EN

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Translation of Original instructions

NYK

Technical manual

AIR-COOLED REVERSIBLE MODULAR HEAT PUMP

Cooling capacity 25.8 ton

Heating capacity 345,991 BTU/h

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.

COMPANY CERTIFICATIONS

SAFETY CERTIFICATIONS

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

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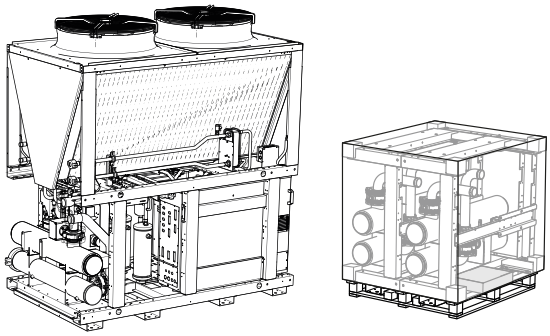
FIELDS OF THE RANGE

NYK is supplied as two separate units, whose assembly is simple and rapid, see KCOLL accessory instruction.



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

Reversible outdoor heat pumps for the production of chilled/heated water designed to satisfy the needs of residential and commercial buildings, or for industrial applications.
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 units designed to reduce the overall unit dimensions to a minimum.

SILENT

Silent at the highest levels thanks to the inverter fans used in both the standard (J) and oversized (M) options – the latter also offer high static pressure.

FLEXIBILITY

NYK allows the installation to be adapted to the actual development system requirements, therefore, the power can be increased over time in a simple and inexpensive way.

MODEL WITH PARTIAL HEAT RECOVERY (DESUPERHEATER)

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

CONFIGURATOR

Field		Description
1,2,3		**NYK**
4,5,6		**Size** 500
7		**Model**
	H	Heat pump
8		**Heat recovery**
	°	Without heat recovery
	D	With desuperheater (1)
9		**Coils**
	°	Copper-aluminium
	R	Copper pipes-copper fins
	S	Copper pipes-Tinned copper fins
	V	Copper pieps-Coated aluminium fins
10		**Fans**
	J	Inverter
	M	Inverter surdimensionnés
11		**Power supply**
	6	230V ~3/60Hz
	7	460V ~ 3 60Hz
	8	575V ~3/60Hz
	9	208V ~3/60Hz
12,13		**Integrated hydronic kit**
	00	145 psi nominal
	01	300 psi nominal
14		**System type**
	2	2-pipe system
	4	4-pipe system

(1) The desuperheater must be intercepted in heating mode. In cooling mode, a water temperature no lower than 95 °F must always be guaranteed on the heat exchanger inlet.

RELIABILITY

— The electrical panel on each module and the management logic via the Multichiller_EVO accessory, which allows the modules to work in synergy with each other, ensure continuity of service even if one unit malfunctions.
— Modularity is essential when component redundancy is required, as it allows for a safer system design and increased reliability.
— Possibility of using them in a system with fixed or variable flow rates.
— Possibility of excluding individual modules with valves on every unit in case of maintenance.

ALSO JOINT PRODUCTION OF HOT/COLD WATER

Besides choosing the components carefully and the particular cooling configuration with vapor injection compressors, we decided to provide a plug and play unit to also manage the hydraulic circuit, allowing the type of unit for 2 or 4 pipe systems in the configurator to be chosen.
— **In the 2-pipe configuration** , the production of hot or cold water is alternated according to need.
— **In the 4-pipe** configuration, hot or cold water can also be produced simultaneously if several modules are installed. The throttle valves on each module, independent of each other, allow the water produced on the collector of the hot or cold circuit to be switched according to the operating mode of the single unit established by the Multichiller_EVO, according to the cooling / heat load required by the system.

CONTROL PCO_5

Microprocessor adjustment, with keyboard and LCD display,for easy access on the unit is a menu available in several languages.
Adjustment includes complete management of the alarms and their log.
The presence of a programmable timer allows functioning time periods and a possible second set-point to be set.
The temperature control takes place with the integral proportional logic, based on the water output temperature.
Modalità Night Mode: it is possible to set a silenced operation profile.
Perfect for night operation since it guarantees greater acoustic comfort in the evenings, and a high efficiency in the time of greater load.

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.

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.

Reversing valve

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

One-way valve

They allow one-way flow of the refrigerant.

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.

Inverter ventilation group

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

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.

■ *Without hydronic kit "00"*

Differential transmitter

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.

■ *Version with hydronic kit "01"*

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.

