AERMEC

la prima per il clima

R134a

RS485

CPU

Technical manuaL - installation - maintenance

HWF

WATER/WATER CHILLER

- INDOOR UNIT
- WITH HIGH ENERGY EFFICIENCY
- OPTIMISED FOR HIGH CONDENSATION TEMPERATURES
- MAXIMUM WATER OUTLET TEMPERATURE FROM THE CONDENSER 60 °C

AERMEC
COMPANY QUALITY SYSTEM
ICIM
ISO 9001:2000 - Cert. n° 0128/5
CISQ IQNet
AERMEC S.P.A.

EUROVENT CERTIFIED PERFORMANCE

CE

EN

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 CE 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

AERMEC S.p.A
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HWF

SERIAL NUMBER	

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

NAME **HWF**

TYPE **Liquid chillers**

MODEL

To which this declaration refers, complies with the following harmonised standards:

IEC EN 60335-2-40	Safety standard regarding electrical heat pumps, air conditioners and dehumidifiers
IEC EN 61000-6-1 **IEC EN 61000-6-3**	Immunity and electromagnetic emissions for residential environments
IEC EN 61000-6-2 **IEC EN 61000-6-4**	Immunity and electromagnetic emissions for industrial environments
EN378	Refrigerating systems and heat pumps - Safety and environmental requirements
UNI EN 12735	Seamless, round copper tubes for air conditioning and refrigeration
UNI EN 14276	Pressure equipment for cooling systems and heat pumps

Therefore complying with the essential requirements of the following directives:

- LVD Directive: 2006/95/CE
- Electromagnetic Compatibility Directive 2004/108/CE
- Machinery Directive 2006/42/CE
- PED Directive regarding pressurised devices 97/23/CE

The product, in agreement with Directive 97/23/CE, satisfies the Total quality Guarantee procedure (form H1) with certificate n.09/021-QT6704 Rev.4 issued by the notified body n.1131 CEC via Pisacane 46 Legnano (MI) - Italy

The person authorised to constitute the technical file is: Massimiliano Sfragara - 37040 Bevilacqua (VR) Italy - via Roma,996

Bevilacqua 15/04/2010

Marketing Manager
Signature

Standards and Directives respected on designing and constructing the unit:

Safety:
Machinery Directive
2006/42/CE

Low Voltage Directive
LVD 2006/95/CE

Electromagnetic compatibility
Directive
EMC 2004/108/CE

Pressure Equipment Directive
PED 97/23/CE EN 378,
UNI EN 14276

Electric part:
EN 60204-1

Protection rating
IP20

Acoustic part:
Sound power
(EN ISO 9614-2)
Sound pressure
(EN ISO 3744)

Certifications:
Eurovent: Aermec participates in the EUROVENT Certification Program up to 1500 kW
The products of interest figure in the EUROVENT Guide of Certified products.

Refrigerant GAS:
This unit contains fluoride gases with greenhouse effect covered by the Kyoto Protocol. Maintenance and disposal must only be performed by qualified staff.

1. GENERAL WARNINGS

AERMEC liquid chillers are constructed according to the recognised technical standards and safety regulations. They are designed for air conditioning and the production of hot water and must be destined to this use compatibly with their performance features. 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).
The appliance must be installed in such a way as to enable maintenance and/or repairs to be carried out (SEE SECTION FOR THE NSTALLER page38).
The appliance warranty does not cover the costs for ladders, scaffolding, or other elevation systems that may become necessary for carrying out servicing under warranty.
Do not modify or tamper with the chiller 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.

1.2. WARNINGS REGARDING SAFETY AND INSTALLATION STANDARDS

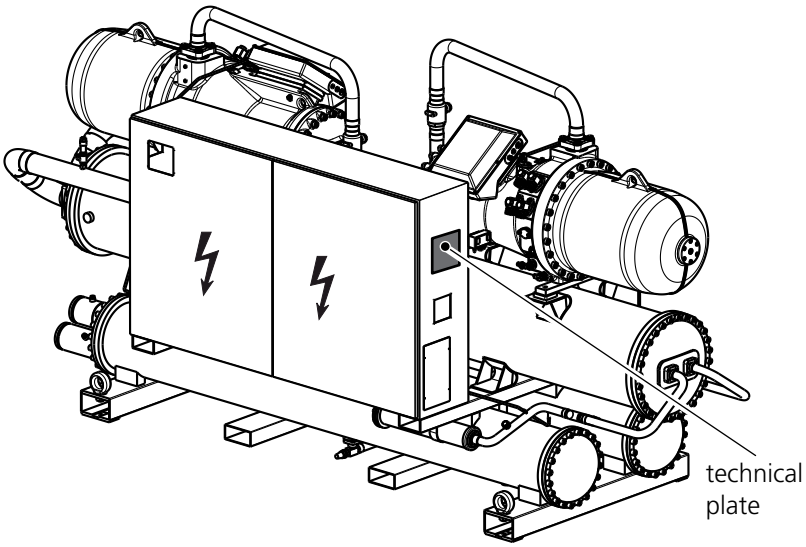
- The cooler must be installed by a qualified and suitably trained technician, in compliance with the national legislation in force in the country of destination (Ministerial Decree 329/2004).
  AERMEC will not assume any responsibility for damage due to failure to follow these instructions.
- Before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

2. PRODUCT IDENTIFICATION

The HWFs can be identified by:

- PACKING LABEL
  which shows the product identification data
- TECHNICAL PLATE
  Positioned on one side of the electric box

NOTE
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

Water cooled high energy efficiency liquid chillers.
Optimised for high condensation temperatures.
INDOOR UNIT for the production of cooled water. Compressors optimised for the use of the **R134a gas**, shell and tube condensers, dry expansion evaporator and electronic regulation valve.
They are units supplied complete with refrigerant load, factory-inspected and only requires electric and hydraulic connections in the place of installation.
While versions "E" are delivered just pre-charged

They are units designed to warranty:

3.1. HIGH EFFICIENCY

For the **"A" high efficiency** unit
Thanks to the technology applied, the use of the dedicated compressors and heat exchangers with high heat exchange co-efficients, allow to reach
E.E.R. > of 5
C.O.P. > di 4.5
values at the work conditions declared by Eurovent.
Guaranteeing lower working costs and consequently quicker return of the investment

3.2. FLEXIBILITY

Flexibility of system requirements, thanks to the use of latest generation electronic regulation and continuous modulation of the cooling capacity with the electronic thermostatic valve, benefiting the system energy efficiency.

3.3. SILENCE

Guaranteed by the integral bonnet where " L" SET-UP is requested, further lowered the sound level with respect to the standard version.
Sensitive and careful consideration of customer requirements, Aermec offers the possibility of lowering noise even further using the **AKW accessory**, only available in the "L" SET-UP

3.4. AVAILABLE VERSIONS

3.4.1. ° Standard Reversible heat pump.

Reversible unit in heat pump mode on water side.
For functioning in heating mode, envision the isolation of the condenser using the"IS" ACCESSORY.
The electronic regulation is set-up for management of the unit on summer or winter set-point depending on the mode.
Switch-over is manual.

3.4.2. A High efficiency Reversible heat pump

Extended operational limits and performance

3.4.3. °D/AD with desuperheater

Unit for the production of cooled water, complete with additional heat exchanger downstream from the compressor in order to make use of heat produced from overheating.
This function is particularly indicated for applications with the production of domestic hot water or other uses with integration of a boiler of solar kits.

3.4.4. °T/AT with total recovery

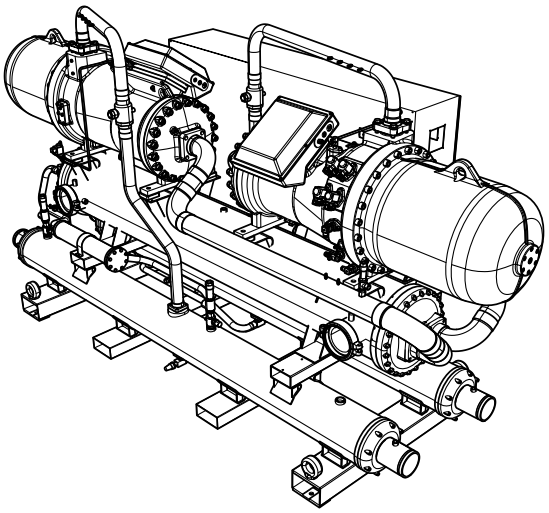
Unit for the production of cooled water, complete with additional refrigerant/ water exchanger for total recovery of the condensation heat. Recovery is managed depending on reaching the set-point set.
This function is particularly indicated for applications with air handling unit or production of domestic hot water integrated with a boiler of solar kit.

- **Indoor unit**
- **Optimised for high condensation temperatures**
- **Maximum temperature of the water produced at the condenser 60 °C**
- **Electronic thermostatic valve**
- **High energy efficiencies**
- **Flexibility in the system**
- **Silence**

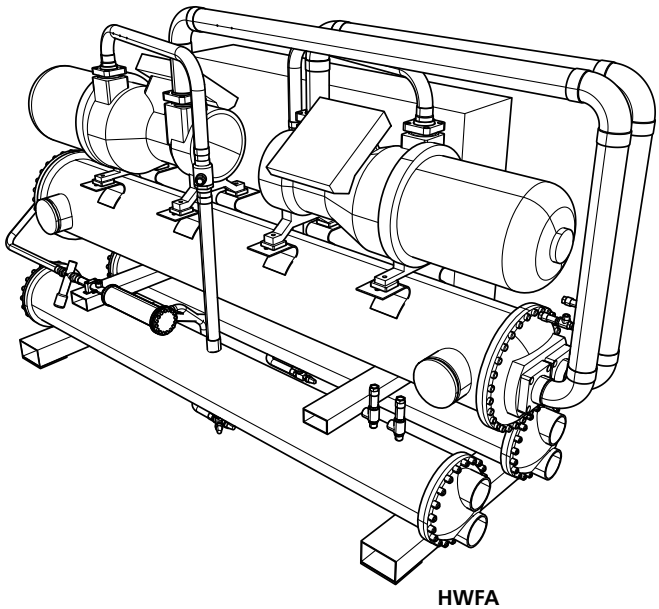
4. CONFIGURATOR

1,2,3	4,5,6,7	8	9	10	11	12
HWF	2512	°	A	°	°	°

Field	CODE	
1, 2, 3	**HWF**	
4,5,6,7	**SIZES**	2512 - 2812 - 3212 - 3612 - 4212 - 4812 - 5612 - 6412
8	**MODEL**	
	°	Optimised for high condensation
9	**VERSIONS:**	
	°	Standard
	A	High efficiency
10	**SET-UP**	
	°	Standard
	L	Silenced
11	**HEAT RECOVERY**	
	°	Without heat recovery
	D (1)	Desuperheater (NOT AVAILABLE FOR THE CONDENSERLESS "E")
	T (1)	Total heat recovery (NOT AVAILABLE FOR THE CONDENSERLESS "E")
12	**CONDENSER**	
	°	Standard
	E (1)	Condenserless
13	**POWER SUPPLY**	
	°	400V-3-50 Hz with fuses
	8	400V-3-50 Hz with magnet circuit beakers
	5	500V-3-50 Hz with fuses (for 2512 and 2812 only)
	9	500V-3-50 Hz with magnet circuit breakers (for 2512 and 2812 only)
		Configuration example: HWF2812°°°°°
	(1)	**For the condenserless units (E) - with desuperheater (D) and total recovery (T) contact the establishment**



HWF°
Standard



HWFA
High efficiency

5. DESCRIPTION OF THE STANDARD UNIT COMPONENTS

5.1. STRUCTURE

Base and support structure
Made up from hot galvanised sheet steel profiles with suitable thickness. Polyester powder painting (RAL 9002), resistant to atmospheric agents.
Realised in a way to allow total accessibility to the components inside, for service and maintenance operations.

5.2. COOLING CIRCUIT

Unit with independent cooling circuits for each compressor to guarantee functioning continuity and easy maintenance. Each cooling circuit has:

Compressor
With semi-hermetic screw with two rotors.

Oil flow induced by the pressure difference, therefore avoiding the aid of the dedicated pump, studied especially to guarantee a constant and uniform lubrication of the bearings in any compressor work state, both in full and partial load.

Oil separator incorporated with the use of a steel mesh filter that ensures constant presence of oil in the compressor.

Partialisation of the cooling capacity via slide valve which, depending on the position assumed, determines a stepless reduction of the compression chamber, can modulate continuously from 100% to 12.5% of its capacity

Each compressor has:
- Circuit breaker protection (Fuses) of the motor,
- Discharge temperature and oil level check
- Electric resistance for heating the guard with compressor at a standstill. The resistance is powered automatically on unit stop, as long as it remains live.

User side heat exchanger
Exchanger, with evaporator function, direct expansion shell and tube type, with pipes side refrigerant passage and case side water passage. Case side with baffles to increase the turbulence and therefore the efficiency of the heat exchange.
Steel case covered with closed cell expanded elastomer anti-condensation covering. The shell and tube is realised with copper pipes grooved internally to favour heat exchange.
The heat exchanger has a differential pressure switch to monitor the correct flow of water when the unit is running, thus preventing the formation of ice inside. The heat exchanger is manufactured respecting the PED Standard respectively working pressures and resistance to stress.
Victaulic water side connections (with stub pipe supplied for the connection)

Source side heat exchanger
Condenser, flooded type shell and tube, with pipes side water passage and case side refrigerant. Steel case and shell and tube realised with internally and externally grooved copper pipes in order to favour heat exchange.
For the units functioning in HEAT PUMP MODE (reversible hydraulic side) the heat exchanger must be insulated with (ACCESSORY IS) closed cell expanded elastomer anti-condensation covering with thickness of 10 mm and heat conductivity equal to 0.033 W/mK at 0°C.
Removable heads to allow inspection and cleaning of the pipes. The heat exchanger is manufactured respecting the PED Standard respectively working pressures and resistance to stress.
Victaulic water side connections (with stub pipe supplied for the connection)

Filter dehydrator, with replaceable cartridges
Mechanical with cartridge realised in ceramics and hygroscopic material, able to withhold impurities and any traces of humidity present in the cooling circuit.

Indicator for liquid passage with humidity presence signal,
Used to check the refrigerant gas load and the eventual presence of humidity in the cooling circuit.

Electronic thermostatic valve
The valve 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.

One-way valve
Allows the passage of the refrigerant in just one direction. Positioned on the compressor flow, it prevents inverse rotation of the rotors after stopping.

Solenoid valve for LIQUID INJECTION
The valve positioned between the compressor flow and the thermostatic valve outlet
allows to perform defrosting cycles without inverting the cycle.

Cocks
On the liquid and pressing line, to isolate the refrigerant if requested in the event of extraordinary maintenance.

Cooling circuit safety valves
Calibrated at 22 bar HP and 16.5 LP, they intervene by discharging the over pressure in the case of anomalous pressures.

5.3. SAFETY AND CONTROL

Low pressure transducers
Placed on high pressure side of cooling circuit, signals the work pressure to control board, generating a pre-warning in case abnormal pressure occurs.

High pressure transducer
Placed on high pressure side of cooling circuit, signals the work pressure to control board, generating a pre-warning in case abnormal pressure occurs.

Double high pressure switch (manual+tool)
Calibrated in the factory, positioned on the high pressure side of the cooling circuit, stops the functioning of the compressor in the event of abnormal work pressures.

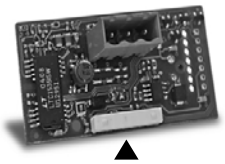
5.4. ELECTRIC CONTROL BOARD AND REGULATION

Electric power and control board, manufactured in compliance with the EN 60204-1/IEC 204-1 Standards, complete with:
- Circuit board
- transformer for the control circuit,
- Door lock main isolating switch,
- Fuses for compressors. Magnet circuit breakers are also available on request
- Power section
- clamps for remote ON/OF,
- Compressors protection with internal circuit breakers
- connection clamps to the remote keyboard,
- summer-winter manual change-over clamps,
- clamps for alarm signal,
- clamps for signalling compressor switch-on status,
- safety fuses,
- Protection rating: IP54,
- Control circuit numbered cables,
- Phases sequence control and for maximum voltage,

5.4.1. Adjustment

The electronic adjustment on HWF chillers is made up of a control board for every compressor connected to each other in a network and a control panel with display. The board that controls compressor n°1 is the “master” board, while the other is the “slave”. The transducers, loads and alarms relative to the compressor that controls are connected to every board, while only the general machine ones are connected to the master board. The program and the parameters set are memorised permanently on FLASH memory, allowing them to be kept also in the case of a power cut (without the need for a maintenance battery).
The connection to the supervision

GRAPHIC TERMINAL
4 characters + icons to ease reading of the machine functioning



AER485P1 Accessory

serial line according to the **standard RS485**, is realised via the serial boards **ACCESSORY RS485P1** and the communication protocol.

- The terminal, always managed by microprocessor, has a wide format keyboard that allows complete display of the machine state.

The controls and the LCD mean easy and safe access to the settings and the multi-level and multi-language structure allow consultation and intervention on the unit.
The connection of the terminal to the pCO is not necessary for normal functioning of the controller, but can only be used for initial programming of the fundamental parameters.

Microprocessor

- Remote on/off with external contact without voltage.
- Multi-language menu
- Phases sequence control
- Independent control of the individual compressors
- Amperometric transformer
- Cumulative faults block signal
- Historical alarms function
- Daily/weekly programming
- Water temperature display
- input/output
- Alarms display.
- Integral proportional regulation on the temperature of the output water
- Programmable timer function
- Function with double calibration point linked to an external contact
- Can be interfaced with Modbus protocol (AER485P1 accessory)
- Pump/s control
- Compressors rotation management
- Analogue input from 4 to 20 mA
- "Always Working" function. In the event of
- Critical conditions (e.g. an environmental temperature that is too high) the machine does not stop but can adjust itself and supply the maximum power in those conditions.
- "Switching Histeresys" self-adapting work differential
- To always ensure the correct work times of the compressors even in systems with low water content or insufficient flow rate. This system decreases wear of the compressors
- PDC "Pull Down Control" system to prevent the activation of power steps when the temperature of the water quickly approaches the set-point. Optimises machine functioning when working normally and in the presence of load variations, ensuring the best machine efficiency in all conditions.

For further information please refer to user manual.

5.5. COMPONENTS OF OTHER VERSIONS

"L set-up" standard integral acoustic bonnet
Realised in peraluman panels covered internally by a sound-absorbent material in polyester fibre with thickness of 30 mm. This allow to lower the sound power. For precise data refer to chapter 15.

6. ACCESSORIES

6.1. ELECTRIC REGULATION ACCESSORY

- **AER485P1**: This accessory allows connection of the unit to BMS supervising systems with RS485 electric standard and MODBUS protocol
  NOTE: n°1 must be envisioned per compressor.

- **MULTICHILLER**: Control system for control, switch-on and switch-off of the single chillers in a plant in where multiple units are installed in parallel, always ensuring constant flow to the evaporators.

- **AERWEB30**: the AERWEB device allows the remote control of a chiller from a common PC by means of a serial connection. By using additional modules the device allows control of the chiller by telephone network, using the AERMODEM accessory or GSM network. The AERWEB can pilot up to 9 chillers, each of which must be equipped with the AER485P1 accessory.

- **PRV3**: Allows to control the chiller at a distance.

6.2. ELECTRIC ACCESSORIES

- **RIFHWF**: Current rephaser. Connected in parallel to the motor, it allows a reduction of the input current (about 10%) with cost effective advantages. It can only be installed in the machine construction phase and so must be requested on ordering.

6.3. GENERIC ACCESSORIES

- **AKW (only available in silenced L set-up and can only be installed in the factory.**
  This accessory allows to lower the noise even further via:
  - An optimised compressor cover using high density material without lead that allows to reduce vibrations even further.
  - Anti-vibration mounts in AV rubber for compressors in order to reduce their vibrations so as to prevent damage caused to the pipes and use of flexible joints.
  - Isolation of the larger pipes to reduce the typical noise of the gas.
  - Isolation of the most critical points

- **IS (Mandatory for machine functioning in heat pump mode)**
  KIT for the isolation of the heat exchanger with closed cell expanded elastomer covering with thickness of 10 mm and heat conductivity equal to 0.033 W/mK a 0°C.

- **AVX** Spring anti-vibration kit

Accessories compatibility								
Mod	**2512**	**2812**	**3212**	**3612**	**4212**	**4812**	**5612**	**6412**
AERWEB30	•	•	•	•	•	•	•	•
MULTICHILLER	•	•	•	•	•	•	•	•
AER485P1	• (x2)	• (x2)	• (x2)	• (x2)	• (x2)	• (x2)	• (x2)	• (x2)
PRV3	•	•	•	•	•	•	•	•
AVX	•	•	•	•	•	•	•	•
RIFHWF (1)	2512	2812	3212	3612	4212	4812	5612	6412
AKW(WF-L) (1)	•	•	•	•	•	•	•	•
IS1 (2)	°/A	°/A	°	°	°	°		
IS2			A	A	A	A	°	°
IS3							A	A

AVX ANTI-VIBRATION MOUNT compatibility								
standard / standard silenced								
Mod WF	**2512°**	**2812°**	**3212°**	**3612°**	**4212°**	**4812°**	**5612°**	**6412°**
AVX	673	673	673	674	674	674	675	675

Mod WF	**2512°L**	**2812°L**	**3212°L**	**3612°L**	**4212°L**	**4812°L**	**5612°L**	**6412°L**
AVX	673	673	674	674	674	674	675	675

high efficiency/high efficiency silenced								
Mod WF	**2,512A**	**2,812A**	**3,212A**	**3,612A**	**4,212A**	**4,812A**	**5,612A**	**6,412A**
AVX	673	673	674	675	675	675	676	676

Mod WF	**2512AL**	**2812AL**	**3212AL**	**3612AL**	**4212AL**	**4812AL**	**5612AL**	**6412AL**
AVX	674	674	675	675	675	675	676	676

(x2) Indicates the amount to order

(1) The accessories must be envisioned on making the order, because they can only be installed in the factory

(2) The isolation kit is mandatory in heat pump functioning mode and is to be envisioned when placing the order, because it can only be installed in the factory

° STANDARD version

A HIGH EFFICIENCY version

°L/AL Silenced version

7. HWF °/A TECHNICAL DATA

HWF	VERS.	U.M.	2512	2812	3212	3612	4212	4812	5612	6412
Cooling capacity	°	kW	630	716	846	949	1095	1261	1421	1519
	A		645	733	858	969	1112	1253	1439	1529
Total input power	°	kW	127	144	169	191	220	252	286	305
	A		123	140	164	185	212	239	275	293
Water flow rate at the evaporator	°	l/h	108360	123152	145512	163228	188340	216892	244412	261268
	A		110940	126076	147584	166668	191264	215516	247500	262992
Pressure drops at the evaporator	°	kPa	41	56	53	44	41	60	65	72
	A		44	60	57	41	59	40	42	50
Condenser water consumption	°	l/h	130204	147924	174580	196080	226180	260236	293604	313725
	A		132096	150156	175792	198488	227728	256624	294800	313388
Condenser pressure drops	°	kPa	16	16	17	15	17	23	18	18
	A		65	66	68	66	67	72	77	76

HWF		U.M.	2512	2812	3212	3612	4212	4812	5612	6412
Heating capacity	°	kW	670	762	898	1009	1163	1338	1512	1615
	A		678	771	902	1019	1168	1317	1513	1609
Total input power	°	kW	149	170	199	225	259	297	338	360
	A		145	165	193	218	250	282	325	346
Condenser water flow rate	°	l/h	115240	131064	154456	173548	200036	230128	260064	277780
	A		116616	132612	155144	175268	200892	226528	260236	276748
Condenser pressure drops	°	kPa	13	12	13	12	14	18	14	14
	A		51	52	53	51	52	56	60	59
Evaporator water consumption	°	l/h	89612	101824	120228	134848	155482	179044	201928	215860
	A		91676	104232	121948	137772	157892	178024	204336	217236
Evaporator pressure drops	°	kPa	28	39	36	30	28	41	45	49
	A		30	41	39	28	40	28	29	34

ENERGETIC INDEX										
E.E.R.	°		4,96	4,97	5,01	4,97	4,98	5,00	4,97	4,98
	A		5,24	5,24	5,23	5,24	5,25	5,24	5,23	5,22
E.E.R. EN 14511	°									
	A									
E.E.R. (EUROVENT CLASS)	°		B	B	B	B	B	B	B	B
	A		A	A	A	A	A	A	A	A
E.S.E.E.R.			5,85	5,87	5,91	5,86	5,87	5,90	5,86	5,88
C.O.P.	°		4,50	4,48	4,51	4,48	4,49	4,50	4,47	4,49
	A		4,68	4,67	4,67	4,67	4,67	4,67	4,66	4,65
C.O.P. EN 14511	°									
	A									
C.O.P. (EUROVENT CLASS)	°		A	A	A	A	A	A	A	A
	A		A	A	A	A	A	A	A	A

ELECTRICAL DATA			400V-3-50Hz							
Total input current when cold	°	A	226	255	286	314	378	426	488	530
	A		221	249	278	306	367	408	471	514
Total input current when hot	°	A	267	300	337	371	446	503	575	625
	A		261	293	328	361	433	481	556	606
Maximum current (F.L.A.)	°-A	A	370	418	468	516	612	690	776	846
Peak current (L.A.R.)	°-A	A	545	613	670	723	892	995	1193	1340
Protection rating of the machine			IP20							

Charges (1)										
Refrigerant (R134a)	°-A	Kg								
Oil	°-A	Kg	19	19	35	35	35	35	38	38

PARTIALISATIONS										
Partialisation of the unit	°-A	%	12,5-100	12,5-100	12,5-100	12,5-100	12,5-100	12,5-100	12,5-100	12,5-100

TWIN-SCREW COMPRESSORS										
N° compressors	°-A	n°	2	2	2	2	2	2	2	2
N° circuits	°-A	n°	2	2	2	2	2	2	2	2
Electric resistance	°-A	n° / W	1/300	1/300	1/300	1/300	1/300	1/300	1/300	1/300

NOMINAL REFERENCE CONDITIONS

COOLING
EVAPORATOR
Water input temperature 12 °C
Output water temperature 7 °C
Δt 5 °C

CONDENSER
Water input temperature 30 °C
Output water temperature 35 °C
Δt 5 °C

HEATING
EVAPORATOR
Water input temperature 10 °C
Output water temperature 5 °C
Δt 5 °C

CONDENSER
Water input temperature 40 °C
Output water temperature 45 °C
Δt 5 °C

(1) The declared data can be amended any time Aermec considers it necessary

HWF	VERS.	U.M.	2512	2812	3212	3612	4212	4812	5612	6412
USER side SHELL AND TUBE EVAPORATOR										
Quantity	°-A	n°	1	1	1	1	1	1	1	1
Water content	°-A	l								
VICTAULIC hydraulic connections	IN/OUT	Ø	6"	6"	6"	8"	8"	8"	8"	8"
SOURCE side SHELL AND TUBE CONDENSERS										
Quantity	°-A	n°	2	2	2	2	2	2	2	2
Water content	°-A	l								
VICTAULIC hydraulic connections	IN/OUT	Ø	5"	5"	5"	5"	5"	5"	6"	6"
SOUND DATA										
Sound power	°-A	dB(A)	93,6	94,0	93,5	93,7	94,6	95,5	97,3	97,9
Sound Pressure	°-A	dB(A)	61,6	62,0	61,5	61,7	62,6	63,5	65,3	65,9
Sound power	°L-AL	dB(A)	85,5	86,2	87,0	87,9	90,2	89,8	91,0	90,8
Sound Pressure	°L-AL	dB(A)	53,5	54,2	55,0	55,9	58,2	57,8	59,0	58,8
STANDARD VERSIONS DIMENSIONS AND WEIGHTS										
Height	°	mm	2100	2100	2050	2120	2140	2140	2210	2210
	A		2180	2180	2190	2340	2340	2340	2380	2380
Width	°	mm	1470	1470	1470	1520	1550	1550	1600	1600
	A		1470	1470	1537	1695	1695	1695	1700	1700
Depth	°	mm	3690	3690	4030	4030	4370	4370	4610	4760
	A		4330	4330	4330	4370	4550	4550	4800	4800
Empty weight	°	Kg	3570	3650	4470	4750	5100	5200	6110	6310
	A		4080	4140	5470	5950	6290	6460	7310	7410
Functioning weight	°	Kg								
	A									

for E - D - T set-ups,
CONTACT THE ESTABLISHMENT

8. HWF °E/AE TECHNICAL DATA

HWF	VERS.	U.M.	2512	2812	3212	3612	4212	4812	5612	6412
Cooling capacity	°E	kW	540	615	726	816	947	1070	1225	1311
	AE		577	657	779	873	1012	1143	1263	1362
Total input power	°E	kW	141	161	189	212	246	278	318	340
	AE		143	162	191	214	248	280	320	342
Water flow rate at the evaporator	°E	l/h	92883	105773	124872	140352	162884	184040	210700	225492
	AE		99244	113004	133988	150156	174064	196596	217236	234264
Pressure drops at the evaporator	°E	kPa	30	42	39	32	31	44	49	54
	AE		35	48	47	33	49	34	32	39
ENERGETIC INDEX										
E.E.R.	°E		3,83	3,82	3,84	3,85	3,85	3,85	3,85	3,86
	AE		4,03	4,06	4,08	4,08	4,08	4,08	3,95	3,98
E.E.R. EN 14511	°E									
	AE									
E.E.R. (EUROVENT CLASS)	°E		A	A	A	A	A	A	A	A
	AE		A	A	A	A	A	A	A	A
ELECTRICAL DATA			400V-3-50Hz							
Total input current	°E	A	247	278	315	345	416	465	532	579
	AE		249	281	318	348	418	467	534	581
Maximum current	ALL	A	370	418	468	516	612	690	776	846
Peak current	ALL	A	545	613	670	723	892	995	1193	1340
Protection rating of the machine			IP20							
Charges (1)										
Refrigerant (R134a)	ALL	Kg								
Oil	ALL	Kg	19	19	35	35	35	35	38	38
PARTIALISATIONS										
Partialisation of the unit		%	70-100	70-100	70-100	70-100	70-100	70-100	70-100	70-100
TWIN-SCREW COMPRESSORS										
N° compressors	ALL	n°	2	2	2	2	2	2	2	2
N° circuits	ALL	n°	2	2	2	2	2	2	2	2
Electric resistance	ALL	n° / W	1/300	1/300	1/300	1/300	1/300	1/300	1/300	1/300
USER side SHELL AND TUBE EVAPORATOR										
Quantity	ALL	n°	1	1	1	1	1	1	1	1
Water content	ALL	l								
VICTAULIC hydraulic connections	IN/OUT	Ø	6"	6"	6"	8"	8"	8"	8"	8"
REFRIGERANT CONNECTIONS										
CIRCUIT 1										
Gas load (R134a)	ALL	Kg								
liquid line	ALL	Ø								
Gas line		Ø								
CIRCUIT 2										
Gas load (R134a)	ALL	Kg								
liquid line	ALL	Ø								
Gas line		Ø								
SOUND DATA										
Sound power	E/AE	dB(A)	93,6	94,0	93,5	93,7	94,6	95,5	97,3	97,9
Sound Pressure	E/AE	dB(A)	61,6	62,0	61,5	61,7	62,6	63,5	65,3	65,9
Sound power	L	dB(A)	85,5	86,2	87,0	87,9	90,2	89,8	91,0	90,8
Sound Pressure	L	dB(A)	53,5	54,2	55,0	55,9	58,2	57,8	59,0	58,8

NOMINAL REFERENCE CONDITIONS

COOLING
EVAPORATOR

Water input temperature	12 °C
Output water temperature	7 °C
Δt	5 °C
Condensation temperature	45 °C

Sound power
Aermec determines sound power values in agreement with the 9614-2 Standard, in compliance with that requested by Eurovent certification.

