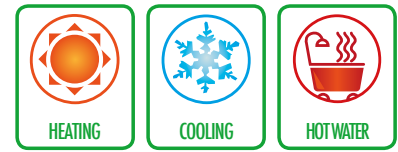


Hybrid systems

IANUS system

Ianus: The latest green technology generation

IANUS is an autonomous system combining a geothermal heat pump with hybrid photovoltaic thermal panels. It provides residential heating, cooling and domestic hot water production by using the generated electrical power. The IANUS system transforms free and renewable air and solar energy into the thermal and electric power needed by the housing unit. IANUS makes the most out of available renewable energy with no need for any fossil fuels, and without contributing to greenhouse gas emissions.



Benefits of the IANUS system

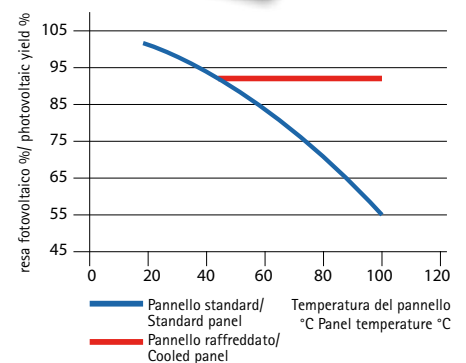
- Thermal and electrical energy form the same solar panel
- Improved use of panel absorbing surface area
- Increase photovoltaic performance through cell cooling
- Reduced material and installation costs
- Autonomous electrical power generation
- Use of state incentives feed -in tariff + tax relief
- Use of reduced rate meter for the heat pump, resulting in improved energy consumption balance

What does "hybrid system" mean?

Hybrid photovoltaic collectors transform part of the absorbed solar radiation into electric power and transfer the thermal energy generated by radiation and by the electric power to the heat pump.

Two important benefits are therefore obtained:

- the conditions for the efficient operation of the heat pump are created (high COP), as the pump receives the necessary electric and thermal energy from photovoltaic collectors;
- photovoltaic cell operating temperature is reduced, thus increasing kWh production by up to 30%.



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IANUS system

The system components' operation is coordinated and improved by the Galileus software, which creates the right conditions for high comfort and user-friendly technology. In case of frost or ice formation on the front side of the photovoltaic panel that would cause an interruption in electricity production, the system automatically removes the ice by shortly reversing the refrigeration cycle and heating the glass surface.


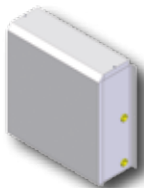
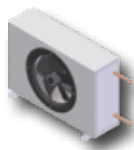

The system ensures the same level of comfort with high performance even in case of snow, ice or frost. It improves power production efficiency by heating the panel surface in the most cost-effective way and making it run in the shortest time possible.

Main components of the IANUS system are:

- Heat pump for heating, cooling and DHW productions
- Hybrid photovoltaic panels
- Device's storage tank
- FREE HEATING kit which contains a plate heat exchanger, a 3-way deviation valve and a circulation pump; it heats DHW under sufficient solar radiation conditions without activating the heat pump compressor.



