



MEX EXR R454C

25÷29

210÷420

Reversible Heat Pumps for High Temperature Water production



ErP
COMPLIANT

WE MAKE INNOVATIONS. WE PROVIDE SOLUTIONS.

 Thermocold®
THE AIRVOLUTION

MEX EXR R454C

Reversible Heat Pumps for High Temperature Water production



Heating/cooling and domestic hot water production DHW



REFRIGERANT R454C - Ecological with low GWP

ADVANCED FUNCTIONS: Management of **hybrid systems** and **domestic hot water production**



SCROLL COMPRESSORS - High efficiency scroll compressors optimized for R454C refrigerant



HOT WATER UP TO 65°C - Hot water from -20°C up to +40°C of external air



HYDRAULIC OPTIONS: Single or double pumps and inertial tank



Very silent with SL accessory



Eurovent certification

Reliability of the performances and quality assurance of Thermocold products and their characteristics



Efficiency

High efficiency units both at nominal and at partial loads **(ErP compliant at MT and LT)**

ErP
COMPLIANT



Composition: 22%R32 + 78% R1234yf

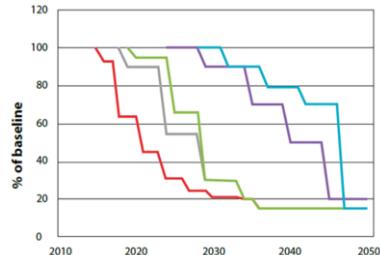


Classification: A2L, non-toxic and low flammable

Low GWP = 146

- 93% vs R410A (GWP 2088)
- 78% vs R32 (GWP 675)
- 91% vs R407C (GWP 1774)

Continuous phase-down of HFC



EU F-GAS : EU community

Non A5-1: Andorra, Australia, Azerbaijan, Canada, Cyprus, Denmark, Iceland, Israel, Japan, Liechtenstein, Monaco, New Zealand, Norway, Switzerland, Ukraine, **United States of America**.

Non A5-2: Belarus, Kazakhstan, **Russia**, Tajikistan, Uzbekistan.

A5-1: The 137 other Parties of the Montreal Protocol (eg. China).

A5-2: Bahrain, India, Iran, Iraq, Kuwait, Oman, Pakistan, Qatar, Saudi Arabia, and the United Arab Emirates.

Reference volume (100%) corresponding to the mean annual total of CO₂ equivalent introduced in UE's atmosphere between 2009 and 2012.

TECHNICAL FEATURES

Last generation **AC FANS** with speed modulation for a perfect control in all operating field (EC fans as option)



Microprocessor electronic control with display (CR- remote control option)



Cu/Al coil with hydrophilic treatment (TX- prepainted fins as option)



Scroll Compressors optimized for R454C:

- 2cpr/1 circuit sizes 25-210
- 4cpr/2 circuits sizes 414-420

SS-soft starter option

EEV for an accurate control of the refrigerant flow and a reduced superheat



Stainless steel AISI 316 plate exchanger, complete with flow switch and antifreeze electric heater (counterflow both in cooling and heating operation)



THE RANGE



25 ÷ 29

High temperature heat pump with scroll compressors. Refrigerant R454C.

- 3 sizes
- Heating capacity: 20-23-29 kW
- Cooling capacity: 17-20-25 kW
- 2 compressors/1 circuit



210 ÷ 420

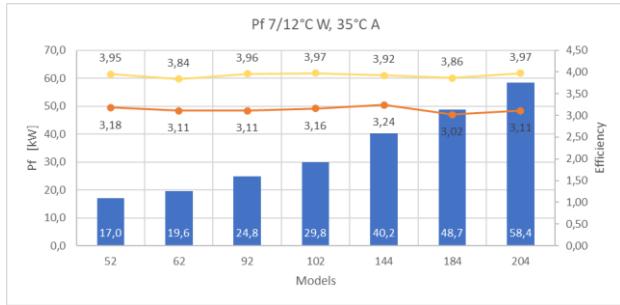
High temperature heat pump with scroll compressors. Refrigerant R454C.

