EN

23.04 – 5890989_07
Translation of Original instructions

WRL 180 - 650

Technical manual

WATER COOLED HEAT PUMP REVERSIBLE WATER SIDE

Cooling capacity 49 ÷ 174 kW

Heating capacity 55 ÷ 192 kW

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.
However, please note that for a more accurate selection, you can also use the Magellano selection program, available on our website.
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

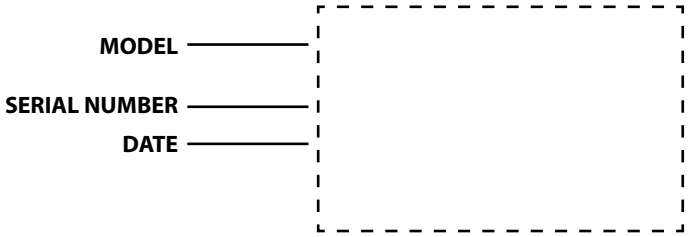
SAFETY CERTIFICATIONS

This marking indicates that this product should not be disposed with other household wastes throughout the EU. To prevent possible harm to the environment or human health from uncontrolled disposal of Waste Electrical and Electronic Equipment (WEEE), please return the device using appropriate collection systems, or contact the retailer where the product was purchased. Please contact your local authority for further details. Illegal dumping of the product by the user entails the application of administrative sanctions provided by law.

EC DECLARATION OF CONFORMITY

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

WRL 180 - 650



We, the undersigned, hereby declare under our own responsibility that the assembly in question, defined as follows:

Name: WRL
Type: Water cooled heat pump reversible water side
Models: WRL 180-650 HPW data
to which this declaration refers, complies with all the provisions related to the following directives:

Machinery Directive 2006/42/EC
Erp Directive 2009/125/CE
RoHS Directive on the restriction of the use of certain hazardous substances in EEE: 2011/65/UE
PED Directive regarding pressurised devices: 2014/68/UE
Electromagnetic Compatibility Directive EMCD: 2014/30/UE

The above-mentioned declaration complies with the harmonised European standards:
UNI EN ISO 12100: 2010
UNI EN 378-2: 2017
UNI EN 12735-1: 2020
CEI EN 60204-1: 2018
CEI EN IEC 61000-6-1: 2019
CEI EN IEC 61000-6-3: 2021

This declaration of conformity has been released under the exclusive responsibility of the manufacturer.
The person authorised to draw up the technical file is Luca Martin via Roma 996, 37040 Bevilacqua (VR) Italy..

The unit complies with the project data indicated in the technical file in the paragraph Definition of the Assembly, is in agreement with Directive 2014/68/EU and satisfies the Total Guarantee procedure (form H) with certificate no. 06/270-QT33664 Rev.16 issued by the notified body no. 1131 CEC via Pisacane 46 Legnano (MI) - Italia.
The list of critical components relevant to the above factory number, in accordance with the provisions of Directive 2014/68/EU, is provided together with this Declaration of Conformity (doc. "List of components for Declaration of Conformity").

We also declare that, at the time this preloaded equipment was placed on the European market by Aermec S.p.A. (which imports or manufactures in the Union), the hydrofluorocarbons contained therein are considered in the unit system of the Union referred to in Chapter IV of EU Regulation 517/2014 as they were placed on the market by a manufacturer or importer of hydrofluorocarbons to which Article 15 of EU Regulation 517/2014 applies.

Signed for and on behalf of: AERMEC S.p.A.

Bevilacqua (VR),

Marketing manager
Luigi Zucchi

UKCA DECLARATION OF CONFORMITY

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

WRL 180 - 650

MODEL

SERIAL NUMBER

DATE

We, the undersigned, hereby declare under our own responsibility that the assembly in question, defined as follows:

Name: WRL
Type: Water cooled heat pump reversible water side
Models: WRL 180-650 HPW data
to which this declaration refers, complies with all the provisions related to the following directives:

S.I. 2008 No.1597
S.I. 2016 No.1091
S.I. 2016 No.1105
S.I. 2012 No.3032
S.I. 2010 No.2617

The above-mentioned declaration complies with the harmonised European standards:
EN IEC 61000-6-1: 2019
EN IEC 61000-6-3: 2021
EN 378-2: 2016
EN 12735-1: 2020
EN 60204-1: 2018
EN ISO 12100: 2010

This declaration of conformity has been released under the exclusive responsibility of the manufacturer.
The person authorised to draw up the technical file is Luca Martin.

The unit complies with the project data reported in the technical file in the Definition of the Assembly paragraph, it is in agreement with S.I. 2016 No.1105 and satisfies the full quality assurance procedure (form H) with certificate no. 22-UK-PER-033-H Rev. 0 issued by the notified body no. 0097, DNV UK Limited: Vivo Building, 30 Stamford Street, London, SE1 9LQ. United Kingdom.
The list of critical components relevant to the factory number shown above, in accordance with S.I. 2016 No.1105, is provided together with this Declaration of Conformity (doc. "Component List for Declaration of Conformity").

Signed for and on behalf of: AERMEC S.p.A.

Bevilacqua (VR),

Marketing manager
Luigi Zucchi

TABLE OF CONTENTS

1 PRODUCT DESCRIPTION

AERMEC IS ALWAYS COMMITTED TO SAFEGUARDING THE ENVIRONMENT

The constant increase in atmospheric pollution and global warming led to a rapid change in the regulations in the HVAC & R sector. From the United Nations Framework Convention on Climate Change, all members have gradually committed to fix the new targets, which are increasingly more restrictive and have the following aim:
— reduce green house gas emission;
— limit the increase of global warming within 2°C compared to the pre-industrial age;
— promote the adoption of renewable energy sources.
This entails major changes in the HVAC refrigerant gas sector.

FIELDS OF THE RANGE

Air-cooled outdoor chiller designed to meet air conditioning needs in residential/commercial complexes or industrial applications.
The base, the structure and the panels are made of galvanized steel treated with polyester paint RAL 9003.

Maximum adaptability

The standard unit is supplied with a water filter, differential pressure switch and safety valve already installed on the service and source side (and also on the recovery side, if present).
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).
Low-head and 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.

Operating field

Full-load operation with the production of chilled water 4-18°C, and the possibility to produce also negative temperature water down to -8°C for the evaporator and hot water for the condenser up to 55 °C.
(for more information, refer to the technical documentation).

Version with desuperheater

Cooler complete with a desuperheater section.
In the configuration with desuperheater, it is also possible to produce free-hot water.
Each exchanger is protected by an anti-freeze resistance.

Control µPc

Microprocessor adjustment, with keyboard and LCD display,for easy access on the unit is a menu available in several languages.
— Possibility to control two units in a Master-Slave configuration
— 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.

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.

2 CONFIGURATOR

Field		Description
1,2,3		**WRL**
4,5,6		**Size** 180, 200, 300, 400, 500, 550, 600, 650
7		**Operating field**
	°	Standard mechanic thermostatic valve (1)
	X	Electronic thermostatic expansion valve
	Y	Low temperature mechanic thermostatic valve (2)
8		**Model**
	°	Heat pump reversible on the water side
	E	Evaporating unit (3)
	K	Heat pump reversible on the water side with low pressure drops
9		**Version**
	°	Standard
10		**Heat recovery**
	°	Without heat recovery
	D	With desuperheater
11		**Integrated hydronic kit, source side**
	°	Without hydronic kit
	B	On-off pump
	F	Single low-head inverter pump
	I	High-head inverter pump
	U	Pump high head
		Applications with bore hole water
	V	2-way modulating valve
12		**Integrated hydronic kit user side**
	°	Without hydronic kit
	N	Pump high head
	P	Pump low head
13		**Field for future development**
	°	Field for future development
14		**Soft-start**
	°	Without soft-start
	S	With soft-start
15		**Power supply**
	°	400V~3N 50Hz

(1) Water produced from 4 °C ÷ 18 °C
(2) Water produced from 4 °C ÷ - 8 °C
(3) Shipped with holding charge only

3 UNIT COMPONENTS DESCRIPTION

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.

REFRIGERANT CIRCUIT

Compressors

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

Filter drier (180-500)

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

Dehydrator filter, with replaceable cartridges (550-650)

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

The valve modulates the flow of gas to the evaporator in relation to the heat load, to ensure the intake gas is properly heated.

4-way cycle inversion valve

reverses the refrigerant fluid flow.

Sight glass

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

One-way valve

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

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_4)	< 2ppm
Manganese (Mn)	< 0,05 ppm
Iron (Fe)	< 0,2 ppm
Alkalinity (HCO_3)	70 - 300 ppm
Chloride ions (Cl-)	< 50 ppm
Free chlorine	< 0,5 ppm
Sulphate ions (SO_4)	< 50 ppm
Sulphide ion (S)	None
Ammonium ions (NH_4)	None
Silica (SiO_2)	< 30 ppm

NOTE: Always provide a water filter upstream (inlet) of the heat exchanger. In order to ensure the limits of acceptability of the water, it is recommended to use a filter with holes not greater than one millimetre.

Flow switch

Safety valve

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

Drain valve

Discharges the water from the hydraulic circuit.

