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NETZERO WATER/WATER HEAT PUMPS

1. Previous concepts
2. NETZERO water/water heat pumps
3. ecoSMART Energy Managers

Previous concepts

Types of heat pumps

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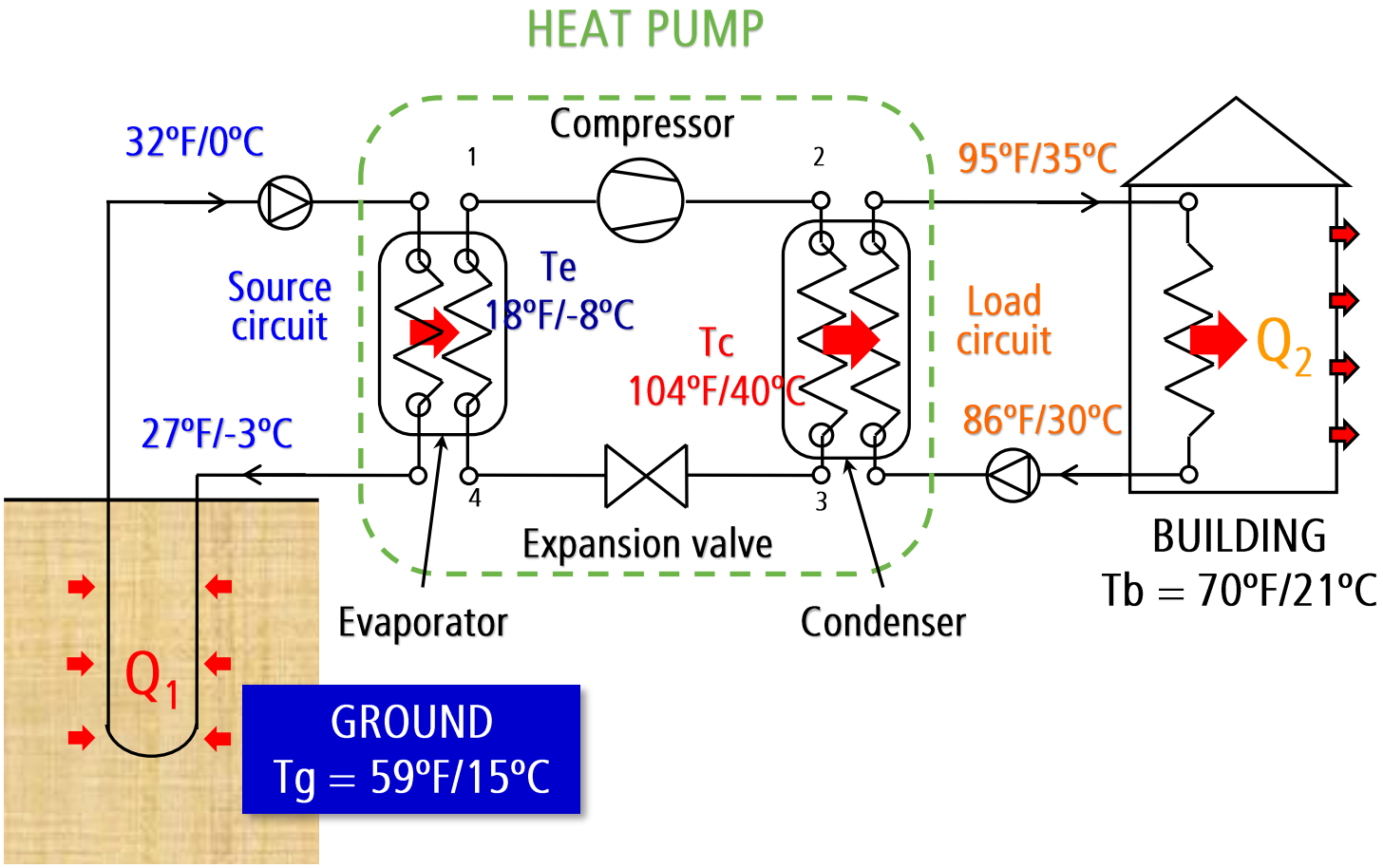
- Water/Water heat pumps



Types of heat pumps

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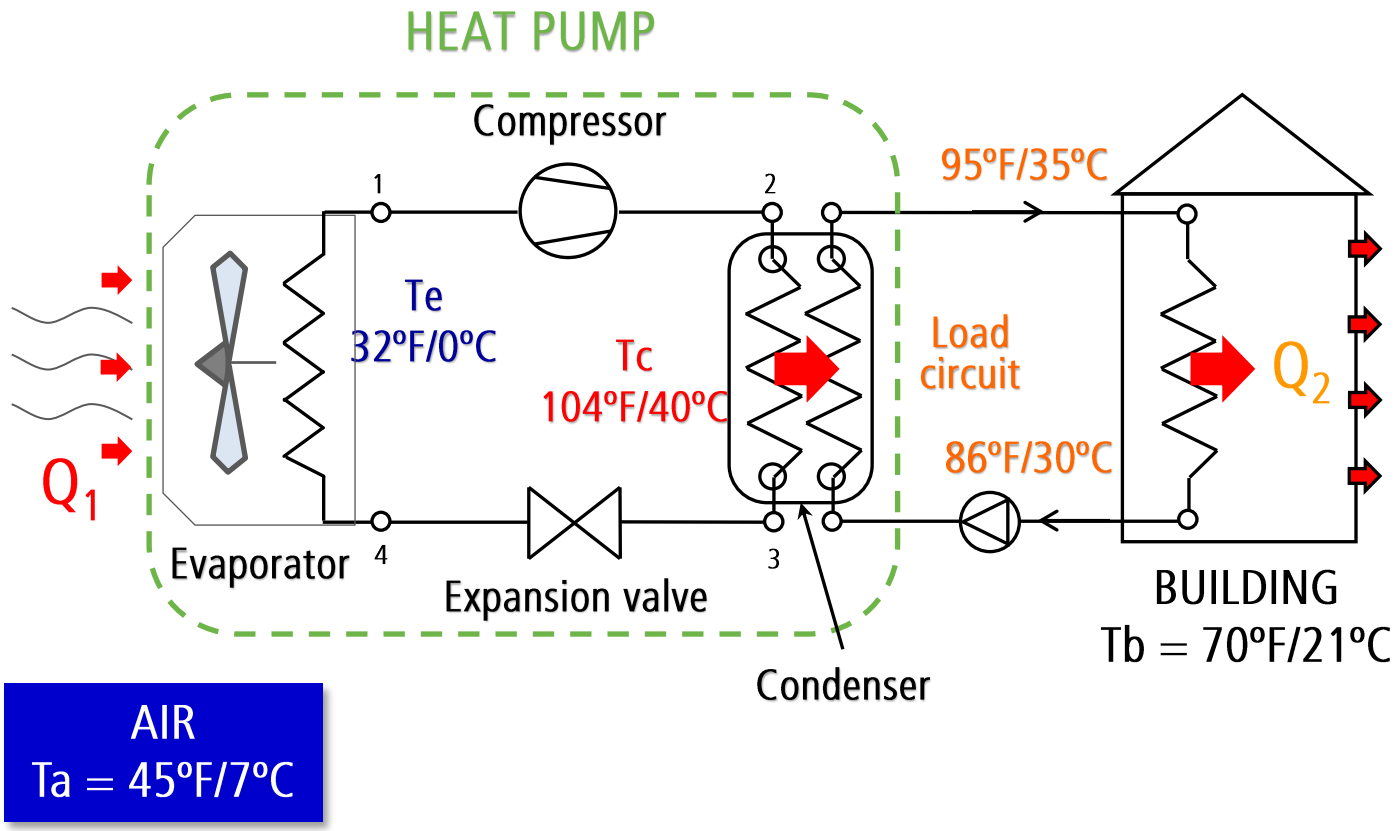
- Air/Water heat pumps



Heat pumps. Efficiency

Heat pump efficiency

1- Instant efficiency

- COP (Coefficient Of Performance), heating efficiency.

  "Ratio between the heating power and the electric absorbed power".

$$COP = \frac{P_H}{P_E}$$

- EER (Efficiency Energy Ratio), cooling efficiency.

  "Ratio between the cooling power and the electric absorbed power".

$$EER = \frac{P_C}{P_E}$$

Heat pumps. Efficiency

Heat pump efficiency

2- Seasonal efficiency (Seasonal Performance Factor).

Much more representative parameters!

- **SCOP (Seasonal COP), seasonal heating efficiency.**

"Ratio between the heating energy supplied and the electrical energy absorbed during a certain period of time".

$$SCOP = \frac{E_H}{E_E}$$

- **SEER (Seasonal EER), seasonal cooling efficiency.**

"Ratio between the cooling energy supplied and the electrical energy absorbed during a certain period of time".

$$SEER = \frac{E_C}{E_E}$$

Heat pumps. Efficiency

Heat pump efficiency

2- Seasonal efficiency (Seasonal Performance Factor).

Much more representative parameters!

- **SPF (Seasonal Performance Factor), Global Seasonal Efficiency.**

"Ratio between the total energy supplied (heating and cooling) and the electrical energy absorbed during a certain period of time".

$$SPF = \frac{E_H + Ec}{E_E}$$

Previous concepts

BLOCK I. Product Ranges

I.I. Water/Water heat pump & Energy Managers

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Water/Water heat pumps

NETZERO RANGE

Traditional heat pumps

➢ On/off compressors, NO INVERTER, FIXED POWER – LOAD SIDE

- The Seasonal Performance Factor (SPF) decreases significantly because the heat pump can't adapt to the demand variations and the outlet temperature of the heat pump needs to be higher

- A buffer tank and at least one additional shunt group (circulation pump + mixing valve) are needed, and also more space in the machine room, increasing considerably the cost and the complexity of the installation

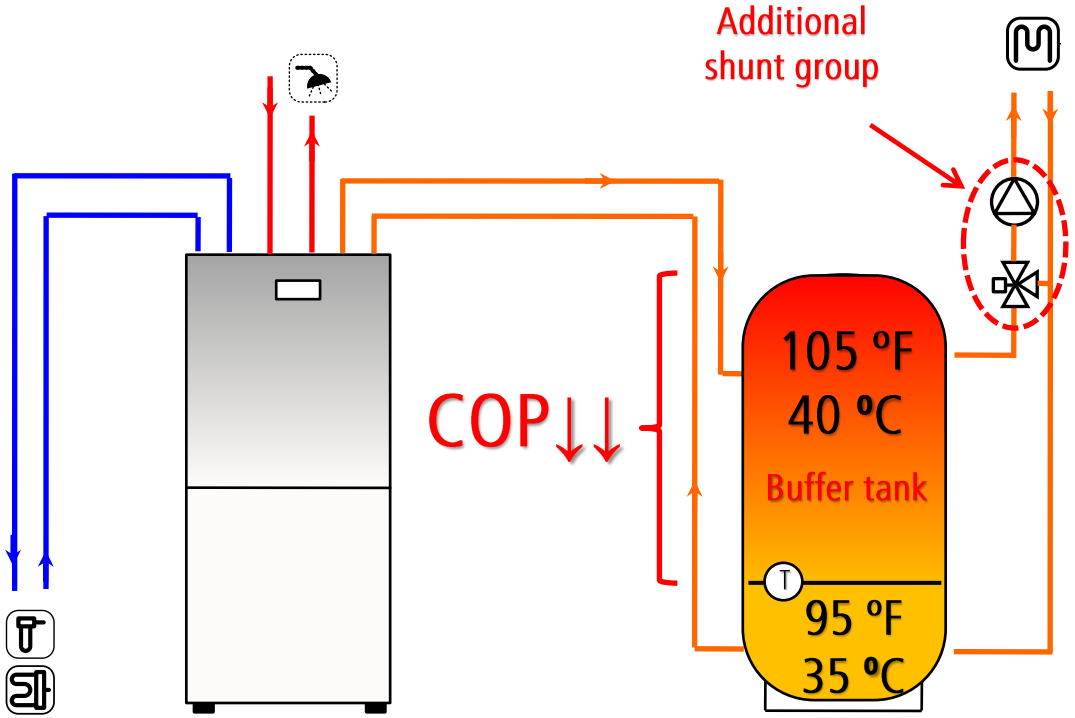
- Besides the buffer tank means a loss of efficiency throughout the year, since its temperature is higher (winter) or lower (summer) than the ambient temperature

Traditional heat pumps

GEOSMART NETZERO

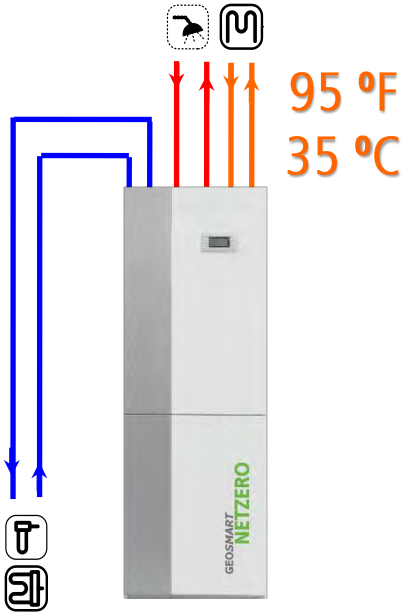
➢ On/off compressors, NO INVERTER, FIXED POWER – LOAD SIDE

Traditional installation



Installation with NETZERO

✓ LOWER COST
✓ HIGHER PERFORMANCE



Installation overcost$_{(\text{Buffer tank + shunt group})}$: 2.000 ~3.000 $ + material and time

+ the most expensive thing → space needed!

