AERMEC
air conditioning

60Hz RS485 CAN R410A

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

NRP 0280-0750

REVERSIBLE HEAT PUMPS

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

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

EN

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INRP1UY. 1305. 5806711_00

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

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1. RECEIPT OF THE PRODUCT AND INSTALLATION

1.1. RECEIPT AND HANDLING

The machine is sent from the factory wrapped with estincoil placed on a pallet.
Before handling the unit, verify the lifting capacity of the machines used.
Handling must be performed by qualified, suitably equipped staff.

1.2. HANDLING THE MACHINE:

Whenever the machine must be lifted using belts, place protections between the belts and the framework to prevent damage to the structure.
Insert pipes (NOT SUPPLIED) in the pre-arranged holes (NRP 0200 - 0700) long enough to allow fixing of lifting belts.
NRP 0750 units are supplied with eyebolts; they must be lifted using suitable belts hooked to all the installed eyebolts.

1.2.1. LIFTING STANDARDS

1. All panels must be tightly fixed before moving the unit;
2. before lifting, check the specific weight on the technical plate;
3. use all, and only, the lifting points indicated;
4. use ropes in compliance with Standards and of equal length;
5. use a spacer beam in compliance with Standards (not included);
6. handle the unit with care and without sudden movements.

It is prohibited to stop under the unit during lifting operations.
- **The machine must always be kept in a vertical position.**
- **The instructions found on the machine are an integral part of the same. They must be read and kept carefully.**
- **ATTENTION: The units CANNOT be stacked.**

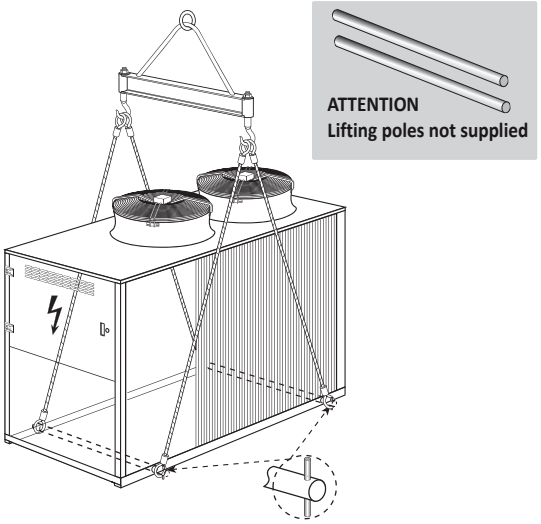
1.3. SELECTION AND PLACE OF INSTALLATION

The NRP air/water OUTDOOR heat pump with gas side conversion (R410A) is sent from the factory already inspected and only requires electric and hydraulic connections in the place of installation.
Before beginning the installation process, decide with the client where the unit is to be installed, whilst paying attention to the following:

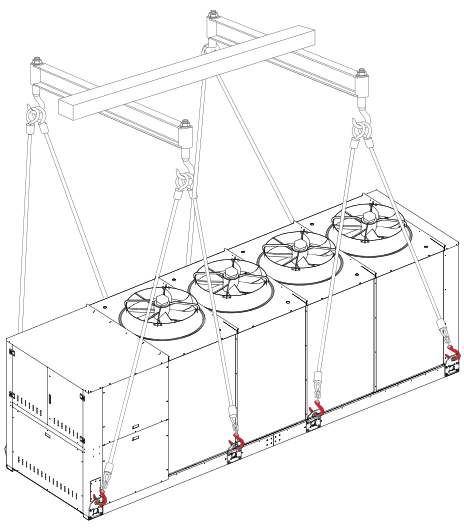
1. The support surface must be capable of supporting the unit weight.
2. The safety distances between the units and other appliances or structures must be scrupulously respected.
3. The unit must be installed by a qualified technician in compliance with national laws in the country of destination.
4.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

EXAMPLE 1
"OF THE LIFTING"
Size NRP 0280-0700.
Insert pipes (**NOT SUPPLIED**) in holes on the base with length such to allow positioning of the belts used for lifting.
To prevent the unit structure being damaged by the belts place protections between the latter and the machine.
It is prohibited to stop under the unit.

NOTE:
The appliance warranty does not cover the costs for ladders, scaffolding, or other elevation systems that may become necessary for carrying out servicing under warranty.

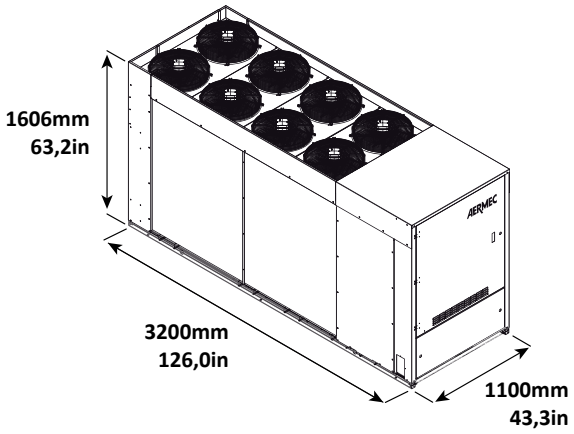


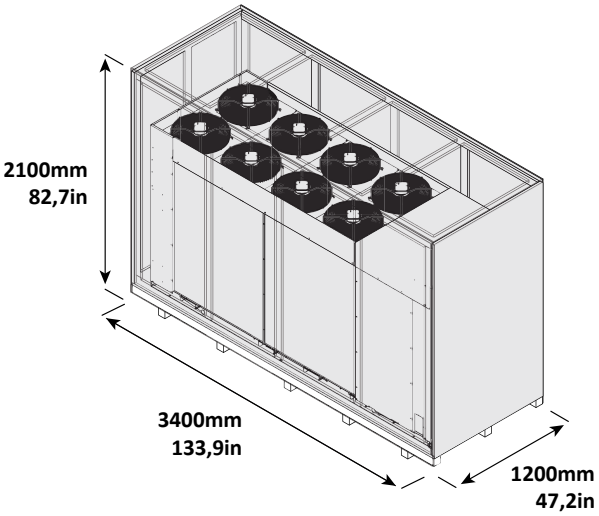
EXAMPLE 2
"OF THE LIFTING"
NRP 0750 (always use all the provided eyebolts)
Before moving the unit, check the lifting capacity of the machines used.
Once the packaging has been removed, the unit must be handled by qualified personnel, using the appropriate equipment. To handle the machine:
"IN THE EVENT OF LIFTING", hook the lifting cables to the special eyebolts In order to avoid damaging the unit with the cables, insert protection elements between them and the machine. Is it absolutely forbidden to stand beneath the unit.