HYDRAULIC CIRCUIT COMPONENTS IN VERSIONS WITH HYDRONIC KIT

Pump

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

WARNING: In the event of installation the pump must be managed by the control of the unit for the correct functioning of the machine.

Expansion vessel

Membrane type precharged with nitrogen.

System buffer tank

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

CONTROL AND SAFETY COMPONENTS

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.

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/OF;
— 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 WRL 180 - 650 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

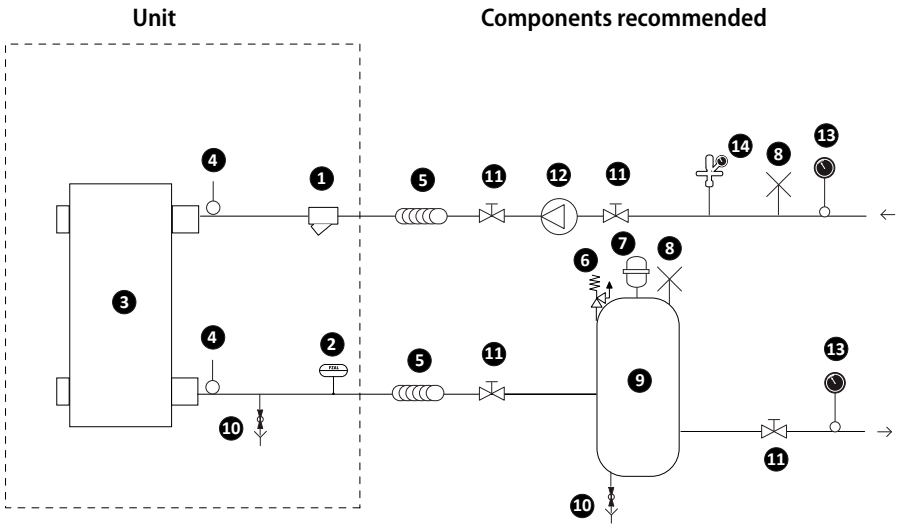
— Remote on/off with voltage-free external contact;
— Multi-language menu;
— Phase sequence control;
— Separate control of the individual compressors;
— Amperometric transformer;
— Cumulative faults block signal;
— Historical alarms function;
— Daily/weekly programming;
— Water temperature display;
— 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.

4 MAIN HYDRAULIC CIRCUITS

HEAT PUMP REVERSIBLE ON THE WATER SIDE

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)

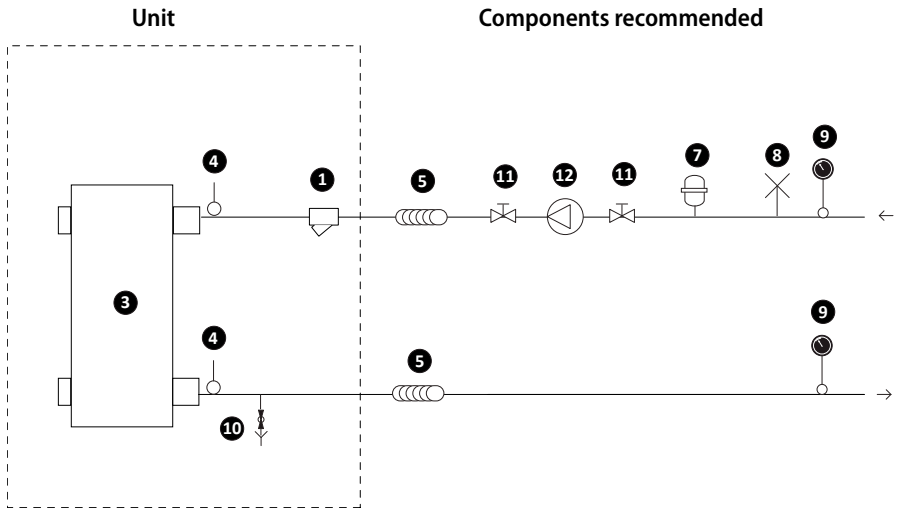
5 Anti-vibration joints
6 Pressure relief valve
7 Expansion vessel
8 Air drain valve
9 Storage tank
10 Drain valve
11 Shut-off tap
12 Pump
13 Pressure gauge
14 Loading unit

NOTE: Always provide a water filter upstream (inlet) of the heat exchanger. In order to ensure the limits of acceptability of the water, it is recommended to use a filter with holes not greater than one millimetre.

NOTE: It is absolutely fundamental to keep the oxygen concentration in the water under control, especially in open vessel systems. In fact, this type of system is very sensitive to the additional oxygenation of water (which can be caused by the incorrect positioning of certain components). This phenomenon triggers corrosion processes resulting in the subsequent perforation 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.

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

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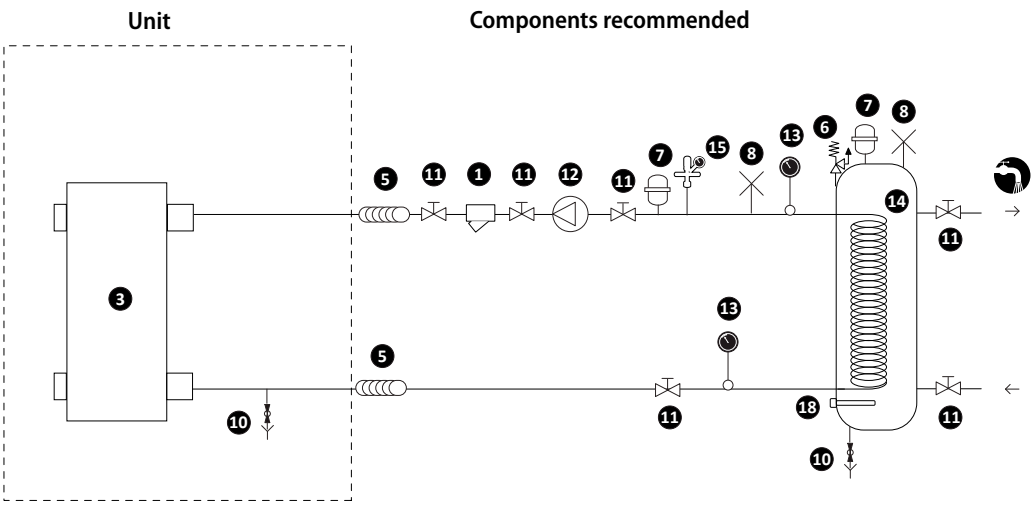
With desuperheater



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

■ *NOTE: Always provide a water filter upstream (inlet) of the heat exchanger. In order to ensure the limits of acceptability of the water, it is recommended to use a filter with holes not greater than one millimetre.*

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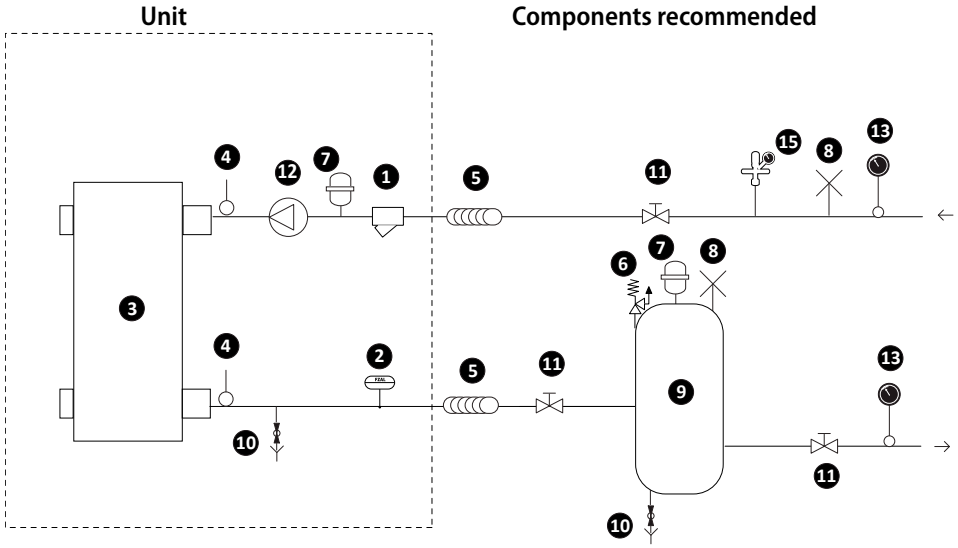
System side - with pumps



