bajo nuestra exclusiva responsabilidad, que el conjunto en cuestión, denominado:

Nome / Name / Nom / Name / Nombre NRV  
Tipo / Type / Type / Typ / Tipo Outdoor Chiller  
Modello / Model / Modèle / Model / Modelo

A cui questa dichiarazione si riferisce è conforme a tutte le disposizioni pertinenti delle seguenti direttive:  
To which this declaration refers, complies with all the provisions related to the following directives:  
Aquel cette déclaration se réfère, est conforme à toutes les dispositions relatives des directives suivantes:  
Das Gerät, auf welches sich diese Erklärung bezieht, entspricht allen Verordnungen im Zusammenhang mit den folgenden Richtlinien:  
A la que esta declaración se refiere, es conforme con todas las disposiciones pertinentes de las siguientes directivas:

**Direttiva Macchine: 2006/42/CE**  
**Direttiva Compatibilità Elettromagnetica EMC: 2014/30/UE**  
**Direttiva PED in materia di attrezzature a pressione: 2014/68/UE**

L'oggetto della dichiarazione di cui sopra è conforme alle pertinenti normative di armonizzazione dell'Unione:  
The above-mentioned declaration complies with the harmonised European standards:  
L'objet de la déclaration reportée ci-dessus est conforme aux normes d'harmonisation relatives de l'Union:  
Der Gegenstand der genannten Erklärung entspricht den diesbezüglichen harmonisierten Normen der europäischen Gemeinschaft:  
El objeto de la declaración de arriba es conforme con las normativas pertinentes de armonización de la Unión:

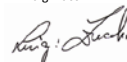
<b>CEI EN 60204-1: 2006</b>	<b>CEI EN 61000-6-2: 2006</b>	<b>EN378-2: 2012</b>
<b>UNI EN ISO 12100: 2010</b>	<b>CEI EN 61000-6-4: 2007</b>	<b>UNI EN 12735-1: 2010</b>
		<b>UNI EN 14276-1: 2011</b>

La presente dichiarazione di conformità è rilasciata sotto la responsabilità esclusiva del fabbricante.  
This declaration of conformity has been released under the exclusive responsibility of the manufacturer.  
La déclaration de conformité présente est délivrée sous la responsabilité exclusive du fabricant.  
Diese Konformitätserklärung wurde unter der ausschließlichen Verantwortung des Herstellers ausgestellt.  
Esta declaración de conformidad se ha otorgado bajo la responsabilidad exclusiva del fabricante.

La persona autorizzata a costituire il fascicolo tecnico è Luca Martin. Il prodotto, in accordo con la direttiva 97/23/CE, soddisfa la procedura di Garanzia qualità Totale (modulo H) con certificato n.06/270-QT3664 Rev.8 emesso dall'organismo notificato n.1131 CEC via Pisacane 46 Legnano (MI) - Italy.  
The person authorised to compile the technical file is Luca Martin. The product, in agreement with Directive 97/23/CE, satisfies the Total quality Guarantee procedure (form H) with certificate no. 06/270-QT3664 Rev. 8 issued by the notified body n.1131 CEC via Pisacane 46 Legnano (MI) - Italy.  
La personne autorisée à constituer le dossier technique est Luca Martin. Le produit, selon la directive 97/23/CE, respecte la procédure de Garantie de qualité Totale (module H) par le certificat n.06/270-QT3664 Rév.8 émis par l'organisme notifié n.1131 CEC via Pisacane 46 Legnano (MI) - Italie.  
Die bevollmächtigt, die technischen Unterlagen zusammenzustellen ist Luca Martin. In Übereinstimmung mit der Richtlinie 97/23/EG, erfüllt das Produkt die Anforderungen des Verfahrens der umfassenden Qualitätssicherung (Modul H), Zertifikat Nr.06/270-QT3664 Rev.8, ausgestellt durch benannte Stelle Nr. 1131 CEC Via Pisacane 46, Legnano (MI) - Italy.  
La persona facultada para elaborar el expediente técnico es Luca Martin. El producto, conforme a la directiva 97/23/CE, cumple con el procedimiento de Garantía de calidad total (módulo H) con certificado n. 06/270-QT3664 Rev. 8 emitido por el organismo autorizado n. 1131 CEC via Pisacane 46 Legnano (MI) - Italia.

Bevilacqua (VR)

Commercial Director  
Luigi Zucchi



## GENERAL WARNINGS

This product is a complex machine. Things and persons may be exposed to risks during installation, operation, maintenance or repair, caused by certain conditions or components, such as for example, but not only, refrigerant, oils, moving mechanical parts pressure, heat sources, electricity. This products and its documentation, including this manual, are intended for persons in possession of appropriate training to enable them to operate correctly and safely. Before performing any operation on this equipment, it is essential for the operating personnel to have read and understood all manuals and any other material of reference. They must also know and observe the standards applicable to the activities to be performed.

### ATTENTION

**Any intervention on the unit must be performed by authorised and qualified experienced technicians, in accordance with current regulations.**

The unit shows the following risks:

- Risk of electric discharges.
- Risk of injuries due to rotating parts.
- Risk of injuries due to sharp edges and heavy weights.
- Risk of injuries due to high pressure gas.
- Risk of injuries due to high or low temperatures of components.
- Substances inside the water;

It is vital that all work on the unit is performed in compliance with the local standards. All work on the system must be performed to perfection