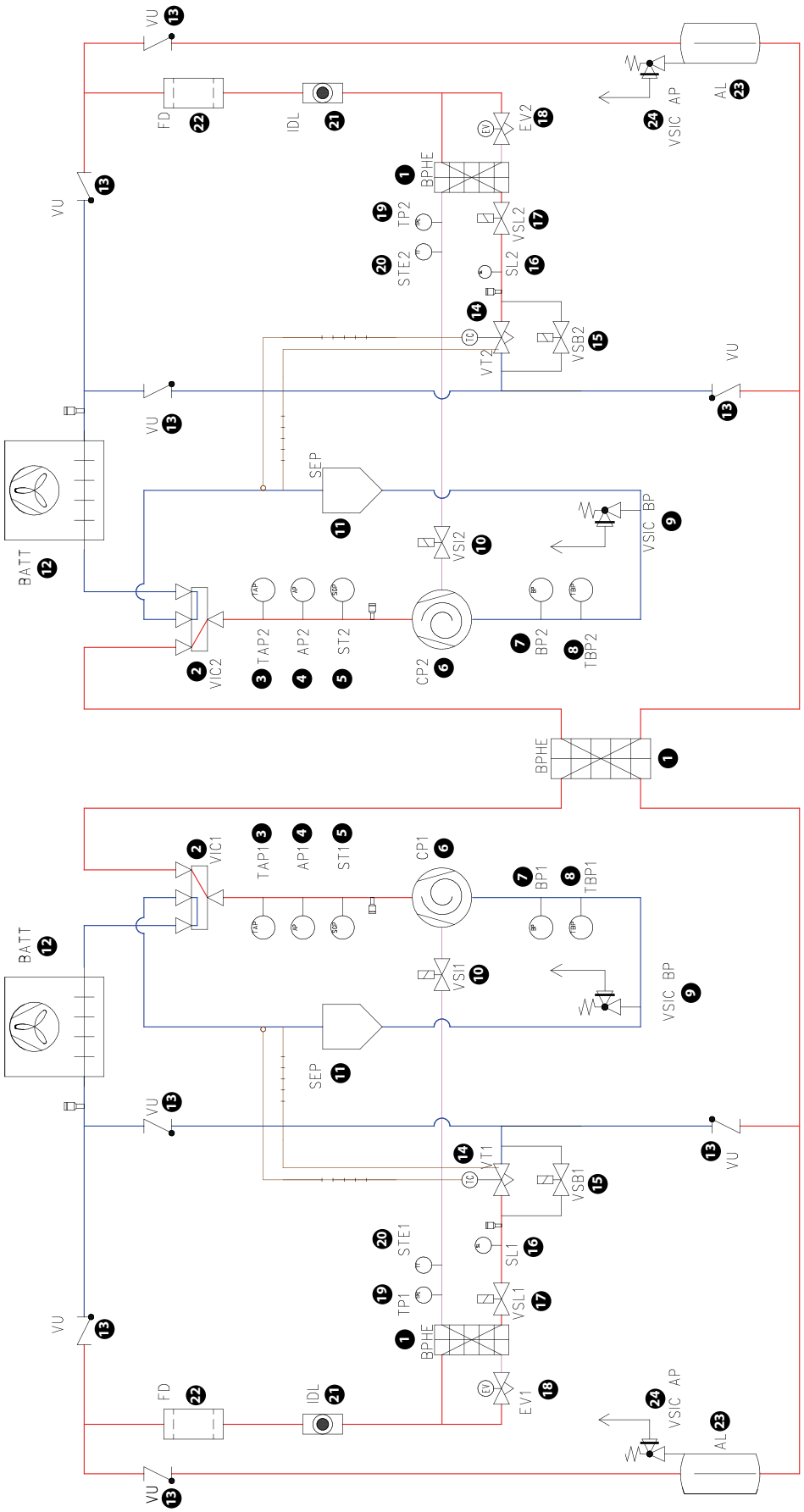
Electronic controller

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.*

REFRIGERANT CIRCUIT



Key:

1 Plate heat exchanger
2 4-way cycle inversion valve
3 High pressure transducer
4 High pressure switch
5 Discharge temperature sensor
6 Compressor
7 Low pressure switch
8 Low pressure transducer
9 Low pressure safety valve
10 Hot gas Injection solenoid valve
11 Liquid separator
12 Finned coil
13 One-way valve
14 Thermostatic expansion valve
15 Solenoid by-pass valve
16 Liquid probe
17 Solenoid valve
18 electronic valve
19 Pressure transducer electronic valve
20 Electronic expansion valve temperature probe
21 Sight glass
22 Filter drier
23 Liquid accumulator
24 High pressure side pressure relief valve

