AERMEC
air conditioning

60Hz | R410A | FAN AXIAL | MODUCONTROL | COMPRESSOR SCROLL

HEAT PUMPS - Technical - Installation manual

HEAT PUMP

ANL 100-150HA

60Hz

- EXTERNAL UNIT
- HIGH EFFICENCY
- HOT WATER PRODUCING UP TO 122°F / 50°C
- POWER SUPPLY 60Hz

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

ETL LISTED c US Intertek

EN

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Dear Customer,
Thank you for choosing an AERMEC product. This product is the result of many years of experience and in-depth engineering research, and it is built using top quality materials and advanced technologies.
In addition, the CE mark guarantees that our appliances fully comply with the requirements of the European Machinery Directive in terms of safety. We constantly monitor the quality level of our products, and as a result they are synonymous with Safety, Quality, and Reliability.
Product data may be subject to modifications deemed necessary for improving the product without the obligation to give prior notice.

Thank you again.
AERMEC S.p.A

INDEX

Standards and Directives respected on designing and constructing the unit:

PROTECTION RATING
1. IP 24

ACOUSTIC PART:
1. ISO DIS 9614/2 (INTENSIMETRIC METHOD))
2. SOUND POWER (EN ISO 9614-2)
3. SOUND PRESSURE (EN ISO 3744)

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

STANDARD:
UL 1995
Heating and cooling equipment.

ANSI/NFPA
Standard 70 National Electrical code (N.E.C.).

CSA C.22.1.- C.22.2
Safety Standard Electrical Installation.

1. DESCRIPTION AND CHOCE OF UNIT

Chillers and heat pumps for outdoor condensed in the air with R410A Series ANL have been designed and manufactured to satisfy heating and cooling needs and the production of domestic hot water (DHW) in medium to small commercial or residential buildings.

These units, have extremely silent functioning and are highly efficient and reliable, thanks to the use of exchangers with a large exchange surface and low-noise high-efficiency scroll compressors.

They are available in the following versions:

ANL "°" Standard
ANL "H" Heat pumps

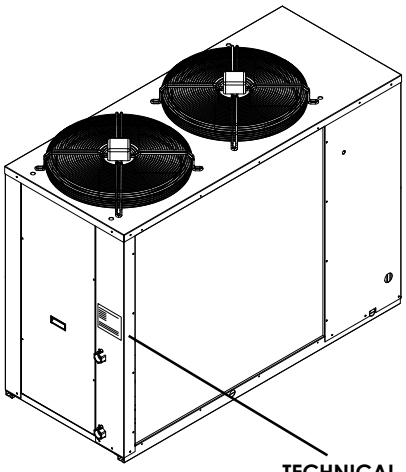
The versions can be in different set-ups at the same time in order to satisfy a wide range of plant engineering solutions:
"°" Standard
"P" Pumps
"A" Pump |Storage tank

2. PRODUCT IDENTIFICATION

ANL are identified by the following:

- PACKAGING LABEL: that includes the product identification data.
- TECHNICAL PLATE: placed on the right strut side. (see TAV.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.



TAV.1

3. CECK LIST

Chiller circuit	
Scroll compressor	Standard
Water side heat exchanger	Standard
Source side heat exchanger	Standard
Dehydrator filter	Standard
Thermostatic valve	Standard
Solenoid valve	Standard
By-pass valve of hot gas injecton	No
Indicator for liquid passage	Standard
4-way cycle reverse valve	Standard
One way valves	Standard
Liquid storage tank	Standard
High pressure switch	Standard
Low pressure switch	No
High pressure transducer	Standard
Low pressure transducer	Standard
Desuperheater	No
Tap the liquid and discharge	No

Hydraulic circuit Version "°"	ANL100	ANL150
Water filter	Standard	Standard
Differential pressure switch	Standard	Standard
Flow switch	No	No
Safety valve	No	No
Air vent	Standard	Standard
Expansion tank	No	No

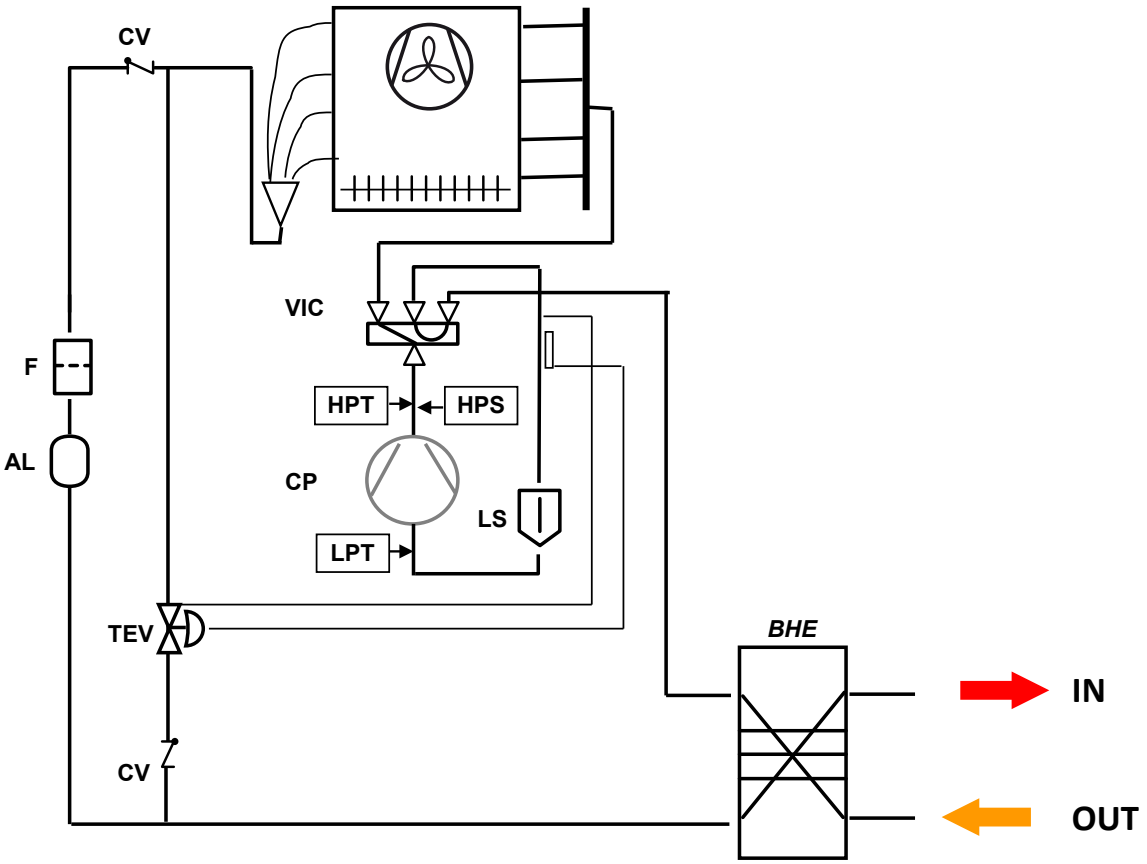
Hydraulic circuit Version "P"	100	150
Water filter	Standard	Standard
Differential pressure switch	Standard	Standard
Flow switch	No	No
Safety valve	Standard	Standard
Air vent	Standard	Standard
Pump	Standard	Standard
Expansion tank	Standard	Standard

Hydraulic circuit Version "A"	100	150
Water filter	Standard	Standard
Differential pressure switch	Standard	Standard
Flow switch	No	No
Safety valve	Standard	Standard
Air vent	Standard	Standard
Pump	Standard	Standard
Expansion tank	Standard	Standard
Storge tank	Standard	Standard

4. CONFIGURATOR

FIELD	CODE	
1, 2 ,3	ANL	
4, 5, 6	SIZE	100 -150
7	MODEL	
	H	heat pump
8	VERSION	
	°	standard
	P	with pump
	A	with storage tank and pump
9	HEAT RECOVERY	
	°	without heat recovery units
10	COILS	
	°	in aluminium
11	FIELD OF USE	
	°	temperature of water produced up to 39.2°F / +4°C
12	EVAPORATOR	
	°	standard, PED normative
13	SUPPLY	
	6	3~220-60Hz
	7	3~460-60Hz

5. MAIN COOLING LAYOUT



KEY	
CP	Compressor
HPT	High pressure transducer
HPS	High pressure switch
LPT	Low pressure transducer
VIC	Cycle reversing valve
CN	Finned coil
CV	One-way valve
F	Dehydrator filter
AL	Liquid storage tank
TEV	Thermostatic valve
BHE	Plate exchanger
V	Fan/s

6. DESCRIPTION OF COMPONENTS

6.1. CHILLER CIRCUIT

SCROLL COMPRESSORS
High efficiency scroll-type hermetic compressors, assembled on elastic antivibration supports, driven by a 2-pole electric motor with internal thermal protection. of the electric heater casing included as standard. The heater is automatically powered when the unit stops, provided that the unit is kept under tension.

WATER SIDE HEAT EXCHANGER
Of the plate-type (AISI 316), externally insulated with closed cell material to reduce thermal dispersion. Fitted, as standard, with antifreeze heater.

6.1.1. WATER FEATURES

PH	6-8
Electric conductivity	less than 200 mV/cm (77°F / 25°C)
Chloride ions	less than 50 ppm
Sulphuric acid ions	less than 50 ppm
Total iron	less than 0.3 ppm
Alkalinity M	less than 50 ppm
Total hardness	less than 50 ppm
Sulphur ions	none
ammonia ions	none
Silicone ions	less than 30 ppm

SOURCE SIDE HEAT EXCHANGER
Made with copper pipes and aluminium louvered fins blocked by mechanical expansion of the pipes. Provided with protective grid.

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

ONE WAY VALVES
Allow one-way flow of the fluid.

THERMOSTATIC VALVE
The mechanical valve, with external equaliser positioned at the evaporator inlet, modulates the flow of gas to the evaporator, according to the heat load, in order to ensure a correct heating level of the intake gas.

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

INDICATOR FOR LIQUID PASSAGE WITH HUMIDITY PRESENCE SIGNAL
Used to check the refrigerant gas load and the eventual presence of humidity in the cooling circuit.

4-WAY CYCLE REVERSE VALVE
Inverts the flow of refrigerant gas.

ONE-WAY VALVES
Allows the passage of the refrigerant in just one direction.

LIQUID STORAGE TANK
Compensates the difference in volume between louveres coil and plate exchanger, withholding excess liquid.

6.2. FRAME AND FANS

SUPPORT FRAME
Load-bearing structure Made of hot-galvanised steel sheet of a suitable thickness, varnished with polyester
powders able to resist atmospheric agents over time.

VENTILATION UNIT
Axial fan, balanced statically and dynamically. The electric fans are protected electrically by magnet-circuit breakers and mechanically by anti-intrusion metal grids, according to the IEC EN 60335-2-40 Standard.

6.3. HYDRAULIC CIRCUIT STANDARD COMPONENTS

WATER FILTER
Equipped with steel filtering mesh; prevents the heat exchangers from clogging.
It is indispensable in order to prevent serious damage to the plate exchanger.

DIFFERENTIAL PRESSURE SWITCH
It checks that here is water circulation inside the heat exchangers. Adversary, it blocks the unit.

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

AIR VENT
Assembled on the upper part of the hydraulic system; it releases any air bubbles that may be present in the system.

6.4. HYDRAULIC COMPONENTS FOR CONFIGURABLE VERSIONS

CIRCULATION PUMP
Depending on the characteristics of the pump chosen, it offers a useful head to overcome the pressure drops in the system.

EXPANSION TANK
With nitrogen pre-load membrane.

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

STORAGE TANK
In order to reduce the thermal dispersion and eliminate the phenomenon of the formation of condensation, it is insulated with polyurethane material of a suitable thickness.
It is required to reduce the number of peaks of the compressor and to even the temperature

of water to be sent to the utilities.

6.5. SAFETY AND CONTROL COMPONENTS

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

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

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.

6.6. ELECTRIC COMPONENTS

Electric Control Board
Contains the power section and the management of controls and safety devices. It is in compliance with the IEC 60204-1 Standard and the Directives regarding electromagnetic compatibility EMC 89/336/EEC and 92/31/EEC.

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

Control board
Allows complete control of the appliance.
For a more in-depth description please refer to the user manual.

