

# WWM 0500

## Technical manual



### WATER COOLED HEAT PUMP REVERSIBLE WATER SIDE

Cooling capacity 31 ton

Heating capacity 433,956 BTU/h





*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. Product description .....	p. 6
Fields of the range .....	p. 6
2. Unit components description .....	p. 7
Refrigerant circuit.....	p. 7
Hydraulic circuit.....	p. 7
Control and safety components .....	p. 7
Structure.....	p. 7
Electric control board and regulation.....	p. 7
3. Main hydraulic circuits .....	p. 9
Water characteristics.....	p. 10
4. Cooling circuit base diagrams.....	p. 11
5. Accessories.....	p. 12
Factory fitted accessories .....	p. 12
Accessories compatibility.....	p. 12
6. Performance specifications .....	p. 13
7. General technical data .....	p. 14
Electric data.....	p. 14
Dimensions.....	p. 14
8. Minimum technical spaces .....	p. 15
Example of installation.....	p. 15
9. Operating limits .....	p. 16
10. Pressure drops.....	p. 17
11. System water content.....	p. 18
Minimum system water content.....	p. 18
12. Correction factors .....	p. 19
Corrective factors for Average water temperatures different from nominal values .....	p. 19
Fouling: deposit corrective factors $[K \cdot m^2]/[W]$ .....	p. 19
13. Glycol.....	p. 19
Ethylene glycol.....	p. 19
Propylene glycol .....	p. 19
14. Sound data.....	p. 20

# 1 PRODUCT DESCRIPTION

## 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 meet air conditioning needs in residential/commercial complexes or industrial applications.

These are indoor units with hermetic scroll compressors, system side heat exchanger and plate source.

The base, the structure and the panels are made of galvanized steel treated with polyester paint RAL 9003.

The precise choice of components, the special configuration, and the possibility to connect several independent modules and manage them as if they were a single unit are all aspects that guarantee maximum output at full load, whilst ensuring continuous adaptation to the real service needs.

**Bus Bar, to facilitate the electrical connections.**

### Modularity

Thanks to its modular construction, the installation can be adapted to suit specific system development needs whilst guaranteeing improved safety and reliability.

As a result, the cooling capacity can be easily increased over time, at a limited cost.

**WWM consists of independent 31 ton, modules that can be linked together to reach a capacity of 1,124 ton.**

**With WWM, you can combine up to 36 units designed to minimise the overall dimensions.**

The modules are easy to install and link together from the hydronic point of view, thanks to the connections with grooved joints.

### Refrigerant circuit

The refrigerant circuit can easily be disconnected from the unit, maintaining all the functions of the hydronic circuit to ensure correct system operation.

### Hydraulic components

WWM version PN10 has the **switch**; WWM version PN21 mounts the **transmitter**.

Fitted as standard, with **butterfly shut-off valves** on both hydronic lines for disconnecting the circuit when maintenance needs to be carried out.

In the event of a variable flow rate, the **motorised hydronic valves** can intercept one module or more in order to reduce the flow rate when there is a low thermal load level.

### Very quiet

The WWM units stand out for their quiet operation.

Accurate unit sound-proofing, using good-quality sound absorbent material, means all the units work at low noise levels.

### Units in parallel

The MULTICHILLER\_EVO (accessory) allows up to 9 units to be managed in parallel mode.

This accessory allows to maximise the total efficiency to the system under to work load, external air temperature conditions and water produced.

Each unit has its own electrical panel, guaranteeing continuity even if one module malfunctions or goes into lockout.

### Configurator

Field	Description
1,2,3	<b>WWM</b>
4,5,6,7	<b>Size</b> 0500
8	<b>Operating field (1)</b> ° Standard mechanic thermostatic valve
9	<b>Model</b> 2 Double refrigerant circuit
10	<b>Hydraulic pressure rating</b> 1 145 psi (PN10) 3 300 psi (PN21)
11	<b>Hydraulic headers kit</b> ° No headers provided A 6" Headers kit - PN21 standard carbon steel pipes declared in accordance with ASTM A106 Schedule 40 H 6" Headers kit - PN21 standard carbon steel pipes declared in accordance with EN 10255
12	<b>Power connection</b> ° Without bus bars B With bus bars
13	<b>Power supply</b> 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
14	<b>Electrical panel SCCR</b> ° 10 kA control panel
15	<b>Peak current reduction</b> ° Without power factor device R With power factor device (2)
16	<b>Field for future development</b> ° -

(1) Water produced up to 39.2 °F

(2) Factory installed

## 2 UNIT COMPONENTS DESCRIPTION

### REFRIGERANT CIRCUIT

#### Compressors

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

#### 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.

#### Sight glass

It is used to verify that the expansion system is powered correctly and the presence of humidity in the cooling circuit.

#### Solenoid valve

Allows one-way flow of the refrigerant. Positioned on the compressor flow, it prevents inverse rotation of the rotors after stopping.

