EN

4138428_07 – 23.07
Translation of Original instructions

NYB-NYB F

Technical manual

60 Hz | GAS R410A | 2

AIR-WATER CHILLER

Cooling capacity 29.0 ton (NYB)

Cooling capacity 18.9 ton (NYB F)

AERMEC

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, 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.

CERTIFICATIONS

COMPANY CERTIFICATIONS

SAFETY CERTIFICATIONS

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

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

Is made up of independent 31 ton modules that can be connected to each other up to a power of 276 ton. Every single module is an outdoor chiller to produce chilled water.
The base, the structure and the panels are made of galvanized steel treated with polyester paint RAL 9003.

MODULARITY

It is possible to couple up to 9 chillers designed to reduce the overall unit dimensions to a minimum.
The combination of the various chillers allows all the strengths of the individual module to be maintained.
Modularity allows you to adapt installation to the actual development needs of the system. This way the cooling capacity can be increased over time simply and affordably.
Modularity is essential when component redundancy is required, as it allows for a safer system design and increased reliability.

MODEL WITH PARTIAL HEAT RECOVERY (DESUPERHEATER)

In the configuration with desuperheater, it is also possible to produce free-hot water.

MICROCHANNEL COILS

Microchannel heat exchanger that guarantees higher thermal exchange yield. Circuit that optimises the liquid distribution in the coil, which is arranged with V beam geometry with open angle.
Standard micro-channel coils protection air filter for free-cooling versions. Built with frame and a composite set in aluminium micro-stitched net with extremely low head losses.

OPERATING FIELD

Functioning at full load is guaranteed up to 118.4 °F outdoor air temperature for NYB cooling only, 114.8 °F for NYB free-cooling. The unit can produce chilled water up to 39.2 °F.
Maximum yield at full load but even partial load, thanks to the partialisation steps that increase as the number of connected modules increases this ensures continuous adaptation to the actual system requirements.

VERSIONS

A High efficiency

CONFIGURATOR

Configurator NYB

Field		Description
1,2,3		**NYB**
4,5,6,7		**Size** 0500
8		**Operating field**
	°	Standard mechanic thermostatic valve (1)
	Y	Low temperature mechanic thermostatic valve (2)
9		**Model**
	°	Cooling only
10		**Heat recovery**
	°	Without heat recovery
	D	With desuperheater (3)
11		**Version**
	A	High efficiency
12		**Coils**
	°	Aluminium microchannel
	I	Copper-aluminium
	O	Coated aluminium microchannel
	R	Copper pipes-copper fins
	S	Copper pipes-Tinned copper fins
13		**Fans**
	°	Standard
	J	Inverter (4)
	M	Inverter surdimensionnés
14		**Power supply**
	6	230V ~ 3 60Hz with magnet circuit breakers
	7	460V ~ 3 60Hz with magnet circuit breakers
	8	575V ~ 3 60Hz with magnet circuit breakers
	9	208V ~ 3 60Hz with magnet circuit breakers
15,16		**Integrated hydronic kit**
	00	Collecteurs hydrauliques standard 90 psi nominaux (PN6)
	01	300 psi nominal hydraulic collectors (PN21)

(1) Water produced up to +39.2 °F
(2) Water produced from 39.2 °F up to +21.2 °F
(3) If the unit is also fitted with a low temperature valve in addition to the desuperheater, it is necessary to always guarantee a minimum water temperature of 95°F at its inlet.
(4) Ventilateurs J de série avec l'alimentation 208V 3 ~ 60 Hz

Configurator NYB F

Field		Description
1,2,3		**NYB**
4,5,6,7		**Size** 0500
8		**Operating field (1)**
	°	Standard mechanic thermostatic valve
9		**Model**
	F	Free-cooling
10		**Heat recovery**
	°	Without heat recovery
	D	With desuperheater (2)
11		**Version**
	A	High efficiency
12		**Coils**
	°	Aluminium microchannel
	I	Copper-aluminium
	O	Coated aluminium microchannel
	R	Copper pipes-copper fins
	S	Copper pipes-Tinned copper fins
13		**Fans**
	J	Inverter (3)
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	6	230V ~ 3 60Hz with magnet circuit breakers
	7	460V ~ 3 60Hz with magnet circuit breakers
	8	575V ~ 3 60Hz with magnet circuit breakers
	9	208V ~ 3 60Hz with magnet circuit breakers
15,16		**Integrated hydronic kit**
	00	Collecteurs hydrauliques standard 90 psi nominaux (PN6)

(1) Water produced up to +39.2 °F
(2) Pendant le fonctionnement à froid, il faut toujours garantir une température de l'eau non inférieure à 95 °F à l'entrée de l'échangeur, si l'on travaille avec de basses températures d'eau produite dans le circuit primaire.
(3) Ventilateurs J de série avec l'alimentation 208V 3 ~ 60 Hz

2 UNIT COMPONENTS DESCRIPTION

REFRIGERANT CIRCUIT

Compressors

High-efficiency scroll hermetic compressors with 2-pole electric motors. All the compressors are equipped with inner electronic thermal protection device.

Microchannel coils

The full range uses aluminium microchannel coils, ensuring very high levels of efficiency.
This allows using less refrigerant compared to traditional copper coils.

System side heat exchanger

Brazed plate heat exchanger in stainless steel. It is externally insulated with closed cell neoprene anti-condensation material.
Supplied as standard with electric anti-freeze electric heater

Filter drier

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

Sight glass

Used to check the refrigerant gas load and the possible presence of humidity in the cooling circuit.

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.

Flow shut-off valves

Present on liquid and pressing line to interrupt the refrigerant in the case of extraordinary maintenance.

Solenoid valves

The valves close when the compressor switches off, blocking the flow of refrigerant gas to the evaporator, recovery and the coil.

HYDRAULIC CIRCUIT

Free-cooling water coils

With water running through the system for free-cooling operating mode. It presents copper pipes and aluminium louvers locked in place due to the expansion of the pipes.

Two way valve

Located on the water side of the free-cooling circuit, this is an ON-OFF diverting valve managed via an electric servo-command.

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.

Standard fan unit

Equipped with accident-prevention net, it consists of axial fans and 6-pole motor with external rotor and protection rating IP54.
Moreover, the motor is equipped with inner thermal protection with automatic reset.

■ *Standard for NYB cooling only*

Inverter fans

Continuous speed modulation based on condensing pressure.
High-efficiency brushless motor for greater energy savings.

■ *Standard for NYB free-cooling*

CONTROL AND SAFETY COMPONENTS

Differential pressure switch

Located between the inlet and outlet of the evaporator.

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

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.

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.

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*

ELECTRICAL CONTROL AND POWER PANEL

Complete with:
— door interlocked isolator
— Magnet 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 (only for versions without pump units).
— 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

The microprocessor controls features cutting edge functions and proprietary adjustments.
The keyboard is equipped with control keys and LCD display, which allows you to consult and make interventions on the unit by means of the multi-level menu, with language selection settings. It controls:
— The system temperature for cooling the environments or industrial processes. The different temperatures are managed automatically according to the unit work conditions and requirements.
— Management and alarm log to have always a prompt diagnosis of the unit operation.
— Creation of operation time periods required for efficient programming
— A self-adaptive logic is used to defrost. This logic allows you to adjust the number of defrosts in order to increase efficiency.

Systems consisting of two chillers allow the unit to be adjusted via (Master/Slave), supplied as per standard. In case of several chillers through the Multichiller_EVO. The supervision is possible thanks to different options, with proprietary devices or by integrating other systems via ModBus, Bacnet, LonWorks etc. protocols.
A specific keyboard for wall-mounting installation (PGD1 accessory) allows the remote control of all the functions.

