Heat pump systems
Water –Water Geothermal Heat Pumps



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Heat pumps, why?

Why choose geothermal heating for our home?
...for five excellent reasons

✔ energy saving
✔ user-friendly
✔ eco-friendly
✔ independence from fossil fuels
✔ system flexibility

Innovation, safety, user-friendly, eco-friendly:
4 key words

For over forty years, Fiorini has been operating in the plumbing and heating sector, giving a strong impetus to innovation, which in Italy makes it a pioneer in an advanced sector such as heat pumps. Building on this, Fiorini not only offers heat pumps, but also "systems". The goal is to provide a complete device in which each element is carefully selected and the components are perfectly integrated to provide a quick and flexible response ensuring the highest level of comfort and efficiency. The applications are varied: winter heating, summer cooling, efficient production of domestic hot water, from a single residence up to an industrial complex. Our strength is a comprehensive knowledge of renewable energy technologies, which makes it possible to design and build integrated systems aimed at exploiting and integrating various energy sources such as geothermal, aerothermal, solar thermal, photovoltaic sources, etc..

The heart of the system: the heat pump

The heart of the system is the heat pump, which is designed and manufactured in-house from scratch: the wide range of powers makes it possible to satisfy every need. Our highly technical expertise ensures excellent support at all stages, from project assessment and investment analysis with targeted amortization schemes to system design, commissioning and after-sales service. Despite being standardized, the system can be customized. Every customer is our partner. The technical information on the device is conserved in order to be able to add further components, at any time, based on changing needs.

The brain of the system: continuous monitoring and easy management

The brain of the system is the control and adjustment software, stemming from the experience of our in-house technicians. The control system makes it possible to manage and to monitor the correct operation of all hydraulic and mechanical components. The GEO HFE-HFS and ADV plus series heat pumps are operated by micro-processors equipped with our flagship software Galileus. That software has been conceived by Fiorini not only to supervise all operational modes of the device, but also to monitor the whole air conditioning and DHW production system. It is an integrated system capable of independently managing the terminals of a radiant system, ambient dehumidification and the integration of a solar thermal system. It also makes it possible to control free cooling during intermediate seasons. All Galileus functions can be managed through the LCD panel supplied with it, which indicates the set operation mode and any system malfunctioning. Adjustment and control can also be remotely managed through a special kit that enables you to conveniently check and change any operation parameter from your own computer or from the service centre.

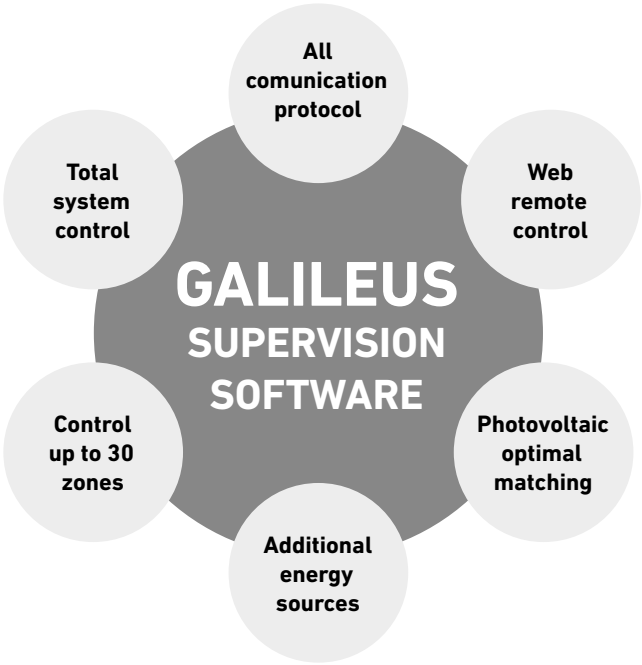


Galileus System

What is the Galileus system?

The Galileus software is installed in the GEO HF Heat pumps. The software is developed by the research office and is meant to completely and meticulously manage the mechanisms present in a modern conditioning system.

Therefore, the Galileus system coordinates all the energy sources (heat pump, solar thermal, integrated water heater, etc) and it manages all mechanisms of the installation (floor heating, high temperature installation, DHW production, mechanical ventilation system, etc).



Legend

1. GEO heat pump
2. Probe or well
3. Thermal storage tank
4. SET fresh water station
5. Fan
6. Environment Zone Kit (inside the heat pump)
7. Room thermostat
8. Remote keypad
9. Deviation valve kit
10. Mixing valve kit
11. Device pump
12. Solar panel (Additional source)
13. Solar kit (inside the heat pump)
14. Storage tank
15. Web module (inside the machine control unit)
16. Freecooling
17. Towel warmer
18. Outdoor air probe



Basic functions

1. **Facilitated start-up:** Galileus has a guided configuration, which invites you to respond to a number of questions. In this way, the world around the Galileus and the installation it manages is construed systematically.

2. **Integrated sources:** Galileus has a complete and rational management of the integrated sources, from solar thermal to stove, from water heater to electrical resistor. Its use is based on the operation costs and the most convenient energy source is always used in order to satisfy the demand of the installation.

3. **Sanitary production:** Galileus meticulously manages the production of domestic water since it is one of the biggest costs on the overall heat production. Thanks to the heat exchanger that is installed on the flow of the compressor (for GEO HFE/R), Galileus uses this device and recuperates surplus heat from the compressor while the heat pump works for the installation in either summer or winter mode. For large withdrawals of sanitary water Galileus has the priority on the production of domestic water by giving all power generated by the compressor.

4. **Freecooling:** Galileus intelligently manages the cooling by transporting heat from the environment directly to the thermal source (ex. Geothermal probe). This can be done in two ways: manually or automatically. In the automatic mode, Galileus checks whether the heat taken from the environment is sufficient for the user's requirements. If not, it activates the compressor of the heat pump..

5. **outside air temperature probe:** GThrough the outside air temperature probe, the Galileus manages the compensation of the setpoint of the heat pump or the setpoint of the mixing valves (installation). Moreover, it makes the automatic seasonal change between "Summer – Domestic – Winter" possible.

6. **Visualisation:** Galileus is easy to use. It gives a series of clear information about the central installation, the integrated sources and the zones it manages.

Ambient regulation

7. **Ambient zones:** Galileus can coordinate 30 different climate zones by controlling the temperature and the humidity (control of the dew point in summer mode) and by activating the dehumidifiers (also with integration in summer). Galileus also completely manages the bathrooms. It manages the radiant installation and the towel heaters either in integration or as an independent system in the transitional seasons (fall and spring). There is also a chronothermostat (daily or weekly) with 6 temperature levels.

8. **Mixing valves:** Galileus can manage up to 16 mixing valves, their flow probe and their set point (fixed, compensated or controlled from the dew point).

9. **Modulating zone valve:** Galileus can also manage up to 16 modulating zone valves which are regulated on the basis of the ambient temperature and have the capacity of change the flow to the radiant system when the set point is almost reached in order to maintain a constant comfort.

10. **Management fan coil:** Galileus can completely manage up to 15 fan coil; 3 more automatic velocity, fan coil valve, minimum temperature valve, either in winter or summer mode. The control can also be mixed: up to 30 radiant zones in winter and 15 fan coil in summer.

11. **Relaunch pump or zone valve:** Galileus can operate up to 30 relaunch pumps on the tank/installation side or 30 zone valves, depending on the demands of the various zones or the domestic precedence.

12. **Heat recuperation:** Galileus has an integrated function: heat recuperation from the sources (solar thermal or other systems) and is able to transfer and distribute heat to the installation and the domestic side in an intelligent way.

13. **Heat pumps in series:** Galileus manages up to 5 heat pumps in series with the Master-Slave function.

