

HYDRONIC



**CHILLERS AND INVERTER AIR/WATER HEAT
PUMPS WITH AXIAL FANS**



TECHNICAL BULLETIN

MEX VS 15 RH / MEX VS 16 RH

MEX VS 18 RH / MEX VS 19 RH

MEX VS 112 RH / MEX VS 112T RH

MEX VS 115 RH / MEX VS 115T RH

Cod. MUI141247820-05

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CE CONFORMITY DECLARATION



DICHIARAZIONE DI CONFORMITÀ CE

THE COMPANY TCM SRL – VIA DEI CICLAMINI 25 70026 MODUGNO BARI – ITALY
LA SOCIETÀ TCM SRL / VIA DEI CICLAMINI 25 70026 MODUGNO BARI - ITALY

DECLARES
DICHIARA

that the unit:
che la macchina:

Definition : Chiller and inverter air/water heat pumps with axial fans /
 Definizione : Refrigeratori e pompe di calore inverter aria/acqua con
 ventilatori assiali

Model N° : MEX VS 15 RH/16 RH/18 RH/19 RH/112 RH/112T RH/115
 N° modello : RH/115T RH
 MEX VS KA 15 RH/16 RH/18 RH/19 RH/112 RH/112T
 RH/115 RH/115T RH

Serie N°:
 N° di serie:

MEETS THE REQUIREMENTS OF DIRECTIVE 2006/42/CE
È CONFORME AI REQUISITI DELLA DIRETTIVA 2006/42/CE

1. The unit is in CAT. I, so it's free from the application of Directive 2014/68/UE (Reference to Art. I, paragraph 2, point f)
L'attrezzatura a pressione rientra nella CAT. I. L'unità è quindi esente dall'applicazione della normativa PED 2014/68/UE (Riferimento Art. I, paragrafo 2 punto f).

2. Harmonized standards applied to designing and manufacture : UNI EN 378-1, UNI EN378-2, UNI EN 12735-1
Norme armonizzate applicate alla progettazione ed alla costruzione : UNI EN 378-1, UNI EN378-2, UNI EN 12735-1

3. Others European Directives and harmonized standards applied to the equipment : 2014/35/UE, 2014/30/UE, 2011/65/UE, 2012/19/UE, CEI EN 60335-2-40, CEI EN 55014-1, CEI EN 55014-2, CEI EN 61000-3-2, CEI EN 61000-3-3, CEI EN 62233
Eventuali altre Direttive Europee e norme armonizzate applicate all'attrezzatura : 2014/35/UE, 2014/30/UE, 2011/65/UE, 2012/19/UE, CEI EN 60335-2-40, CEI EN 55014-1, CEI EN 55014-2, CEI EN 61000-3-2, CEI EN 61000-3-3, CEI EN 62233

The manufacturer states, also, that the technical file is compiled and kept at TCM Srl.
Il fabbricante inoltre dichiara che il fascicolo tecnico della macchina è costituito e custodito presso TCM Srl.

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The manual of MEX VS units collects all the necessary information for the better use of the equipment under safety conditions for the operator thus meeting the requirements listed in the 2006/42/CE Equipment Directive and following amendments.

1 PURPOSE AND CONTENT OF THE MANUAL

This manual provides basic information as for the installation, the operation and the maintenance of the MEX VS units. It is addressed to machine operators and it enables them to use the equipment efficiently, even if they do not have any previous specific knowledge of it.

	<i>WARNING: Although this manual is also destined for the end-user utilizations, some discribed activities are allowed only for trained technical personnels who should be in possession of Vocational and Technical Training allowing them to be responsible for carrying out the activity. They should be properly updated with courses approved by the competent authorities. These activities include: installation, both ordinary and extraordinary maintenance, appliance disposal and any other activity required by "qualified staff."</i>
	<i>After the end of installation and/or maintenance of the appliance, the qualified operator has a duty to properly inform the end-user about the use of the appliance and the necessary periodical checks.</i>
	<i>The installer is responsible to deliver all necessary documentation (including this manual) to the user and should ensure him to keep it in a safe place near the appliance where it can be available at any time.</i>

This manual describes the characteristics of the equipment at the time in which it is being put on the market; therefore, it may not include technological improvements introduced later by the company as part of its constant endeavour to enhance the performance, ergonomics, safety and functionality of its products.

The company, therefore, is not constrained to update the manuals for previous versions of machines.

It's recommended that, the user must follow the instructions contained in this booklet, especially those concerning the safety and routine maintenance.

1.1 CONSERVATION OF THE MANUAL




The manual has to be always kept by the user for future reference. It has to be stored in a safe place, away from dusts and moisture. It has to be available and accessible to all users who shall consult it when they are in doubt on how to operate the equipment.

The company reserves the right to modify its products and related manuals without necessarily updating previous versions of the reference material. It declines also any responsibility for possible inaccuracies in the manual if due to printing or transcription errors.

The customer shall store any updated copy of the manual or parts of it delivered by the manufacturer as an attachment to this manual.

The company is available to give any detailed information about this manual and to give information regarding the use and the maintenance of its own units.

1.2 GRAPHIC SYMBOLS

	<i>Indicates operations that can be dangerous for people and/or disrupts the correct operation of the equipment.</i>
	<i>Indicates prohibited operations.</i>
	<i>Indicates important information that the operator has to follow in order to guarantee the correct operation of the equipment in complete safety.</i>

2 SAFETY LAWS

The MEX VS units have been designed in compliance with the following Directives and Harmonised Norms concerning the safety of the appliances:

- 97/23/CE, 2014/35/UE, 2014/30/UE, 2011/65/UE, 2012/19/UE Community Directives
- UNI EN 378-1, 378-2, UNI EN 12735-1 Norms
- CEI EN 60335-2-40 Norms
- CEI EN 55014-1, CEI EN 55014-2, CEI EN 61000-3-2, CEI EN 61000-3-3, CEI EN 62233 Norms

And the following directives and regulations concerning the energy labeling and the eco-friendly products:

- Community directive 2009/125/CE and subsequent transpositions
- Community directive 2010/30/UE and subsequent transpositions
- Regulation UE No 811/2013
- Regulation UE No 813/2013

3 PERMITTED USES

- The company excludes any contractual and extra contractual liabilities for damages caused to persons, animals or objects, by incorrect installation, setting and maintenance, improper use of the equipment, and the partial or superficial reading of the information contained in this manual.
- These units have been designed only for heating and/or cooling water. Any other use not expressly authorized by the manufacturer is considered improper and therefore not allowed.
- The location of the plant, the hydraulic and electrical circuits must be established by the planting designer and must take into account both technical requirements as well as any applicable local laws and authorized specifications.
- The execution of all works must be performed by skilled and qualified personnel, competent in the existing rules in different countries.

4 GENERAL SAFETY GUIDELINES

Before beginning to operate on MEX VS units every user has to be perfectly knowledgeable about the functions of the equipment and its controls and has to have read and understood the information listed in this manual.

	<i>It's strictly forbidden to remove and/or tamper with any safety device.</i>
	<i>Children or unassisted disabled persons are not allowed to use the appliance.</i>
	<i>Do not touch the appliance when barefoot or parts of the body are wet or damp.</i>
	<i>Do not clean the unit when the power is 'ON'.</i>
	<i>Do not pull, remove or twist the electrical cables coming out from the unit, even if it is disconnected from the main power supply.</i>
	<i>Do not step with your feet on the appliance, sit down and/or place any type of object.</i>
	<i>Do not spray or pour water directly on the unit.</i>
	<i>Do not dispose of, abandon or leave within reach of children packaging materials (cardboard, staples, plastic bags, etc.) as they may represent a hazard.</i>
	<i>Any routine or not-routine maintenance operation shall be carried out when the equipment has been shut down, disconnected from electric power sources.</i>
	<i>Do not put neither your hands nor insert screwdrivers, spanners or other tools into moving parts of the equipment.</i>
	<i>The equipment supervisor and the maintenance man have to receive suitable training for the performance of their tasks in safety.</i>
	<i>Operators have to know how to use personal protective devices and have to know the accident-prevention guidelines contained in national and international laws and norms.</i>

4.1 WORKERS' HEALTH AND SAFETY

The European Community has adopted a number of directives on workplace's health and safety, which are 89/391/CEE, 89/686/CEE, 2009/104/CE, 86/188/CEE and 77/576/CEE directives, and the subsequent integrations/modification. Every employer shall implement such provisions and ensure that their workers to respect them. We observe therefore that:


	<i>Do not tamper with or replace parts of the equipment without the specific consent of the manufacturer. The manufacturer shall have no responsibility whatsoever in case of unauthorised operations.</i>
	<i>Using components, expendable materials or spare parts that do not correspond to those recommended by the manufacturer and/or listed in this manual may be dangerous for the operators and/or damage the equipment</i>
	<i>The operator's workplace has to be kept clean, tidy and free from objects that may prevent free movements. Appropriate lighting of the work place shall be provided so as to allow the operator to carry out the required operations safely. Poor or too strong lighting can cause risks.</i>
	<i>Ensure that work places are always adequately ventilated and that aspirators are working, in good condition and in compliance with the requirements of the laws in force.</i>

The unit operates with R410A refrigerant gas, which is a greenhouse gas according to the F-gas Regulation (EU) 517/2014 (mandatory in the European area). This Regulation, among the provisions, requires all operators intervening in greenhouse gas systems to be in possession of a certificate issued or recognized by the competent authority, attesting to a successful completion of an examination entitling them to carry out such work. In particular:

- Device contains up to 3kg of the total amount of refrigerant gas: Category II certificate.
- Device contains 3kg or more than 3kg of the total amount of refrigerant gas: Category I certificate.





The refrigerant R410A in gaseous form is heavier than air and tends to concentrate highly in little ventilated environments when a leak occurs. Its inhalation can cause dizziness, suffocation and can develop lethal gas if it becomes in contact with open flames or hot objects, (please see "REFRIGERANT SAFETY DATA SHEET" paragraph 4.4).

For any intervention on the heat pump:

	<i>Wear appropriate Personal Protective Equipment (PPE) specifically, gloves and goggles.</i>
	<i>Ensure that the workplace is well ventilated. Do not work in closed rooms or ditches with weak air circulation.</i>
	<i>Do not work on the refrigerant near open flames or near hot parts.</i>
	<i>Avoid any refrigerant leakage into the environment and pay particular attention to leakage from pipes and/or fittings after evacuating the refrigerant circuit.</i>






4.2 PERSONAL SAFETY EQUIPMENT

When operating and maintaining the MEX VS units, it is required to use the following personal protective equipment.

	<i>Protective clothing: Maintenance men and operators have to wear protective clothing that complies with the basic safety requirements currently in force. In case of slippery floors, users have to wear safety shoes with non-slip soles.</i>	
	<i>Gloves: During maintenance or cleaning operation protection gloves have to be used</i>	
		<i>Mask and goggles: Respiratory protection (mask) and eye protection (goggles) should be used during cleaning and maintenance operations.</i>

4.3 SAFETY SYMBOLS

The unit features the following safety signs, which has to be complied with:

	<i>General hazards</i>
	<i>Electric shock hazard</i>
	<i>Presence of moving organs</i>
	<i>Presence of surfaces that may cause injuries</i>
	<i>Presence of hot surfaces that can cause burns</i>

4.4 REFRIGERANT SAFETY DATA SHEET

Name:	R410A (50% Difluoromethane (R32); 50% Pentafluoroethane (R125)).
RISKS INDICATIONS	
Major risks:	Asphyxia
Specific risks:	The rapid evaporation may cause freezing.
FIRST AID	
General information:	Never give anything by mouth to an unconscious person.
Inhalation:	Move to fresh air. Oxygen or artificial respiration if necessary. Do not administer adrenaline or similar drugs.
Eyes contact:	Rinse carefully with water for at least 15 minutes and consult a doctor.
Contact with skin:	Wash immediately with plenty of water. Take off immediately the contaminated clothing.
FIRE PREVENTION	
Extinguishing Media:	Whatever.
Specific risks:	Increase in pressure.
Specific methods:	Use water spray to cool containers
ACCIDENTAL RELEASE ACTIONS	
Personal precautions:	Evacuate personnel to safe areas. Provide adequate ventilation. Use personal protective equipment.
Environmental precautions:	Evaporate.
Cleaning method:	Evaporate.
HANDLING AND STORAGE	
Manipulation	
Action/technical precautions:	Provide sufficient air exchange and/or suction in work places.
Recommendations for safe use:	Do not breathe vapors or aerosol.
Storage:	Close tightly and store in a cool, dry and well ventilated place. Store in original container. Incompatible products: explosive, flammable materials, Organic peroxide
EXPOSURE CONTROL / PERSONAL PROTECTION	
Control parameters:	AEL (8-h e 12-h TWA) = 1000ml/m ³ for each of the two components.
Respiratory protection:	For rescue and maintenance operation in storage tanks use self-contained respirator apparatus. The vapors are heavier than air and can cause suffocation by reducing oxygen available for breathing.
Eyes protection:	Safety glasses.
Protection of hands:	Rubber gloves.
Hygiene measures:	Do not smoke.
PHYSICAL AND CHEMICAL PROPERTIES	
Colour:	Colourless.
Odor:	Light.
Boiling point:	-52.8°C at atmospheric pressure.
Lighting point:	It does not ignite.
Density:	1.08kg/l at 25°C.
Solubility in water:	Negligible.
STABILITY AND REACTIVITY	
Stability:	No reactivity when used with the appropriate instructions.
Materials to avoid:	Highly oxidizing materials. Incompatible with magnesium, zinc, sodium, potassium and aluminum. The incompatibility is more serious if the metal is present in powdered form or if the surfaces were, recently, unprotected.
Decomposition products	These products are halogenated compounds, hydrogen fluoride, carbon oxides (CO, CO ₂), carbonyl halides.
Risks:	
TOXICOLOGICAL INFORMATION	
Acute toxicity:	(R32) LC50/ inhalation /4 hours/on rat >760 ml/l (R125) LC50/ inhalation /4 hours/on rat >3480 mg/l
Local effects:	Concentrations substantially above the TLV may cause narcotic effects. Inhalation of decomposed products of high concentrations may cause respiratory failure (pulmonary edema).
Long term toxicity:	Did not show carcinogenic, teratogenic or mutagenic effects in animal experiments.
ECOLOGICAL INFORMATION	
Global Warming Potential GWP (R744=1)	2088
Ozone Depletion Potential ODP (R11=1):	0
Disposal considerations:	usable with reconditioning.

5 TECHNICAL CHARACTERISTICS

The MEX VS water chillers and heat pumps series are designed for applications in residential and commercial areas. These units are extremely versatile and can operate in heat pump mode with the ability of producing hot water at a temperature of 58°C for environmental heating and sanitary applications. The INVERTER compressor with brushless DC motor technology, matched with electronic expansion valve, pump and variable speed blower are generally used for optimizing the power consumption and efficient operation of the refrigerating components.

5.1 FRAME

All the units of MEX VS series are made up of hot-galvanised thick sheet metal, painted with polyurethane powder enamels at 180°C to ensure the best resistance against atmospheric agents. The frame is self-supporting with removable panels. All screws and rivets for outdoor installations are in galvanized steel.

5.2 REFRIGERANT CIRCUIT

The refrigerant gas used in these units is R410A. The refrigerant circuit has been manufactured by means of international primary brands components and according to the UNI EN 13134 Rule concerning welding procedures. The refrigerant circuit includes: 4 way reverse cycle valve, electronic expansion valve, liquid separator, liquid receiver, valves for maintenance and control, pressure safety device, pressure transducers to accurately adjust the evaporating and condensing pressures, filters for throttling valve to avoid its clogging.

5.3 COMPRESSORS

The installed DC inverter compressors are rotary hermetic twin rotary type designed to be used with R410 refrigerant.

The compressors are mounted in a separate chamber, isolated from the air stream in order to reduce the noise, and are equipped with crankcase heater. In order to avoid the oil dilution which may cause seizure of the compressor. The crankcase heater operates when the compressor remains off for at least 30 minutes and if the discharge temperature is below 20°C (with hysteresis of 2.0°C). When the compressor restarts, the crankcase heater will stop operation. The crankcase heater works even if the unit is in shut off mode, which will protect the compressor from restart failure.

We recommend you to turn ON the unit and to put it in standby mode at least for 6 hours before starting the operation, especially if the system has been completely turned off for a period of time.

The checking of the compressors is possible through removing the frontal and lateral panels of the unit allowing easy maintenance of the compressors even when the unit is operation.

5.4 AIR SIDE EXCHANGERS

The air side exchangers are made up of copper pipes and aluminium fins. The tubes are mechanically expanded into the aluminium fins to improve the heat exchange factor. The geometry of these condensers guarantee a low air side pressure drop and, then, the use of low rotation (and low noise emission) fans.

5.5 FANS

The fans are axial type with aluminium aerofoil blades. They are statically and dynamically balanced and supplied complete of the safety fan guard according to the CEI EN 60335-2-80 Rule (safety for electrical apparatus of domestic and similar use). They are mounted on the unit frame by interposition of rubber vibration dampers. The electric motors are all brushless DC type with 8 poles (about 200/1000 rpm). The motors are directly driven with an integrated thermal overload protection. The protection class of the motors is IP X44.

5.6 USER SIDE HEAT EXCHANGERS

The user side heat exchangers are made up of AISI 304 stainless steel braze-welded plates type. The user heat exchangers are factory insulated with flexible close cell material and can be equipped with antifreeze heater (KA optional). Each heat exchanger is provided with a temperature sensor working as antifreeze protection that activates the circulator, even in the case when the unit is turned off when the conditions set in the controller have been occurred.