- compressors magnet circuit-breaker protection.
- fans magnet-circuit breakers protection;
- auxiliary magnet circuit-breaker protection
- Heat exchanger inlet/outlet water temperature probes
- Gas temperature probe one on the for pressing line and coil
- External air temperature probe

► For further information please refer to user manual

Electric Regolation
MODU CONTROL

Temperature control of the output water with proportional-integral algorithm: maintains average output temperature at value set

- Self-adapting differential switch: guarantees minimum functioning times of the compressor in systems with low water content.
- Intelligent defrosting for pressure reduction: allows to determine when the coil is effectively defrosted, avoiding useless defrosting
- Set-point compensation with external temperature: reduces energy consumption
- Pre-alarms with automatic reset: in the case of alarm, a certain number of re-starts are allowed before the definitive block alarm on the ΔT: to identify wiring errors (reverse rotation) or blocked cycle reversing valve
- Compressor functioning hours count.
- Compressor peak count.
- Historical alarms
- Autostart after voltage drop.
- Local or remote control

Display of the start of the unit:

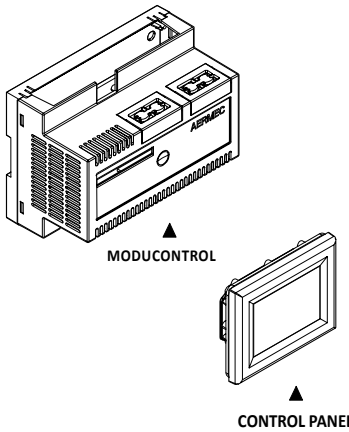
1. Voltage presence
2. compressor ON/OFF
3. functioning mode (hot/cold)
4. alarm active

Probes, transducers and parameters display

1. Water outlet
2. water inlet
3. Coil temperature (heat pumps)
4. Pressing gas temperature
5. External air temperature (heat pumps)
6. Pressure delivery (heat pumps)
7. Intake pressure (heat pumps)
8. Temperature error (sum of the proportional and integral error)
9. Stand-by times for start-up/switch-off of the compressor
10. Alarms management:
11. Low pressure
12. High pressure (primary alarm: switch directly blocks supply to compressor)
13. High discharge temperature
14. Anti-freeze
15. Water differential flow switch. Alarm on the ΔT

- Alarms with automatic reset with limited number of re-starts before blocking.
- ON/OFF external contact
- Change season from external contact

For further information please refer to user manual.



7. ACCESSORIES COMPATIBILTY TABLE

VT
Group of anti-vibration, to be installed under the base.

ANL	MODELS	100	150
MECHANICAL ACCESSORY			
VT	P		
	A	15	15

8. TECHNICAL DATA

TECHNICAL DATA	MODELS	POWER SUPPLY	M.U.	ANL100	ANL150
COOLING MODE					
Cooling capacity	Alls	Alls	Tons	6,57	8,16
Total input power	H	Alls	kW	8,24	9,48
	HP-HA	Alls	kW	8,99	10,98
Water flow rate	Alls	Alls	gpm	16	20
Evaporator pressure drops	H	-	psi	3,80	3,52
Filter pressure drop	H	-	psi	0,55	0,84
Total pressure drop	H	-	psi	4,35	4,36
Useful head	HP-HA	-	psi	14,65	19,14
HEATING MODE					
Heating capacity	Alls	Alls	BTU/h	94755	111850
Total input power	H	Alls	kW	8,29	9,57
	HP-HA	Alls	kW	9,04	11,07
Water flow rate	Alls	Alls	gpm	21	25
Evaporator pressure drops	H	-	psi	6,38	5,15
Filter pressure drop	H	-	psi	0,96	1,31
Total pressure drop	H	-	psi	7,34	6,45
Useful head	HP-HA	-	psi	10,44	14,94
ENERGY INDEX					
EER	H	Alls	W/W	9,58	10,34
	HP-HA	Alls	W/W	8,78	8,92
COP	H	Alls	W/W	3,35	3,43
	HP-HA	Alls	W/W	3,07	2,96
IPLV	Alls	Alls	BTU/W	16,39	17,73
ELECTRICAL DATA					
Imput current on COOLING	H	220-3-60	A	31,40	36,70
	H	460-3-60	A	17,10	19,64
	HP-HA	220-3-60	A	34,26	42,51
	HP-HA	460-3-60	A	18,66	22,75
Imput current on HEATING	H	220-3-60	A	31,59	37,05
	H	460-3-60	A	17,21	19,83
	HP-HA	220-3-60	A	34,45	42,86
	HP-HA	460-3-60	A	18,76	22,93
Peak current (LRA)	H	220-3-60	A	167,40	192,20
	H	460-3-60	A	81,40	94,30
	HP-HA	220-3-60	A	171,00	198,40
	HP-HA	460-3-60	A	83,40	97,50
MCA	H	220-3-60	A	51,30	60,60
	H	460-3-60	A	25,50	31,80
	HP-HA	220-3-60	A	54,90	66,80
	HP-HA	460-3-60	A	27,50	35,00
MOP	H	220-3-60	A	70,00	80,00
	H	460-3-60	A	35,00	45,00
	HP-HA	220-3-60	A	75,00	90,00
	HP-HA	460-3-60	A	35,00	45,00

HEATING (AHRI CONDITIONS)

Inlet water temperature	**40°C / 104°F**
Outlet water temperature	**45°C / 113°F**
External air temperature	**7°C / 44.6°F b.s** **6°C / 42.8°F b.u.**

COOLING (AHRI CONDITIONS)

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

AHRI conditions: leaving water 6,7°C / 44,6°F
flow rate 0,043 l/s per kW (full load)
Load 100% air 35°C / 95°F
Load 75% air 26,7°C / 80,06°F
Load 50% air 18,3°C / 64,94°F
Load 25% air 12,8°C / 55,04°F

SOUND POWER
Aermec determines sound power values in agreement with the 9614-2 Standard.

SOUND PRESSURE
Sound pressure measured in free field conditions with reflective surface (directivity factor Q=2) at 394 in/10mt distance from external surface of unit, in compliance with ISO 3744 regulations.

TECHNICAL DATA	MODELS	POWER SUPPLY	M.U.	ANL100	ANL150
IP PROTECTION					
IP	Alls	-	-	24	24
SCROLL COMPRESSORS					
Number / Circuit	Alls	-	n°/n°	2 / 1	2 / 1
Resistance sump compressor	Alls	-	n° x W	2 x 35	2 x 35
Capacity controls	Alls	-	%	0 - 50 - 100	0 - 50 - 100
CHARGE					
R410A refrigerant	Alls	-	lib	28,0	35,3
Oil compressor	Alls	-	lib	3,5	3,5
SYSTEM SIDE EXCHANGER					
Quantity	Alls	-	n°	1,00	1,00
Water content	Alls	-	dm3	1,90	2,50
Hydraulic connection	Alls	-	Ø	1"¼	1"¼
HYDRONIC KIT SYSTEM SIDE					
Storage tank	HA	-	n°/gl	1/26,42	1/26,42
EXPANSION VASSEL					
Expansion vassel	HP-HA	-	n°/gl	1/2,11	1/2,11
Expansion vassel calibration	HP-HA	-	bar	1,50	1,50
PUMP					
Imput power	-	-	kW	0,75	1,50
Imput current	-	220-3-60	A	**3,6**	**6,2**
	-	460-3-60	A	2,0	3,2
SAFETY VALVE					
Safety valve	-	-	n°/bar	1/6	1/6
FAN					
Quantity	-	-	n°	2	2
Air flow	-	-	cfm	7775	7068
Input current	-		A	2	2
Input power	-	-	kW	0,6	0,6
SOUND DATA					
Sound pressure	-	-	db(A)	76	77
Sound power	-	-	db(A)	44	45
DIMENSION					
Height	-	-	in	57	57
Width	-	-	in	30	30
Depth	-	-	in	69	69
Weight	H	-	lib	650	710
	HP	-	lib	690	756
	HA	-	lib	800	866

HEATING (AHRI CONDITIONS)
Inlet water temperature **40°C / 104°F**
Outlet water temperature **45°C / 113°F**
External air temperature **7°C / 44.6°F b.s**
6°C / 42.8°F b.u.

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

AHRI conditions: leaving water 6,7°C / 44,6°F
flow rate 0,043 l/s per kW (full load)
Load 100% air 35°C / 95°F
Load 75% air 26,7°C / 80,06°F
Load 50% air 18,3°C / 64,94°F
Load 25% air 12,8°C / 55,04°F

SOUND POWER
Aermec determines sound power values in agreement with the 9614-2 Standard.

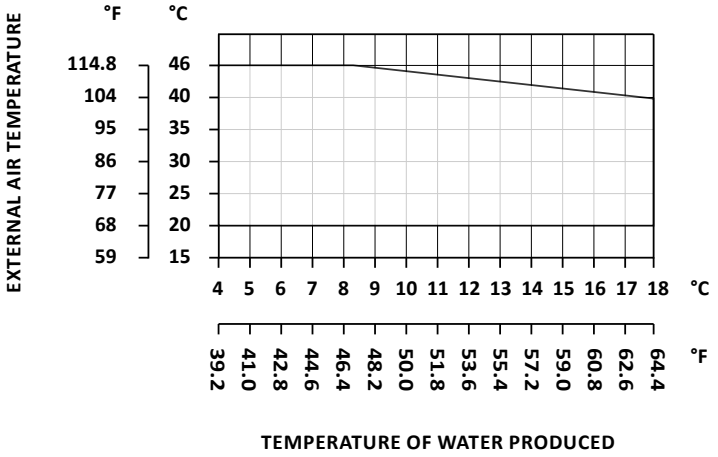
SOUND PRESSURE
Sound pressure measured in free field conditions with reflective surface (directivity factor Q=2) at 394 in/10mt distance from external surface of unit, in compliance with ISO 3744 regulations.

9. OPERATING LIMITS

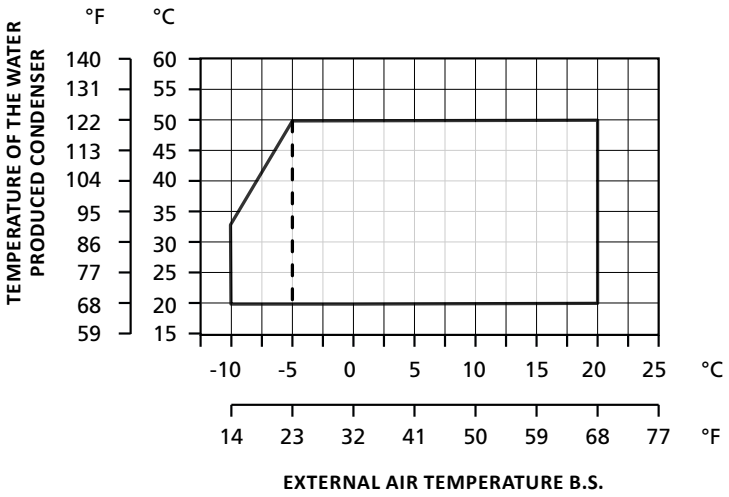
The devices in their standard configuration, are not suitable for installation in a saline environment. To the limits of operation, please refer to the diagram, valid for AHRI standard conditions.

Wind breaks should be implemented if the unit is installed in particularly windy areas, to prevent a malfunction of the unit.

9.1. COOLING MODE



9.2. HEATING MODE (FOR HEATING PUMP)



9.3. PROJECT DATA

		High pressure side	Low pressure side
Acceptable maximum pressure	bar	42	25
Acceptable maximum temperature	°C	120	52
Acceptable minimum temperature	°C	-10	-16

ATTENTION
When the unit is installed in particularly windy areas, we recommend installing wind barriers if wind speed exceeds 2.5 m/s”

ATTENTION
Contact our technical sales department if the unit needs to operated outside the operating limits.