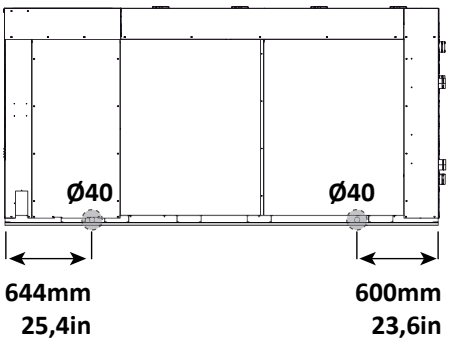
2. DIMENSIONAL TABLES

2.1. DIMENSIONS NRP 0280 - 0300 - 0330 - 0350

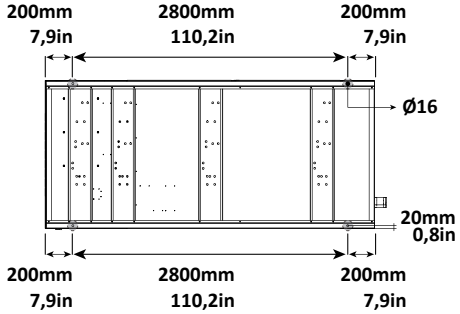




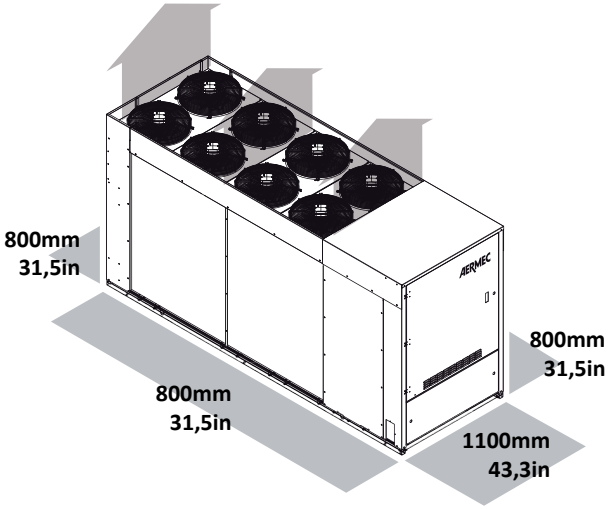
2.2. LIFTING POINTS



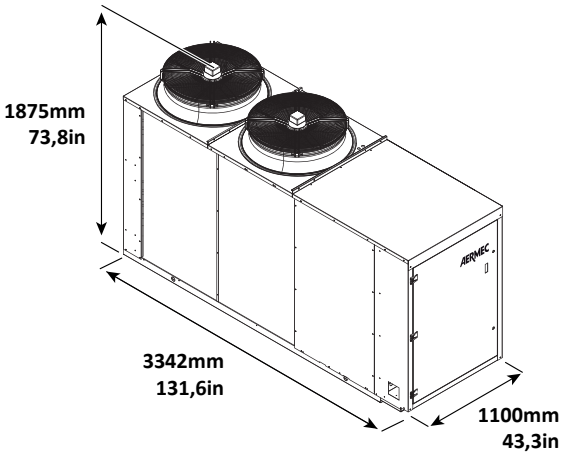
2.3. POSITION ANTI-VIBRATION MOUNTS

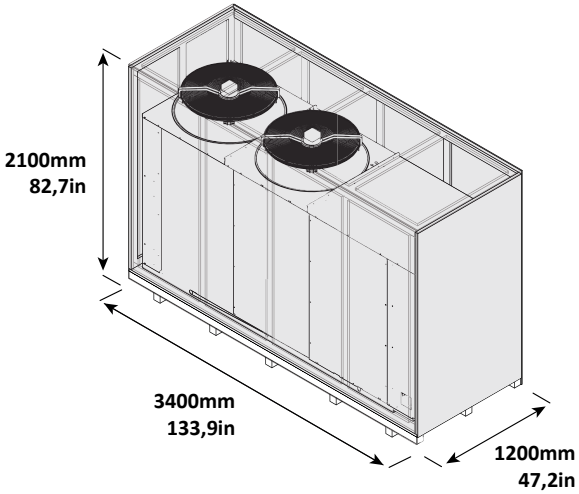


2.4. MINIMUM CLEARANCE SPACE

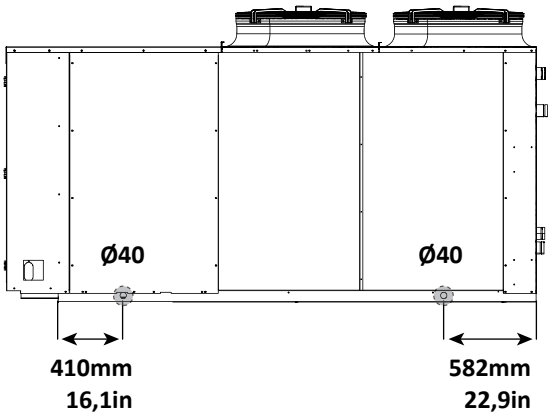


2.5. DIMENSIONS NRP 0500 - 0550

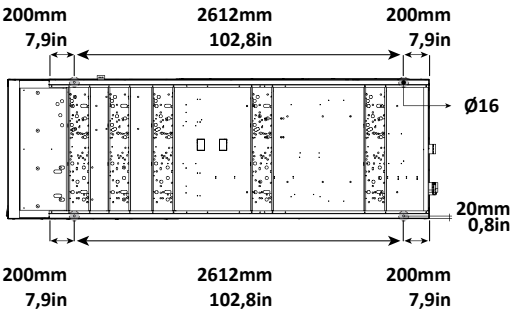




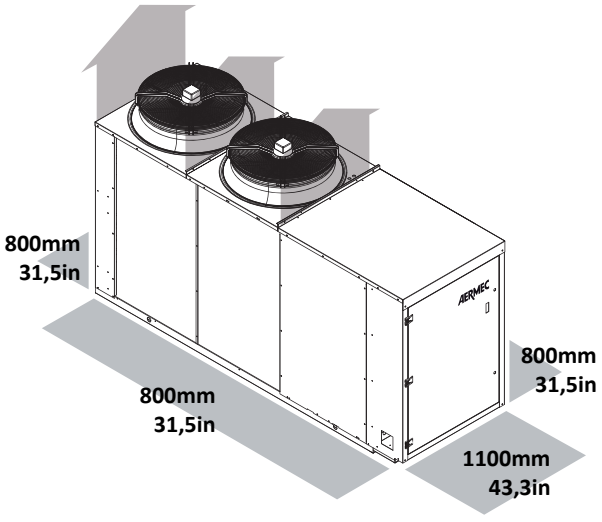
2.6. LIFTING POINTS



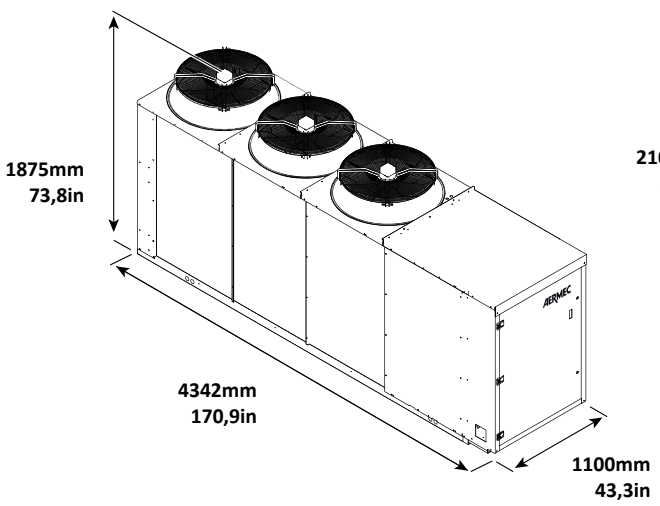
2.7. POSITION ANTI-VIBRATION MOUNTS

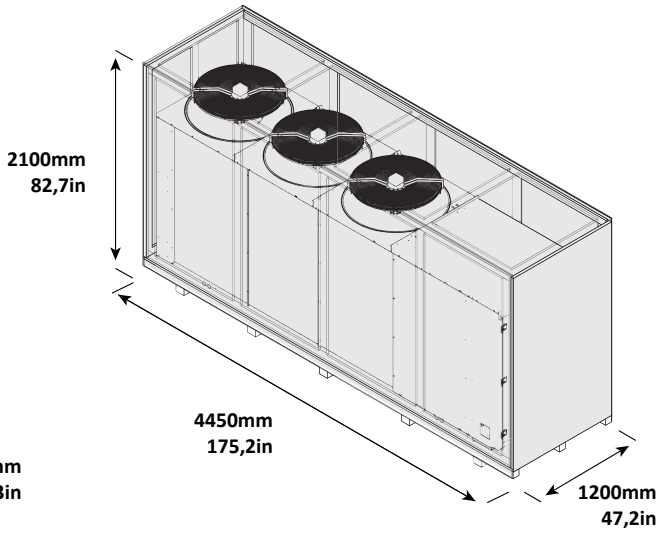


