

WPHBA HE | WPHA HE

Heat pump

Cooling only

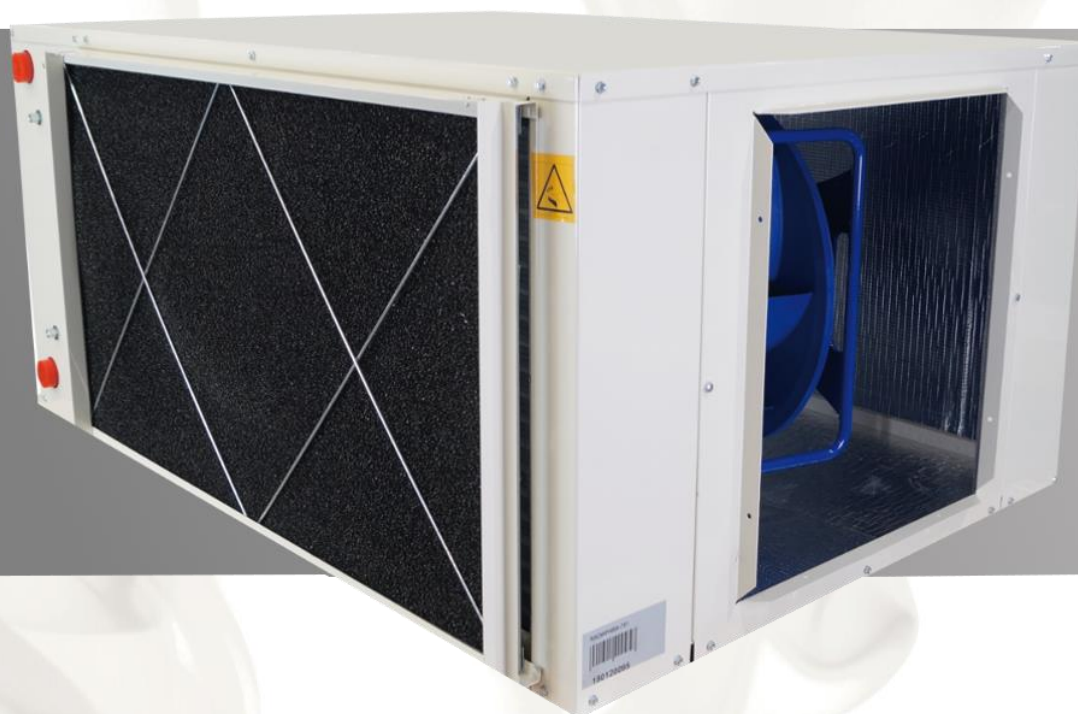
HORIZONTAL WATER-AIR COMPACT PACKAGED UNITS

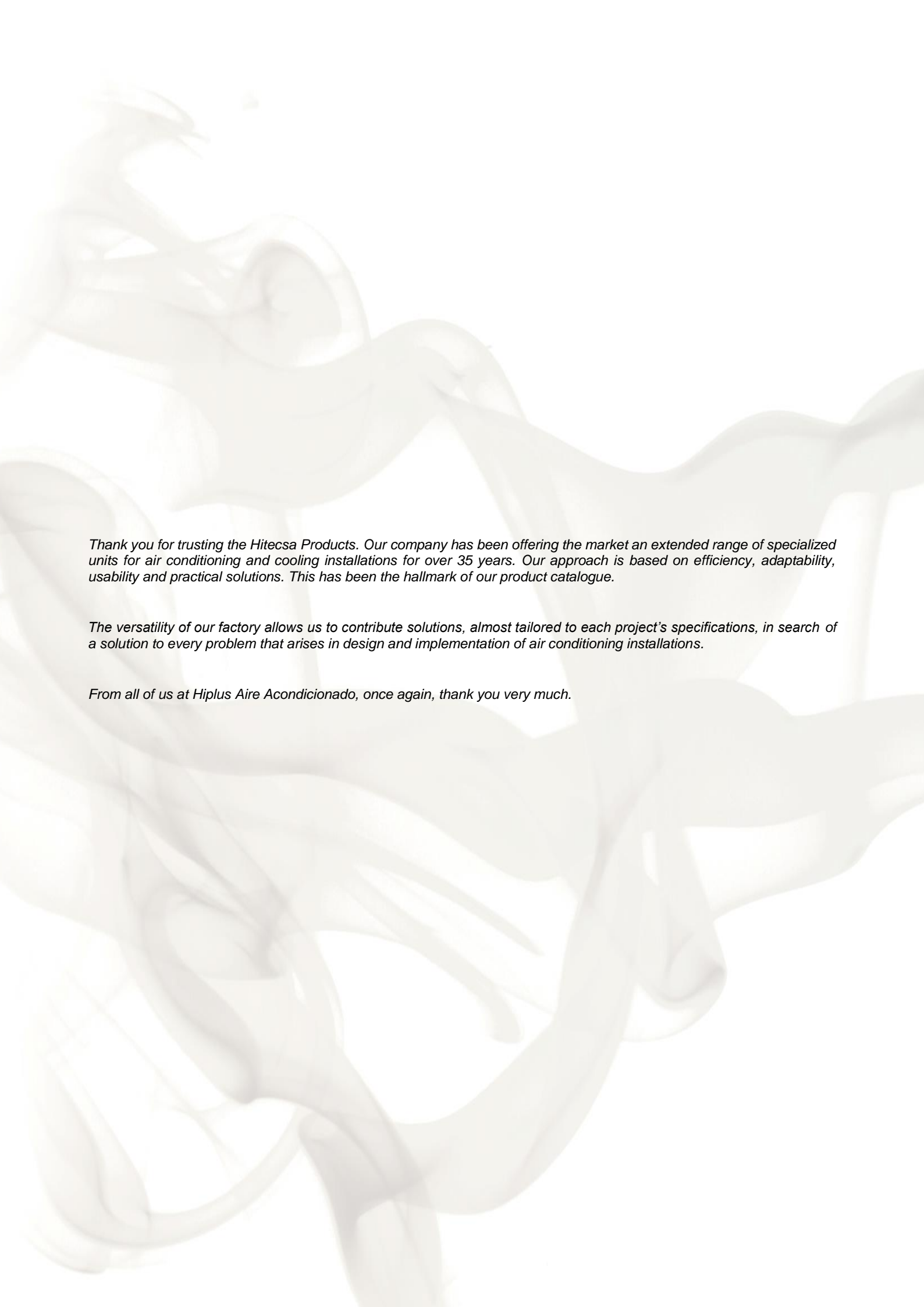


Models: 091 | 121 | 141 | 171 | 201 | 251 | 351 | 401 | 501 | 701 | 751 | 1001 | 1201

Cooling capacity: from 2.4 to 41.0 kW

Heating capacity: from 2.3 to 37.9 kW





Thank you for trusting the Hitecsa Products. Our company has been offering the market an extended range of specialized units for air conditioning and cooling installations for over 35 years. Our approach is based on efficiency, adaptability, usability and practical solutions. This has been the hallmark of our product catalogue.

The versatility of our factory allows us to contribute solutions, almost tailored to each project's specifications, in search of a solution to every problem that arises in design and implementation of air conditioning installations.

From all of us at Hiplus Aire Acondicionado, once again, thank you very much.

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INTRODUCTION

Purpose of this Manual

This manual and any other attached instructive document such as refrigeration lines drawings, electrical diagrams, etc. have been issued to allow a correct installation, commissioning and maintenance of the unit. Therefore it is essential to read the instructions carefully.



Verify that all the necessary information for the correct installation of the system is included in the manuals that have been supplied with this unit and/or the rest of the indoor units, accessories, etc. The manufacturer declines any responsibility for any damage to people, animals or material resulting from an incorrect use of the unit and/or failure to observe these instructions.

In case of different interpretations and/or errors, the documentary priority will be: 1. Characteristics plate of the unit, 2. IOM (this document), 3. EDM, technical catalogue, 4. UM user manuals.

Conservation of the Manual

This manual and the electric diagram of the unit must be retained and remain available to the operator for any further consultation.

Updating the Data

The continuous improvement in design and performance to which we are committed to gives us the right to modify the specifications of our products without prior notice.

Electrical Supply



Check that the electrical network features are in accordance to the data stated in the data nameplate of the unit.

Local Safety Regulations

Observe and analyse all possible causes of accidents that may arise in the place or places of installation of the units, control the medium and tools that will be use, etc. It is impossible to anticipate each of the potential circumstances of danger in this manual. Respect the valid local security standards during installation.

Principles of Security on the Installation

The unit has been designed and built so that it does not represent any risk to the health and safety of people. Appropriate solutions for the project have been adopted to eliminate the possible causes of risk in the installation.

Packaging and Replacement of Equipment



The material of the package (plastic bags, insulating materials, nails, etc.) is a potential source of danger. Consequently, it should be kept out of the reach of children and properly recycled according to the valid local safety regulations.

This product should not be mixed with household waste at the end of its life. Due to the refrigerant, oil and other components contained in this product, it must be dismantled by professional installers, all waste should be sent, according to its nature to recycling, composting or treatment plants, or an authorized management agency in accordance with current local legislations.

Utilization

The unit will be used only for the purpose it has been designed. Any other use does not imply any kind of compromise or obligation from the manufacturer.

INTRODUCTION

Incorrect Operation

In case of breakdowns or operation faults, turn off unit.

Periodic Inspections and Maintenance



Carry out periodic inspections to detect possible damaged or broken pieces. If they are not repaired it could cause damage to people or stuff. Before executing any maintenance operation, cut off the unit power supply.

Make sure to leave the maintenance areas open. If these areas have to be necessarily invaded by the construction of air supply and/or lateral return ducts. Verify that the design of the ducts allow the access to the fans and the change of the filters or that these are accessible from the other lateral.

All operations shall be carried out in accordance with local safety regulations.

Repairing Operations



The reparations shall be always and exclusively made by trained personal authorized by the manufacturer using original spares. The safety devices of the unit could be affected when failing to comply with these warnings.

Modifications

The manufacturer will not respond to the warranty and to the possible damages of the unit in case of electrical and/or mechanical modifications. The unauthorized manipulation, reparation or modification of the unit will automatically invalidate the warranty.

Refrigerant

This product is hermetically sealed and contains R-410A which is a HFC fluorinated greenhouse gas.

This product is hermetically sealed and its operation depends on the use of R-410A which is a HFC fluorinated greenhouse gas.

REGULATIONS AND CERTIFICATIONS

ISO 9001 CERTIFICATION: HIPLUS AIRE ACONDICIONADO S.L., trying always to find the maximum satisfaction of costumers, has obtained the ISO 9001: Quality System referred to its production activity. This will result in a continuous determination to improve quality and reliability of all our products; commercial activities, design, raw materials, production and after-sales service, are the means to reach our goal.

CE MARKING: Our equipment are CE marked, in conformity with the essential requirements of the applicable EC directives and their last modifications as well as with the national legislation of each country.



SAFETY PRECAUTIONS



Before starting any installation, service or maintenance operation, turn off the main power switch in order to avoid electrical shock that may cause personal damages.

In case of folding electrical panels, before folding them up in order to access to the interior of the machine, it is **MANDATORY** to disconnect the power supply hose from the electrical voltage, **IT MUST ALWAYS BE FREE OF VOLTAGE** for this operation.



DANGER

- Do not touch or adjust the safety elements inside of any unit of the system. In repairs use only original spare parts and install them properly in the same position where old parts were placed.
- The installation and maintenance of air conditioning equipment could be dangerous because the system is under pressure, some of its elements have high temperatures and include electrical components.
- Do not install the unit into an explosive atmosphere.
- If it was necessary to open the electrical panel and access the inside of the machine it is **MANDATORY** to disconnect the power supply hose from the machine. It **MUST BE FREE OF VOLTAGE** for this operation.
- It is generally forbidden to carry out work on electrical live parts. Protection class of the device when it is complete opened is IP00! Beware, do not touch any hazardous voltage parts directly.
- Check the safe isolation from the supply using a two-pole voltage detector.
- Even after disconnecting the main voltage, life-threatening charges may exist between the protective ground "PE" and the main connection.
- Units with water-air, water-water or refrigerant-water heat exchangers must be conveniently protected from breaks by freezing when the room temperature can reach values lower than 5 °C.

In this case, it is mandatory heat, remove completely the water or add antifreeze to ensure that the freezing point is always lower than the room temperature.



WARNING!

The warranty of the unit will not respond to the damages caused by frozen water.

- **When the motor runs independently due to air flowing through or if it continues to run down after being turned off**, dangerous voltages of over 50 V can arise on the internal connections of the motor through operation of the generator.
- When there are EC motors or motors with variable speed control, the protective earth is conducting high discharge currents (depending on the switching frequency, current source voltage and motor capacity). Earthing in compliance with EN specifications shall therefore be observe even for testing and trial conditions (EN 50 178, Art. 5.2.11). Without earthing, dangerous voltages can be present on the motor housing.
- Through use of capacitors, danger of death exists even after switching off the device in case of direct contact with conductive parts or with parts that carry voltage due to fault condition. It is only allowed remove or open the housing of the controller when the power supply cable is disconnected and after a waiting time of 3 minutes.

SAFETY PRECAUTIONS



ATTENTION!

