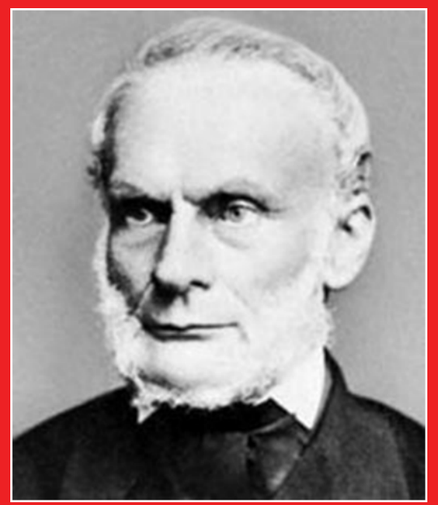
clausius

NEW GENERATION OF GROUND SOURCE HEAT PUMPS

Domestic and high power ranges



Rudolf **CLAUSIUS**
(1822-1888)

German physicist who enunciated the 2nd Law of Thermodynamics applied to Heat Pumps and Refrigeration Systems. He is considered to be one of the first ecologists, soon in 1885 predicted, **"...the future of humanity depends on being able to feed our industries and machines with the only contest of renewable energy..."**.

CLAUSIUS

CLAUSIUS is a new generation of ground source heat pumps that emerged after many years of serious and rigorous research at the University of Vigo.

At CLAUSIUS we design and develop only ground source heat pumps, which has allowed us to achieve a high degree of specialization in this type of equipments. In these years we have managed to make CLAUSIUS a synonym of continuous innovation and incorporation of the latest technology in ground source heat pumps. We work every day with the sole objective of developing the most reliable and efficient ground source heat pumps on the market.

In CLAUSIUS the reliability of our heat pumps has become our obsession, being aware that it is only possible to achieve by using the best available components and, mainly, testing one by one, by ourselves, all our heat pumps in a test bench in the laboratory, before sending them to any customer. Only by testing one by one each heat pump is possible to guarantee its reliability once installed.

In CLAUSIUS we control the brain ... another of the lessons learned from experience, after these years, is that the control system in a heat pump is what really makes the difference, that is why we develop and improve the control software of our heat pumps day by day, considering the opinions and requirements of our customers.

In CLAUSIUS we do not care if they follow us ... it means that we are ahead ...

Universidade Vigo

AIT Austrian Institute of Technology TOMORROW TODAY · MCS · Bundesamt für Wirtschaft und Ausfuhrkontrolle · Netherlands Enterprise Agency · CE

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CLAUSIUS GROUND SOURCE HEAT PUMPS

Advantages

• COP of 5.01. The highest COP reached by an inverter ground source heat pump from 2015.

• Unique. Domestic Hot Water up to 80/85 ºC. New DHW production system that allows to reach DHW termperatures up to 85º.

• High power with inverter system. Up to 150 kW with new Copeland Inverter Technology.

• Accessibility. New lift opening system that allows an easy access to all components inside the unit.

• Premium quality. Incorporate only premium brand European components of the best existing manufactures.

• Integration. Integrate heating, cooling and domestic hot water services in one compact unit with a single installation. Integral air conditioning and DHW production. They allow the production of heating, cooling and DHW with a single installation.

• Passive cooling. Allow passive cooling production with an extremely low cost and low energy consumption, exceeding Air Source heat pumps technologically.

• Silent. Do not require noisy fans and do not generate air drafts, as all their components are silent and sound insulated inside the case.

• Comfort for users. They are controlled with simple thermostats and do not require any user interaction, providing great comfort.

• Clean and safe. They do not require any type of fuel and do not generate flames or smoke, so they do not need fuel storage tanks or chimneys.

• No visual impact. They do not require any elements on the outside, all components are buried or inside the house.

• Reliable. Twenty years ‘fit and forget’ lifespan. Installations with ground source heat pumps require minimal maintenance and have a long life by using a simple, proven, well-known and very reliable technology.

• Efficiency. Market leading ErPA+++ rating. Energy efficiency and economic savings. They provide a far more energy efficiency than traditional systems and other types of heat pumps, so the cost of heating is drastically reduced, achieving significant savings.

DOMESTIC RANGE, CLASSIC & ELITE

CLAUSIUS TECHNOLOGY

The highest COP in the market for ground source heat pumps with inverter technology since 2015, certified by the Austrian Institute of Technology, according to EN14511.

Copeland inverter technology and scroll compressors, the best inverter technology available in the market. We incorporate Inverter heat recovery that improves efficiency and reliability.

Alfa Laval asymmetric plate heat exchangers, the most efficient heat exchange technology currently available.

R410A refrigerant, maximum efficiency with low environmental impact.

Carel electronic expansion valve for an accurate control of the refrigerant flow in the evaporator.

Wilo high efficiency variable speed pumps (Class A), for an optimum flow control in both brine and heating circuits.

new

Accessibility. New lift opening system (patented), that allows an easy access to all components inside the unit.

classic

CLAUSIUS TECHNOLOGY

new

New DHW production system up to 80/85 ºC without electrical heaters (patented system). No specific antilegionella treatment is required.

elite

new

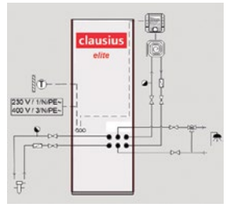
Heating, domestic hot water services, active and passive cooling in one compact unit. Control with passive cooling priority, to obtain maximum efficiency in cooling processes.

new

Minimum acoustic level. Specific acoustic insulation system for the compressor and the refrigeration module. Use of different insulation materials to attenuate a higher frequency range.

All-in-one design and plug & play installation. Circulation pumps, expansion vessels, safety and drain valves integrated in all models. Ready to install.

Easy and compact installation. With an inverter system, the use of buffer tanks is not required, so that the installation is very simple and requires less space, reducing installation and assembly costs.



New control strategies. More efficient, reliable and secure installations.

Online monitoring and inspection. Remote access, preventive maintenance and higher reliability.