2.8. MINIMUM CLEARANCE SPACE

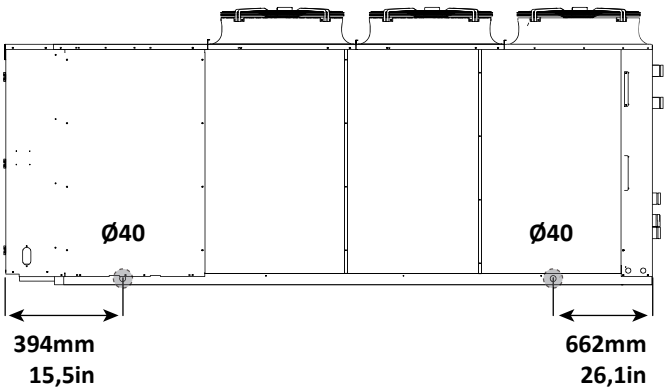


2.9. DIMENSIONS NRP 0600 - 0650 - 0700

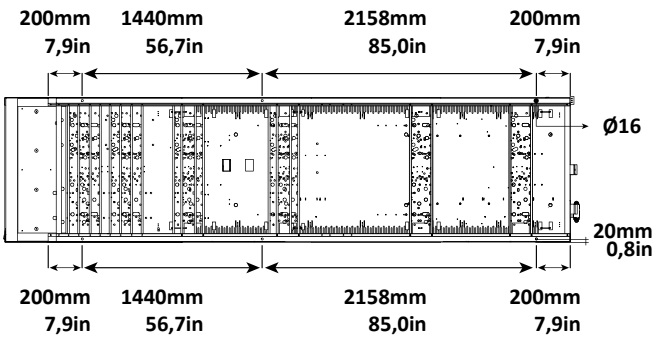




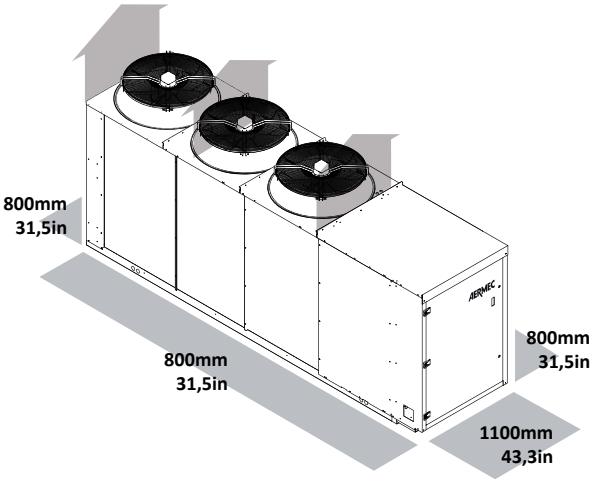
2.10. LIFTING POINTS



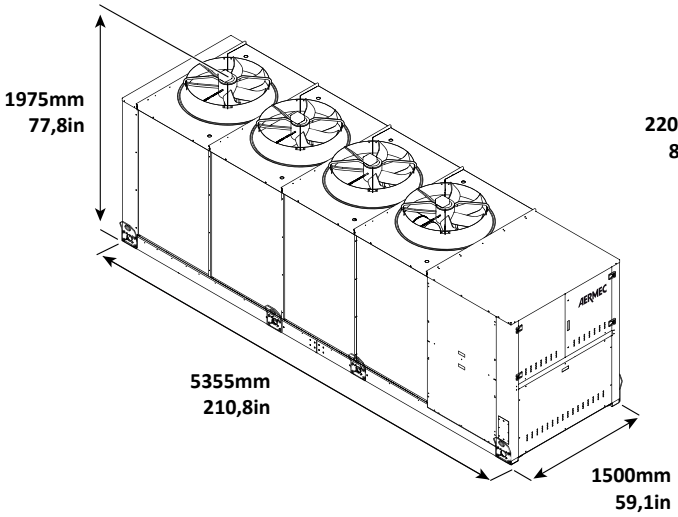
2.11. POSITION ANTI-VIBRATION MOUNTS

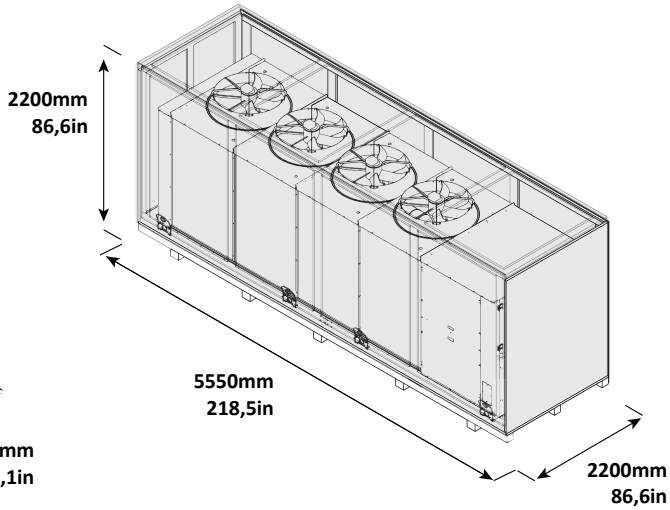


2.12. MINIMUM CLEARANCE SPACE

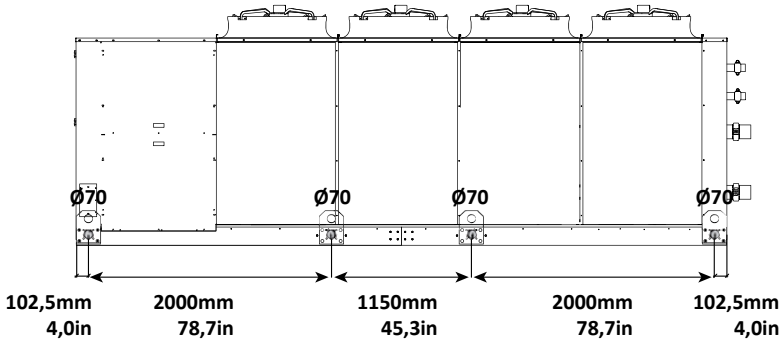


2.13. DIMENSIONS NRP 0750

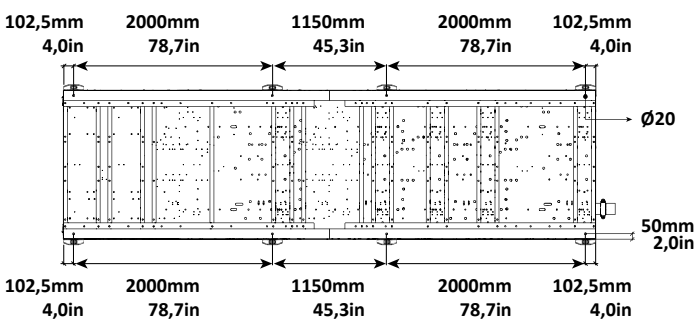




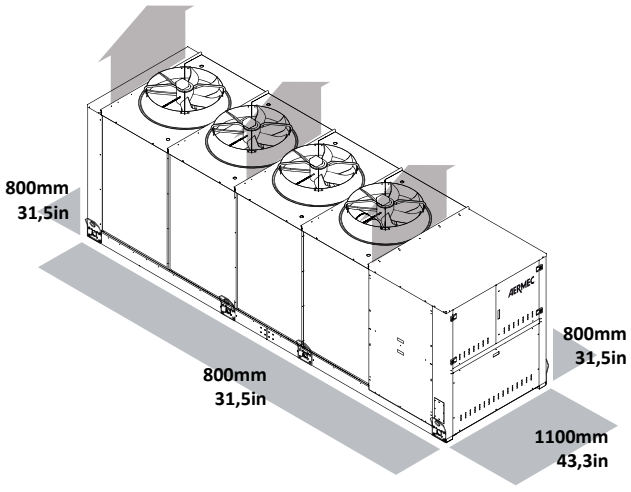
2.14. LIFTING POINTS



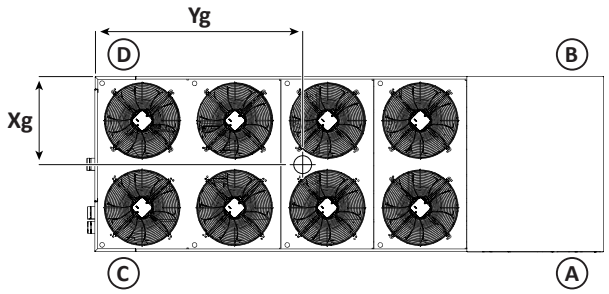
2.15. POSITION ANTI-VIBRATION MOUNTS