- 4 sizes
- Heating capacity: 34-44-54-67 kW
- Cooling capacity: 30-40-47-59 kW
- 210: 2 compressors/1 circuit
- 410 - 420: 4 compressors/2 circuits

Key points:

- Low GWP refrigerant
- High seasonal and nominal efficiency
- Hot water up to 65°C
- Advanced functions integrated on the control system

PERFORMANCES AND EFFICIENCY in COOLING



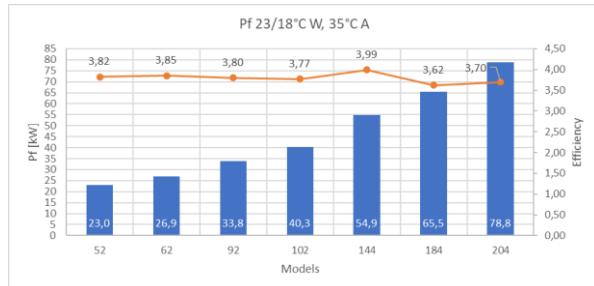
*Increased energy seasonal efficiency
 SEER
 with EC accessory!*



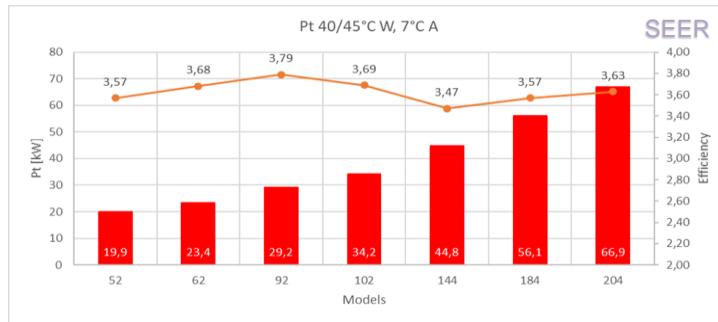
Pf-EER 7/12, 35° C EN 14511
 SEER EN14825 - low temperature 7/12° C

EER>3,8

EER>3,5

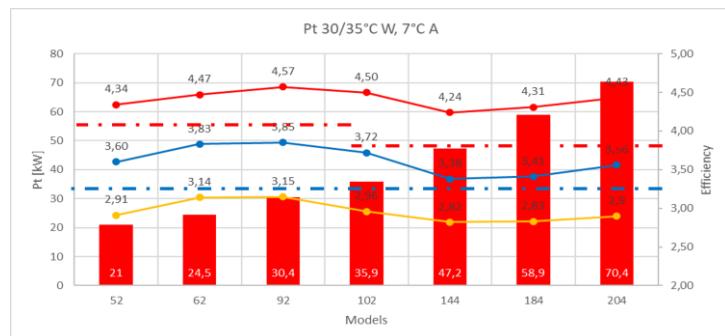


Pf-EER 18/23, 35° C EN 14511



Pt-COP 40/45, 7° C EN 14511

COP>4,1
 COP >3,8
 SCOP LT>3,2
 SCOP MT>2,82

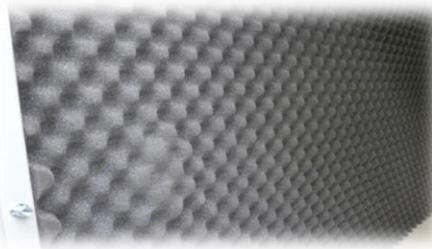


Pt-COP 30/35, 7° C EN 14511
 SCOP LT EN14825 - low temperature 30/35° C
 SCOP MT EN14825 - medium temperature 47/55° C