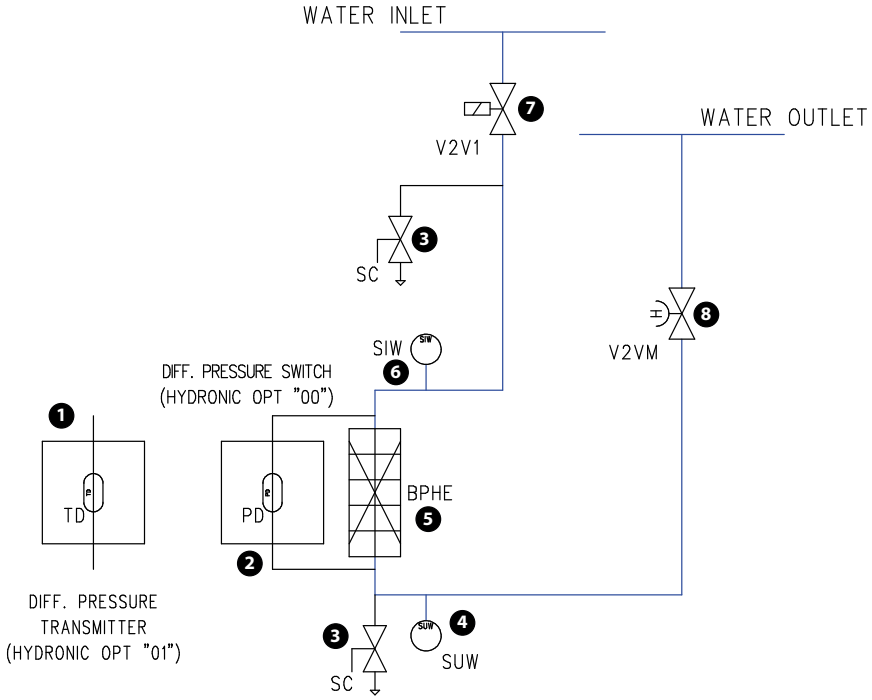
MAIN HYDRAULIC CIRCUITS

2-PIPE

■ *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.



Key:

1	Differential transmitter	3	Discharge valve	6	Water inlet temperature sensor
2	Differential pressure switch	4	Water outlet temperature probe	7	Electronic 2 way valve
		5	Plate heat exchanger	8	Manual 2-way 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.*

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.

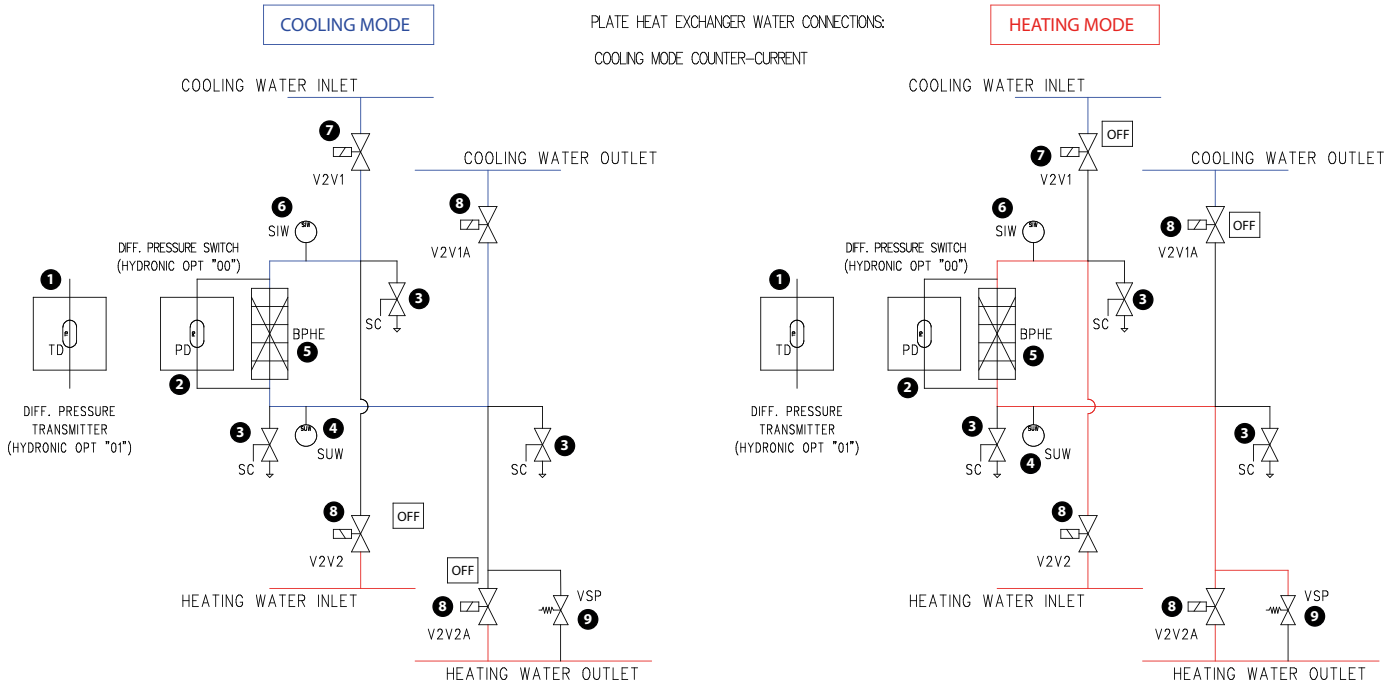
It is of fundamental importance to keep the oxygen concentration in the water under control, especially in open vessel systems. This type of system, in fact, is very sensitive to the phenomenon of extra-oxygenation of the water (an event that can be encouraged by the incorrect positioning of some components).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

4-PIPE

■ *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.



Key:

1	Differential transmitter	4	Water outlet temperature probe	8	Manual 2-way valve
2	Differential pressure switch	5	Plate heat exchanger	9	Overpressure valve
3	Discharge valve	6	Water inlet temperature sensor		
		7	Electronic 2 way 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.*

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.