COMPONENTS AS STANDARD

1 Water filter
2 Flow switch
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

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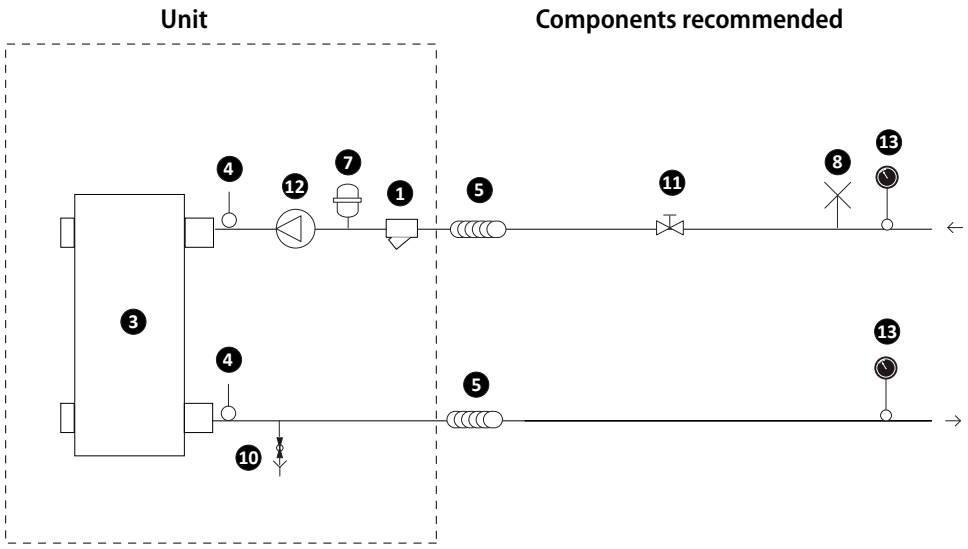
Geothermal side - with pumps



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

■ *NOTE: Always provide a water filter upstream (inlet) of the heat exchanger. In order to ensure the limits of acceptability of the water, it is recommended to use a filter with holes not greater than one millimetre.*

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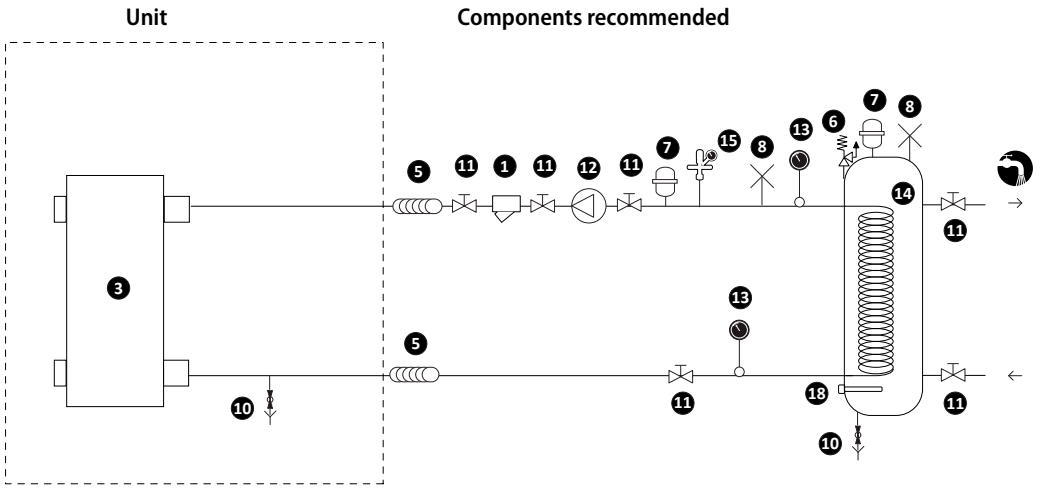
With desuperheater



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

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WATER CHARACTERISTICS

System: Chiller with plate heat exchanger	
PH	7,5 - 9
Total hardness	4,5 - 8,5 °dH
Electric conductivity	10-500 µS /cm
Temperature	< 65 °C
Oxygen content	< 0,1 ppm
Max. glycol amount	50 %
Phosphates (PO_4)	< 2ppm
Manganese (Mn)	< 0,05 ppm
Iron (Fe)	< 0,2 ppm
Alkalinity (HCO_3)	70 - 300 ppm
Chloride ions (Cl-)	< 50 ppm
Free chlorine	< 0,5 ppm
Sulphate ions (SO_4)	< 50 ppm
Sulphide ion (S)	None
Ammonium ions (NH_4)	None
Silica (SiO_2)	< 30 ppm

NOTE: Always provide a water filter upstream (inlet) of the heat exchanger. In order to ensure the limits of acceptability of the water, it is recommended to use a filter with holes not greater than one millimetre.

NOTE: It is absolutely fundamental to keep the oxygen concentration in the water under control, especially in open vessel systems. In fact, this type of system is very sensitive to the additional oxygenation of water (which can be caused by the incorrect positioning of certain components). This phenomenon triggers corrosion processes resulting in the subsequent perforation of the heat exchanger and pipes.

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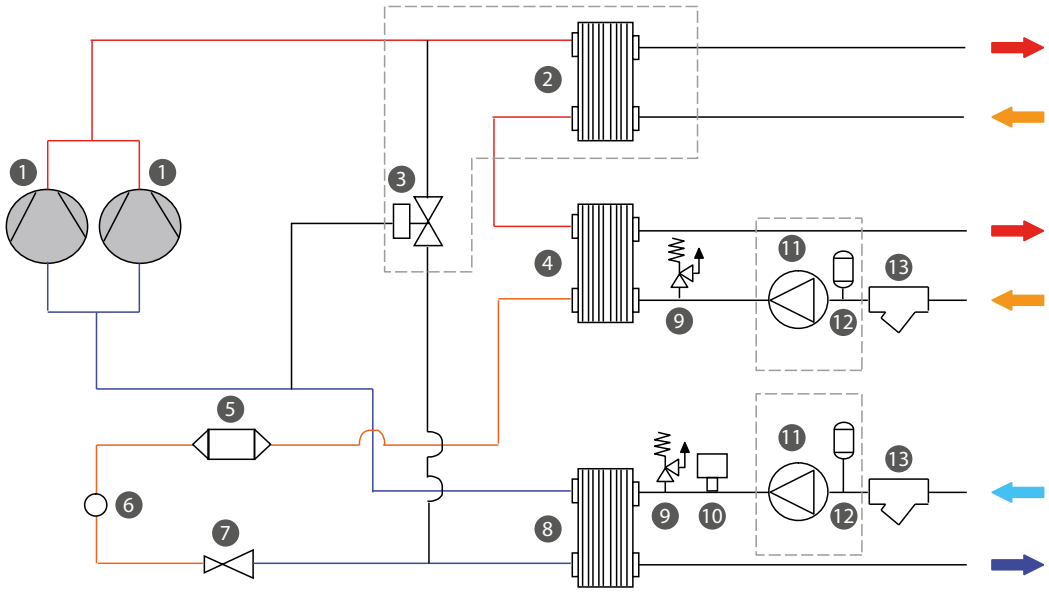
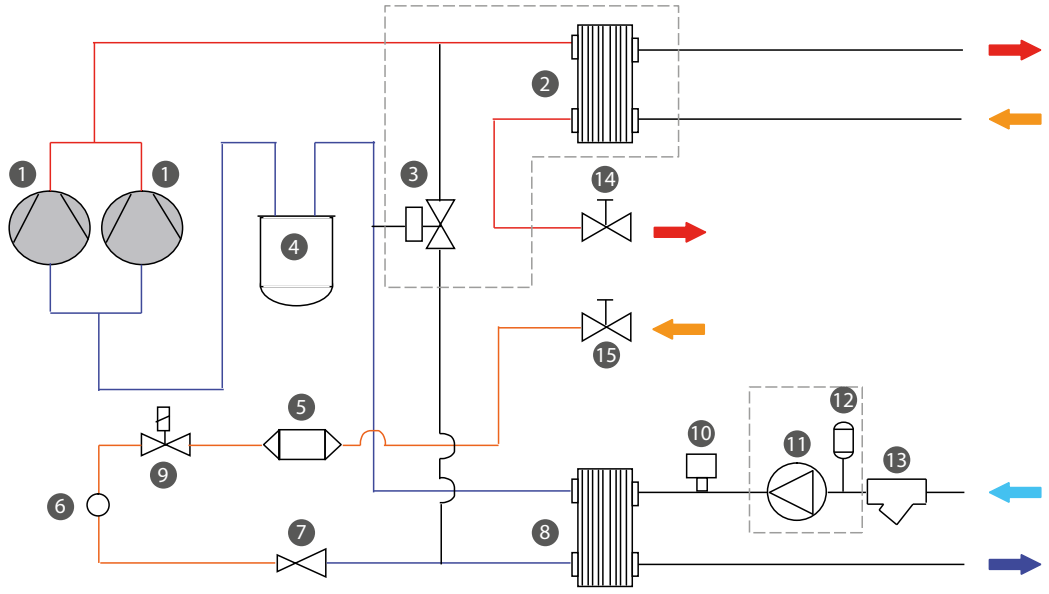
5 MAIN COOLING REFRIGERANT LAYOUTS

WRL 180-650



1 Compressor
2 Desuperheater
3 Hot gas injection valve
4 Condenser
5 Filter drier
6 Sight glass
7 Thermostatic expansion valve
8 Evaporator
9 Pressure relief valve
10 Flow switch
11 Pump
12 Expansion vessel
13 Water filter

WRL E 180-650



1 Compressor
2 Desuperheater
3 Hot gas injection valve
4 Liquid separator
5 Filter drier
6 Sight glass
7 Thermostatic expansion valve
8 Evaporator
9 Pressure relief valve
10 Flow switch
11 Pump
12 Expansion vessel
13 Water filter
14 Liquid valve
15 Liquid return valve

