WELCOME
Open Days April 2013

Galletti
AIR CONDITIONING

Over 100 years of History and tradition

The Galletti Family have

over 100 years history in the

mechanical manufacturing industry &

over 50 years history in the heating

and air conditioning business

Galletti together with Columbus is

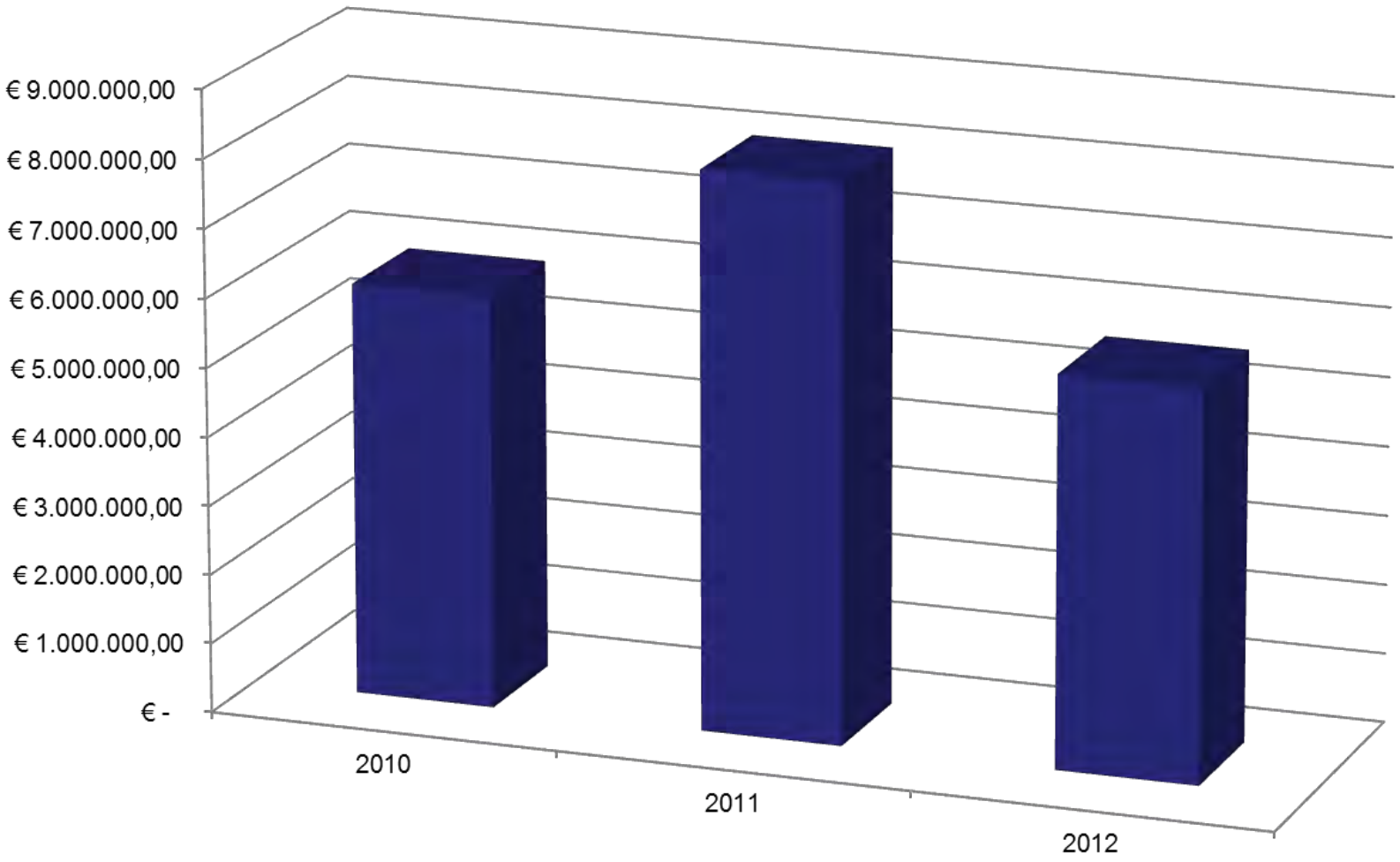
over **20 years presence** in the

Hungarian Market..

Over 100 years of History and tradition

Galletti Group now consists of 6 manufacturing plants totalling over 60.000m² and has over 460 employees

Galletti Group Investment 2010-2012 – Total € 19.5 Mln

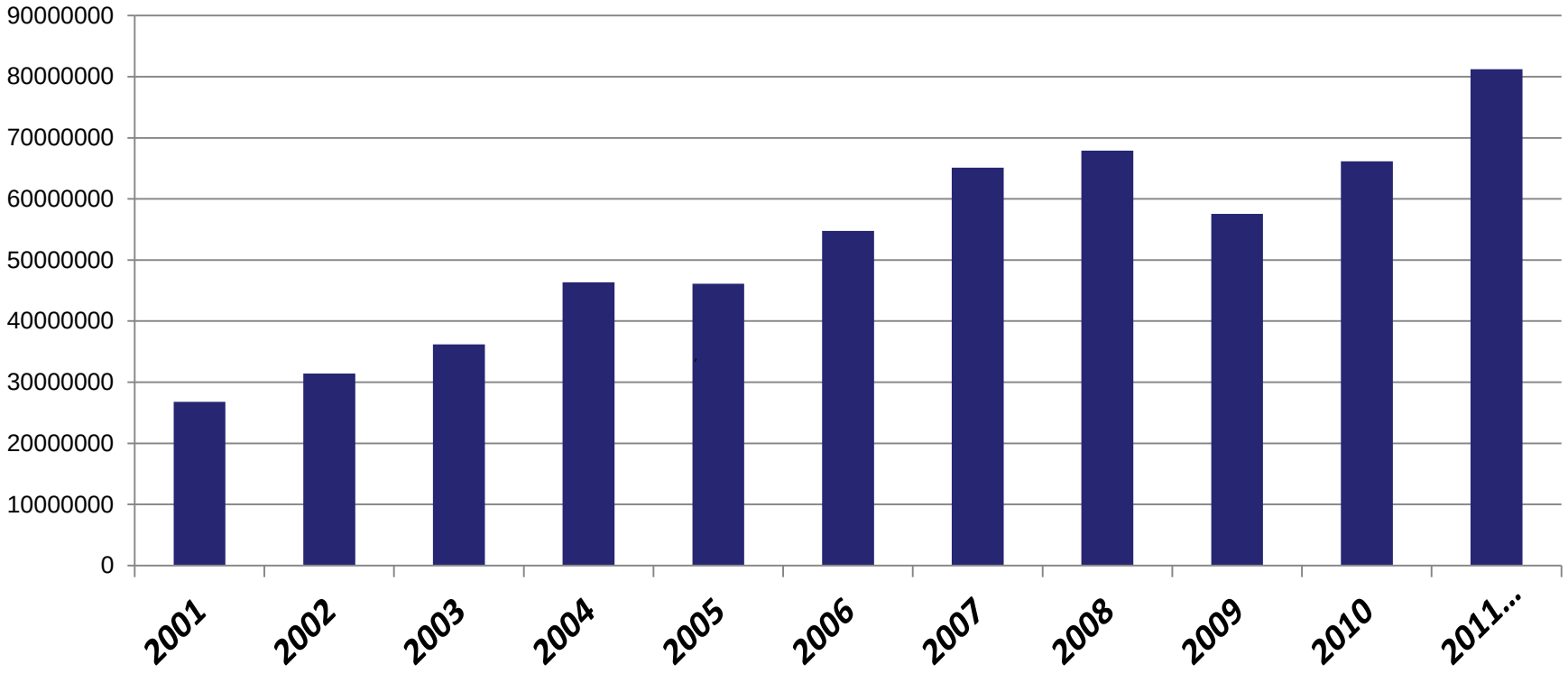


GALLETTI TODAY

Galletti S.p.A

24.000m^2 one of the biggest producer of fan coils & terminal units in Europe. Production also of chillers, heat pumps, polyvalent units, unit heaters for residential, commercial & industrial purposes

Galletti Group is one of the fastest growing groups in the HVAC field..




Export share on global turnover
80%
70%
60%
50%
40%
30%
20%
10%
0%
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
Domestic
Export

Product Development
2012/2013

Galletti
AIR CONDITIONING

New Developments 2013

- Extension of the LSE range to 1200kW
- Extension of the LEW range to 650kW
- New LCP multifunction heat pumps
- New HiWarm multifunction heat pumps
- New range of inverter units: MPI-DC
- New fan coil configuration: Estro 1.2
- New cassette IWC with innovative 4x2 valves for 4 pipe system
- MPE Series extended to 76kW
- New buffer tanks in collaboration with Cordivari

AIR COOLED CHILLERS and HEAT PUMPS

5 lines of chillers and heat pumps

from 4 to 1200 kW

WATER COOLED CHILLERS and HEAT PUMPS

Water-water chillers and heat pumps

….2013 the range has been extended to 650kW!

Full range of Multifunction HEAT PUMPS

Packaged Air/water :

4-350 kW

Split type Air/water :

1-33 kW

Water/water:

40-420 kW

GALLETTI news – ESTRO 1.2 NEW VERSION

ESTRO 1.2

22 sizes 9 constructive versions 3 different motors

Estro 1.2: an improved and competitive proposal

- The **widest range** in sizes and models on the market!
- Featuring the new generation of **inverters** motors
- A complete range of **sanified** fan coil units

Bioxigen®

Nuovo sistema Sanificazione Aria

New Purifying Air Innovation

Estro 1.2: the new range compared with main competitors

GALLETTI Estro 1.2																								
ESTRO		1	2	3	4		44	5	6	64	7		74		8	9	84	94	95	10	104		11	114	12
Cooling		1150	1540	1740	1960		2240	2420	2930	3290	3510		4560		4330	4770	4970	5400	5260	6710	7380		8020	8980	10950

AERMEC FCX series																								
FCX	17		22	24		32			34	42			50		44	54	62			64	82	102		84	
Cooling	1000		1500	1730		2210			2800	3400			4190		4450	4970	4860			6350	7420	7620		8600	

SABIANA CRC series																								
CRC	13	14	23	24		33	34	43	44		53	54	63		64	73	74	83	84	93	94				
Cooling	1030	1230	1560	1810		2390	2570	2870	3120		3640	4090	4090		4790	5110	5580	5820	6470	6740	7600				

Cooling capacity 1 – 11 kW

Estro 1.2: an improved and competitive proposal

- Heat exchangers with 2 / 3 / 4 rows

- 3 different motors
  - Standard 3 speeds
  - 6 speeds
  - BLDC inverter

- 9 constructive versions

…for a total amount of more than 350 configurations

Estro 1.2: exclusive features

Wide range: 20 models / 9 versions/ 3-speed electric motor

Higher quality EC motor: EMB range

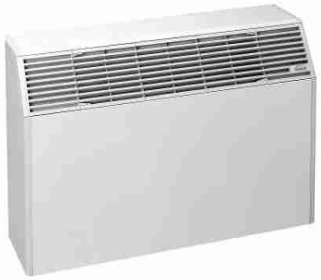
Control of fan coil unit based on temperature and humidity

Purification of terminal unit and environment: BIOXIGEN technology

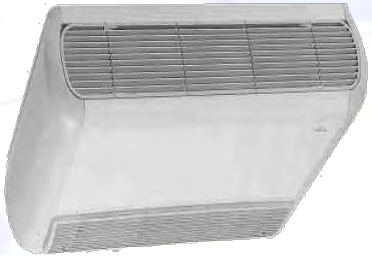
ESTRO 1.2: the versions with cabinet

FL/FLI:
- wall installation
- vertical air outlet
- bottom side inlet

FP/FPI:
- ceiling installation
- front side outlet
- rear side inlet



FA/FAI:
- wall installation, can be recessed in niche
- inclined air outlet
- bottom side inlet



FU/FUI:
- Floor/ceiling installation
- Vertical air outlet (in vertical installation)
- Front side inlet (in vertical installation)

CL/CLI:
- wall installation, color of the cabinet RAL 9001
- vertical air outlet
- bottom side inlet

FB/FBI:
- Floor/ceiling installation
- Low body only **438 mm** height
- Vertical air outlet (in vertical installation)
- Front side inlet (in vertical installation)

ESTRO 1.2: the versions for recessed installation

FC/FCI:

- Wall/ceiling installation
- front side outlet (in horizontal installation)
- Intake on rear side (in horizontal installation)

FF/FFI:

- Floor/ceiling installation
- Vertical air outlet
- Front side inlet

FBC/FBCI:

- Floor/ceiling installation
- Low body only **413 mm** height
- Vertical air outlet
- Front side inlet

Estro 1.2: BLDC technology

The permanent magnet electric motor (brushless), controlled by an inverter, allows the continuous variation of air flow rate

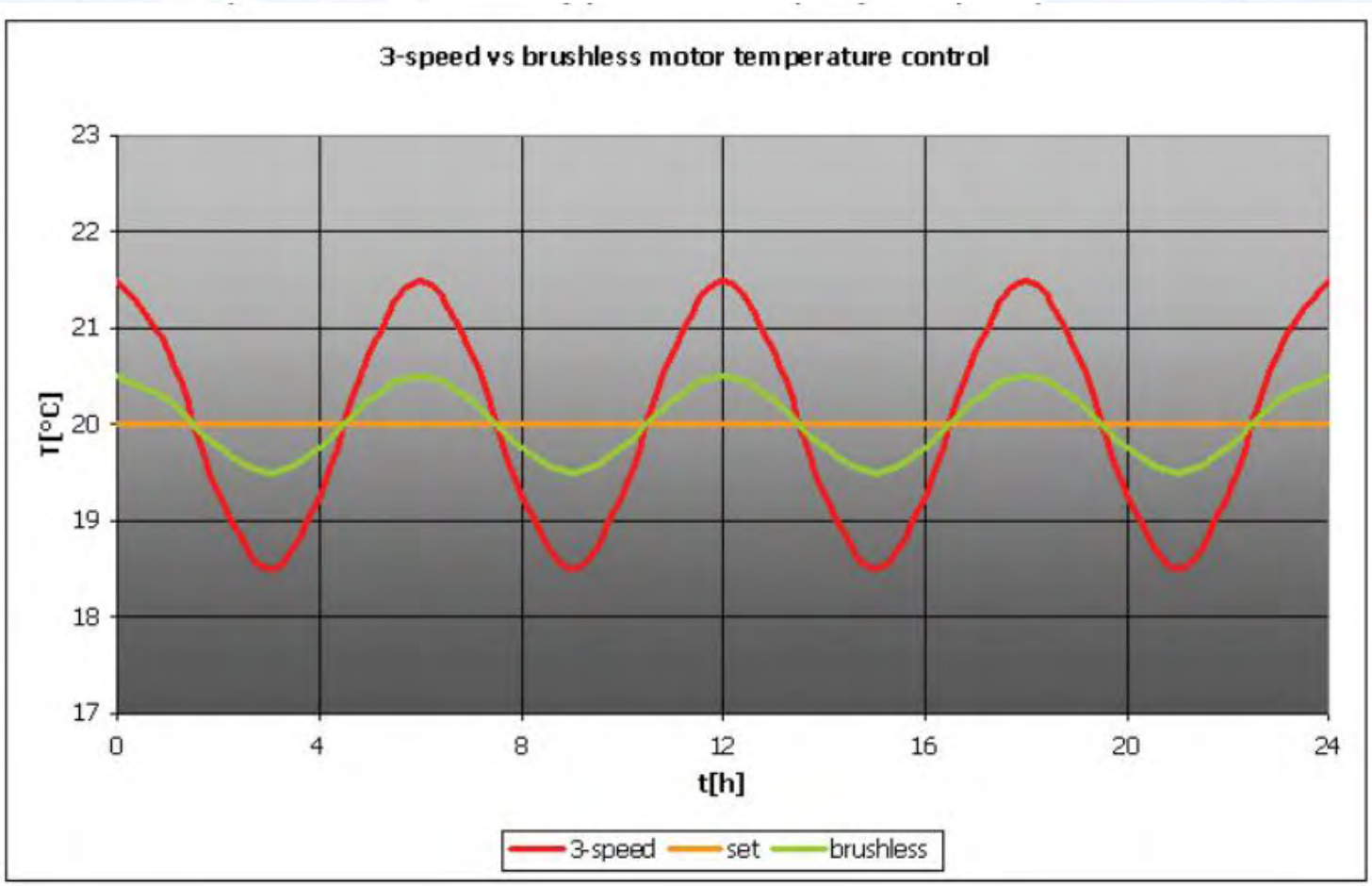
Estro 1.2: BLDC technology pros

Up to 30% reduction of the input power compared with traditional on/off motors

Corresponding reduction in CO_2 emissions!

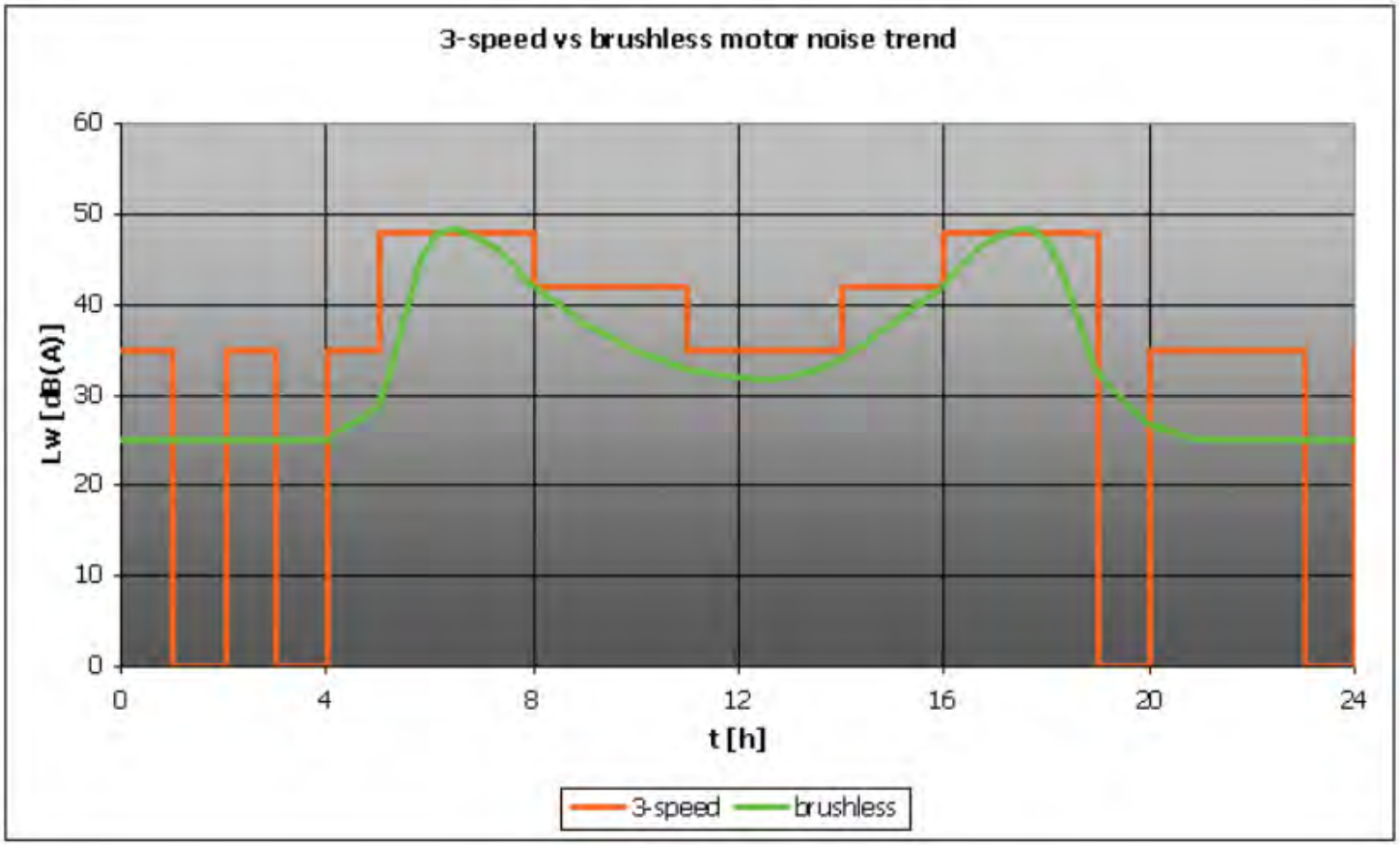
Estro 1.2: BLDC technology pros

BLDC Inverter technology continuously adjusts the air flow rate to the actual needs of the room by reducing the oscillations of temperature that are typical with capacity steps control.



Estro 1.2: BLDC technology pros

BLDC Inverter technology allow the reduction of the average sound emissions compared with on/off motors



Estro 1.2: EBM Proposal

New EBM BLDC motor:

- Top of the range
- Optimized noise level
- Estro 1.2 will be part of Greentech products

GREEN TECH

Estro 1.2: BIOXIGEN

INNOVATIVE IONIZATION SYSTEM FOR TERMINAL UNITS

Bioxigen®
your best indoor air quality

Estro 1.2: BIOXIGEN

- The main component of the Bioxigen® system is a condenser (“ionization tube”): it consists of a quartz cylinder and special metal meshes powered by single-phase AC at a low rate of energy consumption *.

- The condenser generates a flow of small negative oxygen ions through an oscillating electric field. The negative oxygen ions aggregate in “cluster” endowed with high oxidizing power.

- These cluster neutralize germs and bacteria with a redox process keeping the proper ionic proportion.