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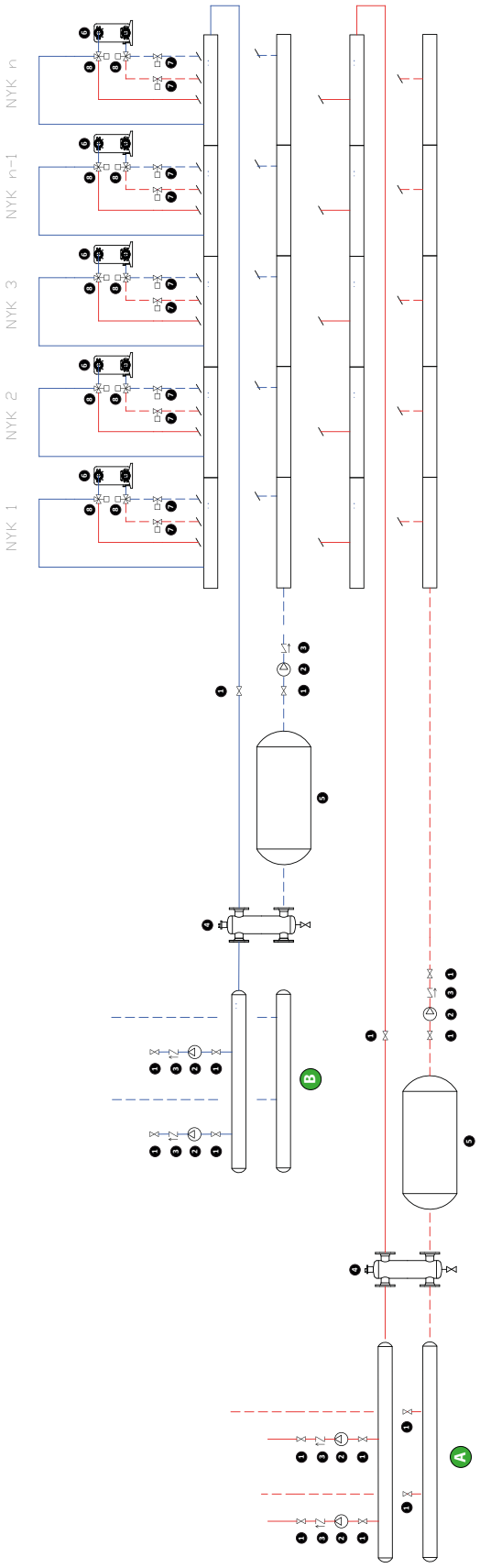
EXAMPLE OF SYSTEM

The drawing is provided for purely exemplary purposes, the selection of the number, position and size of the hydraulic components is the responsibility of the system designer.



Key:

A **Hot side**
B **Cold side**
1 Shut-off valve
2 Pump
3 One-way valve
4 Circuit breaker
5 Storage tank
6 Exchanger
7 Shut-off motorized valve
8 diverting valve

ACCESSORIES

AER485P1: RS-485 interface for supervision systems with MODBUS protocol.
AERNET: The device allows the control, the management and the remote monitoring of a Chiller with a PC, smartphone or tablet using Cloud connection. AERNET works as Master while every unit connected is configured as Slave (max. 6 unit); also, with a simple click is possible to save a log file with all the connected unit datas in the personal terminal for post analysis.
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.
CRATE: Special crate for transport

MANDATORY ACCESSORIES FOR ONLY THE 4-TUBE UNITS

KCOLL00_NYK4T: Additional manifold kit (145 psi) removable for a separate shipment.
KCOLL01_NYK4T: Additional manifold kit (300 psi) removable for a separate shipment.
KCOLLPACK_NYK4T: Packaging for the manifold kits (2 kits per package)

FACTORY FITTED ACCESSORIES

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

■ *Kit of 2 x 6" caps for manifolds*

ACCESSORIES COMPATIBILITY

Accessories

Model	500
AER485P1	•
AERNET	•
MULTICHILLER_EVO	•
PGD1	•

Special crate for transport

500
CRATE_NYB

Pair of caps with grooved joints assembled on the unit manifold

500
KNYB

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

Additional manifold kits

Accessory	NYK 500
KCOLL00_NYK4T	•
KCOLL01_NYK4T	•
KCOLLPACK_NYK4T	•

1 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 °

2 PERFORMANCE SPECIFICATIONS

Size			500
Cooling performance 54.0 °F / 44.1 °F (1)			
Cooling capacity	6,7,8,9	ton	25.8
Input power	6,7,8,9	kW	30.5
Cooling total input current	6	A	104.5
	7	A	52.3
	8	A	41.8
	9	A	115.6
EER	6,7,8,9	BTU/(Wh)	10.18
IPLV	6,7,8,9	BTU/(Wh)	13.68
Water flow rate system side	6,7,8,9	gpm	61.8
Pressure drop system side	6,7,8,9	ftH_2O	6.02
Heating performance * °F / 120.0 °F (2)			
Heating capacity	6,7,8,9	BTU/h	345,991
Input power	6,7,8,9	kW	34.9
Heating total input current	6	A	107.0
	7	A	53.0
	8	A	43.0
	9	A	118.0
COP	6,7,8,9	kW/kW	2.90
Water flow rate system side	6,7,8,9	gpm	65.2
Pressure drop system side	6,7,8,9	ftH_2O	6.69

(1) Data: System side water heat exchanger 54.0 °F / 44.1 °F; External air 95 °F
(2) Data: System side water heat exchanger * °F / 120.0 °F; External air 47 °F

