

EN

23.05 - 6755517_09
Translation of Original instructions

ANL 100-150-HP

Installation Manual



REVERSIBLE AIR/WATER HEAT PUMP

Cooling capacity 7 ÷ 8 ton

Heating capacity 94,755 ÷ 111,850 BTU/h



www.aermec.com

Dear Customer,

Thank you for wanting to learn about a product Aermec. This product is the result of many years of experience and in-depth engineering research, and it is built using top quality materials and advanced technologies.

The manual you are about to read is meant to present the product and help you select the unit that best meets the needs of your system.

WARNING: personnel who possess the necessary skills according to state, national and local regulations in force must choose and size the machine

Aermec Aermec, always attentive to the continuous changes in the market and its regulations, reserves the right to make all the changes deemed necessary for improving the product, including technical data.

Thank you again.

Aermec S.p.A.

COMPANY CERTIFICATIONS



SAFETY CERTIFICATIONS



Intertek



This mark indicates that the disposal of this product must strictly follow the national and local laws in force.

TABLE OF CONTENTS

1. Fields of the range	p. 6	15. Sound data	p. 22
2. Configurator.....	p. 6	16. General warnings	p. 23
3. Unit components description	p. 7	Introduction	p. 23
Refrigerant circuit.....	p. 7	General warnings	p. 23
Hydraulic circuit.....	p. 7	Essential safety rules	p. 23
Structure and fans.....	p. 7	Precautions concerning the hydraulic circuit	p. 24
Control and safety components	p. 7	Precautions concerning the electrical circuit.....	p. 24
Electrical control and power panel	p. 7	Precautions concerning the cooling circuit.....	p. 24
4. Main hydraulic circuits	p. 9	Preventions.....	p. 24
Internal and external hydraulic circuit with ANLH (STANDARD)	p. 9	Warnings	p. 24
Internal and external hydraulic circuit with ANL HP	p. 10	17. Installation.....	p. 25
Internal and external hydraulic circuit with ANL HA	p. 11	Receiving the product.....	p. 25
5. Main cooling refrigerant layouts	p. 12	Packaging handling and removal	p. 25
6. Accessories	p. 13	Handling with a forklift	p. 25
Factory fitted accessories	p. 13	Lifting with a hoist or crane.....	p. 25
Accessories compatibility.....	p. 13	Storage.....	p. 26
7. Selection criteria of the heat exchangers according to the place of installation of the unit.....	p. 14	Place of installation	p. 26
Sea coast environments.....	p. 14	Positioning.....	p. 26
Industrial environments	p. 14	18. Minimum technical spaces.....	p. 27
Mix of seaside and industrial environments	p. 14	Single installation.....	p. 27
Urban environments.....	p. 14	Multiple installation	p. 27
Rural environments	p. 14	19. Hydraulic connections	p. 28
Additional tips.....	p. 14	Connections	p. 28
8. Performance specifications	p. 15	Water characteristics.....	p. 28
Energy data	p. 15	Discharging system	p. 29
9. General technical data	p. 16	Anti-freeze protection	p. 29
Dimensions and weights	p. 16	20. Dimensions and position of hydraulic connections	p. 30
10. Operating limits	p. 17	Dimensions.....	p. 30
Cooling mode.....	p. 17	Position of hydraulic connections.....	p. 30
Heating mode range.....	p. 17	21. Weight distribution and anti-vibration mounts position.....	p. 31
11. Pressure drops.....	p. 18	22. Electrical wiring	p. 32
Useful head.....	p. 18	Electric data.....	p. 33
12. System water content.....	p. 19	Connecting the auxiliary control board.....	p. 34
Minimum system water content.....	p. 19	Electric power connection to te electrical mains	p. 35
Maximum system water content.....	p. 19	23. Commisioning - Warnings.....	p. 36
Expansion vessel setting	p. 20	Start-up	p. 36
13. Correction factors	p. 21	24. Maintenance	p. 37
Corrective factors for Average water temperatures different from nominal values	p. 21	Precautions and preventive measures to observe during maintenance	p. 37
Fouling: deposit corrective factors $[K \cdot m^2]/[W]$	p. 21	Routine and extraordinary maintenance	p. 38
14. Glycol.....	p. 21	Decommissioning and disposing of the machine components.....	p. 38
Ethylene glycol.....	p. 21	25. List of the recommended periodic interventions	p. 39
Propylene glycol	p. 21	General interventions.....	p. 39
		Interventions on the circuit	p. 39

1 FIELDS OF THE RANGE



The Selection and the sizing of the unit for each application must be approved by a person skilled in the field of the existing legislation

ANL outdoor air-cooled heat pumps with R410A refrigerant have been designed and manufactured to meet heating and domestic hot water (DHW) production

requirements in medium to small-sized residential, commercial or industrial buildings.

The units are characterised by an extremely low noise operation and a high efficiency and reliability, through the use of high efficiency heat exchangers and scroll compressors of high performance and low noise.

2 CONFIGURATOR

Field	Description
1,2,3	ANL
4,5,6	Size 100, 150
7	Model
H	Heat pump
8	Version
°	Standard
A	With storage tank and pump
P	With pump
9	Heat recovery
°	Without heat recovery
10	Coils
°	Alluminium
11	Operating field
°	Standard mechanic thermostatic valve
12	Evaporator
°	Standard
13	Power supply
6	220V 3 ~ 60Hz
7	460V 3 ~ 60Hz

3 UNIT COMPONENTS DESCRIPTION

REFRIGERANT CIRCUIT

Compressors

Crankcase heaters as standard, automatically activated when the unit stops, as long as power is maintained to the unit.

System side heat exchanger

Brazed plate heat exchanger in stainless steel. It is externally insulated with closed cell neoprene anti-condensation material.

Source side heat exchanger

Finned coil heat exchanger with copper tubes and aluminium louvers adequately spaced to ensure high efficiencies.

Desuperheater

Brazed plate heat exchanger in stainless steel. It is externally insulated with closed cell neoprene anti-condensation material.

Reversing valve

4-way cycle inversion valve. Reverses the refrigerant fluid flow.

Liquid accumulator

Compensates for the difference in volume between the finned coil and the plate heat exchanger, retaining the excessive liquid.

Filter drier

Hermetic-mechanical made of hygroscopic material, able to withhold impurities and any traces of humidity present in the cooling circuit.

One-way valve

They allow one-way flow of the refrigerant.

Mechanic thermostatic valve

The mechanical type valve, with external equaliser located at the evaporator outlet, modulates the flow of refrigerant into the evaporator based on the load and ensures the correct superheat of the suction gas.

Liquid sight glass with moisture indicator

Used to check for the presence of moisture in the refrigerant circuit.

HYDRAULIC CIRCUIT

Water filter

Equipped with steel filtering mesh, it prevents the heat-exchanger from clogging system side due to any impurity inside the circuit.

Flow switch

Checks that water is circulating in the heat exchanger, and stops the unit if this is not the case.

Pump

They provide useful static pressure to the system, excluding the unit pressure drops.

Expansion vessel

Membrane type precharged with nitrogen.

Pressure relief valve

Calibrated at 6 Bar and drain pipe, it activates by discharging overpressure if abnormal pressure occurs.

Air drain valve

Mounted at the highest level of the hydraulic system. The air vent is used for the release of any air pockets from the hydraulic circuit.

■ *Of automatic type.*

System buffer tank

In steel to reduce heat gain and avoid the formation of condensation. Insulated with polyurethane material of adequate thickness. It reduces the number of compressor starts and stabilises the water temperature delivered to the system.

■ *Available only on request the tank in stainless steel AISI 304.*

STRUCTURE AND FANS

Structure

Supporting structure for outdoor installation, in hot-dipped galvanized sheet steel, with RAL 9003 polyester powder coating. Designed to ensure the maximum access for service and maintenance.

■ *The base for sizes 100 - 150 has holes in the proximity of the coil to permit drainage of water during the defrost cycle.*

Axial fans

External rotor axial fan with helicoidal blades
Housed in a casing, complete with protective grilles.
6 pole electric motor with thermal protection.

CONTROL AND SAFETY COMPONENTS

High pressure switch

With fixed calibration, placed on the high pressure side of the cooling circuit, it inhibits the operation of the compressor if abnormal work pressure occurs.

■ *Manual reset*

High pressure transducer

Placed on the high pressure side of the cooling circuit, signals the work pressure to control board, generating a pre-warning in case abnormal pressure occurs.

Low pressure transducer

Placed on low pressure side of cooling circuit, it signals the work pressure to the control board, generating a pre-warning in case abnormal pressure occurs.

ELECTRICAL CONTROL AND POWER PANEL

Electrical panel conforming to EN 60204-1/IEC 204-1, complete with:

- control circuit transformer
- door interlocked isolator
- circuit breakers and contactors for compressors and fans
- terminals for REMOTE PANEL
- spring type terminals for control circuit
- externally rated cabinet, with double panel and seals
- electronic controller
- evaporator pump and recovery pump control consent relay
- heat recovery (only for versions without pump assembly)
- All numbered cables

Door interlocked isolator

Access to the electrical panel is by operating the handle of the door interlocked isolator which removes power to the unit.

To avoid accidentally powering up the unit during maintenance the isolator is fitted with a locking mechanism.

Controller keypad

Allows complete control of the unit.

For further information refer to the user manual.

Electronic controller MODU CONTROL

Control of the leaving water temperature with a proportional-integral algorithm: maintains the average leaving temperature to the desired valve

- Auto-adaptive differential starter timer: ensures the compressor minimum required running time for systems with low water content
- Intelligent defrost by decreasing pressure: determines when the coil is frosted avoiding unnecessary defrost cycles
- External air temperature setpoint compensation (with external air temperature sensor accessory): reduces electrical consumption
- Condensation check based on the pressure rather than on temperature for absolute stability (with DCPX accessory)
- Inverse condensation check for the heat pump functioning mode also in summer (with DCPX accessory)
- Pre-alarms with automatic reset: in case of alarms a number of restarts are permitted before a definitive lock out
- Alarm based on ΔT : to identify errors (reverse rotation) or reversing valve blocked
- Compressor hour run counter
- Compressor number of starts counter
- Alarm history

- Automatic restart after power failure
- Local or remote control

Display of unit status

- Power on
- Compressor ON/OFF
- Operating mode (heating/cooling)
- Alarm active

Display of sensors, transducers and parameters

- Water outlet temperature
- Water inlet
- Coil temperature (heat pump unit)
- Discharge refrigerant temperature
- External air temperature (heat pump, with DCPX and sensor)
- Discharge pressure (heat pump unit)
- Suction pressure (heat pump unit)
- Error from setpoint temperature (sum of the proportional and integral error)
- Delay time to start / stop the compressor
- Control of alarms
- Low pressure
- High pressure (pre-alarm: pressostat directly removes power to the compressor)
- High discharge temperature
- Anti-freeze
- Flow switch
- Alarm based on ΔT
- Alarms with automatic reset and limited number of resets before definitive lock out.
- ON/OFF control from remote contact
- Change of season from remote contact

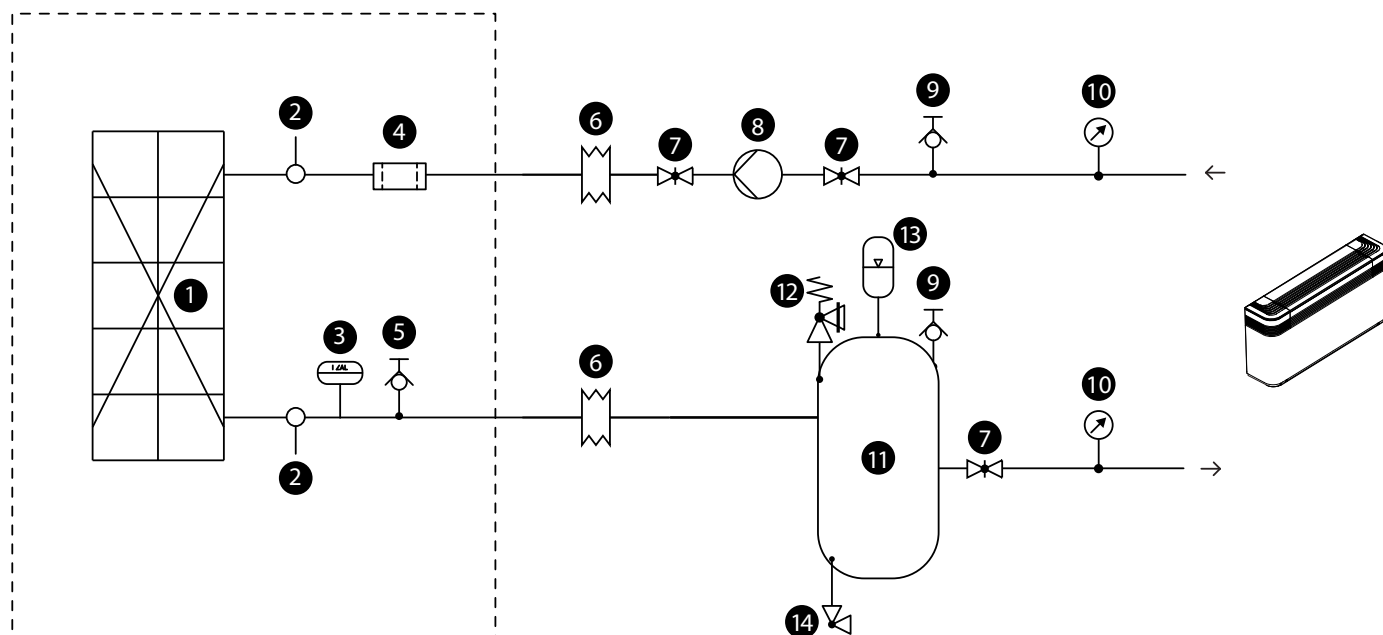
■ *For further information refer to the user manual.*

4 MAIN HYDRAULIC CIRCUITS

INTERNAL AND EXTERNAL HYDRAULIC CIRCUIT WITH ANLH (STANDARD)



Water filter: Installation in the immediate vicinity of the heat exchanger is mandatory.