IWC water cassette

High-quality manufacturing

4X2 valve kit

4-speed motors as standard:
L_W(A) min 30 dB(A)

«sanified» cassette with BIOXIGEN

The new IWC hydronic cassette

- The design and the components are completely MADE- in-ITALY
- High-quality manufacturing : top of the category even for reduced noise levels
- INVERTER fans motor

Inverter Technology

The new IWC hydronic cassette

- 6 models with 1 coil for 2- and 4-pipe systems, available with wire or infrared controller for a cooling capacity range 2-9 kW
- 2 models with 2 coils for 4-pipe systems
- 4-speed motors as standard
- 60x60 modularity up to 5kW cooling capacity
- Condensate drainage pump with dual level float switch
- Set up for external air inlet and for channeling air out of the unit

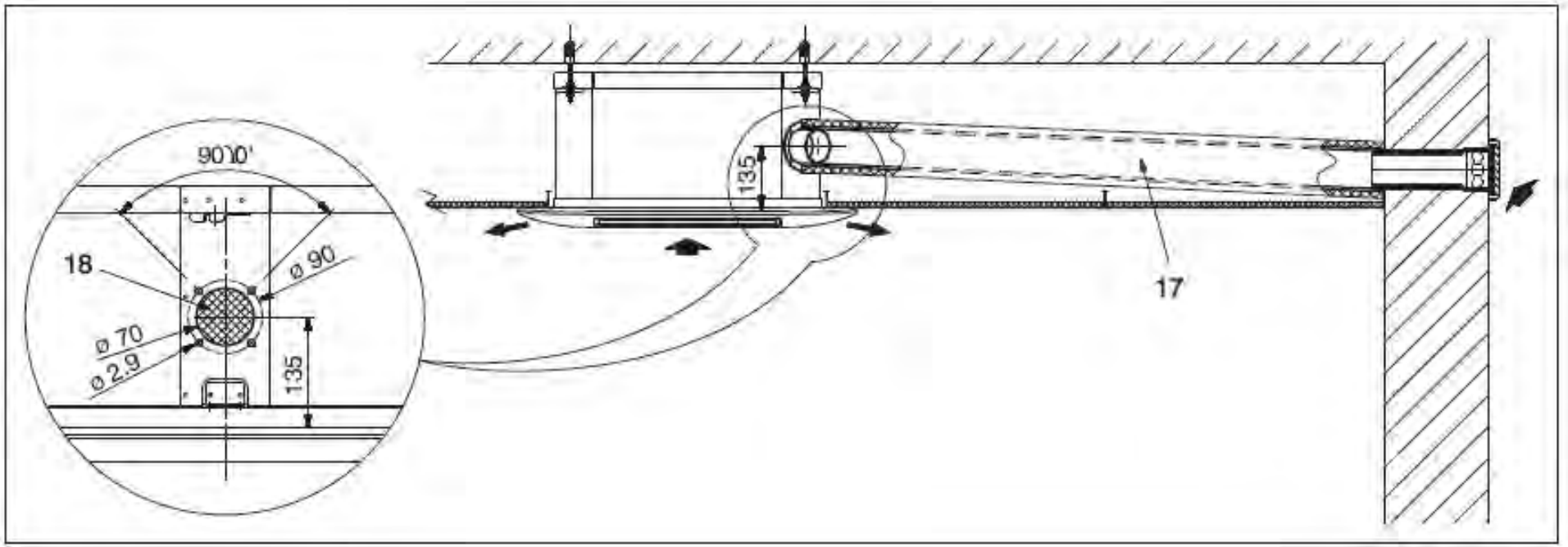
60x60

90x90

90x120

IWC: constructive features

The bearing structure is made of galvanized steel sheet, internally and externally coated so as to ensure the thermal and sound insulation of the unit. The casing accommodates the main components of the unit (heat exchanger, fan motor assembly and condensate drainage pump) and it is set up for external air intake and for air distribution to adjacent premises.

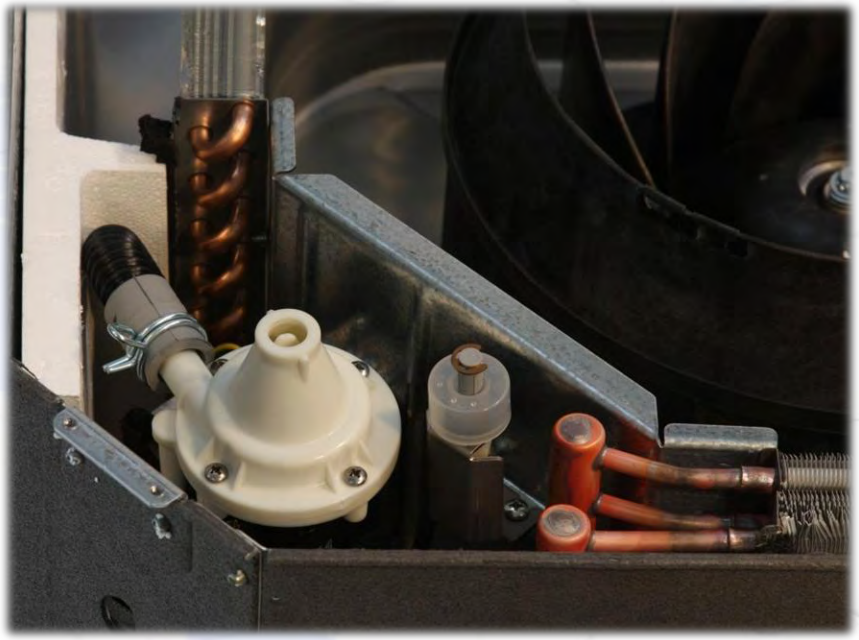


IWC: the fans

Centrifugal fan with backward curved blades, dynamically and statically balanced, directly connected to the electric motor, operating at 4 speeds so as to ensure adequate sound power level and energy saving.

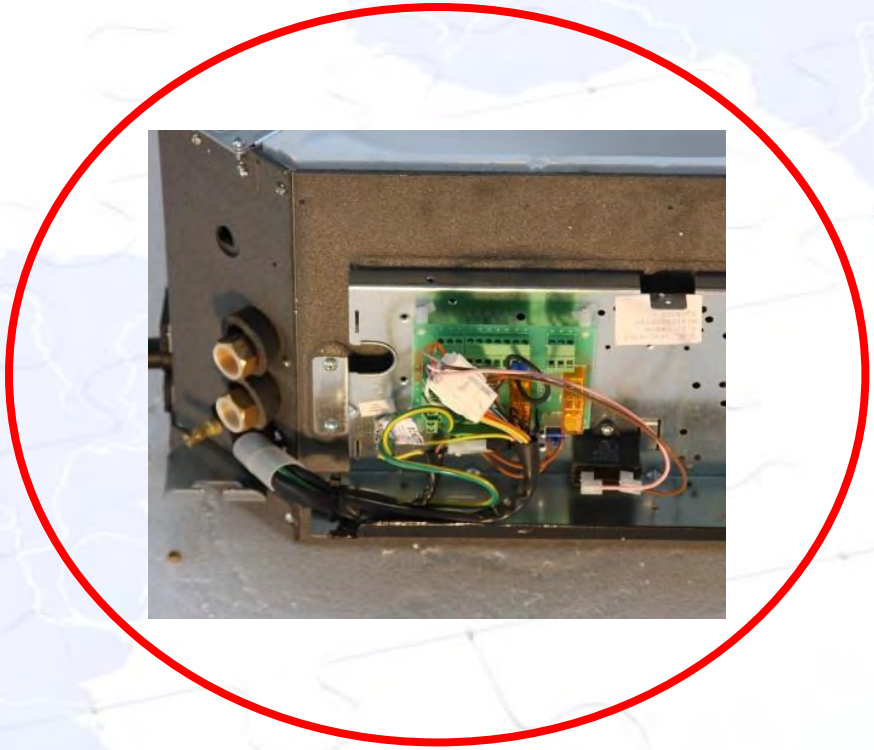
IWC: drainage pump

Condensate drainage pump with 250 mm available head, equipped with a dual level float switch for the monitoring of the condensate level in the drip tray and for the management of the alarm system. When the condensate drainage pump is running (triggered by the float switch, first level) the ventilation is lower so as to facilitate the drainage of the condensate from the heat exchanger fins.



IWC: constructive features

The electrical components placed in an external box are electric board for the management of the unit and relay for the operation of the drainage pump. The box is located next to the water piping connections so as to reduce the space for installation.



IWC: accessories

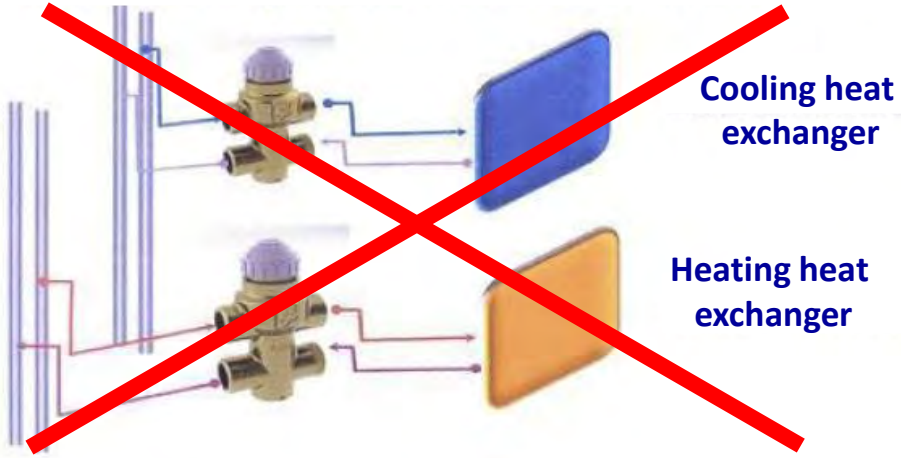
ACCESSORIES COUPLING TABLE

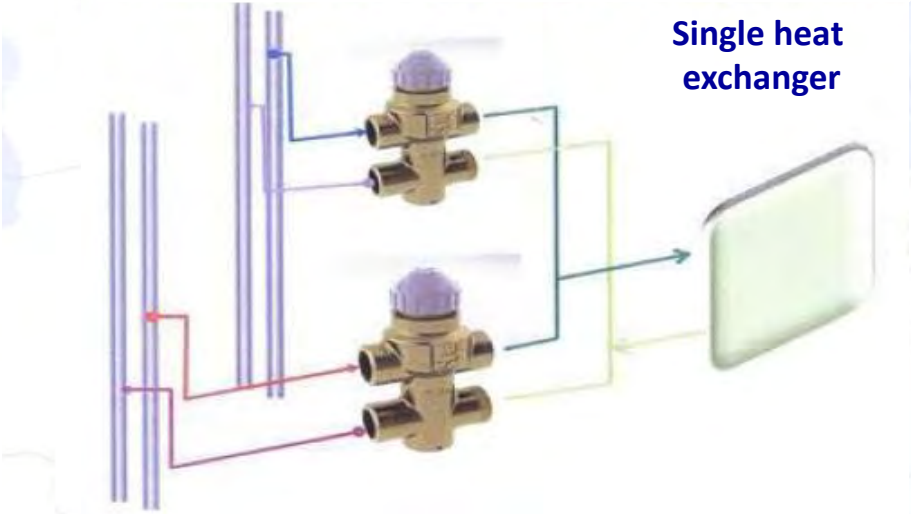
ACCESSORIES AVAILABLE	1 BTR model, cable control	1 BTR model, IR remote control	2 BTR model, cable control
LED 503 control panel	X		X
BASE MYCOMFORT control panel	X		X
MEDIUM MYCOMFORT control panel	X		X
LARGE MYCOMFORT control panel	X		X
Sensor for measuring water temperature	X		X
2-way valve kit with 230V ON/OFF actuator	X	X	X
2-way valve kit with 24V ON/OFF actuator	X	X	X
2-way valve kit with modulating actuator	X	X	X
3-way valve kit/4 connections with ON/OFF actuator	X	X	X
3-way valve kit/4 connections with 24V ON/OFF actuator	X	X	X
3-way valve kit/4 connections with modulating actuator (24V, 0-10V signal)	X	X	X
4X2 3-way valve kit/4 connections with 24V ON/OFF actuator	X	X	
4X2 3-way valve kit/4 connections with 230V ON/OFF actuator	X	X	

IWC: 4x2 valve

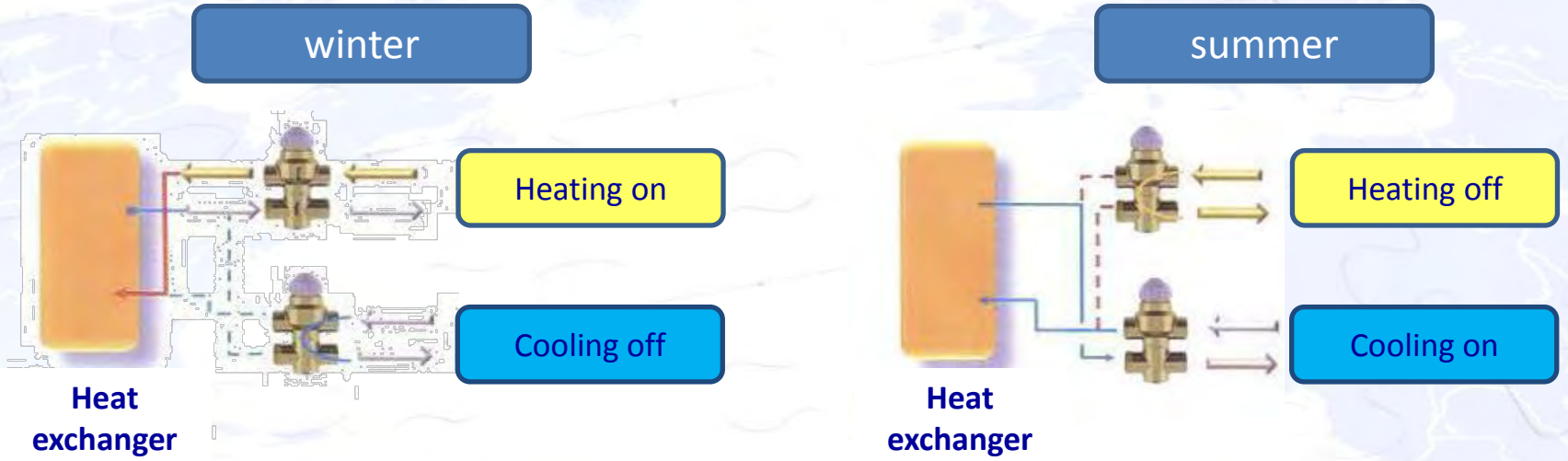
Innovative concept for 4 pipes systems

The 4X2 valve kit has been designed to use terminals with one heat exchanger in four-pipe fan coil units with separate "heating" and "cooling" pipes.





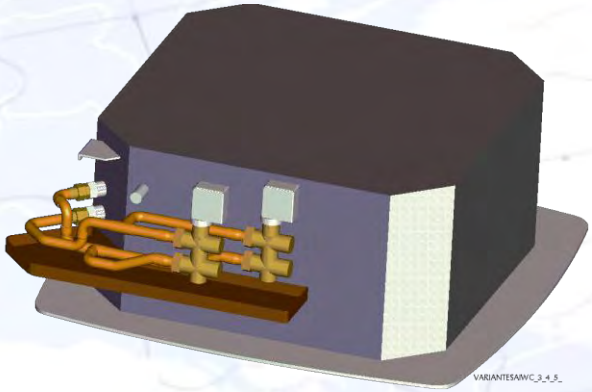
IWC: 4x2 valve

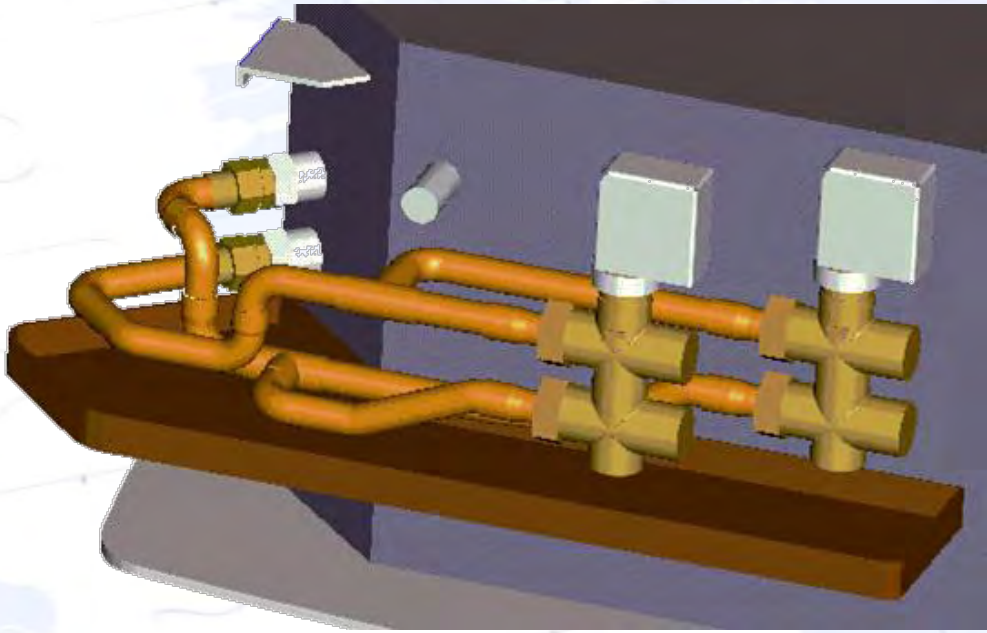


- Significant performance increase in winter thanks to the possibility to use lower water temperature with consequent energy saving!

- Lower cost of the unit + reduced installaton costs

IWC: 4x2 valve





The control panel must be able to manage the response time of electro-thermal actuators -> 4x2 valve needs:

- LED 503
- MYCOMFORT all

IWC: BIOXIGEN

The first «sanified» cassette on the market

Bioxigen®
your best indoor air quality

INNOVATIVE patented DEIONIZATION SYSTEM FOR INDOOR UNITS

AIR-WATER: MPE – PERFORMA range

54 models – 4 ÷ 76 kW

R-410A REFRIGERANT

EUROVENT CERTIFIED PERFORMANCE
www.eurovent-certification.com

AIR-WATER CHILLERS AND HEAT PUMPS: MPE

23 cooling only and heat pump models, cooling from 4 to 75 kW and heating from 5 to 82 kW

R-410A REFRIGERANT

- **MPE -> Performa**
- **Chillers and heat pumps for comfort applications where there is a demand for high efficiency and an extended working range**
- **Among the best of current market offerings in terms of energy efficiency, functionality and price**
- **Eligibility for tax benefits (5 heat pump models)**

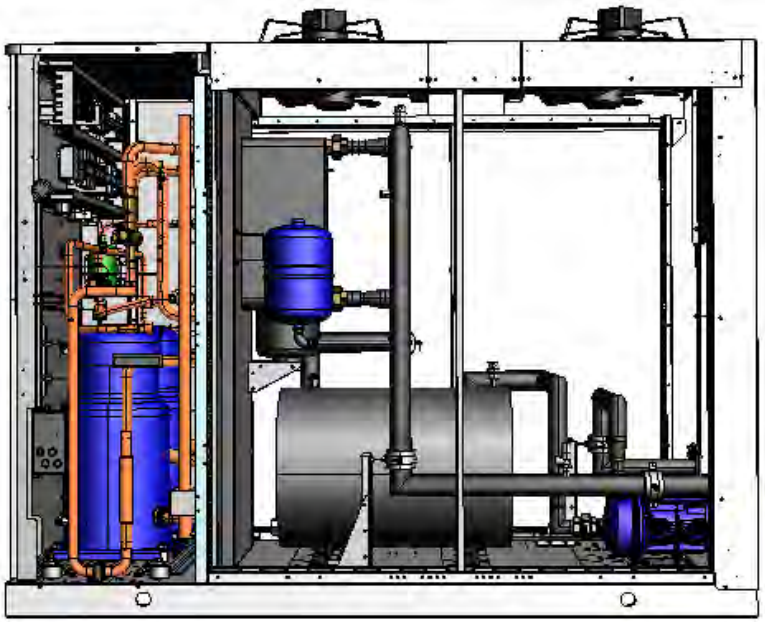
MPE: product plus

23 cooling only and heat pump models, cooling from 4 to 75 kW and heating from 5 to 82 kW

- DEDICATED FINNED PACK HEAT EXCHANGERS
- **SUMMERTIME OPERATION WITH HIGH AIR TEMPERATURES (up to 51°c)**
- **HIGH PARTIAL LOAD EFFICIENCY (tandem configuration)**
- EXTREMELY QUIET OPERATION
- SLIDING SETPOINT (based on outdoor air temperature)
- SELF-ADAPTIVE DIFFERENTIAL: OPERATION WITH SMALL VOLUMES OF WATER (without storage reservoir)
- SMART DEFROST SYSTEM (with advanced microprocessor)

MPE: plus

- Frame: **painted galvanized metal sheets** (RAL9002) → Resistant to corrosion
- Compressors compartment is completely closed and accessible from 3 sides
- Hydronic kit: high head pressure, mixture of water and glycole (max 35%)



MPE: components

- **BRAZE-WELDED STAINLESS STEEL HEAT EXCHANGERS**
- **SCROLL COMPRESSORS (SINGLE COMPRESSOR OR TANDEM)**
- **A HYDRONIC UNIT CAN BE INCORPORATED IN ALL MODELS WITHOUT CHANGING THE OVERALL DIMENSIONS (single or double pump stainless steel with «OR» execution)**
- ELECTRIC FAN WITH 6 or 8 POLE EXTERNAL ROTOR DIRECTLY COUPLED TO AN AXIAL FAN (from 1 to 4 fans)
- **MICROPROCESSOR CONTROLLER: µCHILLER2 and pCO XS**

MPE: product code

1. Product
2. Version:
   - 0. Single compressor
   - T. Tandem
3. Size
4. Chiller/Reversible Heat Pump (C/H)
5. Power supply:

   0: 400/3N/50 Hz

   M: 230/1/50 HZ

   2: 400/3N/50 Hz + circuit brakers

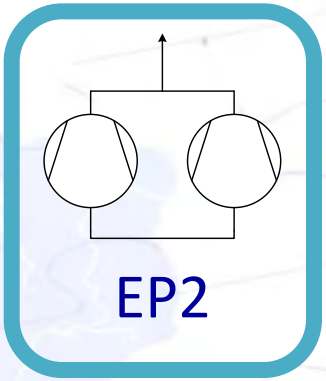
   4: 230/1/50 HZ + circuit brakers

MPE T: new extension line

- Extension line (frame 5): MPE tandem
  - Range similar to I° frame LCE
  - Easier configuration (as for MPE)

} lower €/kW

- MPE T054
- MPE T061
- MPE T069
- MPE T076



MPE T extension line: performances

- Cooling capacity (@ A 35°C/W 12/7): 54,6 ÷ 76,0 kW
- Sound power, Lw = 81 dB(A)
- Effiency ratio:
  - Heating (@ A 7/W 40/45°C): COP = 3,14 ÷ 3,29
  - Cooling (@ A 35°C/W 12/7C): EER = 2,71 ÷ 2,96