## PRECAUTIONS AGAINST RESIDUAL RISKS

### INSTRUCTIONS

- Install the unit according to the requirements herein
- **The personnel nearing the machine must be competent in the use of this refrigerant and observe the current regulations.**
- Regularly perform all maintenance operations provided for in this manual
- Wear personal protective equipment (**gloves, eye protection, helmet, ...**) appropriate to the operations to be performed; do not wear clothes or accessories that may get caught or be sucked by the air flows; gather and tie your hair up before entering the unit
- The machine must be transported in compliance with current regulations, taking into account the features of the fluids inside and their characterisation described in the safety data sheet
- An inadequate transport may damage the machine, also generating refrigerant leaks. Before commissioning, check for leaks and make any necessary repairs.
- The installation must comply with the requirements of EN378-3 and the local current regulations. In particular, indoor installation must ensure adequate ventilation and provide refrigerant detectors when necessary.
- The machine must not be installed in environments with risk of explosion but in a suitable place. In particular, if intended for indoor use, it cannot be installed outdoors
- The machines must be installed in structures protected from lightning as provided by the applicable laws and technical standards
- Keep fire extinguishers near the machine suitable for putting out fires on electrical equipment and, for lubricant oil of the compressor and the refrigerant as provided by the relative safety data sheets (for example a CO<sub>2</sub> fire extinguisher)
- It is not permitted to walk or place other bodies on the machines
- Make the plant engineering connections to the unit according to the instructions in this manual
- It is mandatory to install a water filter on the evaporator, penalty invalidation of the warranty
- Do not bend or hit pipes containing under pressure fluids  
Do not exceed the maximum allowable pressure (PS) of the unit's water circuit shown on the serial number plate
- Before removing elements along the under pressure water circuits, shut-off the pipe section involved and gradually drain the fluid until its pressure and that of the atmosphere are balanced.
- The unit contains under pressure refrigerant gas: no operation must be performed on under pressure equipment except during maintenance that must be carried out by competent and authorised personnel
- Perform brazing or welding only on empty pipes and clear of any lubricating oil residues; do not near flames or other heat sources to the pipes containing refrigerant fluid
- Do not work with naked flames near the unit
- In order to avoid an environmental risk, make sure that any fluid leaks are recovered in suitable devices in compliance with local regulations.
- Do not use your hands to control any refrigerant leaks
- Keep all lubricants in properly marked containers  
do not keep flammable liquids near the plant
- Do not remove the protections from mobile elements while the unit is running
- Do not use cables with inadequate section or flying connections, not even for limited periods or emergencies
- Check the unit is properly earthed before starting it
- Before opening the electrical panel, disconnect the unit from the mains by means of the external isolator
- In case of units with shunt capacitors, wait 3 minutes from when power supply was disconnected from the unit before accessing inside the electrical panel
- If the unit is equipped with integrated inverter compressors, disconnect the power supply and wait at least 5 minutes before accessing for maintenance: the internal components remain live for this time, generating the risk of electrocution
- The safety devices must be maintained efficient and periodically checked as prescribed by current regulations
- In case a piece is disassembled, make sure it is correctly reassembled before restarting the unit
- Even with the unit off, prevent the fluid in contact with the heat exchangers exceed the temperature limits indicated in the documentation and freeze.
- Do not send the heat exchangers fluids other than water or its mixtures with ethylene glycol/propylene in a maximum concentration of 30%
- The machine must only be employed for the use for which it was made;



Warning:  
Hot surface



Warning:  
Electricity



Warning:



Warning:  
Flammable material



Warning:  
Sharp element



Warning:  
Biological hazard



Wear head  
protection



Wear protective  
gloves



Wear eye protection



Wear ear protection



Wear safety  
footwear

any other use can be dangerous and void the warranty

## **PREVENTIONS**

- Make sure that the protections of mobile elements are correctly in place before restarting the unit
- Fans, motors and belt drives may be in motion: always wait for them to stop and take appropriate precautions to prevent their activation before accessing them
- the machine and the pipes have very hot and very cold surfaces that lead to risk of burns
- Before opening a machine panel, ascertain whether it is or not firmly connected to it by hinges
- Louvers of the heat exchangers, edges of the components and metal panels can generate cuts
- The installation must ensure that the temperature of the fluid entering the unit is maintained stable and within the provided limits; therefore, pay attention to the adjustment of any external thermal exchange and control devices (drycooler, evaporating towers, area valves, ...), to the adequate dimensioning of the mass of fluid circulating in the plant (in particular when plant areas are excluded) and to install systems for the recirculation of the necessary fluid flow rate so as to maintain the machine temperatures within the allowed limits (e.g. during the start-up phase).
- The material used for the machine protective packaging must always be kept out of the reach of children as it is a source of danger
- In units with compressors in parallel, do not disable the individual compressors for long periods.

## 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.  
The NRV units are supplied with eyebolts; they must be lifted using suitable straps hooked to all the installed eyebolts.

### LIFTING STANDARDS

- All panels must be tightly fixed before moving the unit;
- Before lifting, check the specific weight on the technical plate.
- Only use the lifting point indicated by the appropriate labels, and always use all the lifting points.
- Use ropes in compliance with Standards and of equal length;
- Use a spacer beam in compliance with Standards (not included)
- Handle the unit with care and without sudden movements.
- The machine must always be kept in a vertical position;

**WARNING: The units cannot be stacked.**

### SELECTION ON THE PLACE OF INSTALLATION

The chiller is shipped already tested and only requires electrical and hydraulic connections in the installation site.

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

- The support surface must withstand the weight of the unit.
- The safety distances between the units and other appliances or structures must be scrupulously respected.
- The unit must be installed by a qualified technician in compliance with national laws in the country of destination.
- It is mandatory to foresee the necessary technical space in order to allow ROUTINE AND EXTRAORDINARY MAINTENANCE interventions.
- Remember that during operation, the chiller can cause vibrations; therefore, anti-vibration supports are recommended, fastened to the base according to the assembly layout.
- Fix the unit checking that it is level.

**WARNING: The units cannot be stacked.**

#### WARNING:

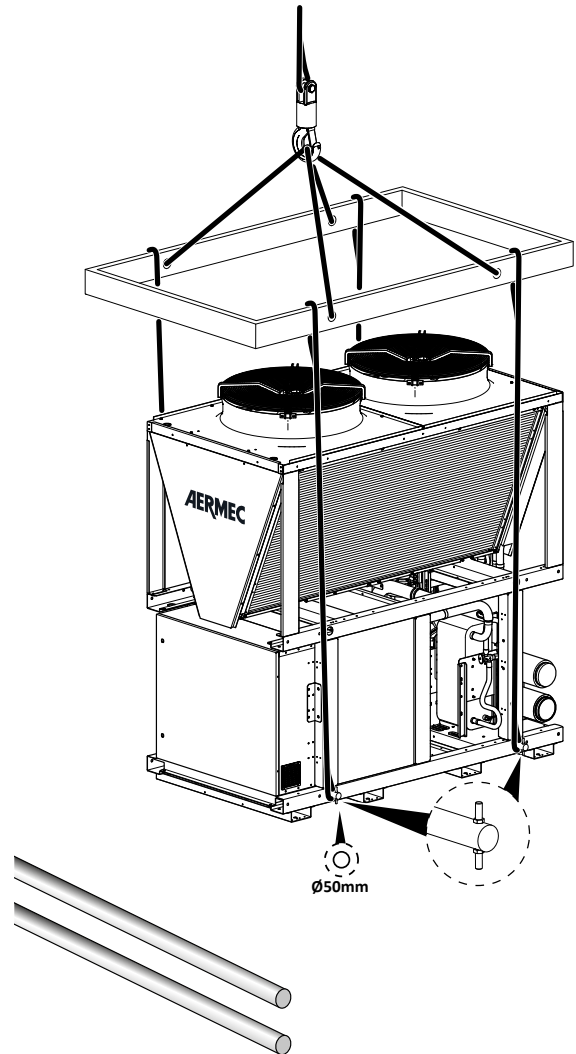
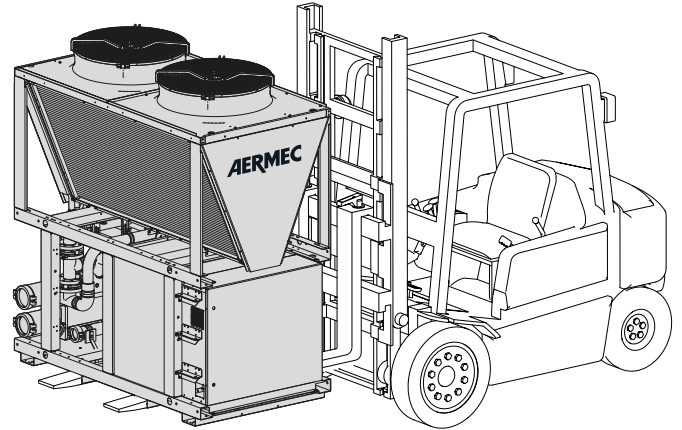
- It is prohibited to stop under the unit during lifting operations.
- The units cannot be stacked.
- The unit must be installed in order to make possible the maintenance and / or repair.