- Only qualified and trained service staff (technical service) must make the installation, commissioning and carry out maintenance works. Unqualified personnel can only make basic tasks such as cleaning and replacement of filters, etc.
- Prevent access to children so they cannot play with the appliances.
- In every visit, all precautions must be taken into account: those recommended in the installation, operation and maintenance instructions, as well as the ones indicated in labels of the unit. Do not forget to strictly follow any other safety precautions.
- DO NOT introduce objects into the air inlets or outlets that can be drawn into the fan, people, etc.
- Use safety glasses, work gloves and any other safety accessory necessary.
- The fan / motor may switch on and off automatically for functional reasons.
- After power failure or main disconnection an automatic restart of the fan takes place after voltage return!
- Wait for the fan to come to a complete standstill before approaching it!
- In the AC external rotor motor the external rotor turns during operation!
- For brazing operations use a quenching cloth and take precautions to have at close distance a fire extinguisher.
- This product contains fluorinated greenhouse gases, its leakage can cause displacement of air and cause insufficient oxygen to breath.
The decomposition of fluorinated gases when being burned due to e.g. brazing operations, may cause the existence of highly toxic and corrosive gases.
- **Must follow all safety recommendations.**



WARNING!

The responsibility of all personal and material damages caused by an unplanned or inappropriate use will be on the person or operating company of the unit, and will not be on its manufacturer.

Product precautions

The equipment accomplishes the current technical standards at the moment of its delivery and basically it is considered secure. The unit and its corresponding accessories should only be assembled and operate if they are in perfect conditions and in agreement with the instructions manual of the manufacturer. Utilizations which are not in accordance with the technical specifications of the unit (Name plate and appendix / technical data) might cause defects and other kind of damages.

TECHNICAL SPECIFICATIONS

VERNE HE RANGE		091	121	141	171	201
WPHA / WPHBA						
COOLING CAPACITIES (1)						
Nominal cooling capacity (1)	kW	2.36	3.18	3.86	4.82	5.83
Power input (1)	kW	0.72	0.94	1.06	1.11	1.56
EER Coefficient (1)	kW / kW	3.3	3.37	3.64	4.35	3.75
SEER Coefficient (1)	kW / kW	2.94	3.06	3.03	3.74	3.35
$\eta_{s,c}$ (1)	-	109.5	114.4	113.3	141.8	126.1
Water flow	m ³ /h	0.5	0.67	0.81	1.01	1.23
Pressure drop	kPa	8.3	14.3	20.3	17.3	24.9
COOLING CAPACITIES (2)						
Nominal cooling capacity (2)	kW	2.64	3.56	4.33	5.38	6.51
Power input (2)	kW	0.52	0.68	0.76	0.83	1.12
EER Coefficient (2)	kW / kW	5.11	5.24	5.69	6.49	5.82
SEER Coefficient (2)	kW / kW	3.7	3.87	3.82	4.55	4.23
$\eta_{s,c}$ (2)	-	139.8	146.7	144.6	174.2	161.2
Water flow	m ³ /h	0.56	0.75	0.91	1.13	1.37
Pressure drop	kPa	10.3	17.6	25.2	21.3	30.4
WPHBA (Heat pump units)						
HEATING CAPACITIES (3)						
Heating capacity (3)	kW	2.26	3.16	3.86	4.56	5.75
Power input Heat (3)	kW	0.68	0.85	1.12	1.04	1.44
COP Coefficient (3)	kW / kW	3.31	3.72	3.46	4.37	4.0
SCOP Coefficient (3)	kW / kW	2.87	3.22	2.99	3.78	3.22
$\eta_{s,h}$ (3)	-	106.7	120.8	111.5	143.4	130.7
Water flow	m ³ /h	0.47	0.66	0.8	0.96	1.23
Pressure drop	kPa	7.4	13.9	19.9	15.8	24.9
HEATING CAPACITIES (4)						
Heating capacity (4)	kW	1.76	2.47	3.03	3.57	4.49
Power input Heat (4)	kW	0.6	0.75	0.99	0.96	1.28
COP Coefficient (4)	kW / kW	2.91	3.27	3.05	3.72	3.52
SCOP Coefficient (4)	kW / kW	2.52	2.83	2.63	3.22	3.05
$\eta_{s,h}$ (4)	%	92.8	105.2	97.1	120.7	113.9
Water flow	m ³ /h	0.36	0.51	0.62	0.75	0.97
Pressure drop	kPa	4.5	8.6	12.4	10.0	16.1

- 1) **Nominal conditions. Refrigeration tower:** Indoor air 27/19 °C. Condenser water: inlet 30 °C / outlet 35 °C (Inlet partial loads 26/22/18).
- 2) **Geothermal conditions:** Indoor air 27/19 °C. Condenser water: inlet 10 °C / outlet 15 °C (Inlet partial loads 10/10/10).
- 3) **Underground water conditions:** Indoor air 20 °C. Evaporator water: inlet 10 °C, unit water flow 100 % outlet 4) 7 °C.
- 5) **Brine conditions:** Indoor air 20 °C. Evaporator water: inlet 0 °C, unit water flow 100 % outlet -3°C.

TECHNICAL SPECIFICATIONS

VERNE HE RANGE		091	121	141	171	201
REFRIGERANT						
Type	-	R-410A				
Global warming potential (GWP) (5)	-	2088				
Refrigerant load WPHA	kg	0.4		0.5		0.55
Refrigerant load WPHBA	kg	0.7	0.6	0.9	1.5	1.2
COMPRESSOR						
Type	-	Rotary				
Quantity	-	1				
Voltage	V / ~ / Hz	230 / I+N / 50				
Oil type	-	ESTER VG74		POE	ESTER VG74	
Oil quantity in compressor	L	0.35	0.40	0.44	0.48	0.62
EVAPORATOR FAN						
Type	-	Radial with EC motor				
Quantity	-	1				
Size	mm	190		250		
Nominal air flow	m ³ /h	500	600	700	900	1100
Static pressure available	Pa	25				
Maximum pressure available	Pa	515	410	300	760	700
Motor nominal Capacity	kW	0.2		0.5		
Nominal speed	r.p.m.	2500	2924	3365	1368	1640
Power supply	V / ~ / Hz	230 / I+N / 50				
INDOOR HEAT EXCHANGER						
Type	-	Coil with aluminium fins and copper pipes				
Frontal area	m ²	0.165			0.188	
Fin slot	mm - (")	2.1 - 3/8"				
OUTDOOR HEAT EXCHANGER						
Type	-	Brazen plates				
Quantity	-	1				
Water connections (gas male screw)	(")	3/4"				
Number of plates	-	16			22	
ELECTRICAL DATA						
Voltage	V / ~ / Hz	230 / I + N / 50				
Maximum current input	A	5.78	7.18	8.28	9.63	12.63
Start-up current	A	20.98	22.98	35.68	28.13	45.03
DIMENSIONS AND WEIGHT						
Length	mm	1055				
Width	mm	560				
Height	mm	410			470	
Conduit	mm x mm	225x225			236x296	
Weight	kg	60	62	65	75	77
SOUND LEVEL						
Total sound power (Lw)	dB (A)	72		73	71	

- 6) **GWP:** Global warming potential (climatic) of 1 kg of greenhouse gas relative to 1 kg of CO₂, calculated in terms of 100-year warming potential.

TECHNICAL SPECIFICATIONS

VERNE HE RANGE		251	351	401	501
WPHA / WPHBA					
COOLING CAPACITIES (1)					
Nominal cooling capacity (1)	kW	7.47	11.31	13.06	16.61
Power input (1)	kW	1.78	2.85	3.24	3.44
EER Coefficient (1)	kW / kW	4.19	3.97	4.03	4.82
SEER Coefficient (1)	kW / kW	3.77	3.61	3.6	4.5
$\eta_{s,c}$ (1)	-	142.7	136.4	136	172.2
Water flow	m ³ /h	1.57	2.38	2.75	3.5
Pressure drop	kPa	14.5	31.3	40.9	21.3
COOLING CAPACITIES (2)					
Nominal cooling capacity (2)	kW	8.35	12.66	14.62	18.55
Power input (2)	kW	1.33	2.05	2.33	2.49
EER Coefficient (2)	kW / kW	6.3	6.18	6.29	7.46
SEER Coefficient (2)	kW / kW	4.63	4.58	4.56	5.69
$\eta_{s,c}$ (2)	-	177.2	175.1	174.6	219.8
Water flow	m ³ /h	1.76	2.67	3.08	3.91
Pressure drop	kPa	17.9	38.8	50.5	26.2
WPHBA (Heat pump units)					
HEATING CAPACITIES (3)					
Heating capacity (3)	kW	7.47	11.61	13.44	15.22
Power input Heat (3)	kW	1.71	3.33	3.08	3.17
COP Coefficient (3)	kW / kW	4.38	3.48	4.36	4.8
SCOP Coefficient (3)	kW / kW	3.8	3.02	3.77	4.16
$\eta_{s,h}$ (3)	-	144	112.9	142.8	158.6
Water flow	m ³ /h	1.54	2.4	2.8	3.5
Pressure drop	kPa	14.0	31.8	42.3	21.3
HEATING CAPACITIES (4)					
Heating capacity (4)	kW	5.86	9.11	10.55	11.89
Power input Heat (4)	kW	1.56	2.97	2.74	2.82
COP Coefficient (4)	kW / kW	3.76	3.07	3.84	4.22
SCOP Coefficient (4)	kW / kW	3.26	2.66	3.32	3.66
$\eta_{s,h}$ (4)	-	122.2	98.3	124.7	138.4
Cold Water flow	m ³ /h	1.2	1.88	2.2	2.76
Pressure drop	kPa	8.8	20.3	27.1	13.7

- Nominal conditions. Refrigeration tower:** Indoor air 27/19 °C. Condenser water: inlet 30 °C / outlet 35 °C (Inlet partial loads 26/22/18).
- Geothermal conditions:** Indoor air 27/19 °C. Condenser water: inlet 10 °C / outlet 15 °C (Inlet partial loads 10/10/10).
- Underground water conditions:** Indoor air 20 °C. Evaporator water: inlet 10 °C, unit water flow 100 % outlet 7 °C.
- Brine conditions:** Indoor air 20 °C. Evaporator water: inlet 0 °C, unit water flow 100 % outlet -3°C.

TECHNICAL SPECIFICATIONS

VERNE HE RANGE		251	351	401	501
REFRIGERANT					
Type	-	R-410A			
Global warming potential (GWP) (5)	-	2088			
Refrigerant load WPHA	kg	0.7	0.8		2
Refrigerant load WPHBA	kg	1.7	1.8	2.8	3.8
COMPRESSOR					
Type	-	Rotatory	Scroll		
Quantity	-	1			
Power supply	V / ~ / Hz	230/1+N/50	400/3/50		
Oil type	-	ESTER VG74	PVE		
Oil quantity in compressor	L	0.62	1.33	1.57	
EVAPORATOR FAN					
Type	-	Radial with EC motor			
Quantity	-	1			
Size	mm	310			400
Nominal air flow	m ³ /h	1500	2000	2300	2800
Static pressure available	Pa	25	37	50	
Maximum pressure available	Pa	1050	1630	1580	1150
Motor nominal Capacity	kW	1.35	2.5		2.4
Nominal speed	r.p.m	1190	1558	1777	1044
Power supply	V / ~ / Hz	230/1+N/50	400/3/50		
INDOOR HEAT EXCHANGER					
Type	-	Coil with aluminium fins and copper pipes			
Front surface	m ²	0.252			0.45
Fin slot	mm - (")	1.8 - 3/8"	1.8 - 3/4"	1.8 - 3/8"	2.1 - 3/8"
Oil type	-	PVE			POE
Oil quantity in compressor	L	1.57	2.46		3.31
OUTDOOR HEAT EXCHANGER					
Type	-	Brazen plates			
Quantity	-	1			
Water connections (gas male screw)	"	3/4"			1 1/4"
Number of plates	-	42			32
ELECTRICAL DATA					
Power supply	V / ~ / Hz	230/1+N/50	400/3+N/50		
Maximum current input	A	17.4	11.0	9.24	13.39
Start-up current	A	65.3	52.84	62.04	73.79
DIMENSIONS AND WEIGHT					
Length	mm	1135			1385
Width	mm	670			940
Height	mm	530			620
Conduit	mm x mm	350x350			450x500
Weight	kg	90	110	115	160
SOUND LEVEL					
Total sound power (Lw)	dB (A)	71	68	70	68

5) **GWP:** Global warming potential (climatic) of 1 kg of greenhouse gas relative to 1 kg of CO₂, calculated in terms of 100-year warming potential.

