Release June 2022

AIR TO WATER HEAT PUMPS

AIRHEAT 2.0 Series

Nominal heating capacity from 10 to 100 kW for domestic hot water production applications or process heating with high delta temperature, up to 90 °C

Enex presents AIRHEAT 2.0, the new, renewed and extended range of air to water heat pumps for DHW (Domestic Hot Water) that uses CO_2 (Carbon Dioxide - R744) natural refrigerant fluid. A synthesis of innovation, flexibility and energy saving, the AIRHEAT 2.0 series air to water heat pumps offer an unbeatable solution for the ability to produce large quantities of hot water at high temperatures, overcoming the typical limits of traditional heat pumps with synthetic refrigerants.
Enex was the first ever company to develop CO_2-only solutions since 2004. CO_2 is a natural fluid with zero OPD, GWP = 1. Neutral refrigerant of excellence, CO_2 is neither toxic nor flammable: it is in fact the one of the natural gases with fewer contraindications and for this reason it is a candidate as the refrigerant of the future, not subject to the F-gas regulation on fluorinated gases.

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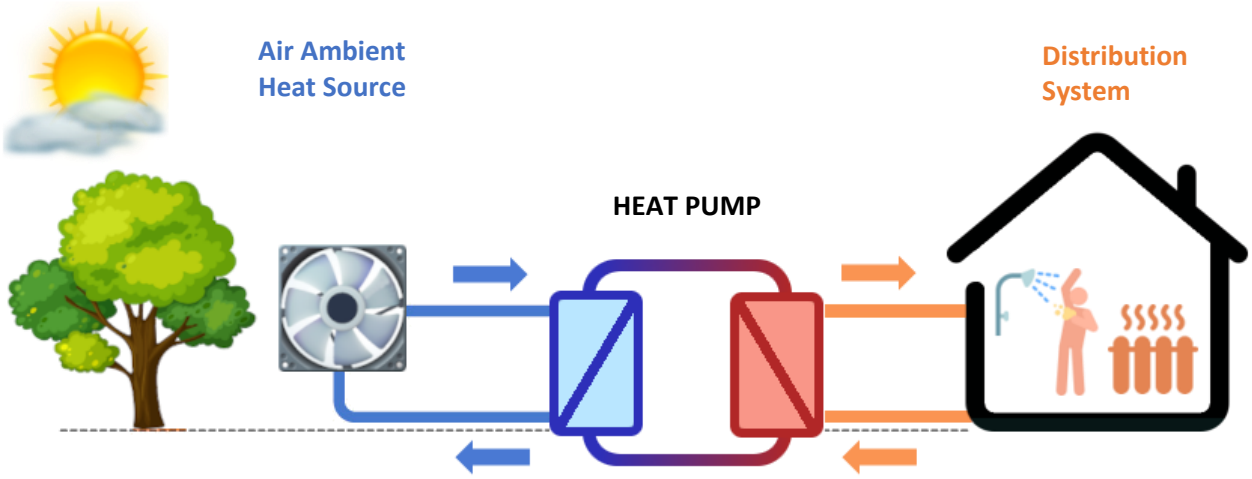
THE KEY ROLE OF THE HEAT PUMP TECHNOLOGY IN EUROPE

The key role of heat pumps, for the heating, cooling and production of domestic hot water in buildings, for the achievement of the new European community decarbonisation objectives of the building sector for the next decade, is perfectly reflected in the "European Green Deal" which expects the EU to become the first climate-neutral continent by 2050.