14. **BMS system:** Galileus is easily combined with supervision system with various types of protocols (modbus – Lon – Bacnet etc). Through the web ports, the system can go on the internet and send alarm mails. Moreover, it can be interrogated by whichever pc or smartphone without installing any software.

15. **Managing the recirculation:** Galileus can manage the recirculation of the domestic water, not only through time slots, but also through the temperature of the loop.

Special functions

16. **Optimization of the photovoltaic source:** Galileus is easily combined with photovoltaic installations. It monitors the production of electric energy and transforms it in thermal energy. The consumption of the other generators is always controlled by Galileus in order to be able to make a perfect balance of produced, consumed and transformed (in thermal) energy.

17. **Load control:** Next to the optimization of the photovoltaic source the Galileus can also manage the electrical loads. Because Galileus knows the production of the photovoltaic system, the limit of the contactor and the electric loads in the residence, the system can shut off when the requested power in the residence will reach the limit of the contactor.

18. **Touchscreen:** Galileus also has a touchscreen. You can easily reach every detail of the installation and manage it.

Self-diagnosis and safety

1. **Loss of refrigerant:** Upon the first start-up, Galileus knows whether the heat pump has lost refrigerant between the trip from the manufacturing plant and the installation.

2. **Sequence of phases:** When the compressor is started up, Galileus knows whether the rotation sense of the motor is correct.

3. **Compression alarm:** Galileus detects when the compressor is not able to compress the refrigerant gas because of 'a broken by-pass valve' or seizure.

4. **Alarm installation:** Galileus helps the user by explicitly stating the type of alarm. In this way, it is easier to make a diagnosis, without using installation codes.

5. **Alarm history:** A part of the physic memory of the Galileus is dedicated to the registration of date and hour of the alarms and its reset.

6. **Assistance:** Galileus helps those that have to carry out assistance thanks to the temperature and pressure sensors in the frigorific circuit. In this way, it gives a complete vision of that frigorific circuit. The technician does not have to connect the manometers to the frigorific circuit, which guarantees the integrity and the efficiency of that system.



Recuperating heat for DHW production

All GEO HFE/R Fiorini heat pumps have a circuit for DHW production. This circuit consists of a heat exchanger (refrigerant/water) with high efficiency circulator and at the refrigerant side it is directly connected to the outlet of the compressor.

In this position the refrigerant gas is at its max temperature (70-80°C) and makes it therefore possible to quickly produce domestic water at a temperature which is higher than the temperature in traditional heat pumps.
The power the heat exchanger can exchange is equal to the total power of the compressor. This means that during the DHW production phase all the power of the heat pump can be used.

Another specific feature of this heat pump is that, thanks to the Galileus software, it can recuperate 20% of the total power. This recuperation can take place at any time during the heating or cooling in order to produce domestic hot water by using the high temperature gas that comes out of the compressor. Briefly, the production of domestic hot water is guaranteed in every operation phase of the heat pump with a quota between 20% and 100% of its power.
Normally the major part of the functioning hours of heat pumps is dedicated to DHW production. Therefore, improving the efficiency of this function means sensibly improving the efficiency of the heat pump in se and the installation in which it is assembled.

Main features

1. -20% of the total power is recuperated and used for DHW production at high temperatures.

2. Simultaneously producing DHW and heating

3. Possibility to modulate the power meant for DHW production from 20% up to 100% of the available thermal power.

4. In summer mode, DHW is produced free of charge thanks to the condensation heat which is dispersed in the thermal source.

5. Possibility to simultaneously produce hot water for heating and cold water for cooling installations.



Geothermal systems

Earth heat

- Earth is a renewable heat source. The energy it contains comes from the sun and the natural heat of the earth crust. This energy is free of charge and available in large amounts; it must only be transferred from the soil to the homes. Geothermal and clean energy represents an essential source not only for the end user but also for the entire ecosystem.

How to exchange heat between the soil and the house

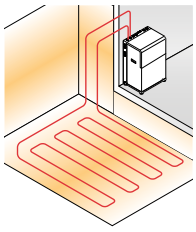
- Geothermal energy is available at a constant temperature (approximately 14°C at a depth of 20 to 100 m) throughout the year, but it is not enough to supply the entire heating system.
- GEO heat pumps transfer the heat from the soil and increase the temperature of the thermovector fluid by means of the compressor powered solely by electricity.
- This process is particularly efficient; in fact, 1 kW of electricity can produce up to 5 kW of thermal energy. Efficiency is ensured throughout the year, unlike with air-heat exchangers.
- By reversing the cycle during summer, GEO heat pumps can cool your home by releasing the heat captured inside to the outdoors, thereby settling the energy balance.

How does a geothermal system work?

- The soil on which the house is built can be a sufficient energy source to heat and cool your home.
- There are several solutions to exchange heat between an underground source and the thermovector fluid:
  - horizontal heat exchanger probes buried 2 metres deep;
  - vertical probes (buried 80 - 120 m deep);
  - Stratum, river or lake water.
- A thermovector fluid, usually water or a glycol-water mixture, flows inside the probes, transferring the heat to the GEO heat pump, thereby making it available for heating, cooling and sanitary production.

Probes

Horizontal heat exchanger probes

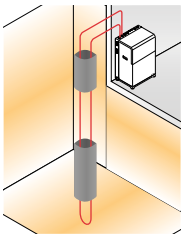


- This type of probes must be buried 1 - 1.5 m deep (always 20 cm below the freezing limit) in the soil, which must be left unsown.
- PE probes (DN 25 o DN 32) require an average lawn surface equal to 2.5 – 3 times the area to be heated.

Indications:

- moist and clay soils.
- Do not divert rainwater through drains to optimise soil regeneration.
- Do not pave over the surface of the manifold
- Avoid trees and bushes with deep roots.
- The circuit piping must be provided with a water vapour barrier to prevent condensation and ice dams from forming.

Closed circuit vertical probes (water-glycol)



- Vertical probes require a perforation of approximately 150 mm diameter where a PE pipe circuit is placed (geothermal probe) sealed with a bentonite mixture.
- PE probes (DN 32 for double-U pipes or DN 40 for U-pipes)
- According to the soil quality, for every thermal kW yielded by the heat pump an average between 15 and 20 m probe is required.

Indications:

- Drilling depth ranges between 80 and 120 m. For larger demands, several parallel probes must be used.
- In the event of multiple drilling, keep the probes at a distance of at least 8 - 10 m (grid) to prevent thermal interference.
- When drilling vertical probes, always provide an adequate distance from the building foundations in order to prevent soil subsidence and thermal strain. It is advisable to consult a geologist.

Performance	
Subsoil	**Performance [W/m2]**
Dry sandy soil	10–15
Moist sandy soil	15–20
Dry cohesive soil	20–25
Moist cohesive soil	25–30
Saturated sand/gravel	30–40

Performance	
Subsoil	**Performance [W/m2]**
Bad subsoil (dry soil)	20
Rock or moist soil	50
High conductivity rock	70
Dry gravel/sand	<20
Saturated gravel/sand	55-65
Moist clay, silt	30-40
Limestone rock	45-60
Sandstone	55-65
Granite	55-70
Gneiss	60-70

Geothermal systems

Stratum-water wells

Placement close to a water source or an underground stratum makes a direct heat exchange possible. The water which is collected is reintroduced by a second well after the heat exchange with the heat pump.

The geothermal system flow rate is 4 l/min/kW (heating).

