



REVERSIBLE / CHILLER - HEAT PUMPS - Installation Maintenance Manual

CHILLER - HEAT PUMPS
WATER/WATER

- HIGH EFFICIENCY
- MAXIMUM WATER OUTLET TEMPERATURE 55 °C
- DESUPERHEATER
- SUITABLE FOR GEOTHERMAL APPLICATIONS

WRL
180-650



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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WRL

SERIAL NUMBER

EC DECLARATION OF CONFORMITY

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

NAME WRL
TYPE WATER-COOLED REVERSIBLE CHILLER / HEAT PUMP
MODEL

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

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

Therefore complying with the essential requirements of the following directives:

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

The product, in agreement with Directive 97/23/CE, satisfies the Total quality Guarantee procedure (form H) with certificate n.06/270-QT3664 Rev.4 issued by the notified body n.1131 CEC via Pisacane 46 Legnano (MI) - Italy

Bevilacqua

15/04/2010

Marketing Manager
Signature



FOR THE INSTALLER



1. RECEIPT OF THE PRODUCT AND INSTALLATION

1.0.1. Receipt and handling

The machine is sent from the factory wrapped with estincoil placed on a loading pallet

Before handling the unit, verify the lifting capacity of the machines used.

Handling must be performed by qualified, suitably equipped staff.

Handling the machine:

- Whenever it is envisioned to lift the machine with belts, so as not to damage the structure, place protections between the belts and the framework. It is prohibited to stop below the unit during lifting.
- **The machine must always be kept in a vertical position;**
- **The instructions found on the machine on an integral part of the same. It is recommended to read them and keep them with care.**
- **WARNING: The units CANNOT be stacked.**

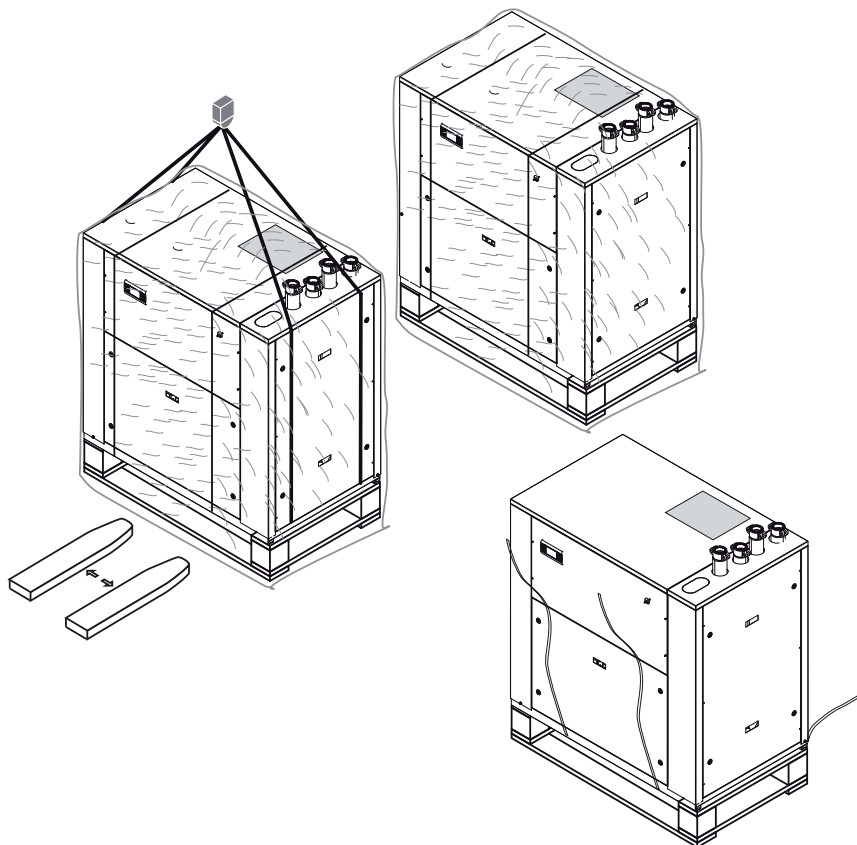
1.0.2. Selection and place of installation

The WRL water/water INDOOR heat pump with gas side inversion (R410A) is sent from the factory already inspected and only requires electric and hydraulic connections in the place of installation.

