



HEATING SYSTEM

TECHNICAL BULLETIN

Water to water multi-functional unit for summer and winter air-conditioning and sanitary hot water production for residential applications.



RANGE:

Cooling capacity: 5,7 kW – 39,2kW

($T_{AE} = 35^{\circ}\text{C}$; $T_{WI/WO} = 12^{\circ}\text{C}/7^{\circ}\text{C}$)

Heating capacity: 7,0 kW – 44,9kW

($T_{AE} = 7^{\circ}\text{C}$; $T_{WI/WO} = 40^{\circ}\text{C}/45^{\circ}\text{C}$)

ACS production heating capacity: 7,0 kW – 44,9 kW

($T_{AE} = 7^{\circ}\text{C}$; $T_{WI/WO} = 40^{\circ}\text{C}/45^{\circ}\text{C}$)



ISO 9001:2008



Technical data and dimensions are not binding. Thermocold Costruzioni s.r.l si reserves the right to carry out any modification if needed.

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PRODUCT PRESENTATION

MARA is a water to water multi-functional unit for summer cooling, winter heating and hot sanitary water production up to 60°C expressly designed for residential application and for the small tertiary.

MARA is a total recovery multi-functional unit equipped with 2 water circuits: the main circuit supplying hydronic terminals and a secondary circuit with a recovery heat exchanger specifically dimensioned for hot sanitary water production.



ALL IN ONE MULTI-FUNCION UNIT

Expressly designed for residential and tertiary applications, MARA is the all in one solution for summer and winter air-conditioning and the simultaneous hot sanitary water production.

MARA can provide hot sanitary water throughout the year, assuring free of cost productions during summer, thanks to the thermodynamic recovery of the condensing heat. MARA is equipped with a scroll compressor optimized for the heat pump mode with R410a as a refrigerant gas, for the production of:

- Hot and cold water for summer and winter air-conditioning;
- Hot sanitary water (HSW).

Mara's innovative technical solutions allow to overcome both traditional and last generation heat pumps operational limits, assuring:

- High heating performances during winter;
- Free choice of designing options (up to 60°C) permitting:
 - **Hot water production** on the condensing exchanger for winter conditioning;
 - **Hot water production** on the recovery exchanger, to serve sanitary consumption;
 - **Cold water production** on the evaporator exchanger during summer conditioning.
- High reliability and durability (mechanical stress reduction thanks to the lower compression ratios in comparison to traditional heat pumps);
- High efficiency: COP >4,1.

HIGHLIGHTS

Environmentally friendly refrigerant

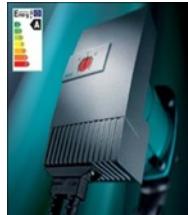
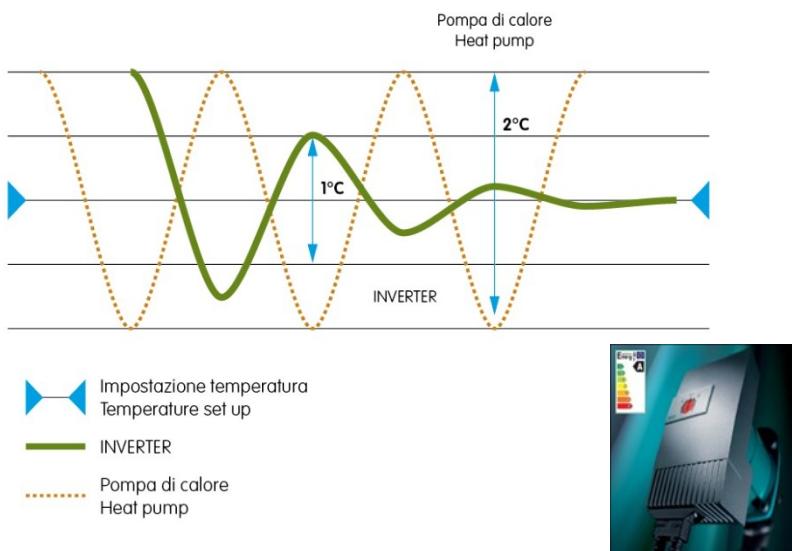
R410a



R410a is an eco-friendly gas refrigerant: it doesn't damage the ozone (ODP=0) and permits to obtain high efficiency systems, to restrain power consumptions and consequently the CO₂ emissions in the atmosphere.

Scroll compressors are more efficient, compact and silent because optimized for the R410a utilization.

INVERTER circulators (optional accessory)



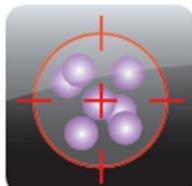
Full inverter circulators (optional accessory) allow the unit start-up optimization in the heat pump mode.

By reducing the water capacity, the condensing temperature is always under control permitting the maximization of defrost cycles and the faster achievement of the set point temperature.

Furthermore this solution ease the unit start even after long inactivity periods or in case of water tank low temperature.

Inverter pumps are equipped with brushless engines: on equal hydraulic features, the power absorbed is lower, also thanks to the inrush currents elimination.

High temperature of water outlet



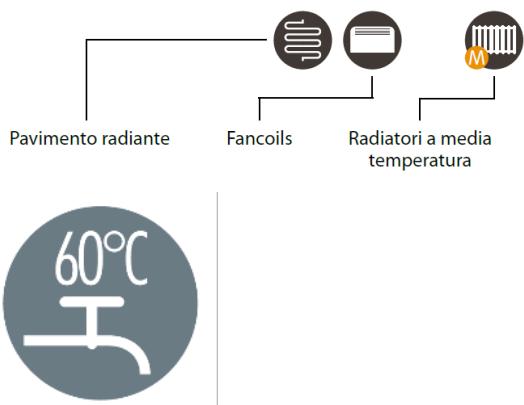
Water is warmed up to 60°C, a high temperature compared to the normal heat pumps results.

This temperature is high enough to eliminate the risk of legionella; however the system is able to trigger automatically the anti-legionella cycle if needed.



HIGHLIGHTS

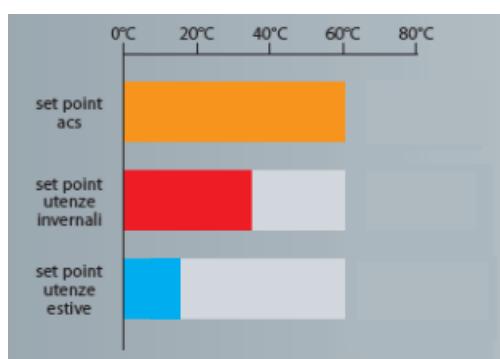
Adaptability and interfaceability with every kind of plant



Due to the possibility of reaching water production temperatures up to 60°C, MARA displays an high adaptability to every kind of residential application. MARA W is an extremely flexible unit, designed to be perfectly integrated with any kind of winter air conditioning terminal such as:

- Radiant floor;
- Fancoils;
- Medium temperature radiators (55°C)
- High temperature radiators.

Independent set point management



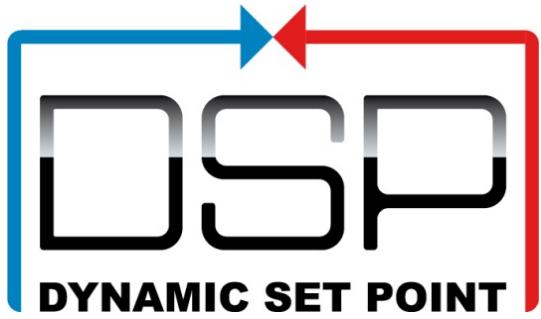
With multi-functional units it's possible to set different and completely independent set points for the summer air conditioning and the production of hot sanitary water. This way the unit works with diffrentiated COPs, one for the winter air conditioning and one for the sanitary, remarkably increasing the unit productivity on a yearly basis.

- (1) Outdoor water temperature Twin/out= 15/10°C
- (2) Outdoor water temperature Twin/out= 30/35°C



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Dynamic set point



The DYNAMIC SET POINT allows to optimize the heat load provided to the users during the entire period of operation of the unit.

Depending on the heat load , the control set point fits always guaranteeing an optimal temperature of the feed water to the terminals of the plant, providing only the necessary thermal energy as a function of the outside air temperature .

In fact if the outdoor temperature increases, through the function DSP it is possible:

- To increase the set point in case it is necessary to contain power consumptions and it is needed to ensure a difference between the indoor and outdoor temperature such avoid lack of comfort due to the excessive changes of temperature;
- To reduce the set point in case it is required to compensate in such a way the excess of thermal load; of course this is a function to be used with precaution because it generates higher power consumption.

HIGHLIGHTS

Digital Defrost



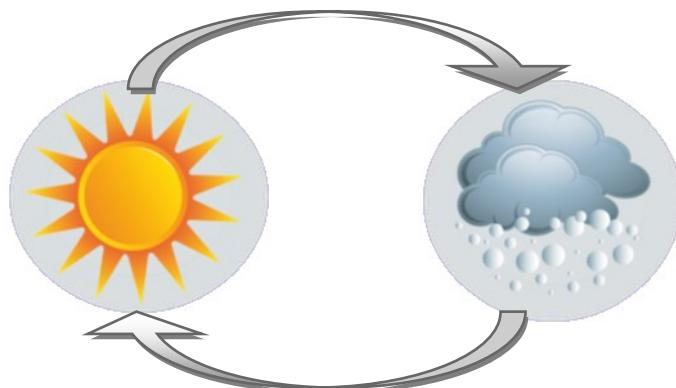
DIGITAL DEFROST is a digital self-adaptive defrosting system able to prevent the production of frost that works only in case of effective presence of frost on the coils' fins.

In particular, the system operates by modulating the compressors' inverter frequency according to the outdoor temperature, raising the evaporating temperature above the defrost limit.

The unit is subjected to a significantly reduced number of defrost cycles.

The reduction of mechanical stress, due to the cycle inversions during heating mode, implies an increase in the life cycle of the unit, as well as improving the comfort felt by the user.

Automatic changeover



Automatic change over allows the unit operating cycle inversion from summer to winter and viceversa, in accordance with the outdoor temperature variations. When set and band are fixed for the outdoor temperature, the unit will automatically commute its operating mode.

Energy Saving



If the Energy Saving mode is enabled during specific time slots, the controller will adapt the set point values dragging them to modifiable values.

This operation mode leads for example to an increased functionality during time slots when the power costs is lower, or to a decreased functionality when there is a lower thermal load.

If both modes are activated for the same time slot, the electronic gives place to the automatic turn off.

HIGHLIGHTS

Easy of installation



MARA ease of installation is typical of all the heat pump + chiller units, in other word, it is sufficient to connect them electrically and hydraulically. The operating time slots and the hot water temperature can be set up on the electronic controller. Neither particular technical intervention or gas network connection are required, therefore there is a major flexibility in terms of positioning.

Reduced manutention and chimneys elimination



MARA does not require any annual inspection for the security and manutention, that is regular in the case of traditional gas and fuel systems, which makes it a low cost extremely convenient alternative.

MARA W has all the advantages of the heat pumps, such as the total elimination of chimneys and consequently of the explosions risk, and besides it is exonerated from several manutention and security controls provided for by the new regulations in force (I.S.P.E.S.L.) for traditional boilers and heat pumps.

OPERATING MODES

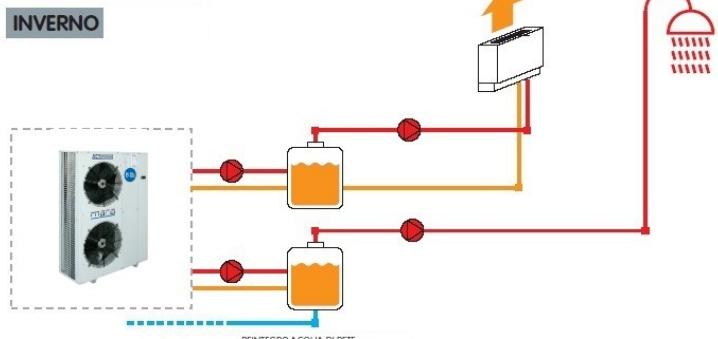
MARA is equipped with 2 water circuits, one for the winter heating and summer cooling and the other dedicated to the hot sanitary water production. It is characterized by the innovative refrigerator circuit and the advanced control system which allows the satisfaction of all the plant necessities, both conditioning and sanitary, in every season.

The operating mode are:

- Summer air-conditioning
- Summer air-conditioning + hot sanitary water production
- Hot sanitary water production only, both in summer and winter.
- Winter air-conditioning.

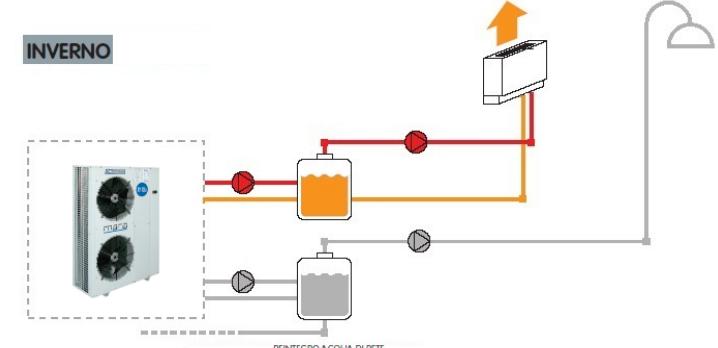
The system control gives place to the hot water production.

WINTER AIR-CONDITIONING AND HOT SANITARY WATER PRODUCTION



During winter MARA produces hot water up to 60°C for the heating and hot water production (giving priority to the sanitary consumptions).

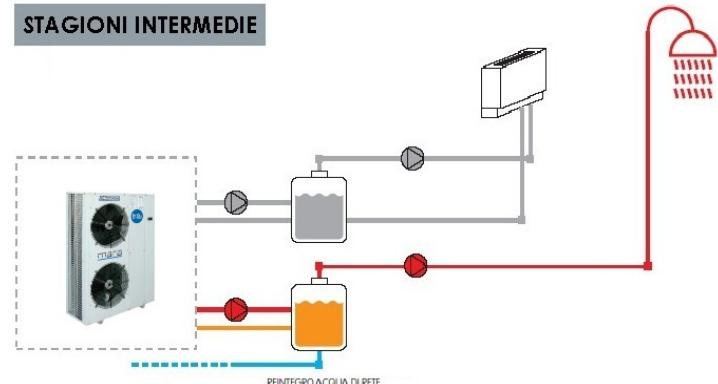
WINTER AIR CONDITIONING



During winter MARA produces hot water up to 60°C for the heating.

SANITARY HOT WATER PRODUCTION

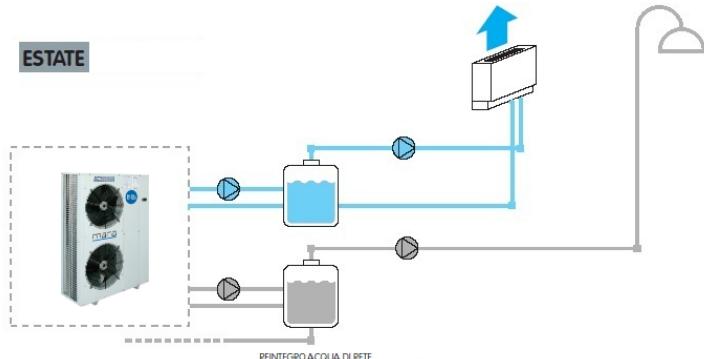
During mid-seasons MARA produces hot water up to 60°C



OPERATING MODES

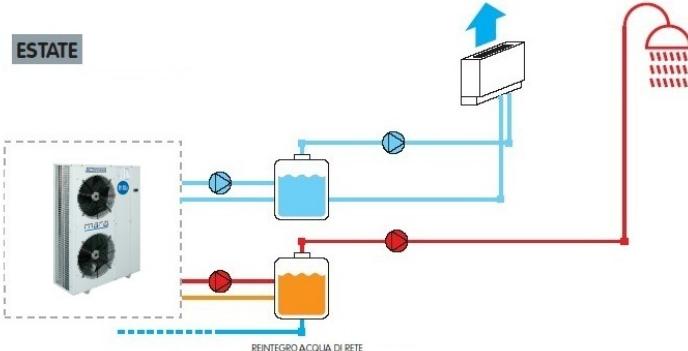
SUMMER AIR-CONDITIONING

During summer MARA produces cold water for the cooling.



SUMMER AIR-CONDITIONING AND HOT WATER PRODUCTION

During Summer MARA produces cold water for the cooling and free of costs hot water production (fino a 60°C) to serve sanitary consumptions.



According to the plant's necessities, the controller selects the operating mode automatically. The starting and turning-off are carried out in accordance with the unit inlet water temperature (built in temperature probes), to the 3 set points (summer, winter and hot water) and to the 3 differentials (summer, winter and hot water).

The controller can manage the following operations:

- remote on/off (through installator freed contact)
- summer/winter switch (through installator freed contact)
- hot water mode activation that disable the summer/winter air conditioning (through installator freed contact). It's possible to enable the HW mode directly from the remote display.

There is also the possibility to activate the following operation modes:

- Time slots programmation which allows:
 - Unit turning-on and turning-off time setting.
 - Different set-points choice, on a time slot basis. The user can liberally arrange set points for the air-conditioning according to the time slots by increasing or decreasing the water temperature, during the time slot when a lower thermal load is required, or otherwise lead the unit to work more when the power costs are lower.

Units are equipped with variable flow rate circulators both for the hydronic circuit dedicated to the air conditioning and the sanitary dedicated circuit.

The modulation of both circulators is managed by the electronic controller which arranges the flow according to the inlet water temperature. During summer air-conditioning the circulator flow rate will boost when the inlet water temperature gets lower. Conversely during winter, the circulator flow rate will boost when the inlet water temperature increases.

Concerning the sanitary circuit, when the sanitary hot water temperature increases, the circulator flow rate will boost proportionally.

TECHNICAL SPECIFICATION

SCROLL COMPRESSOR

Units are equipped with hermetic scroll compressor, characterized by high performances, reduced vibrations and contained noise levels. The volumetric efficiency guarantees high COP values. The electric engine, cooled by the aspiration refrigerant, is equipped with automatic internal thermal protection.

VENTILATORI

Units are equipped with axial fans with variable fan speed modulation according to the condensation and evaporation pressure with airfoil blades extremely silent suitable for residential applications.

CASING

Galvanized steel casing which provides the unit with elevated corrosion resistance. The frontal panel is easy to be removed to have access to all the internal components and allows to easily carry out the maintenance.

AIR-CONDITIONING AND HSW PLATE HEAT EXCHANGERS

Direct expansion, stainless steel AISI 316 brazed plate type, externally insulated with closed cell anti-condensation material and equipped with water differential pressure switch and antifreeze protection electric heater.

SOURCE HEAT EXCHANGER

The condensing / evaporating exchangers are with finned coil and copper tubes, with corrugated fins of aluminum with spacing of the tubes 30/26 and spacing fins differentiated with fin pitch of 1.6mm at the top and 2.5mm at the bottom.

Thanks to the differentiated spacing is obtained a uniform speed profile across the coils so as to increase the heat exchange in the lower part especially critical in heat pumps.

On the basis of the coils are installed thermostatic electrical heaters, immersed in the last row of tubes, in such a way that the heat develops around the entire pipe by increasing the conduction of heat. These electrical heaters are useful to prevent formation of ice on the batteries and to reduce the defrosting time favoring the drainage of the condensate.

Copper tubes are mechanically expanded, and are of a high efficiency with CROSS-GROOVED tube.

The batteries are also designed for ecological fluids, the velocity inside the tubes, not less than 10m/sec, are such as to ensure the correct entrainment of the oil in each load condition.

REFRIGERANT CIRCUIT

The refrigeration circuit is made entirely of copper and includes:

- Thermostatic expansion valve;
- High and low pressure shut-off valves on the line;
- Liquid shut-off valve;
- Refrigerant charge;
- Liquid receiver;
- Four way valve for reversing the cycle;
- Safety low pressure valve;
- Liquid line solenoid valve;
- Pressure transducers;
- Filter drier;
- Connection valve.

AIR-CONDITIONING WATER CIRCUIT

Summer and winter air-conditioning water circuit includes:

- Air conditioning variable flow rate system water pump;
- Automatic relief valve;
- HSW and air conditioning system expansion tank .
- Safety valve;
- Shut-off valve;
- Differential pressure switch.
- Pressostato differenziale.

HOT SANITARY WATER CIRCUIT

- Variable flow circulator;
- Automatic relief valve;
- HSW and air conditioning system expansion tank .
- Safety valve;

- Shut-off valve;



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TECHNICAL SPECIFICATION

ELECTRIC CONTROL PANEL AND POWER

Electric board made in accordance with standards CEI44-5/IEC 204-2 including:

- contactors for compressor and fans;
- fuses for the compressor;
- fuses for control circuit.
- Engines fans protection fuses;
- Condensing control;
- Condensation/evaporation modular fans.