3 GENERAL TECHNICAL DATA

		NYK 500
Compressor		
Type	type	Scroll
Number	no.	2
Circuits	no.	2
Refrigerant	type	R410A
Compressor - Circuit (C1/C2)		
Refrigerant load circuit 1	lbs	19.8
Refrigerant load circuit 2	lbs	19.8
System side heat exchanger		
Type	type	Brazed plate
Number	no.	1

ELECTRIC DATA

FAN J

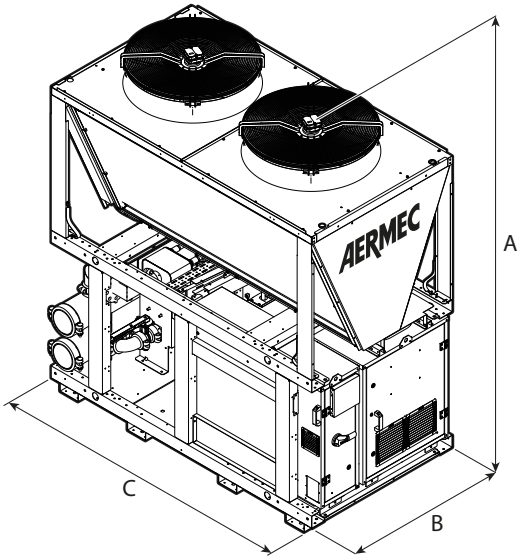
		NYK 500
Power supply: 230V		
Peak current (LRA)	A	444.0
Minimum circuit amperage (MCA)	A	175.0
Maximum overcurrent permitted by the protection device (MOP)	A	225.0
Cooling total input current	A	104.5
Heating total input current	A	106.6
Power supply: 460V		
Peak current (LRA)	A	222.0
Minimum circuit amperage (MCA)	A	90.0
Maximum overcurrent permitted by the protection device (MOP)	A	110.0
Cooling total input current	A	52.0
Heating total input current	A	53.0
Power supply: 575V		
Peak current (LRA)	A	178.0
Minimum circuit amperage (MCA)	A	70.0
Maximum overcurrent permitted by the protection device (MOP)	A	90.0
Cooling total input current	A	41.8
Heating total input current	A	42.6
Power supply: 208V		
Peak current (LRA)	A	491.0
Minimum circuit amperage (MCA)	A	200.0
Maximum overcurrent permitted by the protection device (MOP)	A	250.0
Cooling total input current	A	115.6
Heating total input current	A	117.9

FAN M

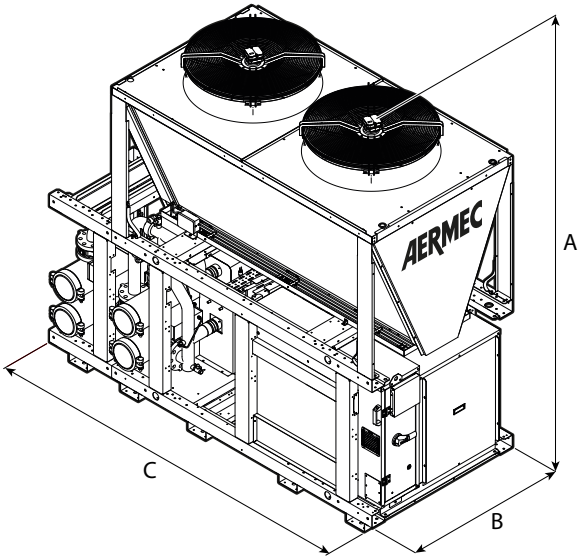
		NYK 500
Power supply: 230V		
Peak current (LRA)	A	455.0
Minimum circuit amperage (MCA)	A	175.0
Maximum overcurrent permitted by the protection device (MOP)	A	225.0
Cooling total input current	A	104.5
Heating total input current	A	106.6
Power supply: 460V		
Peak current (LRA)	A	228.0
Minimum circuit amperage (MCA)	A	90.0
Maximum overcurrent permitted by the protection device (MOP)	A	110.0
Cooling total input current	A	52.0
Heating total input current	A	53.0
Power supply: 575V		
Peak current (LRA)	A	182.0
Minimum circuit amperage (MCA)	A	70.0
Maximum overcurrent permitted by the protection device (MOP)	A	90.0
Cooling total input current	A	41.8
Heating total input current	A	42.6
Power supply: 208V		
Peak current (LRA)	A	504.0
Minimum circuit amperage (MCA)	A	200.0
Maximum overcurrent permitted by the protection device (MOP)	A	250.0
Cooling total input current	A	115.6
Heating total input current	A	117.9