**WARNING: Lifting bars are NOT provided.**

**Don't use after lifting point except for that present.**

#### WARNING:

**If the unit is installed in particularly windy locations the provision of wind barriers may be necessary to avoid malfunctions.**





## RECEPTION

### STORAGE

It may happen that, after receipt, the units are not to be immediately installed and are kept in storage. In case of medium-long term storage, we recommend applying the following procedures:

- Make sure there is no water inside the hydraulic systems.
- Do not remove the protections from the heat exchanger.
- Do not remove the plastic protective films.
- Make sure that the electrical panels are closed.
- Before using the equipment, store all items provided in a dry and clean place so that they can be used in the future. We recommend storing the unit in a dry and sheltered place (especially for units intended for indoors).

**NOTE** The maximum storage temperature of the units depends on the type of refrigerant contained, see table. Beyond this limit, there is a risk of refrigerant leaking through the safety valves.

Maximum storage temperature			
Refrigerant	type	class	Max temp. (°C)
R134a			<50°C
R410A			<50°C
R1234ze			<50°C

### PLACEMENT AND INSTALLATION REQUIREMENTS

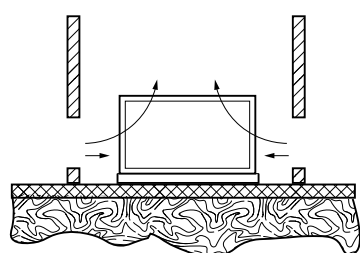
For unit installation it is important to perform the following preliminary preparation tasks:

- When installing, make sure that the atmospheric or environmental agents do not affect and corrode the cooling circuit components, causing the refrigerant to leak in the environment and, if so, make the appropriate adjustments.
- The air-cooled units with fans are designed for outdoor installation. Contact Aermec before making any type of installation.
- The water-cooled units are designed for indoor installation. Contact Aermec before making any type of installation.
- For the positioning of the air-cooled units for outdoor use, choose a place that is not exposed to excessive wind (install windbreaks if the wind speed exceeds 2.2 m/s).
- The soil under the unit must be flat, smooth and sufficiently strong to withstand the weight of the unit with a full refrigerant load, as well as the occasional presence of the normal maintenance equipment.
- In locations exposed to frost, if the unit is installed on soil, the support base must rest on concrete columns with a depth greater than the normal depth of frost of the soil. It is always advisable to build a support base separate from the main building to avoid the transmission of vibrations.
- For normal applications, the rigidity of the unit and the positioning of point loads allow for an installation that minimises vibrations. In the case of installations requiring particularly low vibration levels, you can use the anti-vibration supports..

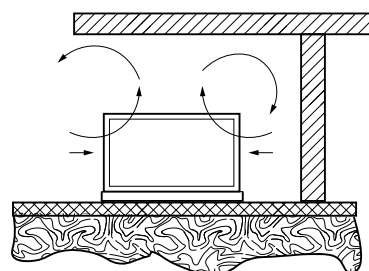
**ATTENTION:** The use of anti-vibration supports **MUST** be combined with the installation in the unit water piping of flexible couplings. The anti-vibration supports must be fixed to the unit **BEFORE** it is earthed. **AERMEC** is not responsible for the choice of capacity of the anti-vibration supports.

- The unit must be fixed to the anti-vibration supports and these firmly fixed to the concrete base, see chapter **weight distribution and minimum technical spaces**
- Check that the contact surfaces of the anti-vibration supports are levelled to the base. If necessary, use spacers or level the base but, in any case, make sure that the anti-vibration supports rest flat on the base surface.
- **It is essential that the units are installed leaving sufficient space around them to allow easy access to the components for maintenance and repair purposes.** Only for air-cooled units: if the outlet air from the condensers meets any obstacle, it tends to go back on the fans. This increases the temperature of the air used to cool the condensers. Obstructions on the air outlet also compromise the air distribution on the entire heat exchange surface of the condenser. Both these conditions, which reduce the heat exchange capacity of the coils, increase the condensing pressure. This leads to a loss of power and increase of the compressor absorption.
- Only for air-cooled chillers: to prevent the airflow reversing due to prevailing winds, the units cannot be completely covered with a high and continuous windbreak. If it is not possible to avoid this configuration, after written approval by an Aermec representative, you can install an air exhaust duct at the same height as the surrounding shield.

**ATTENTION:** It is important that the units are installed flat. The improper installation of the unit invalidates the warranty.



**Windbreak**  
recommended with wind above 2.2 m/s

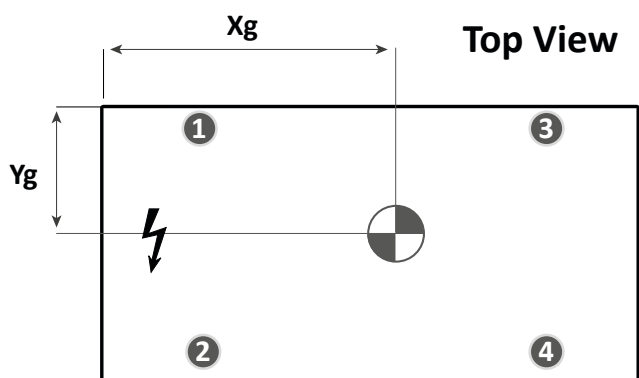
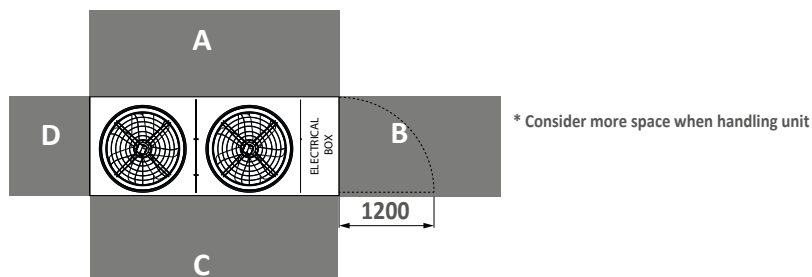


