

NXP 0500-1650

Technical manual



WATER-WATER MULTIPURPOSE

Cooling capacity 31 ÷ 129 ton

Heating capacity 398,026 ÷ 1,654,817 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.

COMPANY CERTIFICATIONS



SAFETY CERTIFICATIONS



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

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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

Multi-purpose indoor model designed for applications with 2 or 4-pipe systems. Just one unit is capable of satisfying the yearly hot and cold water demand simultaneously and independently.

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

OPERATING FIELD

Work at full load with chilled water production from 39.2 a 64.4 °F at the evaporator and hot water at the condenser up to 131.0 °F.

DUAL-CIRCUIT UNIT

The units are dual-circuit, to ensure maximum efficiency both at full load and at partial load.

OPTION INTEGRATED HYDRONIC KIT, SOURCE AND USER SIDE

To obtain a solution that offers economic savings and easy installation, these units can be configured with an integrated hydronic kit on both the service side and the recovery side.

The kit contains the main hydraulic components, and is available in various configurations with a single pump or a standby pump too, so the customer can choose the right useful head.

■ *The flow switch is available as an accessory for both the system side and the recovery side, and is compulsory; if it is not installed, the warranty will be considered invalid.*

CONFIGURATOR

Field	Description
1,2,3	NXP
4,5,6,7	Size 0500, 0550, 0600, 0650, 0700, 0750, 0800, 0900, 1000, 1250, 1400, 1500, 1650
8	Operating field
	° Standard mechanic thermostatic valve (1)
	Y Low temperature mechanic thermostatic valve (2)
9	System type
	2 2-pipe system
	4 4-pipe system
10	Version
	L Standard silenced
11	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
12	System side - pumps
	° Without hydronic kit
	M Single pump low head
	N Pump low head + stand-by pump
	O Single pump high head
	P Pump high head + stand-by pump
13	Recovery side - pumps
	° Without hydronic kit
	U Single pump low head
	V Pump low head + stand-by pump
	W Single pump high head
	Z Pump high head + stand-by pump (3)

(1) Water produced up to 39.2 °F

(2) Water produced from 39.2 °F ÷ 46.4 °F

(3) Not available for the sizes 1250-1400-1500-1650

2 UNIT COMPONENTS DESCRIPTION

REFRIGERANT CIRCUIT

Compressors

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

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.

Recovery side heat exchanger

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

Reversing valve

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

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.

Isolation valves

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

Solenoid valves

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

Liquid accumulator

Compensates for the difference in volume between the finned coil and the plate heat exchanger, retaining the excessive liquid.

■ *Always passed through.*

HYDRAULIC CIRCUIT (VERSIONS WITH HYDRONIC KIT)

Flow switch

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

Pump

They provide useful static pressure to the system, excluding the unit pressure drops. A second standby pump (twin pumps) can be supplied upon request.

Water filter (mandatory accessory)

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

■ *The filter only protects the heat exchangers; if the water is particularly dirty, you are advised to fit an external filter to protect the pumps.*

Expansion vessel

Membrane type precharged with nitrogen.

■ *On the reversible heat pumps (water side), it's located on the evaporator.*

Air drain valve

Mounted at the highest level of the hydraulic system. The air vent is used for the release of any air pockets from the hydraulic circuit.

■ *Of automatic type*

STRUCTURE

Structure

Supporting structure for outdoor installation, in hot-dipped galvanized sheet steel, with RAL 9003 polyester powder coating.

Designed to ensure the maximum access for service and maintenance.

Acoustic protection cover

It is comprised of panels in suitably thick galvanized sheet metal and internally finished with sound-proofing material.

CONTROL AND SAFETY COMPONENTS

Pressure relief valve for cooling circuit

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.

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 interlocked isolator
- Magnet circuit breakers and contactors for compressors and fans
- terminals for REMOTE PANEL
- spring type terminals for control circuit
- externally rated cabinet, with double panel and seals
- electronic controller
- evaporator pump and recovery pump control consent relay (only for versions without pump units)
- All numbered cables

Door interlocked isolator

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

To avoid accidentally powering up the unit during maintenance the isolator is fitted with a locking mechanism.

Controller keypad

Allows complete control of the unit.

For further information refer to the user manual.

Electronic controller

The microprocessor controls features cutting edge functions and proprietary adjustments.

The keyboard is equipped with control keys and LCD display, which allows you to consult and make interventions on the unit by means of the multi-level menu, with language selection settings. It controls:

- The system temperature for cooling the environments or industrial processes. The different temperatures are managed automatically according to the unit work conditions and requirements.
- Management and alarm log to have always a prompt diagnosis of the unit operation.
- Creation of operation time periods required for efficient programming
- A self-adaptive logic is used to defrost. This logic allows you to adjust the number of defrosts in order to increase efficiency.


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

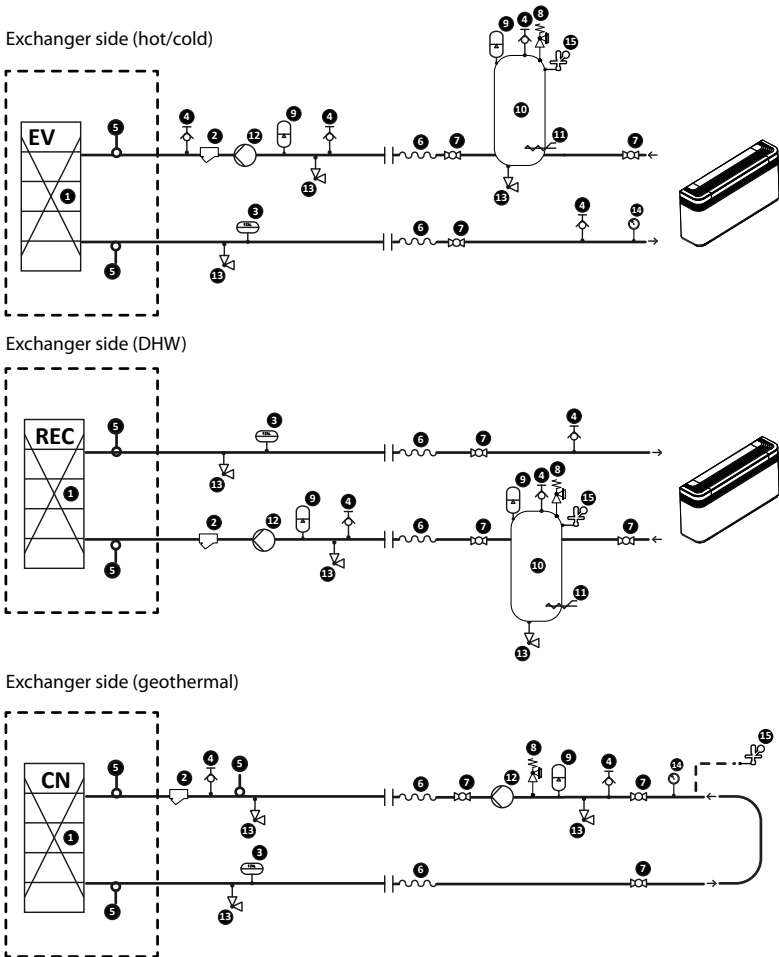
■ *For further information refer to the user manual.*

3 MAIN HYDRAULIC CIRCUITS

2-PIPE

Without hydronic kit

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



- Components as standard**


 - 1 Plate heat exchanger
 - 5 Water temperature sensors (IN/OUT)


Components not provided and responsibility of the installer

 - 2 Water filter
 - 3 Flow switch
 - 4 Drain valve
- 13 Drain valve
 - 4 Drain valve
 - 6 Anti-vibration joints
 - 7 Flow shut-off valves
 - 8 Pressure relief valve
 - 9 Expansion vessel
- 10 System storage tank (recommended installation if the system water content is lower than that indicated in the table)
 - 11 Antifreeze electric heater
 - 12 Pump
 - 13 Drain valve
 - 14 Pressure gauge
 - 15 Automatic fill point

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

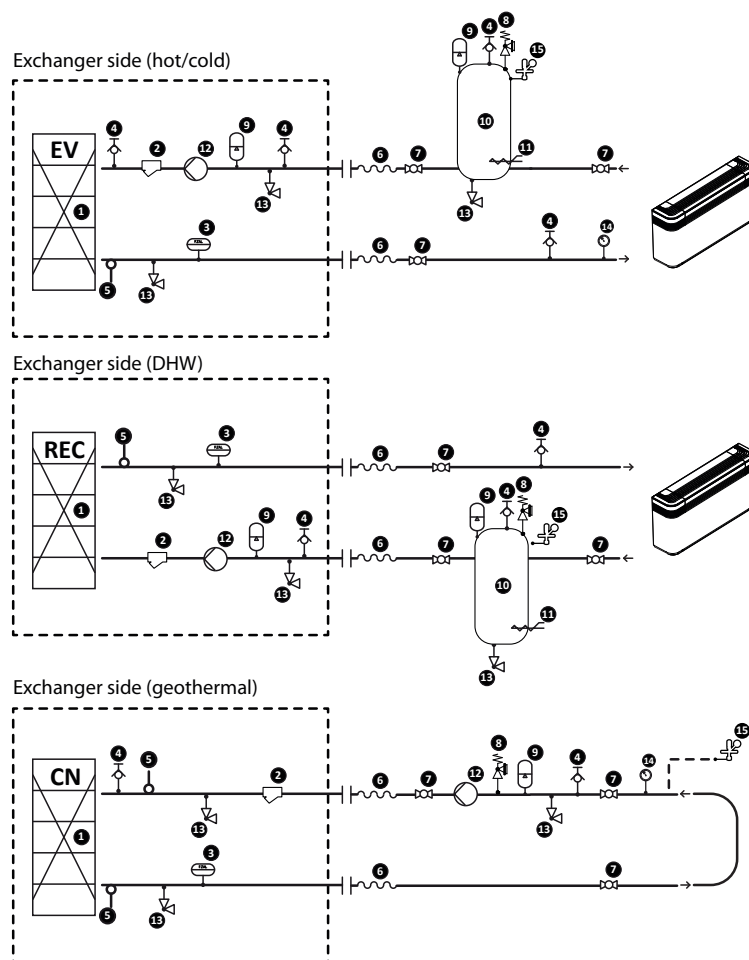
 **WARNING** under no circumstances does the unit have to be operated with water circulating on the heat exchanger whose characteristics are different from those indicated in the table WATER CHARACTERISTICS, under penalty of the warranty expiration. Aermec cannot be held responsible for any malfunction 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 hydronic kit



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



Components as standard

- 1 Plate heat exchanger
- 2 Water filter
- 3 Flow switch
- 4 Drain valve
- 5 Water temperature sensors (IN/OUT)
- 9 Expansion vessel
- 12 Pump

- 13 Drain valve

Components not provided and responsibility of the installer

- 4 Drain valve
- 6 Anti-vibration joints
- 7 Flow shut-off valves
- 8 Pressure relief valve
- 9 Expansion vessel

- 10 System storage tank (recommended installation if the system water content is lower than that indicated in the table)
- 11 Antifreeze electric heater
- 12 Pump
- 13 Drain valve
- 14 Pressure gauge
- 15 Automatic fill point

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

with water whose characteristics are outside the limits in the table **WATER CHARACTERISTICS** and for their consequences.



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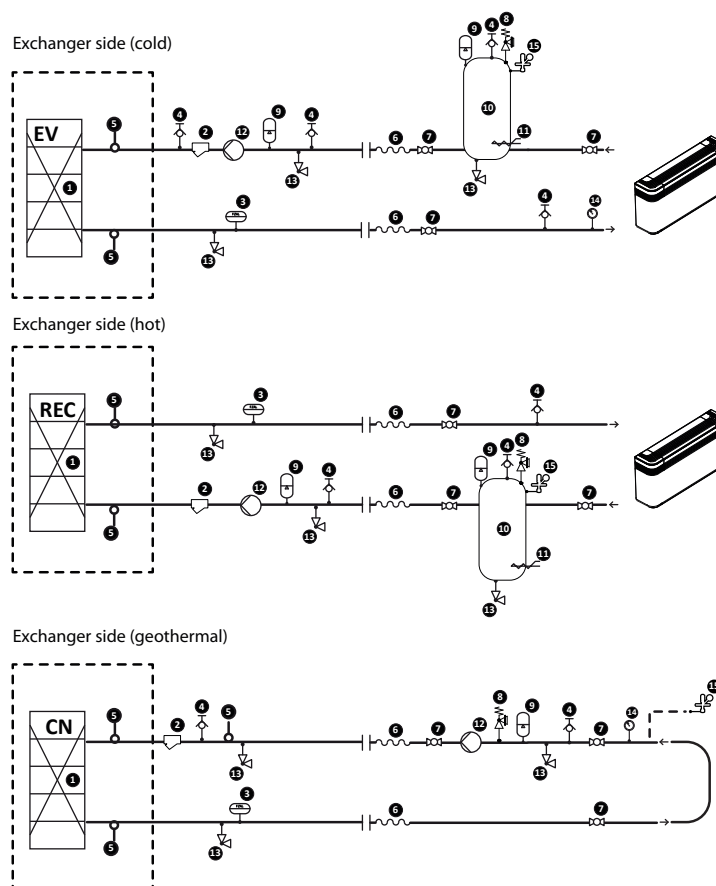
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4-PIPE

Without hydronic kit



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



Components as standard

- 1 Plate heat exchanger
- 5 Water temperature sensors (IN/OUT)

Components not provided and responsibility of the installer

- 2 Water filter
- 3 Flow switch
- 4 Drain valve

- 13 Drain valve
- 4 Drain valve
- 6 Anti-vibration joints
- 7 Flow shut-off valves
- 8 Pressure relief valve
- 9 Expansion vessel

- 10 System storage tank (recommended installation if the system water content is lower than that indicated in the table)
- 11 Antifreeze electric heater
- 12 Pump
- 13 Drain valve
- 14 Pressure gauge
- 15 Automatic fill point

