

CHILLERS- Technical manual - installation - maintenance

WF

Dear customer,

Thank you for choosing AERMEC. It is the fruit of many years of experience and special design studies and has been made of the highest grade materials and with cutting edge technology.

In addition, all our products bear the EC mark indicating that they meet the requirements of the European Machine Directive regarding safety. The quality level is being constantly monitored, so AERMEC products are synonymous with Safety, Quality and Reliability.

The data may undergo modifications considered necessary for the improvement of the product, at any time and without the obligation for any notice thereof.

Thank you again.
AERMEC S.p.A

AERMEC S.p.A. reserves the right at all times to make any modification for the improvement of its product and is not obliged to add these modification to machines of previous manufacture that have already been delivered or are being built.

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WF

SERIAL NUMBER

DECLARATION OF CONFORMITY

We, the undersigned, declare on our own exclusive responsibility that the unit in question, so defined:

NAME

WF

TYPE

WATER TO WATER CHILLER

MODEL

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

CEI EN 60335-2-40

Safety regulation regarding electric heat pumps, air conditioners and dehumidifiers

CEI EN 61000-6-1

Electromagnetic immunity and emission in residential environment

CEI EN 61000-6-3

CEI EN 61000-6-2

Electromagnetic immunity and emission in industrial environment

CEI EN 61000-6-4

EN378

Refrigerating system and heat pumps - Safety and environmental requirements

UNI EN 12735

Round welding-free copper pipes for air conditioning and cooling

UNI EN 14276

Pressure equipment for refrigerating systems and heat pumps

thus meeting the essential requisites of the following directives:

- LVD Directive: 2006/95/EC
- Electromagnetic Compatibility Directive 2004/108/EC
- Machine Directive 2006/42/EC
- PED Directive relating to pressure equipment 97/23/EC

In compliance with Directive 97/23/EC, the product meets the Full quality assurance procedure (module H1) with certificate no. 06/270-QT3664 Rev.0 issued by the notified body no. 1131 CEC via Pisacane 46 Legnano (MI) - Italy

The person authorised to compile the technical sheet is: Massimiliano Sfragara - 37040 Bevilacqua (VR) Italy – Via Roma, 996

Bevilacqua

28/12/2009

Marketing Director
Signature



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

Safety:

Machine Directive

2006/42/EC

Low voltage directive

LVD 2006/95/EC

Electromagnetic compat-

ibility

directive

EMC 2004/108/EC

Pressure containers directive

PED 97/23/CE EN 378,

UNI EN 14276

Electrical part:

EN 60204-1

Protection rating

IP24

Acoustic part:

SOUND POWER

(EN ISO 9614-2)

SOUND PRESSURE

(EN ISO 3744)

Certifications:

Eurovent

Refrigerant GAS: R134a

This unit contains fluorinated greenhouse gases covered by the Kyoto Protocol. Maintenance and disposal operations must be only carried out by qualified staff.

1. GENERAL WARNINGS

WF AERMEC models are built according to recognised technical standards and safety regulations. They have been designed for air conditioning and hot water production and must be used for this purpose in accordance with their performance characteristics. The company shall not be contractually or non-contractually liable for any damage to people, animals or objects, for failures caused by errors during installation, adjustment and maintenance or incorrect use. All the uses not expressly indicated in this manual are not allowed.

1.1. STORAGE OF THE DOCUMENTATION

Deliver the following instructions plus all the complementary documentation to the system user, who shall be responsible for keeping the instructions so that they are always available when needed. Read carefully this chapter; all the procedures must be carried out by qualified personnel according to the regulations in force in the different countries (M.D. 329/2004). The unit must be installed in such a way as to make all maintenance and/or repair operations possible.

The warranty of the device does not in any case cover costs owing to ladder trucks, lifts or other lifting systems that may be required in order to carry out repairs under warranty. Do not modify or tamper with the chiller as this may cause dangerous situations and the manufacturer shall not be liable for any damages. The warranty shall not be valid if the indications mentioned above are not observed.

1.2. SAFETY PRECAUTIONS AND INSTALLATION

- the chiller must be installed by an authorised and qualified technician, in compliance with the national legislation in force in the country of destination (MD 329/2004).
AERMEC shall not be held responsible for any damage whatsoever resulting from the non-compliance with these instructions.
- Before starting any work, it is necessary TO READ CAREFULLY THE INSTRUCTIONS, AND TO PERFORM THE SAFETY CHECKS TO AVOID ANY RISKS. All the personnel in charge must be aware of the operations and the risks that may arise when all the unit installation operations begin.

2. PRODUCT IDENTIFICATION

The WF models can be identified by the:

- PACKAGING LABEL
that includes the product identification data
- TECHNICAL PLATE
Placed on the right strut side (see fig.1)

NOTE

If the identification plate, or any other means to identify the product, is tampered with, removed or missing, installation and maintenance operations are hampered

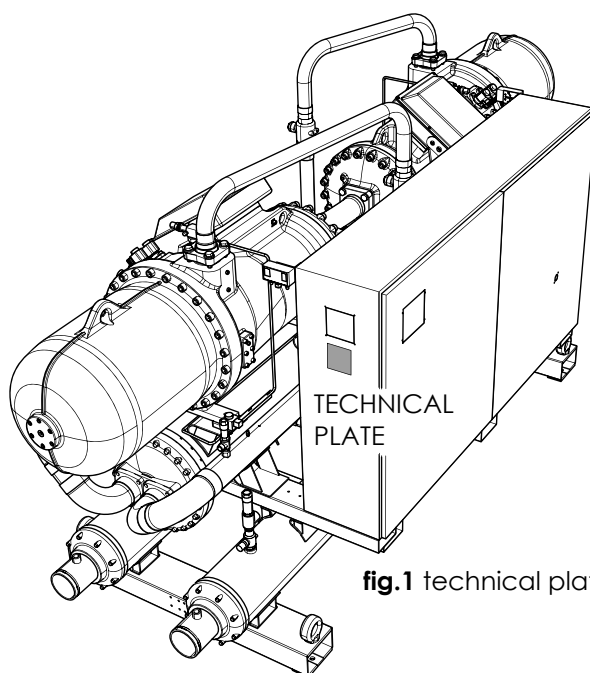


fig.1 technical plate

3. DESCRIPTION AND CHOICE OF THE UNIT

Water-cooled liquid chillers FOR INDOOR INSTALLATION, equipped with 2 chiller circuits. The evaporator and two condensers are of the dry expansion tube core type. The WF unit is tested and delivered complete with refrigerant and oil charge (it will be necessary to arrange just the hydraulic and electric connections on site), while the Condenserless UNITS <<E>> are delivered with a watertight charge only.

3.1. AVAILABLE MODELS

- Standard °
- High efficiency A

Extended operating limits:

- temperature of condenser output water up to 55°

- temperature of evaporator output water down to -6°

3.2. AVAILABLE VERSIONS

- **Standard °**
- **Silenced L**

Reduced sound emission thanks to compressor casing with galvanised sheet metal panels of a suitable thickness and with good sound-absorbing capacity

Heat recovery units:

- Without recovery units °
- Desuperheater D
- Total recovery T

Condenser:

- Standard °
- Condenserless E

3.3. AVAILABLE CONFIGURATIONS

WF range chillers are available in 8 sizes. By combining the wide variety of available options, it is possible to configure each model in the WF range in such a way as to meet the most varied system requirements. The following configurator shows how the commercial code for the various options is compiled.

3.4. DESCRIPTION AND CHOICE OF THE UNIT

1.2	3,4,5,6	7	8	9	10	11
WF	4802	°	°	°	°	°

Field Code

1, 2 WF

3, 4, 5, 6 Size: 2502, 2802, 3202, 3602, 4202, 4802, 5602, 6402

7 Model:
° Standard
A High efficiency

8 Heat recovery:
° Standard
D Partial recovery (Desuperheater)
T Total recovery

9 Version:
° Standard
L Silenced

10 Condenser:
° Standard
E Condenserless

11 Power supply:
° 400V-3 50Hz with fuses
8 400V-3 50Hz with thermomagnetic switches
5 500V-3 50Hz with fuses (for 2502 and 2802 standard and high efficiency only)
9 500V-3 50Hz with thermomagnetic switches (for 2502 and 2802 standard and high efficiency only)

4. DESCRIPTION OF COMPONENTS

4.1. COOLING CIRCUIT

Compressor/s

Semi-hermetic high-efficiency screw compressors, with a cooling capacity regulation by means of continuous modulation from 40 to 100% (from 25 to 100% with electronic valve) and fitted with:

- Thermal motor protection
- Oil discharge temperature check
- Electric heater for the oil casing heating with the compressor at a standstill
- Reset button.

Evaporator

Tube core exchanger are of the dry expansion tube core type, suitably scaled to get high level performances.

Steel housing with closed cell foam elastomer anti-condensation mattress.

The tube core is made with copper tubes, with a special profile that allows high heat exchange together with efficient drainage. An anti-freeze electric heater can be fitted upon request (THIS ACCESSORY CAN ONLY BE ASSEMBLED IN THE FACTORY), to protect the heat exchanger against outside temperatures down to -20°C and avoid the formation of ice in standby mode. With the unit working, protection is ensured by the outlet water temperature probe.

Condensers

Tube core exchangers of the are of the dry expansion tube core type, suitably scaled to get high level performances.

Steel housing with closed cell foam elastomer anti-condensation mattress.

The tube core is made with copper tubes, with a special profile that allows high heat exchange together with efficient drainage.

Filter- drier

Of the mechanical cartridge type, made of ceramics and hygroscopic material able to trap impurities and any traces of humidity in the cooling circuit.

Liquid indicator

One per circuit, for checking the refrigerant gas load and any humidity in the cooling circuit.

Thermostatic valve

The electronic type valve, with outside equaliser on the evaporator outlet, modu-

lates the gas flow to the evaporator on the basis of the thermal load, in such a way as to ensure the proper degree of overheating of the intake gas.

Taps

They are located in the liquid and discharge lines and allow to intercept the refrigerant in case of extraordinary maintenance.

Solenoid valve

The valve closes when the compressor turns off, preventing the flow of refrigerant gas towards the evaporator.

4.2. FRAME

Load-bearing structure

Made of hot-galvanised steel sheet of a suitable thickness, painted with polyester powders able to resist atmospheric agents over time. RAL9002

4.3. HYDRAULIC COMPONENTS

Water side differential pressure switch on evaporator

It is located between the inlet and outlet of the evaporator, and has the task of checking that there is water circulation; if this is not the case, it blocks the unit.

4.4. SAFETY AND CONTROL COMPONENTS

Low pressure transducer

Allows displaying, on the microprocessor board display, the value of the compressor's suction pressure (one per circuit) on the low-pressure side of the cooling circuit

High pressure transducer

Allows displaying, on the microprocessor board display, the value of the compressor's delivery pressure (one per circuit) On the high pressure side of the cooling circuit

High pressure switch

Factory-calibrated, it is placed on the high pressure side of the cooling circuit, it shuts down compressor operation in the case of abnormal operating pressure.

Double high pressure switch (manual + tool)

Factory-calibrated, it is placed on the high pressure side of the cooling circuit (one per circuit), shutting down compressor operation in the case of abnormal operating pressure.

Cooling circuit safety valves (HP, LP)

Calibrated at 22 bar HP - 16.5 LP, they cut in relieving the overpressure in the case of abnormal operating pressures (1 per circuit)

- **Fuses or thermomagnetic switches for compressors protection to be specified when ordering**
- **Auxiliary protection thermomagnetic switch**

4.5. ELECTRICAL COMPONENTS

Electrical panel

Contains the power section and the management of the controls and safety devices.

Door-block disconnecting switch

It is possible to access the electrical panel by disconnecting the voltage, then using the opening lever of the panel itself. This lever can be blocked with one or more padlocks during maintenance, in order to prevent the machine being powered up accidentally.

Control keypad

Provides full control functions.

NB

For a detailed description refer to the user manual.

4.6. ELECTRONIC REGULATION

Electronic regulation on the WF chillers consists of a control board for each compressor, connected to each other in a network, and a control panel with display. In the case of models with more than one compressor, the board controlling compressor 1 is the "MASTER" board, while the others are "SLAVE". On each board, transducers, loads and alarms are connected to the controlling compressor while the general machine ones are connected only on the master board. The program and parameter pre-set are stored permanently in the controller's FLASH memory, to ensure that they are kept in memory even when the system is not powered (without the need for an auxiliary battery).

The connection to the serial supervision assistance line in accordance with the **RS485** standard, is performed through the serial boards **ACCESSORY RS485P1** and the communication protocol.

- The terminal, which is always controlled by

microprocessor, is equipped with a display, a keypad and a set of LEDs, and is used for programming control parameters (Set Points, differential band, alarm threshold) and for fundamental user operations (ON/OFF, display of controlled values).

The terminal does not need to be connected to the pCO for normal controller operation, and is necessary only when initially programming the basic parameters.

Microprocessor

- Remote on/off with external contact without power
- Multilingual menu
- Phase sequence control
- Independent control of individual compressors
- Ammetric transformer

- Cumulative failure block signalling
- Alarm log function
- Daily/weekly programming
- Inlet/outlet water temperature display
- Alarm display
- Full proportional regulation of the output water temperature
- Programmable timer function
- Function with double setting point connected to an external contact
- Interfaceability with the Modbus protocol (accessory)
- Pump/s control
- Compressor rotation control
- Analogue input from 4 to 20 mA
- "Always Working" function In case of critical conditions (e.g. too high ambient temperature) the machine does not stop but is able to regulate itself and

provide the maximum power that can be generated in those conditions.

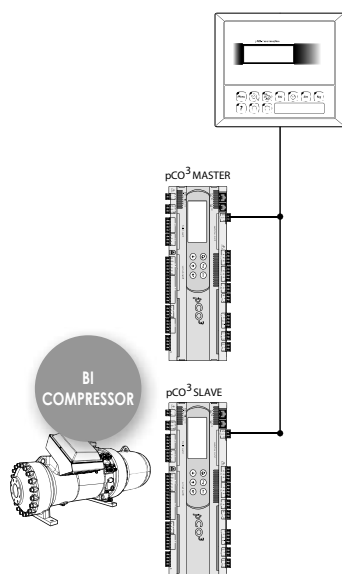
- Self adapting operating differential "Switching Histeresys" to ensure correct compressor operation at all times even in plants with a low water content or insufficient flow rates. This system reduces the compressor wear
- The PDC "Pull Down Control" system to prevent the activation of the power steps when the water temperature is approaching the set point quickly. It optimises the operation of the machine both when running normally or when there are load variations, thereby assuring top machine efficiency in all situations.

For further information, refer to the user manual.

5. ACCESSORIES

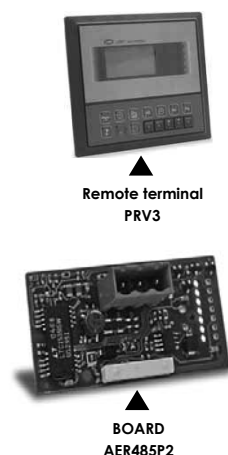
5.1. ELECTRIC REGULATION ACCESSORIES

- **AER485P1:** Through this accessory, it is possible to connect the unit with BMS supervision systems with electrical standard RS 485 and MODBUS type protocol
NOTE: disclosure must be provided for compressor No. 1 .
- **AERWEB30:** the AERWEB device allows remote control of a chiller via a serial link from a standard PC. Using additional modules, the device allows to



control the chiller via the telephone network, using the AERMODEM accessory; or via the GSM network, using the AERMODEM GSM accessory. AERWEB can pilot up to 9 chillers, but each of these must be equipped with the **AER485** or **AER485P1** accessory.

- **MULTICHILLER:** Control system to switch the individual chillers on and off and control them, in a system in which several units are installed in parallel, always ensuring a constant delivery to the evaporators.
- **PRV:** This allows the chiller command operations to be given from a distance.

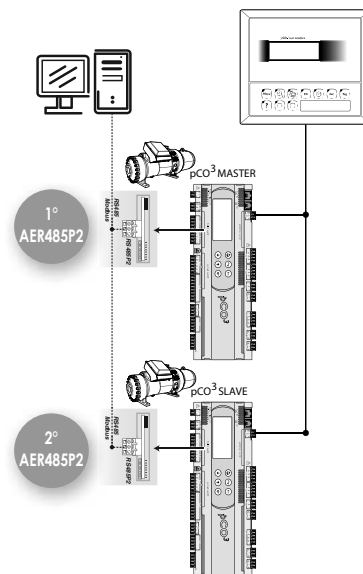


5.2. ELECTRICAL ACCESSORIES

- **RIF:** Current phase advancer. Parallel connection with the motor makes the reduction of input current possible. It can only be installed when the machine is being made and must therefore be specified when the order is placed.