Components as standard

- 1 Plate heat exchanger
- 2 Water temperature sensors (IN/OUT)
- 3 Flow switch
- 4 Water filter
- 5 Air drain valve

Components not provided and responsibility of the installer

- 6 Anti-vibration joints
- 7 Flow shut-off valves
- 8 Pump
- 9 Air drain valve

- 10 Pressure gauge
- 11 Storage tank
- 12 Pressure relief valve
- 13 Expansion vessel
- 14 Drain valve

Do not fill up the hydraulic system by glycol near the suction of the pump. High concentration of glycol could stuck the pump. Do not use the pump to mix water and glycol.



It is of fundamental importance to keep the oxygen concentration in the water under control, especially in open vessel systems. This type of system, in fact, is very sensitive to the phenomenon of extra-oxygenation of the water (an event that can be encouraged by the incorrect positioning of some components). This phenomenon can trigger corrosion processes and subsequent drilling of the heat exchanger and pipes.

Water characteristics

System: Chiller with plate heat exchanger

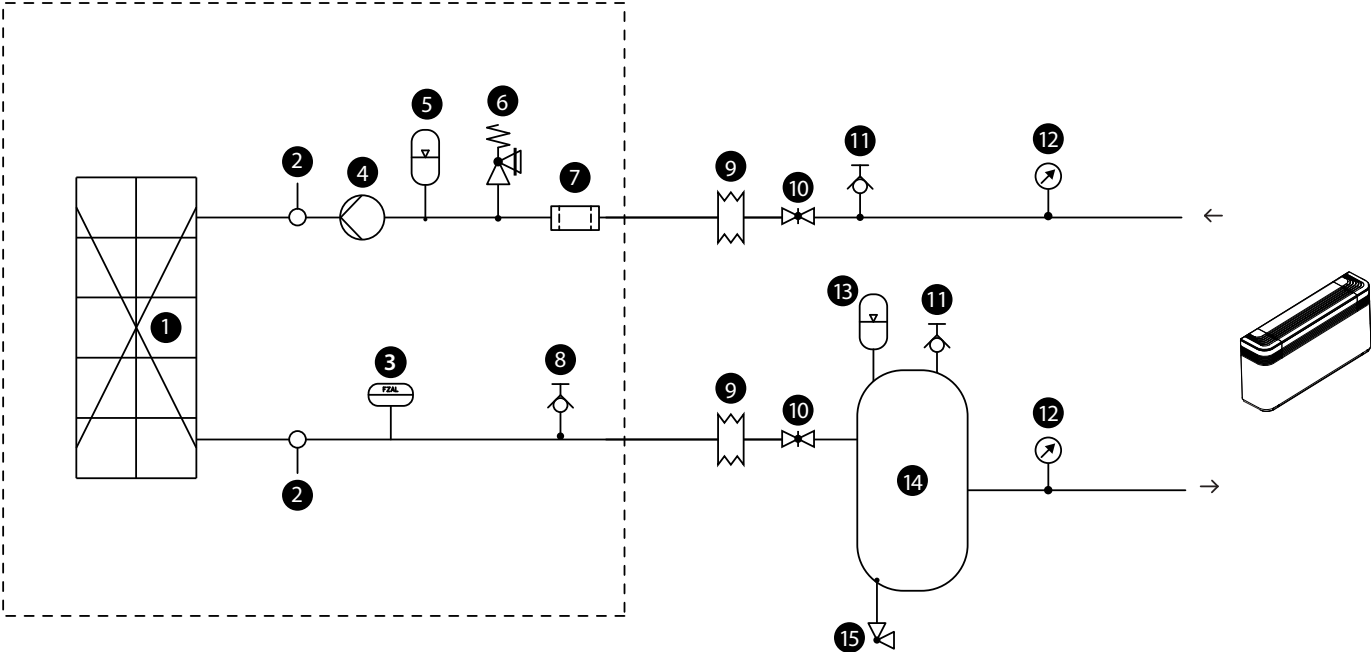
PH	7,5 - 9
Total hardness	4,5 - 8,5 °dH
Electric conductivity	10-500 µS /cm
Temperature	< 65 °C
Oxygen content	< 0,1 ppm
Max. glycol amount	50 %
Phosphates (PO ₄)	< 2ppm
Manganese (Mn)	< 0,05 ppm
Iron (Fe)	< 0,2 ppm
Alkalinity (HCO ₃)	70 - 300 ppm
Chloride ions (Cl ⁻)	< 50 ppm
Free chlorine	< 0,5 ppm
Sulphate ions (SO ₄)	< 50 ppm
Sulphide ion (S)	None
Ammonium ions (NH ₄)	None
Silica (SiO ₂)	< 30 ppm



WARNING under no circumstances does the unit have to be operated with water circulating on the heat exchanger whose characteristics are different from those indicated in the table WATER CHARACTERISTICS, under penalty of the warranty expiration. Aermec cannot be held responsible for any malfunction of the units which are operated with water whose characteristics are outside the limits in the table WATER CHARACTERISTICS and for their consequences.

INTERNAL AND EXTERNAL HYDRAULIC CIRCUIT WITH ANL HP

Water filter: Installation in the immediate vicinity of the heat exchanger is mandatory,.



Components as standard

- 1 Plate heat exchanger
- 2 Water temperature sensors (IN/OUT)
- 3 Flow switch
- 4 Pump
- 5 Expansion vessel

- 6 Pressure relief valve
- 7 Water filter
- 8 Air drain valve

Components not provided and responsibility of the installer

- 9 Anti-vibration joints

- 10 Flow shut-off valves
- 11 Air drain valve
- 12 Pressure gauge
- 13 Expansion vessel
- 14 Storage tank
- 15 Drain valve

Do not fill up the hydraulic system by glycol near the suction of the pump. High concentration of glycol could stuck the pump. Do not use the pump to mix water and glycol.

rect positioning of some components). This phenomenon can trigger corrosion processes and subsequent drilling of the heat exchanger and pipes.

Water characteristics

System: Chiller with plate heat exchanger	
PH	7,5 - 9
Total hardness	4,5 - 8,5 °dH
Electric conductivity	10-500 µS /cm
Temperature	< 65 °C
Oxygen content	< 0,1 ppm
Max. glycol amount	50 %
Phosphates (PO ₄)	< 2ppm
Manganese (Mn)	< 0,05 ppm
Iron (Fe)	< 0,2 ppm
Alkalinity (HCO ₃)	70 - 300 ppm
Chloride ions (Cl-)	< 50 ppm
Free chlorine	< 0,5 ppm
Sulphate ions (SO ₄)	< 50 ppm
Sulphide ion (S)	None
Ammonium ions (NH ₄)	None
Silica (SiO ₂)	< 30 ppm

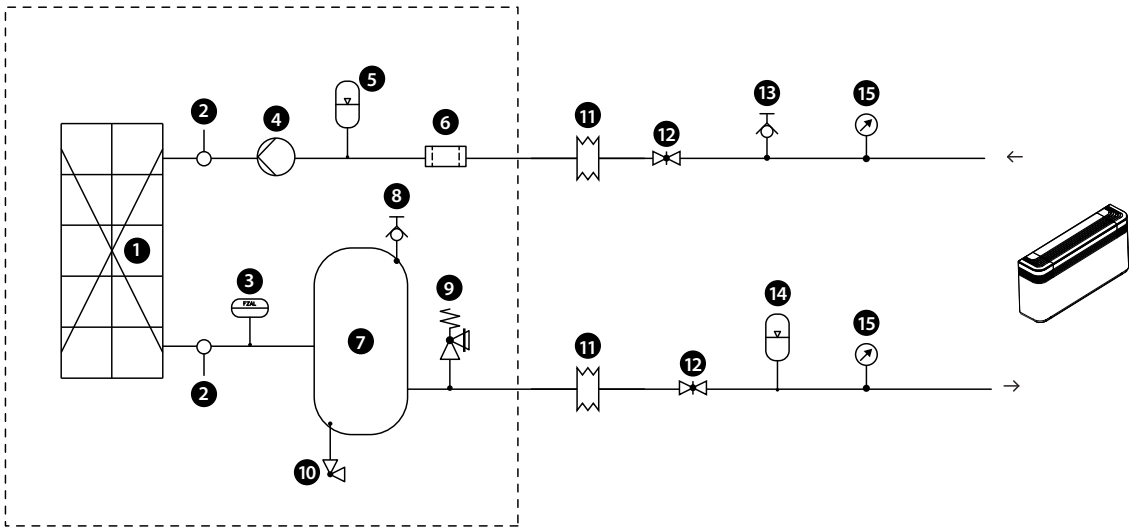
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It is of fundamental importance to keep the oxygen concentration in the water under control, especially in open vessel systems. This type of system, in fact, is very sensitive to the phenomenon of extra-oxygenation of the water (an event that can be encouraged by the incor-

INTERNAL AND EXTERNAL HYDRAULIC CIRCUIT WITH ANL HA



Water filter: Installation in the immediate vicinity of the heat exchanger is mandatory,.



Components as standard

- 1 Plate heat exchanger
- 2 Water temperature sensors (IN/OUT)
- 3 Flow switch
- 4 Pump
- 5 Expansion vessel
- 6 Water filter
- 7 Storage tank
- 8 Air drain valve
- 9 Pressure relief valve
- 10 Drain valve

Components not provided and responsibility of the installer

- 11 Anti-vibration joints
- 12 Flow shut-off valves
- 13 Air drain valve
- 14 Expansion vessel
- 15 Pressure gauge

* ATTENTION: Flooded heat exchanger inside the storage tank

Do not fill up the hydraulic system by glycol near the suction of the pump. High concentration of glycol could stuck the pump. Do not use the pump to mix water and glycol.

Water characteristics

System: Chiller with plate heat exchanger	
PH	7,5 - 9
Total hardness	4,5 - 8,5 °dH
Electric conductivity	10-500 µS /cm
Temperature	< 65 °C
Oxygen content	< 0,1 ppm
Max. glycol amount	50 %
Phosphates (PO ₄)	< 2ppm
Manganese (Mn)	< 0,05 ppm
Iron (Fe)	< 0,2 ppm
Alkalinity (HCO ₃)	70 - 300 ppm
Chloride ions (Cl ⁻)	< 50 ppm
Free chlorine	< 0,5 ppm
Sulphate ions (SO ₄)	< 50 ppm
Sulphide ion (S)	None
Ammonium ions (NH ₄)	None
Silica (SiO ₂)	< 30 ppm

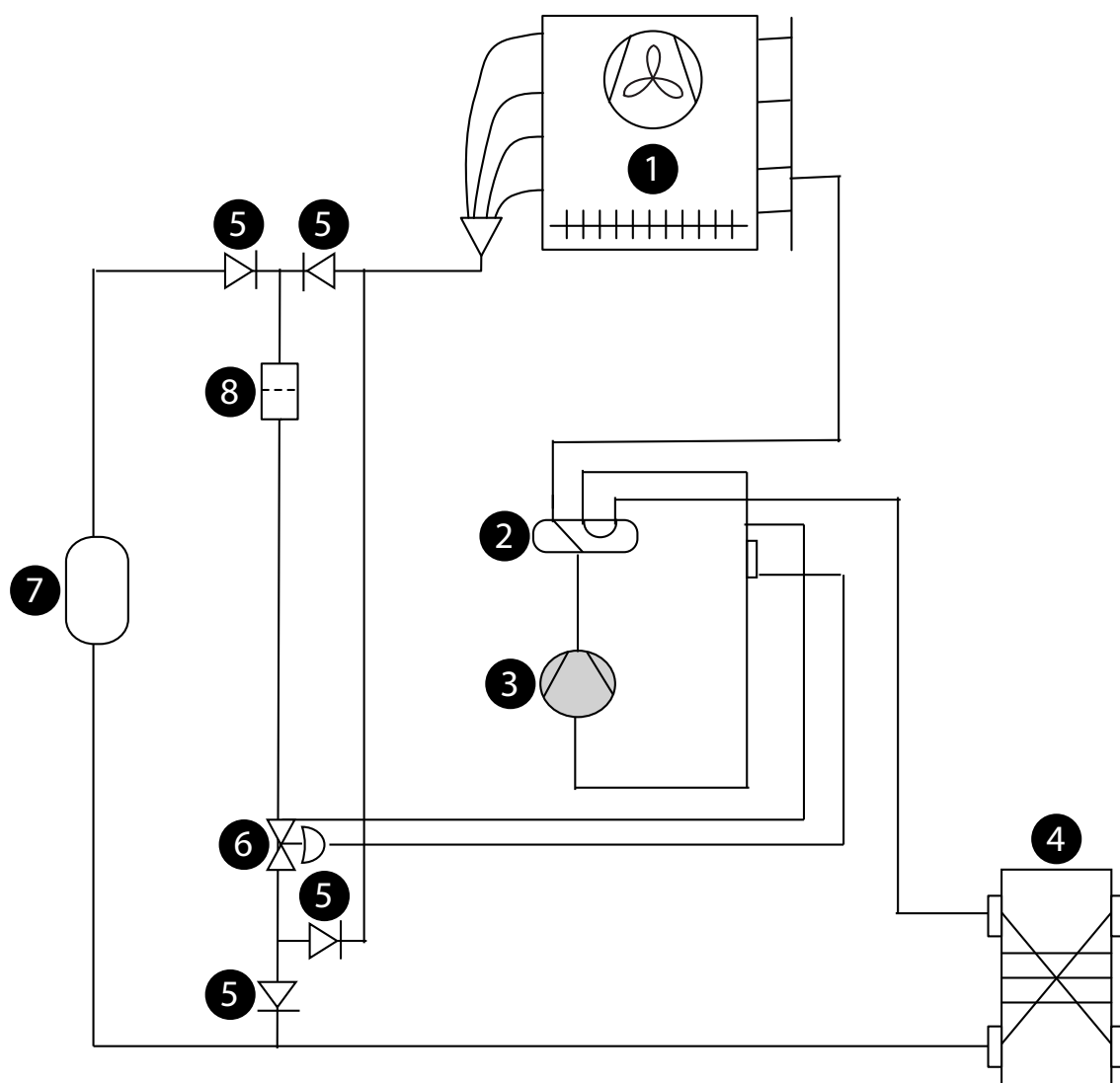


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It is of fundamental importance to keep the oxygen concentration in the water under control, especially in open vessel systems. This type of system, in fact, is very sensitive to the phenomenon of extra-oxygenation of the water (an event that can be encouraged by the incorrect positioning of some components). This phenomenon can trigger corrosion processes and subsequent drilling of the heat exchanger and pipes.