MPE: Range extension

LCE frame 1

VS

MPE tandem

0000000000000

Configuration
of base version chiller

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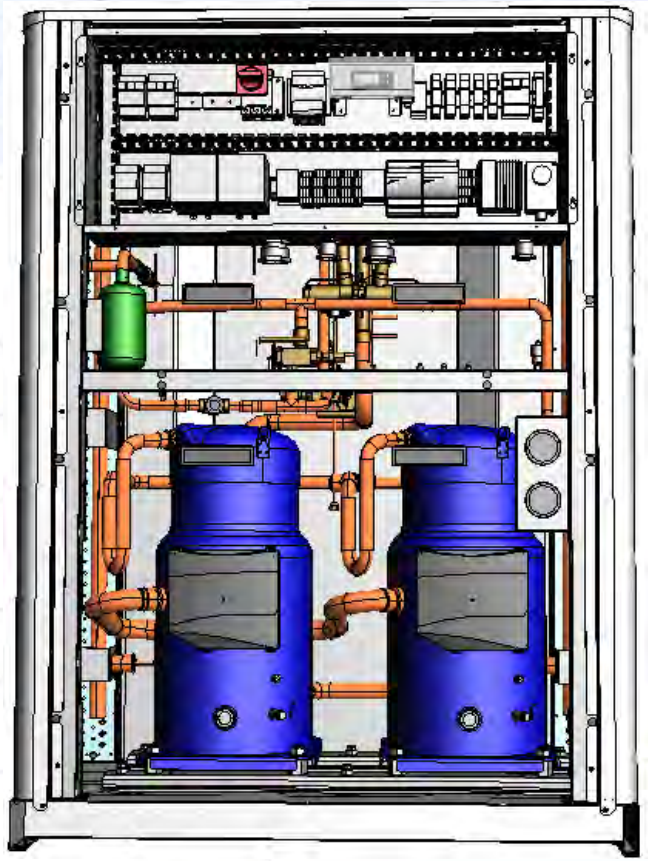
	Price List [€]	
MPET054C0AA	€ 17.300	- 8,8 %
LCE 052 CL	€ 18.960	
MPET061C0AA	€ 18.200	- 8,2 %
LCE 062 CS	€ 19.817	
MPET069C0AA	€ 18.500	- 15,8 %
LCE 072 CS	€ 21.959	
MPET076C0AA	€ 20.500	- 13,8 %
LCE 082 CS	€ 23.780	

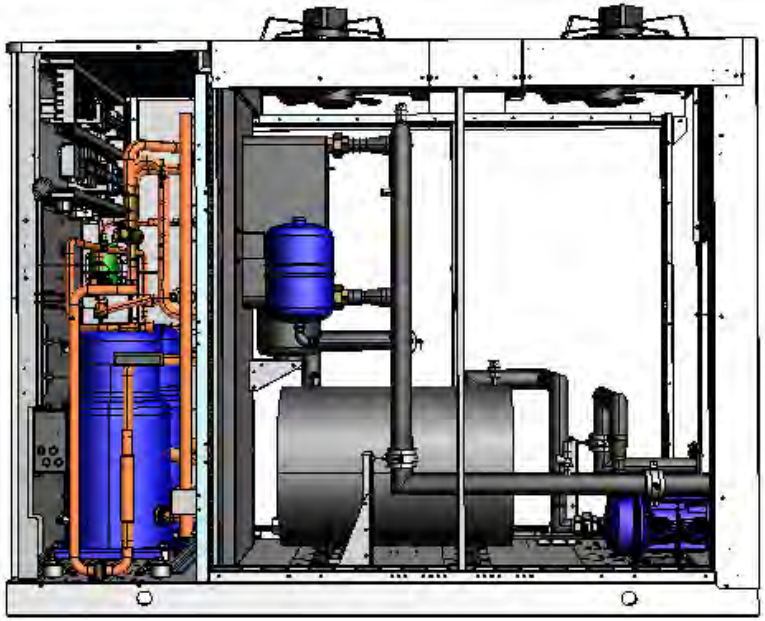
MPE: Main benefits

- Dual compressor version: Power partialization as a function of thermal load and water-side differential
- Access to income tax deductions of 55%
- Outdoor installation
- Residential and commercial uses
- Wide operating range



MPE: Main benefits

- Structure: In painted, galvanised sheet metal (RAL9002) → Corrosion resistant
- Completely closed compressor compartment, accessible from three sides
- Hydronic kits: High head pump, glycol/water blends (max 35%)

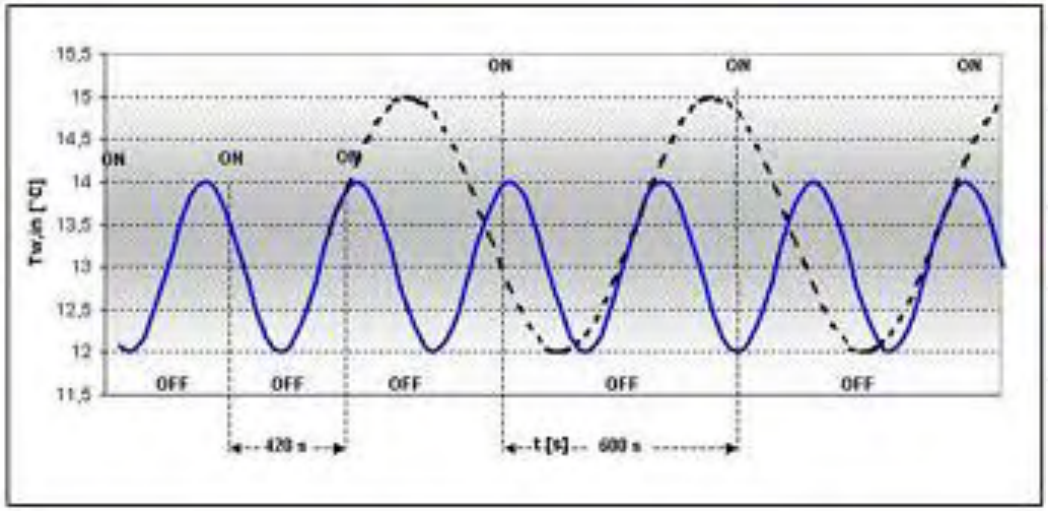


MPE: Main benefits

•Auto-adaptive operation: Set Point automatic adjustment as a function of outside temperature:

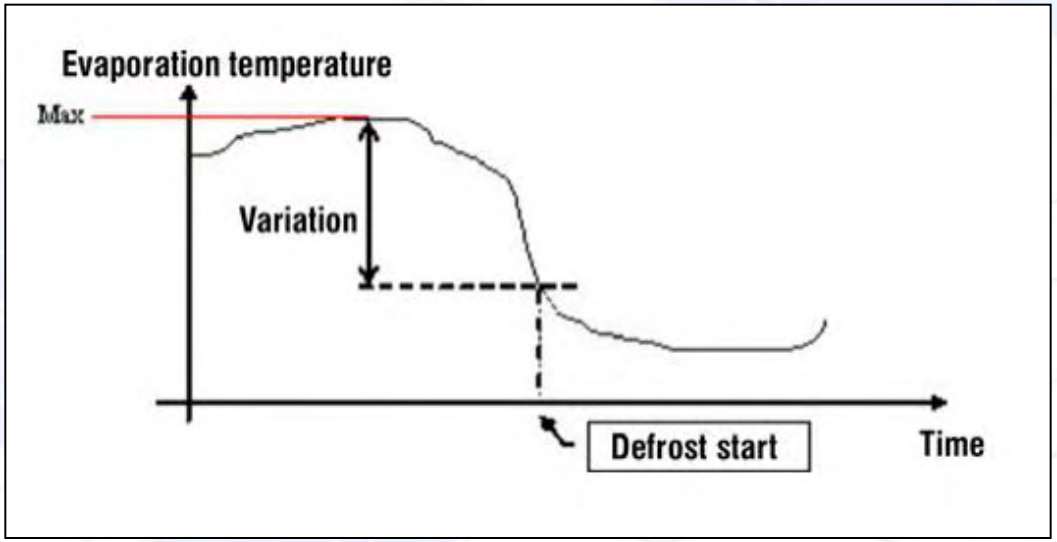
→consumption reduction
→broadening of the operating field

•Low water content systems also available without buffer tank thanks to the automatic adjustment limiting the # of the compressor startups



MPE: Main benefits

- Smart defrost system (with advanced control): it identifies the external exchanger performance deterioration caused by ice formation



MPE: Controls

- **Base mchiller 2** control, with modbus protocol, allowing immediate connection to ERGO networks
- Evaporator inlet water T control
- Defrost management (MPE H)
- Fans speed control (optional)
- Dynamic setpoint management as a function of air T
- Connection to serial line RS485 for supervision/tele-assistance

MPE: Controls

- **Base mchiller 2 - Controlled devices**
  Compressor
  Fans
  Cycle inversion valve (MPE H)
  Water circulation pump
  Antifreeze resistance (optional)

- **PCO Advanced control**
  LAN networks
  Smart defrost system

MPE: Scroll Danfoss SH compressors

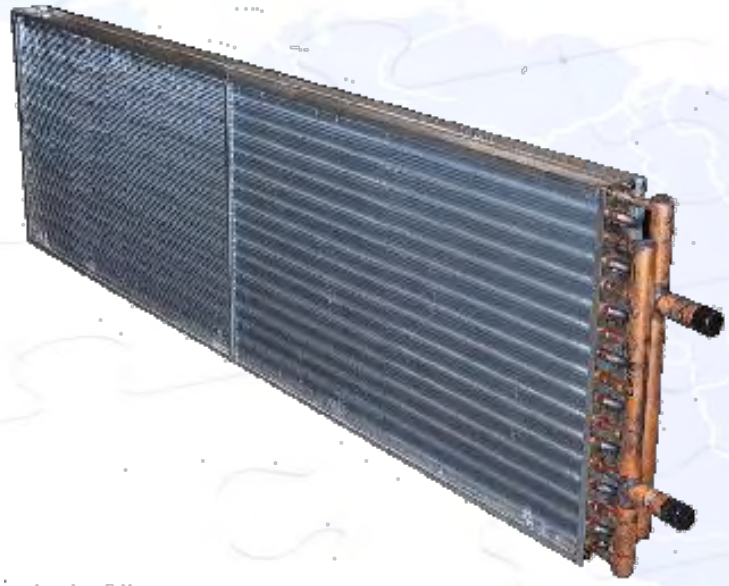
- ↑ η thermodynamic
- Pressure drop reduction
- Oil use at low viscosity → + 5% EER
- Protections against overheating, overcurrent, and overtemperature
- Mounted on anti-vibration devices

MPE: Alfa Laval plate exchangers

- Brazed plates in austenitic stainless steel AISI 316:
  - Low refrigerant charge compared to standard solutions
- Internal corrugation of the plates + Perfect polishing of the plates:
  - High fluid turbulence makes it difficult for filth and limestone to build up on the condenser side.

MPE: FINNED PACK HEAT EXCHANGER

- Special pipes Φ=8 mm
- Hydrophilic treatment of heat pump



- Reduced internal volume
- Improved reliability at high pressures
- Lower noise
- Reduced defrost time

Eurocoil
HEAT EXCHANGERS

MPE – Chilling operating limits

- Opt 1:

Condensation control

- Opt 2:

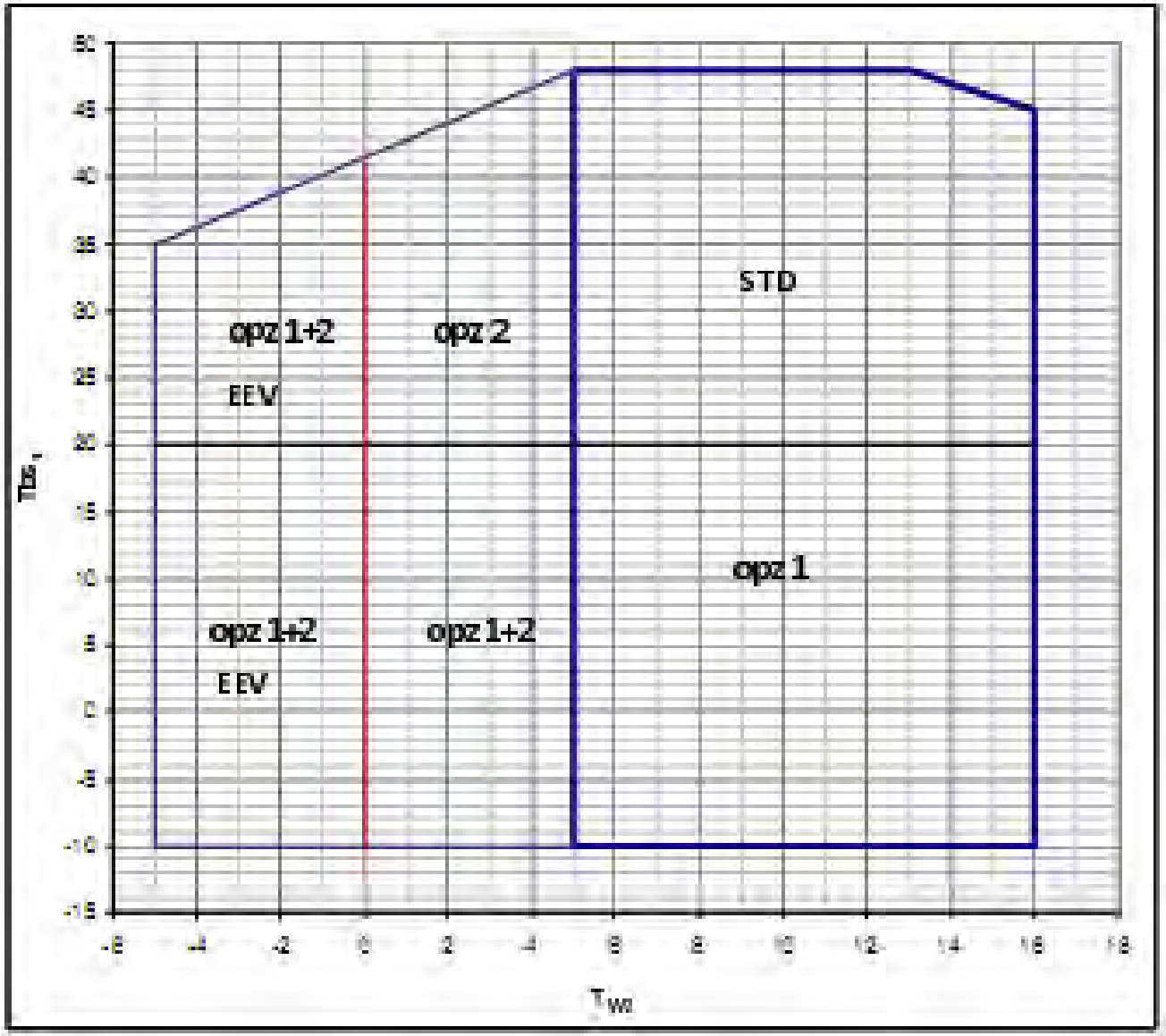
Glycol + opt. Low T

- EEV:

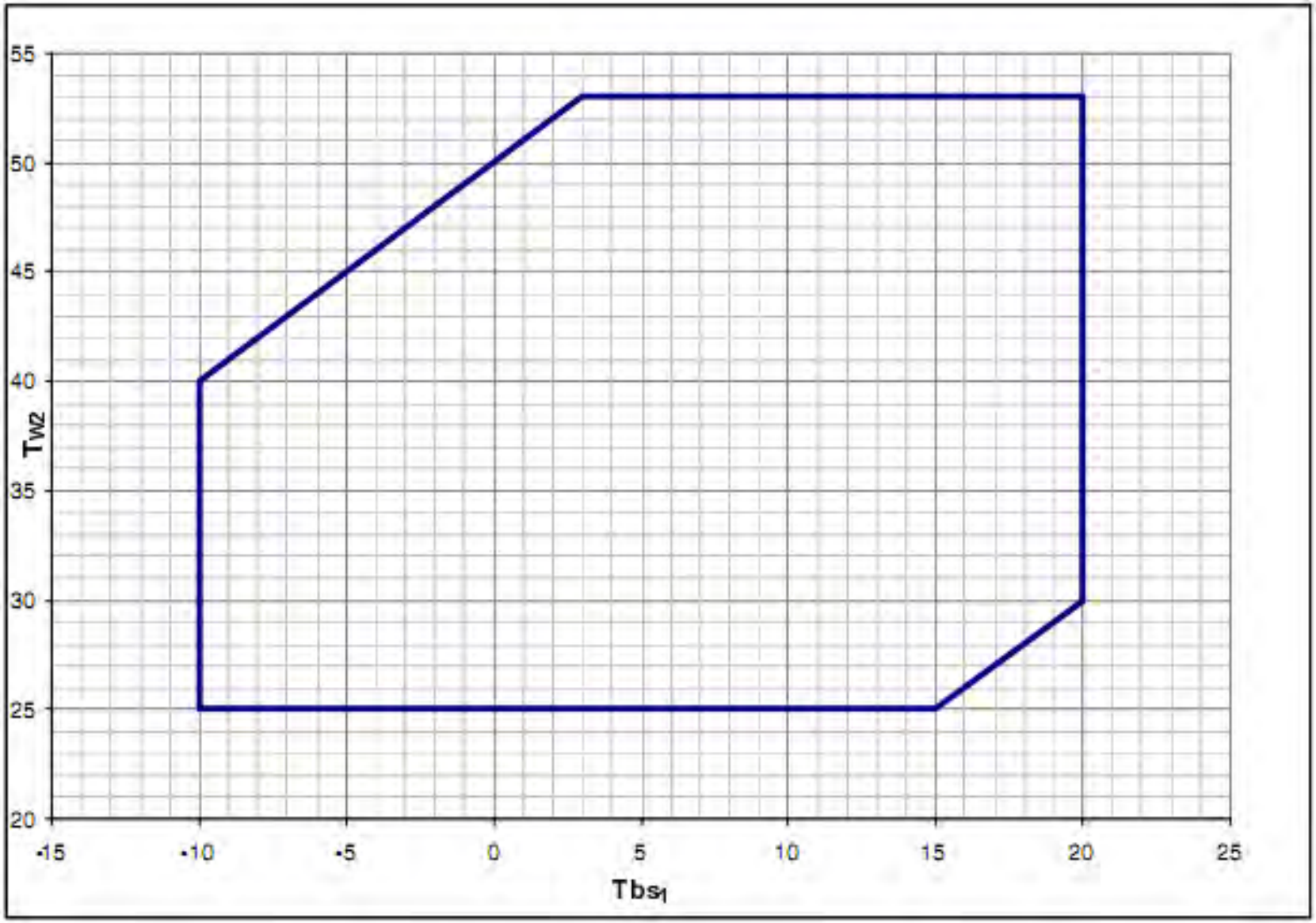
Electronic valve

- STD:

Standard



MPE – PDC operating limits



MPI DC: product plus

- ELECTRONIC EXPANSION VALVE AS STANDARD FEATURE TO MAXIMISE EFFICIENCY AT PARTIAL LOADS
- 3 DIFFERENT “EFFICIENCY PACK” TO REACH HIGH EFFICIENCY @ FULL LOAD AND PARTIAL LOADS
- SOUNDPROOFING WITH 3 DIFFERENT SOLUTIONS
- RESTRAINED DIMENSIONS
- HYDRONIC OPTIONS WITH PUMPS WITH «AND» EXECUTION OR «OR» EXECUTION

GALLETTI news : MPI- DC INVERTER CHILLERS & HEAT PUMPS

MPI DC: main components

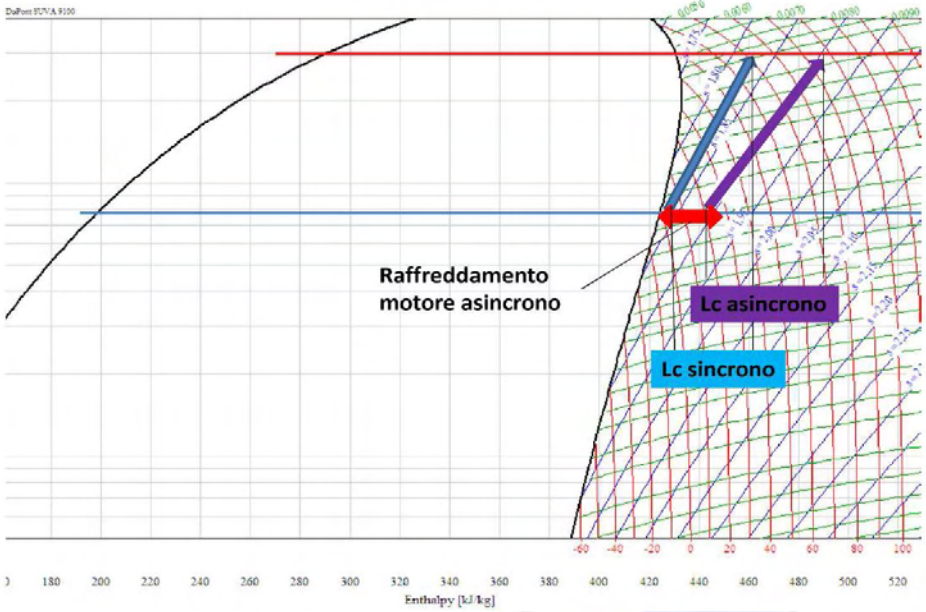
- 5 Models 8- 28KW
- BLDC variable speed compressors
- DC Inverter Carel Power Drive
- Inverter EC Pump
- Inverter EC Fans
- Micrprocessor Controller Carel pCO
- Electronic Expansion Valve

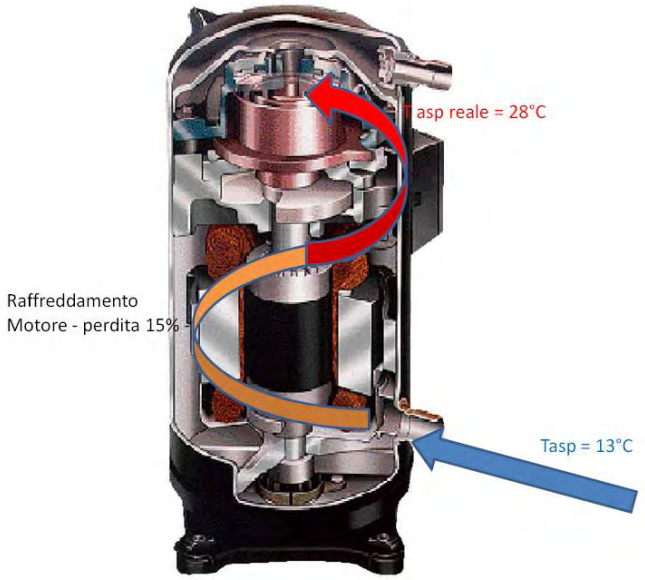
MPI DC: BLDC VARIABLE SPEED COMPRESSORS

Advantages of synchronous tech. against asynchronous (most popular):