DIMENSIONS AND WEIGHTS

2-pipe system



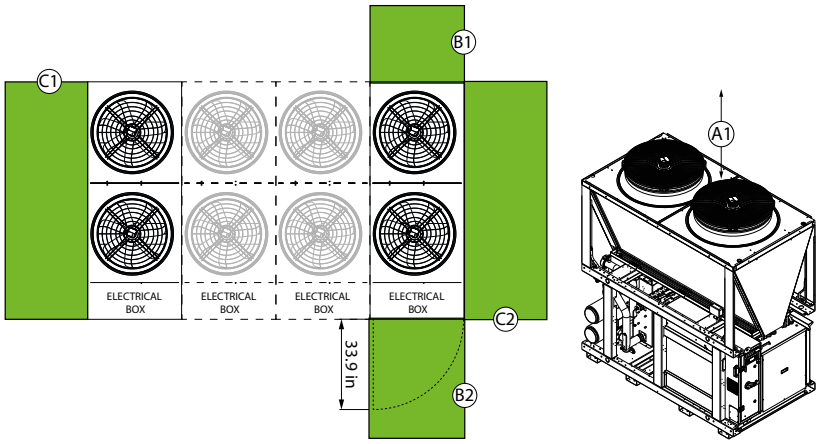
4-pipe system



Size			500
Dimensions and weights			
A	J	in	96.5
	M	in	99.5
B	J,M	in	46.9
2-pipe system			
C	J,M	in	86.6
4-pipe system			
C	J,M	in	107.3

Size			500
2-pipe			
Empty weight	6,8,9	lbs	3,571
	7	lbs	2,954
4-pipe			
Empty weight	6,8,9	lbs	3,968
	7	lbs	3,351

4 MINIMUM TECHNICAL SPACES



		NYK 500
Minimum technical spaces		
A1	in	118.1
B1	in	39.4
B2	in	59.1
C1	in	39.4
C2	in	39.4

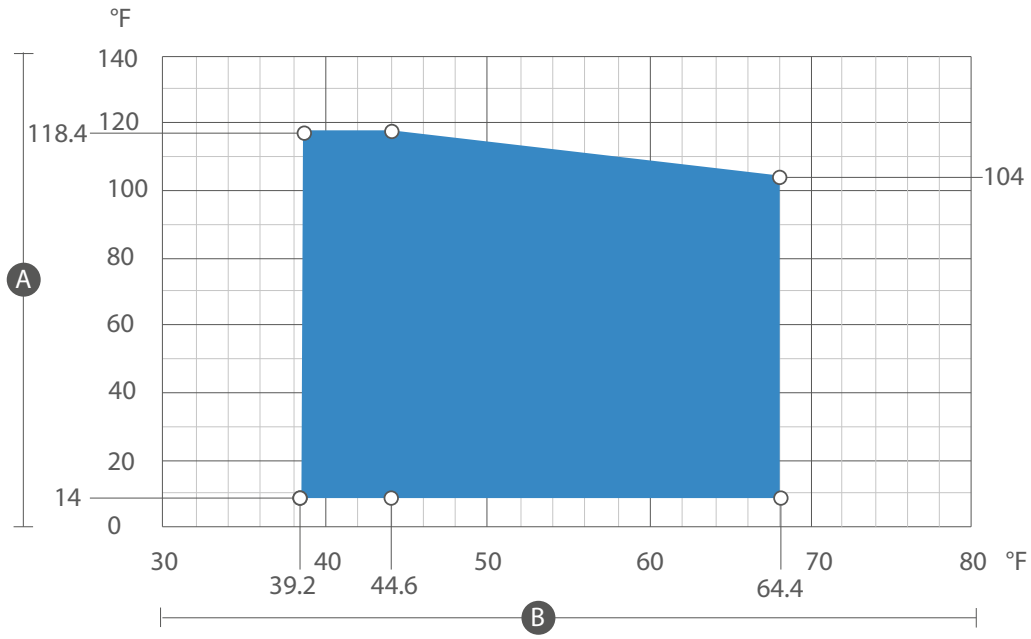
5 OPERATING LIMITS

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, valid for ΔT = -22.0 °F (cooling mode) and ΔT = -22.9 °F (heating mode).

■ *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 4.3 knot.*

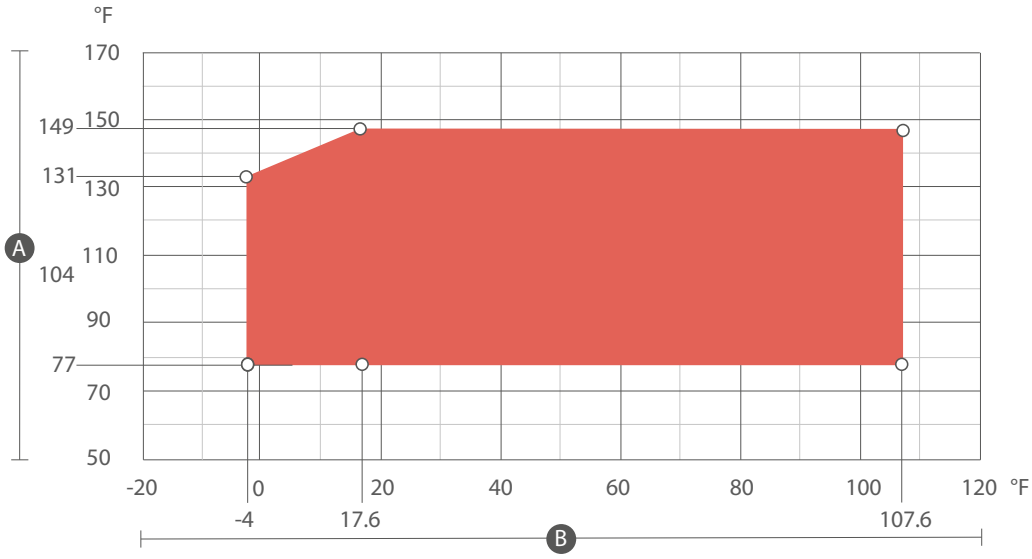
WARNING: Under no circumstances does the unit have to be operated outside the operating limit under penalty of the warranty expiration. Aermec S.p.A. cannot be held responsible for any malfunction of the units which are operated outside the established limits and for their consequences.