Traditional heat pumps

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- On/off compressors, NO INVERTER, FIXED POWER – LOAD SIDE

Traditional installation

Installation with NETZERO

✓ LOWER COST
✓ HIGHER PERFORMANCE

Traditional heat pumps

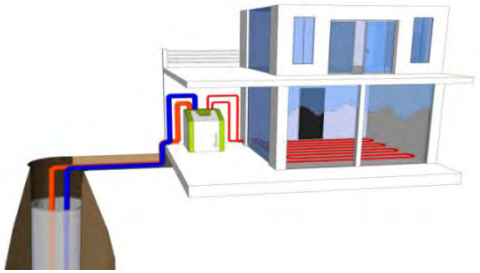
GEOSMART NETZERO

➢ On/off compressors, NO INVERTER, FIXED POWER – SOURCE SIDE

- In many cases an oversizing, and therefore an overcost, of the source system is needed since the thermal power needed does not match any commercial value and installing a higher capacity heat pump is required

PRACTICAL EXAMPLE

- ➢ Real thermal power needed: 37.500 Btu/h
- ➢ Installed power with traditional heat pump (closest commercial value that meets): 44.500 Btu/h
- ➢ Installed power with NETZERO heat pump: 37.500 Btu/h



Dimensioning of the source system

1- Installation with traditional heat pump

$m_{source\ system}$ = (44.500 - (44.500/5))/170 = 209 m = 685 Ft

2- Installation with NETZERO heat pump

$m_{source\ system}$ = (37.500 - (37.500/5))/170 = 176 m = 577 Ft

Cost of the source system

1- Installation with traditional heat pump

Cost= 209 m x 40 $/m= 8.360 $

2- Installation with NETZERO heat pump

Cost= 176 m x 40 $/m= 7.040 $

Overcost in the source system: 1.320 $

$m_{source\ system}$ = (P-(P/COP))/P_{EE}

P_{EE}≡ Especific extraction power [BTU/h/m]

Drilling cost considered : 40 $/m

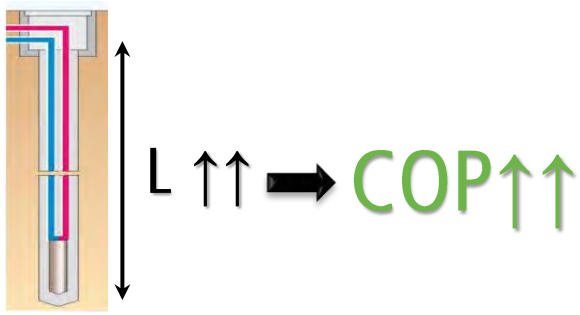
Traditional heat pumps

GEOSMART NETZERO

➢ On/off compressors, NO INVERTER, FIXED POWER – SOURCE SIDE

SOURCE SYSTEMS: ADVANTAGES OF INVERTER TECHNOLOGY

✓ LOWER COST
✓ HIGHER PERFORMANCE



Inverter Technology, along with our control strategies, not only provide significant performance **advantages** when it comes to the load side but also when it comes to the **source side**.

The source systems are dimensioned for the maximum thermal power that the installation needs.

However, because the installations operate most of the time at partial loads and because our heat pumps have the ability to modulate and adapt their power to the one required by the installation, **most of the time the source systems are oversized.**

Result → Increased fluid temperature in the source circuit and consequently increased performance.

Traditional heat pumps

➢ External modules for cooling

- Hydraulic inversion

- Significant increase in the cost of equipment and installation (3.500 ~ 3.500 $)

- Much more complex installations

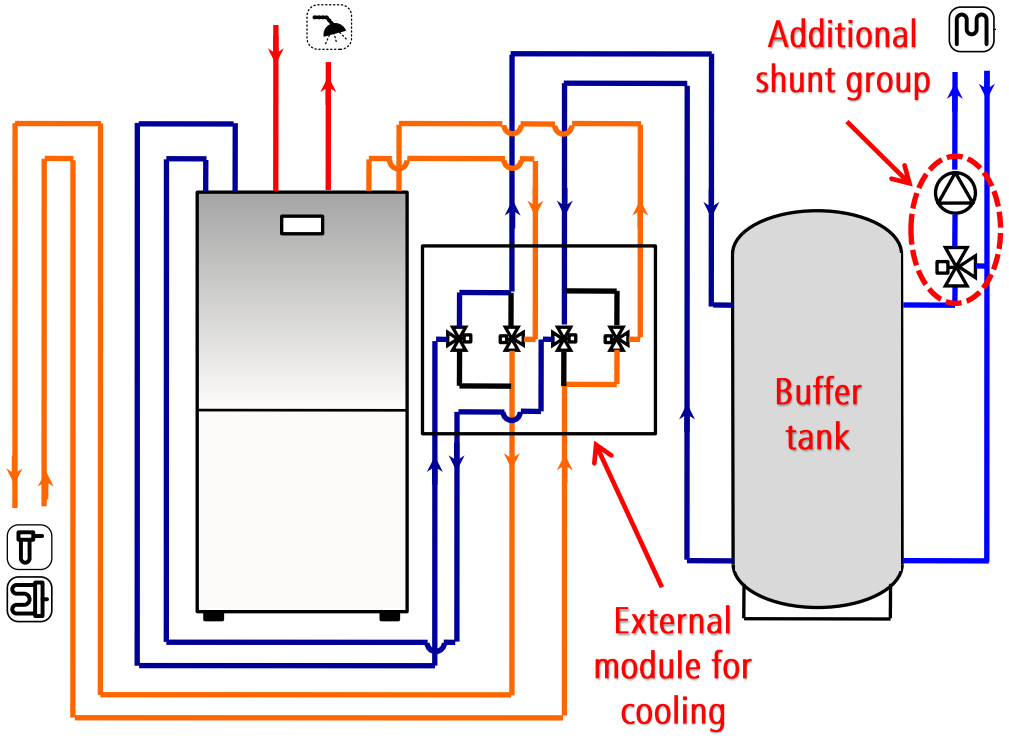
- Glycol is also necessary in the load circuit, or install a plate heat exchanger with an even higher cost

Traditional heat pumps

GEOSMART NETZERO

➢ External modules for cooling

Traditional installation



Installation with NETZERO 4-WAY VALVE

Installation overcost$_{(\text{Buffer tank + shunt group + module for cooling})}$: 6.000 ~8.000 $ + material and time

+ the most expensive thing → space needed!

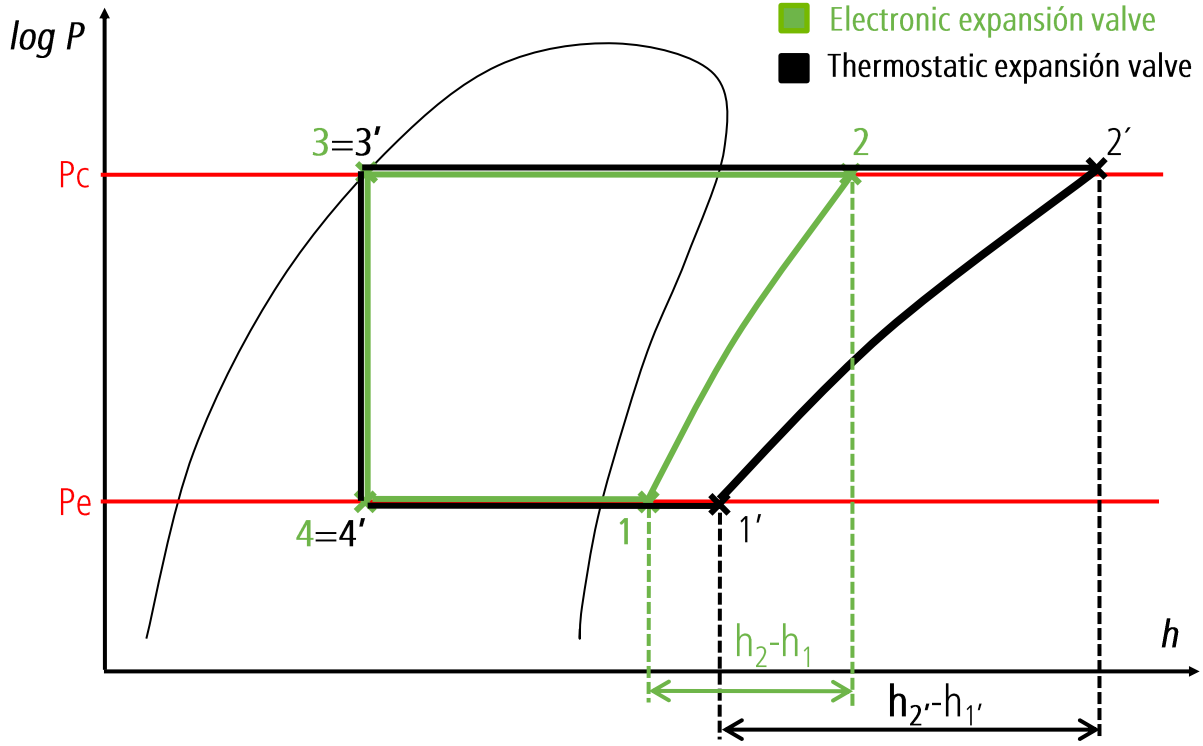
Traditional heat pumps

GEOSMART NETZERO

➢ Thermostatic expansion valves

- Much worse control of the refrigerant flow

- As a consequence, higher overheating degrees → higher electrical consumption for the compression and worse COP



$h_{2'}-h_{1'} > h_2-h_1$

$W_{comp}' > W_{comp}$

$COP' < COP$

Traditional heat pumps

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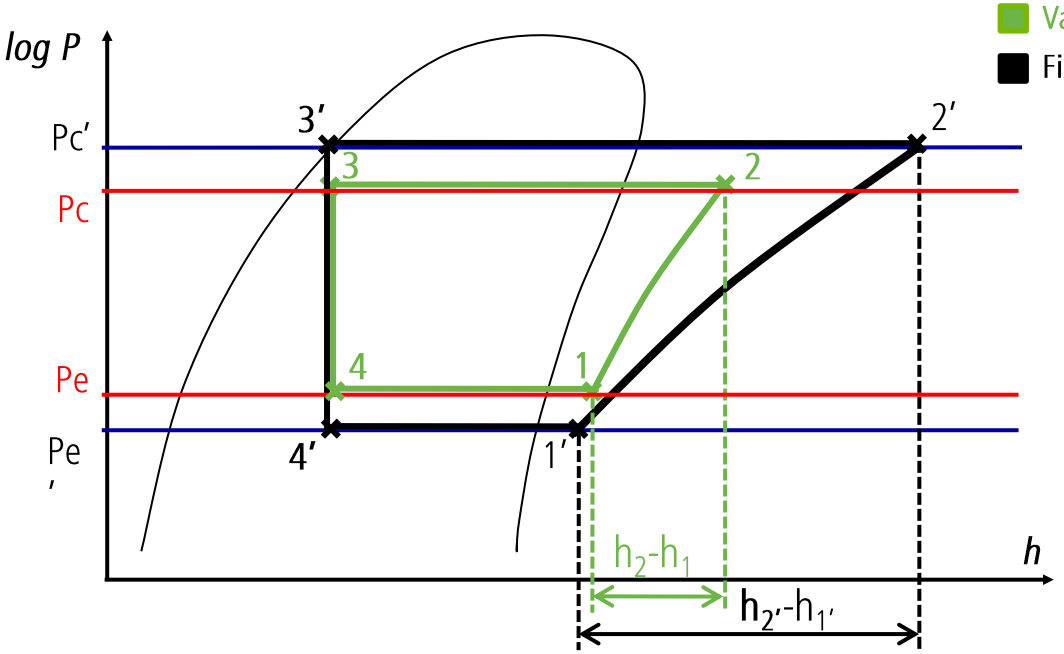
➢ Circulation pumps, fixed speed and less power (when they are included)

- Unable to adapt to demand variations → higher electrical consumption

- Higher differences of temperature between the inlet and outlet of the heat exchangers → lower evaporation pressure and higher condensation pressure → worse COP



Variable speed and high power circulation pumps

Fixed speed and low power circulation pumps

$h_{2'}-h_{1'} > h_2-h_1$

$W_{comp}' > W_{comp}$

$COP' < COP$

Traditional heat pumps

GEOSMART NETZERO

➢ Only 3-phase power supply for high power models

- Higher cost

- Less flexibility

➢ Big peaks of consumption when the compressor starts (large starting currents)

- Oversized electrical installations

- Necessary to contract a higher value of maximum electric power → more expensive, every month

- Great effect on the SPF

NETZERO Technology

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➢ The most advanced technology available in the market

INVERTER TECHNOLOGY

World's 1st manufacturer introducing it in water/water heat pumps

➢ Our own control strategies and software → the heat pump manages the whole installation

- The highest modulation ranges within Inverter Technology
- Electronic expansion valves, all models
- Active cooling by reversing the refrigerant cycle
- Variable speed circulation pumps, Class A, integrated
- PCOOEM+, control based system
- 1-Phase or 3-Phase power supply
- Soft starts

NETZERO Technology

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NETZERO

Main components from the best brands on the market

- Variable speed scroll compressor, COPELAND
- Plate heat exchangers, DANFOSS
- Electronic expansion valve, CAREL
- PCOOEM+ control & Driver , CAREL
- Variable speed circulation pumps, Class A, GRUNDFOS
- Auxiliary components, DANFOSS
- DHW tank and coil, Stainless steel 316L

EMERSON Climate Technologies

Copeland brand products

GRUNDFOS

CAREL

Danfoss

NETZERO Technology

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INVERTER TECHNOLOGY

- Carel Driver + Copeland variable speed compressor

- 3 power ranges: 1-9 kW (3.400 to 30.700 Btu/h), 3-12 kW (10.200 to 41.000 Btu/h) and 5-22 kW (17.000 to 75.000 Btu/h) → The highest modulation range in Inverter Technology

- 1 Phase or 3 Phase power supply

- Possibility to limit the thermal power and/or the electrical consumption

- No need for soft starters

- No intensity peaks

Copeland® brand products

EMERSON Climate Technologies

CAREL

NETZERO Technology

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NETZERO heat pumps VS Traditional heat pumps

Adaptation of the heat pump to the installation

Adaptation of the installation to the heat pump

DHW
13.600 Btu/h

HEATING
41.000 Btu/h

COOLING
20.500 Btu/h

POOL
27.300 Btu/h

- ✓ Inverter technology allows adapting the power of the heat pump IN EACH OF THE SERVICES INDEPENDENTLY → SEVERAL HEAT PUMPS IN ONE & LOWER INITIAL INVESTMENT
- ✓ The **DIRECT** connection to the different services ensures minimum outlet temperatures and maximum efficiency

NETZERO Technology

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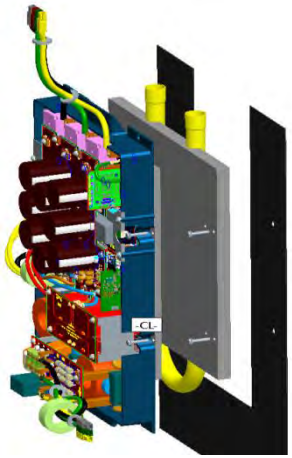
Cooling of the Inverter with the load circuit

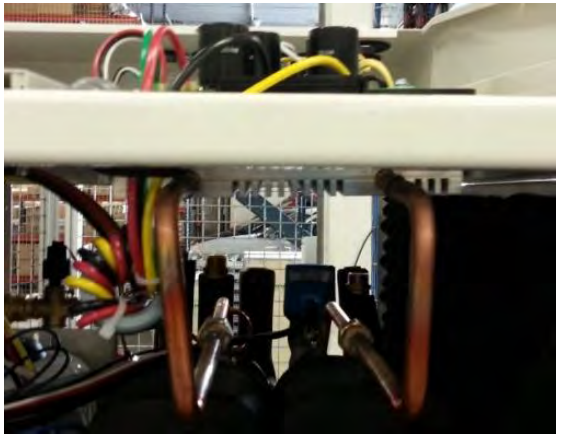
Own design

- No fan needed, lower electrical consumption

- No apertures in the case, lower noise level

- Injection of the heat recovered from the Inverter into the heating system, increasing the SPF