TECHNICAL SPECIFICATIONS

VERNE HE RANGE		701	751	1001	1201
WPHA					
COOLING CAPACITIES (1)					
Nominal cooling capacity (1)	kW	20.11	25.44	34.06	40.05
Power input (1)	kW	4.43	5.81	7.32	8.92
EER Coefficient (1)	kW / kW	4.54	4.38	4.66	4.49
SEER Coefficient (1)	kW / kW	4.27	4.05	4.28	4.11
$\eta_{s,c}$ (1)	%	162.7	154	163	156.4
Water flow	m ³ /h	4.23	5.36	7.17	8.43
Pressure drop	kPa	30.3	46.9	34.4	46.5
COOLING CAPACITIES (2)					
Nominal cooling capacity (2)	kW	22.46	28.44	38.09	44.8
Power input (2)	kW	3.2	4.18	5.42	6.39
EER Coefficient (2)	kW / kW	7.02	6.81	7.03	7.01
SEER Coefficient (2)	kW / kW	5.4	5.14	5.28	5.23
$\eta_{s,c}$ (2)	%	208	197.7	203.3	201.1
Water flow	m ³ /h	4.73	5.99	8.02	9.43
Pressure drop	kPa	37.2	57.6	42.4	57.2
WPHBA (Heat pump units)					
HEATING CAPACITIES (3)					
Heating capacity (3)	kW	18.57	24.79	32.42	37.9
Power input Heat (3)	kW	3.96	5.63	7.27	8.59
COP Coefficient (3)	kW / kW	4.69	4.41	4.46	4.41
SCOP Coefficient (3)	kW / kW	4.07	3.82	3.86	3.81
$\eta_{s,h}$ (3)	%	154.9	144.7	146.3	144.6
Water flow	m ³ /h	4.31	5.73	7.45	8.68
Pressure drop	kPa	31.3	53.1	37.0	49.0
HEATING CAPACITIES (4)					
Heating capacity (4)	kW	14.51	19.4	25.41	29.73
Power input Heat (4)	kW	3.52	5	6.66	7.65
COP Coefficient (4)	kW / kW	4.13	3.88	3.82	3.89
SCOP Coefficient (4)	kW / kW	3.58	3.36	3.3	3.35
$\eta_{s,h}$ (4)	%	135.1	126.2	123.9	126.1
Cold water flow	m ³ /h	3.4	4.53	5.97	7.04
Pressure drop	kPa	20.2	34.4	24.5	33.3

- 1) **Nominal conditions. Refrigeration tower:** Indoor air 27/19 °C. Condenser water: inlet 30 °C / outlet 35 °C (Inlet partial loads 26/22/18).
- 2) **Geothermal conditions:** Indoor air 27/19 °C. Condenser water: inlet 10 °C / outlet 15 °C (Inlet partial loads 10/10/10).
- 3) **Underground water conditions:** Indoor air 20 °C. Evaporator water: inlet 10 °C, unit water flow 100 % outlet 7 °C.
- 4) **Brine conditions:** Indoor air 20 °C. Evaporator water: inlet 0 °C, unit water flow 100 % outlet -3°C.

TECHNICAL SPECIFICATIONS

VERNE HE RANGE		701	751	1001	1201
REFRIGERANT					
Type	-	R-410A			
Global warming potential (GWP) (5)	-	2088			
Refrigerant load WPHA	kg	1.6	1.7	2.4	3
Refrigerant load WPHBA	kg	4	4.2	6.1	6.3
COMPRESSOR					
Type	-	Scroll			
Quantity	-	1			
Power supply	V / ~ / Hz	400/3/50			
Oil type	-	PVE			POE
Oil quantity in compressor	L	1.57	2.46		3.31
EVAPORATOR FAN					
Type	-	Radial with EC motor			
Quantity	-	1			
Size	mm	400		450	
Nominal air flow	m ³ /h	3400	4300	6200	7000
Static pressure available	Pa	50	62	75	75
Maximum pressure available	Pa	1100	975	580	400
Motor nominal Capacity	W	2.4		2.0	
Nominal speed	r.p.m.	1242	1509	1476	1643
Power supply	V / ~ / Hz	400/3/50			
INDOOR HEAT EXCHANGER					
Type	-	Coil with aluminium fins and copper pipes			
Frontal area	m ²	0.45		0.84	
Fin slot	mm - "	2.1 - 3/8"			
OUTDOOR HEAT EXCHANGER					
Type	-	Brazed plates			
Quantity	-	1			
Water connections (gas male screw)	"	1 1/4"			
Number of plates	-	32		52	
ELECTRICAL DATA					
Voltage	V / ~ / Hz	400 / 3+N / 50			
Maximum current input	A	17.89	19.64	23.01	26.12
Start-up current	A	90.79	128.74	128.51	150.42
DIMENSIONS AND WEIGHT					
Length	mm	1385		1930	
Width	mm	940		1040	
Height	mm	620		690	
Conduit	mm x mm	450x500		550x550	
Weight	kg	160	180	230	250
SOUND LEVEL					
Total sound power (Lw)	dB (A)	74	76	78	79

5) **GWP:** Global warming potential (climatic) of 1 kg of greenhouse gas relative to 1 kg of CO₂, calculated in terms of 100-year warming potential.

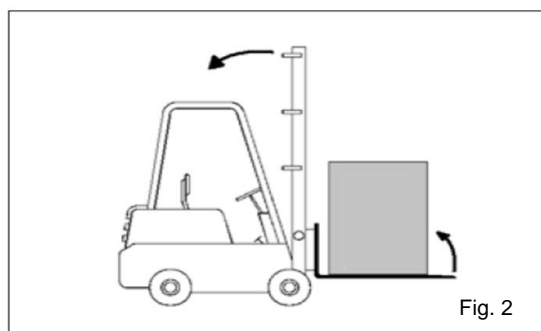
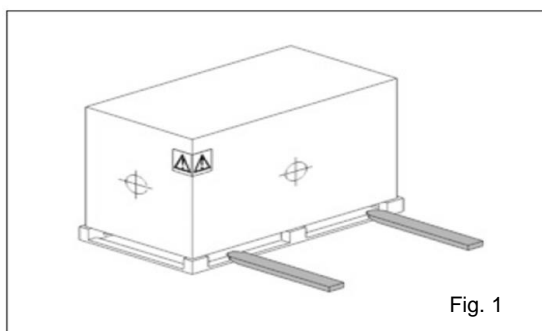
TRANSPORT & RECEPTION

INSPECTION AT RECEPTION

- It is advisable to examine the equipment carefully at the time of its reception.
- Check that the equipment has not been damaged during transport and has been supplied complete with all parts specified in the order and/or with the optional specified in the order. If this is not the case contact the transport company immediately. (First 48h)
- Verify the correct voltage of the nameplate and make sure it is in accordance with local power supply.
- In case of any flaw or anomaly detected, please contact HITECSA.

RIGGING

- Before moving the unit, make sure that all panels are well fixed.
- Raise and set down the equipment carefully.
- Do not tilt the unit more than 15 degrees during transportation (Fig. 2).
- Always transport the unit in its original packaging to the place of installation.
- All units come with a particular rigging diagram of that model, similar to the one shown below. Be sure to hoist the machine through the points indicated in the diagram.
- Make sure that the unit is balanced, stable and without any deformations when it is lifted.



STORAGE

If the equipment is going to be stored before the installation, please follow the instructions below in order to avoid damages, corrosion or deterioration:

- Move it carefully.
- Do not place the machine in places exposed to ambient temperature above 50°C and preferably keep the unit away from direct sunlight.
- Avoid placing the unit with plastic wrapping protection under the sun, as the pressure of the circuits could assume values that could lead to the intervention of the safety valves.

In addition, when cooling, water condensation occurs inside the machine and the plastic wrap.

- Avoid placing other objects on top of the unit (unless it is done within the limits of the overlap planes indicated on the packaging, etc. Follow these indications).
- Avoid prolonged storage, before installation, water inlet, dust and objects in general due to invasion or biological, meteorological and/or human inclemencies.
- Minimum storage temperature: 5°C.
- Maximum relative humidity: 90%

INSTALLATION

INSTALLATION LOCATION

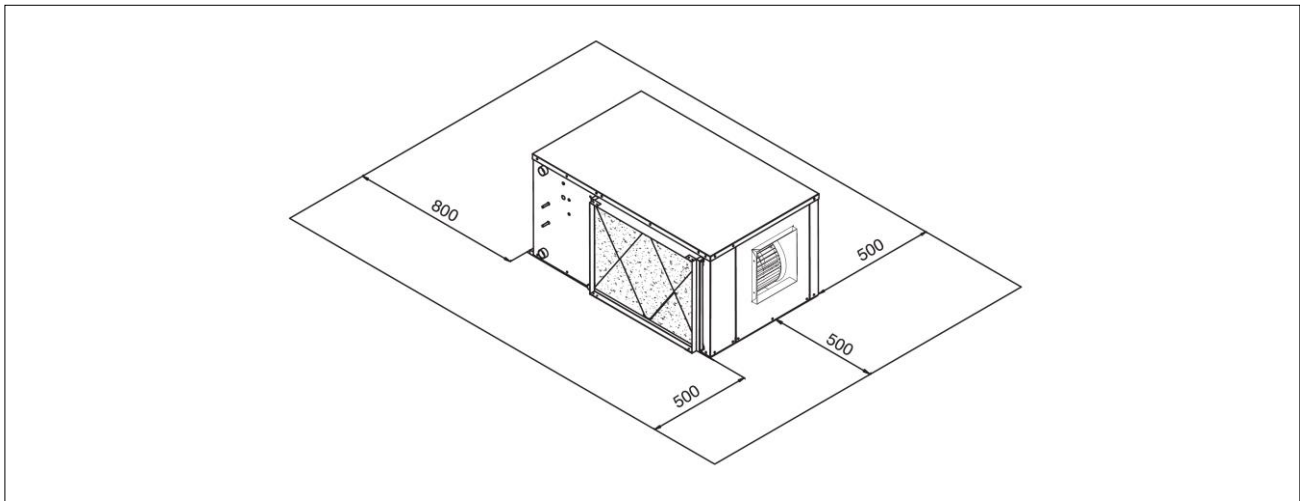
- Consult and respect the rules and local regulations which regulate the installation of air conditioning systems.
- Choose a site without dust and debris.
- Respect the appropriate service area for the equipment which will be installed.
- Verify that the ground or structure on which the unit will be installed is able to support its weight in operation.
- Fit shock absorbers throughout the installation to prevent the transmission of noise and vibration.
- Check that the direction of the sound level is not going to disturb anyone.

UNIT SETTLEMENT

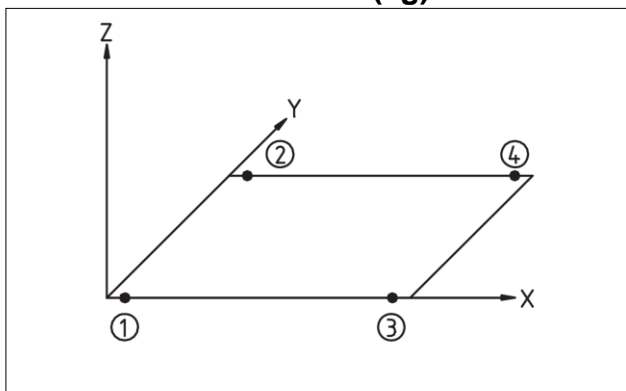
- Be sure unit is correctly balanced.
- The bed frame should have sufficient strength to support unit weight.
- Be sure that after settlement the unit drain is working properly.

SERVICE AREA

Make sure to respect the following measurements for the correct operation of the unit.



WEIGHT DISTRIBUTION (kg)



(3 – 4): Electrical panelboard side

MODEL	1	2	3	4
091	13	13	16	18
121	14	14	16	18
141	14	15	17	19
171	16	17	20	22
201	16	19	20	22
251	21	22	22	25
351	24	26	29	31
401	26	27	30	32
501	38	38	41	43
701	38	38	41	43
751	43	44	46	47
1001	55	56	59	60
1201	61	61	63	65

INSTALLATION

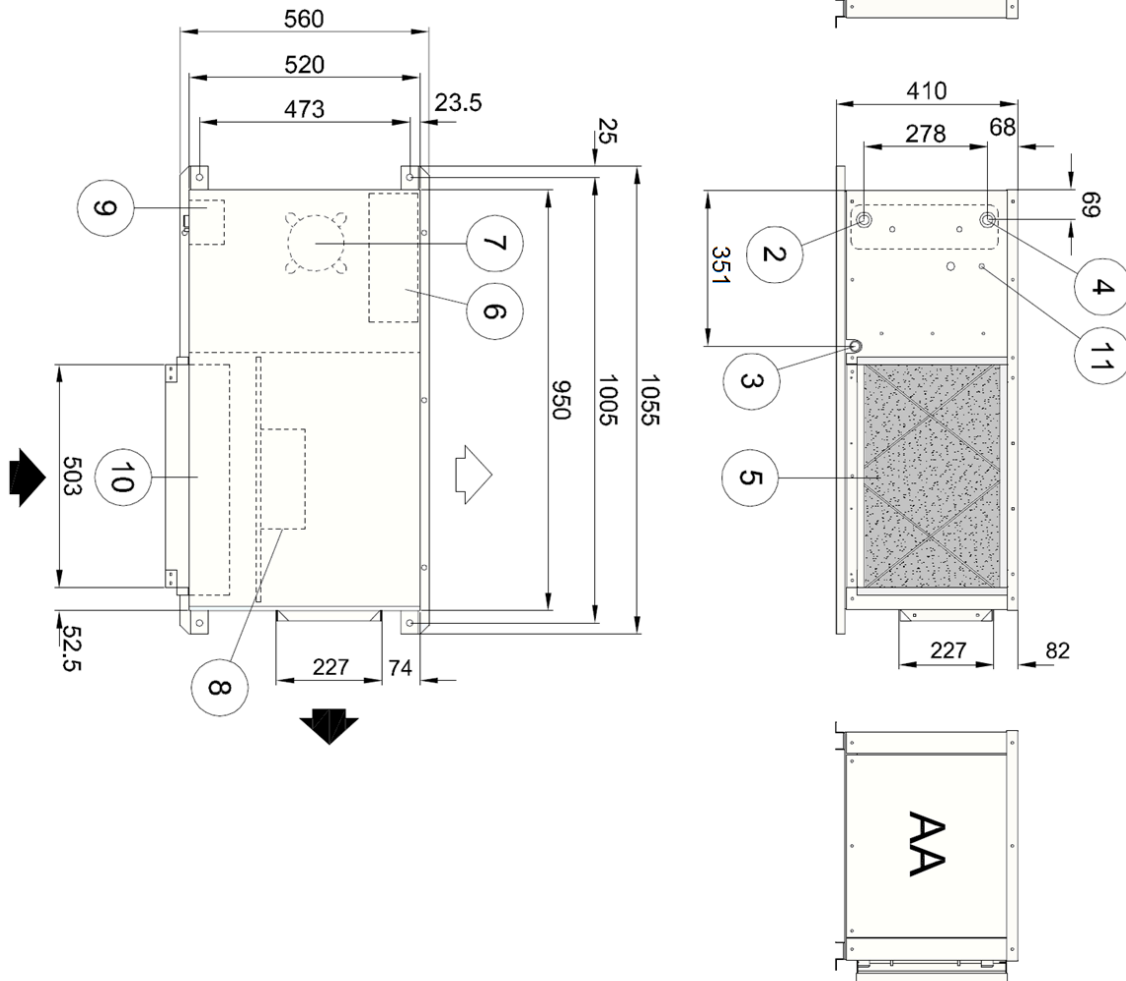
DIMENSIONS AND WEIGHT

Models 091 – 141

MODEL	APROX. WEIGHT (kg)	
	Net Weight	Packaged Weight
091	60	75
121	62	77
141	65	80