2.16. MINIMUM CLEARANCE SPACE

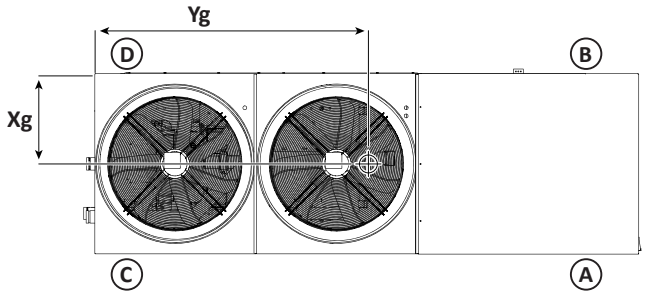


3. WEIGHTS | CENTRE OF GRAVITY AND POINT LOAD PERCENTAGES



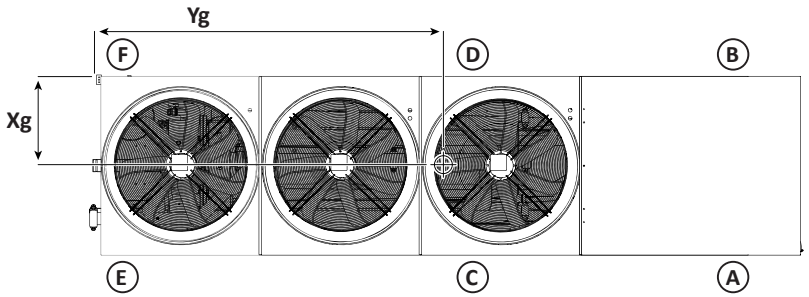
EMPTY WEIGHT														
NRP	HYDRONIC KIT	UNIT WEIGHT (Kg)	BARYCENTRE (mm)		BARYCENTRE (in)		WEIGHT DISTRIBUTION ON SUPPORTS (%)							
			Gx	Gy	Gx	Gy	A	B	C	D	E	F	G	H
NRP0280	00	884	554	1214	21,8	47,8	19%	21%	28%	31%	-	-	-	-
NRP0300	00	909	555	1193	21,9	47,0	20%	22%	28%	30%	-	-	-	-
NRP0330	00	935	556	1170	21,9	46,1	20%	23%	27%	30%	-	-	-	-
NRP0350	00	1018	556	1190	21,9	46,9	20%	22%	28%	30%	-	-	-	-

RUNNING WEIGHT														