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Electronic expansion valve

- Accurate and quick control of superheating
- Accurate control of mass flow to evaporator
- Improvement of evaporator efficiency
- Quick response to load changes
- Mainly important in combination with Inverter Technology
- No need for shut-off solenoid valve

CAREL

NETZERO Technology

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NETZERO

Plate heat exchangers

- Condenser, asymmetric plates channels

- Evaporator, "*Equalancer*" distribution system

Danfoss

NETZERO Technology

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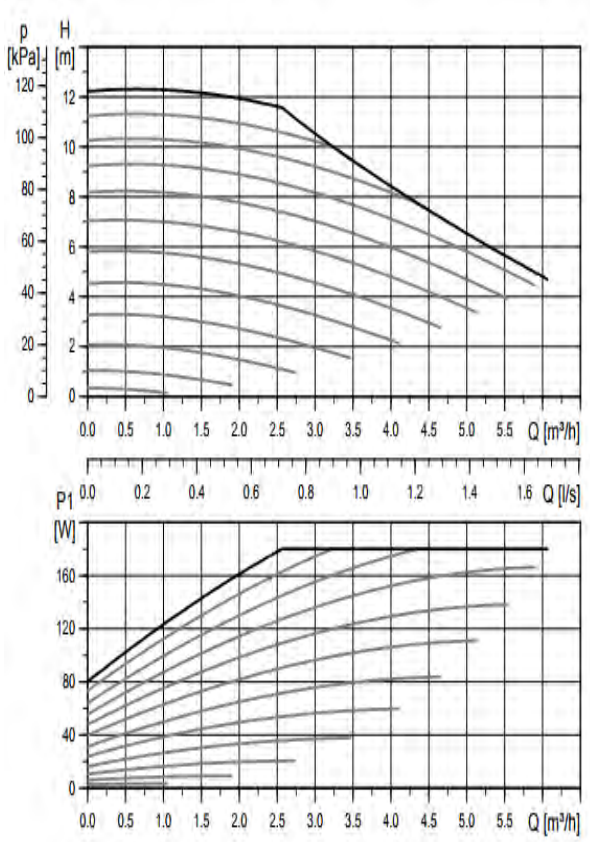
Variable speed circulation pumps

- Grundfos

- High efficiency, Class A

- Integrated in source and load circuits

- Possibility to set the desired temperature difference (ΔT) in evaporator and condenser, and the maximum and minimum powers



NETZERO Technology

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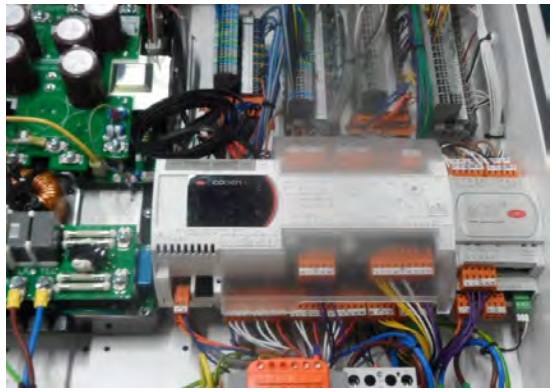
Our own control strategies and software

- Integrated management of the whole installation by the heat pump
  - ✓ Control of auxiliary external systems (boilers, heaters, etc.)
  - ✓ Control of up to 4 shunt groups at different temperatures simultaneously
  - ✓ Control of simultaneous production of heating and cooling (4 pipes installations)
  - ✓ Control of up to 3 heat pumps in cascade
  - ✓ Total control of the compressor operation map (full adaptation of the heat pump to the installation)
  - ✓ Control of hybrid source systems
  - ✓ Control of pool heating
  - ✓ Control of DHW recirculation
  - ✓ And much more…



NETZERO Technology

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Simple user interface. Carel screen

- User and installer access levels

- Multilanguage

NETZERO Technology

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Instrumentation and control

- Temperature sensors
    - Refrigerant suction and discharge
    - Supply/return source and heating circuits
    - Inverter plate and motor wiring
- Pressure sensors
    - Refrigerant suction and discharge
    - Source and heating circuits
- Electric power, Inverter
- Compressor torque, maximum torque

NETZERO Technology

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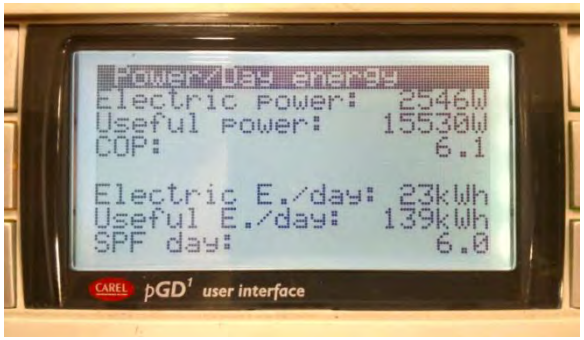
Power, COP, SPF and energy counters

- Instantaneous
  - Electric power, measured
  - Heating/cooling power, calculated
  - COP
- Daily, monthly and yearly energy counter
  - Electric energy, measured
  - Heating / cooling energy, calculated
  - SPF



NETZERO Technology

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NETZERO EASYNET - CONTROL THROUGH INTERNET

The NETZERO Easynet is compatible with all NETZERO heat pumps.

FUNCTIONS:

- ✓ **Remote control:** access via the Internet to the control of the heat pump
- ✓ **Configuration management:** access and management of parameters and equipment configuration
- ✓ **Access to instantaneous functioning data:** possibility to visualize in real time the operating parameters and performance of the equipment

NETZERO Technology

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Compact units, "all in one concept"

- Integrated source and load circulation pumps
- Integrated source and load expansion vessels
- Integrated security valves
- Integrated flexible stainless steel hoses
- Integrated drainage valves

NETZERO Technology

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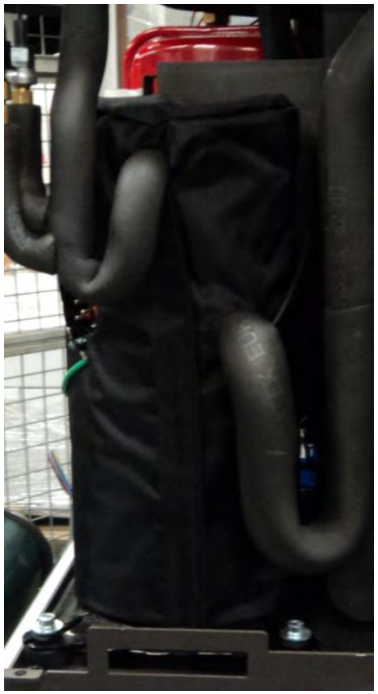
Noiseless. Sound insulation on the case (refrigerant module completely isolated) and the compressor



NETZERO – Range

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➢ 3 power ranges

- NETZERO 3-12 kW (10.200 to 41.000 Btu/h)
- NETZERO 5-22 kW (17.000 to 75.000 Btu/h)
- NETZERO 1-9 kW (3.400 to 30.700 Btu/h) → SMALLEST INVERTER SCROLL COMPRESSOR ON THE MARKET

➢ Power supply

- 1 Phase
- 3 Phases

NETZERO – Range

GEOSMART NETZERO

NETZERO COMPACT

Stainless Steel DHW Tank integrated, 43,6 gallons

NETZERO Basic

NETZERO – Range

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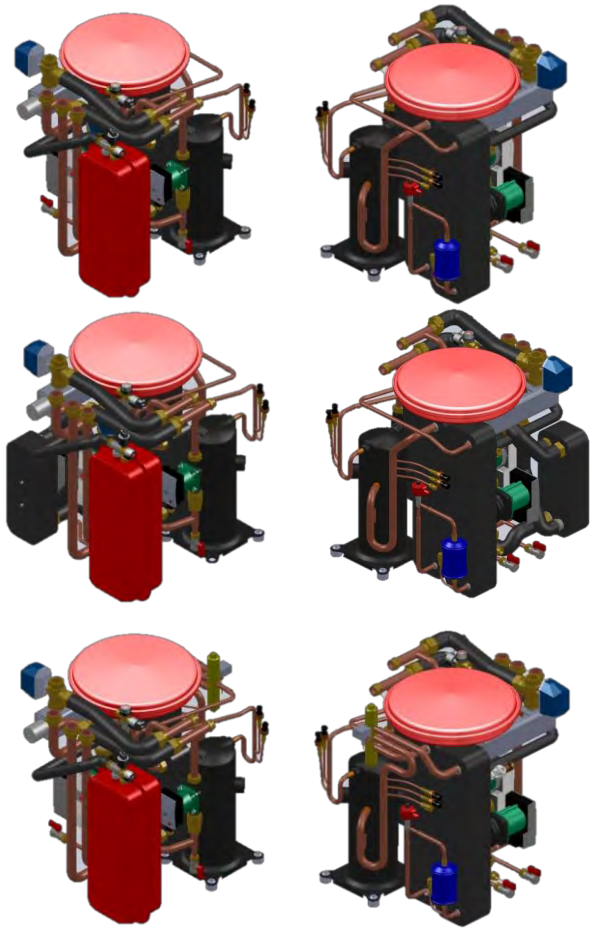


MODULES

MODULE 1

HEATING + DHW +
POOL HEATING

MODULE 2

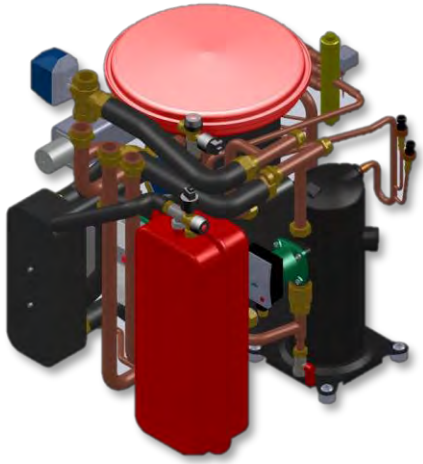
HEATING +
PASSIVE COOLING +
DHW + POOL HEATING

MODULE 3

HEATING +
ACTIVE COOLING +
DHW + POOL HEATING

MODULE 4

HEATING +
ACTIVE COOLING +
PASSIVE COOLING+ DHW
+ POOL HEATING



NETZERO – Range

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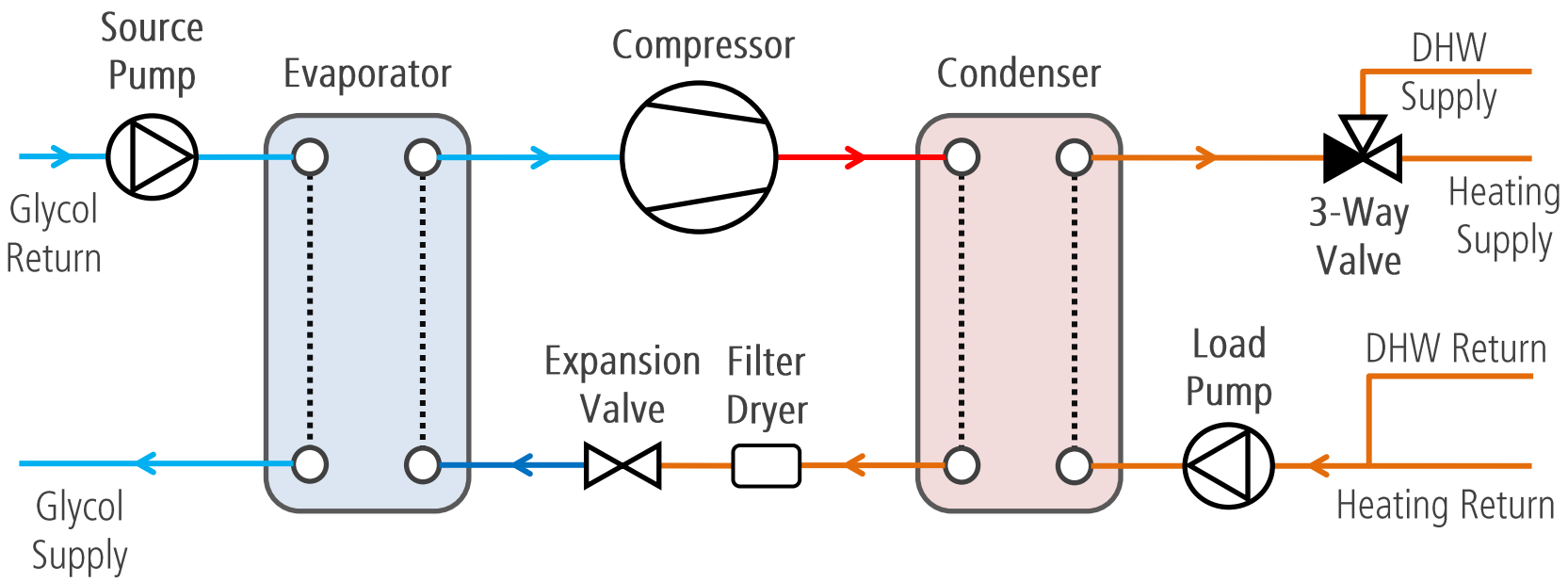
MODULES

