AERMEC

air conditioning

60Hz RS485 CRV R410A

MULTIPURPOSE UNITS FOR 2/4 - PIPE SYSTEMS - Technical manual

NRP 0800-1800

REVERSIBLE HEAT PUMPS

- DESIGNED FOR 2 AND 4-PIPE SYSTEMS FOR EXTERNAL INSTALLATION
- OUTDOOR UNIT
- HIGH EFFICIENCIES

EN

AERMEC COMPANY QUALITY SYSTEM ICIM ISO 9001:2008 - Cert. n° 0128 CISQ IQNet AERMEC S.P.A.

C ETL CM LISTED US Intertek

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INRP260HzTY. 1312. 5806717_03

Dear Customer,
Thank you for choosing an AERMEC product. 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.
In addition, the EC mark guarantees that our appliances fully comply with the requirements of the European Machinery Directive in terms of safety. We constantly monitor the quality level of our products, and as a result they are synonymous with Safety, Quality, and Reliability.

Product data may be subject to modifications deemed necessary for improving the product without the obligation to give prior notice.

Thank you again.
AERMEC S.p.A

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Standards and directives to be followed in the design and manufacture of the unit:

STANDARD
1. UL 1995 Heating and cooling equipment
2. ANSI/NFPA Standard 70 National Electrical code (N.E.C.)
3. CSA C.22.1.- C.22.2 Safety Standard Electrical Installation

SAFETY LEVEL
1. IP24

ACOUSTIC PART
1. ISO DIS 9614/2 (sound intensity method)

REFRIGERANT GAS (R410A)
This unit contains fluorinated greenhouse gases covered by the Kyoto Protocol. Maintenance and disposal operations must be only carried out by qualified staff, in compliance with existing laws.

1. GENERAL WARNINGS

The NRP AERMEC units are constructed according to the recognised technical standards and safety regulations.
Multipurpose **OUTDOOR** units for 2 or 4 pipe systems, especially designed for simultaneous production of **cold** and **hot** water and fully independent.
Any contractual or extracontractual liability of the Company is excluded for injury/damage to persons, animals or objects owing to installation, regulation and maintenance errors or improper use. All uses not expressly indicated in this manual are prohibited.

1.1. PRESERVATION OF THE DOCUMENTATION

The instructions along with all the related documentation must be given to the user of the system, who assumes the responsibility to conserve the instructions so that they are always at hand in case of need.
Read this sheet carefully; the execution of all works must be performed by qualified staff, according to Standards in force on this subject in different countries. (Ministerial Decree 329/2004).

1.2. INSTALLATION

The unit must be installed in such a way that maintenance and/or repairs can be carried out.

1.3. WARRANTY

The appliance warranty does not cover the costs for ladder trucks, scaffolding, or other elevation systems that may become necessary for carrying out servicing under warranty.
Do not modify or tamper with the unit as dangerous situations can be created and the manufacturer will not be liable for any damage caused. The validity of the warranty shall be void in the event of failure to comply with the above-mentioned indications.

1.4. WARNINGS REGARDING SAFETY AND INSTALLATION STANDARDS

- The unit must be installed by a qualified and suitably trained technician, in compliance with the national legislation in force in the country of destination (Ministerial Decree 329/2004).
  AERMEC will not assume any responsibility for damage due to failure to follow these instructions.

- Before beginning any operation, READ THESE INSTRUCTIONS CAREFULLY AND CARRY OUT THE SAFETY CHECKS TO AVOID ALL RISKS. All the staff involved must have thorough knowledge of the operations and any dangers that may arise at the moment in which the installation operations are carried out.

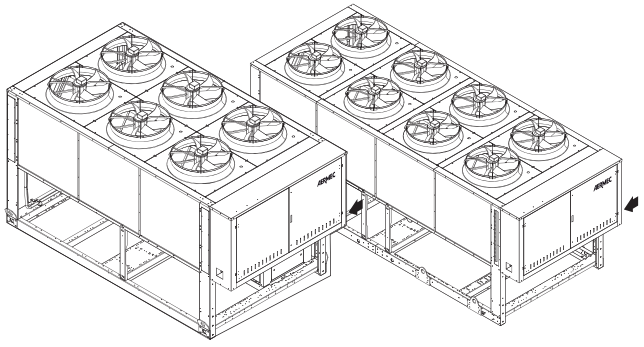
WARNING
Can not be excluded:
1. **The only system side COLD (NRP 4 PIPES)**
2. **The only SYSTEM SIDE (NRP 2 PIPES)**

2. PRODUCT IDENTIFICATION

The units can be identified through:
- PACKING LABEL which shows the product identification data

- TECHNICAL PLATE

ATTENTION
Tampering, removal, lack of the identification plate or other does not allow the safe identification of the product and will make any installation or maintenance operation to be performed difficult.



3. PRESENTATION

Multipurpose **OUTDOOR** units for 2 or 4 pipe systems, especially designed for simultaneous production of **cold** and **hot** water and fully independent.

AVAILABLE VERSIONS

3.1. FOR 2-PIPE SYSTEMS

The multipurpose 2-pipe units have been made for applications with 2 pipe terminals, e.g. hotels, where there is a cold/hot water and DHW demand throughout the year.
The operating modes are:

SUMMER FUNCTIONING

1. Cold water production to system.
2. Production of domestic hot water with use of total recovery **(NO ANTI-LEGIONELLA CYCLE).**

WINTER FUNCTIONING

3. Heat pump supplying the system.
4. Service heat pump of DHW.

3.2. FOR 4-PIPE SYSTEMS

The multipurpose 4-pipe units have been made for applications with 4 pipe terminals, e.g. shopping centres, offices or facilities with large windows where there can be the simultaneous demand for hot and cold water with a system which does not require season changeover and therefore is a valid alternative to traditional systems based on the chiller-boiler combination.
The microprocessor control logic ensures perfectly satisfying heat and cooling loads.
The operating modes are:

PRODUCTION OF COOLED WATER ONLY
The multipurpose unit acts as a classical refrigerator: cool water to the system and condensation heat disposal outside through finned coils.

PRODUCTION OF HOT WATER ONLY
The multipurpose unit acts as a heat pump, exploiting the heat of the outside air, through the finned coil (evaporator) it raises the temperature of the water to be sent to the system through a plate heat exchanger (condenser). The main difference from traditional cycle reverse heat pumps is that the heated water is produced in different heat exchanger from the one used to produce cold water.
This separates the two hot-cold sections required for 4-pipe systems.

COMBINED PRODUCTION
If the utility requires simultaneous hot and cold water, the unit acts as a water heat pump, controlling condensation and evaporation on two distinct plate heat exchangers associated to circulation of cold and hot water in the system.
It automatically changes from one configuration to another (managed by on-board microprocessor) to optimise the spent energy depending on the demand by the utility.

Maximum reliability
Multi-circuit unit designed to provide the maximum efficiency both with full load and partial loads, guaranteeing operating continuity should one of the circuits stop to facilitate maintenance.
Having several compressors and circuits ensures control of more steps of power yielded in both modes.

Built-in hydronic kit
Encloses the main hydraulic components; available in several configurations with high or low static pressure single pump or reserve pump (see configurator).

4. CECK LIST

COOLING CIRCUIT	2-pipe unit	4-pipe unit
Thermostatic valve (cooling mode)	•	•
Thermostatic valve (recovery mode)	•	•
Cycle reverse valve	•	**n.a.**
Recovery enable valve	•	•
Heat exchanger plate (Evaporator)	**n.a.**	•
Heat exchanger plate (Evaporator/Condenser)	•	**n.a.**
Heat exchanger plate (DHW/Total Recovery)	•	•
Air side coil exchanger	•	•
Compressor	•	•
Dehydrator filter	•	•

COOLING CIRCUIT	2-pipe unit	4-pipe unit
High pressure switch (manually reset)	•	•
High pressure transducer	•	•
Low pressure transducer	•	•
Liquid indicator	•	•
Liquid tank	•	•
One-way valves	•	•
Liquid separator	•	•
Solenoid valves	•	•
Relief valves	•	•

KEY:
• As standard
n.a. Not avaiable

	System 2 pipe		System 4 pipe	
	System	**DHW**	**Cooling side**	**Heating side**
STANDARD HYDRAULIC CIRCUIT ON ALL VERSIONS				
Filter	Supplied	No	Supplied	No
Flow switch	As per standard	No	As per standard	No
VERSIONS WITH PUMPS ONLY (the more complete versions are described)				
Filter	As per standard	As per standard	As per standard	As per standard
Pump/s	As per standard	As per standard	As per standard	As per standard
Drain valve	As per standard	As per standard	As per standard	As per standard
Air vent valve	As per standard	As per standard	As per standard	As per standard
Expansion vessels (2x25 l)	As per standard	As per standard	As per standard	As per standard

4.1. DESCRIPTION AND CHOICE OF THE UNIT

Field:

1 2 3 Code NRP

4 5 6 7 Size 0800, 0900, 1000, 1250, 1400, 1500, 1650, 1800

8 Version
- **A** High efficiency
- **E** Silenced high efficiency (data on demand for sizes 0800÷1800)

9 Type of system:
- **2** 2 pipe system (cooling + DHW heating)
- **4** 4 pipe system (cooling + heating)

10 Coil
- **°** Aluminium
- **R** Copper
- **S** Tinned copper
- **V** Coated aluminium (epoxy paint)

11 Fan
- **I** Inverter

12 Power supply
- **6** 230/3/60 with magnet circuit breakers
- **7** 460/3/60 with magnet circuit breakers
- **8** 575/3/60 with magnet circuit breakers

13 14 System side hydronc kit
- **00** Without hydronic kit
- **P1** Single low head pump
- **P2** Single low head pump and reserve pump
- **P3** Single high head pump
- **P4** Single high head pump and reserve pump

15 16 DHW side idronic kit ①
- **00** Without hydronic kit
- **R1** Single low head pump
- **R2** Single low head pump and reserve pump
- **R3** Single high head pump
- **R4** Single high head pump and reserve pump

① **DHW SIDE/SYSTEM SIDE**
DHW side, production of domestic hot water, in 2-pipe systems.
System side, production of hot water, in 4-pipe systems.

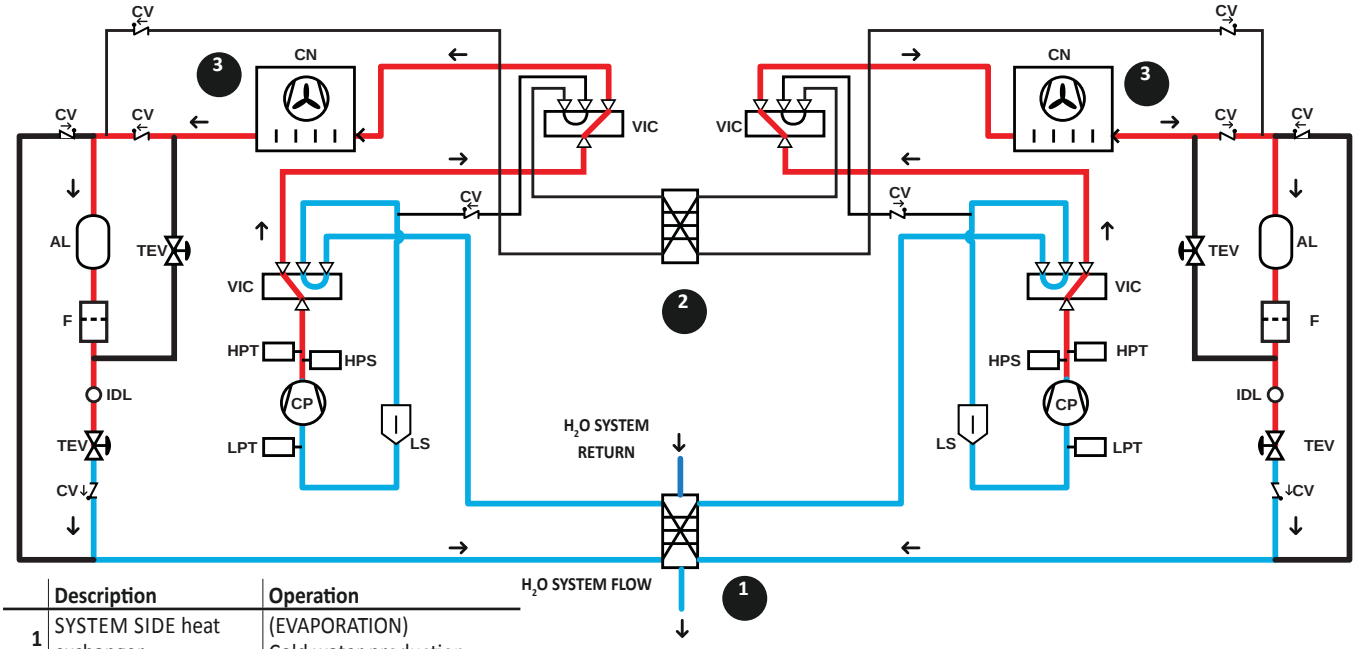
POSSIBLE CONFIGURATIONS BETWEEN HYDRONIC KITS

system hydronic unit	Recovery hydronic unit					
		SDgr	R1	R2	R3	R4
	SDgr	•	•	•	•	•
	P1	•	•	•	•	•
	P2	•	•	•	•	•
	P3	•	•	•	•	•
	P4	•	•	•	•	•