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

3 BASIC PRINCIPLES ON MICROCHANNEL COIL CORROSION

The main material in Aermec heat exchangers is aluminium.
Aluminium is a very reactive material, whose surface is easily oxidized. As long as this hard layer of aluminium oxide remains intact, the aluminium at the base will remain corrosion resistant.
For other materials, for example steel, the oxide layer detaches from the surface and peels off, thereby allowing the underlying metal to be constantly attacked.
Extreme environments may, however, damage the layer of oxide that could not be regenerated as quickly as necessary to provide sufficient protection to the product. These hostile environments are distinguished by very high or very low levels of pH. Normally, the protective oxide of aluminium is generally stable in the pH range of 4.5 and 8.5. For this reason, sea water with neutral pH does not intrinsically corrode aluminium. Galvanic corrosion is the reason why precautions are required in marine environments for heat exchangers with aluminium cooling louvers and copper piping. Galvanic corrosion occurs when different metals come into contact through an electrolyte. Because of an electrochemical reaction, electrons detach from one of the metals (reduce), whereas the other metal increases the electrons (oxidized).
The role of each metal is determined by the respective galvanic potential, typically summarised by the galvanic series. The metal with the lower galvanic potential will be reduced (consumed), whereas the metal with higher potential will be oxidized, thereby becoming more resistant.
In the case of aluminium and copper (for example in the presence of salt water), the aluminium will be sacrificed in favour of the copper. It is customary for Aermec to custom design the chemistry and the selection of materials to make sure that the first component to corrode is a fin structure. The pipe that carries the refrigerant, which has a round or microchannel section, is the component of the most protected exchanger since perforation would cause the refrigerant to leak.
Pitting corrosion is nothing else than the localised version of galvanic corrosion. The different material is often an inclusion in the same base metal alloy. Often, the surface treatment, for example thermal zinc spraying (with low galvanic potential), are those used most in order to create general corrosion, which acts laterally across the surface of the part, which is a preferable corrosion to direct downward corrosion through a cavity, so as to avoid perforation.

Anthill or ant-nest corrosion is a poorly known phenomenon which takes its name from the morphology that is similar to that of a nest of ants. It can be best described as micro-pitting because the cavities on the surface are generally so small that they are invisible to the naked eye. This type of corrosion occurs more commonly in copper pipes. The ant-hill corrosion is caused by the chemical reaction which requires three components: oxygen, water and an organic acid.

CAUSES OF CORROSION

The principal cause of corrosion is elevated humidity and/or temperatures in the presence of contaminant gases. These conditions alone, or in combination, accelerate the natural corrosion process in metals.

Humidity

Moisture in air can be considered the lifeblood of galvanic corrosion. A galvanic corrosion cell requires an electrolyte or current carrying media, to reach a dynamic state. The electrolyte can be water or any water-soluble substance with good conducting properties. Moisture in the air is one such electrolyte. Humid air contaminated with corrosive gasses further accelerates the corrosion rate as the air's current carrying otential increases.

Temperature

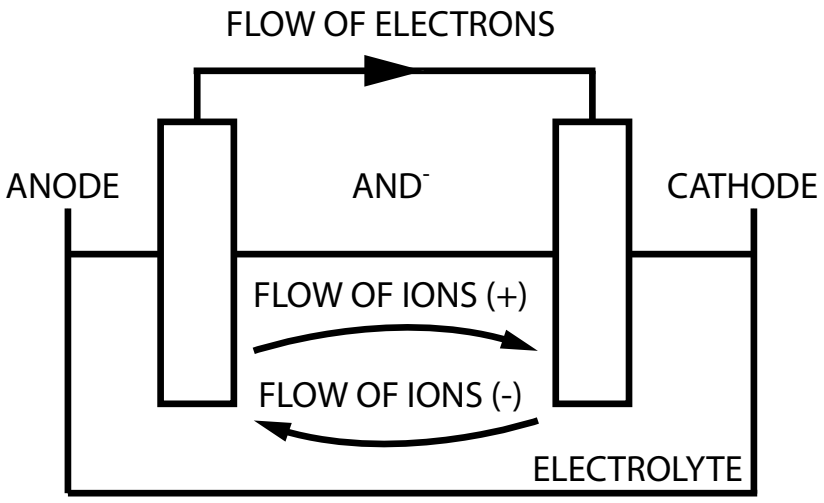
Chemical reactions in general are temperature dependent, with increased temperature normally resulting in a faster reaction rates.

Corrosive gases

Not all gases cause corrosion. Specifically, we are concerned with three types of gases:

— Acidic gases, such as hydrogen sulfide, sulfur oxides, chlorides, hydrogen fluoride (HF) and nitrogen oxides;
— Caustic gases, such as ammonia;
— Oxidizing gases, such as ozone

■ *Of the gases that can cause corrosion, the acidic gases are typically the most harmful.*



4 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 (SO_2, SO_3) 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 in-dustrial 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-going 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 duel 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 disper-sion 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 1.9-3.1 mi 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 °

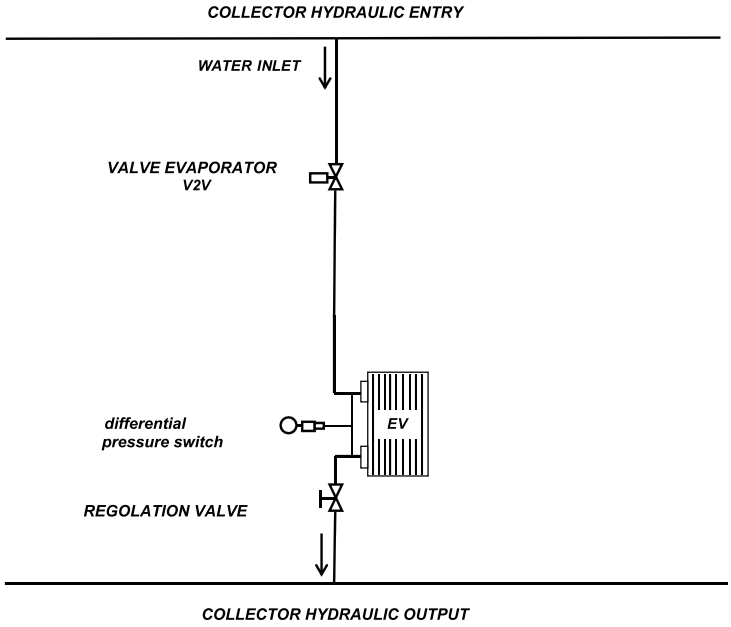
5 MAIN HYDRAULIC CIRCUITS

NYB COOLING ONLY

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

In the absence of glycol, the machine needs to be powered to ensure the heaters (if present) and the pumps (if present) are operating to avoid glazing and, therefore, damaging the components in the hydraulic circuit.

Flushing the plant's hydraulic circuit (cleaning the hydraulic circuit) needs to be done by excluding the chiller's hydraulic circuit. Make sure, in any case, that the water has not entered the chiller by ensuring you open the chiller's hydraulic circuit drains. Any water accumulated in the chiller's hydraulic circuit can cause icing/damage to the components.



Water characteristics

System: Chiller with plate heat exchanger	
PH	7,5 - 9
Total hardness	4,5 - 8,5 °dH
Temperature	< 65 °C
Oxygen content	< 0,1 ppm
Max. glycol amount	50 %
Phosphates (PO_4)	< 2ppm
Manganese (Mn)	< 0,05 ppm
Iron (Fe)	< 0,3 ppm
Alkalinity (HCO_3)	70 - 300 ppm
Chloride ions (Cl-)	< 50 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.

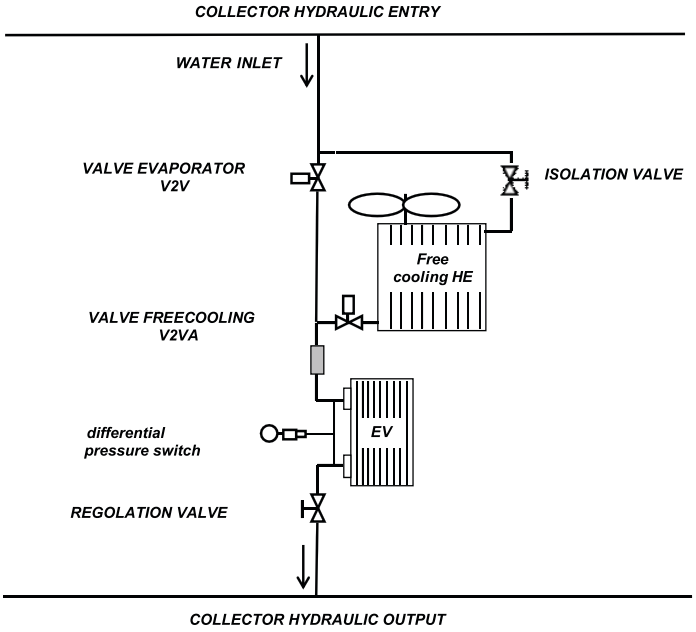
It is of fundamental importance to keep the oxygen concentration in the water under control, especially in open vessel systems. This type of system, in fact, is very sensitive to the phenomenon of extra-oxygenation of the water (an event that can be encouraged by the incorrect positioning of some components).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

NYB FREE-COOLING

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

In the absence of glycol, the machine needs to be powered to ensure the heaters (if present) and the pumps (if present) are operating to avoid glazing and, therefore, damaging the components in the hydraulic circuit.