5 MAIN COOLING REFRIGERANT LAYOUTS



- | | | | | | |
|---|-----------------|---|-----------------------------|---|--------------------|
| 1 | Finned coil | 4 | Plate heat exchanger | 7 | Liquid accumulator |
| 2 | Reversing valve | 5 | One-way valve | 8 | Filter drier |
| 3 | Compressor | 6 | Mechanic thermostatic valve | | |

6 ACCESSORIES

AERBAC-MODU: Ethernet communication Interface for protocols Bacnet/IP, Modbus TCP/IP, SNMP
DCPX: Device for condensation temperature control, with continuous speed modulation of fans by using a pressure transducer.
MODU-485BL: RS-485 interface for supervision systems with MODBUS protocol.
PR3: Simplified remote panel. This makes it possible to carry out the unit's basic controls with the signalling of alarms. Can be made remote with shielded cable up to 150 m.
VT: Antivibration supports

FACTORY FITTED ACCESSORIES

VT: Antivibration supports

■ *Compatibility with VMF system: for more information about the system, refer to the dedicated documentation.*

ACCESSORIES COMPATIBILITY

Model	Ver	100	150
AERBAC-MODU	°A,P	•	•
DCPX	°A,P	•	•
MODU-485BL	°A,P	•	•
PR3	°A,P	•	•

VT: Antivibration

Ver	100	150
°P	VT... (1)	VT... (1)
A	VT15	VT15

(1) Contact us.

7 SELECTION CRITERIA OF THE HEAT EXCHANGERS ACCORDING TO THE PLACE OF INSTALLATION OF THE UNIT

The guide provides advice for applications. Although recommendations are given, all the details about the real world application of our products cannot be fully covered in this document.

For these reasons, this section contains the basic warnings and precautions to be taken into account in general, it being understood that:

- **The final choice of the type of exchanger according to the place of installation is left to the client (or to the professional appointed by him).**
- **In any case, it is recommended to wash the coils with adequate frequency (a maximum time interval of three months is recommended, shorter in conditions of particularly dirty and aggressive atmospheres) to preserve their condition and ensure the proper functioning of the unit.**

Potentially corrosive outdoor environments include areas near coasts, industrial sites, densely populated urban areas, certain rural areas or a combination of these environments. Other factors, including the presence of effluent gas, sewage vents or open sewage systems and the exhaust of diesel engines can all be harmful for the microchannel coil.

The purpose of this application guide is to provide general information on the mechanisms of corrosion and corrosive environments.

SEA COAST ENVIRONMENTS

Coastal or marine environments are characterized by the abundance of sodium chloride (salt) which is carried by sea spray, mist, or fog. Most importantly, this salt water can be carried more than several miles by ocean breezes and tidal currents. It's not uncommon to experience salt-water contamination as far as 10km from the coast.

For this reason, it may be necessary to protect the exchangers from electrolytes of marine origin through the appropriate choice of materials and / or appropriate protective treatment.

INDUSTRIAL ENVIRONMENTS

Industrial applications are associated with several different conditions that can potentially produce a variety of atmospheric emissions.

Contaminants from sulphur and nitrogen oxides are most often linked to high-density urban environments. The combustion of coal oils and fuel oils releases sulphur oxides (SO₂, SO₃) and nitrogen oxides (NO_x) into the atmosphere. These gases accumulate in the atmosphere and return to the ground as acid rain or low pH dew.

Industrial emissions are not only potentially corrosive: many industrial dust particles can be loaded with harmful components such as metal oxides, chlorides, sulphates, sulfuric acid, carbon and carbon compounds.

In the presence of oxygen, water or high humidity environments, these particles can be extremely corrosive and in several forms, including general and localised corrosion, such as pitting and anthill.

MIX OF SEASIDE AND INDUSTRIAL ENVIRONMENTS

Sea mist loaded with salt, associated with the harmful emissions of an industrial environment, poses a serious risk.

The combined effects of the salt loaded mist and industrial emissions accelerate corrosion.

Within the manufacturing plants, corrosive gas may result from the processing of chemicals or by the typical industrial processes used in manufacturing.

Potential sources of risk to be considered are open sewage systems, exhaust vents, diesel engine exhaust, emissions from heavy traffic, landfills, aircraft and ocean-go-

ing ship engine exhaust, industrial production, chemical treatment facilities (cooling towers in the vicinity) and fossil fuel power plants.

URBAN ENVIRONMENTS

Densely populated areas generally have high levels of emissions of motor vehicles and increases in use for heating buildings.

Both conditions elevate sulfur oxide (SO_x) and nitrogen oxide (NO_x) concentrations. Corrosive atmospheres may even occur in some closed areas, such as facilities with swimming pools and water treatment systems.

It is advisable to pay particular attention to the positioning of the units if it occurs in the immediate vicinity of these places, and to avoid that they are installed in the vicinity of outlets for the expulsion of air coming from them, or in any case exposed to such atmospheres.

Corrosion severity in this environment is a function of the pollution levels, which in turn depend on several factors including population density in the area.

Any equipment installed in locations immediately adjacent to diesel engine exhausts, incinerator flues, fuel-fired boiler flues, or areas exposed to fossil fuel emissions shall be considered subject to the same measures as an industrial application.

RURAL ENVIRONMENTS

Rural environments may contain high levels of pollution from ammonia and nitrogen products from animal excrements, fertilizers and high concentration of diesel engine exhaust. The approach to these environments must be entirely similar to that of industrial environments.

Local weather conditions have a major role in the concentration or dispersion of outdoor gaseous contaminants.

Thermal inversions can trap pollutants, thereby producing serious air pollution problems.

ADDITIONAL TIPS

Although each of the above corrosive environments can be detrimental to the life of the heat exchanger, several additional factors must be considered before choosing the final design.

The local climate surrounding the site of application may be influenced by the presence of:

- wind
- dust
- road salts
- swimming pools
- diesel engines discharge / traffic
- Localised mist
- cleaning agents for domestic use
- Sewage system outlets
- many other separate contaminants

Even within 3-5 km from these particular local climates a normal environment with moderate characteristics can be classified as an environment that requires preventive corrosion measures. When these factors are directly and immediately part of the environment, their influence is further aggravating.

Only in the absence of potentially risky situations such as those indicated above can an environment be considered moderate.

Application	Tip
Severe environments	Coils with suitable protection
Moderate environments	Standard coil °

8 PERFORMANCE SPECIFICATIONS

ANL (°)

Size		100	150
Cooling performance 54.0 °F / 44.1 °F (1)			
Cooling capacity	ton	6.57	8.16
Input power	kW	8.24	9.48
Cooling total input current	A	17.0	20.0
EER	BTU/(Wh)	2.80	3.03
IPLV	BTU/(Wh)	4.80	5.19
Water flow rate system side	gpm	15.72	19.52
Pressure drop system side	ftH ₂ O	10.04	10.04
Heating performance 104 °F / 113 °F (2)			
Heating capacity	BTU/h	94,755	111,850
Input power	kW	8.29	9.57
Heating total input current	A	17.0	20.0
COP	kW/kW	3.350	3.430
Water flow rate system side	gpm	19.11	22.56
Pressure drop system side	ftH ₂ O	14.72	12.04

(1) Data: System side water heat exchanger 54.0 °F / 44.1 °F; External air 95 °F
(2) Data: System side water heat exchanger 104 °F / 113 °F; External air 44.6 °F

ANL - (A)

Size		100	150
Cooling performance 54.0 °F / 44.1 °F (1)			
Cooling capacity	ton	6.57	8.16
Input power	kW	8.72	10.34
Cooling total input current	A	18.0	21.0
EER	BTU/(Wh)	2.65	2.77
IPLV	BTU/(Wh)	-	-
Water flow rate system side	gpm	15.72	19.52
Useful head system side	ftH ₂ O	33.8	44.2
Heating performance 104 °F / 113 °F (2)			
Heating capacity	BTU/h	94,755	111,850
Input power	kW	8.80	10.48
Heating total input current	A	18.0	21.0
COP	kW/kW	3.150	3.130
Water flow rate system side	gpm	19.11	22.56
Useful head system side	ftH ₂ O	24.1	34.5

(1) Data: System side water heat exchanger 54.0 °F / 44.1 °F; External air 95 °F
(2) Data: System side water heat exchanger 104 °F / 113 °F; External air 44.6 °F

ANL - (P)

Size		100	150
Cooling performance 54.0 °F / 44.1 °F (1)			
Cooling capacity	ton	6.57	8.16
Input power	kW	8.72	10.34
Cooling total input current	A	18.0	21.0
EER	BTU/(Wh)	2.65	2.77
IPLV	BTU/(Wh)	-	-
Water flow rate system side	gpm	15.72	19.52
Useful head system side	ftH ₂ O	33.8	44.2
Heating performance 104 °F / 113 °F (2)			
Heating capacity	BTU/h	94,755	111,850
Input power	kW	8.80	10.48
Heating total input current	A	18.0	21.0
COP	kW/kW	3.150	3.130
Water flow rate system side	gpm	19.11	22.56
Useful head system side	ftH ₂ O	24.1	34.5

(1) Data: System side water heat exchanger 54.0 °F / 44.1 °F; External air 95 °F
(2) Data: System side water heat exchanger 104 °F / 113 °F; External air 44.6 °F

8.1 ENERGY DATA

Size			100	150
Part load IPLV				
100 %	°A,P	BTU/(Wh)	4.80	5.19

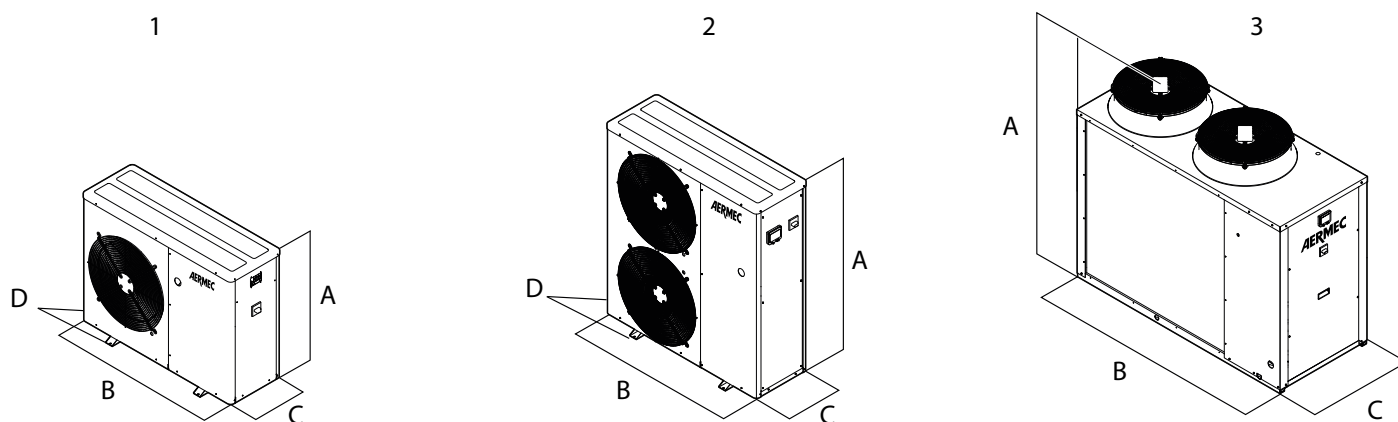
9 GENERAL TECHNICAL DATA

Size			100	150
Compressor				
Type	°A,P	type	Scroll	Scroll
Compressor regulation	°A,P	Type	On-Off	On-Off
Number	°A,P	no.	2	2
Circuits	°A,P	no.	1	1
Refrigerant	°A,P	type	R410A	R410A
Refrigerant charge (1)	°A,P	lbs	28.0	35.3
Total oil charge	°A,P	lbs	3.5	3.5
System side heat exchanger				
Type	°A,P	type	Brazed plate	Brazed plate
Number	°A,P	no.	1	1
Hydraulic connections				
Connections (in/out)	°A,P	Type	Gas - F	Gas - F
Sizes (in/out)	°A,P	Ø	1"1/4	1"1/4
Fan				
Type	°A,P	type	Axial	Axial
Fan motor	°A,P	type	Asynchronous	Asynchronous
Number	°A,P	no.	2	2
Air flow rate	°A,P	cfm	8,240.1	7,945.8
Sound data calculated in cooling mode (2)				
Sound power level	°A,P	dB(A)	76.0	77.0
Sound pressure level (10 m / 33 ft)	°A,P	dB(A)	44.0	45.0
Sound pressure level (1 m / 3.3 ft)	°A,P	dB(A)	59.0	60.0

(1) The load indicated in the table is an estimated and preliminary value. The final value of the refrigerant load is indicated on the unit's technical label. For further information contact the office.

(2) Sound power calculated on the basis of measurements made in accordance with UNI EN ISO 9614-2. Sound pressure (cold functioning) measured in free field, 10 m / 33 ft away from the unit external surface (in compliance with UNI EN ISO 3744).