Key:
• Avaiable

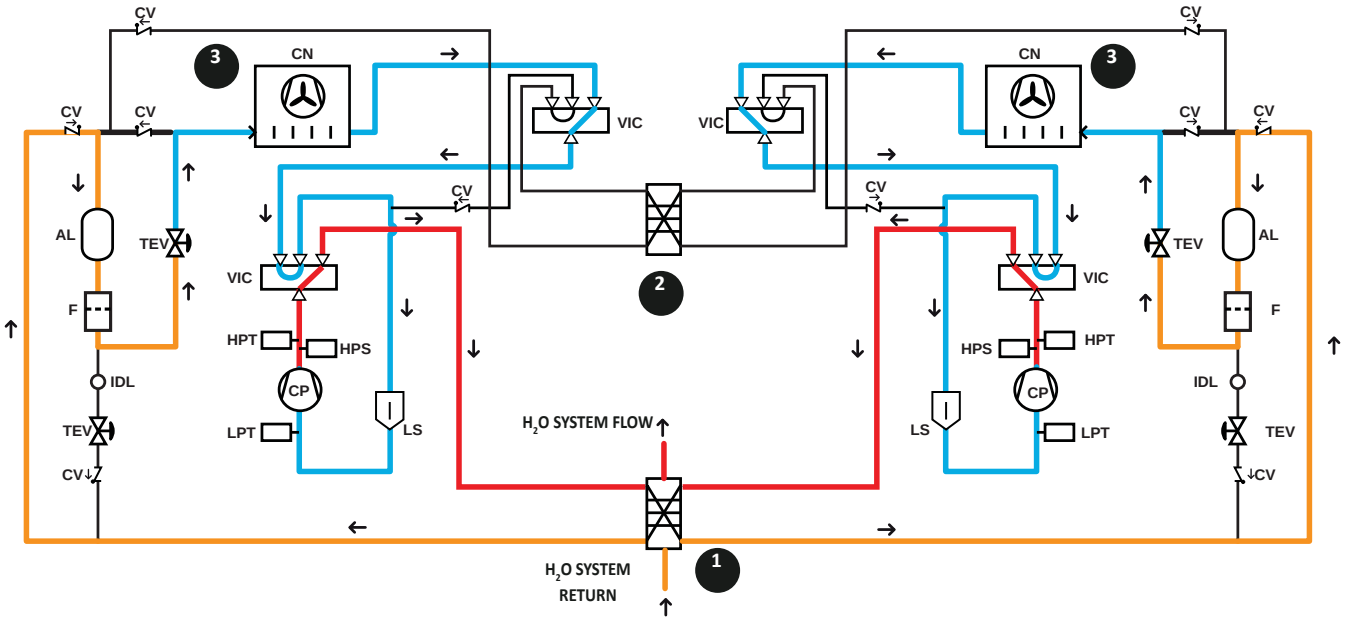
5. BASIC OPERATING LAYOUT FOR 2-PIPE SYSTEM

COLD WATER PRODUCTION ONLY TO SYSTEM



	Description	Operation
1	SYSTEM SIDE heat exchanger	(EVAPORATION) Cold water production
2	DHW SIDE heat exchanger	not running
3	SOURCE SIDE heat exchanger	(CONDENSATION) Heat exchange with air

HOT WATER PRODUCTION ONLY TO SYSTEM

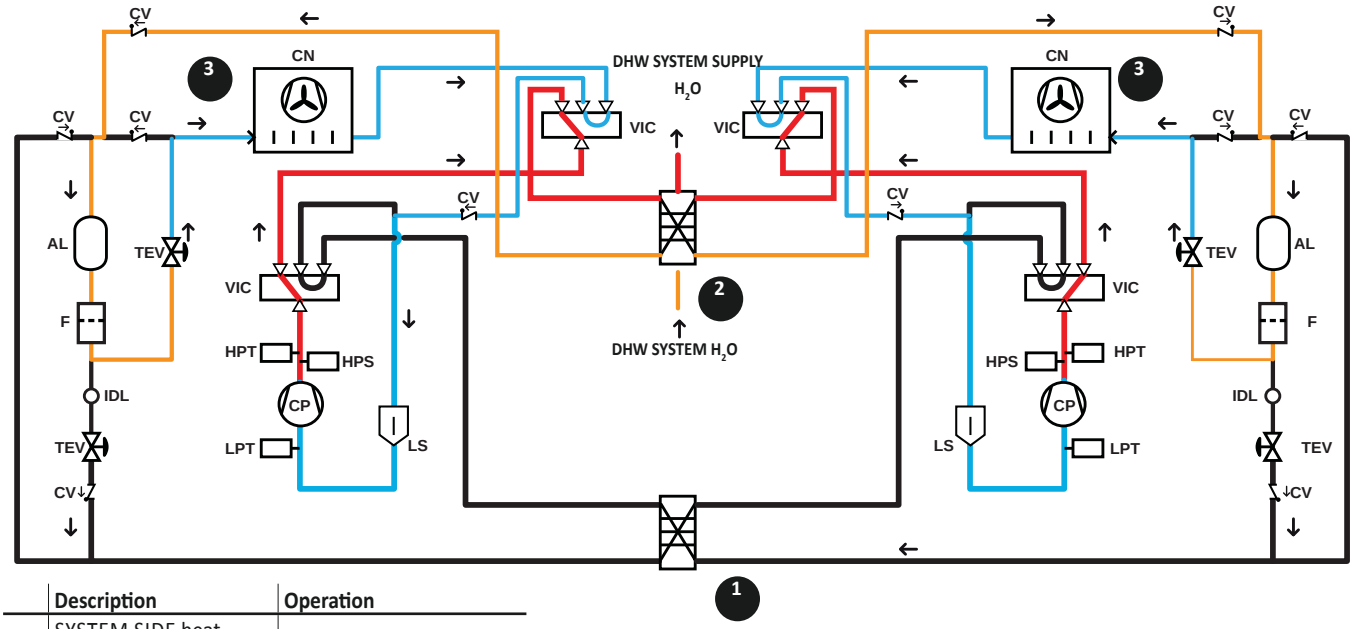


	Description	Operation
1	SYSTEM SIDE heat exchanger	(CONDENSATION) Hot water production
2	DHW SIDE heat exchanger	not running
3	SOURCE SIDE heat exchanger	(EVAPORATION) Heat exchange with air

	Key
1	System side heat exchanger
2	DHW side heat exchanger
3	Source side heat exchanger
AL	Liquid storage tank
CV	One-way valve
F	Dehydrator filter

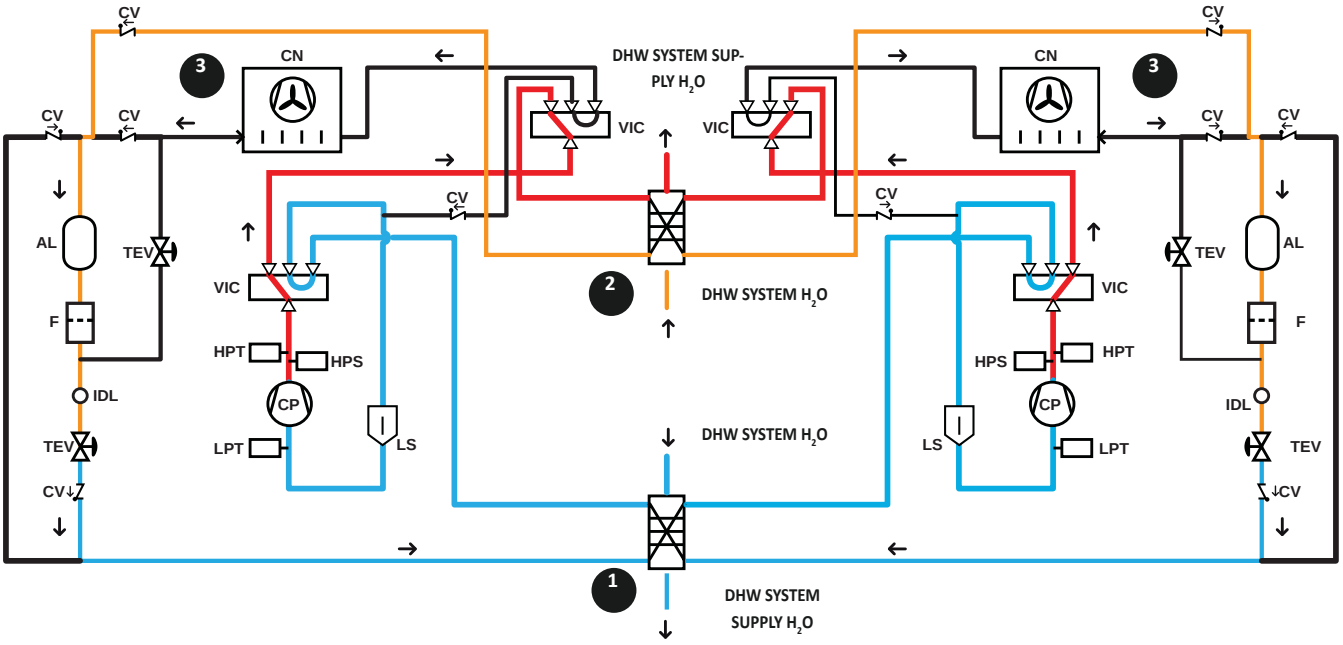
IDL	Liquid indicator
HPT	High pressure transducer
HPS	High pressure switch
LPT	Low pressure transducer
LS	Liquid separator
TEV	Thermostatic valves
VIC	Cycle reversing valves

2 CIRCUITS TO PRODUCE HOT WATER ONLY TO DHW



	Description	Operation
1	SYSTEM SIDE heat exchanger	Not running
2	DHW SIDE heat exchanger	(CONDENSATION) DHW production
3	SOURCE SIDE heat exchanger	(EVAPORATION) Heat exchange with air

2 CIRCUITS TO PRODUCE COLD WATER TO SYSTEM AND HOT WATER TO DHW

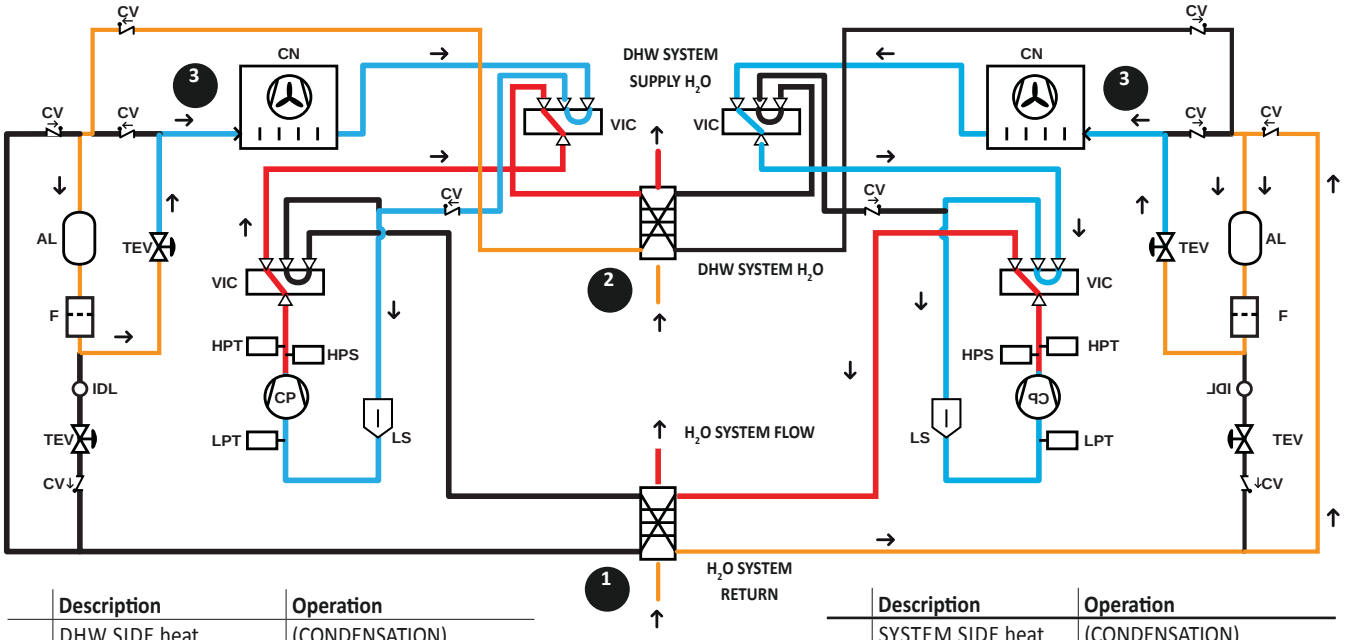


	Description	Operation
1	SYSTEM SIDE heat exchanger	(EVAPORATION) Cold water production
2	DHW SIDE heat exchanger	(CONDENSATION) DHW production
3	SOURCE SIDE heat exchanger	Not running

	Key
1	System side heat exchanger
2	DHW side heat exchanger
3	Source side heat exchanger
AL	Liquid storage tank
CV	One-way valve
F	Dehydrator filter

IDL	Liquid indicator
HPT	High pressure transducer
HPS	High pressure switch
LPT	Low pressure transducer
LS	Liquid separator
TEV	Thermostatic valves
VIC	Cycle reversing valves

CIRCUIT FOR PRODUCING HOT WATER TO SYSTEM | CIRCUIT FOR PRODUCING HOT WATER TO DHW

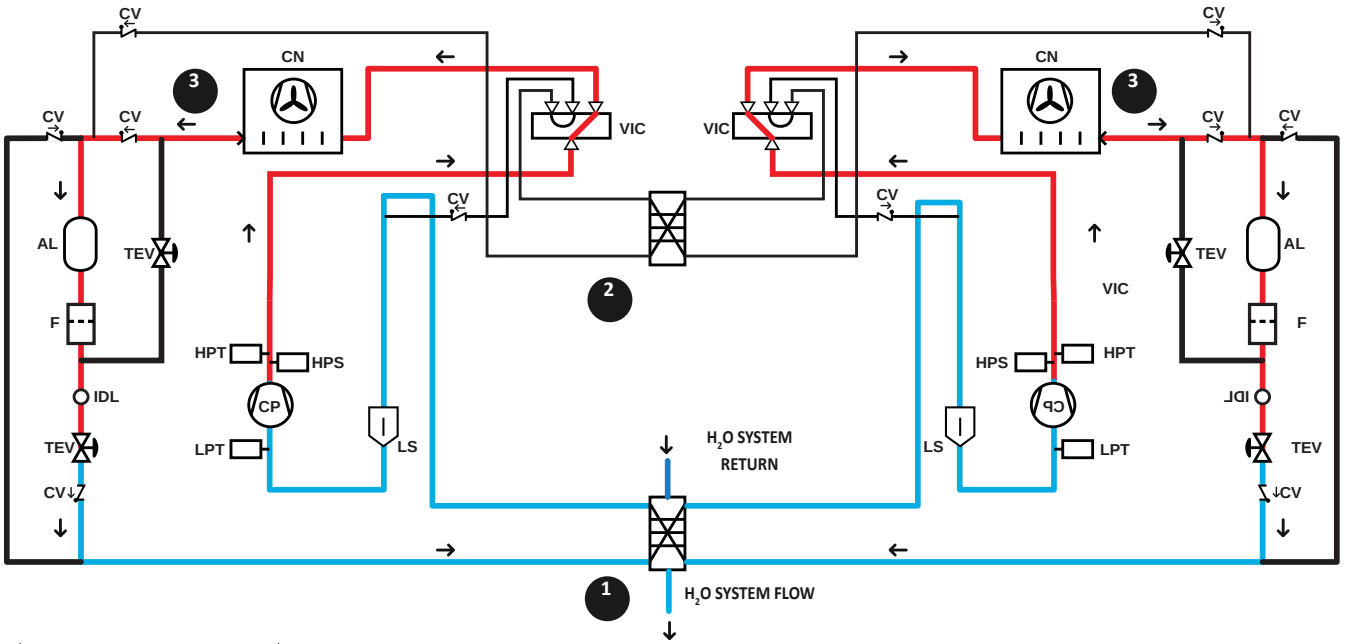


	Description	Operation
2	DHW SIDE heat exchanger	(CONDENSATION) DHW production
3	SOURCE SIDE heat exchanger	(EVAPORATION) Heat exchange with air