Flushing the plant's hydraulic circuit (cleaning the hydraulic circuit) needs to be done by excluding the chiller's hydraulic circuit. Make sure, in any case, that the water has not entered the chiller by ensuring you open the chiller's hydraulic circuit drains. Any water accumulated in the chiller's hydraulic circuit can cause icing/damage to the components.



Water characteristics

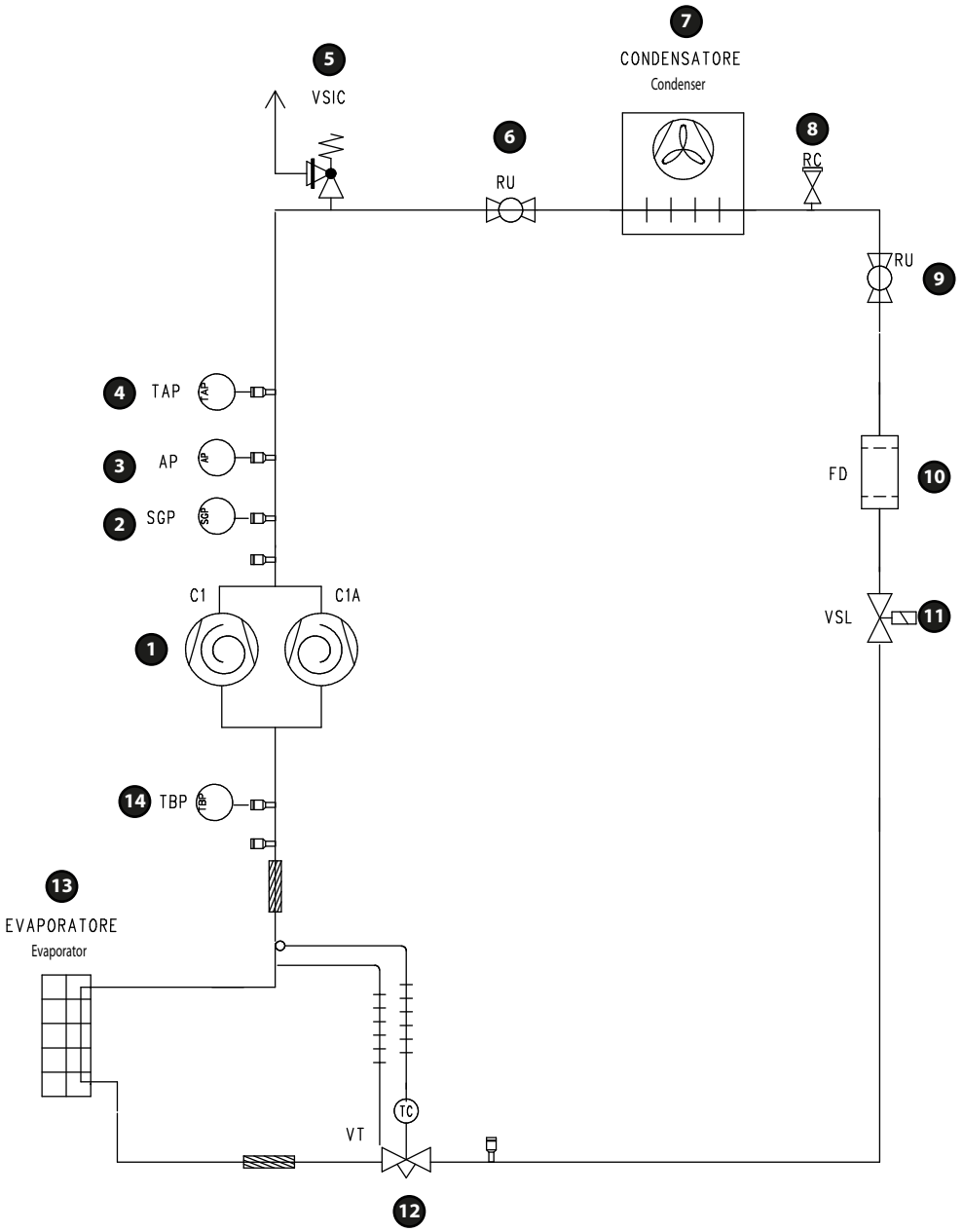
System: Chiller with plate heat exchanger	
PH	7,5 - 9
Total hardness	4,5 - 8,5 °dH
Temperature	< 65 °C
Oxygen content	< 0,1 ppm
Max. glycol amount	50 %
Phosphates (PO_4)	< 2ppm
Manganese (Mn)	< 0,05 ppm
Iron (Fe)	< 0,3 ppm
Alkalinity (HCO_3)	70 - 300 ppm
Chloride ions (Cl-)	< 50 ppm
Sulphate ions (SO_4)	< 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.

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.

6 MAIN COOLING REFRIGERANT LAYOUTS

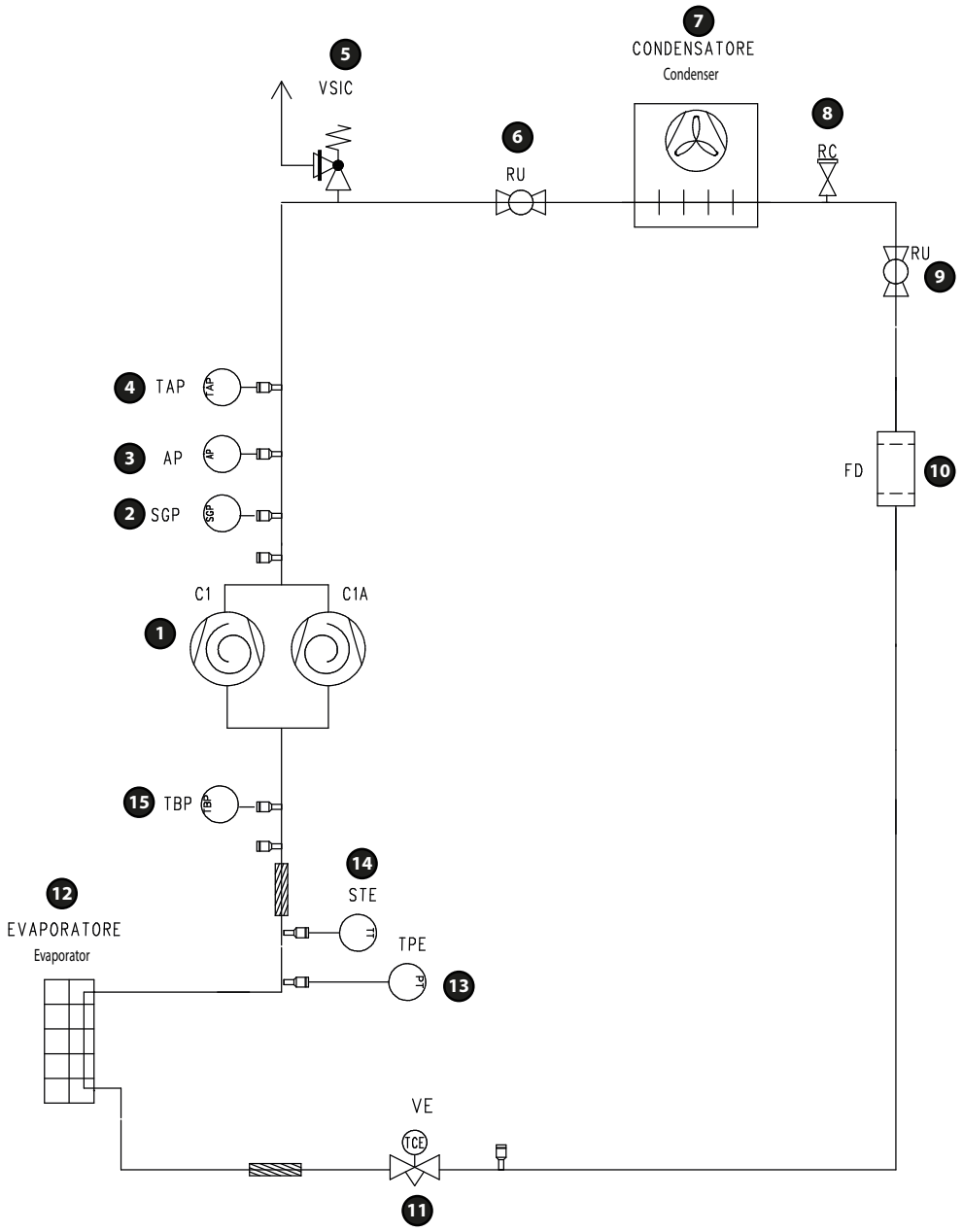
UNIT WITH MECHANICAL THERMOSTATIC EXPANSION VALVE



