EN

23.04 – 5890710_06
Translation of Original instructions

WRL 200-500

Technical manual

WATER COOLED HEAT PUMP REVERSIBLE WATER SIDE

Cooling capacity 15.26 ÷ 26.86 ton

Heating capacity 201,664 ÷ 350,761 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 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

Water-water offering chilled/hot water, designed to mit air conditioning needs in residential/commercial complexes or industrial applications.
Indoor units with hermetic scroll compressors and plate heat exchangers.
In the configuration with desuperheater, it is also possible to produce free-hot water.
The technological choices made, always oriented to the highest quality, ensure very easy installation.
In fact, the electrical and hydraulic connections are all located at the top of the unit making it easy to install and maintain, also reducing the technical areas and their placement in the smallest space possible.

OPERATING FIELD

Full-load operation with the production of chilled water 39.2 °F to 64.4 °F, and the possibility to produce also negative temperature water down to 17.6 °F for the evaporator and hot water for the condenser up to 131.0 °F.

PLUG AND PLAY

All the units are equipped with scroll compressors and plate heat exchangers; the base and panelling are made of steel treated with RAL 9003 polyester paints.
The electric and hydraulic connections are all located on the upper part of the unit facilitating installation and maintenance. This allows reduced plant room space and installation in the smallest space possible.
The heat pump can be supplied with all the components required for its installation in new systems and to replace other heat generators. It can be combined with low temperature emission systems such as floor heating or fan coils, but also with conventional radiators.

VERSION WITH INTEGRATED HYDRONIC KIT

To obtain a solution that offers economic savings and facilitates installation, these units can be configured with an integrated hydronic kit on both hydraulic sides (service and source).
High-head pumps are available, along with a modulating 2-way valve that can only be applied on the source side to reduce consumption in applications with groundwater.

2 CONFIGURATOR

Field		Description
1,2,3		**WRL**
4,5,6		**Size** 200, 400, 500
7		**Operating field**
	°	Standard mechanic thermostatic valve (1)
	X	Electronic thermostatic expansion valve (2)
	Y	Low temperature mechanic thermostatic valve (3)
8		**Model**
	°	Heat pump reversible on the water side
	E	Evaporating unit
9		**Version**
	°	Standard
10		**Heat recovery**
	°	Without heat recovery
	D	With desuperheater (4)
11		**Integrated hydronic kit, source side**
	°	Without hydronic kit
	U	Pump high head
	V	2-way modulating valve
12		**Integrated hydronic kit user side**
	°	Without hydronic kit
	N	Pump high head
13		**Field for future development**
	°	Field for future development
14		**Soft-start**
	°	Without soft-start
	S	With soft-start (5)
15		**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

(1) Water produced up to +39.2 °F
(2) Water produced up to +39.2 °F. For different temperature please contact the factory.
(3) Water produced from 39.2 °F up to 17.6 °F
(4) With this option the "Y" valve is not compatible.
(5) Only for supplies 460V ~ 3 60Hz and 575V ~ 3 60Hz

3 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.

Source side heat exchanger

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

Filter drier

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

Sight glass

It is used to verify that the expansion system is powered correctly and the 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.

Electronic thermostatic expansion valve

Compared with a mechanical thermostatic valve, the electronic one offers better overheating control so the evaporator is used more efficiently in all conditions, thereby boosting machine output.
Its use in comfort dedicated applications allows to make substantial benefits especially in the presence of varying loads, because it allows you to maintain the maximum efficiency with any external air temperature.
In industrial applications, where there is often a need to make temperature changes in a wide range of environmental conditions, the use of the electronic valve is ideal because it avoids the need for continuous calibration, adapting the system to different load conditions and hence making it independent.

HYDRAULIC CIRCUIT (VERSIONS WITHOUT HYDRONIC KIT)

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.

Drain valve

HYDRAULIC CIRCUIT (VERSIONS WITH HYDRONIC KIT)

Pump

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

Expansion vessel

Membrane type precharged with nitrogen.

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.

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

Complete with:
— door lock main isolating switch,
— magnetothermic switches and meters for compressors;
— phase sequence control,
— terminals for the connection with the remote keypad (OPTIONAL),
— terminals for remote alarm signals,
— clamps for signalling compressor switch-on status,
— terminals for boiler / heaters signal input,
— terminals for differential pressure switch alarm signal,
— electronic control µPC,
— control circuit numbered cables,
— terminals for 3-way valve,
— 0-10V terminals for modulating valve control

Door interlocked isolator

Access to the electrical panel is by operating the handle of the door interlocked isolator which removes power to the unit.
When the electrical panel is closed, this lever can be locked - using one padlock or more - during maintenance to prevent the machine being powered up accidentally.

Control panel

Allows complete control of the unit.
For further information refer to the user manual.

Electronic controller µPC

The device is the new controller for the management of the reversible water-cooled units; the new PGD1 8-row display guarantees clear reading, with the icons showing how the machine is operating.
Some entries are password protected and only available to the service technician.
The electronics also include a series of protection algorithms aimed at preventing any damage to the main system components.

List of functions

Main functions:

1. Parametrization of the compressor's on/off times to prevent ON/OFF cycles too close together.
2. To prevent any risk of the plate heat exchanger breaking due to the water freezing, it contains 3 anti-freeze liquids (geothermal, system and zones). In addition, the microprocessor stops the compressor if the temperature detected by the exchanger output probe is lower than the set antifreeze value.
3. Water flow rate alarm activated by the differential pressure switches fitted as standard.
4. Condensation control managed through the speed modulation of the circulating pumps with phase cut or inverter, two-way modulating valve, pump ON/OFF systems.
5. "Chiller" water set-point compensation for external temperature.

Additional functions:

— Management of an external integration resource dedicated to the domestic water heater.
— System management with heat pump and boiler.
— Anti-Legionella cycle.
— Time slots for the daily/weekly programming.
— **Temperature control**: temperature regulation is based on the delivery water from the system.
— **System side circulating pump**: the electronic board has an output to manage the circulating pump - always ON in COOLING and HEATING mode, and OFF with a 1-minute delay after unit switch-off (standby).
— **Source side pump**: the electronic board has an output to manage the source side pump (refer to the configurator for the available pumps). The source side pump is turned on before the compressor is started and turned off about 30 seconds after it is turned off.
— **Antifreeze alarm**: the antifreeze function is only active when the unit is switched on or in standby. To prevent any risk of the plate heat exchanger breaking due to the water inside it freezing, the microprocessor stops the compressor if the temperature detected by the exchanger output temperature probe is lower than +39.2°F. The triggering of this alarm stops the compressor, but the pump will remain active.

■ *THIS ANTIFREEZE TEMPERATURE SETTING CAN ONLY BE ALTERED BY AN AUTHORISED SERVICE CENTRE, AND ONLY AFTER CHECKING THERE IS AN ANTIFREEZE LIQUID IN THE WATER CIRCUIT.*

— **Domestic hot water antifreeze**: the DHW antifreeze function is only active if there is an integration resource dedicated to DHW storage. The integration

resource is activated if the water temperature detected by the DHW probe is lower than +39.2°F, and is switched off at +44.6°F.