10. PERFORMANCE IN COOLING MODE

10.1. ANL 100

Temp. of water produced (C°)	Temp. of water produced (F°)	External air temeperature																	
		20°C			25°C			30°C			35°C			40°C			46°C		
		68°F			77°F			86°F			95°F			104°F			114.8°F		
		Pc	Pe	EER	Pc	Pe	EER	Pc	Pe	EER	Pc	Pe	EER	Pc	Pe	EER	Pc	Pe	EER
		Tons	kW	BTU/h/W	Tons	kW	BTU/h/W	Tons	kW	BTU/h/W	Tons	kW	BTU/h/W	Tons	kW	BTU/h/W	Tons	kW	BTU/h/W
4	39.2	7,49	5,69	15,82	7,07	6,49	13,07	6,63	7,35	10,84	6,20	8,10	9,20	5,76	8,78	7,88	5,25	9,35	6,74
6	42.8	7,79	5,69	16,45	7,35	6,54	13,50	6,90	7,39	11,23	6,46	8,15	9,51	6,01	8,87	8,13	5,48	9,43	6,98
7	44.6	7,94	5,78	16,51	7,49	6,58	13,67	7,04	7,44	11,38	**6,57**	**8,24**	**9,58**	6,13	8,87	8,31	5,60	9,48	7,09
8	46.4	8,09	5,82	16,71	7,64	6,63	13,84	7,18	7,47	11,54	6,71	8,24	9,78	6,25	8,91	8,42	5,71	9,49	7,23
10	50	8,39	5,87	17,18	7,92	6,72	14,16	7,45	7,52	11,89	6,96	8,33	10,04	6,49	8,96	8,70	-	-	-
12	53.6	8,68	5,92	17,63	8,20	6,76	14,57	7,70	7,61	12,15	7,22	8,38	10,35	6,73	9,01	8,98	-	-	-
14	57.2	8,97	6,00	17,95	8,46	6,81	14,93	7,97	7,66	12,49	7,46	8,42	10,64	6,96	9,04	9,25	-	-	-
16	60.8	9,25	6,04	18,38	8,74	6,85	15,33	8,22	7,70	12,82	7,70	8,47	10,93	7,19	9,09	9,50	-	-	-
18	64.4	9,52	6,09	18,78	9,00	6,95	15,57	8,47	7,79	13,07	7,94	8,50	11,22	7,44	9,18	9,73	-	-	-

10.2. ANL 150

Temp. of water produced (C°)	Temp. of water produced (F°)	External air temeperature																	
		20			25			30			35			40			46		
		68°F			77°F			86°F			95°F			104°F			114.8°F		
		Pc	Pe	EER	Pc	Pe	EER	Pc	Pe	EER	Pc	Pe	EER	Pc	Pe	EER	Pc	Pe	EER
		Tons	kW	BTU/h/W	Tons	kW	BTU/h/W	Tons	kW	BTU/h/W	Tons	kW	BTU/h/W	Tons	kW	BTU/h/W	Tons	kW	BTU/h/W
4	39.2	9,30	6,55	17,07	8,77	7,47	14,11	8,23	8,45	11,69	7,70	9,32	9,92	7,15	10,10	8,51	6,52	10,76	7,28
6	42.8	9,68	6,55	17,75	9,13	7,53	14,57	8,57	8,50	12,12	8,01	9,38	10,26	7,46	10,20	8,78	6,80	10,85	7,53
7	44.6	9,86	6,65	17,82	9,30	7,57	14,75	8,74	8,55	12,28	**8,16**	**9,48**	**10,34**	7,62	10,20	8,97	6,95	10,91	7,65
8	46.4	10,05	6,69	18,03	9,49	7,63	14,94	8,92	8,60	12,45	8,33	9,48	10,55	7,76	10,25	9,09	7,09	10,92	7,80
10	50	10,42	6,75	18,54	9,83	7,73	15,28	9,25	8,66	12,83	8,65	9,58	10,84	8,06	10,30	9,39	-	-	-
12	53.6	10,78	6,81	19,02	10,18	7,78	15,72	9,56	8,76	13,11	8,96	9,64	11,16	8,36	10,36	9,69	-	-	-
14	57.2	11,14	6,91	19,37	10,50	7,83	16,11	9,89	8,81	13,48	9,26	9,68	11,48	8,65	10,41	9,98	-	-	-
16	60.8	11,48	6,95	19,83	10,85	7,88	16,54	10,20	8,86	13,83	9,56	9,74	11,79	8,93	10,46	10,25	-	-	-
18	64.4	11,82	7,01	20,26	11,18	7,99	16,80	10,52	8,96	14,10	9,86	9,78	12,10	9,23	10,56	10,50	-	-	-

KEY
Pc: Cooling capacity
Pe: Input power

IN COOLING MODE

- Inlet water temperature	12°C / 53.6°F
- Outlet water temeprature	7°C / 44.6°F
- External air temeperature	35°C / 95°F
- Δt	5°C / 41°F

10.3. ANL 100 HP-HA

Temp. of water produced (C°)	Temp. of water produced (F°)	External air temeperature																	
		20°C			25°C			30°C			35°C			40°C			46°C		
		68°F			77°F			86°F			95°F			104°F			114.8°F		
		Pc	Pe	EER	Pc	Pe	EER	Pc	Pe	EER	Pc	Pe	EER	Pc	Pe	EER	Pc	Pe	EER
		Tons	kW	BTU/h/W	Tons	kW	BTU/h/W	Tons	kW	BTU/h/W	Tons	kW	BTU/h/W	Tons	kW	BTU/h/W	Tons	kW	BTU/h/W
4	39.2	7,49	6,21	14,50	7,07	7,08	11,98	6,63	8,02	9,93	6,20	8,84	8,43	5,76	9,58	7,23	5,25	10,20	6,18
6	42.8	7,79	6,21	15,08	7,35	7,14	12,37	6,90	8,06	10,29	6,46	8,89	8,72	6,01	9,67	7,46	5,48	10,29	6,40
7	44.6	7,94	6,30	15,13	7,49	7,18	12,53	7,04	8,11	10,43	**6,57**	**8,99**	**8,78**	6,13	9,67	7,62	5,60	10,34	6,50
8	46.4	8,09	6,35	15,32	7,64	7,23	12,69	7,18	8,16	10,58	6,71	8,99	8,96	6,25	9,72	7,72	5,71	10,35	6,62
10	50	8,39	6,40	15,75	7,92	7,33	12,98	7,45	8,21	10,90	6,96	9,09	9,21	6,49	9,77	7,98	-	-	-
12	53.6	8,68	6,45	16,16	8,20	7,37	13,35	7,70	8,31	11,14	7,22	9,14	9,48	6,73	9,82	8,23	-	-	-
14	57.2	8,97	6,55	16,45	8,46	7,43	13,68	7,97	8,36	11,45	7,46	9,18	9,76	6,96	9,87	8,48	-	-	-
16	60.8	9,25	6,59	16,85	8,74	7,47	14,05	8,22	8,40	11,75	7,70	9,24	10,01	7,19	9,92	8,71	-	-	-
18	64.4	9,52	6,65	17,21	9,00	7,58	14,27	8,47	8,50	11,98	7,94	9,28	10,28	7,44	10,02	8,92	-	-	-

10.4. ANL 150 HP-HA

Temp. of water produced (C°)	Temp. of water produced (F°)	External air temeperature																	
		20°C			25°C			30°C			35°C			40°C			46°C		
		68°F			77°F			86°F			95°F			104°F			114.8°F		
		Pc	Pe	EER	Pc	Pe	EER	Pc	Pe	EER	Pc	Pe	EER	Pc	Pe	EER	Pc	Pe	EER
		Tons	kW	BTU/h/W	Tons	kW	BTU/h/W	Tons	kW	BTU/h/W	Tons	kW	BTU/h/W	Tons	kW	BTU/h/W	Tons	kW	BTU/h/W
4	39.2	9,30	7,58	14,74	8,77	8,65	12,18	8,23	9,79	10,09	7,70	10,80	8,57	7,15	11,70	7,35	6,52	12,46	6,28
6	42.8	9,68	7,58	15,33	9,13	8,72	12,58	8,57	9,84	10,46	8,01	10,86	8,86	7,46	11,82	7,58	6,80	12,57	6,50
7	44.6	9,86	7,70	15,38	9,30	8,77	12,74	8,74	9,91	10,60	**8,16**	**10,98**	**8,92**	7,62	11,82	7,74	6,95	12,63	6,61
8	46.4	10,05	7,75	15,57	9,49	8,84	12,90	8,92	9,96	10,75	8,33	10,98	9,11	7,76	11,87	7,85	7,09	12,65	6,73
10	50	10,42	7,82	16,01	9,83	8,95	13,19	9,25	10,03	11,08	8,65	11,10	9,36	8,06	11,93	8,11	-	-	-
12	53.6	10,78	7,88	16,42	10,18	9,01	13,57	9,56	10,14	11,32	8,96	11,16	9,64	8,36	12,00	8,37	-	-	-
14	57.2	11,14	8,00	16,72	10,50	9,07	13,91	9,89	10,21	11,64	9,26	11,22	9,92	8,65	12,05	8,62	-	-	-
16	60.8	11,48	8,05	17,12	10,85	9,12	14,28	10,20	10,26	11,94	9,56	11,28	10,18	8,93	12,12	8,85	-	-	-
18	64.4	11,82	8,12	17,49	11,18	9,25	14,51	10,52	10,38	12,17	9,86	11,33	10,45	9,23	12,23	9,06	-	-	-

KEY
Pc: Cooling capacity
Pe: Input power

IN COOLING MODE

- Inlet water temperature	12°C / 53.6°F
- Outlet water temeprature	7°C / 44.6°F
- External air temperature	35°C / 95°F
- Δt	5°C / 41°F

11. PERFORMANCE IN HEATING MODE

11.1. ANL 100 H

External air temperature °C	External air temperature °F	Water temperature produced																					
		20°C			25°C			30°C			35°C			40°C			45°C			50°C		
		68°F			77°F			86°F			95°F			104°F			113°F			122°F		
		Ph	Pe	COP	Ph	Pe	COP	Ph	Pe	COP	Ph	Pe	COP	Ph	Pe	COP	Ph	Pe	COP	Ph	Pe	COP
		BTU/h	Kw	W/W	BTU/h	Kw	W/W	BTU/h	Kw	W/W	BTU/h	Kw	W/W	BTU/h	Kw	W/W	BTU/h	Kw	W/W	BTU/h	Kw	W/W
-10	14	61624	0,63	28,82	60676	4,27	4,16	59696	6,32	2,77	58585	7,33	2,34	-	-	-	-	-	-	-	-	-
-8	17.6	65937	0,62	31,32	64466	4,27	4,42	63094	6,32	2,92	61689	7,32	2,47	60121	7,78	2,26	-	-	-	-	-	-
-6	21.2	70184	0,62	33,34	68191	4,27	4,68	66427	6,32	3,08	64760	7,32	2,59	63029	7,78	2,37	61166	8,24	2,18	-	-	-
-4	24.8	74399	0,62	35,34	71883	4,27	4,93	69694	6,32	3,23	67766	7,32	2,71	65904	7,79	2,48	64009	8,25	2,27	61983	9,24	1,97
-2	28.4	78516	0,63	36,73	75510	4,27	5,18	72961	6,33	3,38	70740	7,33	2,83	68747	7,79	2,59	66819	8,25	2,37	64891	9,24	2,06
0	32	82633	0,64	38,07	79104	4,28	5,42	76164	6,33	3,52	73680	7,33	2,95	71524	7,80	2,69	69629	8,26	2,47	67799	9,25	2,15
2	35.6	77928	0,64	35,90	78614	4,29	5,37	78124	6,34	3,61	76784	7,34	3,07	74922	7,80	2,82	72929	8,27	2,58	71099	9,26	2,25
4	39.2	97140	0,65	44,08	94821	4,30	6,46	92893	6,35	4,29	91194	7,35	3,64	89560	7,81	3,36	87861	8,28	3,11	85900	9,27	2,71
6	42.8	103381	0,66	46,22	100702	4,31	6,85	98447	6,36	4,53	96422	7,35	3,84	94526	7,82	3,54	92533	8,29	3,27	90311	9,28	2,85
7	44.6	106355	0,67	46,86	103479	4,31	7,04	101029	6,37	4,65	98872	7,45	3,89	96814	7,83	3,62	**94755**	**8,29**	**3,35**	92337	9,28	2,92
8	46.4	109197	0,67	48,11	106158	4,32	7,20	103545	6,37	4,76	101225	7,36	4,03	99003	7,83	3,71	96716	8,30	3,42	94232	9,29	2,97
10	50	114752	0,67	49,84	111321	4,33	7,54	108315	6,38	4,97	105636	7,37	4,20	103087	7,84	3,86	100506	8,30	3,55	97761	9,30	3,08
12	53.6	120143	0,68	51,45	116287	4,34	7,86	112922	6,39	5,18	109883	7,38	4,36	106975	7,85	4,00	104067	8,31	3,67	100996	9,31	3,18
14	57.2	125534	0,69	53,01	121254	4,34	8,19	117464	6,40	5,38	114033	7,39	4,52	110798	7,86	4,13	107531	8,32	3,79	104133	9,31	3,28
16	60.8	131024	0,70	54,57	126318	4,35	8,52	122136	6,40	5,59	118281	7,39	4,69	114654	7,87	4,27	111027	8,33	3,91	107302	9,32	3,37
18	64.4	136807	0,70	56,98	131644	4,35	8,87	127005	6,41	5,81	122724	7,40	4,86	118705	7,87	4,42	114719	8,33	4,04	110602	9,32	3,48
20	68	143015	0,70	59,56	137330	4,35	9,26	132232	6,41	6,05	127560	7,40	5,05	123084	7,87	4,59	118705	8,33	4,18	114229	9,32	3,59