Components:

1 Compressor
2 Discharge gas temperature probe
3 High pressure switch
4 High pressure transducer
5 Pressure relief valve
6 Isolation valve
7 Condenser
8 Charging connection
9 Isolation valve
10 Filter drier
11 Solenoid valve
12 Mechanic thermostatic valve
13 Evaporator
14 Low pressure transducer

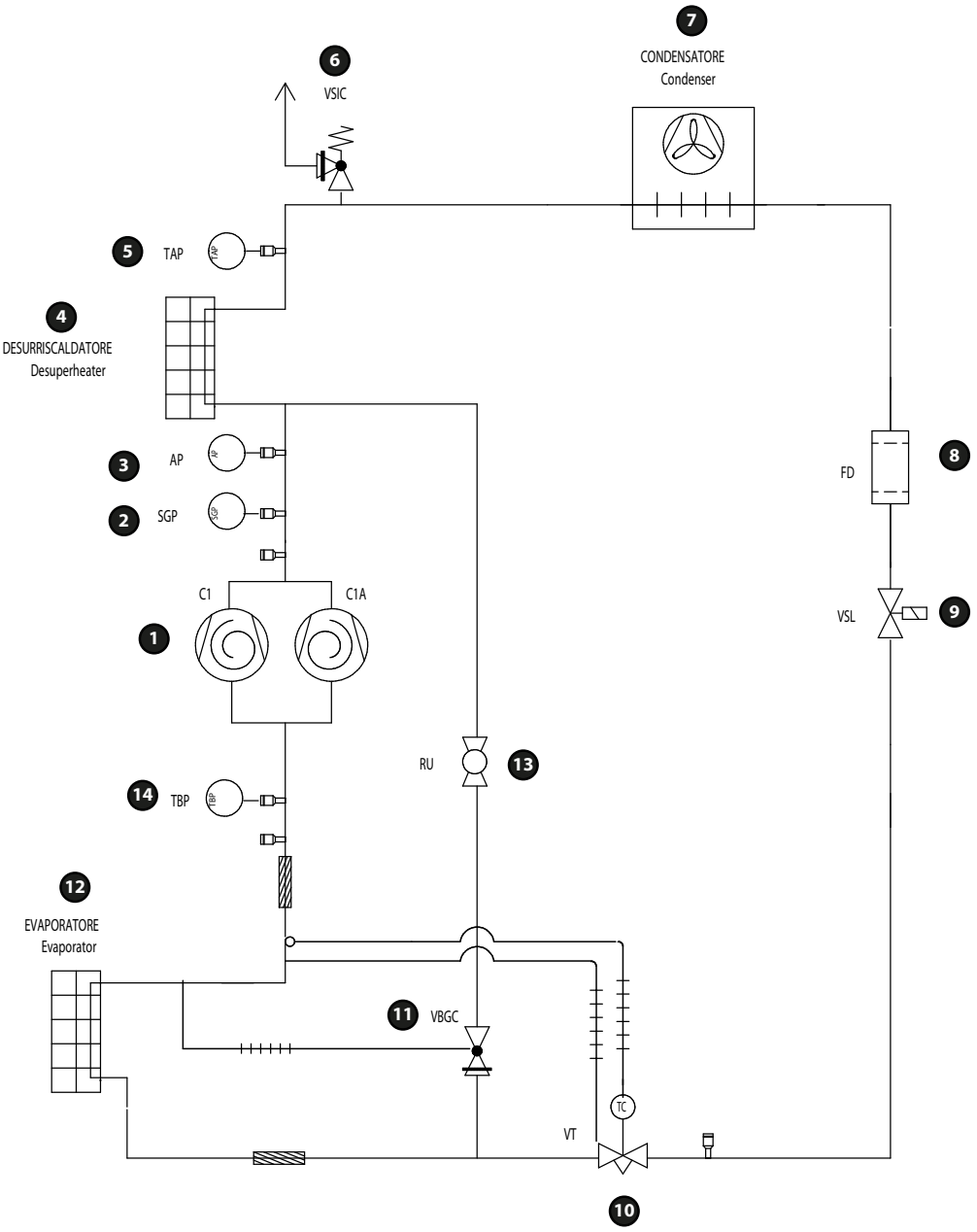
UNIT WITH ELECTRONIC THERMOSTATIC EXPANSION VALVE



Components:

1 Compressor
2 Discharge gas temperature probe
3 High pressure switch
4 High pressure transducer
5 Pressure relief valve
6 Isolation valve
7 Condenser
8 Charging connection
9 Isolation valve
10 Filter drier
11 Electronic thermostatic expansion valve
12 Evaporator
13 Electronic expansion valve pressure transducer
14 Electronic expansion valve temperature probe
15 Low pressure transducer

UNIT WITH MECHANICAL THERMOSTATIC EXPANSION VALVE AND DESUPERHEATER



Components:

1 Compressor
2 Discharge gas temperature probe
3 High pressure switch
4 Desuperheater
5 High pressure transducer
6 Pressure relief valve
7 Condenser
8 Filter drier
9 Solenoid valve
10 Mechanic thermostatic valve
11 Hot gas injection valve
12 Evaporator
13 Isolation valve
14 Low pressure transducer

7 ACCESSORIES

AER485P1: RS-485 interface for supervision systems with MODBUS protocol.
FB1: Air filter to protect the micro-channel coils. Formed of a frame and a composite baffle in micro-expanded aluminium mesh, with particularly low pressure drops.
GPNYB_BACK: kit with 1 anti-intrusion grid for the short side of the unit.
GPNYB_SIDE: kit with 2 anti-intrusion grids for the long side of the unit.
MULTICHILLER_EVO: Control, switch-on and switch-off system of the single chillers where multiple units are installed in parallel, always ensuring constant flow rate to the evaporators.
PGD1: Allows you to control the unit at a distance.
FB1: standard for NYB free-cooling

CRATE: Special crate for transport
DRE: Electronic device for peak current reduction.
RIF: Power factor correction. Connected in parallel to the motor allowing about 10% reduction of input current.
KNYB: Pair of caps with grooved joints assembled on the unit manifold.
KREC: Accessory kit to remote the electric power supply input to the back

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

ACCESSORIES COMPATIBILITY

Model	Ver	0500
AER485P1	A	•
FB1	A	•
GPNYB_BACK	A	•
GPNYB_SIDE	A	•
MULTICHILLER_EVO	A	•
PGD1	A	•

FB1: standard for NYB free-cooling

Special crate for transport

Ver	0500
A	CRATE_NYB

DRE: electronic device for peak current reduction

Ver	0500
A	DRE (1)

(1) Contact the factory
A grey background indicates the accessory must be assembled in the factory

Power factor correction

Ver	0500
A	RIF (1)

(1) Contact the factory
A grey background indicates the accessory must be assembled in the factory