DIMENSIONS AND WEIGHTS



Size			100	150
Dimensions and weights				
A	°A,P	in	57.1	57.1
B	°A,P	in	29.5	29.5
C	°A,P	in	68.9	68.9
Empty weight	°	lbs	650	710
	A	lbs	800	866
	P	lbs	690	756

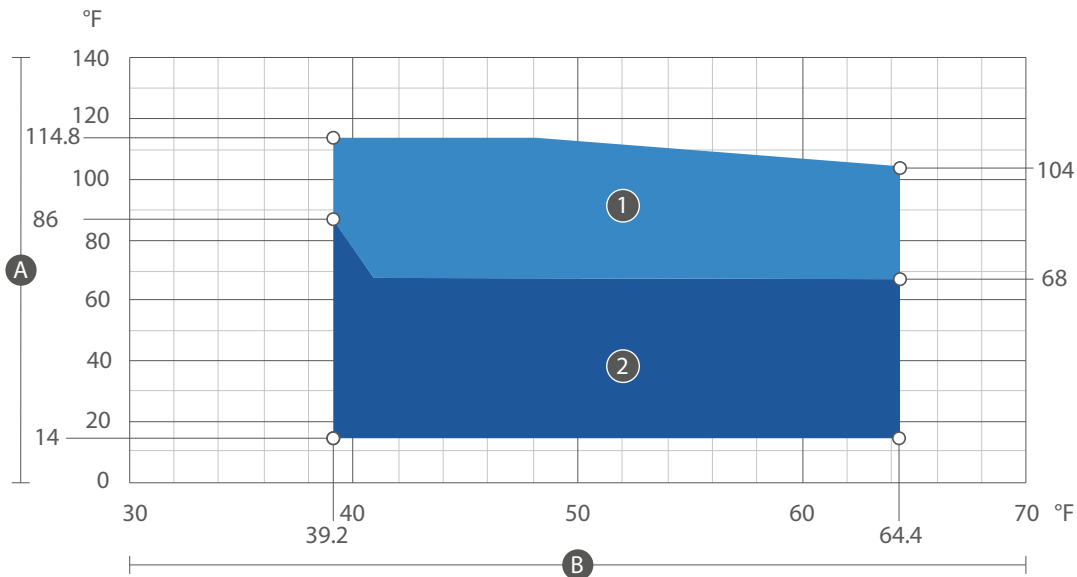
10 OPERATING LIMITS

In their standard configuration, the units are not suitable for installation in salty environments.
The values indicated in the table refer to the min. and max. limits of the unit.
If the unit operates beyond the operational limits, we recommend you first contact our technical-sales service.

■ If the unit is installed in particularly windy locations the provision of wind barriers may be necessary to avoid malfunctions. It should be installed if wind speed is above 4.9 knot.

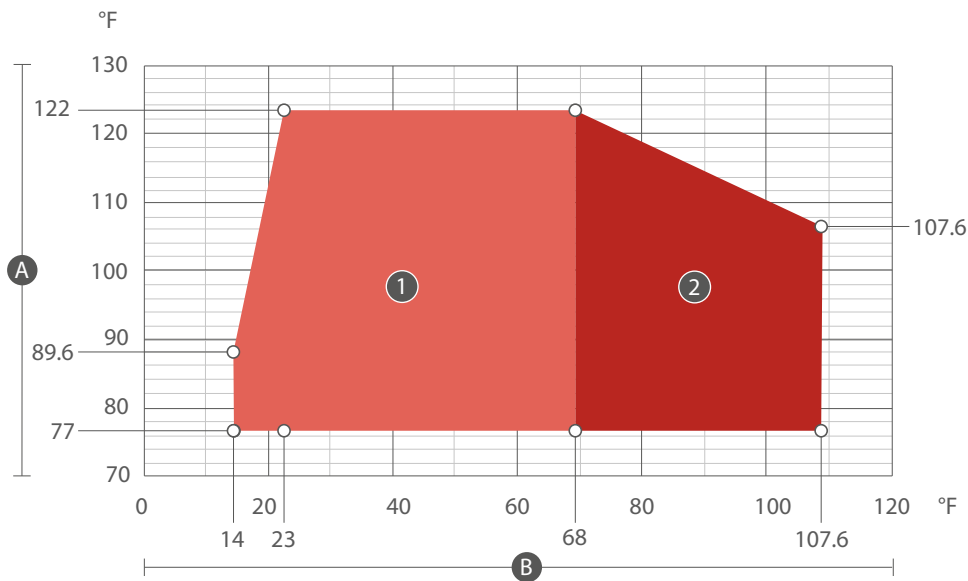
WARNING: Under no circumstances does the unit have to be operated outside the operating limit under penalty of the warranty expiration. Aermec S.p.A. cannot be held responsible for any malfunction of the units which are operated outside the established limits and for their consequences.

COOLING MODE



Key A External air temperature (°F) B Water produced temperature (°F) 1 Standard mode 2 DCPX Functioning (accessory)

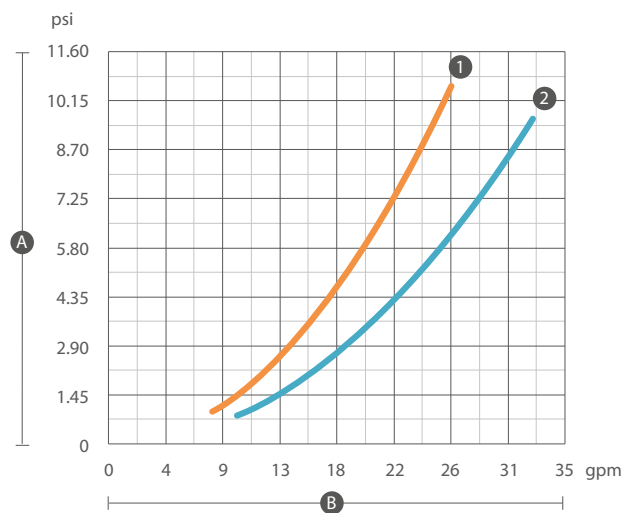
HEATING MODE RANGE



Key A Water produced temperature (°F) B External air temperature (°F) 1 Standard mode 2 DCPX Functioning (accessory)

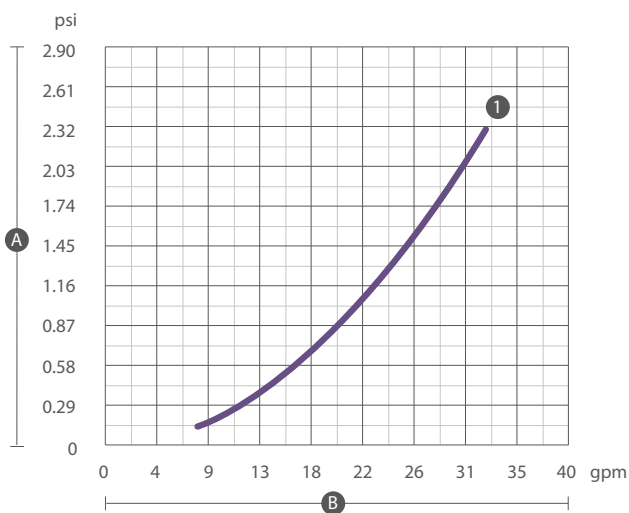
11 PRESSURE DROPS

COOLING ONLY



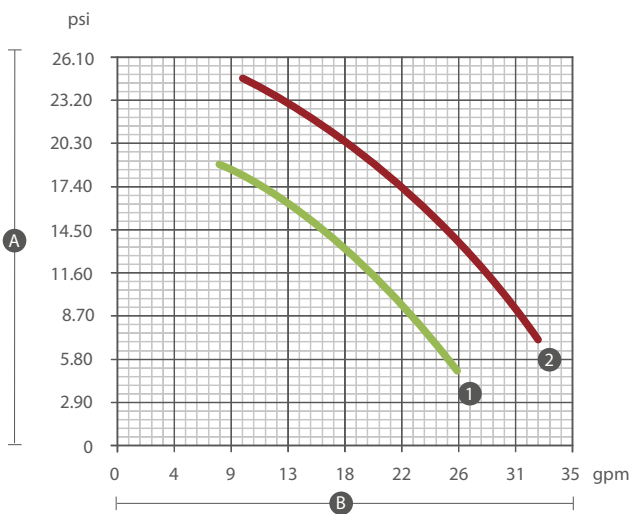
- Key:**
- A Pressure drops (psi)
 - B Water flow rate (gpm)
 - 1 ANL 100
 - 2 ANL 150

WATER FILTER - PRESSURE DROP



- Key:**
- A Pressure drops (psi)
 - B Water flow rate (gpm)
 - 1 Size 1" 1/2

11.1 USEFUL HEAD



- Key:**
- A Pressure drops (psi)
 - B Water flow rate (gpm)
 - 1 ANL 100
 - 2 ANL 150

12 SYSTEM WATER CONTENT

MINIMUM SYSTEM WATER CONTENT

For correct unit operation, there must be a suitable amount of water in the system. A sufficient quantity of water not only ensures machine stability, but also helps avoid a high number of hourly compressor start-ups.

To calculate it, use the formula: Unit rated cooling capacity (ton) x table value (gal/ton) = Minimum system content (gal).

Size		100	150
Minimum system water content			
Minimum water content for air conditioning	°A,P	gal/ton	3.7

Note: the water content referred to in the tables corresponds to the amount of water effectively useful for inertial purposes; this value does not necessarily coincide with the entire system water content, and must be calculated on the basis of the system layout and operating modes.

A example is given below, but it does not cover a possible situation.

Example: for a chiller/heat pump equipped with a primary and a secondary circuit, and in which the zone pumps of the secondary circuit could (even occasionally) be turned off, only the water content of the primary circuit has value of useful water content for the counting purposes.

If you are in any doubt, please refer to the relevant technical documentation or contact the AERMEC Technical-Commercial Service.



NOTICE: Under no circumstances does the unit have to be operated when water flow rate on the heat exchanger is below the minimum water flow rate or above the maximum water flow rate, under penalty of the warranty expiration. Aermec cannot be held responsible for any malfunction of the units which are operated outside the established limits of water flow rate and for their consequences



NOTICE: Under no circumstances does the unit have to be operated in a system in which the content of the water circulating is below the MINIMUM SYSTEM WATER CONTENT, under penalty of the warranty expiration. Aermec cannot be held responsible for any malfunction of the units which are operated in a system in which the content of the water circulating is below the MINIMUM SYSTEM WATER CONTENT and for their consequences



NOTICE: in the case of several units connected in parallel, the designer must ensure that the configuration of the system and the management logic adopted do not cause too frequent START/STOP cycles and / or sudden changes in the water flow rate of the groups in operation



ATTENTION It is recommended to design systems with high water content (minimum recommended values shown in tab), in order to limit:

- Number of peaks made by the compressors
- The reduction of water temperature during defrosting cycles in the winter period for heat pumps.



NOTICE: in the case of several units connected in parallel, the designer must ensure that the configuration of the system and the management logic adopted do not cause too frequent START/STOP cycles and / or sudden changes in the water flow rate of the groups in operation

MAXIMUM SYSTEM WATER CONTENT

Units with the hydronic kit mounted come standard with the expansion vessel set at 21.8 psi, the pressure relief valve and the water filter mounted.

The maximum system water content depends on the capacity of the expansion vessel and on the calibration of the pressure relief valve.

Size		100	150
Hydronic kit			
Expansion vessel number	° A,P	no. no.	1
Storage tank number	° A,P	no. no.	1
Storage tank capacity	° A	gal gal	- 26.4
Pressure relief valve	° A,P	n°/psi	1/87

The table gives an example of the maximum water content calculated at the indicated operating conditions and only to protect the unit.

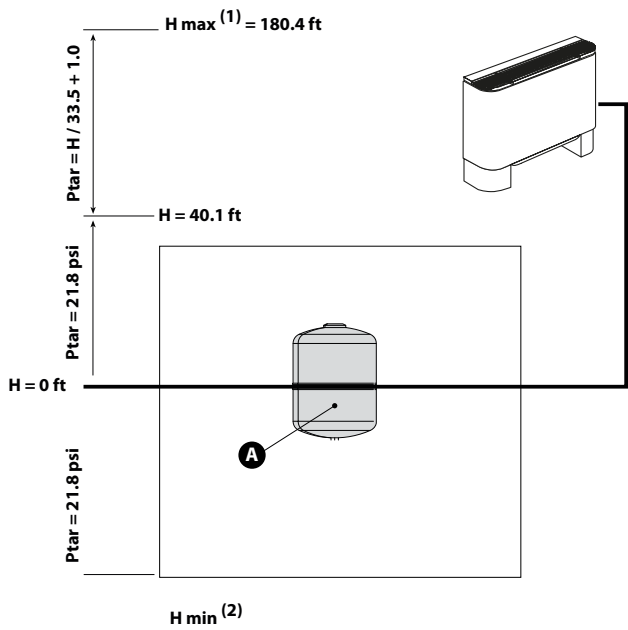
If the volume of water in the system is higher, add another expansion vessel of the correct size.

System water temperature max/min	°F	104 / 39.2				
Hydraulic height	ft	98.4	82.00	65.6	49.2	40.1
Expansion vessel pre-load	psi	46.4	40.6	33.3	26.1	21.7
Water content maximum	gal	574.3	698.9	823.6	948.3	1017.5
System water temperature max/min	°F	140 / 39.2				
Expansion vessel pre-load	psi	46.4	40.6	33.3	26.1	21.7
Water content maximum	gal	258.3	314.3	370.8	426.9	457.5

The data in the table refer to units with a 6.3 gal. expansion vessel.