Typical combinations for housing units from 6 to 10 kW

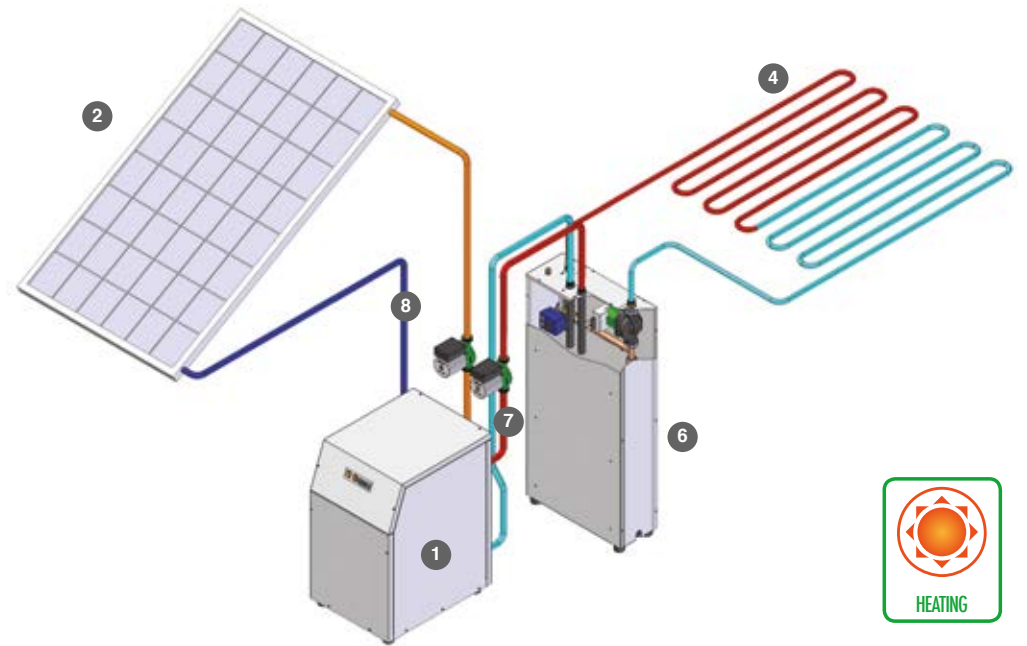
GEO HFE	Thermal photovoltaic panel		Kit Freeheating	Kit Drycooler	Diverter kit
					
Size	n°	kWp	n°	Size	n°
6	19	4.5	1	Dry 6-8	1
8	26	6	1	Dry 6-8	1
10	34	8	1	Dry 10-12	1

IANUS hybrid system solutions

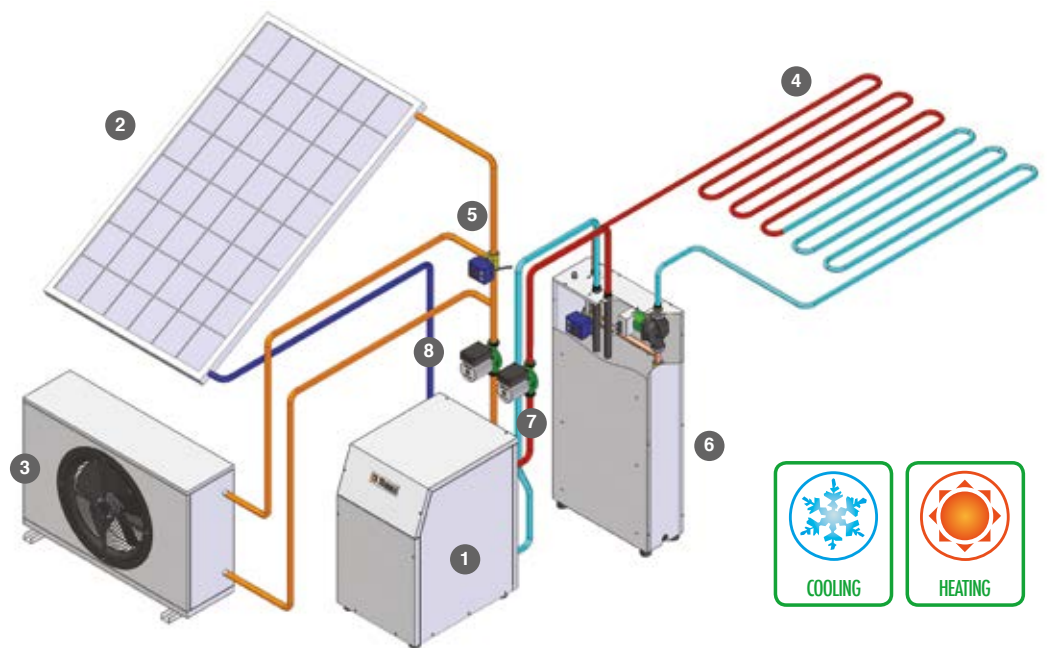
- 1 GEO EASY-E HT heat pump
- 2 thermal photovoltaic panel
- 3 dry cooler
- 4 floor heating
- 5 IANUS deviation valve kit
- 6 compact storage tank for the installation
- 7 device's circulation kit
- 8 geothermal circulation kit

Device's solutions with Ianus system are proposed below according to the energy demand of the housing unit.