CLASSIC CONFIGURATION

clausius

- POWER ranges from 1 to 10 kW / 3 to 15 kW / 5 to 25 kW
- COPs 4.63 / 4.61 / 5.01, according to EN14511
- EERs 6.5 / 6.4 / 6.8, according to EN14511
- Single phase and three phases electrical power supply in all ranges
- R410A refrigerant
- Electronic expansion valve
- Built in active and passive cooling
- Built in Class A variable speed circulation pumps
- Built in expansion vessels and security valves
- Built in 3-way valve for DHW production
- Built in energy counters, COP, EER and SPFs
- Built in pressure sensors in both brine and heating circuit
- Market leading noise reduction enabling flexible plant room location
- New control strategies
- Control through climate regulation
- Control for 2 climate zones
- Swimming pool control
- Special programs, floor drying, air venting program, etc
- Limitation of maximum powers through software
- Possibility of cascading up to 14 units
- Optional control with “Clausius Advance Control”
- Tested one by one in test bench

COP 5.01 AIT Austria

The highest COP in the market with inverter technology from 2015.

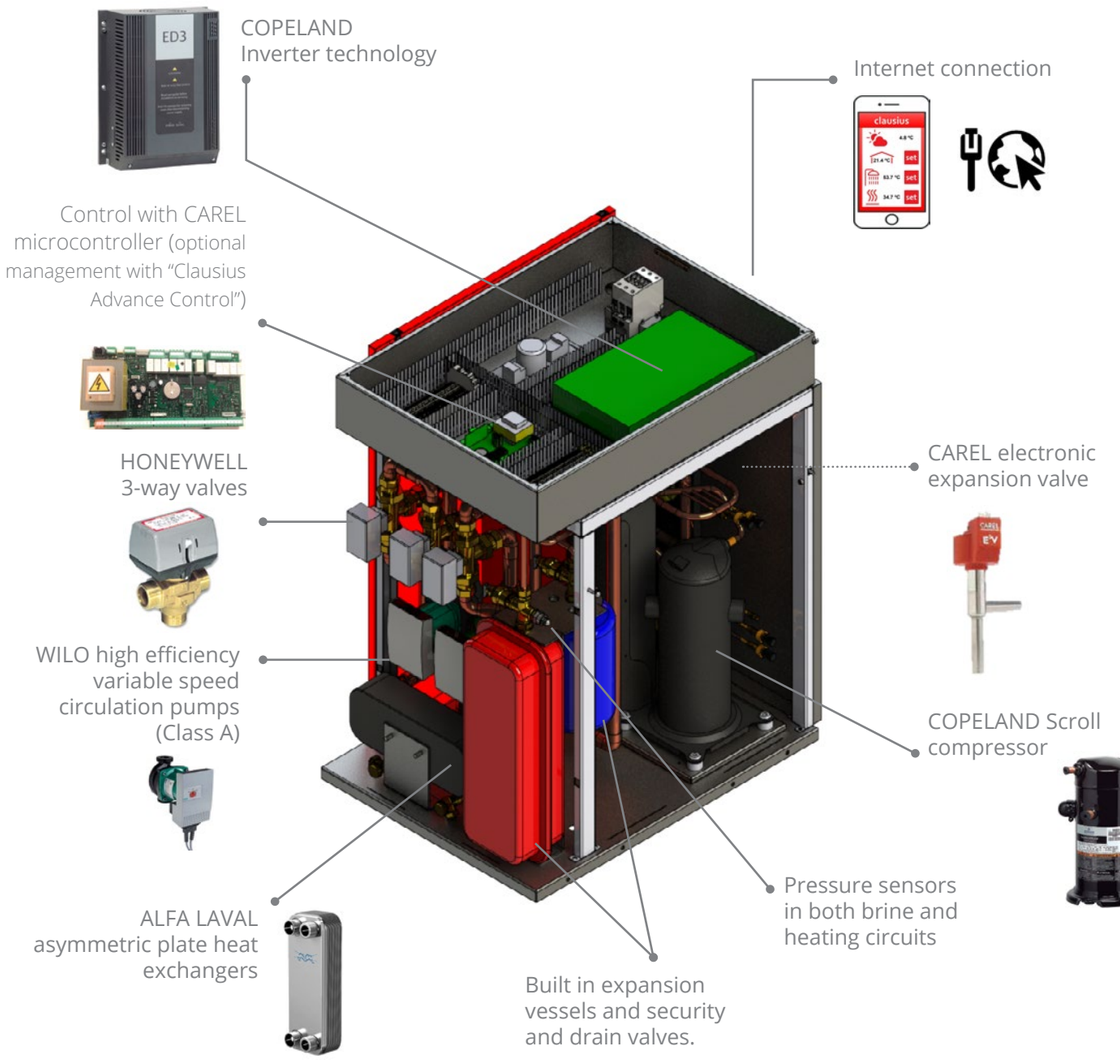
Copeland inverter technology

MODELS IN THREE POWER RANGES, 1-10 KW, 3-15 KW Y 5-25 KW

H	Heating and domestic hot water production
HC	Heating, domestic hot water, active and passive cooling production.

CLASSIC COMPONENTS

In the manufacture of CLAUSIUS ground source heat pumps, we only use components from the European premium brands.



WE MANUFACTURE WITH THE BEST COMPONENTS IN THE MARKET

Copeland Scroll · ALFA LAVAL · CAREL · wilo · Danfoss · Honeywell

ELITE CONFIGURATION

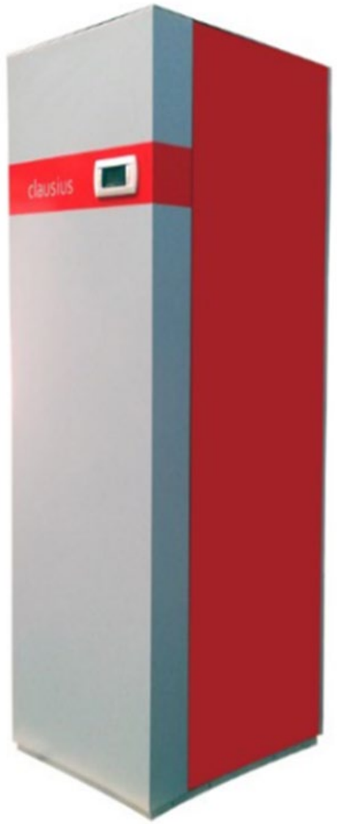
clausius

- 200 l DHW tank made of stainless steel AISI 316
- DHW production system up to 80/85 ºC without electrical heaters, through a built-in desuperheater.
- Power ranges from 1 to 10 kW/ 3 to 15 kW/ 5 to 25 kW
- COPs 4.63/ 4.61/ 5.01, according to EN14511
- EERs 6.5/ 6.4 / 6.8, according to EN14511
- Single phase and three phases electrical power supply in all ranges
- R410A refrigerant
- Electronic expansion valve
- Built in DHW production, active and passive cooling
- Built in expansion vessels and security and drainage valves
- Built in Class A variable speed circulation pumps
- Built in energy counters, COP, EER and SPFs
- Built in pressure sensors in both brine and heating circuits
- Market leading noise reduction enabling flexible plant room location
- New control strategies
- Control through climate regulation
- Control of 2 climate zones
- Swimming pool control
- Special programs, floor drying, air venting program, etc
- Limitation of maximum powers through software
- Possibility of cascading up to 14 units
- Optional control with “Clausius Advance Control”
- Tested in test bench.