5.3. GENERAL ACCESSORIES

- **AVX:** spring anti-vibration supports



WF	2502	2802	3202	3602	4202	4802	5602	6402
AER485P1		Through this accessory it is possible to connect the unit with BMS supervision systems with electrical standard RS 485 and MODBUS type protocol.						
ALL		•	•	•	•	•	•	•
AVX		Sprung anti-vibration supports. Select the model using the compatibility table.						
°	673	673	673	674	674	674	675	675
A	673	673	674	675	675	675	676	676
° L	673	673	674	674	674	674	675	675
A L	674	674	675	675	675	675	676	676

AERWEB30		AERWEB30: the AERWEB device allows the remote control of a chiller from a common PC, using a serial connection. Using additional modules, the device allows the chiller to be controlled via the telephone line (using the AERMODEM accessory) or via the GSM network (using the AERMODEM GSM accessory). AERWEB can pilot up to 9 chillers, but each of these must be equipped with accessory AER485 or AER485P1.						
ALL		•	•	•	•	•	•	•

REF		Current rephaser. Parallel connection with the motor makes the reduction of input current possible. It can only be installed when the machine is being made and must therefore be specified when the order is placed.						
ALL	REFWF 2502	REFWF 2802	REFWF 3202	REFWF 3602	REFWF 4202	REFWF 4802	REFWF 5602	REFWF 6402

MULTICHILLER		Control system to switch the individual chillers on and off, and control them, in a system in which several units are installed in parallel, always ensuring a constant delivery to the evaporators.						
ALL		•	•	•	•	•	•	•
PRV		This allows the chiller command operations to be given from a distance.						
ALL		•	•	•	•	•	•	•

6. TECHNICAL DATA

6.1. WF ° - A

WF	vers.	u.m.	2502	2802	3202	3602	4202	4802	5602	6402
Cooling output	°	kW	616	691	792	906	1050	1155	1323	1410
	A		653	735	858	989	1111	1222	1395	1492
Total input power	°	kW	131	148	170	194	225	247	284	303
	A		129	145	166	187	220	240	275	293
Evaporator water flow rate	°	l/h	105950	118850	136220	155830	180600	198660	227600	242500
	A		112320	126420	147580	170110	191090	210180	239900	256000
Evaporator pressure drops	°	kPa	50	70	59	54	48	56	67	71
	A		50	67	71	43	58	45	46	53
Condenser water consumption	°	l/h	128480	144310	165460	189200	219300	241140	276400	294600
	A		134500	151360	176130	202270	228930	251460	287200	307000
Condenser pressure drops	°	kPa	23	22	22	23	22	22	21	20
	A		70	70	72	71	71	71	71	70
Heating capacity	°	kW	634	714	817	932	1085	1188	1368	1457
	A		667	752	883	1018	1143	1257	1435	1535
Total input power	°	kW	151	172	197	224	261	286	329	351
	A		150	168	193	217	254	278	319	339
Condenser water flow rate	°	l/h	109050	122810	140520	160300	186620	204340	235300	250600
	A		114720	129340	151880	175100	196600	216200	246800	264000
Condenser pressure drops	°	kPa	16	15	15	16	15	15	15	14
	A		51	51	52	52	51	52	51	51
Water consumption on the evaporator	°	l/h	83080	93220	106640	121780	141730	155140	178700	190200
	A		88920	100450	118680	137770	152910	168390	192000	205700
Evaporator pressure drops	°	kPa	29	40	34	31	27	33	39	41
	A		31	41	45	27	36	28	28	33

ENERGY INDEXES										
EER	°	W/W	4.70	4.67	4.66	4.67	4.67	4.68	4.66	4.65
	A		5.06	5.07	5.17	5.29	5.05	5.09	5.07	5.09
COP	°	W/W	4.20	4.15	4.15	4.16	4.16	4.15	4.16	4.15
	A		4.45	4.48	4.58	4.69	4.5	4.52	4.50	4.53
ESEER	°	W/W	5.55	5.51	5.50	5.51	5.51	5.52	5.50	5.49
	A		5.77	5.78	5.89	6.03	5.76	5.80	5.78	5.80

ELECTRICAL DATA										
Power supply	°	A	400V-3-50Hz							
	A									
Input current (cold)	°	A	232	261	287	319	386	420	483	526
	A		230	257	282	310	378	410	471	514
Input current (hot)	°	A	263	296	326	361	438	477	548	597
	A		261	291	320	352	429	465	535	583
Maximum current (FLA)	°	A	430	462	560	620	640	720	900	1132
	A		430	462	560	620	640	720	900	1132
Starting current (LRA)	°	A	575	635	716	775	906	1010	1255	1483
	A		575	635	716	775	906	1010	1255	1483

Refrigerant:	°E	type	R134a							
	AE									
Oil charge (C1 = C2)	°E	dm3	19	19	35	35	35	35	38	38
	AE		19	19	35	35	35	35	38	38

COMPRESSOR (twin-screw)	vers.	u.m.	2502	2802	3202	3602	4202	4802	5602	6402
No. of compressors/circuits	all		2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/2
Electric heater	°	no.	1 + 1	1 + 1	1 + 1	1 + 1	1 + 1	1 + 1	1 + 1	1 + 1
	A		1 + 1	1 + 1	1 + 1	1 + 1	1 + 1	1 + 1	1 + 1	1 + 1
Electric heater	°	W	300	300	300	300	300	300	300	300
	A		300	300	300	300	300	300	300	300
Capacity controls (electronic VT)	°	%	12.5-100	12.5-100	12.5-100	12.5-100	12.5-100	12.5-100	12.5-100	12.5-100
	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

EVAPORATOR (TUBE CORE)										
Water content	°	litres	248	241	234	401	483	504	493	535
	A		539	528	493	917	887	857	947	931
Water connections (VICTAULIC)	°	Ø	6"	6"	6"	8"	8"	8"	8"	8"
	A		8"	8"	8"	10"	10"	10"	10"	10"
Quantity	°	no.	1							
	A									

CONDENSER (TUBE CORE)										
Water content (C1 = C2)	°	litres	32	37	43	48	56	61	71	76
	A		54	61	72	83	93	101	114	122
Water connections (VICTAULIC)	°	Ø	5"	5"	5"	5"	5"	5"	6"	6"
	A		4"	4"	5"	5"	5"	5"	6"	6"
Quantity (C1 / C2)	°	no.	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1
	A		1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1

DESUPERHEATER (TUBE CORE)										
Quantity	°	no.	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1
	A		1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1

HEAT RECOVERY (TUBE CORE)										
Quantity	°	no.	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1
	A		1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1

SAFETY VALVE HP										
Calibration	°	bar	22	22	22	22	22	22	22	22
	A		22	22	22	22	22	22	22	22
Quantity (C1 / C2)	°	no.	2 + 2	2 + 2	2 + 2	2 + 2	2 + 2	2 + 2	3 + 3	3 + 3
	A		2 + 2	2 + 2	2 + 2	2 + 2	2 + 2	2 + 2	3 + 3	3 + 3

SOUND DATA										
Sound power	°	dB(A)	93.6	94	93.5	93.7	94.6	95.5	97.3	97.9
	A		93.6	94	93.5	93.7	94.6	95.5	97.3	97.9
Sound pressure	°	dB(A)	61.6	62	61.5	61.7	62.6	63.5	65.3	65.9
	A		61.6	62	61.5	61.7	62.6	63.5	65.3	65.9

DIMENSIONS *										
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	4520	4610	4760
	A		4330	4330	4330	4370	4550	4550	4800	4800
Weight when empty	°	kg	3560	3610	4460	4700	5050	5230	6100	6300
	A		4060	4120	5445	6005	6340	6510	7400	7500
Weight during operation	°	kg	3872	3925	4780	5197	5645	5856	6735	6987
	A		4707	4770	6082	7088	7413	7569	8575	8675

***Warning:** for the dimensions of versions D - T - L - E, contact the company

Sound pressure measure in free field, with direction factor 2 at a distance of 10m,
in accordance with ISO 3744.

Performance values refer to the following conditions:

Cooling:

-Evaporator water (in/out) = 12°C / 7°C

-Condenser water (in/out) = 30°C / 35°C

- Δt = 5°C

Heating:

-Evaporator water (in/out) = 40°C / 45°C

-Condenser water (in/out) = 10°C / 5°C

- Δt = 5°C

6.2. WF °E - AE

WF	vers.	u.m.	2502	2802	3202	3602	4202	4802	5602	6402
Cooling output	°E	kW	527	595	676	789	906	997	1143	1217
	AE		550	622	719	837	940	1035	1180	1261
Total input power	°E	kW	145	166	190	222	252	277	318	340
	AE		147	168	192	223	255	280	321	343
Evaporator water flow rate	°E	l/h	90590	102360	116240	135720	155870	171550	196530	209330
	AE		94660	106960	123680	143910	161660	178030	202960	216860
Evaporator pressure drops	°E	kPa	37	52	43	41	36	42	50	53
	AE		36	48	50	31	42	32	33	38

ENERGY INDEXES	vers.	u.m.								
EER	°E	W/W	3.64	3.58	3.56	3.56	3.59	3.60	3.59	3.58
	AE		3.75	3.71	3.74	3.76	3.68	3.70	3.68	3.68

ELECTRICAL DATA										
Power supply	°E	A	400V-3-50Hz							
	AE									
Input current (cold)	°E	A	252	286	316	360	424	463	532	577
	AE		255	288	320	362	430	467	537	581
Maximum current (FLA)	°E	A	430	462	560	620	640	720	900	1132
	AE		430	462	560	620	640	720	900	1132
Starting current (LRA)	°E	A	575	635	716	775	906	1010	1255	1483
	AE		575	635	716	775	906	1010	1255	1483

Refrigerant:	°E	type	R134a							
	AE									
Oil charge (C1 = C2)	°E	dm3	19	19	35	35	35	35	38	38
	AE		19	19	35	35	35	35	38	38

COMPRESSORS (twin-screw)										
No. of compressors/circuits	all		2/2	2/2	2/2	2/2	2/2	2/2	2/2	2/2
Electric heater (No. / capacity)	°		1 + 1	1 + 1	1 + 1	1 + 1	1 + 1	1 + 1	1 + 1	1 + 1
	A		1 + 1	1 + 1	1 + 1	1 + 1	1 + 1	1 + 1	1 + 1	1 + 1
Electric heater	°	W	300	300	300	300	300	300	300	300
	A		300	300	300	300	300	300	300	300
Capacity controls (electronic VT)	°	%	12.5-100	12.5-100	12.5-100	12.5-100	12.5-100	12.5-100	12.5-100	12.5-100
	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

EVAPORATOR (TUBE CORE)										
Water content	°	litres	248	241	234	401	483	504	493	535
	A		539	528	493	917	887	857	947	931
Water connections (VICTAULIC)	°	Ø	6"	6"	6"	8"	8"	8"	8"	8"
	A		8"	8"	8"	10"	10"	10"	10"	10"
Quantity	°	no.	1							
	A									

DESUPERHEATER (TUBE CORE)										
Quantity	°	no.	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1
	A		1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1

SAFETY VALVE HP										
Calibration	°	bar	22	22	22	22	22	22	22	22
	A		22	22	22	22	22	22	22	22
Quantity (C1 / C2)	°	no.	2 + 2	2 + 2	2 + 2	2 + 2	2 + 2	2 + 2	3 + 3	3 + 3
	A		2 + 2	2 + 2	2 + 2	2 + 2	2 + 2	2 + 2	3 + 3	3 + 3

SOUND DATA										
Sound power	°	dB(A)	93.6	94	93.5	93.7	94.6	95.5	97.3	97.9
	A		93.6	94	93.5	93.7	94.6	95.5	97.3	97.9
Sound pressure	°	dB(A)	61.6	62	61.5	61.7	62.6	63.5	65.3	65.9
	A		61.6	62	61.5	61.7	62.6	63.5	65.3	65.9

Sound pressure measured in free field, with direction factor 2 at a distance of 10m, in accordance with ISO 3744.

Performance values refer to the following conditions:

Cooling:

-Evaporator water (in/out) = 12°C / 7°C

-Condenser water (in/out) = 30°C / 35°C

- Δt = 5°C

Heating:

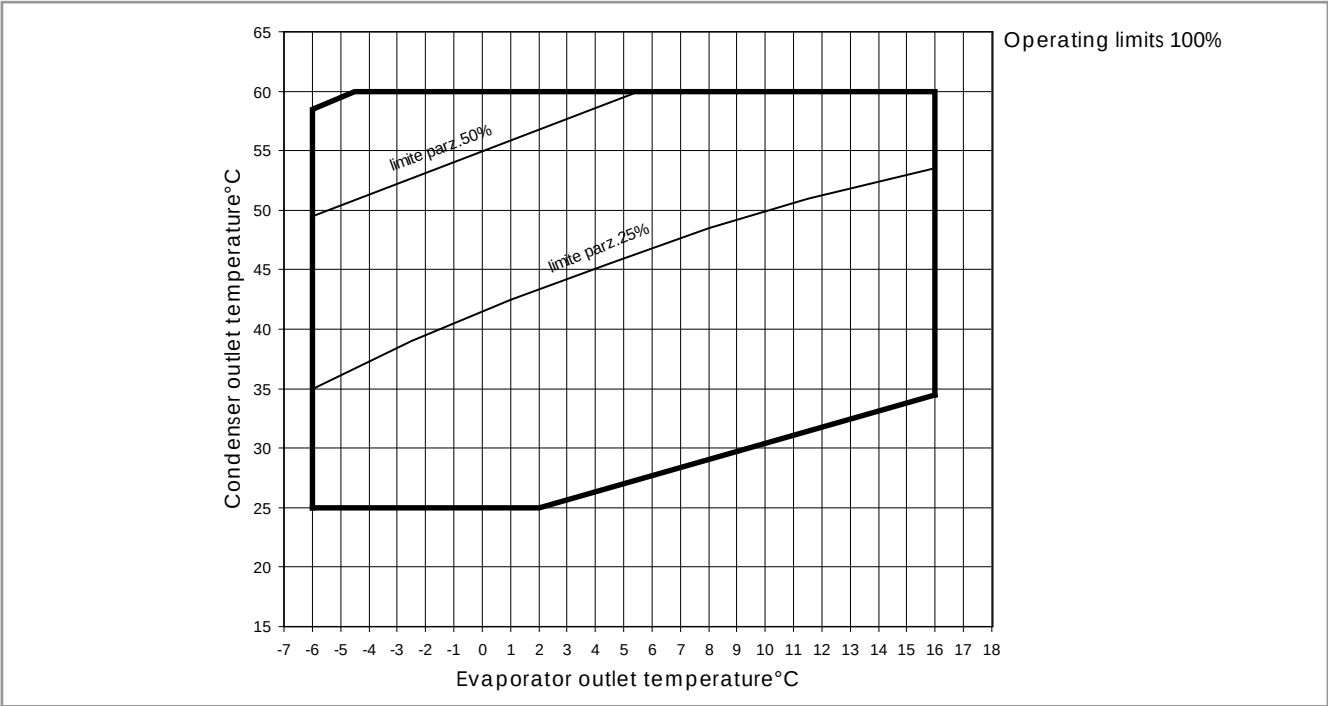
-Evaporator water (in/out) = 40°C / 45°C

-Condenser water (in/out) = 10°C / 5°C

- Δt = 5°C

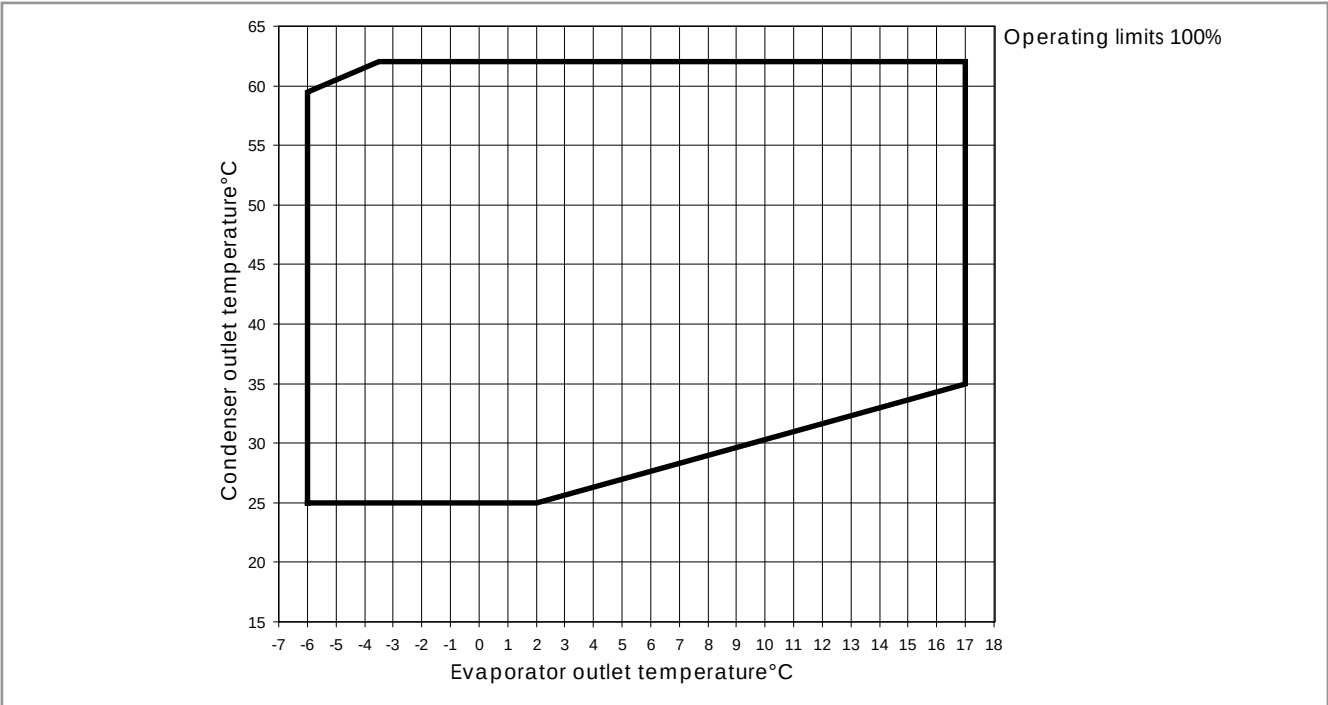
7. OPERATING LIMITS

Standard Version



The partial load limit of 25% corresponds to the 12.5% of the total cooling capacity of the unit (1 compressor off)

Condenserless unit



The minimum partial load limit is set to 70% in all operating conditions of the unit

Dati di progetto DIR 97/23/CE		HIGH PRESSURE SIDE	LOW PRESSURE SIDE
Maximum pressure allowable	bar	22	16,5
Maximum setting allowable	°C	125	55
Minimum temperature allowable	°C	10	-10

8. CORRECTION FACTORS

8.1. COOLING CAPACITY AND INPUT POWER

"HEAT PUMP VERSIONS IN COOLING MODE"

The cooling capacity yielded, and the input electrical capacity in conditions other than rated conditions, are obtained by multiplying the rated values (P_f , P_e) by the respective correction coefficients (C_f , C_a).

The following diagrams allow you to obtain the correction coefficients to be used for the various versions of the devices, in cooling mode; next each curve the external air temperature to which it refers is shown.