NRP	HYDRONIC KIT	UNIT WEIGHT (Kg)	BARYCENTRE (mm)		BARYCENTRE (in)		WEIGHT DISTRIBUTION ON SUPPORTS (%)							
			Gx	Gy	Gx	Gy	A	B	C	D	E	F	G	H
NRP0280	00	916	554	1216	21,8	47,9	19%	21%	28%	31%	-	-	-	-
NRP0300	00	941	555	1195	21,8	47,0	20%	22%	28%	31%	-	-	-	-
NRP0330	00	969	556	1172	21,9	46,1	20%	22%	27%	30%	-	-	-	-
NRP0350	00	1058	556	1189	21,9	46,8	20%	22%	28%	30%	-	-	-	-



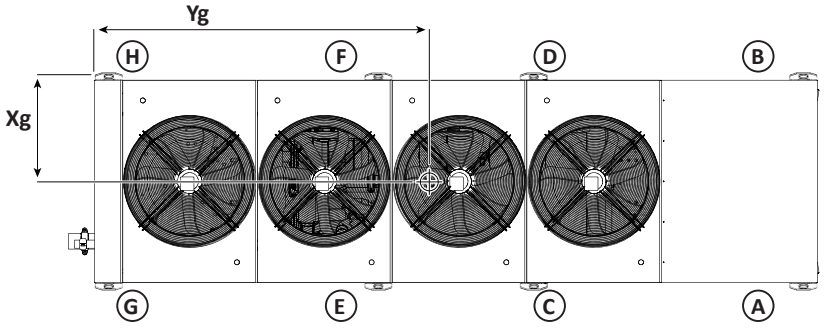
EMPTY WEIGHT														
NRP	HYDRONIC KIT	UNIT WEIGHT (Kg)	BARYCENTRE (mm)		BARYCENTRE (in)		WEIGHT DISTRIBUTION ON SUPPORTS (%)							
			Gx	Gy	Gx	Gy	A	B	C	D	E	F	G	H
NRP0500	00	1118	555	1446	21,8	56,9	28%	28%	22%	22%	-	-	-	-
NRP0550	00	1166	564	1416	22,2	55,7	28%	29%	21%	22%	-	-	-	-