Module 1 - **NETZERO B1 / C1**	**Services** DHW / Heating / Pool heating



NETZERO – Range

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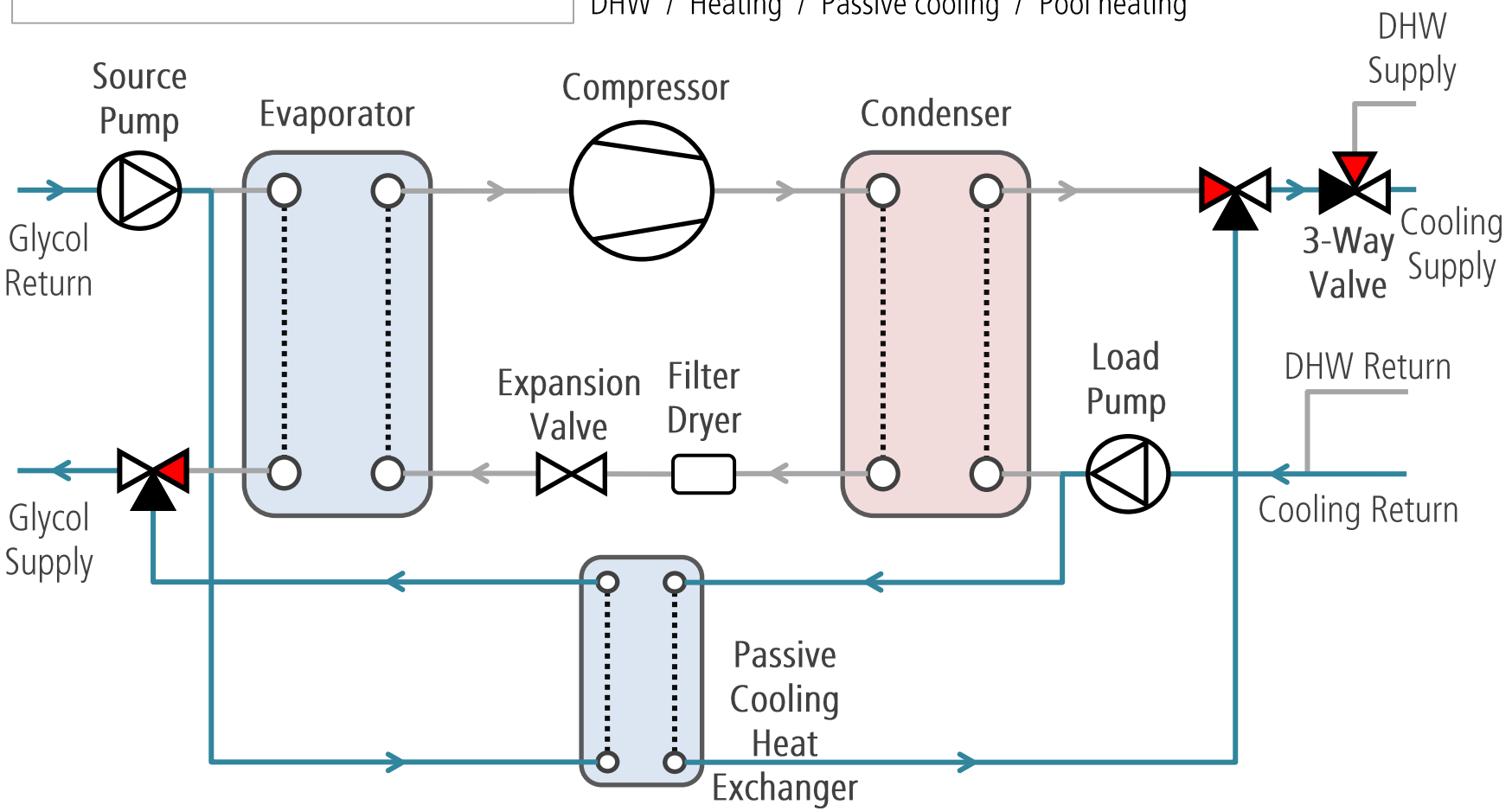
MODULES

Module 2 - **NETZERO B2 / C2**

Services

DHW / Heating / Passive cooling / Pool heating



NETZERO – Range

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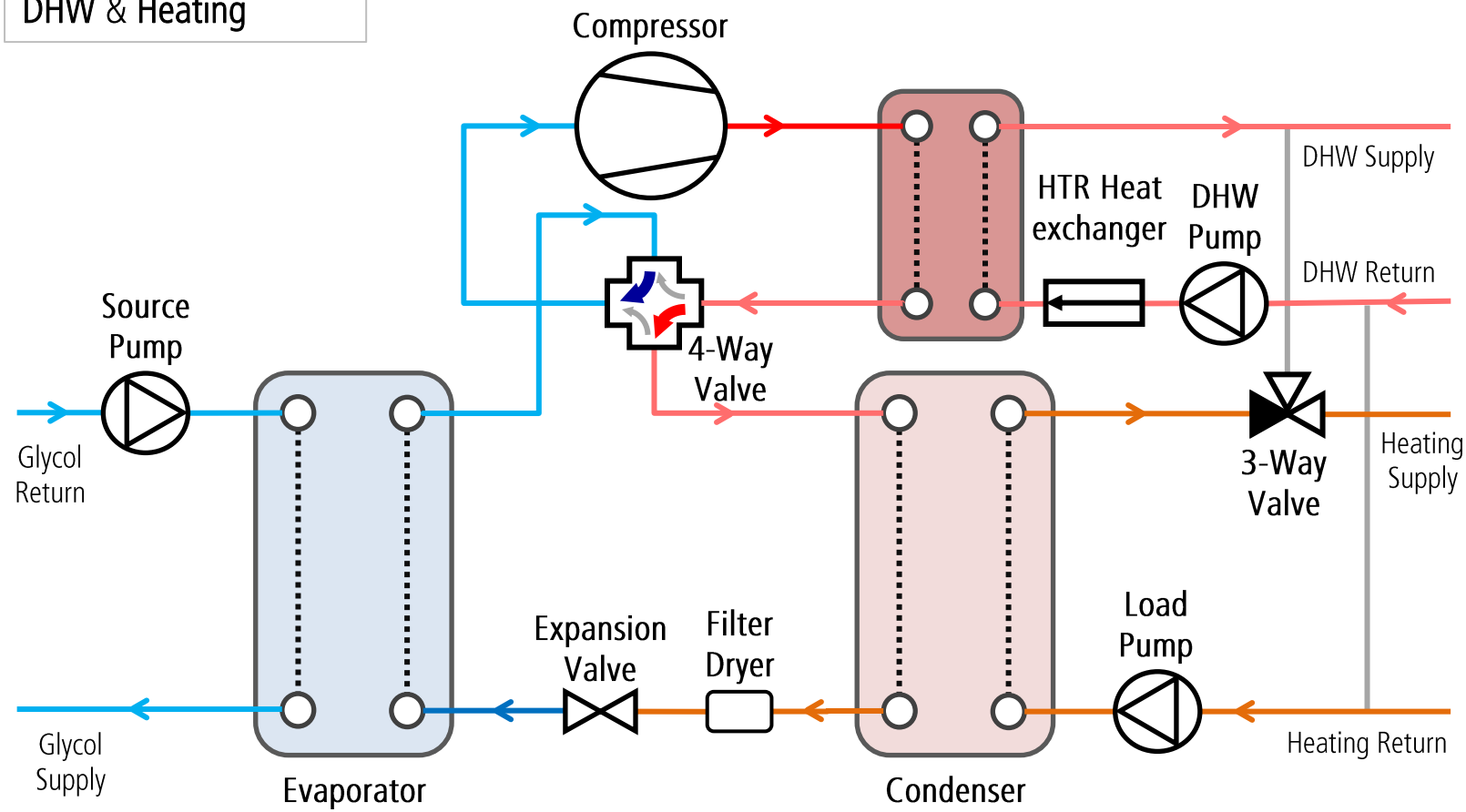
MODULES

Module 3 - **NETZERO B3 / C3**

DHW & Heating

Services

DHW / Heating / Active cooling / Pool heating



NETZERO – Range

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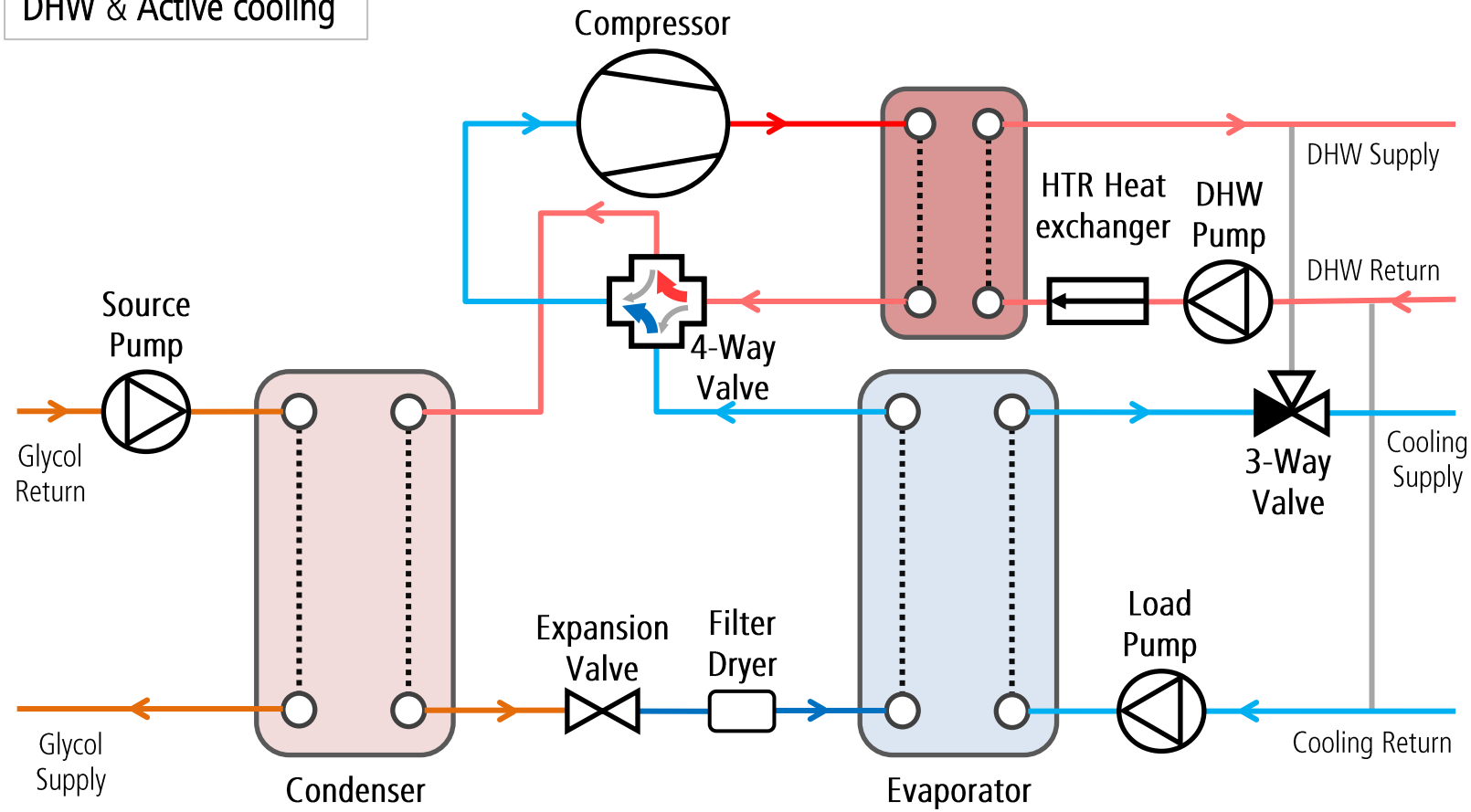
MODULES

Module 3 - **NETZERO B3 / C3**

Services

DHW / Heating / Active cooling / Pool heating

DHW & Active cooling



NETZERO – Range

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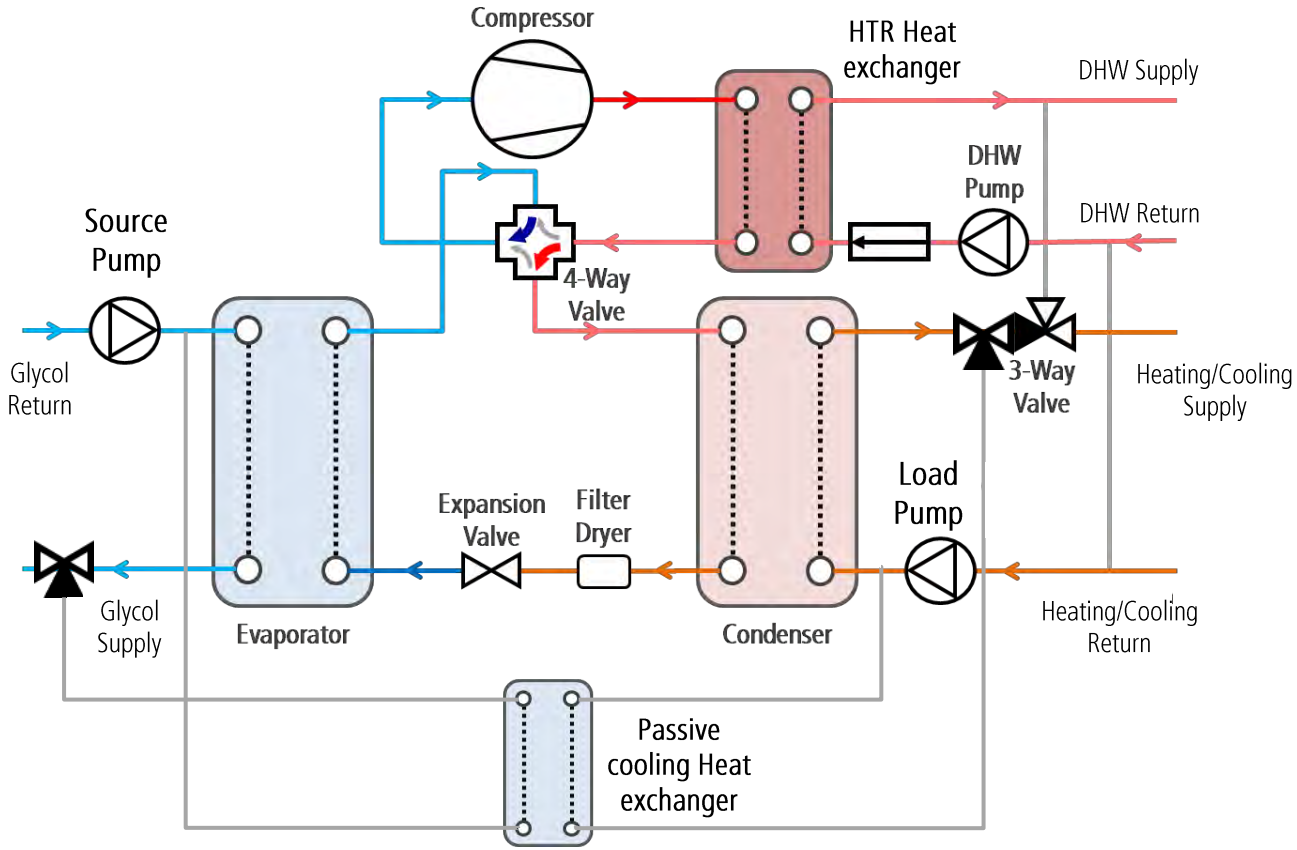
MODULES