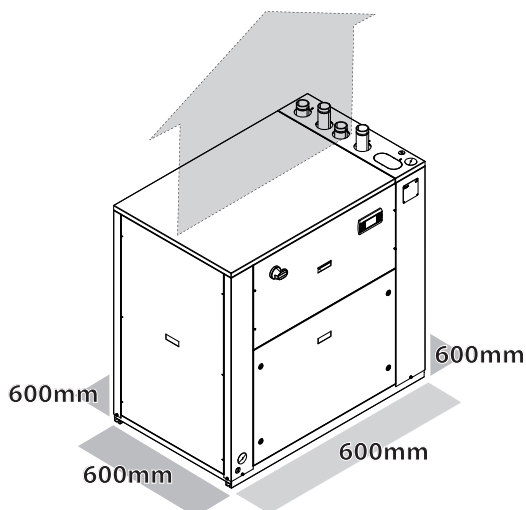
Before beginning installation consent with client and pay attention to the following recommendations:

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

► HANDLING



► MINIMUM TECHNICAL SPACES



⚠ ATTENTION:
DRAWINGS ONLY INDICATIVE

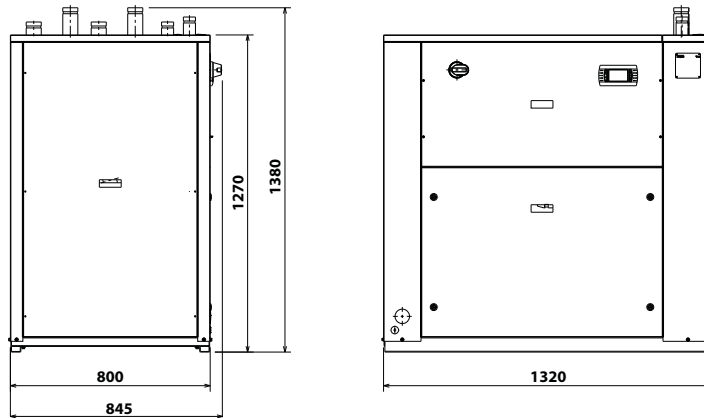
2. ACCESSORIES

- AER485P1: RS-485 interface for supervising systems with MODBUS protocol.
- VT: Anti-vibration mounts, group of four anti-vibration mounts to assemble under the unit's sheet steel base.
- STA: Room temperature probe, 230Vac recess kit containing the room probe with display and regulation knob, able to control an ON-OFF valve or a zone pump
- STH: Room temperature and humidity probe, 230Vac recess kit containing the room and humidity probes with display and regulation knob, able to control an ON-OFF valve or a zone pump and dehumidifier consent
- SSM: Probe to be used in combination with the mixing valve in the presence for under floor systems application. Accessory to be ordered together with the VMFCRP one.
- S...I: System storage tanks; available in sizes 200, 300, 400 and 500 litres (S200I, S300I, S400I and S500I).
- PGD1: Simplified remote panel. Allows to perform the basic controls of the unit with alarm signals. Remote control max distance up to 500 m with 2 PAIRS of TWISTED cable + SHIELD with shielded pairs and TCONN6J000.
- KSAE: External air probe. Temperature probe with plastic container.
- VMFCRP: Zones Management
The WRL heat pump, can manage up to a maximum of n° 3 zones with the following methods:
 - Zone n° 1: managed in series thanks to the use of latest generation electronic regulation. it is recommended to fit the 'belt' SSM sensor (accessory) to control the output temperature.
 - The unit is sent with n°1 temperature probe for eventual sanitary storage tank.
 - The management of the remaining Zone 2 and Zone 3 is possible using the VMFCRP + SSM.

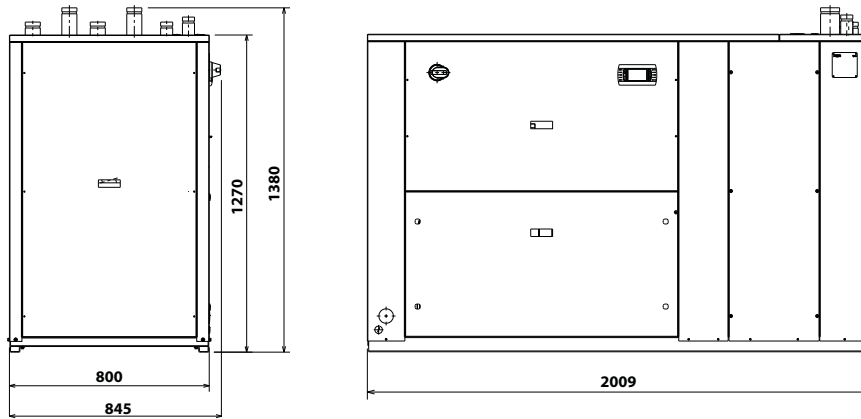
WRL / H	180	200	300	400	500	550	600	650
AER485P1	•	•	•	•	•	•	•	•
VT	9	9	9	9	15	15	15	15
STA	•	•	•	•	•	•	•	•
STH	•	•	•	•	•	•	•	•
SSM	•	•	•	•	•	•	•	•
S...I (200-300-400-500)	•	•	•	•	•	•	•	•
PGD1	•	•	•	•	•	•	•	•
KSAE	•	•	•	•	•	•	•	•
VMFCRP	•	•	•	•	•	•	•	•

3. WRL TABLES

► DIMENSIONS WRL 180 / 400 (mm)



► DIMENSIONS WRL / WRLH - 500-650 (mm)