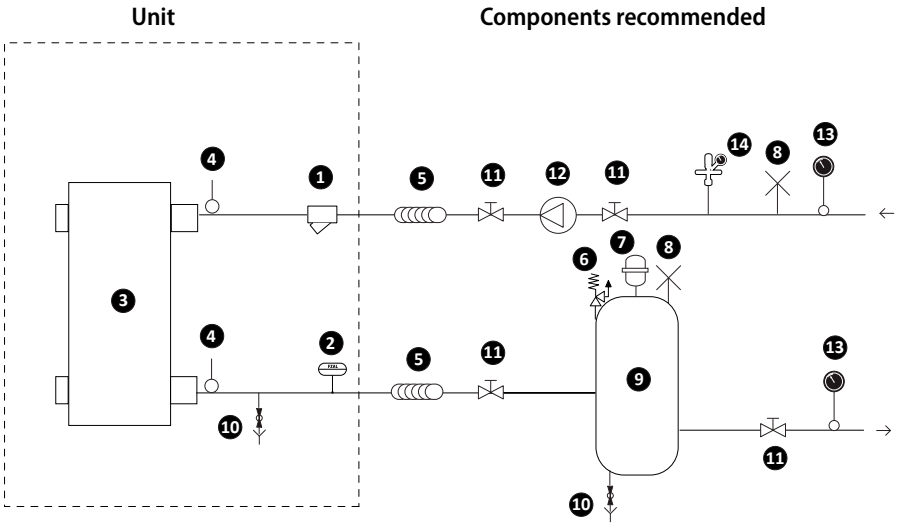
— **Wizard**: a start-up procedure has been created to facilitate unit set-up. This procedure is used on the first start-up.
— **Supervision systems**: MODBUS and BACnet.

■ *For other requirements, please contact the company.*

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

4 MAIN HYDRAULIC CIRCUITS

SYSTEM SIDE



COMPONENTS AS STANDARD

1 Water filter
2 Flow switch
3 Plate heat exchanger
4 Water temperature sensor
10 Drain valve

HYDRAULIC COMPONENTS RECOMMENDED OUTSIDE THE UNIT (AT THE INSTALLER'S RESPONSIBILITY)

5 Anti-vibration joints
6 Pressure relief valve
7 Expansion vessel
8 Air drain valve
9 Storage tank
10 Drain valve
11 Shut-off tap
12 Pump
13 Pressure gauge
14 Loading unit

Intermediate exchangers (suitably sized by the designer) are required upstream of the heat exchangers of the refrigeration unit in all cases where strict compliance with the above limits is not guaranteed or in the presence of dirty/aggressive water. Failure to comply with the above requirement shall invalidate the warranty.

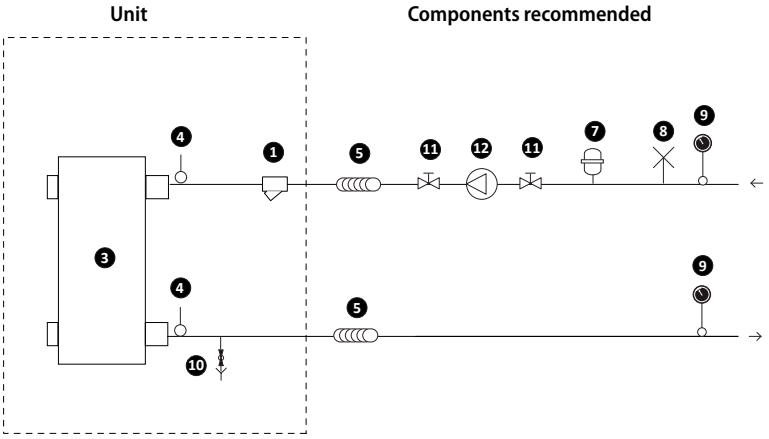
Water characteristics

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.

GEOTHERMAL SIDE



COMPONENTS AS STANDARD

1 Water filter
3 Plate heat exchanger
4 Water temperature sensor
10 Drain valve

HYDRAULIC COMPONENTS RECOMMENDED OUTSIDE THE UNIT (AT THE INSTALLER'S RESPONSIBILITY)

5 Anti-vibration joints
7 Expansion vessel
8 Air drain valve
9 Pressure gauge
11 Shut-off tap
12 Pump

Intermediate exchangers (suitably sized by the designer) are required upstream of the heat exchangers of the refrigeration unit in all cases where strict compliance with the above limits is not guaranteed or in the presence of dirty/aggressive water. Failure to comply with the above requirement shall invalidate the warranty.

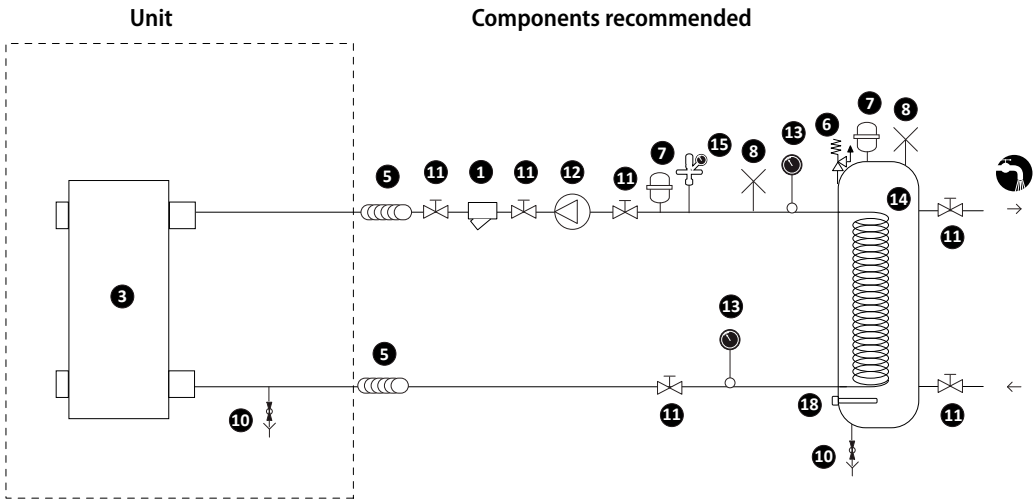
Water characteristics

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.

WITH DESUPERHEATER



COMPONENTS AS STANDARD

3 Plate heat exchanger (DESUPERHEATER)
10 Drain valve

HYDRAULIC COMPONENTS RECOMMENDED OUTSIDE THE UNIT (AT THE INSTALLER'S RESPONSIBILITY)

1 Water filter
5 Anti-vibration joints
6 Pressure relief valve
7 Expansion vessel
8 Air drain valve
10 Drain valve
11 Shut-off tap
12 Pump
13 Pressure gauge
14 Storage tank
15 Loading unit
18 Electric heater

Intermediate exchangers (suitably sized by the designer) are required upstream of the heat exchangers of the refrigeration unit in all cases where strict compliance with the above limits is not guaranteed or in the presence of dirty/aggressive water. Failure to comply with the above requirement shall invalidate the warranty.