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



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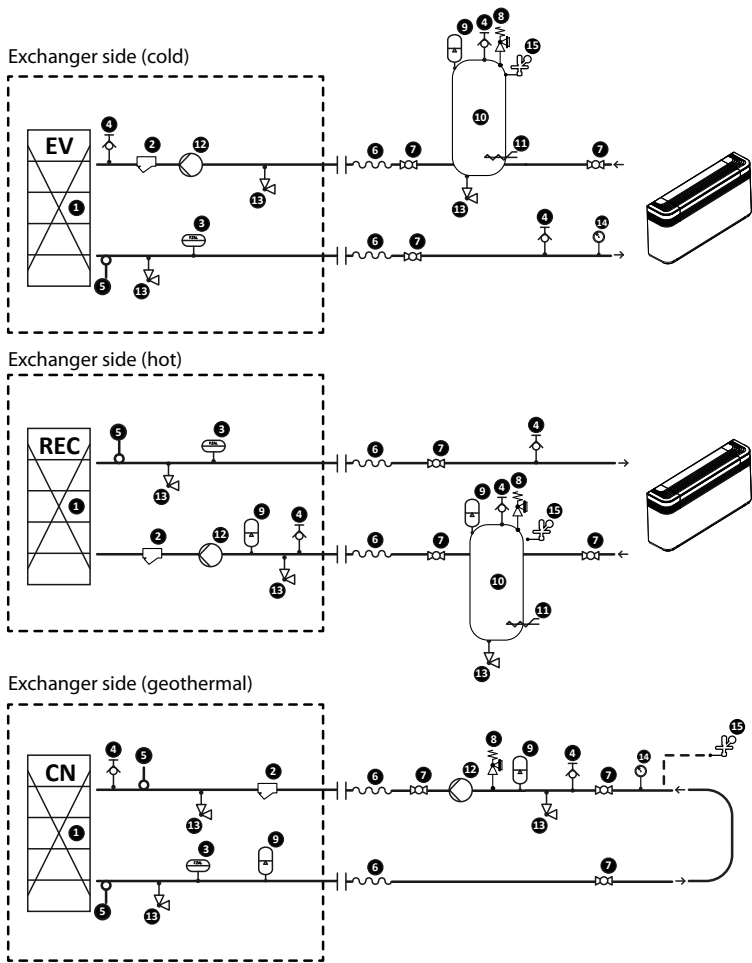


It is of fundamental importance to keep the oxygen concentration in the water under control, especially in open vessel systems. This type of system, in fact, is very sensitive to the phenomenon of extra-oxygenation of the water (an event that can be encouraged by the incorrect positioning of some components).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

With hydronic kit



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



Components as standard

- 1 Plate heat exchanger
- 2 Water filter
- 3 Flow switch
- 4 Drain valve
- 5 Water temperature sensors (IN/OUT)
- 9 Expansion vessel
- 12 Pump

Components not provided and responsibility of the installer

- 13 Drain valve
- 4 Drain valve
- 6 Anti-vibration joints
- 7 Flow shut-off valves
- 8 Pressure relief valve
- 9 Expansion vessel

- 10 System storage tank (recommended installation if the system water content is lower than that indicated in the table)
- 11 Antifreeze electric heater
- 12 Pump
- 13 Drain valve
- 14 Pressure gauge
- 15 Automatic fill point

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

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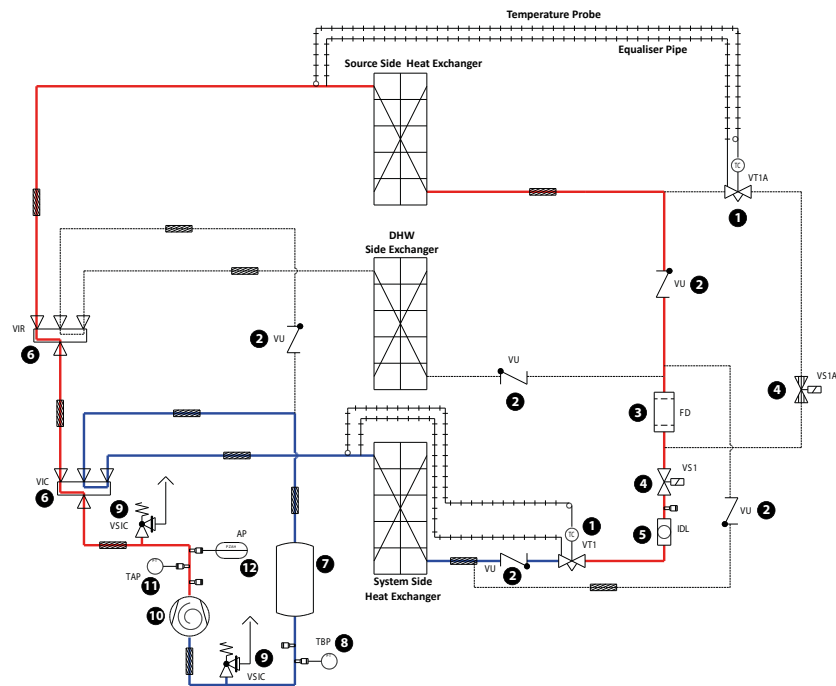
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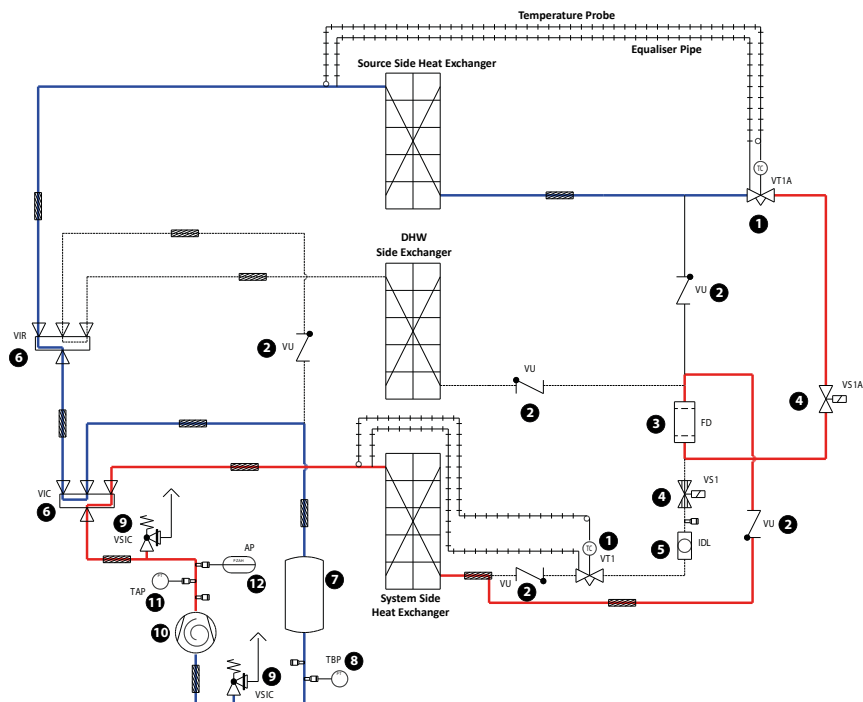
4 MAIN COOLING REFRIGERANT LAYOUTS

NXP 2-PIPES SYSTEM - COOLING ONLY MODE



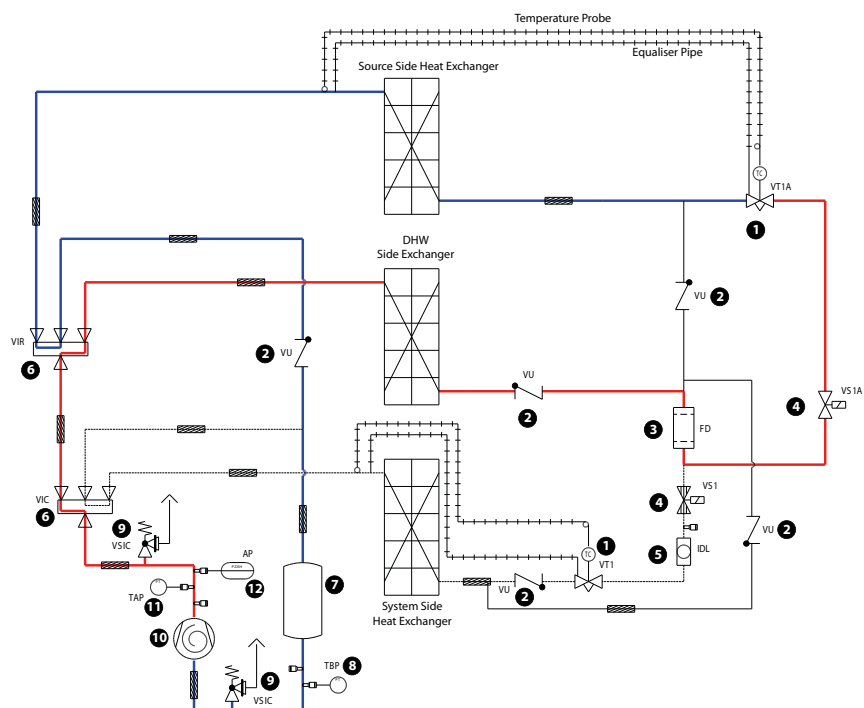
- Key:**
- | | | | | | |
|---|------------------------------|---|-------------------------|----|--------------------------|
| 1 | Thermostatic expansion valve | 5 | Sight glass | 10 | Compressor |
| 2 | One-way valve | 6 | Cycle inversion valve | 11 | High pressure transducer |
| 3 | Filter drier | 7 | Liquid accumulator | 12 | High pressure switch |
| 4 | Solenoid valve | 8 | Low pressure transducer | | |
| | | 9 | Pressure relief valve | | |

NXP 2-PIPES SYSTEM - HEATING MODE RANGE



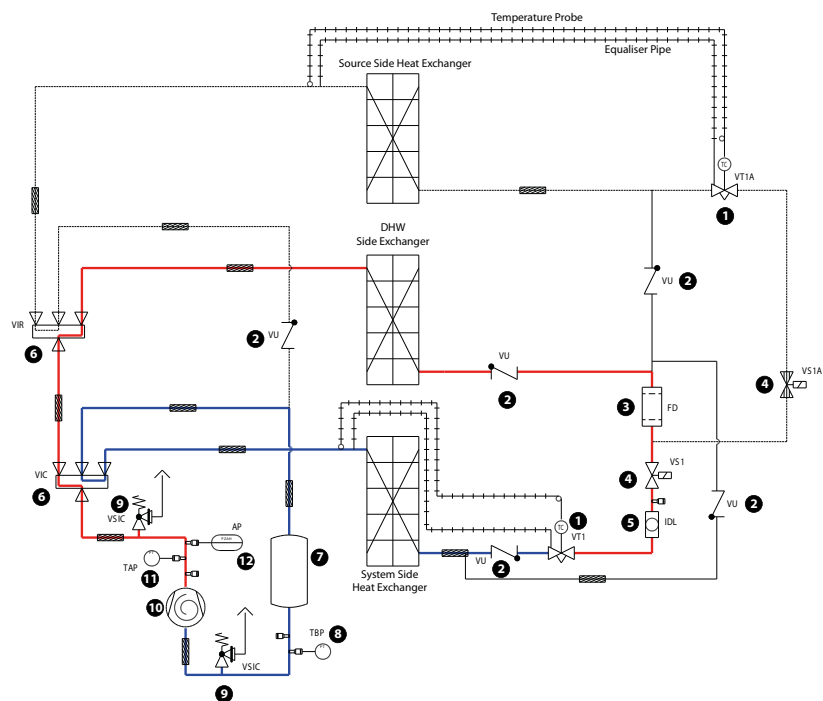
- Key:**
- | | | | | | |
|---|------------------------------|---|-------------------------|----|--------------------------|
| 1 | Thermostatic expansion valve | 5 | Sight glass | 10 | Compressor |
| 2 | One-way valve | 6 | Cycle inversion valve | 11 | High pressure transducer |
| 3 | Filter drier | 7 | Liquid accumulator | 12 | High pressure switch |
| 4 | Solenoid valve | 8 | Low pressure transducer | | |
| | | 9 | Pressure relief valve | | |

NXP 2-PIPES SYSTEM - HEAT RECOVERY ONLY MODE



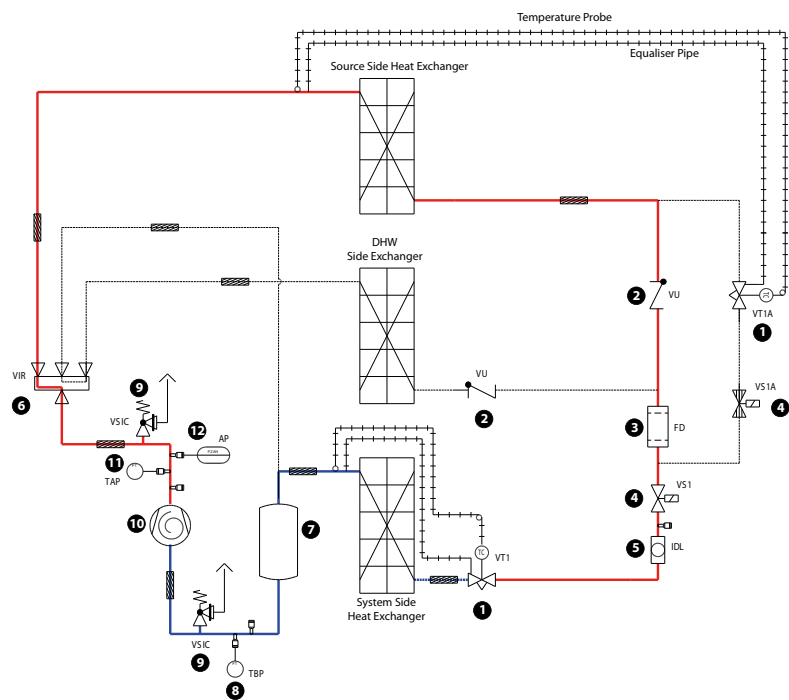
- Key:**
- | | | | | | |
|---|------------------------------|---|-------------------------|----|--------------------------|
| 1 | Thermostatic expansion valve | 5 | Sight glass | 10 | Compressor |
| 2 | One-way valve | 6 | Cycle inversion valve | 11 | High pressure transducer |
| 3 | Filter drier | 7 | Liquid accumulator | 12 | High pressure switch |
| 4 | Solenoid valve | 8 | Low pressure transducer | | |
| | | 9 | Pressure relief valve | | |