Heating with EASY-E HT

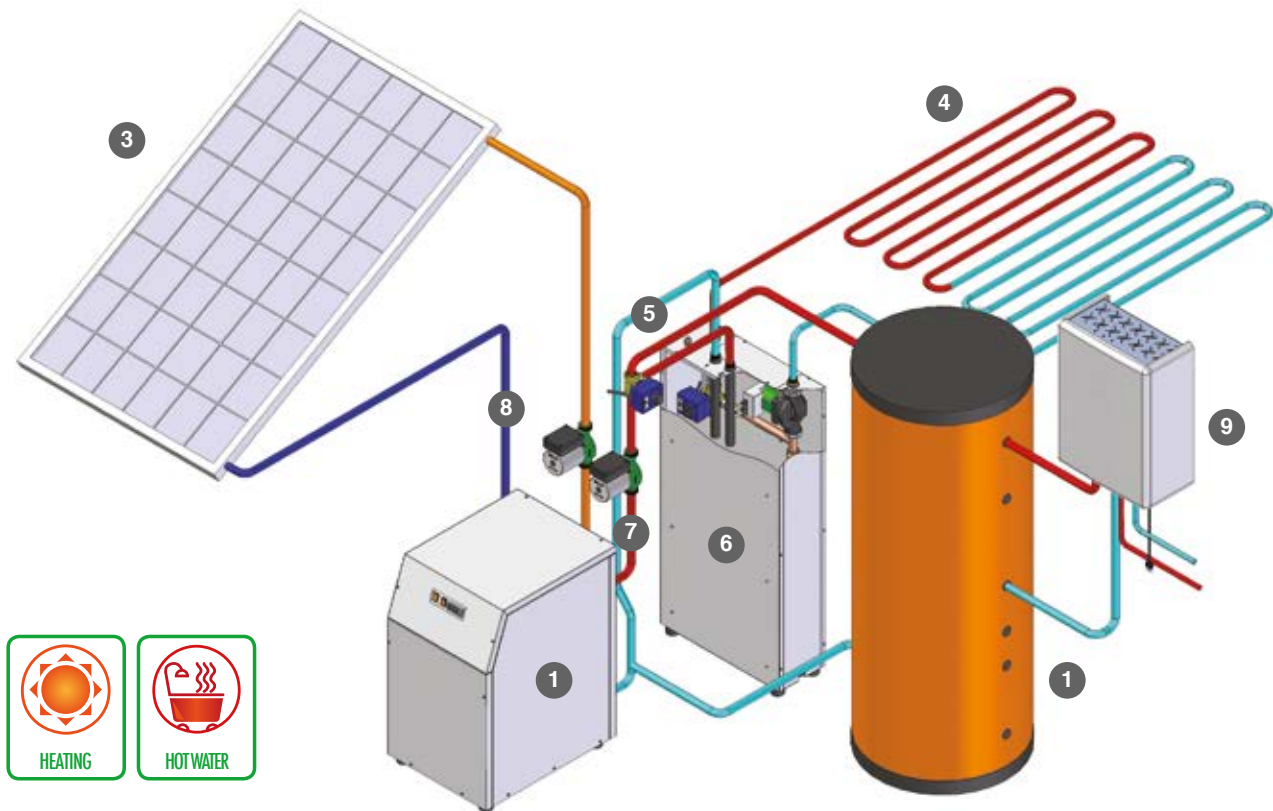


Heating and cooling with EASY-E HTR



IANUS hybrid system solutions

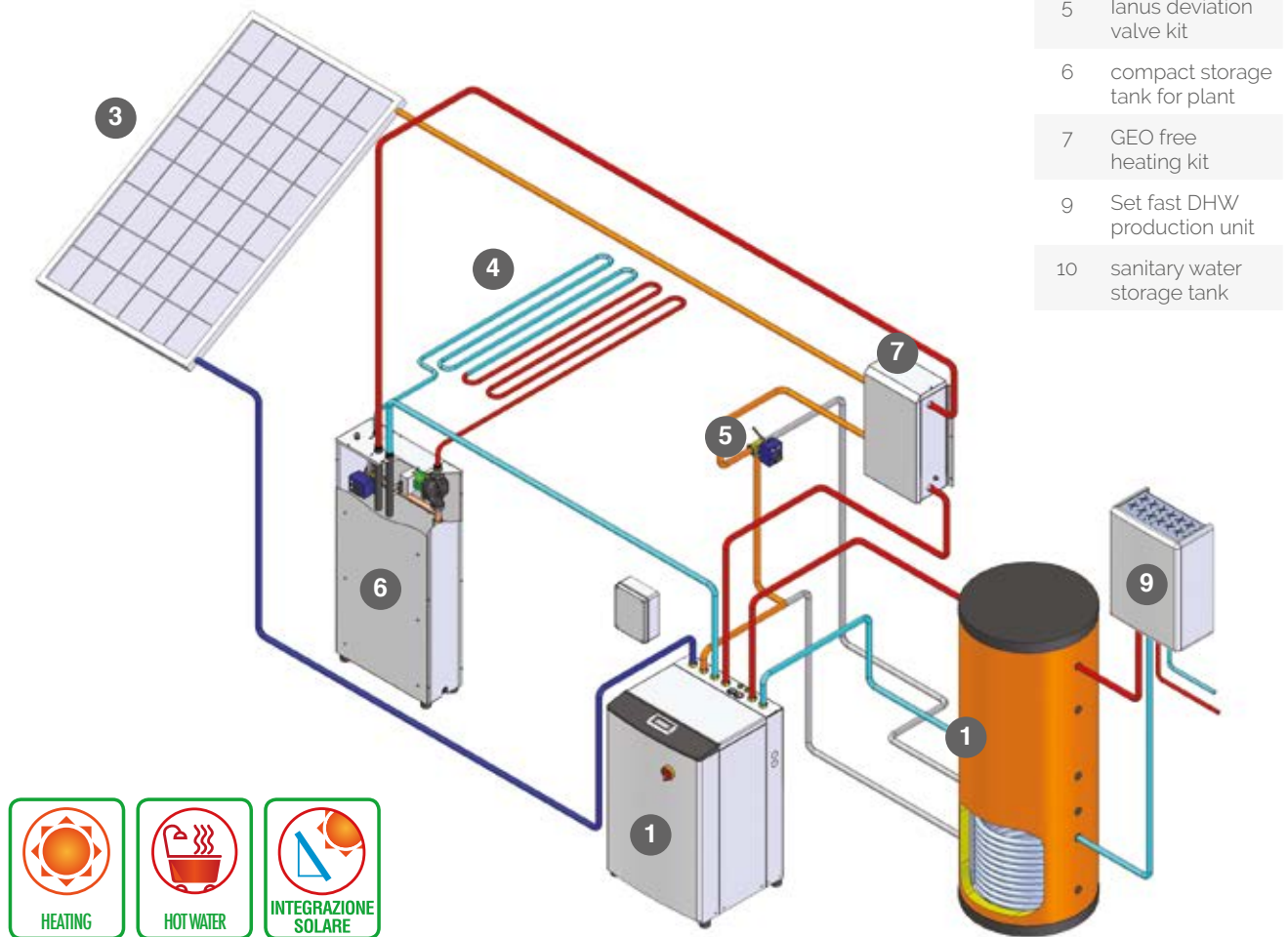
Heating and DHW production with EASY-E HT + DHW kit



- 1 GEO EASY-E HT heat pump
- 3 thermal photovoltaic panel
- 4 floor heating
- 5 IANUS deviation valve kit
- 6 Compact inertial storage tank
- 7 device circulator kit
- 8 geothermal probe circulator kit
- 9 SET fast DHW production unit
- 10 sanitary water storage tank