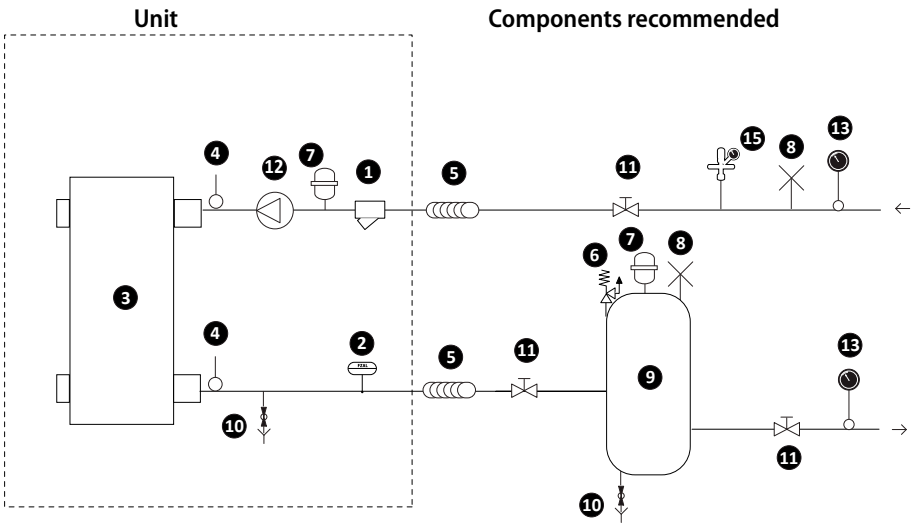
Water characteristics

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.

SYSTEM SIDE - WITH PUMPS



COMPONENTS AS STANDARD

1 Water filter
3 Plate heat exchanger
4 Water temperature sensor
7 Expansion vessel
10 Drain valve
12 Pump

HYDRAULIC COMPONENTS RECOMMENDED OUTSIDE THE UNIT (AT THE INSTALLER'S RESPONSIBILITY)

5 Anti-vibration joints
6 Pressure relief valve
7 Expansion vessel
8 Air drain valve
9 Storage tank
10 Drain valve
11 Shut-off tap
13 Pressure gauge
15 Loading unit

Intermediate exchangers (suitably sized by the designer) are required upstream of the heat exchangers of the refrigeration unit in all cases where strict compliance with the above limits is not guaranteed or in the presence of dirty/aggressive water. Failure to comply with the above requirement shall invalidate the warranty.

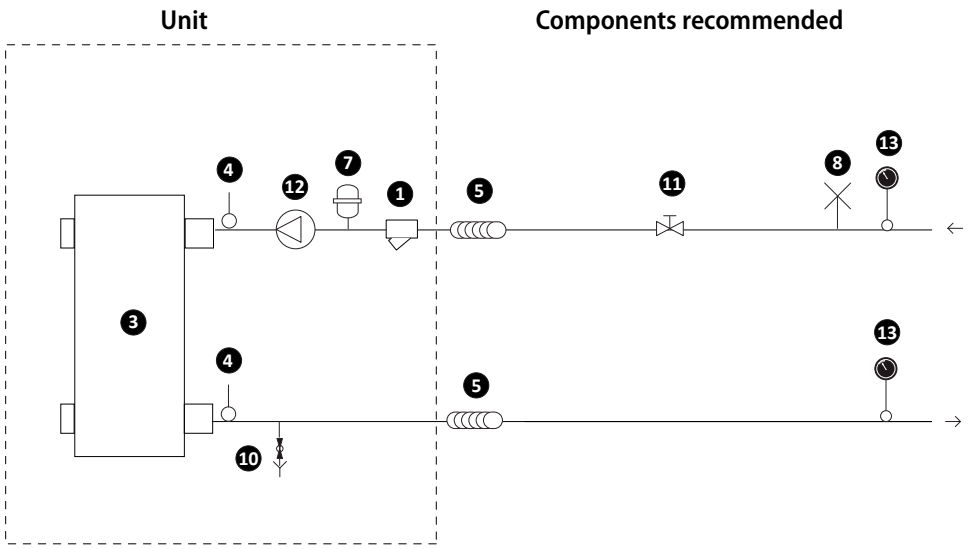
Water characteristics

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.

GEOTHERMAL SIDE - WITH PUMPS



COMPONENTS AS STANDARD

1 Water filter
3 Plate heat exchanger
4 Water temperature sensor
7 Expansion vessel
10 Drain valve
12 Pump

HYDRAULIC COMPONENTS RECOMMENDED OUTSIDE THE UNIT (AT THE INSTALLER'S RESPONSIBILITY)

5 Anti-vibration joints
8 Air drain valve
11 Shut-off tap
13 Pressure gauge

Intermediate exchangers (suitably sized by the designer) are required upstream of the heat exchangers of the refrigeration unit in all cases where strict compliance with the above limits is not guaranteed or in the presence of dirty/aggressive water. Failure to comply with the above requirement shall invalidate the warranty.

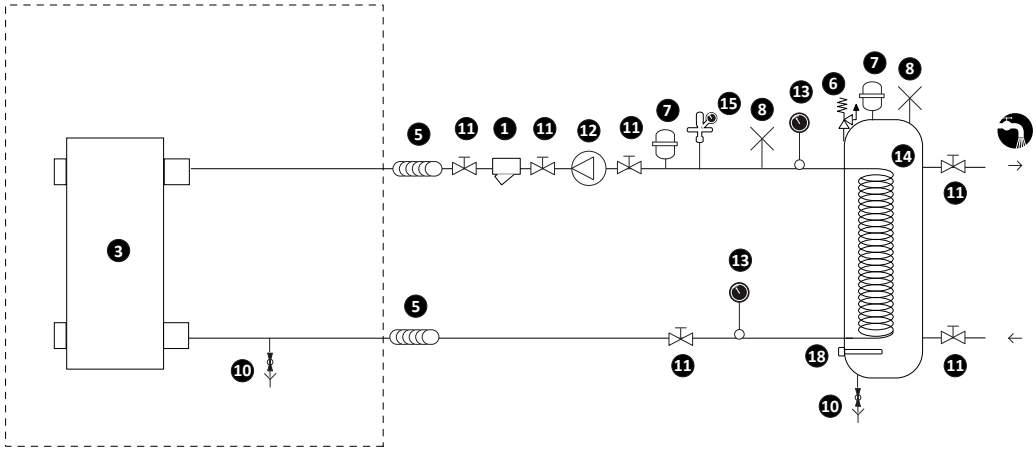
Water characteristics

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.

WITH DESUPERHEATER



COMPONENTS AS STANDARD

3 Plate heat exchanger (DESUPERHEATER)
10 Drain valve

HYDRAULIC COMPONENTS RECOMMENDED OUTSIDE THE UNIT (AT THE INSTALLER'S RESPONSIBILITY)

1. Water filter
5 Anti-vibration joints
6 Pressure relief valve
7 Expansion vessel
8 Air drain valve
10 Drain valve
11 Shut-off tap
12 Pump
13 Pressure gauge
14 Storage tank
15 Loading unit
18 Electric heater

Intermediate exchangers (suitably sized by the designer) are required upstream of the heat exchangers of the refrigeration unit in all cases where strict compliance with the above limits is not guaranteed or in the presence of dirty/aggressive water. Failure to comply with the above requirement shall invalidate the warranty.