NXP 2-PIPES SYSTEM - COOLING MODE HEAT RECOVERY ONLY



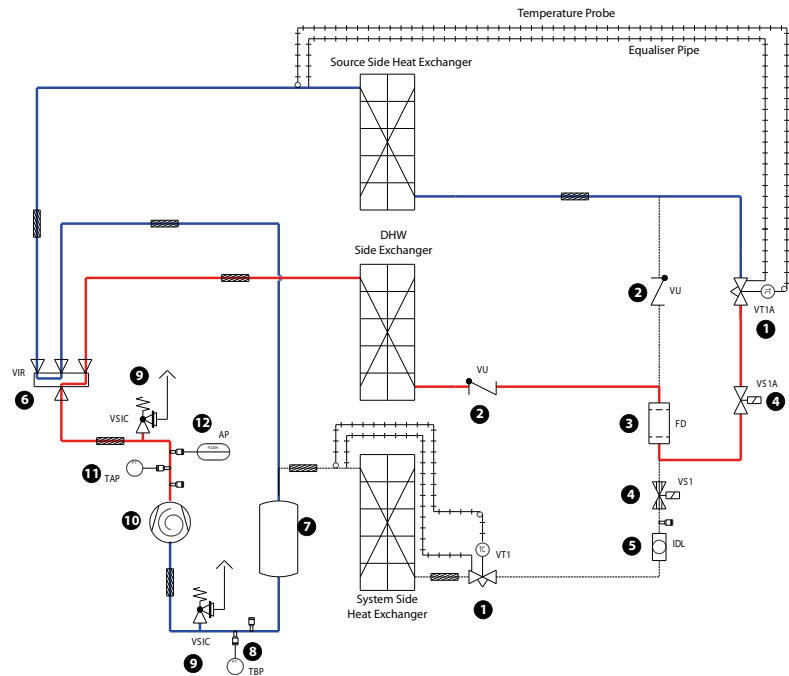
- Key:**
- | | | | | | |
|---|------------------------------|---|-------------------------|----|--------------------------|
| 1 | Thermostatic expansion valve | 5 | Sight glass | 10 | Compressor |
| 2 | One-way valve | 6 | Cycle inversion valve | 11 | High pressure transducer |
| 3 | Filter drier | 7 | Liquid accumulator | 12 | High pressure switch |
| 4 | Solenoid valve | 8 | Low pressure transducer | | |
| | | 9 | Pressure relief valve | | |

NXP 4-PIPES SYSTEM - COOLING ONLY MODE



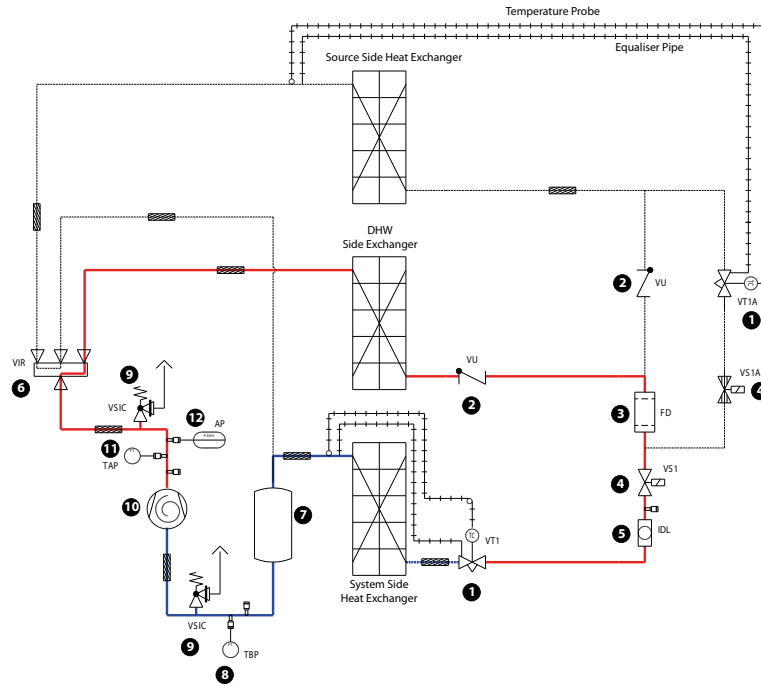
- Key:**
- | | | | | | |
|---|------------------------------|---|-------------------------|----|--------------------------|
| 1 | Thermostatic expansion valve | 5 | Sight glass | 10 | Compressor |
| 2 | One-way valve | 6 | Cycle inversion valve | 11 | High pressure transducer |
| 3 | Filter drier | 7 | Liquid accumulator | 12 | High pressure switch |
| 4 | Solenoid valve | 8 | Low pressure transducer | | |
| | | 9 | Pressure relief valve | | |

NXP 4-PIPES SYSTEM - HEATING MODE RANGE



- Key:**
- | | | | | | |
|---|------------------------------|---|-------------------------|----|--------------------------|
| 1 | Thermostatic expansion valve | 5 | Sight glass | 10 | Compressor |
| 2 | One-way valve | 6 | Cycle inversion valve | 11 | High pressure transducer |
| 3 | Filter drier | 7 | Liquid accumulator | 12 | High pressure switch |
| 4 | Solenoid valve | 8 | Low pressure transducer | | |
| | | 9 | Pressure relief valve | | |

NXP 4-PIPES SYSTEM - COOLING MODE WITH HEAT RECOVERY



- Key:**
- | | | | |
|---|------------------------------|----|--------------------------|
| 1 | Thermostatic expansion valve | 10 | Compressor |
| 2 | One-way valve | 11 | High pressure transducer |
| 3 | Filter drier | 12 | High pressure switch |
| 4 | Solenoid valve | | |
| 5 | Sight glass | | |
| 6 | Cycle inversion valve | | |
| 7 | Liquid accumulator | | |
| 8 | Low pressure transducer | | |
| 9 | Pressure relief valve | | |

5 ACCESSORIES

- AER485P1:** RS-485 interface for supervision systems with MODBUS protocol.
- AERNET:** The device allows the control, the management and the remote monitoring of a Chiller with a PC, smartphone or tablet using Cloud connection. AERNET works as Master while every unit connected is configured as Slave (max. 6 unit); also, with a simple click is possible to save a log file with all the connected unit datas in the personal terminal for post analysis.
- MULTICHILLER_EVO:** Control, switch-on and switch-off system of the single chillers where multiple units are installed in parallel, always ensuring constant flow rate to the evaporators.
- PGD1:** Allows you to control the unit at a distance.
- AVX:** Spring anti-vibration supports.
- CRATE:** Special crate for transport

ACCESSORIES COMPATIBILITY

Model	Ver	0500	0550	0600	0650	0700	0750	0800	0900	1000	1250	1400	1500	1650
AER485P1	L	*	*	*	*	*	*	*	*	*	*	*	*	*
AERNET	L	*	*	*	*	*	*	*	*	*	*	*	*	*
MULTICHILLER_EVO	L	*	*	*	*	*	*	*	*	*	*	*	*	*
PGD1	L	*	*	*	*	*	*	*	*	*	*	*	*	*

Special crate for transport

Version	System side - pumps	Recovery side - pumps	0500	0550	0600	0650	0700	0750	0800	0900	1000	1250	1400	1500	1650
L	°	°	CRATE11	CRATE11	CRATE11	CRATE11	CRATE11	CRATE11	CRATE11	CRATE11	CRATE11	CRATE11	CRATE11	CRATE11	CRATE11
L	°	U,V,W,Z	CRATE12	CRATE12	CRATE12	CRATE12	CRATE12	CRATE12	CRATE12	CRATE12	CRATE13	CRATE13	CRATE13	CRATE13	CRATE13
L	M,N,O,P	°U,V,W,Z	CRATE12	CRATE12	CRATE12	CRATE12	CRATE12	CRATE12	CRATE12	CRATE12	CRATE13	CRATE13	CRATE13	CRATE13	CRATE13

Antivibration

Version	System side - pumps	Recovery side - pumps	0500	0550	0600	0650	0700	0750	0800	0900	1000	1250	1400	1500	1650
L	°	°	AVX351	AVX351	AVX356	AVX356	AVX356	AVX365	AVX365	AVX366	AVX367	AVX367	AVX367	AVX367	AVX367
L	°	U,V,W,Z	AVX368	AVX368	AVX368	AVX369	AVX369	AVX363	AVX363	AVX370	AVX371	AVX371	AVX372	AVX372	AVX372
L	M	°U,W	AVX368	AVX368	AVX368	AVX369	AVX369	AVX363	AVX363	AVX370	AVX371	AVX371	AVX372	AVX372	AVX372
L	N	°	AVX368	AVX368	AVX368	AVX369	AVX369	AVX363	AVX363	AVX370	AVX371	AVX371	AVX372	AVX372	AVX372
L	O	°U,W	AVX368	AVX368	AVX368	AVX369	AVX369	AVX363	AVX363	AVX370	AVX371	AVX371	AVX372	AVX372	AVX372
L	P	°	AVX368	AVX368	AVX368	AVX369	AVX369	AVX363	AVX363	AVX370	AVX371	AVX371	AVX372	AVX372	AVX372
L	M	V,Z	AVX368	AVX368	AVX368	AVX369	AVX363	AVX373	AVX373	AVX370	AVX371	AVX374	AVX374	AVX374	AVX372
L	N	U,V,W,Z	AVX368	AVX368	AVX368	AVX369	AVX363	AVX373	AVX373	AVX370	AVX371	AVX374	AVX374	AVX374	AVX372
L	O	V,Z	AVX368	AVX368	AVX368	AVX369	AVX363	AVX373	AVX373	AVX370	AVX371	AVX374	AVX374	AVX374	AVX372
L	P	U,V,W,Z	AVX368	AVX368	AVX368	AVX369	AVX363	AVX373	AVX373	AVX370	AVX371	AVX374	AVX374	AVX374	AVX372

6 SELECTION CRITERIA OF THE HEAT EXCHANGERS ACCORDING TO THE PLACE OF INSTALLATION OF THE UNIT

The guide provides advice for applications. Although recommendations are given, all the details about the real world application of our products cannot be fully covered in this document.

For these reasons, this section contains the basic warnings and precautions to be taken into account in general, it being understood that:

- **The final choice of the type of exchanger according to the place of installation is left to the client (or to the professional appointed by him).**
- **In any case, it is recommended to wash the coils with adequate frequency (a maximum time interval of three months is recommended, shorter in conditions of particularly dirty and aggressive atmospheres) to preserve their condition and ensure the proper functioning of the unit.**

Potentially corrosive outdoor environments include areas near coasts, industrial sites, densely populated urban areas, certain rural areas or a combination of these environments. Other factors, including the presence of effluent gas, sewage vents or open sewage systems and the exhaust of diesel engines can all be harmful for the microchannel coil.

The purpose of this application guide is to provide general information on the mechanisms of corrosion and corrosive environments.

SEA COAST ENVIRONMENTS

Coastal or marine environments are characterized by the abundance of sodium chloride (salt) which is carried by sea spray, mist, or fog. Most importantly, this salt water can be carried more than several miles by ocean breezes and tidal currents. It's not uncommon to experience salt-water contamination as far as 10km from the coast.

For this reason, it may be necessary to protect the exchangers from electrolytes of marine origin through the appropriate choice of materials and / or appropriate protective treatment.

INDUSTRIAL ENVIRONMENTS

Industrial applications are associated with several different conditions that can potentially produce a variety of atmospheric emissions.

Contaminants from sulphur and nitrogen oxides are most often linked to high-density urban environments. The combustion of coal oils and fuel oils releases sulphur oxides (SO_2 , SO_3) and nitrogen oxides (NO_x) into the atmosphere. These gases accumulate in the atmosphere and return to the ground as acid rain or low pH dew.

Industrial emissions are not only potentially corrosive: many industrial dust particles can be loaded with harmful components such as metal oxides, chlorides, sulphates, sulfuric acid, carbon and carbon compounds.

In the presence of oxygen, water or high humidity environments, these particles can be extremely corrosive and in several forms, including general and localised corrosion, such as pitting and anthill.

MIX OF SEASIDE AND INDUSTRIAL ENVIRONMENTS

Sea mist loaded with salt, associated with the harmful emissions of an industrial environment, poses a serious risk.

The combined effects of the salt loaded mist and industrial emissions accelerate corrosion.

Within the manufacturing plants, corrosive gas may result from the processing of chemicals or by the typical industrial processes used in manufacturing.

Potential sources of risk to be considered are open sewage systems, exhaust vents, diesel engine exhaust, emissions from heavy traffic, landfills, aircraft and ocean-go-

ing ship engine exhaust, industrial production, chemical treatment facilities (cooling towers in the vicinity) and fossil fuel power plants.

URBAN ENVIRONMENTS

Densely populated areas generally have high levels of emissions of motor vehicles and increases in dual use for heating buildings.

Both conditions elevate sulfur oxide (SO_x) and nitrogen oxide (NO_x) concentrations. Corrosive atmospheres may even occur in some closed areas, such as facilities with swimming pools and water treatment systems.

It is advisable to pay particular attention to the positioning of the units if it occurs in the immediate vicinity of these places, and to avoid that they are installed in the vicinity of outlets for the expulsion of air coming from them, or in any case exposed to such atmospheres.

Corrosion severity in this environment is a function of the pollution levels, which in turn depend on several factors including population density in the area.

Any equipment installed in locations immediately adjacent to diesel engine exhausts, incinerator flues, fuel-fired boiler flues, or areas exposed to fossil fuel emissions shall be considered subject to the same measures as an industrial application.

RURAL ENVIRONMENTS

Rural environments may contain high levels of pollution from ammonia and nitrogen products from animal excrements, fertilizers and high concentration of diesel engine exhaust. The approach to these environments must be entirely similar to that of industrial environments.

Local weather conditions have a major role in the concentration or dispersion of outdoor gaseous contaminants.

Thermal inversions can trap pollutants, thereby producing serious air pollution problems.

ADDITIONAL TIPS

Although each of the above corrosive environments can be detrimental to the life of the heat exchanger, several additional factors must be considered before choosing the final design.

The local climate surrounding the site of application may be influenced by the presence of:

- wind
- dust
- road salts
- swimming pools
- diesel engines discharge / traffic
- Localised mist
- cleaning agents for domestic use
- Sewage system outlets
- many other separate contaminants

Even within 1.9-3.1 mi from these particular local climates a normal environment with moderate characteristics can be classified as an environment that requires preventive corrosion measures. When these factors are directly and immediately part of the environment, their influence is further aggravating.

Only in the absence of potentially risky situations such as those indicated above can an environment be considered moderate.