Indications:

- The use of groundwater strata requires authorisation by the Province of competence.
- The minimum water temperature must not drop below 7°C, whereas the maximum water temperature must not exceed 20°C.
- The quality of the water must comply with the indications in the "chemical-physical properties" table at the end of the paragraph; otherwise, an external inspectable plate heat exchanger must be placed between the heat pump and the well water circuit.
- The level of the detected stratum must be measured by having it pour continuously for 24 – 48 hours, making sure that after this period the level of the stratum has not decreased (if so, a deeper or larger stratum must be found).
- It is important to ensure a distance of at least 10-15 m between the suction well and the drainage well to prevent underground hydraulic short-circuits (unless water is reintroduced in a stratum at a different level from the suction well).

Heating systems

Geothermal heat pumps are advanced energy systems that are integrated in systems with certain basic features e.g., good thermal insulation class, especially for cooling applications during summer. It is important to consider the operating temperatures: The economic convenience of using a geothermal heat pump is set to a 50°C flow temperature in domestic hot water production and at lower temperatures (35-40 °C) for the flow to the heating system.

This is why a typical system which is to be installed downstream a geothermal system (except for heated towel rails and radiators for bathrooms) can be:

- a low temperature floor radiant heating system
- a low temperature radiant wall heating system
- a low temperature ceiling radiant heating system
- a low temperature radiant plate heating system (e.g. as a replacement for old radiators)
- a medium temperature convection heating system (e.g. as a replacement for old radiators)
- a medium temperature fan coil heating system (e.g. as a replacement for old radiators)
- an oversized heated towel rail with auxiliary heating element or pouring of the primary boiler circuit.

Should there be several areas designed on the (floor or wall) radiant system i.e., in the event the heating system does not have enough water content/thermal inertia, the installation has to be adapted with a hydraulic breaker or a heat storage device to ensure adequate water circulation in the geothermal pump for regular operation.





Water-water geothermal heat pumps GEO HFE 6-42

Reversible geothermal heat pump with highly efficient domestic hot water production unit



Power from 6 to 33 kW

Functions

✔ Production of hot water for installation
✔ Production of chilled water for installation
✔ Production of high temperature domestic water
✔ Production in priority of DHW simultaneous with the production for the installation

Main features

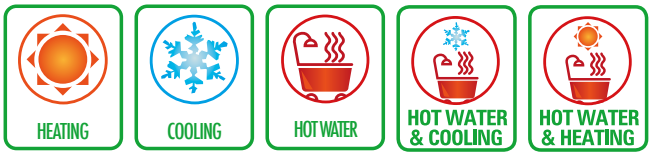
✔ high efficiency scroll-compressor
✔ inverter circulators on the three circuits (device, domestic, geothermal)
✔ total DHW recovery
✔ DHW production up to 65°C
✔ Galileus regulation for the whole system
✔ up to 5 heat pumps in series

Applications

✔ Exchange on probe (standard)
✔ Exchange on well (upon request)



Start-up: first start-up is mandatory. See page 361



		Probe			
		GEO HFE Without recovery		With recovery GEO HFE/R	
Gas	Model	Code	Price	Code	Price
R410a	6 M	444090045		444090001	
	6 T	444090047		444090003	
	8 M	444090049		444090005	
	8 T	444090051		444090007	
	12 M	444090053		444090009	
	12 T	444090055		444090011	
	16 T	444090059		444090015	
	20 T	444090061		444090017	
	24 T	444090063		444090019	
	33 T	444090065		444090021	
	42 T	444090120		444090124	

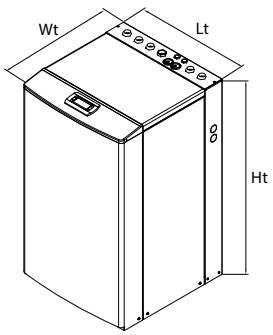
Models	
GEO	Heating-cooling for device with geothermal probe
GEO/R	Heating-cooling for device and DHW production with geothermal probe
GEO/P	Heating-cooling for device with well (upon request)
GEO/R/P	Heating-cooling for device and DHW production with well (upon request)

Technical data
GEO HFE 6-42

Sizes		6	8	12	16	20	24	33	42
Winter functioning B0/W35									
Energy label		A++	A++	A++	A++	A++	A++	A++	A++
Thermal power	kW	5,8	7,5	10,2	13,2	17,1	21,0	25,4	33,8
Compressor absorbed power	kW	1,30	1,7	2,2	2,9	3,7	4,4	5,5	7,8
COP		4,43	4,57	4,68	4,60	4,60	4,82	4,60	4,4
Device									
Device's water flow rate	m3/h	0,99	1,30	1,75	2,26	2,93	3,61	4,37	5,8
Head pressure	mca	6,5	6,2	5,8	5,0	6,7	6,0	11,1	81,5
Pump's absorbed power	kW	0,07	0,07	0,07	0,07	0,14	0,14	0,31	0,31
Geothermal									
Cooling power to exchange in probe	kW	4,5	6,0	8,1	10,5	13,5	16,0	20,2	26,0
Probe liquid flow rate	m3/h	1,30	1,71	2,32	3,00	3,87	4,58	5,79	8,1
Head pressure	mca	5,9	5,5	8,9	6,1	5,1	4,1	8,7	4,89
Pump's absorbed power	kW	0,07	0,07	0,14	0,14	0,14	0,14	0,31	0,31
DHW side B0/W50									
Thermal power	kW	5,3	7,0	9,4	11,9	15,7	18,6	23,7	31,5
Domestic water flow	m3/h	0,91	1,21	1,62	2,05	2,70	3,20	4,08	5,5
Head pressure	mca	6,6	6,2	5,7	5,5	4,1	5,2	5,3	9,18
Pump's absorbed power	kW	0,07	0,07	0,07	0,07	0,07	0,14	0,14	0,31
Winter functioning									
Thermal power	kW	7,5	9,9	13,3	16,7	22,2	26,1	33,5	42,3
Compressor absorbed power	kW	1,3	1,6	2,2	2,8	3,8	4,4	5,6	7,8
COP		5,85	6,10	6,14	6,04	5,88	5,99	6,02	5,5
Device									
Device's water flow rate	m3/h	1,27	1,67	2,24	2,82	3,75	4,40	5,64	7,4
Head pressure	mca	5,94	5,59	4,93	3,70	5,40	4,61	8,82	6,62
Well									
Cooling power to exchange in well	kW	6,2	8,2	11,1	13,9	18,4	21,6	27,8	34,5
Well liquid flow rate	m3/h	1,06	1,40	1,88	2,37	3,14	3,68	4,73	6,1
Exchanger pressure loss	mca	0,3	0,4	0,6	0,7	0,7	0,9	0,9	14,4
Summer functioning									
Cooling power	kW	9,5	12,5	16,6	20,9	27,5	32,7	41,6	47,6
Compressor's absorbed power	kW	1,3	1,5	2,1	2,8	3,8	4,3	5,7	8,6
EER		7,39	8,19	7,84	7,44	7,33	7,68	7,35	5,6
Device									
Device's water flow rate	m3/h	1,63	2,14	2,85	3,59	4,55	5,62	7,16	8,2
Device's head pressure	mca	5,8	5,0	3,7	3,0	3,3	3,3	6,6	4,58
Geothermal									
Thermal power to exchange in probe	kW	10,7	13,9	18,6	23,6	31,0	36,8	47,0	56,2
Probe liquid flow rate	m3/h	1,91	2,39	3,20	4,06	5,33	6,33	8,08	10,2
Head pressure	mca	5,1	4,5	5,4	3,1	3,4	4,2	4,1	2,55
Features									
Compressor type		Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll
Number of compressors		1	1	1	1	1	2	2	2
Refrigerant		R410a	R410a	R410a	R410a	R410a	R410a	R410a	R410a
Power supply	V/Ph/Hz	230/1/50	230/1/50 400/3/50	230/1/50 400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Diametric hydraulic fittings		1"	1"	1"	1"	1"	1"1/4	1"1/4	1"1/4
Expansion vessels (device and geothermal)	litres	2	2	4	4	8	8	8	8
Water circuit's max content	litres	29	29	57	57	114	114	114	114
Sound pressure at 1m	dB(A)	48	49	50	52	54	56	60	66
Weight (unpacked)	Kg	146	153	169	195	215	262	302	320
Weight (packed)	Kg	151	158	175	200	220	270	310	345