Module 4 - **NETZERO B4 / C4**

Services

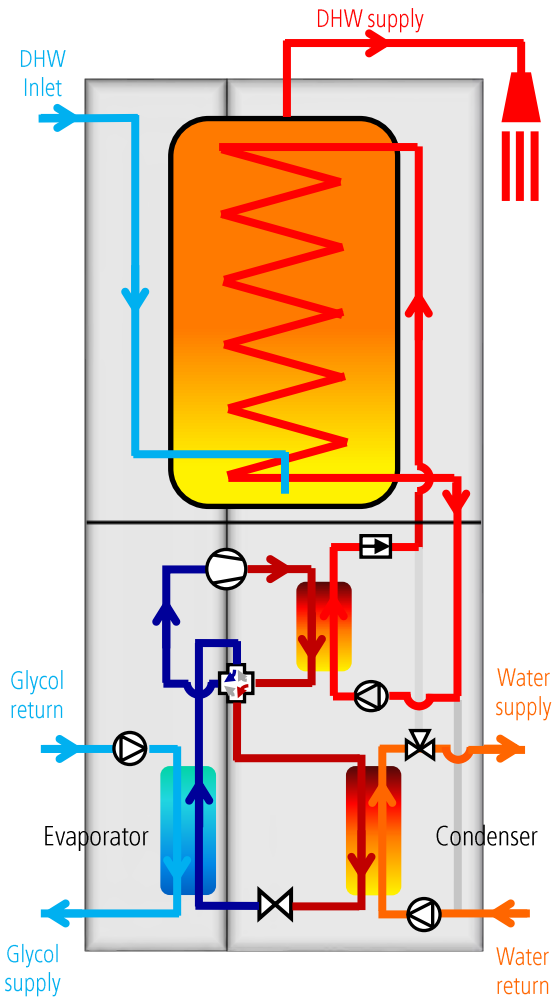
DHW / Heating / Passive cooling / Active cooling / Pool heating



HTR TECHNOLOGY – UNIQUE IN THE WORLD

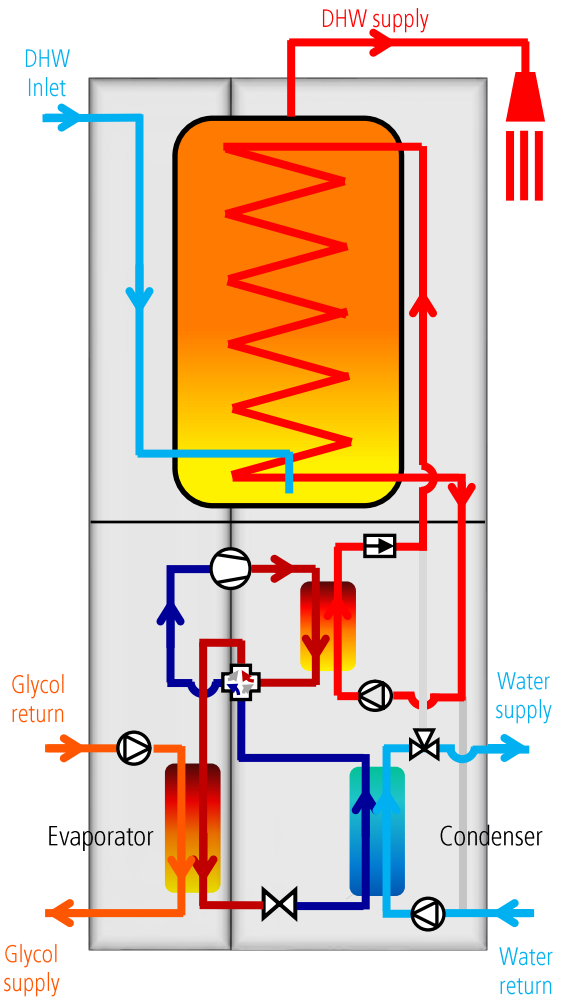
GEOSMART NETZERO

HEATING + DHW



- HEATING/COOLING AND DHW/POOL HEATING SIMULTANEOUSLY
- YIELD INCREASE OF UP TO 200%
- DHW PRODUCTION UP TO 158 ºF
- GREAT REDUCTION OF THE NUMBER OF CYCLE REVERSIONS IN SUMMER

COOLING + DHW



HTR TECHNOLOGY – UNIQUE IN THE WORLD

GEOSMART NETZERO

Traditional heat pumps waste all the energy extracted from the house in the cooling process, transferring it to the ground or the ambient air (figure 1).

However, thanks to the exclusive ECOFOREST HTR technology this energy extracted from the house is recovered and used for producing DHW simultaneously (figure 2) thereby achieving an astonishing yields.

And all this increasing both the lifetime of the heat pump and comfort in the house as a result of the consequent reduction of refrigerant cycle inversions.

TRADITIONAL TECHNOLOGY

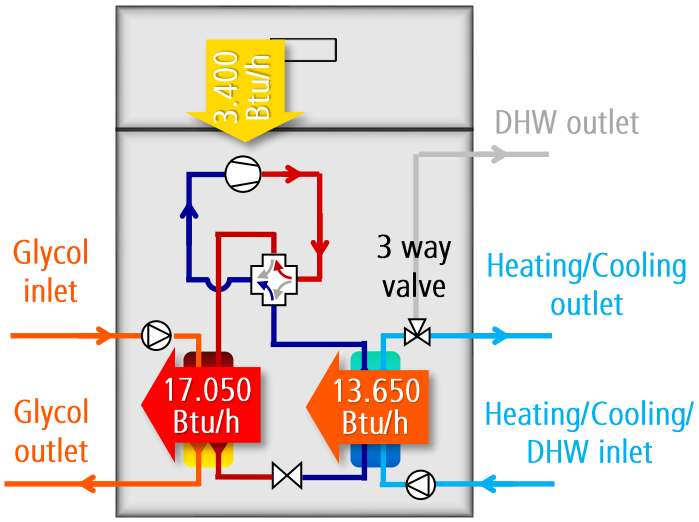


Figure 1

Performance = 13.650/3.400 = 4

NETZERO HTR TECHNOLOGY

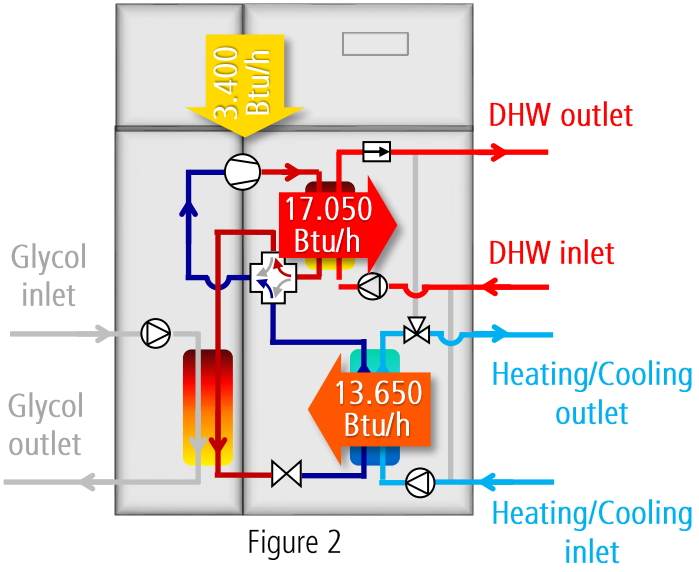


Figure 2

Performance = (13.650+17.050)/3.400 = 9

HTR TECHNOLOGY – UNIQUE IN THE WORLD

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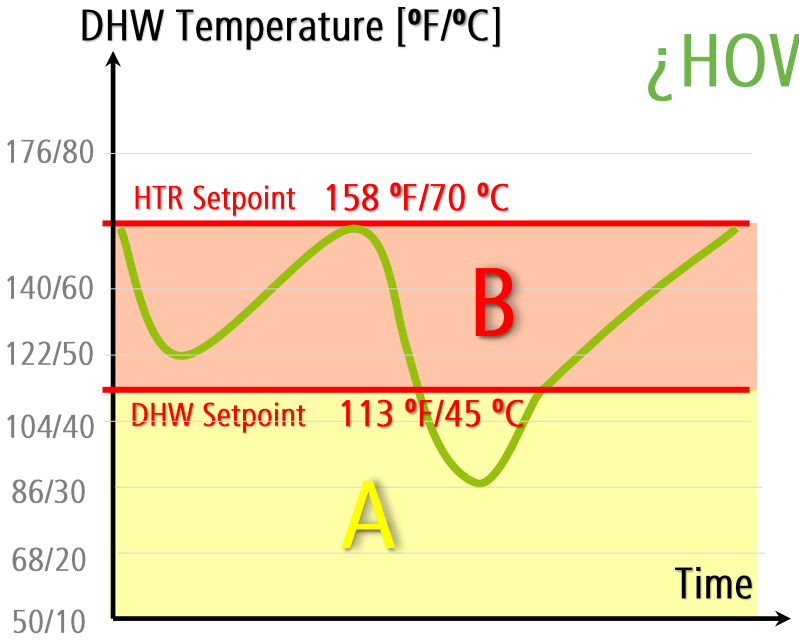


¿HOW IT WORKS?

Thanks to this technology 2 different temperatures for DHW can be set:

1- DHW SETPOINT, or lower limit. It is the minimum value that guarantees comfort if there is a DHW demand.

2- HTR SETPOINT, or upper limit. The maximum configurable value is 158 ºF, which the heat pump can reach without any electrical support.

2 zones corresponding to 2 different operating modes:

ZONE A. DHW Temperature < DHW Setpoint

- Heat pump produces only DHW using for this the main condenser and circulation pump (higher power available).
- Very fast heating up to DHW Setpoint.

ZONE B. DHW Setpoint ≤ DHW Temperature < HTR Setpoint

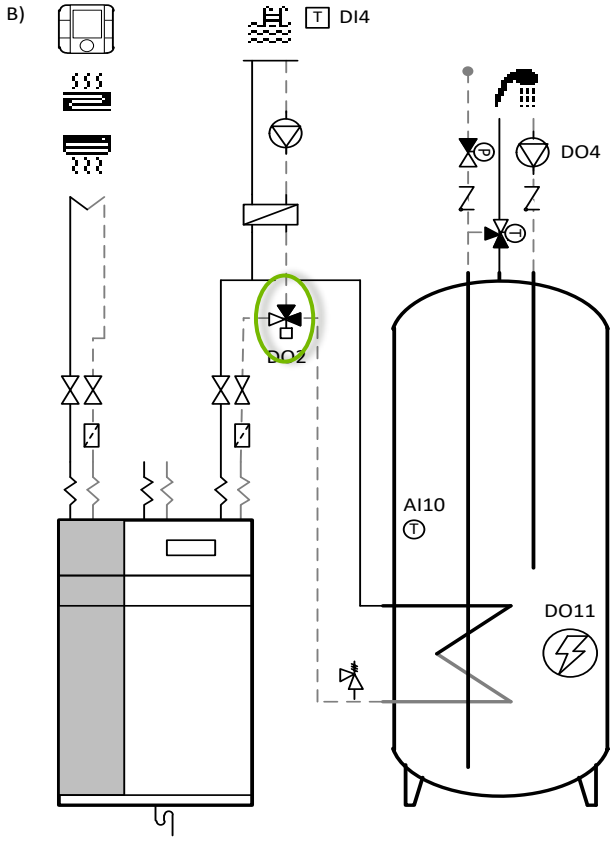
- The heat pump continues to heat the DHW with the desuperheater (HTR heat exchanger) up to HTR Setpoint, while simultaneously meeting the cooling demand.
- Considerable increase in the performance of the system by producing the DHW with lower condensation temperatures in Winter (heating + DHW) and taking advantage of the energy extracted from the house in Summer (active cooling + DHW).

HTR TECHNOLOGY – UNIQUE IN THE WORLD

GEOSMART NETZERO

HTR TECHNOLOGY FOR POOL HEATING

- By simply installing a 3-way valve commanded by the heat pump itself it is possible to use the HTR technology to simultaneously meet the demands of cooling and pool, heating it completely for free and reducing our energy bills considerably.
- It is also possible to simultaneously meet the demands of heating and pool in the same way as it is done with the DHW.



NETZERO – INSTALLATIONS

GEOSMART
NETZERO

➢ Inverter Technology

- No buffer tank and no additional shunt groups required in many installations (and when recommended, the volume needed will be much lower)

- Direct connection to the different services

- Possibility of adapting the power to each of the demands

➢ All in one, "plug and play"

- Simpler and much cheaper installations

GEOSMART NETZERO

AIR SOURCE with water/water heat pumps NETZERO + AU (Air Unit) RANGE

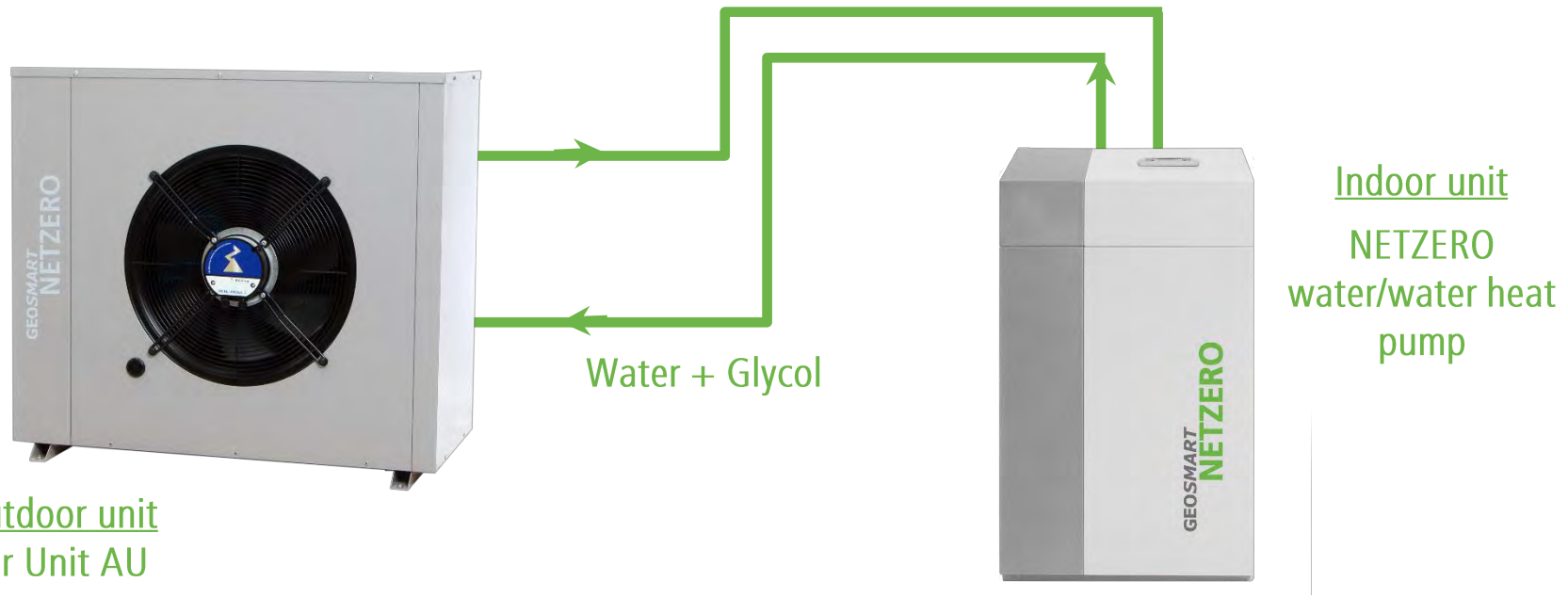
NETZERO + AU (Air Unit) Range

GEOSMART NETZERO

A different and exclusive way of aerothermal

The combination of our NETZERO heat pumps and our AU Air Units is a different way of running aerothermal installations, using the high performances of our NETZERO water/water heat pumps but in a more economically affordable way.