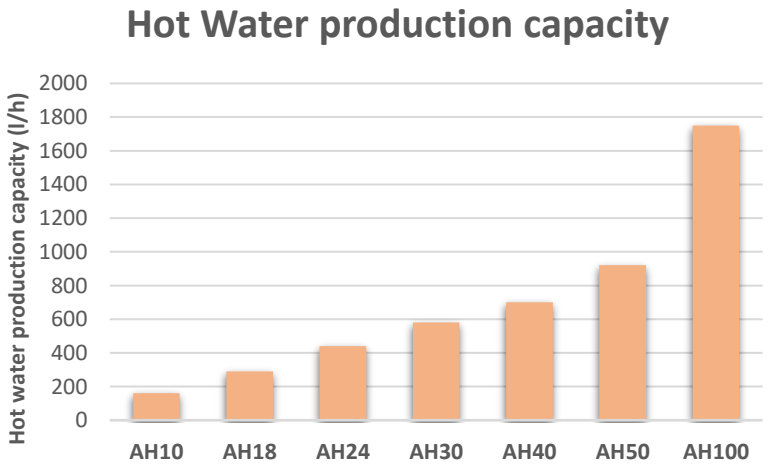


Examplification image of the heat pump technology
In the refrigeration cycle of a heat pump, the refrigerant gas (in our case CO_2) has the ability to absorb heat from a natural source (for example in the case of AIRHEAT 2.0: the air of the external environment in which the heat pump is placed) and then, following a compression that raises the temperature, transfer it to the heating system. The energy returned to the system can even be 5 times greater than that energy supplied to the heat pump (in the form of electricity) and if this electrical energy would come from a renewable source (for example photovoltaic with or without storage) the system thus configured it would become 100% renewable energy.

PRODUCTION OF HIGH VOLUMES OF HOT WATER

Thanks to the new range extension, AIRHEAT 2.0 heat pumps perfectly cover capacity requests between 10 and 100 kW, with the possibility of extending the power range even more widely given the possibility of using more units in parallel.

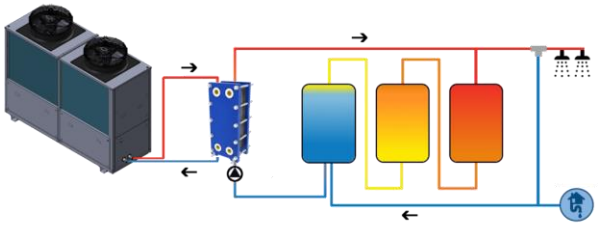
AIRHEAT 2.0 heat pumps are the optimal solution in all applications where a high production of hot water is required, such as:
- Residential complexes;
- Hotels;
- Canteens;
- Restaurants;
- Hospitals;
- Gyms;
- Sport centers;
- Swimming pools;
- Industrial processes.



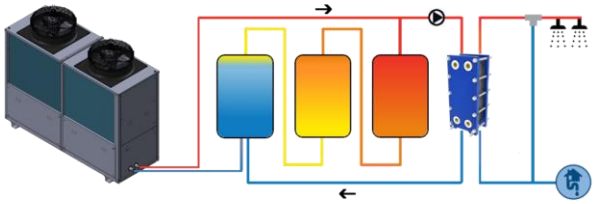
Conditions are: water IN/OUT 10/60°C - Air 7°C

TYPICAL SYSTEM CONFIGURATIONS TO ADAPT TO THE DIFFERENT NEEDS

AIRHEAT 2.0 heat pumps represent a flexible and intelligent choice to manage according to the different configurations and system needs: technical water and domestic hot water for both instantaneous production and storage. Here are some examples of typical uses that take advantage of the stratification principle.



INSTANTANEOUS TECHNICAL WATER PRODUCTION AND STORAGE OF DOMESTIC HOT WATER



STORAGE OF TECHNICAL WATER AND INSTANTANEOUS PRODUCTION OF DOMESTIC HOT WATER

ADVANTAGES CONNECTED TO THE USE OF CO_2 AS NATURAL REFRIGERANT

The AIRHEAT 2.0 range through the use of natural CO_2 refrigerant allows the designer of systems in both civil and industrial fields to adopt a solution that looks to the future with the following distinctive advantages:

- Environment protection
  - CO_2 obtained from the recovery of waste from other industrial or natural processes
  - Non pollutant
- Security for People
  - Non toxic
  - Non flammable
- Excluded from F-Gas regulation
  - GWP = 1
  - ODP = 0

SAFETY GROUP	LOWER TOXICITY Harmless to health	HIGHER TOXICITY Harmfull to health
Higher flammability	A3	B3
Lower flammability	A2L	B2L
Flammable	A2	B2
Non flammable	A1	B1

Table: Refrigerant safety classes

Compared to common synthetic refrigerants, the CO_2 natural refrigerant offers an unparalleled advantage from the point of view of the very low impact towards the Global Warming Potential (GWP), as for most of the natural refrigerants, but unlike the latter it further distinguishes itself by having minimum toxicity levels and for being non-flammable, thus obtaining the best possible safety class group for a refrigerant: A1.