The control interface guarantees:

- Monitoring of analogical status variables of the system (water temperature in / out, working pressure);
- Monitoring of the status of the actuators (compressors on / off, valves and antifreeze heater status,...);
- Alarm code reading;
- Activation of the machine in the desired cycle;
- Changing of operating parameters of the machine (with various levels depending on the password entered);
- Changing of defrosting timing (only for air cooled heat pumps);
- Modify antifreeze threshold

ELECTRONIC CONTROLLERS

The programmable controller is based on a powerful platform with 256bit microprocessor, 4MB mass storage with a hardware and software configuration made with the most innovative technology in terms of processing speed and connectivity.

The keypad allows a complete and intuitive display of all the main control variables of both circuits .

The diagnostics includes a complete alarm management, alarm history and data logger which stores an archive of about 4 days (further expandable by USB memory) where the main variables and the operating status of the unit are recorded. ModBus master and slave communication protocol.

The temperature regulation us carried out by two hydraulic circuits (cooled water and hot water), with a continuous proportional logic according to the return water temperature.

The operating parameters of the machine are protected by 3 levels of password (user-maintainer-builder). The user panel provides information LCD dysplay with exhaustive descriptions in Italian and English (selectable).

- Ability to interface with the main BMS systems via RS485.
- Ability to interface with I/O expansion modules via CanBus
- Ability to control the unit by voltage free contacts
- Input Ethernet RJ45, for routing on the web of all the parameters of the unit, providing a total remote control of unit.
- USB input to upload parameter files, system files, firmware and to download files of historical alarms, residing parameters files and default parameters files.
- User interface on the door of the panel, low-reflection LCD, equipped with 8 function keys, easy iconic display, easy sliding between the dynamic screens.
- Management of electronic expansion valves through controller based on PID logic, with LOP control (low operating pressure), maintenance of the minimum working pressure and of the MOP (maximum operating pressure) for the management of the maximum working pressure.

The microprocessor manages:

- Starting of the compressors with the start-up and stop time control
- Compressor rotation with FIFO logic
- Solenoid valves of liquid lines with pump-down management during stops through double control of suction pressure and maximum time of the procedure.
- Electric anti-freeze heater for user and source exchangers.
- Hot, cold and source side water pumps management through voltage free contacts for standard versions; for hydraulic versions the pump management is automatically controlled.
- Alarm signal for each refrigerant circuit of the unit through voltage free contacts.

The microprocessor will control and display by suitable measuring transducers the following variables:

- Inlet and outlet water temperature to the cold user exchanger
- Inlet and outlet water temperature to the hot user exchanger
- Outlet water temperature to the source exchanger
- Condensing pressure of each refrigerant circuit.
- Evaporating pressure of each refrigerant circuit.
- Total operating time of each compressor.
- Total operating time of the unit.

The microprocessor will protect the unit in the following cases, the resetting of any alarm will always be manual.

- Low evaporating pressure by analogical and digital input with possibility to edit the marking details.
- High condensing pressure by analogical and digital input.
- High temperature of the compressors windings.
- Reverse rotation of each compressor
- Low pressure difference between discharge and suction (to allow a correct lubrication of the compressor) with the possibility to edit the start-up delay and the minimum requested value.
- High pressure difference on the oil filter.
- High temperature of pumps motor windings
- Lack of water flow on cold, hot and source exchanger.
- Low evaporator outlet water temperature
- Low condenser outlet water temperature
- Low source outlet water temperature

It is also possible to display and edit through the microprocessor the following value:

- Operating setpoint of the unit
- Operating differential of the unit.
- Set point and anti-freeze block differential.
- Set point and differential of activation of the exchanger heaters.
- Minimum operating time of each compressor.
- Minimum stop time of each compressor.
- Maximum number of starts per hour of each compressor.
- Set point and optimal condensation pressure differential (condensation and evaporation control)

Other functionalities ensured from the microprocessor are:

- Activating of preventive functions at extreme conditions of high pressure
- Activating of preventive functions at extreme conditions of low pressure
- Activation of preventive functions at limit conditions of high discharge temperature.
- Activating preventive functions at extreme conditions of low evaporator leaving water temperature.
- Activating preventive functions at extreme conditions of high evaporator inlet water temperature.
- Protection from unwanted changes of the parameters thanks of the use of password and systems to confirm the changed data.
- Indication of the unit status and the components status.
- Possibility to exclude each compressor for the maintenance.
- Possibility to change the set point by external analog signal.
- Possibility of ON/OFF remote signal through digital external signal.
- Communication with supervision systems (data and parameters exchange)
- Auto power on-off of the unit using time slots.
- Adjustment of the set point by time bands both with direct and reverse direction logic (Energy Saving).



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ACCESSORIES

- Built in air-conditioning circuit inverter circulator + hot water circuit inverter circulator (M)
- Remote control panel (L)
- High low tension limiting device + phase/voltage failure protection relé (M)
- Automatic water filling (L)
- Flow switch (L)
- Water strainer (L)
- Rubber anti vibration mounts (L)
- Epoxy coated condensing coil fins (M)
- Snow protection (M)

L:Loose

M:Mounted

STANDARD REFERENCES

THE PRESSURE EQUIPMENT DIRECTIVE (97/23/EC)

UNI EN ISO 3744 ACOUSTIC REGULATION

UNI-EN-ISO 9001:2008: QUALITY MANAGEMENT SYSTEMS

LOW VOLTAGE DIRECTIVE (LVD) 2006/95/EC.

MACHINERY DIRECTIVE 2006/42/EC

DIRECTIVE FOR ELECTROMAGNETIC COMPATIBILITY 2004/108/CE

CEI-EN 60204-1 DIRECTIVE (CEI44-5; CEI EN 62061) MACHINERY SAFETY – ELECTRIC MACHINERY – EQUIPMENTS

ERP DIRECTIVE (ENERGY-RELATED-PRODUCTS ECODESIGN 2009/125/CE)

UNI EN 14511-1-2-3-4 TESTING CONDITIONS.

CERTIFICATIONS

PED RELEASED FROM IMQ SPA - NOTIFIED BODY FOR REGULATION 97/23/EC (No. 0051)

ACCORDING TO THE FOLLOWING STATEMENTS:

- DECLARATION OF QUALITY SYSTEM APPROVAL - FORM H1 (QUALITY ASSURANCE WITH DESIGN CONTROL AND

MONITORING OF FINAL CHECK DETAIL): CERTIFICATE N. PEC-0051-1105003

- CERTIFICATES OF EXAMINATION OF THE PROJECT N. 0051-PEC-1105004/05/06/07/08

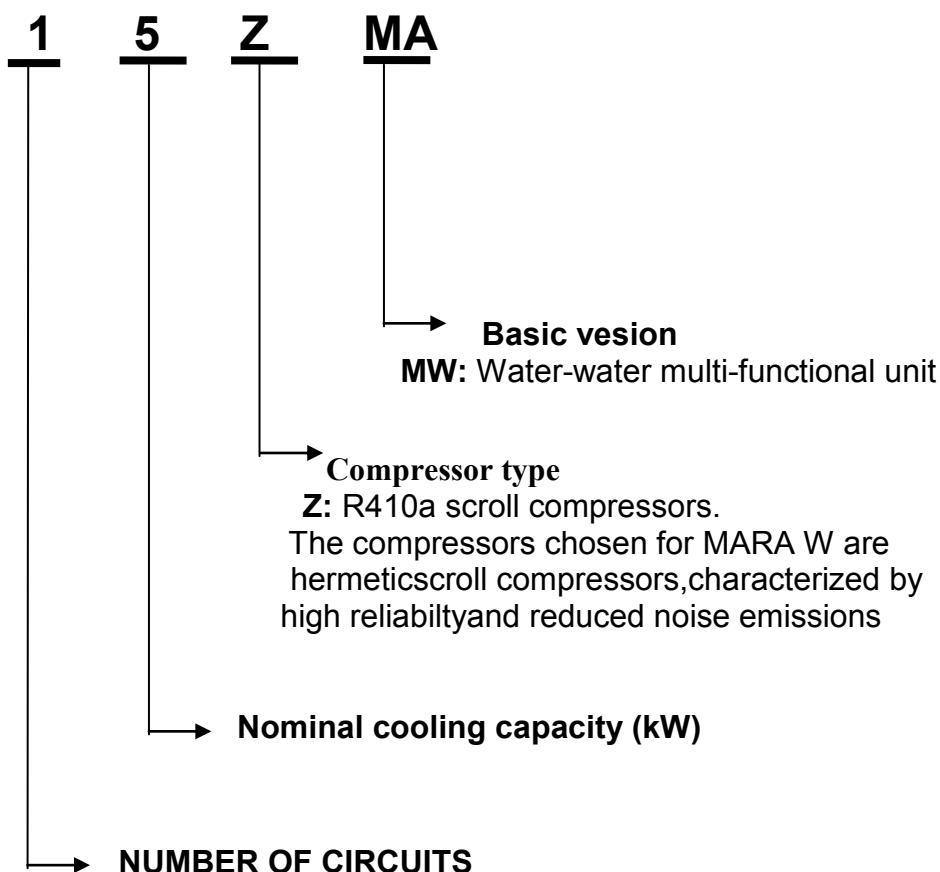
ACCORDING TO THE STANDARD QUALITY CERTIFICATION UNI EN ISO 9001:2008 ISSUED BY CSQ (ACCREDITED ACCREDIA)

CERTIFICATION OF PERFORMANCE UNIT BY MEANS OF TESTING TO PRESENT WHEN THE THIRD BODY - RINA SPA (OPTIONAL)

GOST - (OPTIONAL) FOR PRESSURE RECIPIENTS OF THE RUSSIAN FEDERATION.

IDENTIFICATION CODES

La codifica dei prodotti MARA è semplice in quanto le unità sono presenti in un unico allestimento e segue la codifica adottata da Thermocold per le altre unità:



TECHNICAL SPECIFICATIONS

CARATTERISTICA FEATURE	DESCRIZIONE DESCRIPTION	SPECIFICHE FUNZIONAMENTO OPERATING CONDITIONS					TAGLIA SIZE	TAGLIA SIZE	TAGLIA SIZE
		AE	CON	REC	EV	UM			
POTENZE NOMINALI NOMINAL CAPACITY	POTENZA FRIGORIFERA - COOLING CAPACITY	35			12/7	Kw	5,71	6,62	8,19
	POTENZA TERMICA - HEATING CAPACITY	7/6,2	40/45			Kw	7,02	7,86	9,48
	POTENZA TERMICA RECUPERO SANITARIO ESTIVA - SUMMER SANITARY RECOVERY HEATING POWER			40/45	12/7	Kw	7,46	8,52	10,58
	POTENZA TERMICA SANITARIO MEZZE STAGIONI - HEALTH SEASONS THERMAL POWER	15/10,8		40/45		Kw	9,56	10,70	12,90
	POTENZA TERMICA SANITARIO INVERNALE - WINTER SANITARY HEATING POWER	7/6,2		40/45		Kw	7,02	7,86	9,48
POTENZE ASSORBITE NOMINALI NOMINAL POWER INPUT	POTENZA ASSORBITA COMPRESSORI - COMPRESSORS INPUT	35			12/7	Kw	1,75	1,90	2,39
	POTENZA ASSORBITA COMPRESSORI - COMPRESSORS INPUT	7/6,2	40/45			Kw	1,97	2,21	2,73
	POTENZA ASSORBITA COMPRESSORI RECUPERO SANITARIO ESTIVA - COMPRESSOR POWER INPUT SUMMER SANITARY RECOVERY			40/45	12/7	Kw	1,75	1,90	2,39
	POTENZA ASSORBITA COMPRESSORI SANITARIO MEZZE STAGIONI - COMPRESSOR POWER INPUT HEALTH SEASONS SANITARY	15/10,8		40/45		Kw	2,20	2,47	3,05
	POTENZA ASSORBITA COMPRESSORI SANITARIO INVERNALE - COMPRESSOR POWER INPUT WINTER SANITARY	7/6,2		40/45		Kw	1,97	2,21	2,73
PRESTAZIONI ENERGETICHE ENERGETIC PERFORMANCE	EER SOLO FREDDO ESTATE - EER ONLY CHILLER DURING SUMMER	35			12/7		3,04	3,26	3,25
	COP POMPA DI CALORE UTENZE INVERNO - COP HEAT PUMP DURING WINTER	7/6,2	40/45				3,34	3,36	3,31
	EER FREDDO + SANITARIO ESTATE - EER CHILLER + HSW DURING SUMMER			40/45	12/7		7,53	7,97	7,85
	COP POMPA DI CALORE SANITARIO mezze stagioni - COP HEAT PUMP middle seasons	15/10,8		40/45			4,10	4,12	4,06
	COP POMPA DI CALORE SANITARIO INVERNO - COP HEAT PUMP WINTER SANITARY	7/6,2		40/45			3,34	3,36	3,31
	ESEER (1)						5,16	5,54	5,53
	TEP(Total efficiency performance)						8,44	8,83	8,71

AE temperatura aria esterna [°C](bulbo secco/bulbo umido) - Outdoor air temperature [°C](dry bulb/wet bulb)

CON temperatura acqua condensatore [°C] (IN/OUT) (RISCALDAMENTO) - Condenser water temperature [°C] (IN/OUT)

REC temperatura acqua recuperatore [°C] (IN/OUT) (A.C.S.) - Recovery water temperature [°C] (IN/OUT)(HSW)

EV temperatura acqua evaporatore [°C] (IN/OUT) (RAFFRESCAMENTO) - Evaporator water temperature IN/OUT (COOLING)

(1) ESEER SECONDO EUROVENT - ESEER ACCORDING TO EUROVENT

TECHNICAL SPECIFICATIONS

CARATTERISTICA FEATURE	DESCRIZIONE DESCRIPTION	SPECIFICHE FUNZIONAMENTO OPERATING CONDITIONS					TAGLIA SIZE	TAGLIA SIZE	TAGLIA SIZE
		AE	CON	REC	EV	UM			
POTENZE NOMINALI <i>NOMINAL CAPACITY</i>	POTENZA FRIGORIFERA - COOLING CAPACITY	35			12/7	Kw	14,17	14,61	16,72
	POTENZA TERMICA - HEATING CAPACITY	7/6,2	40/45			Kw	16,15	16,67	19,86
	POTENZA TERMICA RECUPERO SANITARIO ESTIVA - SUMMER SANITARY RECOVERY HEATING POWER			40/45	12/7	Kw	18,16	18,99	21,91
	POTENZA TERMICA SANITARIO MEZZE STAGIONI - HEALTH SEASONS THERMAL POWER	15/10,8		40/45		Kw	21,98	22,69	27,03
	POTENZA TERMICA SANITARIO INVERNIALE - WINTER SANITARY HEATING POWER	7/6,2		40/45		Kw	16,15	16,67	19,86
POTENZE ASSORBITE <i>NOMINAL POWER INPUT</i>	POTENZA ASSORBITA COMPRESSORI - COMPRESSORS INPUT	35			12/7	Kw	3,99	4,38	5,19
	POTENZA ASSORBITA COMPRESSORI - COMPRESSORS INPUT	7/6,2	40/45			Kw	4,28	4,60	5,62
	POTENZA ASSORBITA COMPRESSORI RECUPERO SANITARIO ESTIVA - COMPRESSOR POWER INPUT SUMMER SANITARY RECOVERY			40/45	12/7	Kw	3,99	4,38	5,19
	POTENZA ASSORBITA COMPRESSORI SANITARIO MEZZE STAGIONI - COMPRESSOR POWER INPUT HEALTH SEASONS SANITARY	15/10,8		40/45		Kw	4,77	5,13	6,27
	POTENZA ASSORBITA COMPRESSORI SANITARIO INVERNIALE - COMPRESSOR POWER INPUT WINTER SANITARY	7/6,2		40/45		Kw	4,28	4,60	5,62
PRESTAZIONI <i>ENERGETIC PERFORMANCE</i>	EER SOLO FREDDO ESTATE - EER ONLY CHILLER DURING SUMMER	35			12/7		3,33	3,15	3,07
	COP POMPA DI CALORE UTENZE INVERNO - COP HEAT PUMP DURING WINTER	7/6,2	40/45				3,56	3,43	3,38
	EER FREDDO + SANITARIO ESTATE - EER CHILLER + HSW DURING SUMMER			40/45	12/7		8,10	7,67	7,44
	COP POMPA DI CALORE SANITARIO mezze stagioni - COP HEAT PUMP middle seasons	15/10,8		40/45			4,37	4,21	4,14
	COP POMPA DI CALORE SANITARIO INVERNO - COP HEAT PUMP WINTER SANITARY	7/6,2		40/45			3,56	3,43	3,38
	ESEER (1)						5,67	5,35	5,22
	TEP(Total efficiency performance)						9,04	8,61	8,39

AE temperatura aria esterna [°C](bulbo secco/bulbo umido) - *Outdoor air temperature [°C](dry bulb/wet bulb)*CON temperatura acqua condensatore [°C] (IN/OUT) (RISCALDAMENTO) - *Condenser water temperature [°C] (IN/OUT)*REC temperatura acqua recuperatore [°C] (IN/OUT) (A.C.S.) - *Recovery water temperature [°C] (IN/OUT)(HSW)*EV temperatura acqua evaporatore [°C] (IN/OUT) (RAFFRESCAMENTO) - *Evaporator water temperature IN/OUT (COOLING)*(1) ESEER SECONDO EUROVENT - *ESEER ACCORDING TO EUROVENT*

TECHNICAL SPECIFICATIONS

CARATTERISTICA FEATURE	DESCRIZIONE DESCRIPTION	SPECIFICHE FUNZIONAMENTO OPERATING CONDITIONS					TAGLIA SIZE	TAGLIA SIZE	TAGLIA SIZE	
		AE	CON	REC	EV	UM	119	123	126	
POTENZE NOMINALI NOMINAL CAPACITY	POTENZA FRIGORIFERA - COOLING CAPACITY	35				12/7	Kw	20,33	22,36	28,31
	POTENZA TERMICA - HEATING CAPACITY	7/6,2	40/45				Kw	23,64	26,61	31,34
	POTENZA TERMICA RECUPERO SANITARIO ESTIVA - SUMMER SANITARY RECOVERY HEATING POWER			40/45	12/7	Kw	26,38	29,22	36,26	
	POTENZA TERMICA SANITARIO MEZZE STAGIONI - HEALTH SEASONS THERMAL POWER	15/10,8		40/45		Kw	32,18	36,22	40,19	
	POTENZA TERMICA SANITARIO INVERNALE - WINTER SANITARY HEATING POWER	7/6,2		40/45		Kw	23,64	26,61	31,34	
POTENZE ASSORBITE NOMINALI NOMINAL POWER INPUT	POTENZA ASSORBITA COMPRESSORI - COMPRESSORS INPUT	35			12/7	Kw	6,05	6,86	7,95	
	POTENZA ASSORBITA COMPRESSORI - COMPRESSORS INPUT	7/6,2	40/45			Kw	6,55	7,25	8,34	
	POTENZA ASSORBITA COMPRESSORI RECUPERO SANITARIO ESTIVA - COMPRESSOR POWER INPUT SUMMER SANITARY RECOVERY			40/45	12/7	Kw	6,05	6,86	7,95	
	POTENZA ASSORBITA COMPRESSORI SANITARIO MEZZE STAGIONI - COMPRESSOR POWER INPUT HEALTH SEASONS SANITARY	15/10,8		40/45		Kw	7,31	8,09	9,52	
	POTENZA ASSORBITA COMPRESSORI SANITARIO INVERNALE - COMPRESSOR POWER INPUT WINTER SANITARY	7/6,2		40/45		Kw	6,55	7,25	8,34	
PRESTAZIONI ENERGETICHE ENERGETIC PERFORMANCE	EER SOLO FREDDO ESTATE - EER ONLY CHILLER DURING SUMMER	35			12/7		3,08	3,02	3,09	
	COP POMPA DI CALORE UTENZE INVERNO - COP HEAT PUMP DURING WINTER	7/6,2	40/45				3,33	3,42	3,29	
	EER FREDDO + SANITARIO ESTATE - EER CHILLER + HSW DURING SUMMER			40/45	12/7		7,72	7,52	8,12	
	COP POMPA DI CALORE SANITARIO mezze stagioni - COP HEAT PUMP middle seasons	15/10,8		40/45			4,10	4,20	3,75	
	COP POMPA DI CALORE SANITARIO INVERNO - COP HEAT PUMP WINTER SANITARY	7/6,2		40/45			3,33	3,42	3,29	
	ESEER (1)						5,24	5,14	5,26	
	TEP(Total efficiency performance)						8,60	8,47	8,92	

AE temperatura aria esterna [°C](bulbo secco/bulbo umido) - Outdoor air temperature [°C](dry bulb/wet bulb)

CON temperatura acqua condensatore [°C] (IN/OUT) (RISCALDAMENTO) - Condenser water temperature [°C] (IN/OUT)

REC temperatura acqua recuperatore [°C] (IN/OUT) (A.C.S.) - Recovery water temperature [°C] (IN/OUT)(HSW)