With this type of installation, we replace or complement geothermal drillings as a source system with one or more Air Units (AU).



NETZERO + AU (Air Unit) Range

GEOSMART NETZERO

Many and very important advantages

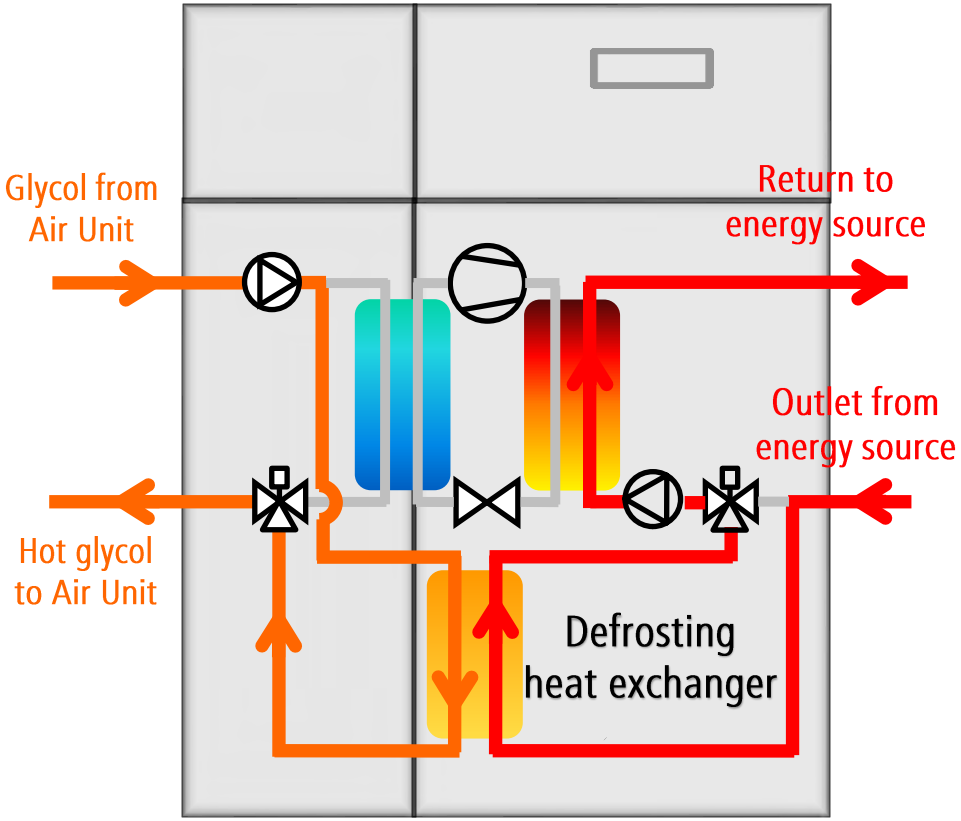
- Exclusively hydraulic installation. No need to handle any kind of refrigerant. Simpler and cheaper installation.
- Exclusive defrost technology.
- Main components in the indoor unit (it is the heat pump itself), longer service life.
- Compressor deactivated during defrosts, large increase in seasonal performance.
- Greater separation between fins. Significant reduction in the number of defrosts.
- No limitation of distance between indoor and outdoor unit.
- Great versatility. Possibility of hybridizing with geothermal drillings.
- Exclusive NETZERO HTR technology that allows to produce heating/cooling and DHW/pool heating simultaneously.
- DHW temperatures up to 158 ºF thanks to HTR technology.

NETZERO + AU (Air Unit) Range

GEOSMART
NETZERO

NETZERO EXCLUSIVE DEFROST TECHNOLOGY

- Exclusive defrost technology that contributes to significantly increase the Seasonal Performance Coefficient (SPF) as the compressor is deactivated during the process. Nor is it necessary to activate electrical heaters.
- Possibility of selecting the energy source used for defrosting (DWH, heating or pool). No need to cool down the house in the process.
- Waiting times are drastically reduced since it is not necessary to reverse the cycle to perform defrosts.



NETZERO + AU (Air Unit) Range

GEOSMART
NETZERO

POWER RANGES

- Wide range, from 3.400 to 225.200 Btu/h (3 units in cascade)
- Both three-phase and single-phase

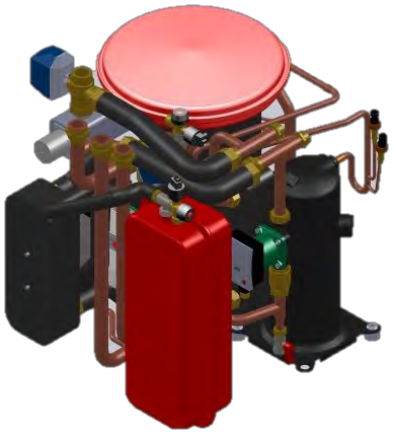
- ✓ NETZERO 1-9 kW + 1 AU12 → 3.400 to 37.500 Btu/h
- ✓ NETZERO 3-12 kW + 1 AU12 → 10.200 to 54.600 Btu/h
- ✓ NETZERO 5-22 kW + 1 AU12 → 17.000 to 61.400 Btu/h
- ✓ NETZERO 5-22 kW + 2 AU12 → 17.000 to 75.000 Btu/h

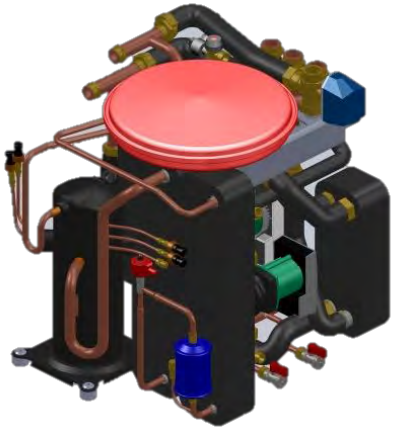
**The NETZERO modules that can be combined with Air Units AU12 are modules 2 (heating + DHW + pool heating only) and modules 4 (heating + DHW + active cooling + pool heating) **

NETZERO + AU (Air Unit) Range

GEOSMART
NETZERO

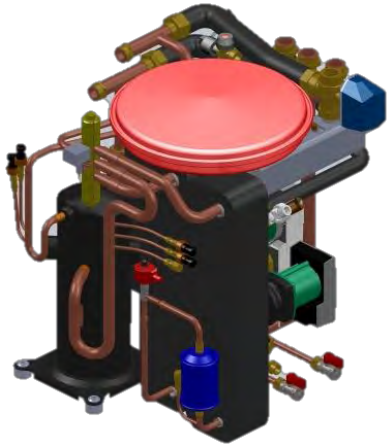
MODULES

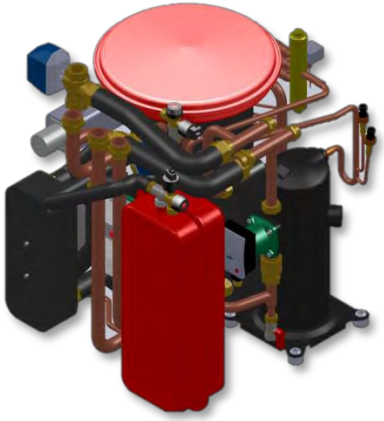




MODULE 2

HEATING + DHW +
POOL HEATING





MODULE 4

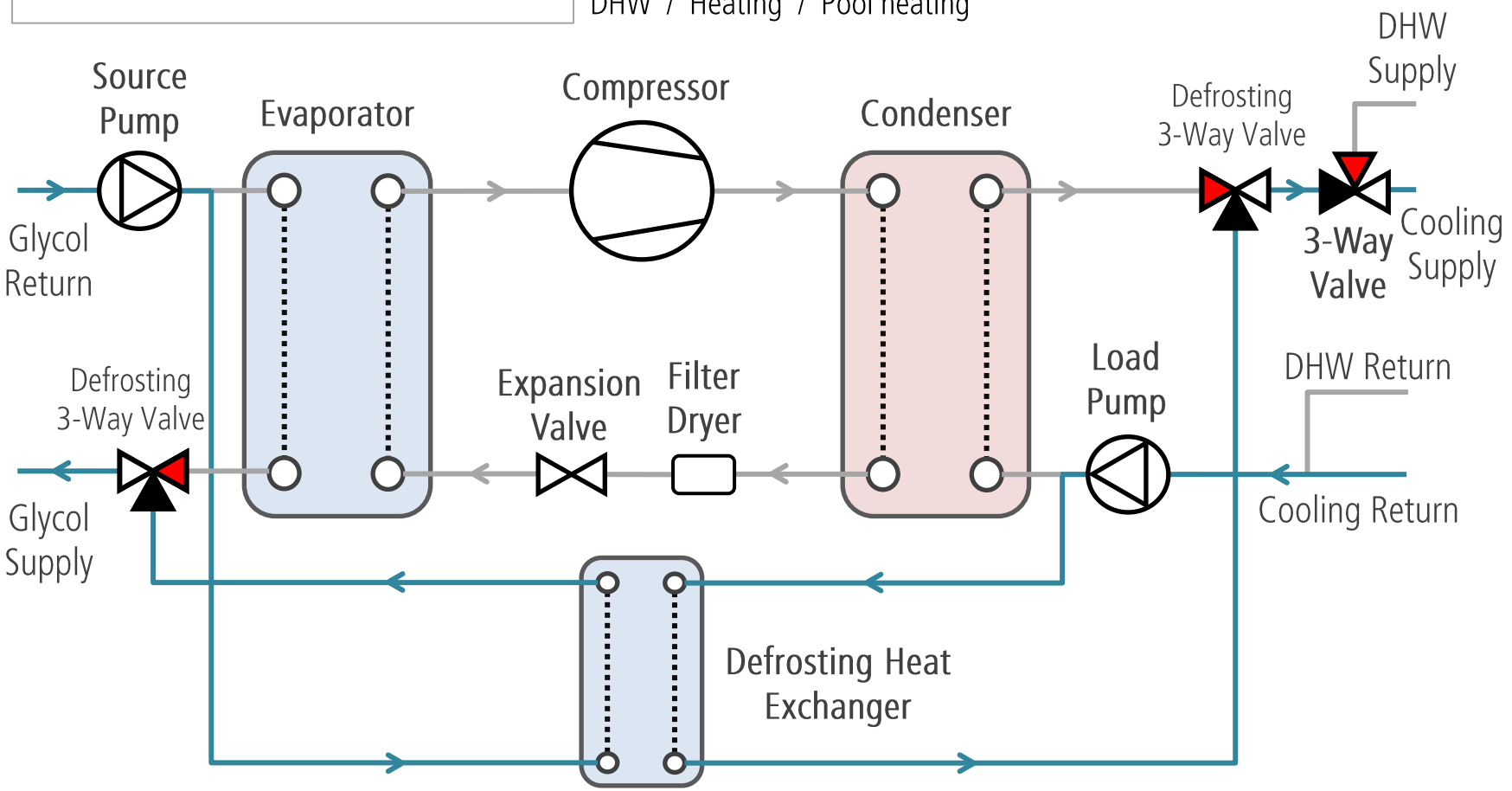
HEATING +
ACTIVE COOLING + DHW +
POOL HEATING

NETZERO + AU (Air Unit) Range

GEOSMART
NETZERO

MODULES

Module 2 - **NETZERO B2 / C2**	**Services**
	DHW / Heating / Pool heating



NETZERO + AU (Air Unit) Range

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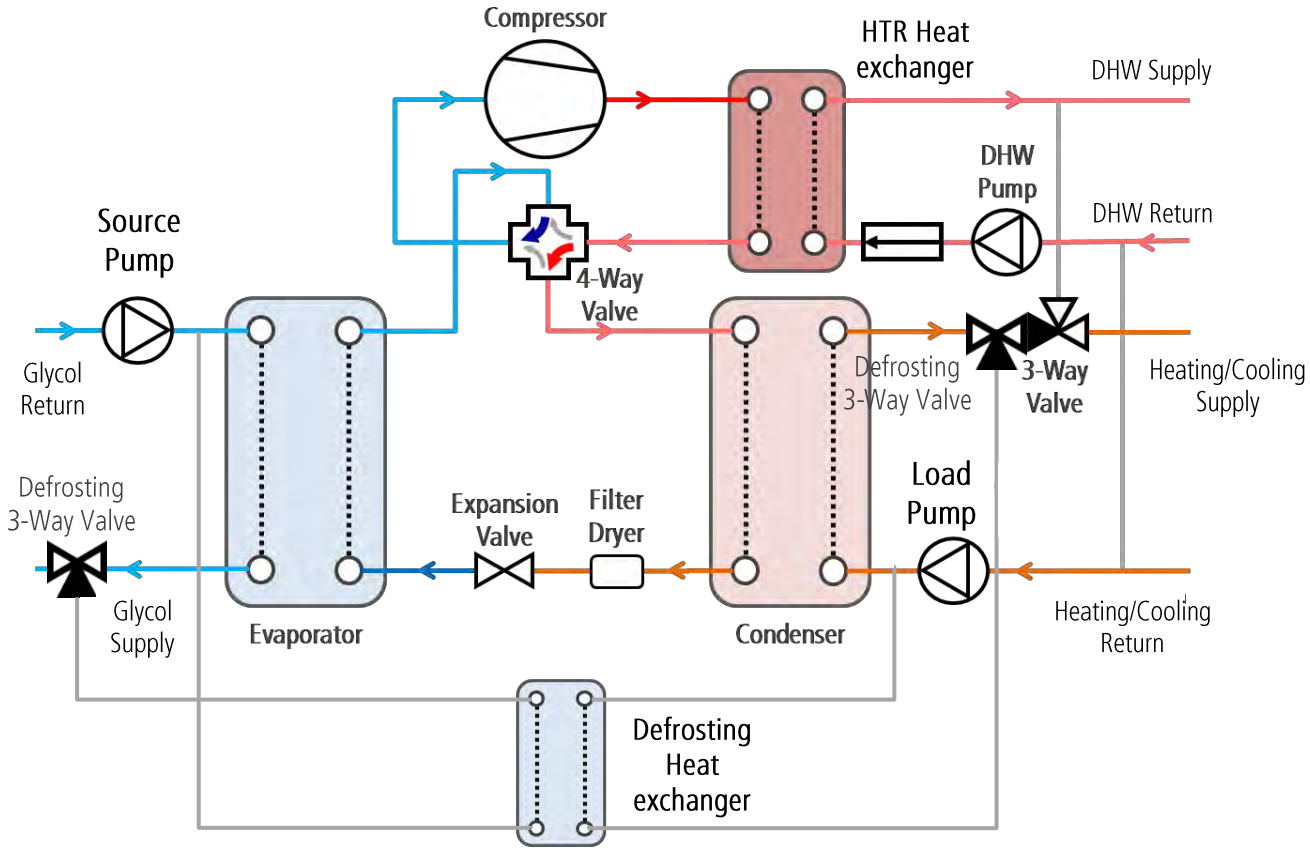
NETZERO

MODULES

Module 4 - **NETZERO B4 / C4**

Services

DHW / Heating / Active cooling / Pool heating



NETZERO + AU (Air Unit) Range

GEOSMART
NETZERO

NETZERO EXCLUSIVE HYBRID SOURCE

Why choose between ground source and air source when I can get the best of both?