EXPANSION VESSEL SETTING

The expansion tank volume is 6.3 gal. The standard value of the expansion tank pre-charge pressure is 21.8 psi, but this can be calibrated up to a maximum of 87.0 psi. The expansion tank pressure setting has to be adjusted based on the difference in height (H) of the installation (see figure) according to the formula: $p \text{ (rating) [psi]} = H \text{ [ft]} / 10,2 + 0,3$. For example: if level difference H is equal to 65.6 ft, the calibration value of the vessel will be 33.4 psi. If the calculated pressure setting value is less than 21.8 psi (when $H < 12.25$), maintain the standard pressure setting.



- Key
- A Expansion vessel
 - 1 Check that highest utility is not higher than 180.4 ft
 - 2 Ensure that lowest utility can withstand global pressure in that position

13 CORRECTION FACTORS

CORRECTIVE FACTORS FOR AVERAGE WATER TEMPERATURES DIFFERENT FROM NOMINAL VALUES

The pressure drops are calculated with an average water temperature of 50.0 °F (Cooling mode), 109.4 °F (Heating or recovery mode)

System side heat exchanger															
		Cooling mode								Heating mode or recovery					
Average water temperatures	°F	41.0	50.0	59.0	68.0	86.0	104.0	122.0	73.4	82.4	91.4	100.4	109.4	118.4	127.4
Correction factor		1.02	1.00	0.98	0.97	0.95	0.93	0.91	1.04	1.03	1.02	1.01	1.00	0.99	0.98

FOULING: DEPOSIT CORRECTIVE FACTORS [K*M²]/[W]

	0,0	0,00005	0,0001	0,0002
Corrective factor of cooling capacity	1,0	1	0.98	0.94
Corrective factor of imput power	1,0	1	0.98	0.95

14 GLYCOL

ETHYLENE GLYCOL

Cooling mode

CORRECTION FACTOR WITH ETHYLENE GLYCOL - COOLING MODE											
Freezing Point	°F	0	25.47	21.02	15.93	10.20	3.67	-3.89	-12.62	-22.79	-34.78
Percent ethylene glycol	%	0	10	15	20	25	30	35	40	45	50
Qwc	—	1.000	1.033	1.040	1.049	1.060	1.072	1.086	1.102	1.120	1.141
Pc	—	1.000	0.990	0.985	0.980	0.975	0.970	0.965	0.960	0.955	0.950
Pa	—	1.000	0.996	0.994	0.992	0.990	0.988	0.986	0.984	0.982	0.980
Δp	—	1.000	1.109	1.157	1.209	1.268	1.336	1.414	1.505	1.609	1.728

Heating mode range

CORRECTION FACTOR WITH ETHYLENE GLYCOL - HEATING MODE											
Freezing Point	°F	0	25.47	21.02	15.93	10.20	3.67	-3.89	-12.62	-22.79	-34.78
Percent ethylene glycol	%	0	10	15	20	25	30	35	40	45	50
Qwh	—	1.000	1.027	1.038	1.050	1.063	1.078	1.095	1.114	1.135	1.158
Ph	—	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Pa	—	1.000	1.002	1.003	1.004	1.005	1.007	1.008	1.010	1.012	1.015
Δp	—	1.000	1.087	1.128	1.175	1.227	1.286	1.353	1.428	1.514	1.610

PROPYLENE GLYCOL

Cooling mode

CORRECTION FACTOR WITH PROPYLENE GLYCOL - COOLING MODE											
Freezing Point	°F	0	25.83	22.46	18.61	14.04	8.46	1.65	-6.65	-16.67	-28.70
Percent propilene glycol	%	0	10	15	20	25	30	35	40	45	50
Qwc	—	1.000	1.007	1.006	1.007	1.010	1.015	1.022	1.032	1.044	1.058
Pc	—	1.000	0.985	0.978	0.970	0.963	0.955	0.947	0.939	0.932	0.924
Pa	—	1.000	0.996	0.994	0.992	0.990	0.988	0.986	0.984	0.982	0.980
Δp	—	1.000	1.082	1.102	1.143	1.201	1.271	1.351	1.435	1.520	1.602

Heating mode range

CORRECTION FACTOR WITH PROPYLENE GLYCOL - HEATING MODE											
Freezing Point	°F	0	25.83	22.46	18.61	14.04	8.46	1.65	-6.65	-16.67	-28.70
Percent propilene glycol	%	0	10	15	20	25	30	35	40	45	50
Qwh	—	1.000	1.008	1.014	1.021	1.030	1.042	1.055	1.071	1.090	1.112
Ph	—	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Pa	—	1.000	1.003	1.004	1.005	1.007	1.009	1.011	1.014	1.018	1.023
Δp	—	1.000	1.050	1.077	1.111	1.153	1.202	1.258	1.321	1.390	1.467

■ Attention: Avoid adding the glycol in the hydraulic circuit near the pump intake. A high concentration of glycol and additives above the permissible limits can block the pump: do not use the pump as a mixer.

15 SOUND DATA

Size			100	150
Sound data calculated in cooling mode (1)				
Sound power level	°A,P	dB(A)	76,0	77,0
Sound pressure level (10 m / 33 ft)	°A,P	dB(A)	44,0	45,0
Sound pressure level (1 m / 3.3 ft)	°A,P	dB(A)	59,0	60,0
Sound power by centre octave band dB(A)				
125 Hz	°A,P	dB(A)	61,2	62,4
250 Hz	°A,P	dB(A)	66,0	67,3
500 Hz	°A,P	dB(A)	71,4	72,2
1000 Hz	°A,P	dB(A)	72,0	72,7
2000 Hz	°A,P	dB(A)	68,9	69,7
4000 Hz	°A,P	dB(A)	60,5	61,5
8000 Hz	°A,P	dB(A)	48,6	49,6

(1) Sound power calculated on the basis of measurements made in accordance with UNI EN ISO 9614-2. Sound pressure (cold functioning) measured in free field, 10 m / 33 ft away from the unit external surface (in compliance with UNI EN ISO 3744).

Data 14511:2018

System water temperature 53.6/44.6 (in/out)

External air temperature 95.0 °F

Standard fans

Note

For operating conditions different to those declared refer to the selection program Magellano, available on www.aermec.com

16 GENERAL WARNINGS

INTRODUCTION

The unit you have purchased is a complex machine. During installation, operation, maintenance and repair, people and property can be exposed to risks caused by certain conditions or components such as, but not limited to, refrigerant gas, oils, moving parts, pressures, sources of heat, electrical voltage.

This manual provides information about the standard functions and procedures of all units in the series and is an important support document for qualified personnel, but does not replace them.

Before proceeding with the installation and start-up of the unit, carefully read this manual and all of its notes marked with the following symbols, which indicate the various levels of hazard or situations that are potentially hazardous to prevent malfunctioning or physical damage to property or personal injury:



HAZARD indicates a situation of imminent danger: if it is not observed, it can cause death or serious injuries, it is mandatory to carefully follow the listed measures.



WARNINGS indicate a potentially dangerous situation: which if not avoided could cause serious or fatal injuries. Pay close attention while working



WARNING indicates a potentially dangerous situation that, if not avoided, could lead to slight or moderate injuries or damage to property



INFORMATION this points out that a potentially harmful situation could occur that, if not avoided, could cause property damage



IMPORTANT additional information on how to use the product

The manual contains important indications for commissioning the unit as well as fundamental instructions in order to prevent personal injuries or damage to the machine during its operation. Finally, to also guarantee that it will operate perfectly, maintenance instructions are provided.

The unit must be installed by specialised technicians in compliance with current laws in the country of installation. The unit must also be started up by authorised and trained personnel, and all activities must be carried out in compliance with and in observance of all the local standards and laws, and all work on the system must be performed in a workmanlike manner.



Even though our unit is equipped with numerous safety and protection devices and has been tested in the factory, maximum attention must be paid when working on it, observing the precautions against residual risks.

GENERAL WARNINGS



ATTENTION:

- The machine must be transported in compliance with the laws in force in the country of destination, considering the characteristics of the fluids it contains and their characterisation. Incorrect transport could cause machine damage, which would also generate refrigerant leaks. Before the first start-up, it is necessary to search for any leaks using suitable personal protective equipment;
- When the product is received, check the condition and completeness of the supply and, if it does not match what was ordered, contact the agency that sold the equipment;
- The product is intended to be used for the purpose indicated by Aermec and for which it was expressly designed. Aermec shall not be contractually or non-contractually liable for any damage to people, animals or objects, installation, adjustment and maintenance errors or incorrect use;
- During installation and/or maintenance operations, remember that they must be performed by qualified and prepared personnel and it is required to wear protective devices (gloves, eye protection, helmet, ...) that are suitable for the operations to be performed: do not wear clothing or accessories that can get caught or be sucked in by the air flows; collect and tie up hair before accessing the inside of the unit, Aermec shall not be held liable for the failure to observe the safety and accident prevention regulations in force;



Personal protective equipment (PPE) (1)

Operations

	Handling	Installation and/or maintenance	Welding or brazing
Safety gloves, helmet, goggles, safety footwear, protective garments.	•	•	•
Earmuffs		•	•

(1) It is recommended to follow the instructions in EN 378-3.

- Observe the laws in force in the country of unit installation that concern use and disposal of the packaging, the products used for cleaning and maintenance, and for managing the end of the unit's service life;
- Repair and maintenance work must be performed by Aermec Technical Service. Do not modify or tamper with the unit as dangerous situations may be created and the equipment manufacturer will not be liable for any damage caused;
- In the case of abnormal operation, or if liquids leak, move the main switch for the system to "off" and close the interception taps. Call the local Aermec Technical Service and do not work on the equipment personally;
- The unit must be installed in structures that are protected against atmospheric discharges, as required by applicable laws and technical standards;
- The equipment contains refrigerant gas: proceed carefully to prevent damaging the gas circuit or the finned coil;
- Based on EU regulation 517/2014 concerning certain fluorinated greenhouse gases, it is mandatory to indicate the total quantity of refrigerant contained in the installed system. This value is indicated on the rating plate on the unit;
- This unit contains fluorinated greenhouse gases covered by the Kyoto Protocol. Maintenance and disposal operations must be only carried out by qualified personnel;
- This manual is an integral part of the unit and as a result it must be stored carefully and must always accompany it, even if transferred to another owner or user, or if transferred to another plant. If damaged or lost, a copy can be downloaded from our website www.aermec.com
- The overall fire risk assessment at the place of installation (i.e. fire load calculation) is the responsibility of the user.
- Perform the plant connections following the indications provided in this manual.



IT IS FORBIDDEN TO:

- It is not permitted to walk on the machine or to place other items on it: no part of the unit may be used as a walkway or support for goods or people. Periodically check and repair or, if necessary, replace any component or pipe that shows signs of damage. Use a platform, or suitable scaffolding to work at higher levels;
- Remove the protections from mobile elements while the unit is running;
- Touch the moving parts, stand between them or insert pointed objects through the grids.
- Any technical intervention or cleaning operation before having disconnected the appliance from the mains electric power supply: by positioning the system master switch and the main device switch at "OFF".
- Modify the safety or regulation devices. The devices must be replaced by the After-sales Technical Service Aermec, using only original components.
- Pull, detach or twist the electrical cables coming out of the unit even if it is disconnected from the mains electric power supply;
- To dispose of the packaging material in the environment or leave it within reach of children: as it may be a potential source of danger. Therefore it must be disposed of according to what is defined by current laws.

ESSENTIAL SAFETY RULES

Any technical intervention must be performed by qualified and authorised personnel. The personnel performing the work must have been trained and be familiar with this type of product and its installation.

The machine must only be employed for the use for which it was made; any other use can be dangerous and void the warranty;

It is not permitted to walk on the machine or to place other items on it. No part of the unit may be used as a walkway or support for goods or people. Periodically

check and repair or, if necessary, replace any component or pipe that shows signs of damage. Use a platform, or suitable scaffolding to work at higher levels.

All the precautions concerning the handling of refrigerant must be observed in accordance with current regulations.

The overall fire risk assessment at the place of installation (i.e. fire load calculation) is the responsibility of the user;

Keep fire extinguishers near the machine suitable for putting out fires on electrical equipment and, for lubricant oil of the compressor and the refrigerant;

PRECAUTIONS CONCERNING THE HYDRAULIC CIRCUIT

Perform the plant connections following the indications provided in the manual:

- **It is necessary to install a water filter and a flow switch on the heat exchangers, otherwise the warranty shall be void;**
- **During commissioning, it is mandatory to carry out a seal test on the air of the hydraulic circuit (minimum pressure 2.5 bar and a search for leakages on every joint - e.g. using leak detector foam or soap + water) before filling it with glycol. This is to avoid the need for corrections due to leaks caused, for example, during the transportation/handling stage (even though the circuit is tested before leaving the Aermec factory);**
- Do not bend or strike pipes containing pressurised fluids. Do not exceed the maximum permissible pressure (PS) of the unit's water circuit;
- Before removing elements along the pressurised water circuits, intercept the concerned section of pipe and release the fluid gradually until the pressure is balanced with the atmospheric pressure;
- 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 liquids to the heat exchangers other than water or its mixtures with ethylene/propylene glycol in concentrations above what is indicated in the technical documentation;

PRECAUTIONS CONCERNING THE ELECTRICAL CIRCUIT

- Perform the plant connections following the indications provided in this manual;
- 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 has components such as integrated inverters, disconnect the power supply and wait at least 15 minutes before accessing it for maintenance operations: the internal components remain energised for this period, generating the risk of electrocution;
- The safety devices must be maintained efficient and periodically checked as prescribed by current regulations;

PRECAUTIONS CONCERNING THE COOLING CIRCUIT

- The overall fire risk assessment at the place of installation (i.e. fire load calculation) is the responsibility of the user;



Warning:
Hot surface



Warning:
Electricity



Warning:
Moving parts



Warning:
Sharp element

Check periodically that the safety labels are in the correct position on the machine, and replace them if necessary.