EV temperatura acqua evaporatore [°C] (IN/OUT) (RAFFRESCAMENTO) - Evaporator water temperature IN/OUT (COOLING)

(1) ESEER SECONDO EUROVENT - ESEER ACCORDING TO EUROVENT

TECHNICAL SPECIFICATIONS

CARATTERISTICA FEATURE	DESCRIZIONE DESCRIPTION	SPECIFICHE FUNZIONAMENTO OPERATING CONDITIONS					TAGLIA SIZE	TAGLIA SIZE
		AE	CON	REC	EV	UM	132	140
POTENZE NOMINALI NOMINAL CAPACITY	POTENZA FRIGORIFERA - COOLING CAPACITY	35			12/7	Kw	34,83	39,22
	POTENZA TERMICA - HEATING CAPACITY	7/6,2	40/45			Kw	39,73	44,90
	POTENZA TERMICA RECUPERO SANITARIO ESTIVA - SUMMER SANITARY RECOVERY HEATING POWER			40/45	12/7	Kw	44,80	50,85
	POTENZA TERMICA SANITARIO MEZZE STAGIONI - HEALTH SEASONS THERMAL POWER	15/10,8		40/45		Kw	51,49	58,76
	POTENZA TERMICA SANITARIO INVERNIALE - WINTER SANITARY HEATING POWER	7/6,2		40/45		Kw	39,73	44,90
POTENZE ASSORBITE NOMINALI NOMINAL POWER INPUT	POTENZA ASSORBITA COMPRESSORI - COMPRESSORS INPUT	35			12/7	Kw	9,97	11,63
	POTENZA ASSORBITA COMPRESSORI - COMPRESSORS INPUT	7/6,2	40/45			Kw	10,75	12,15
	POTENZA ASSORBITA COMPRESSORI RECUPERO SANITARIO ESTIVA - COMPRESSOR POWER INPUT SUMMER SANITARY RECOVERY			40/45	12/7	Kw	9,97	11,63
	POTENZA ASSORBITA COMPRESSORI SANITARIO MEZZE STAGIONI - COMPRESSOR POWER INPUT HEALTH SEASONS SANITARY	15/10,8		40/45		Kw	12,45	13,71
	POTENZA ASSORBITA COMPRESSORI SANITARIO INVERNIALE - COMPRESSOR POWER INPUT WINTER SANITARY	7/6,2		40/45		Kw	10,75	12,15
PRESTAZIONI ENERGETICHE ENERGETIC PERFORMANCE	EER SOLO FREDDO ESTATE - EER ONLY CHILLER DURING SUMMER	35			12/7		3,12	3,06
	COP POMPA DI CALORE UTENZE INVERNO - COP HEAT PUMP DURING WINTER	7/6,2	40/45				3,32	3,36
	EER FREDDO + SANITARIO ESTATE - EER CHILLER + HSW DURING SUMMER			40/45	12/7		7,99	7,74
	COP POMPA DI CALORE SANITARIO mezze stagioni - COP HEAT PUMP middle seasons	15/10,8		40/45			3,77	3,94
	COP POMPA DI CALORE SANITARIO INVERNIALE - COP HEAT PUMP WINTER SANITARY	7/6,2		40/45			3,32	3,36
	ESEER (1)						5,30	5,20
	TEP(Total efficiency performance)						8,82	8,64

AE temperatura aria esterna [°C](bulbo secco/bulbo umido) - Outdoor air temperature [°C](dry bulb/wet bulb)

CON temperatura acqua condensatore [°C] (IN/OUT) (RISCALDAMENTO) - Condenser water temperature [°C] (IN/OUT)

REC temperatura acqua recuperatore [°C] (IN/OUT) (A.C.S.) - Recovery water temperature [°C] (IN/OUT)(HSW)

EV temperatura acqua evaporatore [°C] (IN/OUT) (RAFFRESCAMENTO) - Evaporator water temperature IN/OUT (COOLING)

(1) ESEER SECONDO EUROVENT - ESEER ACCORDING TO EUROVENT

TECHNICAL SPECIFICATIONS

CARATTERISTICA FEATURE	DESCRIZIONE DESCRIPTION	UM	TAGLIA SIZE 15	TAGLIA SIZE 16	TAGLIA SIZE 18
VOLUME ACCUMULI MINIMI <i>WATER STORAGE MINIMUM CAPACITY</i>	ACCUMULO ACQUA FREDDA UTENZE ESTATE / INVERNO - COLD WATER STORAGE SUMMER WINTER UTILITIES	lt	60,00	60,00	80,00
	ACCUMULO ACQUA CALDA SANITARIA - HOT WATER STORAGE	lt	60,00	60,00	80,00
PORTATE ACQUA NOMINALI SCAMBIATORI NOMINAL HEAT EXCHANGER WATER FLOW RATE	PORTATA ACQUA FREDDA ESTATE UTENZE FREDDDE - COLD WATER FLOW RATE	mch	0,98	1,14	1,41
	PERDITA DI CARICO - PRESSURE DROP	kPa	22,79	25,66	33,03
	PREVALENZA UTILE CIRCOLATORE - EXTERNAL STATIC PRESSURE	kPa	49,00	45,00	36,00
SCAMBIATORE AD ACQUA DI RECUPERO PER ACS RECOVERY HEAT EXCHANGER FOR H.S.W.	PORTATA ACQUA CALDA SANITARIA SULLO SCAMBIATORE DI RECUPERO CONDIZIONI NOMINALI T IN 40°C T OUT 45°C - HOT SANITARY WATER FLOW RATE ON RECOVERY EXCHANGER IN NOMINAL CONDITION T IN 40°C T OUT 45°C	mch	1,28	1,47	1,82
	PERDITA DI CARICO - PRESSURE DROP	kPa	29,84	31,06	33,18
	PREVALENZA UTILE CIRCOLATORE - AVAILABLE PUMP HEAD PRESSURE	kPa	40,00	37,00	32,00
PORTATE ACQUA DI UTILIZZO A.C.S. H.S.W FLOW RATE	PORTATE ISTANTANEE DI UTILIZZO ACQUA CALDA SANITARIA DELTA T 30°C T IN 15°C - T OUT 45°C CON T EST 0°C 90%UR- SANITARY HOT WATER FLOW RATE THERMAL GRADIENT 30°C T IN 15°C T OUT 45°C WITH T EXT 7°C 90%UR	LMIN	3,35	3,76	4,53
	PORTATE ISTANTANEE DI UTILIZZO ACQUA CALDA SANITARIA DELTA T 30°C T IN 15°C - T OUT 45°C CON T EST 7°C 90%UR- SANITARY HOT WATER FLOW RATE THERMAL GRADIENT 30°C T IN 15°C T OUT 45°C WITH T EXT 0°C 90%UR	LMIN	2,68	3,00	3,62
	PORTATE ISTANTANEE DI UTILIZZO ACQUA CALDA SANITARIA DELTA T 45°C T IN 15°C - T OUT 60°C CON T EST 7°C 90%UR- SANITARY HOT WATER FLOW RATE THERMAL GRADIENT 45°C T IN 15°C T OUT 60°C WITH T EXT 7°C 90%UR	LMIN	1,88	2,10	2,54
	PORTATE ISTANTANEE DI UTILIZZO ACQUA CALDA SANITARIA DELTA T 45°C T IN 15°C - T OUT 60°C CON T EST 0°C 90%UR- SANITARY HOT WATER FLOW RATE THERMAL GRADIENT 45°C T IN 15°C T OUT 60°C WITH T EXT 0°C 90%UR	LMIN	1,50	1,68	2,03
TEMPI DI RIGENERAZIONE ACCUMULI WATER TANK REGENERATION TIME	TEMPO DI RIGENERAZIONE DEL SERBATOIO SANITARIO DALLA TEMP DI 30°C ALLA TEMP DI 45°C CON T EST 7°C UR 90% - WATER TANK REGENERATION TIME FROM 30°C UP TO 45°C WITH T EXT 7°C UR 90%	MIN'	8,94	7,99	8,83
	TEMPO DI RIGENERAZIONE DEL SERBATOIO SANITARIO DALLA TEMP DI 30°C ALLA TEMP DI 45°C CON T EST 0°C UR 90% - WATER TANK REGENERATION TIME FROM 30°C UP TO 45°C WITH T EXT 0°C UR 90%	MIN'	11,18	9,99	11,04
	TEMPO DI RIGENERAZIONE DEL SERBATOIO SANITARIO DALLA TEMP DI 30°C ALLA TEMP DI 60°C CON T EST 7°C UR 90% - WATER TANK REGENERATION TIME FROM 30°C UP TO 60°C WITH T EXT 7°C UR 90%	MIN'	17,89	15,98	17,66
	TEMPO DI RIGENERAZIONE DEL SERBATOIO SANITARIO DALLA TEMP DI 30°C ALLA TEMP DI 60°C CON T EST 0°C UR 90% - WATER TANK REGENERATION TIME FROM 30°C UP TO 60°C WITH T EXT 0°C UR 90%	MIN'	22,36	19,97	22,08
SCAMBIATORE AD ARIA AIR EXCHANGER	NUMERO VENTILATORI - NUMBER OF FANS		1,00	1,00	1,00
	PORTATA ARIA - AIRFLOW	mch	3.175,00	3.175,00	3.175,00
	POTENZA ASSORBITA VENTILATORI - POWER INPUT FANS	kW	0,13	0,13	0,13

TECHNICAL SPECIFICATIONS

CARATTERISTICA FEATURE	DESCRIZIONE DESCRIPTION	UM	TAGLIA SIZE 114	TAGLIA SIZE 115	TAGLIA SIZE 117
VOLUME ACCUMULI MINIMI <i>WATER STORAGE MINIMUM CAPACITY</i>	ACCUMULO ACQUA FREDDA UTENZE ESTATE / INVERNO - COLD WATER STORAGE SUMMER WINTER UTILITIES	lt	150,00	150,00	150,00
	ACCUMULO ACQUA CALDA SANITARIA - HOT WATER STORAGE	lt	150,00	150,00	150,00
PORTATE ACQUA NOMINALI <i>SCAMBIATORI NOMINAL HEAT EXCHANGER WATER FLOW RATE</i>	PORTATA ACQUA FREDDA ESTATE UTENZE FREDDHE - COLD WATER FLOW RATE	mch	2,44	2,51	2,88
	PERDITA DI CARICO - PRESSURE DROP	kPa	40,87	41,18	49,26
	PREVALENZA UTILE CIRCOLATORE - EXTERNAL STATIC PRESSURE	kPa	52,00	51,00	40,00
SCAMBIATORE AD ACQUA DI RECUPERO <i>PER ACS RECOVERY HEAT EXCHANGER FOR HSW</i>	PORTATA ACQUA CALDA SANITARIA SULLO SCAMBIATORE DI RECUPERO CONDIZIONI NOMINALI T IN 40°C T OUT 45°C - HOT SANITARY WATER FLOW RATE ON RECOVERY EXCHANGER IN NOMINAL CONDITION T IN 40°C T OUT 45°C	mch	3,12	3,27	3,77
	PERDITA DI CARICO - PRESSURE DROP	kPa	36,40	36,86	36,66
	PREVALENZA UTILE CIRCOLATORE - AVAILABLE PUMP HEAD PRESSURE	kPa	51,00	49,00	45,00
PORTATE ACQUA DI UTILIZZO A.C.S. <i>HSW FLOW RATE</i>	PORTATE ISTANTANEE DI UTILIZZO ACQUA CALDA SANITARIA DELTA T 30°C T IN 15°C - T OUT 45°C CON T EST 0°C 90%UR- SANITARY HOT WATER FLOW RATE THERMAL GRADIENT 30°C T IN 15°C T OUT 45°C WITH T EXT 7°C 90%UR	LMIN	7,72	7,96	9,49
	PORTATE ISTANTANEE DI UTILIZZO ACQUA CALDA SANITARIA DELTA T 30°C T IN 15°C - T OUT 45°C CON T EST 7°C 90%UR- SANITARY HOT WATER FLOW RATE THERMAL GRADIENT 30°C T IN 15°C T OUT 45°C WITH T EXT 0°C 90%UR	LMIN	6,17	6,37	7,59
	PORTATE ISTANTANEE DI UTILIZZO ACQUA CALDA SANITARIA DELTA T 45°C T IN 15°C - T OUT 60°C CON T EST 7°C 90%UR- SANITARY HOT WATER FLOW RATE THERMAL GRADIENT 45°C T IN 15°C T OUT 60°C WITH T EXT 7°C 90%UR	LMIN	4,32	4,46	5,31
	PORTATE ISTANTANEE DI UTILIZZO ACQUA CALDA SANITARIA DELTA T 45°C T IN 15°C - T OUT 60°C CON T EST 0°C 90%UR- SANITARY HOT WATER FLOW RATE THERMAL GRADIENT 45°C T IN 15°C T OUT 60°C WITH T EXT 0°C 90%UR	LMIN	3,46	3,57	4,25
TEMPI DI RIGENERAZIONE ACCUMULI <i>WATER TANK REGENERATION TIME</i>	TEMPO DI RIGENERAZIONE DEL SERBATOIO SANITARIO DALLA TEMP DI 30°C ALLA TEMP DI 45°C CON T EST 7°C UR 90% - WATER TANK REGENERATION TIME FROM 30°C UP TO 45°C WITH T EXT 7°C UR 90%	MIN'	9,72	9,42	7,90
	TEMPO DI RIGENERAZIONE DEL SERBATOIO SANITARIO DALLA TEMP DI 30°C ALLA TEMP DI 45°C CON T EST 0°C UR 90% - WATER TANK REGENERATION TIME FROM 30°C UP TO 45°C WITH T EXT 0°C UR 90%	MIN'	12,15	11,77	9,88
	TEMPO DI RIGENERAZIONE DEL SERBATOIO SANITARIO DALLA TEMP DI 30°C ALLA TEMP DI 60°C CON T EST 7°C UR 90% - WATER TANK REGENERATION TIME FROM 30°C UP TO 60°C WITH T EXT 7°C UR 90%	MIN'	19,44	18,83	15,81
	TEMPO DI RIGENERAZIONE DEL SERBATOIO SANITARIO DALLA TEMP DI 30°C ALLA TEMP DI 60°C CON T EST 0°C UR 90% - WATER TANK REGENERATION TIME FROM 30°C UP TO 60°C WITH T EXT 0°C UR 90%	MIN'	24,30	23,54	19,76
SCAMBIATORE AD ARIA <i>AIR EXCHANGER</i>	NUMERO VENTILATORI - NUMBER OF FANS		2,00	2,00	2,00
	PORTATA ARIA - AIRFLOW	mch	6.328,00	6.108,00	5.140,00
	POTENZA ASSORBITA VENTILATORI - POWER INPUT FANS	kW	0,13	0,13	0,13

TECHNICAL SPECIFICATIONS

CARATTERISTICA FEATURE	DESCRIZIONE DESCRIPTION	UM	TAGLIA SIZE 119	TAGLIA SIZE 123	TAGLIA SIZE 126
VOLUME ACCUMULI MINIMI <i>WATER STORAGE MINIMUM CAPACITY</i>	ACCUMULO ACQUA FREDDA UTENZE ESTATE / INVERNO - COLD WATER STORAGE SUMMER WINTER UTILITIES	lt	200,00	250,00	250,00
	ACCUMULO ACQUA CALDA SANITARIA - HOT WATER STORAGE	lt	200,00	250,00	250,00
PORTATE ACQUA NOMINALI <i>SCAMBIATORI NOMINAL HEAT EXCHANGER WATER FLOW RATE</i>	PORTATA ACQUA FREDDA ESTATE UTENZE FREDDDE - COLD WATER FLOW RATE	mch	3,50	3,85	4,87
	PERDITA DI CARICO - PRESSURE DROP	kPa	43,02	51,39	25,59
	PREVALENZA UTILE CIRCOLATORE - EXTERNAL STATIC PRESSURE	kPa	41,00	61,00	196,00
SCAMBIATORE AD ACQUA DI RECUPERO <i>RECOVERY HEAT EXCHANGER FOR HSW</i>	PORTATA ACQUA CALDA SANITARIA SULLO SCAMBIATORE DI RECUPERO CONDIZIONI NOMINALI T IN 40°C T OUT 45°C - HOT SANITARY WATER FLOW RATE ON RECOVERY EXCHANGER IN NOMINAL CONDITION T IN 40°C T OUT 45°C	mch	4,54	5,03	6,24
	PERDITA DI CARICO - PRESSURE DROP	kPa	36,05	37,65	32,73
	PREVALENZA UTILE CIRCOLATORE - AVAILABLE PUMP HEAD PRESSURE	kPa	37,00	18,00	139,00
PORTATE ACQUA DI UTILIZZO A.C.S. <i>HSW FLOW RATE</i>	PORTATE ISTANTANEE DI UTILIZZO ACQUA CALDA SANITARIA DELTA T 30°C T IN 15°C - T OUT 45°C CON T EST 0°C 90%UR- SANITARY HOT WATER FLOW RATE THERMAL GRADIENT 30°C T IN 15°C T OUT 45°C WITH T EXT 7°C 90%UR	LMIN	11,29	12,71	14,97
	PORTATE ISTANTANEE DI UTILIZZO ACQUA CALDA SANITARIA DELTA T 30°C T IN 15°C - T OUT 45°C CON T EST 7°C 90%UR- SANITARY HOT WATER FLOW RATE THERMAL GRADIENT 30°C T IN 15°C T OUT 45°C WITH T EXT 0°C 90%UR	LMIN	9,04	10,17	11,98
	PORTATE ISTANTANEE DI UTILIZZO ACQUA CALDA SANITARIA DELTA T 45°C T IN 15°C - T OUT 60°C CON T EST 7°C 90%UR- SANITARY HOT WATER FLOW RATE THERMAL GRADIENT 45°C T IN 15°C T OUT 60°C WITH T EXT 7°C 90%UR	LMIN	6,33	7,12	8,39
	PORTATE ISTANTANEE DI UTILIZZO ACQUA CALDA SANITARIA DELTA T 45°C T IN 15°C - T OUT 60°C CON T EST 0°C 90%UR- SANITARY HOT WATER FLOW RATE THERMAL GRADIENT 45°C T IN 15°C T OUT 60°C WITH T EXT 0°C 90%UR	LMIN	5,06	5,70	6,71
TEMPI DI RIGENERAZIONE ACCUMULI <i>WATER TANK REGENERATION TIME</i>	TEMPO DI RIGENERAZIONE DEL SERBATOIO SANITARIO DALLA TEMP DI 30°C ALLA TEMP DI 45°C CON T EST 7°C UR 90% - WATER TANK REGENERATION TIME FROM 30°C UP TO 45°C WITH T EXT 7°C UR 90%	MIN'	8,85	9,83	8,35
	TEMPO DI RIGENERAZIONE DEL SERBATOIO SANITARIO DALLA TEMP DI 30°C ALLA TEMP DI 45°C CON T EST 0°C UR 90% - WATER TANK REGENERATION TIME FROM 30°C UP TO 45°C WITH T EXT 0°C UR 90%	MIN'	11,07	12,29	10,43
	TEMPO DI RIGENERAZIONE DEL SERBATOIO SANITARIO DALLA TEMP DI 30°C ALLA TEMP DI 60°C CON T EST 7°C UR 90% - WATER TANK REGENERATION TIME FROM 30°C UP TO 60°C WITH T EXT 7°C UR 90%	MIN'	17,71	19,66	16,70
	TEMPO DI RIGENERAZIONE DEL SERBATOIO SANITARIO DALLA TEMP DI 30°C ALLA TEMP DI 60°C CON T EST 0°C UR 90% - WATER TANK REGENERATION TIME FROM 30°C UP TO 60°C WITH T EXT 0°C UR 90%	MIN'	22,13	24,58	20,87
SCAMBIATORE AD ARIA <i>AIR EXCHANGER</i>	NUMERO VENTILATORI - NUMBER OF FANS		2,00	2,00	2,00
	PORTATA ARIA - AIRFLOW	mch	5.580,00	7.180,00	7.180,00
	POTENZA ASSORBITA VENTILATORI - POWER INPUT FANS	kW	0,27	0,27	0,60