#### Filter drier

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

#### Solenoid valves

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

### HYDRAULIC CIRCUIT

#### Water filter

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

#### Water characteristics

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



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



**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.**

#### Drain valve

Discharges the water from the hydraulic circuit.

#### Flow switch

#### 2 way modulating control valve

Only in the condenser side.

#### Motorized on/off 2 way valve

Only in the evaporator side.

#### Manual 10 steps 2 way valve

Present both in the evaporator and condenser side.

### CONTROL AND SAFETY COMPONENTS

Situated on the evaporator side in order to avoid damages due to insufficient water flow. WWM vers PN10 has the switch, the PN21 version mounts the transmitter.

#### Pressure switch/differential transmitter

#### 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.

#### Safety valve

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

### STRUCTURE

#### Load-bearing structure

Made of hot-dipped galvanised steel profiles with suitable thickness.

Paint with polyester powders (RAL 9003).

Made in order to allow total accessibility to internal components, for servicing and maintenance operations.

### ELECTRIC CONTROL BOARD AND REGULATION

The electric power and control panel, built in conformity to the regulation CEI EN 60204-1: 2018 is complete with:

- Circuit board;
- Transformer for the control circuit;
- door lock main isolating switch;
- Fuses for compressors. Magnet circuit breakers are also available on request;
- Power section;
- Clamps for remote ON/OFF;
- Compressors protection with internal circuit breakers;
- Connection clamps to the remote keyboard;
- Summer-winter manual change-over clamps;
- Clamps for alarm signal;
- Clamps for signalling compressor switch-on status;
- Safety fuses;
- Control circuit numbered cables;
- Imbalance sequence check between the phases.

#### Door interlocked isolator

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

#### Electronic controller

The electronic adjustment on WWM chillers is made up of a control board for every compressor connected to each other in a network and a control panel with display. The board that controls compressor n°1 is the "master" board, while the other is the "slave".

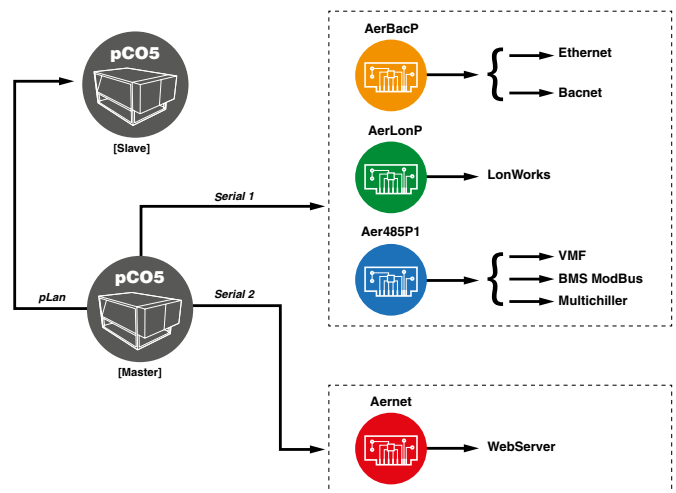
Relative to the compressor that controls, transducers, loads and alarms are connected to every board, while only the machine general ones are connected to the master board.

The program and the parameters set are memorised permanently on FLASH memory, allowing them to be kept also in the case of a power cut (without the need for a maintenance battery).

## Microprocessor

- Remote on/off with voltage-free external contact;
- Multi-language menu;
- Phase sequence control;
- Separate control of the individual compressors;
- Amperometric transformer;
- Cumulative faults block signal;
- Historical alarms function;
- Daily/weekly programming;
- Water temperature display;
- Input/output;
- Alarms display;
- Integral proportional regulation on the temperature of the output water;
- Programmable timer function;
- Function with double calibration point linked to an external contact (between double set point);
- Can be interfaced with Modbus protocol (AER485P1 accessory);
- Pump/s control;
- Compressors rotation management;
- Analogue input from 4 to 20 mA;
- “Always Working” function in the case of critical conditions (e.g. an environmental temperature that is too high) the machine does not stop but can adjust itself and supply the maximum power in those conditions;
- “Switching Hysteresis” self-adapting work differential;
- “Switching Hysteresis” to always ensure the correct functioning times of the compressors even in plants with low water content or insufficient flow rates. This system decreases compressor wear;
- PDC “Pull Down Control” system to prevent the activation of power steps when the water temperature quickly approaches the set-point. Optimises machine