Refrigerant	R744 (CO_2)	R290	R717 (NH_3)	R32	R454B
GWP	1	3	0	675	466
Security	A1 ✔	A3	B2	A2L	A2L

GENERAL TECHNICAL DATA

	AH10	AH18	AH24	AH30	AH40	AH50	AH100
Design conditions	**Water 10°C / 60°C – Air 7°C D.B. / 6°C W.B.**						
Heating Capacity (kW)	9,5	16,9	25,7	33,8	40,7	53,3	102,0
COP	3,6	3,6	4,1	4,0	3,9	3,9	4,2
Design conditions	**Water 10°C / 60°C – Air -7°C D.B. / -8°C W.B.**						
Heating Capacity (kW)	6,5	11,5	17,7	23,4	28,0	36,6	70,6
COP	2,4	2,7	3,1	3,1	2,9	2,8	3,1
Design conditions	**Water 10°C / 60°C – Air 12°C D.B. / 11°C W.B.**						
Heating Capacity (kW)	10,4	18,6	28,0	37,1	44,5	58,1	111,0
COP	3,9	3,9	4,5	4,4	4,3	4,2	4,5

SPECIFICATIONS DESCRIPTION OF STANDARD UNITS

AIRHEAT 2.0 unit for the production of domestic hot water up to 90°C with process water with a high temperature difference, equipped with heat pump technology with high energy efficiency CO_2 natural refrigerant in an Air-Water monobloc configuration for nominal heating capacity from 10 to 100 kW.

Main components:

- Compressor: semi-hermetic, specifically designed for transcritical CO_2 applications;
- Single wall stainless steel brazed plate heat exchanger;
- Integrated inverter driven water pump;
- Finned pack evaporator;
- Axial fans with integrated rotation speed control;
- Electronic expansion valve for accurate high pressure control;
- Proprietary heat pump management software developed by Enex to optimize the performance and reliability of the units;
- LCD display placed on the electrical panel of the unit with an easy and intuitive graphic interface;
- Remote connection with Modbus RS-485 or TCP / IP protocols as a standard (web server included);
- Energy meter included;
- Remote supervision for remote assistance service;
- Painted frame closed by sound-absorbing panels;
- Anti-vibration feet to reduce vibrations and noise;
- Analog safety pressure gauge on the high pressure side;
- Cooling circuit made entirely of stainless steel for maximum strength and reliability;
- PED certification (Cat. ≤ III);
- Plug and play unit tested in real operating conditions during the end-of-line test.

DETAILED TECHNICAL DATA

ELECTRIC DATA

	AH10	AH18	AH24	AH30	AH40	AH50	AH100
Electric alimentation	230 / 1 / 50	400 / 3 / 50	400 / 3 / 50	400 / 3 / 50	400 / 3 / 50	400 / 3 / 50	400 / 3 / 50
FLA (A)	8,5	11,5	24,0	27,5	27,5	39,5	66,0
LRA (A)	-	45,0	86,0	92,0	92,0	170,0	245,0
LRA with soft starter (A)	-	31,0	60,0	64,5	64,5	120,0	170,0

HYDRAULIC DATA

	AH10	AH18	AH24	AH30	AH40	AH50	AH100
Connection diameter IN	½ " INOX	1 " INOX	1 ¼ " INOX	1 ¼ " INOX	1 ½ " INOX	1 ½ " INOX	2 " INOX
Connection diameter OUT	½ " INOX	1 " INOX	1 ¼ " INOX	1 ¼ " INOX	1 ½ " INOX	1 ½ " INOX	2 " INOX
Pump type	EC	EC	EC	EC	EC	EC	EC
Av. Pressure Drop (m)	7	7	8	8	8	8	35

SOUND POWER LEVELS

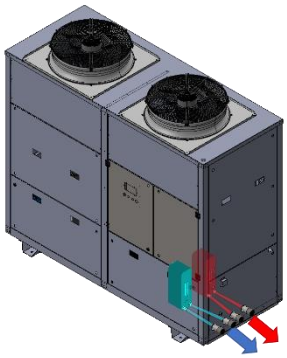
	AH10	AH18	AH24	AH30	AH40	AH50	AH100
L_{wA} (dB(A))	70	78	78	78	80	88	88
L_{pA} (dB(A)) @10m, Q = 2	42	50	50	50	52	60	60