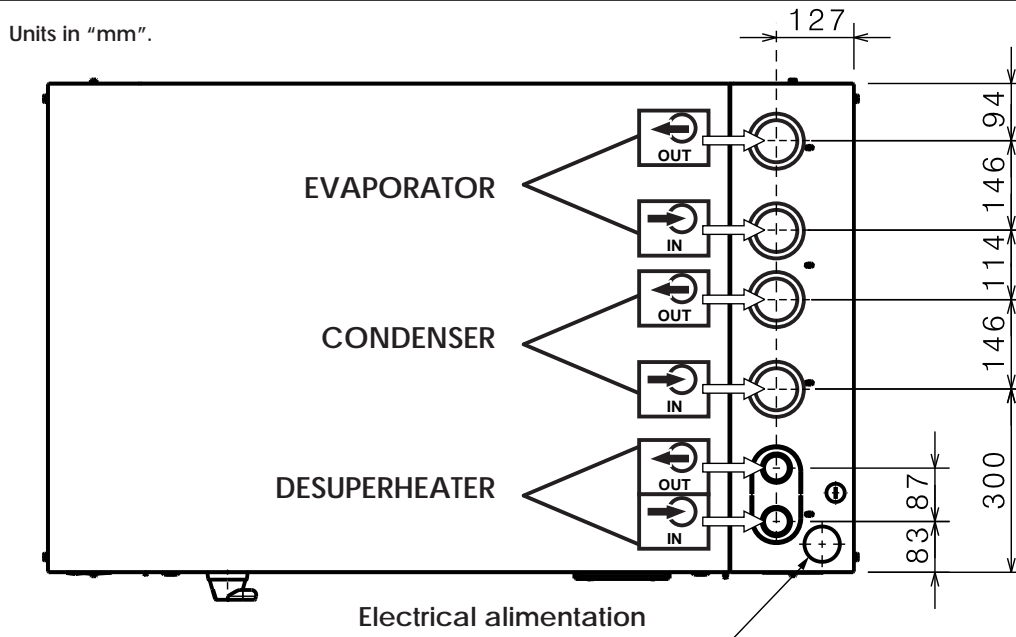
► WEIGHT

WRL (Kg)	180	200	300	400	500	550	600	650
empty weight	375	375	381	388	518	594	670	715
weight with pallet	385	385	391	398	530	606	682	727
running weight	398	398	406	413	548	624	706	751

WRLH (Kg)	180	200	300	400	500	550	600	650
empty weight	370	370	381	388	522	598	708	753
weight with pallet	380	380	391	398	534	610	720	765
running weight	390	390	404	411	552	628	749	794

4. POSITION/DIMENSION CONNECTION WRL

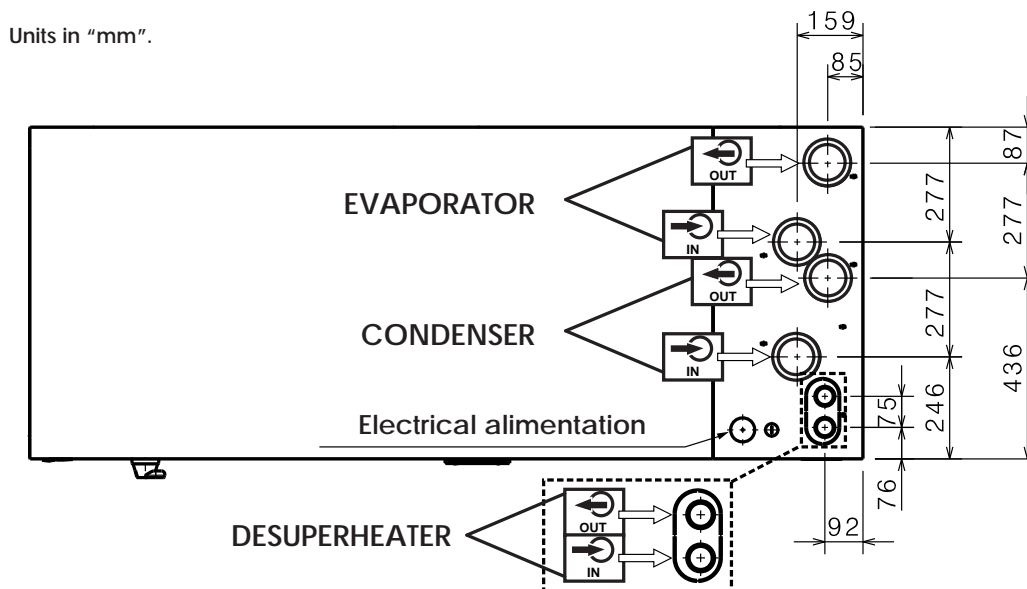
► WRL 180 / 400 (ONLY COOLING)



► CONNECTIONS (Ø)