- Keep fire extinguishers near the machine suitable for putting out fires on electrical equipment and, for lubricant oil of the compressor and the refrigerant;
- The unit contains pressurised refrigerant gas: no operation may be performed on pressurised equipment except during maintenance, which must be performed by skilled and qualified 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;
- An accidental release of refrigerant may cause risk of suffocation due to a lack of oxygen: install the machine in a well ventilated environment in accordance with EN 378-3 and local regulations currently in force. Those who come into contact with the machine must be equipped with a leak detector that is calibrated and validated to reveal any used refrigerant leaks.
- The unit is fitted out with overpressure relief devices (safety valves): in the event that these devices start, the refrigerant gas is released at high temperature and high velocity. Prevent the gas flow from harming people or things;
- Install the unit at a distance enough from the exhaust wells;
- Keep all lubricants in properly marked containers. Do not keep flammable liquids near the plant;

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;
- As this unit is intended only for installation outdoors and in an area with authorised access only, there are no load limits.

WARNINGS

The unit has the following safety labels to indicate the potential risks (placed on potentially hazardous parts or close to them).

- Do not stand under the unit during lifting;

STORAGE

It is possible that the units may not be immediately installed upon receipt. If they are stored for a medium-long period of time, the following procedures are recommended:

- The units cannot be stacked;
- Check for any damage
- 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, put all the supplied items in a dry and clean location so that they can be used in the future.

The minimum and maximum unit storage temperature depends on the type of refrigerant used, see the table. Above this limit, there is a risk of refrigerant leaks through the pressure relief valves.

Maximum storage temperature					
Refrigerant	Type	Class	Min temp. (°F)	Max. temp. (°F)	
R134a	HFC	A1	-4.0 °F	< 122.0 °F	
R410A	HFC	A1	-4.0 °F	< 122.0 °F	
R513A	HFC	A1	-4.0 °F	< 122.0 °F	
R32	HFC	A2L	-4.0 °F	< 122.0 °F	
R1234ze	HFO	A2L	-4.0 °F	< 122.0 °F	

PLACE OF INSTALLATION



All the units in this series are designed to be installed outdoors: on roofs or on the ground in places where there are no obstacles that could reduce the air flow towards the finned heat exchanger coils.

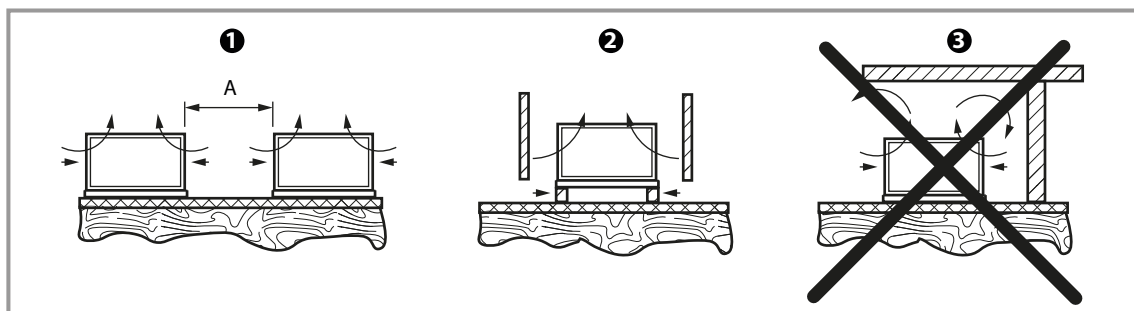
The location of the unit must be defined by the system designer or a person who is an expert in the material and must consider both the purely technical requirements as well as any local laws in force.

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



The following must be avoided

- Positioning in air shafts, holes and/or basement windows;
- Obstacles or barriers that cause the return of the exhaust air;
- Locations with aggressive atmospheres;
- Areas in which the unit's noise level could be amplified due to reverberations or resonance;
- Positioning in corners where there is usually an accumulation of dust, leaves and anything else that could reduce the efficiency of the equipment, obstructing the passage of air;
- That the air expulsion from the equipment can penetrate into living areas through doors or windows;
- That the air expelled by the unit is countered by adverse wind;
- 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 4.9 knot).



1 Side-by-side units;

2 Windbreak barrier **recommended for wind above 4.3 knot;**

3 Installation not permitted;
A. 91 in

POSITIONING

The units must:

- They must be installed in an area that cannot be accessed by the public and/or be protected against access by unauthorised persons, if necessary also install fences;
- Be positioned on a levelled surface that is able to support the weight of the unit with the refrigerant load and complete water, in addition to the occasional presence of 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;
- If the machine is installed in a place potentially subject to snow accumulation or ice formations in the base, it is recommended to install the unit with at least 300 mm above the ground;
- It is recommended to use suitably sized 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 at the base. If necessary, use spacers or level the base, but in any case make sure that the anti-vibration supports are placed flat on the surfaces of the base;
- The use of anti-vibration supports **MUST** be done in combination with the installation of flexible couplings in the unit's water pipes. The anti-vibration supports must be fixed to the unit **BEFORE** being earthed. AERMEC is not responsible for selecting the capacity of the anti-vibration supports;
- Each side of the unit must have space to allow all routine and extraordinary maintenance to be performed, the vertical air exhaust must not be obstructed.

18 MINIMUM TECHNICAL SPACES

For all units, it is fundamental to respect the minimum distances in order to guarantee optimal ventilation to the finned heat exchanger coils to avoid the following:

- The generation of hazardous atmospheres in the case of refrigerant gas leaks;
- Return of hot air;
- Insufficient air flow to the finned heat exchanger coils.



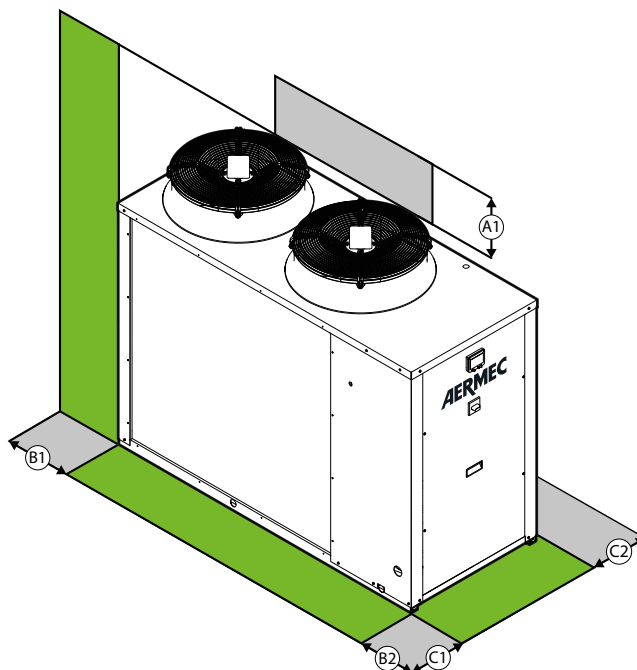
Each side of the unit must have space to allow all routine and extraordinary maintenance to be performed.



The air suction inlet and the vertical air exhaust must not be obstructed.

The following images indicate the minimum required space:

SINGLE INSTALLATION



*** Minimum technical space, to be ensured in order for the chiller to work properly and for possible maintenance.**

■ *The drawings are provided solely as examples.*

VERSION A

Size			100	150
Fan				
Number	°A,P	no.	2	2
Minimum technical spaces				
A1	°A,P	in	118.1	118.1
B1	°A,P	in	31.5	31.5
B2	°A,P	in	43.3	43.3
C1	°A,P	in	31.5	31.5
C2	°A,P	in	31.5	31.5

MULTIPLE INSTALLATION

The minimum distances indicated above guarantee unit operation in the majority of applications. There are however specific situations that involve the installation of multiple units:




A 91 in


B 59 in


19 HYDRAULIC CONNECTIONS


In particular, the unit is intended to be connected:


- to a hydronic system that must be designed to be classified according to EN 378-1 as an indirect ventilated system (ref EN 378-1; 2016, par. 5.5.2.2), as an indirect vented closed system (ref EN 378-1; 2016, par. 5.5.2.3), or as a double indirect system according to EN 378-1 (ref. EN 378-1; 2016, par. 5.5.2.4).
 - The intermediate fluid (water or water-glycol mixture) is in direct communication with the occupied space and a refrigerant leak in the intermediate circuit must be dissipated to the atmosphere outside the occupied space and in an area that is suitably ventilated to prevent the generation of explosive atmospheres.
 - In particular, for a closed system this condition requires installing a properly sized mechanical device in a suitable position of the hydronic circuit for the collection and draining of the refrigerant. If drain and/or safety valves are installed in the unit, they do not in any way replace this device.
 - The automatic air drain must be installed in all the highest points of the hydraulic circuit, outside the building and far from sources of ignition. In order to guarantee that flammable refrigerant will not flow into the environment in the case of leaks, it is recommended to install it with a primary and secondary circuit.
- The units may be available with or without integrated hydronic kit, in any case:


 **NOTICE** under no circumstances does the unit have to be operated with water circulating on the heat exchanger whose characteristics are different from those indicated in the table WATER CHARACTERISTICS, under penalty of the warranty expiration. Aermec cannot be held responsible for any malfunction of the units which are operated with water whose characteristics are outside the limits in the table WATER CHARACTERISTICS and for their consequences.


 **WARNING!** Clean the system carefully before connecting the unit: this cleaning allows all possible residues to be eliminated, such as welding spatter, wastes, rust or any other impurity from the pipes. These substances could deposit inside and cause the equipment to malfunction. The connection pipes must be properly supported so as not to burden the unit with their weight.

 **WARNING!** 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.

 **WARNING!** 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.

 **WARNING!** The charge or discharge of the heat exchange fluids must be made during installation by qualified technicians using the fittings provided on the hydraulic circuit. Never use the unit heat exchangers to top-up the heat exchanger fluid.

 **During commissioning, it is mandatory to carry out a seal test on the air of the hydraulic circuit (minimum pressure 36.3 psi and a search for leakages on every joint - e.g. using leak detector foam or soap+water) before filling it with glycol. This is to avoid the need for corrections due to leaks caused, for example, during the transportation/handling stage (even though the circuit is tested before leaving the Aermec factory).**


 **WARNING! Water filter and flow switch:** It is necessary to install a water filter and a flow switch upstream of each heat exchanger if they are not supplied with the unit.


CONNECTIONS

Before starting the system, check that the hydraulic circuits are connected to the correct heat exchangers. The water circulating pump must preferably be installed upstream so that the evaporator/condenser is subjected to positive pressure. The water inlet and outlet connections are indicated in the dimensions table in this manual, or are available online at 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 tank and a safety valve;
- Respect the water inlet and outlet connections shown on the unit;
- Install manometer on the water inlet and outlet fittings;
- Install stop valve near the water inlet and outlet fittings;
- Install flexible joints for the connection of the pipes;
- 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 32.0 °F, insulate the pipes and provide an electric heater. As an option, you can also protect the pipes inside the unit;
- Check the continuity of the earthing;

 **It is prohibited to operate the unit without an installed and clean water filter.**

 **The charge or discharge of the heat exchange fluids must be made during installation by qualified technicians using the fittings provided on the hydraulic circuit.**

 **Never use the unit heat exchangers to top-up the heat exchanger fluid.**

WATER CHARACTERISTICS

It is recommended before loading the system to analyse the water, the hydraulic circuit must have all the devices necessary for treating the water.


The use of untreated water or water that is not treated properly can cause deposits of incrustations, algae, mud or cause erosion or corrosion, causing serious damage to the heat exchanger.


It is recommended to request the support of a specialised technician for the water treatment in order to determine the quality of your water and any corrective interventions.

Aermec shall not be liable for any damage deriving from the use of "hard" water that is not treated or that was improperly treated.

The following table provides an incomplete list of the water quality recommended for the plate heat exchangers:

System: Chiller with plate heat exchanger	
PH	7,5 - 9
Total hardness	4,5 - 8,5 °dH
Electric conductivity	10-500 µS /cm
Temperature	< 65 °C
Oxygen content	< 0,1 ppm
Max. glycol amount	50 %
Phosphates (PO ₄)	< 2ppm
Manganese (Mn)	< 0,05 ppm
Iron (Fe)	< 0,2 ppm
Alkalinity (HCO ₃)	70 - 300 ppm
Chloride ions (Cl ⁻)	< 50 ppm
Free chlorine	< 0,5 ppm
Sulphate ions (SO ₄)	< 50 ppm
Sulphide ion (S)	None
Ammonium ions (NH ₄)	None
Silica (SiO ₂)	< 30 ppm

 **It is of fundamental importance to keep the oxygen concentration in the water under control, especially in open vessel systems. This type of system, in fact, is very sensitive to the phenomenon of extra-oxygenation of the water (an event that can be encouraged by the incorrect positioning of some components). This phenomenon can trigger corrosion processes and subsequent drilling of the heat exchanger and pipes.**

 **WARNING** under no circumstances does the unit have to be operated with water circulating on the heat exchanger whose characteristics are different from those indicated in the table WATER CHARACTERISTICS, under penalty of the warranty expiration. Aermec cannot be

held responsible for any malfunction of the units which are operated with water whose characteristics are outside the limits in the table WATER CHARACTERISTICS and for their consequences.

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.



WARNING! Make sure that air drain valves have been installed in all the highest points of the hydraulic circuit and outside inhabited environments. To permit the circuit to drain, make sure that the drain valves have been installed in the lowest points of the circuit and that they are open.

ANTI-FREEZE PROTECTION

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 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.