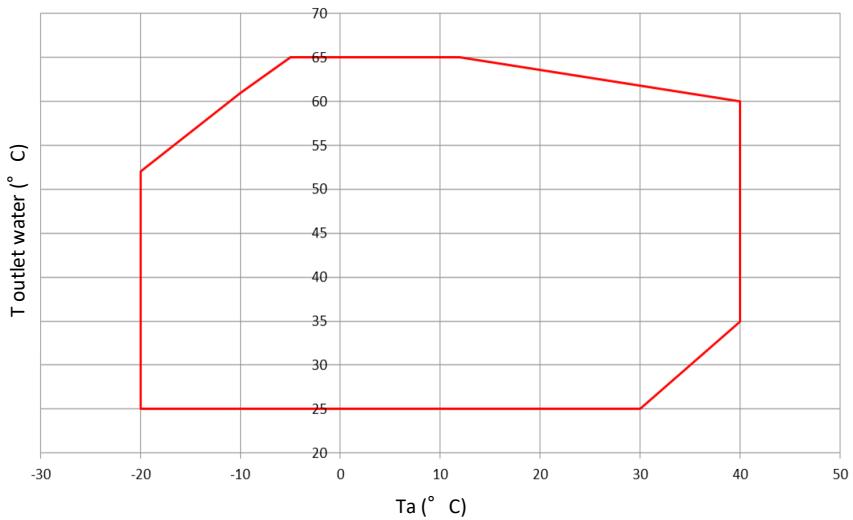
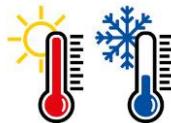
SOUND LEVELS



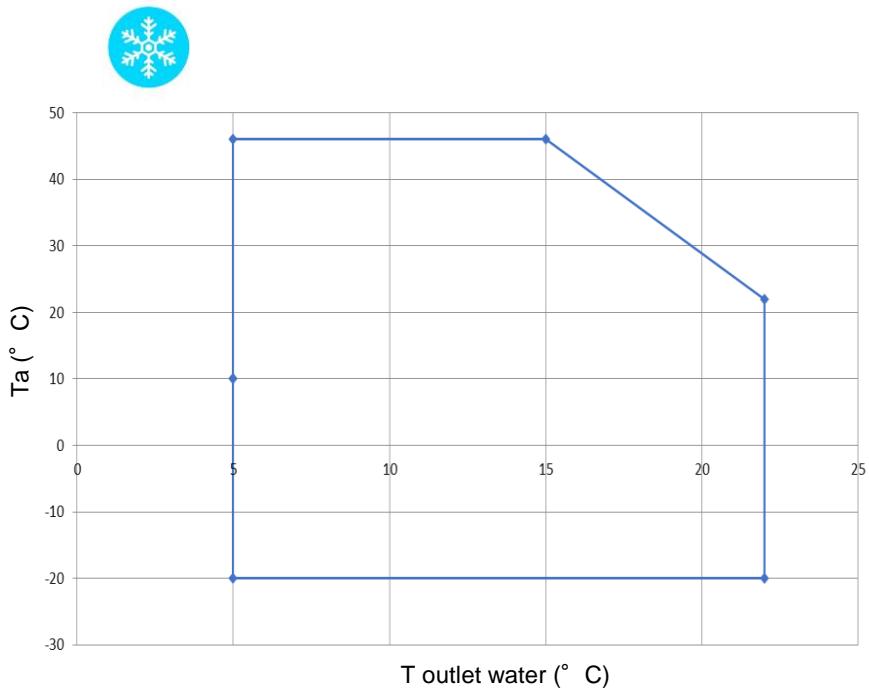
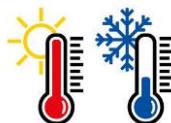
SL- Unit silencement with compressor case and soundproofing insulation