Better heat rjection system (heat generated on stator and not on the rotor): it is therefore possible to cool it down using the discharge gas

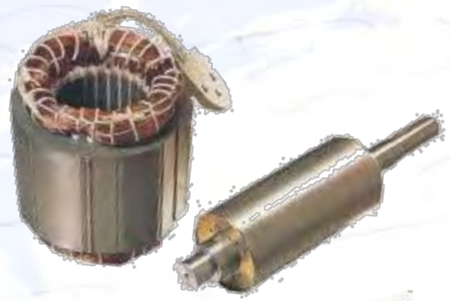
For the above reasons this compressor is called “Hot





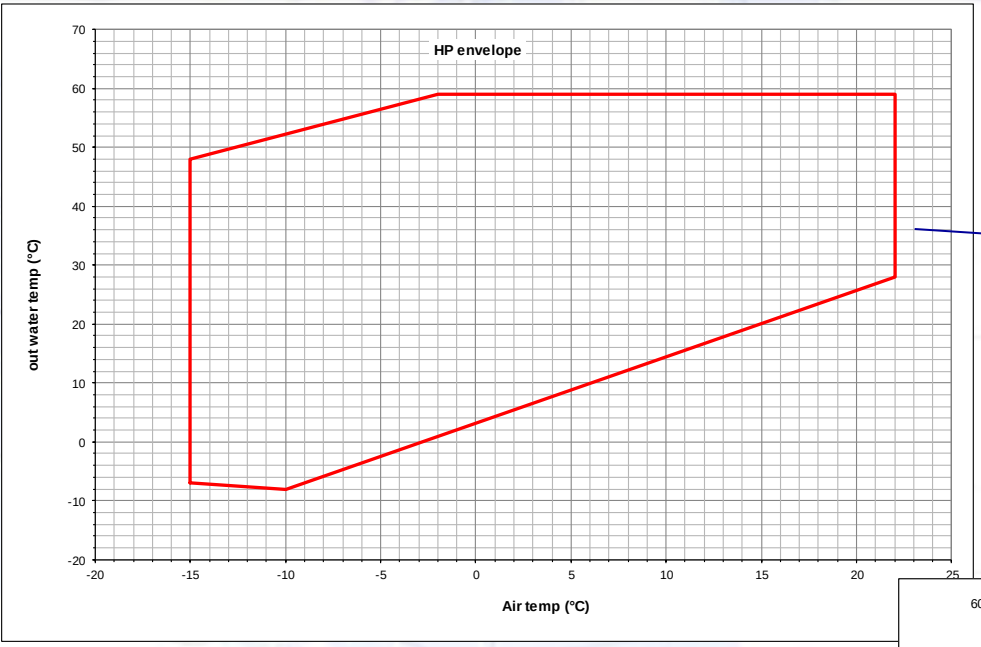
The compression energy depend upon the suction T: if there is not any furter superheat, the gas compression energy is reduced and you get an higher volumetric efficiency

MPI DC: VARIABLE SPEED COMPRESSORS BLDC

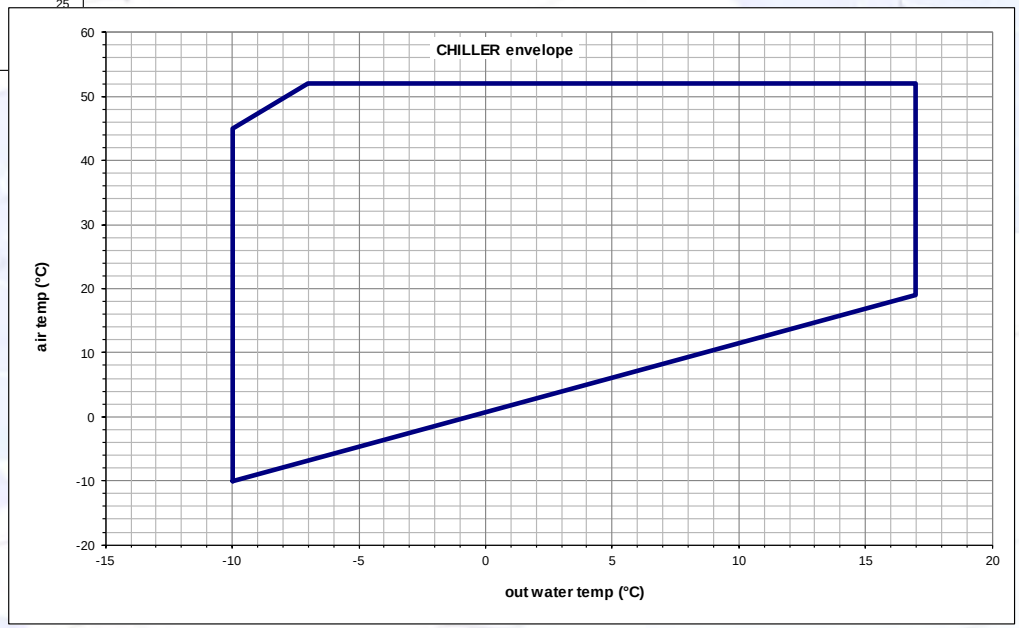


- ✓ Permanent-magnet synchronous motor
- ✓ Reduced motor inertia
- ✓ Small sizes
- ✓ Reduced noise level
- ✓ Absence of losses due to current flow in the rotor and to induction → higher partial load efficiency
- ✓ Increased isentropic efficiency of the compression

MPI DC: working range



Test to extend working range to 40°C outdoor air T ongoing



MPI: product code

1. Product
2. Only single compressor
3. Size
4. Chiller/Reversible Heat Pump (C/H)
5. Power supply

   0: 400/3N/50 Hz

   M: 230/1/50 HZ

   2: 400/3N/50 Hz + circuit brakers

   4: 230/1/50 HZ + circuit brakers

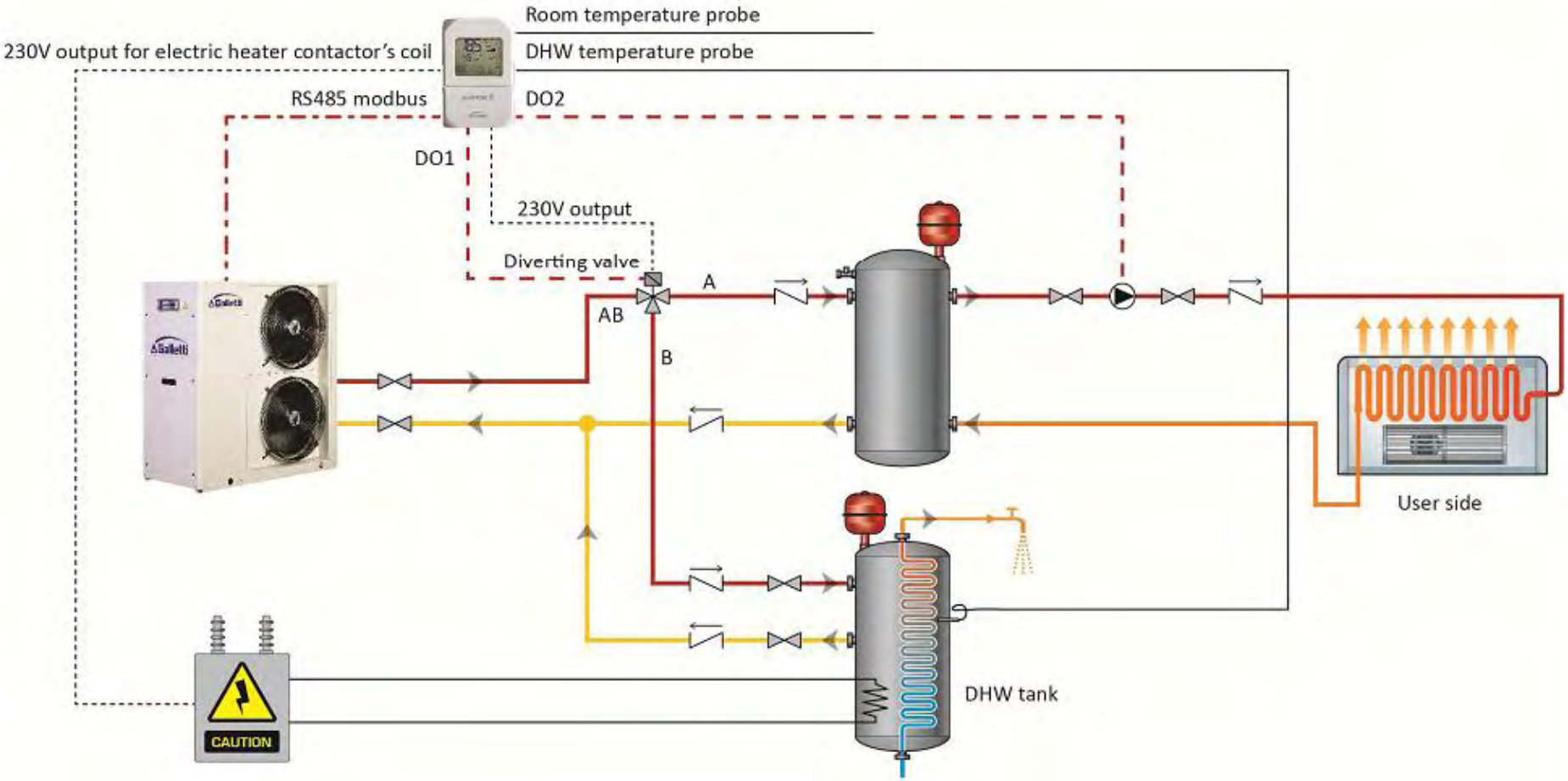
MyChiller ACS Remote Control: Main functions

The MyChiller ACS has been designed to manage the MPI DC heat pumps by a serial connection

The Mychiller remote control is connected by a RS485 connection.

The remote control is able to connect also with ModBus with Carel µchiller2, µchiller2 SE, pCO1 e pCOXS controllers.

MyChiller ACS: typical installation



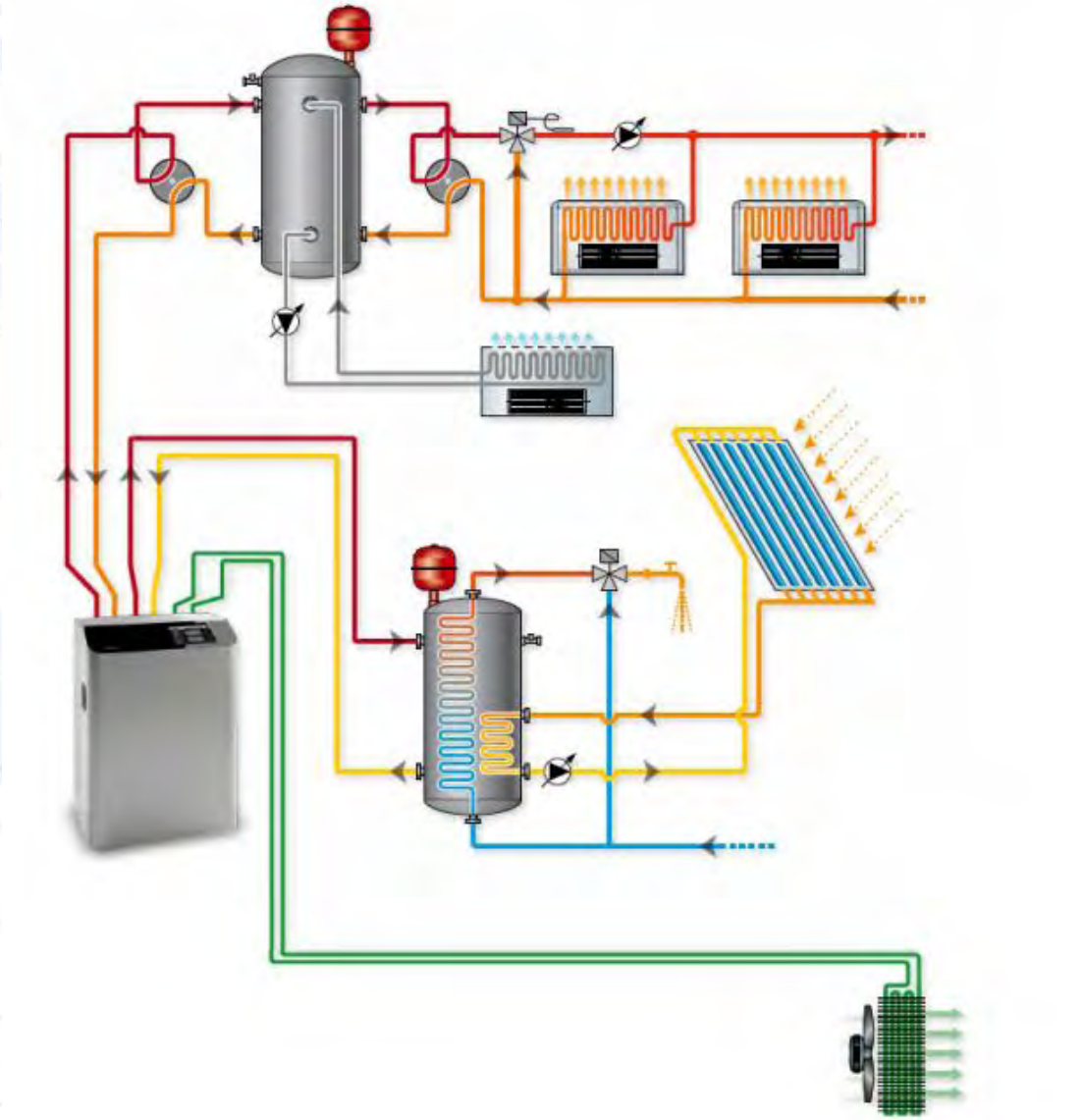
MyChiller ACS Remote Control: Main functions

- ON/OFF of the unit.
- Regulation of the setpoint temperature (inlet water temperature).
- Winter/Summer selection mode.
- Visualization and modification of the principal parameters of the unit (differential, minimum and maximum setpoints).
- Visualization of advanced parameters (inlet water temperature, condensation pressure)
- Visualization of the unit alarms
- Management of a DHW buffer tank.
- Volt free contact in order to start/stop the unit
- Volt free contact for remote enabling of the DHW buffer tank
- Management of the of the deviating 3 way valve by digital output
- Management of the pumps

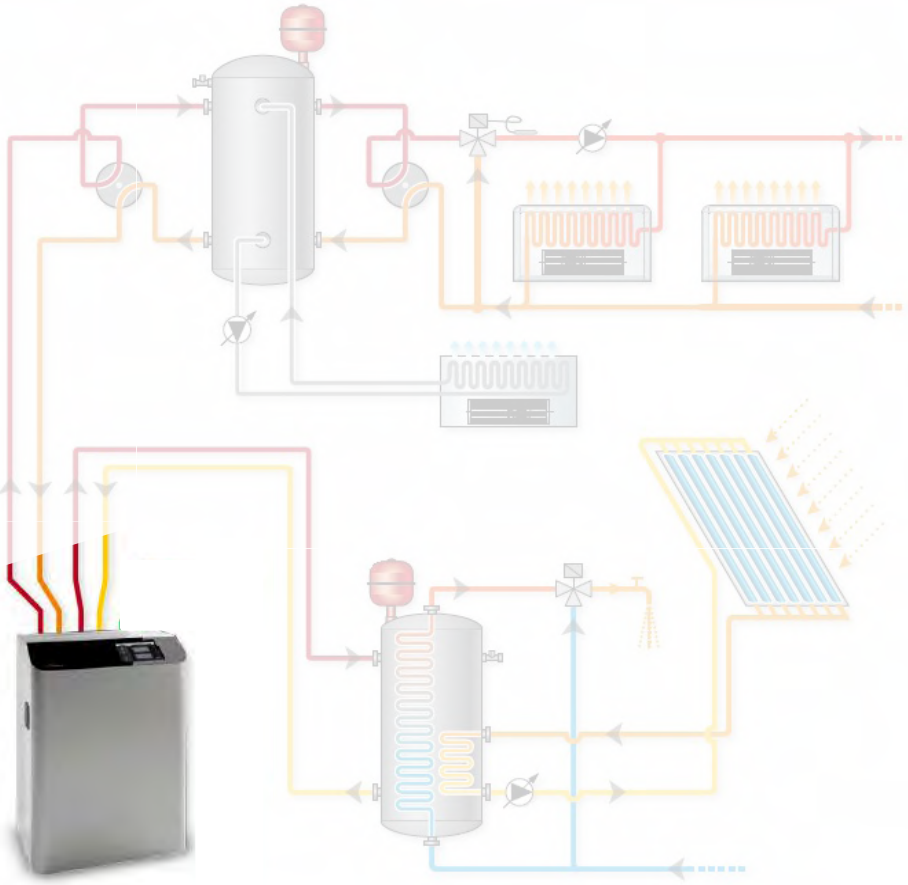
Multifunction HP with total recovery

4 families air/water and water-water from 6 kW to 420 kW

MULTIFUNCTION PLANTS

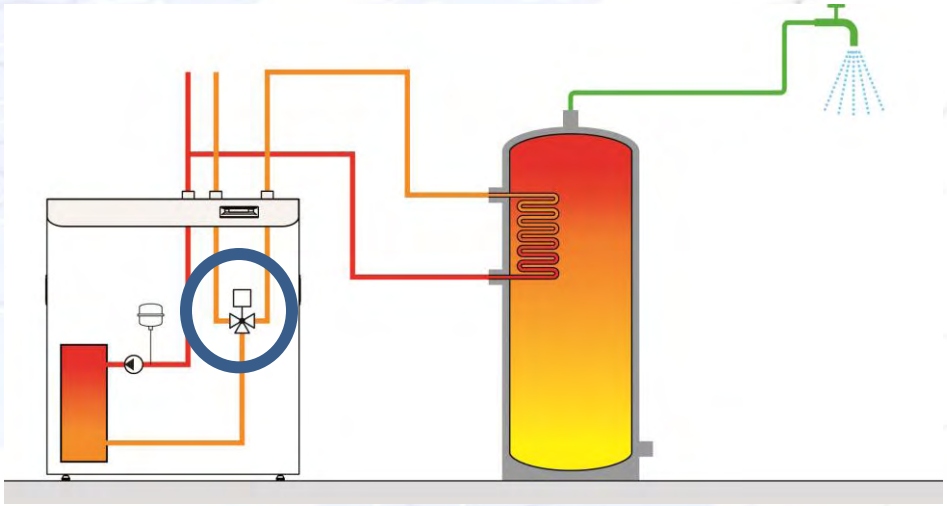


MULTIFUNCTION HEAT PUMP



Multifunction heat pump

THE SOLUTION WITH A 3-WAYS VALVE



Refrigerant circuit:

- 2 heat exchangers

Hydraulic circuit:

- One 3-ways valve (integrated in the unit or outside)
- 1 pump on plant side
- 2 hydraulic circuits not separated

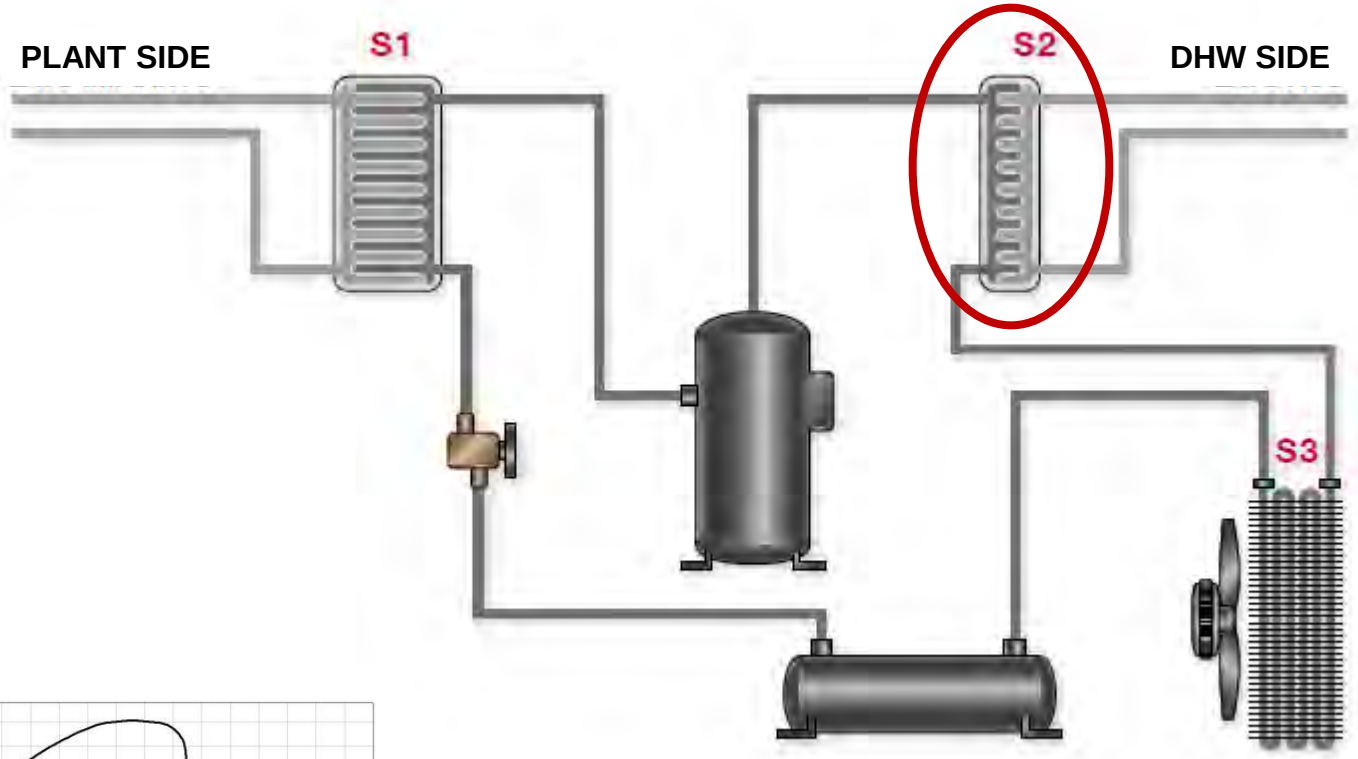
Advantages.