Legend:

1. Power supply input
 2. Water inlet
 3. Outdoor water drain Ø 3/4" male
 4. Water outlet
 5. Air filter
 6. Electrical box
 7. Compressor
 8. EC motor fan
 9. Condenser heat exchanger
 10. Evaporator coil
 11. Pressostatic valve connection (option)
- AA Access panel



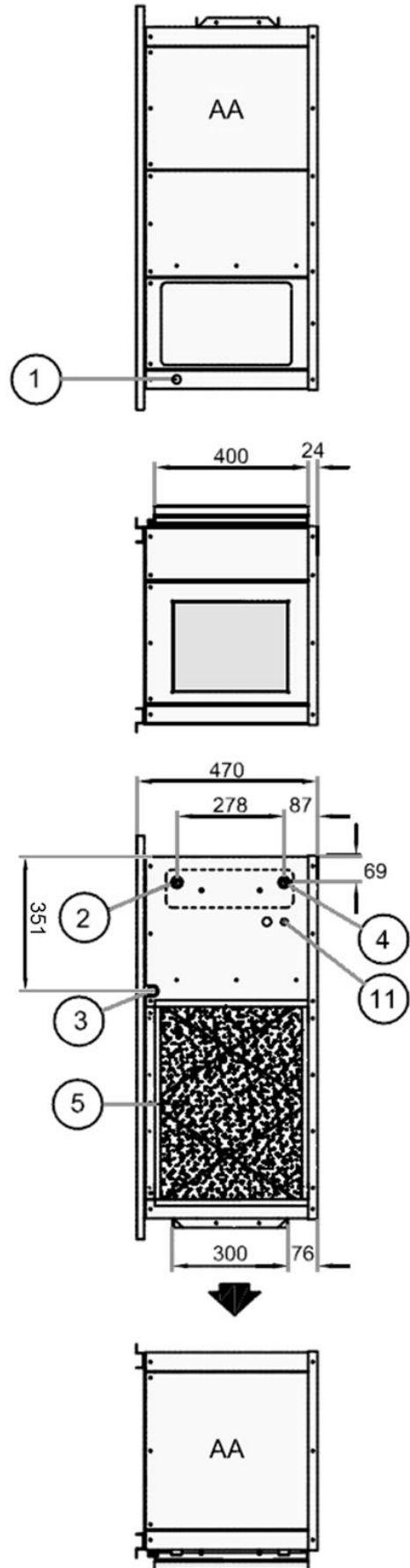
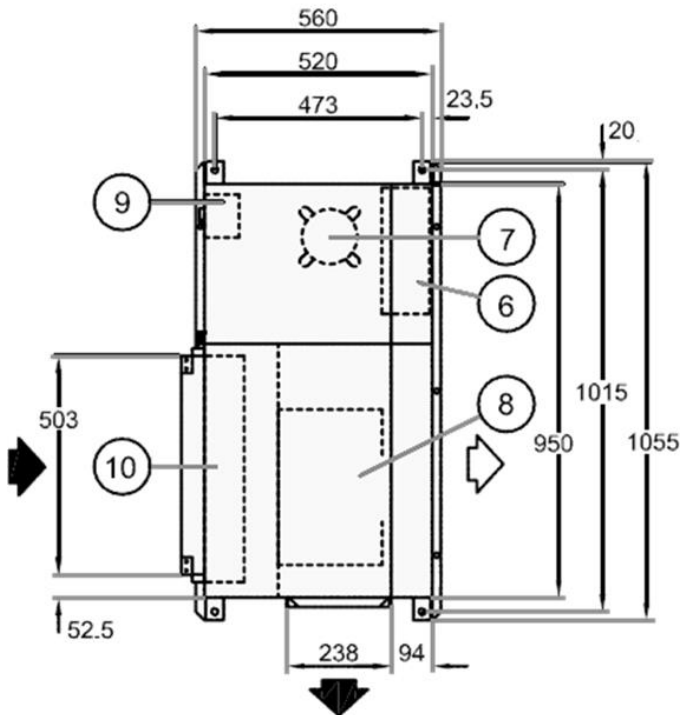
INSTALLATION DIMENSIONS AND WEIGHT

Models 171 – 201

MODEL	APROX. WEIGHT (kg)	
	Net Weight	Packaged Weight
171	75	90
201	77	92

Legend:

1. Power supply input
 2. Water inlet
 3. Outdoor water drain Ø 3/4" male
 4. Water outlet
 5. Air filter
 6. Electrical box
 7. Compressor
 8. EC motor fan
 9. Condenser heat exchanger
 10. Evaporator coil
 11. Pressostatic valve connection (optional)
- AA Access panel



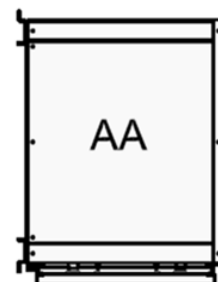
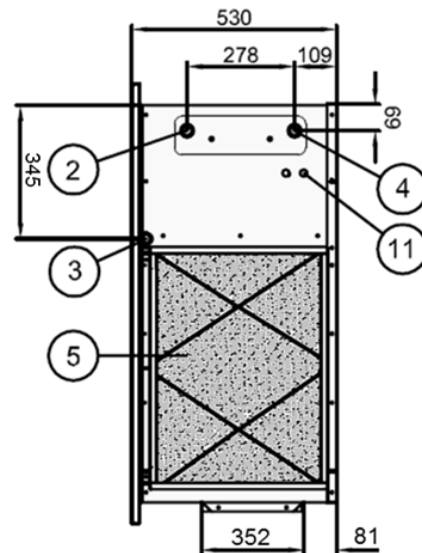
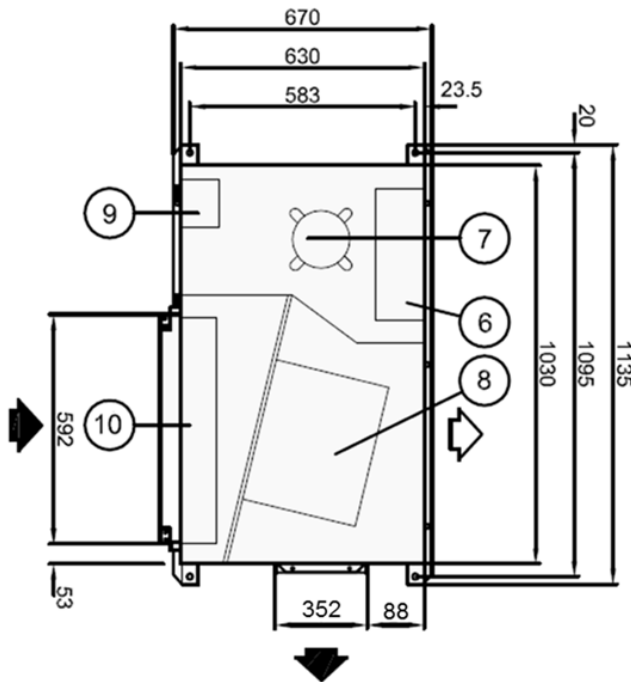
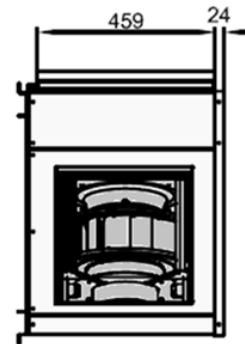
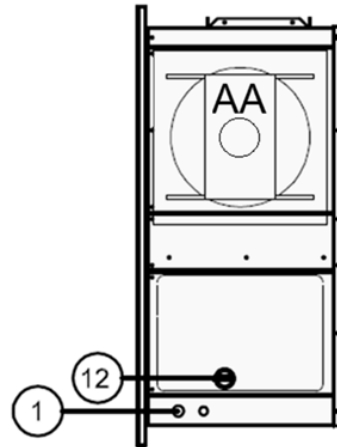
INSTALLATION DIMENSIONS AND WEIGHT

Models 251 – 451

MODEL	APROX. WEIGHT (kg)	
	Net Weight	Packaged Weight
251	90	105
351	110	115
401	115	130

Legend:

1. Power supply input
 2. Water inlet
 3. Outdoor water drain Ø 3/4" male
 4. Water outlet
 5. Air filter
 6. Electrical box
 7. Compressor
 8. EC motor fan
 9. Condenser heat exchanger
 10. Evaporator coil
 11. Pressostatic valve connection (optional)
 12. Main switch
- AA Access panel



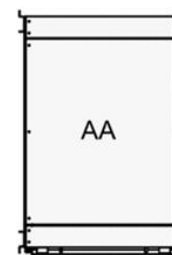
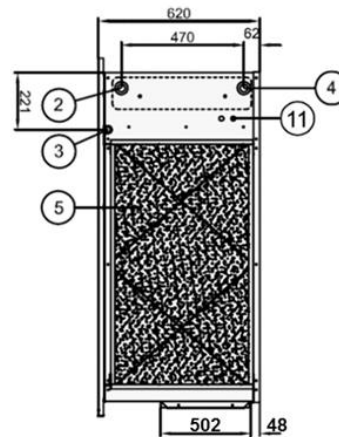
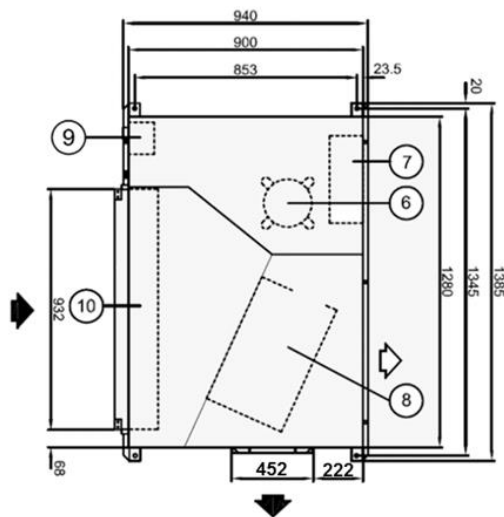
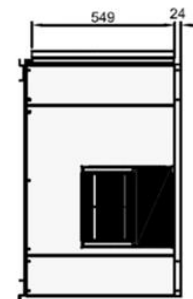
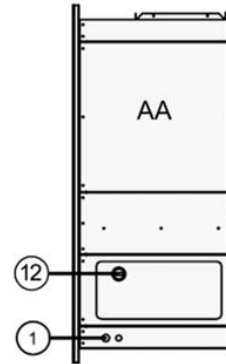
INSTALLATION DIMENSIONS AND WEIGHT

Models 501 – 751

MODEL	APROX. WEIGHT (kg)	
	Net Weight	Packaged Weight
501	160	175
701	160	175
751	180	195

Legend:

- 1. Power supply input
 - 2. Water inlet
 - 3. Outdoor water drain Ø 3/4" male
 - 4. Water outlet
 - 5. Air filter
 - 6. Compressor
 - 7. Electrical box
 - 8. EC motor fan
 - 9. Condenser heat exchanger
 - 10. Evaporator coil
 - 11. Pressostatic valve connection (optional)
 - 12. Main switch
- AA Access panel