KEY:

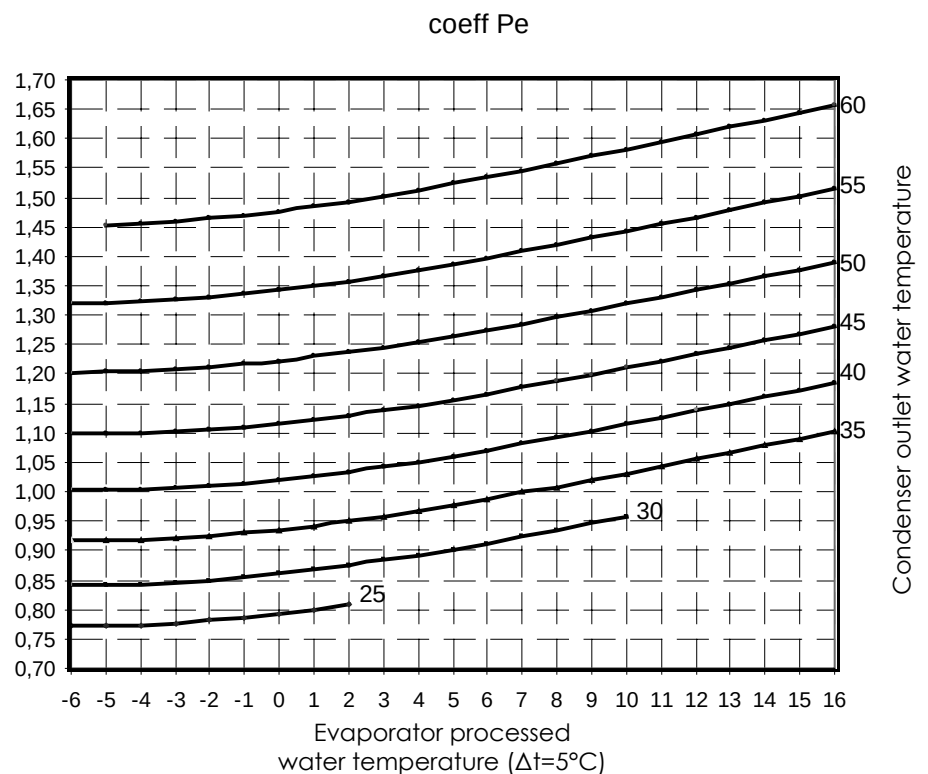
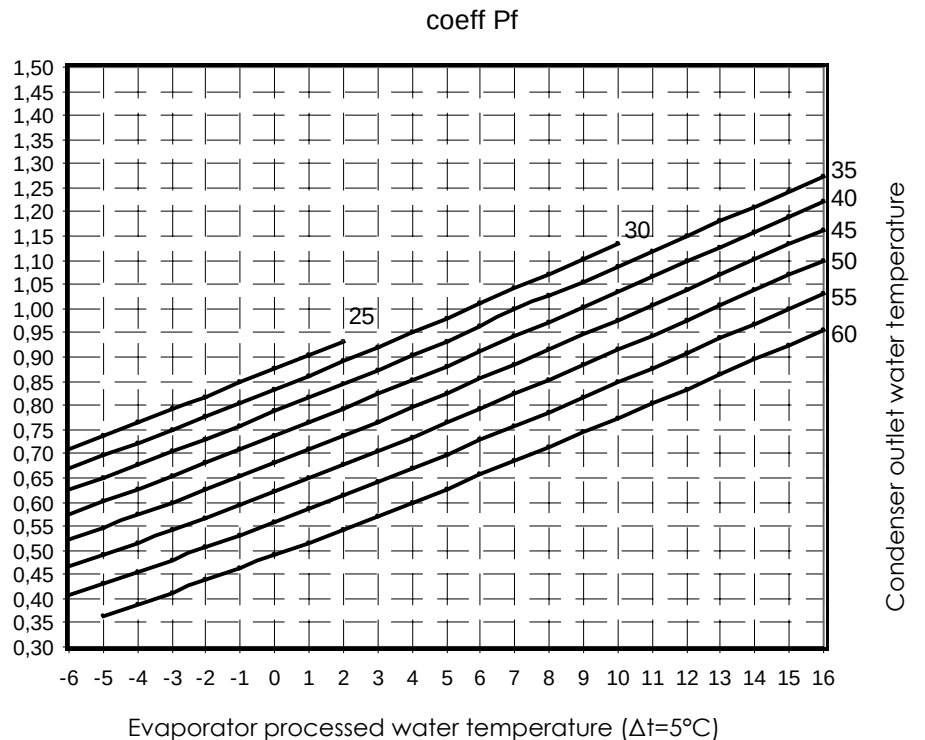
C_f = Cooling capacity correction coefficient

C_a = Input power correction coefficient

NB:

FOR THE VERSIONS with temperatures below 4°C, contact the company

FOR ΔT DIFFERENT FROM 5°C to the evaporator refer to Tab.9.3.1 for cooling capacity and input power correction factors. To account for exchanger soiling, apply the relative fouling factors



9.3.1 Correction factors for Δt different from the Chiller Rated value

	3	5	8	10
Cooling capacity correction factors	0.99	1	1.02	1.03
Input power correction factors	0.99	1	1.01	1.02

9.4.1 Fouling factors

[K*m ²]/[W]	0.00005	0.0001	0.0002
Cooling capacity correction factors	1	0.98	0.94
Input power correction factors	1	0.98	0.95

8.2. HEATING CAPACITY AND INPUT POWER

- "HEAT PUMP VERSIONS IN HEATING MODE"

The heating capacity yielded and the input electrical capacity in conditions other than rated conditions are obtained by multiplying the rated values (P_t , P_e) by the respective correction coefficients (C_t , C_a).

The diagram allows you to obtain the correction coefficients; corresponding to each curve, the temperature of the hot processed water referred to is reported, assuming a difference in water temperature between the input and output of the condenser equal to 5°C.

The outputs are intended as net of the defrosting cycles.

KEY:

C_t = Heating capacity correction coefficient

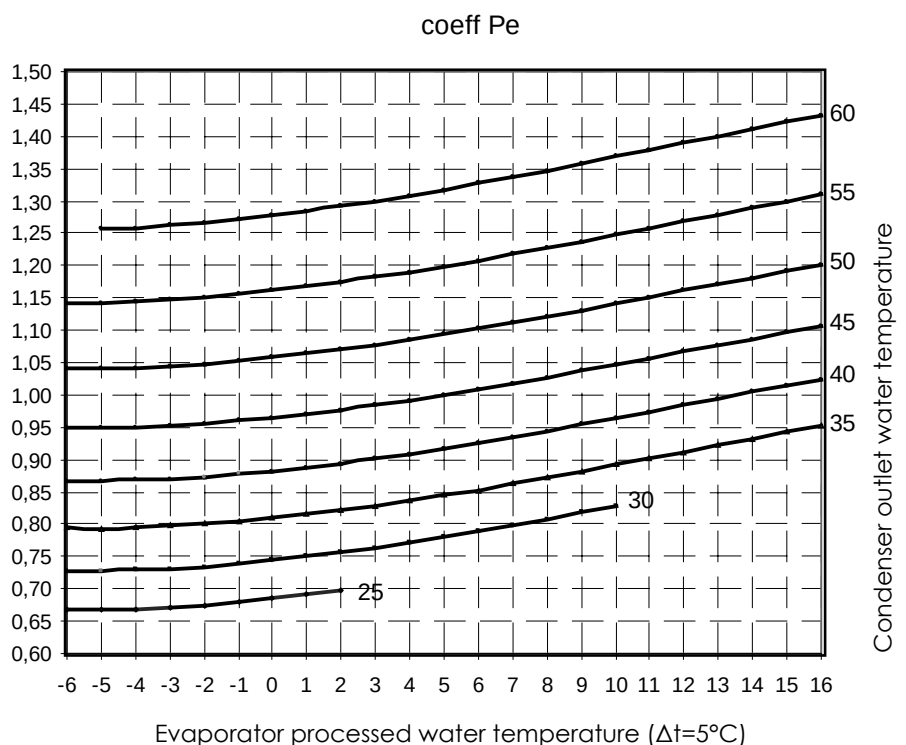
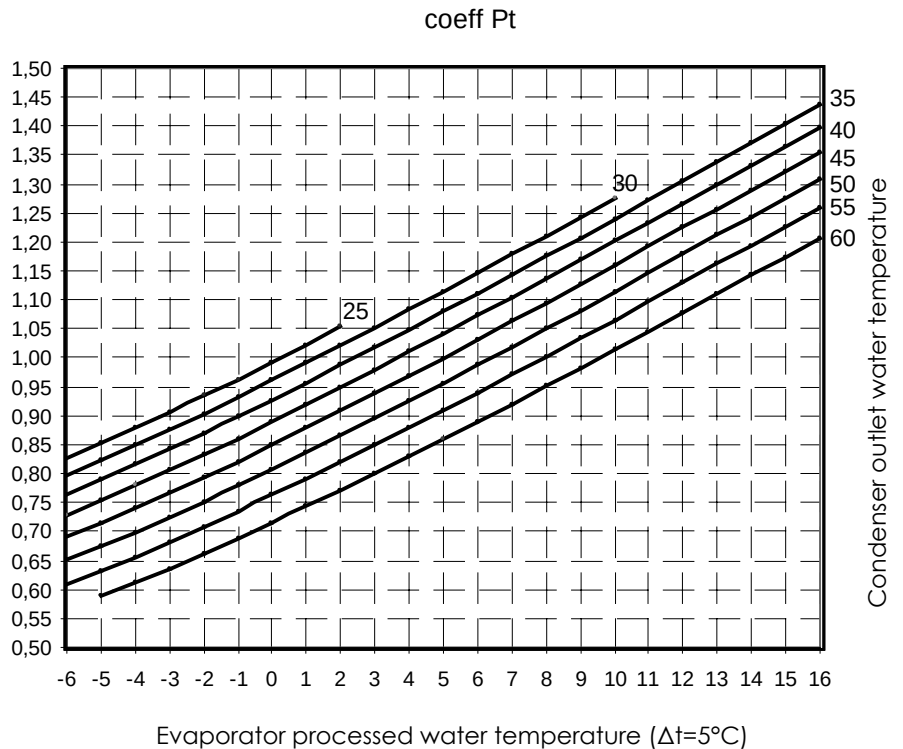
C_a = Input power correction coefficient

8.2.1. FOR Δt DIFFERENT FROM THE RATED VALUE

For Δt different from 5°C to the evaporator, refer to Tab 8.1.1 for the cooling capacity and input power correction factors. To account for exchanger soiling, apply the relative fouling factors

8.3. FOULING FACTORS

The performances supplied by the table refer to the conditions of clean pipes with fouling factor = 1. For values different from the fouling factor, multiply the values in the performance table by the reported coefficients.



8.1.1. Correction factors for Δt different from the Chiller Rated value

	3	5	8	10
Cooling capacity correction factors	0.99	1	1.02	1.03
Input power correction factors	0.99	1	1.01	1.02

8.1.2. Fouling factors

[K*m ²]/[W]	0.00005	0.0001	0.0002
Cooling capacity correction factors	1	0.98	0.94
Input power correction factors	1	0.98	0.95

8.5. HEATING CAPACITY AND INPUT POWER

– “CONDENSERLESS UNIT IN COOLING MODE”

The cooling capacity yielded, and the input electrical capacity in conditions other than rated conditions, are obtained by multiplying the rated values (P_f , P_e) by the respective correction coefficients (C_f , C_a).

The following diagrams allow you to obtain the correction coefficients to be used for the various versions of the devices, in cooling mode; next each curve the external air temperature to which it refers is shown.

KEY:

C_f = Cooling capacity correction coefficient

C_a = Input power correction coefficient

NB:

FOR THE VERSIONS with temperatures below 4°C, contact the company

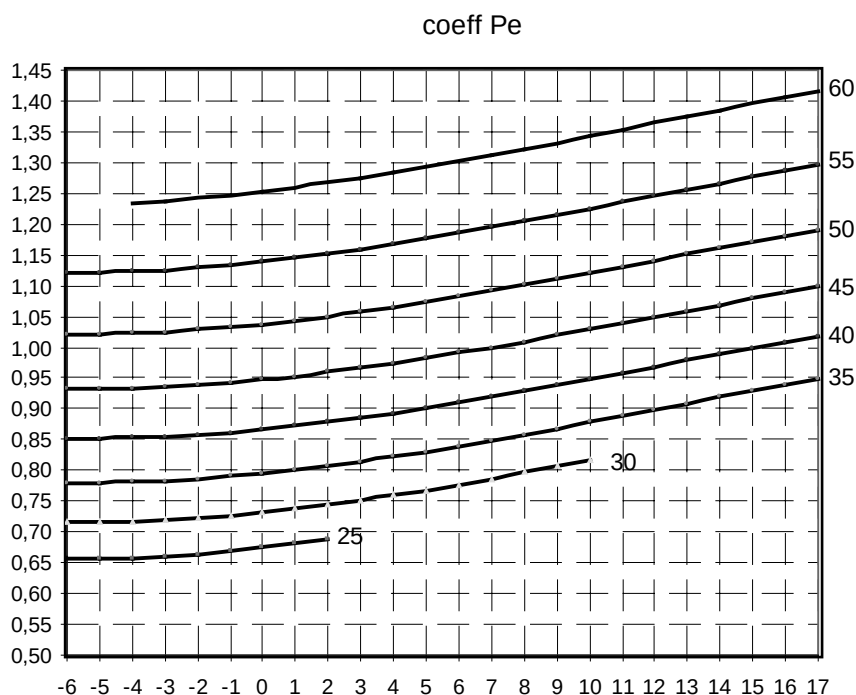
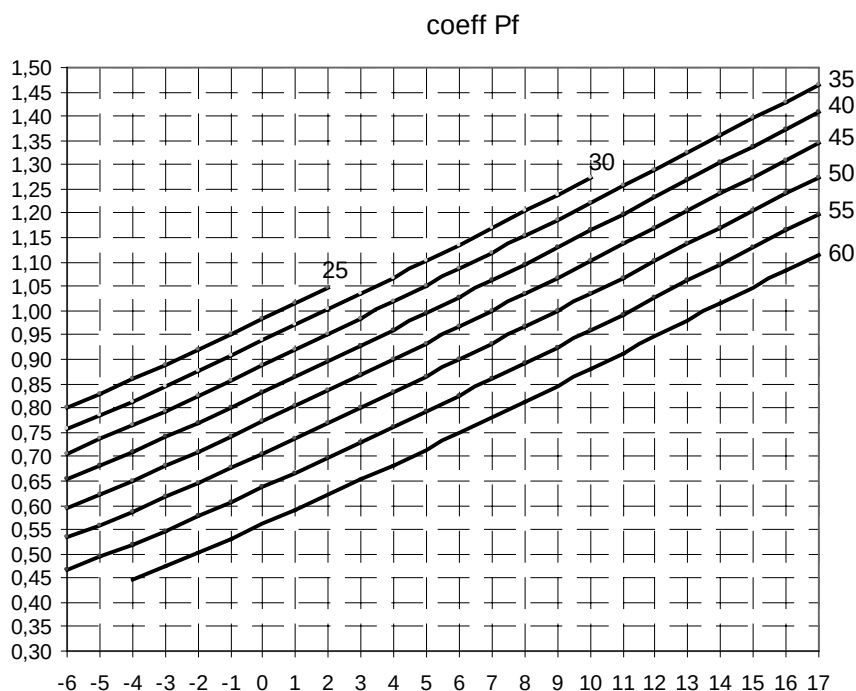
FOR Δt DIFFERENT FROM 5°C to the evaporator refer to Tab.9.3.1 for cooling capacity and input power correction factors. To account for exchanger soiling, apply the relative fouling factors

8.3.1. FOR Δt DIFFERENT FROM THE RATED VALUE

For Δt different from 5°C to the evaporator, refer to Tab 8.5.1. for the cooling capacity and input power correction factors. To account for exchanger soiling, apply the relative fouling factors

8.4. FOULING FACTORS

The performances supplied by the table refer to the conditions of clean pipes with fouling factor = 1. For values different from the fouling factor, multiply the values in the performance table by the reported coefficients.



8.4.1. Correction factors for Δt different from the Chiller Rated value

	3	5	8	10
Cooling capacity correction factors	0.99	1	1.02	1.03
Input power correction factors	0.99	1	1.01	1.02

8.4.2. Fouling factors

[K*m ²]/[W]	0.00005	0.0001	0.0002
Cooling capacity correction factors	1	0.98	0.94
Input power correction factors	1	0.98	0.95

9. GLYCOL

- The cooling capacity and input power correction factors make allowance for the presence of glycol and the different evaporation temperature.
- The pressure drop correction factor already takes into account the different flow rate deriving from the application of the water flow rate correction factor.
- The correction factor of the water flow rate is calculated so as to maintain the same Δt that would be used in the absence of glycol.

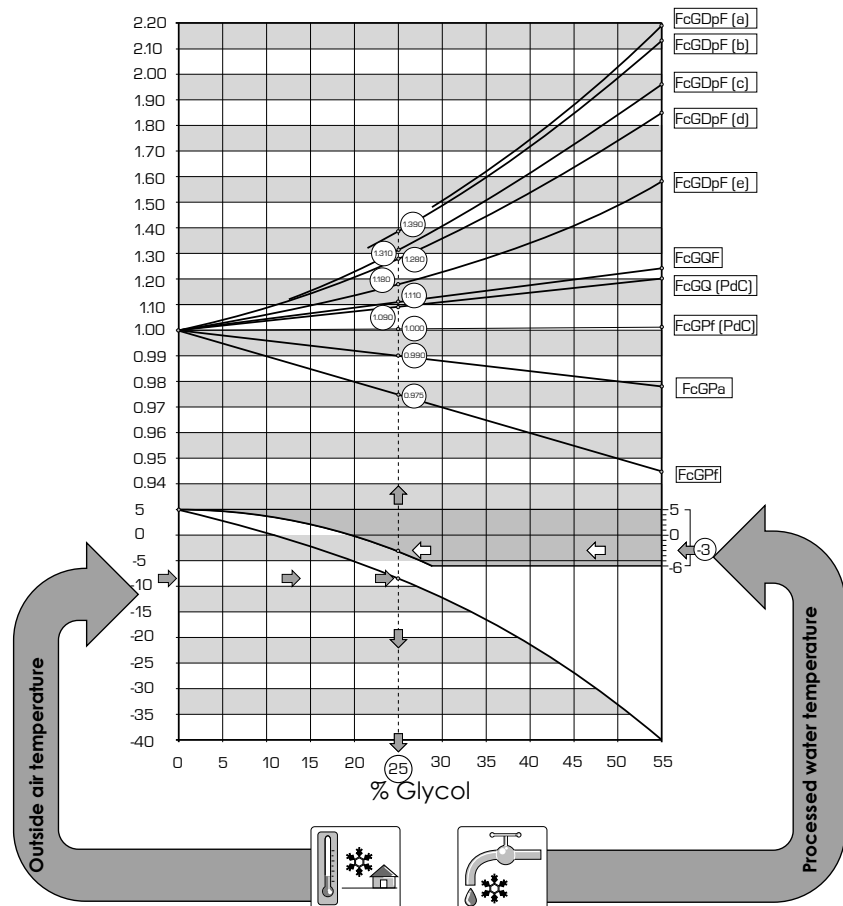
NOTE

An example is given to make it easier to read the following graph. By using the diagram below it is possible to establish the percentage of glycol necessary; this percentage can be calculated taking into account one of the following factors: On the basis of the fluid considered (water or air), it will be necessary to enter the graph from the right or left side, from the intersection of the outside air temperature or processed water temperature straight lines and the relative curves, a point is obtained through which the vertical line that will identify both the percentage of glycol and the relative percentage coefficients will have to pass.