5.7 ELECTRIC BOX

The electric box is manufactured according to the current European Union laws. The accessibility to the board is possible after removing the cover panel of the unit using proper tools. The protection degree is IP24. The terminal board is supplied with voltage free contacts for remote ON-OFF, winter/summer change over, auxiliary heater, sanitary water temperature sensor control of external 3-way valve and free contacts for remote control panel and for the management of the dual set point of operation.

5.8 CONTROL SYSTEM

All the units of MEX VS series are standard supplied with a microprocessor adopting an overheating control logic program through the electronic expansion valve which is driven by the pressure transducers signals. The microprocessor is also capable of controlling the following functions: water temperature regulation, antifreeze protection, compressors' time setting, compressor automatic starting sequence, alarm reset, alarm management and operating LED. Upon request, the microprocessor can be connected to a BMS remote control system and to the simpler HNS system with our terminal units. The control system together with the INVERTER technology and the on board sensors continuously monitor and adapt the performance of the inverter compressor, of the pump and of the fan (2 fans for the models: 112 RH, 112T RH, 115 RH and 115T RH) according to the value of cooling power at any working conditions requested by the user.

5.9 MONITORING AND PROTECTION DEVICES

All units are standard supplied with the following monitoring and protection devices: return water temperature sensor installed at the return water pipe line from the plant, operating and antifreeze sensor installed at the outlet pipe of the water to the plant, high pressure transducer, low pressure transducer, compressor's inlet and outlet temperature sensors, compressors thermal protection device, fans thermal protection device, water side installed water flow switch to protect the evaporator, high pressure HP flow switch.

5.10 HYDRAULIC CIRCUIT

The **MEX VS** chillers units are supplied with an integrated hydraulic circuit including: circulating pump with high efficiency DC brushless motor ($EEL \leq 0,23$ for the sizes 112 RH and 115 RH, however for 15 RH, 16 RH, 18 RH and 19 RH $EEL \leq 0,20$), suitable for chilled water utilization and directly run by a controller on board, plate heat exchanger, expansion vessel (The expansion vessel capacity depends on the size of the unit, refer to the technical data shown in chapter 12), safety valve (6 bar) that have to be connected with a colleting tank, the manual air release valve and the flow switch.

5.11 FAN SPEED CONTROL

This type of control is managed by the microprocessor and is necessary for optimizing the pressure of evaporation/condensation during summer/winter operation in order to allow proper running of the unit.

6 AVAILABLE VERSIONS

MEX VS reversible heat pump with integrated hydronic system (expansion vessel, safety valve, pressure gauge, modulating pump, flow switch, manual air release valve, load/unload valve).

The available models are: 15RH, 16 RH, 18 RH, 19 RH, 112 RH, 112T RH, 115 RH, and 115T RH. The sizes of 112 RH and 115 RH are available in both single-phase and three-phase electric power. However the other sizes are all single-phase electric power units.

Accessory denomination:

Field	Variant	Description	Name
KA	1	The antifreeze kit uses a self-regulating heating cable wrapped around the basement of the outdoor unit near the condensing coil and two in PET heaters placed on the faces of the plate heat exchanger.	KA



WARNING: The antifreeze kit is an optional factory-installed accessory and cannot be mounted after purchasing the unit.

6.1 OPTIONAL ACCESSORIES

OPTIONAL ACCESSORIES NOT INSTALLED IN THE FACTORY	
AG	Anti-vibration rubber pad to be installed in the chassis of the unit for possible shock absorption.
KDS	Kit for dual set point (already included in Hi-T) that allows the control of a second set point of operation for the plant side.

IMPORTANT NOTE

ONLY THE OPTIONAL ACCESSORIES THAT ARE NOT INSTALLED IN THE FACTORY CAN BE REQUIRED AFTER THE ORDER OF THE UNIT, WHILE THE FACTORY INSTALLED ACCESSORIES CAN NOT BE REQUIRED AFTER THE ORDER OF THE UNIT.

WARNING: The optional accessories are subject to revisions. They may be changed without the need to update the previous manuals and without giving prior notice. If you are interested in buying these accessories after you have purchased the unit, please contact our offices for the availability.

7 INSTALLATION



WARNING: All the operation described in next chapters **MUST BE DONE BY TRAINED PEOPLE ONLY**. Before any operation on the unit, be sure that the electric supply is disconnected. Be sure also, using suitable obstructions, that can avoid accidental power supply switching ON until the end of all operations.

7.1 GENERALITY

When installing or servicing the unit, it is necessary to strictly follow the rules listed in this manual, to conform to all the specifications of the labels on the unit, and to take any possible precautions. Not observing the rules reported on this manual can create dangerous situations.



After receiving the unit, immediately check its integrity. The unit left the factory in perfect condition; any eventual damage has to be questioned to the carrier and recorded on the Delivery Note before signing it.

The company has to be informed, within 8 days, of the extent of the damage. The Customer should prepare a written statement of any severe damage.



WARNING: The units are designed for outdoor installation. The place of installation must be entirely far away from fire risk. All the necessary measures should be adopted in order to prevent the fire risk in the place of installation. The outdoor ambient temperature shall not exceed 46°C. Above this value, the unit is no longer covered by the directives in force in the area of pressure equipment.



WARNING: The unit should be installed so that adequate clearance is available for maintenance and repair. The warranty does not cover costs related to platforms or handling equipment necessary for any maintenance.



All maintenance and testing operations should be carried out only by **QUALIFIED PERSONNEL**.



Before any operation on the unit, make sure the power supply is disconnected.



WARNING: MOVING PARTS, RISK OF DEATH.

Disconnect the power supply and ensure that the fan is stopped before opening the front panel.



The temperatures of heads and discharge piping of the compressor are usually high.



Be careful when working near condensing coils.

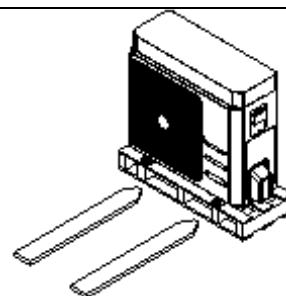
The aluminum fins are very sharp and can cause serious injuries.



After the maintenance operations, close the panels tightly with the fastening screws.

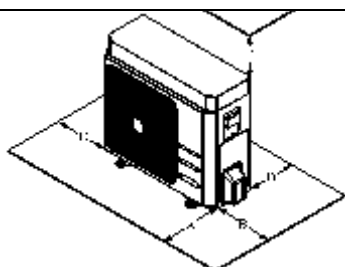
7.2 LIFTING AND HANDLING

When unloading and installing the unit, it is highly recommended to avoid any sudden move in order to protect the inner components. Units can be lifted by means of a forklift or, in alternative, of belts, being sure not to damage the lateral panels and the cover. It is important to keep the unit horizontal during these operations.



7.3 LOCATION AND MINIMUM TECHNICAL CLEARANCES

The all MEX VS units are designed for outdoor installation: any cover over the unit and location near trees (even if they partially cover the unit) has to be avoided in order to prevent air recirculation. It is advisable to create a proper basement, with a size similar to unit foot-print. Unit vibration level is very low: it is advisable however, to fit a rigid rubber band between basement and unit base-frame. It is also possible to install anti-vibration supports (springs or rubbers) to keep vibrations at a very low level. Absolute care has to be taken to ensure adequate air volume to the condenser. Re-circulation of discharge air has to be avoided; failure to observe this point will result in poor performance or activation of safety controls. For these reasons it is absolutely necessary to respect the following clearances:



MOD.	A	B	C	D	E
MEX VS 15 RH	1500	500	400	400	500
MEX VS 16 RH	1500	500	400	400	500
MEX VS 18 RH	1500	500	400	400	500
MEX VS 19 RH	1500	500	400	400	500
MEX VS 112RH/112T RH	1500	500	400	400	500
MEX VS 115RH/115T RH	1500	500	400	400	500




CAUTION: It is obligatory to install the unit on a firm and appropriate basement to support its weight. Considering the weight of the unit, possible vibrations and resultant noise, we do not recommend suspension installation of the unit; in this case, the firm is not responsible for any damage or inconvenience that may result.

7.4 HYDRAULIC CONNECTIONS

The hydraulic connections have to be installed in accordance with national and local regulations; pipes can be made up of steel, galvanized steel or PVC. Pipes have to be designed depending on the nominal water flow and on the hydraulic pressure drops of the system. All pipes have to be insulated with closed-cell material of adequate thickness. Chillers have to be connected to piping by means of flexible joints. Piping should include:

- Hole thermometers to monitor the system's temperature.
- Manual gate valves to separate the chiller from the hydraulic circuit.
- Y-shaped metallic filter and a dirt separator (to be mounted on the inlet pipe) with a mesh not larger than 1mm.
- Charging group and discharge valve, where necessary.

	WARNING: Make sure that, when designing the pipe length and diameter, do not exceed the maximum head loss on the plant side, please see the technical data given in the table of Paragraph 12 (available pressure head).
	WARNING: Connect the pipes to the attacks by using always key against key system.
	WARNING: The expansion vessel have a limited volume. The installator have to provide a further expansion vessel if it is necessary.
	WARNING: Unit water inlet pipe have to be in correspondence with the connection labelled: "WATER INLET", otherwise the evaporator may freeze.
	WARNING: It is compulsory to install on the WATER INLET connection a metallic filter (with a mesh not larger than 1mm) and a dirt separator. the warranty will no longer be valid If the water flow switch was manipulated or altered or if the metallic filter and/or dirt separator were not installed. The filter and the dirt separator have to be kept clean, therefore make sure that are clean after the unit installing the unit, and then check them periodically.
	All units are standard supplied with the water flow switch (factory installed). The warranty will be invalidated if the water flow switch was altered, removed, or if the water filter and the dirt separator were not installed on the unit. Please refer to the wiring diagram for the water flow switch electric connections. Make sur that the heating system and the safety valves must comply with the requirements of EN 12828.

7.4.1 Drainage connection

All the units of MEX VS series have been designed to use their own base as a drain pan; a plastic pipe fitting is standard provided to be installed onto the lower part of the unit in the special housing enabling the connection of a drainage pipe.



Drainage pipe fitting




Drainage pipe fitting housing



Drainage pipe fitting connected to the unit

Each unit is also provided, on the basement of the hydronic kit (at the heat exchanger side), with a hole that can allow to drain any condensed water can leach from plumbing pipes. As the pipes must be well-insulated, the production of condensed water is however very low and therefore the connection of a drainage pipe to that hole is not very required.

7.4.2 Plant circuit charging

	WARNING: Verify all the charging/topping up operations.
	WARNING: Before beginning the charging/topping up operation of the plant circuit, disconnect the unit for the electric power supply.
	WARNING: The charging/topping up of the plant circuit must always be done under controlled conditions of pressure (max 1 bar). Make sure that you have installed on the line of charging/topping up a pressure reducerdevice and a relief valve.
	WARNING: The water on the charging/topping up pipe must be suitably pre-filtered from any impurities and suspended particles. Make sure that you have installed a cartridge filter removable. Make sure that an extractable cartridge filter and a dirt separator have been installed.
	WARNING: It is required to proceed by air purging periodically in order to eliminate the accumulated air from the plant circuit system.
	WARNING: Make sure to install an automatic air vent valve at the highest point of the system.



Knurled nut

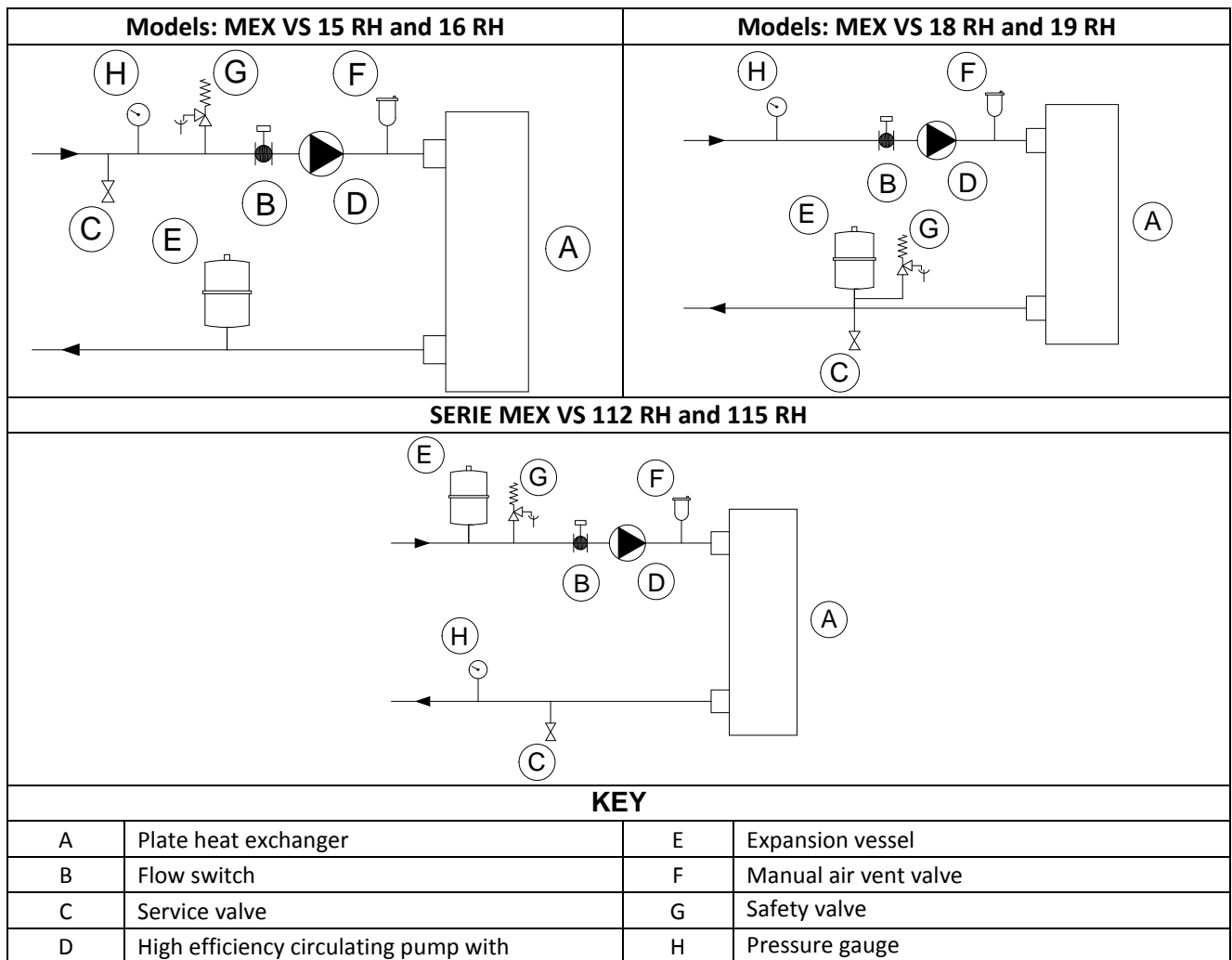
Cap with gasket

You can use the service valve, when it is necessary to refill the plant or adapt the concentration of glycol. Unscrew the cap of the service valve and connect to the hose a pipe of 14 mm or (inner diameter size - check the faucet model that is installed on your own unit) connected to the water network, and then load the system by unscrewing the knurled nut. When the operation is concluded, retighten the knurled nut and screw on the cap. In any case, we recommend you to use for the water loading of the plant an external tap whose arrangement is by the installer.

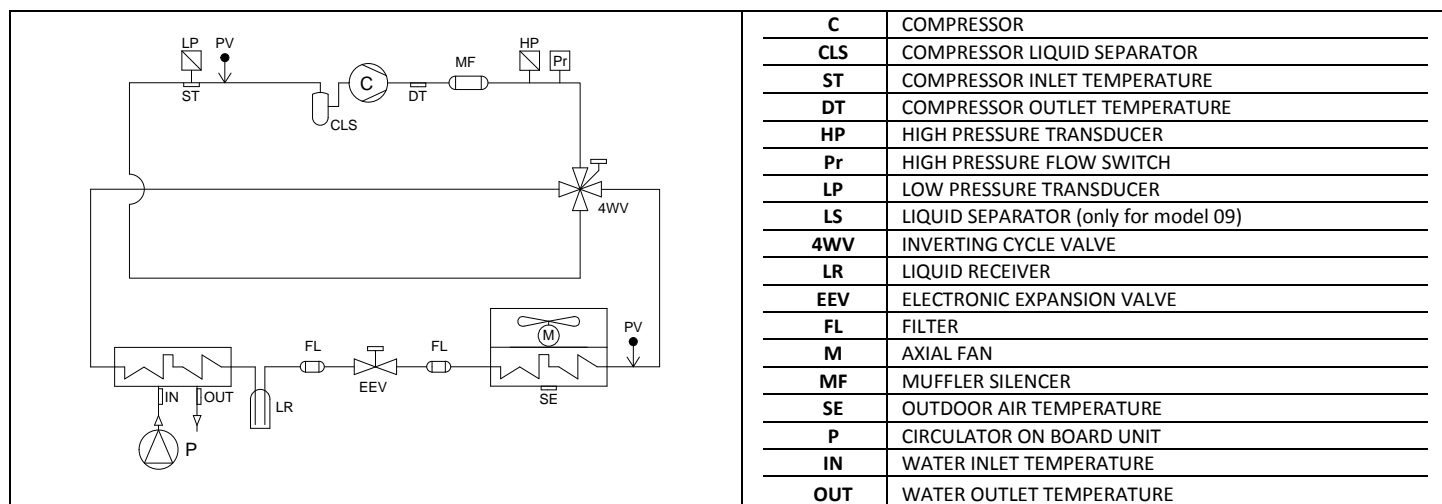
7.4.3 Plant drainage system

When it is necessary to drain the plant, close at first the inlet and outlet manual gate valves (not supplied) and then remove the pipes that are disposed externally on the water inlet and on the water outlet in order to spill away the liquid contained in the unit (for easier operation, it is recommended to install externally two draining valves, on the water inlet and on the water outlet, between the unit and the manual gate valves).