Application	Tip
Severe environments	Coils with suitable protection
Moderate environments	Standard coil °

7 PERFORMANCE SPECIFICATIONS

2-PIPE

Size			0500	0550	0600	0650	0700	0750	0800	0900	1000	1250	1400	1500	1650
Cooling system side 2-pipe system (1)															
Cooling capacity	L	ton	30.93	33.82	36.50	41.48	46.75	51.97	59.95	71.17	80.81	89.91	101.47	115.54	129.30
Input power	L	kW	23.70	25.56	27.17	30.98	35.73	39.88	47.58	54.42	62.12	70.53	78.32	90.79	103.32
Cooling input current	L	A	42.0	41.0	46.0	51.0	57.0	63.0	84.0	89.0	95.0	108.0	120.0	137.0	154.0
EER	L	BTU/(Wh)	15.66	15.88	16.12	16.07	15.70	15.64	15.12	15.69	15.61	15.30	15.55	15.27	15.02
Water flow rate source side	L	gpm	100.10	109.20	117.55	133.67	151.23	168.25	195.22	230.26	261.69	292.17	328.82	375.59	421.55
Pressure drop source side	L	ftH ₂ O	6.36	7.36	6.69	8.70	9.37	6.36	8.36	6.69	7.69	9.37	9.70	12.71	15.72
Water flow rate system side	L	gpm	73.99	80.91	87.32	99.25	111.84	124.34	143.43	170.27	193.34	215.10	242.76	276.43	309.34
Pressure drop system side	L	ftH ₂ O	3.68	4.35	4.01	5.02	5.35	3.68	4.68	3.68	4.35	5.35	5.35	7.03	8.70
Heating system side 2-pipe system (2)															
Heating capacity	L	BTU/h	398,026	433,564	465,965	529,312	599,892	671,509	782,537	909,032	1,024,966	1,149,656	1,291,809	1,474,540	1,654,817
Input power	L	kW	28.37	31.43	33.31	38.66	43.97	48.87	57.75	65.36	74.11	84.64	94.36	109.31	124.58
Heating input current	L	A	47.0	48.0	53.0	59.0	67.0	74.0	96.0	102.0	110.0	125.0	139.0	160.0	181.0
COP	L	kW/kW	4.11	4.04	4.10	4.01	4.00	4.03	3.97	4.08	4.05	3.98	4.01	3.95	3.89
Water flow rate source side	L	gpm	67.81	73.48	79.31	89.51	101.33	113.67	131.90	154.46	173.86	193.92	218.44	248.18	277.16
Pressure drop source side	L	ftH ₂ O	3.01	3.35	3.01	3.68	4.35	2.68	3.68	3.01	3.35	4.01	4.35	5.35	6.69
Water flow rate system side	L	gpm	89.26	97.23	104.50	118.71	134.53	150.60	175.49	203.86	229.86	257.82	289.70	330.68	371.11
Pressure drop system side	L	ftH ₂ O	5.35	6.36	5.69	7.36	8.03	5.35	7.03	5.35	6.02	7.36	7.69	9.70	12.38
Heating domestic hot water side 2-pipe system (3)															
Heating capacity	L	BTU/h	398,026	433,564	465,965	529,312	599,892	671,509	782,537	909,032	1,024,966	1,149,656	1,291,809	1,474,540	1,654,817
Input power	L	kW	28.37	31.43	33.31	38.66	43.97	48.87	57.75	65.36	74.11	84.64	94.36	109.31	124.58
Heating total input current	L	A	47.0	48.0	53.0	59.0	67.0	74.0	96.0	102.0	110.0	125.0	139.0	160.0	181.0
COP	L	kW/kW	4.11	4.04	4.10	4.01	4.00	4.03	3.97	4.08	4.05	3.98	4.01	3.95	3.89
Water flow rate source side	L	gpm	67.81	73.48	79.31	89.51	101.33	113.67	131.90	154.46	173.86	193.92	218.44	248.18	277.16
Pressure drop source side	L	ftH ₂ O	3.01	3.35	3.01	3.68	4.35	2.68	3.68	3.01	3.35	4.01	4.35	5.35	6.69
Water flow rate domestic hot water side	L	gpm	89.3	97.2	104.5	118.7	134.5	150.6	175.5	203.9	229.9	257.8	289.7	330.7	371.1
Pressure drop domestic hot water side	L	ftH ₂ O	5.4	6.4	5.7	7.4	8.0	5.4	7.0	5.4	6.0	7.4	7.7	9.7	12.4
Simultaneous operation (heating + cooling), 2 pipes (4)															
Cooling capacity	L	ton	25.51	27.64	29.83	33.67	38.11	42.76	49.61	58.10	65.40	72.94	82.16	93.35	104.25
Recovered heating power	L	BTU/h	398,026	433,564	465,965	529,312	599,892	671,509	782,537	909,032	1,024,966	1,149,656	1,291,809	1,474,540	1,654,817
Input power	L	kW	28.37	31.43	33.31	38.66	43.97	48.87	57.75	65.36	74.11	84.64	94.36	109.31	124.58
Water flow rate system side	L	gpm	73.99	80.91	87.32	99.25	111.84	124.34	143.43	170.27	193.34	215.10	242.76	276.43	309.34
Pressure drop system side	L	ftH ₂ O	3.68	4.35	4.01	5.02	5.35	3.68	4.68	3.68	4.35	5.35	5.35	7.03	8.70
Water flow rate domestic hot water side	L	gpm	89.3	97.2	104.5	118.7	134.5	150.6	175.5	203.9	229.9	257.8	289.7	330.7	371.1
Pressure drop domestic hot water side	L	ftH ₂ O	5.4	6.4	5.7	7.4	8.0	5.4	7.0	5.4	6.0	7.4	7.7	9.7	12.4

- (1) Water user side 54.0 °F / 44.1 °F; Water source side 86 °F / 95 °F
(2) Water user side 104 °F / 113 °F; Water source side 50 °F / 44.1 °F
(3) Water exchanger to the total recovery side 104 °F / 113 °F; Water source side 50 °F / 44.1 °F
(4) Water exchanger to the total recovery side * / 113 °F; Water to the system side heat exchanger * / 44.1 °F;

4-PIPE

Size			0500	0550	0600	0650	0700	0750	0800	0900	1000	1250	1400	1500	1650
Cooling system side 4-pipe system (1)															
Cooling capacity	L	ton	30.93	33.82	36.50	41.48	46.75	51.97	59.95	71.17	80.81	89.91	101.47	115.54	129.30
Input power	L	kW	23.70	25.56	27.17	30.98	35.73	39.88	47.58	54.42	62.12	70.53	78.32	90.79	103.32
Cooling input current	L	A	42.0	41.0	46.0	51.0	57.0	63.0	84.0	89.0	95.0	108.0	120.0	137.0	154.0
EER	L	BTU/(Wh)	15.66	15.88	16.12	16.07	15.70	15.64	15.12	15.69	15.61	15.30	15.55	15.27	15.02
Water flow rate source side	L	gpm	100.10	109.20	117.55	133.67	151.23	168.25	195.22	230.26	261.69	292.17	328.82	375.59	421.55
Pressure drop source side	L	ftH ₂ O	6.36	7.36	6.69	8.70	9.37	6.36	8.36	6.69	7.69	9.37	9.70	12.71	15.72
Water flow rate system side	L	gpm	73.99	80.91	87.32	99.25	111.84	124.34	143.43	170.27	193.34	215.10	242.76	276.43	309.34
Pressure drop system side	L	ftH ₂ O	3.68	4.35	4.01	5.02	5.35	3.68	4.68	3.68	4.35	5.35	5.35	7.03	8.70
Heating system side 4-pipe system (2)															
Heating capacity	L	BTU/h	398,026	433,564	465,965	529,312	599,892	671,509	782,537	909,032	1,024,966	1,149,656	1,291,809	1,474,540	1,654,817
Input power	L	kW	28.37	31.43	33.31	38.66	43.97	48.87	57.75	65.36	74.11	84.64	94.36	109.31	124.58
Heating total input current	L	A	47.0	48.0	53.0	59.0	67.0	74.0	96.0	102.0	110.0	125.0	139.0	160.0	181.0
COP	L	kW/kW	4.11	4.04	4.10	4.01	4.00	4.03	3.97	4.08	4.05	3.98	4.01	3.95	3.89
Water flow rate source side	L	gpm	67.81	73.48	79.31	89.51	101.33	113.67	131.90	154.46	173.86	193.92	218.44	248.18	277.16
Pressure drop source side	L	ftH ₂ O	3.01	3.35	3.01	3.68	4.35	2.68	3.68	3.01	3.35	4.01	4.35	5.35	6.69
Water flow rate system side	L	gpm	89.26	97.23	104.50	118.71	134.53	150.60	175.49	203.86	229.86	257.82	289.70	330.68	371.11
Pressure drop system side	L	ftH ₂ O	5.35	6.36	5.69	7.36	8.03	5.35	7.03	5.35	6.02	7.36	7.69	9.70	12.38
Simultaneous operation (heating + cooling), 4 pipes (3)															
Cooling capacity	L	ton	25.51	27.64	29.83	33.67	38.11	42.76	49.61	58.10	65.40	72.94	82.16	93.35	104.25
Recovered heating power	L	BTU/h	398,026	433,564	465,965	529,312	599,892	671,509	782,537	909,032	1,024,966	1,149,656	1,291,809	1,474,540	1,654,817
Input power	L	kW	28.37	31.43	33.31	38.66	43.97	48.87	57.75	65.36	74.11	84.64	94.36	109.31	124.58
Water flow rate cold side	L	gpm	74.0	80.9	87.3	99.2	111.8	124.3	143.4	170.3	193.3	215.1	242.8	276.4	309.3
Pressure drop cold side	L	ftH ₂ O	3.7	4.3	4.0	5.0	5.4	3.7	4.7	3.7	4.3	5.4	5.4	7.0	8.7

- (1) Water user side 54.0 °F / 44.1 °F; Water source side 86 °F / 95 °F
(2) Water user side 104 °F / 113 °F; Water source side 50 °F / 44.1 °F
(3) Water exchanger to the total recovery side * / 113 °F; Water to the system side heat exchanger * / 44.1 °F

Size			0500	0550	0600	0650	0700	0750	0800	0900	1000	1250	1400	1500	1650
Water flow rate hot side	L	gpm	89.3	97.2	104.5	118.7	134.5	150.6	175.5	203.9	229.9	257.8	289.7	330.7	371.1
Pressure drop hot side	L	ftH ₂ O	5.4	6.4	5.7	7.4	8.0	5.4	7.0	5.4	6.0	7.4	7.7	9.7	12.4
(1) Water user side 54.0 °F / 44.1 °F; Water source side 86 °F / 95 °F															
(2) Water user side 104 °F / 113 °F; Water source side 50 °F / 44.1 °F															
(3) Water exchanger to the total recovery side * / 113 °F; Water to the system side heat exchanger * / 44.1 °F															

GENERAL TECHNICAL DATA

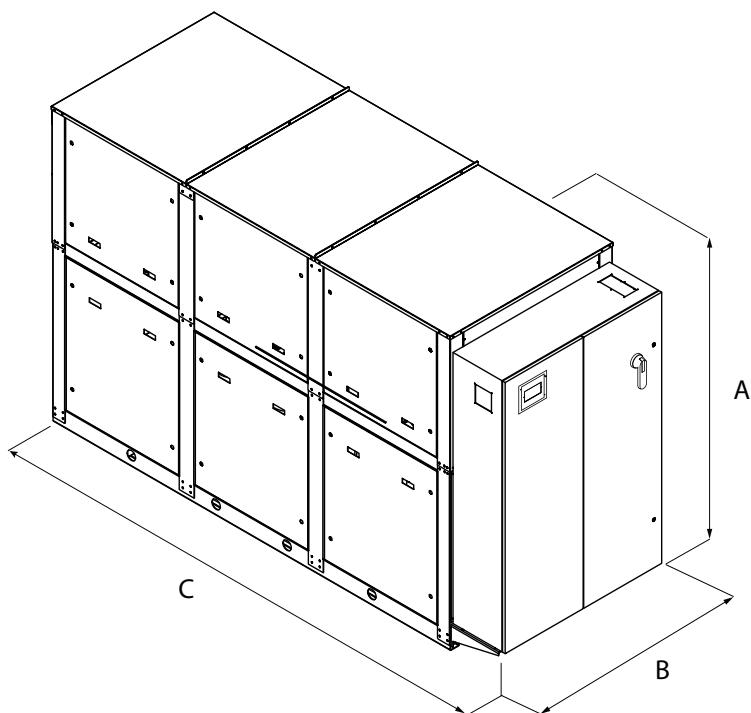
Size			0500	0550	0600	0650	0700	0750	0800	0900	1000	1250	1400	1500	1650
Compressor															
Type	L	type	Scroll												
Compressor regulation	L	Type													
Number	L	no.	2	3	3	4	4	4	4	4	4	4	4	4	4
Circuits	L	no.	2	2	2	2	2	2	2	2	2	2	2	2	2
Refrigerant	L	type	R410A												
Refrigerant load circuit 1 (1)	L	lbs	18.1	18.1	21.6	21.6	24.5	37.5	38.1	57.8	61.7	61.7	68.3	68.3	68.3
Refrigerant load circuit 2 (1)	L	lbs	18.1	18.1	21.6	21.6	24.5	37.5	38.1	57.8	61.7	61.7	68.3	68.3	68.3
2-pipe system - System side heat exchanger (hot/cold)															
Type	L	type	Braze plate												
Number	L	no.	1	1	1	1	1	1	1	1	1	1	1	1	1
Minimum water flow rate	L	gpm	43.1	43.1	52.0	52.0	58.6	74.0	74.0	111.4	122.4	122.4	148.4	148.4	148.4
Maximum water flow rate	L	gpm	189.3	189.3	189.3	189.3	189.3	462.3	462.3	462.3	462.3	462.3	462.3	462.3	462.3
Sizes (in/out)	L	Ø	2" 1/2 US	2" 1/2 US	2" 1/2 US	2" 1/2 US	2" 1/2 US	3"	3"	3"	4"	4"	4"	4"	4"
2-pipe system - Recovery side heat exchanger (domestic hot water)															
Type	L	type	Braze plate												
Number	L	no.	1	1	1	1	1	1	1	1	1	1	1	1	1
Minimum water flow rate	L	gpm	43.1	43.1	52.0	52.0	58.6	74.0	74.0	111.4	122.4	122.4	148.4	148.4	148.4
Maximum water flow rate	L	gpm	189.3	189.3	189.3	189.3	189.3	462.3	462.3	462.3	462.3	462.3	462.3	462.3	462.3
Sizes (in/out)	L	Ø	2" 1/2 US	2" 1/2 US	2" 1/2 US	2" 1/2 US	2" 1/2 US	3"	3"	3"	4"	4"	4"	4"	4"
4-pipe system - System side heat exchanger (cold side)															
Type	L	type	Braze plate												
Number	L	no.	1	1	1	1	1	1	1	1	1	1	1	1	1
Minimum water flow rate	L	gpm	43.1	43.1	52.0	52.0	58.6	74.0	74.0	111.4	122.4	122.4	148.4	148.4	148.4
Maximum water flow rate	L	gpm	189.3	189.3	189.3	189.3	189.3	462.3	462.3	462.3	462.3	462.3	462.3	462.3	462.3
Sizes (in/out)	L	Ø	2" 1/2 US	2" 1/2 US	2" 1/2 US	2" 1/2 US	2" 1/2 US	3"	3"	3"	4"	4"	4"	4"	4"
4-pipe system - Recovery side heat exchanger (hot side)															
Type	L	type	Braze plate												
Number	L	no.	1	1	1	1	1	1	1	1	1	1	1	1	1
Minimum water flow rate	L	gpm	43.1	43.1	52.0	52.0	58.6	74.0	74.0	111.4	122.4	122.4	148.4	148.4	148.4
Maximum water flow rate	L	gpm	189.3	189.3	189.3	189.3	189.3	462.3	462.3	462.3	462.3	462.3	462.3	462.3	462.3
Sizes (in/out)	L	Ø	2" 1/2 US	2" 1/2 US	2" 1/2 US	2" 1/2 US	2" 1/2 US	3"	3"	3"	4"	4"	4"	4"	4"
Sound data calculated in cooling mode (2)															
Sound power level	L	dB(A)	79,0	78,1	79,0	79,0	79,5	80,0	82,0	85,2	87,0	88,8	90,0	91,8	93,6
Sound pressure level (10 m / 33 ft)	L	dB(A)	47.1	46.2	47.1	47.1	47.7	48.1	50.1	53.3	55.1	56.9	58.1	59.9	61.7
Sound pressure level (1 m / 3.3 ft)	L	dB(A)	61.0	60.1	61.0	61.0	61.5	62.0	64.0	67.1	69.0	70.7	72.0	73.8	75.6