COOLING



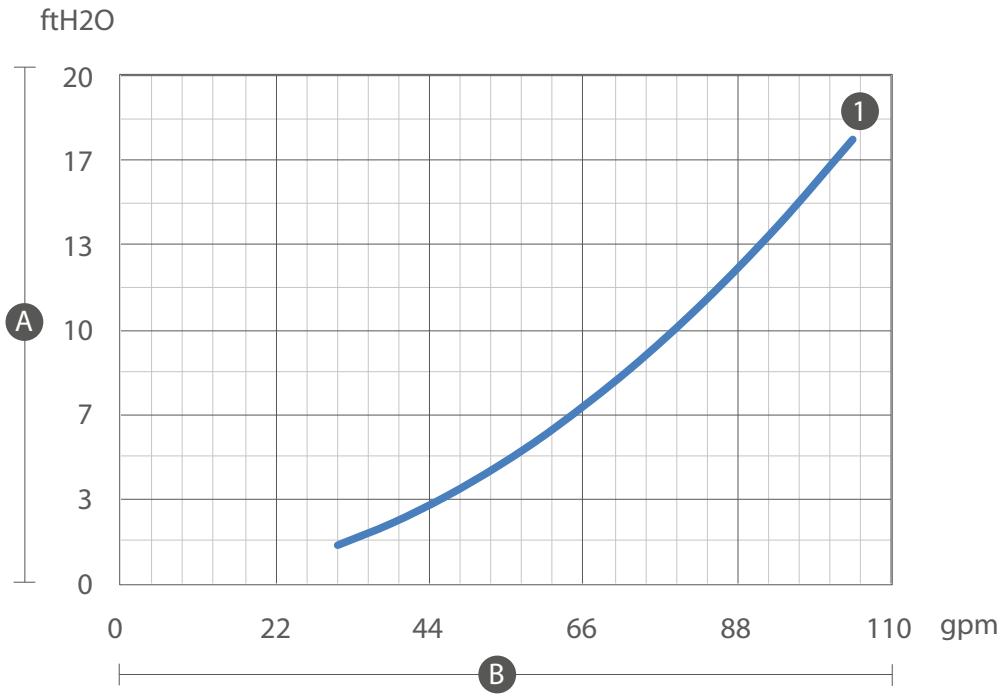
Key:
A **External air temperature (°F)**
B **Water produced temperature (°F)**

HEATING



Key
A. Water produced temperature (°F)
B. External air temperature (°F)

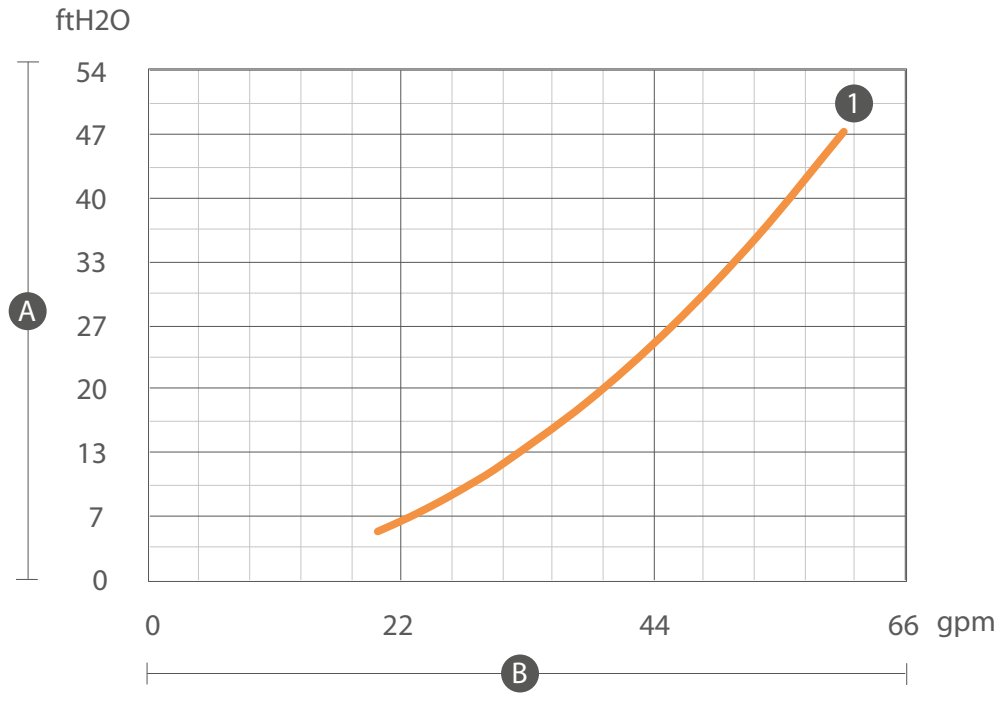
6 PRESSURE DROPS



Key:
1 NYK 500

■ *System side water heat exchanger 54.0 °F / 44.1 °F; External air 95 °F*

DESUPERHEATER



Key:
1 NYK 500

■ *The desuperheater must be intercepted in heating mode. In cooling mode, a water temperature no lower than 95 °F must always be guaranteed on the heat exchanger inlet.*

System side water heat exchanger 54.0 °F / 44.1 °F; External air 95 °F
The desuperheater must be intercepted in heating mode. In cooling mode, a water temperature no lower than 95 °F must always be guaranteed on the heat exchanger inlet.