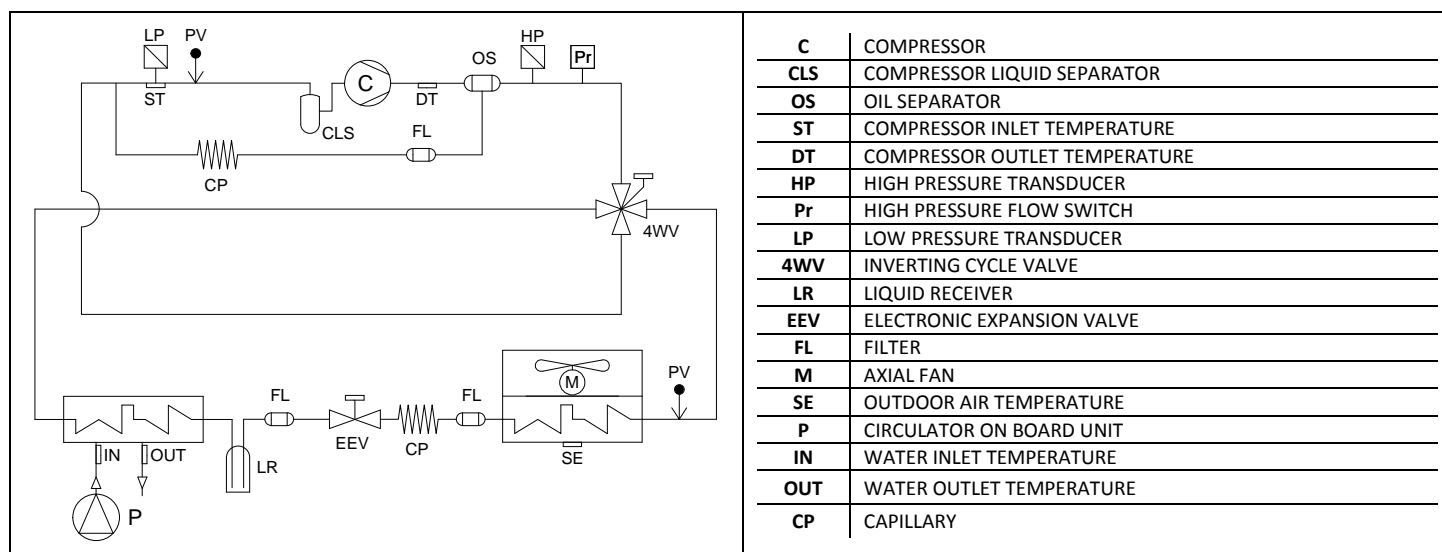
7.4.4 Hydraulic circuit



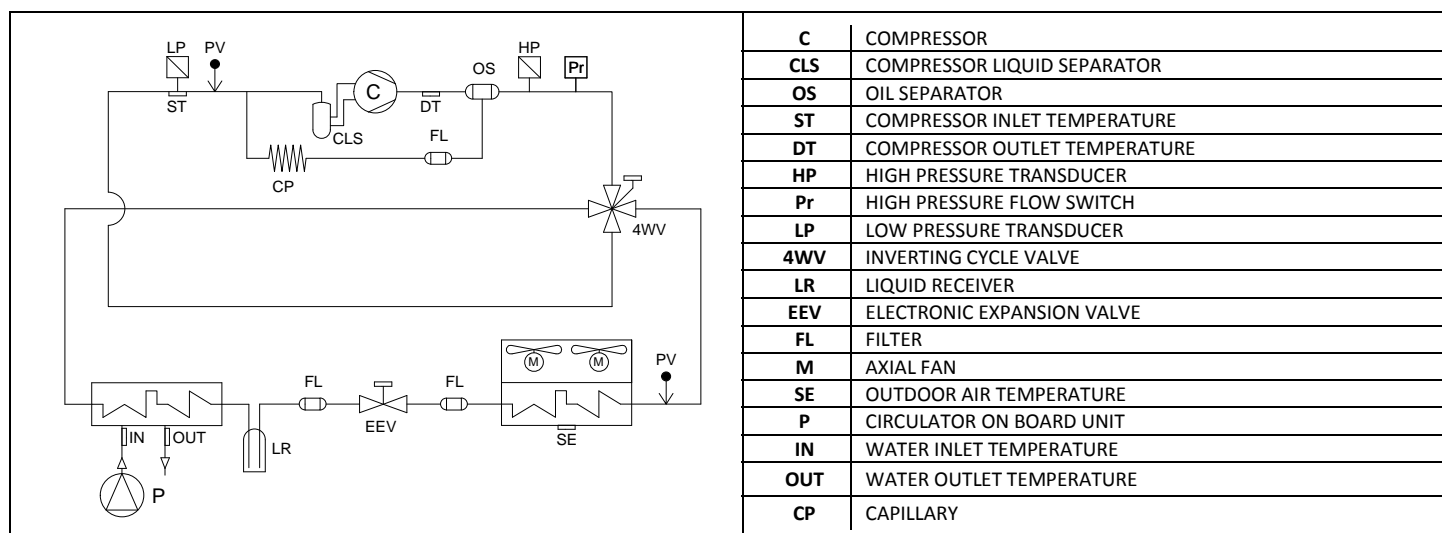
7.5 REFRIGERANT DIAGRAM OF 15RH-16 RH



7.6 REFRIGERANT DIAGRAM OF 18 RH-19 RH









7.7 REFRIGERANT DIAGRAM OF 112RH-115 RH



7.8 ELECTRICAL CONNECTIONS

Check out that the power supply meets the unit's electric nominal data (tension, phases, frequency) reported on the label in the unit's side panel. Power connections have to be made in accordance to the wiring diagram enclosed with the unit and in conformity with the national and international norms in force (providing equipment as general magnetothermic circuit breaker, differential circuit breakers for each electric line, proper grounding for the plant, etc.). Power cables, electric protections and line fuses have to be sized according to the specifications listed in the wiring diagram enclosed with the unit and in the electrical data contained in the table of technical characteristics (see Paragraph 12).

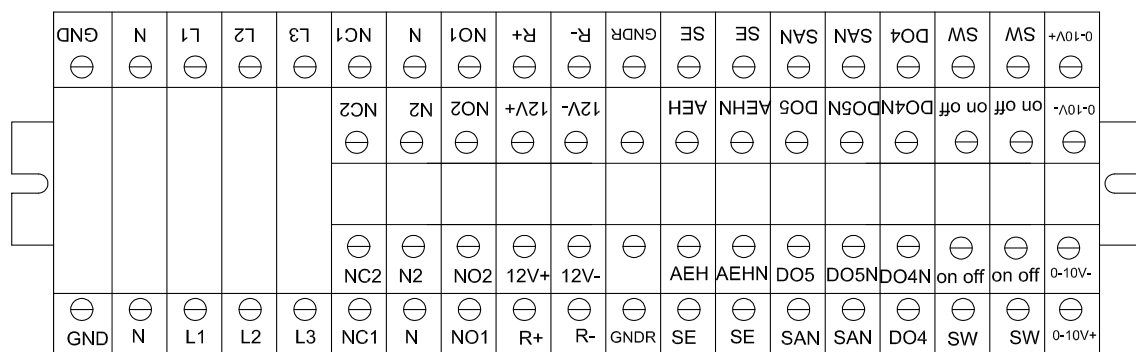
	WARNING: The electrical panel is located under the coping plate. It is necessary to respect the minimum clearances given in section 7.3 in order to be able to connect the wires.
	WARNING: Installer has to provide a general circuit breaker (for example a magnetothermic circuit breaker) at the beginning of unit circuit system.
	WARNING: The supply voltage's fluctuations cannot exceed $\pm 10\%$ of the nominal value. Should this tolerance not be respected, please contact our technical department.
	WARNING: The power supply have to respect the listed limits: failing this, warranty will terminate immediately. Before any operation on the unit, be sure that the power supply is disconnected. WARNING: The water flow switch (B component in the previous hydraulic circuit and factory installed) have ALWAYS to be connected following the indications listed in the wiring diagram. Never bridge the water flow switch connections in the terminal board. Should the water flow switch connections altered or not properly made, the guarantee will be invalidated.
	WARNING: The remote control panel is connected to the water chiller by means of no.4 wires having a 1,5 mm ² section. The power supply cables have to be separated from the remote control wires. The maximum distance is 50m.
	WARNING: The remote control panel cannot be installed in areas with strong vibrations, corrosive gases, and excess of dirtiness or high humidity levels. Leave free the area near the cooling openings.

7.8.1 Wiring terminal block

	Electrical wiring have to be done only by qualified personnel.
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The electrical connections have to be realized by qualified personnel. The terminal block is located under the cover of the unit close to the side where the controller is positioned. To get access to the terminal block, please see the indications reported in the paragraph 7.8.2. The wiring to the terminal block has to be realized in accordance to the below notes (the drawing is for illustration).

The illustrations below are for the corresponding sizes 112T RH and 115T RH, as for the other models, the only difference is concerning the power supply input terminals.



The connections indicated below are standard. Other connections are shown in the manual MCO of the on board control of MEX VS unit (see "TABLE OF CONFIGURATIONS ALLOWED TO USER AND INSTALLER"), depending on the configurations adopted.

Terminal	Connection	Type
PE	Connect to the grounding wire of the power supply	Power supply input 1-Ph/N/PE, 230V, 50Hz (only for the sizes 15RH/16RH/18RH/19RH/112RH/115RH)
N	Connect to the neutral wire of the power supply	
L	Connect to the phase wire of the power supply	
PE	Connect to the grounding wire of the power supply	Power supply input for 3-Ph/N/PE, 400 Vac, 50Hz. (only for the sizes 112T RH and 115T RH)
N	Connect to the neutral wire of the power supply	
L1	Connect this terminal to L1 of the three-power supply	
L2	Connect this terminal to L2 of the three-power supply	
L3	Connect this terminal to L3 of the three-power supply	Changeover contact, 1- phase power supply 230Vac, 50Hz, 5A resistives, 1A inductives
NC1	Normally closed terminal (230Vac).	
N	Terminal for neutral wire (230Vac).	
NO1	Normally open terminal (230Vac).	
NC2	Normally closed terminal (230Vac).	Changeover contact, 1- phase power supply 230Vac, 50Hz, 5A resistives, 1A inductives
N2	Terminal for neutral wire (230Vac)	
NO2	Normally open terminal (230Vac).	
R+	Modbus signal connection + for remote keyboard	
R-	Modbus signal connection - for remote keyboard	Modbus communication
GNDR	Modbus ground reference terminal connection for remote keyboard	
12V+	Remote keyboard power supply (12V, 50Hz, 500mA)	
12V-	Remote keyboard power supply (12V, 50Hz, 500mA)	Output for 12Vac, 50Hz power supply

SE/SE	Programmable analog input with sensor NTC-10kΩ at 25°C β 3435. Or voltage-free digital input	Analog or digital input
AEHN	Terminal for neutral line of (230Vac)	Under-voltage output single phase 230Vac, 50Hz, 5A resistive, 1A inductive.
AEH	Terminal of phase line of (230Vac).	
SAN/SAN	Programmable analog input with sensor NTC-10kΩ at 25°C β 3435. Or voltage-free digital input	Analog or digital input
DO4N	Terminal for neutral line of single phase power supply (230Vac).	Under-voltage output single phase 230Vac, 50Hz, 5A resistive, 1A inductive. Can be used in the versions without KA
DO4	Terminal for phase line of (230Vac).	
DO5N	Terminal for neutral line of (230Vac).	Under-voltage output single phase 230Vac, 50Hz, 5A resistive, 1A inductive. Can be used in the versions without KA
DO5	Terminal for phase line of (230Vac).	
SW/SW	Input for summer/winter mode commutation from remote control panel (to activate this function, please see corresponding paragraph in the control manual)	Voltage-free digital input
onoff /onoff	on/off remote input (closed = unit is ON / open =unit is OFF)	Voltage-free digital input
0-10V+	Signal input: 0-10V (+) for set point adjustment	Analog input (ST10)
0-10V-	Signal input: 0-10V (-) for set point adjustment	

7.8.2 Terminal block and the electric box

The following illustration shows the the removal procedure of the coping plate for the models 112 RH/115 RH, but the same procedure is applicable for the other models

- 1.Remove the screws connecting the top plate. Two for each side of the unit and other two crews connecting the top plate with the hole-cable plate holder. (For the small sizes, there is only one fixing screw in the controller's lateral part of the unit)
- 2.Remove the screws connecting the cover plate of the electric box then proceed to connect wire to the terminal block.
- 3.Insert the cables PG cable glands located on the side of the unit to take them outside the unit
- 4.Close the electric box and the top panel of the unit with their fixing screws.



The above operations must be done after turning off the unit and disconnecting it from the power supply (by mean of an appropriate disconnecting switch which should be already mouted by the installer).

Operations to be performed by qualified personnel.

Remove the top cover without taking away the holder of hole-cabe plate.


The work is completed, please fix all the removed plates then tighten all screws and washers (if expected).



8 START UP

Before start-up:

- Check out the availability of the supplied wiring diagrams and manuals of installed apparatus.
- Check out the availability of the electrical and hydraulic diagrams of the plant in which the unit is installed.
- Check that the shut-off valves of the hydraulic circuits are open.
- Verify that the hydraulic circuit has been charged under pressure and air vented.
- Check out that all water connections are properly installed and all indications on unit labels are observed.
- Ensure that arrangements have been provided to drain the condensate.
- Check out that all power cables are properly connected and all terminals are hardly fixed.
- Check that electrical connections are carried out according to the norms in force including grounding.
- Check out that the voltage is the one indicated in the unit labels.
- Make sure the voltage is within the limits ($\pm 10\%$) of tolerance range.
- Check out that crankcase heaters are powered correctly.
- Check out that there is no refrigerant leakage.
- Check out that all the cover panels are installed in the proper position and locked with fastening screws before start up.

	WARNING: The unit must be connected to the electrical network and should be in STAND-BY mode (powered) closing the general switch in order to operate the crankcase heaters of the compressor for a minimum of 12 hours before start up. (the heaters are automatically powered when the main switch is switched off). The crankcase heaters are working properly if, after some minutes, the temperature of crankcase's compressor is about 10°C ÷ 15°C higher than ambient temperature.
	WARNING: The weight of the pipes doesn't load unit structure.
	WARNING: Never switch off the unit (for a temporary stop) by switching off the main switch: this component should be used to disconnect the unit from the power supply only for lengthy stoppages (e.g. seasonal stoppages). Besides, failing the power supply, the crankcase's heaters are not supplied thus resulting in a possible breakdown of the compressors once the unit is switched on.
	WARNING: Do not modify the internal wiring of the unit otherwise the warranty will terminate immediately.
	WARNING: The summer/winter operating mode have to be selected at the beginning of the related season. Frequent and sudden changes of this seasonal operating mode have to be avoided in order to prevent severe damages to compressors.
	WARNING: When you first install and start-up the unit make sure that the unit is working properly in both cooling and heating modes.



9 SHUTDOWNS FOR LONG PERIODS

The types of shutdown depends on the weather of the site where the unit is installed and on the period of the stop. The antifreeze system, if it's installed, stay on work also with the on-board control unit in "OFF" position.








If the time of stop is long and the temperature is low, we recommend to drain the hydraulic circuits or use a mixture of water and glycol.

Drain the hydraulic circuits and shutdown the unit with this passage:

- Turn off the unit by placing the switch of each unit to "OFF" position.
- Close the water valves.
- Place the general differential circuit breaker on "OFF" position, if it is installed upstream of the system.

	If the temperature drops below 0°C there is serious danger of frost: add a mixture of water and glycol in the plant, otherwise drain the hydraulic circuits of the plant and of the heat pump.
	WARNING: the operation, although it was transient, with water temperatures below +5°C is not guaranteed on the basis of the limits set out in Paragraph 15.4. Before you turn the unit on after a long off period, make sure that the temperature of the mixture of water and glycol is higher than or at least equal to + 5°C.

10 MAINTENANCE AND PERIODICAL CONTROLS

	WARNING: All the operations described in this chapter HAVE TO BE CARRIED OUT BY TRAINED STAFF ONLY . Before any operation or before entering the inner components of the unit, be sure that the power supply is disconnected. The compressor's heads and discharge piping are usually at high temperature levels. Be very careful when operating in their surroundings. Aluminium coil fins are very sharp and can cause serious wounds. Be very careful when operating in their surroundings. After maintenance operations, re-install the cover panels, and fix them by means of screws.
	The refrigerant circuits must not be filled with different gas other than that indicated on the nameplate. The use of a different refrigerant can cause severe damage to the compressor.
	It's forbidden to use oils other than those specified in this manual. The use of a different oil can cause serious damage to the compressor.
	The temperatures of heads and discharge piping of the compressor are usually high.
	Be careful when working near condensing coils. The aluminum fins are very sharp and can cause serious injuries.
	After the maintenance operations, close the panels tightly with the fastening screws.
	Be sure that only trained and qualified personnel to perform maintenance operation and periodical inspections on the equipment. The EU Regulation 517/2014 establishes that users should assign a qualified personnel to be responsible to regularly carry out inspections of the facilities, to perform tightness test and eliminating eventual leakages within the shortest possible time. Also has to check the obligatoriness and the necessary documentation about the Regulation (EU) No 517/2014 and its subsequent amendment or repeal.