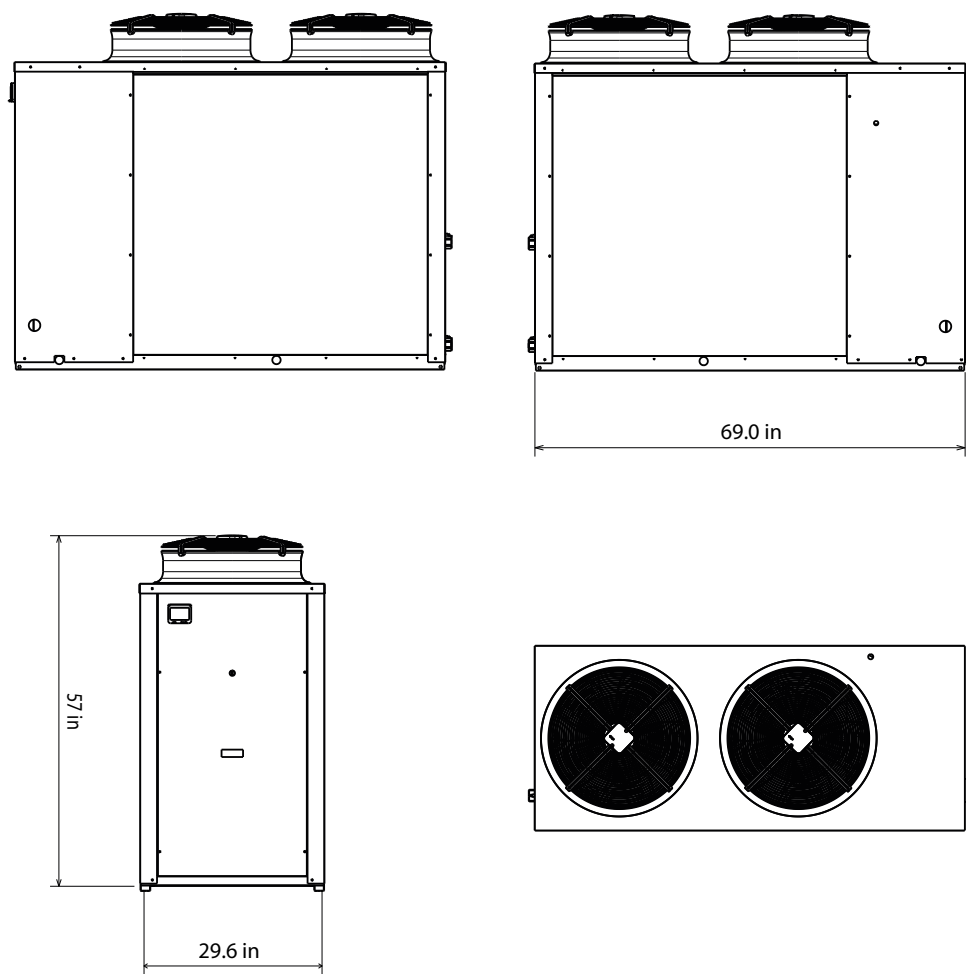


IT IS FORBIDDEN! to insert glycol in the hydraulic circuit near the pump intake:

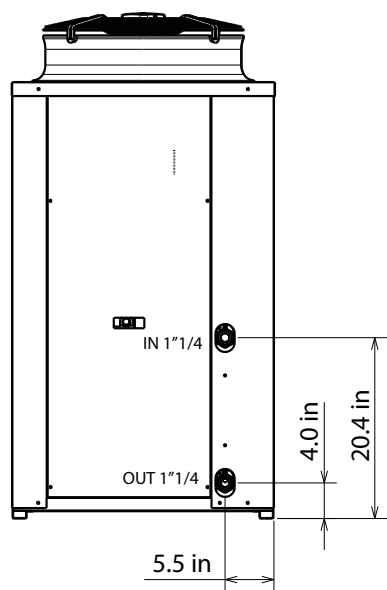
- A high concentration of glycol and additives that exceeds the permissible limits could cause the blockage of the pump;
- Do not use the pump as a mixer.

20 DIMENSIONS AND POSITION OF HYDRAULIC CONNECTIONS

DIMENSIONS

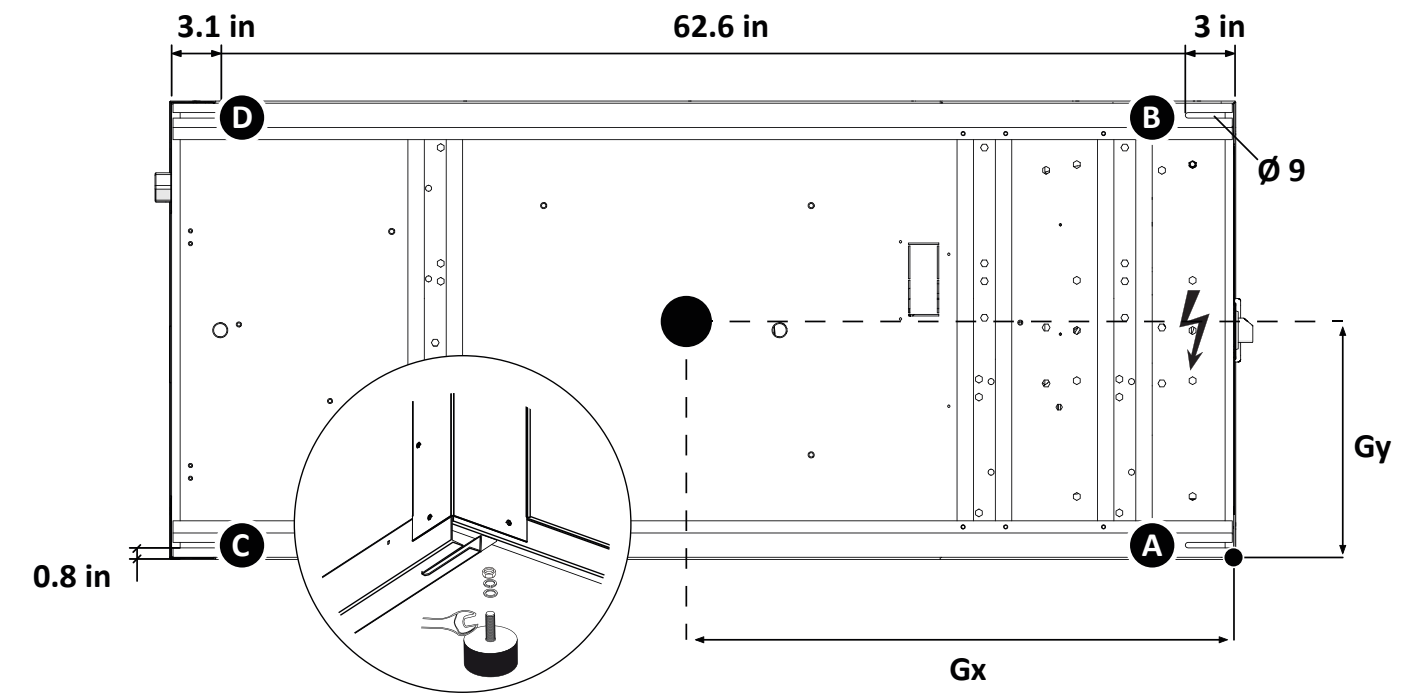


POSITION OF HYDRAULIC CONNECTIONS



21 WEIGHT DISTRIBUTION AND ANTI-VIBRATION MOUNTS POSITION


Position of the vibration dampers



Weight distribution

Size			100	150
Dimensions and weights				
Empty weight	°	lbs	650	710
	A	lbs	800	866
	P	lbs	690	756
Centre of gravity (empty)				
X	°A,P	in	15.0	15.0
Y	°	in	23.8	24.8
	A,P	in	25.2	26.4
Weight distribution in % on the supports (empty)				
1	°	%	32,20%	31,40%
	A	%	30,10%	29,30%
	P	%	31,20%	30,30%
2	°	%	33,30%	32,60%
	A	%	30,90%	30,30%
	P	%	32,20%	31,40%
3	°	%	17,00%	17,70%
	A	%	19,20%	19,90%
	P	%	18,00%	18,80%
4	°	%	17,50%	18,30%
	A	%	19,80%	20,50%
	P	%	18,60%	19,50%

22 ELECTRICAL WIRING

 **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.**

 **THE CABLE GLANDS ARE NOT SUPPLIED WITH THE UNIT**

This equipment is compliant with IEC 61000-3-12 provided that the short circuit power S_{sc} is greater than or equal to $R_{sce} \times S_{equ}$ in the point of interface between the user's power supply and the public network.

The equipment installer or user is responsible for making sure, together with the distribution network operator if necessary, that the equipment is connected only to a power supply with a short-circuit power S_{sc} that is higher than or equal to $R_{sce} \times S_{equ}$.

with:

- $S_{equ} = 400 [V] \times 1.73 \times I_{rated} [A]$
- I_{rated} = machine input current under rated conditions [A]
- R_{sce} = Machine "short circuit ratio".


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 s 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). If these parameters are not respected, contact the energy supplier;
- For electric connections, use the cables with double isolation according to the Standards in force on this subject in the different countries.

The following 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.

 **All electrical operations:** must be carried out by personnel who fulfil the necessary legal requirements and who have been trained and informed on the risks correlated with those operations.

- The characteristics of the electrical lines and related components must be established by personnel authorised to design electric installations, following international regulations and the national regulations of the country in which the unit is installed, in compliance with the legislative regulations in force at the moment of installation;
- it is mandatory to check the machine sealing before connecting the electrical wiring. The machine must only be powered once the hydraulic and electric operations are completed;
- Electrical connections must be placed through the prepared sections (see figure .X) using suitable cable glands with a minimum IP67 grade or higher;
- If the supply cord is damaged, it must be replaced by the manufacturer or its service agent or a similarly qualified person in order to avoid a hazard.

ELECTRIC DATA

The designer must calculate the appropriate line switch, power supply line, connection to the earth wire and connection cables for the section and length of the cables, depending on:

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

Power supply 220V

Size			100	150
POWER SUPPLY: 6				
Cooling performance 12 °C / 7 °C				
Cooling total input current	°	A	31.4	36.7
	A,P	A	34.3	42.5
Heating performance 40 °C / 45 °C				
Heating total input current	°	A	31.6	37.1
	A,P	A	34.5	42.9
Electric data				
Peak current (LRA)	°	A	170.0	195.0
	A,P	A	173.0	200.0
Minimum circuit amperage (MCA)	°	A	50.0	60.0
	A,P	A	60.0	70.0
Maximum overcurrent permitted by the protection device (MOP)	°	A	60.0	80.0
	A,P	A	70.0	80.0

(1) Data EN 14511:2018; System side water heat exchanger 53.6 °F / 44.6 °F; External air 95.0 °F

(2) Data EN 14511:2018; System side water heat exchanger 104.0 °F / 113.0 °F; External air 45 °F b.s. / 43 °F b.u

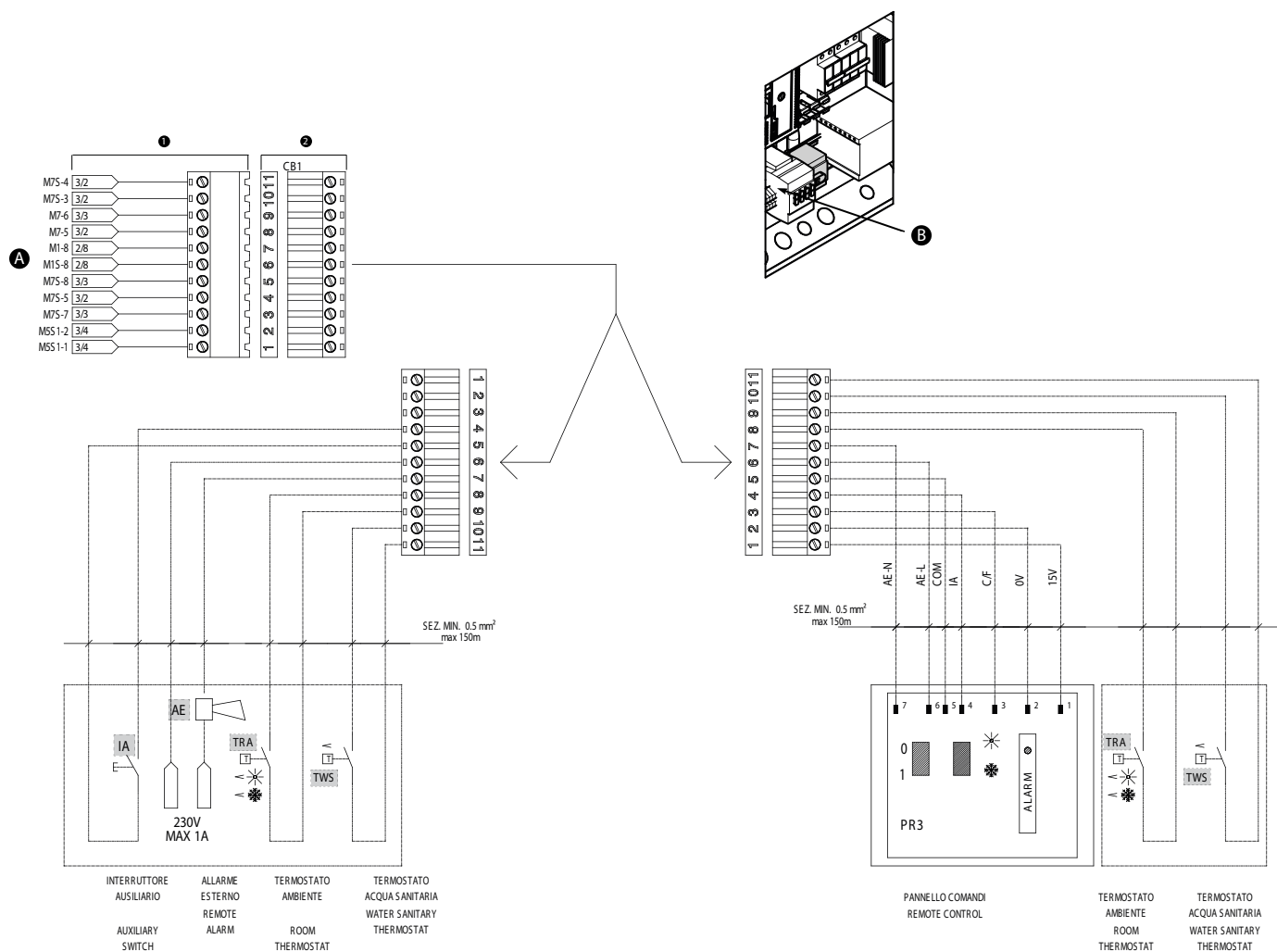
Power supply 460V

Size			100	150
POWER SUPPLY: 7				
Cooling performance 12 °C / 7 °C				
Cooling total input current	°	A	17.1	19.6
	A,P	A	18.7	22.8
Heating performance 40 °C / 45 °C				
Heating total input current	°	A	17.2	19.8
	A,P	A	18.8	22.9
Electric data				
Peak current (LRA)	°	A	84.0	97.0
	A,P	A	85.0	100.0
Minimum circuit amperage (MCA)	°A,P	A	30.0	35.0
Maximum overcurrent permitted by the protection device (MOP)	°	A	30.0	40.0
	A,P	A	35.0	45.0

(1) Data EN 14511:2018; System side water heat exchanger 53.6 °F / 44.6 °F; External air 95.0 °F

(2) Data EN 14511:2018; System side water heat exchanger 104.0 °F / 113.0 °F; External air 45 °F b.s. / 43 °F b.u

CONNECTING THE AUXILIARY CONTROL BOARD



Terminals 6 and 7 provide basic insulation opposed to main power supply line, all others give a reinforced insulation



The auxiliary control board points highlighted are the ones that the installer can use.