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 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.
PGD1: Allows you to control the unit at a distance.
VT: Antivibration supports

ACCESSORIES COMPATIBILITY

Model	Ver	200	400	500
AER485P1	°	•	•	•
AERNET	°	•	•	•
PGD1	°	•	•	•

Antivibration

Ver	200	400	500
°	VT9	VT9	VT15

7 PERFORMANCE SPECIFICATIONS

WRL °

Size			200	400	500
Cooling performance 54.07 °F / 44.06 °F (1)					
Cooling capacity	°	ton	15.26	20.64	26.86
Input power	°	kW	11.38	15.08	19.02
Cooling total input current	°	A	21.0	26.0	32.0
EER	°	BTU/(Wh)	16.09	16.42	16.95
IPLV	°	BTU/(Wh)	23.68	24.16	24.91
Water flow rate system side	°	gpm	36.51	49.38	64.26
Pressure drop system side	°	ftH_2O	7.03	12.71	7.03
Water flow rate source side	°	gpm	47.96	64.64	83.67
Pressure drop source side	°	ftH_2O	10.71	20.74	9.70
Heating performance 104.00 °F / 113.00 °F (2)					
Heating capacity	°	BTU/h	201,700	271,500	350,800
Input power	°	kW	13.91	18.43	23.25
Heating total input current	°	A	25.0	32.0	39.0
COP	°	kW/kW	4.250	4.317	4.422
Water flow rate system side	°	gpm	45.23	60.88	78.66
Pressure drop system side	°	ftH_2O	9.37	18.40	8.70
Water flow rate source side	°	gpm	34.17	46.21	60.14
Pressure drop source side	°	ftH_2O	6.36	11.04	6.02

(1) Reference conditions: AHRI std 550/590 I-P; Water user side 54.07 °F / 44.06 °F; Water source side 85.24 °F / 94.55 °F
(2) Reference conditions: AHRI std 550/590 I-P; Water user side 104.00 °F / 113.00 °F; Water source side 50.00 °F / 41.00 °F

8 PART LOAD IPLV

Size			200	400	500
Part load IPLV					
100 %	°	BTU/(Wh)	16.07	16.41	16.96
75 %	°	BTU/(Wh)	21.46	21.91	22.59
50 %	°	BTU/(Wh)	25.69	26.24	27.06
25 %	°	BTU/(Wh)	24.47	24.98	25.76

9 GENERAL TECHNICAL DATA

Size			200	400	500
Compressor					
Type	°	type		Scroll	
Compressor regulation	°	Type		On-Off	
Number	°	no.	2	2	2
Circuits	°	no.	1	1	1
Refrigerant	°	type		R410A	
Refrigerant charge (1)	°	lbs	12.8	15.4	24.3
Oil	°	Type		POE	
Total oil charge	°	lbs	7.9	15.0	15.0
System side heat exchanger					
Type	°	type		Brazed plate	
Number	°	no.	1	1	1
Minimum water flow rate	°	gpm	11.9	11.9	36.1
Maximum water flow rate	°	gpm	74.0	74.0	211.3
Connections (in/out)	°	Type		Grooved joints	
Sizes (in/out)	°	Ø	2″	2″	2″1/2
Source side heat exchanger					
Type	°	type		Brazed plate	
Number	°	no.	1	1	1
Minimum water flow rate	°	gpm	12.8	12.8	41.8
Maximum water flow rate	°	gpm	74.0	74.0	211.3
Connections (in/out)	°	Type		Grooved joints	
Sizes (in/out)	°	Ø	2″	2″	2″1/2
Sound data calculated in cooling mode (2)					
Sound power level	°	dB(A)	78.0	82.0	83.0
Sound pressure level (10 m / 33 ft)	°	dB(A)	46.5	50.5	51.4
Sound pressure level (1 m / 3.3 ft)	°	dB(A)	62.1	66.1	66.5

(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).

ELECTRIC DATA

Power supply: 230V

	Version	Integrated hydronic kit user side	Integrated hydronic kit, source side		200	400	500
Peak current (LRA)	°	°	°/V	A	226.6	283.0	359.0
	°	°	U	A	234.6	291.0	367.0
	°	N	°/V	A	234.6	291.0	367.0
	°	N	U	A	242.6	299.0	375.0
Minimum circuit amperage (MCA)	°	°	°/V	A	70.0	75.0	125.0
	°	°	U	A	70.0	90.0	125.0
	°	N	°/V	A	70.0	90.0	125.0
	°	N	U	A	80.0	100.0	150.0
Maximum overcurrent permitted by the protection device (MOP)	°	°	°/V	A	80.0	100.0	150.0
	°	°	U	A	90.0	110.0	150.0
	°	N	°/V	A	90.0	110.0	150.0
	°	N	U	A	100.0	110.0	175.0

Power supply: 460V

	Version	Integrated hydronic kit user side	Integrated hydronic kit, source side		200	400	500
Peak current (LRA)	°	°	°/V	A	118.4	149.2	183.2
	°	°	U	A	122.4	153.2	187.2
	°	N	°/V	A	122.4	153.2	187.2
	°	N	U	A	126.4	157.2	191.2
Minimum circuit amperage (MCA)	°	°	°/V	A	35.0	45.0	60.0
	°	°	U	A	35.0	50.0	60.0
	°	N	°/V	A	35.0	50.0	60.0
	°	N	U	A	40.0	60.0	70.0
Maximum overcurrent permitted by the protection device (MOP)	°	°	°/V	A	40.0	60.0	75.0
	°	°	U	A	45.0	60.0	75.0
	°	N	°/V	A	45.0	60.0	75.0
	°	N	U	A	50.0	60.0	80.0

Power supply: 575V

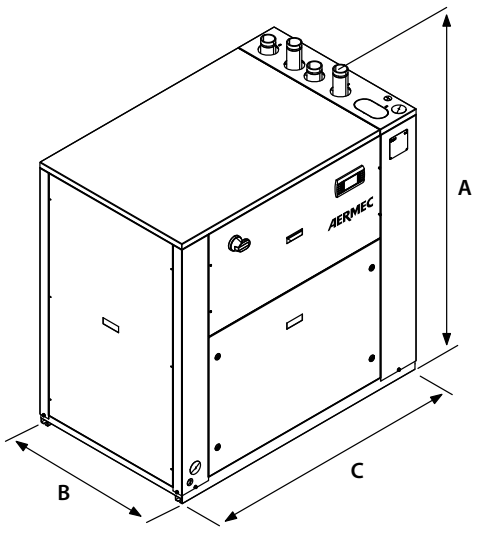
	Version	Integrated hydronic kit user side	Integrated hydronic kit, source side		200	400	500
Peak current (LRA)	°	°	°/V	A	92.4	99.7	134.7
	°	°	U	A	95.6	102.9	137.9
	°	N	°/V	A	95.6	102.9	137.9
	°	N	U	A	98.8	106.1	141.1
Minimum circuit amperage (MCA)	°	°	°/V	A	25.0	35.0	50.0
	°	°	U	A	30.0	35.0	50.0
	°	N	°/V	A	30.0	35.0	50.0
	°	N	U	A	30.0	40.0	60.0
Maximum overcurrent permitted by the protection device (MOP)	°	°	°/V	A	30.0	40.0	60.0
	°	°	U	A	35.0	45.0	60.0
	°	N	°/V	A	35.0	45.0	60.0
	°	N	U	A	35.0	45.0	70.0