It is a good rule to carry out periodic checks in order to verify the proper operation of the unit.

OPERATION	1 month	4 month	6 month
Filling the water circuit.	x		
Presence of bubbles in the water circuit.	x		
Check out that safety and control devices work correctly.	x		
Check out possible oil leakage from compressor.	x		
Check out possible water leakages from the hydraulic circuit.	x		
Check out the proper working of the flow switches.	x		
Check out that the crankcase electric heaters are properly supplied and functioning.	x		
Clean the metallic filters of the hydraulic circuit.	x		
Clean the finned coil by means of compressed.	x		
Check out that all the terminals on the electric board as well as on the terminals of the compressor are properly fixed.		x	
Tightening of water connections.		x	
Check out the tightening and the balancing of the fan blades.		x	
Correct voltage.			x
Correct absorption.			x
Check the refrigerant charge.			x
Check the operating pressure, and superheat and subcooling.			x
Check of the efficiency of circulation pump.			x
Check the expansion tank.			x
If the unit should be out of service for a long period, discharge water from the piping and from heat exchanger. This operation is necessary if, during seasonal stoppages, ambient temperature is expected to go down below the freezing point of the employed fluid.			x

10.1 ENVIRONMENTAL PROTECTION


According to the norms dealing with the use of depleting stratospheric ozone substances, it is forbidden to release refrigerants fluids in the atmosphere. They have to be collected and delivered to the seller or to proper gathering points at the end of their operating life. Refrigerant R410A is mentioned among controlled substances and for this reason it has to be subjected to the mentioned norms. **A particular care is recommended during service operations in order to reduce as much as possible any refrigerant loss.**

11 APPLIANCE RECYCLING

Once the unit is arrived at the end of its life cycle and needs to be removed or replaced, the following operations are recommended:

- the refrigerant has to be recovered by trained people and sent to proper collecting centre;
- compressors' lubricating oil has to be collected and sent to proper collecting centre;
- the frame and the various components, if not serviceable any longer, have to be dismantled and divided according to their nature, particularly copper and aluminium, which are present in conspicuous quantity in the unit. These operations allow easy material recover and recycling process, thus reducing the environmental impact.

The user is responsible of the proper disposal of this product, according to national regulations in the country of destination of the appliance. For more information you should contact the installation company or local competent authority.

	<i>An incorrect decommissioning of the appliance may create serious environmental damage and endanger people's safety. Therefore, it's recommended that the unit shall be disposed only by authorized persons and technical training who have followed training courses recognized by the competent authorities.</i>
	<i>It is required to follow the same precautions described in the previous paragraphs.</i>
	<i>Pay special attention during the disposal operation of the refrigerant gas.</i>

12 TECHNICAL DATA

TECHNICAL CHARACTERISTICS		Unit	Model MEX VS			
			15 RH	16 RH	18 RH	19 RH
Electric data	Power supply		230V/1/50Hz		230V/1/50Hz	
	Maximum power input	kW	3,3	4,8	5,1	6,1
	Maximum current input	A	14,4	21,2	22,4	26,9
Cooling	Cooling capacity (min./nom./max.) (1)	kW	3,65 / 6,87 / 7,56*	4,65 / 8,52 / 9,12*	5,4 / 10 / 11,35*	5,4 / 11,9 / 13,1*
	Power input (1)	kW	1,69	2,18	2,26	2,65
	E.E.R. (1)	W/W	4,06	3,91	4,43	4,49
	Cooling capacity (min./nom./max.) (2)	kW	2,32 / 5,07 / 5,58*	2,95 / 6,12 / 6,73*	3,27 / 7,56 / 8,83*	3,27 / 8,49 / 9,6*
	Power input (2)	kW	1,74	2,11	2,43	2,74
	E.E.R. (2)	W/W	2,91	2,90	3,11	3,10
	SEER(5)	W/W	3,59	3,61	4,63	4,73
Heating	Heating capacity (min./nom./max.) (3)	kW	2,78 / 6,57 / 7,23*	3,54 / 8,01 / 8,81*	4,69 / 10 / 10,8*	4,69 / 12,1 / 12,7*
	Power input (3)	kW	1,47	1,85	2,26	2,89
	C.O.P. (3)	W/W	4,47	4,33	4,43	4,19
	Heating capacity (min./nom./max.) (4)	kW	2,24 / 6,15 / 6,76*	2,85 / 7,92 / 8,71*	3,9 / 9,51 / 10,3*	3,9 / 11,3 / 12,1*
	Power input (4)	kW	1,83	2,40	2,74	3,32
	C.O.P. (4)	W/W	3,36	3,31	3,47	3,41
	SCOP (6)	W/W	3,84	3,83	4,24	4,31
Compressor	Energy efficiency water at 35°C/55°C	Class	A++ / A+	A++ / A+	A++ / A+	A++ / A+
	Type		Twin Rotary DC Inverter	Twin Rotary DC Inverter	Twin Rotary DC Inverter	Twin Rotary DC Inverter
Fan motor	Number		1	1	1	1
	Refrigerant oil (type, quantity)	mL	ESTER OIL VG74, 670	ESTER OIL VG74, 670	ESTER OIL VG74,	ESTER OIL VG74, 1000
Refrigerant	Type		Brushless DC motor	Brushless DC motor	Brushless DC motor	Brushless DC motor
	Number		1	1	1	1
Circulator	Type		R410A	R410A	R410A	R410A
	Refrigerant quantity (11)	kg	2,05	1,9	3,8	3,8
	Quantity of CO ₂ equivalent (11)	ton	5,28	4,0	7,9	7,9
	Design Pressure (high/low)	MPa	4,2 / 2,7	4,2 / 2,7	4,2 / 2,7	4,2 / 2,7
Hydraulic circuit	Water flow rate (3)	m ³ /h	1,13	1,38	1,72	2,08
	Available head pressure (3)	kPa	44,6	34,5	39,4	34,2
	Rated power input (3)	kW	0,045	0,045	0,06	0,075
	Max power input	kW	0,045	0,045	0,06	0,075
	Max. current input	A	0,44	0,44	0,58	0,6
	Energy Efficiency Index (EEI) circulator		≤ 0,20	≤ 0,20	≤ 0,20	≤ 0,21
Noise level	Expansion vessel	L	1	1	1	1
	Hydraulic connections	inch	1" M	1" M	1" M	1" M
	Minimum volume of water (7)	L	31	37	46	51
Dimensions and weight	Sound power (8)	dB(A)	62,0	62,5	63,0	63,5
	Sound pressure at 1 m (9)	dB(A)	54	54,5	55	55,5
	Sound pressure at 10 m (9)	dB(A)	34	34,5	35	35,5
Dimensions and weight	Dimensions (LxDxW)	mm	925 x 785 x 380	925 x 785 x 380	1047 x 913 x 465	1047 x 913 x 465
	Max. Packing dimensions (LxDxW) (10)	mm	995 x 944 x 415	995 x 944 x 415	1120 x 1080 x 520	1120 x 1080 x 520
	Operating weight	kg	67	67,5	97	97
	Net/Gross weight	kg	63,4 / 71,4	63,4 / 71,4	95,5 / 102	95,5 / 102

Operating conditions:

(1) Cooling: Outdoor air temperature 35°C; inlet/outlet water temperature 23/ 18°C.

(2) Cooling: Outdoor air temperature 35°C; inlet/outlet water temperature 12/7°C.

(3) Heating: Outdoor air temperature 7°C DB 6°C WB; inlet/outlet water temperature 30/35°C.

(4) Heating: Outdoor air temperature 7°C DB 6°C WB; inlet/outlet temperature 40/45°C.

(5) Cooling: Water temperature inlet/outlet 7/12°C.

(6) Heating: in average climate condition; T_{div}=-7°C; water temperature inlet/outlet 30/35°C.

(7) Calculated for a decrease of the water temperature of the plant with 10°C with a defrosting cycle of 6 minutes.

(8) Sound power heating mode condition (3); the value is determined respecting the measurements taken in accordance with the regulations UNI EN ISO 9614-2, in compliant with the Eurovent certification.

(9) Sound pressure level obtained with internal measurements made in accordance with ISO 3744, in case of the sound source located in free field positioned over a reflecting plane.

(10) Packaging height including the pallet: in particular, the pallet height, for the models 15 RH/16 RH is 117mm, and for the models 18 RH/19 RH is 126mm.

(11) The data are only indicative and subject to change. For the correct data, refer to the technical label stuck on the unit.

(*) activating the Max Hz function.

The Power inputs include all circuit components such as fan motors, pumps, valves and controller, the test data is obtained according to EN 14511: 2013.

TECHNICAL CHARACTERISTICS		Unit	Model MEX VS			
			112 RH	112T RH	115 RH	115T RH
Electric data	Power supply		230V/1/50Hz	400V/3P+N+T/50Hz	230V/1/50Hz	400V/3P+N+T/50Hz
	Maximum power input	kW	7,7	7,7	8,1	8,1
	Corrente massima assorbita	A	32,8	10,9	33	11,5
Cooling	Cooling capacity (min./nom./max.) (1)	kW	6,7 / 13,8 / 15,2*		8,70 / 15,69 / 16,30*	
	Power input (1)	kW	2,93		3,20	
	E.E.R. (1)	W/W	4,70		4,90	
	Cooling capacity (min./nom./max.) (2)	kW	5,3 / 11,46 / 12,05*		6,30 / 14,64 / 16,00*	
	Power input (2)	kW	3,70		4,52	
	E.E.R. (2)	W/W	3,10		3,24	
	SEER (5)	W/W	4,51		4,77	
Heating	Heating capacity (min./nom./max.) (3)	kW	5,5 / 13,76 / 15,1*		7,10 / 15,21 / 15,90*	
	Power input (3)	kW	3,2		3,45	
	C.O.P. (3)	W/W	4,3		4,41	
	Heating capacity (min./nom./max.) (4)	kW	5,3 / 13,55 / 14,9*		6,50 / 15,17 / 15,80*	
	Power input (4)	kW	4,04		4,38	
	C.O.P. (4)	W/W	3,35		3,46	
	SCOP (6)	W/W	4,01		4,07	
Compressor	Energy efficiency water at 35°C/55°C	Class	A++ / A+		A++ / A++	
	Type		Twin Rotary DC Inverter		Twin Rotary DC Inverter	
	Number		1		1	
Fan motor	Refrigerant oil (type, quantity)	mL	ESTER OIL VG74, 1400		ESTER OIL VG74, 1400	
	Type		Brushless DC motor		Brushless DC motor	
Refrigerant	Number		2		2	
	Type		R410A		R410A	
	Refrigerant quantity (11)	kg	4,74		5,0	
Circulator	Quantity of CO ₂ equivalent (11)	ton	9,90		10,4	
	Design pressure (high/low)	MPa	4,2 / 2,7		4,2 / 2,7	
	Water flow rate (3)	m ³ /h	2,37		2,62	
	Available head pressure (3)	kPa	63,4		52,9	
	Rated power input (3)	kW	0,14		0,14	
	Max power input	kW	0,14		0,14	
	Max. current input	A	1,10		1,10	
Hydraulic circuit	Energy Efficiency Index (EEI) circolatore		≤ 0,23		≤ 0,23	
	Expansion vessel	L	2		2	
	Hydraulic connections	inch	1" M		1" M	
Noise level	Minimum volume of water (7)	L	69		88	
	Sound power (8)	dB(A)	65,5		66,0	
	Sound pressure at 1m (9)	dB(A)	57,5		58	
Dimensions and weight	Sound pressure at 10m (9)	dB(A)	37,5		38	
	Dimensions (LxDxW)	mm	1060 x 1405 x 455		1060 x 1405 x 455	
	Max. Packing dimensions (LxDxW) (10)	mm	1125 x 1675 x 690		1125 x 1675 x 690	
	Operating weight	kg	119		130	
	Net/Gross weight	kg	115,5 / 126		126,3 / 137	

Prestazioni riferite alle seguenti condizioni:

(1) Cooling: Outdoor air temperature 35°C; inlet/outlet water temperature 23/18°C.

(2) Cooling: Outdoor air temperature 35°C; inlet/outlet water temperature 12/7°C.

(3) Heating: Outdoor air temperature 7°C DB 6°C WB; inlet/outlet water temperature 30/35°C.

(4) Heating: Outdoor air temperature 7°C DB 6°C WB; inlet/outlet temperature 40/45°C.

(5) Cooling: Water temperature inlet/outlet 7/12°C.

(6) Heating: in average climate condition; T_{br}=-7°C; water temperature inlet/outlet 30/35°C.

(7) Calculated for a decrease of the water temperature of the plant with 10°C with a defrosting cycle of 6 minutes.

(8) Sound power heating mode condition (3); the value is determined respecting the measurements taken in accordance with the regulations UNI EN ISO 9614-2, in compliant with the Eurovent certification.

(9) Sound pressure level obtained with internal measurements made in accordance with ISO 3744, in case of the sound source located in free field positioned over a reflecting plane.

(10) Packaging height including pallet: in particular, the pallet height, for the models 112 RH/112T RH/115 RH/115T RH is 170mm.

(11) The data are only indicative and subject to change. For the correct data, refer to the technical label on the unit.

(*) activating the Max Hz function.

The Power inputs include all circuit components such as fan motors, pumps, valves and controller, the test data is obtained according to EN 14511: 2013.

N.B. The performance data are indicative and could be subject to change. In addition, the performances declared in (1), (2), (3) and (4) are to be understood referring to the instantaneous power according to UNI EN 14511. The declared data in (6) is determined according to UNI EN 14825.



WARNING: The minimum temperature allowed for storing the unit is 5°C.

13 ELECTRIC DATA OF THE UNIT AND AUXILIARIES

Power supply of the unit	V/~ /Hz	230/1/50*-400/3/50**	Remote control circuit	V/~ /Hz	12/1/50
Control board circuit	V/~ /Hz	12/1/50	Fans power supply	V/~ /Hz	230/1/50

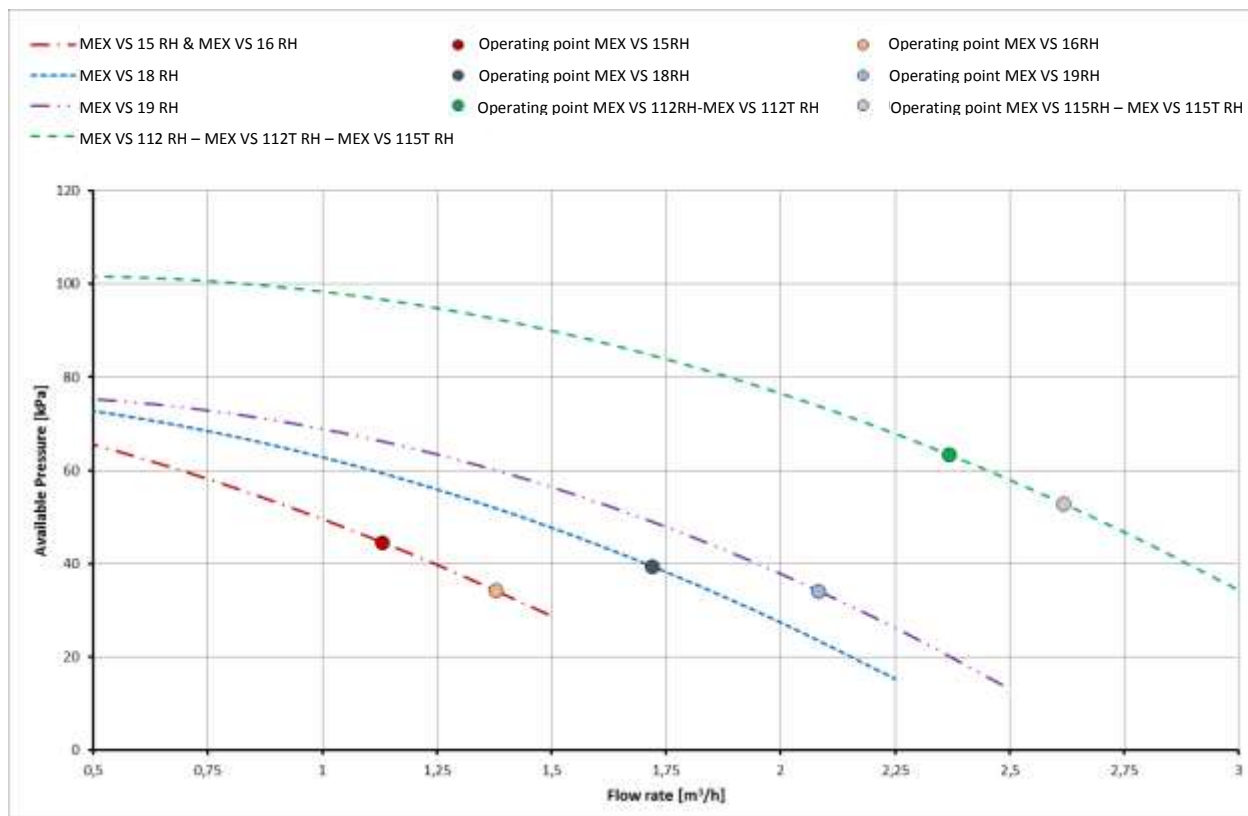
For the models 15 RH, 16 RH, 18 RH, 19 RH, 112 RH and 115 RH* - For the models 112T RH, 115T RH**.