FRIGORIFIC CIRCUIT MAIN COMPONENT

	AH10	AH18	AH24	AH30	AH40	AH50	AH100
N. circuits /compressor	1/1	1/1	1/1	1/1	1/1	1/1	1/1
Type compressor	Semi hermetic	Semi hermetic	Semi hermetic	Semi hermetic	Semi hermetic	Semi hermetic	Semi hermetic
Tyoe Refrigerant	R744	R744	R744	R744	R744	R744	R744
Refrigerant charge (kg)	3,8	4,3	6,4	6,7	8,6	9,6	20
Number of fans	1	1	2	2	2	3	2
Type of fans	Axial	Axial	Axial	Axial	Axial	Axial	Axial
Nominal Air Flow (m^3/h)	5.100	8.850	11.660	11.660	17.880	23.850	47.690

COOLING HEAT RECOVERY

AIRHEAT 2.0 heat pumps are able to recover cooling energy for the production of cold water, which can be efficiently used with significant energy savings for the air conditioning needs of the building or for process purposes, typical of the food industry, pharmaceutical or hospital requirements.



STANDARD CONFIGURATIONS OPTIONS AND ACCESSORIES

Depending on the size and model, AIRHEAT 2.0 units can be equipped with a series of devices that expand the range of use and improve the completeness of the unit:

- ON / OFF Compressor control;
- Soft Starter;
- Inverter;
- Water pump (always included);
- Domestic hot water pump (option);
- Ducted option;
- "Low Noise" option;
- Recovery;
- Coils enhanced corrosion protection;
- Modbus TCP / IP (always included);
- Remote monitoring (always included).

	ON / OFF COMPR.	SOFT STARTER	INVERTER	WATER PUMP	DHW WATER PUMP (Alternative)	DUCTED OPTION	LOW NOISE OPT.	COLD RECOVERY	COIL CORROSION PROTECTION	MODBUS TCP/IP	REMOTE MONITORING
AH10	-	-	●	●	○	○	●	-	○	●	●
AH18	-	●	-	●	○	○	●	-	○	●	●
AH24	●	○	-	●	○	○	○	○	○	●	●
AH30	●	○	-	●	○	○	○	○	○	●	●
AH40	●	○	-	●	○	○	○	○	○	●	●
AH50	●	○	-	●	○	○	○	○	○	●	●
AH100	●	○	-	●	○	○	○	○	○	●	●

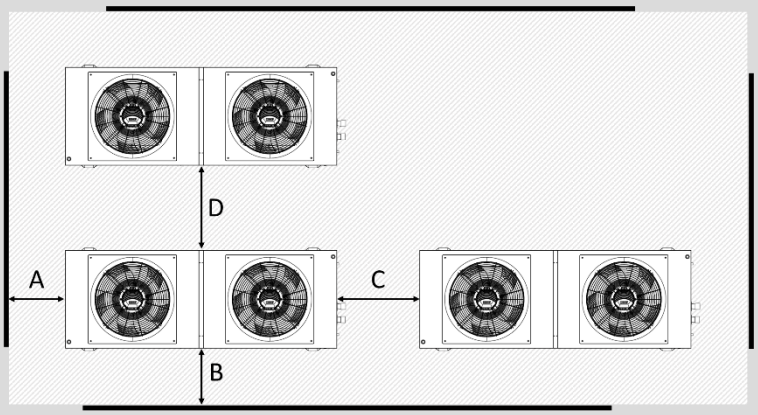
NOTES: ● STANDARD ○ OPTIONAL - NOT AVAILABLE

WORKING CONDITIONS AND LIMITS OF USE

	AH10	AH18	AH24	AH30	AH40	AH50	AH100
Outdoor Air Temp. (°C)	-15 → +43	-15 → +43	-15 → +43	-15 → +43	-15 → +43	-15 → +43	-15 → +43
Water in temperature (°C)	+5 → +50	+5 → +50	+5 → +50	+5 → +50	+5 → +50	+5 → +50	+5 → +50
Water out temperature (°C)	+45 → +90	+45 → +90	+45 → +90	+45 → +90	+45 → +90	+45 → +90	+45 → +90
ΔT minimum (K)	20	20	20	20	20	20	20