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.
KSAE: External air sensor.
PGD1: Allows you to control the unit at a distance.
SSM: Probe to be used with the mixer valve in applications with radiant panels. The probe requires the VMF-CRP area accessory as well.
TAH: Ambient terminal with temperature and humidity probe - 230V AC flush-mounting model that can command an On-Off valve or a zone pump and dehumidifier consent.
TAT: Ambient terminal with temperature probe - 230V AC flush-mounting model that can command an On-Off valve or a zone pump.
VMF-CRP: Accessory module for controlling boilers, heat recover units and pumps (if associated with VMF-E5 / RCC panels); if associated with the VMF-E6 panel, the VMF-CRP modules will be able to manage heat recovery units, RAS, boiler, sanitary management, I/O control, pumps.
VT: Antivibration supports

ACCESSORIES COMPATIBILITY

Ver	180	200	300	400	500	550	600	650
Model: °, E, K								
°	AER485P1, AERNET, KSAE, PGD1, SSM, TAH, TAT, VMF-CRP	AER485P1, AERNET, KSAE, PGD1, SSM, TAH, TAT, VMF-CRP	AER485P1, AERNET, KSAE, PGD1, SSM, TAH, TAT, VMF-CRP	AER485P1, AERNET, KSAE, PGD1, SSM, TAH, TAT, VMF-CRP	AER485P1, AERNET, KSAE, PGD1, SSM, TAH, TAT, VMF-CRP	AER485P1, AERNET, KSAE, PGD1, SSM, TAH, TAT, VMF-CRP	AER485P1, AERNET, KSAE, PGD1, SSM, TAH, TAT, VMF-CRP	AER485P1, AERNET, KSAE, PGD1, SSM, TAH, TAT, VMF-CRP

Antivibration

Version	Integrated hydronic kit, source side	Integrated hydronic kit user side	180	200	300	400	500	550	600	650
°	°,B,F,I,U,V	°,N,P	VT9	VT9	VT9	VT9	VT15	VT15	VT15	VT15

7 PERFORMANCE SPECIFICATIONS

WRL - °

Size		180	200	300	400	500	550	600	650
Cooling performance 12 °C / 7 °C (1)									
Cooling capacity	kW	49,7	64,3	74,4	85,9	99,8	129,5	150,1	169,0
Input power	kW	10,8	14,4	16,8	18,3	20,4	27,0	31,0	35,7
Cooling total input current	A	20,0	25,0	29,0	62,0	36,0	51,0	59,0	68,0
EER	W/W	4,59	4,47	4,42	4,69	4,90	4,80	4,84	4,73
Water flow rate source side	l/h	10336	13418	15531	17725	20550	26664	30860	34836
Pressure drop source side	kPa	27	46	62	81	32	52	57	72
Water flow rate system side	l/h	8549	11082	12824	14822	17186	22296	25844	29025
Pressure drop system side	kPa	27	43	46	60	30	49	53	67
Heating performance 40 °C / 45 °C (2)									
Heating capacity	kW	55,8	72,6	84,1	95,6	110,7	143,6	166,1	187,7
Input power	kW	13,2	17,6	20,5	22,4	24,8	32,9	37,9	43,9
Heating total input current	A	24,0	30,0	34,0	38,0	44,0	61,0	71,0	82,0
COP	W/W	4,24	4,13	4,10	4,27	4,46	4,36	4,38	4,27
Water flow rate source side	l/h	12542	16257	18813	21745	25213	32709	37914	42683
Pressure drop source side	kPa	58	93	99	129	65	105	114	144
Water flow rate system side	l/h	9685	12580	14561	16557	19196	24909	28816	32553
Pressure drop system side	kPa	24	40	55	71	28	45	50	63

(1) Date 14511:2022; Water user side 12 °C / 7 °C; Water source side 30 °C / 35 °C
(2) Date 14511:2022; Water user side 40 °C / 45 °C; Water source side 10 °C / 7 °C

WRL - K

Size		180	200	300	400	500	550	600	650
Cooling performance 12 °C / 7 °C (1)									
Cooling capacity	kW	49,7	66,3	76,7	88,6	99,8	133,5	154,6	174,1
Input power	kW	10,8	14,4	16,9	18,3	20,4	26,7	30,8	35,6
Cooling total input current	A	20,0	25,0	29,0	32,0	36,0	51,0	59,0	68,0
EER	W/W	4,59	4,61	4,55	4,85	4,50	5,00	5,02	4,90
Water flow rate source side	l/h	10336	13753	15919	18173	20550	27338	31642	35716
Pressure drop source side	kPa	27	48	65	85	32	55	60	76
Water flow rate system side	l/h	8549	11414	13209	15267	17186	22965	26619	29967
Pressure drop system side	kPa	27	34	42	48	30	24	33	41
Heating performance 40 °C / 45 °C (2)									
Heating capacity	kW	55,8	74,3	86,1	97,9	110,7	147,1	170,1	192,1
Input power	kW	13,2	17,5	20,5	22,2	24,8	32,3	37,3	43,1
Heating total input current	A	24,0	30,0	34,0	38,0	44,0	61,0	71,0	82,0
COP	W/W	4,24	4,24	4,20	4,40	4,46	4,56	4,56	4,46
Water flow rate source side	l/h	12542	16745	19337	22397	25213	33690	39052	43963
Pressure drop source side	kPa	58	73	90	103	65	52	71	88
Water flow rate system side	l/h	9685	12876	14904	16953	19196	25504	29507	33331
Pressure drop system side	kPa	24	42	57	74	28	48	52	66

(1) Date 14511:2022; Water user side 12 °C / 7 °C; Water source side 30 °C / 35 °C
(2) Date 14511:2022; Water user side 40 °C / 45 °C; Water source side 10 °C / 7 °C

WRL - E

Size		180	200	300	400	500	550	600	650
Cooling performance 12 °C / 7 °C (1)									
Cooling capacity	kW	46,0	60,1	69,6	80,1	90,6	121,3	140,2	158,7
Input power	kW	12,4	16,0	18,5	19,8	23,1	29,6	34,1	38,5
Cooling total input current	A	23,0	29,0	32,0	36,0	42,0	56,0	65,0	74,0
EER	W/W	3,71	3,76	3,76	4,05	3,92	4,10	4,11	4,12
Water flow rate system side	l/h	7903	10326	11958	13762	15566	20841	24088	27266
Pressure drop system side	kPa	23	39	39	56	25	42	47	57

(1) Service side water 12 °C / 7 °C; Condensing temperature 45 °C

8 ENERGY INDICES (REG. 2016/2281 EU)

WRL °

Size		180	200	300	400	500	550	600	650
SEER - 12/7 (EN14825: 2018) (1)									
SEER	W/W	4,65	4,55	4,54	4,74	5,31	5,04	5,12	4,97
Seasonal efficiency	%	182,8%	178,9%	178,5%	186,4%	209,3%	198,7%	201,7%	195,8%
UE 813/2013 performance in average ambient conditions (average) - 55 °C - Pdesignh ≤ 400 kW (2)									
Pdesignh	kW	68	91	98	119	137	185	212	236
ηsh	%	173.0%	170.0%	170.0%	175.0%	189.0%	186.0%	189.0%	184.0%
SCOP	W/W	4,53	4,45	4,45	4,58	4,93	4,85	4,93	4,80
Efficiency energy class		A+++	-	-	-	-	-	-	-
UE 813/2013 performance in average ambient conditions (average) - 35 °C - Pdesignh ≤ 400 kW (3)									
Pdesignh	kW	79	-	-	-	-	-	-	-
ηsh	%	222.0%	-	-	-	-	-	-	-
SCOP	W/W	5,75	-	-	-	-	-	-	-
Efficiency energy class		A+++	-	-	-	-	-	-	-

(1) Calculation performed with FIXED water flow rate and VARIABLE outlet temperature.
(2) Efficiencies for average temperature applications (55 °C)
(3) Efficiencies for low temperature applications (35 °C)

WRL K

Size		180	200	300	400	500	550	600	650
SEER - 12/7 (EN14825: 2018) (1)									
SEER	W/W	4,65	4,71	4,67	4,90	5,31	5,31	5,35	5,19
Seasonal efficiency	%	182,8%	185,3%	183,6%	192,9%	209,3%	209,2%	210,9%	204,6%
UE 813/2013 performance in average ambient conditions (average) - 55 °C - Pdesignh ≤ 400 kW (2)									
Pdesignh	kW	68	91	98	119	137	185	212	236
ηsh	%	173.0%	170.0%	170.0%	175.0%	189.0%	186.0%	189.0%	184.0%
SCOP	W/W	4,53	4,45	4,45	4,58	4,93	4,85	4,93	4,80
Efficiency energy class		A+++	-	-	-	-	-	-	-
UE 813/2013 performance in average ambient conditions (average) - 35 °C - Pdesignh ≤ 400 kW (3)									
Pdesignh	kW	79	-	-	-	-	-	-	-
ηsh	%	222.0%	-	-	-	-	-	-	-
SCOP	W/W	5,75	-	-	-	-	-	-	-
Efficiency energy class		A+++	-	-	-	-	-	-	-