(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

Size			0500	0550	0600	0650	0700	0750	0800	0900	1000	1250	1400	1500	1650
POWER SUPPLY: 6															
Electric data															
Peak current (LRA)	L	A	404.1	381.2	421.2	360.8	433.1	455.7	532.4	709.5	733.6	853.0	891.8	916.8	978.8
Minimum circuit amperage (MCA)	L	A	125.5	130.8	136.4	141.7	182.1	217.9	237.0	277.8	314.1	339.6	362.3	417.1	465.9
Maximum overcurrent permitted by the protection device (MOP)	L	A	181.3	182.1	192.1	175.0	233.3	269.2	292.8	351.7	388.0	424.9	447.6	526.8	575.5
POWER SUPPLY: 7															
Electric data															
Peak current (LRA)	L	A	208.0	186.7	215.7	180.1	210.2	220.5	266.1	317.5	328.4	384.2	401.8	453.8	481.9
Minimum circuit amperage (MCA)	L	A	62.0	66.8	71.6	79.1	89.2	98.2	114.5	123.9	132.2	158.1	181.0	209.3	234.4
Maximum overcurrent permitted by the protection device (MOP)	L	A	88.2	89.2	97.9	97.1	111.6	120.6	140.8	154.3	162.7	200.0	222.9	263.8	288.9
POWER SUPPLY: 8															
Electric data															
Peak current (LRA)	L	A	154.3	137.3	160.3	122.4	155.4	163.3	199.0	251.2	259.6	324.4	337.9	349.7	371.3
Minimum circuit amperage (MCA)	L	A	55.6	52.7	57.5	56.7	72.6	86.7	103.1	105.1	106.9	129.7	149.9	182.8	212.0
Maximum overcurrent permitted by the protection device (MOP)	L	A	79.3	72.6	81.3	69.6	92.5	106.6	126.8	129.7	131.5	164.4	184.7	232.2	261.4
POWER SUPPLY: 9															
Electric data															
Peak current (LRA)	L	A	410.9	389.8	429.8	373.7	447.2	472.2	552.8	731.1	757.8	879.2	922.1	950.4	1,019.0
Minimum circuit amperage (MCA)	L	A	131.7	137.0	142.6	147.9	188.3	224.2	243.3	284.1	320.4	345.9	368.6	423.4	472.1
Maximum overcurrent permitted by the protection device (MOP)	L	A	187.5	188.3	198.4	181.3	239.6	275.5	299.0	358.0	394.3	431.2	453.8	533.0	581.7

Dimensions and weights

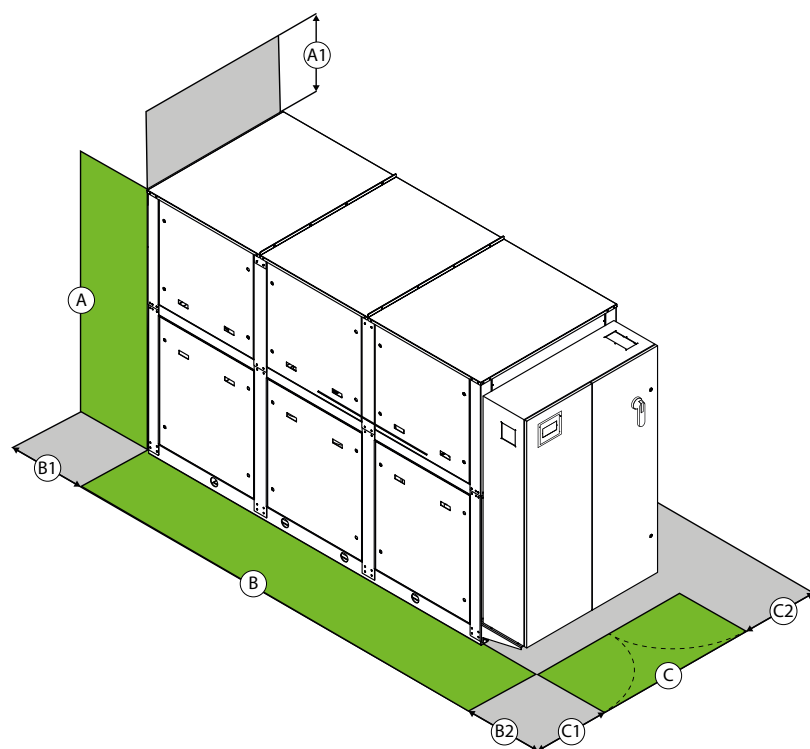


Size			0500	0550	0600	0650	0700	0750	0800	0900	1000	1250	1400	1500	1650
Dimensions and weights without hydronic kit															
A	L	in	83.5	83.5	83.5	83.5	83.5	83.5	83.5	83.5	83.5	83.5	83.5	83.5	83.5
B	L	in	49.2	49.2	49.2	49.2	49.2	49.2	49.2	49.2	49.2	49.2	49.2	49.2	49.2
C	L	in	102.4	102.4	102.4	102.4	102.4	102.4	102.4	102.4	102.4	102.4	102.4	102.4	102.4
Dimensions and weights with pump/s															
A	L	in	83.5	83.5	83.5	83.5	83.5	83.5	83.5	83.5	83.5	83.5	83.5	83.5	83.5
B	L	in	49.2	49.2	49.2	49.2	49.2	49.2	49.2	49.2	49.2	49.2	49.2	49.2	49.2
C	L	in	135.8	135.8	135.8	135.8	135.8	135.8	135.8	135.8	147.6	147.6	147.6	147.6	147.6

				0500	0550	0600	0650	0700	0750	0800	0900	1000	1250	1400	1500	1650
Empty weight	Version	System side - pumps	Recovery side - pumps													
	L	°	°	lbs	2,646	2,822	2,932	3,064	3,175	3,307	3,505	4,233	4,718	5,203	5,225	5,401
	L	°	U/V/W/Z	lbs	3,263	3,395	3,417	3,660	3,770	4,034	4,059	4,985	5,593	5,728	6,102	6,199
	L	M	°U/W	lbs	3,263	3,395	3,417	3,660	3,770	4,034	4,059	4,985	5,593	5,728	6,102	6,199
	L	N	°	lbs	3,263	3,395	3,417	3,660	3,770	4,034	4,059	4,985	5,593	5,728	6,102	6,199
	L	O	°U/W	lbs	3,263	3,395	3,417	3,660	3,770	4,034	4,059	4,985	5,593	5,728	6,102	6,199
	L	P	°	lbs	3,263	3,395	3,417	3,660	3,770	4,034	4,059	4,985	5,593	5,728	6,102	6,199
	L	M	V/Z	lbs	3,461	3,594	3,616	3,858	3,968	4,233	4,288	5,214	6,021	6,155	6,530	6,627
	L	N	U/V/W/Z	lbs	3,461	3,594	3,616	3,858	3,968	4,233	4,288	5,214	6,021	6,155	6,530	6,627
	L	O	V/Z	lbs	3,461	3,594	3,616	3,858	3,968	4,233	4,288	5,214	6,021	6,155	6,530	6,627
	L	P	U/V/W/Z	lbs	3,461	3,594	3,616	3,858	3,968	4,233	4,288	5,214	6,021	6,155	6,530	6,627

8 MINIMUM TECHNICAL SPACES

SINGLE INSTALLATION




* Minimum technical space, to be ensured in order for the chiller to work properly and for possible maintenance.

Size			0500	0550	0600	0650	0700	0750	0800	0900	1000	1250	1400	1500	1650
Minimum technical spaces															
A1	L	in	39.4	39.4	39.4	39.4	39.4	39.4	39.4	39.4	39.4	39.4	39.4	39.4	39.4
B1	L	in	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5
B2	L	in	43.3	43.3	43.3	43.3	43.3	43.3	43.3	43.3	43.3	43.3	43.3	43.3	43.3
C1	L	in	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5
C2	L	in	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5	31.5

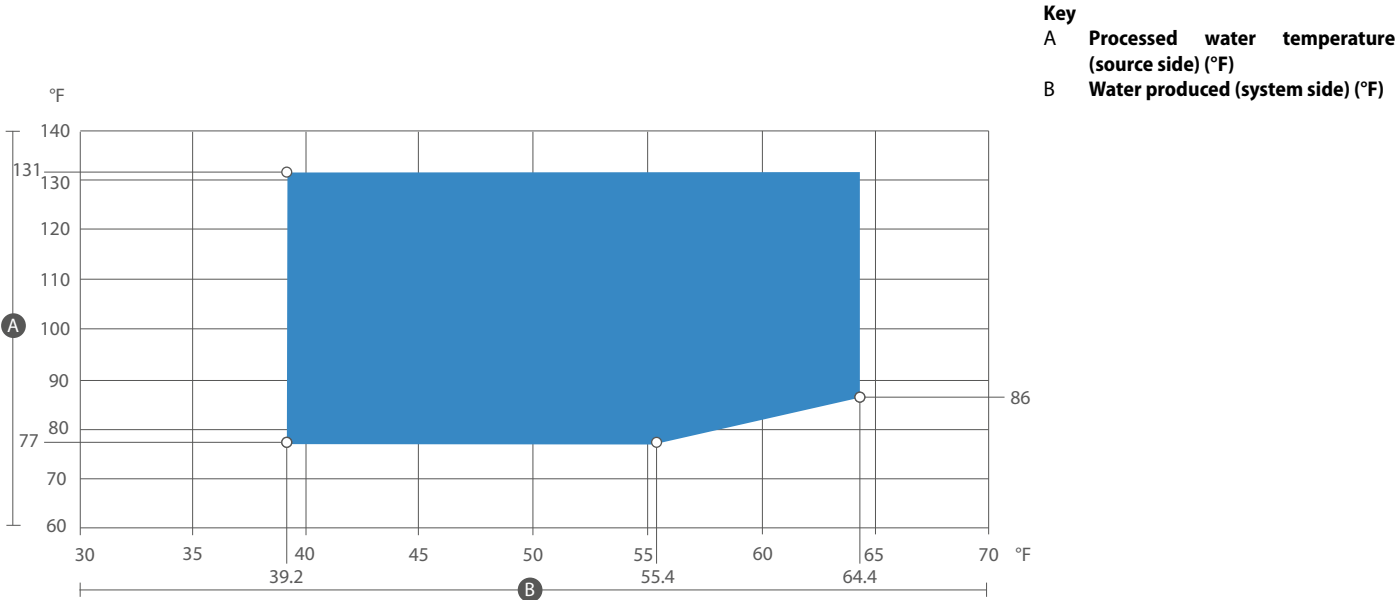
9 OPERATING LIMITS

In their standard configuration, the units are not suitable for installation in salty environments.
The values indicated in the table refer to the min. and max. limits of the unit, valid for $\Delta T = -22.0\text{ }^{\circ}\text{F}$ (cooling mode) and $\Delta T = -22.9\text{ }^{\circ}\text{F}$ (heating mode).

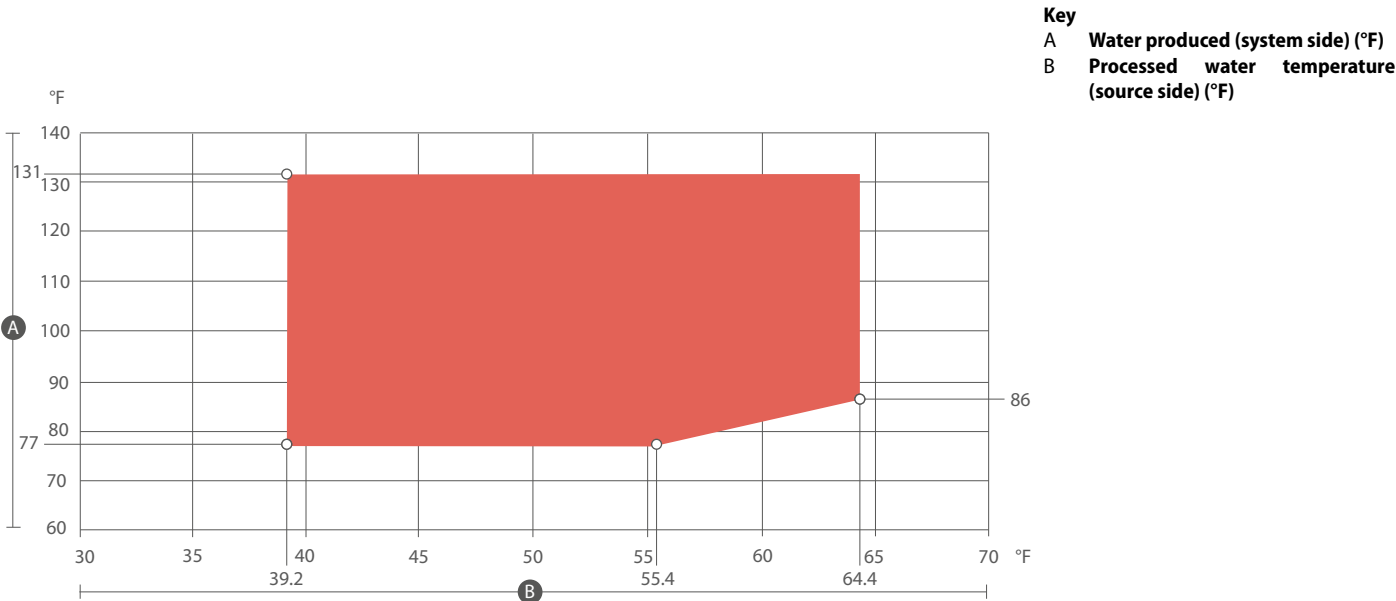
 **WARNING:** Under no circumstances does the unit have to be operated outside the operating limit under penalty of the warranty expiration. Aermec S.p.A. cannot be held responsible for any malfunction of the units which are operated outside the established limits and for their consequences.