TECHNICAL SPECIFICATIONS

CARATTERISTICA FEATURE	DESCRIZIONE DESCRIPTION	UM	TAGLIA SIZE	TAGLIA SIZE
VOLUME ACCUMULI MINIMI <i>WATER STORAGE MINIMUM CAPACITY</i>	ACCUMULO ACQUA FREDDA UTENZE ESTATE / INVERNO - COLD WATER STORAGE SUMMER WINTER UTILITIES	lt	320,00	390,00
	ACCUMULO ACQUA CALDA SANITARIA - HOT WATER STORAGE	lt	320,00	390,00
PORTATE ACQUA NOMINALI SCAMBIATORI <i>NOMINAL HEAT EXCHANGER WATER FLOW RATE</i>	PORTATA ACQUA FREDDA ESTATE UTENZE FREDDA - COLD WATER FLOW RATE	mch	5,99	6,75
	PERDITA DI CARICO - PRESSURE DROP	kPa	32,25	36,07
	PREVALENZA UTILE CIRCOLATORE - EXTERNAL STATIC PRESSURE	kPa	149,00	114,00
SCAMBIATORE AD ACQUA DI RECUPERO <i>RECOVERY HEAT EXCHANGER FOR H.W.</i>	PORTATA ACQUA CALDA SANITARIA SULLO SCAMBIATORE DI RECUPERO CONDIZIONI NOMINALI T IN 40°C T OUT 45°C - HOT SANITARY WATER FLOW RATE ON RECOVERY EXCHANGER IN NOMINAL CONDITION T IN 40°C T OUT 45°C	mch	7,71	8,75
	PERDITA DI CARICO - PRESSURE DROP	kPa	34,72	33,35
	PREVALENZA UTILE CIRCOLATORE - AVAILABLE PUMP HEAD PRESSURE	kPa	70,00	16,00
PORTATE ACQUA DI UTILIZZO A.C.S. <i>H.W. FLOW RATE</i>	PORTATE ISTANTANEE DI UTILIZZO ACQUA CALDA SANITARIA DELTA T 30°C T IN 15°C - T OUT 45°C CON T EST 0°C 90%UR- SANITARY HOT WATER FLOW RATE THERMAL GRADIENT 30°C T IN 15°C T OUT 45°C WITH T EXT 7°C 90%UR	LMIN	18,98	21,45
	PORTATE ISTANTANEE DI UTILIZZO ACQUA CALDA SANITARIA DELTA T 30°C T IN 15°C - T OUT 45°C CON T EST 7°C 90%UR- SANITARY HOT WATER FLOW RATE THERMAL GRADIENT 30°C T IN 15°C T OUT 45°C WITH T EXT 0°C 90%UR	LMIN	15,19	17,16
	PORTATE ISTANTANEE DI UTILIZZO ACQUA CALDA SANITARIA DELTA T 45°C T IN 15°C - T OUT 60°C CON T EST 7°C 90%UR- SANITARY HOT WATER FLOW RATE THERMAL GRADIENT 45°C T IN 15°C T OUT 60°C WITH T EXT 7°C 90%UR	LMIN	10,63	12,01
	PORTATE ISTANTANEE DI UTILIZZO ACQUA CALDA SANITARIA DELTA T 45°C T IN 15°C - T OUT 60°C CON T EST 0°C 90%UR- SANITARY HOT WATER FLOW RATE THERMAL GRADIENT 45°C T IN 15°C T OUT 60°C WITH T EXT 0°C 90%UR	LMIN	8,50	9,61
TEMPI DI RIGENERAZIONE ACCUMULI <i>WATER TANK REGENERATION TIME</i>	TEMPO DI RIGENERAZIONE DEL SERBATOIO SANITARIO DALLA TEMP DI 30°C ALLA TEMP DI 45°C CON T EST 7°C UR 90% - WATER TANK REGENERATION TIME FROM 30°C UP TO 45°C WITH T EXT 7°C UR 90%	MIN'	8,43	9,09
	TEMPO DI RIGENERAZIONE DEL SERBATOIO SANITARIO DALLA TEMP DI 30°C ALLA TEMP DI 45°C CON T EST 0°C UR 90% - WATER TANK REGENERATION TIME FROM 30°C UP TO 45°C WITH T EXT 0°C UR 90%	MIN'	10,54	11,36
	TEMPO DI RIGENERAZIONE DEL SERBATOIO SANITARIO DALLA TEMP DI 30°C ALLA TEMP DI 60°C CON T EST 7°C UR 90% - WATER TANK REGENERATION TIME FROM 30°C UP TO 60°C WITH T EXT 7°C UR 90%	MIN'	16,86	18,18
	TEMPO DI RIGENERAZIONE DEL SERBATOIO SANITARIO DALLA TEMP DI 30°C ALLA TEMP DI 60°C CON T EST 0°C UR 90% - WATER TANK REGENERATION TIME FROM 30°C UP TO 60°C WITH T EXT 0°C UR 90%	MIN'	21,07	22,72
SCAMBIATORE AD ARIA <i>AIR EXCHANGER</i>	NUMERO VENTILATORI - NUMBER OF FANS		2,00	2,00
	PORTATA ARIA - AIRFLOW	mch	9.195,00	13.742,00
	POTENZA ASSORBITA VENTILATORI - POWER INPUT FANS	kW	0,60	0,60

TECHNICAL SPECIFICATIONS

CARATTERISTICA FEATURE	DESCRIZIONE DESCRIPTION		TAGLIA SIZE	TAGLIA SIZE	TAGLIA SIZE
		UM	15	16	18
COMPRESSORI COMPRESSORS	NUMERO COMPRESSORI - COMPRESSOR NUMBER		1	1	1
	CIRCUITI FRIGORIFERI - REFRIGERANT CIRCUITS		1	1	1
	GRADINI DI PARZIALIZZAZIONE - CIRCUIT STEPS		1	1	1
	CARICA REFRIGERANTE - REFRIGERANT CHARGE	kg	1,5	1,6	2,0
	CARICA OLIO - OIL CHARGE	lt	0,7	1,1	1,7
DATI ELETTRICI ELECTRICAL DATA	FLI MAX	kW	5,2	6,1	7,0
	FLA MAX	A	9,4	11,3	12,1
	SA MAX	A	43,64	72,6	62,6
	FLI MAX SINGOLO CIRCOLATORE - SINGLE CIRCULATOR FLI MAX	kW	0,13	0,13	0,13
	FLA MAX SINGOLO CIRCOLATORE - SINGLE CIRCULATOR FLA MAX	A	1,2	1,2	1,2
	alimentazione elettrica standard - ELECTRIC POWER STANDARD		230V / 1PH / 50HZ		
DATI ACUSTICI ACUSTIC DATA	LIVELLO DI PRESSIONE SONORA A 5 M - SOUND PRESSURE LEVEL AT 5M DISTANCE	dBA	44	44	44
	LIVELLO DI POTENZA SONORA - SOUND POWER LEVEL	dBA	69	69	69
DIMENSIONI E PESI DIMENSIONS AND WEIGHT	LUNGHEZZA - LENGTH		1110	1110	1110
	LARGHEZZA - WIDTH		590	590	590
	ALTEZZA - HEIGHT		980	980	980
	PESO IN FUNZIONAMENTO - OPERATING WEIGHTS		117	119	122

TECHNICAL SPECIFICATIONS

CARATTERISTICA FEATURE	DESCRIZIONE DESCRIPTION		TAGLIA SIZE	TAGLIA SIZE	TAGLIA SIZE
		UM	114	115	117
COMPRESSORI COMPRESSORS	NUMERO COMPRESSORI - COMPRESSOR NUMBER		1	1	1
	CIRCUITI FRIGORIFERI - REFRIGERANT CIRCUITS		1	1	1
	GRADINI DI PARZIALIZZAZIONE - CIRCUIT STEPS		1	1	1
	CARICA REFRIGERANTE - REFRIGERANT CHARGE	kg	2,6	3,2	3,6
	CARICA OLIO - OIL CHARGE	lt	1,7	1,7	1,7
DATI ELETTRICI ELECTRICAL DATA	FLI MAX	kW	5,6	5,8	6,9
	FLA MAX	A	11	11	13
	SA MAX	A	64,2	64,2	67,2
	FLI MAX SINGOLO CIRCOLATORE - SINGLE CIRCULATOR FLI MAX	kW	0,13	0,13	0,13
	FLA MAX SINGOLO CIRCOLATORE - SINGLE CIRCULATOR FLA MAX	A	1,2	1,2	1,2
	alimentazione elettrica standard - ELETTRIC POWER STANDARD		400V / 3PH / 50HZ		
DATI ACUSTICI ACUSTIC DATA	LIVELLO DI PRESSIONE SONORA A 5 M - SOUND PRESSURE LEVEL AT 5M DISTANCE	dBA	47	49	49
	LIVELLO DI POTENZA SONORA - SOUND POWER LEVEL	dBA	72	74	74
DIMENSIONI E PESI DIMENSIONS AND WEIGHT	LUNGHEZZA - LENGTH		1300	1300	1300
	LARGHEZZA - WIDTH		590	590	590
	ALTEZZA - HEIGHT		1635	1635	1635
	PESO IN FUNZIONAMENTO - OPERATING WEIGHTS		155	170	177

TECHNICAL SPECIFICATIONS

CARATTERISTICA FEATURE	DESCRIZIONE DESCRIPTION		TAGLIA SIZE	TAGLIA SIZE	TAGLIA SIZE
		UM	119	123	126
COMPRESSORI COMPRESSORS	NUMERO COMPRESSORI - COMPRESSOR NUMBER		1	1	1
	CIRCUITI FRIGORIFERI - REFRIGERANT CIRCUITS		1	1	1
	GRADINI DI PARZIALIZZAZIONE - CIRCUIT STEPS		1	1	1
	CARICA REFRIGERANTE - REFRIGERANT CHARGE	kg	3,8	4,6	6,6
	CARICA OLIO - OIL CHARGE	lt	1,7	2,8	2,8
DATI ELETTRICI ELECTRICAL DATA	FLI MAX	kW	8,5	8,8	11,3
	FLA MAX	A	16,4	17,7	23,8
	SA MAX	A	75,4	101,4	161,2
	FLI MAX SINGOLO CIRCOLATORE - SINGLE CIRCULATOR FLI MAX	kW	0,45	0,45	0,45
	FLA MAX SINGOLO CIRCOLATORE - SINGLE CIRCULATOR FLA MAX	A	2	2	2
	alimentazione elettrica standard - ELECTRIC POWER STANDARD		400V / 3PH / 50HZ		
DATI ACUSTICI ACUSTIC DATA	LIVELLO DI PRESSIONE SONORA A 5 M - SOUND PRESSURE LEVEL AT 5M DISTANCE	dBA	50	49	49
	LIVELLO DI POTENZA SONORA - SOUND POWER LEVEL	dBA	75	74	74
DIMENSIONI E PESI DIMENSIONS AND WEIGHT	LUNGHEZZA - LENGTH		1300	1300	1800
	LARGHEZZA - WIDTH		590	590	590
	ALTEZZA - HEIGHT		1635	1635	1635
	PESO IN FUNZIONAMENTO - OPERATING WEIGHTS		191	202	290

TECHNICAL SPECIFICATIONS

CARATTERISTICA FEATURE	DESCRIZIONE DESCRIPTION	UM	TAGLIA SIZE	TAGLIA SIZE
			132	140
COMPRESSORI COMPRESSORS	NUMERO COMPRESSORI - COMPRESSOR NUMBER		1	1
	CIRCUITI FRIGORIFERI - REFRIGERANT CIRCUITS		1	1
	GRADINI DI PARZIALIZZAZIONE - CIRCUIT STEPS		1	1
	CARICA REFRIGERANTE - REFRIGERANT CHARGE	kg	7,4	7,9
	CARICA OLIO - OIL CHARGE	lt	3,3	3,3
DATI ELETTRICI ELECTRICAL DATA	FLI MAX	kW	12,1	15,7
	FLA MAX	A	25,3	30,5
	SA MAX	A	135,2	163,2
	FLI MAX SINGOLO CIRCOLATORE - SINGLE CIRCULATOR FLI MAX	kW	1,1	1,1
	FLA MAX SINGOLO CIRCOLATORE - SINGLE CIRCULATOR FLA MAX	A	4	4
	alimentazione elettrica standard - ELECTRIC POWER STANDARD		400V / 3PH / 50HZ	
DATI ACUSTICI ACUSTIC DATA	LIVELLO DI PRESSIONE SONORA A 5 M - SOUND PRESSURE LEVEL AT 5M DISTANCE	dBA	49	49,5
	LIVELLO DI POTENZA SONORA - SOUND POWER LEVEL	dBA	74	74,5
DIMENSIONI E PESI DIMENSIONS AND WEIGHT	LUNGHEZZA - LENGTH		1800	1800
	LARGHEZZA - WIDTH		590	590
	ALTEZZA - HEIGHT		1635	1635
	PESO IN FUNZIONAMENTO - OPERATING WEIGHTS		361	386

PERFORMANCES

Winter air conditioning and hot sanitary water production operation mode

TAGLIA SIZE	Twoutc	30 °C		35 °C		40 °C		45 °C		55 °C		60° C	
		Tain	Pt	Pa	Pt								
15	-20	3,53	1,32	3,52	1,50	-	-	-	-	-	-	-	-
	-10	4,62	1,36	4,58	1,50	4,56	1,73	4,57	1,96	-	-	-	-
	-5	5,37	1,38	5,31	1,55	5,27	1,75	5,24	1,98	-	-	-	-
	0	6,19	1,38	6,09	1,55	6,00	1,75	5,92	1,97	-	-	-	-
	5	7,08	1,37	6,94	1,54	6,80	1,74	6,68	1,97	6,46	2,52	6,41	2,87
	7	7,48	1,37	7,32	1,54	7,16	1,74	7,02	1,97	6,76	2,52	6,68	2,88
	15	9,48	1,41	9,24	1,59	8,99	1,79	8,76	2,01	8,30	2,57	8,00	3,04
16	-20	4,00	1,51	4,04	1,75	-	-	-	-	-	-	-	-
	-10	5,24	1,56	5,26	1,75	5,29	2,07	5,36	2,39	-	-	-	-
	-5	6,10	1,58	6,09	1,82	6,10	2,09	6,14	2,41	-	-	-	-
	0	6,92	1,53	6,85	1,76	6,81	2,02	6,79	2,32	-	-	-	-
	5	7,83	1,49	7,71	1,71	7,61	1,95	7,52	2,24	7,45	2,94	7,39	3,35
	7	8,25	1,47	8,11	1,69	7,97	1,93	7,86	2,21	7,73	2,90	7,64	3,32
	15	10,46	1,52	10,24	1,73	10,00	1,98	9,81	2,26	9,50	2,96	9,12	3,51
18	-20	4,99	1,87	4,91	2,15	-	-	-	-	-	-	-	-
	-10	6,54	1,93	6,39	2,15	6,25	2,52	6,14	2,90	-	-	-	-
	-5	7,60	1,96	7,41	2,23	7,22	2,55	7,03	2,93	-	-	-	-
	0	8,75	1,91	8,51	2,17	8,27	2,48	8,04	2,84	-	-	-	-
	5	9,91	1,86	9,62	2,12	9,34	2,42	9,05	2,76	8,49	3,63	8,43	4,13
	7	10,40	1,84	10,09	2,10	9,78	2,39	9,48	2,73	8,88	3,58	8,79	4,09
	15	13,19	1,90	12,74	2,16	12,27	2,45	11,83	2,79	10,92	3,66	10,51	4,31
114	-20	8,64	2,99	8,45	3,34	-	-	-	-	-	-	-	-
	-10	11,32	3,08	11,01	3,34	10,80	3,82	10,74	4,27	-	-	-	-
	-5	13,16	3,12	12,75	3,46	12,47	3,86	12,31	4,32	-	-	-	-
	0	14,94	3,12	14,41	3,46	14,01	3,85	13,74	4,31	-	-	-	-
	5	16,97	3,11	16,31	3,45	15,78	3,84	15,38	4,29	14,94	5,36	14,82	6,11
	7	17,91	3,11	17,20	3,44	16,61	3,83	16,15	4,28	15,60	5,35	15,42	6,12
	15	22,70	3,21	21,72	3,54	20,83	3,93	20,15	4,38	19,16	5,46	18,45	6,44
115	-20	8,93	3,21	8,73	3,58	-	-	-	-	-	-	-	-
	-10	11,69	3,30	11,36	3,58	11,14	4,11	11,06	4,59	-	-	-	-
	-5	13,60	3,35	13,16	3,72	12,85	4,15	12,68	4,64	-	-	-	-
	0	15,45	3,35	14,89	3,72	14,46	4,14	14,16	4,63	-	-	-	-
	5	17,56	3,35	16,87	3,71	16,30	4,13	15,87	4,61	15,39	5,76	15,26	6,56
	7	18,54	3,34	17,79	3,70	17,16	4,12	16,67	4,60	16,06	5,75	15,89	6,57
	15	23,50	3,45	22,46	3,80	21,53	4,22	20,80	4,70	19,74	5,87	19,01	6,93

Tain= Temperatura aria esterna (bulbo secco) [°C]/Outdoor air temperature(dry bulb) [°C]

Twoutc = Temperatura acqua uscita recuperatore [°C] / Heat recovery outlet water temperature [°C]

Pt = Potenza termica [kW] / Heating capacity [kW]

Pa = Potenza assorbita dai compressori [kW] / Compressors power input [kW]

PERFORMANCES

Winter air conditioning and hot sanitary water production operation mode

TAGLIA SIZE	Twoutc	30 °C		35 °C		40 °C		45 °C		55 °C		60 °C	
		Tain	Pt	Pa	Pt	Pa	Pt	Pa	Pt	Pa	Pt	Pa	Pt
117	-20	10,69	3,87	10,42	4,34	-	-	-	-	-	-	-	-
	-10	13,99	3,98	13,57	4,34	13,27	4,99	13,17	5,62	-	-	-	-
	-5	16,28	4,04	15,71	4,50	15,32	5,05	15,10	5,68	-	-	-	-
	0	18,51	4,04	17,79	4,49	17,24	5,03	16,86	5,66	-	-	-	-
	5	21,05	4,03	20,17	4,48	19,45	5,02	18,90	5,63	18,31	7,11	18,16	8,10
	7	22,23	4,03	21,27	4,47	20,48	5,01	19,86	5,62	19,11	7,10	18,90	8,12
	15	28,18	4,15	26,87	4,60	25,69	5,13	24,78	5,75	23,48	7,25	22,61	8,55
119	-20	12,66	4,50	12,38	5,05	-	-	-	-	-	-	-	-
	-10	16,58	4,63	16,12	5,05	15,83	5,82	15,77	6,55	-	-	-	-
	-5	19,28	4,70	18,67	5,24	18,27	5,88	18,08	6,62	-	-	-	-
	0	21,89	4,70	21,10	5,24	20,51	5,87	20,14	6,59	-	-	-	-
	5	24,87	4,70	23,88	5,22	23,09	5,84	22,53	6,56	21,98	8,29	21,80	9,45
	7	26,24	4,69	25,17	5,21	24,30	5,83	23,64	6,55	22,92	8,27	22,67	9,46
	15	33,27	4,84	31,79	5,36	30,48	5,98	29,49	6,70	28,16	8,45	27,12	9,97
123	-20	13,57	5,04	13,49	5,59	-	-	-	-	-	-	-	-
	-10	17,77	5,18	17,56	5,59	17,37	6,34	17,27	7,03	-	-	-	-
	-5	20,67	5,26	20,35	5,80	20,05	6,41	19,80	7,11	-	-	-	-
	0	23,76	5,34	23,30	5,88	22,85	6,48	22,42	7,16	-	-	-	-
	5	27,15	5,41	26,54	5,95	25,92	6,55	25,31	7,22	24,24	8,89	24,05	10,13
	7	28,67	5,44	28,00	5,98	27,30	6,58	26,61	7,25	25,37	8,91	25,09	10,19
	15	36,35	5,61	35,36	6,15	34,25	6,74	33,20	7,41	31,17	9,10	30,02	10,73
126	-20	15,86	5,72	15,77	6,35	-	-	-	-	-	-	-	-
	-10	20,76	5,88	20,54	6,35	20,34	7,22	20,25	8,02	-	-	-	-
	-5	24,15	5,97	23,79	6,59	23,48	7,30	23,21	8,10	-	-	-	-
	0	27,79	6,06	27,28	6,68	26,80	7,38	26,33	8,18	-	-	-	-
	5	31,80	6,14	31,12	6,76	30,44	7,46	29,76	8,25	28,56	10,15	28,33	11,56
	7	33,61	6,17	32,84	6,79	32,07	7,49	31,30	8,27	29,90	10,17	29,57	11,63
	15	42,60	6,36	41,48	6,98	40,23	7,68	39,05	8,46	36,74	10,39	35,38	12,26
132	-20	20,25	7,50	20,12	8,33	-	-	-	-	-	-	-	-
	-10	26,52	7,72	26,21	8,33	25,91	9,46	25,73	10,49	-	-	-	-
	-5	30,84	7,84	30,36	8,65	29,90	9,56	29,49	10,61	-	-	-	-
	0	35,47	7,95	34,79	8,75	34,11	9,67	33,44	10,70	-	-	-	-
	5	40,55	8,05	39,64	8,86	38,71	9,76	37,78	10,79	36,07	13,28	35,78	15,12
	7	42,84	8,09	41,82	8,90	40,78	9,80	39,72	10,83	37,76	13,30	37,35	15,21
	15	54,30	8,34	52,82	9,15	51,16	10,05	49,56	11,07	46,39	13,59	44,68	16,03
140	-20	23,03	8,44	22,93	9,43	-	-	-	-	-	-	-	-
	-10	30,14	8,69	29,87	9,43	29,58	10,79	29,40	12,04	-	-	-	-
	-5	35,06	8,82	34,60	9,79	34,14	10,90	33,71	12,17	-	-	-	-
	0	40,13	8,85	39,45	9,82	38,73	10,92	38,02	12,17	-	-	-	-
	5	45,70	8,90	44,78	9,85	43,79	10,93	42,76	12,17	40,84	15,20	40,51	17,32
	7	48,21	8,92	47,18	9,86	46,06	10,94	44,90	12,17	42,68	15,18	42,21	17,36
	15	61,12	9,20	59,59	10,14	57,78	11,21	56,01	12,44	52,43	15,51	50,50	18,29