(1) Calculation performed with FIXED water flow rate and VARIABLE outlet temperature.
(2) Efficiencies for average temperature applications (55 °C)
(3) Efficiencies for low temperature applications (35 °C)

9 GENERAL TECHNICAL DATA

Size			180	200	300	400	500	550	600	650
Compressor										
Type	°,E,K	type					Scroll			
Compressor regulation	°,E,K	Type					On-Off			
Number	°,E,K	no.	2	2	2	2	2	2	2	2
Circuits	°,E,K	no.	1	1	1	1	1	1	1	1
Refrigerant	°,E,K	type					R410A			
Refrigerant charge (1)	°,K	kg	6,0	7,0	6,8	7,2	9,0	14,5	16,8	16,5
	E	kg	Holding charge	Holding charge	Holding charge	Holding charge	Holding charge	Holding charge	Holding charge	Holding charge
Total oil charge	°,K	kg	5,0	5,0	5,0	5,7	6,3	12,1	12,1	12,1
	E	kg	-	-	-	-	-	-	-	-
Source side heat exchanger										
Type	°,K	type					Brazed plate			
	E	type								
Number	°,K	no.	1	1	1	1	1	1	1	1
	E	no.	-	-	-	-	-	-	-	-
System side heat exchanger										
Type	°,E,K	type					Brazed plate			
Number	°,E,K	no.	1	1	1	1	1	1	1	1
Source side hydraulic connections										
Connections (in/out)	°,K	Type					Grooved joints			
	E	Type								
Sizes (in/out)	°,K	Ø	2″	2″	2″	2″	2″1/2	2″1/2	2″1/2	2″1/2
	E	Ø								
System side hydraulic connections										
Connections (in/out)	°,E,K	Type					Grooved joints			
Sizes (in/out)	°,E,K	Ø	2″	2″	2″	2″	2″1/2	2″1/2	2″1/2	2″1/2
Sound data calculated in cooling mode (2)										
Sound power level	°,E,K	dB(A)	61,1	61,8	62,9	71,1	67,6	79,1	79,1	79,1
Sound pressure level (10 m)	°,E,K	dB(A)	29,6	30,3	31,4	39,6	36,0	47,5	47,5	47,5

(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, as required for Eurovent certification. Sound pressure (cold functioning) measured in free field, 10m away from the unit external surface (in compliance with UNI EN ISO 3744).

10 ELECTRIC DATA

Size			180	200	300	400	500	550	600	650
Electric data										
Maximum current (FLA)	°,E,K	A	32,6	41,8	45,2	52,1	59,0	99,0	112,0	125,0
Peak current (LRA)	°,E,K	A	119,0	123,0	125,0	167,0	174,0	265,0	310,0	323,0

11 MINIMUM TECHNICAL SPACES

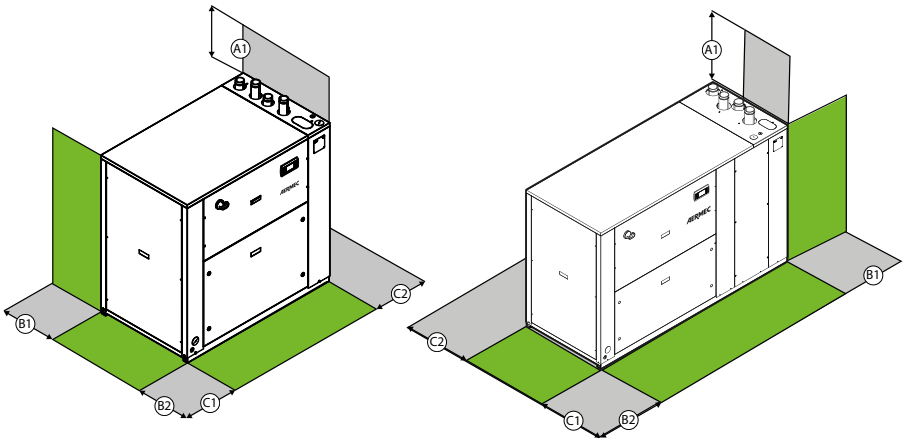
With regards to all units, it is essential to respect the minimum distances to avoid:
— The generation of hazardous atmospheres in the case of refrigerant gas leaks;

The place where the unit is installed must be accessible and permitted only to authorised personnel.

It is important that the units are installed flat. The improper installation of the unit invalidates the warranty.

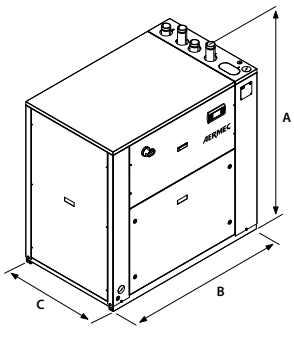
Each side of the unit must have space to allow all routine and extraordinary maintenance to be performed.

THE FOLLOWING IMAGES INDICATE THE MINIMUM REQUIRED SPACE:

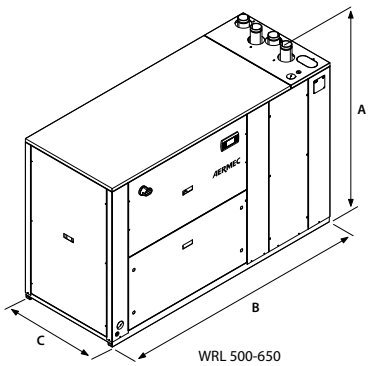


Size			180	200	300	400	500	550	600	650
Minimum technical spaces										
A1	°	mm	600	600	600	600	600	600	600	600
	E,K	mm	-	-	-	-	-	-	-	-
B1	°	mm	600	600	600	600	600	600	600	600
	E,K	mm	-	-	-	-	-	-	-	-
B2	°	mm	600	600	600	600	600	600	600	600
	E,K	mm	-	-	-	-	-	-	-	-
C1	°	mm	600	600	600	600	600	600	600	600
	E,K	mm	-	-	-	-	-	-	-	-
C2	°	mm	600	600	600	600	600	600	600	600
	E,K	mm	-	-	-	-	-	-	-	-

DIMENSIONS



WRL 180-400



WRL 500-650

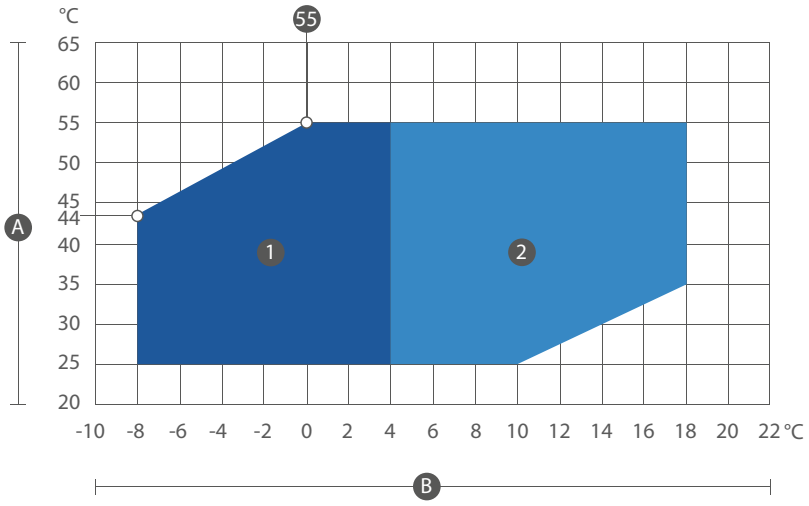
Dimensions and weights

Size			180	200	300	400	500	550	600	650
Dimensions and weights										
A	°,E,K	mm	1380	1380	1380	1380	1380	1380	1380	1380
B	°,E,K	mm	1320	1320	1320	1320	2060	2060	2060	2060
C	°,E,K	mm	845	845	845	845	845	845	845	845
Empty weight	°,K	kg	375	375	381	388	518	594	670	715
	E	kg	-	-	-	-	-	-	-	-

12 OPERATING LIMITS

The units, in standard configuration, are not suitable for installation in aggressive environments. The values indicated here refer to the min. and max. temperature limits of the unit. For further information, refer to the Magellano selection program available on the website Aermec.
The min and max temperature limits are highlighted in the envelope. It is recommended to consider these temperatures when transporting in containers.