NEW SYSTEM

New DHW production system up to 80/85 ºC, patented system.

200 litters of hot water up to 80/85 ºC without electrical heaters

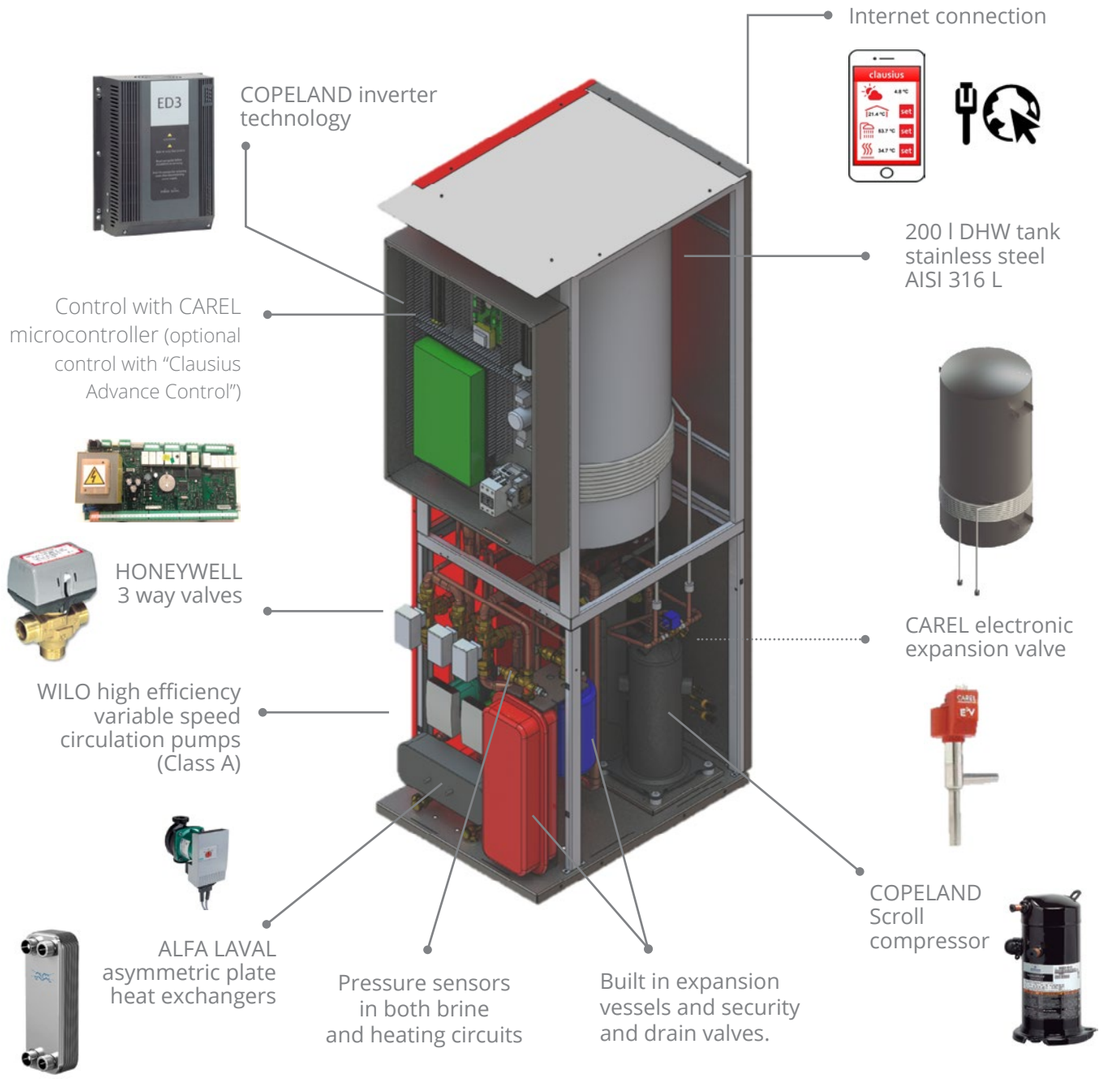


MODELS IN THREE POWER RANGES, 1-10 KW, 3-15 KW Y 5-25 KW

H	Heating and domestic hot water with built- in deposit
HC	Heating, domestic hot water with built- in deposit, active and passive cooling productin

ELITE COMPONENTS

Elite configuration includes a DHW tank made of stainless Steel AISI 316 with 200 l capacity and built in desuperheater, which allows to get DHW temperatures up to 80/85 ºC.



WE MANUFACTURE WITH THE BEST COMPONENTS IN THE MARKET

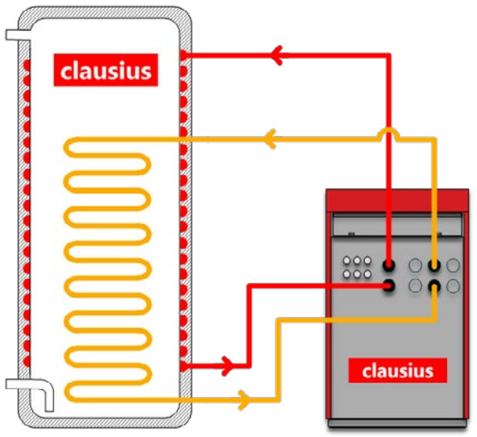
OPTIONS IN DOMESTIC RANGE

White finish, TULIP WHITE

All models in Classic and Elite configuration are also available in **white finish.**

DHW tanks with built-in desuperheater. Clausius DHW-DS

Our CLAUSIUS DHW-DS tanks with built-in desuperheater have been specially designed for their use with the Classic models and incorporate the same DHW system as the Elite models. The combination of the Classic models with DHW-DS tanks allows DHW production at temperatures up to 80/85 ºC without electrical heaters.