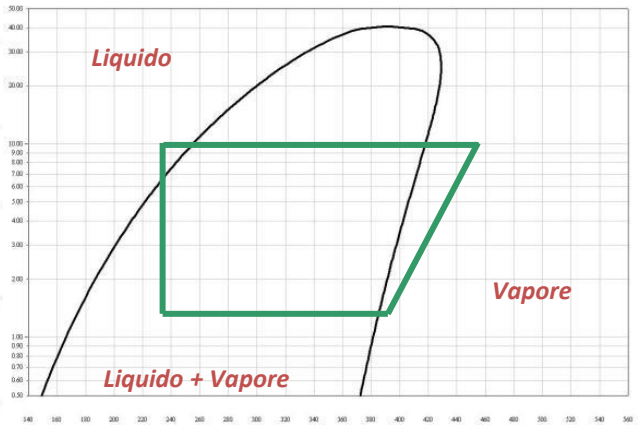
- Easy to construct
- Low cost

Disadvantages:

- During summer it is not able to produce at the same time cool on plant side and DHW: if the unit is working in cooling mode and there is demand for DHW, the unit has to reverse the cycle
- There ins't any kind of heat recovery

PARTIAL HEAT RECOVERY: a solution with many limits





Advantages:

- Partial heat recovery
- Easy to construct
- Costs

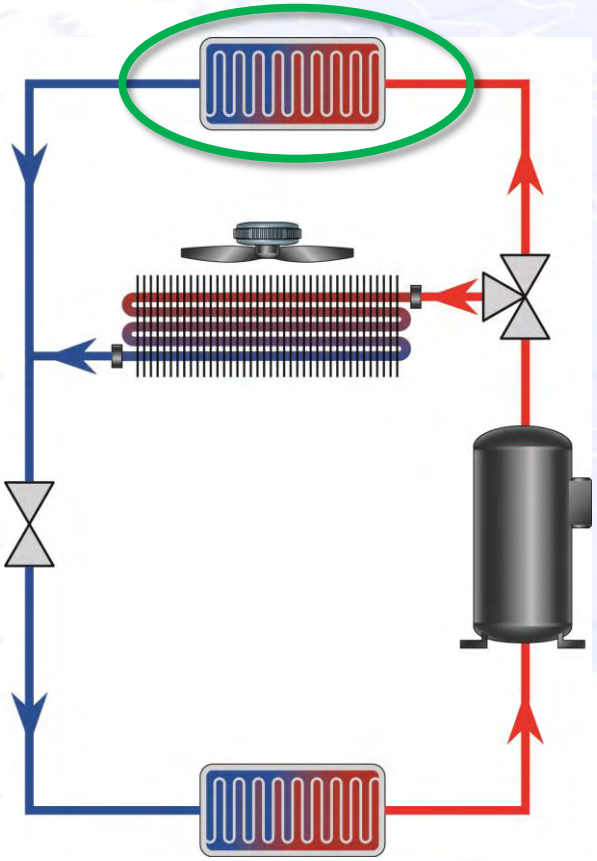
Disadvantages:

- It is not able to produce DHW all over the year (only during cooling mode)
- It is not able to produce only DHW

CHILLER WITH TOTAL HEAT RECOVERY

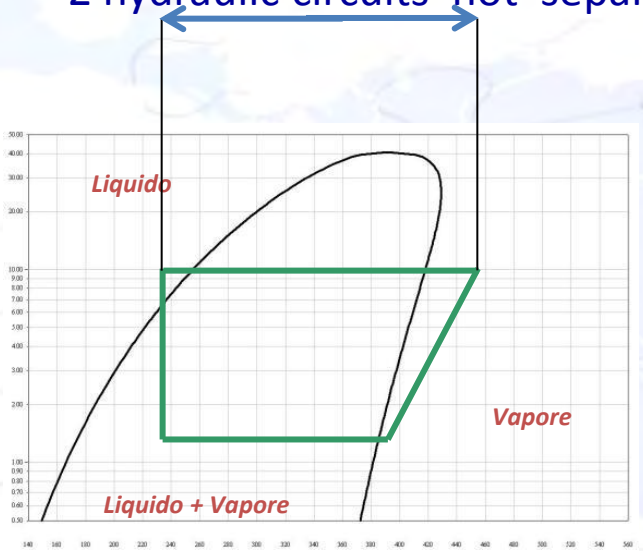
Refrigerant circuit:

- There is an additional heat exchanger (condenser) in parallel with the finned block heat exchanger
- 3-ways valve



Hydraulic circuit:

- 2 hydraulic circuits not separated



Advantages:

- 100% heat recovery in cooling mode

Disadvantages:

- It is not able to produce DHW all over the year (only during cooling mode)
- It is not able to produce only DHW

MULTIFUNCTION HP with TOTAL HEAT RECOVERY

Advantages of a multifunction heat pump compared to a standard heat pump:

1. In cooling mode is able at the same time to cool and to produce DHW with total heat recovery (without reversing the cycle)

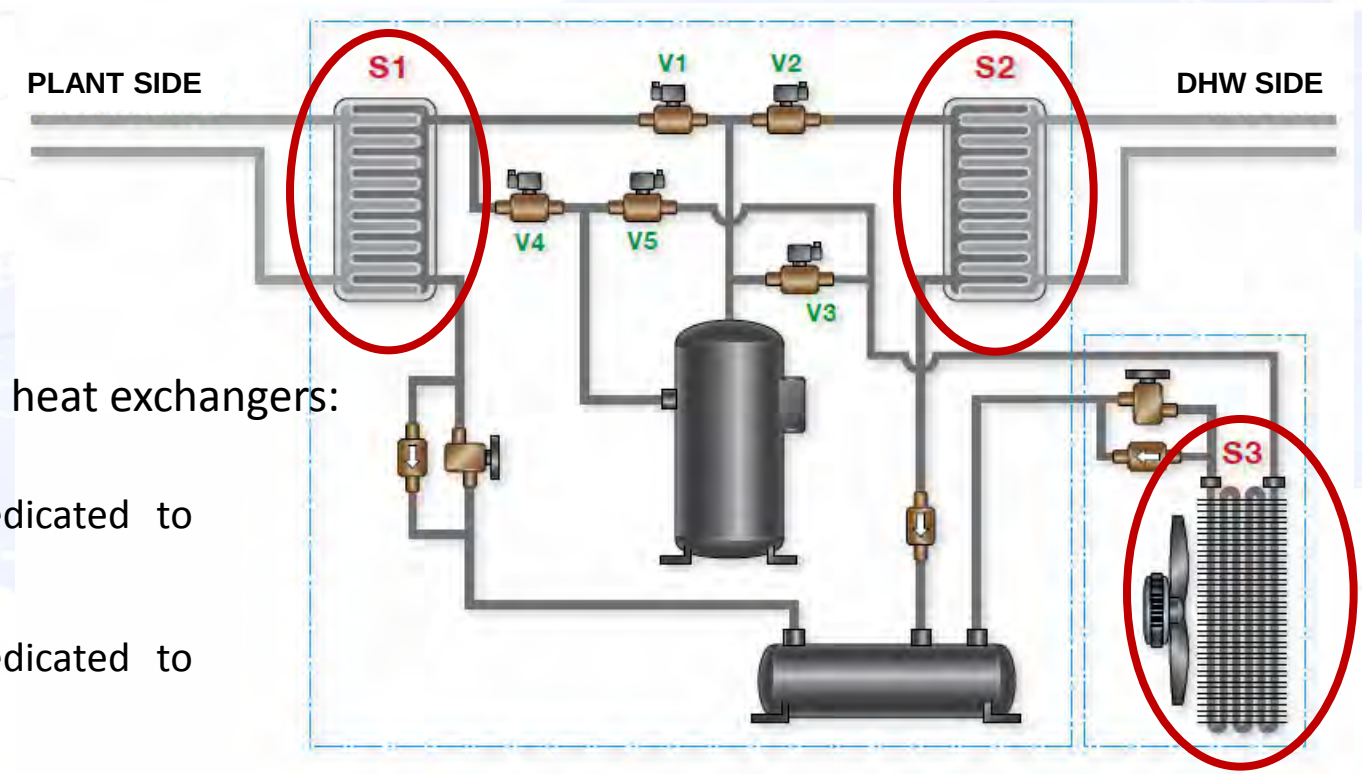
Plus compared to the 3 ways valve solution

2. It is able to produce only DHW

Plus compared to partial/total heat recovery solution

MULTIFUNCTION HP with TOTAL HEAT RECOVERY – How is it done?

(example of air-water heat pump for 2 pipes system)

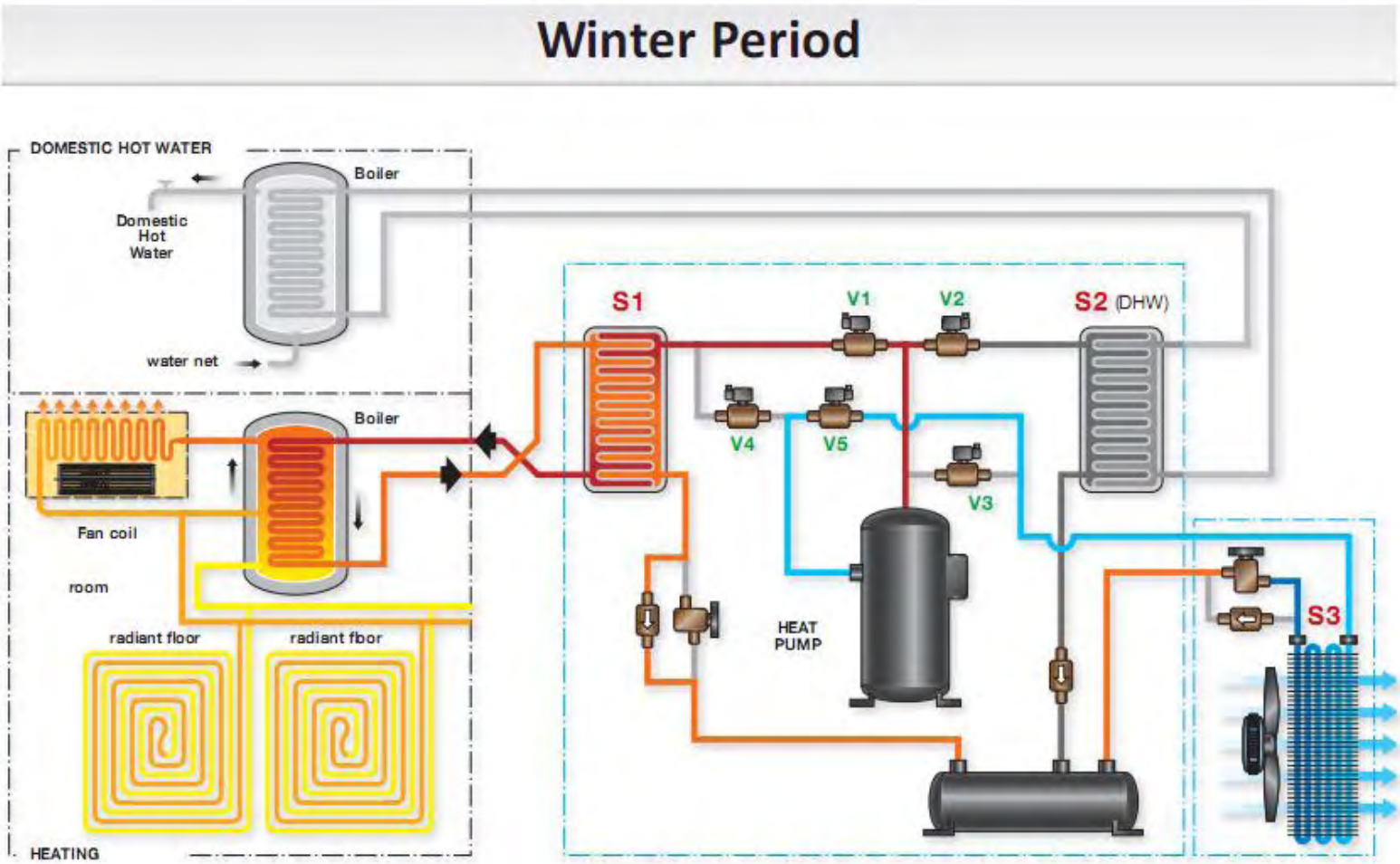


The unit has three different heat exchangers:

1. Plate heat exchanger dedicated to plant side
2. Plate heat exchanger dedicated to DHW circuit
3. Finned block heat exchanger

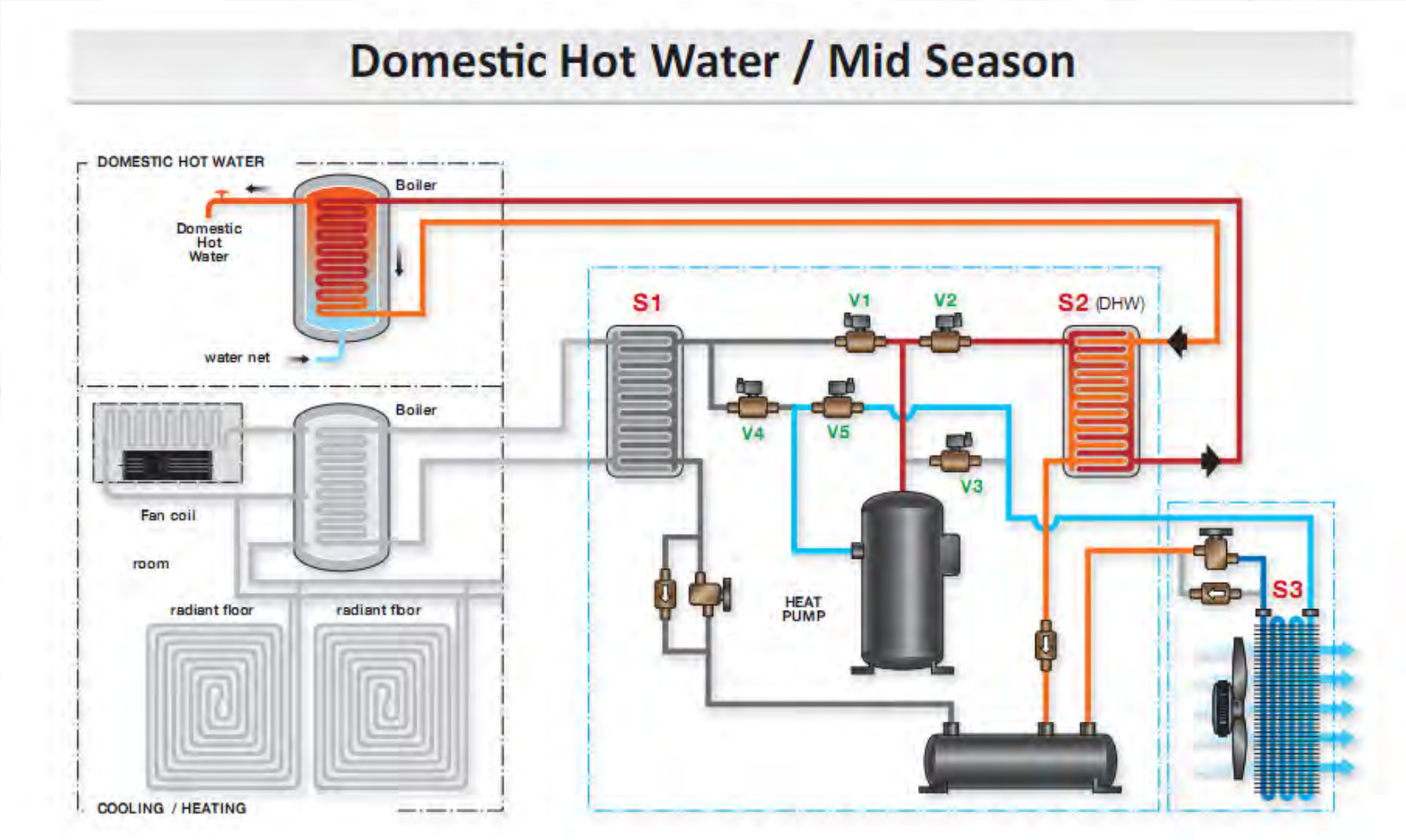
MULTIFUNCTION HP with TOTAL HEAT RECOVERY – How does it work?

(example of air-water heat pump for 2 pipes system)



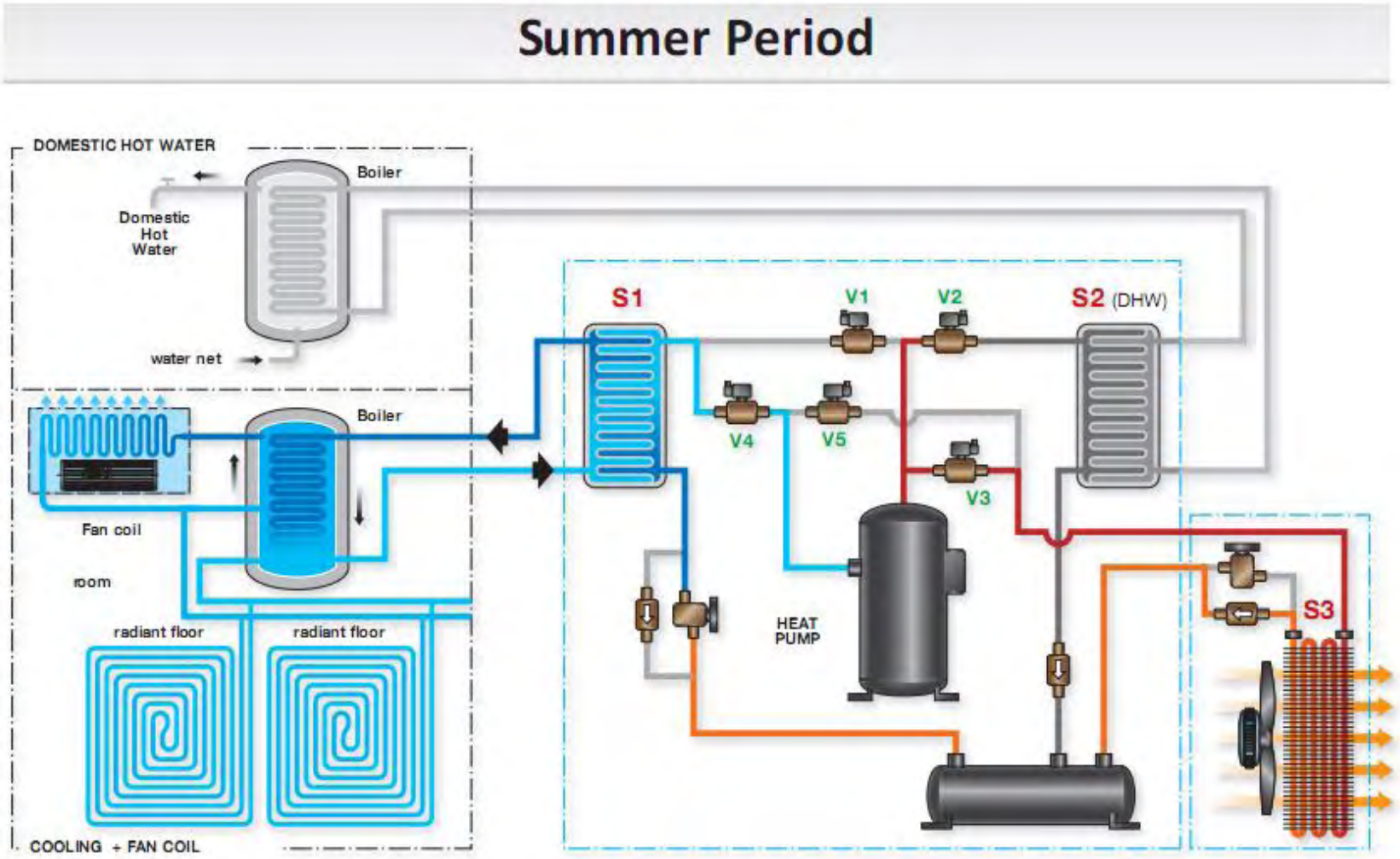
MULTIFUNCTION HP with TOTAL HEAT RECOVERY – How does it work?