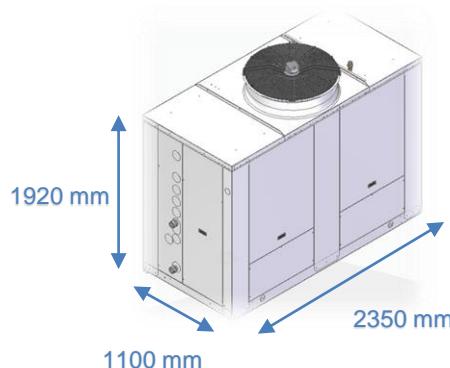
OPERATING FIELD IN HEATING



OPERATING FIELD IN COOLING



DIMENSIONS



25 ÷ 29

210

414 – 420

ADVANCED FUNCTIONS

Main functions **integrated**
that **can be enabled** by the user:



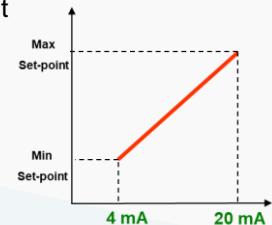
- Remote set-point with 0-10 V signal (IAV)
- Remote set-point with 4-20 mA (IAA)
- Climatic compensation— change of the set-point according to the external air temperature
- Remote signal for second set-point activation (IAS)
- Demand limit from digital input (IDL)
- Pump «energy saving» function
- Domestic hot water management (DHW)
- Hybrid systems management (HYM)

REMOTE SET-POINT WITH 0-10 V SIGNAL (IAV)

REMOTE SET-POINT WITH 4-20 mA (IAA)

In some environments or installations it is useful to associate a variation of the set-point according to plant loads or specific unit's functioning modes, for example radiant panel applications.

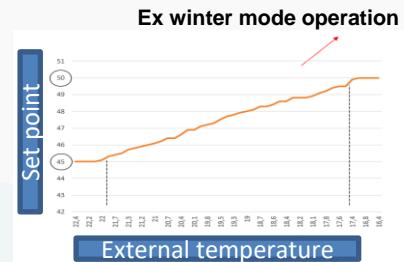
Set-point changes according to the analog input (in voltage or current) with a wired external remote control



REMOTE SET-POINT WITH 0-10 V SIGNAL (IAV)

REMOTE SET-POINT WITH 4-20 mA (IAA)

It is possible to make set-point compensation according to the external air temperature (temperature probe standard on the unit). According to the external air temperature, the set-point is calculated by adding (winter period) or by subtracting (summer period) an offset value to the set-point. It is possible to decide whether to activate the function in both operating modes or only in one of them.



REMOTE SIGNAL FOR SECOND SET-POINT ACTIVATION (IAS)

In some environments or installations it can be useful to pre-set different unit's functioning modes, for example because the building is more or less crowded depending on time, e.g. night/day or working days/weekend. To meet these different needs the standard functioning set-point can be modified, adding or subtracting a set value. The set point changes according to the input of an external device or, for example, by time slots. As the standard set-point, also the second set-point can have values between a pre-defined working range.

With the IAS accessory the second set-point is enabled through a **digital input**.



Set-point 1
Set-point 2



DEMAND LIMIT FROM DIGITAL INPUT (IDL)

The IDL accessory allows self-limiting unit's absorbed and delivered power, for example during the time when the building is not occupied, or when there is low need of heating or cooling for specific needs related to the maximum electrical absorption to be respected. With IDL accessory the unit can be set to self-limit its delivered power at a certain percentage, precisely pre-defined from parameter (value set as % of total delivered power). Consequently, the absorbed power will also be lower and total energy consumption will be reduced.

Through IDL accessory the power limitation can be managed through a digital input.

PUMP «ENERGY SAVING» FUNCTION

Function already enabled. Thanks to the «pump energy saving» function (sniffer) the user side pump is switched off at set-point achieved in an energy saving logic. The reactivation then takes place at regular intervals and is preparatory to the intervention of the antifreeze alarm and the thermoregulation



MANAGEMENT OF DOMESTIC HOT WATER PRODUCTION (DHW)

If the function is enabled the microprocessor control can manage (from digital external input ex. thermostat, from analogue input ex. Probe) a 3-way diverter valve (V3D accessory) for domestic hot water production (digital output).