	Description	Operation
1	SYSTEM SIDE heat exchanger	(CONDENSATION) Hot water production
3	SYSTEM SIDE heat exchanger	(EVAPORATION) Heat exchange with air

6. BASIC OPERATING LAYOUT FOR 4-PIPE SYSTEM

COLD WATER PRODUCTION ONLY TO SYSTEM

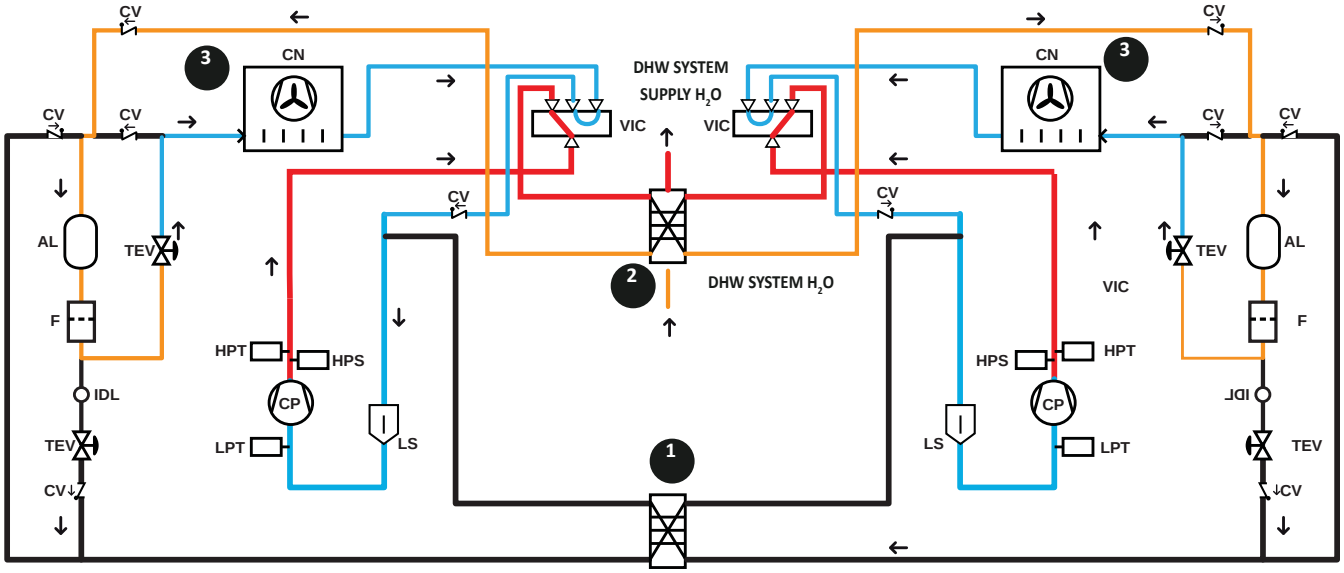


	Description	Operation
1	SYSTEM SIDE heat exchanger	(EVAPORATION) Cold water production
2	DHW SIDE heat exchanger	not running
3	SOURCE SIDE heat exchanger	(CONDENSATION) Heat exchange with air

	Key
1	System side heat exchanger
2	DHW side heat exchanger
3	Source side heat exchanger
AL	Liquid storage tank
CV	One-way valve
F	Dehydrator filter

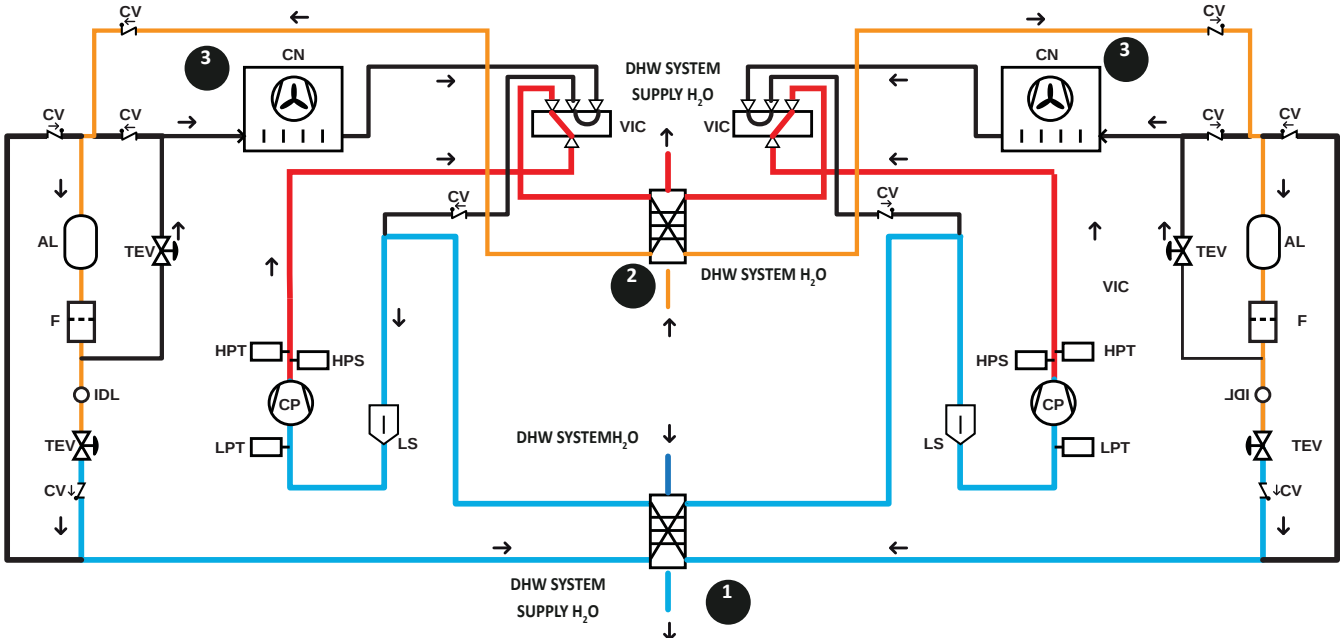
IDL	Liquid indicator
HPT	High pressure transducer
HPS	High pressure switch
LPT	Low pressure transducer
LS	Liquid separator
TEV	Thermostatic valves
VIC	Cycle reversing valves

HOT WATER PRODUCTION ONLY TO SYSTEM



	Description	Operation
1	COOLING SIDE heat exchanger	Not running
2	HEATING SIDE heat exchanger	(CONDENSATION) hot water production
3	SOURCE SIDE heat exchanger	(EVAPORATION) Heat exchange with air

SIMULTANEOUS HOT AND COLD WATER PRODUCTION TO SYSTEM



	Description	Operation
1	COOLING SIDE heat exchanger	(EVAPORATION) Cold water production
2	HEATING SIDE heat exchanger	(CONDENSATION) hot water production
3	SOURCE SIDE heat exchanger	Not running

	Key
1	System side heat exchanger
2	DHW side heat exchanger
3	Source side heat exchanger
AL	Liquid storage tank
CV	One-way valve
F	Dehydrator filter

IDL	Liquid indicator
HPT	High pressure transducer
HPS	High pressure switch
LPT	Low pressure transducer
LS	Liquid separator
TEV	Thermostatic valves
VIC	Cycle reversing valves

7. DESCRIPTION OF COMPONENTS

7.1. STRUCTURE

BASEAND SUPPORT STRUCTURE
Made up from hot galvanised sheet steel elements with suitable thickness. All parts painted with polyester powder paints (RAL 9002), resistant to atmospheric agents.
Realised in a way to allow total accessibility to the components internal components. All panels are covered with sound-absorbent material with suitable thickness.

7.2. COOLING CIRCUIT

COMPRESSOR
Hermetic scroll rotary compressors. All compressors come with casing resistance, electronic thermal protection with centralised manual resetting and two-pole electric motor.

COOLING/HEATING EXCHANGER SYSTEM SIDE
Braze welded AISI 316 steel plate heat exchanger, insulated externally with closed cell neoprene anti-condensation material. When the unit is not running, it is protected against formation of ice inside by an electric resistance.

7.3. WATER FEATURES

PH	6-8
Electric conductivity	Less than 200 mV/cm (25°C)
Chloride ions	Less than 50 ppm
Sulphuric acid ions	Less than 50 ppm
Total iron	Less than 0.3 ppm
Alkalinity M	Less than 50 ppm
Total hardness	Less than 50 ppm
Sulphur ions	None
Ammonia ions	None
Silicone ions	Less than 30 ppm

DHW SIDE HEAT EXCHANGER (2 pipes)
HEATING SIDE SYSTEM (4 pipes)
Braze welded AISI 316 steel plate heat exchanger, insulated externally with closed cell neoprene anti-condensation material. When the unit is not running, it is protected against formation of ice inside by an electric resistance.

AIR SIDE COIL EXCHANGER
Finned pack heat exchanger made with copper pipes and aluminium fins adequately spaced to ensure better heat exchange performance.

CYCLE REVERSING VALVE (2 PIPE)
4-way cycle reversing valve. Inverts the flow of refrigerant gas.

RECOVERY ENABLE VALVE
4-way valve enables the recovery heat exchanger.

LIQUID STORAGE TANK
(always passed by)
Compensates the difference in volume between finned coil and plate exchanger, retaining excess liquid.

LIQUID SEPARATOR
Located on the suction point of the compressor, to protect against any flowback of liquid refrigerant, flooded start-ups, operation in the presence of liquid.

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

ONE WAY VALVES
Allows one-way flow of the refrigerant.

THERMOSTATIC VALVES
Two valves installed:
(cooling mode and recovery mode)
Mechanical valves, with external equaliser positioned at evaporator outlet, modulates the flow of gas to the evaporator, depending on the heat load, in order to ensure a correct heating level of the intake gas.

SOLENOID VALVES
The valve closes when the compressor switches off, blocking the flow of refrigerant gas to the evaporator, recovery and the coil.

INDICATOR FOR LIQUID
Used to check presence of humidity in cooling circuit.

7.4. STANDARD HYDRAULIC CIRCUIT

WATER FILTERS
Equipped with steel filtering mesh, prevents the heat exchangers both of the system side and the DHW/heating system side from clogging.

FLOW SWITCHES
They have the task of controlling that there is water circulation inside the heat exchangers; if this is not the case, they block the unit.

AIR VENT VALVE
Mounted on the top of the hydraulic system; they discharge possible air pockets.

7.4.1. COMPONENTS OF HYDRAULIC CIRCUIT IN CONFIGURABLE VERSIONS

PUMPS
High or low static pressure.

EXPANSION VESSEL
With nitrogen pre-load membrane.

SAFETY VALVE
Equipped with a piped discharger, intervenes by discharging the over pressure in case of anomalous pressures.

SYSTEM STORAGE TANK
Made of steel to reduce heat loss and to eliminate the formation of condensation, insulated by thick polyurethane.

DRAIN TAP

7.5. SAFETY AND CONTROL COMPONENTS

MANUALLY RESET HIGH PRESSURE SWITCH
With fixed calibration, placed on high pressure side of cooling circuit, inhibits functioning of compressor if abnormal work pressure occurs.

LOW PRESSURE TRANSDUCER
Placed on the low pressure side of the cooling circuit, it signals the work pressure to the control board generating a pre-warning in the case of anomalous pressures.

HIGH PRESSURE TRANSDUCER
Placed on the high pressure side of the cooling circuit, it signals the work pressure to the control board generating a pre-warning in the case of anomalous pressures.

RELIEF VALVES
They intervene by discharging the overpressure in the case of anomalous pressures.
- Calibrated at 45 bar on HP branch.
- Calibrated at 30 bar on LP branch.

CONDENSATION PRESSURE CONTROLLER
This device allows correct functioning with external temperatures lower than 10°C and as low as – 10°C.
It consists of an adjustment circuit board that varies the number of fan revs according to the condensation pressure read by the high pressure transducer, in order to keep it sufficiently high for correct unit functioning.
It also allows correct functioning in heating mode with external temperatures exceeding 30°C and up to 42°C.

7.6. ELECTRIC CONTROL AND POWER BOARD

Electric board in compliance with standards UL1995, EN 60204-1/IEC 204-1, complete with:
- transformer for the control circuit,
- door lock main isolating switch,
- fuses and contactors for compressors and fans,
- terminals for REMOTE PANEL,
- spring type control circuit terminal board,
- outdoor electric board with double door and gaskets,
- electronic controller,
- evaporator pump and recovery pump control consent relay (only for versions without pump units),
- all numbered cables.

DOOR-LOCK ISOLATING SWITCH
The electric control board can be accessed by removing the voltage. Act on the opening lever of the control board itself. This lever can be locked using one or more padlocks during maintenance interventions to prevent the machine being powered up accidentally.

CONTROL BOARD
1. Allows the complete control of the appliance. For a more in-depth description please refer to the user manual.valve and ON/OFF pumps.
2. Production of DHW through a 3-way diverter valve or the total recovery version.

Additional functions:
- Control of an external integration resource dedicated to DHW.