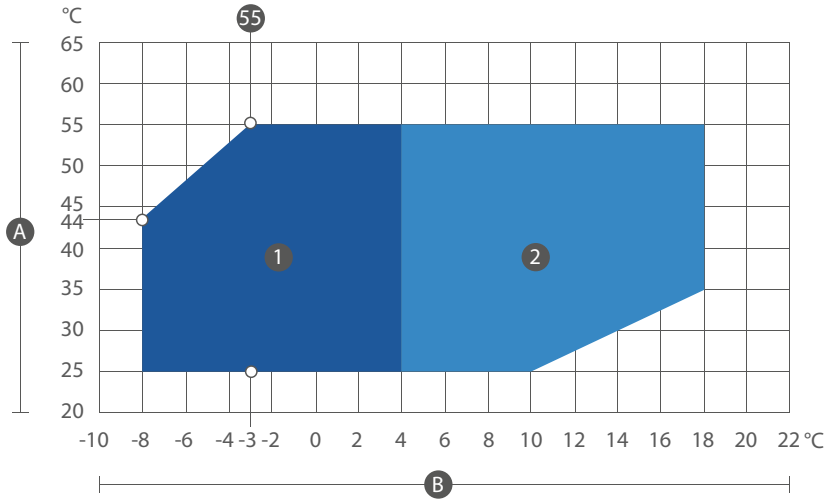
180-200-300-400-500



Key

A	Outlet water temperature - source side (°C)
B	Outlet water temperature - user side (°C)
1	Operation with glycol-water solution
2	Standard mode

550-600-650



Key

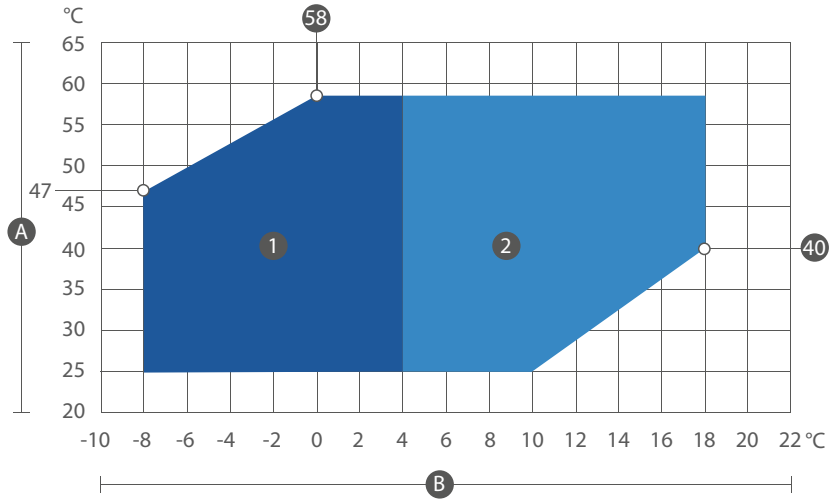
A	Outlet water temperature - source side (°C)
B	Outlet water temperature - user side (°C)
1	Operation with glycol-water solution
2	Standard mode

Attention: With produced water temperature at ≤ 4°C, it is advisable to provide a percentage of glycol inside the hydraulic circuit in order to avoid damaging the unit.

Condenser Input (Δtc) output difference:
— min: 5° C.
— max: 22° C.

Evaporator Inlet (Δte) output difference:
— min: 3° C.
— max: 10° C.

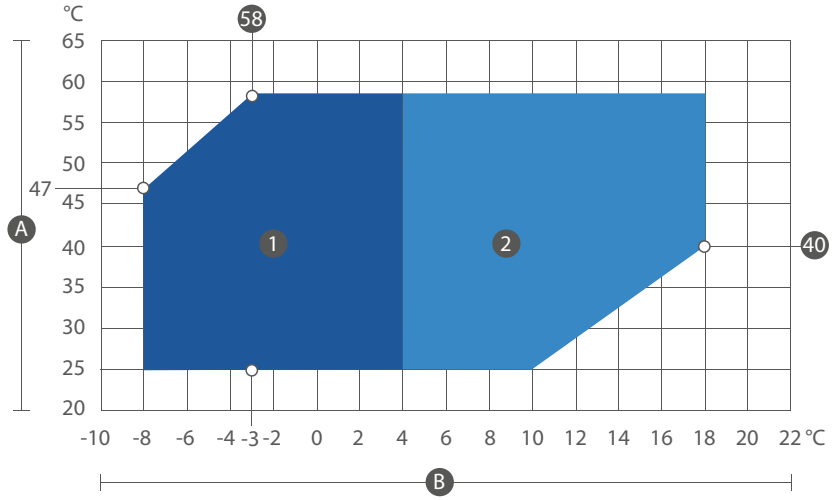
WRL E - 180-200-300-400-500



Key

A Outlet water temperature - source side (°C)
B Outlet water temperature - user side (°C)
1 Operation with glycol-water solution
2 Standard mode

WRL E - 550-600-650



Key

A Outlet water temperature - source side (°C)
B Outlet water temperature - user side (°C)
1 Operation with glycol-water solution
2 Standard mode

PROJECT DATA

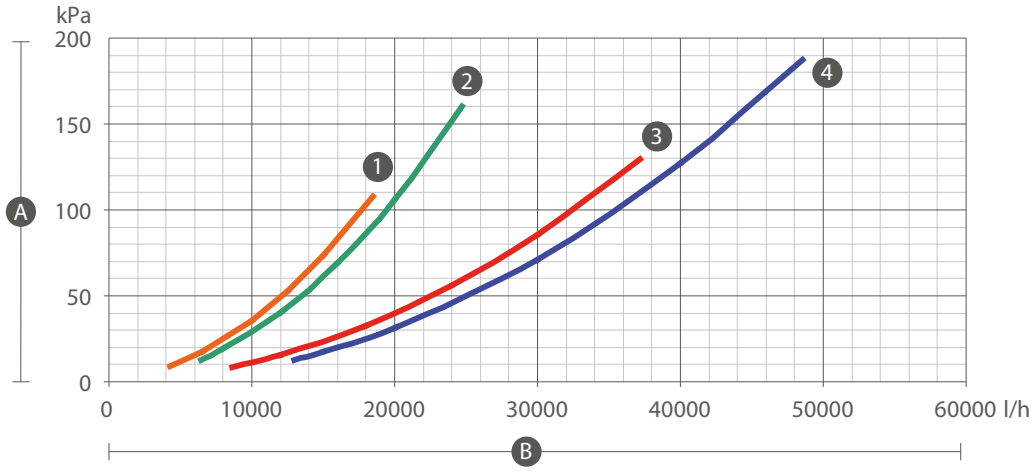
Cooling - WRL 180-200-300-500		**High pressure side**	**Low Pressure side**
Maximum allowable pressure	bar	42	22
Maximum allowable temperature	°C	125	38
Minimum allowable temperature	°C	-10	-30
Cooling - WRL 400-550-600			
Maximum allowable pressure	bar	42	30
Maximum allowable temperature	°C	125	51
Minimum allowable temperature	°C	-10	-30
Cooling - WRL 650			
Maximum allowable pressure	bar	45	30
Maximum allowable temperature	°C	125	51
Minimum allowable temperature	°C	-10	-30

13 PRESSURE DROPS

The following graphs show the pressure loss values in kPa according to the flow rate in l/h, the operating field is established by the minimum and maximum value shown in the tables.

COOLING MODE

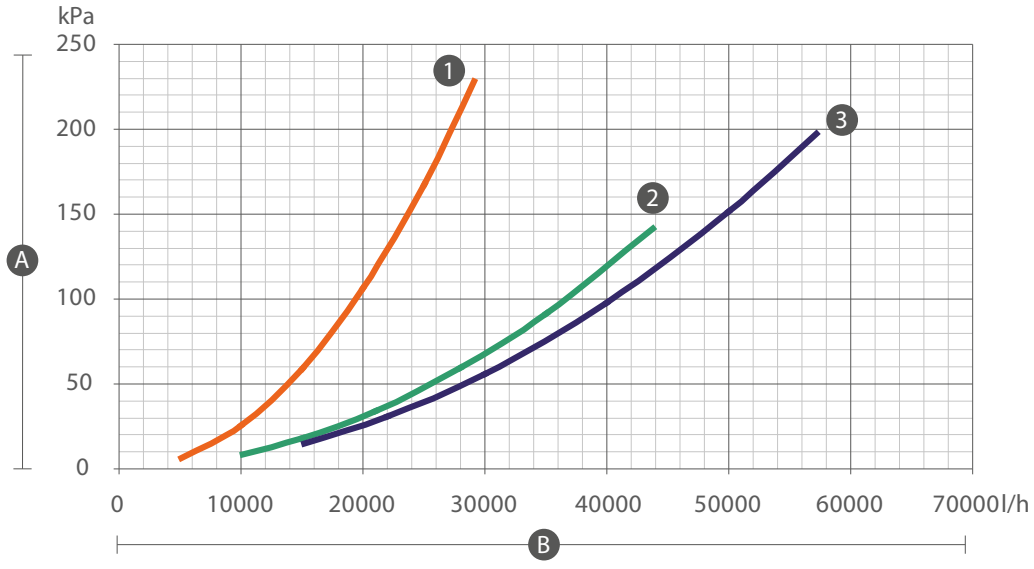
System side



A **Pressure drop (kPa)**
B **Water flow rate (l/h)**
1 180-200
2 300-400
3 500-550
4 600-650

Size		180	200	300	400	500	550	600	650
System side heat exchanger									
Minimum water flow rate	l/h	4275	5541	6412	7411	8593	11148	12922	14513
Maximum water flow rate	l/h	14248	18470	21373	24703	28643	37160	43073	48375