CLAUSIUS CLASSIC with DHW-DS tank with built-in desuperheater

DOMESTIC RANGE OPTIONS

Classic models combined with CLAUSIUS DHW tanks with desuperheater include all connection and control elements of the system and are delivered pre-charged with refrigerant and quick connections.

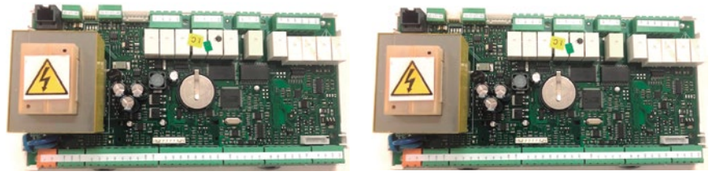
The capacities of the CLAUSIUS DHW tanks with desuperheater available are 250, 300 and 500 liters. The use of these tanks with Classic models enables us to have large volumes of DHW at high temperature and to have a significant increasing of the domestic hot water amount available for use in the home. The use of a tank of 500 liters with ACS at 80 ºC allows to obtain more than 1000 liters of hot water for domestic use at 38 ºC.

CLAUSIUS Advance Control

The unique CLAUSIUS “Advance Control System” has been specifically designed by CLAUSIUS and can be incorporated on demand in all models of the domestic range, increasing its functionality and allowing the management of complex installations and the CLAUSIUS Air and Hybrid systems.

CLAUSIUS Advance Control incorporates all the functionalities of the CLAUSIUS Standard control system. Furthermore, adds the features that are detailed below.

- Control of 5 mixing groups.
- Control of 6 zones with heating and cooling thermostats.
- Control of the DHW recirculation system.
- Control of 3 electrical heaters of up to 3 kW each.
- Control with flow switches in both brine and heating circuits.
- Simultaneous use of Th-tunes, Internet Kit and Data Acquisition Kit.
- Indoor temperature and humidity measurements.
- Communication with home automation systems with signals on/off, winter/summer and independent activation of heating and DHW.
- Control of bivalent systems through on-off of the complementary system.
- Control of up to 14 cascade heat pumps.
- Control of the heat pump combined with photovoltaic systems.
- Control of simultaneous heating and cooling production system.
- Control of the CLAUSIUS Air System.
- Control of the CLAUSIUS Hybrid system.

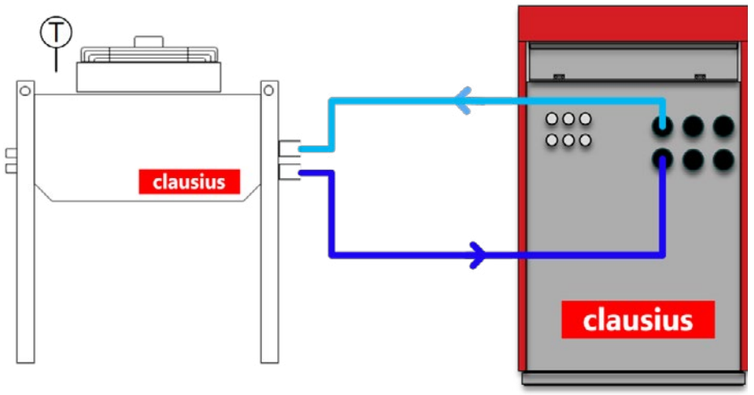


CLAUSIUS AIR SYSTEM

Heating systems with ground source heat pumps have many advantages comparing to systems with air source heat pumps and are more efficient and reliable. However, in some cases it may not be possible to install a ground collector system due to space limitations or other legislative restrictions, so only in these cases is it recommended to use air source heat pumps.

Clausius air source system (CLAUSIUS Air System) is based on maintaining all the advantages of ground source systems, replacing only the ground collector by a simple, efficient, reliable, robust and long-lasting air collector system.

CLAUSIUS Air System uses the same CLAUSIUS ground source heat pumps combined with an external air unit (CLAUSIUS Air Source), specially designed and tested by CLAUSIUS, in which the energy that is available in the air is extracted for its input to the heat pump.



CLAUSIUS Air System

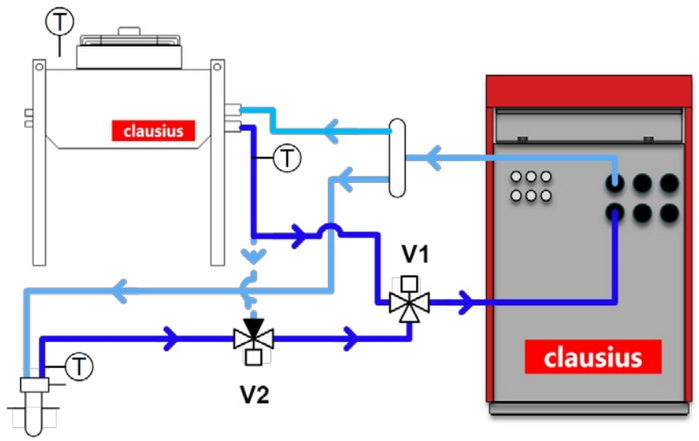
CLAUSIUS Air Source external unit transfers the energy captured from the air to the heat pump through a closed circuit in which glycol is recirculated using the circulation pumps integrated in the heat pumps, the same as in the ground source systems. Therefore, CLAUSIUS Air System is based on a very simple and reliable installation since the circulation of refrigerant is not required between the air unit located outside and the heat pump located inside the house, which would require the installation by highly qualified personnel and reduces the reliability of the system due to possible leaks of high pressure refrigerant in the pipes.

Furthermore, compared to systems with compact air source heat pumps, which components are outdoors exposed to weather elements, and therefore, subject to inclement weather, CLAUSIUS air system has the advantage that only the air unit is on the outside meanwhile all the other components are located inside the house protected from the elements and weather exposure, which, with no doubt increases considerably its reliability and useful life.