ATTENTION
For questions of space, in configurations with storage tank and built-in pump/s on the system side, no pumps can be available on the recovery side!

8. ACCESSORIES

8.1. MECHANICAL ACCESSORIES

AVX ANTI-VIBRATION MOUNTS
Group of anti-vibration mounts.

GP PROTECTION GRIDS
Protect the external coil from blows and prevent access to the underlying area where the compressors and the chiller circuit are housed. Every kit includes two grids.

TRX1
The storage tanks with holes and integrative resistances are delivered from the factory with plastic protective caps.
Before the system is loaded, the plastic caps must be replaced with the specific TRX1 if installation of one or all the resistances is not foreseen.

8.2. ELECTRIC ACCESSORIES

AER485P1
RS-485 interface for supervising systems with MODBUS protocol.

AERWEB300
Accessory AERWEB allows remote control of a chiller through a common PC and an ethernet connection over a common browser; 4 versions available:
AERWEB300-6: Web server to monitor and remote control max. 6 units in RS485 network;
AERWEB300-18: Web server to monitor and remote control max. 18 units in RS485 network;
AERWEB300-6G: Web server to monitor and remote control max. 6 units in RS485 network with integrated GPRS modem;
AERWEB300-18G: Web server to monitor and remote control max. 18 units in RS485 network with integrated GPRS modem;

PGD1
Graphical display, which allows complete management of the unit like the one on board the machine. Can be controlled up to 50 m away with a telephone cable, 200 m with a shielded AWG 24 cable.

RIF
Current rephaser. Connected in parallel to the motor, it allows a reduction of the input current (approx. 10%). It can only be installed in the factory and so must be requested on ordering.

NRP	VERSION	0800	0900	1000	1250	1400	1500	1650	1800
MECHANICAL ACCESSORIES									
AVX	00	704	710	716	719	725	730	734	737
	P1-P2-P3-P4 R1-R2-R3-R4	706	712	712	721	727	732	736	736
GP	A	GP260	GP260	GP260	GP350	GP350	GP350	GP500	GP500
ELECTRIC ACCESSORIES									
DRE	ALL	801	901	1001	1251	1401	1501	1651	1801
RIF *	ALL	•	•	•	•	•	•	•	•
AER485P1	ALL	•	•	•	•	•	•	•	•
PGD1	ALL	•	•	•	•	•	•	•	•
AERWEB300-6	ALL	•	•	•	•	•	•	•	•
AERWEB300-18	ALL	•	•	•	•	•	•	•	•
AERWEB300-6G	ALL	•	•	•	•	•	•	•	•
AERWEB300-18G	ALL	•	•	•	•	•	•	•	•

*** Please contact us.**

9. TECHNICAL DATA

Model			0800	0900	1000	1250	1400	1500	1650	1800
① **COOLING MODE**										
Cooling capacity	**A**	ton	51,71	58,45	65,31	82,72	94,63	106,64	113,01	120,35
Input power	**A**	kW	64,11	73,01	81,91	102,49	117,53	132,42	141,29	151,41
Water flow rate	**A**	gpm	123,84	139,98	156,42	198,11	226,65	255,4	270,65	288,24
Total pressure drops SYSTEM SIDE	**A**	PSI	3,92	4,35	3,19	3,48	3,63	4,06	4,06	4,21
Available static pressure Low static pressure pump	A	PSI	21,40	19,95	20,03	18,75	23,11	19,63	21,52	20,31
Available static pressure High static pressure pump	A	PSI	38,73	37,16	37,04	34,89	41,80	37,56	43,57	42,41
② **HEATING MODE**										
Heating capacity	**A**	BTU/h	738278	830351	928369	1178567	1338583	1498599	1594589	1689276
Input power	**A**	kW	70,91	79,71	87,11	111,92	126,32	140,72	149,92	158,92
Water flow rate	**A**	gpm	163,85	184,29	206,04	261,57	297,09	332,60	353,90	374,92
Pressure drops SYSTEM SIDE VERS. 2 PIPES	**A**	PSI	16,37	13,89	13,69	10,67	12,95	7,43	13,42	11,61
Pressure drops DHW SIDE/SYSTEM SIDE [1]	**A**	PSI	33,26	30,37	29,62	24,82	29,56	22,62	35,70	33,91
ENERGY INDEX										
EER	**A**	BTU/W	9,70	9,63	9,56	9,70	9,67	9,67	9,60	9,56
COP	**A**	W/W	3,05	3,05	3,12	3,09	3,11	3,12	3,12	3,12

1 **DHW SIDE/SYSTEM SIDE**

DHW side, production of domestic hot water, in 2-pipe systems.
System side, production of hot water, in 4-pipe systems.

① **COOLING CONDITIONS: AHRI STANDARD**

System water outlet	6,7°C - 44,06°F
System water flow	0,043 l/s per kW
External air temperature	35°C - 95°F

② **HEATING CONDITIONS:**

DHW / System water inlet	40°C - 104°F
DHW / System water outlet	45°C - 113°F
External air temperature d.b./w.b.	7/6°C - 44,6°F/42,8

Model			0800	0900	1000	1250	1400	1500	1650	1800
③ **TOTAL RECOVERY MODE**										
Cooling capacity	**A**	ton	46,30	52,52	59,73	74,36	85,93	97,29	104,49	111,54
Recovered capacity	**A**	ton	62,34	70,97	80,20	100,51	116,02	131,32	141,12	150,76
Total input power	**A**	kW	59,40	68,30	75,80	96,80	111,40	126,00	135,60	145,20
TER - Total Efficiency Ratio	-	W/W	6,43	6,36	6,49	6,35	6,38	6,38	6,37	6,35
Water flow rate Evaporator	A	gpm	110,97	125,89	143,16	178,23	205,97	233,19	250,47	267,35
Evaporator pressure drops SYSTEM SIDE	A	PSI	3,43	3,89	3,03	3,16	3,55	4,06	4,19	4,36
Recovery water flow rate	A	gpm	166,04	189,01	213,60	267,68	309,01	349,76	375,85	401,52
Recovery pressure drops DHW SIDE/SYSTEM SIDE [1]	A	PSI	5,63	6,35	3,90	5,24	5,76	6,49	6,61	6,81
TOTAL RECOVERY MODE - SYSTEM SIDE PUMP										
Available static pressure Low static pressure pump	A	PSI	22,8	21,7	21,5	20,9	25,7	22,7	23,3	22,2
Available static pressure High static pressure pump	A	PSI	40,2	39,0	38,7	37,5	44,9	41,3	45,3	44,3
TOTAL RECOVERY MODE - DHW / SYSTEM SIDE PUMP										
Available static pressure Low static pressure pump	A	PSI	23,4	20,4	19,8	20,5	17,2	13,3	17,6	15,2
Available static pressure High static pressure pump	A	PSI	33,0	29,5	28,4	42,6	39,4	35,5	33,2	30,6

1 **DHW SIDE/SYSTEM SIDE**

DHW side, production of domestic hot water, in 2-pipe systems.
System side, production of hot water, in 4-pipe systems.

③ **TOTAL RECOVERY CONDITIONS:**

System heat exchanger

Water outlet	6,7°C / 44,06°F
Water flow	0,043 l/s per kW

DHW / System heat exchanger

Water inlet	40°C / 104°F
Water outlet	45°C / 113°F

Model			0800	0900	1000	1250	1400	1500	1650	1800
ELECTRICAL DATA: 230V-3-60HZ POWER SUPPLY										
Input current (cooling mode)		A	245	-	-	-	-	-	-	-
Input current (total recovery mode)		A	219	-	-	-	-	-	-	-
Input current (heating mode)		A	264	-	-	-	-	-	-	-
NO PUMP VERSION										
LRA		A	571	-	-	-	-	-	-	-
MCA		A	309	-	-	-	-	-	-	-
MOP		A	371	-	-	-	-	-	-	-
Recommended fuse		A	350	-	-	-	-	-	-	-
SYSTEM + DHW/SYSTEM LOW HEAD PUMPS										
LRA		A	595	-	-	-	-	-	-	-
MCA		A	332	-	-	-	-	-	-	-
MOP		A	394	-	-	-	-	-	-	-
Recommended fuse		A	350	-	-	-	-	-	-	-
SYSTEM + DHW/SYSTEM HIGH HEAD PUMPS										
LRA		A	608	-	-	-	-	-	-	-
MCA		A	346	-	-	-	-	-	-	-
MOP		A	408	-	-	-	-	-	-	-
Recommended fuse		A	400	-	-	-	-	-	-	-
ELECTRICAL DATA: 460V-3-60HZ POWER SUPPLY										
Input current (cooling mode)		A	114	121	129	162	184	206	223	240
Input current (total recovery mode)		A	99	106	112	142	162	183	198	212
Input current (heating mode)		A	122	130	135	173	193	213	227	242
NO PUMP VERSION										
LRA		A	294	344	355	448	500	528	546	541
MCA		A	151	162	172	234	266	294	312	328
MOP		A	181	196	206	281	326	354	373	374
Recommended fuse		A	175	175	200	250	300	350	350	350
SYSTEM + DHW/SYSTEM LOW HEAD PUMPS										
LRA		A	305	356	366	462	516	544	567	561
MCA		A	163	173	184	248	281	309	333	348
MOP		A	192	207	218	295	342	370	393	394
Recommended fuse		A	175	200	200	250	300	350	350	350
SYSTEM + DHW/SYSTEM HIGH HEAD PUMPS										
LRA		A	312	363	373	468	522	550	581	576
MCA		A	170	180	190	254	288	316	347	362
MOP		A	199	214	224	301	348	376	408	409
Recommended fuse		A	175	200	200	300	300	350	400	400
ELECTRICAL DATA: 575V-3-60HZ POWER SUPPLY										
Input current (cooling mode)		A	88	94	100	126	143	160	173	186
Input current (total recovery mode)		A	37	82	86	109	125	141	152	164
Input current (heating mode)		A	95	100	105	134	149	165	176	187
NO PUMP VERSION										
LRA		A	233	282	285	383	400	432	439	460
MCA		A	134	136	139	193	230	262	268	270
MOP		A	160	164	166	232	285	317	323	309
Recommended fuse		A	150	150	150	225	250	300	300	300
SYSTEM + DHW/SYSTEM LOW HEAD PUMPS										
LRA		A	242	291	294	394	413	445	455	476
MCA		A	143	145	148	204	242	275	285	287
MOP		A	170	173	176	243	297	330	340	325
Recommended fuse		A	150	150	175	225	250	300	300	300
SYSTEM + DHW/SYSTEM HIGH HEAD PUMPS										
LRA		A	248	297	299	399	417	450	466	488
MCA		A	149	151	154	209	247	280	296	298
MOP		A	175	178	181	248	302	335	351	337
Recommended fuse		A	175	175	175	225	300	300	350	300

Model			0800	0900	1000	1250	1400	1500	1650	1800
CHARGE										
Refrigerant R410A (circuit C1)	-	lb	120,6	121,5	122,8	180,6	180,6	187,4	187,4	187,4
Refrigerant R410A (circuit C2)	-	lb	120,6	121,5	122,8	180,6	180,6	187,4	187,4	187,4
Oil (circuit C1)	-	dm^3	6,8	6,8	9,4	13,6	13,6	12,6	12,6	20,4
Oil (circuit C2)	-	dm^3	6,8	9,4	9,4	13,6	12,6	12,6	20,4	20,4
COMPRESSORS										
Quantity / Circuits	-	n°/n°	4 / 2	4 / 2	4 / 2	4 / 2	4 / 2	4 / 2	5 / 2	6 / 2
Capacity control	-									
EC INVERTER FANS										
Quantity	-	n°	6	6	6	8	8	8	8	8
Air flow	-	m^3/h	134000	134000	134000	180000	180000	180000	180000	180000
Input power (230V)	-	kW	14,40	14,40	14,40	19,20	19,20	19,20	19,20	19,20
Input power (460/575V)	-	kW	15,36	15,36	15,36	20,48	20,48	20,48	20,48	20,48
Input current (230V)	-	A	45,0	45,0	45,0	60,0	60,0	60,0	60,0	60,0
Input current (460V)	-	A	23,4	23,4	23,4	31,2	31,2	31,2	31,2	31,2
Input current (575V)	-	A	18,7	18,7	18,7	25,0	25,0	25,0	25,0	25,0
SYSTEM SIDE HEAT EXCHANGER										
Quantity	-	n°	1	1	1	1	1	1	1	1
Water content	-	dm^3	20,0	22,5	30,2	32,9	37,4	41,0	45,5	50,0
Water connections	-	inch	3"	3"	3"	4"	4"	4"	4"	4"
SYSTEM SIDE (2 AND 4 PIPES) - HYDRONIC KIT										
EXPANSION VESSEL										
Quantity expansion vessel	-	n°	2	2	2	2	2	2	2	2
Content expansion vessel	-	gal	25	25	25	25	25	25	25	25
Expansion vessel calibration	-	PSI	1,5	1,5	1,5	1,5	1,5	1,5	1,5	1,5
LOW STATIC HEAD PUMP										
Input power	-	kW	3,0	3,0	3,0	3,0	4,0	4,0	5,5	5,5
Input current (230V)	-	A	10,0	-	-	-	-	-	-	-
Input current (460V)	-	A	5,0	5,0	5,0	5,0	6,6	6,6	9,2	9,2
Input current (575V)	-	A	4,0	4,0	4,0	4,0	5,3	5,3	7,4	7,4
HIGH STATIC HEAD PUMP										
Input power	-	kW	5,5	5,5	5,5	5,5	7,5	7,5	11,0	11,0
Input current (230V)	-	A	18,4	-	-	-	-	-	-	-
Input current (460V)	-	A	9,2	9,2	9,2	9,2	11,0	11,0	17,3	17,3
Input current (575V)	-	A	7,4	7,4	7,4	7,4	8,8	8,8	13,8	13,8
SAFETY VALVE										
Safety valve	-	n°	1	1	1	1	1	1	1	1
Safety valve	-	PSI	87,0	87,0	87,0	87,0	87,0	87,0	87,0	87,0