KREC: kit to remote the electric power supply input to the back

Ver	0500
A	KREC-6-9, KREC-7-8

A grey background indicates the accessory must be assembled in the factory

KNYB: Pair of caps with grooved joints assembled on the unit manifold

Ver	0500
A	KNYB

A grey background indicates the accessory must be assembled in the factory

8 PERFORMANCE SPECIFICATIONS

Performance specifications NYB cooling only

Size			0500
Cooling performance 54.0 °F / 44.1 °F (1)			
Cooling capacity	A	ton	29.0
Input power	A	kW	32.9
Cooling total input current	A	A	55.0
EER	A	BTU/(Wh)	10.56
IPLV	A	BTU/(Wh)	12.49
Water flow rate system side	A	gpm	69.3
Pressure drop system side	A	ftH_2O	7.36

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

Performance specifications NYB free-cooling

Size			0500
Cooling performance chiller operation (1)			
Cooling capacity	A	ton	28.5
Input power	A	kW	33.8
Cooling total input current	A	A	56.0
EER	A	BTU/(Wh)	10.09
IPLV	A	BTU/(Wh)	13.72
Water flow rate system side	A	gpm	68.1
Pressure drop system side	A	ftH_2O	7.36
Cooling performances with free-cooling (2)			
Cooling capacity	A	ton	18.9
Input power	A	kW	4.5
Free cooling total input current	A	A	7.5
EER	A	BTU/(Wh)	49.92
Water flow rate system side	A	gpm	68.1
Pressure drop system side	A	ftH_2O	16.06

(1) System side water heat exchanger 53.6 °F / 44.6 °F; External air 95 °F; Chiller operation 100%; Free-cooling 0%
(2) System side water heat exchanger 53.6 °F / * °C; External air 35.6 °F

PARTIALISATIONS EER

Size			0500
Part load IPLV			
100 %	A	BTU/W	10.58
75 %	A	BTU/W	12.08
50 %	A	BTU/W	12.93
25 %	A	BTU/W	12.25

9 GENERAL TECHNICAL DATA

Size			0500
Compressor			
Type	A	type	Scroll
Compressor regulation	A	Type	On-Off
Number	A	no.	2
Circuits	A	no.	2
Refrigerant	A	type	R410A
Refrigerant charge	A	lbs	31
Oil	A	Type	POE
Total oil charge	A	gal	1.79

System side heat exchanger - NYB cooling only

Size			0500
System side heat exchanger			
Type	A	type	Brazed plate
Number	A	no.	1
Minimum water flow rate	A	gpm	34.7
Maximum water flow rate	A	gpm	115.7
Connections (in/out)	A	Type	Grooved joints
Sizes (in/out)	A	Ø	6"

System side heat exchanger - NYB free-cooling

Size			0500
System side heat exchanger			
Type	A	type	Brazed plate
Number	A	no.	1
Minimum water flow rate	A	gpm	40.9
Maximum water flow rate	A	gpm	114.5
Connections (in/out)	A	Type	Grooved joints
Sizes (in/out)	A	Ø	6"

ELECTRIC DATA

Electrical data NYB cooling only

	Version	Fans	Power supply		0500
Peak current (LRA)	A	°/J	6	A	429.00
	A	°/J	7	A	222.97
	A	°/J	8	A	166.98
	A	°	9	A	-
	A	J	9	A	433.81
	A	M	6	A	438.40
	A	M	7	A	227.57
	A	M	8	A	170.66
	A	M	9	A	443.21
Minimum circuit amperage (MCA)	A	°/J	6	A	140.48
	A	°/J	7	A	69.11
	A	°/J	8	A	61.34
	A	°	9	A	-
	A	J	9	A	145.29
	A	M	6	A	149.88
	A	M	7	A	73.71
	A	M	8	A	65.02
	A	M	9	A	154.69
Maximum overcurrent permitted by the protection device (MOP)	A	°/J	6	A	175.00
	A	°/J	7	A	90.00
	A	°/J/M	8	A	80.00
	A	°	9	A	-
	A	J	9	A	200.00
	A	M	6/9	A	200.00
	A	M	7	A	99.99

- not available

Electrical data NYB free-cooling

	Version	Fans	Power supply		0500
Peak current (LRA)	A	J	6	A	429.00
	A	J	7	A	222.97
	A	J	8	A	166.98
	A	J	9	A	433.81
	A	M	6	A	438.40
	A	M	7	A	227.57
	A	M	8	A	170.66
	A	M	9	A	443.00
Minimum circuit amperage (MCA)	A	J	6	A	140.48
	A	J	7	A	69.11
	A	J	8	A	61.34
	A	J	9	A	145.29
	A	M	6	A	149.88
	A	M	7	A	73.71
	A	M	8	A	65.02
	A	M	9	A	155.00
Maximum overcurrent permitted by the protection device (MOP)	A	J	6	A	175.00
	A	J	7	A	90.00
	A	J/M	8	A	80.00
	A	J	9	A	200.00
	A	M	6/9	A	200.00
	A	M	7	A	100.00

FANS DATA

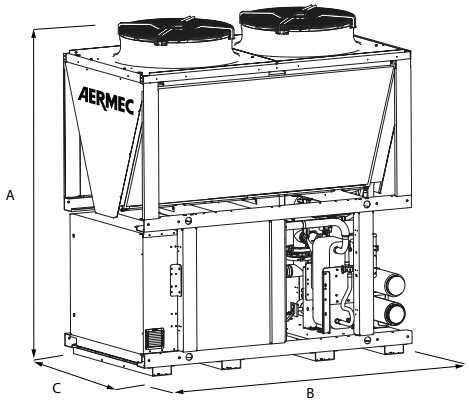
Fans NYB cooling only

Size			0500
FANS: °			
Fan			
Type	A	type	Axial
Fan motor	A	type	Asynchronous with phase cut
Number	A	no.	2
Air flow rate	A	cfm	23,543
FANS: J			
Fan			
Type	A	type	Axial
Fan motor	A	type	Inverter
Number	A	no.	2
Air flow rate	A	cfm	23,543
FANS: M			
Fan			
Type	A	type	Axial
Fan motor	A	type	Inverter
Number	A	no.	2
Air flow rate	A	cfm	23,543

Fans NYB free-cooling

Size			0500
FANS: J			
Fan			
Type	A	type	Axial
Fan motor	A	type	Inverter
Number	A	no.	2
Air flow rate	A	cfm	20,011
FANS: M			
Fan			
Type	A	type	Axial
Fan motor	A	type	Inverter
Number	A	no.	2
Air flow rate	A	cfm	20,011

DIMENSIONS AND WEIGHTS



Dimensions and weights NYB cooling only

Size			0500
Dimensions and weights			
A	A	in	96.5
B	A	in	86.6
C	A	in	46.9
Empty weight	A	lbs	2,046
Weight functioning	A	lbs	2,213

Dimensions and weights NYB free-cooling

Size			0500
Dimensions and weights			
A	A	in	96.5
B	A	in	86.6
C	A	in	46.9
Empty weight	A	lbs	2,672
Weight functioning	A	lbs	3,007

10 OPERATING RANGE

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, valid for ΔT = 10.1 DT °F (cooling mode) and ΔT = 9.0 DT °F (heating mode).
If the unit operates beyond the operational limits, we recommend you first contact our technical-sales service.