9.1. HOW TO READ THE GLYCOL CURVES

The curves shown in the figure summarise a notable quantity of data, each of which is represented by a specific curve. In order to use these curves correctly, it is necessary to make some initial considerations:

- If you want to calculate the percentage of glycol on the basis of the outside air temperature, you must enter from the left-hand axis and, once you have intersected the curve, trace 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, for the flow rates and the pressure drops (remember that these coefficients must anyway be multiplied by the rated value of the sizes examined); the lower axis advises the percentage of glycol necessary on the basis of the outside air temperature considered. If you want to calculate the percentage of glycol



KEY:

FcGPf	Correction factor of the cooling capacity
FcGPa	Correction factor of the input power
FcGDpF (a)	Correction factor of the pressure drops (evaporator) (average temp. = -3.5°C)
FcGDpF (b)	Correction factor of the pressure drops (average temp. = 0.5°C)
FcGDpF (c)	Correction factor of the pressure drops (average temp. = 5.5°C)
FcGDpF (d)	Correction factor of the pressure drops (average temp. = 9.5°C)
FcGDpF (e)	Correction factor of the pressure drops (average temp. = 47.5°C)
FcGQF	Correction factor of the outputs (evaporator) (average temp. = 9.5°C)
FcGQC	Correction factor of the outputs (condenser) (average temp. = 47.5°C)

NB:

Although the graph reaches outside air temperatures of -40°C, it is necessary to maintain the machine's operating limits as reference.

on the basis of the temperature of the processed water, you must enter from the right-hand axis and, once you have intersected the curve, trace a vertical line which, in turn, will intercept all the other curves; the points obtained from the upper curves represent the coefficients for the cooling capacity and input power, for the flow rates and the pressure drops (remember that these coefficients must anyway be multiplied by the rated value of the sizes examined); the lower axis advises the percentage of glycol necessary to produce water at the

required temperature.

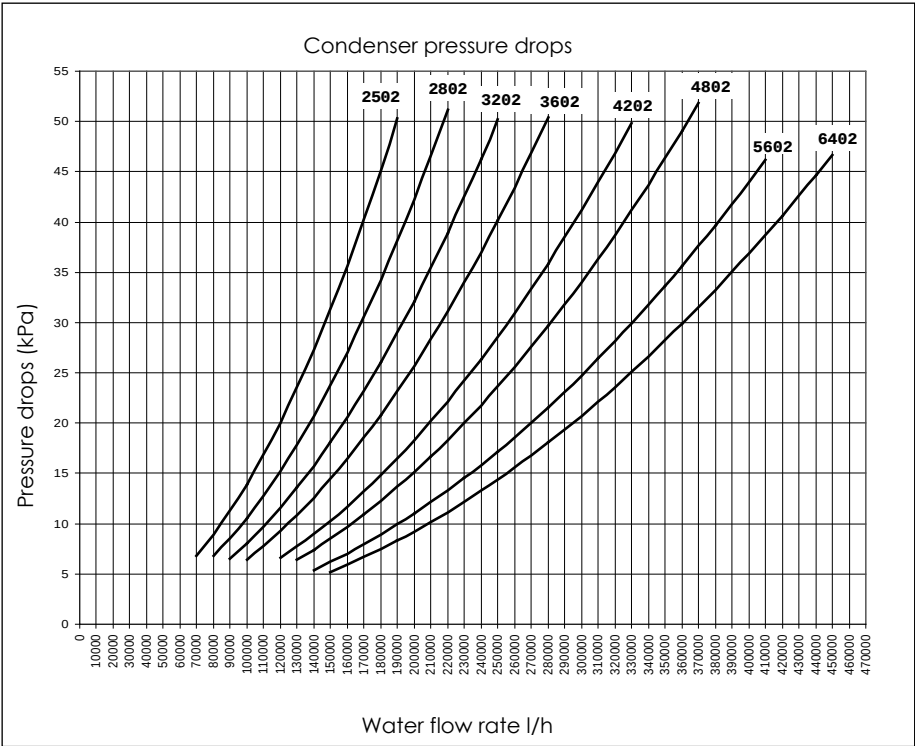
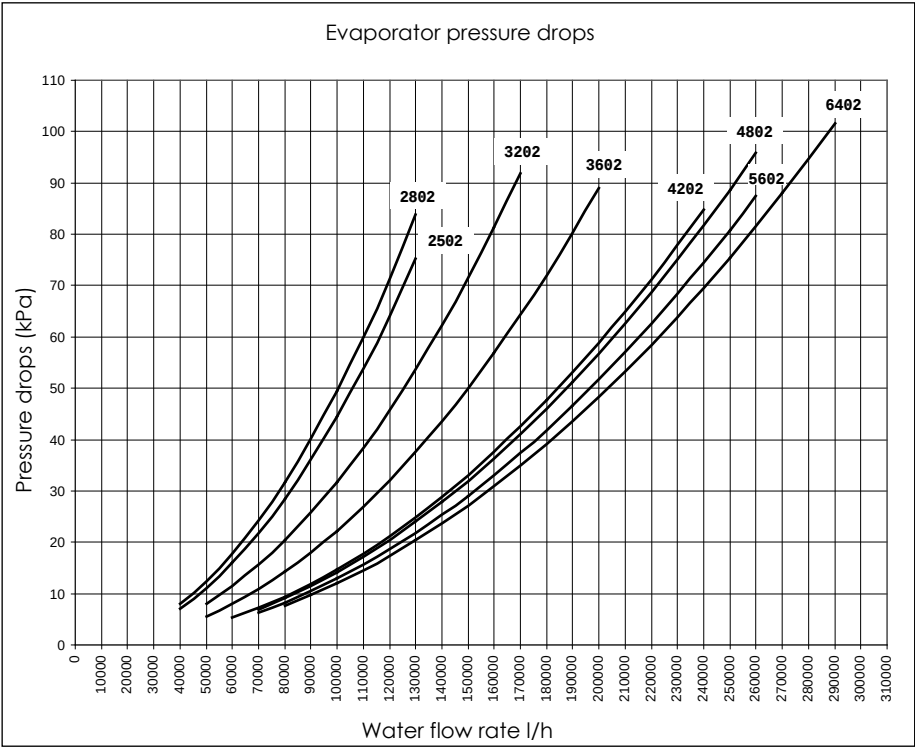
- Remember that the initial sizes "OUTSIDE AIR TEMPERATURE" and "PROCESSED WATER TEMPERATURE", are not directly linked to each other, so it is not possible to enter the curve of one of these sizes, and obtain the corresponding point on the other curve.

10. TOTAL PRESSURE DROPS (STANDARD °)

The pressure drops include:

- EVAPORATORS
- CONDENSERS

The diagram pressure drops are related to an average water temperature of 10 °C. The following table shows the correction to apply to the pressure drops when the average water temperature varies



Average water temperature °C	5	10	15	20	30	40	50
Multiplicational coefficient	1.02	1	0.985	0.97	0.95	0.93	0.91

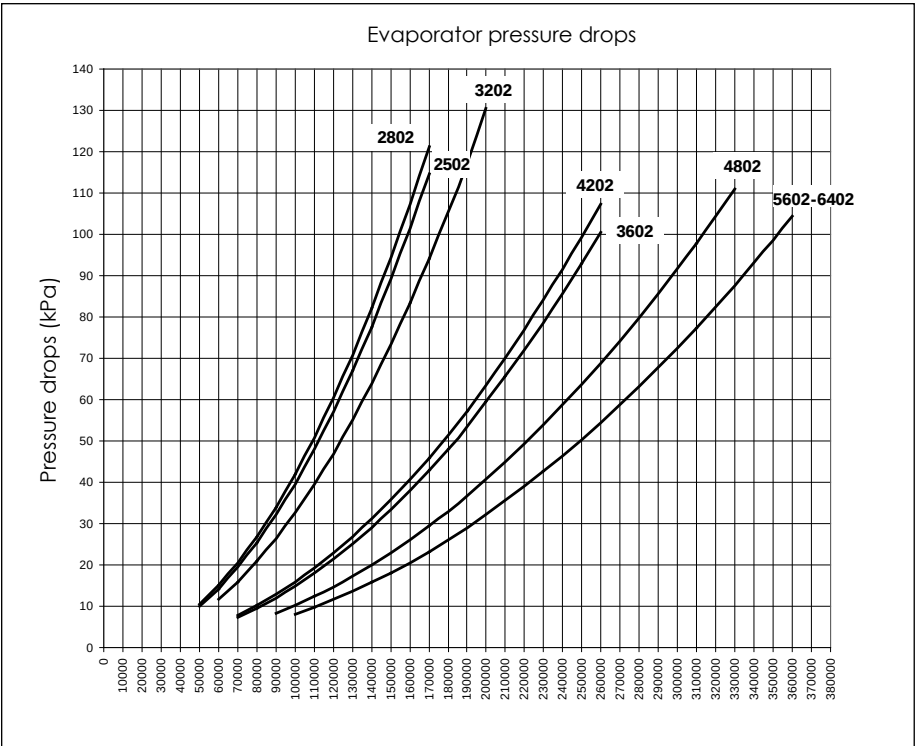
(1)	Minimum water content
(2)	Minimum water content in the case of process applications or operation with low outside temperatures and low load.
	Adjusting the outlet water temperature project Δt less than 5°C.

11. TOTAL PRESSURE DROPS (HIGH EFF. A)

The pressure drops include:

- EVAPORATORS
- CONDENSERS

The diagram pressure drops are related to an average water temperature of 10 °C. The following table shows the correction to apply to the pressure drops when the average water temperature varies



Water flow rate l/h



Water flow rate l/h

Average water temperature °C	5	10	15	20	30	40	50
Multiplicational coefficient	1.02	1	0.985	0.97	0.95	0.93	0.91

(1)	Minimum water content
(2)	Minimum water content in the case of process applications or operation with low outside temperatures and low load.
	Adjusting the outlet water temperature project Δt less than 5°C.

COOLING LINES							
Model	Line length [m]	Suction line f [mm]		Liquid line f [mm]		Refrigerant R134a per metre of line [g/m]	Refrigerant R134a per metre of line [g/m]
		C1	C2	C1	C2	C1	C2
WF 2502E	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
WF 2802E	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
WF 3202E	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
WF 3602E	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
WF 4202E	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
WF 4802E	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
WF 5602E	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
WF 6402E	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

for each machine there are 2 circuits,
therefore 2 gas lines + 2 liquid lines

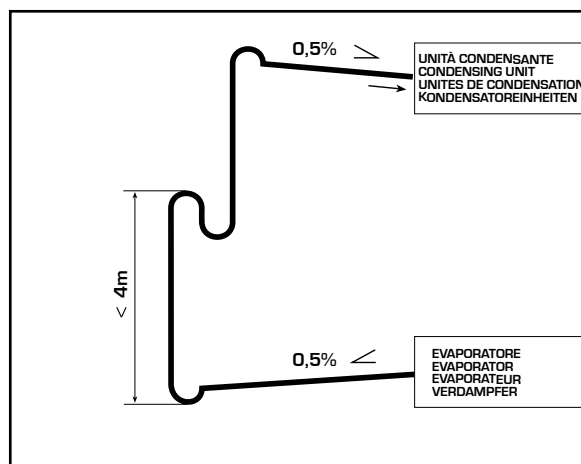
(*) Minimum capacity control 2 compressors ON

Key

C1 = Cooling circuit 1

C2 = Cooling circuit 2

If the evaporator is positioned lower than the condenser, drain-taps must be available on the suction line to draw the oil towards the compressor. By "line length" we mean the distance between the units, measured on the liquid line. For further information, contact the head office.



12. SOUND DATA

12.1. SOUND LEVELS OF STANDARD WF VERSION «°»

Sound power

Aermec determines the sound power value on the basis of measurements taken in accordance with standard 9614-2, in compliance with the Eurovent certification.

Sound pressure

Sound pressure in free field, on a reflecting plane (directional factor Q=2), in accordance with standard ISO 3744.

The rated value refers to:

Evaporator water temperature 12/7 °C

Condenser air temperature 35°C

Δt 5°C

WF °	Total sound levels			Octave band[Hz]						
	Pow. dB(A)	Pressure		125	250	500	1000	2000	4000	8000
		dB(A) 10m	dB 1m	Sound power by central band frequency [dB]						
2502°	93.6	61.6	75.6	54.0	74.7	86.1	91.0	87.5	69.3	56.9
2802°	94.0	62	76	59.5	74.3	88.5	91.2	86.7	71.2	59.3
3202°	93.5	61.5	75.5	69.1	82.7	85.8	91.3	83.8	78.3	64.1
3602°	93.7	61.7	75.7	66.5	84.8	87.0	90.7	84.8	75.6	63.3
4202°	94.6	62.6	76.6	64.8	88.4	88.9	89.8	86.8	68.0	56.6
4802°	95.5	63.5	77.5	65.4	87.0	87.9	92.7	86.7	76.1	63.3
5602°	97.3	65.3	79.3	65.9	87.0	88.3	95.7	86.7	76.4	64.9
6402°	97.9	65.9	79.9	58.9	84.6	91.9	95.4	88.6	79.5	63.9

12.2. SOUND LEVELS OF STANDARD SILENCED VERSION «L»

WF L	Total sound levels			Octave band[Hz]						
	Pow. dB(A)	Pressure		125	250	500	1000	2000	4000	8000
		dB(A) 10m	dB 1m	Sound power by central band frequency [dB]						
2502L	85.5	53.5	67.5	50.0	74.7	79.1	83.0	76.5	55.3	44.9
2802L	86.2	54.2	68.2	55.5	74.3	81.5	83.2	75.7	57.2	47.3
3202L	87.0	55	69	65.1	82.7	78.8	83.3	72.8	64.3	52.1
3602L	87.9	55.9	69.9	62.5	84.8	80.0	82.7	73.8	61.6	51.3
4202L	90.2	58.2	72.2	60.8	88.4	81.9	81.8	75.8	54.0	44.6
4802L	89.8	57.8	71.8	61.4	87.0	80.9	84.7	75.7	62.1	51.3
5602L	91.0	59	73	61.9	87.0	81.3	87.7	75.7	62.4	52.9
6402L	90.8	58.8	72.8	54.9	84.6	84.9	87.4	77.6	65.5	51.9

12.3. SOUND LEVELS WITH AK KIT

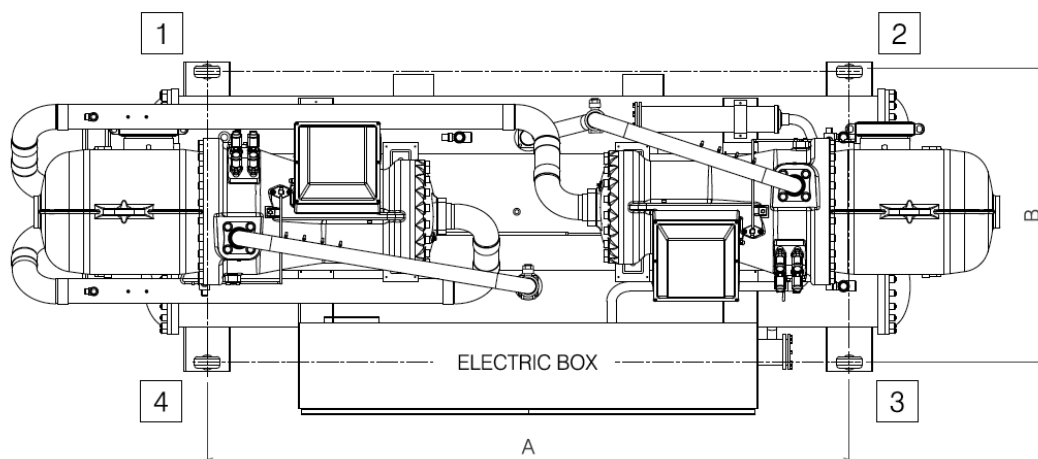
NB: only available with the L version

WF WITH AK KIT	Total sound levels			Octave band[Hz]						
	Pow. dB(A)	Pressure		125	250	500	1000	2000	4000	8000
		dB(A) 10m	dB 1m	Sound power by central band frequency [dB]						
2502	80.8	80.8	48.8	56.0	63.7	73.1	79.0	72.5	54.3	42.9
2802	81.4	81.4	49.4	61.5	63.3	75.5	79.2	71.7	56.2	45.3
3202	81.5	81.5	49.5	71.1	71.7	72.8	79.3	68.8	63.3	50.1
3602	81.5	81.5	49.5	68.5	73.8	74.0	78.7	69.8	60.6	49.3
4202	82.4	82.4	50.4	66.8	77.4	75.9	77.8	71.8	53.0	42.6
4802	83.2	83.2	51.2	67.4	76.0	74.9	80.7	71.7	61.1	49.3
5602	85.2	85.2	53.2	67.9	76.0	75.3	83.7	71.7	61.4	50.9
6402	85.4	85.4	53.4	60.9	73.6	78.9	83.4	73.6	64.5	49.9