Model			0800	0900	1000	1250	1400	1500	1650	1800
DHW / SYSTEM SIDE HEAT EXCHANGER										
Quantity	-	n°	1	1	1	1	1	1	1	1
Total water content	-	dm^3	20,0	22,5	30,2	32,9	37,4	41,0	45,5	50,0
Water connections	-	inch	3"	3"	3"	4"	4"	4"	4"	4"
DHW SIDE (2 PIPES) / SYSTEM SIDE (4 PIPES) - HYDRONIC KIT										
EXPANSION VESSEL										
Expansion vessel	-	n°	2	2	2	2	2	2	2	2
Expansion vessel	-	gal	6,6	6,6	6,6	6,6	6,6	6,6	6,6	6,6
Expansion vessel calibration	-	PSI	21,7	21,7	21,7	21,7	21,7	21,7	21,7	21,7
LOW STATIC HEAD PUMP										
Input power	-	kW	4,0	4,0	4,0	5,5	5,5	5,5	7,5	7,5
Input current (230V)	-	A	13,2	-	-	-	-	-	-	-
Input current (460V)	-	A	6,6	6,6	6,6	9,2	9,2	9,2	11,0	11,0
Input current (575V)	-	A	5,3	5,3	5,3	7,4	7,4	7,4	8,8	8,8
HIGH STATIC HEAD PUMP										
Input power	-	kW	5,5	5,5	5,5	7,5	7,5	7,5	11,0	11,0
Input current (230V)	-	A	18,4	-	-	-	-	-	-	-
Input current (460V)	-	A	9,2	9,2	9,2	11,0	11,0	11,0	17,3	17,3
Input current (575V)	-	A	7,4	7,4	7,4	8,8	8,8	8,8	13,8	13,8
SOUND DATA (COOLING MODE)										
Sound power	A	dB	89	92	93	94	95	96	96	96
Sound pressure	A	dB	57	60	61	62	63	64	64	64
DIMENSIONS - WEIGHT										
Height	-	inch	96,5	96,5	96,5	96,5	96,5	96,5	96,5	96,5
Width	-	inch	86,6	86,6	86,6	86,6	86,6	86,6	86,6	86,6
Lenght	-	inch	167,3	167,3	167,3	226,4	226,4	226,4	226,4	226,4
Weight (empty unit)	-	lb	5357,2	5754,1	6327,3	7782,3	8024,8	8201,2	8598,0	8994,9

SOUND POWER
Aermec determines sound power values on the basis of measurements made in accordance with UNI EN ISO 9614-2, as required for Eurovent certification.

SOUND PRESSURE
Sound pressure in free field, at 10m / 32,8ft distance from the external surface of the unit (in accordance with UNI EN ISO 3744).

10. OPERATIONAL LIMITS

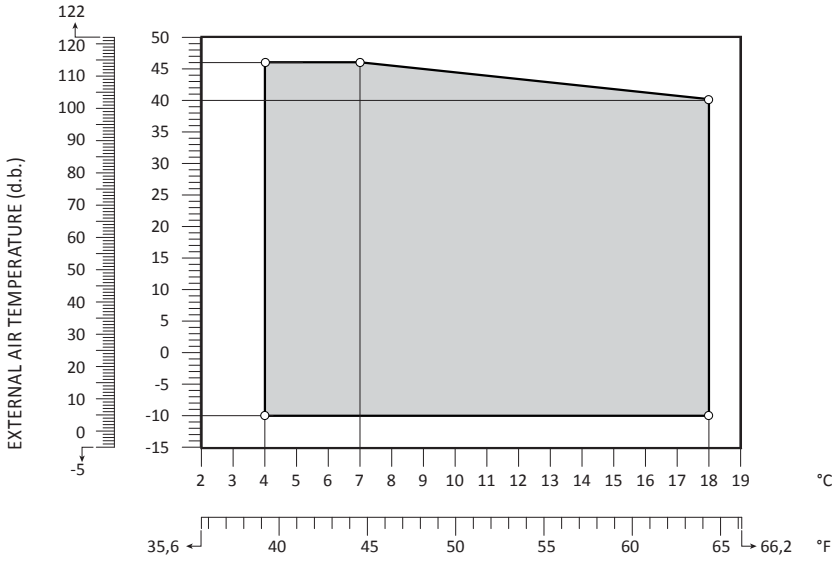
10.1. COOLING MODE

The units, in standard configuration, are not suitable for installation in salty environments.
For functioning limits, please refer to the diagrams, valid for Δt 5°C/10°F.

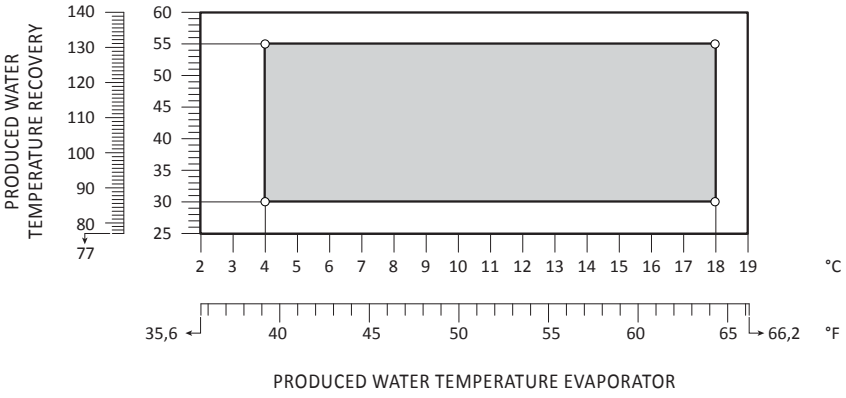
In summer mode, the unit can be started with external air 46°C/114,8°F and inlet water 35°C/95°F. In winter and RECOVERY mode, the unit can be started with external air -15°C/5°F and inlet water 20°C/68°F.
In these conditions, operation is only allowed for a short amount of time and to bring the system to the proper temperature.
To shorten this operation, it is recommended to install a three-way valve which makes it possible to bypass the water from the utilities to the plant, until achieving conditions which allow the unit to work within the allowed operating limits.

ATTENTION
In windy areas, for correct operation of condensing control it is recommended to install a windbreak barrier.
It should be installed if wind velocity is beyond 2,5 m/s.

COOLING MODE

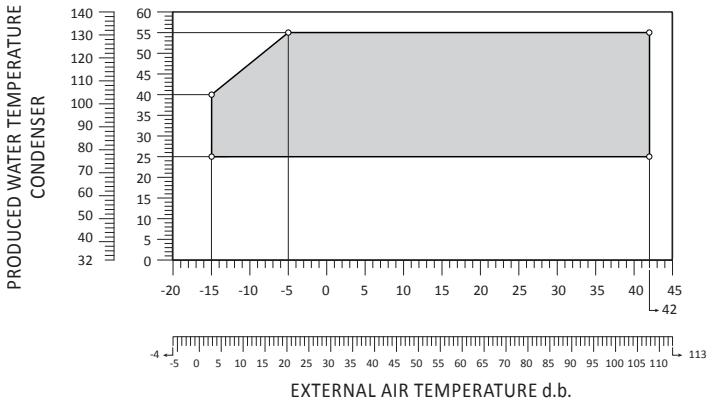


CHILLER + TOTAL RECOVERY



10.2. HEATING MODE

In summer mode, the unit can be started with external air 46°C/114,8°F and inlet water 35°C/95°F. In winter and RECOVERY mode, the unit can be started with external air -15°C/5°F and inlet water 20°C/68°F.
In these conditions, operation is only allowed for a short amount of time and to bring the system to the proper temperature.
To shorten this operation, it is recommended to install a three-way valve which makes it possible to bypass the water from the utilities to the plant, until achieving conditions which allow the unit to work within the allowed operating limits.



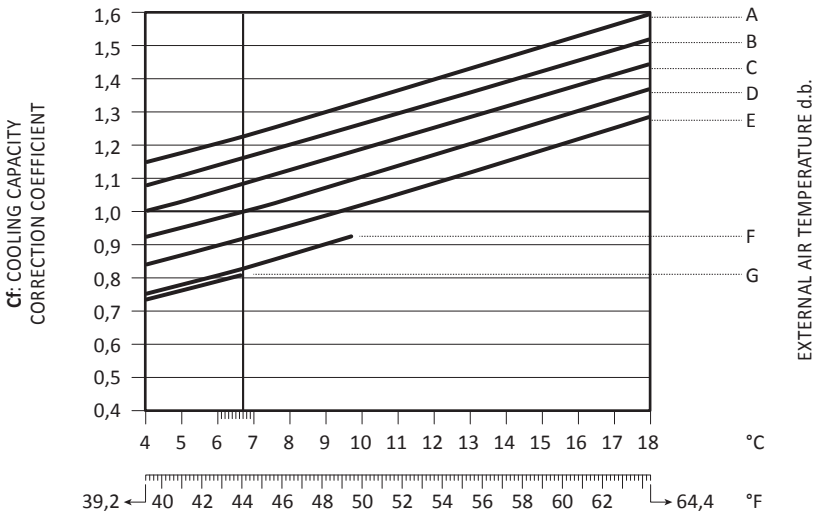
11. CORRECTIVE FACTORS FOR DATA DIFFERENT THAN NOMINAL IN COOLING MODE

11.1. COOLING CAPACITY AND INPUT POWER

The refrigerating capacity yielded and the input electrical capacity in conditions other than rated conditions are obtained by multiplying the rated values (Pc, Pa) by the respective correction coefficients (Cf, Ca).
The diagram allows you to obtain the correction coefficients; corresponding to each curve, the temperature of the cold processed water referred to is reported, assuming a difference in water temperature between the input and output of the condenser equal to 5°C/10°F.

KEY:
Pc: Cooling capacity
Pa: Input power
Cf: Cooling capacity correction coefficient
Ca: Input power correction coefficient

Pc: COOLING CAPACITY



		A	B	C	D	E	F	G
Condenser utput water temeprature	°C	20	25	30	35	40	45	46
	°F	68	77	86	95	104	113	114,8

11.2. FOR ΔT DIFFERENT FROM THE RATED VALUE

For Δt different from 5K, refer to Tab.
"**Δt DIFFERENT FROM NOMINAL (Δt 5)**" for the cooling capacity and input power correction factors.

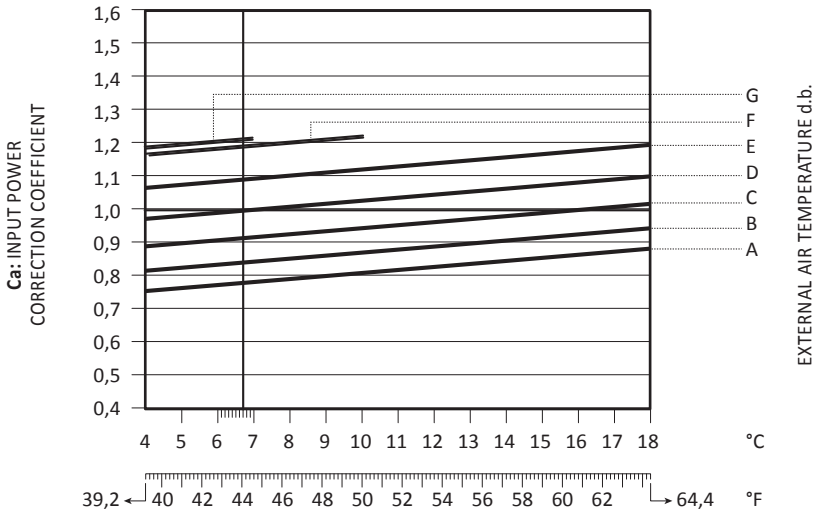
Δt DIFFERENT FROM NOMINAL (Δt 5)				
	3	**5**	**8**	**10**
Cooling capacity	0,99	1	1,02	1,03
Input power	0,99	1	1,01	1,02

11.3. FOULING FACTORS

The performance levels indicated in table: "**FOULING FACTOR [K*M²]/[W]"** refer to conditions with clean tubes, with a fouling factor = 1. For values different from the fouling factor, multiply the values in the performance table by the reported coefficients.

FOULING FACTOR [K*M2]/[KW] correction factors			
	0,018	**0,05**	**0,1**
Cooling capacity	1	0,987	0,967
Input power	1	0,987	0,967

Pa: TOTAL INPUT POWER



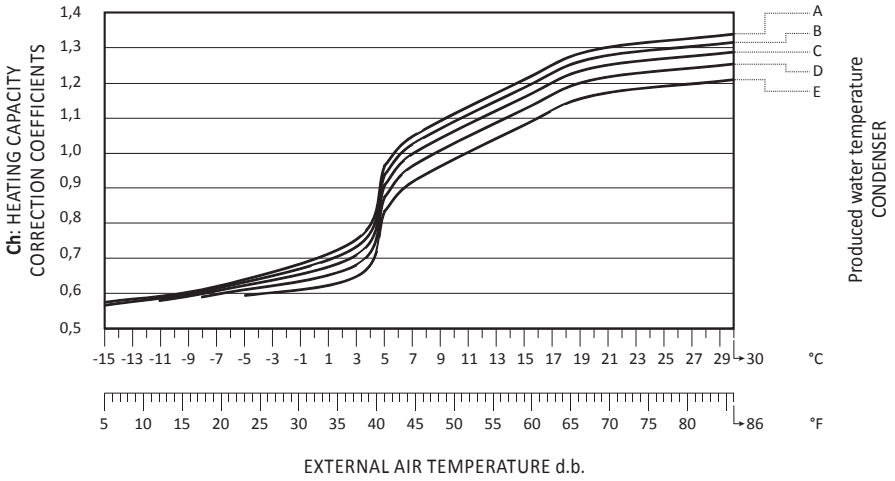
		A	B	C	D	E	F	G
Condenser utput water temeprature	°C	20	25	30	35	40	45	46
	°F	68	77	86	95	104	113	114,8

11.4. HEATING CAPACITY AND INPUT POWER

The heating capacity yielded and the input electrical capacity in conditions other than rated conditions are obtained by multiplying the rated values (Ph, Pa) by the respective correction coefficients (Ch, Ca).
The diagram allows you to obtain the correction coefficients; corresponding to each curve, the temperature of the hot processed water referred to is reported, assuming a difference in water temperature between the input and output of the condenser equal to 5°C/10°F.