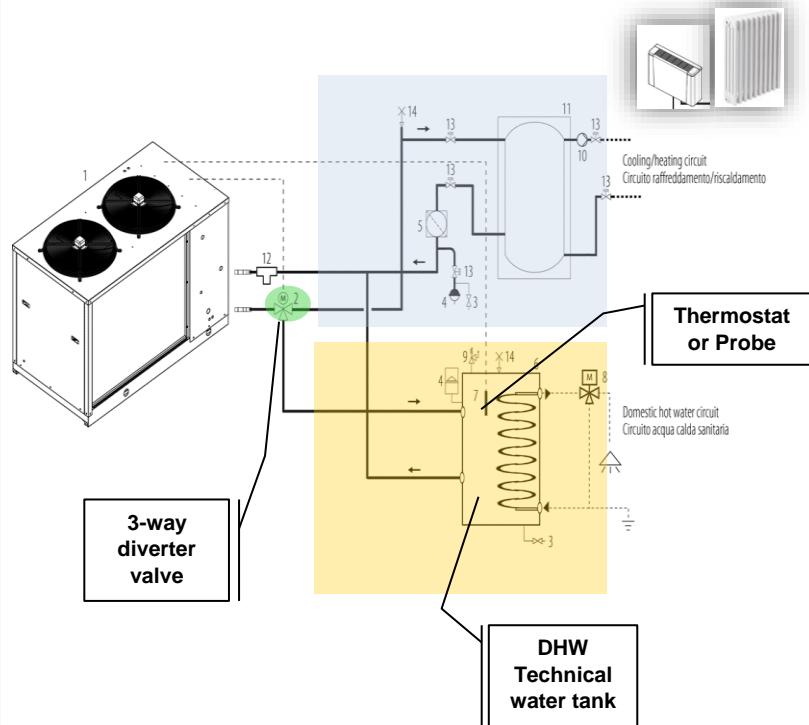
3 operating modes are allowed:

- SUMMER OPERATION AND DHW PRODUCTION (priority management)
- WINTER OPERATION AND DHW PRODUCTION (priority management)
- DHW PRODUCTION ONLY



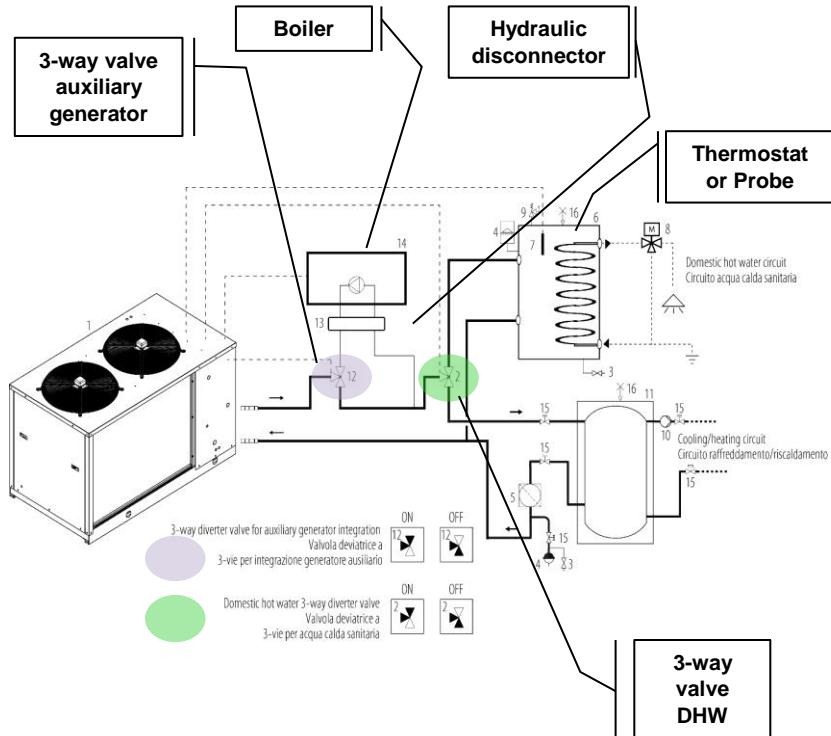
MANAGEMENT OF DOMESTIC HOT WATER PRODUCTION (DHW) EXAMPLE OF THE HYDRAULIC CIRCUIT