Sound Pressure
Sound pressure measured in free field conditions with reflective surface (directivity factor Q=2) at 10mt distance from external surface of unit, in compliance with ISO 3744 regulations.

(1) The declared data can be amended any time Aermec considers it necessary

HWF	VERS.	U.M.	2512	2812	3212	3612	4212	4812	5612	6412
DIMENSIONS AND WEIGHTS										
Height	E	mm	2100	2100	2050	2120	2140	2140	2210	2210
	AE		2180	2180	2190	2340	2340	2340	2380	2380
Width	E	mm	1470	1470	1470	1520	1550	1550	1600	1600
	AE		1470	1470	1537	1695	1695	1695	1700	1700
Depth	E	mm	3690	3690	4030	4030	4370	4370	4610	4760
	AE		4330	4330	4330	4370	4550	4550	4800	4800
Empty weight	E	Kg	3570	3650	4470	4750	5100	5200	6110	6310
	AE		4080	4140	5470	5950	6290	6460	7310	7410
Functioning weight	E	Kg								
	AE									

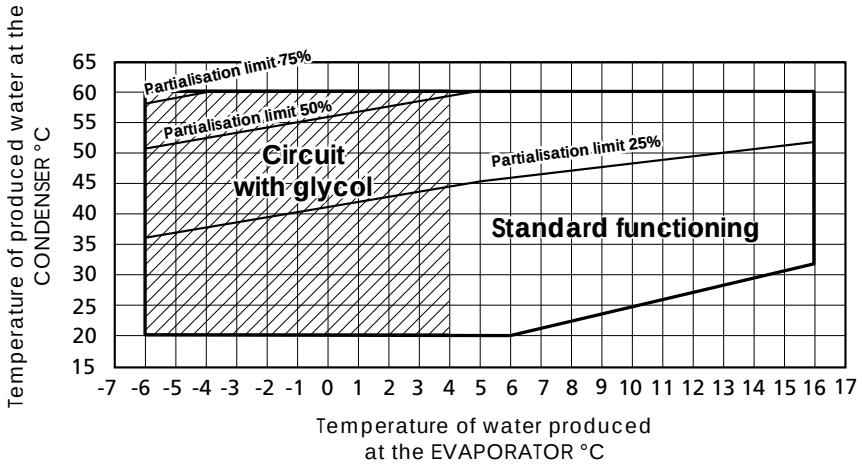
for E - D - T set-ups,
CONTACT THE ESTABLISHMENT

9. FUNCTIONING LIMITS

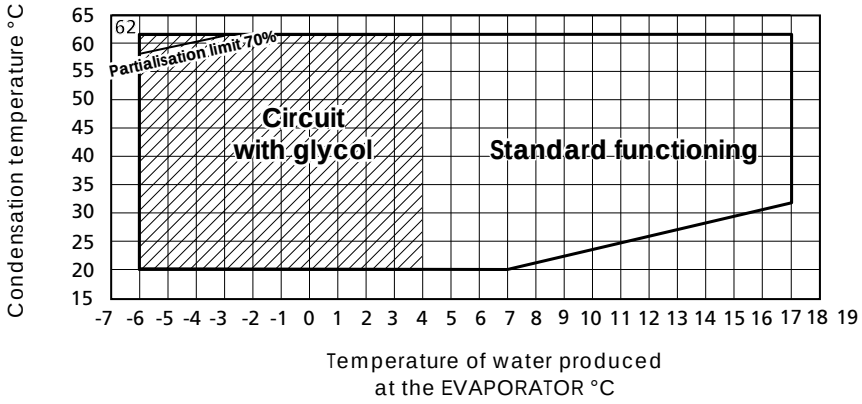
For functioning limits, please refer to the diagrams, valid for Δt = 5°C.

NOTE
If the unit is to function outside of operational limits, we recommend firstly contacting our technical-sales service

9.1. FUNCTIONING LIMITS FOR HWF°/A MODELS



9.2. FUNCTIONING LIMITS FOR HWF°E/AE



9.3. DESIGN DATA

COOLING		High pressure side	Low pressure side
Acceptable maximum pressure	bar	22	16,5
Acceptable maximum temperature	°C	120	55
Acceptable minimum temperature	°C	-10	-10

10. PERFORMANCE IN COOLING MODE

10.1. HWF 2512 STANDARD VERSION "°"

temp of water produced at evaporator °C	temp of water produced AT THE Condenser °C																	
	20		25		30		35		40		45		50		55		60	
	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe
	[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]	
-6	462,5	93,3	443,7	99,0	420,4	106,6	393,1	116,4	362,3	128,2	328,6	142,1	292,4	158,3	254,1	176,8	214,3	197,5
-4	494,5	93,6	475,7	99,3	452,4	106,9	425,0	116,6	394,1	128,4	360,0	142,3	323,4	158,5	284,7	176,8	244,4	197,5
-2	528,2	94,5	509,4	100,2	486,0	107,9	458,5	117,5	427,3	129,3	393,0	143,2	356,0	159,3	316,7	177,6	275,8	198,2
0	563,7	95,9	544,9	101,6	521,4	109,3	493,7	119,0	462,2	130,7	427,5	144,6	390,0	160,6	350,2	178,9	308,7	199,5
2	601,0	97,8	582,1	103,5	558,5	111,1	530,5	120,8	498,7	132,5	463,6	146,4	425,6	162,4	385,2	180,7	342,9	201,2
4	640,0	99,9	621,1	105,6	597,2	113,3	569,0	123,0	536,8	134,7	501,2	148,6	462,6	164,6	421,6	182,8	378,6	203,3
6	680,9	102,2	661,8	108,0	637,7	115,7	609,1	125,4	576,5	137,2	540,4	151,0	501,3	167,0	459,5	185,2	415,8	205,7
7	-	-	682,8	109,2	658,6	117,0	**630,0**	**127,0**	597,0	138,4	560,6	152,3	521,1	168,3	479,1	186,5	434,9	207,0
8	-	-	704,3	110,5	679,9	118,3	651,0	128,0	617,9	139,7	581,2	153,6	541,4	169,6	499,0	187,8	454,4	208,3
10	-	-	748,6	113,0	723,9	120,8	694,5	130,6	660,9	142,4	623,6	156,2	583,1	172,3	539,9	190,5	494,4	210,9
12	-	-	-	-	769,6	123,3	739,7	133,1	705,6	144,9	667,7	158,8	626,4	174,9	582,4	193,1	535,9	213,5
14	-	-	-	-	817,1	125,6	786,7	135,5	752,0	147,4	713,3	161,3	671,3	177,4	626,4	195,6	579,0	216,1
16	-	-	-	-	-	-	835,4	137,6	800,0	149,5	760,6	163,5	717,8	179,6	671,9	197,9	623,5	218,4

10.2. HWF 2512 HIGH EFFICIENCY VERSION "A"

evaporator output water temperature °C	Condenser water outlet temperature °C																	
	20		25		30		35		40		45		50		55		60	
	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe
	[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]	
-6	473,6	90,3	454,2	95,9	430,4	103,3	402,4	112,7	371,0	124,1	336,4	137,7	299,3	153,3	260,2	171,2	219,4	191,3
-4	506,3	90,7	487,0	96,2	463,1	103,6	435,1	113,0	403,4	124,4	368,6	137,9	331,1	153,5	291,5	171,3	250,2	191,3
-2	540,8	91,5	521,6	97,1	497,6	104,5	469,4	113,8	437,5	125,2	402,4	138,7	364,5	154,2	324,3	172,0	282,4	192,0
0	577,1	92,9	557,9	98,4	533,8	105,9	505,4	115,2	473,2	126,6	437,7	140,0	399,3	155,5	358,6	173,3	316,0	193,2
2	615,3	94,7	596,0	100,2	571,7	107,6	543,1	117,0	510,6	128,4	474,6	141,8	435,7	157,3	394,4	175,0	351,1	194,9
4	655,3	96,7	635,9	102,3	611,4	109,8	582,5	119,1	549,6	130,5	513,1	143,9	473,7	159,4	431,7	177,0	387,6	196,9
6	697,1	99,0	677,6	104,6	652,9	112,1	623,6	121,5	590,3	132,8	553,3	146,3	513,2	161,7	470,5	179,4	425,7	199,2
7	-	-	699,1	105,8	674,3	113,3	**645,0**	**123,0**	611,2	134,1	574,0	147,5	533,6	163,0	490,5	180,6	445,2	200,4
8	-	-	721,1	107,0	696,1	114,5	666,5	124,0	632,6	135,3	595,1	148,8	554,3	164,3	510,8	181,9	465,2	201,7
10	-	-	766,4	109,4	741,1	117,0	711,0	126,5	676,6	137,9	638,5	151,3	597,0	166,8	552,8	184,5	506,2	204,3
12	-	-	-	-	787,9	119,4	757,4	128,9	722,4	140,4	683,6	153,8	641,3	169,4	596,2	187,0	548,7	206,8
14	-	-	-	-	836,6	121,6	805,4	131,2	769,9	142,7	730,3	156,2	687,3	171,8	641,3	189,4	592,8	209,3
16	-	-	-	-	-	-	855,3	133,3	819,1	144,8	778,7	158,4	734,9	174,0	687,9	191,7	638,4	211,5

Pc = Cooling capacity

Pe = Input power

from 4 to -6 functioning with glycol

ΔT DIFFERENT FROM NOMINAL (ΔT 5)				
AT THE EVAPORATOR	**3**	**5**	**8**	**10**
Cooling capacity	0,99	1	1,02	1,03
Input power	0,99	1	1,01	1,02
Heating capacity	0,99	1	1,02	1,03
AT THE CONDENSER	-	**5**	**10**	**15**
Cooling capacity	-	1	1,01	1,02
Input power	-	1	0,99	0,98
Heating capacity	the variations can be ignored			

FOULING FACTOR [K*M²]/[W]			
	0,00001	**0,00002**	**0,00005**
Cooling capacity	1	0,99	0,98
Input power	1	1	1
Heating capacity	1	1	0,99
Input power	1	1	1,02

The performances (cooling - absorbed), stated here are always calculated with Δt 5°C. In order to obtain performance and absorption with different Δt, use the corrective factors given in the table.

The performance supplied refer to clean pipe conditions with deposit factor = 1. For different deposit factor values, multiply the performance table data by the coefficients given in the table.

10.3. HWF 2812 STANDARD VERSION "°"

evaporator output water temperature °C	Condenser water outlet temperature °C																	
	20		25		30		35		40		45		50		55		60	
	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe
	[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]	
-6	525,7	105,8	504,2	112,2	477,7	120,9	446,7	131,9	411,8	145,3	373,5	161,2	332,3	179,5	288,8	200,4	243,5	224,0
-4	562,0	106,1	540,6	112,6	514,1	121,3	483,0	132,2	447,8	145,6	409,2	161,4	367,6	179,7	323,6	200,5	277,7	224,0
-2	600,3	107,2	579,0	113,6	552,4	122,3	521,1	133,3	485,7	146,6	446,7	162,3	404,6	180,6	360,0	201,3	313,4	224,7
0	640,6	108,8	619,3	115,2	592,6	123,9	561,1	134,9	525,3	148,2	485,9	163,9	443,3	182,1	398,1	202,8	350,8	226,2
2	683,0	110,9	661,6	117,3	634,7	126,0	602,9	137,0	566,8	150,3	526,9	166,0	483,7	184,1	437,8	204,8	389,7	228,1
4	727,4	113,3	705,8	119,8	678,7	128,5	646,6	139,5	610,1	152,8	569,6	168,5	525,8	186,6	479,2	207,3	430,3	230,5
6	773,9	115,9	752,1	122,5	724,8	131,2	692,3	142,2	655,2	155,5	614,2	171,2	569,7	189,4	522,3	210,0	472,5	233,2
7	-	-	776,0	123,9	748,5	132,6	**716,0**	**144,0**	678,5	157,0	637,1	172,7	592,3	190,8	544,5	211,4	494,2	234,7
8	-	-	800,5	125,3	772,7	134,1	739,8	145,1	702,2	158,5	660,6	174,2	615,3	192,3	567,1	212,9	516,4	236,1
10	-	-	850,8	128,1	822,7	137,0	789,3	148,1	751,1	161,4	708,8	177,2	662,7	195,3	613,6	215,9	561,9	239,1
12	-	-	-	-	874,7	139,8	840,7	150,9	801,9	164,3	758,8	180,1	711,9	198,3	661,9	218,9	609,1	242,1
14	-	-	-	-	928,7	142,4	894,1	153,6	854,6	167,1	810,7	182,9	762,9	201,1	711,9	221,8	658,0	245,0
16	-	-	-	-	-	-	949,5	156,0	909,2	169,5	864,5	185,4	815,7	203,7	763,6	224,4	708,6	247,6

10.4. HWF 2812 HIGH EFFICIENCY VERSION "A"

evaporator output water temperature °C	Condenser water outlet temperature °C																	
	20		25		30		35		40		45		50		55		60	
	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe
	[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]	
-6	538,2	102,8	516,2	109,1	489,1	117,6	457,4	128,3	421,6	141,3	382,3	156,7	340,2	174,5	295,6	194,9	249,3	217,7
-4	575,3	103,2	553,5	109,5	526,3	117,9	494,5	128,6	458,5	141,6	418,9	156,9	376,3	174,7	331,3	194,9	284,3	217,8
-2	614,6	104,2	592,7	110,5	565,5	118,9	533,5	129,6	497,2	142,5	457,3	157,8	414,2	175,6	368,5	195,8	320,9	218,5
0	655,8	105,8	634,0	112,0	606,6	120,5	574,4	131,1	537,8	144,1	497,4	159,4	453,8	177,0	407,5	197,2	359,1	219,9
2	699,2	107,8	677,3	114,1	649,8	122,5	617,2	133,2	580,2	146,1	539,4	161,4	495,2	179,0	448,2	199,1	399,0	221,8
4	744,7	110,1	722,6	116,5	694,9	124,9	662,0	135,6	624,6	148,5	583,1	163,8	538,3	181,4	490,6	201,5	440,5	224,1
6	792,2	112,7	770,0	119,1	742,0	127,6	708,7	138,3	670,8	151,2	628,8	166,5	583,2	184,1	534,7	204,2	483,7	226,7
7	-	-	794,5	120,4	766,3	129,0	**733,0**	**140,0**	694,6	152,6	652,3	167,9	606,3	185,5	557,4	205,6	506,0	228,1
8	-	-	819,5	121,8	791,1	130,4	757,4	141,1	718,9	154,1	676,2	169,3	629,9	187,0	580,5	207,0	528,6	229,6
10	-	-	871,0	124,6	842,2	133,2	808,0	143,9	769,0	156,9	725,6	172,2	678,5	189,9	628,2	209,9	575,2	232,5
12	-	-	-	-	895,4	135,9	860,7	146,7	821,0	159,8	776,8	175,1	728,8	192,8	677,6	212,9	623,6	235,4
14	-	-	-	-	950,7	138,5	915,3	149,3	874,9	162,4	830,0	177,8	781,0	195,5	728,8	215,6	673,6	238,2
16	-	-	-	-	-	-	972,0	151,7	930,8	164,8	885,0	180,3	835,1	198,0	781,8	218,1	725,5	240,7

The performances (cooling - absorbed), stated here are always calculated with Δt 5°C. In order to obtain performance and absorption with different Δt, use the corrective factors given in the table.

The performance supplied refer to clean pipe conditions with deposit factor = 1. For different deposit factor values, multiply the performance table data by the coefficients given in the table.

Pc = Cooling capacity

Pe = Input power

from 4 to -6 functioning with glycol

ΔT DIFFERENT FROM NOMINAL (ΔT 5)				
AT THE EVAPORATOR	**3**	**5**	**8**	**10**
Cooling capacity	0,99	1	1,02	1,03
Input power	0,99	1	1,01	1,02
Heating capacity	0,99	1	1,02	1,03
AT THE CONDENSER	-	**5**	**10**	**15**
Cooling capacity	-	1	1,01	1,02
Input power	-	1	0,99	0,98
Heating capacity	the variations can be ignored			

FOULING FACTOR [K*M²]/[W]			
	0,00001	**0,00002**	**0,00005**
Cooling capacity	1	0,99	0,98
Input power	1	1	1
Heating capacity	1	1	0,99
Input power	1	1	1,02

10.5. HWF 3212 STANDARD VERSION "°"

temp of water produced at evaporator °C	temp of water produced AT THE Condenser °C																	
	20		25		30		35		40		45		50		55		60	
	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe
	[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]	
-6	621,1	124,1	595,8	131,7	564,5	141,9	527,9	154,8	486,6	170,6	441,3	189,2	392,6	210,7	341,2	235,2	287,8	262,9
-4	664,0	124,6	638,8	132,1	607,5	142,3	570,7	155,2	529,2	170,9	483,5	189,4	434,3	210,9	382,3	235,3	328,1	262,9
-2	709,3	125,8	684,1	133,4	652,7	143,5	615,7	156,4	573,9	172,0	527,7	190,5	478,0	211,9	425,3	236,3	370,4	263,8
0	756,9	127,7	731,7	135,3	700,2	145,4	662,9	158,3	620,7	173,9	574,1	192,4	523,7	213,7	470,3	238,0	414,5	265,4
2	807,0	130,1	781,7	137,7	749,9	147,9	712,4	160,8	669,7	176,4	622,5	194,8	571,5	216,1	517,3	240,4	460,5	267,7
4	859,5	132,9	834,0	140,6	802,0	150,8	764,0	163,7	720,8	179,3	673,0	197,7	621,3	219,0	566,2	243,3	508,4	270,5
6	914,4	136,0	888,7	143,7	856,3	154,0	818,0	166,9	774,2	182,5	725,7	200,9	673,1	222,2	617,1	246,5	558,3	273,7
7	-	-	916,9	145,4	884,4	155,7	**846,0**	**169,0**	801,7	184,2	752,8	202,7	699,8	223,9	643,3	248,2	584,0	275,4
8	-	-	945,8	147,0	913,0	157,4	874,1	170,3	829,7	186,0	780,5	204,4	727,0	225,7	670,0	249,9	610,1	277,1
10	-	-	1005,3	150,4	972,1	160,8	932,6	173,8	887,5	189,5	837,4	207,9	783,1	229,2	725,0	253,4	663,9	280,7
12	-	-	-	-	1033,5	164,1	993,4	177,1	947,5	192,9	896,6	211,4	841,2	232,7	782,0	256,9	719,7	284,2
14	-	-	-	-	1097,3	167,1	1056,4	180,3	1009,8	196,1	957,9	214,6	901,5	236,0	841,1	260,3	777,5	287,5
16	-	-	-	-	-	-	1121,9	183,1	1074,3	199,0	1021,4	217,6	963,9	239,0	902,3	263,3	837,3	290,6

10.6. HWF 3212 HIGH EFFICIENCY VERSION "A"

evaporator output water temperature °C	Condenser water outlet temperature °C																	
	20		25		30		35		40		45		50		55		60	
	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe
	[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]	
-6	629,9	120,5	604,2	127,8	572,5	137,7	535,4	150,3	493,5	165,5	447,5	183,6	398,2	204,4	346,1	228,3	291,8	255,1
-4	673,4	120,9	647,8	128,2	616,1	138,1	578,8	150,6	536,7	165,8	490,3	183,8	440,5	204,6	387,7	228,4	332,8	255,1
-2	719,4	122,1	693,8	129,4	661,9	139,3	624,5	151,8	582,0	167,0	535,2	184,9	484,8	205,6	431,4	229,3	375,6	256,0
0	767,7	123,9	742,1	131,3	710,1	141,1	672,3	153,6	629,5	168,8	582,2	186,7	531,2	207,4	477,0	231,0	420,4	257,6
2	818,4	126,2	792,8	133,6	760,6	143,5	722,5	156,0	679,2	171,2	631,3	189,0	579,6	209,7	524,6	233,3	467,0	259,8
4	871,7	129,0	845,8	136,4	813,4	146,3	774,9	158,8	731,1	174,0	682,6	191,9	630,1	212,5	574,2	236,1	515,6	262,5
6	927,4	132,0	901,3	139,5	868,5	149,4	829,6	162,0	785,2	177,1	736,0	195,0	682,7	215,7	625,9	239,2	566,2	265,6
7	-	-	930,0	141,1	896,9	151,1	**858,0**	**164,0**	813,1	178,8	763,5	196,7	709,7	217,3	652,4	240,8	592,3	267,2
8	-	-	959,2	142,7	926,0	152,7	886,5	165,3	841,5	180,5	791,6	198,3	737,4	219,0	679,5	242,5	618,8	268,9
10	-	-	1019,5	145,9	985,9	156,0	945,8	168,6	900,1	183,8	849,3	201,8	794,2	222,4	735,3	245,9	673,3	272,3
12	-	-	-	-	1048,1	159,2	1007,5	171,9	961,0	187,2	909,3	205,1	853,1	225,8	793,1	249,3	729,9	275,8
14	-	-	-	-	1112,8	162,2	1071,4	174,9	1024,1	190,3	971,5	208,3	914,2	229,0	853,0	252,6	788,5	279,0
16	-	-	-	-	-	-	1137,8	177,7	1089,5	193,1	1035,9	211,2	977,5	232,0	915,1	255,5	849,2	282,0

Pc = Cooling capacity

Pe = Input power

from 4 to -6 functioning with glycol

ΔT DIFFERENT FROM NOMINAL (ΔT 5)				
AT THE EVAPORATOR	**3**	**5**	**8**	**10**
Cooling capacity	0,99	1	1,02	1,03
Input power	0,99	1	1,01	1,02
Heating capacity	0,99	1	1,02	1,03
AT THE CONDENSER	-	**5**	**10**	**15**
Cooling capacity	-	1	1,01	1,02
Input power	-	1	0,99	0,98
Heating capacity	the variations can be ignored			

FOULING FACTOR [K*M²]/[W]			
	0,00001	**0,00002**	**0,00005**
Cooling capacity	1	0,99	0,98
Input power	1	1	1
Heating capacity	1	1	0,99
Input power	1	1	1,02

The performances (cooling - absorbed), stated here are always calculated with Δt 5°C. In order to obtain performance and absorption with different Δt, use the corrective factors given in the table.

The performance supplied refer to clean pipe conditions with deposit factor = 1. For different deposit factor values, multiply the performance table data by the coefficients given in the table.

10.7. HWF 3612 STANDARD VERSION "°"

evaporator output water temperature °C	Condenser water outlet temperature °C																	
	20		25		30		35		40		45		50		55		60	
	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe
	[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]	
-6	696,8	140,3	668,3	148,8	633,2	160,4	592,1	175,0	545,8	192,8	495,0	213,8	440,4	238,1	382,8	265,8	322,8	297,1
-4	744,9	140,8	716,6	149,3	681,4	160,8	640,2	175,4	593,6	193,1	542,4	214,1	487,2	238,3	428,9	266,0	368,1	297,1
-2	795,6	142,2	767,4	150,7	732,1	162,2	690,7	176,8	643,7	194,4	592,0	215,3	536,2	239,5	477,1	267,1	415,5	298,1
0	849,1	144,3	820,8	152,9	785,4	164,4	743,7	178,9	696,3	196,6	644,0	217,4	587,5	241,5	527,6	269,0	464,9	300,0
2	905,2	147,0	876,8	155,6	841,2	167,2	799,1	181,7	751,2	199,3	698,3	220,2	641,1	244,3	580,2	271,7	516,6	302,6
4	964,1	150,2	935,5	158,9	899,6	170,4	857,1	185,0	808,6	202,6	755,0	223,4	696,9	247,5	635,1	274,9	570,3	305,7
6	1025,7	153,7	996,9	162,4	960,6	174,0	917,5	188,6	868,5	206,3	814,1	227,1	755,1	251,2	692,2	278,5	626,3	309,3
7	-	-	1028,6	164,3	992,1	175,9	**949,0**	**191,0**	899,3	208,2	844,5	229,0	785,0	253,1	721,6	280,5	655,1	311,2
8	-	-	1060,9	166,2	1024,2	177,8	980,6	192,5	930,8	210,2	875,5	231,0	815,6	255,1	751,6	282,4	684,4	313,2
10	-	-	1127,7	169,9	1090,4	181,7	1046,1	196,4	995,6	214,1	939,4	235,0	878,4	259,1	813,3	286,4	744,8	317,2
12	-	-	-	-	1159,3	185,4	1114,3	200,2	1062,9	218,0	1005,7	238,9	943,6	263,0	877,2	290,4	807,3	321,2
14	-	-	-	-	1230,9	188,9	1185,1	203,8	1132,7	221,6	1074,5	242,6	1011,2	266,7	943,5	294,2	872,1	324,9
16	-	-	-	-	-	-	1258,4	206,9	1205,1	224,9	1145,8	245,9	1081,2	270,1	1012,1	297,6	939,2	328,4

10.8. HWF 3612 HIGH EFFICIENCY VERSION "A"

evaporator output water temperature °C	Condenser water outlet temperature °C																	
	20		25		30		35		40		45		50		55		60	
	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe
	[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]	
-6	711,4	135,9	682,4	144,2	646,6	155,4	604,6	169,5	557,3	186,7	505,4	207,1	449,7	230,6	390,8	257,5	329,6	287,7
-4	760,6	136,4	731,7	144,6	695,8	155,8	653,7	169,9	606,1	187,1	553,8	207,3	497,5	230,8	437,9	257,6	375,8	287,7
-2	812,4	137,7	783,5	146,0	747,6	157,1	705,2	171,2	657,3	188,3	604,5	208,6	547,5	232,0	487,2	258,7	424,2	288,7
0	867,0	139,8	838,1	148,1	802,0	159,2	759,3	173,3	710,9	190,4	657,5	210,6	599,9	233,9	538,7	260,6	474,7	290,6
2	924,3	142,4	895,3	150,7	859,0	161,9	815,9	176,0	767,1	193,1	713,0	213,2	654,6	236,6	592,5	263,2	527,4	293,1
4	984,4	145,5	955,3	153,9	918,6	165,1	875,1	179,2	825,7	196,3	770,9	216,4	711,6	239,7	648,5	266,3	582,4	296,1
6	1047,3	148,9	1017,9	157,3	980,8	168,6	936,9	182,7	886,8	199,8	831,2	220,0	771,0	243,3	706,8	269,8	639,5	299,6
7	-	-	1050,3	159,1	1013,0	170,4	**969,0**	**185,0**	918,2	201,7	862,3	221,8	801,6	245,1	736,9	271,7	668,9	301,5
8	-	-	1083,3	161,0	1045,8	172,3	1001,2	186,4	950,4	203,6	894,0	223,7	832,7	247,0	767,5	273,6	698,8	303,4
10	-	-	1151,4	164,6	1113,4	176,0	1068,2	190,2	1016,5	207,4	959,2	227,6	896,9	250,9	830,4	277,4	760,5	307,2
12	-	-	-	-	1183,7	179,6	1137,8	193,9	1085,3	211,1	1026,9	231,4	963,5	254,7	895,7	281,3	824,3	311,1
14	-	-	-	-	1256,8	183,0	1210,0	197,4	1156,6	214,7	1097,2	235,0	1032,5	258,4	963,4	284,9	890,5	314,7
16	-	-	-	-	-	-	1285,0	200,4	1230,5	217,8	1169,9	238,2	1104,0	261,7	1033,4	288,3	959,0	318,1

The performances (cooling - absorbed), stated here are always calculated with Δt 5°C. In order to obtain performance and absorption with different Δt, use the corrective factors given in the table.