(example of air-water heat pump for 2 pipes system)



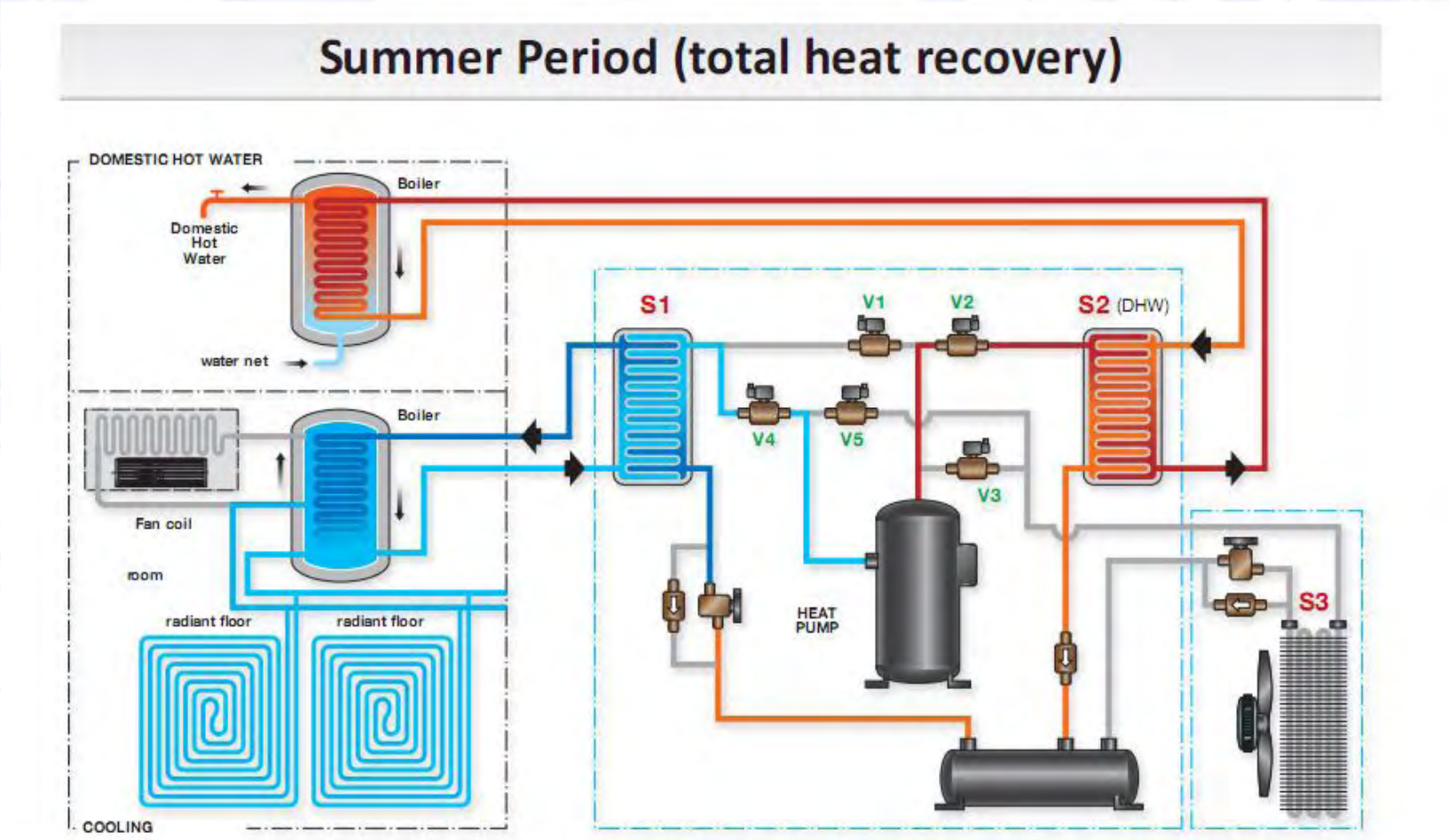
MULTIFUNCTION HP with TOTAL HEAT RECOVERY – How does it work?

(example of air-water heat pump for 2 pipes system)



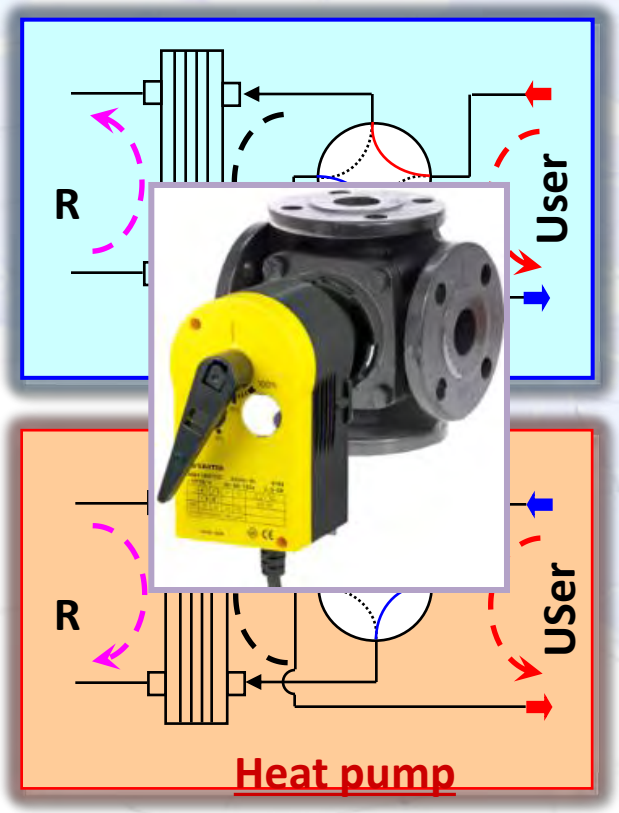
MULTIFUNCTION HP with TOTAL HEAT RECOVERY – How does it work?

(example of air-water heat pump for 2 pipes system)



ADVANCED TECHNOLOGICAL SOLUTIONS ON MULTIFUNCTION HEAT PUMPS

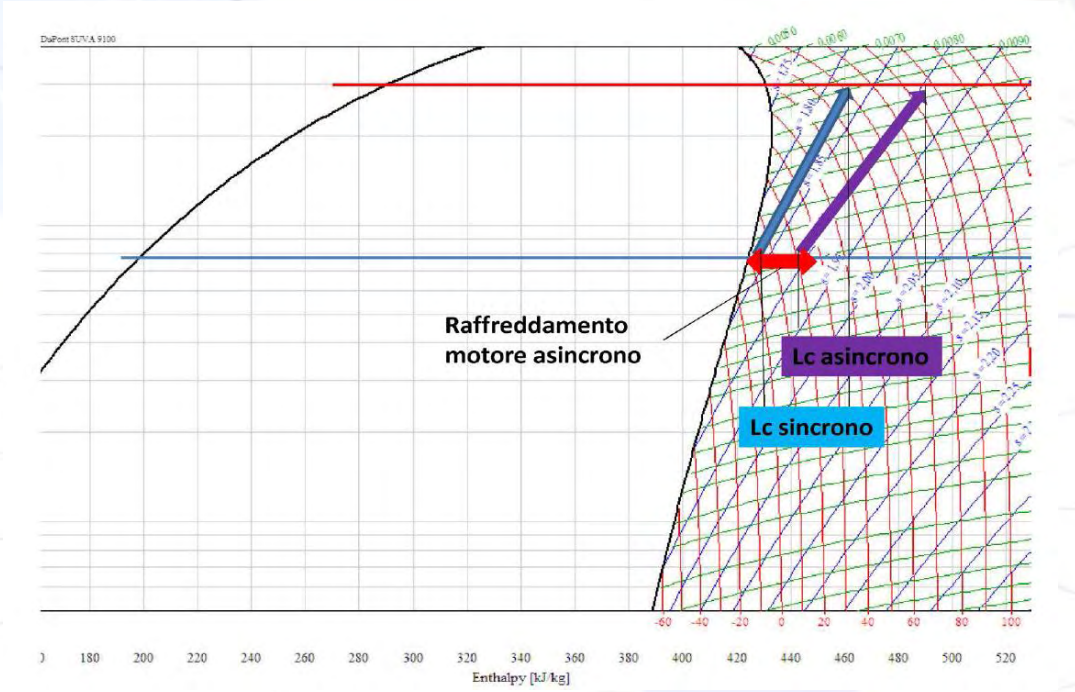
- ✓ Electronic-driven electric expansion valve
- ✓ high efficiency pumping kit
- ✓ Counter flow heat exchange

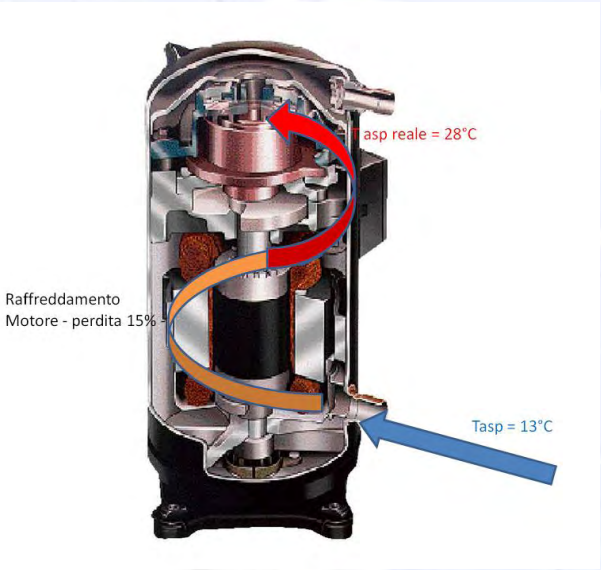


ADVANCED TECHNOLOGICAL SOLUTIONS ON MULTIFUNCTION HEAT PUMPS

PROS of the BLDC motor on the asynchronous motor:

The heat (coming form the stator only) is better rejected in the BLDC motors, so the compressors can be cooled down with discharge gasses.





- the compression power input depends from the suction gas temperature
- in standard compressors (asynchronous) the suction side gasses are further superheated
- in BLDC motors the suction gasses are cooler → lower compression power input

ADVANCED TECHNOLOGICAL SOLUTIONS ON MULTIFUNCTION HEAT PUMPS

- ✓ Permanent-magnet synchronous motor
- ✓ Reduced motor inertia
- ✓ Small sizes
- ✓ Reduced noise level
- ✓ Absence of losses due to current flow in the rotor and to induction → higher partial load efficiency
- ✓ Increased isentropic efficiency of the compression

MULTIFUNCTION HP with TOTAL HEAT RECOVERY: HI WARM

- Splitted unit
- R410A
- BLDC variable speed compressors
- 3 sizes covering the range 1÷34 kW
- Heat-pump mode up to a 60°C (@ 0°C ambient T)
- Minimum ambient T -15°C (@ 55°C supply water T)
- High efficiency pumping kit
- low-noise and light outdoor unit (can be ducted)
- innovative design
- integrated control of building's electrical devices

MULTIFUNCTION HP with TOTAL HEAT RECOVERY: HI WARM

Scroll or Twin-Rotary compressors

Twin-Rotary

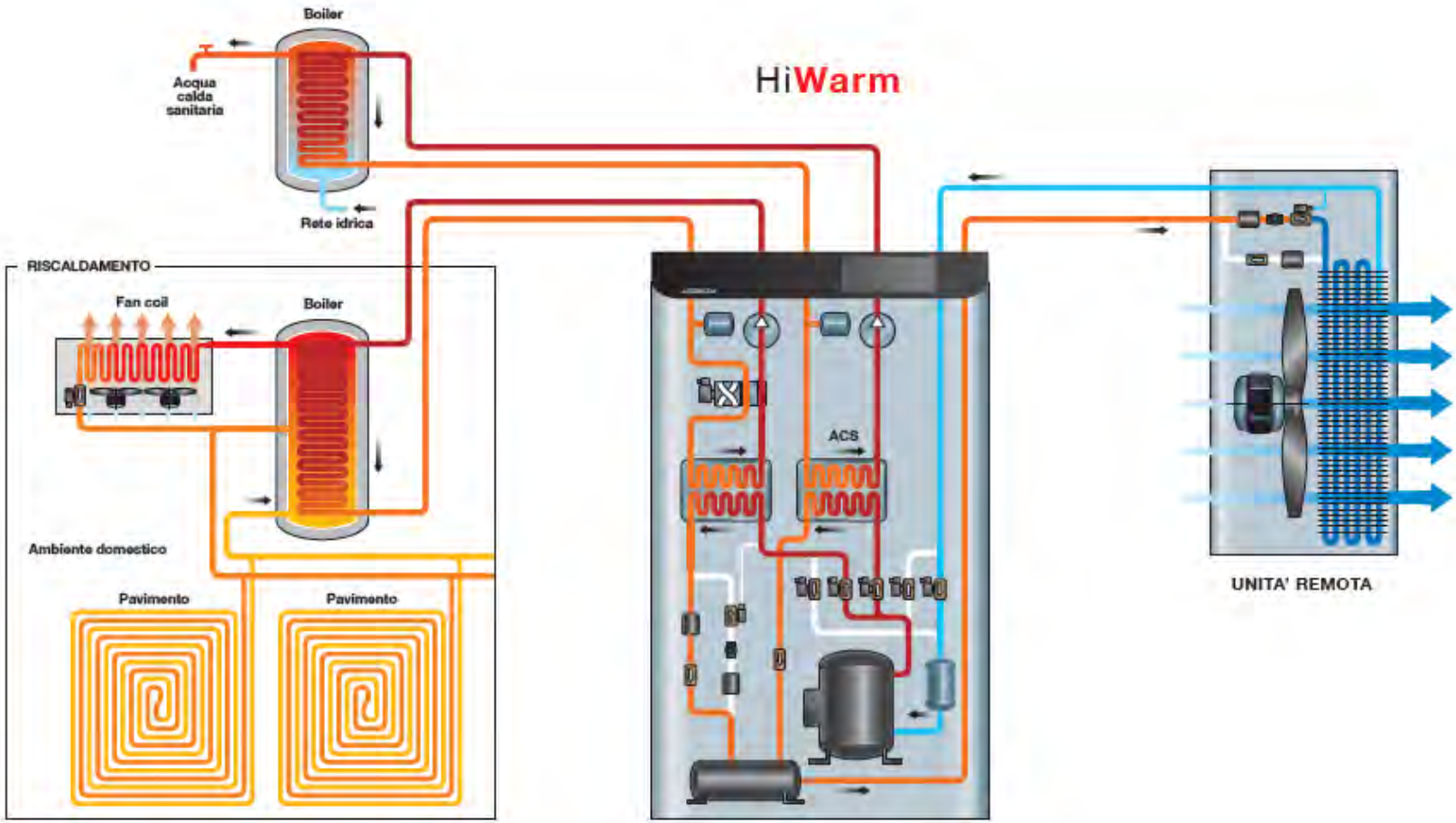
Hi Warm 012

Scroll

Hi Warm 022

Hi Warm 033

HI WARM: how it works



INVERNO
riscaldamento + sanitario

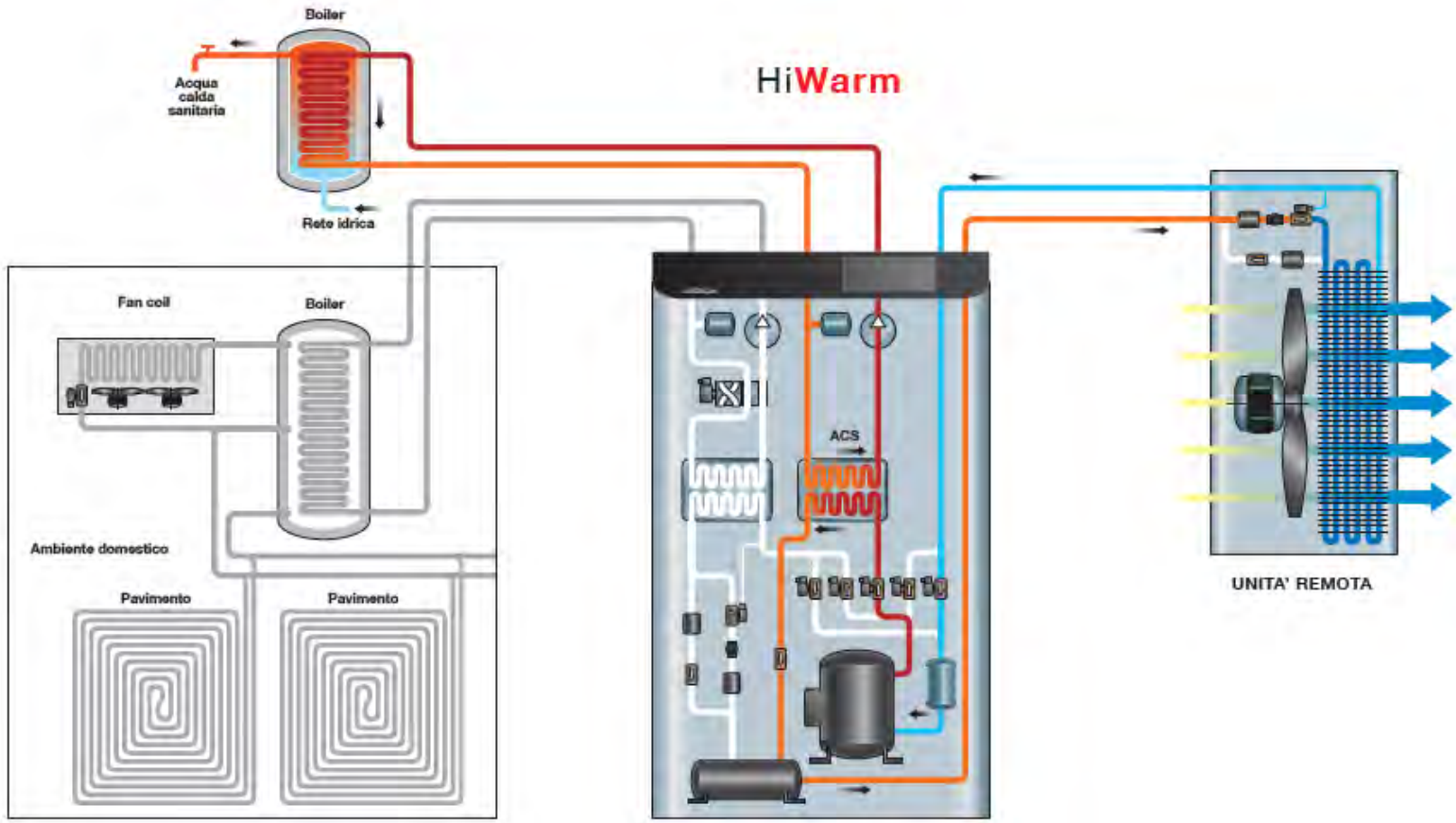
CLIMA MITE
solo sanitario

ESTATE
sanitario + raffrescamento

ESTATE
sanitario + raffreddamento con deumid.

CONTROLLER
Schema principali sensori e cablaggi

HI WARM: how it works



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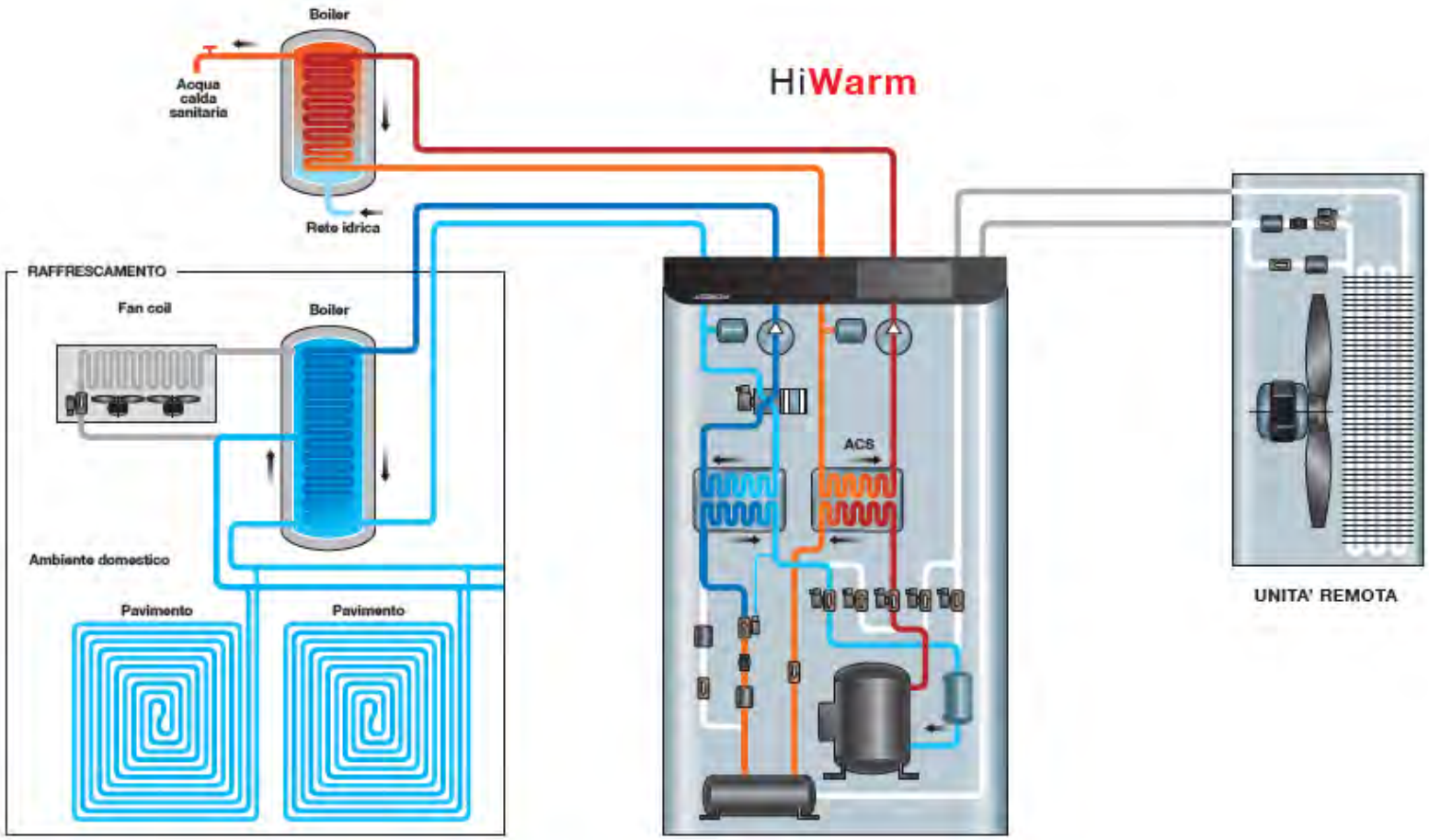
CONTROLLER
Schema principali sensori e controlli