**Installation not allowed**

# MINIMUM TECHNICAL SPACES

## INSTALLATION - MINIMUM TECHNICAL SPACES AND WEIGHT DISTRIBUTION

						SPAZI TECNICI MINIMI				
	V-blok	Fans axial		A	B	C	D			
	n°	n°		mm	mm	mm	mm	mm		
0550	1	2		0	1500	0	2000	3000		



EMPTY MACHINE  
WHITOUT CASE PACKAGING

Model	Size	Versions	Module	kit	Weight (kg)	Module 1					
						Barycentre (mm)		Weight distribution percentage on supports unit operating (%)			
						Empty		1	2	3	4
NRV	0550	00	1	00	1105*	XG1	XY1	26.9	24.0	26.0	23.2
						1180	561				

\* Weight of the Standard unit without accessoires

## HYDRAULIC CONNECTIONS

The units may be available with or without integrated hydronic kit, in any case:

**ATTENTION** *The choice and installation of components external to the unit is up to the installer, who must operate according to the rules of good technical design and in compliance with the regulations in force in the country of destination.*

**ATTENTION** *The hydraulic connection pipes to the unit must be suitably dimensioned for the effective water flow rate requested by the system when running. The water flow rate to the heat exchanger must always be constant*

**ATTENTION** *Wash the system thoroughly before connecting the unit. This cleaning will eliminate any residues such as welding drips, scale, rust, or other impurities from the piping. These substances can also deposit inside and cause unit malfunctions. The connection piping must be adequately supported so that its weight does not rest on the appliance*

### CONNECTIONS

Before starting the system, check that the hydraulic circuits are connected to the current exchangers (or, that the evaporator in the air/water units or evaporator and condenser in the water water units or the intake and flow fittings have not been reversed). The water circulation pump must preferably be installed upstream so that the evaporator/condenser is subject to a positive pressure. The water inlet and outlet connections are indicated in the dimension tables in this manual, or available on [www.aermec.com](http://www.aermec.com)

It is important to follow the recommendations (not complete) below:

- The water pipes must not transmit radial or axial forces or vibrations to the exchangers (use flexible hoses to reduce the transmitted vibrations)
- It is necessary to install manual or automatic vent valves in the highest points of the circuit; and also provide discharge fittings in the lowest points to allow emptying the entire circuit
- To maintain the pressure in the circuits, you must install an expansion valve and a safety device
- Respect the water inlet and outlet connections shown on the unit
- Install thermometers on the water inlet and outlet fittings.
- Install stop valve near the water inlet and outlet fittings.
- After performing a leak test, insulate the pipes to reduce heat loss and prevent the formation of condensation
- If the external water pipes are in an area where it is likely that the environment temperature drops below 0°C, insulate the pipes and provide an electric heater. As an option, you can also protect the pipes inside the unit.
- Refer also to the percentage of recommended glycol, in the technical manual

**ATTENTION** It is necessary to provide a water filter and a flow switch in the hydraulic circuit upstream of the heat exchanger.

- The water filter in models without hydronic kit is supplied, is mounted in the pump or pump and accumulation models.
- The flow switch is available as an accessory.

**FAILURE TO DO THIS INVALIDATES THE WARRANTY.**

### DISCHARGING SYSTEM

In the event the system is stopped during winter, the water in the heat exchanger can freeze damaging the heat exchanger irreversibly. To prevent danger of freezing, three solutions are possible:

1. Full water discharge from the unit.
2. Using the resistances. In this case the resistances must always be supplied with electrical power for the entire period of possible freezing (machine in stand-by).
3. Operation with glycol/water fluid, with a percentage of glycol based on the minimum outdoor temperature expected.

### ANTI-FREEZE PROTECTION

**ATTENTION:** *the addition of glycol is the only effective protection against freezing; the glycol/water solution must be sufficiently concentrated to ensure proper protection and prevent ice forming at minimum temperature provided for a given installation. Take the necessary precautions if using non-passivated MEG anti-freeze solutions (monoethylene glycol or monopropylene glycol). Corrosion phenomena may occur with these anti-freeze solutions in contact with oxygen.*

*However, always refer to the glycol supplier documentation to check its recommended concentration.*

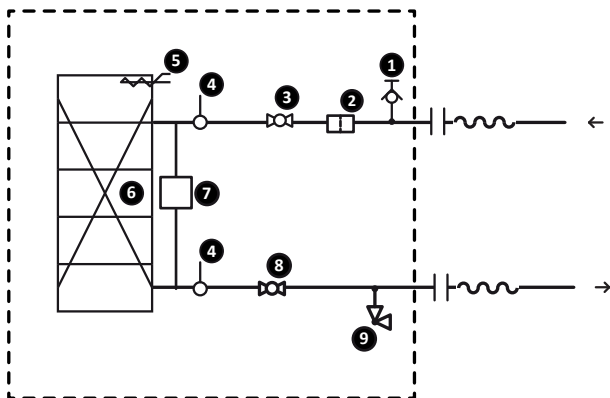
## HYDRAULIC DIAGRAMS AND WATER FEATURES

### Series components supplied:

- 1 Air vent valve
- 2 Water filter
- 3 butterfly check valves (motorized)
- 4 Water temperature probe
- 5 Electrical heater
- 6 Plate heat exchanger
- 7 Pressure switch
- 8 butterfly check valves (mechanics)
- 9 Discharge valve

Water features	
<b>System: Chiller with plate heat exchanger</b>	
PH	7,5-9
Electric conductivity	100-500 $\mu$ S/cm
Total hardness	4,5-8,5 dH
Temperature	< 65°C
Oxygen content	< 0,1 ppm
Max. glycol amount	0,5
Phosphates (PO <sub>4</sub> )	< 2ppm
Manganese (Mn)	< 0,05 ppm
Iron (Fe)	< 0,3 ppm
Alkalinity (HCO <sub>3</sub> )	70 - 300 ppm
Chloride ions (Cl <sup>-</sup> )	< 50 ppm
Sulphate ions (SO <sub>4</sub> )	< 50 ppm
Sulphide ion (S)	none
Ammonium ions (NH <sub>4</sub> )	none
Silica (SiO <sub>2</sub> )	< 30ppm

Standard Circuit



## ELECTRICAL CONNECTIONS

The units are completely wired at the factory and only require connection to the electric power supply 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:

- The electrical mains features are suitable for the absorption values indicated in the electrical data table, also taking into consideration any other machines functioning at the same time.
- The unit is only powered when installation has been completed (hydraulic and electric).
- Respect the connection indications of the phase, and earth wires.
- The power supply line must have a relevant protection mounted upstream against short circuits and dispersions to earth, which isolates the system with respect to other utilities.
- The voltage must be within a tolerance of  $\pm 10\%$  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.
- For electric connections, use the cables with double isolation according to the Standards in force on this subject in the different countries.