The performance supplied refer to clean pipe conditions with deposit factor = 1. For different deposit factor values, multiply the performance table data by the coefficients given in the table.

Pc = Cooling capacity

Pe = Input power

from 4 to -6 functioning with glycol

ΔT DIFFERENT FROM NOMINAL (ΔT 5)				
AT THE EVAPORATOR	**3**	**5**	**8**	**10**
Cooling capacity	0,99	1	1,02	1,03
Input power	0,99	1	1,01	1,02
Heating capacity	0,99	1	1,02	1,03
AT THE CONDENSER	-	**5**	**10**	**15**
Cooling capacity	-	1	1,01	1,02
Input power	-	1	0,99	0,98
Heating capacity	the variations can be ignored			

FOULING FACTOR [K*M²]/[W]			
	0,00001	**0,00002**	**0,00005**
Cooling capacity	1	0,99	0,98
Input power	1	1	1
Heating capacity	1	1	0,99
Input power	1	1	1,02

10.9. HWF 4212 STANDARD VERSION "°"

temp of water produced at evaporator °C	temp of water produced AT THE Condenser °C																	
	20		25		30		35		40		45		50		55		60	
	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe
	[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]	
-6	803,9	161,6	771,1	171,4	730,6	184,7	683,2	201,6	629,8	222,0	571,2	246,2	508,2	274,3	441,7	306,2	372,5	342,2
-4	859,5	162,2	826,8	172,0	786,2	185,3	738,7	202,0	684,9	222,4	625,8	246,6	562,2	274,5	494,8	306,3	424,7	342,2
-2	918,1	163,7	885,4	173,6	844,8	186,8	796,9	203,6	742,8	224,0	683,1	248,0	618,7	275,9	550,5	307,6	479,4	343,4
0	979,7	166,2	947,1	176,1	906,2	189,3	858,1	206,1	803,4	226,4	743,1	250,4	677,9	278,2	608,8	309,9	536,5	345,5
2	1044,5	169,4	1011,7	179,3	970,6	192,5	922,0	209,3	866,8	229,6	805,7	253,6	739,7	281,3	669,5	312,9	596,0	348,5
4	1112,4	173,0	1079,5	183,0	1038,0	196,3	988,9	213,1	933,0	233,4	871,1	257,4	804,1	285,1	732,8	316,7	658,1	352,2
6	1183,5	177,1	1150,3	187,1	1108,4	200,5	1058,7	217,3	1002,1	237,6	939,3	261,6	871,2	289,3	798,7	320,8	722,6	356,3
7	-	-	1186,8	189,2	1144,7	202,6	1095,0	220,0	1037,7	239,8	974,4	263,8	905,8	291,5	832,7	323,0	755,8	358,5
8	-	-	1224,2	191,4	1181,8	204,8	1131,4	221,7	1074,0	242,1	1010,2	266,1	941,0	293,8	867,2	325,3	789,7	360,8
10	-	-	1301,2	195,7	1258,2	209,3	1207,1	226,2	1148,7	246,6	1083,9	270,7	1013,5	298,4	938,4	329,9	859,3	365,3
12	-	-	-	-	1337,7	213,6	1285,7	230,6	1226,4	251,1	1160,5	275,2	1088,8	302,9	1012,2	334,5	931,5	369,9
14	-	-	-	-	1420,2	217,6	1367,4	234,7	1307,0	255,3	1239,8	279,4	1166,8	307,2	1088,7	338,8	1006,3	374,3
16	-	-	-	-	-	-	1452,1	238,3	1390,5	259,0	1322,1	283,3	1247,6	311,2	1167,8	342,8	1083,7	378,3

10.10. HWF 4212 HIGH EFFICIENCY VERSION "A"

evaporator output water temperature °C	Condenser water outlet temperature °C																	
	20		25		30		35		40		45		50		55		60	
	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe
	[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]	
-6	816,4	155,7	783,1	165,2	742,0	178,0	693,8	194,2	639,6	214,0	580,0	237,3	516,1	264,3	448,5	295,1	378,2	329,7
-4	872,8	156,3	839,6	165,7	798,5	178,5	750,1	194,7	695,5	214,4	635,5	237,6	570,9	264,5	502,5	295,2	431,3	329,7
-2	932,3	157,8	899,2	167,3	857,9	180,1	809,3	196,2	754,3	215,8	693,7	239,0	628,3	265,8	559,1	296,4	486,8	330,9
0	994,9	160,2	961,8	169,7	920,3	182,4	871,4	198,6	815,9	218,2	754,6	241,3	688,4	268,1	618,2	298,6	544,8	333,0
2	1060,7	163,2	1027,5	172,7	985,7	185,5	936,4	201,7	880,3	221,3	818,2	244,4	751,2	271,1	679,9	301,6	605,3	335,8
4	1129,7	166,7	1096,2	176,3	1054,1	189,2	1004,3	205,3	947,5	224,9	884,7	248,0	816,6	274,7	744,2	305,1	668,3	339,4
6	1201,9	170,6	1168,1	180,3	1125,6	193,2	1075,1	209,4	1017,6	229,0	953,9	252,1	884,8	278,8	811,1	309,2	733,8	343,3
7	-	-	1205,3	182,4	1162,5	195,3	1112,0	212,0	1053,8	231,1	989,5	254,2	919,9	280,9	845,6	311,3	767,6	345,5
8	-	-	1243,2	184,4	1200,1	197,4	1149,0	213,6	1090,6	233,3	1025,9	256,4	955,6	283,1	880,7	313,5	802,0	347,6
10	-	-	1321,4	188,6	1277,7	201,7	1225,8	218,0	1166,6	237,7	1100,8	260,8	1029,3	287,5	953,0	317,9	872,7	352,1
12	-	-	-	-	1358,4	205,8	1305,7	222,2	1245,4	241,9	1178,5	265,2	1105,7	291,9	1027,9	322,3	946,0	356,5
14	-	-	-	-	1442,3	209,7	1388,6	226,2	1327,3	246,0	1259,1	269,3	1184,9	296,1	1105,6	326,5	1021,9	360,7
16	-	-	-	-	-	-	1474,6	229,7	1412,1	249,6	1342,6	273,0	1266,9	299,8	1186,0	330,3	1100,6	364,5

Pc = Cooling capacity

Pe = Input power

from 4 to -6 functioning with glycol

ΔT DIFFERENT FROM NOMINAL (ΔT 5)				
AT THE EVAPORATOR	**3**	**5**	**8**	**10**
Cooling capacity	0,99	1	1,02	1,03
Input power	0,99	1	1,01	1,02
Heating capacity	0,99	1	1,02	1,03
AT THE CONDENSER	-	**5**	**10**	**15**
Cooling capacity	-	1	1,01	1,02
Input power	-	1	0,99	0,98
Heating capacity	the variations can be ignored			

FOULING FACTOR [K*M²]/[W]			
	0,00001	**0,00002**	**0,00005**
Cooling capacity	1	0,99	0,98
Input power	1	1	1
Heating capacity	1	1	0,99
Input power	1	1	1,02

The performances (cooling - absorbed), stated here are always calculated with Δt 5°C. In order to obtain performance and absorption with different Δt, use the corrective factors given in the table.

The performance supplied refer to clean pipe conditions with deposit factor = 1. For different deposit factor values, multiply the performance table data by the coefficients given in the table.

10.11. HWF 4812 STANDARD VERSION "°"

evaporator output water temperature °C	Condenser water outlet temperature °C																	
	20		25		30		35		40		45		50		55		60	
	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe
	[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]	
-6	925,8	185,1	888,0	196,4	841,4	211,6	786,8	230,9	725,3	254,3	657,7	282,0	585,2	314,1	508,6	350,7	428,9	391,9
-4	989,8	185,7	952,1	197,0	905,4	212,2	850,7	231,4	788,7	254,8	720,7	282,4	647,4	314,4	569,9	350,9	489,1	392,0
-2	1057,2	187,6	1019,7	198,8	972,8	214,0	917,8	233,2	855,4	256,5	786,6	284,1	712,5	316,0	634,0	352,4	552,0	393,3
0	1128,3	190,4	1090,6	201,7	1043,6	216,9	988,1	236,0	925,2	259,3	855,7	286,8	780,7	318,7	701,0	355,0	617,8	395,8
2	1202,9	194,0	1165,1	205,3	1117,8	220,5	1061,8	239,7	998,2	263,0	927,9	290,5	851,8	322,3	771,0	358,5	686,4	399,2
4	1281,1	198,2	1243,1	209,6	1195,4	224,9	1138,8	244,1	1074,5	267,4	1003,2	294,8	926,0	326,6	843,9	362,7	757,8	403,4
6	1362,9	202,8	1324,6	214,3	1276,4	229,6	1219,2	248,9	1154,0	272,2	1081,7	299,6	1003,3	331,4	919,8	367,5	832,2	408,1
7	-	-	1366,7	216,8	1318,2	232,1	**1261,0**	**252,0**	1195,0	274,7	1122,1	302,2	1043,1	333,9	958,9	370,0	870,4	410,6
8	-	-	1409,7	219,2	1360,9	234,6	1302,9	253,9	1236,8	277,3	1163,4	304,8	1083,7	336,5	998,7	372,6	909,4	413,2
10	-	-	1498,4	224,2	1448,9	239,7	1390,1	259,1	1322,9	282,5	1248,3	310,0	1167,2	341,8	1080,7	377,9	989,6	418,5
12	-	-	-	-	1540,5	244,6	1480,7	264,1	1412,3	287,6	1336,4	315,2	1253,8	347,0	1165,6	383,1	1072,7	423,7
14	-	-	-	-	1635,5	249,2	1574,7	268,8	1505,1	292,4	1427,8	320,1	1343,7	351,9	1253,7	388,1	1158,9	428,7
16	-	-	-	-	-	-	1672,2	273,0	1601,3	296,7	1522,5	324,5	1436,7	356,4	1344,9	392,7	1248,0	433,3

10.12. HWF 4812 HIGH EFFICIENCY VERSION "A"

evaporator output water temperature °C	Condenser water outlet temperature °C																	
	20		25		30		35		40		45		50		55		60	
	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe
	[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]	
-6	920,0	175,5	882,4	186,3	836,0	200,7	781,8	219,0	720,7	241,2	653,6	267,5	581,5	297,9	505,4	332,6	426,2	371,7
-4	983,5	176,2	946,1	186,8	899,7	201,3	845,3	219,5	783,7	241,7	716,1	267,9	643,3	298,2	566,3	332,8	486,0	371,7
-2	1050,5	177,9	1013,2	188,6	966,7	203,0	911,9	221,2	849,9	243,3	781,6	269,4	708,0	299,7	630,0	334,2	548,5	373,0
0	1121,1	180,6	1083,7	191,3	1037,0	205,7	981,9	223,9	919,3	246,0	850,3	272,0	775,7	302,2	696,6	336,6	613,9	375,4
2	1195,2	184,0	1157,7	194,7	1110,7	209,2	1055,1	227,4	991,9	249,4	922,0	275,5	846,4	305,6	766,1	340,0	682,0	378,6
4	1273,0	188,0	1235,2	198,8	1187,8	213,3	1131,6	231,5	1067,6	253,6	996,8	279,6	920,2	309,7	838,6	344,0	753,0	382,6
6	1354,3	192,4	1316,2	203,3	1268,3	217,8	1211,5	236,0	1146,6	258,1	1074,8	284,2	996,9	314,3	914,0	348,5	826,9	387,1
7	-	-	1358,1	205,6	1309,9	220,1	**1253,0**	**239,0**	1187,4	260,5	1115,0	286,6	1036,5	316,7	952,8	350,9	864,9	389,5
8	-	-	1400,8	207,9	1352,3	222,5	1294,7	240,8	1228,9	263,0	1156,0	289,1	1076,8	319,2	992,4	353,4	903,7	391,9
10	-	-	1488,9	212,7	1439,7	227,3	1381,3	245,7	1314,5	267,9	1240,3	294,0	1159,8	324,2	1073,8	358,4	983,3	396,9
12	-	-	-	-	1530,7	232,0	1471,3	250,5	1403,4	272,8	1327,9	298,9	1245,9	329,1	1158,2	363,4	1065,9	401,9
14	-	-	-	-	1625,1	236,4	1564,7	255,0	1495,6	277,3	1418,7	303,6	1335,1	333,8	1245,7	368,1	1151,5	406,6
16	-	-	-	-	-	-	1661,6	258,9	1591,1	281,4	1512,8	307,7	1427,6	338,0	1336,3	372,4	1240,1	411,0

The performances (cooling - absorbed), stated here are always calculated with Δt 5°C. In order to obtain performance and absorption with different Δt, use the corrective factors given in the table.

The performance supplied refer to clean pipe conditions with deposit factor = 1. For different deposit factor values, multiply the performance table data by the coefficients given in the table.

Pc = Cooling capacity

Pe = Input power

from 4 to -6 functioning with glycol

ΔT DIFFERENT FROM NOMINAL (ΔT 5)				
AT THE EVAPORATOR	**3**	**5**	**8**	**10**
Cooling capacity	0,99	1	1,02	1,03
Input power	0,99	1	1,01	1,02
Heating capacity	0,99	1	1,02	1,03
AT THE CONDENSER	-	**5**	**10**	**15**
Cooling capacity	-	1	1,01	1,02
Input power	-	1	0,99	0,98
Heating capacity	the variations can be ignored			

FOULING FACTOR [K*M²]/[W]			
	0,00001	**0,00002**	**0,00005**
Cooling capacity	1	0,99	0,98
Input power	1	1	1
Heating capacity	1	1	0,99
Input power	1	1	1,02

10.13. HWF 5612 STANDARD VERSION "°"

temp of water produced at evaporator °C	temp of water produced AT THE Condenser °C																	
	20		25		30		35		40		45		50		55		60	
	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe
	[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]	
-6	1043,3	210,1	1000,7	222,9	948,1	240,2	886,6	262,0	817,3	288,6	741,2	320,1	659,5	356,5	573,1	398,1	483,4	444,8
-4	1115,3	210,8	1072,9	223,6	1020,3	240,8	958,6	262,7	888,8	289,2	812,1	320,5	729,5	356,8	642,2	398,2	551,1	444,8
-2	1191,4	212,9	1149,0	225,7	1096,3	242,9	1034,2	264,7	963,9	291,2	886,4	322,4	802,9	358,6	714,4	399,9	622,1	446,4
0	1271,4	216,1	1229,0	228,9	1176,0	246,1	1113,5	267,9	1042,6	294,3	964,3	325,5	879,7	361,7	790,0	402,8	696,2	449,2
2	1355,5	220,2	1313,0	233,0	1259,6	250,3	1196,6	272,1	1124,9	298,5	1045,6	329,7	959,9	365,7	868,8	406,8	773,5	453,1
4	1443,6	225,0	1400,8	237,9	1347,1	255,2	1283,3	277,0	1210,8	303,4	1130,5	334,6	1043,5	370,6	951,0	411,7	854,0	457,8
6	1535,9	230,2	1492,7	243,2	1438,4	260,6	1373,9	282,5	1300,4	308,9	1218,9	340,1	1130,6	376,1	1036,5	417,1	937,8	463,2
7	-	-	1540,2	246,0	1485,5	263,4	**1421,0**	**286,0**	1346,6	311,8	1264,5	343,0	1175,5	379,0	1080,6	420,0	980,9	466,0
8	-	-	1588,6	248,8	1533,6	266,3	1468,3	288,2	1393,7	314,7	1311,0	345,9	1221,2	381,9	1125,4	422,9	1024,8	469,0
10	-	-	1688,6	254,5	1632,8	272,0	1566,5	294,1	1490,7	320,6	1406,6	351,9	1315,3	387,9	1217,8	428,9	1115,2	474,9
12	-	-	-	-	1735,9	277,6	1668,5	299,8	1591,5	326,4	1506,0	357,7	1412,9	393,8	1313,5	434,8	1208,9	480,9
14	-	-	-	-	1843,0	282,8	1774,5	305,1	1696,1	331,9	1608,9	363,3	1514,1	399,4	1412,8	440,5	1305,9	486,6
16	-	-	-	-	-	-	1884,4	309,9	1804,5	336,7	1715,7	368,3	1619,0	404,5	1515,5	445,6	1406,4	491,8

10.14. HWF 5612 HIGH EFFICIENCY VERSION "A"

evaporator output water temperature °C	Condenser water outlet temperature °C																	
	20		25		30		35		40		45		50		55		60	
	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe
	[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]	
-6	1056,5	202,0	1013,4	214,3	960,2	230,9	897,9	252,0	827,6	277,5	750,6	307,8	667,8	342,8	580,4	382,8	489,5	427,7
-4	1129,5	202,7	1086,5	215,0	1033,3	231,6	970,7	252,6	900,1	278,1	822,4	308,2	738,8	343,1	650,3	382,9	558,1	427,7
-2	1206,5	204,7	1163,6	217,0	1110,2	233,6	1047,3	254,5	976,1	280,0	897,7	310,0	813,1	344,8	723,5	384,5	630,0	429,2
0	1287,5	207,8	1244,6	220,1	1190,9	236,7	1127,6	257,6	1055,8	283,0	976,5	313,0	890,9	347,8	800,0	387,3	705,0	431,9
2	1372,7	211,7	1329,6	224,1	1275,6	240,7	1211,7	261,6	1139,1	287,0	1058,9	317,0	972,1	351,7	879,8	391,2	783,3	435,6
4	1461,9	216,3	1418,6	228,7	1364,1	245,4	1299,6	266,4	1226,1	291,8	1144,8	321,7	1056,7	356,4	963,0	395,8	864,8	440,2
6	1555,3	221,3	1511,6	233,9	1456,6	250,6	1391,3	271,6	1316,9	297,0	1234,4	327,0	1144,9	361,6	1049,7	401,0	949,6	445,4
7	-	-	1559,7	236,6	1504,3	253,3	**1439,0**	**275,0**	1363,6	299,8	1280,5	329,8	1190,4	364,4	1094,2	403,8	993,3	448,1
8	-	-	1608,7	239,3	1553,0	256,1	1486,9	277,1	1411,3	302,6	1327,6	332,6	1236,7	367,2	1139,7	406,6	1037,8	450,9
10	-	-	1709,9	244,7	1653,5	261,6	1586,3	282,7	1509,6	308,3	1424,5	338,3	1331,9	373,0	1233,2	412,4	1129,3	456,7
12	-	-	-	-	1757,9	267,0	1689,7	288,2	1611,7	313,8	1525,0	344,0	1430,8	378,7	1330,2	418,1	1224,2	462,4
14	-	-	-	-	1866,4	272,0	1797,0	293,4	1717,6	319,1	1629,3	349,3	1533,3	384,1	1430,7	423,5	1322,5	467,9
16	-	-	-	-	-	-	1908,2	297,9	1827,3	323,8	1737,4	354,1	1639,5	389,0	1534,7	428,5	1424,2	472,9

Pc = Cooling capacity

Pe = Input power

from 4 to -6 functioning with glycol

ΔT DIFFERENT FROM NOMINAL (ΔT 5)				
AT THE EVAPORATOR	**3**	**5**	**8**	**10**
Cooling capacity	0,99	1	1,02	1,03
Input power	0,99	1	1,01	1,02
Heating capacity	0,99	1	1,02	1,03
AT THE CONDENSER	-	**5**	**10**	**15**
Cooling capacity	-	1	1,01	1,02
Input power	-	1	0,99	0,98
Heating capacity	the variations can be ignored			

FOULING FACTOR [K*M²]/[W]			
	0,00001	**0,00002**	**0,00005**
Cooling capacity	1	0,99	0,98
Input power	1	1	1
Heating capacity	1	1	0,99
Input power	1	1	1,02

The performances (cooling - absorbed), stated here are always calculated with Δt 5°C. In order to obtain performance and absorption with different Δt, use the corrective factors given in the table.

The performance supplied refer to clean pipe conditions with deposit factor = 1. For different deposit factor values, multiply the performance table data by the coefficients given in the table.

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10.15. HWF 6412 STANDARD VERSION "°"

evaporator output water temperature °C	Condenser water outlet temperature °C																	
	20		25		30		35		40		45		50		55		60	
	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe
	[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]	
-6	1115,2	224,0	1069,7	237,7	1013,5	256,1	947,8	279,5	873,7	307,8	792,3	341,4	704,9	380,2	612,7	424,5	516,7	474,4
-4	1192,3	224,8	1146,9	238,4	1090,7	256,8	1024,7	280,1	950,1	308,4	868,1	341,8	779,8	380,6	686,5	424,7	589,2	474,4
-2	1273,5	227,0	1228,3	240,7	1171,9	259,0	1105,5	282,3	1030,4	310,5	947,6	343,8	858,3	382,5	763,7	426,5	665,0	476,0
0	1359,1	230,4	1313,8	244,1	1257,1	262,5	1190,3	285,7	1114,5	313,9	1030,8	347,2	940,4	385,7	844,5	429,6	744,2	479,0
2	1449,0	234,8	1403,5	248,5	1346,5	266,9	1279,1	290,2	1202,4	318,3	1117,7	351,6	1026,1	390,0	928,7	433,9	826,8	483,2
4	1543,2	239,9	1497,5	253,7	1440,0	272,2	1371,8	295,4	1294,3	323,6	1208,5	356,8	1115,5	395,2	1016,6	439,0	912,9	488,2
6	1641,8	245,5	1595,7	259,4	1537,6	277,9	1468,7	301,2	1390,1	329,4	1303,0	362,7	1208,6	401,1	1108,0	444,8	1002,4	494,0
7	-	-	1646,4	262,4	1587,9	280,9	**1519,0**	**305,0**	1439,4	332,5	1351,7	365,7	1256,5	404,2	1155,1	447,9	1048,5	497,0
8	-	-	1698,2	265,4	1639,4	284,0	1569,5	307,4	1489,8	335,6	1401,4	368,9	1305,4	407,3	1203,1	451,0	1095,5	500,1
10	-	-	1805,0	271,4	1745,4	290,1	1674,5	313,6	1593,5	341,9	1503,6	375,2	1406,0	413,7	1301,8	457,4	1192,1	506,5
12	-	-	-	-	1855,6	296,1	1783,6	319,7	1701,3	348,1	1609,8	381,5	1510,4	420,0	1404,1	463,7	1292,2	512,8
14	-	-	-	-	1970,1	301,6	1896,9	325,4	1813,1	353,9	1719,9	387,4	1618,6	426,0	1510,2	469,7	1396,0	518,9
16	-	-	-	-	-	-	2014,3	330,4	1928,9	359,1	1834,0	392,7	1730,6	431,4	1620,0	475,3	1503,4	524,5

10.16. HWF 6412 HIGH EFFICIENCY VERSION "A"

evaporator output water temperature °C	Condenser water outlet temperature °C																	
	20		25		30		35		40		45		50		55		60	
	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe	Pc	Pe
	[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]	
-6	1122,6	215,2	1076,8	228,3	1020,2	246,0	954,0	268,5	879,4	295,7	797,5	327,9	709,6	365,3	616,7	407,8	520,1	455,7
-4	1200,1	216,0	1154,5	229,1	1097,9	246,7	1031,4	269,1	956,4	296,3	873,8	328,4	785,0	365,6	691,0	408,0	593,0	455,7
-2	1281,9	218,1	1236,4	231,2	1179,6	248,8	1112,8	271,2	1037,2	298,3	953,8	330,3	864,0	367,4	768,7	409,7	669,4	457,3
0	1368,0	221,4	1322,4	234,5	1265,4	252,2	1198,2	274,5	1121,8	301,5	1037,6	333,5	946,6	370,5	850,0	412,7	749,1	460,2
2	1458,5	225,6	1412,7	238,7	1355,4	256,4	1287,5	278,7	1210,3	305,8	1125,1	337,7	1032,9	374,7	934,9	416,8	832,3	464,2
4	1553,3	230,5	1507,3	243,7	1449,4	261,5	1380,9	283,8	1302,8	310,8	1216,4	342,8	1122,8	379,7	1023,3	421,7	918,9	469,0
6	1652,6	235,8	1606,2	249,2	1547,7	267,0	1478,3	289,4	1399,2	316,5	1311,6	348,4	1216,5	385,3	1115,3	427,3	1009,0	474,5
7	-	-	1657,2	252,0	1598,4	269,9	**1529,0**	**293,0**	1448,9	319,4	1360,6	351,3	1264,8	388,3	1162,7	430,2	1055,4	477,5
8	-	-	1709,4	254,9	1650,2	272,8	1579,9	295,3	1499,6	322,4	1410,6	354,4	1314,0	391,3	1211,0	433,3	1102,7	480,5
10	-	-	1816,9	260,7	1756,9	278,7	1685,5	301,2	1604,0	328,5	1513,5	360,5	1415,3	397,4	1310,3	439,4	1199,9	486,6
12	-	-	-	-	1867,8	284,4	1795,3	307,1	1712,5	334,4	1620,4	366,5	1520,3	403,4	1413,4	445,5	1300,7	492,7
14	-	-	-	-	1983,1	289,8	1909,4	312,6	1825,0	340,0	1731,2	372,1	1629,2	409,2	1520,1	451,3	1405,2	498,5
16	-	-	-	-	-	-	2027,6	317,4	1941,6	345,0	1846,0	377,3	1742,0	414,4	1630,7	456,6	1513,3	503,8

The performances (cooling - absorbed), stated here are always calculated with Δt 5°C. In order to obtain performance and absorption with different Δt, use the corrective factors given in the table.

The performance supplied refer to clean pipe conditions with deposit factor = 1. For different deposit factor values, multiply the performance table data by the coefficients given in the table.