Note: Electric data may change for updating. It is therefore necessary to refer always to the technical data label stuck on right-side panel of the unit.

14 HYDRAULIC CIRCUIT AVAILABLE HEAD PRESSURE

Below the characteristic curves corresponding to Head pressure -Water flow without head losses of the hydronic kit. The optimal operating point is shown on each curve under the specified conditions at the apex (3) p. 20.

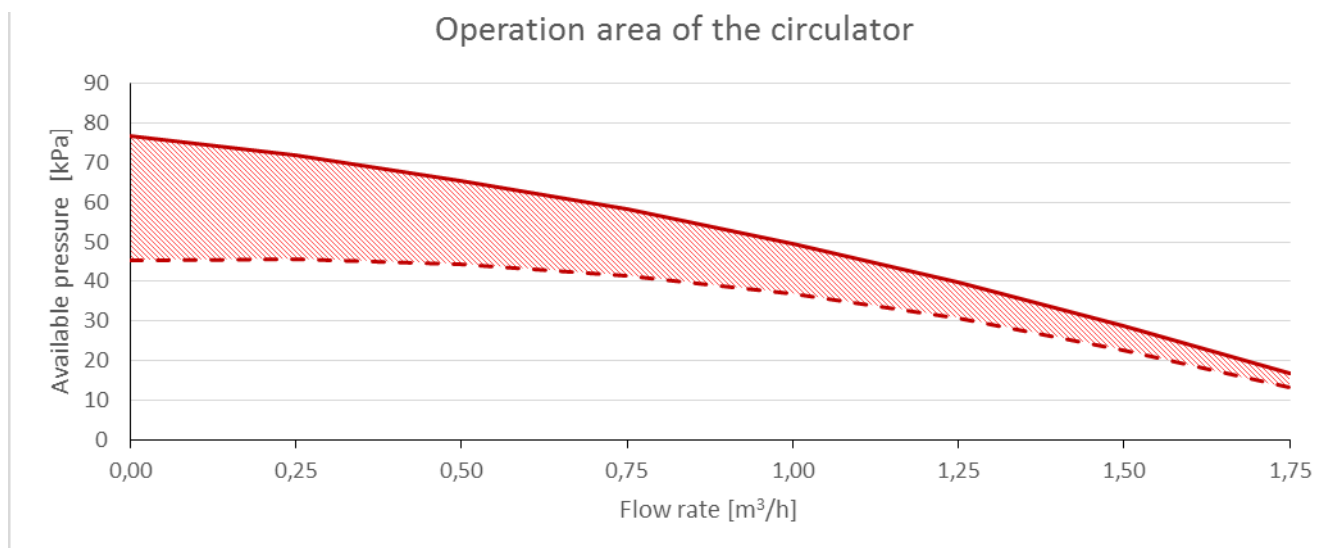
The circuit's plant must be designed so as to ensure the nominal water flow rate corresponding to the operating points indicated below.



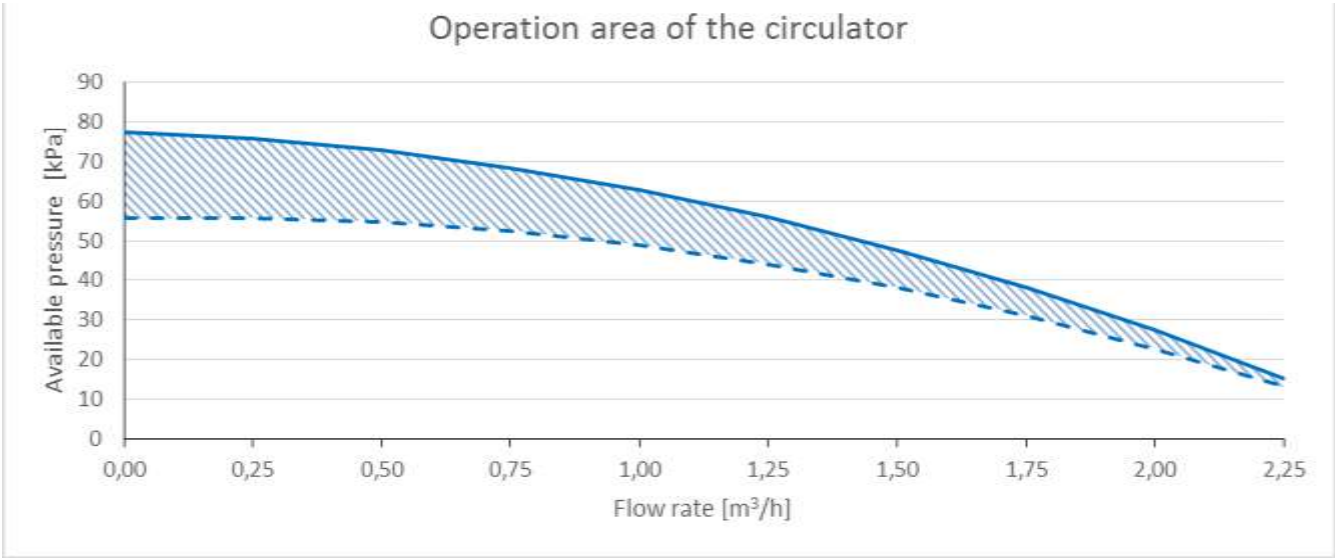
Here also the range of the available head pressures that the unit can provide during the circulator modulation periode.

MEX VS 15RH-16RH

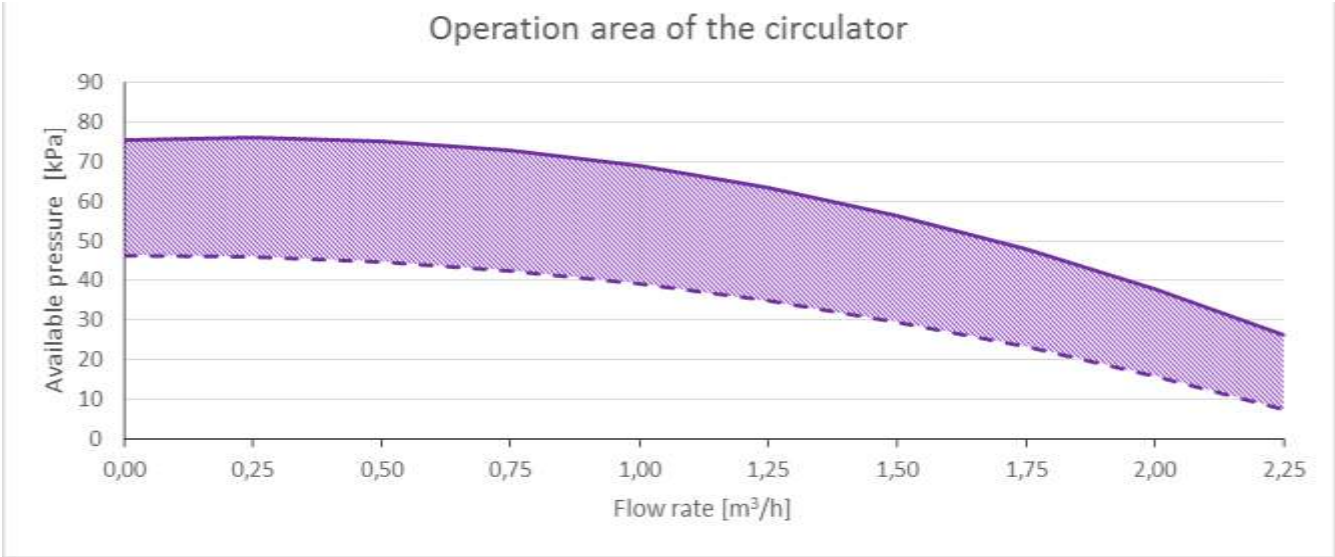
Operation area of the circulator



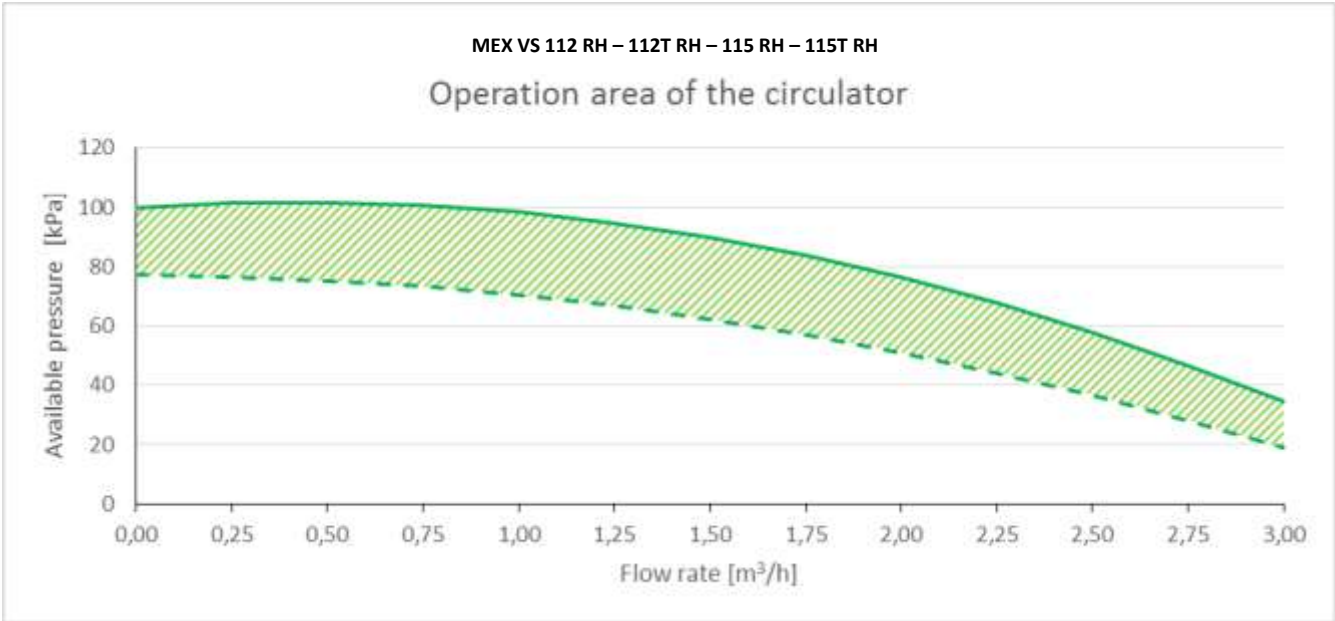
MEX VS 18RH



MEX VS 19 RH



MEX VS 112 RH – 112T RH – 115 RH – 115T RH



15 OPERATION LIMITS

15.1 EVAPORATOR WATER FLOW RATE

The nominal water flow rate is referred to a ΔT equal to 5°C, between the evaporator's inlet and outlet temperatures. The allowed maximum flow rate is corresponding to $\Delta T=3^{\circ}\text{C}$; higher values may cause too high pressure drops. The allowed minimum water flow rate is corresponding to $\Delta T=8^{\circ}\text{C}$ (except for the models MEX VS 15 RH for which a maximum temperature difference of $\Delta T=6,25^{\circ}\text{C}$ is allowed and for the model "MEX VS 16 RH" where the maximum temperature difference is $7,5^{\circ}\text{C}$). Insufficient values may cause too low evaporating temperatures with the intervention of safety devices which would stop the unit and, in some particular cases, the water can freeze in the evaporator coil causing the refrigeration circuit to break down.

We enclosed below a most accurate table showing the minimum flow rates that to ensure for the plate heat exchanger for a the proper operation of unit according to the model (**note:** the water flow switch is used for preventing the freezing sensor from failure in the case of insufficient water flow but it does not ensure the required minimum flow rate which allows the unit to work properly)

Models	MEX VS							
	15RH	16RH	18RH	18RH	112RH	112TRH	115RH	115TRH
Required minimum water flow rate [m ³ /h]	0,71	0,86	1,08	1,30	1,48		1,64	
Required maximum water flow rate [m ³ /h]	1,88	2,30	2,87	3,47	3,95		4,37	

As a first approach, and in the absence of other detection systems, the proper flow rate for getting the best performance from your unit can be found at maximum speed of the circulator, using the pressure gauges for controlling the pressure difference between the return and the delivery water on the outside water connections of the unit and make sure that such value is equal or less than the static pressure indicated on the curves shown in paragraph 14 for the respective models.

15.2 COLD WATER TEMPERATURE (SUMMER OPERATION)

The allowed minimum temperature at the evaporator's outlet is 5°C; for more lower temperatures please contact us. In this case contact our company for the feasibility study and evaluation of changes to be made according to your requests. The maximum temperature that can be maintained at the outlet of the evaporator is 25°C. Higher temperatures (up to a maximum of 40°C) can anyway be tolerated during transitions and start-up phases of the system.

15.3 HOT WATER TEMPERATURE (WINTER OPERATION)

Once the system is working at the right temperature, the inlet hot water temperature should not to be lower than 25°C; the lowest values that are not related to transitional or start-up stages may cause system's malfunction and possible compressor breakdowns. The maximum outlet water temperature have not to exceed 58°C. At this temperature, the power consumption and performance in terms of C.O.P. are enhanced if the outdoor temperature is higher than 5°C, even if the unit is still able to operate up to the limit temperature that are reported in the envelope.

For higher temperatures than those pointed out, especially if have a concomitant with the reduction of the water flow rate, it may cause abnormalities to the normal operating of the unit, or the safety devices act in critical cases.

15.4 AMBIENT AIR TEMPERATURE AND SUMMARIZING TABLES

The units are designed and manufactured to operate, in summer operation, with the condensate control, with outdoor air temperatures ranging between -10°C and 46°C. While operating as a heat pump, the allowed range of the outdoor temperature goes from -20°C to 40°C as a function of the water outlet temperature as indicated in the below table.

Operation limits

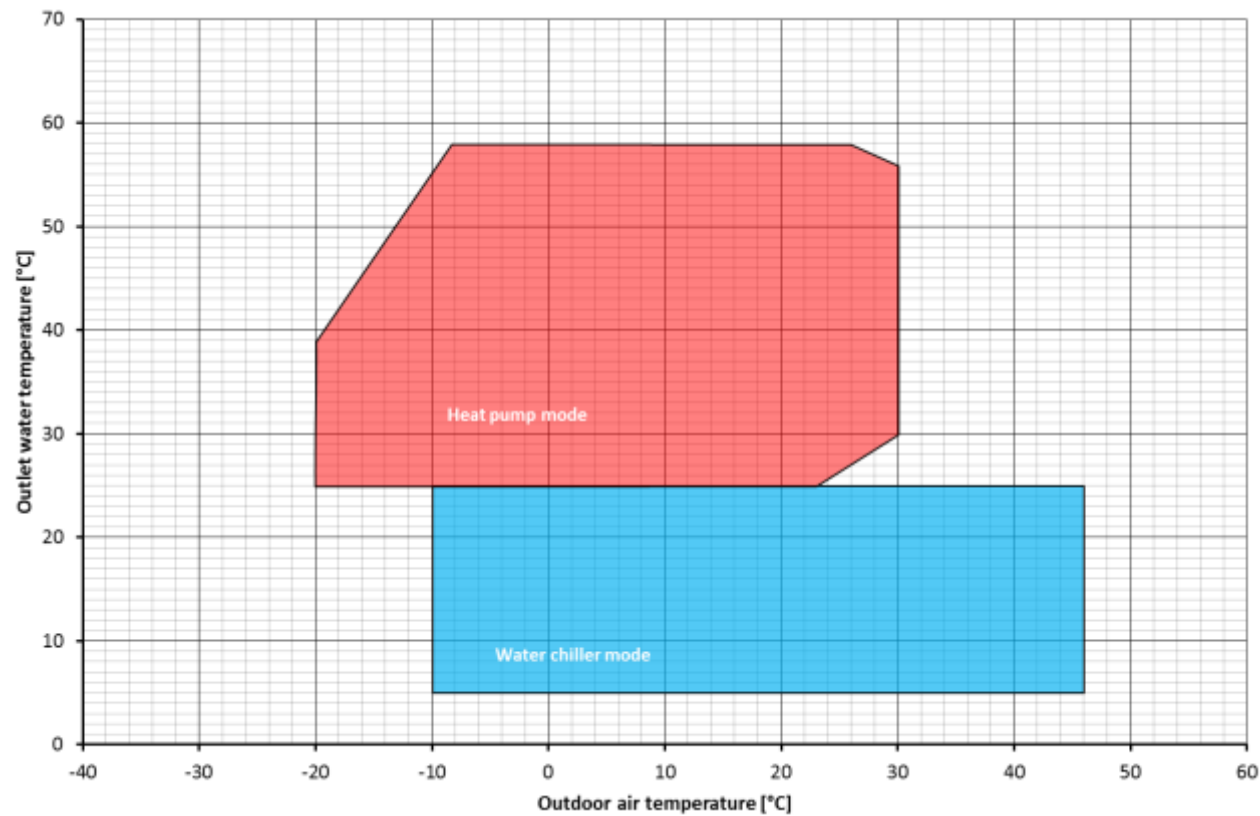
Water chiller mode		
Ambient temperature	Minimum -10°C	Maximum +46°C
Water outlet temperature	Minimum +5°C	Maximum +25°C
Heat pump mode		
Ambient temperature	Minimum -20°C	Maximum +30°C
Water outlet temperature	Minimum +25°C	Maximum +58°C*/+63°C**
Heat pump mode for sanitary hot water		
Ambient temperature with maximum water temperature 38°C	Minimum -20°C	Maximum +40°C
Ambient temperature with maximum water temperature 55°C	Minimum -10°C	Maximum +35°C
Water outlet temperature	Minimum +20°C	Maximum +58°C*/+63°C**

(*) The setting of the unit is 57°C, the value of the maximum temperature takes into account the hysteresis of 1°C present on the parameter.