All indicated operating conditions comply with the regulation EN14511

Utility circuit				
B0/W35	radiant plant	°C	30/35	In-Out
W5/W35	radiant plant	°C	30/35	In-Out
B30/W18	radiant plant	°C	23/18	In-Out
	Domestic circuit			
B0/W50	DHW	°C	45/50	In-Out
External circuit				
B0/W35	glycol water geothermal probe 20%	°C	0/-3	In-Out
W5/W35	well water	°C	10/5	In-Out
B30/W18	glycol water geothermal probe 20%	°C	30/35	In-Out
B0/W50	glycol water geothermal probe 20%	°C	0/-3	In-Out



Dimensions	Sizes			
	6-8	12	16-20	24-42
Lt	620	620	620	800
Wt	575	650	650	880
Ht	1000	1080	1080	1070

Accessories
GEO HFE 6-42

Control/regulation accessories			
code	**description**	**price**	**function**
452010006*	Web Kit (pCOweb - remote control)		Makes it possible to control and supervise the installation via internet.
452010010*	Serial port kit RS485 Modbus		Makes it possible to communicate with the supervision systems through the Modbus protocol
452010074*	Serial port kit Konnex		Makes it possible to communicate with the supervision systems through the Konnex protocol
452010075*	Serial prot kit RS485 BACnet		Makes it possible to communicate with the supervision systems through the Bacnet protocol
452010050	My-zone kit with T/U thermostat		Thermostat for temperature and humidity. Max 30
452010051	My-board kit expansion kit for My-zone		Expansion kit to control the dehumidifier, the circulation pump, zone valve and mixing valve
452010053	Field-bus for zone RS485 kit		Necessary for connection of Galileus5 with Myzone and Myboard
452010061	My-power kit		It optimizes the self-consumption of the energy produced by the photovoltaic system and allows the activation of the heat pump according to the active electrical loads to prevent excessive consumption. It is possible to monitor a maximum phase current of 40 A.
452020123	Soundproofing Kit GEO HFE/EASY 6-8		The soundproofing kit must be installed on the compressor to attenuate the noise of the heat pump (the sound insulating panels are installed as standard). If purchased together with the heat pump, the soundproofing kit comes already installed.
452020124	Soundproofing Kit GEO HFE/EASY 12		
452020125	Soundproofing Kit GEO HFE/EASY 16		
452020126	Soundproofing Kit GEO HFE/EASY 20		
452020127	Soundproofing Kit GEO HFE 24		
452020128	Soundproofing Kit GEO HFE 33		
452020129	Soundproofing Kit GEO HFE 42		
452020136	Soft starter kit GEO HFE 24-33 T		Electronic device installed at the factory on a three-phase unit. Reduces the maximum value of the compressor starting current by using an inverter which powers the motor by varying the frequency so as to limit the inrush current
452020137	Soft starter kit GEO HFE 42 T		

* Kits 452010006, 452010010, 452010074, 452010075 are alternative options. Only one of these interfaces can be chosen.

Accessories for the device			
code	**description**	**price**	**function**
421120013	MFREE SMALL		Module for passive cooling – application size 6-8-12
421120014	MFREE MEDIUM		Module for passive cooling – application size 16-20-24
421120015	MFREE LARGE		Module for passive cooling – application size 33-42
452010003	Mixing kit		Makes it possible to regulate the supply temperature of the cooling device

Accessories for IANUS System with GEO (up to GEO 33)			
code	**description**	**price**	**function**
452010042	IANUS SOL KIT		Makes it possible to regulate thermal solar system for hybrid photovoltaic panels. Solar circulator not included
452010037	IANUS deviation kit		Optimized the use of thermal sources (PVT and probes) base on the environmental conditions. Obligated with mixed system (PVT + probe)

Water-water geothermal heat pumps GEO HFS 60-100

Reversible geothermal heat pump with highly efficient domestic hot water production unit. The circulation pumps on the three circuits not supplied as standard, but available as an accessory.



Power from 60 to 100 kW

Functions

✔ Production of hot water for installation
✔ Production of cold water for installation
✔ Production of high temperature domestic water
✔ Production in priority of DHW simultaneous with the production for the installation

Main features

✔ high efficiency scroll-compressor
✔ total DHW recovery
✔ DHW production up to 65°C
✔ Galileus regulation for the whole system
✔ up to 5 heat pumps in series

Applications

✔ Exchange on probe (standard)
✔ Exchange on well (upon request)

Start-up: first start-up is mandatory. See page 361

HEATING | COOLING | HOT WATER | HOT WATER & COOLING | HOT WATER & HEATING

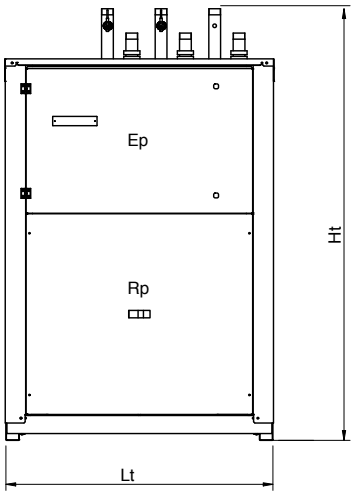


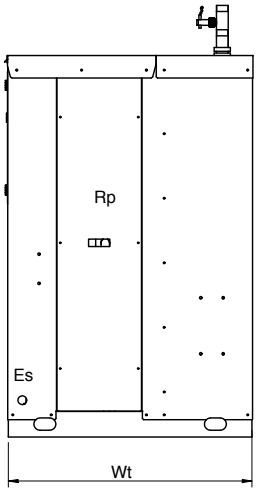
Models	
GEO/R	Heating, cooling for device and DHW production with geothermal probe
GEO/R/P	Heating, cooling for device and DHW production with well (upon request)
GEO	Heating, cooling for device with geothermal probe
GEO/P	Heating, cooling for device with well (upon request)

		without recovery GEO HFS		with recovery GEO HFS/R	
Gas	Model	Code	Price	Code	Price
R410a	60 T	444090121		444090125	
	80 T	444090122		444090126	
	100 T	444090123		444090127	