- Possibility of using different source systems in the same installation with a heat pump → possibility of hybridizing traditional geothermal drillings with our Air Units (AU).
- Unique installations with the advantages of both systems, choosing the heat pump at all times the most efficient source or combination of sources.

NETZERO + AU (Air Unit) Range

GEOSMART
NETZERO

NETZERO EXCLUSIVE HYBRID SOURCE

A 100% ground source installation has the highest performance but ... Limitations:

- ✓ Budget
- ✓ Land availability

1 AU12 equals ≈ 1 vertical borehole of 125 m = 410 Ft

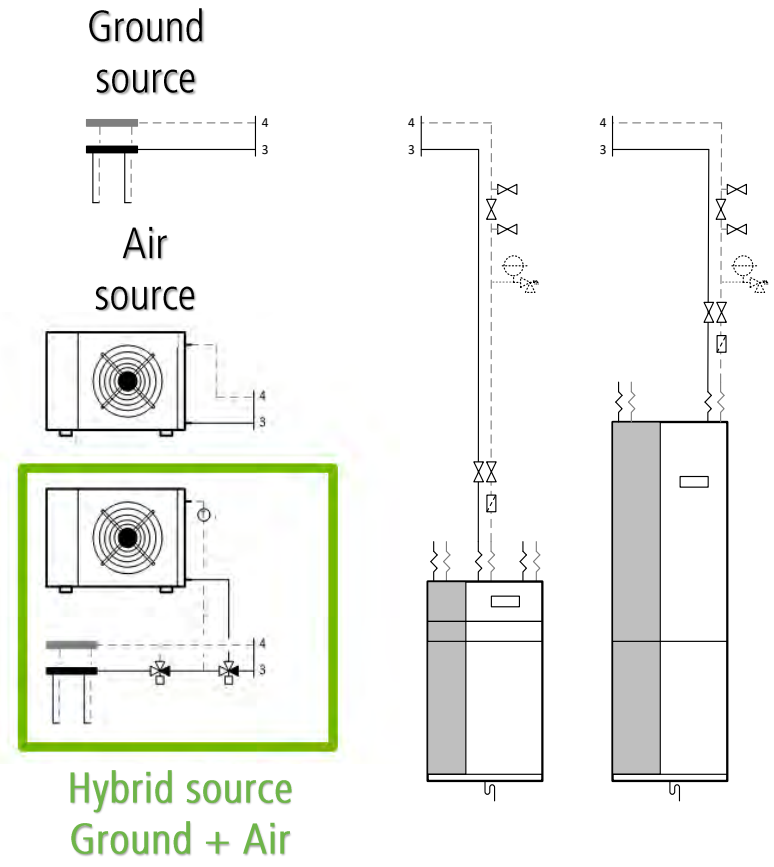
Why not combine ground source with air source and get the best of both?

NETZERO + AU (Air Unit) Range

GEOSMART
NETZERO

NETZERO EXCLUSIVE HYBRID SOURCE

- ✓ Search for higher performance
- ✓ Initial investment reduction
- ✓ Depth restrictions (vertical boreholes)
- ✓ No availability of land
- ✓ Problems of under sizing of the source system
- ✓ Increased thermal demands (eg housing expansion)
- ✓ Redundancy in case of failure of one of the sources



GEOSMART NETZERO

PHOTOVOLTAIC HYBRIDIZATION ECOSMART RANGE

ecoSMART Range

GEOSMART NETZERO

Patented hybridization with photovoltaic installations

100% COMPATIBLE with all NETZERO heat pump models

Europaisches Patentamt
European Patent Office
Office européen des brevets

Patented Technology

Unique in the world

SG Ready
Smart Heat Pumps

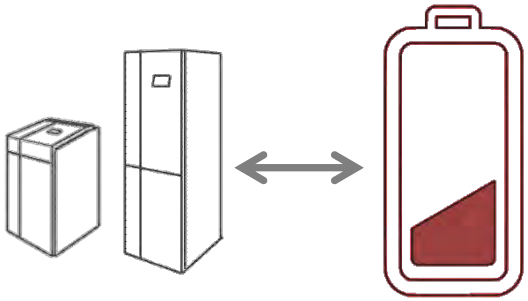
e-manager

e-system

ecoSMART Range

GEOSMART NETZERO

TRADITIONAL ENERGY SOLUTION



Heat pumps

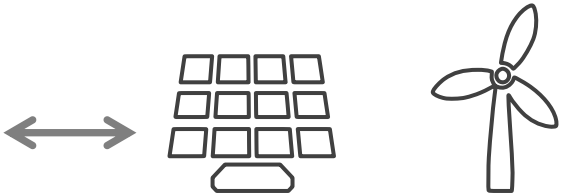
BATTERY STORAGE

X Limited shelf life

X Decreased performance

X High cost

X Limited natural resource



Renewable energy sources

ecoSMART Range

GEOSMART NETZERO

NETZERO ENERGY SOLUTION

Energy manager e-manager/e-system

THERMAL ENERGY STORAGE!!

	DHW	HEATING	COOLING	POOL
Base settings	113ºF/45ºC	95ºF/35ºC	59ºF/15ºC	79ºF/26ºC
Surplus settings	140ºF/60ºC	140ºF/60ºC	45ºF/7ºC	90ºF/32ºC

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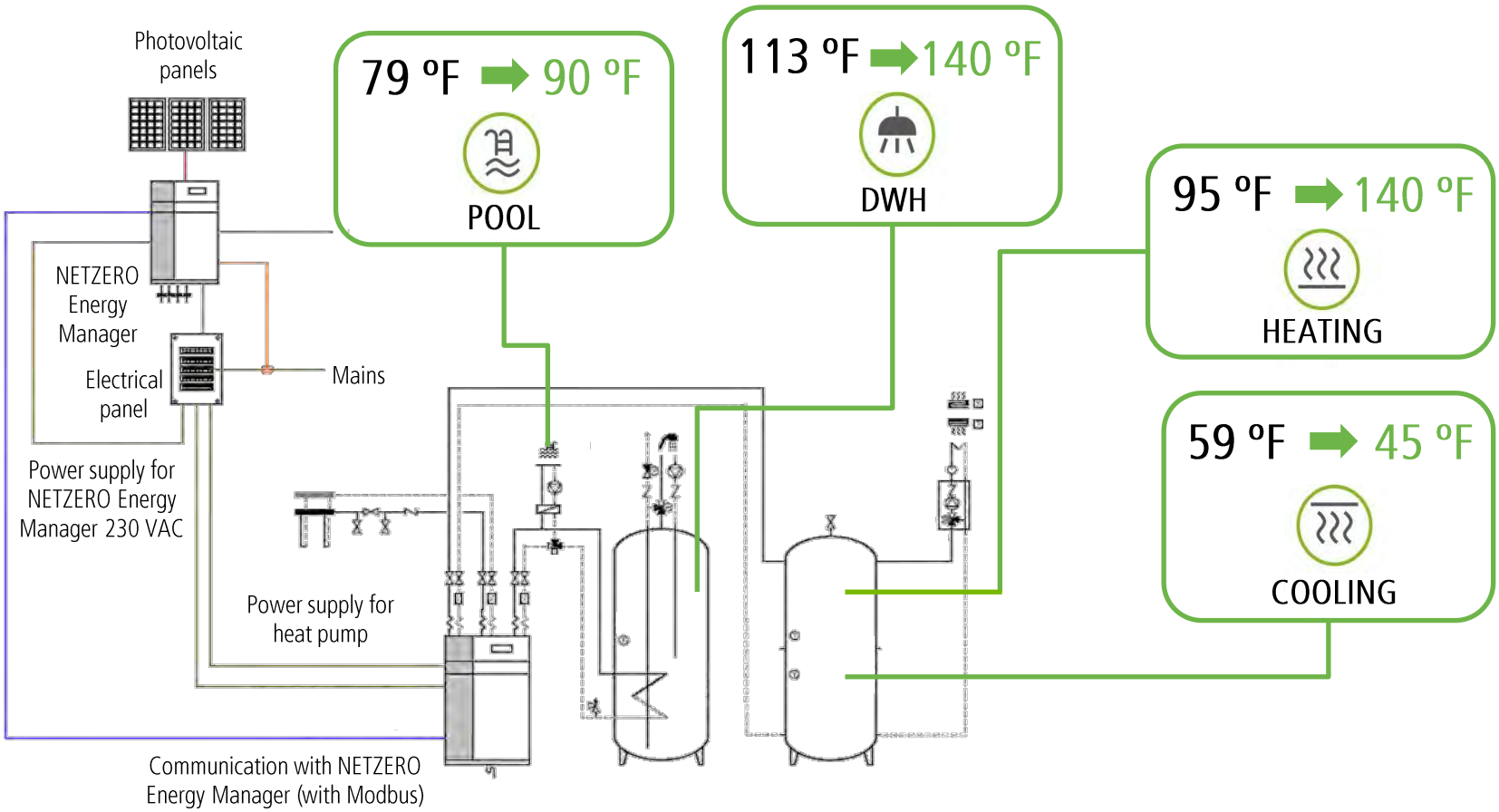
GEOSMART
NETZERO

NETZERO ENERGY SOLUTION – Buffer tank



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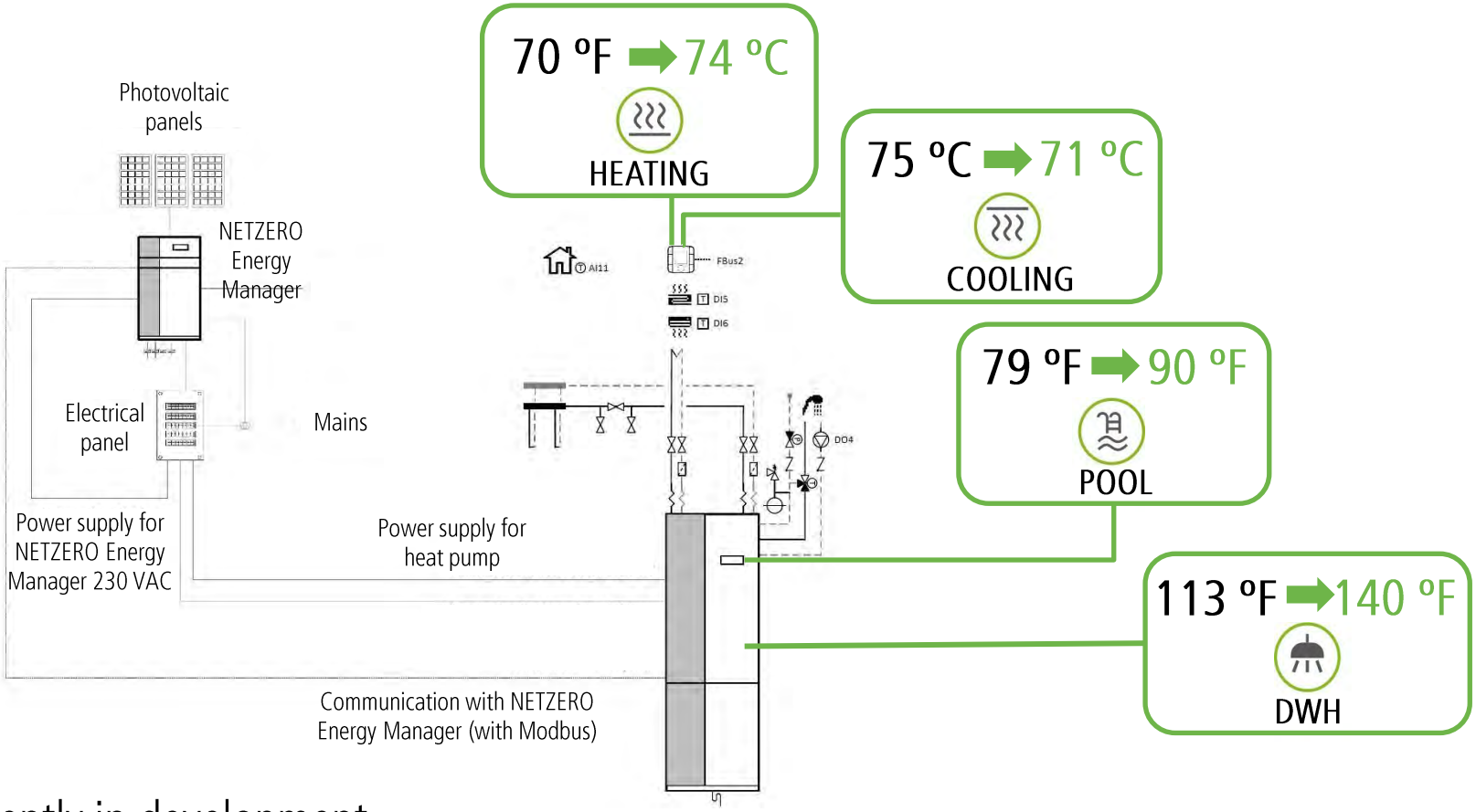
NETZERO