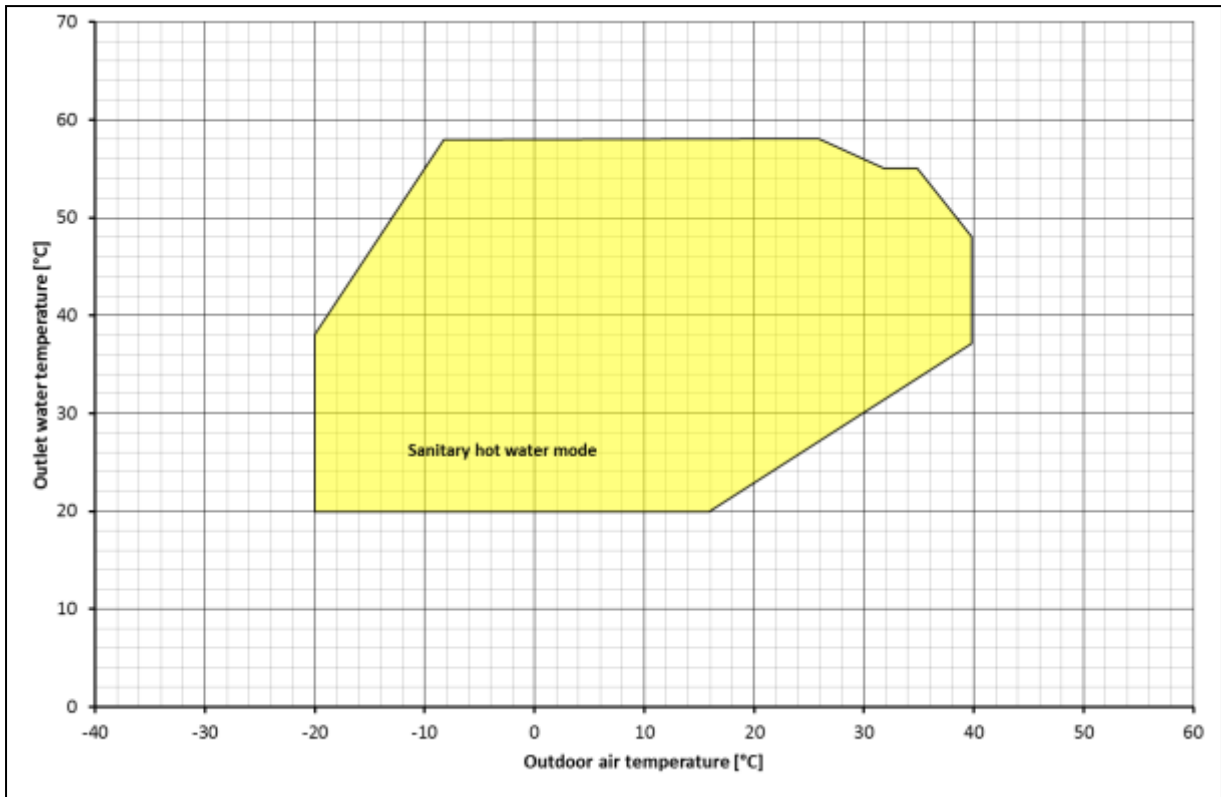
(**) with a supplementary electric heater (not supplied)

Below the operation limits are graphed, in the case of air conditioning and sanitary hot water production.

WATER CHILLER/HEAT PUMP MODES



DOMESTIC HOT WATER MODE



16 CORRECTION FACTORS FOR USE OF GLYCOL

Glycol rate	Freezing point (°C)	CCF	IPCF	WFCF	PDCF
10%	-3,2	0,985	1	1,02	1,08
20%	-7,8	0,98	0,99	1,05	1,12
30%	-14,1	0,97	0,98	1,10	1,22
40%	-22,3	0,965	0,97	1,14	1,25
50%	-33,8	0,955	0,965	1,2	1,33

CCF: Capacity correction factor

IPCF: Input power correction factor

WFCF: Water flow rate correction factor

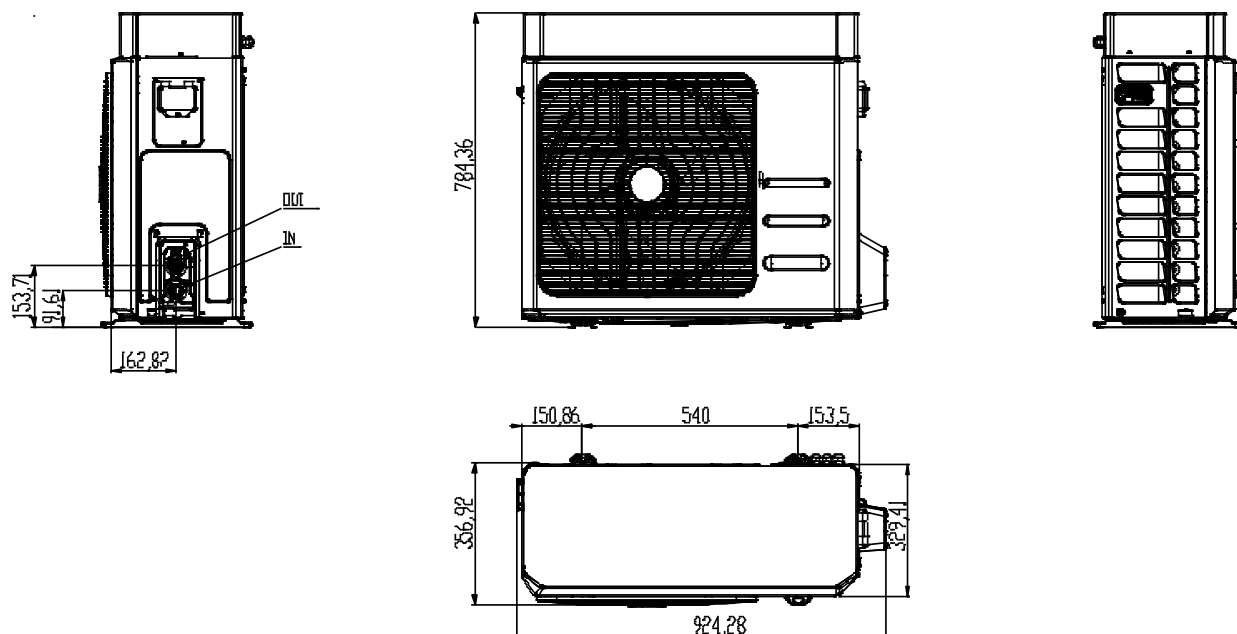
PDCF: Pressure drops correction factor

The water flow rate and pressure drop correction factors are to be applied directly to the values given for operation without glycol. The water flow rate correction factor is calculated in order to get the same temperature's difference that would be obtained without glycol. The pressure drops' correction factor takes into account the different water flow rate obtained from the application of the water flow rate correction factor.

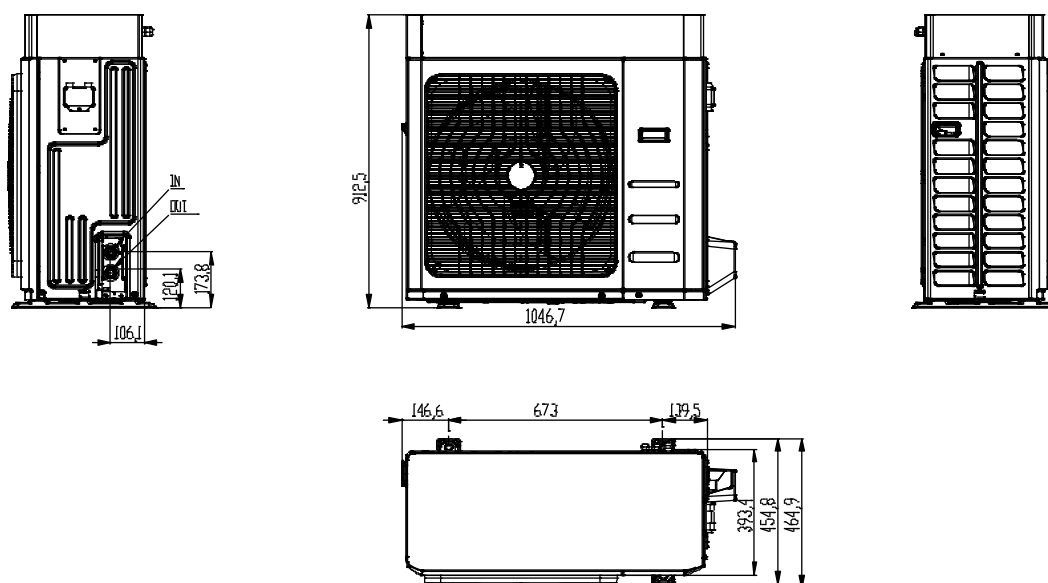
17 DIMENSIONS

17.1 MODELS MEX VS 15 RH/16 RH

IN/OUT: 1" M

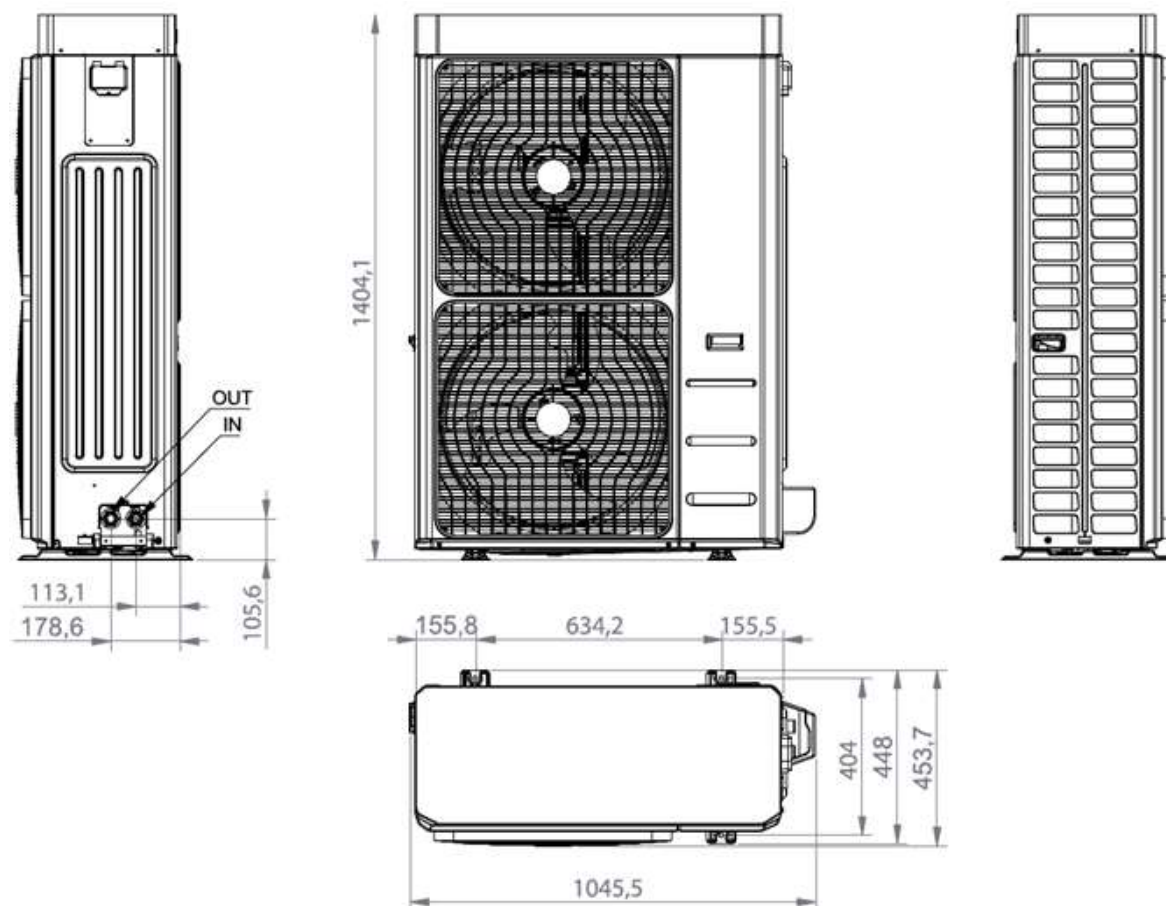


17.2 MODELS MEX VS 18 RH/19 RH IN/OUT: 1" M



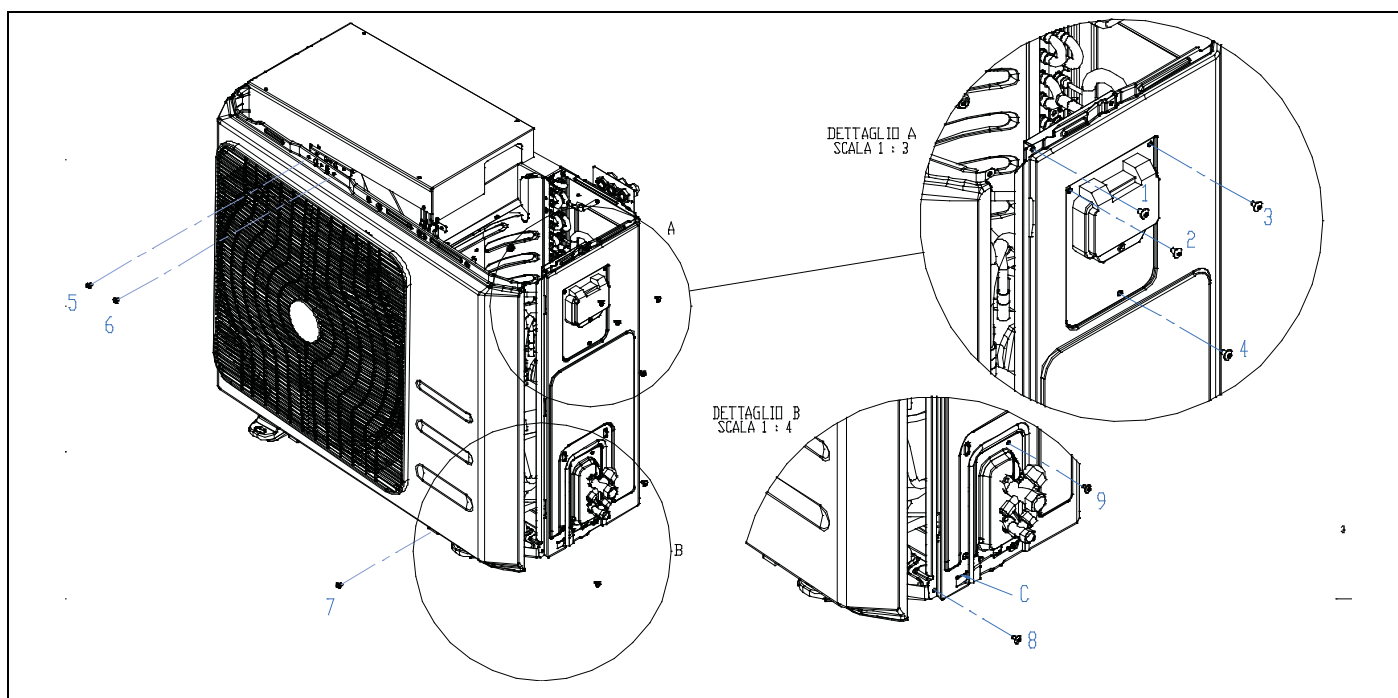
17.3 MODELS MEX VS 112 RH /112T RH / 115 RH / 115T RH