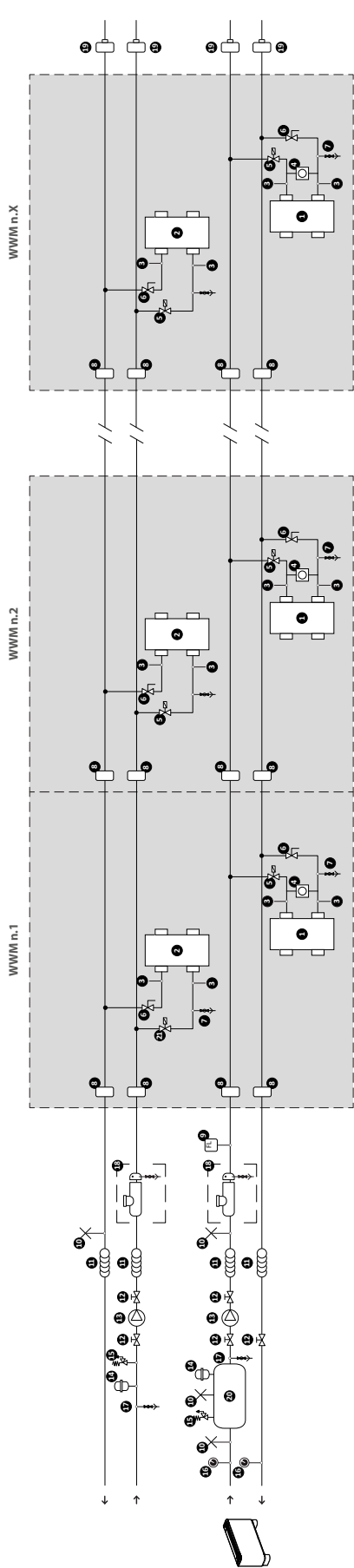
functioning when working normally and in the presence of load variations, ensuring the best machine efficiency in all conditions.  
For further information please refer to the user manual.





3 MAIN HYDRAULIC CIRCUITS

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.



Components as standard	
1	Evaporator
2	Condenser
3	Water temperature sensor
4	Pressure switch/differential transmitter
5	On/off 2 way valve
6	Manual 10 steps 2 way valve
7	Drain valve
8	Grooved cap
9	2 way modulating control valve
10	Air drain valve
11	Anti-vibration joints
12	Flow shut-off valves
13	Pump
14	Expansion valve
15	Pressure relief valve
16	Pressure gauge
17	Drain valve
18	Water filter not supplied. <b>Installation in the immediate vicinity of the heat exchanger is mandatory, penalty waiver of warranty</b>
19	Hydronic caps (accessory)
20	Storage tank
21	Components not provided and responsibility of the installer
22	Flow switch not provided. <b>Installation compulsory for the warranty to be valid</b>

## WATER CHARACTERISTICS

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



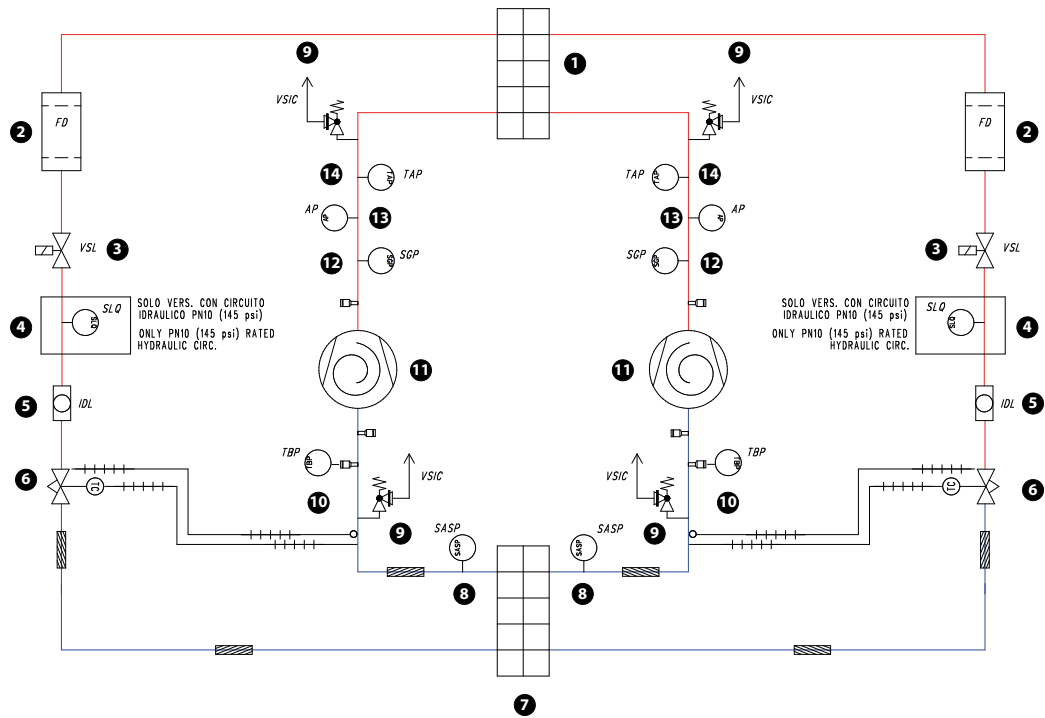
It is of fundamental importance to keep the oxygen concentration in the water under control, especially in open vessel systems. This type of system, in fact, is very sensitive to the phenomenon of extra-oxygenation of the water (an event that can be encouraged by the incorrect positioning of some components).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