Tain= Temperatura aria esterna (bulbo secco) [°C]/Outdoor air temperature(dry bulb) [°C]

Twoutc = Temperatura acqua uscita recuperatore [°C] / Heat recovery outlet water temperature [°C]

Pt = Potenza termica [kW] / Heating capacity [kW]

Pa = Potenza assorbita dai compressori [kW] / Compressors power input [kW]

PERFORMANCES

Summer air conditioning

TAGLIA SIZE	Tain Twoute	25 °C		30 °C		32 °C		35 °C		40 °C		45° C	
		Pf	Pa										
15	5	6,09	1,35	5,75	1,52	5,61	1,60	5,40	1,72	5,03	1,94	4,65	2,09
	6	6,26	1,36	5,92	1,53	5,77	1,61	5,56	1,73	5,17	1,96	5,55	1,83
	7	6,44	1,37	6,08	1,55	5,94	1,63	5,71	1,75	5,32	1,98	5,71	1,84
	8	6,62	1,38	6,25	1,56	6,10	1,64	5,87	1,77	5,46	2,00	5,88	1,86
	10	6,99	1,41	6,60	1,59	6,43	1,68	6,19	1,81	5,76	2,04	6,21	1,90
	15	8,19	1,54	7,77	1,74	7,60	1,82	7,34	1,96	6,83	2,21	7,40	2,04
16	5	7,01	1,44	6,64	1,65	6,49	1,74	6,26	1,89	5,86	2,16	5,41	2,32
	6	7,21	1,44	6,83	1,65	6,68	1,75	6,44	1,89	6,03	2,17	5,57	2,33
	7	7,41	1,45	7,02	1,66	6,87	1,75	6,62	1,90	6,19	2,17	5,73	2,34
	8	7,62	1,46	7,22	1,67	7,06	1,76	6,80	1,91	6,36	2,18	5,90	2,35
	10	8,05	1,47	7,62	1,68	7,45	1,77	7,18	1,92	6,71	2,20	6,24	2,36
	15	9,43	1,60	8,98	1,83	8,79	1,93	8,52	2,08	7,96	2,37	7,43	2,54
18	5	9,01	1,83	8,42	2,08	8,18	2,19	7,81	2,37	7,16	2,70	6,61	2,91
	6	9,22	1,84	8,62	2,09	8,38	2,20	8,00	2,38	7,34	2,72	6,78	2,92
	7	9,43	1,84	8,82	2,10	8,57	2,21	8,19	2,39	7,52	2,73	6,95	2,93
	8	9,64	1,85	9,02	2,11	8,77	2,22	8,38	2,40	7,69	2,74	7,13	2,95
	10	10,05	1,87	9,41	2,13	9,15	2,24	8,74	2,42	8,04	2,76	7,47	2,96
	15	11,78	2,04	11,08	2,32	10,80	2,43	10,37	2,63	9,53	2,98	8,90	3,19
114	5	15,63	3,20	14,48	3,54	14,03	3,69	13,39	3,94	12,36	4,40	11,41	4,73
	6	16,07	3,22	14,89	3,56	14,43	3,71	13,77	3,96	12,72	4,43	11,76	4,77
	7	16,52	3,23	15,31	3,58	14,85	3,74	14,17	3,99	13,10	4,46	12,12	4,79
	8	16,98	3,25	15,75	3,60	15,27	3,76	14,58	4,02	13,48	4,49	12,50	4,83
	10	17,95	3,29	16,66	3,65	16,16	3,81	15,44	4,07	14,29	4,54	13,28	4,88
	15	21,04	3,60	19,62	3,97	19,08	4,14	18,31	4,41	16,95	4,91	15,81	5,25
115	5	16,15	3,50	14,94	3,88	14,47	4,05	13,80	4,32	12,74	4,83	11,76	5,19
	6	16,60	3,52	15,36	3,90	14,89	4,08	14,20	4,35	13,11	4,86	12,11	5,24
	7	17,06	3,54	15,80	3,93	15,31	4,10	14,61	4,38	13,50	4,89	12,49	5,26
	8	17,54	3,56	16,25	3,95	15,75	4,13	15,03	4,41	13,89	4,93	12,88	5,30
	10	18,54	3,60	17,19	4,00	16,68	4,18	15,92	4,47	14,73	4,99	13,69	5,36
	15	21,74	3,94	20,25	4,36	19,68	4,54	18,88	4,84	17,46	5,39	16,30	5,77

Twoute = Temperatura acqua uscita evapotatore [°C] / Evaporator outlet water temperature [°C]

Tain = Temperatura aria in ingresso [°C]/Air input temperature [°C]

Pf = Potenza frigorifera [kW] / Cooling capacity [kW]

Pa = Potenza assorbita dai compressori [kW] / Compressors power input [kW]

PERFORMANCES

Summer air conditioning

TAGLIA SIZE	Tain	25 °C		30 °C		32 °C		35 °C		40 °C		45 °C	
	Twoute	Pf	Pa										
117	5	18,63	4,10	17,17	4,57	16,61	4,78	15,80	5,12	14,53	5,75	13,41	6,18
	6	19,14	4,13	17,65	4,60	17,08	4,81	16,25	5,15	14,95	5,79	13,81	6,24
	7	19,68	4,16	18,15	4,63	17,57	4,85	16,72	5,19	15,39	5,83	14,24	6,27
	8	20,22	4,18	18,67	4,66	18,07	4,88	17,20	5,23	15,84	5,87	14,68	6,32
	10	21,37	4,24	19,74	4,73	19,12	4,94	18,21	5,30	16,78	5,95	15,60	6,39
	15	25,06	4,63	23,25	5,14	22,57	5,37	21,60	5,74	19,90	6,43	18,57	6,88
119	5	22,61	4,77	20,85	5,32	20,18	5,57	19,21	5,97	17,69	6,70	16,33	7,21
	6	23,24	4,80	21,44	5,36	20,75	5,61	19,76	6,01	18,20	6,75	16,82	7,27
	7	23,89	4,83	22,05	5,40	21,35	5,65	20,33	6,05	18,73	6,80	17,33	7,31
	8	24,56	4,86	22,68	5,43	21,96	5,68	20,92	6,09	19,28	6,84	17,87	7,37
	10	25,97	4,93	24,00	5,51	23,25	5,76	22,15	6,18	20,44	6,94	18,99	7,45
	15	30,44	5,39	28,26	5,99	27,44	6,26	26,27	6,69	24,23	7,50	22,62	8,02
123	5	23,89	5,57	22,57	6,13	22,02	6,36	21,16	6,74	19,69	7,45	18,18	8,01
	6	24,58	5,62	23,21	6,18	22,64	6,42	21,76	6,80	20,24	7,51	18,70	8,09
	7	25,27	5,67	23,86	6,23	23,27	6,47	22,36	6,86	20,80	7,57	19,24	8,14
	8	25,98	5,72	24,53	6,29	23,92	6,53	22,97	6,92	21,37	7,64	19,81	8,22
	10	27,44	5,82	25,89	6,39	25,24	6,64	24,24	7,04	22,54	7,76	20,95	8,34
	15	32,17	6,36	30,49	6,96	29,79	7,21	28,74	7,62	26,73	8,39	24,95	8,98
126	5	30,69	6,46	28,80	7,12	28,01	7,41	26,82	7,87	24,77	8,71	22,86	9,36
	6	31,53	6,52	29,58	7,18	28,76	7,47	27,55	7,93	25,42	8,78	23,49	9,45
	7	32,38	6,57	30,37	7,24	29,53	7,53	28,28	8,00	26,09	8,85	24,14	9,52
	8	33,26	6,63	31,18	7,30	30,32	7,60	29,03	8,07	26,77	8,92	24,81	9,60
	10	35,04	6,74	32,83	7,43	31,93	7,72	30,57	8,20	28,17	9,07	26,18	9,73
	15	41,08	7,37	38,67	8,08	37,69	8,39	36,26	8,88	33,40	9,79	31,18	10,48
132	5	37,27	8,07	35,21	8,88	34,34	9,23	32,99	9,79	30,69	10,81	28,33	11,63
	6	38,31	8,14	36,17	8,96	35,28	9,31	33,89	9,87	31,52	10,90	29,12	11,74
	7	39,36	8,21	37,16	9,03	36,23	9,39	34,80	9,95	32,37	10,99	29,95	11,83
	8	40,44	8,28	38,16	9,11	37,21	9,47	35,73	10,04	33,23	11,09	30,80	11,93
	10	42,64	8,42	40,22	9,26	39,20	9,63	37,63	10,21	34,99	11,27	32,52	12,10
	15	49,99	9,21	47,36	10,08	46,27	10,45	44,63	11,06	41,50	12,17	38,73	13,03
140	5	41,93	9,29	39,67	10,27	38,70	10,70	37,17	11,40	34,51	12,69	31,86	13,64
	6	43,09	9,36	40,75	10,35	39,74	10,79	38,17	11,48	35,43	12,78	32,73	13,76
	7	44,26	9,44	41,84	10,43	40,81	10,87	39,18	11,57	36,37	12,88	33,65	13,85
	8	45,46	9,52	42,96	10,52	41,89	10,96	40,21	11,66	37,32	12,97	34,59	13,96
	10	47,93	9,67	45,25	10,68	44,11	11,13	42,32	11,84	39,28	13,17	36,50	14,14
	15	56,19	10,58	53,29	11,63	52,07	12,08	50,20	12,83	46,58	14,22	43,47	15,22

Twoute = Temperatura acqua uscita evapotatore [°C] / *Evaporator outlet water temperature [°C]*

Tain = Temperatura aria in ingresso [°C]/*Air input temperature [°C]*

Pf = Potenza frigorifera [kW] / *Cooling capacity [kW]*

Pa = Potenza assorbita dai compressori [kW] / *Compressors power input [kW]*

PERFORMANCES

Summer air conditioning+HSW production

TAGLIA SIZE	Twoutr Twoute	30 °C			35 °C			40 °C			45 °C			55 °C			60 °C		
		Pf	Pa	Pt															
15	5	6,37	1,27	7,64	6,04	1,43	7,47	5,69	1,61	7,30	5,32	1,83	7,15	4,52	2,33	6,86	4,12	2,54	6,66
	6	6,58	1,26	7,84	6,23	1,43	7,66	5,87	1,62	7,49	5,49	1,83	7,32	4,67	2,34	7,01	5,51	1,99	7,49
	7	6,79	1,26	8,05	6,43	1,43	7,86	6,06	1,62	7,68	5,67	1,83	7,50	4,83	2,34	7,17	5,70	1,99	7,69
	8	7,00	1,27	8,26	6,63	1,43	8,07	6,25	1,62	7,87	5,85	1,83	7,68	4,99	2,34	7,33	5,89	1,99	7,88
	10	7,44	1,27	8,71	7,05	1,44	8,49	6,65	1,63	8,27	6,22	1,84	8,06	5,31	2,35	7,67	6,30	2,00	8,30
	15	8,81	1,36	10,17	8,38	1,54	9,92	7,97	1,73	9,70	7,50	1,95	9,45	6,50	2,47	8,97	7,75	2,09	9,85
16	5	7,25	1,28	8,54	6,92	1,47	8,39	6,57	1,68	8,25	6,20	1,93	8,13	5,46	2,53	7,99	5,05	2,75	7,81
	6	7,48	1,28	8,76	7,13	1,46	8,59	6,77	1,67	8,44	6,39	1,92	8,31	5,63	2,51	8,14	5,21	2,73	7,95
	7	7,71	1,27	8,98	7,35	1,46	8,81	6,98	1,66	8,64	6,59	1,91	8,49	5,80	2,50	8,30	5,37	2,71	8,09
	8	7,94	1,26	9,21	7,57	1,45	9,02	7,19	1,66	8,84	6,79	1,89	8,68	5,97	2,48	8,45	5,54	2,69	8,23
	10	8,43	1,25	9,68	8,04	1,43	9,47	7,63	1,64	9,26	7,20	1,87	9,07	6,34	2,45	8,79	5,88	2,66	8,54
	15	9,96	1,35	11,31	9,53	1,53	11,06	9,10	1,74	10,84	8,63	1,98	10,61	7,68	2,57	10,25	7,15	2,79	9,93
18	5	9,52	1,64	11,16	8,96	1,87	10,82	8,36	2,13	10,49	7,73	2,43	10,16	6,34	3,18	9,52	5,84	3,46	9,30
	6	9,78	1,63	11,41	9,20	1,86	11,06	8,60	2,12	10,72	7,97	2,41	10,38	6,56	3,16	9,72	6,05	3,43	9,49
	7	10,04	1,62	11,66	9,45	1,85	11,30	8,84	2,11	10,95	8,20	2,40	10,60	6,78	3,14	9,91	6,26	3,41	9,67
	8	10,30	1,62	11,92	9,70	1,84	11,54	9,08	2,10	11,18	8,43	2,39	10,82	6,99	3,12	10,11	6,46	3,39	9,85
	10	10,81	1,60	12,42	10,20	1,83	12,02	9,56	2,08	11,64	8,89	2,37	11,25	7,43	3,09	10,51	6,87	3,35	10,22
	15	12,79	1,73	14,52	12,10	1,95	14,05	11,42	2,21	13,63	10,67	2,51	13,18	9,02	3,24	12,26	8,37	3,51	11,88
114	5	16,32	2,93	19,25	15,24	3,24	18,48	14,22	3,61	17,83	13,29	4,03	17,31	11,63	5,03	16,66	10,63	5,47	16,10
	6	16,85	2,93	19,77	15,73	3,24	18,97	14,68	3,60	18,29	13,72	4,02	17,74	12,00	5,03	17,03	10,99	5,47	16,46
	7	17,39	2,92	20,31	16,24	3,24	19,48	15,16	3,60	18,76	14,17	4,02	18,19	12,38	5,02	17,41	11,36	5,46	16,82
	8	17,95	2,92	20,87	16,77	3,23	20,00	15,66	3,60	19,26	14,63	4,02	18,65	12,79	5,02	17,80	11,73	5,45	17,18
	10	19,12	2,91	22,03	17,88	3,22	21,10	16,70	3,59	20,29	15,61	4,01	19,62	13,63	5,01	18,64	12,54	5,44	17,97
	15	22,63	3,14	25,76	21,24	3,45	24,69	20,00	3,82	23,81	18,80	4,24	23,03	16,65	5,26	21,90	15,36	5,70	21,06
115	5	16,91	3,20	20,11	15,74	3,55	19,28	14,64	3,95	18,59	13,62	4,41	18,03	11,80	5,51	17,31	10,76	5,99	16,75
	6	17,46	3,20	20,66	16,26	3,54	19,80	15,12	3,94	19,07	14,08	4,40	18,48	12,19	5,50	17,69	11,14	5,98	17,12
	7	18,03	3,20	21,22	16,79	3,54	20,33	15,63	3,94	19,57	14,55	4,40	18,95	12,59	5,50	18,09	11,53	5,97	17,50
	8	18,61	3,20	21,81	17,35	3,54	20,88	16,15	3,94	20,08	15,04	4,39	19,43	13,01	5,49	18,50	11,92	5,97	17,89
	10	19,84	3,19	23,03	18,51	3,53	22,04	17,25	3,93	21,17	16,07	4,38	20,45	13,90	5,48	19,38	12,77	5,95	18,72
	15	23,49	3,43	26,93	22,00	3,77	25,78	20,66	4,18	24,83	19,36	4,64	23,99	17,00	5,75	22,75	15,67	6,23	21,90

Twoutc = Temperatura acqua uscita recuperatore [°C] / Heat recovery outlet water temperature [°C]

Twoute = Temperatura acqua uscita evaporatore [°C] / Evaporator outlet water temperature [°C]

Pf = Potenza frigorifera [kW] / Cooling capacity [kW]

Pt = Potenza termica [kW] / Heating capacity [kW]

Pa = Potenza assorbita dai compressori [kW] / Compressors power input [kW]

PERFORMANCES

Summer air conditioning+HSW production

TAGLIA SIZE	Twoutr Twoute	30 °C			35 °C			40 °C			45 °C			55 °C			60 °C		
		Pf	Pa	Pt	Pf	Pa	Pt	Pf	Pa	Pt	Pf	Pa	Pt	Pf	Pa	Pt	Pf	Pa	Pt
117	5	19,59	3,75	23,35	18,17	4,17	22,34	16,83	4,67	21,50	15,61	5,24	20,85	13,44	6,61	20,05	12,26	7,19	19,45
	6	20,23	3,75	23,98	18,77	4,17	22,93	17,39	4,66	22,05	16,13	5,23	21,36	13,88	6,61	20,49	12,69	7,18	19,87
	7	20,89	3,75	24,64	19,39	4,16	23,55	17,97	4,66	22,63	16,67	5,23	21,90	14,34	6,60	20,94	13,12	7,17	20,30
	8	21,57	3,75	25,31	20,03	4,16	24,19	18,57	4,65	23,23	17,23	5,22	22,45	14,82	6,59	21,41	13,57	7,16	20,73
	10	23,00	3,74	26,74	21,37	4,15	25,53	19,84	4,64	24,48	18,41	5,21	23,62	15,83	6,57	22,40	14,53	7,14	21,67
	15	27,23	4,03	31,26	25,41	4,44	29,85	23,77	4,94	28,70	22,18	5,51	27,70	19,35	6,91	26,26	17,84	7,48	25,32
119	5	23,65	4,38	28,03	21,99	4,87	26,86	20,45	5,45	25,89	19,03	6,11	25,15	16,53	7,72	24,25	15,24	8,39	23,63
	6	24,41	4,38	28,79	22,71	4,86	27,58	21,12	5,44	26,56	19,66	6,11	25,77	17,07	7,71	24,78	15,75	8,38	24,13
	7	25,20	4,38	29,58	23,45	4,86	28,31	21,82	5,43	27,25	20,31	6,10	26,41	17,62	7,70	25,32	16,28	8,37	24,64
	8	26,02	4,37	30,39	24,22	4,86	29,08	22,54	5,43	27,96	20,98	6,09	27,07	18,20	7,69	25,89	16,81	8,36	25,17
	10	27,72	4,37	32,09	25,83	4,85	30,68	24,05	5,42	29,47	22,40	6,08	28,48	19,41	7,67	27,08	17,97	8,33	26,30
	15	32,78	4,70	37,48	30,65	5,18	35,83	28,73	5,76	34,49	26,89	6,43	33,32	23,58	8,06	31,64	21,88	8,73	30,61
123	5	24,81	5,16	29,97	23,59	5,67	29,26	22,28	6,24	28,52	20,91	6,88	27,79	18,01	8,45	26,46	16,39	9,18	25,57
	6	25,60	5,17	30,77	24,34	5,68	30,02	23,00	6,25	29,25	21,58	6,89	28,47	18,60	8,45	27,05	16,95	9,19	26,15
	7	26,41	5,18	31,59	25,11	5,70	30,81	23,73	6,26	29,99	22,27	6,90	29,17	19,20	8,46	27,67	17,53	9,20	26,72
	8	27,24	5,19	32,43	25,90	5,71	31,61	24,48	6,27	30,76	22,98	6,91	29,89	19,82	8,47	28,29	18,10	9,21	27,31
	10	28,95	5,21	34,17	27,54	5,73	33,27	26,04	6,30	32,33	24,44	6,93	31,38	21,10	8,49	29,58	19,33	9,22	28,55
	15	34,30	5,61	39,91	32,76	6,13	38,88	31,21	6,70	37,91	29,48	7,34	36,82	25,85	8,91	34,76	23,78	9,66	33,44
126	5	31,61	5,97	37,57	30,04	6,56	36,60	28,36	7,23	35,59	26,59	7,97	34,57	22,84	9,77	32,61	21,00	10,62	31,62
	6	32,59	5,98	38,57	30,98	6,58	37,55	29,26	7,24	36,50	27,43	7,99	35,42	23,58	9,78	33,36	21,71	10,63	32,34
	7	33,60	5,99	39,59	31,94	6,59	38,52	30,17	7,25	37,42	28,29	8,00	36,29	24,34	9,79	34,12	22,43	10,64	33,07
	8	34,63	6,00	40,63	32,92	6,60	39,52	31,10	7,27	38,37	29,18	8,01	37,19	25,11	9,80	34,91	23,15	10,65	33,80
	10	36,76	6,02	42,78	34,96	6,62	41,58	33,04	7,29	40,33	31,00	8,04	39,04	26,72	9,82	36,54	24,68	10,66	35,34
	15	43,46	6,49	49,95	41,48	7,08	48,56	39,48	7,75	47,24	37,24	8,50	45,74	32,51	10,31	42,82	30,12	11,17	41,29
132	5	38,88	7,43	46,31	36,96	8,17	45,13	34,91	9,00	43,91	32,73	9,92	42,65	28,11	12,16	40,27	25,82	13,23	39,05
	6	40,10	7,44	47,54	38,12	8,19	46,31	36,01	9,01	45,02	33,77	9,94	43,70	29,01	12,18	41,19	26,69	13,24	39,93
	7	41,34	7,46	48,80	39,31	8,20	47,51	37,14	9,03	46,16	34,83	9,95	44,78	29,94	12,19	42,13	27,58	13,25	40,82
	8	42,61	7,48	50,08	40,52	8,22	48,74	38,29	9,04	47,33	35,91	9,97	45,88	30,89	12,20	43,09	28,46	13,26	41,72
	10	45,24	7,50	52,75	43,03	8,25	51,28	40,67	9,08	49,75	38,16	10,00	48,16	32,86	12,22	45,08	30,34	13,27	43,62
	15	53,50	8,08	61,58	51,07	8,82	59,89	48,62	9,65	58,27	45,85	10,58	56,43	40,00	12,84	52,83	37,04	13,91	50,95
140	5	43,93	8,52	52,45	41,83	9,40	51,23	39,50	10,41	49,92	36,96	11,57	48,53	31,43	14,40	45,83	28,58	15,66	44,24
	6	45,29	8,53	53,82	43,13	9,41	52,54	40,74	10,42	51,16	38,13	11,57	49,70	32,44	14,40	46,84	29,56	15,66	45,21
	7	46,68	8,54	55,22	44,46	9,42	53,89	42,01	10,43	52,43	39,33	11,57	50,90	33,49	14,39	47,88	30,55	15,64	46,19
	8	48,10	8,56	56,66	45,83	9,44	55,26	43,30	10,43	53,74	40,55	11,58	52,13	34,56	14,38	48,94	31,55	15,63	47,19
	10	51,04	8,60	59,64	48,65	9,46	58,11	45,99	10,45	56,44	43,09	11,58	54,67	36,78	14,37	51,15	33,68	15,61	49,29
	15	60,47	9,25	69,72	57,87	10,12	67,98	55,15	11,11	66,26	51,98	12,26	64,24	45,06	15,10	60,16	41,44	16,35	57,80