KEY:
Ph: Heating capacity
Pa: Input power
Ch: Heating capacity correction coefficient
Ca: Input power correction coefficient

Ph: HEATING CAPACITY



		A	B	C	D	E
Condenser utput water temeprature	°C	**35**	40	45	50	55
	°F	**95**	104	113	122	131

11.5. FOR ΔT DIFFERENT FROM THE RATED VALUE

For Δt different from 5K, refer to Tab. "**Δt DIFFERENT FROM NOMINAL (Δt 5)**" for the cooling capacity and input power correction factors.

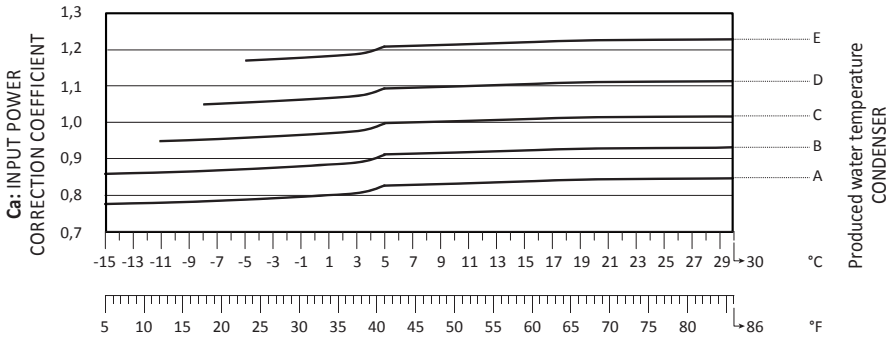
Δt DIFFERENT FROM NOMINAL (Δt 5)				
	3	**5**	**8**	**10**
Heating capacity	0,99	1	1,01	1,02
Input power	1,01	1	0,98	0,96

11.6. FOULING FACTORS

The performance levels indicated in table: "**FOULING FACTOR [K*M²]/[W]**" refer to conditions with clean tubes, with a fouling factor = 1. For values different from the fouling factor, multiply the values in the performance table by the reported coefficients.

FOULING FACTOR [K*M2]/[KW] correction factors			
	0,018	**0,05**	**0,1**
Cooling capacity	1	0,987	0,967
Input power	1	0,987	0,967

Pa: TOTAL INPUT POWER

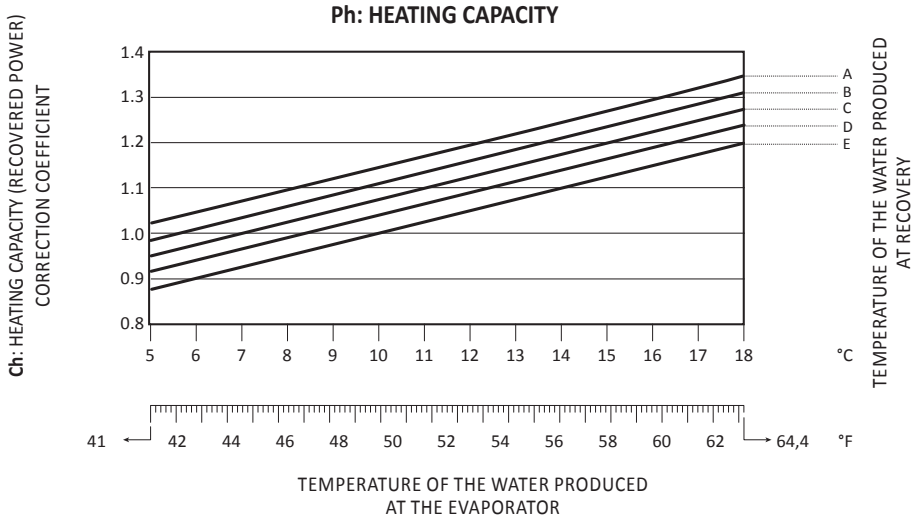


		A	B	C	D	E
Condenser utput water temeprature	°C	**35**	40	45	50	55
	°F	**95**	104	113	122	131

11.7. CORRECTIVE COEFFICIENTS OF RECOVERED HEATING CAPACITY

The refrigerating capacity yielded and the input electrical capacity in conditions other than rated conditions are obtained by multiplying the rated values (Pc, Pa) by the respective correction coefficients (Cf, Ca).
The diagram allows you to obtain the correction coefficients; corresponding to each curve, the temperature of the hot processed water referred to is reported, assuming a difference in water temperature between the input and output of the condenser equal to 5°C/10°F.

KEY:
Ph: Heating capacity
Pa: Input power
Ch: Heating capacity correction coefficient
Ca: Input power correction coefficient



11.8. FOR ΔT DIFFERENT FROM THE RATED VALUE

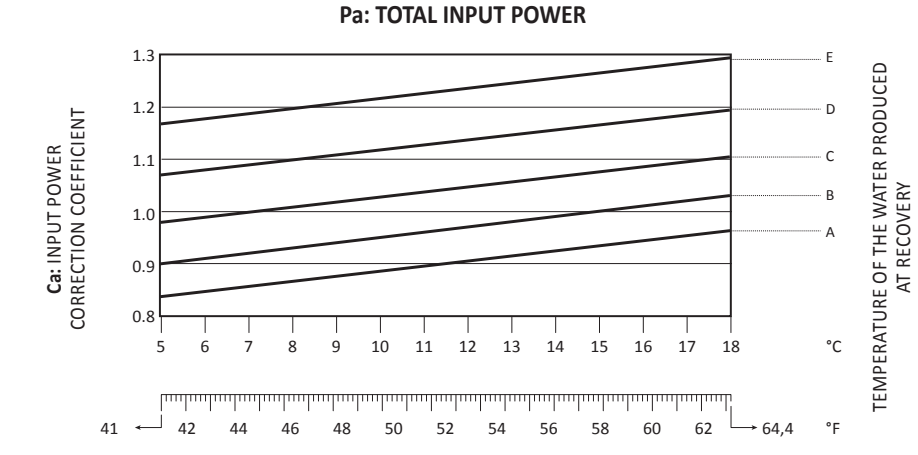
For Δt different from 5K, refer to Tab.
"**Δt DIFFERENT FROM NOMINAL (Δt 5)**" for the cooling capacity and input power correction factors.

		A	B	C	D	E
Condenser utput water temeprature	°C	35	40	45	50	55
	°F	95	104	113	122	131

FOULING FACTOR [K*M2]/[KW] correction factors			
	0,018	**0,05**	**0,1**
Cooling capacity	1	0,987	0,967
Input power	1	0,987	0,967

11.9. FOULING FACTORS

The performance levels indicated in table: "**FOULING FACTOR [K*M²]/[W]"** refer to conditions with clean tubes, with a fouling factor = 1. For values different from the fouling factor, multiply the values in the performance table by the reported coefficients.

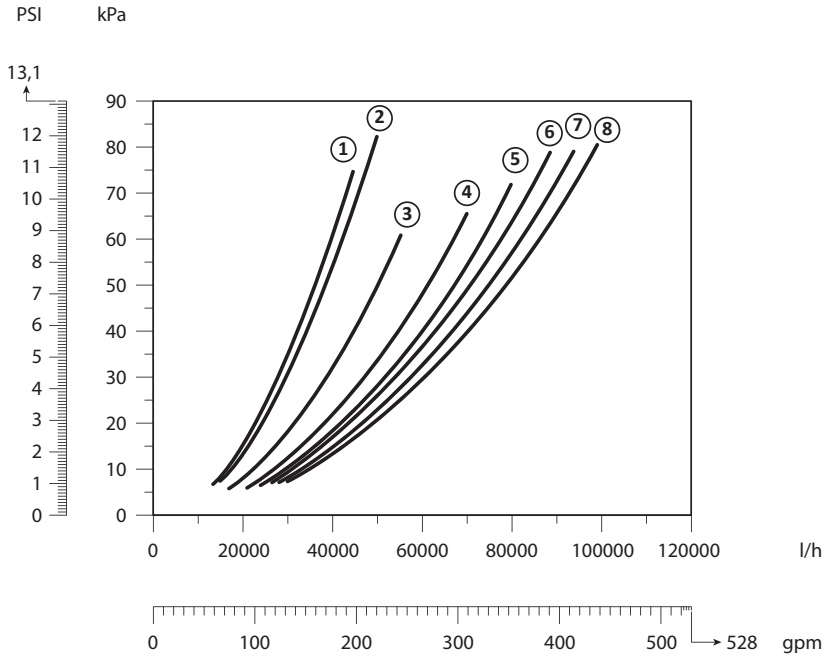


		A	B	C	D	E
Condenser utput water temeprature	°C	**35**	40	45	50	55
	°F	**95**	104	113	122	131

FOULING FACTOR [K*M2]/[KW] correction factors			
	0,018	**0,05**	**0,1**
Cooling capacity	1	0,987	0,967
Input power	1	0,987	0,967

12. PRESSURE DROP

SYSTEM SIDE (EV) PRESSURE DROP COOLING MODE FUNCTIONING (2/4 PIPES)
The diagram pressure drop are related to an average water temperature of 10°C/50°F



Key:

NRP	
①	0800
②	0900
③	1000
④	1250
⑤	1400
⑥	1500
⑦	1650
⑧	1800

Evaporator inlet water temperature	7°C/44,6°F
Evaporator outlet water temperature	12°C/53,6°F
External air temperature	35°C/95°F
Average water temperature	10°C/50°F

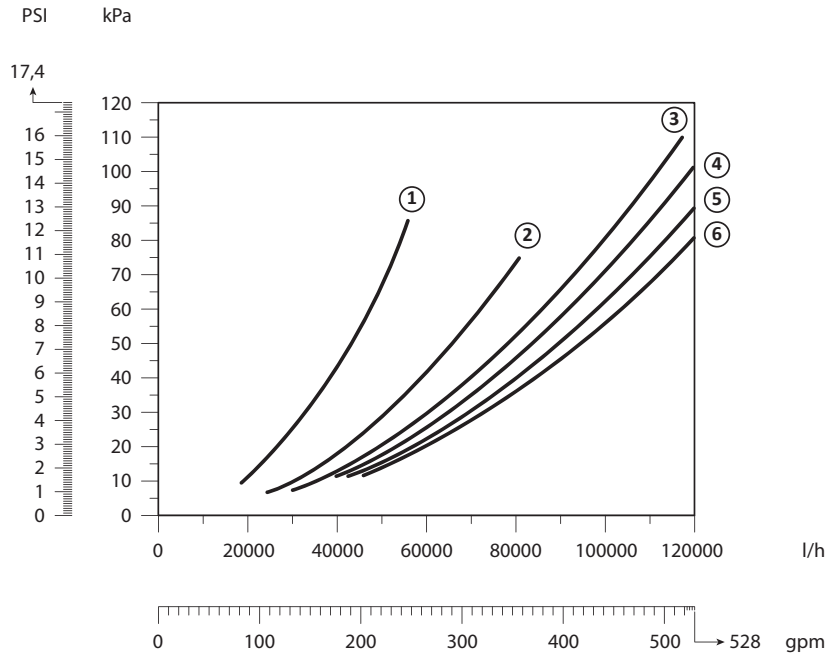
For temperatures other than 10°C/50°F, use the corrective factors table.

CORRECTIVE FACTORS TABLE - EVAPORATOR							
Average water temperature (°C / °F)	5/41	**10/50**	15/59	20/68	30/86	40/104	50/122
Multiplicative coefficients	1,02	**1,00**	0,98	0,97	0,95	0,93	0,91

Water flow rate MIN e MAX

NRP			
Model	u.m.	MIN	MAX
NRP 0800 A	gpm	59,02	196,73
NRP 0900 A	gpm	66,08	220,28
NRP 1000 A	gpm	74,50	243,84
NRP 1250 A	gpm	92,65	308,83
NRP 1400 A	gpm	105,02	350,05
NRP 1500 A	gpm	117,25	390,84
NRP 1650 A	gpm	124,25	414,17
NRP 1800 A	gpm	131,12	437,07

RECOVERY MODE WITH DHW SIDE (2 PIPES) HOT WATER PRODUCTION SYSTEM SIDE (4 PIPES)
The diagram pressure drop are related to an average water temperature of 43°C/109,4°F



Key:

NRP	
①	0800-0900
②	1000-1250
③	1400
④	1500
⑤	1650
⑥	1800

Recovery inlet water temperature	40°C/104°F
Recovery outlet water temperature	45°C /113°F
Average water temperature	43°C/109,4°F

For temperatures other than 43°C/109,4°F, use the corrective factors table.