Pc = Cooling capacity

Pe = Input power

from 4 to -6 functioning with glycol

ΔT DIFFERENT FROM NOMINAL (ΔT 5)				
AT THE EVAPORATOR	**3**	**5**	**8**	**10**
Cooling capacity	0,99	1	1,02	1,03
Input power	0,99	1	1,01	1,02
Heating capacity	0,99	1	1,02	1,03
AT THE CONDENSER	-	**5**	**10**	**15**
Cooling capacity	-	1	1,01	1,02
Input power	-	1	0,99	0,98
Heating capacity	the variations can be ignored			

FOULING FACTOR [K*M²]/[W]			
	0,00001	**0,00002**	**0,00005**
Cooling capacity	1	0,99	0,98
Input power	1	1	1
Heating capacity	1	1	0,99
Input power	1	1	1,02

11. PERFORMANCE IN HEATING MODE

11.1. HWF 2512 STANDARD VERSION "°"

temp of water produced at evaporator °C	temp of water produced AT THE Condenser °C																	
	20		25		30		35		40		45		50		55		60	
	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe
	[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]	
-6	556,9	92,8	543,3	98,5	527,2	106,1	509,1	115,8	489,4	127,5	468,8	141,4	447,8	157,5	427,0	175,9	406,9	196,5
-4	589,5	93,1	576,0	98,8	559,8	106,4	541,5	116,0	521,7	127,8	500,7	141,6	479,3	157,6	458,0	175,9	437,2	196,5
-2	624,4	94,0	610,9	99,7	594,7	107,3	576,2	116,9	556,1	128,6	534,8	142,4	513,0	158,4	491,0	176,7	469,6	197,2
0	661,6	95,5	648,1	101,1	631,8	108,7	613,1	118,4	592,7	130,0	571,0	143,8	548,6	159,8	526,1	178,0	504,0	198,4
2	700,9	97,3	687,4	103,0	671,0	110,6	652,1	120,2	631,3	131,9	609,2	145,6	586,3	161,6	563,1	179,7	540,2	200,2
4	742,4	99,4	728,8	105,1	712,2	112,7	693,0	122,4	671,8	134,0	649,3	147,8	625,8	163,7	601,9	181,9	578,3	202,3
5	764,0	100,5	750,3	106,3	733,5	113,9	714,2	123,6	692,8	135,2	**670,0**	**149,0**	646,2	164,9	622,0	183,0	598,0	203,4
6	786,0	101,7	772,3	107,5	755,4	115,1	735,9	124,8	714,3	136,5	691,2	150,2	667,1	166,1	642,5	184,3	618,1	204,6
7	-	-	794,7	108,7	777,7	116,4	758,0	126,0	736,2	137,7	712,8	151,5	688,4	167,4	663,5	185,5	638,6	205,9
8	-	-	817,6	109,9	800,4	117,6	780,6	127,3	758,5	139,0	734,9	152,8	710,1	168,7	684,8	186,8	659,5	207,2
10	-	-	864,7	112,4	847,3	120,2	827,0	129,9	804,5	141,6	780,2	155,4	754,8	171,4	728,7	189,5	702,5	209,8
12	-	-	-	-	895,8	122,7	875,1	132,4	852,1	144,2	827,2	158,0	801,0	174,0	774,1	192,1	747,0	212,4
14	-	-	-	-	946,0	125,0	924,8	134,8	901,2	146,6	875,7	160,5	848,7	176,5	821,0	194,6	792,9	215,0
16	-	-	-	-	-	-	976,1	136,9	951,8	148,8	925,6	162,7	897,8	178,7	869,1	196,9	840,1	217,3

11.2. HWF 2512 HIGH EFFICIENCY VERSION "A"

evaporator output water temperature °C	Condenser water outlet temperature °C																	
	20		25		30		35		40		45		50		55		60	
	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe
	[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]	
-6	563,6	90,3	549,8	95,8	533,5	103,3	515,1	112,7	495,3	124,1	474,4	137,6	453,2	153,3	432,1	171,1	411,7	191,2
-4	596,5	90,6	582,8	96,1	566,5	103,5	548,0	112,9	527,9	124,3	506,7	137,8	485,1	153,4	463,4	171,2	442,4	191,2
-2	631,8	91,5	618,2	97,0	601,8	104,4	583,1	113,8	562,7	125,2	541,2	138,6	519,1	154,2	496,9	171,9	475,2	191,9
0	669,5	92,9	655,8	98,4	639,3	105,8	620,4	115,2	599,7	126,5	577,8	140,0	555,2	155,5	532,4	173,2	510,0	193,1
2	709,3	94,7	695,6	100,2	679,0	107,6	659,8	117,0	638,8	128,3	616,4	141,7	593,3	157,2	569,8	174,9	546,7	194,8
4	751,3	96,7	737,5	102,3	720,7	109,7	701,3	119,1	679,9	130,4	657,0	143,8	633,2	159,3	609,1	177,0	585,2	196,8
5	773,1	97,8	759,3	103,4	742,3	110,9	722,7	120,2	701,1	131,6	**678,0**	**145,0**	653,9	160,5	629,5	178,1	605,1	198,0
6	795,4	99,0	781,5	104,6	764,4	112,0	744,7	121,4	722,8	132,8	699,4	146,2	675,1	161,7	650,2	179,3	625,5	199,1
7	-	-	804,2	105,8	787,0	113,3	767,0	122,7	745,0	134,0	721,3	147,4	696,6	162,9	671,4	180,6	646,2	200,4
8	-	-	827,3	107,0	810,0	114,5	789,9	123,9	767,6	135,3	743,7	148,7	718,6	164,2	693,0	181,8	667,4	201,6
10	-	-	875,0	109,4	857,4	117,0	836,9	126,4	814,1	137,8	789,6	151,3	763,8	166,8	737,4	184,4	710,9	204,2
12	-	-	-	-	906,5	119,4	885,6	128,9	862,3	140,3	837,1	153,8	810,6	169,3	783,4	186,9	755,9	206,7
14	-	-	-	-	957,3	121,6	935,9	131,2	912,0	142,7	886,1	156,2	858,9	171,7	830,8	189,4	802,3	209,2
16	-	-	-	-	-	-	987,7	133,2	963,2	144,8	936,6	158,3	908,6	173,9	879,5	191,6	850,1	211,4

Ph = Heating capacity

Pe = Input power

from 4 to -6 functioning with glycol

ΔT DIFFERENT FROM NOMINAL (ΔT 5)				
AT THE EVAPORATOR	**3**	**5**	**8**	**10**
Cooling capacity	0,99	1	1,02	1,03
Input power	0,99	1	1,01	1,02
Heating capacity	0,99	1	1,02	1,03
AT THE CONDENSER	-	**5**	**10**	**15**
Cooling capacity	-	1	1,01	1,02
Input power	-	1	0,99	0,98
Heating capacity	the variations can be ignored			

FOULING FACTOR [K*M²]/[W]			
	0,00001	**0,00002**	**0,00005**
Cooling capacity	1	0,99	0,98
Input power	1	1	1
Heating capacity	1	1	0,99
Input power	1	1	1,02

The performances (heating - absorbed), stated here are always calculated with Δt 5°C. In order to obtain performance and absorption with different Δt, use the corrective factors given in the table.

The performance supplied refer to clean pipe conditions with deposit factor = 1. For different deposit factor values, multiply the performance table data by the coefficients given in the table.

11.3. HWF 2812 STANDARD VERSION "°"

temp of water produced at evaporator °C	temp of water produced AT THE Condenser °C																	
	20		25		30		35		40		45		50		55		60	
	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe
	[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]	
-6	633,4	105,9	617,9	112,3	599,6	121,1	579,0	132,1	556,6	145,5	533,2	161,3	509,3	179,7	485,6	200,6	462,7	224,2
-4	670,4	106,3	655,1	112,7	636,7	121,4	615,9	132,4	593,3	145,8	569,5	161,6	545,2	179,9	520,9	200,7	497,2	224,2
-2	710,1	107,3	694,8	113,7	676,3	122,4	655,4	133,4	632,5	146,8	608,3	162,5	583,4	180,8	558,5	201,6	534,1	225,0
0	752,4	108,9	737,1	115,4	718,5	124,1	697,3	135,0	674,0	148,4	649,4	164,1	624,0	182,3	598,3	203,1	573,2	226,4
2	797,2	111,0	781,8	117,5	763,1	126,2	741,6	137,1	718,0	150,5	692,8	166,2	666,8	184,4	640,4	205,1	614,4	228,4
4	844,4	113,4	828,9	119,9	810,0	128,6	788,2	139,6	764,1	152,9	738,4	168,6	711,7	186,8	684,6	207,5	657,7	230,8
5	868,9	114,7	853,3	121,2	834,3	130,0	812,3	141,0	788,0	154,3	**762,0**	**170,0**	734,9	188,2	707,4	208,8	680,1	232,1
6	893,9	116,0	878,3	122,6	859,1	131,4	836,9	142,4	812,4	155,7	786,1	171,4	758,7	189,6	730,8	210,2	703,0	233,5
7	-	-	903,8	124,0	884,5	132,8	862,1	143,8	837,3	157,1	810,7	172,9	782,9	191,0	754,6	211,7	726,3	234,9
8	-	-	929,8	125,4	910,3	134,2	887,8	145,3	862,7	158,6	835,8	174,3	807,6	192,5	778,9	213,2	750,1	236,4
10	-	-	983,4	128,3	963,6	137,1	940,6	148,2	915,0	161,6	887,4	177,4	858,4	195,5	828,8	216,2	799,0	239,4
12	-	-	-	-	1018,8	139,9	995,3	151,1	969,1	164,5	940,8	180,3	911,0	198,5	880,4	219,2	849,6	242,4
14	-	-	-	-	1075,9	142,6	1051,8	153,8	1025,0	167,3	995,9	183,1	965,3	201,3	933,7	222,0	901,7	245,3
16	-	-	-	-	-	-	1110,1	156,2	1082,5	169,7	1052,7	185,6	1021,1	203,9	988,5	224,6	955,4	247,9

11.4. HWF 2812 HIGH EFFICIENCY VERSION "A"

temp of water produced at evaporator °C	temp of water produced AT THE Condenser °C																	
	20		25		30		35		40		45		50		55		60	
	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe
	[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]	
-6	640,9	102,8	625,2	109,0	606,7	117,5	585,8	128,2	563,2	141,2	539,5	156,6	515,4	174,4	491,4	194,7	468,2	217,6
-4	678,3	103,1	662,8	109,4	644,2	117,8	623,2	128,5	600,3	141,5	576,2	156,8	551,6	174,6	527,0	194,8	503,1	217,6
-2	718,5	104,1	703,0	110,4	684,3	118,8	663,1	129,5	639,9	142,4	615,5	157,7	590,3	175,5	565,1	195,6	540,4	218,4
0	761,3	105,7	745,8	112,0	727,0	120,4	705,5	131,1	682,0	144,0	657,1	159,3	631,3	176,9	605,4	197,1	579,9	219,7
2	806,6	107,7	791,1	114,0	772,1	122,5	750,3	133,1	726,4	146,0	701,0	161,3	674,6	178,9	648,0	199,0	621,7	221,7
4	854,4	110,1	838,7	116,4	819,5	124,9	797,5	135,5	773,1	148,4	747,1	163,7	720,1	181,3	692,7	201,4	665,5	224,0
5	879,1	111,3	863,4	117,7	844,1	126,1	821,9	136,8	797,3	149,8	**771,0**	**165,0**	743,6	182,6	715,8	202,7	688,1	225,3
6	904,5	112,6	888,7	119,0	869,2	127,5	846,8	138,2	822,0	151,1	795,4	166,4	767,7	184,0	739,4	204,0	711,3	226,6
7	-	-	914,5	120,4	894,9	128,9	872,3	139,6	847,2	152,5	820,3	167,8	792,2	185,4	763,5	205,5	734,9	228,0
8	-	-	940,8	121,7	921,1	130,3	898,2	141,0	872,9	154,0	845,7	169,2	817,2	186,8	788,1	206,9	758,9	229,4
10	-	-	995,1	124,5	975,0	133,1	951,7	143,9	925,8	156,8	897,9	172,1	868,6	189,8	838,6	209,8	808,4	232,4
12	-	-	-	-	1030,9	135,8	1007,1	146,6	980,5	159,7	951,9	175,0	921,8	192,7	890,8	212,7	859,6	235,3
14	-	-	-	-	1088,6	138,4	1064,3	149,3	1037,1	162,3	1007,7	177,7	976,7	195,4	944,7	215,5	912,4	238,0
16	-	-	-	-	-	-	1123,2	151,6	1095,3	164,7	1065,1	180,2	1033,2	197,9	1000,2	218,0	966,7	240,6

The performances stated here are always calculated with Δt 5°C. In order to obtain performance and absorption with different Δt, use the corrective factors given in the table.

The performance supplied refer to clean pipe conditions with deposit factor = 1. For different deposit factor values, multiply the performance table data by the coefficients given in the table.

Ph = Heating capacity

Pe = Input power

from 4 to -6 functioning with glycol

ΔT DIFFERENT FROM NOMINAL (ΔT 5)				
AT THE EVAPORATOR	**3**	**5**	**8**	**10**
Cooling capacity	0,99	1	1,02	1,03
Input power	0,99	1	1,01	1,02
Heating capacity	0,99	1	1,02	1,03
AT THE CONDENSER	-	**5**	**10**	**15**
Cooling capacity	-	1	1,01	1,02
Input power	-	1	0,99	0,98
Heating capacity	the variations can be ignored			

FOULING FACTOR [K*M²]/[W]			
	0,00001	**0,00002**	**0,00005**
Cooling capacity	1	0,99	0,98
Input power	1	1	1
Heating capacity	1	1	0,99
Input power	1	1	1,02

11.5. HWF 3212 STANDARD VERSION "°"

temp of water produced at evaporator °C	temp of water produced AT THE Condenser °C																	
	20		25		30		35		40		45		50		55		60	
	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe
	[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]	
-6	746,4	123,9	728,2	131,5	706,6	141,7	682,3	154,6	656,0	170,3	628,4	188,9	600,3	210,4	572,3	234,9	545,3	262,5
-4	790,1	124,4	772,0	131,9	750,3	142,1	725,8	155,0	699,2	170,6	671,1	189,1	642,5	210,5	613,8	235,0	586,0	262,5
-2	836,8	125,6	818,8	133,2	797,1	143,3	772,3	156,2	745,3	171,8	716,8	190,2	687,5	211,6	658,1	236,0	629,4	263,4
0	886,7	127,5	868,6	135,1	846,7	145,2	821,7	158,1	794,4	173,7	765,3	192,1	735,3	213,4	705,1	237,7	675,5	265,0
2	939,5	129,9	921,4	137,5	899,3	147,7	873,9	160,5	846,1	176,1	816,5	194,5	785,8	215,8	754,7	240,0	724,1	267,3
4	995,1	132,7	976,9	140,4	954,5	150,6	928,8	163,4	900,5	179,0	870,2	197,4	838,7	218,7	806,8	242,9	775,1	270,1
5	1023,9	134,3	1005,6	141,9	983,2	152,1	957,2	165,0	928,6	180,6	**898,0**	**199,0**	866,1	220,3	833,7	244,5	801,5	271,7
6	1053,4	135,8	1035,0	143,5	1012,4	153,8	986,3	166,7	957,4	182,3	926,4	200,7	894,1	221,9	861,2	246,1	828,4	273,3
7	-	-	1065,1	145,2	1042,3	155,4	1015,9	168,3	986,7	184,0	955,4	202,4	922,7	223,6	889,3	247,8	855,9	275,0
8	-	-	1095,8	146,8	1072,8	157,1	1046,2	170,1	1016,7	185,7	985,0	204,1	951,8	225,3	917,9	249,5	884,0	276,7
10	-	-	1159,0	150,1	1135,6	160,5	1108,5	173,5	1078,3	189,2	1045,8	207,6	1011,7	228,9	976,7	253,1	941,6	280,2
12	-	-	-	-	1200,7	163,8	1173,0	176,9	1142,1	192,6	1108,7	211,1	1073,6	232,4	1037,5	256,6	1001,2	283,7
14	-	-	-	-	1267,9	166,9	1239,6	180,0	1207,9	195,8	1173,7	214,3	1137,6	235,7	1100,3	259,9	1062,7	287,1
16	-	-	-	-	-	-	1308,2	182,8	1275,7	198,7	1240,5	217,3	1203,4	238,7	1164,9	262,9	1125,9	290,2

11.6. HWF 3212 HIGH EFFICIENCY VERSION "A"

temp of water produced at evaporator °C	temp of water produced AT THE Condenser °C																	
	20		25		30		35		40		45		50		55		60	
	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe
	[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]	
-6	749,7	120,2	731,5	127,5	709,8	137,4	685,3	150,0	658,9	165,2	631,2	183,2	602,9	204,0	574,9	227,8	547,7	254,5
-4	793,6	120,6	775,4	127,9	753,6	137,8	729,0	150,3	702,3	165,5	674,1	183,4	645,3	204,2	616,6	227,9	588,6	254,6
-2	840,6	121,8	822,4	129,1	800,6	139,0	775,8	151,5	748,7	166,6	720,0	184,5	690,6	205,2	661,1	228,8	632,2	255,4
0	890,6	123,6	872,5	131,0	850,5	140,8	825,4	153,3	797,9	168,4	768,7	186,3	738,6	207,0	708,3	230,5	678,5	257,0
2	943,7	126,0	925,5	133,4	903,3	143,2	877,8	155,7	849,9	170,8	820,1	188,7	789,3	209,3	758,1	232,8	727,3	259,3
4	999,5	128,7	981,2	136,1	958,8	146,0	933,0	158,5	904,5	173,6	874,1	191,5	842,5	212,1	810,4	235,6	778,5	262,0
5	1028,5	130,2	1010,1	137,6	987,5	147,6	961,5	160,0	932,8	175,2	**902,0**	**193,0**	870,0	213,6	837,4	237,1	805,0	263,5
6	1058,1	131,7	1039,7	139,2	1016,9	149,1	990,7	161,6	961,6	176,8	930,5	194,6	898,1	215,2	865,0	238,7	832,1	265,1
7	-	-	1069,8	140,8	1047,0	150,7	1020,5	163,3	991,1	178,4	959,6	196,3	926,8	216,9	893,2	240,3	859,7	266,7
8	-	-	1100,7	142,4	1077,6	152,4	1050,9	164,9	1021,2	180,1	989,3	197,9	956,0	218,6	922,0	242,0	887,9	268,4
10	-	-	1164,1	145,6	1140,7	155,7	1113,4	168,3	1083,1	183,5	1050,4	201,3	1016,2	222,0	981,0	245,4	945,8	271,8
12	-	-	-	-	1206,0	158,9	1178,2	171,5	1147,1	186,8	1113,6	204,7	1078,4	225,4	1042,2	248,8	1005,7	275,2
14	-	-	-	-	1273,6	161,9	1245,1	174,6	1213,3	189,9	1178,9	207,9	1142,6	228,6	1105,2	252,1	1067,4	278,4
16	-	-	-	-	-	-	1314,0	177,3	1281,4	192,7	1246,1	210,7	1208,7	231,5	1170,1	255,0	1130,9	281,4

Ph = Heating capacity

Pe = Input power

from 4 to -6 functioning with glycol

ΔT DIFFERENT FROM NOMINAL (ΔT 5)				
AT THE EVAPORATOR	**3**	**5**	**8**	**10**
Cooling capacity	0,99	1	1,02	1,03
Input power	0,99	1	1,01	1,02
Heating capacity	0,99	1	1,02	1,03
AT THE CONDENSER	-	**5**	**10**	**15**
Cooling capacity	-	1	1,01	1,02
Input power	-	1	0,99	0,98
Heating capacity	the variations can be ignored			

FOULING FACTOR [K*M²]/[W]			
	0,00001	**0,00002**	**0,00005**
Cooling capacity	1	0,99	0,98
Input power	1	1	1
Heating capacity	1	1	0,99
Input power	1	1	1,02

The performances stated here are always calculated with Δt 5°C. In order to obtain performance and absorption with different Δt, use the corrective factors given in the table.

The performance supplied refer to clean pipe conditions with deposit factor = 1. For different deposit factor values, multiply the performance table data by the coefficients given in the table.

11.7. HWF 3612 STANDARD VERSION "°"

temp of water produced at evaporator °C	temp of water produced AT THE Condenser °C																	
	20		25		30		35		40		45		50		55		60	
	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe
	[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]	
-6	838,7	140,1	818,3	148,7	794,0	160,2	766,6	174,8	737,0	192,6	706,0	213,5	674,4	237,8	643,1	265,6	612,7	296,8
-4	887,7	140,6	867,4	149,2	843,0	160,7	815,5	175,2	785,6	192,9	754,1	213,8	721,9	238,1	689,7	265,7	658,4	296,8
-2	940,3	142,0	920,0	150,5	895,6	162,0	867,8	176,6	837,5	194,2	805,4	215,1	772,5	239,3	739,5	266,8	707,2	297,8
0	996,3	144,1	976,0	152,7	951,4	164,2	923,3	178,7	892,5	196,4	859,9	217,2	826,2	241,3	792,3	268,7	759,0	299,7
2	1055,6	146,9	1035,3	155,5	1010,4	167,0	982,0	181,5	950,7	199,1	917,4	219,9	882,9	244,0	848,0	271,4	813,6	302,3
4	1118,1	150,1	1097,6	158,7	1072,5	170,3	1043,6	184,8	1011,8	202,4	977,8	223,2	942,4	247,2	906,5	274,6	870,9	305,4
5	1150,5	151,8	1129,9	160,5	1104,7	172,0	1075,6	186,6	1043,4	204,2	**1009,0**	**225,0**	973,2	249,0	936,8	276,4	900,5	307,2
6	1183,7	153,6	1163,0	162,3	1137,6	173,9	1108,2	188,4	1075,7	206,1	1040,9	226,9	1004,6	250,9	967,7	278,2	930,8	309,0
7	-	-	1196,8	164,1	1171,1	175,7	1141,5	190,3	1108,7	208,0	1073,5	228,8	1036,7	252,8	999,2	280,2	961,7	310,9
8	-	-	1231,2	166,0	1205,4	177,7	1175,5	192,3	1142,3	209,9	1106,7	230,8	1069,4	254,8	1031,3	282,1	993,2	312,9
10	-	-	1302,2	169,8	1276,0	181,5	1245,5	196,2	1211,6	213,9	1175,0	234,7	1136,7	258,8	1097,4	286,1	1058,0	316,8
12	-	-	-	-	1349,1	185,2	1317,9	200,0	1283,2	217,7	1245,7	238,6	1206,3	262,7	1165,8	290,1	1125,0	320,8
14	-	-	-	-	1424,7	188,7	1392,8	203,5	1357,2	221,4	1318,7	242,3	1278,2	266,5	1236,3	293,9	1194,0	324,6
16	-	-	-	-	-	-	1469,9	206,7	1433,4	224,6	1393,9	245,7	1352,1	269,9	1308,9	297,3	1265,1	328,1

11.8. HWF 3612 HIGH EFFICIENCY VERSION "A"

temp of water produced at evaporator °C	temp of water produced AT THE Condenser °C																	
	20		25		30		35		40		45		50		55		60	
	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe
	[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]	
-6	847,0	135,8	826,4	144,1	801,8	155,2	774,2	169,4	744,3	186,6	713,0	206,9	681,1	230,4	649,4	257,3	618,8	287,5
-4	896,5	136,3	876,0	144,5	851,4	155,7	823,6	169,8	793,4	186,9	761,6	207,2	729,0	230,7	696,5	257,4	664,9	287,5
-2	949,6	137,6	929,1	145,9	904,4	157,0	876,4	171,1	845,8	188,2	813,4	208,4	780,2	231,8	746,8	258,5	714,2	288,5
0	1006,2	139,7	985,7	147,9	960,8	159,1	932,5	173,2	901,4	190,2	868,4	210,4	834,4	233,8	800,1	260,4	766,5	290,3
2	1066,1	142,3	1045,5	150,6	1020,5	161,8	991,7	175,9	960,1	192,9	926,5	213,1	891,6	236,4	856,4	263,0	821,6	292,9
4	1129,2	145,4	1108,5	153,8	1083,2	165,0	1054,0	179,0	1021,8	196,1	987,5	216,3	951,7	239,6	915,5	266,1	879,5	295,9
5	1161,9	147,1	1141,1	155,5	1115,6	166,7	1086,2	180,8	1053,7	197,9	**1019,0**	**218,0**	982,8	241,3	946,0	267,8	909,5	297,6
6	1195,4	148,8	1174,5	157,2	1148,8	168,4	1119,2	182,6	1086,4	199,7	1051,2	219,8	1014,6	243,1	977,2	269,6	940,1	299,4
7	-	-	1208,6	159,0	1182,8	170,3	1152,8	184,4	1119,7	201,5	1084,1	221,7	1047,0	245,0	1009,1	271,4	971,3	301,2
8	-	-	1243,4	160,8	1217,4	172,1	1187,2	186,3	1153,7	203,4	1117,7	223,6	1080,0	246,9	1041,6	273,4	1003,1	303,1
10	-	-	1315,1	164,5	1288,6	175,8	1257,8	190,1	1223,6	207,2	1186,7	227,4	1148,0	250,7	1108,3	277,2	1068,5	307,0
12	-	-	-	-	1362,5	179,5	1331,0	193,7	1295,9	211,0	1258,1	231,2	1218,3	254,5	1177,4	281,1	1136,1	310,8
14	-	-	-	-	1438,8	182,8	1406,6	197,2	1370,7	214,5	1331,8	234,8	1290,8	258,2	1248,6	284,7	1205,9	314,5
16	-	-	-	-	-	-	1484,5	200,3	1447,6	217,7	1407,7	238,0	1365,5	261,5	1321,9	288,1	1277,6	317,9

The performances stated here are always calculated with Δt 5°C. In order to obtain performance and absorption with different Δt, use the corrective factors given in the table.

The performance supplied refer to clean pipe conditions with deposit factor = 1. For different deposit factor values, multiply the performance table data by the coefficients given in the table.

Ph = Heating capacity

Pe = Input power

from 4 to -6 functioning with glycol

ΔT DIFFERENT FROM NOMINAL (ΔT 5)				
AT THE EVAPORATOR	**3**	**5**	**8**	**10**
Cooling capacity	0,99	1	1,02	1,03
Input power	0,99	1	1,01	1,02
Heating capacity	0,99	1	1,02	1,03
AT THE CONDENSER	-	**5**	**10**	**15**
Cooling capacity	-	1	1,01	1,02
Input power	-	1	0,99	0,98
Heating capacity	the variations can be ignored			

FOULING FACTOR [K*M²]/[W]			
	0,00001	**0,00002**	**0,00005**
Cooling capacity	1	0,99	0,98
Input power	1	1	1
Heating capacity	1	1	0,99
Input power	1	1	1,02

11.9. HWF 4212 STANDARD VERSION "°"

temp of water produced at evaporator °C	temp of water produced AT THE Condenser °C																	
	20		25		30		35		40		45		50		55		60	
	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe
	[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]	
-6	966,7	833,4	943,1	884,2	915,1	952,8	883,6	1039,6	849,5	1145,1	813,8	1269,9	777,4	1414,4	741,2	1579,2	706,2	1764,7
-4	1023,2	836,3	999,8	887,0	971,7	955,4	940,0	1042,0	905,5	1147,2	869,2	1271,6	832,0	1415,7	795,0	1579,9	758,9	1764,7
-2	1083,8	844,5	1060,4	895,3	1032,3	963,6	1000,2	1050,0	965,3	1155,0	928,4	1279,1	890,4	1422,7	852,3	1586,5	815,1	1770,8
0	1148,4	857,2	1125,0	908,1	1096,6	976,4	1064,2	1062,8	1028,8	1167,6	991,1	1291,5	952,3	1434,8	913,2	1598,1	874,8	1782,0
2	1216,7	873,4	1193,3	924,5	1164,7	993,0	1131,9	1079,4	1095,8	1184,2	1057,4	1307,8	1017,6	1451,0	977,4	1614,0	937,7	1797,4
4	1288,8	892,4	1265,1	943,8	1236,2	1012,4	1202,9	1098,9	1166,2	1203,7	1127,0	1327,4	1086,2	1470,3	1044,9	1633,1	1003,8	1816,2
5	1326,1	902,7	1302,4	954,2	1273,3	1023,0	1239,7	1109,5	1202,7	1214,4	**1163,0**	**1338,0**	1121,7	1480,9	1079,7	1643,6	1038,0	1826,6
6	1364,3	913,2	1340,5	964,9	1311,2	1033,9	1277,3	1120,5	1239,9	1225,5	1199,8	1349,1	1158,0	1492,0	1115,3	1654,6	1072,9	1837,6
7	-	-	1379,4	976,0	1349,9	1045,1	1315,7	1131,9	1277,9	1236,9	1237,3	1360,5	1194,9	1503,4	1151,7	1666,1	1108,5	1848,9
8	-	-	1419,1	987,2	1389,4	1056,4	1354,9	1143,4	1316,7	1248,5	1275,6	1372,2	1232,7	1515,1	1188,7	1677,7	1144,8	1860,5
10	-	-	1501,0	1009,5	1470,7	1079,2	1435,6	1166,5	1396,5	1271,9	1354,4	1395,9	1310,2	1538,9	1264,9	1701,5	1219,5	1884,2
12	-	-	-	-	1555,0	1101,4	1519,1	1189,2	1479,1	1294,9	1435,9	1419,1	1390,5	1562,3	1343,7	1725,0	1296,7	1907,7
14	-	-	-	-	1642,1	1122,1	1605,4	1210,3	1564,4	1316,5	1520,0	1441,1	1473,3	1584,6	1425,0	1747,5	1376,3	1930,3
16	-	-	-	-	-	-	1694,3	1229,2	1652,2	1335,9	1606,6	1460,9	1558,5	1604,8	1508,7	1767,9	1458,2	1951,0

11.10. HWF 4212 HIGH EFFICIENCY VERSION "A"

temp of water produced at evaporator °C	temp of water produced AT THE Condenser °C																	
	20		25		30		35		40		45		50		55		60	
	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe
	[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]	
-6	970,8	155,7	947,2	165,2	919,1	178,0	887,4	194,2	853,2	214,0	817,3	237,3	780,7	264,3	744,4	295,1	709,3	329,7
-4	1027,6	156,3	1004,1	165,7	975,9	178,5	944,0	194,7	909,4	214,4	872,9	237,6	835,6	264,5	798,4	295,2	762,2	329,7
-2	1088,5	157,8	1065,0	167,3	1036,7	180,0	1004,5	196,2	969,4	215,8	932,4	239,0	894,2	265,8	856,0	296,4	818,6	330,9
0	1153,3	160,2	1129,8	169,7	1101,3	182,4	1068,8	198,6	1033,2	218,2	995,4	241,3	956,4	268,1	917,1	298,6	878,6	333,0
2	1222,0	163,2	1198,4	172,7	1169,7	185,5	1136,7	201,7	1100,5	221,3	1061,9	244,4	1022,0	271,1	981,6	301,6	941,8	335,8
4	1294,3	166,7	1270,6	176,3	1241,5	189,2	1208,1	205,3	1171,2	224,9	1131,8	248,0	1090,9	274,7	1049,4	305,1	1008,1	339,4
5	1331,8	168,7	1308,0	178,3	1278,8	191,1	1245,1	207,3	1207,8	226,9	**1168,0**	**250,0**	1126,5	276,7	1084,4	307,1	1042,5	341,3
6	1370,2	170,6	1346,3	180,3	1316,8	193,2	1282,8	209,4	1245,2	229,0	1204,9	252,1	1162,9	278,8	1120,1	309,2	1077,5	343,3
7	-	-	1385,3	182,4	1355,7	195,3	1321,4	211,5	1283,4	231,1	1242,6	254,2	1200,1	280,9	1156,6	311,3	1113,3	345,5
8	-	-	1425,2	184,4	1395,4	197,4	1360,8	213,6	1322,4	233,3	1281,1	256,4	1238,0	283,1	1193,9	313,5	1149,7	347,6
10	-	-	1507,4	188,6	1477,0	201,7	1441,7	218,0	1402,5	237,7	1360,2	260,8	1315,8	287,5	1270,4	317,9	1224,7	352,1
12	-	-	-	-	1561,7	205,8	1525,6	222,2	1485,4	241,9	1442,1	265,2	1396,4	291,9	1349,5	322,3	1302,2	356,5
14	-	-	-	-	1649,2	209,7	1612,3	226,1	1571,1	246,0	1526,5	269,3	1479,6	296,1	1431,2	326,5	1382,2	360,7
16	-	-	-	-	-	213,1	1701,6	229,7	1659,3	249,6	1613,5	273,0	1565,2	299,8	1515,2	330,3	1464,5	364,5

Ph = Heating capacity

Pe = Input power

from 4 to -6 functioning with glycol

ΔT DIFFERENT FROM NOMINAL (ΔT 5)				
AT THE EVAPORATOR	**3**	**5**	**8**	**10**
Cooling capacity	0,99	1	1,02	1,03
Input power	0,99	1	1,01	1,02
Heating capacity	0,99	1	1,02	1,03
AT THE CONDENSER	-	**5**	**10**	**15**
Cooling capacity	-	1	1,01	1,02
Input power	-	1	0,99	0,98
Heating capacity	the variations can be ignored			

FOULING FACTOR [K*M²]/[W]			
	0,00001	**0,00002**	**0,00005**
Cooling capacity	1	0,99	0,98
Input power	1	1	1
Heating capacity	1	1	0,99
Input power	1	1	1,02

The performances stated here are always calculated with Δt 5°C. In order to obtain performance and absorption with different Δt, use the corrective factors given in the table.