Technical data
GEO HFS 60-100

Sizes		60	80	100
Winter functioning B0/W35				
Energy label		A++	A++	A++
Thermal power	kW	48,8	64,6	85,4
Compressor absorbed power	kW	11,7	15,8	20
COP		4,2	4,1	4,3
Device				
Device's water flow rate	m3/h	8,2	10,8	14,4
Pump's absorbed power	kPa	18,0	29,3	17,5
Geothermal				
Cooling power to exchange in probe	kW	37,2	48,8	65,4
Probe liquid flow rate	m3/h	11,3	14,8	19,8
Exchanger load loss	kPa	41,9	56,3	40,6
DHW side B0/W50				
Thermal power	kW	44,9	58,5	78,6
Domestic water flow	m3/h	7,8	10,2	13,7
Exchanger load loss	kPa	15,2	20,2	14,8
Winter functioning W5/W35				
Thermal power	kW	60,1	79,3	105,0
Compressor absorbed power	kW	11,8	16,0	20,5
COP		5,2	5,0	5,2
Device				
Device's water flow rate	m3/h	10,5	13,8	18,3
Exchanger load loss	kPa	27,5	44,6	26,6
Well				
Cooling power to exchange in well	kW	48,3	63,3	84,6
Well liquid flow rate	m3/h	8,5	11,1	14,8
Exchanger pressure loss	kPa	20,1	32,2	19,2
Summer functioning B30/W18				
Cooling power	kW	65,3	86,9	117,7
Compressor's absorbed power	kW	13,0	16.8	22,0
EER		5,1	5,2	5,4
Device				
Device's water flow rate	m3/h	11,7	15,7	20,7
Device's exchanger load loss	mca	50,9	21,0	33,1
Geothermal				
Thermal power to exchange in probe	kW	78,2	103,6	139,7
Probe liquid flow rate	m3/h	14,6	19,5	25,7
Exchanger load loss	kPa	55,8	77,3	54,8
Features				
Compressor type		scroll	scroll	scroll
Number of compressors		2	2	2
Refrigerant		R410a	R410a	R410a
Power supply	V/Ph/Hz	400/3/50	400/3/50	400/3/50
Diametric hydraulic fittings		1"1/2	1"1/2	1"1/2
Sound pressure at 1m	dB(A)	71	73	74
Weight (unpacked)	Kg	425	465	505
Weight (packed)	Kg	450	490	530





	Model 60-80-100
Ht	1770
Lt	1100
Wt	1000

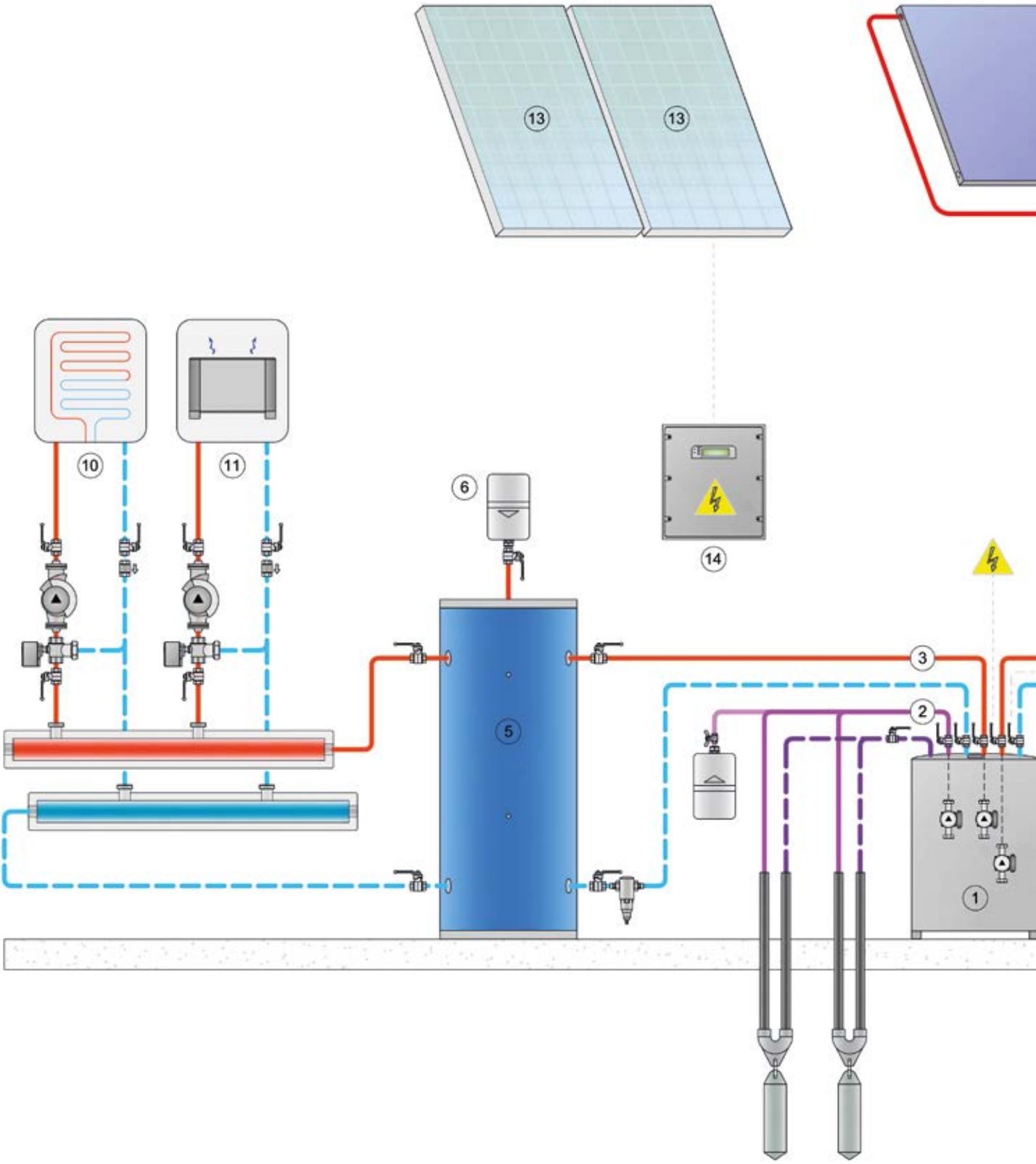
All indicated operating conditions comply with the regulation EN14511

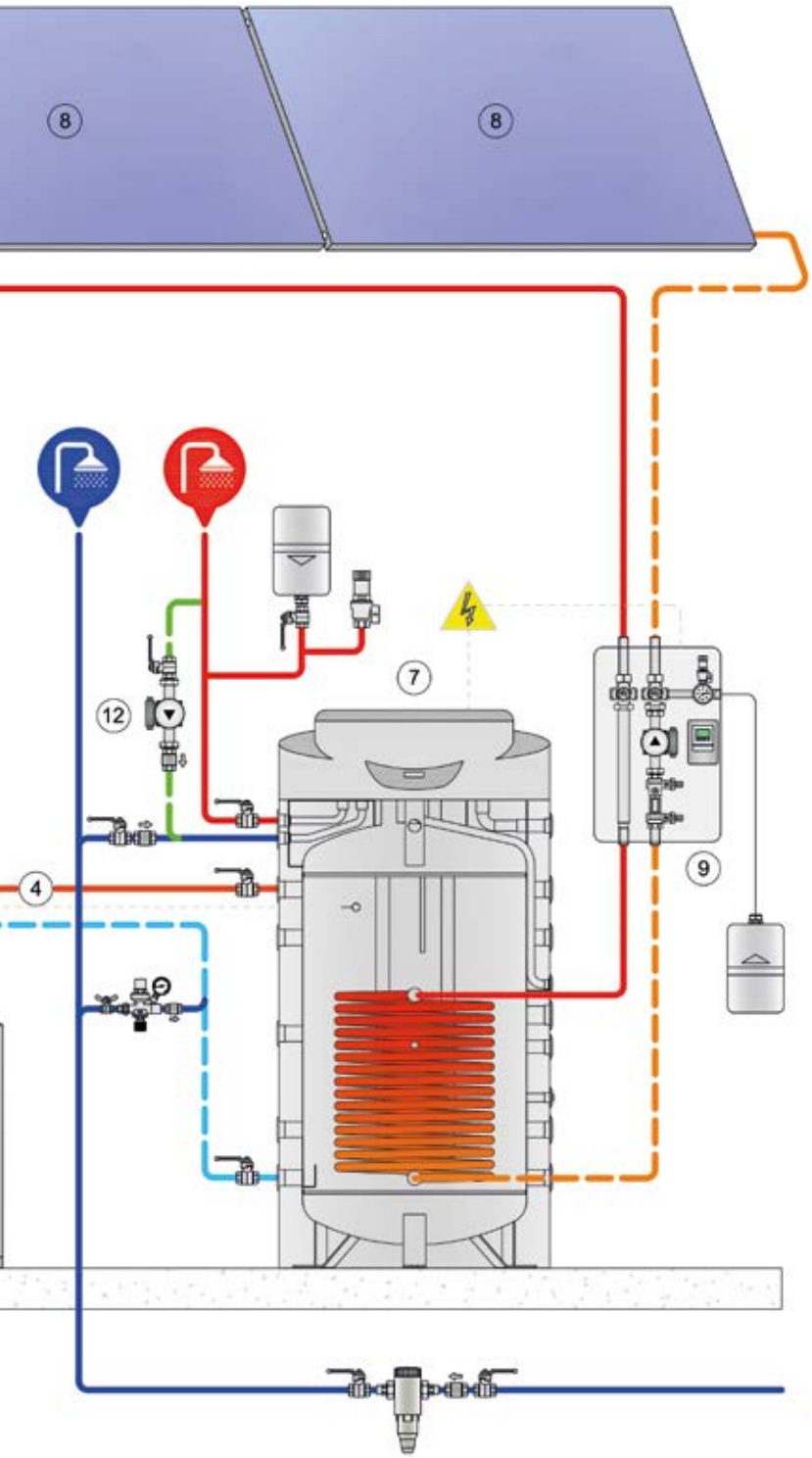
Utility circuit				
B0/W35	radiant plant	°C	30/35	In-Out
W5/W35	radiant plant	°C	30/35	In-Out
B30/W18	radiant plant	°C	23/18	In-Out
	Domestic circuit			
B0/W50	DHW	°C	45/50	In-Out
External circuit				
B0/W35	glycol water geothermal probe 20%	°C	0/-3	In-Out
W5/W35	well water	°C	10/5	In-Out
B30/W18	glycol water geothermal probe 20%	°C	30/35	In-Out
B0/W50	glycol water geothermal probe 20%	°C	0/-3	In-Out