### it is mandatory:

- The use of an omnipolar magnet circuit breaker switch, in compliance with the current 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.
- To make an effective earth connection. The manufacturer cannot be considered responsible for any damage caused by the lack of or ineffective appliance earth connection.
- For units with three-phase power supply, check the correct connection of the phases.

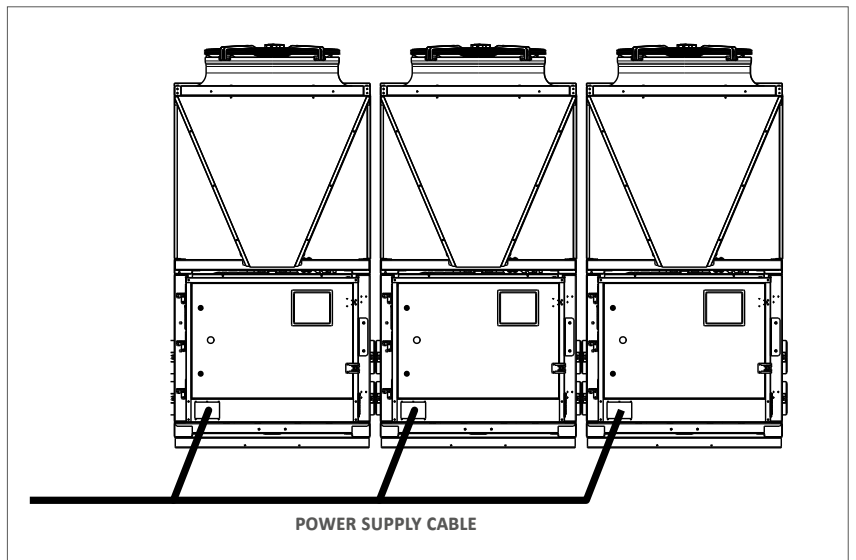
### ATTENTION

- All the electrical operations must be carried out by personnel in possession of the necessary qualifications by law, suitably trained and informed on the risks related to these operations.
- The characteristics 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 moment of installation
- For the installation requirements refer only to the wiring diagram supplied with the unit. - The wiring diagram along with the manuals must be kept in good condition and always available for any future servicing on the unit.
- **IT IS mandatory to verify that the machine is watertight before making the electrical connections and it must only be powered up after the hydraulic and electrical works have been completed.**

### ELECTRICAL DATA

The cable section shown in the table are recommended for maximum lengths of 50m. For longer lengths or different cable laying, it is up to the PLANNER to calculate the appropriate line switch, the power supply line as well as the connection to the earth wire and connection cables depending on:

- The length
- The type of cable
- The absorption of the unit and the physical location, and the ambient temperature.



### ELECTRICAL DATA OF THE UNIT WITHOUT HYDRONIC KIT

Mod.	Vers.	Power supply	Units		Recommended cables section						
					Power cables			Controls and safety devices		Earth	IL
					Phases	Cables for Single phase	Section Cable (mm <sup>2</sup> )	Total Cables (n°)	Section Cable (mm <sup>2</sup> )		
			Comp. (n°)	Vent. (n°)	(n°)	(n°)	(mm <sup>2</sup> )	(n°)	(mm <sup>2</sup> )	(mm <sup>2</sup> )	(A)
0550	*	1	2	2	3	1	35	3	1,5	1 X 35	125

- L.R.A. Peak current from unit
- F.L.A. Maximum current from unit
- Earth Earth wire to connect to unit
- IL Master switch

## COMMISSIONING - WARNINGS

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 time frame for the completion of works for the system. Prior to the intervention, all other works (electrical and hydraulic hook-ups, priming and bleeding of air from the system) must have been completed.

### START-UP

#### OPERATIONS TO BE PERFORMED WITH NO VOLTAGE PRESENT

##### **ATTENTION**

*the unit is not working:*

Check:

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

#### OPERATIONS TO BE PERFORMED WITH THE UNIT LIVE

##### **ATTENTION**

*the unit is still not working:*

- Supply power to the unit by turning the master switch to the ON position.
- Use a tester to verify that the value of the power supply voltage to the phases is equal to  $400V \pm 10\%$ ; also verify that the unbalance between phases is no greater than 3%.
- Check that the connections made by the installer are in compliance with the documentation.
- Verify that the resistor of the compressor sump is working 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 CONTROLS

- 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).**
- Make sure that the circulation pump/s is operating and that the water flow rate is sufficient to close the contact of the flow switch, if installed.
- Check the water flow rate, measuring the pressure difference between inlet and outlet of the evaporator and calculate the flow rate using the evaporator pressure drop tables present in this manual.
- Check the correct functioning of the flow meters if installed. Closing the cut-off valve at the output of the heat exchanger; the unit control panel must show the block. Finally re-open the valve and rearm the block.

#### COMMISSIONING

- Once all the aforementioned checks have been carried out, the unit can be commissioned
- Close the door of the electrical panel.
- Set the unit main switch to ON, the unit will start after a few minutes

#### OPERATIONS TO BE PERFORMED WITH MACHINE ON

##### **ATTENTION**

*the unit is working:*

Check:

- That the compressor input current is lower than the maximum indicated in the electrical data table.
- Before starting the unit, check that the compressor rotates in the correct direction through a three-phase protection. The spiral compressors compress in one direction of rotation only. Therefore, it is essential for the phase of the three-phase spiral compressors to be correctly connected (the correct direction of rotation can be controlled when the pressure on the intake side decreases and that on the flow side increases with the compressor in operation). If the connection is incorrect, the direction of rotation is reversed: this causes a loud noise and the reduction of current consumption. In this case, the protection system inside the compressor activated turning off the unit. To solve the problem, disconnect and swap the wires between two of the phases, then connect the three-phases again.
- 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%.
- Control of the anti-freeze alarm, the alarm is always active, even in standby mode. In order to prevent the heat exchanger from damage due to water freezing, the unit is immediately switched off and the relative alarm indicated, once the water temperature value has dropped below the minimum antifreeze set point (3°C). The unit can only restart after a manual reset and if the anti-freeze probe measures a water temperature above 4°C. With the unit off and water temperature below 4°C, if fitted the anti-freeze electric heater of the exchanger (accessory) will activate, turning off when the water temperature exceeds 5°C. The water pump is always on.