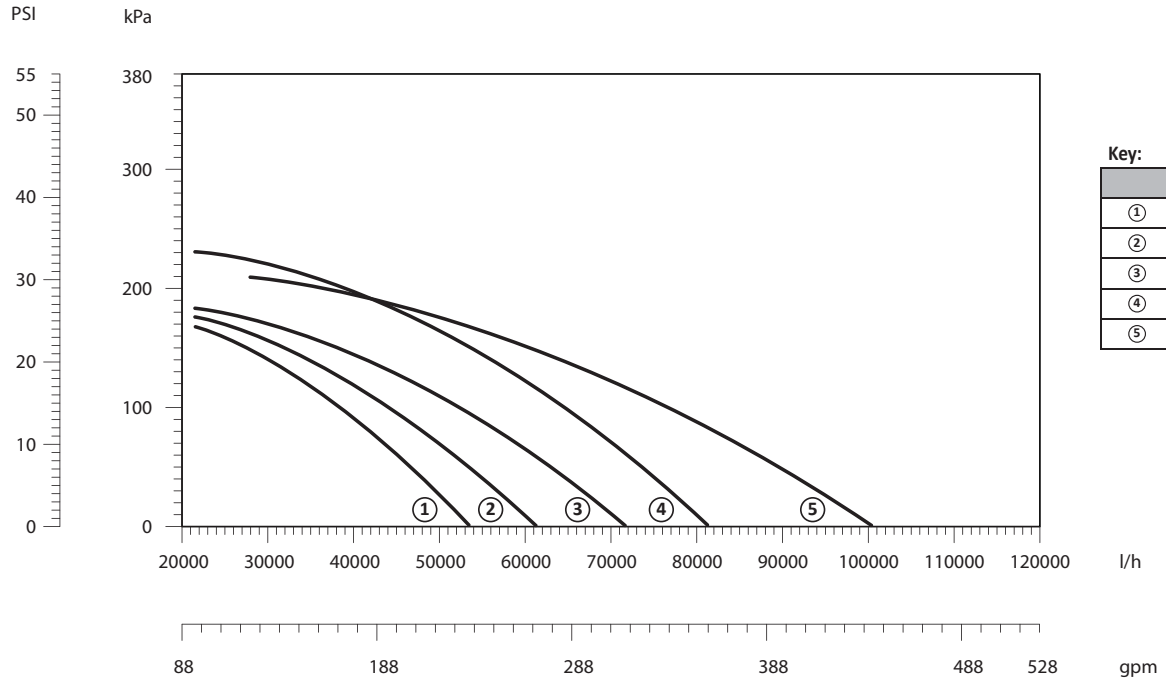
CORRECTIVE FACTORS TABLE - EVAPORATOR								
Average water temperature (°C / °F)	23/73,4	**28/82,4**	33/91,4	38/100,4	43/109,4	48/118,4	53/127,4	58/136,4
Multiplicative coefficients	1,04	**1,03**	1,02	1,01	1,00	0,99	0,98	0,97

Water flow rate MIN e MAX

NRP			
Model	u.m.	MIN	MAX
NRP 0800 A	gpm	83,02	245,68
NRP 0900 A	gpm	94,51	245,68
NRP 1000 A	gpm	106,80	356,00
NRP 1250 A	gpm	133,84	446,13
NRP 1400 A	gpm	154,50	515,01
NRP 1500 A	gpm	174,88	528,34
NRP 1650 A	gpm	187,93	528,34
NRP 1800 A	gpm	200,76	528,34

13. USEFUL STATIC PRESSURES 2|4 PIPE SYSTEM

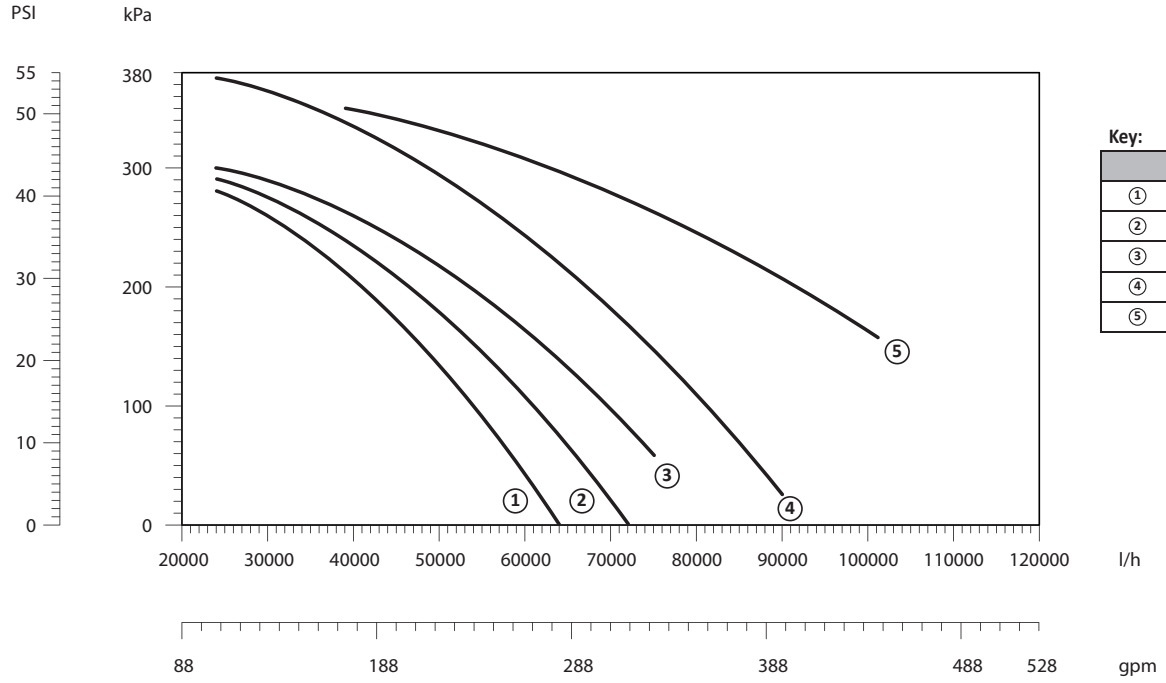
13.1. LOW STATIC PRESSURE PUMPS IN COOLING MODE - SYSTEM SIDE



Key:

	NRP
①	0800-0900
②	1000
③	1250
④	1400-1500
⑤	1800

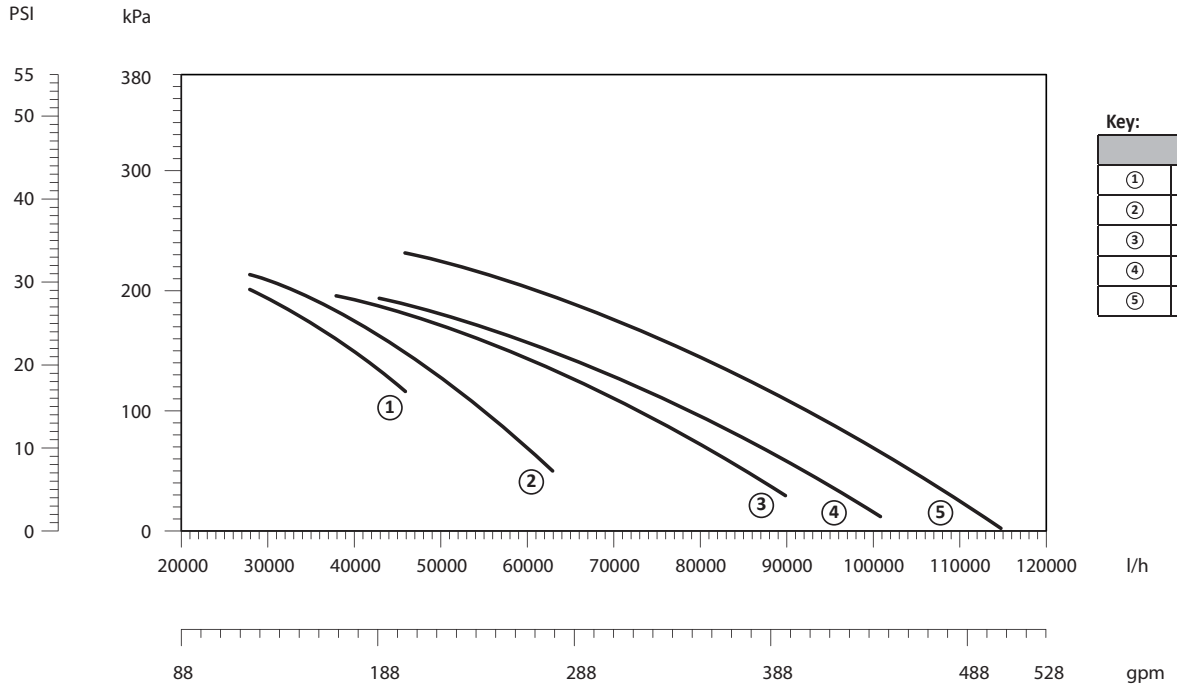
13.2. HIGH STATIC PRESSURE PUMPS IN COOLING MODE - SYSTEM SIDE



Key:

	NRP
①	0800-0900
②	1000
③	1250
④	1400-1500-1650
⑤	1800

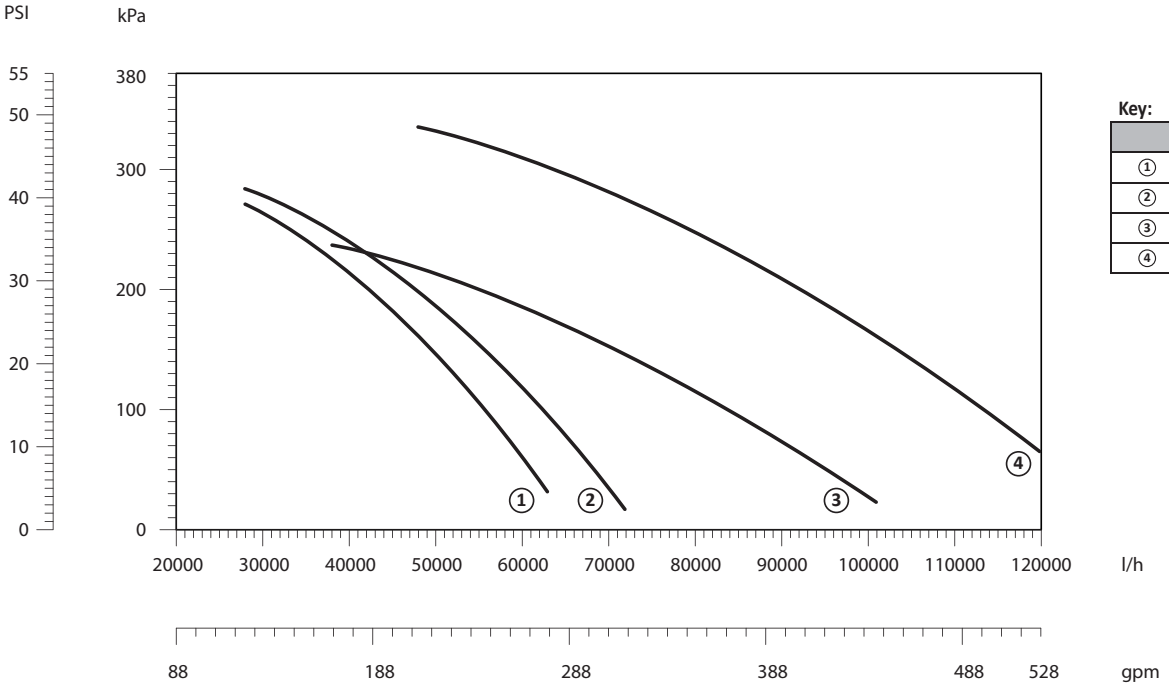
13.3. LOW STATIC PRESSURE PUMPS IN COOLING MODE - RECOVERY MODE



Key:

NRP	
①	0800-0900
②	1000
③	1250-1500
④	1650
⑤	1800

13.4. HIGH STATIC PRESSURE PUMPS IN COOLING MODE - RECOVERY MODE



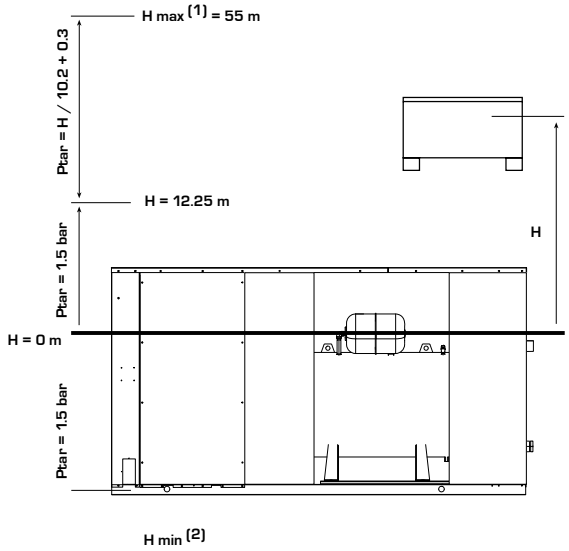
Key:

NRP	
①	0800-0900
②	1000
③	1250-1500
④	1650-1800

14. EXPANSION VESSEL CALIBRATION

14.1. EXPANSION VESSEL CALIBRATION

Standard pre-load pressure value of the expansion vessel is 1,5bar/21,8PSI, whereas volume is 24 litres. Maximum pressure 6bar/87PSI.
Calibration of the vessel must be regulated using the maximum level difference (H) of the user (see diagram) by using the following formula:
p (calibration) [bar] = H [m] / 10.2 + 0.3.
For example: if level difference (H) is equal to 20m/65,6ft, the calibration value of the vessel will be 2,3bar/33,4PSI.
If calibration value obtained from formula is less than 1,5bar/21,8PSI (that is for H < 12.25), keep calibration as standard.



KEY
(1) Check that highest installation is not higher than 55 metres.
(2) Ensure that lowest installation can withstand global pressure in that position.

15. MINIMUM WATER CONTENT

NRP	U.M.	800	900	1000	1250	1400	1500	1650	1800
Number of compressors	n°	4	4	4	4	4	4	4	4
Minimum water content admitted COLD SIDE	gal/ton	6,50	6,50	6,50	6,50	6,50	6,50	6,50	6,50
Minimum water content admitted the HOT SIDE	gal/ton	6,50	6,50	6,50	6,50	6,50	6,50	6,50	6,50
Recommended water content COOLING SIDE | HEATING SIDE	gal/ton	13,01	13,01	13,01	13,01	13,01	13,01	13,01	13,01

ATTENTION
It is recommended to design systems with high water content (minimum recommended values shown in table), to limit:
1. The hourly number of inversions between functioning modes.
2. Decrease in water temperature during winter defrost cycles.