IN/OUT: 1" M



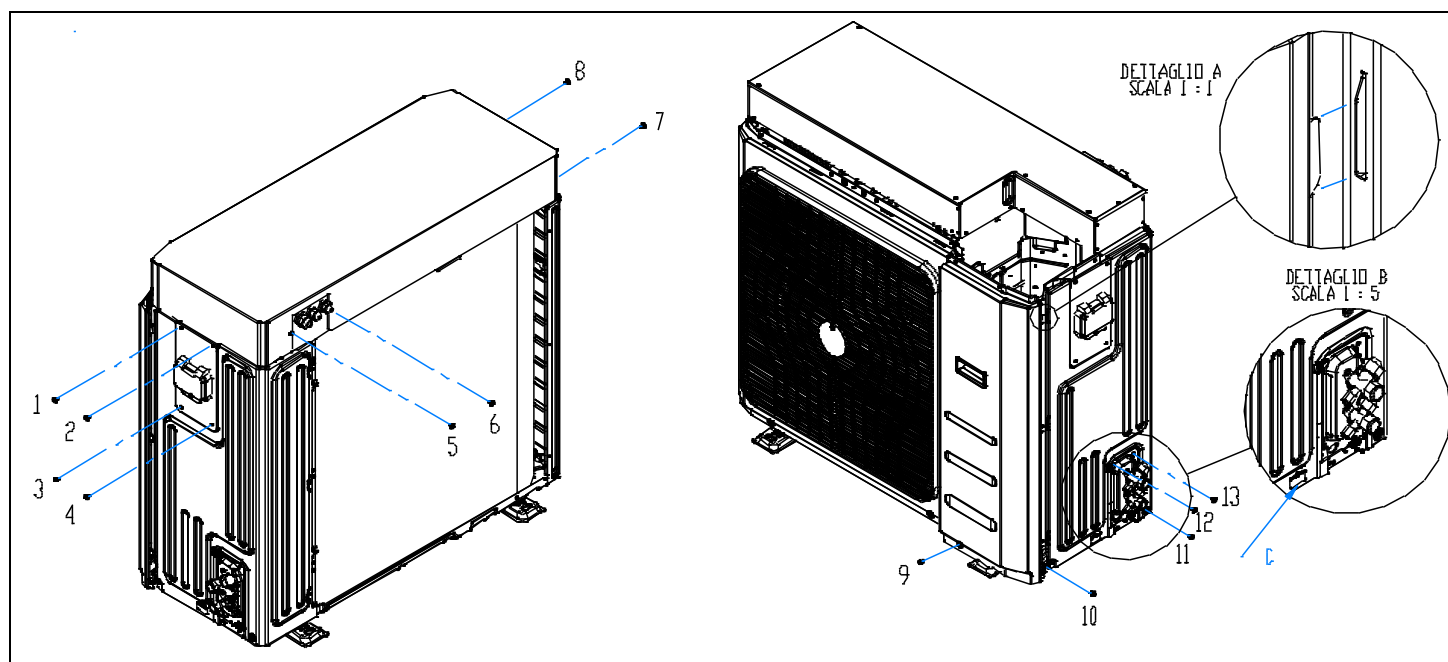
17.4 INTERNAL PARTS OF THE UNIT

17.4.1 Mod. MEX VS 15 RH / 16 RH



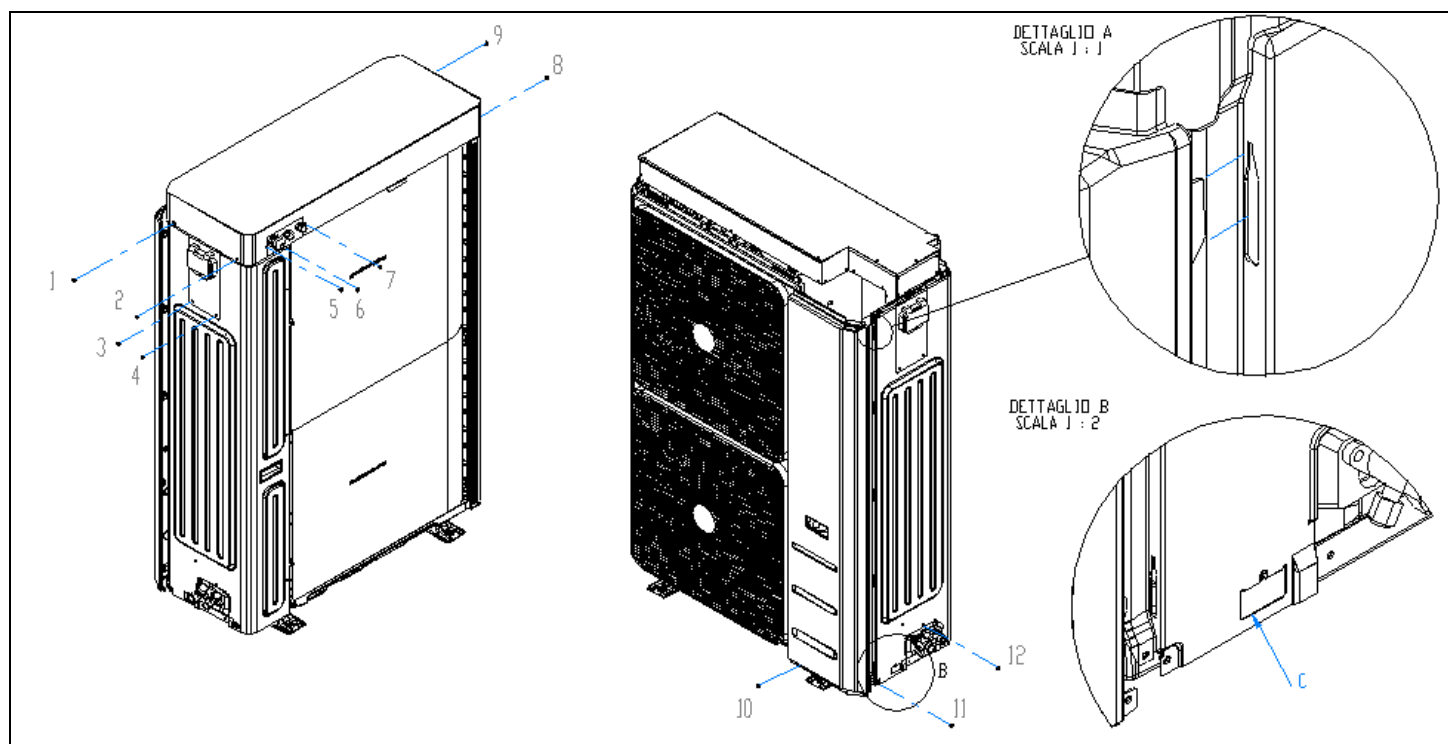
- 1) Remove the top cover
- 2) Twist off the screws (number 2; 3; 4) of the user interface cover plate and the screw (1) from the side panel for separating the side panel from the front panel (Detail A).
- 3) Sequentially, twist off the screws (number 5; 6; 7) in order to move shift slightly the front panel and gain access to the screw (number 8) visible in detail B.
- 4) Twist off the screws (number 8; 9 visible in detail B) and those positioned on the battery side of the unit. To remove the side panel, pull it up (in order to free the tab of the base coupling which is indicated as C in detail B) and remove it.

17.4.2 Mod. MEX VS 18 RH / 19 RH



- 1) Remove the cover twisting off the screws (number 1; 2; 3; 4; 5; 6; 7; 8).
- 2) Twist off the screws (number 9; 10) of the front panel and then push the panel downward to remove the interlocking tab (Detail A); pull the panel forward to remove it.
- 3) Twist off the screws (number 11; 12; 13) and those places on the battery side of the unit. To remove the side panel, pull the panel forward to remove it (in order to loose the hooking tab on the basement indicated as C in the detail B) and remove it.

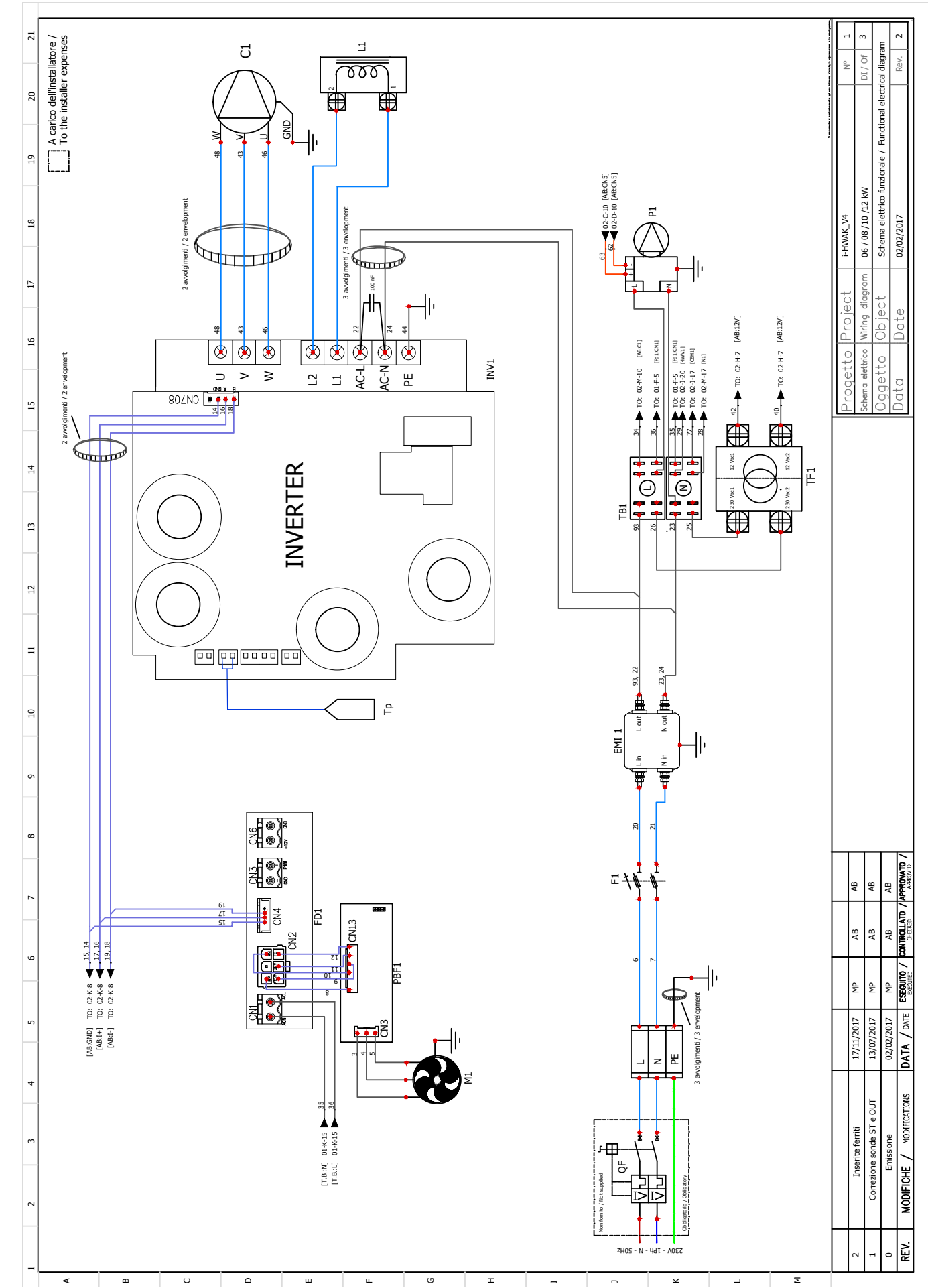
17.4.3 Mod. MEX VS 112 RH / 112T RH / 115 RH / 115T RH



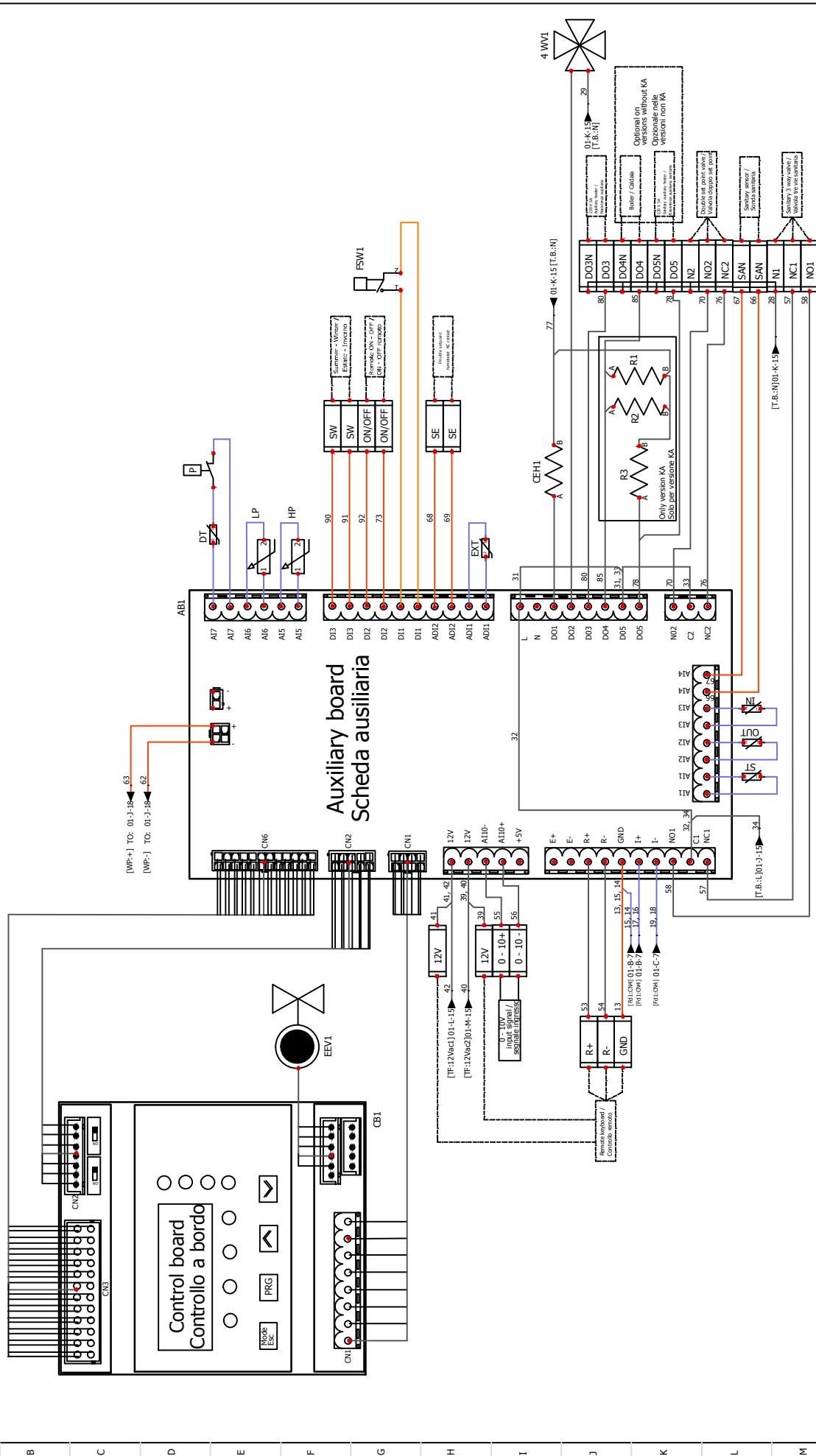
- 1) Remove the cover twisting off the screws (number 1; 2; 3; 4; 5; 6; 7; 8; 9).
- 2) Twist off the screws (number 10; 11) of the front panel and then push the panel downward to remove the interlocking tab (Detail A); pull the panel forward to remove it.
- 3) Twist off the screw number 12 and those placed of the battery side of the unit. To remove the side panel, pull it upward (in order to loose the hooking tab on the basement indicated as C in the detail B) and remove it.