Twoutc = Temperatura acqua uscita recuperatore [°C] / Heat recovery outlet water temperature [°C]

Twoute = Temperatura acqua uscita evaporatore [°C] / Evaporator outlet water temperature [°C]

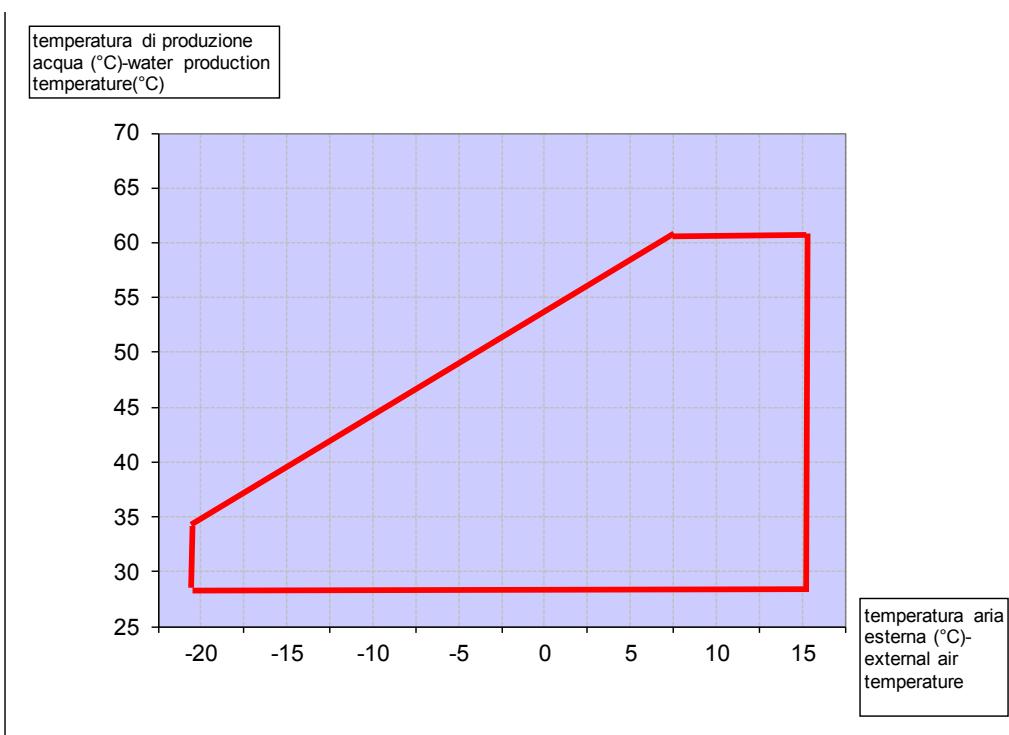
Pf = Potenza frigorifera [kW] / Cooling capacity [kW]

Pt = Potenza termica [kW] / Heating capacity [kW]

Pa = Potenza assorbita dai compressori [kW] / Compressors power input [kW]

OPERATIVE RANGE

WINTER AIR-CONDITIONING AND HOT SANITARY WATER PRODUCTION





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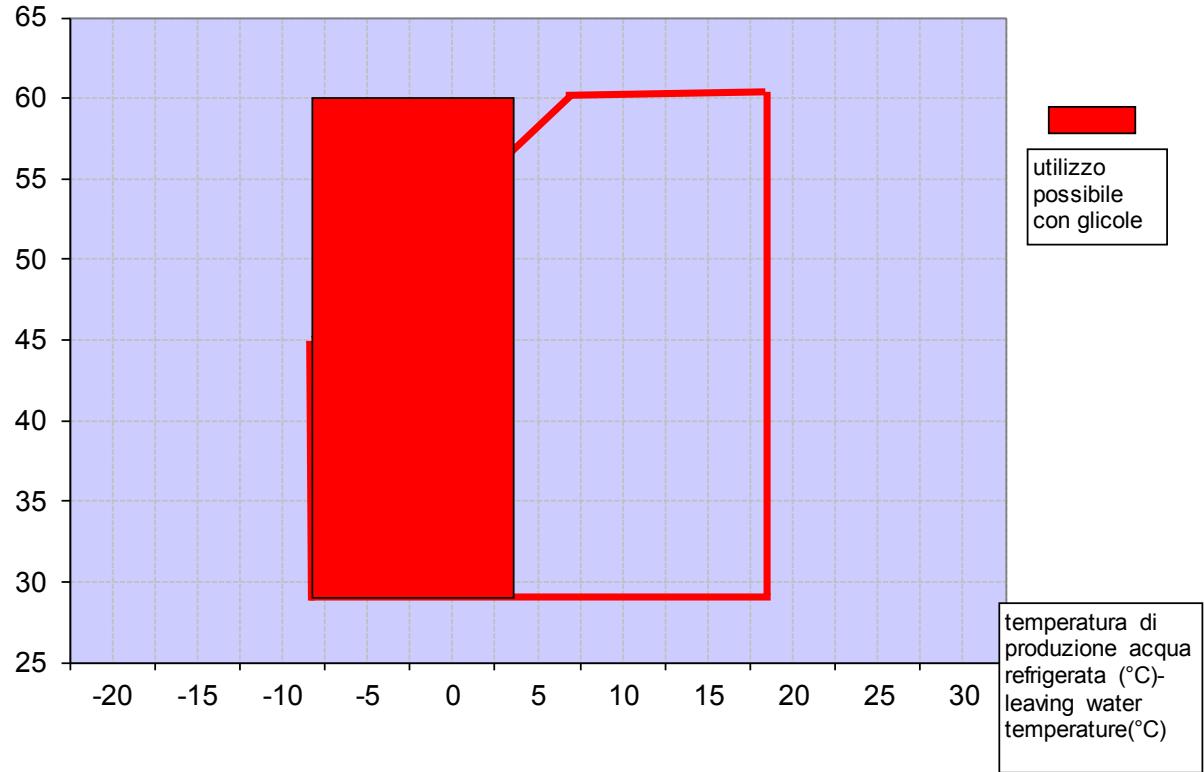
SUMMER AIR-CONDITIONING



OPERATIVE RANGE

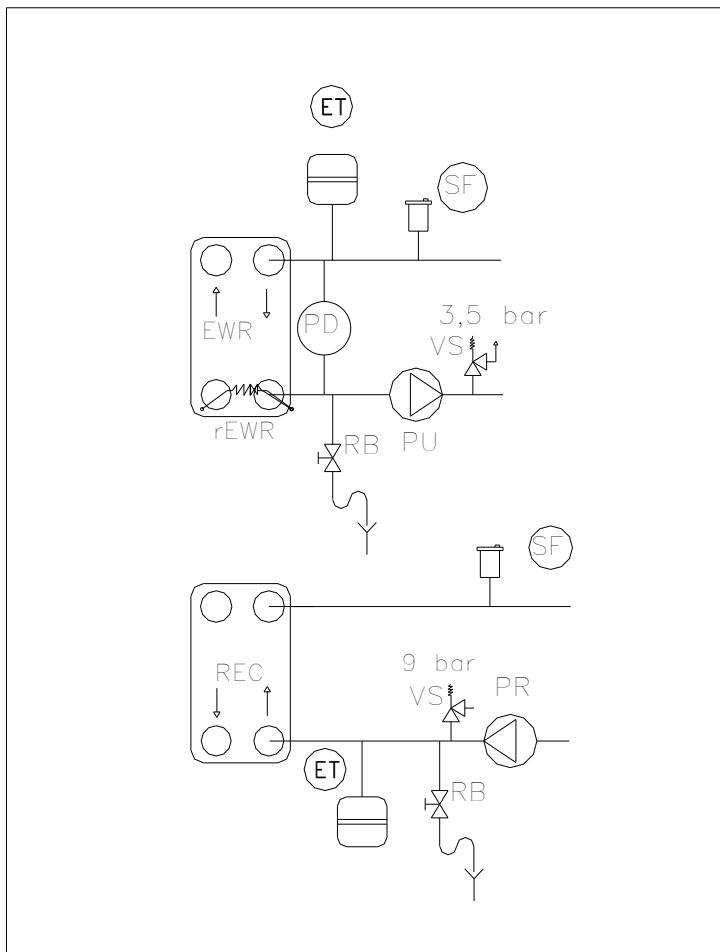
SUMMER AIR-CONDITIONING AND HOT SANITARY WATER PRODUCTION

temperatura di produzione
acqua (°C)- water
production temperature(°C)



HYDRAULIC KIT

MARA W standard configuration envisages the integration of variable flow pumps.

WATER SCHEME

REC	RECOVERY
rEXR	EVAPORATOR/CONDENSATOR
EWR	EVAPORATOR/CONDENSATOR
PU	AIR-CONDITIONING PUMPS
PR	HSW PUMPS
SF	MANUAL RELIEF VALVE
RB	SHUT-OFF VALVE
ET	EXPANSION TANK
VS	SAFETY VALVE
PD	DIFFERENTIAL PRESSURE SWITCH



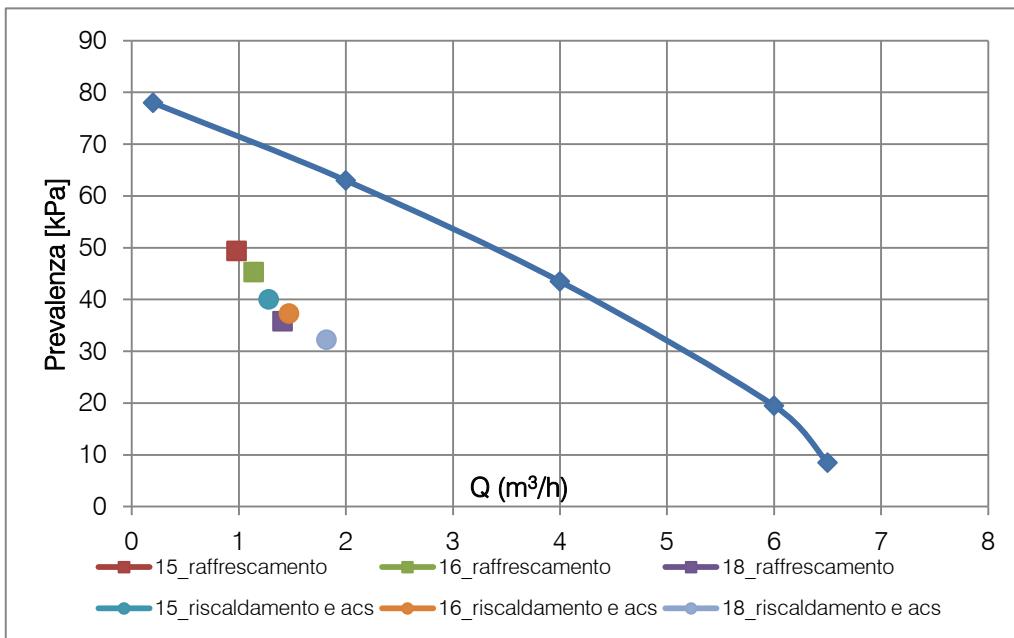
mara



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HSW + AIR-CONDITIONING PUMPS HEAD PRESSURE CURVE

MARA 15 – 18



COOLING				
Mod.	Q [m³/h]	Y [kPa]	H [kPa]	Hu [kPa]
15	0,98	22,8	72	49
16	1,14	25,7	71	45
18	1,41	33,0	69	36

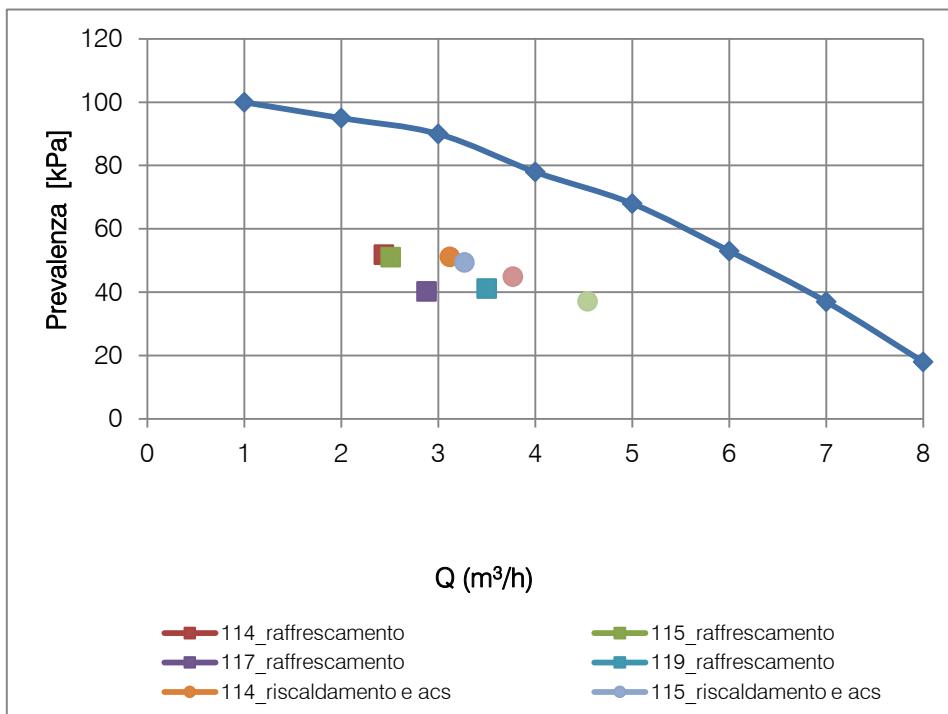
HEATING + HSW				
Mod.	Q [m³/h]	Y [kPa]	H [kPa]	Hu [kPa]
15	1,28	29,8	70	40
16	1,47	31,1	68	37
18	1,82	33,2	65	32

Q Water Load (m³/h)

Y Pressure Drop (kPa)

H Pump head pressure(kPa)

Hu Available head pressure(kPa)

HSW + AIR-CONDITIONING PUMPS HEAD PRESSURE CURVE
MARA 114 – 119

COOLING				
Mod.	Q [m^3/h]	Y [kPa]	H[kPa]	Hu [kPa]
114	2,44	40,9	93	52
115	2,51	41,2	92	51
117	2,88	49,3	90	40
119	3,5	43,0	84	41

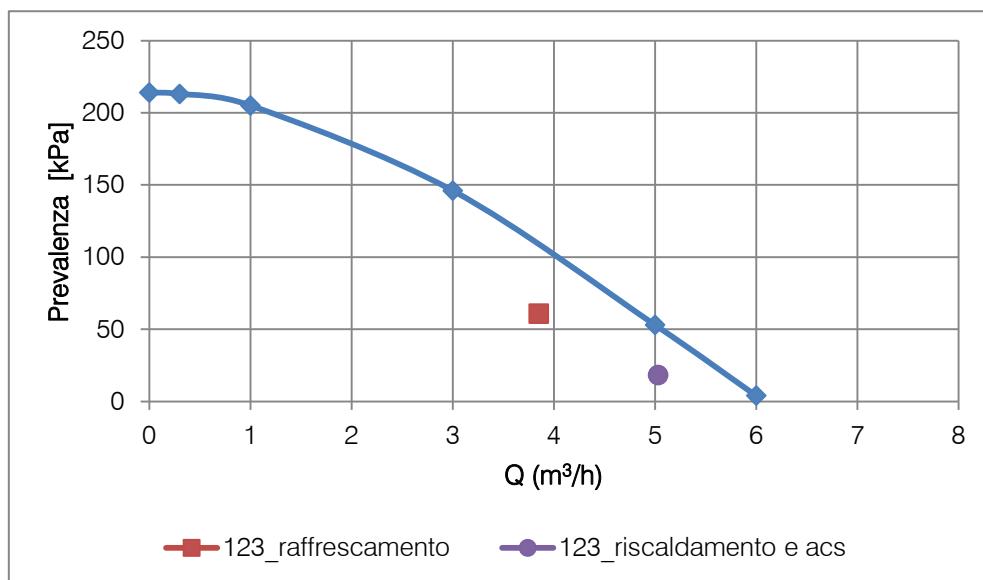
HEATING AND HSW				
Mod.	Q [m^3/h]	Y [kPa]	H[kPa]	Hu [kPa]
114	3,12	36,4	88	51
115	3,27	36,9	86	49
117	3,77	36,7	82	45
119	4,54	36,1	73	37

Q Water Load (m^3/h)

Y Pressure Drop (kPa)

H Pump head pressure(kPa)

Hu Available head pressure(kPa)

HSW + AIR-CONDITIONING PUMPS HEAD PRESSURE CURVE
MARA 123-126

COOLING				
Mod.	Q [m³/h]	Y [kPa]	H[kPa]	Hu [kPa]
123	3,85	51,4	112	61

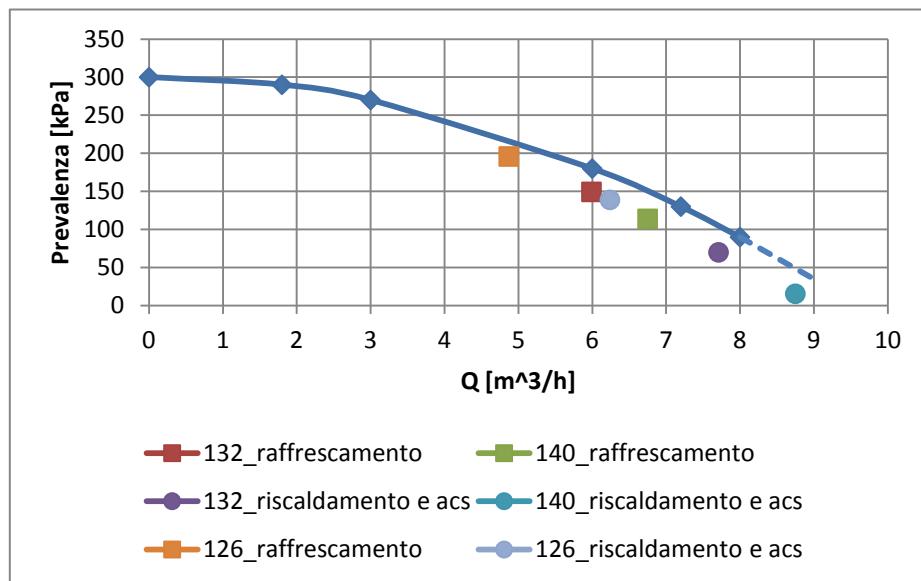
HEATING AND HSW				
Mod.	Q [m³/h]	Y [kPa]	H[kPa]	Hu [kPa]
123	5,03	37,7	56	18

Q Water Load (m³/h)

Y Pressure Drop (kPa)

H Pump head pressure(kPa)