##### **ATTENTION**

*The anti-freeze set temperature can only be varied by an authorised after-sales centre and only after having checked that there is a suitable % of anti-freeze solution in the water circuit.*

*Whenever this alarm intervenes, call the nearest authorised after-sales service immediately*

- Control of the water flow rate alarm, the unit provides for the management of a flow rate alarm controlled by a differential pressure switch or flow switch if provided. This type of safety device intervenes after the first 30 seconds of pump functioning, if the water flow rate is not sufficient. The intervention stops the compressor and the pump itself.

# MAINTENANCE

## ATTENTION

**Any cleaning, inspection, control, routine and extraordinary maintenance must be performed by experienced, authorised personnel and qualified to perform the above tasks. These tasks must be performed to perfection as prescribed by M.D. 37/2008.**

During the execution of

- Risks of electric discharges;
- Risk of injuries due to the presence of rotating parts;
- Risk of injuries due to the presence of sharp edges and heavy weights;
- Risks of injuries due to the presence of components containing high pressure gas;
- Risks of injuries due to high or low temperature components.
- Noise-related risks of the machine functioning;
- Risks related to the presence of harmful substances in hydronic circuits.

**These tasks must be performed using the appropriate personal protective equipment, see figure below**

Maintenance operations are essential to maintain the refrigerant unit efficient, from a purely functional point of view and with regard to energy and safety.

In the absence of specific regulations regarding HFO refrigerants, the manufacturer prescribes the application of and compliance with that indicated in the:

- Regulation (EC) No.842/2006- art.3 concerning the "leakage containment"
- Regulation (EC) No.1516/2007 concerning the "standard leakage checking requirements" and related national laws implementing the above European regulations.

## ATTENTION

**For the unit, the user must provide a system booklet which he must ensure, or its designee authorised to service the machine, will contain all required records in order to have a historical documentation of the unit functioning. The absence of records in the booklet may count as evidence of lack of maintenance**

## PRECAUTIONS TO BE OBSERVED DURING MAINTENANCE

### ATTENTION

**Maintenance operations can only be performed by authorised technicians.**

### PRECAUTIONS AGAINST RESIDUAL RISKS MECHANICAL RISKS

- Before opening a machine panel, ascertain whether it is or not firmly connected to it by hinges;
- In case a piece is disassembled, make sure it is correctly reassembled before restarting the unit;

- Louvers of the heat exchangers, edges of the components and panels, screws can generate cuts;
- Do not remove the protections from mobile elements while the unit is running;
- Make sure that the protections of mobile elements are correctly in place before restarting the unit;
- It is not permitted to walk or place other bodies on the machine;
- Fans, motors and belt drives may be in motion, always wait for them to stop and take appropriate precautions to prevent their activation before accessing them;
- Isolate the unit from the mains by means of the external isolator provided for the insertion of padlocks (up to 3) for blocking in "open" position.
- Place a sign reading "Do not turn on - maintenance in progress" on the open isolator
- Equip yourself with the appropriate personal protective equipment (helmet, insulated gloves, protective goggles, accident-prevention shoes, etc.)
- Equip yourself with tools in good condition and make sure to have fully understood the instructions before using them
- If having to take measurements and perform checks that require the machine to run, you must:
  - make sure that any remote control systems are disconnected; however, keep in mind that the PLC on the machine controls its functions and can enable and disable the components creating hazardous situations (e.g. power and rotate the fans and their mechanical drive systems).
  - Operate with the electrical board open the shortest time possible
  - Close the electrical board as soon as the single measurement or control is performed
- For outdoor units, do not perform interventions in dangerous weather conditions such as rain, snow, fog, etc.
- The cooling circuit contains under pressure refrigerant gas: any operation must be performed by competent personnel in possession of the authorisations and qualifications required by current laws

## ATTENTION

**it is forbidden to LOAD the cooling circuit with a refrigerant gas different from that indicated. Using different refrigerant gas can severely damage the unit**

- never keep the cooling circuit open, because the oil absorbs humidity and degrades
- during venting protect yourself against any leakage of fluids at dangerous temperatures and/or pressures
- always use appropriate equipment (extractor, antistatic bracelet, etc.) when replacing electronic boards
- if replacing a motor, compressor, evaporator, condensing coils or any other heavy element, make sure that the lifting devices are compatible with the weight to be handled
- in air units with independent compressor compartment, do not access the fan compartment without having first disconnected the machine through the isolator on the board and having placed a sign reading "Do not turn on - maintenance in progress"



Warning: Hot surface



Warning: Electricity



Warning:



Warning: Flammable material



Warning: Sharp element



Warning: Biological hazard



Wear head protection



Wear protective gloves



Wear eye protection



Wear ear protection



Wear safety footwear

- contact the company if changes must be made to the refrigerant, hydraulic or electric diagram of the unit, as well as its control logic

#### PREVENTION OF CHEMICAL / FIRE / ENVIRONMENTAL RISKS

- Any intervention on the machine must be performed with "NO SMO-KING"
- non disperdere mai in ambiente i fluidi contenuti nel circuito frigorifero
- The water circuit may contain harmful substances. Prevent the contents coming into contact with skin, eyes and clothing. Use the prescribed personal protective equipment. (chemical risk);
- If there is a need to perform a braze-welding, so with the use of special torch with naked flame, the same flame must only be activated if in the absence of freon gas in the environment and on the cooling circuit pipes. Inside piping must be "washed" and contain nitrogen type inert gas. The presence of flame and freon gas decomposes the same, forming lethal and carcinogenic compounds.
- Hot works require the availability of a Carbon Dioxide (CO<sub>2</sub>) fire extinguisher. DO NOT USE WATER, leachates could be hazardous for the discharges; if using water, provide a containment tank.

#### PREVENTION AGAINST RESIDUAL RISKS DUE TO PRESSURE OR HIGH/ LOW TEMPERATURE

- The unit contains under pressure gas: no operation must be performed on under pressure equipment except during maintenance that must be carried out by competent and authorised personnel;
- Perform brazing or welding only on empty pipes and clear of any lubricating oil residues; do not near flames or other heat sources to the pipes containing under pressure fluids;
- Do not work with naked flames near the unit;
- Do not bend or hit pipes containing under pressure fluids;
- The unit is equipped with overpressure release devices (safety valve): if these devices intervene, the refrigerant gas is released at high temperature and speed;
- The machine and the pipes have very hot or very cold surfaces that lead to risk of burns by contact;
- Do not use your hands to control any refrigerant leaks;
- Before removing elements along the under pressure hydronic circuits, shut-off the pipe section involved and gradually drain the fluid until its pressure and that of the atmosphere are balanced.