The performance supplied refer to clean pipe conditions with deposit factor = 1. For different deposit factor values, multiply the performance table data by the coefficients given in the table.

11.11. HWF 4812 STANDARD VERSION "°"

temp of water produced at evaporator °C	temp of water produced AT THE Condenser °C																	
	20		25		30		35		40		45		50		55		60	
	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe
	[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]	
-6	1112,1	185,0	1085,1	196,3	1052,8	211,5	1016,6	230,8	977,4	254,2	936,3	281,9	894,4	314,0	852,7	350,5	812,5	391,7
-4	1177,2	185,6	1150,2	196,9	1117,9	212,1	1081,4	231,3	1041,7	254,7	1000,0	282,3	957,2	314,2	914,6	350,7	873,1	391,7
-2	1246,9	187,5	1220,0	198,7	1187,6	213,9	1150,7	233,1	1110,5	256,4	1068,1	283,9	1024,4	315,8	980,6	352,2	937,8	393,1
0	1321,2	190,3	1294,3	201,6	1261,6	216,7	1224,4	235,9	1183,6	259,2	1140,3	286,7	1095,6	318,5	1050,6	354,7	1006,4	395,5
2	1399,8	193,9	1372,8	205,2	1339,9	220,4	1302,2	239,6	1260,7	262,9	1216,5	290,3	1170,8	322,1	1124,5	358,3	1078,8	399,0
4	1482,7	198,1	1455,5	209,5	1422,2	224,7	1383,9	243,9	1341,7	267,2	1296,6	294,6	1249,7	326,4	1202,1	362,5	1154,9	403,2
5	1525,6	200,4	1498,4	211,8	1464,9	227,1	1426,3	246,3	1383,6	269,6	**1338,0**	**297,0**	1290,5	328,7	1242,2	364,8	1194,2	405,5
6	1569,6	202,7	1542,2	214,2	1508,5	229,5	1469,5	248,7	1426,5	272,0	1380,3	299,5	1332,2	331,2	1283,2	367,3	1234,3	407,9
7	-	-	1587,0	216,6	1553,0	232,0	1513,7	251,2	1470,2	274,5	1423,5	302,0	1374,7	333,7	1325,0	369,8	1275,3	410,4
8	-	-	1632,7	219,1	1598,5	234,5	1558,8	253,8	1514,8	277,1	1467,6	304,6	1418,1	336,3	1367,6	372,4	1317,1	413,0
10	-	-	1726,8	224,1	1692,0	239,6	1651,6	258,9	1606,6	282,3	1558,2	309,8	1507,4	341,6	1455,3	377,7	1402,9	418,2
12	-	-	-	-	1789,0	244,5	1747,7	264,0	1701,6	287,4	1651,9	315,0	1599,7	346,8	1545,9	382,9	1491,8	423,5
14	-	-	-	-	1889,2	249,1	1846,9	268,7	1799,8	292,2	1748,7	319,9	1694,9	351,7	1639,5	387,9	1583,4	428,5
16	-	-	-	-	-	-	1949,2	272,9	1900,8	296,5	1848,4	324,3	1793,0	356,2	1735,7	392,4	1677,6	433,1

11.12. HWF 4812 HIGH EFFICIENCY VERSION "A"

temp of water produced at evaporator °C	temp of water produced AT THE Condenser °C																	
	20		25		30		35		40		45		50		55		60	
	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe
	[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]	
-6	1094,7	175,6	1068,0	186,4	1036,3	200,8	1000,6	219,1	962,0	241,3	921,6	267,6	880,3	298,1	839,4	332,8	799,7	371,9
-4	1158,7	176,3	1132,2	187,0	1100,4	201,4	1064,5	219,6	1025,4	241,8	984,3	268,0	942,2	298,4	900,2	333,0	859,4	371,9
-2	1227,3	178,0	1200,8	188,7	1168,9	203,1	1132,7	221,3	1093,1	243,4	1051,3	269,6	1008,3	299,9	965,2	334,4	923,1	373,2
0	1300,4	180,7	1273,9	191,4	1241,8	205,8	1205,2	224,0	1165,0	246,1	1122,4	272,2	1078,4	302,4	1034,1	336,8	990,6	375,6
2	1377,8	184,1	1351,3	194,9	1318,9	209,3	1281,7	227,5	1240,9	249,6	1197,4	275,6	1152,4	305,8	1106,9	340,2	1061,9	378,8
4	1459,4	188,1	1432,7	198,9	1399,9	213,4	1362,2	231,6	1320,6	253,7	1276,2	279,8	1230,1	309,9	1183,2	344,2	1136,7	382,8
5	1501,7	190,2	1474,9	201,1	1441,9	215,6	1403,9	233,8	1361,9	255,9	**1317,0**	**282,0**	1270,2	312,1	1222,7	346,4	1175,4	385,0
6	1545,0	192,5	1518,0	203,4	1484,8	217,9	1446,5	236,2	1404,1	258,3	1358,7	284,3	1311,3	314,5	1263,0	348,7	1215,0	387,3
7	-	-	1562,1	205,7	1528,6	220,3	1490,0	238,6	1447,1	260,7	1401,2	286,8	1353,2	316,9	1304,2	351,1	1255,3	389,7
8	-	-	1607,1	208,1	1573,4	222,7	1534,3	241,0	1491,0	263,1	1444,5	289,2	1395,9	319,3	1346,2	353,6	1296,4	392,1
10	-	-	1699,7	212,8	1665,5	227,5	1625,7	245,9	1581,4	268,1	1533,7	294,2	1483,7	324,3	1432,4	358,6	1380,9	397,1
12	-	-	-	-	1760,9	232,1	1720,2	250,6	1674,9	272,9	1626,0	299,1	1574,6	329,3	1521,7	363,6	1468,4	402,1
14	-	-	-	-	1859,5	236,5	1817,9	255,1	1771,5	277,5	1721,3	303,7	1668,3	334,0	1613,7	368,3	1558,5	406,8
16	-	-	-	-	-	-	1918,6	259,1	1871,0	281,6	1819,4	307,9	1764,8	338,2	1708,5	372,6	1651,3	411,2

The performances stated here are always calculated with Δt 5°C. In order to obtain performance and absorption with different Δt, use the corrective factors given in the table.

The performance supplied refer to clean pipe conditions with deposit factor = 1. For different deposit factor values, multiply the performance table data by the coefficients given in the table.

Ph = Heating capacity

Pe = Input power

from 4 to -6 functioning with glycol

ΔT DIFFERENT FROM NOMINAL (ΔT 5)				
AT THE EVAPORATOR	**3**	**5**	**8**	**10**
Cooling capacity	0,99	1	1,02	1,03
Input power	0,99	1	1,01	1,02
Heating capacity	0,99	1	1,02	1,03
AT THE CONDENSER	-	**5**	**10**	**15**
Cooling capacity	-	1	1,01	1,02
Input power	-	1	0,99	0,98
Heating capacity	the variations can be ignored			

FOULING FACTOR [K*M²]/[W]			
	0,00001	**0,00002**	**0,00005**
Cooling capacity	1	0,99	0,98
Input power	1	1	1
Heating capacity	1	1	0,99
Input power	1	1	1,02

11.13. HWF 5612 STANDARD VERSION "°"

temp of water produced at evaporator °C	temp of water produced AT THE Condenser °C																	
	20		25		30		35		40		45		50		55		60	
	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe
	[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]	
-6	1256,8	210,5	1226,2	223,4	1189,8	240,7	1148,8	262,6	1104,5	289,3	1058,0	320,8	1010,7	357,3	963,6	398,9	918,1	445,8
-4	1330,2	211,3	1299,8	224,1	1263,3	241,4	1222,1	263,2	1177,2	289,8	1130,0	321,2	1081,7	357,6	1033,5	399,1	986,6	445,8
-2	1409,0	213,3	1378,7	226,2	1342,0	243,4	1300,4	265,3	1255,0	291,8	1207,0	323,1	1157,6	359,4	1108,1	400,8	1059,7	447,3
0	1493,0	216,5	1462,6	229,4	1425,7	246,7	1383,6	268,5	1337,5	295,0	1288,6	326,2	1238,1	362,5	1187,3	403,7	1137,3	450,2
2	1581,8	220,6	1551,3	233,5	1514,2	250,8	1471,5	272,7	1424,6	299,1	1374,7	330,4	1323,0	366,5	1270,8	407,7	1219,1	454,1
4	1675,5	225,4	1644,8	238,4	1607,2	255,8	1563,9	277,6	1516,2	304,1	1465,2	335,3	1412,2	371,4	1358,4	412,5	1305,1	458,8
5	1724,0	228,0	1693,2	241,0	1655,4	258,4	1611,8	280,3	1563,6	306,8	**1512,0**	**338,0**	1458,3	374,1	1403,7	415,2	1349,5	461,4
6	1773,7	230,7	1742,7	243,8	1704,7	261,2	1660,7	283,1	1612,0	309,6	1559,8	340,8	1505,4	376,9	1450,0	418,0	1394,9	464,2
7	-	-	1793,4	246,5	1755,0	264,0	1710,6	285,9	1661,4	312,4	1608,6	343,7	1553,5	379,8	1497,3	420,9	1441,2	467,1
8	-	-	1845,0	249,4	1806,3	266,9	1761,5	288,8	1711,8	315,4	1658,4	346,6	1602,6	382,8	1545,5	423,8	1488,4	470,0
10	-	-	1951,4	255,0	1912,1	272,6	1866,4	294,7	1815,5	321,3	1760,8	352,6	1703,4	388,7	1644,5	429,8	1585,4	476,0
12	-	-	-	-	2021,6	278,2	1974,9	300,4	1922,9	327,1	1866,8	358,5	1807,7	394,7	1747,0	435,8	1685,8	481,9
14	-	-	-	-	2134,9	283,5	2087,1	305,8	2033,8	332,6	1976,1	364,0	1915,4	400,3	1852,7	441,4	1789,3	487,6
16	-	-	-	-	-	-	2202,7	310,5	2148,0	337,5	2088,8	369,1	2026,1	405,4	1961,4	446,6	1895,8	492,8

11.14. HWF 5612 HIGH EFFICIENCY VERSION "A"

temp of water produced at evaporator °C	temp of water produced AT THE Condenser °C																	
	20		25		30		35		40		45		50		55		60	
	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe
	[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]	
-6	1257,6	202,4	1227,0	214,8	1190,6	231,4	1149,5	252,5	1105,2	278,1	1058,7	308,5	1011,3	343,6	964,3	383,6	918,8	428,6
-4	1331,1	203,1	1300,7	215,5	1264,2	232,1	1222,9	253,1	1178,0	278,7	1130,8	308,9	1082,4	343,9	1034,2	383,7	987,3	428,7
-2	1410,0	205,1	1379,6	217,5	1342,9	234,1	1301,2	255,1	1255,8	280,6	1207,8	310,7	1158,4	345,6	1108,9	385,4	1060,4	430,1
0	1494,0	208,2	1463,5	220,6	1426,6	237,2	1384,5	258,2	1338,4	283,6	1289,4	313,7	1238,9	348,5	1188,1	388,2	1138,1	432,8
2	1582,9	212,2	1552,4	224,6	1515,2	241,2	1472,5	262,2	1425,6	287,6	1375,6	317,7	1323,9	352,4	1271,6	392,0	1220,0	436,6
4	1676,6	216,8	1645,9	229,2	1608,3	245,9	1564,9	266,9	1517,2	292,4	1466,2	322,4	1413,1	357,1	1359,3	396,7	1305,9	441,2
5	1725,2	219,3	1694,3	231,8	1656,5	248,5	1612,8	269,5	1564,6	295,0	**1513,0**	**325,0**	1459,3	359,7	1404,7	399,2	1350,4	443,7
6	1774,9	221,8	1743,9	234,4	1705,8	251,1	1661,7	272,2	1613,0	297,7	1560,9	327,7	1506,4	362,4	1451,0	401,9	1395,8	446,3
7	-	-	1794,5	237,1	1756,1	253,8	1711,7	274,9	1662,5	300,4	1609,7	330,5	1554,6	365,2	1498,3	404,7	1442,1	449,1
8	-	-	1846,2	239,8	1807,5	256,6	1762,7	277,7	1712,9	303,3	1659,5	333,3	1603,6	368,0	1546,5	407,5	1489,3	451,9
10	-	-	1952,7	245,2	1913,3	262,1	1867,6	283,4	1816,7	308,9	1762,0	339,1	1704,5	373,8	1645,6	413,3	1586,4	457,7
12	-	-	-	-	2023,0	267,5	1976,3	288,8	1924,2	314,5	1868,0	344,7	1808,9	379,5	1748,1	419,0	1686,9	463,4
14	-	-	-	-	2136,3	272,6	2088,5	294,0	2035,2	319,8	1977,5	350,0	1916,6	384,9	1853,9	424,5	1790,5	468,9
16	-	-	-	-	-	-	2204,2	298,6	2149,4	324,5	2090,1	354,9	2027,5	389,8	1962,7	429,4	1897,0	473,9

Pc = Heating capacity

Pe = Input power

from 4 to -6 functioning with glycol

ΔT DIFFERENT FROM NOMINAL (ΔT 5)				
AT THE EVAPORATOR	**3**	**5**	**8**	**10**
Cooling capacity	0,99	1	1,02	1,03
Input power	0,99	1	1,01	1,02
Heating capacity	0,99	1	1,02	1,03
AT THE CONDENSER	-	**5**	**10**	**15**
Cooling capacity	-	1	1,01	1,02
Input power	-	1	0,99	0,98
Heating capacity	the variations can be ignored			

FOULING FACTOR [K*M²]/[W]			
	0,00001	**0,00002**	**0,00005**
Cooling capacity	1	0,99	0,98
Input power	1	1	1
Heating capacity	1	1	0,99
Input power	1	1	1,02

The performances stated here are always calculated with Δt 5°C. In order to obtain performance and absorption with different Δt, use the corrective factors given in the table.

The performance supplied refer to clean pipe conditions with deposit factor = 1. For different deposit factor values, multiply the performance table data by the coefficients given in the table.

11.15. HWF 6412 STANDARD VERSION "°"

temp of water produced at evaporator °C	temp of water produced AT THE Condenser °C																	
	20		25		30		35		40		45		50		55		60	
	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe
	[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]	
-6	1342,4	224,2	1309,7	237,9	1270,8	256,4	1227,0	279,7	1179,7	308,1	1130,1	341,7	1079,5	380,6	1029,3	424,9	980,7	474,8
-4	1420,9	225,0	1388,3	238,7	1349,4	257,1	1305,3	280,4	1257,4	308,7	1207,0	342,1	1155,4	380,9	1103,9	425,1	1053,8	474,8
-2	1505,0	227,2	1472,6	240,9	1433,4	259,3	1389,0	282,5	1340,4	310,8	1289,2	344,2	1236,5	382,8	1183,6	426,9	1131,9	476,4
0	1594,7	230,6	1562,2	244,3	1522,8	262,7	1477,9	286,0	1428,6	314,2	1376,4	347,5	1322,4	386,0	1268,1	430,0	1214,8	479,5
2	1689,6	235,0	1657,0	248,7	1617,3	267,2	1571,7	290,4	1521,7	318,6	1468,4	351,9	1413,1	390,4	1357,3	434,3	1302,2	483,6
4	1789,6	240,1	1756,8	253,9	1716,7	272,4	1670,5	295,7	1619,5	323,9	1565,0	357,1	1508,4	395,6	1450,9	439,4	1394,0	488,7
5	1841,5	242,9	1808,6	256,7	1768,2	275,2	1721,5	298,5	1670,1	326,7	**1615,0**	**360,0**	1557,7	398,5	1499,4	442,2	1441,4	491,5
6	1894,5	245,7	1861,5	259,6	1820,8	278,2	1773,8	301,5	1721,8	329,7	1666,1	363,0	1608,0	401,4	1548,8	445,2	1489,9	494,4
7	-	-	1915,5	262,6	1874,5	281,2	1827,1	304,5	1774,6	332,8	1718,2	366,1	1659,4	404,5	1599,3	448,3	1539,3	497,5
8	-	-	1970,7	265,6	1929,4	284,2	1881,5	307,6	1828,4	335,9	1771,4	369,2	1711,7	407,7	1650,7	451,4	1589,8	500,6
10	-	-	2084,3	271,6	2042,3	290,4	1993,5	313,9	1939,2	342,2	1880,7	375,6	1819,4	414,0	1756,5	457,8	1693,4	507,0
12	-	-	-	-	2159,3	296,3	2109,5	320,0	2053,9	348,4	1993,9	381,8	1930,8	420,4	1866,0	464,1	1800,6	513,3
14	-	-	-	-	2280,3	301,9	2229,3	325,7	2172,4	354,2	2110,8	387,7	2045,8	426,3	1978,9	470,2	1911,2	519,4
16	-	-	-	-	-	-	2352,7	330,7	2294,3	359,4	2231,0	393,1	2164,2	431,8	2095,0	475,7	2024,9	524,9

11.16. HWF 6412 HIGH EFFICIENCY VERSION "A"

temp of water produced at evaporator °C	temp of water produced AT THE Condenser °C																	
	20		25		30		35		40		45		50		55		60	
	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe	Ph	Pe
	[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]		[kW]	
-6	1337,4	215,5	1304,8	228,7	1266,1	246,4	1222,5	268,8	1175,3	296,1	1125,9	328,4	1075,5	365,8	1025,5	408,4	977,0	456,3
-4	1415,6	216,3	1383,2	229,4	1344,4	247,1	1300,5	269,5	1252,7	296,7	1202,5	328,8	1151,1	366,1	1099,8	408,5	1049,9	456,4
-2	1499,4	218,4	1467,1	231,5	1428,1	249,2	1383,8	271,5	1335,5	298,7	1284,4	330,8	1231,9	367,9	1179,2	410,3	1127,7	457,9
0	1588,7	221,7	1556,4	234,8	1517,2	252,5	1472,4	274,8	1423,3	301,9	1371,2	334,0	1317,5	371,0	1263,4	413,3	1210,3	460,8
2	1683,3	225,9	1650,9	239,1	1611,3	256,8	1565,9	279,1	1516,0	306,2	1462,9	338,2	1407,9	375,2	1352,3	417,4	1297,4	464,8
4	1783,0	230,8	1750,3	244,1	1710,3	261,8	1664,2	284,2	1613,4	311,3	1559,2	343,2	1502,8	380,2	1445,6	422,3	1388,8	469,7
5	1834,6	233,4	1801,8	246,7	1761,6	264,5	1715,2	286,9	1663,9	314,0	**1609,0**	**346,0**	1551,9	383,0	1493,8	425,0	1436,1	472,4
6	1887,5	236,2	1854,6	249,5	1814,0	267,4	1767,2	289,8	1715,4	316,9	1659,9	348,9	1602,0	385,8	1543,1	427,9	1484,3	475,2
7	-	-	1908,4	252,4	1867,6	270,2	1820,3	292,7	1768,0	319,8	1711,8	351,8	1653,2	388,8	1593,4	430,8	1533,6	478,1
8	-	-	1963,4	255,3	1922,2	273,2	1874,5	295,7	1821,6	322,8	1764,8	354,9	1705,4	391,8	1644,6	433,9	1583,8	481,1
10	-	-	2076,6	261,1	2034,7	279,1	1986,1	301,7	1932,0	328,9	1873,8	361,0	1812,7	397,9	1750,0	440,0	1687,1	487,2
12	-	-	-	-	2151,3	284,8	2101,6	307,5	2046,3	334,8	1986,5	367,0	1923,7	404,0	1859,0	446,1	1793,9	493,3
14	-	-	-	-	2271,8	290,2	2221,0	313,0	2164,3	340,4	2102,9	372,7	2038,2	409,8	1971,5	451,9	1904,1	499,2
16	-	-	-	-	-	-	2344,0	317,9	2285,8	345,5	2222,8	377,8	2156,1	415,0	2087,2	457,2	2017,4	504,5

The performances stated here are always calculated with Δt 5°C. In order to obtain performance and absorption with different Δt, use the corrective factors given in the table.

The performance supplied refer to clean pipe conditions with deposit factor = 1. For different deposit factor values, multiply the performance table data by the coefficients given in the table.

Ph = Heating capacity

Pe = Input power

from 4 to -6 functioning with glycol

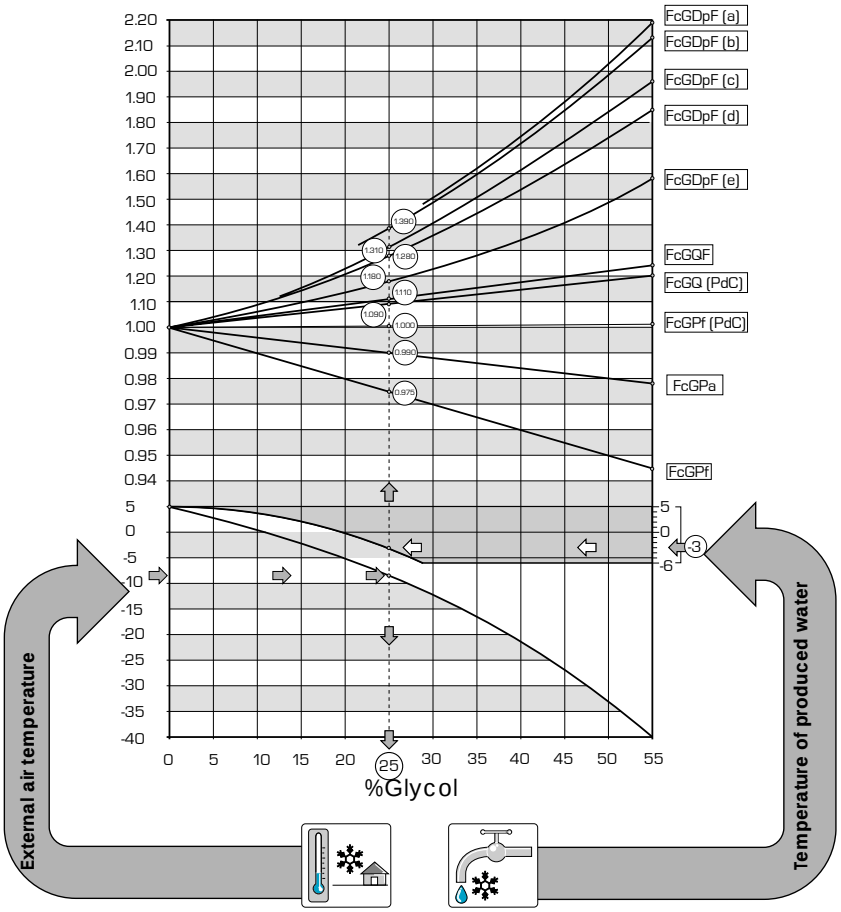
ΔT DIFFERENT FROM NOMINAL (ΔT 5)				
AT THE EVAPORATOR	**3**	**5**	**8**	**10**
Cooling capacity	0,99	1	1,02	1,03
Input power	0,99	1	1,01	1,02
Heating capacity	0,99	1	1,02	1,03
AT THE CONDENSER	-	**5**	**10**	**15**
Cooling capacity	-	1	1,01	1,02
Input power	-	1	0,99	0,98
Heating capacity	the variations can be ignored			

FOULING FACTOR [K*M²]/[W]			
	0,00001	**0,00002**	**0,00005**
Cooling capacity	1	0,99	0,98
Input power	1	1	1
Heating capacity	1	1	0,99
Input power	1	1	1,02

12. GLYCOL

- The correction factors of cooling power and input power take into account the presence of glycol and diverse evaporation temperatures.
- The pressure drop correction factor considers the different flow rate resulting from the application of the water flow rate correction factor.
- The water flow rate correction factor is calculated to keep the same Δt that would be present with the absence of glycol.

NOTE
On the following page an example is given to help graph reading.
To determine the percentage of glycol required, see diagram below; this percentage calculation can take into consideration one of the following factors:
Depending on which fluid is considered (water or air), the graph is interpreted by the right or left side at the crossing point on the curves with the external temperature line or the water produced line. A point from which the vertical line will pass is obtained and this will distinguish both glycol percentage and relative correction coefficients.



12.1. HOW TO INTERPRET GLYCOL CURVES

The curves shown in the diagram summarise a significant number of data, each of which is represented by a specific curve. In order to use these curves correctly it is first necessary to make some initial reflections.

- If you wish to calculate the percentage of glycol on the basis of the external air temperature, enter from the left axis and on reaching the curve draw a vertical line, which in turn will intercept all the other curves; the points obtained from the upper curves represent the coefficients for the correction of the cooling capacity and input power, the flow rates and the pressure drops (remember that these coefficients must be multiplied by the nominal value of the size in question); while the glycol percentage value recommended to produce desired water temperature is on the lower axis.
- If you wish to calculate the percentage of glycol on the basis of the temperature of the water produced, enter from the right axis and on reaching the curve draw a vertical line, which in turn will intercept all the other curves; the points obtained from the upper curves represent the coefficients for the correction of the cooling capacity and input power, the flow rates and the pressure drops (remember that these coefficients must be multiplied by the nominal value of the size in question); while the lower axis recommends the glycol percentage value necessary to produce water at the desired temperature.
- Initial rates for "EXTERNAL AIR TEMPERATURE" and "TEMPERATURE OF PRODUCED WATER", are not directly related, therefore it is not possible to refer to the curve of one of these rates to obtain corresponding point on the curve of the other rate.

KEY:

FcGPf	Corrective factors for cooling capacity
FcGPa	Corrective factors of the input power
FcGDpF (a)	Correction factors for pressure drop (evaporator) (av. temp. = -3.5 °C)
FcGDpF (b)	Correction factor for pressure drops (av. temp. = 0.5 °C)
FcGDpF (c)	Correction factor for pressure drops (av. temp. = 5.5 °C)
FcGDpF (d)	Correction factor for pressure drops (av. temp. = 9.5 °C)
FcGDpF (e)	Correction factor for pressure drops (av. temp. = 47.5 °C)
FcGQF	Correction factor of flow rates (evap.) (av. temp. = 9.5 °C)
FcGQC	Correction factors of flow rates (condenser) (av. temp. = 47.5 °C)

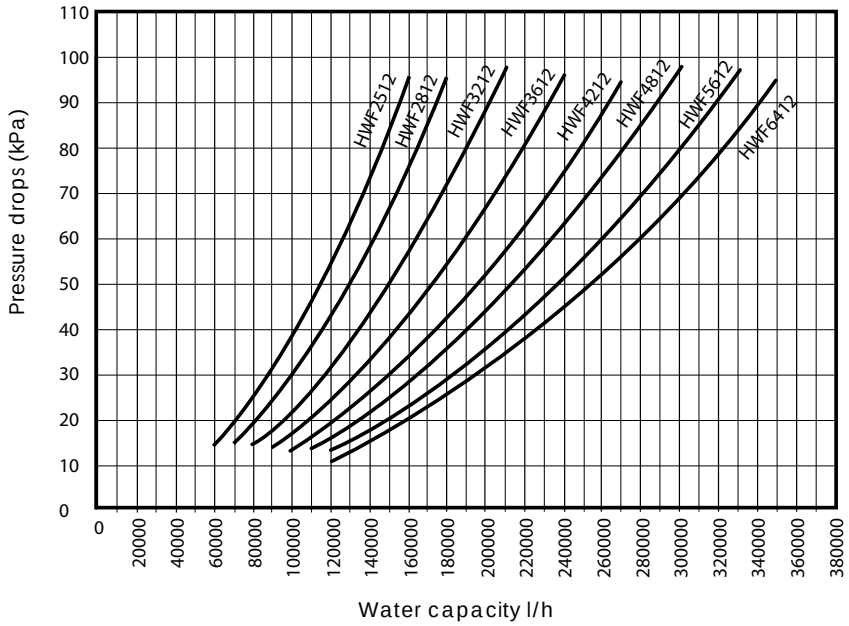
NOTE
Although graph shows up to external air temperature of -40°C, unit operational limits must be considered.