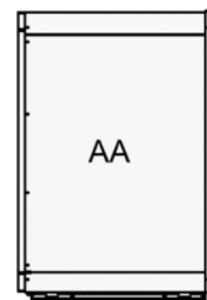
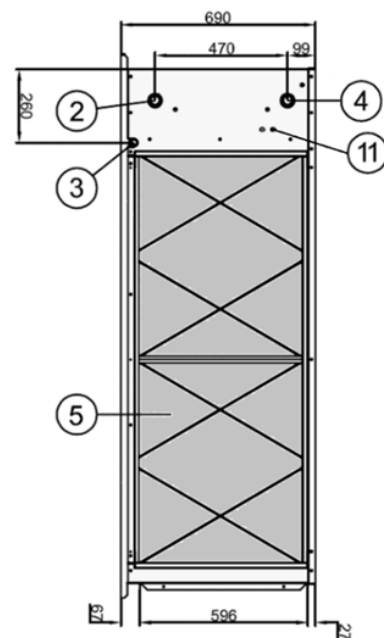
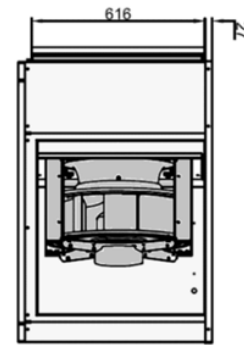
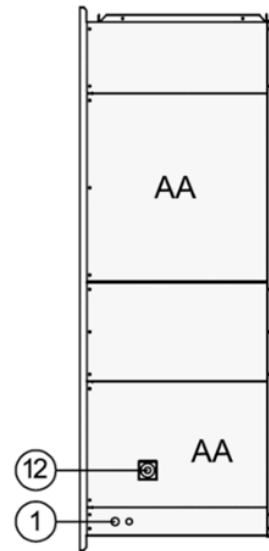
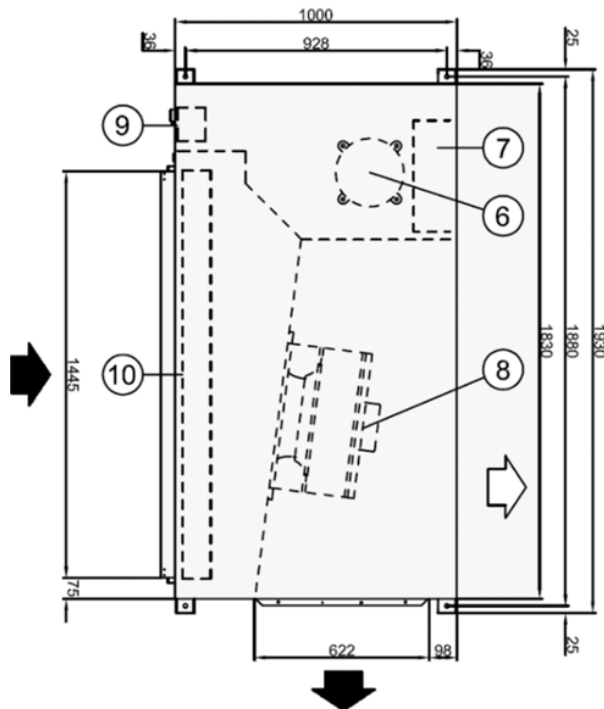
INSTALLATION DIMENSIONS AND WEIGHT

Models 1001 – 1201

MODEL	APROX. WEIGHT (kg)	
	Net Weight	Packaged Weight
1001	230	245
1201	250	265

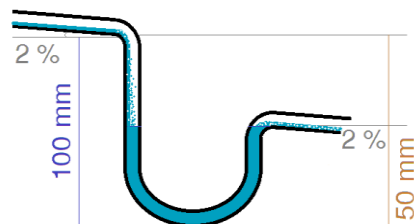
Legend:

1. Power supply input
 2. Water inlet
 3. Outdoor water drain Ø 3/4" male
 4. Water outlet
 5. Air filter
 6. Compressor
 7. Electrical box
 8. EC motor fan
 9. Condenser heat exchanger
 10. Evaporator coil
 11. Pressostatic valve connection (optional)
 12. Main switch
- AA Access panel



INSTALLATION WATER DRAIN

- The indoor drain unit (of condensate water) has a 3/4" gas (ISO 228-1, BSPP) male connection.
- Condensate drain pipe diameter should be equal or larger than the unit connection depending on the line length and general building configuration.
- The drainage line should be inclined a minimum 2% for proper water evacuation.
- When drain line is exposed to air temperatures below 0 degrees, it is necessary to cover with thermal insulation or electrical heating wire to avoid water freezing and tube damage.
- It is convenient to install the drain trap with proper dimensions (see diagram).



Recommended minimum drain trap dimensions

AIR DUCTS

- Air duct dimensions will be determined according to the airflow and available pressure of the unit.
- Ducts must be designed by qualified technicians.
- Use ducts made of non-flammable materials in order to avoid any risk of fire as a consequence of the deflagration of gases. It is advisable to use metal sheet duct with insulation.
- Use flexible ducts to connect air ducts into the unit and thus avoid vibration and noise transmission.
- A bad design of the ducts will reduce the performance of the machine and may block access to maintenance or change filters, fans, etc., especially when there is only one access.

INSTALLATION

HYDRAULIC INSTALLATION

The selection of the components and the installation shall be made by a qualified installer according to the valid local legislation and the good practice rules.

Make sure that you are aware of all the local rules and regulations for hydraulic installations and that you comply with them.

The design and calculation of the pipes shall be realised keeping in mind that the pressure drop of the installation shall never exceed the pressure drop that would overcome the pump of the installation. A wrong design with inadequate pressure drops in the section pipes that lead to the indoor units would entail the malfunction of some of them.

The installation shall be completed according to the hydraulic connection diagram (please refer to the below shown diagram).

Proceed to the installation of a water filter that is provided with an inner net to retain the particles with a maximum diameter of 0.5mm.

A proper maintenance of the filter and the flow switch at an appropriate periodicity shall be completed to avoid deposits that could block them.

Comply with the stated indications regarding the water inlet and outlet of the unit and install a by-pass valve if necessary.

WATER FILLING

Use water at around 20°C to fill the hydraulic circuit. After the system has been drained, the pressure level must be as stated in the installation project or according to the pressure level of the main installation. In case when the water installation of the unit is going to be added to an existing water installation, the main installation probably will comprise a filling system already.

Attention: An expansion tank with a bigger capacity will be required according to the filled water volume.

Drainage

Verify that all the high points of the installation are provided with a bleed valve.

Use the pump during one minute, stop it and drain the circuit (if manual). Wait for another minute and repeat the same process until there is no more water. 5 to 10 processes like this one may be necessary to drain the system completely for water.

Remember to drain any other components that include tubes where there might be air pockets (example: differential switch). They will not work properly with air.

Air in the circuit will produce noises, will entail a lower water flow and a bad performance of the exchanger, etc...

Risk of frost

If the unit or the water installation are exposed to temperatures around 4°C it is necessary to take the appropriate measures against the risk of frost.

For example:

- Mix the water of the installation with glycol.
- Protect the pipes with heating cables placed under the insulation lining.

Empty the installation and control at the same time that:

- There are no closed valves that may retain water even after draining the installation.
- There are no low spots where water may stagnate even after draining; if necessary proceed to purging the installation.

Glycol additions

Keep in mind that the use of glycol solutions increases the pressure drop.

Make sure that the type of glycol you will use is compatible with hydraulic circuit components (pumps, filters, etc.) and that it is a non-corrosive product.

GLYCOL ADDITION to WATER (%)								
	0°C	-2°C	-5°C	-10°C	-15°C	-20°C	-25°C	-30°C
ETHYLENE GLYCOL	0%	6%	14%	24%	31%	36%	41%	45%
PROPYLENE GLYCOL	0%	7%	15%	25%	33%	39%	44%	48%

Make sure that the freezing temperature is below the minimum temperature that the water may reach with a security margin even when the unit is OFF.

INSTALLATION

THE HYDRAULIC CIRCUIT AND ITS COMPONENTS

The plate heat exchanger is the most fragile part of the hydraulic circuit. Therefore it is very important that the units provided with a plate exchanger work in an open hydraulic circuit and in a closed thermal circuit within the control values as stated in the following chart. The Langelier index shall not be exceeded (downwards or upwards) as in such a situation corrosive or encrusting water may be produced. That would jeopardize the component and the unit warranty would not apply. In such a case a special exchanger suitable for this quality of water would be necessary.

Element contained in water	Concentration by mg/l	Effects of a higher value	Effects of a lower value
Suspended solids	Variable	Can deteriorate the material	No effects are observed
Conductivity	≤ 500 µs/cm	No effects are observed	-
	> 500 µs/cm	-	Not recommended
NH₃	Must be between 2 and 20	Not recommended	No effects are observed
Chlorides	≤ 300	-	No effects are observed
	> 300	Corrosion	-
Iron	≤ 10	No effects are observed	-
	> 10	-	Corrosion
Carbonic acids	Must be between 20 and 50	Corrosion	Not recommended
PH	Must be between 6 and 9	Corrosion	No effects are observed
Sulphates	Must be between 70 and 300	No effects are observed	Corrosion
Langelier	Must be between -0,5 and +0,5	Water with tendency to create incrustations	Water with corrosive tendency

Shut-off valves

Installed at the inlet and the outlet of each component, they allow to carry out the maintenance operations without having to empty the installation.

Thermometers and pressure gauges

Installed at the inlet and the outlet of the main elements. They make maintenance and control operations easier.

Air release valves

Installed at the highest points of the installation. They enable air drainage of the circuit.

Drainage valves

Install them at all the low points to empty the circuit.

Supports

The weight of the pipes must not be supported by the connections of the unit. Therefore supporting rings shall be used.

Expansion vessel

It maintains the correct pressure of the installation, we recommend filling at 2.15 bar, when the water temperature varies from cold to pump and vice versa. The expansion vessel has to be dimensioned according to the water content of the installation.

In special circumstances it may be necessary to install one or more additional vessels even if the unit already is equipped with one.

Security devices

The installation of the following safety devices is **MANDATORY** when these elements **ARE NOT** included as standard features. Not complying with this condition will entail the **LOSS OF WARRANTY**.

Water filter

At the water inlet of the unit, to protect the heat exchanger or other critical components from obstructions and/or clogging.

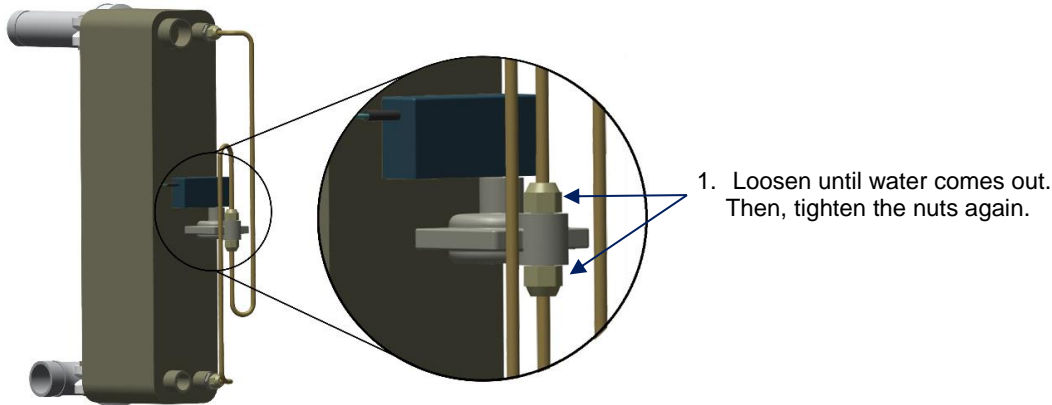
Flow switch

It aims at protecting the plate heat exchanger from breakage caused by a too low water flow that would make the equipment completely inoperative.

INSTALLATION

Differential switch

We will use it along with the flow switch and both devices will be redundant. Their function is similar. Air pockets may be generated after filling the circuit with water. We will have to make sure that there is no air to garanty that this component will work properly: we will proceed to purging by loosening the nuts of the tubes (please see below, 1.).



The warranty will not cover any damages to the plate exchanger caused by air in the switch that would be responsible for its malfunction.

INSTALLATION OF THE FLOW SWITCH AS AN OPTION

It is compulsory to mount the flow switch at the water outlet of the unit. The water flow shall be laminar to make sure that the flow switch works properly: Install the flow switch on a straight section of the tube where there is no section change. The distance to the switch shall be minimum 6 times the diameter (D) of the tube and at the outlet there shall be a distance of minimum 3 times the diameter of the tube. No other component or accessory shall be installed on that tube. If you use a flow switch from another supplier (not delivered by Hitecsa), refer to the instructions of the producer and respect the dimensions as previously stated.



Bear in mind that the flow switch has a limited operation range due to the tube diameter. We will need to choose the diameter of the tube where it will be installed depending on the flow of the unit.

	VERNE range	91	121	141	171	201	251	351	401	501	701	751	1001	1201
Water Connections (male gas thread)	"	3/4"									1 1/4"			
Model of the supplied flow switch	-	SF1RE									SF1K			
Recommended tube diameter	"	1"				1 1/4"				1 1/2"	2"		3"	
Minimum Flow Setting (Disconnection - Off)	m ³ /h	0,2	0,4	0,7	0,8	1,1	1,4	2,4	2,7	3,2	3,6	5	6	7,4
Nominal Flow Setting (Connection - On)	m ³ /h	0,6	0,7	0,9	1	1,3	1,6	2,6	2,9	3,5	4,3	5,5	7,6	8,7

Possible flow switch settings:

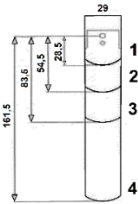
SF1RE models 091 - 251			
Tube ø	Max. Q m ³ /h	Min. setting Off (On) m ³ /h	Max. setting Off (On) m ³ /h
1"	3,6	0,2 (0,6)	1,0 (1,1)
1 1/4"	6	0,25 (0,9)	1,4 (1,6)
1 1/2"	9	0,5 (1,2)	1,6 (2,2)
2"	15	0,9 (2,3)	3,6 (4,1)
2 1/2"	24	1,2 (3,1)	4,9 (5,5)
3"	36	2,1 (4,9)	7,4 (8,2)

SF1K models 351 - 1201			
Tube ø	Max. Q m ³ /h	Min. setting Off (On) m ³ /h	Max. setting Off (On) m ³ /h
1	3,6	0,6 (1,0)	2,0 (2,1)
1 1/4"	6	0,8 (1,3)	2,8 (3,0)
1 1/2"	9	1,1 (1,7)	3,7 (4,0)
2"	15	2,2 (3,1)	5,7 (6,1)
2 1/2"	24	2,7 (4,0)	6,5 (7,0)
3"	36	4,3 (6,2)	10,7 (11,4)

Please contact Hitecsa for other possible flow options.