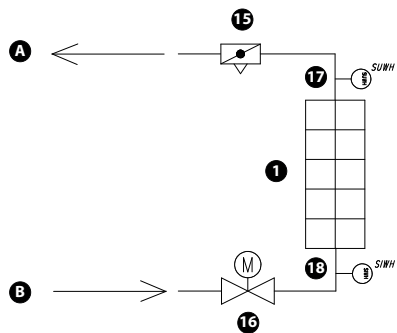
Intermediate exchangers (suitably sized by the designer) are required upstream of the heat exchangers of the refrigeration unit in all cases where strict compliance with the above limits is not guaranteed or in the presence of dirty/aggressive water. Failure to comply with the above requirement shall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

## 4 COOLING CIRCUIT BASE DIAGRAMS

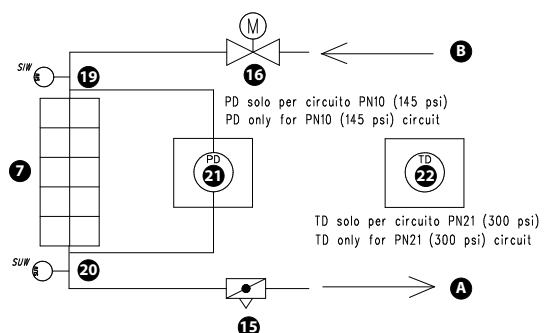
Double circuit



VALVOLA 2 VIE MANUALE A 10 POSIZIONI  
MANUAL 10 STEPS 2 WAY VALVE



VALVOLA 2 VIE ON/OFF  
ON/OFF 2 WAY VALVE



### Components

- |                                |   |  |
|--------------------------------|---|--|
| 1 Condenser                    | 9 Pressure relief valve                     | 18 Condenser water inlet temperature probe |
| 2 Filter drier                 | 10 Low pressure transducer                  | 19 Water inlet temperature sensor          |
| 3 Solenoid valve               | 11 Compressor                               | 20 Water outlet temperature probe          |
| 4 Liquid temperature probe     | 12 Discharge gas temperature probe          | 21 Differential pressure switch            |
| 5 Sight glass                  | 13 High pressure switch                     | 22 Differential transmitter                |
| 6 Thermostatic expansion valve | 14 High pressure transducer                 |  |
| 7 Evaporator                   | 15 Wafer type butterfly valve               | A Water outlet                             |
| 8 Intake temperature probe     | 16 2 way valve                              | B Water inlet                              |
|                                | 17 Condenser water outlet temperature probe |  |

## ACCESSORIES

**AER485P1:** RS-485 interface for supervision systems with MODBUS protocol.

**AERBACP:** Ethernet communication Interface for protocols Bacnet/IP, Modbus TCP/IP, SNMP

**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.

**KCABLEV\_WWM:** Kit Bus Bar, to facilitate the electrical connections.

**KWWM:** Kit containing 4 caps with a diameter of 6" for the water manifolds.

**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.

### FACTORY FITTED ACCESSORIES

**CRATE\_WWM°:** Special crate for transport

**CRATE\_WWMH-A:** Special crate for transport

**KITIDRO\_WWM:** Water filter with connection pipe (diameter 6") with drain tap and additional bulb well (diameter ½") available to the installer.

**KREC\_WWM:** Cable entries box in order to facilitate the electrical installation.

### ACCESSORIES COMPATIBILITY

Accessory	WWM 0500°	WWM 0500A	WWM 0500H
AER485P1	•	•	•
AERBACP	•	•	•
AERNET	•	•	•
KCABLEV_WWM	•	•	•
KWWM	•	•	•
MULTICHILLER_EVO	•	•	•

For the control with MULTICHILLER EVO, nr.1 accessory AER485P1 is mandatory for every WWM of the system.

Special crate for transport

Accessory	WWM 0500°	WWM 0500A	WWM 0500H
CRATE_WWM°	•		
CRATE_WWMH-A		•	•

Cable entries box

Accessory	WWM 0500°	WWM 0500A	WWM 0500H
KREC_WWM	•	•	•

Water filter

Accessory	WWM 0500°	WWM 0500A	WWM 0500H
KITIDRO_WWM	•	•	•

Additional manifold kits

Accessory	WWM 0500A	WWM 0500H
KCOLLA_WWM	•	
KCOLLH_WWM		•

## 5 PERFORMANCE SPECIFICATIONS

WWM 0500°		
<b>Cooling performance 54.07 °F / 44.06 °F (1)</b>		
Cooling capacity	ton	31.22
Input power	kW	23.16
EER	BTU/(Wh)	16.17
IPLV	BTU/(Wh)	20.81
Cooling total input current	A	34.0
Water flow rate system side	gpm	74.69
Pressure drop system side	ftH <sub>2</sub> O	6.69
Water flow rate source side	gpm	98.02
Pressure drop source side	ftH <sub>2</sub> O	10.37
<b>Heating performance 104.00 °F / 113.00 °F (2)</b>		
Heating capacity	BTU/h	433,956
Input power	kW	29.69
COP	kW/kW	4.284
Heating total input current	A	44.0
Water flow rate system side	gpm	58.47
Pressure drop system side	ftH <sub>2</sub> O	3.68
Water flow rate source side	gpm	66.32
Pressure drop source side	ftH <sub>2</sub> O	5.02