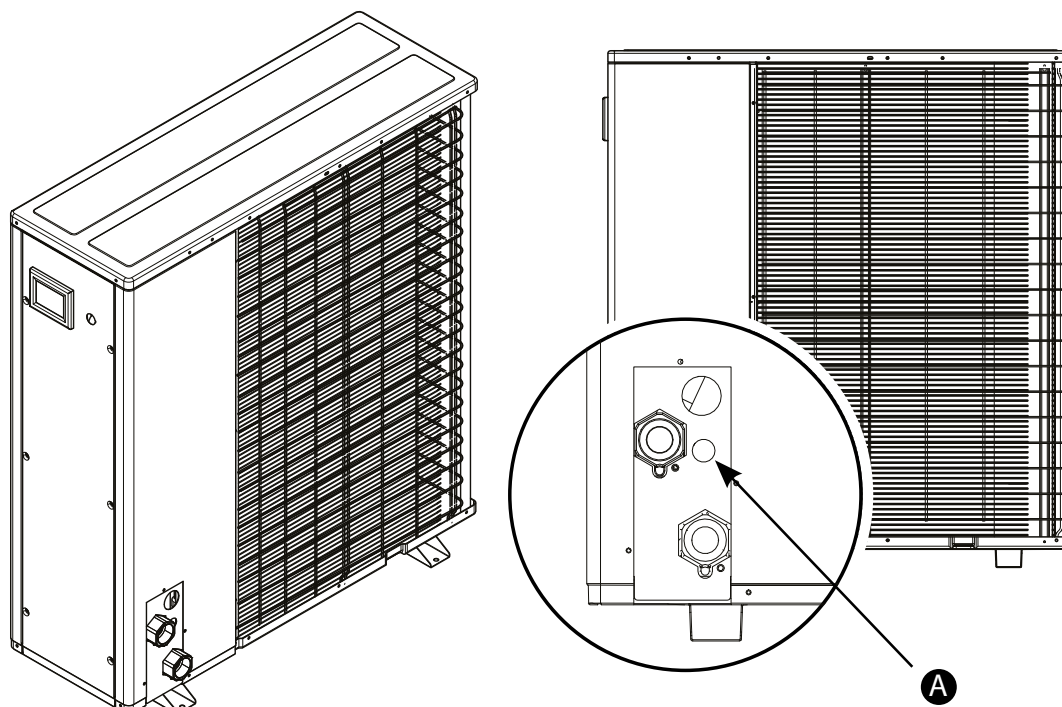
■ For any other details, refer to the complete electric diagram on the machine

22.1 ELECTRIC POWER CONNECTION TO THE ELECTRICAL MAINS

- Open the external covering panels (if present)
- Make sure that the switch is at "OFF" before opening the electric control board for the connection of the unit to the power supply
- Use the plates/holes to pass the main electric power supply cable and the cables of the other external connections under the responsibility of the installer.
- It is prohibited to access positions not specifically envisioned in this manual with electric cables.
- Avoid direct contact with non-insulated copper piping and with the compressor.
- Identify the clamps for the electric connection and always refer exclusively to the wiring diagram supplied with the unit.
- Remove any protections from the cable fixing points.
- 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, N (if present), and PE respecting the polarities L1-L2-L3 and N as phases, and PE as grounding
- Ensure that all protections removed for the electric connection have been restored before powering the unit electrically.
- Close all the opened panels.
- Turn the switch at "ON" position.
- Position the system master switch (outside the appliance) at "ON".



For auxiliary connection please refer to the wiring diagrams supplied with the unit.



Key:

A Recommended hole for electric cables

23 COMMISSIONING - WARNINGS

START-UP



NOTICE: Aermec cannot be held responsible for any malfunction of the units which are due to errors during commissioning.

Operations to be performed with no voltage present



WARNING 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;
- Check that the connections made by the installer are in compliance with the documentation;
- Check for refrigerant gas leaks, especially near the pressure points of pressure gauges, pressure transducers and pressure switches (vibrations during transport may have loosened the connections).

Operations to be performed with no voltage present



WARNING the unit is 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 in each inlet heat exchanger. (Mandatory component for warranty to be valid);

■ *Check that the circulation pump(s) are working, and that the water flow rate is sufficient to close the flow switch contact if installed, . We recommend installing one always upstream of every heat exchanger.*

- 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



WARNING the unit is working.

If it is necessary to carry out measures or controls that require the machine to be operating, the following is necessary:

- 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).
- 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.
- The antifreeze set temperature can only be changed by an authorised service centre and only after checking that there is a suitable % of antifreeze solution in the hydraulic circuit. If this alarm goes off, call the authorised technical service

24 MAINTENANCE



NOTICE: Aermec cannot be held responsible for any malfunction of the units which are due to improper or missing maintenance.



Any cleaning, inspection, control or routine or extraordinary maintenance intervention: must be carried out by expert technical personnel who are authorised and qualified to perform the activities indicated above. These activities must be carried out with the machine turned off and not powered, and in a workmanlike manner according to what is required by the national laws in force. When carrying out these activities, the machine has the following risks:

- 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 (refer to what is declared in the user manual);
- Risks related to the presence of harmful substances in hydronic circuits.

These activities must be carried out using personal protective equipment suitable for the activities to carry out.



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 HFC refrigerants, the manufacturer prescribes the application of and compliance with that indicated in the:

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



WARNING 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 AND PREVENTIVE MEASURES TO OBSERVE DURING MAINTENANCE



WARNING Maintenance operations can only be performed by authorised technicians.

precautions against residual risks mechanical risks



WARNING The cooling circuit contains pressurised refrigerant gas:

- all operations must be performed by skilled personnel who have the legally required authorisations or qualifications.
- 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



IT IS FORBIDDEN TO LOAD: the cooling circuit with a refrigerant other than the one indicated. Using a different refrigerant gas could seriously damage the unit.

- 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 on the machine or to place other items on it;
- 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;
- If the unit has components such as integrated inverters, disconnect the power supply and wait at least 15 minutes before accessing it for maintenance operations: the internal components remain energised for this period, generating the risk of electrocution;
- 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;
- For outdoor units, do not perform interventions in dangerous weather conditions such as rain, snow, fog, etc.
- Never keep the cooling circuit open, because the oil absorbs humidity and degrades;
- 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";
- 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



WARNING Any intervention on the machine must be performed with "NO SMOKING";



WARNING Never disperse the fluid contained in the cooling circuit in the environment;



WARNING The water circuit may contain harmful substances. Prevent the contents coming into contact with skin, eyes and clothing. Use the prescribed personal protective equipment;

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 (CO₂) 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



WARNING 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.



WARNING 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;



WARNING Do not work with naked flames near the unit;



WARNING Do not bend or hit pipes containing under pressure fluids;



WARNING The unit is equipped with overpressure release devices (safety valve): if these devices intervene, the refrigerant gas is released at high temperature and speed;



WARNING The machine and the pipes have very hot or very cold surfaces that lead to risk of burns by contact;



WARNING Do not use your hands to control any refrigerant leaks;



WARNING 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;



- If the unit has power factor correction condensers, 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 has components such as integrated inverters, disconnect the power supply and wait at least 15 minutes before accessing it for maintenance operations: the internal components remain energised for this period, generating the risk of electrocution;



- If the supply cord is damaged, it must be replaced by the manufacturer or its service agent or a similarly qualified person in order to avoid a hazard.

ROUTINE AND EXTRAORDINARY MAINTENANCE

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

In particular:

- Place a sign reading "Do not turn on – maintenance in progress" on the open isolator;
- Equip yourself with the appropriate personal protective equipment;
- The cooling circuit components must be replaced after draining the refrigerant gas contained in the circuit;
- Always and only use original spare parts which can be purchased from authorised resellers;
- 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 type and quantity of refrigerant indicated on the identification label.

The compressor input and output pressure and temperature for determining the overheating and undercooling of the machine must be measured as follows:

- With the machine off, access its cooling circuit;
- Connect the necessary instruments, **pressure gauges** connected with suitable extensions to the pressure sockets on the compressor inputs and outputs, **thermometers** connected to thermocouple probes that are fastened to the pipes at the compressor inputs and outputs. Do not use metratats, as they require the operator to approach the machine's cooling circuit;
- Turn on the machine and acquire the measurements, remaining at a distance and in a position not exposed to the pressurised parts of the cooling circuit;
- As soon as the measurements have been completed, turn off the machine, remove the instruments and close the cooling circuit compartment.
- In the case of machines that do not have a cooling circuit compartment closed with a metal structure, the high-low pressure pressure switch must be tested with the operator in front of the machine panel where the control panel is located, remaining at a distance and not exposed to the pressurised parts of the cooling circuit.

Replacement of the compressor

Inspection and control

The leak inspection and control operations on the machine must be performed when the machine is off and not electrically powered.

Cleaning the machine

The machine cleaning activities must be performed when the machine is off and not electrically powered.

DECOMMISSIONING AND DISPOSING OF THE MACHINE COMPONENTS



WARNING The unit contains fluorinated greenhouse gases that are regulated by the Kyoto protocol. The law prohibits its disposal in the environment and requires it to be collected and delivered to the reseller or a collection centre.

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

- The refrigerant gas must be fully collected by specialised personnel with the necessary qualifications in specific containers and be delivered to collection centres;
- The lubrication oil contained in the compressors and in the cooling circuit must be collected and delivered to collection centres;
- The structure, electrical and electronic equipment and components must be divided according to their product category and material of construction and delivered to collection centres;
- If the water circuit contains mixtures with anti-freeze, the content must be collected and delivered to collection centres;
- Observe the national laws in force.

25 LIST OF THE RECOMMENDED PERIODIC INTERVENTIONS

GENERAL INTERVENTIONS

DESCRIPTION	FREQUENCY			
	Note	3 Mths	6 Mths	12 Mths
GENERAL INTERVENTIONS				
Refrigerant leak control (this operation must be performed with the frequency suggested by current regulations)		•		
Unit supply voltage control		•		
Compressor supply voltage control		•		
Fan supply voltage control		•		
Solenoid valve control		•		
Pressure switch operation and calibration control, if applicable		•		
Pressure/temperature probe control and reading		•		
Control and replacement, if necessary, of the filter driers				•
Compressor contactor control		•		
Fan contactor control, if applicable				•
Heat exchanger coil cleaning (preferably from the inside towards the outside)	(1)	•		
Check for the presence of rust or signs of corrosion in the components, paying particular attention to pressurised containers. In that case, replace them or use specific products			•	•
General unit cleaning				•
Vent the hydraulic circuit and the heat exchangers, the coexistence of air and water reduces performance and can promote the formation of rust			•	

(1) To clean the coils, refer to the dedicated chapter.

INTERVENTIONS ON THE CIRCUIT

DESCRIPTION	FREQUENCY			
	Note	3 Mths	6 Mths	12 Mths
INTERVENTIONS ON THE COOLING CIRCUIT OPERATING WITH FULL LOAD				
Measurement of the overheating temperature			•	
Measurement of the undercooling temperature			•	
Measurement of the exhaust gas temperature			•	
Measurement of fan input			•	
Measurement of compressor input			•	
COMPRESSOR CONTROLS				
Oil level control		•		
Oil acidity control				•
Control of proper operation of the carter heater			•	
Control of the oil level sensor, if present			•	
HYDRAULIC CIRCUIT CONTROLS				
Measurement of pump input			•	
Check the rotor seal of the pump(s)		•		
Control of flexible joints		•		
Control of the proper operation and calibration of the flow switch, if present		•		
Control of the proper operation of the differential pressure switch, if present		•		
Control the concentration of the glycol solution, if applicable	(1)	•		
Cleaning the water filter		•		

(1) If the glycol must be changed, refer to the documentation provided by the supplier.



WARNING The frequency of the operations described here is only approximate, they can vary based on how the unit is used and the type of system where it is installed. If the unit is installed in aggressive environments, we recommend reducing the intervention times.

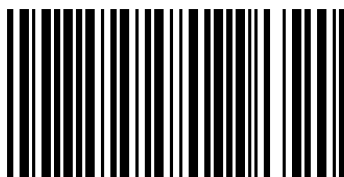


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