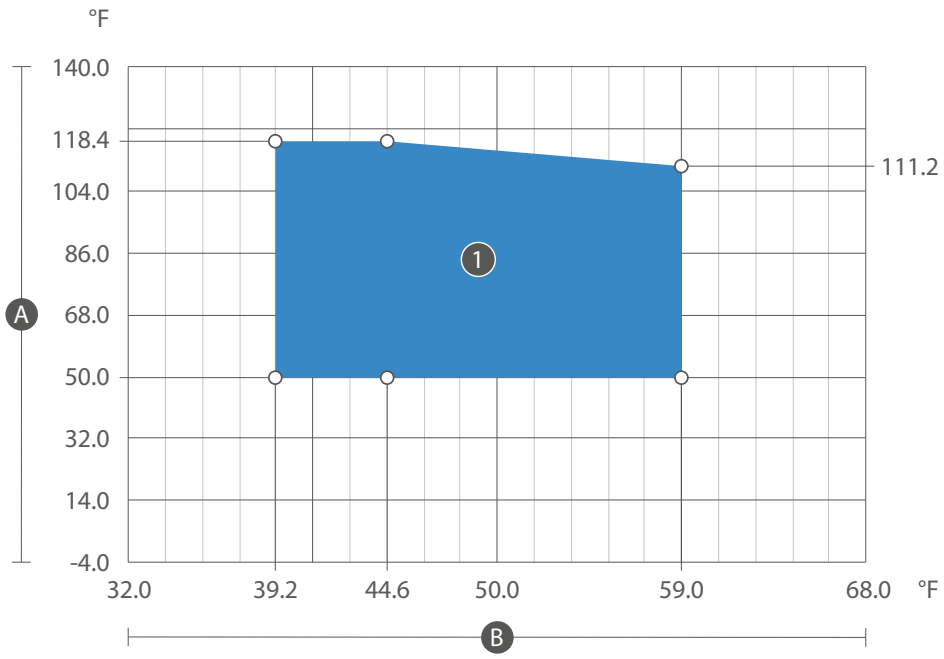
■ *If the unit is installed in particularly windy locations the provision of wind barriers may be necessary to avoid malfunctions. It should be installed if wind speed is above 4.9 knot.*

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.

OPERATING RANGE NYB COOLING ONLY

Operating range - fans ° - valve °

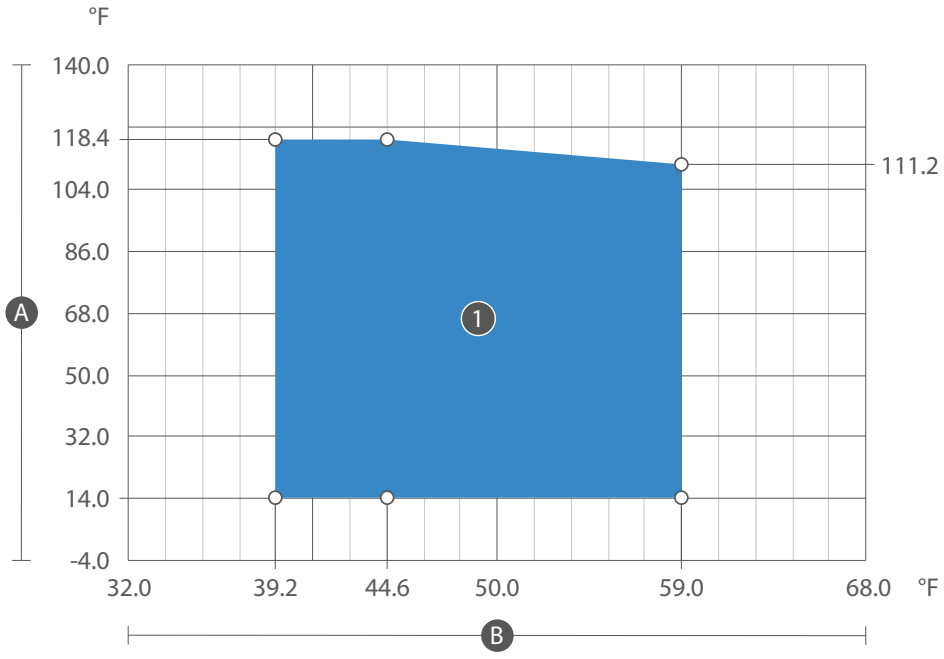
Operating range - fans ° - valve °



Key
A **External air temperature (°F)**
B **Water produced temperature (°F)**
1 Standard mode

Operating range - fans J - valve °

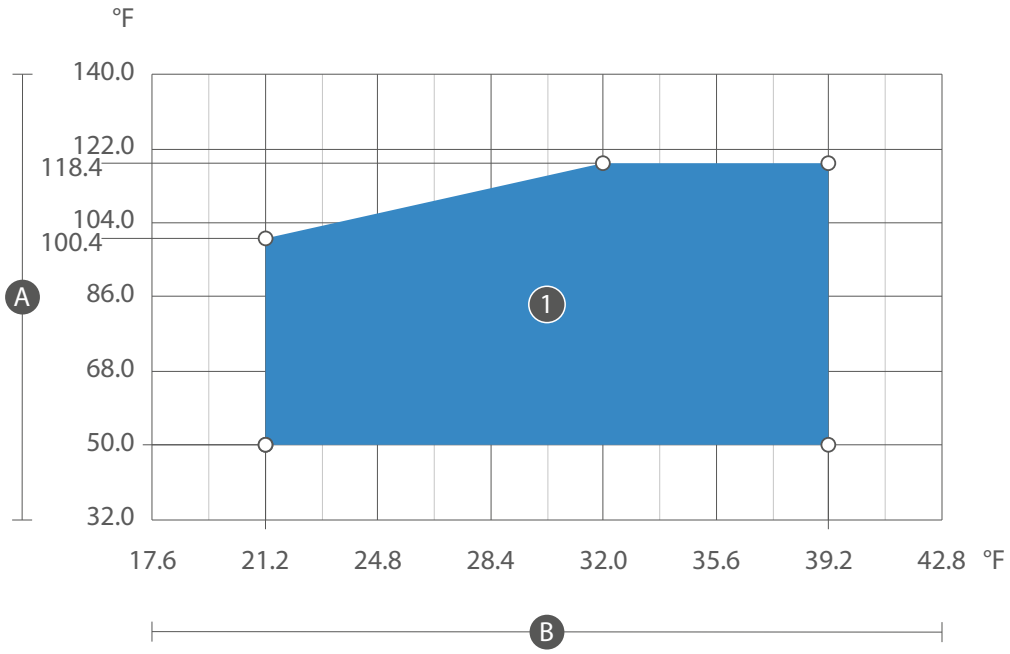
Operating range - fans J - valve °



Key
A **External air temperature (°F)**
B **Water produced temperature (°F)**
1 Standard mode