(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

## 6 GENERAL TECHNICAL DATA

WWM 0500°		
<b>Compressor</b>		
Type	type	Scroll
Number	no.	2
Circuits	no.	2
Refrigerant	type	R410A
Refrigerant load circuit 2 (1)	lbs	12.1
Refrigerant load circuit 1 (1)	lbs	12.3
Oil	Type	Emkarate RL32 3MAF
Oil charge circuit 1	gal	0.9
Oil charge circuit 2	gal	0.9
<b>Source side heat exchanger</b>		
Type	type	Brazed plate
Number	no.	1
Minimum water flow rate	gpm	29.7
Maximum water flow rate	gpm	169.0
Connections (in/out)	Type	Grooved joints
Sizes (in/out)	Ø	6"
<b>System side heat exchanger</b>		
Type	type	Brazed plate
Number	no.	1
Minimum water flow rate	gpm	35.9
Maximum water flow rate	gpm	138.5
Connections (in/out)	Type	Grooved joints
Sizes (in/out)	Ø	6"
<b>Sound data calculated in cooling mode (2)</b>		
Sound power level	dB(A)	84
Sound pressure level (10 m / 33 ft)	dB(A)	52.6
Sound pressure level (1 m / 3.3 ft)	dB(A)	68.3

(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).

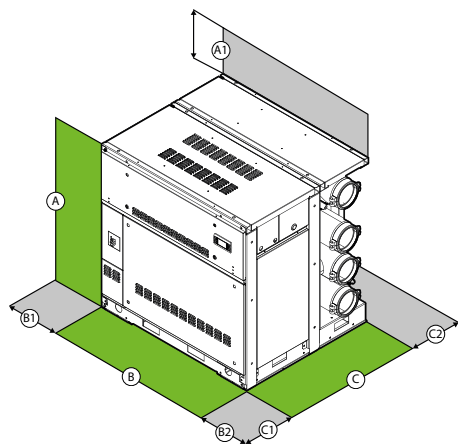
## ELECTRIC DATA

WWM 0500°		
<b>Power supply: 230V</b>		
Peak current (LRA)	A	411.0
Minimum circuit amperage (MCA)	A	125.0
Maximum overcurrent permitted by the protection device (MOP)	A	175.0
<b>Power supply: 460V</b>		
Peak current (LRA)	A	212.0
Minimum circuit amperage (MCA)	A	61.0
Maximum overcurrent permitted by the protection device (MOP)	A	80.0
<b>Power supply: 575V</b>		
Peak current (LRA)	A	156.0
Minimum circuit amperage (MCA)	A	54.0
Maximum overcurrent permitted by the protection device (MOP)	A	75.0
<b>Power supply: 208V</b>		
Peak current (LRA)	A	409.0
Minimum circuit amperage (MCA)	A	129.0
Maximum overcurrent permitted by the protection device (MOP)	A	175.0

## DIMENSIONS

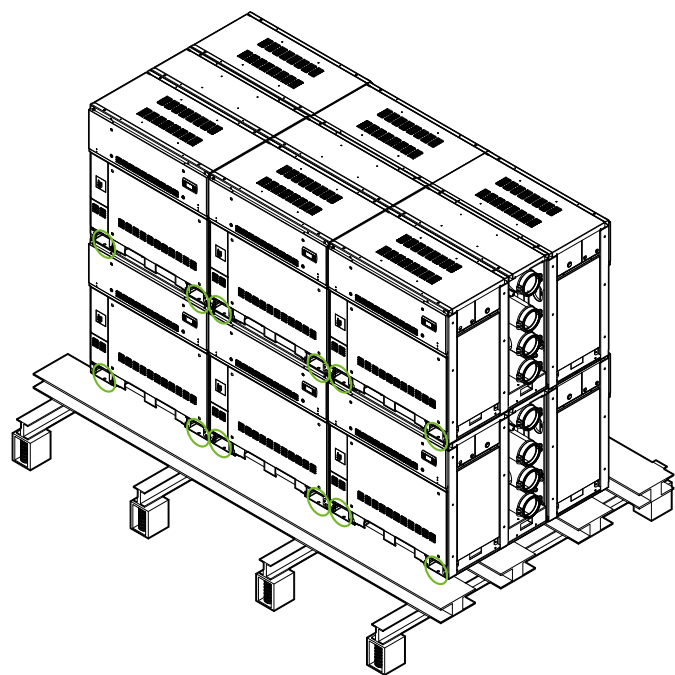
		WWM 0500°	WWM 0500H	WWM 0500A
<b>Dimensions and weights</b>				
A	in	51.2	51.2	51.2
B	in	52.4	52.4	52.4
C	in	30.5	45.3	45.3
D	in	-	17.8	17.8
<b>Weights</b>				
Weight empty + packaging	lbs	1,543	2,050	2,050
Weight functioning	lbs	1,567	2,297	2,297
Empty weight + packaging (with bus bars)	lbs	1,623	2,130	2,130
Weight functioning (with bus bars)	lbs	1,647	2,377	2,377
<b>Hydraulic headers kit</b>				
Weight empty + packaging	lbs	-	507	507
Weight functioning	lbs	-	728	728