Accessories
GEO HFS 60-100

code	description	price	function
452010006	Web Kit (remote control)		Makes it possible to control and supervise the installation via internet
452010010	Serial port kit RS485 Modbus		Makes it possible to communicate with the supervision systems through the Modbus protocol
452010074	Serial port kit Konnex		Makes it possible to communicate with the supervision systems through the Konnex protocol
452010075	Serial prot kit RS485 BACnet		Makes it possible to communicate with the supervision systems through the Bacnet protocol
452010050	My-zone kit with T/U thermostat		Thermostat for temperature and humidity. Max 30
452010051	My-board kit expansion kit for My-zone		Expansion kit to control the dehumidifier, the circulation pump, zone valve and mixing valve
452010053	Field-bus for zone RS485 kit		Necessary for connection of Galileus5 with Myzone and Myboard
452010061	My-power kit		It optimizes the self-consumption of the energy produced by the photovoltaic system and allows the activation of the heat pump according to the active electrical loads to prevent excessive consumption. It is possible to monitor a maximum phase current of 40 A.
452020122	Anti-vibration kit GEO HFS 60-80-100		Anti-vibration feet and hardware for fixing to the unit to be installed on site during the heat pump positioning. It allows to damp the vibrations transmitted by the heat pump to the structure on which it rests. For the smaller units, the anti-vibration feet are included in the supply of the unit.
452020130	Soundproofing Kit GEO HFS 60-80		The soundproofing kit must be installed on the compressor to attenuate the noise of the heat pump (the sound insulating panels are installed as standard). If purchased together with the heat pump, the soundproofing kit comes already installed.
452020131	Soundproofing Kit GEO HFS 100		
452020138	Soft starter kit GEO HFS 60 T		Electronic device installed at the factory on a three-phase unit. Reduces the maximum value of the compressor starting current by using an inverter which powers the motor by varying the frequency so as to limit the inrush current
452020139	Soft starter kit GEO HFS 80 T		
452020140	Soft starter kit GEO HFS 100 T		
452010003	Mixing kit		Makes it possible to regulate the supply temperature of the cooling device
452020142	Pumps kit GEO HFS 60		Module that includes the pumps of the geothermal, the plant and the sanitary. The electric power circuit of the pumps must be prepared by the customer. Through a command provided by special outputs set up in the electrical panel of the unit, the pumps for the circulation of hydraulic fluids between the machine and the geothermal probes, the system storage and the sanitary puffer are controlled.
452020143	Pumps kit GEO HFS 80		
452020144	Pumps kit GEO HFS 100		
452020145	Pumps kit GEO/R HFS 60		
452020146	Pumps kit GEO/R HFS 80		
452020147	Pumps kit GEO/R HFS 100		

Installation chart
GEO HFE - HFS





1	GEO heat pump
2	Geothermal or well circuit with inverter pump
3	System circuit with inverter pump
4	DHW circuit with inverter pump
5	Accumulator tank, VKG-HC model
6	Safety kit
7	Semi-instantaneous DHW preparer AQUAMATIC
8	Thermal solar collector
9	Solar pump kit
10	Heating system 1
11	Heating system 2
12	DHW recirculation sytem
13	PV system
14	PV inverter

Water-water geothermal heat pumps
GEO EASY-E HT/HTR

High temperature geothermal heat pump

Power from 6 to 33kW



Functions

✔ Production of very hot water for the installation
✔ Production of cold water for the installation (HTR version)
✔ Production of DHW (with accessory)

Main features

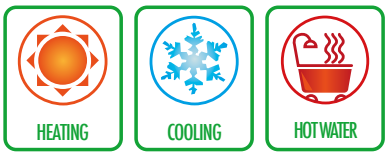
✔ High efficiency scroll-compressor
✔ On-off circulators on the three circuits as accessory to install on the outside of the device
✔ DHW production up to 65°C with kit to assembly on the outside of the device

Applications

✔ Exchange on probe (standard)
✔ Exchange on well (upon request)

Start-up: first start-up is mandatory. See page 361





Models	
GEO EASY-E HT	Heating and DHW production (accessory)
GEO EASY-E HTR	Heating-cooling and DHW production (accessory)

Compatibility

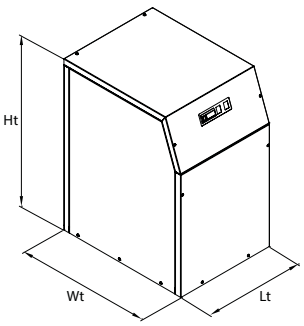
	Domestic diverter control kit	Easy diverter kit	MFREE	Control kit MFREE	Plant circulator kit	Geotherm circulator kit	Pressure switch kit	Solenoid kit	External air probe kit	Guard resistance kit	Exchangers resistance kit	Phase cut kit (1)	Compressor insulation kit
EASY-E HT geothermal probe	✔	✔	✔	✔	✔	✔	-	-	✔	✔	✔	-	✔
EASY-E HT well water	✔	✔	✔	✔	✔	-	-	✔	✔	✔	✔	-	✔
EASY-E HTR geothermal probe	✔	✔	✔	✔	✔	✔	-	-	✔	✔	✔	✔	✔
EASY-E HTR well water	✔	✔	✔	✔	✔	-	✔	✔	✔	✔	✔	-	✔