- HP can't be equipped with tank (SI accessory)
- DHW requirement managed through external digital or analogue input
- 3-way diverter valve must be installed on the supply line in order to divert the water flow from the plant to the domestic hot water circuit
- Priority is given to DHW requirement
- It is recommended:
 - place the thermostat inside the technical water tank at least 5 ° C below the DHW set point of the heat pump
 - place the 3-way valve as close as possible to the heat pump to avoid, during summer operation, pouring of cold water present in the pipes on the sanitary technical water tank



MANAGEMENT OF HYBRID SYSTEMS (HYM) EXAMPLE OF THE HYDRAULIC CIRCUIT

- HP can't be equipped with tank (SI accessory)
- The hybrid system is controlled by the heat pump microprocessor and this implies that the circulation pump on the heat pump is switched on in accordance with the thermoregulation logics. Any shutdown of the pump (caused for example by the flow alarm) will also coincide with the end of the request from the auxiliary generator.
- In case of a heat pump alarm that does not affect the circulation pump, the controller can activate the auxiliary boiler respecting the management rules envisaged by the HYM function.
- Both the two 3-way diverter valve (for DHW and auxiliary generator) must be connected to the terminals on the electrical board and managed by the unit control.
- The heat pump is put in stand-by in case of water return temperature too high to avoid high pressure alarm (through a thermostat, not supplied, that must be connected to the digital input on the electrical board).



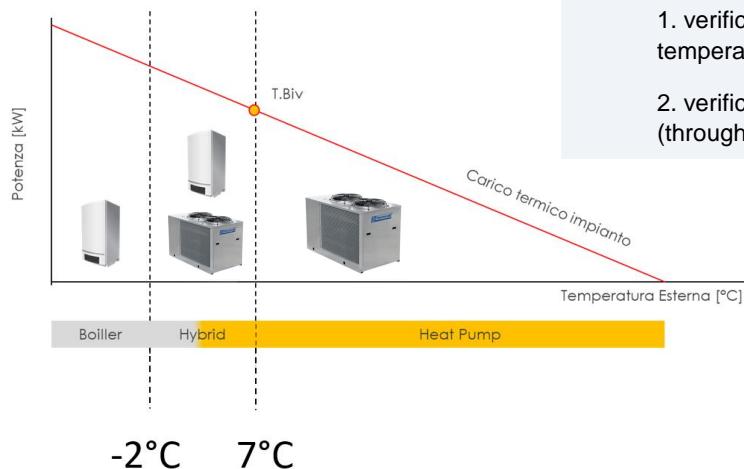
MANAGEMENT OF HYBRID SYSTEM (HYM)

If the function is enabled, the microprocessor control can manage an external source in integration/replacement of the heat (electrical heater/boiler).

The hybrid system is able to meet both the requirements of the plant and the production of domestic hot water (if DHW function is enabled).