WRL	180		200		300		400	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Evaporator	2"	2"	2"	2"	2"	2"	2"	2"
Condenser	2"	2"	2"	2"	2"	2"	2"	2"
Desuperheater	1"½	1"½	1"½	1"½	1"½	1"½	1"½	1"½

► WRL 500 / 650 (ONLY COOLING)

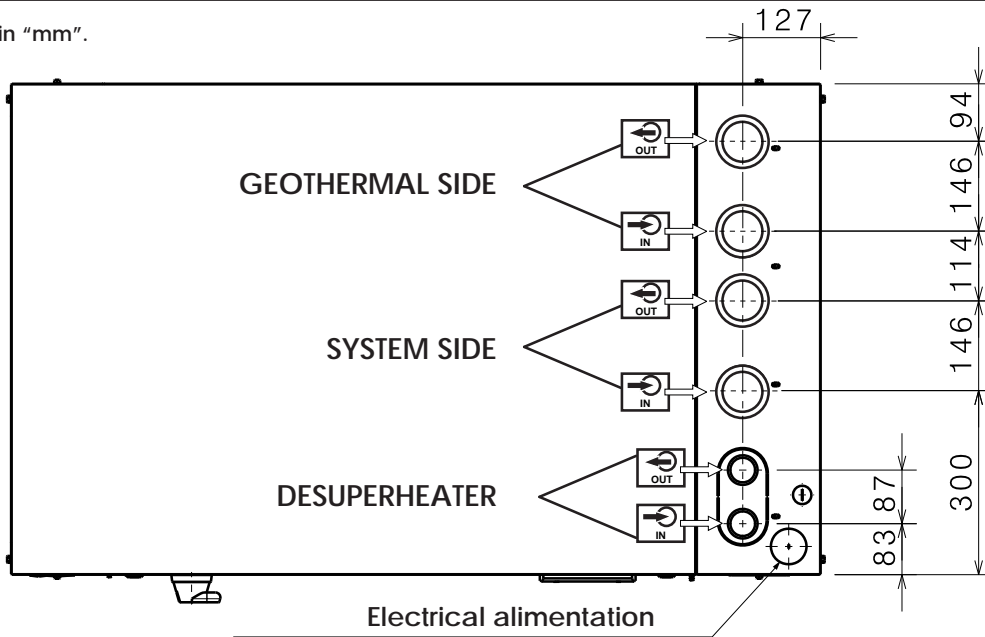


► CONNECTIONS (Ø)

WRL	500		550		600		650	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Evaporator	2"½	2"½	2"½	2"½	2"½	2"½	2"½	2"½
Condenser	2"½	2"½	2"½	2"½	2"½	2"½	2"½	2"½
Desuperheater	1"½	1"½	1"½	1"½	1"½	1"½	1"½	1"½

► WRLH 180 / 400 (HEAT PUMP)

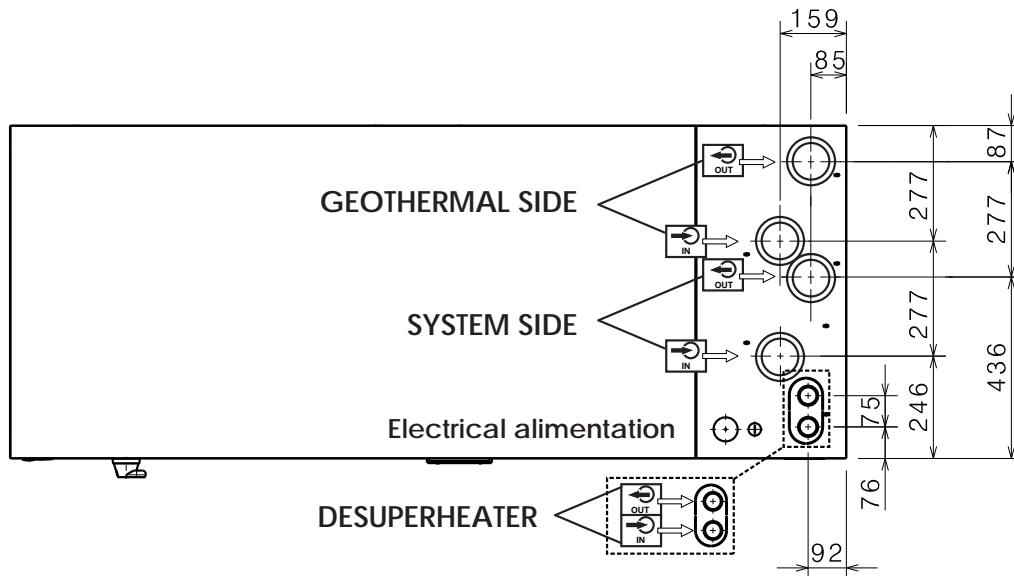
Units in "mm".