CLAUSIUS HYBRID SYSTEM

CLAUSIUS ground source heat pumps can be used in hybrid geothermal-aerothermal systems, in which ground and air collector systems are integrated in the same installation. Hybrid systems allow to obtain the advantages of both systems, avoiding their major drawbacks, such as the low efficiency of the air source due to the reduction of the outside temperature and the high cost of the ground collector systems.

CLAUSIUS heat pumps include a specific control for hybrid systems. The control of the heat pump selects in each moment the operating conditions providing the maximum possible energy efficiency by distributing the glycol flow optimally between the ground and air collectors, obtaining maximum efficiency in the heating system at any time



CLAUSIUS hybrid system

Ground recharge

CLAUSIUS hybrid systems allow to recharge the energy in the field when the outside temperature is high and heating the home is not required, by transferring the heat energy captured in the air collector system and its dissipation in the ground through the ground collector.

The ground is recharged at a very low cost allowing to use it as an energy storage system. The energy stored is subsequently recovered through the ground collector system for its input to the house through the heating system.

TECHNICAL SPECIFICATIONS

		H 1-10 (classic / elite)	**HC 1-10** (classic / elite)	**H 3-15** (classic / elite)	**HC 3-15** (classic / elite)	**H 5-25** (classic / elite)	**HC 5-25** (classic / elite)
Applications	Heating and DHW	•	•	•	•	•	•
	Passive cooling		•		•		•
	Active cooling		•		•		•
Power	Heating (kW)	1 - 10	1 - 10	3 - 15	3 - 15	5 - 25	5 - 25
	Active cooling (kW)		2 - 11		4 - 16.5		7 - 30
	Electric power (kW)	0.4 - 2.1	0.4 - 2.1	0.8 - 3.3	0.8 - 3.3	1.3 - 5.6	1.3 - 5.6
Power supply	230 V 1/N/PE⁻	•	•	•	•	•	•
	400 V 3/N/PE⁻	•	•	•	•	•	•
DHW tank	COP[1]	4.63	4.63	4.61	4.61	5.01	5.01
	EER		6.5		6.4		6.8
DHW tank		External / Integrated (200 l)	External / Integrated (200 l)	External / Integrated (200 l)	External / Integrated (200 l)	External / Integrated (200 l)	External / Integrated (200 l)
Refrigerant	Type	R410A					
	Type (kg)	1.1 / 1.25	1.0 / 1.5	1.5 / 1.75	1.5 / 1.75	1.8 / 2.1	1.8 / 2.1
Dimensions	height x width x depth (mm)	Classic 1040 x 600 x 800 / Elite 1850 x 600 x 800					
Connections	Brine and heating	1"					
	DHW	3/4"					
Weight	(kg)	147 / 227	158 / 238	163 / 243	174 / 254	168 / 248	179 / 259
Sound level	(dB)	42					

[1] According to EN14511 under conditions 0/ -3 °C and 30/35 °C.

A+++

Energy labelling, product sheets and technical documentation according to **Delegated Regulation (UE) Nº 811/2013.**

HIGH POWER RANGE, STRONG

CLAUSIUS TECHNOLOGY

new

We are the first manufacturer to bring new Copeland high power compressors and inverters into production.

new

We are the first manufacturer to use high power inverter with the widest power range in the market, from 7 to 50 kW and from 12 to 75 kW.

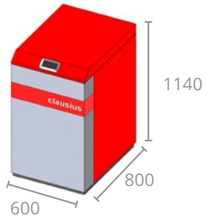
INVERTER
7-50 kW
12-75 kW

new

We are the first manufacturer to integrate heating, active cooling, passive cooling and desuperheater into a single high power unit. New system for DHW production up to 70/75 ºC with desuperheater and DHW independent circuit. Control of cooling mode with passive cooling priority.

new

High power in a minimum space. Up to 75 kW in a 600 mm x 800 mm x 1140 mm case (width x depth x height).

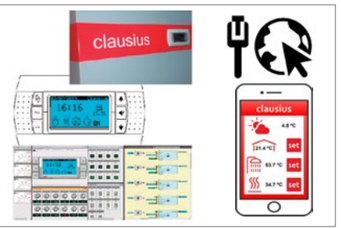


new

Accessibility. New lift opening system (patented) that allows an easy access to all components inside the unit.

New control strategies. More efficient, reliable and secure installations.

Online monitoring and inspection. Remote access, preventive maintenance and higher reliability.



STRONG CONFIGURATION

clausius

- Power ranges from 7 to 50 kW and from 12 to75 kW
- COP 4,8 according to EN14511
- EER 6,5 according to EN14511
- Three phase electrical power supply
- Active cooling integrated
- Optional integration of passive cooling
- Optional integration of desuperheater for high temperature DHW production
- Refrigerant R410A
- Electronic expansion valve
- Energy meters, COP, EER and SPFs integrated
- Built in pressure sensors in both brine circuit and heating circuit
- Market leading noise reduction
- Control with double microcontroller
- New control strategies
- Swimming pool control
- Control of 5 mixing groups and 6 climate zones
- External passive cooling control
- Control of DHW production in two independent tanks
- Possibility of cascading up to 14 units
- Optional online monitoring and inspection through internet connection
- Tested one by one in test bench