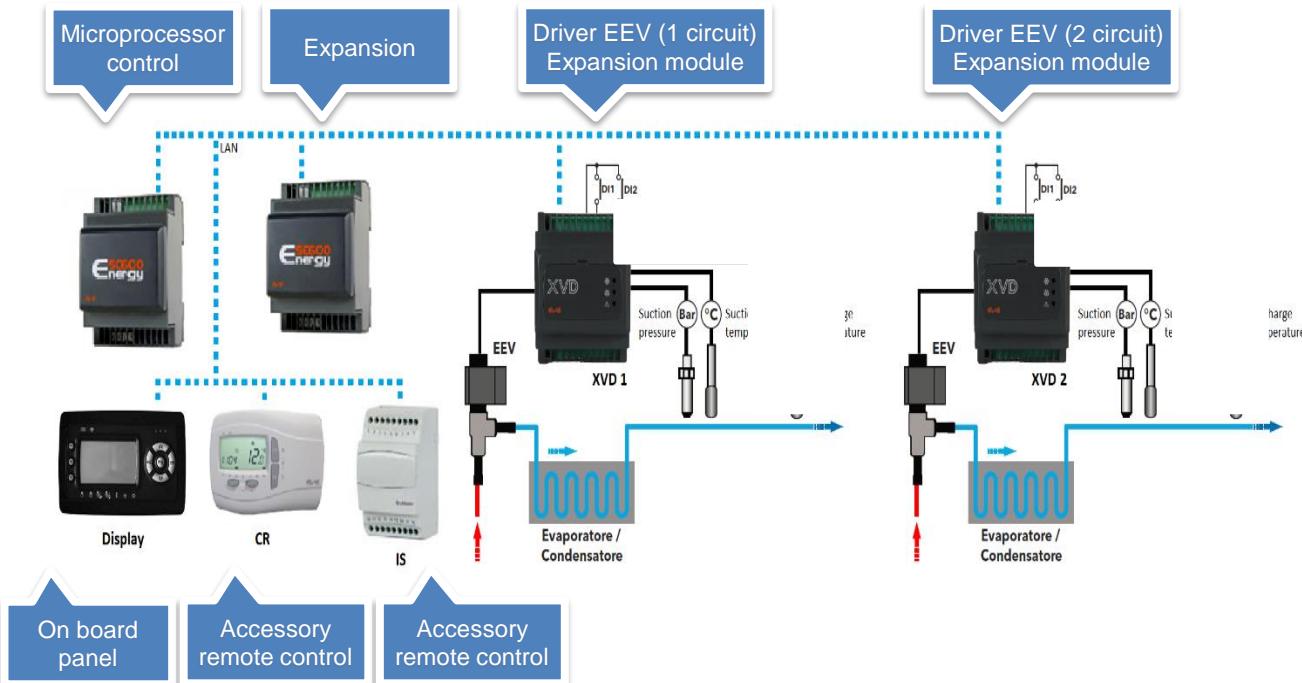
To manage the request of the auxiliary generator (through digital output), the microprocessor control verifies two different aspects:

1. verification of the external air temperature (through temperature probe in the unit)
2. verification of the thermoregulation temperature (through temperature probe on the water)



ELECTRIC BOARD & MICROPROCESSOR CONTROL

Boards and interfaces -> the same for all the units



User interfaces



Display

On board panel with display.

- 3 access levels: user - service - manufacturer.
- Buttons for digital icon selection and display.

It allows the visualization of all the process variables of the unit, the access to the parameters of setting of the work sets and their modification. On the technical assistance level, it allows access to the management parameters of the unit through a password (access allowed only to authorized personnel)



Remote control panel (CR accessory)

With the same functions of the on board panel

For remote control2

Graphic display of the status of the unit:
Heating/cooling/stand-by/alarm/defrosting/economy

Input/Output visualization

Temperature/pressure visualisation

EEV status visualization (% of opening)

Active alarms

Manual reset alarms

Change of the set point

Modification of operating mode: heating/cooling/DHW

ON-OFF switch

Weekly scheduler (ON-OFF)

FACTORY FITTED ACCESSORIES

- **SI** – Inertial tank

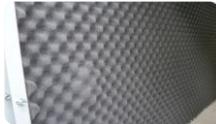
MODEL		25 - 29	210 - 420
Water content	l	100	400