► CONNECTIONS (Ø)

WRL	180		200		300		400	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Geothermal side	2"	2"	2"	2"	2"	2"	2"	2"
System side	2"	2"	2"	2"	2"	2"	2"	2"
Desuperheater	1"½	1"½	1"½	1"½	1"½	1"½	1"½	1"½

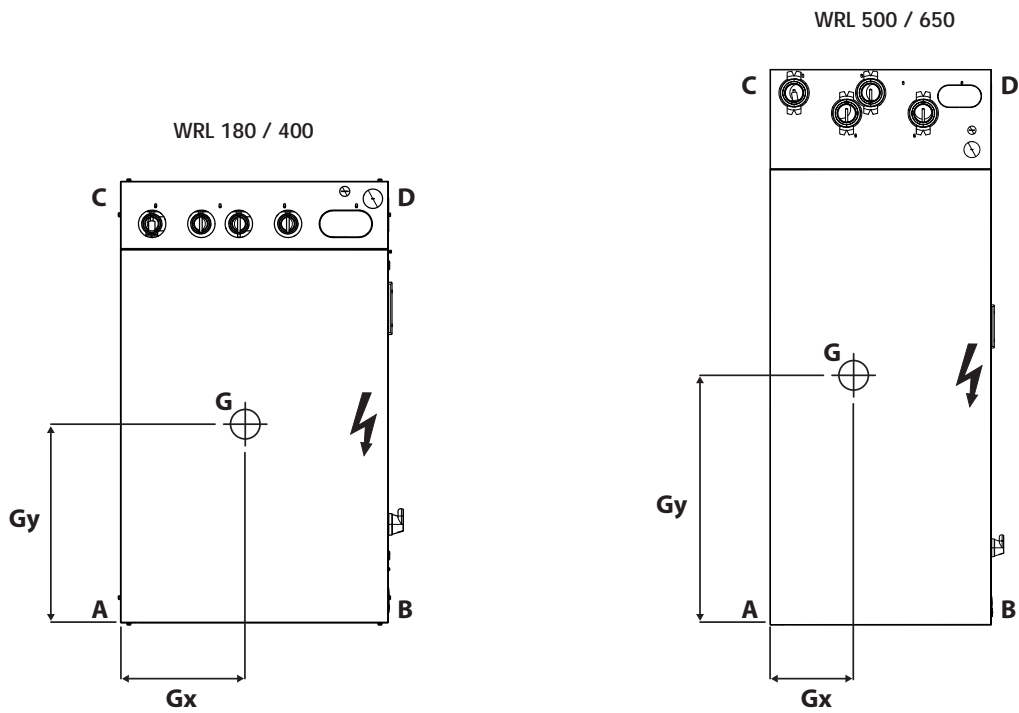
► WRLH 500 / 650 (HEAT PUMP)



► CONNECTIONS (Ø)

WRL	500		550		600		650	
	IN	OUT	IN	OUT	IN	OUT	IN	OUT
Geothermal side	2"½	2"½	2"½	2"½	2"½	2"½	2"½	2"½
System side	2"½	2"½	2"½	2"½	2"½	2"½	2"½	2"½
Desuperheater	1"½	1"½	1"½	1"½	1"½	1"½	1"½	1"½

5. BARYCENTRE



WRL	Total weight (machine working)	G_x	G_y	Support A [kg]	Support B [kg]	Support C [kg]	Support D [kg]
180	398	412	562	109.5	116.4	83.4	88.7
200	398	412	562	109.5	116.4	83.4	88.7
300	406	409	568	111.7	116.7	86.7	90.6
400	413	412	562	113.5	120.5	86.6	91.9
500	548	388	1005	140.5	132.2	142.0	133.6
550	624	387	944	170.2	159.6	152.0	142.6
600	706	386	953	190.9	178.4	173.9	162.5
650	751	386	916	210.4	196.4	177.9	166.1

6. ELECTRIC CONNECTIONS

The WRL heat pumps are completely wired at the factory and only require connection to the electrical mains, downstream from a unit switch, according to that envisioned by the Standards in force on this subject in the country of installation.

It is also advised to check that:

- The electrical mains features are suitable for the absorption values indicated in the electrical data table, TAB. also taking into consideration any other machines operating at the same time.
- The unit is only powered when installation has been completed (hydraulic and electric).
- Respect the connection indications of the phase, and earth wires.
- The power supply line must have a relevant protection mounted upstream against short circuits and dispersions to earth, which isolates the system with respect to other utilities.
- The voltage must be within a tolerance of $\pm 10\%$ 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,



All the electrical operations must be carried out by **STAFF 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.

contact the electric energy public body. For electric connections, use the cables with double isolation according to the Standards in force on this subject in the different countries.

- The use of an omnipolar magnet circuit breaker switch is mandatory, in compliance with the IEC-EN Standards (contact opening at least 3 mm), with suitable cut-off power and differential protection on the basis of the electric data table shown below, installed as near as

possible to the appliance.

- It is mandatory to make an effective earth connection. The manufacturer cannot be considered responsible for any damage caused by the lack of or ineffective appliance earth connection.
- For units with three-phase power supply, check the correct connection of the phases.