13. SAFETY AND CHECK PARAMETER SETTING

CHECK PARAMETERS										
Cooling set	Water inlet temperature in cooling mode					MIN.		4°C		
						MAX.		15°C		
						DEFAULT		7.0°C		
Antifreeze intervention	Antifreeze alarm intervention temperature on 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								
COMPRESSOR THERMOMAGNETIC SWITCHES 400V			2502	2802	3202	3602	4202	4802	5602	6402
Compressors	no.	2	2	2	2	2	2	2	2	2
MTC1	A	196A	214A	280A	310A	320A	360A	450A	566A	566A
MTC2	A	196A	214A	280A	310A	320A	360A	450A	566A	566A
COMPRESSORS THERMAL RELAY			2502	2802	3202	3602	4202	4802	5602	6402
RT1	A	125A	136A	178A	197A	203A	228A	260A	320A	320A
RT2	A	125A	136A	178A	197A	203A	228A	260A	320A	320A
COMPRESSORS FUSES			2502	2802	3202	3602	4202	4802	5602	6402
F1	A	250A	250A	315A	315A	400A	400A	500A	630A	630A
F2	A	250A	250A	315A	315A	400A	400A	500A	630A	630A
MAIN SWITCH			2502	2802	3202	3602	4202	4802	5602	6402
IG	A	400	400	630	630	800	800	1000	1250	1250
TRANSDUCERS AND PRESSURE SWITCHES			2502	2802	3202	3602	4202	4802	5602	6402
High pressure double pressure switch (HP)	bar	PRM2	PRM2	PRM2	PRM2	PRM2	PRM2	PRM2	PRM2	PRM2
High pressure transducer (THP)	bar	30bar	30bar	30bar	30bar	30bar	30bar	30bar	30bar	30bar
Low pressure transducer (TLP)	bar	10bar	10bar	10bar	10bar	10bar	10bar	10bar	10bar	10bar
COOLING CIRCUIT SAFETY			2502	2802	3202	3602	4202	4802	5602	6402
Low-pressure valve	bar	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5
High-pressure valve	bar	22	22	22	22	22	22	22	22	22

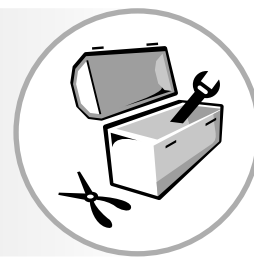
14. WEIGHT DISTRIBUTION AND CENTRES OF GRAVITY



See configurator

Code	Size	Model	Recovery	Version	Condenser	Weight and centre of gravity when empty			Supports in %				
						A	B	tot weight	1	2	3	4	
						mm	mm	kg	%	%	%	%	AVX
WF	2502	°	°	°	°	2710	1240	3873	25.0%	25.0%	25.0%	25.0%	673
WF	2502	A	°	°	°	2590	1240	4707	25.0%	25.0%	25.0%	25.0%	673
WF	2502	°	°	L	°	2710	1240	4183	25.0%	25.0%	25.0%	25.0%	673
WF	2502	A	°	L	°	2590	1240	5017	25.0%	25.0%	25.0%	25.0%	674
WF	2802	°	°	°	°	2710	1240	3926	25.0%	25.0%	25.0%	25.0%	673
WF	2802	A	°	°	°	2590	1240	4769	25.0%	25.0%	25.0%	25.0%	673
WF	2802	°	°	L	°	2710	1240	4236	25.0%	25.0%	25.0%	25.0%	673
WF	2802	A	°	L	°	2590	1240	5079	25.0%	25.0%	25.0%	25.0%	674
WF	3202	°	°	°	°	2590	1240	4779	25.0%	25.0%	25.0%	25.0%	673
WF	3202	A	°	°	°	2800	1270	6082	25.0%	25.0%	25.0%	25.0%	674
WF	3202	°	°	L	°	2590	1240	5134	25.0%	25.0%	25.0%	25.0%	674
WF	3202	A	°	L	°	2800	1270	6437	25.0%	25.0%	25.0%	25.0%	675
WF	3602	°	°	°	°	2590	1270	5196	25.0%	25.0%	25.0%	25.0%	674
WF	3602	A	°	°	°	2380	1390	7087	25.0%	25.0%	25.0%	25.0%	675
WF	3602	°	°	L	°	2590	1270	5551	25.0%	25.0%	25.0%	25.0%	674
WF	3602	A	°	L	°	2380	1390	7457	25.0%	25.0%	25.0%	25.0%	675
WF	4202	°	°	°	°	2590	1270	5644	25.0%	25.0%	25.0%	25.0%	674
WF	4202	A	°	°	°	2380	1390	7413	25.0%	25.0%	25.0%	25.0%	675
WF	4202	°	°	L	°	2590	1270	6014	25.0%	25.0%	25.0%	25.0%	674
WF	4202	A	°	L	°	2380	1390	7783	25.0%	25.0%	25.0%	25.0%	675
WF	4802	°	°	°	°	2590	1270	5856	25.0%	25.0%	25.0%	25.0%	674
WF	4802	A	°	°	°	2380	1390	7568	25.0%	25.0%	25.0%	25.0%	675
WF	4802	°	°	L	°	2590	1270	6226	25.0%	25.0%	25.0%	25.0%	674
WF	4802	A	°	L	°	2380	1390	7938	25.0%	25.0%	25.0%	25.0%	675
WF	5602	°	°	°	°	2800	1270	6735	25.0%	25.0%	25.0%	25.0%	675
WF	5602	A	°	°	°	2600	1430	8575	25.0%	25.0%	25.0%	25.0%	676
WF	5602	°	°	L	°	2800	1270	7135	25.0%	25.0%	25.0%	25.0%	675
WF	5602	A	°	L	°	2600	1430	8975	25.0%	25.0%	25.0%	25.0%	676
WF	6402	°	°	°	°	2800	1270	6987	25.0%	25.0%	25.0%	25.0%	675
WF	6402	A	°	°	°	2600	1430	8675	25.0%	25.0%	25.0%	25.0%	676
WF	6402	°	°	L	°	2800	1270	7387	25.0%	25.0%	25.0%	25.0%	675
WF	6402	A	°	L	°	2600	1430	9075	25.0%	25.0%	25.0%	25.0%	676

FOR THE INSTALLER



15. SELECTION AND PLACE OF INSTALLATION

Before installing the unit, decide with the customer the position in which it will be placed, pay attention to the following points:

- the support surface must be able to withstand the weight of the unit;
- the safety distance between the units and other equipment or structures must be strictly respected.
- The unit must be installed by an authorised technician in compliance with the national laws in the country of destination respecting the minimum technical spaces to allow maintenance.

16. POSITIONING

The machine is delivered from the factory wrapped in estincoll.

Before moving the unit, check the lifting capacity of the machines used. Once the packaging has been removed, the unit must be handled by qualified personnel with the suitable equipment. To handle the machine: see figure

- hook up the lifting belts to the provided eyebolts (as indicated in figure).

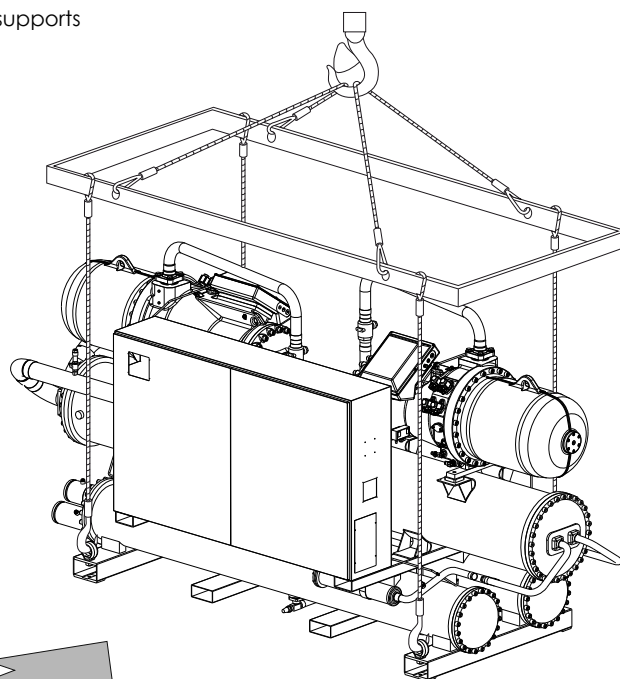
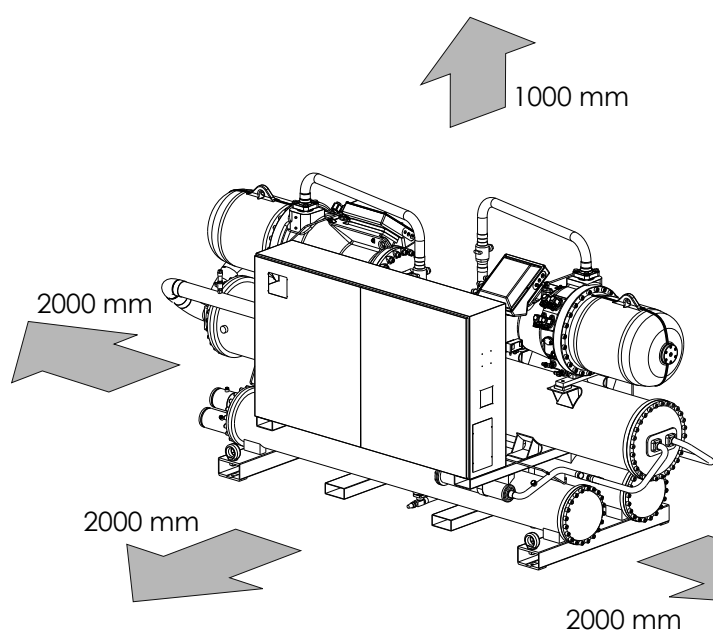
WARNING: ALWAYS USE ALL THE PROVIDED EYEBOLTS

- In order to avoid damaging the unit with the cables, insert protection elements between them and the machine. It is absolutely forbidden to stand beneath the unit.
- Take into account that when the chiller is working, vibrations may be generated; it is therefore advisable to install anti-vibration supports

(AVX accessories), fitting them to the holes in the base according to the assembly diagram.

- It is compulsory to provide the necessary technical spaces, to allow REGULAR AND EXTRAORDINARY MAINTENANCE INTERVENTIONS
- Fasten the unit by checking carefully that its on the same level; check that easy access to the hydraulic and electric part is allowed.

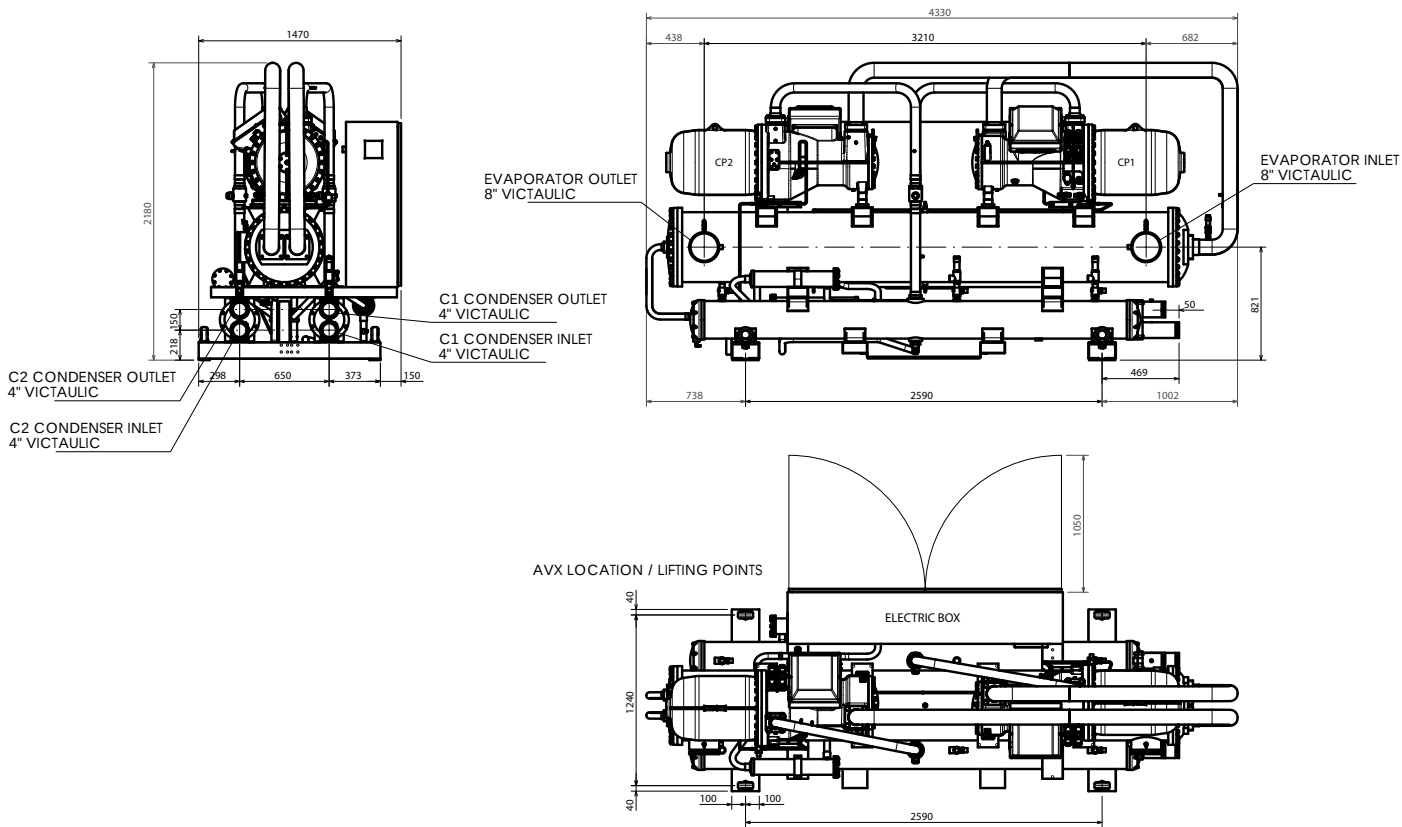
16.1. MINIMUM TECHNICAL SPACES (mm)



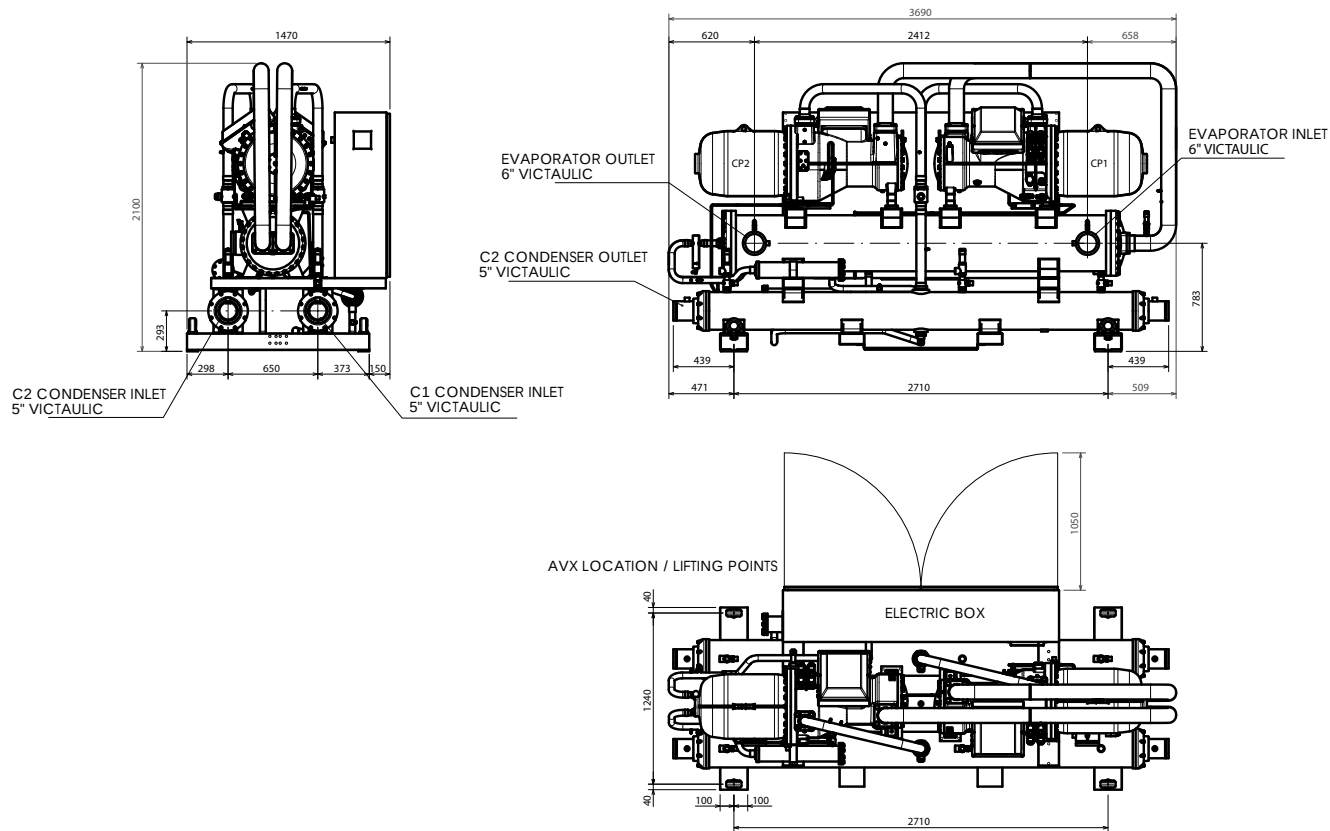
WARNING:
ALWAYS USE
ALL THE RINGS
AVAILABLE