16. ETHYLENE GLYCOL

COOLING MODE - CORRECTION FACTOR WITH ETHYLENE GLYCOL												
Freezing Point	°C/°F	0/32	-5/23	-7/19,4	-10/14	-13/8,6	-15/5	-20/-4	-25/-13	-30/-22	-37/-34,6	-44/-47,2
Percent ethylene glycol	%	0	12	15	20	25	30	35	40	45	50	55
Qw	-	1,00	1,052	1,066	1,088	1,111	1,133	1,155	1,177	1,199	1,220	1,242
Pc	-	1,000	0,988	0,985	0,980	0,975	0,970	0,965	0,960	0,955	0,950	0,945
Pa	-	1,000	0,995	0,994	0,992	0,990	0,988	0,986	0,984	0,982	0,980	0,978
Dp	-	-	1,103	1,159	1,222	1,292	1,368	1,452	1,541	1,637	1,740	1,849

HEATING MODE - CORRECTION FACTOR WITH ETHYLENE GLYCOL												
Freezing Point	°C/°F	0/32	-5/23	-7/19,4	-10/14	-13/8,6	-15/5	-20/-4	-25/-13	-30/-22	-37/-34,6	-44/-47,2
Percent ethylene glycol	%	0	10	15	20	25	30	35	40	45	50	55
Qw	-	1,000	1,029	1,045	1,064	1,085	1,107	1,131	1,156	1,184	1,213	1,244
Ph	-	-	-	-	-	-	-	-	-	-	-	-
Pa	-	1,000	1,002	1,003	1,004	1,005	1,007	1,008	1,010	1,012	1,015	1,018
Dp	-	-	1,047	1,078	1,114	1,158	1,209	1,268	1,336	1,413	1,501	1,599

Qw: Corrective factor of flow rates (middle water temperatur 9,5°C/49,1°F)
Pc: Corrective factor of cooling capacity
Ph: Corrective factor of heating capacity
Pa: Corrective factor of imput power
Dp: Corrective factor of pressure drop

17. PROPYLENIC GLYCOL

COOLING MODE - CORRECTION FACTOR WITH PROPYLENIC GLYCOL												
Freezing Point	°C/°F	0/32	-5/23	-7/19,4	-10/14	-13/8,6	-15/5	-20/-4	-25/-13	-30/-22	-37/-34,6	-44/-47,2
Percent propylenic glycol	%	0	10	15	20	25	30	35	40	45	50	55
Qw	-	1,000	1,019	1,028	1,038	1,048	1,058	1,068	1,078	1,089	1,099	1,110
Pc	-	1,000	0,985	0,978	0,970	0,963	0,955	0,947	0,939	0,932	0,924	0,916
Pa	-	1,000	0,996	0,994	0,992	0,990	0,988	0,986	0,984	0,982	0,980	0,978
Dp	-	-	1,039	1,065	1,126	1,218	1,339	1,485	1,655	1,846	2,055	2,279

HEATING MODE - CORRECTION FACTOR WITH PROPYLENIC GLYCOL												
Freezing Point	°C/°F	0/32	-5/23	-7/19,4	-10/14	-13/8,6	-15/5	-20/-4	-25/-13	-30/-22	-37/-34,6	-44/-47,2
Percent propylenic glycol	%	0	10	15	20	25	30	35	40	45	50	55
Qw	-	1,000	1,011	1,020	1,030	1,043	1,057	1,073	1,092	1,113	1,136	1,162
Ph	-	-	-	-	-	-	-	-	-	-	-	-
Pa	-	1,000	1,003	1,004	1,005	1,007	1,009	1,011	1,014	1,018	1,023	1,029
Dp	-	-	1,047	1,078	1,114	1,158	1,209	1,268	1,336	1,413	1,501	1,599

Qw: Corrective factor of flow rates (middle water temperatur 9,5°C/49,1°F)
Pc: Corrective factor of cooling capacity
Ph: Corrective factor of heating capacity
Pa: Corrective factor of imput power
Dp: Corrective factor of pressure drop

18. SOUND DATA

SOUND POWER:
Aermec determines sound power values on the basis of measurements made in accordance with UNI EN ISO 9614-2, as required for Eurovent certification.

SOUND PRESSURE:
Sound pressure in free field, at 10 m/ 393,7in distance from the external surface of the unit (in accordance with UNI EN ISO 3744)

NRP	VERS.	Total sound levels			Octave band[Hz]						
		Pot. [dB(A)]	Pressure		125	250	500	1000	2000	4000	8000
			[dB(A)] 10m 32,8ft	[dB(A)] 1 m 3,3ft	Sound power by central band frequency [dB(A)]						
800	A	89	57	69	83,4	78,9	81,3	83,0	77,7	73,0	62,9
900	A	92	60	72	86,4	81,9	84,3	86,0	80,7	76,0	65,9
1000	A	93	61	73	85,9	82,4	85,6	86,9	84,3	80,1	69,9
1250	A	94	62	74	86,1	87,9	87,3	88,5	86,4	80,0	67,1
1400	A	95	63	75	88,9	85,4	86,8	91,0	84,2	76,0	66,9
1500	A	96	64	76	90,9	85,4	87,8	90,0	85,2	77,5	68,9
1650	A	96	64	76	88,9	87,9	89,3	91,0	86,2	78,0	68,9
1800	A	96	64	76	87,9	88,4	89,3	91,5	85,2	76,0	67,9

19. CONTROL AND SAFETY PARAMETERS CALIBRATION

COOLING SET	Min	Max.	Default
Water inlet temperature in cooling mode	**-10°C / 14°F**	**20°C / 68°F**	**7°C / 44,6°F**

HEATING SET	Min	Max.	Default
Inlet water temperature in heating functioning mode	**30°C / 86°F**	**55°C / 131°F**	**50°C / 122°F**

ANTI-FREEZE INTERVENTION	Min	Max.	Default
Intervention temperature of the anti-freeze alarm on the EV side (water outlet temperature)	**-15°C / 5°F**	**4°C / 39,2°F**	**3°C / 37,4°F**

TOTAL DIFFERENTIAL	Min	Max.	Default
Proportional temperature band within which the compressors are activated and deactivated	**3°C / 5,4**	**10°C / 18**	**5°C / 10**

Autostart	Auto

NRP	U.M.	0800	0900	1000	1250	1400	1500	1650	1800
HIGH PRESSURE PRESSURE SWITCH MANUAL REARM									
PA	psi / bar	580 / 40	580 / 40	580 / 40	580 / 40	580 / 40	580 / 40	580 / 40	580 / 40
HIGH PRESSURE TRANSDUCER									
TAP	psi / bar	566 / 39	566 / 39	566 / 39	566 / 39	566 / 39	566 / 39	566 / 39	566 / 39
LOW PRESSURE TRANSDUCER									
TBP	psi / bar	29 / 2	29 / 2	29 / 2	29 / 2	29 / 2	29 / 2	29 / 2	29 / 2
COOLING CIRCUIT SAFETY VALVES									
AP (High pressure)	psi / bar	653 / 45	653 / 45	653 / 45	653 / 45	653 / 45	653 / 45	653 / 45	653 / 45
BP (Low pressure)	psi / bar	435 / 30	435 / 30	435 / 30	435 / 30	435 / 30	435 / 30	435 / 30	435 / 30

20. PART LOAD

HEATING (AHRI CONDITIONS)
Inlet water temperature **40°C / 104°F**
Outlet water temperature **45°C / 113°F**
External air temperature **7°C_44.6°F B.S. / 6°C_42.8°F B.U.**

COOLING (AHRI CONDITIONS)
Outlet water temperature **6,7°C / 44,6°F**
Flow rate **0,043l/s per kW**
External temperature **35°C / 95°F**

NRP	LEVELS OF POWER					
COOLING CAPACITY %	1º	2º	3º	4º	5º	6º
NRL 0800	25	50	75	100	-	-
NRL 0900	27	53	77	100	-	-
NRL 1000	25	50	75	100	-	-
NRL 1250	25	50	75	100	-	-
NRL 1400	23	44	63	82	100	-
NRL 1500	17	34	50	67	84	100
NRL 1650	19	37	55	71	86	100
NRL 1800	17	34	50	67	84	100
POWER INPUT %	1º	2º	3º	4º	5º	6º
NRL 0800	21	44	71	100	-	-
NRL 0900	23	47	73	100	-	-
NRL 1000	21	44	71	100	-	-
NRL 1250	21	44	71	100	-	-
NRL 1400	18	37	56	77	100	-
NRL 1500	12	26	41	59	79	100
NRL 1650	14	29	46	63	81	100
NRL 1800	**12**	**26**	**41**	**59**	**79**	**100**
HEATING CAPACITY %	1º	2º	3º	4º	5º	6º
NRL 0800	25	49	75	100	-	-
NRL 0900	27	52	77	100	-	-
NRL 1000	25	49	75	100	-	-
NRL 1250	25	49	75	100	-	-
NRL 1400	22	43	62	81	100	-
NRL 1500	16	33	48	65	83	100
NRL 1650	18	36	53	69	85	100
NRL 1800	16	33	48	65	83	100
POWER INPUT %	1º	2º	3º	4º	5º	6º
NRL 0800	21	44	71	100	-	-
NRL 0900	23	47	73	100	-	-
NRL 1000	21	44	71	100	-	-
NRL 1250	21	44	71	100	-	-
NRL 1400	20	37	56	79	100	-
NRL 1500	12	26	41	59	79	100
NRL 1650	14	29	46	63	81	100
NRL 1800	12	26	41	59	79	100

21. THERMOMAGNETIC

MODEL	POWER SUPPLY	PUMP TYPE	COMPRESSOR	COMPRESSOR THERMOMAGNETIC	PUMP THERMOMAGNETIC	FAN THERMOMAGNETIC
NRL 0800	220V	LOW PUMP	CP1-CP1A	59 A	11,5 A	4 x 7,2 A SF 6 x 7,2 A PC
		HIGH PUMP	CP2-CP2A	59 A	14,5 A	
	460V	LOW PUMP	CP1-CP1A	30,4 A	5,8 A	4 x 7,2 A SF 6 x 4,2 A PC
		HIGH PUMP	CP2-CP2A	30,4 A	7,2 A	
	575V	LOW PUMP	CP1-CP1A	27,5 A	4,6 A	4 x 3,7 A SF 6 x 3,7 A PC
		HIGH PUMP	CP2-CP2A	27,5 A	5,8 A	
NRL 0900	220V	LOW PUMP	CP1-CP1A	59 A	11,5 A	4 x 7,2 A SF 6 x 7,2 A PC
		HIGH PUMP	CP2-CP2A	82,5 A	19,5 A	
	460V	LOW PUMP	CP1-CP1A	30,4 A	5,8 A	4 x 4,2 A SF 6 x 4,2 A PC
		HIGH PUMP	CP2-CP2A	40,5 A	9,7 A	
	575V	LOW PUMP	CP1-CP1A	27,5 A	4, 6 A	4 x 3,7 A SF 6 x 3,7 A PC
		HIGH PUMP	CP2-CP2A	32,3 A	7,7 A	
NRL 1000	220V	LOW PUMP	CP1-CP1A	82,5 A	11,5 A	4 x 7,2 A SF 6 x 7,2 A PC
		HIGH PUMP	CP2-CP2A	82,5 A	19,5 A	
	460V	LOW PUMP	CP1-CP1A	40,5 A	5,8 A	4 x 4,2 A SF 6 x 4,2 A PC
		HIGH PUMP	CP2-CP2A	40,5 A	9,7 A	
	575V	LOW PUMP	CP1-CP1A	32,3 A	4,6 A	4 x 3,7 A SF 6 x 3,7 A PC
		HIGH PUMP	CP2-CP2A	32,3 A	7,7 A	
NRL 1250	220V	LOW PUMP	CP1-CP1A	104 A	11,5 A	8 x 7,2 A SF 8 x 7,2 A PC
		HIGH PUMP	CP2-CP2A	104 A	19,5 A	
	460V	LOW PUMP	CP1-CP1A	51,5 A	5,8 A	8 x 4,2 A SF 8 x 4,2 A PC
		HIGH PUMP	CP2-CP2A	51,5 A	9,7 A	
	575V	LOW PUMP	CP1-CP1A	41,7 A	4,6 A	8 x 3,7 A SF 8 x 3,7 A PC
		HIGH PUMP	CP2-CP2A	41,7 A	7,7 A	
NRL 1400	220V	LOW PUMP	CP1-CP1A	104 A	14,5 A	8 x 7,2 A SF 8 x 7,2 A PC
		HIGH PUMP	CP2-CP2A-CP2B	82,5 A	26,5 A	
	460V	LOW PUMP	CP1-CP1A	51,5 A	7,2 A	8 x 4,2 A SF 8 x 4,2 A PC
		HIGH PUMP	CP2-CP2A-CP2B	40,5 A	13,2 A	
	575V	LOW PUMP	CP1-CP1A	41,7 A	5,8 A	8 x 3,7 A SF 8 x 3,7 A PC
		HIGH PUMP	CP2-CP2A-CP2B	32,3 A	10,6 A	
NRL 1500	220V	LOW PUMP	CP1-CP1A-CP1B	82,5 A	14,5 A	8 x 7,2 A SF 8 x 7,2 A PC
		HIGH PUMP	CP2-CP2A-CP2B	82,5 A	26,5 A	
	460V	LOW PUMP	CP1-CP1A-CP1B	40,5 A	7,2 A	8 x 4,2 A SF 8 x 4,2 A PC
		HIGH PUMP	CP2-CP2A-CP2B	40,5 A	13,2 A	
	575V	LOW PUMP	CP1-CP1A-CP1B	32,3 A	5,8 A	8 x 3,7 A SF 8 x 3,7 A PC
		HIGH PUMP	CP2-CP2A-CP2B	32,3 A	10,6 A	
NRL 1650	220V	LOW PUMP	CP1-CP1A-CP1B	82,5 A	19,5 A	8 x 7,2 A SF 8 x 7,2 A PC
		HIGH PUMP	CP2-CP2A-CP2B	104 A	38,5 A	
	460V	LOW PUMP	CP1-CP1A-CP1B	40,5 A	9,7 A	8 x 4,2 A SF 8 x 4,2 A PC
		HIGH PUMP	CP2-CP2A-CP2B	51,5 A	19,5 A	
	575V	LOW PUMP	CP1-CP1A-CP1B	32,3 A	7,7 A	8 x 3,7 A SF 8 x 3,7 A PC
		HIGH PUMP	CP2-CP2A-CP2B	41,7 A	15,4 A	
NRL 1800	220V	LOW PUMP	CP1-CP1A-CP1B	104 A	19,5 A	8 x 7,2 A SF 8 x 7,2 A PC
		HIGH PUMP	CP2-CP2A-CP2B	104 A	38,5 A	
	460V	LOW PUMP	CP1-CP1A-CP1B	51,5 A	9,7 A	8 x 4,2 A SF 8 x 4,2 A PC
		HIGH PUMP	CP2-CP2A-CP2B	51,5 A	19,5 A	
	575V	LOW PUMP	CP1-CP1A-CP1B	41,7 A	7,7 A	8 x 3,7 A SF 8 x 3,7 A PC
		HIGH PUMP	CP2-CP2A-CP2B	41,7 A	15,4 A	

AERMEC S.p.A.
37040 Bevilacqua (VR) Italy–Via Roma, 996
Tel. (+39) 0442 633111
Telefax 0442 93730–(+39) 0442 93566
www.aermec.com - info@aermec.com