IANUS hybrid system solutions

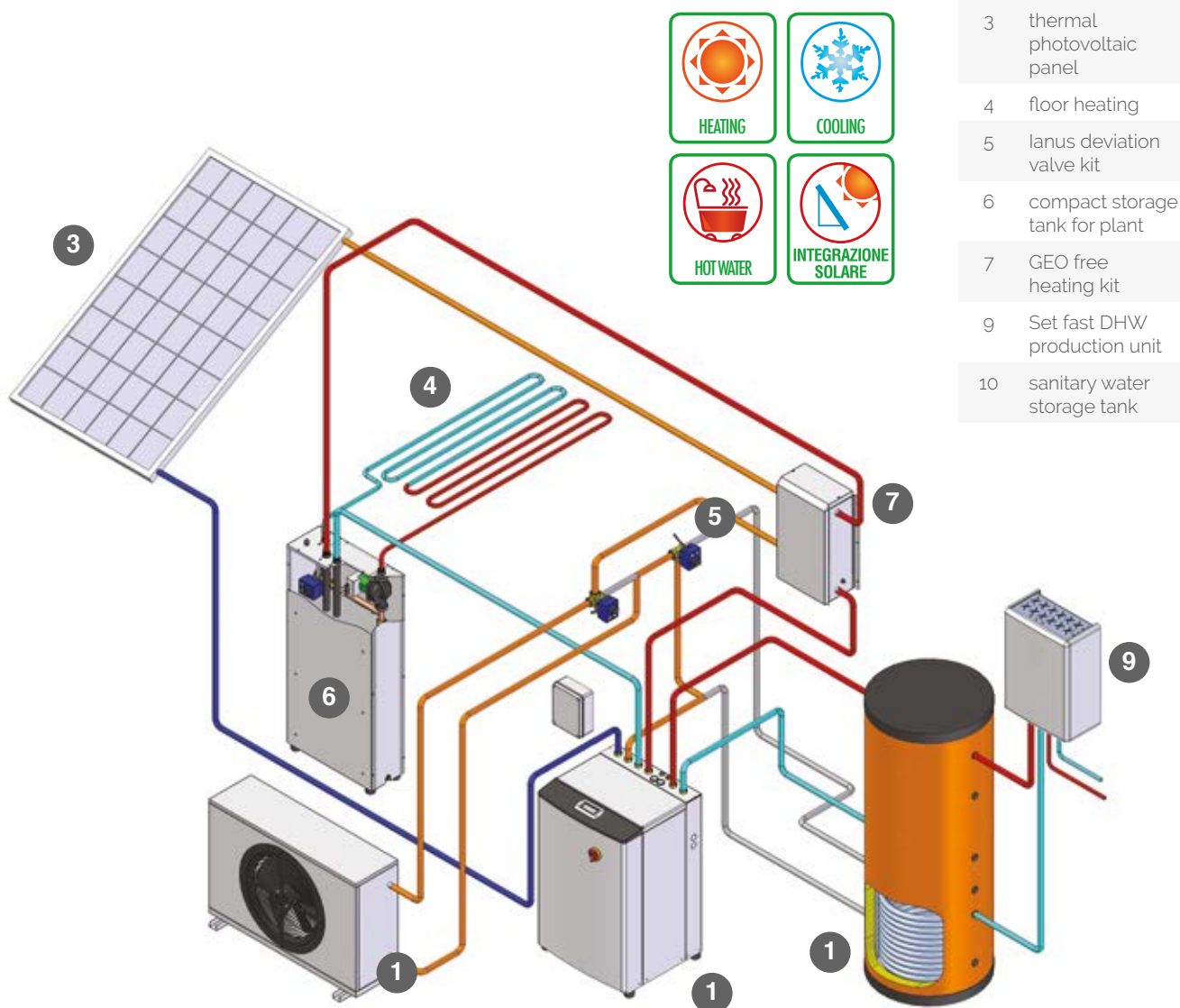
Heating + DHW + solar thermal
With GEO HFE + HFREE kit free heating



- | | |
|----|--------------------------------|
| 1 | GEO HFE heat pump |
| 3 | thermal photovoltaic panel |
| 4 | floor heating |
| 5 | lanus deviation valve kit |
| 6 | compact storage tank for plant |
| 7 | GEO free heating kit |
| 9 | Set fast DHW production unit |
| 10 | sanitary water storage tank |