Power supply: 208V

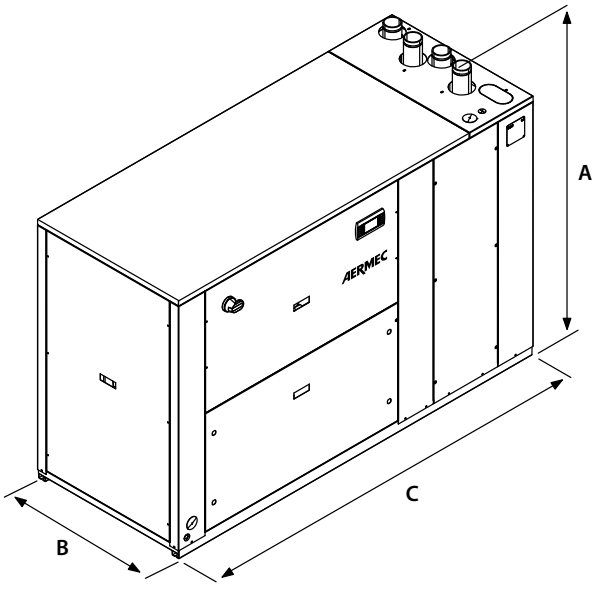
	Version	Integrated hydronic kit user side	Integrated hydronic kit, source side		200	400	500
Peak current (LRA)	°	°	°/V	A	231.4	287.8	363.8
	°	°	U	A	239.6	296.0	372.0
	°	N	°/V	A	239.6	296.0	372.0
	°	N	U	A	247.8	304.2	380.2
Minimum circuit amperage (MCA)	°	°	°/V	A	70.0	80.0	125.0
	°	°	U	A	75.0	90.0	150.0
	°	N	°/V	A	75.0	90.0	150.0
	°	N	U	A	90.0	100.0	150.0
Maximum overcurrent permitted by the protection device (MOP)	°	°	°/V	A	90.0	110.0	150.0
	°	°	U	A	100.0	110.0	175.0
	°	N	°/V	A	100.0	110.0	175.0
	°	N	U	A	110.0	125.0	175.0

DIMENSIONS

WRL 200-400

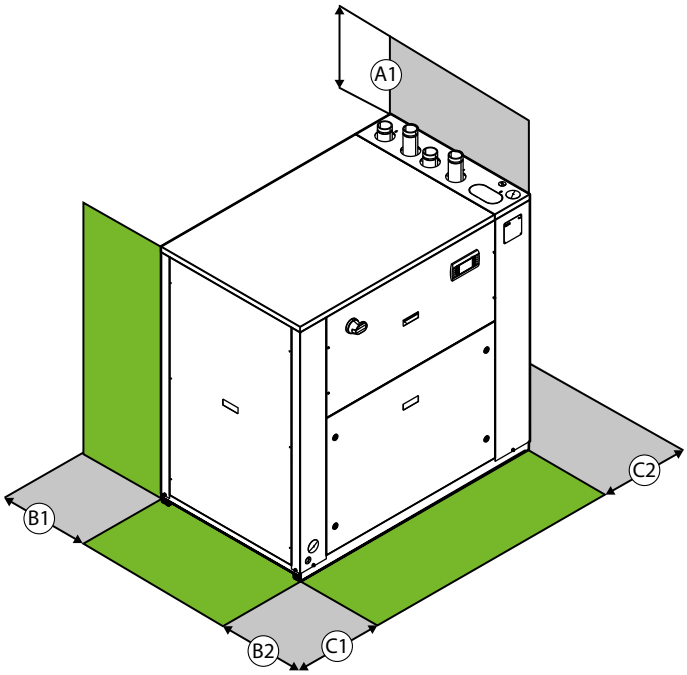


WRL 500



Size			200	400	500
Dimensions and weights					
A	°	in	54.3	54.3	54.3
B	°	in	33.3	33.3	33.3
C	°	in	52.0	52.0	81.1

10 MINIMUM TECHNICAL SPACES



Size			200	400	500
Minimum technical spaces					
A1	°	in	23.6	23.6	23.6
B1	°	in	23.6	23.6	23.6
B2	°	in	23.6	23.6	23.6
C1	°	in	23.6	23.6	23.6
C2	°	in	23.6	23.6	23.6

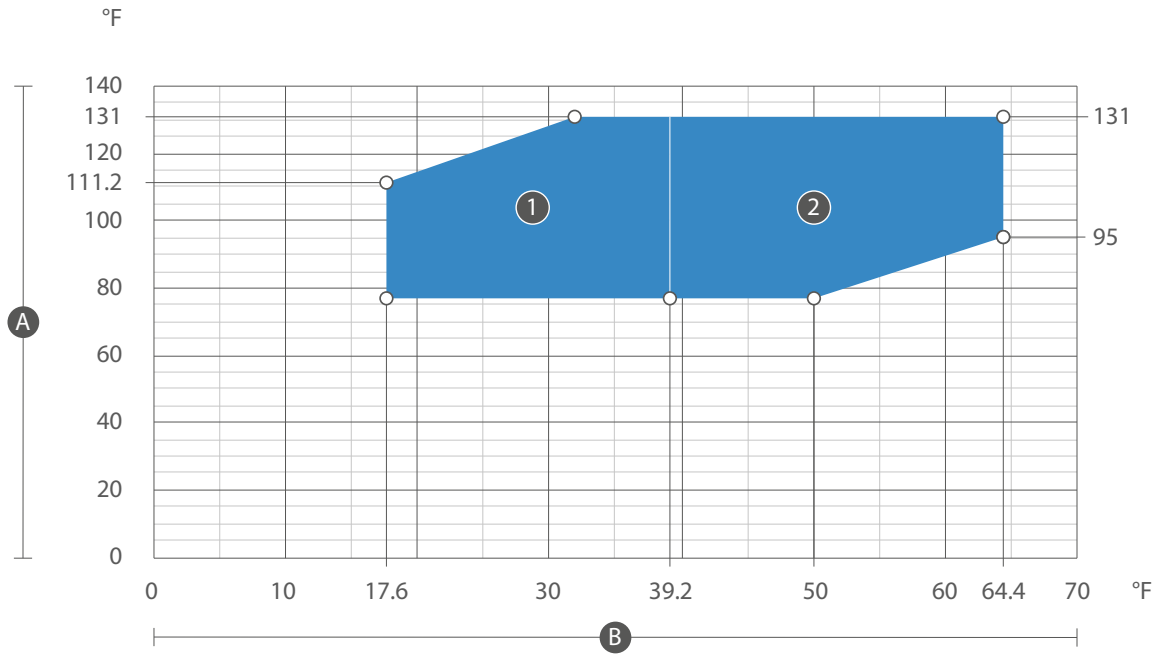
■ *A1 = For further information please contact the head office.*

11 OPERATING LIMITS

The values indicated in the table refer to the min. and max. limits of the unit, valid for ΔT = 10°F (cooling mode) and ΔT = 9°F (heating mode).
If the unit operates beyond the operational limits, we recommend you first contact our technical-sales service.