WARNING:

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

6.1. RECOMMENDED ELECTRIC CABLE SECTION

The cable section shown in the table are recommended for maximum lengths of 50m.

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

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

ATTENTION:

Check the tightening of all power wire clamps on commissioning and after 30 days from start-up. Subsequently, check the tightening of all the power clamps every six months.

Loose terminals can cause overheating of the cables and components.

6.2. ELECTRIC POWER CONNECTION TO THE ELECTRICAL MAINS

1. Before connecting the unit to the power supply mains, ensure that the isolating switch is open.
2. Open the front panel
3. Use the holes at the top on the framework for the main electric power supply cable and for the cables of the other external connections under the responsibility of the installer.
4. It is forbidden to access with electric cables in positions not specifically envisioned in this manual.
5. Avoid direct contact with not insulated copper piping and with compressor.
6. Identify the clamps for the electric connection, always refer to the electric layout supplied with the unit.
7. For the functional connection of the unit bring a power supply cable to the electric control board inside the unit and connect to the U-N and PE clamps respecting (U) phase, (N) neutral, (PE) earth in case of single-phase power supply (230V-50Hz),
8. U-V-W like phases, N like neutral and PE like earth in case of three-phase power supply (400V-3N-50Hz).
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 main system 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 timeframe for the completion of works for the system. Prior to the work to be carried out by the AERMEC service personnel, all other works (electrical and hydraulic hook-ups, priming and bleeding of air from the system) must have been completed.

Before starting the unit make sure that:

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. The hydraulic connections have been made respecting the inlet and outlet
5. The hydraulic plant has been loaded and bled.
6. The hydraulic circuit cocks are open
7. The electric connections have been made correctly
8. The voltage is within the tolerance of 10% of the unit nominal value
9. Earthing is correctly made. All electric and hydraulic connections are correctly tightened.

7.2. MACHINE COMMISSIONING

- Close the electric control board hatch.
- Position the appliance door-lock isolating switch at ON, turning the handle downwards.
- Press the ON key to switch the machine. When the LED is on the unit is ready for functioning.

For electric connections, use the cables with double isolation according to the Standards in force on this subject in the countries where the unit is installed.



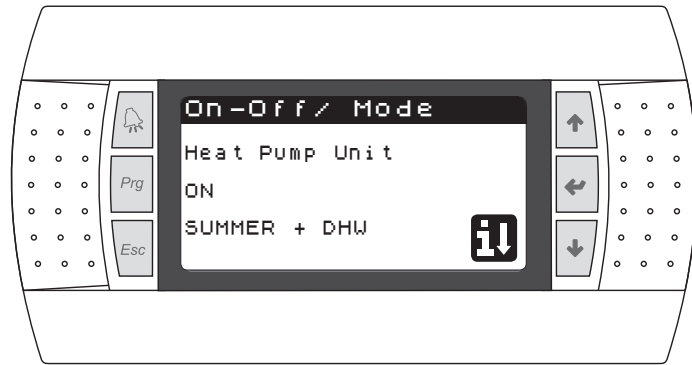
Commissioning must be performed with standard settings. Only when the inspection has been completed can the functioning Set Point values be changed.

Before start-up, power the unit for at least 12-24 hours positioning the protection magnet circuit breaker switch and the door lock isolating switch at ON

Make sure that the control panel is off in order to allow the compressor sup oil to heat.

7.3. SEASON CHANGEOVER

- For every season change, check that the functioning limits lie within the limits.
- Check that the compressor input current is lower than the maximum indicated in the technical data table.
- Check, that in models with three-phase power supply, that the compressor noise level is not abnormal. If this is the case, invert a phase.
- Make sure that the voltage value lies within the pre-fixed limits and that unbalance between the three phases (three-phase power supply) is not above 3%.



7.3.1. Season changeover from panel on machine

How to activate season changeover:
Under the On- Off branch it is possible change the functioning mode of the machine. In the second selection line (can ONLY be edited if OFF was selected in the first line) it is possible to select the seasonal state of the heat pump (SUMMER, WINTER, DHW ONLY). Clearly according to the machine configured and according to the accessories installed.

NOTE:
ALWAYS REFER TO THE PROCEDURE ILLUSTRATED IN THE USE MANUAL.