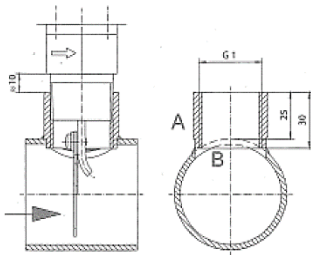
INSTALLATION

Installation of the paddle according to the diameter of the tube:



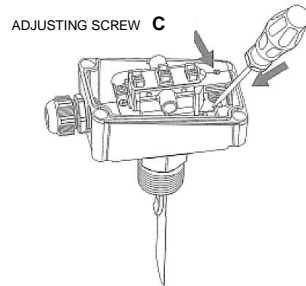
Tube	Paddle
1" - 1 1/2"	1
2" - 2 1/2"	1+2
3" - 4"	1+2+3

INSTRUCTIONS



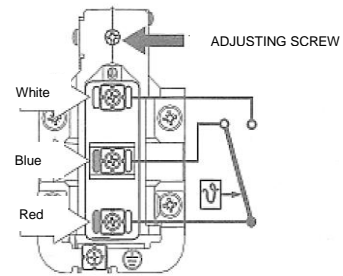
When screwing (A) make sure that the inside part of the tube is not invaded (B) and that the paddle's position is perpendicular to the water flow.

VERIFICATION OF THE PADDLE MOVEMENT



After the installation is completed verify that the paddle can move easily inside the tube. Use a screwdriver to press slightly until the micro-switch makes "click", see above.

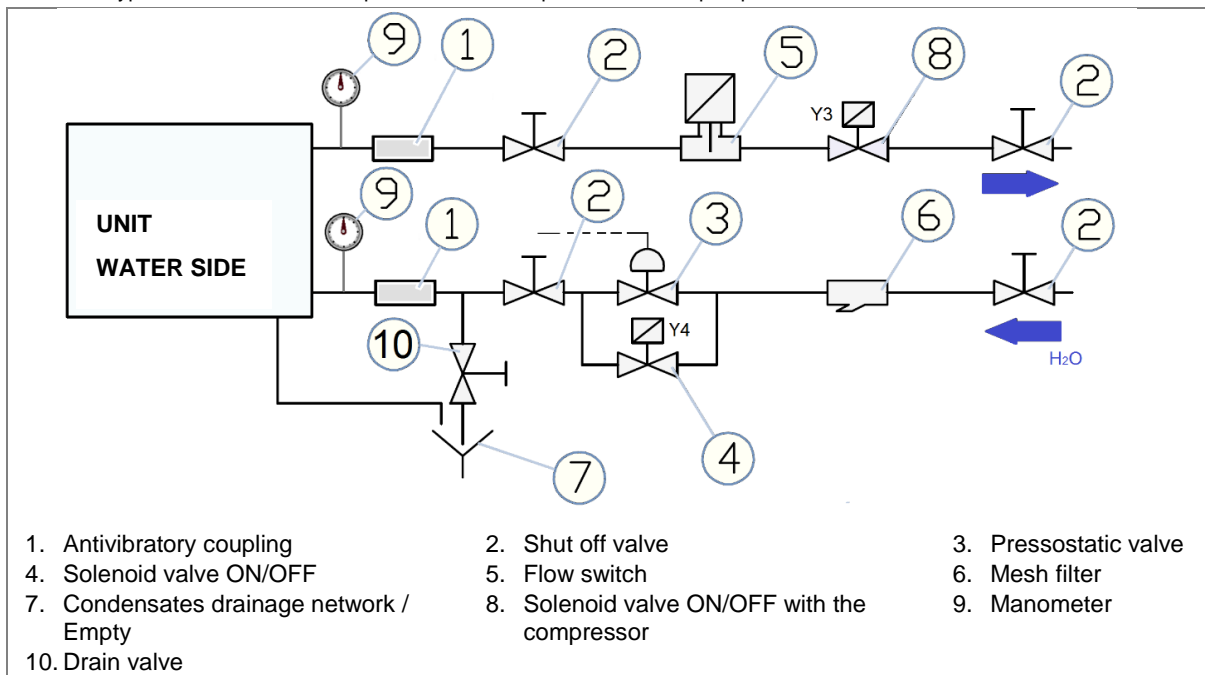
ELECTRICAL CONNECTIONS



The red/white contact (normally in the open position) will be closed when the necessary flow is detected and will open up when the flow is lower than the set value. When the flow level is matching the minimum allowed level, adjust the C screw until the red/white contact opens up (refer to the previous drawing).

WATER CONNECTIONS WITH OPTIONAL PRESOSTATIC VALVE

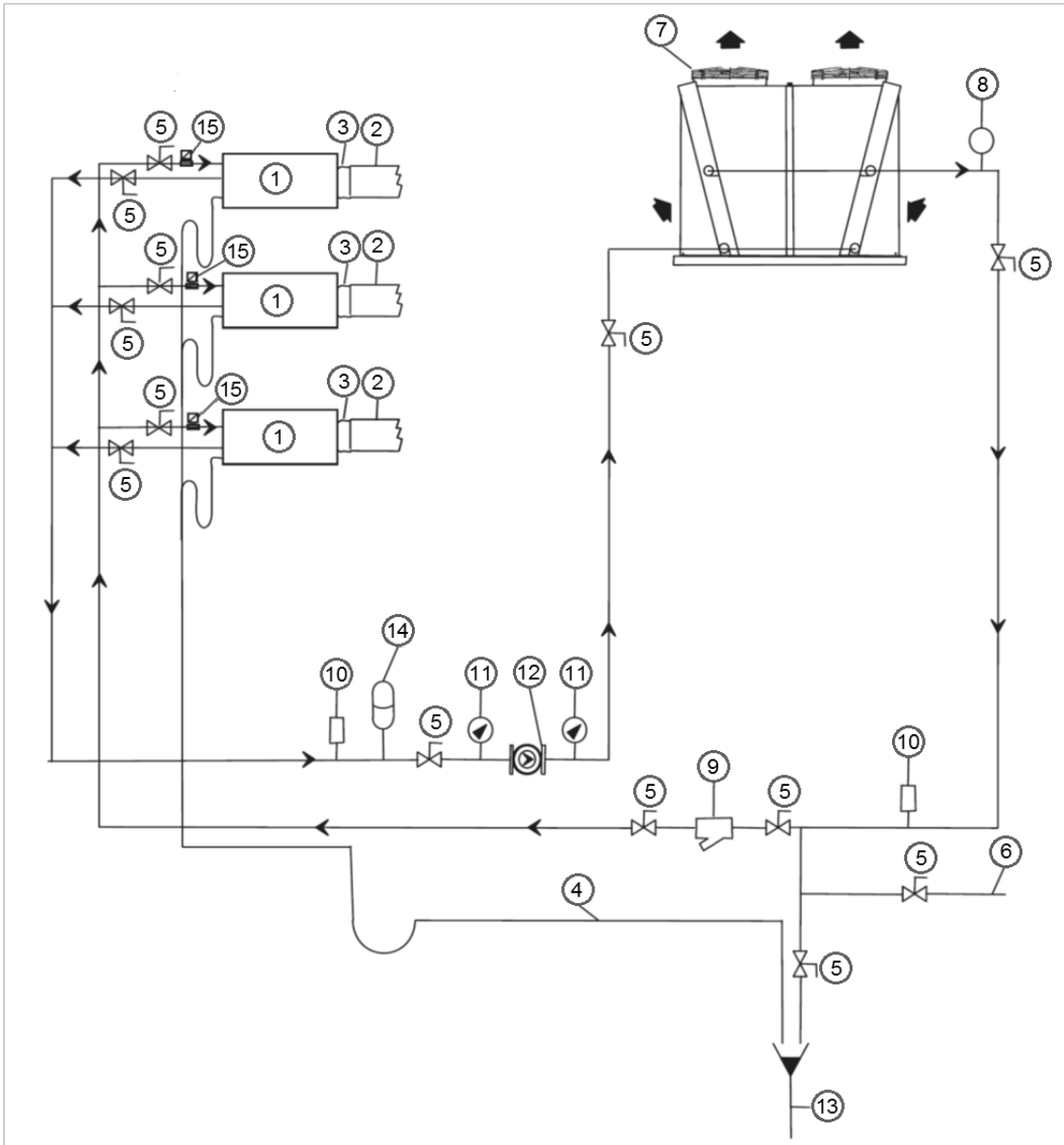
Install the Bypass solenoid valve with presostatic valve option in the heat pump units.



NOTE: The pressure tap of the presostatic valve must be connected to the high pressure outlet of the unit. Graphs show connections for heat pump units. In case of cooling only units, do not mount the solenoid valve. While mounting the presostatic valve, the performance of the flow switch on the compressor start-up must be timed during 1 minute, to let de valve act.

INSTALLATION

ELEMENTS AND HYDRAULIC CONNECTIONS OF THE INSTALLATION DIAGRAM



- | | | | | |
|-----------------------|------------------------|-------------------|---------------|------------------|
| ① WPHA/BA unit | ④ Condensates drainage | ⑦ Dry cooler | ⑩ Thermometer | ⑬ Drainage |
| ② Air duct | ⑤ Shut off valve | ⑧ Automatic purge | ⑪ Manometer | ⑭ Expansion tank |
| ③ Flexible connection | ⑥ Water line | ⑨ Mesh filter | ⑫ Water pump | ⑮ Flow switch |

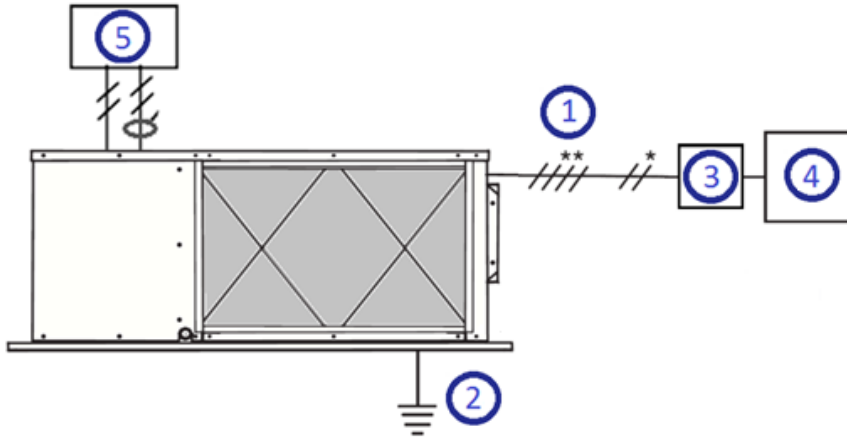


ATTENTION!

It is mandatory to install the flow switch in the water inlet of the machine with a previous section which length is 6 times the \varnothing of the inlet and 2 times the \varnothing of the outlet of horizontal length without any section change in order to ensure that the flow rate of water/fluid is laminar. In case of installing flow switches that are not supplied by HITECSA, follow the instructions of the manufacturer making sure that the above mentioned lengths do not decrease. Failure to comply with these guidelines causes loss of the equipment warranty.

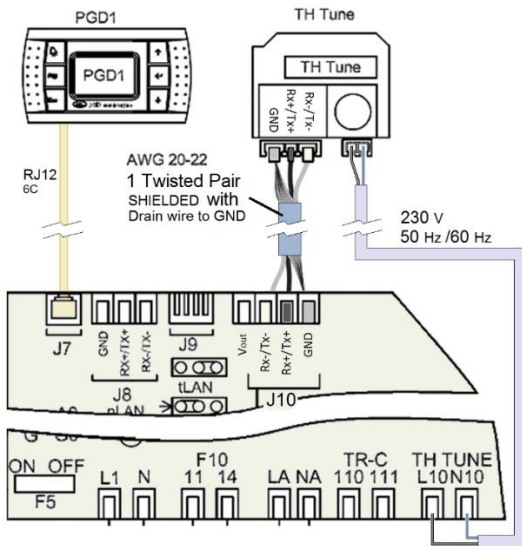
INSTALLATION

ELECTRICAL CONNECTIONS



1. Power Supply :
* 091- 251 Single-phase
** 351-1201 Three-phase+Neutral
2. Ground
3. Delayed-action fuses or circuit breaker D curve.
4. Main switch
5. Th TUNE Control

Thermostat connections.