° - MECHANIC THERMOSTATIC VALVE (WATER PRODUCED FROM 39.2 °F)

COOLING

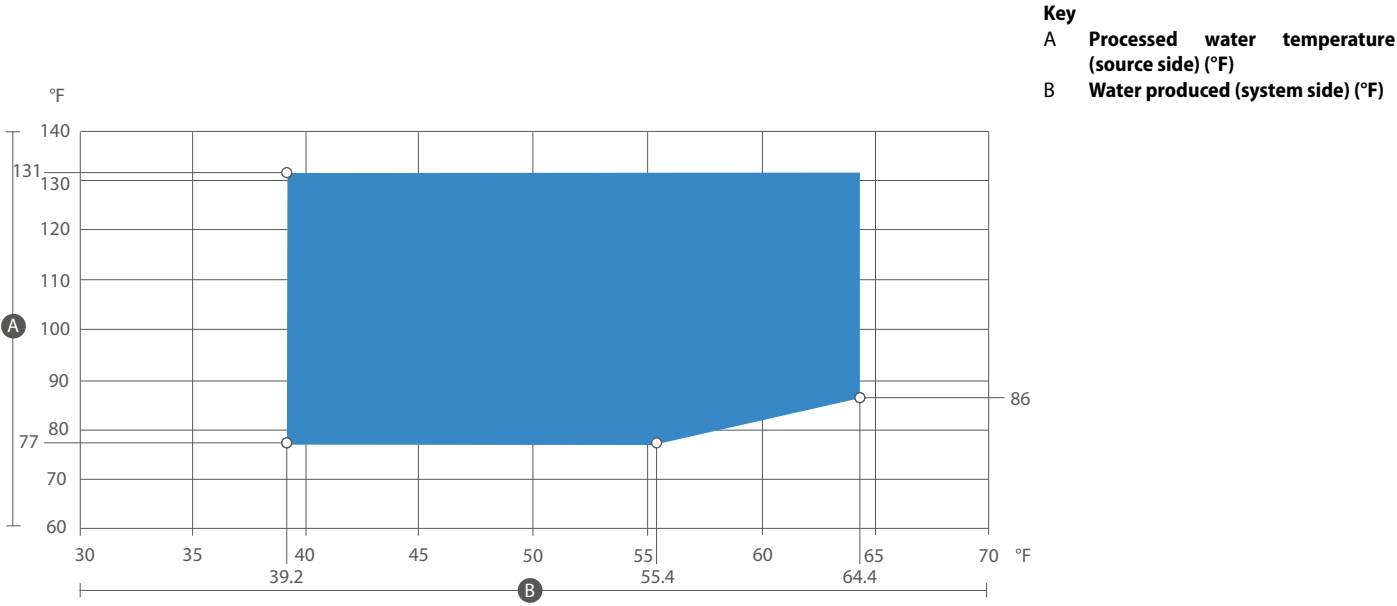


HEATING

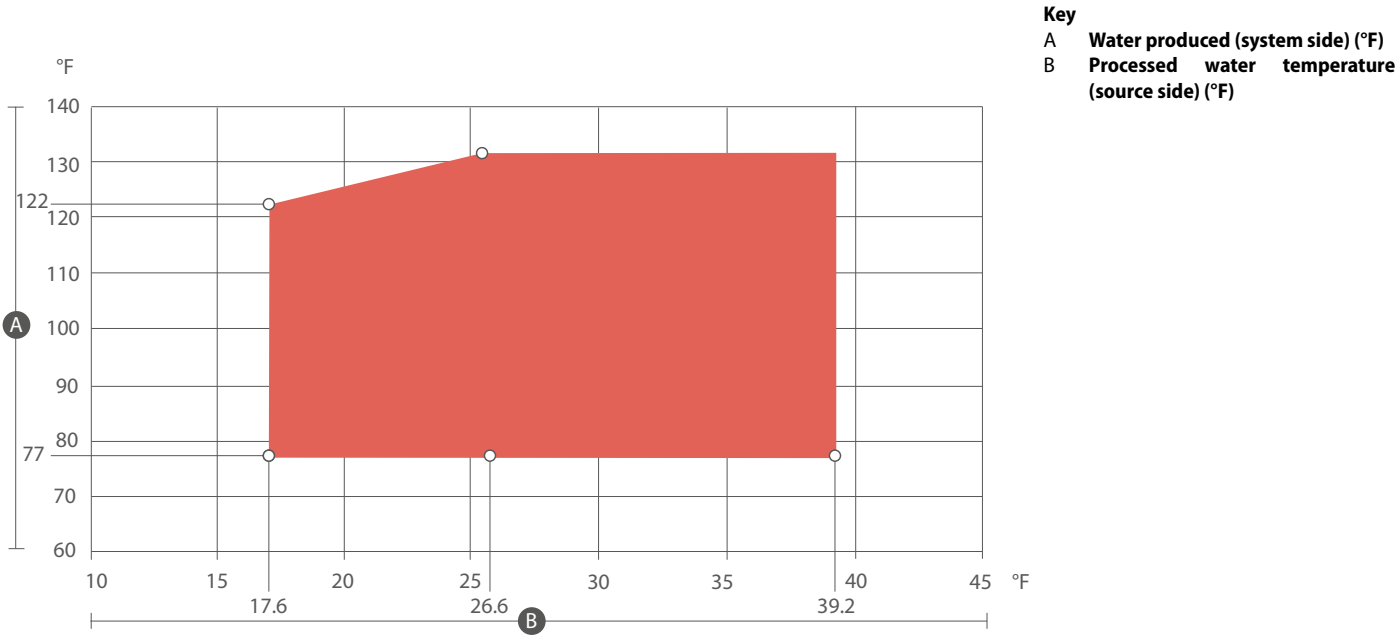


Y - MECHANIC THERMOSTATIC VALVE (PRODUCED WATER TEMPERATURE LOWER THAN 39.2 °F)

COOLING



HEATING

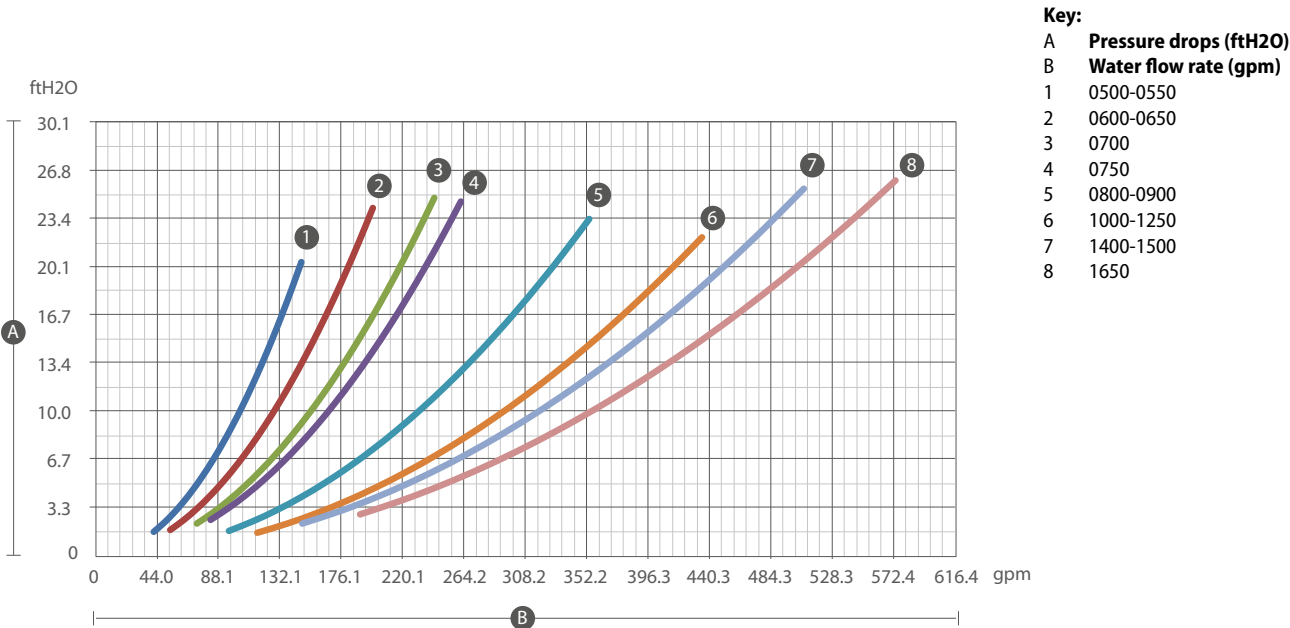


10 PRESSURE DROPS

SYSTEM SIDE - COLD WATER PRODUCTION - 2/4 PIPES

Cooling
Evaporator water temperature (in/out) 53.7°F/44.6°F
Condenser water temperature (in/out) 86°F/95°F

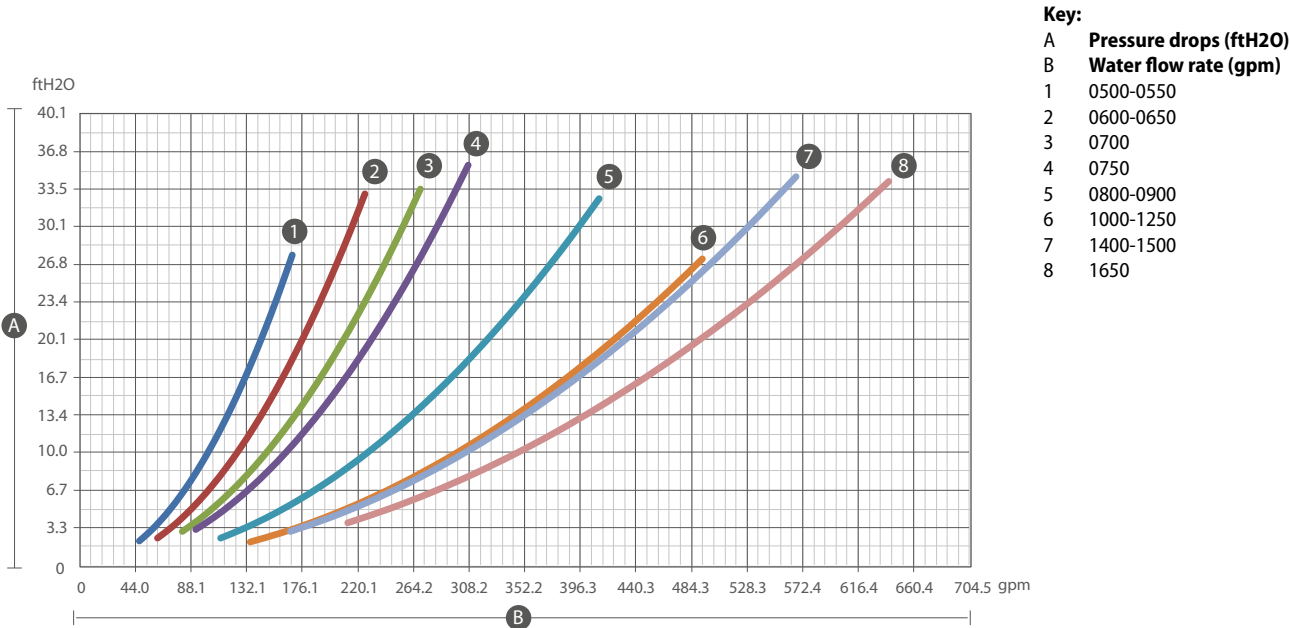
Version (°)



WITH RECOVERY DHW SIDE (2-PIPE) / SYSTEM SIDE HOT WATER PRODUCTION (4-PIPE)

Heating
Condenser water temperature (in/out) 104°F/113°F
Evaporator water temperature (in/out) 50°F/44.6°F

Version (°)