Technical data
GEO EASY-E HT/HTR

Sizes		6	8	12	16	20	24	33
Energy label		A++	A++	A++	A++	A++	A++	A++
Winter functioning BO/W35								
Thermal power	kW	5,8	7,5	10,2	13,2	17,1	21,1	28,3
Compressor's absorbed power	kW	1,3	1,7	2,2	2,9	3,7	4,6	6,1
COP		4,43	4,34	4,68	4,60	4,60	4,64	4,62
Device								
Device's water flow rate	m^3/h	0,99	1,30	1,75	2,26	2,93	3,63	4,87
Exchanger pressure loss	mca	0,3	0,3	0,5	0,7	0,7	0,8	1,0
Geothermal								
Cooling power to exchange in probe	kW	4,5	6,0	8,1	10,5	13,5	16,8	22,5
Probe liquid flow rate	m^3/h	1,30	1,71	2,32	3,00	3,87	4,82	6,45
Exchanger pressure loss	mca	0,7	0,7	1,1	1,4	1,4	1,4	1,7
Domestic W5/W35								
Thermal power	kW	7,5	9,9	13,3	16,7	22,2	27,5	37,2
Compressor's absorbed power	kW	1,3	1,6	2,2	2,8	3,8	4,7	6,3
COP		5,85	6,10	6,14	6,04	5,88	5,86	5,95
Device								
Domestic water flow	m^3/h	1,27	1,67	2,24	2,82	3,75	4,64	6,28
Exchanger pressure loss	mca	0,46	0,51	0,78	1,00	1,10	1,19	1,62
Well								
Cooling power to exchange in well	kW	6,2	8,2	11,1	13,9	18,4	22,7	30,9
Well liquid flow rate	m^3/h	1,06	1,40	1,88	2,37	3,14	3,87	5,26
Exchanger's pressure loss	mca	0,3	0,4	0,6	0,7	0,7	0,9	0,9
Summer functioning B30/W18								
Cooling power	kW	9,5	12,5	16,6	20,9	27,5	34,3	43,8
Compressor's absorbed power	kW	1,3	1,5	2,1	2,8	3,8	4,9	6,7
COP		7,39	8,19	7,84	7,44	7,33	6,97	6,55
Device								
Device's water flow rate	m^3/h	1,63	2,14	2,85	3,59	4,55	5,90	7,53
Device's head pressure	mca	0,7	0,8	1,2	1,5	3,3	1,6	1,9
Geothermal								
Thermal power to exchange in probe	kW	10,7	13,9	18,6	23,6	31,0	39,0	50,5
Probe's liquid flow rate	m^3/h	3,07	2,39	3,20	4,06	5,33	6,71	8,69
Exchanger pressure loss	mca	0,9	1,0	1,5	2,0	3,4	2,4	3,0
Features								
Refrigerant		R410a	R410a	R410a	R410a	R410a	R410a	R410a
Compressor type		Scroll	Scroll	Scroll	Scroll	Scroll	Scroll	Scroll
Number of compressors		1	1	1	1	1	1	1
Power supply	V/Ph/Hz	230/1/50 400/3/50	230/1/50 400/3/50	230/1/50 400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Hydraulic coupling		1"	1"	1"	1"	1"	1"1/4	1"1/4
Sound pressure at 1m	dB(A)	48	49	50	52	54	59	61
Weight (unpacked)	kg	112	117	127	139	172	197	215
Weight (packed)	kg	130	135	145	157	192	217	235

All indicated working conditions comply with the regulation EN14511

Utility circuit				
B0/W35	radiant plant	°C	30/35	In-Out
W5/W35	radiant plant	°C	30/35	In-Out
B30/W18	radiant plant	°C	23/18	In-Out
External circuit				
B0/W35	glycol water geothermal probe 20%	°C	0/-3	In-Out
W5/W35	glycol water geothermal probe 20%	°C	10/5	In-Out
B30/W18	glycol water geothermal probe 20%	°C	30/35	In-Out



Dim.	Sizes	
	6-16	20-33
Lt	500	670
Wt	660	855
Ht	885	965

Code
GEO EASY-E HT/HTR



HEATING

GEOTHERM WELL

HEATING COOLING

GEOTHERM WELL

EASY geothermal systems					
		Only hot GEO EASY-E HT		Hot/cold GEO EASY-E HTR*	
gas	model	code	price	code	price
R410a	6 M	444100001		444100012	
	6 T	444100003		444100014	
	8 M	444100004		444100015	
	8 T	444100006		444100017	
	12 M	444100009		444100018	
	12 T	444100008		444100020	
	16 T	444100010		444100021	
	20 T	444100011		444100022	
	24 T	444100023		444100025	
	33T	444100024		444100026	

*R indicated that the heat pump is reversible

Accessories
GEO EASY-E HT/HTR

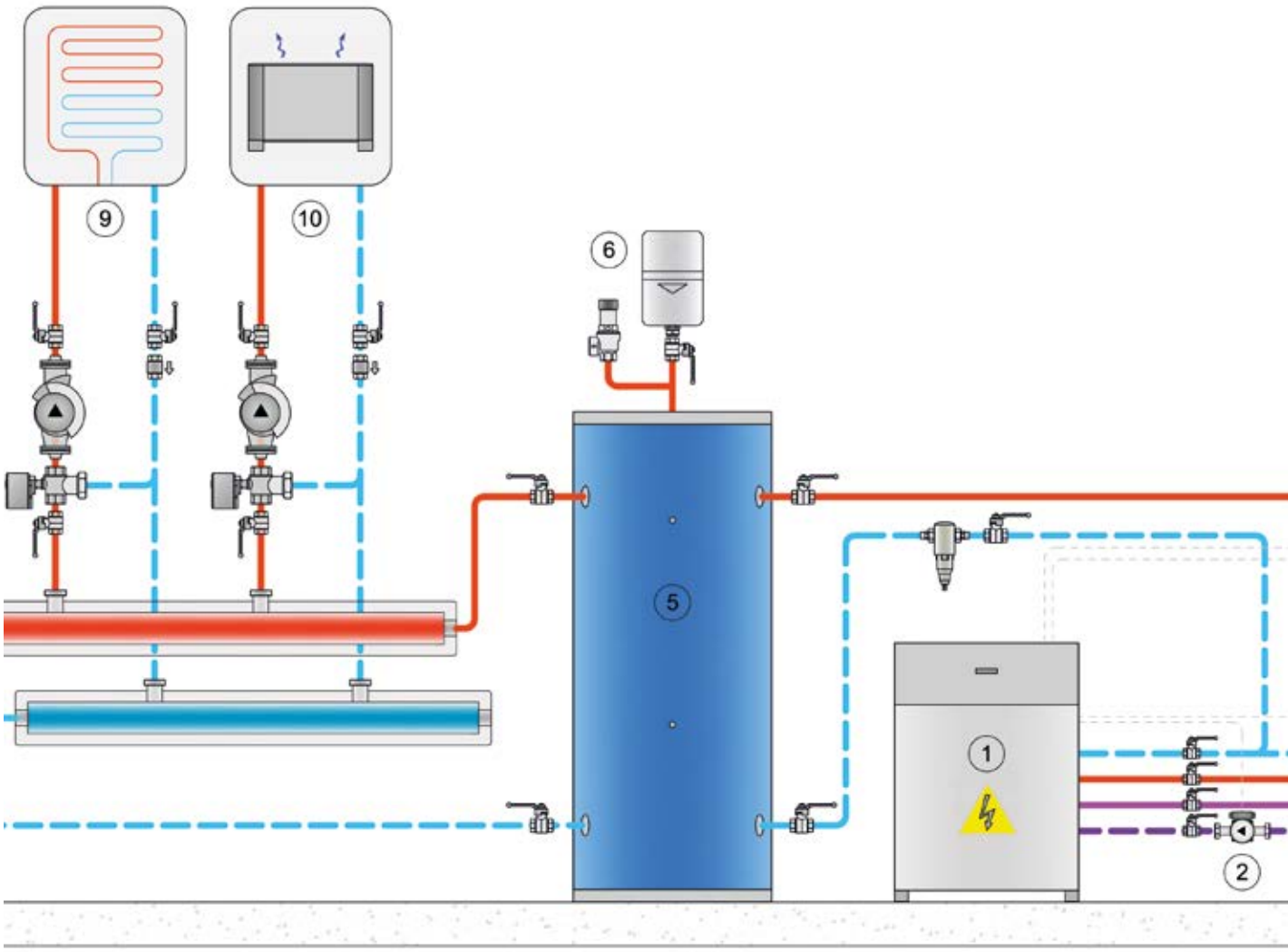
Device accessories			
code	**description**	**price**	**function**
452020028	KIT DEVIATRICE SANITARIO EASY-E		Valvola deviatrice per la produzione di ACS.
452020123	Soundproofing Kit GEO HFE/EASY 6-8		The soundproofing kit must be installed on the compressor to attenuate the noise of the heat pump (the sound insulating panels are installed as standard). If purchased together with the heat pump, the soundproofing kit comes already installed.
452020124	Soundproofing Kit GEO HFE/EASY 12		
452020125	Soundproofing Kit GEO HFE/EASY 16		
452020126	Soundproofing Kit GEO HFE/EASY 20		
452020132	Soundproofing Kit GEO EASY 24		
452020133	Soundproofing Kit GEO EASY 33		
452020134	Soft starter kit GEO HFE/EASY 6-8-12 M		Electromechanical device installed at the factory instead of the compressor contactor on single-phase units. It reduces the maximum value of the compressor starting current by varying the supply voltage of the motor through the management of a specific starting capacitor.
452020135	Soft starter kit GEO HFE/EASY 6-8-12-16-20 T		Electronic device installed at the factory on a three-phase unit. Reduces the maximum value of the compressor starting current by using an inverter which powers the motor by varying the frequency so as to limit the inrush current
452020141	Soft starter kit GEO EASY 24-33 T		