NETZERO ENERGY SOLUTION – Direct Installations*



*Currently in development

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GEOSMART NETZERO

E-MANAGER

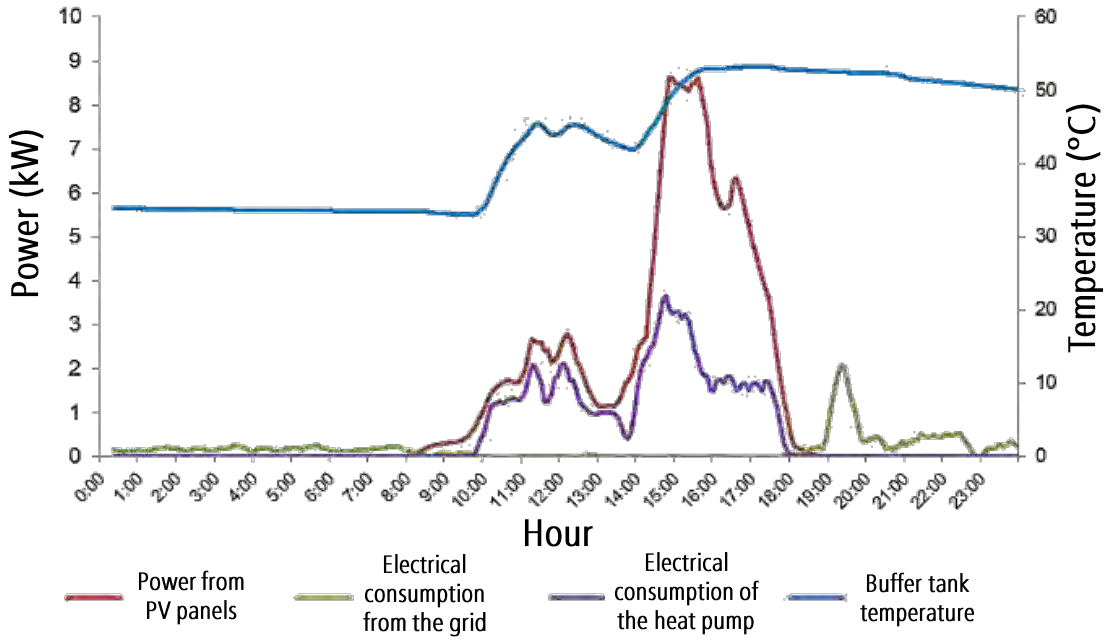
e-manager Functionalities

- «Smart Grid Ready»
- Zero balance between production and consumption (Net Zero Balance)
- Tariff control
- Power limitation
- Non-critical loads management

ecoSMART Range

GEOSMART
NETZERO

ZERO BALANCE BETWEEN PRODUCTION AND CONSUMPTION (NET ZERO BALANCE)



As can be seen in the following graph corresponding to a full day, the electrical consumption from the grid during the operation of the heat pump is zero. During the period where there is photovoltaic surplus, the energy manager sends a signal to the heat pump to increase the setpoint of the buffer tank, **thus causing thermal storage at zero cost.**

* Graph corresponding to a house with a 10 kW photovoltaic installation and a NETZERO heat pump

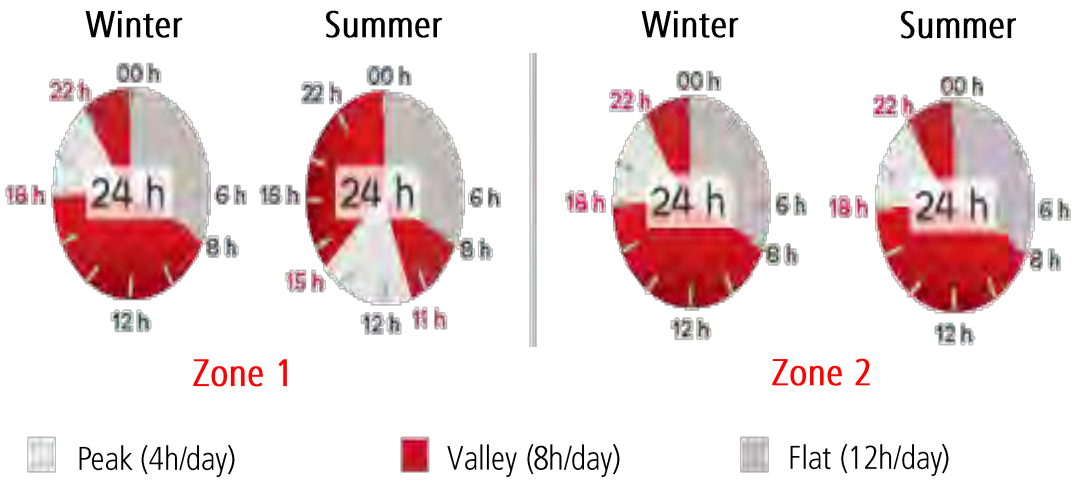
ecoSMART Range

GEOSMART
NETZERO

MORE FUNCTIONALITIES: TARIFF CONTROL

The energy managers allow you to set peak and valley electricity rate schedules for the summer and winter periods.

The heat pump will produce more energy when electricity is cheaper and will reduce consumption when it is more expensive. This allows considerable savings on the electric bill.



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NETZERO

MORE FUNCTIONALITIES: POWER LIMITATION

It is possible to configure an electric power consumption limit for the installation in the e-manager / e-system. If the consumption level is close to this limit, the heat pump will reduce its electrical consumption so as not to exceed it.

MORE FUNCTIONALITIES: NON-CRITICAL LOADS MANAGEMENT

The e-manager / e-system includes relay outputs to supply up to five non-critical loads. These loads will only be activated in case of electrical surplus, and the power and time are configurable.

The deactivation of the loads can be done by: level of consumption of the grid, time, activation of a digital input, or manually.

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E-SYSTEM

e-manager - "Brain"

Solar Inversor SK-SU5000E

- Output Power (AC) - 4,6 kW
- Output Voltage (AC) - 230V, 50/60 Hz
- Input Power (DC) - 5 kW
- Max. Inlet Voltage (DC) - 550 V

Batteries LiFePO4

- Up to 5 modules
- 2,4kWh / module - > 12kWh

EXPLANATORY VIDEO

ecoSMART Range

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NETZERO

REAL CASE

- **Location:** Spain
- **Year:** 2019
- **Source Type:** Ground source
- **Max. thermal power needed:** 34.000 Btu/h
- **Services:** Heating, cooling, DHW and pool heating

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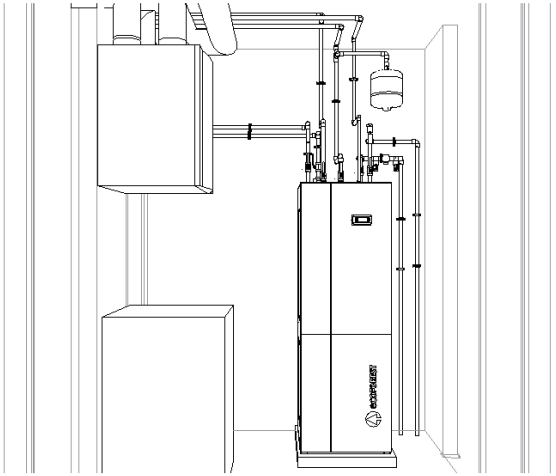
NETZERO

REAL CASE

- Water/Water NETZERO heat pump C4 3-12 kW
- Energy manager e-system
- Photovoltaic panels
- Underfloor heating + fancoils
- 43,6 gallons DHW Tank (Integrated in the heat pump)



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NETZERO

REAL CASE: ENERGY BILLS

Som Energia SCCL
CIF: F55091367
Domicili: CL. Pic de Peguera, 11 A 2 8 17003 - Girona
Mail: info@somenergia.coop

DADES DE LA FACTURA

IMPORT DE LA FACTURA 32,71€

Núm. de factura: **FE1900309115**
Data factura: **11/04/2019**
Període facturat: **de 06/03/2019 a 02/04/2019**
Núm. Contracte: **96900**
Adreça de subministrament:

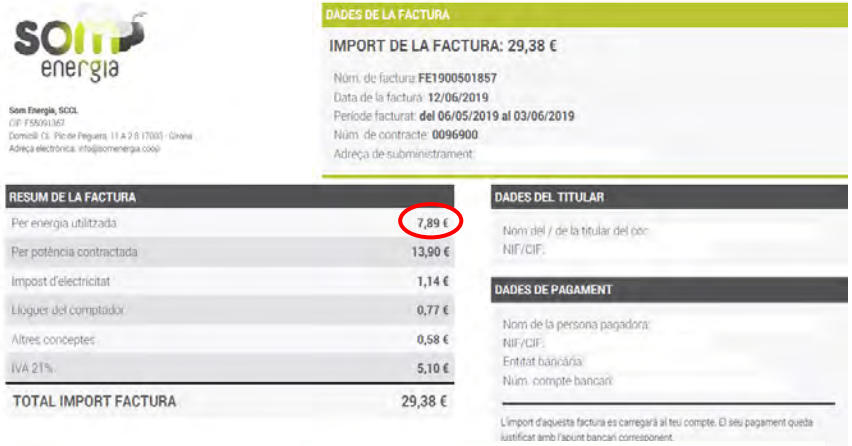
RESUM DE LA FACTURA	
Per energia utilitzada	11,02€
Per potència contractada	13,42€
Impost electricitat	1,28€
Lloguer comptador	0,75€
Altres conceptes	0,56€
IVA 21%	5,68€
TOTAL IMPORT FACTURA	32,71€

DADES DEL TITULAR

Nom del titular del contracte:
NIF/CIF:

DADES DE PAGAMENT

Nom persona pagadora:
NIF/CIF:
Entitat bancària:
Núm. compte bancari:



Som Energia, SCCL
CIF: F55091367
Domicili: CL. Pic de Peguera, 11 A 2 8 17003 - Girona
Adreça electrònica: info@somenergia.coop

DADES DE LA FACTURA

IMPORT DE LA FACTURA: 29,38 €

Núm. de factura: **FE1900501857**
Data de la factura: **12/06/2019**
Període facturat: **del 06/05/2019 al 03/06/2019**
Núm. de contracte: **0096900**
Adreça de subministrament:

RESUM DE LA FACTURA	
Per energia utilitzada	7,89 €
Per potència contractada	13,90 €
Impost d'electricitat	1,14 €
Lloguer del comptador	0,77 €
Altres conceptes	0,58 €
IVA 21%	5,10 €
TOTAL IMPORT FACTURA	29,38 €

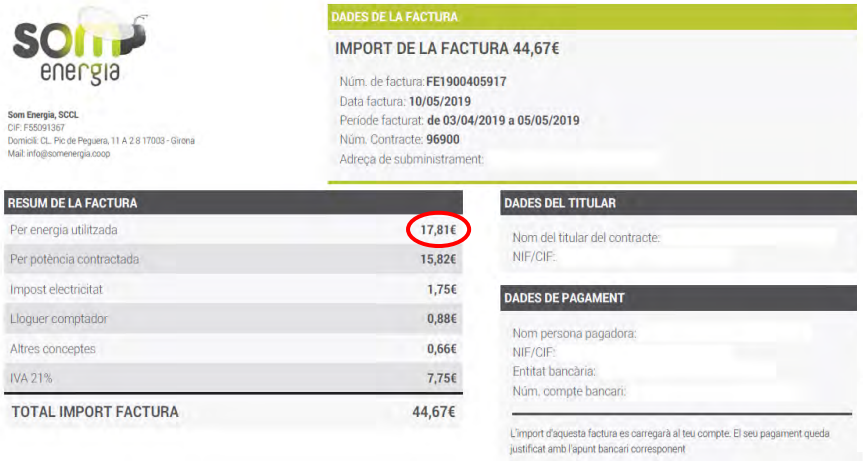
DADES DEL TITULAR

Nom del / de la titular del cor
NIF/CIF:

DADES DE PAGAMENT

Nom de la persona pagadora:
NIF/CIF:
Entitat bancària:
Núm. compte bancari:

L'import d'aquesta factura es carregarà al teu compte. El seu pagament queda justificat amb l'apunt bancari corresponent.



Som Energia, SCCL
CIF: F55091367
Domicili: CL. Pic de Peguera, 11 A 2 8 17003 - Girona
Mail: info@somenergia.coop

DADES DE LA FACTURA

IMPORT DE LA FACTURA 44,67€

Núm. de factura: **FE1900405917**
Data factura: **10/05/2019**
Període facturat: **de 03/04/2019 a 05/05/2019**
Núm. Contracte: **96900**
Adreça de subministrament:

RESUM DE LA FACTURA	
Per energia utilitzada	17,81€
Per potència contractada	15,82€
Impost electricitat	1,75€
Lloguer comptador	0,88€
Altres conceptes	0,66€
IVA 21%	7,75€
TOTAL IMPORT FACTURA	44,67€

DADES DEL TITULAR

Nom del titular del contracte:
NIF/CIF:

DADES DE PAGAMENT

Nom persona pagadora:
NIF/CIF:
Entitat bancària:
Núm. compte bancari:

L'import d'aquesta factura es carregarà al teu compte. El seu pagament queda justificat amb l'apunt bancari corresponent

Som Energia, SCCL
CIF: F55091367
Domicili: CL. Pic de Peguera, 11 A 2 8 17003 - Girona
Adreça electrònica: info@somenergia.coop

DADES DE LA FACTURA

IMPORT DE LA FACTURA: 25,46 €

Núm. de factura: **FE1900601329**
Data de la factura: **09/07/2019**
Període facturat: **del 04/06/2019 al 02/07/2019**
Núm. de contracte: **0096900**
Adreça de subministrament:

RESUM DE LA FACTURA	
Per energia utilitzada	4,80 €
Per potència contractada	13,90 €
Impost d'electricitat	0,99 €
Lloguer del comptador	0,77 €
Altres conceptes	0,58 €
IVA 21%	4,42 €
TOTAL IMPORT FACTURA	25,46 €

DADES DEL TITULAR

Nom del / de la titular del cor
NIF/CIF:

DADES DE PAGAMENT

Nom de la persona pagadora
NIF/CIF:
Entitat bancària:
Núm. compte bancari:

L'import d'aquesta factura es carregarà al teu compte. El seu pagament queda justificat amb l'apunt bancari corresponent

Coming soon…

GEOSMART
NETZERO

- **NETZERO HP 12-40 kW** (41.700-136.500 Btu/h), **NETZERO HP 15-70 kW** (51.200-238.000 Btu/h) and **NETZERO HP 25-100 kW** (85.300-340.000 Btu/h)
- **NETZERO PRO 1-6 kW** (3.400-20.500 Btu/h)
- **NETZERO AIR PRO 1-7 kW** (3.400-23.900 Btu/h), **NETZERO AIR PRO 1-9 kW** (3.400-30.700 Btu/h), **NETZERO AIR PRO 3-12 kW** (10.200-41.000 Btu/h), **NETZERO AIR EVI 4-20 kW** (13.600-68.200 Btu/h)
- **Air Unit AU6, AU22, AU40U, AU70, AU100, AU150**
- And much much more…

NETZERO AIR EVI 4-20 kW


Air Unit AU150

NETZERO HP 25-100 kW

BLOCK I. Product Ranges

I.I. Water/Water heat pump & Energy Managers