Source side

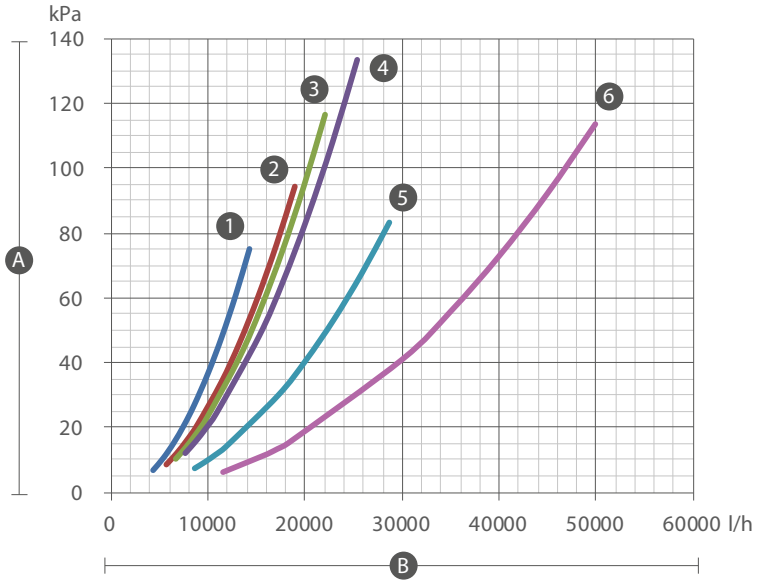


A **Pressure drop (kPa)**
B **Water flow rate (l/h)**
1 180-200-300-400
2 500-550
3 600-650

Size		180	200	300	400	500	550	600	650
Source side heat exchanger									
Minimum water flow rate	l/h	5168	6709	7766	8863	10275	13332	15430	17418
Maximum water flow rate	l/h	17227	22363	25885	29542	34250	44440	51433	58060

Data 14511:2022
The capacities and pressure drops in the heat exchangers calculated:
DHW side water 12 °C / 7 °C; Source side water 30 °C / 35 °C
For operating conditions different to those declared refer to the selection program Magellano, available on www.aermec.com

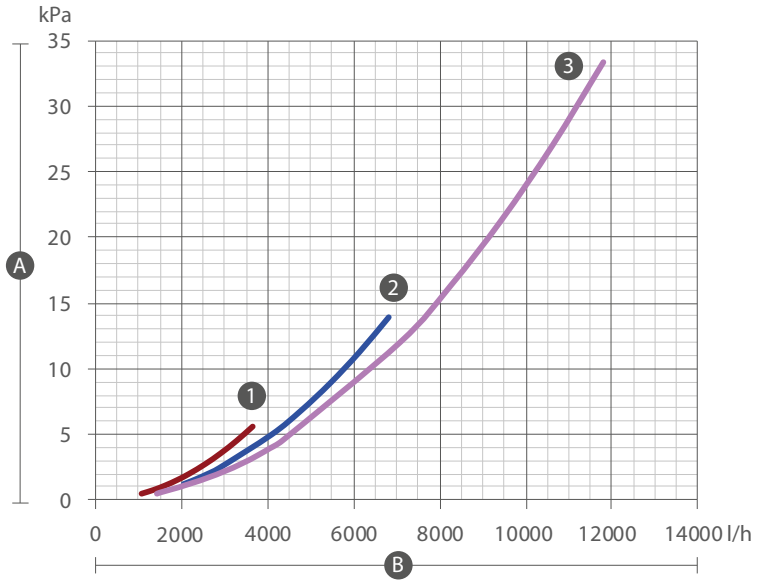
Version K



A **Pressure drop (kPa)**
B **Water flow rate (l/h)**
1 180
2 200
3 300
4 400
5 500
6 550-600-650

Size		180	200	300	400	500	550	600	650
System side heat exchanger									
Minimum water flow rate	l/h	4275	5707	6605	7634	8593	11483	13310	14984
Maximum water flow rate	l/h	14248	19023	22015	25445	28643	38275	44365	49945

Desuperheater



A **Pressure drop (kPa)**
B **Water flow rate (l/h)**
1 180
2 300-400-500
3 200-550-600-650

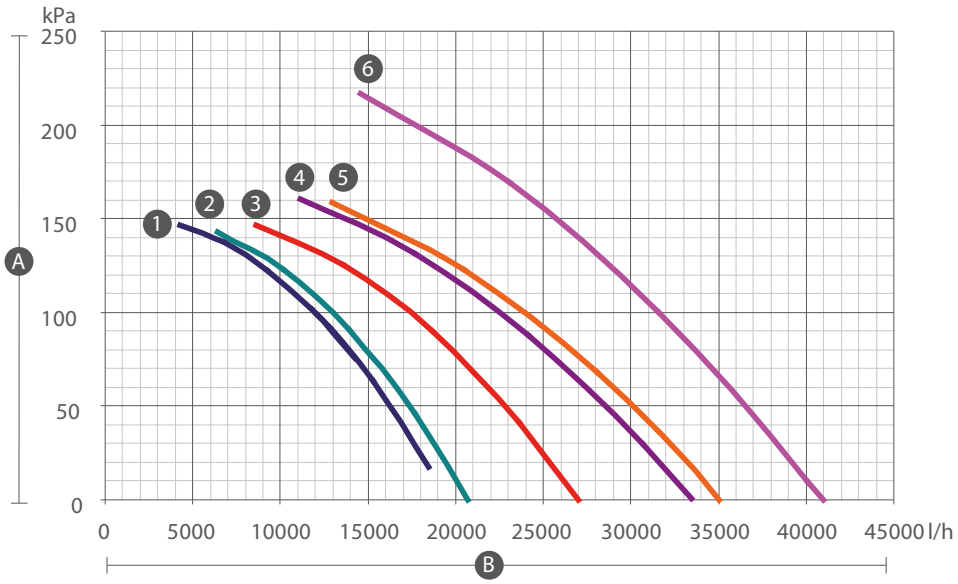
Size		180	200	300	400	500	550	600	650
Desuperheater									
Minimum water flow rate	l/h	1090	1430	1550	1765	2050	2815	3220	3540
Maximum water flow rate	l/h	3633	4767	5167	5883	6833	9383	10733	11800

Data 14511:2022
The capacities and pressure drops in the heat exchangers calculated:
DHW side water 12 °C / 7 °C; Source side water 30 °C / 35 °C
For operating conditions different to those declared refer to the selection program Magellano, available on www.aermec.com

14 USEFUL HEAD SYSTEM

LOW HEAD PUMP - P

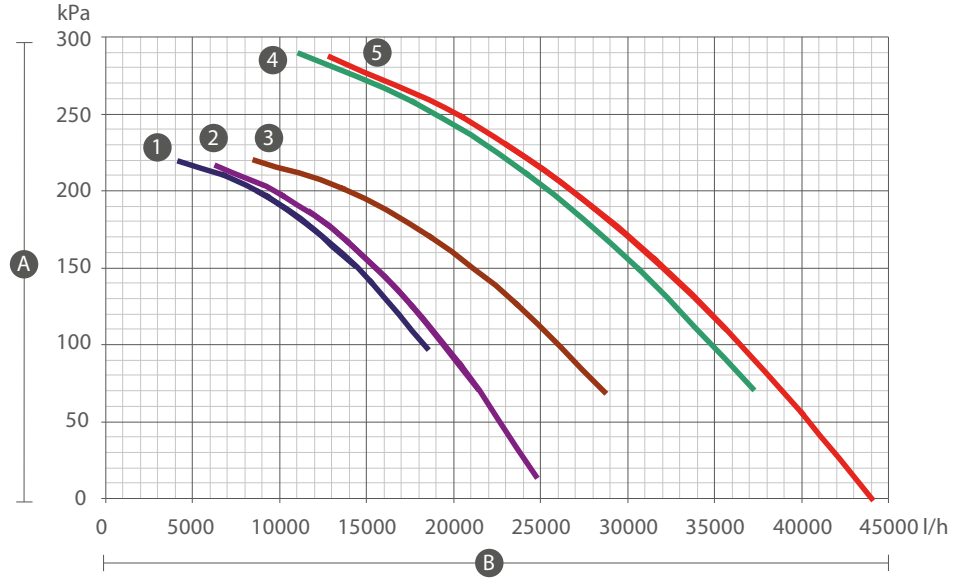
System side



A **Pressure drop (kPa)**
B **Water flow rate (l/h)**
1 180-200
2 300-400
3 500
4 550
5 600
6 650