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.

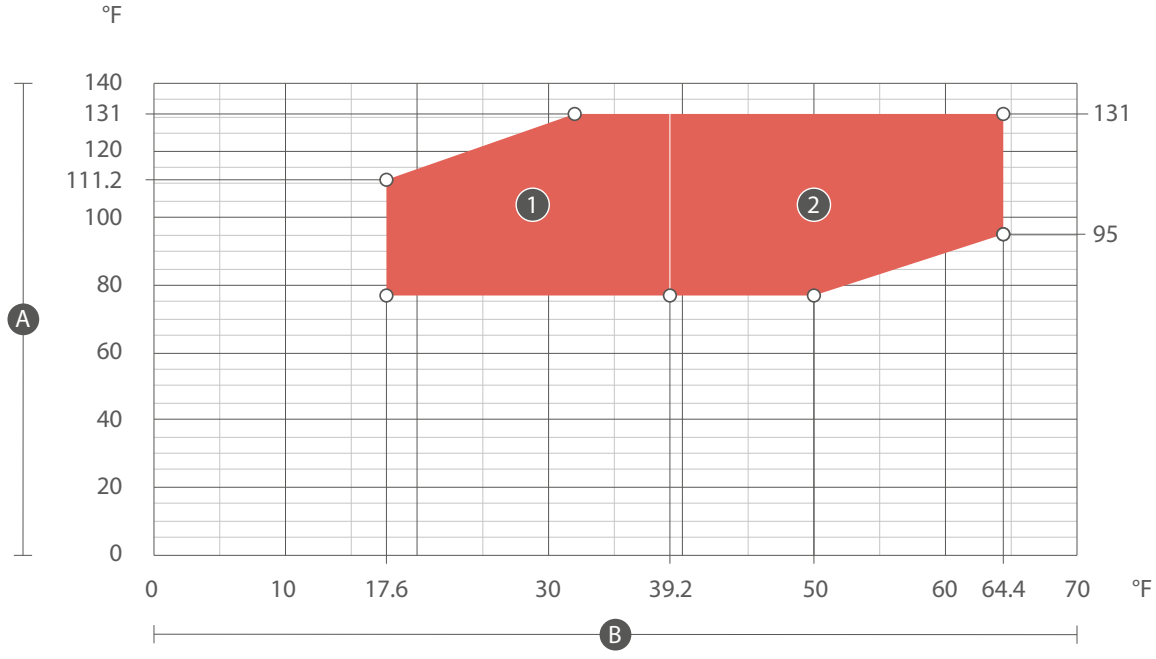
OPERATING COOLING MODE RANGE



Key

A **Processed water temperature (source side) (°F)**
B **Water produced (system side) (°F)**
1 Operation: valve Y
2 Operation: valve ° / X

OPERATING HEATING MODE RANGE



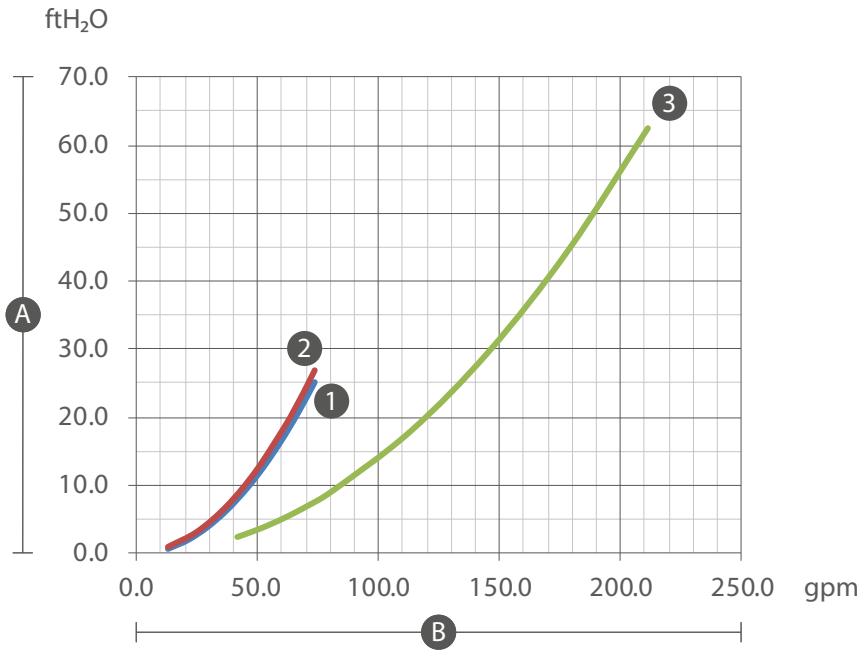
Key

A **Water produced (system side) (°F)**
B **Processed water temperature (source side) (°F)**
1 Operation: valve Y
2 Operation: valve ° / X

12 PRESSURE DROPS

WITHOUT HYDRONIC KIT

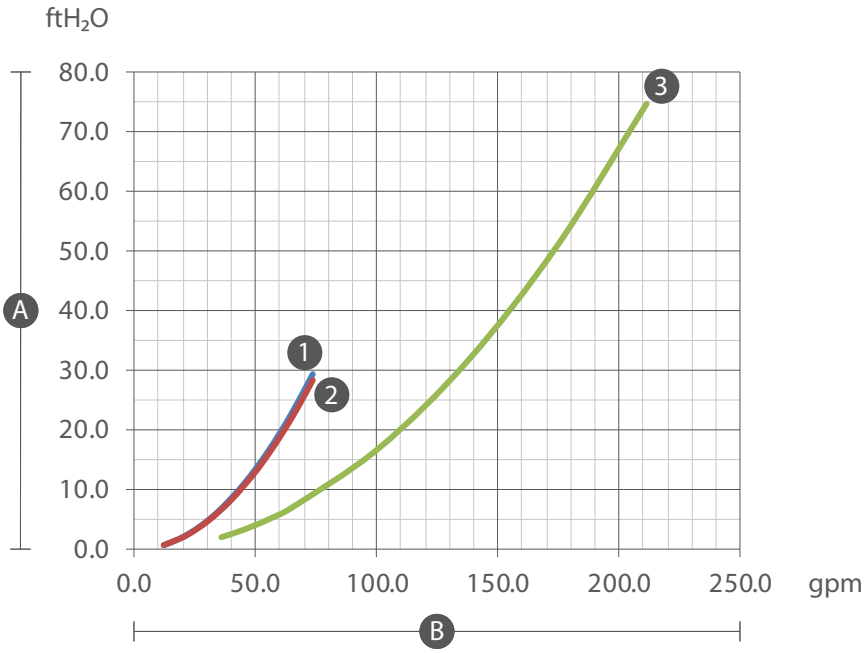
Source side heat exchanger
Condenser
Water input temperature 85.24 °F
Outlet water temperature 94.55°F