#### PREVENTION AGAINST RESIDUAL ELECTRICAL RISKS

- Before opening the electrical panel, disconnect the unit from the mains by means of the external isolator;
- Wait the time indicated on the machine plate from when the power supply was disconnected from the unit before accessing inside the electrical panel;
- If the unit is equipped with integrated inverter type compressors, disconnect the power supply and wait at least 5 minutes before accessing for maintenance: the internal components remain live for this time, generating the risk of electrocution.

#### CLEANING THE MACHINE

The machine must be turned off and electrically disconnected when being cleaned.

#### INSPECTION AND CONTROL

The machine must be turned off and electrically disconnected during its inspection and leak check.

#### ROUTINE AND EXTRAORDINARY MAINTENANCE

The machine must be turned off and electrically disconnected during its maintenance (with possible replacement of components). In particular:

- Before any intervention, isolate the unit from the mains by means of the external isolator provided for the insertion of padlocks (up to 3) for blocking in "open" position

Place a sign reading "Do not turn on – maintenance in progress" on the open isolator;

- Equip yourself with tools in good condition and make sure to have fully understood the instructions before using them;
- Equip yourself with the appropriate personal protective equipment as indicated in paragraph 1 of this report;
- For outdoor units, do not perform interventions in dangerous weather conditions such as rain, snow, fog, thunderstorms, etc;
- The cooling circuit components must be replaced after draining the refrigerant gas contained in the circuit;
- During venting protect yourself against any leakage of fluids at dangerous temperatures and/or pressures;
- Always use appropriate equipment (extractor, antistatic bracelet etc) when replacing electronic boards;
- If replacing a motor, compressor, evaporator, condensing coil or any other heavy element, make sure that the lifting devices are compatible with the weight to be handled;
- In air units with independent compressor compartment, do not access the fan compartment without having first disconnected the machine through the isolator on the board and having placed a sign reading "Do not turn on – maintenance in progress" ;
- Always and only use original spare parts purchased directly from Aermec or from official dealers. Contact Aermec should it be necessary to move the unit one year after its positioning on-site or it must be dismantled;
- It is not permitted to change the refrigerant, hydraulic or electric layout of the unit, or its control logic unless expressly authorised by Aermec;
- The machine must be loaded with the refrigerant in the feature label and in the required quantity;
- Make sure to have removed all tools, electrical cables or other loose object and having perfectly connected the machine to the system before closing it and starting it;
- The inspections and measurements necessary to establish the correct functioning of the machine to be run with the machine in operation, must be performed with the machine closed (framework fixed on the machine), reading the measurements collected by the control board and viewable in the control panel of the same. In the case of machines with cooling circuit compartment open, stand in front of the control panel of the electrical panel remaining distant and not exposed to the under pressure parts of the cooling circuit

#### ATTENTION

***When having to take measurements with the machine on and the electrical panel and cooling circuit open, be careful since the machine is live, the cooling circuit contains high pressure gas, the pipes may be hot or cold, some parts may be in motion.***

Any absorption measurements of the compressors, compressor casings, pumps and fans as well as the power supply measurements, must be taken as follows:

- With machine off, access its panel;
- Connect the measuring instruments such as current clamps (to measure the current) and multimeters (to measure the voltage). These instruments must be fitted with appropriate terminals/clamps that allow to remotely control the measurement;
- Access the machine and read the measurements made by the instruments, keeping AWAY from live electrical parts;
- As soon as the measurements are taken, turn off the machine, remove the instruments and close the electrical panel.

The measurements of the compressor inlet and outlet temperature and pressure to determine the overheating and subcooling of the machine, must be carried out as follows:

The measurements of the compressor inlet and outlet temperature and pressure to determine the overheating and subcooling of the machine, must be carried out as follows:

- With machine off, access its cooling circuit;



- Connect the necessary instruments,
  - Pressure gauges connected through appropriate extensions to the compressor inlet and outlet pressure plugs;
  - Thermometers connected to thermocouple probes that are fixed to the compressor inlet and outlet pipes. Avoid using metratatst that require the operator to near the machine cooling circuit;
- Access the machines **and acquire the measurements, keeping AWAY from the under pressure parts of the cooling circuit;**
- As soon as the measurements are taken, turn off the machine, remove the instruments and close the cooling circuit compartment.

The high/low pressure switch, where present must be tested with the machine “closed”, reading the high pressure circuit pressure on the machine control panel.

In case of machines with the cooling circuit compartment not closed by framework, the high/low pressure switch must be tested by standing in front of the machine panel where the control panel is located, remaining distant and not exposed to the under pressure parts of the cooling circuit.

### **CLEANING COIL MICRO - CHANNEL**

Keep surfaces clean battery mirco-channel is critical to maintaining the refrigeration systems at optimum performance levels. Dirt, grease, oil, and other foreign material must be removed periodically from the surface of the battery according to the following recommendations.

#### **Required components:**

- **Personal protective equipment**
- **hot water**
- **High-pressure washing**

**Procedure:** Use a high-pressure washer with a large jet and a force sufficient to remove all foreign material, proceed with care to avoid damage and possible wear of the fins.

Lastly rinse abundantly also the carpentry and the fans to be sure that you have removed all the impurities.

# MAINTENANCE - LIST OF THE RECOMMENDED PERIODIC INTERVENTIONS

## RECOMMENDED PERIODIC MAINTENANCE INTERVENTIONS

DESCRIPTION	FREQUENCY				
	3/4 months	6 months	12 months	24 months	functioning hours
<b>GENERAL INTERVENTIONS</b>					
Check of any refrigerant leaks (this must be done respecting the deadlines recommended by the current European regulations)	•				
Check of the unit power supply voltage	•				
Check of the compressors' power supply voltage	•				
Check of the fan power supply voltage	•				
Check of the solenoid valves	•				
Functioning and calibration check of the pressure switches, if and where present	•				
Replacement of the safety valve				•	
Check and reading of the pressure/temperature probes	•				
Check and possible replacement of the dehydrating fans			•		
Check of compressors contactors	•				
Check of fans contactors, where present			•		
Exchanger coils cleaning		•			
Check and cleaning of shell and tube heat exchangers if necessary where present (1)			•		
Check of electric resistances of the heat exchangers		•			
Check for rust and corrosion in components, paying particular attention to under pressure containers. In this case replace them of intervene with specific products			•		
General cleaning of the unit			•		
Bleed the hydraulic circuit and the heat exchangers, the simultaneous presence of air and water reduces yield and can benefit the arising of rust					
<b>INTERVENTIONS TO COOLING CIRCUIT Functioning at full load</b>					
Overheating temperature measurement		•			
Subcooling temperature measurement		•			
Exhaust gas temperature measurement		•			
Fans absorption measurement		•			
Compressors absorption measurement		•			
<b>COMPRESSOR CHECKS</b>					
Check oil level	•				
Check oil acidity			•		
Oil replacement					compressore vite 8000 ore
					compressore scroll 12000 ore
Check the proper functioning of the casing resistance		•			
Check oil level sensor, if any		•			
<b>CHECKS ON HYDRAULIC CIRCUIT</b>					
Pumps absorption measurement		•			
Check the pump rotor gasket	•				
Check the flexible joints	•				
Check the seal of the shell and tube heat exchanger heads, where present		•			
Check the proper functioning and calibration of the flow switch, where present	•				
Check the proper functioning of the differential pressure switch, where present	•				
Check the concentration of glycol solution, if provided	3months*				
Cleaning the water filter	•				

\* To replace the glycol, refer to the documentation provided by the supplier.