HI WARM: how it works



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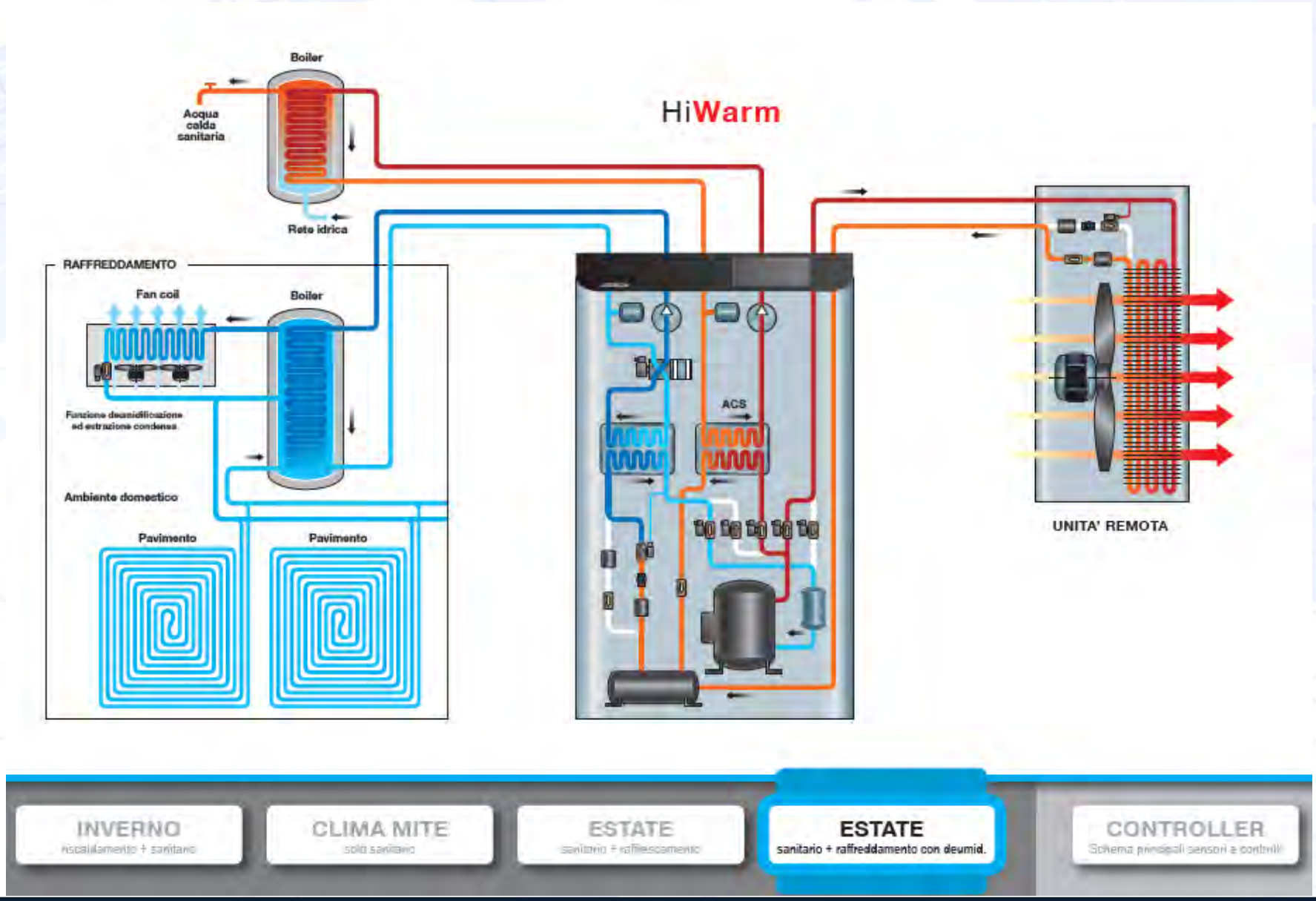
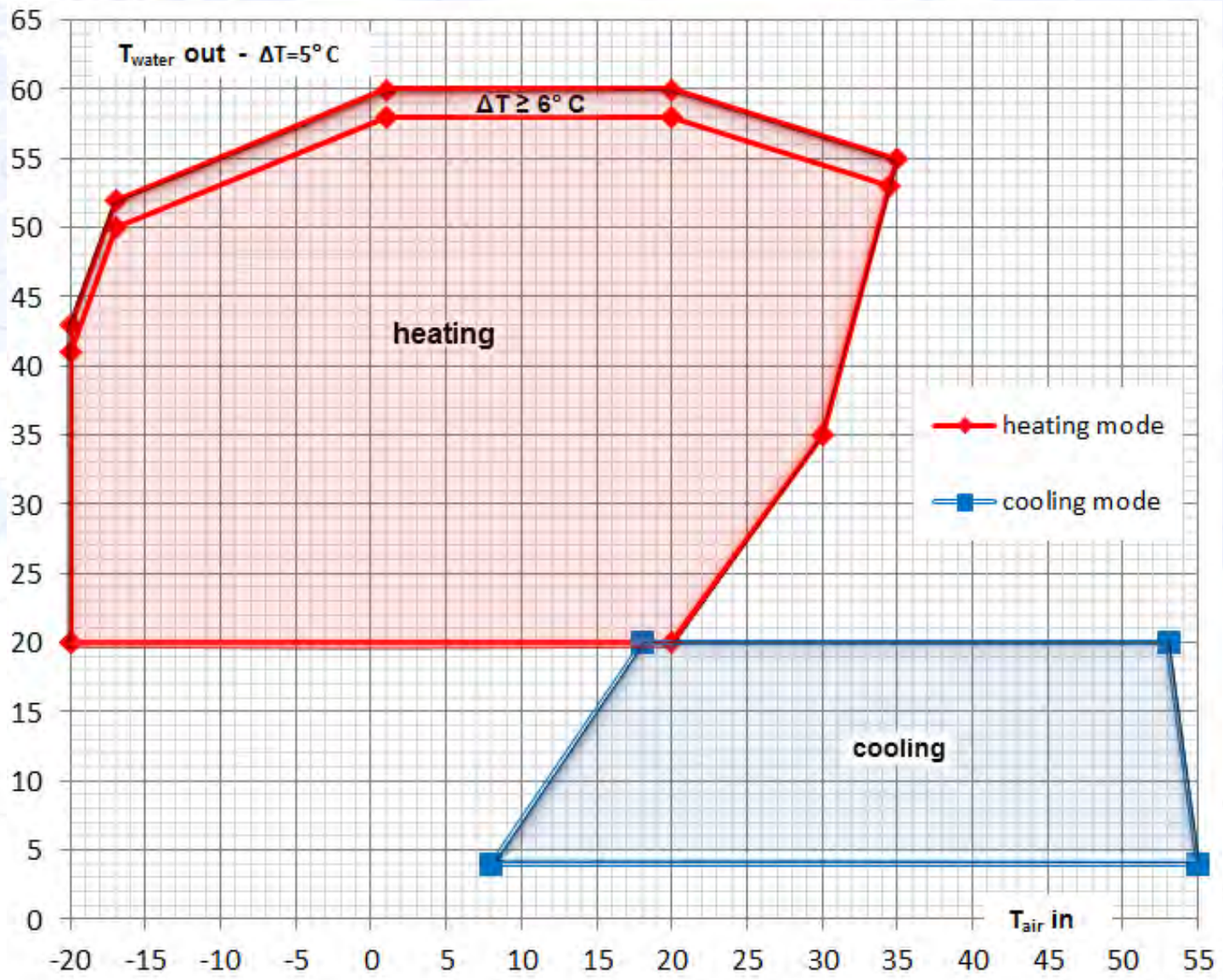
HI WARM: how it works

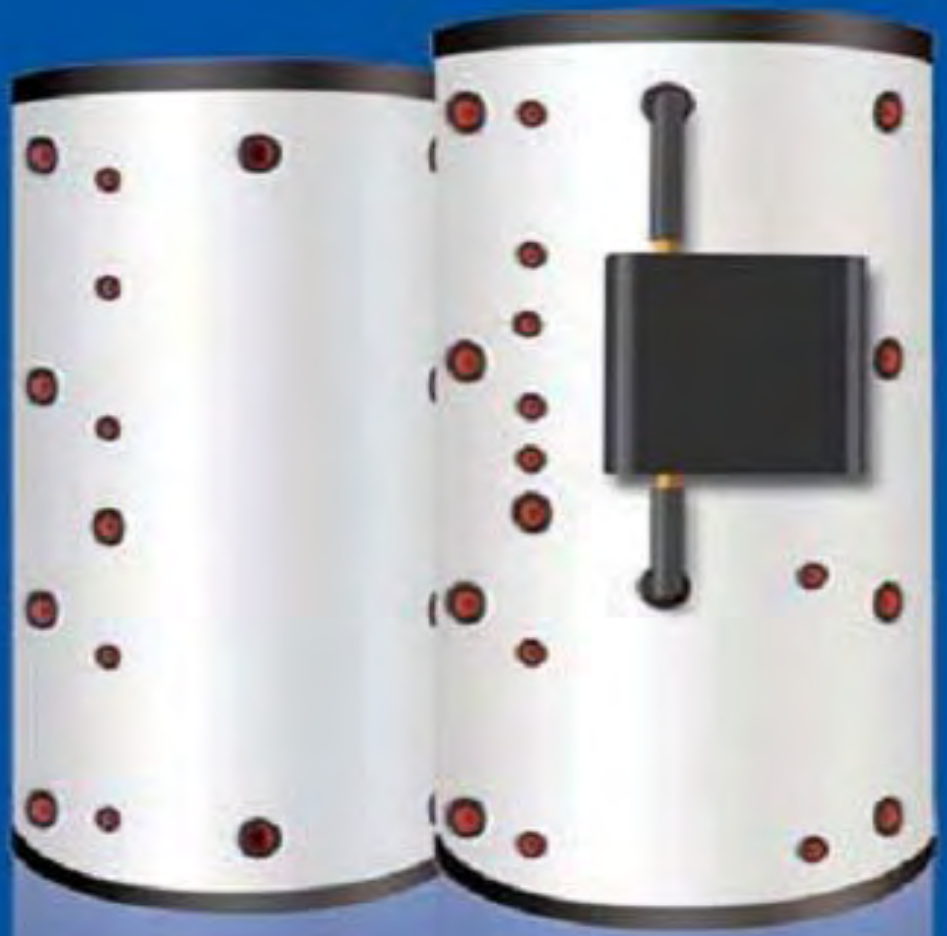


HI WARM: PERFORMANCES

		Water 30°C-35°C			Water 40°C-45°C		
		HiWarm 12	HiWarm 22	HiWarm 33	HiWarm 12	HiWarm 22	HiWarm 33
Heatpump: air @ -10		**110 Hz**	**120 Hz**	**120 Hz**	**110 Hz**	**120 Hz**	**120 Hz**
Heating capacity	[kW]	7,89	15,75	25,46	7,61	15,41	24,56
Compressor absorbed power	[kW]	2,30	4,87	8,08	2,74	6,04	9,46
Fans absorbed power	[kW]	0,3	0,5	0,6	0,3	0,5	0,6
COP (Pf/(Pa+Pv+Pp))	[-]	3,03	2,95	2,93	2,51	2,37	2,43
Heatpump: air @ -5		**110 Hz**	**120 Hz**	**120 Hz**	**110 Hz**	**120 Hz**	**120 Hz**
Heating capacity	[kW]	9,14	18,00	27,99	8,79	17,48	27,18
Compressor absorbed power	[kW]	2,40	5,03	8,12	2,88	6,19	9,66
Fans absorbed power	[kW]	0,3	0,5	0,6	0,3	0,5	0,6
COP (Pf/(Pa+Pv+Pp))	[-]	3,39	3,28	3,20	2,76	2,63	2,64
Heatpump: air @ 0		**110 Hz**	**120 Hz**	**120 Hz**	**110 Hz**	**120 Hz**	**120 Hz**
Heating capacity	[kW]	10,58	20,59	31,28	10,14	19,88	30,46
Compressor absorbed power	[kW]	2,46	5,14	8,15	3,00	6,32	9,84
Fans absorbed power	[kW]	0,3	0,5	0,6	0,3	0,5	0,6
COP (Pf/(Pa+Pv+Pp))	[-]	3,82	3,67	3,55	3,07	2,93	2,91

HI WARM – WORKING RANGE





DHW production tanks

DHW TANKS: a brief premise

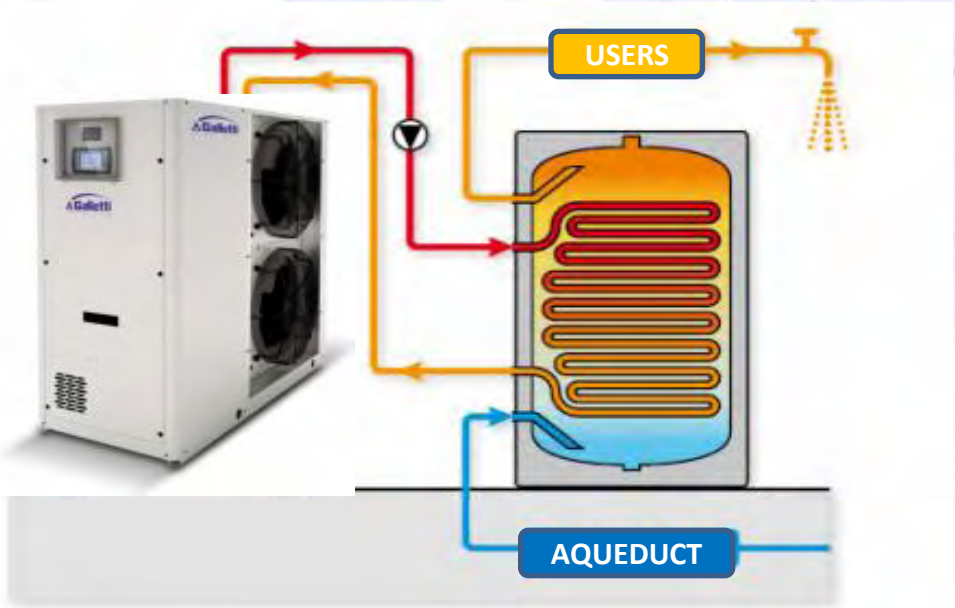
In systems in combination with heat pumps:

- Storage for the production of DHW must always be set up (as it is not «quick exchange» it is necessary to store the required energy)
- Hydraulic separation is required (gas and DHW cannot «coexist» in the same plate exchanger)

STORAGE TANK -> DHW storage

CONSTRUCTION FEATURES:

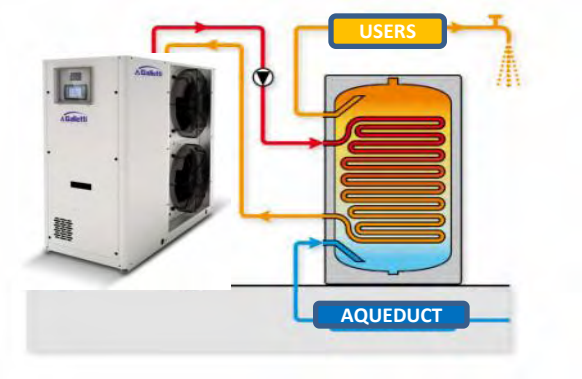
- Glazed, teflon coated, porcelain or stainless steel inside
- Crude steel coil



STORAGE TANK -> DHW storage

Benefits:

- Contained costs
- Once the entire storage tank is heated up a large volume of DHW is available
- Good stratification also in the withdrawal phase («syringe effect»)



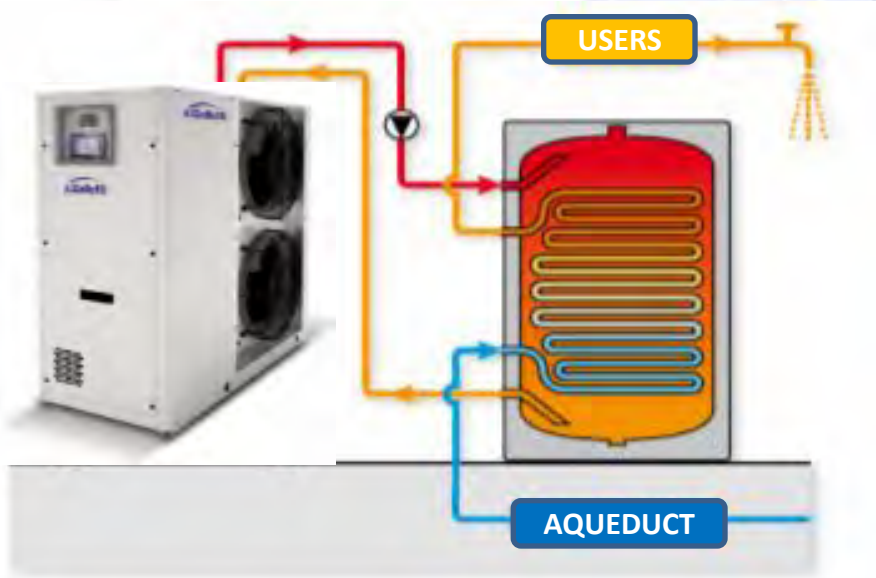
Disadvantages:

- **Requires an anti-legionella cycle**
- The pump operates with a reduced volume of water-> «Plugging» risk on the coil: if the heat pump is not able to transfer the entire power through the coil the technical water returns to the unit too hot and the heat pump will stop -> risk of switching on/off too frequently
- Reloading times can be long (there is an interposing coil)
- Not the best T approach between technical water and DHW (Delta T approximately 5°C)

THERMAL STORAGE TANK -> technical water storage

CONSTRUCTION FEATURES:

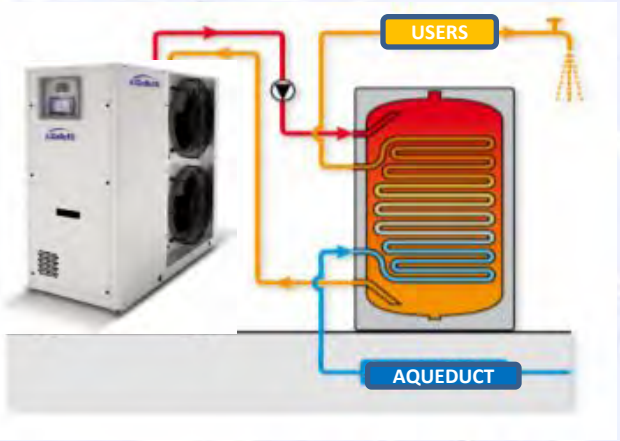
- Crude carbon steel inside
- **Stainless steel coil**
- DHW is produced **instantaneously**



THERMAL STORAGE TANK -> technical water storage

Benefits:

- The heat pump works better (no «plug» effect on the coil)
- **No anti-legionella cycle**
- Quicker re-loading times (there is no interposing coil in the re-loading phase)



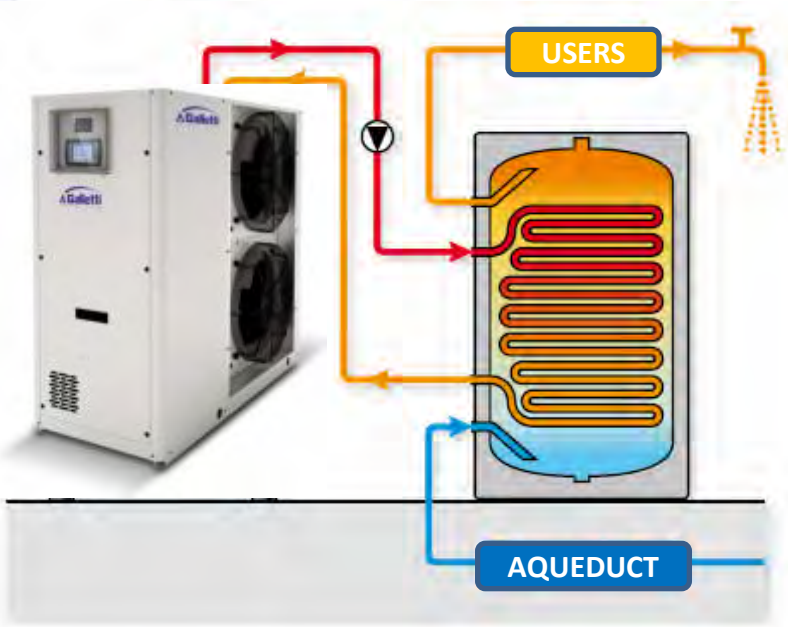
Disadvantages:

- Cost greater than the solution that includes a DHW storage tank (due to the stainless steel coil)
- **It requires «large» exchange areas**

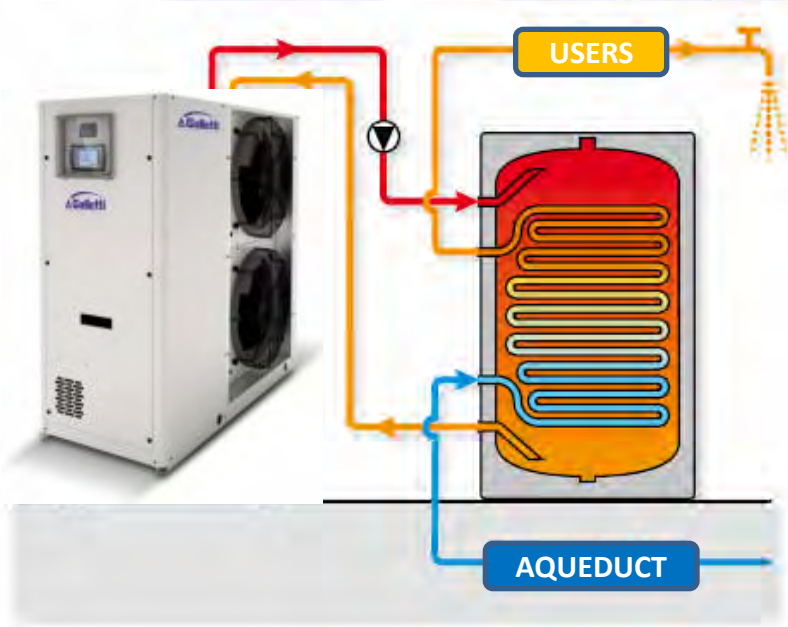
DHW TANKS: two possible «standard» configurations

When withdrawals are not excessive this is the option Galletti suggests between the standard configurations