SYSTEM WATER CONTENT

MINIMUM SYSTEM WATER CONTENT

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: 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

The minimum water content of the system allows you to limit the activations and shutdowns of the compressor.
To calculate it use the formula Pc (ton) X gal.

		NYK 500
Minimum system water content		
Minimum water content for air conditioning	gal/ton	6.5

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

7 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

8 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

9 SOUND DATA

WITHOUT STATIC PRESSURE

Sound data calculated in cooling mode

Size			500
Sound data calculated in cooling mode (1)			
Sound power level	J	dB(A)	89,1
	M	dB(A)	86,2
Sound pressure level (10 m / 33 ft)	J	dB(A)	57,2
	M	dB(A)	54,3
Sound pressure level (1 m / 3.3 ft)	J	dB(A)	70,9
	M	dB(A)	68,1
Sound power by centre octave band dB(A)			
63 Hz	J	dB(A)	84.5
	M	dB(A)	68.0
125 Hz	J	dB(A)	80,4
	M	dB(A)	71,5
250 Hz	J	dB(A)	75,4
	M	dB(A)	76,1
500 Hz	J	dB(A)	78,9
	M	dB(A)	79,9
1000 Hz	J	dB(A)	82,8
	M	dB(A)	82,3
2000 Hz	J	dB(A)	79,9
	M	dB(A)	78,7
4000 Hz	J	dB(A)	71,6
	M	dB(A)	72,7
8000 Hz	J	dB(A)	61,7
	M	dB(A)	62,9

(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 calculated in heating mode

Size			500
Sound data calculated in heating mode (1)			
Sound power level	J	dB(A)	91,8
	M	dB(A)	89,4
Sound pressure level (10 m / 33 ft)	J	dB(A)	59,9
	M	dB(A)	57,5
Sound pressure level (1 m / 3.3 ft)	J	dB(A)	73,6
	M	dB(A)	71,2
Sound power by centre octave band dB(A)			
63 Hz	J	dB(A)	86.5
	M	dB(A)	70.0
125 Hz	J	dB(A)	83,0
	M	dB(A)	74,1
250 Hz	J	dB(A)	78,1
	M	dB(A)	78,8
500 Hz	J	dB(A)	82,5
	M	dB(A)	83,5
1000 Hz	J	dB(A)	86,3
	M	dB(A)	85,7
2000 Hz	J	dB(A)	82,3
	M	dB(A)	81,1
4000 Hz	J	dB(A)	73,8
	M	dB(A)	75,0
8000 Hz	J	dB(A)	63,9
	M	dB(A)	65,1

(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).

System water temperature 54.0/44.1 °F (in/out)
External air temperature 95.0 °F
Note
For operating conditions different to those declared refer to the selection program Magellano, available on www.aermec.com

WITH STATIC PRESSURE

Sound data calculated in cooling mode

Size			500
Sound data calculated in cooling mode (1)			
Sound power level	J	dB(A)	-
	M	dB(A)	96,6
Sound power by centre octave band dB(A)			
63 Hz	J	dB(A)	-
	M	dB(A)	95.1
125 Hz	J	dB(A)	-
	M	dB(A)	89,1
250 Hz	J	dB(A)	-
	M	dB(A)	80,6
500 Hz	J	dB(A)	-
	M	dB(A)	78,9
1000 Hz	J	dB(A)	-
	M	dB(A)	77,9
2000 Hz	J	dB(A)	-
	M	dB(A)	81,6
4000 Hz	J	dB(A)	-
	M	dB(A)	76,0
8000 Hz	J	dB(A)	-
	M	dB(A)	71,2

(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 calculated in heating mode

Size			500
Sound data calculated in heating mode (1)			
Sound power level	J	dB(A)	-
	M	dB(A)	99,2
Sound power by centre octave band dB(A)			
63 Hz	J	dB(A)	-
	M	dB(A)	97.5
125 Hz	J	dB(A)	-
	M	dB(A)	92,1
250 Hz	J	dB(A)	-
	M	dB(A)	83,7
500 Hz	J	dB(A)	-
	M	dB(A)	82,9
1000 Hz	J	dB(A)	-
	M	dB(A)	81,8
2000 Hz	J	dB(A)	-
	M	dB(A)	84,4
4000 Hz	J	dB(A)	-
	M	dB(A)	78,7
8000 Hz	J	dB(A)	-
	M	dB(A)	73,8

(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).

System water temperature 54.0/44.1 °F (in/out)
External air temperature 95.0 °F
Note
For operating conditions different to those declared refer to the selection program Magellano, available on www.aermec.com

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