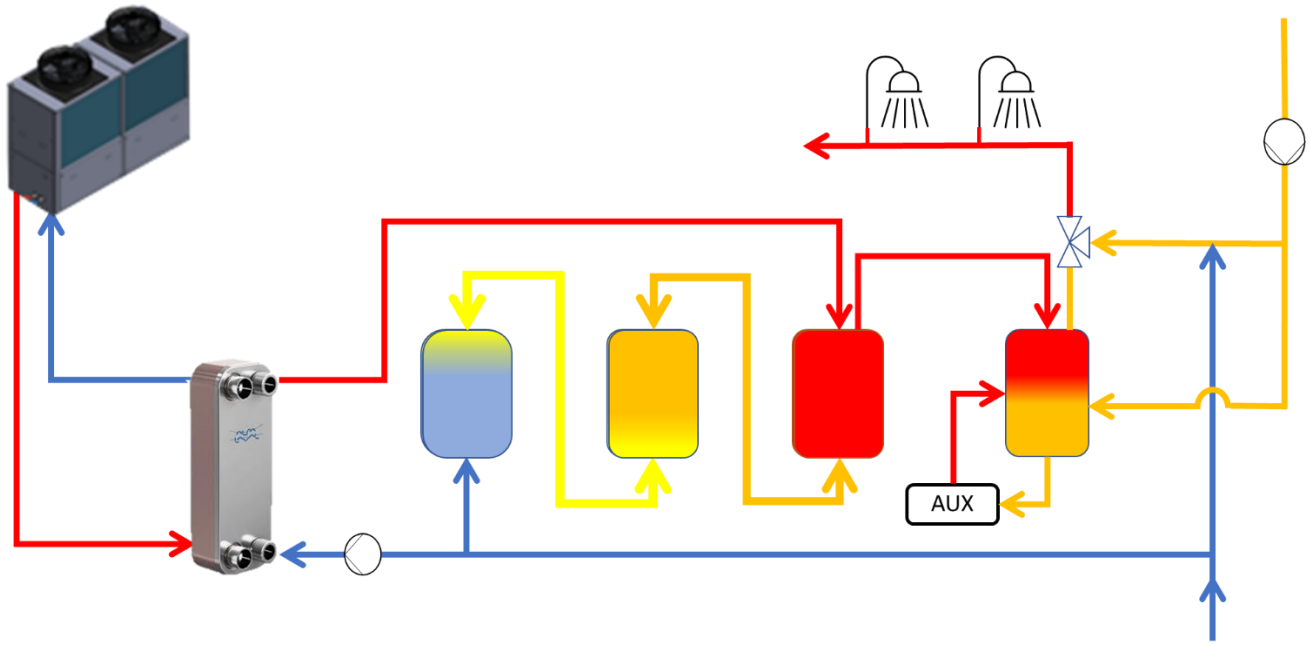
DIMENSIONS, WEIGHTS AND SPACE OF RESPECT

	Dimensions L x P x H (mm)	Weights (kg)	A (m)	B (m)	C (m)	D (m)
AH10	1100 x 900 x 2000	360	1,0	1,0	1,5	1,5
AH18	1150 x 920 x 2000	400	1,0	1,0	1,5	1,5
AH24	1550 x 920 x 2000	550	1,0	1,0	1,5	1,5
AH30	1550 x 920 x 2000	550	1,0	1,0	1,5	1,5
AH40	2380 x 970 x 2100	750	1,0	1,0	1,5	1,5
AH50	3040 x 1290 x 2500	750	1,0	1,0	1,5	1,5
AH100	3040 x 1290 x 2500	1500	2,0	2,0	2,0	2,0