17. DIMENSIONAL TABLES

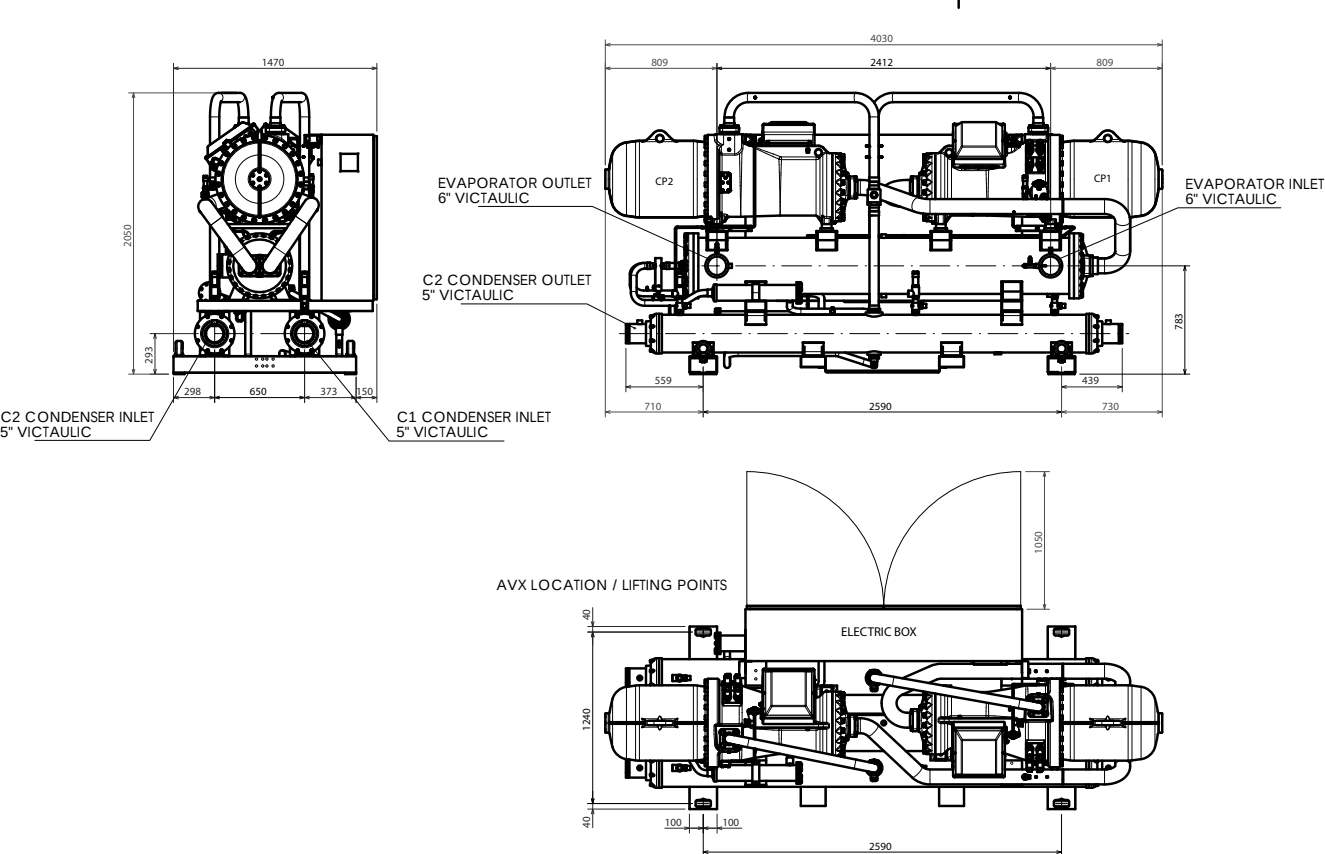
17.1. WF 2502 A_WF 2802 A (mm)



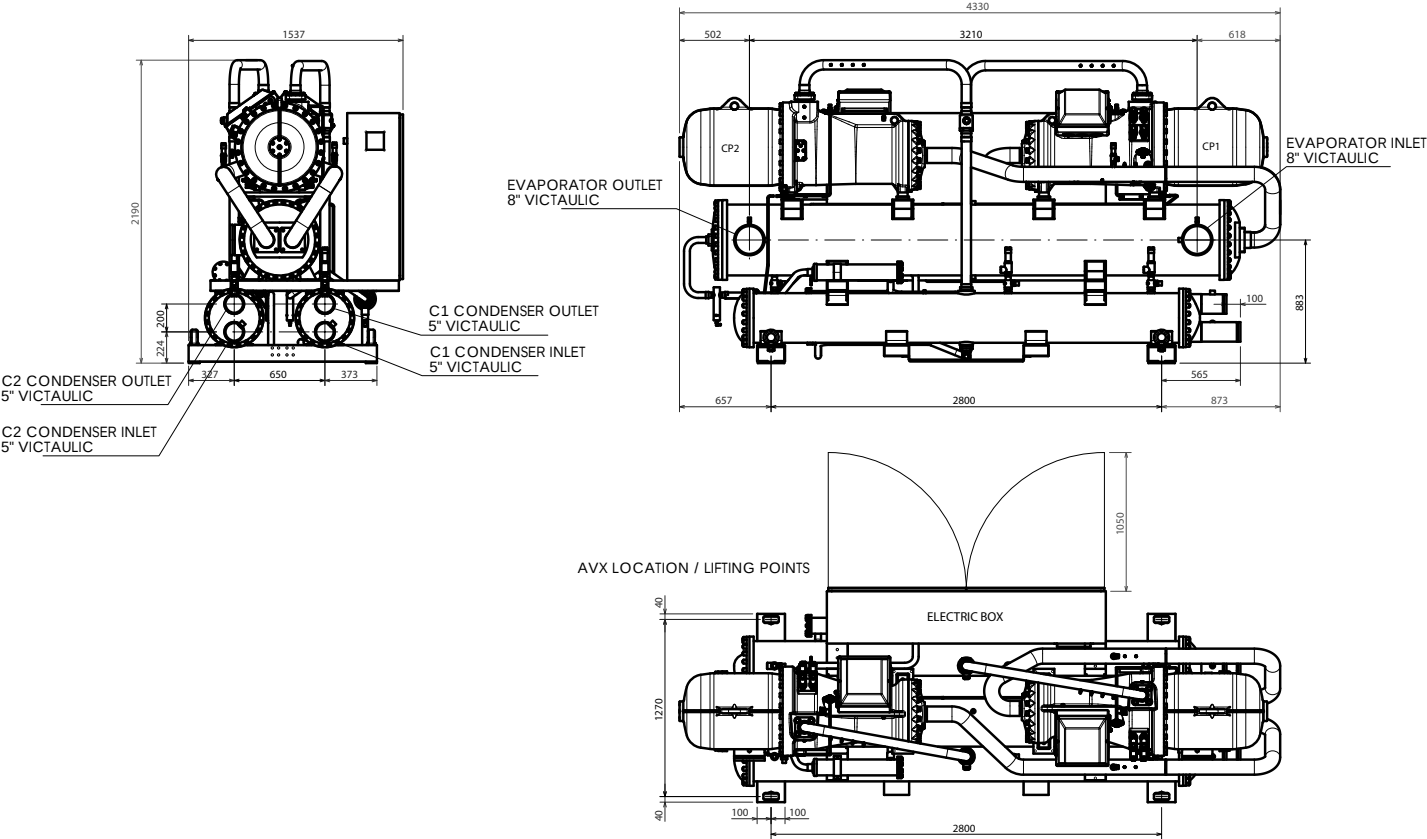
17.2. WF 2502_WF 2802 (mm)