- **PS** – Single circulating pump. On board of the unit.
- **PD (only for 210÷420 sizes)** – Double circulating pump (1+1 in stand-by). On board of the unit. At each activation the pump with less functioning hours is activated.
- **PSI** – Inverter single circulating pump. On board of the unit.
- **PDI (only for 210÷420 sizes)** - Inverter double circulating pump (1+1 in stand-by). On board of the unit. At each activation the pump with less functioning hours is activated.
 - With a fixed speed pump, the calibration / commissioning of the system can be done by acting through traditional adjustment devices (eg calibration valves) by introducing pressure drops to compensate for the excess head given by the pump. The accessory allows the simplification of the calibration and commissioning operations at the end of the calibration, the unit must work at a constant flow rate.
- **IS** - Modbus RTU protocol, RS485 serial interface-> Unit supervision can be easily developed via proprietary devices or the integration in third party systems by means of Modbus RTU protocol over RS485 serial interface.



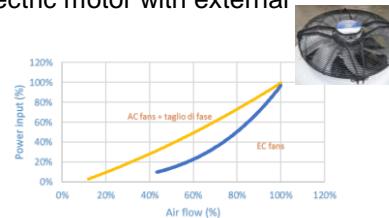
- **SL** – Unit silencement.

- “Coat” cover on compressors, made of soundproof material with external plastic covering that further protects it from impacts, scratches and rain. Soundproof insulating material made of Polyurethane foam sheets on the side panels. Sound power reduction of -2dB(A)



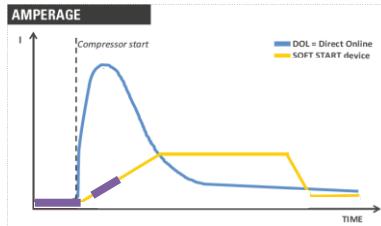
- **EC** - EC Inverter fans. Axial fans directly coupled to an Inverter three-phase electric motor with external rotor. A safety fan guard is fitted on the air flow discharge.

- Low consumption especially at partial loads
- Fan speed variation for enlarge operating envelope and better control
- Low noise at partial loads



- **ECH (only for 210÷420 sizes)** - EC Inverter fans with high available static pressure. Axial fans directly coupled to an Inverter three-phase electric motor fitted with an enhanced nozzle to increase both efficiency and available static pressure, with a range from 60 to 110 Pa. Their use allows ducted/indoor installation. A safety fan guard is fitted on the air flow discharge.

- **SS-Soft start**
 - reduction of the inrush current peak



- **TX- Coil with pre-coated fins** (ATT! ML/F units have as standard coils with hydrophilic treatment to avoid ice on the coil. TX accessory excludes hydrophilic treatment)
 - To be used on aggressive environments. It consist on a polyurethane single layer film on coil fins applied with spray method.
- **GDS- Leak detector (sniffer)**
 - When the sniffer takes action an alarm is managed that switches off all the active resources (pump, fans, compressors). The alarm is reset manually



- **FO-FG-FM-FUM-FDM** - Antifreeze heater for tank, pipes and single/double pump
- **PCF1-Power factor correction condensers ($\cos\phi=0,95$)**
 - are useful to increase the $\cos\phi$ of the units, reducing the reactive power.

ACCESSORIES SUPPLIED LOOSE

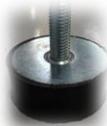
- **CR** – Remote control panel. Same functions of the on-board panel



- **V3D** – 3-Way valve for domestic hot water production



- **RP** – Coil protection metallic guards



- **AG** – Rubber shocks absorbers.

- **AM (only for 210÷420)** - Spring shocks absorbers

**THANK YOU FOR YOUR
KIND ATTENTION!**

WE MAKE INNOVATIONS. WE PROVIDE SOLUTIONS.