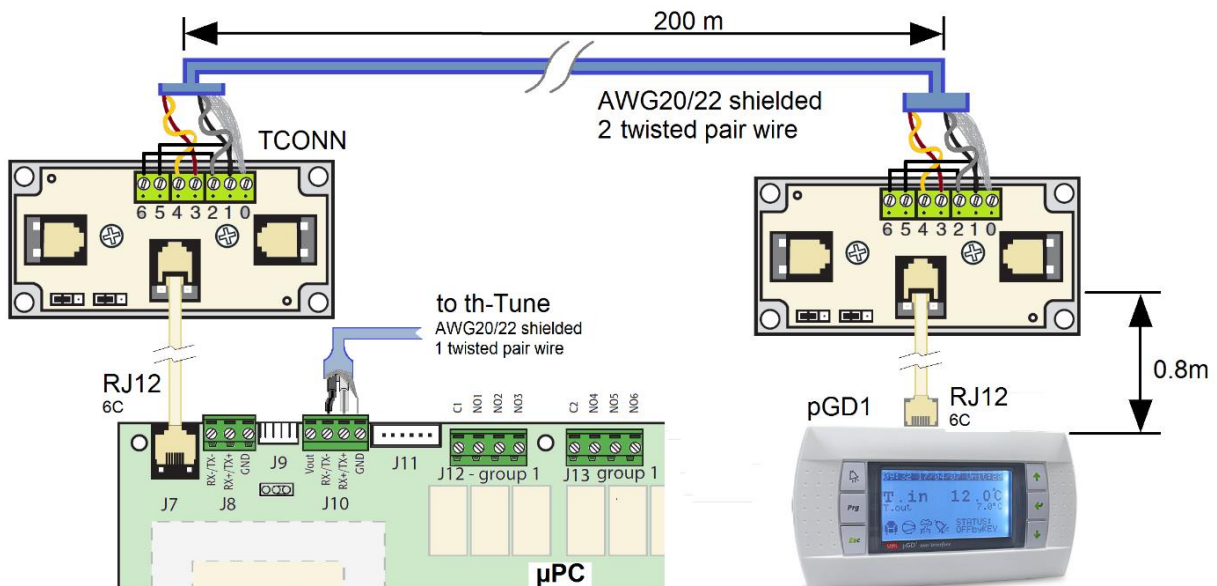


Th-TUNE CONNECTION:

- Two power supply cables 230 VAC (L+N)
- A shielded twisted pair cable AWG 20/22 with drain wire to GND.
- The message "Cn" on the display indicates that the communication between the thermostat and the control board has failed if it does not disappear. Proceed to controlling the cable connection and make sure that they are connected to the right terminals.

PGD CONNECTION (Option):

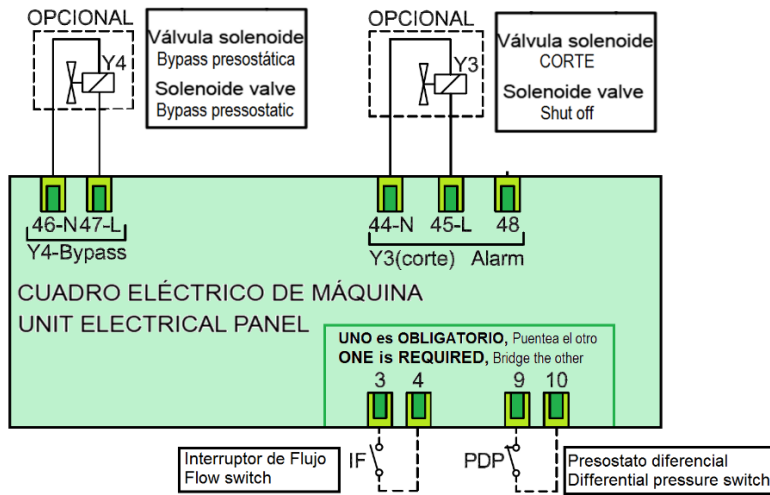
- Connection through 6 wire telephone cable for lines greater than 50m intersperse with TCONN (4 wire twisted and shielded, see diagram).



INSTALLATION

ELECTRICAL CONNECTIONS

Electrical connection of the hydraulic accessories for control with TH-TUNE and µPC



- Do not forget that at least one of the safety devices must be installed and the terminals of the unused safety element must be bypassed.
- The option solenoid cut-off valve (Y3) and the optional alarm can not be selected at the same time.

OPERATION



BEFORE START UP

- Start up has to be performed by a qualified service personnel in air conditioning.
- Make sure that the panels are firmly secured with screws.
- Check that there is no leakage of oil or refrigerant.
- Make sure that the unit is evenly levelled.
- Make sure that there is space enough for operation and maintenance.



Before opening the electrical panel and having access to the inside of the equipment it is MANDATORY to disconnect the power supply hose of the machine which MUST BE FREE OF VOLTAGE for this operation.

- Check that the drainage is not blocked.
- Verify if there are losses of water. Check that the valves work correctly.
- Check the water circuit allows its emptying for repairs or stop and its correct air purge.
- Always use the electrical diagram of the unit to make the connections.
- Make sure that all electrical connections are properly tight.
- The power supply of the unit must be as indicated on the serial plate. Damage caused by the start-up of the unit in an incorrect voltage line is not covered by Hitecsa's warranty.
- The unit must not be supplied with any other voltage than that indicated on the serial plate. The power supply to the unit must be within 10% of the voltage indicated on the serial plate.
- Check the correct rotation direction of the fans.
- The installer must place line protection elements in accordance with current legislation.
- Wiring of electrical connections must be protected by a tube or other cable conduits.
- Make sure if the crankcase heater of each compressor has been operating during 24 hours prior the Start Up.
- Check that the air filters are clean and correctly fitted.
- Check the condition and placement of grilles, diffusers, air ducts, etc.

START UP



It is very important to evacuate air from the system and clean dirt particles of the water circuit. The two operations must be done at the same time.

- At first start up the water pump for a few minutes.
- Stop the water pump and notice if the automatic purge is working. Repeat this operation 10 times. If it proceeds in this way, all the existing air will go out from the system and the water circuit will be filled.
- The next step is to remove the water mesh filter and clean it. The performance of the system will improve since the dirty mesh filter has a high pressure drop.
- It is necessary to take notes of the air inlet and outlet temperatures to the internal coil, the volts and amps of the compressor and motor fan, as well as the suction and discharge pressure of each compressor.
- Remember that the air filters shall be cleaned after the first 4 hours of operation.
- Complete at least 3 cooling cycle operations.

OPERATION

OPERATING LIMITS

Cooling cycle

INPUT TEMPERATURE	MINIMUM	MAXIMUM
Dry indoor air	19°C	31°C
Wet indoor air	15°C	21°C
Water inlet	15°C *	45°C **

*For water inlets lower than 25°C, it is necessary to install the presostatic valve accessory.

** On request units can be manufactured for 50 °C.

Heating cycle

TEMPERATURE	MINIMUM	MAXIMUM
Dry air inlet	18°C	24°C
Water inlet	12°C	27°C

OPERATION

TH TUNE CONTROL

This controller, comes as standard with 2 compressor units (until model 4502.2)

ON-OFF CONTROL

Press and hold the button (On / Off) for two seconds to turn the thermostat on or off. The word "OFF" will be displayed on the thermostat screen when it is off.

NOTE: The thermostat will show "OFFd" if the remote on-off contact is open and "OFFs" when the shutdown is done through Modbus. When switching on for the first time or after a power failure the message "Cn" will be displayed during a few seconds until communication with the board is established.

TEMPERATURE ADJUSTMENT

- Adjust the setpoint temperature by turning the central button.

SYSTEM MODES

Press (Mode) button to alternate between the available operations modes.

Available system modes:

- Cooling Mode** – Display will show the icon: ❄️ and in the down-Right corner: ❄️.
- Heating Mode** – Display will show the icon: 🔥 & ❄️. This mode is not available for cooling only machines.
- Automatic Mode** – Display will show: "Auto". This mode is not available for cooling only machines. This operating mode will change between cold and heat depending on the selected temperature setpoint. The mode that is active at each moment will be indicated in the lower right part of the display: 🔥 Heating, ❄️ Cooling.
- Only Fan** – Display will show two icons at the same time: ❄️ + 🌀. The fan will operate in continuous mode and will not take into account the temperature value introduced in the setpoint.
- NOTE:** When the outdoor temperature is very low and you want the machine to operate in **cooling mode**, either by selecting this mode or by selecting the **Auto mode**. If the machine does **NOT** have condensation control then it could stop due to the activation of an alarm.
Beware of always leaving **Auto mode** active! The conditions that lead to the previous error could be given.

Indoor Fan Modes:

"Fan / Autofan" with Ventilation "Continuous / Auto"

- Press (Fan) button, to alternate between automatic or continuous ventilation modes.



- With automatic fan - The icon on the screen will show "Auto". The fan only works when there is a request for cold or heat.



- Without automatic fan - The word "Auto" disappears from the icon. The fan operates in continuous mode.



Warnings and Information signals

On the Th-tune screen, some 4-letter alphanumeric characters (AL01) may be displayed.

When the (🔔) symbol also appears then it is an **alarm**, otherwise it is a **warning** or an **information signal**. The warnings disappear automatically when the cause disappears, however the alarms have to be reset.

Description of the Warning Codes

CODE	DESCRIPTION
AVFS	Warning of Dirty Filter
Cn	Trying to establish communication with the control board (Modbus)
IFAb	No water flow Info.
OFFd	The remote contact On-off is open.
OFFs	Stoppage through supervisor (Modbus, Bacnet, etc.)
OFFn	Security stoppage

Alarms

All alarms are serious, cause the unit stoppage and activate an output signal through a relay.

Alarm Codes Reset



Press the central button several times until RES appears (only available when there is at least one active alarm). All alarms, whose causes have disappeared or have been solved, are cancelled.



Turn the central button to change from 0 to 1.



Press the central button once.

When the reset has been made, the text will change to OK.

After the reset, the thermostat will return automatically to its normal state, displaying the ambient or return temperature as configured.

OPERATION

TH TUNE CONTROL

Description of the Alarm Codes

CODE	DESCRIPTION
AL01	Alarm B1 probe disconnected (Outdoor temperature)
AL02	Alarm B2 probe disconnected (Air supply temperature)
AL03	Alarm B3 probe disconnected (Discharge temperature comp.1)
AL05	Alarm B5 probe disconnected (Return humidity)
AL06	Alarm B6 probe disconnected (Return humidity)
AL07	Alarm B7 probe disconnected (Outdoor humidity)
AL08	Alarm B8 probe disconnected (Inlet water temperature circuit 2)
AL09	Alarm B9 probe disconnected (Outlet water temperature circuit 3)
AL11	Alarm B11 probe disconnected (Low pressure C1, only 2 circuits units)
AL12	Alarm B12 probe disconnected (Low pressure C2, only 2 circuits units)
ALb1	Alarm B1 probe disconnected (Outdoor temperature)
ALb2	Alarm B2 probe disconnected (Air supply temperature)
ALb3	Alarm B3 probe disconnected (Discharge temperature comp.1)
ALb5	Alarm B5 probe disconnected (Return humidity)
ALb6	Alarm B6 probe disconnected (Return humidity)
ALb7	Alarm B7 probe disconnected (Outdoor humidity)
ALb8	Alarm B8 probe disconnected (Inlet water temperature circuit 2)
ALb9	Alarm B9 probe disconnected (Outlet water temperature circuit 3)
ALF6	Thermic alarm compressor
ALF7	Thermic alarm indoor fan
ALH1	Anti-icing alarm 1 (Water inlet below 12°C)
ALH2	Anti-icing alarm 2 (Water outlet below 6°C)
ALH3	Anti-icing alarm 3 (Water inlet < 15°C and ΔT > 8°C)
ALH4	Anti-icing alarm 4 (Compressor ON and ΔT Water Inlet/Outlet below 1,5°C)
ALIF	Flow switch alarm
ALPA	Alarm high pressure switch circuit 1
ALPB	Alarm low pressure switch circuit 1
ALPM	Minimum pressure switch alarm
ALRF	Lack of refrigerant alarm
A2F7	Thermic alarm compressor 2 (2 circuit unit)
A2F8	Thermic alarm indoor fan 2 (2 circuit unit)
A2PA	Alarm high pressure switch circuit 2
A2PB	Alarm low pressure switch circuit 2
A2PM	Minimum pressure switch alarm circuit 2
A2RF	Lack of refrigerant alarm circuit 2

MAINTENANCE



WARNING!

Before performing any service or maintenance operation it is mandatory to turn off the main power switch of the system to avoid any personal injuries. Locked it so that nobody other than a qualified technician can switch on electrical power.

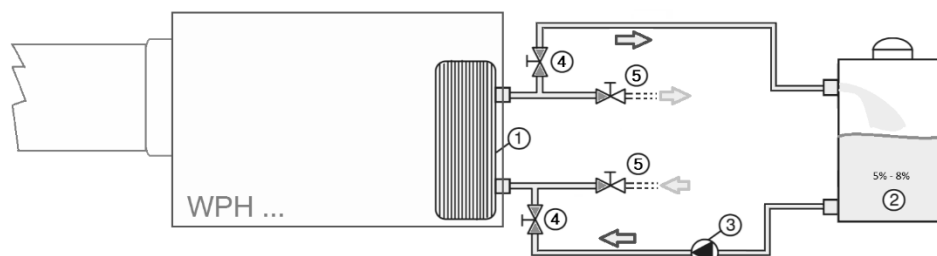
Read the SAFETY PRECAUTIONS!

It is advisable to do maintenance works every 1.000 operating hours as well as at the beginning of each cooling season.