HIGH HEAD PUMP - N

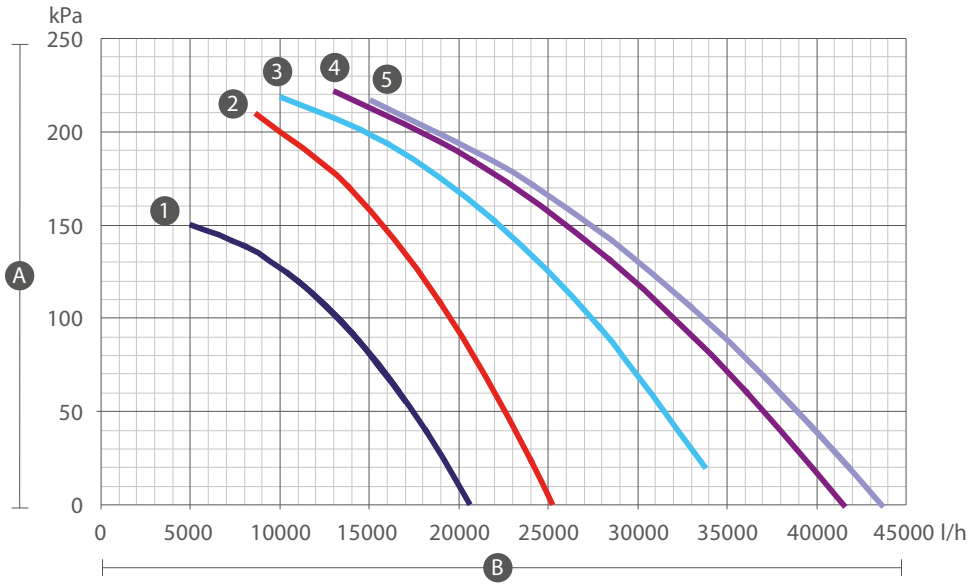
System side



A **Pressure drop (kPa)**
B **Water flow rate (l/h)**
1 180-200
2 300-400
3 500
4 550
5 600-650

LOW HEAD PUMP - B-F

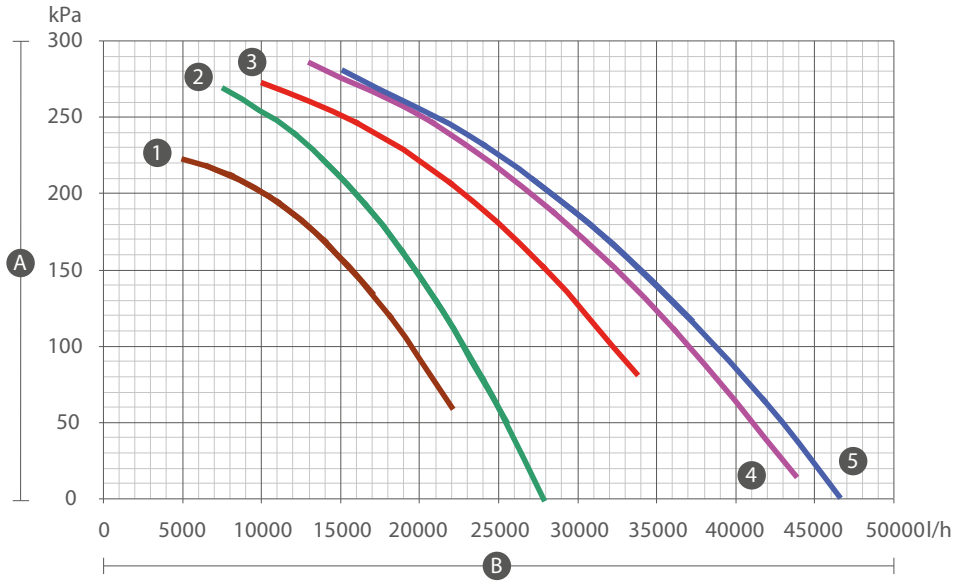
Condenser side



A	**Pressure drop (kPa)**
B	**Water flow rate (l/h)**
1	180-200-300
2	400
3	500
4	550
5	600-650

HIGH HEAD PUMP - U-I

Condenser side



A	**Pressure drop (kPa)**
B	**Water flow rate (l/h)**
1	180-200
2	300-400
3	500
4	550
5	600-650

15 SYSTEM WATER CONTENT

MINIMUM SYSTEM WATER CONTENT

For correct unit operation, there must be a suitable amount of water in the system. A sufficient quantity of water not only ensures machine stability, but also helps avoid a high number of hourly compressor start-ups.
To calculate it, use the formula: Unit rated cooling capacity (kW) x table value (l/kW) = Minimum system content (l).

Size		180	200	300	400	500	550	600	650
Minimum system water content									
Minimum water content for air conditioning	l/kW	7,0	7,0	7,0	7,0	7,0	7,0	7,0	7,0
Minimum water content for processes	l/kW	14,0	14,0	14,0	14,0	14,0	14,0	14,0	14,0

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.

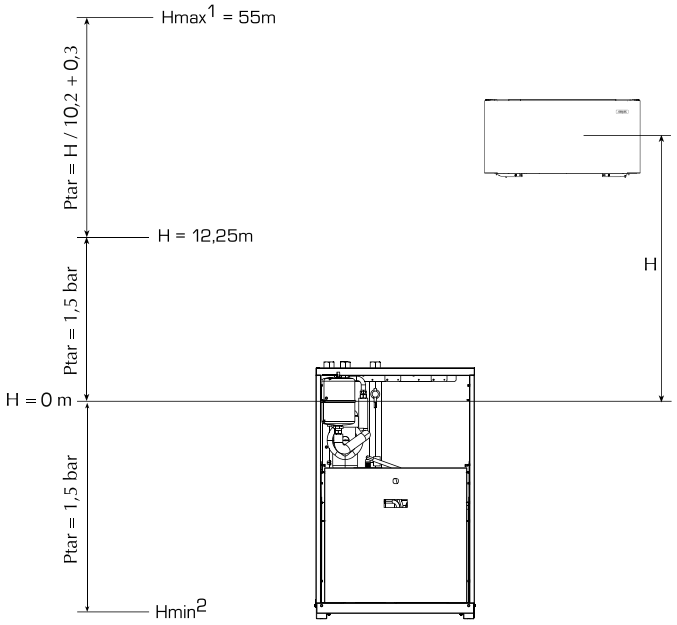
A example is given below, but it does not cover a possible situation.
Example: for a chiller/heat pump equipped with a primary and a secondary circuit, and in which the zone pumps of the secondary circuit could (even occasionally) be turned off, only the water content of the primary circuit has value 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.

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.**

EXPANSION VESSEL SETTING

The expansion tank volume is 12L. The standard value of the expansion tank pre-charge pressure is 1.5 bar, but this can be calibrated up to a maximum of 6 bar.
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 [m] / 10.2 + 0.3.
For example, if the difference in height H is 20 m then the value of the expansion tank pressure setting is 2.3 bar.
If the calculated pressure setting value is less than 1.5 bar (when H < 12.25), maintain the standard pressure setting.



Key
A Expansion vessel
1 Check that highest utility is not higher than 55 metres
2 Ensure that lowest utility can withstand global pressure in that position

16 CORRECTION FACTORS

CORRECTIVE FACTORS FOR AVERAGE WATER TEMPERATURES DIFFERENT FROM NOMINAL VALUES

The pressure drops are calculated with an average water temperature of 10 °C (Cooling mode), 43 °C (Heating or recovery mode)

		System side heat exchanger														
		Cooling mode							Heating mode or recovery							
Average water temperatures	°C	5	10	15	20	30	40	50	23	28	33	38	43	48	53	58
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

17 GLYCOL

ETHYLENE GLYCOL

Cooling mode

CORRECTION FACTOR WITH ETHYLENE GLYCOL - COOLING MODE											
Freezing point	°C	0	–3,63	–6,10	–8,93	–12,11	–15,74	–19,94	–24,79	–30,44	–37,10
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	°C	0	–3,63	–6,10	–8,93	–12,11	–15,74	–19,94	–24,79	–30,44	–37,10
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	°C	0	–3,43	–5,30	–7,44	–9,98	–13,08	–16,86	–21,47	–27,04	–33,72
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	°C	0	–3,43	–5,30	–7,44	–9,98	–13,08	–16,86	–21,47	–27,04	–33,72
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

Qwc Corrective factor of flow rates (middle water temperatur 9,5°C)
Qwh Corrective factor of flow rates (middle water temperatur 42,5°C)
Pc Corrective factor of cooling Capacity
Ph Corrective factor of heating Capacity
Pa Correction factor input Power
ΔP Correction factor Pressure drop

18 SOUND DATA

Size		180	200	300	400	500	550	600	650
Sound data calculated in cooling mode (1)									
Sound power level	dB(A)	61,1	61,8	62,9	71,1	67,6	79,1	79,1	79,1
Sound pressure level (10 m)	dB(A)	29,6	30,3	31,4	39,6	36,0	47,5	47,5	47,5
Sound pressure level (1 m)	dB(A)	45,2	45,9	47,0	55,2	51,1	62,6	62,6	62,6
Sound power by centre octave band dB(A)									
125 Hz	dB(A)	48,9	49,0	57,5	47,0	59,4	55,8	55,8	55,8
250 Hz	dB(A)	52,4	53,3	54,3	51,9	51,7	60,7	60,7	60,7
500 Hz	dB(A)	58,8	59,6	56,4	66,0	62,4	74,1	74,1	74,1
1000 Hz	dB(A)	53,0	53,4	54,2	68,8	62,1	76,8	76,8	76,8
2000 Hz	dB(A)	47,2	47,9	54,1	59,3	61,1	66,5	66,5	66,5
4000 Hz	dB(A)	45,0	45,6	51,0	53,8	49,2	61,4	61,4	61,4
8000 Hz	dB(A)	35,9	36,6	37,7	37,1	39,8	45,1	45,1	45,1

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

Data 14511:2022
DHW water 12 °C / 7 °C; Source water 30 °C / 35 °C
Note
For operating conditions different to those declared refer to the selection program Magellano, available on www.aermec.com

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

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