11.2. ANL 150 H

External air temperature °C	External air temperature °F	Water temperature produced																					
		20°C			25°C			30°C			35°C			40°C			45°C			50°C		
		68°F			77°F			86°F			95°F			104°F			113°F			122°F		
		Ph	Pe	COP	Ph	Pe	COP	Ph	Pe	COP	Ph	Pe	COP	Ph	Pe	COP	Ph	Pe	COP	Ph	Pe	COP
		BTU/h	Kw	W/W	BTU/h	Kw	W/W	BTU/h	Kw	W/W	BTU/h	Kw	W/W	BTU/h	Kw	W/W	BTU/h	Kw	W/W	BTU/h	Kw	W/W
-10	14	72741	0,72	29,47	71623	4,93	4,26	70466	7,30	2,83	69154	8,46	2,40	-	-	-	-	-	-	-	-	-
-8	17.6	77832	0,71	32,03	76097	4,93	4,52	74477	7,30	2,99	72818	8,45	2,53	70967	8,98	2,32	-	-	-	-	-	-
-6	21.2	82846	0,71	34,09	80493	4,93	4,79	78411	7,30	3,15	76444	8,45	2,65	74400	8,98	2,43	72201	9,51	2,22	-	-	-
-4	24.8	87822	0,71	36,14	84852	4,93	5,04	82268	7,30	3,30	79992	8,45	2,78	77794	8,99	2,54	75557	9,53	2,32	73165	10,67	2,01
-2	28.4	92681	0,72	37,55	89133	4,93	5,30	86125	7,31	3,45	83502	8,46	2,89	81149	8,99	2,65	78874	9,53	2,43	76598	10,67	2,10
0	32	97541	0,73	38,92	93375	4,94	5,54	89904	7,31	3,60	86973	8,46	3,01	84427	9,00	2,75	82190	9,54	2,53	80031	10,68	2,20
2	35.6	91987	0,73	36,71	92797	4,95	5,49	92218	7,32	3,69	90637	8,47	3,14	88439	9,00	2,88	86086	9,55	2,64	83926	10,69	2,30
4	39.2	114666	0,75	45,07	111927	4,96	6,61	109652	7,33	4,38	107646	8,48	3,72	105718	9,01	3,44	103712	9,56	3,18	101398	10,71	2,78
6	42.8	122032	0,76	47,26	118870	4,97	7,00	116208	7,34	4,64	113817	8,49	3,93	111580	9,02	3,62	109227	9,57	3,34	106605	10,72	2,92
7	44.6	125542	0,77	47,92	122148	4,97	7,20	119255	7,36	4,75	116710	8,60	3,98	114280	9,04	3,71	**111850**	**9,57**	**3,43**	108996	10,72	2,98
8	46.4	128897	0,77	49,20	125311	4,99	7,37	122225	7,36	4,87	119487	8,50	4,12	116864	9,04	3,79	114164	9,58	3,49	111233	10,73	3,04
10	50	135454	0,78	50,96	131404	5,00	7,71	127856	7,37	5,09	124693	8,51	4,29	121685	9,05	3,94	118638	9,58	3,63	115398	10,74	3,15
12	53.6	141818	0,79	52,61	137267	5,01	8,03	133294	7,38	5,29	129707	8,52	4,46	126275	9,06	4,09	122842	9,59	3,75	119217	10,75	3,25
14	57.2	148182	0,80	54,20	143129	5,01	8,38	138655	7,39	5,50	134606	8,54	4,62	130787	9,07	4,23	126930	9,60	3,87	122919	10,75	3,35
16	60.8	154662	0,81	55,80	149108	5,02	8,71	144171	7,39	5,72	139620	8,54	4,79	135339	9,08	4,37	131057	9,61	3,99	126660	10,76	3,45
18	64.4	161488	0,81	58,26	155394	5,02	9,07	149918	7,40	5,94	144865	8,55	4,97	140121	9,08	4,52	135416	9,61	4,13	130556	10,76	3,56
20	68	168816	0,81	60,90	162105	5,02	9,47	156089	7,40	6,18	150573	8,55	5,16	145289	9,08	4,69	140121	9,61	4,27	134837	10,76	3,67

KEY
Ph: Heathing capacity
Pe: Input power

IN HEATING MODE

- Inlet water temperature	40°C / 104°F
- Outlet water temperature	45°C / 113°F
- External air temperature	b.s. 7°C / 44.6°F
- Δt	5°C / 41°F

11.3. ANL 100 HP-HA

External air temperature °C	External air temperature °F	Water temperature produced																				
		20°C			25°C			30°C			35°C			40°C			45°C			50°C		
		68°F			77°F			86°F			95°F			104°F			113°F			122°F		
		Ph	Pe	COP	Ph	Pe	COP	Ph	Pe	COP	Ph	Pe	COP	Ph	Pe	COP	Ph	Pe	COP	Ph	Pe	COP
		BTU/h	Kw	W/W	BTU/h	Kw	W/W	BTU/h	Kw	W/W	BTU/h	Kw	W/W	BTU/h	Kw	W/W	BTU/h	Kw	W/W	BTU/h	Kw	W/W
-10	14	61624	0,68	26,43	60676	4,66	3,82	59696	6,90	2,54	58585	7,99	2,15	-	-	-	-	-	-	-	-	-
-8	17.6	65937	0,67	28,72	64466	4,66	4,06	63094	6,90	2,68	61689	7,98	2,27	60121	8,48	2,08	-	-	-	-	-	-
-6	21.2	70184	0,67	30,57	68191	4,66	4,29	66427	6,90	2,82	64760	7,98	2,38	63029	8,48	2,18	61166	8,99	1,99	-	-	-
-4	24.8	74399	0,67	32,41	71883	4,66	4,52	69694	6,90	2,96	67766	7,98	2,49	65904	8,49	2,27	64009	9,00	2,08	61983	10,08	1,80
-2	28.4	78516	0,68	33,68	75510	4,66	4,75	72961	6,91	3,10	70740	7,99	2,60	68747	8,49	2,37	66819	9,00	2,18	64891	10,08	1,89
0	32	82633	0,69	34,91	79104	4,67	4,97	76164	6,91	3,23	73680	7,99	2,70	71524	8,50	2,46	69629	9,01	2,27	67799	10,09	1,97
2	35.6	77928	0,69	32,92	78614	4,68	4,93	78124	6,92	3,31	76784	8,00	2,81	74922	8,50	2,58	72929	9,02	2,37	71099	10,10	2,06
4	39.2	97140	0,70	40,42	94821	4,69	5,93	92893	6,93	3,93	91194	8,01	3,34	89560	8,51	3,08	87861	9,03	2,85	85900	10,11	2,49
6	42.8	103381	0,71	42,39	100702	4,70	6,28	98447	6,94	4,16	96422	8,02	3,52	94526	8,52	3,25	92533	9,04	3,00	90311	10,12	2,61
7	44.6	106355	0,73	42,97	103479	4,70	6,45	101029	6,95	4,26	98872	8,13	3,57	96814	8,54	3,32	**94755**	**9,04**	**3,07**	92337	10,12	2,67
8	46.4	109197	0,73	44,12	106158	4,71	6,61	103545	6,95	4,37	101225	8,03	3,69	99003	8,54	3,40	96716	9,05	3,13	94232	10,13	2,73
10	50	114752	0,74	45,71	111321	4,72	6,91	108315	6,96	4,56	105636	8,04	3,85	103087	8,55	3,54	100506	9,05	3,25	97761	10,14	2,82
12	53.6	120143	0,75	47,18	116287	4,73	7,20	112922	6,97	4,75	109883	8,05	4,00	106975	8,56	3,66	104067	9,06	3,37	100996	10,15	2,91
14	57.2	125534	0,76	48,61	121254	4,73	7,51	117464	6,98	4,93	114033	8,06	4,15	110798	8,57	3,79	107531	9,07	3,47	104133	10,15	3,01
16	60.8	131024	0,77	50,04	126318	4,74	7,81	122136	6,98	5,13	118281	8,06	4,30	114654	8,58	3,92	111027	9,08	3,58	107302	10,16	3,09
18	64.4	136807	0,77	52,25	131644	4,74	8,14	127005	6,99	5,32	122724	8,07	4,46	118705	8,58	4,06	114719	9,08	3,70	110602	10,16	3,19
20	68	143015	0,77	54,62	137330	4,74	8,49	132232	6,99	5,54	127560	8,07	4,63	123084	8,58	4,21	118705	9,08	3,83	114229	10,16	3,29

11.4. ANL 150 HP-HA

External air temperature °C	External air temperature °F	Water temperature produced																				
		20°C			25°C			30°C			35°C			40°C			45°C			50°C		
		68°F			77°F			86°F			95°F			104°F			113°F			122°F		
		Ph	Pe	COP	Ph	Pe	COP	Ph	Pe	COP	Ph	Pe	COP	Ph	Pe	COP	Ph	Pe	COP	Ph	Pe	COP
		BTU/h	Kw	W/W	BTU/h	Kw	W/W	BTU/h	Kw	W/W	BTU/h	Kw	W/W	BTU/h	Kw	W/W	BTU/h	Kw	W/W	BTU/h	Kw	W/W
-10	14	72741	0,84	25,48	71623	5,70	3,68	70466	8,44	2,45	69154	9,78	2,07	-	-	-	-	-	-	-	-	-
-8	17.6	77832	0,82	27,69	76097	5,70	3,91	74477	8,44	2,58	72818	9,77	2,18	70967	10,39	2,00	-	-	-	-	-	-
-6	21.2	82846	0,82	29,47	80493	5,70	4,14	78411	8,44	2,72	76444	9,77	2,29	74400	10,39	2,10	72201	11,01	1,92	-	-	-
-4	24.8	87822	0,82	31,24	84852	5,70	4,36	82268	8,44	2,86	79992	9,77	2,40	77794	10,40	2,19	75557	11,02	2,01	73165	12,34	1,74
-2	28.4	92681	0,84	32,46	89133	5,70	4,58	86125	8,46	2,98	83502	9,78	2,50	81149	10,40	2,29	78874	11,02	2,10	76598	12,34	1,82
0	32	97541	0,85	33,65	93375	5,72	4,79	89904	8,46	3,12	86973	9,78	2,61	84427	10,41	2,38	82190	11,03	2,18	80031	12,36	1,90
2	35.6	91987	0,85	31,73	92797	5,73	4,75	92218	8,47	3,19	90637	9,80	2,71	88439	10,41	2,49	86086	11,04	2,28	83926	12,37	1,99
4	39.2	114666	0,86	38,97	111927	5,74	5,71	109652	8,48	3,79	107646	9,81	3,22	105718	10,43	2,97	103712	11,06	2,75	101398	12,38	2,40
6	42.8	122032	0,88	40,86	118870	5,75	6,05	116208	8,50	4,01	113817	9,82	3,40	111580	10,44	3,13	109227	11,07	2,89	106605	12,40	2,52
7	44.6	125542	0,89	41,43	122148	5,75	6,22	119255	8,51	4,11	116710	9,95	3,44	114280	10,45	3,20	**111850**	**11,07**	**2,96**	108996	12,40	2,58
8	46.4	128897	0,89	42,53	125311	5,77	6,37	122225	8,51	4,21	119487	9,83	3,56	116864	10,45	3,28	114164	11,08	3,02	111233	12,41	2,63
10	50	135454	0,90	44,06	131404	5,78	6,66	127856	8,52	4,40	124693	9,85	3,71	121685	10,47	3,41	118638	11,08	3,14	115398	12,42	2,72
12	53.6	141818	0,91	45,48	137267	5,79	6,95	133294	8,53	4,58	129707	9,86	3,86	126275	10,48	3,53	122842	11,10	3,24	119217	12,43	2,81
14	57.2	148182	0,93	46,86	143129	5,79	7,24	138655	8,55	4,75	134606	9,87	4,00	130787	10,49	3,65	126930	11,11	3,35	122919	12,43	2,90
16	60.8	154662	0,94	48,24	149108	5,81	7,53	144171	8,55	4,94	139620	9,87	4,14	135339	10,50	3,78	131057	11,12	3,45	126660	12,45	2,98
18	64.4	161488	0,94	50,37	155394	5,81	7,84	149918	8,56	5,13	144865	9,89	4,29	140121	10,50	3,91	135416	11,12	3,57	130556	12,45	3,07
20	68	168816	0,94	52,65	162105	5,81	8,18	156089	8,56	5,34	150573	9,89	4,46	145289	10,50	4,05	140121	11,12	3,69	134837	12,45	3,17