- **Refrigeration circuit:** Check for oil or refrigerant leaks, noises or system's vibration. Take measurements of temperatures and pressures of components and record them on the maintenance form.
- **Electrical circuit:** Make sure that all electrical connections –wires, contactors and terminals- are properly tight. Record the readings for volts and amperes of each compressor and fan motor. Verify the starting current. Check the good operation of all relays, pressure switches and phase sequence relay of Scroll compressor.
- **Fans:** Check the direction of rotation of the fans and examine the support of them. Verify the operating status.
 - Before handling the fan, make sure that it is completely stopped and disconnected from the mains, even if it is already stopped and no one can start it during the intervention.
 - Regular inspection of the device is necessary. This must be taken based on the degree of dirt in propellers, turbines or impellers. The dirt in impellers (propellers or turbines), motors and grids can involve risks and shortens significantly the life of the fan.
 - Keep the fan's air circulation paths clear of obstacles - danger due to shot out objects!
 - It is necessary to check the free passage of condensation water evacuation holes (if they exist) suitable for the assembly position.
 - In cleaning operations be very careful not to unbalance the propeller or turbine.
 - If the cleaning work is carried out improperly, in the case of non-painted / painted fans, no guarantee is assumed as regards the formation of corrosion or adhesion of the paint.
 - To prevent humidity accumulation in the motor, before the cleaning process, the fan must operate for at least 1 hour between 80 and 100% of the maximum number of revolutions!
 - After the cleaning process, the fan must work for 2 hours between 80 and 100% of the maximum number of revolutions to dry!
 - Check the fan for mechanical vibrations at regular intervals (recommended every 6 months). Be aware of the limit values indicated in ISO 14694 and carry out relief measures in case of exceeding these (e.g., the subsequent balancing by expert personnel).
 - Check if there are cracks in the impeller (propeller or turbine), especially in the welding seams.
 - Motors and fans do not need any additional lubrication "thanks" to the use of lubrication for life. After the useful life of the grease expires (30-40,000 h approx.) a change of bearings is required. In view of that, as for any fault (e.g. in the winding or in electronic systems), please contact our technical assistance department.
- **Air filters:** Clean air filters after 4 hours of system operation and every 3 months (or more depending on application). Filters can be cleaned by immersion in warm water with soap, later washed in clean water and dry.
- **Coils:** At least once a year, clean condenser coils with water and detergent, then dry with air at low pressure. Never clean with a wire brush, water and/or air at high pressure.
- **Drainage system:** Verify condition and good operation of the drainage tray and drain trap. It is necessary to clean the condensates trays after the first day of operation. Then, clean it at least once a year. Take into account the meteorological conditions, e.g. in places where falling leaves or the flight of seeds can plug the drain trap, it will also be necessary to clean them at mid and late spring and autumn. The dates are approximate and will depend on the blooming, falling leaves, seeds, etc. of the plants of the zone or the human activity or any other cause.
- **Hydraulic Circuit:** Check for water leaks, as well as noise and vibrations of the system elements. Record water pressure values at the inlet and outlet of the pump.
 - Clean the filter and the flow switch, it should be done frequently enough to avoid deposits that could block them.
 - Make sure you know and comply with all local laws and regulations that affect the maintenance of water facilities.

MAINTENANCE

- Plate heat exchanger:** it is necessary to clean the plate heat exchanger of the evaporator at least once a year. The plate exchanger is cleaned by circulating the cleaning liquid inside. A deposit with acid (5% phosphorus acid should be used, and if it is necessary to clean more frequently, use 5% oxalic acid). Introduce the cleaning liquid through the heat exchanger. To achieve an effective cleaning, the acid should be circulated at least 1.5 times the normal flow rate of water, and if possible in the opposite direction. Then the circuit must be cleaned with a large amount of water to remove traces of acid. Put new water and start.



Legend

1. Plate heat exchanger
2. Cleaning liquid (Water + Acid)
3. Circulating pump
4. Cleaning circuit stock pops
5. Water circuit stock pops

- Compressor:** Check regularly the lubricant oil level, the presence of vibrations or noises and the insulation of the motor.



- DO NOT FORGET to stop the crankcase resistance for 24 hours before starting up the compressor.
- COMPRESSOR LUBRICATION

- Compressors with R-410A refrigerant use synthetic polyester lubricant oils. Each compressor manufacturer has a specific lubricant oil for its product.
- The compressor or system must not be open to the air for more than 15 minutes.
- The synthetic polyol-ester lubricant oil has the capacity to absorb humidity 100 times more than the mineral oil.

MAINTENANCE

REFRIGERANT CHARGE



WARNING!

Never use oxygen to pressurize system or purge lines for leak test. Oxygen reacts violently with oil, which can cause an explosion resulting in damage, personal injury or death.

- In case it is necessary to add or rec IOM_WPHBA HE-WPHA HE_091a1201_207957_180703_FR over refrigerant, use an electronic scale that is suitably reinforced and prepared to withstand the handling of the refrigerant bottle.
- The charge must be made in LIQUID condition.
- The inlet of liquid refrigerant R-410A in the empty tubes causes temperatures below 0°C until the internal pressure reaches 7 bars.



WARNING!

If it is necessary to make brazing operation, first fill the circuit with dry nitrogen. Burning refrigerant 410A results in toxic gas emissions.

- Leaks should be repaired immediately.
- Never overcharge the system.
- Never use compressor as vacuum pump.
- If leakage symptoms appear during the operation, it is necessary to leak test.
- To find small leaks, you will need a detector for HCF.
- If gas leak is detected is necessary to remove and recuperate complete refrigerant charge. Pressurize system with dry nitrogen. If leakage has been not detected break a vacuum, dehydrate and charge with refrigerant.

Do not reintroduce used refrigerant, send it to an authorized recycling location.

FAN WITH EC MOTOR

Rotation caused by an Air Flow in the opposite direction

When the fan is stopped (no signal, no power supply, etc. ...), the motor control does not intervene if the fan rotates in the opposite direction (due, for example, to an air flow).

If we put the fan in operation while turning in the opposite direction, first the control will reduce the rotations in a controlled manner until it reaches the value "0" (stop of the fan). Then the control will make a new start in the proper direction of rotation.

The higher the number of turns in the opposite direction, the longer the control will be needed to stop the fan. In the event that the fan rotates strongly in the opposite direction, the control may not be able to start the fan in the proper direction of rotation.

Information



Do not disconnect the mains voltage so that the fan can start again!

The safe starting of fans is not guaranteed if they are driven in the opposite direction. If the application requires a safe start, the manufacturer of the installation or the user has to take the appropriate measures to prevent a reverse drive.

MAINTENANCE

FAN WITH EC MOTOR

Diagnosis / Failures

Trouble shooting

Type of failure	Possible Cause	Solution
The fan does not rotate	Power supply blackout. Cut of a phase. Overvoltage or very low voltage.	Check the power supply.
	Short circuit to ground.	Check the motor connections and the power supply.
	Short circuit in winding.	Replace the fan.
	The thermal protection of the motor has been switched off (the motor is overheated).	Check that the air passages; if it is necessary to remove the foreign bodies "The drive wheel is blocked or dirty" check the temperature of supply air. Check the voltage.
	The drive wheel is blocked or dirty.	<ul style="list-style-type: none"> • Switch off power to the motor and secure against switching back on. • Check safe isolation from supply. • Remove safety grille. • Remove foreign bodies or soiling. • Remount the safety grille.
The fan does not start	The temperature is very low for the bearing grease.	Insert bearing with cold greasing.
	The airflow circulates in the wrong direction (the motor moves with many revolutions in the wrong direction).	Check the air flow. In cases where the air flow is very strong, it is possible that the fan will not start up.
The fan rotates very slowly	Rotor / blade drags / rubs.	Remove foreign bodies / dirt on the fan, if necessary.
	Temperature management activated. Effective (motor or electronic system overheated).	Check that the air passages; if it is necessary to remove the foreign bodies "The drive wheel is blocked or dirty" check the temperature of supply air. Check the mounting space (air speed above the radiator).
Very low flow	The fan rotates very slowly.	Check type of failure "The fan rotates very slowly."
	Airways blocked.	Check that the air passages (residual air flap / inlet, filters) "The drive wheel is blocked or dirty" check the temperature of supply air.
	The pressure drop is different from expected.	Check the mounting space (air speed above the radiator).
Vibrations	Horizontal swing of the wheel.	Check that the fins / blades are not damaged or dirty or have ice "Rotor blocked or dirty".
	Without vibration damper or with a false one (radial only).	Install the correct vibration damper.
Strange noises	Damaged / worn bearing.	Replace the bearing. With the construction size of the motor 055 "Z" / "B" with transverse flow), replace the fan.
	Rotor / blade drags / rubs.	If necessary, remove foreign bodies / dirt from the fan. "Impeller blocked or dirty."
	Operation beyond the reference point (in axial fans).	Check that the air passages (residual air flap / inlet, filters).
	False cover in the duct (in radial fans).	Check the installation instructions.

MAINTENANCE

FAN WITH EC MOTOR

Diagnosis / Failures

Status LED, Diagnostics through flash code



For motor size "D" and "G" status LED integrated in cover.



LED Code	Relay contacts 11-14 Fan alarms	Causes (Explanation)
OFF	OPEN	Power supply shut-off
ON	CLOSED	Correct operation without failures
1x	CLOSED	No release = OFF
2x	CLOSED	Temperature management activated
3x	OPEN	HALL-IC failure
4x	OPEN	Phase failure (only with type 3 ~)
5x	OPEN	Motor blocked
6x	OPEN	IGBT failure
7x	OPEN	Overvoltage of the intermediate circuit
8x	OPEN	Overvoltage of the intermediate circuit
9x	CLOSED	IGBT cooling pause
11x	OPEN	Motor start failure
12x	OPEN	Network voltage too low
13x	OPEN	Network voltage too high
14x	OPEN	Peak current failure
17x	OPEN	Temperature alarm

APPENDIX: SAFETY DATA R410A

REFRIGERANT DATA	SAFETY DATA: R410A
Toxicity	Low
Contact with Skin	R410 A vapours can irritate the skin and eyes. In liquid form, it can freeze skin on contact. If contact with skin occurs, flush the exposed area with lukewarm water until the entire chemical is removed. If there is evidence of frostbite, bathe in lukewarm water.
Contact with Eyes	If contact with eyes occurs, immediately flush with large amounts of lukewarm water for at least 15 minutes, lifting eyelids occasionally to facilitate irrigation. Seek medical attention as soon as possible.
Ingestion	Very unlikely - should something happen, it will cause frost burns. Do not induce vomiting. Only if the patient is conscious, wash out mouth with water and give some 250 ml of water to drink. Then, obtain medical attention.
Inhalation	Inhalation of the R410A vapour may cause irritation. Vapour inhalation at high concentrations may result in asphyxiation or the heart may become sensitized, causing cardiac arrhythmia. When concentration of R410A reach levels which reduce oxygen to 14-16% by displacement, symptoms of asphyxiation will occur. An individual exposed to high concentrations of R410A must be given medical attention immediately. Adequate ventilation must be provided at all times.
Medical Advice	Semiotics or support therapy is recommended. Cardiac sensitisation has been observed that, in the presence of circulating catecholamines such as adrenalin, may cause cardiac arrhythmia and accordingly, in case of exposure to high concentrations, cardiac arrest.
Prolonged Exposure	R410A: a study on the effects of exposure to 50,000 ppm during the whole life of rats has identified the development of benign testicle tumour. This situation should therefore be negligible for personnel exposed to concentrations equal to or lower than professional levels.
Professional Levels	R410A: Recommended threshold: 1000 ppm v/v - 8 hours TWA.
Stability	R410A: without specifying
Conditions to Avoid	Do not use in the presence of high temperatures, flames, burning surfaces and excess humidity.
Hazardous Reactions	Contact with certain red-hot metals may result in exothermic or explosive reactions and yield toxic and/or corrosive decomposition products. Specific materials to avoid include freshly abraded aluminium surfaces and active metals such as sodium, potassium, calcium, powdered aluminium, magnesium and zinc.
Hazardous Decomposition Products	R410A: Halogen acids produced by thermal decomposition and hydrolysis.
General Precautions	Do not inhale concentrated vapours. Their concentration in the atmosphere should not exceed the minimum pre-set values and should be maintained below the professional threshold. Being weightier than the air, the vapour concentrates on the bottom, in narrow areas. Therefore, the exhaust system must work at low level.
Respiratory System Protection	If you are in doubt about the concentration in the atmosphere, it is recommended to wear a respirator approved by an accident prevention Authority, of the independent or oxygen type.
Storage	Cylinders must be stored in a cool, dry and properly ventilated storage area away from heat, flames, corrosive chemicals, flumes, explosives and be otherwise protected from damage. Keep a temperature below 50°C.
Protective Clothing	Wear overalls, protective gloves and goggles or a mask.
Accidental Release Measures	It is important to wear protective clothing and a respirator. Stop the source of the leak, if you can do this without danger. Negligible leaks can be left evaporating under the sun, providing that the room is well ventilated. Considerable leaks: ventilate the room. Reduce the leak with sand, earth or other absorbing substances. Make sure that the liquid does is not channelled into gutters, sewers or pits where the vapours are likely to create a stuffy atmosphere.
Disposal	The best method is recovery and recycling. If this method is not practicable, dispose according to an approved procedure, which shall ensure the absorption and neutralization of acids and toxic agents.
Fire Fighting Information	R410A: Not flammable in the atmosphere.
Cylinders	The cylinders, if exposed to fire, shall be cooled by water jets; otherwise, if heated, they may explode.
Protective Fire Fighting Equipment	In case of fire, wear an independent respirator and protective clothing.



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