RUNNING WEIGHT														
NRP	HYDRONIC KIT	UNIT WEIGHT (Kg)	BARYCENTRE (mm)		BARYCENTRE (in)		WEIGHT DISTRIBUTION ON SUPPORTS (%)							
			Gx	Gy	Gx	Gy	A	B	C	D	E	F	G	H
NRP0500	00	1169	555	1466	21,8	57,7	27%	28%	22%	23%	-	-	-	-
NRP0550	00	1221	564	1436	22,2	56,5	27%	29%	21%	22%	-	-	-	-



EMPTY WEIGHT														
NRP	HYDRONIC KIT	UNIT WEIGHT (Kg)	BARYCENTRE (mm)		BARYCENTRE (in)		WEIGHT DISTRIBUTION ON SUPPORTS (%)							
			Gx	Gy	Gx	Gy	A	B	C	D	E	F	G	H
NRP0600	00	1456	552	1896	21,7	74,6	9%	9%	31%	32%	10%	10%	-	-
NRP0650	00	1480	552	1888	21,7	74,3	9%	9%	32%	32%	10%	10%	-	-
NRP0700	00	1545	552	1864	21,7	73,4	9%	9%	31%	32%	9%	9%	-	-

RUNNING WEIGHT														
NRP	HYDRONIC KIT	UNIT WEIGHT (Kg)	BARYCENTRE (mm)		BARYCENTRE (in)		WEIGHT DISTRIBUTION ON SUPPORTS (%)							
			Gx	Gy	Gx	Gy	A	B	C	D	E	F	G	H
NRP0600	00	1510	552	1908	21,7	75,1	8%	8%	32%	32%	10%	10%	-	-
NRP0650	00	1539	552	1899	21,7	74,8	8%	8%	32%	32%	10%	10%	-	-
NRP0700	00	1612	552	1875	21,7	73,8	9%	9%	32%	32%	9%	9%	-	-



EMPTY WEIGHT														
NRP	HYDRONIC KIT	UNIT WEIGHT (Kg)	BARYCENTRE (mm)		BARYCENTRE (in)		WEIGHT DISTRIBUTION ON SUPPORTS (%)							
			Gx	Gy	Gx	Gy	A	B	C	D	E	F	G	H
NRP0750	00	2237	754	2153	29,7	84,8	9%	9%	19%	20%	19%	19%	2%	2%

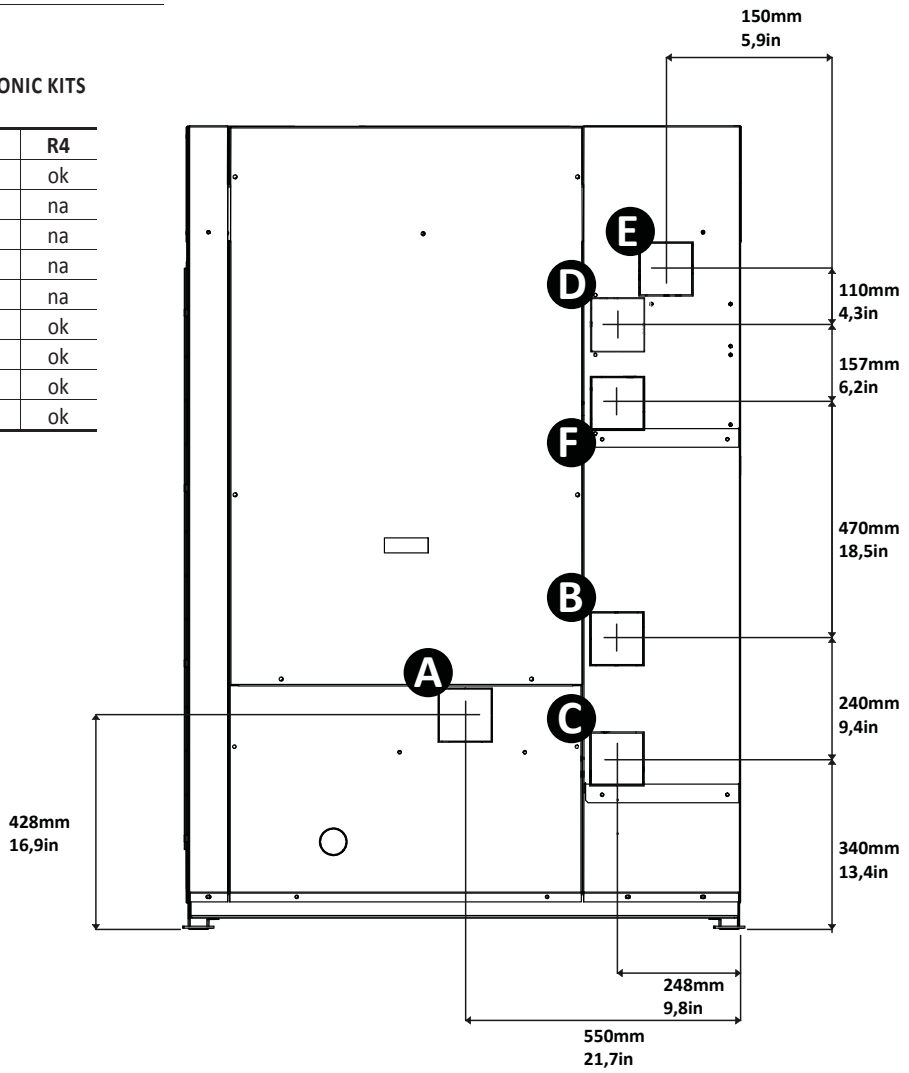
RUNNING WEIGHT														
NRP	HYDRONIC KIT	UNIT WEIGHT (Kg)	BARYCENTRE (mm)		BARYCENTRE (in)		WEIGHT DISTRIBUTION ON SUPPORTS (%)							
			Gx	Gy	Gx	Gy	A	B	C	D	E	F	G	H
NRP0750	00	2312	754	2141	29,7	84,3	9%	9%	20%	20%	18%	18%	2%	2%