IANUS hybrid system solutions

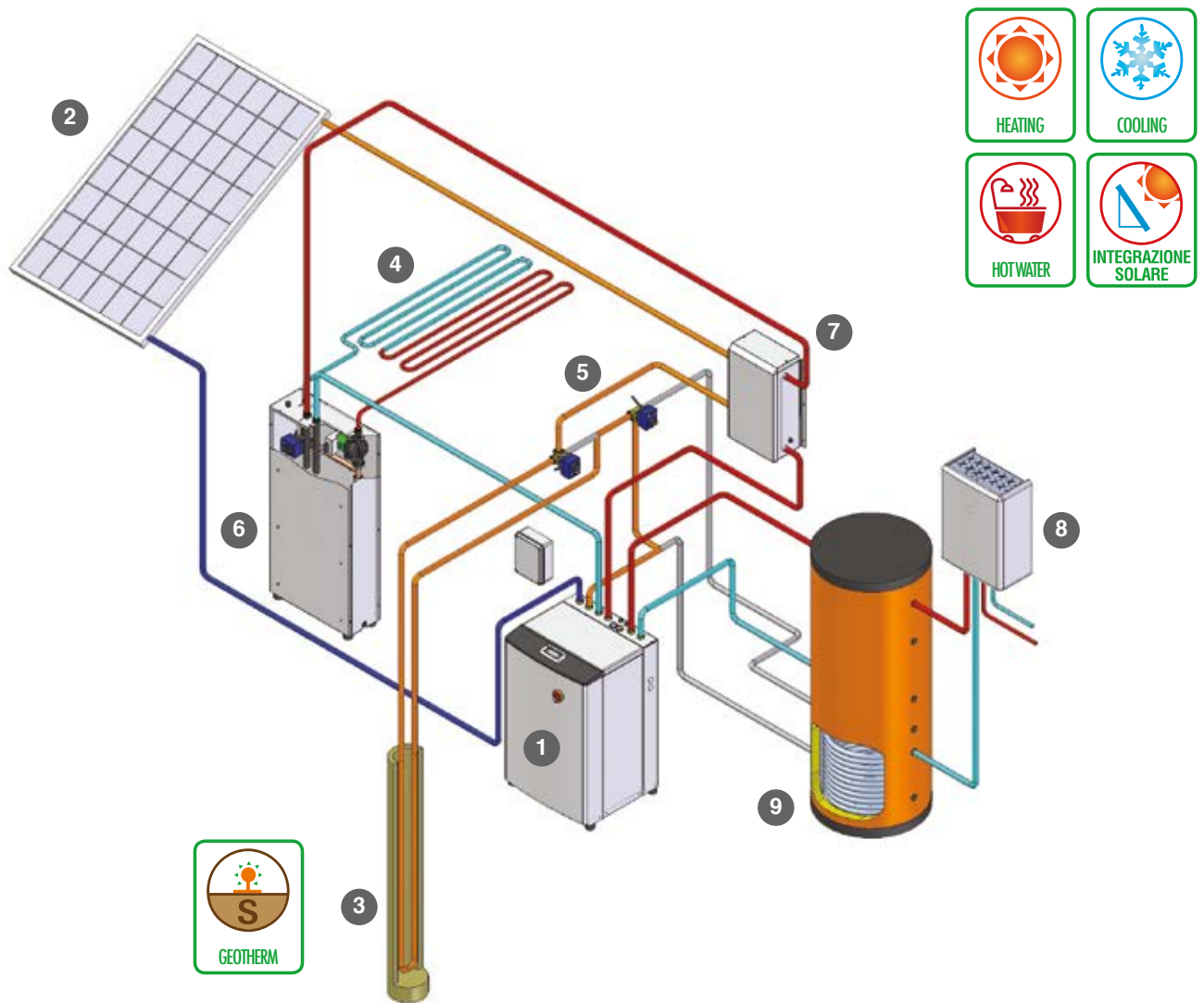
heating + cooling + DHW + solar thermal with GEO HFE



- 1 GEO HFE heat pump
- 3 thermal photovoltaic panel
- 4 floor heating
- 5 lanus deviation valve kit
- 6 compact storage tank for plant
- 7 GEO free heating kit
- 9 Set fast DHW production unit
- 10 sanitary water storage tank

IANUS hybrid system solutions

COMBINED SYSTEM WITH PHOTOVOLTAIC PANEL AND GEOTHERMAL PROBE
HEATING + COOLING + DHW + SOLAR THERMAL con GEO HF / with GEO HFE



- 1 GEO HFE heat pump
- 2 thermal photovoltaic panel
- 3 geothermal probe
- 4 floor heating
- 5 IANUS deviation valve kit
- 6 compact inertial tank for the installation
- 7 GEO free heating kit
- 8 SET fast DHW production unit
- 9 sanitary water storage tank

By combining the heat pump with a double source (geothermal probe + PV/T panel), the heat pump receives the power needed to ensure the proper operation for winter heating and summer cooling. It also makes it possible to improve energy source management, by reducing the area of the photovoltaic field and the depth and number of probes. During cooling, the heat dissipated by the heat pump and the panel – which, in the meantime, is cooled down – is exchanged in the geothermal probe to obtain a useful soil regeneration effect, working as thermal storage for the following heating phase.