A **Pressure drops (ft H_2O)**
B **Water flow rate (gpm)**
1 200
2 400
3 500

Size			200	400	500
Source side heat exchanger					
Minimum water flow rate	°	gpm	12.8	12.8	41.8
Maximum water flow rate	°	gpm	74.0	74.0	211.3

System side heat exchanger
Evaporator
Water input temperature 54.07 °F
Outlet water temperature 44.06 °F

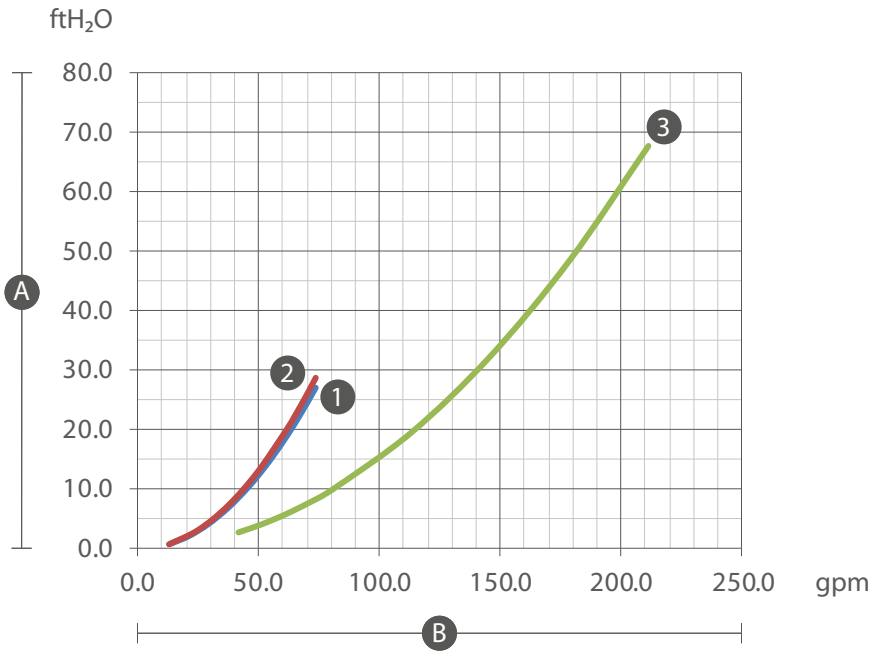


A **Pressure drops (ft H_2O)**
B **Water flow rate (gpm)**
1 200
2 400
3 500

Size			200	400	500
System side heat exchanger					
Minimum water flow rate	°	gpm	11.9	11.9	36.1
Maximum water flow rate	°	gpm	74.0	74.0	211.3

WITH PUMPS

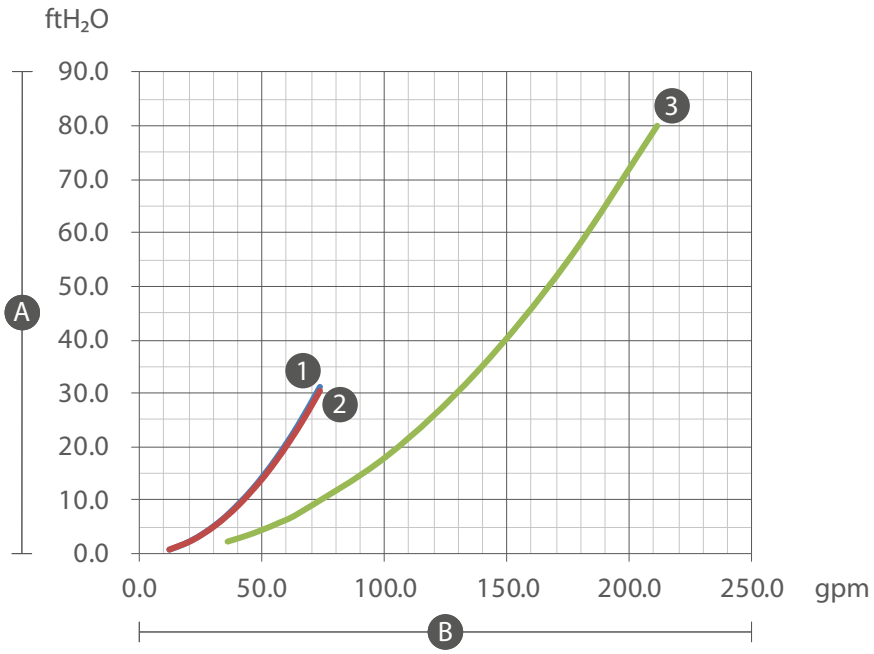
Source side heat exchanger
Condenser
Water input temperature 85.24 °F
Outlet water temperature 94.55°F



A **Pressure drops (ft H_2O)**
B **Water flow rate (gpm)**
1 200
2 400
3 500

Size			200	400	500
Source side heat exchanger					
Minimum water flow rate	°	gpm	12.8	12.8	41.8
Maximum water flow rate	°	gpm	74.0	74.0	211.3

System side heat exchanger
Evaporator
Water input temperature 54.07 °F
Outlet water temperature 44.06 °F

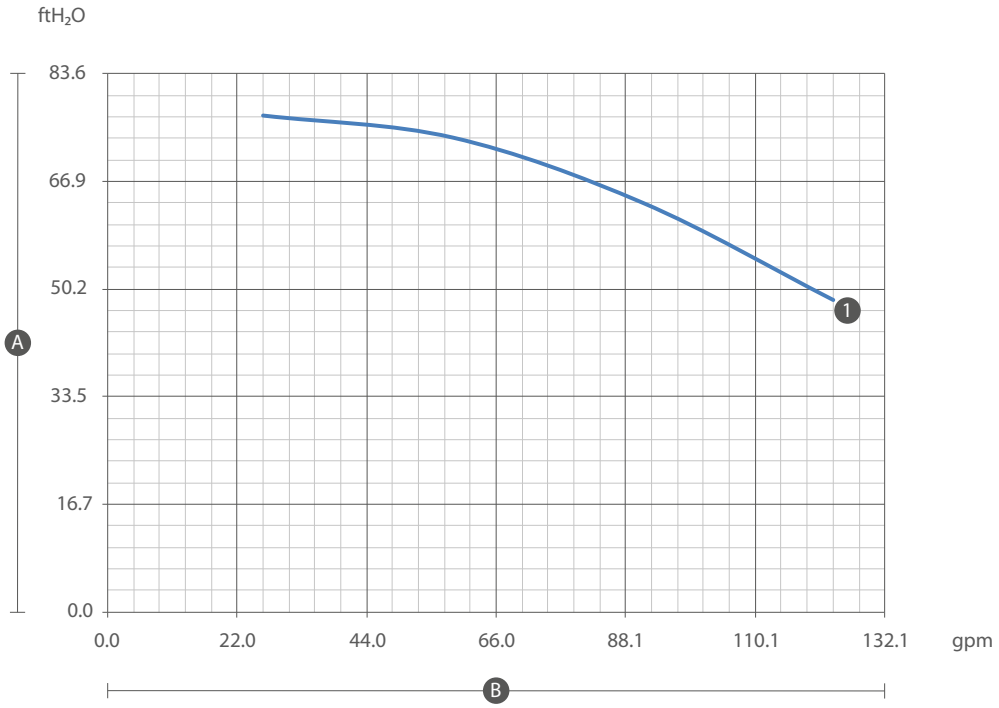


A **Pressure drops (ft H_2O)**
B **Water flow rate (gpm)**
1 200
2 400
3 500

Size			200	400	500
System side heat exchanger					
Minimum water flow rate	°	gpm	11.9	11.9	36.1
Maximum water flow rate	°	gpm	74.0	74.0	211.3

13 PUMPS STATIC PRESSURE

The table shows the characteristic curves of the pumps, **and therefore they do not represent the useful static pressures of the system.**
The useful heads of the system must be calculated by subtracting the unit's pressure drops (Δp) from the useful head of the pump shown in this diagram (see chapter: 12 Pressure drops p. 21).