The frequency of the operations described herein is a guideline one and they may vary depending on how the unit is used and the type of system where it is installed. However, if the unit is installed in harsh environments, we recommend reducing the time of intervention

1 we do not recommend swabbing as it can ruin the inner lining of the pipes, we recommend using appropriate chemicals

## MAINTENANCE - LIST OF THE RECOMMENDED PERIODIC INTERVENTIONS

### RECOMMENDED PERIODIC MAINTENANCE INTERVENTIONS TO UNITS WITH CENTRIFUGAL COMPRESSORS

DESCRIPTION	FREQUENCY		
	6 months	12 months	other
<b>GENERAL CHECKS</b>			
Check that the compressor is not damaged	•		
Check that there are no excessive vibrations induced by other operating components	•		
<b>CHECKS ON ELECTRICAL PARTS</b>			
Check the power supply voltage	•		
Check the proper fastening of the compressor power supply cables		•	
Check the good condition of the electrical cables	•		
Check that the electric current value (A) is that specified in the technical plate	•		
Check the voltage value (A) on the storage tank capacitors	•		
Replace the storage tank condensers			every 5 years
Check the correct functioning of the safety system (alarms)		•	
<b>CHECKS ON ELECTRONIC PARTS</b>			
Check that all communication cables between the compressor and its components are firmly fastened	•		
Check that all electronic devices are firmly in their seat	•		
Visually check that the electronic boards are have no burns or are damaged		•	
Check that the reading of the pressure/temperature sensors is correct			
<b>CHECKS ON THE COOLING CIRCUIT PARTS</b>			
Check the proper functioning of the thermostatic valve		•	
Check the charge of refrigerant gas (1)	•		
Check the proper functioning of the solenoid valves	•		

## DECOMMISSIONING AND DISPOSAL OF THE MACHINE COMPONENTS

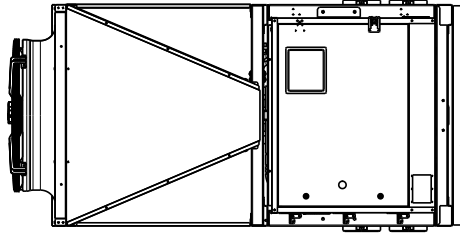
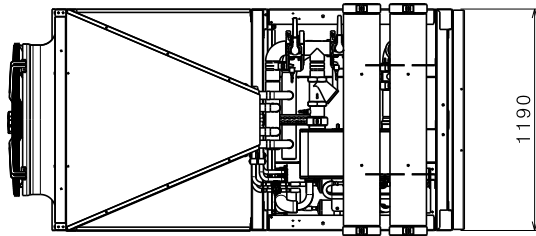
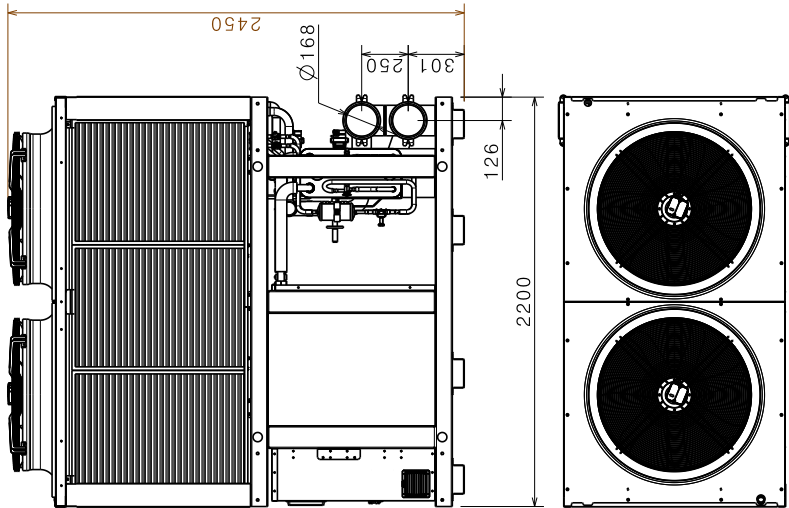
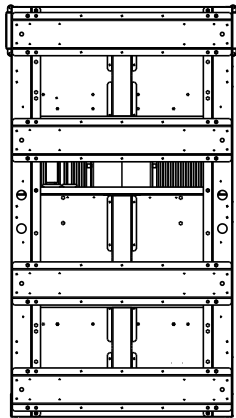
### ATTENTION

*The unit contains greenhouse effect fluoride gases covered by the Kyoto Protocol. The law prohibits its dispersion in the environment and requires its recovery and delivery to the dealer or collection centre.*

When components are removed to be replaced or when the entire unit reaches the end of its life and it must be removed from the installation, in order to minimise the environmental impact, respect the following disposal requirements:

- The refrigerant gas must be fully recovered in special containers and brought to collection centres by specialised personnel having the necessary qualification;
- The lubricating oil in the compressors and cooling circuit must be recovered and brought to collection centres;
- The structure, electric and electronic equipment and components must be separated according to their type and construction material and brought to collection centres;
- If the water circuit contains mixtures with anti-freeze, the content must be collected and brought to collection centres;
- Observe the current national laws

DIMENSIONS UNIT WITHOUT HYDRONIC KIT



MODIFICHE/TESTO ACQUISTO			
DATA	DISEGNATO	VERIFICATO	
1			
2			

INDICE MODIFICHE/TESTO ACQUISTO	0	SOSTITUISCE		SOSTITUITO		MATERIALE		SVILUPPO	
Disegnato	20/11/15	Verificato				COMPRESA INDICAZIONE DI TOLLERANZA	SCALA	PROIEZ	
Data						GRADO DI PRECISIONE MEDIO	%		
Firma	Meneghino					UNI EN 22798			
<b>AERMEC S.P.A.</b> <b>BEVILACQUA (VERONA) ITALY</b> <b>AERMEC</b>									
MODELLO PARTICOLARE CODICE									
									FOGLIO 1/1

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