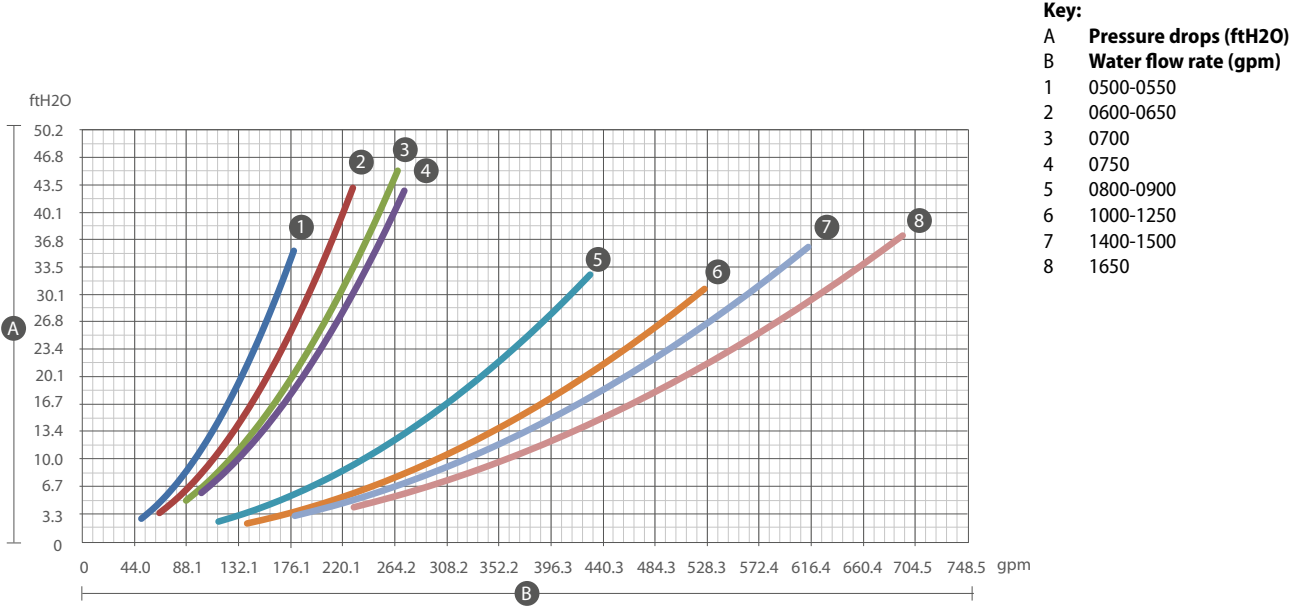


GEOTHERMAL SIDE - 2/4 PIPES

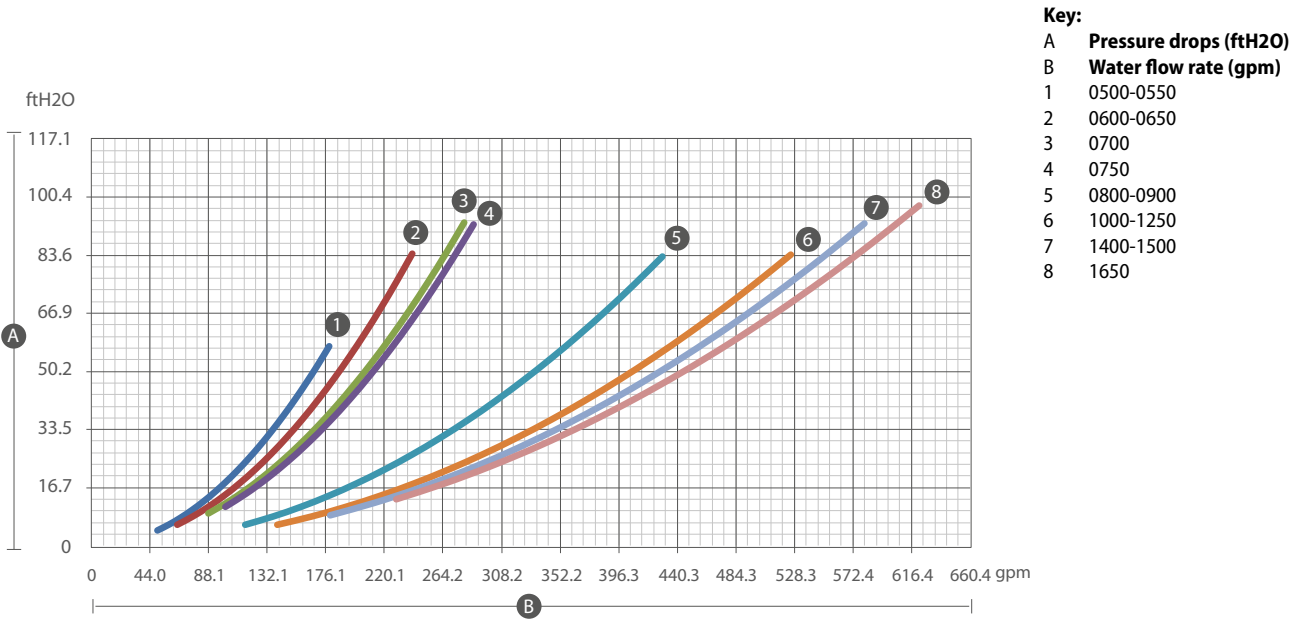
Cooling

Evaporator water temperature (in/out) 53.7°F/44.6°F
Condenser water temperature (in/out) 86°F/95°F

Version (°)



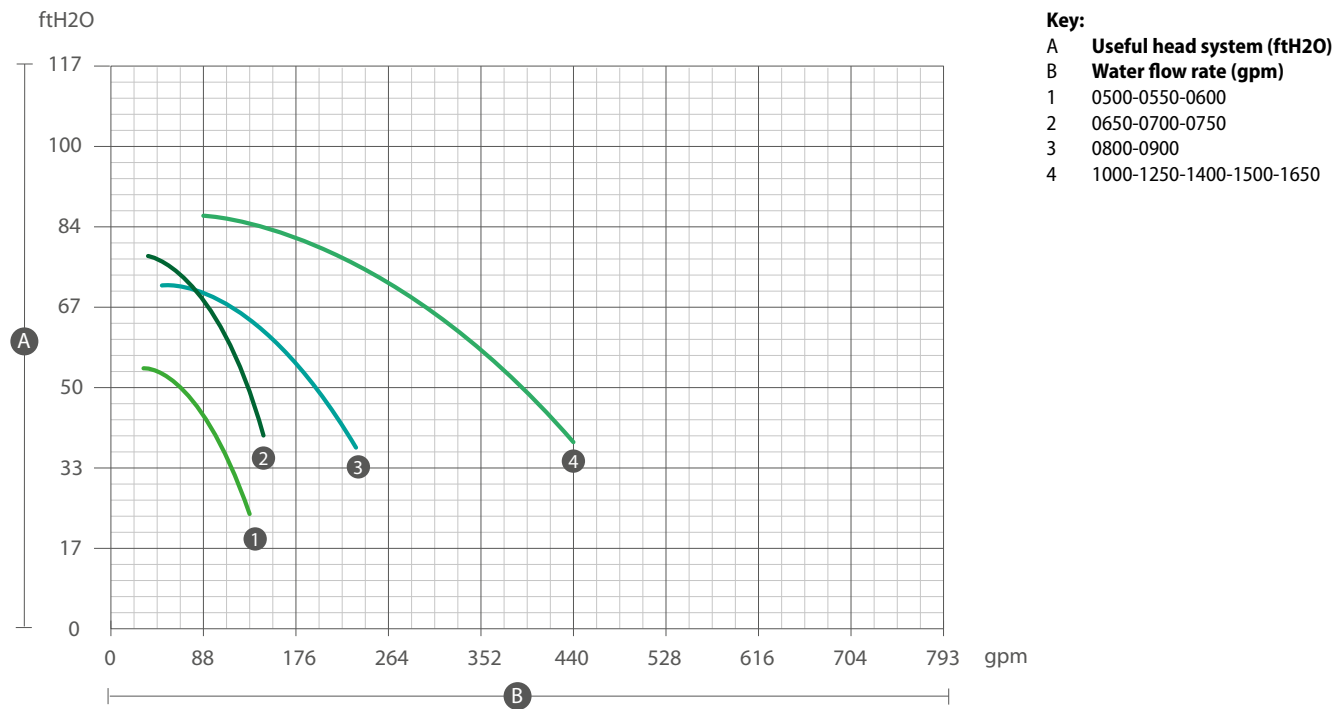
Version (M-N-O-P) (U-V-W-Z)



11 PUMPS STATIC PRESSURE

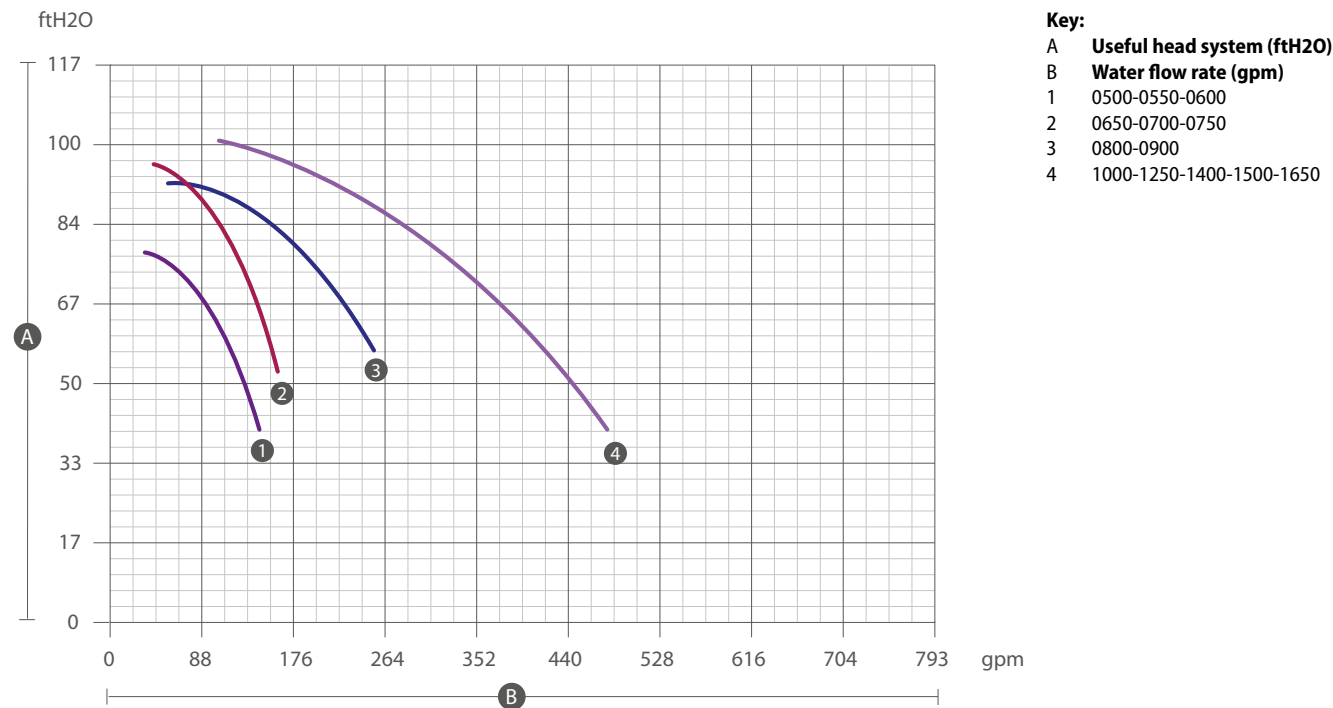
HYDRONIC KIT M-N

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: 10 Pressure drops p. 25).



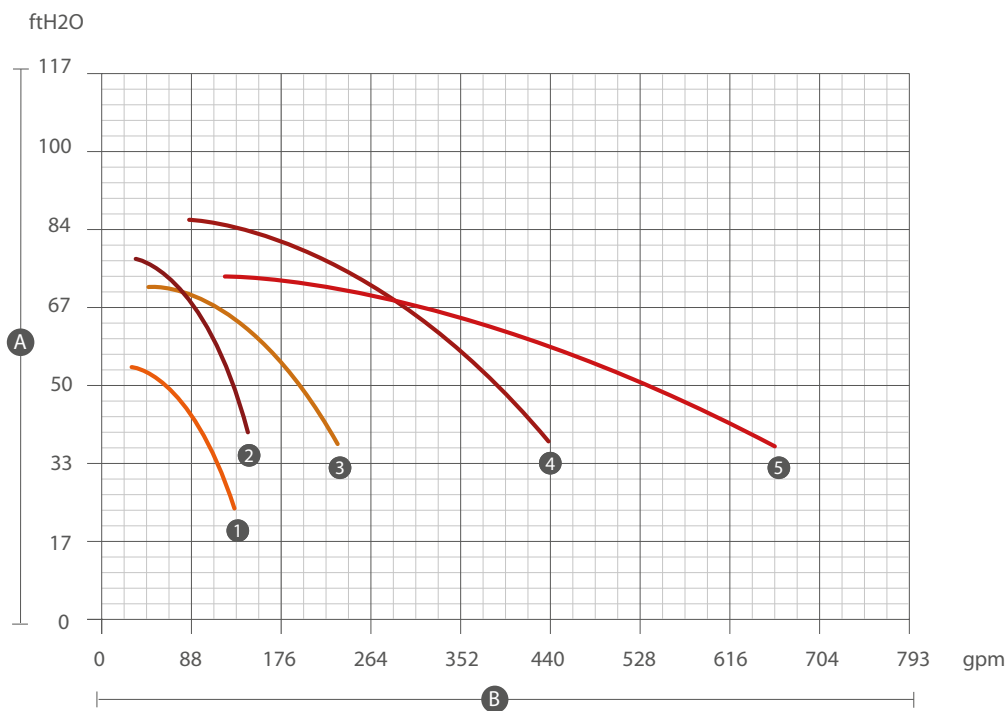
HYDRONIC KIT O-P

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: 10 Pressure drops p. 25).



HYDRONIC KIT U-V

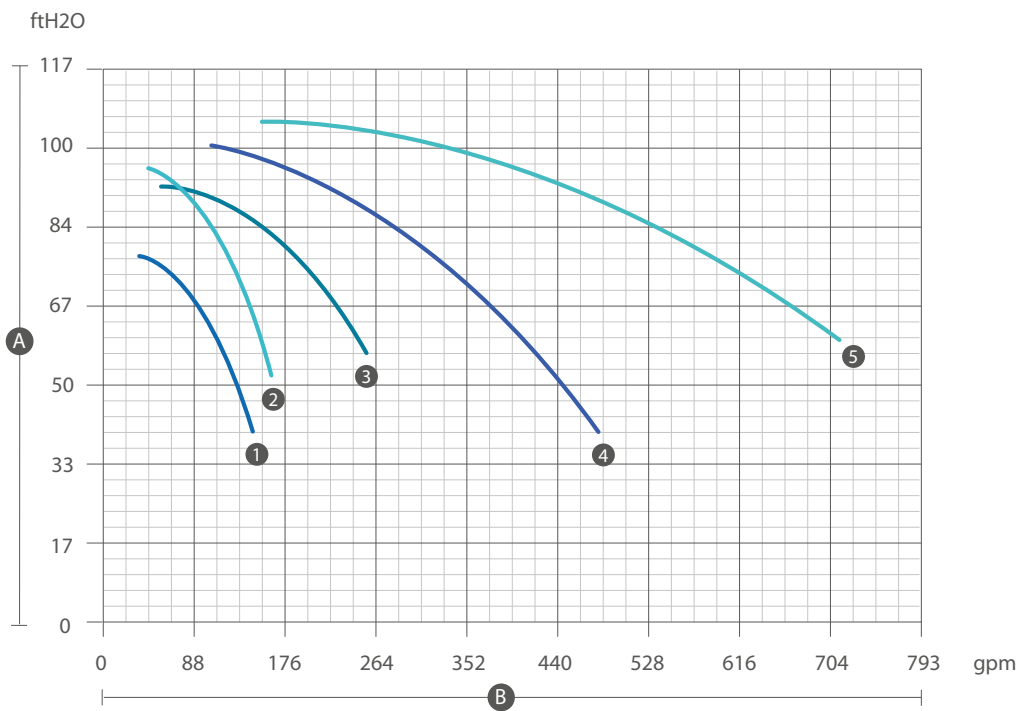
The table shows the characteristic curves of the pumps, and therefore they do not represent the useful static pressures of the system.
The useful heads of the system must be calculated by subtracting the unit's pressure drops (Δp) from the useful head of the pump shown in this diagram (see chapter: 10 Pressure drops p. 25).



- Key:**
- A Useful head system (ftH2O)
 - B Water flow rate (gpm)
 - 1 0500
 - 2 0550-0600
 - 3 0650-0700-0750-0800
 - 4 0900-1000
 - 5 1250-1400-1500-1650

HYDRONIC KIT W-Z

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: 10 Pressure drops p. 25).