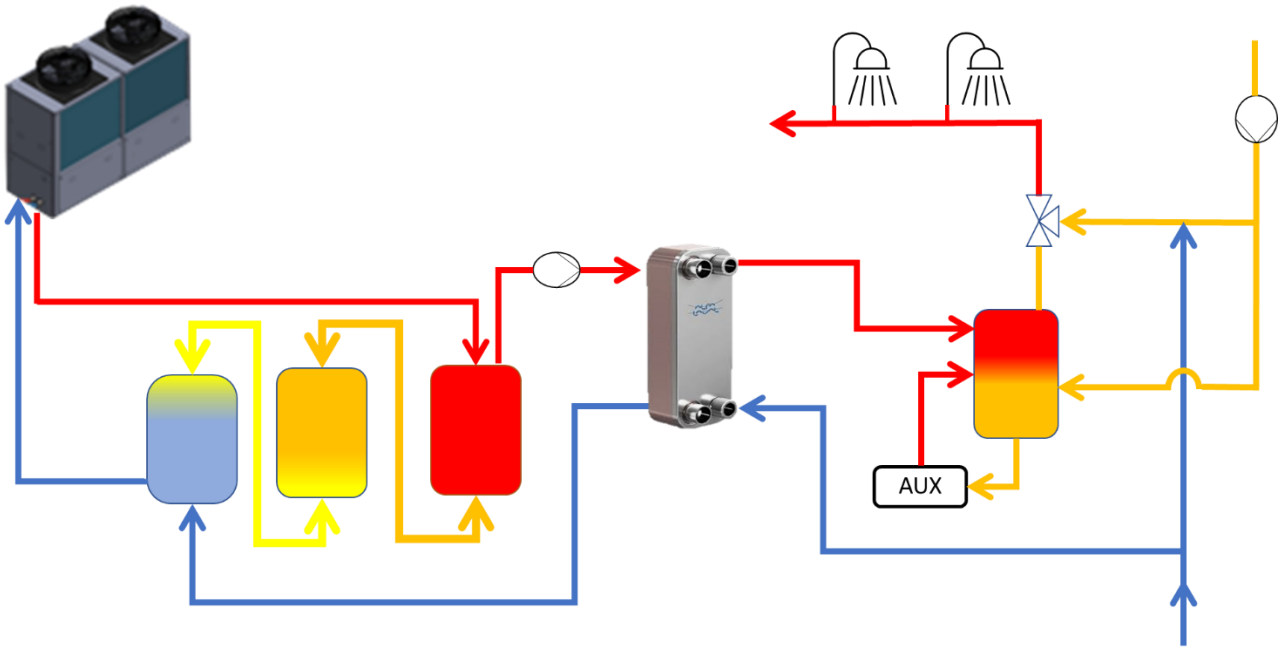
APPLICATION EXAMPLE 1:
DWH STORAGE

When instantaneous technical water production and storage of domestic hot water is required, the advantages represented by the stratification principle combined with the system design can offer relevant benefits in terms of energy efficiency and service level to the users.
In the scheme below, purely by way of non-exhaustive example, it is represented a simplified schematic solution where the position of the plate heat exchanger and the piping design allow to have the highest temperatures available both for hot water storage and for DHW.
In this scheme, it is also showed the recommended position of an eventual auxiliary (AUX) heat source (e.g. a small heat pump, solar thermal energy, waste heat from processes, etc.) to compensate the recirculation loss, thus avoiding operation of the AIRHEAT 2.0 units with high return water temperature, which has a negative effect on heating capacity and energy efficiency.



APPLICATION EXAMPLE 2: TECHNICAL WATER STORAGE

When storage of technical water and instantaneous production of domestic hot water is required, the advantages represented by the stratification principle combined with the system design can offer relevant benefits in terms of energy efficiency and service level to the users.
In the scheme below, purely by way of non-exhaustive example, it is represented a simplified schematic solution where the position of the plate heat exchanger and the piping design allow to have the highest temperatures available both for hot water storage and for DHW.
In this scheme, it is also showed the recommended position of an eventual auxiliary (AUX) heat source (e.g. a small heat pump, solar thermal energy, waste heat from processes, etc.) to compensate the recirculation loss, thus avoiding operation of the AIRHEAT 2.0 units with high return water temperature, which has a negative effect on heating capacity and energy efficiency.



INNOVATION AS ENERGY

2004	>3000	25
Foundation year	Transcritical systems installed	Countries in the world where Enex is present

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