Hu Available head pressure((kPa)

HSW + AIR-CONDITIONING PUMPS HEAD PRESSURE CURVE
MARA 126 – 140

COOLING				
Mod.	Q [m³/h]	Y [kPa]	H[kPa]	Hu [kPa]
126	4,87	25,6	221	196
132	5,99	32,3	182	149
140	6,75	36,1	150	114

HEATING + HSW				
Mod.	Q [m³/h]	Y [kPa]	H[kPa]	Hu [kPa]
126	6,24	32,7	172	139
132	7,71	34,7	105	70
140	8,75	33,4	49	16

Q Portata acqua (m³/h)

Y Perdita di carico (kPa)

H Prevalenza pompa(kPa)

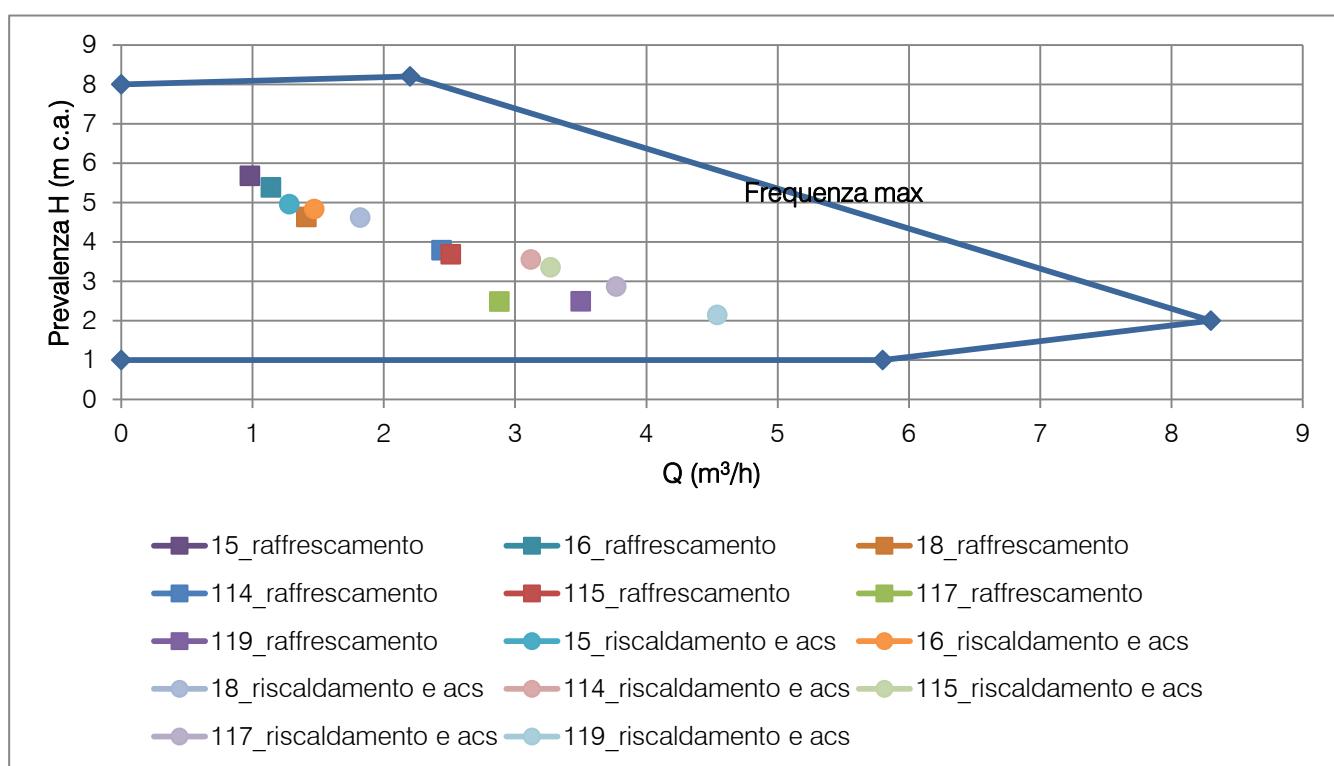
Hu Available head pressure((kPa)

INVERTER PUMPS HEAD PRESSURE CURVE (OPTIONAL)

La configurazione standard delle unità MARA può essere modificata prevedendo l'inserimento di pompe inverter. Di seguito viene riportato il grafico per stimare puntualmente il valore della prevalenza totale in funzione della portata, in particolare viene rappresentato un campo di funzionamento. Occorre precisare che l'utilizzo di pompe a velocità variabile a bordo macchina non ha lo scopo di realizzare impianti a portata variabile. In questo caso si dovrebbe prevedere un circuito secondario, dopo l'accumulo, per parzializzare la portata d'acqua delle utenze dell'impianto.

Climatizzazione e utenze sanitarie

MARA 15-119

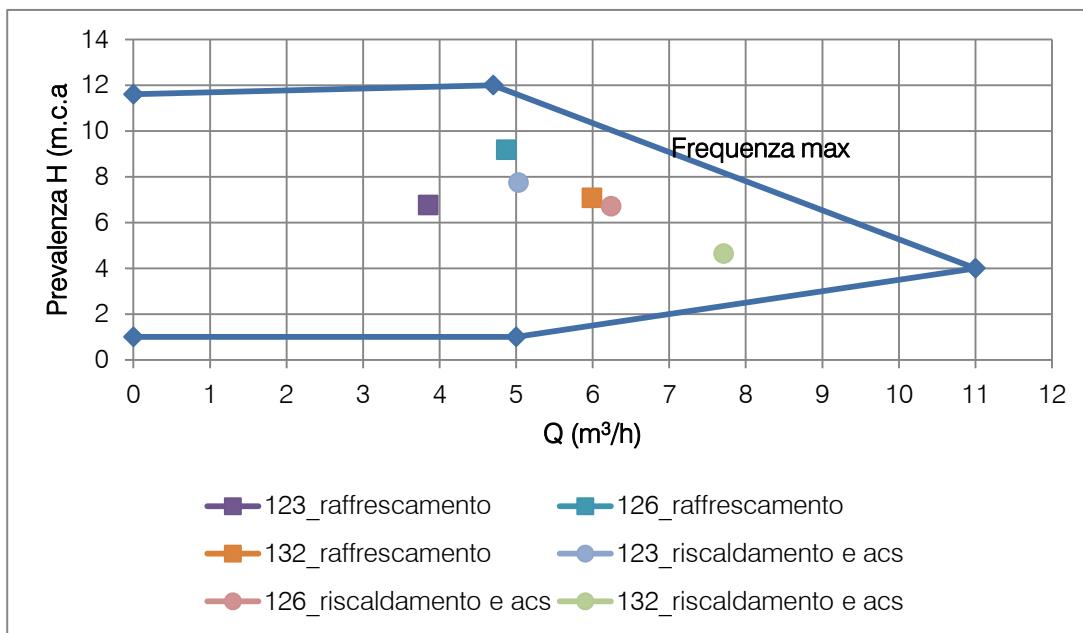


COOLING					
Mod.	Q [m³/h]	Y [kPa]	Y [m.c.a.]	H [m.c.a.]	Hu [m.c.a.]
15	0,98	22,8	2,3	8,0	5,7
16	1,14	25,7	2,6	8,0	5,4
18	1,41	33,0	3,4	8,0	4,6
114	2,44	40,9	4,2	8,0	3,8
115	2,51	41,2	4,2	7,9	3,7
117	2,88	49,3	5,0	7,5	2,5
119	3,5	43,0	4,4	6,9	2,5

HEATING + HSW					
Mod.	Q [m³/h]	Y [kPa]	Y [m.c.a.]	H [m.c.a.]	Hu [m.c.a.]
15	1,28	29,8	3,0	8,0	5,0
16	1,47	31,1	3,2	8,0	4,8
18	1,82	33,2	3,4	8,0	4,6
114	3,12	36,4	3,7	7,3	3,6
115	3,27	36,9	3,8	7,1	3,4
117	3,77	36,7	3,7	6,6	2,9
119	4,54	36,1	3,7	5,8	2,1

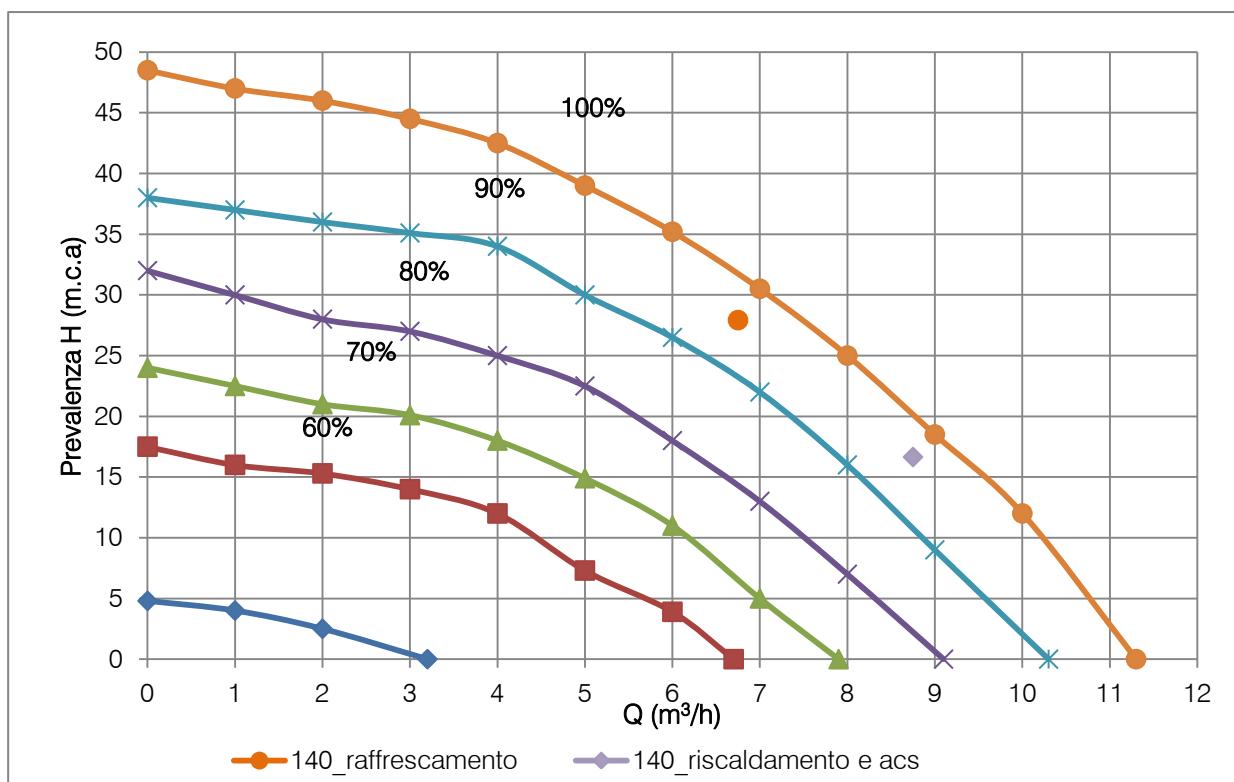
INVERTER PUMPS HEAD PRESSURE CURVE (OPTIONAL)

AIR CONDITIONING AND HOT SANITARY WATER

MARA 123-132

COOLING					
Mod.	Q [m³/h]	Y [kPa]	Y [m.c.a.]	H[m.c.a.]	Hu [m.c.a.]
123	3,85	51,4	5,2	12,0	6,8
126	4,87	25,6	2,6	11,8	9,2
132	5,99	32,3	3,3	10,4	7,1

HEATING + HSW					
Mod.	Q [m³/h]	Y [kPa]	Y [m.c.a.]	H[m.c.a.]	Hu [m.c.a.]
123	5,03	37,7	3,8	11,6	7,7
126	6,24	32,7	3,3	10,0	6,7
132	7,71	34,7	3,5	8,2	4,6

INVERTER PUMPS HEAD PRESSURE CURVE (OPTIONAL)**AIR CONDITIONING AND HOT SANITARY WATER****MARA 140**

COOLING					
Mod.	Q [m³/h]	Y [kPa]	Y [m.c.a.]	H[m.c.a.]	Hu [m.c.a.]
140	6,75	36,1	3,7	31,6	27,9

HEATING + HSW					
Mod.	Q [m³/h]	Y [kPa]	Y [m.c.a.]	H[m.c.a.]	Hu [m.c.a.]
140	8,75	33,4	3,4	20,0	16,6

SCALING CORRECTION SCHEDULES

1. ETHYLENE GLYCOL CORRECTION SCHEDULE

% Ethilene glicol weight		5%	10%	15%	20%	25%	30%	35%	40%
Freezing temperature	°C	-2	-3,9	-6,5	-8,9	-11,8	-15,6	-19	-23,4
Suggested security limit	°C	3	1	-1	-4	-6	-10	-14	-19
Cooling capacity coefficient	-	0,995	0,99	0,985	0,981	0,977	0,974	0,971	0,968
Power input coefficient	-	0,997	0,993	0,99	0,988	0,986	0,984	0,982	0,981
Flow rate coefficient	-	1,003	1,01	1,02	1,033	1,05	1,072	1,095	1,124
Pressur dropo coefficient	-	1,029	1,06	1,09	1,118	1,149	1,182	1,211	1,243

In order to calculate performance with glycoled solutions multiply main sizes by respective coefficients.

2. GLYCOL PERCENTAGE ACCORDING TO THE FREEZING TEMPERATURE

% glycol according to the freezing temperature						
Freezing temperature	0°C	-5°C	-10°C	-15°C	-20°C	-25°C
% Ethilene glycol	5%	12%	20%	28%	35%	40%
Flow rate coefficient	1,02	1,033	1,05	1,072	1,095	1,124

In order to calculate performance with glycoled solutions multiply main sizes by respective coefficients.

3. FOULING FACTOR CORRECTION TABLE

mq°C/W		Coefficiente di correzione della potenza frigorifera <i>Cooling capacity correction coefficient</i>	Coefficiente di correzione della potenza assorbita <i>Power input correction coefficient</i>
0,44	e-4	1	1
0,88	e-4	0,97	0,99
1,76	e-4	0,94	0,98

In order to calculate performance with glycoled solutions multiply main sizes by respective coefficients.

ELETTRICAL DATA

Modello	Compressori(1)			Ventilatori		TOTALE			VALORI MASSIMI(2)		
	F.L.I	F.L.A	L.R.A	E.P.	O.C.	F.L.I	F.L.A	S.A.	F.L.I.	F.L.A.	S.A.
				
	kW	A	A	kW	A	kW	A	A	kW	A	A
15 Z	1,8	3,2	43,0	0,1	0,6	2,0	3,8	43,0	5,2	9,4	43,6
16 Z	2,1	3,7	72,0	0,1	0,6	2,2	4,3	72,0	6,1	11,3	72,6
18 Z	2,4	4,1	62,0	0,1	0,6	2,6	4,6	62,0	7,0	12,1	62,6
114 Z	4,2	7,7	63,0	0,3	1,2	4,4	8,9	63,0	5,6	11,0	64,2
115 Z	4,3	7,7	63,0	0,3	1,2	4,6	8,9	63,0	5,8	11,0	64,2
117 Z	5,1	9,1	66,0	0,3	1,2	5,3	10,2	66,0	6,9	13,0	67,2
119 Z	6,1	10,7	73,0	0,5	2,4	6,7	13,1	73,0	8,5	16,4	75,4
123 Z	6,5	12,0	99,0	0,5	2,4	7,0	14,4	99,0	8,8	17,7	101,4
126 Z	7,6	14,1	156,0	1,2	5,2	8,8	19,3	156, 0	11,3	23,8	161,2
132 Z	8,6	15,9	130,0	1,2	5,2	9,8	21,1	130, 0	12,1	25,3	135,2
140 Z	11,0	19,2	158,0	1,2	5,2	12,2	24,4	158, 0	15,7	30,5	163,2
F.L.I.: full load electrical power											
F.L.A.: Full load electrical power											
L:R:A: compressor motor locked rotor current(direct starting)											

Electrical data referred to 400V - 3PH+N-50Hz

Maximum operating admitted conditions: 10%

Maximum phase unbalance: 3%

F.L.I. full load electrical power

F.L.A. full load operating current

L.R.A. compressor motor locked rotor current (direct starting)

S.A. sum of LRA of the most powerful compressor, FLA of other compressor and fans current

(1) maximum operating admitted conditions by the compressors manufacturer

(2) data referred to the biggest compressor for units with different compressors



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ACOUSTIC DATA

FULL LOAD SOUND POWER LEVEL										
Model	Octave bands (Hz)								Lw	
	Sound power level (dB)									
	63	125	250	500	1000	2000	4000	8000		
15 Z	47,0	43,0	38,4	34,2	31,8	47,0	29,5	18,5	69,0	
16 Z	47,0	43,0	38,4	34,2	31,8	47,0	29,5	18,5	69,0	
18 Z	47,0	43,0	38,4	34,2	31,8	47,0	29,5	18,5	69,0	
114 Z	49,8	45,8	41,2	37,0	34,6	49,8	32,3	21,3	72,0	
115 Z	51,8	47,8	43,2	39,0	36,6	51,8	34,3	23,3	74,0	
117 Z	51,8	47,8	43,2	39,0	36,6	51,8	34,3	23,3	74,0	
119 Z	52,8	48,8	44,2	40,0	37,6	52,8	35,3	24,3	75,0	
123 Z	51,8	47,8	43,2	39,0	36,6	51,8	34,3	23,3	74,0	
126 Z	51,8	47,8	43,2	39,0	36,6	51,8	34,3	23,3	74,0	
132 Z	51,8	47,8	43,2	39,0	36,6	51,8	34,3	23,3	74,0	
140 Z	52,3	48,3	43,7	39,5	37,1	52,3	34,8	23,8	74,5	

CONVERSION FROM SOUND POWER LEVEL TO SOUND PRESSURE LEVEL

$$L_p = L_w + CF$$

Lp = Sound pressure level [dB(A)]

Lw = Sound power level [dB(A)]

CF = Correction factor [dB(A)]

Example:

Lw = 89 dB(A)

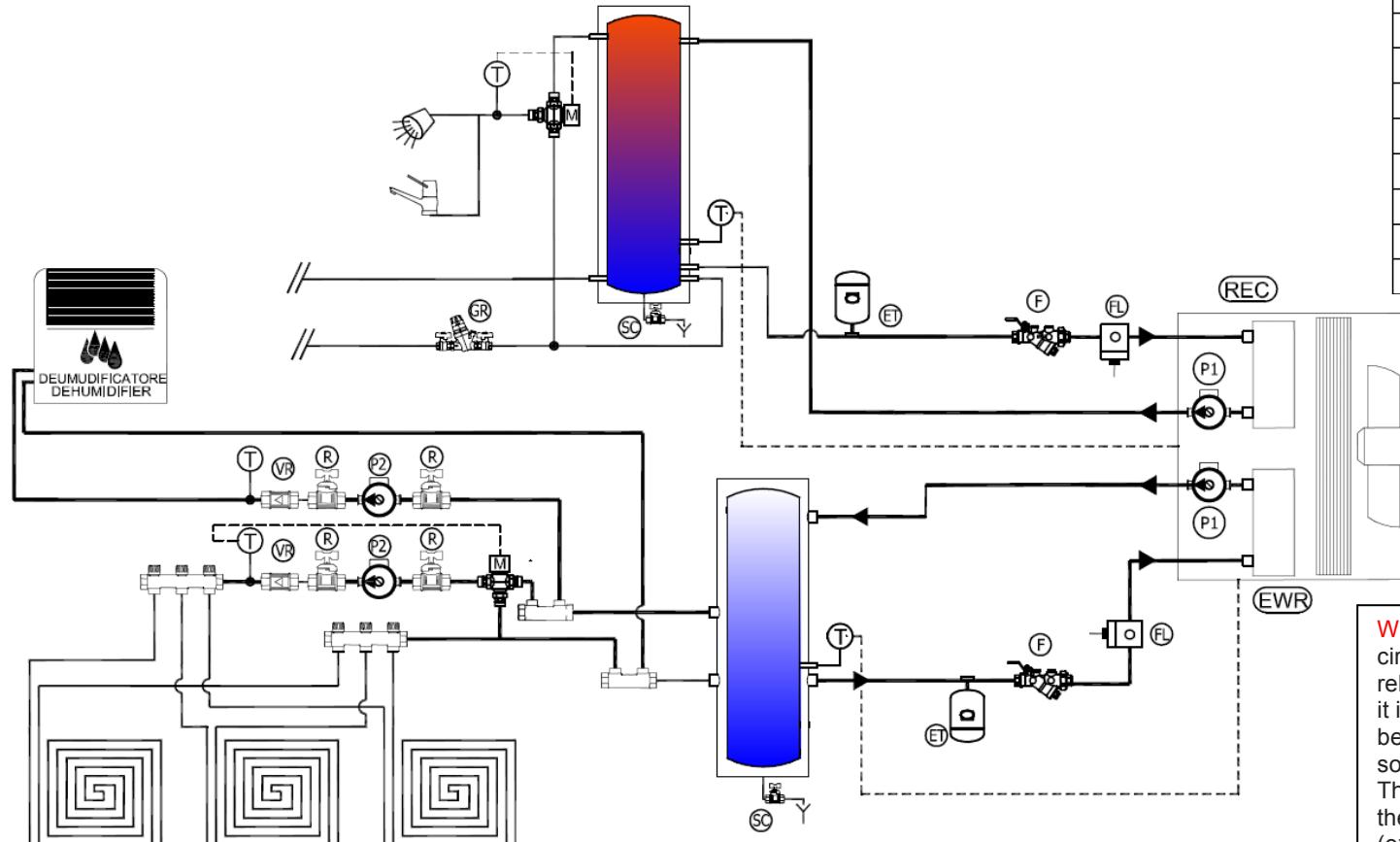
Lp (1m) = 89 dB(A) - 11 dB(A) = 78 dB(A)

Correction factor for Sound pressure Level at 1, 5, 10, 30 mt	
Distance	Correction factor
[m]	[dB (A)]
1	-11,0
5	-25,0
10	-31,0
20	-37,0
30	-40,5



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PLANT SKETCH AND ACCESSORIES (STANDARD VERSION)



P1	POMPA PRIMARIO	- PRIMARY PUMP
P2	POMPA SECONDARIO	- SECONDARY PUMP
T	SONDA TEMPERATURA	- TEMPERATURE PROBE
FL	FLUSSOSTATO	- FLOW SWITCH
SC	SCARICO	- DRAINAGE
ET	VASO DI ESPANSIONE	- EXPANSION VESSEL
GR	GRUPPO DI RIEMPIMENTO	- FILLING GROUP
F	RACCOGLITORE IMPURITA'	- STEEL MESH STRAINER
VR	VALVOLA DI NON RITORNO	- CHECK VALVE
R	VALVOLA INTERCETTAZIONE	- INTERCEPTION VALVE

Warning: Remoting probes return of air conditioning circuit and HSW circuit and removing the jumper between relay circulators, its' possible to stop the circulation when it is not required to activate it. If the outside temperature is below 4 ° C, the operation of the circulators is forced from software to avoid formation of ice in the heat exchangers. The pumps will run at minimum speed in any cycle, even if their activation is not required by the operating cycle (example: drive mode in winter conditioning, HSW circular active with minimum speed).