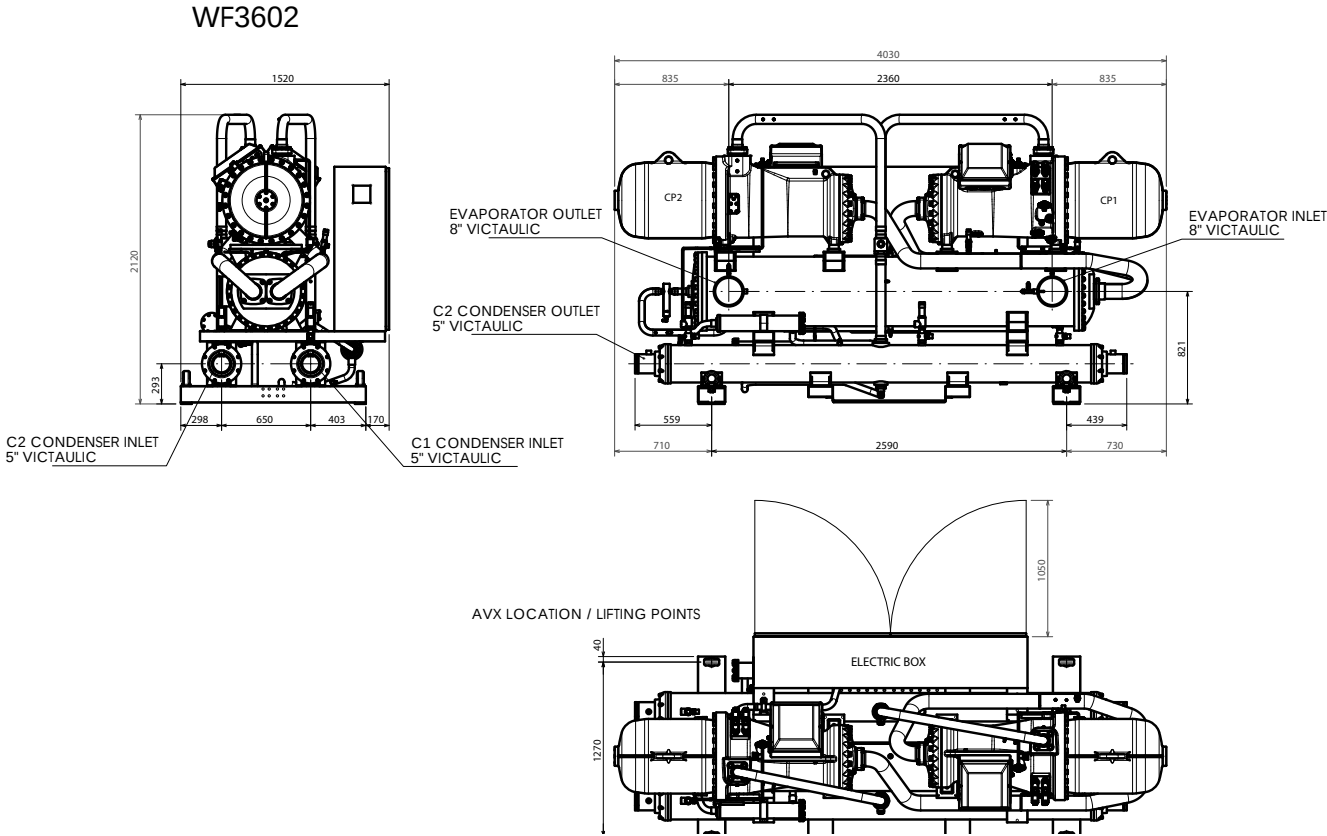
17.4. WF 3202



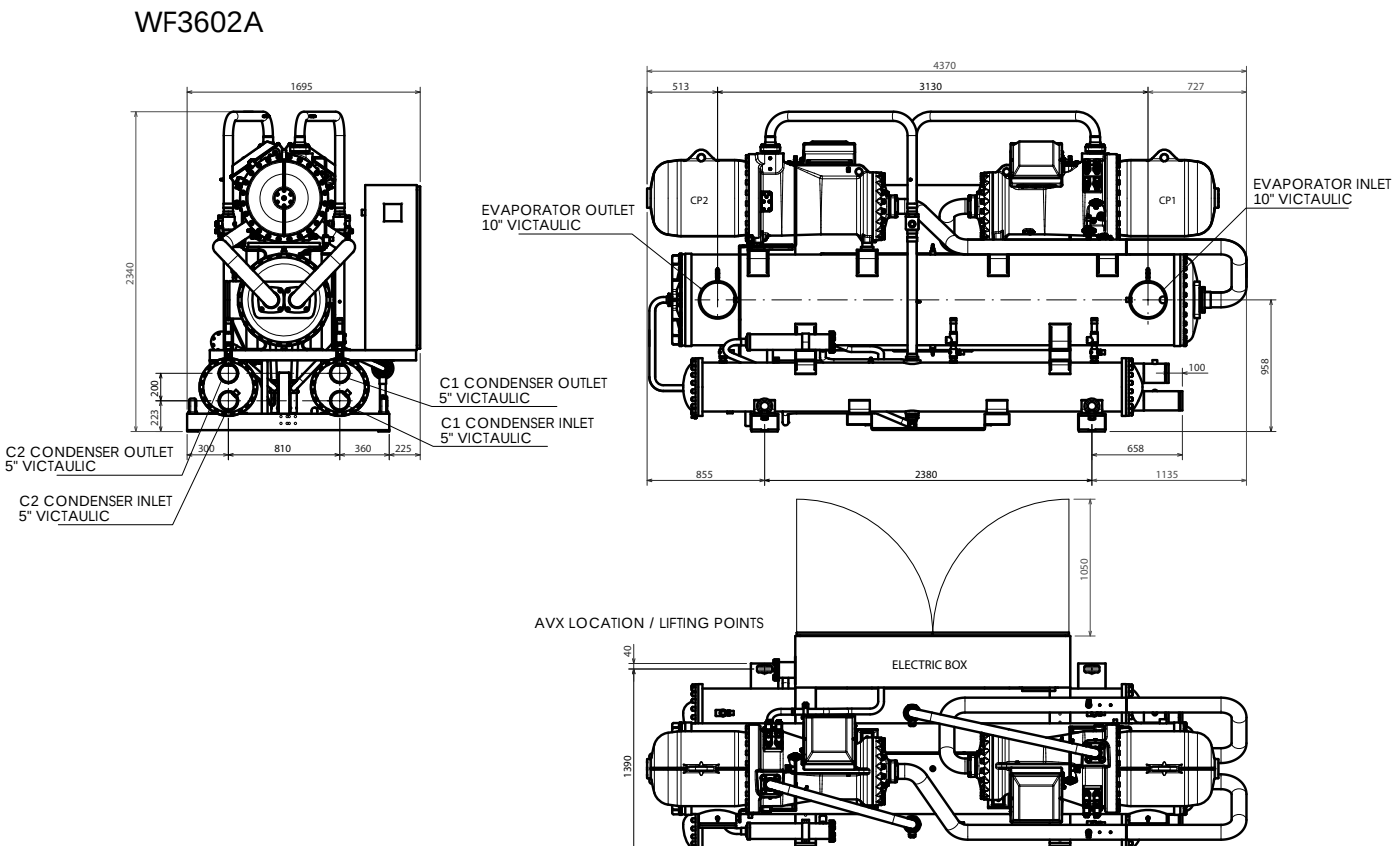
17.3. WF 3202 A



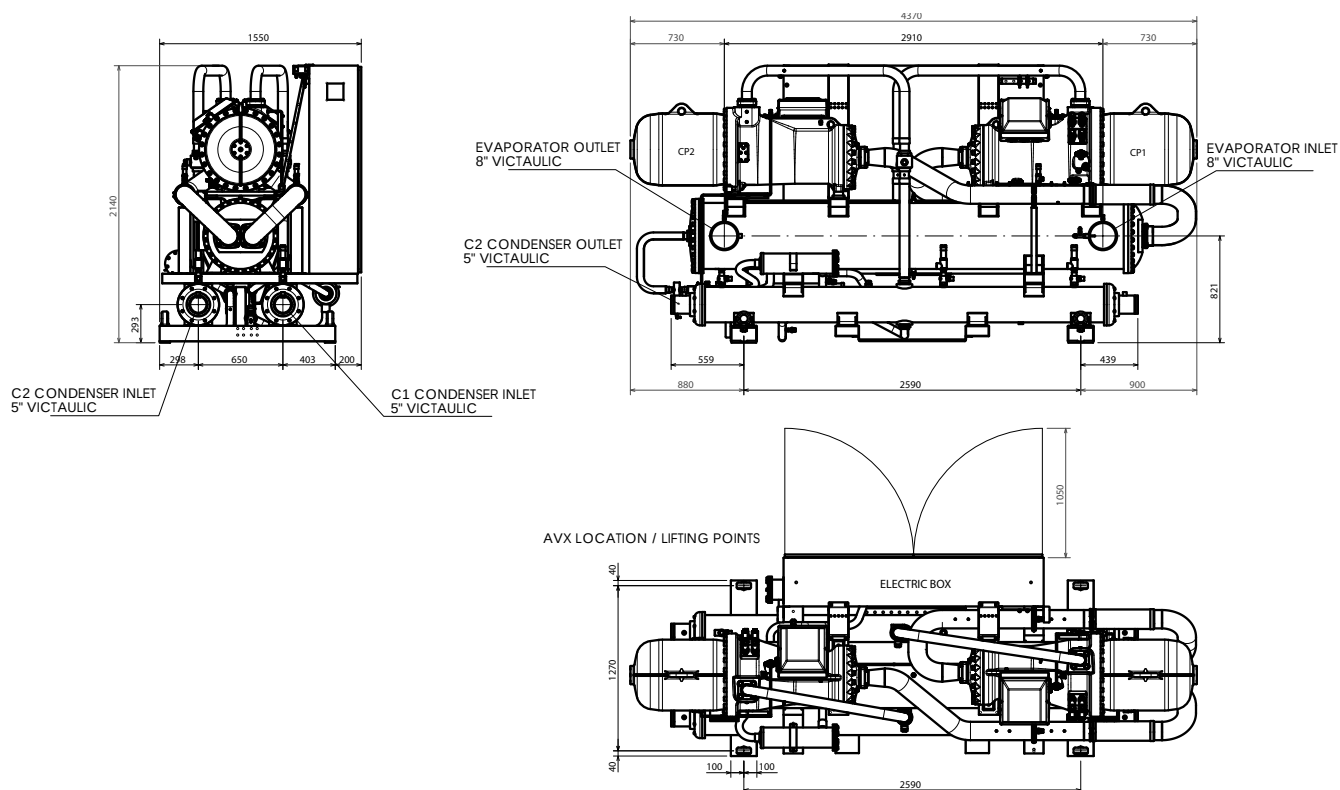
17.5. WF 3602



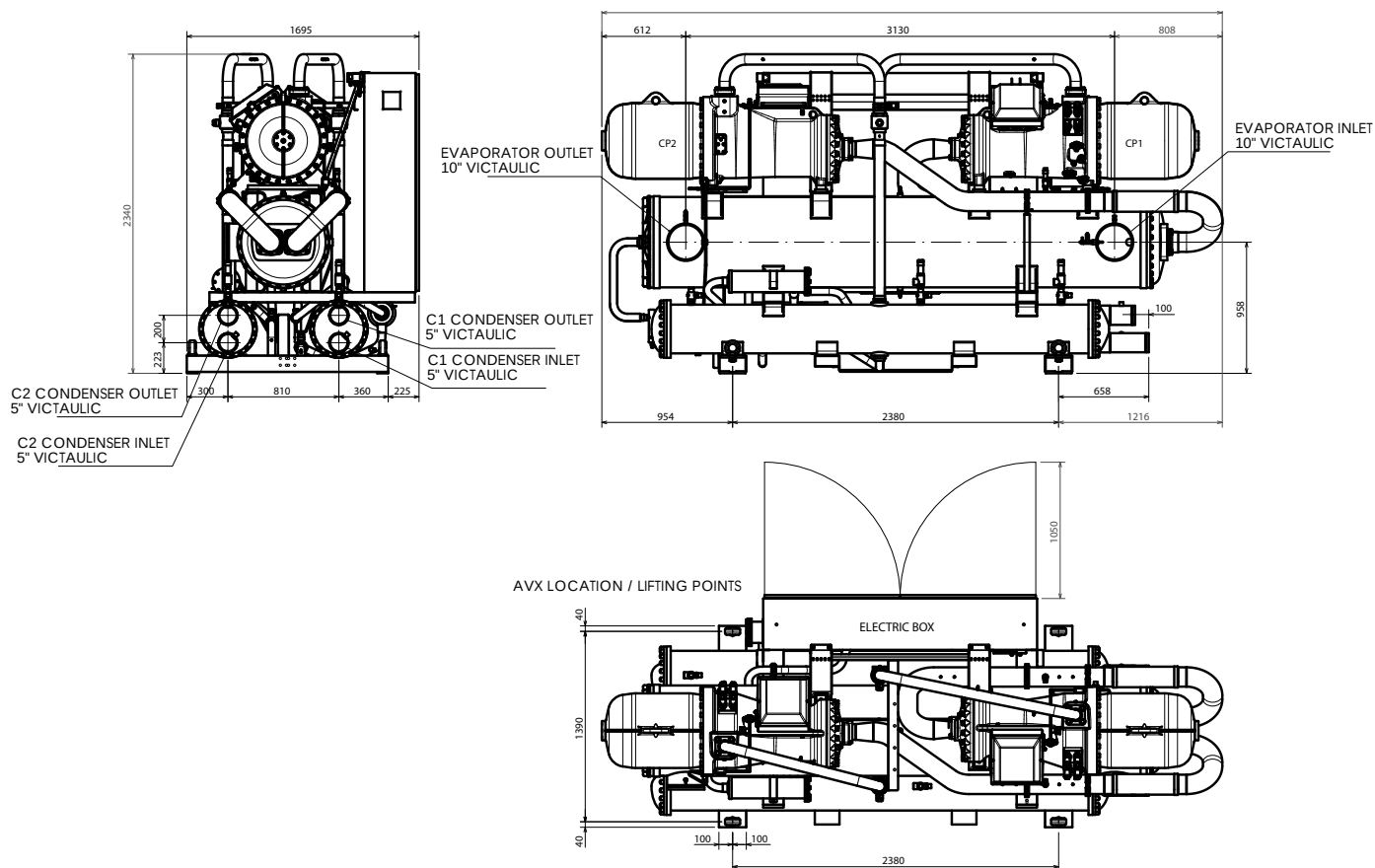
17.6. WF 3602 A



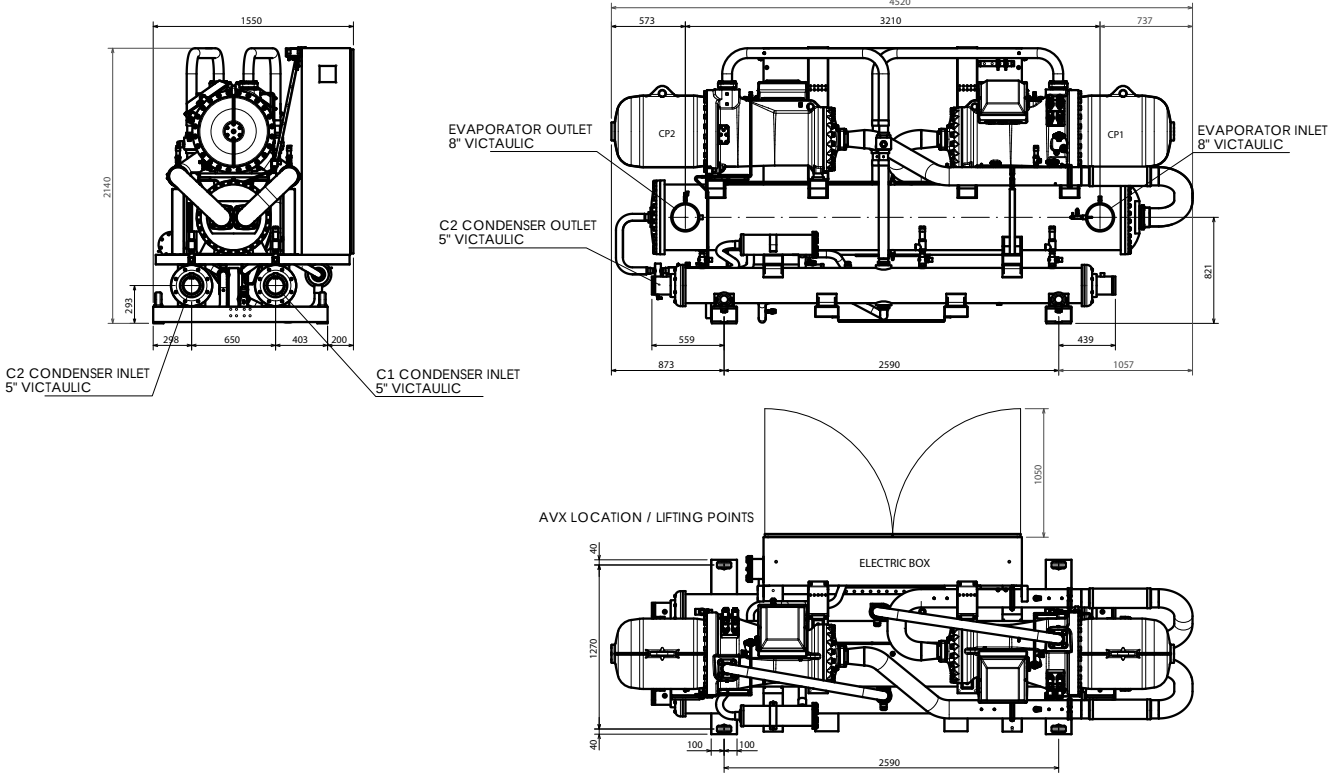
17.7. WF 4202 (mm)



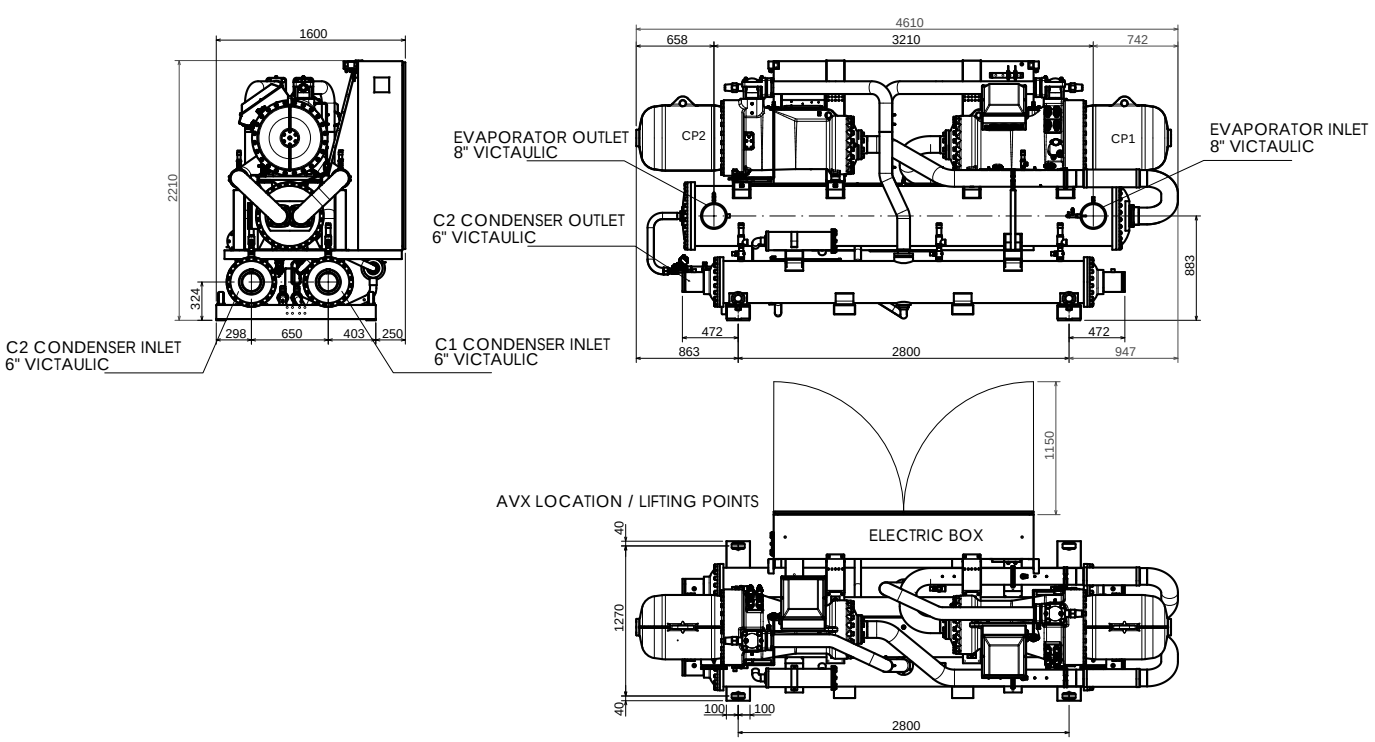
17.8. WF 4202 A - 4802 A (mm)



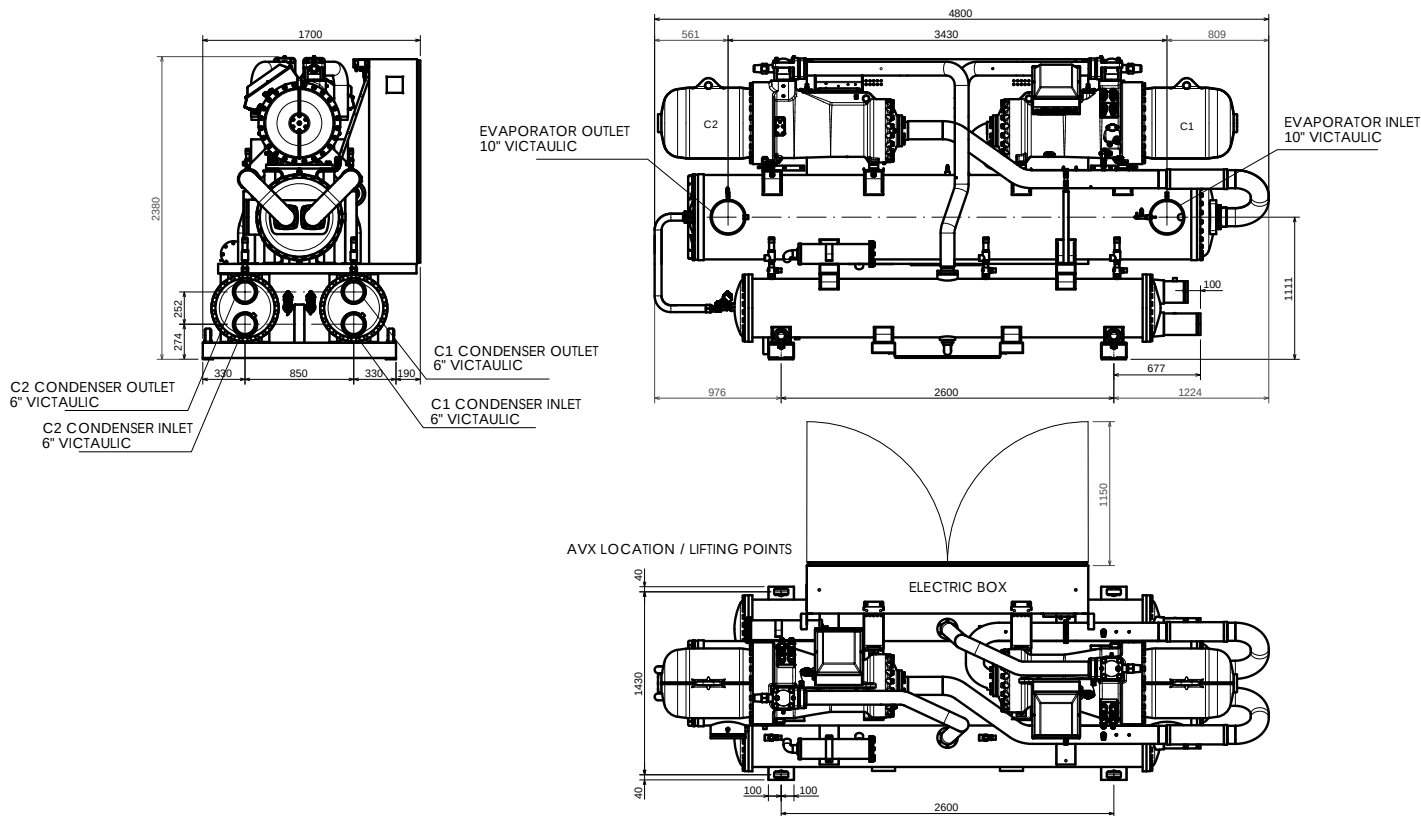
17.9. WF 4802 (mm)



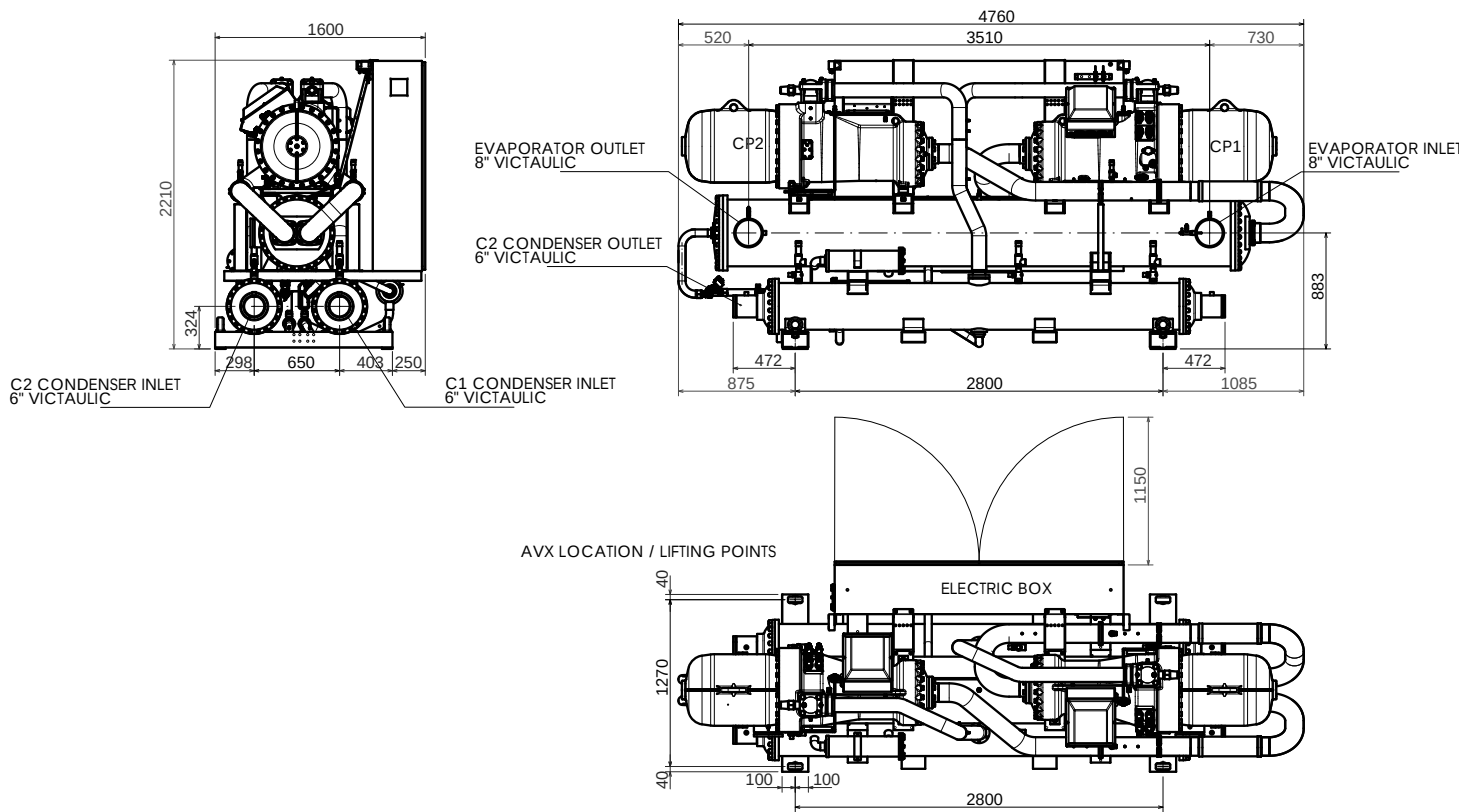
17.10. WF 5602 (mm)



17.12. WF 5602A - WF6402A (mm)



17.11. WF 6402 (mm)



18. HYDRAULIC CIRCUIT

The WF consists of a circuit with:

- **Evaporator (tube core exchanger)**
- **Condensers (tube core exchangers)**
- **Water inlet probe SIW**
- **Water outlet probe SUW**

18.1. EXTERNAL HYDRAULIC CIRCUIT RECOMMENDED

The selection and installation of components outside the WF should be carried out by the installer, who should work according to the technical code of practice and in compliance with the legislation in force in the country of destination (MD 329/2004). Before connecting the pipes make sure that they do not contain stones, sand, rust, slag or any foreign bodies that may damage the system. It is necessary to make a by-pass to the unit to be able to carry out the cleaning of the pipes without having to disconnect the machine. The connection pipes must be properly supported so as not to burden the unit with their weight. On the water circuit, it is advisable to install the following instruments, if not foreseen in the version you have:

1. Two pressure gauges of suitable size (input and output section).
2. Two anti-vibration couplings (input and output section).
3. Two shut-off valves (normal input section, output section calibrating valve).
4. Two thermometers (input and output section).
5. Expansion tanks

6. Pump
7. Accumulation tank
8. Flow switch
9. Safety valve
10. Charging unit
11. Water filter

It is necessary, that the water flow rate to the chiller unit complies with the values reported in the performance tables.

The systems loaded with anti-freeze or specific regulations, need the water backflow system.

Special supply/recovery water, is carried out with appropriate treatment systems.

18.2. SYSTEM LOAD

- Before starting the load, check that the system drain tap is closed.
- Open all the drain valves of the system and of the related terminals.
- Open the shut-off devices of the system.
- Start the filling by slowly opening the water system load cock placed outside the machine.
- When water begins to flow from the terminal vent valves, close them and continue loading up to read on the gauge the value of 1.5 bar.