7 MINIMUM TECHNICAL SPACES



WWM 0500°		
Minimum technical spaces		
A1	in	19.7
B1	in	39.4
B2	in	39.4
C1	in	39.4
C2	in	39.4


EXAMPLE OF INSTALLATION

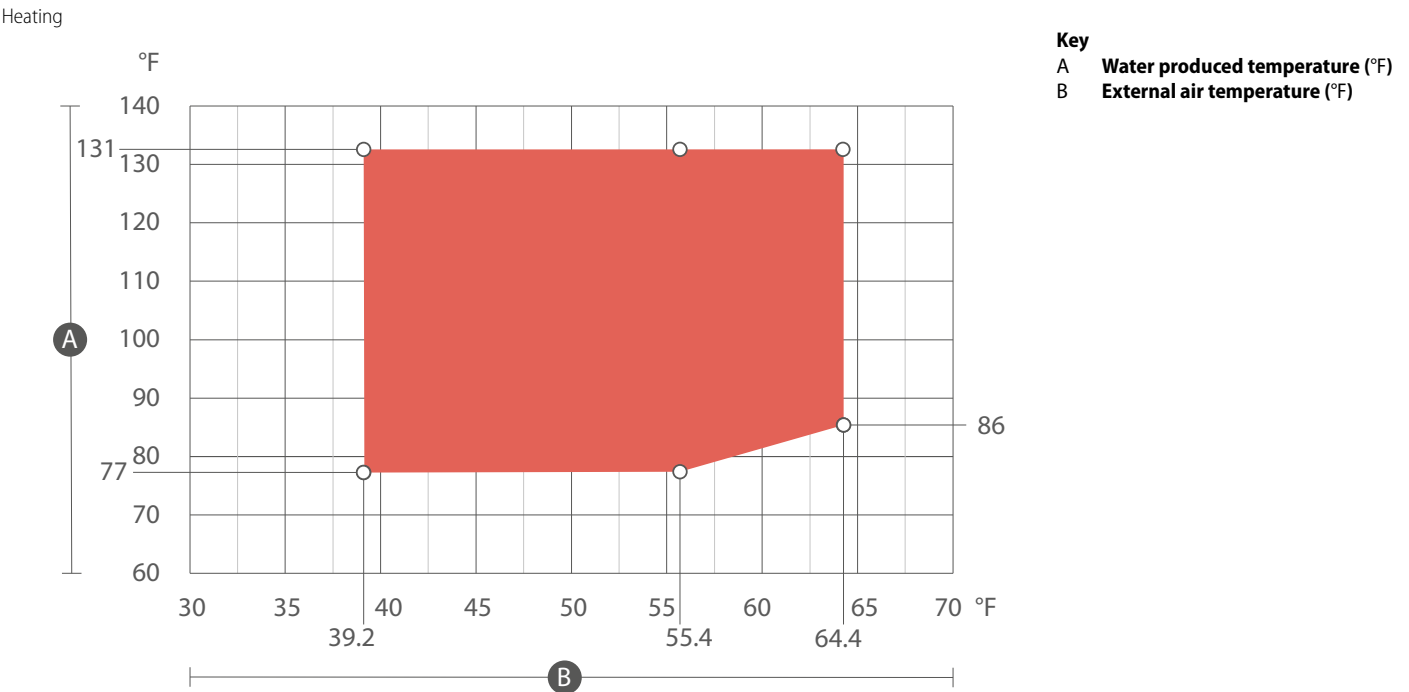
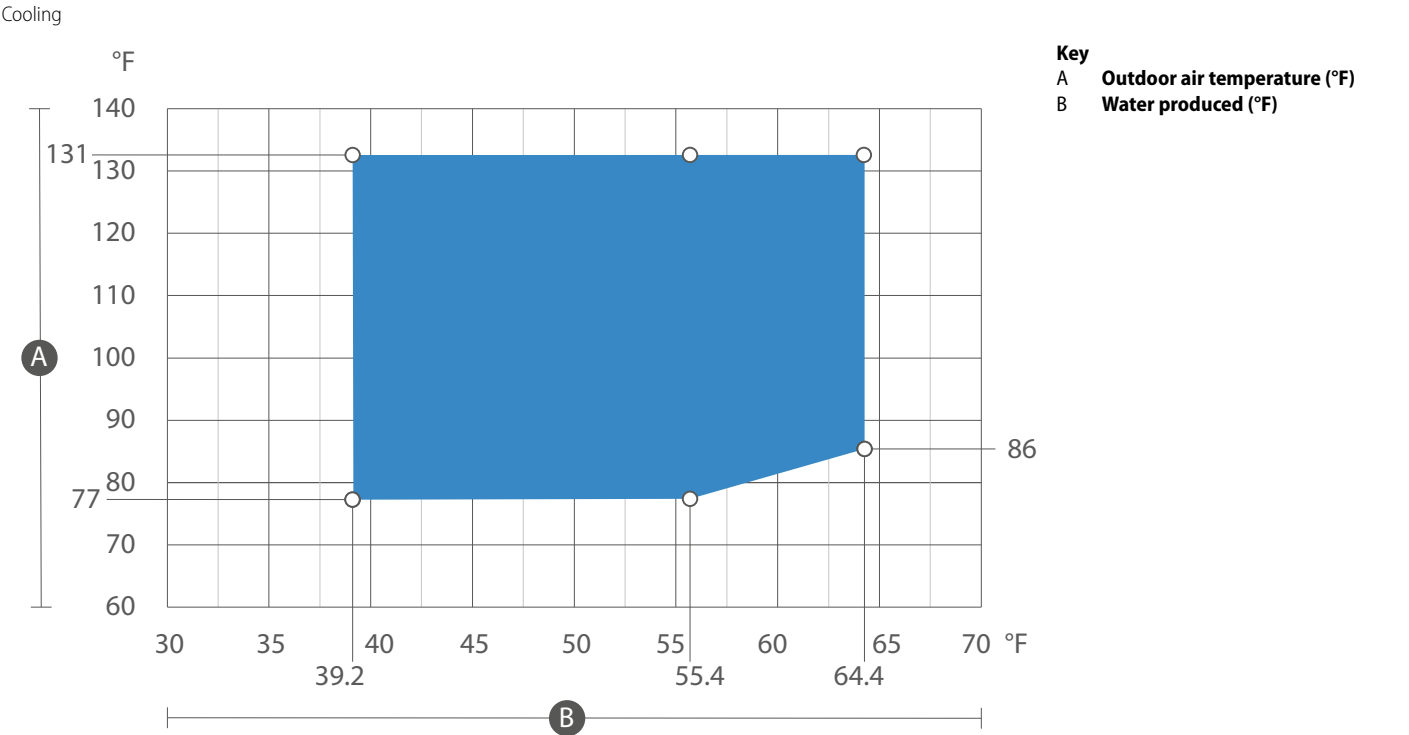