7.4. ELECTRICAL DATA

WRL / WRLH	ALIMENTATION	Max Courrent A	Recommended Section Line	Main switch
180	400V-3N-50Hz	42	10 mm ²	45A
	230V-3-50Hz	73	25 mm ²	80A
200	400V-3N-50Hz	52	10 mm ²	65A
	230V-3-50Hz	90	25 mm ²	100A
300	400V-3N-50Hz	56	16 mm ²	65A
	230V-3-50Hz	97	35mm ²	100A
400	400V-3N-50Hz	61	16mm ²	65A
	230V-3-50Hz	106	35mm ²	125A
500	400V-3N-50Hz	69	25mm ²	80A
	230V-3-50Hz	120	35mm ²	125A
550	400V-3N-50Hz	91	25mm ²	100A
600	400V-3N-50Hz	104	35mm ²	125A
650	400V-3N-50Hz	115	35mm ²	125A

8. EXTRAORDINARY MAINTENANCE

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

8.4.1. Load procedure

The load procedure is the following:

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

9. ROUTINE 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:

9.4.1. Hydraulic circuit

CHECK:

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

9.4.2. Electrical circuit

CHECK:

- Safety efficiency

- Electric supply pressure
- Electrical Input
- Connection tightness
- Functioning of the compressor guard resistance

9.4.3. Cooling circuit

CHECK:

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

9.4.4. Mechanical checks

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.
- The condition of the structure. If there are any oxidised parts, treat with paint suitable to eliminate or reduce oxidation.

WARNING

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

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

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

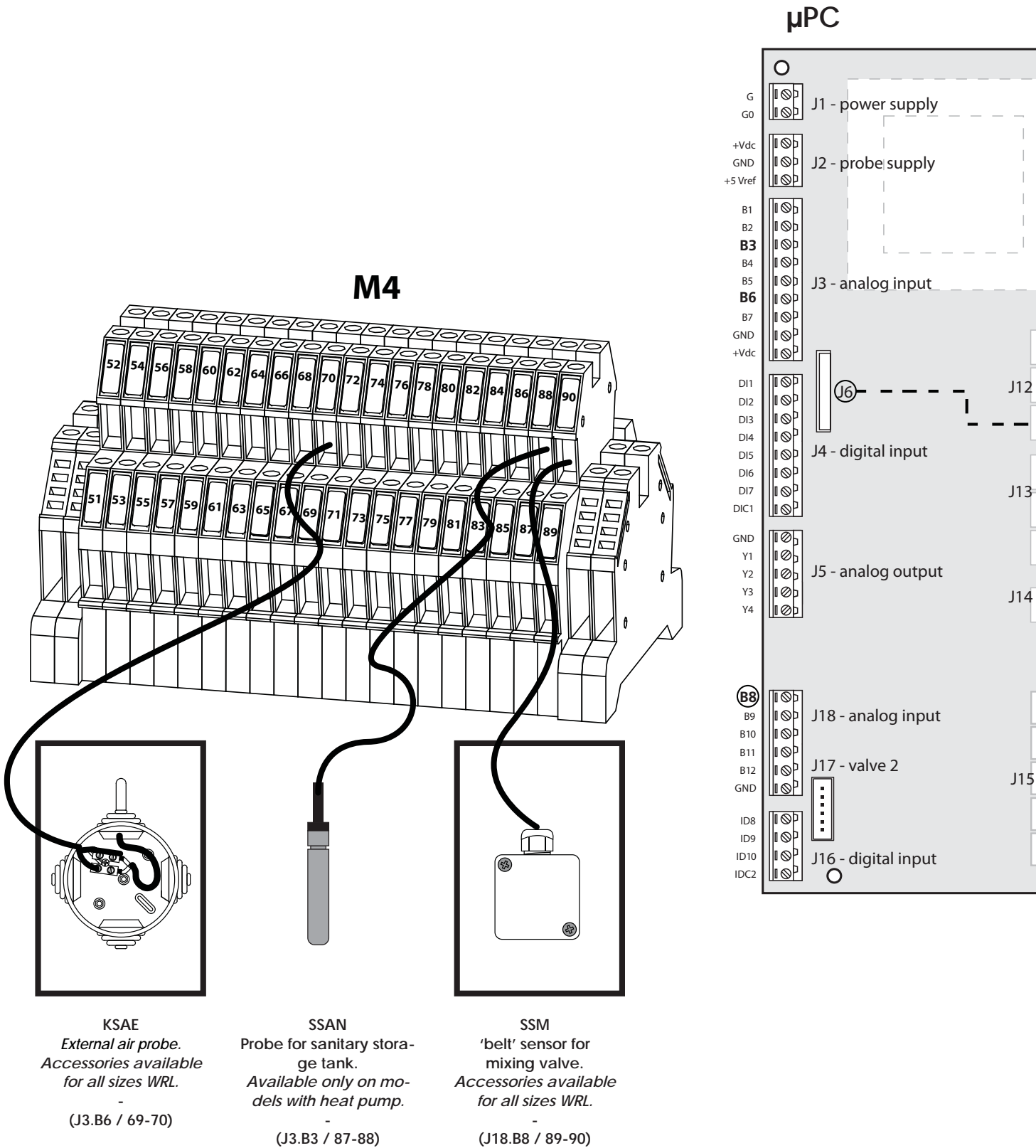
We recommend to envision a machine book (not supplied, but the user's responsibility), which allows to keep track of the interventions performed on the unit. In this way it will be easy to suitably organise the interventions making research and the prevention of any machine breakdowns easier. Use the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