13. HYDRAULIC DATA

13.1. SOURCE SIDE HEAT EXCHANGER PRESSURE DROP COOLING FUNCTIONING MODE (CONDENSER)

The pressure drops in the diagram are relative to an average water temperature of 33 °C. The table gives the correction to apply to the pressure drops on variation of the average water temperature

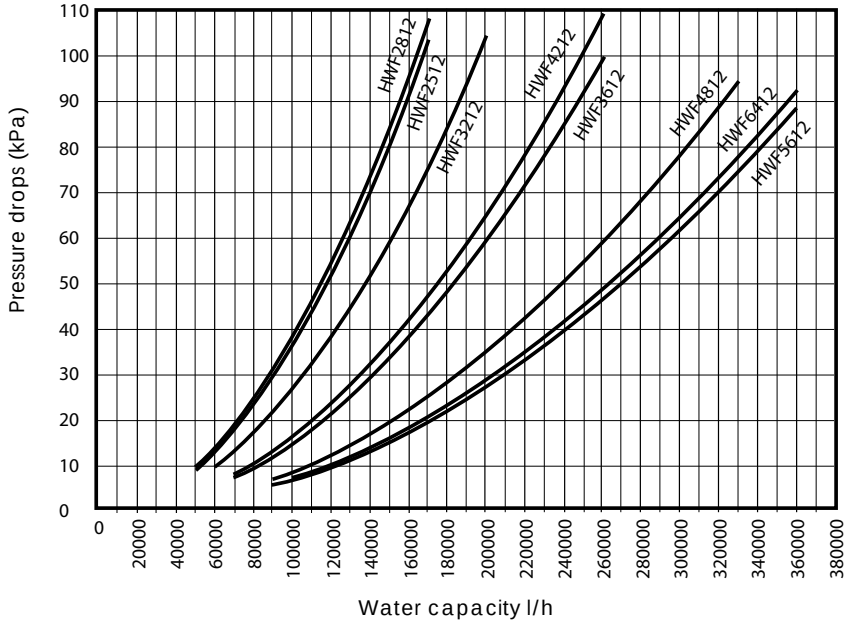
1,028 1,006 1,000 0,985 0,979 0,964



Average water temperature °C	**20**	**30**	**33**	**40**	**43**	**50**
Multiplicative coefficient	1,028	1,006	**1,00**	0,985	0,979	0,964

13.2. SYSTEM SIDE HEAT EXCHANGER PRESSURE DROP COOLING FUNCTIONING MODE (EVAPORATOR)

The diagram pressure drops are relative to an average water temperature of 10°C. The table below gives the corrections to apply to the pressure drops on variation of the average water temperature



Average water temperature °C	**5**	**10**	**15**	**20**	**30**	**40**	**50**
Multiplicative coefficient	1,02	**1**	0,985	0,97	0,95	0,93	0,91

HWF	SOURCE SIDE HEAT EXCHANGER CONDENSER [l/h]			USER SIDE HEAT EXCHANGER EVAPORATOR [l/h]			USER SIDE HEAT EXCHANGER TOTAL RECOVERY [l/h]		USER SIDE HEAT EXCHANGER DESUPERHEATER [l/h]	
	Q.min	Q.max	C.min.H_2O	Q.min	Q.max	C.min.H_2O	Q.min	Q.max	Q.min	Q.max
2512	54000	164000		43000	174000		54000	164000		
2812	62000	184000		43000	174000		62000	184000		
3212	72000	214000		53000	209000		72000	214000		
3612	82000	246000		65000	264000		82000	246000		
4212	92000	278000		65000	264000		92000	278000		
4812	102000	304000		83000	331000		102000	304000		
5612	112000	336000		89000	360000		112000	336000		
6412	120000	360000		89000	360000		120000	360000		

14. CONDENSERLESS REFRIGERANT LINES

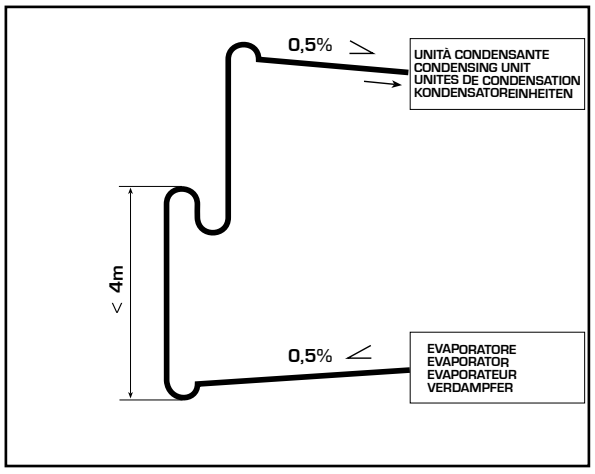
REFRIGERANT LINES							
Model	Line length [m]	Intake line f [mm]		Liquid line f [mm]		R134a refrigerant per metre of line [g/m]	R134a refrigerant per metre of line [g/m]
		C1	C2	C1	C2	C1	C2
HWF 2512 E	0-10	67	67	41	41	1,450	1,450
	10-20	67	67	41	41	1,450	1,450
	20-30	67	67	41	41	1,450	1,450
	30-60	67	67	41	41	1,450	1,450
HWF 2812 E	0-10	67	67	54	54	2,450	2,450
	10-20	67	67	54	54	2,450	2,450
	20-30	67	67	54	54	2,450	2,450
	30-60	67	67	54	54	2,450	2,450
HWF 3212 E	0-10	67	67	54	54	2,450	2,450
	10-20	79	79	54	54	2,520	2,520
	20-30	79	79	54	54	2,520	2,520
	30-60	79	79	54	54	2,520	2,520
HWF 3612 E	0-10	67	67	54	54	2,450	2,450
	10-20	79	79	54	54	2,520	2,520
	20-30	79	79	54	54	2,520	2,520
	30-60	79	79	54	54	2,520	2,520
HWF 4212 E	0-10	79	79	54	54	2,520	2,520
	10-20	79	79	54	54	2,520	2,520
	20-30	92	92	54	54	2,600	2,600
	30-60	92	92	54	54	2,600	2,600
HWF 4812 E	0-10	79	79	67	67	3,690	3,690
	10-20	79	79	67	67	3,690	3,690
	20-30	92	92	67	67	3,770	3,770
	30-60	92	92	67	67	3,770	3,770
HWF 5612 E	0-10	92	92	67	67	3,770	3,770
	10-20	92	92	67	67	3,770	3,770
	20-30	92	92	67	67	3,770	3,770
	30-60	92	92	67	67	3,770	3,770
HWF 6412 E	0-10	92	92	67	67	3,770	3,770
	10-20	92	92	67	67	3,770	3,770
	20-30	92	92	67	67	3,770	3,770
	30-60	92	92	67	67	3,770	3,770

there are n°2 circuits for every machine
therefore n° 2 gas lines + n° 2 liquid lines

(*) Minimum partialisation 2 compressors ON

Key
C1 = Cooling circuit 1
C2 = Cooling circuit 2

If evaporator is placed lower than condenser, syphons are needed in the output line, to favour the transporting of oil towards the compressor. By line length, distance measured between the units on the liquid line, is intended. For additional information please contact company.



15. SOUND DATA

15.1. HWF SOUND LEVELS

Sound power
Aermec determines sound power values in agreement with the 9614-2 Standard, in compliance with that requested by Eurovent certification.

Sound Pressure
Sound pressure measured in free field conditions with reflective surface (directivity factor Q=2) in compliance with ISO 3744 Standard.

Nominal value referred to:
Evaporator water temperature..... 12/7 °C
Condenser air temperature..... 35 °C
Δt ..... 5°C

HWF °/A	Total sound levels			Octave band [Hz]						
	Pow. dB(A)	Pressure.		125	250	500	1000	2000	4000	8000
		dB(A) 10 m	dB(A) 1 m	Sound potential for central band dB (A) frequency						
2512	**93,6**	**61,6**	**75,6**	54,0	74,7	86,1	91,0	87,5	69,3	56,9
2812	**94,0**	**62**	**76**	59,5	74,3	88,5	91,2	86,7	71,2	59,3
3212	**93,5**	**61,5**	**75,5**	69,1	82,7	85,8	91,3	83,8	78,3	64,1
3612	**93,7**	**61,7**	**75,7**	66,5	84,8	87,0	90,7	84,8	75,6	63,3
4212	**94,6**	**62,6**	**76,6**	64,8	88,4	88,9	89,8	86,8	68,0	56,6
4812	**95,5**	**63,5**	**77,5**	65,4	87,0	87,9	92,7	86,7	76,1	63,3
5612	**97,3**	**65,3**	**79,3**	65,9	87,0	88,3	95,7	86,7	76,4	64,9
6412	**97,9**	**65,9**	**79,9**	58,9	84,6	91,9	95,4	88,6	79,5	63,9

15.2. SILENCED STANDARD SOUND LEVELS «L»

HWF L/AL	Total sound levels			Octave band [Hz]						
	Pow. dB(A)	Pressure.		125	250	500	1000	2000	4000	8000
		dB(A) 10 m	dB(A) 10 m	Sound potential for central band dB (A) frequency						
2512	**85,5**	**53,5**	**67,5**	50,0	74,7	79,1	83,0	76,5	55,3	44,9
2812	**86,2**	**54,2**	**68,2**	55,5	74,3	81,5	83,2	75,7	57,2	47,3
3212	**87,0**	**55**	**69**	65,1	82,7	78,8	83,3	72,8	64,3	52,1
3612	**87,9**	**55,9**	**69,9**	62,5	84,8	80,0	82,7	73,8	61,6	51,3
4212	**90,2**	**58,2**	**72,2**	60,8	88,4	81,9	81,8	75,8	54,0	44,6
4812	**89,8**	**57,8**	**71,8**	61,4	87,0	80,9	84,7	75,7	62,1	51,3
5612	**91,0**	**59**	**73**	61,9	87,0	81,3	87,7	75,7	62,4	52,9
6412	**90,8**	**58,8**	**72,8**	54,9	84,6	84,9	87,4	77,6	65,5	51,9

15.3. SOUND LEVELS WITH AKW KIT ACCESSORY

Note: available only in the **"L" BONNET** versions

HWFL WITH AKW KIT	Total sound levels			Octave band [Hz]						
	Pow. dB(A)	Pressure.		125	250	500	1000	2000	4000	8000
		dB(A) 10 m	dB(A) 10 m	Sound potential for central band dB (A) frequency						
2512	**80,8**			56,0	63,7	73,1	79,0	72,5	54,3	42,9
2812	**81,4**			61,5	63,3	75,5	79,2	71,7	56,2	45,3
3212	**81,5**			71,1	71,7	72,8	79,3	68,8	63,3	50,1
3612	**81,5**			68,5	73,8	74,0	78,7	69,8	60,6	49,3
4212	**82,4**			66,8	77,4	75,9	77,8	71,8	53,0	42,6
4812	**83,2**			67,4	76,0	74,9	80,7	71,7	61,1	49,3
5612	**85,2**			67,9	76,0	75,3	83,7	71,7	61,4	50,9
6412	**85,4**			60,9	73,6	78,9	83,4	73,6	64,5	49,9

16. CALIBRATION OF SAFETY AND CONTROL PARAMETERS

CONTROL PARAMETERS			
Cooling Set	Input temperature of the water in cooling functioning mode.	**MIN.**	4°C
		MAX.	15°C
		DEFAULT	7.0°C
Heating Set	Input temperature of the water in heating functioning mode.	**MIN.**	
		MAX.	
		DEFAULT	
Anti-freeze intervention	Intervention temperature of the anti-freeze alarm on the EV side (water output temperature).	**MIN.**	-9°C
		MAX.	4°C
		DEFAULT	3°C
Total differential	Proportional temperature band within which the compressors are activated and deactivated.	**MIN.**	3°C
		MAX.	10°C
		DEFAULT	5°C
Autostart	Auto		

			2512	2812	3212	3612	4212	4812	5612	6412
COMPRESSORS										
Quantity Compressors		n°	2	2	2	2	2	2	2	2
CP1/CP2 magnet circuit breakers calibration	400V-3-50Hz	A	177	203	233	266	306	345	358	411
RT1/RT2 circuit breakers relay calibration	400V-3-50Hz	A	102	127	134	153	176	199	218	237
F1/F2 compressors fuses calibration	400V-3-50Hz	A	200	250	250	315	315	400	400	500
PRESSURE SWITCH - TRANSDUCERS - SAFETY VALVES										
High pressure double pressure switch*		bar	18/19	18/19	18/19	18/19	18/19	18/19	18/19	18/19
High pressure transducer		bar	18	18	18	18	18	18	18	18
Low pressure transducer		bar	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6
High pressure safety valve		bar	22	22	22	22	22	22	22	22
Low pressure safety valve		bar	16,5	16,5	16,5	16,5	16,5	16,5	16,5	16,5

* Calibration of the double pressure switch + rearm with tool 18 bar manual rearm/19 manual rearm with tool.

FOR THE INSTALLER

17. RECEIPT OF THE PRODUCT AND INSTALLATION

17.3.1. Receipt and handling

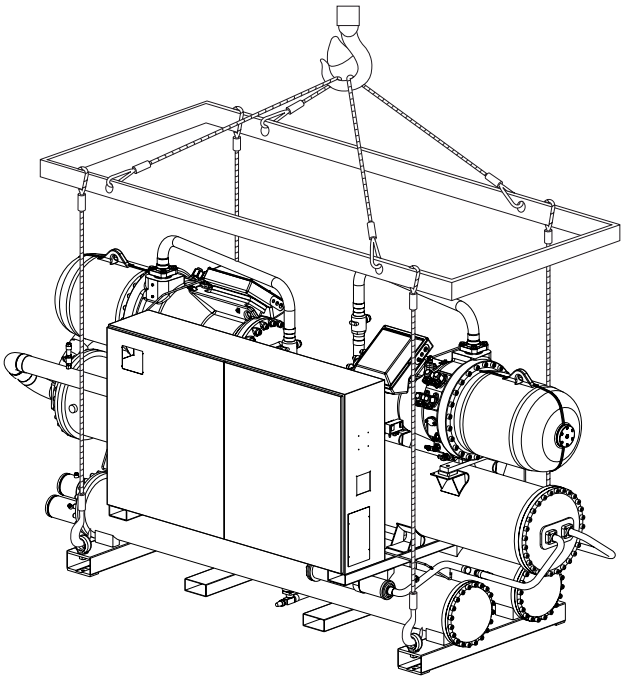
The machine is sent from the factory wrapped with estincoil placed on a pallet.
Before handling the unit, verify the lifting capacity of the machines used.
Handling must be performed by qualified, suitably equipped staff.
To handle the machine:
-Whenever the machine must be lifted using belts, place protections between the belts and the framework to prevent damage to the structure. It is prohibited to stop under the unit during lifting operations.

- **The machine must be kept in a vertical position**
- **The instructions found on the machine are an integral part of the same. They must be read and kept carefully.**

17.3.2. Selection and place of installation

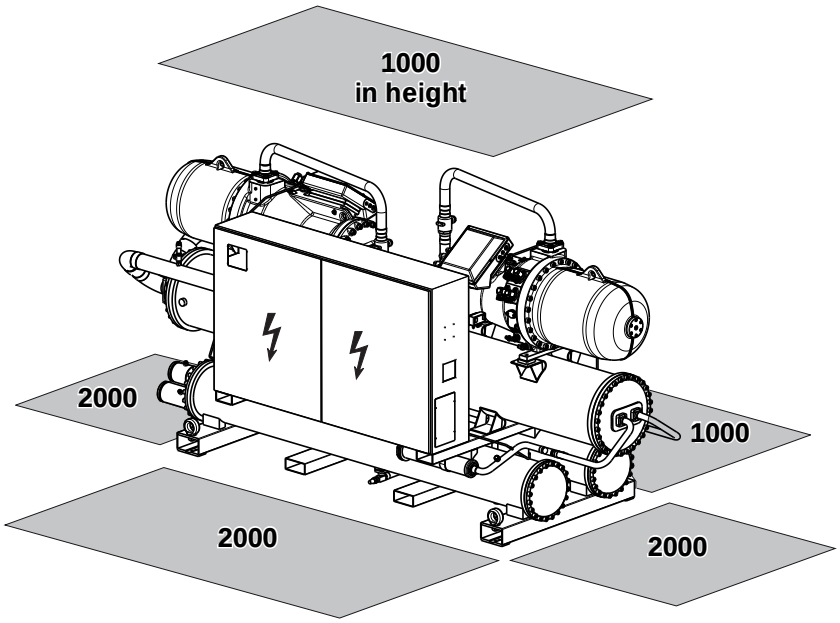
The HWF water/water OUTDOOR heat pump with gas side conversion (R134a) is sent from the factory already inspected and only requires electric and hydraulic connections in the place of installation.
Before beginning installation consent with client and pay attention to the following recommendations:

- The support surface must be capable of supporting the unit weight;
- The safety distances between the units and other appliances or structures must be scrupulously respected.
- The unit must be installed by a qualified technician in compliance with national laws in the country of destination.
- It is mandatory to foresee to the necessary technical space in order to allow ROUTINE AND EXTRAORDINARY MAINTENANCE interventions.
- Remember that whilst operational the chiller can cause vibrations; therefore anti-vibration mounts (AVX ACCESSORIES) are recommended, fixed in the holes on the base according to the assembly layout.
- Fix the unit checking that it is level.

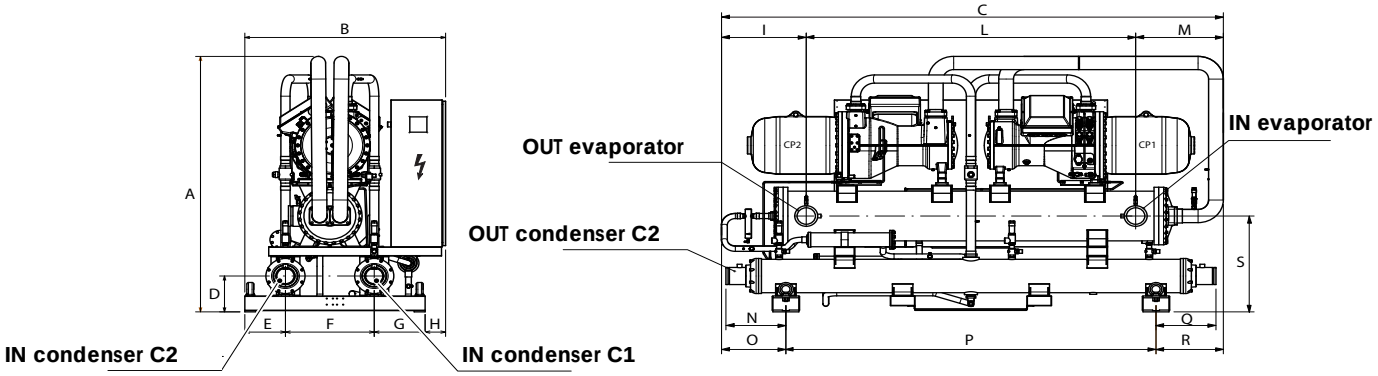


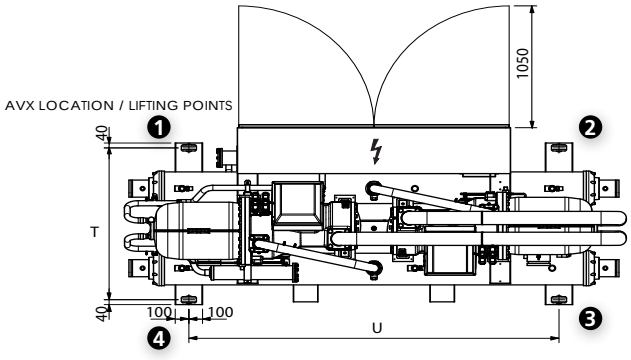
***ATTENTION**:*
ALWAYS USE ALL RINGS PREPARED

17.1. MINIMUM TECHNICAL SPACES (mm)



18. HWF STANDARD/SILENCED DIMENSIONAL TABLES





***ATTENTION**:*
The drawing is indicative, it does not reflect all sizes in the catalogue, the dimensions are maximum and the heights of the connections are always calculated from an external point

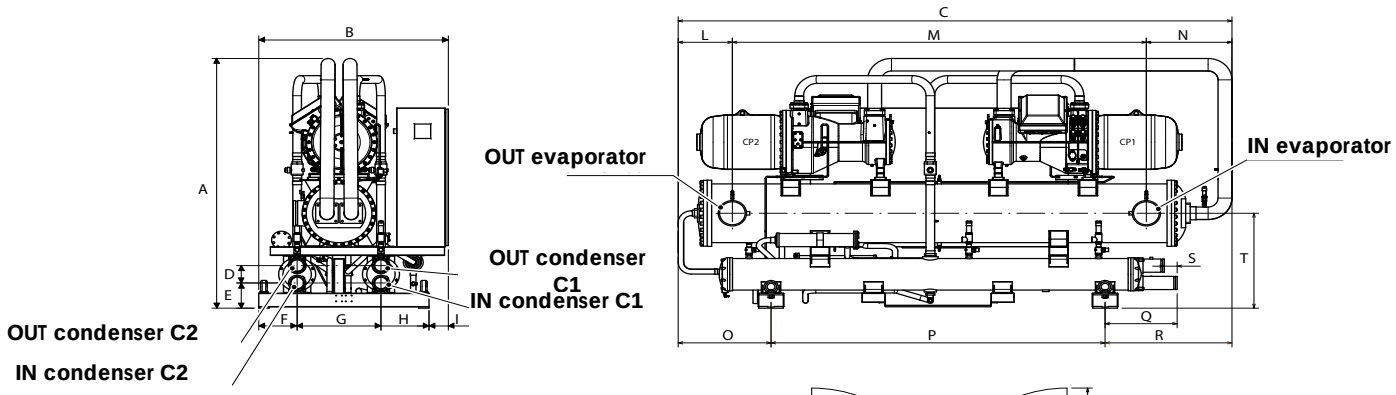
HWF°	DIMENSIONS (mm)			Weights (kg) Barycentres (mm) when EMPTY			Weights (kg) at FULL LOAD	WEIGHTS DISTRIBUTION AS % ON THE RESTS WITHOUT WATER				AVX KIT
	A	B	C	kg	Xg	Xy	kg	1	2	3	4	
2512°	2100	1470	3690	3570				25	25	25	25	673
2812°	2100	1470	3690	3650				25	25	25	25	673
3212°	2050	1470	4030	4470				25	25	25	25	673
3612°	2120	1520	4030	4750				25	25	25	25	674
4212°	2140	1550	4370	5100				25	25	25	25	674
4812°	2140	1550	4370	5200				25	25	25	25	674
5612°	2210	1600	4610	6110				25	25	25	25	675
6412°	2210	1600	4760	6310				25	25	25	25	675

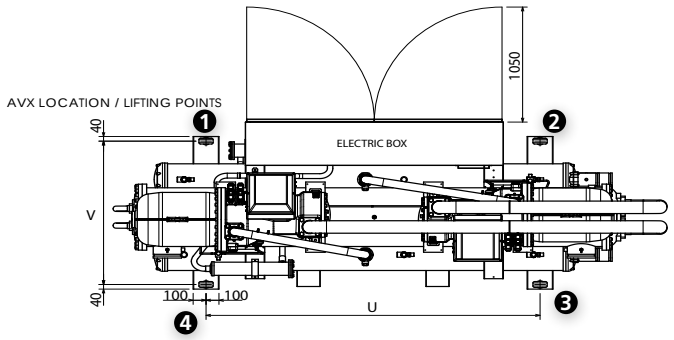
* *The AKW accessory can only be installed in the factory on the "L" units with bonnet, and therefore must be requested in the order phase.*

HWFL	DIMENSIONS (mm)			Weights (kg) Barycentres (mm) when EMPTY			Weights (kg) at FULL LOAD	Weights (kg) with AKW* kit when EMPTY	Weights (kg) with AKW* kit with FULL LOAD		WEIGHTS DISTRIBUTION AS % ON THE RESTS WITHOUT WATER				AVX KIT
	A	B	C	kg	Xg	Xy	kg	kg	kg		1	2	3	4	
2512L				3880							25	25	25	25	673
2812L				3960							25	25	25	25	673
3212L				4825							25	25	25	25	674
3612L				5105							25	25	25	25	674
4212L				5470							25	25	25	25	674
4812L				5570							25	25	25	25	674
5612L				6530							25	25	25	25	675
6412L				6730							25	25	25	25	675

	AVX HYDRAULIC CONNECTIONS AND ANTI-VIBRATION MOUNT POSITION (ACCESSORIES) (mm)																COND.				EVAP.	
	D	E	F	G	H	I	L	M	N	O	P	Q	R	S	T	U	circuit 1 (C1)		circuit 2 (C2)			
																	IN ø	OUT ø	IN ø	OUT ø	IN ø	OUT ø
2512	293	298	650	373	150	620	2412	658	439	471	2710	439	509	783	1240	2710	5"	5"	5"	5"	6"	6"
2812	293	298	650	373	150	620	2412	658	439	471	2710	439	509	783	1240	2710	5"	5"	5"	5"	6"	6"
3212	293	298	650	373	150	809	2412	809	559	710	2590	439	730	783	1240	2590	5"	5"	5"	5"	6"	6"
3612	293	298	650	403	170	835	2360	835	559	710	2590	439	730	821	1270	2590	5"	5"	5"	5"	8"	8"
4212	293	298	650	403	200	730	2910	730	559	880	2590	439	900	821	1270	2590	5"	5"	5"	5"	8"	8"
4812	293	298	650	403	200	730	2910	730	559	880	2590	439	900	821	1270	2590	5"	5"	5"	5"	8"	8"
5612	324	298	650	403	250	658	3210	742	472	863	2800	472	947	883	1270	2800	6"	6"	6"	6"	8"	8"
6412	324	298	650	403	250	520	3510	730	472	875	2800	472	1085	883	1270	2800	6"	6"	6"	6"	8"	8"

19. HWF HIGH EFFICIENCY/HIGH EFFICIENCY SILENCED DIMENSIONAL TABLES





***ATTENTION**:*
The drawing is indicative, it does not reflect all sizes in the catalogue, the dimensions are maximum and the heights of the connections are always calculated from an external point

* *The AKW accessory can only be installed in the factory on the "AL" units with bonnet, and therefore must be requested in the order phase.*

HWFA	DIMENSIONS (mm)			Weights (kg) Barycentres (mm) when EMPTY			Weights (kg) Barycentres (mm) with full LOAD			WEIGHTS DISTRIBUTION AS % ON THE RESTS WITHOUT WATER				AVX KIT
	A	B	C	kg	Xg	Xy	kg	Xg	Xy	1	2	3	4	
2,512A	2180	1470	4330	4080						25	25	25	25	673
2,812A	2180	1470	4330	4140						25	25	25	25	673
3,212A	2190	1537	4330	5470						25	25	25	25	674
3,612A	2340	1695	4370	5950						25	25	25	25	675
4,212A	2340	1695	4550	6290						25	25	25	25	675
4,812A	2340	1695	4550	6460						25	25	25	25	675
5,612A	2380	1700	4800	7310						25	25	25	25	676
6,412A	2380	1700	4800	7410						25	25	25	25	676

HWFAL	DIMENSIONS (mm)			Weights (kg) Barycentres (mm) when EMPTY			Weights (kg) at FULL LOAD	Weights (kg) with AKW* kit when EMPTY	Weights (kg) with AKW* kit with FULL LOAD	WEIGHTS DISTRIBUTION AS % ON THE RESTS WITHOUT WATER				AVX KIT
	A	B	C	kg	Xg	Xy	kg	kg	kg	1	2	3	4	
2512AL				4190						25	25	25	25	674
2812AL				4270						25	25	25	25	674
3212AL				5180						25	25	25	25	675
3612AL				5475						25	25	25	25	675
4212AL				5840						25	25	25	25	675
4812AL				5940						25	25	25	25	675
5612AL				6950						25	25	25	25	676
6412AL				7150						25	25	25	25	676

	AVX HYDRAULIC CONNECTIONS AND ANTI-VIBRATION MOUNT POSITION (ACCESSORIES) (mm)																	COND.				EVAP.	
	D	E	F	G	H	I	L	M	N	O	P	Q	R	S	T	U	V	circuit 1 (C1)		circuit 2 (C2)			
																		IN ø	OUT ø	IN ø	OUT ø	IN ø	OUT ø
2512	150	218	298	650	373	150	438	3212	632	738	2590	469	1002	50	821	1240	2590	4"	4"	4"	4"	8"	8"
2812	150	218	298	650	373	150	438	3212	632	738	2590	469	1002	50	821	1240	2590	4"	4"	4"	4"	8"	8"
3212	200	224	327	650	373	187	502	3210	618	657	2800	565	873	100	883	1270	2800	5"	5"	5"	5"	8"	8"
3612	200	223	300	810	360	225	513	3130	727	855	2380	658	1135	100	958	1390	2380	5"	5"	5"	5"	10"	10"
4212	200	223	300	810	360	225	612	3130	808	954	2380	658	1216	100	958	1390	2380	5"	5"	5"	5"	10"	10"
4812	200	223	300	810	360	225	612	3130	808	954	2380	658	1216	100	958	1390	2380	5"	5"	5"	5"	10"	10"
5612	252	274	330	850	330	190	561	3430	809	976	2600	677	1224	100	1111	1430	2600	6"	6"	6"	6"	10"	10"
6412	252	274	330	850	330	190	561	3430	809	976	2600	677	1224	100	1111	1430	2600	6"	6"	6"	6"	10"	10"

20. HYDRAULIC CIRCUIT

The HWF chiller is equipped with the following, depending on the version:

system SIDE (EVAPORATOR):

- Differential pressure switch
- Shell and tube heat exchanger
- Water drain cock
- Inlet and outlet water temperature probes for the heat exchangers
- Victaulic connections with supplied welded joints

SOURCE SIDE (CONDENSERS):

- Shell and tube heat exchangers, for GEOTHERMAL APPLICATIONS:

20.1. EXTERNAL HYDRAULIC CIRCUIT RECOMMENDED

The choice and the installation of components external to the chiller is up to the installer, who must operate according to the rules of good technical design and in compliance with the regulations in force in the country of destination (Ministerial Decree 329/2004).