KEY
Ph: Heathing capacity
Pe: Input power

IN HEATING MODE

- Inlet water temperature	40°C / 104°F
- Outlet water temperature	45°C / 113°F
- External air temperature	b.s. 7°C / 44.6°F
- Δt	5°C / 41°F

12. ETHYLENE GLYCOL SOLUTIONS

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

NOTE

On the following page an example is given to help graph reading. Using the diagram below it is possible to determine the percentage of glycol required; this percentage can be calculated by taking of the following factors into consideration one:

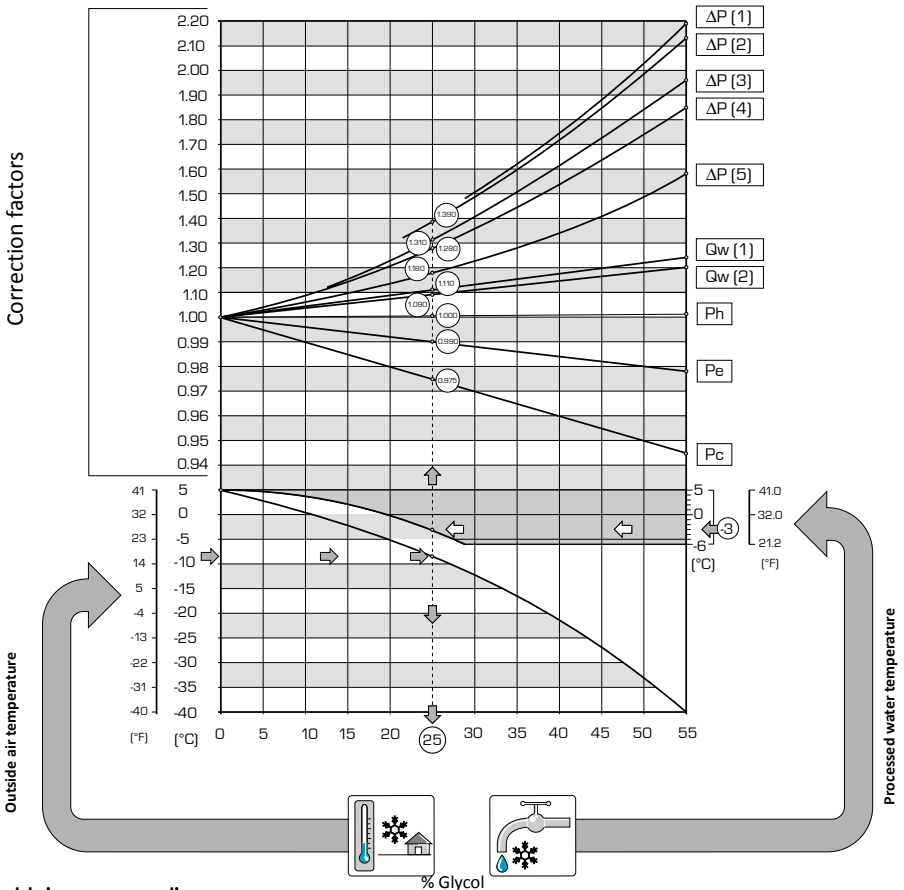
Depending on which fluid is considered (water or air), the graph is interpreted by the right or left side at the crossing point on the curves with the external temperature line or the water produced line. A point from which the vertical line will pass is obtained and this will distinguish both glycol percentage and relative correction coefficients.

11.5. HOW TO INTERPRET GLYCOL CURVES

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

1. If you wish to calculate the percentage of glycol on the basis of the external air temperature, enter from the left axis and on reaching the curve draw a vertical line, which in turn will intercept all the other curves; the points obtained from the upper curves represent the coefficients for the correction of the cooling capacity and input power, the flow rates and the pressure drops (remember that these coefficients must be multiplied by the nominal value of the size in question); while the glycol percentage value recommended to produce desired water temperature is on the lower axis.
2. If you wish to calculate the percentage of glycol on the basis of the temperature of the water produced, enter from the right axis and on reaching the curve draw a vertical line, which in turn will intercept all the other curves; the points obtained from the upper curves represent the coefficients for the correction of the cooling capacity and input power, the flow rates and the pressure drops (remember that these coefficients must be multiplied by the nominal value of the
3. size in question); while the lower axis recommends the glycol percentage value necessary to produce water at the desired temperature.

Initial rates for "EXTERNAL AIR TEMPERATURE" and "TEMPERATURE OF PRODUCED WATER", are not directly related, therefore it is not possible to refer to the curve of one of these rates to obtain corresponding point on the curve of the other rate.



KEY:

Pc	Corrective factors for cooling capacity
Pe	Corrective factors of the input power
Ph	Corrective factors of heating capacity
ΔP (1)	Correction factors for pressure drop av. temp. = 25,7°F / -3,5°C
ΔP (2)	Correction factors for pressure drop av. temp. = 32,9°F / 0,5°C
ΔP (3)	Correction factors for pressure drop av. temp. = 41,9°F / 5,5°C
ΔP (4)	Correction factors for pressure drop av. temp. = 49,1°F / 9,5°C
ΔP (5)	Correction factors for pressure drop av. temp. = 117,5°F / 47,5°C
Qw (1)	Correction factor of flow rates (evap.) av. temp = 49,1°F / 9,5°C
Qw (2)	Correction factor of flow rates (cond.) av. temp = 117,5°F / 47,5°C

NOTE
Although the graph arrives at external air temperatures of -40°C/°F, unit operational limits must be considered.

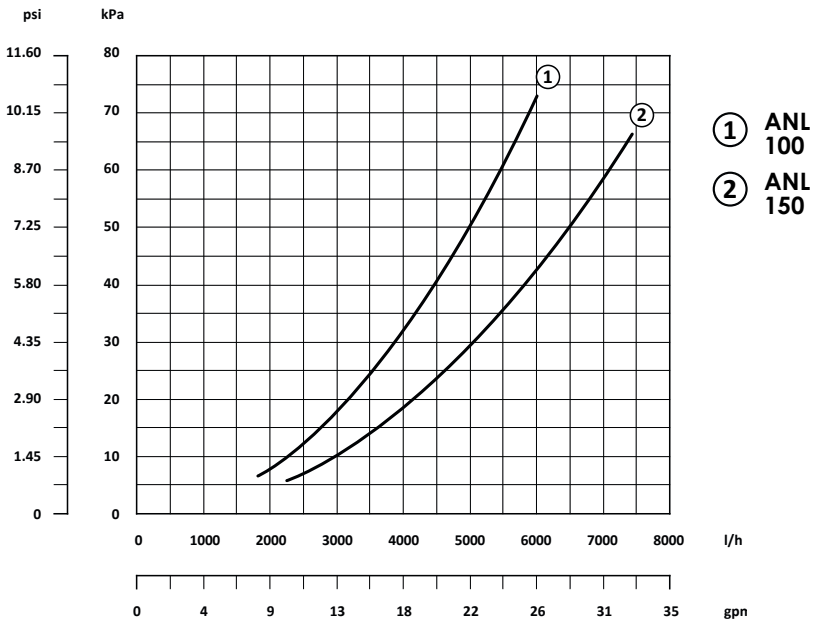
13. PRESSURE DROP

13.1. SYSTEM SIDE - PRESSURE DROP ONLY COOLING VERSION

COOLING (AHRI CONDITIONS)

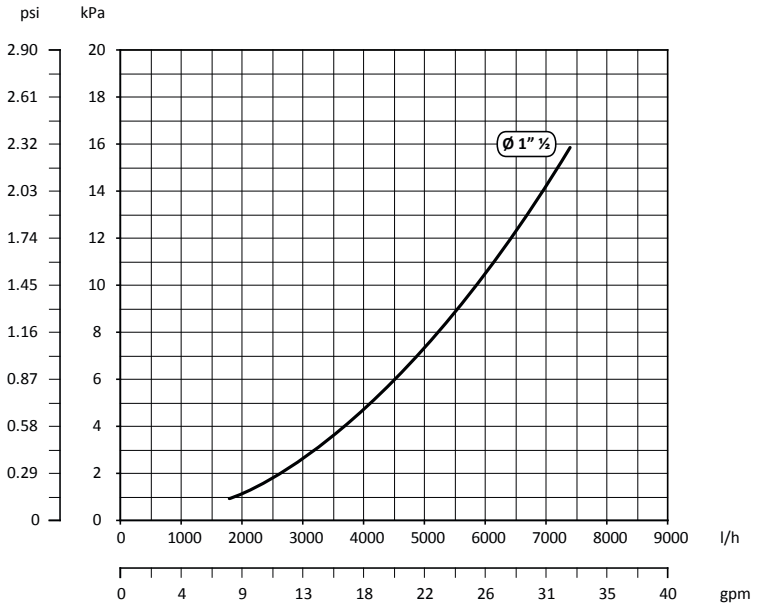
Outlet water temperature	**6,7°C / 44,6°F**
Flow rate	**0,043l/s per kW**
External temperature	**35°C / 95°F**

For temperatures other than 50°F / 10°C to use the table of correction factors.



Average water temperature (°F / °C)	41/5	**50/10**	59/15	68/20	86/30	104/40	122/50
Coefficients	1,02	**1**	0,98	0,97	0,95	0,93	0,91

13.2. WATER FILTER - PRESSURE DROP

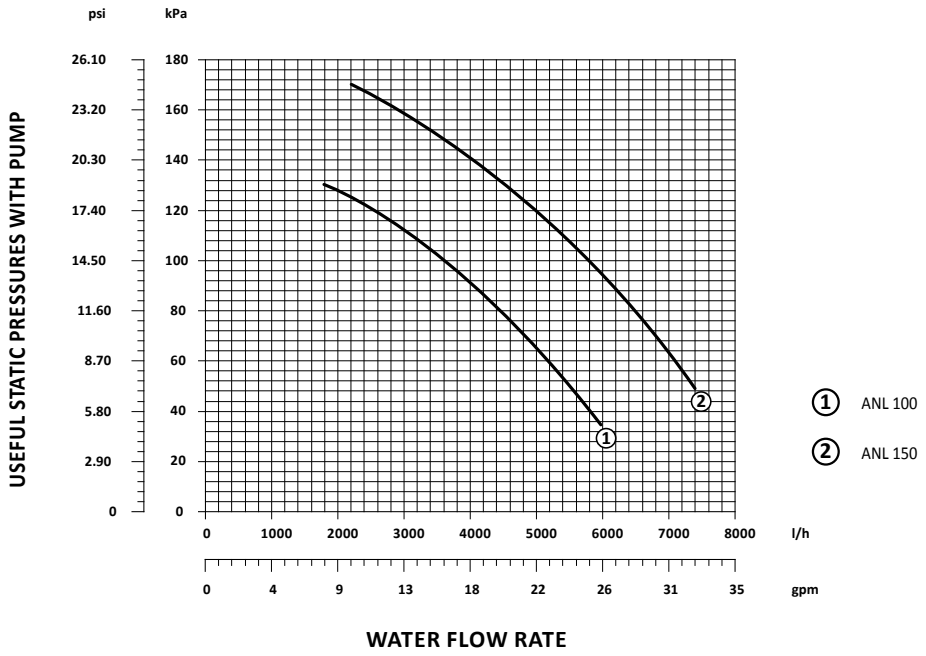


14. USEFUL HEADS

The static pressures stated here are at net of the pressure drops of the heat exchangers, filter, storage tank. Therefore are to be considered USEFUL TO SYSTEM.

- The static pressures are calculated in cooling mode.
- WITH PRESENCE OF GLYCOL for static pressures useful to system PLEASE CONTACT COMPANY.

14.2.1. USEFUL HEADS



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

15. STORAGE TANK

The following tables highlight principle characteristics for hydraulic circuit components, whilst the graph on the following page shows relative static pressures.