18 WIRING DIAGRAMS

18.1 MODELS MEX VS 15 RH / 16 RH / 18 RH / 19 RH

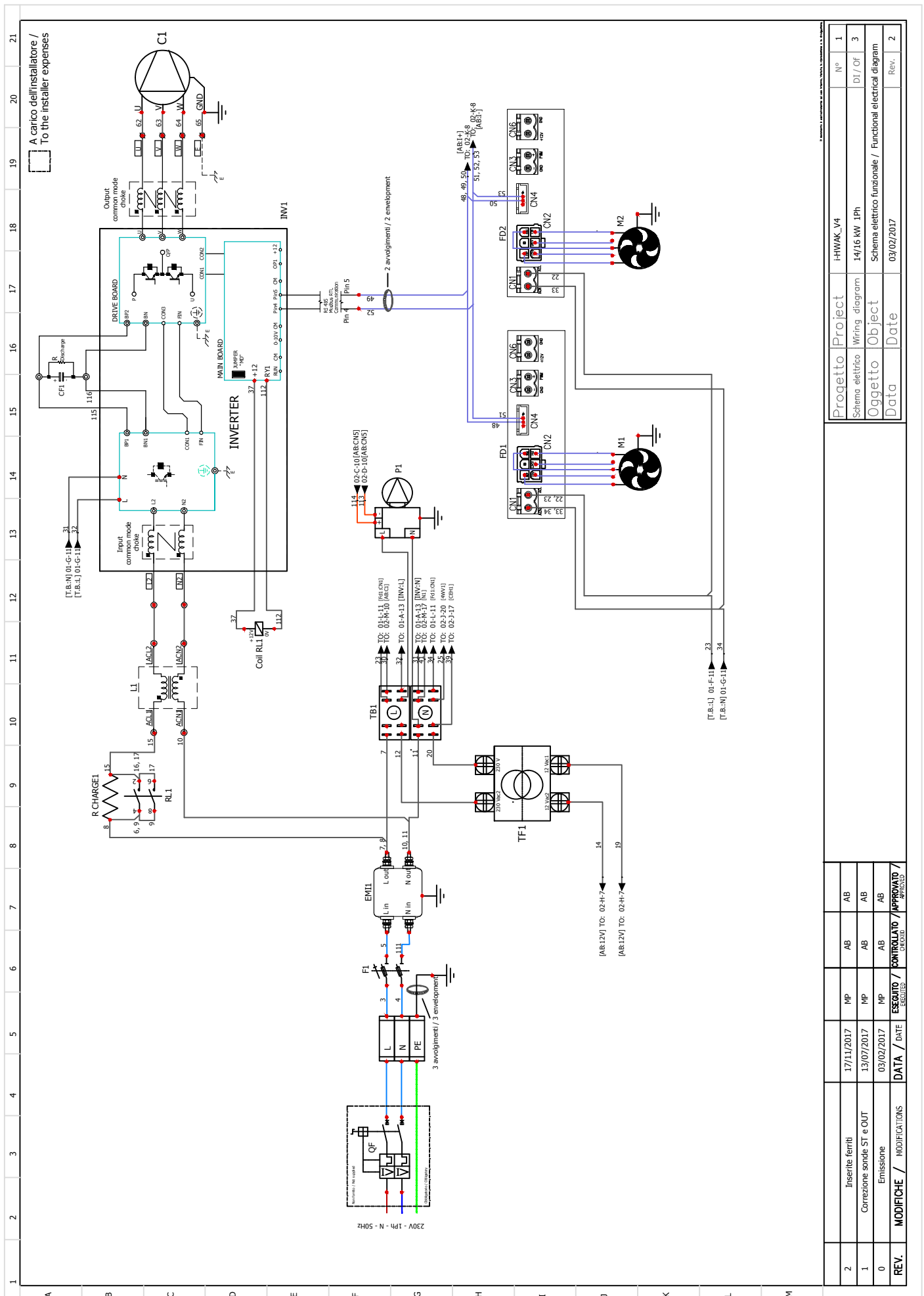


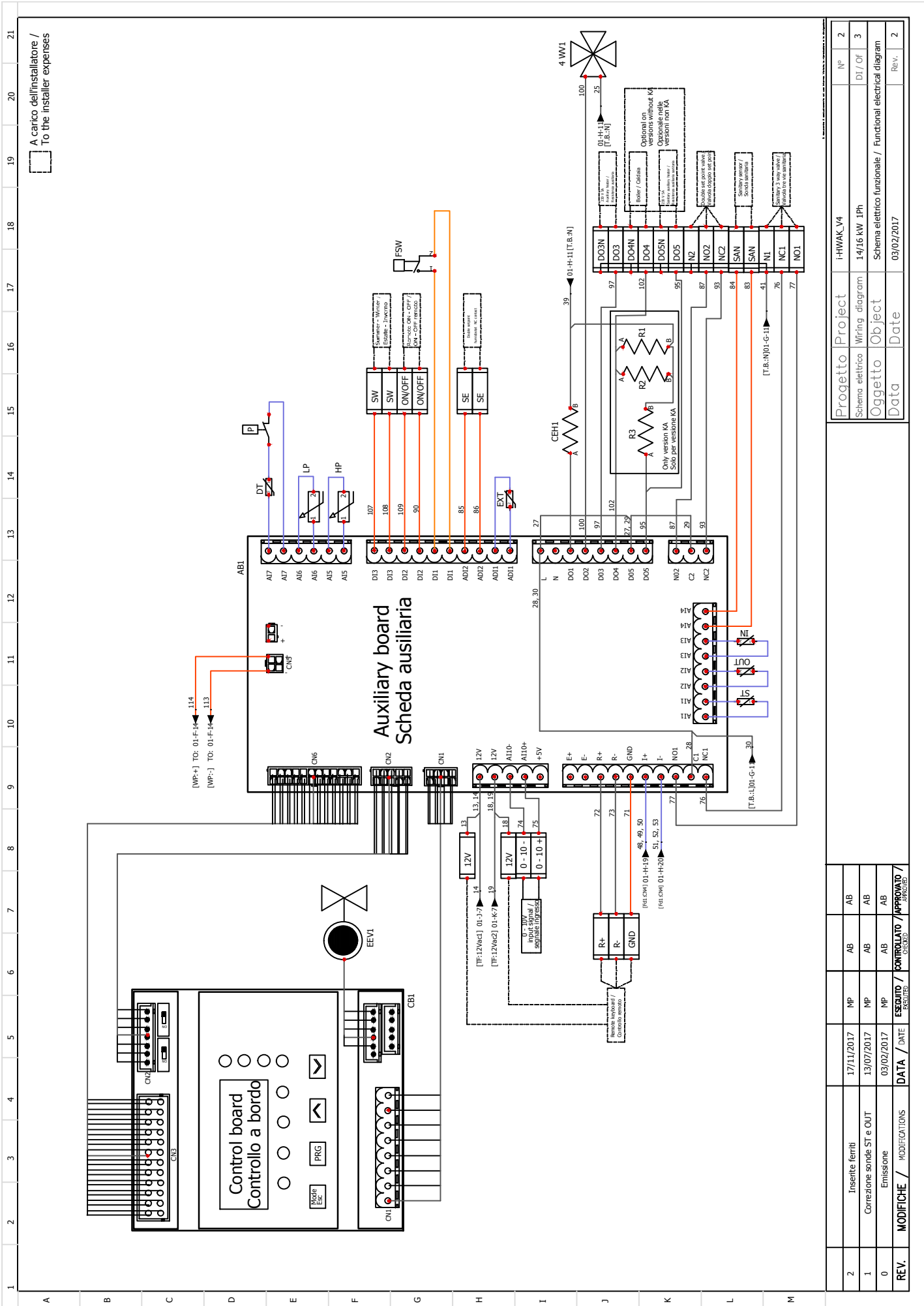
A carico dell'installatore /
To the installer expenses



REV.	MODIFICHE / ESEGUITO / 0	DATA / ESEGUITO / 02/02/2017	MODIFICATIONS / ESEGUITO / 02/02/2017	AB	AB	MP	MP	17/11/2017	17/11/2017	Insertite feriti	HWAK_V4	Project	Schema elettrico	Wiring diagram	Object	Schema elettrico funzionale / Functional electrical diagram	Rev.	2
2																		
1																		
0																		

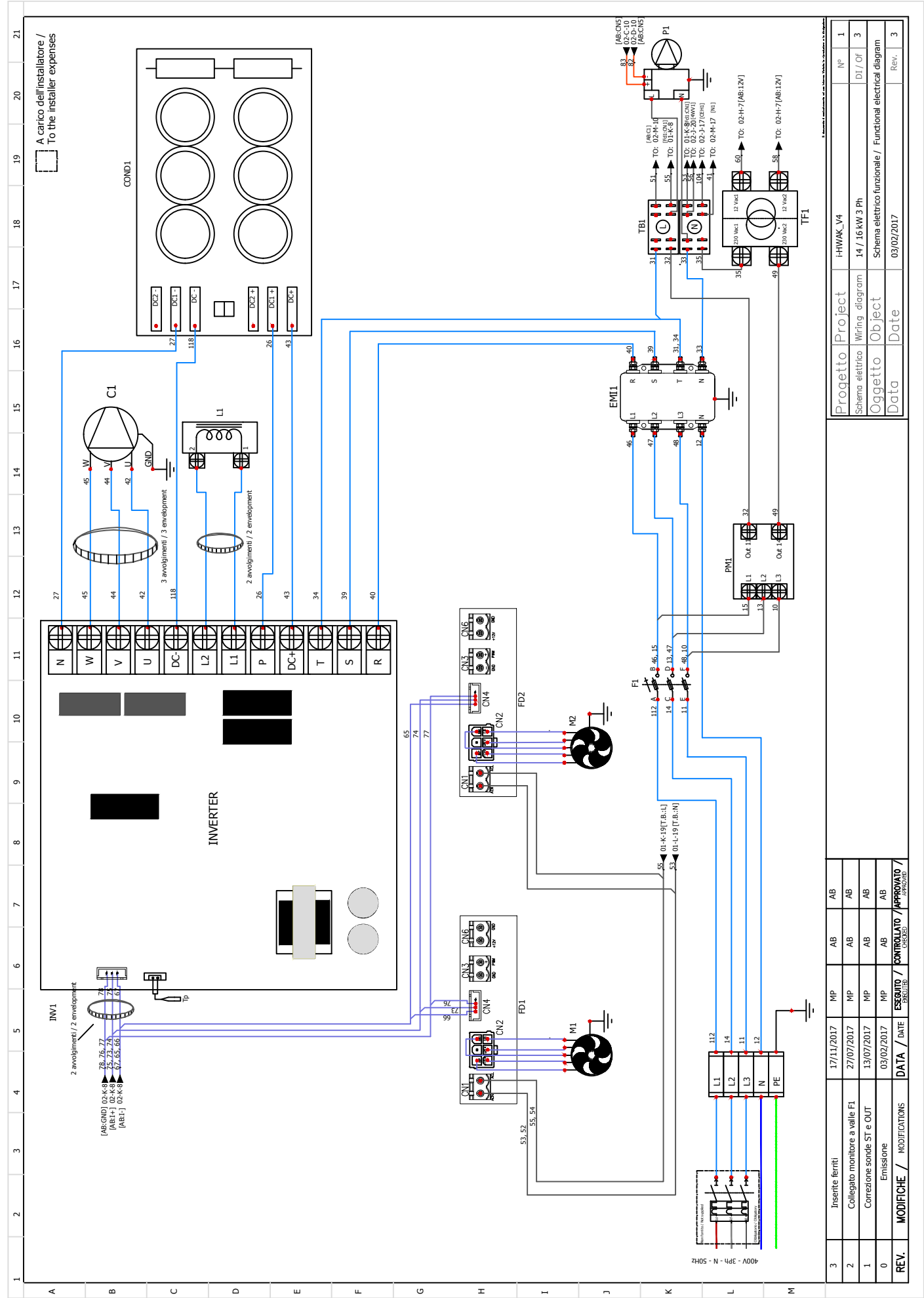
18.2 MODELS MEX VS 112 RH / 115 RH





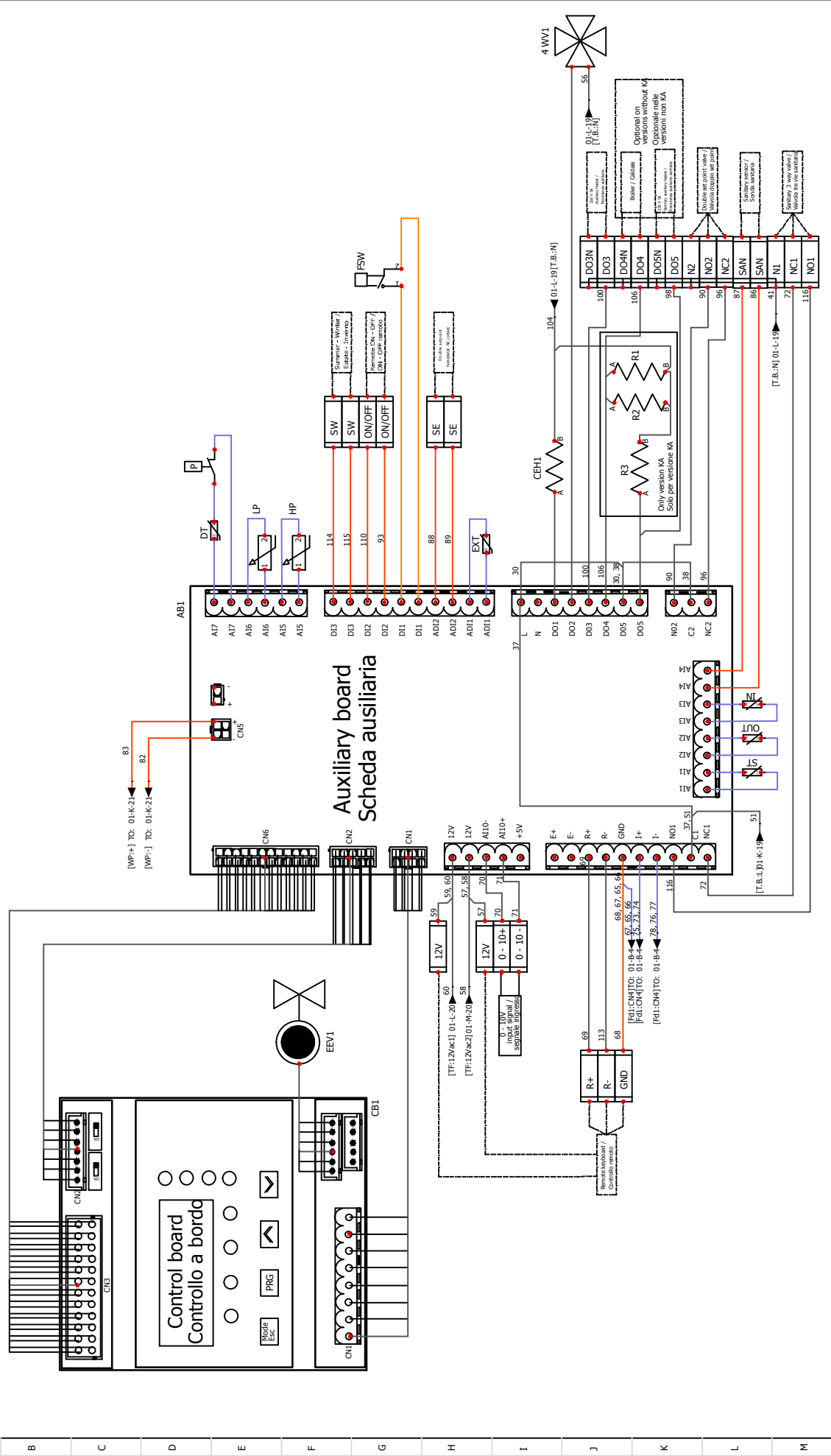
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18.3 MODEL MEX VS 112T RH / 115T RH



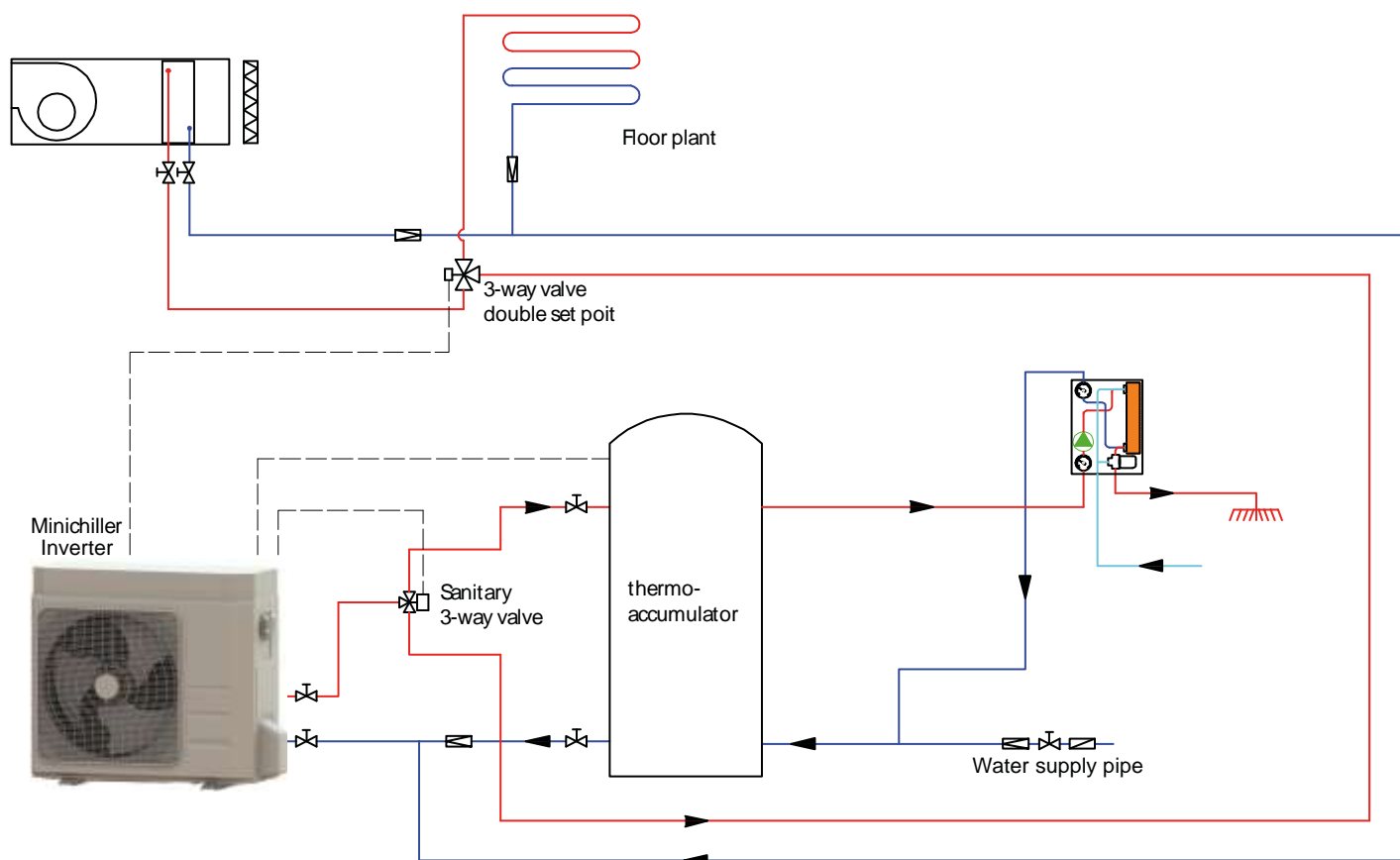
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

A carico dell'installatore /
To the installer expenses



Indice Sonde / Probe index	
Compartiente / Component	Descrizione / Description
IN	Sonda temperatura acqua in ingresso / Water inlet temperature probe
ST	Sensore temperatura aspirazione / Suction temperature sensor
OUT	Sonda temperatura acqua in uscita / Water outlet temperature probe
LP	Trasduttore di bassa pressione / Transducer pressure probe
HP	Trasduttore di alta pressione / Transducer pressure probe
EXT	Sonda temperatura esterna / External temperature probe
DT	Sonda temperatura scarico compressori / Compressor discharge temperature probe /

19 HYDRAULIC DIAGRAM TYPE



20 CONTROL LOGICS

For the control logics see the control manual.

21 HANDBOOK FOR SOME CONFIGURATIONS OF INSTALLATIONS

For more information about the some configurations, you may contact our office and ask for the handbook which collects a series of some recommended drawings of plants that have been highlighted regarding the installation configuration of our high efficiency heat pumps. The "Handbook" aims also the task of showing the symbiotic potential with some of our products in the catalogue.

Technical data shown in this booklet are not binding.
Thermocold shall have the right to introduce at any time whatever modifications
deemed necessary to the improvement of the product..



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