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

DISPOSAL

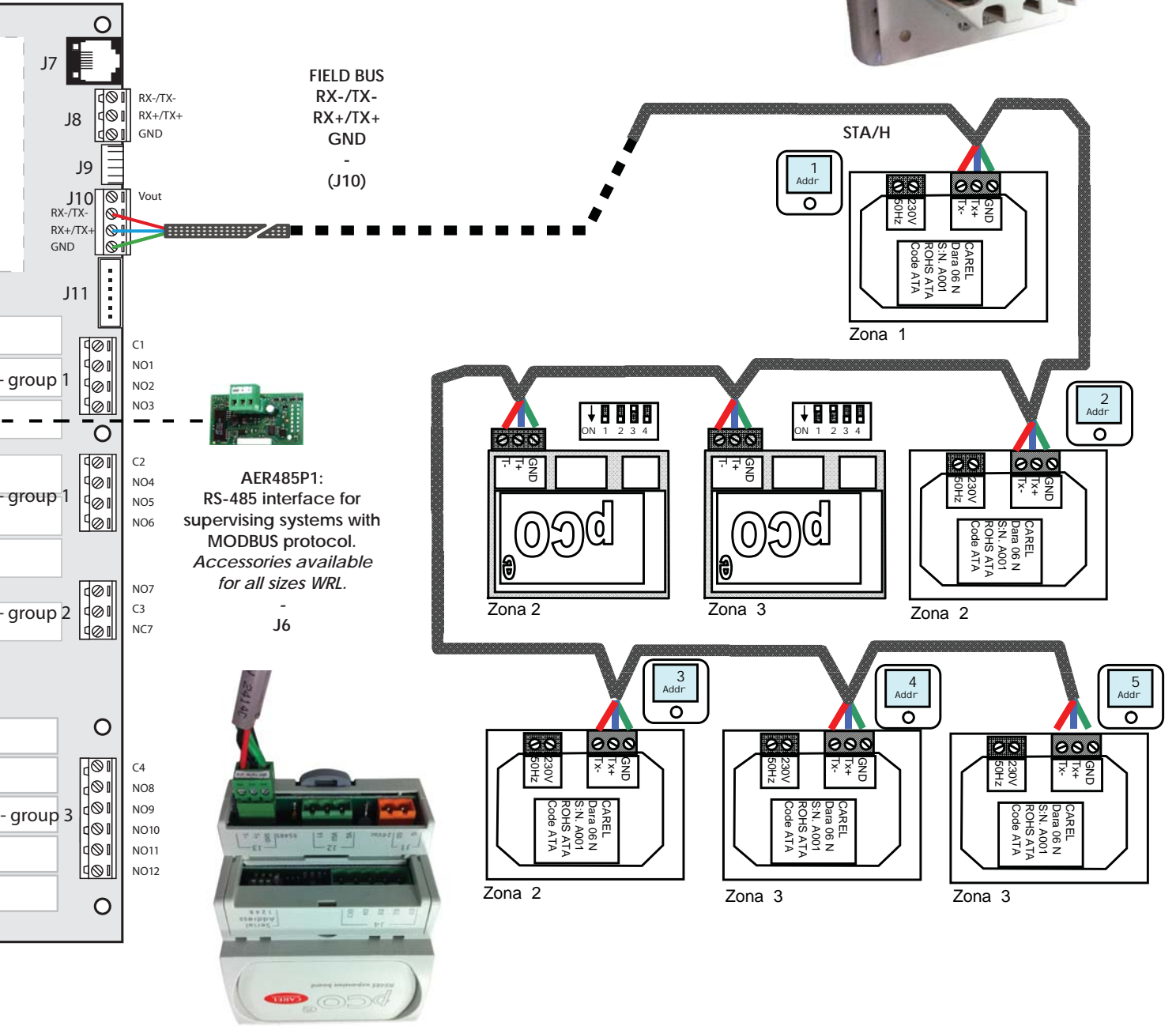
Envisions that disposal of the unit is carried out in conformity with the Standards in force in the different countries.

10. WIRING DIAGRAM



11. MODBUS ELECTRICAL CONNECTION

Through the door named "Field Bus" application, WRL is able to monitor several Modbus slave. Remember to add at the end of a line resistance of 120 ohms between Tx + and Tx-.



ALWAYS REFER TO WIRING ON UNIT (INCLUDED).



ATTENTION:
 To change the Modbus address (STA / H) press + FAN POWER for 3 seconds. Enter the password 22 and change the parameter "Addr".



37040 Bevilacqua (VR) - Italy
Via Roma, 996 - Tel. (+39) 0442 633111
Telefax (+39) 0442 93730 - (+39) 0442 93566
www.aermec.com



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The technical data in the following documentation are not binding. Aermec reserves the right to make all the modifications considered necessary for improving the product at any time.