Before connecting the pipes make sure that they do not contain stones, sand, rust, sludge or foreign bodies that could damage the system. It is good practice to realise a unit by-pass to be able to wash the pipes without having to disconnect the appliance. The connection piping must be adequately supported so that its weight is not borne by the appliance, and we recommend insulating them with suitable material to avoid condensate forming and heat losses.

Ensure that the adjustment and cut-off parts project from the insulation.

It is recommended to install the following tools on the water circuit, whenever not envisioned in the version in your possession:

1. Two manometers with suitable scale (in inlet and outlet).
2. Anti-vibration joints (in inlet and outlet).
3. Cut-off valves (in normal input, in calibration valve output).
4. Thermometers (in inlet and outlet).
5. System Storage Tank
   Water storage
6. Loading unit
7. Provide a discharge valve in the lowest points to facilitate emptying operations.
8. Evaporator side and condensers flow meter (whenever not envisioned if water missing, the high pressure switch intervenes)
9. Expansion vessels
10. Pumps
11. Safety valve
12. Water filters

It is necessary that the water flow rate is in compliance with the values given in the performance tables.

The systems loaded with anti-freeze or particular legal dispositions, make the use of water disconnectors mandatory.
Supply/reintegration water details, must be conditioned with appropriate treatment systems.

20.2. LOADING THE SYSTEM

- Before beginning loading, place the switch at OFF
- Check that system drain cock is closed.
- Open all system vent valves and relative terminals.
- Open the system cut-off devices.
- Start filling by slowly opening the system water loading cock outside the appliance.
- When water starts to escape from the terminal vent valves, close them and continue loading until the value of 1.5 bar is read on the manometer.

The system must be loaded at a pressure between 1 and 2 bar.

It is recommended to repeat this operation after the appliance has functioned for a few hours and to periodically check the system pressure, reintegrating it if it drops below 1 bar.

Check the hydraulic sealing of the joints.

20.3. EMPTYING THE SYSTEM

- Before beginning emptying, place the master switch at "OFF"
- Check that loading/water system reintegration cock is closed
- Open the drain cock outside the appliance and all system vent valves and relative terminals.

If anti-freeze is used by the unit, it must not be dumped as it is harmful to the environment. It should be collected and if possible reused.

Supply/reintegration water details, must be conditioned with appropriate treatment systems.

When to empty the system:

1. Whenever a prolonged winter standstill is envisioned in order to prevent water freezing **(operation not necessary if glycol is used)**
2. Whenever a fault occurs or operations must be performed in the system.

- Before beginning emptying, place the master switch at "OFF" and remove the voltage.
- Discharge the differential pressure switch
- Check that loading/water system reintegration cock is closed
- Open the drain cock outside the appliance and all system vent valves and relative terminals.
- Open the cock positioned under the shell and tube heat exchanger (see fig. 4)
- It is recommended to use compressed air to blow the heat exchanger in order to remove any water.

Note:

If anti-freeze is used by the unit, it must not be dumped as it is harmful to the environment. It should be collected and if possible reused.

20.3.1. 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

EVAPORATOR DRAINDRAWING

21. ELECTRIC CONNECTIONS

All the electrical operations must be carried out bySTAFF IN POSSESSION OF THE NECESSARY QUALIFICATIONS BY LAW, suitably trained and informed on the risks related to these operations.

The characteristics of the electrical lines and of the related components must be determined by STAFF QUALIFIED TO DESIGN ELECTRICAL SYSTEMS, in compliance with the international and national regulations of the place of installation of the unit and in compliance with the regulations in force at the moment of installation

For the installation requirements refer only to the electrical diagram supplied with the appliance. The electrical diagram along with the manuals must be kept in good condition and ALWAYS AVAILABLE FOR ANY FUTURE SERVICING ON THE UNIT.

IT ISmandatory to verify that the machine is watertight before making the electrical connections and it must only be powered up after the hydraulic and electrical works have been completed.

The HWF chillers are completely wired at the factory and only require connection to the electrical mains, downstream from a unit switch, according to that envisioned by the Standards in force on this subject in the country of installation.
It is also advised to check that:

- the electrical mains features are suitable for the absorption values indicated in the electrical data table, also taking into consideration any other machines operating at the same time.
- The unit is only powered when installation has been completed (hydraulic and electric).
- Respect the connection indications of the phase, and earth wires.
- The power supply line must have a relevant protection mounted upstream against short circuits and dispersions to earth, which isolates the system with respect to other utilities.
- The voltage must be within a tolerance of ±10% of the nominal power supply voltage of the machine (for unbalanced three-phase unit max 3% between the phases). Whenever these parameters are not respected, contact the electric energy public body. For electric connections, use the cables with double isolation according to the Standards in force on this subject in the different countries.
- The use of an omnipolar magnet circuit breaker switch is mandatory, in compliance with the IEC-EN Standards (contact opening at least 3 mm), with suitable cut-off power and differential protection on the basis of the electric data table shown below, installed as near as possible to the appliance.
- It is mandatory to make an effective earth connection. The manufacturer cannot be considered responsible for any damage caused by the lack of or ineffective appliance earth connection.
- For units with three-phase power supply, check the correct connection of the phases.

WARNING:
It is prohibited to use the water pipes to earth the appliance.

21.1. ELECTRIC DATA TABLE

The cable sections shown in the table are recommended for maximum lengths of 50m.
For longer lengths or different cable laying, it is up to the PLANNER to calculate the appropriate line switch, the power

HWF		Compressors	TOT		Recommended cables section				
					SEC A	SEC B	EARTH	IL	Maximum length recommended
		N°	L.R.A. [A]	F.L.A. [A]	[mm²]	[mm²]	[mm²]	[A]	[m]
2512	400V-3	2	545	370	240	1,5	120	400	50
2812	400V-3	2	613	418	2x150	1,5	150	400	50
3212	400V-3	2	670	468	2x185	1,5	185	630	50
3612	400V-3	2	723	516	2x240	1,5	240	630	50
4212	400V-3	2	892	612	3x185	1,5	2x150	800	50
4812	400V-3	2	995	690	3x240	1,5	2x185	800	50
5612	400V-3	2	1193	776	4x240	1,5	2x240	1000	50
6412	400V-3	2	1340	846	5x240	1,5	3x240	1250	50

KEY

F.L.I.:	Maximum input power
F.L.A.:	Maximum input current
L.R.A.:	Peak current
Sec A:	Power supply
Sec B:	Controls and safety device connection
IL:	Main switch

supply line as well as the connection to the earth wire and connection cables depending on:

- the length
- the type of cable
- The absorption of the unit and the physical location, and the ambient temperature.

ATTENTION:
Check the tightening of all power wire clamps on commissioning and after 30 days from start-up. Subsequently, check the tightening of all the power clamps every six months.
Loose terminals can cause overheating of the cables and components.

21.2. ELECTRIC POWER CONNECTION TO THE ELECTRICAL MAINS

1. Before connecting the unit to the power supply mains , ensure that the isolating switch is open.
2. Open the front panel
3. Use the holes for the main electric power supply cable and for the cables of the other external connections under the responsibility of the installer.
4. It is forbidden to access positions not specifically envisioned in this manual with electric cables.
5. Avoid direct contact with non-insulated copper piping and with compressor.
6. Identify the clamps for the wiring diagram, always refer to the electric layout supplied with the unit.
7. For the functional connection of the unit, take the power supply cable to the electric control board inside the unit and connect to clamps L1-L2-L3 and PE respecting the polarities,
8. L1-L2-L3 as phases, and PE as earth see figure
9. Re-position the inspection panels
10. Ensure that all protections removed for the electric connection have been restored before electrically

powering the unit.
11. Position the system master switch (external to the appliance) at “ON”.

22. CONTROL AND COMMISSIONING

22.1. PREPARATION FOR COMMISSIONING

Please note that, on request by the Aermec customer or the legitimate owner of the machine, the units in this series can be started up by the AERMEC After-Sales Service in your area (valid only on Italian territory). The start of operation must be scheduled in advance based on the timeframe for the completion of works for the system. Prior to the intervention, all other works (electrical and hydraulic hook-ups, priming and bleeding of air from the system) must have been completed.

22.2. AUXILIARY CONNECTIONS IF ENVISIONED, BY THE INSTALLER

All clamps to which referece is made in the following explanations are part of the terminal board and the regulation situated inside the electric control board.

22.2.1. Remote switch-on/off

To have a remote switch-on/off device , a switch is necessary at clamps 1 and 2 of the terminal board J5.ID1.

22.2.2. Season changeover

- For every season change, check that the functioning limits lie within the limits.
- Connect a switch to clamp 4 and 3 of the J5.ID2 terminal board

22.2.3. Season change from (REMOTE ACCESSORY PANEL)

- Refer to the user manual.

22.2.4. Evaporator pump circuit breaker protection (TMP EV)

Clamp 9 and 10 of the J5.ID6 terminal board

22.2.5. Condenser 1 pump circuit breaker protection (TMP C1)

Clamp 98 and 99 of the J7.ID11 terminal board

22.2.6. Condenser 2 pump circuit breaker protection (TMP C2)

Clamp 100 and 101 of the 2 J7.ID11 terminal board

22.2.7. Compressor 1 exclusion (ECP1) - compressor 2 (ECP2)

Whenever it is necessary to exclude the compressor, connect a switch to clamp 92 and 93 of the J8.ID14 terminal board for compressor 1 (ECP1) - clamps 94 and 95 of the 2 J8.ID14 terminal board for compressor

For the electric connections use double isolated cables in compliance with the Standards in force on this subject in the countries where the unit will be installed. ALWAYS REFER TO THE WIRING DIAGRAM SUPPLIED WITH THE MACHINE.

Commissioning must be performed with standard settings. Only when the inspection has been completed can the functioning Set Point values by changed. Before start-up, power the unit for at least 12-24 hours positioning the protection magnet circuit breaker switch and the door lock isolating switch at ON
Make sure that the control panel is off in order to allow the compressor sump oil to heat.

2 (ECP2).

22.2.8. Condensers flow meter connection (FLC1-FLC2)

Remove the jumpers at clamps 108 and 109 of the J19 terminal board. ID15 for condenser 1 flow meter (FLC1) and the jumper on clamps 110 and 111 of the 2 J19 terminal board. ID15 for condenser 2 flow meter (FCL2).

22.2.9. To control the evaporting (MPOE) and condensing (MPOC1/2) pump

Connect to the clamps:
- 42 and 43 of the J12.N01 terminal board for (MPOE)
- 102 and 103 of the J18.N013 terminal board for (MPOC1)
- 104 and 105 of the 2J18.N013 terminal board for (MPOC2)

22.2.10. Multifunction input (MULTI IN)

A multifunction input is available where it is possible to select 4 different functions, but only 1 can be set:
- 0-10V variable set-point
- Max. power requested (0-10V) power from 0 to 100%
- Min. power limit. (0-10V) power from 0 to 100%
- Compensation set-point

To enable the MULTIFUNCTION input, close the contact between clamps 96 and 97 of the J20.ID18 terminal board. It will then be necessary to control the desired function, enable the panel parameters. To do this, refer to the user manual.

22.3. START -UP

22.3.1. Preliminary operations to be performed with no voltage present

Control:
1. All safety conditions have been respected
2. The unit is correctly fixed to the support surface
3. The minimum technical spaces have been respected;
4. That the main power supply cables have appropriate section, which can support the total absorption of the unit. (see electric data sections) and that the unit has been duly connected to the ground.
5. That all the electrical connections have been made correctly and all the terminals adequately tightened.

22.3.2. The following operations are to be carried out when the unit is live.

1. Supply power to the unit by turning the master switch to the ON position, see **(fig1.)** The display will come on a few seconds after voltage has been supplied; check that the operating status is on OFF.(OFF BY KEY B on lower side of the display).
2. Use a tester to check that the value of the power supply voltage to the RST phases is equal to 400V ±10%; also verify that the unbalance between phases is no greater than 3%.
3. Check that the connections made by the installer are in compliance with the documentation.
4. Verify that the resistor of the compressor sump is working by measuring the increase in temperature of the oil pan. The resistance/s must function for at least 12 hours before start-up of the compressor and in all cases the temperature of the oil pan must be 10 -15°C higher than the room temperature.

HYDRAULIC CIRCUIT

1. Check that all hydraulic connections are made correctly, that the plate indications are complied with and that a mechanical filter has been installed at the evaporator inlet. (Mandatory component for warranty to be valid).
2. Check that the hydraulic system is filled and under pressure and also make sure that no air is present; if so, bleed it.
3. Verify that any on-off valves present in the system are correctly opened.
4. Make sure that the circulation pump/s is operating and that the flow rate of the water is sufficient to close the contact of the flow/pressure switch.
5. Check lthe water flow rate, measuring the pressure difference between input and output of the evaporator and calculate the flow rate using the evaporator pressure drop diagram present in this documentation.
6. Check the correct functioning of the flow meters if installed. Closing the cut-off valve at the output of the heat exchanger; the unit control panel must show the block. Finally re-open the valve and rearm the block.

22.4. MACHINE COMMISSIONING

3.1. After having performed all controls stated above, it is possible to start the unit by pressing the ON key. The display shows the temperature of the water and machine functioning mode. Check the operating parameters (set-point) and reset any alarms present. After a few minutes, the unit will begin operating.

22.4.1. With machine on, check

COOLING CIRCUIT

CHECK:
- **That the compressor input current** is lower than the maximum indicated in the technical data table.

WARNING: Before carrying out the controls indicated below, make sure that the unit is disconnected from the power mains. Make sure that the master switch is locked in the OFF position and an appropriate sign is affixed. Before starting the operations, check that there is no voltage present using a voltmeter or a phase indicator.

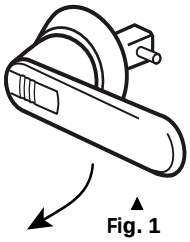


Fig. 1

- **That in models with three-phase power supply**, the compressor noise level is not abnormal. If this is the case, invert a phase.
- **That the voltage value lies within the pre-fixed limits** and that unbalance between the three phases (three-phase power supply) is not above 3%.
- **The presence of any refrigerant GAS leaks** particularly with reference to pressure plugs, pressure transducers and pressure switches. (VIBRATIONS DURING TRANSPORTATION MAY LOOSEN CONNECTIONS).
- **After a brief functioning period, the oil level in the compressor** and that there are no air pockets in the liquid indicator glass. The continuous passage of steam pockets can mean that the load of refrigerant is insufficient or that the thermostatic valve is incorrectly adjusted. The brief presence of vapour is however possible.
- **Overheating**
  Comparing the temperature read using a contact thermostat positioned on the compressor intake with the temperature shown on the low pressure manometer (saturation temperature corresponding to the evaporation pressure). The difference between these two temperatures gives the overheating value. Optimal values are between 4 and 8°C
- **Subcooling**
  Comparing the temperature measured with a contact thermostat situated on the pipe at the outlet of the condenser with the temperature shown on the high pressure manometer (saturation temperature corresponding to the condensation pressure). The difference between these two temperatures gives the subcooling value. Optimal values are between 4 and 5°C
- **The Pressing line temperature**
  If the subcooling and overheating values are regular the temperature measured in the pressing line pipe at the outlet of the compressor must be 30/40°C above the condensation temperature.

CONTROL AND SAFETY DEVICES

CHECK:

- **The Double High pressure switch (manual + tool)**
  That stops the compressor, generating the respective alarm, when the delivery pressure exceeds the setpoint value. The control of its correct functioning can be performed by closing the air intake to the exchanger (in cooling mode) and keeping the high pressure manometer under control, check the intervention in correspondence of the calibration value. Caution: In the event of failure to intervene at the calibration value, stop the compressor immediately and check the cause. The reset is manual and can only be performed when the pressure falls below the differential value. (For the set and differential values, consult the technical manual).

- **The Low pressure switch (if envisioned)**
  That stops the compressor, generating the respective alarm, when the intake pressure drops below the set-point value. The control of its correct functioning can only be performed after about 5 minutes of functioning. Closing the cock slowly on the liquid piping and keeping the low pressure manometer under control, check the intervention in correspondence of the value calibrated. Caution: In the event of failure to intervene at the calibration value, stop the compressor immediately and check the cause. The reset is manual and can only be carried out when the pressure falls below the differential value. (For the set and differential values, consult the technical manual).

- **The anti-freeze control**
  The anti-freeze control managed by the electronic regulation and by the temperature probe located at the outlet of the evaporator is to prevent the formation of ice when the water flow rate is too low. Correct operation can be checked by progressively increasingly the anti-freeze set-point until it passes the outlet water temperature and keeping the water temperature controlled with a high precision thermometer, verify that the unit is off and generates the respective alarm. After this operation, take the anti-freeze set-point back to its original value.

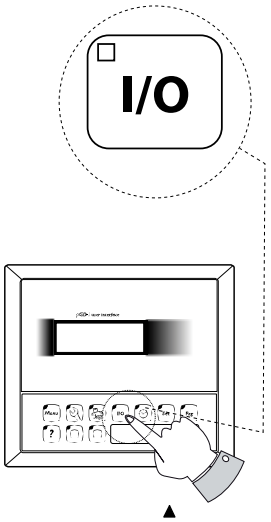


Fig. 2

All the units undergo rigorous tests in the factory, before delivery.
In all cases it is good practice to check all control and safety devices. All control operations must be performed by qualified staff, the incorrect settings of the above-mentioned devices cn cause serious damage to the unit.

23. FUNCTIONING FEATURES

23.1. SET POINT IN COOLING MODE

(Factory set) = 7°C, Δt = 5°C.

23.2. SET POINT IN HEATING MODE

(Factory set) = 45°C, Δt = 5°C.
If the unit power supply is restored after a temporary interruption, the set mode will be kept in the memory.

23.3. COMPRESSOR START-UP DELAY

Two functions have been prepared to prevent compressor start-ups that are too close.
- Minimum time from last switch-off 60 seconds in cooling mode.
- Minimum time from last switch-on 300 seconds in heating mode.

23.4. CIRCULTION PUMPS (NOT SUPPLIED)

The circuit board envisions an output for the management of the circulation pumps.
The pump side utilities start immediately after the first 30 seconds of functioning. When the water flow rate has gone into normal working conditions, the flow meter control functions are activated (if envisioned).
Below find the compressor start-up procedure, by switching the source side pump on with flow meter check if enabled after 20 seconds.
Whenever alarms do not occur, the compressor starts.

23.5. ANTI-FREEZE ALARM

The anti-freeze alarm is active if the machine is off or in stand-by mode. In order to prevent the heat exchanger from breaking due to the water it contains freezing, envision compressor block (if the machine is on below 3.5 °C) and ignition of the resistance (if standby below 5 °C). If the temperature detected by the probe positioned in outlet of the heat exchanger and in inlet to the chiller is less than +3.8°C.

WARNING
THIS ANTI-FREEZE SET TEMPERATURE CAN ONLY BE VARIED BY AN AUTHORISED AFTER-SALES CENTRE AND ONLY AFTER HAVING CHECKED THAT THERE IS ANTI-FREEZE SOLUTION IN THE WATER SYSTEM.
The intervention of this alarm determines compressor block and not pump block, which remains active along with the switch-on of the resistance if installed.
To restore normal functions the temperature of the outlet water must rise above +4°C.
Rearm is manual.

ATTENTION:
WHENEVER THIS ALARM INTERVENES, WE ADVISE YOU CALL THE NEAREST AFTER-SALES SERVICE IMMEDIATELY.

23.6. WATER FLOW RATE ALARM

The unit manages a water flow rate alarm controlled by the differential pressure switch installed in series on the machine. This type of safety device intervenes after the first 30 seconds of pump functioning, if the water flow rate is not sufficient.
The intervention of this alarm determines compressor and pump block.

24. ROUTINE MAINTENANCE

WARNING
Inspection, maintenance and eventual repair work must be carried out only by a legally qualified technician.

Lack of control/maintenance can cause damage to persons or objects.

For appliances installed near to the sea, the maintenance intervals must be halved.

All cleaning is prohibited until the unit has been disconnected from the electric power supply mains.
Make sure there is no voltage present before operating.
Periodic maintenance is fundamental to keep the unit perfectly efficient under a functional and energetic point of view.
It is therefore essential to carry out periodic yearly controls for the:

24.6.1. Hydraulic circuit

CHECK:
- Refilling of water circuit
- Cleaning the water filter
- Control of flow switch
- No air in the circuit (bleed)
- that the water flow rate to the evaporator is constant
- The thermal insulation state of the hydraulic piping
- The percentage of glycol where necessary

24.6.2. Electrical circuit

CHECK:
- Safety efficiency
- Electric supply pressure
- Electrical Input
- Connection tightness
- Functioning of the compressor guard resistance

24.6.3. Cooling circuit

CHECK:
- State of compressor
- Efficiency of the plate heat exchanger resistance
- Work pressure
- Leak test for watertightness control of the cooling circuit
- Functioning of high and low pressure pressure switches
- Carry out the appropriate checks on the filter dryer to check efficiency

24.6.4. Mechanical checks

CHECK:
- Tightening of the screws the compressors and the electrical box, as well as the exterior panelling of the unit. Insufficient fastening can lead to undesired noise and vibrations.
- The condition of the structure. If there are any oxidised parts, treat with paint suitable to eliminate or reduce oxidation.

25. EXTRAORDINARY MAINTENANCE

The HWF chillers are filled with R134a gas and are inspected at the factory. Under normal conditions they do not require Technical Assistance related to control of refrigerant gas. Through time gas leakage may be generated from the joints, causing refrigerant to escape and discharge the circuit, causing appliance malfunctioning.

In these cases the leakage points are to be discovered, repaired and the cooling circuit is to be replenished, respecting the December 28 1993 n°549 law.

25.6.1. Load procedure

The load procedure is the following:
- Empty and dry the entire cooling circuit using a vacuum pump connected to the low and high pressure socket until 10 Pa is read on the vacuum meter. Wait a few minutes and check that this value does not rise above 50 Pa.
- Connect the refrigerant gas cylinder or a load cylinder to the socket on the low pressure line.
- Load the amount of refrigerant gas indicated on the appliance features plate.
- After a few hours of functioning, check that the liquid indicator indicates the dry circuit (dry-green).

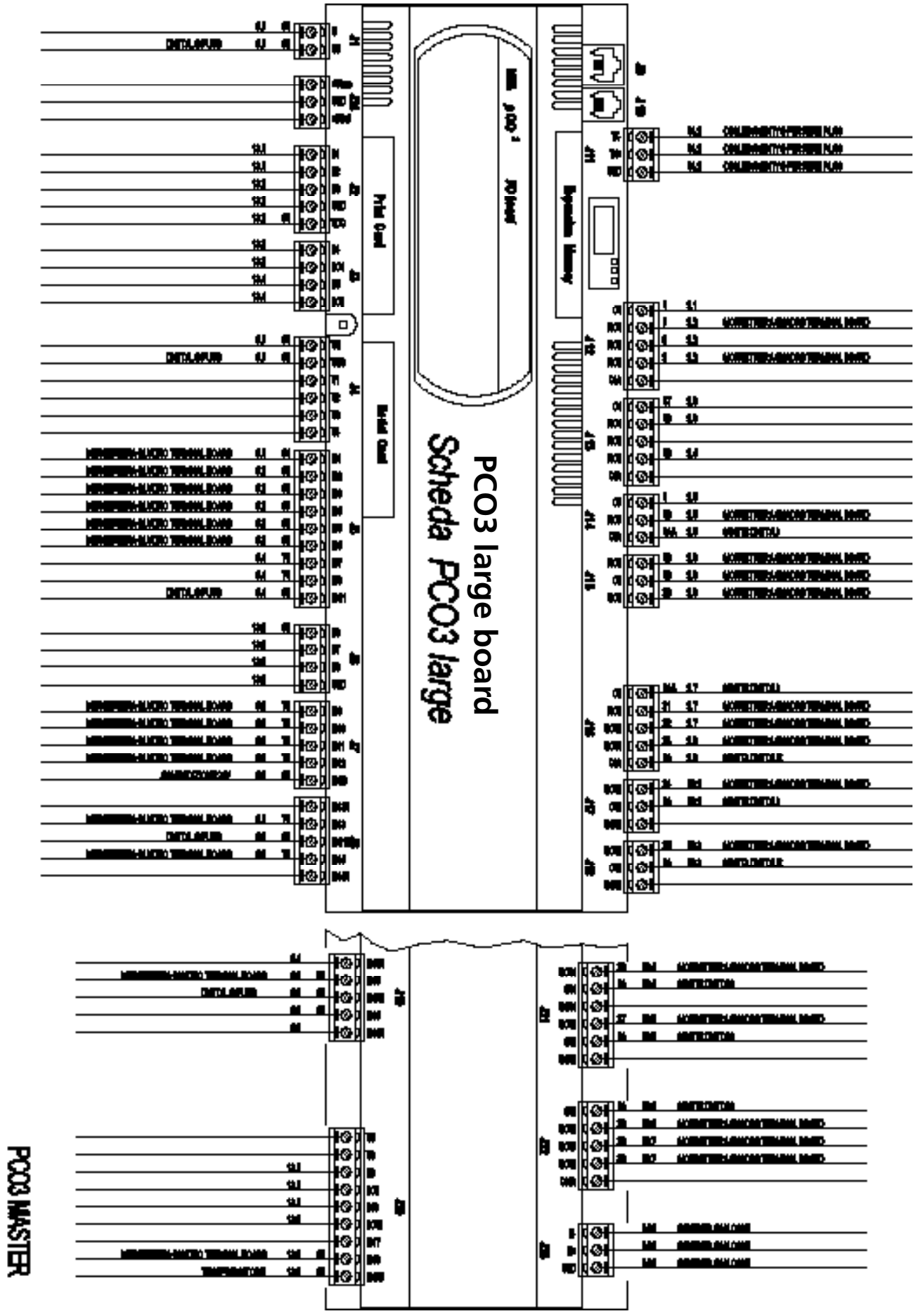
In the case of partial loss, the circuit must be emptied completely before being re-loaded.
- The R134A refrigerant must only be loaded in the liquid state.
- Functioning conditions that are different to the nominal conditions can give rise to values that are greatly different.
- The sealing test or the search for leaks must only be performed using R134a refrigerant gas, checking using a suitable leak detector.
- In the cooling circuit it is prohibited to use oxygen or acetylene or other inflammable or poisonous gases because they are a cause of explosions or intoxication.

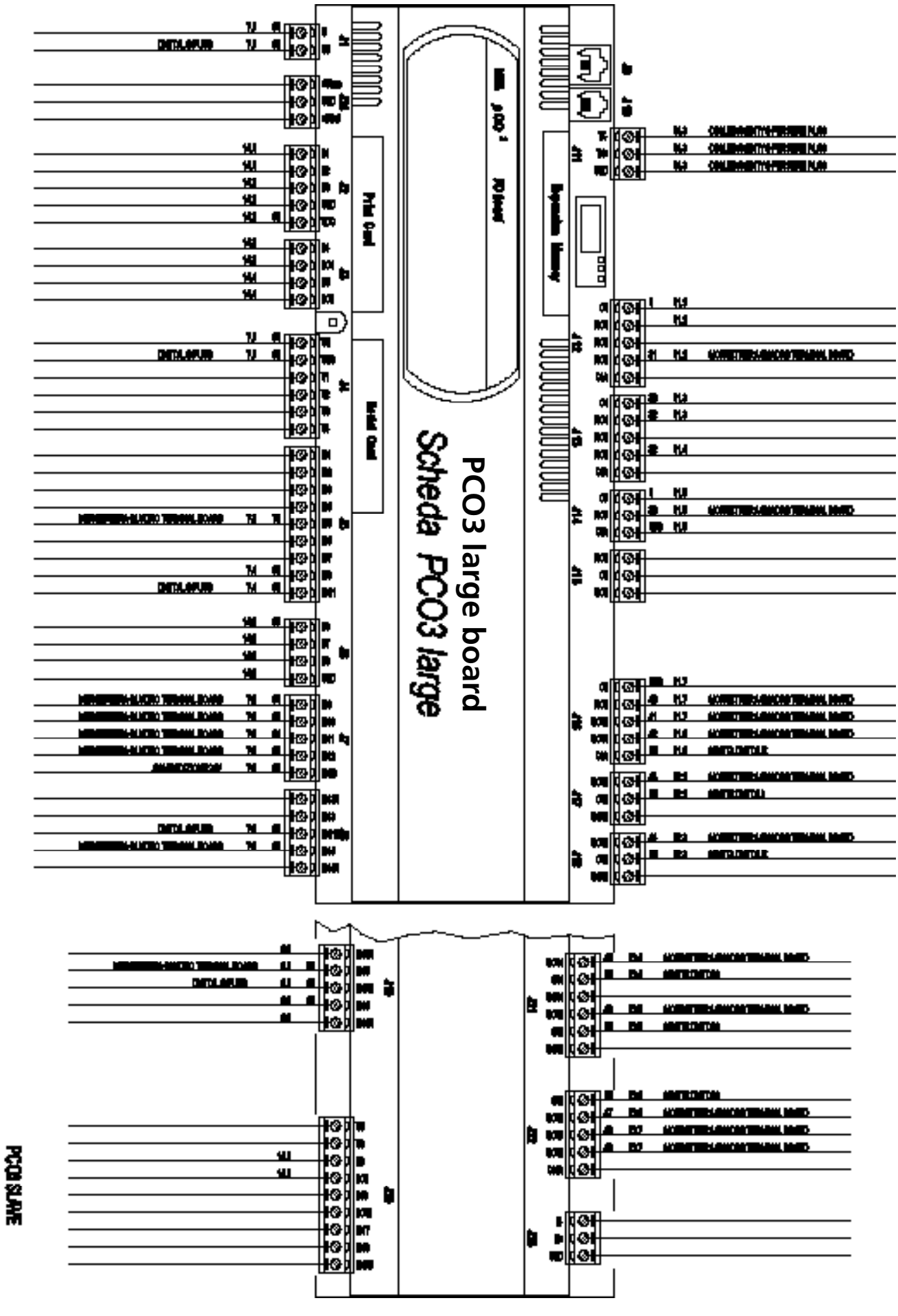
We recommend to envision a machine book (not supplied, but the user's responsibility), which allows to keep track of the interventions performed on the unit. In this way it will be easy to suitably organise the interventions making research and the prevention of any machine breakdowns easier. Use the date to record date, type of intervention made (routine maintenance, inspection or repairs), description of the intervention, measures actuate...