Operating range - fans °/J - valve Y

Operating range - fans °/J - valve Y



Key

A **External air temperature (°F)**

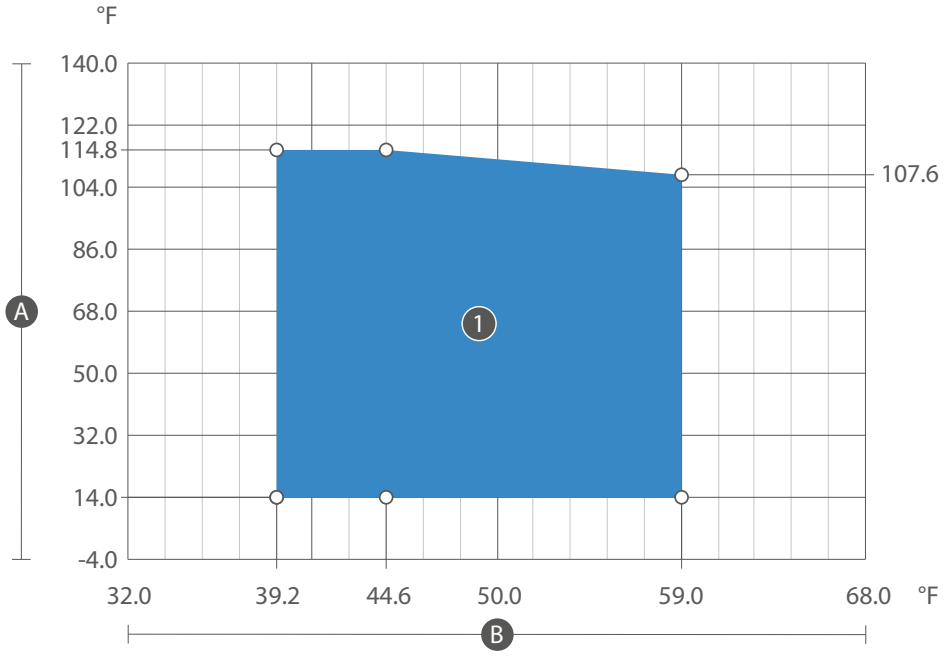
B **Water produced temperature (°F)**

1 Standard mode

OPERATING RANGE NYB FREE-COOLING

Operating range - fans J

Operating range - fans J



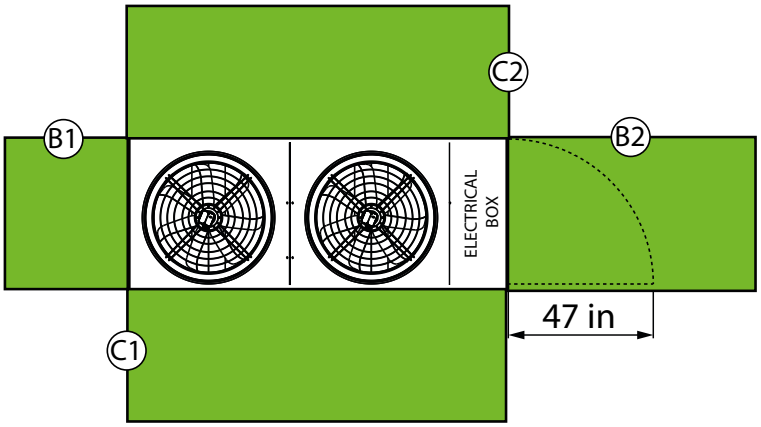
Key

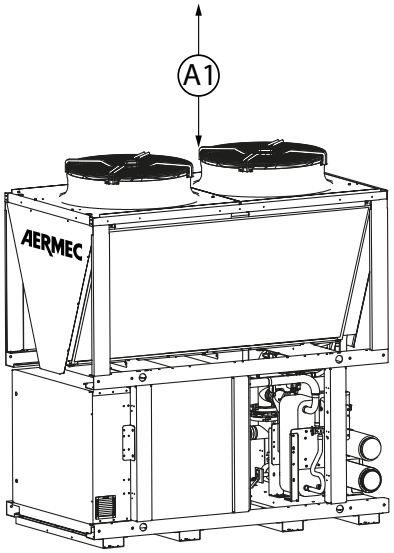
A **External air temperature (°F)**

B **Water produced temperature (°F)**

1 Standard mode

11 MINIMUM TECHNICAL SPACES





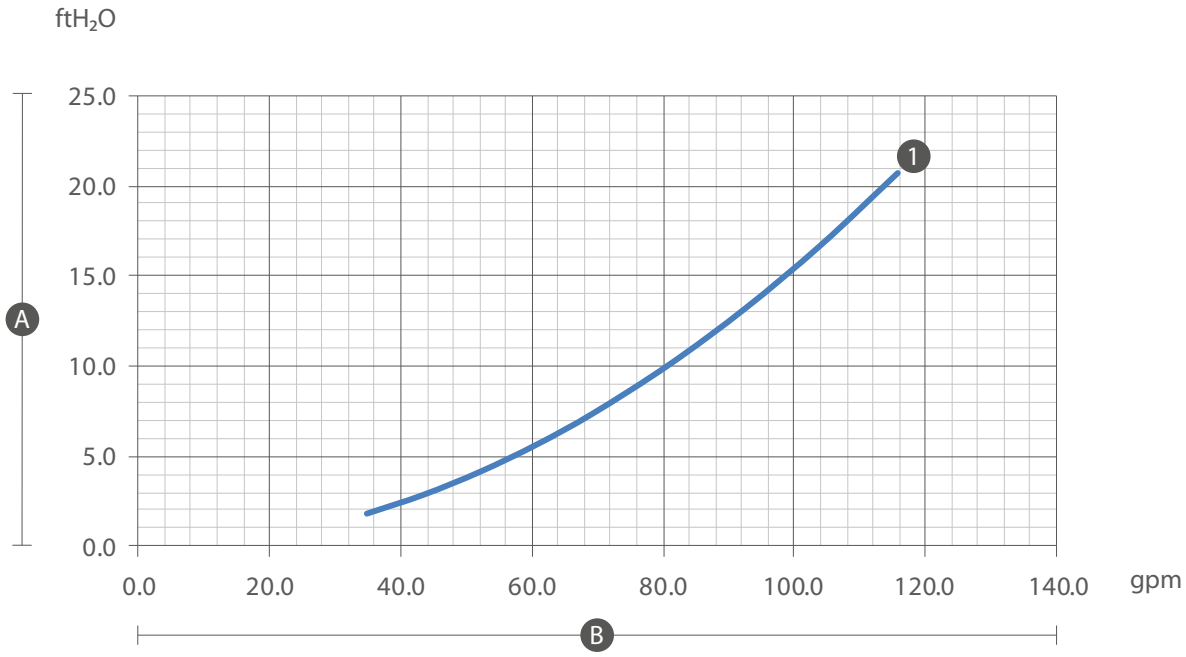
Size			0500
Minimum technical spaces			
A1	A	in	118
B1	A	in	79
B2	A	in	59
C1	A	in	-
C2	A	in	-

12 PRESSURE DROPS

Inlet water temperature 54.1 °F
Outlet water temperature 44.1 °F
External air temperature 95 °F
Average water temperature 50 ° F

ATTENTION: For average water temperature different than 50.0 °F (Cooling mode) or 109.4 °F (Heating or recovery mode) refer to the chapter "Corrective factors for average water temperatures different from nominal values"

PRESSURE DROP NYB COOLING ONLY

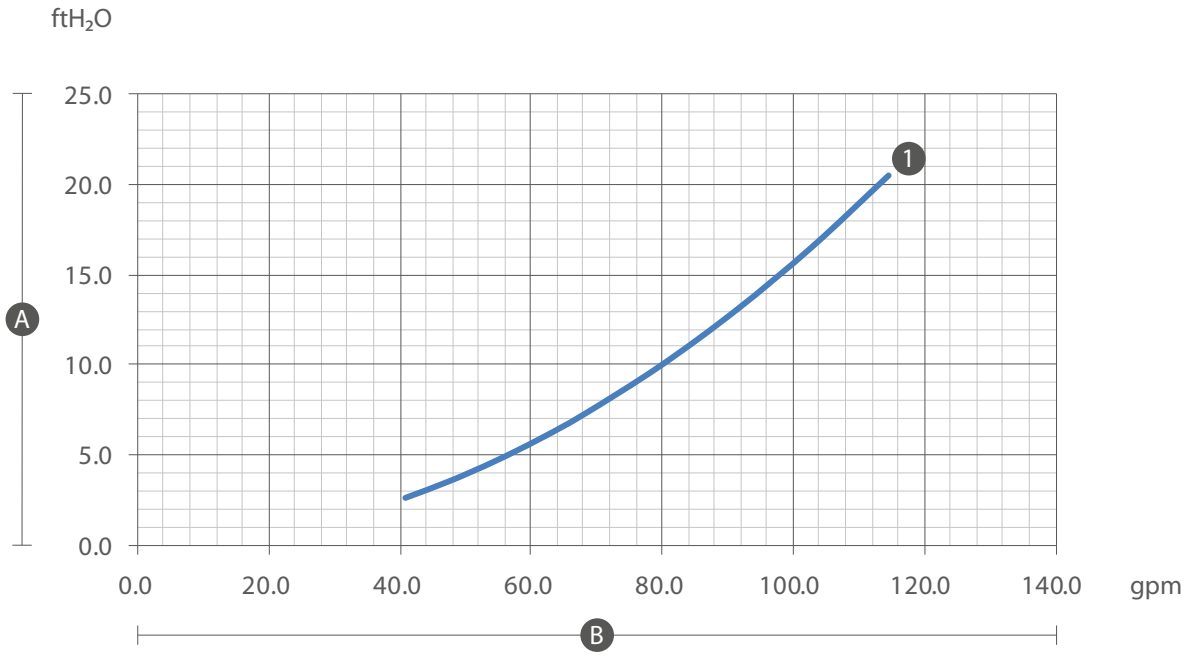


A **Pressure drops (ft H_2O)**
B **Water flow rate (gpm)**
1 0500

Min / max water flow to the system side heat exchanger - NYB cooling only

Size			0500
System side heat exchanger			
Minimum water flow rate	A	gpm	34.7
Maximum water flow rate	A	gpm	115.7