15.1. MINIMUM/MAXIMUM CONTENT OF SYSTEM WATER

The minimum water content of system recommended for units without hydronic kit is calculated using following formula:

Volume = $PFN_{(kW)} \times 4_{(l)}$ = litres of system
PFN: Nominal cooling capacity

That resulting minimum water content necessary for correct function of system.

The adjacent table indicates maximum water capacity in litres of hydraulic plant, compatible with expansion vessel supplied as standard IN THE VERSIONS WITH STORAGE TANK OR PUMP ONLY. The values shown in the table refer to three maximum and minimum water temperatures. If the effective water content of the hydraulic plant (including the storage tank) is greater than that given in the table at operational conditions, another dimensioned expansion vessel must be installed, using thenormal criteria, with reference to the additional volume of water.
In the following tables it is possible to work out the maximum values of the system also for glycoled water functioning.
Values are worked out by multiplying the reference value by the corrective coefficient.

15.2. EXPANSION VESSEL CALIBRATION

Standard pre-load pressure value of expansion vessel when empty is 1.5 bar, maximum value is 6 bar.

Calibration of the vessel must be regulated using the maximum level difference (H) of the user (see diagram) by using the following formula:

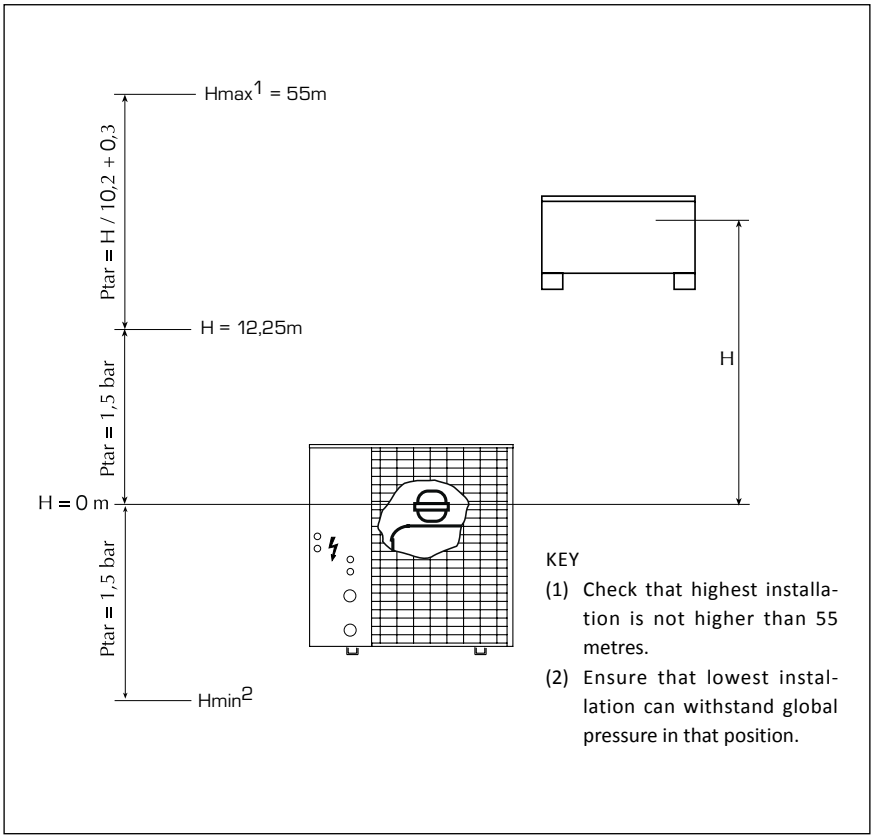
p (calibration) [bar] = H [m] / 10,2 + 0,3.

For example: if level difference (H) is equal to 20m, the calibration value of the vessel will be 2.3 bar.
If calibration value obtained from formula is less than 1.5 bar (that is for H < 12.25), keep calibration as standard.

ANL 100-150						
Hydraulic height	**H m**	**30**	**25**	**20**	**15**	**≥ 12.25**
Calibration of expansion vessel	bar	3.2	2.8	2.3	1.8	1.5
Water content reference values	l (1)	257	303	348	394	419
Water content reference values	l (2)	116	136	157	177	189

Glycoled water	**Water temp. °C**		**Corrective coefficients**	**Recommended conditions**
	max.	min.		
10%	40	-2	0,507	(1)
10%	60	-2	0,686	(2)
20%	40	-6	0,434	(1)
20%	60	-6	0,604	(2)
35%	40	-6	0,393	(1)
35%	60	-6	0,555	(2)

Recommended operational conditions:
(1) Cooling: Max water temp. = 40 °C, min water temp. = 4 °C.
(2) Heating (hot air pump): Max water temp. = 60 °C, min water temp. = 4 °C.



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

16. SOUND DATA

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

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

KEY
- Water input temperature 12 °C
- Temperature of produced water 7 °C
- External air temperature 35 °C

ANL	Total sound levels			Octave band [Hz]						
	Pow. dB(A)	Pressure. dB(A) 10 m	dB(A) 1 m	125	250	500	1000	2000	4000	8000
				Sound power for centre of band [dB] frequency						
100	**76.0**	**44.0**	**58.0**	61.2	66.0	71.4	72.0	68.9	60.5	48.6
150	**77.0**	**45.0**	**59.0**	62.4	67.3	72.2	72.7	69.7	61.5	49.6

17. PARAMETER CALIBRATION OF SAFETY AND CONTROL

CONTROL PARAMETERS

ANL		min.	standard	max.
Cooling set point	°C	4	7	18
Heating set point	°C	35	45	50
Defrosting mode	°C	-9	3	4
Total differential	°C	3	5	10
Autostart		auto		

				100H	150H
SAFETY AND CONTROL COMPONENTS ELECTRIC DATA					
High pressure pressure switch			bar	42	42
Low pressure pressure switch	cold		bar	4	4
	PdC		bar	2	2
High pressure transducer			bar	40	40

CALIBRATION THERMOMAGNETIC ANL60HZ			
Models 60Hz	Compressors magnet circuit breakers	Pumps magnet circuit breakers	Fan magnet circuit breakers
ANL100HA 220V	19,0 A	3,5 A	Fixed 6A (also for auxiliary)
ANL100HA 460V	10,0 A	1,8 A	Fixed 6A (also for auxiliary)
ANL150HA 220V	23,0 A	5,7 A	Fixed 6A (also for auxiliary)
ANL150HA 460V	12,5 A	3,0 A	Fixed 6A (also for auxiliary)

Standards and Directives respected on designing and constructing the unit:

PROTECTION RATING

1. IP 24

ACOUSTIC PART:

1. ISO DIS 9614/2 (INTENSIMETRIC METHOD))
2. SOUND POWER (EN ISO 9614-2)
3. SOUND PRESSURE (EN ISO 3744)

REFRIGERANT GAS:

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

STANDARD:

UL 1995

Heating and cooling equipment.

ANSI/NFPA

Standard 70 National Electrical code (N.E.C.).

CSA C.22.1.- C.22.2

Safety Standard Electrical Installation.

18. GENERAL WARNINGS FOR THE INSTALLER

AERMEC ANLs are constructed according to the recognised technical standards and safety regulations. Any contractual or extracontractual liability of the Company is excluded for injury/damage to persons, animals or objects owing to installation, regulation and maintenance errors or improper use. All uses not expressly indicated in this manual are prohibited.

18.1. PRESERVATION OF THE DOCUMENTATION

1. The instructions along with all the related documentation must be given to the user of the system, who assumes the responsibility to conserve the instructions so that they are always at hand in case of need.
2. Read this sheet carefully; the execution of all works must be performed by qualified staff, according to Standards in force ion this subject in different countries.
3. The appliance must be installed in such a way as to enable maintenance and/or repairs to be carried out.
4. The appliance warranty does not cover the costs for ladder trucks, scaffolding, or other elevation systems that may become necessary for carrying out servicing under warranty.
5. Do not modify or tamper with the chiller as dangerous situations can be created and the manufacturer will not be liable for any damage caused. The validity of the warranty shall be void in the event of failure to comply with the above-mentioned indications.

18.2. WARNINGS REGARDING SAFETY AND INSTALLATION STANDARDS

1. Must be installed by a qualified and suitably trained technician, in compliance with the national legislation in force in the country of destination.
   AERMEC will not assume any responsibility for damage due to failure to follow these instructions.
2. Before beginning any operation, READ THESE INSTRUCTIONS CAREFULLY AND CARRY OUT THE SAFETY CHECKS TO REDUCE ALL RISK OF DANGER TO A MINIMUM. All the staff involved must have thorough knowledge of the operations and any dangers that may arise at the moment in which the installation operations are carried out.

19. SELECTION AND PLACE OF INSTALLATION

Before beginning installation consent with client and pay attention to the following recommendations:

1. The support surface must be capable of supporting the unit weight;
2. The safety differences between the unit and ther appliances or structures must be scrupulously respected so that the inlet and outlet AIR from the fans is free to circulate;
3. The unit must be installed by an enabled technician in compliance with the national legislation in force in the country of destination, respecting the minimum technical spaces in order to allow maintenance.

19.2.1. POSITIONING

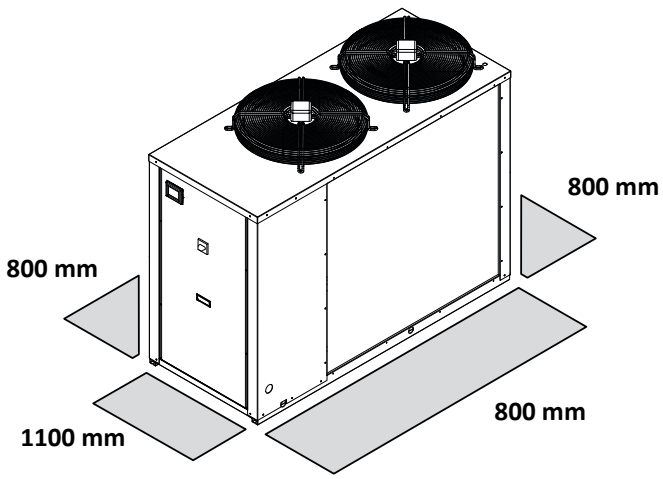
Before handling the unit, verify the lifting capacity of the machines used, respecting the indications given on the packaging.
Insert pipes into the holes supplied on the base (NOT SUPPLIED).The length of the pipes must be such to allow positioning of the lifting belts and relative safety pins.
Position the unit in the place indicated by the customer, placing a rubber covering between the base and the support (min. thickness 10 mm.) or alternatively anti-vibrating feet (ACCESSORIES).
For further information, refer to the dimensional tables.

Fix the unit checking that it is level. Make sure that the hydraulic and electric part can be easily reached.
In case of installation in places where gusts of wind are frequent, fix the unit suitably using tie-rods.
Envision the installation of the condensate drain tray in the versions where envisioned.

ATTENTION
If the unit is installed in particularly windy areas, we recommend providing for windbreak to avoid malfunctioning.

19.2.2. EXEMPOL OF MOVIMENTATION

19.2.3. MINIMUM TECHNICAL SPACES

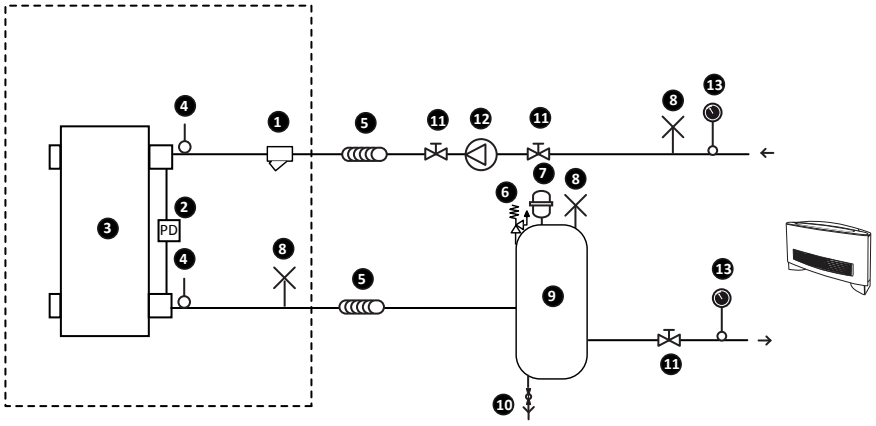


20. HYDRAULIC CIRCUITS OF PRINCIPLE

20.1. HYDRAULIC CIRCUIT FOR INTERNAL AND EXTERNAL ANL "H" (standard)

HYDRAULIC COMPONENTS ANL

HYDRAULIC COMPONENTS SUGGESTED EXTERNAL UNIT



	COMPONENTS SUPPLIED AS STANDARDS
1	Water filter
2	Differential pressure switch
3	Plate exchanger
4	Porbe water temperature (IN/OUT)
8	Air Vent

	NOT SUGGESTED COMPONENTS PROVIDED TO LOAD INSTALLER
5	anti vibration joints
6	Safety valve
7	Expansion tank
9	Storage tank
10	Drain cock
11	Ball Stop
12	Pump
13	Manometer

ATTENTION
The choice and the installation of components external to the ANL °|H èup to the installer, who must operate according to the rules of good technical design and in compliance with the regulations in force in the country of destination.