HIGH POWER

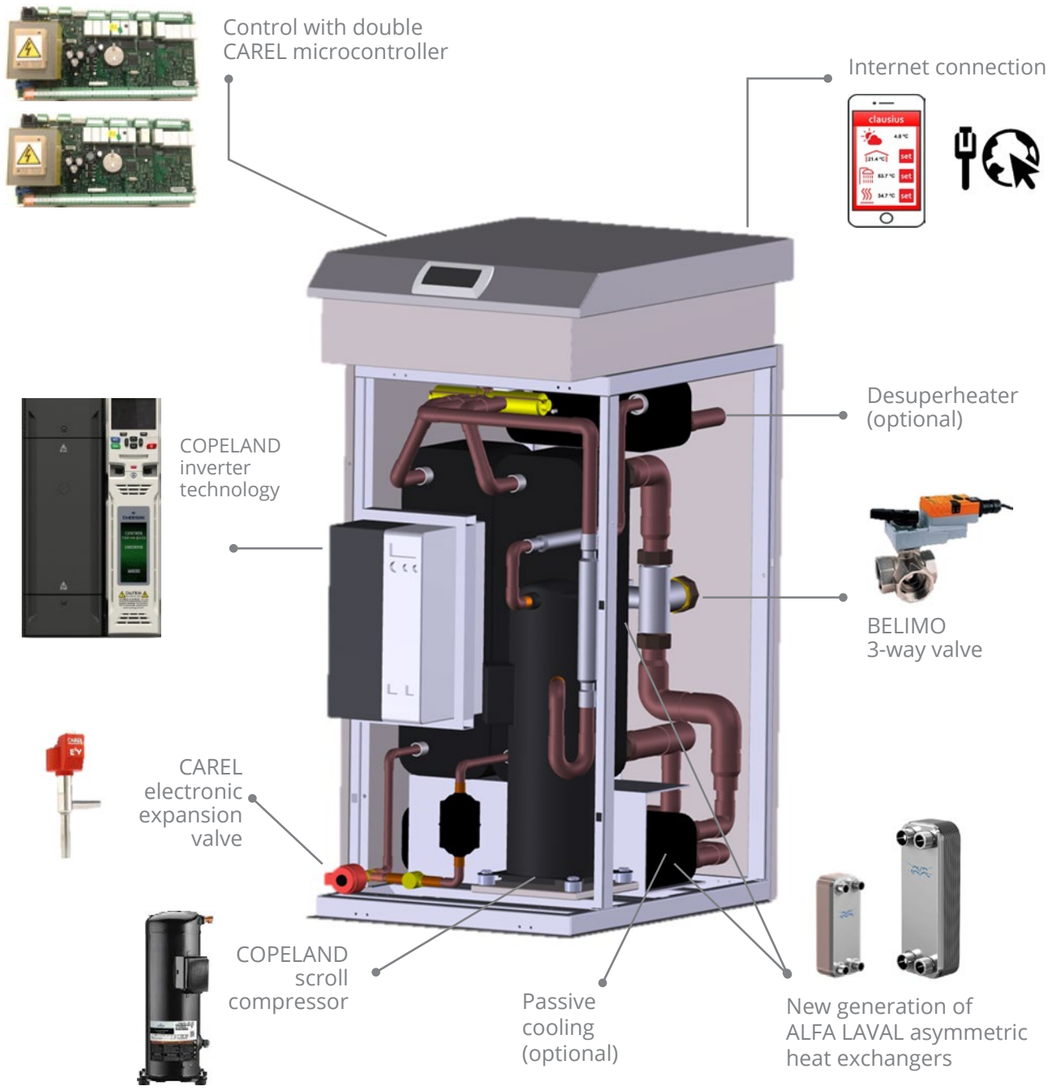
High power with the new Copeland inverter technology

MODELS IN TWO POWER RANGES, 7-50 KW AND 12-75 KW

H	Heating
HC	Heating & active cooling
H PC	Heating & passive cooling
HC PC	Heating, active & passive cooling
H DS	Heating & desuperheater
HC DS	Heating, active cooling & desuperheater
H PC DS	Heating, passive cooling & desuperheater
HC PC DS	Heating, active cooling, passive cooling & desuperheater

STRONG COMPONENTS

Last generation in high power Copeland inverter system.



WE MANUFACTURE WITH THE BEST COMPONENTS IN THE MARKET

High power range, STRONG

TECHNICAL SPECIFICATIONS 7-50

		H 7-50	H 7 - 50 PC	H 7 - 50 DS	H 7 - 50 PC DS	HC 7-50	HC 7 - 50 PC	HC 7 - 50 DS	HC 7 - 50 PC DS
Applications	Heating and DHW	•	•	•	•	•	•	•	•
	Passive cooling		•		•		•		•
	Active cooling					•	•	•	•
	High temperature DHW with desuperheater			•	•			•	•
External component's control	Circulation pumps control	•	•	•	•	•	•	•	•
	DHW control	•	•	•	•	•	•	•	•
	External passive cooling control	•		•		•		•	
	Pool control	•	•	•	•	•	•	•	•
	Mixing groups control	•	•	•	•	•	•	•	•
	Electric heaters control	•	•	•	•	•	•	•	•
Power	Heating (kW)	7-50	7-50	7-50	7-50	7-50	7-50	7-50	7-50
	Active cooling (kW)					9-52	9-52	9-52	9-52
	Passive cooling (kW)		20		20		20		20
Electrical supply	3 ph - 400 V								
Performance	COP[1]	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
	EER					6.7	6.7	6.7	6.7
Refrigerant	Type	R410A							
	Load (kg)	3.6	3.6	3.8	3.8	3.6	3.6	3.8	3.8
Dimensions	Height x Width x Depth (mm)	1140 x 600 x 800							
Connections	Brine and heating	2"							
	High temperature DHW			1 1/4"	1 1/4"			1 1/4"	1 1/4"
Weight	(kg)	175	197	183	205	177	199	185	207
Sound level	(dB)	52 dB							

[1] According to EN14511 under conditions 0/ -3 °C and 30/35 °C, certification pending.

A+++

Energy labelling, product sheets and technical documentation according to **Delegated Regulation (UE) Nº 811/2013.**

TECHNICAL SPECIFICATIONS 12-75

		H 12-75	H 12 - 75 PC	H 12 - 75 DS	H 12 - 75 PC DS	HC 12-75	HC 12-75 PC	HC 12-75 DS	HC 12-75 PC DS
Applications	Heating and DHW	•	•	•	•	•	•	•	•
	Passive cooling		•		•		•		•
	Active cooling					•	•	•	•
	High temperature DHW with desuperheater			•	•			•	•
External component's control	Circulation pumps control	•	•	•	•	•	•	•	•
	DHW control	•	•	•	•	•	•	•	•
	External passive cooling control	•		•		•		•	
	Pool control	•	•	•	•	•	•	•	•
	Mixing groups control	•	•	•	•	•	•	•	•
	Electric heaters control	•	•	•	•	•	•	•	•
Power	Heating (kW)	12-75	12-75	12-75	12-75	12-75	12-75	12-75	12-75
	Active cooling (kW)					14-78	14-78	14-78	14-78
	Passive cooling (kW)		20		20		20		20
Electrical supply		3 ph - 400 V							
Performance	COP[1]	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8
	EER					6.7	6.7	6.7	6.7
Refrigerant	Type	R410A							
	Load (kg)	3.8	3.8	4	4	3.8	3.8	4	4
Dimensions	Height x Width x Depth (mm)	1040 x 600 x 800							
Connections	Brine and heating	2"							
	High temperature DHW			1 1/4"	1 1/4"			1 1/4"	1 1/4"
Weight	(kg)	258	294	274	310	269	305	295	321
Sound level	(dB)	52							

[1] According to EN14511 under conditions 0/ -3 °C and 30/35 °C, certification pending.