A **Pumps static pressure (ft H_2O)**
B **Water flow rate (gpm)**
1 200-400-500 (Pumps U-N)

SINGLE HYDRONIC KITS' DATA

Size			200	400	500
INTEGRATED HYDRONIC KIT USER SIDE: N					
Pumps					
Nr. poles	°	no.	2	2	2
Maximum input power	°	kW	2.19	2.19	2.19
Maximum current	°	A	4.00	4.00	4.00
Minimum water flow rate	°	gpm	4.2	4.2	4.2
Maximum water flow rate	°	gpm	121.5	121.5	121.5

Size			200	400	500
INTEGRATED HYDRONIC KIT, SOURCE SIDE: U					
Pumps					
Nr. poles	°	no.	2	2	2
Maximum input power	°	kW	2.19	2.19	2.19
Maximum current	°	A	4.00	4.00	4.00
Minimum water flow rate	°	gpm	4.2	4.2	4.2
Maximum water flow rate	°	gpm	121.5	121.5	121.5

14 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			200	400	500
Minimum system water content					
Minimum water content for air conditioning	°	gal/ton		6.5	
Minimum water content for processes	°	gal/ton		13.0	

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.**

MAXIMUM SYSTEM WATER CONTENT

Units with the hydronic kit mounted come standard with the expansion vessel set at 21.8 psi and the pressure relief valve.
The maximum system water content depends on the capacity of the expansion vessel and on the calibration of the pressure relief valve.

Size			200	400	500
INTEGRATED HYDRONIC KIT USER SIDE: N					
Hydronic kit					
Expansion vessel number	°	no.	Contact the factory	Contact the factory	Contact the factory
Expansion vessel capacity	°	gal	Contact the factory	Contact the factory	Contact the factory
Pressure relief valve	°	n°/psi	Contact the factory	Contact the factory	Contact the factory

Size			200	400	500
INTEGRATED HYDRONIC KIT, SOURCE SIDE: U					
Hydronic kit					
Expansion vessel number	°	no.	Contact the factory	Contact the factory	Contact the factory
Expansion vessel capacity	°	gal	Contact the factory	Contact the factory	Contact the factory
Pressure relief valve	°	n°/psi	Contact the factory	Contact the factory	Contact the factory

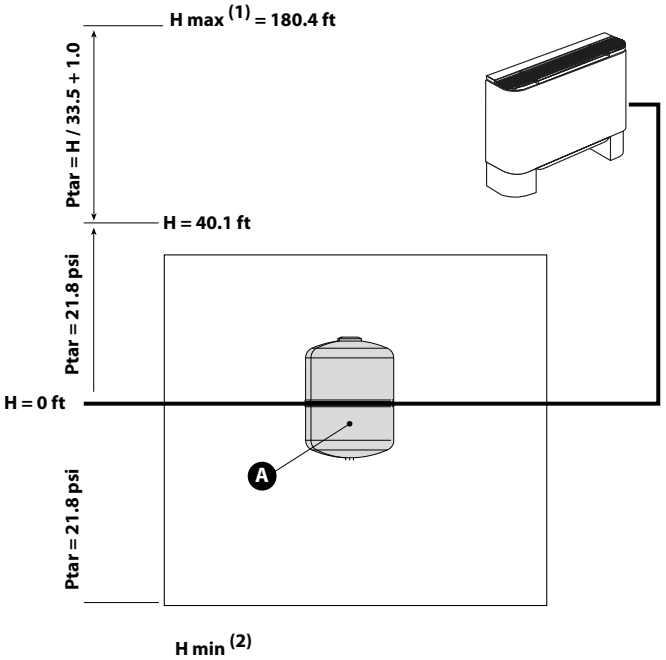
The table gives an example of the maximum water content calculated at the indicated operating conditions and only to protect the unit.
If the volume of water in the system is higher, add another expansion vessel of the correct size.

System water temperature max/min	**°F**			**104/39.2**		
Hydraulic height	**Ft**	**98.4**	**82.0**	**65.6**	**49.2**	**≤40.19**
Expansion vessel pre-load	psi	46.4	40.6	33.4	26.1	21.8
Water content maximum	gal	574.3	699.0	823.7	948.4	1,017.6
System water temperature max/min	**°F**			**140/39.2**		
Expansion vessel pre-load	psi	46.4	40.6	33.4	26.1	21.8
Water content maximum	gal	258.4	314.4	370.9	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 (rating) [bar] = H [ft] / 33.5 + 1.0.
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 calibration value obtained from the formula is less than 21.8 psi (i.e. for H < 40.2), use the standard calibration.



Key
1 Check that highest installation is not higher than 180.4 ft.
2 Ensure that lowest utility can withstand global pressure in that position

15 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

16 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

17 SOUND DATA

Size			200	400	500
Sound data calculated in cooling mode (1)					
Sound power level	°	dB(A)	78.0	82.0	83.0
Sound pressure level (10 m / 33 ft)	°	dB(A)	46.5	50.5	51.4
Sound pressure level (1 m / 3.3 ft)	°	dB(A)	62.1	66.1	66.5
Sound power by centre octave band dB(A)					
125 Hz	°	dB(A)	Contact the factory	Contact the factory	Contact the factory
250 Hz	°	dB(A)	Contact the factory	Contact the factory	Contact the factory
500 Hz	°	dB(A)	Contact the factory	Contact the factory	Contact the factory
1000 Hz	°	dB(A)	Contact the factory	Contact the factory	Contact the factory
2000 Hz	°	dB(A)	Contact the factory	Contact the factory	Contact the factory
4000 Hz	°	dB(A)	Contact the factory	Contact the factory	Contact the factory
8000 Hz	°	dB(A)	Contact the factory	Contact the factory	Contact the factory

(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).

DOWNLOAD THE LATEST VERSION:

http://www.aermec.com/qrcode.asp?q=6448

Aermec S.p.A.
Via Roma, 996 - 37040 Bevilacqua (VR) - Italia
Tel. +39 0442 633 111 - Fax +39 0442 93577
marketing@aermec.com - www.aermec.com

23.04 – 5890710_06