ATTENTION
The hydraulic pipes connecting to the machine must be properly sized to the actual flow of water required by the system in operation. The water flow to the exchanger must always be constant.

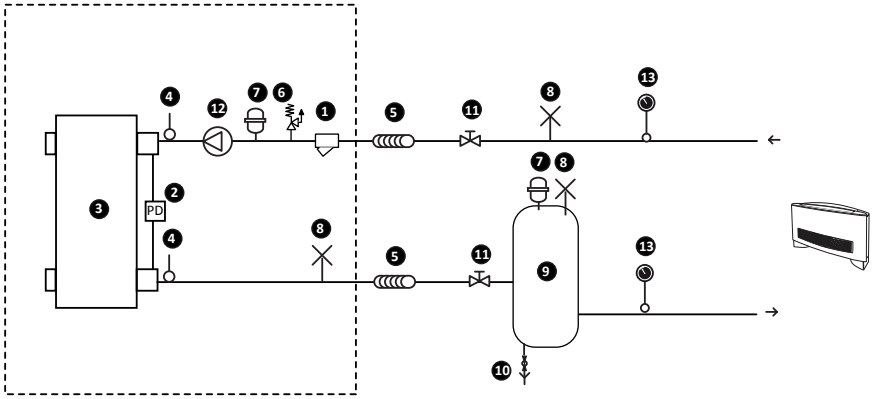
ATTENTION
Carefully wash the plant, before connecting the unit. This allows cleaning to remove any residue such as weld spatter, slag, rust or other impurities from the pipes. These substances may otherwise accumulate in and cause a machine malfunction. The connecting pipes should be supported so as not to weigh, with their weight on the unit.

PH	**6-8**
Electric conductivity	less than 200 mV/cm (25°C)
Chloride ions	less than 50 ppm
Sulphuric acid ions	less than 50 ppm
Total iron	less than 0,3 ppm
Alkalinity M	less than 50 ppm
Total hardness	less than 50 ppm
Sulphur ions	none
ammonia ions	None
Silicone ions	less than 30 ppm

20.2. CIRCUITO IDRAULICO INTERNO ED ESTERNO AD ANL “HP"

HYDRAULIC COMPONENTS ANL

HYDRAULIC COMPONENTS SUGGESTED EXTERNAL UNIT



	COMPONENTS SUPPLIED AS STANDARDS
1	Water filter
2	Pressure switch
3	Plate exchanger
4	Porbe water temperature (IN/OUT)
6	Safety valve
7	Expansion tank
8	Air Vent
12	Pump

	NOT SUGGESTED COMPONENTS PROVIDED TO LOAD INSTALLER
5	anti vibration joints
7	Expansion tank (if necessary)
9	Storage tank
10	Drain cock
11	Ball Stop
13	Manometer

PH	6-8
Electric conductivity	less than 200 mV/cm (25°C)
Chloride ions	less than 50 ppm
Sulphuric acid ions	less than 50 ppm
Total iron	less than 0,3 ppm
Alkalinity M	less than 50 ppm
Total hardness	less than 50 ppm
Sulphur ions	none
ammonia ions	None
Silicone ions	less than 30 ppm

ATTENTION
The choice and the installation of components external to the ANL °|H èup to the installer, who must operate according to the rules of good technical design and in compliance with the regulations in force in the country of destination.

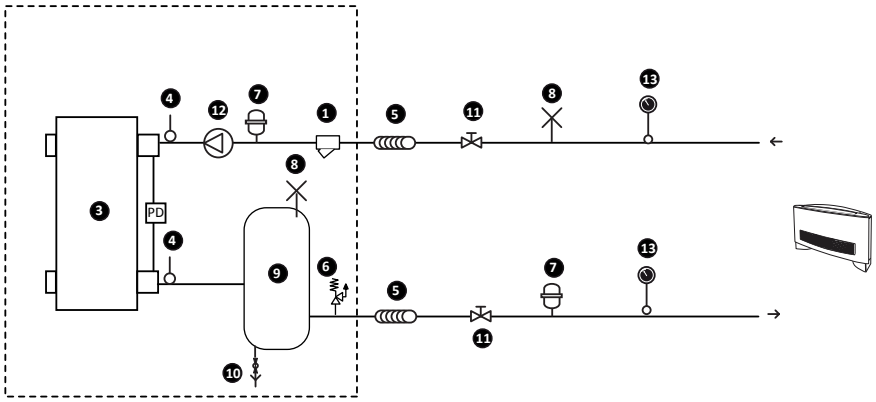
ATTENTION
The hydraulic pipes connecting to the machine must be properly sized to the actual flow of water required by the system in operation. The water flow to the exchanger must always be constant.

ATTENTION
Carefully wash the plant, before connecting the unit. This allows cleaning to remove any residue such as weld spatter, slag, rust or other impurities from the pipes. These substances may otherwise accumulate in and cause a machine malfunction. The connecting pipes should be supported so as not to weigh, with their weight on the unit.

20.3. HYDRAULIC CIRCUIT FOR INTERNAL AND EXTERNAL ANL "HA"

HYDRAULIC COMPONENTS ANL

HYDRAULIC COMPONENTS SUGGESTED EXTERNAL UNIT



	COMPONENTS SUPPLIED AS STANDARDS
1	Water filter
2	Differential pressure switch
3	Scambiatore a piastre
4	Porbe water temperature (IN/OUT)
6	Safety valve
7	Expansion tank
8	Air Vent
9	Storage tank
12	Pump

	NOT SUGGESTED COMPONENTS PROVIDED TO LOAD INSTALLER
5	anti vibration joints
7	Expansion tank (if necessary)
10	Drain cock
11	Ball Stop
13	Manometer

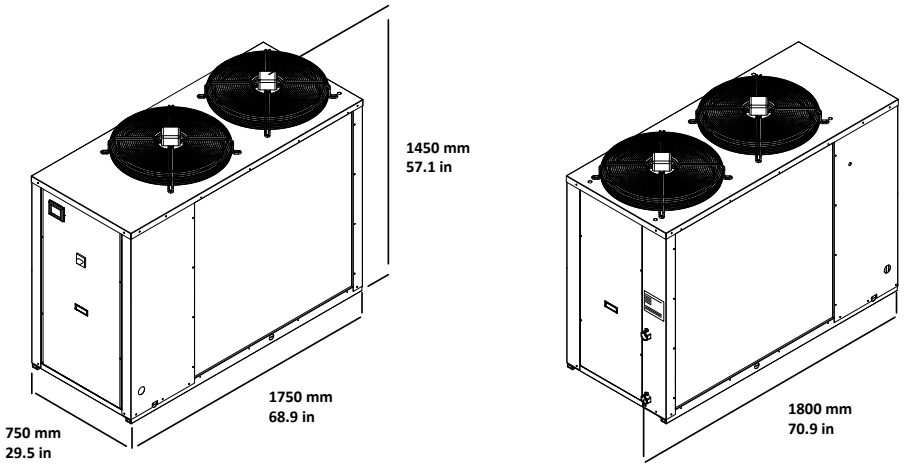
ATTENTION
The choice and the installation of components external to the ANL°A|Q /ANLHA|HQ up to the installer, who must operate according to the rules of good technical design and in compliance with the regulations in force in the country of destination.

ATTENTION
The hydraulic pipes connecting to the machine must be properly sized to the actual flow of water required by the system in operation. The water flow to the exchanger must always be constant.

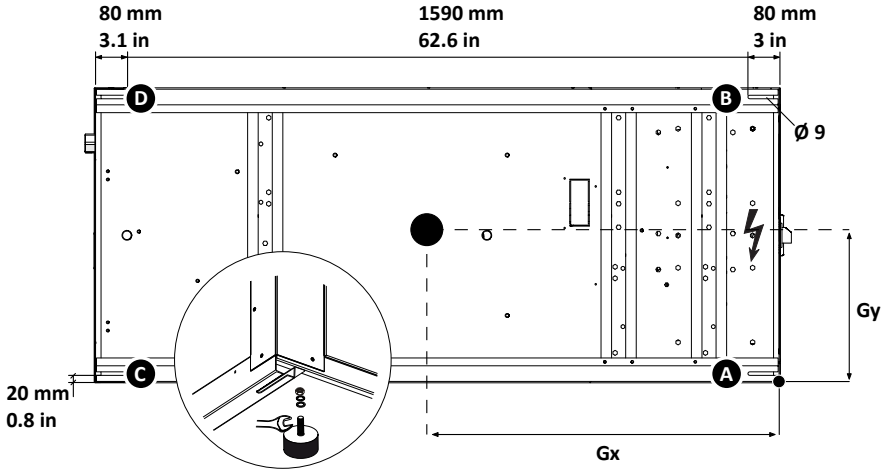
ATTENTION
Carefully wash the plant, before connecting the unit. This allows cleaning to remove any residue such as weld spatter, slag, rust or other impurities from the pipes. These substances may otherwise accumulate in and cause a machine malfunction. The connecting pipes should be supported so as not to weigh, with their weight on the unit

21. DIMENSIONS

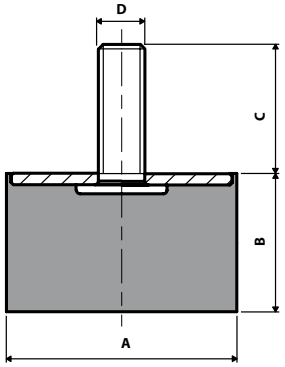
21.1. ANL 100 - 150 H|HP|HA VERSION



22. ANTIVIBRATION POSITIONING AND DISTRIBUTION OF PERCENTAGE ON SUPPORTING POINTS

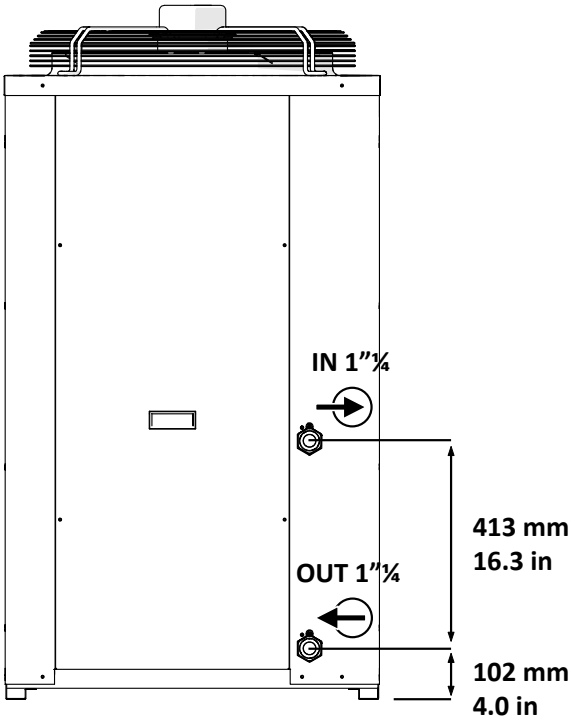


ANL	VERS.	WEIGHT (lib)	CENTER OF GRAVITY		A	B	C	D	KIT VT
			Gy	Gx	%	%	%	%	
ANL100H	°	650	381	604	32,2%	33,3%	17,0%	17,5%	15
	P	690	381	640	31,2%	32,2%	18,0%	18,6%	15
	A	800	381	640	30,1%	30,9%	19,2%	19,8%	15
ANL150H	°	710	382	630	31,4%	32,6%	17,7%	18,3%	15
	P	756	382	671	30,3%	31,4%	18,8%	19,5%	15
	A	866	382	671	29,3%	30,3%	19,9%	20,5%	15



Mod.	A	B	C	D
VT15	50	30	28,5	M10

23. HYDRAULIC CONNECTIONS



24. ELECTRICAL DATA

24.1. COMPRESSOR THERMOMAGNETIC

COMPRESSOR THERMOMAGNETIC	POWER SUPPLY	ANL 100 [A]	ANL 150 [A]
MTC	220V-3-60Hz	19.0	23.0
MTCA	220V-3-60Hz	19.0	23.0
MTC	460V-3-60Hz	10.0	12.5
MTCA	460V-3-60Hz	10.0	12.5

24.2. PUMP THERMOMAGNETIC

PUMP THERMOMAGNETIC	POWER SUPPLY	ANL 100 HP/HA [A]	ANL 150 HP/HA [A]
MTP	220V-3-60Hz	3.5	5.7
	460V-3-60Hz	1.8	3.0

24.3. AUXILIARY THERMOMAGNETIC

AUXILIARY THERMOMAGNETIC	ANL 100 HP/HA [A]	ANL 150 HP/HA [A]
MTA	6.0	6.0

25. STRAT-UP

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

25.1. PRELIMINARY OPERATIONS TO BE MADE WITHOUT TENSION

check:

1. All safety conditions have been respected
2. The unit is correctly fixed to the support surface
3. The minimum technical spaces have been respected
4. That the power cables are generally of appropriate section, to withstand the overall drive power consumption. (see section Electrical Data), and that the unit is properly connected to earth.
5. All electric and hydraulic connections have been tightened well.