A+++

Energy labelling, product sheets and technical documentation according to **Delegated Regulation (UE) Nº 811/2013.**

HIGH POWER RANGE, STRONG TANDEM

CLAUSIUS TECHNOLOGY

new

We are the first manufacturer to use tandem of two high power Copeland scroll compressors.

High Power Copeland inverter technology.

new

We are the first manufacturer to use a high power inverter with the widest power range in the market, from 7 to 100 kW and from 12 to 150 kW.

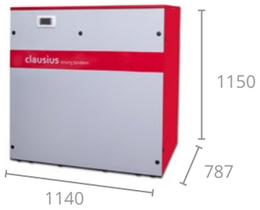
INVERTER
7-100 kW
12-150 kW

new

Optional integration of desuperheater for high temperature DHW production. DHW production with an independent circuit. New control system with flow regulation in the desuperheater for DHW production up to 70/75 ºC.

new

High power in a minimum space. Up to 150 kW in a 1140 mm x 787 mm x 1150 mm case (width x depth x height).

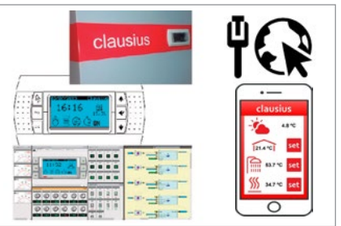


new

Accessibility. New lift opening system (patented) that allows an easy access to all components inside the unit.

New control strategies. More efficient, reliable and secure installations.

Online monitoring and inspection. Remote access, preventive maintenance and higher reliability



STRONG TANDEM CONFIGURATION

clausius

- Power ranges 7 to 100 kW and 12 to 150 kW
- COP 4,7, according to EN14511
- EER 6,5, according to EN14511
- Three phase electrical power supply
- Active cooling integrated
- Optional integration of desuperheater for high temperature DHW production
- R410A refrigerant
- Electronic expansion valve
- Energy meters, COP, EER and SPFs integrated
- Built in pressure sensors in both brine circuit and heating circuit
- Market leading noise reduction
- New control strategies
- Control with double microcontroller
- Control of 5 mixing groups and 6 climate zones
- Swimming pool control
- External passive cooling control
- Control of DHW production in two independent tanks
- Possibility of cascading up to 14 units
- Optional online monitoring and inspection through internet connection
- Tested one by one in test bench

HIGH POWER

Tandem with inverter compressors

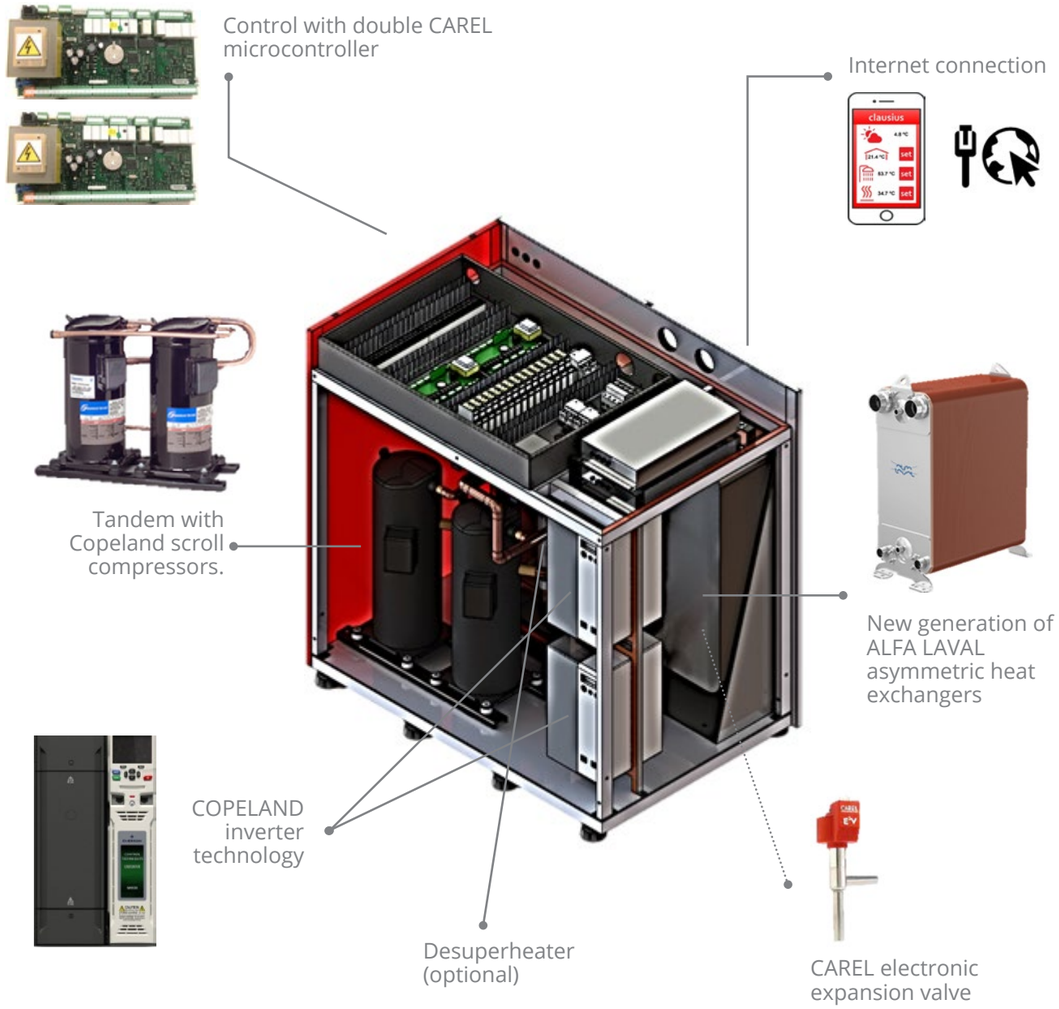
Tandem with Copeland inverter technology

MODELS IN TWO POWER RANGES, 7-100 KW AND 12-150 KW

H	Heating
HC	Heating & active cooling
H DS	Heating & desuperheater
HC DS	Heating, active cooling & desuperheater

STRONG TANDEM COMPONENTS

Tandem with two Copeland scroll compressors with inverter system.