Storage tank: DHW storage

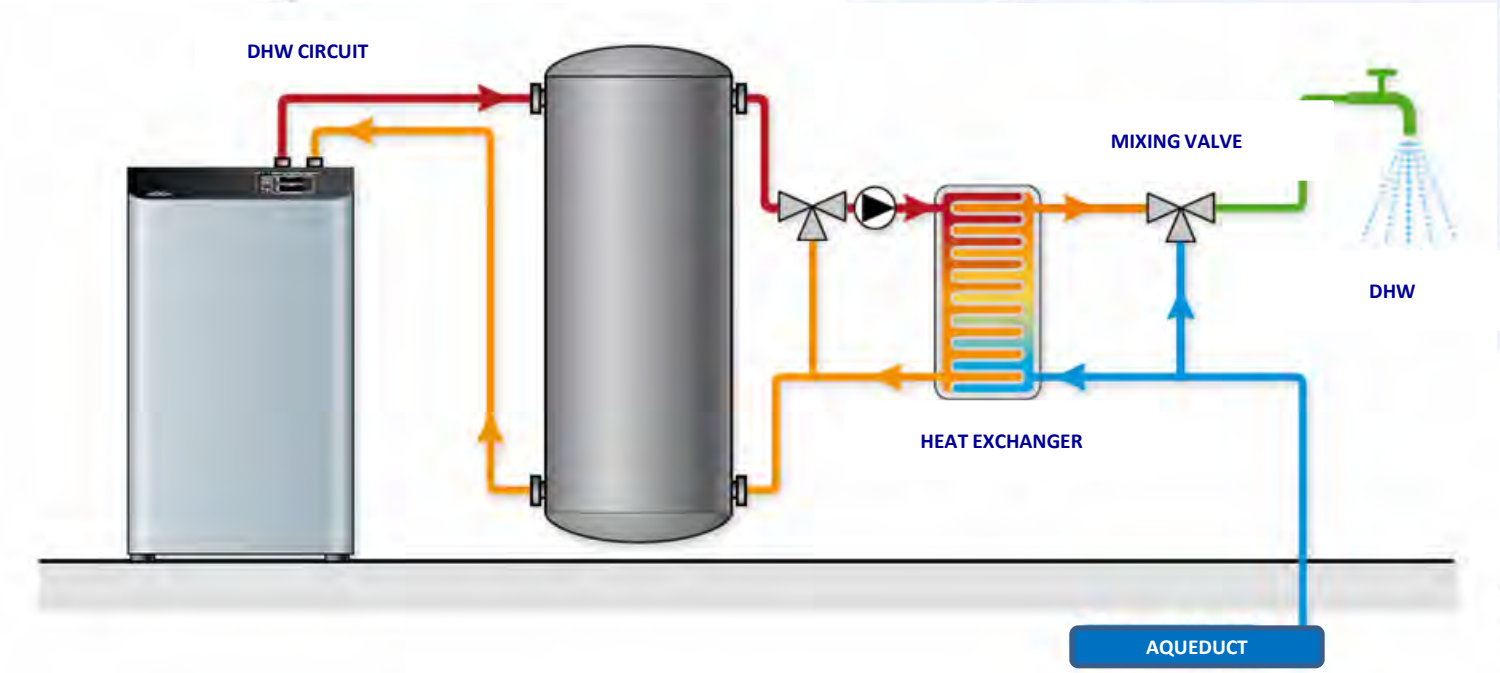


Thermal storage tank: technical water storage



DHW TANKS: an «advanced» configuration

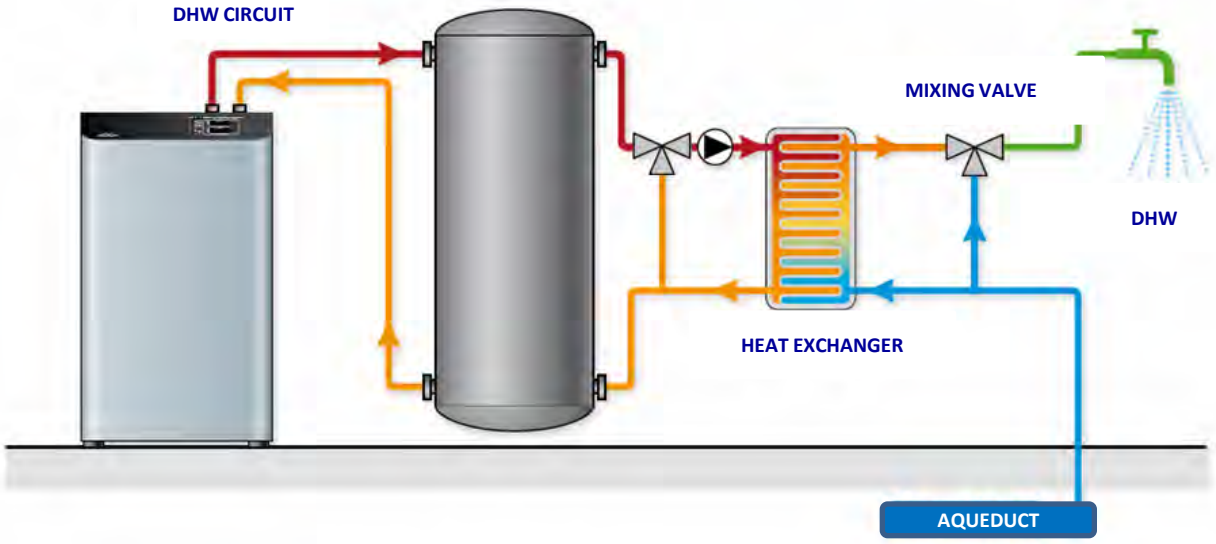
Technical water storage + external heat exchanger



THERMAL STORAGE TANK -> stock of technical water + external heat exchanger

Construction features:

- Crude carbon steel inside
- **Plate heat exchanger**
- on/off pump + mixing valve or modulating pump
- DHW is produced **instantaneously**



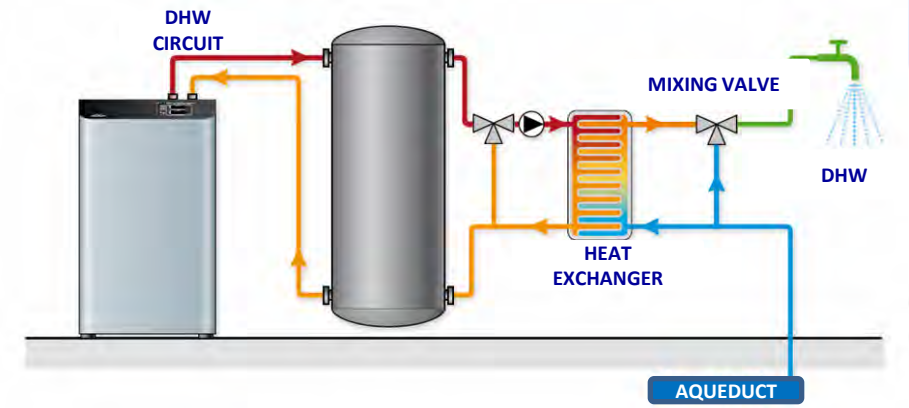
THERMAL STORAGE TANK -> technical water stock + external heat exchanger

Benefits:

- **No anti-legionella cycle**
- More efficient heat exchange -> Improved approach on the delta T (2-3 °C)
- The tank is almost completely emptied out («syringe» effect)
- Easy to increase the number of plates
- Easy to maintain

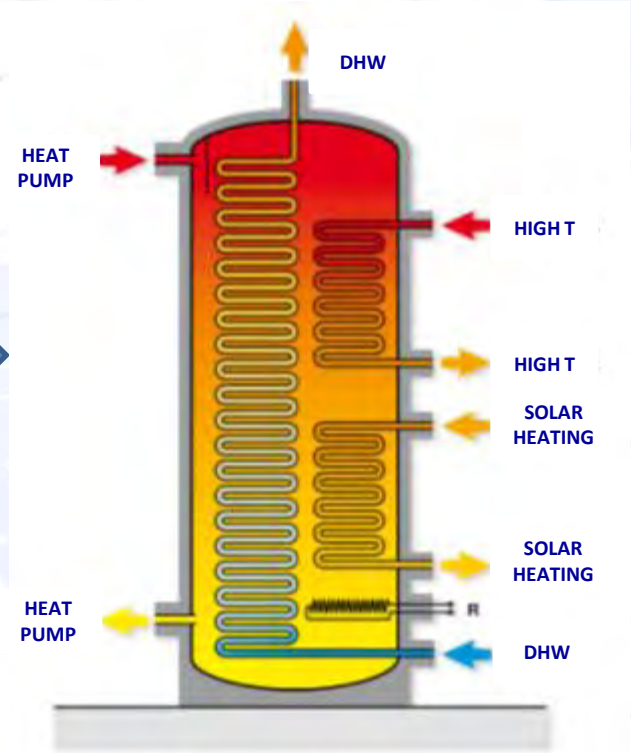
Disadvantages:

- Greater cost (plates + pump)
- Pump absorption



The thermal storage tank according to Galletti approach

The renewable/free energies «container»: heat pump, solar heating, high temperature



THE RANGE OF TANKS GALLETTI by CORDIVARI

Galletti AIR CONDITIONING

CORDIVARI®

Experience with heat pumps

Experience with tanks

- **A range of tanks for DHW production developed ad hoc for heat pumps**
- **A range of tanks that is currently unparalleled among top manufacturers**

RYTN: thermal storage tank without additional coils

CAPACITY	CODE	NET VOLUME	DHW COIL VOLUME	COIL SURFACE	WEIGHT
[l]		[l]	[l]	[m^2]	[KG]
300	RYTN 300	302	7,2	3,5	62
600	RYTN 600	525,8	32,2	5,5	95
800	RYTN 800	760	45,5	7,8	120

RYTN SH: thermal storage tank with additional double coil

CAPACITY	CODE	NET VOLUME	DHW COIL VOLUME	DHW COIL SURFACE	LOWER COIL VOLUME	LOWER COIL SURFACE	UPPER COIL VOLUME	UPPER COIL SURFACE	WEIGHT
[l]		[l]	[l]	[m^2]	[l]	[m2]	[l]	[m2]	[KG]
300	RYTNSH 300	288,3	7,2	3,5	7,8	1,2	4,6	0,9	85
600	RYTNSH 600	501,8	32,2	5,5	13	2,0	8	1,25	132
800	RYTNSH 800	728,0	45,5	7,8	16,3	2,5	11,8	1,8	169

RYTN and RYTNSH: withdrawal data

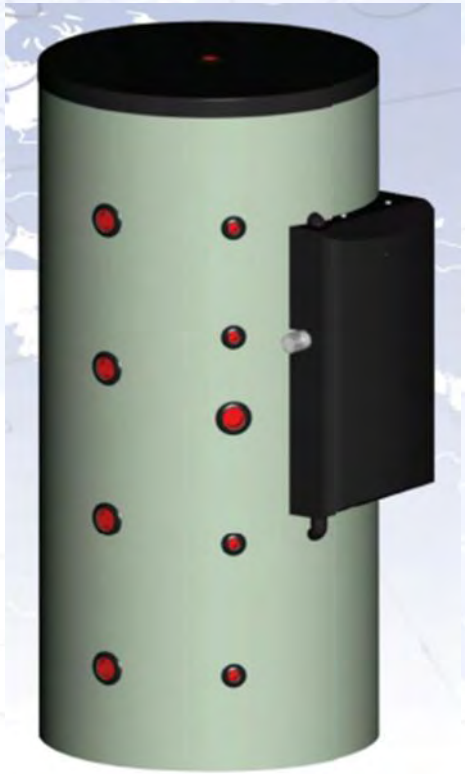
RYTN300 - RYTNSH300	P = 0 kW		P = 5 kW		P = 10 kW		P = 15 kW	
	Q (l/min)	V (l)	Q (l/min)	V (l)	Q (l/min)	V (l)	Q (l/min)	V (l)
DHW 10C°/45C°, starting tank water T 55C°	10	118	10	142	10	166	10	191
	20	83	20	91	20	100	20	108
	30	48	30	51	30	54	30	57
DHW 10C°/45C°, starting tank water T 50C°	10	96	10	116	10	135	10	155
	20	67	20	74	20	81	20	88
	30	39	30	42	30	44	30	47

RYTN600 – RYTNSH600	P = 0 kW		P = 5 kW		P = 10 kW		P = 15 kW		P = 20 kW		P = 25 kW	
	Q (l/min)	V (l)	Q (l/min)	V (l)	Q (l/min)	V (l)	Q (l/min)	V (l)	Q (l/min)	V (l)	Q (l/min)	V (l)
DHW 10C°/45C°, starting tank water T 55C°	10	293	10	353	10	413	10	473	10	533	10	593
	20	223	20	246	20	269	20	291	20	314	20	337
	30	153	30	163	30	174	30	184	30	195	30	205
DHW 10C°/45C°, starting tank water T 50C°	10	240	10	289	10	338	10	387	10	436	10	485
	20	182	20	201	20	220	20	238	20	257	20	276
	30	125	30	134	30	142	30	151	30	159	30	168

RYTN800 – RYTNSH800	P = 0 kW		P = 15 kW		P = 20 kW		P = 25 kW		P = 30 kW		P = 35 kW	
	Q (l/min)	V (l)	Q (l/min)	V (l)	Q (l/min)	V (l)	Q (l/min)	V (l)	Q (l/min)	V (l)	Q (l/min)	V (l)
DHW 10C°/45C°, starting tank water T 55C°	10	469	10	757	10	853	10	949	10	1045	10	1141
	20	367	20	480	20	517	20	555	20	592	20	630
	30	266	30	320	30	339	30	357	30	375	30	393
DHW 10C°/45C°, starting tank water T 50C°	10	384	10	619	10	698	10	777	10	855	10	934
	20	300	20	392	20	423	20	454	20	485	20	515
	30	218	30	262	30	277	30	292	30	307	30	322

Q = flow rate of domestic hot water withdrawn from the coil in l/min
P = power in kW of the connected heat pump under the conditions considered (e.g. outdoor T)
V = maximum quantity of DHW that can be produced under the specified conditions

RYTP: thermal storage tank with external heat exchanger



CAPACITY	CODE	NET VOLUME	MAX POWER DHW MODULE	WEIGHT
[l]		[l]	kW	[KG]
300	RYTPSH 300	286	120*	106
500	RYTPSH 500	505	120*	131
800	RYTPSH 800	803	120*	152

* Max power with reference to a storage T of 80°C. This T is used to calculate the power so as to compare this module with the ones used by Cordivari on the products in the catalogue

RYTP and RYTP SH: WITHDRAWAL DATA

RYTP300 - RYTPSH300	P = 0 kW		P = 5 kW		P = 10 kW		P = 15 kW		P = 20 kW		P = 25 kW	
	Q (l/min)	V (l)	Q (l/min)	V (l)	Q (l/min)	V (l)	Q (l/min)	V (l)	Q (l/min)	V (l)	Q (l/min)	V (l)
DHW 10C°/45C°, starting tank water T 55C°	10	334	10	420	10	566	10	866	10	1846	10	infinite
	20	334	20	372	20	420	20	482	20	566	20	684
	26,3	334*	26,3	362*	26,3	396*	26,3	436*	26,3	485*	26,3	547*
DHW 10C°/45C°, starting tank water T 50C°	10	264	10	332	10	447	10	684	10	1459	10	infinite
	20	264	20	294	20	332	20	381	20	447	20	541
	21	264	21	293	21	328	21	373	21	433	21	515

RYTP600 – RYTPSH600	P = 0 kW		P = 15 kW		P = 20 kW		P = 25 kW		P = 30 kW		P = 35 kW	
	Q (l/min)	V (l)	Q (l/min)	V (l)	Q (l/min)	V (l)	Q (l/min)	V (l)	Q (l/min)	V (l)	Q (l/min)	V (l)
DHW 10C°/45C°, starting tank water T 55C°	10	557	10	1444	10	3078	10	infinite	10	infinite	10	infinite
	20	557	20	804	20	943	20	1141	20	1444	20	1966
	26,3	557	26,3	727	26,3	809	26,3	912	26,3	1045	26,3	1224
DHW 10C°/45C°, starting tank water T 50C°	10	441	10	1143	10	2437	10	infinite	10	infinite	10	infinite
	20	441	20	636	20	747	20	904	20	1143	20	1556
	21	441	21	623	21	723	21	861	21	1063	21	1389

RYTP800 – RYTPSH800	P = 0 kW		P = 15 kW		P = 20 kW		P = 25 kW		P = 30 kW		P = 35 kW	
	Q (l/min)	V (l)	Q (l/min)	V (l)	Q (l/min)	V (l)	Q (l/min)	V (l)	Q (l/min)	V (l)	Q (l/min)	V (l)
DHW 10C°/45C°, starting tank water T 55C°	10	891	10	2310	10	4924	10	infinite	10	infinite	10	infinite
	20	891	20	1286	20	1509	20	1825	20	231	20	3145
	26,3	891	26,3	1163	26,3	1294	26,3	1459	26,3	1672	26,3	1958
DHW 10C°/45C°, starting tank water T 50C°	10	705	10	1828	10	3896	10	infinite	10	infinite	10	infinite
	20	705	20	1018	20	1194	20	1444	20	1828	20	2488
	21	705	21	996	21	1156	21	1376	21	1699	21	2221

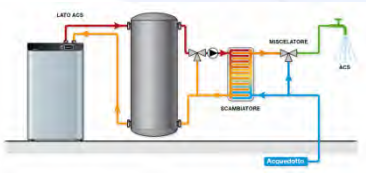
Q = flow rate of domestic hot water withdrawn from the coil in l/min
P = power in kW of the connected heat pump under the conditions considered (e.g. outdoor T)
V = maximum quantity of DHW that can be produced under the specified conditions
***** = DHW outlet temperature 42.6 °C

The path chosen by the Galletti Group...

…is the on-going pursuit for maximum **EFFICIENCY**

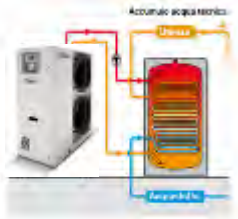
THE BEST SOLUTION:

→ TECHNICAL WATER STORAGE TANK WITH EXTERNAL HEAT EXCHANGER



THE SOLUTION FOR STANDARD APPLICATIONS AT A PRICE THAT CAN MAKE THE DIFFERENCE:

→ TECHNICAL WATER STORAGE TANK WITH COIL FOR DHW



RENEWABLE ENERGY

DIRECTIVE 2009/28/EC
EUROPEAN PARLIAMENT

The EU climate and energy package

Set of binding legislation which aims to ensure the European Union meets its ambitious climate and energy targets for 2020.

- 20% reduction in EU greenhouse gas emissions from 1990 levels;
- Raising the share of EU energy consumption produced from renewable resources to 20%;
- A 20% improvement in the EU's energy efficiency.

20%

DIRECTIVE 2009/28/EC

Promotion of the use of energy from renewable sources

Energy from renewable sources

- Aerothermal energy
- Geotermal energy
- Hydrothermal energy

} **HEAT PUMP**

DIRECTIVE 2009/28/EC

Renewable energy captured by heat pumps

$$E_{RES} = Q_{usable} * [1 - \frac{1}{SPF}] \qquad SPF > SPF_{lim} = 1{,}15 * \frac{1}{\eta}$$

- Q_{usable}: estimated total usable heat delivered by heat pumps
- SPF: estimated average seasonal performance factor for those heat pumps
- η: is the ratio between total gross production of electricity and the primary energy consumption for electricity production

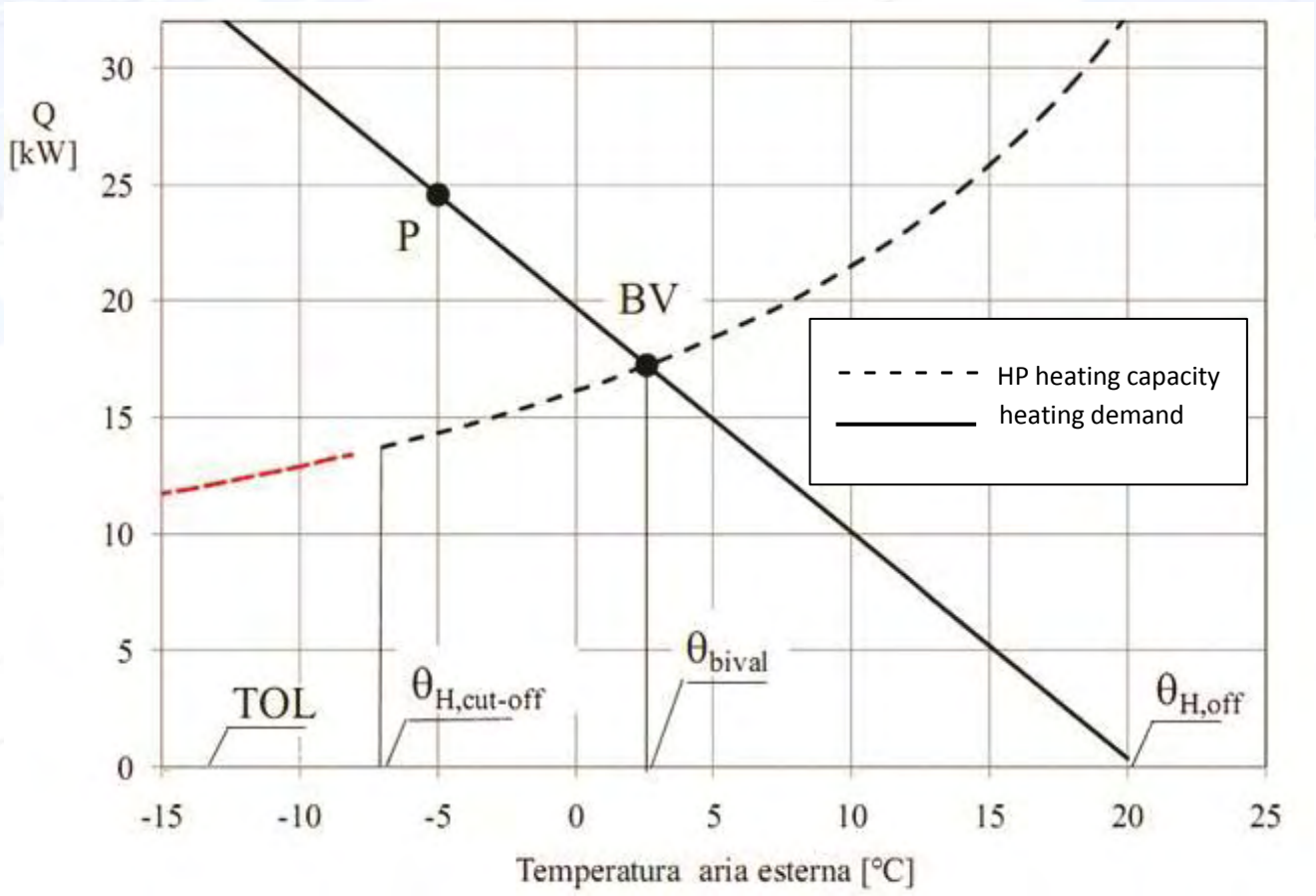
UNI EN 14825: Calculation of SCOP for HP

Renewable energy captured by heat pumps

- **Colder climate zone:** θ_{design} = -22 ˚C
- **Building heating demand:** P_d = 16,4 kW
- **Hiwarm 022**
- **Boiler backup** ($\theta_{air} < TOL$)
- **Bivalent Temperature:** θ_{bival} =-4˚C

UNI EN 14825: Calculation of SCOP for HP

Bivalent Temperature



UNI EN 14825: Calculation of SCOP for HP

Conclusion

Renewable energy captured by heat pumps

- $E_{RES,h} = 24908\ kWh$
- $E_{RES,h} = 61\% \cdot E_{heating\ demand}$

Thank you for your attention

Galletti
AIR CONDITIONING