25.2. THE FOLLOWING OPERATIONS ARE PERFORMED WHEN THE UNIT IS POWERED.

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

HYDRAULIC CIRCUIT

1. Check that all hydraulic connections are made correctly, that the plate indications are complied
2. Check that the hydraulic system is filled and under pressure and also make sure that no air is present; if so, bleed it.

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.

3. Verify that any on-off valves present in the system are correctly opened.
4. Make sure that the circulation pump is operating and that the flow rate of the water is sufficient to close the contact of the flow/ pressure switch.
5. Check lthe water flow rate, measuring the pressure difference between input and output of the evaporator and calculate the flow rate using theevaporator pressure drop diagram present in technical documentation. (www.aermec.com)
6. Check the correct functioning of the flow/ pressure switch if installed. Closing the cut-off valve at the output of the heat exchanger; the unit control panel must show the block. Finally re-open thevalve and rearm the block.

25.3. MACHINE COMMISSIONING

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

25.3.1. CHECKS THE MACHINE IS ON

COOLING CIRCUIT
CHECK:

- **That the compressor input current** is lower than the maximum indicated in the technical data table.
- **That in models with three-phase** power supply, the compressor noise level is not abnormal. If this is the case, invert a phase.
- **That the voltage value lies within the prefixed limits** and that unbalance between the three phases (three-phase power supply) is not above 3%.
- **The presence of any refrigerant GAS leaks** particularly with reference to pressure plugs, pressure transducers and pressure switches. (VIBRATIONS DURING TRANSPORTATION MAY LOOSEN CONNECTIONS).
- **Overheating**
  Comparing the temperature read using a contact thermostat positioned on the compressor intake with the temperature shown on the low pressure manometer (saturation temperature corresponding to the evaporation pressure). The difference between these two temperatures gives the overheating value. Optimal values are between 4 and 8°C
- **The Pressing line temperature**
  If the subcooling and overheating values are regular the temperature measured in the pressing line pipe at the outlet of the compressor must be 30/40°C above the condensation temperature.

CONTROL AND SAFETY DEVICES

CHECK:

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

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

26. FUNCTIONING FEATURES

26.1. SET POINT IN COOLING MODE

(Factory set) = 7°C, Δt = 5°C.

26.2. SET POINT IN RISCALDAMENTO

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

26.3. COMPRESSOR START-UP DELAY

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

26.4. CIRCULATION PUMP

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

26.5. ANTI-FREEZE ALARM

The anti-freeze alarm [11] is active if the machine is off or in stand-by mode. In order to prevent the heat exchanger from breaking due to the water it contains freezing, envision compressor block (if the machine is on below 3.5 °C) and ignition of the resistance (if standby below 5 °C). If the temperature detected by the probe positioned in outlet of the heat exchanger and in inlet to the chiller is less than +3.8°C.

The intervention of this alarm [12] determines compressor block and not pump block, which remains active along with the switchon of the resistance if installed.
To restore normal functions the temperature of the outlet water. Rearm is manual.

26.6. WATER FLOW RATE ALARM

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

ATTENTION

11 This anti-freeze set temperature can only be varied by an authorised after-sales centre and only after having checked that there is anti-freeze solution in the water system.

12 Whenever this alarm intervenes, We advise you call the nearest after-sales service immediately

ATTENTION
We recommend that you include a booklet machine (not supplied, but at the expense user), which allows to keep track of operations performed unit, in this way will be more easy to organize adequately facilitating research and interventions prevention of potential failures the machine.
Return the booklet date, type of surgery performed (maintenance ordinary inspection or repair), description of the measures implemented.

ATTENTION

13 cooling circuits must not be filled with a refrigerant other than that indicated. Use a different refrigerant gases can cause serious damage to the compressor.

27. MAINTENANCE

All cleaning is prohibited until the unit has been disconnected from the electric power supply mains. Make sure there is no voltage present before operating. Periodic maintenance is fundamental to keep the unit perfectly efficient under a functional and energetic point of view.

It is therefore essential to carry out periodic yearly controls for the:

27.2. HYDRAULIC CIRCUIT

CHECK:
1. Refilling of water circuit
2. Cleaning the water filter
3. Control of pressure/flow switch
4. No air in the circuit (bleed) that the water flow rate to the
5. Evaporator is constant
6. The thermal insulation state of the hydraulic piping
7. The percentage of glycol where necessary

27.3. 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.
- In case of prolonged shut-down of the unit during winter (if not added with glycol) or for other inconveniences, drain the chiller hydraulic circuit by the corresponding knobs. 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.

27.4. ELECTRICAL CIRCUIT

CHECK:
8. Safety efficiency
9. Electric supply pressure
10. Electrical Input
11. Connection tightness
12. Verify the operation of the carter compressor resistance

27.5. COOLING CIRCUIT

CHECK:
13. State of compressor
14. Efficiency of the plate heat exchanger resistance if envisioned
15. Work pressure
16. Leak test for watertightness control of the cooling circuit
17. Functioning of high and low pressure switches
18. Carry out the appropriate checks on the filter dryer to check efficiency

27.6. MECHANICAL

CHECK:
1. Check the tightening of the screws the compressors and the electrical box, as well as the exterior panelling of the unit. Insufficient fastening can lead to undesired noise and vibrations
2. State of the structure.
   Treat any shares if you encounter any oxidized paint suitable to iminate or reduce the phenomenon of oxidation.

27.1. EXTRAORDINARY MAINTENANCE

The ANL | ANLH are filled with R410A gas and are inspected at the factory. Under normal conditions they do not require Technical Assistance related to control of refrigerant gas. Through time gas leakage may be generated from the from the joints, causing refrigerant to escape and discharge the circuit, causing appliance malfunctioning. In these cases the leakage points are to be discovered, repaired and the Gas circuit is to be replenished, respecting the December 28 1993 n°549 law.

Load procedure [13]
1. Empty and dry the entire cooling circuit using a vacuum pump connected to the low and high pressure socket until 10 Pa is read on the vacuum meter. Wait a few minutes and check that this value does not rise above 50 Pa.
2. Connect the refrigerant gas cylinder or a load cylinder to the socket on the low pressure line.
3. Load the amount of refrigerant gas indicated on the appliance features plate.
4. After a few hours of functioning, check that the liquid indicator indicates the dry circuit (dry-green). In the case of partial loss, the circuit must be emptied completely before being re-loaded.
5. The R410A refrigerant must only be loaded in the liquid state.
6. Functioning conditions that are different to the nominal conditions can give rise to values that are greatly different.
7. The sealing test or the search for leaks must only be performed using R410A refrigerant gas, checking using a suitable leak detector.
8. In the cooling circuit it is prohibited to use oxygen or acetylene or other inflammable or poisonous gases because they are a cause of explosions or intoxication.

28. DISPOSAL

Provide that the disposal unit is implemented in accordance with the rules in force in different countries.

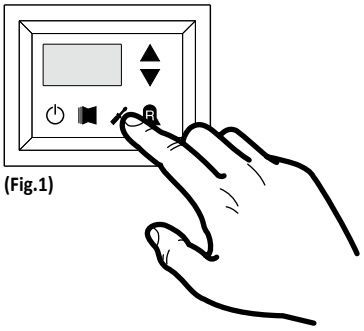
29. LIST OF CONTROLS FOR THE GUIDED PROCEDURE

Some parameters in the moducontrol board must be set appropriately on the basis of the type of system in which the unit is installed.
These modifications, performed by the installer, are summarised and organised in the following guided procedures, with which to correctly set the unit circuit board parameters.

29.1. HOW TO MODIFY A PARAMETER IN THE USER MENU:

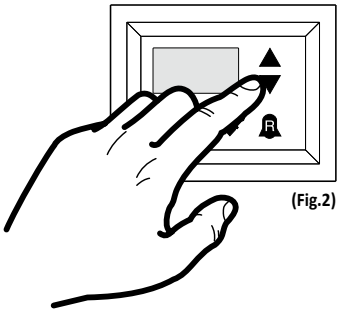
To enter the **USER** presses shown in **(Fig. 1)**, once you press the key you must enter your password to access the various menus;

User password menù: 000 (displayed by default)



(Fig.1)

to change the value of the password using the arrow keys **(Fig. 2)**. Once the correct password, press shown in **(Fig. 1).**



(Fig.2)

The display reads the **USER** parameter index and a three-character string that identifies it, the string is displayed for a second, after which it is replaced by the value for the parameter.

To go to the next, use the arrow keys **(Fig. 2)**. To change a parameter, select it by pressing the button shown in **(Fig. 1)**, change the value assigned by the arrow keys **(Fig. 2)** and to confirm the change, press the switch in **(Fig.1)**.

29.2. HOW TO MODIFY A PARAMETER IN THE INSTALLER MENU:

To enter and edit the menu **INSTALLED** following the same procedure for the user menu.

installer password menu: 030

REQUEST	ANSWER	SOLUTIONS
(1) What type of system terminals are used in the heating circuit?	• Is the unit a cooling only model	• Go to question 2
	• Radiant panels	• Set the parameter **StC** (index 3 USER menu) with the value of 35 °C
	• Fan coils or low temperature radiators	• Set the parameter **StC** (index 3 USER menu) with the value of 45 °C (default value)
	• Other applications	• Set the parameter **StC** (index 3 USER menu) with the value of 55 °C
(2) Is the remote panel accessory installed (PR3)?	• Not installed	• Go to question 3
	• installed	• Set the parameter **PAN** (index 9 **INSTALLER** menù) with the appropriate value selecting from: **Value (1):** • Season control piloted from the circuit board • ON/OFF control enabled from PR3 **Value (2):** • Season control enabled from PR3 • ON/OFF control from panel on machine **Value (3):** • Season control enabled from PR3 • ON/OFF control enabled from PR3
(3) Is the production of DHW envisioned?	• Not envisioned	• Go to question 5
	• envisioned	• Set the parameter **ASA** (index A INSTALLER MENU) with the value (1)
(4) Is a 3-way diverter valve envisioned in the DHW production circuit	• Not installed	• Go to question 5
	• installed	• Set the parameter **AAS** (index C INSTALLER menu) with the appropriate value (in seconds). This parameter indicates the stand-by time for inversion of the 3-way diverter valve on the DHW production system
(5) Is a room thermostat installed?	• Not envisioned	• No operation
	• envisioned	• This parameter enables a digital clamp **ID** (indicated on the circuit board with the code **TRA**) to which a room thermostat must be connected, used to disable the compressors and the integrative resistances. Set the parameter trA (index **D INSTALLER** menu) with the appropriate value, selecting from: **1. Value (1 o 2): ENABLED** **2. Value (0 o 3): DISABLED** **3. Remember that the OPEN state on the clamp represents:** • the compressors and resistances block function if the parameter is set at 1 • the compressors, pumps and resistances block function if the parameter is set at 2 • represents the pump alarm (as in the previous software version), if the parameter is set at the value 3

ATTENTION
For more information, refer to **USER** manual supplied with the chiller and is also available on www.aermec.com

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