- Key:**
- A Useful head system (ftH2O)
 - B Water flow rate (gpm)
 - 1 0500
 - 2 0550-0600
 - 3 0650-0700-0750-0800
 - 4 0900-1000
 - 5 1250-1400-1500-1650

■ For sizes from 1250 to 0650 only pump W is available.

SINGLE HYDRONIC KITS’ DATA

Size			0500	0550	0600	0650	0700	0750	0800	0900	1000	1250	1400	1500	1650
SYSTEM SIDE - PUMPS: °															
Pumps															
Maximum input power	L	kW	-	-	-	-	-	-	-	-	-	-	-	-	-
Maximum current	L	A	-	-	-	-	-	-	-	-	-	-	-	-	-
Nr. poles	L	no.	-	-	-	-	-	-	-	-	-	-	-	-	-
Minimum water flow rate	L	gpm	-	-	-	-	-	-	-	-	-	-	-	-	-
Maximum water flow rate	L	gpm	-	-	-	-	-	-	-	-	-	-	-	-	-
SYSTEM SIDE - PUMPS: M, N															
Pumps															
Maximum input power	L	kW	1.62	1.62	1.62	2.42	2.42	2.42	3.14	3.14	5.66	5.66	5.66	5.66	5.66
Maximum current	L	A	3.19	3.19	3.19	4.58	4.58	4.58	6.23	6.23	10.40	10.40	10.40	10.40	10.40
Nr. poles	L	no.	2	2	2	2	2	2	2	2	2	2	2	2	2
Minimum water flow rate	L	gpm	30.8	30.8	30.8	35.2	35.2	35.2	48.4	48.4	92.5	92.5	92.5	92.5	92.5
Maximum water flow rate	L	gpm	132.1	132.1	132.1	145.3	145.3	145.3	233.4	233.4	422.7	422.7	422.7	422.7	422.7
SYSTEM SIDE - PUMPS: O, P															
Pumps															
Maximum input power	L	kW	2.42	2.42	2.42	3.35	3.35	3.35	4.53	4.53	7.63	7.63	7.63	7.63	7.63
Maximum current	L	A	4.58	4.58	4.58	6.23	6.23	6.23	7.62	7.62	14.20	14.20	14.20	14.20	14.20
Nr. poles	L	no.	2	2	2	2	2	2	2	2	2	2	2	2	2
Minimum water flow rate	L	gpm	35.2	35.2	35.2	44.0	44.0	44.0	57.2	57.2	105.7	105.7	105.7	105.7	105.7
Maximum water flow rate	L	gpm	145.3	145.3	145.3	162.9	162.9	162.9	255.4	255.4	479.9	479.9	479.9	479.9	479.9
Size			0500	0550	0600	0650	0700	0750	0800	0900	1000	1250	1400	1500	1650
RECOVERY SIDE - PUMPS: °															
Pumps															
Maximum input power	L	kW	-	-	-	-	-	-	-	-	-	-	-	-	-
Maximum current	L	A	-	-	-	-	-	-	-	-	-	-	-	-	-
Nr. poles	L	no.	-	-	-	-	-	-	-	-	-	-	-	-	-
Minimum water flow rate	L	gpm	-	-	-	-	-	-	-	-	-	-	-	-	-
Maximum water flow rate	L	gpm	-	-	-	-	-	-	-	-	-	-	-	-	-
RECOVERY SIDE - PUMPS: U, V															
Pumps															
Maximum input power	L	kW	1.62	2.42	2.42	3.14	3.14	3.14	3.14	5.66	5.66	7.58	7.58	7.58	7.58
Maximum current	L	A	3.19	4.58	4.58	6.23	6.23	6.23	6.23	10.40	10.40	14.20	14.20	14.20	14.20
Nr. poles	L	no.	2	2	2	2	2	2	2	2	2	2	2	2	2
Minimum water flow rate	L	gpm	30.8	35.2	35.2	48.4	48.4	48.4	48.4	92.5	92.5	123.3	123.3	123.3	123.3
Maximum water flow rate	L	gpm	132.1	145.3	145.3	233.4	233.4	233.4	233.4	422.7	422.7	660.4	660.4	660.4	660.4
RECOVERY SIDE - PUMPS: W															
Pumps															
Maximum input power	L	kW	2.42	3.35	3.35	4.53	4.53	4.53	4.53	7.63	7.63	11.94	11.94	11.94	11.94
Maximum current	L	A	4.58	6.23	6.23	7.62	7.62	7.62	7.62	14.20	14.20	20.20	20.20	20.20	20.20
Nr. poles	L	no.	2	2	2	2	2	2	2	2	2	2	2	2	2
Minimum water flow rate	L	gpm	35.2	44.0	44.0	57.2	57.2	57.2	57.2	105.7	105.7	154.1	154.1	154.1	154.1
Maximum water flow rate	L	gpm	145.3	162.9	162.9	255.4	255.4	255.4	255.4	479.9	479.9	713.3	713.3	713.3	713.3
RECOVERY SIDE - PUMPS: Z															
Pumps															
Maximum input power	L	kW	2.42	3.35	3.35	4.53	4.53	4.53	4.53	7.63	7.63	-	-	-	-
Maximum current	L	A	4.58	6.23	6.23	7.62	7.62	7.62	7.62	14.20	14.20	-	-	-	-
Nr. poles	L	no.	2	2	2	2	2	2	2	2	2	-	-	-	-
Minimum water flow rate	L	gpm	35.2	44.0	44.0	57.2	57.2	57.2	57.2	105.7	105.7	-	-	-	-
Maximum water flow rate	L	gpm	145.3	162.9	162.9	255.4	255.4	255.4	255.4	479.9	479.9	-	-	-	-

12 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).

NXP - 2-pipe system		0500	0550	0600	0650	0700	0750	0800	0900	1000	1250	1400	1500	1650
Minimum water content allowed SYSTEM SIDE	gal/ton							9.3						
Minimum water content allowed DHW SIDE	gal/ton							9.3						
Recommended water content SYSTEM AND DHW SIDE	gal/ton							13						

NXP - 4-pipe system		0500	0550	0600	0650	0700	0750	0800	0900	1000	1250	1400	1500	1650
Minimum water content allowed COOLING SIDE	gal/ton							6.5						
Minimum water content allowed HEATING SIDE	gal/ton							9.3						
Recommended water content COOLING AND HEATING SIDE	gal/ton							13						

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.

Some examples are given below, but they do not cover all the possible situations.

Example 1: for a 4-pipe multifunction unit with primary circuit (heating and cooling) and secondary circuit, where the zone pumps of the secondary circuit may (even just occasionally) be disabled, the water content of the primary circuit alone is considered the amount useful for count purposes.

Example 2: for a 2-pipe multifunction unit with an intermediate circuit (DHW side) that works on an intermediate heat exchanger for DHW production, and a secondary circuit and boiler downstream from the heat exchanger, the water content of the secondary circuit and the DHW storage tank can only be considered part of the useful amount if both the following conditions are met:

1. the intermediate heat exchanger is suitably sized on the basis of the machine capacity;
2. both pumps (primary and secondary) are always active or are simultaneously commanded on the basis of the temperature of the water in the DHW storage tank (measured by an SSAN probe).

On the system circuit of a multifunction unit for 2-pipe systems, example 1 applies.

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:

- The hourly number of inversions between operating modes
- Drop in water temperature during winter defrost cycles.

MAXIMUM SYSTEM WATER CONTENT

Units with the hydronic kit mounted come standard with the expansion vessel set at 21.8 psi, the pressure relief valve and the water filter mounted.

The maximum system water content depends on the capacity of the expansion vessel.



Warning: the data included in the table refer exclusively to the versions with hydronic kit.

Size		0500	0550	0600	0650	0700	0750	0800	0900	1000	1250	1400	1500	1650
Hydronic kit, user side														
Water filter	L	no.	1	1	1	1	1	1	1	1	1	1	1	1
Flow switch	L	no.	1	1	1	1	1	1	1	1	1	1	1	1
Expansion vessel number	L	no.												
Expansion vessel capacity	L	l												
Pressure relief valve	L	n°/psi												
Drain valve	L	no.	1	1	1	1	1	1	1	1	1	1	1	1
Drain valve	L	no.	1	1	1	1	1	1	1	1	1	1	1	1
Automatic fill point	L	no.	-	-	-	-	-	-	-	-	-	-	-	-
Hydronic kit, source side														
Automatic fill point	L	no.	-	-	-	-	-	-	-	-	-	-	-	-
Water filter	L	no.	1	1	1	1	1	1	1	1	1	1	1	1
Flow switch	L	no.	1	1	1	1	1	1	1	1	1	1	1	1
Expansion vessel number	L	no.						2						

Size			0500	0550	0600	0650	0700	0750	0800	0900	1000	1250	1400	1500	1650
Expansion vessel capacity	L	l							24						
Pressure relief valve	L	n°/psi													
Drain valve	L	no.	1	1	1	1	1	1	1	1	1	1	1	1	1
Drain valve	L	no.	1	1	1	1	1	1	1	1	1	1	1	1	1
Hydronic kit, recovery side															
Water filter	L	no.	1	1	1	1	1	1	1	1	1	1	1	1	1
Flow switch	L	no.	1	1	1	1	1	1	1	1	1	1	1	1	1
Expansion vessel number	L	no.							-						
Expansion vessel capacity	L	l							-						
Pressure relief valve	L	n°/psi													
Drain valve	L	no.	1	1	1	1	1	1	1	1	1	1	1	1	1
Drain valve	L	no.	1	1	1	1	1	1	1	1	1	1	1	1	1
Automatic fill point	L	no.	-	-	-	-	-	-	-	-	-	-	-	-	-

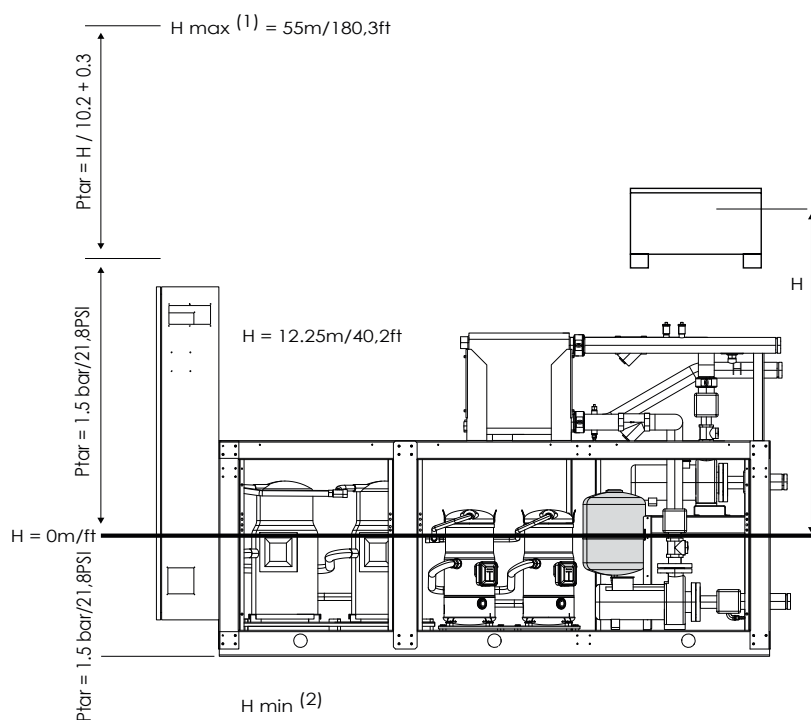
The table gives an example of the maximum water content calculated at the indicated operating conditions and only to protect the unit.
If the volume of water in the system is higher, add another expansion vessel of the correct size.

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: $p \text{ (rating) [bar]} = H \text{ [ft]} / 33.5 + 1.0$.
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.



13 CORRECTION FACTORS

CORRECTIVE FACTORS FOR AVERAGE WATER TEMPERATURES DIFFERENT FROM NOMINAL VALUES

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

System side heat exchanger																
		Cooling mode								Heating mode or recovery						
Average water temperatures	°F	41.0	50.0	59.0	68.0	86.0	104.0	122.0	73.4	82.4	91.4	100.4	109.4	118.4	127.4	134.4
Correction factor		1.02	1.00	0.98	0.97	0.95	0.93	0.91	1.04	1.03	1.02	1.01	1.00	0.99	0.98	0.97

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

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

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 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 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 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.

14 SOUND DATA

Size			0500	0550	0600	0650	0700	0750	0800	0900	1000	1250	1400	1500	1650
Sound data calculated in cooling mode (1)															
Sound power level	L	dB(A)	79,0	78,1	79,0	79,0	79,5	80,0	82,0	85,2	87,0	88,8	90,0	91,8	93,6
Sound pressure level (10 m / 33 ft)	L	dB(A)	47.1	46.2	47.1	47.1	47.7	48.1	50.1	53.3	55.1	56.9	58.1	59.9	61.7
Sound pressure level (1 m / 3.3 ft)	L	dB(A)	61.0	60.1	61.0	61.0	61.5	62.0	64.0	67.1	69.0	70.7	72.0	73.8	75.6
Sound power by centre octave band dB(A)															
125 Hz	L	dB(A)	41,8	44,3	44,6	46,2	45,1	43,5	44,8	53,8	56,5	54,5	50,5	49,5	48,2
250 Hz	L	dB(A)	52,4	54,7	54,7	56,1	55,8	55,4	55,3	69,7	72,5	71,6	70,3	71,4	72,3
500 Hz	L	dB(A)	69,1	70,4	70,5	71,6	71,6	71,7	71,9	76,2	78,2	77,7	77,2	78,0	78,8
1000 Hz	L	dB(A)	71,7	72,2	72,8	73,7	73,2	72,5	74,5	78,9	81,0	84,1	85,9	85,1	84,1
2000 Hz	L	dB(A)	70,8	71,5	71,3	71,8	72,9	73,8	73,4	77,7	79,7	80,9	81,8	81,5	81,3
4000 Hz	L	dB(A)	66,0	68,1	67,8	69,0	69,3	69,6	68,7	72,8	74,8	76,2	77,3	76,7	76,0
8000 Hz	L	dB(A)	53,9	56,8	56,5	58,0	57,8	57,6	56,4	57,0	57,5	60,5	62,1	60,8	58,8

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

Data 14S11:2022

Service side water 54.01°F / 44.01°F (in/out); Source side water 84.99°F / 94.30°F (in/out)

Note

For operating conditions different to those declared refer to the selection program Magellano, available on www.aermec.com

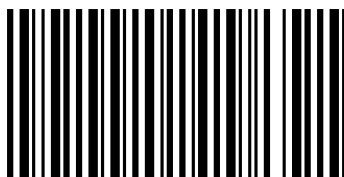


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