- Example of a "stack in line" installation.
- It is recommended to fasten the units to an inertial structure that is installed on vibration dampers, as shown in the image.

8 OPERATING LIMITS

The values indicated in the table refer to the min. and max. limits of the unit, valid for  $\Delta T = 10^{\circ}\text{F}$  (cooling mode) and  $\Delta T = 9^{\circ}\text{F}$  (heating mode).  
If the unit operates beyond the operational limits, we recommend you first contact our technical-sales service.

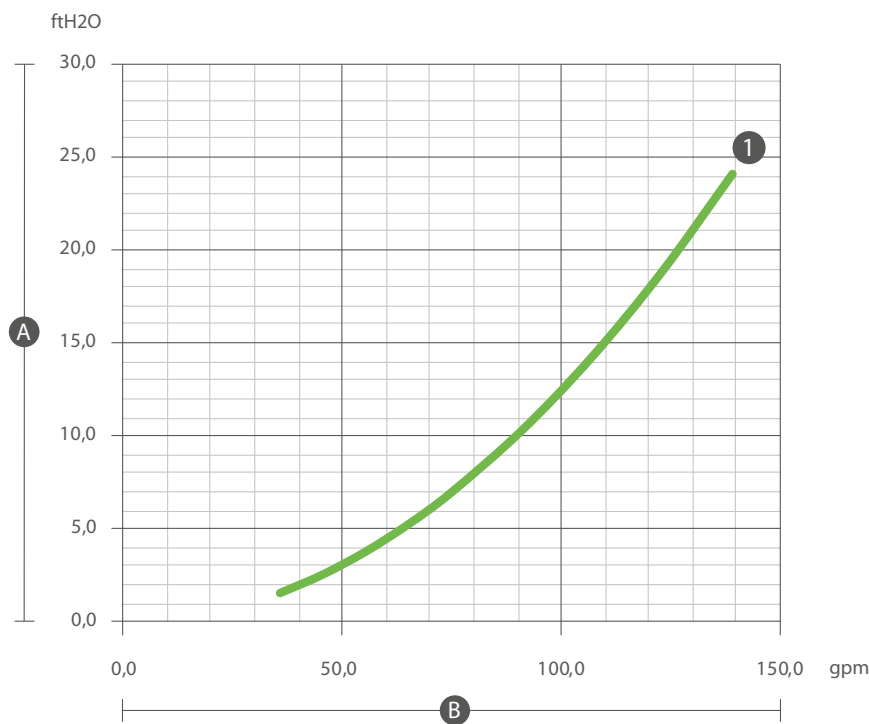
 **WARNING:** Under no circumstances does the unit have to be operated outside the operating limit under penalty of the warranty expiration. Aermec S.p.A. cannot be held responsible for any malfunction of the units which are operated outside the established limits and for their consequences.