HEATING SYSTEM

ELEC1

ELECTRICAL POWER SUPPLY



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Check out that the power supply n
the label in the unit's front 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. Power cables and line fuses have to be sized according to the specifications listed in the wiring diagram enclosed with the unit.

	<p><i>WARNING: The supply voltage's fluctuations can not exceed ±10% of the nominal value. Should this tolerance not be respected, please contact our technical department.</i></p>
	<p><i>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.</i></p> <p><i>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.</i></p>
	<p><i>WARNING: The remote control panel is connected to the water chiller by means of no.4 wires having a 1,5 mm² section. The power supply cables have to be separated from the remote control wires. The maximum distance is 50m.</i></p>
	<p><i>WARNING: The remote control panel cannot be installed closed to areas exposed to strong vibrations, corrosive gases, filth excess or high levels of humidity.</i></p>

Power connection

Protect the electric panel supply circuit through protection devices.

Connect the unit power supply to the line with a section wire compliant to the unit absorption and to the regulation in force.



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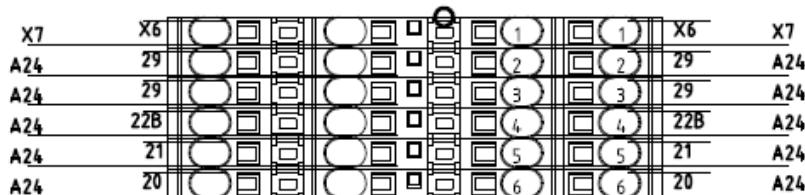
WIRING TERMINAL BLOCK



Electrical wiring have to be done only by qualified personnel.

The electrical connections have to be realized by qualified personnel. The terminal block is located under the unit central panel within the electric panel, and is marked as QG-X. **The terminal block** shall be connecting respecting the following instructions:

QG - X



PE) general groundind.

NN) power supply neutral wire;

L) General supply phase

29) Power supply phase wire (closed= air conditioning activation/open = air conditioning disactivated). Clean contact to connect
A24) recovery abilitation (close = air conditioning activation/open = air conditioning disactivated). Clean contact to connect

23) inlet recovery flow swtich .

A24) inlet recovery flow swtich .

77B) inlet recovery flow swtich

A24)) inlet evaporator flow swtich.

21) summer/winter switching mode input via remote control (closed = summer/open = winter Clean contact to connect);.

A24) summer/winter switching mode input via remote control (closed = su)

20) remote on-off input (closed = unit ON/open = unit OFF);

A24) remote on-off input (closed = unit ON/open = unit OFF);

28) Ingresso pressostato differenziale lato sorgente. Da collegare contatto pulito.

A24)differential pressure switch.

10) outlet source water temperature

13) outlet source water temperature

Rp3-11) source water pump. (closed if the pump is working) directly on the modular relè .

Rp3-14) source water pump. (closed if the pump is working) directly on the modular relè ..

Ral-11) cumulative alarm NO

Ral-14) cumulative alarm NO

N.B.: If the unit works with a monophase supply terminals shall be connected:

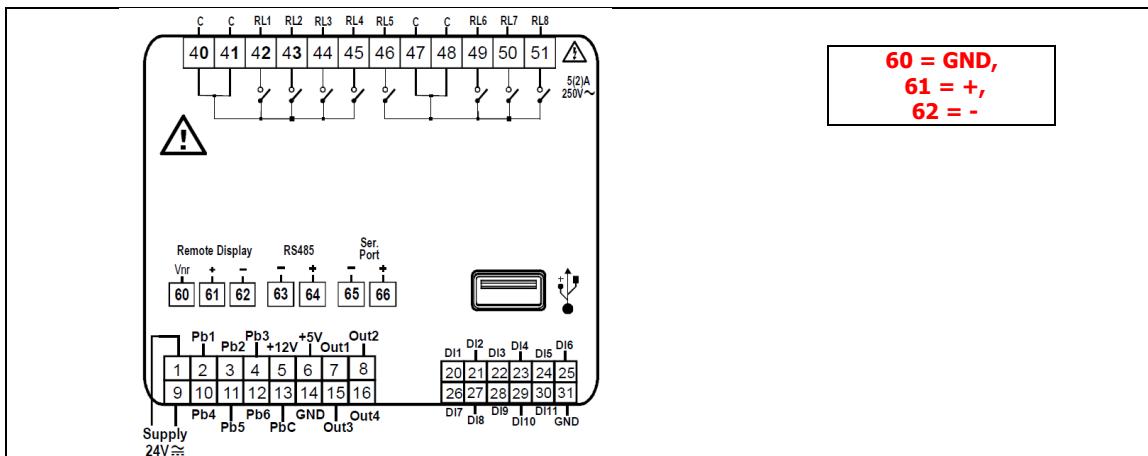


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Remote control panel connection





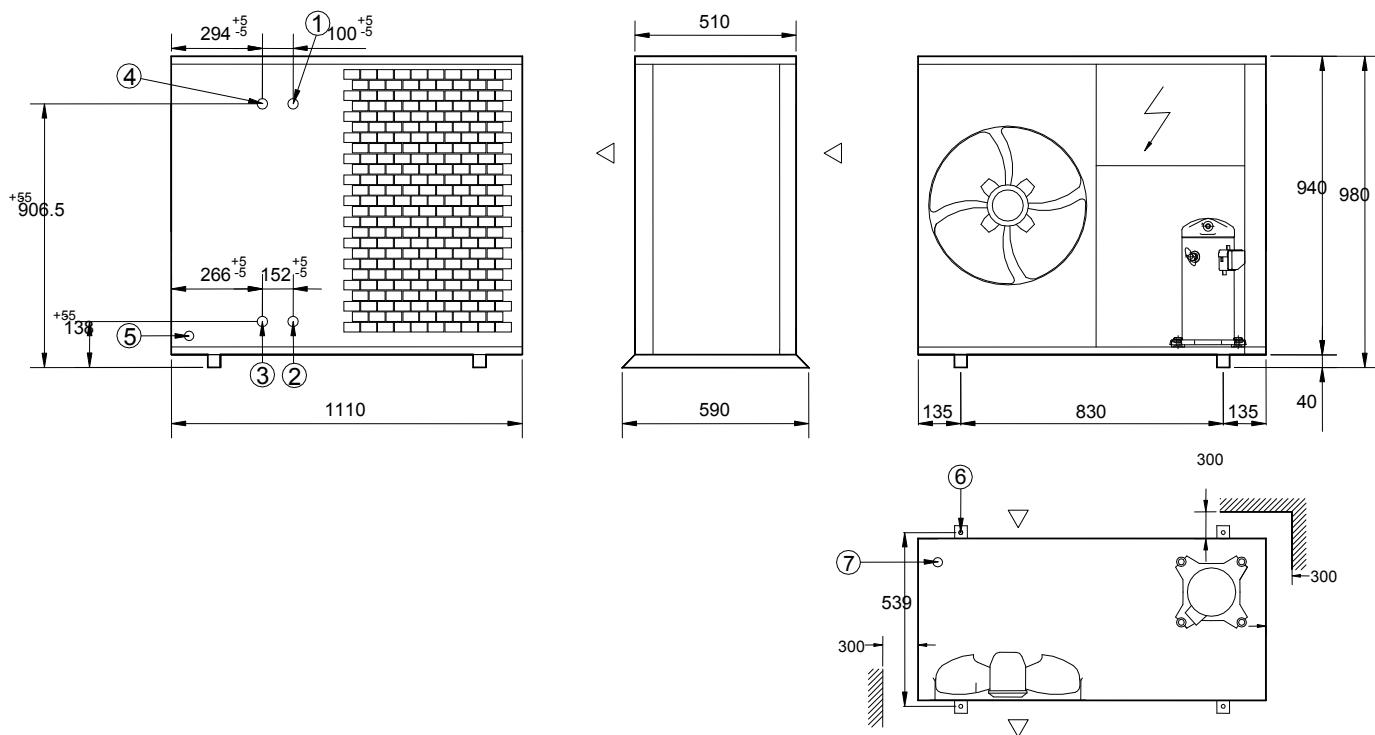
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DIMENSIONAL DRAWINGS AND WEIGHT

MARA 15 Z- 18 Z



1 ENTRATA ACQUA PER CONDIZIONAMENTO WATER INLET FOR AIR CONDITIONING	4 USCITA ACQUA AL CIRCUITO PER SANITARI OUTLET TO SANITARY CIRCUIT
2 USCITA ACQUA PER CONDIZIONAMENTO WATER OUTLET AIR CONDITIONING	5 INGRESSO CAVI POWER SUPPLY
3 ENTRATA ACQUA AL CIRCUITO PER SANITARI INLET TO SANITARY CIRCUIT	6 FORI FISSAGGIO ANTIVIBRANTI Ø8 HOLES FOR MOUNTING ANTIVIBRATION ABSORBERS Ø8
	7 SCARICO CONDENSA Ø1/2" gas CONDENSATE DISCHARGE Ø1/2" gas

Grandezze - Sizes	15	16	18
1	Ø	3/4"	3/4"
2	Ø	1"	1"
3	Ø	1"	1"
4	Ø	3/4"	3/4"

Pesi in funzionamento - Operation weights	kg	117	119	122



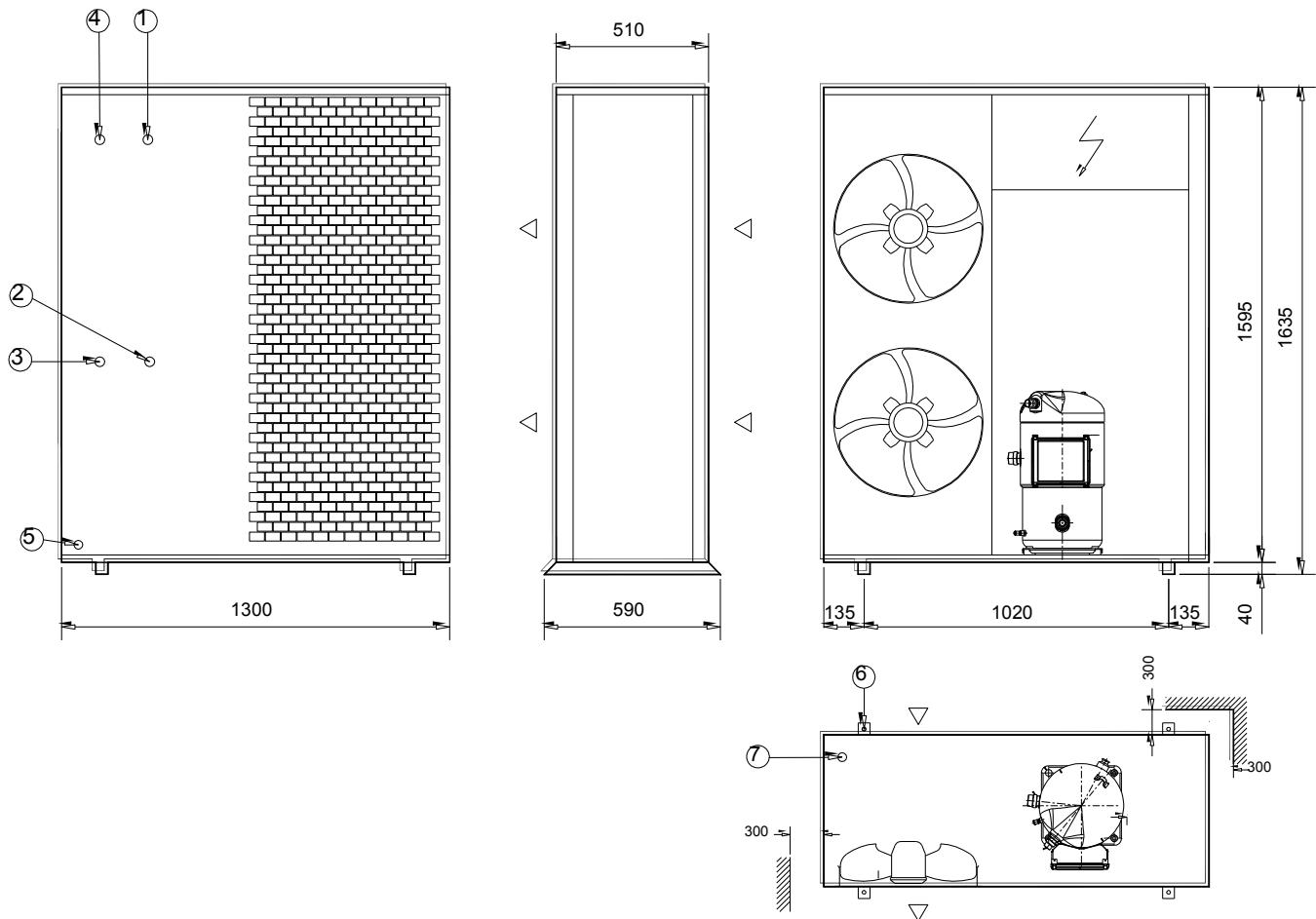
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DIMENSIONAL DRAWINGS AND WEIGHT

MARA 114 Z- 119 Z



1 ENTRATA ACQUA PER CONDIZIONAMENTO WATER INLET FOR AIR CONDITIONING	4 USCITA ACQUA AL CIRCUITO PER SANITARI OUTLET TO SANITARY CIRCUIT
2 USCITA ACQUA PER CONDIZIONAMENTO WATER OUTLET AIR CONDITIONING	5 INGRESSO CAVI POWER SUPPLY
3 ENTRATA ACQUA AL CIRCUITO PER SANITARI INLET TO SANITARY CIRCUIT	6 FORI FISSAGGIO ANTIVIBRANTI Ø8 HOLES FOR MOUNTING ANTIVIBRATION ABSORBERS Ø8
7 SCARICO CONDENSA Ø1/2" gas CONDENSATE DISCHARGE Ø1/2" gas	

Grandezze - Sizes	114	115	117	119
1 - 3 Ø	1"	1"	1"	1"
2 - 4 Ø	1"	1"	1"	1"

Pesi in funzionamento - Operation weights kg	155	170	177	191



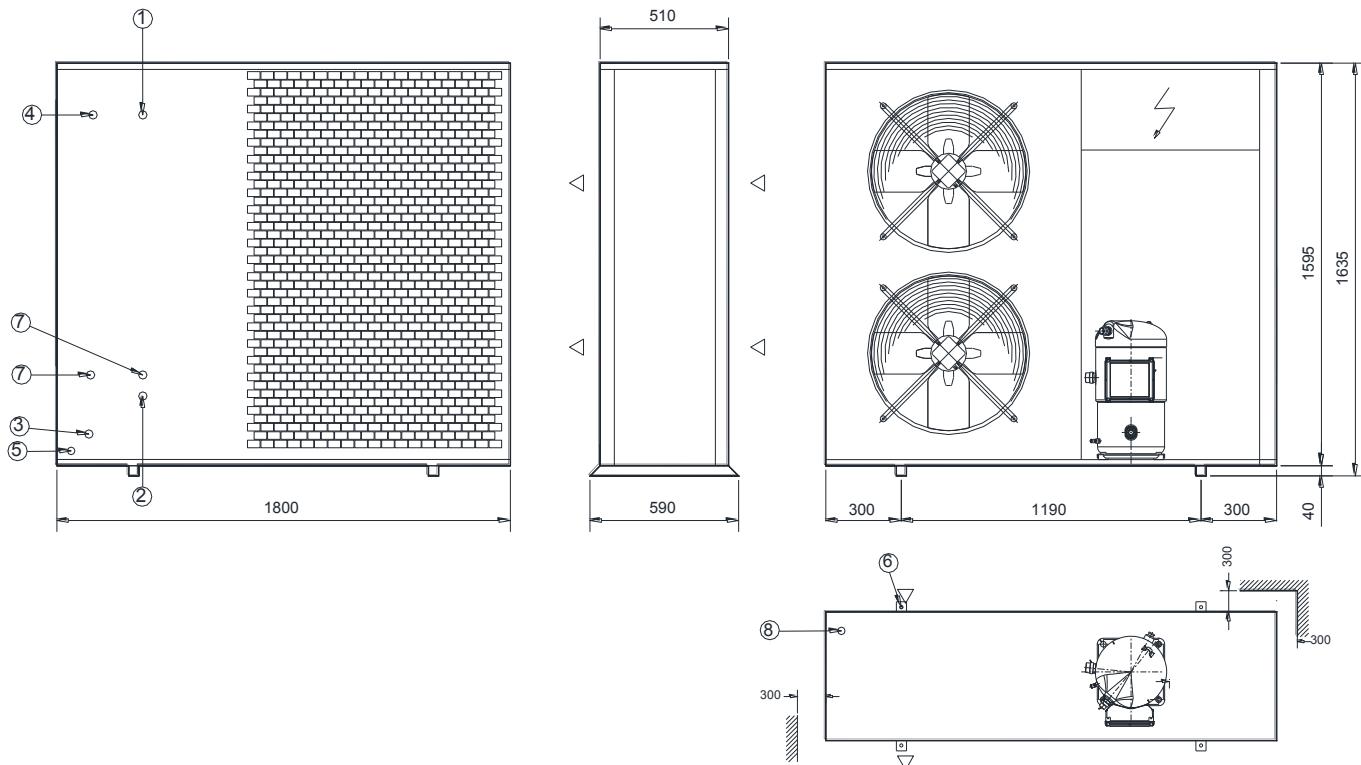
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DIMENSIONAL DRAWINGS AND WEIGHT

MARA 126Z – 140 Z



1 ENTRATA ACQUA PER CONDIZIONAMENTO WATER INLET FOR AIR CONDITIONING	4 USCITA ACQUA AL CIRCUITO PER SANITARI OUTLET TO SANITARY CIRCUIT
2 USCITA ACQUA PER CONDIZIONAMENTO WATER OUTLET AIR CONDITIONING	5 INGRESSO CAVI POWER SUPPLY
3 ENTRATA ACQUA AL CIRCUITO PER SANITARI INLET TO SANITARY CIRCUIT	6 FORI FISSAGGIO ANTIVIBRANTI Ø8 HOLES FOR MOUNTING ANTIVIBRATION ABSORBERS Ø8
7 SCARICO VALVOLA DI SICUREZZA Ø3/4" DISCHARGE SAFETY VALVE Ø3/4"	8 SCARICO CONDENSA Ø1/2" gas CONDENSATE DISCHARGE Ø1/2" gas

Grandezze - Sizes	126	132	140
1	Ø	1 1/4"	1 1/4"
2	Ø	1"	1"
3	Ø	1"	1"
4	Ø	1 1/4"	1 1/4"

Pesi in funzionamento - Operation weights			
kg	290	361	386

Thermocold Costruzioni s.r.l.
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