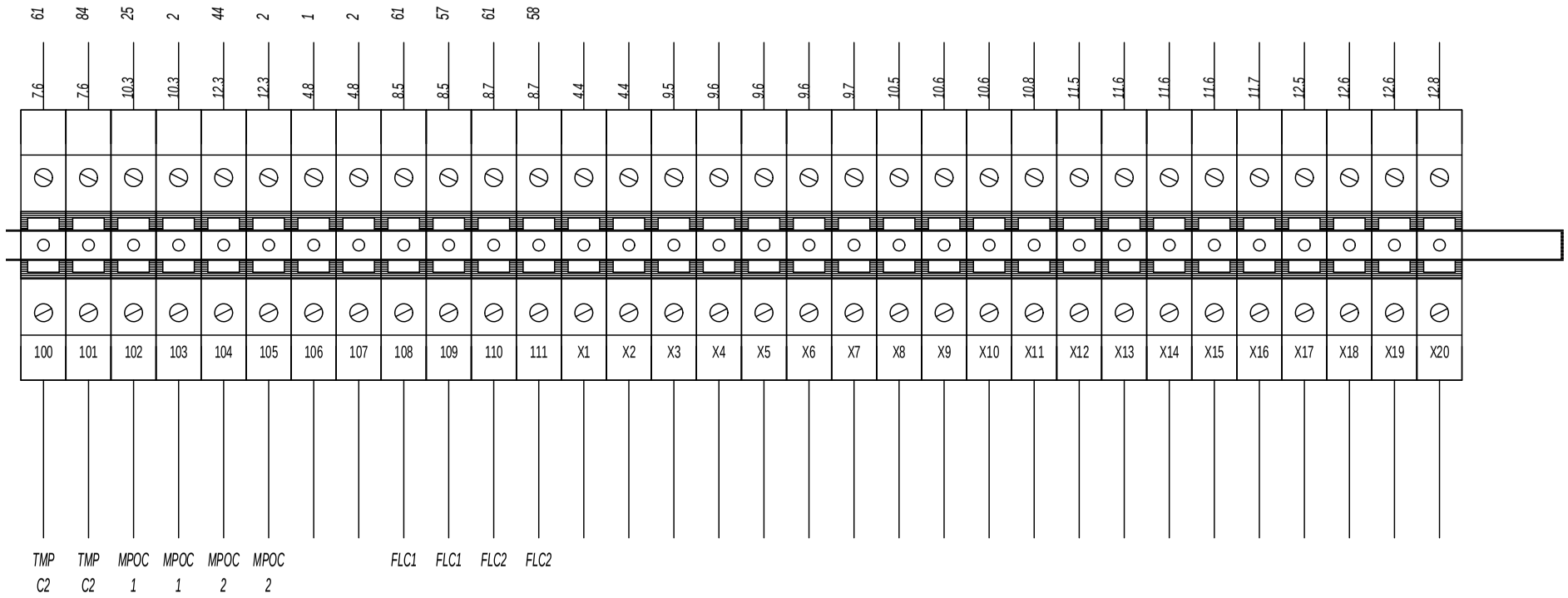
IT IS forbidden to RELOAD the circuit with a refrigerant gas different to the one indicated. Using a different refrigerant gas can cause serious damage to the compressor.

DISPOSAL
Envisions that disposal of the unit is carried out in conformity with the Standards in force in the different countries.

ANOMALY	CAUSE	REMEDY
The unit does not start	• No electric voltage	• Check the presence of voltage • Check the safety systems upstream from the appliance
	• Master switch at OFF • Remote switch at OFF (if present) • Control panel at OFF • Main switch at OFF • Compressor magnet circuit breaker at OFF	• Position at ON
	• Power supply voltage too low	• Check power supply line
	• Remote control switch coil broken • Circuit board broken • Peak condenser broken • Compressor broken	• Replace the component
Insufficient yield	• No refrigerant • Appliance dimensioning • Functioning outside of operational limits	• Check
Noisy compressor	• Liquid return to the compressor • Inadequate fixing	• Check
	• Invertedphase	• Invert a phase
Noise and vibrations	• Contacts between metal bodies	• Check
	• Weak rest	• Restore
	• Loose screws	• Tighten the screws
The compressor stops due to intervention of the protections	• Excessive flow pressure • Low intake pressure • Power supply voltage low • Electric connections fastened badly • Functioning outside of operational limits	• Check
	• Pressure functions badly	• Replace the component
	• Circuit breaker protection intervention	• Check power supply voltage • Check electric isolation of the windings
High discharge pressure	• High water input temperature • Highutilities water inlet temperature	• Check
	• Geothermic side exchanger water flow rate insufficient (functioning in cooling mode) • Utilities side exchanger water flow rate insufficient (functioning in heating mode)	• Check pump functioning
	• Air in the hydraulic system	• Bleed
	• Excessive refrigerant gas load	• Check
Low discharge pressure	• External water temperature low or excessive watwer flow rate • Low utilities water input temperature	• Check
	• Humidity in the cooling circuit	• Empty and restore the gas load
	• Air in the hydraulic system	• Bleed
	• Insufficient gas load	• Check
High intake pressure	• High water input temperature • Low utilities water input temperature • Thermostatic expansion valve too open or damaged	• Check
Low intake pressure	• Low utilities water input temperature • Low external water input temperature • Thermostatic expansion valve damaged or blocked	• Check
	• Insufficient water flow	• Check pump functioning


PCO3 large board
Scheda PCO3 large
PCO3 MASTER


PCO3 large board
Scheda PCO3 large
PCO3 SLAVE



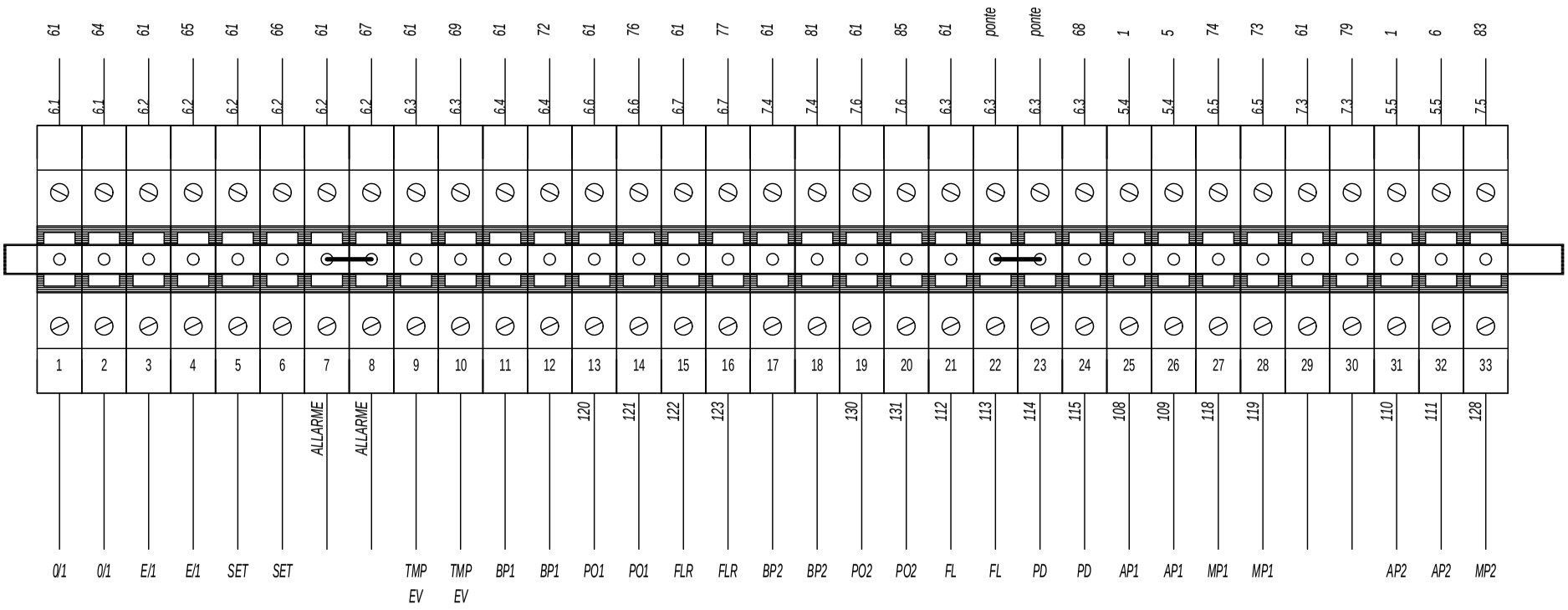
M

MORSETTIERA QUADRO

TERMINAL BOARD

RIEPILOGO MORSETTI

CLAMPS SUMMARY



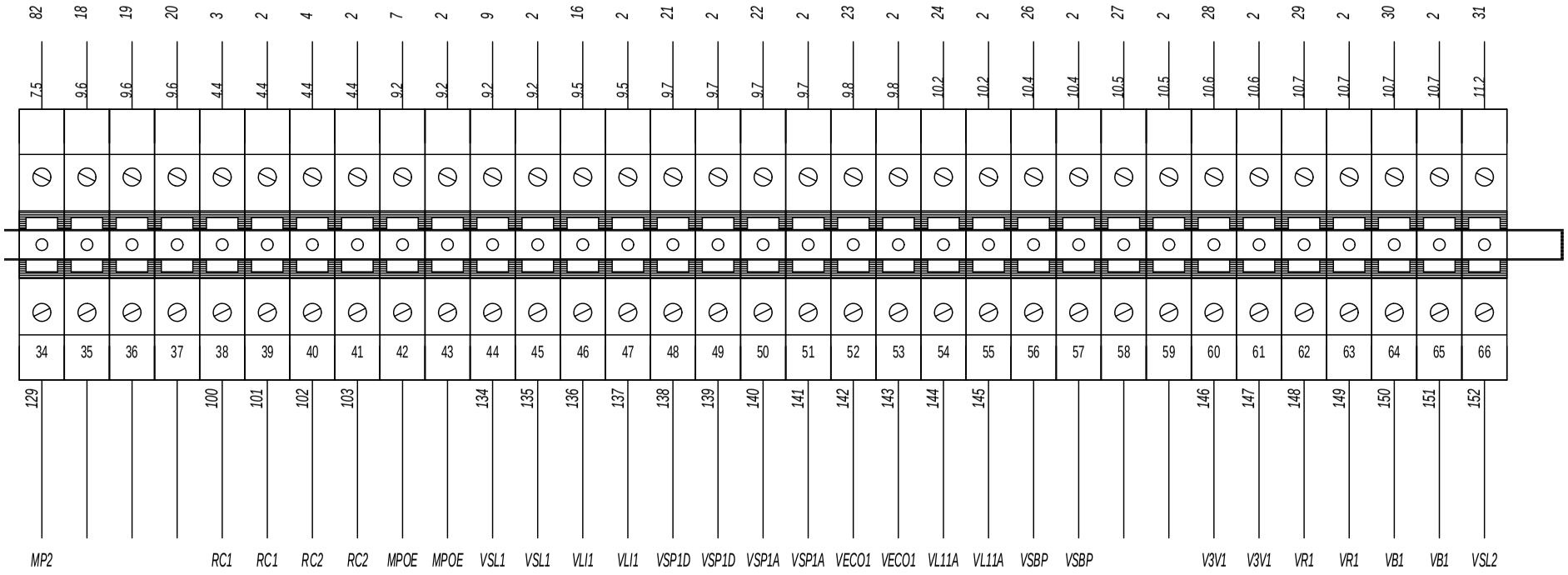
M

MORSETTIERA QUADRO

TERMINAL BOARD

RIEPILOGO MORSETTI

CLAMPS SUMMARY



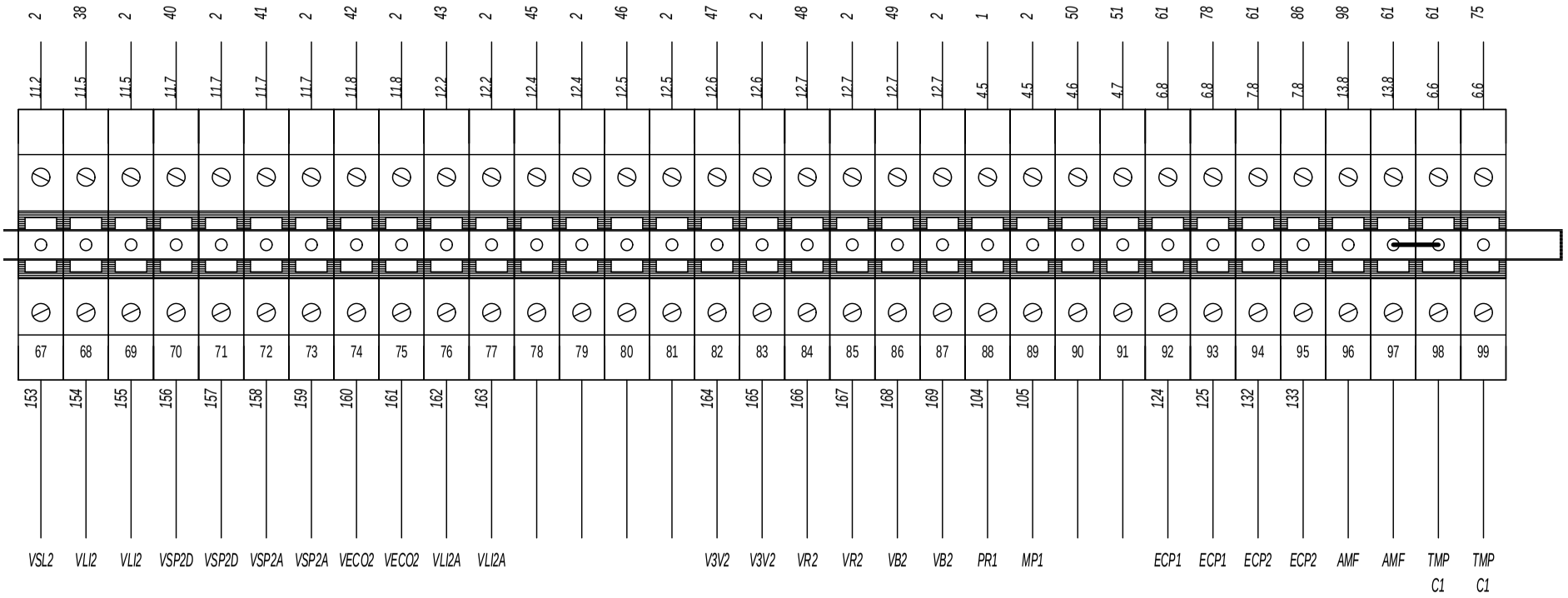
M

MORSETTIERA QUADRO

TERMINAL BOARD

RIEPILOGO MORSETTI

CLAMPS SUMMARY



M

MORSETTIERA QUADRO

TERMINAL BOARD

RIEPILOGO MORSETTI

CLAMPS SUMMARY

26. LIST OF AFTER-SALES SERVICE CENTRES

VALDAOSTA

AOSTA
>>D.AIR di Squaiella D.& Bidoggia C. snc
Tel. 0117 708 112

PIEMONTE

ALESSANDRIA - ASTI - CUNEO
>>Bellisi s.r.l
Corso Savona, 245 - 14100 Asti
Tel. 0141 556 268

BIELLA - VERCELLI
>>LOMBARDI SERVICE S.R.L.
Via delle Industrie - 13856 Vigliano Biellese (BI)
Tel. 0158 113 82

NOVARA - VERBANIA
ALL RANGES EXCEPT FOR SPLIT SYSTEM
>>AIR CLIMA SERVICE S.R.L.
Via Pertini, 9 - 21021 Angera (VA)
Tel 0331 932 110
SPLIT SYSTEM ONLY
>>CL. CLIMA SNC DI BENVEGNÙ L
Via S. Anna, 6 -
21018 Sesto Calende (VA)
Tel. 0331 914 186

TORINO
>>AERSAT TORINO SNC
di Borioli Seondino & C.
Strada Bertolla, 163-10156 Torino
Tel. 0115 611 220
>>**D.AIR**
di Squaiella D. & Bidoggia C. snc
Via Chambery 79/7 - 10142 Torino
Tel. 0117 708 112

LIGURIA

GENOVA
>>BRINZO ANDREA
Via Del Commercio, 27 1/C2
16167 Genova Nervi
Tel. 0103 298 314

IMPERIA
>>AERFRIGO
di A. Amborno e C. s.n.c
Via Z. Massa, 152/154
18038 Sanremo (IM)
Tel. 184 575 257

LA SPEZIA
>>TECNOFRIGO
di Veracini Nandino
Via Lunense, 59
54036 Marina di Carrara (MS)
Tel. 0585 631 831

SAVONA
>>CLIMA COLD
di Pignataro D.
Via Risorgimento, 11
17031 Albenga (SV)
Tel. 0182 51176

LOMBARDIA

BERGAMO
>>ESSEBI
di Sironi Bruno e C. sas
Via Pacinotti, 98 - 24100 Bergamo
Tel. 0354 536 670
BRESCIA
>>TERMOTEC
di Vitali G. & snc
Via G. Galilei - Trav. I°, 2
25010 S. Zeno S. Naviglio (BS)
Tel. 0302 160 812

COMO - SONDRIO - LECCO
>>PROGIELT
di Libeccio & C srl
Via Rigamonti, 21
22020 San Fermo della Battaglia (CO)
Tel. 0315 364 23

CREMONA
>>MORETTI ALBANO & C. SNC
Via Manini, 2/C - 26100 Cremona
Tel. 0372 461 935

MANTOVA
>>F.LLI COBELLi
di Cobelli Davide & C. s.n.c.
Via Tezze, 1 - 46040 Cavriana (MN)
Tel. 0376 826 174

MILANO - LODI ZONA CREMASCA
>>CLIMA CONFORT
di O. Mazzoleni
Via A. Moro, 113
20097 S. Donato Milanese (MI)
Tel. 0251 621 813
>>CLIMA LODI
di Sali Cristian
Via Felice Cavallotti, 29 - 26900 Lodi
Tel. 0371 549 304
>>CRIO SERVICE S.R.L.
Via Gallarate, 353 - 20151 Milano
Tel. 0233 498 280
>>SATIC
di Lovato Dario
Via G. Galilei, 2 int. A/2
20060 Cassina dè Pecchi (MI)
Tel. 0295 299 034

PAVIA
>>BATTISTON GIAN LUIGI
Via Liguria, 4/A -
27058 Voghera (PV)
Tel. 0383 622 53

VARESE
ALL RANGES EXCEPT FOR SPLIT SYSTEM
>>AIR CLIMA SERVICE
di Frascati Paolo & C snc
Via Pertini, 9 -
21021 Angera (VA)
Tel. 0331 932,110
SPLIT SYSTEM ONLY
>>CL. ELLE CLIMA SNC DI BENVEGNÙ L.
Via S. Anna, 6
21018 Sesto Calende (VA)
Tel. 0331 914 186

TRENTINO ALTO ADIGE

BOLZANO - TRENTO
>>SESTER F SNC
di Sester A & C
via Enrico Fermi, 12 - 38100 Trento
Tel. 0461 920 179

FRIULI VENEZIA GIULIA

PORDENONE
>>CENTRO TECNICO SNC
di Menegazzo G. & C.
Via Conegliano, 94/A
31058 Susegana (TV)
Tel. 438,450,271

TRIESTE - GORIZIA
>>LA CLIAMTIZZAZIONE TRIESTE SRI
Strada della Rosandra, 269
34018 San Dorligo della Valle(TS)
Tel. 0408 280 80

UDINE
>>S.A.R.E.
di Musso Dino
Corso S. Valentino, 4
33050 Fraforeano (UD)
Tel. 0432 699 810

VENETO

BELLUNO
>>FONTANA SOFFRIO FRIGORIFERI SNC
Via Sampoi, 68 - 32020 Limana (BL)
Tel. 0437 970 042

LEGNAGO
>>DE TOGNI STEFANO
Via De Nicoli, 2 - 37045 Legnago (VR)
Tel. 0442 203 27

PADOVA
>>CLIMAIR SAs
di F. Cavestro & C.
Via Austria, 21 - Z.I. - 35127 Padova
Tel. 0497 723 24

ROVIGO
>>FORNASINI MAURO
Via Sammartina, 18/A
44040 Chiesuol del Fosso (FE)
Tel. 0532 978 450

TREVISO
>>CENTRO TECNICO DI MENEGAZZO SRL
Via Conegliano, 94/A
31058 Susegana (TV)
Tel. 0438 450 269

VENEZIA CENTRO CITTÀ
>>SIMONATO GIANNI
Via Trento, 29 - 30174 Mestre (VE)
Tel. 0419 598 88

VENEZIA PROVINCIA
>>S.M. S.N.C.
di Spolaore Andrea e Musner Maurizio
Via Fapanni 41/D
30030 Martellago (VE)
Tel. 0415 402 047

VERONA EXCLUDING LEGNAGO
>>ALBERTI FRANCESCO
Via Tombetta, 82 - 37135 Verona
Tel. 0455 094 10

VICENZA
SPLIT SYSTEM ONLY
>>ASSICLIMA
di Colpo Donato
Via Capitello, 63/c
36010 Cavazzale (VI)
Tel. 3368 139 63
ALL RANGES EXCEPT FOR SPLIT SYSTEM
Bianchini Giovanni e Ivan snc
Via G. Galilei, 1Z - Loc. Nogarazza 36057 Arcugnano (VI)
Tel. 0444 569 481

EMILIA ROMAGNA

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Effepi snc
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Via I° Maggio, 13/8
40044 Pontecchio Marconi (BO)
Tel. 0516 781 146

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Fornasini Mauro
Via Sammartina, 18/A
44040 Chiesuol del Fosso (FE)
Tel. 0532 978 450

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Alpi Giuseppe
Via N. Copernico, 100 - 47100 Forlì
Tel. 0543 725 589

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Aersat snc
di Leggio M. & Lolli S.
Piazza Beccadori, 19
41057 Spilamberto (MO)
Tel. 0597 829 08

MODENA NORTH MODENA
Cliamaservice
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Via Per Modena, 18/E
41034 Finale Emilia (MO)
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Via Mantova, 161 - 43100 Parma
Tel. 0521 776 771

Benassi Graziano
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Tel. 0521 460,744

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Via Manini, 2/C - 26100 Cremona
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Ecoclima srl
Via Maestri del lavoro, 14
42100 Reggio Emilia
Tel. 0522 558 709

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AREZZO
Clima service Etruria snc
Via G. Caboto, 69/71/73/75
52100 Arezzo
Tel. 0575 900 700

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SEAT Servizi tecnici srl
Via Aldo Moro, 25
50019 Sesto Fiorentino (FI)
Tel. 0554 255 721

GROSSETO
Acqua e aria service srl
Via D. Lazzaretti, 8A -58100
Grosseto
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SEA s.n.c.
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Via dell'Artigianato, Loc.Pic-
chianti -57121 Livorno
Tel. 0586 426 471

LUCCA - PISTOIA
Frigotec snc G & MC Benedetti
Via V. Civitali, 2 - 55100 Lucca
Tel. 0583 491 089

MASSA CARRARA
Tecnofrigo
di Veracini Nandino
Via Lunense, 59
54036 Marina di Carrara (MS)
Tel. 0585 631 831

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Z.A. 53100 Siena
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Senese srl
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53100 Siena
Tel. 0577 247,406

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60020 Palombina (AN)
Tel. 0718 894 35

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CAST s.n.c
di Antonio Cardinali & R.
Via D. Alighieri, 68
62010 Morrovalle (MC)
Tel. 0733 865 271

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PERUGIA
A.I.T. srl
Via dell'industria, Z.I. Molinac-
cio 06154 Ponte S. Giovanni
(PG)
Tel. 0755 990 564

TERNI
Capoccetti Otello
Via G. Medici, 14 - 05100 Terni
Tel. 0744 277 169

ABRUZZO

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Petrongolo Dino
Via Torremontanara, 30
66010 Torre Vecchia Teatina
(CH)
Tel. 0871 360 311

LAZIO

FROSINONE - LATINA
Mastro Giacomo
Air Service M.C.
P.zza Berardi, 16
03023 Ceccano (FR)
Tel. 0775 601 403

RIETI
Capoccetti Otello
Via G. Medici, 14 - 05100 Terni
Tel. 0744 277 169

SPLIT SYSTEM ONLY
Dueg Clima
di Giulio Giornalista
Via Chitignano, 12B - 00138
Roma
Tel. 0688 130 20

Marchionni Marco
.zza dei Bossi, 16
00172 Centocelle (RM)
Tel. 0623 248 850

ALL RANGES EXCEPT FOR SPLIT SYSTEM
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Via Guidonia Montecelio snc
00191 Roma
Tel. 0633 312 34

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di Massimo Piacentini
Viale Baccelli, 74
00053 Civitavecchia (RM)
Tel. 0766 541 945

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AVELLINO - SALERNO
SAIT s.r.l.
Via G. Deledda, 10
84010 San Marzano sul Sarno
(SA)
Tel. 0815 178 451

CAPRI
Cataldo Costanza
Via Tiberio, 7/F 80073 Capri
(NA)
Tel. 0818 378 479

NAPOLI - CASERTA - BEN-EVENTO
Aerclima sud s.n.c.
di Fisciano Carmelo & C
Via Nuova Toscanella, 34/c
80145 Napoli
Tel. 0815 456 465

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Kliafrigo srl
Via Vallone, 81 - 70121 Bari
Tel. 0805 538 044

FOGGIA
Cliamcenter
di Amedeo Nardella
Via Carmicelli, 29 Pal. A Sc. A
71016 San Severo (FG)
Tel. 3396 522 443

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Grasso Vincenzo
Zona P.I.P. - Lotto n. 38
73052 Parabita (LE)
Tel. 0833 595 267

TARANTO
Orlando Pasquale
Via Vespucci, 5 -74023 Grot-
taglie (TA)
Tel. 099 5 639 823

BASILICATA

MATERA - POTENZA
Aerlucana di A. Scalcione
Via Dei Peucezi, 23
75100 Matera
Tel. 0835 381 467

MOLISE

CAMPOBASSO - ISERNIA
Petrongolo Dino
Via Torremontanara, 30
66010 Torre Vecchia Teatina
(CH)
Tel. 0871 360 311

CALABRIA

CATANZARO - COSENZA - CROTONE
A.E.C. di Ranieri Annarita
Via B. Miraglia, 72 - 88100
Catanzaro
Tel. 0961 771 123

REGGIO CALABRIA
Repaci Antonio
Via Militare 2nda Trav. 8D -
89053 Catona (RC)
Tel. 0965 301 431

REGGIO CALABRIA - VIBOVALENTIA
Manutensud di Antonio Amato
Via F. Cilea, 62
88065 Guardavalle (CZ)
Tel. 0967 865 16

SICILIA

CATANIA - MESSINA
Giuffrida Giuseppe
Via Mandrà, 15/A - 95124
Catania
Tel. 0953 514 85

ENNA - CALTANISSETTA - AGRI-GENTO
Fonti Filippo
Viale Aldo Moro, 141
93019 Sommatino (CL)
Tel. 0922 871 333

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Via T. Marcellini, 7 - 90135
Palermo
Tel. 0915 917 07

SIRACUSA - RAGUSA
Finnocchiaro Antonino
Via Paternò, 71 - 96100 Sira-
cusa
Tel. 0931 756 911

SARDEGNA

CAGLIARI - ORISTANO
Mureddu
di Mureddu Pasquale
Via Garigliano, 13 - 09122
Cagliari
Tel. 0702 846 52

SASSARI - NUORO
Posadinu Salvatore Ignazio
Z.I. Predda Niedda - Sud -
Strada 11 - 07100 Sassari
Tel 0792 612 34

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