Accessories for control and regulation			
code	**description**	**price**	**function**
452010008	External air probe kit		Makes it possible to check the outside air temperature for the EASY series with box, external assembly

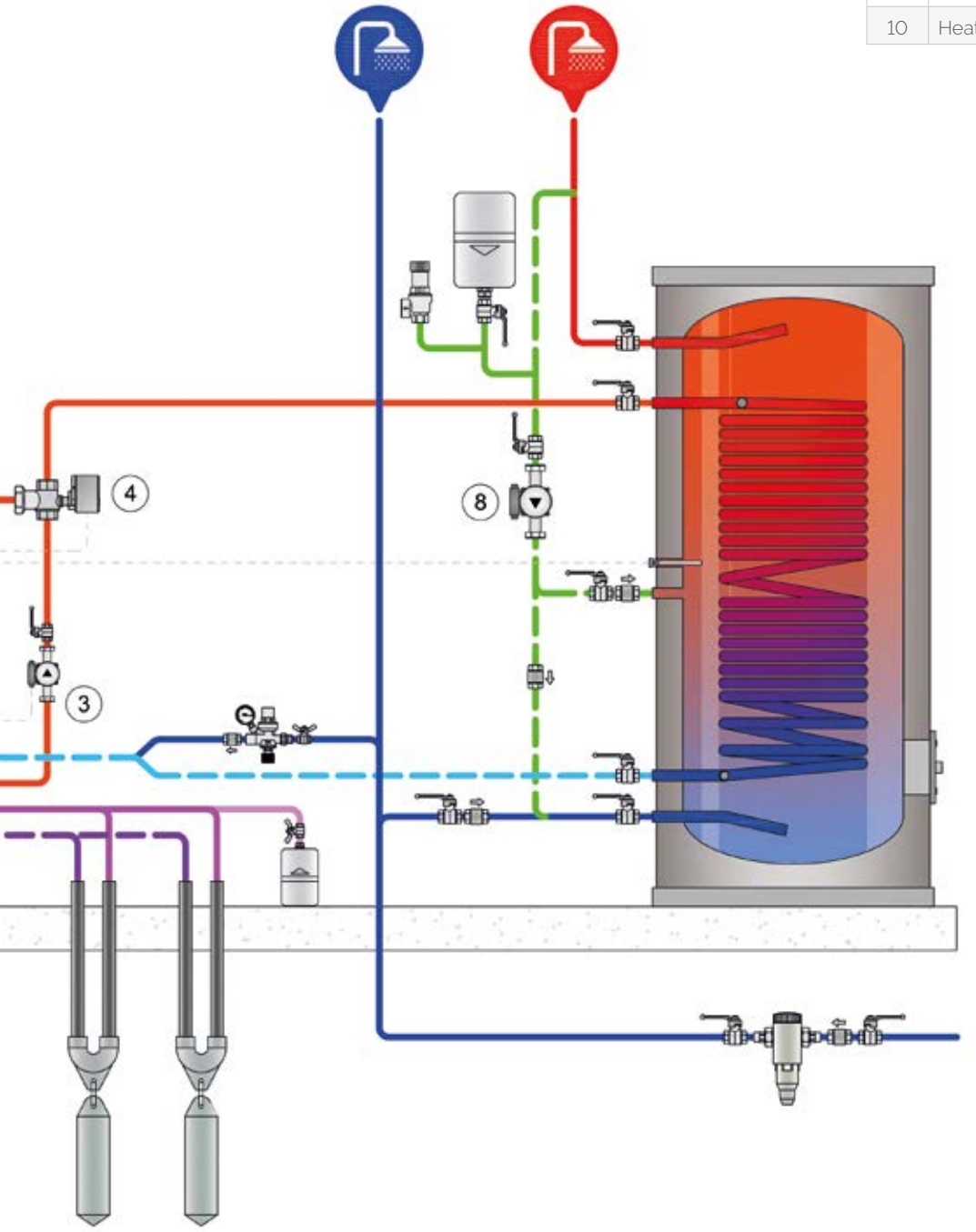
Accessori Macchina			
codice	**descrizione**	**prezzo**	**funzione**
452020097	Circ with inverter kit EASY-E 6-8-12-16 for device		Circulator with inverter for the installation (external assembly) sizes 6 to 16 kW
452020098	Circ with inverter kit EASY-E 20 for device		Circulator with inverter for the installation (external assembly) size 20 kW
452020099	Circ with inverter kit EASY-E 24 for device		Circulator with inverter for the installation (external assembly) size 24 kW
452020100	Circ with inverter kit EASY-E 33 for device		Circulator with inverter for the installation (external assembly) size 33 kW
452020101	Circ with inverter kit EASY-E 6-8 for geothermal		Circulator with inverter for the installation (external assembly) sizes 6 to 8 kW
452020102	Circ with inverter kit EASY-E 12-16 for geothermal		Circulator with inverter for the installation (external assembly) sizes 12 to 16 kW
452020103	Circ with inverter kit EASY-E 20 for device		Circulator with inverter for the installation (external assembly) size 20 kW
452020104	Circ with inverter kit EASY-E 24 for device		Circulator with inverter for the installation (external assembly) size 24 kW
452020105	Circ with inverter kit EASY-E 33 for device		Circulator with inverter for the installation (external assembly) size 33 kW

Layout
GEO EASY-E HT / HTR

Installation diagram with SMART HP water heater for DHW production.
It is also possible to make the plant with AQUAMATIC storage unit..



1	GEO EASY-E HT/HTR heat pump
2	Geothermal pump kit
3	System pump kit
4	3 way diverting valve for DHW sytem
5	Accumulator tank, VKG-HC model
6	Safety kit
7	SMART HP indirect water heater
8	DHW recirculation sytem
9	Heating system 1
10	Heating system 2





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