9 PRESSURE DROPS

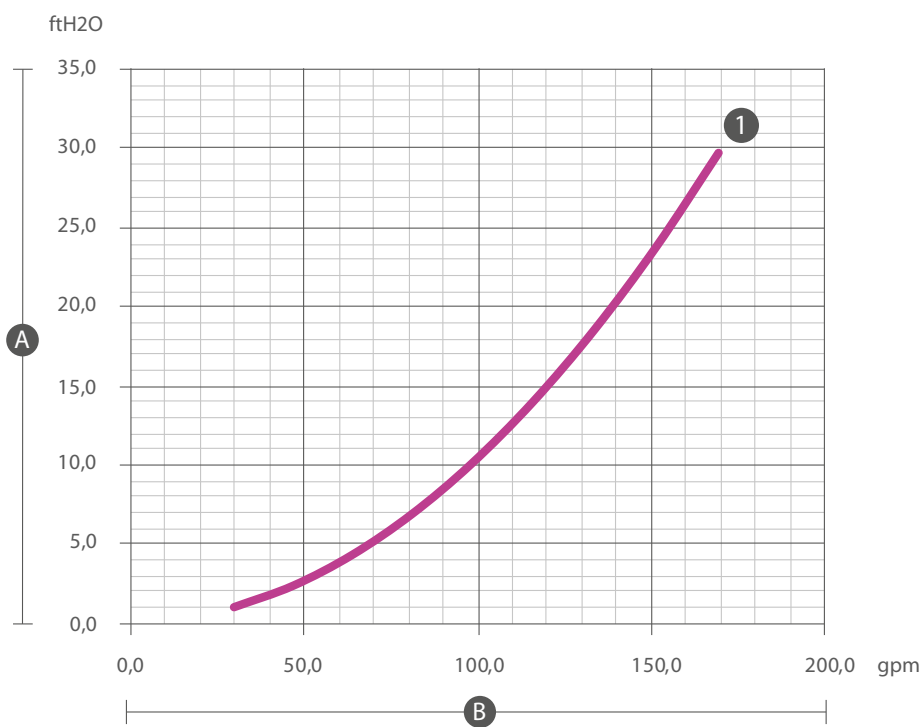
SYSTEM SIDE



Key:  
A Pressure drops (ftH2O)  
B Water flow rate (gpm)  
1 0500

WWM 0500°		
System side heat exchanger		
Minimum water flow rate	gpm	35.9
Maximum water flow rate	gpm	138.5

SOURCE SIDE



Key:  
A Pressure drops (ftH2O)  
B Water flow rate (gpm)  
1 0500

WWM 0500°		
Source side heat exchanger		
Minimum water flow rate	gpm	29.7
Maximum water flow rate	gpm	169.0

## 10 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).

WWM 0500°		
<b>Minimum system water content</b>		
Minimum water content for processes	gal/ton	3,7
Minimum water content for air conditioning	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



**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.

11 CORRECTION FACTORS

CORRECTIVE FACTORS FOR AVERAGE WATER TEMPERATURES DIFFERENT FROM NOMINAL VALUES

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

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

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

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

12 GLYCOL

ETHYLENE GLYCOL

Cooling mode

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

Heating mode range

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

PROPYLENE GLYCOL

Cooling mode

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

Heating mode range

CORRECTION FACTOR WITH PROPYLENE GLYCOL - HEATING MODE											
Freezing Point	°F	0	25.83	22.46	18.61	14.04	8.46	1.65	-6.65	-16.67	-28.70
Percent propylene 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

13 SOUND DATA

WWM 0500°		
Sound data calculated in cooling mode (1)		
Sound power level	dB(A)	84
Sound pressure level (10 m / 33 ft)	dB(A)	52.6
Sound pressure level (1 m / 3.3 ft)	dB(A)	68.3
Sound power by centre octave band dB(A)		
125 Hz	dB(A)	43.6
250 Hz	dB(A)	56.3
500 Hz	dB(A)	74
1000 Hz	dB(A)	77.4
2000 Hz	dB(A)	81.2
4000 Hz	dB(A)	75.2
8000 Hz	dB(A)	67.2

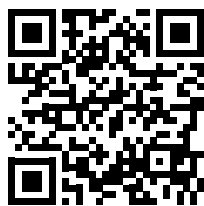
(1) Sound power calculated on the basis of measurements made in accordance with UNI EN ISO 9614-2. Sound pressure (cold functioning) measured in free field, 10 m / 33 ft away from the unit external surface (in compliance with UNI EN ISO 3744).







DOWNLOAD THE LATEST VERSION:



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

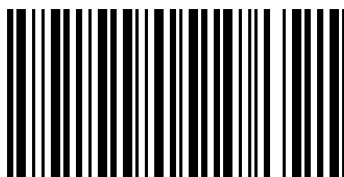


Aermec S.p.A.

Via Roma, 996 - 37040 Bevilacqua (VR) - Italia

Tel. +39 0442 633 111 - Fax +39 0442 93577

marketing@aermec.com - www.aermec.com



23.05 - 5046105\_06