4. POSITION OF HYDRAULIC CONNECTIONS

4.1. NRP 0280-0300-0330-0350-0500-0550-0600-0650-0700

POSSIBLE CONFIGURATIONS BETWEEN HYDRONIC KITS

system hydronic unit	recovery hydronic unit					
		°	R1	R2	R3	R4
	°	ok	ok	ok	ok	ok
	01	ok	na	na	na	na
	02	ok	na	na	na	na
	03	ok	na	na	na	na
	04	ok	na	na	na	na
	P1	ok	ok	ok	ok	ok
	P2	ok	ok	ok	ok	ok
	P3	ok	ok	ok	ok	ok
	P4	ok	ok	ok	ok	ok

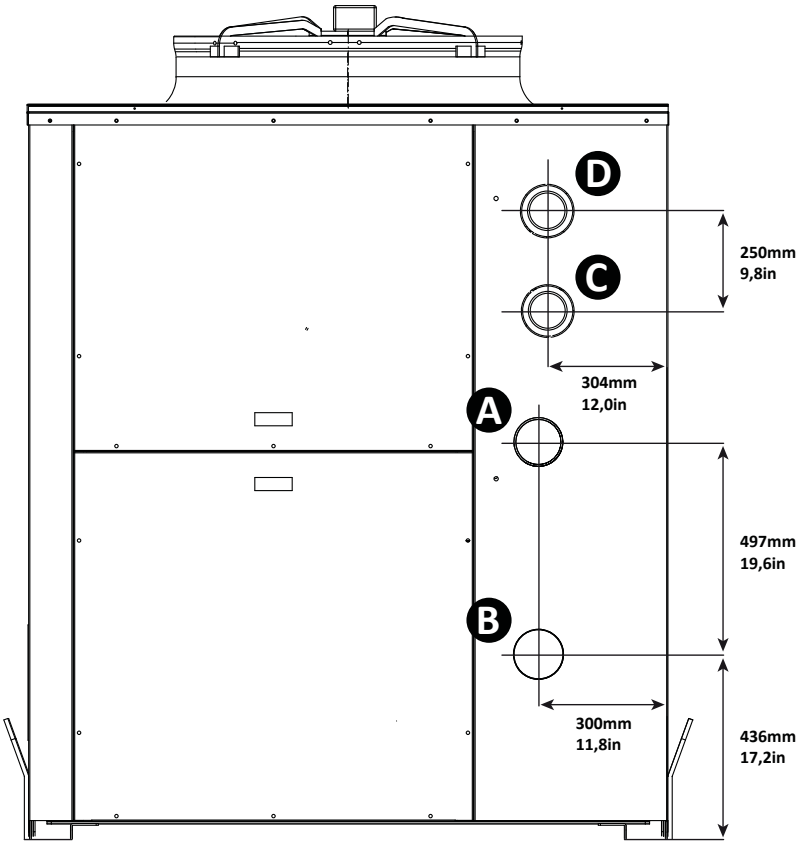


	2 AND 4- PIPE SYSTEM KEY		0280	0300	0330	0350	0500	0550	0600	0650	0700
A	IN - version with pump (P1-P2-P3-P4)	ø	2"½	2"½	2"½	2"½	2"½	2"½	2"½	2"½	2"½
B	IN - standard version (°)	ø	2"½	2"½	2"½	2"½	2"½	2"½	2"½	2"½	2"½
C	OUT - standard version and storage tank version (°/01-02-03-04)	ø	2"½	2"½	2"½	2"½	2"½	2"½	2"½	2"½	2"½
D	IN - from DHW system	ø	2"½	2"½	2"½	2"½	2"½	2"½	2"½	2"½	2"½
E	OUT - from DHW system	ø	2"½	2"½	2"½	2"½	2"½	2"½	2"½	2"½	2"½
F	IN - version with storage tank	ø	2"½	2"½	2"½	2"½	2"½	2"½	2"½	2"½	2"½

4.2. NRP 0750

POSSIBLE CONFIGURATIONS BETWEEN HYDRONIC KITS

system hydronic unit	recovery hydronic unit					
		°	R1	R2	R3	R4
	°	ok	ok	ok	ok	ok
	01	ok	na	na	na	na
	02	ok	na	na	na	na
	03	ok	na	na	na	na
	04	ok	na	na	na	na
	P1	ok	ok	ok	ok	ok
	P2	ok	ok	ok	ok	ok
	P3	ok	ok	ok	ok	ok
	P4	ok	ok	ok	ok	ok



	2 AND 4- PIPE SYSTEM KEY		0750
A	IN - version with pump (P1-P2-P3-P4)	ø	3”
B	IN - standard version (°)	ø	3”
C	OUT - standard version and storage tank version (°/01-02-03-04)	ø	3”
D	IN - from DHW system	ø	3”
E	OUT - from DHW system	ø	3”
F	IN - version with storage tank	ø	3”

ATTENTION
Check the hydraulic sealing of the joints.

ATTENTION
It is recommended to repeat this operation after the appliance has functioned for a few hours and to periodically check the system pressure. The machine must be off (pump Off) when reintegrated.

4.3. LOADING SYSTEM

Before beginning loading, place the switch at OFF

1. Check that system drain cock is closed.
2. Open all vent valves of the system and the relative terminals.
3. Open the system cut-off devices.
4. Start filling by slowly opening the system water loading cock outside the appliance.
5. When water starts to escape from the terminal vent valves, close them and continue loading until the intended pressure value for the system is reached.

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

4.4. DISCHARGING SYSTEM

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

5. CONTROL AND COMMISSIONING

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

1. The electrical mains features are suitable for the absorption values indicated in the electrical data table, also taking into consideration any other machines operating at the same time.
2. The unit is only powered when installation has been completed (hydraulic and electric).
3. Respect the connection indications of the phase, and earth wires.
4. The power supply line must have a relevant protection mounted upstream against short circuits and dispersions to earth, which isolates the system with respect to other utilities.
5. The voltage must be within a tolerance of ±10% of the nominal power supply voltage of the machine (for unbalanced three-phase unit max 3% between the phases). Whenever these parameters are not respected, contact the electric energy public body.
6. For electric connections, use the cables with double isolation according to the Standards in force on this subject in the different countries.