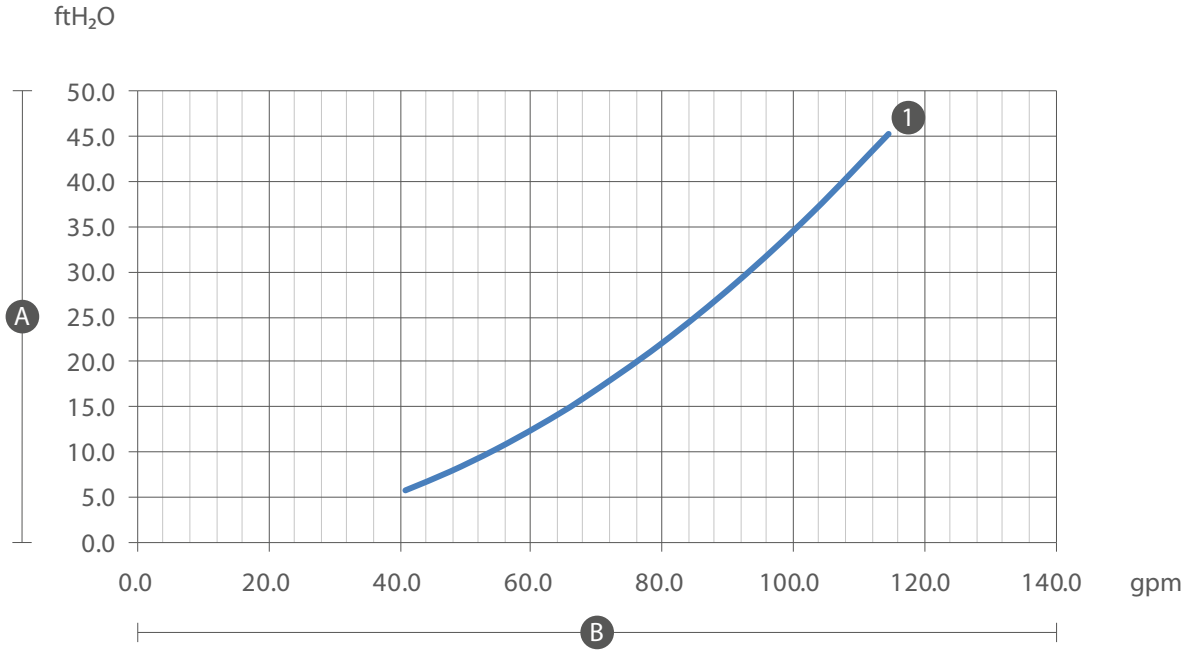
PRESSURE DROP NYB FREE-COOLING (CHILLER OPERATION)



A **Pressure drops (ft H_2O)**
B **Water flow rate (gpm)**

1 0500

PRESSURE DROP NYB FREE-COOLING (FREE-COOLING OPERATION)



A **Pressure drops (ft H_2O)**
B **Water flow rate (gpm)**

1 0500

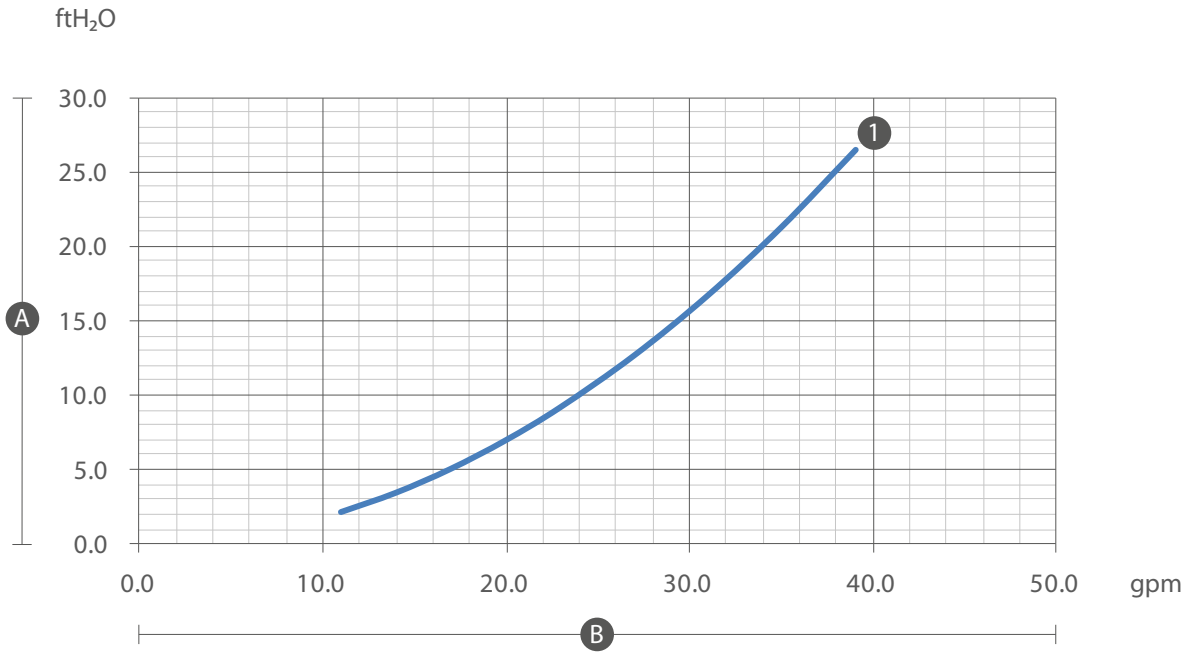
Min / max water flow to the system side heat exchanger - NYB free-cooling

Size			0500
System side heat exchanger			
Minimum water flow rate	A	gpm	40.9
Maximum water flow rate	A	gpm	114.5

DESUPERHEATER PRESSURE DROPS

Desuperheater
Inlet water temperature 104 °F
Outlet water temperature 113 °F
Average water temperature 109.4 °F

■ *ATTENTION: For average water temperatures that differ from 109.4 °F, refer to the chapter "Corrective factors for average water temperatures different from nominal values"*



A **Pressure drops (ft H_2O)**
B **Water flow rate (gpm)**

1 0150

■ *When functioning, the temperature of the water in the heat exchanger inlet must never drop below 95°F.*

Size			0500
Desuperheater			
Minimum water flow rate	A	gpm	11.0
Maximum water flow rate	A	gpm	39.0

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	134.4
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	0.97

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 PROPILENE 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 PROPILENE 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.

Qwc Corrective factor of flow rates (middle water temperatur 49.1 °F)
Qwh Corrective factor of flow rates (middle water temperatur 108.5 °F)
Pc Corrective factor of cooling Capacity
Ph Corrective factor of heating Capacity
Pa Correction factor input Power
ΔP Correction factor Pressure drop

15 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			0500
Minimum system water content			
Minimum water content for air conditioning	A	gal/ton	3.7
Minimum water content for processes	A	gal/ton	7.4

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

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

16 SOUND DATA

Size			0500
Sound data calculated in cooling mode (1)			
Sound power level	A	dB(A)	89.4
Sound pressure level (10 m / 33 ft)	A	dB(A)	57.5
Sound pressure level (1 m / 3.3 ft)	A	dB(A)	71.3
Sound power by centre octave band dB(A)			
125 Hz	A	dB(A)	80.2
250 Hz	A	dB(A)	81.1
500 Hz	A	dB(A)	82.1
1000 Hz	A	dB(A)	85.0
2000 Hz	A	dB(A)	81.2
4000 Hz	A	dB(A)	73.3
8000 Hz	A	dB(A)	63.0

(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).

Sound data NYB free cooling

Size			0500
Sound data calculated in cooling mode (1)			
Sound power level	A	dB(A)	88.4
Sound pressure level (10 m / 33 ft)	A	dB(A)	56.5
Sound pressure level (1 m / 3.3 ft)	A	dB(A)	70.3
Sound power by centre octave band dB(A)			
125 Hz	A	dB(A)	79.2
250 Hz	A	dB(A)	80.1
500 Hz	A	dB(A)	81.1
1000 Hz	A	dB(A)	84.0
2000 Hz	A	dB(A)	80.2
4000 Hz	A	dB(A)	72.3
8000 Hz	A	dB(A)	62.0

(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 54.1/44.1 °F (in/out)
External air temperature 95 °F
Standard fans
Note
For operating conditions different to those declared refer to the selection program Magellano, available on www.aermec.com

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