WE MANUFACTURE WITH THE BEST COMPONENTS IN THE MARKET

TECHNICAL SPECIFICATIONS 7-100

		H 7-100	H 7 - 100 DS	HC 7-100	HC 7 - 100 DS
Applications	Heating & DHW	•	•	•	•
	Active cooling			•	•
	High temperature DHW with desuperheater		•		•
External component's control	Circulation pumps control	•	•	•	•
	DHW control	•	•	•	•
	External passive cooling control	•	•	•	•
	Pool control	•	•	•	•
	Mixing groups control	•	•	•	•
	Electric heaters control	•	•	•	•
Power	Heating (kW)	7-100	7-100	7-100	7-100
	Active cooling (kW)			9-112	9-112
	Desuperheater (kW) (optional)		60		60
Electrical supply		3 ph - 400 V			
Performance	COP[1]	4.7	4.7	4.7	4.7
	EER			6.5	6.5
Refrigerante	Type	R410A			
	Load (kg)	7	7.3	7	7.3
Dimensions	Height x Width x Depth (mm)	1140 x 787 x 1150			
Connections sizes	Brine and heating	3"			
	Desuperheater (optional)		1 1/4"		1 1/4"
Weight	(kg)	430	435	446	451
Sound level [2]	(dB)	65			

[1] Pending certification according to EN14511, under conditions 0/-3 °C y 30/35 °C.
[2] Pending certification according to EN12102.

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Energy labelling, product sheets and technical documentation according to **Delegated Regulation (UE) Nº 811/2013.**

TECHNICAL SPECIFICATIONS 12-150

		H 12-150	H 12-150 DS	HC 12-150	HC 12-150 DS
Applications	Heating & DHW	•	•	•	•
	Active cooling			•	•
	High temperature DHW with desuperheater	•	•	•	•
External component's control	Circulation pumps control	•	•	•	•
	DHW control	•	•	•	•
	External passive cooling control	•	•	•	•
	Pool control	•	•	•	•
	Mixing groups control	•	•	•	•
	Electric heaters control	•	•	•	•
Power	Heating (kW)	12-150	12-150	12-150	12-150
	Active cooling (kW)			14-156	14-156
	Desuperheater (kW) (optional)		60		60
Electrical supply		3 ph - 400 V			
Performance	COP[1]	4.7	4.7	4.7	4.7
	EER			6.5	6.5
Refrigerant	Type	R410A			
	Load (kg)	8.2	8.5	8.2	8.5
Dimensions	Height x Width x Depth (mm)	1140 x 787 x 1150			
Connections sizes	Brine and heating	3"			
	Desuperheater (optional)		1 1/4"		1 1/4"
Weight	(kg)	485	490	501	506
Sound level [2]	(dB)	68			

[1] Pending certification according to EN14511, under conditions 0/-3 °C y 30/35 °C.
[2] Pending certification according to EN12102.

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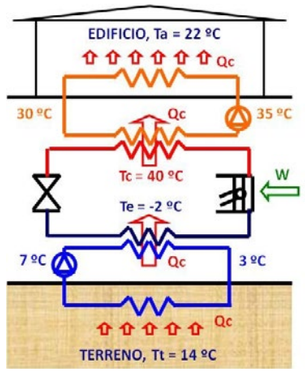
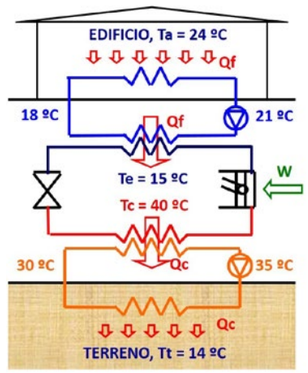
Energy labelling, product sheets and technical documentation according to **Delegated Regulation (UE) Nº 811/2013.**

HEATING AND COOLING INSTALLATIONS WITH GROUND SOURCE HEAT PUMPS

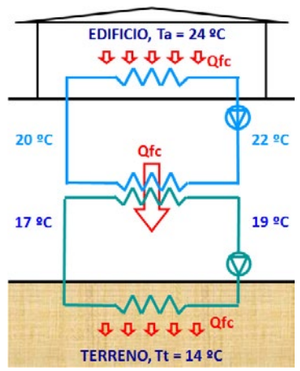
Geothermal energy is the thermal energy available in the ground that can be extracted as heat. If the temperature level of this energy is less than 30 °C, Ground Source Heat Pumps (GSHPs) can be used to extract ground heat for space heating and domestic hot water (DHW) production. Moreover, GSHPs can also be used for active and passive cooling. The geothermal energy is renewable, as recognized explicitly by the EU Directive 2009/28 / EC.



Heating

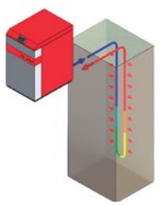


Active cooling

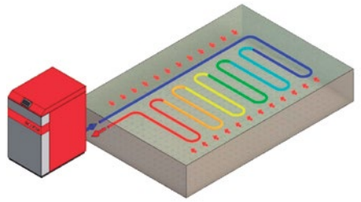


Pasive cooling

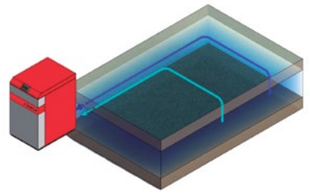
The use of geothermal energy through ground source heat pumps requires the use of collector systems to extract heat from the ground. Collector systems commonly used are vertical boreholes, horizontal ground collectors and groundwater systems.



Borehole

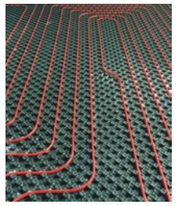


Horizontal ground collector



Groundwater collector

Heating and cooling installations with Ground Source Heat Pumps consist of the ground heat collector system, the heat pump itself and the heat distribution system inside the building. Distribution systems commonly used are underfloor heating and radiant surfaces, fancoil units or low temperature radiators.



Underfloor heating

Fan coil

Low temperature radiator

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