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

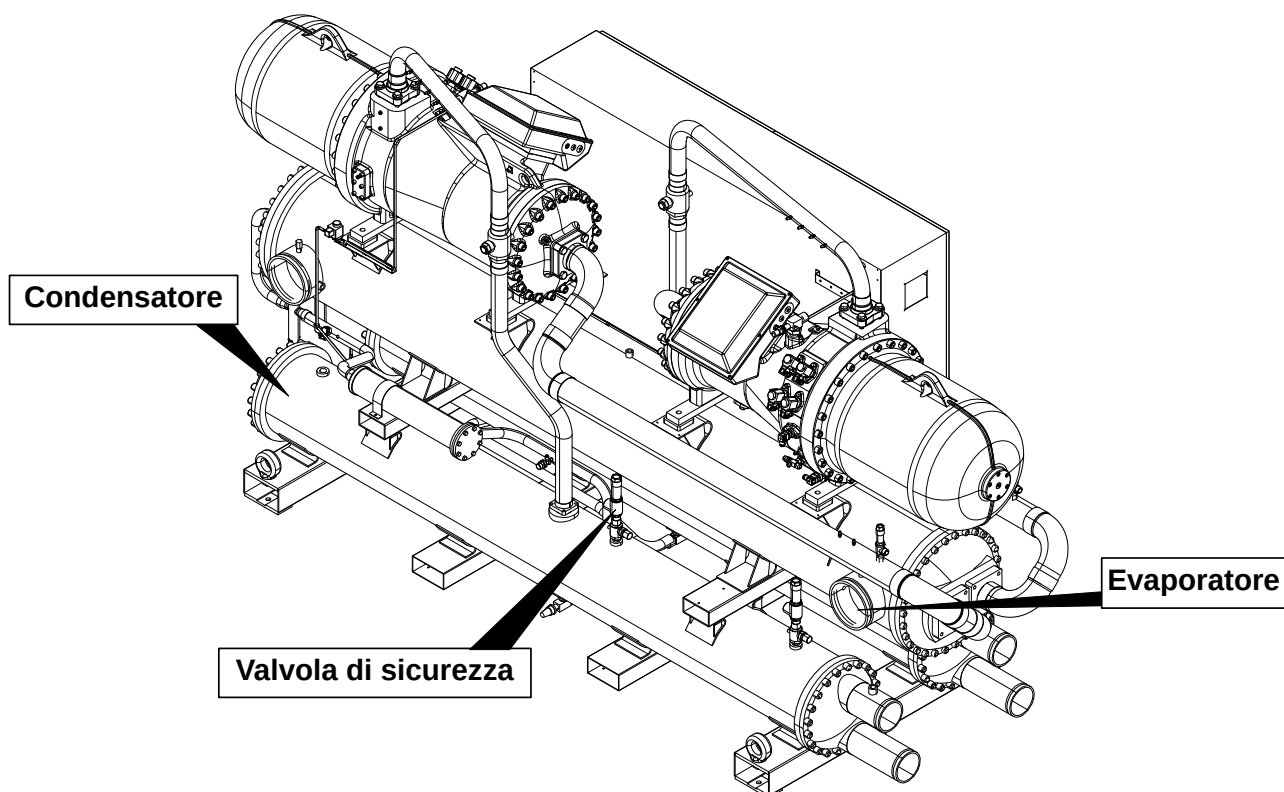
It is advisable to repeat this operation once the machine has worked for some hours and to periodically check the system

pressure, restoring if it drops below 1 bar. Check the hydraulic seal of the joints.

18.3. EMPTYING THE SYSTEM

- Before starting to drain the system, turn "off" the unit
- Check that the water system load/restore tap is closed
- Open the drain tap outside the machine and all the vent valves of the system and the corresponding terminals.

If the system uses glycol, this liquid should not be drained to the environment because it is a pollutant. It must be collected and, if possible, reused.



19. ELECTRICAL WIRINGS

WF chillers are completely wired in the factory and only need the connection to the electricity mains supply, downstream from a group switch, according to the regulations in force in the country where the machine is installed. It is also suggested to check:

- the mains supply characteristics, to ensure it is suitable for the levels indicated in the electrical data table, also taking into consideration any other equipment that may be operating at the same time.
- The unit is only powered after the last (hydraulic and electric) installations.
- Follow the connections instructions of the phase conductors, and earth.
- The power supply line will have a special protection upstream against short circuits and earth losses that sections the system according to other users.
- The voltage should be within a tolerance of $\pm 10\%$ of the rated supply voltage of the machine (for Three-phase units displacement max 3% between the phases). If these parameters are not respected, contact the energy supplier. For electrical wirings use isolated double cables according to the standards in force in the different countries.
- It is necessary to use a omnipolar thermomagnetic switch, in compliance with the CEI-EN standards (contact opening of at least 3 mm), with adequate switch capability and differential protection based on the followed electrical data table, installed as close as possible to the machine.
- It is necessary to carry out an efficient earth connection. The manufacturer can not be held responsible for any damage caused by the failure and ineffective earthing of the machine.
- For units with Three-phase power check the correct connection of the phases.

WARNING:

It is forbidden to use water pipes for the earthing of the machine.



All electrical operations must be carried out BY QUALIFIED PERSONNEL, IN ACCORDANCE WITH THE CORRESPONDING REGULATIONS, trained and informed about the risks related to such operations.



The characteristics of electric lines and related components must be established by PERSONNEL AUTHORISED TO DESIGN ELECTRIC INSTALLATIONS, following international regulations and the national regulations of the country in which the unit is installed, in compliance with the legislative regulations in force at the moment of installation.



For installation requirements, the wiring layout supplied with the unit must be compulsory referred to. The wiring layout together with the manuals must be kept in good conditions and readily ACCESSIBLE FOR FUTURE OPERATIONS ON THE UNIT.



It is compulsory to check the machine sealing before connecting the electrical wirings. The machine should only be powered once the hydraulic and electric operations are completed.

19.1. RECOMMENDED SECTION OF ELECTRIC CABLES

The cable sections indicated in the table are advised for a maximum length of 50 m.

WF	Vers.	U.M.	2502	2802	3202	3602	4202	4802	5602	6402
MAX RECOMMENDED LENGTH	All	MT	50 metres							
SECT. A (400V-3)	All	mm ²	240	2x150	2x185	2x240	3x185	3x240	4x240	5x240
SECT. B (400V-3)	All	mm ²	1.5							
EARTH (400V-3)	All	mm ²	120	150	185	240	2x150	2x185	2x240	3x240
1250IL (400V-3)	All	A	400	400	630	630	800	800	1000	1250

KEY

Sect. A: Power supply

Sect. B: Remote control.

Earth

IL: Main switch

For higher lengths or different types of cable installation, it will be the DESIGNERS responsibility to carefully measure the line main switch, the supply power line and the earthing protection connection, and the working connection cables:

- the length
- the type of cable
- Absorption of the unit and its physical position, and room temperature.

WARNING:
Check that all power cables are correctly secured to the terminals when switched on for the first time and after 30 days of use. Afterwards, check the connection of the power cables every six months. Slack terminals could cause the cables and components to overheat.

19.2. CONNECTION TO THE POWER SUPPLY

- Check there is no voltage on the electric line you want to use.

19.2.1. To access the electric box:

- Turn the electrical panel screws ¼ in counter-clockwise direction
- Turn the handle of the door-block disconnecting switch to OFF (see figure). In this way, the electrical panel can be accessed

19.3. ELECTRICAL POWER CONNECTION

- For functional connection of the unit take the supply power cable to the electrical panel inside the unit fig.1 in the previous page and connect it to the disconnecting switch terminals observing the phase, and the earth. fig.2

19.4. AUXILIARY CONNECTIONS AT THE USER/INSTALLER EXPENSE

For installation requirements for the auxiliary devices, **refer to the wiring diagram supplied with the device.** The wiring diagram together with the manuals must be kept in good conditions and readily ACCESSIBLE FOR FUTURE OPERATIONS ON THE UNIT.



Fig.2

Key fig. 2	
L1	Line 1
L2	Line 2
L3	Line 3
PE	Earth

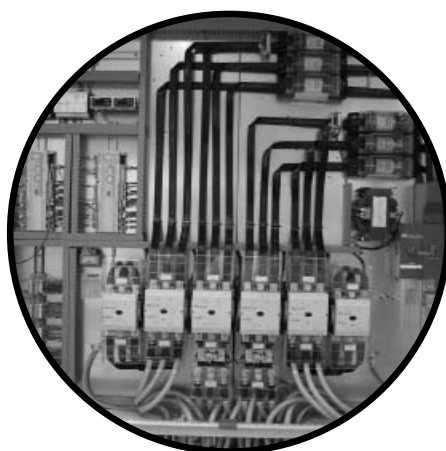
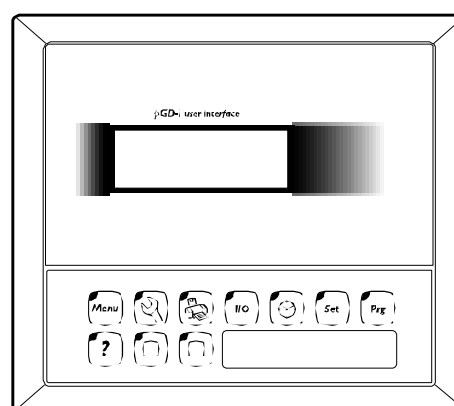


Fig.1

20. CONTROL AND FIRST START-UP

20.1. PREPARATION FOR COMMISSIONING

Bear in mind that a free start-up service is offered by the Aermec Technical Service for the unit of this series, at the request of Aermec customers or legitimate owners and in ITALY only. The start-up must be previously agreed on the basis of the system implementation times. Before the intervention of the AERMEC After Sales Service, all the operations (electrical and hydraulic hook ups, loading and breather from the system) must be completed.

Before starting the unit make sure that:

- All the safety conditions have been respected
- The unit has been properly fixed to the support base
- The minimum technical spaces have been observed;
- Water connections have been performed respecting the input and output
- The hydraulic system has been loaded and vented.
- The hydraulic circuit taps are open
- The electrical wirings have been properly carried out;
- The voltage is within a tolerance of 10% of the unit rated voltage
- The earthing has been carried out correctly
- Tightening of all electrical and hydraulic connections have been well carried out.

20.2. FIRST COMMISSIONING OF THE MACHINE

Before activating the unit:

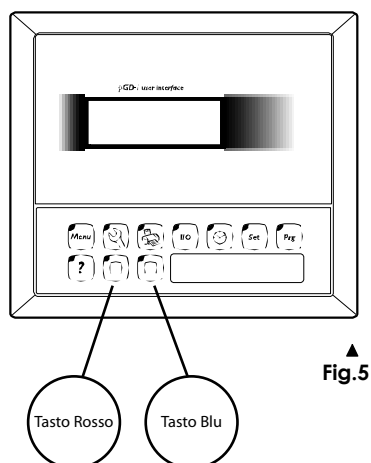
- Close the electric panel lid.
- Position the door-block disconnecting switch of the machine on ON, turning the handle down. **(fig.3)**
- Press the key ON to start the machine **(fig.4)**; when the access LED appears the unit is ready for the operation.

20.3. SEASON CHANGEOVER

- For each seasonal change check that the operation conditions return to the limit.
- Check that the absorption current of the compressor is less than the maximum indicated in the technical data table.
- Make sure that the voltage value are within the prefixed limits and that the displacements between the three phases (Three-phase supply power) do not get above 3%.

20.3.1. Season change of the panel on the machine

Put the unit in standby from the machine controls or the remote contact. To activate the season changeover, just press the keys indicated **(fig. 5)**. For further information refer to the USE manual.



WARNING

The first start-up has to be carried out with the standard settings, only when the test is finished the values of the operation Set Point vary. Before starting up, power the unit for at least 12-24 hours

by positioning the protection thermomagnetic switch and the door-block disconnecting switch on ON fig.1

Make sure that the control panel is turned off until it allows the oil heater system the compressor casing.

LED on

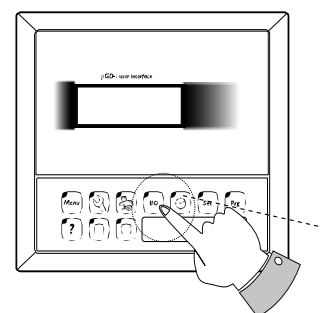
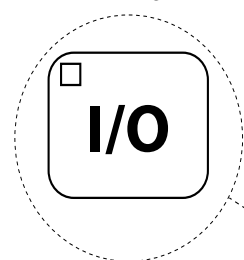
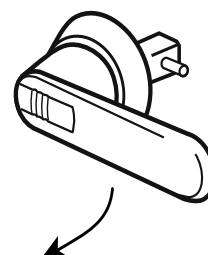


Fig.4

Fig.3



21. OPERATION CHARACTERISTICS

21.1. COOLING SET POINT

(Default defined) = 7°C, Δt = 5°C.

21.2. HEATING SET POINT

(Default defined) = 45°C, Δt = 5°C.

In case of restoring of the unit supplied power after a momentary interruption, the pre-set mode is maintained in memory.

21.3. COMPRESSOR START-UP DELAY

To prevent the compressor start too close to each other, two functions have been arranged.

- Minimum time from last turnoff
60 seconds.
- Minimum time from last start
300 seconds.

21.4. CIRCULATION PUMP

The electronic board provides an output to manage the circulation pump. After the first 10 seconds of pump operation, when the water flow rate is running,

activate the function of water flow rate alarm (flow switch).

21.5. ANTI-FREEZE ALARM

The anti-freeze alarm is active as if the machine is turned-off or if the machine is in standby mode. In order to prevent breakage of the plate-type exchanger due to freezing water contained, the compressor is locked (if the machine is turned on under 4° C) and the heater starts up (if standby below 5° C). If the temperature detected by the probe in the exchanger output and in the chiller input is below +4 ° C.

WARNING

THE ANTI-FREEZE SET TEMPERATURE CAN BE VARIED ONLY BY AN AUTHORISED SERVICE CENTRE AND ONLY AFTER VERIFYING THAT IN THE WATER CIRCUIT IS AN ANTIFREEZE SOLUTION.

The intervention of this alarm sets the compressor block and not of the pump block, which remains active, and the heater starts up if installed.

For resetting the normal functions, the water output temperature has to be over +4 ° C, the reset is manual.

WARNING:

AT ANY INTERVENTIONS OF THIS ALARM IT IS RECOMMENDED TO IMMEDIATELY CONTACT THE NEAREST TECHNICAL SERVICE ASSISTANCE

21.6. WATER FLOW RATE ALARM

The PRV3 provides the management of a water flow rate alarm commanded from a flow switch installed on the machine as standard. This safety type can occur after the first 10 seconds of operation of the pump if the water flow rate is not sufficient.

This alarm sets the block of the compressor and the pump.

WARNING

Inspection, maintenance and possible repair operations must be carried out only by an authorised technician according to the law.

Unsuitable check/maintenance operation may cause damage to things and people.

For machines installed near the sea the maintenance intervals must be halved.

22. REGULAR MAINTENANCE

Any cleaning operation is forbidden before disconnecting the unit from the power supply.

Check for voltage before operating.

Periodic maintenance is essential to maintain the unit in perfect working order under the functional as well as the energetic aspect.

Therefore it is essential to provide yearly controls for the:

22.6.1. Hydraulic circuit

CONTROL:

- Water circuit filling
- Water filter cleaning
- Flow switch control
- Air in the circuit (leaks)
- That the water flow rate to the evaporator is always constant
- The hydraulic piping thermal insulation state
- Where provided the percentage of glycol

22.6.2. Electric circuit

CONTROL:

- Efficiency of safety devices
- Electrical power supply
- Electrical power consumption
- Connections tightened
- Compressor casing heater operation

22.6.3. Cooling circuit

CONTROL:

- Compressor conditions
- Efficiency of the tube core exchanger heater
- Working pressure
- Loss test for the control of the the cooling circuit sealing
- High and low pressure switches operation
- Perform the necessary checks on the filter-drier to verify their efficiency.

22.6.4. Mechanical controls

CONTROL:

- The screws, compressors and the electric box of the unit external panning are properly tightened. If they are poorly tightened, they produce abnormal noise and vibrations
- The structure conditions.
If necessary, treat oxidised parts with paints suitable for eliminating or reducing oxidation.

23. EXTRAORDINARY MAINTENANCE

The WF are loaded with R134A gas and tested in the factory. In normal conditions, no Technical Assistance Service operation is needed for the refrigerant gas check. In the long run, however,

small leaks from the joints may arise. Due to these leaks, the refrigerant comes out and the circuit is drained, causing the unit to malfunction. In these cases, the refrigerant leakage points are found and repaired, and the cooling circuit is recharged, operating in compliance with Law 28 December 1993 no. 549.

23.6.1. Loading procedure

The loading procedure is as follows:

- Empty and dehydrate the entire cooling circuit using a vacuum pump connected to both the low and high pressure test points, until the vacuum gauge reads about 10 Pa. Wait some minutes and check that this value does not go back again over 50 Pa.
- Connect the refrigerant gas bomb or a load cylinder to the grip on the low-pressure line.
- Charge the amount of refrigerant gas indicated on the characteristics plate of the machine.
- After any operation control that the liquid indicator indicates a dry

- circuit (dry-green) In case of partial loss the circuit has to be emptied completely before reloading it.
- The refrigerant R134a has to be loaded only in liquid phase.
 - Different operating conditions from the normal can result in different values.
 - Leak testing or leaking research must be carried out only by using refrigerant gas R134a by checking with a suitable leak detection.
 - It is prohibited to use oxygen or acetylene or other flammable or poisonous gas in the cooling circuit, because they can cause explosions or intoxication.



It is advisable to keep a machine booklet (not supplied, but provided by the user), in order to keep trace of the operations carried out on the unit. In this way, it will be easier to organise the operations properly and facilitate failure prevention and troubleshooting in the machine. In the booklet, write down date, type of operation carried out (regular maintenance, inspection or repair), description of the operation, measures taken...



It is forbidden to CHARGE the cooling circuits with a refrigerant different from the one indicated. If a different refrigerant gas is used, the compressor may be seriously damaged.



DISPOSAL

Provided that the disposal of the unit is carried out according to the rules in force in different countries.



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