MANDATORY

1. The use of an omnipolar magnet circuit breaker switch is mandatory, in compliance with the IEC-EN Standards (contact opening at least 3 mm), with suitable cut-off power and differential protection on the basis of the electric data table shown below, installed as near as possible to the appliance.
2. It is mandatory to make an effective earth connection. The manufacturer cannot be held responsible for any damage caused by the lack of or ineffective appliance earth connection.
3. For units with three-phase power supply, check the correct connection of the phases.

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

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

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

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

5.1. ELECTRIC DATA TABLE

For longer lengths or different cable laying, it is up to the PLANNER to calculate the appropriate line switch, the power supply line as well as the connection to the earth wire and connection cables depending on:

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

ATTENTION
It is prohibited to use the water pipes to earth the appliance.

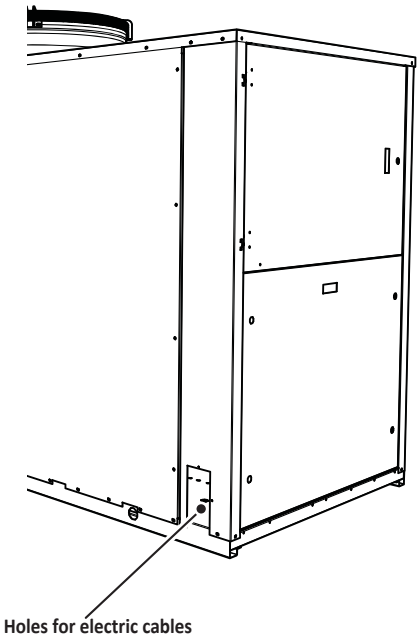
ATTENTION
Check the tightening of all power wire terminals on commissioning and after 30 days from start-up. Subsequently they must be checked every six months. Loose terminals can cause overheating of the cables and components.

5.2. ELECTRICAL DATA

NRP	Power supply	U.M.	NRP 280 E	NRP 300 E	NRP 330 E	NRP 350 E	NRP 500 A	NRP 550 A	NRP 600 A	NRP 650 A	NRP 700 A	NRP 750 A
LRA	230V-3-60Hz	A	239	287	294	375	376	389	373	454	494	546
MCA	230V-3-60Hz	A	87	95	101	146	148	161	180	225	265	284
MOP	230V-3-60Hz	A	117	132	138	203	205	218	218	283	323	346
Recommended fuse	230V-3-60Hz	A	110	125	125	200	200	200	200	250	300	300
LRA	460V-3-60Hz	A	132	157	163	193	189	200	199	229	239	276
MCA	460V-3-60Hz	A	50	57	63	74	70	81	99	110	120	134
MOP	460V-3-60Hz	A	64	77	83	99	95	106	119	135	145	163
Recommended fuse	460V-3-60Hz	A	60	75	80	90	90	100	110	125	125	150
LRA	575V-3-60Hz	A	103	105	108	145	138	146	134	171	186	217
MCA	575V-3-60Hz	A	38	43	46	64	57	64	72	89	105	118
MOP	575V-3-60Hz	A	49	57	60	86	79	86	86	112	127	144
Recommended fuse	575V-3-60Hz	A	45	50	60	80	75	80	80	110	125	125

Data declarated with No Pump version.

6. ELECTRIC POWER CONNECTION TO THE ELECTRICAL MAINS



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

7. CONTROL AND COMMISSIONING

7.1. PREPARATION FOR COMMISSIONING

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

7.2. START - UP

7.2.1. PRELIMINARY OPERATIONS TO BE PERFORMED WITH NO VOLTAGE PRESENT

Control:

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

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.

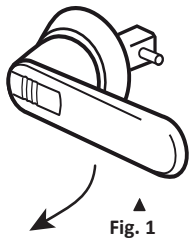


Fig. 1

7.2.2. THE FOLLOWING OPERATIONS ARE TO BE CARRIED OUT WHEN THE UNIT IS LIVE

1. Supply power to the unit by turning the master switch to the ON position; see (fig1.) The display will come on a few seconds after voltage has been supplied; check that the operating status is on OFF.(OFF BY KEY B on lower side of the display).
2. Use a tester to verify 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 casing 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 any event, the temperature of the oil pan must be 10-15°C higher than room temperature.

HYDRAULIC CIRCUIT

1. Check that all hydraulic connections are made correctly, that the plate indications are complied with and that a mechanical filter has been installed at the evaporator inlet. (Mandatory component for warranty to be valid).
2. Make sure that the circulation pump/s is operating and that the water flow rate is sufficient to close the contact of the flow switch.
3. Check the water flow rate, measuring the pressure difference between inlet and outlet of the evaporator and calculate the flow rate using the evaporator pressure drop diagram present in this documentation.
4. Check correct functioning of the flow meters, if installed; on closing the cut-off valve at the outlet of the heat exchanger, the unit must display the block. Finally, open the valve and rearm the block.

7.3. 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.

8. FUNCTIONING FEATURES

8.1. SET POINT IN COOLING MODE

(Factory set) = 7°C, Δt = 5°C.

8.2. SET POINT IN HEATING MODE

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

8.3. 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.

8.4. CIRCULATION PUMPS (NOT SUPPLIED)

The circuit board envisions outputs 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.

8.5. 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 output 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 switch-on of the resistance if installed.
To restore normal functions the temperature of the outlet water must rise above +4°C. Rearm is manual.

8.6. WATER FLOW RATE ALARM

The unit manages a water flow rate alarm controlled by a pressure switch or flow switch installed as per standard 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, call the nearest after-sales service immediately.

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